



Cisco MDS 9000 Series NX-OS Data Mobility Manager Configuration Guide

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Preface

This preface describes the audience, organization of, and conventions used in the Cisco MDS 9000 Series Configuration Guides. It also provides information on how to obtain related documentation, and contains the following chapters:

- [Audience, on page ix](#)
- [Document Conventions, on page ix](#)
- [Related Documentation, on page x](#)
- [Communications, Services, and Additional Information, on page x](#)

Audience

To use this installation guide, you need to be familiar with electronic circuitry and wiring practices, and preferably be an electronic or electromechanical technician.

Document Conventions

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.

Warnings use the following conventions:



Warning This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071.

Related Documentation

The documentation set for the Cisco MDS 9000 Series Switches includes the following documents.

Release Notes

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-release-notes-list.html>

Regulatory Compliance and Safety Information

<http://www.cisco.com/c/en/us/td/docs/switches/datacenter/mds9000/hw/regulatory/compliance/RCSI.html>

Compatibility Information

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-device-support-tables-list.html>

Installation and Upgrade

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-installation-guides-list.html>

Configuration

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-installation-and-configuration-guides-list.html>

CLI

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-command-reference-list.html>

Troubleshooting and Reference

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/tsd-products-support-troubleshoot-and-alerts.html>

To find a document online, use the Cisco MDS NX-OS Documentation Locator at:

http://www.cisco.com/c/en/us/td/docs/storage/san_switches/mds9000/roadmaps/doclocator.html

Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at [Cisco Profile Manager](#).
- To get the business impact you're looking for with the technologies that matter, visit [Cisco Services](#).
- To submit a service request, visit [Cisco Support](#).
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit [Cisco Marketplace](#).
- To obtain general networking, training, and certification titles, visit [Cisco Press](#).
- To find warranty information for a specific product or product family, access [Cisco Warranty Finder](#).

Cisco Bug Search Tool

[Cisco Bug Search Tool](#) (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.



CHAPTER 1

New and Changed Information

- [Change Summary, on page 1](#)

Change Summary

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

[Table 1: Change Summary for Cisco Data Mobility Manager](#) summarizes the new and changed features as described in the *Cisco MDS 9000 Series 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: Change Summary for Cisco Data Mobility Manager

Feature	Description	Changed in Release	Where Documented
DMM	Updated the Limitations and Restrictions section for the bulk notification feature.	6.2(7)	Cisco MDS DMM Overview, on page 3
Cisco MDS 9250i Multiservice Fabric Switch	Added the support for Cisco MDS 9250i Multiservice Fabric Switch.	6.2(5)	Cisco MDS DMM Overview, on page 3 Getting Started, on page 13 Understanding DMM Topologies, on page 27
Method 3	Deprecated Method 3	6.2(3)	—
Greater than 2 Terabyte LUN support (Method 1 Only)	Added capability to migrate LUNs greater than 2TB (Method 1 Jobs only).	6.2(3)	Cisco MDS DMM Overview, on page 3
FC-Redirect on Cisco MDS 9710	Added support for hosts and storages connected to MDS 9710.	6.2(3)	Cisco MDS DMM Overview, on page 3 Understanding DMM Topologies, on page 27

Feature	Description	Changed in Release	Where Documented
There are no changes since 5.0(1a).	—	—	—
DMM Pre-Configuration Wizard	Steps and screenshots added to configure the MDS modules using the DMM Pre-Configuration Wizard.	5.0(1a)	Getting Started, on page 13
CPP and default-gateway	Note added about configuring CPP interface default-gateway on Fabric Manager.	4.2(1)	Getting Started, on page 13



CHAPTER 2

Cisco MDS DMM Overview

- [Cisco MDS DMM Overview, on page 3](#)

Cisco MDS DMM 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 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 Cisco MDS 9000 18/4-Port Multiservice Module (MSM-18/4), MDS 9222i switch, or MDS 9250i switch. With Cisco MDS DMM, no rewiring or reconfiguration is required for the server, the existing storage, or the SAN fabric. The MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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.

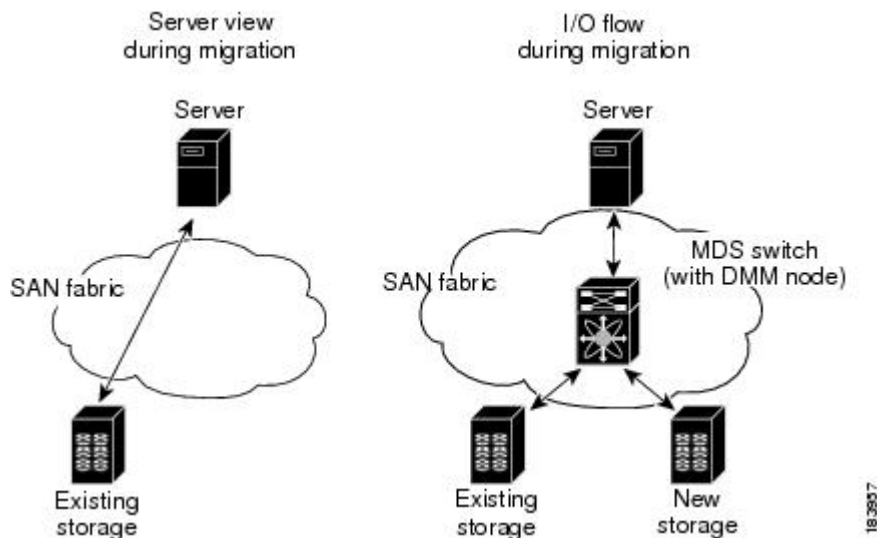
Cisco MDS DMM provides a graphical user interface (GUI) (integrated into Fabric Manager) for configuring and executing data migrations. There is also a command-line interface (CLI), which is suitable for creating scripts.

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 MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch 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 MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch, (Figure 1: Data Migration Using Cisco MDS DMM, on page 4 (right side)). The MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch 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: Data Migration Using Cisco MDS DMM, on page 4 (left side) shows the server's view of the network during data migration. The server is unaware of the MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch, the new storage, and the migration activity.

Figure 1: Data Migration Using Cisco MDS DMM



Cisco MDS DMM performs data migration without any additional layer of virtualization. Cisco MDS DMM requires only the MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch 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.

Supported Switches

- Cisco MDS 9000 18/4-Port Multiservice Module (MSM-18/4)
- Cisco MDS 9222i Switch
- Cisco MDS 9250i Switch

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 (not individual sessions) can be started or stopped.

DMM node

The DMM node comprises of the MDS modules and switches like the MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch that provide intelligent services. The Cisco MDS DMM feature executes on the DMM node.

MSM-18/4 Module, MDS 9222i Switch or MDS 9250i Switch

The MSM-18/4 module, MDS 9222i switch or tare MDS modules and switches that provide intelligent services. The Cisco MDS DMM feature executes on the MDS MSM-18/4 module or the MDS 9222i switches.

Peer MSM-18/4 Module, MDS 9222i Switch or MDS 9250i Switch

In a dual-fabric topology, a data migration job runs on an MSM-18/4 module, MDS 9222i switch or MDS 9250i switch in each fabric. The two MSM-18/4 modules, MDS 9222i switch or the MDS 9250i switch es are peers. The MSM-18/4 modules, MDS 9222i switch or the MDS 9250i switch communicate with their peer MSM-18/4 modules, MDS 9222i switch or the MDS 9250i switches to coordinate the data migration jobs.

Fibre Channel Redirect

Fibre Channel Redirect (FC-Redirect) allows on-demand insertion and removal of the MSM-18/4 module or the MDS 9222i switch 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 DMM node on either an MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch. 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 MSM-18/4 module or the MDS 9222i switch.

Virtual Initiator

A virtual initiator (VI) is a proxy initiator address for a server host bus access (HBA) port. During data migration, the MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch uses a VI to forward redirected traffic to the existing storage port. The MSM-18/4 module or the MDS 9222i switch 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 MSM-18/4 module or the MDS 9222i switch. DMM runs on the CPP.

Data Path Processors

The data path processors (DPPs) are a set of resource processors in the MSM-18/4 module or the MDS 9222i switch. The DPP transfers blocks of data across the switch without impacting the CPP. DMM uses a VI on the DPP for migrating data.

Production Fabric

The production fabric is a fabric where the host port(s) and existing storage port(s) are connected. The server to storage traffic is carried in the production fabric. The new storage port is not present in the production fabric.

Migration Fabric

The migration fabric is a fabric dedicated for data migration or remote replication. The existing storage and the new storage are connected to the migration fabric. No server port is present in the migration fabric.

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 MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch 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 noncritical data applications.

Method 1 Data Migration

For the section of existing storage LUN whose data is already migrated to a 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 center 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 Support Matrix, which is available at [Interoperability Matrix for Cisco Nexus and MDS 9000 Products](#):

Heterogeneous SAN Environments

Cisco MDS DMM supports data migration on SANs that contain third-party vendor switches (such as Brocade). Servers may be connected to the third-party vendor switches, however the existing and new storage devices must be attached to an MDS switch.

Offline Verification

Cisco MDS DMM supports post-migration 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

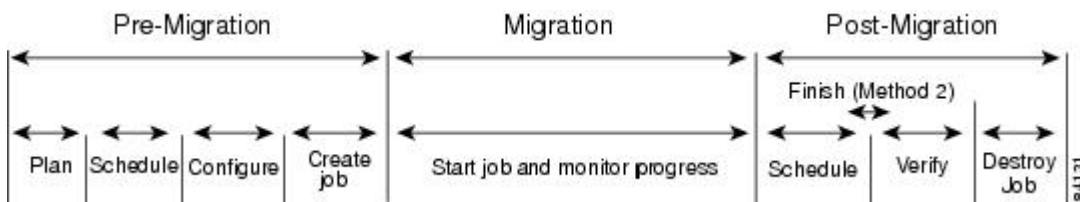
After the data is copied from the existing storage to the new storage, you can delay the reconfiguration of the server to access the new storage. During this period, all writes are mirrored to the existing storage and the new storage. This description assumes Method 1.

Data Migration Overview

A data migration job typically comprises three major stages. (See [Figure 2: Data Migration Stages](#), on page 8.)

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 2: Data Migration Stages



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 [Preparing for Data Migration](#), on page 37

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 Method 1 in the DMM GUI. For Method 2 jobs, the **Est. TOC** field determines when to enter 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

To complete Method 2 data migration, quiesce server applications select **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.

Verify

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 performed just before deleting a job.

Delete

To delete a data migration job (in Method 2), follow these steps:

Procedure

-
- Step 1** Use the DMM GUI to delete the completed data migration job.
- Step 2** Reconfigure the server to access the new storage.
-

Software Requirements

[Table 2: Software Requirements, on page 10](#) lists the supported modules, methods, and releases for Cisco MDS DMM.

Table 2: Software Requirements

Switch Modules	Method	Supported Release
MDS 9250i switches	Method 1	NX-OS Release 6.2(5) and later
MDS 9222i switches	Method 1	NX-OS Release 4.1.3a and later
MDS 9222i switches	Method 2	NX-OS Release 4.1.3a and later
Multiservice Module (MSM-18/4)	Method 1	NX-OS Release 4.1.1b and later
Multiservice Module (MSM-18/4)	Method 2	NX-OS Release 4.1.1b and later



Note To configure DMM on a switch running NX-OS Release 4.1(1) or later, the Fabric Manager server must be running NX-OS Release 4.1(1) or later.

Hardware Requirements

Cisco MDS DMM software application executes on the MSM-18/4 module, MDS 9222i or the MDS 9250i switch.

MSM-18/4 Module or MDS 9222i Switch or MDS 9250i switch Capable Switches

The following switches support the MSM-18/4 modules, MDS 9222i or the MDS 9250i switches:

- All MDS 9200 Series switches
- All MDS 9500 Series 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 9710 (Capable in 6.2(3) or later)
- MDS 9124
- MDS 9134
- MDS 9020



Note Fibre Channel Redirect (FCR) support is introduced in the Cisco MDS 9710 series switch in Cisco NX-OS Release 6.2(3). The storage ports can be connected to Cisco MDS 9710 series switch running with Cisco NX-OS Release 6.2(3) or later.

Server HBA Ports

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

SAN Fabric

The SAN fabric has the following hardware-related requirements:

- Cisco MDS DMM supports single-fabric and dual-fabric topologies. The DMM feature requires at least one MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch in each fabric.
- The Cisco MDS DMM feature is supported in homogeneous and heterogeneous SAN fabrics. The MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch can be located in the fabric on any MDS switch that is capable of supporting these modules. However, the MSM-18/4 module, MDS 9222i or the MDS 9250i switch and the storage ports must either be located on the same switch or connected through a Cisco SAN.

Limitations and Restrictions

Configuration Limitations

The Cisco MDS DMM software application has the following configuration limitations:

- Maximum number of jobs on the MSM-18/4 module, MDS 9222i or the MDS 9250i switch is 16.
- Maximum number of sessions on the MSM-18/4 module, MDS 9222i or the MDS 9250i switch is 255.
- Maximum LUN size is 16 Terabytes (Method 1).
- Maximum number of LUNs in a job is 128.

Restrictions

The Cisco MDS DMM software application has the following restrictions:

- On a single service engine, only one intelligent application can be provisioned.
- The IOA, IVR, NPV and NPIV, F PortChannel or Trunk features cannot coexist with DMM for a specific flow.
- In Cisco NX-OS release 6.2(7), DMM cannot be provisioned when bulk notification feature is enabled and vice versa.

FC-Redirect Limitations

If a target switch is configured for FC-redirect, and the switch has ISLs configured on Generation 1 line cards, then external non-FC-Redirect hosts that are accessing the target switch might experience a disruption in traffic to the switch. This disruption occurs only if the host's FC4-feature type is not registered as sesi-fcp:init.

When adding a Bulk Notification enabled switch to an existing FC-Redirect enabled fabric, a new DMM job must not be configured with any hosts or targets connected to the newly added switch before disabling Bulk notification via CLI command `no fcns bulk-notify` on the newly added switch. Likewise, previously configured DMM jobs may assume operation only after disabling Bulk Notification on the switch. This is applicable only to Cisco NX-OS release 6.2(7) and onwards.



CHAPTER 3

Getting Started

- [Getting Started, on page 13](#)

Getting Started

This chapter describes how to install and configure the Cisco MDS DMM software.

Installing Cisco MDS DMM Software

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



Note

- Cisco MDS NX-OS Release 5.0(1) no longer supports the Storage Services Module (SSM) (DS-X9032-SSM).
- Cisco Fabric Manager 5.0(1) does support the SSM and can be used to configure an SSM running SAN-OS 3.x or NX-OS 4.x software.

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

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

Using DMM Software Licenses

[Table 3: Cisco DMM Licenses, on page 13](#) lists the Cisco DMM licenses that are available.

Table 3: Cisco DMM Licenses

Part Number	Description	Applicable Product
M9250IDMMK9	Cisco Data Mobility Manager (DMM) permanent license for MDS 9250i switch	MDS 9250i switch only
M9250IDMMT6M	Cisco Data Mobility Manager (DMM) time-based license for MDS 9250i switch (for 180 days)	MDS 9250i switch only

Part Number	Description	Applicable Product
M95DMM184K9	Cisco Data Mobility Manager (DMM) permanent license for MSM-18/4 module	MDS 9500 Series with MSM-18/4 module
M95DMM184TSK9	Cisco Data Mobility Manager (DMM) time-based license for MSM-18/4 module (for 180 days)	MDS 9500 Series with MSM-18/4 module
M92DMM184K9	Cisco Data Mobility Manager (DMM) permanent license for MSM-18/4 module	MDS 9200 Series with MSM-18/4 module
M92DMM184TSK9	Cisco Data Mobility Manager (DMM) time-based license for MSM-18/4 module (for 180 days)	MDS 9200 Series with MSM-18/4 module
M9222iDMMK9	Cisco Data Mobility Manager (DMM) permanent license for fixed slot	MDS 9222i Switch only
M9222iDMMTSK9	Cisco Data Mobility Manager (DMM) time-based license (for 180 days) for fixed slot	MDS 9222i Switch only
M95DMMS1K9	Cisco Data Mobility (DMM) permanent license for one MSM-18/4 module or MDS 9222i switch	MDS 9500 Series with MSM-18/4 module or MDS 9222i switch
M95DMMTS1K9	Cisco Data Mobility (DMM) time-based license for one MSM-18/4 module or MDS 9222i switch (for 180 days)	MDS 9500 Series with MSM-18/4 module or MDS 9222i switch
M92DMMS1K9	Cisco Data Mobility (DMM) permanent license for one MSM-18/4 module or MDS 9222i switch	MDS 9200 Series with MSM-18/4 module or MDS 9222i switch
M92DMMTS1K9	Cisco Data Mobility (DMM) time-based license for one MSM-18/4 module or MDS 9222i switch (for 180 days)	MDS 9200 Series with MSM-18/4 module or MDS 9222i switch



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

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



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

For more information about installing or upgrading software licenses, refer to [Cisco MDS 9000 Series NX-OS Licensing Guide](#).

Deployment Guidelines

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

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

DMM Management Installation and Configuration Tools

Cisco MDS DMM supports a CLI tool and a GUI tool for configuring and managing data migrations.

DMM CLI

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

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

Configuring SSH on the Switch

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

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

Configuring IP Connectivity

This section covers the configuration of IP connectivity Cisco MSM-18/4 modules and Cisco MDS 9222i or the Cisco MDS 9250i switches.

Configuring IP Connectivity for MSM-18/4 Modules

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

The MSM-18/4 modules communicate with their peer MSM-18/4 modules using the management IP network. (See [Figure 3: IP Configuration](#), on page 16.)

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

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

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

The IP subnet can use a private address space because these addresses will not be advertised. As noted, the subnet number needs to be unique for each MSM-18/4 module enabled MDS switch that is connected to the same management IP subnetwork.

- Create a CPP interface (with an IP address) on each MSM-18/4 module on the switch.

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

- Configure zoning.

The CPP interfaces and the VSAN 1 interface need to be zoned together.

- Enable IPv4 routing.
- Configure the default gateway for each CPP interface.

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



Note

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

- Configure static routes as required to access the peer MSM-18/4 modules.

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

Figure 3: IP Configuration



The following example is based on the configuration and subnetwork numbers. (See [Figure 3: IP Configuration](#), on page 16.)

The example shows the configuration for MDS 9222i switch1:

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

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

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

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

- Configure a new zone to include the pWWN of the CPP interface on the MSM-18/4 module and the VSAN 1 interface on the supervisor:

```
switch(config)# zone name DMM_IP_MGMT vsan 1

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

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

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

- Enable IPv4 routing:

```
switch(config)# ip routing
```

- Configure the default gateway for the MSM-18/4 modules:

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

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

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

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

```
ip route 10.10.2.1 255.255.255.255 172.22.43.95
```

The following example shows the configuration for MDS 9222i switch2 ([Figure 3: IP Configuration, on page 16](#)):

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

```

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

switch(config-zone)# member pwn 22:00:00:20:25:19:25:11
switch(config-zone)# member pwn 21:00:00:c0:7d:76:04:15
switch(config-zone)# exit
switch(config)# ip routing
switch(config)# ip default-gateway 10.10.2.1 interface cpp 4/1/1
switch(config)# ip route 10.10.1.1 255.255.255.0 172.22.43.94

```

For additional information about configuring IPFC, refer to the [Cisco Fabric Manager IP Services Configuration Guide](#) and the [Cisco MDS 9000 Series NX-OS IP Services Configuration Guide](#).

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

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

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

```

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

```

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

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

```

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

```

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

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

```

switch# show interface vsan 1

vsan1 is up, line protocol is down (port down)
WWPN is 10:00:00:0d:ec:4a:ba:01, FCID not assigned
Internet address is 10.1.3.1/24
MTU 1500 bytes, BW 1000000 Kbit
0 packets input, 0 bytes, 0 errors, 0 multicast
0 packets output, 0 bytes, 0 errors, 0 dropped

```

```

switch# show fcms database vsan 1

There are no entries in the database
switch# show flogi database vsan 1
No flogi sessions found.

```

```
switch# ping 10.1.3.1

interface is down
```

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

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

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

```
switch# show interface vsan 1

vsan1 is up, line protocol is up
WWPN is 10:00:00:0d:ec:4a:ba:01, FCID is 0x1e0003
Internet address is 10.1.3.1/24
MTU 1500 bytes, BW 1000000 Kbit
0 packets input, 0 bytes, 0 errors, 0 multicast
6 packets output, 384 bytes, 0 errors, 0 dropped
switch# ping 10.1.3.1
PING 10.1.3.1 (10.1.3.1) 56(84) bytes of data.
64 bytes from 10.1.3.1: icmp_seq=1 ttl=64 time=0.075 ms
64 bytes from 10.1.3.1: icmp_seq=2 ttl=64 time=0.073 ms
```

Enabling the DMM Feature

You can use the CLI or the Fabric Manager GUI to enable the DMM feature.

Enabling DMM with the CLI

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



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

Procedure

-
- Step 1** switch# **configure terminal**
Enters the configuration mode.
- Step 2** switch(config)# **ssm enable feature dmm module slot**
Enables DMM on the MSM-18/4 module or MDS 9222i switch in the specified slot.
- Step 3** switch(config)# **no ssm enable feature dmm module slot**

Disables DMM on the MSM-18/4 module or MDS 9222i switch in the specified slot.

Using the DMM Pre-Configuration Wizard

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

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

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

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

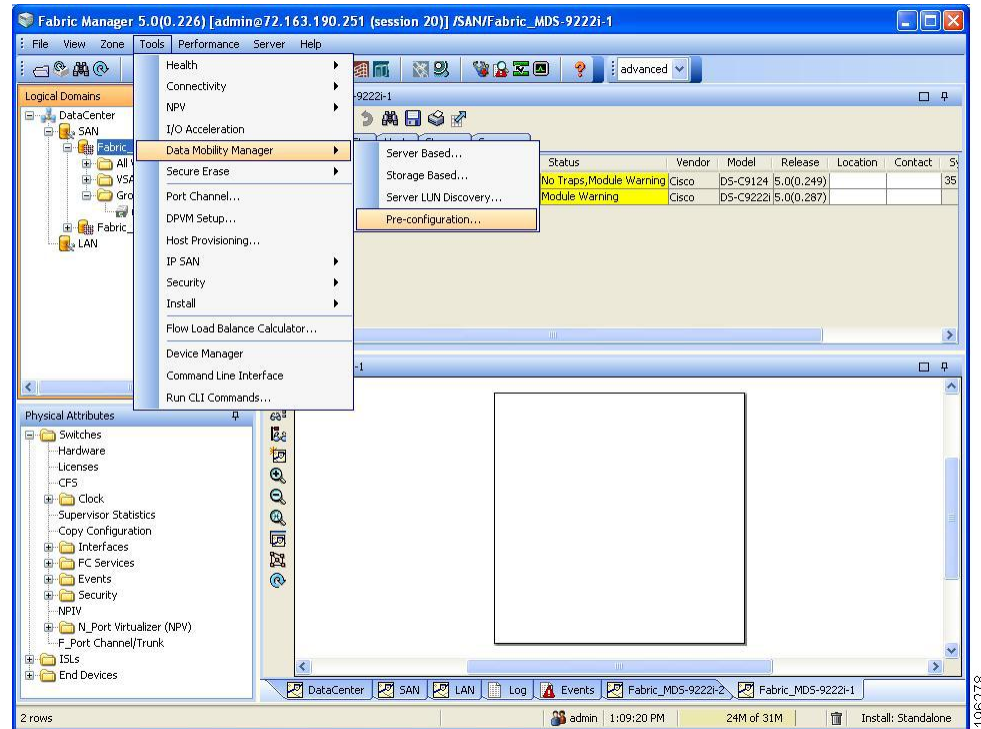
To use the DMM Pre-Configuration Wizard, launch the Fabric Manager GUI after selecting the required fabric .



Note

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

Figure 4: DMM Pre-Configuration



Configuring MDS Modules for DMM

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

Procedure

- Step 1** Select the DMM capable modules that you want to configure and click **Next**.
- Step 2** The Enable Secure Shell (SSH) screen displays a list of DMM switches. The table indicates if SSH is enabled and if the key already exists.
- Click **Next**.
The SSH key is created if the key does not exist already. SSH is enabled. The SSH key is created for protocol RSA with a numbits value of 1024.
Note If SSH is already enabled on all the switches, then the “**No action necessary**” message is displayed. Click **Next** to continue.
- Step 3** Select a switch from the drop-down list to configure the IP address and mask for the VSAN 1 interface.
- Click **Add**.
The switch moves from the drop-down list to the table. One entry can be added for each switch.
 - Click **Next**.
The IP address is created and the IPv4 routing is enabled for all the switches that are selected.

Note The valid mask values are 8, 16, 24, or 32. If the VSAN 1 IP address is already configured for the switch, then the switch does not appear in the drop-down list. If all the switches already have their VSAN 1 IP address configured, then a message is displayed. Once you click **Next**, the IPv4 routing is configured.

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

Figure 5: Error Message for VSAN IP Connectivity



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

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

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

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

b) Click **View necessary gateways**.

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

d) Click **Next**.

The IP address is created and the gateway is configured.

- Note**
- The valid mask values are 8, 16, 24, or 32.
 - If the CPP IP address is already configured for the switch module, then the module does not appear in the drop-down list.
 - The MDS 9222i switch or the MDS 9250i switch is not displayed in the drop-down list because it is not necessary to set a separate CPP IP address or default gateway for the MDS 9222i fixed slot.
 - If all of the switch modules already have their CPP IP addresses configured, then a message is displayed. Click **Next**. The necessary default gateways are configured.

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

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

a) Click **Add**.

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

b) Click **Next**.

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

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

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

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

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

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

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

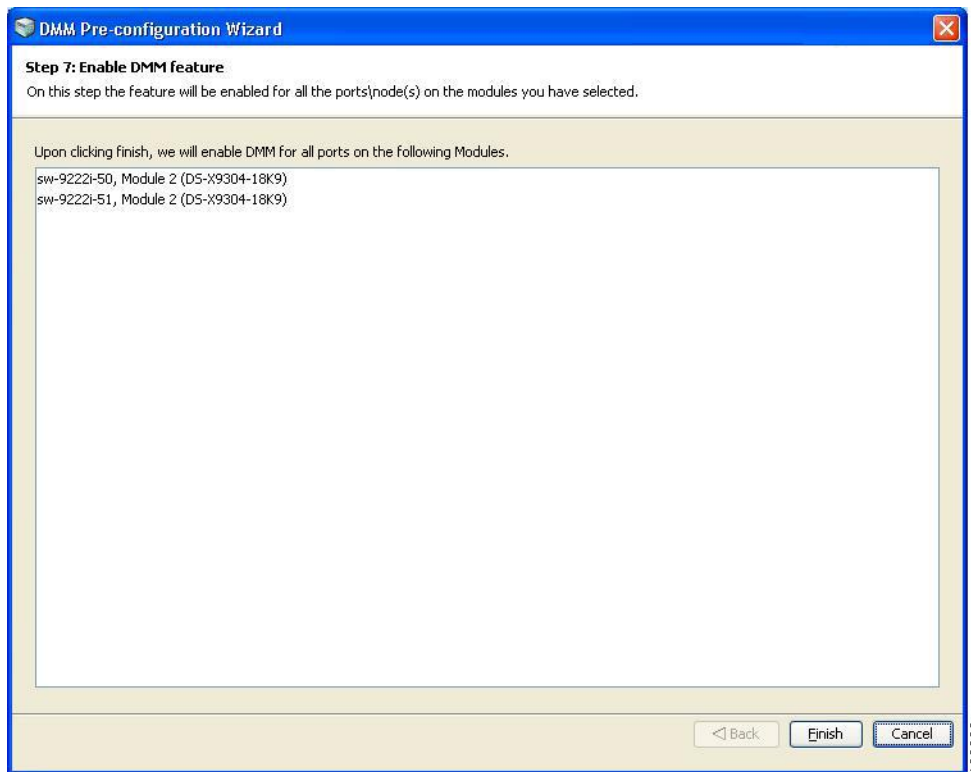
b) Click **Yes** to continue.

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

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

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

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



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

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

Step 8 Click **Close** to close the DMM Pre-Configuration Wizard.

Configuring Migration Rate

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

Configuring Migration Rate Using the CLI

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

Procedure

- Step 1** switch# **configure terminal**
Enters the configuration mode.
- Step 2** switch(config)# **dmm module *module-id* rate_of_migration *fast rate* *medium rate* *slow rate***

Sets the migration rate for the specified MSM-18/4 module or MDS 9222i switch. The migration rate has a range of 1 to 200 and the units are megabytes per second (MB/s).

The default values for migration rate are as follows:

- Slow: 10 MB/s
- Medium: 25 MB/s
- Fast: 60 MB/s

Example

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

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



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



CHAPTER 4

Understanding DMM Topologies

Cisco MDS DMM is designed to support a variety of SAN topologies. The SAN topology influences the location of the MSM-18/4 module or MDS 9222i switch and the DMM feature configuration.

- [Overview](#) , on page 27
- [FC-Redirect](#), on page 27
- [DMM Topology Guidelines](#), on page 29
- [Homogeneous SANs](#), on page 29
- [Heterogeneous SANs](#), on page 30
- [Ports in a Server-Based Job](#), on page 31

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 MSM-18/4 module or the MDS 9222i switch, using the FC-Redirect capability.

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

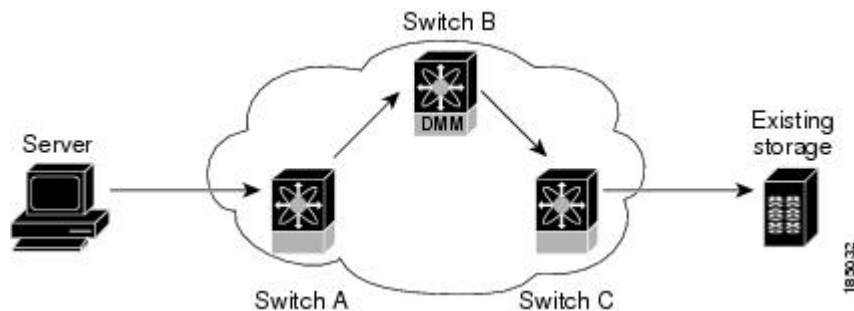
- The existing storage must be connected to a switch with FC-Redirect capability. FC-Redirect capability is available on MDS 9500 Series switch or MDS 9222i switch running Cisco SAN-OS Release 3.2(2c) or later or Cisco NX-OS Release 4.x or later.
- FC-Redirect capability is introduced in Cisco MDS 9710 Series Switch running with Cisco NX-OS 6.2(3) or later.

- FC-Redirect capability is introduced in Cisco MDS 9250i Series Switch running with Cisco NX-OS 6.2(5) or later.
- 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 NX-OS 4.1(1b) 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 MSM-18/4 module or the MDS 9222i switch can be located anywhere in the fabric, as long as the FCNS database in the MSM-18/4 module or the MDS 9222i switch has the required information about the server HBA ports and the existing storage ports. The MSM-18/4 module or the MDS 9222i switch must be running SAN-OS 3.2(1) or NX-OS 4.1(1b) 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 MSM-18/4 module or MDS 9222i switch and the existing storage connected to separate switches. The recommended practice is to connect the existing storage to the same switch as the MSM-18/4 module or MDS 9222i switch.

The server HBA port ([Figure 6: Host Connected to FC-Redirect Switch, on page 28](#)) is connected to switch A and the existing storage is connected to switch C. Both switches have FC Redirect capability. The MSM-18/4 module or MDS 9222i switch is installed on switch B. All three switches are running SAN-OS 3.2(1) or NX-OS 4.1(1b) or later.

Figure 6: Host Connected to FC-Redirect Switch

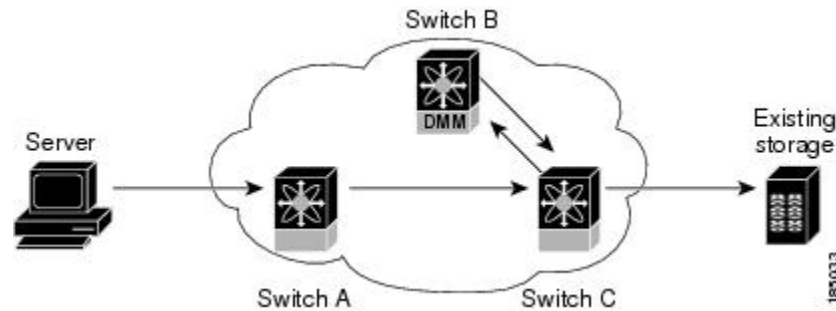


When the data migration job is started, FC-Redirect is configured on switch A to divert the server traffic to the MSM-18/4 module or MDS 9222i switch. FC-Redirect is configured on switch C to redirect the storage traffic to the MSM-18/4 module or MDS 9222i switch.

The server HBA port ([Figure 7: Host Not Connected to FC-Redirect Switch, on page 29](#)) is connected to switch A, which either does not have FC-Redirect capability or is not running SAN-OS 3.2(1) or NX-OS 4.1(1b) or later. The existing storage is connected to switch C, which has FC-Redirect capability. The MSM-18/4 module or MDS 9222i switch is installed on switch B. Switches B and C are running SAN-OS 3.2(1) or NX-OS 4.1(1b) 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 module. 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 MSM-18/4 module or MDS 9222i switch in switch C) avoids the increase in network latency and bandwidth.

Figure 7: 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 a 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 NX-OS 4.1(1b) or later release.
- The MSM-18/4 module is supported on MDS 9500 Series switches and MDS 9200 Series switches. The switch must be running MDS SAN-OS 3.2(1) or NX-OS 4.1(1b) or later release. MDS 9250i switch running 6.2.5 or later release.
- DMM requires a minimum of one MSM-18/4 module or MDS 9222i switch 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.
- Minimum revisions should be updated to include the minimum supported MSM release, NX-OS Release 4.1(1b).
- DMM is supported on NPV, NPIV, and TFPC.



Note In a storage-based migration, if a new server port tries to access the storage ports once the migration has started, storage can become corrupted.

Homogeneous SANs

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

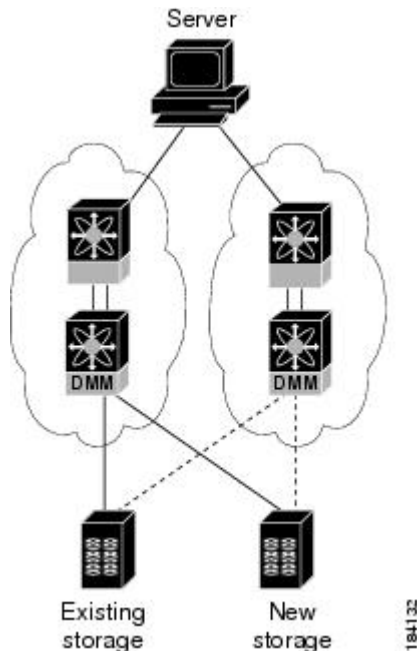
- Core-Edge—Hosts at the edge of the network, and storage at the core.
- Edge-Core—Hosts and storage at the edge of the network, and ISLs between the core switches.

- 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 MSM-18/4 module or MDS 9222i switch in the switch closest to the storage devices. Following this recommendation ensures that DMM introduces no additional network traffic during data migrations.

A common SAN topology ([Figure 8: Homogeneous SAN Topology, on page 30](#)), with servers at the edge of the network and storage arrays in the core.

Figure 8: Homogeneous SAN Topology



In a homogeneous network, you can locate the MSM-18/4 module, MDS 9222i or the MDS 9250i switch on any DMM-enabled MDS switch in the fabric. It is recommended that the MSM-18/4 module or MDS 9222i switch is installed in the switch connected to the existing storage. The new storage should be connected to the same switch as the existing storage. If the MSM-18/4 module, MDS 9222i or the MDS 9250i switch 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 MSM-18/4 module, MDS 9222i, or the MDS 9250i switch).

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 MSM-18/4 module, MDS 9222i, or the MDS 9250i switch 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 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. 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).

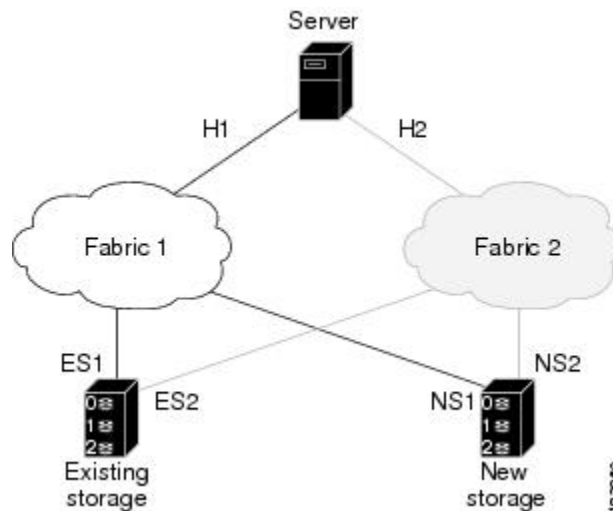
In a single-path configuration, only one active storage port exposes the LUN set to the server. The migration job includes one initiator and target port pair (DMM does not support multiple servers accessing the same LUN set).

Single LUN Set, Active-Active Array

The server accesses three LUNs over Fabric 1 (Figure 9: Single LUN Set, Active-Active Array, on page 31) 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 9: Single LUN Set, Active-Active Array



You create a data migration job with the following configuration:

Table 4: Data Migration Job Configurations

Server Port	Existing Storage Port	New Storage Port
H1	ES1	NS1

H2	ES2	NS2
----	-----	-----

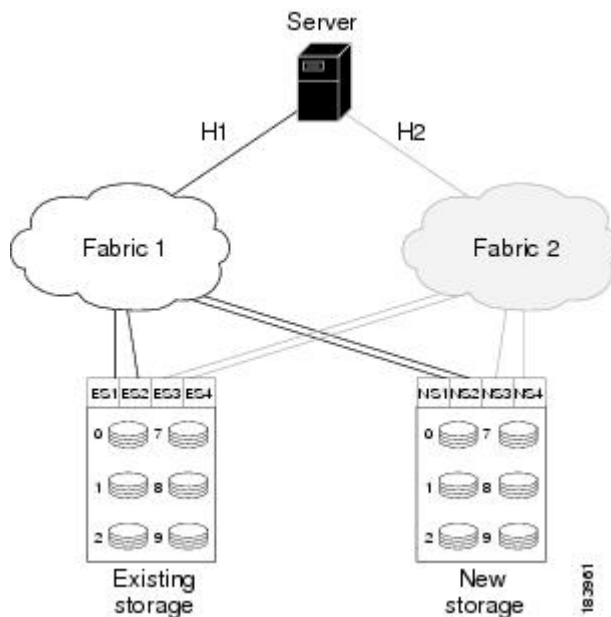


Note If the example in [Figure 9: Single LUN Set, Active-Active Array, on page 31](#) showed multipathing over a single fabric SAN, there would be no difference in the data migration job configuration.

Multiple LUN Set, Active-Active Arrays

The server accesses three LUNs over Fabric 1 (see [Figure 10: Multiple LUN Set, Active-Active Arrays, on page 32](#)), 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 10: 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:

Table 5: First Migration Job Configurations

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:

Table 6: Second Migration Job Configurations

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

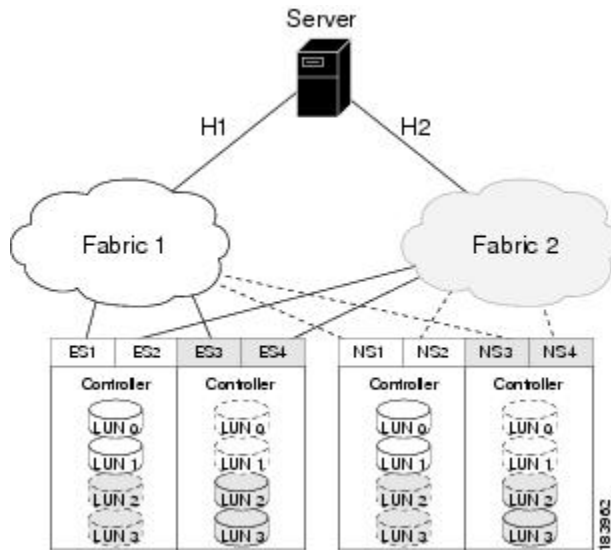
In an active-passive array, the LUNs exposed by a storage port may be active or passive.

Example: Each controller has two active ports

The server accesses a single LUN set. (See [Figure 11: Single LUN Set, Active-Passive Array, on page 33.](#)) 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 that are accessed from two different storage ports. Each storage port is paired for multipathing.

Figure 11: 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 and associated storage ports 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.
- In Cisco DMM, if a data migration job is configured for an Active-Passive array, only the paths on the active controller of the storage are included as part of the job. As a result, if a LUN Trespass has occurred due to a controller failover, the host I/Os on the new path to the storage are not captured by DMM and they are not applied to the new storage. If a LUN trespass or controller-failover occurs during migration, destroy the job and recreate it to perform the migration again to ensure that the old and new storage are synchronized.

One migration job has the following configuration:

Table 7: First Migration Job Configurations

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:

Table 8: Second Migration Job Configurations

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

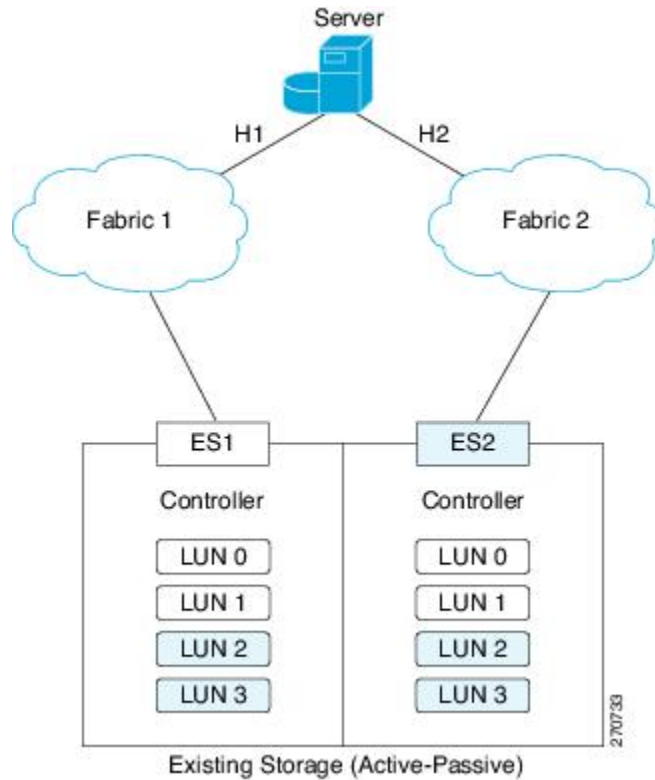
This job includes two data migration sessions (for LUNs 2 and 3).

Example: Each controller has only one active port

The server accesses a single LUN set. (See [Figure 12: Single LUN Set, Active-Passive Array](#), on page 35.) 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 that are accessed from different storage ports.

Figure 12: 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:

Table 9: First Migration Job Configurations

Server Port	Existing Storage	New Storage
H1	ES1	NS1

The other migration job has the following configuration:

Table 10: Second Migration Job Configurations

Server Port	Existing Storage	New Storage
H2	ES2	NS2



CHAPTER 5

Preparing for Data Migration

- [Preparing for Data Migration, on page 37](#)

Preparing for Data Migration

This chapter describes how to prepare for a data migration job.

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 complex activity. We recommend that you create a plan to ensure a smooth data migration.

To create your data migration plan, follow these steps:

Procedure

-
- Step 1** Document the SAN topology for the data migration. Identify and obtain any additional equipment and software licenses.
- Step 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 the Storage ASL Status, on page 39](#) 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.
- Step 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 non-peak hours or configure a slow migration rate.

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

Step 4 As a precaution, ensure that all the critical data on the existing storage have 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.



Note Starting from NX-OS 4.1(1b), Server Lunmap Discovery Module is a part of DMM provisioning. DMM must be enabled using the `ssm enable feature module` command before running the SLD tool.

Configuring MSM-18/4 Modules or MDS 9222i Switches

The Cisco MDS DMM feature executes on the MSM-18/4 module or MDS 9222i switch. 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 MSM-18/4 module or MDS 9222i switch or to another switch).

If necessary, provision an MSM-18/4 module or MDS 9222i switch in each fabric. We recommend that you install the MSM-18/4 module or the MDS 9222i switch on the switches that are connected to the existing storage ports.

If the existing or new storage port is on a different module or switch than the MSM-18/4 module and MDS 9222i switch, ISL network traffic will increase during the migration. This is because all traffic between the existing and new storage is directed through the MSM-18/4 module or MDS 9222i switch. Also, if the server port is on a different module or switch than the MSM-18/4 module or MDS 9222i switch, ISL network traffic will increase during the migration, as all traffic between the server and the storage is directed through the MSM-18/4 module or MDS 9222i switch.

Ensure that Cisco MDS DMM is the only active intelligent application on the MSM-18/4 module or MDS 9222i switch 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 at least 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 the 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 multipath port pairs.

Use the Server LUN Discovery (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, follow these steps:

Procedure

-
- Step 1** `switch# 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 and destination port pair.
 - Step 2** `switch# sld module module number vsan vsan no server-pwwn server pWWN target-pwwn target pWWN discover [detail]`
 Displays the ASL status for LUNs associated with the specified source and destination port pair. The **detail** option displays the detailed output for the source and destination port pair.
-

Example

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

```
switch# 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
=====
```

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.

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 [Understanding DMM Topologies](#) , on page 27.



CHAPTER 6

Troubleshooting Cisco MDS DMM

- [DMM Overview](#), on page 41
- [Best Practices](#), on page 41
- [License Requirements](#), on page 42
- [Initial Troubleshooting Checklist](#), on page 42
- [Common Troubleshooting Tools](#), on page 43
- [Troubleshooting Connectivity Issues](#), on page 43
- [Troubleshooting General Issues](#), on page 44
- [Troubleshooting Scenarios](#), on page 44
- [Troubleshooting Job Creation Issues](#), on page 45
- [Troubleshooting Job Execution Issues](#), on page 49
- [DMM Error Reason Codes](#), on page 51

DMM Overview

Cisco MDS DMM is an intelligent software application that runs on the MSM-18/4 module or MDS 9222i switch. With Cisco MDS DMM, no rewiring or reconfiguration is required for the server, the existing storage, or the SAN fabric. The MSM-18/4 module or MDS 9222i switch 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 possible problems when using DMM if you follow these 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, refer to the [Checking the Storage ASL Status, on page 39](#).

- 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, on page 29](#).

- 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 cutover occurs, so that no data writes are lost.

For additional information about selecting ports for server-based jobs, see the [Ports in a Server-Based Job, on page 31](#).

License Requirements

Each MSM-18/4 module or MDS 9222i switch with Cisco MDS DMM enabled requires a DMM license.

DMM licenses are described in the [Using DMM Software Licenses, on page 13](#).

Initial Troubleshooting Checklist

Begin troubleshooting DMM issues by checking the troubleshooting checklist in the following table.

Table 11: Initial Troubleshooting Checklist

Checklist
Verify that an MSM-18/4 module or MDS 9222i switch is installed on each fabric and that DMM is enabled on the MSM-18/4 module or MDS 9222i switch.
Verify that your DMM licenses are valid.
Verify that DMM is the only intelligent application running on the MSM-18/4 module or MDS 9222i switch.
Verify that the existing and new storage devices are connected to a switch that supports FC-Redirect.

Checklist
Verify that SAN OS 3.2(1) or NX-OS 4.1(1b) or later is running on the switches hosting the MSM-18/4 module or MDS 9222i switch and the storage.
Verify that IP connectivity exists between peer MSM-18/4 modules or MDS 9222i switches by using the ping command.
Verify that the default zone policy in the VSAN with FCR configuration is set to 'DENY'.

Common Troubleshooting Tools

MSM-18/4 module or MDS 9222i switch. The following CLI commands on the MSM-18/4 module or MDS 9222i switch 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 MSM-18/4 module or MDS 9222i switch using the **attach module** command prior to using the **show dmm** commands.

Troubleshooting Connectivity Issues

Cannot Connect to the MSM-18/4 Module or MDS 9222i Switch

Problems connecting the MSM-18/4 module or MDS 9222i switch can be caused by SSH, zoning, or routing configuration issues. [Table 12: Cannot Connect to the MSM-18/4 Module or MDS 9222i Switch](#) lists possible solutions.

Table 12: Cannot Connect to the MSM-18/4 Module or MDS 9222i Switch

Symptom	Possible Cause	Solution
Cannot connect to the MSM-18/4 module or MDS 9222i switch.	SSH not enabled on the supervisor module.	Enable SSH on the switch that hosts the MSM-18/4 module or MDS 9222i switch. See Configuring SSH on the Switch, on page 15 .
	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, on page 15 .
	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, on page 15 .

No Peer-to-Peer Communication

Table 13: No Peer-to-Peer Communication lists possible solutions to problems connecting to the peer MSM-18/4 module or MDS 9222i switch.

Table 13: No Peer-to-Peer Communication

Symptom	Possible Cause	Solution
Cannot ping the peer MSM-18/4 module or MDS 9222i switch.	No route to the peer MSM-18/4 module or MDS 9222i switch.	Configure a static route to the peer MSM-18/4 module or MDS 9222i switch. See Configuring IP Connectivity , on page 15.

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 General Issues

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

You must connect to the MSM-18/4 module or MDS 9222i switch to execute DMM **show** commands. Use the **attach module slot** command to connect to the MSM-18/4 module or MDS 9222i switch.

The **show dmm job** command provides useful information for troubleshooting DMM issues.

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

Capture the output of the **show tech-support fc-redirect** command on all switches with FC-Redirect entries and save the output into a file.

Troubleshooting Scenarios

This section describes the following troubleshooting scenarios:

- **DMM storage based zone causes the active server-based job to fail.**

The Method 2 job that is in progress goes to the failed state if any zone changes are made to the zone entries comprising the NS storage port in the active zone set.

The workaround is to place the optional DMM zone for the particular host and NS into the active zone set before making changes.

- **If a DMM job is configured and running in a dual fabric, a switch reboot will place the configured DMM job in reset mode and indicate one MSM-18/4 module or MDS 9222i switch as missing in Cisco Fabric Manager.**

Even if the switch comes back up, the DMM job will continue to indicate that one MSM-18/4 module or MDS 9222i switch is missing because the switch does not have the information on the DMM job. The DMM job cannot be deleted from Fabric Manager at this point in time.

You have to go to the CLI and explicitly enter the destroy command for that particular job ID to delete the job.

The exception to this rule is if the switch that was rebooted has the information on the DMM job. In such a scenario, Fabric Manager will function normally.

- **The DMM feature cannot be disabled from the MSM-18/4 module or MDS 9222i switch once the grace period has expired.**

Use the poweroff module command and purge the information.

```
switch# configure terminal
switch(config)# poweroff module 1
switch(config)# purge module 1 running-config
```

Troubleshooting Job Creation Issues

The DMM GUI displays error messages to help you troubleshoot basic configuration mistakes when using the job creation wizards. A list of potential configuration errors is included after the last step in the task.

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 allows you to proceed.

[Table 14: Failures During Job Creation](#) lists types of failures that may occur during job creation.

Table 14: Failures During Job Creation

Symptom	Possible Cause	Solution
Create Job failures.	No MSM-18/4 module or MDS 9222i switch available.	Ensure that the fabric has an MSM-18/4 module or MDS 9222i switch 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 the MSM-18/4 modules or MDS 9222i switches is not configured correctly.	The exact error is displayed in the job activity log. See Opening the Job Error Log, on page 46 .
	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:

Procedure

-
- Step 1** 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.
- Note** You must retrieve the job activity log before deleting the job.
- Step 5** The job information and error strings (if any) for each MSM-18/4 module or MDS 9222i switch are displayed.
 - Step 6** Click **Cancel** in the Wizard to delete the job.
-

DMM License Expires

If a time-bound license 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 starts.
- Jobs which are stopped or in a failure state can also be started and executed.
- If the MSM-18/4 module or the MDS 9222i switch performs a restart, the existing jobs cannot be restarted until the switch has a valid DMM license.
- To resolve issues related to an expired license, install a valid DMM license on the switch.

Scheduled Job is Reset

If the MSM-18/4 module or MDS 9222i switch or the switch performs a restart, all scheduled DMM jobs are placed in the Reset state. Use the **Modify** command to restore jobs to the Scheduled state.

To restore each job to the Scheduled state, follow these steps:

Procedure

- 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.
- 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 the scheduled state. If you selected the Now radio button, the job starts immediately.
-

Failures When Creating a Session

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

Failures During Sessions Creation Although the LUN values displayed in 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. To verify the size of the size of the LUNs, follow these steps:

Procedure

- Step 1** Note the host pWWN, existing storage pWWN and the new storage pWWN as displayed on the wizard screen.
- 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
- Step 2** Note the MSM-18/4 module or the MDS 9222i switch information displayed on the wizard screen.
- Step 3** From the switch console, enter the **attach module command** to attach to the MSM-18/4 module or MDS 9222i switch console.
- ```
switch# attach module 2
```
- Step 4** Enter the show dmm job command from the SSM CLI to display the job information. The following example shows 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 switch 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
```

**Step 5** Enter the **show dmm job job-id details** command to display the job details.

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

**Step 6** Look for server information in the output and note the VI pWWN corresponding to the host port. The following example shows server information:

```

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
```

**Step 7** Using the storage pWWN and the VI pWWN, enter the **show dmm job job-id storage tgt-pww vi-pwwn** command to get the LUN information for the existing and new storage. The following example shows the output of the existing storage. Note the Max LBA and Size values.

```
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
```

The following example shows the output of the new storage. Note that the LBA and Size values are smaller than the comparable values in the existing 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
```

- Step 8** Correct the LUN size of the new storage so that it matches the LUN size of the existing storage, and then reconfigure the job.
- 

## Failure When Destroying a Job

This section helps you troubleshoot an error when the job destroy command displays an error.

The following example shows the failure that may occur during job destruction:

```
switch(config)# dmm module 1 job 1 start
switch(config)# dmm module 1 job 2 stop
switch(config)# dmm module 1 job 2 destroy
```

```
DMM Config Destroy error
```

If the job destroy command displays an error, there is a possibility that the job is still in progress and has not stopped. You can enter the job destroy command again to destroy the job completely.

## 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 the Failed or Reset state.

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



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

---

## DMM Jobs in Fail State

If DMM encounters an SSM I/O error to the storage, the job is placed in the Failed state. [Table 15: DMM Jobs in the Failed State](#) lists possible solutions for jobs in the Failed state.

Table 15: DMM Jobs in the Failed State

| Symptom                   | Possible Cause                              | Solution                                                                                                                                                                                        |
|---------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM job status is Failed. | MSM-18/4 module or MDS 9222i switch failure | If the MSM-18/4 module or MDS 9222i switch has performed a reload, you must restart or reschedule all failed jobs when the MSM-18/4 module or MDS 9222i switch returns to an 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 Cisco Fabric Manager to determine why the storage port is no longer online. When the storage port is available, restart the migration.                                                      |
|                           | Server I/O failure                          | Check the DMM Job log for server I/O failures.                                                                                                                                                  |
|                           | Migration I/O failure                       | Check the DMM Job log for migration I/O failures.                                                                                                                                               |
|                           | Internal processing failure                 | Check the DMM Job log for internal processing errors.                                                                                                                                           |

## DMM Jobs in Reset State

Table 16: DMM Jobs in Reset State lists possible causes and solutions for jobs in the Reset state.

Table 16: DMM Jobs in Reset State

| Symptom                                                     | Possible Cause                                                          | Solution                                                                                                                                                                                         |
|-------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM Job fails to complete and is placed in the 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 the zone                          | Correct the zone configuration and restart the data migration job.                                                                                                                               |
|                                                             | New Storage port is moved out of the zone                               | Correct the zone configuration and restart the data migration job.                                                                                                                               |
|                                                             | Loss of IP connectivity to the peer MSM-18/4 module or MDS 9222i switch | Restart the data migration job when IP connectivity has been restored.                                                                                                                           |
|                                                             | MSM-18/4 module or MDS 9222i switch failure                             | If the MSM-18/4 module or MDS 9222i switch has performed a reload, you must restart or reschedule all failed jobs when the MSM-18/4 module or MDS 9222i switch returns to the operational state. |
|                                                             | FC-Redirect failure                                                     | Default zone policy must be set to 'DENY' in the server storage port.                                                                                                                            |

# 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 also captured in the Job Activity Log. [Table 17: DMM Error Codes](#) provides a description of the error codes.

**Table 17: DMM Error Codes**

| Error Code                           | Description                                                                                                                                                                                                                                                          |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM_JOB_NOT_PRESENT                  | A job with specified job ID was not found on the MSM-18/4 module or MDS 9222i switch.                                                                                                                                                                                |
| DMM_JOB_ID_DUPLICATE                 | Job creation using a job ID that already exists on the MSM-18/4 module or MDS 9222i switch.                                                                                                                                                                          |
| 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                | MSM-18/4 module or MDS 9222i switch received a storage job query for a server-based job.                                                                                                                                                                             |
| DMM_JOB_CREATION_ERROR               | MSM-18/4 module or MDS 9222i switch failed while creating the data structures for the job, which could be a memory allocation failure.                                                                                                                               |
| DMM_JOB_INTERNAL_ERROR               | MSM-18/4 module or MDS 9222i switch 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 set up 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 MSM-18/4 modules or MDS 9222i switches is not configured correctly. |
| DMM_JOB_INFRA_REMOTE_LMAP_ERR_TCP_DN | Failure to establish connection with the peer MSM-18/4 module or MDS 9222i switch 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.                                                                                                                                                                               |

| Error Code                         | Description                                                                                                                                                                                                                                                                       |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM_JOB_INFRA_DPP_DIED             | The DPP assigned to the job failed during job creation.                                                                                                                                                                                                                           |
| DMM_JOB_INFRA_NOT_ALLOWED          | The MSM-18/4 module or MDS 9222i switch 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 the MSM-18/4 module or MDS 9222i switch. This error can occur when trying to restart or reschedule a job in the 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 the MSM-18/4 module or MDS 9222i switch. This error can occur when trying to restart or reschedule a job in the 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.                                                                                                                                                                                                         |
| 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 Fibre Channel name Server on the MSM-18/4 module or MDS 9222i switch.                                                                                                                                       |
| DMM_FC_RDRT_NO_ZS_ENTRY            | <p>FC-Redirect configuration failure. The server and existing storage port are not zoned together.</p> <p>Delete the old zones involving any of the storage/host ports being used in the current migration job. Recreate the job.</p>                                             |
| DMM_FC_RDRT_INSTALL_ERROR          | FC-Redirect configuration could not be installed in the fabric. A possible cause is that Cisco Fabric Services is not enabled to distribute the FC-Redirect configuration.                                                                                                        |
| DMM_FC_RDRT_LUXOR_ACL_ERROR        | FC-Redirect failed to program a rewrite entry in the local MSM-18/4 module or MDS 9222i switch.                                                                                                                                                                                   |
| DMM_SRVR_VT_LOGIN_SRVR_LOGIN_ERROR | MSM-18/4 module or MDS 9222i switch failed to log 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.             |



| Error Code                        | Description                                                                                                                                                                                                                                                 |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM_SRVR_VT_LOGIN_VI_LOGIN_ERROR  | MSM-18/4 module or MDS 9222i switch Failed to log 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 MSM-18/4 module or MDS 9222i switch 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 MSM-18/4 module or MDS 9222i switch.    |
| 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.                                                                                                                                                                                       |
| 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.                                                                |

| Error Code                         | Description                                                                                                                                                                                               |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 MSM-18/4 module or MDS 9222i switch 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 MSM-18/4 module or MDS 9222i switch 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 the shared MSM-18/4 module or MDS 9222i switch resources to 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.                                                                                                 |
| DMM_JOB_NO_OFFLINE_FOR_ASYNC       | Method-2 data migration does not support offline mode.                                                                                                                                                    |

| Error Code                                              | Description                                                                                                                                                                                              |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM_PEER_IP_CONNECT_FAILURE                             | Failure to establish IP connection with peer MSM-18/4 module or MDS 9222i switch. Check IP configuration on both MSM-18/4 modules or MDS 9222i switches.                                                 |
| 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 zone set. Delete zones for DMM jobs that no longer exist. |





## CHAPTER 7

# Troubleshooting Cisco MDS DMM

This chapter describes procedures used to troubleshoot the data migration feature in the Cisco MDS 9000 Series Multilayer Switches.

- [DMM Overview](#), on page 57
- [Best Practices](#), on page 57
- [License Requirements](#), on page 58
- [Initial Troubleshooting Checklist](#), on page 58
- [Common Troubleshooting Tools](#), on page 59
- [Troubleshooting Connectivity Issues](#), on page 59
- [Troubleshooting General Issues](#), on page 61
- [Troubleshooting Scenarios](#), on page 61
- [Troubleshooting Job Creation Issues](#), on page 62
- [Troubleshooting Job Execution Issues](#), on page 65
- [DMM Error Reason Codes](#), on page 67

## DMM Overview

Cisco MDS DMM is an intelligent software application that runs on the MSM-18/4 module or MDS 9222i switch. With Cisco MDS DMM, no rewiring or reconfiguration is required for the server, the existing storage, or the SAN fabric. The MSM-18/4 module or MDS 9222i switch 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 possible problems when using DMM if you follow these 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, refer to the [Checking the Storage ASL Status, on page 39](#).

- 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, on page 29](#).

- 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 cutover occurs, so that no data writes are lost.

For additional information about selecting ports for server-based jobs, see the [Ports in a Server-Based Job, on page 31](#).

## License Requirements

Each MSM-18/4 module or MDS 9222i switch with Cisco MDS DMM enabled requires a DMM license.

DMM licenses are described in the [Using DMM Software Licenses, on page 13](#).

## Initial Troubleshooting Checklist

Begin troubleshooting DMM issues by checking the troubleshooting checklist in the following table.

**Table 18: Initial Troubleshooting Checklist**

| Checklist                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Verify that an MSM-18/4 module or MDS 9222i switch is installed on each fabric and that DMM is enabled on the MSM-18/4 module or MDS 9222i switch. |
| Verify that your DMM licenses are valid.                                                                                                           |
| Verify that DMM is the only intelligent application running on the MSM-18/4 module or MDS 9222i switch.                                            |

| Checklist                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Verify that the existing and new storage devices are connected to a switch that supports FC-Redirect.                                           |
| Verify that SAN OS 3.2(1) or NX-OS 4.1(1b) or later is running on the switches hosting the MSM-18/4 module or MDS 9222i switch and the storage. |
| Verify that IP connectivity exists between peer MSM-18/4 modules or MDS 9222i switches by using the <b>ping</b> command.                        |
| Verify that the default zone policy in the VSAN with FCR configuration is set to 'DENY'.                                                        |

## Common Troubleshooting Tools

MSM-18/4 module or MDS 9222i switch. The following CLI commands on the MSM-18/4 module or MDS 9222i switch 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 MSM-18/4 module or MDS 9222i switch using the **attach module** command prior to using the **show dmm** commands.

## Troubleshooting Connectivity Issues

### Cannot Connect to the MSM-18/4 Module or MDS 9222i Switch

Problems connecting the MSM-18/4 module or MDS 9222i switch can be caused by SSH, zoning, or routing configuration issues. [Table 19: Cannot Connect to the MSM-18/4 Module or MDS 9222i Switch](#) lists possible solutions.

Table 19: Cannot Connect to the MSM-18/4 Module or MDS 9222i Switch

| Symptom                                                    | Possible Cause                            | Solution                                                                                                                                                                                                 |
|------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cannot connect to the MSM-18/4 module or MDS 9222i switch. | SSH not enabled on the supervisor module. | Enable SSH on the switch that hosts the MSM-18/4 module or MDS 9222i switch. See <a href="#">Configuring SSH on the Switch, on page 15</a> .                                                             |
|                                                            | 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 <a href="#">Configuring IP Connectivity, on page 15</a> . |
|                                                            | IP routing not enabled.                   | Ensure that IPv4 routing is enabled. Use the <b>ip routing</b> command in configuration mode.                                                                                                            |
|                                                            | IP default gateway.                       | Configure the default gateway for the CPP IPFC interface to be the VSAN 1 IP address. See <a href="#">Configuring IP Connectivity, on page 15</a> .                                                      |

## No Peer-to-Peer Communication

[Table 20: No Peer-to-Peer Communication](#) lists possible solutions to problems connecting to the peer MSM-18/4 module or MDS 9222i switch.

Table 20: No Peer-to-Peer Communication

| Symptom                                                   | Possible Cause                                            | Solution                                                                                                                                |
|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Cannot ping the peer MSM-18/4 module or MDS 9222i switch. | No route to the peer MSM-18/4 module or MDS 9222i switch. | Configure a static route to the peer MSM-18/4 module or MDS 9222i switch. See <a href="#">Configuring IP Connectivity, on page 15</a> . |

## 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 General Issues

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

You must connect to the MSM-18/4 module or MDS 9222i switch to execute DMM **show** commands. Use the **attach module slot** command to connect to the MSM-18/4 module or MDS 9222i switch.

The **show dmm job** command provides useful information for troubleshooting DMM issues.

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

Capture the output of the **show tech-support fc-redirect** command on all switches with FC-Redirect entries and save the output into a file.

## Troubleshooting Scenarios

This section describes the following troubleshooting scenarios:

- **DMM storage based zone causes the active server-based job to fail.**

The Method 2 job that is in progress goes to the failed state if any zone changes are made to the zone entries comprising the NS storage port in the active zone set.

The workaround is to place the optional DMM zone for the particular host and NS into the active zone set before making changes.

- **If a DMM job is configured and running in a dual fabric, a switch reboot will place the configured DMM job in reset mode and indicate one MSM-18/4 module or MDS 9222i switch as missing in Cisco Fabric Manager.**

Even if the switch comes back up, the DMM job will continue to indicate that one MSM-18/4 module or MDS 9222i switch is missing because the switch does not have the information on the DMM job. The DMM job cannot be deleted from Fabric Manager at this point in time.

You have to go to the CLI and explicitly enter the destroy command for that particular job ID to delete the job.

The exception to this rule is if the switch that was rebooted has the information on the DMM job. In such a scenario, Fabric Manager will function normally.

- **The DMM feature cannot be disabled from the MSM-18/4 module or MDS 9222i switch once the grace period has expired.**

Use the poweroff module command and purge the information.

```
switch# configure terminal
switch(config)# poweroff module 1
switch(config)# purge module 1 running-config
```

# Troubleshooting Job Creation Issues

The DMM GUI displays error messages to help you troubleshoot basic configuration mistakes when using the job creation wizards. A list of potential configuration errors is included after the last step in the task.

## 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 allows you to proceed.

[Table 21: Failures During Job Creation](#) lists types of failures that may occur during job creation.

**Table 21: Failures During Job Creation**

| Symptom              | Possible Cause                                                                                                                                                                                                                                                | Solution                                                                                                          |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Create Job failures. | No MSM-18/4 module or MDS 9222i switch available.                                                                                                                                                                                                             | Ensure that the fabric has an MSM-18/4 module or MDS 9222i switch 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 the MSM-18/4 modules or MDS 9222i switches is not configured correctly. | The exact error is displayed in the job activity log. See <a href="#">Opening the Job Error Log, on page 46</a> . |
|                      | 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:

### Procedure

- 
- Step 1** 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.
- Note** You must retrieve the job activity log before deleting the job.
- Step 5** The job information and error strings (if any) for each MSM-18/4 module or MDS 9222i switch are displayed.
  - Step 6** Click **Cancel** in the Wizard to delete the job.
-

## DMM License Expires

If a time-bound license 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 starts.
- Jobs which are stopped or in a failure state can also be started and executed.
- If the MSM-18/4 module or the MDS 9222i switch performs a restart, the existing jobs cannot be restarted until the switch has a valid DMM license.
- To resolve issues related to an expired license, install a valid DMM license on the switch.

## Scheduled Job is Reset

If the MSM-18/4 module or MDS 9222i switch or the switch performs a restart, all scheduled DMM jobs are placed in the Reset state. Use the **Modify** command to restore jobs to the Scheduled state.

To restore each job to the Scheduled state, follow these steps:

### Procedure

---

- 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.
- 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 the scheduled state. If you selected the Now radio button, the job starts immediately.
- 

## Failures When Creating a Session

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

Failures During Sessions Creation Although the LUN values displayed in 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. To verify the size of the size of the LUNs, follow these steps:

### Procedure

---

- Step 1** Note the host pWWN, existing storage pWWN and the new storage pWWN as displayed on the wizard screen.

- 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

**Step 2** Note the MSM-18/4 module or the MDS 9222i switch information displayed on the wizard screen.

**Step 3** From the switch console, enter the **attach module command** to attach to the MSM-18/4 module or MDS 9222i switch console.

```
switch# attach module 2
```

**Step 4** Enter the **show dmm job** command from the SSM CLI to display the job information. The following example shows 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 switch | 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
```

**Step 5** Enter the **show dmm job job-id details** command to display the job details.

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

**Step 6** Look for server information in the output and note the VI pWWN corresponding to the host port. The following example shows server information:

```

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 |

**Step 7** Using the storage pWWN and the VI pWWN, enter the **show dmm job job-id storage tgt-pww vi-pwwn** command to get the LUN information for the existing and new storage. The following example shows the output of the existing storage. Note the Max LBA and Size values.

```
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

The following example shows the output of the new storage. Note that the LBA and Size values are smaller than the comparable values in the existing storage.

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

show dmm job job-id 1205521523 storage tgt-pwvn 0x44f100062b040000 vi-pwvn 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
```

- Step 8** Correct the LUN size of the new storage so that it matches the LUN size of the existing storage, and then reconfigure the job.

## Failure When Destroying a Job

This section helps you troubleshoot an error when the job destroy command displays an error.

The following example shows the failure that may occur during job destruction:

```
switch(config)# dmm module 1 job 1 start
switch(config)# dmm module 1 job 2 stop
switch(config)# dmm module 1 job 2 destroy

DMM Config Destroy error
```

If the job destroy command displays an error, there is a possibility that the job is still in progress and has not stopped. You can enter the job destroy command again to destroy the job completely.

## 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 the Failed or Reset state.

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



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

## DMM Jobs in Fail State

If DMM encounters an SSM I/O error to the storage, the job is placed in the Failed state. [Table 22: DMM Jobs in the Failed State](#) lists possible solutions for jobs in the Failed state.

**Table 22: DMM Jobs in the Failed State**

| Symptom                   | Possible Cause                              | Solution                                                                                                                                                                                        |
|---------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM job status is Failed. | MSM-18/4 module or MDS 9222i switch failure | If the MSM-18/4 module or MDS 9222i switch has performed a reload, you must restart or reschedule all failed jobs when the MSM-18/4 module or MDS 9222i switch returns to an 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 Cisco Fabric Manager to determine why the storage port is no longer online. When the storage port is available, restart the migration.                                                      |
|                           | Server I/O failure                          | Check the DMM Job log for server I/O failures.                                                                                                                                                  |
|                           | Migration I/O failure                       | Check the DMM Job log for migration I/O failures.                                                                                                                                               |
|                           | Internal processing failure                 | Check the DMM Job log for internal processing errors.                                                                                                                                           |

## DMM Jobs in Reset State

[Table 23: DMM Jobs in Reset State](#) lists possible causes and solutions for jobs in the Reset state.

Table 23: DMM Jobs in Reset State

| Symptom                                                     | Possible Cause                                                          | Solution                                                                                                                                                                                         |
|-------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM Job fails to complete and is placed in the 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 the zone                          | Correct the zone configuration and restart the data migration job.                                                                                                                               |
|                                                             | New Storage port is moved out of the zone                               | Correct the zone configuration and restart the data migration job.                                                                                                                               |
|                                                             | Loss of IP connectivity to the peer MSM-18/4 module or MDS 9222i switch | Restart the data migration job when IP connectivity has been restored.                                                                                                                           |
|                                                             | MSM-18/4 module or MDS 9222i switch failure                             | If the MSM-18/4 module or MDS 9222i switch has performed a reload, you must restart or reschedule all failed jobs when the MSM-18/4 module or MDS 9222i switch returns to the operational state. |
|                                                             | FC-Redirect failure                                                     | Default zone policy must be set to 'DENY' in the server storage port.                                                                                                                            |

## 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 also captured in the Job Activity Log. [Table 24: DMM Error Codes](#) provides a description of the error codes.

Table 24: DMM Error Codes

| Error Code             | Description                                                                                                                            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| DMM_JOB_NOT_PRESENT    | A job with specified job ID was not found on the MSM-18/4 module or MDS 9222i switch.                                                  |
| DMM_JOB_ID_DUPLICATE   | Job creation using a job ID that already exists on the MSM-18/4 module or MDS 9222i switch.                                            |
| 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  | MSM-18/4 module or MDS 9222i switch received a storage job query for a server-based job.                                               |
| DMM_JOB_CREATION_ERROR | MSM-18/4 module or MDS 9222i switch failed while creating the data structures for the job, which could be a memory allocation failure. |

| Error Code                           | Description                                                                                                                                                                                                                                                                       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM_JOB_INTERNAL_ERROR               | MSM-18/4 module or MDS 9222i switch 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 set up 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 MSM-18/4 modules or MDS 9222i switches is not configured correctly.              |
| DMM_JOB_INFRA_REMOTE_LMAP_ERR_TCP_DN | Failure to establish connection with the peer MSM-18/4 module or MDS 9222i switch 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 MSM-18/4 module or MDS 9222i switch 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 the MSM-18/4 module or MDS 9222i switch. This error can occur when trying to restart or reschedule a job in the 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 the MSM-18/4 module or MDS 9222i switch. This error can occur when trying to restart or reschedule a job in the 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.                                                                                                                                                                                                         |
| DMM_VT_ISAPI_CREATION_FAILED         | Failed to create a virtual target corresponding to the storage port.                                                                                                                                                                                                              |



| Error Code                         | Description                                                                                                                                                                                                                                                           |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DMM_FC_RDRT_NO_DNS_ENTRY           | FC-Redirect configuration failure. Storage/Server port not visible in Fibre Channel name Server on the MSM-18/4 module or MDS 9222i switch.                                                                                                                           |
| DMM_FC_RDRT_NO_ZS_ENTRY            | FC-Redirect configuration failure. The server and existing storage port are not zoned together.<br><br>Delete the old zones involving any of the storage/host ports being used in the current migration job. Recreate the job.                                        |
| DMM_FC_RDRT_INSTALL_ERROR          | FC-Redirect configuration could not be installed in the fabric. A possible cause is that Cisco Fabric Services is not enabled to distribute the FC-Redirect configuration.                                                                                            |
| DMM_FC_RDRT_LUXOR_ACL_ERROR        | FC-Redirect failed to program a rewrite entry in the local MSM-18/4 module or MDS 9222i switch.                                                                                                                                                                       |
| DMM_SRVR_VT_LOGIN_SRVR_LOGIN_ERROR | MSM-18/4 module or MDS 9222i switch failed to log 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   | MSM-18/4 module or MDS 9222i switch Failed to log 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 MSM-18/4 module or MDS 9222i switch 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 MSM-18/4 module or MDS 9222i switch.              |
| DMM_ITL_NOT_FOUND_IN_NON_ASList    | Attempt to resolve a LUN path that has not been classified as NON ASL.                                                                                                                                                                                                |

| Error Code                        | Description                                                                                                                                                                                       |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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.                                                                                                                             |
| 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 MSM-18/4 module or MDS 9222i switch 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 MSM-18/4 module or MDS 9222i switch where the job is being created.                                                                                     |

| Error Code                                              | Description                                                                                                                                                                                               |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 the shared MSM-18/4 module or MDS 9222i switch resources to 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.                                                                                                 |
| DMM_JOB_NO_OFFLINE_FOR_ASYNC                            | Method-2 data migration does not support offline mode.                                                                                                                                                    |
| DMM_PEER_IP_CONNECT_FAILURE                             | Failure to establish IP connection with peer MSM-18/4 module or MDS 9222i switch. Check IP configuration on both MSM-18/4 modules or MDS 9222i switches.                                                  |
| 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 zone set. Delete zones for DMM jobs that no longer exist.  |





## CHAPTER 8

# Using the DMM CLI for Data Migration

- [Using the DMM CLI for Data Migration](#) , on page 73

## Using the DMM CLI for Data Migration

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

### 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 MSM-18/4 module, MDS 9222i switch or MDS 9250i switch. Each session runs on only one MSM-18/4 module, MDS 9222i switch or MDS 9250i switch. Enter the session configuration commands on the MDS switch that will perform the session migration.

The DMM **show** commands are accessed directly from the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch. From the command prompt in the switch, you must attach to the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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 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, see the [Ports in a Server-Based Job](#), on page 31.

## Configuring Data Migration Using the CLI

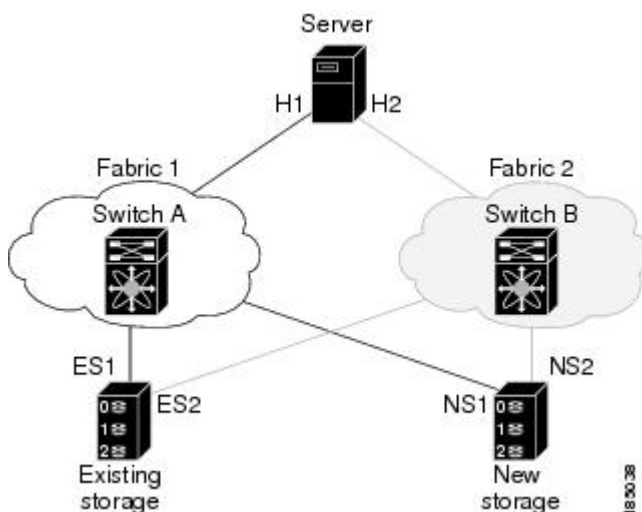
When you enter the command to create a data migration job, the CLI enters DMM job configuration submode. This submode provides commands to configure the server HBA ports, storage ports, and job attributes. The job is only created on the MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch when you enter the **commit** command.

In a dual-fabric topology with redundant paths, the data migration job runs on an MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch in each fabric. You need to configure the job on both MSM-18/4 modules or MDS 9222i switches.

In this chapter, the examples and command descriptions use the following terminology ([Figure 13: Example Topology](#), on page 74):

- The dual fabric configuration includes Fabric 1 and Fabric 2.
- Switch A (on Fabric 1) contains the MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch for data migration jobs.
- Switch B (on Fabric 2) contains the MSM-18/4 module, MDS 9222i switch or the MDS 9250i switch 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 13: Example Topology**



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

## 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 zone set and activate the zone set.

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

### Procedure

---

- Step 1** switchA# **configure terminal**  
Enters configuration mode.
- Step 2** switchA(config)# **dmm module** *module-id* **job** *job-id* **get-vi vsan** *1-4093*  
Retrieves the VI information for the specified MSM-18/4 module, MDS 9222i switch or MDS 9250i switch. 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** *1-4093*  
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** *1-4093*  
Enters configuration mode for the active zone set. Specify the name of the active zone set.
- Step 7** switchA(config-zoneset)# **member** *name*  
Adds the named zone to the zone set.
- Step 8** switchA(config-zoneset)# **exit**  
Exits zone set configuration submode.
- Step 9** switchA(config)# **zoneset activate name** *name* **vsan** *1-4093*  
Reactivates the zone set.
-

**Example**

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 [Storage-Based Migration Example 1, on page 82](#).

---

**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:

**Procedure**


---

**Step 1** switchA# **configure terminal**

Enters configuration mode.

**Step 2** switchA(config)# **dmm module *module-id* job *job-id* create**

Creates a migration job on the specified MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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 [Checking the Storage ASL Status, on page 39](#).

In a dual-fabric topology, configure the IP address of the peer MSM-18/4 module, MDS 9222i switch or MDS 9250i switch (the DMM peers communicate using the management IP network).

To configure the data migration job, use the following steps:

### Procedure

- 
- Step 1** switchA(config-dmm-job)# **server vsan 1-4093 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 1-4093 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 1-4093 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 | 3}**  
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 1, 2 for Method 2.  
For additional information about data migration rate, see [Configuring Migration Rate, on page 24](#).
- Step 5** switchA(config-dmm-job)# **peer IP\_address**  
Configures the IP address of the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch on switch B.

For information about configuring the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch IP addresses, see [Configuring IP Connectivity, on page 15](#)

## 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 MSM-18/4 module, MDS 9222i switch or MDS 9250i switch.

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 MSM-18/4 module, MDS 9222i switch or MDS 9250i switch.

The MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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 MSM-18/4 module, MDS 9222i switch or MDS 9250i switch

The next step is to configure the data migration job on the peer MSM-18/4 module, MDS 9222i switch or MDS 9250i switch.



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

To configure the data migration job on the peer MSM-18/4 module, MDS 9222i switch or MDS 9250i switch, follow these steps:

### Procedure

**Step 1** switchB# **configure terminal**

Enters configuration mode.

**Step 2** switchB(config)# **dmm module *module-id* job *job-id* create**

Creates a migration job on the specified MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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 *1-4093* 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 1-4093 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 1-4093 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 | 3}**  
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 MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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 MSM-18/4 module, MDS 9222i switch or MDS 9250i switch.

For a storage-based migration, you can manually balance the load on the MSM-18/4 modules or the MDS 9222i switches by configuring sessions on both the MSM-18/4 modules or the MDS 9222i switches.



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

To verify that the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch has discovered the LUNs correctly, enter the **show dmm job job-id job id storage** command from the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch CLI.

To configure sessions, follow these steps:

### Procedure

- Step 1** switchA(config)# **dmm module module-id job job-id session**  
Enters session configuration mode for the specified job on the specified MSM-18/4 module, MDS 9222i switch or MDS 9250i switch.
- Step 2** switchA(config-session)# **server pWWN src\_tgt pWWN src\_lun num dst\_tgt pWWN dst\_lun num**

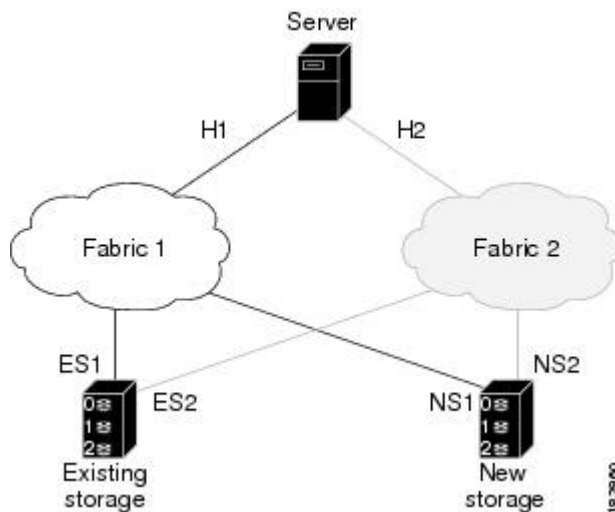
Configures a session. The server HBA port, existing storage port, and new storage port must all belong to the same VSAN.

- **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 hexadecimal notation.
- **dst\_tgt** num is the new storage PWWN.
- **dst\_lun** is the LUN number in the new storage. Enter this value in hexadecimal notation.

## Server-Based Migration Example 2

The topology (Figure 14: Topology for the Example, on page 80), is dual fabric with multipath ports defined in the server and redundant paths to the storage devices.

Figure 14: Topology for the Example



On both switches, the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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 |

The following example shows how to 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 following 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)#
```

The following example shows how to configure the zone and zone set on switch A:

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

The following example shows how to 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 pwn 21:00:00:e0:8b:0a:5d:e7
switchA(config-dmm-job)# storage vsan 100 pwn 50:06:04:82:bf:cf:e0:43 existing
switchA(config-dmm-job)# storage vsan 100 pwn 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#
```

The following example shows how to 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 following VI -
VI NodeWWN: 21:0c:01:0e:ec:02:2d:82
VI PortWWN: 21:0d:00:0d:0a:01:2b:82
switchB(config)#
```

The following example shows how to configure the zone and zone set on switch B:

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

The following example shows how to 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 pwn 21:01:00:e0:8b:0a:5d:e7
switchB(config-dmm-job)# storage vsan 100 pwn 50:06:04:82:bf:cf:e0:5d existing
switchB(config-dmm-job)# storage vsan 100 pwn 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#
```

The following example shows how to configure the data migration sessions on switch A:

```
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
```

The following example shows how to 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
```

The following example shows how to 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
```

The following example shows how to start the data migration job on switch B:

```
switchB(config)# dmm module 8 job 2345 start

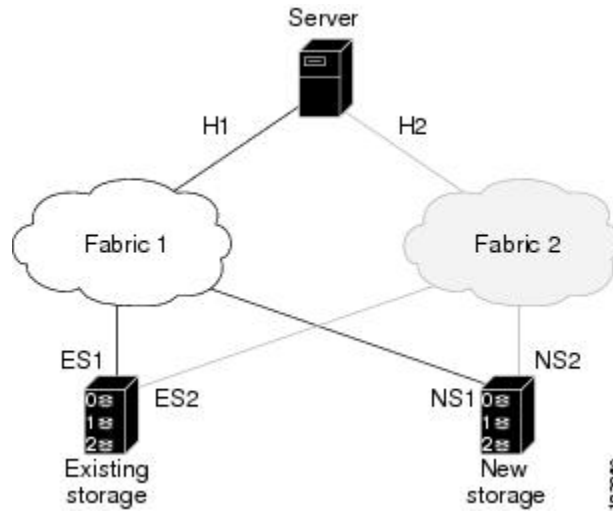
Started New DMM Job Configuration.
Do not exit sub-mode until configuration is complete and committed

switchB(config)# exit
```

## Storage-Based Migration Example 1

The topology ([Figure 15: Storage-Based Migration Example, on page 83](#)), is dual fabric with multipath ports defined in the server and redundant paths to the storage devices.

Figure 15: Storage-Based Migration Example



On both switches, the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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 |

The following example shows how to 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 pwn 21:00:00:e0:8b:0a:5d:e7
switchA(config-dmm-job)# storage vsan 100 pwn 50:06:04:82:bf:cf:e0:43 existing
switchA(config-dmm-job)# storage vsan 100 pwn 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#
```

The following example shows how to 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 pwn 21:01:00:e0:8b:0a:5d:e7
switchB(config-dmm-job)# storage vsan 100 pwn 50:06:04:82:bf:cf:e0:5d existing
switchB(config-dmm-job)# storage vsan 100 pwn 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#
```

The following example shows how to configure the data migration sessions on switch A:

```
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
```

The following example shows how to 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
```

## 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. [Table 25: Job Status Values](#) shows job state values.

**Table 25: 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 in <a href="#">DMM Jobs in Fail State</a> , on page 49 for details. |
| In_Progress      | The job is currently running.                                                                                               |



| Job Status Value | Description                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Reset            | The job has been reinitialized because of failures. See table in <a href="#">DMM Jobs in Reset State, on page 50</a> for details. |
| Finishing        | The Method 2 job is in the final copy iteration.                                                                                  |
| Verify_Stopped   | The job verification has been stopped.                                                                                            |
| Verify_Complete  | The job verification has been completed.                                                                                          |
| Verify_Failure   | The job verification is unsuccessful.                                                                                             |

[Table 26: Command Valid States](#) describes the data migration commands.

**Table 26: Command Valid States**

| Command  | Description                                                                                                                                                                                | Valid Job Status Values                                                              |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Verify   | Performs offline verification of the selected job, and you are prompted to confirm the verification command.                                                                               | Completed, VerifyStopped, Verify_Failure                                             |
| Destroy  | Deletes the selected job (or jobs) and retrieves the job execution log from the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch, and you are prompted to confirm the delete command. | Stopped, Failed, Completed, Reset, VerifyStopped, Verify_Failure, Created, Scheduled |
| Stop     | Stops the selected job.                                                                                                                                                                    | InProgress, Verify                                                                   |
| Start    | Starts the selected job.                                                                                                                                                                   | Created, Failed                                                                      |
| Modify   | Allows you to modify the job attributes or configure a start time for the selected job.                                                                                                    | Created, Scheduled, Reset, Stopped<br>InProgress                                     |
| 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                                                                           |



**Note** You must enter these commands on the switch with sessions configured. If both the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch have sessions configured, enter the commands on both switches.

To control the data migration job, follow these steps:

### Procedure

**Step 1** switchA(config)# **dmm module** *module-id* **job** *job-id* **start**

Starts a data migration job or restarts a job that was stopped or failed.

**Note** For a job in the reset state, enter 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.

**Step 2** switchA(config)# **dmm module *module-id* job stop**

Stops execution of the job.

**Note** Migration is paused in this state. To continue, start the job again. Migration will continue from last stopped point.

**Step 3** switchA(config)# **dmm module *module-id* job *job-id* validate**

If the job is in the reset state, enter the **validate** command. After validation, start the job using the **start** command.

**Note** Always run the validate command on both the MSM-18/4 modules or MDS 9222i switches (even if only one MSM-18/4 module, MDS 9222i switch or MDS 9250i switch has sessions).

**Step 4** 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 the **schedule now** to start the job immediately.

Enter the **reset** to remove the scheduled start time from the job. The job remains in the created state until you manually start it.

**Note** Enter the **schedule** command on each MSM-18/4 module, MDS 9222i switch or MDS 9250i switch with sessions.

## Monitoring DMM Jobs

Use the **show dmm job** command in the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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:

### Procedure

**Step 1** switch# **attach module *module-id***

Enters CLI mode on the MSM-18/4 module, MDS 9222i switch or MDS 9250i switch.

**Step 2** module# **show dmm job**

Displays summary information about the data migration jobs configured on this MSM-18/4 module, MDS 9222i switch or MDS 9250i switch.

**Step 3** module# **show dmm job *job-id* {detail | session | storage}**

Displays information about the specified job.

**The detail** command displays the job attributes, schedule, server HBA and storage ports, the job log, and job error log.

The **session** command displays the sessions included in the job.

The **storage** command displays the storage ports included in the job.

---

### Example

For additional information about monitoring and troubleshooting data migration jobs, see [Troubleshooting Cisco MDS DMM, on page 57](#).

## 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.

### (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 MSM-18/4 module, MDS 9222i switch or MDS 9250i switch 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:

#### Procedure

---

- Step 1** switch(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 off line mode.
- Step 2** switch(config)# **show dmm job** *job-id* **session** [*session-id* *sess-id*]
- Displays the verification progress while verification is performed on a job.
- 

#### Example



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

---



**Caution** Verification is recommended only for the test environment and is NOT recommended for the production environment because this process brings down all the existing applications.

---

## 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.

To reconfigure the server, you might need to take the following steps:

- Perform a graceful shutdown on all server applications that use the migrated LUNs to ensure that there are no pending I/O operations on the existing storage.
- Unmount any file systems, existing LUNs, and the associated storage ports.
- Deport the volume groups or disk groups for the migrated storage for some of the volume managers.
- Use the DMM CLI to perform these tasks:
  - 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.
- Use either of the following options to remove server access:
  - Configure zoning to remove server access to the existing LUNs.
  - Use an appropriate array tool to remove the masking or mapping access. Choose this option if an application that is being migrated requires access to the existing storage after the first migration is completed.
- Before you configure a DMM job, ensure that the zoning is completed for any devices that require NS.
- Configure zoning to add server access to the new LUNs.
- From the server, scan for the new storage.
- Import the volume group or disk groups from 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 this step:

### Procedure

- 
- |               |                                                                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Step 1</b> | <code>switch# configure terminal</code><br>Enters configuration mode.                                                                                            |
| <b>Step 2</b> | <code>switch(config)# dmm module <i>module-id</i> job <i>job-id</i> finish</code><br>Finishes the specified data migration job. This is valid only for Method 2. |
- 

## Restarting Job in the Failed State

When job is in the Failed state, you can restart the job using the start command. This command will start the job from point of last failure.

**Before you begin**

The job should be in Failed state to restart the failed session.

**Procedure**

- 
- Step 1**    switch# **configure terminal**  
Enters configuration mode.
- Step 2**    switch(config)# **dmm module *module-id* job *job-id* start**  
Restarts the job in Failed state.
- 

**Restarting the Failed Sessions While Job is In Progress**

When the sessions in a job have failed, you can restart them using the `restart_session` command. This command restarts all the failed sessions in the job.

**Note**

- The command is only available for the job which is currently doing migration (Job in InProgress state).
  - The failed sessions can now be restarted when the DMM job is still in IN\_PROGRESS state.
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To restart all the failed sessions in the job, follow this step:

**Before you begin**

The job should be in InProgress state to restart the failed sessions.

**Procedure**

|               | Command or Action                                                                    | Purpose                          |
|---------------|--------------------------------------------------------------------------------------|----------------------------------|
| <b>Step 1</b> | switch# <b>configure terminal</b>                                                    | Enters configuration mode.       |
| <b>Step 2</b> | switch(config)# <b>dmm module <i>module-id</i> job <i>job-id</i> restart_session</b> | Restarts all the failed session. |

**Deleting the Job**

To delete the data migration job, follow this step:

**Procedure**

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- Step 1**    switch# **configure terminal**  
Enters configuration mode.

**Step 2**    switch(config)# **dmm module** *module-id* **job** *job-id* **destroy**

Deletes the specified data migration job.

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