Send documentation comments to mdsfeedback-doc@cisco.com

Cisco MDS 9000 Family Data Mobility Manager Configuration Guide

Cisco MDS NX-OS Release 4.1(1) Software
July 2008

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Text Part Number: OL-17360-01

Cisco MDS 9000 Family Data Mobility Manager Configuration Guide

CONTENTS

Send documentation comments to mdsfeedback-doc@cisco.com

Send documentation comments to mdsfeedback-doc@cisco.com

New and Changed Information

This document provides release-specific information for each new and changed feature in Cisco Data Mobility Manager.

Table 1 summarizes the new and changed features as described in the Cisco MDS 9000 Family Data Mobility Manager Configuration Guide, and tells you where they are documented. The table includes a brief description of each new feature and the release in which the change occurred.

Table 1 New and Changed Features for Cisco Data Mobility Manager in Release 4.x

Feature	GUI Change	Description	Changed in Release	Where Documented
MSM 18/4	New tab in the DMM configuration wizard.	Allows you to choose the MSM.	4.1(1)	Chapter 4, “Using the DMM GUI for Data Migration”.

Send documentation comments to mdsfeedback-doc@cisco.com

Preface

Revised: July 25, 2008, OL-17360-01, Cisco MDS NX-OS Release 4.x

This preface describes the audience, organization, and conventions of the *Cisco MDS 9000 Family Data Mobility Manager Configuration Guide*. The preface also provides information on how to obtain related documentation.

Audience

This guide is for experienced network administrators who are responsible for planning, installing, configuring, and maintaining the Cisco MDS 9000 Family Data Mobility Manager (DMM) Configuration Guide application.

Organization

This document is organized as follows:

Chapter	Title	Description
Chapter 1	Product Overview	Presents an overview of the Cisco MDS DMM application.
Chapter 2	Getting Started	Describes the installation, provisioning, and configuration tasks.
Chapter 3	Preparing for Data Migration	Describes the tasks to complete prior to starting a data migration job.
Chapter 4	Using the DMM GUI for Data Migration	Describes how to configure, monitor, and verify data migration jobs using the Cisco MDS DMM GUI.
Chapter 5	Troubleshooting Cisco MDS DMM	Describes procedures for troubleshooting DMM issues.
Chapter 6	Understanding DMM Topologies	Describes the network topologies supported by Cisco MDS DMM.
Chapter 7	Using the DMM CLI for Data Migration	Describes how to use DMM CLI commands to configure and monitor data migration jobs.
Appendix A	DMM CLI Command Reference	Syntax and usage guidelines for the Cisco MDS DMM CLI commands.

Document Conventions

Command descriptions use these conventions:

boldface font	Commands and keywords are in boldface.
italic font	Arguments for which you supply values are in italics.
[ ]	Elements in square brackets are optional.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.

Screen examples use these conventions:

`screen font`	Terminal sessions and information the switch displays are in screen font.
`boldface screen font`	Information you must enter is in boldface screen font.
italic screen font	Arguments for which you supply values are in italic screen font.
`< >`	Nonprinting characters, such as passwords, are in angle brackets.
`[ ]`	Default responses to system prompts are in square brackets.
`!, #`	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

This document uses the following conventions:

Note Means reader *take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Related Documentation

The documentation set for the Cisco MDS 9000 Family includes the following documents. To find a document online, use the Cisco MDS NX-OS Documentation Locator at:

http://www.cisco.com/en/US/docs/storage/san_switches/mds9000/roadmaps/doclocater.htm

Release Notes

- *Cisco MDS 9000 Family Release Notes for Cisco MDS NX-OS Releases*
- *Cisco MDS 9000 Family Release Notes for Storage Services Interface Images*
- *Cisco MDS 9000 Family Release Notes for Cisco MDS 9000 EPLD Images*

Send documentation comments to mdsfeedback-doc@cisco.com

Compatibility Information

- *Cisco MDS 9000 NX-OS Hardware and Software Compatibility Information*
- *Cisco MDS 9000 Family Interoperability Support Matrix*
- *Cisco MDS Storage Services Module Interoperability Support Matrix*
- *Cisco MDS NX-OS Release Compatibility Matrix for Storage Service Interface Images*

Regulatory Compliance and Safety Information

- *Regulatory Compliance and Safety Information for the Cisco MDS 9000 Family*

Hardware Installation

- *Cisco MDS 9124 Multilayer Fabric Switch Quick Start Guide*
- *Cisco MDS 9500 Series Hardware Installation Guide*
- *Cisco MDS 9200 Series Hardware Installation Guide*
- *Cisco MDS 9100 Series Hardware Installation Guide*

Cisco Fabric Manager

- *Cisco MDS 9000 Family Fabric Manager Quick Configuration Guide*
- *Cisco MDS 9000 Family Fabric Manager Configuration Guide*
- *Cisco MDS 9000 Family Fabric Manager Database Schema*

Command-Line Interface

- *Cisco MDS 9000 Family Software Upgrade and Downgrade Guide*
- *Cisco MDS 9000 Family Storage Services Module Software Installation and Upgrade Guide*
- *Cisco MDS 9000 Family CLI Quick Configuration Guide*
- *Cisco MDS 9000 Family CLI Configuration Guide*
- *Cisco MDS 9000 Family Command Reference*

Intelligent Storage Networking Services Configuration Guides

- *Cisco MDS 9000 Family Storage Media Encryption Configuration Guide*
- *Cisco MDS 9000 Family Secure Erase Configuration Guide for Cisco MDS 9500 and 9200 Series*

Troubleshooting and Reference

- *Cisco MDS 9000 Family Troubleshooting Guide*

- *Cisco MDS 9000 Family MIB Quick Reference*
- *Cisco MDS 9000 Family SMI-S Programming Reference*
- *Cisco MDS 9000 Family System Messages Reference*

Installation and Configuration Note

- *Cisco MDS 9000 Family SSM Configuration Note*
- *Cisco MDS 9000 Family Port Analyzer Adapter Installation and Configuration Note*
- *Cisco 10-Gigabit X2 Transceiver Module Installation Note*
- *Cisco MDS 9000 Family CWDM SFP Installation Note*
- *Cisco MDS 9000 Family CWDM Passive Optical System Installation Note*

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

CHAPTER 1

Product Overview

Data migration is the process of copying data from an existing storage device to a new storage device. Data migration is required for storage array upgrades and for consolidation or replacement of existing storage arrays. Traditional methods of migrating data can be complex and can cause service disruptions.

Cisco MDS Data Mobility Manager (DMM) for the Cisco MDS 9000 family of switches provides capabilities and features that simplify data migration and minimize service disruptions.

This chapter includes the following sections:

About Cisco MDS DMM

Traditional data migration methods can be complex and disruptive, often requiring extensive rewiring and reconfiguration of the SAN infrastructure. Configuration changes to servers and storage subsystems require coordination among different IT groups and storage vendor service representatives. Server downtime requires advanced scheduling with potentially long lead times.

Cisco MDS DMM is an intelligent software application that runs on the Storage Services Module (SSM) of an MDS switch. With Cisco MDS DMM, no rewiring or reconfiguration is required for the server, the existing storage, or the SAN fabric. The SSM can be located anywhere in the fabric, as Cisco MDS DMM operates across the SAN. Data migrations are enabled and disabled by software control from the Cisco Fabric Manager.

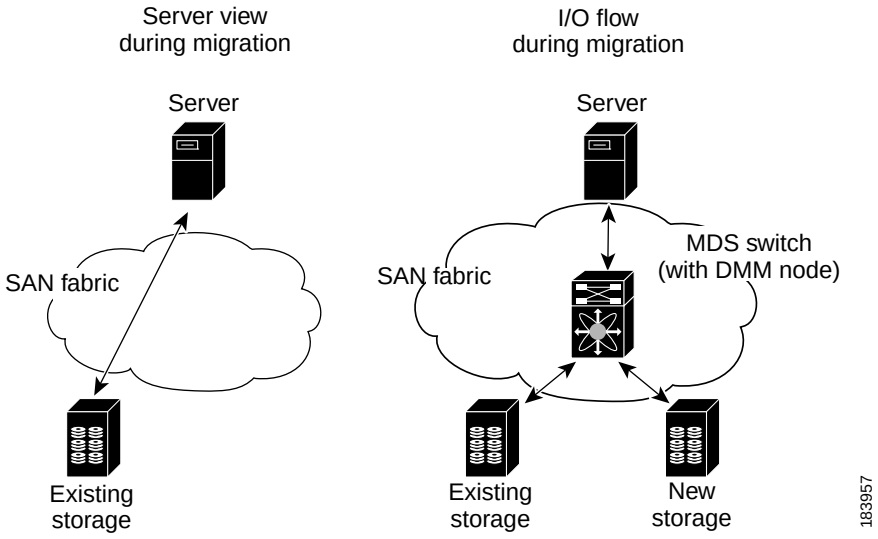
Cisco MDS DMM provides a graphical user interface (GUI) (integrated into Fabric Manager) for configuring and executing data migrations. There is also a command-line interface (CLI), which is suitable for creating scripts.

Cisco MDS DMM can be used in SANs that have only Cisco MDS 9000 switches as well as those containing a heterogeneous mixture of Cisco and other vendor switches.

Application downtime is a critical factor in data migration, as prolonged periods of downtime are difficult to schedule. Cisco MDS DMM minimizes application downtime. Existing data is available to the applications while the migration is performed. Cisco MDS DMM uses hardware and software resources on the SSM to move data to the new storage. This approach ensures that data migration adds no processing overhead to the servers.

Cisco MDS DMM supports online migration, allowing applications to continue to access the existing storage devices. During data migration, all traffic between the server and storage flows through the SSM, as shown in Figure 1-1 (right side). The SSM coordinates all server access to the storage and performs the data migration. The migration activity is transparent to the server, which continues to have full access to the data. Figure 1-1 (left side) shows the server's view of the network during data migration. The server is unaware of the SSM, the new storage, and the migration activity.

Figure 1-1 Data Migration Using Cisco MDS DMM



Cisco MDS DMM performs data migration without any additional layer of virtualization. Cisco MDS DMM requires only SSM configuration to enable the feature and SAN configuration to access the new storage array. Cisco MDS DMM can be enabled (when data needs to be migrated) and disabled (after the migration is completed) without any major SAN or host reconfiguration.

Concepts and Terminology

Cisco MDS DMM uses the following concepts and terminology:

Existing Storage

The storage that is currently used by the application server. The data contained in the existing storage will be migrated to the new storage.

New Storage

The storage to which the data will be migrated.

Logical Unit Number (LUN)

A Logical Unit Number (LUN) is a reference to a unit of storage that you can specify for migration. The LUN is only a unique number in the context of a storage port.

Data Migration Session

A data migration session migrates the data from one LUN in the existing storage to a LUN in the new storage.

Data Migration Job

A data migration job defines a set of LUNs to be migrated together. A data migration session is created for each LUN that is to be migrated. The data migration job is the main unit of configuration and management. For example, the migration rate and other attributes are configured for the data migration job. The data migration job (and not individual sessions) can be started or stopped.

Method 1 Data Migration

For the section of existing storage LUN whose data is already migrated to new storage LUN, any new SCSI Write I/Os from the server is written to both the existing and new storage LUN before sending a response back to the server. Method 1 is typically used in local data migration.

Method 2 Data Migration

SCSI Write I/Os from the server to any section of existing storage LUN are written only to the existing storage LUN. The Write I/O changes to the existing storage LUN are marked in the Modified Region Log [MRL] before sending a response back to the server. These changes are then migrated to the new storage LUN in subsequent iterations. Method 2 is typically used in remote data centre migration.

SSM

An SSM is an MDS switch module that provides intelligent services. The Cisco MDS DMM feature executes on the SSM.

Peer SSM

In a dual-fabric topology, a data migration job runs on an SSM in each fabric. The two SSMs are peers. SSMs communicate with their peer SSMs to coordinate the data migration jobs.

Fibre Channel Redirect

Fibre Channel redirect (FC-Redirect) allows on-demand insertion and removal of SSM intelligent services with minimal disruption to existing traffic. No configuration changes are required on the server or storage devices. Cisco MDS DMM uses the FC Redirect capability to redirect traffic to the SSM. This redirection is transparent to the host and storage devices.

Virtual Target

A virtual target (VT) is a proxy target address for a storage port. During data migration, the FC-Redirect feature redirects traffic from the server to a VT on the SSM.

Virtual Initiator

A virtual initiator (VI) is a proxy initiator address for a server host bus access (HBA) port. During data migration, the SSM uses a VI to forward redirected traffic to the existing storage port. The SSM also uses the VI to forward data migration traffic to the new storage.

Control Plane Processor

The control plane processor (CPP) is the main processor in the SSM. DMM runs on the CPP.

Data Path Processors

The data path processors (DPPs) are a set of resource processors in the SSM. The DPP transfers blocks of data across the switch without impacting the CPP. DMM uses a VI on the DPP for migrating data.

Cisco MDS DMM Features and Capabilities

Cisco MDS DMM supports the following features and capabilities:

Server-Based Migration

In server-based migration, the focus is data migration for the storage used by a particular server (or server HBA port). All LUNs accessed by the selected server are available for migration to new storage.

Storage-Based Migration

In storage-based migration, the focus is data migration for storage exposed by a particular storage array (or storage array port). All LUNs in the specified storage array are available for migration to new storage.

Online Data Migration

Cisco MDS DMM is designed to provide online data migration. The existing storage is available to server applications while the SSM performs the data migration. During migration, data reads from the server are directed to the existing storage. DMM ensures that data writes are processed correctly. For example, if the write is to a storage segment already migrated, the write is mirrored to the existing and new storage.

Offline Data Migration

During offline data migration, servers must not initiate reads or writes to the existing storage. Any server application using the existing storage must be quiesced. Offline data migration is faster than online data migration and can be used for non critical data applications.

Method 1 Data Migration

For the section of existing storage LUN whose data is already migrated to new storage LUN, any new SCSI Write I/Os from the Server is written to both the existing and new storage LUN before sending a response back to the server. Method 1 is typically used in local data migration.

Method 2 Data Migration

SCSI Write I/Os from the server to any section of existing storage LUN are written only to the existing storage LUN. The Write I/O changes to the existing storage LUN are marked in the Modified Region Log [MRL] before sending a response back to the server. These changes are then migrated to the New Storage LUN in subsequent iterations. Method 2 is typically used in remote data centre migration.

Configuration Using Cisco Fabric Manager GUI

The Cisco MDS DMM GUI is integrated into Fabric Manager. The DMM GUI provides a wizard to guide you through the steps required to configure a data migration job. To minimize customer impact, you can schedule the start time for a data migration and you can configure the rate of data migration. The wizard also prompts you to perform tasks on external entities such as the fabric switch and the storage devices.

The DMM GUI also provides a job status screen, for monitoring and managing data migration jobs and sessions.

Configuration Using CLI

Cisco MDS DMM provides a set of CLI commands, which are suitable for creating scripts. These commands are accessed from the MDS switch command console or telnet session.

Migration to Larger LUN

To increase the amount of data that an existing server can access, Cisco MDS DMM facilitates migration to a larger LUN. After the migration, expand the file system on the LUN to take advantage of the increased storage space.

Heterogeneous Storage Migration

Cisco MDS DMM can migrate data between storage devices from different vendors. The supported devices are listed in the Cisco MDS 9000 Family Interoperability document, which is available at the following URL:

http://www.cisco.com/en/US/docs/storage/san_switches/mds9000/interoperability/matrix/Matrix.pdf

Heterogeneous SAN Environments

Cisco MDS DMM supports data migration on SANs that contain third party vendor switches (such as Brocade). The existing and new storage devices must be attached to an MDS switch.

Offline Verification

Cisco MDS DMM supports verification of the new storage. The existing storage is offline during the verification.

Simultaneous Migration of Multiple LUNs

Cisco MDS DMM supports multiple simultaneous data migration jobs and simultaneous data migration sessions within a job.

Dual Fabric Support

Cisco MDS DMM supports data migration for dual fabric topology. In this topology, servers are connected to storage devices across two independent SAN fabrics and the servers are configured for multipathing.

Cisco MDS DMM also supports data migration for single fabric SANs with single-path or multipath configurations.

Delayed Server Reconfiguration

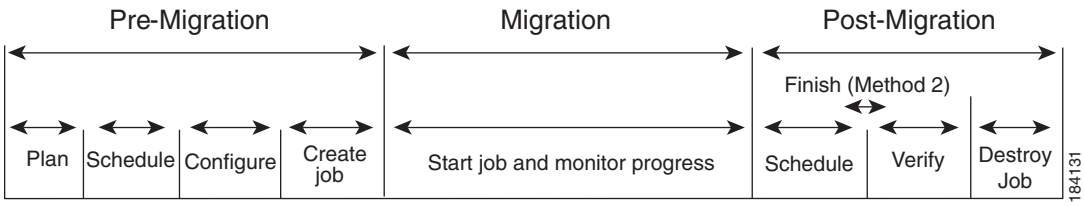
After the data is copied from the existing storage to the new storage, you can delay the reconfiguration of the server to access the new storage. During this period, all writes are mirrored to the existing storage and the new storage. This description assumes Method 1.

Data Migration Overview

A data migration job typically comprises three major stages (see Figure 1-2).

In the pre-migration stage, create a plan for data migration, configure the new storage, and create the DMM job. In the migration stage, start the data migration job and monitor its progress. In the post-migration phase, prepare the server to use the new storage, delete the data migration job, and remove the old storage.

Figure 1-2 Data Migration Stages



The following sections provide an overview of the typical data migration stages (additional details are covered in subsequent chapters):

- Pre-Migration, page 1-6
- Migration, page 1-6
- Post-Migration, page 1-7

Pre-Migration

In the pre-migration stage, create a plan for the migration, configure the new storage, and create the data migration job. Full details about pre-migration activities are covered in Chapter 3, “Preparing for Data Migration.”

Plan

Create a plan for data migration, identifying external dependencies and activities that need to be scheduled.

Configure

Configure the new storage device and any other configuration.

Create the Data Migration Job

Create and configure the data migration job using the DMM GUI. You can create a job without a schedule or you can specify the day and time for the job to start.

Migration

In the migration stage, jobs with a configured schedule jobs start automatically. Manually start unscheduled data migration jobs.

Start the Migration

A data migration job comprises one or more data migration sessions. A data migration session performs the migration of one LUN from the existing storage to the new storage.

During migration, the DMM feature ensures the integrity of the storage data by intercepting all traffic from the server and storage ports involved in the migration job.

Cisco MDS DMM directs all server-initiated reads and writes to the existing storage. If the server initiates a write to a region that has already been migrated, the write is mirrored to the new storage for Method 1. For Method 2, if the server initiates a write to a region that is already migrated, the MRL gets updated for that region while the data gets migrated in the background subsequently.

Monitor

During migration, you can monitor progress of the DMM job by using the job status display for Method1in the DMM GUI. For Method 2 jobs, the **Est. TOC** field determines when to issue the **Finish** command.

Post-Migration

In the post-migration stage, reconfigure the server to use the new storage. The exact post-migration configuration steps vary depending on the operating system of the server.

Method 1

To configure the post-migration steps for Method 1, follow these steps.

Schedule

Schedule a time (and the personnel) to reconfigure the server to use the new storage and remove references to the existing storage.

Verify

Optionally, verify the data integrity between the existing and new storage after the migration has completed. The existing storage must be offline during the verification.

Delete

To delete a data migration job,follow these steps:

• Shut down the server applications to stop accessing the existing storage.

• Use the DMM GUI to delete the completed data migration job.

• Reconfigure the server to access the new storage.

Method 2

To configure the post-migration steps for Method 2, follow these steps.

Schedule

Schedule a time (and the personnel) to reconfigure the server to use the new storage and remove references to the existing storage.

Finish

The finish process for a data migration job involves a series of activities which must be completed in sequence:

To complete Method 2 data migration, follow these steps.

- Click **Finish** to stop access to the existing storage.

The existing storage LUNs are offline for the servers. Cisco DMM migrates the changed blocks from the existing storage LUNs to the new storage LUNs for the last time. See Finishing Jobs, page 4-27 for more details.

Verify Job

Optionally, you can verify the data integrity between existing and new storage after the **Finish** operation is completed. The existing storage LUNs will be offline during the verification. This optional operation can be peformed just before deleting a job.

Delete

To delete a data migration job [in Method 2], follow these steps:

– Use the DMM GUI to delete the completed data migration job.

– Reconfigure the server to access the new storage.

Note Restarting **stopped** or **failed** state for **Method 1,** restarts the job from the beginning. Restarting **stopped** or **failed** state for **Method 2**, restarts the job from the point where the job failed or stopped.

Software Requirements

Cisco MDS DMM has the following software requirements:

- MDS switches hosting the storage or the SSM must be running SAN-OS release 3.2(1) or later for Method 1. SAN-OS Release 3.3(1a) is required for Method 2.
- The Fabric Manager server must be running software release 3.2(1) or later.

Hardware Requirements

Cisco MDS DMM software application executes in the SSM of an MDS switch.

SSM-Capable Switches

The following switches support the SSM:

- All MDS 9200 family switches
- All MDS 9500 family switches

Storage Ports

The storage ports must connect to Cisco MDS switches that support FC-Redirect. All Cisco MDS switches support FC-Redirect, with the following exceptions:

- MDS 9124
- MDS 9134
- MDS 9020

Server HBA Ports

The server HBA ports can be connected to any switch (Cisco or third-party vendor).

SAN Fabric

Note the following hardware-related requirements:

- Cisco MDS DMM supports single-fabric and dual-fabric topologies. The DMM feature requires at least one SSM in each fabric.
- The Cisco MDS DMM feature is supported in homogeneous and heterogeneous SAN fabrics. SSMs can be located on any SSM-capable MDS switch in the fabric. However, the SSM and the storage ports must either be located on the same switch or connected through a Cisco SAN.

Deployment Guidelines

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

- We recommend that you install the SSM in the same MDS switch as the existing storage and connect the new storage 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 SSM.
- MDS DMM supports 16 simultaneous jobs on each SSM.
- Do not add the same initiator/target port pair 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 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.

CHAPTER 2

Getting Started

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

Installing Cisco MDS DMM Software

The Cisco MDS DMM feature runs on the Storage Service Module (SSM) in a MDS 9000 series switch.

The DMM software package is included in the SSI image, delivered as part of SAN OS.

For information on how to install the SSM image, refer to *Cisco MDS 9000 Family Storage Services Module Software Installation and Upgrade Guide*.

Using DMM Software Licenses

You can use the Cisco MDS DMM software without a license for a period of 120 days.

To purchase a license for DMM, use one of the following product identifiers for the MDS 9500 family:

- M95DMMS1K9 perpetual license for one SSM.
- M95DMMTS1K9 time-based license (one SSM for 180 days).

Use one of the following product identifiers for the MDS 9200 family:

- M92DMMS1K9 perpetual license for one SSM.
- M92DMMTS1K9 time-based license (one SSM for 180 days).

You may purchase a DMM license for an SSM 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 an Fabric Manager license.

For more information about installing or upgrading software licenses, refer to *Cisco MDS 9000 Family Fabric Manager Configuration Guide*.

Note If the DMM license for an SSM expires, all scheduled and in-progress jobs will continue to execute. You cannot create new jobs with an expired license.

Installing and Configuring DMM Management Tools

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

- DMM CLI, page 2-2
- DMM GUI (Fabric Manager), page 2-2

DMM CLI

The Cisco MDS DMM feature uses the CLI on the MDS switch and on the SSM.

No DMM-specific tasks are required to install or configure the CLI. For additional information about the CLI, refer to the *Cisco MDS 9000 Family CLI Configuration Guide*.

DMM GUI (Fabric Manager)

The Cisco MDS 9000 Fabric Manager, a Java-based GUI, manages Cisco MDS 9000 Family switches using SNMP. The GUI for the Cisco MDS DMM is integrated into Fabric Manager.

To use the DMM GUI, complete the following tasks:

- Installing Fabric Manager, page 2-2
- Configuring SSH on the Switch, page 2-2

Installing Fabric Manager

The DMM GUI software is bundled into the Fabric Manager software package.

For information about installing Fabric Manager software, refer to *Cisco MDS 9000 Family Fabric Manager Configuration Guide*.

Configuring SSH on the Switch

The DMM GUI communicates with the SSM using a secure shell protocol (SSH) connection. Before using DMM, you need to enable SSH on the switch that hosts the SSM.

For information about configuring SSH, see the SSH chapter of the *Cisco MDS 9000 Family CLI Configuration Guide,* available at the following URL:

http://cisco.com/en/US/products/ps5989/products_configuration_guide_chapter09186a00805ed013.html#wp1423600

Configuring IP Connectivity

SSMs 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.

SSMs communicate with their peer SSMs using the management IP network. Each DMM-enabled SSM on the management IP network must have a unique subnetwork address configured for VSAN 1.

Configuring IPFC for an SSM 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 SSM-enabled MDS switch that is connected to the same management IP subnetwork.
- Create a CPP interface (with an IP address) on each SSM on the switch.

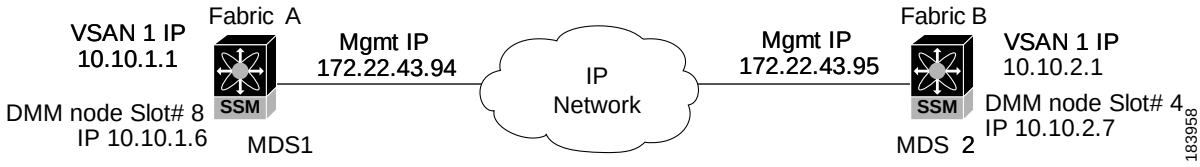
  CPP IP addresses needs to be in the same subnet as the VSAN 1 interface.
- Configure zoning.

  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.
- Configure static routes as required to access the peer SSMs.

  Configure static routes in the switch to each SSM-enabled peer switch to enable routing of packets between peer SSMs.

Figure 2-1 IP Configuration



The following example is based on the configuration and subnetwork numbers shown in Figure 2-1. The example shows the configuration for MDS switch 1:

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

```
MDS-1# configure terminal
MDS-1(config)# interface vsan 1
MDS-1(config-if)# ip address 10.10.1.1 255.255.255.0
MDS-1(config-if)# no shutdown
MDS-1(config-if)# exit
```

- Create the CPP IP/FC interface, and configure an IP address:

```
MDS-1(config)# interface cpp 8/1/1
MDS-1(config-if)# ip address 10.10.1.6 255.255.255.0
MDS-1(config-if)# no shutdown
```

```
MDS-1(config-if)# exit
```

- Configure a new zone to include the pWWN of the CPP interface on the SSM and the VSAN1 interface on the supervisor:

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

- Enable IPv4 routing:

```
MDS-1(config)# ip routing
```

- Configure the default gateway for the SSMs:

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

- Configure static route to access the peer SSMs:

```
MDS-1(config)# ip route 10.10.2.1 255.255.255.0 172.22.43.94
```

The following example shows the configuration for MDS switch 2 (see Figure 2-1):

```
MDS-2# configure terminal
MDS-2(config)# interface vsan 1
MDS-2(config-if)# ip address 10.10.2.1 255.255.255.0
MDS-2(config-if)# no shutdown
MDS-2(config-if)# exit

MDS-2(config)# interface cpp 8/1/1
MDS-2(config-if)# ip address 10.10.2.7 255.255.255.0
MDS-2(config-if)# no shutdown
MDS-2(config-if)# exit

MDS-2(config)# zone name DMM_IP_MGMT vsan 1
MDS-2(config-zone)# member pwwn 22:00:00:20:25:19:25:11
MDS-2(config-zone)# member pwwn 21:00:00:c0:7d:76:04:15
MDS-2(config-zone)# exit

MDS-2(config)# ip routing

MDS-2(config)# ip default-gateway 10.10.2.1 interface cpp 8/1/1

MDS-2(config)# ip route 10.10.1.1 255.255.255.0 172.22.43.95
```

For additional information about configuring IP over Fibre Channel (IPFC), refer to the *Cisco MDS 9000 Family CLI Configuration Guide*.

Enabling the DMM Feature

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

- Enabling DMM with the CLI, page 2-5
- Enabling DMM with Fabric Manager, page 2-5

Enabling DMM with the CLI

To enable DMM on an SSM and to provision ports to use the DMM feature, follow these steps:

	Command	Purpose
Step 1	`Router# configure terminal`	Enters configuration mode.
Step 2	`Router(config)# ssm enable feature dmm module slot`	Enables DMM on the SSM module in the specified slot.
	`Router(config)# no ssm enable feature dmm module slot`	Disables DMM on the SSM module in the specified slot.
Step 3	`Router(config)# ssm enable feature dmm interface slot/port - port`	Enables DMM for the interface in the specified slot and port range.

Enabling DMM with Fabric Manager

To enable DMM for an SSM using Fabric Manager, and to provision ports to use the DMM service, follow these steps:

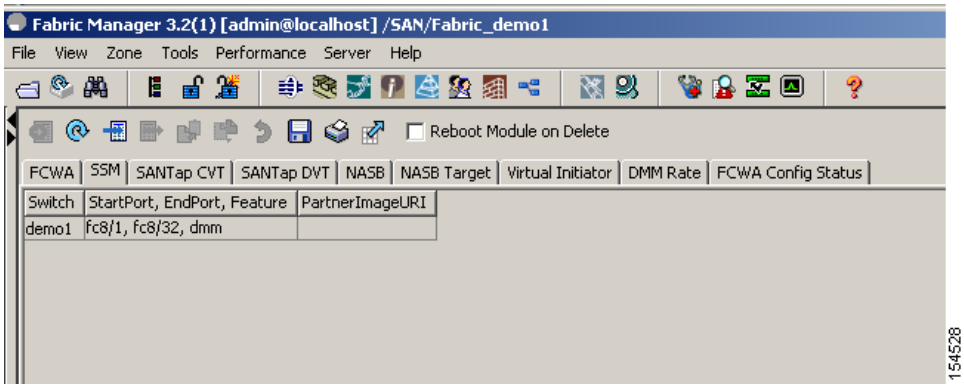
Step 1 Expand **End Devices** and then double click the **Intelligent Features** folder in the Physical Attributes pane.

You see the SSM services display in the Information pane.

Step 2 **a.** Click the **SSM** tab.

You see the set of configured services in the Information pane as shown in Figure 2-2.

Figure 2-2 SSM Tab



b. Click the **MSM** tab.

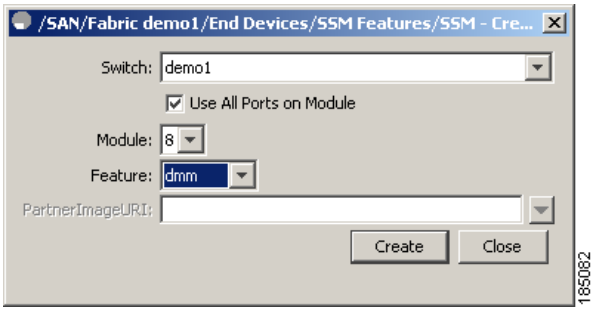
You see the set of configured services in the Information pane as shown in Figure 2-3.

Figure 2-3 MSM Tab

Step 3 Click **Create Row** button (third button in the tool bar, directly above the **SSM** tab).

You see the Create SSM dialog box shown in Figure 2-4.

Figure 2-4 Create SSM Dialog Box



Step 4 Select the switch and SSM module where you want to enable DMM.

Step 5 The **Use All Ports on Module** check box is checked by default. DMM does not support provisioning a subset of the ports on the card to use this service.

Step 6 Select **dmm** from the drop-down list of services.

Step 7 Click **Create** to enable the DMM service.

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 2-7
- Configuring Migration Rate Using Fabric Manager, page 2-7

Configuring Migration Rate Using the CLI

To configure the values associated with the fast, medium and slow migration rates, follow these steps:

Step	Command	Comments
Step 1	`switch(config)# dmm module` *module-id* `rate_of_migration fast` *rate* `medium` *rate* `slow` *rate*	Sets the migration rate for the specified SSM module. The migration rate has a range of 1 to 200 and the units are Megabytes per second (MB/s). The default values for migration rate are as follows: • 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 SSM in slot 4:

```
MDS-1(config)# dmm module 4 rate_of_migration fast 100 medium 25 slow 10
```

Configuring Migration Rate Using Fabric Manager

To configure the values to associate with the fast, medium, and slow migration rates, follow these steps:

Step 1 Expand **End Devices** and then double click the **Intelligent Features** folder in the Physical Attributes pane.

You see the SSM services display in the Information pane.

Step 2 Click the **DMM Rate** tab.

You see the set of configured services in the Information pane as shown in Figure 2-5.

Figure 2-5 Configuring Migration Rate

Step 3 Click in the table cell that you are configuring (Fast, Medium, or Slow).

Step 4 Enter the new value for the migration rate. The units are MB/s.

Step 5 Click the **Save** button to save the configuration values.

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 as 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.

CHAPTER 3

Preparing for Data Migration

This chapter describes how to prepare for a data migration job. It includes the following sections:

Planning a Data Migration Job

Traditional data migration is a complex procedure, which requires coordination of activities that may be performed by vendor representatives and multiple IT groups. Activities may need to occur at specific times to minimize service disruption.

Cisco MDS DMM is designed to minimize the dependency on multiple organizations, and is designed to minimize service disruption. However, even with Cisco MDS DMM, data migration is a fairly complex activity. We recommend that you create a plan to ensure a smooth data migration.

To create your data migration plan, use the following steps:

1. Document the SAN topology for the data migration. Identify and obtain any additional equipment and software licenses.
2. Design the mapping of source LUNs to destination LUNs.

   Identify the LUNs that need to be migrated and the impacted servers. The Server Lunmap Discovery (SLD) tool provides assistance in identifying this information. (See Checking Storage ASL Status, page 3-2 for additional information about the SLD tool).

   Calculate the storage requirements of the new LUNs. Identify the LUNs on the new storage subsystem. The new storage LUNs need to be the same size or larger than the matching existing storage LUN.
3. Develop a schedule for the migration job.

   Identify any required equipment and resources. Availability of external resources (such as a vendor service representative) may impact your schedule.

   Identify periods of low user activity and I/O activity, to minimize disruption during the migration. Cisco MDS DMM provides features to minimize user impact. For example, you can schedule the migration to run during nonpeak hours or configure a slow migration rate.

   Identify any required pre-migration configuration changes. (These changes are described in the following sections.)

   Plan for one short window in which service is not be available during server reconfiguration. (This enables you to access the new storage after the data migration is completed).

4. As a precaution, ensure that any critical data on the existing storage has a recent back up.

Pre-Migration Configuration

Prior to performing a data migration job, ensure that the existing storage, the new storage, and the fabric switches are configured as required. The following sections describe the tasks to be completed:

- Configuring Switches and SSMs, page 3-2
- Configuring the Existing and New Storage, page 3-2
- Configuring Enclosures, page 3-4
- Configuring the SAN Fabric, page 3-5

Configuring Switches and SSMs

The Cisco MDS DMM feature executes on the SSM. The DMM feature supports data migration for storage LUNs exposed anywhere on the SAN fabric (that is, the storage port can be connected to the switch hosting the SSM or to another switch).

If necessary, provision an SSM on an MDS switch in each fabric. We recommend that you install the SSMs on the switches that are connected to the existing storage ports.

If the existing or new storage port is on a different switch than the SSM, ISL network traffic will increase during the migration, as all traffic between the existing and new storage is directed through the SSM. Also, if the server port is on a different switch than the SSM, ISL network traffic will increase during the migration, as all traffic between the server and the storage is directed through the SSM.

Ensure that Cisco MDS DMM is the only active intelligent application on the SSMs being used for the data migration job.

Configuring the Existing and New Storage

Complete the following configuration tasks for the storage devices:

- New Storage—Connect the new storage to the SAN. Create LUN maps and LUN masks. Configure access lists for the new storage.
- Existing Storage—Check that the LUNs are mapped.
- VSANs—Ensure that the existing storage and new storage port pair in each fabric is configured in the same VSAN. Also ensure that for each existing storage port VSAN, there is atleast one new storage port and the server port has to be configured in the same VSAN.
- Zones—Optionally, you can reconfigure zoning to add new storage. Cisco MDS DMM does not enforce zoning for the new storage. If you do not configure the zoning before migration, you must complete this action before server accesses the new storage.

Checking Storage ASL Status

The DMM feature contains the Array-Specific Library (ASL), which is a database of information about specific storage array products. DMM uses the ASL to correlate the LUN maps between multi-path port pairs.

Use the SLD tool to check the ASL status of LUNs on a storage array port. If the LUNs are all ASL=Yes, the Cisco MDS DMM feature automatically correlates the LUN maps.

If some or all of the LUNs result in ASL=No, contact Cisco support.

The SLD tool is launched from the supervisor module CLI. To check the status of a storage port, perform this task:

	Command	Purpose
Step 1	`Router#` **`sld module`** *`module number`* **`vsan`** *`vsan no`* **`server-pwwn`** *`server pWWN`* **`target-pwwn`** *`target pWWN`* **`discover`**	Runs the SLD tool to discover the LUNs associated with the specified source/destination port pair.
Step 2	`Router#` **`show sld module`** *`module number`* **`vsan`** *`vsan no`* **`server-pwwn`** *`server pWWN`* **`target-pwwn`** *`target pWWN`* `[detail]`	Displays the ASL status for LUNs associated with the specified source/destination port pair. The **detail** option displays the detailed output for the source/destination port pair.

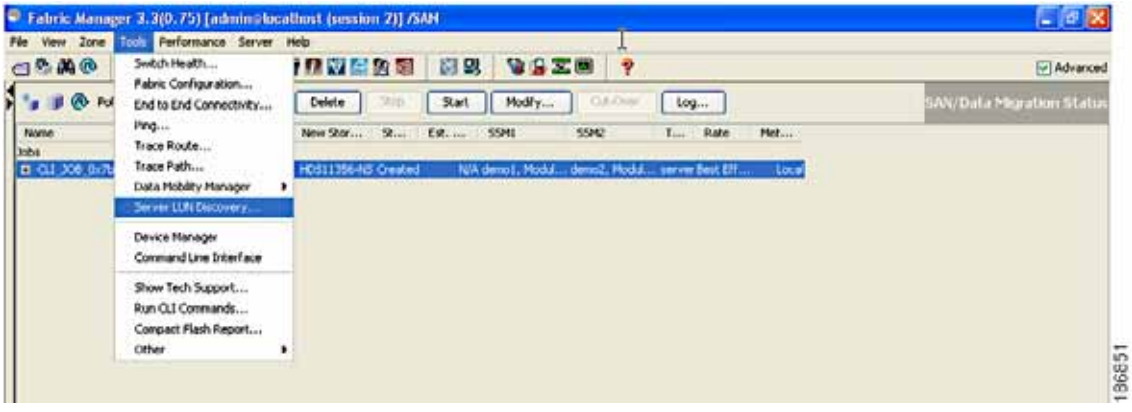
The following example shows how to display ASL status for a storage port:

```
router# show sld module 4 vsan 100 server-pwwn 21:00:00:e0:8b:08:5e:3e target-pwwn
50:06:0e:80:04:2c:5c:70
================================================================================
 Id   LUN Id   Device Type  Size   Vendor Product Id   Serial Number  ASL  Status
 ===============================================================================
  1    0x0      DASD        1.95GB  VendorA  ModelB5       11356      Yes   Active
  2    0x1      DASD        1.95GB  VendorA  ModelB5       11356      Yes   Active
  3    0x2      DASD        1.95GB  VendorA  ModelB5       11356      Yes   Active
  4    0x3      DASD        1.95GB  VendorA  ModelB5       11356      Yes   Active
================================================================================
```

The SLD tool can also be launched from DMM GUI. To perform Server LUN Discovery, complete the following steps:

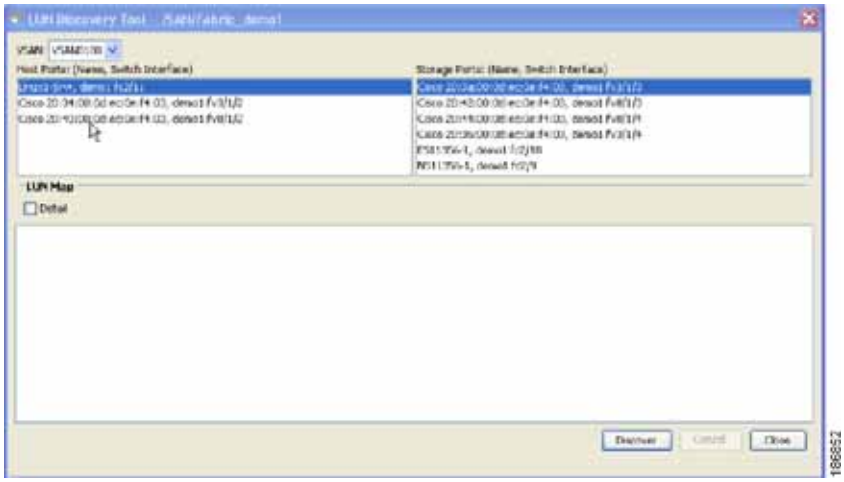
1. Choose **Tools** > **Server LUN Discovery.**

Figure 3-1 Server LUN Discovery



2. Select the **VSAN** and then select the **Host Port** for which you want to do the discovery and choose the **Storage Port** on which you have to do the discovery.

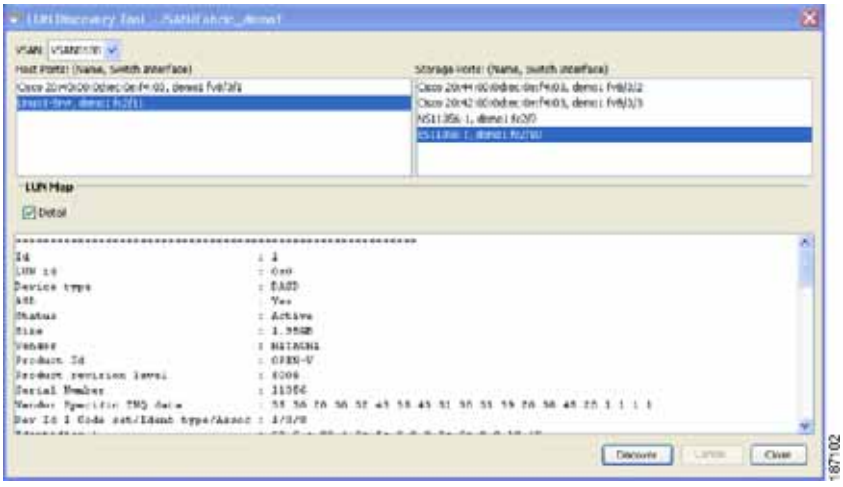
Figure 3-2 Server LUN discovery tool (SAN, host and storage port)



3. Click **Discover**.

The following example shows how to display the ASL status:

Figure 3-3 Example



Note We recommend not to run the SLD tool on a server storage port pair that is already configured in a DMM job.

Configuring Enclosures

Before creating a migration job, you need to ensure that the server and storage ports are included in enclosures.

If the server ports are not already included in existing enclosures, you need to create enclosures for the server ports. If the server has multiple single-port HBAs, all of these ports need to be included in one enclosure. Enclosures for existing and new storage ports are created automatically.

For information on how to configure enclosures, see the *Cisco MDS 9000 Family Fabric Manager Configuration Guide*.

Configuring the SAN Fabric

If the SAN is a heterogeneous SAN, you may need to install new MDS switches or adjust the SAN topology to meet DMM requirements. For additional information about SAN topologies, refer to Chapter 6, “Understanding DMM Topologies.”

CHAPTER 4

Using the DMM GUI for Data Migration

This chapter describes how to use the DMM GUI to configure and monitor data migrations. This chapter includes the following sections:

About Cisco MDS DMM

Cisco MDS Data Mobility Manger (DMM) is an intelligent software application for achieving data migrations. DMM runs on the Storage Services Module (SSM) of an MDS switch and operates across the SAN fabric.

Cisco MDS DMM offers capabilities and features that simplify data migration and minimize disruptions and reconfigurations. For example, the SSM can be located anywhere in the fabric. No reconfiguration is required for the server, the existing storage, or the SAN fabric. Cisco MDS DMM uses resources on the SSM card to perform the migration, so it adds no processing overhead on the application servers

Cisco MDS DMM supports online migration, allowing applications to continue to access the existing storage devices. The SSM coordinates all server access to the storage and runs the data migration. However, this activity is transparent to the server, which continues to have full access to the data.

Cisco MDS DMM supports data migration at the server or storage device level of granularity. Server level migration involves migrating the storage data used by the specified server. Storage device level migration involves migrating all storage data from the specified storage device.

About the DMM GUI

The DMM GUI is integrated into the Fabric Manager and provides wizards to configure server-based and storage-based data migrations. The DMM GUI also provides a status window to monitor and control data migration jobs and sessions.

The following sections provide additional information about the DMM GUI:

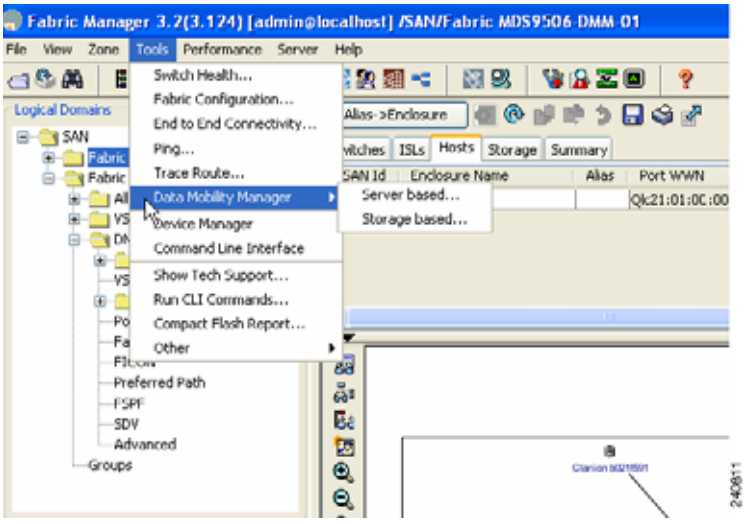
- DMM Data Migration Wizards, page 4-2
- DMM Job Migration Status, page 4-3

DMM Data Migration Wizards

DMM GUI provides wizards to configure and perform data migration jobs. You can launch the DMM wizards from the Fabric Manager, by choosing the Data Mobility Manager option from the Tools menu (see Figure 4-1). There are separate options to launch server-based data migration jobs and storage-based data migration jobs.

You can also launch the DMM wizards from the job status display. On the Data Migration Status toolbar, the Config Server-based Mode tool launches the wizard for a server-based job and the Config Storage-based Mode launches the wizard for a storage-based job (see Figure 4-18).

Figure 4-1 Launching the Wizard



The DMM wizard guides users through the configuration steps. At the end of each step, the wizard communicates with the SSMs as required (to create the job, to obtain configuration information, or to create the sessions).

The DMM GUI uses the configuration information from the SSM to automate parts of the data migration configuration. For example, when you choose a server enclosure, the GUI displays the storage devices (and a list of storage device ports) that are exposed to the server enclosure (based on VSAN and zone information).

The DMM feature performs LUN discovery to select the LUNs available for migration and automates the session creation by matching the LUNs in the existing and new storage. The wizard allows you to adjust the session configuration prior to sending it to the SSM.

Server-Based Data Migration Overview

The major steps in a server-based data migration are as follows:

- Create the job, select the server and storage ports.
- Select the SSMs to run the data migration job.
- (Optional) Select the migration path.
- (Optional) Correlate the LUN maps (existing storage).
- (Optional) Correlate the LUN maps (new storage).
- Configure the data migration sessions.

Storage-Based Data Migration Overview

The major steps in a storage-based data migration are as follows:

- Create the job and select the storage ports.
- Select the SSMs to run the data migration job.
- (Optional) Select the migration path manually.
- Configure the VIs in the storage arrays.
- Verify the zones to be activated.
- (Optional) Correlate the LUN map (existing storage).
- (Optional) Correlate the LUN map (new storage).
- Configure the data migration sessions.

DMM Job Migration Status

In the Fabric Manager window, the Data Migration Status area displays a list of jobs and information about each job. The Data Migration Status area also contains a toolbar of commands that operate on the selected job or jobs. The commands are context sensitive: depending on the status of the selected job or jobs, only certain commands are activated.

The information displayed in the Data Migration Status area is updated periodically, based on polling the SSMs. Set the polling interval using the Poll Interval drop-down list.

You can view the sessions associated with a job by clicking the maximize button (+) next to a job. The display expands to show information about all the sessions associated with the job (see Figure 4-18).

Guidelines for Using the DMM GUI

When using the DMM GUI, note the following guidelines:

- For a storage-based migration, all servers that use the selected storage enclosure must use the same operating system (for example, all AIX or all Solaris).

- If the MDS switch (hosting the storage or the server) performs a restart after the migration but before the job is destroyed, you must restart the data migration from the beginning.
- You can use the DMM GUI simultaneously on multiple Fabric Manager client sessions. However, we recommend that you limit DMM GUI usage to one client session at a time. If an SSM receives conflicting commands from two different client sessions, the SSM may reject commands.

  For the DMM GUI to operate correctly, fabrics must be opened in Fabric Manager using SNMPv3. SSMs on fabrics opened with SNMPv2 are not available for data migration.

Selecting Ports for Server-Based Jobs

When creating a server-based migration job, you must include all active paths from the host to the LUNs being migrated. This is because all writes to a migrated LUN need to be mirrored or logged until the job is destroyed, so that no data writes are lost.

For additional information about selecting ports for server-based jobs, refer to the “Ports to Include in a Server-Based Job” section on page 6-4.

Configuring a Server-Based Migration Job

The DMM GUI wizard guides users through the steps required for configuring a server-based job. The wizard uses information from the SSM to preconfigure much of the required information.

This section assumes a dual-fabric topology with multipath ports defined in the server and in the storage devices.

The wizard creates and configures the job in three steps, which are described in the following sections:

- Creating a Server-Based Migration Job, page 4-4
- Selecting SSMs for the Migration (Server-Based), page 4-7
- Configuring Migration Sessions, page 4-9

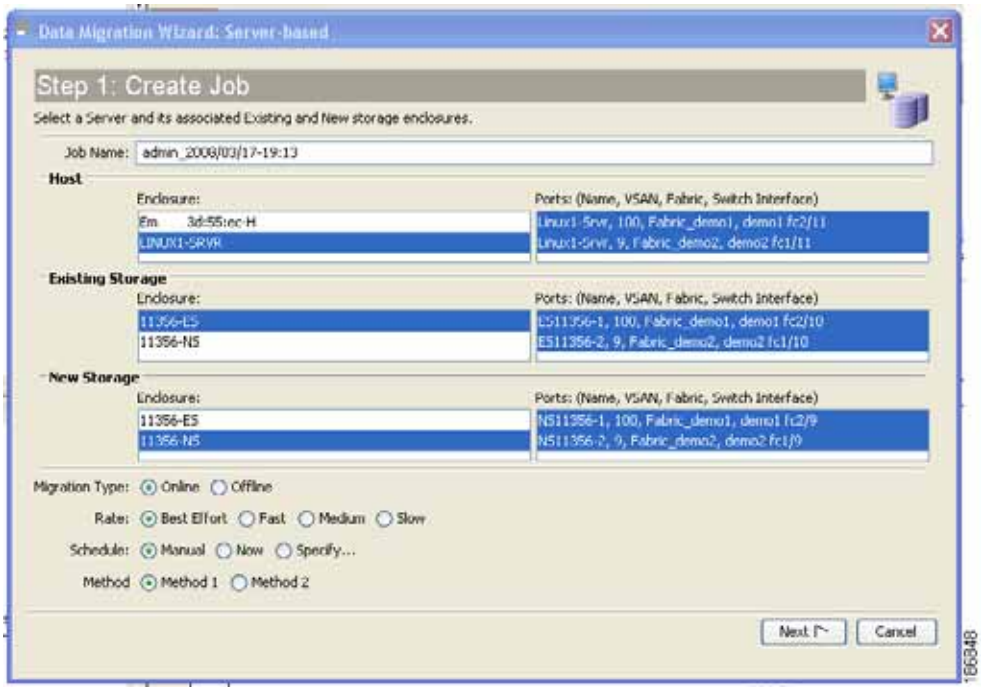
Creating a Server-Based Migration Job

To create a server-based data migration job, launch Fabric Manager and perform this task:

Step 1 In the Tools menu, choose **Data Mobility Manager> Server based**.

You see the Create Job window, as shown in Figure 4-2.

Figure 4-2 Create Job Window



The Create Job window displays the server and storage enclosures available for data migration.

When you select a host enclosure, the wizard lists all existing storage that the selected host port can access (based on Zone and VSAN information). For the new storage, DMM includes zoned and unzoned devices (because the new device may not be zoned yet).

Step 2 From the Enclosure field of the Host pane, choose the server to include in this job. You may need to scroll down to see all of the enclosures.

When you select a server enclosure, you see the available ports in the Ports field of the Host pane.

Step 3 The wizard selects the correct host enclosure ports, so do not change the selection. For additional information about ports to include in the data migration, see section “Ports to Include in a Server-Based Job” section on page 6-4.

Step 4 From the Enclosure field of the Existing Storage pane, choose the existing storage enclosure for this job.

When you select an existing storage enclosure, you see the available ports in the Ports field.

Step 5 The wizard selects all of the ports to include in the job. If the storage is an active-passive array, select only the active ports. For additional information about ports to include for an active-passive array, see section “Single LUN Set, Active-Passive Array” section on page 6-7.

Step 6 From the Enclosure field of the New Storage pane, choose the new storage enclosure for this job.

When you choose a new storage enclosure, you see the available ports in the Ports field.

Step 7 The wizard selects all of the ports to include in the job. If the storage is an active-passive array, select only the active ports. For additional information about ports to include for an active-passive array, see section “Single LUN Set, Active-Passive Array” section on page 6-7.

Step 8 (Optional) In the Job Name field, enter a name for the job. The default value is “admin_” concatenated with today’s date and the current time.

Step 9 (Optional) To configure the job as offline, click the **Offline** Migration Type radio button. The default migration type is online.

Step 10 (Optional) To configure the migration rate, click the appropriate **Rate** radio button. The default rate is best effort, which means that the SSM migrates the data as fast as resources allow. Slow, medium, and fast are configurable migration rates. Their default values are 25, 50, and 100 MB/s, respectively. To change these values, see the "Configuring Migration Rate" section on page 2-6.

Step 11 (Optional) To configure a schedule for the job, click the appropriate **Schedule** radio button. The default is **Manual**, which means that the job is created but will not be started. **Schedule** the job at a later stage.

- Click the **Now** radio button for the job to start right after configuration is complete.
- Click the **Specify** radio button to configure a scheduled start time for the job. Additional fields are displayed, so that you can enter a start date and time (see Figure 4-3).

Figure 4-3 Scheduling the Job

Note If the configured start time is set to past, the job starts as it is specified **now**.

Step 12 Select a method.

Method 1

For the section of existing storage LUN whose data is already migrated to new storage LUN, any new SCSI Write I/Os from the server is written to both the existing and new storage LUN before sending a response back to the server. Method 1 is typically used in local data migration.

Method 2

SCSI Write I/Os from the server to any section of existing storage LUN are written only to the existing storage LUN. The Write I/O changes to the existing storage LUN are marked in the Modified Region Log [MRL] before sending a response back to the server. These changes are then migrated to the new storage LUN on subsequent iterations. Method 2 is used in remote data centre migration.

Step 13 Click **Next**.

If the job configuration is OK, you see the Select SSM window. See Figure 4-4 for more details.

If the job configuration contains errors, you see a pop-up window with one of the following error messages:

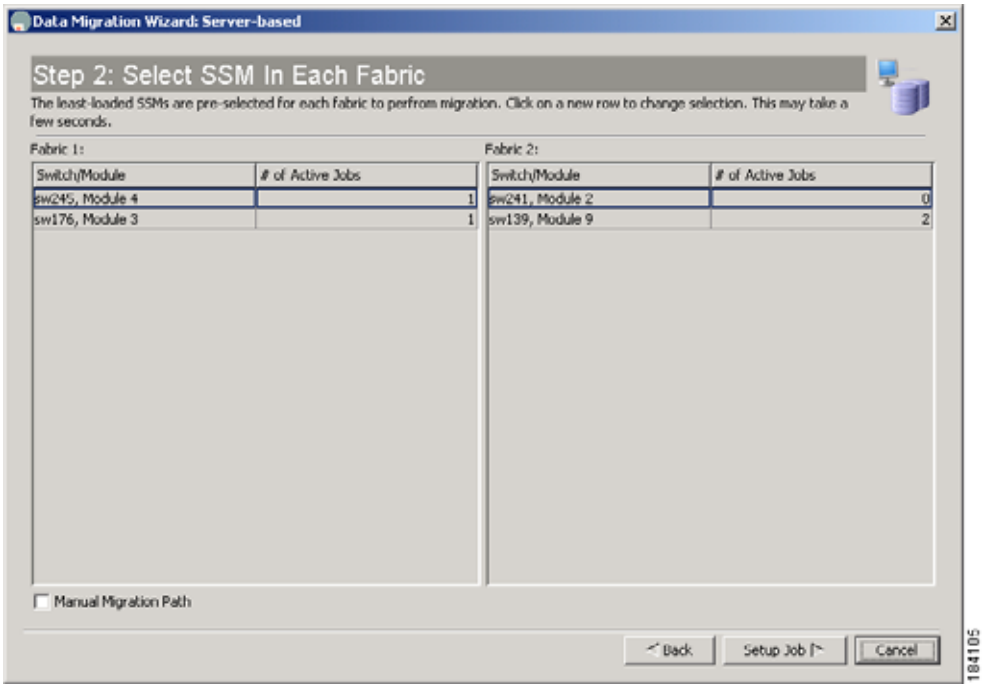
- No host enclosures are defined.
- You cannot select a host enclosure with ports that connect to more than two fabrics.
- There are no paths from the selected host port to any storage ports.

- You must select at least one host port, existing storage port and new storage port.
- If the existing and new storage are in the same enclosure, you cannot select the same storage port for the existing and new storage.
- The matching host port and storage ports (existing and new) must connect across the same fabric.
- The matching host port and storage ports (existing and new) must be members of the same VSAN.

Selecting SSMs for the Migration (Server-Based)

Figure 4-4 shows the The Select SSM window, which displays the DMM-enabled SSMs available to run the migration job.

Figure 4-4 Select SSM Window



The wizard preselects the least-loaded SSM in each fabric and automatically selects the path for each source/destination port pair.

If the selections are acceptable, you can click **Setup Job** to proceed to the next configuration task. The wizard sends the job configuration information to both SSMs and the SSMs create the data migration job. The SSMs return information (such as LUN maps) that is required to configure sessions. You see the Create Session window. See Figure 4-6.

To manually select SSMs or migration paths for the data migration, perform this task:

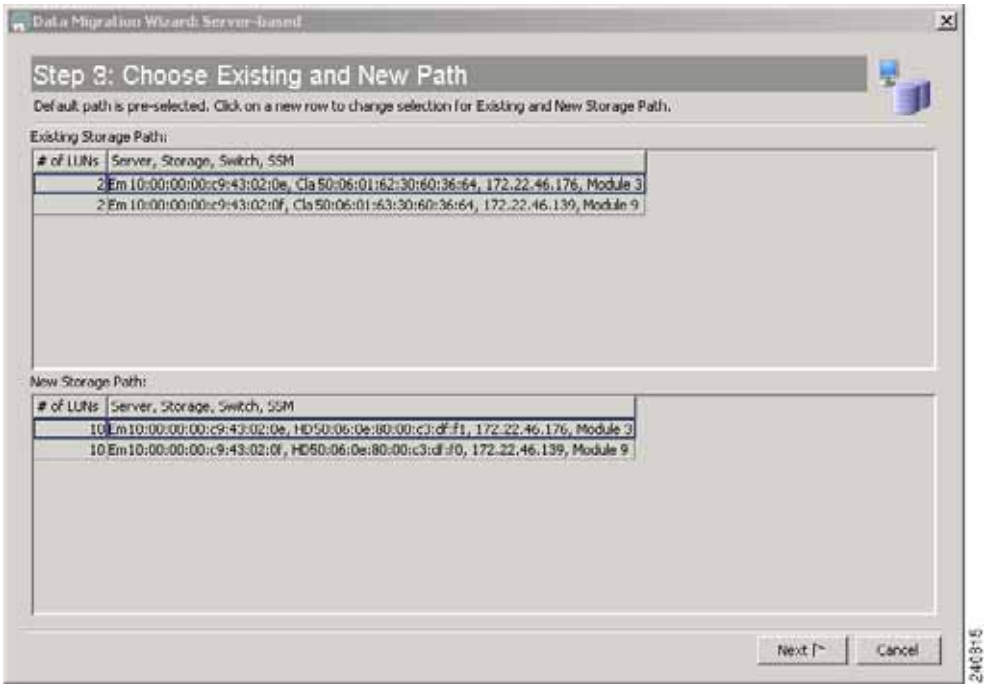
Step 1 (Optional) Click a new row to select an SSM. Hold down the **Control** key and click to deselect a row. The number of active jobs in each SSM is displayed in the # of Active Jobs field.

Step 2 (Optional) Check the **Manual Migration Path** check box to view and manually select source/destination paths. This action causes a pop-up window to open after you perform step 3. For information about selecting paths see the "Selecting Paths to Existing and New Storage" section on page 4-18.

Step 3 Click **Setup Job**.

If you had checked the **Manual Migration Path** check box, you see the Choose Existing and New Path window, as shown in Figure 4-5.

Figure 4-5 Choose Migration Path



Step 4 (Optional) To select a migration path, Click a row to select a path.

Step 5 When you have chosen an existing and new path, click **Next**.

The wizard sends the job configuration information to both SSMs and the SSMs create the data migration job. The SSMs return information (such as LUN maps) that is required to configure sessions.

If the job configuration is OK, you see the Create Session window. See Figure 4-6.

If the job configuration contains errors, you see a pop-up window with the following error message:

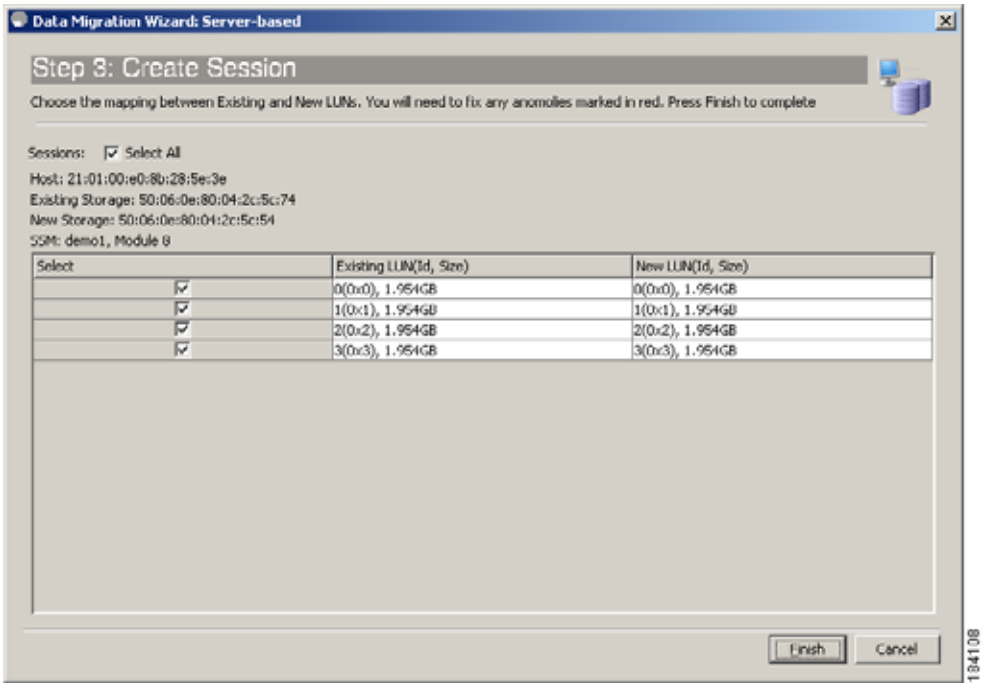
- Mismatched number of LUNs.

  If the number of LUNs on the existing and new storage does not match, the wizard generates an error message and stops. You need to correct the LUN configurations on the storage devices.

Configuring Migration Sessions

Figure 4-6 shows theThe Create Session window, which displays the sessions available for migration.

Figure 4-6 Create Session Window



The wizard preconfigures the sessions by matching existing and new LUN pairs, based on information provided by the SSM. Click **Finish** to accept the sessions as configured.

To manually configure sessions for the data migration, perform this task:

Step 1 Check or uncheck the **Select** check boxes to select (or deselect) sessions for this data migration job. Each session is a source/destination LUN pair.

Step 2 (Optional) Correct any anomalies, which are highlighted in red.

Step 3 Click **Finish**.

The session configuration is sent to the SSMs.

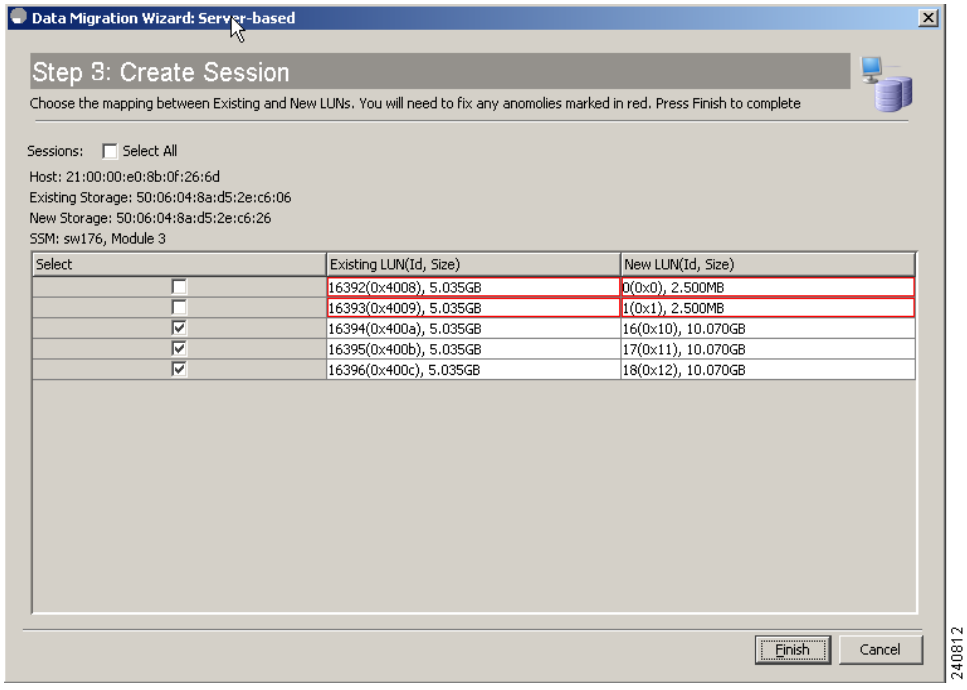
DMM refreshes the Data Migration Status area to display the new data migration job.

Note LUN is the Logical Unit Number as reported by the SCSI REPORT LUNS command [SCSI Opcode 0xA0. See SPC-3 SCSI Standard for more details]. This is the LUN Identifier as displayed by DMM, which is used in session configuration. Use this definition when mapping devices seen by the server to the drives exported by the storage port.

Correcting Session Anomalies

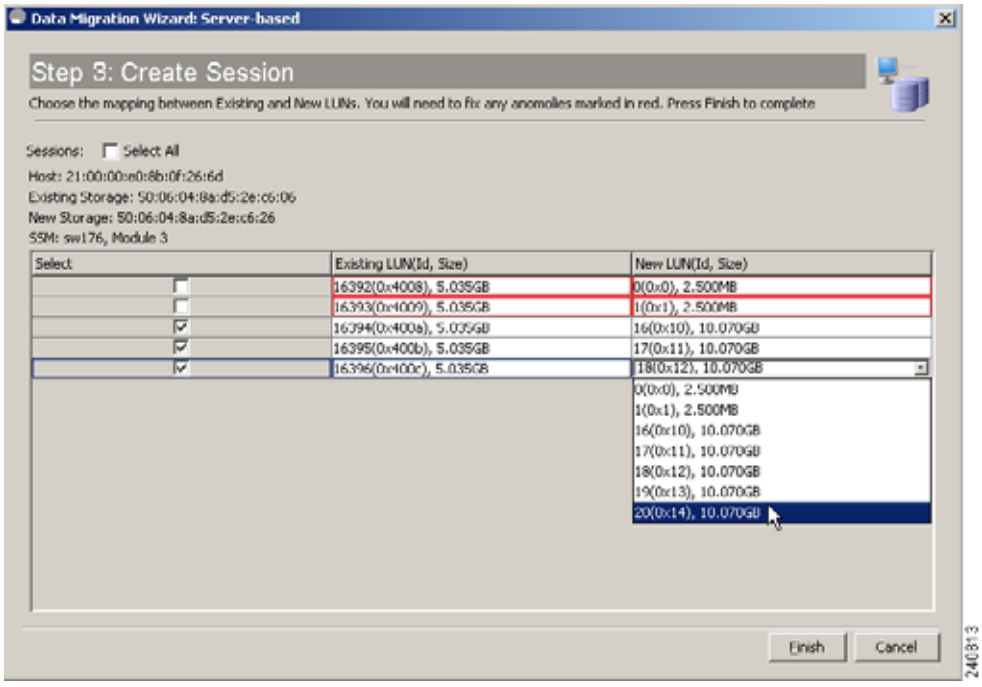
If the GUI detects a problem with a session, the GUI highlights the LUN fields in red. Figure 4-7 shows an example in which LUN 0 in the new storage is smaller than the matching LUN in the existing storage.

Figure 4-7 LUN Size Mismatch



To manually override the preselected LUN match, click the Existing LUN/Size or New LUN/Size field. The field expands to show the available LUN choices (see Figure 4-8). Select the existing and new LUNs that you want to match up.

Figure 4-8 Selecting a LUN



Note Note: The LUN for the new storage must have the same or greater capacity than the existing storage.

Configuring a Storage-Based Migration Job

The DMM GUI wizard guides the user through the steps required to configure a storage-based job. The topology for this example is dual-fabric with multipath ports defined in the server and in the storage devices.

The wizard creates and configures the job in five steps, which are described in the following sections:

- Creating a Job and Selecting Storage Enclosures (Storage-Based Migration), page 4-12
- Selecting SSMs for the Migration (Storage-Based Migration), page 4-14
- Configuring the Virtual Initiators in the Storage Arrays (Storage-Based Migration), page 4-15
- Verifying the New Zone (Storage-Based Migration), page 4-16
- Configuring Migration Sessions, page 4-17

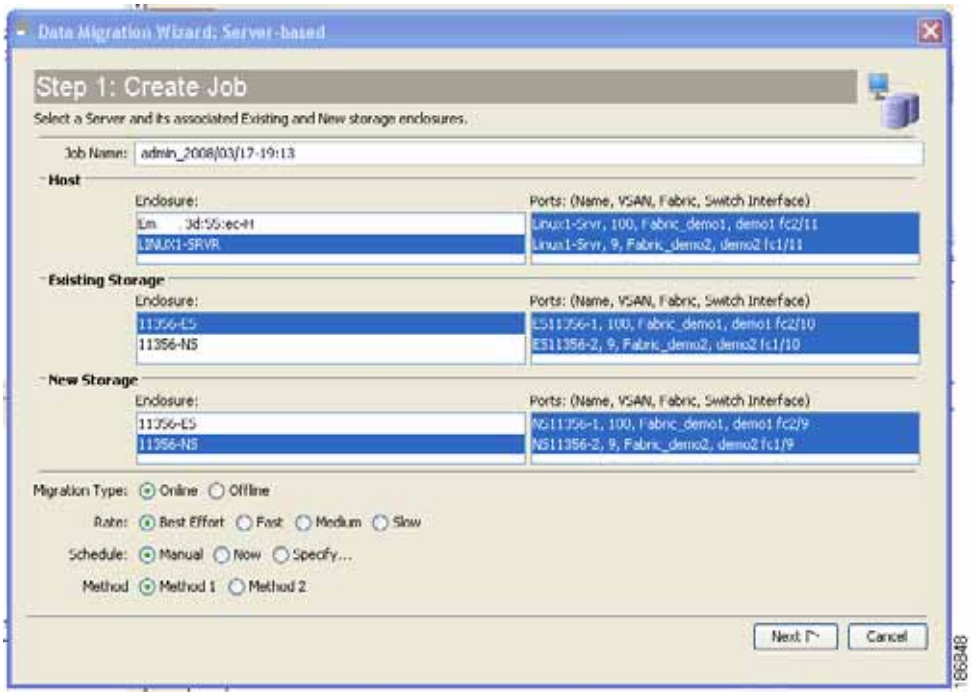
Creating a Job and Selecting Storage Enclosures (Storage-Based Migration)

To create a storage-based data migration job, launch Fabric Manager and perform this task:

Step 1 In the Tools menu, choose **Data Mobility Manager > Storage based**.

You see the Create Job window, as shown in Figure 4-9.

Figure 4-9 Create Job Window (Storage-Based)



Step 2 From the Enclosure field of the Existing Storage pane, choose the existing storage enclosure.

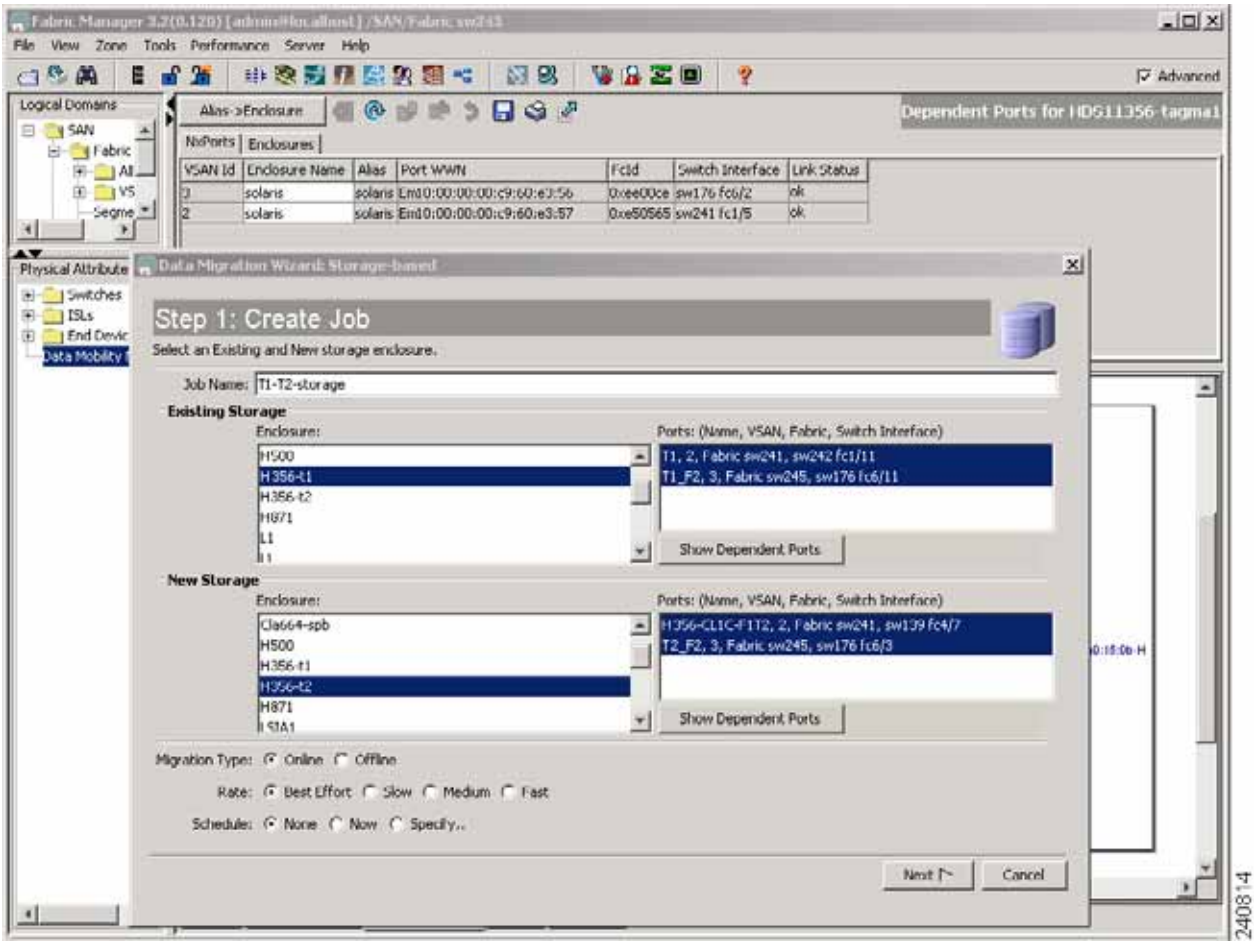
Step 3 The wizard selects all of the ports to include in the job. If the storage is an active-passive array, select only the active ports. For additional information about ports to include for an active-passive array, see section “Single LUN Set, Active-Passive Array” section on page 6-7.

Step 4 From the Enclosure field of the New Storage pane, choose the new storage enclosure

Step 5 The wizard selects all of the ports to include in the job. If the storage is an active-passive array, select only the active ports. For additional information about ports to include for an active-passive array, see section “Single LUN Set, Active-Passive Array” section on page 6-7.

Step 6 (Optional) Click the **Show Dependent Ports** button to display all host ports zoned by the selected storage. The host ports are displayed in the Hosts area of the Fabric Manager window. See Figure 4-10. If the new storage is not zoned, the Hosts area displays all hosts connected to the new storage.

Figure 4-10 Dependent Ports for a Storage-Based Migration



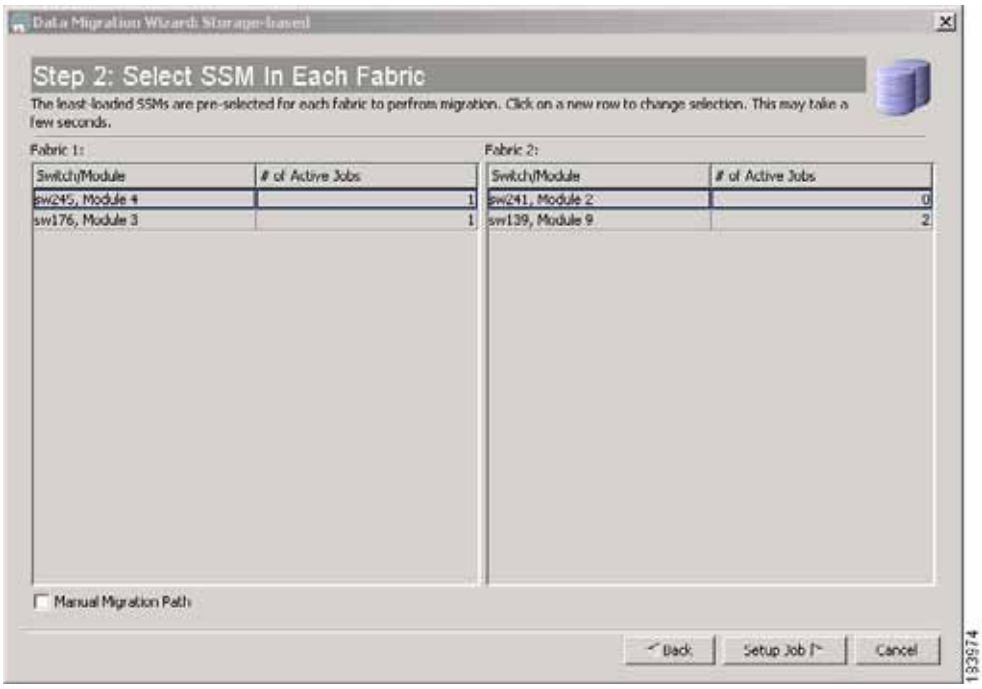
Step 7 Click **Next**.

You see the Select SSM window. See Figure 4-11.

Selecting SSMs for the Migration (Storage-Based Migration)

Figure 4-11 shows the Select SSM window, which displays the available SSMs to run the migration job.

Figure 4-11 Select SSMs for Storage-Based Job



The wizard preselects the least-loaded SSM in each fabric and automatically selects the path for each source/destination port pair.

If the selections are acceptable, you can click **Setup Job** to proceed to the next configuration task. The wizard sends the job configuration information to both SSMs and the SSMs create the data migration job. The SSMs return information (such as LUN maps) that is required to configure sessions. You see the DPP VI Selection window. See Figure 4-12.

To manually select SSMs or migration paths for the data migration, perform this task:

Step 1 (Optional) Click a new row to select an SSM. Hold down the **Control** key and click to deselect a row. The number of active jobs in each SSM is displayed in the # of Active Jobs field.

Step 2 (Optional) Check the **Manual Migration Path** check box to view and manually select source/destination paths. This action causes a pop-up window to open after you perform step 3. For information about selecting paths see the "Selecting Paths to Existing and New Storage" section on page 4-18.

Step 3 Click **Setup Job**.

If you had checked the **Manual Migration Path** check box, you see Choose Existing and New Path window. See Figure 4-5.

Step 4 (Optional) To select a migration path, click a row to select a path.

Step 5 When you have chosen an existing and new path, click **Next**.

The wizard sends the job configuration information to both SSMs and the SSMs create the data migration job. The SSMs return information (such as LUN maps) that is required to configure sessions.

If the job configuration is OK, you see the DPP VI Selection window, as shown in Figure 4-12.

If the job configuration contains errors, you see a pop-up window with the following error message:

- Mismatched number of LUNs.

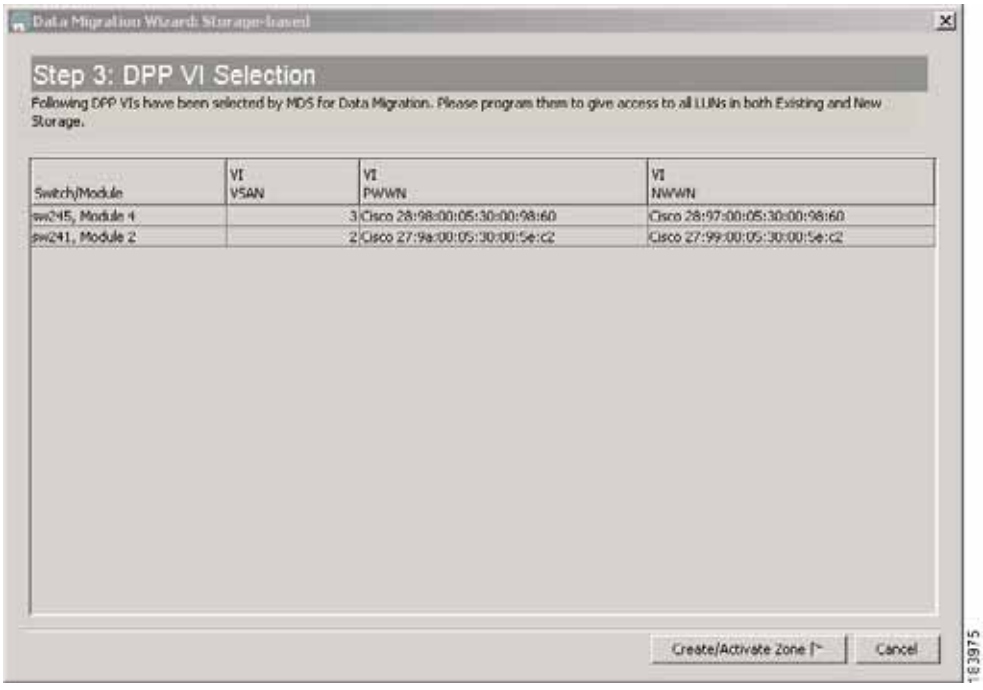
  If the number of LUNs on the existing and new storage do not match, the wizard generates an error message and stops. You need to correct the LUN configurations on the storage devices.

Configuring the Virtual Initiators in the Storage Arrays (Storage-Based Migration)

In a storage-based job, the DMM feature creates a virtual initiator (VI) for each SSM that was selected for the current job. The VI is created in the same VSAN as the storage ports (existing and new). If the job contains multiple storage ports, DMM creates the VI in one of the VSANs.

For the data migration to work correctly, you must configure the storage arrays (existing and new) to allow the VIs access to all LUNs that are being migrated. The VI information is displayed in the DPP VI Selection window, as shown in Figure 4-12.

Figure 4-12 DPP VI Selection



To configure the VIs, perform this task:

Step 1 For each SSM, choose a VI from the dropdown list.

Step 2 Configure the chosen VIs in the existing and new storage devices to allow access to the LUNs being migrated.The exact configuration steps to follow are manufacturer-specific.

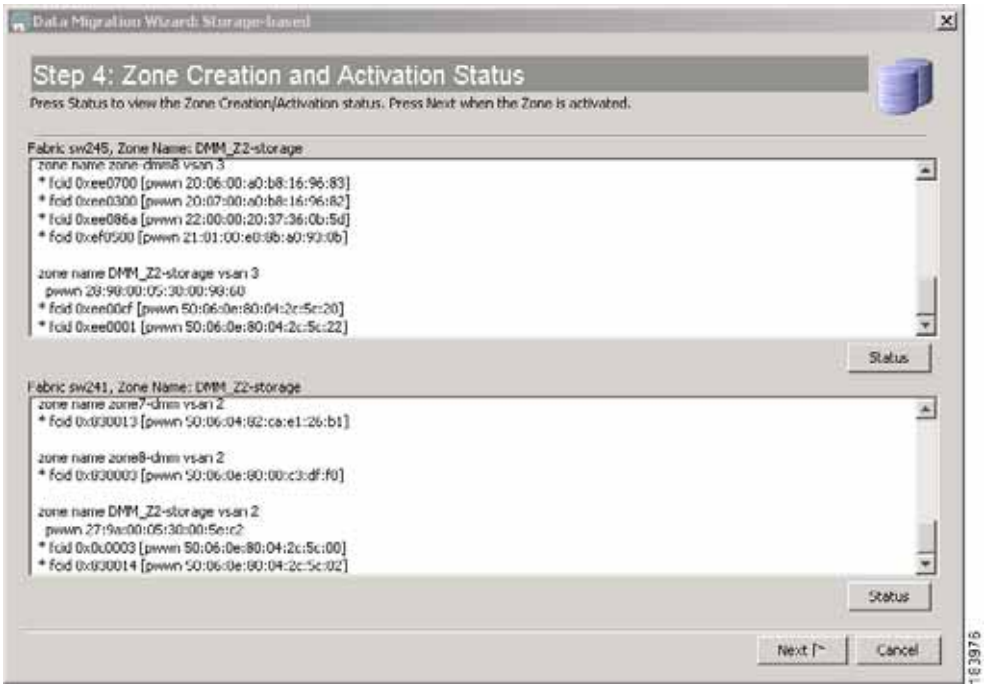
Step 3 Click **Create/activate zone**. You will see the zone creation and activation status window as shown in Figure 4-13.

Note If your storage array provides host group configuration (Example: EMC arrays), ensure that the VIs are added to the same host group as the servers that access the array. This must be done for both existing and new storage.

Verifying the New Zone (Storage-Based Migration)

In a storage-based job, the DMM feature creates a new zone using the job name as the zone name. As shown in Figure 4-13, the Zone Creation and Activation Status window displays information about all zones in each of the two fabrics.

Figure 4-13 Zone Creation Window



To verify the new zones, perform this task:

Step 1 For each fabric, scroll to the end of the list. The newly created zone is at the end of the list. Verify that the activated zones are OK.

Step 2 Click **Next**.

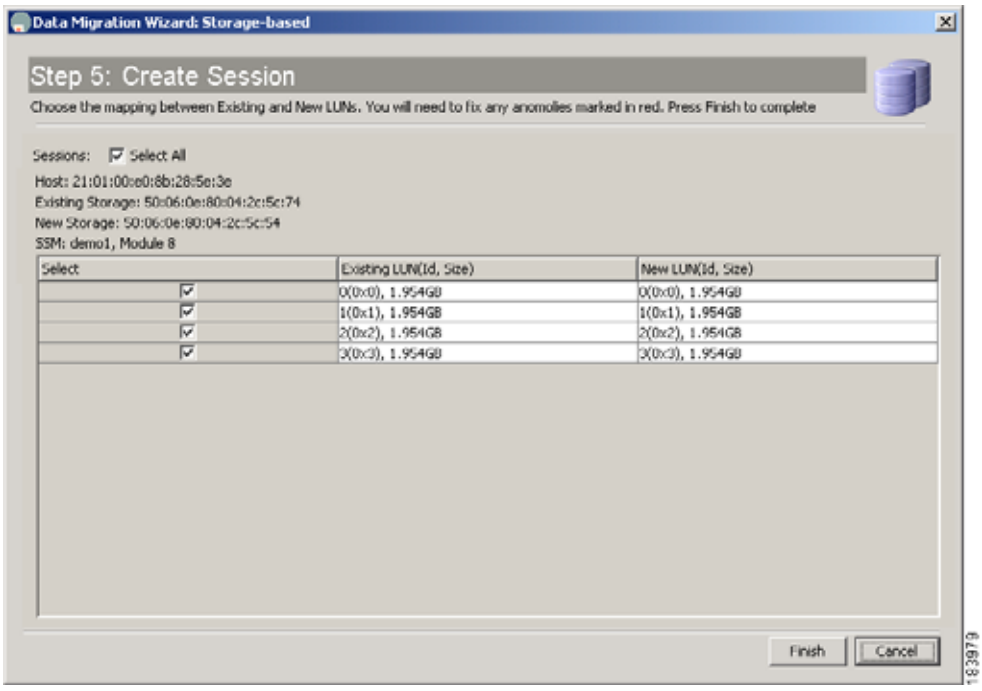
You see the Create Session window, as shown in Figure 4-14.

Note The zone created in step1 for each fabric should be removed after the job is deleted. The zone removal process might involve removing the zone from the zone database of all the MDS switches in the SAN (including the switches without the SSM module). Always remove the VIs from all zones from where it is configured after the job is deleted.

Configuring Migration Sessions

The Create Session window displays the LUNs available for migration, as shown in Figure 4-14.

Figure 4-14 Create Sessions Window



To create sessions for the data migration job, perform this task:

Step 1 The wizard preselects default matches of existing and new LUN pairs.

Step 2 Check/uncheck the **Select** check boxes to select/deselect sessions for this data migration job. Each session is a source/destination LUN pair.

Step 3 (Optional) Check the **Load Balance** check box to balance the sessions between SSMs.

Step 4 (Optional) Correct any anomalies, which are highlighted in red. See the “Correcting Session Anomalies” section on page 4-10 for details.

Step 5 Click **Finish**.

This sends the data migration session configurations to the SSMs. DMM updates the Data Migration Status area in the Fabric Manager window to display the new data migration job.

Note LUN is the Logical Unit Number as reported by the SCSI REPORT LUNS command [SCSI Opcode 0xA0. See SPC-3 SCSI Standard for more details]. This is the LUN Identifier as displayed by DMM, which is used in Session configuration. Use this definition when mapping devices seen by the Server to the drives exported by the Storage Port.

Optional Configuration Steps

The DMM GUI wizard provides two optional configuration steps that apply to both types of data migration jobs (server-based and storage-based).

If the DMM feature cannot automatically correlate the LUN maps across multiple paths for the existing storage or the new storage, the wizard displays the configuration steps to manually correlate the LUNs.

The following sections provide a description of the additional configuration steps:

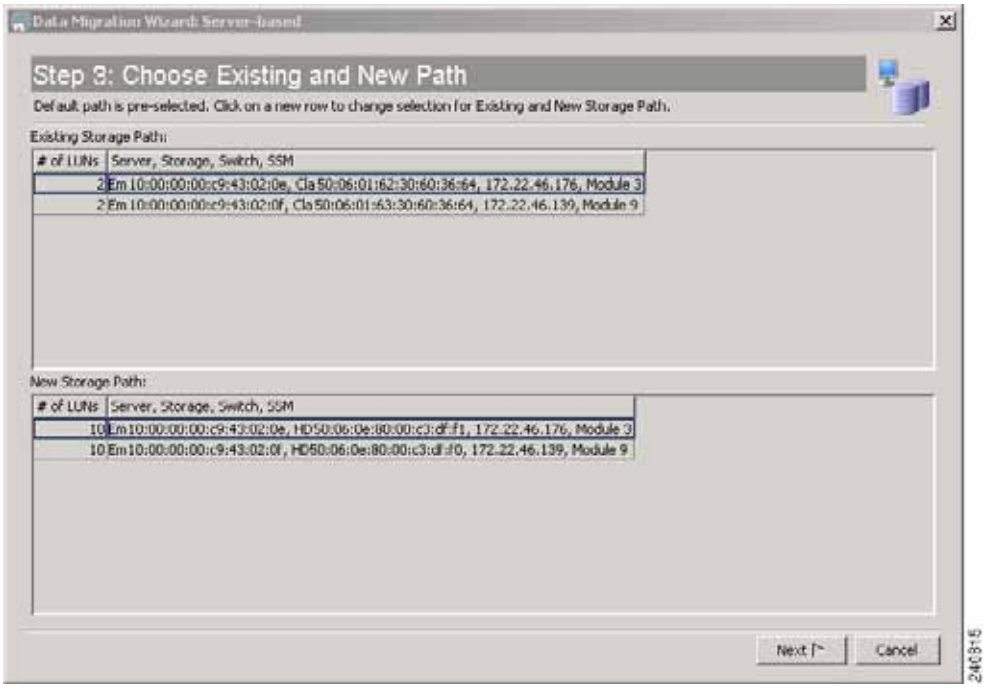
- Selecting Paths to Existing and New Storage, page 4-18
- Correlating LUN Maps (Existing Storage), page 4-19
- Correlating LUN Maps (New Storage), page 4-21

Selecting Paths to Existing and New Storage

The data migration wizard automatically selects a path through the SAN for each source/destination port pair. To manually select the source/destination path,

If you checked the **Manual Migration Path** check box in the Select SSM window**,** you see the Choose Existing and New Path window, as shown in Figure 4-15. This window shows all the available paths, with the selected paths highlighted.

Figure 4-15 Select Paths



To select a migration path, perform this task:

Step 1 Click a path to select or deselect the path.

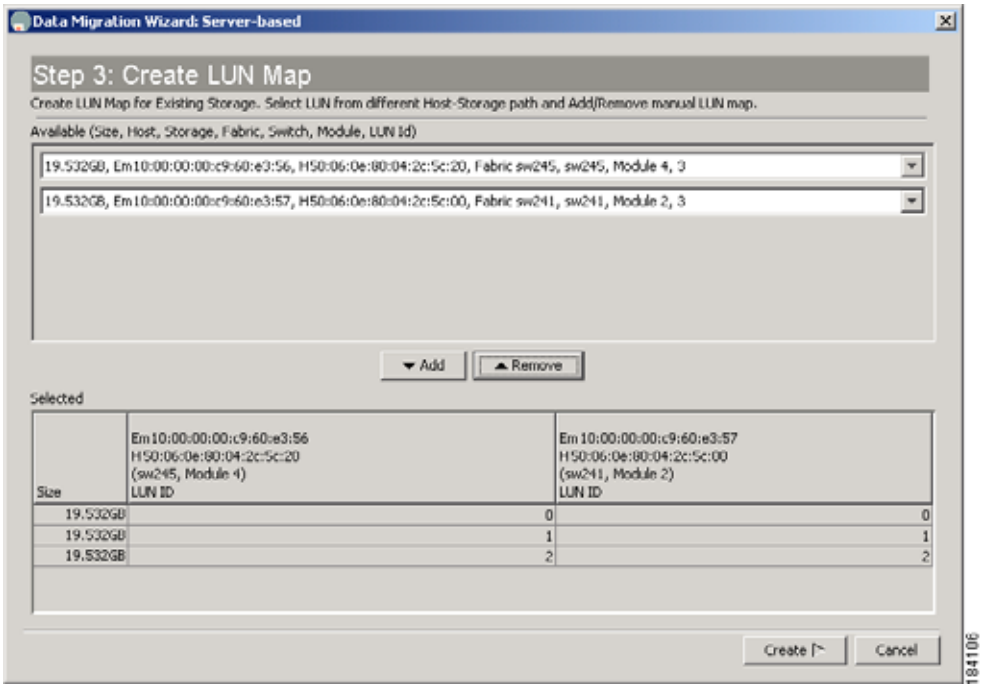
Step 2 When you have selected an existing and new storage path, click **Next**.

Note You must select one existing storage path and one new storage path.

Correlating LUN Maps (Existing Storage)

After you click **Setup Job** in the Select SSM window, DMM automatically correlates the LUN maps. If DMM is unable to correlate the LUN maps for paths to the existing storage, you see the Create LUN Map window, as shown in Figure 4-16.

Figure 4-16 Correlate LUN Map (Existing Storage)



To correlate the LUN maps for the existing storage, perform this task:

Step 1 Use the pull down lists to select a matching set of LUNs on the existing storage paths.

Step 2 Click the **add** button to add the LUN set to the selected list.

Step 3 Repeat step 1 and step 2 for each of the LUN sets.

Step 4 Click **Create**.

This opens the Create LUN Map window (for the new storage).

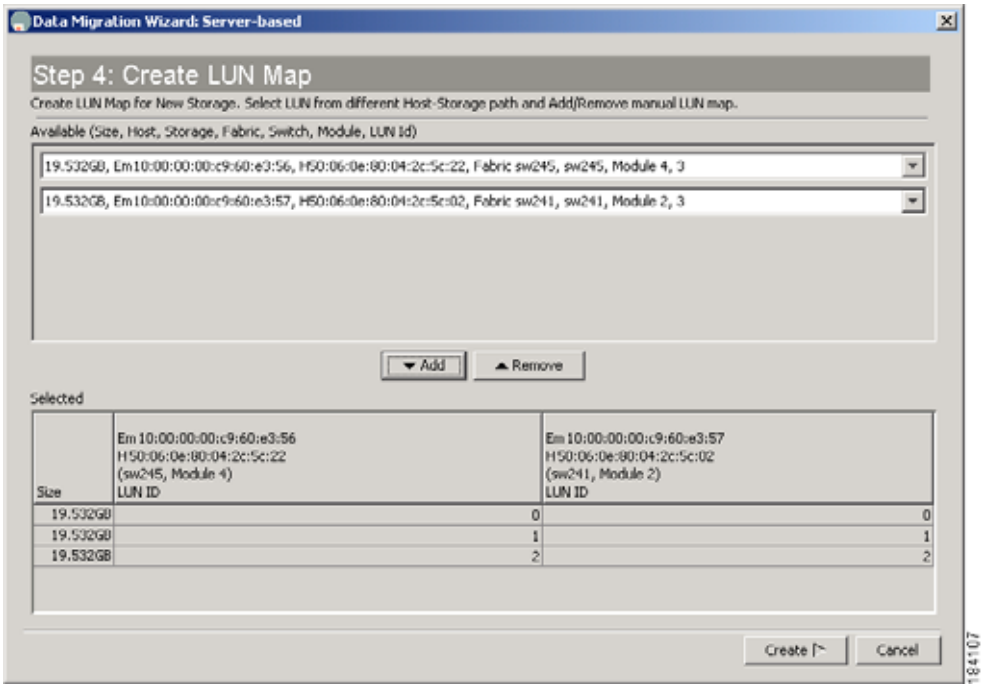
Note For a storage migration job, the path from the VIs are also displayed and also require correlation.

Note Note: You must correlate an existing LUN to only one new LUN.

Correlating LUN Maps (New Storage)

After you click **Setup Job** in the Select SSM window, DMM automatically correlates the LUN maps. If DMM is unable to correlate the LUN maps for paths to the new storage, you see the Create LUN Map window, as shown in Figure 4-17.

Figure 4-17 Correlate LUN Map (New Storage)



To manually correlate the LUNs for the new storage, perform this task:

Step 1 Use the pull down lists to select a matching set of LUNs on the new storage.

Step 2 Click the **add** button to add the LUN set to the **Selected** list.

Step 3 Repeat step 1 and step 2 for each of the LUN sets.

Step 4 Click **Create**.

This opens the Configure Session window, which displays the available migration sessions.

Note For a storage migration job, the path from the VIs are also displayed and also require correlation.

Displaying the Data Migration Status

To display the Data Migration Status, perform this task:

Step 1 Click **Data Mobility Manager** in the physical attributes panel.

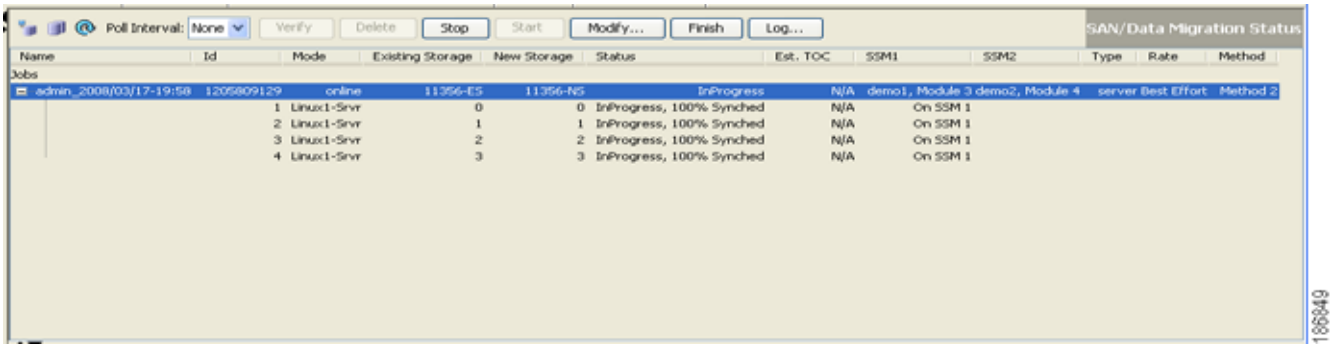
The Job Status area appears in the upper right quarter of the display. The area is labeled “Data Migration Status”.

Using the Data Migration Status

To display Data Migration Status in the Information pane, expand **End Devices** and then select **Data Mobility Manager** in **Physical Attributes**.

The Data Migration Status displays the status of data migration jobs and their sessions (see Figure 4-18). The Data Migration Status also provides a toolbar containing tools to create new jobs and perform operations on existing jobs.

Figure 4-18 Data Migration Status



Note If the DMM job consists of more than ten sessions, at any given instance a maximum of ten sessions are executed simultaneously.

Job Status Display Fields

The job status display is arranged as a table. Each row of the table displays information about one job. You can expand the job to display a table row for each session in the job. If the DMM job consists of more than 10 sessions at any given instance, a maximum of 10 sessions are executed simulataneously. Table 4-1 describes the information that is displayed in the fields for jobs and sessions.

Table 4-1 Field Definitions in the Job Status Display

Field	Description for a Job Row	Description for a Session Row
Name	The name of the job.	This field is blank.
Id	System-assigned unique identifier for the job.	The session number within the job.
Mode	Server mode or storage mode.	This field is blank.
Existing Storage	Alias name of the port on the existing storage.	LUN number on the existing storage.
New Storage	Alias name of the port on the new storage.	LUN number on the new storage.
Status	Status of the job: a created or scheduled job has not yet started. An in-progress job is currently performing the migration. A completed or verified job has finished successfully. A stopped, failed or reset job has finished unsuccessfully.	Status of the session.
Est.TOC	An estimation of time to complete the migration for the entire job.	An estimation of time to complete the migration for the given session of a job.
SSM1	Switch number and slot of the SSM executing the migration job.	Displays **On SSM 1** if the session is executing on SSM 1.
SSM2	Switch number and slot of the SSM executing the migration job.	Displays **On SSM 2** if the session is executing on SSM 2.
Type	Online or offline migration.	This field is blank.
Rate	Best effort, slow, medium, or fast. You set the rate when you configure the migration job. See the “Creating a Server-Based Migration Job” section on page 4-4.	This field is blank.
Method	The method chosen for the Data Migration Job.	The method chosen for the Data Migration Job.

Table 4-2 shows the job status values and provides their descriptions.

Table 4-2 Job Status Values

Job Status Value	Description
Created	The job has been created, but has not been scheduled.
Scheduled	The job has been configured with a scheduled start time. It will automatically start at that time.
InProgress	The job is currently running.

Table 4-2 Job Status Values (continued)

Job Status Value	Description
Finishing InProgress	Method 2 is currently in the final pass of migration.
Completed	The job is completed successfully.
Verifying	The completed job is being verified.
Verify stopped	The verificaton of the job is stopped.
Verify failed	The verificaton of the job had failed.
VerifyCompleted	The completed job is verified.
Stopped	The job is stopped manually by the user.
Failed	The job is stopped because of failures related to storage I/O.
Reset	The job is reinitialized because of failures related to the SAN or IP network. Failure examples include port flaps, connection loss between peer SSMs, or SSM reloads.

Table 4-3 shows the session status values and provides their descriptions.

Table 4-3 Session Status Values

Session State Value	Description
Created	The session has been created, but the data migration has not started running.
InProgress [1]	The data migration for this session is in progress.
VerifyInProgress	The verification of the session is in progress.
VerifyComplete	The verification of the session is complete.
Complete	The session has completed successfully.
Failed	The session has failed because of an internal problem.
Suspended	The user has suspended execution of the session.
I/O Failure	The session has failed because of an I/O problem.
Internal Failure	The session has failed because of internal processing errors.

1. 1-**%Synched** specifies the percentage migrated.

Job Status Display DMM Commands

You can invoke commands on DMM jobs by clicking on the command buttons displayed above the list of jobs. The command buttons are context sensitive. Commands are valid or not valid depending on the job status of the selected job or jobs. Command buttons are grayed out for commands that are not valid for any of the selected jobs. For example, the Stop button is available only when one or more data migration session is in progress.

Table 4-4 shows the data migration commands and provides their descriptions.

Table 4-4 Command Valid States

Command	Description	Valid Job Status Values
Verify	Performs offline verification of the selected job. User is prompted to confirm the verification command.	Completed, InProgress.
Delete	Deletes the selected job (or jobs) and retrieves the job execution log from the SSM. User is prompted to confirm the delete command.	Stopped, Failed, Completed, Reset.
Stop	Stops the selected job.	InProgress, Finishing, Verify InProgress.
Start	Starts the selected job.	Created, Reset.
Modify	Allows you to modify the job attributes or configure a start time for the selected job.	Created, Scheduled, Reset, Stopped.
Finish	Blocks the server access to the existing storage and begins the final pass of migration (only applicable for Method 2).	InProgress.
Log	Opens the DMM log for the selected job.	All job status values.

The following sections contain additional information about the commands:

- Verifying Jobs, page 4-25
- Deleting Jobs, page 4-26
- Starting and Stopping Jobs, page 4-26
- Modifying Jobs, page 4-26
- Finishing Jobs, page 4-27
- Displaying Job Logs, page 4-27

Verifying Jobs

When a job is in completed state, the Verify button is activated in the DMM session status display.

Note Verification is performed in offline mode. Any application using the existing storage needs to be quiesced before you start verification.

The SSM reads each migration region from the existing and new storage, and then performs a comparison of the data.

You can verify multiple jobs simultaneously. However, the verification uses shared hardware resources in the SSM. If you try to verify a job for which the resource is already in use (verifying another job), the command fails.

To verify a job, perform this task:

Step 1 Select the job to be verified from the list in the Data Migration Status pane.

Step 2 Click the **Verify** button in the Data Migration Status tool bar.

You see a confirmation pop-up window.

Step 3 Click OK.

Deleting Jobs

Click the **Delete** button to permanently delete the selected job (or jobs). You are prompted to confirm the delete operation.

When you delete a job, DMM retrieves the job execution log from the SSM to a location on the FM server. You can find the job activity log in the following directory: C:\Documents and Settings\<user>\.cisco_mds9000\tftp\dmm for more details.

You can select multiple jobs for deletion at the same time. This capability is useful when migrating active-passive arrays, which require at least two simultaneous jobs to perform the migration.

Starting and Stopping Jobs

Click the **Stop** button to stop a job that is in progress. Restart the job by clicking the **Start** button.

Modifying Jobs

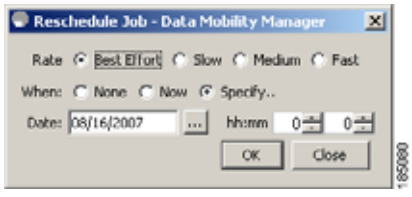
You can change the schedule by performing the following task;

Step 1 Select the job to be verified from the list in the Data Migration Status pane.

Step 2 Click the **Modify** button in the Data Migration Status tool bar.

You see the Reschedule Job pop-up window, as shown in Figure 4-19.

Figure 4-19 Modify Schedule

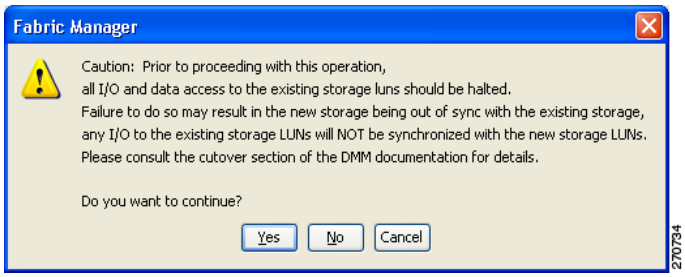


Step 3 Modify the migration rate and schedule as required.

Step 4 Click **OK**.

Finishing Jobs

For a Method 2 Data Migration Job, the **finish** operation needs to be performed. Until the **finish** operation is performed, the job continues to remain in the InProgress state. On clicking **finish**, server access to the existing storage LUNs are blocked. Cisco MDS DMM then performs the process of migrating the final list of changed blocks from the existing storage LUNs to new storage LUNs for the last time. A Method 2 DMM job can be deleted only in the completed state.



Displaying Job Logs

Click the **Log** button to display the Job Log for the selected job.

The job log from both SSMs for dual fabric job includes the following information:

- Created time
- Scheduled time
- Start time
- Finish-request time
- Completed time
- Failed time
- Stopped time
- Verify start time
- Verify completed time
- Verify failed time

Post-Migration Activities

After the data migration job has completed successfully, you need to reconfigure the server to use the new storage. The exact post-migration configuration steps vary depending on the operating system of the server.

Reconfiguration may include the following steps:

- Perform a graceful shut down of all server applications that use the migrated LUNs, to ensure that there are no pending I/O operations on the existing storage.
- Unmount the existing storage file system.

- Configure zoning to remove host access to the existing storage. After this the migration job will go into **Reset** state. This is not an error.
- For **Method 1**- Use the DMM GUI to delete the data migration job. The SSM removes the FC-Redirect entries, so that server and storage traffic no longer flows through the SSM.

  For **Method 2**- Use the DMM GUI to finish the data migration job. When the job moves to Completed state, delete the data migration job. See Finishing Jobs for more details.
- Configure zoning to add host access to the new storage.
- From the server, scan for the new storage.
- Mount the file system for the new storage.
- From the server, restart the server applications to access data from the new storage.
- (Optional) Remove the existing storage:
  - Reconfigure the server to remove the existing storage LUNs.
  - Remove the existing storage from the SAN.

CHAPTER 5

Troubleshooting Cisco MDS DMM

This chapter describes procedures used to troubleshoot the data migration feature in the Cisco MDS 9000 Family multilayer directors and fabric switches. This chapter contains the following sections:

DMM Overview

Cisco MDS DMM is an intelligent software application that runs on the Storage Services Module (SSM) of an MDS switch. With Cisco MDS DMM, no rewiring or reconfiguration is required for the server, the existing storage, or the SAN fabric. The SSM can be located anywhere in the fabric, as Cisco MDS DMM operates across the SAN. Data migrations are enabled and disabled by software control from the Cisco Fabric Manager.

Cisco MDS DMM provides a graphical user interface (GUI) (integrated into Fabric Manager) for configuring and executing data migrations. Cisco MDS DMM also provides CLI commands for configuring data migrations and displaying information about data migration jobs.

Best Practices

You can avoid problems when using DMM if you observe the following best practices:

- Use the SLD tool.

  The DMM feature includes the Array-Specific Library (ASL), which is a database of information about specific storage array products. DMM uses ASL to automatically correlate LUN maps between multipath port pairs.

Use the SLD CLI or GUI output to ensure that your storage devices are ASL classified.

For migration jobs involving active-passive arrays, use the SLD output to verify the mapping of active and passive LUNs to ports. Only ports with active LUNs should be included in migration jobs.

For more information about the SLD tool, see Checking Storage ASL Status, page 3-2.

- Create a migration plan.

  Cisco MDS DMM is designed to minimize the dependency on multiple organizations, and is designed to minimize service disruption. However, even with Cisco MDS DMM, data migration is a fairly complex activity. We recommend that you create a plan to ensure a smooth data migration.

- Configure enclosures.

  Before creating a migration job with the DMM GUI, you need to ensure that server and storage ports are included in enclosures. You need to create enclosures for server ports. If the server has multiple single-port HBAs, all of these ports need to be included in one enclosure. Enclosures for existing and new storage ports are typically created automatically.

- Follow the topology guidelines.

  Restrictions and recommendations for DMM topology are described in the “DMM Topology Guidelines” section on page 6-3.

- Ensure all required ports are included in the migration job

  When creating a data migration job, you must include all possible server HBA ports that access the LUNs being migrated. This is because all writes to a migrated LUN need to be mirrored to the new storage until the cut over occurs, so that no data writes are lost.

  For additional information about selecting ports for server-based jobs, refer to the “Ports to Include in a Server-Based Job” section on page 6-4.

License Requirements

Each SSM with Cisco MDS DMM enabled requires a DMM license. DMM operates without a license for a grace period of 180 days.

DMM licenses are described in the “Using DMM Software Licenses” section on page 2-1.

Initial Troubleshooting Checklist

Begin troubleshooting DMM issues by checking the troubleshooting checklist in Table 5-1.

Table 5-1 Initial Troubleshooting Checklist

Checklist	Checkoff
Verify that an SSM is installed in each fabric, and DMM is enabled on the SSMs.	❑
Verify that your DMM licenses are valid.	❑
Verify that DMM is the only intelligent application running on the SSM.	❑
Verify that the existing and new storage devices are connected to a switch that supports FC-Redirect	❑

Table 5-1 Initial Troubleshooting Checklist (continued)

Checklist	Checkoff
Verify SAN OS 3.2(1) or later is running on the switches hosting the SSM and the storage.	❑
Verify IP connectivity between peer SSMs, by using the **ping** command.	❑

Common Troubleshooting Tools

The following navigation paths may be useful in troubleshooting DMM issues using Fabric Manager:

- Select **End Devices** > **SSM Features** to access the SSM configuration.
- Select **End Devices** > **Data Mobility Manager** to access the DMM status and configuration.

The following CLI commands on the SSM module may be useful in troubleshooting DMM issues:

- show dmm job
- show dmm job job-id *job-id* details
- show dmm job job-id *job-id* session

Note You need to connect to the SSM module using the **attach module** command prior to using the **show dmm** commands.

Troubleshooting Connectivity Issues

This section covers the following topics:

Cannot Connect to the SSM

Problems connecting the SSM can be caused by SSH, zoning, or routing configuration issues. Table 5-2 shows possible solutions.

Table 5-2 Cannot Connect to the SSM

Symptom	Possible Cause	Solution
Cannot connect to the SSM.	SSH not enabled on the supervisor module.	Enable SSH on the switch that hosts the SSM. See Configuring SSH on the Switch, page 2-2.
	Zoning configuration error.	If VSAN 1 default zoning is denied, ensure that the VSAN 1 interface (supervisor module) and the CPP IP/FC interface have the same zoning. See Configuring IP Connectivity, page 2-3
	IP routing not enabled.	Ensure that IPv4 routing is enabled. Use the **ip routing** command in configuration mode.
	IP default gateway.	Configure the default gateway for the CPP IPFC interface to be the VSAN 1 IP address. See Configuring IP Connectivity, page 2-3

No Peer-to-Peer Communication

Table 5-3 shows possible solutions to problems connecting to the peer SSM.

Table 5-3 No Peer-to-Peer Communication

Symptom	Possible Cause	Solution
Cannot ping the peer SSM.	No route to the peer SSM.	Configure a static route to the peer SSM. See Configuring IP Connectivity, page 2-3

Connection Timeouts

If the DMM SSH connection is generating too many timeout errors, you can change the SSL and SSH timeout values. These properties are stored in the Fabric Manager Server properties file (Cisco Systems/MDS 9000/conf/server.properties). You can edit this file with a text editor, or you can set the properties through the Fabric Manager Web Services GUI, under the Admin tab.

The following server properties are related to DMM:

- **dmm.read.timeout**—Read timeout for job creation. The default value is 60 seconds. The value is displayed in milliseconds.
- **dmm.read.ini.timeout**—Read timeout for a job or session query. The default value is 5 seconds. The value is displayed in milliseconds.
- **dmm.connect.timeout**—SSH connection attempt timeout. The default value is 6 seconds. The value is displayed in milliseconds.
- **dmm.connection.retry**—If set to true, DMM will retry if the first connection attempt fails. By default, set to true.

Troubleshooting Job Creation Issues

The DMM GUI displays error messages to help you troubleshoot basic configuration mistakes when using the job creation wizards. See Creating a Server-Based Migration Job, page 4-4. A list of potential configuration errors is included after the last step in the task.

The following sections describe other issues that may occur during job creation:

- Failures During Job Creation, page 5-5
- DMM License Expires, page 5-6
- Scheduled Job is Reset, page 5-6
- Failures during Sessions Creation, page 5-7

Failures During Job Creation

If you make a configuration mistake while creating a job, the job creation wizard displays an error message to help you troubleshoot the problem. You need to correct your input before the wizard will let you proceed.

Table 5-4 shows other types of failures that may occur during job creation.

Table 5-4 Failures During Job Creation

Symptom	Possible Cause	Solution
Create Job failures.	No SSM available.	Ensure that the fabric has an SSM with DMM enabled and a valid DMM license.
	Job infrastructure setup error. Possible causes are incorrect selection of server/storage port pairs, the server and existing storage ports are not zoned, or IP connectivity between SSMs is not configured correctly.	The exact error is displayed in the job activity log. See the “Opening the Job Error Log” section on page 5-5.
	LUN discovery failures.	Use the SLD command in the CLI to check that the LUNs are being discovered properly.

Opening the Job Error Log

To open the job activity log, follow these steps:

Step 1 (Optional) Drag the wizard window to expose the Data Migration Status command bar.

Step 2 Click the **refresh** button.

Step 3 Select the job that you are troubleshooting from the list of jobs.

Step 4 Click the **Log** command to retrieve the job error log.

Step 5 The job information and error strings (if any) for each SSM are displayed.

Step 6 Click **Cancel** in the Wizard to delete the job.

Note You must retrieve the job activity log before deleting the job.

DMM License Expires

If a time-bound license expires (or the default grace period expires), note the following behavior:

- All jobs currently in progress will continue to execute until they are finished.
- Jobs which are configured but not scheduled will run when the schedule kicks in
- Jobs which are stopped or in a failure state can also be started and executed.
- If the switch or SSM module performs a restart, the existing jobs cannot be restarted until the switch has a valid DMM license.

Scheduled Job is Reset

If the SSM or the switch performs a restart, all scheduled DMM jobs are placed in Reset state. Use the **Modify** command to restore jobs to the Scheduled state.

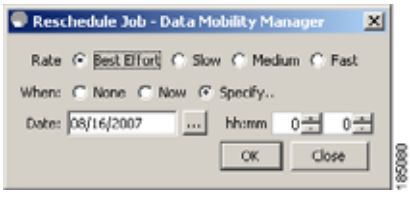
For each job, perform the following task:

Step 1 Select the job to be verified from the job list in the Data Migration Status pane.

Step 2 Click the **Modify** button in the Data Migration Status tool bar.

You see the Reschedule Job pop-up window, as shown in Figure 5-1.

Figure 5-1 Modify Job Schedule



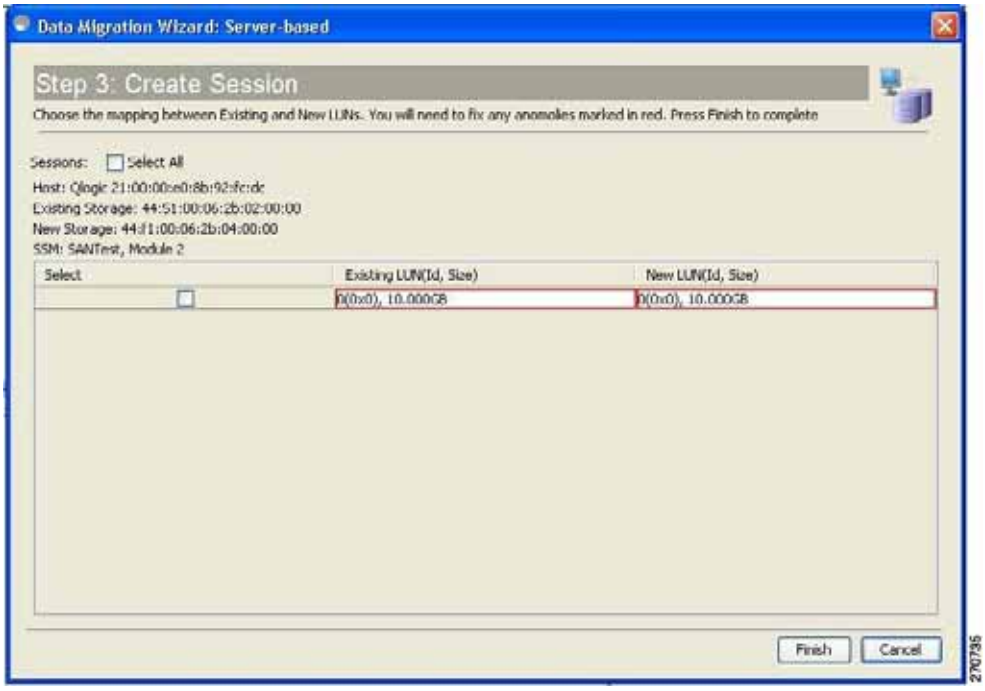
Step 3 The originally configured values for migration rate and schedule are displayed. Modify the values if required.

Step 4 Click **OK**.

The job is automatically validated. If validation is successful, the job transitions into scheduled state. If you selected the Now radio button, the job starts immediately.

Failures during Sessions Creation

Figure 5-2 Failures during sessions creation



This section helps you troubleshoot an error when the new storage is smaller in size than the existing storage.The above figure in the DMM configuration wizard allows the user to configure sessions for the data migration job. The wizard displays a default session configuration. If any session is marked in red (as in the above figure) it implies that the session LUN in the new storage is smaller in size than the session LUN in the existing storage.

Although the LUN values displayed on the wizard are identical, the displayed LUN value in Gigabytes (GB) is rounded off to the third decimal.

The actual size of the LUNs can be verified using the show commands on the SSM CLI by completing the following steps.

- Note down the host pWWN, existing storage pWWN and the new storage pWWN as displayed on the wizard screen. In the above figure (example) the values are:
  - Host: 21:00:00:e0:8b:92:fc:dc
  - Existing storage: 44:51:00:06:2b:02:00:00
  - New storage: 44:f1:00:06:2b:04:00:00
- Note down the SSM information displayed on the wizard screen. In the above example the SSM chosen for the session is "SSM:SANTest, Module 2", where SANTest is the switch and the SSM is Module 2 on that switch.
- From the switch console "attach" to the SSM console using the command **attach module**.
  - Example: **SANTest# attach module 2**
- On the SSM CLI, display the Job Information.

```
module-2# show dmm job
==================================================================================================
                      Data Mobility Manager Job Information
==================================================================================================
 Num     Job Identifier  Name                     Type  Mode  Method DMM GUI IP Peer SSM   DPP Session Status
==================================================================================================
  1      1205521523      admin_2008/03/14-12:05    SRVR  ONL   METHOD-1 10.1.1.5  NOT_APPL       5 CREATED

Number of Jobs :1
```

- Using the Job Identifier from the CLI output, display the job details.

```
module-2# show dmm job job-id 1205521523 detail
```

Look for server information in the output and note down the VI pWWN corresponding to the host port selected:

```
-----------------------------------------------------------------------
       Server Port List (Num Ports :1)
-----------------------------------------------------------------------
Num  VSAN  Server pWWN                  Virtual Initiator pWWN
-----------------------------------------------------------------------
  1    4   21:00:00:e0:8b:92:fc:dc      26:72:00:0d:ec:4a:63:82
```

- Using the storage pWWN and the VI pWWN, run the following command to get the LUN information for the existing and new storage:

Output for existing storage:

```
module-2# show dmm job job-id 1205521523 storage tgt-pwwn 44:51:00:06:2b:02:00:00 vi-pwwn
26:72:00:0d:ec:4a:63:82
show dmm job job-id 1205521523 storage tgt-pwwn 0x445100062b020000 vi-pwwn
0x2672000dec4a6382

Data Mobility Manager LUN Information
StoragePort: 00:00:02:2b:06:00:51:44 VI : 82:63:4a:ec:0d:00:72:26
-------------------------------------------------------------------------------
LUN Number: 0x0
VendorID  : SANBlaze
ProductID : VLUN FC RAMDisk
SerialNum : 2fff00062b0e445100000000
ID Len    : 32
ID        : 600062b0000e44510000000000000000
Block Len : 512
Max   LBA : 20973567
Size      : 10.000977 GB
```

Output for New Storage:

```
module-2# show dmm job job-id 1205521523 storage tgt-pwwn 44:f1:00:06:2b:04:00:00 vi-pwwn
26:72:00:0d:ec:4a:63:82
show dmm job job-id 1205521523 storage tgt-pwwn 0x44f100062b040000 vi-pwwn
0x2672000dec4a6382


Data Mobility Manager LUN Information
StoragePort: 00:00:04:2b:06:00:f1:44 VI : 82:63:4a:ec:0d:00:72:26
-------------------------------------------------------------------------------
LUN Number: 0x0
VendorID  : SANBlaze
ProductID : VLUN FC RAMDisk
SerialNum : 2fff00062b0e44f100000000
ID Len    : 32
ID        : 600062b0000e44f10000000000000000
Block Len : 512
Max   LBA : 20971519
Size      : 10.000000 GB
```

As you can see from the above example

```
Existing Storage : Max LBA : 20973567
                   Size :  10.000977 GB
New Storage       : Max LBA : 20971519
                    Size : 10.000000 GB
```

- Fix the LUN Size on the New Storage and reconfigure the Job.

Troubleshooting Job Execution Issues

If a failure occurs during the execution of a data migration job, DMM halts the migration job and the job is placed in Failed or Reset state.

The data migration job needs to be validated before restarting it. If the DMM job is in Reset state, FC-Redirect entries are removed. In the DMM GUI, validation is done automatically when you restart the job. In the CLI, you must be in Reset state to validate. You cannot validate in a failed state.

Note If a new port becomes active in the same zone as a migration job in progress, DMM generates a warning message in the system logs.

Troubleshooting job execution failures is described in the following sections:

- DMM Jobs in Fail State, page 5-9
- DMM Jobs in Reset State, page 5-10

DMM Jobs in Fail State

If DMM encounters SSM I/O error to the storage, the job is placed in Failed state. Table 5-5 shows possible solutions for jobs in Failed state.

Table 5-5 DMM Jobs in Failed State

Symptom	Possible Cause	Solution
DMM job status is Failed.	SSM failure.	If the SSM has performed a reload, you must restart or reschedule all failed jobs when the SSM returns to operational state.
	Server HBA port offline	Check the server status and server port status. When the server port is available, restart the migration.
	New storage port offline	Use FM to determine why the storage port is no longer online. When the storage port is available, restart the migration.
	Server IO failure	Check the DMM Job log for server IO failures.
	Migration IO failure	Check the DMM Job log for migration IO failures.
	Internal processing failure	Check the DMM Job log for internal processing errors.

DMM Jobs in Reset State

Table 5-6 shows possible causes and solutions for jobs in Reset state.

Table 5-6 DMM Jobs in Reset State

Symptom	Possible Cause	Solution
DMM Job fails to complete and is placed in Reset state.	Server HBA port offline	Check the server status and server port status. When the server port is available, restart the migration.
	Existing or new storage port offline	Use Fabric Manager to determine why the storage port is no longer online. When the storage port is available, restart the migration.
	Server or storage port is moved out of the zone	Correct the zone configuration and restart the data migration job.
	Existing Storage port is moved out of zone	Correct the zone configuration and restart the data migration job.
	New Storage port is moved out of zone	Correct the zone configuration and restart the data migration job.
	Loss of IP connectivity to the peer SSM	Restart the data migration job when IP connectivity has been restored.
	SSM failure	If the SSM has performed a reload, you must restart or reschedule all failed jobs when the SSM returns to operational state.

Troubleshooting General Issues

If you need assistance with troubleshooting an issue, save the output from the relevant **show** commands.

You must connect to the SSM to execute DMM **show** commands. Use the **attach module** *slot* command to connect to the SSM.

The **show dmm job** command provides useful information for troubleshooting DMM issues. For detailed information about using this command, see the DMM CLI Command Reference appendix.

Save the output of command **show dmm tech-support** into a file when reporting a DMM problem to the technical support organization.

Also run the **show tech-support fc-redirect** command on all switches with FC-Redirect entries. Save the output into a file.

DMM Error Reason Codes

If DMM encounters an error while running the job creation wizard, a popup window displays the error reason code. Error reason codes are are also captured in the Job Activity Log. Table 5-7 provides a description of the error codes.

Table 5-7 DMM Error Codes

Error Code	Description
DMM_JOB_NOT_PRESENT	A job with specified job id was not found on the SSM.
DMM_JOB_ID_DUPLICATE	Job creation using a job id that already exists on the SSM.
DMM_JOB_ID_ZERO	Job id 0 is a invalid job id.
DMM_JOB_VSAN_MISMATCH	Server port VSAN number and corresponding storage port VSAN number is different.
DMM_JOB_TYPE_MISMATCH	SSM received a storage job query for a server-based job.
DMM_JOB_CREATION_ERROR	SSM failed while creating the data structures for the job, which could be a memory allocation failure.
DMM_JOB_INTERNAL_ERROR	SSM failed while creating the data structures for the job, which could be a memory allocation failure.
DMM_JOB_SESSION_EXEC	Attempting to delete a job while one or more sessions are in progress. Stop the job first before trying to delete it.
DMM_JOB_DPP_ALLOC_FAILURE	No DPP available to create a job. The maximum number of allowed jobs on a DPP exceeded.
DMM_JOB_INFRA_SETUP_ERROR	Failed to setup infrastructure for a job. Possible causes are incorrect selection of server/storage port pairs, the server and existing storage ports are not zoned, or IP connectivity between SSMs is not configured correctly.
DMM_JOB_INFRA_REMOTE_LMAP_ERR_TCP_DN	Failure to establish connection with the peer SSM during job creation.
DMM_JOB_INFRA_FC_REDIRECT_SETUP_ERR	Failed to install FC-Redirect entries for one or more server-storage pairs in the job.
DMM_JOB_INFRA_DPP_DIED	The DPP assigned to the JOB failed during job creation.
DMM_JOB_INFRA_NOT_ALLOWED	The SSM was unable to create the job. Retry the job creation.
DMM_JOB_SRC_LUN_INFO_NOT_PRESENT	A source LUN specified in the session was not discovered by SSM. This error can occur when trying to restart/reschedule a job in Reset state. A possible cause is a change in LUN inventory or LUN Mapping on the storage device.
DMM_JOB_DST_LUN_INFO_NOT_PRESENT	A destination LUN specified in the session was not discovered by SSM. This error can occur when trying to restart/reschedule a job in Reset state. A possible cause is a change in LUN inventory or LUN Mapping on the storage device.
DMM_VT_VSAN_DOWN	The storage VSAN is not operational or was suspended during JOB creation.

Table 5-7 DMM Error Codes (continued)

Error Code	Description
DMM_VT_ISAPI_CREATION_FAILED	Failed to create a Virtual Target corresponding to the storage port.
DMM_FC_RDRT_NO_DNS_ENTRY	FC-Redirect configuration failure. Storage/Server port not visible in FC Name Server on SSM switch.
DMM_FC_RDRT_NO_ZS_ENTRY	FC-Redirect configuration failure. The server and existing storage port are not zoned together.
DMM_FC_RDRT_INSTALL_ERROR	FC-Redirect configuration could not be installed in the fabric. A possible cause is that CFS is not enabled to distribute FC Redirect configuration.
DMM_FC_RDRT_LUXOR_ACL_ERROR	FC Redirect failed to program a rewrite entry in the local SSM.
DMM_SRVR_VT_LOGIN_SRVR_LOGIN_ERROR	SSM failed to log in or discover LUNs from the storage on behalf of the server. This can occur if the new storage access list is not programmed with the server pWWN, or there is no LUN Mapping on the storage for the selected server.
DMM_SRVR_VT_LOGIN_VI_LOGIN_ERROR	SSM Failed to log in discover LUNs from the storage on behalf of the storage-based job VI. This can occur if the storage access list is not programmed with the VI pWWN, or there is no LUN Mapping on the storage for the VI.
DMM_SRVR_VT_NO_PRLI_SRVR	No PRLI was received from the server after a PLOGI from the server to the storage was accepted.
DMM_PREVIOUS_REQ_INPROGRESS	The SSM cannot process a request because a previous operation on the job has not yet completed.
DMM_ITL_NOT_FOUND	This error may be generated when the user is performing manual correlation of the paths to a LUN from the DMM GUI. It is generated if a specified path (ITL) in the manual correlation has not be discovered by the SSM.
DMM_ITL_NOT_FOUND_IN_NON_ASL_LIST	Attempt to resolve a LUN path that has not been classified as NON ASL.
DMM_ILLEGAL_REQ	The selected command cannot be performed in the current job state.
DMM_INIT_NOT_FOUND	Failed to create a session because the server port is invalid.
DMM_SRC_TGT_NOT_FOUND	Failed to create a session because the existing storage port is invalid.
DMM_DST_TGT_NOT_FOUND	Failed to create a session because the new storage port is invalid.
DMM_ITL_NOT_FOUND_IN_GUI_ASL_LIST	Attempt to update a LUN path that has not been classified as GUI ASL.

Table 5-7 DMM Error Codes (continued)

Error Code	Description
DMM_ITL_FOUND_IN_AUTO_ASL_LIST	Attempt to resolve a LUN path that has already been classified as AUTO ASL.
DMM_SRC_LUN_GREATER_THAN_DST	Session creation failed because the source LUN has a greater size than the destination LUN.
DMM_TGT_NOT_REACHABLE	The storage port is offline.
DMM_SRC_TGT_NOT_ASL_CLASSIFIED	Failure returned when trying to create a session with an source LUN that has not been classified as AUTO ASL or GUI ASL. Manual correlation is required to resolve multipathing for the LUN.
DMM_DST_TGT_NOT_ASL_CLASSIFIED	Failure returned when trying to create a session with an destination LUN that has not been classified as AUTO ASL or GUI ASL. Manual correlation is required to resolve multipathing for the LUN.
DMM_SRC_LUN_ALREADY_EXISTS	Failure returned when trying to create a session with an source LUN that has already been used in another session in the job.
DMM_DST_LUN_ALREADY_EXISTS	Failure returned when trying to create a session with an destination LUN that has already been used in another session in the job.
DMM_VT_FC_REDIRECT_GET_CFG_ERR	The SSM failed to retrieve the existing configuration from FC-Redirect. The FC-Redirect process may no longer be running on the supervisor module.
DMM_NO_LICENSE	No active DMM license is available on the SSM where the job is being created.
DMM_VI_NOT_SEEING_ANY_LUNS	The storage job VI cannot see any LUNs from the existing and new storage ports. Possible causes – no access for VI pWWN on the storage ports or no LUN Mapping for the VI on the storage ports.
DMM_VI_NOT_SEEING_ES_LUNS	The storage job VI cannot see any LUNs from the existing storage ports. Possible causes – no access for VI pWWN on the existing storage ports or no LUN Mapping for the VI on the existing storage ports.
DMM_VI_NOT_SEEING_NS_LUNS	The storage job VI cannot see any LUNs from the new storage ports. Possible causes – no access for VI pWWN on the new storage ports or no LUN Mapping for the VI on the new storage ports.
DMM_NO_RESOURCES_TRY_LATER	Failure returned for the verify operation if shared SSM resources for verify are already being used by another job.
DMM_IT_PAIR_PRESENT_IN_ANOTHER_JOB	Failure returned for job create if the same server-storage port pair(s) is being used by an existing job.

Table 5-7 DMM Error Codes (continued)

Error Code	Description
DMM_JOB_NO_OFFLINE_FOR_ASYNC	Method 2 Data Migration does not support offline mode.
DMM_PEER_IP_CONNECT_FAILURE	Failure to estabilish IP connection with peer SSM. Check IP configuration on both SSMs.
DMM_VPORT_IN_EXISTING_ZONE:Remove old Storage Job Zones	A zone created for a old storage type DMM job still exists. Once a storage job is deleted, the corresponding zone needs to be removed from the zoneset. Delete zones for DMM Jobs that no longer exist.

DMM System Error Messages

DMM generates system messages as described in Table 5-8. For additional details, see

Table 5-8 DMM System Error Messages

System Message	Description
LOG_ERR_DMM_STG_RSCN	An RSCN event was received for the storage associated with a job.
LOG_ERR_DMM_SRVR_RSCN	An RSCN event was received for the server associated with a job.
LOG_ERR_DMM_NEW_NPORT_SRVR_ZONE	A new N-Port has come up which is zoned in the same zone as the server.
LOG_ERR_DMM_NEW_NPORT_STG_ZONE	A new N-Port has come up which is zoned in the same zone the storage.
LOG_EV_DMM_JOB_ START	This event indicates the start of a data migration job.
LOG_EV_DMM_JOB_COMPLETE	Event indicating the completion of a data migration job.
LOG_EV_DMM_JOB_ERROR	Event indicating the suspension of data migration job.
LOG_EV_DMM_JOB_VERIFY_START	Event indicating the start of a data migration job verification.
LOG_EV_DMM_JOB_VERIFY_COMPLETE	Event indicating the completion of a data migration job verification.
LOG_EV_DMM_JOB_VERIFY_ERROR	Event indicating the suspension of data migration job verification due to an error.
LOG_EV_DMM_JOB_STOP	Event indicating that the data migration job was stopped by the administrator.

Table 5-8 DMM System Error Messages (continued)

LOG_EV_DMM_JOB_VERIFY_STOP	Event indicating the suspension of data migration job verification by the user.
LOG_EV_DMM_JOB_ERROR_LOST_SSM_PEER_CONNECTION	Event indicating the suspension of data migration job due to loss in IP connectivity to the peer SSM.

CHAPTER 6

Understanding DMM Topologies

Cisco MDS DMM is designed to support a variety of SAN topologies. The SAN topology influences the location of the SSM module and the DMM feature configuration. The following sections describe common SAN topologies and their implications for DMM:

Overview

Cisco DMM supports homogeneous SANs (all Cisco MDS switches), as well as heterogeneous SANs (a mixture of MDS switches and other vendor switches). In a heterogeneous SAN, you must connect the existing and new storage to Cisco MDS switches.

In both homogeneous and heterogeneous SANs, Cisco MDS DMM supports dual-fabric and single-fabric SAN topologies. Dual-fabric and single-fabric topologies both support single path and multipath configurations.

In a single path configuration, a migration job includes only the one path (which is represented as an initiator/target port pair). In a multipath configuration, a migration job must include all paths (which are represented as two initiator/target port pairs).

FC-Redirect

When a data migration job is in progress, all traffic (in both directions) sent between the server HBA port and the existing storage is intercepted and forwarded to the SSM, using the FC-Redirect capability.

FC-Redirect requirements for the SAN topology/configuration include the following:

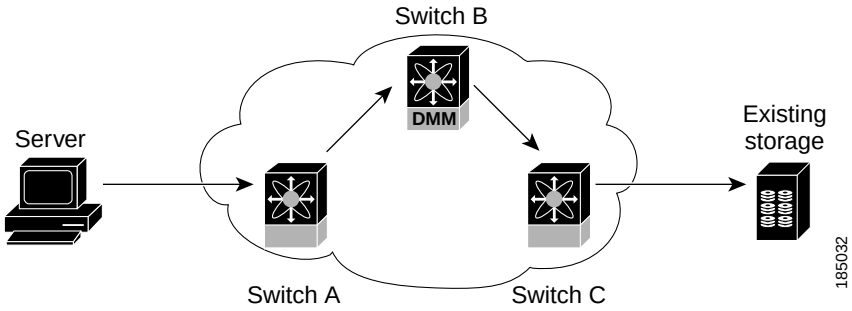
- The existing storage must be connected to a switch with FC-Redirect capability. FC-Redirect capability is available on MDS 9500 series and MDS 9200 series switches.
- Server HBA ports may be connected to a switch with or without FC-Redirect capability.
- The switches with FC-Redirect must be running SAN OS 3.2(1) or later release.

- The server HBA port and the existing storage port must be zoned together. The default-zone policy must be configured as deny.
- The SSM can be located anywhere in the fabric, as long as the FCNS database in the SSM's switch has the required information about the server HBA ports and the existing storage ports. The SSM switch must be running SAN OS 3.2(1) or later release.

The following examples show the server-to-storage packet flow when a data migration job is in progress. For clarity, the example shows the SSM and the existing storage connected to separate switches. Our recommended practice is to connect the existing storage to the same switch as the SSM.

In Figure 6-1, the server HBA port is connected to switch A and the existing storage is connected to switch C. Both switches have FC Redirect capability. The SSM is installed on switch B. All three switches are running SAN OS 3.2(1) or later.

Figure 6-1 Host Connected to FC-Redirect Switch

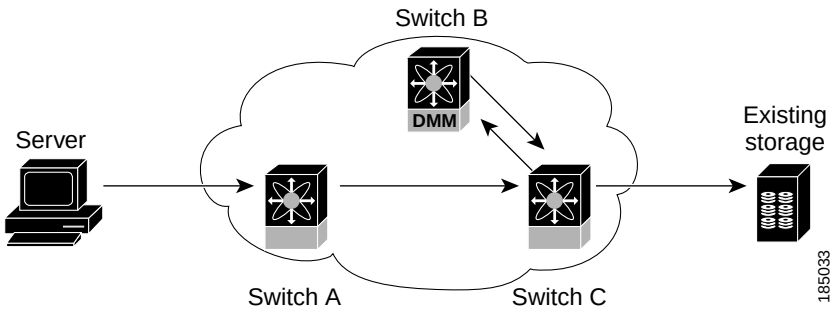


When the data migration job is started, FC-Redirect is configured on switch A to divert the server traffic to the SSM. FC-Redirect is configured on switch C to redirect the storage traffic to the SSM.

In Figure 6-2, the server HBA port is connected to switch A, which does not have FC-Redirect capability or is not running SAN OS 3.2(1) or later. The existing storage is connected to switch C, which has FC-Redirect capability. The SSM is installed on switch B. Switches B and C are running SAN OS 3.2(1) or later.

When the data migration job is started, FC-Redirect is configured on switch C to redirect the server and storage traffic to the SSM. This configuration introduces additional network latency and consumes additional bandwidth, because traffic from the server travels an extra network hop (A to C, C to B, B to C). The recommended configuration (placing the SSM in switch C) avoids the increase in network latency and bandwidth.

Figure 6-2 Host not Connected to FC-Redirect Switch



DMM Topology Guidelines

When determining the provisioning and configuration requirements for DMM, note the following guidelines related to SAN topology:

- The existing and new storage must be connected to MDS switches.
- Switches connected to the storage ports must be running MDS SAN OS 3.2.1 or later release.
- The SSM is supported on MDS 9500 family switches and MDS 9200 family switches. The switch must be running MDS SAN OS 3.2.1 or later release.
- DMM requires a minimum of one SSM in each fabric.
- DMM does not support migration of Logical Volumes. For example, if the existing storage is a Logical Volume with three physical LUNs, DMM treats this as three LUN-to-LUN migration sessions.
- If you plan to deploy DMM and FCIP Write Acceleration together, there are restrictions in the supported topologies. Contact Cisco for assistance with designing the DMM topology.

Note In a storage-based migration, you may corrupt the storage if a new server port tries to access the storage ports once the migration has started. For example, a server port is returned to service, or a new server is brought on line.

Homogeneous SANs

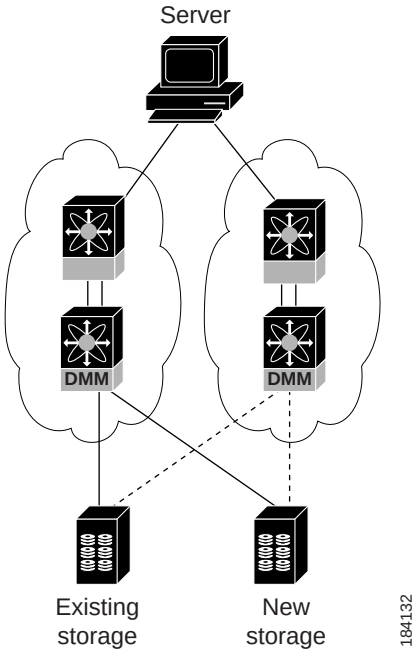
A homogeneous SAN contains only Cisco MDS switches. Most topologies fit the following categories:

- Core-Edge—hosts at the edge of the network, and storage at the core.
- Edge-Core—hosts and storage at the edge of the network, and ISLs between the core switches.
- Edge-Core-Edge—hosts and storage connected to opposite edges of the network and core switches with ISLs.

For all of the above categories, we recommend that you locate the SSM in the switch closest to the storage devices. Following this recommendation ensures that DMM introduces no additional network traffic during data migrations.

Figure 6-3 shows a common SAN topology, with servers at the edge of the network and storage arrays in the core.

Figure 6-3 Homogeneous SAN Topology



In a homogeneous network, you can locate the SSM on any DMM-enabled MDS switch in the fabric. We recommend that you install the SSM in the switch connected to the existing storage. You should also connect the new storage to the same switch as the existing storage. If the SSM is on a different switch from the storage, additional ISL traffic crosses the network during the migration (all traffic between storage and server is routed through the SSM).

Heterogeneous SANs

When planning Cisco MDS DMM data migration for a heterogeneous SAN, note the following guidelines:

- The existing and new storage devices for the migration must be connected to MDS switches.
- The path from the SSM to the storage-connected switch must be through a Cisco fabric.

Depending on the topology, you may need to make configuration changes prior to data migration.

Ports to Include in a Server-Based Job

This section provides guidelines for configuring server-based migration jobs.

When creating a server-based migration job, you must include all possible paths from the host to the LUNs being migrated. This is because all writes to a migrated LUN need to be mirrored in the new storage until the job is destroyed, so that no data writes are lost.

Therefore, all active ports on the existing storage that expose the same set of LUNs to the server must be added to a single data migration job.

In a multipath configuration, two or more active storage ports expose the same set of LUNs to two HBA ports on the server (one initiator/target port pair for each path). Multipath configurations are supported in dual-fabric topologies (one path through each fabric) and in single-fabric topologies (both paths through the single fabric).

In a single path configuration, only one active storage port exposes the LUN set to the server. The migration job includes one initiator/target port pair (DMM does not support multiple servers accessing the same LUN set).

The following sections describe how to apply the rules to various configurations:

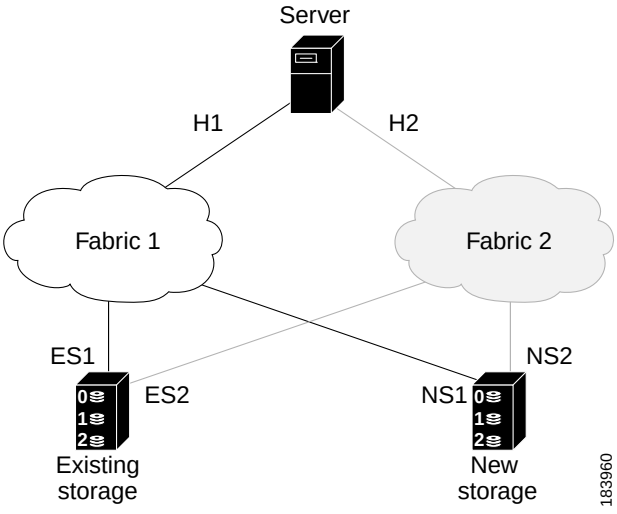
- Single LUN Set, Active-Active Array, page 6-5
- Multiple LUN Set, Active-Active Arrays, page 6-6
- Single LUN Set, Active-Passive Array, page 6-7

Single LUN Set, Active-Active Array

In the example shown in Figure 6-4, the server accesses three LUNs over Fabric 1 using storage port ES1. The server accesses the same LUNs over Fabric 2 using storage port ES2.

Both storage ports (ES1 and ES2) must be included in the same data migration job, as both ports are active and expose the same LUN set.

Figure 6-4 Single LUN Set, Active-Active Array



You create a data migration job with the following configuration:

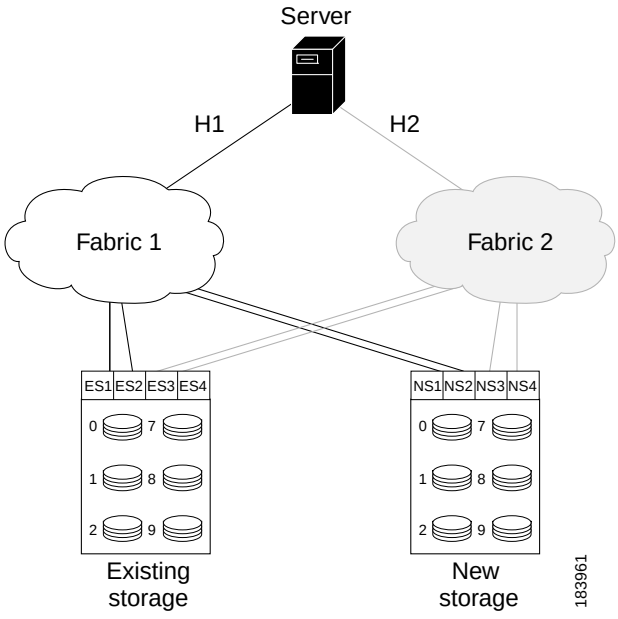
Server Port	Existing Storage Port	New Storage Port
H1	ES1	NS1
H2	ES2	NS2

Note If the example in Figure 6-4 showed multipathing over a single fabric SAN, there would be no difference in the data migration job configuration.

Multiple LUN Set, Active-Active Arrays

In the example shown in Figure 6-5, the server accesses three LUNs over Fabric 1 using storage port ES1. The server accesses the same LUNs over Fabric 2 using storage port ES2. The server accesses three different LUNs over Fabric 1 using storage port ES3, and accesses the same LUNs over Fabric 2 using storage port ES4.

Figure 6-5 Multiple LUN set, active-active arrays



You need to create two data migration jobs, because the server has access to two LUN sets on two different storage ports. You need to include two storage ports in each data migration job, as they are active-active multipathing ports.

One migration job has the following configuration:

Server Port	Existing Storage	New Storage
H1	ES1	NS1
H2	ES2	NS2

This job includes three data migration sessions (for LUNs 1,2, and 3).

The other migration job has the following configuration:

Server Port	Existing Storage	New Storage
H1	ES3	NS3
H2	ES4	NS4

This job includes three data migration sessions (for LUNs 7,8, and 9).

Single LUN Set, Active-Passive Array

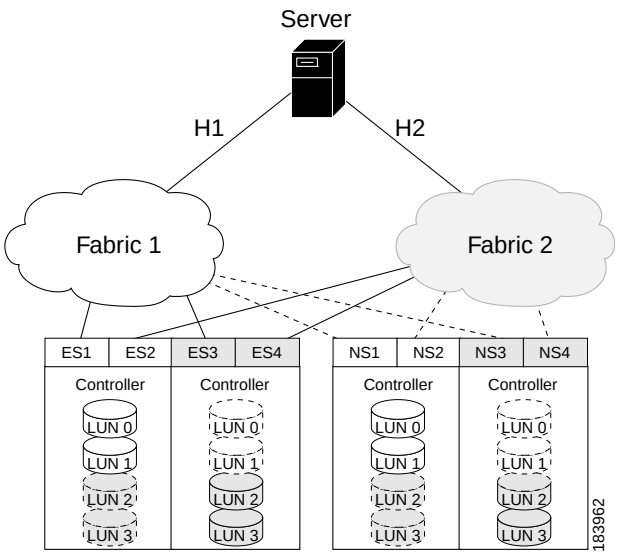
In an active-passive array, the LUNs exposed by a storage port may be active or passive.

Case 1: Each controller has two active ports

In the example shown in Figure 6-6, the server accesses a single LUN set. However, all LUNs are not active on a single storage port. The active-passive array in the example has two controllers, each with two ports. LUN 0 and LUN 1 are active on ES1 and ES2. LUN 2 and LUN 3 are active on ES3 and ES4.

Logically, the server sees two active LUN sets, accessed from two different storage ports each paired for multipathing.

Figure 6-6 Case 1: Single LUN Set, Active-Passive Array



The server accesses LUN 0 and LUN 1 over Fabric 1 using storage port ES1. The server accesses the same LUNs over Fabric 2 using storage port ES2. The server accesses LUN 2 and LUN 3 over Fabric 1 using storage port ES3, and accesses the same LUNs over Fabric 2 using storage port ES4.

You need to create two data migration jobs, because the server has access to two LUN sets over two different storage ports. Each of the data migration jobs includes two storage ports, because both ports access the active LUNs on the storage.

Only the active LUNs are included in each job. (LUNs 0 and 1 in one job and LUNs 1 and 2 in the other job).

Note You can use the Server Lunmap Discovery (SLD) tool to see the LUNs that are active on each port of an active-passive array.

One migration job has the following configuration:

Server Port	Existing Storage	New Storage
H1	ES1	NS1
H2	ES2	NS2

This job includes two data migration sessions (for LUNs 0 and 1).

The other migration job has the following configuration:

Server Port	Existing Storage	New Storage
H1	ES3	NS3
H2	ES4	NS4

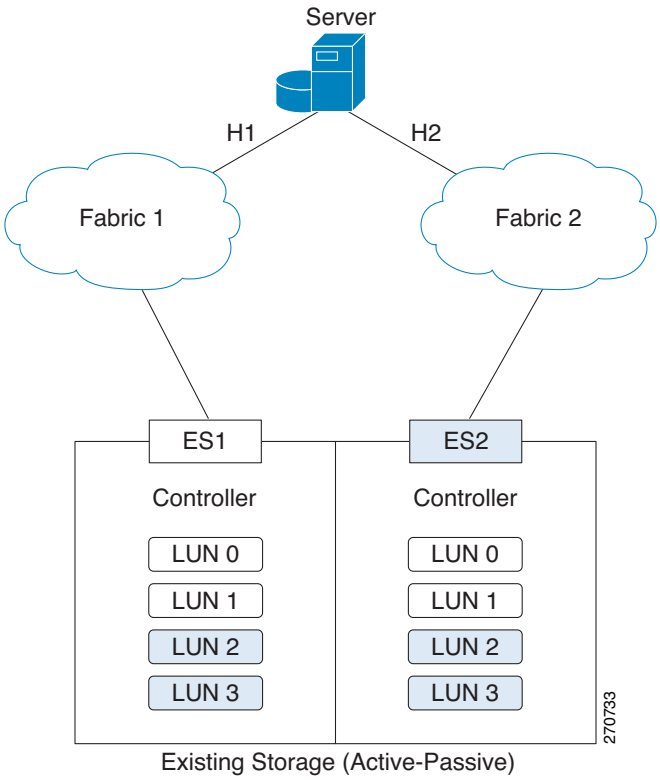
This job includes two data migration sessions (for LUNs 2 and 3).

Case 2: Each controller has only one active port

In the example shown in Figure 6-7, the server accesses a single LUN set. However, all LUNs are not active on a single storage port. The active-passive array in the example has two controllers, each with a single port. LUN 0 and LUN 1 are active on ES1. LUN 2 and LUN 3 are active on ES2.

Logically, the server sees two active LUN sets, accessed from different storage ports.

Figure 6-7 Case 2: Single LUN Set, Active-Passive Array



The server accesses LUN 0 and LUN 1 over Fabric 1 using storage port ES1. The server accesses LUN 3 and LUN 4 over Fabric 2 using storage port ES2.

You need to create two data migration jobs, because the server has access to two LUN sets over two different storage ports. Each of the data migration jobs includes the ports from a single fabric.

One migration job has the following configuration:

Server Port	Existing Storage	New Storage
H1	ES1	NS1

The other migration job has the following configuration:

Server Port	Existing Storage	New Storage
H2	ES2	NS2

CHAPTER 7

Using the DMM CLI for Data Migration

This chapter describes how to use DMM CLI commands to configure and monitor data migration jobs.

This chapter includes the following sections:

About DMM CLI Commands

The DMM feature includes CLI commands to configure and perform data migration jobs. Job and session configuration commands are entered at the switch CLI prompt.

A DMM job can be active on more than one switch. For example, in a dual-fabric topology with multipath configurations, the DMM job runs on a switch in each fabric. To configure the job, you enter DMM CLI commands on both switches.

The DMM feature runs on an SSM in the switch. Each session runs on only one SSM. Enter the session configuration commands on the MDS switch that will perform the session migration.

The DMM **show** commands are accessed directly from the SSM. From the command prompt in the switch, you must attach to the SSM module before entering these commands.

When using the DMM CLI commands, note the following guidelines:

- In DMM job configuration mode, the job configuration is not saved until you enter the **commit** command. If you exit DMM configuration mode without issuing the **commit** command, all job configuration changes are discarded. You only need to enter the **commit** command when configuring a new job.
- For a storage-based migration, all servers that use the selected storage enclosure must use the same operating system (for example, all AIX or all Solaris).
- If the MDS switch (hosting the storage or the server) performs a restart after the migration but before the job is destroyed, you must restart the data migration from the beginning.

Selecting Ports for Server-Based Jobs

When creating a server-based migration job, you must include all possible paths from the server HBA ports to the LUNs being migrated. This is because all writes to a migrated LUN need to be mirrored to the new storage until the cutover occurs, so that no data writes are lost.

For additional information about selecting ports for server-based jobs, refer to the “Ports to Include in a Server-Based Job” section on page 6-4.

Configuring Data Migration Using the CLI

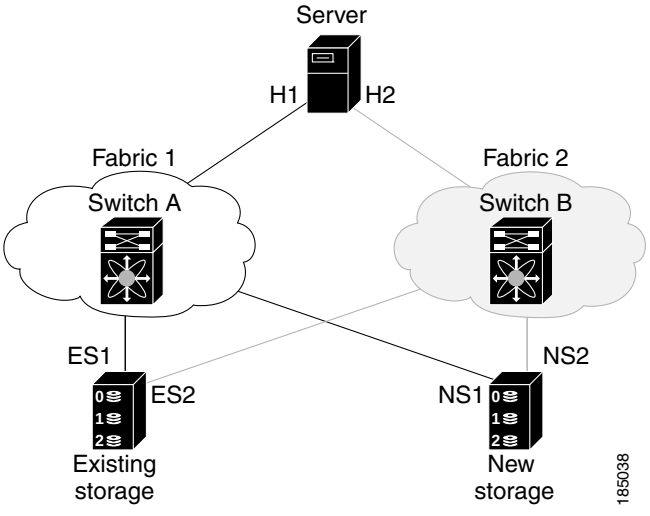
When you enter the command to create a data migration job, the CLI enters DMM job configuration submode. This submode provides commands to configure the server HBA ports, storage ports, and job attributes. The job is only created on the SSM when you enter the commit command.

In a dual-fabric topology with redundant paths, the data migration job runs on an SSM in each fabric. You need to configure the job on both SSMs.

In this chapter, the examples and command descriptions use the following terminology (see Figure 7-1):

- The dual fabric configuration includes Fabric 1 and Fabric 2.
- Switch A (on Fabric 1) contains the SSM for data migration jobs.
- Switch B (on Fabric 2) contains the SSM for data migration jobs.
- H1 and H2 are the server HBA ports to each fabric.
- ES1 and ES2 are the existing storage ports.
- NS1 and NS2 are the new storage ports.

Figure 7-1 Example Topology



The steps to configure a data migration job are described in the following sections:

- Configuring the Virtual Initiator (Storage-Based Migration), page 7-3
- Creating the Data Migration Job, page 7-4

Configuring the Virtual Initiator (Storage-Based Migration)

Note This step is not required for a server-based data migration job.

Prior to creating a storage-based data migration job, you must retrieve the virtual initiator (VI) port world wide name (pWWN) and create a new zone containing the pWWNs of the VI and the storage ports. To use the new zone, add the new zone to a zoneset and activate the zoneset.

To configure the VI in Fabric 1, follow these steps:

Step	Command	Comments
Step 1	switchA# **configuration terminal**	Enters configuration mode.
Step 2	`switchA(config)# dmm module module-id job job-id get-vi vsan 0-4093`	Retrieves the VI information for the specified SSM module. You must specify a unique job identifier. The command output displays the assigned VI node WWN and port WWN.
Step 3	`switchA(config)# zone name name vsan 0-4093`	Creates a new zone.
Step 4	`switchA(config-zone)# member pwwn value`	Uses the member command multiple times to add the VI pWWN, the existing storage pWWNs, and the new storage pWWNs.
Step 5	`switchA(config-zone)# exit`	Exits zone configuration submode.
Step 6	`switchA(config)# zoneset name name vsan 0-4093`	Enters configuration mode for the active zoneset. Specify the name of the active zoneset.
Step 7	`switchA(config-zoneset)# member name`	Adds the named zone to the zoneset.
Step 8	`switchA(config-zoneset)# exit`	Exits zoneset configuration submode.
Step 9	`switchA(config)# zoneset activate name name vsan 0-4093`	Reactivates the zoneset.

Prior to creating the data migration job, you must complete the following configuration tasks on the storage devices:

1. Configure the existing storage to give the VI pWWN access to LUNs that need to be migrated.
2. Configure the new storage to give the VI pWWN access to LUNs that need to be migrated.

Note For a dual-fabric topology, you must repeat the same set of configuration steps on switch B. Retrieve the VI information and create a new zone on switch B and configure the storage to allow the VI to access the LUNs exposed in fabric B. For an example configuration, see the "Storage-Based Migration Example" section on page 7-10.

Creating the Data Migration Job

To configure a data migration job, first create the job on Switch A. After creating the job, the CLI enters DMM job configuration mode, where you enter the commands for configuring the job.

To create the data migration job, follow these steps:

Step	Command	Comments
Step 1	switchA# **configuration terminal**	Enters configuration mode
Step 2	`switchA(config)#` **`dmm module`** *`module-id`* **`job`** *`job-id`* **`create`**	Creates a migration job on the specified SSM module and enters DMM job configuration mode. Specify a unique job identifier. For a storage-based job, use the same job identifier that you specified when retrieving the VI information (in the previous task).

Configuring the Job

Use the commands in DMM job configuration mode to add the server and storage ports to the job.

Note To prevent data corruption, the job must contain all the server HBA ports that can access the set of LUNs being migrated, and all storage ports that expose these LUNs:

- Add all server HBA ports in this fabric that can access the LUNs being migrated.
- Add all storage ports in the fabric that expose the set of LUNs being migrated.

For additional information, see the "Checking Storage ASL Status" section on page 3-2.

In a dual-fabric topology, configure the IP address of the peer SSM (the DMM peers communicate using the management IP network).

Configure the data migration job using the following steps:

Step	Command	Comments
Step 1	`switchA(config-dmm-job)# server vsan 0-4093 pwwn pWWN`	Specifies the VSAN and pWWN of the server HBA port to include in the migration. **Note** All server HBA ports (in fabric 1) that can access the LUNs to be migrated need to be added to this job.
Step 2	`switchA(config-dmm-job)# storage vsan 0-4093 pwwn pWWN existing`	Specifies the VSAN and pWWN of the existing storage port. **Note** All existing storage ports (in fabric 1) that expose the LUNs to be migrated need to be added to this job.
Step 3	`switchA(config-dmm-job)# storage vsan 0-4093 pwwn pWWN new`	Specifies the VSAN and pWWN of the new storage port. **Note** All new storage ports (in fabric 1) that expose the new LUNs need to be added to this job.
Step 4	`switchA(config-dmm-job)# attributes job_type {1 | 2} job_mode {1 | 2} job_rate {1 | 2 | 3 | 4} job_method {1|2}`	Specifies the job type, job mode, and job rate: For **job_type,** enter 1 for server-based migration or 2 for storage-based migration. For **job_mode,** enter 1 for online or 2 for offline migration. For **job_rate** enter 1 for best effort, 2 for slow, 3 for medium, and 4 for fast data migration. For **job_method** enter 1 for Method 1and 2 for Method 2. For additional information about data migration rate, see the “Configuring Migration Rate” section on page 2-6.
Step 5	`switchA(config-dmm-job)# peer IP_address`	Configures the IP address of the SSM on switch B. For information about configuring SSM IP addresses, see the “Configuring IP Connectivity” section on page 2-3

Committing the Job

The next step is to commit the data migration job on switch A. To commit the job, use the **commit** command.

When you enter the **commit** command, the switch sends the job configuration to the SSM.

The DMM feature sends configuration information to other switches in the fabric as required, so that all traffic between the server HBA port and the existing storage is redirected to the SSM.

The SSM performs discovery of all existing and new storage LUNs visible to the server HBA ports/VIs in this job.

Note The **commit** command may require a noticeable amount of time to complete, depending on the number of LUNs to be discovered.

Configuring the Peer SSM

The next step is to configure the data migration job on the peer SSM.

Note You must use the same job number that you created on switch A.

To configure the data migration job on the peer SSM, follow these steps:

Step	Command	Comments
Step 1	switchB# **configuration terminal**	Enters configuration mode.
Step 2	switchB(config)# **dmm module** *module-id* **job** *job-id* **create**	Creates a migration job on the specified SSM module and enters DMM job configuration mode. **Note** Enter the same job ID that you created on switch A.
Step 3	switchB(config-dmm-job)# **server vsan** *0-4093* **pwwn** *pWWN*	Specifies the VSAN and pWWN of the server HBA port to include in the migration. **Note** All server HBA ports (in Fabric 2) that can access the LUNs to be migrated need to be added to this job.
Step 4	switchB(config-dmm-job)# **storage vsan** *0-4093* **pwwn** *pWWN* **existing**	Specifies the VSAN and pWWN of the existing storage port. **Note** All existing storage ports (in Fabric 2) that expose the LUNs to be migrated need to be added to this job.
Step 5	switchB(config-dmm-job)# **storage vsan** *0-4093* **pwwn** *pWWN* **new**	Specifies the VSAN and pWWN of the new storage port. **Note** All new storage ports (in Fabric 2) that expose the new LUNs need to be added to this job.
Step 6	switchB(config-dmm-job)# **attributes job_type** {**1** | **2**} **job_mode** {**1** | **2**} **job_rate** {**1** | **2** | **3** | **4**} **job_method** {**1** | **2**}	Specifies the job type, job mode, job rate, and job method. **Note** The configuration values for the attributes and the schedule must match on both switches.
Step 7	switchB(config-dmm-job)# **peer** *IP_address*	Configures the IP address of the SSM on switch A.
Step 8	switchB(config-dmm-job)# **commit**	Commits the data migration job on switch B.

Configuring Sessions

The next step is to configure sessions in the data migration job. For a server-based migration, configure all of the sessions on one SSM.

For a storage-based migration, you can manually balance the load on the SSMs by configuring sessions on both SSMs.

Note For a a storage-based migration, use the pWWN of the VI as the server in the session configuration.

To display that the SSM has discovered the LUNs correctly, enter the **show dmm job job-id** *job id* **storage** command from the SSM CLI.

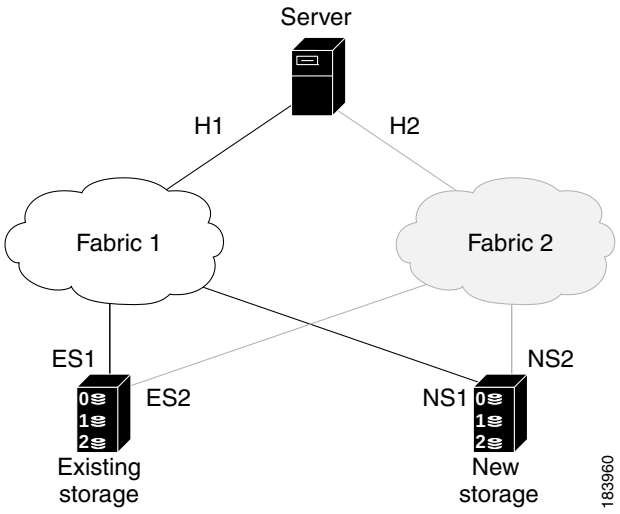
To configure sessions, follow these steps:

Step	Command	Comments
Step 1	`switchA(config)#` **`dmm module`** *`module-id`* **`job`** *`job-id`* **`session`**	Enters session configuration mode for the specified job on the specified SSM.
Step 2	`switchA(config-session)#` **`server`** *`pWWN`* **`src_tgt`** *`pWWN`* **`src_lun`** *`num`* **`dst_tgt`** *`pWWN`* **`dst_lun`** *`num`*	Configures a session. The server HBA port, existing storage port, and new storage port must all belong to the same VSAN. • **server** is the server pWWN (server-based job) or VI pWWN (storage-based job). • **src_tgt** is the existing storage pWWN. • **src_lun** is the LUN number in the existing storage. Enter this value in hexidecimal notation. • **dst_tgt** num is the new storage pWWN. • **dst_lun** is the LUN number in the new storage. Enter this value in hexidecimal notation.

Server-Based Migration Example

The topology for this example is dual fabric with multipath ports defined in the server and redundant paths to the storage devices (as shown in Figure 7-2).

Figure 7-2 Topology for the Example



On both switches, the SSM module is located in slot 8. The pWWNs for the ports are listed here:

Port	pWWN
H1	**21:00:00:e0:8b:0a:5d:e7**
ES1	**50:06:04:82:bf:cf:e0:43**
NS1	**50:06:0e:80:03:4e:95:13**
H2	**21:01:00:e0:8b:0a:5d:e7**
ES2	**50:06:04:82:bf:cf:e0:5d**
NS2	**50:06:0e:80:03:4e:95:03**

```
Configure the data migration job on switch A:

switchA# configure terminal
switchA(config)# dmm module 8 job 2345 create
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switchA(config-dmm-job)# server vsan 100 pwwn 21:0d:00:0d:ec:02:2d:82
switchA(config-dmm-job)# storage vsan 100 pwwn 50:06:04:82:bf:cf:e0:43 existing
switchA(config-dmm-job)# storage vsan 100 pwwn 50:06:0e:80:03:4e:95:13 new
switchA(config-dmm-job)# peer 10.10.2.4
switchA(config-dmm-job)# attributes job_type 1 job_mode 1 job-rate 1 job-method 1
switchA(config-dmm-job)# commit
switchA(config-dmm-job)# end
Ending DMM Job Configuration.
If the Job was not committed, it will be required to reconfigure the job.
```

Configure the data migration job on switch B:

```
switchB# configure terminal
switchB(config)# dmm module 8 job 2345 create
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switchB(config-dmm-job)# server vsan 100 pwwn 21:0d:00:0d:0a:01:2b:82
switchB(config-dmm-job)# storage vsan 100 pwwn 50:06:04:82:bf:cf:e0:5d existing
switchB(config-dmm-job)# storage vsan 100 pwwn 50:06:0e:80:03:4e:95:03 new
switchB(config-dmm-job)# peer 10.10.1.8
switchB(config-dmm-job)# attributes job_type 1 job_mode 1 job-rate 1 job-method 1
switchB(config-dmm-job)# commit
switchB(config-dmm-job)# end
Ending DMM Job Configuration.
If the Job was not committed, it will be required to reconfigure the job.
switchB#
```

Configure the data migration sessions on switch A:

```
switchA(config)# dmm module 4 job 2345 session
switchA(config-session)# server 21:00:00:e0:8b:0a:5d:e7 src_tgt 50:06:04:82:bf:cf:e0:43
src_lun 0x5 dst_tgt 50:06:0e:80:03:4e:95:13 dst_lun 0x0
switchA(config-session)# server 21:00:00:e0:8b:0a:5d:e7 src_tgt 50:06:04:82:bf:cf:e0:43
src_lun 0x6 dst_tgt 50:06:0e:80:03:4e:95:13 dst_lun 0x1
switchA(config-session)# exit
```

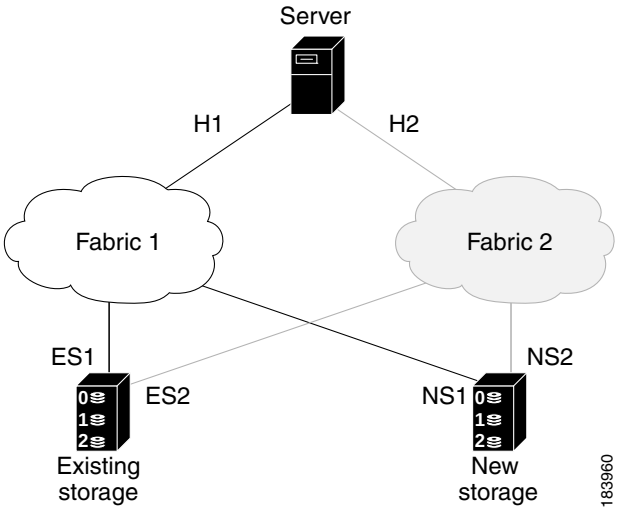
Start the data migration job on switch A:

```
switchA(config)# dmm module 8 job 2345 start
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switchA(config)# exit
```

Storage-Based Migration Example

The topology for this example is dual fabric with multipath ports defined in the server and redundant paths to the storage devices (as shown in Figure 7-3).

Figure 7-3 Topology for the Example



On both switches, the SSM module is located in slot 8. The pWWNs for the ports are listed here:

Port	pWWN
Host 1	**21:00:00:e0:8b:0a:5d:e7**
VI 1	**21:0d:00:0d:ec:02:2d:82**
ES1	**50:06:04:82:bf:cf:e0:43**
NS1	**50:06:0e:80:03:4e:95:13**
Host 2	**21:01:00:e0:8b:0a:5d:e7**
VI 2	**21:0d:00:0d:0a:01:2b:82**
ES2	**50:06:04:82:bf:cf:e0:5d**
NS2	**50:06:0e:80:03:4e:95:03**

```
Configure the VI on switch A:

switchA# configure terminal
switchA(config)# dmm module 8 job 2345 get-vi vsan 100
DMM Storage Job:0x929 assigned follwing VI -
VI NodeWWN: 21:0c:00:0d:ec:02:2d:82
VI PortWWN: 21:0d:00:0d:ec:02:2d:82
sjc7-9509-6(config)#
```

Configure the zone and zoneset on switch A:

```
switchA(config)# zone name DMM1 vsan 100
switchA(config-zone)# member pwwn 21:0d:00:0d:ec:02:2d:82 vi
switchA(config-zone)# member pwwn 50:06:04:82:bf:cf:e0:43 es
switchA(config-zone)# member pwwn 50:06:0e:80:03:4e:95:13 ns
switchA(config-zone)# exit
switchA(config)# zoneset name DMM1 vsan 100
switchA(config-zoneset)# member DMM1
switchA(config-zoneset)# exit
switchA(config)#

Configure the data migration job on switch A:

switchA(config)# dmm module 8 job 2345 create
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switchA(config-dmm-job)# server vsan 100 pwwn 21:0d:00:0d:ec:02:2d:82
switchA(config-dmm-job)# storage vsan 100 pwwn 50:06:04:82:bf:cf:e0:43 existing
switchA(config-dmm-job)# storage vsan 100 pwwn 50:06:0e:80:03:4e:95:13 new
switchA(config-dmm-job)# peer 10.10.2.4
switchA(config-dmm-job)# attributes job_type 2 job_mode 1 job-rate 1 job-method 1
switchA(config-dmm-job)# commit
switchA(config-dmm-job)# end
Ending DMM Job Configuration.
If the Job was not committed, it will be required to reconfigure the job.
switchB#

Configure the VI on switch B:

switchB# configure terminal
switchB(config)# dmm module 8 job 2345 get-vi vsan 100
DMM Storage Job:0x929 assigned follwing VI -
VI NodeWWN: 21:0c:01:0e:ec:02:2d:82
VI PortWWN: 21:0d:00:0d:0a:01:2b:82
switchB(config)#

Configure the zone and zoneset on switch B:

switchB(config)# zone name DMM1 vsan 100
switchB(config-zone)# member pwwn 21:0d:00:0d:0a:01:2b:82 vi
switchB(config-zone)# member pwwn 50:06:04:82:bf:cf:e0:5d es
switchB(config-zone)# member pwwn 50:06:0e:80:03:4e:95:03 ns
switchB(config-zone)# exit
switchB(config)# zoneset name DMM1 vsan 100
switchB(config-zoneset)# member DMM1
switchB(config-zoneset)# exit
switchB(config)#
```

Configure the data migration job on switch B:

```
switchB# configure terminal
switchB(config)# dmm module 8 job 2345 create
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switchB(config-dmm-job)# server vsan 100 pwwn 21:0d:00:0d:0a:01:2b:82
switchB(config-dmm-job)# storage vsan 100 pwwn 50:06:04:82:bf:cf:e0:5d existing
switchB(config-dmm-job)# storage vsan 100 pwwn 50:06:0e:80:03:4e:95:03 new
switchB(config-dmm-job)# peer 10.10.1.8
switchB(config-dmm-job)# attributes job_type 2 job_mode 1 job-rate 1 job-method 1
switchB(config-dmm-job)# commit
switchB(config-dmm-job)# end
Ending DMM Job Configuration.
If the Job was not committed, it will be required to reconfigure the job.
```

```
switchB#

Configure the data migration sessions on switch A: 50:06:04:82:bf:cf:e0:43

switchA(config)# dmm module 4 job 2345 session
switchA(config-session)# server 21:0d:00:0d:ec:02:2d:82 src_tgt 50:06:04:82:bf:cf:e0:43
src_lun 0x5 dst_tgt 50:06:0e:80:03:4e:95:13 dst_lun 0x0

switchA(config-session)# exit

Start the data migration job on switch A:

switchA(config)# dmm module 8 job 2345 start
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switchA(config)# exit

Configure the data migration sessions on switch B:

switchB(config)# dmm module 4 job 2345 session
switchB(config-session)# server 21:0d:00:0d:0a:01:2b:82 src_tgt 50:06:04:82:bf:cf:e0:5d
src_lun 0x5 dst_tgt 50:06:0e:80:03:4e:95:03 dst_lun 0x0

switchB(config-session)# exit

Start the data migration job on switch B:

switchB(config)# dmm module 8 job 2345 start
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switchB(config)# exit
```

Controlling DMM Jobs

The DMM CLI provides a set of commands to control jobs that have been configured. The job state determines which commands are valid to run. Job states are shown in Table 7-1.

Table 7-1 Job Status Values

Job Status Value	Description
Created	The job has been created, but has not been scheduled.
Scheduled	The job has been configured with a scheduled start time. It will automatically start at that time.
Complete	The job has been completed successfully.
Verify	The completed job is being verified.
Stopped	The job has been stopped manually by the user.
Failed	The job has been stopped because of failures. See Table 5-5 for details.
In_Progress	The job is currently running.
Reset	The job has been reinitialized because of failures . See Table 5-6 for details.
Finishing	The Method 2 job is in the final copy iteration.
Verify_Stopped	The job verification has been stopped.

Table 7-1 Job Status Values (continued)

Job Status Value	Description
Verify_Complete	The job verification has been completed.
Verify_Failure	The job verification is unsuccessful.

Table 7-2 describes the data migration commands.

Table 7-2 Command Valid States

Command	Description	Valid Job Status Values
Verify	Performs offline verification of the selected job. User is prompted to confirm the verification command.	Completed, InProgress, VerifyStopped, Verify_Failure
Destroy	Deletes the selected job (or jobs) and retrieves the job execution log from the SSM. User is prompted to confirm the delete command.	Stopped, Failed, Completed, Reset, VerifyStopped, Verify_Failure, Created, Scheduled
Stop	Stops the selected job.	InProgress
Start	Starts the selected job.	Created, Reset
Modify	Allows you to modify the job attributes or configure a start time for the selected job.	Created, Scheduled, Reset, Stopped
Schedule	Allows you to set up schedules.	Created, Scheduled, Stopped
Validate	Validates the stored configuration for a job in a Reset state.	Reset
Finish	Completes the selected job only in case of Method 2.	InProgress
Log	Opens the DMM log for the selected job.	All job status values

Note You must enter these commands on the switch with sessions configured. If both SSMs have sessions configured, enter the commands on both switches.

To control the data migration job, use the following commands:

Command	Purpose
switchA(config)# **dmm module** *module-id* **job** *job-id* **start**	Starts a data migration job or restarts a job that was stopped. **Note** For a job in reset state, run the validate command on both switches before restarting the job. The **start** command is ignored if the job is scheduled for a future time. Use the **schedule now** command to start a scheduled job.
switchA(config)# **dmm module** *module-id* **job** *job-id* **stop**	Stops execution of the job. **Note** Job progress is not preserved. If you start the job again later, the job restarts from the beginning.
switchA(config)# **dmm module** *module-id* **job** *job-id* **validate**	If the job is in the reset state, run the validate option. After validation, start the job using the **start** command. **Note** Always run the validate command on both SSMs (even if only one SSM has sessions).
switchA(config)# **dmm module** *module-id* **job** *job-id* **schedule** [**now** | **hour** *hr* **min** *min* **day** *day* **month** *month* [*year*] | **reset**]	Configures a scheduled start time for the data migration job. Enter **schedule now** to start the job immediately. Enter **reset** to remove the scheduled start time from the job. The job remains in created state until you manually start it. **Note** Enter the schedule command on each SSM with sessions.

Monitoring DMM Jobs

Use the **show dmm job** command in the SSM CLI to monitor the status of data migration jobs, and the current progress of jobs and sessions that are in progress.

To monitor data migration jobs, follow these steps:

Step	Command	Comments
Step 1	switch# **attach module** *module-id*	Enters CLI mode on the SSM module.

Step	Command	Comments
Step 2	`module# show dmm job`	Displays summary information about the data migration jobs configured on this SSM.
Step 3	`module# show dmm job job-id job-id {detail | session | storage}`	Displays information about the specified job. **detail** displays the job attributes, schedule, server HBA and storage ports, the job log, and job error log. **session** displays the sessions included in the job. **storage** displays the storage ports included in the job.

For additional information about monitoring and troubleshooting data migration jobs, see Chapter 5, "Troubleshooting Cisco MDS DMM."

Completing DMM Jobs

When all of the sessions in a job have completed successfully, you can delete the job in coordination with other post-migration tasks, which are described in the following sections:

- (Optional) Verifying the Completed Job, page 7-15
- Post-Migration Activities, page 7-16
- Deleting the Job, page 7-16

(Optional) Verifying the Completed Job

When all of the sessions in a job have completed successfully, you can optionally perform verification of the data in the new storage location. The SSM compares the data in the new storage with the data in the existing storage by reading each migration region from the existing and new storage, and then performing a comparison of the data.

To perform migration verification, follow these steps:

Step	Command	Comments
Step 1	`switchA(config)# dmm module module-id job job-id verify`	Verifies the data migration by comparing the data in the new storage with the data in the existing storage. The **verify** command operates in offline mode.

Note Verification is performed in offline mode. Any service using the existing storage needs to be quiesced before you start verification.

While verification is being performed on a job, you can display the verification progress using the following command:

show dmm job *job-id* **session** [***session-id*** *sess-id*]

Post-Migration Activities

After the data migration job has completed successfully, you need to reconfigure the server to use the new storage. The exact post-migration configuration steps vary depending on the operating system of the server.

Reconfiguration may include the following steps:

- Perform a graceful shut down on all server applications that use the migrated LUNs to ensure that there are no pending I/O operations on the existing storage.
- Unmount the existing storage LUNs.
- Configure zoning to remove server access to the existing LUNs.
- Using the DMM CLI

  For **Method 1**- Delete the data migration job. DMM removes the FC-Redirect entries to the SMM. Server writes are no longer mirrored to the existing and new storage.

  For**Method 2** - Finish the data migration job. When the job moves to **Completed** state, delete the data migration job. See the Finishing Jobs for more details.
- Configure zoning to add server access to the new LUNs.
- From the server, scan for the new storage.
- Mount the file system for the new storage.
- From the server, restart the server applications to access data from the new storage.

Finishing the Job

To finish the data migration job, follow these steps:

Step	Command	Comments
Step 1	`switchA(config)# dmm module module-id job job-id finish` `switch A#`	Finishes the specified data migration job. This is valid only for Method 2. See Finishing Jobs for more details.

Deleting the Job

To delete the data migration job, follow these steps:

Step	Command	Comments
Step 1	`switchA(config)# dmm module module-id job job-id destroy` `switchA#`	Deletes the specified data migration job.

APPENDIX A

DMM CLI Command Reference

The Cisco MDS DMM feature provides a CLI suitable for scripting and advanced operations.

This appendix contains an alphabetical listing of commands that are unique to the Cisco MDS DMM feature.

For information about other commands that apply to the Cisco MDS 9000 Family of multilayer directors and fabric switches, refer to the *Cisco MDS 9000 Family CLI Configuration Guide*.

ssm enable feature dmm

To enable DMM, use the **ssm enable feature dmm** command in configuration mode.

ssm enable feature dmm {**force** {**interface fc** *slot/port* | **module** *slot*} | **interface fc** *slot/port* | **module** *slot*}

Syntax Description

force	Forces a switching module reload.
interface	Specifies the interface.
fc *slot/port*	Specifies the Fiber Channel slot and port numbers.
module *slot*	Specifies the SSM module slot number.

Defaults

The DMM feature is disabled.

Command Modes

Configuration mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

None.

Examples

The following example shows how to enable DMM on a module:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# ssm enable feature dmm module 1
```

The following example shows how to enable DMM on an interface:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# ssm enable feature dmm interface fc 1/1 - 4
```

The following example shows how to force a reload on some of the ports on a line card:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# ssm enable feature dmm force interface fc 1/1 - 8, fc 1/13 - 16
```

Related Commands

Command	Description
show ssm provisioning	Displays information about features provisioned on the SSM.
show dmm job	Displays DMM job information.

dmm module job

To configure a data migration job, use the **dmm module** *mod-id* job command in configuration mode.

dmm module *mod-id*
job *job-id* **create** | **destroy** | **get-vi vsan** *vsan-id* | **restart** | **schedule {hour** *hour* **min** *minute* **day** *day* **month** *month* **year** *year* | **now** | **reset}** | **session** | **stop** | **validate** | **verify** | **finish**

Syntax Description

module *mod-id*	Specifies the module ID.
job *job-id*	Specifies the job ID. The range is 0 to18446744073709551615.
create	Creates the job and enters DMM job configuration submode.
destroy	Deletes the DMM job.
get-vi	Retrieves the VI for the DMM job.
vsan *vsan-id*	Specifies the VSAN ID. The range is 1 to 4093.
start	Starts the DMM job session.
schedule	Schedules the DMM job.
hour *hour*	Specifies the hour the DMM job starts. The range is 0 to 23.
min *minute*	Specifies the minute the DMM job starts. The range is 0 to 59.
day *day*	Specifies the day the DMM job starts. The range is 1 to 31.
month *month*	Specifies the month the DMM job starts. The range is 1 to 12.
year *year*	Specifies the year the DMM job starts. The range is 2000 to 2030.
now	Resets the schedule to start the DMM job immediately.
reset	Resets the DMM job to unscheduled.
session	Enables the Session Configuration submode.
stop	Stops the DMM job.
validate	Validates the DMM job data.
verify	Verifies the data migration for the specified job.
finish	Moves the Method 2 data migration job to completed state.

Defaults

None.

Command Modes

Configuration mode.

Command History

Release	Modification
3.3(1a)	Finish keyword is introduced.

Usage Guidelines

DMM must be enabled before you can create DMM jobs. Use the **ssm enable feature dmm** command to enable DMM.

The data migration job stops executing if it encounters any errors. To restart the migration, enter the **validate** command to validate the job configuration, then enter the **restart** command to restart the job.

Examples

The following example shows how to create a job with a schedule. The job is scheduled to start on Sunday, January 6, 2008 at 11:00 P.M.

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# dmm module 3 job 1 schedule hour 23 min 0 day 6 month 1 year 2008
```

The following example shows how to set the fast migration rate to 100 MB/s, the medium migration rate to 50 MB/s, and slow migration rate to 10 MB/s.

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config) dmm module 3 rate_of_migration fast 100 medium 50 slow 10
```

Related Commands

Command	Description
show dmm job	Displays DMM job information.
show dmm ip-peer	Displays the IP peers that the DMM port is connected to.

attributes (DMM job configuration submode)

To set the attributes of a data migration job, use the **attributes** command in DMM job configuration submode.

attributes job_type {**1** | **2**} **job_mode** {**1** | **2**} **job_rate** {**1** | **2** | **3** | **4**} **job_method** {**1**|**2**}

Syntax Description

job_type {**1** | **2**}	Specifies the job type. Specify 1 for a server type job and 2 for a storage type job.
job_mode {**1** | **2**}	Specifies the job mode. Specify 1 for an online job and 2 for an offline job.
job_rate {**1** | **2** | **3** | **4**}	Specifies the job rate. Specify 1 for the default rate, 2 for a slow rate, 3 for a medium rate, and 4 for a fast rate.
job_method {**1**|**2**}	Specifies the job method. Specify 1 for Method 1 and 2 for Method 2.

Defaults

None.

Command Modes

DMM job configuration submode.

Command History

Release	Modification
3.3(1a)	This command was introduced.

Usage Guidelines

None.

Examples

The following example sets the job type to storage, the job mode to online, and the job rate to fast.

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# dmm module 3 job 1 create
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switch(config-dmm-job)# attributes job_type 2 job_mode 1 job_rate 4 job_method 1
switch(config-dmm-job)#
```

Related Commands

Command	Description
show dmm ip-peer	Displays job information.
show dmm srvr-vt-login	Displays server VT login information.

commit (DMM job configuration submode)

To commit a DMM job, use the **commit** command in DMM job configuration submode.

commit

Syntax Description

This command has no arguments or keywords.

Defaults

None.

Command Modes

DMM job configuration submode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

You need to configure server HBA ports, storage ports, and job attributes before you commit the job.

Examples

The following example shows how to commit a data migration job:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# dmm module 3 job 1 destroy
switch(config-dmm-job)#
```

Related Commands

Command	Description
ssm enable feature dmm	Enables DMM.
show dmm job	Displays job information.

peer (DMM job configuration submode)

To add peer SSM information to a job, use the **peer** command in DMM job configuration submode.

peer *ip-address*

Syntax Description

ip-address	Specifies the peer SSM IP address. The format for the IP address is *A.B.C.D*.

Defaults

None.

Command Modes

DMM job configuration submode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

In a dual-fabric topology, the migration job runs on an SSM in each fabric. The two SSMs exchange messages over the management IP network, so each SSM needs the IP address of the peer.

Examples

The following example shows how to add peer SSM information to a job:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# dmm module 3 job 1 create
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switch(config-dmm-job)# peer 224.2.1.2
switch(config-dmm-job)#
```

Related Commands

Command	Description
show dmm job	Displays job information.
show dmm ip-peer	Displays a DMM port's IP peer.

server (DMM job configuration submode)

To add a server HBA port to the DMM job, use the **server** command in DMM job configuration submode.

server vsan *vsan-id* **pwwn** *port-wwn*

Syntax Description

vsan *vsan-id*	Specifies the VSAN ID. The range is 1 to 4093.
pwwn *port-wwn*	Specifies the world-wide name (WWN) of the server HBA port. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.

Defaults

None.

Command Modes

DMM job configuration submode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

None.

Examples

The following example shows how to add server information to a DMM job:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# dmm module 3 job 1 create
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switch(config-dmm-job)# server vsan 3 pwwn 1d:22:3a:21:3c:44:3b:51
switch(config-dmm-job)#
```

Related Commands

Command	Description
show dmm job	Displays job information.
show dmm srvr-vt-login	Displays server VT login information.

server (configure session submode)

To configure a data migration session, use the server command in session configuration submode.

server *pw-wn* **src_tgt** *pw-wn* **src_lun** *src-lun* **dst_tgt** *pw-wn* **dst_lun** *dst-lun*

Syntax Description

pwwn *pwwn*	Specifies the pWWN of the server. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
src_tgt *pwwn*	Specifies the pWWN of the source target. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
src_lun *src-lun*	Specifies the source LUN number in hex notation. The range is 0x0 to 0xfff.
dst_tgt *pwwn*	Specifies the pWWNof the destination target. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
dst_lun *dst-lun*	Specifies the destination LUN in hex notation. The range is 0x0 to 0xfff.

Defaults

None.

Command Modes

Configure session submode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

None.

Examples

The following example shows how to a source target, source LUN, destination target, and destination LUN in a session:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# dmm module 3 job 1 session
switch(config-session)# server 12:13:1d:1c:2d:2d:3f:3a src_tgt 12:13:1d:1c:2d:2d:3f:3a
src_lun 0x1 dst_tgt 12:13:1d:1c:2d:2d:3f:3a dst_lun 0x5
```

Related Commands

Command	Description
show dmm job	Displays job information.
show dmm srvr-vt-login	Displays server VT login information.

storage (DMM job configuration submode)

To add a storage port to a DMM job, use the **storage** command in DMM job configuration submode.

storage vsan *vsan-id* **pwwn** *port-wwn* {**existing** | **new**}

Syntax Description

vsan *vsan-id*	Specifies the VSAN ID. The range is 1 to 4093.
pwwn *port-wwn*	Specifies the world-wide name of the storage port. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
existing	Specifies a port on the existing storage.
new	Specifies a port on the new storage.

Defaults

None.

Command Modes

DMM job configuration submode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

None.

Examples

The following example shows how to add storage information to a DMM job:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# dmm module 3 job 1 create
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed
switch(config-dmm-job)# storage vsan 3 pwwn 1d:22:3a:21:3c:44:3b:51 existing
switch(config-dmm-job)#
```

Related Commands

Command	Description
ssm enable feature dmm	Enables DMM.
show dmm job	Displays job information.

dmm module

To specify default DMM values for migration block size, number of migration blocks and fast migration speed, use the **dmm module** command in Configuration mode.

dmm module *mod-id* **migration-block-size** *block-size*

dmm module *mod-id* **num-migration-blocks** *num-blocks*

dmm module *mod-id* **rate-of-migration fast** *migration-rate* **medium** *migration-rate* **slow** *migration-rate*

Syntax Description

mod-id	Specifies the module ID.
block-size	Specifies the block size in MB.
num-blocks	Specifies the number of migration blocks per LUN.
rate-of-migration	Migration rate can be configured as slow, medium or fast.
fast *migration-rate*	Specifies the rate for fast migration. Units are Megabytes per second (MB/s).
medium *migration-rate*	Specifies the rate for medium migration. Units are MB/s.
slow *migration-rate*	Specifies the rate for slow migration. Units are MB/s.

Defaults

None.

Command Modes

Configuration mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

None.

Examples

The following example shows how to a job:

```
switch# config t
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# dmm module 3
```

Related Commands

Command	Description
show dmm job	Displays job information.
show dmm ip-peer	Displays a DMM port's IP peer.

show dmm discovery-log

To display SCSI device discovery logs, use the **show dmm discovery-log** command in EXEC mode.

show dmm discovery-log {**all** | **error**}

Syntax Description

all	Displays all entries in the Device Discovery SCSI log.
error	Displays error entries in the Device Discovery SCSI log.

Defaults

None.

Command Modes

EXEC mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

You must connect to an SSM on your switch to execute DMM **show** commands. Use the **show module** command to determine the slot number of an SSM on your switch. Use the **attach module** *slot* command to connect to the SSM.

Examples

The following example displays error entries:

```
switch# attach module 3
Attaching to module 3 ...
To exit type 'exit', to abort type '$.'
Bad terminal type: "ansi". Will assume vt100.
module-3# show dmm discovery-log error
005 State: 3
CDB: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Sts:0x02 SnsKey:0x02 AscAscq:0x0403
Time:    5(ms)

LogIndex:26 HostPWWN:2c:fc:00:05:30:01:9e:88  TargetPWWN:50:06:01:62:30:60:36:64
OPC: 0x00 Lun:0x0000000000000006 State: 3
CDB: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Sts:0x02 SnsKey:0x02 AscAscq:0x0403
Time:    4(ms)
```

Related Commands

Command	Description
ssm enable feature dmm	Enables the DMM feature.
dmm module	Enables DMM configuration on a module.

show dmm fp-port

To display front panel ports on a line card, use the **show dmm fp-port** command in EXEC mode.

show dmm fp-port

Syntax Description

This command has no arguments or keywords.

Defaults

None.

Command Modes

EXEC mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

You must connect to an SSM on your switch to execute DMM **show** commands. Use the **show module** command to determine the slot number of an SSM on your switch. Use the **attach module** *slot* command to connect to the SSM.

Examples

The following example displays front panel ports:

```
switch# attach module 3
Attaching to module 3 ...
To exit type 'exit', to abort type '$.'
Bad terminal type: "ansi". Will assume vt100.
module-3# show dmm fp-port
Cisco DMM Front Panel Port Map
-------------------------------------------------------------------
 Port      Index     Mirage Id    DPP Id
-------------------------------------------------------------------
  1           0           1          2
  2           1           1          2
  3           2           1          2
  4           3           1          2
  5           4           2          3
  6           5           2          3
  7           6           2          3
  8           7           2          3
  9           8           3          6
 10           9           3          6
 11          10           3          6
 12          11           3          6
 13          12           4          7
 14          13           4          7
 15          14           4          7
 16          15           4          7
 17          16           1          1
 18          17           1          1
```

```
19          18          1          1
20          19          1          1
21          20          2          4
22          21          2          4
23          22          2          4
24          23          2          4
25          24          3          5
26          25          3          5
27          26          3          5
28          27          3          5
29          28          4          8
30          29          4          8
31          30          4          8
32          31          4          8
```

Related Commands

Command	Description
ssm enable feature dmm	Enables the DMM feature.
dmm module	Enables DMM configuration on a module.

show dmm ip-peer

To display information about the IP peers the DMM interface is connected to, use the **show dmm ip-peer** command in EXEC mode.

show dmm ip-peer

Syntax Description

This command has no arguments or keywords.

Defaults

None.

Command Modes

EXEC mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

You must connect to an SSM on your switch to execute DMM **show** commands. Use the **show module** command to determine the slot number of an SSM on your switch. Use the **attach module** *slot* command to connect to the SSM.

Examples

The following example displays DMM IP peer information:

```
switch# attach module 3
Attaching to module 3 ...
To exit type 'exit', to abort type '$.'
Bad terminal type: "ansi". Will assume vt100.
module-3# show dmm ip-peer

                  Cisco DMM IP Peer Table
-------------------------------------------------------------------
 No      Type              SD   IP Address      TCP State
-------------------------------------------------------------------
  1      CONFIG_STATION   23    10.100.2.1      DOWN
  2      PEER_SSM         22    10.100.1.20     UP
  3      CONFIG_STATION   19    10.100.2.1      DOWN
```

Related Commands

Command	Description
ssm enable feature dmm	Enables the DMM feature.
dmm module	Enables DMM configuration on a module.

show dmm job

To display DMM job information, use the **show dmm job** command in EXEC mode.

show dmm job *job-id*
{**detail** |
job-fsm-eventlog |
job-infra-fsm-eventlog |
lun_tokens token *tok-pwwn* |
session |[**session_id** *sess-id*] [**session-event-log**] |
storage [**tgt-pwwn** *tgt-pwwn*] {**vi-pwwn** *vi-pwwn*} [**lun-event-log** *lun-id* | **tgt-event-log**]}

Syntax Description

job-id	Specifies the job ID. The range is 0 to 18446744073709551615.
detail	Displays detailed job information.
job-fsm-eventlog	Displays the Job FSM Event Log.
job-infra-fsm-eventlog	Displays the Job Infra FSM Event Log.
lun_tokens	Displays a list of job LUN tokens.
token *tok-pwwn*	Specifies the storage port world-wide name.
session	Displays job session information.
session_id *sess-id*	Specifies the job session. The range is 0 to 255.
session-event-log	Displays the Session FSM Event Log.
storage	Displays the storage ports discovered by DMM.
tgt-pwwn *tgt-pwwn*	Specifies the storage port world-wide name. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
vi-pwwn *vi-pwwn*	Specifies the Virtual Initiator port world-wide name. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
lun-event-log *lun-id*	Displays the Virtual Initiator and Target LUN FSM event log and specifies the LUN ID.
tgt-event-log	Displays the Virtual Initiator and Target FSM Event Log.

Defaults

None.

Command Modes

EXEC mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

You must connect to an SSM on your switch to execute DMM **show** commands. Use the **show module** command to determine the slot number of an SSM on your switch. Use the **attach module** *slot* command to connect to the SSM.

Examples

The following example shows how to display a summary of all the jobs:

```
module-3# sh dmm job  job-id 1205450497 detail
show dmm job job-id 1205450497 details
==========================================================================
          Data Mobility Manager Job Details
==========================================================================
  Job Identifier : 1205450497
  Job Name       : admin_2008/03/13-16:21
  Job Type       : SERVER
  Job Rate       : Default, no rate limiting
  Job Mode       : ONLINE
  Job Method     : METHOD-2
  Job DPP        : 7
  Peer SSM IP    : NOT_APPLICABLE
  DMM GUI IP     : 10.1.0.25
  Job FSM        : READY
  Job Infra FSM  : DONE
--------------------------------------------------------------------------
      Job Schedule Information
--------------------------------------------------------------------------
  Date           :  0/ 0/0 [Month/Day/Year]
  Time           : 0:0      [Hour:Min]
--------------------------------------------------------------------------
       Server Port List (Num Ports :1)
--------------------------------------------------------------------------
Num  VSAN  Server pWWN             Virtual Initiator pWWN
--------------------------------------------------------------------------
  1  100   21:01:00:e0:8b:28:5e:3e 20:40:00:0d:ec:0e:f4:03
--------------------------------------------------------------------------
       Storage Port List (Num Ports :2)
--------------------------------------------------------------------------
Num  VSAN  Storage pWWN            Type  Virtual Target pWWN
--------------------------------------------------------------------------
  1  100   50:06:0e:80:04:2c:5c:54 NS    20:44:00:0d:ec:0e:f4:03
  2  100   50:06:0e:80:04:2c:5c:74 ES    20:42:00:0d:ec:0e:f4:03
------------------------------------------------------------------------------------------
----------
                       DMM GUI PDU History
------------------------------------------------------------------------------------------
----------
Num   PDU Opcode                   GUI IP    Rx                        Tx
------------------------------------------------------------------------------------------
----------
   1   DM_JOB_CREATE_REQ           10.1.0.25 Thu Mar 13 23:21:39 2008  Thu Mar 13 23:21:39
2008
   2   DM_JOB_INFRA_CREATE_REQ     10.1.0.25 Thu Mar 13 23:21:40 2008  Thu Mar 13 23:21:44
2008
   3   DM_JOB_LUNMAP_REQ           10.1.0.25 Thu Mar 13 23:21:45 2008  Thu Mar 13 23:21:45
2008
   4   DM_JOB_SESSION_ADD_REQ      10.1.0.25 Thu Mar 13 23:21:52 2008  Thu Mar 13 23:21:52
2008
   5   DM_JOB_SESSION_ADD_REQ      10.1.0.25 Thu Mar 13 23:21:53 2008  Thu Mar 13 23:21:53
2008
   6   DM_JOB_SESSION_ADD_REQ      10.1.0.25 Thu Mar 13 23:21:54 2008  Thu Mar 13 23:21:54
2008
   7   DM_JOB_SESSION_ADD_REQ      10.1.0.25 Thu Mar 13 23:21:55 2008  Thu Mar 13 23:21:55
2008
   8   DM_JOB_QUERY_REQ            10.1.0.25 Thu Mar 13 23:21:59 2008  Thu Mar 13 23:21:59
2008
------------------------------------------------------------------------------------------
----------
       Job Timing Information [since the last start operation]
```

```
-----------------------------------------------------------------------------------------
----------
Create Time           :Thu Mar 13 23:21:39 2008
Scheduled Time        :Not Applicable
Start  Time           :Not Applicable
Finish-request Time   :Not Applicable
Completed Time        :Not Applicable
Failed Time           :Not Applicable
Stopped Time          :Not Applicable
Verify Start Time     :Not Applicable
Verify Completed Time :Not Applicable
Verify Failed Time    :Not Applicable
```

Related Commands

Command	Description
ssm enable feature dmm	Enables the DMM feature.
dmm module	Enables DMM configuration on a module.

show dmm srvr-vt-login

To display server virtual target login information, use the **show dmm srvr-vt-login** command in EXEC mode.

show dmm srvr-vt-login [**job-id** *job-id*] **server-pwwn** *srvr-pwwn* **vt-pwwn** *vt-pwwn* {**fc_rdrt-fsm-eventlog** | **login-fsm-eventlog**}

Syntax Description

job-id *job-id*	Specifies the job ID. The range is 0 to 18446744073709551615.
server-pwwn *srvr-pwwn*	Specifies the server port world-wide name. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
vt-pwwn *vt-pwwn*	Specifies the Virtual Target port world-wide name. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
fc_rdrt-fsm-eventlog	Displays the Server Virtual Target FC-Redirect FSM Event Log.
login-fsm-eventlog	Displays the Server Virtual Target FSM Event Log.

Defaults

None.

Command Modes

EXEC mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

You must connect to an SSM on your switch to execute DMM **show** commands. Use the **show module** command to determine the slot number of an SSM on your switch. Use the **attach module** *slot* command to connect to the SSM.

Examples

The following example shows how to display the server VT login summary:

```
switch# show dmm srvr-vt-login
==========================================================================================
           Data Mobility Manager Server VT Login Information
==========================================================================================
  Id  Job Id    VSAN Srvr pWWN                Srvr FCID VT pWWN                 VT FCID
State (FC Redirect/Login)
==========================================================================================
  1   1187978941    1  21:32:00:0d:ec:02:2d:82   0x660000  21:36:00:0d:ec:02:2d:82
0x660003    (READY/WAITING_PLOGI)
  2   1187978941    1  21:32:00:0d:ec:02:2d:82   0x660000  21:34:00:0d:ec:02:2d:82
0x66000a    (READY/WAITING_PLOGI)

Number of Logins :2
```

The following example shows how to display the event log for a specified VT:

switch# **show dmm srvr-vt-login job-id 1187978941 server-pwwn 21:32:00:0d:ec:02:2d:82 vt-pwwn 21:36:00:0d:ec:02:2d:82 login-fsm-e**

```
==========================================================================================
Server/VT Login FSM Event Log -> Job Id : 1187978941 Server : 21:32:00:0d:ec:02:2d:82  VT
: 21:36:00:0d:ec:02:2d:82
==========================================================================================

Log Entry: 1 time: Fri Aug 24 11:09:19 2007
    Curr state: DMM_SRVR_VT_LOGIN_S_NULL
    Triggered event: DMM_SRVR_VT_LOGIN_E_START_ACTION

Log Entry: 2 time: Fri Aug 24 11:09:19 2007
    Curr state: DMM_SRVR_VT_LOGIN_S_WAITING_PLOGI
    Triggered event: DMM_SRVR_VT_LOGIN_E_LOGIN_DONE_OK
```

Related Commands

Command	Description
ssm enable feature dmm	Enables the DMM feature.
dmm module	Enables DMM configuration on a module.

show dmm vt

To display virtual target information, use the **show dmm vt** command in EXEC mode.

show dmm vt vt-job-id *job-id* **pwwn** *vt-pwwn* **vt-fsm-eventlog**

Syntax Description

vt-job-id *job-id*	Specifies the virtual target job ID. The range is 0 to 18446744073709551615.
pwwn *vt-pwwn*	Specifies the virtual target port world-wide name. The format is hh:hh:hh:hh:hh:hh:hh:hh, where h is a hexadecimal number.
vt-fsm-eventlog	Displays the Virtual Target FSM Event Log.

Defaults

None.

Command Modes

EXEC mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

You must connect to an SSM on your switch to execute DMM **show** commands. Use the **show module** command to determine the slot number of an SSM on your switch. Use the **attach module** *slot* command to connect to the SSM.

Examples

The following example displays virtual target information:

```
switch# attach module 3
Attaching to module 3 ...
To exit type 'exit', to abort type '$.'
Bad terminal type: "ansi". Will assume vt100.
module-3# show dmm vt
================================================================================
                      Data Mobility Manager VT Information
================================================================================
  Id Job Id      VT pWWN                    VSAN FCID       IF-IDX      PORT    STATE
================================================================================
  1  1177009472  2f:00:00:05:30:01:9e:88    3    0xee00a0   0x1110000   0x10    VT_UP
  2  1177009472  2c:fe:00:05:30:01:9e:88    3    0xee00a1   0x1110000   0x10    VT_UP
Number of VTs :2
```

Related Commands

Command	Description
ssm enable feature dmm	Enables the DMM feature.
dmm module	Enables DMM configuration on a module.

debug dmm-debug

To enable debugging for DMM, use the **debug dmm-debug** command.

debug dmm-debug {**all** | **common-err** | **common-ev** | **fsm** | **init** | **itl-err** | **itl-ev** | **job-err** | **job-ev** | **msghndlr-err** | **msghndlr-ev** | **p2p-err** | **p2p-ev** | **timer** | **vi-lun-err** | **vi-lun-ev** | **vi-tgt-err** | **vi-tgt-ev**}

Syntax Description

all	Enables all DMM debug options.
common-err	Enables debugging for DMM common errors.
common-ev	Enables debugging for DMM common events.
fsm	Enables debugging for DMM FSM.
init	Enables debugging for DMM initialization.
itl-err	Enables debugging for DMM ITL errors.
itl-ev	Enables debugging for DMM ITL events.
job-err	Enables debugging for DMM job errors.
job-ev	Enables debugging for DMM job events.
msghndlr-err	Enables debugging for DMM message handler errors.
msghndlr-ev	Enables debugging for DMM message handler events.
p2p-err	Enables debugging for DMM P2P errors.
p2p-ev	Enables debugging for DMM P2P events.
timer	Enables debugging for the DMM timer.
vi-lun-err	Enables debugging for Virtual Initiator LUN errors.
vi-lun-ev	Enables debugging for Virtual Initiator LUN events.
vi-tgt-err	Enables debugging for Virtual Initiator and Target errors.
vi-tgt-ev	Enables debugging for Virtual Initiator and Target events.

Defaults

Debugging for DMM is disabled.

Command Modes

EXEC mode.

Command History

Release	Modification
3.2(1)	This command was introduced.

Usage Guidelines

You must connect to an SSM on your switch to execute DMM debug commands. Use the **show module** command to determine the slot number of an SSM on your switch. Use the **attach module** *slot* command to connect to the SSM.

Examples

The following example enables all the DMM debug options:

```
switch# debug dmm-debug all
```

Related Commands

Command	Description
ssm enable feature dmm	Enables the DMM feature.
dmm module	Configures DMM.

INDEX

Send documentation comments to mdsfeedback-doc@cisco.com

I

J

L

M

N

P

S

T

V