



# Sun Multipath Failover Driver 1.0 for AIX User's Guide

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Part No. 806-7767-10  
February 2001, [Revision 01](#)

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# Preface

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The *Sun Multipath Failover Driver 1.0 for AIX User's Guide* provides instructions for installing and using the Sun Multipath Failover Driver software.

This guide is designed for use with the *Sun StorEdge T3 Disk Tray Installation, Operation, and Service Manual* and is written for experienced system administrators of the AIX operating environment and related disk storage systems.

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## Before You Read This Book

Read the *Sun StorEdge T3 Disk Tray Installation, Operation, and Service Manual* to install and operate the Sun StorEdge™ T3 array.

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## How This Book Is Organized

This manual is organized as follows:

Chapter 1 provides an overview of the Sun Multipath Failover Driver.

Chapter 2 describes how to install and uninstall the driver.

Chapter 3 describes how to access and use the driver console.

Chapter 4 describes how to configure the driver's options.

Chapter 5 describes how to use the driver to change and restore the host data path.

Chapter 6 provides troubleshooting information.  
Glossary is a list of words and phrases and their definitions.

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## Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your .login file. Use <code>ls -a</code> to list all files. % You have mail.
<b>AaBbCc123</b>	What you type, when contrasted with on-screen computer output	% <b>su</b> 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> .

---

## Shell Prompts

Shell	Prompt
C shell	<i>machine_name%</i>
C shell superuser	<i>machine_name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

---

## Related Documentation

<b>Application</b>	<b>Title</b>	<b>Part Number</b>
Late-breaking Information	readme file in the installation directory (/usr/lpp/hiav/hiav_gui)	N/A
Installation and Service	<i>Sun StorEdge T3 Disk Tray Installation, Operation, and Service Manual</i>	806-1062
Release Notes	<i>Sun StorEdge T3 Disk Tray Release Notes</i>	806-1497
System Administration	<i>Sun StorEdge T3 Disk Tray Administrator's Guide</i>	806-1063
Component Manager Installation	<i>Sun StorEdge Component Manager Installation Guide</i>	806-1576
Component Manager User's Guide	<i>Sun StorEdge Component Manager User's Guide</i>	806-1579
Component Manager Release Notes	<i>Sun StorEdge Component Manager Release Notes</i>	806-1580

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# Sun Multipath Failover Driver Overview

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This chapter contains the following topics:

- “Driver Description” on page 1
- “Driver Console” on page 3

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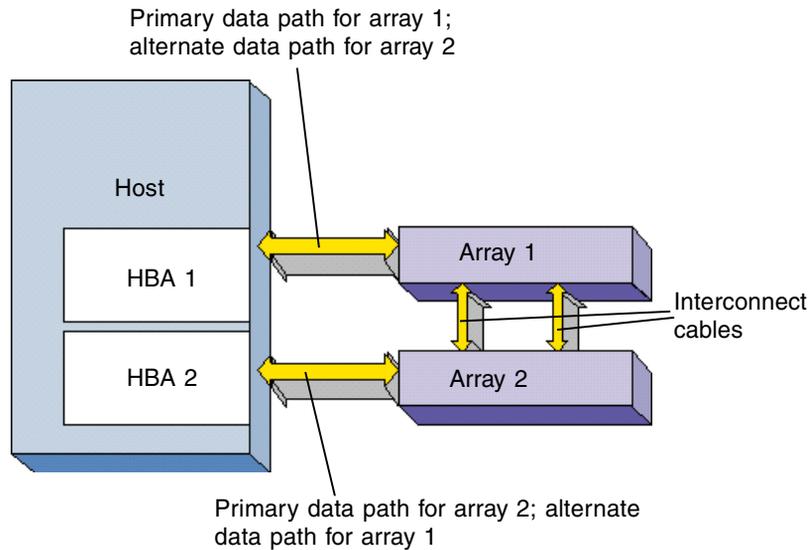
## Driver Description

The Sun Multipath Failover Driver provides the ability to both automatically and manually transfer I/O from one host data path to another on your Sun StorEdge™ T3 array. If a failure occurs in one host data path, the driver automatically detects the failure and provides continuous access to your data.

The driver requires that you have two arrays configured as a partner group with two host bus adapters (HBAs) connected (as shown in FIGURE 1-1), providing controller and data path redundancy. Refer to the *Sun StorEdge T3 Disk Tray Installation, Operation, and Service Manual* for information about configuring a partner group and enabling multipathing support.

Each array can have up to two logical unit numbers (LUNs), also known as volumes. For more information about LUNs and how to configure them, refer to the *Sun StorEdge T3 Disk Tray Installation, Operation, and Service Manual* and the *Sun StorEdge T3 Disk Tray Administrator's Guide*.

When properly configured, each array in the partner group has two host data paths: primary and alternate. FIGURE 1-1 shows a typical partner group configuration and identifies the primary and alternate data paths for each array.



**FIGURE 1-1** Sun StorEdge T3 Array Partner Group

The interconnect cables connect multiple arrays. The two arrays regularly exchange status and other information using these connections.

If the primary data path to one array fails for any reason, the driver transfers all I/O from the failed data path to the alternate data path, making sure that no data is lost. This process is called *failover*. When the primary host data path becomes operational again, the driver can automatically transfer I/O back to the primary path. This process is called *failback*. For information about enabling automatic failback, see “Enabling and Disabling Auto Failback” on page 15.

The failure of any component in the host data path (HBA, cables, RAID controller, or the whole array) will cause a failover.

You can also manually transfer the I/O for each LUN from the primary path to the alternate path and back again using the driver console.

---

# Driver Console

The driver console window provides a graphical user interface (GUI) to configure the driver, check array status, and manually cause a failover or failback. For information about accessing the console, see Chapter 3.



## Installing the Driver

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This chapter contains the following topics:

- “Preparing for Installation” on page 5
  - “Installing the Driver” on page 6
  - “Uninstalling the Driver” on page 8
- 

## Preparing for Installation

Before you install the driver, you must make sure that you have the correct versions of the following hardware and software.

**TABLE 2-1** Required Hardware and Software

Component	Version
Operating system	AIX version 4.3.3
HBA (two required)	IBM FC#6227 <ul style="list-style-type: none"> <li>• Driver devices.pci.df1000f7.rte version 4.3.3.25</li> <li>• Firmware version SF320.A9</li> </ul>
Sun StorEdge T3 array	Firmware 1.14 or later
Component Manager Workstation	Ultra 60 or higher on Solaris™
Java™ Runtime Environment (JRE)	Version 1.3 (download from <a href="http://www.ibm.com">www.ibm.com</a> )

Version 1.0 of the Sun Multipath Failover Driver only supports direct connections between the host and arrays. It does not support connections using Fibre Channel hubs or switches.

---

# Installing the Driver

After you download the installation file for AIX (hiav.obj.1.0.0.xx) from the Sun Web site, you are ready to install the driver. You can use either the graphical user interface (GUI) or command line version of the System Management Interface Tool (SMIT) for the installation. The steps that follow use the GUI version.

To install the driver:

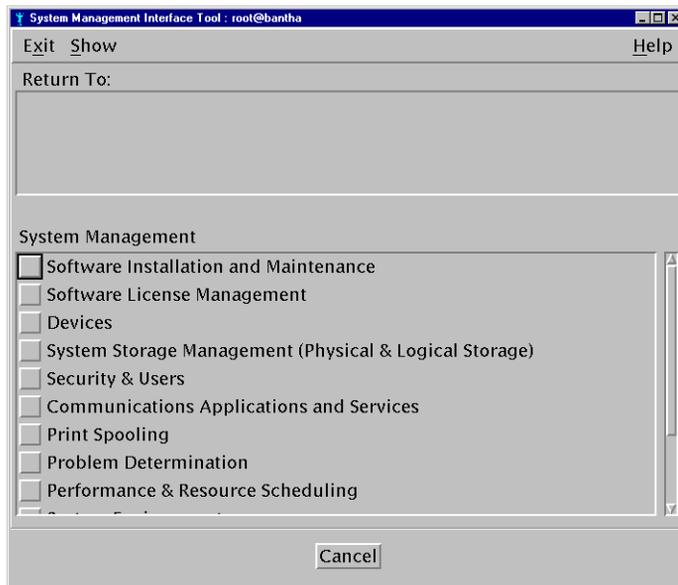
1. **Log in as root.**
2. **Delete the .toc file from the directory where the installation file is.**

```
# rm -f .toc
```

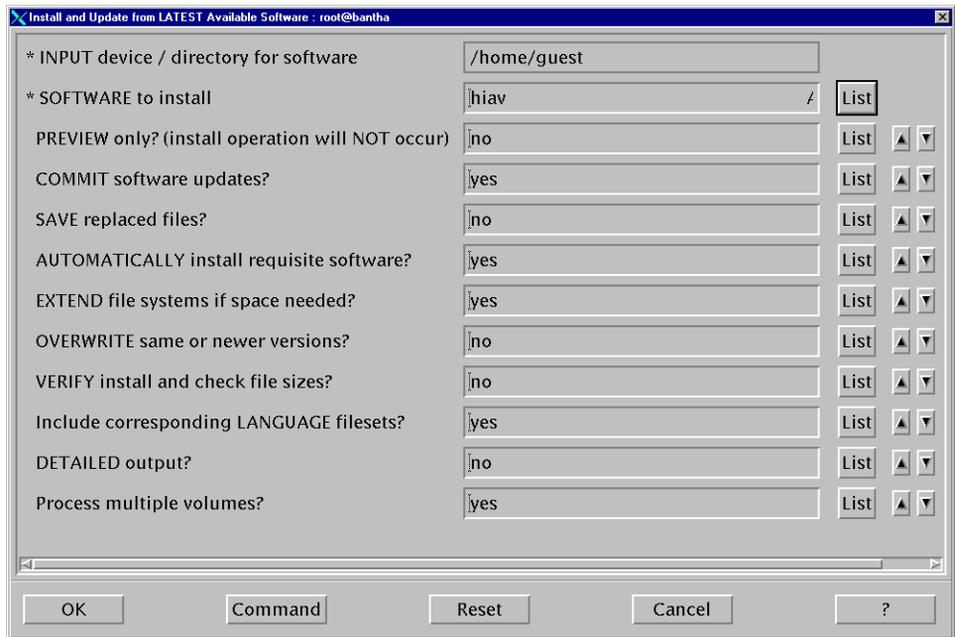
If a .toc file exists in the directory, deleting it avoids any conflicts with old .toc information.

3. **Start SMIT.**

```
# smit
```



4. Click Software Installation and Maintenance.
5. Click Install and Update Software.
6. Click Install and Update from LATEST Available Software.
7. Type the full path to the directory where the installation file is in the “\*INPUT device / directory for software” field.
8. Click OK.
9. Click List next to “\*SOFTWARE to install.”
10. Select the line that starts with “hiav.”
11. Click OK.



12. Change the installation settings as needed.  
When you are ready to run the actual installation, be sure to set “PREVIEW only” to no.
13. Click OK.  
The system confirms that you want to proceed.

#### 14. Click OK.

The Output section of the Install and Update from LATEST Available Software window shows the status of the installation. Read the readme file in the installation directory (`/usr/lpp/hiav/hiav_gui`) for late-breaking information about the driver.

## Verifying the Installation

You can verify that the installation was successful.

To verify the installation:

- Use the `lslpp` command.

```
# lslpp -l | grep hiav
```

If the driver is installed properly, a response similar to the following displays:

```
hiav.obj 1.0.0.xx COMMITTED T3 High Availability Disk
```

---

## Uninstalling the Driver

Before you uninstall the driver, you must:

- Make sure that the operating system is not accessing the arrays
- Unmount the file system on each array
- Vary off the volume group from each array

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

---

**Caution** – You should not use the arrays in a partner group configuration with two HBAs without the driver installed. Uninstalling the driver will cause the operating system to see two paths to each LUN, which may result in data corruption.

---

You uninstall the driver the same way you uninstall most AIX software. You can use either the GUI or command line version of SMIT to uninstall the driver. The steps that follow use the GUI version.

To uninstall the driver:

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

```
# smit
```

3. **Click Software Installation and Maintenance.**
4. **Click Software Maintenance and Utilities.**
5. **Click Remove Installed Software.**
6. **Click List next to “\*SOFTWARE name.”**
7. **Select the line that starts with “hiav.”**
8. **Click OK.**
9. **Change the uninstallation settings as needed.**

When you are ready to run the actual installation, be sure to set “PREVIEW only” to no.

10. **Click OK.**

The system confirms that you want to proceed.

11. **Click OK.**

The Output section of the Remove Installed Software window shows the status of the uninstallation.



## Working with the Driver Console

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This chapter contains the following topics:

- “Accessing the Driver Console” on page 11
- “Understanding the Console Window” on page 12

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### Accessing the Driver Console

You use the console to configure the driver, check array status, and manually cause a failover or failback.

To access the console:

1. **Change to the directory where the console files are installed.**

```
# cd /usr/lpp/hiav/hiav_gui
```

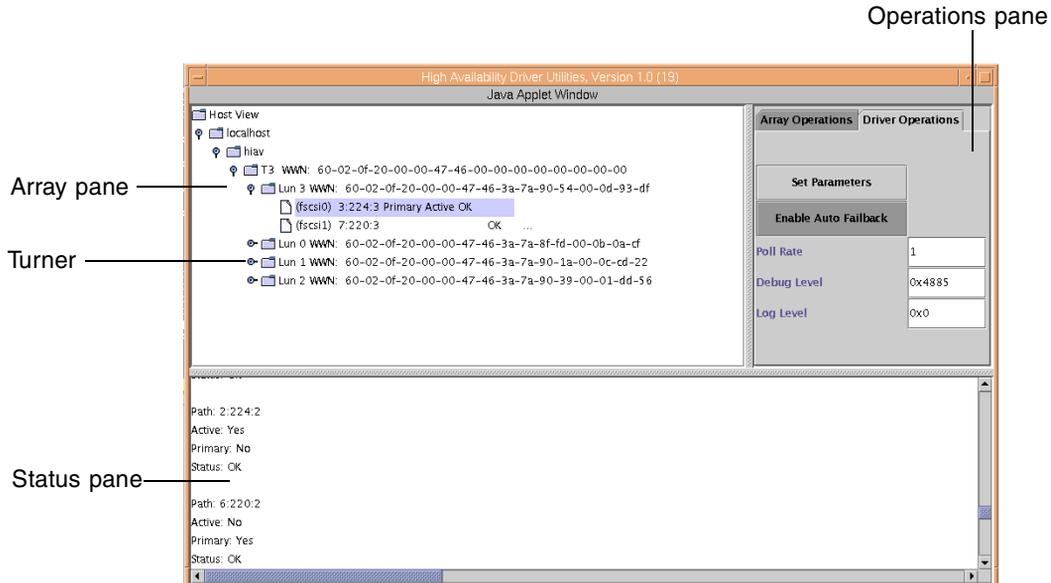
2. **Use the `startall` script to start the console.**

```
# ./startall
```

After a few seconds, the console window displays.

# Understanding the Console Window

FIGURE 3-1 shows the console window with the Driver Operations tab and all the details of one HBA displayed. From the console, you can configure the driver, check the status of an array, and cause a failover or failback.



**FIGURE 3-1** Console with Driver Operations Tab Displayed

The primary parts of the driver console window are:

- **Array pane**—Displays the HBAs, arrays, LUNs (also known as volumes), and host data paths in a hierarchy.
- **Turner**—Expands or collapses the hierarchy in the Array pane.
- **Status pane**—Displays status information as you change the host data path, change the driver configuration, and check array status.
- **Operations pane**—Displays the buttons and fields that you use to configure and use the driver.
  - **Array Operations tab**—Use these buttons to change the host data path between the primary and alternate paths. If the buttons do not display, expand the hierarchy and select the array. For information about using these functions, see Chapter 5.
  - **Driver Operations tab**—Use these buttons and fields to configure the driver. If the buttons do not display, expand the hierarchy and select the HBA. For information about these settings, see Chapter 4.

# Navigating the Console Window

When the console window first displays, only the Host View folder displays at the top of the Array pane. You can display a hierarchy of information including the host computer, HBAs, arrays, LUNs, and host data paths.

To display the host data path information in the Array pane:

1. **Double-click the Host View folder to display your host computer.**
2. **Click the turner next to the host computer name to display the HBAs installed in the host.**
3. **Click the turner next to the HBA to display the array.**

The HBA's World Wide Name (WWN) displays next to the HBA.

4. **Click the turner next to the array to display the LUNs on the array.**

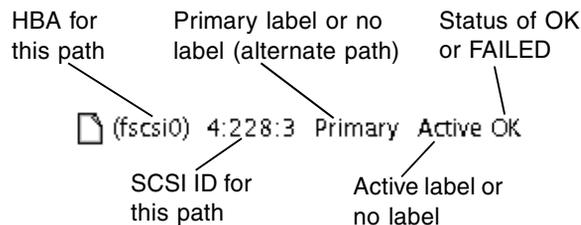
Each LUN's WWN displays next to the LUN. All LUNs on the partner group display in one list under one array.

For more information about LUNs and how to configure them, refer to the *Sun StorEdge T3 Disk Tray Installation, Operation, and Service Manual* and the *Sun StorEdge T3 Disk Tray Administrator's Guide*.

5. **Click the turner next to the LUN to display the host data paths.**

You see two host data paths for each array. One is the primary path and the other is the alternate path.

The data paths display the following information:





## Configuring the Driver

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This chapter contains the following topics:

- “Enabling and Disabling Auto Failback” on page 15
- “Setting the Poll Rate” on page 16
- “Setting the Debug Level and Log Level” on page 16

---

## Enabling and Disabling Auto Failback

You can configure the driver to automatically fail back to the primary host data path when that path becomes operational. By default, Auto Failback is enabled.

To enable or disable Auto Failback:

- 1. From the console window, click the Driver Operations tab.**

If the buttons do not display, expand the hierarchy and select the HBA.

- 2. Click Enable Auto Failback.**

The Auto Failback button is a toggle. After you click Enable Auto Failback, the button changes to Disable Auto Failback. Click the button again to disable Auto Failback.

The configuration change occurs immediately.

---

## Setting the Poll Rate

You can change how often the driver checks the status of the primary data path after a failover. The poll rate setting is only applicable when Auto Failback is enabled. If Auto Failback is enabled and the driver finds that the primary path is operational after polling, the driver fails back to the primary path.

The default poll rate setting is one second.

To set the poll rate:

- 1. From the console window, click the Driver Operations tab.**  
If the buttons do not display, expand the hierarchy and select the HBA.
- 2. Type how often, in seconds, you want the driver to check the status of the primary data path in the Poll Rate field.**
- 3. Click Set Parameters.**

The change does not take effect until you click Set Parameters. A configuration changed status message displays in the Status pane.

---

## Setting the Debug Level and Log Level

The Debug Level and Log Level functions are for use by service engineers only.

## Using the Driver

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This chapter contains the following topics:

- “Checking the Status of the Host Data Paths” on page 17
- “Changing the Host Data Path” on page 18
- “Restoring the Primary Path to a LUN” on page 20
- “Restoring the Primary Path to an Array” on page 21

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## Checking the Status of the Host Data Paths

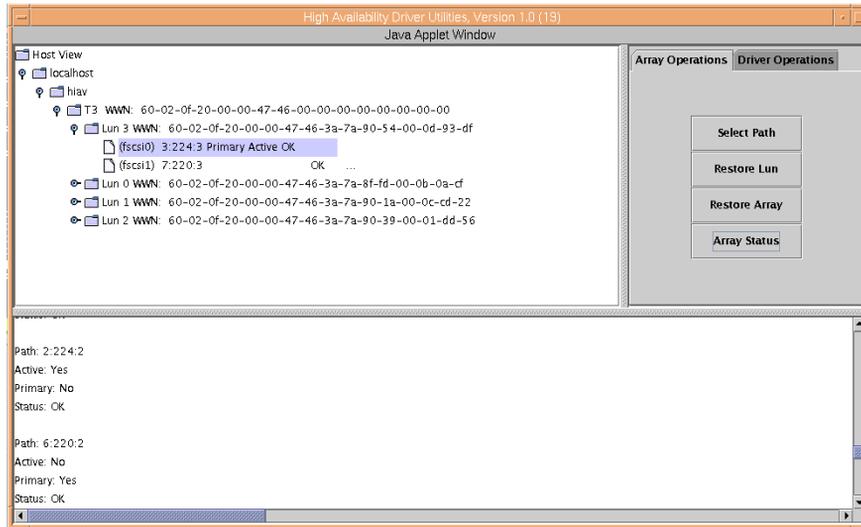
You can check the status of both host data paths for each LUN.

To check the status of the host data paths:

1. **From the console window, click the Array Operations tab.**  
If the buttons do not display, expand the hierarchy and select the array.
2. **Select the array, path, or LUN.**

### 3. Click Array Status.

The status information for each data path displays in the Status pane as shown in the following example console window.



---

## Changing the Host Data Path

You can change the host data path from the primary path to the alternate path for a specific LUN. When you do this, you are manually causing a failover.

After a failover, you can also change the host data path from the alternate path to the primary path for a specific LUN. When you do this, you are manually causing a failback.

You might want to use this function when you perform maintenance on one HBA or need to replace the HBA or another component in the host data path.

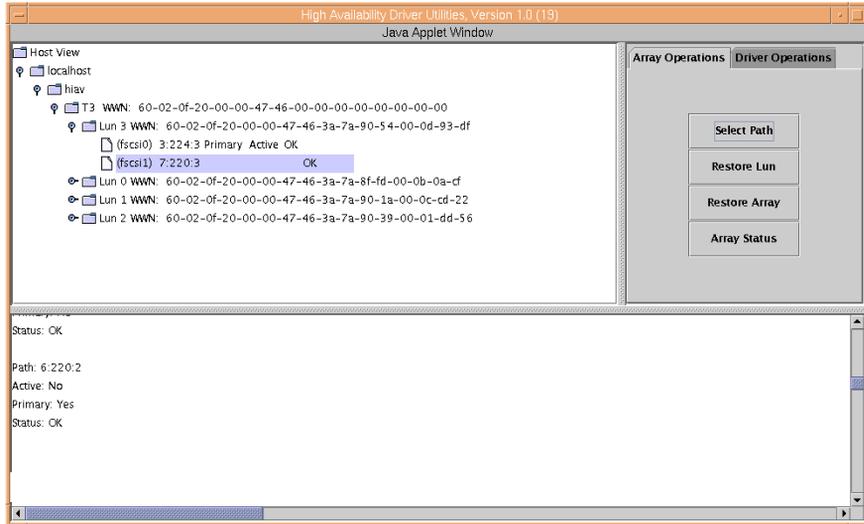
To change the host data path:

**1. From the console window, click the Array Operations tab.**

If the buttons do not display, expand the hierarchy and select the array.

**2. Select the inactive host data path for a LUN.**

The Active label shows which host data path is currently active.

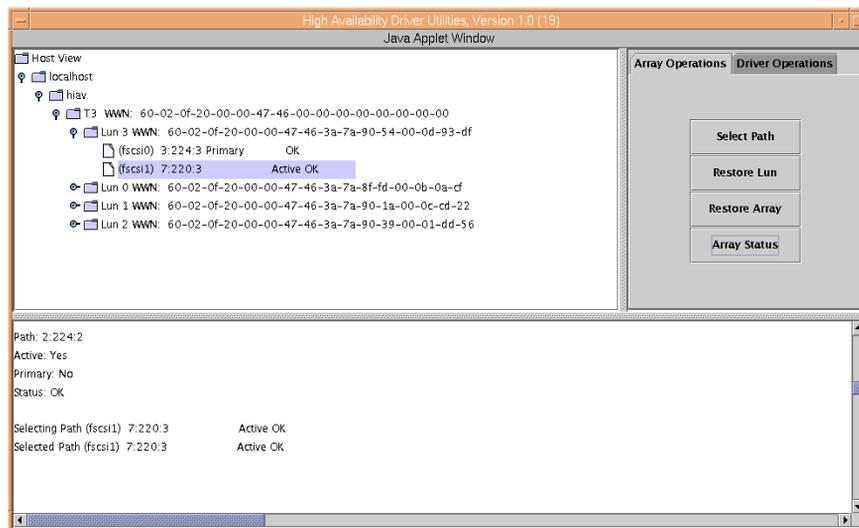


### 3. Click Select Path.

The following messages display in the Status pane (the second message takes a few seconds) and the Active label moves to the new path:

Selecting Path *HBA SCSI ID Status*

Selected Path *HBA SCSI ID Status*



If the change fails, a message displays in the Status pane. Check that all components of the host data path you want to use are working properly.

---

## Restoring the Primary Path to a LUN

After a failover, you can change the host data path for a specific LUN back to the primary data path. The change only works if the primary data path is operational.

To restore the primary path to a LUN:

1. **From the console window, click the Array Operations tab.**

If the buttons do not display, expand the hierarchy and select the array.

2. **Select the LUN whose primary path you want to restore.**

### 3. Click Restore Lun.

The following messages display in the Status pane (the second message takes a few seconds) and the Active label moves to the primary path:

```
Restoring Lun LUN identifier
```

```
Restored Lun LUN identifier
```

If the change fails, a message displays in the Status pane. Check that all components of the primary data path you want to use are working properly.

---

## Restoring the Primary Path to an Array

After a failover, you can change the host data path for all LUNs on an array back to the primary data path. The change only works if each primary data path is operational.

To restore the primary path to all LUNs on an array:

### 1. From the console window, click the Array Operations tab.

If the buttons do not display, expand the hierarchy and select the array.

### 2. Select the array.

### 3. Click Restore Array.

The following messages display in the Status pane (the second message takes a few seconds) and the Active label moves to the primary path:

```
Restoring Array T3 WWN array's WWN
```

```
Restored Array T3 WWN array's WWN
```

If the change fails, a message displays in the Status pane. Check that all components of the primary data path you want to use are working properly.



## Troubleshooting

---

This chapter contains the following topics:

- “Nothing displays below localhost in the Console Window” on page 23

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### Nothing displays below localhost in the Console Window

If you display the console window and you cannot display anything below localhost, the driver is not communicating properly with the array. Try the following to resolve the problem:

**1. Be sure that the array is up and running.**

Refer to the *Sun StorEdge T3 Disk Tray Installation, Operation, and Service Manual* and the *Sun StorEdge T3 Disk Tray Administrator's Guide*.

**2. Be sure the connections to each array are operational.**

Diagnosing errors in the host data channel is outside of the scope of this document. To determine the cause of failures in the data path, you must use host-based application diagnostics. Refer to the documentation for the selected diagnostics tool for information on identifying data channel failures.

**3. If the problem still persists, you can remove and reinstall the devices.**

- a. Make sure that the operating system is not accessing the arrays.**
- b. Unmount the file system on each array.**

c. Use the `lsdev` command to list all devices.

```
# lsdev -Cc disk
hdisk0 Available 10-88-00-8,0 16 Bit LVD SCSI Disk Drive
hdisk1 Available 20-58-01-01 Sun T3 FCP Disk Array LUN
hdisk2 Available 10-68-01-01 Sun T3 FCP Disk Array LUN
hdisk3 Available 10-68-01-01 Sun T3 FCP Disk Array LUN
hdisk4 Available 10-68-01-01 Sun T3 FCP Disk Array LUN
```

d. Use the `rmdev` command to remove each array listed.

```
# rmdev -dl hdisk#
hdisk1 deleted
```

e. Use the `lsdev` command to list all HBAs.

```
# lsdev -Cc driver
fscsi0 Available 10-68-01 FC SCSI I/O Controller Protocol Device
fscsi1 Available 20-58-01 FC SCSI I/O Controller Protocol Device
```

f. Use the `rmdev` command to remove each HBA listed and all of its children.

```
# rmdev -dl fscsi# -R
hdisk5 deleted
hdisk6 deleted
hiav0 deleted
hdisk2 deleted
hiav2 deleted
hdisk3 deleted
```

g. Use the `cfgmgr` command to rescan the bus and find the devices.

```
# cfgmgr -v
```

4. Copy the system error log to a file and review it for any Fibre Channel errors.

```
# errpt > /tmp/filename
# more | filename
```

# Glossary

---

<b>array</b>	A Sun StorEdge T3 array that contains an internal RAID controller and nine disk drives with Fibre Channel connectivity to the data host.
<b>alternate path</b>	The secondary host I/O path that a controller fails over to when a failure occurs on the primary path.
<b>failback</b>	The process by which a failed over controller changes its I/O from the alternate path back to its primary path after the primary path becomes operational.
<b>failover</b>	The process by which one controller changes its I/O from the primary path to the alternate path.
<b>logical unit number (LUN)</b>	One or more drives that is grouped into a unit; also called a “volume.”
<b>partner group</b>	A pair of interconnected arrays.
<b>primary path</b>	The host I/O path that each controller uses by default under normal operating conditions.
<b>volume</b>	One or more drives that is grouped into a unit; also called a “LUN.”
<b>World Wide Name (WWN)</b>	Unique number assigned to each device on a Fibre Channel loop.



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