SAN provisioning

ONTAP 9

NetApp
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SAN provisioning

SAN management overview

The content in this section shows you how to configure and manage SAN environments with the ONTAP command line interface (CLI) and System Manager in ONTAP 9.7 and later releases.

If you are using the classic System Manager (available only in ONTAP 9.7 and earlier), see these topics:

- iSCSI protocol
- FC/FCoE protocol

You can use the iSCSI and FC protocols to provide storage in a SAN environment.

With iSCSI and FC, storage targets are called LUNs (logical units) and are presented to hosts as standard block devices. You create LUNs and then map them to initiator groups (igroups). Initiator groups are tables of FC host WWPs and iSCSI host node names and control which initiators have access to which LUNs.

FC targets connect to the network through FC switches and host-side adapters and are identified by world-wide port names (WWPNs). iSCSI targets connect to the network through standard Ethernet network adapters

(NICs), TCP offload engine (TOE) cards with software initiators, converged network adapters (CNAs) or dedicated host bust adapters (HBAs) and are identified by iSCSI qualified names (IQNs).

Configure switches for FCoE

You must configure your switches for FCoE before your FC service can run over the existing Ethernet infrastructure.

What you'll need

- Your SAN configuration must be supported.

  For more information about supported configurations, see the NetApp Interoperability Matrix Tool.

- A Unified Target Adapter (UTA) must be installed on your storage system.

  If you are using a UTA2, it must be set to `cna` mode.

- A converged network adapter (CNA) must be installed on your host.

Steps

1. Use your switch documentation to configure your switches for FCoE.

2. Use the `dcb show` command to verify that the DCB settings for each node in the cluster have been correctly configured.

   ```
   run -node node1 -command dcb show
   ```

   DCB settings are configured on the switch. Consult your switch documentation if the settings are incorrect.

3. Use the `fcp adapter show` command to verify that the FCoE login is working when the FC target port online status is `true`.

   ```
   cluster1::> fcp adapter show -fields node,adapter,status,state,speed,fabric-
   established,physical-protocol
   ```

   If the FC target port online status is `false`, consult your switch documentation.

Related information

NetApp Interoperability Matrix Tool

NetApp Technical Report 3800: Fibre Channel over Ethernet (FCoE) End-to-End Deployment Guide

Cisco MDS 9000 NX-OS and SAN-OS Software Configuration Guides

Brocade products

System Requirements

Setting up LUNs involves creating a LUN, creating an igroup, and mapping the LUN to the igroup. Your system must meet certain prerequisites before you can set up your LUNs.

- The Interoperability Matrix must list your SAN configuration as supported.

- Your SAN environment must meet the SAN host and controller configuration limits specified in NetApp Hardware Universe for your version of the ONTAP software.

- A supported version of Host Utilities must be installed.

  The Host Utilities documentation provides more information.

- You must have SAN LIFs on the LUN owning node and the owning node's HA partner.

Related information

NetApp Interoperability Matrix Tool

ONTAP SAN Host Configuration

NetApp Technical Report 4017: Fibre Channel SAN Best Practices

What to know before you create a LUN

Why actual LUN sizes slightly vary

You should be aware of the following regarding the size of your LUNs.

- When you create a LUN , the actual size of the LUN might vary slightly based on the OS type of the LUN. The LUN OS type cannot be modified after the LUN is created.

- If you create a LUN at the max 16 TB size, be aware that the actual size of the LUN might be slightly less. ONTAP rounds down the limit to be slightly less.

- The metadata for each LUN requires approximately 64 KB of space in the containing aggregate. When you create a LUN, you must ensure that the containing aggregate has enough space for the LUN's metadata. If the aggregate does not contain enough space for the LUN's metadata, some hosts might not be able to access the LUN.

Guidelines for assigning LUN IDs

Typically, the default LUN ID begins with 0 and is assigned in increments of 1 for each additional mapped LUN. The host associates the LUN ID with the location and path name of the LUN. The range of valid LUN ID numbers depends on the host. For detailed information, see the documentation provided with your Host Utilities.

Guidelines for mapping LUNs to igroups

- You can map a LUN only once to an igroup.

- You can map a LUN to only one specific initiator through the igroup.

- You can add a single initiator to multiple igroups, but the initiator can be mapped to only one LUN.

- You cannot use the same LUN ID for two LUNs mapped to the same igroup.

- You should use the same protocol type for igroups and port sets.

Verify and add your protocol FC or iSCSI license

Before you can enable block access for a storage virtual machine (SVM) with FC or iSCSI, you must have a license.

Example 1. Steps

System Manager

Verify and add your FC or iSCSI license with ONTAP System Manager (9.7 and later).

1. In System Manager, click **Cluster > Settings > Licenses**

2. If the license is not listed, click **+ Add** and enter the license key.

3. Click **Add**.

CLI

Verify and add your FC or iSCSI license with the ONTAP CLI.

1. Verify that you have a active license for FC or iSCSI.

   ```
   system license show
   ```

   ```
   Package            Type     Description           Expiration
   ----------------   -------  --------------------
   --------------------
    Base              site     Cluster Base License  -
    NFS               site     NFS License           -
    CIFS              site     CIFS License          -
    iSCSI             site     iSCSI License         -
    FCP               site     FCP License           -
   ```

2. If you do not have a active license for FC or iSCSI, add your license code.

   ```
   license add -license-code your_license_code
   ```

= Provision SAN storage for VMware datastores
:toc: macro
:toclevels: 1
:hardbreaks:
:icons: font
:linkattrs:
:relative_path: ./
:imagesdir: /tmp/d20230406-16087-1b22gbx/source/./san-admin/./media/

This procedure creates new LUNs on an existing storage VM which already has the FC or iSCSI protocol configured.

If you need to create a new storage VM and configure the FC or iSCSI protocol, see Configure an SVM for FC or Configure an SVM for iSCSI.

> ⓘ Asymmetric logical unit access (ALUA) is always enabled during LUN creation. You cannot change the ALUA setting.

Beginning with ONTAP 9.8, when you provision storage, QoS is enabled by default. You can disable QoS

or choose a custom QoS policy during the provisioning process or at a later time.

When you have completed this procedure, you can manage VMware datastores with Virtual Storage Console (VSC) for VMware vSphere. Beginning with VSC 7.0, VSC is part of the ONTAP Tools for VMware vSphere virtual appliance, which includes VSC, vStorage APIs for Storage Awareness (VASA) Provider, and Storage Replication Adapter (SRA) for VMware vSphere capabilities.

Be sure to check the NetApp Interoperability Matrix to confirm compatibility between your current ONTAP and VSC releases.

For more information, see TR-4597: VMware vSphere for ONTAP and the documentation for your VSC release.

System Manager

Create LUNs to provide storage with System Manager for ONTAP 9.7 or later.

LUNs appear as disks to the ESXi host.

To set up SAN protocol access for ESXi hosts to datastores using System Manager Classic (for ONTAP 9.7 and earlier releases), see the following topics:

- FC configuration for ESXi using VSC overview
- iSCSI configuration for ESXi using VSC overview

> (i) Asymmetric logical unit access (ALUA) is always enabled during LUN creation. You cannot change the ALUA setting.

Steps

1. In System Manager, click **Storage > LUNs** and then click **Add**.

2. Enter the required information to create the LUN.

3. You can click **More Options** to do any of the following, depending upon your version of ONTAP.

Option	Available beginning with

• Assign QoS policy to LUNs instead of parent volume
 	
   ◦ **More Options > Storage and Optimization**
 	
   ◦ Select **Performance Service Level**.
 	
   ◦ To apply the QoS policy to individual LUNs instead of the entire volume, select **Apply these performance limits enforcements to each LUN**.
 	
      By default, performance limits are applied at the volume level.
	ONTAP 9.10.1

• Create a new initiator group using existing initiator groups 　○ **More Options > HOST INFORMATION** 　○ Select **New initiator group using existing initiator groups**. 　　**NOTE**: The OS type for an igroup containing other igroups cannot be changed after it has been created.	ONTAP 9.9.1
• Add a description to your igroup or host initiator 　The description serves as an alias for the igroup or host initiator. 　○ **More Options > HOST INFORMATION**	ONTAP 9.9.1
• Create your LUN on an existing volume 　By default, a new LUN is created in a new volume. 　○ **More Options > Add LUNs** 　○ Select **Group related LUNs**.	ONTAP 9.9.1
• Disable QoS or choose a custom QoS policy 　○ **More Options > Storage and Optimization** 　○ Select **Performance Service Level**. 　　**NOTE**: In ONTAP 9.9.1 and later, if you select a custom QoS policy, you can also select manual placement on a specified local tier.	ONTAP 9.8

4. For FC, zone your FC switches by WWPN. Use one zone per initiator and include all target ports in each zone.

5. Use Virtual Storage Console (VSC) for VMware vSphere, to discover and initialize the LUN.

6. Verify that the ESXi hosts can write and read data on the LUN.

CLI

Create LUNs to provide storage with the ONTAP CLI.

1. Use the `system license show` command to verify that you have a license for FC or iSCSI.

```
system license show
```

```
Package            Type     Description             Expiration
-----------------  -------  ----------------------  --------------------
Base               site     Cluster Base License    -
NFS                site     NFS License             -
CIFS               site     CIFS License            -
iSCSI              site     iSCSI License           -
FCP                site     FCP License             -
```

2. If you do not have a license for FC or iSCSI, use the `license add` command.

   ```
   license add -license-code your_license_code
   ```

3. Enable your protocol service on the SVM:

   For iSCSI: `vserver iscsi create -vserver vserver_name -target-alias vserver_name`

   For FC: `vserver fcp create -vserver vserver_name -status-admin up`

4. Create two LIFs for the SVMs on each node:

   ```
   network interface create -vserver vserver_name -lif lif_name -role data -data
   -protocol iscsi|fc -home-node node_name -home-port port_name -address
   ip_address -netmask netmask
   ```

   NetApp supports a minimum of one iSCSI or FC LIF per node for each SVM serving data. However, two LIFS per node are required for redundancy.

5. Verify that your LIFs have been created and that their operational status is `online`:

   ```
   network interface show -vserver vserver_name lif_name
   ```

6. Create your LUNs:

   ```
   lun create -vserver vserver_name -volume volume_name -lun lun_name -size
   lun_size -ostype linux -space-reserve enabled|disabled
   ```

   Your LUN name cannot exceed 255 characters and cannot contain spaces.

   ⓘ   The NVFAIL option is automatically enabled when a LUN is created in a volume.

7. Create your igroups:

   ```
   igroup create -vserver vserver_name -igroup igroup_name -protocol
   fcp|iscsi|mixed -ostype linux -initiator initiator_name
   ```

8. Map your LUNs to igroups:

   ```
   lun mapping create -vserver vserver_name -volume volume_name -lun lun_name
   -igroup igroup_name
   ```

9. Verify that your LUNs are configured correctly:

```
lun show -vserver vserver_name
```

10. [Create a port set and bind to an igroup](#) (optional).

11. Follow steps in your host documentation for enabling block access on your specific hosts.

12. Use the Host Utilities to complete the FC or iSCSI mapping and to discover your LUNs on the host.

Related information

[ONTAP SAN Host Configuration](#)
[SAN Administration overview](#)
[View and manage SAN initiator groups in System Manager](#)
[NetApp Technical Report 4017: Fibre Channel SAN Best Practices](#)

= Provision SAN storage for Linux servers
:toc: macro
:toclevels: 1
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:imagesdir: /tmp/d20230406-16087-1b22gbx/source/./san-admin/./media/

This procedure creates new LUNs on an existing storage VM which already has the FC or iSCSI protocol configured.

If you need to create a new storage VM and configure the FC or iSCSI protocol, see [Configure an SVM for FC](#) or [Configure an SVM for iSCSI](#).

LUNs appear to Linux as SCSI disk devices.

> (i) Asymmetric logical unit access (ALUA) is always enabled during LUN creation. You cannot change the ALUA setting.

You must have an FC license and it must be enabled. If the FC license is not enabled, the LIFs and SVMs appear to be online but the operational status is down. The FC service must be enabled for your LIFs and SVMs to be operational. You must use single initiator zoning for all of the FC LIFs in the SVM to host the initiators.

You need to know the initiator identifiers (FC WWPN or iSCSI iqn) for your Linux server.

Beginning with ONTAP 9.8, when you provision storage, QoS is enabled by default. You can disable QoS or choose a custom QoS policy during the provisioning process or at a later time.

System Manager

Create LUNs to provide storage for a Linux server using the FC or iSCSI SAN protocol with ONTAP System Manager (9.7 and later).

To complete this task using System Manager Classic (available with 9.7 and earlier) refer to [iSCSI configuration for Red Hat Enterprise Linux](#)

1. On your Linux server, install the NetApp Linux Host Utilities package.
2. In System Manager, click **Storage > LUNs** and then click **Add**.
3. Enter the required information to create the LUN.
4. You can click **More Options** to do any of the following, depending upon your version of ONTAP.

Option	Available beginning with
• Assign QoS policy to LUNs instead of parent volume ◦ **More Options > Storage and Optimization** ◦ Select **Performance Service Level**. ◦ To apply the QoS policy to individual LUNs instead of the entire volume, select **Apply these performance limits enforcements to each LUN**. By default, performance limits are applied at the volume level.	ONTAP 9.10.1
• Create a new initiator group using existing initiator groups ◦ **More Options > HOST INFORMATION** ◦ Select **New initiator group using existing initiator groups**. NOTE: The OS type for an igroup containing other igroups cannot be changed after it has been created.	ONTAP 9.9.1
• Add a description to your igroup or host initiator The description serves as an alias for the igroup or host initiator. ◦ **More Options > HOST INFORMATION**	ONTAP 9.9.1
• Create your LUN on an existing volume By default, a new LUN is created in a new volume. ◦ **More Options > Add LUNs** ◦ Select **Group related LUNs**.	ONTAP 9.9.1
• Disable QoS or choose a custom QoS policy ◦ **More Options > Storage and Optimization** ◦ Select **Performance Service Level**. NOTE: In ONTAP 9.9.1 and later, if you select a custom QoS policy, you can also select manual placement on a specified local tier.	ONTAP 9.8

5. For FC, zone your FC switches by WWPN. Use one zone per initiator and include all target ports in each zone.

6. On your Linux server, discover the new LUNs:

```
/usr/bin/rescan-scsi-bus.sh
```

> ⓘ Optionally partition the LUNs and create file systems.

7. Verify the Linux server can write and read data on the LUN.

CLI

Create LUNs to provide storage for a Linux server using the FC or iSCSI SAN protocol with ONTAP CLI.

1. Use the `system license show` command to verify that you have a license for FC or iSCSI.

```
system license show
```

```
Package           Type    Description            Expiration
---------------- ------- -------------------- --------------------
Base              site    Cluster Base License  -
NFS               site    NFS License           -
CIFS              site    CIFS License          -
iSCSI             site    iSCSI License         -
FCP               site    FCP License           -
```

2. If you do not have a license for FC or iSCSI, use the `license add` command.

```
license add -license-code your_license_code
```

3. Enable your protocol service on the SVM:

   For iSCSI: `vserver iscsi create -vserver vserver_name -target-alias vserver_name`

   For FC: `vserver fcp create -vserver vserver_name -status-admin up`

4. Create two LIFs for the SVMs on each node:

```
network interface create -vserver vserver_name -lif lif_name -role data -data
-protocol iscsi|fc -home-node node_name -home-port port_name -address
ip_address -netmask netmask
```

   NetApp supports a minimum of one iSCSI or FC LIF per node for each SVM serving data. However, two LIFS per node are required for redundancy.

5. Verify that your LIFs have been created and that their operational status is `online`:

```
network interface show -vserver vserver_name lif_name
```

6. Create your LUNs:

```
lun create -vserver vserver_name -volume volume_name -lun lun_name -size
lun_size -ostype linux -space-reserve enabled|disabled
```

Your LUN name cannot exceed 255 characters and cannot contain spaces.

> ℹ️ The NVFAIL option is automatically enabled when a LUN is created in a volume.

7. Create your igroups:

```
igroup create -vserver vserver_name -igroup igroup_name -protocol
fcp|iscsi|mixed -ostype linux -initiator initiator_name
```

8. Map your LUNs to igroups:

```
lun mapping create -vserver vserver_name -volume volume_name -lun lun_name
-igroup igroup_name
```

9. Verify that your LUNs are configured correctly:

```
lun show -vserver vserver_name
```

10. Create a port set and bind to an igroup (optional).

11. Follow steps in your host documentation for enabling block access on your specific hosts.

12. Use the Host Utilities to complete the FC or iSCSI mapping and to discover your LUNs on the host.

Related information

SAN Administration overview
ONTAP SAN Host Configuration
View and manage SAN initiator groups in System Manager
NetApp Technical Report 4017: Fibre Channel SAN Best Practices

= Provision SAN storage for Windows servers
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:imagesdir: /tmp/d20230406-16087-1b22gbx/source/./san-admin/./media/

This procedure creates new LUNs on an existing storage VM which already has the FC or iSCSI protocol configured.

If you need to create a new storage VM and configure the FC or iSCSI protocol, see Configure an SVM for FC or Configure an SVM for iSCSI.

LUNs appear as disks to the Windows host.

> ℹ️ Asymmetric logical unit access (ALUA) is always enabled during LUN creation. You cannot change the ALUA setting.

Beginning with ONTAP 9.8, when you provision storage, QoS is enabled by default. You can disable QoS or choose a custom QoS policy during the provisioning process or at a later time.

System Manager

Create LUNs to provide storage for a Windows server using the FC or iSCSI SAN protocol with ONTAP System Manager (9.7 and later)

To complete this task using System Manager Classic (available with 9.7 and earlier) refer to iSCSI configuration for Windows

Steps

1. On your Windows server, install the native DSM for Windows MPIO.
2. In System Manager, click **Storage > LUNs** and then click **Add**.
3. Enter the required information to create the LUN.
4. You can click **More Options** to do any of the following, depending upon your version of ONTAP.

Option	Available beginning with
• Assign QoS policy to LUNs instead of parent volume ◦ **More Options > Storage and Optimization** ◦ Select **Performance Service Level**. ◦ To apply the QoS policy to individual LUNs instead of the entire volume, select **Apply these performance limits enforcements to each LUN**. By default, performance limits are applied at the volume level.	ONTAP 9.10.1
• Create a new initiator group using existing initiator groups ◦ **More Options > HOST INFORMATION** ◦ Select **New initiator group using existing initiator groups**. **NOTE**: The OS type for an igroup containing other igroups cannot be changed after it has been created.	ONTAP 9.9.1
• Add a description to your igroup or host initiator The description serves as an alias for the igroup or host initiator. ◦ **More Options > HOST INFORMATION**	ONTAP 9.9.1
• Create your LUN on an existing volume By default, a new LUN is created in a new volume. ◦ **More Options > Add LUNs** ◦ Select **Group related LUNs**.	ONTAP 9.9.1

	ONTAP 9.8

• Disable QoS or choose a custom QoS policy
 	
   ◦ **More Options > Storage and Optimization**
 	
   ◦ Select **Performance Service Level**.
 	
   NOTE: In ONTAP 9.9.1 and later, if you select a custom QoS policy, you can also select manual placement on a specified local tier.	

5. For FC, zone your FC switches by WWPN. Use one zone per initiator and include all target ports in each zone.

6. On your Windows server, discover the new LUN.

7. Initialize the LUN and optionally format it with a file system.

8. Verify the Windows server can write and read data on the LUN.

CLI

Create LUNs to provide storage for a Windows server using the FC or iSCSI SAN protocol with the ONTAP CLI.

1. Use the `system license show` command to verify that you have a license for FC or iSCSI.

```
system license show
```

```
 Package           Type     Description           Expiration
 ----------------  -------  --------------------  --------------------
 Base              site     Cluster Base License  -
 NFS               site     NFS License           -
 CIFS              site     CIFS License          -
 iSCSI             site     iSCSI License         -
 FCP               site     FCP License           -
```

2. If you do not have a license for FC or iSCSI, use the `license add` command.

```
license add -license-code your_license_code
```

3. Enable your protocol service on the SVM:

   For iSCSI: `vserver iscsi create -vserver vserver_name -target-alias vserver_name`

   For FC: `vserver fcp create -vserver vserver_name -status-admin up`

4. Create two LIFs for the SVMs on each node:

```
network interface create -vserver vserver_name -lif lif_name -role data -data
-protocol iscsi|fc -home-node node_name -home-port port_name -address
ip_address -netmask netmask
```

   NetApp supports a minimum of one iSCSI or FC LIF per node for each SVM serving data. However, two

LIFS per node are required for redundancy.

5. Verify that your LIFs have been created and that their operational status is `online`:

   ```
   network interface show -vserver vserver_name lif_name
   ```

6. Create your LUNs:

   ```
   lun create -vserver vserver_name -volume volume_name -lun lun_name -size
   lun_size -ostype linux -space-reserve enabled|disabled
   ```

   Your LUN name cannot exceed 255 characters and cannot contain spaces.

   (i) | The NVFAIL option is automatically enabled when a LUN is created in a volume.

7. Create your igroups:

   ```
   igroup create -vserver vserver_name -igroup igroup_name -protocol
   fcp|iscsi|mixed -ostype linux -initiator initiator_name
   ```

8. Map your LUNs to igroups:

   ```
   lun mapping create -vserver vserver_name -volume volume_name -lun lun_name
   -igroup igroup_name
   ```

9. Verify that your LUNs are configured correctly:

   ```
   lun show -vserver vserver_name
   ```

10. Create a port set and bind to an igroup (optional).
11. Follow steps in your host documentation for enabling block access on your specific hosts.
12. Use the Host Utilities to complete the FC or iSCSI mapping and to discover your LUNs on the host.

Related information

= Provision SAN storage
:toc: macro
:toclevels: 1
:hardbreaks:
:icons: font
:linkattrs:
:relative_path: ./san-admin/
:imagesdir: /tmp/d20230406-16087-1b22gbx/source/./san-admin/./media/

If a procedure for your specific host is not available, you can use these steps to provision storage for any support SAN host.

This procedure creates new LUNs on an existing storage VM which already has the FC or iSCSI protocol configured.

If you need to create a new storage VM and configure the FC or iSCSI protocol, see [Configure an SVM for FC](#) or [Configure an SVM for iSCSI](#).

If the FC license is not enabled, the LIFs and SVMs appear to be online but the operational status is down.

LUNs appear to your host as disk devices.

> ⓘ Asymmetric logical unit access (ALUA) is always enabled during LUN creation. You cannot change the ALUA setting.

You must use single initiator zoning for all of the FC LIFs in the SVM to host the initiators.

Unresolved directive in san-admin/provision-storage.adoc - include::_include/98_qos_enabled_by_default.adoc[]

System Manager

Create LUNs to provide storage for a SAN host using the FC or iSCSI protocol with ONTAP System Manager (9.7 and later).

To complete this task using System Manager Classic (available with 9.7 and earlier) refer to [iSCSI configuration for Red Hat Enterprise Linux](#)

Steps

1. Install the appropriate [SAN host utilities](#) on your host.

2. In System Manager, click **Storage > LUNs** and then click **Add**.

3. Enter the required information to create the LUN.

Unresolved directive in san-admin/provision-storage.adoc -

include::_include/san_add_lun_more_options.adoc[]

5. For FC, zone your FC switches by WWPN. Use one zone per initiator and include all target ports in each zone.

6. Discover LUNs on your host.

7. Verify that the host can write and read data on the LUN.

CLI

Create LUNs to provide storage for a SAN host using the FC or iSCSI protocol with the ONTAP CLI.

1. Use the `system license show` command to verify that you have a license for FC or iSCSI.

   ```
   system license show
   ```

   ```
   Package            Type    Description            Expiration
   -----------------  ------- --------------------   --------------------
   Base               site    Cluster Base License   -
   NFS                site    NFS License            -
   CIFS               site    CIFS License           -
   iSCSI              site    iSCSI License          -
   FCP                site    FCP License            -
   ```

2. If you do not have a license for FC or iSCSI, use the `license add` command.

   ```
   license add -license-code your_license_code
   ```

3. Enable your protocol service on the SVM:

   For iSCSI: `vserver iscsi create -vserver vserver_name -target-alias vserver_name`

   For FC: `vserver fcp create -vserver vserver_name -status-admin up`

4. Create two LIFs for the SVMs on each node:

   ```
   network interface create -vserver vserver_name -lif lif_name -role data -data
   -protocol iscsi|fc -home-node node_name -home-port port_name -address
   ip_address -netmask netmask
   ```

   NetApp supports a minimum of one iSCSI or FC LIF per node for each SVM serving data. However, two LIFS per node are required for redundancy.

5. Verify that your LIFs have been created and that their operational status is `online`:

   ```
   network interface show -vserver vserver_name lif_name
   ```

6. Create your LUNs:

   ```
   lun create -vserver vserver_name -volume volume_name -lun lun_name -size
   lun_size -ostype linux -space-reserve enabled|disabled
   ```

Your LUN name cannot exceed 255 characters and cannot contain spaces.

> ⓘ | The NVFAIL option is automatically enabled when a LUN is created in a volume.

7. Create your igroups:

   ```
   igroup create -vserver vserver_name -igroup igroup_name -protocol
   fcp|iscsi|mixed -ostype linux -initiator initiator_name
   ```

8. Map your LUNs to igroups:

   ```
   lun mapping create -vserver vserver_name -volume volume_name -lun lun_name
   -igroup igroup_name
   ```

9. Verify that your LUNs are configured correctly:

   ```
   lun show -vserver vserver_name
   ```

10. Create a port set and bind to an igroup (optional).

11. Follow steps in your host documentation for enabling block access on your specific hosts.

12. Use the Host Utilities to complete the FC or iSCSI mapping and to discover your LUNs on the host.

Related information

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