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Cisco Fabric Manager Server Federation Deployment Guide

Cisco MDS NX-OS Release 5.0(1a)
Cisco MDS 9000 FabricWare Release 5.x
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Cisco Fabric Manager Server Federation Deployment Guide

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Preface

This preface describes the audience, organization, and conventions of the *Cisco MDS 9000 Family Fabric Manager Server Federation Deployment Guide*. It also provides information on how to obtain related documentation.

Audience

This guide is for experienced network administrators who are responsible for configuring and maintaining the Cisco MDS 9000 Family of multilayer directors and fabric switches.

Organization

This Guide is organized as follows:

Chapter	Title	Description
Chapter 1	Cisco Fabric Manager Server Federation Overview	Provides a brief overview of Fabric Manager components and Server Fedration .
Chapter 2	Deploying Cisco Fabric Manager Server Federation	Provides information on deploying Fabric Manager Server Fedration .

Document Conventions

Command descriptions use these conventions:

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

Screen examples use these conventions:

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

This document uses the following conventions:

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

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

Related Documentation

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

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

Release Notes

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

Regulatory Compliance and Safety Information

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

Compatibility Information

- *Cisco Data Center Interoperability Support Matrix*
- *Cisco MDS 9000 NX-OS Hardware and Software Compatibility Information and Feature Lists*

- *Cisco MDS NX-OS Release Compatibility Matrix for Storage Service Interface Images*
- *Cisco MDS 9000 Family Switch-to-Switch Interoperability Configuration Guide*
- *Cisco MDS NX-OS Release Compatibility Matrix for IBM SAN Volume Controller Software for Cisco MDS 9000*
- *Cisco MDS SAN-OS Release Compatibility Matrix for VERITAS Storage Foundation for Networks Software*

Hardware Installation

- *Cisco MDS 9500 Series Hardware Installation Guide*
- *Cisco MDS 9200 Series Hardware Installation Guide*
- *Cisco MDS 9100 Series Hardware Installation Guide*
- *Cisco MDS 9124 and Cisco MDS 9134 Multilayer Fabric Switch Quick Start Guide*

Software Installation and Upgrade

- *Cisco MDS 9000 NX-OS Release 4.1(x) and SAN-OS 3(x) Software Upgrade and Downgrade Guide*
- *Cisco MDS 9000 Family Storage Services Interface Image Install and Upgrade Guide*
- *Cisco MDS 9000 Family Storage Services Module Software Installation and Upgrade Guide*

Cisco NX-OS

- *Cisco MDS 9000 Family NX-OS Licensing Guide*
- *Cisco MDS 9000 Family NX-OS Fundamentals Configuration Guide*
- *Cisco MDS 9000 Family NX-OS System Management Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Interfaces Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Fabric Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Quality of Service Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Security Configuration Guide*
- *Cisco MDS 9000 Family NX-OS IP Services Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Intelligent Storage Services Configuration Guide*
- *Cisco MDS 9000 Family NX-OS High Availability and Redundancy Configuration Guide*
- *Cisco MDS 9000 Family NX-OS Inter-VSAN Routing Configuration Guide*

Cisco Fabric Manager

- *Cisco Fabric Manager Fundamentals Configuration Guide*
- *Cisco Fabric Manager System Management Configuration Guide*
- *Cisco Fabric Manager Interfaces Configuration Guide*

- *Cisco Fabric Manager Fabric Configuration Guide*
- *Cisco Fabric Manager Quality of Service Configuration Guide*
- *Cisco Fabric Manager Security Configuration Guide*
- *Cisco Fabric Manager IP Services Configuration Guide*
- *Cisco Fabric Manager Intelligent Storage Services Configuration Guide*
- *Cisco Fabric Manager High Availability and Redundancy Configuration Guide*
- *Cisco Fabric Manager Inter-VSAN Routing Configuration Guide*
- *Cisco Fabric Manager Online Help*
- *Cisco Fabric Manager Web Services Online Help*

Command-Line Interface

- *Cisco MDS 9000 Family Command Reference*

Intelligent Storage Networking Services Configuration Guides

- *Cisco MDS 9000 I/O Acceleration Configuration Guide*
- *Cisco MDS 9000 Family SANTap Deployment Guide*
- *Cisco MDS 9000 Family Data Mobility Manager Configuration Guide*
- *Cisco MDS 9000 Family Storage Media Encryption Configuration Guide*
- *Cisco MDS 9000 Family Secure Erase Configuration Guide*
- *Cisco MDS 9000 Family Cookbook for Cisco MDS SAN-OS*

Troubleshooting and Reference

- *Cisco NX-OS System Messages Reference*
- *Cisco MDS 9000 Family NX-OS Troubleshooting Guide*
- *Cisco MDS 9000 Family NX-OS MIB Quick Reference*
- *Cisco MDS 9000 Family NX-OS SMI-S Programming Reference*
- *Cisco MDS 9000 Family Fabric Manager Server Database Schema*

Obtaining Documentation and Submitting a Service Request

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

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

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

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CHAPTER 1

Cisco Fabric Manager Server Federation Overview

This chapter provides an overview of the Cisco Fabric Manager Server Federation features and includes the following sections:

Cisco Fabric Manager Server Federation

Server Federation is a distributed system that includes a collection of intercommunicated servers or computers, which is utilized as a single, unified computing resource. With Fabric Manager Server clustering, you can communicate with multiple servers together in order to provide high availability, scalability, and easy manageability of data and programs running within the cluster. The core of server cluster includes several functional units such as Fabric Manager Server, embedded web servers, database and Fabric Manager Client that accesses the servers.

The Fabric Manager Server in the cluster uses the same database to store and retrieve data. The database is shared among different servers to share common information. A Fabric Manager Client or Fabric Manager Web client can open fabrics from the Fabric Manager Server using the mapping table. A fabric can be moved from one logical server to another. A logical server also can be moved from one physical machine to another machine.

Federated Server Architecture

This section explains some key points about Federated Server architecture. There are four components in a federated environment: Fabric Manager Server, Fabric Manager Client, Fabric Manager Web Client and databases.

- **Fabric Manager Server**— Fabric Manager Server is a platform for advanced MDS monitoring, troubleshooting, and configuration capabilities. Fabric Manager Server provides centralized MDS management services and performance monitoring. SNMP operations are used to efficiently collect fabric information. Each computer configured as a Cisco Fabric Manager Server can monitor multiple Fibre Channel SAN fabrics. Up to 16 clients (by default) can connect to a single Cisco Fabric Manager Server concurrently.

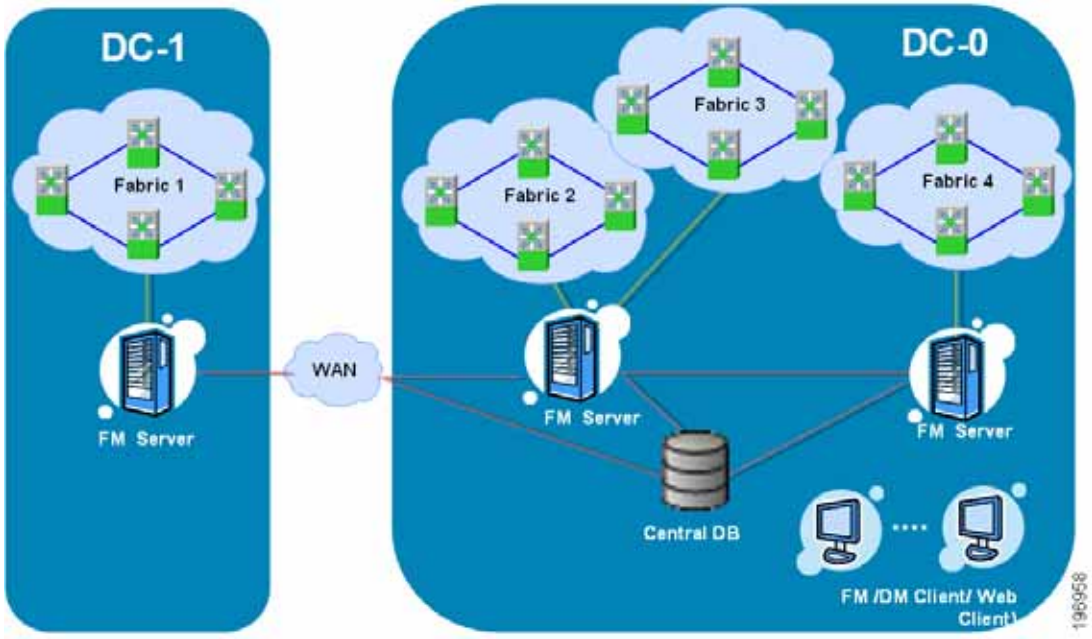
- **Fabric Manager Client**— Cisco Fabric Manager Client is a Java and SNMP-based network fabric and device management tool with a GUI that displays real-time views of your network fabric, including Cisco Nexus 5000 Series switches, Cisco MDS 9000 Family switches and third-party switches, hosts, and storage devices.

- **Fabric Manager Web client**— Fabric Manager Web Client is a web-based application with which you can monitor Cisco MDS switch events, performance, and inventory from a remote location using a web browser.

- **Database**— Oracle Database 10g Express, Oracle 10g Enterprise Edition, PostgreSQL 8.2 / 8.1.

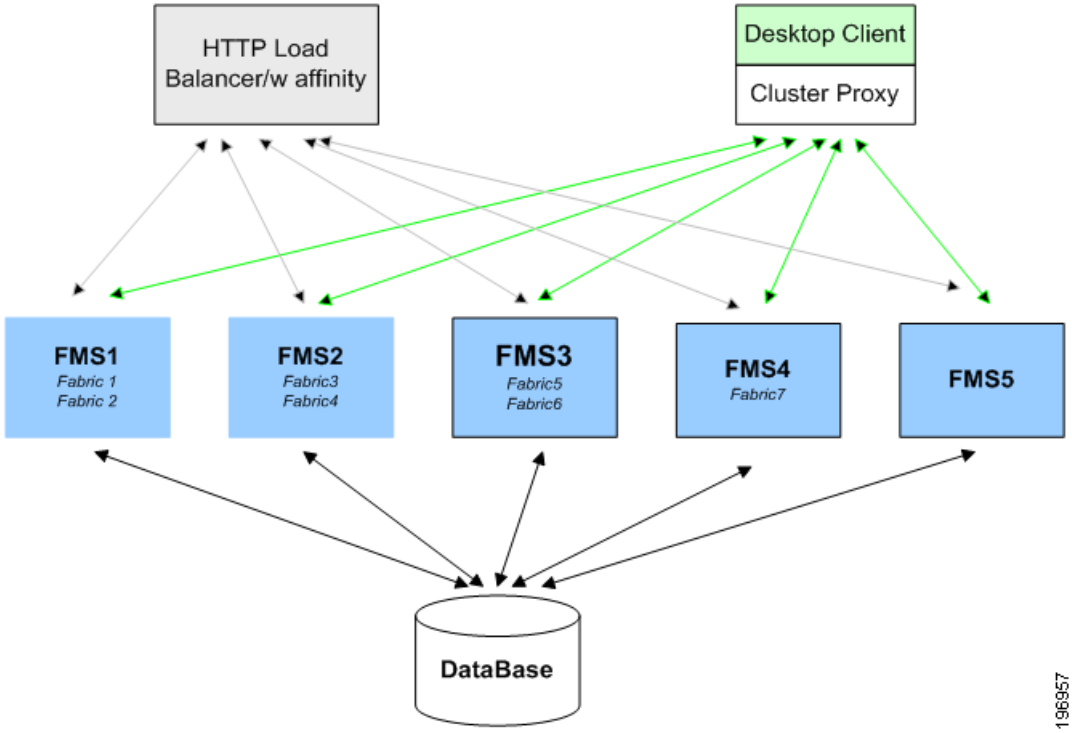
The Fabric Manager Servers and embedded web servers form a federation sharing a central database. Fabric Manager Client or Fabric Manager Web Client facilitates centralized management of the servers in a cluster.

Figure 1-1 Federated Server Architecture



Fabric Manager Servers and the Fabric Manager Web Clients in the cluster share a common database. The HTTP load balancer interfaces with the web servers to handle requests from web clients and the Fabric Manager desktop client will access Fabric Manager Servers in a cluster through the cluster proxy.

Figure 1-2 Federated Server Architecture

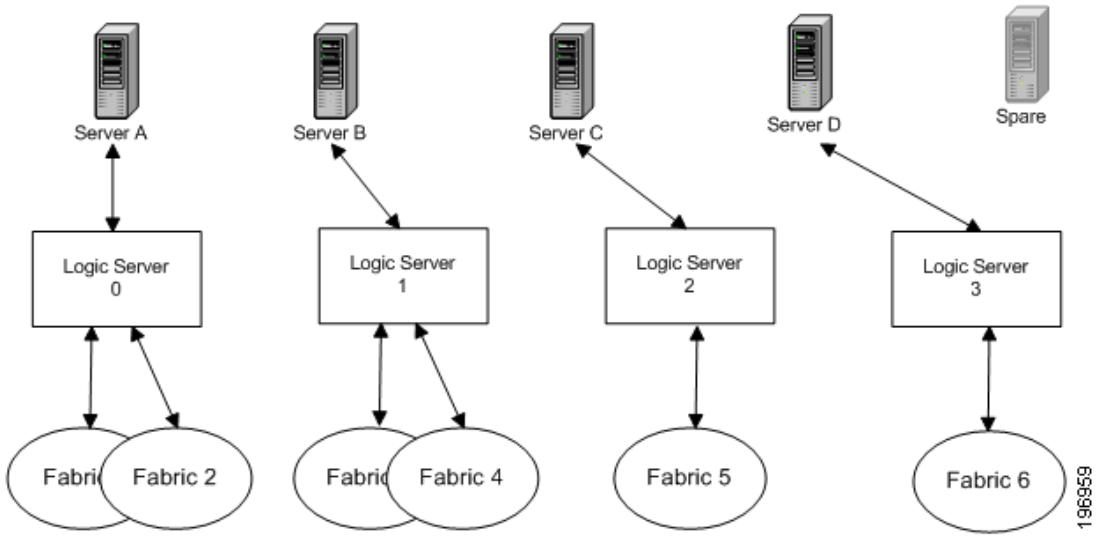


The relationships between physical server, logical server, and the fabrics are maintained by a centralized database. The mappings from logical to physical server as well as the mappings with the fabrics are managed by each Fabric Manager Server.

- **Logical Server**—Describes the functional layout – logically they appear to be different servers. In network topologies, a logical topology describes the paths that data can take across a network irrespective of how they are connected to each other.
- **Physical Server**— A physical server describes how the system is connected together in the physical world.
- **Fabric**— A fabric is similar to a network segment in a local area network. A typical Fibre Channel SAN fabric is made up of a number of Fibre Channel switches.

You can move fabrics from one logical server to another logical server. The logical servers also can be moved from one physical machine to another physical machine as well depending upon your resource constraints or requirements as shown in Figure 1-3. The mapping table entries should remain synchronized with the changes. This design helps to redistribute workloads, saves from manual failover, helps to optimize performance or scalability, and avoids collision of server IDs.

Figure 1-3 Federated Servers



Server IDs are assigned to the Fabric Manager Server when you install a Fabric Manager Server in the cluster. The Installer checks for server ID conflicts with the mapping table in the shared database. The Fabric Manager Web Client or Fabric Manager Client can open fabrics from Fabric Manager Server using the mapping table. All Fabric Manager Servers communicates with the same database.

Figure 1-4 Moving Fabrics

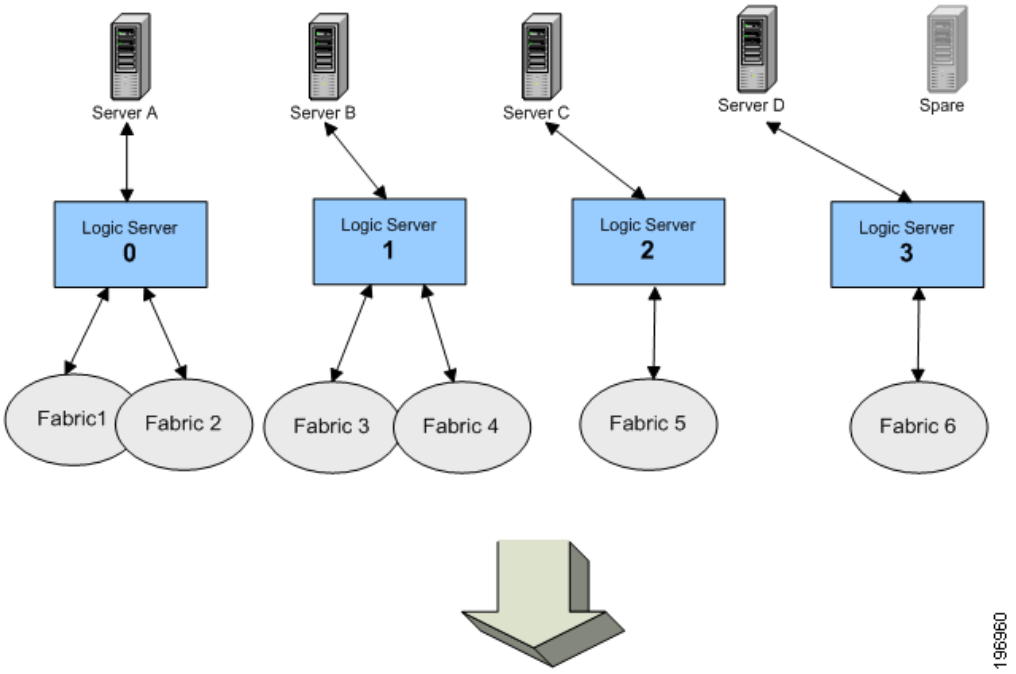
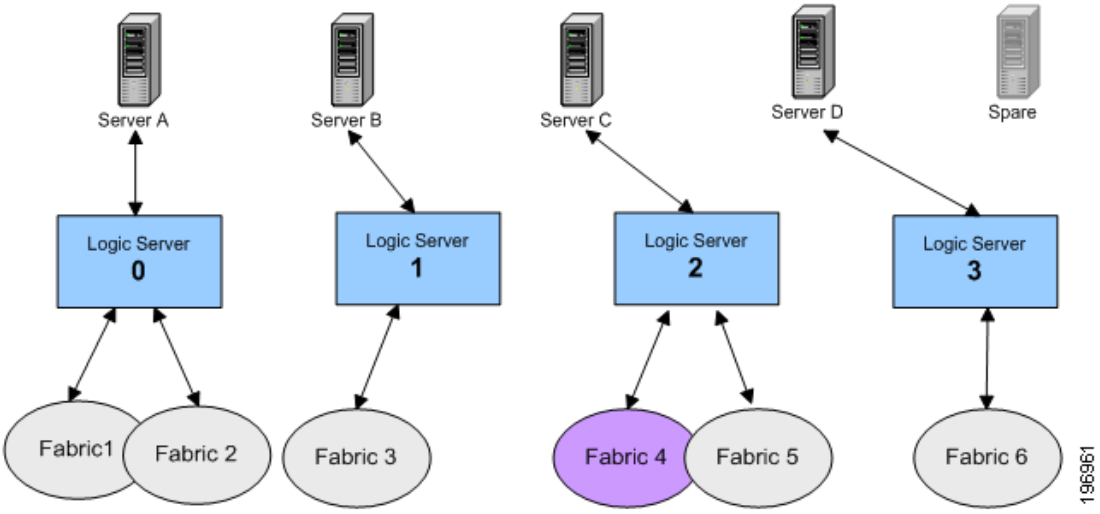


Figure 1-5 Moving Fabrics



Terminology

The following table defines some of the common acronyms used in the federated server environment:

Acronym	Definition
FM	Fabric Manager.
FMS	Fabric Manager Server.
PM	Performance Manager.
SAN	Storage Area Network.

Features and Capabilities

Fabric Manager Server clustering has the following features and capabilities:

- Manage storage networking across all Cisco SAN and unified fabrics.
- Scalable performance through server federation for a multiple and large fabrics with many end-devices across different geographic data centers.
- Visibility of adjacent Ethernet networks and end-devices.
- Enables I/O convergence (FCoE).
- Real-time monitoring of SAN health status and network events.
- Visibility into performance, utilization, topology, and configuration details for more efficient planning and provisioning.

Fabric Manager Server License provides the following functionalities with out installing any additional software:

- Multiple Fabric Management

- Historical performance monitoring
- Performance prediction
- Summary reports
- Detailed drill-down reports
- Continuous health and event monitoring
- Roaming user profiles
- Fabric analyzer integration

Requirements and Prerequisites

The following prerequisites are required to set up Server Federation:

Hardware Requirements, page 1-7
Software Requirements, page 1-7
Software Licensing Requirements, page 1-8

Hardware Requirements

CPU Requirements

Dedicated dual processors@ 2.0 GHz for Oracle DB

Storage Requirements

Data file= 2GB (min) 20GB (max)

Backup & Restore: 6GB config file for 100 switches

Memory Requirements

2 GB (SGA) for a large setup.

Connectivity Requirements

Support up to 100 concurrent connections to sustain up to 10 server nodes in federated mode.

Software Requirements

Operating Systems

- Windows 2003 SP2
- Windows XP SP2
- Windows XP SP3
- Windows Vista SP1 (Enterprise edition)
- Red Hat Enterprise Linux AS Release 5
- Solaris (SPARC) 9 and 10
- VMWare ESX Server 3.5

Note Only Windows 2003 SP2 VM created on VMWare ESX Server 3.5 is supported.

Java

- Sun JRE and JDK 1.5(x) and 1.6(x) is supported

Browsers

- Internet Explorer 6.x and 7.0
- Firefox 3.0
- Mozilla 1.7 (packaged with Solaris 9)

Database

- Oracle Database 10g Express, Oracle 10g Enterprise Edition
- Oracle 11g Enterprise Edition
- PostgreSQL 8.2 (Windows and Red Hat Enterprise Linux AS Release 4)
- PostgreSQL 8.1 (Solaris 8, 9 and 10)

Java Database Connectivity (JDBC)

The Fabric Manager uses Oracle JDBC drivers ojdbc14.jar and ojdbc14.jar to access the Oracle database and store data. You can download the recommended version (10.2.0.1.0) of the ojdbc14.jar file, from the following link:

http://www.oracle.com/technology/software/tech/java/sqlj_jdbc/htdocs/jdbc_10201.html

Software Licensing Requirements

Fabric Manager Federated Server environment has the following license requirements:

Cisco Fabric Manager Server is licensed on a per switch basis. The following functions and features will be active only when you purchase the license.

- Federation and Multiple Fabric Management
- Historical performance monitoring
- Performance prediction
- Summary reports
- Detailed drill-down reports
- Continuous health and event monitoring
- Roaming user profiles
- Fabric analyzer integration

Note Server clustering will not function on a trial license.

CHAPTER 2

Deploying Cisco Fabric Manager Server Federation

Fabric Manager Server clustering provides high availability, scalability and easy manageability of data and programs running within the cluster. The core of server cluster includes several functional units such as Fabric Manager Server, embedded web servers, database, and Fabric Manager Client accesses the servers. Three stages in the deployment cycle include planning for deployment, installing the federated servers and managing the federated servers.

This chapter contains the following sections:

Planning for Deployment

To design a solution, including determining the structure, capabilities, and architecture for a site, you might want information that helps you to structure the server topology, plan authentication methods, determine which capabilities of Server Federation you want to take advantage of, and that helps you to plan for those capabilities and to tailor the solution to your organization's requirements.

When planning for a clustered environment, consider the following factors:

- Geographic locations of the data centers that are participating in the federation.
- Total number of ports or end devices for all the existing and potential fabrics in each data center (to determine the workload).
- The Fabric Manager should be placed close to the fabrics it manages in order to reduce the latency in SNMP request and response.
- One Fabric Manager will be able to manage 150,000 ports.
- Dedicate one separate physical server for the database.
- Dedicate one separate physical server for each Fabric Manager Server in the federation.

Installing the Federated Servers

During this stage, you configure your environment, install Federated Servers, and then start operating and managing sites. Depending on your environment and your solution, you may have several configuration steps to perform for your servers.

If you choose PostgreSQL as your database, you can setup the database using the install wizard when installing the first server in the federation. You should use the database URL and DBA user and password that was created when you installed the first server when adding new servers to the federation.

Installing the Database

You need to install the database first. Alhough it supports both PostgreSQL and Oracle XE, you should install and use Oracle Enterprise version.

Note All the servers in the federation must be using the database installed by the first server in the federation. The database information is available in the server properties file.

Installing the Fabric Manager Server

After you install the first Fabric Manager Server, you can configure all the subsequent installations to join the existing server federation. You can install only ten servers in a federation.

To install Fabric Manager Server on Windows, follow these steps:

Step 1 Click the **Install Management Software** link on your desktop.

Step 2 Choose **Management Software** > **Cisco Fabric Manager**.

Step 3 Click the **Installing Fabric Manager** link.

Step 4 Click the **FM Installer** link.

You see the welcome message in the Cisco Fabric Manager Installer window shown in Figure 2-1.

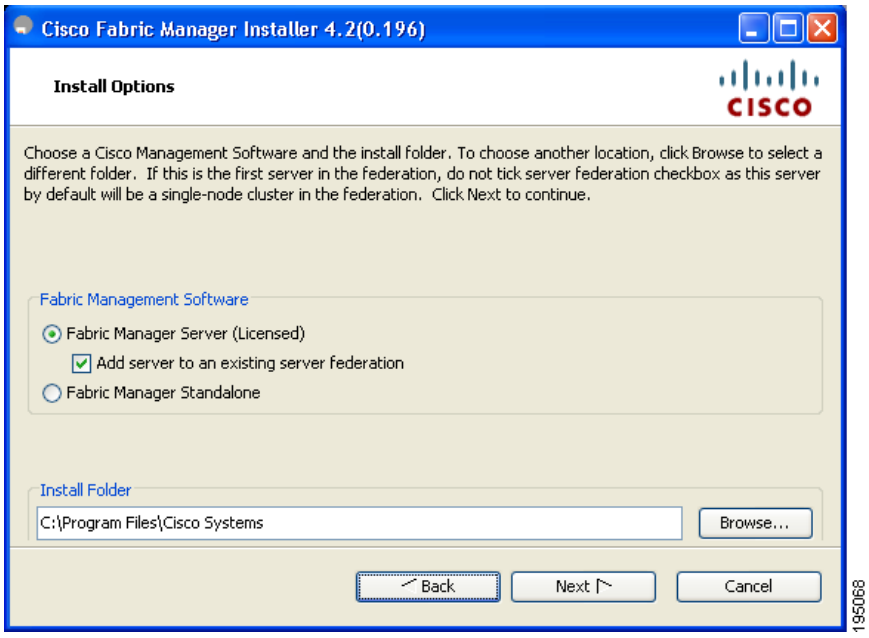
Figure 2-1 Welcome to the Management Software Setup Wizard

Step 5 Click the **Custom** radio button, and then click **Next** to begin the installation.

Step 6 Check the **I accept the terms of the License Agreement** check box, and then click **Next**.

You see the Install Options dialog box shown in Figure 2-2.

Figure 2-2 Install Options Dialog Box



Step 7 Click one of the radio buttons:

- **Fabric Manager Server (Licensed)** to install the server components for Fabric Manager Server.

- Check the **Add server to an existing federation** check box to add the server into an existing federation.

- Fabric Manager Standalone to install the standalone version of Fabric Manager.

Note Verify that the Fabric Manager Server hostname entry exists on the DNS server, unless the Fabric Manager Server is configured to bind to a specific interface during installation.

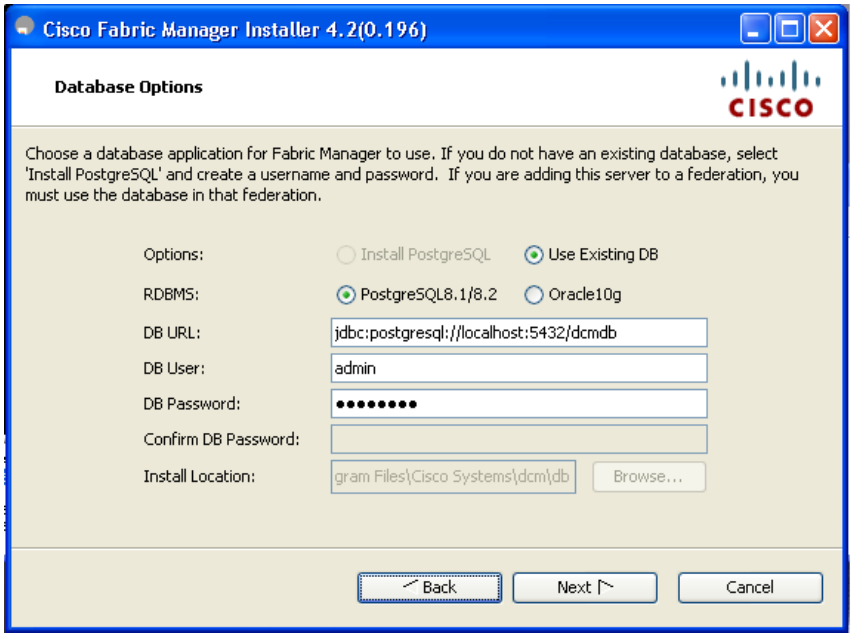
Step 8 Select an installation folder on your workstation for Fabric Manager.

On Windows, the default location is C:\Program Files\Cisco Systems\MDS 9000**.** On a UNIX (Solaris or Linux) machine, the installation path name is /usr/local/cisco_mds9000 or $HOME/cisco_mds9000, depending on the permissions of the user doing the installation.

Step 9 Click **Next**.

You see the Database Options dialog box shown in Figure 2-3.

Figure 2-3 Database Options Dialog Box



Step 10 Click either the Install PostgreSQL radio button or the Use existing DB radio button to specify which database you want to use.

Note If you choose to install PostgreSQL, you must disable any security software you are running because PostgreSQL may not install certain folders or users.

Note If you had installed the database separately, click the **Use existing database** radio button and enter the credentials of the database that you installed in the previous step.

Note Before you install PostgreSQL, remove the cygwin/bin from your environment variable path if Cygwin is running on your system.

Step 11 If you select Use existing DB, click either the either Install PostgreSQL radio button or the Use existing DB radio button.

Step 12 Click **Next** in the Database Options dialog box.

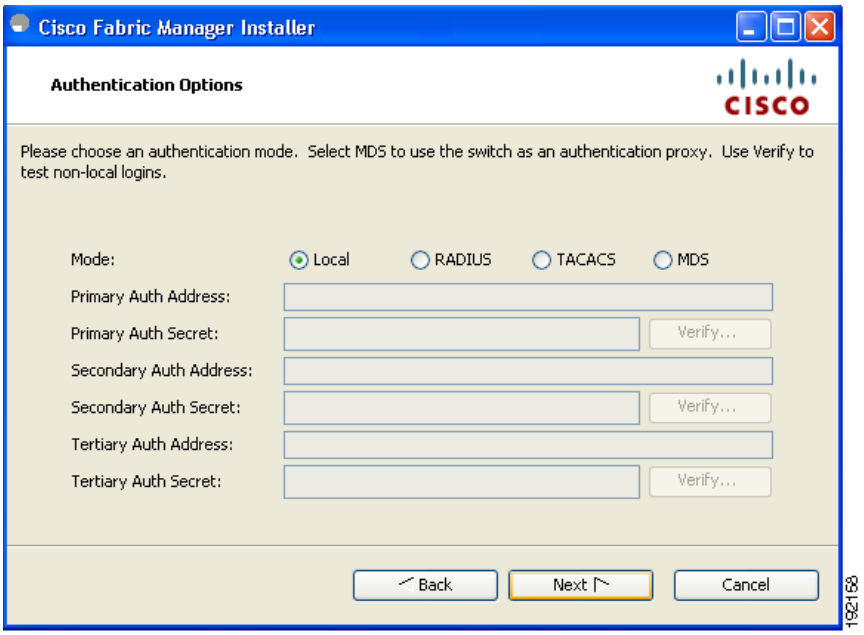
You see the User Options dialog box shown in Figure 2-4.

Figure 2-4 User Options Dialog Box

Step 13 Enter a user name and password and click **Next**.

You see the Authentication Options dialog box shown in Figure 2-5.

Figure 2-5 Authentication Options Dialog Box



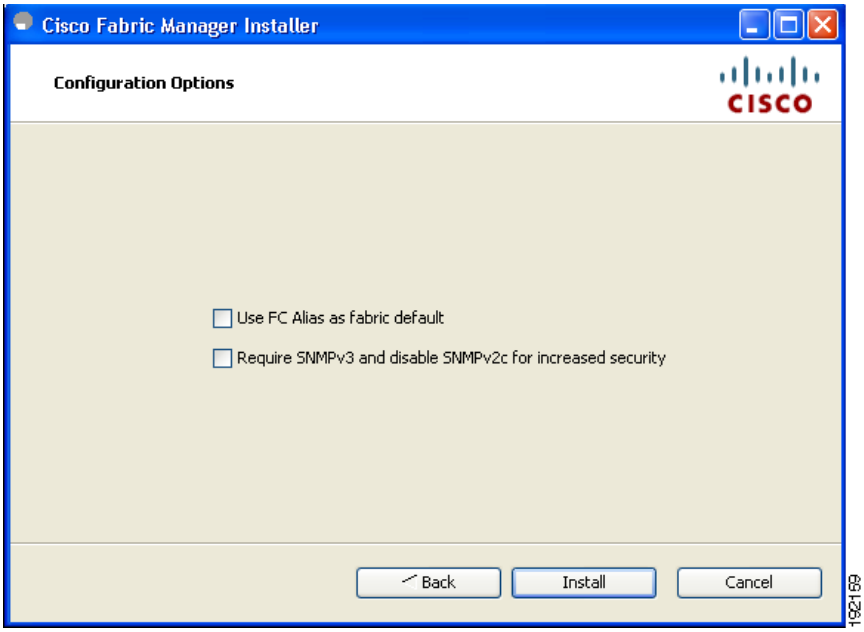
Step 14 Choose an authentication mode (Local, RADIUS, TACACS or MDS) and click **Next**.

Note When the MDS radio button is selected, the FM authentication uses the user database in the switch for authentication.

Step 15 Click **Verify** to test your login.

You see the Configuration Options dialog box for Fabric Manager Standalone shown in Figure 2-6.

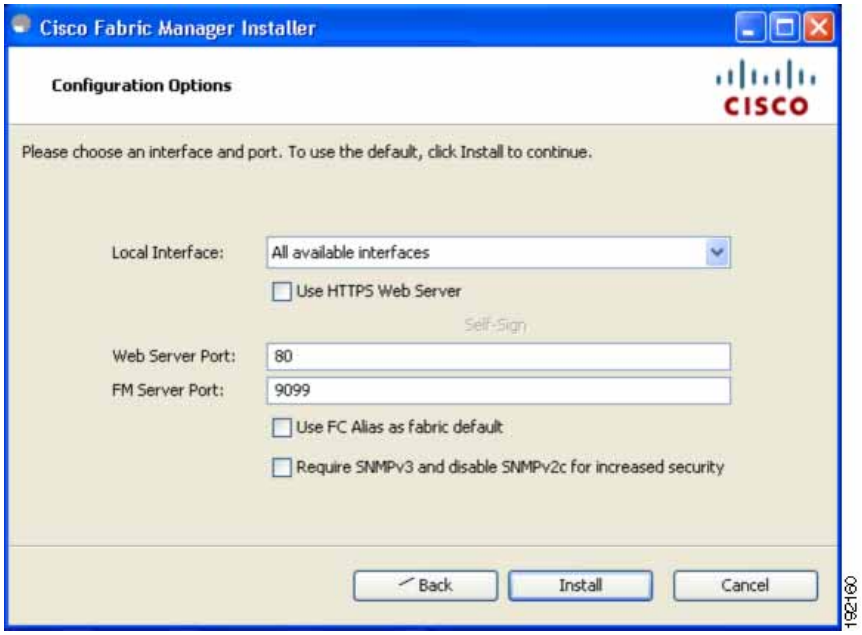
Figure 2-6 Configuration Options Dialog Box for Fabric Manager Standalone



Step 16 Check the FC Alias and SNMPv3 check boxes as desired and click **Install** if you are installing Fabric Manager Standalone.

You see the Configuration Options dialog box for Fabric Manager Server shown in Figure 2-7.

Figure 2-7 Configuration Options Dialog Box for Fabric Manager Server



Step 17 Select the local interface and web server port or Fabric Manager server port. You can change the Fabric Manager Server port number to a port that is not used by any other application. If you check the **Use HTTPS Web Server** check box, the Web Server Port field is grayed out and the default port is 443.

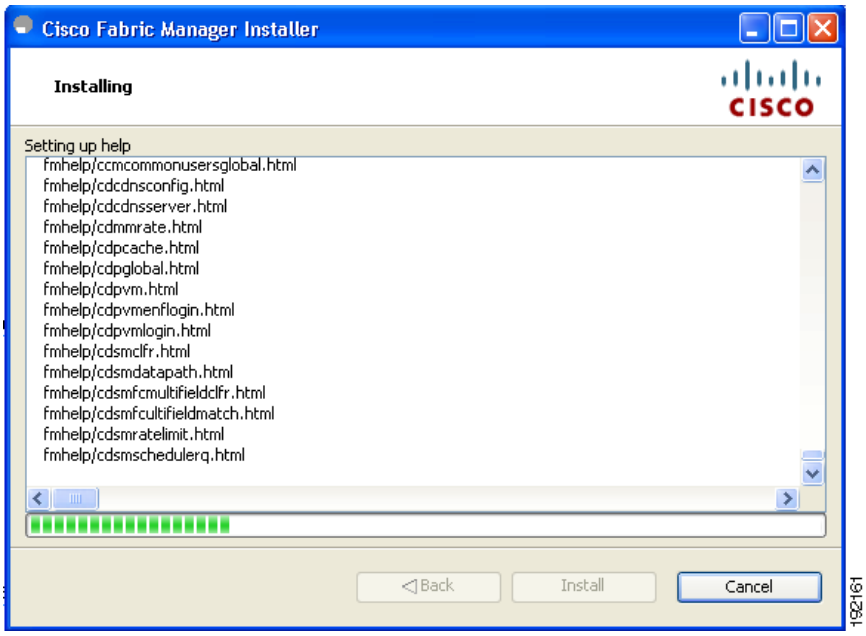
Step 18 Check the FC Alias and SNMPv3 check boxes as desired.

Step 19 Click **Install** if you are installing Fabric Manager Server. You see the installation progress in the Cisco Fabric Manager Installer window as shown in Figure 2-8.

Note You should verify that the Fabric Manager Server hostname entry exists on the DNS server, unless the Fabric Manager Server is configured to bind to a specific interface during installation.

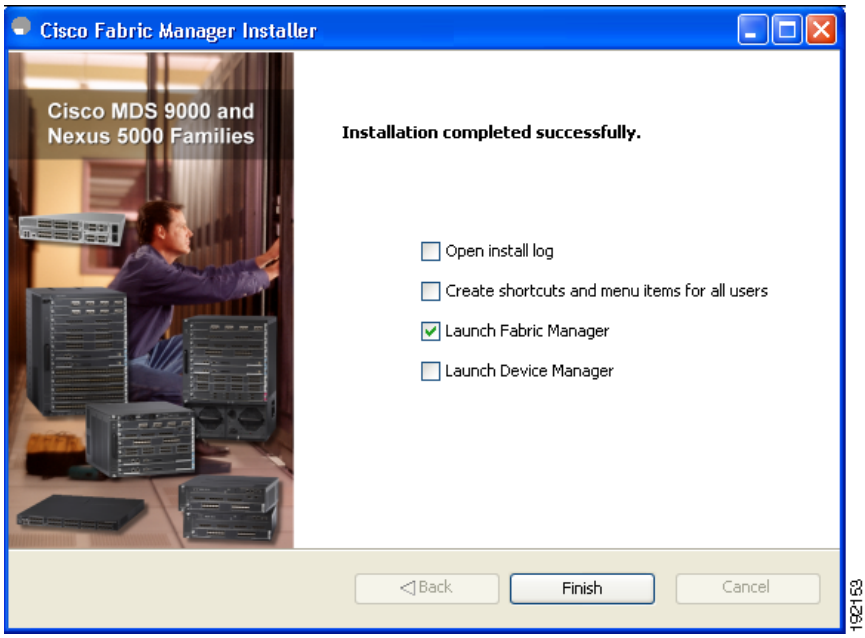
Note If you select a specific IP address during installation and change the server host IP address, you must modify the following two files that are all located in the $INSTALL/conf directory. Change server.bindaddr**s** to the new IP address in the server.properties file and change wrapper.app.parameter.4 to the new IP address in the FMServer.conf file.

Figure 2-8 Progress of Installation



Once the installation is finished, you see an installation completed message in the Cisco Fabric Manager Installer window shown in Figure 2-9.

Figure 2-9 Install Complete



Note If you installed Fabric Manager Standalone, you can choose to launch Fabric Manager or Device Manager by checking the **Launch Fabric Manager** or **Launch Device Manager** check boxes. Icons for Fabric Manager and Device Manager are automatically created on the desktop.

Step 20 Click **Finish** to close the Cisco Fabric Manager Installer window.

Managing Federated Servers with Fabric Manager Client

Discovering a Fabric

Step 1 Double-click the Fabric Manager icon to launch Fabric Manager.

You see the Fabric Manager Login dialog box shown in Figure 2-10

Figure 2-10 Fabric Manager Server Login Dialog Box

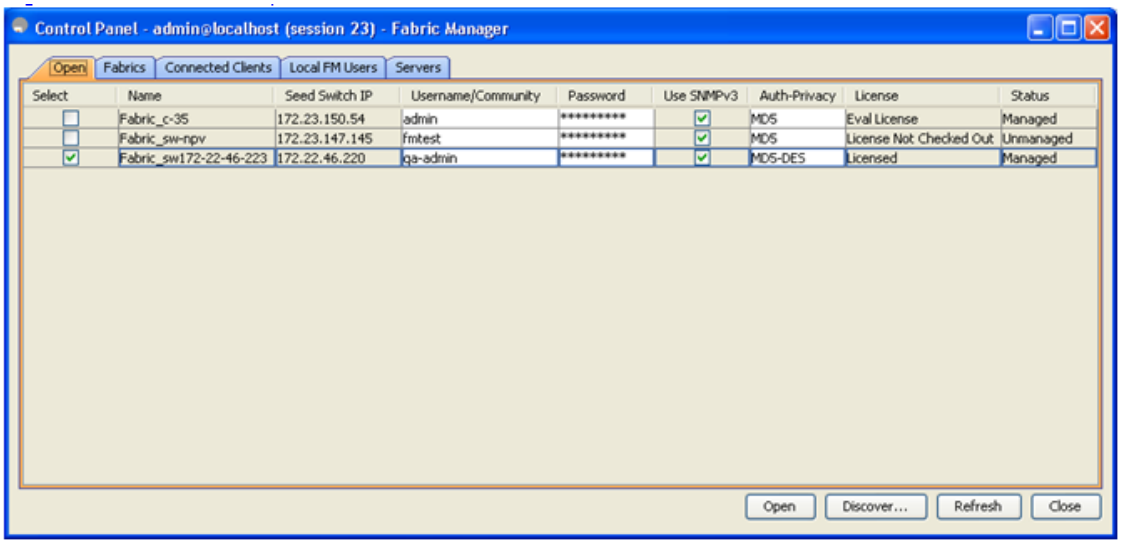
Step 2 Enter the Fabric Manager Server user name and password.

Step 3 Check the Use SNMP Proxy check box if you want Fabric Manager Client to communicate with Fabric Manager Server through a TCP-based proxy server.

Step 4 Click **Login**. Once you successfully log in to Fabric Manager Server, you can set the seed switch and open the fabrics that you are entitled to access.

You see the control panel as shown in Figure 2-11.

Figure 2-11 Control Panel – Open Tab



Step 5 Click **Open** to open a selected fabric.

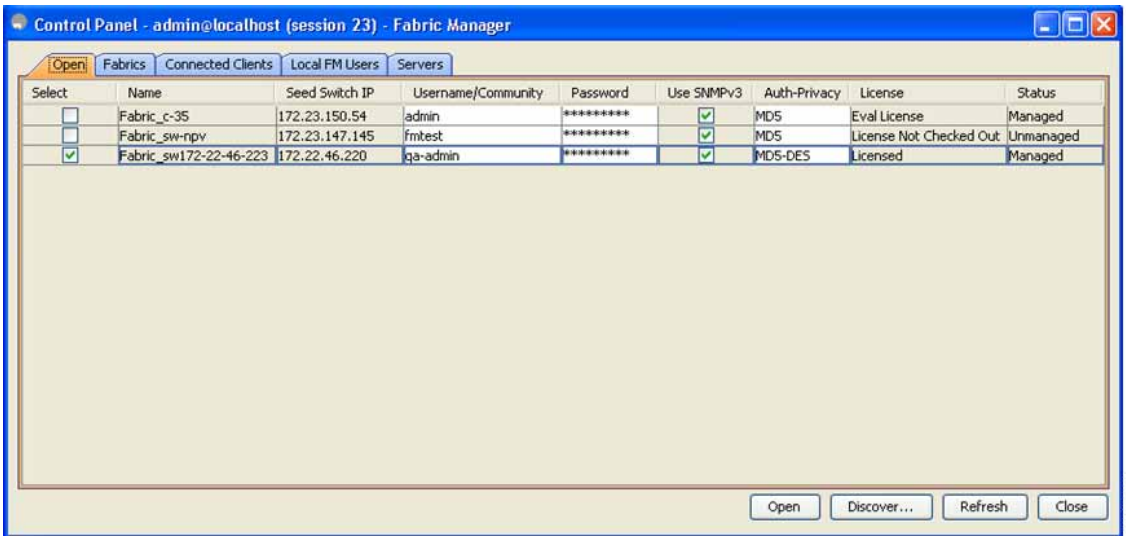
Opening the Fabric on a Different Server

To open the fabric on a different server follow these steps:

Step 1 Choose **Server** > **Admin**.

You see the Control Panel as shown in Figure 2-12.

Figure 2-12 Control Panel



Step 2 Click **Discover**.

You see the Discover New Fabric dialog box as shown in Figure 2-13.

Figure 2-13 Discover new Fabric

Step 3 In the Seed Switch list box, enter the IP Address of the seed switch.

Step 4 In the User Name field, enter the user name.

Step 5 In the password field, enter the password.

Step 6 From the Auth-Privacy drop-down list, choose the privacy protocol you want to apply.

Step 7 To open the selected fabric in a different server, select the server ID from the Server drop-down list.

Step 8 Click **Discover**.

Note You may receive an error message when you discover a fabric in a cluster while another Fabric Manager Server is joining the federation. You can discover the fabric on after the installation or upgradation is complete.

Viewing the Sessions in a Cluster

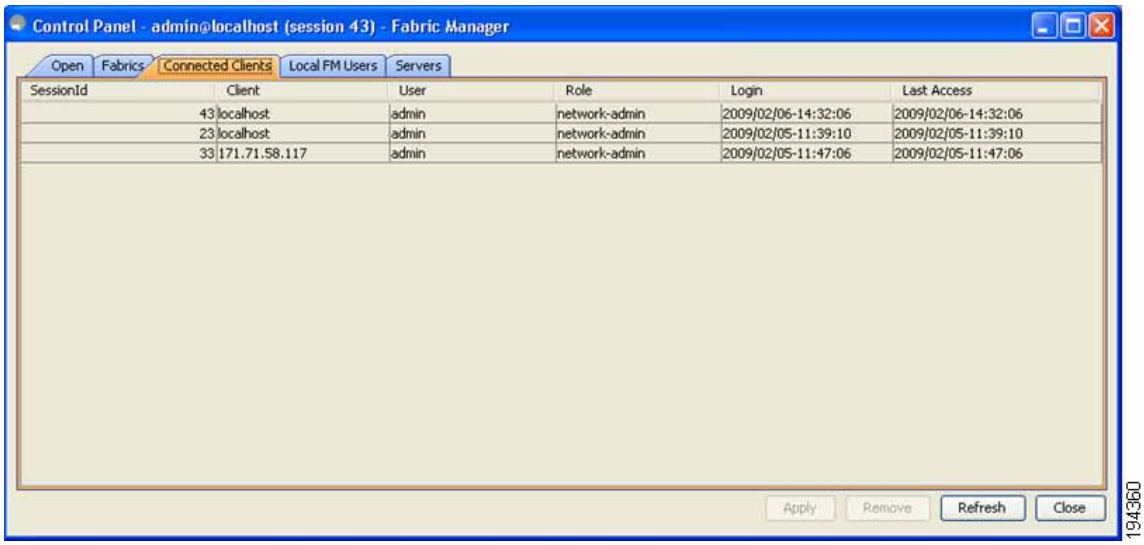
To view all the sessions in a cluster, follow these steps:

Step 1 Choose **Server** > **Admin**.

Step 2 Click the **Connected Clients** tab.

You see the Control Panel as shown inFigure 2-14.

Figure 2-14 Connected Clients



Viewing the Servers in a Cluster

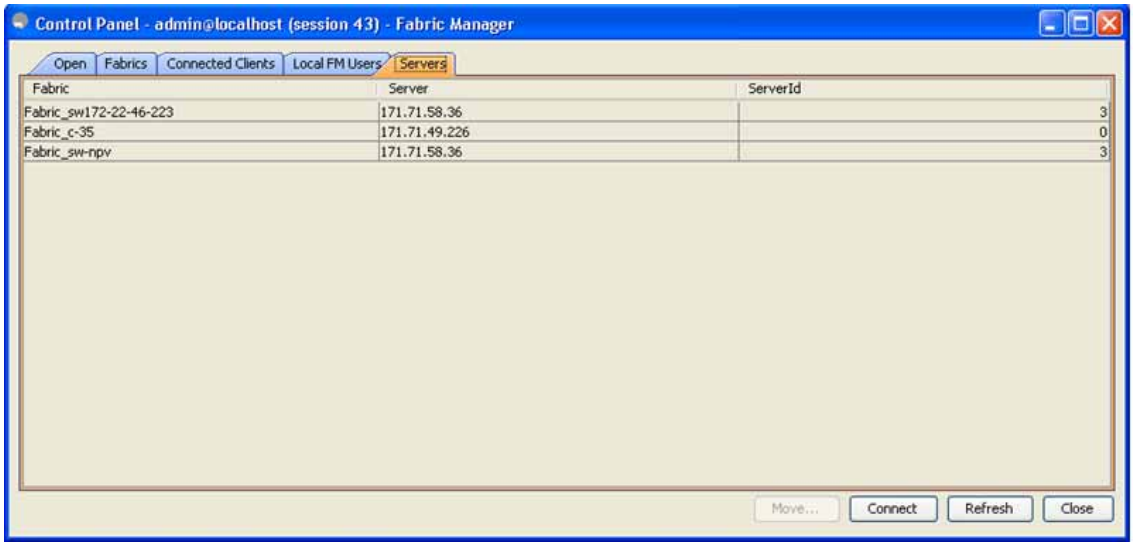
To view all the servers in a cluster follow these steps:

Step 1 Choose **Server** > **Admin**.

Step 2 Click **Servers** tab.

You see the Control Panel as shown in Figure 2-15

Figure 2-15 Servers



Managing Federated Servers with Fabric Manager Web Client

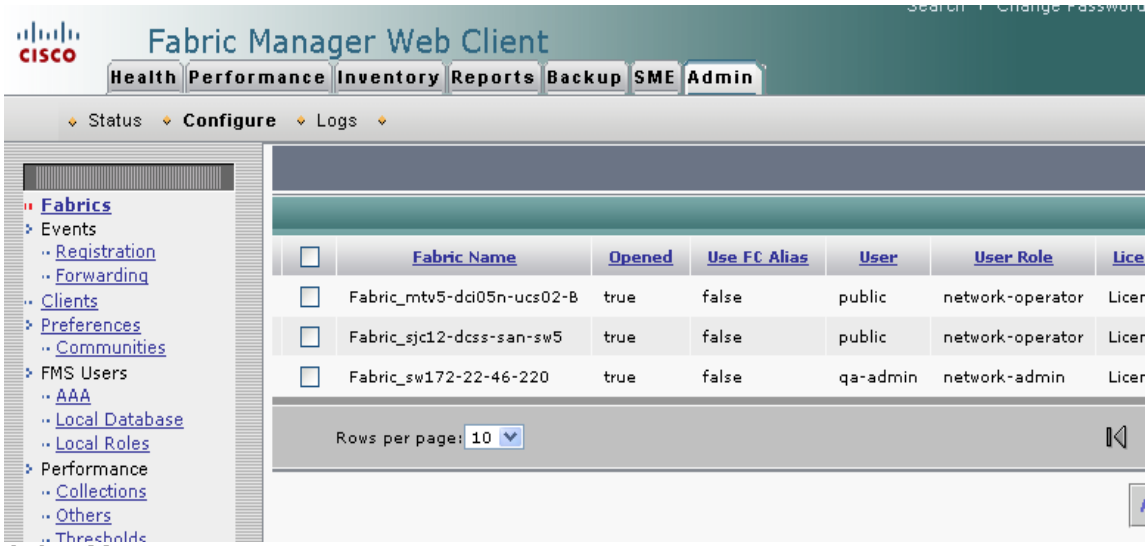
To start managing fabrics using Fabric Manager Web Client, follow these steps:

Step 1 Click the **Admin** tab, and then click **Configure**.

Step 2 Click **Fabrics** in the left navigation pane.

You see the list of fabrics (if any) managed by Fabric Manager Server in the Opened column as shown in Figure 2-16.

Figure 2-16 List of Fabrics



Step 3 Click **Add**.

You see the Add Fabric dialog box as shown in Figure 2-17

Figure 2-17 Add Fabric

Step 4 Enter the fabric seed switch IP address for this fabric.

Step 5 Enter the user name and password for this fabric.

Step 6 (Optional) Check the SNMPV3 check box.

Step 7 Select the privacy settings from the **Auth-Privacy** listbox.

Step 8 Click **Add** to begin managing this fabric.

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