Set up namespaces for NVMe

ONTAP 9

NetApp
November 04, 2021

Table of Contents

Set up namespaces for NVMe

NVMe namespaces considerations

To set up the NVMe protocol in your SAN environment, you must configure an SVM for NVMe, create namespaces and subsystems, configure an NVMe/FC LIF, and then map the namespaces to the subsystems. There are certain considerations you should be aware of when working with NVMe namespaces.

- If you lose data in a LUN, it cannot be restored from a namespace, or vice versa.
- The space guarantee for namespaces is the same as the space guarantee of the containing volume.
- Beginning with ONTAP 9.6, namespaces support 512 byte blocks and 4096 byte blocks.

  4096 is the default value. 512 should only be used if the host operating system does not support 4096 byte blocks.

- Namespaces do not support the following:
  - Renaming

    You cannot rename a namespace.

  - Resizing

    You cannot increase or decrease the size of a namespace.

  - Inter-volume move
  - Inter-volume copy

Configure an SVM for NVMe

If you want to use the NVMe protocol on a node, you must configure your SVM specifically for NVMe.

What you'll need

Your FC or Ethernet adapters must support NVMe. Supported adapters are listed in the NetApp Hardware Universe.

Steps

1. If you do not want to use an existing SVM, create one:

   `vserver create -vserver` *`SVM_name`*

   a. Verify that the SVM is created:

      `vserver show`

2. Verify that you have NVMe or TCP capable adapters installed in your cluster:

   For NVMe: `network fcp adapter show -data-protocols-supported fc-nvme`

For TCP: `network port show`

3. If you are running ONTAP 9.7 or earlier, remove all protocols from the SVM:

   `vserver remove-protocols -vserver SVM_name -protocols iscsi,fcp,nfs,cifs,ndmp`

   Beginning in ONTAP 9.8, it is not necessary to remove other protocols when adding NVMe.

4. Add the NVMe protocol to the SVM:

   `vserver add-protocols -vserver SVM_name -protocols nvme`

5. If you are running ONTAP 9.7 or earlier, verify that NVMe is the only protocol allowed on the SVM:

   `vserver show -vserver SVM_name -fields allowed-protocols`

   NVMe should be the only protocol displayed under the `allowed protocols` column.

6. Create the NVMe service:

   `vserver nvme create -vserver SVM_name`

7. Verify that the NVMe service was created:

   `vserver nvme show -vserver SVM_name`

   The `Administrative Status` of the SVM should be listed as `up`.

8. Create an NVMe/FC LIF:

ONTAP version	Applicable protocols	Command
ONTAP 9.9.1 or earlier	FC	`network interface create -vserver SVM_name -lif lif_name -role data -data -protocol fc-nvme -home -node home_node -home -port home_port`

ONTAP version	Applicable protocols	Command
ONTAP 9.10.1	FC or TCP	`network interface create -vserver SVM_name -lif lif_name -service-policy {default-data-nvme-tcp | default-data-nvme-fc} -home-node home_node -home-port home_port -status admin up -failover-policy disabled -firewall-policy data -auto-revert false -failover-group failover_group -is-dns -update-enabled false`

9. Create an NVMe/FC LIF on the HA partner node:

ONTAP version	Applicable protocols	Command
ONTAP 9.9.1 or earlier	FC	`network interface create -vserver SVM_name -lif lif_name -role data -data -protocol fc-nvme -home -node home_node -home -port home_port`
ONTAP 9.10.1 or later	FC or TCP	`network interface create -vserver SVM_name -lif lif_name -service-policy {default-data-nvme-tcp | default-data-nvme-fc} -home-node home_node -home-port home_port -status admin up -failover-policy disabled -firewall-policy data -auto-revert false -failover-group failover_group -is-dns -update-enabled false`

10. Verify the NVMe/FC LIFs were created:

    `network interface show -vserver SVM_name`

11. Create volume on the same node as the LIF:

    `vol create -vserver SVM_name -volume vol_name -aggregate aggregate_name -size`

volume_size

If a warning message is displayed about the auto efficiency policy, it can be safely ignored.

Create an NVMe namespace and subsystem

For systems using the NVMe protocol, you must create one or more NVMe namespaces and subsystems. Each namespace can then be mapped to an NVMe subsystem to allow data access from your host system.

What you'll need

The SVM must already be configured for NVMe.

Steps

1. Verify that the SVM is configured for NVMe:

   `vserver show -vserver` *`SVM_name`* `-fields allowed-protocols`

   `NVMe` should be displayed under the `allowed-protocols` column.

2. Create the NVMe namespace:

   `vserver nvme namespace create -vserver` *`SVM_name`* `-path` *`path`* `-size` *`size_of_namespace`* `-ostype` *`OS_type`*

3. Create the NVMe subsystem:

   `vserver nvme subsystem create -vserver` *`SVM_name`* `-subsystem` *`name_of_subsystem`* `-ostype` *`OS_type`*

4. Verify that the subsystem was created:

   `vserver nvme subsystem show -vserver` *`SVM_name`*

   The `nvme` subsystem should be displayed under the `Subsystem` column.

Map an NVMe namespace to a subsystem

You must map a namespace to a subsystem when using NVMe.

What you'll need

- You must have configured an SVM for NVMe.
- You must have created an NVMe namespace and subsystem.

About this task

A namespace can only be mapped to a single subsystem.

Steps

1. Obtain the NQN from the host.

2. Add the host NQN to the subsystem:

   ```
   vserver nvme subsystem host add -vserver SVM_name -subsystem subsystem_name
   -host-nqn Host_NQN:subsystem.subsystem_name
   ```

3. Map the namespace to the subsystem:

   ```
   vserver nvme subsystem map add -vserver SVM_name -subsystem subsystem_name
   -path path
   ```

4. Verify that the namespace is mapped to the subsystem:

   ```
   vserver nvme namespace show -vserver SVM_name -instance
   ```

   The subsystem should be listed as the `Attached subsystem`.