Oracle FS Path Manager 4

Release Notes

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Preface

Oracle Resources

Important: For the latest version of this document, visit the *SAN Storage – Oracle Flash Storage Systems* section at the Oracle Help Center (http://www.oracle.com/goto/fssystems/docs).

Table 1: Oracle resources

For help with...	Contact...
Support	*http://www.oracle.com/support* (www.oracle.com/support)
Training	*https://education.oracle.com* (https://education.oracle.com)
Documentation	• *SAN Storage – Oracle Flash Storage Systems*: (http://www.oracle.com/goto/fssystems/docs) • From Oracle FS System Manager (GUI): **Help** > **Documentation** • From Oracle FS System HTTP access: (*system-name-ip*/documentation.php where *system-name-ip* is the name or the public IP address of your system)
Documentation feedback	*http://www.oracle.com/goto/docfeedback* (http://www.orarcle.com/goto/docfeedback)
Contact Oracle	*http://www.oracle.com/us/corporate/contact/index.html* (http://www.oracle.com/us/corporate/contact/ index.html)

Typographical Conventions

Table 2: Typography to mark certain content

Convention	Meaning
italics	Within normal text, words in italics indicate one of the following items: • Hypertext, as in a URL • A reference to a book title • New terms and emphasized words • Command variables
`monospace`	Indicates one of the following, depending on the context: • The name of a file or the path to the file • *Output* displayed by the system on the command line
`monospace` (bold)	*Input* provided by an administrator on the command line.
>	Indicates a menu item or a navigation path in Oracle FS System Manager (GUI). For example, "Click **SAN** > **Storage** > **LUNS** > **Action** > **Clone**" means to click the **Clone** link on the **SAN** page in the GUI.
...	Indicates that one or more steps have been omitted from the path or menu structure. The ellipsis is used within an expression of a navigation path or within a cascading menu structure. For example, in the **SAN** > **Storage** > **LUNS** > **...** > **Clone** menu structure, the **...** implies that one or more menu items have been omitted.

Command Syntax Conventions

Table 3: Typography to mark command syntax

Typographic symbol	Meaning
[ ]	Square brackets. Delimits an optional command parameter or a set of optional command parameters.
{ }	Braces. Delimits a set of command parameters, one of which must be selected.
|	Vertical bar. Separates mutually exclusive parameters.
. . .	Ellipsis. Indicates that the immediately preceding parameter or group of parameters can be repeated.
`monospace`	Indicates the name of a command or the name of a command option (sometimes called a *flag* or *switch*).
italic	Indicates a variable for which you need to supply a value.

Command parameters that are not enclosed within square brackets ([ ]) are required.

Important: The above symbols (and font styling) are based on the POSIX.1-2008 specification. These symbols are used in the command syntax only to clarify how to use the command parameters. *Do not enter these symbols on the command line.*

C<small>HAPTER</small> 1

FSPM and Oracle FS System Notes

Known Oracle FS System and Pillar Axiom Issues

The following issues are associated with the listed versions of the Oracle FS System and Pillar Axiom systems.

Table 4: Known Oracle FS System and Pillar Axiom issues

Fixed in release	Issue	Workaround or planned fix
5.0	[13759030] If an iSCSI initiator is connected to a port on a Controller (Slammer), and that Controller (Slammer) is powered off, the GUI displays the LUN and Host connection status for the iSCSI initiator as `Connected`.	This issue is fixed in release 5.0 of the Pillar Axiom software.
5.0	[13759805] If more than 256 SAN LUNs are configured on an Pillar Axiom, the GUI can send invalid messages to the FSPM daemon running on SAN host systems. The control path connection between FSPM and the Pillar Axiom continually moves between `Communicating` and `Not Communicating` states. This prevents features that depend on the FSPM control path (such as setting the load balancing algorithm) from working properly. The data path, which manages LUN access from the host, is not affected.	This issue is fixed in release 5.0 of the Pillar Axiom software.

Table 4: Known Oracle FS System and Pillar Axiom issues (continued)

Fixed in release	Issue	Workaround or planned fix
5.2.1 (and 4.5.1)	[13764609, 13762326] While the system is recovering from temporary use of non-optimized paths to the alternate Controller (Slammer), there can be a decrease in I/O performance between a LUN and a Controller (Slammer).	This issue is fixed in release 4.5.1 or higher and 5.2.1 or higher of the Pillar Axiom software. If the Pillar Axiom is running a release earlier than 4.5.1 or 5.2.1, you can perform the following actions: 1 Re-home the LUN to the alternate CU on the Controller (Slammer) by following the instructions in the *Oracle Flash Storage System Administrator's Guide* to re-home the LUN. 2 Re-home the LUN again to the Controller (Slammer).
5.4	[13764561] The GUI sometimes continues to display host paths that are no longer valid after FSPM stops. FSPM no longer communicates path information to the GUI and the GUI continues to display the host paths as if FSPM was still running.	This issue is fixed in release 5.4 of the Pillar Axiom software.
5.4	[14581579] A defect in the Pillar Axiom software prevents proper creation of an FSPM host entry in the management server when there are more than 1024 LUN mappings to the initiators associated with the host, and the mappings differ between the initiators. You can recognize this defect in the GUI when the following symptoms occur together: • The FSPM host is not communicating. • The system displays the following `TaskFailed` system alert: `UNSATISFIED_REQUEST_PM I_COMMUNICATION_ERROR`	This issue was fixed in release 5.4 of the Pillar Axiom software. For Pillar Axiom software version 5.3 or earlier, take the following actions: 1 Stop the FSPM service on the host. 2 Manually update the mappings on all of the host initiators so that all initiators see the exact same set of LUNs with the same LUN number. 3 To enable the host to configure itself, restart the FSPM service.

Table 4: Known Oracle FS System and Pillar Axiom issues (continued)

Fixed in release	Issue	Workaround or planned fix
5.4	[14747038] The Pillar Axiom software is sometimes unable to configure the load balancing setting for LUNs on FSPM hosts. Attempts to change the load balancing setting through the GUI or CLI fail with the following error: `Unsatisfied request due to internal error`	This issue was fixed in the release 5.4 Pillar Axiom software.
6.1	[17478592] When HP-UX mode is selected for a host, the Pillar Axiom System enables configurations to be created which are not compatible with HP-UX mode. HP-UX mode is not actually enabled in these cases even though the configuration says that HP-UX mode is enabled.	Workaround: before enabling HP-UX mode for a host entry, make sure no unmapped (globally visible) LUN is assigned LUN number 0. Also make sure no LUN is mapped to the host entry with LUN number 0. After HP-UX mode has been enabled for a host entry, ensure that no unmapped (globally visible) LUN is subsequently given LUN number 0, and that no LUN is subsequently mapped to the host entry with LUN number 0.

CHAPTER 2

FSPM 4.0 for AIX

What Is New in This Release

The following describes new or changed features in this FSPM release.

Table 5: Release information and new features

Operating system	AIX version	FSPM version	New features
AIX	5.3, 6.1, and 7.1	4.0	• Support for Oracle Flash Storage System 6.1 or higher. Continued support for Pillar Axiom version 4.5 or higher. • Fibre Channel over Ethernet (FCoE) adapters are supported for connection through a fabric to Controller FC ports. • Dynamic Reconfiguration support for FC/FCoE/iSCSI adapters which can be dynamically moved between partitions (provided that specific operating system procedures are followed). • Virtual Fibre Channel adapters using NPIV are supported, with restrictions on use with Live Partition Mobility. • Boot from iSCSI and FCoE is supported in addition to Boot from FC. • Live Partition Mobility is supported, with restrictions on use with Virtual Fibre Channel adapters.

Supported AIX Distributions and Platforms

Oracle FS Path Manager 4.0 for AIX requires one of the following versions of AIX:

- AIX Version 5.3 at Technology Level 12 (5300-12) or later.

- AIX Version 6.1 at Technology Level 5 (6100-05) or later.

- AIX Version 7.1 at Technology Level 0 (7100-00) or later.

- Virtual I/O Server at version 2.2.1 or later.

Note: FSPM supports all POWER systems supported by the above AIX versions.

Known FSPM Issues for AIX

The issues listed in the following table are known Oracle FS Path Manager (FSPM) which have not been resolved.

Note: The information in this document applies to both Pillar Axiom Systems 4.5 or higher and Oracle Flash Storage Systems 6.1 or higher unless a specific product or version is referenced. FSPM supports both Pillar Axiom Systems and Oracle Flash Storage Systems; Axiom Path Manager supports only Pillar Axiom Systems.

Table 6: Known FSPM issues for AIX

Operating system	Issue	Workaround or planned fix
AIX	[13755409] If an iSCSI initiator name is configured in AIX using a string in a format other than that defined by RFC 3722, FSPM does not correctly associate that initiator name with the host entry in the Oracle FS System Manager.	Use the normalized and generalized character set specified by RFC 3722 when configuring iSCSI initiator names in AIX.

Resolved FSPM Issues for AIX

The issues listed in the following table have been resolved.

Table 7: Resolved FSPM issues for AIX

Operating system	Issue
AIX	[19599797] The Vital Product Data reported for Pillar Axiom LUNs when, for example, using the *-v* option to the `lscfg` command was mostly invalid.

Known Operating System Issues for AIX

The following operating system issues for AIX impact running Oracle FS Path Manager.

This section applies to these versions of AIX: 5.3, 6.1, and 7.1.

AIX cfgmgr Command

[All AIX Versions] The AIX `cfgmgr` command does not always detect and enable all available paths to devices such as LUNs.

Run the `cfgmgr` to bring all LUNs and paths online. You may need to run the `cfgmgr` more than once to bring all LUNs and paths online.

Live Partition Mobility Migration

[All AIX Versions] Live Partition Mobility does not migrate a partition properly if mapped LUNs are used with virtual FC HBAs.

To correct this problem, either use global LUNS on virtual FC HBAs or present LUNs using virtual SCSI.

Oracle FS System Manager Shows Path Counts of 0/0 for LUN

[All AIX Versions]The display of host information in the Oracle FS System Manager includes a count of the number of optimized and non-optimized paths to each LUN.

For AIX hosts these counts are only valid when a LUN is in use on the host (for example, when it is a member of a varied on volume group). When a LUN is not in use, these counts show as 0.

Switch Login Mode Changes

[All AIX Versions] A supported IBM Fibre Channel host bus adapter (HBA) can log in to the switch in loop mode instead of fabric mode which causes AIX to not communicate through the HBA to storage targets.

To correct this problem, lock the switch port into the F-port mode.

AIX Port Speed Displayed as Unknown

[AIX Versions 6.1 and 7.1] Port speed is displayed as **unknown** on the ports tab in the Oracle FS System Manager.

When you navigate to **SAN** > **Storage** > **Hosts** > **Modify Host** > **Ports Tab** the port speed is displayed as **Unknown**. This is a known issue with AIX versions 6.1 and 7.2 which needs to be resolved by IBM in the operating system.

Documentation Changes for Oracle FS Path Manager 4 Installation Guide for AIX

No changes at the time of publication of this document.

FSPM 4.0 for HP-UX

What Is New in This Release

The following describes new or changed features in this FSPM release.

Table 8: Release information and new features

Operating system	Version	FSPM version	New features
HP-UX	11iv3	4.0	• Support for Oracle Flash Storage System 6.1 or higher. Continued support for Pillar Axiom version 4.5 or higher. • Support for iSCSI, FCoE adapters, and additional FC adapters.

Supported HP-UX Distributions and Platforms

Oracle FS Path Manager (FSPM) is supported on 64-bit HP-UX platforms.

This release of FSPM supports HP-UX 11i v3 (HP-UX 11.31) Update 3 (September 2008 release) or later distributions for the following server architectures:

- 64-bit on PA-RISC 2.0
- 64-bit Itanium

This release does not support blade servers.

Important: This release of FSPM does not support HP-UX versions previous to HP-UX 11i v3 Update 3.

Known FSPM Issues for HP-UX

The issues listed in the following table are known Oracle FS Path Manager (FSPM) which have not been resolved.

Note: The information in this document applies to both Pillar Axiom Systems 4.5 or higher and Oracle Flash Storage Systems 6.1 or higher unless a specific product or version is referenced. FSPM supports both Pillar Axiom Systems and

Oracle Flash Storage Systems; Axiom Path Manager supports only Pillar Axiom Systems.

Table 9: Known FSPM issues for HP-UX

Operating system	Issue	Workaround or planned fix
HP-UX	Not applicable for this release.	Not applicable for this release.

Resolved FSPM Issues for HP-UX

The issues listed in the following table have been resolved.

Table 10: Resolved FSPM issues for HP-UX

Operating system	Issue
HP-UX	Not applicable for this release.

Known Operating System Issues for HP-UX

The following operating system issues for HP-UX can have an impact on running Oracle FS Path Manager.

At the time of publication of this document, there were no issues for the supported version of HP-UX which is 11i v3.

Documentation Changes for Oracle FS Path Manager 4 Installation Guide for HP-UX

No changes at the time of publication of this document.

CHAPTER 4

FSPM 4.0 for Linux

What Is New in This Release

The following describes new or changed features in this FSPM release.

Table 11: Release information and new features

Operating system	Version	FSPM version	New features
Linux	See Linux version list	4.0	• Support for Oracle Flash Storage System 6.1 or higher. Continued support for Pillar Axiom version 4.5 or higher. • Support for iSCSI adapters. • Support for multiple Linux distributions and releases in a single FSPM release.

Supported Linux and Platform Distributions

FSPM supports CentOS, Oracle Linux, Oracle VM Server, Red Hat Enterprise Linux, and SUSE Linux Enterprise Server versions as listed below.

FSPM supports the following Linux distributions and platforms:

- Community Enterprise Operating System (CentOS) versions 5.8 and all later 5.x versions, 6.1 and all later 6.x versions, 7.0 and all later 7.x versions

- Oracle Linux versions 5.8 and all later 5.x versions, 6.1 and all later 6.x versions, 7.0 and all later 7.x versions (all kernels, RHCK and UEKs)

- Oracle VM Server for x86 versions 3.1 and all later 3.x versions

- Red Hat Enterprise Linux (RHEL) versions 5.8 and all later 5.x versions, 6.1 and all later 6.x versions, 7.0 and all later 7.x versions

- SUSE Linux Enterprise Server versions 11.1 and all later 11.x versions, 12.0 and all later 12.x versions

Note: FSPM supports all 32-bit and 64-bit x86 platforms supported by the Linux distributions and versions listed above.

Known FSPM Issues for Linux

The issues listed in the following table are known Oracle FS Path Manager (FSPM) issues which have not been resolved.

Note: The information in this document applies to both Pillar Axiom Systems 4.5 or higher and Oracle Flash Storage Systems 6.1 or higher unless a specific product or version is referenced. FSPM supports both Pillar Axiom Systems and Oracle Flash Storage Systems; Axiom Path Manager supports only Pillar Axiom Systems.

This section uses these abbreviations:

- Community Enterprise Operating System (CentOS)
- Oracle VM Server for x86 (OVS)
- Red Hat Enterprise Linux (RHEL)
- SUSE Linux Enterprise Server (SLES)

[21487142] Installation Sets Oracle Directory to 500 Permissions

When the `oracle-fspm` or the `oracle-fspm-params` package is installed, updated, or repaired, the permissions and the ownership of the `/opt/oracle` directory are set to specific values.

When any of the above actions occur, the `/opt/oracle` directory is set as follows:
```
dr-x------. 3 root root 4096 Aug 3 18:21 /opt/oracle
```
These settings can cause problems for other software that had been installed previously and for software that is installed into this directory in the future.

Workaround

If the directory already exists before installing an FSPM package, record the ownership and the permissions of the directory before installing FSPM. Then, after the installation, restore the ownership and the permissions back to the original values. For example:
```
# ls -ld /opt/oracle
d-wx-wx-wx. 2 bin sys 4096 Aug 3 18:43 /opt/oracle

# getfacl -p /opt/oracle > /tmp/oraperms

# rpm -Uvh oracle-fspm-params-6.6.6-1.noarch.rpm
Preparing...
#########################################
[100%]
   1:oracle-fspm-params
#########################################
[100%]

# ls -ld /opt/oracle
dr-x------. 3 root root 4096 Aug 3 18:46 /opt/oracle

# setfacl --restore=/tmp/oraperms

# ls -ld /opt/oracle
d-wx-wx-wx. 3 bin sys 4096 Aug 3 18:46 /opt/oracle
```

Alternatively, you can reset the values manually:

```
# ls -ld /opt/oracle
d-wx-wx-wx. 2 bin sys 4096 Aug 3 18:20 /opt/oracle

# rpm -Uvh oracle-fspm-params-4.0.8-1.noarch.rpm
Preparing...
###########################################
[100%]
   1:oracle-fspm-params
###########################################
[100%]

# ls -ld /opt/oracle
dr-x------. 3 root root 4096 Aug 3 18:21 /opt/oracle

# chown bin /opt/oracle
# chgrp sys /opt/oracle
# chmod 333 /opt/oracle
# ls -ld /opt/oracle
d-wx-wx-wx. 3 bin sys 4096 Aug 3 18:21 /opt/oracle
```

Note: The original settings of `/opt/oracle` in this example are for illustration purposes only. It is very unlikely that your directory would have these settings.

If the directory did not exist before you installed FSPM, but you later have problems installing other products because of the permissions on this directory, change the permissions to allow access. For example:
```
# ls -ld /opt/oracle
dr-x------. 3 root root 4096 Aug 3 18:21 /opt/oracle

# chmod 755 /opt/oracle
# ls -ld /opt/oracle
drwxr-xr-x. 3 root root 4096 Aug 3 18:21 /opt/oracle
```

Resolved FSPM Issues for Linux

The issues listed in the following table were resolved.

This section uses these abbreviations:

- Community Enterprise Operating System (CentOS)
- Oracle VM Server for x86 (OVS)
- Red Hat Enterprise Linux (RHEL)
- SUSE Linux Enterprise Server (SLES)

Table 12: Resolved FSPM issues for Linux

Operating system	Issue
All Linux Operating Systems	[17170303] If the `/tmp` directory was mounted with the **NODEV** option then the FSPM daemon was not able to communicate with the Pillar Axiom because it could not create or read from temporary device files it created during run time.

Known Operating System Issues for Linux

The following operating system issues for Linux can have an impact on running Oracle FS Path Manager.

In the following information, if a defect applies only to a specific version, that version is listed.

Access to LUNs

[All Linux Operating Systems] Access LUNs through `device-mapper` or individual partition paths to ensure access to the LUNs.

The Linux `device-mapper` creates paths in the `/dev/mapper/` directory to represent multipath Oracle FS System LUNs and partitions. With the exception of the situation described in the instructions for partitioning and formatting LUN disks, access to multipath LUNs and their partitions must be through these paths.

If a multipath partition is configured into `/etc/fstab`, omit the sixth field of its entry (fs_passno), or set it to 0 to prevent `fsck` from running automatically on the partition during a system boot. This is because `device-mapper` is not yet configured at the time `fsck` runs during boot, so the multipath devices are not accessible.

Important: Failure to disable fs_passno causes host boot failure.

Filesystems Marked Read-Only When Access to Boot LUN Is Lost

[All Linux Operating Systems]When a SAN host loses access to all paths to a boot LUN, Linux marks the filesystem on the client as read-only.

Linux can lose all paths to a boot LUN. When a SAN host loses access to all paths to a boot LUN, to prevent data corruption, the Linux system marks the filesystem on the client as read-only. This behavior is as designed and occurs regardless of whether the Oracle FS Path Manager (FSPM) is installed on the SAN host. To improve the path recovery time, Oracle recommends that you take the following action: modify the `/etc/multipath.conf` file and set **`failback immediate`**.

[13245579 and 13326325] Verify Time-outs Path Failover Failback Test

[All Linux Operating Systems and OVS] Oracle VM Server hosts and guest Virtual Machines can be forced to reboot during a failover because of too short a time-out value.

Oracle recommends that you increase the heartbeat time-out value on all Oracle VM Server servers with the information shown below:

Edit the following file on all servers:
`/etc/sysconfig/o2cb`

Oracle recommends that you set a time-out threshold value of 151 or higher as this value impacts failback time. You may need to adjust this value based on your

environment. This is an example of how to set the value to the minimum recommended value of 151:

```
OCB_HEARTBEAT_THRESHOLD=151
```

Note: The heartbeat time-out values apply to any Oracle Cluster File System (OCFS) including OVS and any Linux operating system using OCFS.

[13746418] SAN Dynamic Reconfiguration

[**All Linux Operating Systems**] Linux does not automatically update storage LUNs after a dynamic reconfiguration. Dynamic reconfiguration is the addition, deletion, growing, resizing, or cloning of one or more LUNs attached to a host.

Linux requires a series of steps, including a potential host reboot, when a LUN is dynamically reconfigured. The details vary between Linux distributions and releases. You should review the discussion of dynamic SAN reconfiguration in the storage or SAN administration guide for the release you are using. The following steps provide general guidance which can be helpful.

Note: These guidelines apply to both Pillar Axiom Systems and Oracle Flash Storage Systems.

LUNs Added Dynamically

In most systems, a newly added LUN is immediately visible on the host without a rescan. However, due to inconsistent device driver behavior on some hosts, if the added LUN is not visible, a rescan usually makes it visible. A rescan usually involves an I/O reset.

Create a new LUN on the Oracle FS System and assign it to the host. Run the rescan script and if running the rescan script does not bring up the LUNs, you may need to assign a new LUN number. Assign a new LUN number that the Linux operating system does not consider already in use. To correct this situation, modify the host LUN number in the Oracle FS System Manager (GUI). Assign a new, unique value that falls within the range of permitted values. If necessary, rescan to add the LUN.

Both Emulex and QLogic provide rescan scripts that may help in dynamically configuring LUNs. See your adapter vendor's website for information on any tools they provide for scanning the SAN.

LUNs Deleted Dynamically

Deleting a LUN prevents the LUN from being visible from the host. This includes deleting LUN mapping and LUN masking. In general, LUN deletion disrupts normal function of the Linux multipath framework and must be planned.

If a LUN is deleted, it may appear as either a `200000000000` entry or as the original LUID with `Path down` messages. These entries may persist until the host is rebooted.

To avoid disruption, you may blacklist the LUN. Refer to your Linux documentation for information on blacklisting a LUN.

The host usually picks up the deleted LUN, and it is deleted from the `/dev/mapper` table. However, this may not occur on all platforms consistently. If you want to view the device-mapper LUN mapping table, start the `multipathd` shell by running the following command:

```
# /sbin/multipathd -k
```

To delete a LUN, we recommend shutting down the host, deleting the LUN or LUN mapping from the Oracle FS System system, and then restarting the host. If this procedure is not possible, you may want to run the following procedure.

Important: The following procedure will interrupt I/O and may require an immediate reboot of your host. In some cases, this may require a power cycle of the host to recover.

1   Copy the following and run it as a script:

```
#!/bin/bash
# Must be run as root
/etc/init.d/fspmd stop
/sbin/multipath -F
/sbin/service/multipathd stop
# RESCAN SCRIPT FROM QLOGIC / EMULEX
# Please modify the following line based on your rescan
script location
/usr/bin/ql-dynamic-tgt-lun-disc.sh -s -r
/sbin/service/multipathd start
/etc/init.d/fspmd start
/sbin/multipath -v3 -ll
```

Tip: The rescan script might require your interaction.

2   Be prepared to reboot the host as soon as possible after deleting LUNs in case something goes wrong.

If a LUN that is visible to a Linux 2.6 (kernel or higher) host is deleted from the Oracle FS System, and the `/sbin/multipath -F` or `/sbin/multipath -f` command is run before rebooting the host, the device-mapper configuration map may become unusable and all access to LUNs may be lost due to a bug in the Linux device-mapper code. If this occurs, the only way to recover is to reboot the host. Rebooting the host will flush any deleted path entries from the device table.

LUNs Resized Dynamically

When you resize a LUN, a host reboot is often necessary due to the constraints in the Linux device-mapper.

Note: Linux operating systems may provide the ability to expand a LUN without a host reboot. Review your Linux operating system documentation to determine if you need to reboot the host after expanding a LUN.

Clone LUNs Added or Deleted Dynamically

The procedures for adding or deleting LUNs described above also apply for Clone LUNs.

[13757647] Unable to Update Path States

[All Linux Operating Systems] After paths are lost and restored, it may be necessary to manually refresh `device-mapper` to update the host path state.

Because of a Linux defect, it may be necessary to run the following command to restore the path state after paths have been lost and restored on the host:
```
# /sbin/multipathd reconfigure
```

Running the `/sbin/multipathd show maps topology` command to show the state of the LUNs as seen by the kernel fails to show the current path status on the Linux host. This prevents the FSPM daemon from updating the LUN status.

Note: If you need to restart the multipath daemon on your operating system, review your operating system documentation before restarting the daemon.

If running the `multipathd reconfigure` command does not recover the condition, run the following command to restart the multipath daemon:
```
# service multipathd restart
```

[13758951] Multipath Failed Path Errors

[All Linux Operating Systems] The multipath command can return errors that indicate only that there are failed paths.

Note: The following information provides an example of how multipath errors are displayed in Linux 6.2; other versions of Linux will present multipath errors differently, Review your operating system documentation for information on error handling.

If paths are in a failed state, the `multipath` command for returns the following error messages:
```
multipath -ll 2000b08005c001259
9:0:0:3: sg_io failed status 0x8 0x1 0x0 0x0
9:0:0:3: Unable to get INQUIRY vpd 1 page 0x0.
error calling out /sbin/scsi_id -g -u -s /block/sdaf
8:0:0:3: sg_io failed status 0x8 0x1 0x0 0x0
```
These error messages indicate only that there are failed paths in the multipath device map. The multipath device map shows paths that are failed and active, and `sg_io failed` refers to failed paths. These errors indicate that the system is responding correctly.

You must fix the failed paths or if these errors occur during failover testing, recognize that this is normal and expected Linux multipath behavior.

Note: The `multipath` command can be invoked automatically by the system at various times, so it is possible for messages like these to be seen whenever paths are in an unusual state, such as during dynamic reconfiguration.

[13759240] Multipath-Tools Take Time to Recover the Path Count

[SUSE Linux Enterprise Server 11] After a number of paths have changed state (failed or returned) at about the same time, the SUSE Linux Enterprise Server multipath-tools can take up to 15 minutes to recover.

During this time the `multipathd show maps topology` command times out, causing the Oracle FS System GUI to display the wrong path count after a port has been disabled.

You can try restarting the multipath daemon to resolve the problem. A defect has been filed with the operating system vendor.

[13761100] Too Many Files Open

[All Linux Operating Systems] The `multipath` command will issue an error indicating that too many files are open when the number of open files exceeds the configured host system limit.

To determine the number of files open, run the following command:
```
# lsof | wc -l
```

Compare the result of that command with the host system limit. To determine the host system limit, run the following command:
```
# ulimit
```

If necessary, increase the system limit by following the instructions in the operating system documentation. In addition, set the `max_fds` value in the `/etc/multipath.conf` file to an appropriate limit.

Some operating systems may require a host reboot is required to ensure that the system limits are updated.

[13761123] LUN State Not Updated

[All Linux Operating Systems] Due to Linux defect in the `device-mapper` packages, `multipath-tools` may not accurately update the state of the LUN.

When the LUN state is not accurately updated, the Oracle FS System may not reflect the correct path count during a port enable or port disable test.

Note: This is a Linux defect; check the operating system documentation to determine if this defect is resolved.

To correct this problem, restart the `device-mapper` to update the path status.

[13761188] Not All iSCSI Paths Listed

[All Linux Operating Systems] On hosts with a large number of devices, all iSCSI paths may not be listed.

This is the result of a problem in the Linux iSCSI and `device-mapper` code.

To display the missing paths, rescan all iSCSI devices using the following command:
```
# iscsiadm -m node -R
```

Restart the `multipathd` service using the following command:
```
# service multipathd restart
```

[13762235] Too Many Paths Cause Device Mapper to Hang

[All Linux Operating Systems] The `device-mapper` daemon occasionally hangs if operating system limits on the number of paths or devices, or other related limits, are exceeded.

A few paths appear to be missing in the host, and the `multipathd show maps topology` command hangs.

It may be necessary to restart the multipath daemon to correct the problem. Use the following command:
```
# service multipathd restart
```

Limits can be tuned by changing your operating system limits; follow instructions in your system operating administrator's guide.

[13762246, 13765445, 16415311, 13765445] Call Trace During Path Failure

[All Linux Operating Systems] Because of a Linux defect, call-trace messages can appear during path failure.

These messages are usually informational only and do not disrupt I/O. These messages are an operating system issue and are not the result of a FSPM issue.

[13762263] Oracle Cluster NOA Messages

[All Linux Operating Systems Running Oracle Clusterware] When a node in a cluster reboots, it may take up to six minutes for paths to switch to the optimized paths, causing transitional non-optimized access (NOA) messages to be generated.

This is a defect in the `device-mapper` operating system code.

In a steady state, I/O runs in the optimized path as expected by the operating system.

[13762937, 13766418] LUNs Not Shown

[All Linux Operating Systems] Due to a Linux `device-mapper` defect, some LUNs are not shown in the output of the `/sbin/multipathd show maps topology` command.

The unused LUNs exist and are otherwise usable. This only affects reporting of LUNs to the Oracle FS System system and does not affect I/O or usage of the device. The FSPM is unable to update the host path status on the Oracle FS System, but I/O continues as expected. As a result, FSPM displays incorrect information.

[13764910] Non-Optimized Access Events

[All Linux Operating Systems] Non-optimized access (NOA) events may be logged on the Oracle FS System system for up to ten minutes after a Controller failover and failback, after all paths to a Controller fail and subsequently recover, or after a new LUN is mapped to the host.

After a Controller failover and failback or a new LUN is mapped to the host, it can take some time for Linux to recover all paths and bring them back into use. During this period the host may continue to access the LUNs through paths which did not fail. This may cause short bursts of NOA to some LUNs. Once Linux brings the paths fully back into use, the host will synchronize again with the Controller on the best paths to use, and NOA events will no longer be logged.

[13764931,13792540] Device Mapper Driver Not Loaded

[Oracle Linux 6.x] The Oracle Linux 6.x operating system does not automatically load the `device-mapper` driver by default upon restarting the `multipathd` service, so it may be necessary to load the driver manually before installing Oracle FS Path Manager (FSPM).

The multipath driver must always be loaded before FSPM is installed.

If FSPM is installed prior to loading the `device-mapper` driver, the following error message appears:
```
# DM multipath kernel driver not loaded
```
The `device-mapper` driver can be loaded in one of two ways:

- **`mpathconf --with_module y`**

  Refer to the `mpathconf` man pages for an explanation.

- Manually load the `device-mapper` using the following command:
  ```
  # modprobe dm_multipath
  ```

The first method is recommended.

Note: Review operating system information on multipath services and the device-mapper.

Note: Refer to the man pages of multipath and its components for additional information.

[13765459, 13766023] Host dom0 Reboots After Path Failure

[Oracle VM Server 3.1, 3.2, and 3.3] After a path failure between the host and the Oracle FS System , the host may unexpectedly crash and reboot.

The path failure may be caused by a failure in the Fibre Channel over Ethernet (FCoE) SAN or by a failure in the Oracle FS System such as a Controller being restarted or powered off.

Consider increasing the timeout values on the Oracle VM Server; review the Oracle VM Server documentation for further information. You can also contact Oracle Customer Support for a solution.

[13959093] LUNs Not Seen

[All Linux Operating Systems] The Oracle FS System might not be able to see all LUNs reported from the host through the FSPM daemon.

After certain failover situations, the `multipathd show maps topology` command on the host does not list all the storage LUNs and paths.

This is a known Linux problem that affects only the information display, not the actual I/O of the LUNs.

[14282233] Combo FC and iSCSI LUNs are not Supported

[Oracle VM Server 3.1, 3.2, and 3.3] Oracle VM Server does not support combination FC and iSCSI LUNs.

While the iSCSI LUNs are visible in the **Storage** tab of the Oracle VM Server Manager, the FC LUNs are not visible.

This is a known Oracle VM Server product limitation.

[14591627] Restart iSCSI Service

[Oracle VM Server 3.1, 3.2, and 3.3] Oracle VM Server does not automatically re-establish iSCSI sessions after a Controller power failure and restore.

Restart the iSCSI service on the Oracle VM Server host to re-establish the iSCSI sessions.

[14625828] Reboot to See All Paths to Oracle Virtual Networking vHBA LUNs

[Oracle VM Server 3.1 and 3.2] Oracle VM Server hosts do not recognize all paths to LUNs added to Oracle Virtual Networking vHBAs without a reboot. which causes `multipath-tools` and Oracle FS System Manager (GUI) to display an incorrect count of the paths available to each LUN.

When adding or modifying LUNs to an Oracle Vifrtual Networking vHBA, reboot the Oracle VM Server host to see an accurate count of the available paths in the GUI.

[14708044] Oracle Virtual Networking Driver Fails to Restore Paths

[Oracle VM Server 3.2.2] After failover and failback of a host using an Oracle Virtual Networking virtual FC adapter, traffic does not come back to its original paths when the failed CU is back online.

Recommended solution: to recover the paths, run an Oracle Virtual Networking host rescan, and then run the `multipath -v3` command. This restores the paths and I/O returns to the optimized paths.

[14708089, 14711677] Adding or Deleting LUNs Requires Reboot

[All Linux Operating Systems] Addition or deletion of LUNs on an Oracle Virtual Network virtual HBA (vHBA) requires a host reboot.

Oracle recommends rescanning the SCSI bus or using driver rescanning tools to solve this issue. If this fails, Oracle recommends you add or delete LUNs only when a host reboot can be accommodated or is scheduled.

[13759822] Emulex HBAs Can Cause Core Dumps

[SUSE Linux Enterprise Server 11] The Emulex host bus adapter (HBA) driver occasionally causes core dumps on a host during path failure on the host or the storage array.

Emulex HBA users should run the `zypper` command to install the latest SUSE Linux Enterprise Server 11 updates and verify that 8.3.5.25 or later driver with a firmware version of FV2.8A4 or later is installed.

SUSE is working with Emulex to develop a permanent fix for this issue. Check with SUSE Customer Support for the status of this fix.

[16429851] Driver Trace Log Message Information Only

[All Linux Operating Systems] A control unit (CU) failover and failback might generate a driver trace log message which is informational only.

A CU failover and failback might generate in the logs a driver trace message that is informational only. When one path fails, the failover path is chosen, and I/O continues on that path until the original path (failback) is restored. The failover and failback process might generate a driver trace message which can be ignored.

Here is an example of how a driver trace message might appear in the logs. Note, in the example, the operating system version is not shown but in the log files, the operating system version is listed.

```
Mar 28 20:15:14 kernal: INFO: task multipathd:2550 blocked for
more than 120 seconds
kernal: "echo 0 > /proc/sys/kernal/hung_task_timeout_secs"
disables this message.
kernal: multipathd d 00000000000 0 2550 1 2551 2533...
```

[19295547, 19597319] Multipathing Uses Incorrect Paths

[OVS 3.2.7 and 3.3.1] When the `multipathd reconfigure` command is run in Oracle VM Server 3.2.7 or 3.3.1 for x86, the Multipath Daemon becomes corrupted leading to invalid maps for multipath devices. This can cause incorrect paths to be used or access to LUNs to be lost. The command is used by Oracle FS Path Manager.

This issues is resolved by using Oracle VM Server for x86 (OVS) 3.3.2 or higher.

Documentation Changes for Oracle FS Path Manager 4 Installation Guide for Linux

No changes at the time of publication of this document.

CHAPTER 5

FSPM for Oracle Solaris

What Is New in This Release

The following describes new or changed features in this FSPM release.

Table 13: Release information and new features

Operating system	Version	FSPM version	New features
Oracle Solaris	10 and 11	4.0	• Support for Oracle Flash Storage System 6.1 or higher. Continued support for Pillar Axiom version 4.5 or higher. • Support for Oracle Virtual Networking.
Oracle Solaris	10 and 11	4.1	• Automatic handling of SAN initiator and target port additions (like Oracle Virtual Networking virtual HBAs and Oracle FS SAN ports) so that the host definitions and mappings to make the LUNs accessible through these ports is updated automatically.

Oracle Solaris Software Requirements 4.1

Oracle FS Path Manager (FSPM) 4.1 for Oracle Solaris, requires the following software patches and updates.

Note: The FSPM installer checks for the required patches and fails the installation process if the required patches, as listed below, are not installed on the operating system.

Table 14: Supported software

Operating system	Supported

Oracle Solaris 10	The minimum supported release of Oracle Solaris 10 is the 8/07 (Update 4) release. The following are required update patchset and kernel patches:
	
	• For Oracle Solaris 10 8/07 (Update 4) through 8/10 (Update 9) releases:
	
	    • On SPARC systems: Oracle Solaris 10 8/11 (Update 10) Patchset. This bundle includes patch 144401-10 which is used to indicate this bundle is installed. The patchset can be downloaded from *https://updates.oracle.com/download/13058415.html*. You also need kernel patches 150400-22 and 151615-01.
	
	    • On x86 systems: Oracle Solaris 10 8/11 (Update 10) Patch Bundle. This bundle includes patch 144402-10 which is used to indicate this bundle is installed. The patch bundle can be downloaded from *https://updates.oracle.com/download/13058416.html*
	
	    You also need kernel patches 150401-22 and 151616-01.
	
	• For Oracle Solaris 10 8/11 (Update 10) and later updates releases:
	
	    • On SPARC systems: kernel patches 150400-22 and 151615-01
	
	    • On x86 systems: kernel patches 150401-22 and 151616-01
	
	Note: Update Patchsets are different from Recommended Patchsets. You must install the specified Update Patchset regardless of which other patchsets or bundles are installed. You can install a later Update Patchset such as the Oracle Solaris 10 1/13 (Update 11) instead of the Oracle Solaris 10 8/11 (Update 10) patchset.

Oracle Solaris 11	Either of the following: • Oracle Solaris 11.2 with Support Repository Update 7.4 (SRU 7.4) or any later installed SRU • Oracle Solaris 11.3 or any later version. **Note:** FSPM 4 does not support Oracle Solaris 11 Express.
Oracle Virtual Network (OVN) drivers	Oracle Virtual Networking (OVN) is supported on Oracle Solaris 11.3 SRU 11.6 (Oracle Solaris 11.3.11.6.0) and later. Oracle recommends that you use the latest available SRU with Oracle Solaris 11.3 when using OVN.

Oracle Solaris Software Requirements 4.0

Oracle FS Path Manager (FSPM) 4.0 for Oracle Solaris, requires the following software patches and updates.

Note: The FSPM installer checks for the required patches and fails the installation process if the required patches, as listed below, are not installed on the operating system.

Table 15: Supported software

Operating system	Supported

Oracle Solaris 10	The minimum supported release of Oracle Solaris 10 is the 8/07 (Update 4) release. The following are required update patchset and kernel patches:
	
	• For Oracle Solaris 10 8/07 (Update 4) through 8/10 (Update 9) releases:
	
	   • On SPARC systems: Oracle Solaris 10 8/11 (Update 10) Patchset. This bundle includes patch 144401-10 which is used to indicate this bundle is installed. The patchset can be downloaded from *https://updates.oracle.com/download/13058415.html*. You also need kernel patch 147440-24.
	
	   • On x86 systems: Oracle Solaris 10 8/11 (Update 10) Patch Bundle. This bundle includes patch 144402-10 which is used to indicate this bundle is installed. The patch bundle can be downloaded from *https://updates.oracle.com/download/13058416.html*
	
	   You also need kernel patch 147441-24.
	
	• For Oracle Solaris 10 8/11 (Update 10) release:
	
	   • On SPARC systems: kernel patch 147440-24
	
	   • On x86 systems: kernel patch 147441-24
	
	• For Oracle Solaris 10 1/13 (Update 11) and later updates, no additional patches are required.
	
	Note: Update Patchsets are different from Recommended Patchsets. You must install the specified Update Patchset regardless of which other patchsets or bundles are installed. You can install a later Update Patchset such as the Oracle Solaris 10 1/13 (Update 11) instead of the Oracle Solaris 10 8/11 (Update 10) patchset.

Oracle Solaris 11	Either of the following: • Oracle Solaris 11 11/11 with Support Repository Update 10.5 (SRU 10.5) or any later installed SRU • Oracle Solaris 11.1 or any later version. **Note:** FSPM 4 does not support Oracle Solaris 11 Express.
Oracle Virtual Network (OVN) drivers	Oracle Virtual Networking (OVN) is supported on Oracle Solaris 11.2 and later releases of Oracle Solaris when OVN host drivers are installed. OVN Host Drivers, release 5.5.0 or higher, must be installed on the host.

Known FSPM Issues for Solaris

The issues listed in the following table are known Oracle FS Path Manager (FSPM) which have not been resolved.

Note: The information in this document applies to both Pillar Axiom Systems 4.5 or higher and Oracle Flash Storage Systems 6.1 or higher unless a specific product or version is referenced. FSPM supports both Pillar Axiom Systems and Oracle Flash Storage Systems; Axiom Path Manager supports only Pillar Axiom Systems.

Table 16: Known FSPM issues for Solaris

Operating system	Issue	Workaround or planned fix
Oracle Solaris 10	[13745390] When the TCP/IP connection between the daemon and the Pilot is lost (for example, if you restart the Oracle FS System or Pillar Axiom system or if the Oracle FS System or Pillar Axiom Management IP is changed), the GUI displays the host as **Not Communicating**. The daemon does not automatically re-establish communication until the `TCP KEEPALIVE` period has expired on the host. By default, the period is two hours. You can reconfigure the host to change this period of time, but doing so affects all programs on the host that use `TCP KEEPALIVE`. Before changing `TCP KEEPALIVE` value, ensure that the new value works with other programs.	Restart the daemon on the host to re-establish communications.

Resolved FSPM 4.1 Issues for Solaris

The issues listed in the following table have been resolved.

Table 17: Resolved FSPM 4.1 issues for Solaris

Issues
[13745415] **Communication with the Pilot not established after a SAN connection**: If a SAN connection to an Oracle FS System was established after the FSPM daemon had started on the host, FSPM might not discover that system and establish a management connection to its Pilot in a timely manner.
[16803514] **Dynamically added HBA ports not automatically detected**: FSPM did not necessarily notice when Fibre Channel (FC) HBAs were added dynamically to a host at runtime, and so often did not automatically add the FC HBAs to the host definition in the Oracle FS System.
[19693021] **FSPM periodically not communicating with the Pilot**: When many changes were detected at the host in quick succession, FSPM could lose communication with the Pilots for a while, and then reconnect.
[20105124] **Limit of 2048 LUNs in communication with the Pilot**: FSPM and the Oracle FS System Pilot were only able to exchange information about 2048 LUNs, instead of the 4096, which were supported. Information would only be displayed correctly in the user interfaces for 2048 LUNs on each host.
[22952241] **Errors at the host cause inappropriate load balancing settings**: The load balancing settings for LUNs could get set to unexpected values when certain transient errors happened on the host.
[23499175] **FSPM daemon boot disruption**: In unusual conditions during host boot, the starting of the FSPM daemon could be disrupted.
[23733362] **FSPM daemon shutdown timeout**: Some error conditions could cause an FSPM daemon shutdown to take longer than expected, causing the Service Management Facility to time it out.

Resolved FSPM 4.0 Issues for Solaris

The issues listed in the following table have been resolved.

Table 18: Resolved FSPM 4.0 issues for Solaris

Issue
[16357359] The `IMA` function (`IMA_LuInquiry`) has a file descriptor leak that results in too many files being open and not closed. This disrupts the FSPM daemon function but the daemon restarts automatically if the daemon detects this condition. Review Oracle Solaris system operating documentation and release notes for further information.

Known Operating System Issues for Oracle Solaris

The following operating system issues for Oracle Solaris can have an impact on running Oracle FS Path Manager.

[13765489] Cannot Configure Load Balancing for Each LUN

The Oracle Solaris I/O multipathing features, formerly referred to as StorageTek Traffic Management Software (STMS), do not provide the ability to configure load balancing for each LUN individually or enable load balancing to be changed without a restart.

No workaround available.

[13765490] No Fibre Channel Priority for Multi-Protocol LUNs

The Oracle Solaris I/O multipathing features, formerly referred to as StorageTek Traffic Management Software (STMS), do not provide any method for Fibre Channel (FC) paths to be prioritized over iSCSI paths.

Because there is no method to prioritize FC paths over iSCSI, all optimized paths are treated equally. For combination LUNs in round-robin mode, traffic is sent over both FC and iSCSI paths. For combination LUNs in static mode, either an FC or iSCSI path is chosen.

[13765943] Path Failures on Paths Not in Use

Oracle Solaris Oracle Solaris I/O multipathing features, formerly referred to as StorageTek Traffic Management Software (STMS), do not regularly check the status of paths that are not currently used. This causes the Oracle Solaris I/O multipathing features to not report these paths as failed.

For example, if optimized paths to a LUN are available, Oracle Solaris I/O multipathing features do not report that any non-optimized paths to the LUN have failed. This causes the available paths counts in the Oracle FS System Manager (GUI) to be over estimated for non-optimized paths.

[15720991 and 15735699] Masked Target Ports for LUN

After one or all of the primary or optimized target ports of a LUN are masked out, I/O to the LUN fails instead of failing over to other available paths.

No workaround is available.

[15785554] LUN Target State Does Not Match CLI or GUI

The `mpathadm` commands do not always show updated access state values for paths to LUNs. The `mpathadm show logical-unit` *<logical unit name>* and `mpathadm show lu` *<logical unit name>* commands might show values that can

cause incorrect optimized and non-optimized path counts for LUN in the Oracle FS System Manager (GUI) and Oracle FS CLI.

Do not depend exclusively on the optimized and non-optimized path counts displayed in the Oracle FS System Manager (GUI) and Oracle FS CLI to determine if some path failures occurred. Use the Oracle Solaris `luxadm display pathname` and `iscsiadm list target -S` commands to determine the State and Class values for these paths.

[16357359] File Descriptor Leak

An iSCSI Management API function (IMA_LuInquiry) has a file descriptor leak that results in too many files being open and not closed.

Oracle FS Path Manager restarts the daemon if this condition is encountered.

[17499686] Incorrect Error Message Logged

When Oracle FS System LUNs are brought online by an Oracle Solaris system, the host may log messages such as `WARNING: Page83 data not standards compliant Oracle Oracle FS1-2`. These messages are incorrect and should be ignored.

Ignore the message, `WARNING: Page83 data not standards compliant Oracle FS1-2`, as the message is invalid.

[19769121] Failure to Boot Through Emulex 16 Gbps FC HBA

When using a 16 Gbps Emulex FC HBA to boot from a SPARC host using a LUN on an Oracle FS System, the host can sometimes fail to boot. The console can display a message such as `No viable default device found in boot-device variable`.

To work around this problem, modify or verify the LUN configuration using the Oracle FS System Manager (GUI) to enable **Use as a Boot LUN**.

Follow these steps:

1   Navigate to **SAN** > **LUNs**.

2   Choose the boot LUN and select **Actions** > **Modify.**

3   Under the **Quality of Service** tab, make sure **Use as a Boot LUN** is checked (enabled).

If this configuration does not resolve the problem, then perform these steps:

1   Navigate to **SAN** > **LUNs**.

2   Choose the boot LUN and select **Actions** > **Modify.**

3   Under the **Quality of Service** tab, make sure **Disable Reference Tag Checking** is checked (enabled).
    Both **Use as a Boot LUN** and **Disable Reference Tag Checking** should be checked (enabled).

[21821220] Duplicate PortWWN Reported

Messages like 'HBA_GetAdapterPortAttributes adapter 4 port 0 reports a duplicate PortWWN, ignored' are logged. These messages appear in groups, with the number of messages in the group increasing each time. This issue was introduced in Oracle Solaris 11.3 initial release (Solaris 11.3.0.30.0) and fixed in Oracle Solaris 11.3 SRU 7.5 (Solaris 11.3.7.5.0).

Disregard the messages like 'HBA_GetAdapterPortAttributes adapter 4 port 0 reports a duplicate PortWWN, ignored'.

[22520532] Memory Leaks in sun_fc Library Event Functions

The sun_fc library has a memory leak which causes the memory usage of the FSPM daemon to increase over time.

The FSPM daemon should be restarted if its memory usage becomes a problem.

[23086911] Failure to Provide LUN Configuration Information

In some situations the Multipath API library MP_GetMPLogicalUnitProperties function fails to return the requested information. This can cause problems such as the `mpathadm` command returning errors, and the Oracle FS System user interfaces being unable to show the path name used for a LUN on the Solaris host.

No workaround is known.

[23292879] Spurious Errors Logged When iSCSI Service Not Running

If the iSCSI service is not running, FSPM may log messages such as 'IMA_GetNodeProperties gave no initiator name' and 'LHBA 0: IMA_GetTargetOidList failed, status IMA_ERROR_UNEXPECTED_OS_ERROR'.

Ignore these messages.

[23757532] Spurious Events Reported to IMA Library Clients

The iSCSI subsystem reports many spurious events to IMA library clients such as the FSPM process. This causes FSPM to scan the host and the SAN far more frequently than necessary, which may cause unnecessary log entries and some additional load on the system.

No workaround is available.

[24417847] HBA_GetAdapterName Failed Reported

Several messages like 'HBA_GetAdapterName(13) failed, status HBA_STATUS_ERROR_UNAVAILABLE' may be logged after Fibre Channel (FC) HBAs have been hot-plugged in the system. This problem is fixed in Oracle Solaris 11.3 SRU 13.4 (Solaris 11.3.13.4.0).

The messages can be ignored.

Known Oracle Virtual Networking Issues

The following Oracle Virtual Networking issues have been seen when using Oracle FS Path Manager with OVN Fibre Channel on Oracle Solaris 11.3 SRU 11.6 (Oracle Solaris 11.3.11.6.0).

[21359580] Unable to Communicate With LUN 0

The OVN driver sometimes sends an invalid command to LUN 0, which puts that LUN into an 'ACA Active' state; when this occurs the host messages file might contain messages saying 'Unexpected SCSI status received: 0x30'. This prevents the host from being able to communicate successfully with the LUN, which can make any data on the LUN inaccessible and prevent FSPM on the host being able to discover and communicate with the Pilot on the Oracle FS System.

No workaround is known.

[21373215] Solaris Reboot Required to Reliably Bring LUNs On-line

When LUNs are newly mapped to a host, the host often needs to be rebooted to bring all OVN paths to the LUNs online at the host.

No reliable workaround is known. Steps such as setting the vHBAs down and then up or rescanning the vHBAs at the Oracle Fabric Interconnect followed by running `cfgadm` on the host will sometimes bring all paths online, but often only bring some of the paths online.

[22450983] Dynamically Added vHBA Ports Not Added to Host Definition

When OVN virtual HBA ports are added to a Solaris host, FSPM on the host may not automatically add those ports to the Oracle FS host entry definition for the host. This is because the OVN driver does not raise an event to tell FSPM that something has changed. Restart the FSPM service on the host to force it to discover the new ports.

Restart the FSPM service on the host to force it to discover the new ports.

[22923056] Host Confused About LUN Identities After LUN Replacement

If one set of LUNs is unmapped from a host and a different set of LUN mapped in its place, the host sometimes becomes confused about which LUNs are accessible. Device names associated with the old LUNs may continue to exist, but reads or writes to those devices are sent to the replacement LUNs.

Reboot the host to correct the situation.

[23262839] Data Returned By 'fcinfo lu -v' is Corrupt When Using OVN

The `fcinfo lu -v` command sometimes prints out garbage data if the LUN is connected over OVN.

No workaround is known.

[23265646] Arbitrary characters displayed in 'Alias' field for OVN ports

The values displayed for OVN port aliases in the Oracle FS System user interfaces sometimes consist of meaningless sequences of characters. This is because the OVN driver returns garbage data to FSPM in the PortSymbolicName field of the FC-HBA API.

No workaround is known.

[23279071] Temporary fabric problems may cause LUNs to be unmapped

The OVN drivers in the host often fail to return information about vHBAs in the host while there is a problem in the OVN fabric. This indicates to the FSPM that the vHBAs have been removed from the host, so FSPM removes them from the definition of the host in the Oracle FS System, which in turn causes all LUNs to be unmapped from the vHBAs. When things recover and OVN again reports the vHBAs present in the host, FSPM adds the vHBA ports back into the host definition and the LUNs are mapped again. However, the Oracle Fabric Interconnect does not automatically make the LUNs visible to the host again.

Rescan the vHBAs at the Oracle Fabric Interconnect might correct this issue.

[24673248] OS Devices Persist After LUNs Are Unmapped From the Host

After LUNs connected over OVN are unmapped from the host at the Oracle FS System, commands such as `mpathadm list lu` may continue to show the LUNs as online with available working paths.

The correct status will be reported after the host is rebooted.

[24702514] I/O May Be Disrupted During a Non-disruptive Update

I/O over OVN to LUNs on an Oracle FS System may be disrupted if the Oracle FS System is updated in manner which is intended to be non-disruptive.

No workaround is known.

[24734246] Paths Lost After HBA Reset in The Oracle Fabric Interconnect

If a Fibre Channel (FC) HBA in the Oracle Fabric Interconnect is reset, LUN paths from a host over OVN which are routing through that HBA may not recover automatically. The LUNs may become inaccessible.

Reboot the host to recover access through all the paths.

Documentation Changes for Oracle FS Path Manager 4 Installation Guide for Solaris

No changes at the time of publication of this document.

FSPM 4.0 for Windows Server

What Is New in This Release

The following describes new or changed features in this FSPM release.

Table 19: Release information and new features

Operating system	Version	FSPM version	New features
Windows Server	2008, 2008 R2, 2012, and 2012 R2	4.0	• Added support for Oracle Flash Storage System version 6.1 or higher. Continued support for Pillar Axiom version 4.5 or higher. • Added support for Windows Server 2012 R2 • Dropped support for Windows Server 2003 and 2003 R2

Supported Windows Editions

Oracle FS Path Manager (FSPM) for Windows supports the following Windows editions on 32-bit, x64, and Itanium-based systems.

Note: Some of the editions of Windows Server 2008 listed here include the Hyper-V option, and other editions do not. FSPM supports the editions that include Hyper-V, regardless of whether Hyper-V is enabled and in use.

For more information on the different editions of Windows Server, refer to:

- *Microsoft's Windows Server 2012 R2 web site*

  (http://www.microsoft.com/en-us/server-cloud/windows-server/)

- *Microsoft's Windows Server 2008 R2 web site*

  (http://technet.microsoft.com/en-us/windowsserver/bb3105588)

Oracle FS Path Manager supports the following Windows Server 2012 and 2012 R2 editions:

- Windows Server 2012 R2 Foundation

- Windows Server 2012 R2 Essentials

- Windows Server 2012 R2 Standard

- Windows Server 2012 R2 Datacenter

- Windows Server 2012 Foundation

- Windows Server 2012 Essentials

- Windows Server 2012 Standard

- Windows Server 2012 Datacenter

For more information regarding software use and lists of current and resolved product issues, refer to the *Oracle FS Path Manager Release Notes.*

Oracle FS Path Manager supports the following Windows Server 2008 and 2008 R2 editions:

- Windows Server 2008 R2 Standard

- Windows Server 2008 R2 Enterprise

- Windows Server 2008 R2 Datacenter

- Windows Web Server 2008 R2

- Windows Server 2008 R2 for Itanium-Based Systems

- Windows Server 2008 Standard

- Windows Server 2008 Enterprise

- Windows Server 2008 Datacenter

- Windows Server 2008 Standard without Hyper-V

- Windows Server 2008 Enterprise without Hyper-V

- Windows Server 2008 Datacenter without Hyper-V

- Windows Server 2008 for Itanium-Based Systems

Known FSPM Issues for Windows

List of Oracle FS Path Manager (FSPM) known issues for this release.

Note: The information in this document applies to both Pillar Axiom Systems 4.5 or higher and Oracle Flash Storage Systems 6.1 or higher unless a specific product or version is referenced. FSPM supports both Pillar Axiom Systems and Oracle Flash Storage Systems; Axiom Path Manager supports only Pillar Axiom Systems.

No issues for this release when this document was published.

Resolved FSPM Issues for Windows

The issues listed in the following table have been resolved.

Table 20: Resolved FSPM issues for Windows

Issue
[13745422] Daemon should restart automatically if the daemon is stopped unexpectedly.
[14376489] Multipath I/O feature not always installed as expected during installation.
[16524276] When using Windows Device Manager to view the device properties of an Oracle FS System disk, the **MPIO Path Details** screen shows invalid data for the storage controller ID and State associated with the path to the Oracle FS System.

Known Operating System Issues for Windows

The following operating system issues for Microsoft Windows Server can have an impact on running Oracle FS Path Manager.

These are the known issues at the time this document was published.

[36166] FSPM Installation Hangs

Occasionally, installation of MPIO-based components (such as FSPM) may hang if data I/O occurs during installation to any disk subsystems controlled by MPIO.

Messages such as `Restarting all SCSI adapters` may be displayed while the FSPM installation is suspended. Microsoft specifies that I/O to MPIO-managed disk subsystems should be low or quiescent during the installation.

If this happens, restart the host and try the FSPM install or upgrade process again.

[13746944] Multiple iSCSI Initiator Names

The Microsoft iSCSI Software Initiator may sometimes use an iSCSI initiator name other than the one set in its configuration.

For example, if the configured initiator name ends with the fully qualified domain name of the host, when making iSCSI connections, the iSCSI Software Initiator may use a name ending with only the node name of the host. In this case, the Oracle FS System Manager and command line interface (CLI) will report that the host is using two iSCSI initiator names, both the configured name and the name it is actually using.

This is normal behavior of the Microsoft iSCSI Software Initiator as the iSCSI Software Initiator has two names associated with it and the Oracle FS Path Manager is reporting both of these names.

[13750786] Warmstart Suspends I/O to LUNs

If an Oracle FS System experiences a temporary outage because of a warm start on one Controller while attached to a Windows host running FSPM, the LUNs on the non-failing Controller may experience a suspension of I/O for a period longer than the normal recovery process.

All I/O should resume without failure, however, after this brief delay.

[13754533] Hyper-V Delays Switching to Alternate iSCSI Path

Windows Server with Hyper-V enabled can take an exceptionally long time to report iSCSI path failures to FSPM, resulting in long delays before FSPM moves I/O to an alternate path.

For example, I/O may pause for five minutes or more before it is transferred from one Controller to its alternate Controller. This issue can occur on the Hyper-V host or on operating system instances running in guest partitions.

There is no known solution for this issue.

[13755165] Added iSCSI Paths Not Detected

iSCSI paths added to a formerly Fibre Channel-only host might not be detected by FSPM.

When LUNs on an Oracle Flash Storage System are mapped to the SAN host through Fibre Channel, and iSCSI paths are subsequently enabled, FSPM might not detect the iSCSI paths. When the iSCSI Software Initiator is configured on the host, it will successfully connect to the Oracle Flash Storage System through iSCSI, but FSPM will not detect the iSCSI paths.

Reboot the host to correct the problem.

[16049073] Qlogic iSCSI SAN HBA

When booting from an iSCSI SAN through a QLogic HBA, the iSCSI sessions created by the HBA firmware during the boot process are not always subsequently made available to Windows.

This means that some of the iSCSI connections between the HBAs and the Oracle FS System Controllers cannot be used as paths by MPIO and will not be counted by FSPM.

[15906824] Failed iSCSI Paths Not Detected

If a physical network link is removed while being used by an iSCSI connection, the system may not notice that the iSCSI connection has failed until I/O is sent over the failed link.

Oracle FS Path Manager (FSPM) does not normally send I/O over non-optimized paths so Windows and FSPM can continue to report that the iSCSI non-optimized path is present and working although the underlying physical network link has failed.

Microsoft Windows Knowledge Base MPIO Articles

Oracle FS Path Manager (FSPM) uses the Windows Multipath I/O (MPIO) feature. Unless your system already has some other MPIO-based multipathing solution installed, the installation of FSPM will install and enable MPIO. It is therefore possible that issues caused by this Microsoft multipathing feature may become apparent on your system after installing FSPM. The following table lists current entries in the Microsoft Windows Knowledge Base describing issues that may apply when Microsoft MPIO is implemented on your system.

Table 21: Microsoft Windows MPIO knowledge base articles

Article ID	Summary
977506	The iSCSI Software Initiator Setup program does not select the default options as expected.
977567	An upgrade from Windows Server 2008 SP1 to Windows Server 2008 R2 rolls back if the default SAN policy is set to "offline shared"
978562	The "Validate Multiple Arbitration" test on a Windows Server 2008 R2-based failover cluster may incorrectly fail.
947788	The System Recovery Tool in System Center Data Protection Manager 2007 cannot create recovery points when the protected server is a passive node of a cluster or when the protected server has multipath I/O disks.
951434	The Windows Server 2008 cluster validation process may fail when disjoint iSCSI networks use the same subnet.
951590	Multipath I/O disks may disappear after you use the Hot Add Processor feature to add a new CPU to a Windows Server 2008-based computer.
952779	A Windows Server 2008-based computer that has a single-processor stops responding if an MPIO-connected device is repeatedly connected and then disconnected.
953531	A "0x0000007E" Stop error occurs in Windows Server 2008 after you unmount and delete a persistent VSS snapshot.
953652	A physical disk resource may unexpectedly fail or go offline when the IsAlive function is executed on a Windows Server 2008 cluster node.
957509	Stop error when you use a Microsoft Device Specific Module in Windows Server 2008: "0x000000C2".
957522	The Windows Server 2008 system may stop responding when an error occurs on one of the logical units of a storage array that is connected over a single MPIO path.
958912	A Windows Server 2008-based computer may stop responding when you use a Device Specific Module that plugs into MPIO.
961570	The system becomes unresponsive after the primary MPIO path is disconnected on a Windows Server 2008-based computer.
961891	Error message when you try to restart or shut down a Windows Server 2008-based computer that is connected to an MPIO-controlled storage device: "Stop 0x0000009F".

Table 21: Microsoft Windows MPIO knowledge base articles (continued)

Article ID	Summary
963702	A Windows Server 2008 Failover Cluster that has an MPIO solution may encounter stop code 0x0000007E or 0x000000D5 during a path failover.
967349	Access to an MPIO-controlled storage device fails on a Windows Server 2008-based computer after you disconnect and then reconnect all data cables.
967724	A Windows Server 2008-based computer that has the MPIO solution installed and that has many LUNs attached stops responding during the startup process after you install hotfix 963702.
967999	A Stop 0x0000007E error may occur when you start a Windows Server 2008-based computer from an iSCSI boot device that is connected over MPIO paths.
968287	The MPIO failover process does not complete on a Windows Server 2008-based computer that uses Microsoft Device Specific Module for MPIO.
970525	Cluster resources fail over before the time expires in the PDORemovePeriod parameter in Windows Server 2008.
972324	Support for an adjustable PathRecoveryInterval in Windows Server 2008.
973607	When MPIO disks are enumerated under stress, ports may be missing from Device Manager **Location** field.
973663	After you generate an MPIO configuration report on a computer that is running Windows Server 2008 R2, some the text in the report is not readable.
974878	PhysicalDisk counters contain invalid and duplicate entries when you use MPIO to control one or more storage devices.
977506	The iSCSI Software Initiator Setup program does not select the default options as expected.
977567	An upgrade from Windows Server 2008 SP1 to Windows Server 2008 R2 rolls back if the default SAN policy is set to offline shared.
978562	The Validate Multiple Arbitration test on a Windows Server 2008 R2-based failover cluster may incorrectly fail.

Documentation Changes

No changes at the time of this publication.

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