



Sun StorEdge™ Traffic Manager 3.1 Software Installation Guide

For Microsoft Windows NT
Microsoft Windows 2000
Microsoft Windows 2003
Operating Systems

Sun Microsystems, Inc.
www.sun.com

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Preface

The *Sun StorEdge Traffic Manager 3.1 Software Installation Guide for Microsoft Windows2003, Microsoft Windows 2000, and Microsoft Windows NT* provides instructions for installing, starting and uninstalling the Sun StorEdge™ Product Name software in Microsoft Windows 2003, 2000, and NT operating environments.

This guide is designed for use with the *Sun StorEdge Traffic Manager 3.1 Software User's Guide* and the *documentation that came with your storage device* and is written for experienced system administrators of the Microsoft Windows NT Service Pack 6a, 2000 Service Pack 4, and 2003 operating environment and related disk storage systems.

The *Sun StorEdge Traffic Manager 3.1 Software User's Guide* can be obtained by clicking Help on any Sun StorEdge Traffic Manager screen and selecting *User's Guide*.

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

- Sun StorEdge 6020 array with 2.1x Firmware Asymmetric Explicit LUN Failover (ELF)
- Sun StorEdge 39xx Asymmetric ELF
- Sun StorEdge 6910 and 6960 Symmetric
- Sun StorEdge 6120 array Asymmetric ELF
- Sun StorEdge 6320 System Asymmetric ELP
- Sun StorEdge 3510 FC array Symmetric
- Sun StorEdge 99xx Symmetric only

Before You Read This Guide

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

How This Guide Is Organized

This manual is organized as follows:

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

Chapter 2 describes how to install, uninstall, and start the software for the driver.

Chapter 3 describes how to access log files and describes their contents.

Chapter 4 provides troubleshooting information.

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

Typographic Conventions

TABLE P-1

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	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.
	Command-line variable; replace with a real name or value	To delete a file, type <code>rm filename</code> .

Related Documentation

TABLE P-2

Application	Title	Part Number
Late-breaking information	<i>Sun StorEdge Traffic Manager 3.1 Software Release Notes for IBM AIX, Hewlett-Packard HP-UX, and Microsoft Windows 2003, 2000, and NT Operating Systems</i>	817-4687-10
Using	Sun StorEdge Traffic Manager 3.1 Software User's Guide	817-3678
SAN configuration	Sun StorEdge SAN foundation Configuration Guide	817-0057-10

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Sun StorEdge Traffic Manager 3.1 Software Installation Guide for Microsoft Windows NT, Microsoft Windows 2000, and Microsoft Windows 2003 Operating Systems, part number 817-3681-10

Sun StorEdge Traffic Manager Software Overview

This chapter contains the following topics:

- “About the Sun StorEdge Traffic Manager Software” on page 1
- “Hub and Switch Configurations” on page 4

About the Sun StorEdge Traffic Manager Software

The Sun StorEdge Traffic Manager software 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 *Sun StorEdge Traffic Manager 3.1 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. From the CLI, the User's Guide.pdf can be accessed directly.

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 adapters (HBA) system names are shown on the right.

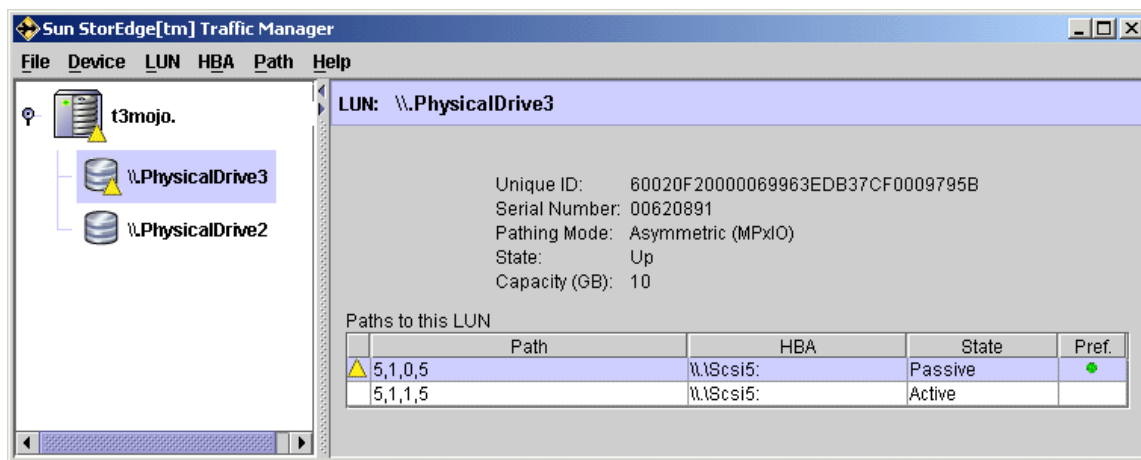


FIGURE 1-1 Host Data Paths Between HBAs and Storage Device Arrays

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 T3 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 or Removed. 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-host environment.

To learn how to perform failback, see the *Sun StorEdge Traffic Manager 3.1 Software User's Guide*. From the GUI, the User's Guide can be accessed by clicking on HELP - > User's Guide. From the CLI, use Adobe Acrobat Reader to access the User's Guide.pdf directly from the `/opt/SunTrafficManager/docs` subdirectory.

Symmetric Device Path Management Description

For Symmetric devices, all paths are active unless a path is unhealthy and in which case, it is down. There is no failover or failback, an unhealthy path is just not used. Load balancing occurs across all active paths to improve performance by using all available paths to a storage device.

Hub and Switch Configurations

The Sun StorEdge Traffic Manager software works with storage device configurations that include hubs and switches. For a list of compatible hubs, see the URL in “Preparing for Installation” on page 5.

For information about configuring the storage devices with switches, refer to the documentation for the switch you are using.

Installing, Removing, and Starting the Sun StorEdge Traffic Manager and Service Manager Software

This chapter contains the following topics:

- “Preparing for Installation” on page 5
- “Loading the Software” on page 6
- “Installing the Software” on page 6
- “Removing the Software” on page 7
- “Starting the Sun StorEdge Traffic Application Manager Software” on page 8

Installing the Software on the Windows Operating System

The following sections describe how to prepare for installing the software, loading the software, and installing the software.

Preparing for Installation

Before you install the driver, ensure 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.

Version 3.1 of the Sun StorEdge Traffic Manager software supports all storage devices that are supported and their corresponding LUNs that are visible to the host system. It also supports all information about all paths for the corresponding LUNs.

Loading the Software

The installation file is `SunTrafficManager_V3.1.xxx.exe` (where `xxx` is the build version number) on the CD for Microsoft Windows 2003, 2000, or NT operating systems.

Note – When the Sun StorEdge Traffic Manager software is installed, the Java™ Runtime Environment (JRE) version 1.4.2 installs automatically. This installation does not affect any JREs already installed on your computer.

Note – When StorEdge Traffic Manager 3.1 is launched from a network location (network drive), and if you agree to install Java™ Runtime Environment (JRE) version 1.4.2, the system may reboot at the end of the JRE installation. When the system comes back up, the Sun StorEdge Traffic Manager 3.1 installation will not continue automatically and has to be restarted by double clicking on the executable.

Note – If you have installed a previous version of the Sun StorEdge Traffic Manager software, you must remove it before installing the new version. See “Removing the Software” on page 7.

▼ Installing the Software

1. **Double click on the file** `SunTrafficManager_V3.1.xxx.exe` **on the CD.**

The Sun StorEdge Traffic Manager software InstallShield Wizard is displayed.

2. **Follow the prompts in the dialog boxes to complete the installation.**

In the Customer Installation dialog box, you are prompted to enter a serial number. The serial number is on the License Card you received with the CD.

An invalid serial number causes the installation to abort with the following error message:

```
Serial Number entered is NOT valid! Aborting the installation . .
```

3. **Reboot your computer.**

Note – You must reboot your computer before you can use the Sun StorEdge Traffic Manager software. Read the `readme.txt` file in the installation directory for late-breaking information about the software.

4. In Microsoft Windows 2003 and 2000 operating systems, you will get a warning message that the driver is not digitally certified by Microsoft. Click YES on this dialog box and continue the installation of the driver.

The Sun StorEdge Traffic Manager 3.1 software is not certified by Microsoft Windows Hardware Qualification Labs (WHQL) and that is the reason for the warning message. The dialog box is shown in FIGURE 2-1.



FIGURE 2-1 Windows Hardware Qualification Labs Warning

5. The Sun StorEdge Traffic Manager is installed.

Removing the Software



Caution – If you do not shut down the Sun StorEdge arrays before you remove the software, removing the Sun StorEdge Traffic Manager software causes the operating system to see two paths to each LUN, which can result in data corruption.

▼ Removing the Software

1. You *must* shut down the Sun StorEdge array and you must reboot the system after the software is removed and before the new version is installed.
2. Use the Microsoft Windows 2003, 2000, or NT Add/Remove program to remove the Sun StorEdge Traffic Manager software.
3. Double-click Sun StorEdge Traffic Manager package to start the wizard.
Follow the prompts.
4. Reboot your computer.

You must reboot the computer after the Sun StorEdge Traffic Manager software is removed.

Starting the Sun StorEdge Traffic Application Manager Software

This section describes how to start the Sun StorEdge Traffic Manager application software from the GUI or the CLI.

▼ Starting the Sun StorEdge Traffic Manager Application Software GUI

- Choose Start -> Programs -> Sun StorEdge Traffic Manager -> Traffic Manager.

The Sun StorEdge Traffic Manager software GUI window is displayed.

The Sun StorEdge Traffic Manager multipathing driver is started automatically at system boot or when supported devices are recognized.

To use the Sun StorEdge Traffic Manager software, click Help on the Sun StorEdge Traffic Manager window and select User's Guide from the pull-down menu. The User's Guide is a PDF file accessible by Adobe Acrobat Reader.

Starting the Sun StorEdge Traffic Manager Application Software CLI

Typing 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` folder or the `sstm` folder is in your path. For example:

```
c:>sstm
```

If you are not in the `sstm` folder or the folder is not in your path, the complete command is:

```
c:>Program Files/Sun Microsystems StorEdge Traffic Manager/sstm
```

The Sun StorEdge Traffic Manager multipathing driver is started automatically at system boot or when supported devices are recognized.

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

For information about the Sun StorEdge Traffic Manager software, go to `User's Guide.pdf` in the directory to display the user's guide. Use Adobe Acrobat Reader to open the `User's Guide.PDF` file found at `/opt/SunTrafficManager/docs`.

Log File Information

This chapter describes the log files and log levels logged in the system log file for Microsoft Windows operating systems.

Topics in this section include:

- “General Log Messages” on page 11
- “Accessing the Log files” on page 13

General Log Messages

There are three general log messages that Sun StorEdge Traffic Manager writes to the system log file. The general messages and an explanation of the variable fields are:

- JAFO: Driver Loaded. Major version: *%VERSION* Minor version: *%VERSION* Point version: *%VERSION* Release version: *%VERSION*.
- JAFO: Path state changed. Lun: *%LUN_NAME* Path: *%PATH_NAME* - Old State: *%PATH_STATE* New State: *%PATH_STATE* Reason: *%REASON*.
- JAFO: Lun state changed. Lun: *%LUN_NAME* - Old State: *%LUN_STATE* New State: *%LUN_STATE*.

Variable Field Descriptions

The variable fields in the general log message are described in TABLE 3-1.

TABLE 3-1 Description of the General Log Messages Variable Fields

Variable Field	Description
LUN_NAME	Replaced with \\.\PhysicalDisk#
LUN_STATE	Replaced with one of the following states: <ul style="list-style-type: none"> • WAITING_FOR_ACTIVE_PATH • DOWN • DOWN_GRACE • UP • TRANSITIONING
PATH_NAME	Replaced with #, #, #, #
PATH_STATE	Replaced with one of the following states: <ul style="list-style-type: none"> • ADMIN • DOWN • REMOVED • TRANSITIONING • UP_ACTIVE • UP_PASSIVE
REASON	Replaced with one of the following: (NOTE: Reason codes are primarily for the expert user and support.) <ul style="list-style-type: none"> • init—New path addition • recovered—Path returning from a removed state • io failure—I/O error. This reason is not exposed to upper-level drivers. It is routed down available paths when possible. • IRP_MN_SURPRISE_REMOVAL—A lower-level driver removed the path check. A state occurred that caused the driver to determine this path might be in a state of TRANSITIONING. • failover:success—Asymmetric device failover was successful • failover:failure—Asymmetric device failover failed • #_#_#_# -%NTSTATUS, %SRB_STATUS, %SCSISTAT—are Microsoft Windows I/O status and can be looked up at http://msdn.microsoft.com. • #_#_#_# same as the preceding bullet except the fourth and fifth values are SCSI and ASC/ASCQ and can be looked up at http://www.t10.org.

The Sun StorEdge Traffic Manager software settings for logging level using the command line interface or graphical user interface effects the messaging in TABLE 3-1. The logging levels that effect Microsoft Windows are Internal, Critical, and Path status changes. When internal logging is enabled, state changes ending in Transitioning will occur.

- Internal error messages normally end in a state of TRANSITIONING, UNKNOWN, or LUN_HARDWARE_ERROR
- Critical error messages normally end in a state of DOWN or REMOVED

- Path change messages normally end in a state of UP_ACTIVE, UP_STANDBY or ADMIN.

Accessing the Log files

There are three kinds of logs on Microsoft Windows 2000, NT and 2003. Events are logged in the system log with a source of `jafo` for Microsoft Windows 2000 and Microsoft Windows 2003, and a source of `jafont` for Microsoft Windows NT.

▼ Accessing the Log Files for Microsoft Windows 2000 or 2003

1. **Click Start -> Settings -> Control Panel.**
The Control Panel opens.
2. **In the Control Panel, double-click Administrative Tools -> Event Viewer.**

▼ Accessing the Log Files for Microsoft Windows NT

- **Click Start -> Programs -> Administrative Tools (Common) -> Event Viewer.**

Troubleshooting

TABLE 4-1 provides Microsoft Windows 2003, Microsoft Windows 2000, and Microsoft Windows NT operating systems troubleshooting information.

TABLE 4-1 Troubleshooting Tips for Microsoft Windows 2003, 2000, and NT

Problem	Solution
The host cannot see the storage devices. If you are running the Sun StorEdge Traffic Manager software, the following message is displayed <code>No failover devices found</code> . No array icons appear in the window.	Check all cabling. If the physical connection is correct, the lights on the back of the Fibre Channel adapter are Green On, Yellow Blinking.
The physical connection between the host and storage device(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 <code>jaf0</code> for Microsoft Windows 2000 and Microsoft Windows 2003, and <code>jafont</code> for Microsoft Windows NT.
The Sun StorEdge Traffic Manager software graphical user interface does not start.	If previous versions of the software exist on the host, remove all the installed versions and then reinstall the new one.

TABLE 4-1 Troubleshooting Tips for Microsoft Windows 2003, 2000, and NT *(Continued)*

Problem	Solution
The storage device partner pairs are connected to the device, but the Sun StorEdge Traffic Manager software does not display them.	Set the <code>mp_support</code> parameter from none to <code>MpxIO</code> . At the Telnet interface to the storage device array, type: <code>sys mp_support MpxIO</code>
Microsoft Windows 2003, 2000, or NT fails to boot.	The BIOS might be looking for a bootable image on the storage device array, and the array does not have one. Disable the BIOS on the host bus adapter during the boot sequence. Press Alt-Q This action is Qlogic specific. In the HBA setup, select the host bus adapter and make sure BIOS is disabled in the HBA configuration menu.
You used to see all the existing LUNs on both storage device arrays in a partner pair over a single active path. Now you see two active paths for each storage device array and each array's LUNs are only visible on its own path. You no longer see all the LUNs on a single path.	Set the <code>mp_support</code> parameter from none to <code>MpxIO</code> . At the Telnet interface to the storage device array, type: <code>sys mp_support MpxIO</code>

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.

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