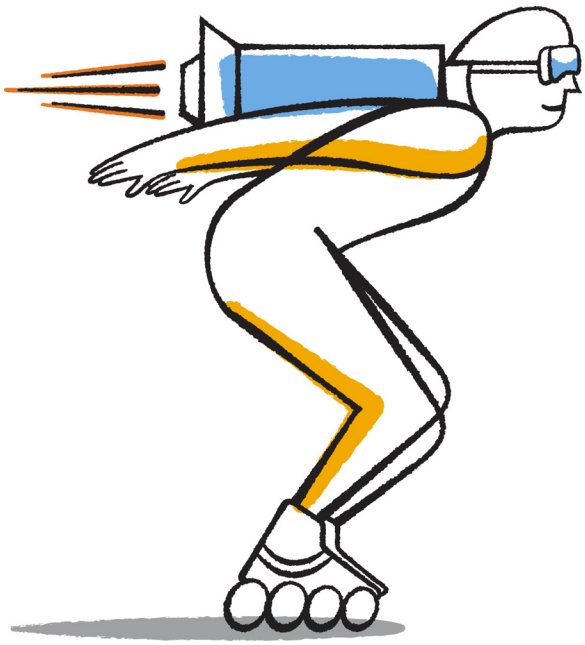
Updated for 8.3.1

Clustered Data ONTAP® 8.3

iSCSI Configuration for Windows Express Guide



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Deciding whether to use this guide

This guide describes how to quickly set up the iSCSI service on a Storage Virtual Machine (SVM), provision a LUN, and make the LUN available using an iSCSI initiator on a Windows host computer.

This guide is based on the following assumptions:

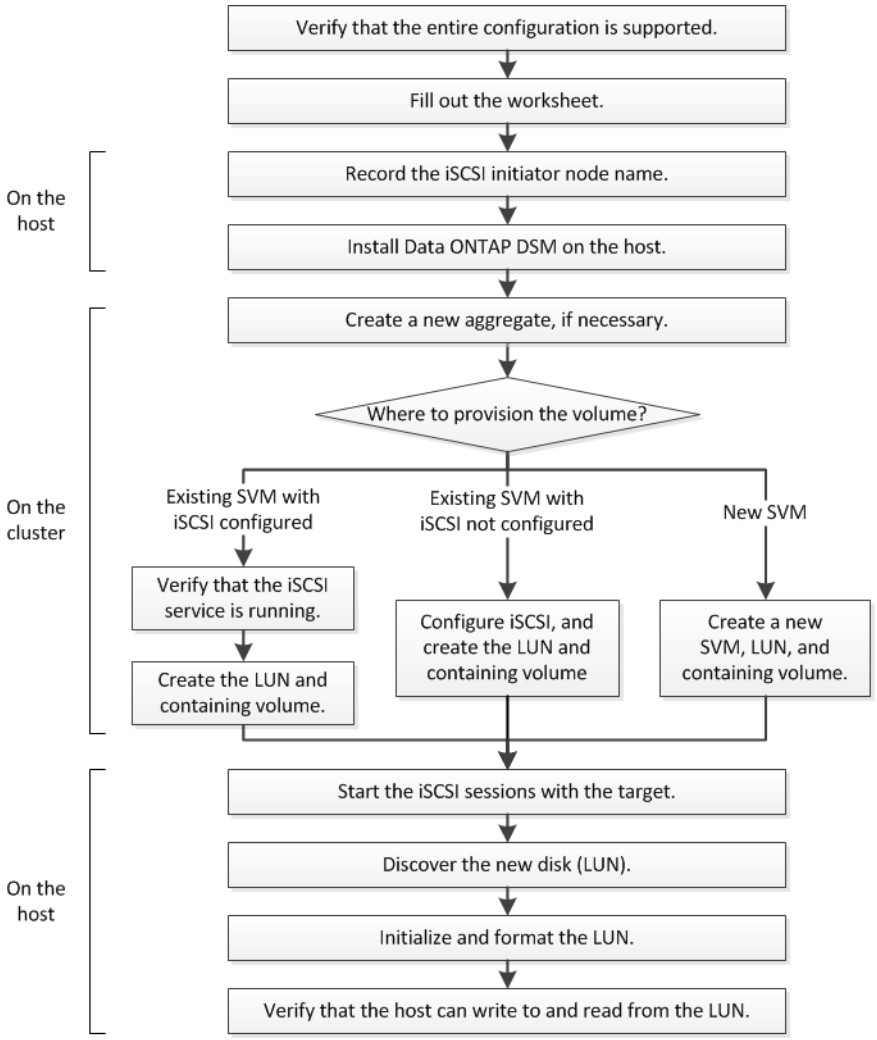
- You want to use best practices, not explore every available option.
- You do not want to read a lot of conceptual background.
- You want to use OnCommand System Manager, not the Data ONTAP command-line interface or an automated scripting tool.
- You are using the Microsoft iSCSI software initiator on Windows Server 2008 or Windows Server 2012.
- Your network uses IPv4 addressing.
- You want to assign addresses to logical interfaces using any of the following methods:
  - Automatically, from a subnet you define
  - Manually, using an address selected from an existing subnet
  - Manually, using an address that will be added to an existing subnet
- You are not configuring iSCSI SAN boot.

If these assumptions are not correct for your situation, you should see the following resources:

- *Clustered Data ONTAP 8.3 SAN Administration Guide*
- *Clustered Data ONTAP 8.3 SAN Configuration Guide*
- *NetApp Documentation: Host Utilities (current releases)* for your version of Windows Host Utilities
- *Data ONTAP DSM 4.1 For Windows MPIO Installation and Administration Guide*
- *NetApp Documentation: OnCommand Workflow Automation (current releases)*
  OnCommand Workflow Automation enables you to run prepackaged workflows that automate management tasks such as the workflows described in Express Guides.

iSCSI configuration and provisioning workflow

When you make storage available to a host using iSCSI, you provision a volume and LUN on the Storage Virtual Machine (SVM), 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 Interoperability Matrix lists the supported configurations.

Steps

1. Go to the *NetApp Interoperability Matrix Tool* 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
- 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 information 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.

Completing the iSCSI configuration worksheet

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

iSCSI identifiers

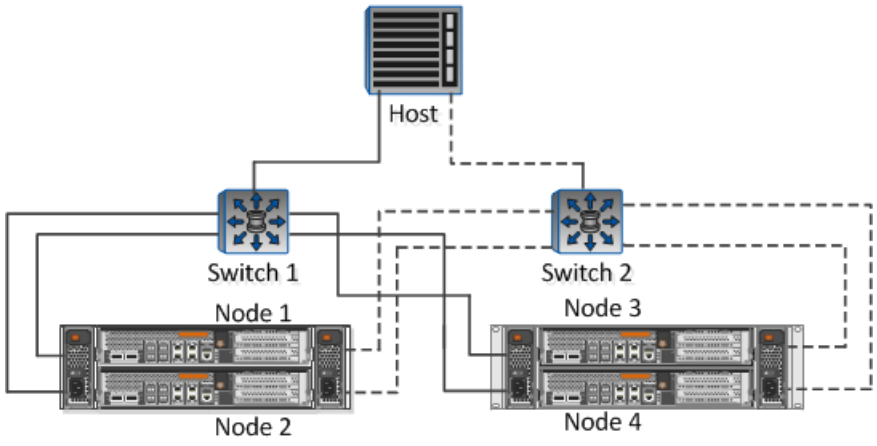
Initiator (host) iSCSI node name (IQN)	
Target alias (optional)	

Target network addresses

The Storage Virtual Machine (SVM) is the iSCSI target.

You require a subnet with two IP addresses for iSCSI data LIFs for each node in the cluster. There should be two separate networks for high availability. The specific IP addresses are assigned by Data ONTAP when you create the LIFs as part of creating the SVM.

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



Subnet for LIFs: _____

Node or LIF with port to switch	IP address	Network mask	Gateway	VLAN ID	Home port
Node 1 / LIF to switch 1					
Node 2 / LIF to switch 1					
Node 3 / LIF to switch 1					
Node 4 / LIF to switch 1					
Node 1 / LIF to switch 2					
Node 2 / LIF to switch 2					
Node 3 / LIF to switch 2					
Node 4 / LIF to switch 2					

Storage configuration

If the aggregate and SVM are already created, record their names here; otherwise, you can create them as required:

Node to own LUN	
Aggregate name	
SVM name	

LUN information

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

SVM information

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

SVM name	
SVM IPspace	
Aggregate for SVM root volume	
SVM user name (optional)	
SVM password (optional)	

SVM management LIF (optional)	Subnet:
	IP address:
	Network mask:
	Gateway:
	Home node:
	Home port:

Recording the iSCSI initiator node name

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

Steps

1. Open the **iSCSI Initiator Properties** dialog box:

If you are using...	Navigate to...
Windows Server 2012 or Windows Server 2012 R2	**Server Manager** > **Dashboard** > **Tools** > **iSCSI Initiator** > **Configuration**
Windows Server 2008, Windows Server 2008 R2, or Windows Vista	**Start** > **Administrative Tools** > **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 *NetApp Interoperability Matrix Tool*
- Identified any required Windows hotfixes from the *NetApp Interoperability Matrix Tool*
  The *Data ONTAP DSM for Windows MPIO Installation and Administration Guide* lists the basic hotfix requirements. The specific row in the *NetApp Interoperability Matrix Tool* 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.

Steps

1. Download the appropriate version of the Data ONTAP DSM from *NetApp Support*.
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 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.

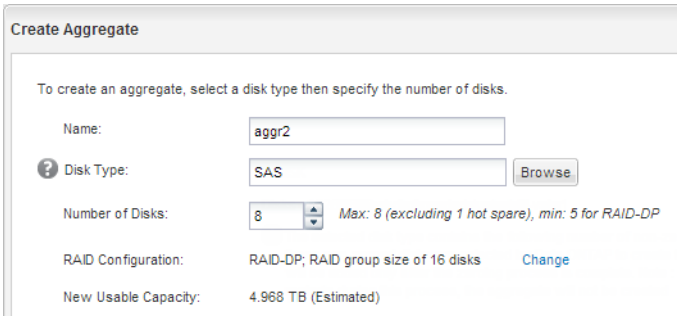
   For an iSCSI-only configuration, the installation program displays an error message that no HBAs were found in the host. You can ignore this message.
5. Reboot the Windows host when prompted.

Creating an aggregate

If you do not want to use an existing aggregate, you can create a new aggregate to provide physical storage to the volume you are provisioning.

Steps

1. Enter the URL **`https://IP-address-of-cluster-management-LIF`** in a web browser and log in to System Manager using your cluster administrator credential.
2. In the navigation pane, expand the **Cluster** hierarchy and click **Storage > Aggregates**.
3. Click **Create**.
4. Follow the instructions on the screen to create the aggregate using the default RAID-DP configuration, and then click **Create**.



Result

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

Deciding where to provision the volume

Before you provision a volume to contain your LUNs, you need to decide whether to add the volume to an existing Storage Virtual Machine (SVM) or to create a new SVM for the volume. You might also need to configure iSCSI on an existing SVM.

About this task

If an existing SVM is already configured with the needed protocols and has LIFs that can be accessed from the host, it is easier to use the existing SVM.

You can create a new SVM to separate data or administration from other users of the storage cluster. There is no advantage to using separate SVMs just to separate different protocols.

Choices

- If you want to provision volumes on an existing SVM that is already configured for iSCSI, see *Verifying that the iSCSI service is running on an existing SVM* on page 10 and *Creating a LUN and its containing volume* on page 11.
- If you want to provision volumes on an existing SVM that has iSCSI enabled but not configured, see *Configuring iSCSI and creating a LUN on an existing SVM* on page 12.

  This is the case when you followed another Express Guide to create the SVM while configuring a different protocol.
- If you want to provision volumes on a new SVM, see *Creating a new SVM* on page 14.

Verifying that the iSCSI service is running on an existing SVM

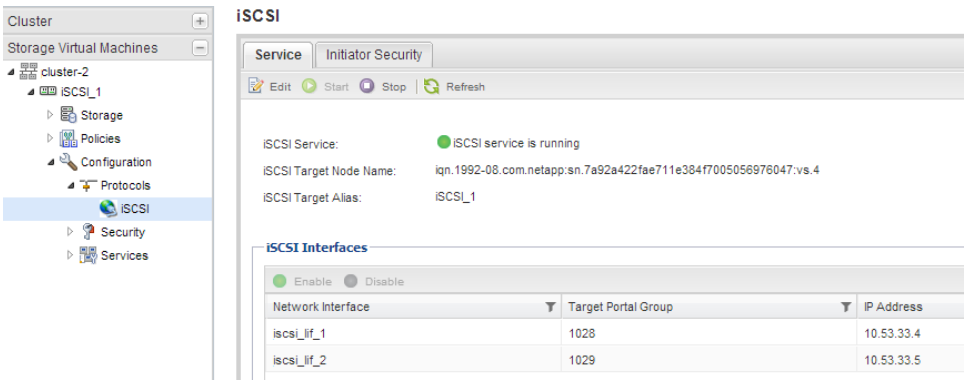
If you choose to use an existing Storage Virtual Machine (SVM), you must verify that the iSCSI service is running on the SVM.

Before you begin

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

Steps

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



5. Record the iSCSI interfaces listed for the SVM.

After you finish

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

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

Creating a LUN and its containing volume

You use the Create LUN wizard to create 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 Storage Virtual Machine (SVM) with the iSCSI protocol enabled and the appropriate LIFs created.
- You must have recorded the iSCSI initiator node name of the host.

Starting with clustered Data ONTAP 8.3, LUNs are mapped to a subset of the initiators in the igroup to limit the number of paths from the host to the LUN.

- By default, Data ONTAP 8.3 uses Selective LUN Map to make the LUN accessible only through paths on the node owning the LUN and its HA partner.
- You still must configure all of the iSCSI LIFs on every node for LUN mobility in case the LUN is moved to another node in the cluster.
- When moving a volume or a LUN, you must modify the Selective LUN Map reporting-nodes list before moving.

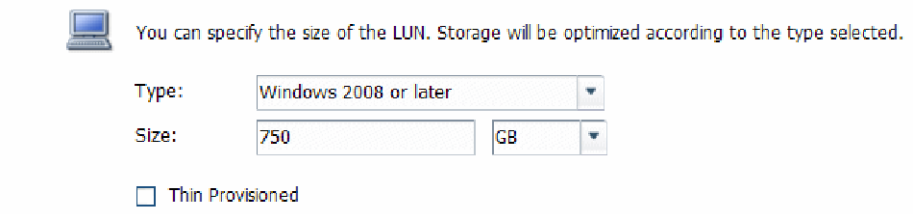
About this task

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.

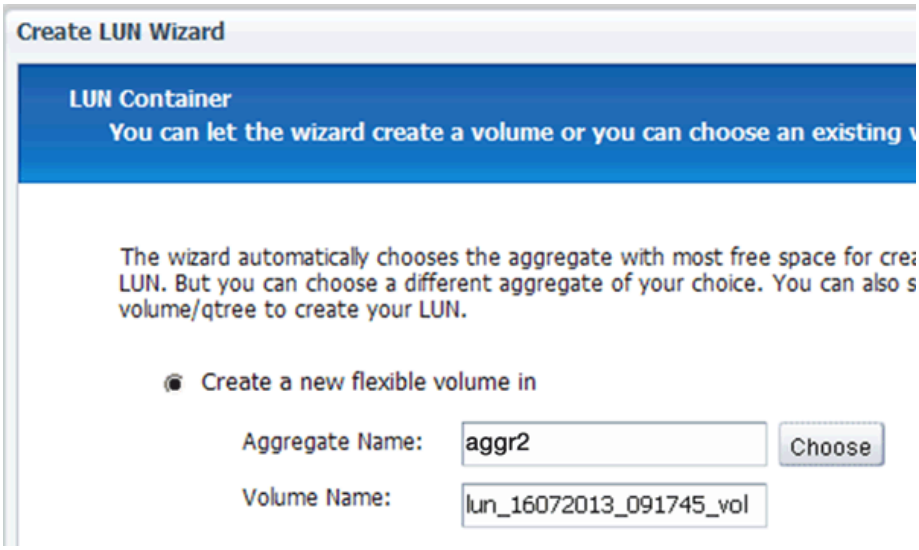
Steps

1. From the OnCommand System Manager home page, double-click the appropriate storage system.
2. Expand the **Storage Virtual Machines** hierarchy in the left navigation pane.
3. In the navigation pane, select the SVM, and then click **Storage > LUNs**.
4. In the **LUN Management** tab, click **Create**, and then type or select information as prompted by the wizard.
5. On the **General Properties** page, select the LUN type **Windows 2008 or later** for LUNs used directly by the Windows host, or select **Hyper-V** for LUNs containing VHDs for Hyper-V virtual machines.

   Leave the **Thin Provisioned** check box unselected.



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



7. 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.
8. Confirm the details, and then click **Finish** to complete the wizard.

Related information

Clustered Data ONTAP 8.3 System Administration Guide

Configuring iSCSI and creating a LUN on an existing SVM

You can configure iSCSI on an existing Storage Virtual Machine (SVM) and create a LUN and its containing volume with a single wizard. The iSCSI protocol must already be enabled but not configured on the SVM. This information is intended for SVMs for which you are configuring multiple protocols, but have not yet configured iSCSI.

Before you begin

You must have enough network addresses available to create two LIFs for each node.

About this task

Starting with clustered Data ONTAP 8.3, LUNs are mapped to a subset of the initiators in the igroup to limit the number of paths from the host to the LUN.

- By default, Data ONTAP 8.3 uses Selective LUN Map to make the LUN accessible only through paths on the node owning the LUN and its HA partner.

- You still must configure all of the iSCSI LIFs on every node for LUN mobility in case the LUN is moved to another node in the cluster.
- When moving a volume or a LUN, you must modify the Selective LUN Map reporting-nodes list before moving.

Steps

1. In the navigation pane, expand the **Storage Virtual Machines** hierarchy and select the SVM.
2. In the SVM **Details** pane, verify that **iSCSI** is displayed with a gray background, which indicates that the protocol is enabled but not fully configured.

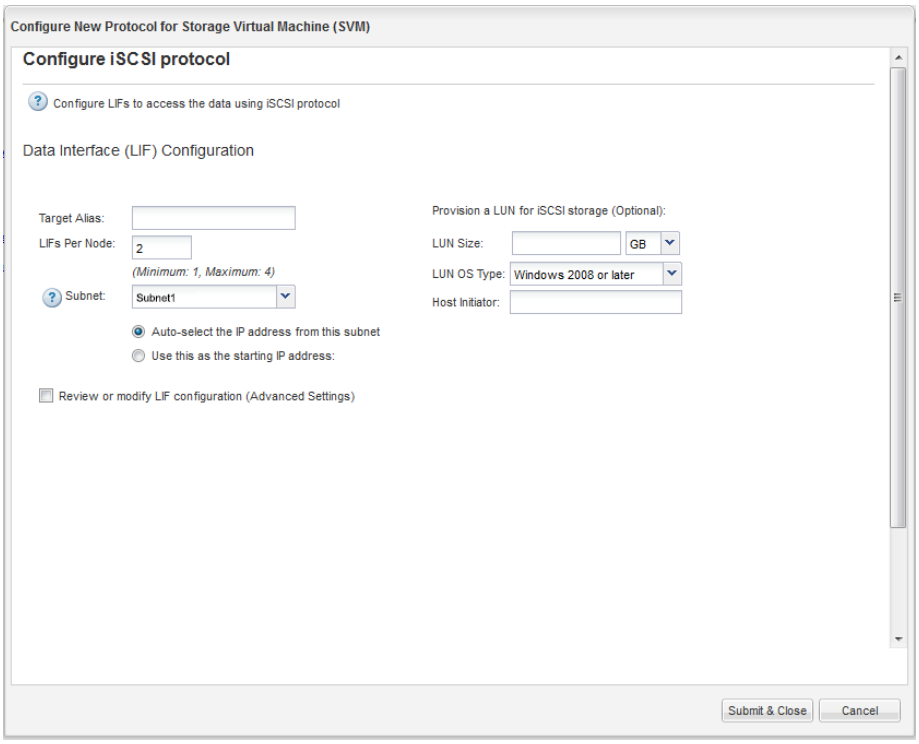
   If **iSCSI** is displayed with a green background, the SVM is already configured.

3. Click the **iSCSI** protocol link with the gray background.

   The Configure iSCSI Protocol window is displayed.
4. Configure the iSCSI service and LIFs from the **Configure iSCSI protocol** page:
   a. Optional: Enter a target alias name.
   b. Enter **2** in the **LIFs per node** field.

      Two LIFs are required for each node, to ensure availability and data mobility.
   c. Select the subnet for the LIFs.
   d. In the **Provision a LUN for iSCSI storage** area, enter the desired LUN size, host type, and iSCSI initiator name of the host.
   e. Click **Submit & Close**.

Example



5. Review the **Summary** page, record the LIF information, and then click **OK**.

Creating a new SVM

The Storage Virtual Machine (SVM) provides the iSCSI target through which a host accesses LUNs. When you create the SVM, you also create logical interfaces (LIFs) and the LUN and its containing volume. You can create a new SVM to separate data or administration from other users of the storage cluster.

Before you begin

- You must have enough network addresses available to create two LIFs for each node.

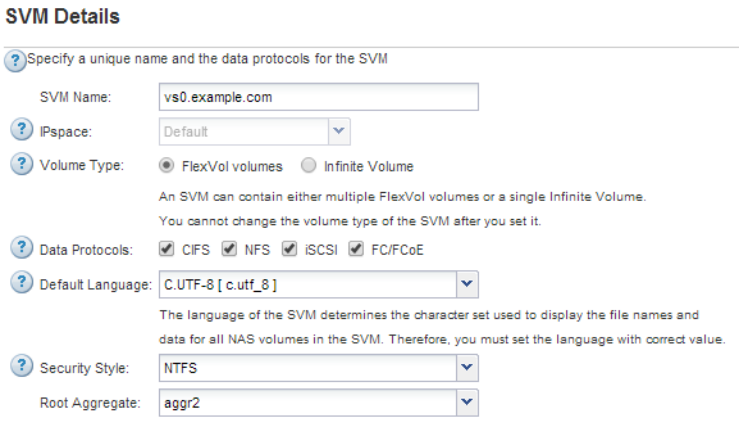
About this task

Starting with clustered Data ONTAP 8.3, LUNs are mapped to a subset of the initiators in the igroup to limit the number of paths from the host to the LUN.

- By default, Data ONTAP 8.3 uses Selective LUN Map to make the LUN accessible only through paths on the node owning the LUN and its HA partner.
- You still must configure all of the iSCSI LIFs on every node for LUN mobility in case the LUN is moved to another node in the cluster.
- When moving a volume or a LUN, you must modify the Selective LUN Map reporting-nodes list before moving.

Steps

1. Expand the **Storage Virtual Machines** hierarchy in the left navigation pane.
2. Click **Create**.
3. In the **Storage Virtual Machine (SVM) Setup** window, create the SVM:



a. Specify a unique name for the SVM.

   The name must either be a fully qualified domain name (FQDN) or follow another convention that ensures unique names across a cluster.

b. Select the IPspace that the SVM will belong to.

   If the cluster does not use multiple IPspaces, the “Default” IPspace is used.

c. Keep the default volume type selection.

   Only FlexVol volumes are supported with SAN protocols.

d. Select all of the protocols that you have licenses for and that you will ever use on the SVM, even if you do not want to configure all of the protocols immediately.

   Selecting both NFS and CIFS when you create the SVM enables these two protocols to share the same LIFs. Adding these protocols later does not allow them to share LIFs.

   If CIFS is one of the protocols you selected, then the security style is set to NTFS. Otherwise, the security style is set to UNIX.

e. Keep the default language setting C.UTF-8.

f. Select the desired root aggregate to contain the SVM root volume.

   The aggregate for the data volume is selected separately in a later step.

g. Click **Submit & Continue**.

The SVM is created, but protocols are not yet configured.

4. If the **Configure CIFS/NFS protocol** page appears because you enabled CIFS or NFS, click **Skip** and then configure CIFS or NFS later.

5. Configure the iSCSI service and create LIFs, and the LUN and its containing volume from the **Configure iSCSI protocol** page:

   a. Optional: Enter a target alias name.

   b. Select the subnet for the LIFs.

   c. Enter **2** in the **LIFs per node** field.

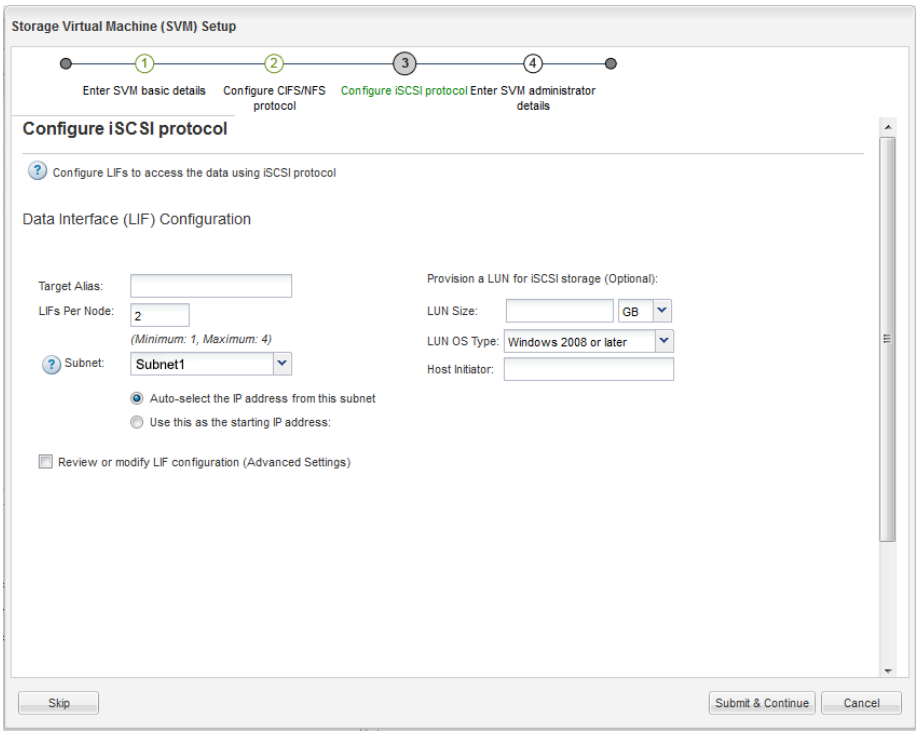
      Two LIFs are required for each node to ensure availability and data mobility.

   d. In the **Provision a LUN for iSCSI storage** area, enter the desired LUN size, host type, and iSCSI initiator name of the host.

e. In the **Provision a LUN for iSCSI storage** area, enter the desired LUN size, host type, and iSCSI initiator name of the host.

f. Click **Submit & Continue**.

Example



6. If the **Configure FC/FCoE protocol** page appears because you enabled FC, click **Skip** and then configure FC later.
7. When the **SVM Administration** appears, configure or defer configuring a separate administrator for this SVM:
   - Click **Skip** and configure an administrator later if desired.
   - Enter the requested information, and then click **Submit & Continue**.
8. Review the **Summary** page, record the LIF information, and then click **OK**.

Related information

NetApp Documentation: Clustered Data ONTAP Express Guides

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 by 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 Storage Virtual Machine (SVM) 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 alternate 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.

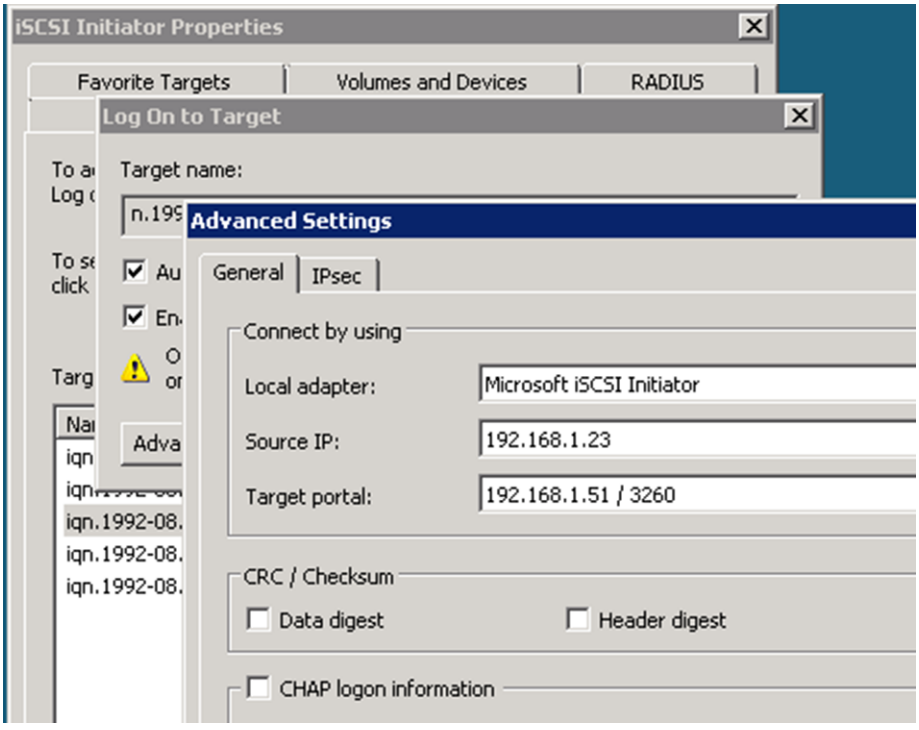
Steps

1. Open the **iSCSI Initiator Properties** dialog box:

For...	Click...
Windows Server 2012	**Server Manager > Dashboard > Tools > iSCSI Initiator**
Windows Server 2008	**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 target 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**.

   The following example is from Windows Server 2008:



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**.

8. On the **Targets** tab, select the same target again, and then 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 connect to each target LIF that is available.

Discovering new disks

LUNs on your Storage Virtual Machine (SVM) 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.

Steps

1. Open the Windows Computer Management utility:

If you are using...	Navigate to...
Windows Server 2012	**Tools > Computer Management**
Windows Server 2008	**Start > Administrative Tools > Computer Management**

2. Expand the **Storage** node in the navigation tree.
3. Click **Disk Management**.

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 instead.

Steps

1. Start Windows Disk Management.
2. Right-click the LUN, and then 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 storage 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 storage cluster is in production use.

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

Steps

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 storage 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.

   You should see two paths to the storage cluster node on which the LUN is created, and two paths to the partner node.

Where to find additional information

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

All of the following documentation is available:

- *Clustered Data ONTAP 8.3 SAN Configuration Guide*
  Describes supported FC, iSCSI, and FCoE topologies for connecting host computers to storage controllers in clusters.
- *Clustered Data ONTAP 8.3 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.
- *Data ONTAP DSM 4.1 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 2008. It is included with the iSCSI software initiator download files.
- *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 web site for further information.

Related information

Microsoft

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