

iSCSI Solaris™ Host Utilities 3.0.1 for Native OS **Setup Guide**

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Preface

About this guide

This guide describes how to configure the iSCSI initiator in the Solaris™ OS to access LUNs on a NetApp® storage system. It also explains how to configure the storage system to work with the initiator and how to create an iSCSI LUN.

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 Solaris versions supported.

Audience

This guide is for administrators of Solaris hosts and NetApp storage systems who:

- ◆ Are familiar with the Solaris operating system.
- ◆ Understand how to configure and administer a storage system.
- ◆ Understand how to use iSCSI to store and retrieve data on a storage system

Terminology

This guide uses the following terms:

- ◆ NetApp storage products (filers, FAS appliances, and NearStore systems) are all *storage systems*—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. In examples that illustrate commands executed on a Solaris workstation, the command syntax and output might differ, depending on your version of Solaris.

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>sanlun lun show volumename</code> command, you enter the characters “<code>sanlun lun show</code>” followed by the actual name of the volume. ◆ 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.

Caution

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 Solaris in the subject line.

Overview

This chapter provides an overview of the iSCSI Solaris Host Utilities.

Topics in this chapter

The chapter includes the following topics:

- ◆ [“The iSCSI Solaris Host Utilities”](#) on page 2
- ◆ [“iSCSI Solaris Host Utilities installation and setup overview”](#) on page 5
- ◆ [“Where to go for additional information”](#) on page 7

The iSCSI Solaris Host Utilities

Understanding how Data ONTAP® software implements iSCSI

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). A Solaris host running the iSCSI initiator software uses the iSCSI protocol to access LUNs on a storage system running Data ONTAP software. The host does not need a hardware iSCSI host bus adapter (HBA). The iSCSI protocol can be implemented over the host's standard Gigabit Ethernet interfaces using a software driver.

The storage system also does not require a hardware iSCSI HBA. The iSCSI protocol on the storage system can be implemented over the storage system's standard Gigabit Ethernet interfaces using a software driver that is integrated into Data ONTAP. Data ONTAP also supports an iSCSI target HBA and a TCP/IP offload engine (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 IP port 3260.

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 Solaris Host Utilities

The iSCSI Solaris 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 Solaris Host Utilities for Native OS supports Sun StorageEdge Traffic Manager (the Solaris multiplexed I/O MPxIO), which is the Solaris native multipathing solution.

This multipathing support lets you configure multiple network paths between the Solaris 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.

Note

The Host Utilities also support IP Multipathing (IPMP). You do not need to perform any specific NetApp configuration to enable IPMP.

Using the Sun StorageEdge Traffic Manager to enable multipathing

The Sun StorageEdge Traffic Manager works by making the underlying paths transparent to the user. It exposes only a consolidated device, such as `/dev/rdisk/c7t60A980004334686568343655496C7931d0s2`.

You need to install the NetApp `mpxio_set` script that comes with the Host Utilities to enable MPxIO. The script adds the NetApp VID/PID information to the Solaris MPxIO Configuration file. See the Sun documentation for more information on the Sun StorageEdge Traffic Manager.

The Host Utilities files

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

- ◆ `filer_info` script. This script collects information about the storage system.
- ◆ `mpxio_set` script. This script adds the required information to the Sun StorageEdge Traffic Manager configuration file to enable multipathing. You can also use this script to restore the Sun StorageEdge Traffic Manager to its default settings.
- ◆ `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.
- ◆ `solaris_info` script. This script collects configuration information about your host.
- ◆ `version` displays the version of the `sanlun` command.
- ◆ The man pages for all the tools.

The 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 Solaris 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 Solaris Host Utilities do not commonly use:

- ◆ basic_config
- ◆ brocade_info
- ◆ cisco_info
- ◆ create_binding.pl
- ◆ mcddata_info
- ◆ qllogic_info
- ◆ SHsupport.pm
- ◆ Telnet.pm

iSCSI Solaris Host Utilities installation and setup overview

Overview of Installing the Host Utilities and setting up your system

Installing the iSCSI Solaris 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

See 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 is a known problem that can affect your system setup. Please check the iSCSI Solaris Host Utilities Release Notes to make sure there are no issues affecting your system setup.

2. Verify that your storage system is:

- ❖ Licensed for iSCSI
- ❖ 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 Solaris 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.

Step	Action
1	(Host) Record or set the host's iSCSI node name and install the Host Utilities software. See Chapter 2, " Initial host setup steps ," on page 9.
2	(Storage system) Configure the storage system: ◆ License and start the iSCSI service ◆ (Optional) Configure CHAP ◆ Create LUNs, create an igroup that contains the host's iSCSI node name, and map the LUNs to that igroup See Chapter 4, " Configuring the storage system for iSCSI ," on page 25.
3	(Host) Configure the initiator on the host: ◆ Set the initiator parameters ◆ (Optional) Configure CHAP See Chapter 3, " Configuring the initiator ," on page 19.
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 See Chapter 5, " Accessing LUNs from the host ," on page 27.

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 Solaris Host Utilities, a list of Host Utilities files, known problems, and limitations	The <i>iSCSI Solaris Host Utilities Release Notes</i>
The most current system requirements for the Solaris 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>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...
Information about managing the iSCSI initiator	◆ The <code>iscsiadm</code> man page on the Solaris host ◆ The Configuring Solaris iSCSI Initiators chapter in the <i>Solaris System Administration Guide: Devices and File Systems</i>, available at http://docs.sun.com/app/docs/prod/solaris
Your host operating system and using its features, such as SVM or the Sun StorageEdge Traffic Manager	◆ Refer to your operating system documentation. You can download Sun manuals in PDF format from http://docs.sun.com/

Overview

This chapter explains how to record the initiator node name and install the Host Utilities software on a Solaris host.

The iSCSI initiator software is included in the supported Solaris OS builds. You do not need to install the initiator software, but you may need to upgrade to a supported OS version.

Topics in this chapter

The chapter includes the following topics:

- ◆ [“Verify that you have a supported configuration”](#) on page 10
- ◆ [“Remove any currently installed Host Utilities or Support Kit”](#) on page 11
- ◆ [“Record the host’s initiator node name”](#) on page 12
- ◆ [“Install the Host Utilities software”](#) on page 14
- ◆ [“Next steps”](#) on page 17

Verify that you have a supported configuration

Supported configurations

Be sure that the version of the Solaris OS on the host and the version of Data ONTAP on the storage system are supported with this iSCSI Solaris Host Utilities.

For information on supported configurations, see 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.

Check the version of your host operating system

You can use the `cat /etc/release` command to display information about your operating system.

Example: The following is one example of checking your operating system version. Your output might vary.

```
$ cat /etc/release
Solaris 10 11/06 s10s_u3wos_10 SPARC
Copyright 2006 Sun Microsystems, Inc. All Rights Reserved.
Use is subject to license terms.
Assembled 14 November 2006
```

Remove any currently installed Host Utilities or Support Kit

Remove previous versions before installing Host Utilities

The iSCSI Solaris Host Utilities for Native OS is a new product that uses a different set of tools from the iSCSI Solaris 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.

Removing the Host Utilities or Support Kit software

You use the same command to remove software regardless of whether it is from the Support Kit or the Host Utilities. Complete the following steps.

Step	Action
1	Enter the following command on the Solaris host: <code>pkgrm NTAPSANTool</code>
2	Follow the prompts to remove the NTAPSANTool package.

(Optional) restore Sun StorageEdge Traffic Manager defaults

You can remove the settings that the `mpxio_set` script added to the Sun StorageEdge Traffic Manager configuration file, if you need to.

To restore the Sun StorageEdge Traffic Manager default settings, execute the following command line:

```
# mpxio_set -d
```

Executing this command causes your system to reboot.

Record the host's initiator node name

Understanding iSCSI node names

Each iSCSI entity on a network has a unique iSCSI node name. This is a logical name that is not linked to an IP address. Only initiators (hosts) and targets (storage systems) are iSCSI entities. Switches, routers, and ports are TCP/IP devices only and do not have iSCSI node names.

The Solaris software initiator uses the `iqn`-type node name format:

`iqn.yyyy-mm.backward_naming_authority:unique_device_name`

`yyyy` is the year and `mm` is the month in which the naming authority acquired the domain name.

`backward_naming_authority` is the reverse domain name of the entity responsible for naming this device. An example reverse domain name is `com.netapp`.

`unique_device_name` is a free-format unique name for this device assigned by the naming authority.

The following example shows a default iSCSI node name for a Solaris software initiator:

`iqn.1986-03.com.sun:01:0003ba0da329.43d53e48`

Recording the host's initiator node name

You need the initiator node name to configure the storage system. To collect and record the host's initiator node name, complete the following step.

Step	Action
1	On the Solaris host console, enter the following command: <pre>iscsiadm list initiator-node</pre> Result: The system displays the iSCSI node name, alias, and session parameters.
2	Record the node name for use when configuring the storage system.

Changing the initiator node name

You can change the default initiator node name; however, the Solaris documentation recommends against changing it. For more information, refer to the `iscsiadm` man page on the Solaris host.

If you do change the initiator node name, be sure to record the new name for use when configuring the storage system.

Node name rules

If you change the host's initiator node name, be sure the new name follows these rules:

- ◆ A node name can be up to 223 bytes.
- ◆ Uppercase characters are always mapped to lowercase characters.
- ◆ A node name can contain alphabetic characters (a to z), numbers (0 to 9) and three special characters:
 - ❖ Period (“.”)
 - ❖ Hyphen (“-”)
 - ❖ Colon (“:”)
- ◆ The underscore character (“_”) is *not* supported.

Install the Host Utilities software

Downloading the Host Utilities software

There are two Host Utilities software distributions: one for SPARC processor systems, and one for x86/x64 (AMD) processor systems.

- ◆ SPARC CPU: `santoolkit_solaris_sparc_3.4.tar.Z`
- ◆ x86/x64 (AMD) CPU: `santoolkit_solaris_amd_3.4.tar.Z`

Download the appropriate iSCSI Solaris Host Utilities file from the NOW web site at <http://now.netapp.com/NOW/cgi-bin/software> to a working directory on your Solaris host.

Note

To prevent you from accidentally installing the wrong file for your processor system, the file will only install if it is the right file for your processor.

Installing the Host Utilities software

To install the Host Utilities software you downloaded, complete the following steps:

Step	Action
1	Place the compressed file for your processor in a directory on your host and go to that directory. ◆ SPARC CPU: <code>santoolkit_solaris_sparc_3.4.tar.Z</code> ◆ x86/x64 (AMD) CPU: <code>santoolkit_solaris_amd_3.4.tar.Z</code> Example: If you are installing the <code>santoolkit_solaris_sparc_3.4.tar.Z</code> file on a SPARC system, you might put it in the <code>/tmp</code> directory. You can use following command lines to place the file in that directory and then move to the directory: <pre># cp santoolkit_solaris_sparc_3.4.tar.Z /tmp # cd /tmp</pre>

Step	Action
2	Unzip the file and extract the software package. You could enter: <pre># zcat santoolkit_solaris_sparc_3.4.tar.Z tar -xvf - (SPARC processor systems) # zcat santoolkit_solaris_amd_3.4.tar.Z tar -xvf - (x86/x64 processor systems)</pre> Result: The scripts are extracted to the current directory. Example: The following is an example of the output you see when you use these commands to extract the scripts. <pre>zcat santoolkit_solaris_sparc_3.4.tar.Z tar -xvf - x ./NTAPSANTool.pkg, 1199616 bytes, 2343 tape blocks</pre>
3	Add the packages that you extracted from tar file. Enter: <pre># pkgadd -d ./NTAPSANTool.pkg</pre> Result: The packages are added to the /opt/NTAP/SANToolkit/bin directory. Example: The following is an example of the output you see when you add the Host Utilities package. Accept the default and install all the packages. <pre># pkgadd -d ./NTAPSANTool.pkg pkgadd -d ./NTAPSANTool.pkg The following packages are available: 1 NTAPSANTool Solaris SAN Tool Utility for NetApp filers. (sun4u) 1.0.0 Select package(s) you wish to process (or 'all' to process all packages). (default: all) [?,?,q]:</pre>

Step	Action
4	Confirm that the toolkit was successfully installed: <pre># pkginfo NTAPSANTool</pre> Example: You can use the <code>pkginfo</code> command to confirm that the toolkit was successfully installed. <pre># pkginfo NTAPSANTool application NTAPSANTool Solaris SAN Tool Utility for NetApp filers.</pre> Once the toolkit is installed, you should have the following tools in the installation directory: <pre>\$ ls -al total 2326 drwxrwxr-x 2 root sys 512 Sep 26 08:46 . drwxrwxr-x 3 root sys 512 Sep 26 08:46 .. -r-xr-xr-x 1 root sys 13924 Sep 25 20:54 SHsupport.pm -r-xr-xr-x 1 root sys 130743 Sep 25 20:54 Telnet.pm -r-xr-xr-x 1 root sys 19906 Sep 25 20:54 basic_config -r-xr-xr-x 1 root sys 4036 Sep 25 20:54 brocade_info -r-xr-xr-x 1 root sys 4287 Sep 25 20:54 cisco_info -r-xr-xr-x 1 root sys 51575 Sep 25 20:54 create_binding.pl -r-xr-xr-x 1 root sys 10197 Sep 25 20:54 filer_info -r-xr-xr-x 1 root sys 4571 Sep 25 20:54 mcddata_info -r-xr-xr-x 1 root sys 11545 Sep 25 20:52 mpxio_set -r-xr-xr-x 1 root sys 1244 Sep 25 20:54 san_version -r-xr-xr-x 1 root sys 881452 Sep 25 20:54 sanlun -r-xr-xr-x 1 root sys 16273 Sep 25 20:54 solaris_info -r-xr-xr-x 1 root sys 12521 Sep 25 20:54 ssd_config.pl -r-xr-xr-x 1 root sys 677 Sep 25 20:54 vidpid.dat15:31:09 sun280r- rtp15 /</pre> Note_____ To determine which files apply to the iSCSI Solaris Host Utilities and which ones apply to the FCP Solaris Host Utilities, see “The Host Utilities files” on page 3. _____

Next steps

Completing the installation

To complete your installation, you must perform the following steps:

1. Configure the storage system. See “[Configuring the storage system for iSCSI](#)” on page 25.
2. Set up multipathing.
 - ❖ You must run the command:

```
mpxio_set -e.
```

See “[Enable multipathing support](#)” on page 20.
3. **(Optional)** Set up CHAP. See “[\(Optional\) Configure CHAP authentication](#)” on page 22.
4. Configure target discovery. See “[Configure dynamic or static target discovery](#)” on page 23.
5. Access the LUNs. See “[Accessing LUNs from the host](#)” on page 27.

Overview

This chapter provides information on how to configure the initiator.

Topics in this chapter

The chapter includes the following topics:

- ◆ [“Adding multipathing support”](#) on page 20
- ◆ [“Additional tasks involved in configuring the initiator”](#) on page 22

Adding multipathing support

Tasks for configuring the initiator

Once the storage system is configured, you need to complete the initiator configuration on the Solaris host. To configure the initiator to connect to the storage system, you must complete the following tasks:

- ◆ “Enable multipathing support”
- ◆ “(Optional) Configure CHAP authentication”
- ◆ “Configure dynamic or static target discovery”

Multipathing support

Solaris supports iSCSI multipath access to the storage system using the standard Sun StorageEdge Traffic Manager multipathing software solution. To take advantage of the Sun StorageEdge Traffic Manager for iSCSI, you should have at least two Ethernet interfaces on the storage system enabled for iSCSI traffic. Each iSCSI interface must be in a different iSCSI target portal group.

By default, Data ONTAP assigns each Ethernet interface to its own iSCSI target portal group. Starting with Data ONTAP version 7.1, you can create target portal groups that contain more than one interface. Be sure you have not put the interfaces you use with the Sun StorageEdge Traffic Manager into the same target portal group.

For more information about using multipathing with iSCSI, see *Using iSCSI Multipathing in the Solaris 10 Operating System*, available from Sun at <http://www.sun.com/blueprints/1205/819-3730.pdf>.

Enable multipathing support

To enable multipathing, you must execute the `mpxio_set` script provided by the Host Utilities to configure the Sun StorageEdge Traffic Manager. You do this by adding the storage system’s vendor ID and product ID (VID/PID) to the Sun StorageEdge Traffic Manager configuration file.

The format of the entries in this file is very specific. To ensure that the entry is correct, the Host Utilities includes the `mpxio_set` script to automatically add the required text. This script was placed in the `/opt/NTAP/SANToolkit/bin` directory when you installed the Host Utilities.

To enable the Sun StorageEdge Traffic Manager feature for NetApp LUNs, execute the following command line:

```
# mpxio_set -e
```

Now reboot your host to enable this feature. On x86/x64 (AMD) systems, you must manually reboot the host. On SPARC systems, run the `stmsboot -e` command after you run the `mpxio_set -e` command. The `stmsboot` command will then prompt you to reboot the host.

The `mpxio_set -e` command places the NetApp VID/PID information in the Sun StorageEdge Traffic Manager Configuration file. It adds the following four lines to the file `/kernel/drv/scsi_vhci.conf`:

```
#Added by NetApp to enable MPxIO
device-type-scsi-options-list =
"NETAPP LUN", "symmetric-option";
symmetric-option = 0x1000000;
```

Additional tasks involved in configuring the initiator

(Optional) Configure CHAP authentication

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

The initiatorCHAP secret value you configure on the Solaris host must be the same as the `inpassword` value you configured on the storage system. The initiator CHAP name must be the same as the `inname` value you configured on the storage system.

Note_____

The Solaris iSCSI initiator allows a single CHAP secret value that is used for all targets. If you try to configure a second CHAP secret, it overwrites the first value you set.

Configure bidirectional CHAP

For bidirectional CHAP, the target CHAP secret value you configure on the Solaris host must be the same as the `outpassword` value you configured on the storage system. The target CHAP username must be set to the target’s iSCSI node name on the storage system. You cannot configure the target CHAP username value on the Solaris host.

Note_____

Make sure you use different passwords for the `inpassword` value and the `outpassword` value.

To configure bidirectional CHAP, complete the following steps.

Step	Action
1	Set the username for the initiator. <code>iscsiadm modify initiator-node --CHAP-name <i>sunhostname</i></code>
2	Tell the initiator to use CHAP authentication. <code>iscsiadm modify initiator-node -a chap</code>
3	Set the initiator password. This password must be at least 12 characters and cannot exceed 16 characters. <code>iscsiadm modify initiator-node --CHAP-secret</code>

Step	Action
4	Configure bidirectional authentication for the target <code>iscsiadm modify target-param -B enable targetIQN</code>
5	Set the target username. <code>iscsiadm modify target-param --CHAP-name <i>filerhostname</i> targetIQN</code>
6	Set the target password. Do not use the same password as the one you supplied for the initiator password. This password must be at least 12 characters and cannot exceed 16 characters. <code>iscsiadm modify target-param --CHAP-secret targetIQN</code>
7	Tell the target to use CHAP authentication <code>iscsiadm modify target-param -a chap targetIQN</code>
8	Configure security on the storage system. <code>iscsi security add -i initiatorIQN -s CHAP -p initpassword -n sunhostname -o targetpassword -m filerhostname"</code>

Configure dynamic or static target discovery

The initiator needs to be configured with one IP address of each storage system. You can use static discovery or dynamic discovery.

Note

iSNS discovery was not supported at the time this document was created.

When you enable dynamic discovery, the host uses the iSCSI SendTargets command to discover all of the available interfaces on a storage system. Be sure to use the IP address of an interface that is enabled for iSCSI traffic.

Follow the instructions in the *Solaris System Administration Guide: Devices and File Systems* to configure and enable iSCSI Target Discovery. You can also refer to the `iscsiadm` man page on the Solaris host.

Before you begin

Before you can configure the storage system, you need the host's iSCSI node name. You recorded that name when you performed the task in “[Recording the host's initiator node name](#)” on page 13.

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 or the web-based FilerView interface to configure a CHAP user name and password. If you use unidirectional CHAP, configure only the `inpassword` and `inname` values. The default CHAP username (`inname`) value for the Solaris initiator is the Solaris host's iSCSI node name. For bidirectional CHAP, you must also set the `outpassword` and `outname` values.

Note

The Solaris initiator assumes that the storage system's CHAP username is the storage system's iSCSI node name. If you are using bidirectional CHAP, you must set the `outname` value to the iSCSI node name. For example:

```
iscsi security add ... -m iqn.1992-08.com.netapp:sn.123456789
```

The Solaris initiator has a single CHAP secret (`inpassword`) that is presented to all targets.

-
- ◆ Create LUNs and an igroup, then map the LUNs to the igroup for the Solaris host. You can manage LUNs using the FilerView interface or using the Data ONTAP command line. Be sure to specify the LUN type and iSCSI igroup type as `solaris`.

For detailed configuration steps

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

**Data ONTAP
Upgrade note**

If you upgrade the Data ONTAP software running on the storage system from version 6.4.x to version 6.5 or later, the CHAP configuration on the storage system is not saved. The format of the CHAP configuration file changed in Data ONTAP 6.5. Be sure to run the `iscsi security add` command for each iSCSI initiator, even if you had previously configured the CHAP settings.

Tasks for accessing LUNs

After the initiator itself is configured, you need to set up the host to access the LUNs you created on the storage system. Depending on the application, you can either create a file system on a LUN or access the LUN as a raw device.

Discovering LUNs and creating links

When you map new LUNs to the Solaris host, run the following command on the host console to discover the LUNs and create iSCSI device links:

```
devfsadm -i iscsi
```

For more information, see the `devfsadm` man page or chapter 15 of the *Solaris System Administration Guide: Devices and File Systems*, available from <http://docs.sun.com/app/docs/prod/solaris>.

Viewing a list of LUNs

To see a list of LUNs mapped to the Solaris host, use the `sanlun` utility included with the Host Utilities. To view a list of LUNs, enter the following command on the host console:

```
/opt/NTAP/SANToolkit/bin/sanlun lun show all
```

For more information, see the `sanlun` man page.

You can also see a list of LUNs by entering the Solaris `format` command. The LUNs on a NetApp storage system include “NETAPP-LUN” in their descriptions.

For more information, see the `format` man page.

Format the LUNs

You use an iSCSI LUN in the same way you use any disk on your Solaris host. You must format the LUNs before you place a file system on them.

To format a LUN, enter the following command on the host console:

```
format
```

Once you have formatted the LUN, you can use the `newfs` command to create a file system on it. For more information, see the `format` and `newfs` man pages.

Making iSCSI devices available on reboot

If you want an iSCSI device to be available on reboot, you need to add an entry to the `/etc/vfstab` file.

This file also needs to contain entries for the Solaris Volume Manager devices.

For more information, see the `vfstab` man page or chapter 15 of the Solaris *System Administration Guide: Devices and File Systems*, available from <http://docs.sun.com/app/docs/prod/solaris>.

Overview

This chapter 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 30
- ◆ [“Using Diagnostic Utilities”](#) on page 33

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 Solaris Host Utilities.

Verify the type of discovery being used

The Host Utilities support both dynamic (SentTarget) and static discovery. At this time, iSNS discovery is not supported.

To check which type of discovery you have enabled, use the `iscsiadm` command:

```
$ iscsiadm list discovery
Discovery:
    Static: disabled
    Send Targets: enabled
    iSNS: disabled
```

In this example, dynamic discovery is enabled.

Check that multipathing is working

If you are having problems, you should confirm that you have the Sun StorageEdge Traffic Manager multipathing working. Execute the `sanlun lun show` command and check the disk name. If the Sun StorageEdge Traffic Manager is working, you should see a long disk name similar to the following:

```
/dev/rdisk/c5t60A980004334686568343771474A4D42d0s2
```

You will see twice as many LUNs as you have mapped. For example, if you had 60 LUNs mapped to the host, you would see two paths per LUN for a total of 120 LUNs.

Bidirectional CHAP is set up, but doesn't work

When you configure bidirectional CHAP, make sure you supply different passwords for the `inpassword` value and the `outpassword` value. If you use the same value for these passwords, CHAP will appear to be set up correctly, but it will not work.

LUNs are not visible on the host

Problem: Storage system LUNs are not listed by the `iscsiadm list target -S` command or by the `sanlun lun show all` command.

What to do: Verify the following configuration settings:

- ◆ Cabling—Verify that the cables between the host and the storage system are properly connected.
- ◆ System requirements—Verify that you have the correct Solaris operating system (OS) version, version of Data ONTAP, and other system requirements. See the *NetApp iSCSI Support Matrix* at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/.
- ◆ Network connectivity—Verify that there is TCP/IP connectivity between the host and the storage system:
 - ❖ From the storage system command line, ping the host.
 - ❖ From the host command line, ping the storage system.
- ◆ Jumbo frames—If you are using jumbo frames in your configuration, ensure that jumbo frames are enabled on all devices in the network path: the host Ethernet NIC, the storage system, and any switches.
- ◆ iSCSI service status—Verify that the iSCSI service is licensed and started on the storage system. For more information about licensing iSCSI on the storage system, see the *Data ONTAP Block Access Management Guide* for your version of Data ONTAP.
- ◆ Initiator login—Verify that the initiator is logged in to the storage system by entering the `iscsi show initiator` command on the storage system console.

If the initiator is configured and logged in to the storage system, the storage system console displays the initiator node name and the target portal group to which it is connected.

If the command output shows that no initiators are logged in, verify that the initiator is configured according to the procedure described in “[Configuring the initiator](#)” on page 19.

- ◆ iSCSI node names—Verify that you are using the correct initiator node names in the `igroup` configuration.

On the storage system, use the `igroup show -v` command to display the node name of the initiator. This node name must match the initiator node name listed by the `iscsiadm list initiator-node` command on the host.

- ◆ LUN mappings—Verify that the LUNs are mapped to an `igroup` that also contains the host. On the storage system, use one of the following commands:

```
lun show -m (displays all LUNs and the igroups they are mapped to)
lun show -g igroup_name (displays the LUNs mapped to the
specified igroup)
```

- ◆ If you are using CHAP, verify that the CHAP settings on the storage system and host match. The incoming usernames and password on the host are the outgoing values on the storage system. The outgoing usernames and password on the storage system are the incoming values on the host. For bidirectional CHAP, the storage system CHAP username must be set to the storage system's iSCSI target node name.

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 Solaris Host Utilities are:

- ◆ `filer_info`. See “[Collecting storage system information](#)” on page 33 for more information.
- ◆ `solaris_info`. See “[Collecting Solaris information](#)” on page 34 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 Solaris 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 <code>filer_info</code> script tells you to delete or rename the file. Result: The output of various status commands are placed in the output directory, where <i>storage_system_name</i> 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 Solaris information

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

Running solaris_info

To execute `solaris_info`, complete the following steps:

Step	Action
1	On the Solaris 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>solaris_info [-d <directory>] [-n <file_name>] -f</pre> <code>-d <directory></code> specifies the location for the file that <code>solaris_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>solaris_info</code>, the utility gathers information about your Solaris 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 Solaris system and contents of the <code>/var/adm/message</code> file.
3	Send the resulting file to Customer Support for analysis.

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