

Sun Blade 6000 Multi-Fabric Network Express Module

User's Guide



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Preface

This document describes how to install and use Oracle's Sun Blade 6000 Multi-Fabric Network Express Module (Multi-Fabric NEM) in a powered-on Sun Blade 6000 Series Modular System.

How This Document Is Organized

[Chapter 1](#) provides an overview of the way in which the Multi-Fabric NEM is used to connect server and storage modules (blades) and describes the features of the Multi-Fabric NEM.

[Chapter 2](#) describes how to install the Multi-Fabric NEM and verify that it has been installed correctly. This chapter also describes how to remove the Multi-Fabric NEM.

[Chapter 3](#) provides information on using the ILOM with the Multi-Fabric NEM.

[Chapter 4](#) provides information on using the Sun Common Array Manager (CAM) with the Multi-Fabric NEM.

Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

Related Documentation

Documents for the Sun Blade 6000 Disk Module can be found at:

<http://docs.sun.com/app/docs/coll/blade6000dskmod>

Documentation Comments

Your comments on improving our documentation are welcome. You can submit your comments by going to:

<http://www.sun.com/hwdocs/feedback>

Please include the title and part number of your document with your feedback:

Sun Blade 6000 Multi-Fabric Network Express Module User's Guide, Sun part number: 820-1705-14.

Features of the Sun Blade 6000 Multi-Fabric Network Express Module

The Sun Blade 6000 Multi-Fabric Network Express Module can be used to connect server blades in a Sun Blade 6000 Modular System chassis with disk blades in the same chassis. The way in which this is done is described in detail in the *Sun Blade 6000 Disk Module Administration Guide* (Sun part number 820-4922). A brief overview is presented in this chapter.

This chapter contains the following topics:

- [“Terminology” on page 2](#)
- [“Overview of the Sun Blade 6000 Multi-Fabric Network Express Module” on page 3](#)
- [“Features” on page 3](#)
- [“Physical Appearance of the Multi-Fabric NEM” on page 4](#)

Terminology

The following terminology is used in this document:

chassis	The Sun Blade 6000 Modular System blade enclosure.
disk module or disk blade	The Sun Blade 6000 Disk Module. The terms “disk module” and “disk blade” are used interchangeably.
server module or server blade	Any server module (blade), including the Sun Blade X6220, X6240, X6250, X6450, T6300, T6320, and T6340 server modules, that will interoperate with the disk module (blade). The terms “server module” and “server blade” are used interchangeably.
Multi-Fabric NEM	The Sun Blade 6000 Multi-Fabric Network Express Module that plugs into a Sun Blade 6000 chassis, the subject of this document. It is sometimes also referred to as a NEMPLUS or NEM+.
SAS-NEM	Any Network Express Module that supports SAS inter-connectivity: for example, the Multi-Fabric NEM or the Sun Blade 10GbE Multi-Fabric Network Express Module (abbreviated 10GbE Multi-Fabric NEM).
NEM 0, NEM 1	NEM slot 0 or NEM slot 1.

Note – From time to time, this document refers to SAS-NEMs rather than Multi-Fabric NEMs. SAS-NEM is a more general category: it includes Multi-Fabric NEMs, as well as other NEMs with SAS connectivity such as the 10GbE Multi-Fabric NEM. From the standpoint of connecting server blades with disk blades, all SAS-NEMs provide the same functionality.

Overview of the Sun Blade 6000 Multi-Fabric Network Express Module

The Sun Blade 6000 Multi-Fabric Network Express Module is a connectivity module for the Sun Blade 6000 Modular System. It connects server blades to the disks in a disk blade through the chassis midplane. The Multi-Fabric NEM also provides 10/100/1000 Ethernet connectivity between server modules and external devices.

The Multi-Fabric NEM does not contain a CPU or service processor. It does, however, contain a SAS expander that connects server modules to disks in Sun Blade 6000 Disk Modules.

The Multi-Fabric NEM can be hot-plugged into the back of the Sun Blade 6000 Modular System chassis.

Features

The following table describes the Multi-Fabric NEM features.

TABLE 1-1 Multi-Fabric NEM Features

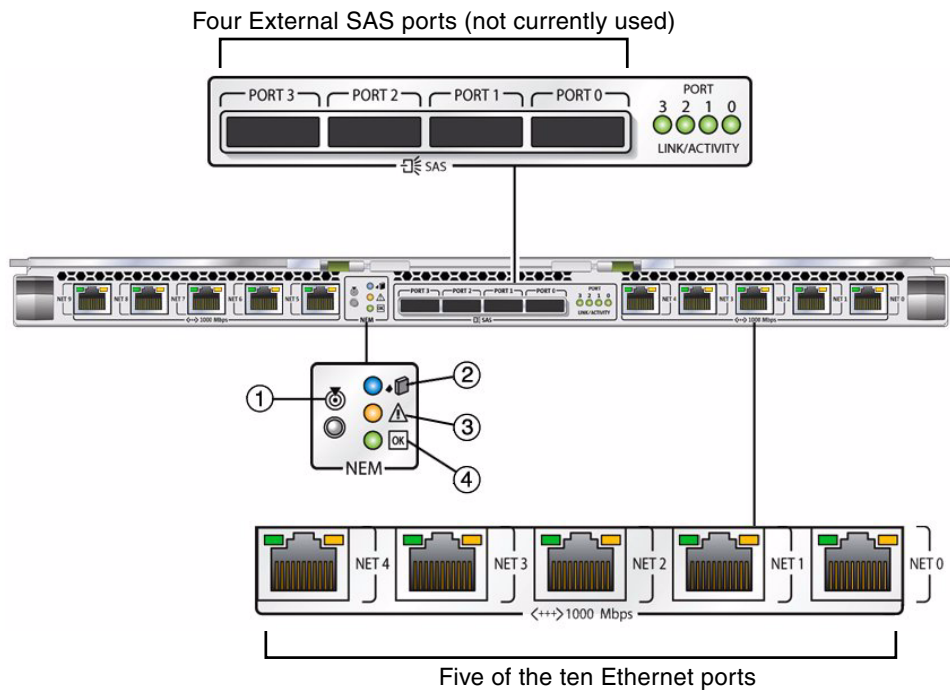
Feature	Quantity
External SAS ports	Not currently used
Internal chassis SAS connections	10 SAS-1 connections (up to 3 Gb/s data transfer speed) between server modules and disk modules
10/100/1000 twisted pair Ethernet (TPE) (RJ-45 connector)	10
Power Consumption	47 Watts
Cooling	Passive (directed from modular system chassis fans).

Physical Appearance of the Multi-Fabric NEM

Multi-Fabric NEM Front Panel

FIGURE 1-1 shows the front panel of the Multi-Fabric NEM, viewed from the back of the chassis. Refer to TABLE 1-2 for descriptions of the LED behavior.

FIGURE 1-1 Multi-Fabric NEM Front Panel



Multi-Fabric NEM Front-Panel LEDs

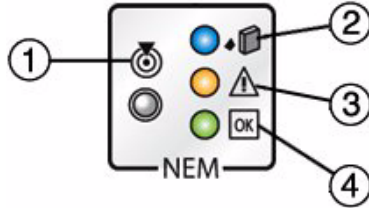
The Multi-Fabric NEM LEDs are shown in [FIGURE 1-1](#). They fall into three categories:

- The External SAS port LEDs (not currently used).
- The Multi-Fabric NEM LEDs.
- The Gigabit Ethernet port LEDs.

Multi-Fabric NEM LEDs

[FIGURE 1-2](#) shows the LED panel for the Multi-Fabric NEM module as a whole.

FIGURE 1-2 Multi-Fabric NEM's LEDs



Refer to [TABLE 1-2](#) for descriptions of the LED behavior.

TABLE 1-2 The Multi-Fabric NEM LEDs

	LED Name	Description
1	Locate button and LED (white)	This LED helps you to identify which system you are working on in a chassis full of servers. <ul style="list-style-type: none">• Push and release this button to make the Locate LED blink for 30 minutes.• If LED is blinking, push and release this button to make the Locate LED stop blinking.• Hold down the button for 5 seconds to initiate a “push-to-test” mode that illuminates all other LEDs for 15 seconds.
2	Ready-to-Remove LED (blue)	<ul style="list-style-type: none">• Not used.
3	Module Fault LED (amber).	This LED has two states: <ul style="list-style-type: none">• Off: No fault.• On: A fault condition has been detected, service action is required.
4	Module OK LED (green)	This LED has three states: <ul style="list-style-type: none">• Off: Module is offline.• On: Module is online.• Slow blinking (1 Hz at 50% duty cycle): Module is booting or configuring (flash update in progress).

Gigabit Ethernet Port LEDs

The GbE ports each have two LEDs, one on each side of the RJ-45 connector. The left LED is green and lights to show that a link has been established. It blinks randomly to show activity.

The right LED is bi-color and can show as amber or green to indicate the speed of that connection. If the Ethernet port is operating at 100 Mbit/sec, the right LED will show one color. If the port is operating at one Gbit/sec, the LED will show a different color. The link-speed color scheme varies depending on which type of server blade is connected to the port (see [TABLE 1-3](#)). If the port is operating at 10 Mbit/sec, the LED will be off.

TABLE 1-3 LED Colors for the Link-Speed LEDs for Each Server Blade

Sun Blade Server Module	NEM Link-Speed LED Color for 10 Mbit/sec Connections (Right LED)	NEM Link-Speed LED Color for 100 Mbit/sec Connections (Right LED)	NEM Link-Speed LED Color for 1000 Mbit/sec Connections (Right LED)
X6220	off	amber	green
X6240	off	amber	green
X6250	off	amber	green
X6440	off	amber	green
X6450	off	amber	green
T6300	off	green	amber
T6320	off	green	amber
T6340	off	amber	green

When a link-speed LED blinks in a repeating sequence of 0.1 second ON and 2.9 seconds OFF, the blade associated with the port is in standby mode. It is functioning at a minimal level but is ready to resume activity.

Note – In some cases, the link LED for a port may remain ON even though the associated blade is in Standby mode.

Installing, Removing, or Replacing the Sun Blade 6000 Multi-Fabric Network Express Module

This chapter describes how to install, remove, or replace a Sun Blade 6000 Multi-Fabric Network Express Module. This chapter also includes instructions for verifying that the Multi-Fabric NEM has been installed correctly.

This chapter contains the following sections:

- [“Installing a Multi-Fabric NEM” on page 9](#)
- [“Verifying Installation of the NEM” on page 11](#)
- [“Removing a Multi-Fabric NEM” on page 17](#)
- [“Replacing a Multi-Fabric NEM” on page 18](#)



Caution – Damage to the Multi-Fabric NEM can occur as the result of careless handling or electrostatic discharge (ESD). Always handle the Multi-Fabric NEM with care to avoid damage to electrostatic-sensitive components. To minimize the possibility of ESD-related damage, Sun strongly recommends using both a workstation antistatic mat and an antistatic wrist strap. You can get an antistatic wrist strap from many electronics stores or from Sun as part number 250-1007.

Installing a Multi-Fabric NEM

You can insert either one or two Multi-Fabric NEM modules in the Sun Blade 6000 chassis.



Caution – If you insert only one Multi-Fabric NEM, it must go in the lower slot (NEM 0).

The Sun Blade 6000 Disk Module requires, at minimum, a SAS-NEM in NEM slot 0 for communication with server blades. For redundant dual paths to SAS disk drives, a SAS-NEM is also required in NEM slot 1.

Both the Multi-Fabric NEM) and the 10GbE Multi-Fabric NEM are supported.

You can mix SAS-NEMs. You can use two Multi-Fabric NEMs, or two 10GbE Multi-Fabric NEMs, or one of each. It does not matter which type is in NEM slot 0.

Note – You can also use a plain NEM (one without SAS connectivity) in slot NEM 1, but not in slot NEM 0. If you use one SAS-NEM and one plain NEM, you do not have redundant paths to SAS disks.

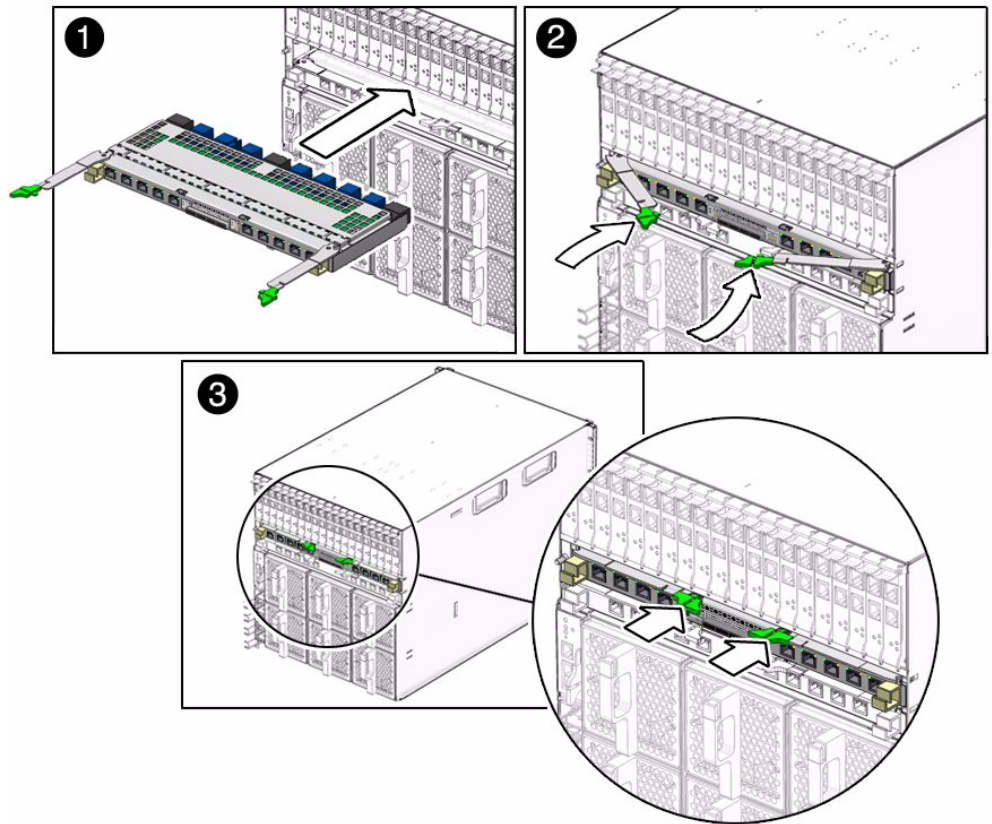
Before installing your Multi-Fabric NEM, remove the NEM filler panel in the slot you plan to use.

▼ To Install a NEM

1. **Unpack the NEM from the box.**
2. **Align the NEM with the chassis slot and ensure the following:**
 - NEM ejector levers are fully opened
 - NEM ejector levers are on the top of the module
3. **Slide the NEM into the vacant NEM chassis slot until you feel it stop.**
4. **Close the ejector levers to secure the NEM in the chassis.**

FIGURE 2-1 shows how to install the Multi-Fabric NEM.

FIGURE 2-1 Installing a Multi-Fabric NEM



Verifying Installation of the NEM

The NEM is automatically detected when it is inserted into the chassis.

You can connect to the Integrated Lights Out Manager (iLOM) command-line interface (CLI) by either of two methods:

- Connect a terminal or PC running a terminal emulator directly to the Chassis Monitoring Module (CMM) serial port on your chassis.
- Connect to the chassis Ethernet Network Management port using a secure shell (SSH).

Instructions for setting up and using ILOM are documented in the *Sun Integrated Lights Out Manager 2.0 User's Guide*, and the *Integrated Lights Out Manager Administration Guide for the Sun Blade 6000 Modular System*, at:
<http://docs.sun.com/app/docs/prod/blade.6000mod#hic>

▼ To Verify Installation With the ILOM CLI

You need to start a ILOM command-line session in a terminal window.

1. At the terminal window prompt, enter

```
-> SSH <IP address of the CMM> -l <login>
```

You are asked for the password.

2. Enter the password.

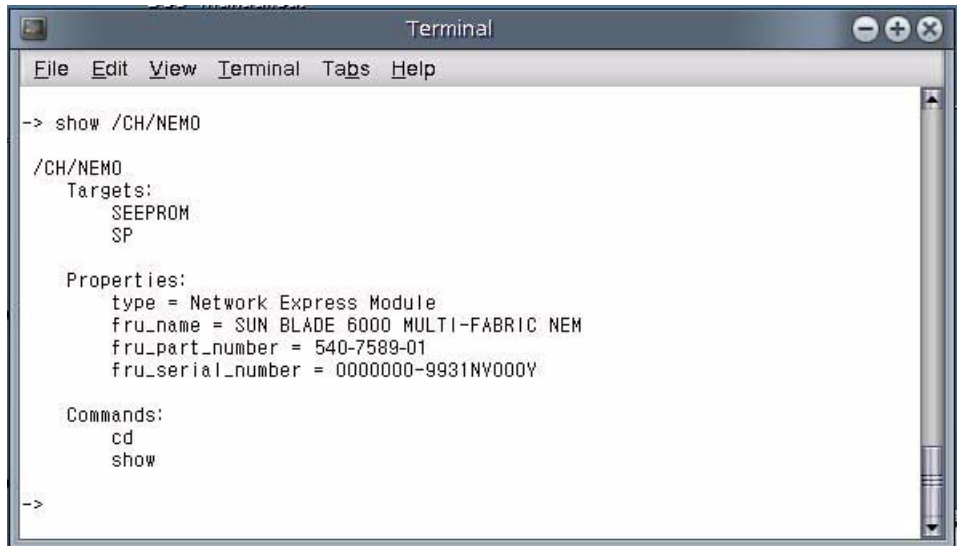
3. Depending on which slot you used when installing the Multi-Fabric NEM, enter

```
-> show /CH/NEM0
```

or

```
-> show /CH/NEM1
```

Information about the NEM and the NEM Field Replaceable Unit (FRU) information appears in the CLI, as shown here:



```
Terminal
File Edit View Terminal Tabs Help

-> show /CH/NEMO

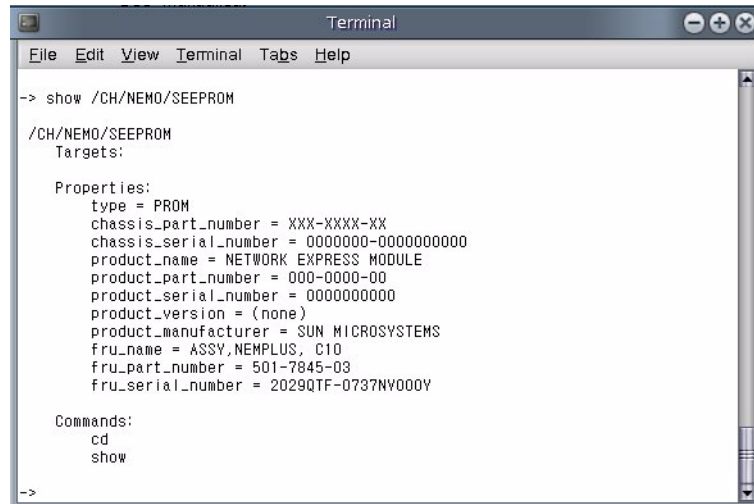
/CH/NEMO
  Targets:
    SEEPROM
    SP

  Properties:
    type = Network Express Module
    fru_name = SUN BLADE 6000 MULTI-FABRIC NEM
    fru_part_number = 540-7589-01
    fru_serial_number = 0000000-9931NV000Y

  Commands:
    cd
    show

->
```

You can also enter **show /CH/NEMO/SEEPROM** or **show /CH/NEM1/SEEPROM**. The NEM SEEPROM information appears in the CLI, as shown here.



```
Terminal
File Edit View Terminal Tabs Help

-> show /CH/NEMO/SEEPROM

/CH/NEMO/SEEPROM
  Targets:

  Properties:
    type = PROM
    chassis_part_number = XXX-XXXX-XX
    chassis_serial_number = 0000000-0000000000
    product_name = NETWORK EXPRESS MODULE
    product_part_number = 000-0000-00
    product_serial_number = 0000000000
    product_version = (none)
    product_manufacturer = SUN MICROSYSTEMS
    fru_name = ASSY,NEMPLUS, C10
    fru_part_number = 501-7845-03
    fru_serial_number = 2029QTF-0737NV000Y

  Commands:
    cd
    show

->
```

4. **If the NEM does not appear in ILOM, verify that the NEM is properly seated in the chassis and verify that you have installed the latest CMM ILOM firmware.**

For more information about using CMM ILOM, see the *Integrated Lights Out Manager Administration Guide for the Sun Blade 6000 Modular System* (820-0052) at: <http://docs.sun.com/app/docs/prod/blade.6000mod#hic>

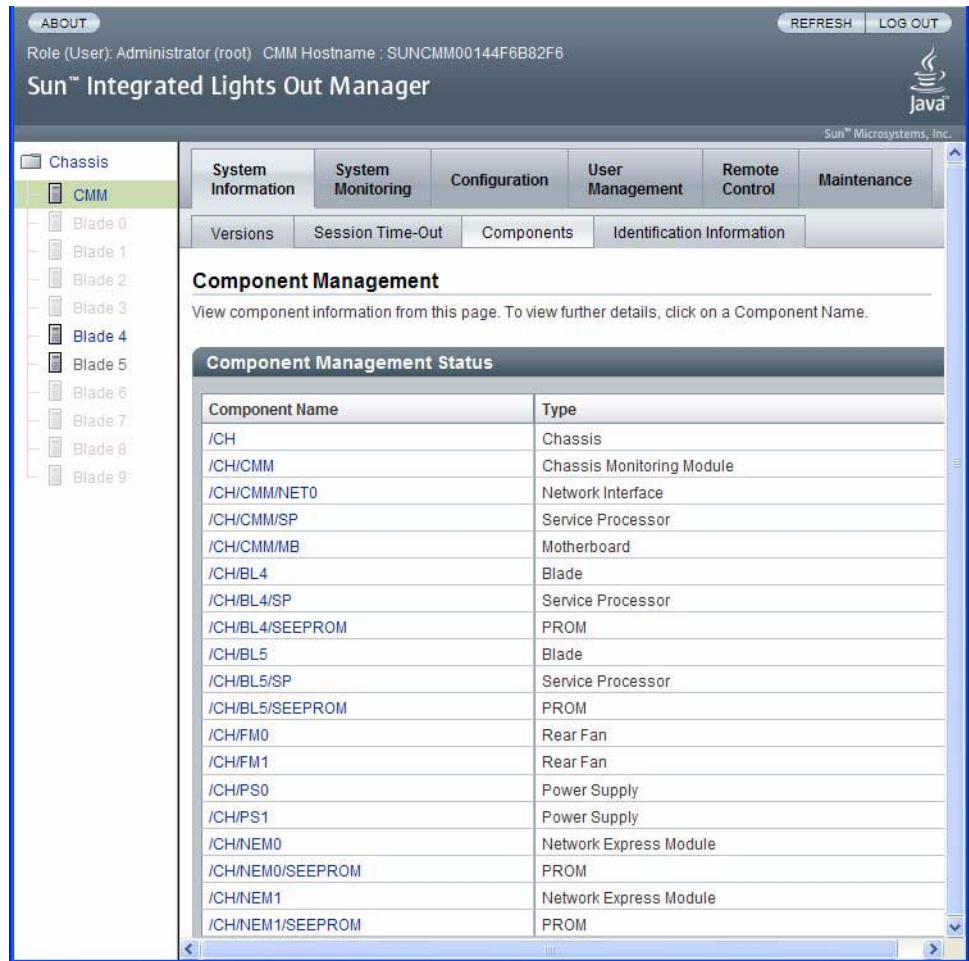
▼ To Verify Installation With the CMM ILOM Web Interface

1. **In a web browser, type the IP address of the CMM in the location bar.**
2. **Log in.**
3. **From the CMM ILOM left navigation bar, select CMM.**
4. **Select Components from the second row of tabs.**

The window shows a list of all the components installed in the chassis (see [FIGURE 2-2](#)). The /CH/NEM0 and /CH/NEM1 Network Express Modules appear near the bottom of the window.

5. **If the NEM you just installed does not appear in ILOM, verify that the NEM is properly seated in the chassis.**

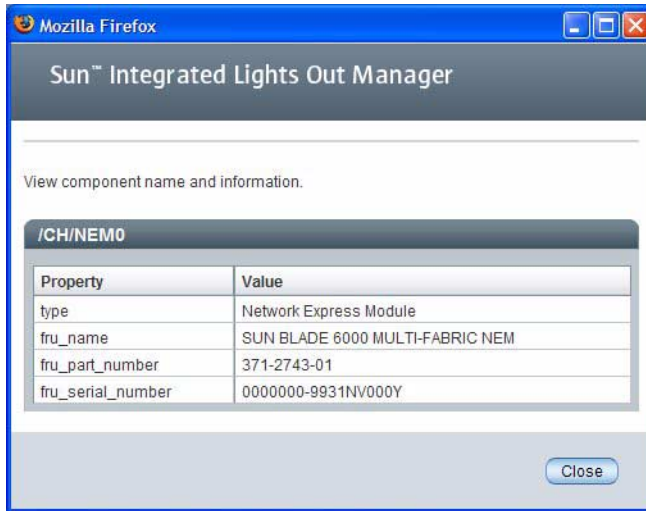
FIGURE 2-2 CMM ILOM Screen for Viewing NEM Information



If you click `/CH/NEM0`, you open a window that shows the FRU information for the Multi-Fabric NEM (see [FIGURE 2-3](#)).

Similarly, if you click `/CH/NEM0/SEEPROM`, you open a window that shows the SEEPROM information for the Multi-Fabric NEM (see [FIGURE 2-3](#)).

FIGURE 2-3 FRU and SEEPROM Information for NEM0 in the Web Browser



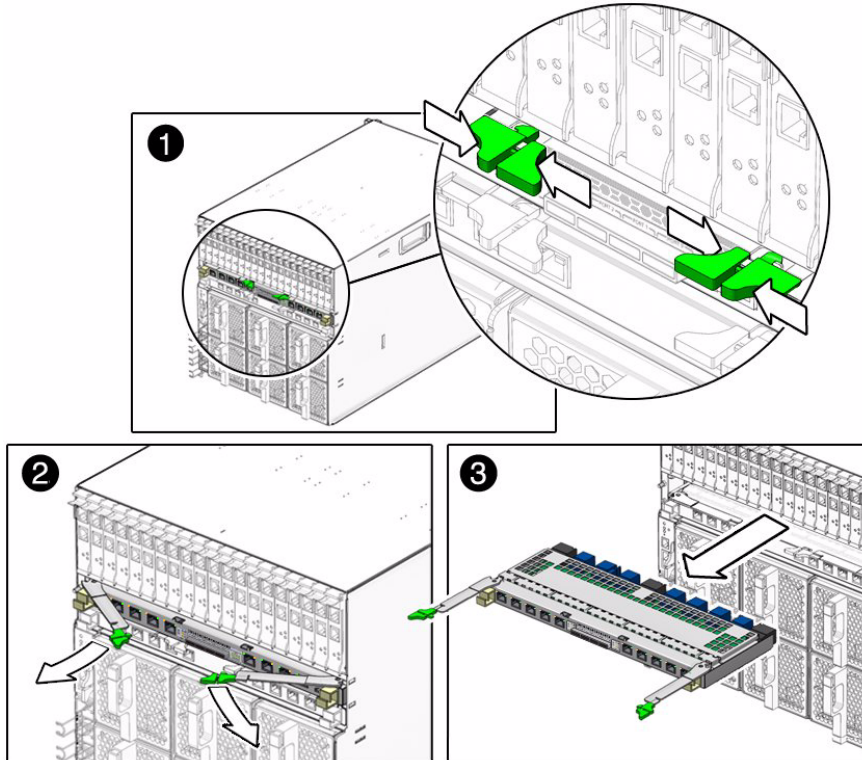
Removing a Multi-Fabric NEM

To remove a Multi-Fabric NEM:

1. If you plan to replace the NEM, label all the cables so you can reconnect them to the same ports.
2. Disconnect all cables from the NEM.
3. Press together and hold the ejector buttons on both the right and left ejector levers.
4. Open the ejector levers by extending them outward until they stop.
5. Holding the opened ejector levers, pull the NEM out.

[FIGURE 2-4](#) shows the removal of a Multi-Fabric NEM.

FIGURE 2-4 Removing a Multi-Fabric NEM



Replacing a Multi-Fabric NEM

If an Multi-Fabric NEM fails, you need to replace it.



Caution – The NEM should be replaced *immediately* after it fails.

The Multi-Fabric NEM is a Customer Replaceable Unit (CRU). You replace the entire module. There are no subcomponents that you can replace.

You can remove and replace a Multi-Fabric NEM from a powered-on chassis using a hot-swap operation.



Caution – Before you remove the NEM from the chassis, you should pause or shut down any active I/O that passes through the NEM.

Note – The blue Ready to Remove LED on the NEM does not function. To help identify a NEM that you plan to remove, you can illuminate the white Locate LED using the proxy CLI. For more information, see [“ILOM 2.0 Proxy CLI Program For SAS-NEMs and Disk Modules”](#) on page 22.



Caution – If the chassis is powered on and you are not replacing the Multi-Fabric NEM within 60 seconds, install a NEM filler panel to ensure proper system cooling.

▼ To Replace a Multi-Fabric NEM



Caution – If you are replacing a functional SAS-NEM (for example replacing a Multi-Fabric NEM with a 10GbE Multi-Fabric NEM), make sure that multipathing at the OS level is enabled on all active server blades in the chassis before you remove the existing NEM. This ensures that the primary path to disks is not lost, which can cause an OS panic.

For servers running Windows 2003, which does not support multipathing, shut down IO to all disks on the disk module that are not in hardware RAID volumes.

1. Label all the cables so you can reconnect them in same location.
2. Disconnect all cables from the NEM.
3. Press together and hold the ejector buttons on both the right and left ejector levers.
4. Open the ejector levers by extending them outward until they stop.
5. Holding the opened ejector levers, pull the NEM out.
6. (IMPORTANT) Execute the “Clear All Non-Present Persistent Mappings” operation described in [Appendix A](#) on all server blades in the chassis that meet *both* of these requirements:
 - a. The server blade is running CAM or a CAM agent.
 - b. The server blade uses an LSI host bus adapter.

7. Insert the new Multi-Fabric NEM into the chassis.
8. Reconnect all the cables in their original location.
9. (IMPORTANT) Execute the “Saving a Snapshot of Your Host Bus Adapter Configuration” operation described in [Appendix A](#) on all server blades in the chassis that meet *all three* of these requirements:
 - a. The server blade is running CAM or a CAM agent.
 - b. The server blade uses an LSI host bus adapter.
 - c. The server blade is running the Solaris OS.

ILOM For the Multi-Fabric NEM

This chapter contains these topics:

- [“ILOM on the CMM” on page 21](#)
- [“ILOM 2.0 Proxy CLI Program For SAS-NEMs and Disk Modules” on page 22](#)
- [“To Start the ILOM 2.0 Proxy CLI Program” on page 22](#)
- [“Navigation Using the CMM ILOM CLI” on page 23](#)
- [“CMM ILOM Management and Monitoring for SAS-NEMs and Disk Modules” on page 25](#)
- [“What You Can Set or Change in the Proxy Program” on page 26](#)
- [“Upgrading CMM ILOM Firmware” on page 26](#)

ILOM on the CMM

ILOM on the Chassis Monitoring Module (CMM) provides minimal information for Multi-Fabric NEMs.

- The ILOM web GUI recognizes the presence of Multi-Fabric NEMs but does not interact with them.
- The ILOM CLI can also get FRU and SEEPROM information from Multi-Fabric NEMs, but does not provide any diagnostic information.
- ILOM generates logs that record if a Multi-Fabric NEM is inserted, removed, powered up, or powered down.
- A log entry is also generated if the Service LED turns on or off. The Service LED is turned on for an over-temperature or over-voltage condition.

Note – A sudden over-voltage or over-temperature surge powers off the Multi-Fabric NEM. When such a module powers off, the Service LED is turned off also. The service condition is recorded in the log, however.

To see the CMM log for the Multi-Fabric NEMs (as well as any disk blades or server blades present), run this command from the CMM CLI:

```
-> show /CMM/logs/event/list
```

If you want to monitor and interact with Multi-Fabric NEMs, you must use a special ILOM proxy program.

ILOM 2.0 Proxy CLI Program For SAS-NEMs and Disk Modules

You can use a proxy program in the Sun Integrated Lights Out Manager (ILOM), version 2.0.3.10 or higher on the chassis CMM to monitor and control your Multi-Fabric NEMs.

Note – There is no proxy CLI for ILOM 3.0.

Only the ILOM command-line interface (CLI) is available for use with the proxy program. You can connect to the ILOM CLI by either of two means:

- Connect a terminal or PC running a terminal emulator directly to the CMM serial port on your chassis.
- or
- Connect to the Ethernet network management port using a secure shell (SSH).

Instructions for setting up and using ILOM are documented in the *Sun Integrated Lights Out Manager 2.0 User's Guide*, available at:

<http://docs.sun.com/app/docs/doc/820-1188>

▼ To Start the ILOM 2.0 Proxy CLI Program

Prerequisite: To start the proxy CLI, a SAS-NEM module must be installed in the chassis in either NEM slot.

1. Connect to the ILOM CLI and then start the proxy CLI with one of the following commands:

```
-> start /CH/NEM0/SAS/cli
```

```
-> start /CH/NEM1/SAS/cli
```

Note – The proxy CLI commands are case-sensitive.

When you start the proxy CLI, you see a list of all the SAS-NEMs and disk blades in the system. For example:

```
-> start /CH/NEM0/SAS/cli
```

```
Are you sure you want to start /CH/NEM0/SAS/cli (y/n)? y
```

```
Found SAS-NEM in NEM slot 0
```

```
Found SAS-NEM in NEM slot 1
```

```
Found STORAGE in BL slot 1
```

```
Found STORAGE in BL slot 3
```

```
Found STORAGE in BL slot 7
```

```
Welcome to proxy CLI on slot 0
```

```
proxy ->
```

There are two NEM slots, 0 and 1, and there are 10 slots for blades like the disk module, 0 through 9. The SAS-NEMs in the chassis are referred to as NEM0 and NEM1, while the disk blades are referred to as BL0, BL1, ... BL9.

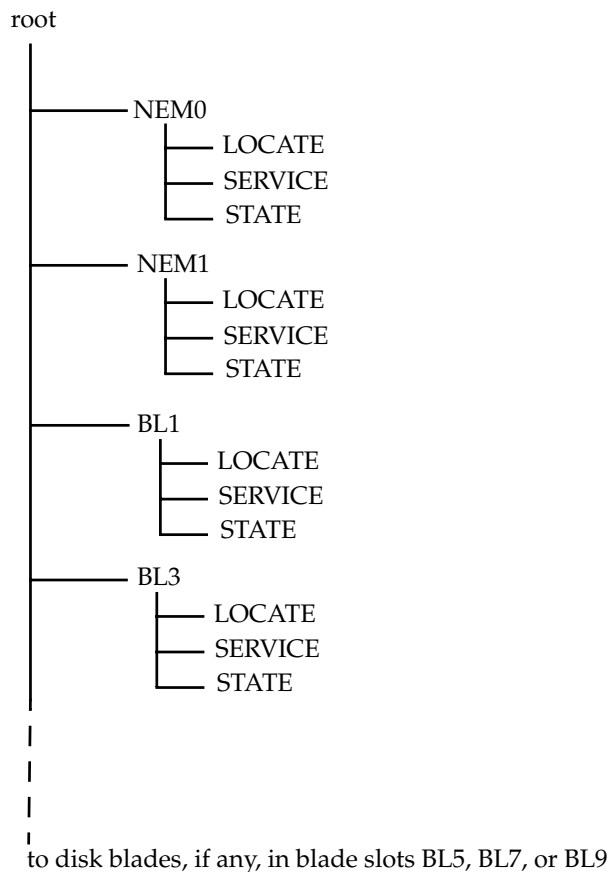
Note – Server modules in the chassis are not detected by the proxy CLI program.

Navigation Using the CMM ILOM CLI

With the CMM ILOM CLI (either with the proxy CLI for ILOM 2.0, or the standard CLI with ILOM 3.0), you navigate through a tree consisting of all the SAS-NEMs and disk modules (called targets) in the chassis. You can use standard Linux and Unix commands such as `cd` or `pwd` to navigate through the tree.

The tree consists of all the SAS-NEMs and disk blades in the chassis.

FIGURE 3-1 The Proxy CLI Tree of Targets



You can use these commands to navigate through the tree:

- `show` (with no argument): Shows contents of the current target. Lists targets directly beneath the current target, properties of the current target, and available proxy commands.
- `show` (with argument): Shows contents of the target specified. For example, `show BL3`
- `cd` (with argument): Changes current target to that of the target specified. For example, `cd NEM1` or `cd ../NEM1`
- `pwd` (with no argument): Determines where you are in the tree of targets (because the prompt doesn't tell you).
- `cd /`: Returns to the root of the tree of targets.

You can use these commands on module targets (NEMx and BLx):

`start`: Powers on the current target or the given target.

`stop`: Powers off the current target or the given target.

`reset`: Powers off, then powers on the current target or the given target.



Caution – The `reset` and `stop` commands do not check for host activity. You should only use these commands if you are sure that the device is not in use.

You can use this command on property targets:

`set`: Changes the value of the specified property to the given value.

You can use these commands at any time:

- `exit`: Leaves the proxy CLI and return to the ILOM CLI.
- `help`: Shows the help screen.
- `version`: Shows the current versions of the proxy program and the AMI MG9073 firmware on each disk blade.
- `load`: Loads new AMI MG9073 firmware.

CMM ILOM Management and Monitoring for SAS-NEMs and Disk Modules

The CMM ILOM CLI (ILOM 2.0 or 3.0) allows you to do the following:

- View and Navigate NEM and Sun Blade 6000 Disk Module chassis locations.
- View the values of the Locate and Service LEDs on the Sun Blade 6000 Disk Modules and SAS-NEMs. The Power and Service LEDs are both under control of the expander firmware running on the disk blade or SAS-NEM. You can view these LEDs from the CLI program, but you cannot change them directly.
- View IPMI sensor state values for the SAS-NEMs and Sun Blade 6000 Disk Modules.
- Stop and start the SAS-NEM or disk module by using the `stop` and `start` commands. You can achieve the same result by setting the `power_state` property to `off` or `on`: for example, `set power_state=off`.
- Reset the SAS-NEM or disk module.
- Light the Locate LED. The CMM ILOM CLI controls only one LED directly. You can turn the Locate LED on (`value=fast blink`) or off (`value=off`). ILOM will turn off the Locate LED after a specified timeout (default = 30 minutes).
- View and load new AMI MG9073s firmware to Sun Blade 6000 Disk Modules.

What You Can Set or Change in the Proxy Program

This CLI allows you to set or change the following:

- Stop and start the SAS-NEM or disk module by using the `stop` and `start` commands. You can achieve the same result by setting the `power_state` property to `off` or `on`: for example, `set power_state=off`.
- Reset the SAS-NEM or disk module.
- Turn the Locate LED on or off.
- View and load new AMI MG9073 firmware to Sun Blade 6000 Disk Modules.

Upgrading CMM ILOM Firmware

ILOM 2.0.3.10, build 36968 for the Sun Blade 6000 System chassis is the minimum version required for use with disk blades and SAS-NEMs. This firmware can be downloaded from:

<http://www.sun.com/servers/blades/downloads.jsp#6000dm>

You can upgrade your ILOM firmware in two ways: by using the CLI or by using the ILOM web interface.

▼ To Upgrade ILOM Firmware Using the CLI

Use a tftp server:

1. Put the `.ima` file in the `/tftpboot` directory.
2. In the CLI, run this command:

```
-> load -source tftp://<IPadd>/ilom.6000-2.0.3.10-r36968.ima
```

where *IPadd* is the IP address of your tftp server.

▼ To Upgrade ILOM Firmware Using the ILOM Web Interface

1. Log in as any user with Administrator privileges.

2. Select Maintenance --> Firmware Upgrade.

The Firmware Upgrade page appears.

3. Click Enter Upgrade Mode.

A dialog box appears asking you to confirm that you want to enter Upgrade mode.

4. Click OK to enter Upgrade mode.

ILOM stops its normal operation and prepares for a flash upgrade.

5. Enter the path to the new ILOM .ima file in the Select Image File to Upload field or click Browse to locate and select the .ima file.

6. Click Upload.

After a short pause, a Firmware Verification screen appears that shows the current firmware version and the requested upgrade version.

7. Click Start Upgrade.

The process takes about 6 minutes. At the end, the service processor is reset.

Using the Common Array Manager

This chapter contains the following sections:

- [“About Enclosure Management” on page 29](#)
 - [“CAM” on page 30](#)
 - [“Obtaining CAM Software” on page 31](#)
 - [“Using CAM With Disk Blades and Multi-Fabric NEMs” on page 31](#)
 - [“Upgrading Expander Firmware” on page 33](#)
-

About Enclosure Management

Your Sun Blade 6000 Multi-Fabric NEM supports a powerful set of enclosure management features accessible from a management client that supports SES-2 (SCSI Enclosure Services). The SAS expander on the Multi-Fabric NEM is SES-2 compliant. These enclosure management features are available through the management software called the Sun Common Array Manager (CAM), which provides a system administrator with the following capabilities:

- Event and fault monitoring
- E-mail alert notification
- FRU identification and status
- Enclosure reset
- Enclosure firmware upgrade
- Fault isolation
- Service Advisor wizard for problem resolution
- Sun Auto Service Request (ASR) uses fault telemetry 24/7 to automatically initiate a service request and begin the problem resolution process as soon as a problem occurs

CAM

CAM is a software application that allows you to manage SAS-NEMs and disk blades in a chassis from one central point. It is written in Java so you can run it on any platform.

Note – CAM operates primarily through disk blades. SAS-NEMs, including the Multi-Fabric NEM, are managed as if they were subcomponents of the disk blades. To use CAM in the Sun Blade 6000 Modular System, you must register the disk blades in the chassis. You cannot register a SAS-NEM. However, if at least one disk blade is registered, then the SAS-NEMs will be visible to CAM and CAM can monitor them and update their expander firmware. This chapter is written around managing a disk blade because that is the way that CAM works. Management of your Multi-Fabric NEMs occurs indirectly through disk blade management.

In a Sun Blade 6000 chassis, one server blade could be chosen to host the CAM software. Alternatively, you can choose any server on your network.

CAM Agent

A second piece of software, called the CAM Agent, must be installed on every server blade that connects to a disk blade. The agent software is OS dependent. There are versions for Linux, Solaris, and Windows.

When a server blade connects to a disk blade, an additional CAM Agent plug-in is required for CAM to recognize the disk blade.

Note – The CAM installation program handles the installation of all three pieces of software.

The CAM Agent communicates with the disk module through the server blade's SAS host bus adapter. Both LSI and Adaptec controllers are supported.

At the initial release of the Sun Blade 6000 Disk Module, the most important functionality of CAM is firmware management. The CAM Agent can report the current versions of expander firmware and can update the expander firmware on both the disk module and the SAS-NEM.

The CAM Agent can monitor temperature and voltage on both the disk blade and the SAS-NEM.

It can also display the topology of your system and report FRU IDs.

Problem Resolution

CAM provides two helpful tools for resolving problems that might occur with the system.

- **Auto Service Request (ASR)** monitors the system's health and performance and automatically notifies the Sun Technical Support Center when critical events occur. Critical alarms generate an Auto Service Request case. These notifications enable Sun Service to respond faster and more accurately to critical on-site issues.

To use ASR, you must provide Sun online account information to enroll your CAM software to participate in the ASR service. After you enroll CAM with ASR, you can choose which systems you want to be monitored and enable them individually.

- **Service Advisor** is a troubleshooting wizard that provides information and procedures for replacing system components.

Obtaining CAM Software

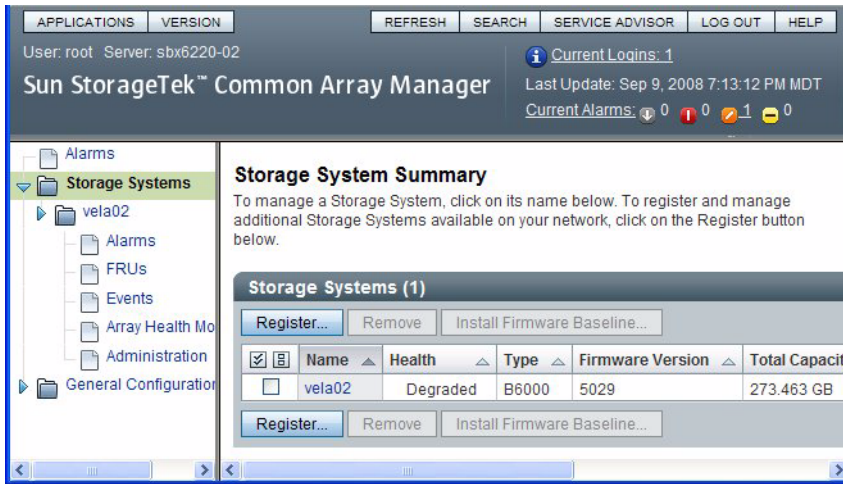
Support for the Sun Blade 6000 Disk Module and Sun Blade 6000 Multi-Fabric NEM is available beginning with CAM version 6.1.2. To obtain the latest CAM software and expander firmware, go to the disk blade download site:

<http://www.sun.com/servers/blades/downloads.jsp#6000dm>

Using CAM With Disk Blades and Multi-Fabric NEMs

CAM provides both a browser and command-line interface. When using the browser interface, you set up user accounts. When an authorized user logs in, information is laid out in pages. A handy navigation tree lists available information. See [FIGURE 4-1](#).

FIGURE 4-1 Example CAM Storage System Summary and Navigation Tree



You use the navigation tree on the left to move among pages within an application. You can click a link to get details about a selected item (such as alarms, FRUs, events, or array health). You can also sort and filter information displayed on a page. When you place your pointer over a button, tree object, link, icon, or column, a tool tip provides a brief description of the object.

Monitoring Component Health

CAM can monitor voltage and temperature on installed disk blades and Multi-Fabric NEMs and can raise alarms (including notification) when thresholds are exceeded. Choose the Array Health Monitoring item from the navigation tree to learn about this capability.

The monitoring capabilities of CAM are fully documented elsewhere. Refer to the *Sun StorageTek Common Array Manager User Guide for the J4000 Array Family* (820-3765) found at:

<http://docs.sun.com/app/docs/prod/stor.armgr#hic>

Note – CAM also has extensive online documentation that you can access using the Help button in the upper right of the browser interface.

Upgrading Expander Firmware

Both the Sun Blade 6000 Disk Module and the Sun Blade 6000 Multi-Fabric NEM enclosures contain SAS expanders with upgradable firmware. You should keep this firmware at the latest released version. CAM includes firmware upgrade capabilities for these components.

A firmware release history for the Sun Blade 6000 Disk Module and supported SAS NEMs is listed in the following table.

Note – Both the disk module and the SAS NEM firmware need to be at the same revision level.

TABLE 4-1 Sun Blade 6000 Disk Module and SAS NEM Firmware

Firmware Revision	Base Firmware Delivery Platform	Supported Hardware	Description
5.02.10 (502A)	Sun Common Array Manager 6.1.2	<ul style="list-style-type: none">• Sun Blade 6000 Disk Module• Sun Blade 6000 Multi-Fabric Network Express Module• Sun Blade 6000 10GbE Multi-Fabric Network Express Module• Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module	Initial release.
5.02.14 (502E)	Sun Common Array Manager 6.4.1	<ul style="list-style-type: none">• Sun Blade 6000 Disk Module• Sun Blade 6000 Multi-Fabric Network Express Module• Sun Blade 6000 10GbE Multi-Fabric Network Express Module• Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module	Support was added for second source to monitor disk module temperature and voltage.
5.04.03	Oracle Hardware Management Pack 2.0 (fwupdate utility)	<ul style="list-style-type: none">• Sun Blade 6000 Disk Module• Sun Blade 6000 Multi-Fabric Network Express Module• Sun Blade 6000 10GbE Multi-Fabric Network Express Module• Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module	Support added for SAS-1/SAS-2 device coexistence in a Sun Blade 6000 Modular System chassis.

Note – At the release of this document, CAM might not have the minimum expander firmware version (5.04.03) required to perform a SAS-1/SAS-2 device coexistence upgrade for SAS-1 NEMs and the Sun Blade 6000 Disk Module. For more information, see [Appendix B](#).

▼ To Upgrade Expander Firmware

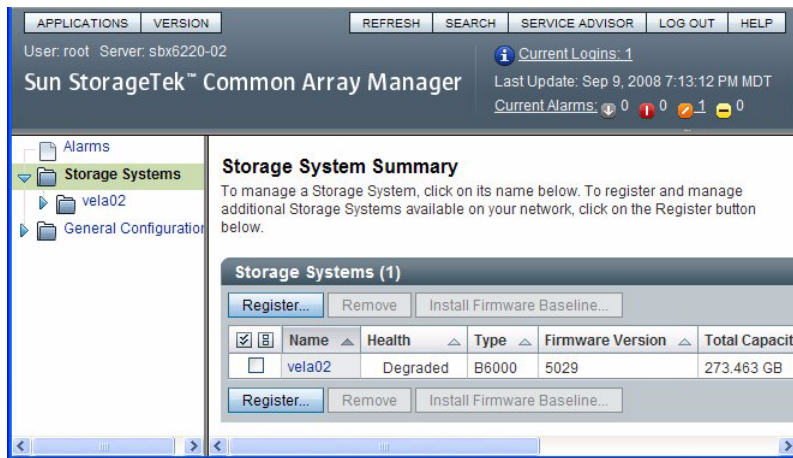
This procedure assumes that you have already registered your disk blades using the CAM interface. You can open the CAM interface online help for instructions on registering disk blades.

Note – Registering the disk blades automatically makes CAM aware of the Multi-Fabric NEMs.

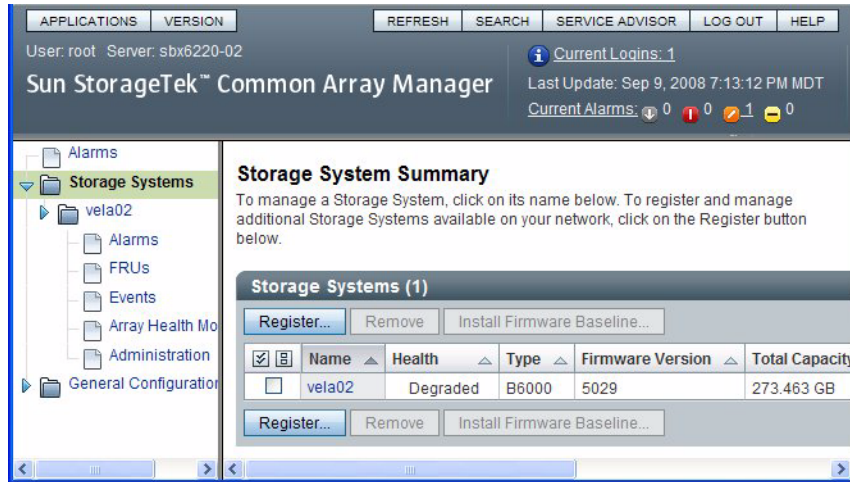
1. Open the CAM browser interface on the server that hosts the CAM software.

You see the registered storage systems listed in the opening summary page. In this example, there is only one registered storage system, a disk blade registered with the name “vela02.”

You can see that vela02’s health is degraded and also that there is a major (orange) alarm in the Current Alarms list.

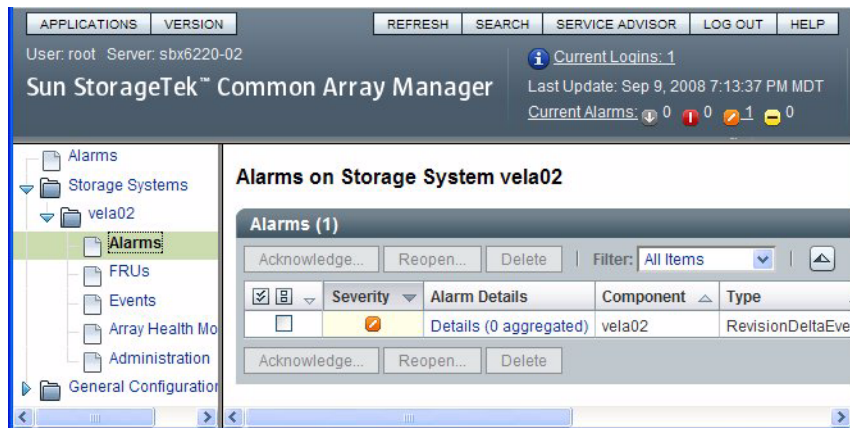


2. Click the arrow to expand vela02 in the navigation tree.



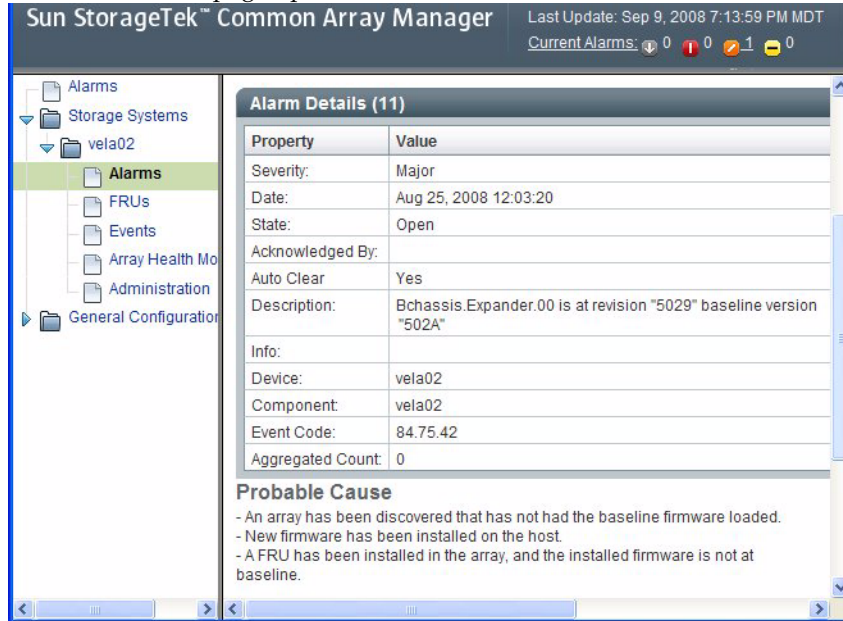
3. Select the Alarms item in the vela02 tree.

The Alarms page for vela02 opens. You can see one major severity (orange) alarm of type RevisionDeltaEvent.



4. Click the link under Alarm Details.

The Alarm Details page opens.



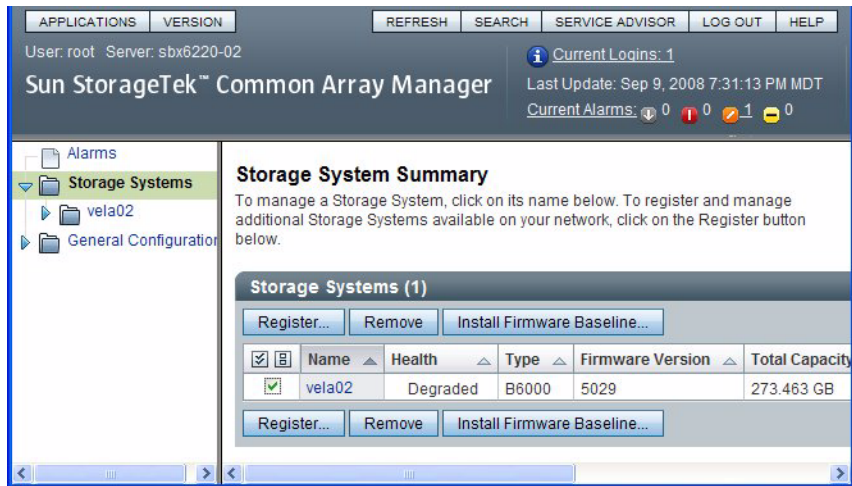
You can see in the Description field for this example that the installed version of expander firmware (5029) is not up to date. A more current version (502A) is available.

Note – You will get this same alarm if the firmware on *any* of the expanders (two on the disk blade and one on each of the Multi-Fabric NEMs) is not current for any reason.

Looking at the Probable Cause, you see various possible ways that the degraded condition that raised the alarm might have been produced.

5. Return to the Storage System Summary page by choosing Storage Systems in the navigation tree and check the check box to the left of the vela02 name.

This selects the vela02 storage system and enables the firmware update button.



Note – In this example, there is only one registered storage system. If there were more, the buttons would be enabled only for the checked system.

6. Click the **Install Firmware Baseline** button to update the expander firmware.
The Analyze and Install Array Firmware Baseline wizard opens.

Note – CAM updates the firmware on *any* expander that is not at the current level.



7. Click Next.

The next screen shows the current firmware versions and the baseline (correct) versions for each expander.

Sun StorageTek™ Common Array Manager

Analyze and Install Array Firmware Baseline

Steps Help **Step 2: Analyze Arrays**

1. Overview
→ 2. Analyze Storage System Firmware
3. Review
4. Results

Firmware information for each array is displayed as the analysis is completed. The action column displays the recommended action to bring each array up to the current firmware baseline. For optimal performance, all arrays should have the same firmware version installed. This wizard will only install the components that are not at the baseline.

Storage Systems (1)

Name	Action	Current Firmware	Baseline
vela02	Install baseline, no disks Disk install is not required	Bchassis.Expander.00: 5029 Bchassis.Expander.01: 5029 nem.00: 5029 nem.01: 5029	Bchassis.Expander.00: 502A Bchassis.Expander.01: 502A nem.00: 502A nem.01: 502A

Previous Next Cancel

8. Accept the default Action and click Next.

The next screen shows a review of what you have selected.

Sun StorageTek™ Common Array Manager

Analyze and Install Array Firmware Baseline

Steps Help **Step 3: Review**

1. Overview
2. Analyze Storage System Firmware
→ 3. Review
4. Results

Review the current selections and then click Finish to perform any specified firmware install.

⚠ All management operations for Storage System should stop prior to firmware install. Disk I/O must be quiesced if disk firmware is being installed.

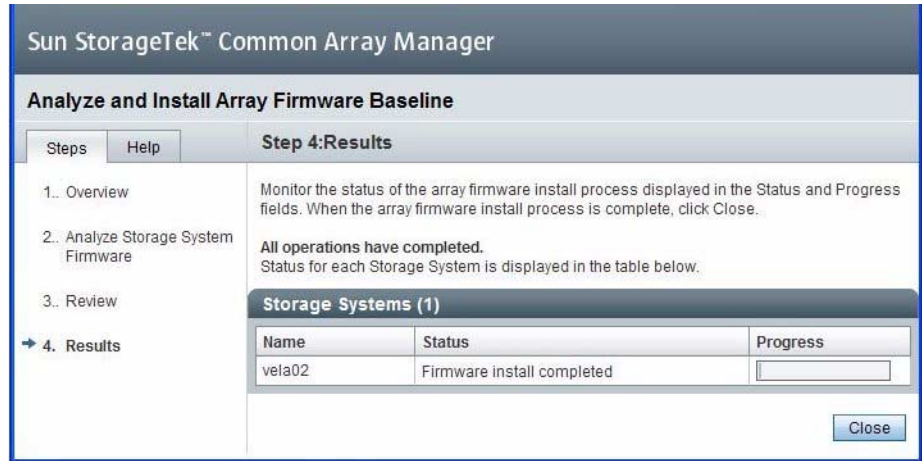
Storage Systems (1)

Name	Action	Current Firmware	Baseline
vela02	Install baseline, no disks Disk install is not required	Bchassis.Expander.00: 5029 Bchassis.Expander.01: 5029 nem.00: 5029 nem.01: 5029	Bchassis.Expander.00: 502A Bchassis.Expander.01: 502A nem.00: 502A nem.01: 502A

Previous Finish Cancel

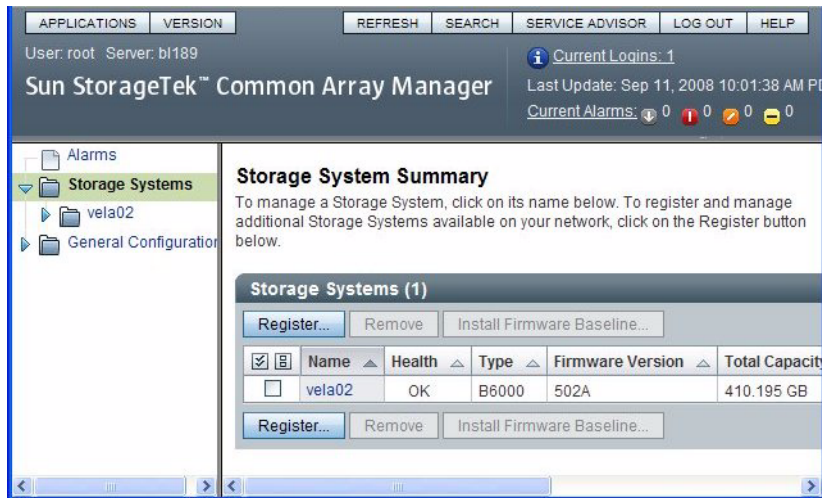
9. If you need to change the Action, click Previous. Otherwise, click Finish.

A series of screens appear, with the Status field showing the current expander being updated. When the process is completed, the Firmware Install completed message appears in the Status Field.



10. Click Close.

The Storage System Summary page reappears. You can see that the disk blade's Health has changed to OK and the alarm is turned off.



Using the `lsiutil` Application

The service procedure in this manual for replacing a Multi-Fabric NEM requires the use of a program called `lsiutil`. This appendix provides information on how to use the application.



Caution – The `lsiutil` application has many features and capabilities. Executing certain combinations of commands can leave your system in an unrecoverable state. When you use this application, be sure you execute the procedures exactly as they are documented here, command by command. Do not skip commands or steps and do not add commands or steps that are not in the documented procedure.

The following topics are covered in this chapter:

- “Where to Obtain the `lsiutil` Software” on page 41
- “Installing `lsiutil`” on page 42
- “Using the Interactive `lsiutil` Menus to Clear Your LSI Host Bus Adapter’s Non-Present Persistence Mappings” on page 42
- “Saving a Snapshot of Your Host Bus Adapter Configuration” on page 46

Where to Obtain the `lsiutil` Software

To use `lsiutil` for the procedure in this appendix, you must have version 1.60 at minimum.

To obtain the latest `lsiutil` software, go to the disk blade download site:

<http://www.sun.com/servers/blades/downloads.jsp#6000dm>

Installing lsiutil

Download `lsiutil` and unzip it in your root directory. It will create operating system-specific subdirectories. If you are running `lsiutil` on a SPARC blade, use the `Solaris` subdirectory. Otherwise, use the `Solaris x86` subdirectory.

Using the Interactive `lsiutil` Menus to Clear Your LSI Host Bus Adapter's Non-Present Persistence Mappings

The procedure for clearing your LSI host bus adapter's non-present persistence mappings requires using the interactive menus of `lsiutil`.

▼ To Clear Your Non-Present Persistence Mappings

1. **Log in to your server as `root`.**
2. **Change to the directory that contains the appropriate version of `lsiutil` for your OS. For example,**

```
# cd directoryname/Solaris x86
```
3. **If you have not done so already, change the permissions (read and execute access) on the `lsiutil` file by entering the following command:**

```
# chmod 755 lsiutil
```
4. **Start `lsiutil` by entering the command:**

```
# ./lsiutil
```

The opening screen appears.

```
root@bl189:~/LSIUtilKit1.60/Linux
File Edit View Terminal Tabs Help
[root@bl189 ~]# cd LSIUtilKit1.60/Linux
[root@bl189 Linux]# ./lsiutil

LSI Logic MPT Configuration Utility, Version 1.60, July 11, 2008

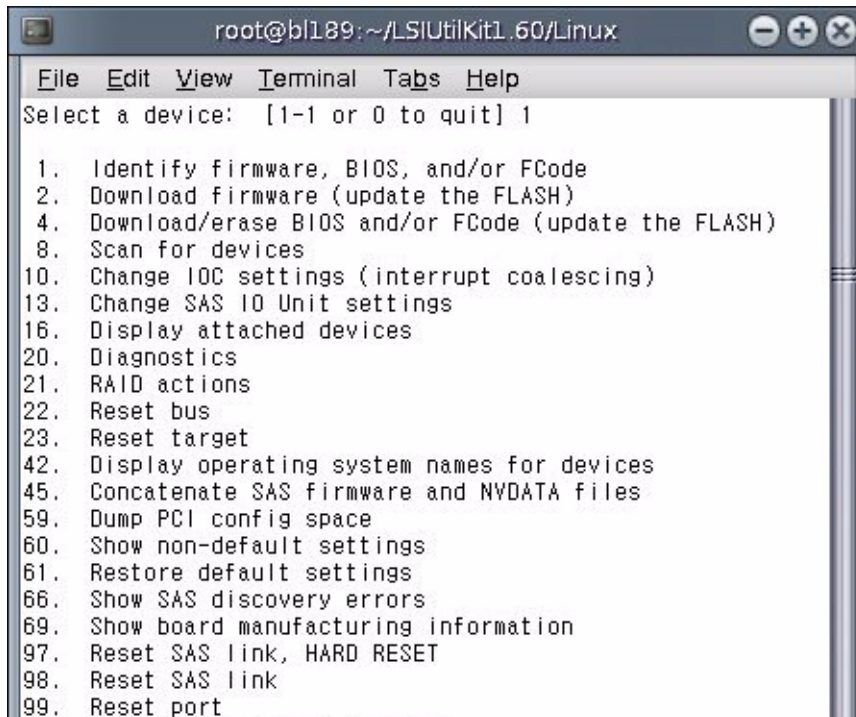
1 MPT Port found

      Port Name      Chip Vendor/Type/Rev  MPT Rev  Firmware Rev  IOC
1. /proc/mpt/ioc0   LSI Logic SAS1068E B2   105      01185b00     0

Select a device: [1-1 or 0 to quit]
```

5. Type 1 and press Enter.

The main menu appears.

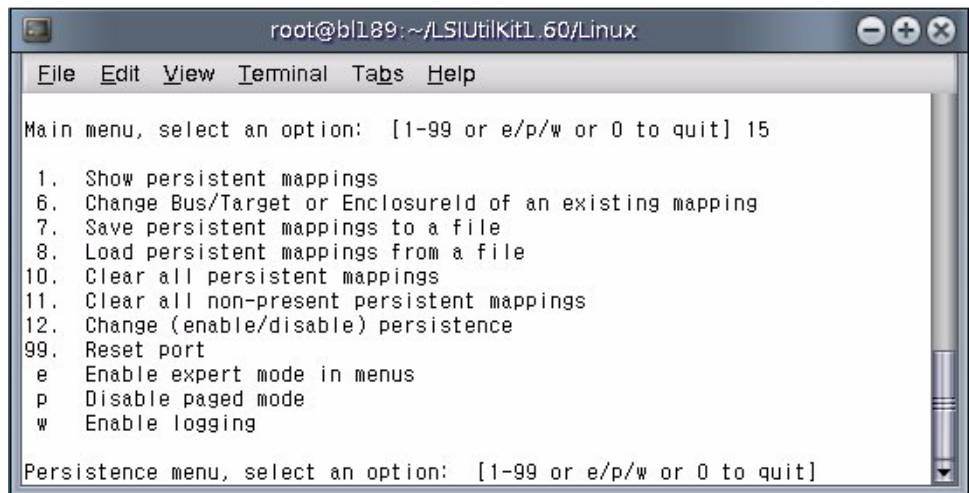


```
root@bl189:~/LSIUtilKit1.60/Linux
File Edit View Terminal Tabs Help
Select a device: [1-1 or 0 to quit] 1
1. Identify firmware, BIOS, and/or FCode
2. Download firmware (update the FLASH)
4. Download/erase BIOS and/or FCode (update the FLASH)
8. Scan for devices
10. Change IOC settings (interrupt coalescing)
13. Change SAS IO Unit settings
16. Display attached devices
20. Diagnostics
21. RAID actions
22. Reset bus
23. Reset target
42. Display operating system names for devices
45. Concatenate SAS firmware and NVDATA files
59. Dump PCI config space
60. Show non-default settings
61. Restore default settings
66. Show SAS discovery errors
69. Show board manufacturing information
97. Reset SAS link, HARD RESET
98. Reset SAS link
99. Reset port
```

You cannot see all the commands in the menu because they are too numerous, but you can enter any option number if you know what it is. In our case we want to open the Persistence menu. This is done with option 15.

6. Type 15 and press Enter.

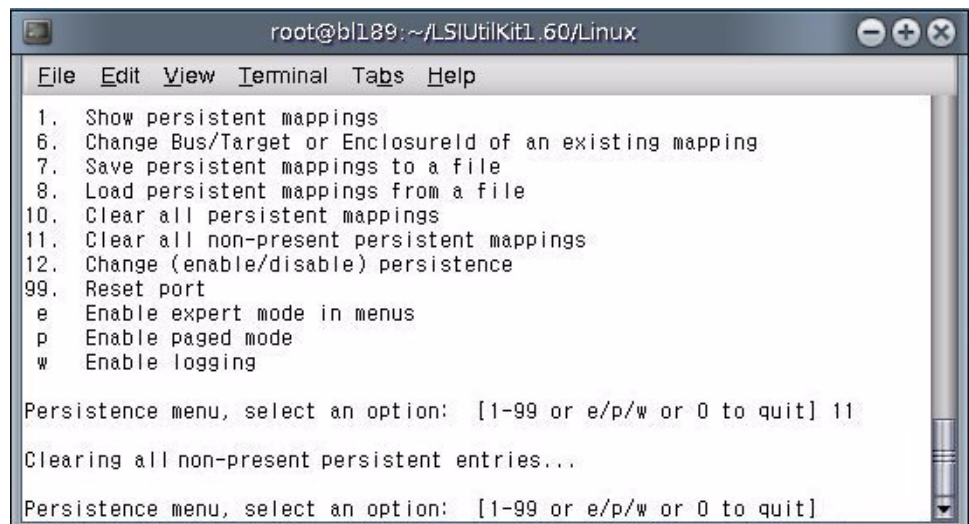
The Persistence menu opens.

A terminal window titled "root@bl189:~/LSIUtilKit1.60/Linux" with a menu bar containing "File", "Edit", "View", "Terminal", "Tabs", and "Help". The main text displays a menu with the following options:

```
Main menu, select an option: [1-99 or e/p/w or 0 to quit] 15
1. Show persistent mappings
6. Change Bus/Target or EnclosureId of an existing mapping
7. Save persistent mappings to a file
8. Load persistent mappings from a file
10. Clear all persistent mappings
11. Clear all non-present persistent mappings
12. Change (enable/disable) persistence
99. Reset port
e Enable expert mode in menus
p Disable paged mode
w Enable logging
Persistence menu, select an option: [1-99 or e/p/w or 0 to quit]
```

7. Type 11 (Clear all non-present persistence mappings) and press Enter.

This clears any entries in the host bus adapter's persistence map that refer to target objects that are no longer present.

A terminal window titled "root@bl189:~/LSIUtilKit1.60/Linux" with a menu bar containing "File", "Edit", "View", "Terminal", "Tabs", and "Help". The main text displays the persistence menu and the execution of option 11:

```
1. Show persistent mappings
6. Change Bus/Target or EnclosureId of an existing mapping
7. Save persistent mappings to a file
8. Load persistent mappings from a file
10. Clear all persistent mappings
11. Clear all non-present persistent mappings
12. Change (enable/disable) persistence
99. Reset port
e Enable expert mode in menus
p Enable paged mode
w Enable logging
Persistence menu, select an option: [1-99 or e/p/w or 0 to quit] 11
Clearing all non-present persistent entries...
Persistence menu, select an option: [1-99 or e/p/w or 0 to quit]
```

8. Type and enter 0 three times to exit the lsiutil application.

Saving a Snapshot of Your Host Bus Adapter Configuration

For various server configurations, you should save a “snapshot” file that contains the persistence mappings of your LSI host bus adapter. Then, in the event of a host bus adapter failure, you can restore the persistence mappings to a replacement adapter, allowing you to recover gracefully. See the *Sun Blade 6000 Disk Module Service Manual* (820-1703) for details.

1. Log in to your server as `root`.

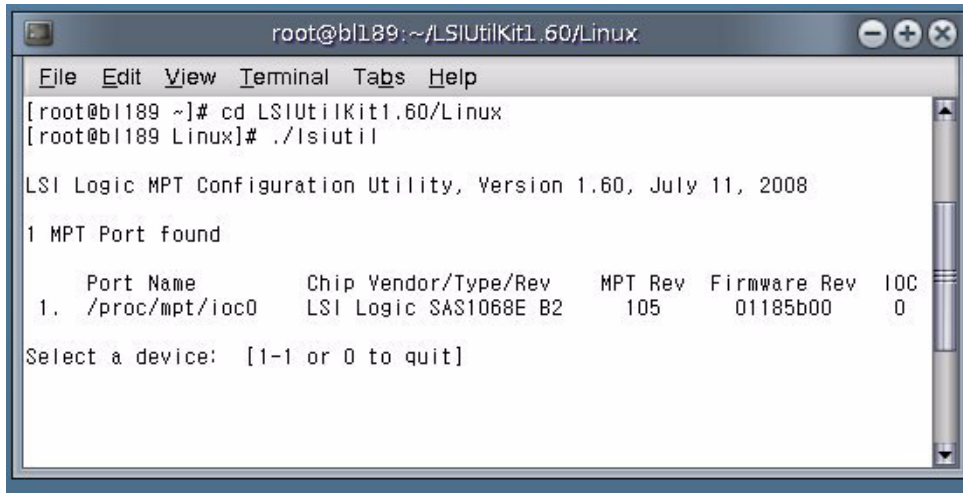
2. Change to the directory that contains the appropriate version of `lsiutil` for your OS. For example,

```
# cd directoryname/Solaris x86
```

3. Enter the application name in the appropriate context. For example:

```
# ./lsiutil
```

The opening screen appears.



```
root@bl189:~/LSIUtilKit1.60/Linux
File Edit View Terminal Tabs Help
[root@bl189 ~]# cd LSIUtilKit1.60/Linux
[root@bl189 Linux]# ./lsiutil

LSI Logic MPT Configuration Utility, Version 1.60, July 11, 2008

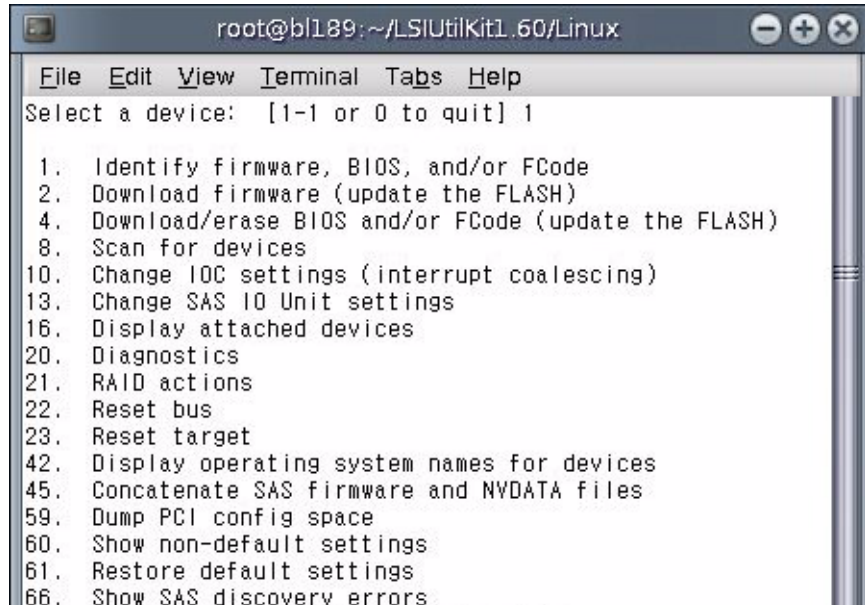
1 MPT Port found

   Port Name          Chip Vendor/Type/Rev   MPT Rev  Firmware Rev  IOC
1. /proc/mpt/ioc0    LSI Logic SAS1068E B2   105      01185b00      0

Select a device: [1-1 or 0 to quit]
```

4. Type `1` and press `Enter`.

The main menu appears

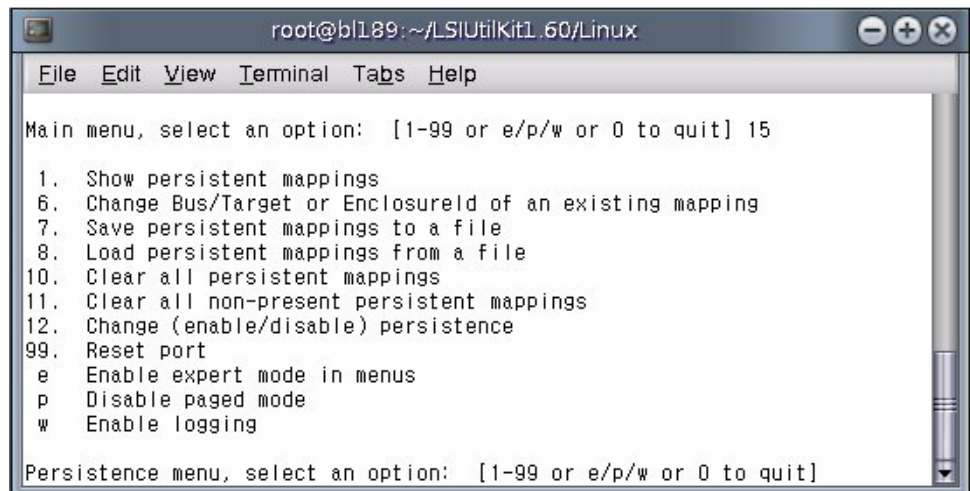


```
root@bl189:~/LSIUtilKit1.60/Linux
File Edit View Terminal Tabs Help
Select a device: [1-1 or 0 to quit] 1
1. Identify firmware, BIOS, and/or FCode
2. Download firmware (update the FLASH)
4. Download/erase BIOS and/or FCode (update the FLASH)
8. Scan for devices
10. Change IOC settings (interrupt coalescing)
13. Change SAS IO Unit settings
16. Display attached devices
20. Diagnostics
21. RAID actions
22. Reset bus
23. Reset target
42. Display operating system names for devices
45. Concatenate SAS firmware and NVDATA files
59. Dump PCI config space
60. Show non-default settings
61. Restore default settings
66. Show SAS discovery errors
```

You cannot see all the commands in the menu, but you can enter any command number if you know what it is. In this case we want to open the Persistence menu. This is done with command 15.

5. Type 15 and press Enter.

The Persistence menu opens.

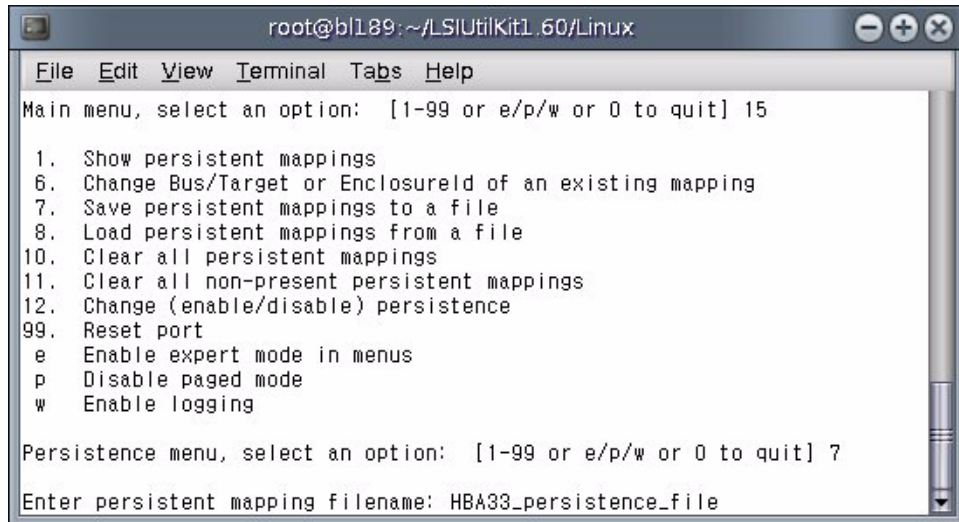


```
root@bl189:~/LSIUtilKit1.60/Linux
File Edit View Terminal Tabs Help
Main menu, select an option: [1-99 or e/p/w or 0 to quit] 15
1. Show persistent mappings
6. Change Bus/Target or EnclosureId of an existing mapping
7. Save persistent mappings to a file
8. Load persistent mappings from a file
10. Clear all persistent mappings
11. Clear all non-present persistent mappings
12. Change (enable/disable) persistence
99. Reset port
e Enable expert mode in menus
p Disable paged mode
w Enable logging
Persistence menu, select an option: [1-99 or e/p/w or 0 to quit]
```

6. Type 7 (Save Persistent Mappings to a File) and press Enter.

You are prompted for the name of the file where you want to store the host bus adapter configuration (persistent mappings).

7. Enter a file name. For example, `HBA33_persistence_file`.



```
root@bl189:~/LSIUtilKit1.60/Linux
File Edit View Terminal Tabs Help
Main menu, select an option: [1-99 or e/p/w or 0 to quit] 15
1. Show persistent mappings
6. Change Bus/Target or EnclosureId of an existing mapping
7. Save persistent mappings to a file
8. Load persistent mappings from a file
10. Clear all persistent mappings
11. Clear all non-present persistent mappings
12. Change (enable/disable) persistence
99. Reset port
e Enable expert mode in menus
p Disable paged mode
w Enable logging
Persistence menu, select an option: [1-99 or e/p/w or 0 to quit] 7
Enter persistent mapping filename: HBA33_persistence_file
```

The file is saved to the current directory. You get confirmation of this with a statement of the number of persistent entries saved.

8. Type and Enter 0 three times to exit the `lsituil` application.



Caution – You *must* save the persistence table snapshot to external media as you will not be able to reinstall it from a local disk.

Upgrading the NEM to Allow a SAS-2 Compatible Server Blade in the Chassis

This appendix provides information on what is required to allow a server module with a SAS-2 RAID Expansion Module (REM) to function in a Sun Blade 6000 Modular System chassis that has SAS-1 NEMs, or SAS-1 NEMs and a Sun Blade 6000 Disk Module (which is a SAS-1 device).

Note – The easiest way to identify SAS-1 and SAS-2 devices is by the maximum data transfer speeds supported by the device. SAS-1 devices have a maximum data transfer speed of 3 Gb per second. SAS-2 devices have a maximum data transfer speed of 6 Gb per second. Refer to your device documentation for a list of specifications.

Server with a SAS-2 REM Might Hang When Inserted into a Chassis with SAS-1 Devices

If a server module with a SAS-2 REM is inserted into a Sun Blade 6000 Modular System chassis that has SAS-1 NEMs, or SAS-1 NEMs and Sun Blade 6000 Disk Module, the server's SAS-2 REM might hang. To prevent this, you need to upgrade the firmware of your SAS-1 NEMs and Sun Blade 6000 Disk Modules to a firmware version that supports SAS-1/SAS-2 coexistence. **This upgrade must be done before you insert a SAS-2 server blade into the chassis.**

Available SAS-1 NEMs and disk modules that would require this upgrade include Oracle's:

- Sun Blade 6000 Disk Module (B18-AA)
- Sun Blade 6000 Multi-Fabric Network Express Module (X4212A)
- Sun Blade 6000 10GbE Multi-Fabric Network Express Module (X4236A)
- Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module (X4238)

An example of a SAS-2 server module is the Sun Blade X6270 M2. This server includes a SAS-2 REM. Available SAS-2 REMs include:

- Sun Storage 6 Gb SAS REM RAID HBA (SGX-SAS6-R-REM-Z)
- Sun Storage 6 Gb SAS REM HBA (SGX-SAS6-REM-Z)

Refer to your product documentation to find out if your server blade includes a SAS-2 REM.

For detailed instructions on performing the upgrade, refer to the *SAS-1/SAS-2 Compatibility Upgrade Guide for the Sun Blade 6000 Modular System* (821-1800) which can be found in:

<http://docs.sun.com/app/docs/prod/blade.6000mod#hic>

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