# Module 7: Data Access

## Exercise 1: Configuring the NFS Protocol in a Storage VM

In this exercise, you use best practice tools to create a simple NFS server in a storage VM (storage virtual machine, also known as SVM).

## Objectives

This exercise focuses on enabling you to do the following:

- Configure a storage VM to host the NFS protocol
- Access an NFS export from a Linux client

## Case Study

It might be a long time before the IT staff can fully integrate the authentication domain of Dwurgle Enterprises with Zarrot Industries. In the meantime, the easiest way to enable Dwurgle employees to access the NetApp system is to create a storage VM that uses the Dwurgle domain to authenticate user identities.

You create a storage VM for Dwurgle and enable the NFS access protocol.

You create an NFS exported directory and verify that Dwurgle client hosts can access the directory.

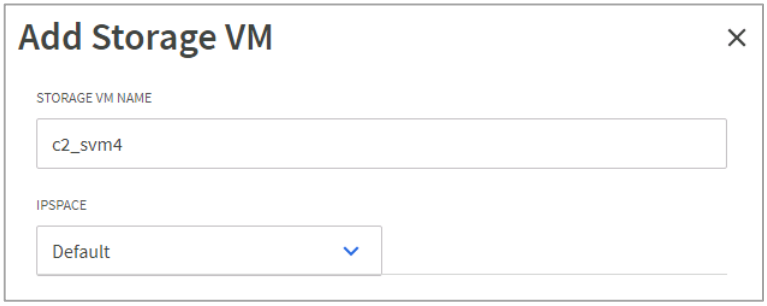
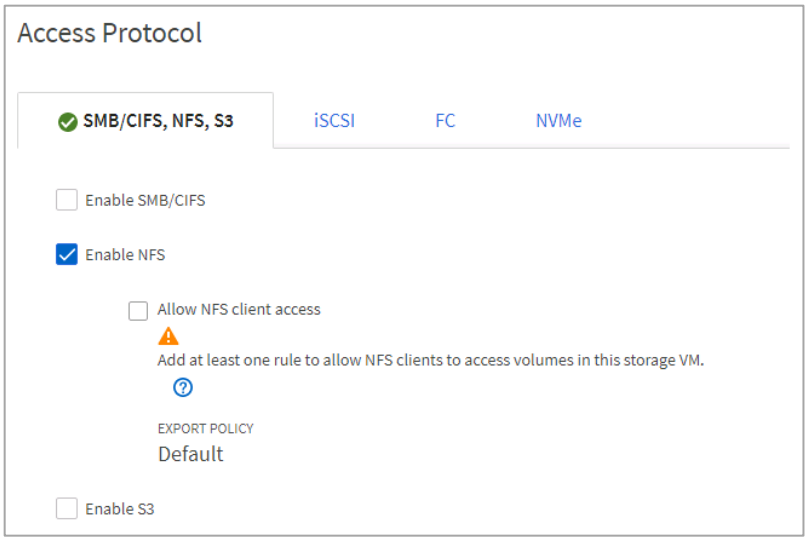
## Lab Equipment

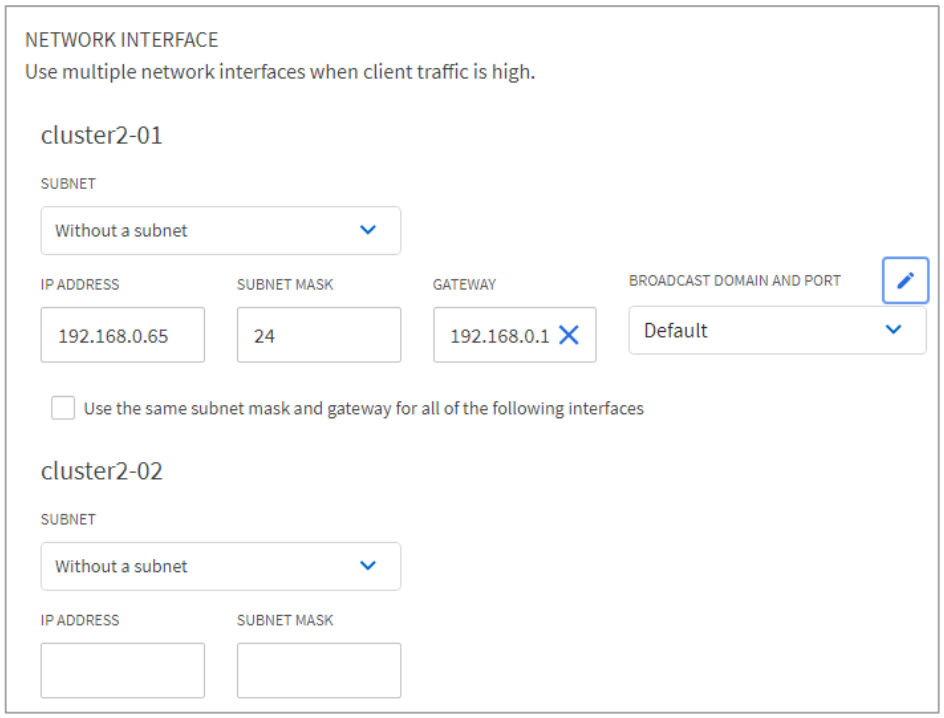
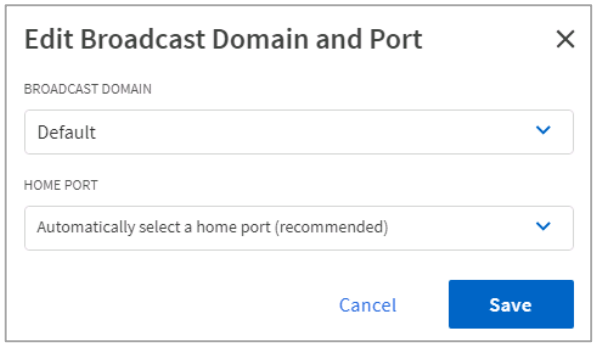
Use the following equipment to complete the exercise:

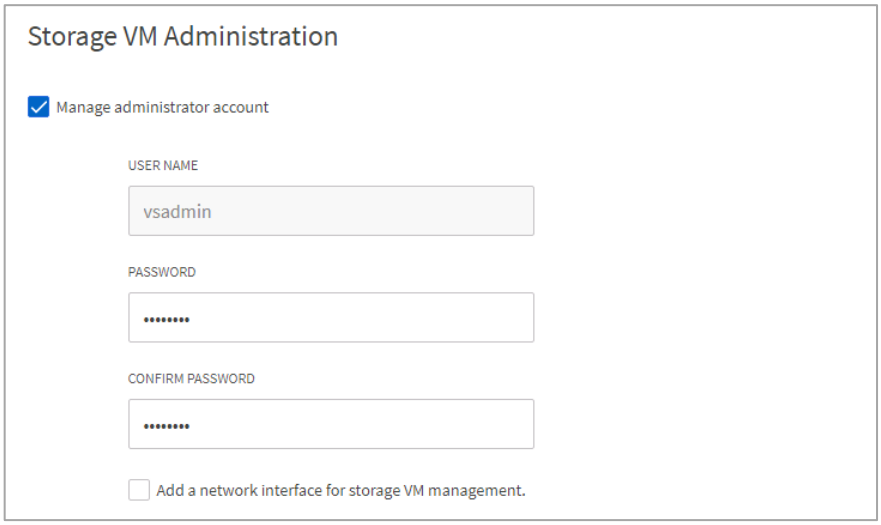
| System | Host Name | IP Addresses | User Name | Password |
|---|---|---|---|---|
| Windows Server | jumphost | 192.168.0.5 | DEMO\Administrator | Netapp1! |
| ONTAP cluster-management LIF (cluster2) | cluster2 | 192.168.0.102 | admin (case-sensitive) | Netapp1! |
| CentOS 8 Server | centos8 | 192.168.0.61 | root (case sensitive) | Netapp1! |

## Task 1: Create a Storage VM to Host the NFS Protocol

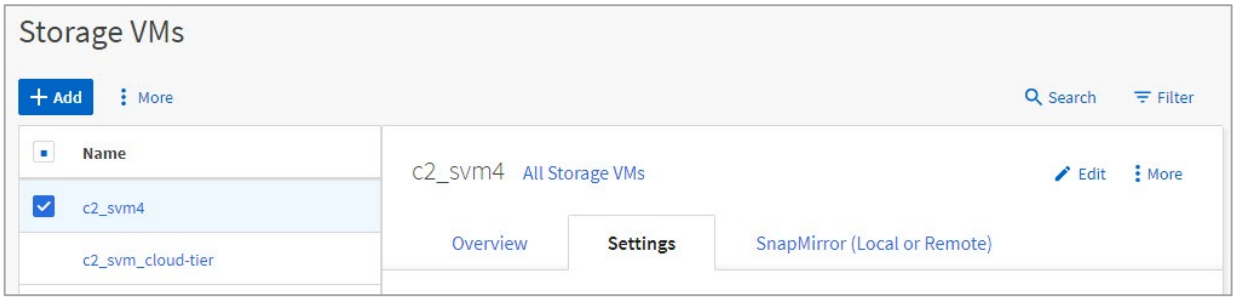
| Step | Action |
|---|---|
| **1-1** | Log in to NetApp ONTAP System Manager for **cluster2**. |
| **1-2** | From the System Manager Dashboard menu, select **Storage > Storage VMs**. |
| **1-3** | Click **Add**. |

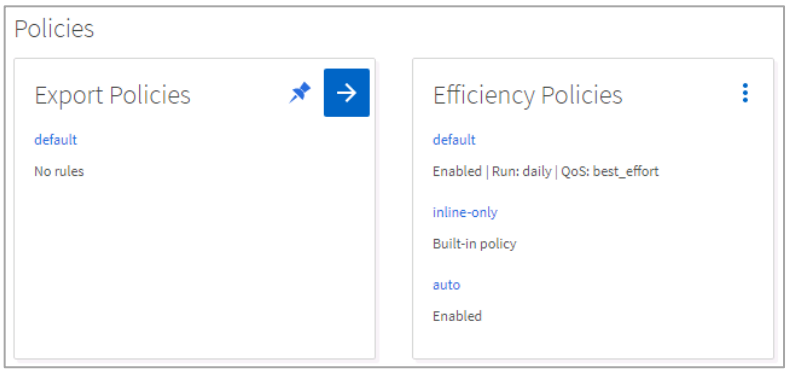
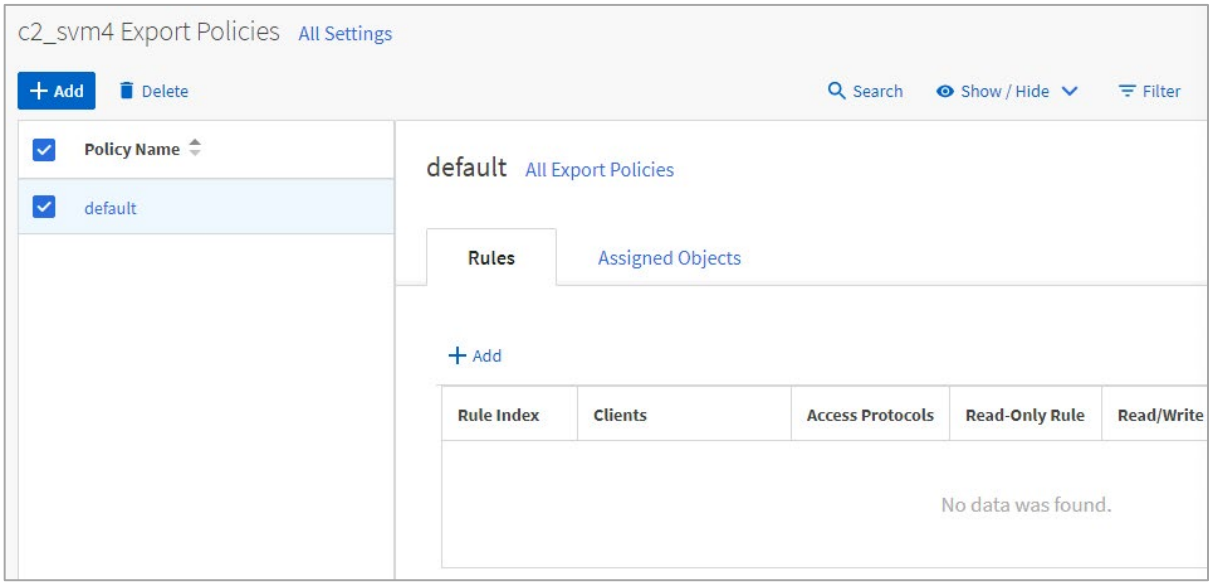
| Step | Action |
|---|---|
| 1-4 | On the Add Storage VM page, specify the following settings:<br>• Storage VM name: **c2_svm4**<br>• IPspace: **Default** (default)<br>  |
| 1-5 | In the Access Protocol section, select the **Enable NFS** checkbox.<br>  |
| 1-6 | The Default export policy does not permit client access. You create an export policy later to grant access. |
| 1-7 | Do not change the default language.<br>  |

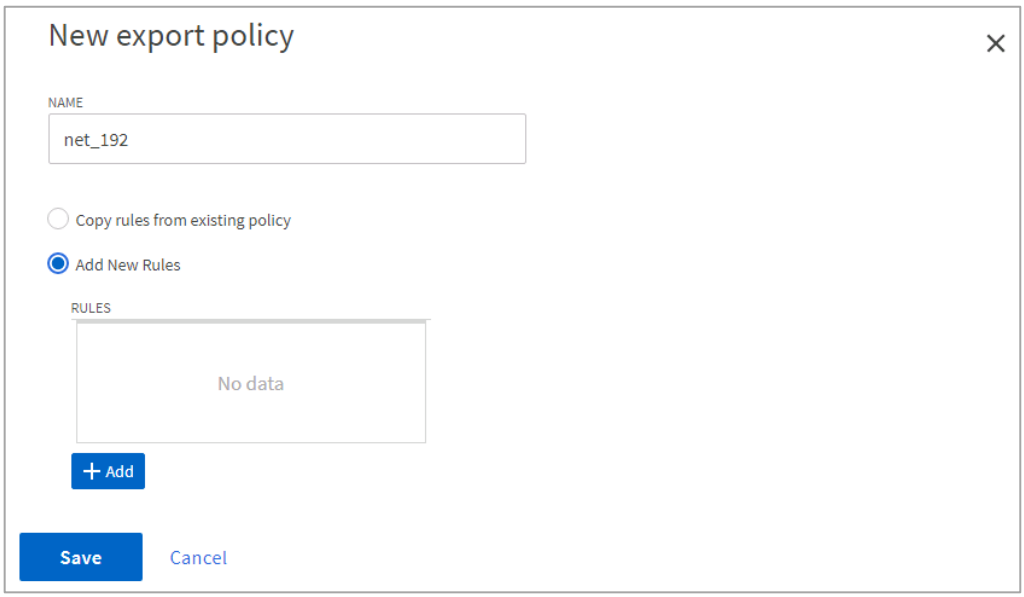
| Step | Action |
|---|---|
| 1-8 | In the Network Interface section, specify the following settings:<br>• Subnet: **Without a subnet** (default)<br>• IP address: **192.168.0.65**<br>• Subnet mask: **24**<br>• Gateway: **192.168.0.1** (default)<br>  |
| 1-9 | Click the **Edit** (pencil) icon next to Broadcast Domain and Port. |
| 1-10 | Click **Cancel** to accept the default settings and dismiss the Edit Broadcast Domain and Port window.<br>  |

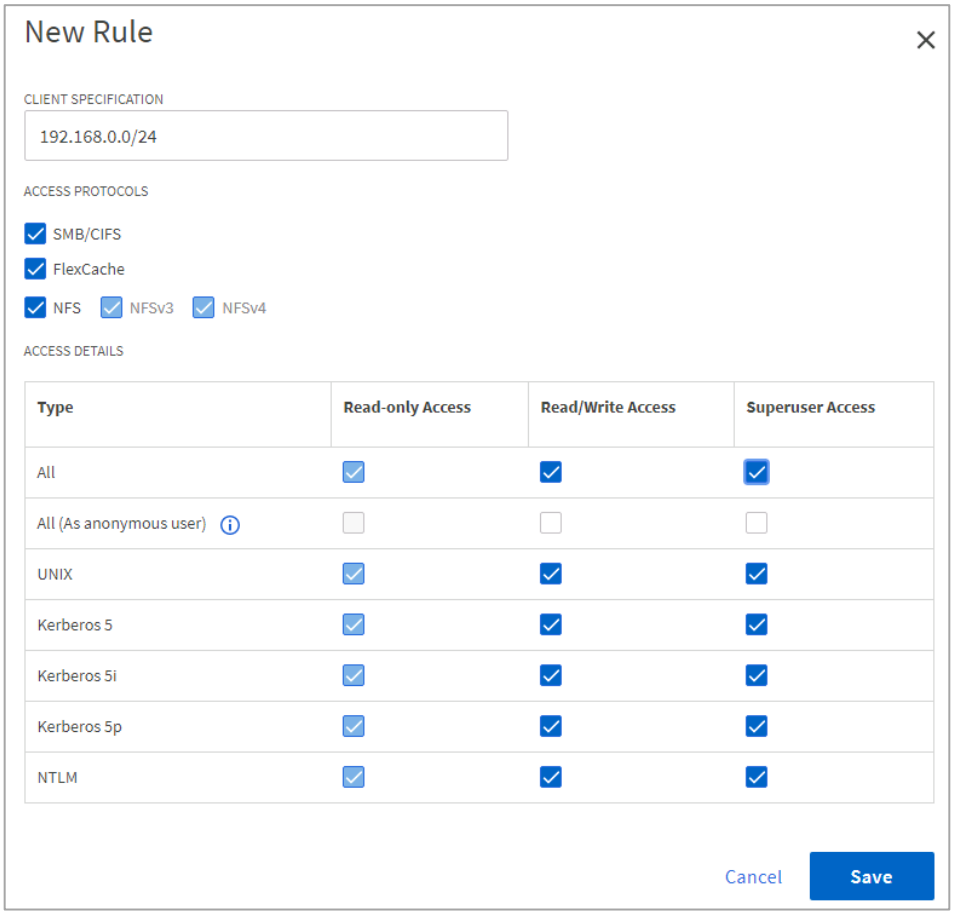
| Step | Action |
|---|---|
| 1-11 | In the Storage VM Administration section, select the **Manage administrator account** checkbox and specify the following settings:<br>• User Name: **vsadmin** (default)<br>• Password and Confirm Password: **Netapp1!**<br>• Add a network interface for storage VM management: **<not selected>** (default)<br>  |
| 1-12 | Review the configuration, and then click **Save**. |

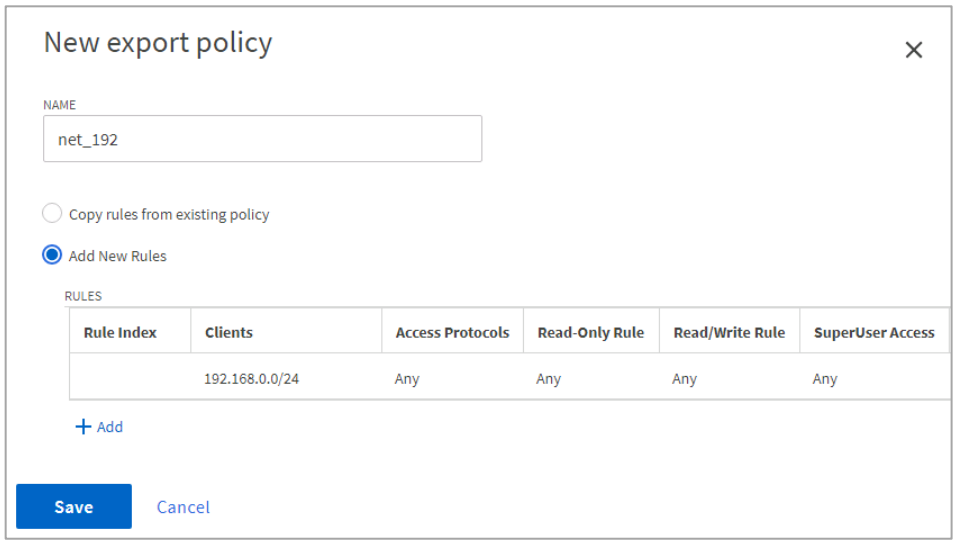
## Task 2: Create a Storage VM Export Policy

| Step | Action |
|---|---|
| 2-1 | From the list of storage VMs, click **c2_svm4**. |
| 2-2 | On the c2_svm4 details page, click the **Settings** tab.<br>  |

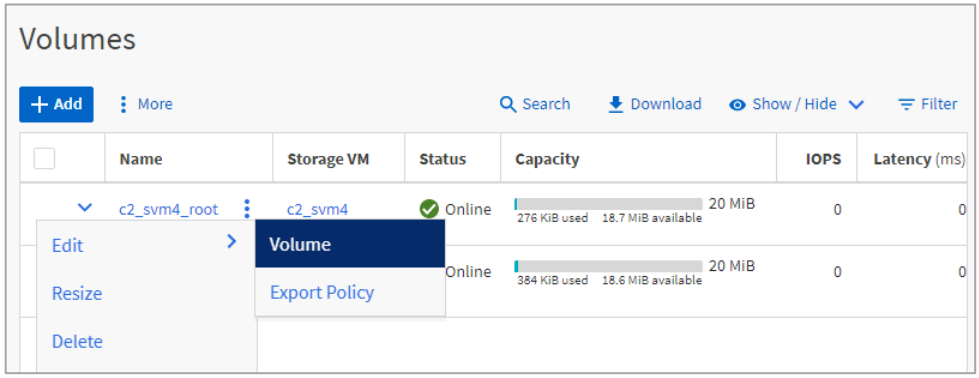
| Step | Action |
|---|---|
| 2-3 | In the Export Policies pane, click the arrow.<br>  |
| 2-4 | In the Policy Name section, select **default**, and then click the **Rules** tab and note that the default export policy contains no rules that grant access to client hosts.<br>  |
| 2-5 | In the upper left of the Export Polices page, click the **Add** button to create a new export policy.<br>  |

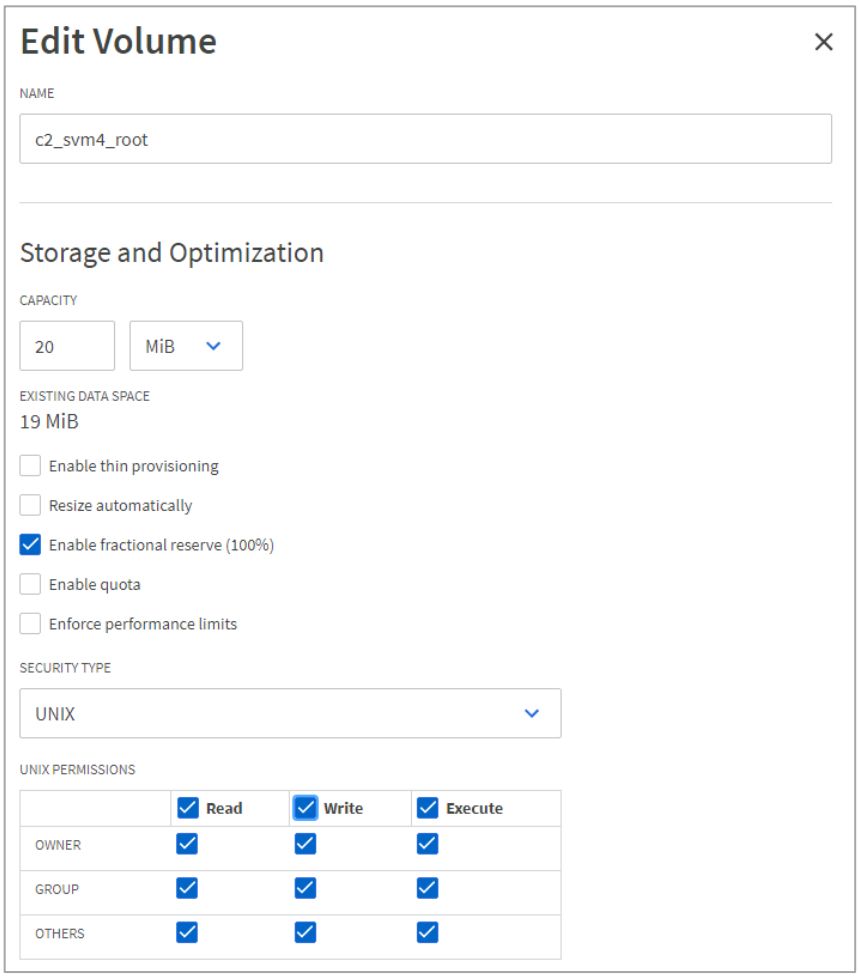
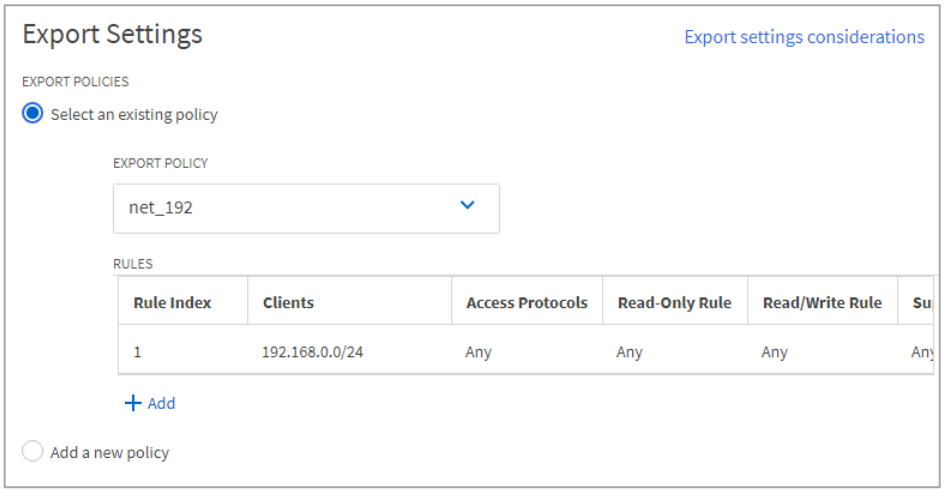
| Step | Action |
|---|---|
| 2-6 | In the New export policy dialog box, specify the following settings:<br>• Name: **net_192**<br>• Add New Rules: **<selected>**<br>  |
| 2-7 | Click **Add** to create an export policy rule. |

| Step | Action |
|---|---|
| 2-8 | In the New Rule dialog box, specify the following settings:<br>• Client Specification: **192.168.0.0/24**<br>• Access Protocols: **SMB/CIFS**, **FlexCache**, and **NFS**<br>• Access Details:<br>All = **Read-only Access**, **Read/Write Access**, **Superuser Access**<br>  |
| 2-9 | Click **Save** to save the export rule. |

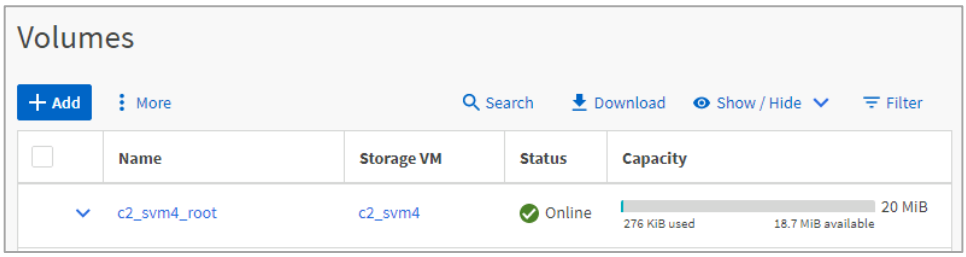
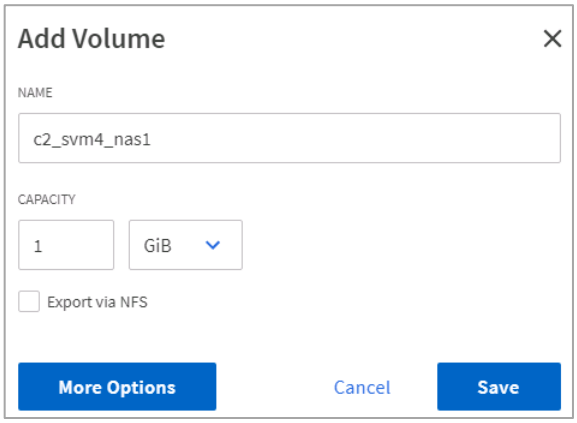
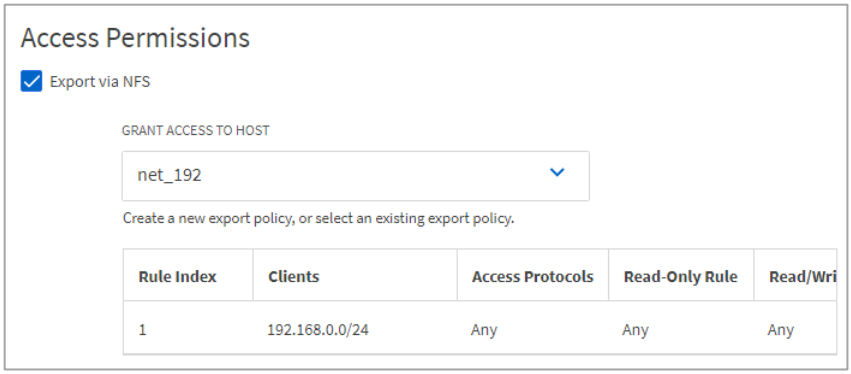
| Step | Action |
|---|---|
| 2-10 | Click **Save** to save the export policy.<br>  |

## Task 3: Enable User Access to a Volume

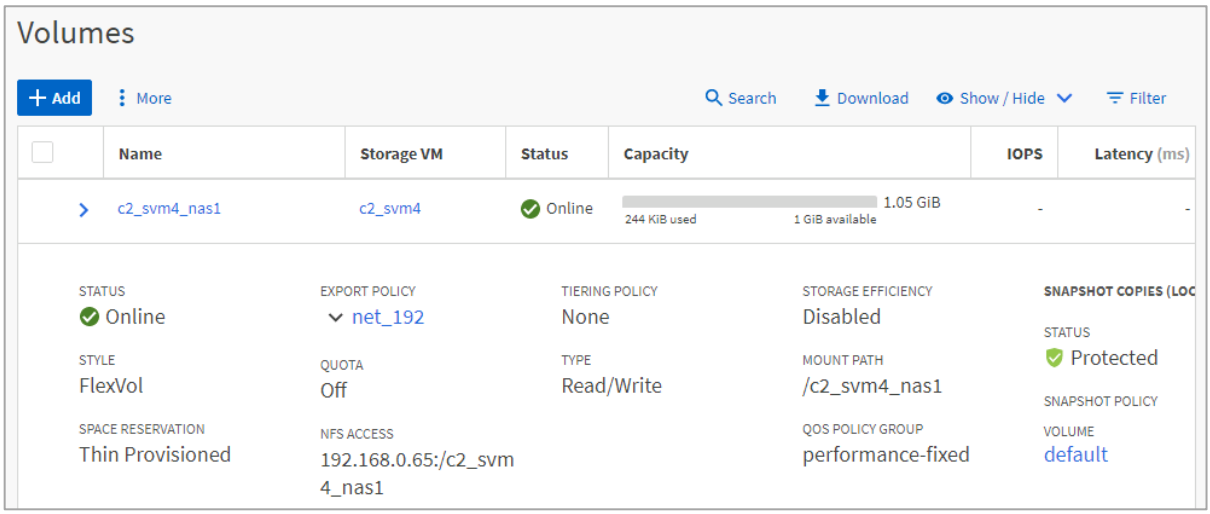
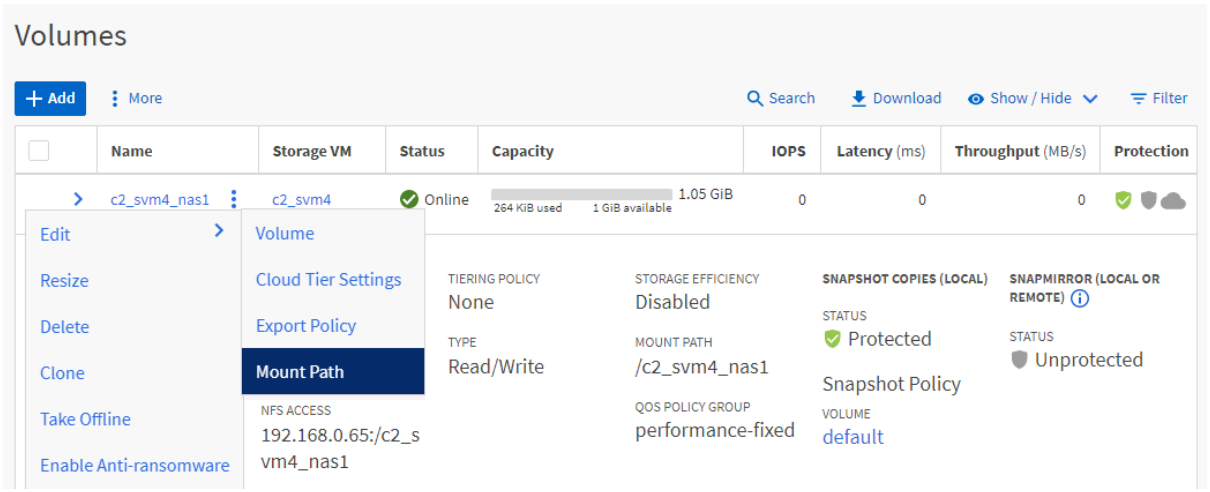
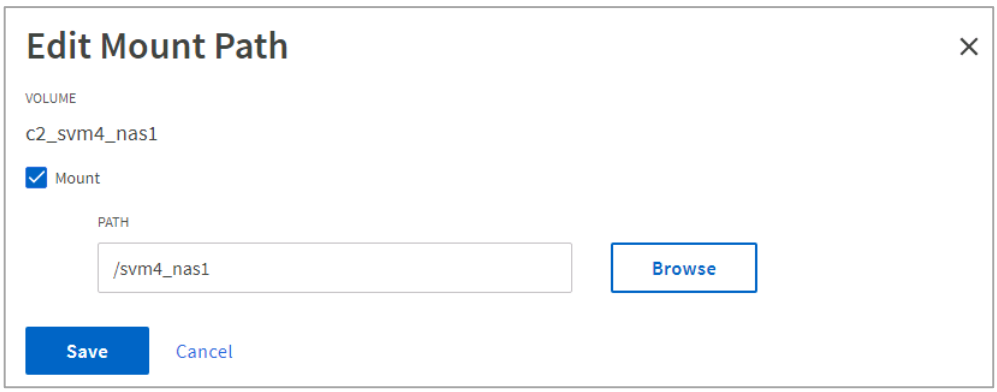
| Step | Action |
|---|---|
| 3-1 | From the System Manager Dashboard menu, select **Storage > Volumes**. |
| 3-2 | Position your cursor over **c2_svm4_root**, then from the More menu, select **Edit > Volume**.<br>  |

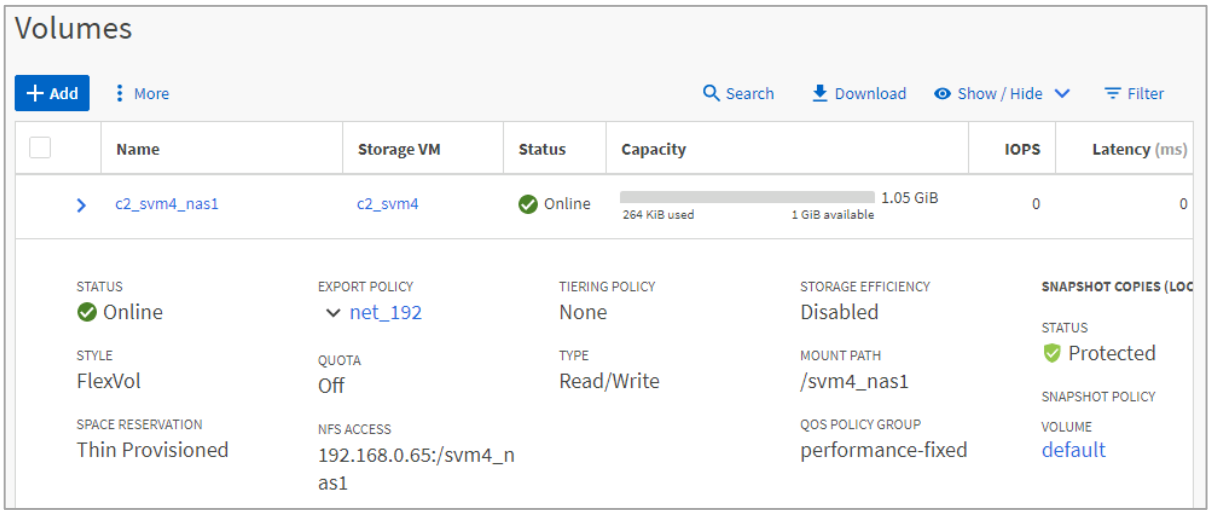
| Step | Action |
|---|---|
| 3-3 | In the Edit Volume dialog box, enable **Write** permission for Group and Others.<br>  |
| 3-4 | In the Export Settings section, specify the following settings:<br>• Select an existing policy: **<selected>** (default)<br>• Export Policy: **net_192**<br>  |
| 3-5 | Click **Save**. |

## Task 4: Create a NAS Data Volume

| Step | Action |
|---|---|
| 4-1 | On the Volumes page, click **Add**.<br>  |
| 4-2 | In the Add Volume dialog box, specify the following settings:<br>• Name: **c2_svm4_nas1**<br>• Capacity: **1 GiB**<br>  |
| 4-3 | Click **More Options**. |
| 4-4 | In the Access Permissions section, specify the following settings:<br>• Export via NFS: **<selected>**<br>• Grant Access to Host: **net_192** (default)<br>  |
| 4-5 | Click **Save**. |

## Task 5: Change a Volume Mount Path

| Step | Action |
|---|---|
| 5-1 | On the Volumes page, expand **c2_svm4_nas1**, and note the Mount Path value.<br>  |
| 5-2 | From the c2_svm4_nas1 More menu, select **Edit > Mount Path**.<br>  |
| 5-3 | In the Edit Mount Path window, specify the following settings:<br>• Mount: **<selected>** (default)<br>• Path: **/svm4_nas1**<br>  |

| Step | Action |
|---|---|
| 5-4 | Click **Save**. |
| 5-5 | On the Volumes page, observe the Mount Path and the NFS Access value.   |

## Task 6: Access an NFS Export from a Linux Client

| Step | Action |
|---|---|
| 6-1 | From PuTTY, log in to your Linux computer:<br>• Username: **root**<br>• Password: **Netapp1!** |
| 6-2 | Create directories for the NFS mounts:<br>`mkdir /mnt/svm4`<br>`mkdir /mnt/nas1` |
| 6-3 | Using the IP address of the NAS data LIF that belongs to storage VM c2_svm4, access the exports through NFS:<br>`mount -t nfs 192.168.0.65:/ /mnt/svm4`<br>`mount -t nfs 192.168.0.65:/svm4_nas1 /mnt/nas1` |
| 6-4 | You are not mounting CIFS shares or volume names. You are mounting paths in the namespace. |
| 6-5 | Explore both NFS mounts, which are mounted at different points in the c2_svm4 namespace.<br>`cd /mnt/svm4`<br>`ls`<br>`cd svm4_nas1`<br>`touch my_monkey`<br>`ls`<br>`cd /mnt/nas1`<br>`ls` |

**End of exercise**