

iSCSI AIX® Host Utilities 3.0

Installation and Setup Guide

Network Appliance, Inc.
495 East Java Drive
Sunnyvale, CA 94089 USA
Telephone: +1 (408) 822-6000
Fax: +1 (408) 822-4501
Support telephone: +1 (888) 4-NETAPP
Documentation comments: doccomments@netapp.com
Information Web: <http://www.netapp.com>

Part number 215-03240_A0
June 2007

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Preface

About this guide

This guide describes how to configure the iSCSI initiator included in the AIX operating system. It also describes how to configure a NetApp storage system to work with an AIX host, and how to access the storage system LUNs as disks on the host.

See the *Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products*, available on the NetApp on the Web™ (NOW) site at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/ for information on the specific AIX versions supported, including required technology levels and PTFs.

Audience

This guide is for administrators of AIX hosts and NetApp storage systems.

Terminology

This guide uses the following terms:

- ◆ NetApp storage products (filers, FAS appliances, and NearStore systems) are all storage systems and are also sometimes called filers or storage appliances.
- ◆ *LUN* (Logical Unit Number) refers to a logical unit of storage identified by a number.
- ◆ *LUN ID* refers to the numerical identifier for a LUN.
- ◆ *Initiator* refers to the system component that originates an I/O command over an I/O bus or network.
- ◆ *Target* refers to the storage system that receives an I/O request and serves the data requested by the initiator.

Command conventions

You can enter storage system commands on the system console or from any client that can obtain access to the storage system using a Telnet session.

Formatting conventions

The following table lists different character formats used in this guide to set off special information.

Formatting convention	Type of information
<i>Italic type</i>	◆ Words or characters that require special attention. ◆ Placeholders for information you must supply. For example, if the guide requires you to enter the <code>fcctest</code> <i>adaptername</i> command, you enter the characters “fcctest” followed by the actual name of the adapter. ◆ Book titles in cross-references.
Monospaced font	◆ Command and daemon names. ◆ Information displayed on the system console or other computer monitors. ◆ The contents of files.
Bold monospaced font	Words or characters you type. What you type is always shown in lowercase letters, unless your program is case-sensitive and uppercase letters are necessary for it to work properly.

Keyboard conventions

This guide uses capitalization and some abbreviations to refer to the keys on the keyboard. The keys on your keyboard might not be labeled exactly as they are in this guide.

What is in this guide...	What it means...
hyphen (-)	Used to separate individual keys. For example, Ctrl-D means holding down the Ctrl key while pressing the D key.
<i>Enter, enter</i>	Used to refer to the key that generates a carriage return; the key is named Return on some keyboards. Also used to mean pressing one or more keys and then pressing the Enter key.
<i>type</i>	Used to mean pressing one or more keys on the keyboard.

Special messages

This guide contains special messages that are described as follows:

Note

A note contains important information that helps you install or operate the system efficiently.

Attention

An attention contains instructions that you must follow to avoid damage to the equipment, a system crash, or loss of data.

How to send your comments

Your feedback is important in helping us to provide the most accurate and high-quality information. If you have comments or suggestions for improving this publication, you can send us comments electronically to doccomments@netapp.com. To help us direct the comments to the correct division, please put iSCSI AIX in the subject line.

About this chapter

This chapter provides a brief overview of the installation process and the tasks you need to complete before you install the Host Utilities.

Topics covered in this chapter

This chapter includes the following topics:

- ◆ [“iSCSI AIX Host Utilities overview”](#) on page 2
- ◆ [“iSCSI AIX Host Utilities installation and setup overview”](#) on page 4
- ◆ [“Where to go for additional information”](#) on page 6

iSCSI AIX Host Utilities overview

Understanding how iSCSI is implemented

The iSCSI protocol is a licensed service on the storage system that enables you to transfer block data to hosts using the SCSI protocol over TCP/IP. The iSCSI protocol standard is defined by RFC 3720 (www.ietf.org).

In an iSCSI network, storage systems are targets that have storage target devices, which are referred to as LUNs (logical units). An AIX host uses the iSCSI protocol to access LUNs on a storage system.

For the iSCSI AIX Host Utilities 3.0, the iSCSI protocol is implemented over either the host's standard Gigabit Ethernet interfaces or an iSCSI TCP/IP offload engine (TOE) adapter. The iSCSI protocol on the storage system can be implemented over the storage system's standard Gigabit Ethernet interfaces using either a software driver that is integrated into Data ONTAP or, with Data ONTAP 7.1 and later, an iSCSI target HBA and an iSCSI TOE.

The connection between the initiator and target uses a standard TCP/IP network. No special network configuration is needed to support iSCSI traffic. The network can be a dedicated TCP/IP network, or it can be your regular public network. The storage system listens for iSCSI connections on TCP port 3260.

For the iSCSI AIX Host Utilities 3.0 for Native OS, the AIX host supports using a hardware initiator or iSCSI TOE card. This release of the Host Utilities also supports:

- ◆ Switch trunking to enable use of iSCSI without AIX's native MPIO for multipathing.
- ◆ Multipathing to enable use of iSCSI with AIX's native MPIO PCM (Path Control Module)

For information on the supported configurations, see either the *NetApp Interoperability Matrix Tool* at <http://now.netapp.com/matrix/mtx/login.do> or the *Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products*, on the NOW site at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/iscsi_support_matrix.shtml

For more information on using iSCSI with your storage system, see the *Data ONTAP Block Access Management Guide* for your version of Data ONTAP.

The iSCSI AIX Host Utilities

The iSCSI AIX Host Utilities provide tools you can use to display information about LUNs and set up multipathing. The primary tool for working with LUNs is the `sanlun` utility. The Host Utilities also contain tools for setting up your system and checking it. For information on the contents of the Host Utilities, see “[The Host Utilities files](#)” on page 3.

Multipathing

The iSCSI AIX Host Utilities support multipathing using the AIX native operating system’s MPIO with IBM’s default PCM. This multipathing support lets you configure multiple network paths between the AIX host and storage system. If one path fails, traffic continues on the remaining paths. You must have multipathing enabled if the host has multiple paths to a LUN.

The Host Utilities files

The Host Utilities installs a set of tools. The Host Utilities contain the following components:

- ◆ `aix_info` script. This script collects configuration information about your host.
- ◆ `filer_info` script. This script collects information about the storage system.
- ◆ `san_version` command. This command displays the version of the SAN Toolkit that you are running.
- ◆ `sanlun` utility. You can use this utility to display information about LUNs on the storage system that are available to this host.
- ◆ The man pages for all the tools.

Many of the tools installed by Host Utilities are common across other kits. There are some differences in kits, though, so some of the files installed do not apply to the iSCSI AIX Host Utilities. You can ignore these files. They do not affect your system or its performance. So that you can confirm that all the files installed are part of the Host Utilities software, here is a list of the files that the iSCSI AIX Host Utilities do not commonly use:

- ◆ `brocade_info`
- ◆ `cisco_info`
- ◆ `mcdata_info`

iSCSI AIX Host Utilities installation and setup overview

Overview of installing the Host Utilities and setting up your system

Installing the iSCSI AIX Host Utilities and setting up your system involves a number of steps that are performed on both the storage system and the host. The following sections provide information about the tasks you need to perform.

Pre-requisites

Before you install the Host Utilities, you must perform the following tasks:

1. Set up your system:

- ❖ Host OS and appropriate updates
- ❖ Storage system and Data ONTAP
- ❖ If you are using multipathing, iSCSI TOE card and 1 Gigabit iSCSI TOE PCI-X Adapter device driver

See either the *NetApp Interoperability Matrix Tool* at <http://now.netapp.com/matrix/mtx/login.do> or the *Compatibility and Configuration Guide for NetApp FCP and iSCSI Products* at <http://now.netapp.com/NOW/knowledge/docs/docs.shtml> for current information about the system requirements.

Note

Occasionally there are known problems that can affect your system setup. Please check the iSCSI AIX Host Utilities Release Notes to make sure there are no issues affecting your system setup.

2. Verify that your storage system is:

- ❖ Licensed correctly
- ❖ Running the iSCSI service
- ❖ Set up with working volumes and qtrees (if desired)

Note

It is recommended that you create volumes and LUNs with space reservations enabled.

3. If you have the iSCSI AIX Support Kit or Host Utilities currently installed, remove that software.

Setup procedure

The procedure for setting up the iSCSI protocol on a host and storage system follows the same basic sequence for all host types. You perform some of the steps on the host and some on the storage system. The following table summarizes the steps.

1. **(Host)** Perform these steps:
 - ❖ Record or set the host's iSCSI node name
 - ❖ Install the Host Utilities software.
 - ❖ List each storage system in the host's targets file.
2. **(Storage system)** Configure the storage system:
 - ❖ **(Optional)** Configure CHAP
 - ❖ Create LUNs, create an igroup that contains the host's iSCSI node name, and map the LUNs to that igroup
3. **(Host)** Configure the initiator on the host:
 - ❖ Set the initiator parameters
 - ❖ **(Optional)** Configure CHAP.
4. **(Host)** Access the LUNs from the host:
 - ❖ Discover LUNs
 - ❖ Create file systems on the LUNs and mount them, or configure the LUNs as raw devices

Where to go for additional information

Where to go for more information

The following table describes where to find additional information about using iSCSI on your storage system.

If you want...	Go to...
Changes in this release of the iSCSI AIX Host Utilities, known problems, and limitations	The <i>iSCSI AIX Host Utilities Release Notes</i>
The most current system requirements for the AIX host	◆ <i>NetApp iSCSI Support Matrix</i> at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/iscsi_support_matrix.shtml ◆ <i>NetApp Interoperability Matrix Tool</i> at http://now.netapp.com/matrix/mtx/login.do
Best practices or configuration issues	NetApp Knowledge Base at https://now.netapp.com/eservice/kbbrowse
The supported storage system models for Data ONTAP licensed with iSCSI	◆ <i>NetApp Interoperability Matrix Tool</i> at http://now.netapp.com/matrix/mtx/login.do ◆ <i>Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products</i>, available on the NOW site at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/iscsi_support_matrix.shtml ◆ <i>System Configuration Guide for Data ONTAP</i> online version at http://now.netapp.com/NOW/knowledge/docs
Configuring the storage system	◆ <i>Best Practices for Reliability: New System Installation</i> at http://now.netapp.com/NOW/knowledge/docs/other/best_practices/index.shtml ◆ <i>Data ONTAP® Software Setup Guide</i> at http://now.netapp.com/NOW/knowledge/docs/ontap/ontap_index.shtml
Information about how to configure and manage the iSCSI service on the storage system	The following documentation for your release of Data ONTAP: ◆ <i>Data ONTAP Block Access Management Guide</i> ◆ <i>Data ONTAP Release Notes</i>

If you want...	Go to...
Your host operating system	Refer to your operating system documentation.
Information about managing the iSCSI initiator	◆ <i>IBM AIX System Management Guide: Communications and Networks</i>

About this chapter

This chapter explains the tasks you need to perform before you install the Host Utilities software as well as instructions for installing the software.

Topics in this chapter

This chapter includes the following topics:

- ◆ [“Tasks involved in installing the Host Utilities”](#) on page 10
- ◆ [“Verify that you have a supported configuration”](#) on page 11
- ◆ [“Download and uncompress the Host Utilities software”](#) on page 13
- ◆ [“Installing the Host Utilities software”](#) on page 15
- ◆ [“Uninstalling the software packages”](#) on page 26

Tasks involved in installing the Host Utilities

Installation task overview

Installing the Host Utilities is simple; however, the complete process involves several tasks. You perform some of these tasks before you do the actual installation. Once you have the Host Utilities software installed, you must configure it. For information on configuring the Host Utilities, see the information in [“Configuring the initiator and the storage system”](#) on page 33 and the information in [“Accessing LUNs from the AIX host”](#) on page 43.

Note

The iSCSI software initiator is included as part of the AIX Base Operating System. You obtain the media and documentation from your IBM reseller.

Tasks to perform before you install the Host Utilities

Before you install the Host Utilities software, there are several tasks you should preform that will enable the installation to go smoothly. They include:

- ◆ Making sure you have the correct AIX technology level
- ◆ Confirming you have the recommended AIX PTFs applied
- ◆ Making sure you have the correct adapter device driver for iSCSI TOE installed
- ◆ Removing any previous iSCSI AIX Host Utilities or Support Kits that you have installed
- ◆ Downloading the Host Utilities software and uncompressing the files

Verify that you have a supported configuration

Verify configuration and AIX technology level

Be sure that the version of AIX on the host and the version of Data ONTAP on the storage system are supported with this version of the iSCSI AIX Host Utilities. You should verify that your AIX host is running a supported technology level.

For information on supported configurations, see either the *NetApp Interoperability Matrix Tool* at <http://now.netapp.com/matrix/mtx/login.do> or the *Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products* at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/iscsi_support_matrix.shtml.

Apply required PTFs

For best performance, be sure to apply any AIX PTFs listed in the *NetApp iSCSI Support Matrix*.

PTFs are available from the IBM Support site at <http://www-912.ibm.com/eserver/support/fixes/>.

Make sure the adapter device driver is installed

The IBM iSCSI hardware iSCSI TOE card requires that you install the 1 Gigabit iSCSI TOE PCI-X Adapter device driver on the host before you install the adapter and the Host Utilities software. You can use the `lslpp -l` command to verify that the device driver is installed.

Example: To verify that the driver filesets for the copper connector are installed, issue the `lslpp -l devices.pci.1410d002*` command.

Note

The device and the vendor ID that you use with this command varies. For example, the IBM pSeries adapters use vendor IDs of 1014 (which is 1410 endian-reversed), while a Blade daughter card uses the QLogic vendor ID of 1077.

```
# lslpp -l devices.pci.1410d002*
Fileset                                Level  State      Description
-----
Path: /usr/lib/objrepos
devices.pci.1410d002.com  5.3.0.50  COMMITTED  Common PCI iSCSI TOE Adapter
Device Software
devices.pci.1410d002.diag      5.3.0.50  COMMITTED  1000 Base-TX PCI-X iSCSI TOE
Adapter Device Diagnostics
devices.pci.1410d002.rte  5.3.0.50  COMMITTED  1000 Base-TX PCI-X iSCSI TOE
Adapter Device Software
```

To verify that the driver filesets for the optical connector are installed, issue the `lslpp -l devices.pci.1410cf02*` command.

```
# lslpp -l devices.pci.1410cf02*
Fileset                                Level  State      Description
-----
Path: /usr/lib/objrepos
devices.pci.1410cf02.diag      5.3.0.50  COMMITTED  1000 Base-SX PCI-X iSCSI TOE
Adapter Device Diagnostics
devices.pci.1410cf02.rte  5.3.0.50  COMMITTED  1000 Base-SX PCI-X iSCSI TOE
Adapter Device Software
```

You should also check the IBM site to confirm that the IBM iSCSI hardware iSCSI TOE card is supported on a specific IBM machine type and model. The IBM iSCSI hardware iSCSI TOE card is not supported on all IBM machine types and models.

Remove any currently installed Host Utilities

If you currently have a version of the iSCSI AIX Host Utilities or Support Kit installed, you should remove it. For instructions on doing this, see “[Uninstalling the software packages](#)” on page 26.

Note

Previous versions of the Host Utilities were called Support Kits.

Download and uncompress the Host Utilities software

Software packages required for the Host Utilities

The iSCSI AIX Host Utilities include the following software packages:

- ◆ The AIX host settings software package — contains NetApp's device definitions that are required for iSCSI AIX configurations.
- ◆ The NetApp SAN Toolkit software package — contains the `sanlun` utility and diagnostic scripts. The `sanlun` utility displays configuration information about LUNs and HBAs. The diagnostic scripts collect information about your system if a problem occurs. Customer support may ask you to run the `sanlun` utility or a diagnostic script if a problem occurs.

You must download and install both the host settings software package and the SAN Toolkit software package.

Downloading the Host Utilities software

To get a copy of the Host Utilities, download both software distributions from the NOW site at <http://now.netapp.com/NOW/cgi-bin/software> to a working directory on your host.

Note

If you do not download the software to your AIX host, you must move it to a directory on that host before you install it.

Uncompressing the software file you downloaded

To uncompress the software files you downloaded from the NOW site, complete the following steps.

Step	Action
1	Change to the directory where you saved the downloaded software and enter the following commands to uncompress the iSCSI AIX Host Utilities host settings package and SAN Toolkit package: <pre># zcat NetApp_aix_mpio_4.0.0.tar.Z tar -xvf - # zcat santoolkit_aix_v3.0.0.tar.Z tar xvf -</pre> Result: The extracted software is placed in the directory where you downloaded the software. Example: Executing the <code>zcat</code> and <code>tar</code> commands with the host settings file and the SAN Toolkit file produces output similar to the following. <pre>HostA# zcat NetApp_aix_mpio_4.0.0.tar.Z tar xvf - x ./NetApp_aix_mpio_4.0.0X2/NetApp.mpio_attach_kit, 195584 bytes, 382 media blocks. HostA# zcat santoolkit_aix_v3.0.0.tar.Z tar xvf - x ./NetApp.SAN_toolkit, 1146880 bytes, 2240 media blocks. HostA#</pre>
2	Go to “Installing the Host Utilities software” on page 15.

Installing the Host Utilities software

Methods for installing the Host Utilities software

You can install the host settings software and the SAN Toolkit software using either the AIX System Management Interface Tool (SMIT) or the `installp` command.

Note

This section uses SMIT as its installation example.

Upgrading from an earlier attach kit

If you have an iSCSI AIX Host Support Kit or a previous version of the Host Utilities installed, you should remove it before you install a new version of the Host Utilities. See “[Uninstalling the software packages](#)” on page 26.

Using SMIT to
install the software

You must install both the host setting software and the SAN Toolkit software. To do this, complete the following steps.

Note _____
This installation example installs the host settings software. You then repeat the steps to install the SAN Toolkit.

Step	Action
1	Make sure you are logged in as root.
2	Start SMIT by entering the following command: # smit install
3	At the screen that appears, select the option titled “Install and Update Software.” Example: When you start SMIT, it displays the following screen. On this screen, the “Install and Update Software” option is the first menu option. <pre># smitty install +-----+ Software Installation and Maintenance Move cursor to desired item and press Enter. Install and Update Software List Software and Related Information Software Maintenance and Utilities Software Service Management Network Installation Management EZ NIM (Easy NIM Tool) System Backup Manager Alternate Disk Installation EFIX Management F1=Help F2=Refresh F3=Cancel Esc+8=Image Esc+9=Shell Esc+0=Exit Enter=Do +-----+</pre>

Step	Action
4	At the next screen, select the Install Software menu option. Example: The following is an example of the Install and Update Software screen. <pre> +-----+ Install and Update Software Move cursor to desired item and press Enter. Install Software Update Installed Software to Latest Level (Update All) Install Software Bundle Update Software by Fix (APAR) Install and Update from ALL Available Software F1=Help F2=Refresh F3=Cancel Esc+8=Image Esc+9=Shell Esc+0=Exit Enter=Do +-----+</pre>

Step	Action
5	At the Install Software screen, specify the location of the software in one of the following ways: ◆ Manually enter the location by providing the following information. ❖ If you're installing from the CD-ROM, enter the CD-ROM drive. ❖ If you're installing from the host machine, enter the path to the software package (for example, /var/tmp/ntap_aix_mpio_4.0.0/NetApp.mpio_attach_kit). ◆ Press F4 to display a list of options. If you want to use the F4 method, complete the following steps: 1. Press F4. 2. At the prompt for software to install, enter NetApp.mpio_attach_kit. 3. At the prompt asking whether you want to continue or cancel, press Enter to complete the installation. Example 1: The following is an example of entering the path to the software package when you're at the Install Software screen. <pre> +-----+ Install Software Type or select a value for the entry field. Press Enter AFTER making all desired changes. [Entry Fields] * INPUT device / directory for software [/var/tmp/ntap_aix_mpio_4.0.0/NetApp.mpio_attach_kit]+ F1=Help F2=Refresh F3=Cancel F4=List Esc+5=Reset Esc+6=Command Esc+7=Edit Esc+8=Image Esc+9=Shell Esc+0=Exit Enter=Do +-----+</pre>

Step	Action
	Example 2: After you enter path to the software package, SMIT displays the following screen. This is the screen where you enter name of the software package, Netapp.mpio_attach_kit, and press Enter. <pre> +-----+ Install Software Type or select values in entry fields. Press Enter AFTER making all desired changes. [Entry Fields] * INPUT device / directory for software [/var/tmp/ntap_aix_mpio_4.0.0/NetApp.mpio_attach_kit] + * SOFTWARE to install [NetApp.mpio_attach_kit] + PREVIEW only? (install operation will NOT occur) no + COMMIT software updates? yes + SAVE replaced files? no + AUTOMATICALLY install requisite software? yes + EXTEND file systems if space needed? yes + OVERWRITE same or newer versions? no + VERIFY install and check file sizes? no + Include corresponding LANGUAGE filesets? yes + DETAILED output? no + Process multiple volumes? yes + ACCEPT new license agreements? no + Preview new LICENSE agreements? no + F1=Help F2=Refresh F3=Cancel F4=List Esc+5=Reset Esc+6=Command Esc+7=Edit Esc+8=Image Esc+9=Shell Esc+0=Exit Enter=Do +-----+ </pre>

Step	Action
6	SMIT displays a warning, asking you to confirm that you want to install the software. Press Enter to continue. Example 1: The following is an example of entering the path to the software package when you're at the Install Software screen. <pre>x*****x x ARE YOU SURE? x x x x Continuing may delete information you may want x x to keep. This is your last chance to stop x x before continuing. x x Press Enter to continue. x x Press Cancel to return to the application. x x x x Flx F1=Help F2=Refresh F3=Cancel x x Esx Esc+8=Image Esc+0=Exit Enter=Do x x*****x</pre>

Step	Action
7	SMIT displays information about the installation. Note_____ By default, the host settings software installs the filesets for both iSCSI and FCP. This is not a problem. If you are using only iSCSI, ignore the FCP fileset. _____ Example of a successful installation: The following is an example of output you might see when an installation successfully completes. <pre> COMMAND STATUS Command: running stdout: yes stderr: no Before command completion, additional instructions may appear below. NetApp.mpio_attach_kit.pcmadm 4.0.0.0 NetApp.mpio_attach_kit.iscsi 4.0.0.0 NetApp.mpio_attach_kit.fcp 4.0.0.0 NetApp.mpio_attach_kit.config 4.0.0.0 << Copyright notice for NetApp.mpio_attach_kit >> (C) Copyright Network Appliance, Inc. 2003-2006. All rights reserved. << End of copyright notice for NetApp.mpio_attach_kit >>. . . . Finished processing all filesets. (Total time: 5 secs). 0503-409 installp: bosboot verification starting... installp: bosboot verification completed. 0503-408 installp: bosboot process starting... bosboot: Boot image is 23825 512 byte blocks. 0503-292 This update will not fully take effect until after a system reboot. * * * A T T E N T I O N * * * System boot image has been updated. You should reboot the system as soon as possible to properly integrate the changes and to avoid disruption of current functionality.</pre>

Step	Action
	<pre> installp: bosboot process completed. +-----+ Summaries: +-----+ Installation Summary ----- Name Level Part Event Result ----- NetApp.mpio_attach_kit.pcm 4.0.0.0 USR APPLY SUCCESS NetApp.mpio_attach_kit.isc 4.0.0.0 USR APPLY SUCCESS NetApp.mpio_attach_kit.fcp 4.0.0.0 USR APPLY SUCCESS NetApp.mpio_attach_kit.conf 4.0.0.0 USR APPLY SUCCESS COMMAND STATUS Command: OK stdout: yes stderr: no Before command completion, additional instructions may appear below. NetApp.mpio_attach_kit.config 4.0.0.0 << Copyright notice for NetApp.mpio_attach_kit >> (C) Copyright Network Appliance, Inc. 2003-2006. All rights reserved. << End of copyright notice for NetApp.mpio_attach_kit >>. . . . Finished processing all filesets. (Total time: 5 secs). 0503-409 installp: bosboot verification starting... installp: bosboot verification completed. 0503-408 installp: bosboot process starting... bosboot: Boot image is 23825 512 byte blocks. 0503-292 This update will not fully take effect until after a system reboot. installp: bosboot process completed. +-----+ Summaries: +-----+ Installation Summary ----- </pre>

Example: The following is an example of installing the SAN Toolkit using the command line:

```
# installp -aXd NetApp.SAN_toolkit NetApp.SAN_toolkit
+-----+
+-----+
+-----+
Pre-installation Verification...
+-----+
+-----+
Verifying selections...done
Verifying requisites...done
Results...

SUCSESSES
-----
Filesets listed in this section passed pre-installation verification
and will be installed.

Selected Filesets
-----
NetApp.SAN_toolkit.sanlun 3.0.0.0          # Network Appliance SAN Toolki...
NetApp.SAN_toolkit.scripts 3.0.0.0        # Network Appliance SAN Toolki...

<< End of Success Section >>

FILESET STATISTICS
-----
    2 Selected to be installed, of which:
    2 Passed pre-installation verification
-----
    2 Total to be installed

+-----+
+-----+
Installing Software...
+-----+
+-----+

installp: APPLYING software for:
    NetApp.SAN_toolkit.scripts 3.0.0.0
    NetApp.SAN_toolkit.sanlun 3.0.0.0

. . . . . << Copyright notice for NetApp.SAN_toolkit >> . . . . .
(C) Copyright Network Appliance, Inc. 2003.
All rights reserved.

. . . . . << End of copyright notice for NetApp.SAN_toolkit >>. . . .

Finished processing all filesets. (Total time: 2 secs).
```

```

+-----+
                        Summaries:
+-----+
Installation Summary
-----
Name                      Level      Part      Event      Result
-----
NetApp.SAN_toolkit.scripts 3.0.0.0    USR      APPLY      SUCCESS
NetApp.SAN_toolkit.sanlun  3.0.0.0    USR      APPLY      SUCCESS
#

```

Uninstalling the software packages

Remove previous versions before installing the Host Utilities

The iSCSI AIX Host Utilities for Native OS is a new product that uses a different set of tools from the iSCSI AIX Support Kit. You should not have both products installed on the same host.

If you have a Support Kit installed, you must remove it before you install the Host Utilities. You should also remove any currently installed Host Utilities software before you install the new software.

Before you uninstall previous versions of software

Before you uninstall a previous version of the software, make sure you do the following;

- ◆ Unmount the file systems that contain the volume groups mapped to storage system LUNs.
- ◆ Quiesce and export the volume groups.
- ◆ Stop multipathing software.
- ◆ Remove the existing NetApp LUN handles.

These procedures disconnect NetApp LUNs from the host before you uninstall the software.

Uninstall a previous Support Kit

If you have an earlier version of the iSCSI AIX Support Kit installed on your AIX host, uninstall it before installing the new version.

To uninstall an earlier support kit, complete the following steps.

Step	Action
1	On the AIX host console, run the <code>./uninstall</code> script in the <code>/opt/NetApp/iscsitools/bin</code> directory.
2	From the System Management menu, choose Software Installation and Maintenance > Software Maintenance and Utilities > Remove Installed Software.
3	Press Esc-4 to list installed software packages.

Step	Action
4	Select the following packages to uninstall: ◆ Netapp.iscsi_toolkit.sanlun ◆ Netapp.iscsi_toolkit.scripts

Uninstalling the Host Utilities software from an AIX host

You can use SMIT to uninstall the Host Utilities software.

Note

You should always uninstall the current Host Utilities software before installing a new version.

Uninstalling the Host Utilities software using SMIT

To uninstall the software using SMIT, complete the following steps.

Step	Action
1	Ensure that you are logged in as root.
2	Start SMIT by entering the following command: <pre># smit</pre>

Step	Action
3	Select the “Software Installation and Maintenance” menu option. Example: When you start SMIT, it displays the following screen. <pre>+-----+ root> # smit System Management Move cursor to desired item and press Enter. Software Installation and Maintenance Software License Management Devices System Storage Management (Physical & Logical Storage) Security & Users Communications Applications and Services Print Spooling Problem Determination Performance & Resource Scheduling System Environments Processes & Subsystems Applications Cluster System Management Using SMIT (information only) F1=Help F2=Refresh F3=Cancel Esc+8=Image Esc+9=Shell Esc+0=Exit Enter=Do +-----+</pre>

Step	Action
4	At the screen that appears, select the Software Maintenance and Utilities menu option. Example: The following is an example of the Software Installation and Maintenance screen. <pre> +-----+ Software Installation and Maintenance Move cursor to desired item and press Enter. Install and Update Software List Software and Related Information Software Maintenance and Utilities Network Installation Management System Backup Manager F1=Help F2=Refresh F3=Cancel Esc+8=Image Esc+9=Shell Esc+0=Exit Enter=Do +-----+ </pre>

Step	Action
5	At the next screen, select the Remove Installed Software menu option. Example: The following is an example of the Software Maintenance and Utilities screen. <pre> +-----+ Software Maintenance and Utilities Move cursor to desired item and press Enter. Commit Applied Software Updates (Remove Saved Files) Reject Applied Software Updates (Use Previous Version) Remove Installed Software Copy Software to Hard Disk for Future Installation Check Software File Sizes After Installation Verify Software Installation and Requisites Clean Up After Failed or Interrupted Installation F1=Help F2=Refresh F3=Cancel Esc+8=Image Esc+9=Shell Esc+0=Exit Enter=Do +-----+</pre>

Step	Action
6	Remove the software in one of the following ways: ◆ Enter the package name (NetApp.mpio_attach_kit). (Make sure that the “Preview only” option is set to no.) ◆ Press F4 to display a list of names. If you use F4, complete the following steps: 1. Press F4. 2. Scroll down the list of names until you reach NetApp.mpio_attach_kit. 3. Select NetApp.mpio_attach_kit and press Enter. 4. At the prompt asking whether you want to continue or cancel, press Enter to complete the uninstall. Example 1: The following is an example of the Remove Installed Software screen. Note_____ By default PREVIEW only is set to yes. You must change it to no if you want to uninstall. _____ <pre>+-----+ Remove Installed Software Type or select values in entry fields. Press Enter AFTER making all desired changes. [Entry Fields] * SOFTWARE name [NetApp.mpio_attach_kit.config NetApp.mpio_attach_kit.fcp NetApp.mpio_attach_NetApp.mpio_attach_kit-> + PREVIEW only? (remove operation will NOT occur) no + REMOVE dependent software? no + EXTEND file systems if space needed? no + DETAILED output? no + F1=Help F2=Refresh F3=Cancel F4=List Esc+5=Reset Esc+6=Command Esc+7=Edit Esc+8=Image Esc+9=Shell Esc+0=Exit Enter=Do +-----+</pre>

Step	Action
	Example of successful uninstall: The following output appears when you successfully uninstall the software. <pre>Command: running stdout: yes stderr: no Before command completion, additional instructions may appear below. 0503-409 installp: bosboot verification starting... installp: bosboot verification completed. +-----+ Deinstalling Software... +-----+ installp: DEINSTALLING software for: NetApp.mpio_attach_kit.config 4.0.0.0 NetApp.mpio_attach_kit.fcp 4.0.0.0 NetApp.mpio_attach_kit.iscsi 4.0.0.0 NetApp.mpio_attach_kit.pcmadm 4.0.0.0 Finished processing all filesets. (Total time: 4 secs). 0503-409 installp: bosboot verification starting... installp: bosboot verification completed. 0503-408 installp: bosboot process starting... bosboot: Boot image is 23818 512 byte blocks. 0503-292 This update will not fully take effect until after a system reboot. * * * A T T E N T I O N * * * System boot image has been updated. You should reboot the system as soon as possible to properly integrate the changes and to avoid disruption of current functionality. installp: bosboot process completed. +-----+ Summaries: +-----+ Installation Summary ----- Name Level Part Event Result ----- NetApp.mpio_attach_kit.confi 4.0.0.0 USR DEINSTALL SUCCESS NetApp.mpio_attach_kit.fcp 4.0.0.0 USR DEINSTALL SUCCESS NetApp.mpio_attach_kit.iscsi 4.0.0.0 USR DEINSTALL SUCCESS NetApp.mpio_attach_kit.pcmad 4.0.0.0 USR DEINSTALL SUCCESS</pre>

Overview

This chapter provides information on how to configure the initiator and the storage system.

Topics in this chapter

The chapter includes the following topics:

- ◆ [“Configuring the initiator”](#) on page 34
- ◆ [“Configuring the storage system for iSCSI”](#) on page 39

Configuring the initiator

Change the software initiator's iSCSI node name

You must change the software initiator's iSCSI node name. The default node name generated by AIX does not work with the storage system. To change the node name, complete the following steps:

Step	Action
1	Enter the following command on the AIX host console: <pre>chdev -l iscsi0 -a initiator_name=nodename</pre> <i>nodename</i> is the new iSCSI node name for the host. Node names must follow these rules: ◆ The format must be <code>iqn.1996-04.com.ibm:unique-value</code>. ◆ Maximum 223 characters. ◆ Allowed characters are lowercase letters (a to z), numbers (0 to 9), period (“.”), hyphen (“-”), and colon (“:”). ◆ The underscore character (“_”) is <i>not</i> allowed.
2	Verify the new node name by entering the following command: <pre>lsattr -El iscsi0</pre>

Remove the protocol device or change databases

Before you can configure the iSCSI TOE adapter, you must either:

- ◆ Remove the protocol device if it is configured. Normally, this device will be configured.
Or
- ◆ Make the changes to the database. Once you make changes, you must reboot your system.

To find the protocol device for the iSCSI TOE adapter, use the `lsdev -p <adapter>` command. To remove the protocol device, use the `rmdev -dl <protocol_device>` command.

Once you've found and removed the protocol device, you can configure the adapter without any issues.

Example: This example locates the protocol device.

```
# lsdev -p ics0
iscsi0 Available 01-11-01 iSCSI Protocol Device
```

Now it removes the device:

```
# rmdev -dl iscsi0
iscsi0 Defined
```

Configure the iSCSI TOE adapter

After you insert the iSCSI TOE adapter and install the Host Utilities software, you must configure the adapter.

You use the `smit iscsi` command to do this. The example below shows how you select the option to configure the characteristics of the adapter and select the number of the adapter you are configuring.

Note

This is an example of configuring the adapter after you have removed the protocol device. If you did not remove the protocol device, then you would set “Apply change to DATABASE only” to **yes**.

```
# smit iscsi
```

```
+-----+  
iSCSI
```

Move cursor to desired item and press Enter.

```
  iSCSI Adapter  
  iSCSI Protocol Device  
  iSCSI Target Device Parameters in ODM  
+-----+
```

Select "iSCSI Adapter"

```
+-----+  
iSCSI Adapter
```

Move cursor to desired item and press Enter.

```
  List All iSCSI Adapters  
  Change / Show Characteristics of an iSCSI Adapter  
  Generate Error Report  
  Trace iSCSI Adapter  
+-----+
```

Select "Change / Show Characteristics of an iSCSI Adapter"

```

+-----+
|                                     iSCSI Adapter                                     |
|                                                                              |
| Move cursor to desired item and press Enter.                               |
|                                                                              |
|  ics0 Available 01-11 iSCSI Adapter                                         |
|  ics1 Available 01-13 iSCSI Adapter                                         |
|                                                                              |
| F1=Help          F2=Refresh          F3=Cancel                             |
| F8=Image         F10=Exit             Enter=Do                             |
| /=Find           n=Find Next                                                  |
+-----+

Change / Show Characteristics of an iSCSI Adapter

```

Type or select values in entry fields.

Press Enter AFTER making all desired changes.

	[Entry Fields]	
iSCSI Adapter	ics0	
Description	iSCSI Adapter	
Status	Available	
Location	09-09	
iSCSI Initiator Name	[iqn.1996-04.com.ibm:sn.0310b806g1]	
Maximum number of Commands to Queue to Adapter	[200]	+#
Maximum Transfer Size	[0x100000]	+
Discovery Filename	[/etc/iscsi/targetshw]	
Discovery Policy	file	+
Automatic Discovery Secrets Filename	[]	
Adapter IP Address	[10.60.244.136]	
Adapter Subnet Mask	[255.255.255.0]	
Adapter Gateway Address	[]	
Apply change to DATABASE only	no	+

Add information to the targets file

You must edit the targets file indicated by the Discovery Filename parameter. For each storage system in the cluster pair, you need to supply the:

- ◆ IP address
- ◆ TCP port
- ◆ iSCSI target nodename

Note

The NetApp iSCSI target only supports file as the value of the Discovery Policy.

To get information for the targets file, use the following Data ONTAP commands:

◆ The `iscsi portal show` command

```
# iscsi portal show
Network portals:
IP address      TCP Port  TPGroup  Interface
10.60.244.34    3260     1000     e0
```

◆ The `iscsi nodename` command

```
# iscsi nodename
iSCSI target nodename: iqn.1992-08.com.netapp:sn.33610044
```

You can then see what the final targets file looks like by entering the `more /etc/iscsi/targetshw` command line. For example:

```
# more /etc/iscsi/targetshw
10.60.244.34 3260 iqn.1992-08.com.netapp:sn.33610044
10.60.244.35 3260 iqn.1992-08.com.netapp:sn.33610045
```

If your environment uses multiple hardware iSCSI TOE adapters, you may need to set up multiple target files. This is only necessary if you have multiple unique network segments. In that case you would need a unique targets file for each network segment. On a flat network, you would want one targets file and all the adapters to log into the same iSCSI target.

For information on adding targets, see [“Adding targets”](#) on page 44.

Configuring the storage system for iSCSI

Before you begin

You need the host's iSCSI node name that you created before you can configure the storage system.

You must verify that you are running a supported version of Data ONTAP software on your storage system. For the latest information on which Data ONTAP versions are supported, refer to the *NetApp iSCSI Support Matrix* at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/iscsi_support_matrix.shtml

Tasks for configuring the storage system

To configure the storage system and prepare it for initiator access, you must complete the following tasks:

- ◆ Ensure that the iSCSI service is licensed and started.
- ◆ If you want to use CHAP authentication, use the `iscsi security` command to configure a CHAP user name and password.
- ◆ Create LUNs and map them to igroups. You can manage LUNs using the web-based FilerView interface or using the Data ONTAP command line. Be sure to specify the LUN type and igroup type as `aix`.

For detailed steps

For detailed steps, see the *Data ONTAP Block Access Management Guide* for your version of Data ONTAP.

Using CHAP with AIX software initiators

There are two types of CHAP user names and passwords. These types indicate the direction of authentication, relative to the storage system:

- ◆ Inbound—The storage system authenticates the initiator. Inbound settings are required if you are using CHAP authentication.
- ◆ Outbound—The AIX software initiator does not support authentication of the storage system using CHAP. Do not specify outbound settings for AIX hosts.

Initiator CHAP settings are defined in the `/etc/iscsi/targets` file on the host. The storage system's inbound password must match the initiator's CHAPSecret in the `/etc/iscsi/targets` file on the host. The storage system's inbound user name must match the initiator node name of the host. The AIX software initiator always uses its iSCSI node name as its CHAP user name.

Data ONTAP Upgrade note

In some cases, if you upgrade the Data ONTAP software running on the storage system, the CHAP configuration on the storage system is not saved. Be sure to run the `iscsi security add` command for each iSCSI initiator, even if you had previously configured the CHAP settings.

Configuring CHAP authentication

(Optional) Configure CHAP authentication

If you choose, you can also configure CHAP authentication. When you use CHAP, you must configure it on both the host and the storage system.

The AIX initiator supports both unidirectional and bidirectional CHAP. By default, the initiator uses its iSCSI node name as its CHAP username.

Setting CHAP on the storage system

The storage system recognizes two types of CHAP user names and password. These types indicate the direction of authentication, relative to the storage system:

- ◆ Inbound—The storage system authenticates the initiator. Inbound settings are required if you are using CHAP authentication.
- ◆ Outbound—The AIX software initiator does not support authentication of the storage system using CHAP. Do not specify outbound settings for AIX hosts.

Initiator CHAP settings are defined in the targets file specified in the Discovery Filename parameter. The storage system's inbound password must match the initiator's CHAPSecret in the `/etc/iscsi/targets` file on the host. The storage system's inbound user name must match the initiator node name of the host. The AIX software initiator always uses its iSCSI node name as its CHAP user name.

Overview of accessing LUNs

NetApp LUNs appear to the AIX host as disks. You can use LUNs like you would use any local disk on the system.

Topics in this chapter

This chapter includes the following topics:

- ◆ [“Configuring iSCSI targets”](#) on page 44
- ◆ [“Discovering and using LUNs”](#) on page 46

Configuring iSCSI targets

Adding targets

To access LUNs on a storage system, you must add an entry for the storage system to the Discovery Filename on the AIX host. You need one entry for each storage system, regardless of the number of interfaces that are enabled for iSCSI traffic. A clustered storage system needs two entries, one for each node in the cluster.

Note For information on working with targets for the iSCSI TOE, see [“Add information to the targets file”](#) on page 37.

To add a target, complete the following steps.

Step	Action
1	With a text editor, open the host's /etc/iscsi/targets file.
2	Add one line for one interface on each storage system. Be sure to use an interface that is enabled for iSCSI traffic. <i>HostNameOrAddress PortNumber iSCSIName [CHAPSecret]</i> <i>HostNameOrAddress</i> is the host name or IP address of a gigabit Ethernet interface on the storage system. Specify an interface that is enabled for iSCSI communication. <i>PortNumber</i> is always 3260. <i>iSCSIName</i> is the iSCSI target node name of the storage system. <i>CHAPSecret</i> is the optional CHAP password for the host. Enclose the text string in double quotes. This value must match the value configured on the storage system for this initiator. Examples: <pre>192.168.10.100 3260 iqn.1992-08.com.netapp:sn.12345678</pre> <pre>192.168.10.19 3260 iqn.1992-08.com.netapp:sn.12345678 "q2r2E8g12B1e7R3g"</pre>

**For more
information**

See the “targets File” section of the *IBM AIX Files Reference*.

Discovering and using LUNs

Discovering LUNs

After configuring the `/etc/iscsi/targets` file, rescan the AIX host to discover the LUNs you mapped to the host.

To rescan and discover LUNs, enter the following command on the AIX host console:

```
cfgmgr
```

Run the `cfgmgr` command each time you add a new LUN and map it to the AIX host.

Viewing LUN information with `sanlun`

The `sanlun` tool included in the Host Utilities displays information about storage systems and LUNs. The `sanlun` tool is installed in the `/opt/NetApp/santools/bin` directory. To view LUN information, enter the following command on the AIX host console:

```
sanlun lun show all
```

Viewing disk properties, including LUN queue depth

The AIX disk properties include the queue depth used for a LUN. The queue depth affects performance and is automatically set for LUNs on NetApp storage systems. To view the queue depth, enter the following command on the AIX host console:

```
lsattr -El hdiskx
```

x is the AIX disk number for the LUN, for example `hdisk4`.

Note

The queue depth should be set above 1 only for LUNs on storage systems running a version of Data ONTAP that is supported by the iSCSI AIX Host Utilities.

For a list of supported versions, see the *NetApp iSCSI Support Matrix* at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/iscsi_support_matrix.shtml

Using LUNs

The NetApp LUNs appear on the AIX host as disks. You can then use these disks the same way you use local disks on the host.

To display all AIX disks, including NetApp LUNs, enter the following command:

```
lsdev -Cc disk
```

The ODM file that is installed as part of the Host Utilities causes the LUNs to be displayed as MPIIO NetApp iSCSI Disks.

Overview

This appendix provides some troubleshooting tips and information about the Host Utilities diagnostic utilities.

Topics in this chapter

The chapter includes the following topics:

- ◆ [“General troubleshooting information”](#) on page 50
- ◆ [“Make sure the iSCSI TOE card is working correctly”](#) on page 51
- ◆ [“Using Diagnostic Utilities”](#) on page 54

General troubleshooting information

Check the Release Notes for the most up-to-date information

Be sure to check the *Release Notes* for a list of known problems and limitations. The *Release Notes* also contain information on how to look up information about known bugs.

You can access the *Release Notes* from the NOW site. A link to the *Release Notes* is online in the SAN/ISAN library at <http://now.netapp.com/NOW/knowledge/docs/san/>. A link is also available on the NOW Description Page for the iSCSI AIX Host Utilities.

Make sure your configuration is supported

Certain combinations of host operating system software, host hardware, Data ONTAP software, and storage system hardware may not work well together. Be sure you are using a supported configuration by checking the *NetApp iSCSI Support Matrix* at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/iscsi_support_matrix.shtml.

Collect information

Record any error messages displayed on the host or storage system console. Collect the host and storage system log files. Record the symptoms of the problem and any changes made to the host or storage system just before the problem appeared.

Run the `filer_info` and `aix_info` scripts that are included with this support kit. The scripts are installed in the `/opt/NetApp/santools/bin` directory on the AIX host. For information on using them, see “[Using Diagnostic Utilities](#)” on page 54.

Contact technical support

If you are unable to resolve the problem, contact NetApp Support for assistance.

Make sure the iSCSI TOE card is working correctly

Verify information about the iSCSI TOE card

You can use the `lscfg -vl ics*` command verify the feature code, part number, and firmware level of the IBM iSCSI hardware iSCSI TOE card.

```
# lscfg -vl ics*
ics0      U787B.001.DNW872B-P1-C1-T2   iSCSI Adapter
IBM iSCSI Server TX Adapter           :
Part Number.....30R5219
EC Level.....J85591
Manufacture ID.....52P8480
FRU Number.....30R5209
Customer Card ID Number....1986 (feature code)
Brand.....H0
Serial Number.....YJ1H7N62F08W
Network Address.....000D60B96D55
ROM Level.(alterable).....000002000057
Product Specific.(Z1).....iqn.1996-04.com.ibm:sn.0310b806g1
Device Specific.(YL).....U787B.001.DNW872B-P1-C1-T2
```

If the IBM iSCSI hardware iSCSI TOE card is installed in a server that is not supported, you may receive the following message when running the `cfgmgr` command:

```
cfgmgr -l ics0
Method error (/usr/lib/methods/cfgqlisc -l ics0 ): 0514-086
Cannot perform the requested function because the specified
device is not supported on this platform.
```

The iSCSI TOE adapters stay logged into the iSCSI target only if the iSCSI device handles are currently in an active volume group. Otherwise, the iSCSI device handles are closed, and the initiator logs out of the target after device discovery.

Verify that the iSCSI TOE is logged on to the storage system

To verify if the iSCSI TOE card is logged onto the storage system, go to the storage system and issue either the `igroup show` command or the `iscsi initiator show` command.

```
*> igroup show
ibmp550-fak01 (iSCSI) (ostype: aix):
iqn.1996-04.com.ibm:sn.0310b806g1 (logged in on: e0)
iqn.1996-04.com.ibm:sn.0310b806g2 (logged in on: e0)
*> iscsi initiator show
Initiators connected:
```

```

        TSIH  TPGroup  Initiator
        35    1000    iqn.1996-04.com.ibm:sn.0310b806g1 /
40:00:0f:21:00:00
        36    1000    iqn.1996-04.com.ibm:sn.0310b806g2 /
40:00:0f:21:00:00

```

You can also use the ping command to determine if the storage system can communicate with the iSCSI TOE card.

Note

Do not use the ping command on the host because the iSCSI TOE card does not have an ethernet interface.

Verify the adapter's configuration

You can use the `lsattr -El icsX` command (where *X* is the adapter instance) to verify that the iSCSI TOE adapter characteristics were configured correctly.

```

# lsattr -El ics0
bus_intr_lvl    278                Bus interrupt level      False
bus_io_addr     0xcfc00            Bus I/O address          False
bus_mem_addr    0xc0100000         Bus memory address       False
disc_filename   /etc/iscsi/targetshw         Discovery Filename       True
disc_policy     file              Discovery Policy          True
gateway_addr    10.60.224.136             Adapter Gateway Address  True
host_addr       10.60.224.136             Adapter IP Address       True
initiator_name  iqn.1996-04.com.ibm:sn.0310b806g1 iSCSI Initiator Name    True
intr_priority   3                Interrupt Priority        False
lg_term_dma     0x800000             Amount of memory used for long term DMA mapping  True
max_xfer_size   0x100000             Maximum transfer size     True
num_cmd_elems   200                Maximum number of commands to queue to the adapter True
subnet_mask     255.255.255.0         Adapter Subnet Mask      True

```

Check the LUN characteristics

You can display the characteristics of a LUN by executing the `lsattr -El <hdiskname>` command.

```
# lsattr -El hdisk4
PCM                PCM/friend/NetAppDefaultPCM      Path Control Module      False
algorithm          round_robin                                Algorithm                 True
clr_q              no                                           Device CLEARS its Queue on error True
dist_err_pcnt      0                                           Distributed Error Sample Time True
dist_tw_width      50                                           Distributed Error Sample Time True
hcheck_cmd         inquiry                                Health Check Command      True
hcheck_interval    30                                           Health Check Interval     True
hcheck_mode        nonactive                                Health Check Mode         True
host_addr          10.60.244.35                               Hostname or IP Address    False
location           Location Label                             Location Label            True
lun_id             0x0                                         Logical Unit Number ID    False
max_transfer        0x40000                                    Maximum TRANSFER Size     True
port_num           0xcbc                                     PORT Number               False
pvid               000a105418b0c7ed00000000000000000 Physical volume identifier
False
q_err              yes                                           Use QERR bit              True
q_type             simple                                Queuing TYPE              True
queue_depth        12                                           Queue DEPTH               True
reassign_to        120                                         REASSIGN time out value   True
reserve_policy     no_reserve                                Reserve Policy             True
rw_timeout         120                                         READ/WRITE time out value True
start_timeout      60                                           START unit time out value True
target_name        iqn.1992-08.com.netapp:sn.33610045 Target NAME                False
```

Check the MPIO disk path information

If you want to see information about the MPIO disk paths, execute the `lspath` command.

Using Diagnostic Utilities

Diagnostic utilities

The Host Utilities provide command-line utilities that provide diagnostic information you can use for troubleshooting.

When you run these utilities, they gather configuration information about your host and storage system. They automatically collect information and place it in a directory. Then they create a compressed tar file of that directory. You can send this file to NetApp customer support.

Normally, you only use these utilities when requested to do so by Customer Support. The utilities that apply to the iSCSI AIX Host Utilities are:

- ◆ `filer_info`. See “[Collecting storage system information](#)” on page 54 for more information.
- ◆ `aix_info`. See “[Collecting AIX information](#)” on page 55 for more information.

General steps for executing the programs

Although some of the scripts have arguments that you may want to use, the general steps for executing these scripts are the same.

Step	Action
1	Change to the <code>/opt/NTAP/SANToolkit/bin</code> directory: <code>cd /opt/NTAP/SANToolkit/bin</code>
2	Enter the utility name. If the utility you are using includes arguments, you can enter them as well. Result: The configuration information that the utility gathers is placed in a compressed file.

Collecting storage system information

If you are having a problem, Customer Support might ask you to run `filer_info` to collect storage system configuration information. You should only run this utility when requested to do so by Customer Support. To execute `filer_info`, complete the following steps.

Running filer_info

Complete the steps below to collect storage system information.

Step	Action
1	On the AIX host, change to the /opt/NTAP/SANToolkit/bin directory: <pre>cd /opt/NTAP/SANToolkit/bin</pre>
2	At the host command prompt, enter the following command: <pre>filer_info [-d <i>path_and_file_name</i>] [-l <i>passwd</i>] -n <storage_system_name> -f</pre> -d enables you to specify a different path in which to place the resulting output. -l passwd allows you to specify a password to access the storage system. -n <storage_system_name> specifies the target of the command, where storage_system_name is the name or IP address of the storage system accessed. -f automatically overwrites an existing <storage_system_name> file in the default output directory. You might have an existing file in this directory if you previously ran the script. If you do not use the -f option, and you have an existing file, the filer_info script tells you to delete or rename the file. Result: The output of various status commands are placed in the output directory, where storage_system_name is replaced by the storage system name or IP address. The contents of this directory are placed in a tarred and compressed file named storage_system_<storage_system_name>.tar.Z.
3	Send the resulting compressed file to Customer Support for analysis.

Collecting AIX information

If you are having a problem, Customer Support might ask you to run `aix_info` to collect configuration information about your host. You should only run this utility when requested to do so by Customer Support.

Running aix_info

To execute `aix_info`, complete the following steps:

Step	Action
1	On the AIX host, change to the <code>/opt/NTAP/SANToolkit/bin</code> directory: <pre>cd /opt/NTAP/SANToolkit/bin</pre>
2	At the command prompt, enter the following command: <pre>aix_info [-d <directory>] [-n <file_name>] -f</pre> <code>-d <directory></code> specifies the location for the file that <code>aix_info</code> creates. <code>-n <file_name></code> specifies the name for the output file and directory names. <code>-f</code> automatically overwrites an existing <code>.tar.Z</code> file in the default output directory. You might have an existing file in this directory if you previously ran the script. If you do not use the <code>-f</code> option, and you have an existing file, the script tells you to delete or rename the file. Result: When you run <code>aix_info</code>, the utility gathers information about your AIX configuration and places it in a <code>.tar.Z</code> file. It also creates a directory and populates it with files containing output from numerous commands run on the AIX system and contents of the <code>/var/adm/message</code> file.
3	Send the resulting file to Customer Support for analysis.