Sun Multipath Failover Driver 1.0 for HP-UX User's Guide

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Preface

The *Sun Multipath Failover Driver 1.0 for HP-UX 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 HP-UX operating environment and related disk storage systems.

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.

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.

Typographic Conventions

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

Shell Prompts

Shell	Prompt
C shell	*machine_name*`%`
C shell superuser	*machine_name*`#`
Bourne shell and Korn shell	`$`
Bourne shell and Korn shell superuser	`#`

Related Documentation

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

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CHAPTER 1

Sun Multipath Failover Driver Overview

This chapter contains the following topics:

- "Driver Description" on page 1
- "Driver Console" on page 3

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.

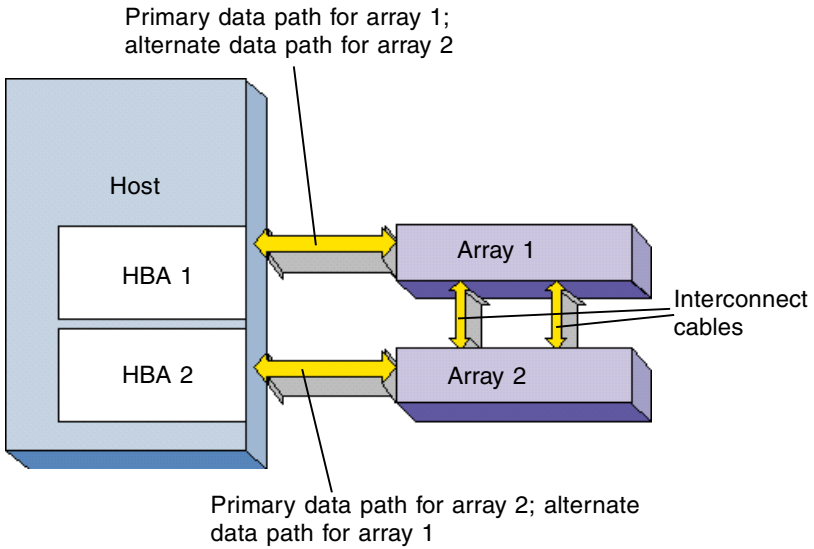


FIGURE 1-1 Sun StorEdge T3 Array Partner Group

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 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.

CHAPTER 2

Installing the Driver

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	HP-UX version 11
HBA (two required)	HP 3740A • Driver version B.11.00.03 Tachyon FC • Firmware version 3.0
Sun StorEdge T3 array	Firmware 1.14
Component Manager Workstation	Ultra 60 or higher on Solaris™
Java™ Runtime Environment	Version 1.3 (download the RTE from www.hp.com)

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.

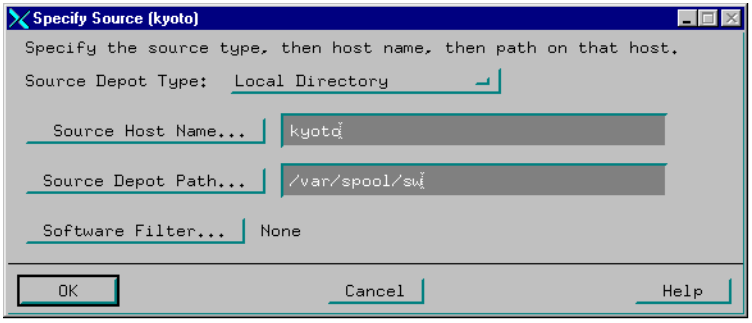
Installing the Driver

After you download the installation file for HP-UX (`hiav11_64.01.00.xx.depot`) from the Sun Web site, you are ready to install the driver. You can install the driver using the swinstall command line interface or using the graphical user interface (GUI). The steps below use the GUI.

To install the driver:

1. **Start the software installation utility.**

```
# swinstall
```



2. **Type the host system name in the Source Host Name field.**

   The field may be filled in automatically.

3. **Type the full path to the location of the installation file in the Source Depot Path field.**

   You must include the name of the installation file in the path.

4. **Click OK.**

5. **Select the driver name (HIAV).**

6. **Choose Actions ->Mark for Install.**

7. **Choose Actions -> Install (analysis).**

8. **When the analysis is complete, click Logfile to see the results of the analysis and whether there will be any problems with the installation.**

   If there are problems with the analysis, you must resolve them before you can install the driver. Refer to your operating system documentation.

9. **Click OK to exit the log file.**

10. **If there are no problems with the analysis, click OK to begin the installation.**

    The system confirms that you want to proceed.

11. **Click Yes.**

    The system tells you that the kernel will be rebuilt and that you will have to reboot the computer after installation.

12. **Click Yes.**

    The Done button becomes active when the installation is complete.

13. **Click Done to reboot the computer.**

    You must reboot the computer before you use can use the driver. Read the `readme` file in the installation directory (`/opt/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 `swlist` command.**

```
# swlist HIAV
```

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

```
# HIAV         A.01.00.xx High Availability Multi-Path Driver
HIAV.GUI       1.xx       HIAV GUI Utility
HIAV.driver    1.xx       HIAV Driver
HIAV.utilities 1.xx       HIAV utilitiesar
```

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.

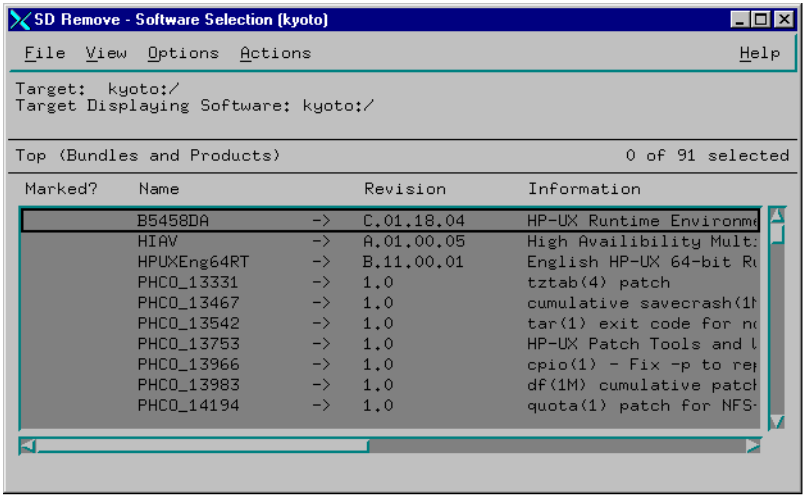
Caution – You should not use the arrays in a partner group configuration with two HBAs without the driver installed. Uninstalling the driver will cause the operating system to see two paths to each LUN, which may result in data corruption.

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

To uninstall the driver:

1. **Start the software uninstallation utility.**

```
# swremove
```



2. **Select the line that starts with HIAV.**
3. **Choose Actions ->Mark for Remove.**
4. **Choose Actions -> Remove (analysis).**
5. **When the analysis is complete, click Logfile to see the results of the analysis and whether there will be any problems with uninstalling the driver.**

   If there are problems with the analysis, you must resolve them before you can uninstall the driver. Refer to your operating system documentation.
6. **Click OK to exit the log file.**
7. **If there are no problems with the analysis, click OK.**

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

   The system tells you that the kernel will be rebuilt and that you will have to reboot the computer after uninstallation.
9. **Click Yes.**

   The Done button becomes active when the uninstallation is complete.
10. **Click Done to reboot the computer.**

    You must reboot the computer.

CHAPTER 3

Working with the Driver Console

This chapter contains the following topics:

- "Accessing the Driver Console" on page 11
- "Understanding the Console Window" on page 12

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 /opt/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.

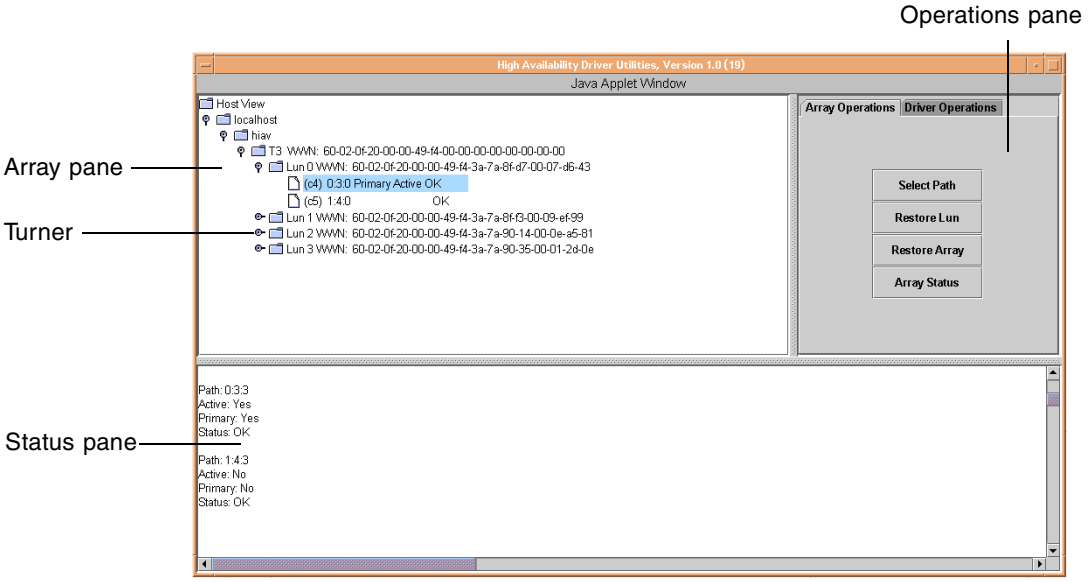


FIGURE 3-1 Console with Driver Operations Tab Displayed

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.**

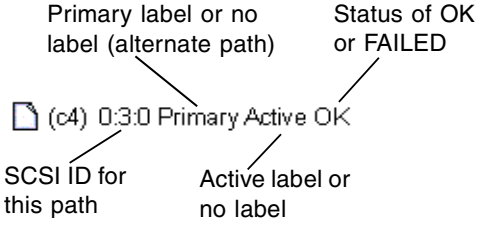
   The HBA's World Wide Name (WWN) displays next to the HBA.
4. **Click the turner next to the array to display the LUNs on the array.**

   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:



CHAPTER 4

Configuring the Driver

This chapter contains the following topics:

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

Enabling 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 *not* enabled.

To enable 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 30 seconds.

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.

CHAPTER 5

Using the Driver

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

Checking the Status of the Host Data Paths

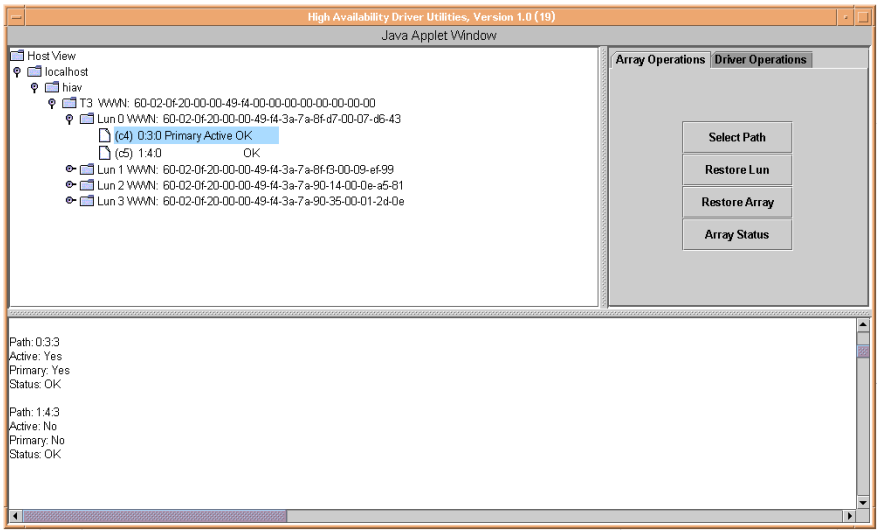
You can check the status of both host data paths for each LUN.

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, LUN, or path.**

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.

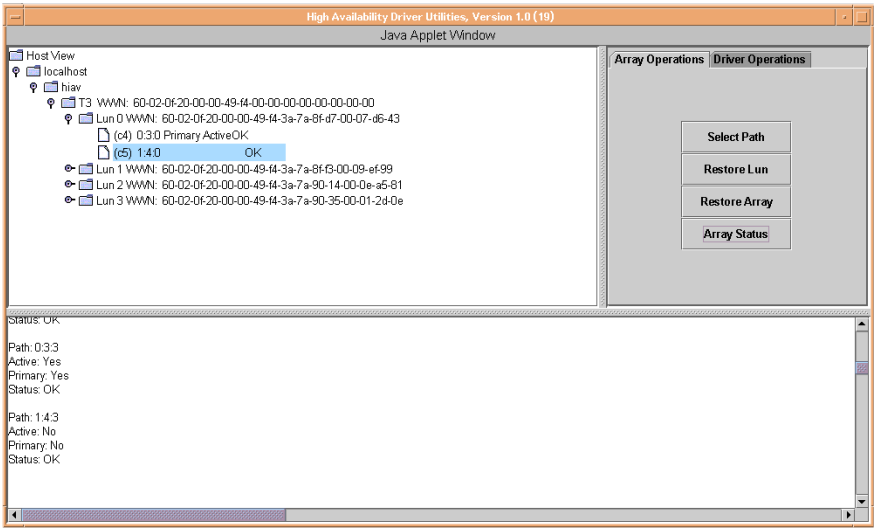
To change the host data path:

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.

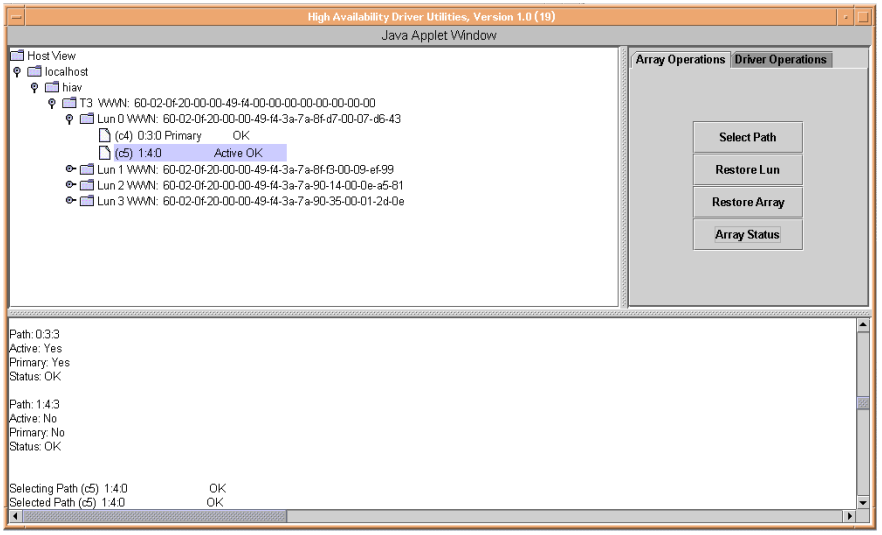


3. **Click Select Path.**

   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.

CHAPTER 6

Troubleshooting

This chapter contains the following topics:

■ "Nothing displays below localhost in the Console Window" on page 23

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. **Use the `ioscan` command to make sure that the operating system is seeing all arrays and LUNs.**

   The example shows only a portion of the output.

```
# ioscan -f
bc           0 root      CLAIMED     BUS_NEXUS
ioa          0  10 sba       CLAIMED     BUS_NEXUS    System Bus Adapter (582)
ba           0  10/0                   lba       CLAIMED     BUS_NEXUS    Local
PCI Bus Adapter (782)
lan          0  10/0/12/0               btlan3    CLAIMED     INTERFACE    PCI
Ethernet (10110019)
target       7  10/0/255/0.0            tgt       CLAIMED     DEVICE
disk         3  10/0/255/0.0.0          sdisk     CLAIMED     DEVICE       T300
LUN 0x398e8be2000f2af4
disk         4  10/0/255/0.0.1          sdisk     CLAIMED     DEVICE       T300
LUN 0x3a23b75000037659
ba           2  10/1                    lba       CLAIMED     BUS_NEXUS    Local
PCI Bus Adapter (782)
fc           0  10/1/4/0                td        CLAIMED     INTERFACE    HP
Tachyon TL/TS Fibre Channel Mass Storage Adapter
fcp          0  10/1/4/0.8              fcp       CLAIMED     INTERFACE    FCP
Protocol Adapter
ext_bus      4  10/1/4/0.8.0.255.0      fcpdev    CLAIMED     INTERFACE    FCP
Device Interface
target       8  10/1/4/0.8.0.255.0.2    tgt       CLAIMED     DEVICE
hiavp        4  10/1/4/0.8.0.255.0.2.0  hiav_path CLAIMED     DEVICE       T300
PATH 0x398e8be2000f2af4
hiavp        5  10/1/4/0.8.0.255.0.2.1  hiav_path CLAIMED     DEVICE       T300
PATH 0x3a23b75000037659
fc           1  10/1/5/0                td        CLAIMED     INTERFACE    HP
Tachyon TL/TS Fibre Channel Mass Storage Adapter
fcp          1  10/1/5/0.8              fcp       CLAIMED     INTERFACE    FCP
Protocol Adapter
ext_bus      6  10/1/5/0.8.0.255.0      fcpdev    CLAIMED     INTERFACE    FCP
Device Interface
target       6  10/1/5/0.8.0.255.0.3    tgt       CLAIMED     DEVICE
hiavp       12  10/1/5/0.8.0.255.0.3.0  hiav_path CLAIMED     DEVICE       T300 PATH
0x398e8be2000f2af4
hiavp       13  10/1/5/0.8.0.255.0.3.1  hiav_path CLAIMED     DEVICE       T300 PATH
0x3a23b75000037659
ba           3  10/4                    lba       CLAIMED     BUS_NEXUS    Local PCI Bus
```

3. **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 causes 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.

4. **Check the event log located in** `/var/adm/syslog/syslog.log`**.**

   The driver writes the following messages to the event log.

   When there are no paths to an array:

```
hiav: array identifier, unit identifier, has no more good paths.
```

   When a path becomes good:

```
hiav: array identifier, unit identifier, path identifier, is now good.
```

   When there were formerly no paths to an array, and one comes back online:

```
hiav: array identifier, unit identifier is back online.
```

   When a path goes down:

```
hiav: array %identifier, unit identifier, path identifier, has failed.
```

5. **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** `rm` **command to remove the devices.**

Caution – The `rm` command that follows is a very powerful command that, if entered incorrectly, can delete all files from the root directory. Only experienced system administrators should use this command.

Note – Do *not* put a space before the asterisk in the commands below.

```
# rm /dev/rdsk/*
# rm /dev/dsk/*
```

d. Use the `insf` command to rescan the bus and find the devices.

The example shows only a portion of the output.

```
# insf -e
insf: Installing special files for audio instance 0 address 10/0/13/0
insf: Installing special files for sdisk instance 0 address 10/0/14/0.0.0
insf: Installing special files for sdisk instance 2 address 10/0/15/1.6.0
insf: Installing special files for sctl instance 2 address 10/0/15/1.7.0
insf: Installing special files for sdisk instance 3 address 10/0/255/0.0.0
insf: Installing special files for sdisk instance 4 address 10/0/255/0.0.1
insf: Installing special files for pseudo driver cn
insf: Installing special files for pseudo driver mm
insf: Installing special files for pseudo driver ptym
insf: Installing special files for pseudo driver ptys
insf: Installing special files for pseudo driver dmem
insf: Installing special files for pseudo driver diag0
insf: Installing special files for pseudo driver dev_config
insf: Installing special files for pseudo driver strlog
insf: Installing special files for pseudo driver sad
insf: Installing special files for pseudo driver ip
insf: Installing special files for pseudo driver arp
insf: Installing special files for pseudo driver rawip
insf: Installing special files for pseudo driver tcp
insf: Installing special files for pseudo driver udp
insf: Installing special files for pseudo driver stcpmap
insf: Installing special files for pseudo driver nuls
```

Glossary

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

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