# Sun StorEdge™ Traffic Manager 4.4 Software Installation Guide

## For the IBM AIX Operating System

Sun Microsystems, Inc.
www.sun.com

Part No. 817-6273-10
March 2004

Send comments about this document to: docfeedback@sun.com

Please
Recycle

# Contents

# Figures

# Tables

# Preface

The *Sun StorEdge™ Traffic Manager 4.4 Software Installation Guide for the IBM AIX Operating System* provides instructions for installing the Sun StorEdge™ Traffic Manager software on the host.

This guide is designed for use with the documentation that came with your storage device and is written for experienced system administrators of the IBM AIX operating environment and related disk storage systems.

Throughout this guide, *storage device* is used to designate the storage devices supported in this release. The supported devices are:

- Sun StorEdge T3B array
- Sun StorEdge 3510 FC array
- Sun StorEdge 6120 array
- Sun StorEdge 6320 system
- Sun StorEdge 6910/6960 systems
- Sun StorEdge 6920 system
- Sun StorEdge 9900 series

## Before You Read This Guide

Read the documentation that came with your storage device and have an experienced system administrator's knowledge of the supported IBM AIX operating environment in which you are installing the Sun StorEdge™ Traffic Manager software.

# How This Guide Is Organized

This guide is organized as follows:

Chapter 1 provides an overview of the Sun StorEdge™ Traffic Manager software.

Chapter 2 describes how to install and remove the software for the driver.

Chapter 3 contains information about accessing the log files and explains the information contained in them.

Chapter 4 provides troubleshooting information.

Glossary contains a list of words and phrases and their definitions.

# Typographic Conventions

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

# Related Documentation

| Application | Title | Part Number |
|---|---|---|
| Late-breaking information | *Sun StorEdge ™Traffic Manager 4.4 Software Release Notes for IBM AIX, Hewlett-Packard HP-UX, and Microsoft Windows 2000 and 2003 Operating Systems* | 817-6275-10 |
| Using | *Sun StorEdge™ Traffic Manager 4.4 Software User's Guide* | 817-6270-10 |
| SAN documentation | *Sun StorEdge SAN Foundation Configuration Guide* | 817-3672-10 |

# Accessing Sun Documentation Online

You can view, print, or purchase a broad selection of Sun documentation, including localized versions at:

`http://www.sun.com/documentation`

# Contacting Sun Technical Support

If you have technical questions about this product that are not answered in this document, go to:

`http://www.sun.com/service/contacting`

# Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. 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 StorEdge™ Traffic Manager 4.4 Software Installation Guide for the IBM AIX Operating System*, part number 817-6273-10.

CHAPTER 1

# Sun StorEdge™ Traffic Manager Software Overview

This chapter contains the following topics:



## About the Sun StorEdge™ Traffic Manager Software

The Sun StorEdge™ Traffic Manager is a system for managing multiple paths to storage devices. The Sun StorEdge™ Traffic Manager system is comprised of a graphical user interface (GUI) application, a command-line interface (CLI) application, and system device drivers for managing the multiple paths. If a failure occurs in one host data path, the Sun StorEdge™ Traffic Manager software automatically detects the failure and provides continuous access to your data through an alternate data path.

Refer to Chapter 2 of this guide for information about starting the software and to the *Sun StorEdge™ Traffic Manager 4.4 Software User's Guide* for a description of using the GUI and CLI interfaces. From the GUI, the User's Guide can be accessed by clicking on HELP -> User's Guide. The UsersGuide.pdf can also be accessed directly from the usr/SunTrafficManager/docs subdirectory using Adobe Acrobat Reader.

# System Configuration

The Sun StorEdge™ Traffic Manager system maintains and presents storage system configuration information. FIGURE 1-1 shows an example of using the Sun StorEdge™ Traffic Manager GUI application to access the Sun StorEdge™ Traffic Manager system.

In FIGURE 1-1, each storage device and the LUNs associated with it are shown on the left side of the screen and the paths and host bus adapter (HBA) system names are shown on the right.

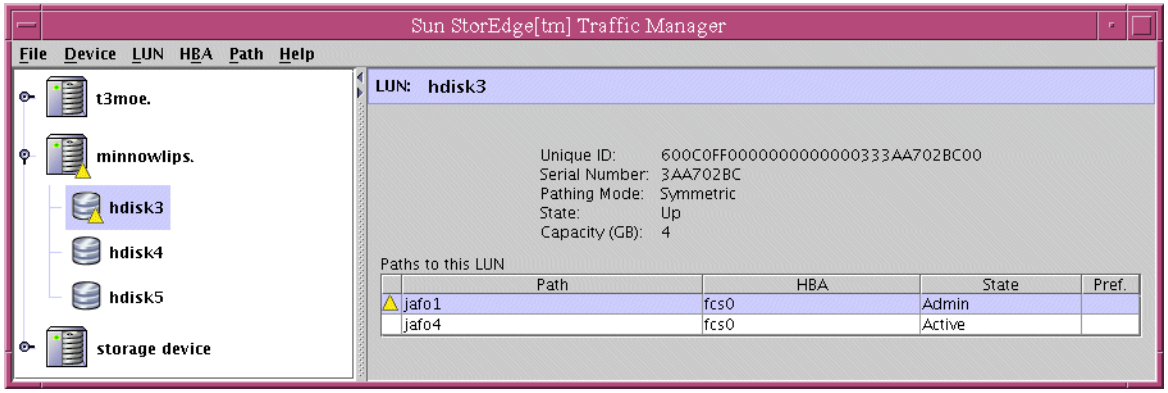


**FIGURE 1-1** Host Data Paths Between HBAs and the Storage Devices

# Asymmetric Device Path Management Description

For Asymmetric devices, the following description of failover and failback operations apply.

## Failover

A LUN on a asymmetric device can only have one active controller at a time. The remaining controller is known as the passive controller. Paths to the active controller are known as active paths. Paths to the passive controller are known as passive paths. The process by which a LUN may force a passive controller to become its active controller is known as LUN failover. Upon successful LUN failover, passive paths to a controller become active and previous active paths become passive. On the Sun StorEdge 6320, Sun StorEdge 39xx, and Sun StorEdge 6120 arrays, failover is

implemented per device volume. Therefore, if volume slicing is enabled, there may be multiple LUNs on the volume affected by a failover. Also in a multi-initiator environment, a LUN failover on one host is detected by all other hosts using LUNs on the same volume.

LUN failover can be initiated by both automatic and manual means.

## Automatic Failover by Error Detection

If a path receives errors and fails, it is marked as Down. If all the active paths for a LUN are marked down and there are remaining passive paths, the driver automatically causes a LUN failover to activate the passive paths.

## Manual Failover Initiated by the User *`activate`* Command

The user may use the `activate` command to manually initiate a LUN failover by activating a passive path. Previously active paths will become passive. If the LUN is a slice on a volume, all LUNs on that volume will failover for all hosts.

## Manual Failover Initiated by User *`restore`* Command

On some devices, a LUN may have a default active controller. This is known as the preferred controller. A `restore` command will attempt to cause a failover of all LUNs that do not currently have active paths to their preferred controller.

## Automatic Failback Initiated by an Automatic Restore

If the driver recognizes that a down path becomes passive, an automatic `restore` command may occur. This is currently known as autofailback. The autofailback parameter must be set to `enabled` in order for this to occur.

---

**Note –** Autofailback is not supported in a multi-initiator environment.

---

To learn how to perform failback, see the *Sun StorEdge™ Traffic Manager 4.4 Software User's Guide*. From the GUI, the User's Guide can be accessed by clicking on HELP -> User's Guide. The UsersGuide.pdf can also be accessed directly from the `/usr/SunTrafficManager/docs` subdirectory using Adobe Acrobat Reader.

## Symmetric Device Path Management Description

All paths to symmetric devices are active unless a path is unhealthy or down. There is no failover or failback, since an unhealthy path is not used. Load balancing occurs across all active paths to improve performance by using all available paths to a storage device.

# Switch Configurations

The Sun StorEdge™ Traffic Manager software also works with storage device configurations that include switches. For information about configuring a storage device with switches, refer to the documentation for the switch you are using.

CHAPTER 2

# Installing, Removing, and Starting the Sun StorEdge™ Traffic Manager Software

This chapter contains the following topics:



## Installing the Software on the IBM AIX Operating System

**Note –** If you have installed a previous version of the driver earlier than version 3.1, you must uninstall it before installing the new version. See "Uninstalling the Software" on page 9.

The installation file is named SunTrafficManager*51*.

**Note –** You should install the Sun StorEdge™ Traffic Manager software before physically attaching the array so the arrays can be discovered by the software.

## Preparing for Installation

Before you install the driver, make sure that you have the correct versions of the hardware and software. For the most-up-to date information, see: `http://www.sun.com/storage/san/multiplatform_support.html`.

Ensure that you have downloaded the valid SSTM 4.4 software binary package from the Sun Download Center (SDLC).

## ▼ Installing the Software From the Command Line

- **Install the Sun StorEdge™ Traffic Manager software file with the CLI on an IBM AIX host. For example:**

```
# installp -acd /directory package
```

Where *directory* is the name of the directory containing the Sun StorEdge™ Traffic Manager package and *package* is one of the package names in TABLE 2-1 that is appropriate for your locale.

**TABLE 2-1** Installation Package Names for Each Locale

| Locale | Package Name |
|---|---|
| English | SunTrafficManager51 |
| Simplified Chinese | SunTrafficManager_ZH51 |
| Japanese | SunTrafficManager_JA51 |
| French | SunTrafficManager_FR51 |
| Korean | SunTrafficManager_KO51 |
| Traditional Chinese | SunTrafficManager_ZHTW51 |

## ▼ Installing the Software Using SMIT

Use the System Management Interface Tool (SMIT) to start the Sun StorEdge™ Traffic Manager software.

1. **Log in as superuser.**

2. **Start SMIT.**

```
# smit
```

The SMIT installation window is displayed.

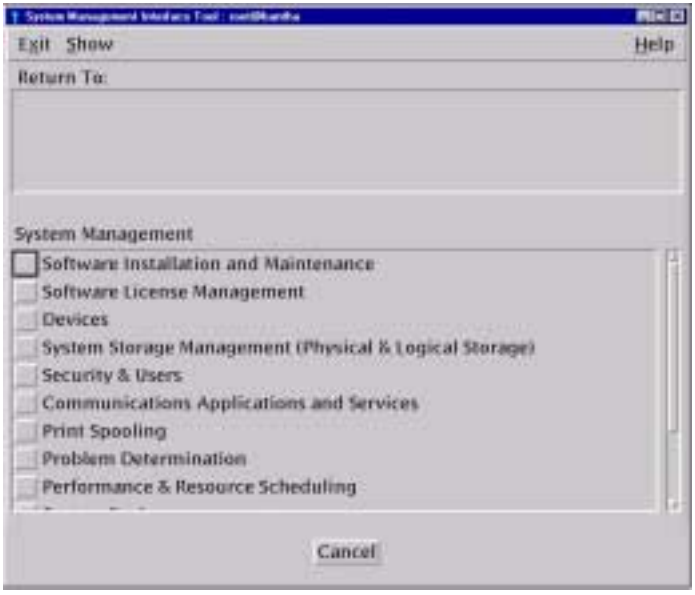


**FIGURE 2-1** SMIT Installation Window for IBM AIX Operating System

3. **Select Software Installation and Maintenance -> Install and Update Software -> Install Software.**

4. **Type the full path to the directory where the installation file is in the "*INPUT device / directory for software" field.**

Click OK to confirm.

5. **Click List next to "*SOFTWARE to install," select the line that starts with** `SunTrafficManager`**, and then click OK.**

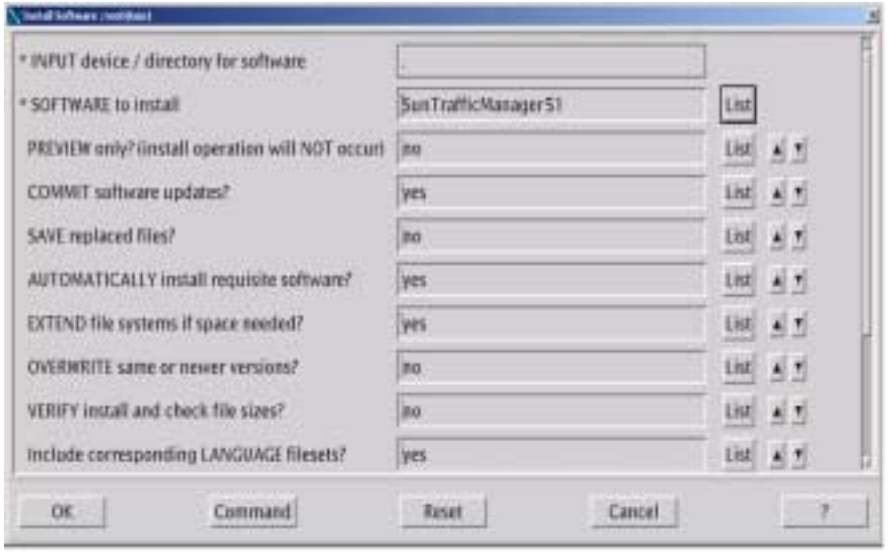


**FIGURE 2-2** SMIT Install and Update Window

6. **Change the rest of the installation settings as needed.**
7. **When you are ready to run the actual installation, set "PREVIEW only" to no and click OK.**

   The system confirms that you want to proceed.
8. **Click OK.**

   The Output section of the Install and Update from LATEST Available Software window shows the status of the installation.
9. **Exit SMIT and see the next section to verify the installation.**

## ▼ Verifying the Installation

1. **As superuser, type:**

```
# lslpp -l | grep SunTrafficManager
```

- If the Sun StorEdge™ Traffic Manager software is installed properly in IBM AIX 5.1.0, a response similar to the following is displayed:

```
SunTrafficManager51.doc 4.4.0.xx COMMITTED Sun Traffic Manager for AIX
SunTrafficManager51.gui 4.4.0.xx COMMITTED Sun Traffic Manager for AIX
SunTrafficManager51.rte 4.4.0.xx COMMITTED Sun Traffic Manager for AIX
SunTrafficManager51.cluster 4.4.0.xx COMMITTED Sun Traffic Manager for AIX
```

2. **Probe the devices on the host and load the Sun StorEdge™ Traffic Manager driver into the kernel if you find supported storage devices:**

```
# cfgmgr
```

**Note –** Install the Sun StorEdge™ Traffic Manager software on the host before physically attaching the storage so the storage can be discovered.

# Uninstalling the Software

If you are upgrading the Sun StorEdge™ Traffic Manager software to another version, remove the older version first. Perform the following steps to uninstall the Sun StorEdge™ Traffic Manager software.

## ▼ Preparing for Removal of the Software From the IBM AIX Platform

1. **Make sure that the operating system is not accessing the storage devices.**

   Know who is using the storage system in your system configuration and whether the storage system is being used.

2. **List all the storage devices to determine which ones are known to the Sun StorEdge™ Traffic Manager software:**

```
# lsdev -Cc disk
```

A response similar to the following is displayed, where `hdisk0` is the IBM AIX system disk:

```
host:/ $ lsdev -Cc disk
hdisk0 Available 10-88-00-8,0 16 Bit LVD SCSI Disk Drive
hdisk1 Available 10-68-01-01  Sun 69xx Storage System FCP Disk Array LUN
hdisk2 Available 10-68-01-01  Sun 69xx Storage System FCP Disk Array LUN
hdisk3 Available 10-68-01-01  Sun 69xx Storage System FCP Disk Array LUN
```

3. **List the volume groups that the disks comprise:**

```
# lspv diskname
```

- Where *diskname* is the name of the disk associated with the Sun StorEdge™ Traffic Manager; for example, *hdisk1.*

4. **List the file systems on the volume groups of the arrays:**

```
# lsvg -l volume_group_name
```

- Where *volume_group_name* is the name of the volume group.

5. **Unmount each of the file systems from the volume groups:**

```
# umount file_system_name
```

- Where *file_system_name* is the name of the file system.

6. **Vary the volume groups off line:**

```
# varyoffvg volume_group_name
```

7. **Remove all storage devices, where *diskname* identifies each storage device to be removed:**

```
# rmdev -dl diskname
```

8. **List all of the array paths:**

```
# lsdev -Cc jafo
```

9. **Remove all the paths.**

   Path deletion might fail if you try to delete the current path and there is a redundant path. Repeat Step 8 and Step 9 until all paths are deleted:

```
# rmdev -dl pathname
```

Refer to your operating system documentation for more information about these functions.

**Caution –** Do not use the arrays in a partner group configuration with two HBAs without the Sun StorEdge™ Traffic Manager driver installed. Uninstalling the driver causes the operating system to see two paths to each LUN, which can result in data corruption.

## ▼ Uninstalling the Software From the Command Line

To uninstall the Sun StorEdge™ Traffic Manager software:

1. **Log in as superuser.**
2. **Type the following command:**

```
# installp -u package
```

Where *package* is the appropriate name specified in TABLE 2-1.

## ▼ Uninstalling the Software Using SMIT

1. **Log in as superuser.**
2. **Start SMIT.**

```
# smit
```

3. **Select Software Installation and Maintenance -> Software Maintenance and Utilities -> Remove Installed Software.**
4. **Remove all dependents for the software.**

   All pieces of the Sun StorEdge™ Traffic Manager software package must be selected to completely remove the driver.
5. **Change the rest of the settings as needed.**
6. **When you are ready to run the actual removal, set "PREVIEW only" to "no" and then click OK.**

   The system confirms that you want to proceed.
7. **Click OK.**

# Starting the Sun StorEdge™ Traffic Manager Application Software

This section describes how to start the Sun StorEdge™ Traffic Manager application software. It contains the topic:

## Starting the Sun StorEdge™ Traffic Manager Application Software GUI

To start the Sun StorEdge™ Traffic Manager application software GUI in IBM AIX, open a terminal window and type the following:

```
# trafficmgr
```

The Sun StorEdge™ Traffic Manager GUI is displayed.

To get information about using the Sun StorEdge™ Traffic Manager GUI, click Help and select User's Guide from the pull-down menu.

## ▼ Starting the Sun StorEdge™ Traffic Manager Application Software CLI

Entering the `sstm` command with any option on the command line starts the Sun StorEdge™ Traffic Manager application software CLI if you are in the `sstm` directory or the `sstm` directory is in your path.

To start the Sun StorEdge™ Traffic Manager CLI:

1. **Open a terminal window and log in as superuser.**
2. **Type the following command from anywhere:**

```
# sstm
```

The Sun StorEdge™ Traffic Manager command line interface is displayed.

To get a full list of available CLI options, type `sstm -?`.

The Sun StorEdge™ Traffic 4.4 Software User's Guide is loaded in the Sun StorEdge Traffic Manager directory when Sun StorEdge Traffic Manager software is installed. For information about the Sun StorEdge™ Traffic Manager software, use Adobe Acrobat Reader to open the UsersGuide.PDF file found at `/usr/SunTrafficManager/docs`.

CHAPTER 3

# Log File Information

This chapter describes the log files for the IBM AIX operating environment and the log levels logged in the system log file. See the Sun StorEdge™ Traffic Manager 4.4 User's Guide for a description of setting the log levels.

Topics in this section include:



## Listing IBM AIX Error Log Entries for Sun StorEdge™ Traffic Manager

The logging messages for IBM AIX have log IDs based on message length. To get a template listing of AIX error log IDs for Sun StorEdge™ Traffic Manager software, use the `errpt` command of AIX. For example:

```
> errpt -tJ "JAFO_LOG*"

319A03A2JAFO_LOG_INFO_128 INFO H Log entry
8B515DE8JAFO_LOG_INFO_64 INFO H Log entry
B4284724JAFO_LOG_INFO_MAX INFO H Log entry
F2E7E2BFJAFO_LOG_INFO_512 INFO H Log entry
```

To get a detailed listing of only Sun StorEdge™ Traffic Manager software-related error messages, use the AIX `errpt` command specifying to report only labels like `JAFO_LOG`. For example:

```
> errpt -aJ “JAFO_LOG*”

LABEL:      JAFO_LOG_INFO_256
IDENTIFIER:   F2272237

Date/Time:    Thu Oct 9 12:18:42 CDT
Sequence Number: 987696
Machine Id:   000228BF4C00
Node Id:     aix2
Class:      H
Type:       INFO
Resource Name:  jafo9
Resource Class: jafo
Resource Type:  t300
Location:    27-08-01

Description
Log entry

Probable Causes
none

Failure Causes
none

    Recommended Actions
    none

Detail Data

JAFO: Path state changed. DOWN-> ACTIVE Path: jafo9 LUN: hdisk2
Reason:IO status SC_GOOD_STATUS
08000001010000000000000000
000000000 1 1 0
```

# Accessing the Log Files

## Accessing the Log Files for the IBM AIX Platform

The log files are contained in the following binary file:

```
/var/adm/ras/errlog
```

Use the errpt command to view the contents of the log file. For example, to view only Sun StorEdge™ Traffic Manager related messages, type:

```
errpt -aJ “JAFO_LOG*”
```

# Log Level

This section describes the various log messages at the various logging levels as configured by the GUI or CLI. See the Sun StorEdge™ Traffic Manager 4.4 Software User’s Guide for a description of setting the logging level for all devices attached to the current host. The Sun StorEdge™ Traffic Manager 4.4 Software User’s Guide is displayed by selecting `Help` from the Sun StorEdge™ Traffic Manager window and selecting `User’s Guide` from the drop down list.

You can configure the following logging levels:

- Informational messages - These include all critical error messages as well as non-critical alerts. Non-critical alerts are usually when something has changed but no functionality is lost.
- Data path change messages - changes to the state of a host data path.
- Critical error messages - Unrecoverable errors, such as when the Sun StorEdge™ Traffic Manager software loses access to a LUN or is out of memory.
- Caution and internal error messages - Errors the Sun StorEdge™ Traffic Manager software encounters but does not handle.

If logging level Data Path Changes is not set, data path change messages are not shown.

If logging levels Data Path Changes and Critical Error messages are set, only critical information is shown.

If logging levels Data Path Changes and Internal Errors are set, only non-critical information is shown.

**TABLE 3-1** Log Informational Messages

| Message | Message Explanation | Information in the Message |
|---|---|---|
| Driver loaded. | The operating system has loaded the SunTrafficManager driver. | • Major version<br>• Minor version<br>• Point version<br>• Release version |

**TABLE 3-2** Log Data Path Changes and Log Critical Errors

| Message | Message Explanation | Information in the Message |
|---|---|---|
| Path state change. | This message is logged when the state of any path changes for critical reasons. | 1. Old state and new state. Valid values are:<br>• Active<br>• Passive<br>• Down<br>2. Path name<br>3. Unique LUN ID<br>4. Reason string, valid values are:<br>• I/O status—state change as a result of I/O status. There will also be detail data consisting of operating system specific SCSI status.<br>• User initiated—state change as a result of user initiated action, for example, activate or disable<br>• AutoFailback initiated—state change as a result of auto failback action<br>• Failover initiated—state change due to the need for passive to active action |

**TABLE 3-3** Critical Log Messages

| Message | Message Explanation | Information in the Message |
|---|---|---|
| Failover command sent to: | This message is logged when the state of any path changes for critical reasons and the logging levels Log Data Path Changes is set in addition to Log Critical Error. | 1. Path name on which the failover command was sent<br>2. Unique LUN ID<br>3. Unique array ID<br>4. Controller ID<br>5. Reason string, valid values are:<br>• User initiated—failover command sent as a result of user initiated action. For example, activate or disable.<br>• AutoFailBack initiated—failover command sent as a result of auto restore failback action<br>• Failover initiated—failover command sent due to the need for passive to active action |

**TABLE 3-4** Log Data Path Changes and Log Internal Errors

| Message | Message Explanation | Information in the Message |
|---|---|---|
| Path state changed to: | This message is logged when the state of any path changes for critical or non-critical reasons and the logging levels Log Data Path Changes and Log Internal Errors are set. | 1. Old state and new state. Valid values are:<br>• Unknown<br>• Active<br>• Passive<br>• Transition<br>• Down<br>• Admin<br>• Removed<br>2. Path name<br>3. Unique LUN ID<br>4. Reason string, valid values are:<br>• IO status—state change as a result of I/O status. There will also be detail data consisting of operating system specific SCSI status.<br>• Device added—state change as a result of a new path<br>• Device removed—state change as a result of a path removed<br>• User initiated—state change as a result of a user initiated action. For example, activate or disable.<br>• AutoFailBack initiated—state change as a result of auto failback action<br>• Failover initiated—state change due to a need for passive to active action |

**TABLE 3-5** Log Internal Messages

| Message | Message Explanation | Information in the Message |
|---|---|---|
| LUN state changed. | This message is logged when any noncritical LUN state changes occur. | 1. Old LUN state and new LUN state. Valid values are:<br>• Unknown<br>• Up<br>• Transition<br>• Down_Grace<br>• Down<br>• Removed<br>2. LUN unique ID |

CHAPTER 4

# Troubleshooting

TABLE 4-1 provides Sun StorEdge™ Traffic Manager troubleshooting information in the IBM AIX operating system.

**TABLE 4-1** Troubleshooting Tips for the Sun StorEdge™ Traffic Manager Software

| Problem | Solution |
|---|---|
| You want to use the command-line interface. | From a terminal session, type sstm to start the Sun StorEdge™ Traffic Manager CLI utility. |
| The physical connection between the host and array(s) is correct, but the host still does not see the array devices. | Check the Event Viewer. Look for messages logged by the driver named `Jafo`. |

# Glossary

| | |
|---|---|
| **active path** | A path that is healthy and ready for I/O. |
| **array** | A Sun StorEdge array that contains an internal RAID controller and disk drives with Fibre Channel connectivity to the data host. |
| **failback** | The process of making a LUN's preferred controller the active controller. Also known as restore. |
| **failover** | The process of sending a failover command down a passive path to change the active controller for a LUN. |
| **host bus adapter (HBA)** | A controller board that connects the host computer bus and the FC-AL that manages the transfer of information between the two channels. |
| **logical unit number (LUN)** | A piece of logical storage presented by the device to the host. |
| **passive path** | For an asymmetric device, a path to a passive controller. Can be made active by sending a failover command. |
| **preferred controller** | On an asymmetric device, the default active controller for a LUN. |
| **restore** | The process of making a LUN's preferred controller the active controller. Also known as failback. |
| **volume** | One or more drives configured into a RAID group. May be sliced into smaller LUNs to be presented to the host. |
| **worldwide name (WWN)** | Unique number assigned to each device on a Fibre Channel loop. |

# Index

## M



## N



## P



## R



## S



## T



## U



## V