

Dell™ PowerVault™ Systems

# DELL OPENMANAGE™ ATF OPERATION GUIDE

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# Preface

## About This Guide

This guide describes how to use Dell OpenManage ATF (Application Transparent Failover) software on Dell PowerVault 650F and 651F storage systems with host computers running the Microsoft Windows NT 4.0 Terminal Server, Windows NT 4.0 Enterprise Edition, Windows NT 4.0 Server, Windows 2000 Server, or Windows 2000 Advanced Server operating system.

This guide assumes that the disk-array storage systems are connected to their host(s). If ATF is in an environment with two or more hosts, the hosts must be networked. The hosts' operating systems must be up and running for the network to be operational. The chapters in this guide are summarized as follows:

- Chapter 1, "Dell OpenManage Application Transparent Failover," defines ATF and introduces the storage-system configurations that can benefit from using ATF.
- Chapter 2, "Using ATF for Windows NT 4.0 and Windows 2000," discusses adding devices, restoring paths, and using the ATF restore utility.
- Chapter 3, "Using ATF for Netware," discusses system needs for ATF on systems running Netware.
- Chapter 4, "Troubleshooting ATF," provides problem descriptions, causes, and solutions to the problems.

## Other Documents You May Need

Besides this *Dell OpenManage ATF Operation Guide*, the following documentation may be helpful with your system:

- *Dell OpenManage Data Agent for NT and Integrator Installation and Operation Guide*
- *Dell OpenManage Data CLI for NT Installation and Operation Guide*
- *Dell OpenManage Data Supervisor, Event Monitor, and Integrator Installation and Operation Guide*
- *Dell OpenManage Data Administrator Installation and Operation Guide*
- *Dell OpenManage Data Organizer Installation and Operation Guide*

- *Dell OpenManage Data Analyzer Installation and Operation Guide*
- *Dell OpenManage DAE-MON Installation and Operation Guide*
- *Dell PowerVault System Storage Area Network (SAN) Installation and Troubleshooting Guide*
- *Dell PowerVault 650F Rackmount Storage System Installation and Service Guide*
- *Dell PowerVault 630F and 250F Rackmount Storage Systems Installation and Service Guide*
- *Dell PowerVault 651F Deskside Storage System Installation and Service Guide*
- *Dell PowerVault 251F Deskside Storage System Installation and Service Guide*
- *Dell PowerVault Storage Systems Standby Power Supply Installation Guide*
- *Dell PowerVault Systems Storage Area Network (SAN) Version 2.0 Revision Compatibility Guide* (available at <http://support.dell.com>)

You may also have one or more of the following documents.



*NOTE: Documentation updates are sometimes included with your system to describe changes to your system or software. Always read these updates **before** consulting any other documentation because the updates often contain the latest information.*

- Operating system documentation is included if you ordered your operating system software from Dell. This documentation describes how to install (if necessary), configure, and use your operating system software.
- Documentation is included with any options you purchase separately from your system. This documentation includes information that you need to configure and install these options in your Dell computer.
- Technical information files—sometimes called “readme” files—may be installed on your hard-disk drive to provide last-minute updates about technical changes to your system or advanced technical reference material intended for experienced users or technicians.

## ***Notational Conventions***

The following subsections describe notational conventions used in this document.

### ***Notes, Cautions, and Warnings***

Throughout this guide, blocks of text may be accompanied by an icon and printed in bold type or in italic type. These blocks are notes, cautions, and warnings, and they are used as follows:



*NOTE: A NOTE indicates important information that helps you make better use of your computer system.*



**CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**



**WARNING: A WARNING indicates the potential for bodily harm and tells you how to avoid the problem.**

Some warnings may appear in alternate formats and may be unaccompanied by an icon. In such cases, the specific presentation of the warning is mandated by regulatory authority.

## *Typographical Conventions*

The following list defines (where appropriate) and illustrates typographical conventions used as visual cues for specific elements of text throughout this document:

- *Keycaps*, the labeling that appears on the keys on a keyboard, are enclosed in angle brackets.  
Example: <Enter>
- *Key combinations* are series of keys to be pressed simultaneously (unless otherwise indicated) to perform a single function.  
Example: <Ctrl><Alt><Enter>
- *Commands* presented in lowercase bold are for reference purposes only and are not intended to be typed when referenced.

Example: "Use the **format** command to . . . ."

In contrast, commands presented in the Courier New font are part of an instruction and intended to be typed.

Example: "Type `format a:` to format the diskette in drive A."

- *Filenames* and *directory names* are presented in lowercase bold.  
Examples: **autoexec.bat** and **c:\windows**
- *Syntax lines* consist of a command and all its possible parameters. Commands are displayed in lowercase bold; variable parameters (those for which you substitute a value) are displayed in lowercase italics; constant parameters are displayed in lowercase bold. The brackets indicate items that are optional.

Example: **del** [*drive:*] [*path*] *filename* [*/p*]

- *Command lines* consist of a command and may include one or more of the command's possible parameters. Command lines are presented in the Courier New font.

Example: `del c:\myfile.doc`

- *Screen text* is text that appears on the screen of your monitor or display. It can be a system message, for example, or it can be text that you are instructed to type as part of a command (referred to as a *command line*). Screen text is presented in the Courier New font.

Example: The following message appears on your screen:

```
No boot device available
```

Example: "Type md c:\programs and press <Enter>."

- *Variables* are placeholders for which you substitute a value. They are presented in italics.

Example: DIMM*x* (where *x* represents the DIMM socket designation).



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## CHAPTER 1

# *Dell OpenManage™ Application Transparent Failover*

Dell OpenManage Application Transparent Failover (ATF) is a software product that works with Dell™ PowerVault™ 650F and 651F disk-array storage systems to let applications continue running after the failure of a storage processor (SP), host bus adapter (HBA), or cable. Without human intervention, ATF can route input/output (I/O) information through a secondary path to the disk units that the applications need. The following topics are discussed in this chapter:

- ATF requirements
- ATF disk-array storage-system configurations

## *ATF Requirements*

ATF has the following requirements. Any additional restrictions related to the operating system are explained in Chapter 2.

- **Host bus adapter** — Within a SAN, an HBA provides the connectivity from the host computer system to the external Fibre Channel device or to a PowerVault 5xF switch. The following HBAs are supported: QLA2100, QLA2100F, QLA2200, and QLA2200F.

The QLA2x00 series HBAs support a 33-megahertz (MHz), 64-bit Peripheral Component Interconnect (PCI) 2.1 interface (fully backward compatible with 32-bit PCI). The QLA2100 and QLA2200 support copper media. The QLA2100F and QLA2200F support fiber-optic media. The QLA2200/66 series HBAs support a 66-MHz, 64-bit PCI 2.1 interface (fully backward compatible with 32-bit PCI). The QLA2200/66 supports copper media. The QLA2200F/66 supports fiber-optic media.

- **Disk-array storage system** — Each one must be installed in one of the configurations valid for ATF as explained in “ATF Disk-Array Storage System Configurations,” found later in this chapter.
- **Storage-system microcode (Licensed Internal Code) and programmable read-only memory (PROM) levels** — Each storage system must have microcode (Licensed Internal Code) and storage-system PROM code of certain minimum levels.

- **Bound LUNs** — Storage-system disk modules must be bound into logical unit numbers (LUNs) using the Data Supervisor or Data Administrator. A LUN used for ATF should be bound as a redundant array of independent disks (RAID) level that is highly available. Do not use ATF with RAID 0 groups or individual disk units because those configurations represent a single point of failure.
- **LUN Auto-assign parameter** — For ATF to work correctly, the storage-system **Auto-assign** option for each LUN must be disabled. By default, the **Auto-assign** option is disabled. You can use Data Supervisor or Data Administrator to confirm that each LUN that ATF will support has its **Auto-assign** option disabled.



*NOTE: For information on the most current revisions of BIOS and firmware, see the Dell PowerVault Systems Storage Area Network (SAN) Version 2.0 Revision Compatibility Guide at <http://support.dell.com>.*

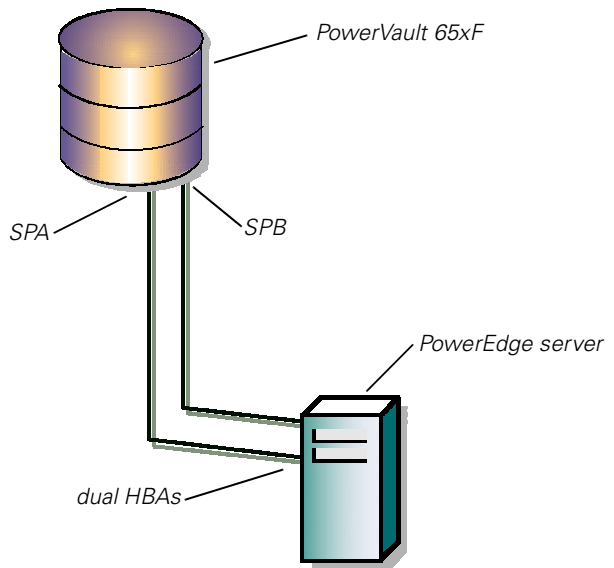
## ***ATF Disk-Array Storage System Configurations***

There are many configurations for disk-array storage systems. The following storage-system configurations can benefit from ATF:

- Dual-HBA/dual-SP configuration
- Dual-initiator/dual-bus or dual-initiator/dual-loop configuration
- Dual HBA SAN-attached configuration

### ***Dual-HBA/Dual-SP Configuration***

The dual-HBA/dual-SP configuration has one host with two HBAs, each connected by a Fibre Channel (FC) loop to an SP in the storage system.



**Figure 1-1. Dual-HBA/Dual-SP Configuration**

For best SP performance with this configuration, you can bind some LUNs on one SP and the other LUNs on the other SP. The SP that binds a LUN is the default owner of that LUN and determines the primary I/O path to that disk unit. The route through the other SP is the secondary path and is available if a component in the primary route fails.

Table 1-1 lists the error recovery features of this configuration.

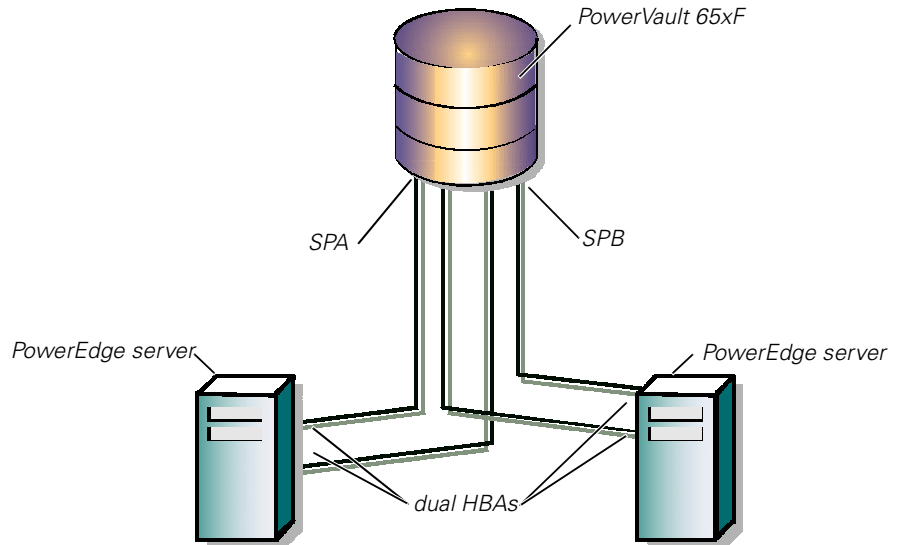
**Table 1-1. Error Recovery Features for Dual-HBA/Dual-SP Configurations**

Failing component	Continue after failure?	What happens and how to recover
Disk module	Yes	With RAID of any level other than RAID 0*, applications continue running; if a hot spare is available, a rebuild begins immediately.
SP	Yes (with ATF)	I/O operations fail to the disk units owned by the failing SP.  With ATF, the software automatically transfers control of the failed SP's disk units to the working SP. Applications continue running without receiving any indication of an error. (A failover message goes to the system log.)  Without ATF, applications fail. When convenient, an authorized service provider can replace the SP and transfer control of the disk units back to the primary SP.
Fan module	Yes	Applications continue running; an authorized service provider replaces the module.
Power supply	Yes	If a redundant power supply is present, applications continue running; otherwise, the storage system shuts down. The authorized service provider replaces the module.
Host bus adapter	Yes (with ATF)	With ATF, the software automatically transfers control of the failed adapter's disk units to the working adapter's SP. Applications continue running without receiving any indication of an error. (A failover message goes to the system log.)  Without ATF, applications fail. When convenient, an authorized service provider can replace the adapter, and the system operator can transfer control of the disk units to the replacement adapter's SP.
Cable	Yes (with ATF)	With ATF, the software automatically transfers control of the failed cable's disk units to the working cable's SP. Applications continue running without receiving any indication of an error. (A failover message goes to the system log.)  Without ATF, applications fail. When convenient, an authorized service provider can replace the cable, and the system operator can transfer control of the disk units back to the primary SP.

\* RAID 0 is not recommended with ATF because it represents a single point of failure.

## ***Dual-Initiator/Dual-Bus or Dual-Initiator/Dual-Loop Configuration***

The dual-initiator/dual-bus configuration provides high availability by protecting against host failure. Each host has two HBAs, each connected by an FC loop to a separate SP in the storage system.



***Figure 1-2. Dual-Initiator/Dual-Bus Configuration***

For best SP performance, you can bind some LUNs on one SP and the other LUNs on the other SP. The SP that binds a LUN is the default owner of that LUN and determines the primary path to that LUN. The route through the other SP is the secondary path and is available if a component in the primary route fails.

ATF lets applications continue after failure of an SP, HBA, or storage system cable. To let applications continue after host failure, Microsoft® Cluster Server software is required for one host to take over the failed host's disks. Both hosts must have the same model of HBA and both must be using ATF.

Table 1-2 lists the error recovery features of this configuration.

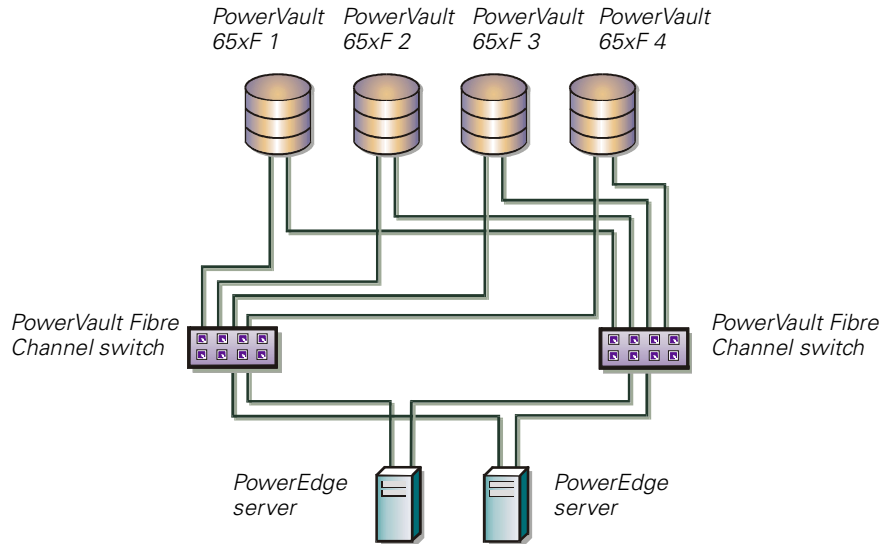
**Table 1-2. Error Recovery Features for Dual-Initiator/Dual-Bus Configurations**

Failing component	Continue after failure?	What happens and how to recover
Disk module	Yes	With RAID of any level other than RAID 0*, applications continue running; an authorized service provider replaces the module.
SP	Yes (with ATF)	With ATF, the software transfers disks to the surviving SP; applications continue without receiving any indication of an error. (A failover message goes to the system log.)  Without ATF, applications fail. When convenient, an authorized service provider can replace the SP and transfer control of the disk units to the replacement SP.
Fan module	Yes	Applications continue running; the system operator replaces the module.
Power supply	Yes	If a redundant power supply is present, applications continue; otherwise, the storage system shuts down. An authorized service provider replaces the module.
Host bus adapter	Yes (with ATF)	With ATF, the software transfers disks to the surviving adapter's SP; applications continue without receiving any indication of an error. (A failover message goes to the system log.)  Without ATF, applications fail. When convenient, an authorized service provider replaces the adapter, and the system operator transfers control of the disk units to the new adapter's SP.
Host system	Yes (with failover software)	Microsoft Cluster Server failover software can direct the other host to take over the failed host's disk units. See the <i>Dell PowerEdge Cluster FE100 and FL100 Information Update</i> for more information.

\* RAID 0 is not recommended because it represents a single point of failure.

## Dual-HBA SAN-Attached Configuration

The dual-HBA SAN-attached configuration below uses four PowerVault 65xF storage systems connected via Fibre Channel switches to two servers using dual HBAs.



**Figure 1-3. Dual-HBA SAN-Attached Configuration**

For best SP performance, you can bind some LUNs on one SP and the other LUNs on the other SP. The SP that binds a LUN is the default owner of that LUN and determines the primary path to that LUN. The route through the other SP is the secondary path, and is available if a component in the primary route fails.

ATF lets applications continue after failure of an SP, HBA, or storage system cable.

Table 1-3 lists the error recovery features of this configuration.

**Table 1-3. Error Recovery Features for Dual-HBA SAN-Attached Configurations**

Failing component	Continue after failure?	What happens and how to recover
Disk module	Yes	With RAID of any level other than RAID 0*, applications continue running; an authorized service provider replaces the module.
SP	Yes (with ATF)	With ATF, the software transfers disks to the surviving SP; applications continue without receiving any indication of an error. (A failover message goes to the system log.)  Without ATF, applications fail. When convenient, an authorized service provider can replace the SP and transfer control of the disk units to the replacement SP.
Fan module	Yes	Applications continue running; the system operator replaces the module.
Power supply	Yes	If a redundant power supply is present, applications continue; otherwise, the storage system shuts down. An authorized service provider replaces the module.
Host bus adapter	Yes (with ATF)	With ATF, the software transfers disks to the surviving adapter's SP; applications continue without receiving any indication of an error. (A failover message goes to the system log.)  Without ATF, applications fail. When convenient, an authorized service provider replaces the adapter, and the system operator transfers control of the disk units to the new adapter's SP.

\* RAID 0 is not recommended because it represents a single point of failure.



## CHAPTER 2

# *Using ATF for Windows NT<sup>®</sup> 4.0 and Windows<sup>®</sup> 2000*

This chapter explains how to use Application Transparent Failover (ATF) with Microsoft Windows NT 4.0 Terminal Server, Windows NT 4.0 Enterprise Edition, Windows NT 4.0 Server, Windows 2000 Server, or Windows 2000 Advanced Server operating systems. The following topics are discussed in this chapter:

- Adding devices to a system with ATF installed
- Failover messages
- Restoring the original path with the ATF restore utility
- ATF trespass utility

To use ATF, a host system must be running the Windows NT 4.0, Windows 2000, or Novell<sup>®</sup> NetWare<sup>®</sup> operating system. General requirements appear in Chapter 1. For the latest installation requirements, see the ATF release notice on the *PowerVault Fibre Channel Update* CD or the *PowerVault Fibre Channel Utilities* CD. The storage-system configurations are explained in Chapter 1.



*NOTE: For information on which hosts you can use and the required software revisions and service packs, see the Dell PowerVault Systems Storage Area Network (SAN) Version 2.0 Revision Compatibility Guide at <http://support.dell.com>.*

## *Adding Devices to a Server With ATF Installed*

If you add logical unit numbers (LUNs) or a storage processor (SP) to a storage system or if you add one or more storage systems or host bus adapters (HBAs), you need to reboot so that ATF is reconfigured to support the new devices. You do not need to install any new device driver software.

## *Failover Messages*

When an SP or HBA fails, ATF automatically switches over to the other path. This allows applications to continue running after a device fails. When the ATF fails over,

the Windows NT or Windows 2000 Event Viewer logs messages such as the following:

```
Tues Sept 23 11:22:43 SERVER CLatf Warning I/O Error
Tues Sept 23 11:22:43 SERVER CLatf Warning SP Marked as failed
Tues Sept 23 11:22:43 SERVER CLatf Warning FAILOVER STARTED
Tues Sept 23 11:22:43 SERVER CLatf Warning FAILOVER SUCCESSFUL
```

To restore, execute  
ATF\_RESTORE atf\_sp0

Write down the last line to use in restoring the original path later.



*NOTE: In the event of a failure condition, ATF can take up to 2 minutes to trespass LUNs to a peer SP. During this time, read and write requests from network clients may not be serviced. This can cause some applications to fail, requiring an application restart or retry for the failed operation.*

## ***Restoring the Original Path With the ATF Restore Utility***

Following a failure condition and a successful ATF trespass of LUNs to a peer SP, you must resolve the condition that caused the failure before you can use the **atf\_restore** command.

From the command prompt window, in the directory where the ATF executable programs were stored (for example, directory **C:\Program Files\Dell OpenManage\PowerVault Manager\Dell OpenManage ATF\X.X.X.**) type the following:

```
atf_restore atf_spn
```

In this command, *n* is the number of the disk-array storage system (not the SP) whose path failed and that you want to restore. The first storage system on a bus is number 0, and the second is number 1. The message displayed when the failure occurred shows the correct command line.

An **atf\_restore** operation works only on a LUN that has been trespassed successfully. An event in the Windows NT Event Viewer system log should report `Failover Successful`. There may be cases, such as in total array power failure, where ATF reports `Failover Failed` while prompting you to run **atf\_restore** to restore paths. This is an erroneous message.

In configurations with multiple servers accessing the same array, ensure that all servers have intact redundant paths to the array before issuing an **atf\_restore** command to the array. If you run **atf\_restore** from a server with valid paths while another server has a broken path, the restore runs successfully, but the server with the broken path can cause the restored LUNs to immediately repeat failover.



*NOTE: ATF performs a trespass failover only when it detects failed I/O requests on a LUN due to a broken loop path or an SP failure. In the event that the path to a single disk that is part of a LUN fails, ATF will not trespass that LUN because I/O requests can still be serviced by that LUN with one disk missing. A hot spare will not begin a rebuild in this case.*

## **ATF Trespass Utility**

The **atf\_trespass** utility allows you to control the temporary assignment of LUNs to SPs. This utility issues trespass commands that direct the storage system to transfer control of one or more LUNs to a specific SP.



*NOTE: A trespass operation will affect I/O to the disk units involved and may affect the operating system. Use this utility only when the system is idle or when you must transfer control of disk unit(s).*

From a command prompt window, use the following command form:

**atf\_trespass atf\_sp** *n sp:mode[:lun]*

Table 2-1 lists the arguments for this command.

**Table 2-1. Arguments for the ATF Trespass Utility**

<b>Argument</b>	<b>Explanation</b>
<i>n</i>	The number of the disk-array storage system (not SP) whose LUN(s) you want to trespass. The first storage system on a bus is number 0, and the second is number 1.
<i>sp:mode[:lun]</i>	Identifies the trespass with two or three fields separated by colons.
<i>sp</i>	Indicates the SP in the storage system. 0 means SP A. 1 means SP B.
<i>mode</i>	Specifies the trespass operation to perform.
<i>0</i>	Trespass LUN(s) to the original owning SP. If you specify <i>lun</i> , the command affects that LUN only. If you omit <i>lun</i> , the command affects all LUNs currently controlled by <i>sp</i> .
<i>1</i>	Trespass only the LUN specified in the <i>lun</i> field; you must specify <i>lun</i> .
<i>2</i>	Trespass LUN(s) to <i>sp</i> .
<i>lun</i>	Identifies the LUN to trespass (0, 1, 2, 3, and so on). If you omit this in mode 0 or 2, the command affects all LUNs controlled by <i>sp</i> . You must specify the LUN in mode 1.

For example, the following commands restore all LUNs in storage system 0 to their original owning SP. These commands are equivalent to **atf\_restore atf\_sp0**.

```
atf_trespass atf_sp0 0:0  
atf_trespass atf_sp0 1:0
```



## CHAPTER 3

# *Using ATF for NetWare*

This chapter explains how to use Application Transparent Failover (ATF) with the Novell NetWare operating system. The following topics are discussed in this chapter:

- Adding devices to a system with ATF installed
- Failover messages
- High Availability Device Management (HADM) operations

To use ATF for NetWare, a host system must be running NetWare 4.2 with Support Pack 8a or later or NetWare 5.x. General requirements appear in Chapter 1. For the latest installation requirements, see the ATF release notice located on the *PowerVault Fibre Channel Update* CD or the *PowerVault Fibre Channel Utilities* CD. The storage-system configurations are explained in Chapter 1.

To manage ATF for NetWare you must use the HADM utility (**hadm.nlm**). The HADM utility is a command line application utility that runs on NetWare 4.2 and 5.x as NetWare Loadable Module (NLM). The HADM utility interfaces with the NetWare failover driver (**sccisan.cdm**) to manage the redundant input/output (I/O) path for Dell PowerVault 650F and 651F disk-array storage systems with redundant storage processors (SPs). The management utility allows the user to restore the LUNs back to the original SP after a LUN/SP failover or to temporarily trespass a LUN to the peer SP for LUN load balance between the SPs.

## *Adding Devices to a Server With ATF Installed*

If you add LUNs or an SP to a storage system or if you add one or more storage systems, you need to reboot your server so that ATF is reconfigured to support the new devices. You do not need to install any new device driver software.

## Failover Messages

When an SP or HBA fails, ATF automatically switches over to the other path. This allows applications to continue running after a device fails. When the ATF fails over, the NetWare console displays messages like the following:

```
5-03-2000 12:58:29 pm:      SCSISAN-0.0-0
IO error occurred on [V596-A3-D0:1]!      SP Signature=F702E135

5-03-2000 12:58:29 pm:      SCSISAN-0.0-0
IO error occurred on [V596-A3-D1:3]!      SP Signature=CA106031

5-03-2000 12:58:43 pm:      SCSISAN-0.0-0
Failover recovery complete on [V596-A2-D0:1]. SP Signature=B50FAF35

5-03-2000 12:58:43 pm:      SCSISAN-0.0-0
Failover recovery complete on [V596-A2-D1:3]. SP Signature=3FE5731
```

**[Vxxx-Ax-Dx:x]** is the node that is listed in the Dell OpenManage Administrator. **SP Signature** is the digital signature of the SP that currently owns the LUN. Use these two pieces of information when you issue the **restore** command.



*NOTE: In the event of a failure condition, ATF can take up to 2 minutes to trespass LUNs to a peer SP. During this time, read and write requests from network clients may not be serviced. This can cause some applications to fail, requiring an application restart or retry for the failed operation.*

## HADM Operations

The HADM utility takes user input from the command line and sends the request to the failover driver. The HADM utility provides the following operations:

- **list** — lists of all Dell PowerVault 650F and 651F disk-array storage systems with redundant SPs
- **restore** — restores LUNs back to the original SP
- **trespass** — trespasses a LUN to a designated SP

### List Operation

To get a list of storage systems, type the following at the command line prompt:

```
hadm list
```

The output from the HADM utility will provide the following information:

- Storage system number (SSN), which is used as an input for the **restore** and **trespass** operation
- SP signature and peer SP signature of the dual SPs in the storage system, which is used to identify the storage system
- Node name, which is displayed in the Dell OpenManage Administrator and is another way to identify the storage system



*Note: The node name is valid only for the machine that is currently being administered in the Dell OpenManage Administrator. Each NetWare server assigns its own node names to each adapter based on the type of adapter and the PCI slot it occupies. If you want to associate the node name that is displayed on the Administrator with an SSN, you must issue the **hadm list** command on the console of the machine that is being administered.*

The following is a sample output of the **hadm list** command:

Storage Devices with dual SPs

\*\*\*\*\*

ssn	SpSignature	Peer SpSignature	Node Name
2	3fe5731	ca10631	[V596-A2-D1:0]
1	b50faf35	f702e135	[V596-A2-D0:0]

## **Restore Operation**

Following a failure condition and a successful ATF trespass of LUNs to a peer SP, you must resolve the condition that caused the failure before you can restore the LUNs. After a failed path has been replaced, you can restore the original path by typing the following at the command line prompt:

```
hadm restore ssn
```

In this command, *ssn* is the storage system number (not the SP) of the failed path. The messages in the system console log will display the SP signature and node name of the SP that owns the failed LUN. With the **hadm list** command, you can associate the SP signature with the SSN. To associate the SP signature with its SSN, follow the instructions found later in this section.

In configurations with multiple servers accessing the same array, you must ensure that all servers have intact redundant paths to the array before issuing a **hadm restore** command to the array. If you run **hadm restore** from a server with valid paths while another server has a broken path, the restore runs successfully, but the server with the broken path can cause the restored LUNs to immediately repeat failover.



*NOTES: You must resolve the condition that caused the failure before issuing the **restore** command or the LUNs will not restore back to their default SPs.*

*ATF performs a trespass failover only when it detects failed I/O requests on a LUN due to a broken loop path or an SP failure. In the event that the path to a single disk that is part of a LUN fails ATF will not trespass that lun over because I/O requests can still be serviced by that LUN with one disk missing. A hot-spare will not begin a rebuild in this case.*

## *Associating the SSN From the Console*

To associate the SSN with the failed path from the console:

1. Write down the SP signature and the node name that is displayed in the error message on the NetWare server console.
2. Issue the **hadm list** command.
3. Find the SP signature or the node name in the output from the **hadm list** command.
4. Note the SSN that is in the same row as the SP signature or node name that you found in step 3.

## *Associating the SSN From the Dell OpenManage Administrator*

To associate the SSN with the failed path from the Dell OpenManage Administrator:

1. If you see a fault on the Administrator, note the node name where the fault occurred.
2. Go to the console of the NetWare server that you are administrating from the Administrator.
3. Issue the **hadm list** command.
4. Find the node name in the output from the **hadm list** command.
5. Note the SSN that is in the same row as the node name that you found in step 4.



*NOTE: To make sure that you are restoring the correct storage array, always issue the **restore** command on the same server that you used to associate the SSN with the failed path.*

## *Trespass Operation*

The **hadm trespass** utility allows you to control the temporary assignment of LUNs to SPs. This utility issues trespass commands that direct the storage system to transfer control of one or more LUNs to a specific SP.



*NOTE: A trespass operation will affect I/O to the disk units involved and may affect the operating system. Use this utility only when the system is idle or when you must transfer control of hard-disk unit(s).*

From the command line prompt, use the following command form:

```
hadm trespass ssn sp lun
```

Table 3-1 lists the arguments for this command.

***Table 3-1. Arguments for the HADM Trespass Utility***

<b>Argument</b>	<b>Explanation</b>
<i>ssn</i>	Identifies the storage system number whose LUN the user wants to trespass.
<i>sp</i>	Identifies the SP to trespass the LUN to (a or A means SP A and b or B means SP B).
<i>lun</i>	Identifies the LUN number to trespass.





# CHAPTER 4

## *Troubleshooting ATF*

### *Troubleshooting*

This chapter provides general troubleshooting information for Dell OpenManage Application Transparent Failover (ATF).

Table 4-1 describes problems you may encounter and the probable causes and solutions for each problem.

**Table 4-1. Troubleshooting ATF**

<b>Problem</b>	<b>Probable Cause</b>	<b>Corrective Action</b>
An storage processor (SP) panic 0x040070024 can occur in cases when ATF is not installed and a disk takes an extremely long time to remap a sector while the SP controller firmware is attempting to perform a redundant write operation to that disk.	This SP panic happens only when more than one remap operation is underway and the array is experiencing a heavy I/O load.	Install ATF to prevent SP failure.  The SP that experiences the panic reboots and recovers without operator intervention. Data integrity is maintained. The failure mechanism may never be seen under the most stressful test environments.
Polls during a failover condition report an error message.	A peer SP has taken control of LUNs while a failure condition exists.	Use Data Supervisor or Administrator in the other path.

**Table 4-1. Troubleshooting ATF (continued)**

Problem	Probable Cause	Corrective Action
<p>An SP fails and all LUNs have been transferred to the surviving SP. When the failed SP is replaced, the new SP does not complete its power up.</p>	<p>The new SP begins disabling the cache (flushing pages to disk). Until this completes, the new SP will not power up.</p>	<p>To determine when the new SP is operational, wait until the following two messages appear in the unsolicited event log of the SP that is still operable:</p> <pre data-bbox="989 401 1273 482">06/30/00 16:23:03 SP B 0x643 (SP Initializing) 0x00</pre> <pre data-bbox="989 510 1273 591">06/30/00 16:32:44 SP B 0x644 (SP Inserted) 0x00</pre> <p>At this point, you can issue the <b>atf_restore</b> command to restore the LUNs back to the replaced SP. Be aware that the unsolicited event log window does not update dynamically. You must click the refresh button to see new entries.</p>
<p>The <b>hadm restore</b> or <b>hadm trespass</b> command does not restore LUNs or trespass LUNs correctly.</p>	<p>Both paths to the SPs were not operational during the NetWare server boot.</p>	<p>Issue the command <b>scan all luns</b> on the NetWare console to find all secondary paths to LUNs.</p>
<p></p>	<p>The path to the peer SP is not operational.</p>	<p>Connect or repair the path to the peer SP.</p>
<p>The <b>hadm list</b> command outputs the following: No Storage Systems with Redundant SPs found.</p>	<p>Both paths to the SPs were not operational during the NetWare server boot.</p>	<p>Issue the command <b>scan all luns</b> on the NetWare console to find all secondary paths to LUNs.</p>
<p></p>	<p>The path to the peer SP is not operational.</p>	<p>Connect or repair the path to the peer SP.</p>



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