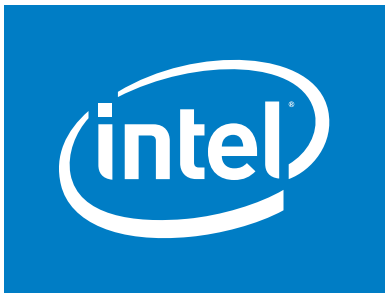
Intel® Storage System SSR212PP

Based on EMC AX150® Technology



PowerPath iSCSI for Windows:

Getting Started

Intel Order Number D59958-001

Revision 1.0

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Contents

List of Figures

List of Tables

Preface

About this Manual

Thank you for purchasing and using the Intel¤ Storage System SSR212PP . This guide describes how to install and use PowerPath iSCSI for Windows, which is used to manage an iSCSI storage system (SSR212PPi or SSR212PP2i) from a Windows 2003l® Server host.

This manual is written for system technicians who are responsible for installing, administering, troubleshooting, upgrading, and repairing this storage system. For the latest version of this manual, see http://support.intel.com/support/motherboards/server/SSR212PP.

Additional Information and Software

If you need more information about this product or information about the accessories that can be used with this storage system, use the following resources. These files are available at the SSR212PP support website. Unless otherwise indicated in the following table, once on this Web page, type the document or software name in the search field at the left side of the screen and select the option to search "This Product."

For this information or software	Use this Document or Software
For in-depth technical information about this product	Intel® Storage System SSR212PP *Technical Product Specification*
If you just received this product and need to install it	Intel® Storage System SSR212PP *Quick Start User's Guide* in the product box
For virtual system tours and interactive repair information	A link to the SMaRT Tool is available under "Other Resources" at the right side of the screen at http://support.intel.com/support/motherboards/server/*SSR212PP*
Accessories and spacres	Intel® Storage System SSR212PP *Spares Installation Guide*
Hardware (peripheral boards, adapter cards) and operating systems that have been tested with this product	Tested Hardware Operating Systems List (THOL)

What is PowerPath iSCSI?

1

PowerPath¤ iSCSI is an intelligent path management application specifically designed to work within the Microsoft¤ Mulitpathing I/O (MPIO) framework. PowerPath iSCSI supports a Microsoft Management Contsole (MMC) based snap-in through which the user manages hardware and software on the Windows¤ platform. PowerPath iSCSI offers a base level of high available multi-pathing I/O for environments using SSR212PP iSCSI storage systems.

PowerPath iSCSI is a distinct product from PowerPath.

PowerPath iSCSI Features

PowerPath iSCSI provides:

- ***Automatic path failover***.PowerPath iSCSI supports multiple paths between a SSR212PP LUN and a host. Having multiple paths enables the host to access a LUN even if a specific path is unavailable. PowerPath iSCSI automatically detects path failure and redirects I/O from the failed path to an alternate path. This eliminates loss of data and application downtime. Failovers are transparent and nondisruptive to applications.
- ***Autorestore***. If LUNs have been relocated, or *trespassed*, to the passive (unassigned) storage processor because all paths to the active (assigned) storage processor had failed or been taken offline, PowerPath iSCSI automatically restores those LUNs to the assigned storage processor when a failed or offline path to that storage processor returns to service.
- ***High-availability cluster support***. PowerPath iSCSI is particularly beneficial in cluster environments, as it can prevent operational interruptions and costly downtime. PowerPath iSCSI s path failover capability avoids node failover, maintaining uninterrupted application support on the active node in the event of a path disconnect (as long as another path is available).

PowerPath iSCSI Management Interfaces

PowerPath iSCSI provides the following management interfaces:

- A graphical user interface (GUI) for managing paths from the host to the storage system. PowerPath iSCSI uses a MMC-based GUI that interacts with WMI to obtain the data to display. The GUI displays path, adapter, disk, and path-state information. Any state change is refreshed in the GUI automatically. The GUI also provides the interface for setting the path state.

- The powermt utility, a command line interface for managing paths from the host to the storage system.

Why Use PowerPath iSCSI?

PowerPath iSCSI provides high availability for mission-critical I/O.

The PowerPath iSCSI software runs on a Windows server and manages the paths between the server and the LUNs in a SSR212PP iSCSI storage system. A *path* consists of host interface hardware and drivers, cables, two switch ports (if a switch is present), and storage processor ports. The path to a LUN runs through the storage processor to which it was assigned when it was created. PowerPath iSCSI supports multiple paths from a server with multiple host interfaces to a SSR212PP LUN.

If a path fails, PowerPath iSCSI detects the failure and automatically transfers I/O from that path to a working path, with no user intervention necessary. The following examples explain this more fully.

Without PowerPath iSCSI

Without PowerPath iSCSI, a failure of any component in the path causes a loss of access to the LUNs in the path, as shown in Figure 1.

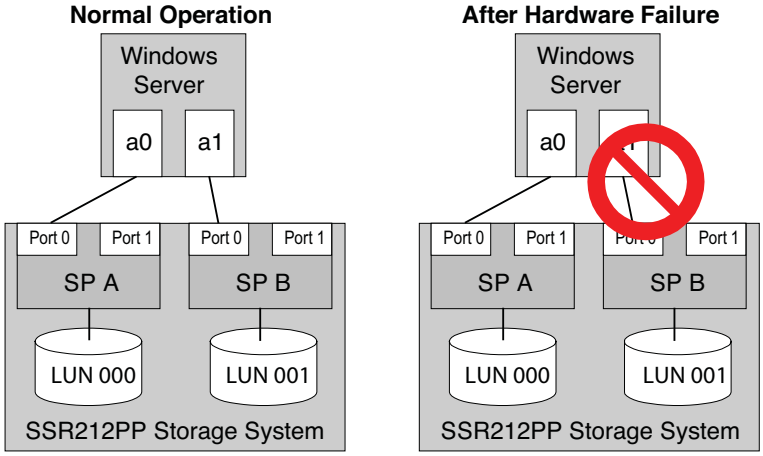

FIGURE 1. Without PowerPath iSCSI, Access is Lost When a Path Fails

During normal operation, the server has access to both LUNs. Without PowerPath iSCSI, if HBA a1 fails, the only path to LUN 001 is lost, and the server can no longer access that LUN.

With PowerPath iSCSI

With PowerPath iSCSI supporting multipath operation, the server maintains access to a LUN even if any component of the path from the server to the LUN fails. For example, if HBA a1 fails, PowerPath iSCSI directs storage processor A to assign itself (trespass) LUN 001. PowerPath iSCSI diverts I/O to the path through HBA a0, and I/O to the disk continues as shown in Figure 2.

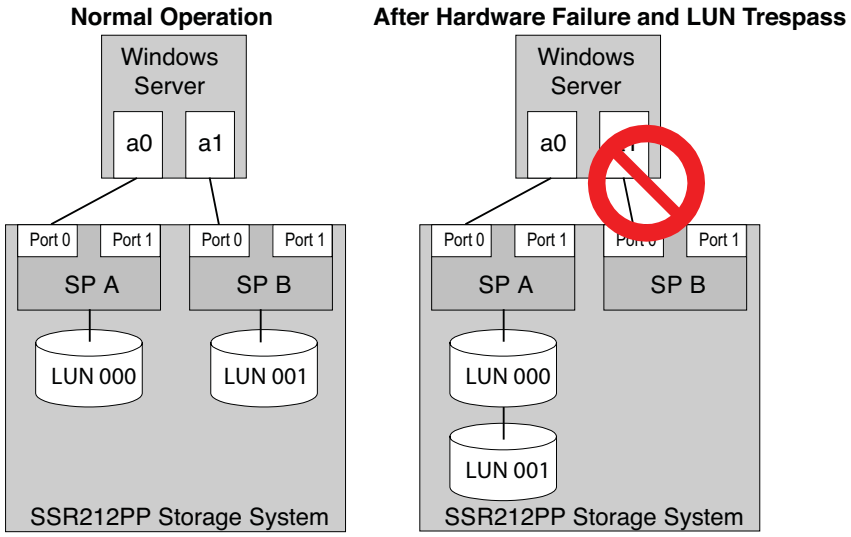

FIGURE 2. With PowerPath iSCSi, Access Continues When a Path Fails

This failover is transparent and does not disrupt application I/O.

Installing PowerPath iSCSI for Windows

2

Before you install

This section describes what to do before you install PowerPath iSCSI on a host.

- ❑ Obtain up-to-date information:
  - Check the SSR212PP support website for the most current information.
  - Check the release notes. Intel updates release notes periodically and post them on the SSR212PP support website. Release notes are cumulative and include information about every PowerPath iSCSI point release, new system and environment requirements, and all known and fixed bugs.
- ❑ Choose a convenient time.

  After installing PowerPath iSCSI, you must shut down the host, connect additional cables, and then restart the host. Therefore, you should plan to install PowerPath iSCSI at a time when a reboot will cause the least disruption to your site. To avoid warning messages when rebooting, you should log on to a Windows host using an administrator account and close all applications (including virus-scanning software) and client files before starting the installation.
- ❑ Prepare the host.

  It is recommended that you install PowerPath iSCSI on a host that has never had a previous version of PowerPath installed on it. If a previous version of PowerPath had been installed on the host, make sure that it has been completely removed before installing PowerPath iSCSI.

  - Verify that your environment meets the requirements detailed in the *PowerPath iSCSI for Windows Release Notes*, including:
    - Operating system versions and patches needed to support PowerPath iSCSI.
    - Host-storage system interconnection topologies specified in the E-Lab Navigator.
    - Specific PowerPath iSCSI requirements.
  - Configure host interface drivers if you have not already done so. Check the HBA/NIC vendor documentation for the specific settings.
  - If you use the Microsoft iSCSI Initiator 1.05a:
    - Check the option Automatically restore this connection when the system boots in the Log On to Target dialog box unless you have a specific reason not to do so.

- The Microsoft iSCSI Software Initiator offers the Enable Multi-Path option when you connect to a target. It is recommended that you do *not* select Enable Multi-Path from the Log On to Target dialog box when establishing connections to an iSCSI array.

  If you select Enable Multi-Path, the Microsoft iSCSI Software Initiator remembers only one connection per target on reboot, and you may need to reconfigure paths.

- Do not connect multiple paths from the host to the storage system interface ports or switches until you have installed PowerPath iSCSI and shut down the host.
- Check your browser requirements before viewing online help. If you do not have the proper browser installed, you may view help files directly from the installation CD. The browser requirements are in described in the *PowerPath iSCSI for Windows Release Notes*.

❑ Prepare the storage system.

PowerPath iSCSI is supported on SSR212PP-Series iSCSI storage systems.

Installing PowerPath iSCSI From the Windows Desktop

Use the following procedure to install PowerPath iSCSI from the Windows desktop.

Do not connect multiple paths from the HBAs/NICs to the storage system interface ports or switches until you have installed PowerPath iSCSI and shut down the host. The correct procedure is: Install PowerPath iSCSI, shut down the host, connect additional cables, and then power on the host.

STEP 1. Locate PowerPath iSCSI in the *SSR212PP Resource CD* menu.

STEP 2. To install the PowerPath iSCSI software:

a. In the Run window, enter the name of the installation program:

drive:\W2003\EMCPP.iSCSI.1.1.W2003.32bit.GA.exe

where *drive* is the CD drive letter (for example, C). Then click OK.

Alternatively, double-click the platform specific .exe icon from the appropriate directory on the CD.

b. In the setup wizard Welcome window, click Next. Enter your user name and organization and click Next.

c. To install in the default directory, click Next.

It is recommended that you install PowerPath iSCSI in the default directory.

To install in a different directory, click Change and choose another directory. Click OK, and then Next.

CAUTION

Do not specify the Windows System directory for your system (specified by the %SYSTEMROOT% environment variable). PowerPath iSCSI will not function correctly if it is installed in this directory.

d. In the Ready to Install the Program dialog box, click Install. When prompted by the Licensing Tool, type your 24-digit registration number in the License Key field. Click Add, and then OK.

e. In the InstallShield Wizard Completed dialog box, click Finish.

f. When the setup wizard asks whether you want to reboot the host, click No.

g. Shut down the host.

h. Connect the remaining cables from the host to the storage system interface ports or switches.

i. Power on the host. PowerPath iSCSI is now fully configured, with multiple paths to the LUNs.

STEP 3. Following these steps automated PowerPath iSCSI installation. In addition, you may create a log file while you install from the command prompt.

PowerPath iSCSI supports two types of command line installations:

- ***Silent installations***. Unattended PowerPath iSCSI installation using command-line parameters; does not require any user input. See "Silent installation" on page 7 for more information.
- ***Interactive installations***. Attended PowerPath iSCSI installation that requires user input. See "Interactive installation" on page 9 for more information.

Do not connect multiple paths from the host to the storage system interface ports or switches until you have installed PowerPath iSCSI and shut down the host. The correct procedure is: Install PowerPath iSCSI, shut down the host, connect additional cables, and then power on the host.

Silent installation

To perform a silent PowerPath iSCSI installation, type a command in the following format (but all on one line):

To perform a silent PowerPath iSCSI installation, use a command line in the following format (type all on one line):

drive:\W2003\EMCPP.iSCSI.1.1.W2003.32bit.GA.exe /s /v" /q /L*v *pathToLogfile* [*property=propertyValue*]* "

where:

- *drive* is the CD drive letter, for example, C.
- *pathToLogfile* is the complete path to the log file, for example, C:\logs\PPremove.log.
- *property=propertyValue* is one or more optional properties.

Table 1, "Silent Installation Variables" describes the variables used in the syntax above. Table 2, "Optional Properties" describes the optional properties.

TABLE 1. Silent Installation Variables

Variable	Function
/s	Informs InstallShield that this is a silent installation.
/v	Directs InstallShield to pass the following information string (enclosed in quotes) to the Microsoft Installer (MSI).
/q	Informs the Microsoft Installer that this is a quiet installation (no user interface).
/L*v *file*	Directs the Microsoft Installer to write verbose output to the file specified with this option. The target directory for the log file must exist before starting a silent installation using the logging option (as required by the Windows installer engine).

TABLE 2. Optional Properties

Property[a]	Description
LICENSENUM=*license_key*	The value must be a valid license or no license will be saved.
INSTALL_DRIVE=*drive*	¥ The installation only uses first character entered and must be a valid drive letter or the default drive will be used. ¥ The INSTALL_DRIVE value will be ignored if the same version of PowerPath iSCSI is installed.
NO_REBOOT=1	If NO_REBOOT=1, the host will not reboot after PowerPath iSCSI is installed.

NOTES:
a. All properties must be in uppercase letters or the information will not be passed to installer.

Examples of silent installations

The following are all valid command lines for silent installations:

- Silent installation with logging, set the PowerPath iSCSI license, set the install drive, disable reboot at completion:

  EMCPP.iSCSI.1.1.W2003.32bit.GA.exe /s /v" /q /L*v C:\logs\PPsetup.log LICENSENUM=0000-0000-0000-0000-0000-0000 INSTALL_DRIVE=Z NO_REBOOT=1"

- Silent installation with no logging, set the PowerPath iSCSI license, disable reboot at completion:

  EMCPP.iSCSI.1.1.W2003.32bit.GA.exe /s /v" /q
  LICENSENUM=0000-0000-0000-0000-0000-0000 NO_REBOOT=1"

Interactive installation

To perform an interactive installation of PowerPath iSCSI from the command line, use a command line in the following format (type all on one line):

drive:\W2003\EMCPP.iSCSI.1.1.W2003.32bit.GA.exe /v"/L*v *pathToLogfile*
[*property=propertyValue*]* "

where:

- *drive* is the CD drive letter (for example, C).
- *pathToLogfile* is the complete path to the log file (for example, C:\logs\PPremove.log).
- *property=propertyValue* is one or more optional properties.

Table 3, "Interactive Installation Variables" describes the variables used in the syntax. Table 2 "Optional Properties" on page -8 describes the optional properties.

TABLE 3. Interactive Installation Variables

Variable	Function
/v	Directs InstallShield to pass the following information string (enclosed in quotes) to the Microsoft Installer (MSI).
/L*v *file*	Directs the Microsoft Installer to write verbose output to the file specified with this option. The target directory for the log file must exist before starting an interactive installation using the logging option (as required by the Windows installer engine).

Examples of Interactive Installations

The following are all valid command lines for interactive installations:

- Interactive installation with logging, set the PowerPath iSCSI license, set the install drive, disable reboot at completion:

  EMCPP.iSCSI.1.1.W2003.32bit.GA.exe /v" /L*v C:\logs\PPsetup.log
  LICENSENUM=0000-0000-0000-0000-0000-0000 INSTALL_DRIVE=Z NO_REBOOT=1"

- Interactive installation with no logging, set the PowerPath iSCSI license, disable reboot at completion:

  EMCPP.iSCSI.1.1.W2003.32bit.GA.exe /v"LICENSENUM=0000-0000-0000-0000-0000-0000
  NO_REBOOT=1"

Removing PowerPath iSCSI for Windows

3

Before you remove PowerPath iSCSI from the host, close all applications and client files to avoid warning messages when rebooting after the uninstall.

CAUTION

Data corruption is possible if multiple paths remain on a system after PowerPath iSCSI has been removed. Make sure that you remove any redundant paths during the uninstall process, following the instructions in this section.

Removing PowerPath iSCSI using Add/Remove Programs

STEP 1. From the Start menu, select Settings ▸ Control Panel.

STEP 2. On the Control Panel, right-click Add/Remove Programs and select Open.

STEP 3. On the Add/Remove Programs panel, select PowerPath iSCSI for Windows and click Remove.

STEP 4. When prompted to remove PowerPath iSCSI, click Yes.

STEP 5. When prompted to restart the host, click No.

STEP 6. Shut down the host and disconnect the redundant paths from the host to the storage system:

a. From the Start menu, select Shut Down.

b. In the Shut Down Windows dialog box, select Shut Down from the list, and click OK.

c. With the host shut down, disconnect redundant cables from the host to the storage system interface ports.

SAN configurations may have multiple logical configurations per physical connection. Ensure that no redundant paths exist.

Starting PowerPath iSCSI

4

To Start PowerPath iSCSI:

STEP 1. From the Start menu, select Settings ▸ Control Panel.

STEP 2. On the Control Panel, select Administrative Tools ▸ Computer Management.

Alternatively, click the My Computer icon on your desktop and select Manage from the menu.

The PowerPath iSCSI application, highlighted in Figure 3, resides under the Storage component of the Computer Management utility.

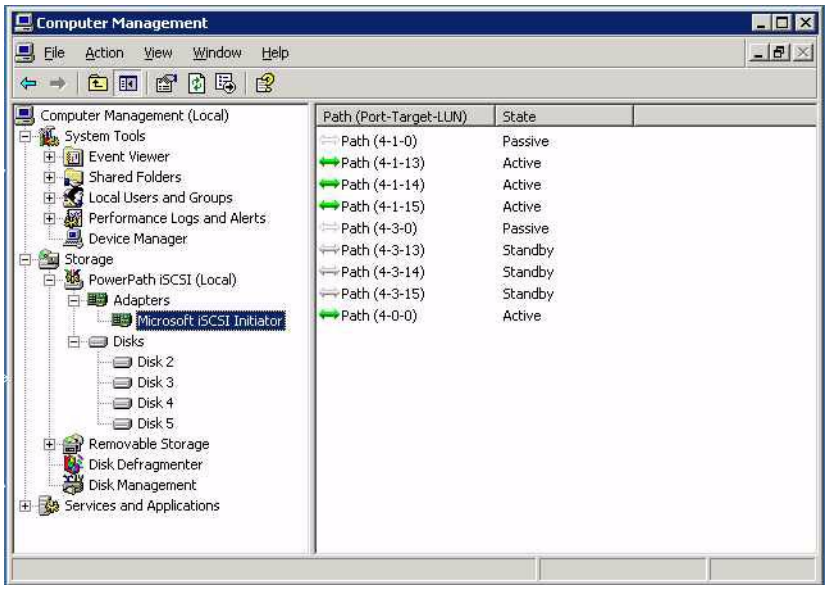

FIGURE 3. PowerPath iSCSI

STEP 3. On the Computer Management panel, select PowerPath iSCSI.

Using the PowerPath iSCSI GUI

5

Objects managed by PowerPath iSCSI are shown as **icons**. The type of icon reflects the object and, in the case of a path, the state of the object selected. See Table 4 on page -17 for a description of standard PowerPath iSCSI icons.

Panes

The PowerPath iSCSI application includes two panes:

- A scope pane displays PowerPath iSCSI objects in a hierarchical list that expand or collapse the list for more detail.
- A result pane displays configuration statistics for PowerPath iSCSI objects selected in the scope pane.

Figure 4 shows the PowerPath iSCSI application.

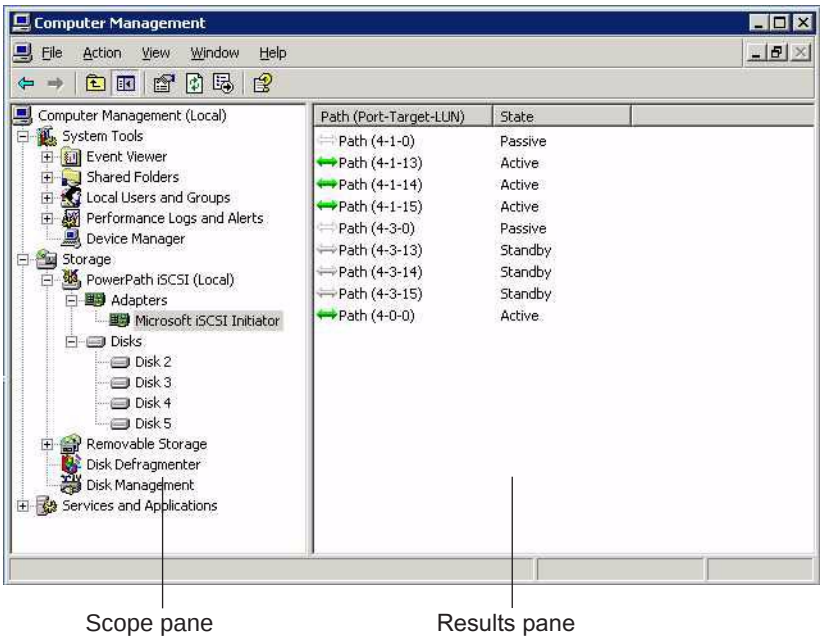

FIGURE 4. PowerPath iSCSI

Device Properties Dialog Boxes

Device properties dialog boxes allow you to display the device properties of selected PowerPath iSCSI objects:

- ***Root Node Properties*.** Use this to show root node details. To display this tab, select the root node in the scope pane, right-click, and select Properties.

  The root node is the top-level view of your configuration and represents the host being managed by PowerPath iSCSI.

- ***Adapter Properties***. Use this to show adapter details. To display this tab, select an adapter, right-click, and select Properties.
- ***Disk Properties***. Use this to show disk details. To display this tab, select a disk, right-click, and select Properties.

See online help for a complete description of all fields in device properties dialog boxes.

Online Help

You can get details about object properties from the online help file. Access online help from the Help menu or F1 key. If you do not have the proper browser installed, you may run this help file directly from the installation CD.

If you do not have the Internet Explorer 5.0 browser or higher installed on your system, you cannot launch the PowerPath iSCSI online help files from the MMC console. If you want to view the help file without installing Internet Explorer, launch the file PowerPath_iSCSI_Online_Help.chm directly from the help folder on the software CD.

PowerPath iSCSI Icons

PowerPath iSCSI icons represent the PowerPath-managed objects in your configuration. These objects are displayed in a hierarchy in the scope pane and are displayed in the result pane. The type of icon reflects the state of the particular object selected. Table 4 displays the standard PowerPath iSCSI icons.

The PowerPath iSCSI objects in the following table communicate with the host. The root node is the graphical representation of this host and is the top level view of your configuration.

For a more complete description of path states and instructions on making paths active, see the online help.

TABLE 4. PowerPath iSCSI Icons

Object	Description	Icon
PowerPath iSCSI Icon: Managed Paths	Visible within the root level of the MMC snap-in, also referred to as the root node.	
PowerPath iSCSI Icon: No Managed Paths	The root node is displayed in light gray to indicate that PowerPath iSCSI is not able to locate any MPIO paths to manage.	
Adapter Icon	Identifies an adapter that contains paths that are managed by PowerPath iSCSI.	
Disk Icon	Identifies a disk managed by PowerPath iSCSI.	
Active Path Icon	Identifies an active I/O path managed by PowerPath iSCSI.	
Standby Path Icon	Identifies an I/O-capable path that is inactive.	
Passive Path Icon	Identifies a path connected to the non-active storage processor.	
Unlicensed Path Icon	Identifies a path (other than the single active/passive pair) connected to a host that does not have a valid PowerPath iSCSI license.	

Managing PowerPath iSCSI 1.1 From the Command Line

6

Use the powermt commands listed in Table 5 to manage a PowerPath iSCSI environment from the command line.

TABLE 5. powermt Commands

Command	Function
powermt display	Displays the state of HBAs/NICs, paths, storage system ports, and devices configured for PowerPath iSCSI.
powermt restore	Restores paths and relocates SSR212PP iSCSI devices to their default storage processor.
powermt update_lun_names	Causes PowerPath iSCSI to retrieve the latest user-assignable LUN names for devices on a SSR212PP system.
powermt version	Displays the version of PowerPath iSCSI installed on the host.

Usage Notes

- In a default PowerPath iSCSI installation, the powermt utility resides in the directory:

  %systemdrive%\Program Files\EMC\PowerPathiSCSI.

- You must have administrative rights to use most powermt commands. Multiple powermt instances can be launched.
- To use powermt, launch the command prompt window, and then type the command in that window.
- All powermt commands return 0 to the user process on success, or 1 on error.

The powermt display Command

The command powermt display displays information about HBAs/NICs, paths, storage-system ports, and devices managed by PowerPath iSCSI.

Syntax

powermt display [ports] [class=clariion|all] [dev=*device*|all] [every=*seconds*]
powermt display paths [every=*seconds*]

In the current release, the class argument is always set to clariion. Therefore, you do not need to specify this argument in the powermt display command.

Arguments

ports — Displays information about storage system ports, one line per port.

paths — Displays information about paths configured for and managed by PowerPath iSCSI.

dev=*device*|all — Displays information about the specified *device*. all specifies all devices.

every=*seconds* — Integer from 1 to 86400 that specifies, in seconds, how often the display is updated. By default, the display is not updated.

The *seconds* value is the minimum time between refreshes; the actual time is affected by the overall system load. On busy systems, display updates can be less frequent than specified.

Detailed Description

The powermt display command has four forms, as shown in Table 6 :

TABLE 6. The powermt display Command

Command	Description
powermt display	Yields the display described in Figure 5 on page -20.
powermt display paths	Yields the paths display described in Figure 6 on page -21.
powermt display ports	Yields the ports display described in Figure 7 on page -21.
powermt display dev	Yields the devices display described in Figure 8 on page -23.

The Initiator Display

Figure 5 shows a sample HBA display (when neither the paths nor the ports argument is used).

```
C:\Documents and Settings\Administrator>powermt display

CLARiiON logical device count=4

================================================================================
----- Host Bus Adapters ---------  ------ I/O Paths -----  ------ Stats ------
### HW Path                       Summary   Total   Dead  IO/Sec Q-IOs Errors
================================================================================
  4 Port4\Path0                   Optimal      16      0    -      0      0
  5 Port5\Path0                   Optimal      16      0    -      0      0
```

FIGURE 5. initiator Display Example

Table 7 on page -22 describes the fields in the display output.

The Paths Display

With the paths argument, you display all paths between the host and storage-system ports that the host can access. The output has one line per path. Sample output of powermt display paths is shown in Figure 6.

```
C:\Documents and Settings\Administrator>powermt display paths

CLARiiON logical device count=4

================================================================================
----- Host Bus Adapters --------- ------ Storage System -----    - I/O Paths -
### HW Path                            ID          Interface     Total    Dead
================================================================================
  4 Port4\Path1                  APM00041301639         SP B1      4      0
  4 Port4\Path1                  APM00041301639         SP B0      4      0
  4 Port4\Path1                  APM00041301639         SP A1      4      0
  4 Port4\Path1                  APM00041301639         SP A0      4      0
  5 Port5\Path1                  APM00041301639         SP B1      4      0
  5 Port5\Path1                  APM00041301639         SP B0      4      0
  5 Port5\Path1                  APM00041301639         SP A1      4      0
  5 Port5\Path1                  APM00041301639         SP A0      4      0
```

FIGURE 6. Paths Display Example

Table 7 on page -22 describes the fields in the display output.

The Ports Display

A sample ports display (when only the ports argument is used) is shown in Figure 7. With the ports argument, you display the state of the storage-system ports visible to the hosts under PowerPath iSCSI control. The output has one line per port.

```
C:\Documents and Settings\Administrator>powermt display ports

Storage class = CLARiiON

================================================================================
----------- Storage System --------------     -- I/O Paths --   --- Stats ---
ID              Interface         Wt_Q      Total    Dead    Q-IOs  Errors
================================================================================
 APM00041301639         SP B1      256          8       0       0       0
 APM00041301639         SP B0      256          8       0       0       0
 APM00041301639         SP A1      256          8       0       0       0
 APM00041301639         SP A0      256          8       0       0       0
```

FIGURE 7. Ports Display Example

Table 7 describes the fields in the display output.

Fields in the HBA, paths, and ports Display

Table 7 describes the fields in the HBA, paths, and ports displays.

TABLE 7. Fields in the HBA, paths, and ports Display

Field	Value	Description
CLARiiON logical device count	Non-negative integer	Total number of unique CLARiON LUNs configured by PowerPath iSCSI that this host can access.
Host Bus Adapters ###	Non-negative integer	PowerPath iSCSI number for the HBA. This number is preserved across boots but is not preserved after configuration changes.
Host Bus Adapters HW Path	Alphanumeric string	*port#\path#*, where # is the integer displayed in Properties in Disk Administrator or Disk Management; for example, port1\path0.
I/O Paths Summary	optimal degraded failed	Status of the paths originating from this HBA: ¥ optimal means all paths are alive (usable). ¥ degraded means one or more, but not all, paths from this HBA are dead (not usable). ¥ failed means all paths are dead and no data is passing through this HBA.
I/O Paths Total	Non-negative integer	Total number of paths that originate from this HBA.
I/O Paths Dead	Integer in the range [0..I/O Paths Total]	Total number of paths originating from this HBA that are dead (not usable).
Stats IO/sec	Non-negative integer	This field is blank for powermt display, unless it is used with the every parameter. Subsequent powermt display iterations display the average number of I/Os sent across this bus each second.
Stats Q-IOs	Non-negative integer	Total number of outstanding I/Os on this HBA now.
Stats Errors	Non-negative integer	Total number of times any logical I/O paths on this bus transitioned from *alive* to *dead.* This is always equal to or less than the total number of HBA I/O errors. It is cleared at boot time or when powermt restore executes.
Storage System ID	Hexadecimal value or alphanumeric string	Identification number for the storage system on which the logical device is located.
Storage System Interface	Alphanumeric string	Interface port: SP [A-B][0-3]
Storage System Wt_Q	Non-negative integer	Maximum number of write I/O requests that will be serviced before the I/O queue checks for any outstanding read I/O.

The Devices Display

A sample devices display (shown when only the dev argument is used) is shown in Figure 8.

```
C:\Documents and Settings\Administrator>powermt display dev=physicaldrive2

Pseudo name =PHYSICALDRIVE2
CLARiiON ID= APM00041301639  [Dell1750-01]
Logical device ID= 600601602B7B11004C81A0D08687D911 [LUN 138]
state=Active; policy=LB_ACTIVE_PASSIVE; priority=0; queued-IOs=0
Default owner=SP A    Current owner=SP A
================================================================================
---------------- Host ---------------    - Storage Sys - - Path -   -- Stats
### HW Path                 I/O Paths    Interf.    Wt_Q  Status    Q-IOs Errors
================================================================================
  4  port4\path0\tgt3\lun3  c4t3d3      SP B1       256   Passive     0    0
  4  port4\path0\tgt2\lun3  c4t2d3      SP B0       256   Passive     0    0
  4  port4\path0\tgt1\lun3  c4t1d3      SP A1       256   Active      0    0
  4  port4\path0\tgt0\lun3  c4t0d3      SP A0       256   Standby     0    0
  5  port5\path0\tgt3\lun3  c5t3d3      SP B1       256   Passive     0    0
  5  port5\path0\tgt2\lun3  c5t2d3      SP B0       256   Passive     0    0
  5  port5\path0\tgt1\lun3  c5t1d3      SP A1       256   Standby     0    0
  5  port5\path0\tgt0\lun3  c5t0d3      SP A0       256   Standby     0    0
```

FIGURE 8. Device Display Example

Table 8 explains the fields in the devices display.

TABLE 8. Fields in the Devices Display

Field	Value	Description
Pseudo name	Alphanumeric string	Platform-specific value assigned by PowerPath iSCSI to the device.
CLARiiON ID	Hexadecimal value or alphanumeric string	Identification number for the storage system on which the logical device is located. For SSR212PP systems only, the user-configurable storage group name, if available, is by default displayed in brackets after this identification number.
Logical device ID	Hexadecimal value or alphanumeric string	Identification number for the logical device. Each logical device on each storage system has a unique ID. Each storage system, however, uses the same storage-system ID. Together, storage-system ID and logical-device ID create a unique ID for every logical device in the world. On a SSR212PP system, the logical-device ID is a 32-digit number. This is *not* the same as the standard device identifier used by Navisphere. For SSR212PP systems only, the user-assignable LUN name, if available, is by default displayed in brackets after this identification number.
state	Active	Indicates the state of the storage system. The only valid value is Active. If the storage system is not active, the command fails.

Field	Value	Description
policy	LB_ACTIVE_PASSIVE	This version of PowerPath iSCSI does not support load balancing. The value is always LB_ACTIVE_PASSIVE.
priority	0	This version of PowerPath iSCSI does not support priority. The value is always 0.
queued- IOs	Non-negative integer	Number of I/O requests queued to this PowerPath iSCSI device.
Default owner Current owner	SP *x* SP *x*	Default and current owners of the logical device (SSR212PP systems only).
Host ###	Non-negative integer	PowerPath iSCSI number for the HBA. This number is preserved across boots but is not preserved after configuration changes.
Host HW Path	Alphanumeric string	port#\path#\tgt#\lun#, where # is the integer displayed in Properties in Disk Administrator or Disk Management; for example, port2\path0\tgt6\lun7.
Host I/O Paths	Alphanumeric string	The platform-specific device name for the path.
Storage Sys Intef.	Alphanumeric string	Interface port: SP [A-B][0-3]
Storage System Wt_Q	Non-negative integer	Maximum number of write I/O requests that will be serviced before the I/O queue checks for any outstanding read I/O.
Path Status	active standby passive unlicensed	An active path can currently accept I/O. On a SSR212PP iSCSI storage system, PowerPath iSCSI marks the first path to the active storage processor as the active path. A standby path is an I/O capable path that is being held in reserve should an active path fail. On a SSR212PP iSCSI storage system, PowerPath iSCSI marks the redundant paths to the assigned storage processor as standby paths. Note that the unlicensed version of PowerPath iSCSI does not support standby paths. A passive path is held in reserve. On a SSR212PP ISCSI storage array, PowerPath iSCSI marks all paths to the unassigned storage processor as passive. If LUNs are trespassed to that storage processor, PowerPath iSCSI marks one of the passive paths as the active path and the remaining passive paths as standby. Note that the unlicensed version of PowerPath iSCSI supports a single passive path. The unlicensed version of PowerPath iSCSI supports a single active and passive path. All others paths are marked as unlicensed.
Stats Q-IOs	Non-negative integer	Total number of I/O operations under way to this path. This is the total number of I/O requests to this device that have not completed. The sum of in-progress I/Os for all paths should equal the number of in-progress I/Os for the PowerPath iSCSI device.
Stats Errors	Non-negative number	Total number of times this path transitioned from *alive* to *dead.* This is always equal to or less than the total number of HBA I/O errors. It is cleared at boot time or when powermt restore executes.

The powermt restore Command

Description

The command powermt restore relocates SSR212PP LUNs to their default storage processor.

Syntax

powermt restore [hba=*hba*/all]|[dev=*device*|all]

Arguments

hba=*hba*|all — Limits restoration to paths from the specified HBA. The value of *hba* is a number in the Host ### column of the powermt display output. The argument all (the default) specifies all HBAs under PowerPath iSCSI control.

dev=*device*|all — Limits restoration to the specified path, or all paths to the specified device. The argument all (the default) specifies all paths to all devices.

The hba and dev arguments are mutually exclusive. You cannot specify both arguments in the same powermt restore command.

The powermt update lun_names Command

Description

The command powermt update lun_names causes PowerPath iSCSI to retrieve the latest SSR212PP user-assignable LUN names. A user-assignable LUN name is a character string that a user or system manager associates with a LUN and assigns through Navisphere.

Syntax

powermt update lun_names

The powermt version Command

Description

The command powermt version prints the version of PowerPath iSCSI installed on the host.

Syntax

powermt version

PowerPath iSCSI Event Log Messages

7

PowerPath iSCSI writes messages to the Windows Event Log each time that a significant event happens. Use the Windows Event Viewer to view a log of PowerPath iSCSI message.

Accessing the Windows Event Viewer

To access the Windows Event Viewer:

STEP 1. From the Start menu, select Settings ▸ Control Panel. On the Control Panel, select Administrative Tools ▸ Computer Management.

Alternatively, click the My Computer icon on your Desktop and select Manage from the menu.

STEP 2. On the Computer Management panel, select Event Viewer ▸ System.