

iSCSI Novell® NetWare® Initiator Support Kit 1.0

Setup and Configuration 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 215-00592-A0
July 2003

Copyright and trademark information

Copyright information

Copyright © 1994–2003 Network Appliance, Inc. All rights reserved. Printed in the U.S.A.

No part of this book covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Portions of this product are derived from the Berkeley Net2 release and the 4.4-Lite-2 release, which are copyrighted and publicly distributed by The Regents of the University of California.

Copyright © 1980–1995 The Regents of the University of California. All rights reserved.

Portions of this product are derived from NetBSD, which is copyrighted by Carnegie Mellon University.

Copyright © 1994, 1995 Carnegie Mellon University. All rights reserved. Author Chris G. Demetriou.

Permission to use, copy, modify, and distribute this software and its documentation is hereby granted, provided that both the copyright notice and its permission notice appear in all copies of the software, derivative works or modified versions, and any portions thereof, and that both notices appear in supporting documentation.

CARNEGIE MELLON ALLOWS FREE USE OF THIS SOFTWARE IN ITS “AS IS” CONDITION. CARNEGIE MELLON DISCLAIMS ANY LIABILITY OF ANY KIND FOR ANY DAMAGES WHATSOEVER RESULTING FROM THE USE OF THIS SOFTWARE.

Software derived from copyrighted material of The Regents of the University of California and Carnegie Mellon University is subject to the following license and disclaimer:

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notices, this list of conditions, and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notices, this list of conditions, and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgment:
This product includes software developed by the University of California, Berkeley and its contributors.
4. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS “AS IS” AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER

IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Software derived from copyrighted material of Network Appliance, Inc. is subject to the following license and disclaimer:

Network Appliance reserves the right to change any products described herein at any time, and without notice. Network Appliance assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by Network Appliance. The use and purchase of this product do not convey a license under any patent rights, trademark rights, or any other intellectual property rights of Network Appliance.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

Trademark information

NetApp and the Network Appliance design are registered trademarks of Network Appliance, Inc. in the United States, Canada, and the European Union. Network Appliance is a registered trademark of Network Appliance, Inc. in Monaco and a trademark of Network Appliance, Inc. in the United States and Canada. FAServer is a registered trademark of Network Appliance, Inc. in the United States and the European Union. NetCache is a registered trademark of Network Appliance, Inc. in the European Union and Japan, and a trademark of Network Appliance, Inc. in the United States. SnapCopy is a registered trademark of Network Appliance, Inc. in the European Union and a trademark of Network Appliance, Inc. in the United States. WAFL is a registered trademark of Network Appliance, Inc. in the United States, the European Union, and Canada. FilerView, SecureShare, SnapManager, SnapMirror and SnapRestore are registered trademarks of Network Appliance, Inc. in the United States. Data ONTAP is a trademark of Network Appliance, Inc. in the United States and Canada. Snapshot is a trademark of Network Appliance, Inc. in the United States and the European Union. NetApp—the Network Appliance Company—is a registered trademark of Network Appliance, Inc. in the United States and other countries. ApplianceWatch, BareMetal, Center-to-Edge, ContentDirector, DataFabric, gFiler, MultiStore, NearStore, SecureAdmin, Serving Data by Design, Smart SAN, SnapCache, SnapDrive, SnapVault, vFiler, and Web Filer are trademarks of Network Appliance, Inc. in the United States.

Network Appliance is a licensee of the CompactFlash and CF Logo trademarks.

All other brands or products are trademarks or registered trademarks of their respective holders and should be treated as such.

Table of Contents

Chapter 1	Overview of the Novell iSCSI software initiator	1
Chapter 2	Installation and control	3
	Installing the initiator	4
	Starting and stopping the initiator	5
Chapter 3	Creating and Managing LUNs	7
	Preparing to create LUNs.	8
	Creating LUNs	10
	Making new LUNs visible to the NetWare server	19
	Creating file systems	23

What the initiator is	The Novell® iSCSI software initiator is a collection of .NLM, .HAM, and .NCF files provided by Novell. These files allow a Novell NetWare® server to connect to a Network Appliance™ filer running Data ONTAP™ software 6.4 or later using the iSCSI protocol. Logical Unit Numbers (LUNs) created on the filer appear as raw disks to the NetWare server. LUNs are formatted using standard NetWare tools, and appear to the NetWare server as normal volumes.
Support for the initiator	Full support for the software initiator is provided by Novell. Contact Novell support for any issues that you think are related to the initiator. NetApp provides support for basic iSCSI connectivity with the initiator.
Features supported in this release	For a list of features supported in this release of the Novell iSCSI software initiator, see the NOW site at http://now.netapp.com .
System requirements	For a list of the hardware and software system requirements for this release of the Novell iSCSI software initiator, see the NOW site at http://now.netapp.com .

About this chapter

This chapter describes the basic installation and control of the Novell iSCSI software initiator. This chapter contains the following topics.

- ◆ “Installing the initiator” on page 4
- ◆ “Starting and stopping the initiator” on page 5

Installing the initiator

How to use the initiator

To use the Novell iSCSI software initiator, you must complete the following tasks:

- ◆ Obtain the Novell iSCSI software initiator
- ◆ Install the Novell iSCSI software initiator
- ◆ Start the Novell iSCSI software initiator

Obtaining the initiator for NetWare 5.1 and 6.0

For NetWare 5.1 and 6.0, the iSCSI software initiator is available from the Novell Web site at <http://download.novell.com>. The initiator is included in NetWare 6.5.

Installing the initiator with NetWare 5.1 and 6.0

If you are using NetWare 5.1 or 6.0, you need to install the initiator software. To install the Novell iSCSI software initiator, complete the following steps.

Note

For the latest Novell iSCSI software initiator installation instructions, see the Novell Web site.

Step	Action
1	Download the initiator from the Novell web site
2	Map a drive letter to the root of the NetWare server SYS: volume.
3	Extract the software initiator zip file to the root of the NetWare server SYS: volume. Note The zip archive places files in the root of the SYS: volume, as well as in other directories. You must preserve the paths contained in the archive.

Starting and stopping the initiator

Starting the initiator To start the Novell iSCSI software initiator, complete the following step.

Step	Action
1	At the NetWare server command prompt, enter the following command: ion Result: The Novell iSCSI software initiator starts. Note To start the Novell iSCSI software initiator automatically at the time the NetWare server boots, place the <code>ion</code> command in the NetWare server <code>autoexec.ncf</code> file. Example: <pre>NWS: ion Loading Module IOCTL.NLM [OK] Loading Module ISCSILIB.NLM [OK] Loading Module ISCSINIT.NLM [OK] Loading Module ISCSIHAM.HAM [OK] Loading Module ISCSINRM.NLM [OK] Loading Module ISCSIXML.NLM [OK] NWS:</pre>

Stopping the initiator

To stop the Novell iSCSI software initiator, complete the following step.

Step	Action
1	At the NetWare server command prompt, enter the following command. ioff Result: The Novell iSCSI software initiator stops. Example: <pre>NWS: ioff Module ISCSIXML.NLM unloaded Module ISCSINRM.NLM unloaded Module ISCSIHAM.HAM unloaded Module ISCSINIT.NLM unloaded Module IOCTL.NLM unloaded NWS:</pre>

About this chapter

This chapter describes how to create LUNs for iSCSI access on the filer and manage the LUNs from the host using NetWare disk management tools.

Topics in this chapter

This chapter discusses the following topics:

- ◆ “Preparing to create LUNs” on page 8
- ◆ “Creating LUNs” on page 10
- ◆ “Making new LUNs visible to the NetWare server” on page 19

Preparing to create LUNs

Preparation tasks

To prepare to create LUNs, you must complete the following tasks:

- ◆ Obtain the iSCSI node name for the NetWare server.
- ◆ Ensure that the iSCSI service is licensed and started on the filer.

Obtaining the iSCSI node name for the NetWare server

To obtain the node name for a the NetWare server, complete the following steps.

Step	Action
1	Enter the following command on the NetWare server: <pre>iscsi get InitiatorName</pre> Result: The iSCSI node name of the NetWare server is displayed. Example: <pre>NWS: iscsi get InitiatorName "InitiatorName"="iqn.1984-08.com.novell:.NWS.ou.TREE."</pre>
2	Record the iSCSI node name exactly as it appears between the quotes.

Ensuring that the iSCSI service is licensed and started

To ensure that the iSCSI service is licensed and started on the filer, complete the following steps.

Step	Action
1	On the filer console, enter the following command: <pre>license</pre> Result: The filer console displays the codes for licensed protocols.

Step	Action	
2	If...	Then...
	The console displays a license code for the iSCSI service	Proceed to Step 3.
	The console does not display a license code for the iSCSI service	1. Enter the following command to license the iSCSI service: license add code <i>code</i> is the iSCSI license code provided to you by NetApp. 2. Proceed to Step 3.
3	Enter the following command to start the iSCSI service: iscsi start Example: filer> iscsi start iSCSI service started Tue Sep 17 16:25:51 EDT [iscsi.adapter.online:notice]: ISCSI: iswta, Adapter brought online.	

Creating LUNs

Rules for creating LUNs

The following rules apply to creating LUNs for a NetWare server:

- ◆ You must create a LUN with an ID of 0. If a LUN with an ID of 0 is not present, the server does not discover LUNs with IDs higher than seven.
- ◆ Ensure that LUNs are created at the root of a filer volume or at the root of a qtree within a volume.
- ◆ Do not put LUNs in /vol/vol0 (the root volume). This volume contains files that Data ONTAP uses to administer the filer.
- ◆ Disable scheduled snapshots.

NetApp recommends that you do not use scheduled snapshots to replicate LUNs on a regular basis because multiple LUNs from different hosts can exist on the same WAFL® volume.

To disable specific snapshots, see the detailed information about snapshots in the *Data ONTAP 6.4 Data Protection Guide*.

Enabling space reservations

NetApp recommends enabling space reservations when creating LUNs. Data ONTAP 6.4 enables you to manage space reservations at the LUN level. When you enable space reservations, Data ONTAP reserves enough space on the volume so that writes to the LUN do not fail. For detailed information about space reservations, see Chapter 2, “Creating LUNs and Initiator Groups,” in the *Data ONTAP 6.4 Block Access Management Guide*.

Methods for creating LUNs

You can use the following methods to create LUNs and map them to igroups:

- ◆ Filer command line—You use the `lun setup` command to create a LUN and map it to an igroup.

Note

You can also use the `lun create` and `lun map` commands to create a LUN and map it to an igroup. For detailed information about these commands, see the *Data ONTAP 6.4 Block Access Management Guide*.

- ◆ FilerView® Web-based interface—You use the LUN Wizard to create a LUN and map it to an igroup.

**For detailed
information**

For detailed information about creating LUNs, see the following topics:

- ◆ “Creating LUNs with the LUN setup command” on page 12
- ◆ “Creating LUNs with FilerView” on page 17

Creating LUNs with the LUN setup command

Command for creating LUNs

The `lun setup` command prompts you for information required for creating a LUN and an igroup, and for mapping the LUN to an iSCSI igroup. When a default in brackets [] is provided, you can press Enter to accept the default.

You can create an igroup and add the iSCSI node name to it when prompted. If you already created an igroup, you can use an existing igroup and add the node name to the group.

You can interrupt the `lun setup` process at any time by pressing Ctrl-C. Any information that you entered is discarded.

Creating LUNs

To create LUNs on the filer using the `lun setup` command, complete the following steps.

Step	Action
1	On the filer’s command line, enter the following command to create a LUN: <pre>lun setup</pre> Result: The <code>lun setup</code> command displays the following instructions: This setup will take you through the steps needed to create LUNs and to make them accessible by initiators. You can type ^C (Control-C) at any time to abort the setup and no unconfirmed changes will be made to the system.
2	Enter y in response to the following prompt: <pre>Do you want to create a LUN? [y]: y</pre> Result: When you press Enter (accept the “yes” default), the <code>lun setup</code> command provides more instructions and prompts you to enter your values, as shown in the remaining steps.

Step	Action
3	Enter default in response to the following prompt: <pre>OS type of LUN (default/solaris/windows) [default]: default</pre>
4	Enter a LUN path in response to the next prompt: A LUN path must be absolute. A LUN can only reside in a volume or qtree root. For example, to create a LUN with the name "lun0" in the qtree root /vol/vol1/q0, specify the path as <pre>"/vol/vol1/q0/lun0" Enter LUN path: <i>lun_path</i></pre> Example: An example of <i>lun_path</i> is /vol/vol1/mtree1/lun_sdata or /vol/vol1/lun_tdata.
5	Specify whether you want to enable space reservations in response to the following prompt: Caution— Turning space reservations off can cause data loss. A LUN can be created with or without space reservations being enabled. Space reservation guarantees that data writes to that LUN will never fail. Do you want the LUN to be space reserved? [y]:
6	Enter the LUN size in response to the following prompt: Size for a LUN is specified in bytes. You can use single-character multiplier suffixes: b(sectors), k(KB), m(MB), g(GB) or t(TB). Enter LUN size: ____ Example: An example is 5g, meaning 5 GB of raw disk. Result: A LUN with the specified size of raw disk is created if the configuration information is accepted later in this program. The quantity of usable disk space by the host varies, depending on the host's operating system and the application using the LUN.

Step	Action
7	Enter a comment string, if desired, or press Enter in response to the following prompt: You can add a comment string to describe the contents of the LUN. Please type a string (without quotes), or hit ENTER if you don't want to supply a comment. Enter comment string:_____ Note_____ If you press Enter and do not add a comment, you can add a comment later with the <code>lun comment</code> command. For more information, see the <code>lun comment</code> man page on the filer.
8	Enter igroup information at the prompt. The LUN will be accessible to an initiator group. You can use an existing group name, or supply a new name to create a new initiator group. Enter '?' to see existing initiator group names. Name of initiator group [default igroup name if it exists]: Result: An igroup is created or specified.
9	Enter iSCSI at the next prompt to specify the type of igroup: Type of initiator group <i>igroup_name</i> (FCP/iSCSI) [FCP]: iSCSI

Step	Action
10	Enter comma-separated node names, in response to the following prompt: An iSCSI initiator group is a collection of initiator node names. Each node name can begin with either 'eui.' or 'iqn.' and should be in the following formats: eui.{EUI-64 address} or iqn.yyyy-mm.{reversed domain name}:{any string} Eg: iqn.2001-04.com.acme:storage.tape.sys1.xyz or eui.02004567A425678D You can separate node names by commas. Enter '?' to display a list of connected initiators. Hit ENTER when you are done adding node names to this group. Enter comma separated nodenames: iqn.1989-03.com.isinit:appl Note You can enter ? to view a list of node names or refer to the node name that you recorded in “Obtaining the iSCSI node name for the NetWare server” on page 8.
11	Enter default in response to the next prompt: OS type of initiator group "<i>igroup_name</i>" (default/solaris/windows):
12	Enter the LUN ID for the LUN that is mapped to the igroup in response to the next prompt. You can also enter ? to display the LUNs already in use by one or more initiators in the specified igroup. The lun_setup script supplies the next available LUN ID. The LUN will be accessible to all the initiators in the initiator group. Enter '?' to display LUNs already in use by one or more initiators in group "<i>new_group_name</i>". LUN ID at which initiator group "<i>new_group_name</i>" sees "<i>lun_path</i>"[0]: Result: The LUN ID is assigned to the LUN (LUN path) and mapped to the igroup.

Step	Action
13	When the script displays the LUN configuration information and prompts you to accept the configuration, enter y to accept the configuration or n to discard the configuration: Do you want to accept this configuration? [y]:y Result: If you enter y, the LUN is mapped to the specified igroup and all changes to the system are committed. At this point, Ctrl-C cannot undo the changes.
14	Finish or continue creating LUNs by responding to the final prompt: Do you want to create another LUN? [n]:
15	Proceed to “Making new LUNs visible to the NetWare server” on page 19.

Creating LUNs

Creating LUNs with FilerView

Creating LUNs

To create LUNs with FilerView, complete the following steps.

Step	Action
1	Open a browser on your host.
2	Enter the name of the filer, followed by /na_admin/ as the location for the URL. Example: If you have a filer named filerX, enter the following address in the browser: http://filerX/na_admin Result: The NetApp Online administrative window is displayed.
3	Click FilerView. Result: The user name and password window is displayed.
4	Enter your filer administrator user name and password, then click the OK button. Result: The NetApp FilerView window is displayed.
5	In the NetApp FilerView window, click LUNs > Wizard. Result: The Wizard window appears and explains how to use it.
6	Follow the instructions in the Wizard and enter information in the appropriate fields. Note _____ You can click the online Help button (the question mark) for more guidelines. _____
7	Record the LUN IDs that you used to map the LUNs to the igroup.

Step	Action
8	At the Commit Changes window, review your input. If everything is correct, press Commit. Result: The LUN Wizard: Success! window appears and the LUN you created is mapped to the igroups you specified.

Making new LUNs visible to the NetWare server

Methods for making LUNs available

To make LUNs available to a NetWare server, you can use one of the following:

- ◆ The NetWare Remote manager GUI
- ◆ The NetWare command-line interface

Note

Before attempting to connect the NetWare server to the LUNs on the filer, the iSCSI service must be started on both the NetWare server and the filer.

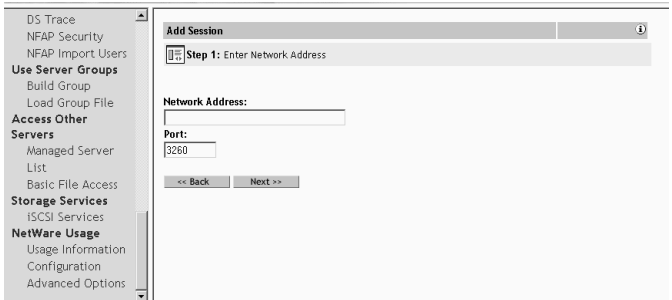
Note

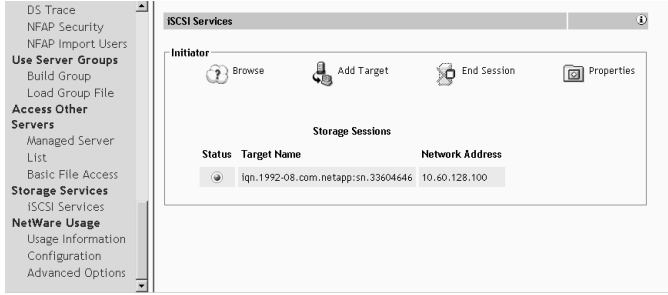
The Novell iSCSI initiator defaults to one LUN per connection. If you have more than one LUN defined on the filer, you must set the initiator property “Number of LUN probes per target” value to greater than, or equal to, the number of LUNs that you want to connect to on the filer. This is done on the initiator Properties page, and must be done prior to establishing the connection. If more LUNs are added after the connection is established, the connection must be dropped and restarted to detect the new LUNs. For more information about the initiator Properties page, see the Novell iSCSI for NetWare documentation.

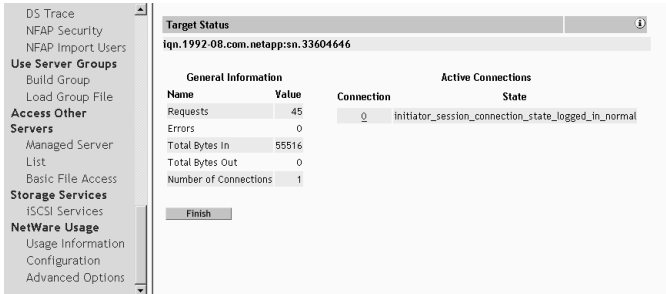
Using NetWare Remote Manager

After you create LUNs, you must make these LUNs visible to the NetWare server.

To make the new LUN visible to the NetWare server using NetWare Remote Manager, complete the following steps.

Step	Action
1	In NetWare Remote Manager, select iSCSI Services. Result: The iSCSI Services screen is displayed. 
2	Select Add Target. Result: The Add Session screen is displayed. 
3	In the Network Address field, enter the IP address of the filer interface to which you want to connect.

Step	Action
4	Click Next Result: The Select Targets screen is displayed, and the iSCSI host name of the filer is shown. 
5	Select the radio button next to the filer iSCSI host name.
6	Click Next. Result: The iSCSI Services screen is displayed. The IP address and iSCSI node name of the filer is shown. 

Step	Action
7	Click the icon below the Status label. Result: The filer is scanned for available LUNs. The Target Status screen is displayed. 
8	Click Finish. Result: The iSCSI Services screen is displayed. The filer status, target name, and network address are displayed under the Storage Sessions section.

Using the command line

To make the new LUN visible to the NetWare server using NetWare console, complete the following step.

Step	Action
1	On the NetWare console, enter the following command: <pre>iscsinit connect ipaddress</pre> <i>ipaddress</i> is the IP address of the filer interface to which you want to connect. Result: An iSCSI connection is made to the filer. Example: <pre>NWS: iscsinit connect 192.168.1.100 Connection to "iqn.1992-08.com.netapp:sn.12" established.</pre>

Creating file systems

About file systems

After the NetWare server connects to the filer and accesses LUNs, you must create file systems on the LUNs before NetWare can store data on the LUNs. For more information about creating file systems, see the Novell documentation Web site at <http://www.novell.com/documentation>.

File system support

Because a LUN appears to a NetWare server as a raw disk, you can use both the Traditional NetWare File System (NWFS) and the Novell Storage Service (NSS).

Note

NetApp recommends using the NSS file system on iSCSI connected LUNs.

Name space support

You can use any name space on an iSCSI-connected LUN.

