Pillar Axiom Path Manager 2.0 Installation Guide and Release Notes for Solaris 10
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CHAPTER 1

Introduction to the Axiom Path Manager

This document describes how to install and configure the Pillar Axiom Path Manager 2.0 software. The information in this document is for System Administrators who want to use the Path Manager software on a SAN host running the Solaris operating system.

Pillar Axiom Path Manager 2.0 supports Solaris 10 Update 1 (1/06 Release) and later on 64-bit SPARC and x64 (AMD64/EM64T), with supported Solaris patch releases. Refer to Verify Patches for more information.

The software uses Sun Microsystems’ StorageTek Traffic Manager software (STMS, also known as MPxIO) to support multiple physical paths to storage. The Axiom Path Manager daemon works with STMS to make Pillar Axiom system LUNS visible to Solaris without manual configuration.

The features of the Axiom Path Manager software include:

- Sun’s boot from SAN capability on certified servers
- Sun’s clustering capability on certified servers
- Automatic data path failover
- Dynamic path failover and failback
- Automatic recognition of SAN hosts in the Axiom Storage Manager
- Management of the Path Manager driver from the Axiom Storage Manager
- Call-Home log collection

You must have Pillar Axiom system 1.6 or later installed on your system to use this software.

This Solaris 10 release includes kernel patches (as part of the kernel distribution) that Sun specifically developed and released to work with the Pillar Axiom system. This makes Solaris 10 “plug and play”, allowing easy installation and use with the Pillar Axiom system and Pillar Axiom Path Manager software.
Note: For additional information regarding software use and lists of current product issues, see Chapter 3, Product Issues and Notes.

Contact Information

Table 1 Contacts at Pillar Data Systems

<table>
<thead>
<tr>
<th>For help with...</th>
<th>Contact...</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Error messages • Usage questions</td>
<td>Context-sensitive help that is available in the graphical user interface (GUI).</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:support@pillardata.com">support@pillardata.com</a>.</td>
</tr>
<tr>
<td></td>
<td>USA: 1-877-4PILLAR (1-877-474-5527)—request Technical Support at the prompt.</td>
</tr>
<tr>
<td></td>
<td>International: +1 408 518 4400.</td>
</tr>
<tr>
<td></td>
<td>Web: <a href="http://support.pillardata.com/">http://support.pillardata.com/</a>.</td>
</tr>
<tr>
<td></td>
<td>Have your system serial number ready.</td>
</tr>
<tr>
<td>• Implementation assistance • System information • Enhancement requests</td>
<td><a href="mailto:sales@pillardata.com">sales@pillardata.com</a>.</td>
</tr>
<tr>
<td></td>
<td>USA: 1-877-4PILLAR (1-877-474-5527)—request Sales at the prompt.</td>
</tr>
<tr>
<td></td>
<td>International: +1 408 503 4200.</td>
</tr>
<tr>
<td>Documentation improvements and resources</td>
<td><a href="mailto:docs@pillardata.com">docs@pillardata.com</a>.</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.pillardata.com/techdocs/%E2%80%94log">http://www.pillardata.com/techdocs/—log</a> in with your username and password.</td>
</tr>
</tbody>
</table>
Supported Hardware

This release of Axiom Path Manager supports the following hardware:

- All SPARC servers qualified by Sun for use with Solaris 10 on 64-bit processors.
- ALL x64 (AMD64/EM64T) server systems listed in Sun Microsystems’ Hardware Compatibility List certified for use with Solaris 10.
- All HBAs supported by Sun Microsystems for use with Sun StorageTek Traffic Manager.

Solaris Requirements

To run the Axiom Path Manager software on Solaris 10 do the items below in the order listed:

- Install Solaris 10
- Install Supported HBAs
- Verify Patches

Install Solaris 10

Install Solaris 10 release on your system according to Sun’s instructions before you install Axiom Path Manager. STMS is installed with Solaris 10 by default. For information on how to configure STMS, refer to the Sun Microsystems Web site:

http://www.sun.com
Install Supported HBAs

Sun Microsystems provides HBAs that run on the systems listed in Supported Hardware. For a list of supported HBAs, contact Sun Technical Support, your Pillar Sales representative, Pillar Technical Support at the numbers listed in Table 1, Contacts at Pillar Data Systems, or refer to the Hardware Compatibility List on the Sun Web site:

http://www.sun.com/bigadmin/hcl/

Verify Patches

After you install the HBAs, verify the following patches are installed depending on your system. These patches have been tested by Pillar Data Systems. Use the showrev -p command to verify the patch numbers below or later patch versions are installed:

Table 2 Supported Solaris Patches

<table>
<thead>
<tr>
<th></th>
<th>Description and range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPARC</td>
<td>118833, 119130-19, 119715-09, 119578-18</td>
</tr>
<tr>
<td>x86</td>
<td>119131-19, 18855, 118844-30, 119716-06</td>
</tr>
</tbody>
</table>

Note: Refer to the Sun Microsystems Web Site for the latest patch updates.

Axiom Path Manager Operating Limits

This version of the Axiom Path Manager operates within the limits listed below. Limits may change for new Pillar Axiom System releases. Refer to the Pillar Axiom System Release Notes for the latest information.

Table 3 Axiom Path Manager operating limits

<table>
<thead>
<tr>
<th>Item</th>
<th>Description and range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axiom systems</td>
<td>Maximum = 8 per SAN host</td>
</tr>
<tr>
<td>SAN Slammers</td>
<td>Maximum = 4 per Axiom system</td>
</tr>
</tbody>
</table>
Important! Not all combinations of the limits shown in have been tested. Use care when operating a system that has been configured to run at or near these limits. The system may exhibit anomalies when all limits are exercised concurrently.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description and range</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUNs</td>
<td>Maximum =</td>
</tr>
<tr>
<td></td>
<td>• 1024 per Axiom system (512 LUNs that have nonzero Snap LUN storage)</td>
</tr>
<tr>
<td></td>
<td>• 1024 per SAN Slammer (512 LUNs that have nonzero Snap LUN storage)</td>
</tr>
<tr>
<td></td>
<td>• 512 per SAN Slammer control unit (CU)</td>
</tr>
<tr>
<td></td>
<td>• 256 per SAN Slammer CU port</td>
</tr>
<tr>
<td></td>
<td>• 256 visible per SAN host data paths</td>
</tr>
<tr>
<td>Data paths</td>
<td>Maximum = 32 to each LUN</td>
</tr>
<tr>
<td>FC HBA ports</td>
<td>Maximum = 32 per SAN host</td>
</tr>
</tbody>
</table>

Axiom Path Manager Overview

The Axiom Path Manager software for Solaris 10 consists of a daemon that runs on the host system in cooperation with Sun’s StorageTek Traffic Manager software. It prevents multiple paths from being presented as multiple disk drives; every configured multi-pathed Pillar Axiom LUN will be presented as a single disk drive to the operating system. The STMS driver supports failover across redundant paths. The daemon assists with driver configuration and uses the control path to send and receive information about the hosts. It runs as a background process at the user level and looks after management tasks. The daemon sends host attributes to the Pilot. The software then takes control of the paths, hides actual paths from the operating system, and behaves like a virtual HBA with a single path to each LUN. See Figure 1, Axiom Path Manager: A view from the SAN host for an overview of how the Axiom Path Manager software works on hosts.
The control path (dashed lines) is not a requirement for the data path (solid lines) to function.

The daemon uses the control path to:

- Get information (for example, the load balancing algorithm) from the Pilot.
- Send information (for example, host attributes and statistics) to the Pilot.
- Get path information from the HBA drivers.
- Configure the StorageTek Traffic Manager software

The StorageTek Traffic Manager software:

- Controls and manages all data paths to Axiom LUNs.
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- Groups multiple paths to an Axiom LUN and presents this group to the OS as a single LUN or disk.
- Identifies and uses optimized paths when possible.
- Determines which path to use when load balancing is enabled.
- Handles path failover and failback.
- Manages data path errors.
CHAPTER 2

Axiom Path Manager Installation

This chapter discusses how to install the Axiom Path Manager, and covers the following topics:

• Axiom Path Manager Prerequisites
• Download and Install the Axiom Path Manager
• Uninstall Axiom Path Manager
• Load Balancing Configurations

Axiom Path Manager Prerequisites

The Axiom Path Manager software requires a network connection, configured LUNs, and compatible HBAs and drivers to function properly. This section discusses these prerequisites.

Network Requirements

The Axiom Path Manager communicates with the Pilot over secure, encrypted XML. If the Axiom Path Manager is installed on a SAN host, that host will require a TCP/IP connection for communication with the Axiom Storage Manager. The network configuration must allow the SAN host to connect to TCP port 26004 on the Pilot Management Ethernet Interfaces. Verify your system has the following:

• A SAN Slammer
• A Fibre Channel protocol license
• Ethernet connections to the Pilot’s management ports
Solaris Installation

Verify you have correctly installed and configured Solaris supported HBAs, patches, updates, and the STMS software as described in Supported Hardware and Solaris Requirements.

Boot from SAN and Clustering

Sun supports booting the host using a LUN on a Pillar Axiom system as the system disk, and cluster configurations. Verify with Sun that your system and configuration can support booting from a SAN-attached disk before you install the Axiom Path Manager software. You must also have Pillar Axiom System release 1.6 or later installed.

Setting up a SAN with boot technology requires hardware dependencies, and has many deployment scenarios which are beyond the scope of this document. For information on how to set up a Sun system to boot from a SAN-attached disk, refer to boot from SAN documentation on Sun’s Web site:

http://docs.sun.com/app/docs

Note: Although this release of Axiom Path Manager supports boot from SAN and clustering, these features were not tested by Pillar Data Systems. For problems in clustering and boot from SAN configurations, contact Sun Microsystems.
Download and Install the Axiom Path Manager

To use the Axiom Path Manager, you must download the software, then configure the LUNs before you begin installation. This section describes these procedures.

Download the Software

Before you download the Axiom Path Manager software, verify your system meets the prerequisites in Axiom Path Manager Prerequisites and Supported Hardware.

To download the Axiom Path Manager software:

2. Click Login.
3. Enter your Username and Password, and click the Login button.
4. In the Downloads pane, click on the Axiom Path Manager Version 2.0 (For Solaris) download.
5. Choose the correct package for your system.
6. In the Download Details box, click on the green arrow. The software package downloads to your system.

Configure the SAN on the Pillar Axiom System

Do the following to configure the SAN:

1. Verify all HBAs and their components are installed on the host according to instructions.
2. Set up the SAN (physical connectivity and any required switch zoning) so that all required host HBA ports can access the required Axiom Slammer ports.
3. In the Storage SAN Hosts page on the Axiom Path Manager, check the connection. Each host port should show up individually as an entry with Hostname Unknown, and its Port WWN given as the HBA Port Name.

Note: After you install the software, see the Complete the LUN Configuration section. You must complete the configuration for the software to work correctly.
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Install the Axiom Path Manager Software

Install the Axiom Path Manager software on the host:

1. Extract the Pillar Axiom Path Manager software package you downloaded from the Solaris directory.
2. Copy the file to the host system.
3. Log in as root and change to the directory where the file is located.
4. Run the command:
   `pkgadd -d package name`

   In many cases you may see some messages similar to the following during installation:
   
   The following files are already installed on the system and are being used by another package:
   `/usr/lib/libHBAAPI.so`
   Do you want to install these conflicting files [y,n,?,q]

   We recommend you answer yes to all questions unless you have a specific reason not to. Axiom Path Manager is not guaranteed to work with other versions of libHBAAPI.so.

Complete the LUN Configuration

To complete LUN configuration after you have installed the software:

1. Check the Storage SAN Hosts page in the Axiom Path Manager. The individual entries for the host's ports should be replaced with a single entry under the host's name.
2. Create any new LUNs on the Axiom system for this host, and set up any mappings of LUNs to the new host entry.
3. Use the following command on the Solaris host to clear and update the device list:
   `devfsadm -C`
To configure and display the LUNS, do the following on the Solaris host:

1. Use the `cfgadm -al` command to configure the LUNS.
2. To use the LUNS, run the `format` command.
3. To list the available LUNS, use the `luxadm probe` command.
4. To list datapaths, use the `luxadm display path` command.

**Uninstall Axiom Path Manager**

To uninstall the software:

1. Log in as root.
2. Run the command:
   ```sh
   pkgrm axiompmd
   ```
3. Restart when prompted.

**Load Balancing Configurations**

In the Pillar Axiom Path Manager software for Solaris 10, load balancing is configured using the STMS mechanisms. Load balancing configuration settings made in the Axiom Storage Manager are ignored by Axiom Path Manager for Solaris 10. Refer to Sun documentation for load balancing options and configuration mechanisms.
CHAPTER 3
Product Issues and Notes

This section provides helpful additional information about the Axiom Path Manager software.

Dropped Connection to the Axiom Pilot and KEEPALIVE

When the TCP/IP connection between the daemon and the Axiom Pilot is lost (for example, if the Axiom system is restarted), the host will be shown in the Axiom Axiom Storage Manager as Not Communicating. The daemon may not automatically re-establish communication until the TCP/IP KEEPALIVE period has expired on the host. By default this period is 2 hours. The Solaris administrator can reconfigure the host to change this period, but doing so will affect all programs on the host that use TCP/IP KEEPALIVE; the administrator should ensure that the chosen value is acceptable to all programs that depend on it. The administrator can force communications to be re-established by restarting the daemon on the host.

Daemon Control Path Connection Loss

The Axiom Path Manager daemon will lose its control-path connection to the Pillar Axiom system if the Axiom Management IP address is changed. It will not automatically reconnect. The Administrator can force communications to be re-established by restarting the daemon on the host.
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