IBM System Storage N series

Clustered Data ONTAP 8.2 iSCSI Configuration and Provisioning for Windows Express Guide

SC27-6407-00

Contents

Preface

About this guide

This document applies to IBM N series systems running Data ONTAP, including systems with gateway functionality. If the terms *Cluster-Mode* or *clustered Data ONTAP* are used in this document, they refer to the Data ONTAP features and functionality designed for clusters, which are different from 7-Mode and prior Data ONTAP 7.1, 7.2, and 7.3 release families.

In this document, the term *gateway* describes IBM N series storage systems that have been ordered with gateway functionality. Gateways support various types of storage, and they are used with third-party disk storage systems—for example, disk storage systems from IBM, HP®, Hitachi Data Systems®, and EMC®. In this case, disk storage for customer data and the RAID controller functionality is provided by the back-end disk storage system. A gateway might also be used with disk storage expansion units specifically designed for the IBM N series models.

The term *filer* describes IBM N series storage systems that either contain internal disk storage or attach to disk storage expansion units specifically designed for the IBM N series storage systems. Filer storage systems do not support using third-party disk storage systems.

Supported features

IBM System Storage N series storage systems are driven by NetApp Data ONTAP software. Some features described in the product software documentation are neither offered nor supported by IBM. Please contact your local IBM representative or reseller for further details.

Information about supported features can also be found on the N series support website (accessed and navigated as described in Websites).

Websites

IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. The following web pages provide N series information:

- A listing of currently available N series products and features can be found at the following web page:

  www.ibm.com/storage/nas/
- The IBM System Storage N series support website requires users to register in order to obtain access to N series support content on the web. To understand how the N series support web content is organized and navigated, and to access the N series support website, refer to the following publicly accessible web page:

  www.ibm.com/storage/support/nseries/

  This web page also provides links to AutoSupport information as well as other important N series product resources.
- IBM System Storage N series products attach to a variety of servers and operating systems. To determine the latest supported attachments, go to the IBM N series interoperability matrix at the following web page:

www.ibm.com/systems/storage/network/interophome.html

- For the latest N series hardware product documentation, including planning, installation and setup, and hardware monitoring, service and diagnostics, see the IBM N series Information Center at the following web page:

  publib.boulder.ibm.com/infocenter/nasinfo/nseries/index.jsp

Getting information, help, and service

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your IBM N series product, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure they are connected.
- Check the power switches to make sure the system is turned on.
- Use the troubleshooting information in your system documentation and use the diagnostic tools that come with your system.
- Refer to the N series support website (accessed and navigated as described in Websites) for information on known problems and limitations.

Using the documentation

The latest versions of N series software documentation, including Data ONTAP and other software products, are available on the N series support website (accessed and navigated as described in Websites).

Current N series hardware product documentation is shipped with your hardware product in printed documents or as PDF files on a documentation CD. For the latest N series hardware product documentation PDFs, go to the N series support website.

Hardware documentation, including planning, installation and setup, and hardware monitoring, service, and diagnostics, is also provided in an IBM N series Information Center at the following web page:

publib.boulder.ibm.com/infocenter/nasinfo/nseries/index.jsp

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services. Visit the following web page for support telephone numbers:

www.ibm.com/planetwide/

Firmware updates

IBM N series product firmware is embedded in Data ONTAP. As with all devices, ensure that you run the latest level of firmware. Any firmware updates are posted to the N series support website (accessed and navigated as described in Websites).

Note: If you do not see new firmware updates on the N series support website, you are running the latest level of firmware.

Verify that the latest level of firmware is installed on your machine before contacting IBM for technical support.

How to send your comments

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Be sure to include the following:

- Exact publication title
- Publication form number (for example, GC26-1234-02)
- Page, table, or illustration numbers
- A detailed description of any information that should be changed

Deciding whether to use this guide

This guide describes how to quickly set up the iSCSI service on a Vserver, provision a LUN, and make the LUN available using an iSCSI initiator on a Windows host computer. You should use this guide if you want a standard configuration following IBM best practices.

This guide does not provide information all the available options or a lot of conceptual background for the tasks.

This guide is based on the following assumptions:

- Your storage system has been successfully installed and a cluster has been created.
- You have downloaded and are running OnCommand System Manager 3.0 or later for all applicable tasks.

  This guide does not include procedures using the Data ONTAP CLI except when the CLI is the only way to complete a task.
- You are using the Microsoft iSCSI software initiator on Windows Server 2003, Windows Server 2008, or Windows Server 2012.
- Your network uses IPv4 addressing.
- You are not configuring iSCSI SAN boot.

If these assumptions are not correct for your installation, or if you want more conceptual background information, you should see the following documentation instead:

- *Clustered Data ONTAP SAN Administration Guide*
- *Clustered Data ONTAP SAN Configuration Guide*
- *Windows Host Utilities Installation and Setup Guide*
- *Data ONTAP DSM for Windows MPIO Installation and Administration Guide*
- *OnCommand System Manager Help*

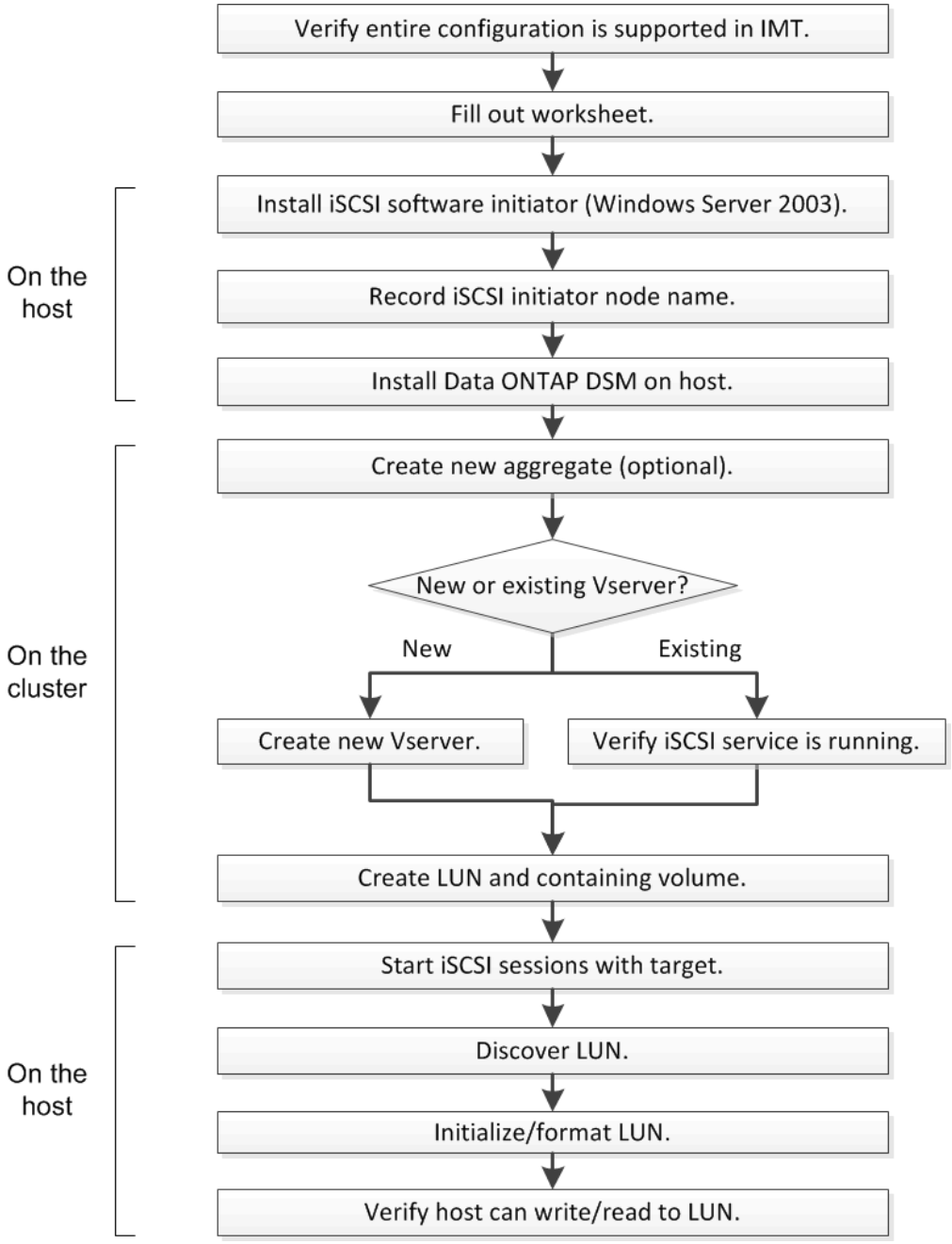
This documentation is available on N series support website (accessed and navigated as described in Websites).

Related information:

IBM N series support website: www.ibm.com/storage/support/nseries

iSCSI configuration and provisioning workflow

When you make storage available to a host using iSCSI, you provision a volume and LUN on the Vserver, and then connect to the LUN from the host.



Verifying that the iSCSI configuration is supported

To ensure reliable operation, you must verify that the entire iSCSI configuration is supported. The IBM N series interoperability matrix website (accessed and navigated as described in Websites) lists the supported configurations.

Procedure

1. Go to the IBM N series interoperability matrix website (accessed and navigated as described in Websites) to verify that you have a supported combination of the following components:
   - Data ONTAP software
   - Host computer CPU architecture (for standard rack servers)
   - Specific processor blade model (for blade servers)
   - Storage protocol (iSCSI)
   - Windows operating system version
   - iSCSI software initiator
   - Data ONTAP DSM for Windows MPIO
2. Click the configuration name for the selected configuration. Details for that configuration are displayed in the Configuration Details window.
3. Review the information in the following tabs:
   - Notes

     Lists important alerts and notes that are specific to your configuration.

     Review the alerts to identify the hotfixes that are required for your operating system.
   - Policies and Guidelines

     Provides general guidelines for all SAN configurations.

Related information:

IBM N series interoperability matrix: www.ibm.com/systems/storage/network/interophome.html

Filling out the iSCSI provisioning worksheet

You require iSCSI identifiers, network addresses, and storage configuration information to perform iSCSI provisioning tasks.

iSCSI identifiers

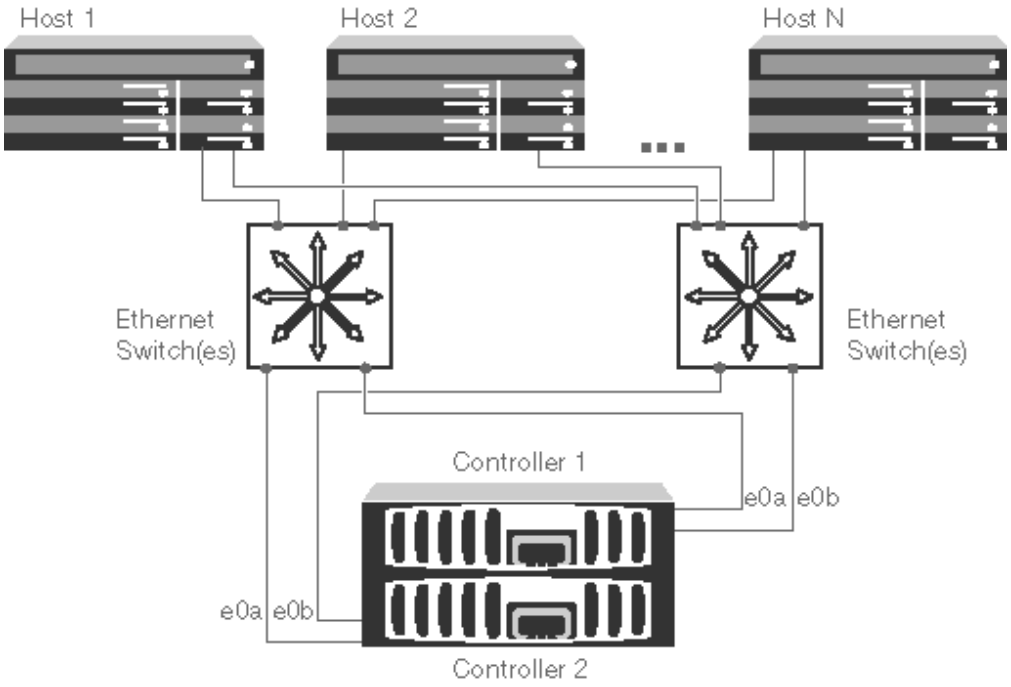
Initiator (host) iSCSI node name (IQN)	
Target alias (optional)	

Target network addresses

The Vserver is the iSCSI target.

You require at least four IP addresses for the iSCSI data LIFs. There should be two separate networks for high availability.

If possible, separate iSCSI traffic on separate physical networks or on VLANs.



Node / LIF	IP address	Network mask	Gateway	VLAN ID	Home port
Node 1 / 1					
Node 1 / 2					
Node 2 / 1					
Node 2 / 2					
Node 3 / 1 (optional)					

Node / LIF	IP address	Network mask	Gateway	VLAN ID	Home port
Node 3 / 2 (optional)					
Node 4 / 1 (optional)					
Node 4 / 2 (optional)					

Storage configuration

If the aggregate or Vserver is already created, record their names here. Otherwise you can create them as required.

Node to own LUN	
Aggregate name	
Vserver name	

LUN information

LUN size	
Host operating system	
LUN name (optional)	
LUN description (optional)	

Vserver information

If you are not using an existing Vserver, you require the following information to create a new one.

Vserver name	
Aggregate for Vserver root volume	
Vserver user name (optional)	
Vserver password (optional)	
Vserver management LIF (optional)	IP address:
	Network mask:
	Gateway:
	Home node:
	Home port:

Installing the iSCSI software initiator for Windows Server 2003

The iSCSI software initiator creates the iSCSI connection on the Windows host. For Windows Server 2003, you must download and install the software initiator. The iSCSI software initiator is built in to Windows Server 2008 and Windows Server 2012.

Procedure

1. Go to the Microsoft website.
2. Search for "iSCSI initiator".
3. Follow the instructions on the Microsoft page to download and start the installation of the latest version of the iSCSI software initiator. You must select the correct package for the CPU type of your Windows host.
4. When prompted to select installation options, select **Initiator Service** and **Software Initiator**.
5. Select the **Microsoft MPIO Multipathing Support for iSCSI** check box.
6. Follow the prompts to complete the installation.

Recording the iSCSI initiator node name

You must record the iSCSI initiator node name from the iSCSI initiator program on the Windows host.

Procedure

1. Open the iSCSI Initiator Properties dialog box:

For	Click
Windows Server 2012	**Server Manager** > **Dashboard** > **Tools** > **iSCSI Initiator** > **Configuration**
Windows Server 2008, Windows Server 2008 R2, and Windows Vista	**Start** > **Administrative Tools** > **iSCSI Initiator**
Windows Server 2003 and Windows XP	**Start** > **All Programs** > **Microsoft iSCSI Initiator** > **Microsoft iSCSI Initiator**

2. Copy the **Initiator Name** or **Initiator Node Name** value to a text file or write it down. The exact label in the dialog box differs depending on the Windows version. The iSCSI initiator node name looks like this:

```
iqn.1991-05.com.microsoft:server3
```

Installing the Data ONTAP DSM for Windows MPIO

The Data ONTAP DSM for Windows MPIO manages multiple paths between the Windows host and the storage cluster. Multiple paths are required to ensure that your host can access its LUN if a path or component fails. The Data ONTAP DSM sets the required timeout values and storage parameters on the host.

Before you begin

You must have completed the following tasks:

- Identified the required version of the Data ONTAP DSM for Windows MPIO from the IBM N series interoperability matrix (accessed and navigated as described in Websites)
- Identified any required Windows hotfixes from the IBM N series interoperability matrix website (accessed and navigated as described in Websites)

  The *Data ONTAP DSM for Windows MPIO Installation and Administration Guide* lists the basic hotfix requirements. The specific row in the IBM N series interoperability matrix website (accessed and navigated as described in Websites) for your configuration lists the latest hotfix requirements.
- Obtained a license key for the Data ONTAP DSM for Windows MPIO

About this task

This task requires rebooting the Windows host.

Detailed installation information is available in the *Data ONTAP DSM for Windows MPIO Installation and Administration Guide*, available with the software download.

Procedure

1. Download the appropriate version of the Data ONTAP DSM from the N series support website (accessed and navigated as described in Websites).
2. Install any required Windows hotfixes. The Data ONTAP DSM installer will not proceed until the required hotfixes have been installed.
3. For Windows Server 2003 and 2008, install Windows PowerShell 2.0 or later. Installing PowerShell is not required for Windows Server 2008 R2 or later.
4. Run the Data ONTAP DSM installation program and follow the prompts. For an iSCSI-only configuration, the installation program displays an error message that no HBAs were found in the host. You can ignore this message.
5. Reboot the Windows host when prompted.

Related information:

IBM N series interoperability matrix: www.ibm.com/systems/storage/network/interophome.html

IBM N series support website: www.ibm.com/storage/support/nseries

Creating an aggregate

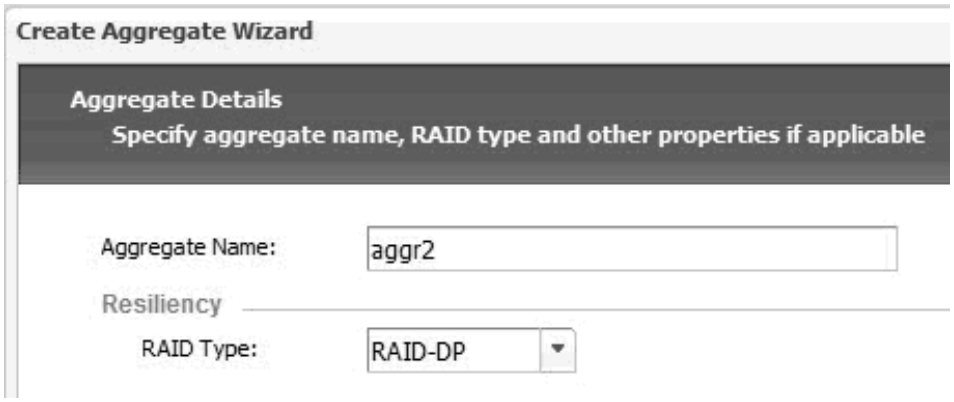
You create an aggregate to provide storage to one or more FlexVol volumes. Aggregates are made up of physical storage objects, such as HDDs and SSDs.

About this task

This procedure is performed using System Manager.

Procedure

1. From the home page, double-click the appropriate storage system.
2. Expand either the **Cluster** or the **Nodes** hierarchy in the left navigation pane.
3. In the navigation pane, click **Storage** > **Aggregates**.
4. Click **Create**.
5. In the Create Aggregate wizard, click **Next**.
6. Optional: If you want to change the default name, specify a new name, such as `aggr2`. The default aggregate name ends in a date and time stamp.



7. Accept the default value for **RAID Type**, and click **Next**. You can change the RAID type later if necessary.
8. In the Aggregate Details page, click **Select disks**.
9. In the Change Disk Selection page, select the node on which you want to create the aggregate, specify at least 5 disks in the **Number of capacity disks to use** field, and click **Save and Close**.
10. Click **Create**.
11. Click **Finish**.

Results

The aggregate is created with the specified configuration and added to the list of aggregates in the Aggregates window.

Creating a new Vserver

The Vserver provides the iSCSI target and owns the LUN and its containing volume. The logical interfaces (LIFs) that provide paths to the LUN are owned by the Vserver.

Before you begin

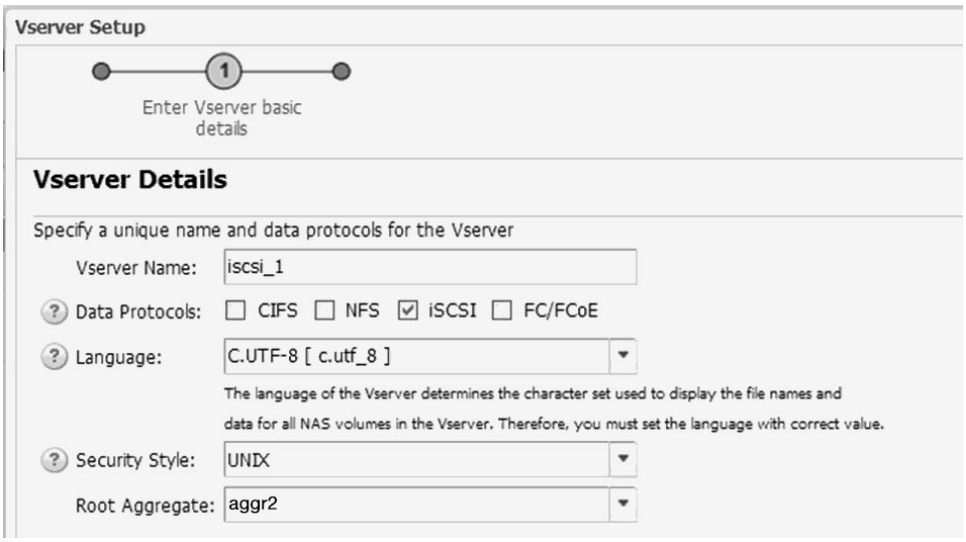
You must have the network addresses to create LIFs for each node.

About this task

The Vserver can always be managed by the cluster administrator. You can optionally define an administrator for only this Vserver.

Procedure

1. From the OnCommand System Manager home page, double-click the appropriate storage system.
2. Expand the **Vservers** hierarchy in the left navigation pane.
3. In the Vserver window, click **Create**.
4. On the Vserver Details page, enter a name for the Vserver, select **iSCSI** as the data protocol, and then select an aggregate for the root volume.



5. Click **Submit & Continue** to accept the remaining default values.
6. On the Configure iSCSI Protocol page, enter the network addresses for the data LIFs from the worksheet. Each node must have two LIFs on separate networks for high availability.

   Selecting the **Review or modify LIFs configuration** check box enables you to enter individual addresses instead of having the addresses assigned automatically based on a starting address.
7. Review the summary information, and if you had the system automatically assign IP addresses, record the iSCSI LIF details.

Verifying that the iSCSI service is running on an existing Vserver

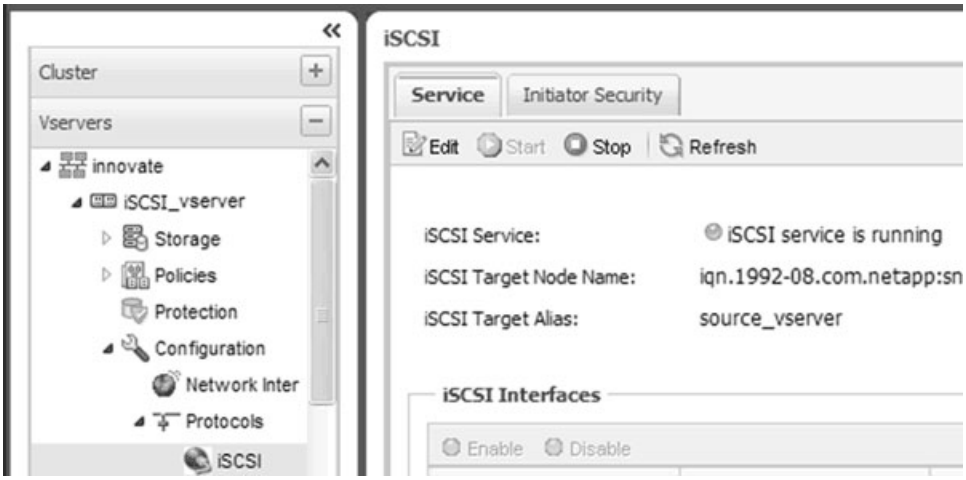
If you choose to use an existing Vserver, you must verify that the iSCSI service is running on the Vserver.

Before you begin

You must have selected an existing Vserver on which you plan to create a new LUN.

Procedure

1. From the OnCommand System Manager home page, double-click the appropriate storage system.
2. Expand the **Vservers** hierarchy in the left navigation pane.
3. In the navigation pane, select the Vserver and click **Configuration** > **Protocols** > **iSCSI**.
4. Verify that the iSCSI service is running.



5. Record the iSCSI interfaces listed for the Vserver.

What to do next

If the iSCSI service is not running, start the iSCSI service or create a new Vserver.

If there are fewer than two iSCSI interfaces per node, update the iSCSI configuration on the Vserver or create a new Vserver for iSCSI.

Creating a LUN and its containing volume

The Create LUN wizard creates a LUN and the FlexVol volume that contains the LUN. The wizard also creates the igroup and maps the LUN to the igroup, which enables the specified host to access the LUN.

Before you begin

- There must be an aggregate with enough free space to contain the LUN.
- There must be a Vserver with the iSCSI protocol enabled and the appropriate LIFs created.
- You must have recorded the iSCSI initiator node name of the host.

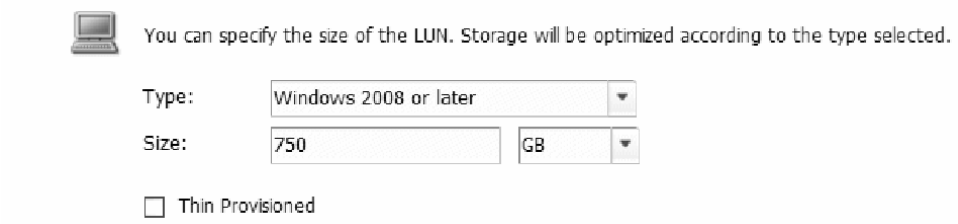
About this task

If your organization has a naming convention, you should use names for the LUN, volume, and so on that fit your convention. Otherwise you should accept the default names.

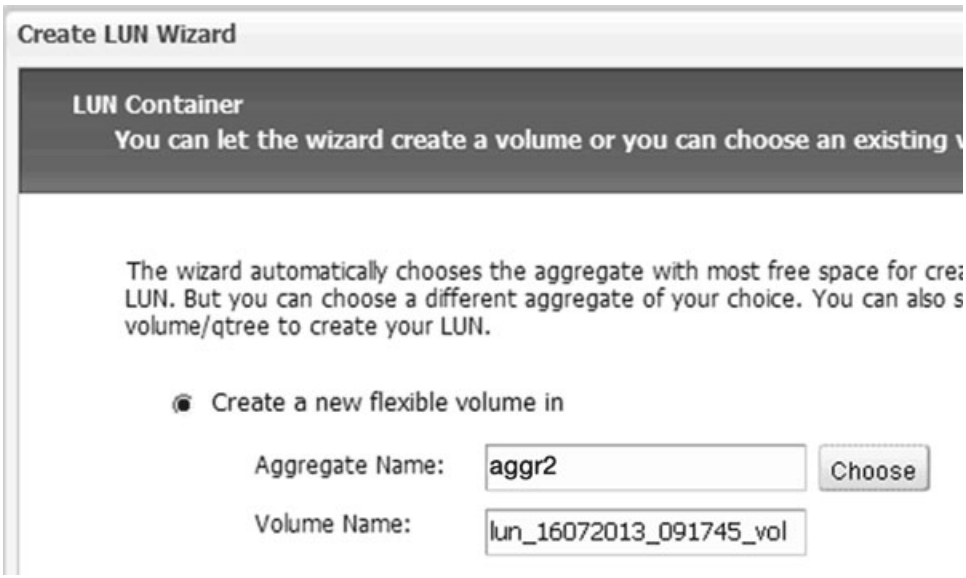
Procedure

1. From the OnCommand System Manager home page, double-click the appropriate storage system.
2. Expand the **Vservers** hierarchy in the left navigation pane.
3. In the navigation pane, select the Vserver and click **Storage** > **LUNs**.
4. In the **LUN Management** tab, click **Create**.
5. Type or select information as prompted by the wizard.
6. On the General Properties page, retain the default (deselected) value for **Thin Provisioned**. To learn more about thin provisioning and the requirements for using it, see the *Clustered Data ONTAP SAN Administration Guide*.

   You must select the LUN type that matches your version of Windows. There are two types for Windows Server 2003 (MBR or GPT) and one type for all versions of Windows Server 2008 and later.



7. On the LUN Container page, create a new FlexVol volume.



8. On the Initiators Mapping page, click **Add Initiator Group**, enter the required information on the General tab, and then on the Initiators tab, enter the iSCSI initiator node name of the host that you recorded.
9. Confirm the details and click **Finish** to complete the wizard.

Starting iSCSI sessions with the target

The Windows host must have an iSCSI connection to each node in the cluster. You establish the sessions from the host using the iSCSI Initiator Properties dialog box on the host.

Before you begin

You must know the IP address of an iSCSI data LIF on the Vserver that contains the LUN you are accessing.

About this task

In clustered Data ONTAP, the iSCSI host must have paths to each node in the cluster. The Data ONTAP DSM selects the best paths to use. If paths fail, the Data ONTAP DSM selects new paths.

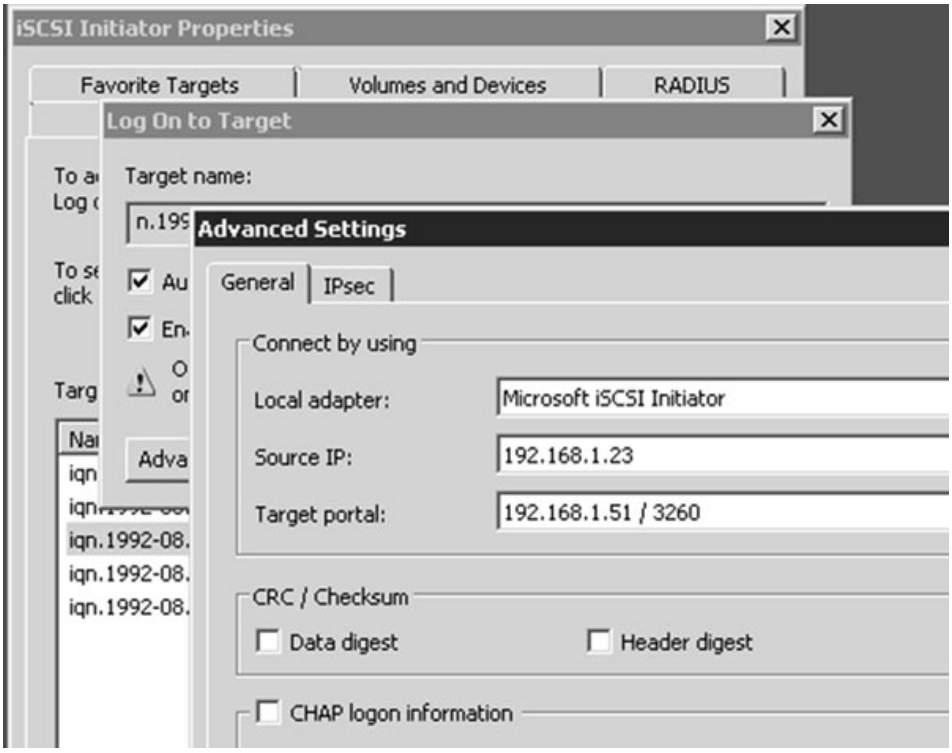
The buttons and labels in the iSCSI Initiator Properties dialog box vary between versions of Windows. Some of the steps in the task include more than one button or label name; you should pick the name that matches the version of Windows you are using.

Procedure

1. Open the iSCSI Initiator Properties dialog box:

For...	Click...
Windows Server 2012	**Server Manager** > **Dashboard** > **Tools** > **iSCSI Initiator**
Windows Server 2008 or Windows Server 2003	**Start** > **Administrative Tools** > **iSCSI Initiator**

2. On the Discovery tab, click **Discover Portal** or **Add Portal**, and then enter the IP address of the iSCSI target port.
3. On the Targets tab, select the first target portal you discovered and then click **Log on** or **Connect**.
4. Select **Enable multi-path**, select **Automatically restore this connection when the computer starts** or **Add this connection to the list of Favorite Targets**, and then click **Advanced**.
5. For **Local adapter**, select **Microsoft iSCSI Initiator**.
6. For **Source IP** or **Initiator IP**, select the IP address of a port on the same subnet or VLAN as one of the iSCSI target LIFs.
7. Retain the default values for the remaining check boxes and then click **OK**. The following example is from Windows Server 2008:



8. Select the next target portal in the list, and click **Log on** or **Connect**.
9. Select **Enable multi-path**, select **Automatically restore this connection when the computer starts** or **Add this connection to the list of Favorite Targets**, and then click **Advanced**.
10. For **Source IP** or **Initiator IP**, select the IP address of a different port on the subnet or VLAN of a different iSCSI target LIF.
11. For **Target portal**, select the IP address of the iSCSI target LIF that corresponds to the port you just selected for **Source IP**.
12. Retain the default values for the remaining check boxes and then click **OK**.
13. Repeat steps 8 through 12 to log in to each target portal that is discovered.

Discovering new disks

LUNs on your storage system appear as disks to the Windows host. Any new disks for LUNs you add to your system are not automatically discovered by the host. You must manually rescan disks to discover them.

Procedure

1. Open the Windows Computer Management utility:

For...	Click...
Windows Server 2012	**Tools** > **Computer Management**
Windows Server 2008	**Start** > **Administrative Tools** > **Computer Management**
Windows Server 2003	**Start** > **Administrative Tools** > **Computer Management**

2. Expand the **Storage** node in the navigation tree.
3. Click **Disk Management**.
4. Click **Action** > **Rescan Disks**.

Initializing and formatting the LUN

When a new LUN is first accessed by the Windows host, it has no partition or file system. You must initialize the LUN, and optionally format it with a file system.

Before you begin

The LUN must have been discovered by the Windows host.

About this task

LUNs appear in Windows Disk Management as disks.

You can initialize the disk as a basic disk with a GPT or MBR partition table.

You typically format the LUN with a file system such as NTFS. But some applications use raw disks.

Procedure

1. Start Windows Disk Management.
2. Right-click the LUN, and select the required disk or partition type.
3. Follow the instructions in the wizard. If you choose to format the LUN as NTFS, you must select the **Perform a quick format** check box.

Verifying that the host can write to and read from the LUN

Before using the LUN, you should verify that the host can write data to the LUN and read it back.

Before you begin

The LUN must be initialized and formatted with a file system.

About this task

If the cluster node on which the LUN is created can be failed over to its partner node, you should verify reading the data while the node is failed over. This test might not be possible if the cluster is in production use.

Procedure

1. On the host, copy one or more files to the LUN.
2. Copy the files back to a different folder on the original disk.
3. Compare the copied files to the original. You can use the **comp** command at the Windows command prompt to compare two files.
4. Optional: Fail over the cluster node containing the LUN and verify that you can still access the files on the LUN.
5. Use the Data ONTAP DSM to view the paths to the LUN and verify that you have the expected number of paths.

What to do next

If any of the tests fail, verify that the iSCSI service is running and check the iSCSI paths to the LUN.

Where to find additional information

There are additional documents to help you learn more about iSCSI configuration and provisioning.

All of the following documentation is available from the N series support website (accessed and navigated as described in Websites):

Clustered Data ONTAP SAN Configuration Guide
Describes supported FC, iSCSI, and FCoE topologies for connecting host computers to storage controllers in clusters.

Clustered Data ONTAP SAN Administration Guide
Describes how to configure and manage the iSCSI, FCoE, and FC protocols for clustered SAN environments, including configuration of LUNs, igroups, and targets.

OnCommand System Manager Help
Describes how to use OnCommand System Manager to complete typical tasks.

Data ONTAP DSM for Windows MPIO Installation and Administration Guide
Describes how to install and use the Data ONTAP DSM for Windows MPIO software.

Microsoft documentation

Documentation about the Microsoft iSCSI software initiator is available directly from Microsoft.

Microsoft iSCSI Software Initiator Version 2.X Users Guide
Describes the Microsoft iSCSI software initiator for Windows Server 2003 and Server 2008. Included with the iSCSI software initiator download files. This document is available from Microsoft.

Microsoft iSCSI Initiator Overview
Online Help for the Windows Server 2012 iSCSI initiator (available from within the initiator). Describes the software initiator and includes links to the Microsoft website for further information.

Related information:

IBM N series support website: www.ibm.com/storage/support/nseries

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Index

M

N

P

R

S

T

V

W

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