

installation and reference guide

HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays



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HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays

Contents

- About this guide 5
 - Intended audience 5
 - Related documentation 5
 - Document conventions and symbols 5
 - HP technical support 6
 - HP-authorized reseller 6
 - Helpful web sites 6

- 1 Installing the HP MPIO Full-Featured Device Specific Module (DSM) for Windows for EVA Disk Arrays software 9
 - Preparing for installation 9
 - Installing HP MPIO EVA DSM software 10
 - Installing HP MPIO EVA DSM 10
 - Installing HP MPIO EVA DSM on stand-alone systems 10
 - Installing HP MPIO EVA DSM on cluster configurations 11
 - Setting up boot from a SAN 11
 - Removing HP MPIO EVA DSM software 12
 - Using silent installation 12
 - Installing HP MPIO EVA DSM 13
 - Upgrading HP MPIO EVA DSM 13
 - Removing HP MPIO EVA DSM 14

- 2 Managing storage arrays using the HP MPIO EVA DSM with the CLI utility 15
 - CLI commands 15
 - hpdsm devices 15
 - hpdsm paths device 16
 - hpdsm set device policy 16
 - hpdsm set device path 17
 - hpdsm cleanup device 17
 - hpdsm notify 17
 - hpdsm help 19

- A Software components 21
 - Drivers 21
 - User mode components 21
 - HP MPIO DSM manager GUI 21
 - HP MPIO EVA DSM command line interface (CLI) 22
 - HP MPIO EVA DSM performance monitoring provider 22

- B Multipathing driver event log messages 23
 - MPIO.SYS event log messages 23
 - HP MPIO EVA DSM event log messages 26

- Glossary 27

- Index 29

Tables

1 Document conventions	5
2 Pre-installation checklist	10
3 Notification strings	18
4 HP MPIO DSM manager GUI files	22
5 MPIO.SYS event log messages	23
6 HP MPIO EVA DSM event log messages	26

About this guide

This guide provides information about HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays (called the “HP MPIO EVA DSM” throughout this guide), including:

- Installing HP MPIO EVA DSM software
- Managing HP MPIO EVA DSM

Intended audience

This document is intended for customers who have purchased the HP MPIO EVA DSM and who are experienced with the following:

- Microsoft Windows 2000 and Windows Server 2003 (32-bit or 64-bit systems)
- EVA4000, EVA6000, and EVA8000 disk arrays
- Microsoft Cluster Server (MSCS)

Related documentation

In addition to this guide, please refer to the following document for this product:

- *HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays release notes.*

Additional documentation, including whitepapers and best-practices documents, is available at: <http://www.hp.com>.

Document conventions and symbols

Table 1 Document conventions

Convention	Element
Medium blue text: Related documentation	Cross-reference links and email addresses
Medium blue, underlined text (http://www.hp.com)	Web site addresses
Bold font	<ul style="list-style-type: none">• Key names• Text typed into a GUI element, such as into a box• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
<i>Italic font</i>	Text emphasis
Monospace font	<ul style="list-style-type: none">• File and directory names• System output• Code• Text typed at the command line
<i>Monospace, italic font</i>	<ul style="list-style-type: none">• Code variables• Command-line variables
Monospace, bold font	Emphasis of file and directory names, system output, code, and text typed at the command line

 **WARNING!**

Indicates that failure to follow directions could result in bodily harm or death.

 **CAUTION:**

Indicates that failure to follow directions could result in damage to equipment or data.

 **IMPORTANT:**

Provides clarifying information or specific instructions.

 **NOTE:**

Provides additional information.

HP technical support

Telephone numbers for worldwide technical support are listed on the HP support web site: <http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP recommends that customers sign up online using the Subscriber's choice web site: <http://www.hp.com/go/e-updates>.

- Subscribing to this service provides you with e-mail updates on the latest product enhancements, newer versions of drivers, and firmware documentation updates as well as instant access to other product resources.
- After signing up, you can quickly locate your products by selecting Business support and then Storage under Product Category.

HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-282-6672.
- Elsewhere, visit the HP web site: <http://www.hp.com>. Then click Contact HP to find locations and telephone numbers.

Helpful web sites

For other product information, see the following HP web sites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- <http://www.hp.com/support/>
- <http://www.docs.hp.com>

1 Installing the HP MPIO Full-Featured Device Specific Module (DSM) for Windows for EVA Disk Arrays software

HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays (HP MPIO EVA DSM) provides multipathing support for HP StorageWorks disk arrays on Windows platforms using the Microsoft Multipath Input-Output (MPIO) framework. This chapter provides instructions for installing and removing the HP MPIO EVA DSM, including:

- [Preparing for installation](#)
- [Installing HP MPIO EVA DSM software](#)
 - [Setting up boot from a SAN](#)
- [Removing HP MPIO EVA DSM software](#)
- [Using silent installation](#)

Preparing for installation

Before installing HP MPIO EVA DSM, verify that your system components supports the HP MPIO EVA DSM and whether or not you need to upgrade hardware or software before installation.

 **NOTE:**

Some of the tasks or procedure steps may not apply to your configuration.

To prepare your system for the installation of HP MPIO EVA DSM:

1. Complete the Pre-Installation checklist ([Table 2](#)).
2. Install all hardware components, as described in the hardware installation and configuration documentation.
3. Install the required operating system service packs, if applicable.
4. Back up your computer.
5. Log in with Administrator privileges.
6. Ensure that no other installation program is in progress (for example, the Found New Hardware wizard).
7. If your system is running Microsoft Terminal Server, change the Terminal Server from Execution mode to Installation mode.

Table 2 lists the information you need before installing the HP MPIO EVA DSM software.

Table 2 Pre-installation checklist

Task	
Check the contents of the HP MPIO EVA DSM kit and the Fibre Channel hardware to make sure nothing is missing. If you are missing any component, contact your account representative, or call the HP Customer Service hotline at (800) 354-9000.	<input type="checkbox"/>
Obtain and review the most current versions of the following documents: <ul style="list-style-type: none">• <i>HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays release notes</i>• Installation and configuration information for your system, available at the following web site: http://www.hp.com/country/us/eng/prodserv/storage.html• Supported SAN topologies for HP MPIO EVA DSM, as defined and described in the <i>HP StorageWorks SAN design reference guide</i> available at the following web site: http://h18006.www1.hp.com/products/storageworks/san/documentation.html. [http://h18006.www1.hp.com/products/storageworks/san/documentation.html]	<input type="checkbox"/>
Refer to the <i>HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays release notes</i> to verify that your Host Bus Adapter (HBA) drivers are the required version(s).	<input type="checkbox"/>
Check your HP MPIO EVA DSM's license to determine on which systems you can install the software: <ul style="list-style-type: none">• Full license (part number ending in AA)—No installation restrictions• Upgrade license (part number ending in CA)—Requires previously installed HP MPIO EVA DSM software.	<input type="checkbox"/>

△ **CAUTION:**

Installing HP MPIO EVA DSM software when the Terminal Server is in execution mode may have adverse effects on other software products. For detailed information, refer to the Microsoft web site: <http://support.microsoft.com/default.aspx?scid=kb;en-us;186612>.

Installing HP MPIO EVA DSM software

You can install HP MPIO EVA DSM on a stand-alone system or cluster configuration. The procedure that you follow depends on your current system configuration.

- [Installing HP MPIO EVA DSM](#)
- [Setting up boot from a SAN](#)

Installing HP MPIO EVA DSM

This section describes how to install HP MPIO EVA DSM on the following configurations:

- [Installing HP MPIO EVA DSM on stand-alone systems](#)
- [Installing HP MPIO EVA DSM on cluster configurations](#)

Installing HP MPIO EVA DSM on stand-alone systems

You can install this software prior to attaching the hardware. To install the HP MPIO EVA DSM on a stand-alone system:

1. Complete the pre-installation checklist (Table 2) and the pre-installation procedure.
2. Ensure that only a single path is connected to the storage devices.
3. Configure the storage sets.
4. Insert the HP MPIO EVA DSM software CD-ROM on your server or a network drive.

5. Choose one of the following options to access the CD-ROM:
 - From your server: If you have `AutoRun` enabled on your server, the setup program starts automatically. Otherwise, select Start > Run, then browse to the `Launch.exe` program on the CD-ROM drive.
 - From your Network drive: If you are accessing the CD-ROM on a Network drive, select Start > Run, then browse to the `Launch.exe` program on the network drive.
6. In the launch window, click Install HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays.
7. Read the information displayed on your screen to complete the installation.
8. Add the redundant paths to the storage devices.

Installing HP MPIO EVA DSM on cluster configurations

To install HP MPIO EVA DSM on each member of a cluster configuration:



NOTE:

In a cluster configuration, HP MPIO EVA DSM must be installed on one cluster at a time.

1. Complete the pre-installation checklist (Table 2) and the pre-installation procedure.
2. Using Cluster Administrator:
 - Move all cluster shared storage to one server.
 - Pause cluster node A.
 - Select Resource Attributes > Disable failback for all groups containing resources managed by MSCS.
3. Install HP MPIO EVA DSM on node A by following step 2-8 from the procedure [Installing HP MPIO EVA DSM on stand-alone systems](#).
4. Using Cluster Administrator:
 - Unpause cluster node A.
 - Pause cluster node B.
5. Install HP MPIO EVA DSM on node B, following step 2-8 from the procedure [Installing HP MPIO EVA DSM on stand-alone systems](#).
6. Using Cluster Administrator:
 - Unpause cluster node B.
 - Restore failback as needed.
 - Redistribute LUNs.

Setting up boot from a SAN

HP MPIO EVA DSM can be set up to boot externally from a SAN that uses HP StorageWorks HBAs and RAID arrays. Booting externally offers the following advantages:

- Optional elimination of server-based internal boot devices.
- Decreased downtime in the event of a server failure.

However, booting from a SAN requires specific setup procedures based on the specific software solutions, HBA firmware, and boot BIOS versions. Refer to the following documents for detailed information about booting from a SAN:

- *HP StorageWorks Booting 32-bit Windows from a Storage Area Network Application Notes* available at this web site: <http://h18006.www1.hp.com/products/storageworks/san/documentation.html>.

- *HP StorageWorks Booting Itanium 64-bit Windows Systems from a Storage Area Network Application Notes* available at this web site: <http://h18006.www1.hp.com/products/storageworks/san/documentation.html>.

Removing HP MPIO EVA DSM software

To remove the HP MPIO EVA DSM software, you must re-configure the SAN and reboot your server.

CAUTION:

Removing multipathing software from a multipath hardware configuration can cause data loss or corruption. Be sure to disconnect the server from multipath storage or eliminate all but one path to that storage from the server prior to removing the HP MPIO EVA DSM software.

NOTE:

Do not start this procedure unless you can complete all of the following steps without interruption.

To remove HP MPIO EVA DSM software:

1. Back up all user data on multipath storage.
2. If possible, disconnect the storage from the server. If it is necessary to maintain single-path connections from the server to the storage (as in the case of servers that boot from a SAN device), use the following guidelines:
 - If it is a one-host/one-storage array, HP recommends removing redundant cable connections.
 - If the storage continues to be accessed by other servers still in multipath mode and by this server in single-path mode and it is on an EVA systems, use switch zoning to establish the single connection (path) from the server.
3. Select Start > Settings > Control Panel > Add or Remove Programs.
4. Select HP MPIO Full-Featured DSM for Windows for EVA Disk Arrays from the Remove Program dropdown list.
5. Click Remove and follow the prompts.

The system displays a cautionary statement advising of the potential data loss or corruption that could result from removing this software.
6. Close the Add/Remove Programs window.

NOTE:

The LUNs may be inaccessible at this time.

7. Reboot the system.

Using silent installation

Silent installation can be run from the CD-ROM on your computer or from a network drive. It installs the HP MPIO EVA DSM with little intervention. Silent installation is useful if you are installing the software on a large number of servers that require software installation.

This section describes how to use silent installation to perform a new installation, to upgrade an existing installation, or to remove an existing installation, including:

- [Installing HP MPIO EVA DSM](#)
- [Upgrading HP MPIO EVA DSM](#)
- [Removing HP MPIO EVA DSM](#)

Syntax

```
<install drive>:\MPInstall\setup.exe /s /f1C:\setup.iss /f2C:\MPSInstallLog.txt
```

The <install drive> refers to the drive which contains the installation media.

The setup.iss is the response file from which information is taken for silent installation.

The MPSInstallLog.txt file records information about the silent installation. The installation completes in a few minutes.



NOTE:

The C: in /f1C: and /f2C: refers to a local drive on the system or a network drive on which the response file is created and MPSInstallLog.txt is written (provided there is write permission in the directory).

```
<Default_Target_Dir> = C:\Program Files\Hewlett-Packard\HP MPIO DSM\EVA DSM
```

<User_Target_Dir>= a directory on the system on which the new installation is to be done or directory of an existing installation.

Installing HP MPIO EVA DSM

To perform a silent installation of HP MPIO EVA DSM:

1. Make a copy of the new.iss file in the installation kit.
2. Rename this copy of the file as setup.iss
3. Choose one of the following options:
 - To install the Microsoft MPIO Framework component along with the DSM component, use the default setup.iss file.
 - To install only the DSM component (when the Microsoft MPIO Framework already exists on your system), edit the setup.iss file as follows:
 - a. In line 33, replace Component-count=2 with Component-count=1.
 - b. Remove line 34.
 - c. In line 35, replace Component-1=DSM with Component-0=DSM.
4. If you want to install to a directory other than the default directory, replace szDir= <Default_Target_Dir> with szDir= <User_Target_Dir> in lines 26 and 31 of the setup.iss file.
5. If you want to avoid the automatic reboot feature, edit the setup.iss file as follows:
 - In line 47, replace Result=6 with Result=1.
 - In line 48, replace BootOption =3 with BootOption=0.

Upgrading HP MPIO EVA DSM

To upgrade from a previous version of HP MPIO EVA DSM to the current version, complete the following steps:

1. Make a copy of the update.iss file in the installation kit.
2. Rename this copy of the file as setup.iss
3. Choose one of the following options:
 - To install the Microsoft MPIO Framework component along with the DSM component, use the default setup.iss file.

- To install only the DSM component (when the Microsoft MPIO Framework already exists on your system), edit the `setup.iss` file as follows:
 - a. In line 22, replace `Component-count=2` with `Component-count=1`.
 - b. Remove line 23.
 - c. In line 24, replace `Component-1=DSM` with `Component-0=DSM`.
- 4. If you want to avoid the automatic reboot feature, edit the `setup.iss` file as follows:
 - In line 36, replace `Result=6` with `Result=1`.
 - In line 37, replace `BootOption =3` with `BootOption=0`.

Removing HP MPIO EVA DSM

To remove HP MPIO EVA DSM:

1. Make a copy of the `uninstall.iss` file in the installation kit.
2. Rename this copy of the file as `setup.iss`
3. If you want to avoid the automatic reboot feature, edit the `setup.iss` file as follows:
 - In line 28, replace `Result=6` with `Result=1`.
 - In line 29, replace `BootOption=3` with `BootOption=0`.

2 Managing storage arrays using the HP MPIO EVA DSM with the CLI utility

The Command Line Interface utility (CLI) for HP MPIO EVA DSM provides the ability to monitor and manage multipathing devices. This chapter describes the user interface for the CLI, including:

- [CLI commands](#)

CLI commands

This section describes the CLI commands:

- [hpdsm devices](#)
- [hpdsm path device](#)
- [hpdsm set device policy](#)
- [hpdsm set device path](#)
- [hpdsm cleanup device](#)
- [hpdsm notify](#)
- [hpdsm help](#)

hpdsm devices

Syntax: `hpdsm devices`

The `hpdsm devices` command displays information about the HP MPIO devices as shown in the following example. If there are no devices present, the following message is displayed:
No devices found.



NOTE:

See [hpdsm set device policy](#) for a definition of the policies. The P.B.T.L. column shows the device port, bus, target, and LUN.

Example:

hpdsm devices

Device#	Device Name	Serial No.	Active Paths	Policy	Disk#	P.B.T.L
1	HP HSV210	600508B400101F6A00006000000A0000	8	NLB	Disk 2	4.1.1.1
2	HP HSV210	600508B400101F6A0000600000100000	8	SQST	Disk 3	4.1.2.2
3	HP HSV210	600508B400101F6A0000600000160000	8	SQST	Disk 4	4.1.0.3
4	HP HSV210	600508B400101F6A00006000001C0000	8	NLB	Disk 5	4.1.1.4
5	HP HSV210	600508B400101F6A0000600000220000	8	RR	Disk 6	4.1.2.5
6	HP HSV210	600508B400101F6A0000600000270000	8	SQST	Disk 7	4.1.2.6
7	HP HSV210	600508B400101F6A00006000002C0000	8	SQST	Disk 8	4.1.1.7
8	HP HSV210	600508B400101F6A0000600000310000	8	SQST	Disk 9	4.1.0.8

hpdsm paths device

Syntax: `hpdsm paths device=x`

The `hpdsm paths device` command displays information about the paths available for device `x`, as shown in the following example.

 **NOTE:**

The P.B.T.L. column shows the device port, bus, target, and LUN.

```
hpdsm paths device=1
```

Path#	Controller Port#	State	HBA Slot#	P.B.T.L
1	P8398DXAAQQ010	Active	11	4.1.0.1
2	P8398DXAAQQ013	Active	11	4.1.1.1
3	P8398DXAAQQ010	Active	11	4.1.2.1
4	P8398DXAAQQ013	Active	11	4.1.3.1
5	P8398DXAAQQ010	Active	11	5.1.0.1
6	P8398DXAAQQ013	Active	11	5.1.1.1
7	P8398DXAAQQ010	Active	11	5.1.2.1
8	P8398DXAAQQ013	Active	11	5.1.3.1

hpdsm set device policy

Syntax: `hpdsm set device=x policy=policy`

The `hpdsm set device policy` command sets the load balancing policy for device `x` to one of the following:

- No_Load_Balance (NLB)
- Round_Robin (RR)
- Shortest_Queue_Requests (SQR)
- Shortest_Queue_Bytes (SQB)
- Shortest_Queue_ServiceTime (SQST)

The example below demonstrate the information displayed by the `hpdsm set device policy` command.

 **NOTE:**

You can not change the load balance policy in an MSCS environment.

Example:

```
hpdsm set device=1 policy=sqst
```

```
Device Name           : HP HSV210
Device Serial No.     : 600508B400101F6A00006000000A0000
Change Load Balance policy (y/n) ? y
```

```
Load Balance policy changed.  Verify by issuing "hpdsm" command.
```


hpdsm set device path

Syntax: `hpdsm set device=x path=y`

The `hpdsm set device path` command changes the preferred path for device *x*, as shown in the example below.



NOTE:

Use the `hpdsm paths device` command to view the available paths for the device.

```
hpdsm set device=1 path=1
```

```
Device Name           : HP HSV210
Device Serial No.     : 600508B400101F6A00006000000A0000
Controller Port No.   : P8398DXAAQQ010
Change Load Balance policy (y/n) ? y
```

Preferred Path changed. Verify by issuing "hpdsm devices" command.

hpdsm cleanup device

Syntax: `hpdsm cleanup device=x`

The `hpdsm cleanup device` command allows you to clean up the failed path information for specified device *x*, as shown in the example below:

Example:

```
hpdsm cleanup device=1
```

```
Device Name           : HP HSV210
Device Serial No.     : 600508B400101F6A00006000000A0000
Cleanup the failed path information for this LUN (y/n) ? y
Cleanup Succeeded. Verify by issuing "hpdsm" command.
```

hpdsm notify

Syntax: `hpdsm notify event = notification_event_number time=number_of_minutes`

The `hpdsm notify` command defines user notification of events. The time attribute defines the number of minutes that will elapse from the time the event occurs until the user is notified. The maximum value is 700,000 minutes.

Received HPDSM_PATH_FAILOVER from HPEVADSM

hpdsm help

Syntax: hpdsm help

The `hpdsm help` command displays help information for the CLI.

A Software components

This appendix describes the HP MPIO EVA DSM software components, including:

- [Drivers](#)
- [User mode components](#)

Drivers

Multipathing drivers are a critical element of the operating system. The HP MPIO EVA DSM software components include the following multipath drivers:

- **Microsoft Framework Drivers**
 - `MPIO.SYS` is the Multipathing bus driver.
 - `MPDEV.SYS` is the replacement class driver. It communicates with `MPIO.SYS`.
 - `MSPFLTR.SYS` is a port driver filter (HBA upper filter).
- **HP Device Specific Module (DSM) driver**
 - `HPEAADM.SYS` is the HP DSM driver for EVA disk arrays. It interacts with `MPIO.SYS` to provide device-specific functions.

HP recommends that you do not remove, delete, or disable these drivers while multipath hardware is attached to your system.

User mode components

The user mode components includes: –

- [HP MPIO DSM manager GUI](#)
- [HP MPIO EVA DSM command line interface](#)
- [HP MPIO EVA DSM performance monitoring provider](#)

HP MPIO DSM manager GUI

The HP MPIO DSM manager GUI monitors and manages the HP DSMs. It also enables administrator to receive email notifications on path/device failure events. The HP MPIO DSM

Manager is provided as a separate installation package. HP MPIO DSM Manager contains files described in [Table 4](#):

Table 4 HP MPIO DSM manager GUI files

File	Description
SecurePathMgr.dll	This is the Microsoft Management Console snap-in DLL used to manage the HP DSMs.
VolInfoDLL.dll	Gathers information about the drive letter, mount points, and volume labels from the system.
SpWmiInfo.dll	Handles the communication with the HP DSMs using WMI interfaces.
SpNotifier.dll	Used by the SpMonitor.exe to send E-mail notifications.
SpEditCfg.exe	Creates and modifies the configuration file for E-mail notifications.
SpMonitor.exe	Sends E-mail notifications using the configuration information specified in the file SPNotificationConfig.xml.
BlankSPNotificationConfig.xml	Used as a blank template file used by the SpEditCfg.exe to create the actual configuration file for E-mail notifications.
SPNotificationConfig.xml	Generated by SpEditCfg.exe and stores the configuration information for E-mail notifications.

HP MPIO EVA DSM command line interface (CLI)

The HP MPIO EVA DSM command line interface (HPDSM.EXE) enables you to monitor and manage HP DSMs in an MPIO environment.

HP MPIO EVA DSM performance monitoring provider

The HP MPIO EVA DSM performance monitoring provider (HpPerfProv.DLL) helps you monitor the Input/Output (I/O) performance of a path using the system monitor.

B Multipathing driver event log messages

This appendix lists event log messages for HP MPIO EVA DSM drivers and provides a description of each message. The error log messages are written to the `SYSTEM` log file.

This appendix provides information about the following event log messages:

- [MPIO.SYS event log messages](#)
- [HP MPIO EVA DSM event log messages](#)

MPIO.SYS event log messages

Table 5 lists MPIO driver event log messages, an explanation of each message, and a description of the data that accompanies the message.

Table 5 MPIO.SYS event log messages

Event ID	Message	Description	Contents of the data dump
1	<i>Pseudo-LUN</i> created.	MPIO created a new pseudo-LUN (a new disk physical device object).	N/A
2	Added device to <i>pseudo-LUN</i> .	A new instance of an existing pseudo-LUN device object is seen through a different path.	The current number of paths to the device
3	There was an error creating a device claimed by the DSM.	MPIO failed to create a new (or update an existing) pseudo-LUN device object, even though <i>DSM_name</i> claimed support for it.	N/A
16	A fail-over on <i>pseudo-LUN</i> occurred.	A pseudo-LUN handled a failover. This message does not indicate whether the failover was successful.	The Path ID of the failed device
17	<i>Pseudo-LUN</i> is currently in a degraded state. One or more paths have failed, though the process is now complete.	At least one path to a pseudo-LUN has failed. This signals the end of failover handling for the pseudo-LUN and that the device is now operating with at least one less path.	N/A
18	A Single Path Fail-Over is being attempted on <i>pseudo-LUN</i>	A pseudo-LUN has just one path, and DSM has requested a failover.	The Path ID of the failing device
19	An operation failed on device due to lack of memory.	Resource allocation failed during an attempted failover, and failover is not currently active.	The Path ID of the failing device

Event ID	Message	Description	Contents of the data dump
20	A Path Verification request to a device on <i>pseudo-LUN</i> that is controlled by <i>DSM_name</i> has failed. This may indicate a path failure.	A call to a DSM's PathVerify routine to a pseudo-LUN has failed. This event occurs during final initialization after PathVerify has checked whether the device can be reached through a newly found path.	N/A
21	The internal state of <i>device_object</i> is inconsistent. This indicates potential failures in this support.	MPIO is unable to run through its maintained list of pseudo-LUNs.	N/A
22	A fail-over on <i>pseudo-LUN</i> was attempted, however the attempt failed. The devices will be removed.	A failover attempt on a pseudo-LUN has failed. This could indicate that the DSM did not return a valid path after the call to InvalidatePath.	N/A
23	All paths have failed. <i>Pseudo-LUN</i> will be removed.	There are no available paths to the pseudo-LUN. The device has gone into total failure and will be removed.	N/A
24	A PnP Operation rejected, as <i>device</i> is not in a state where the request can be honored.	A PnP request for QueryRemove was rejected because the device is in the paging, hiber, or crash dump path state.	N/A
25	Requests that were queued to <i>pseudo-LUN</i> have failed during resubmission.	An issued request from the pseudo-LUN's queue failed. This always occurs when the device is in the process of being removed.	Path ID used for resubmission
32	<i>DSM_name</i> failed to return a Path to <i>pseudo-LUN</i> .	One of the following events occurred during failover: MPIO's call to the DSMs InvalidatePath failed; DSM did not return a new path; DSM did not return a path when MPIO called the LBGetPath routine.	N/A
33	<i>DSM_name</i> returned a bogus path to <i>device</i> .	MPIO is unable to find an operational device-path pair representation (device info) for the path that the DSM wants to use for the I/O to the device	Bogus Path ID returned by DSM; If the Path ID = NULL, the DSM has failed to return a path.
35	<i>DSM_name</i> supplied an invalid ID for an operation on <i>notification_type</i> .	MPIO received a DSMNotification call, but is unable to map the DSMID to a device.	DSM ID

Event ID	Message	Description	Contents of the data dump
36	An unknown DSM supplied an invalid ID for an operation on <i>pseudo-LUN</i> .	DSM called DSMSendRequest to have MPIO send a request on its behalf, but MPIO is unable to find the <i>pseudo-LUN</i> requested.	DSM ID
37	<i>DSM_name</i> is attempting an operation on <i>pseudo-LUN</i> . The Type is noted in the dump data.	<i>DSM_name</i> has called DSMNotification on a <i>pseudo-LUN</i> .	The type of notification called by DSM
38	A device under <i>pseudo-LUN</i> , being controlled by <i>DSM_name</i> was removed, but the DSM failed the operation.	An MPIO call to DSM's RemoveDevice operation failed.	DSM ID of the failed attempt

HP MPIO EVA DSM event log messages

Table 6 lists the HP MPIO EVA DSM event log messages and provides a description of each message.

Table 6 HP MPIO EVA DSM event log messages

Event ID	Message	Description
101	Discovered a new multipath capable disk with serial number X; first path SCSI address Y.	A new multipath disk has been discovered. X represents the serial number of the new disk. Y is the SCSI address of the first path to this disk.
102	A new path (SCSI address Y) was added to existing multipath capable disk X.	A new path to an existing multipath disk has been discovered. X represents the serial number of the disk. Y is the SCSI address of the new path that was found.
103	The path (SCSI address Y) to multipath capable disk X has recovered.	A failed path to an existing multipath disk has recovered. X represents the serial number of the disk. Y is the SCSI address of the path that has been recovered.
108	The DSM has completed remove processing for path (SCSI address Y) to multipath capable disk X.	The DSM has completed processing the removal notification for a path to a given multipath disk. X represents the serial number of the disk. Y is the SCSI address of the path for which the removal notification has been processed.
301	The DSM failed to initialize during startup.	The DSM did not initialize successfully during startup.
302	An unrecoverable path failure occurred on SCSI address Y. Disk X failed due to no redundant paths available.	All paths to an existing multipath disk have failed. X represents the serial number of the disk. Y is the SCSI address of the last path that failed.
303	Too many paths for disk with serial number X. Path (SCSI address Y) not added.	A new path in excess of the supported number of paths for an existing multipath disk has been discovered. X represents the serial number of the disk. Y is the SCSI address of the newly found path.
304	An unrecoverable path failure occurred on SCSI address Y. Disk X is still accessible over redundant path(s).	A redundant path to an existing multipath disk has failed. X represents the serial number of the disk. Y is the SCSI address of the path that failed.

Glossary

This glossary defines the terms used in this guide or related to this product. It is not a comprehensive glossary of computer terms.

controller	A hardware device that facilitates communication between a host and one or more LUNs organized as an array.
DSM	Device Specific Module
fabric	A network that contains high-speed fiber connections resulting from the interconnection of switches and devices. A fabric is an active and intelligent non-shared interconnect scheme for nodes.
failover	The automatic substitution of a functionally equivalent system component for a component that has failed.
HBA	Host Bus Adapter. An I/O device that serves as the interface connecting a host system to the SCSI bus or SAN (Storage Area Network)
host	The computer system on which the Multipath software is running.
LUN	Logical Unit Number. The actual unit number assigned to a device by the RAID system controller.
mode	<p>A user-selectable parameter that specifies path behavior during normal and failure conditions. Paths can be set to one of the following modes:</p> <ul style="list-style-type: none">• Preferred — Indicates the path you choose for the desired I/O paths. When a path is in preferred mode, load balance is not enabled and the Load Balance Type displays as <code>none</code>.• Alternate — Indicates a path that is used for device access and I/O activities when the preferred path fails..
MPIO	Multipathing Input/Output.
path	A virtual communication route that enables data and commands to pass between a host server and a storage device.
path state	<p>An attribute that describes the operational condition of a path. A path can exist in one of the following states:</p> <ul style="list-style-type: none">• Active — Path is currently used for the I/O stream or is available for load balancing.• Available — Path is currently available, but not used for device access. The path is only in this state when no load balancing policy has been selected for the LUN.• Standby — Intermediate state of the path before it is initialized (made ready for device access), normally will not be seen.• Failed — Path is currently unusable for the I/O stream.
port A	The relative number of an HBA. A specific port number is determined according to its order of discovery by the Windows operating system. HBA's include SCSI, Fibre Channel, and IDE adapter types.

SAN	Storage Area Network. A configuration of networked devices for storage.
state	<p>An attribute that describes the current operational condition of an object. The possible state include:</p> <ul style="list-style-type: none"> • Good: The multipathing device can be accessed on at least one path. • Degraded: One or more paths are failed to the storage unit.
target	<p>The definition of target depends on the environment:</p> <ul style="list-style-type: none"> • For parallel SCSI configurations, the target is the actual target number assigned to a device. • For Fibre Channel configurations, a target number is assigned by a mapping function at the miniport–driver level and is derived from AL_PA (Arbitrated Loop Physical Addresses) in an FC–AL topology. • For SAN switched fabric, a target is assigned to a WWPN. This target can have values between 16 and 125. • For a fabric topology, target is a mapping function derived from the order of discovery according to port connections at the SAN (Storage Area Network) switch.
topology	An interconnection scheme that allows multiple servers and storage devices to communicate. Arbitrated loop and switched fabric are examples of Fibre Channel topologies.

Index

B

boot from SAN
 setting up, 11

C

conventions
 text symbols, 6

D

documentation
 HP web site, 5
drivers
 Multipathing bus, 21
 replacement class, 21

H

HP
 Subscriber's choice web site, 6

I

installation
 silent, 12
installing

Multipathing software, 10

M

MPDEV.SYS, 21
MPIO.SYS, 21

R

related documentation, 5
removing Multipathing software, 12

S

Subscriber's choice, HP, 6
symbols in text, 6

T

text symbols, 6

W

web sites
 HP documentation, 5
 HP Subscriber's choice, 6