

**hp surestore
auto path**

user's guide

HP-UX



notice

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safety notices

Any servicing, adjustment, maintenance, or repair must be performed only by authorized service-trained personnel.

<i>Caution</i>	Denotes a hazard that can cause hardware or software damage.
WARNING	Denotes a hazard that can cause personal injury or death.

format conventions

literal	Specifies text to be typed exactly as shown, such as commands, path names, file names, and directory names.
<i>variable</i>	Indicates that you must supply a value.
output	Denotes text displayed on the screen.
{ }	Indicates that you must choose one of the listed options.
	Separates a choice of options.

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About this guide

The instructions given in this guide are intended for system administrators who already have the following skills and knowledge:

- a background in data processing and understands direct-access storage device subsystems and their basic functions.
- familiarity with disk arrays and RAID technology.
- expertise with the operating system, including commands and utilities.

Unless otherwise noted, the term *disk array* refers to any of these disk arrays:

HP Surestore Disk Array XP256
HP Surestore Disk Array XP512
HP Surestore Disk Array XP48
HP Surestore Virtual Array 7100
HP Surestore Virtual Array 7400

For information about the disk arrays, please refer to the owner's manuals.

Revision history

July 2001	Preliminary release for HP-UX.
October 2001	First release for HP-UX 11.00 and 11.11. Revised installation instructions. Enhanced the CLI commands.

Updates

For the most current information about related products, visit the support web site:

Auto Path XP **www.hp.com/support/apxp**

Auto Path VA **www.hp.com/support/apva**

For information about product availability, configuration, and connectivity, consult your HP account representative.

Auto Path features

HP Auto Path for HP-UX provides automatic input/output (I/O) path failover, recovery, and load balancing for host systems configured with multiple host adapters and connections to a disk array.

Auto Path provides enhanced data availability with these features:

- automatic path failover to an alternate path
- automatic path recovery after failed path is serviced
- dynamic load balancing over multiple paths
- command-line user interface (CLI) for Auto Path management

Dynamic load balancing

Auto Path performs dynamic load balancing while monitoring each path to ensure that the I/O transaction is completed. The load balancing policy is selected by the administrator.

The dynamic load balancing policy prevents any path from becoming overloaded, and it helps to prevent the congestion that occurs when many I/O operations are directed to common devices along the same path.

If a preferred path is used for a device, the entire I/O for that particular device flows through the preferred path. No load balancing is done by Auto Path for that device.

Automatic failover and recovery

In the event of a failure of any part of a path between the disk array and a server, Auto Path automatically switches to an alternate path, dropping the failed path out of the I/O rotation without any loss of data. The failover is not visible to applications, so normal operation continues without downtime.

For troubleshooting information, see “Troubleshooting” (page 25).

Automatic path recovery

When a path fails, it is no longer used. After the path is returned to normal, Auto Path automatically begins using the path with the designated load balancing policy. No user action is necessary.

If the failed path was set as the preferred path, after the path is recovered, Auto Path automatically begins using the preferred path. No user action is necessary.

System requirements

To install Auto Path, the system must conform to these requirements:

- HP-UX 11.00 or 11.11
- administrator **root** access to the HP-UX system
- Devices on the disk array for use by Auto Path must be part of volume groups configured using LVM.

For specific installation requirements for your system, contact your HP account representative.

Additional information Support information about host bus adapter (HBA) driver pairs and switches can be found in the **README.txt** file on the Auto Path installation CD-ROM. If your HBA is not listed, contact your HP account representative.

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Installation

This chapter describes the procedures for installing Auto Path for operation with HP-UX. Installation of Auto Path software is performed by users with administrator privileges.

The HP account representative can assist in determining the supported configurations for your system.

Installing Auto Path software

To install Auto Path, you must have superuser (**root**) access on the host.

Caution *Read the **readme.txt** file on the installation media for more details about installation.*

To install Auto Path:

1. Log on to the HP 9000 system as superuser (**root**).
2. Insert the Auto Path installation CD into the CD-ROM drive.
3. Mount the CD on your file system.
4. From the command line, execute the **extract.sh** script from the CD.
This script creates the **Autopath** directory and copies files to the host.
5. From the command line, execute the **install.sh** script from the **Autopath** directory.
6. For systems with PCI A5158A controller cards, patch PHKL_23939 for HP-UX 11.00 and patch PHKL_23626 or later for HP-UX 11.11 should already be installed on the system. If not, apply the patches.
7. Reboot the system.

Uninstalling Auto Path

To uninstall Auto Path:

1. Log on to the HP 9000 system as superuser (**root**).
2. Enter the following command:
autopath uninstall
3. Reboot the system.

Command-line interface

The Auto Path command-line interface (CLI) can be used only on hosts connected to devices with the Auto Path driver installed. The commands supported by this interface and the syntax are described here:

- **autopath display** (page 20)
- **autopath recover** (page 22)
- **autopath set_lbpolicy** (page 23)
- **autopath set_prefpath** (page 24)
- **autopath uninstall** (page 17)

autopath display

Display devices

Syntax `autopath display { path | all }`

path Specifies a physical device path.

all Displays details about all Auto Path devices in the system.

Description The **autopath display** command displays all paths to the end devices in the system, associated load balancing policies, and status.

In the output, **(PP)** indicates the preferred path.

Examples

```
HP $ autopath display /dev/dsk/c7t0d0
```

```
Auto Path Driver Version: VER 1.01.00
Auto Path CLI Version   : VER 1.01.00
```

```
Details for path: /dev/dsk/c7t0d0
```

```
Load Balance Policy   : Round Robin
```

```
=====
Device Paths          Device Status
=====
/dev/dsk/c7t0d0       Failed
/dev/dsk/c9t0d0       Active
=====
```

```
HP $ autopath display all
```

```
Auto Path Driver Version: VER 1.01.00
Auto Path CLI Version   : VER 1.01.00
```

```
Details for path: /dev/dsk/c7t0d0
```

```
Load Balance Policy   : Round Robin
```

```
=====
Device Paths          Device Status
=====
/dev/dsk/c7t0d0       Failed
/dev/dsk/c9t0d0       Active
=====
```

```

        Details for path:      /dev/dsk/c7t0d1
Load Balance Policy      :      No Load Balance

=====
Device Paths              Device Status
=====
/dev/dsk/c7t0d1           Active
/dev/dsk/c9t0d1           Active
=====

        Details for path:      /dev/dsk/c7t0d2
Load Balance Policy      :      No Load Balance

=====
Device Paths              Device Status
=====
/dev/dsk/c7t0d2           Active
/dev/dsk/c9t0d2           Active
=====

        Details for path:      /dev/dsk/c7t0d3
Load Balance Policy      :      No Load Balance

=====
Device Paths              Device Status
=====
/dev/dsk/c7t0d3           Active
/dev/dsk/c9t0d3           Active
=====

```

autopath recover

Recover failed paths

Syntax `autopath recover`

Description The **autopath recover** command spawns a process to enable automatic path recovery. This command is automatically activated during system boot time.

If the process is terminated or is not invoked automatically, you can invoke this command from the command line to enable the automatic path recovery feature.

Related information “Automatic path recovery” (page 12)

autopath set_lbpolicy

Set load-balancing policy

Syntax `autopath set_lbpolicy policy path`

<i>policy</i>	The load balancing policy name:
none	no load balancing policy
RR	round robin
SQL	shortest queue length
SST	shortest service time
<i>path</i>	The physical device path.

Description The `autopath set_lbpolicy` command sets the load balance policy for the specified device path.

Example

```
HP $ autopath set_lbpolicy RR /dev/dsk/c0t0d0
HP $ AUTOPATH UI : Load Balance Policy RR set successfully.
```

autopath set_prefpath

Set preferred path

Syntax `autopath set_prefpath path`

path The physical device path.

Description The `autopath set_prefpath` command sets the preferred device path when no load balancing policy has been set. When the path details are displayed with the `autopath display` command, the preferred path is marked **(PP)**.

Example HP \$ autopath set_prefpath /dev/dsk/c4t0d0
HP \$ AUTOPATH UI : Preferred Path set successfully

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Troubleshooting

Troubleshooting can be performed by the customer or an HP service representative in accordance with your HP service contract. If you are unable to resolve an error condition, ask your HP service representative for assistance.

Recovering after a failure

When a path fails, it is no longer used by Auto Path. After the path is returned to normal, Auto Path automatically begins using the path with the designated load balancing policy. No user action is necessary.

If the failed path was the designated preferred path, after the path recovers, Auto Path automatically begins using the path as the preferred path. No user action is necessary.

Related information **autopath recover** (page 22)

Contacting HP customer service

If you call HP customer support, provide as much information about the problem as possible, including the circumstances surrounding the error or failure and the exact content of any error messages displayed on the host system.

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