

# StarWind Virtual SAN: Configuration Guide for Microsoft Windows Server [Hyper-V], StarWind Deployed as a Controller VM using Web UI

2026

TECHNICAL PAPERS



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## About StarWind

StarWind is a pioneer in virtualization and a company that participated in the development of this technology from its earliest days. Now the company is among the leading vendors of software and hardware hyper-converged solutions. The company’s core product is the years-proven StarWind Virtual SAN, which allows SMB and ROBO to benefit from cost-efficient hyperconverged IT infrastructure. Having earned a reputation of reliability, StarWind created a hardware product line and is actively tapping into hyperconverged and storage appliances market. In 2016, Gartner named StarWind “Cool Vendor for Compute Platforms” following the success and popularity of StarWind HyperConverged Appliance. StarWind partners with world-known companies: Microsoft, VMware, Veeam, Intel, Dell, Mellanox, Citrix, Western Digital, etc.

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## Annotation

## Relevant Products

This guide applies to StarWind Virtual SAN and StarWind Virtual SAN Free, specifically Controller Virtual Machine (CVM) version 20231016 and later.

For older versions of StarWind Virtual SAN (OVF Version 20230901 and earlier), please refer to this configuration guide:

[StarWind Virtual SAN \(VSAN\): Configuration Guide for Microsoft Windows Server \[Hyper-V\], VSAN Deployed as a Windows Application using Legacy GUI.](#)

## Purpose

This document outlines how to configure a Microsoft Hyper-V Failover Cluster using StarWind Virtual SAN (VSAN), with VSAN running as a Controller Virtual Machine (CVM). The guide includes steps to prepare Hyper-V hosts for clustering, configure physical and virtual networking, and set up the Virtual SAN Controller Virtual Machine.

For more information about StarWind VSAN architecture and available installation options, please refer to the:

[StarWind Virtual \(VSAN\) Getting Started Guide.](#)

## Audience

This technical guide is intended for storage and virtualization architects, system administrators, and partners designing virtualized environments using StarWind Virtual SAN (VSAN).

## Expected Result

Following this guide will result in a fully configured, highly available Windows Failover Cluster with virtual machine shared storage provided by StarWind VSAN.

NOTE: This guide applies to clusters with 2, 3, or more nodes. Be sure to follow the notes within each configuration step to ensure you perform the actions appropriate for your specific cluster size.

## Prerequisites

### Starwind Virtual San System Requirements

Prior to installing StarWind Virtual SAN, please make sure that the system meets the requirements, which are available via the following link:

<https://www.starwindsoftware.com/system-requirements>

Recommended RAID settings for HDD and SSD disks:

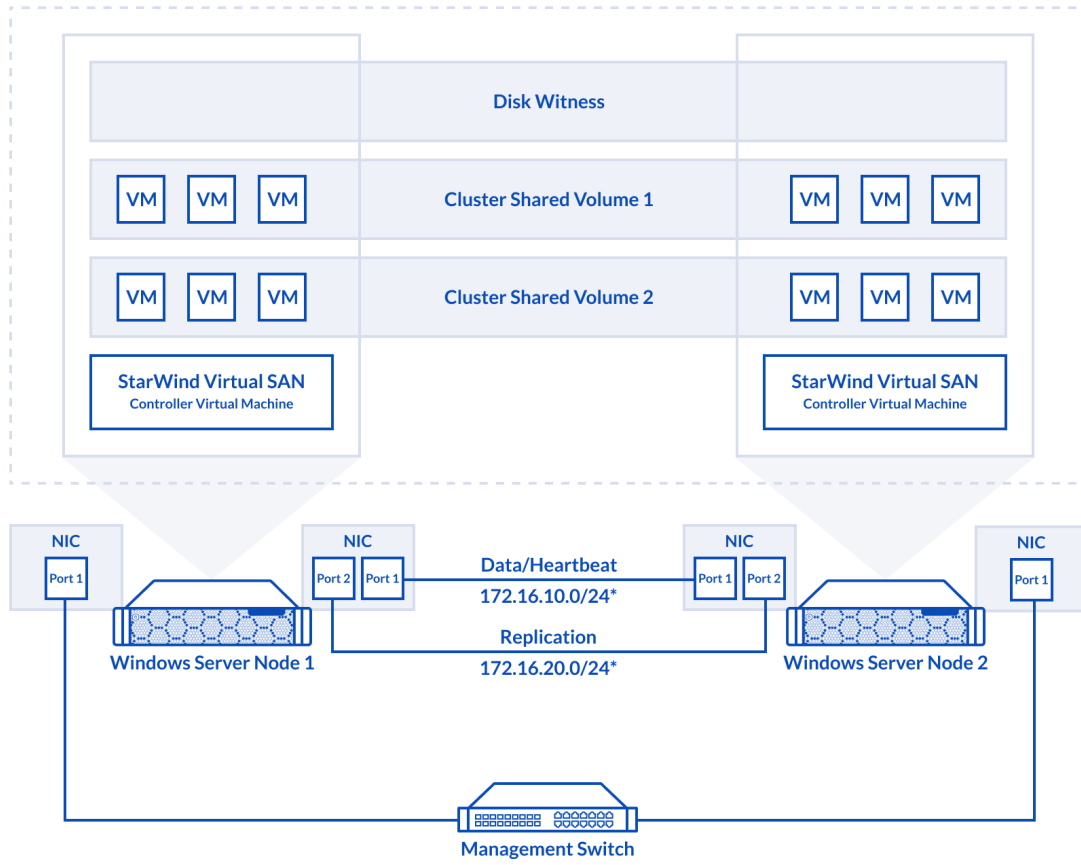
<https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-hdd-and-ssd-disks/>

Please read StarWind Virtual SAN Best Practices document for additional information:

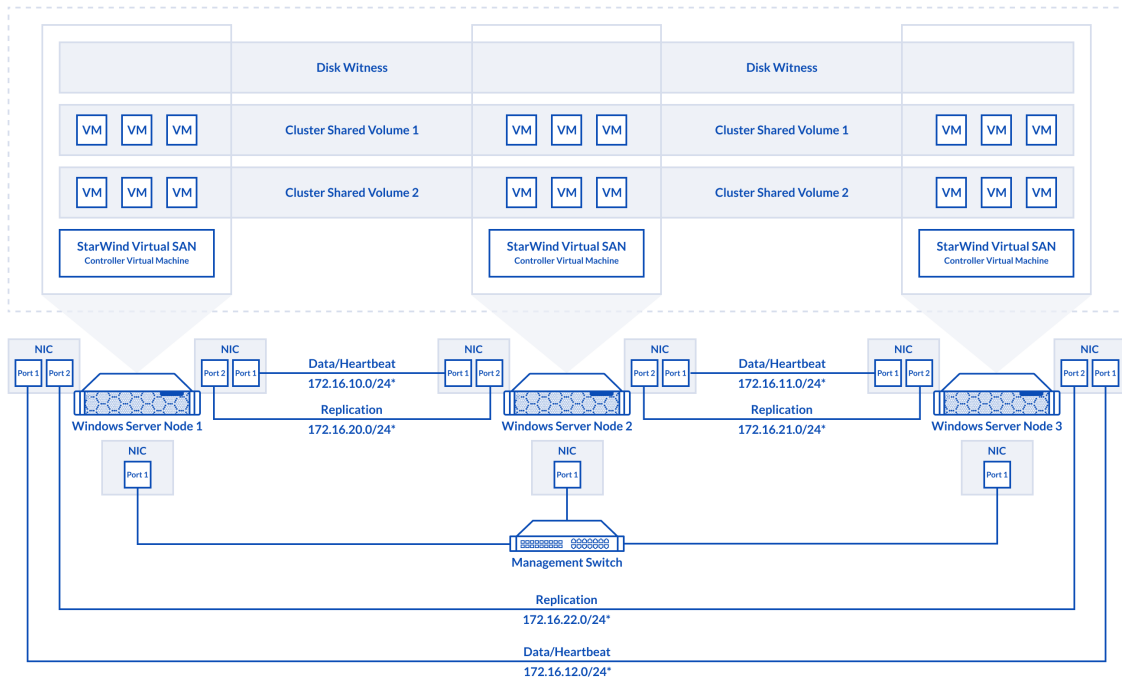
<https://www.starwindsoftware.com/resource-library/starwind-virtual-san-best-practices>

### Solution Diagram

The diagrams below illustrate the network and storage configuration of the solution:



2-node cluster



3-node cluster

### Preconfiguring cluster nodes

1. Make sure that a domain controller is configured and the servers are added to the domain.

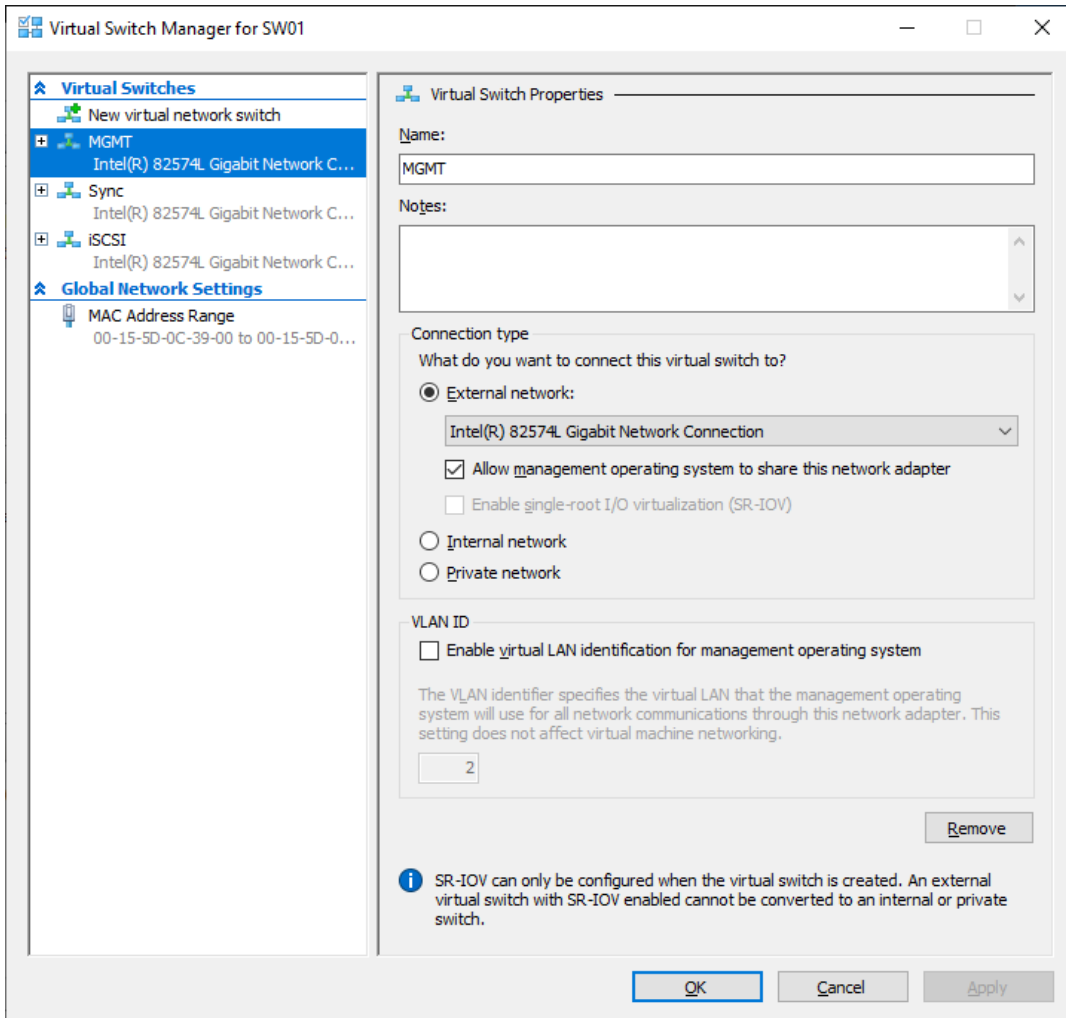
NOTE: Please follow the recommendation in [KB article](#) on how to place a DC in case of StarWind Virtual SAN usage.

2. Deploy Windows Server on each server and install Failover Clustering and Multipath I/O features, as well as the Hyper-V role on both servers. This can be done through Server Manager (Add Roles and Features menu item).

3. Define at least 2x network interfaces (2 node scenario) or 4x network interfaces (3 node scenario) on each node that will be used for the Synchronization and iSCSI/StarWind heartbeat traffic. Do not use iSCSI/Heartbeat and Synchronization channels over the same physical link. Synchronization and iSCSI/Heartbeat links can be connected either via redundant switches or directly between the nodes (see diagram above).

4. Separate external Virtual Switches should be created for iSCSI and Synchronization traffic based on the selected before iSCSI and Synchronization interfaces. Using Hyper-V

Manager open Virtual Switch Manager and create two external Virtual Switches: one for the iSCSI/StarWind Heartbeat channel (iSCSI) and another one for the Synchronization channel (Sync).



5. Configure and set the IP address on each virtual switch interface. In this document, 172.16.1x.x subnets are used for iSCSI/StarWind heartbeat traffic, while 172.16.2x.x subnets are used for the Synchronization traffic.

NOTE: In case NIC supports SR-IOV, enable it for the best performance. An additional internal switch is required for iSCSI Connection. Contact support for additional details.

6. Set MTU size to 9000 on iSCSI and Sync interfaces using the following Powershell script.

```
$iSCSIs = (Get-NetAdapter -Name "*iSCSI*").Name
$Syncs = (Get-NetAdapter -Name "*Sync*").Name
foreach ($iSCSI in $iSCSIs) {
```

```
Set-NetAdapterAdvancedProperty -Name "$iSCSI" -RegistryKeyword
"*JumboPacket" -Registryvalue 9014
Get-NetAdapterAdvancedProperty -Name "$iSCSI" -RegistryKeyword
"*JumboPacket"
}
foreach ($Sync in $Syncs) {
Set-NetAdapterAdvancedProperty -Name "$Sync" -RegistryKeyword
"*JumboPacket" -Registryvalue 9014
Get-NetAdapterAdvancedProperty -Name "$Sync" -RegistryKeyword
"*JumboPacket"
}
```

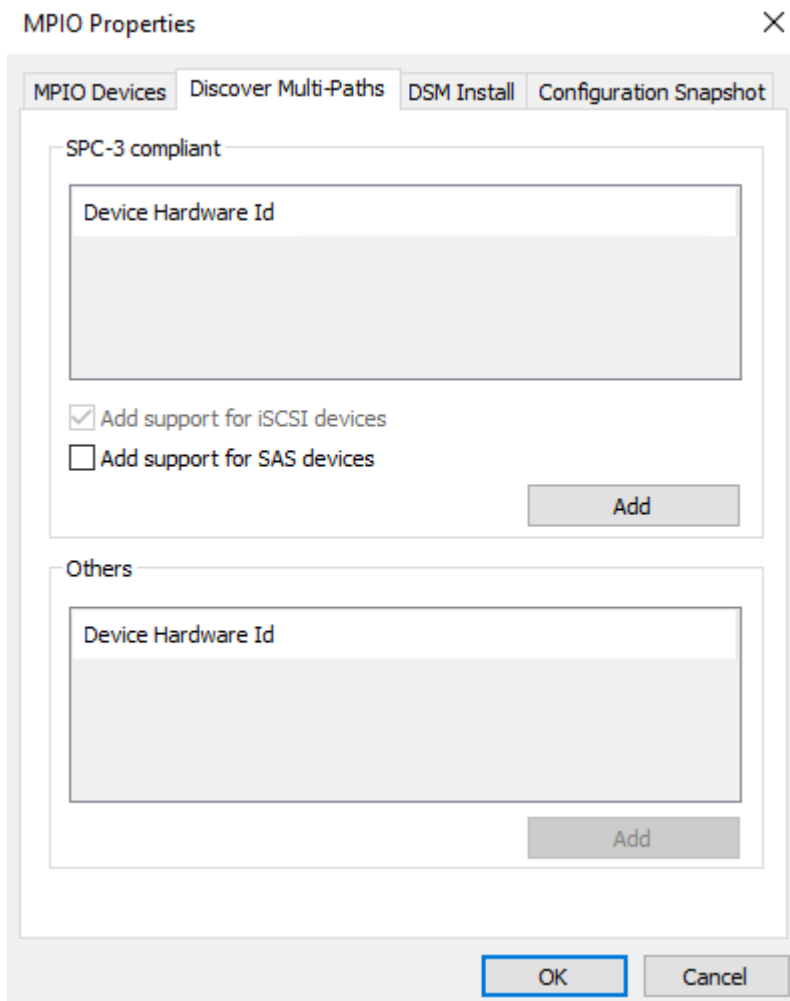
It will apply MTU 9000 to all iSCSI and Sync interfaces if they have iSCSI or Sync as part of their name.

NOTE: MTU setting should be applied on the adapters only if there is no live production running through the NICs.

7. Open the MPIO Properties manager: Start -> Windows Administrative Tools -> MPIO. Alternatively, run the following PowerShell command :

```
mpiocpl
```

8. In the Discover Multi-Paths tab, select the Add support for iSCSI devices checkbox and click Add.



9. When prompted to restart the server, click Yes to proceed.

10. Repeat the same procedure on the other server.

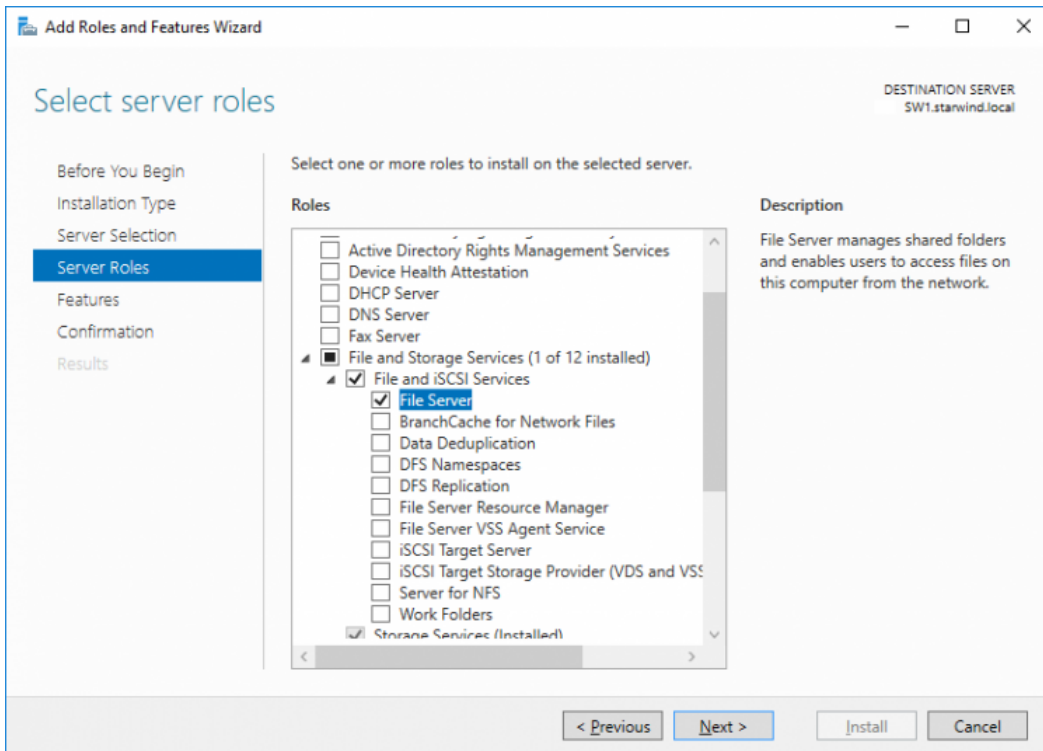
## Installing File Server Roles

Please follow the steps below if file shares configuration is required

### Scale-Out File Server (Sofs) For Application Data

1. Open Server Manager: Start -> Server Manager.
2. Select: Manage -> Add Roles and Features.
3. Follow the installation wizard steps to install the roles selected in the screenshot

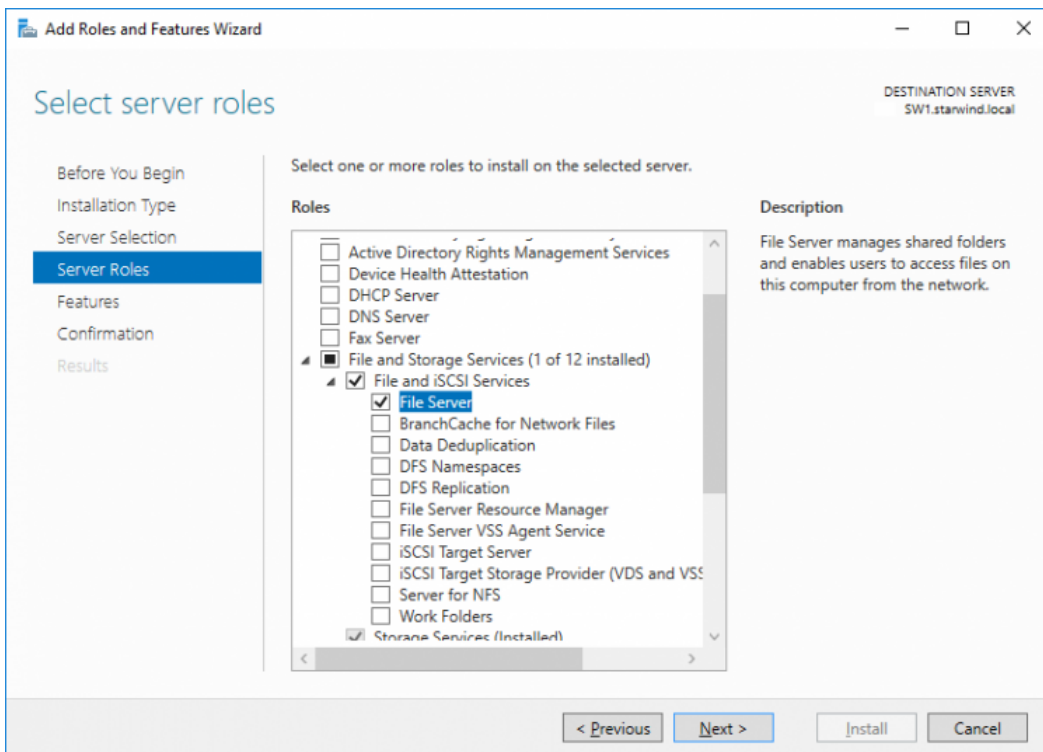
below:



4. Restart the server after installation is completed and perform steps above on the each server.

## File Server For General Use With Smb Share

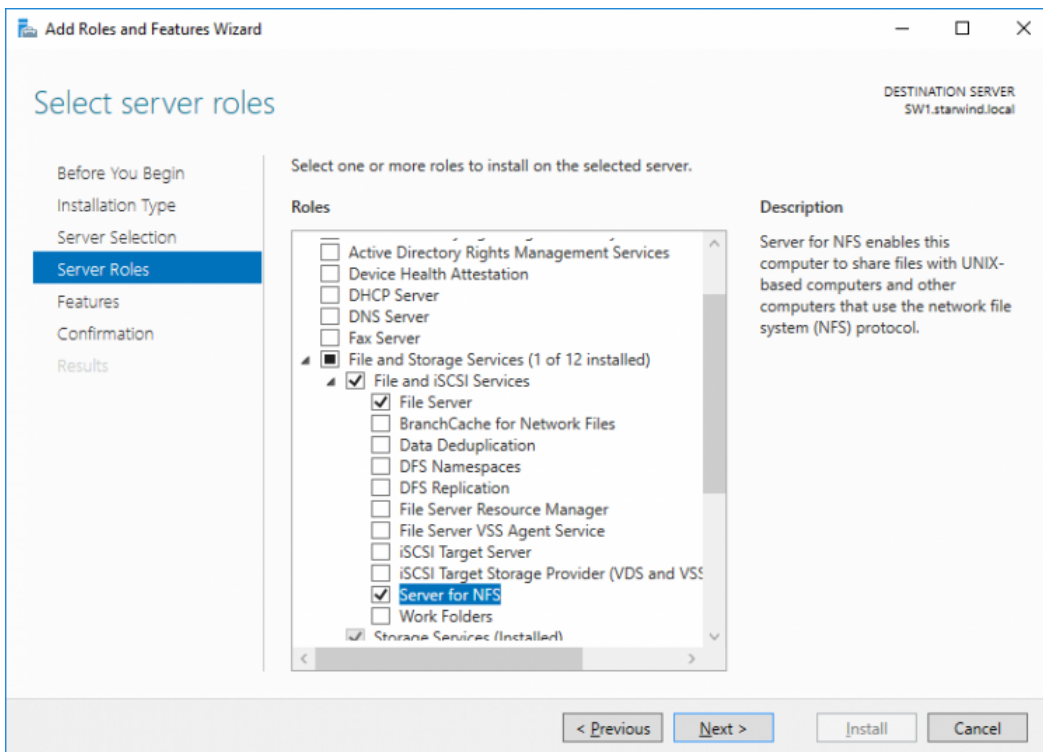
1. Open Server Manager: Start -> Server Manager.
2. Select: Manage -> Add Roles and Features.
3. Follow the installation wizard steps to install the roles selected in the screenshot below:



4. Restart the server after installation is completed and perform steps above on each server.

## File Server For General Use With Nfs Share

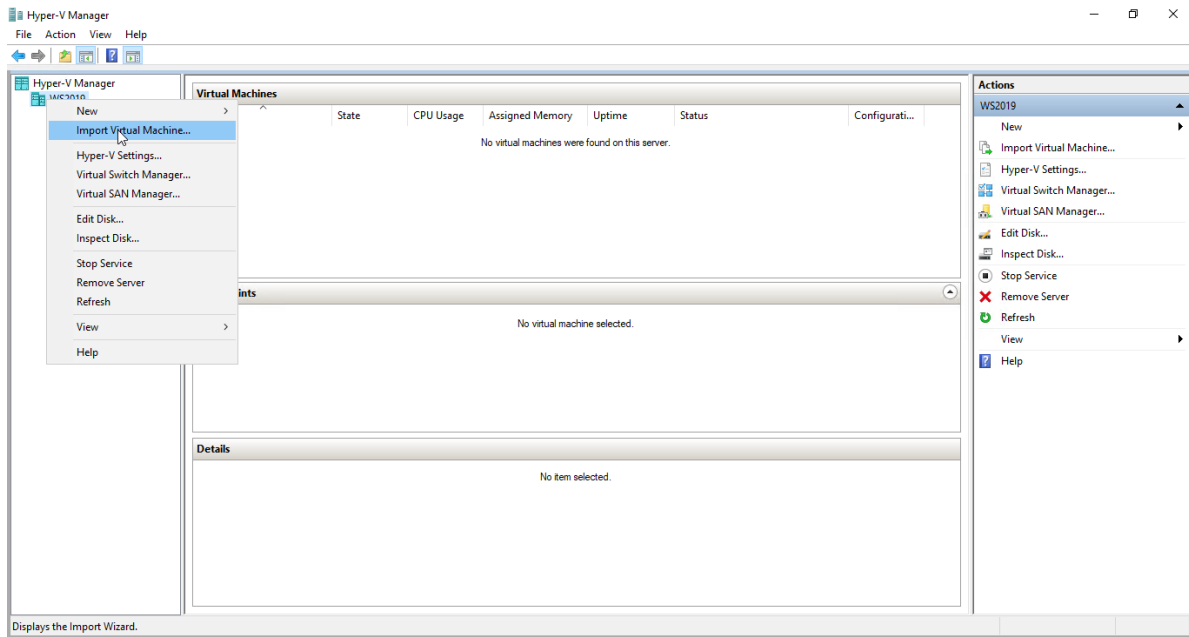
1. Open Server Manager: Start -> Server Manager.
2. Select: Manage -> Add Roles and Features.
3. Follow the installation wizard steps to install the roles selected in the screenshot below:



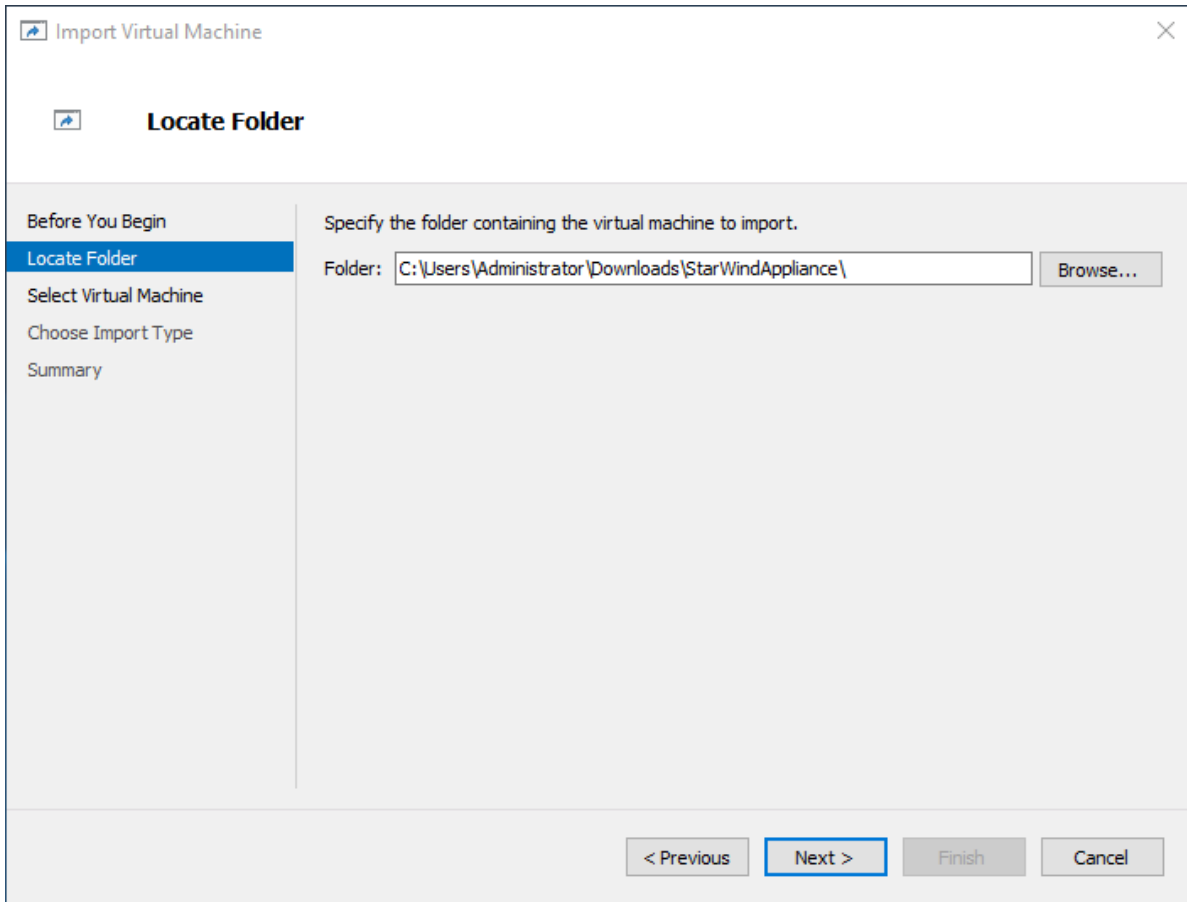
4. Restart the server after installation is completed and perform steps above on each server.

## Deploying Starwind Virtual San Cvm

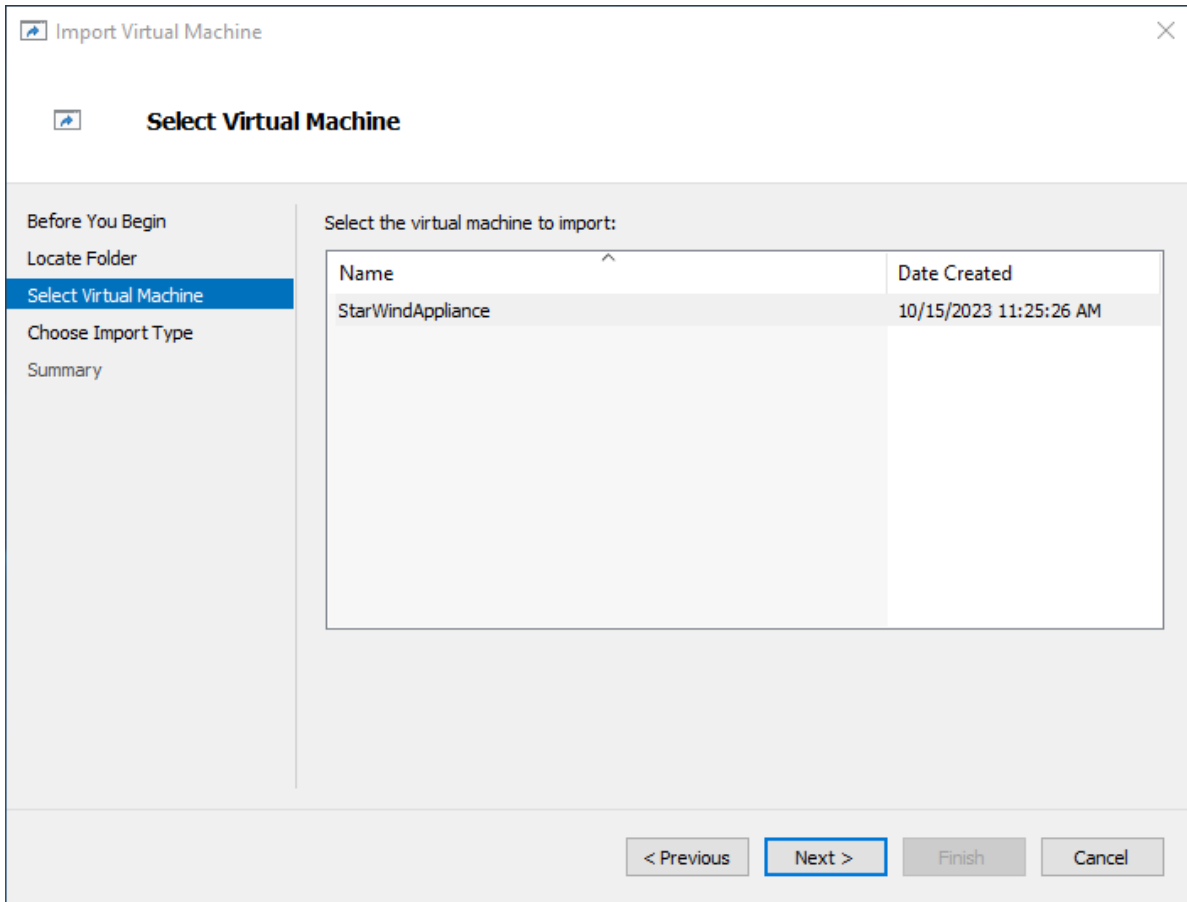
1. Download the zip archive containing StarWind Virtual SAN CVM from <https://www.starwindsoftware.com/vsan#download>
2. Extract the virtual machine files on the server where StarWind Virtual SAN CVM will be deployed.
3. Open Hyper-V Manager and launch the Import Virtual Machine wizard.



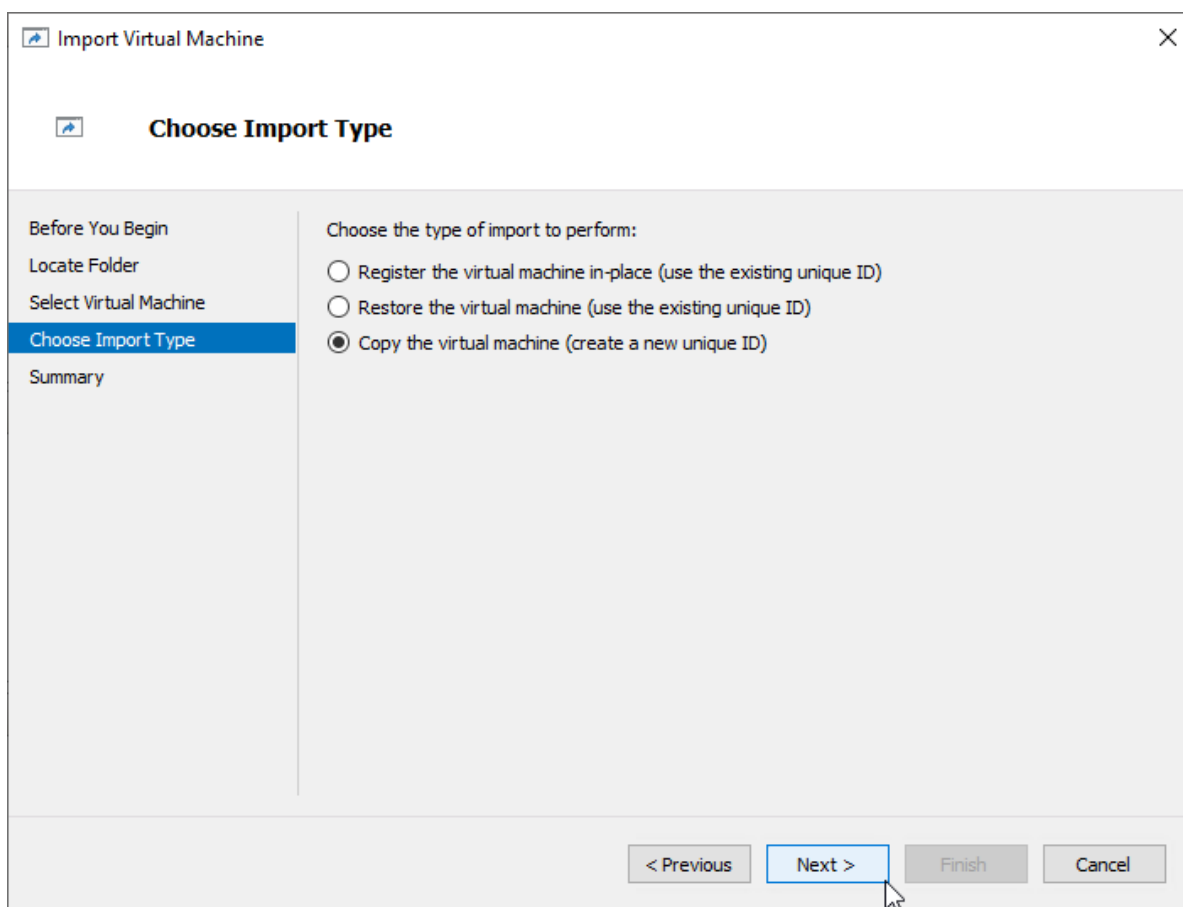
4. On the Locate Folder step of the wizard, navigate to the location of the StarWind Virtual SAN CVM template folder, select the folder, and then click Next.



5. On the Select Virtual Machine step, click Next.

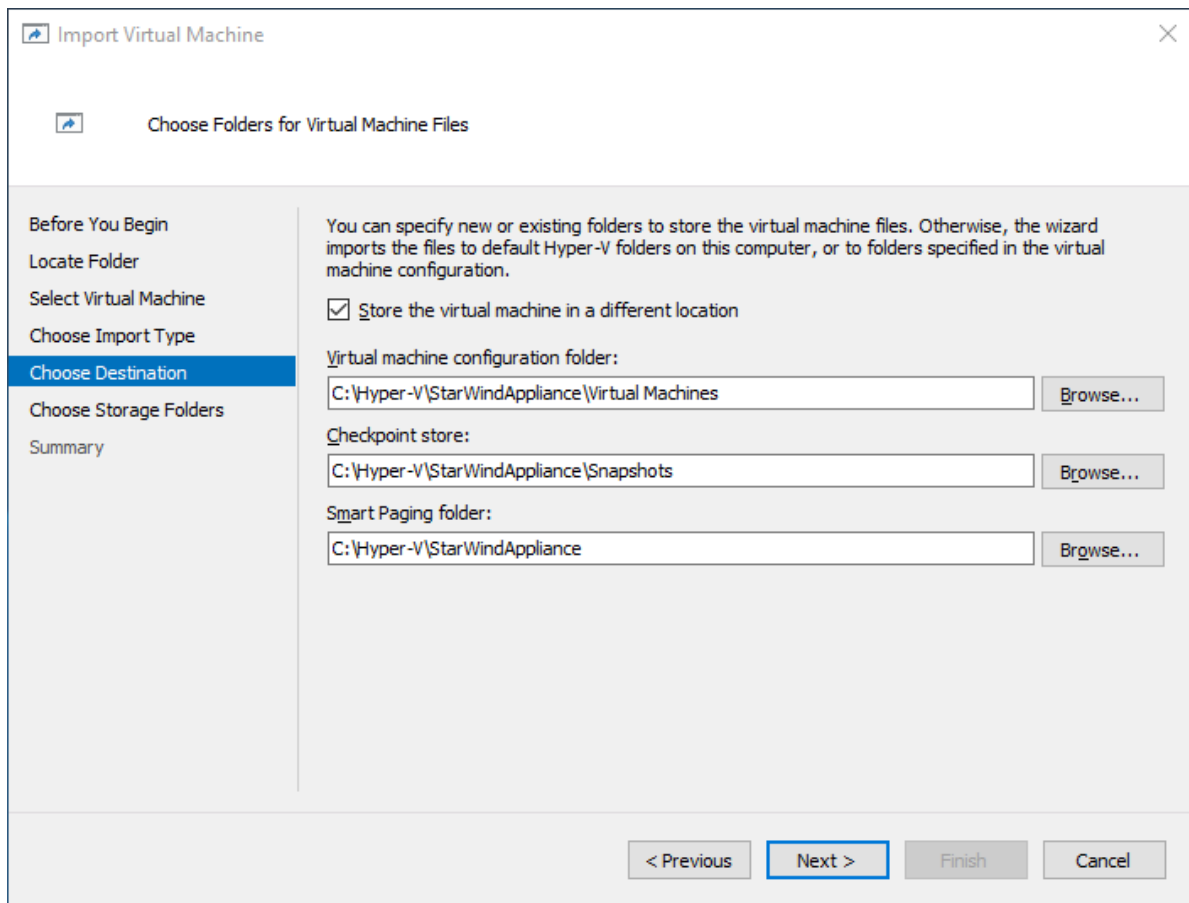


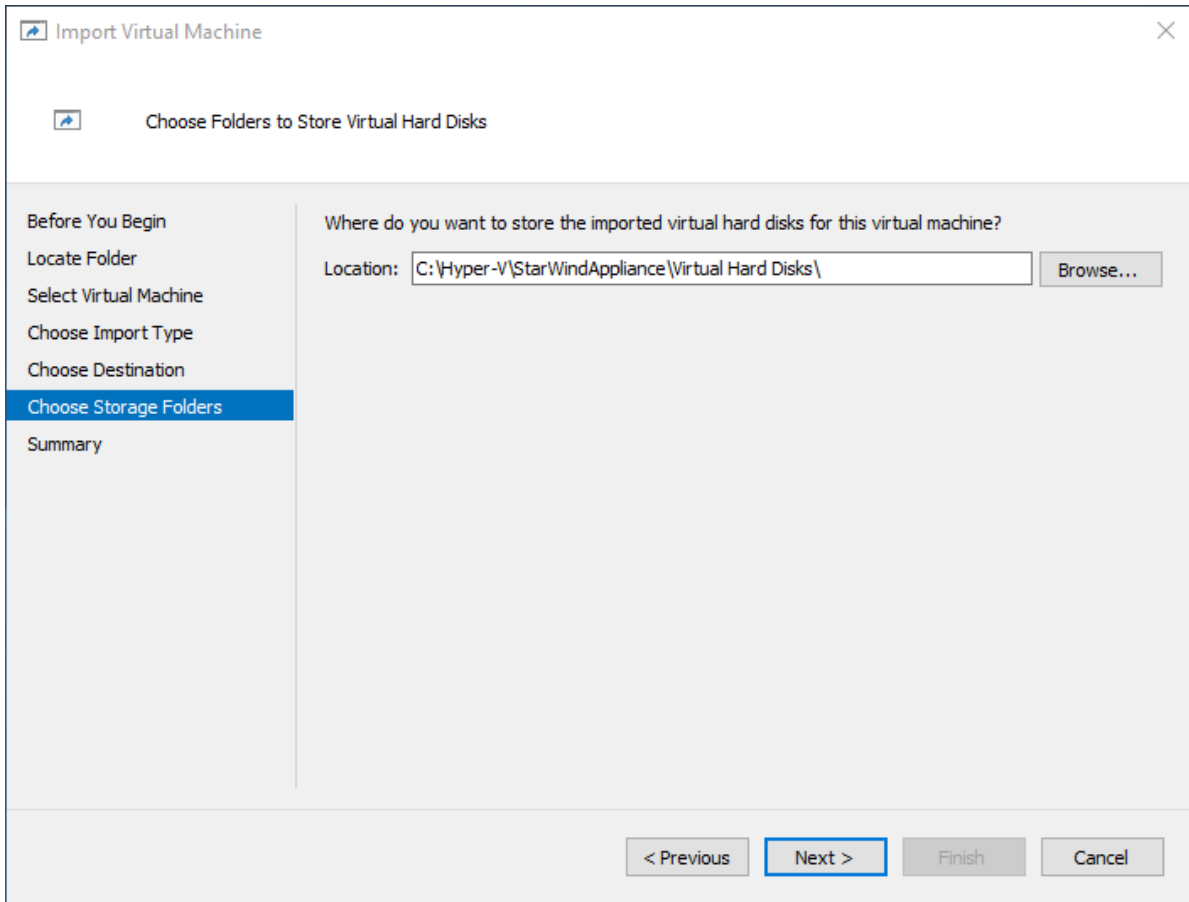
6. On the Choose Import Type step, select the Copy the virtual machine import type and click Next.

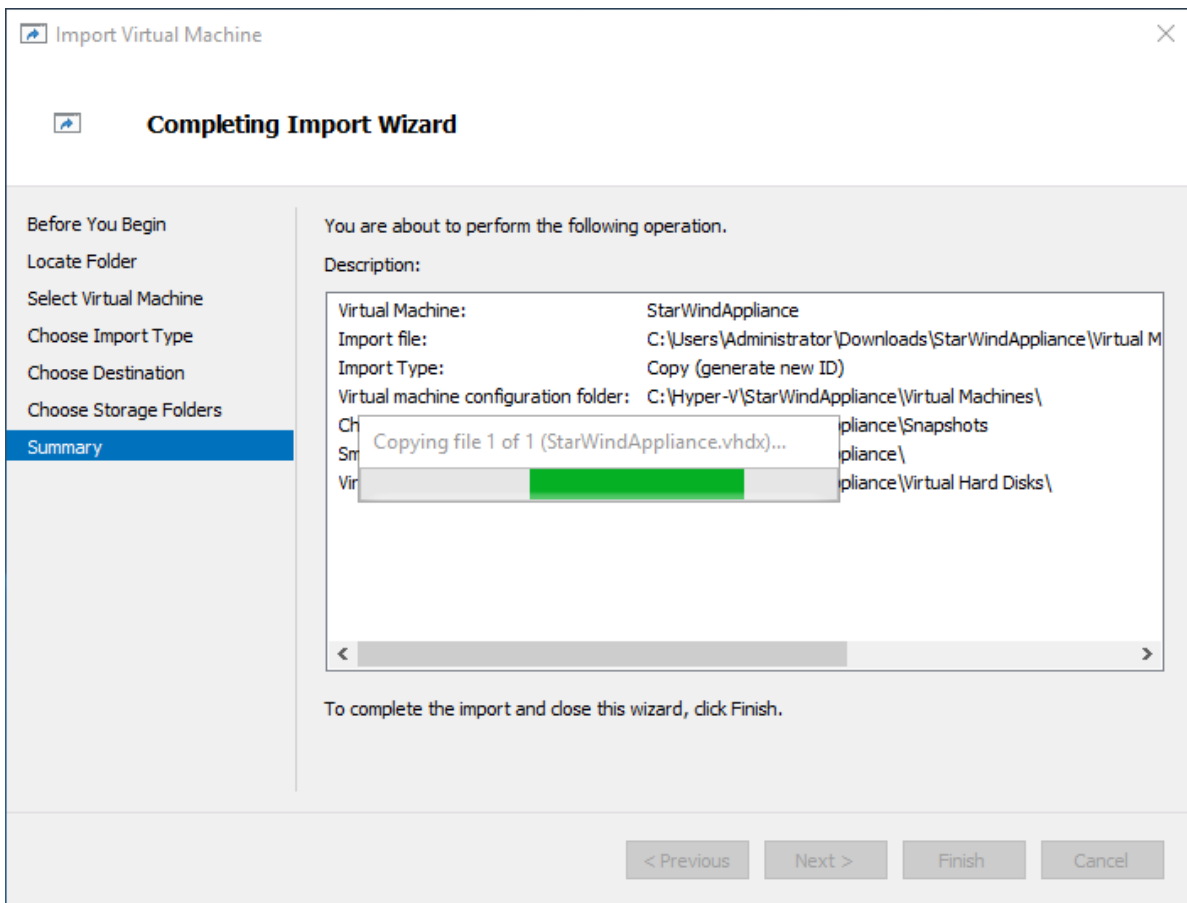


7. On the Choose Destination and Choose Storage Folders steps, specify folders to store virtual machine files, such as configuration, snapshots, smart paging, and virtual disks. Then, click Next.

NOTE: It's recommended to deploy StarWind Virtual SAN CVM on a separate storage device accessible to the hypervisor host, e.g., a BOSS card, etc.





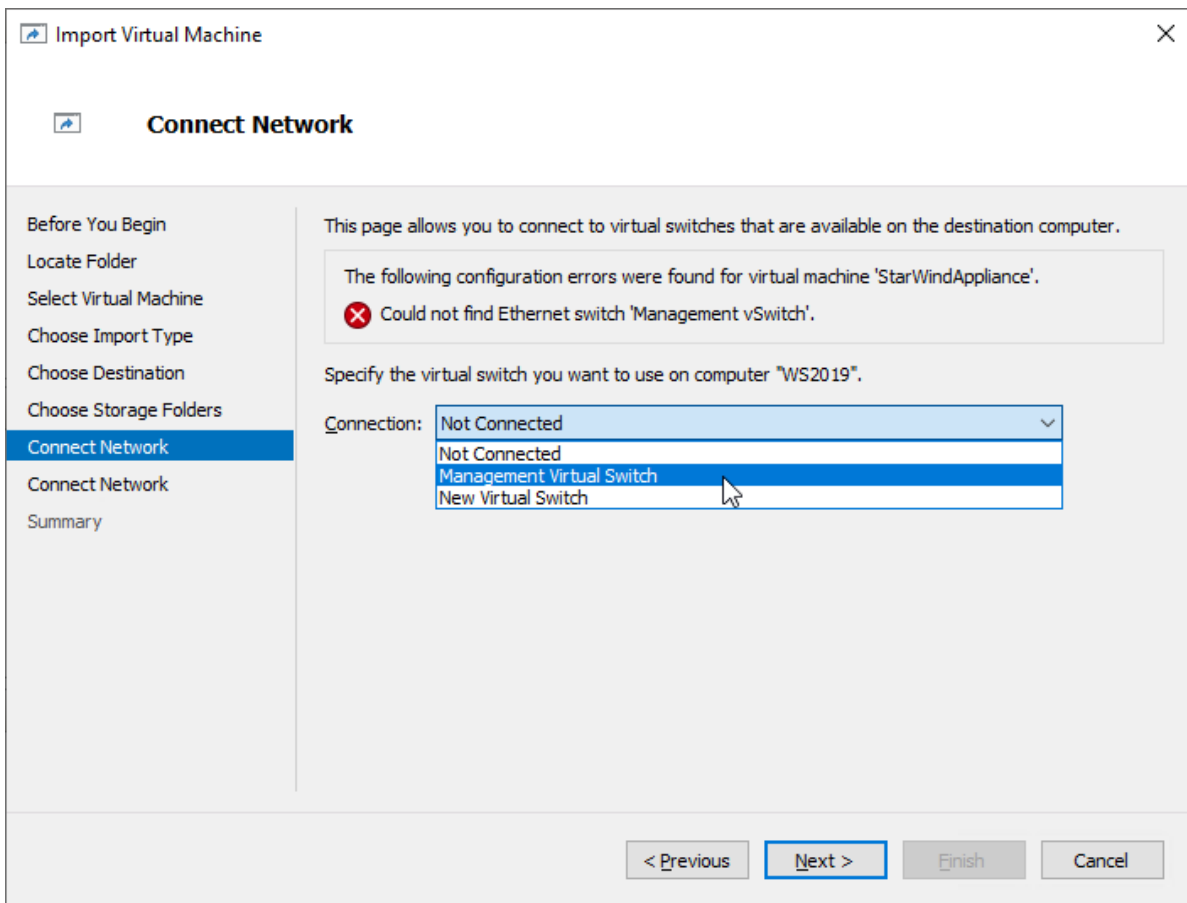


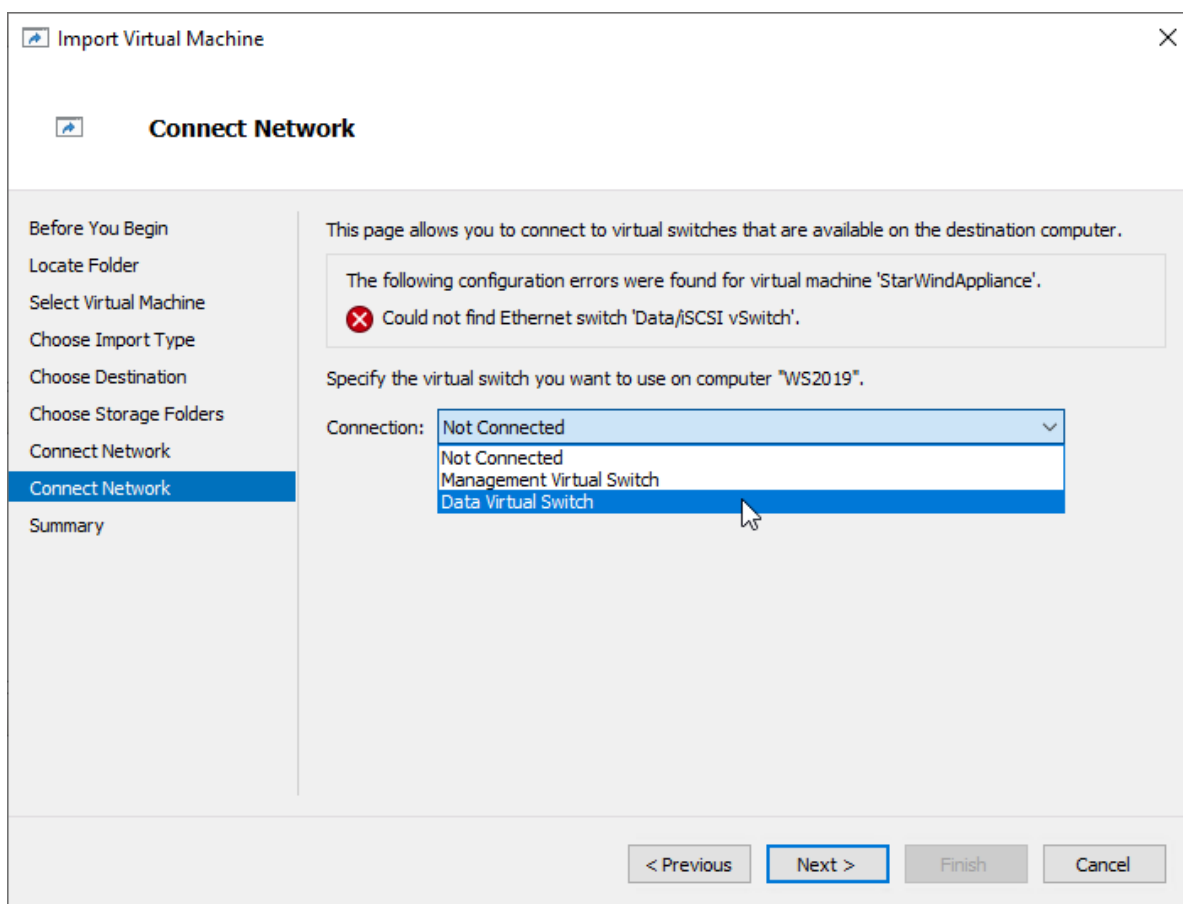
8. On the Connect Network step, the wizard will validate the network settings.

Below are the default names for virtual switches:

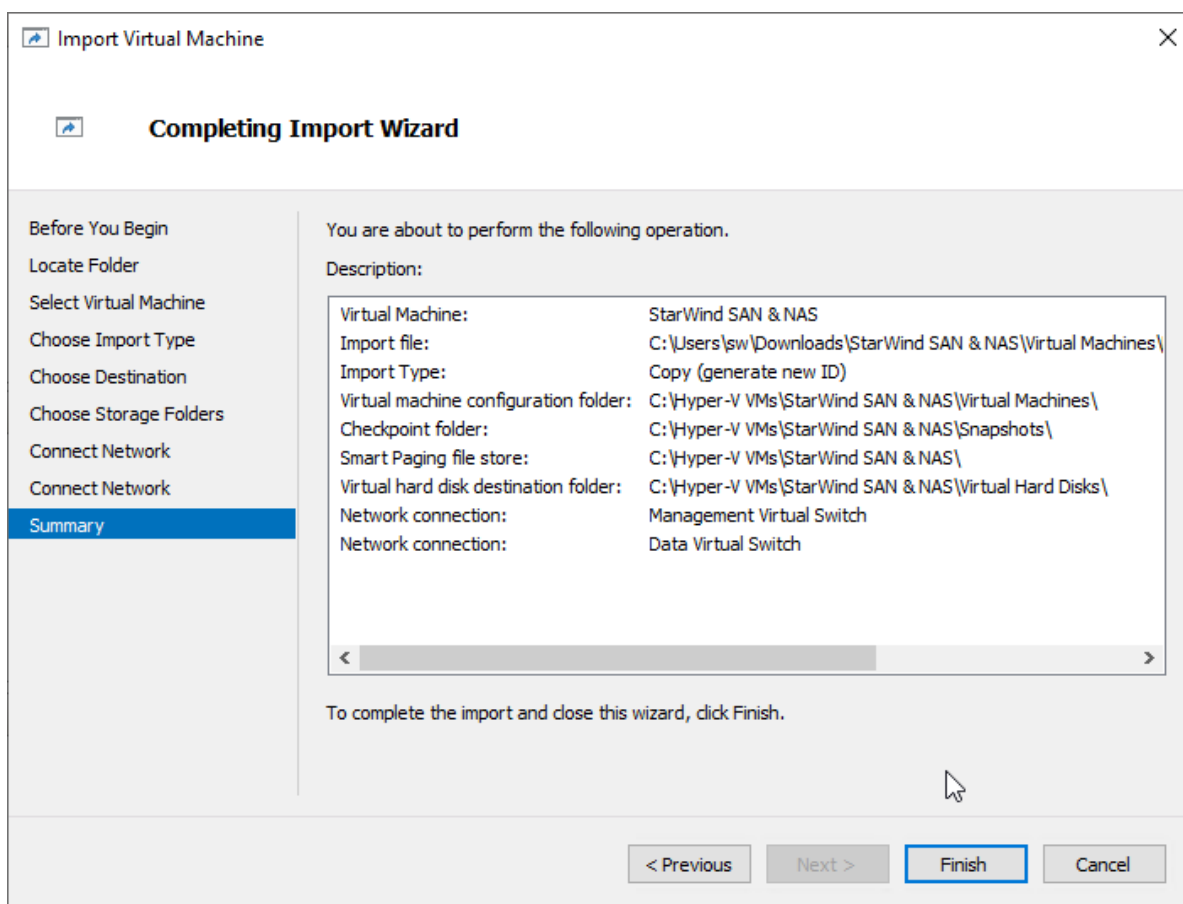
- The Management network virtual switch is named "Management vSwitch"
- The Data/Heartbeat network virtual switch is named "Data/iSCSI vSwitch"
- The Replication network virtual switch is named "Replication/Sync vSwitch"

If the existing virtual switches have different names, manually select the appropriate ones from the drop-down list. Then, click Next.





9. On the Summary step, review the configuration settings and click Finish to begin the import process.



10. Repeat steps 1 through 9 on each host where StarWind CVM should be deployed.

## Initial Configuration Wizard

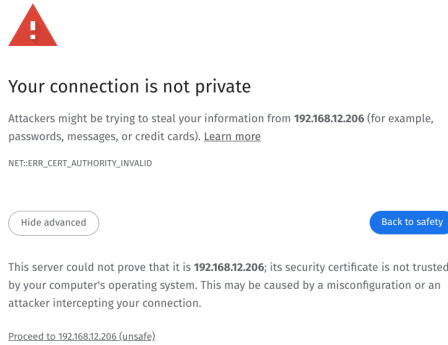
1. Start the StarWind Virtual SAN Controller Virtual Machine.
2. Launch the VM console to view the VM boot process and obtain the IPv4 address of the Management network interface.

NOTE: If the VM does not acquire an IPv4 address from a DHCP server, use the Text-based User Interface (TUI) to set up the Management network manually.

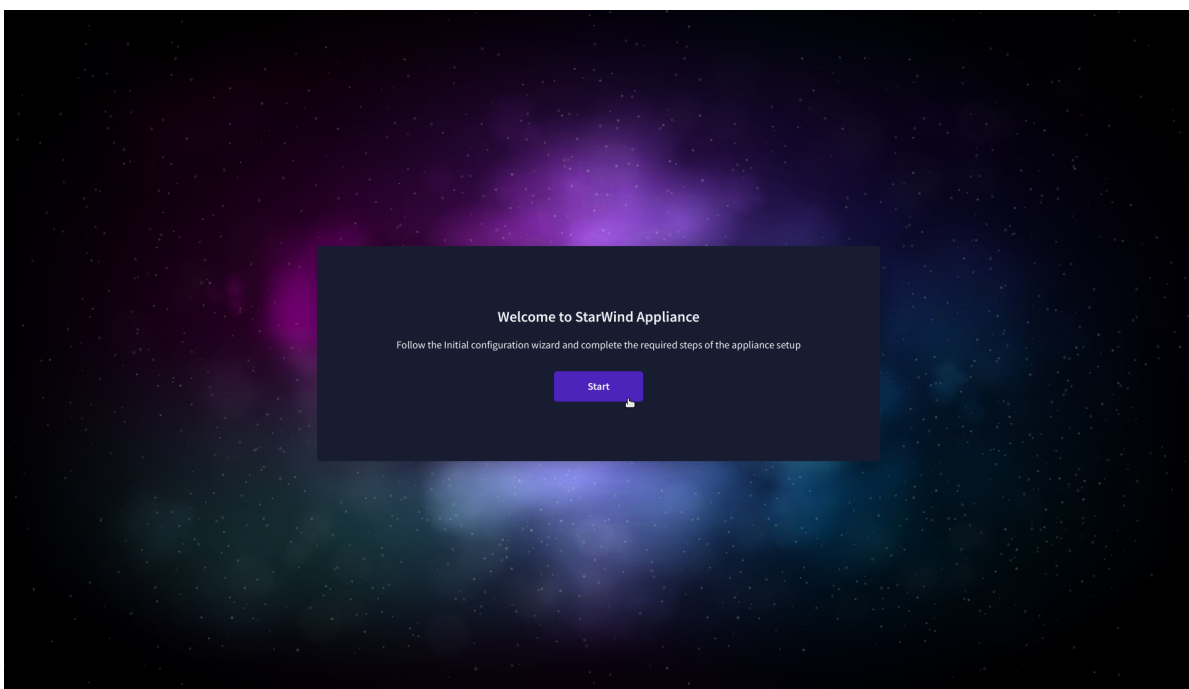
Default credentials for TUI: user/rds123RDS

3. Using a web browser, open a new tab and enter the VM's IPv4 address to access the

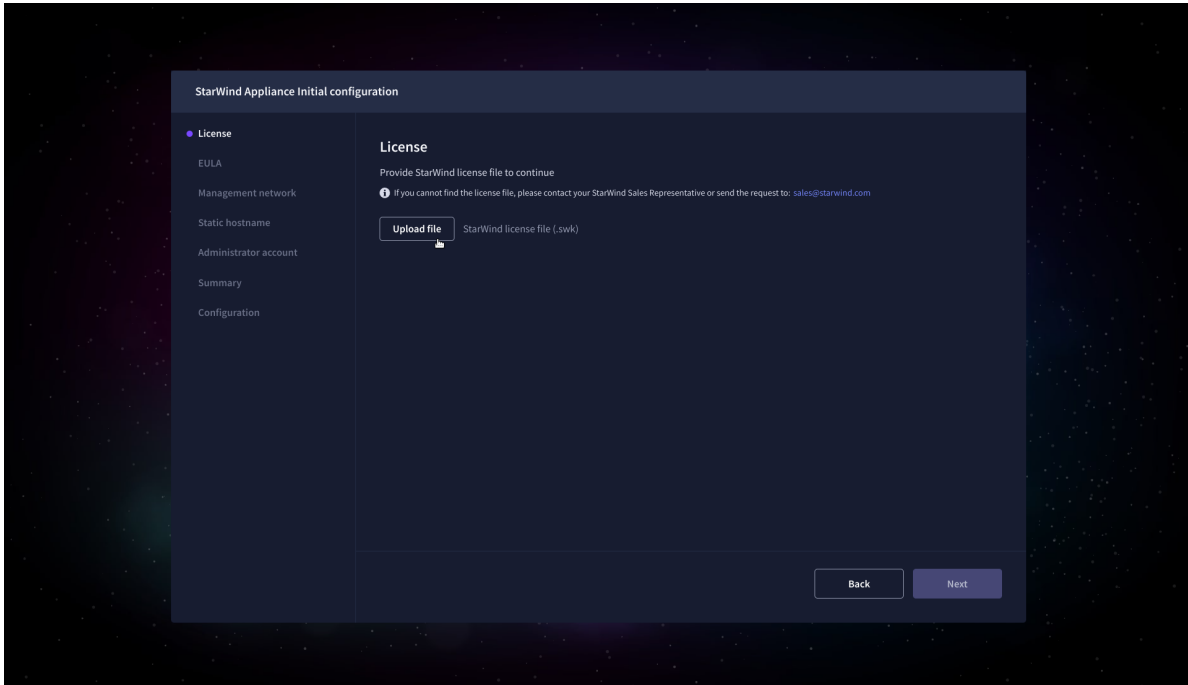
StarWind VSAN Web Interface. On the Your connection is not private screen, click Advanced and then select Continue to...



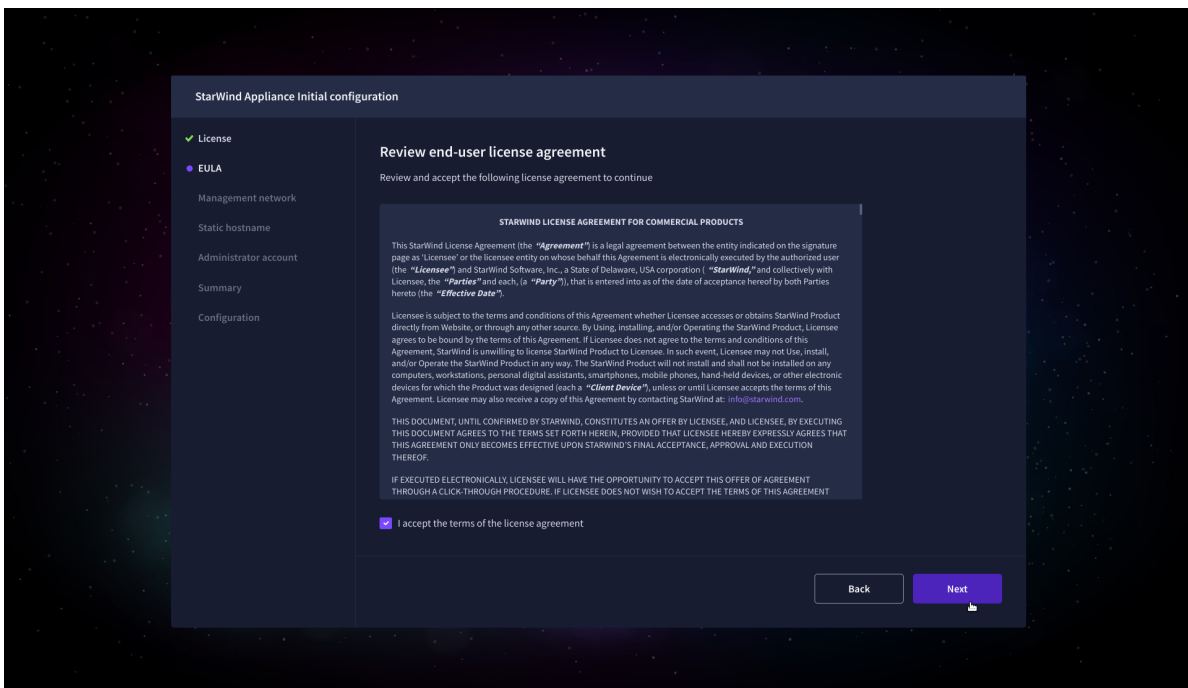
4. On the Welcome to StarWind Appliance screen, click Start to launch the Initial Configuration Wizard.



5. On the License step, upload the StarWind Virtual SAN license file.

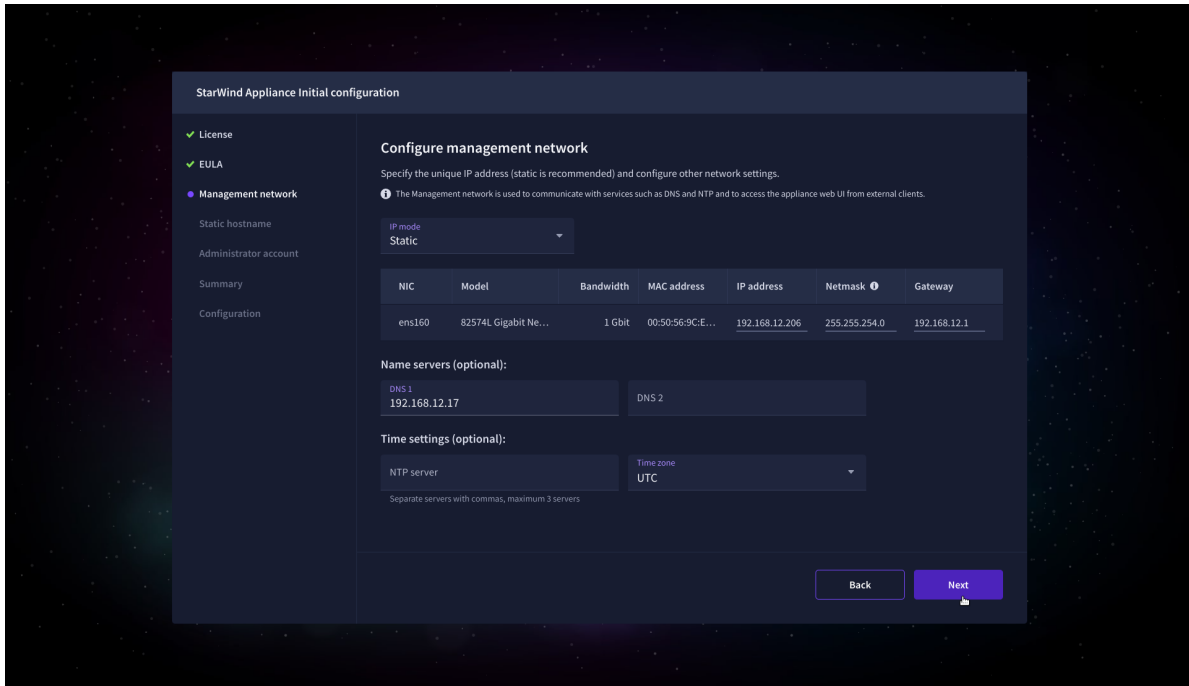


6. On the EULA step, read and accept the End User License Agreement to continue.

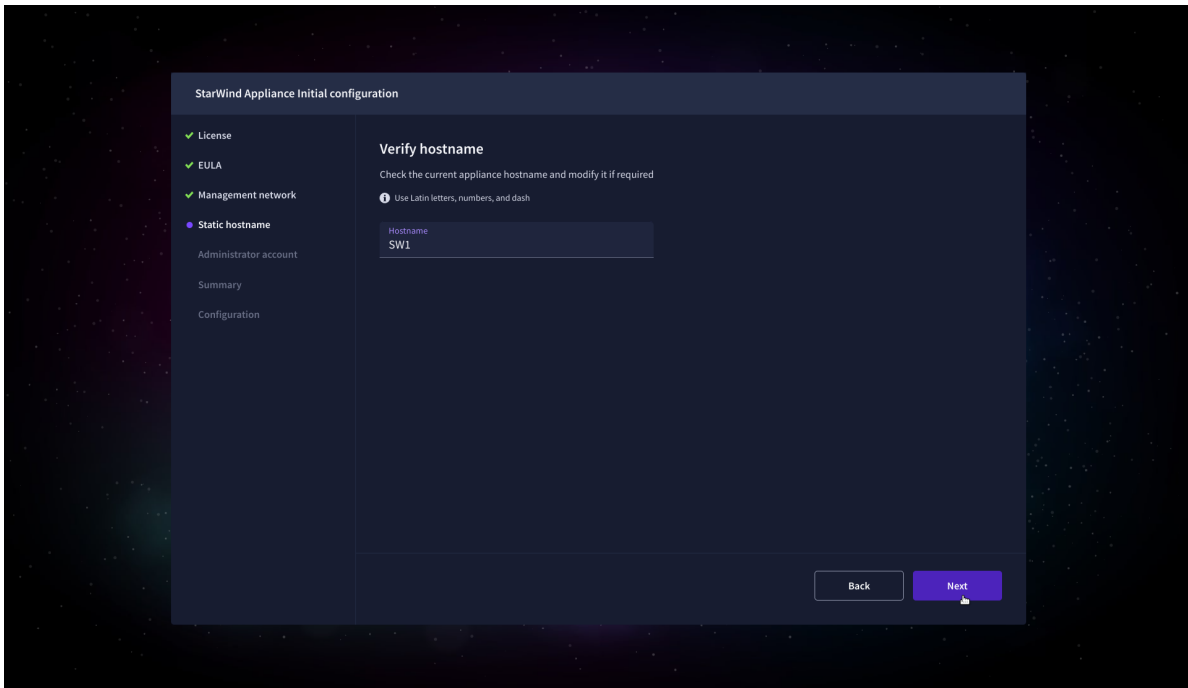


7. On the Management network step, review or edit the network settings and click Next.

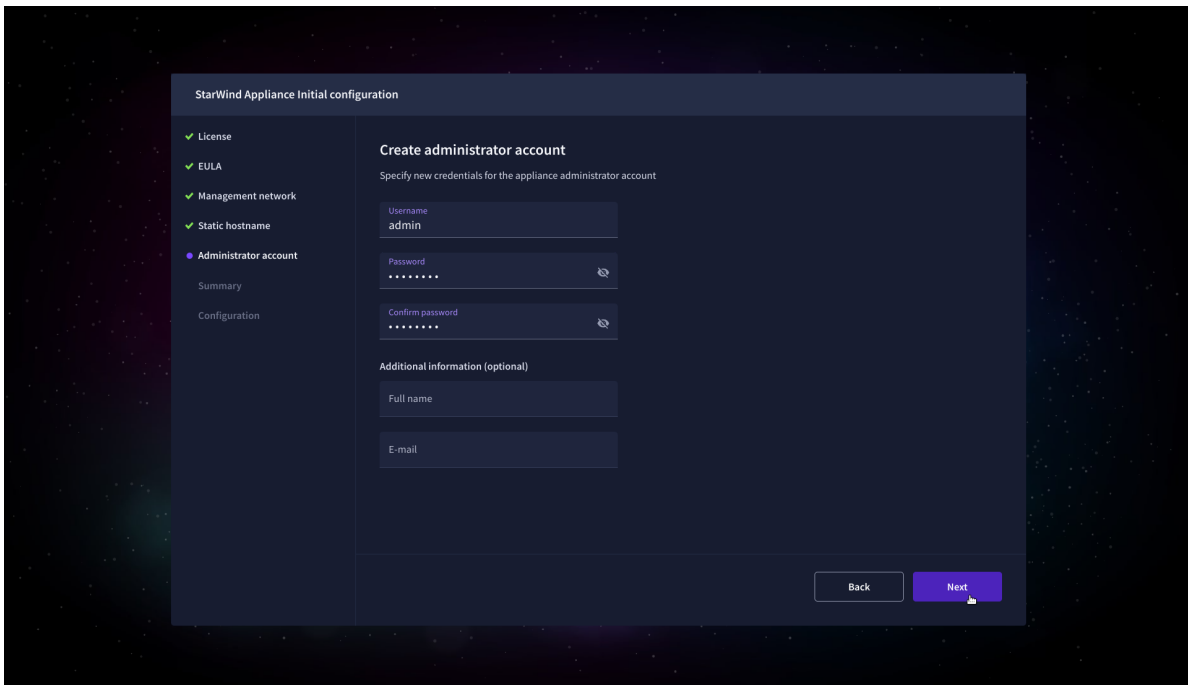
**IMPORTANT:** The use of Static IP mode is highly recommended.



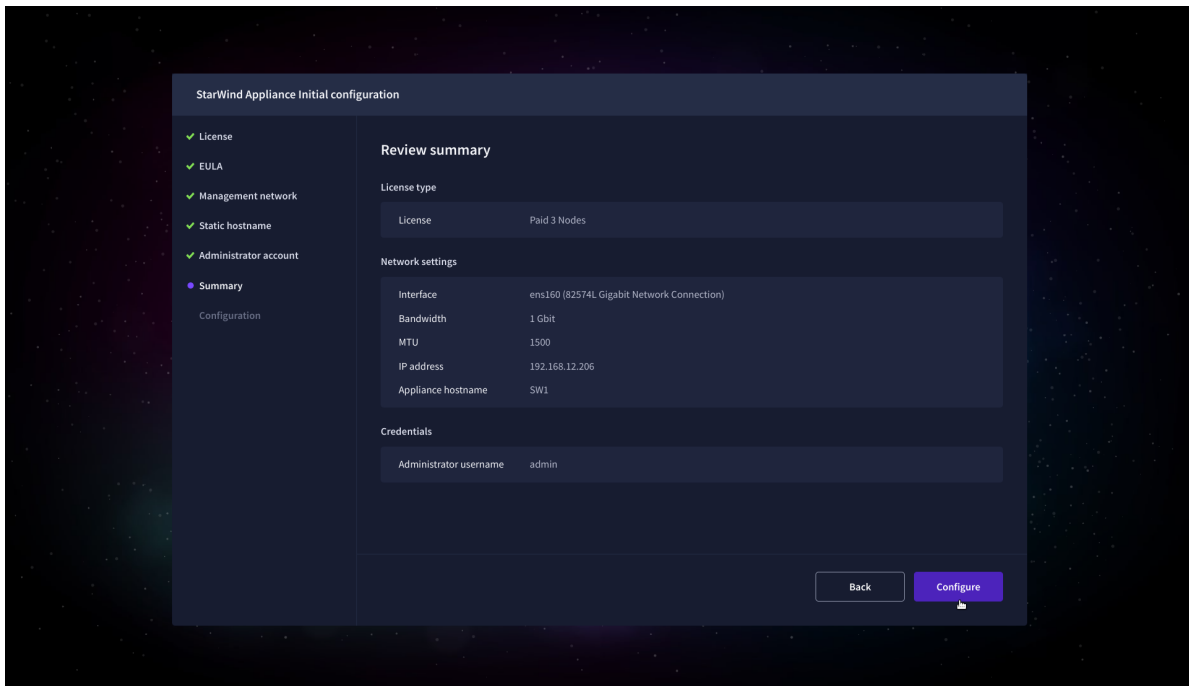
8. On the Static hostname, specify the hostname for the virtual machine and click Next.



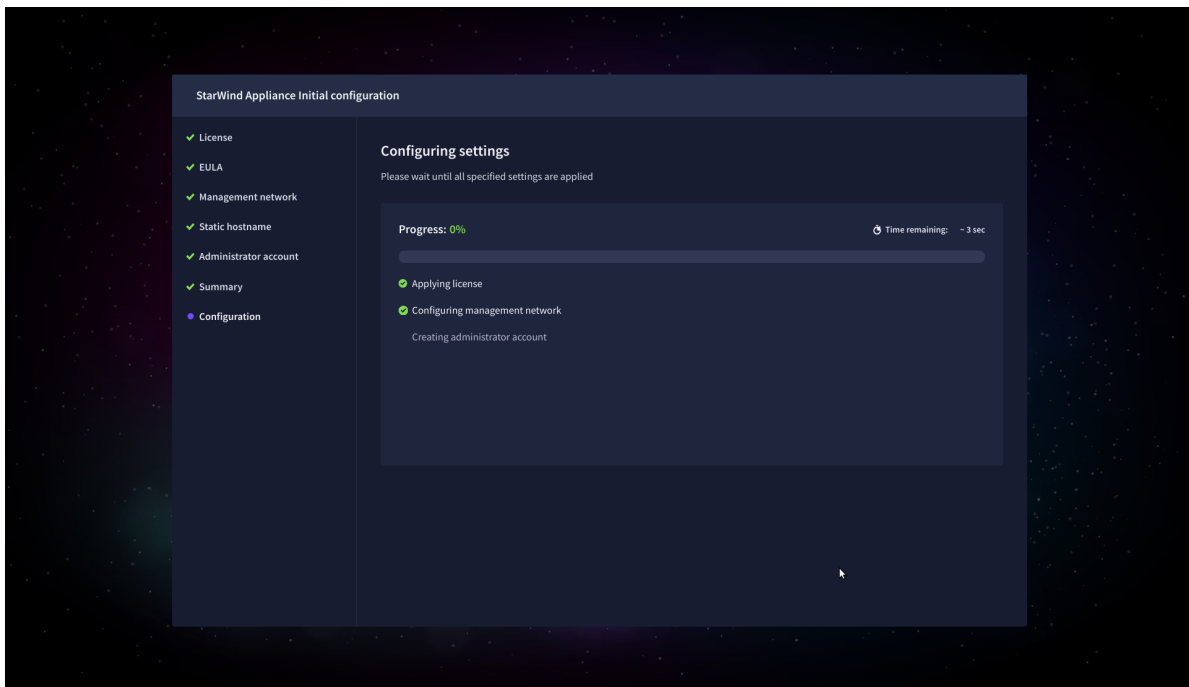
9. On the Administrator account step, specify the credentials for the new StarWind Virtual SAN administrator account and click Next.



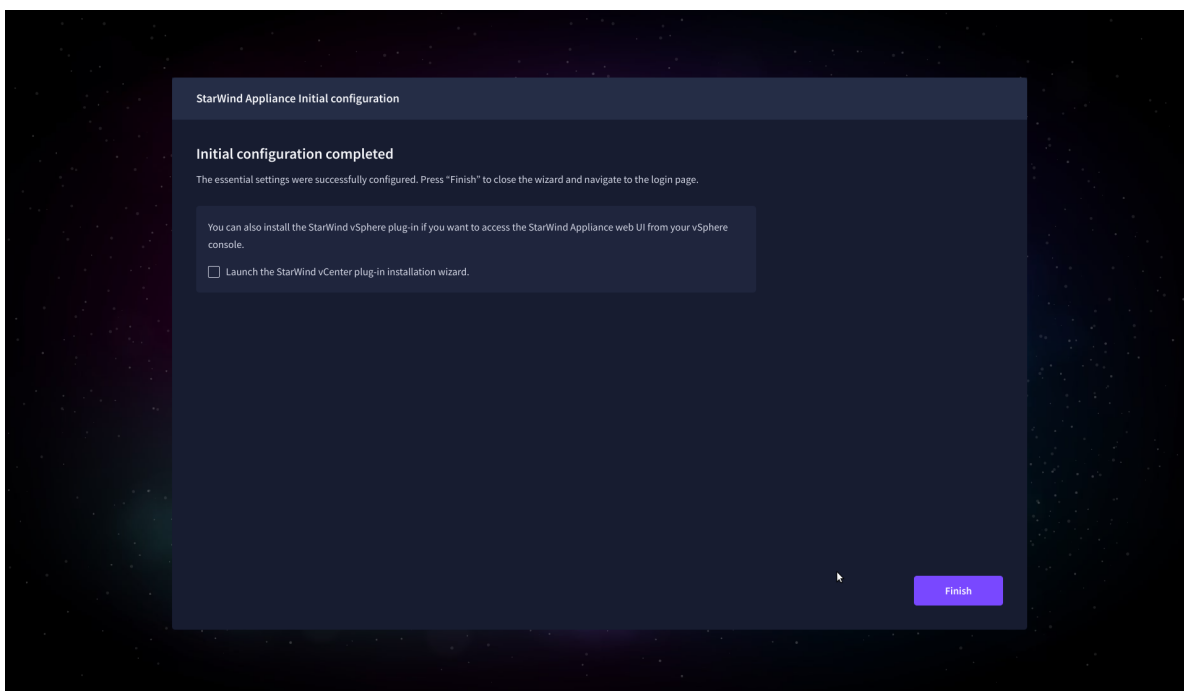
10. Wait until the Initial Configuration Wizard configures StarWind Virtual SAN for you.



11. Please standby until the Initial Configuration Wizard configures StarWind VSAN for you.



12. After the configuration process is completed, click Finish to install the StarWind vCenter Plugin immediately, or uncheck the checkbox to skip this step and proceed to the Login page.

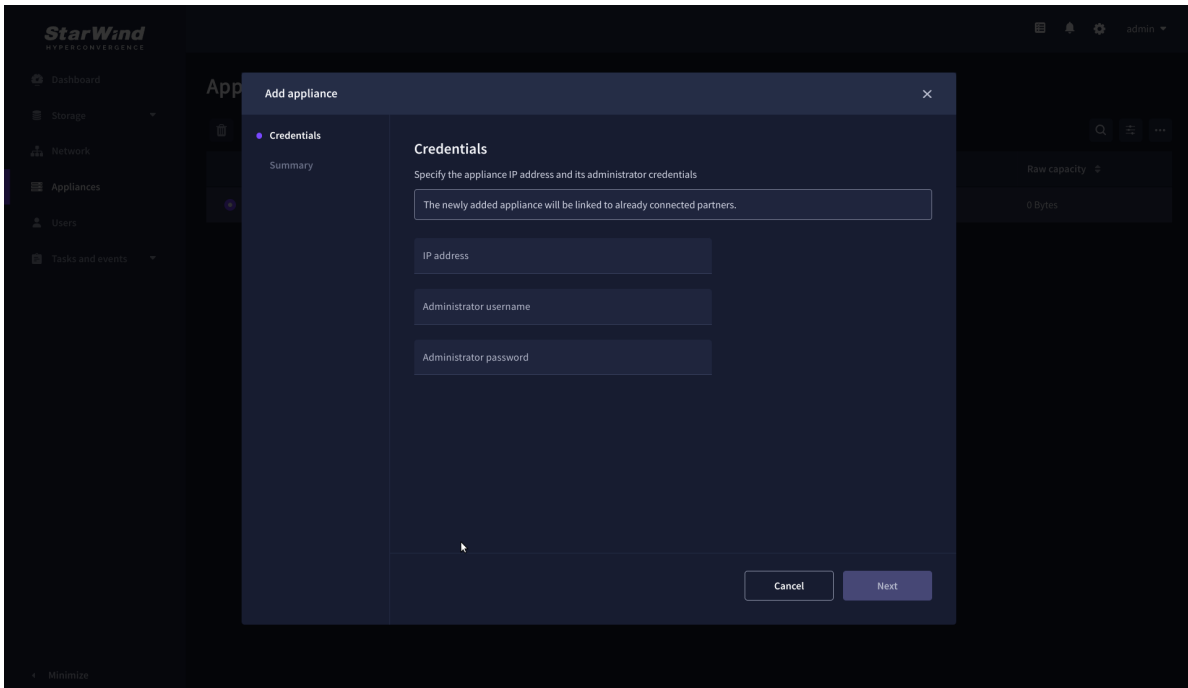


13. Repeat steps 1 through 12 on each Windows Server host.

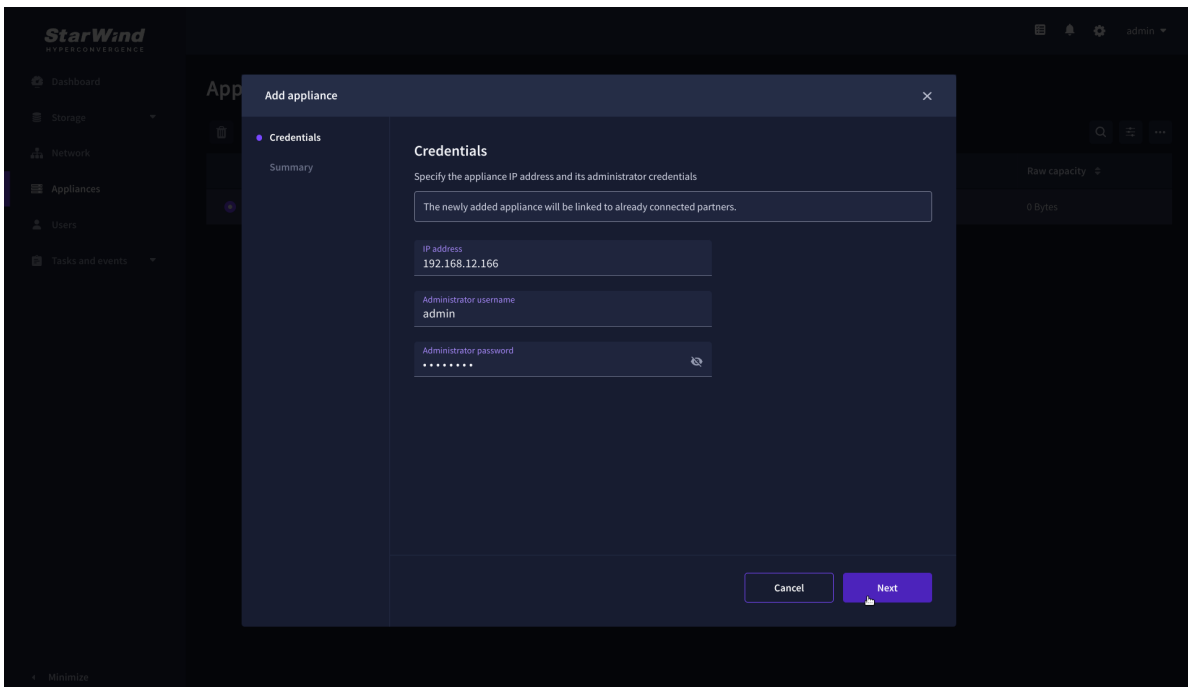
## Add Appliance

To create replicated, highly available storage, add partner appliances that use the same StarWind Virtual SAN license key.

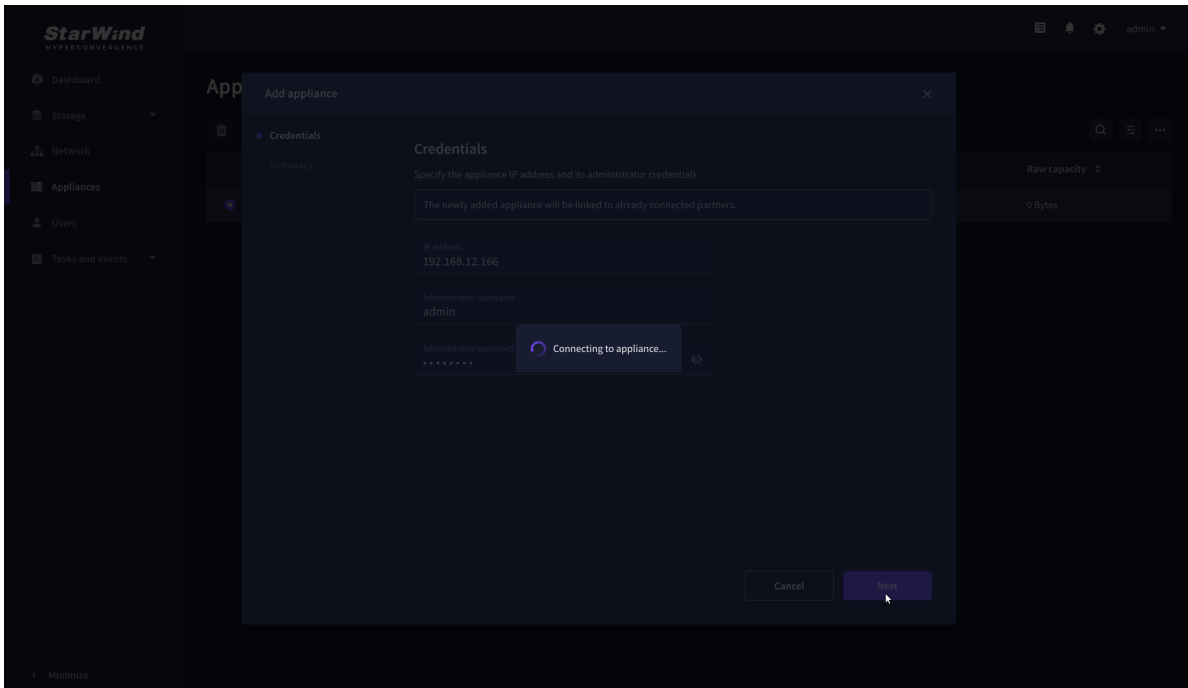
1. Navigate to the Appliances page and click Add to open the Add appliance wizard.
2. On the Credentials step, enter the IP address and credentials for the partner StarWind Virtual SAN appliance, then click Next.



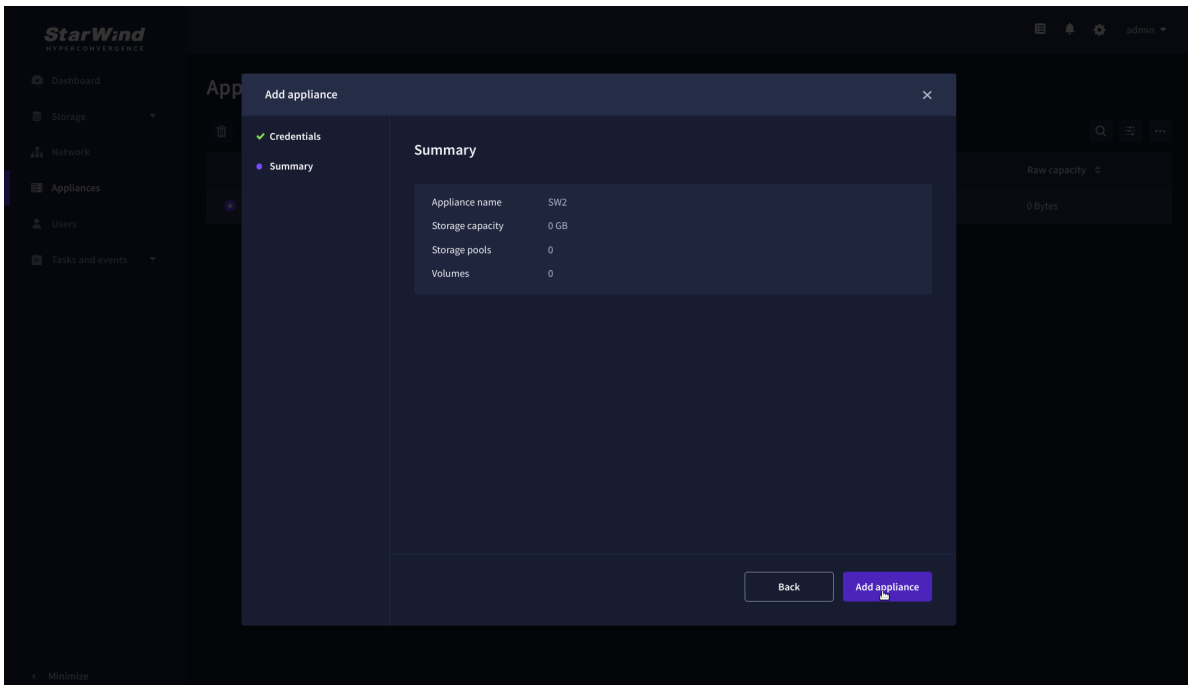
3. Provide credentials of partner appliance.



4. Wait for the connection to be established and the settings to be validated

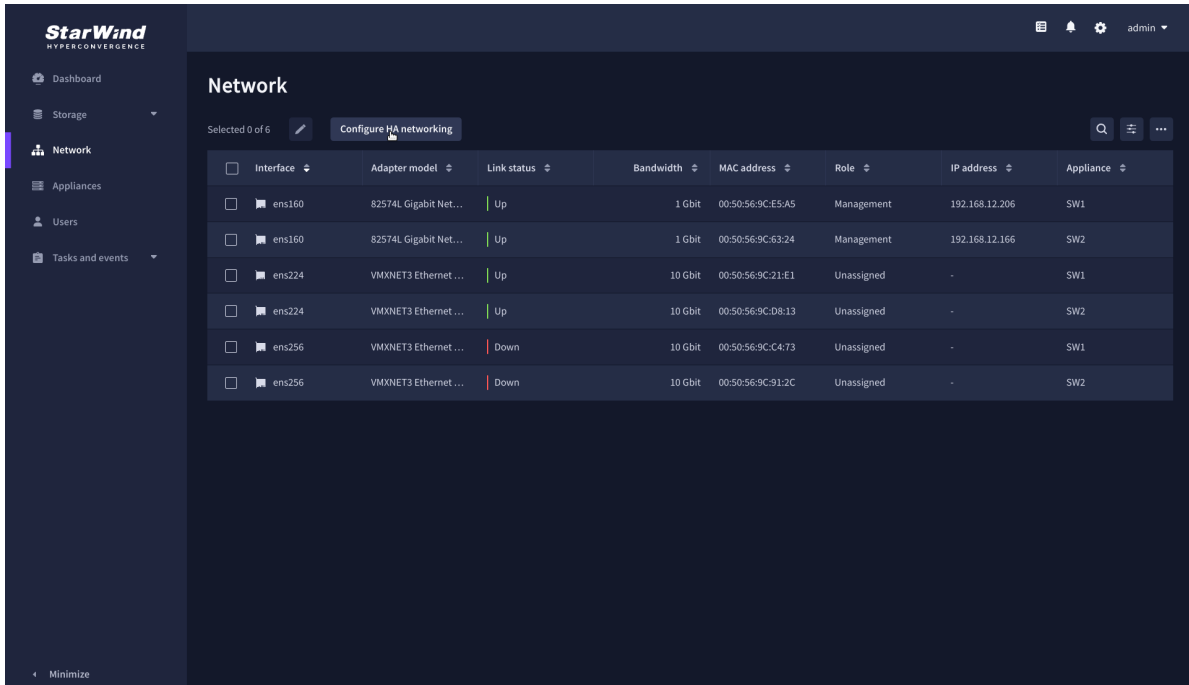


5. On the Summary step, review the properties of the partner appliance, then click Add Appliance.



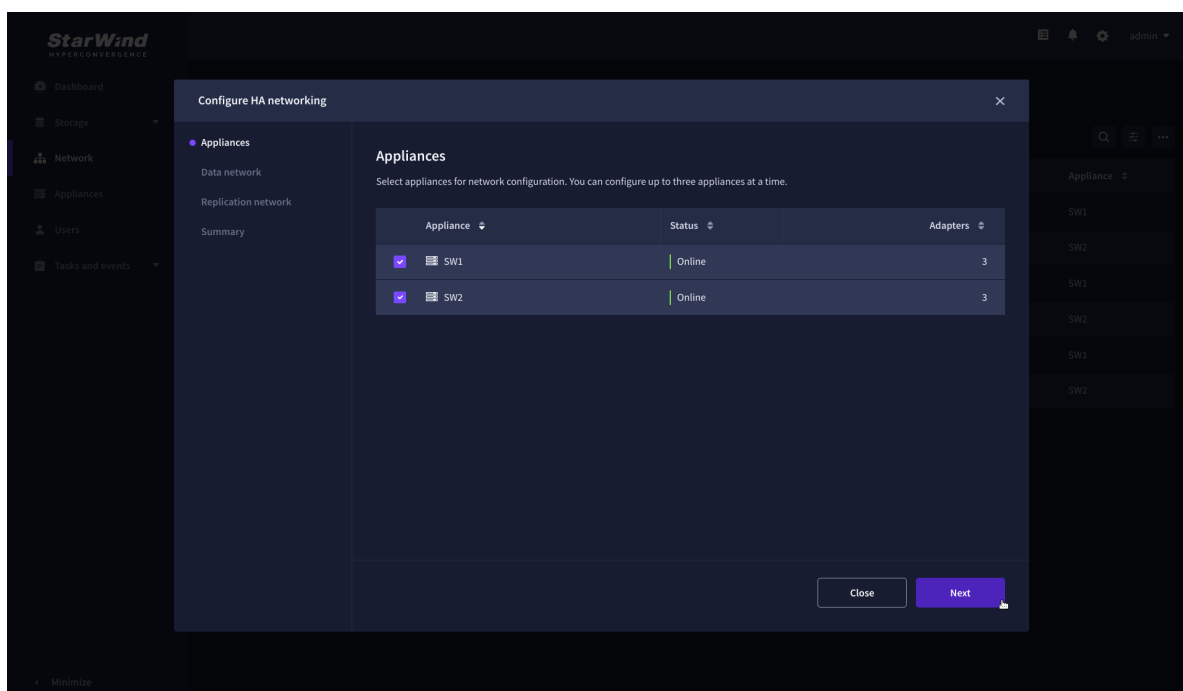
## Configure Ha Networking

1. Navigate to the Network page and open Configure HA networking wizard.



2. On the Appliances step, select either 2 partner appliances to configure two-way replication, or 3 appliances for three-way replication, then click Next.

NOTE: The number of appliances in the cluster is limited by your StarWind Virtual SAN license.



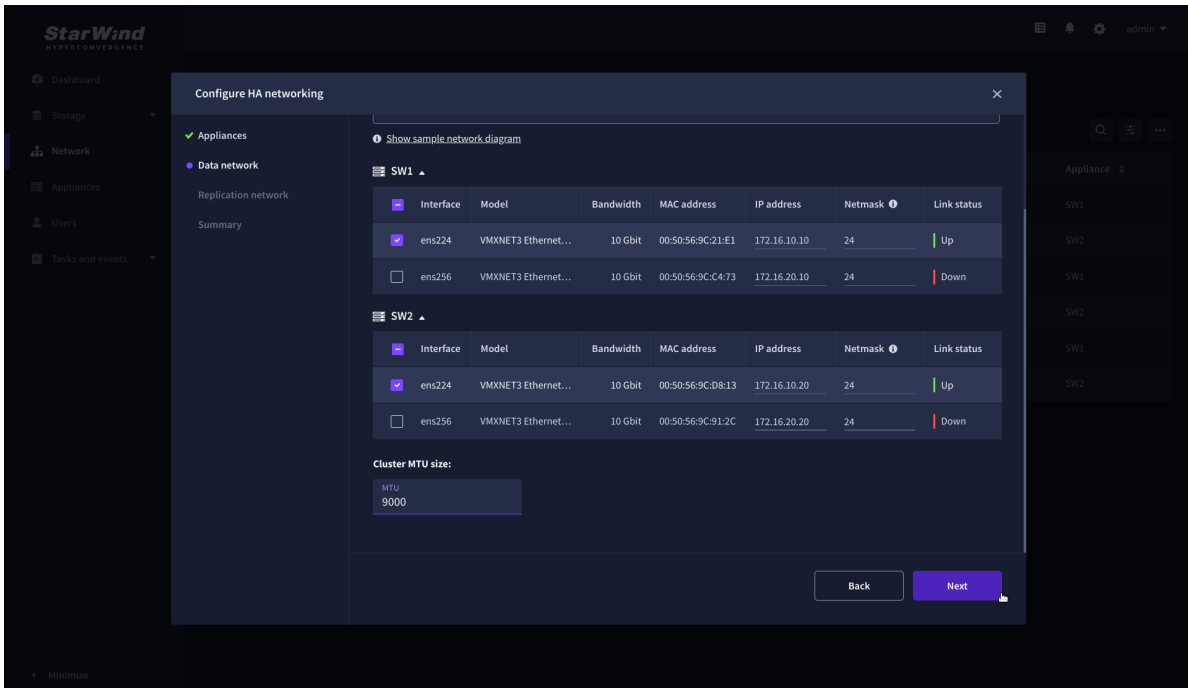
3. On the Data Network step, select the network interfaces designated to carry iSCSI or NVMe-oF storage traffic. Assign and configure at least one interface on each appliance (in our example: 172.16.10.10 and 172.16.10.20) with a static IP address in a unique network (subnet), specify the subnet mask and Cluster MTU size.

**IMPORTANT:** For a redundant, high-availability configuration, configure at least 2 network interfaces on each appliance. Ensure that the Data Network interfaces are interconnected between appliances through multiple direct links or via redundant switches.

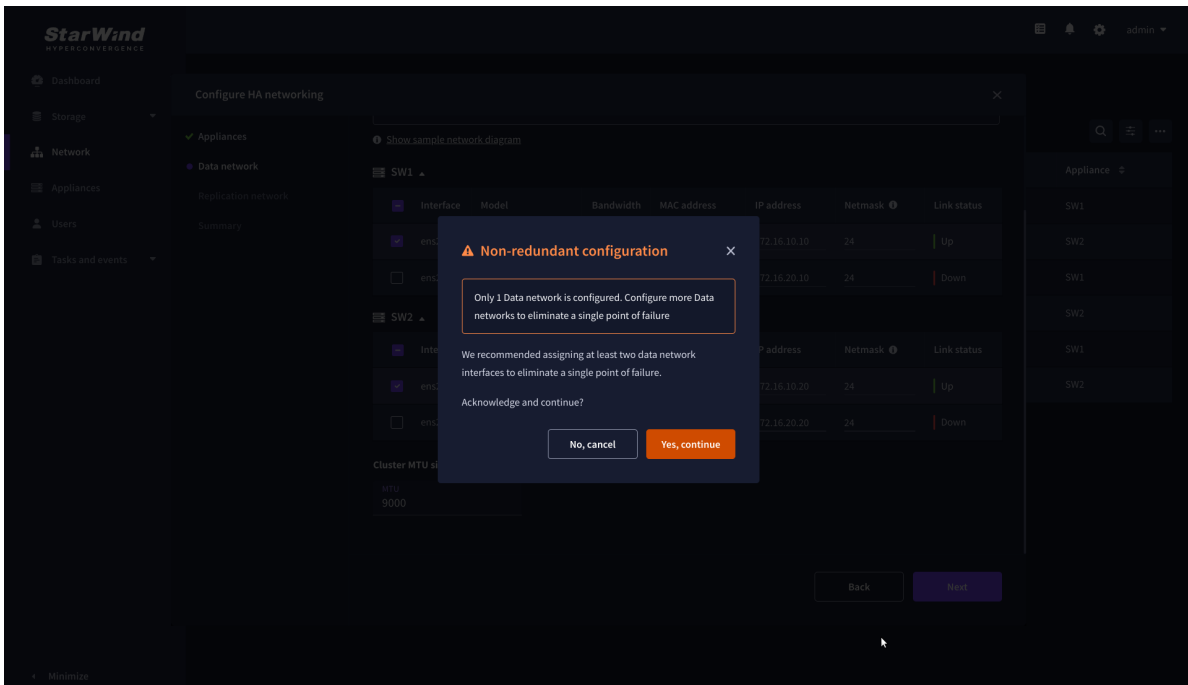
4. Assign MTU value on all selected network adapters, e.g. 1500 or 9000 bytes. If you are using network switches with the selected Data Network adapters, ensure that they are configured with the same MTU size value. In case of MTU settings mismatch, stability and performance issues might occur on the whole setup.

**NOTE:** Setting MTU to 9000 bytes on some physical adapters (like Intel Ethernet Network Adapter X710, Broadcom network adapters, etc.) might cause stability and performance issues depending on the installed network driver. To avoid them, use 1500 bytes MTU size or install the stable version of the driver.

5. Once configured, click Next to validate network settings.



6. The warning might appear if a single data interface is configured. Click Yes, continue to proceed with the configuration.



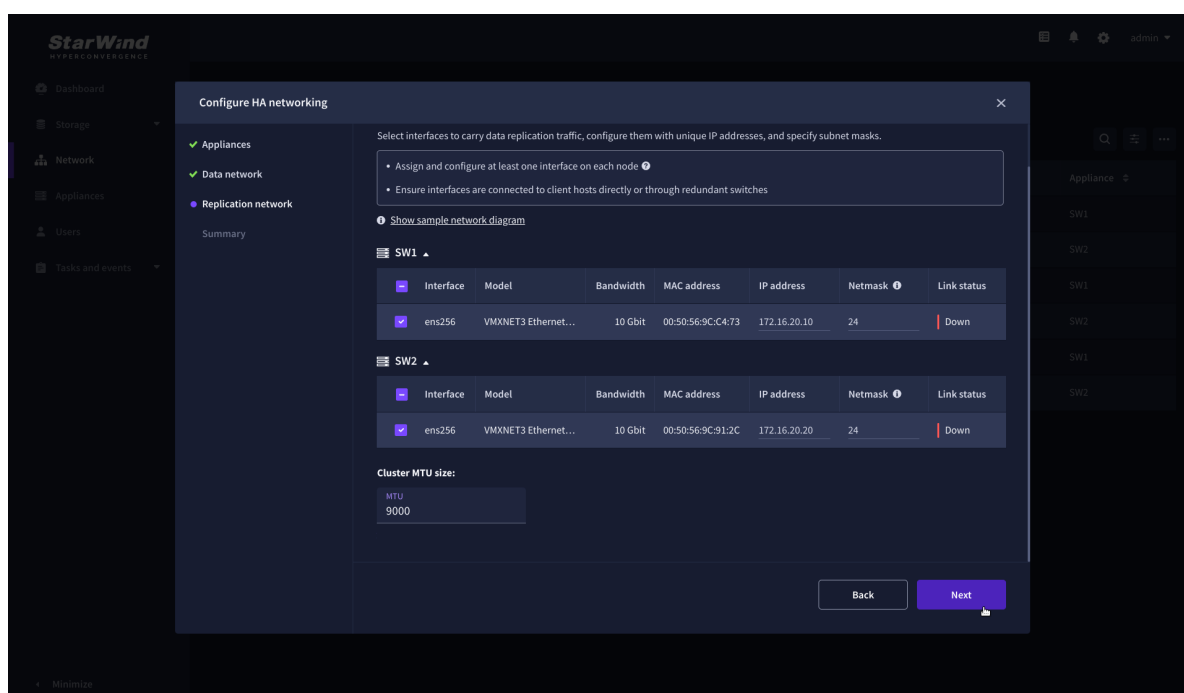
7. On the Replication Network step, select the network interfaces designated to carry the traffic for synchronous replication. Assign and configure at least one interface on each appliance with a static IP address in a unique network (subnet), specify the subnet mask and Cluster MTU size.

**IMPORTANT:** For a redundant, high-availability configuration, configure at least 2 network interfaces on each appliance. Ensure that the Replication Network interfaces are interconnected between appliances through multiple direct links or via redundant switches.

8. Assign MTU value on all selected network adapters, e.g. 1500 or 9000 bytes. If you are using network switches with the selected Replication Network adapters, ensure that they are configured with the same MTU size value. In case of MTU settings mismatch, stability and performance issues might occur on the whole setup.

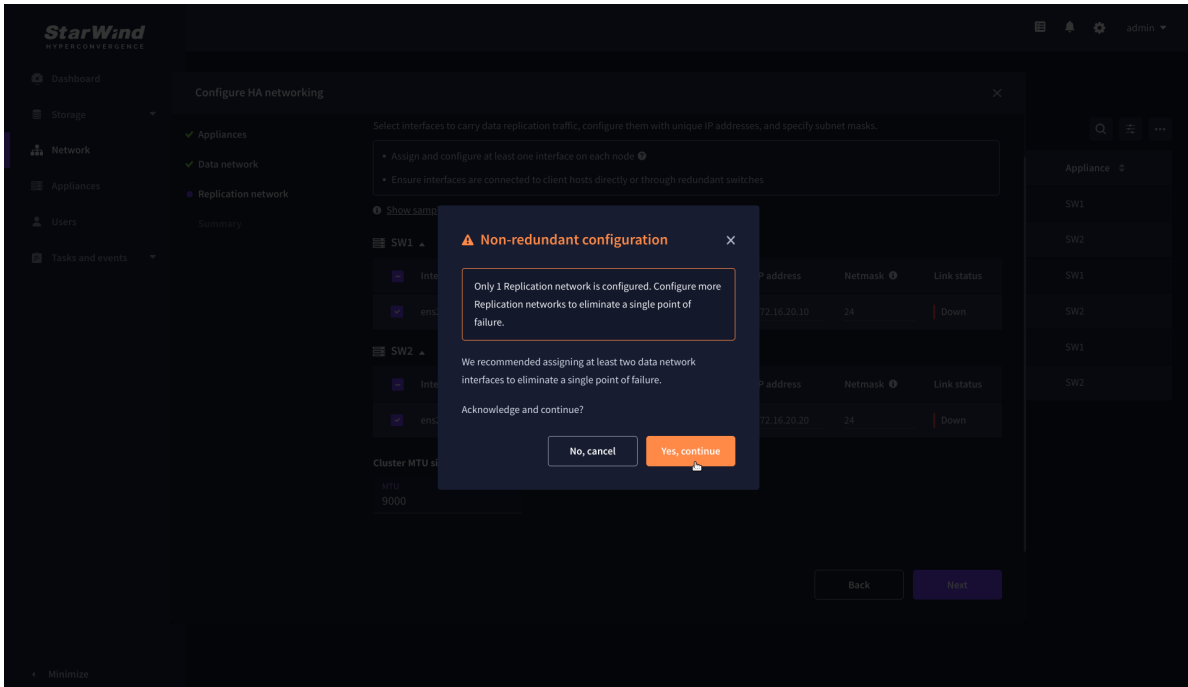
**NOTE:** Setting MTU to 9000 bytes on some physical adapters (like Intel Ethernet Network Adapter X710, Broadcom network adapters, etc.) might cause stability and performance issues depending on the installed network driver. To avoid them, use 1500 bytes MTU size or install the stable version of the driver.

9. Once configured, click Next to validate network settings.

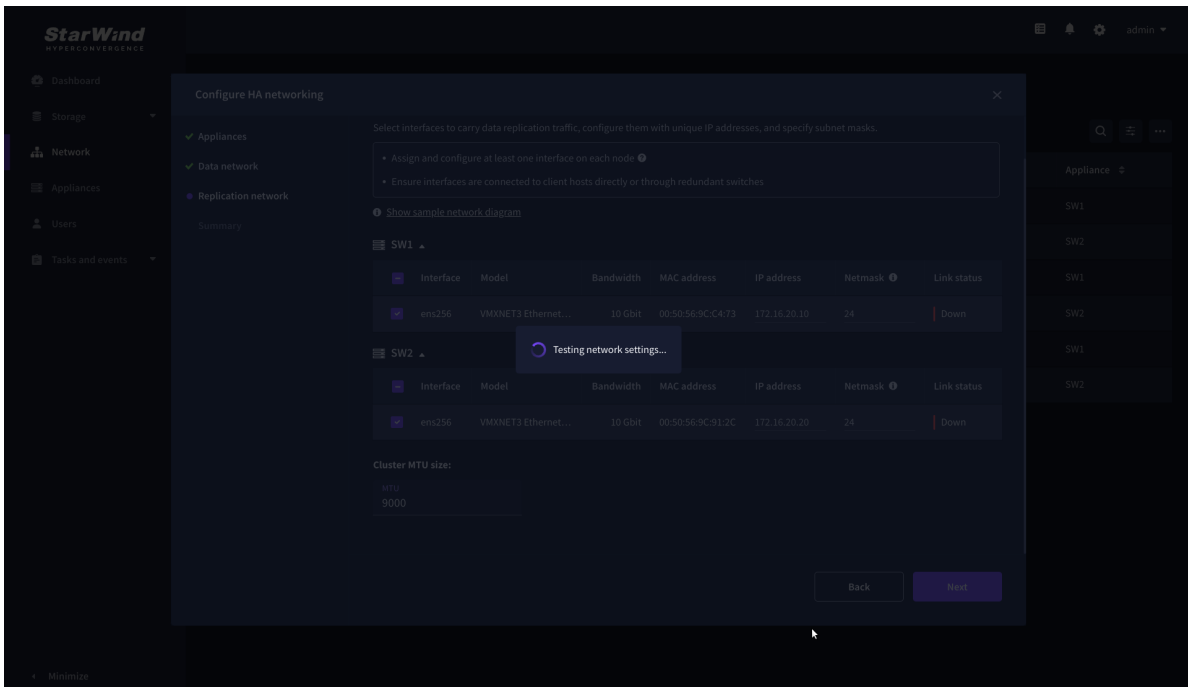


10. If only one Replication Network interface is configured on each partner appliance, a warning message will pop up. Click Yes, continue to acknowledge the warning and

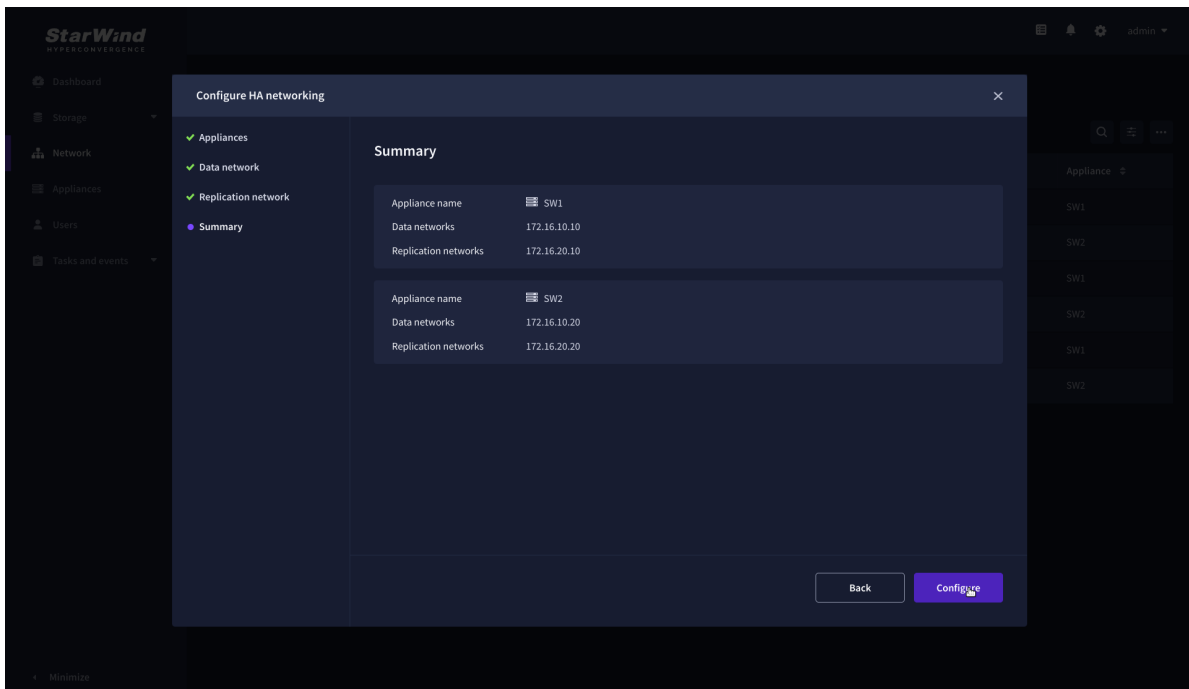
proceed.



11. Wait for the configuration completion.



12. On the Summary step, review the specified network settings and click Configure to apply the changes.



## Add Physical Disks

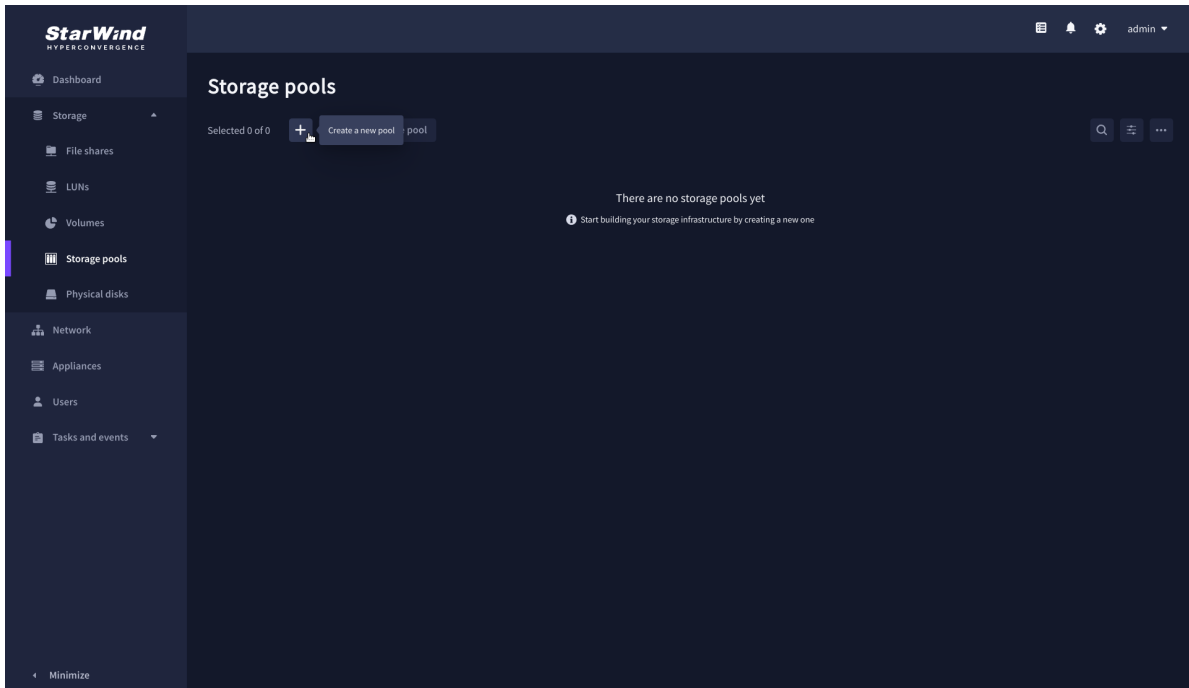
Attach physical storage to StarWind Virtual SAN Controller VM:

- Ensure that all physical drives are connected through an HBA or RAID controller.
- To get the optimal storage performance, add HBA, RAID controllers, or NVMe SSD drives to StarWind CVM via a passthrough device.

For detailed instructions, refer to [Microsoft's documentation on DDA](#). Also, find the storage provisioning guidelines in the [KB article](#).

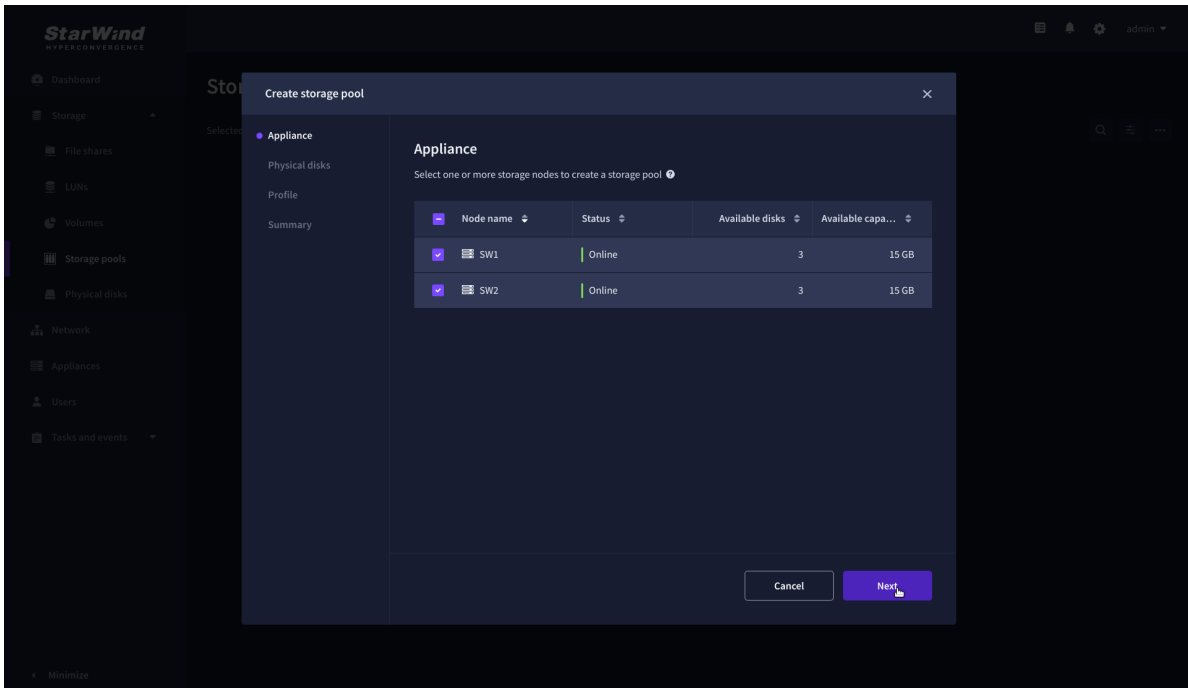
## Create Storage Pool

1. Navigate to the Storage pools page and click the + button to open the Create storage pool wizard .



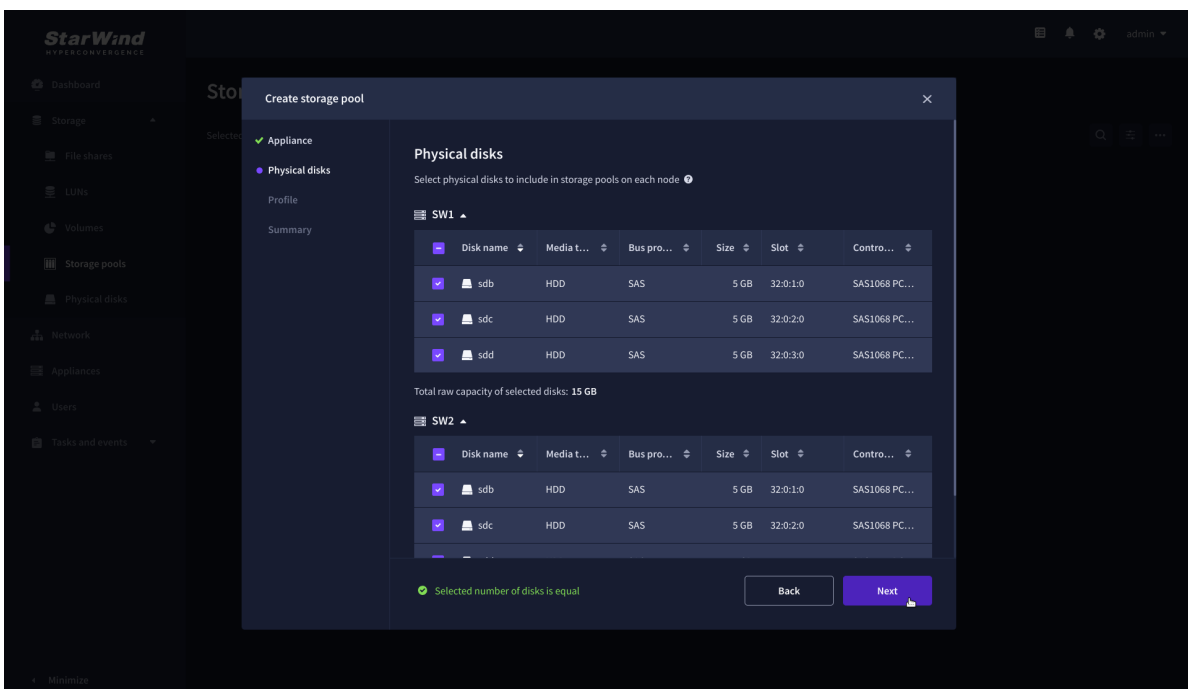
2. On the Appliance step, select partner appliances on which to create new storage pools, then click Next.

NOTE: Select 2 appliances for configuring storage pools if you are deploying a two-node cluster with two-way replication, or select 3 appliances for configuring a three-node cluster with a three-way mirror.

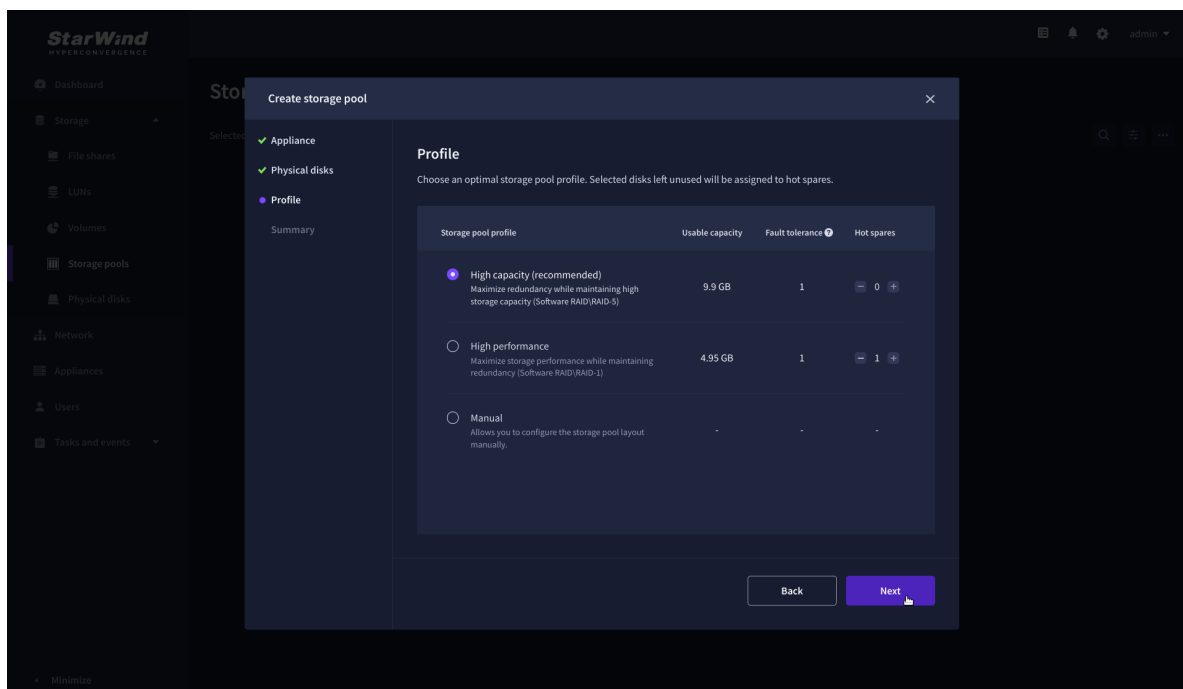


3. On the Physical disks step, select physical disks to be pooled on each node, then click Next.

**IMPORTANT:** Select an identical type and number of disks on each appliance to create storage pools with a uniform configuration.



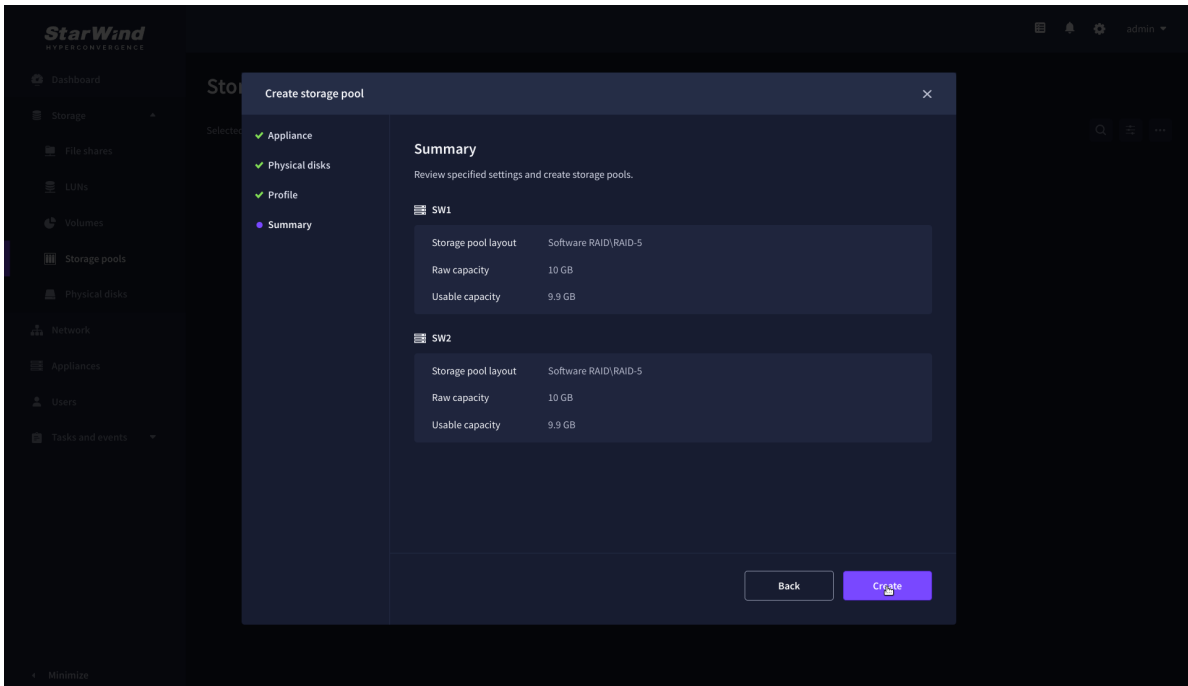
4. On the Profile step, select one of the preconfigured storage profiles, or choose Manual to configure the storage pool manually based on your redundancy, capacity, and performance requirements, then click Next.



NOTE: Hardware RAID, Linux Software RAID, and ZFS storage pools are supported. To simplify the configuration of storage pools, preconfigured storage profiles are provided. These profiles recommend a pool type and layout based on the attached storage:

- High capacity - creates Linux Software RAID-5 to maximize storage capacity while maintaining redundancy.
- High performance - creates Linux Software RAID-10 to maximize storage performance while maintaining redundancy.
- Hardware RAID - configures a hardware RAID virtual disk as a storage pool. This option is available only if a hardware RAID controller is passed through to the StarWind Virtual SAN.
- Better redundancy - creates ZFS Striped RAID-Z2 (RAID 60) to maximize redundancy while maintaining high storage capacity.
- Manual - allows users to configure any storage pool type and layout with the attached storage.

5. On the Summary step, review the storage pool settings and click Create to configure new storage pools on the selected appliances.



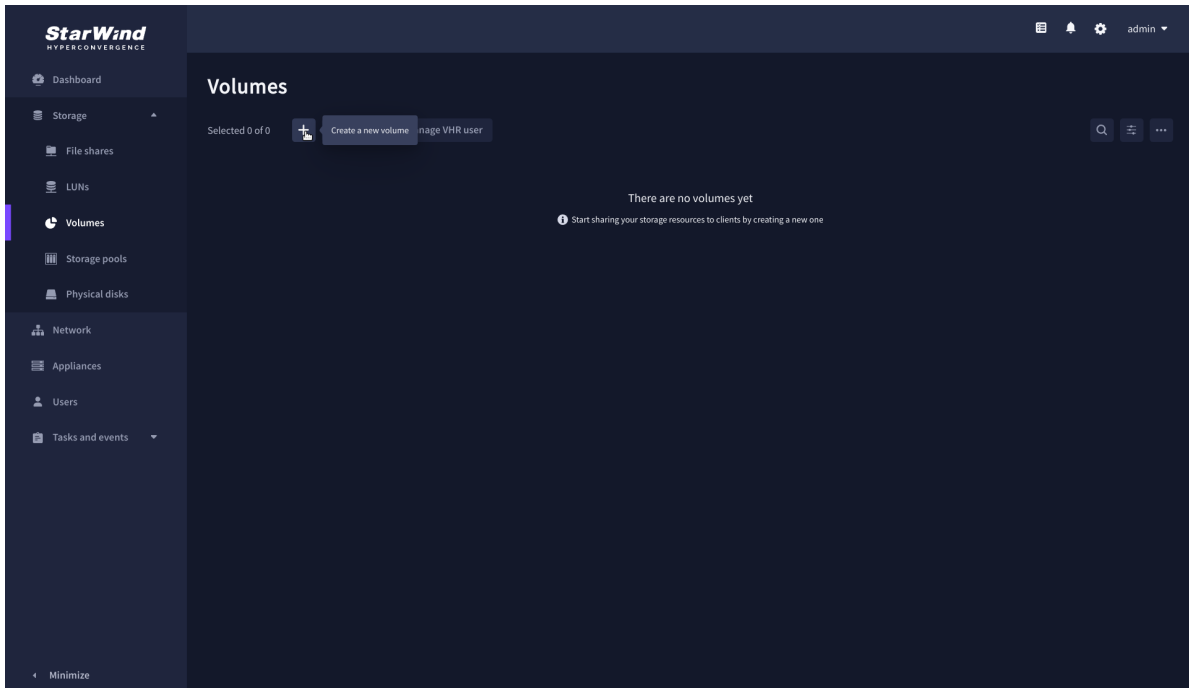
NOTE: The storage pool configuration may take some time, depending on the type of pooled storage and the total storage capacity. Once the pools are created, a notification will appear in the upper right corner of the Web UI.

IMPORTANT: In some cases, additional tweaks are required to optimize the storage performance of the disks added to the Controller Virtual Machine. Please follow the steps in this KB to change the scheduler type depending on the disks type:

<https://knowledgebase.starwindsoftware.com/guidance/starwind-vsan-for-vsphere-changing-linux-i-o-scheduler-to-optimize-storage-performance/>

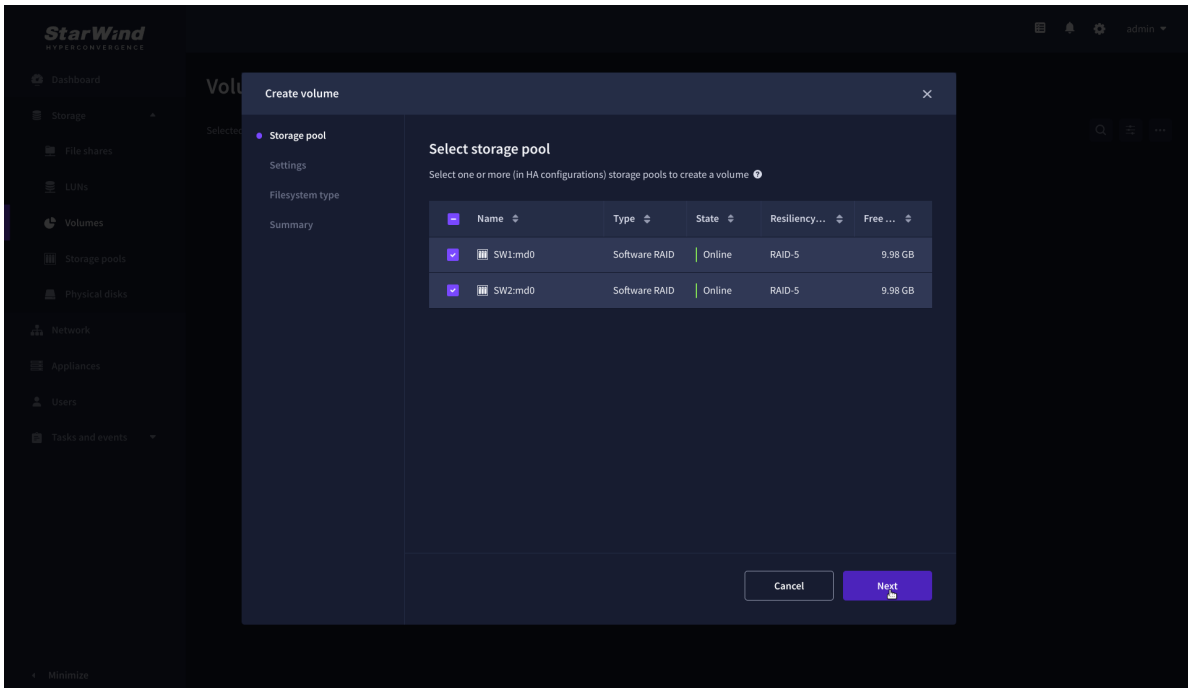
## Create Volume

1. Navigate to the Volumes page and click the + button to open the Create volume wizard.

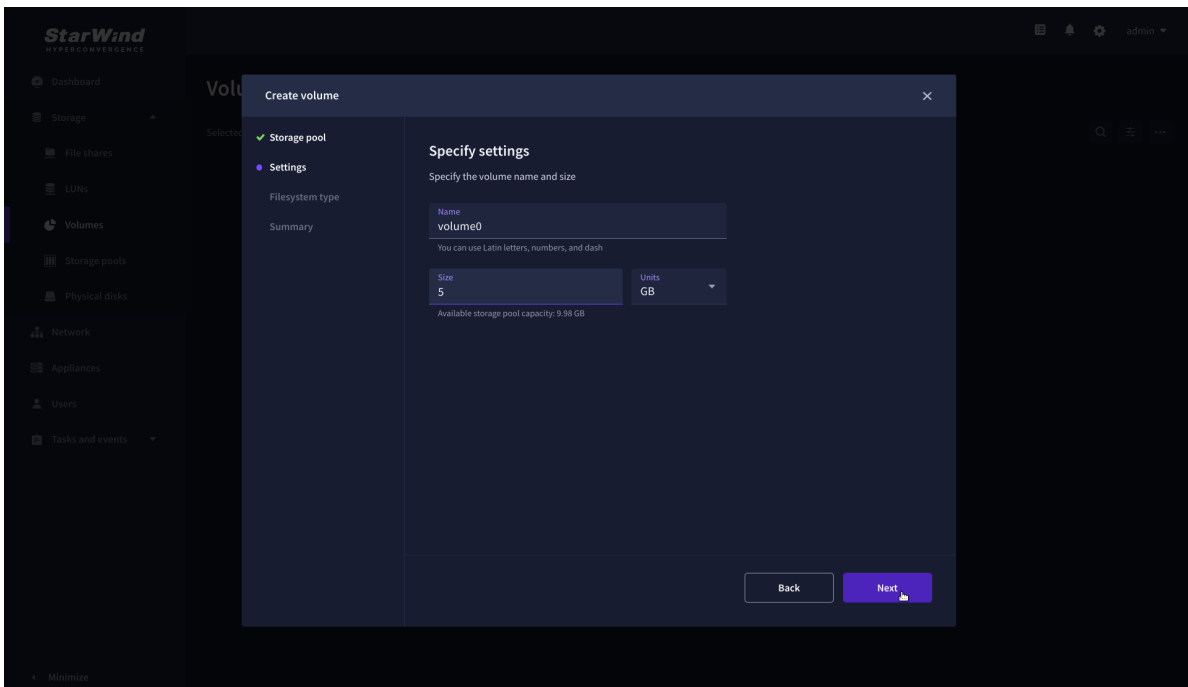


2. On the Storage pool step, select partner appliances on which to create new volumes, then click Next.

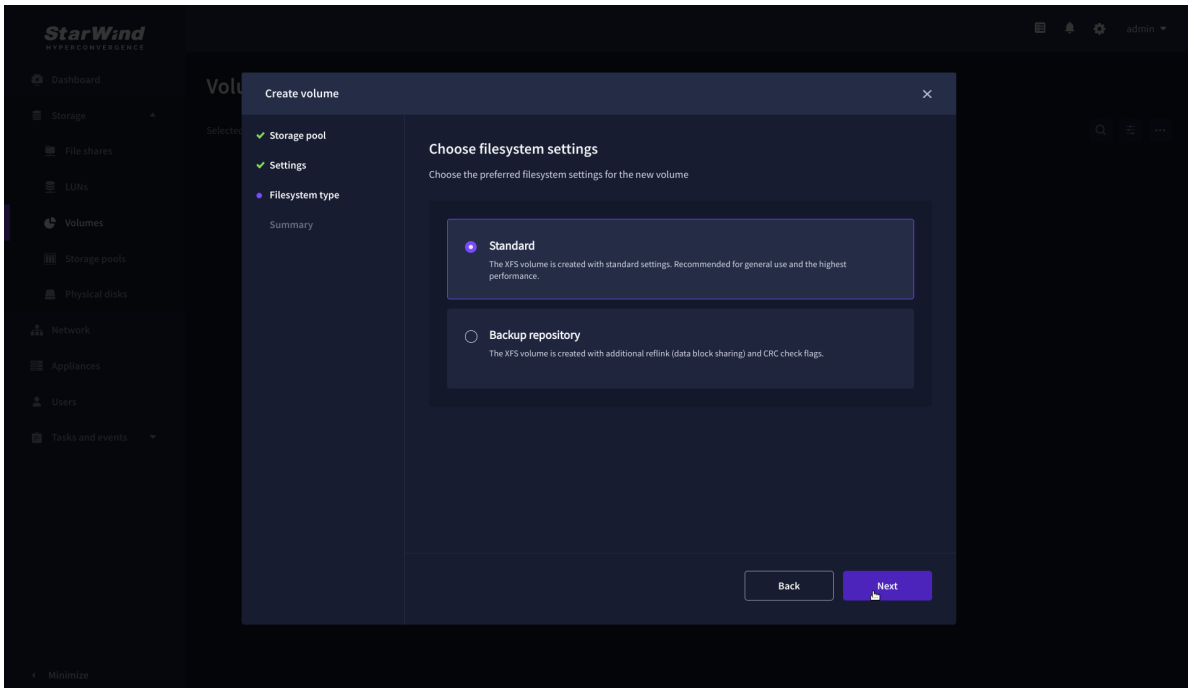
NOTE: Select 2 appliances for configuring volumes if you are deploying a two-node cluster with two-way replication, or select 3 appliances for configuring a three-node cluster with a three-way mirror.



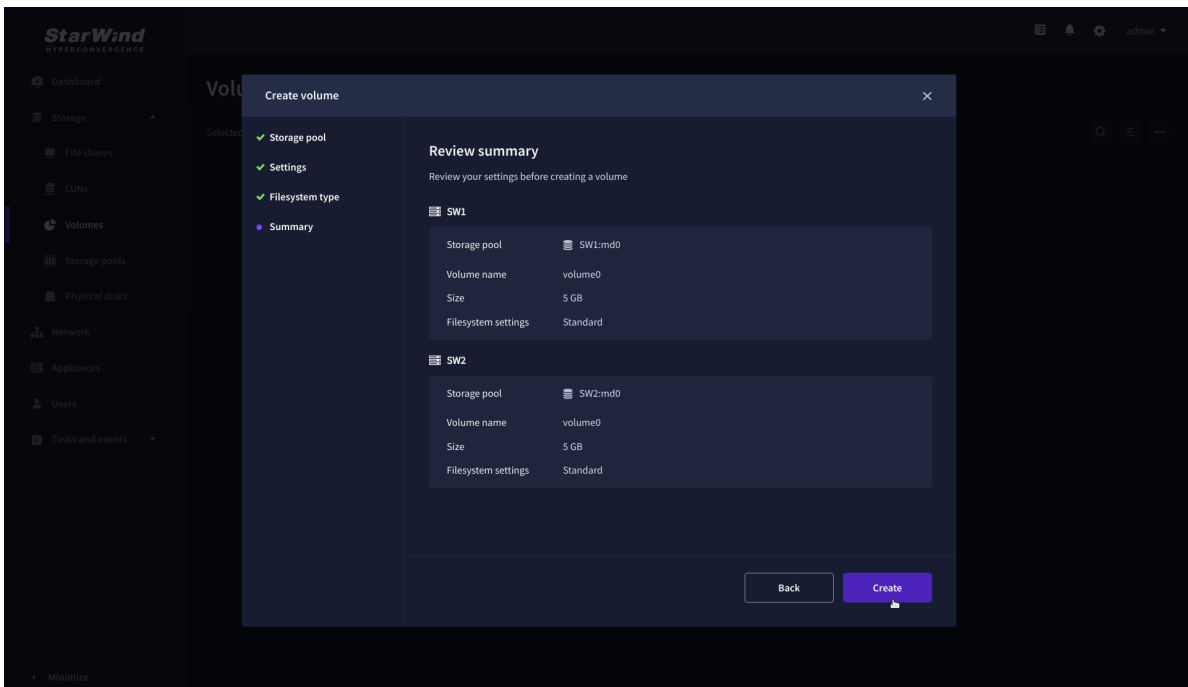
3. On the Settings step, specify the volume name and size, then click Next.



4. On the Filesystem type step, select Standard, then click Next.



5. Review Summary and click the Create button to create the pool.

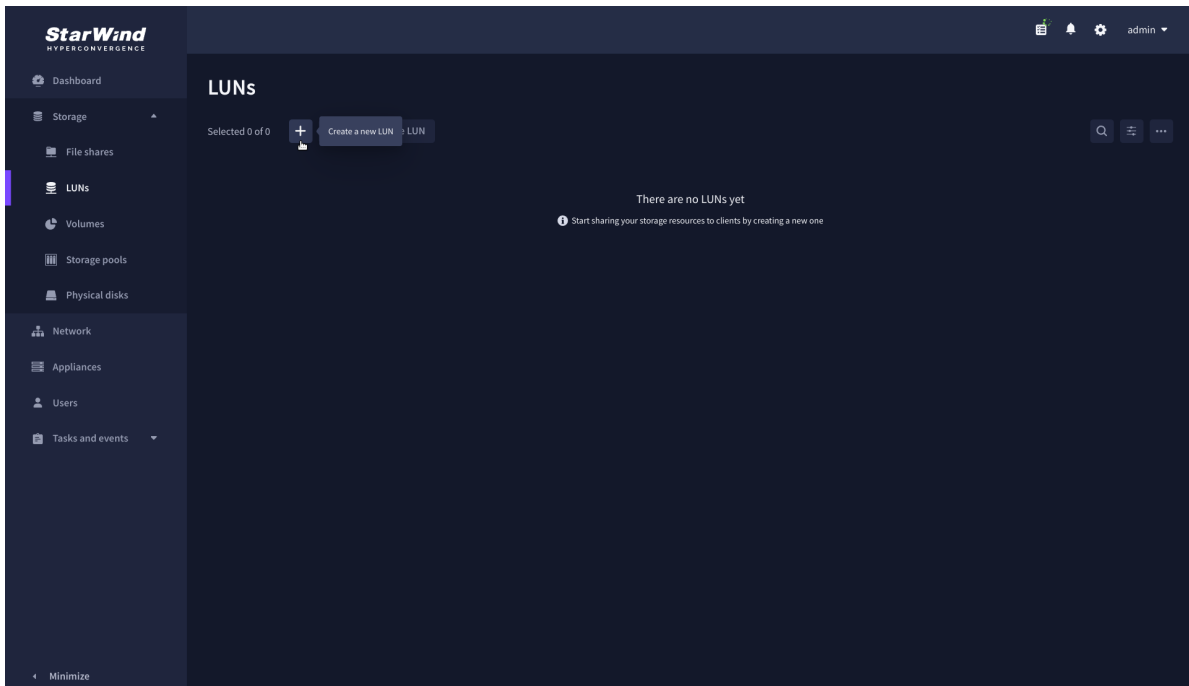


## Create Ha Lun Using Webui

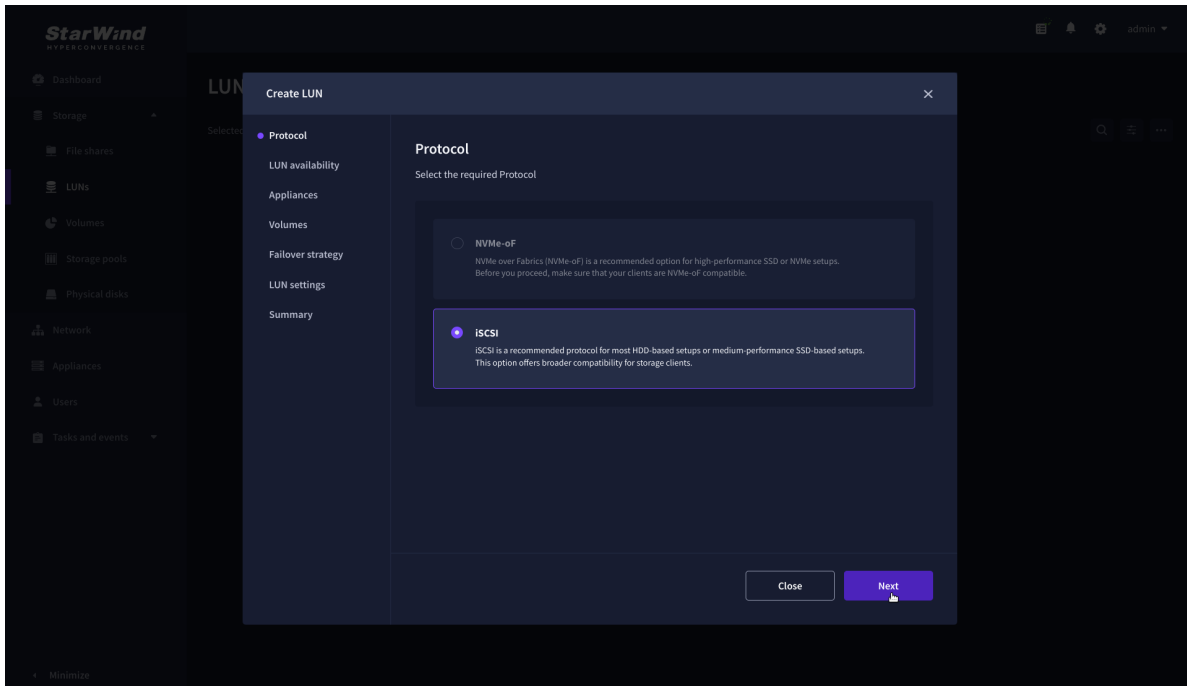
This section describes how to create LUN in Web UI. This option is available for the setups with Commercial, Trial, and NFR licenses applied.

For setups with a Free license applied, the PowerShell script should be used to create the LUN – please follow the steps described in the section: Create StarWind HA LUNs using PowerShell

1. Navigate to the LUNs page and click the + button to open the Create LUN wizard.



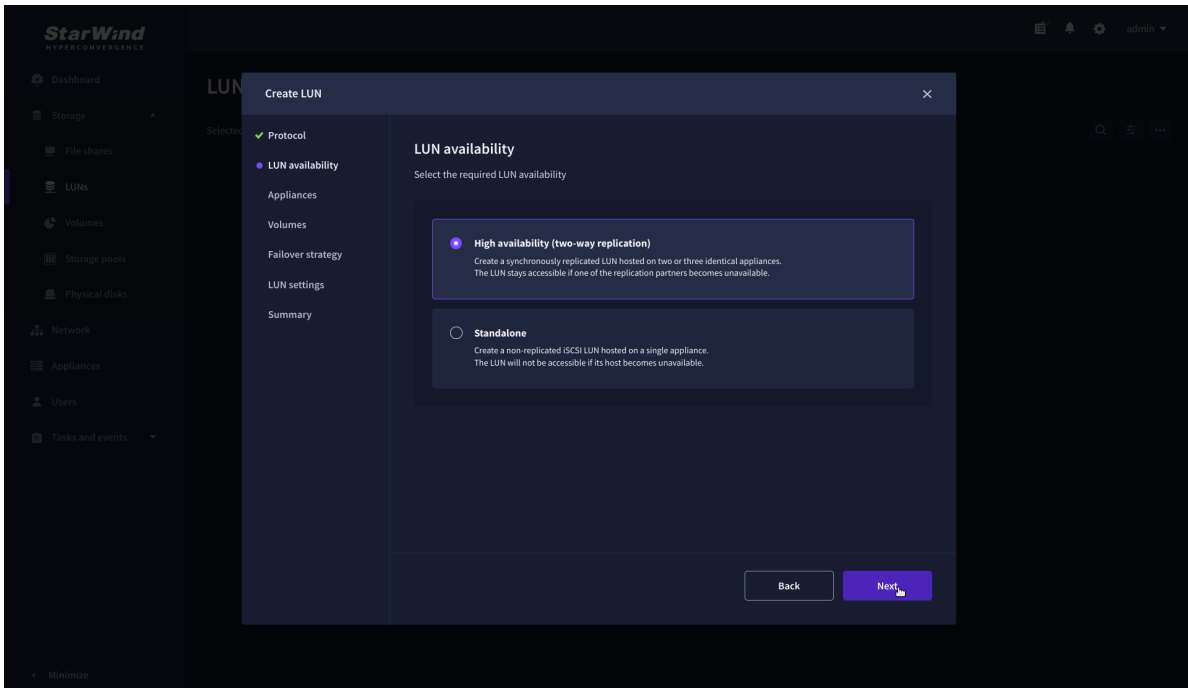
2. On the Protocols step, select the preferred storage protocol and click Next.



3. On the LUN availability step, select the High availability and click Next.

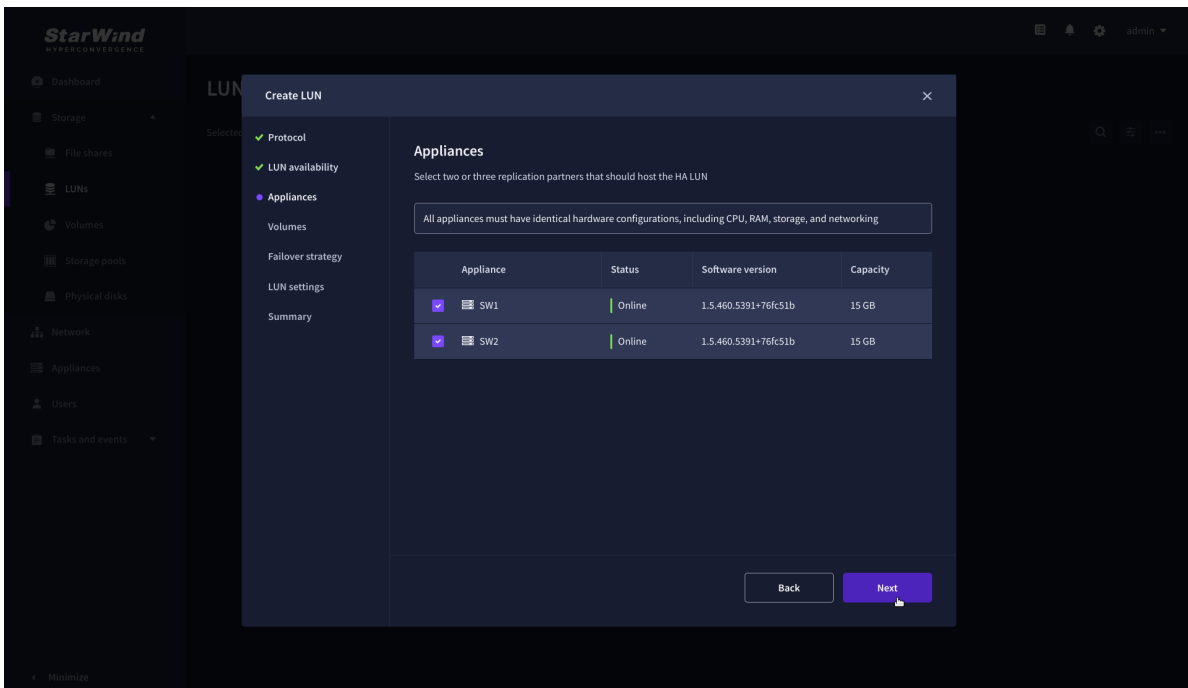
NOTE: The availability options for a LUN can be Standalone (without replication) or High Availability (with 2-way or 3-way replication), and are determined by the StarWind Virtual SAN license.

Below are the steps for creating a high-availability iSCSI LUN.



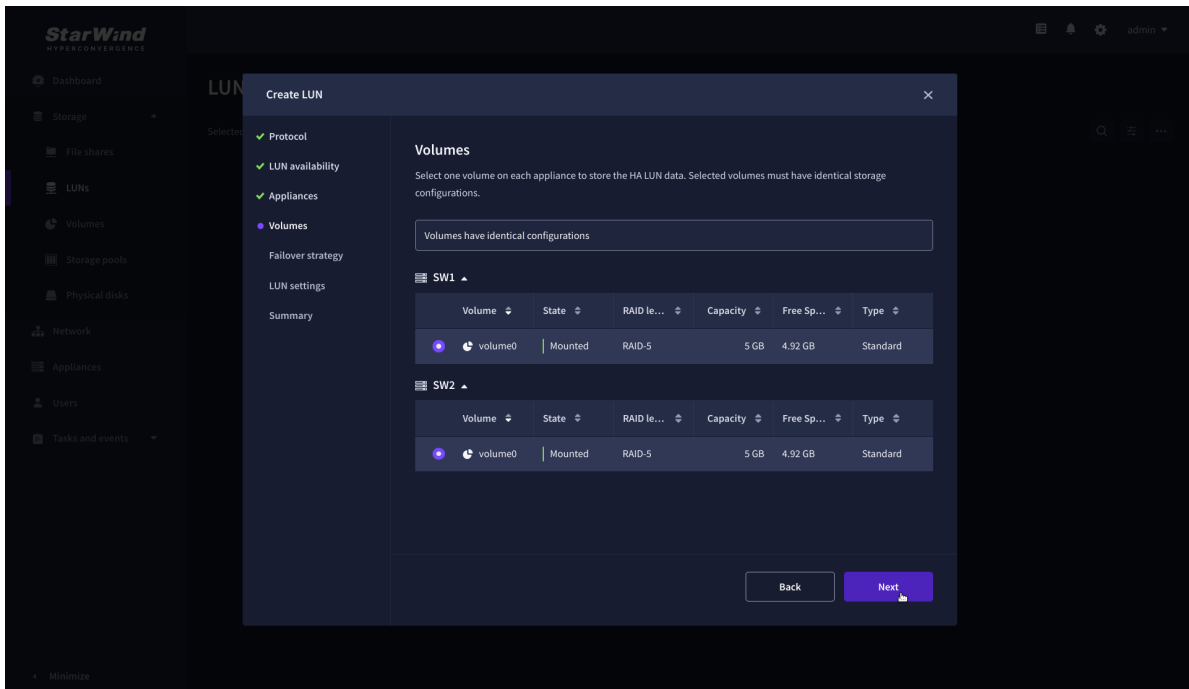
4. On the Appliances step, select partner appliances that will host new LUNs and click Next.

**IMPORTANT:** Selected partner appliances must have identical hardware configurations, including CPU, RAM, storage, and networking.



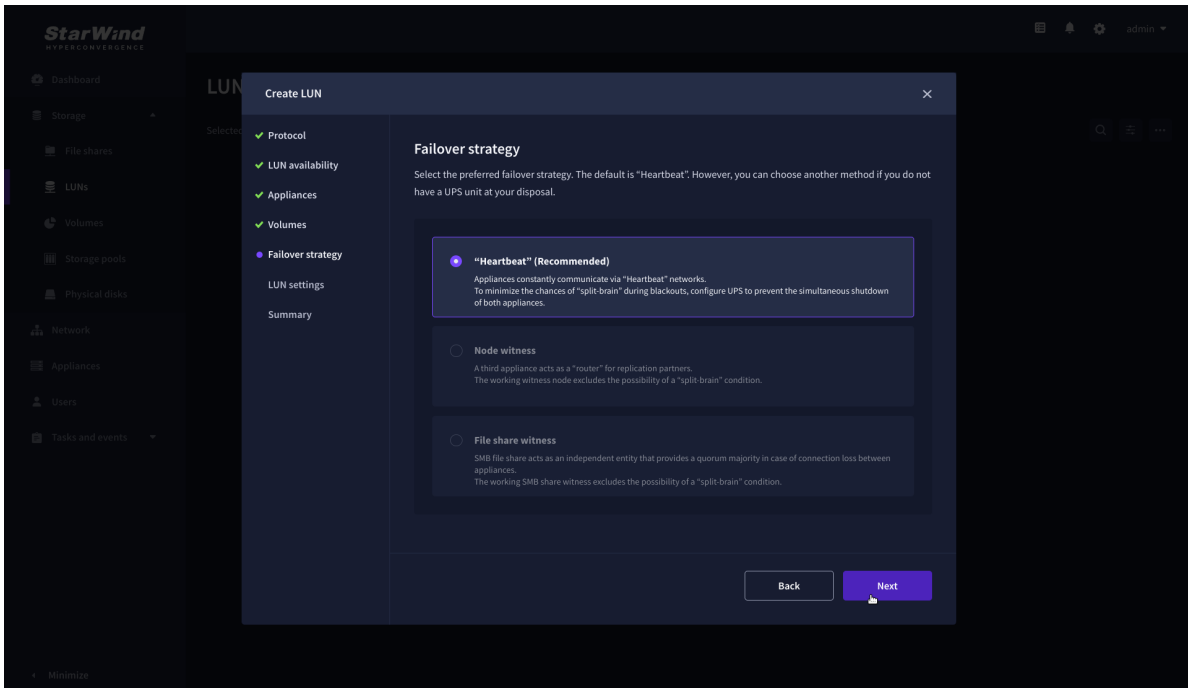
5. On the Volumes step, select the volumes for storing data on the partner appliances and click Next.

**IMPORTANT:** For optimal performance, the selected volumes must have identical underlying storage configurations.



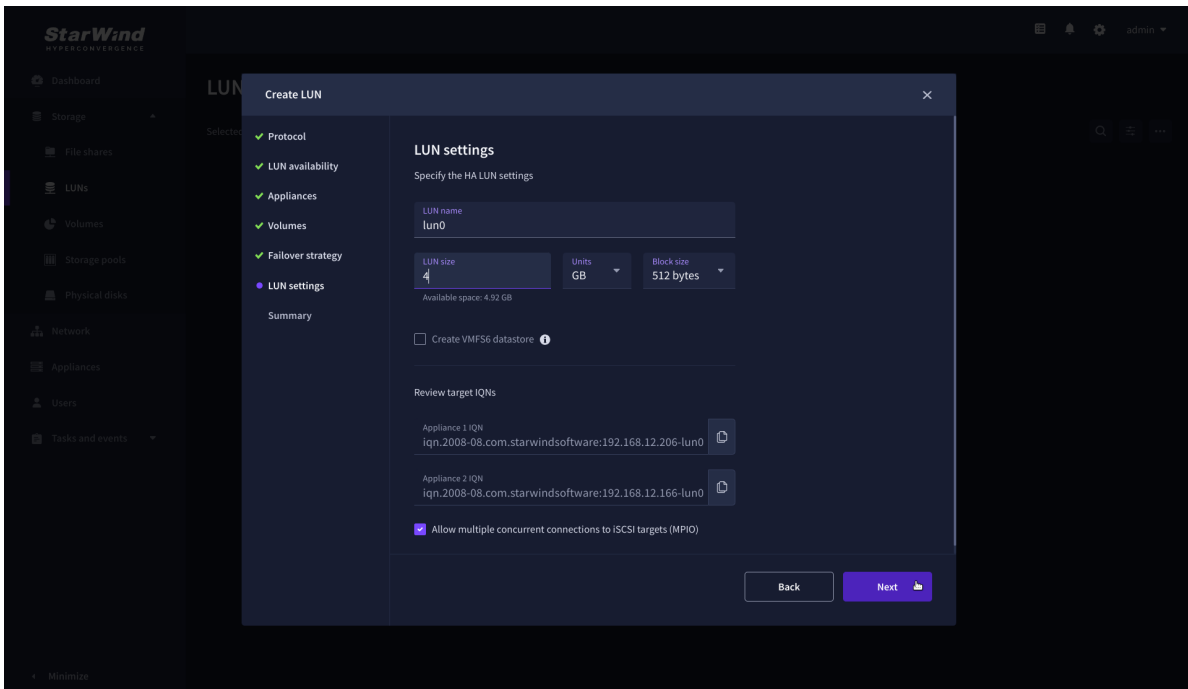
6. On the Failover strategy step, select the preferred failover strategy and click Next.

**NOTE:** The failover strategies for a LUN can be Heartbeat or Node Majority. In case of 2-nodes setup and None Majority failover strategy, Node witness (requires an additional third witness node), or File share witness (requires an external file share) should be configured. These options are determined by StarWind Virtual SAN license and setup configuration. Below are the steps for configuring the Heartbeat failover strategy in a two-node cluster.

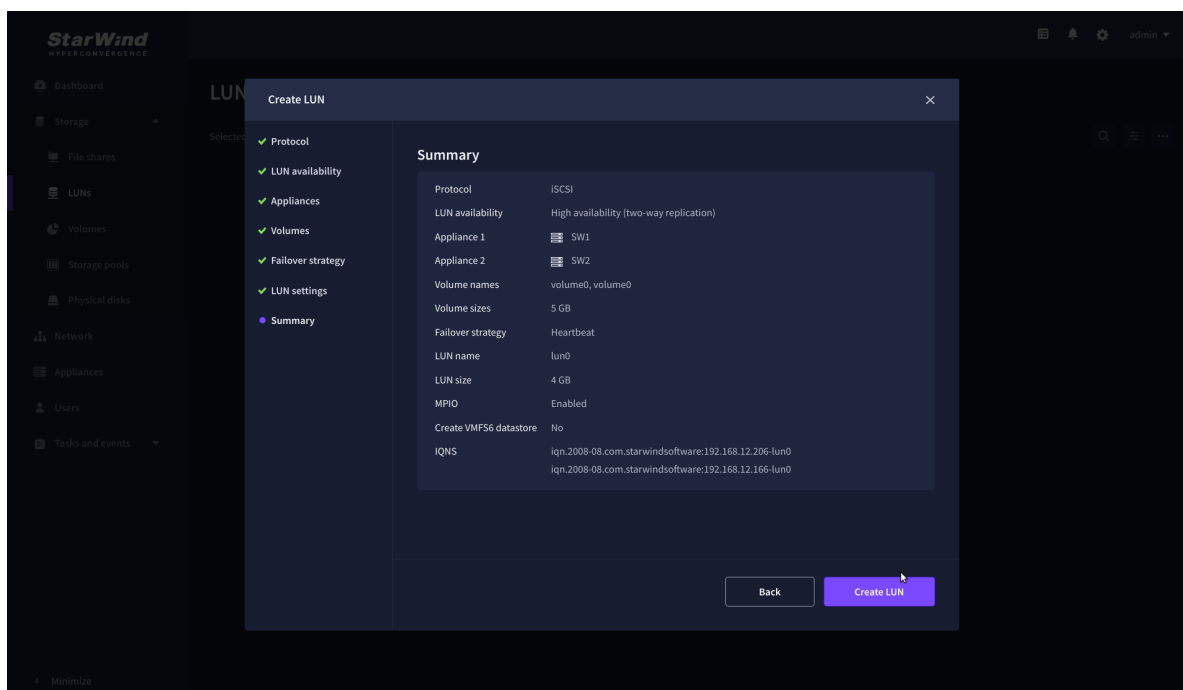


7. On the LUN settings step, specify the LUN name, size, block size, then click Next.

NOTE: For high-availability configurations, ensure that MPIO checkbox is selected.



8. On the Summary step, review the LUN settings and click Create to configure new LUNs on the selected volumes.



## Connecting Starwind Virtual Disk To Hyper-V Servers

Enabling Multipath Support on Hyper-V Servers

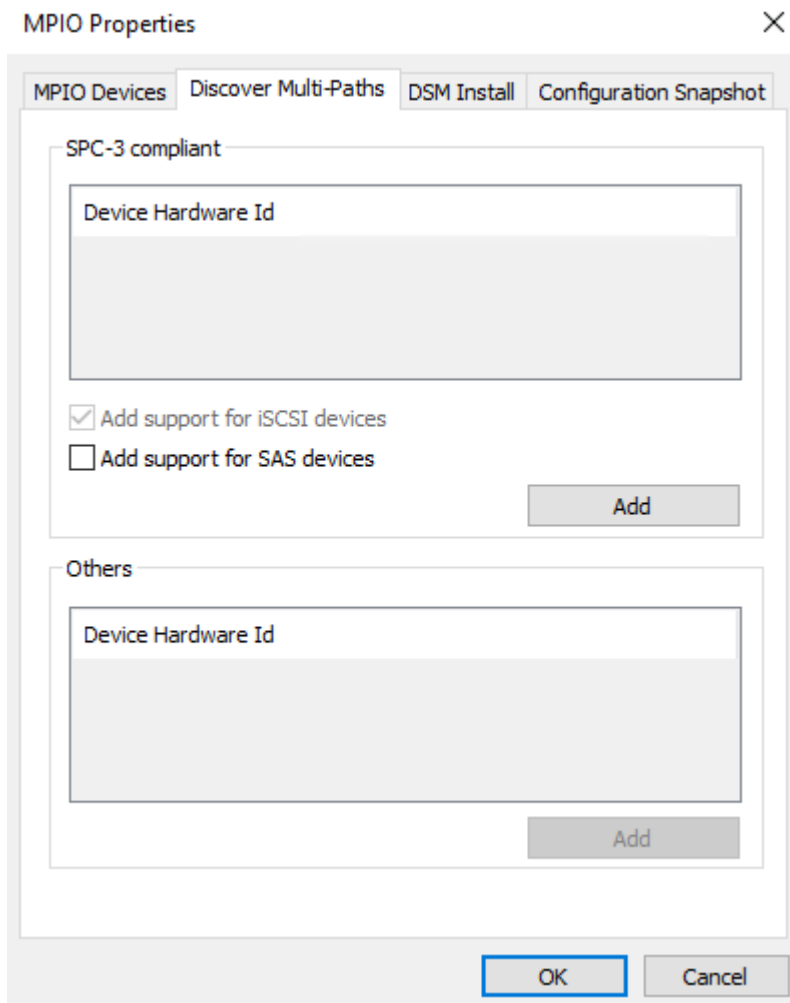
1. Install the Multipath I/O feature by executing the following command in the PowerShell window:

```
dism /online /enable-feature:MultipathIo
```

2. Open MPIO Properties by executing the following command in the CMD window:

```
mpioctl
```

3. In the Discover Multi-Paths tab, select the Add support for iSCSI devices checkbox and click Add.



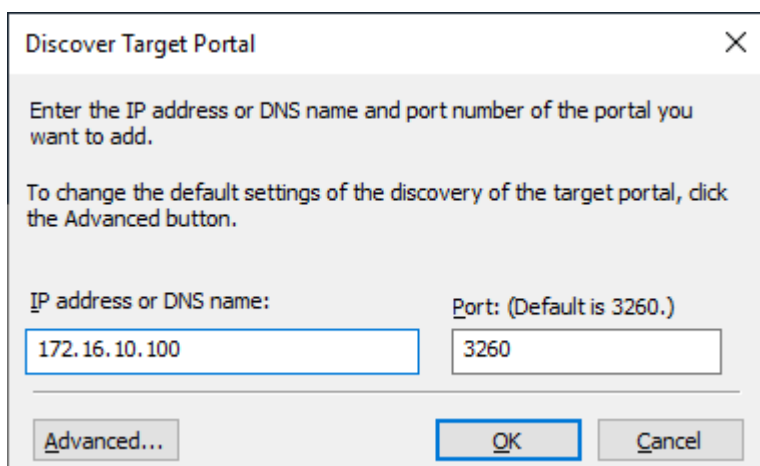
4. When prompted to restart the server, click Yes to proceed.
5. Repeat the same procedure on the other compute server that will be connected to SAN & NAS appliance.

#### Provisioning StarWind SAN & NAS Storage to Hyper-V Server Hosts

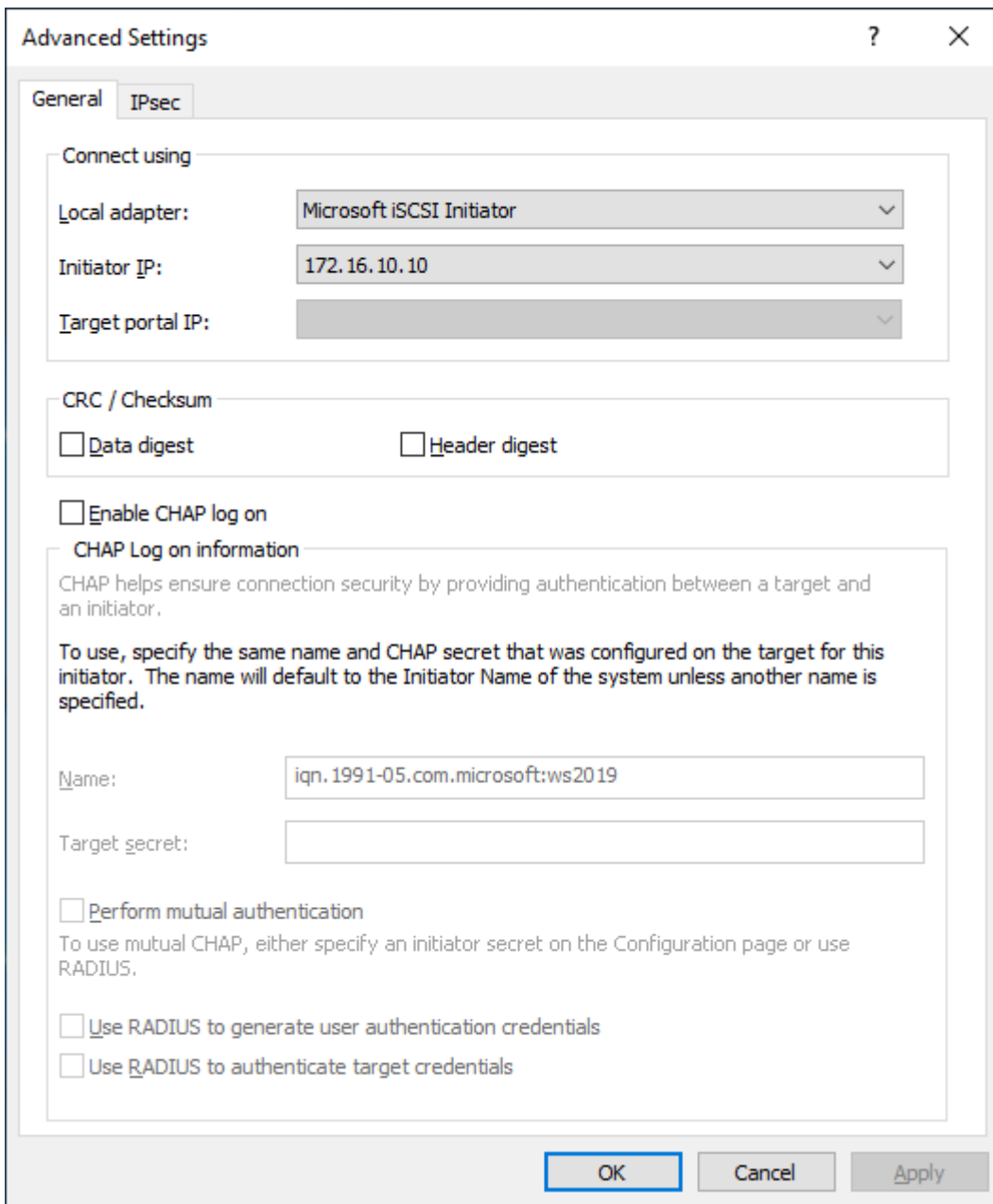
1. Launch Microsoft iSCSI Initiator by executing the following command in the CMD window:

```
iscsicpl
```

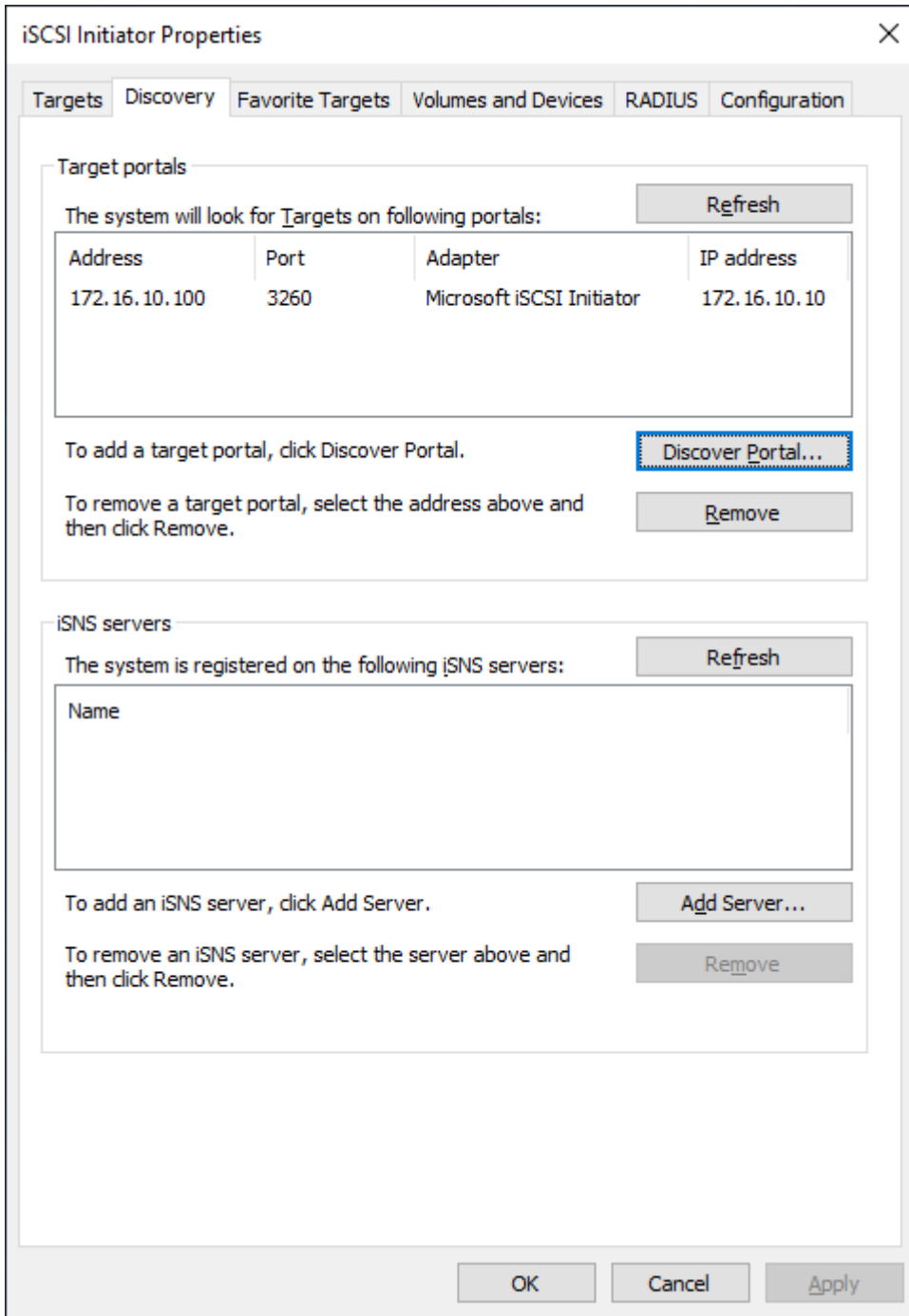
2. Navigate to the Discovery tab.
3. Click the Discover Portal button. The Discover Target Portal dialog appears. Type the IP address assigned to iSCSI/Data interface, i.e. 172.16.10.100.



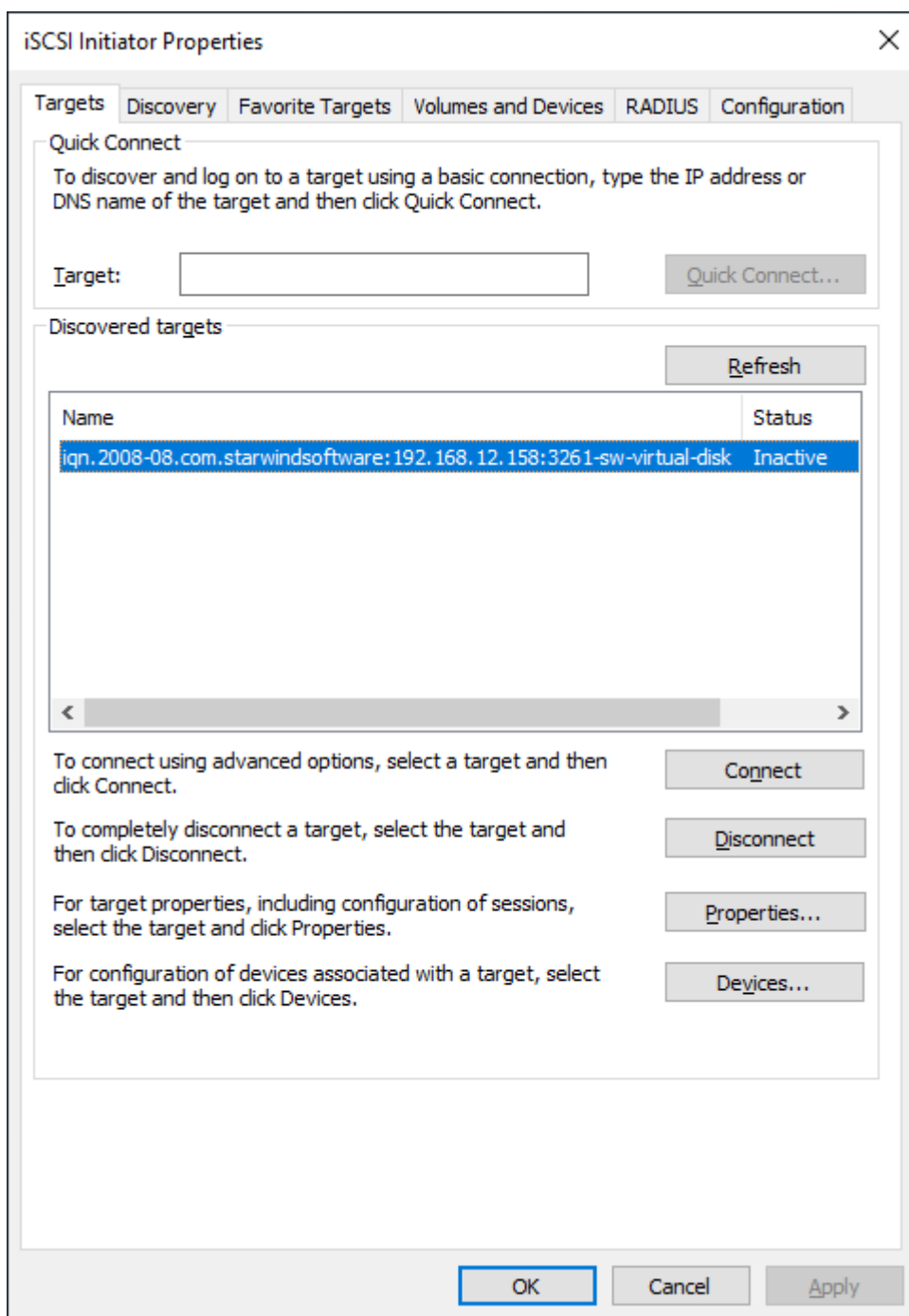
4. Click the Advanced button. Select Microsoft iSCSI Initiator as a Local adapter and as Initiator IP select the IP address of a network adapter connected to the Data\iSCSI virtual switch. Confirm the actions to complete the Target Portal discovery.



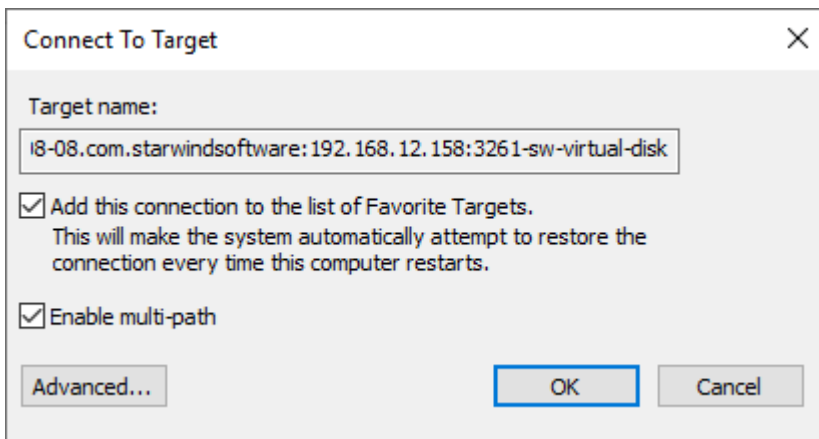
5. The target portals are added on this server.



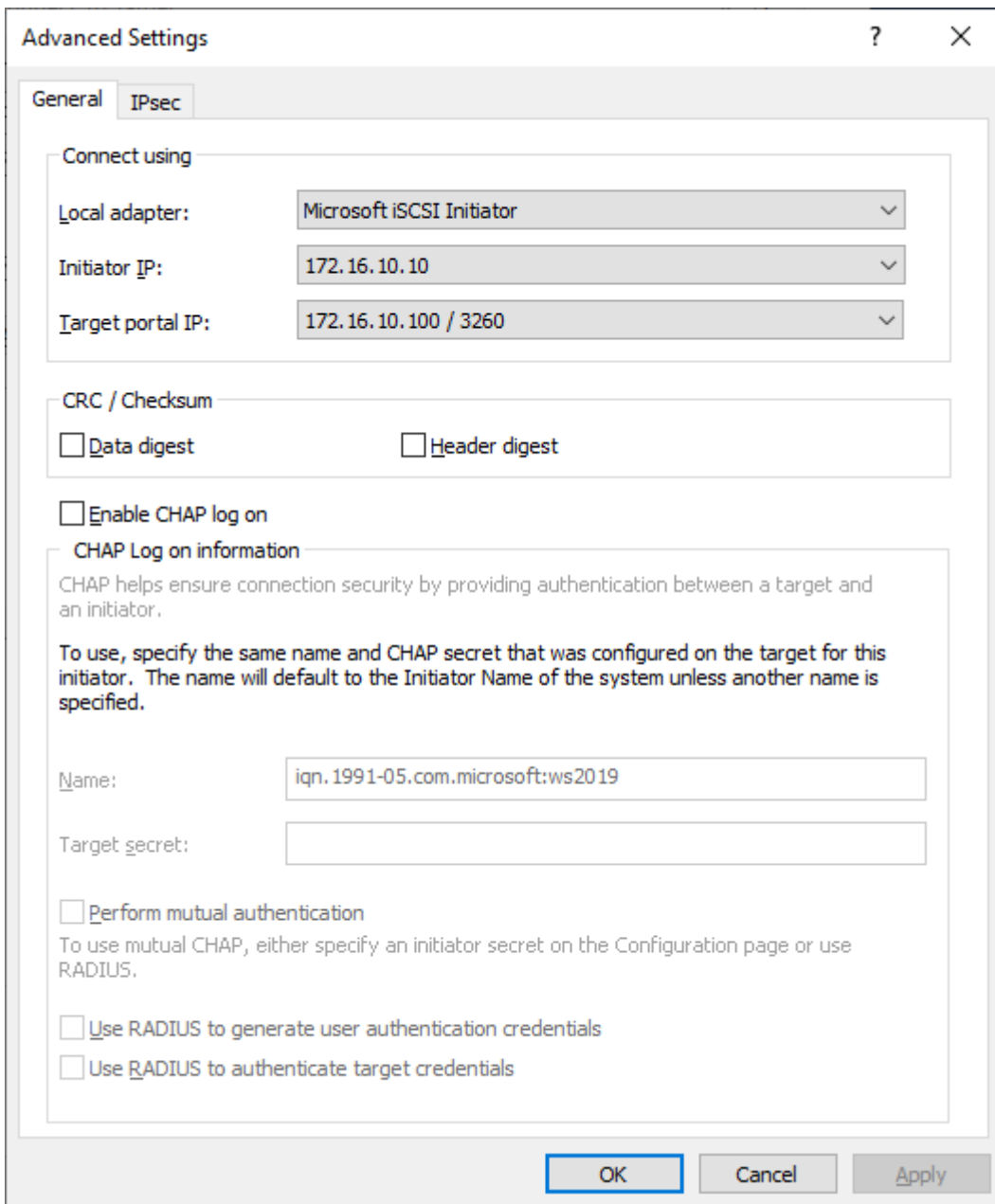
6. Click the Targets tab. The previously created targets (virtual disks) are listed in the Discovered Targets section.



7. Select the target created in StarWind SAN & NAS web console and click Connect.
8. Enable checkboxes as shown in the image below. Click Advanced.



9. Select Microsoft iSCSI Initiator in the Local adapter dropdown menu. In the Initiator IP field, select the IP address for the Data/iSCSI channel. In the Target portal IP, select the corresponding portal IP from the same subnet. Confirm the actions.



10. Repeat steps 1-9 for all remaining device targets.

11. Repeat steps 1-9 on the other compute servers, specifying corresponding Data/iSCSI channel IP addresses.

### Connecting Disks to Servers

To initialize the connected iSCSI target disks and create the partitions on them use DISKPART.

1. Run diskpart in the CMD window:

List disk

Select disk X //where X is the number of the disk to be processed

Online disk

Clean

Attributes disk clear readonly

Convert GPT

Create Partition Primary

Format fs=ntfs label=X quick //where X is the name of the Volume

NOTE: It is recommended to initialize the disks as GPT.

```

Administrator: C:\Windows\system32\cmd.exe - powershell
Copyright (C) 1999-2013 Microsoft Corporation.
On computer: HYPER-V-1

DISKPART> list disk

   Disk ###  Status         Size      Free      Dyn  Gpt
   -----  -
   Disk 0    Online         100 GB     0 B           *
   Disk 1    Offline        21 GB     21 GB
   Disk 2    Offline       1024 MB   1024 MB

DISKPART> select disk 1
Disk 1 is now the selected disk.

DISKPART> online disk
DiskPart successfully onlined the selected disk.

DISKPART> attributes disk clear readonly
Disk attributes cleared successfully.

DISKPART> convert GPT
DiskPart successfully converted the selected disk to GPT format.

DISKPART> Create Partition primary
DiskPart succeeded in creating the specified partition.

DISKPART> format fs=ntfs label=CSV1 quick

 100 percent completed

DiskPart successfully formatted the volume.

DISKPART> _

```

2. Perform the steps above on other compute servers.

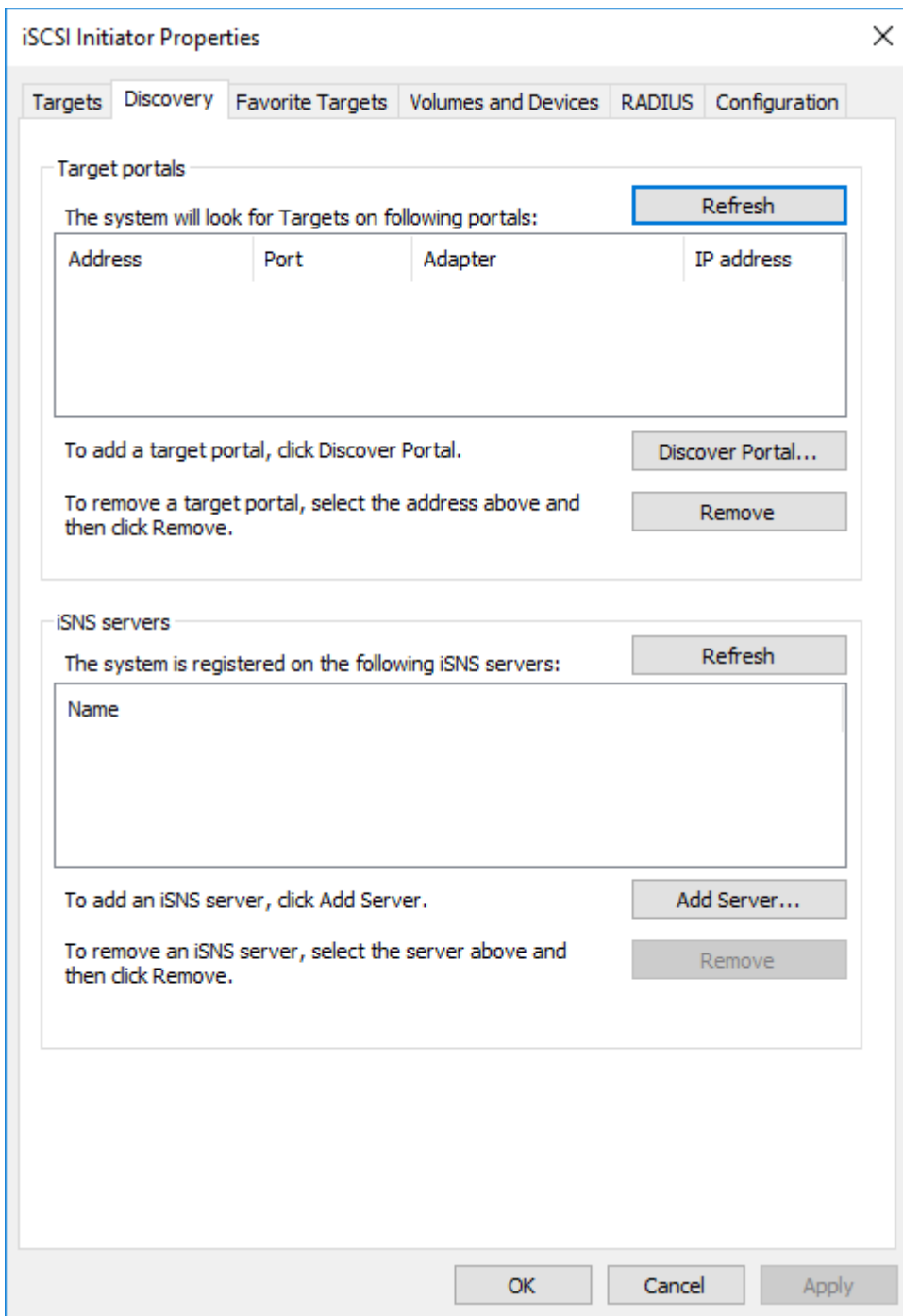
## 2-Node: Provisioning Starwind Ha Storage To Windows Server Hosts

Discovery of StarWind iSCSI targets on Windows Server hosts

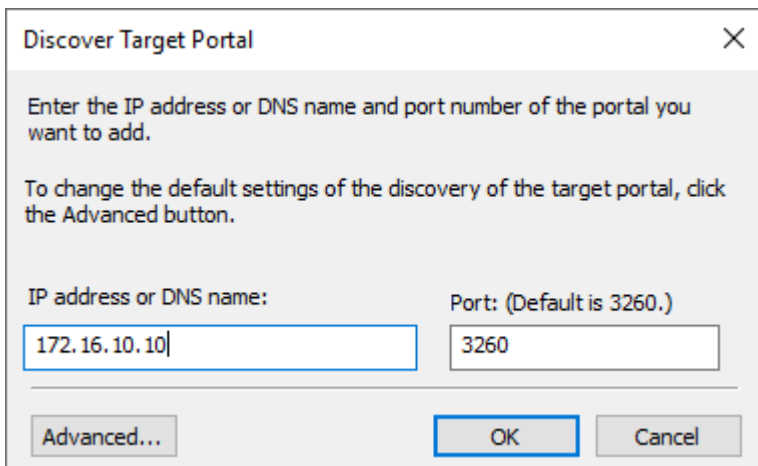
1. Open Start/Search and type “iSCSI Initiator” to Launch Microsoft iSCSI Initiator. Alternatively, start Command Prompt (CMD) and execute the following command:

```
iscsicpl
```

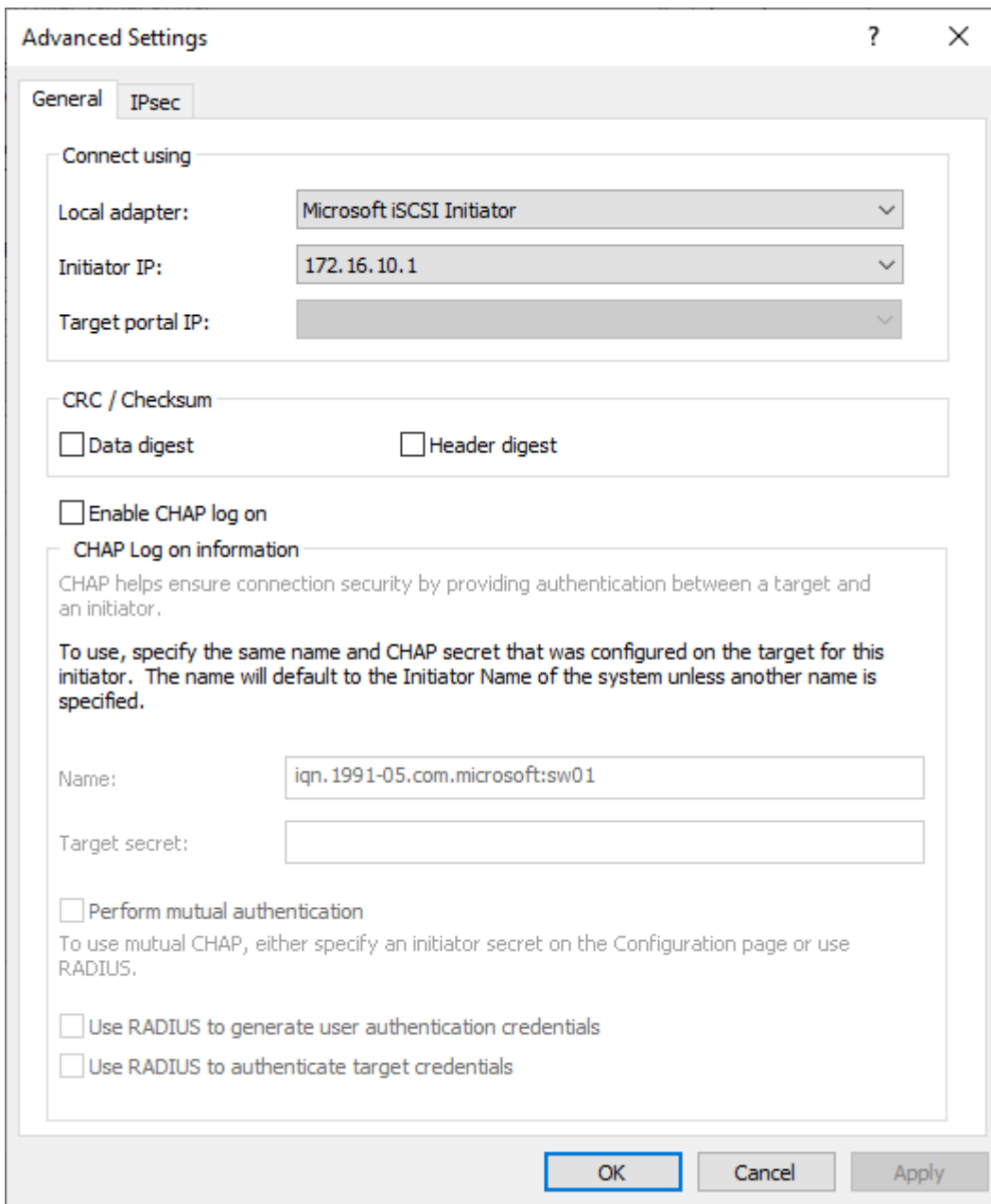
2. In the iSCSI Initiator Properties window, navigate to the Discovery tab and click Discover Portal...



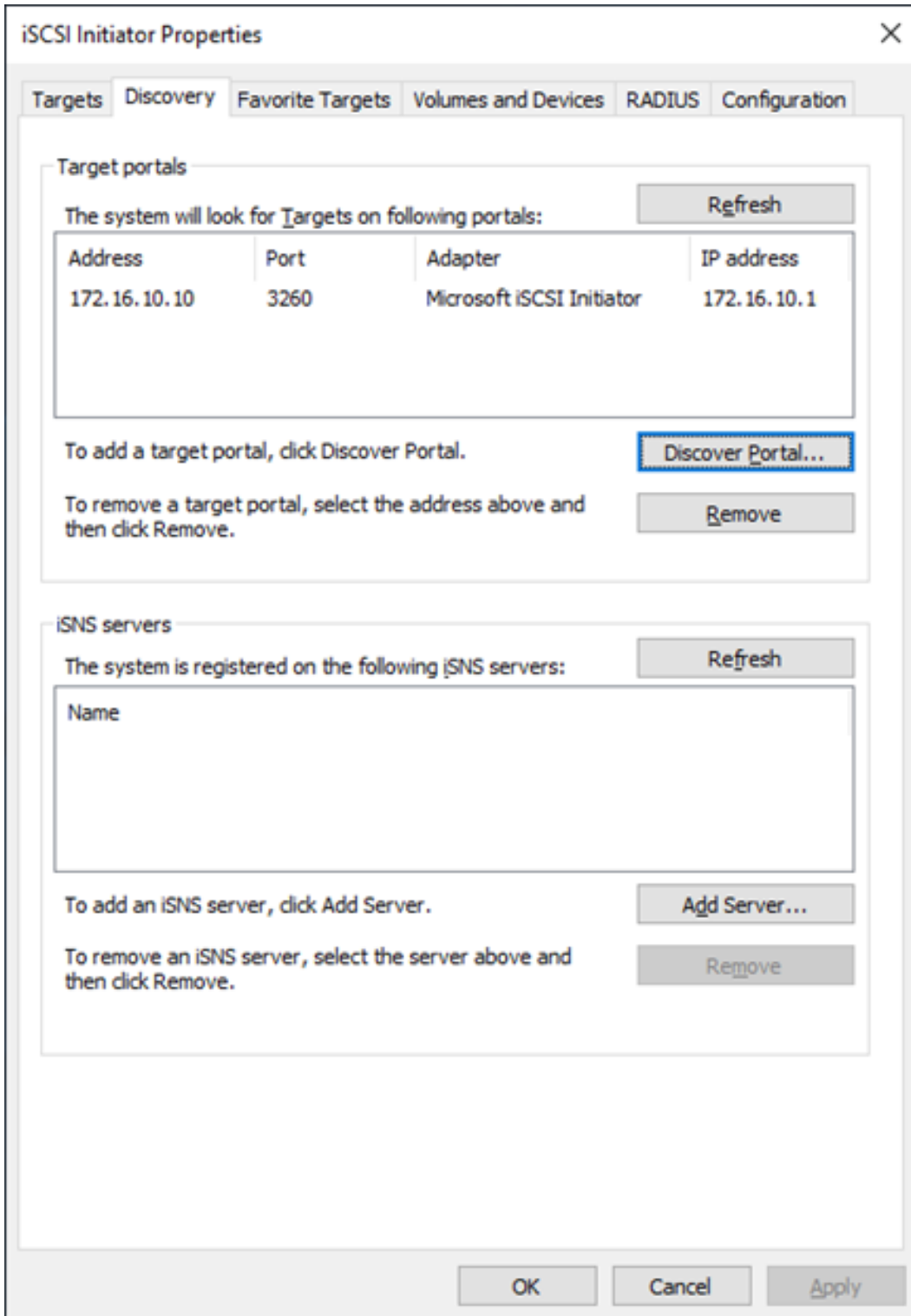
3. In the Discover Target Portal window, enter the IP address of the first StarWind Appliance’s Data network interface (for example, appliance “SW1” with the IP address 172.16.10.10), then click Advanced...



4. In the Advanced Settings window, under the Connect using section, select Microsoft iSCSI Initiator as the Local adapter. Then, select the IP address of the Data/Heartbeat network of the current Windows Server host as the Initiator IP, and click Apply.

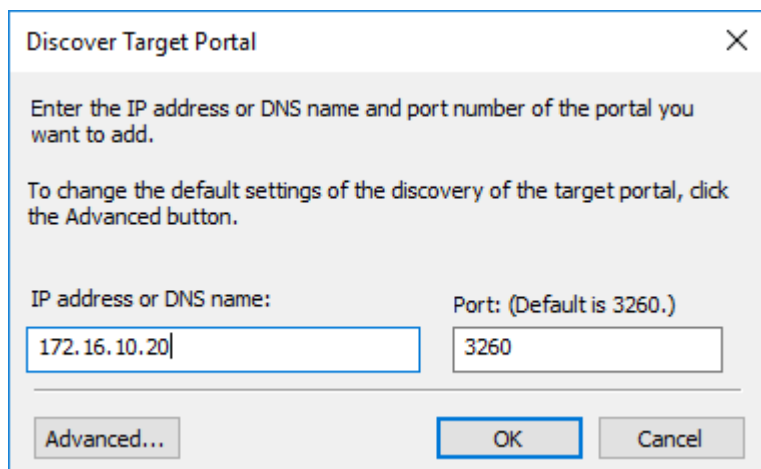


5. In the Discovery tab, click Discover Portal...

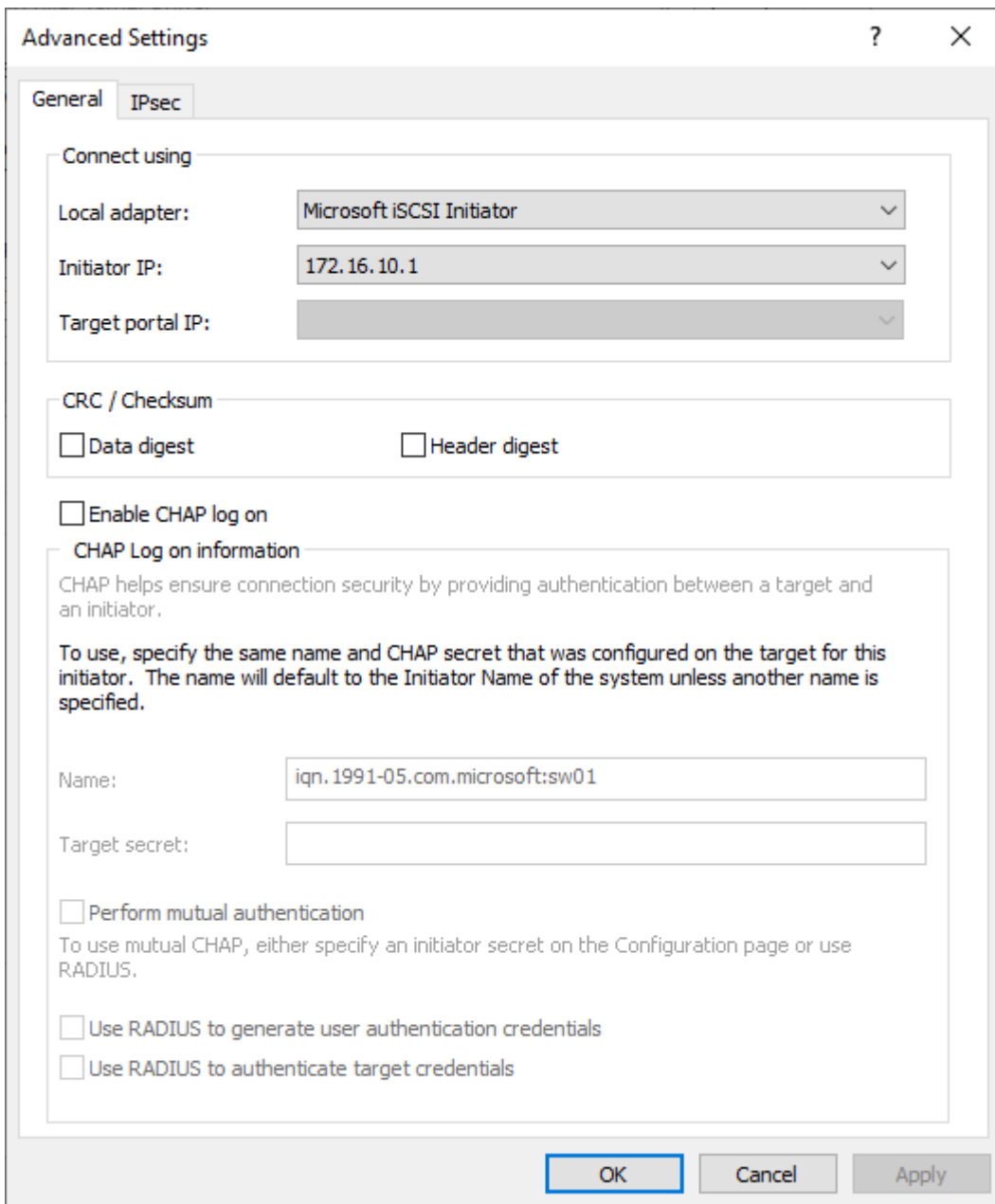


6. In the Discover Target Portal window, enter the IP address of the second StarWind Appliance’s Data network interface (for example, appliance “SW2” with the IP address

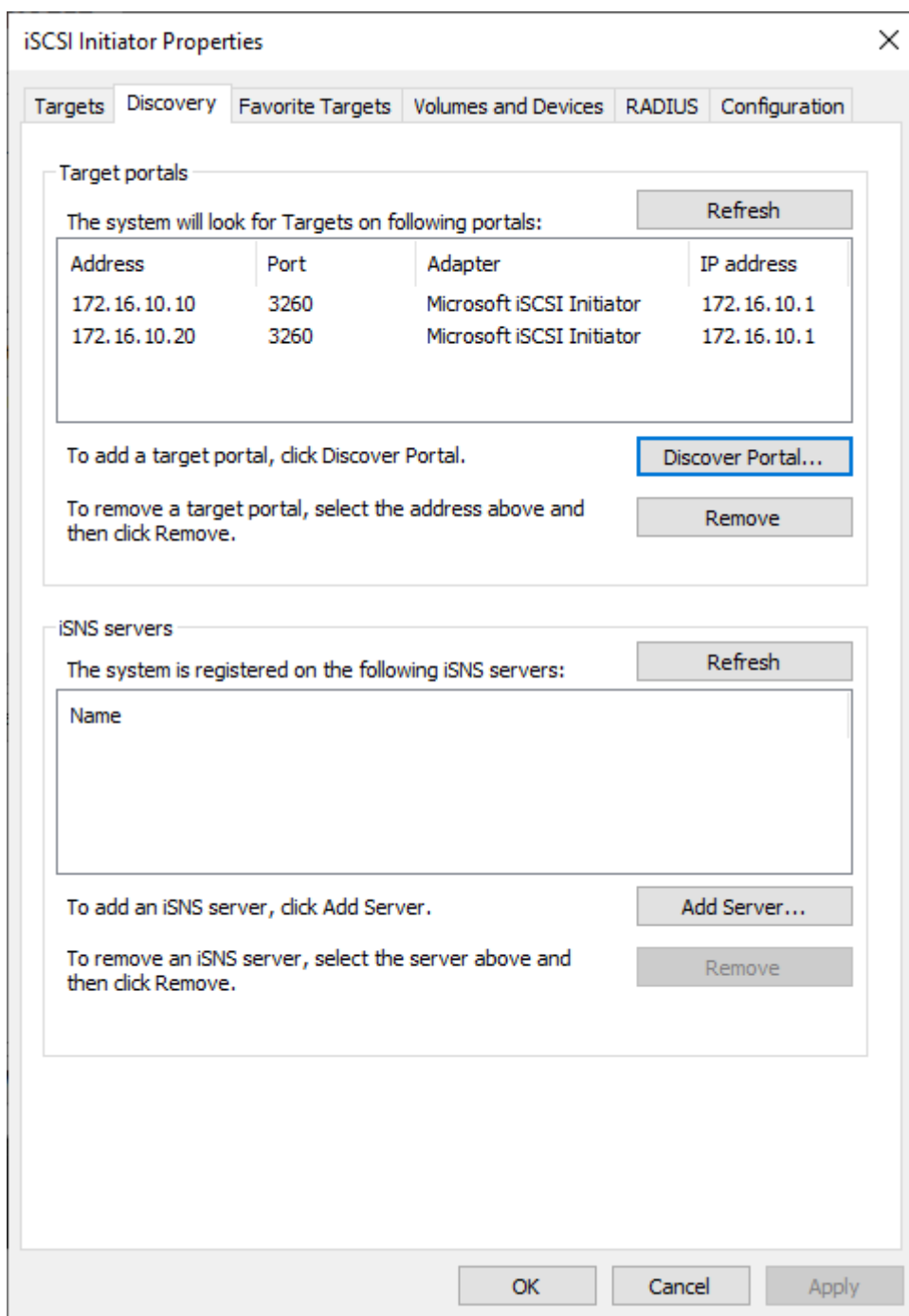
172.16.10.20), then click Advanced...



7. In the Advanced Settings window, under the Connect using section, select Microsoft iSCSI Initiator as the Local adapter. Then, select the IP address of the Data/Heartbeat network of the current Windows Server host as the Initiator IP, and click Apply.



8. Now, all iSCSI target portals have been added to the first Windows Server host.

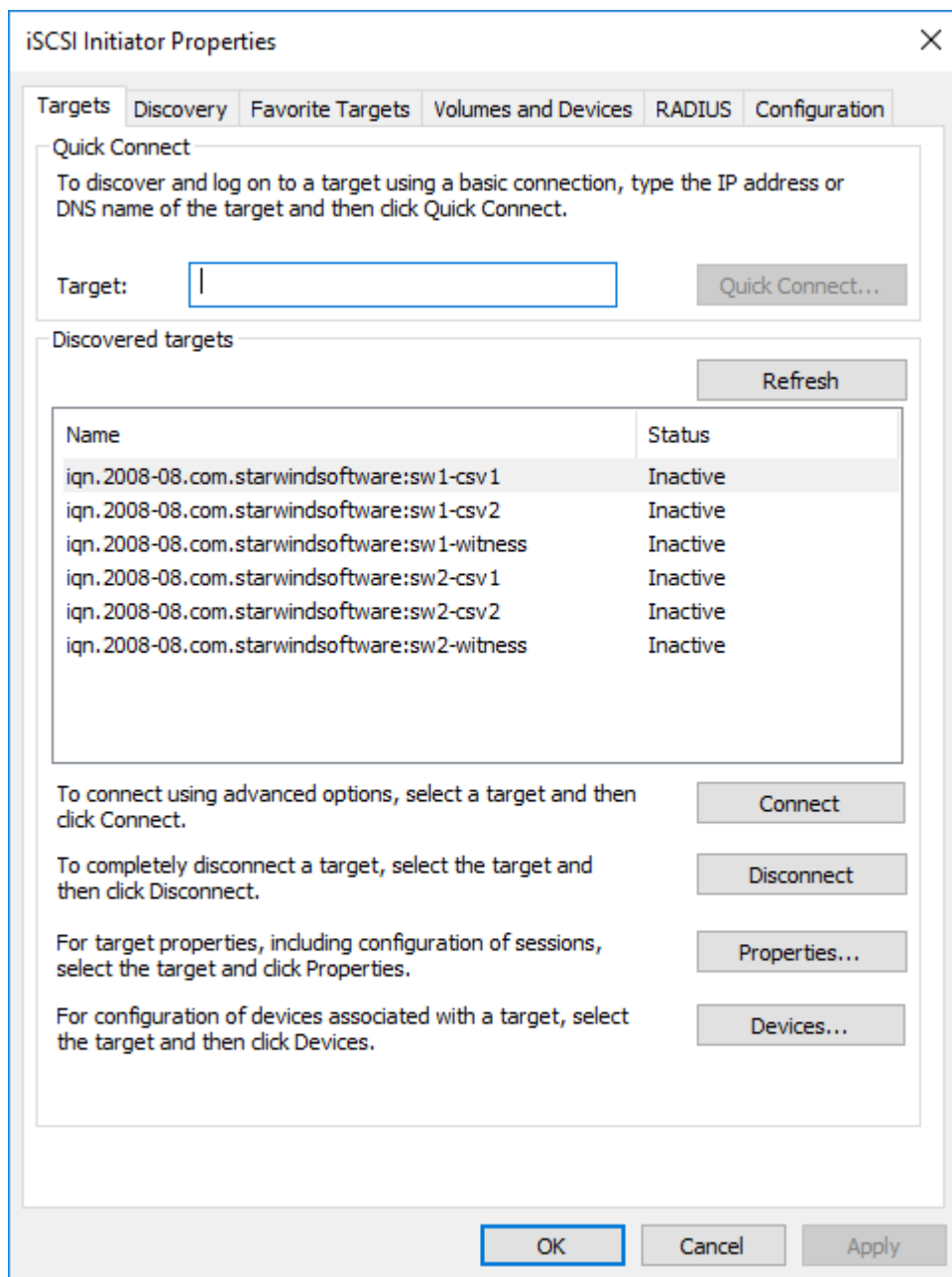


9. Repeat the steps 1-8 on the partner node.

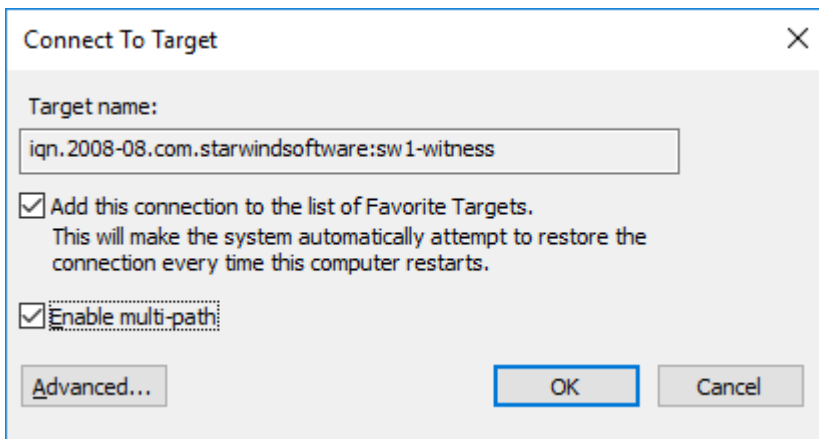
### Connecting StarWind iSCSI targets to Windows Server hosts

1. Click the Targets tab. The previously created targets are listed in the Discovered Targets section.

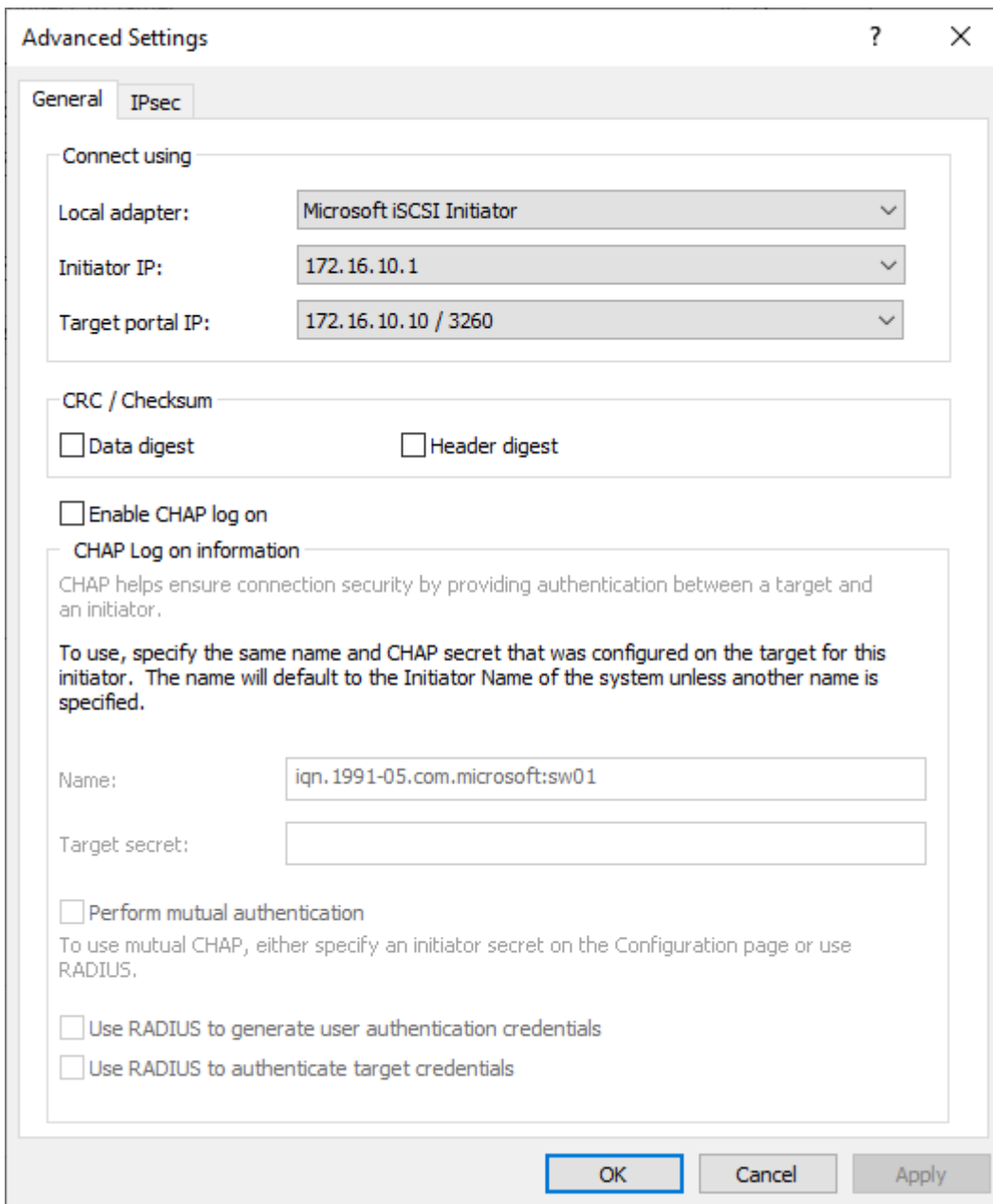
NOTE: If the created targets are not listed, check the firewall settings of the StarWind Server as well as the list of networks served by the StarWind Server (go to StarWind Management Console -> Configuration -> Network). Alternatively, check the Access Rights tab in StarWind Management Console for any restrictions.



2. Select the Witness target from the local server and click Connect.
3. Enable checkboxes as shown in the image below. Click Advanced.

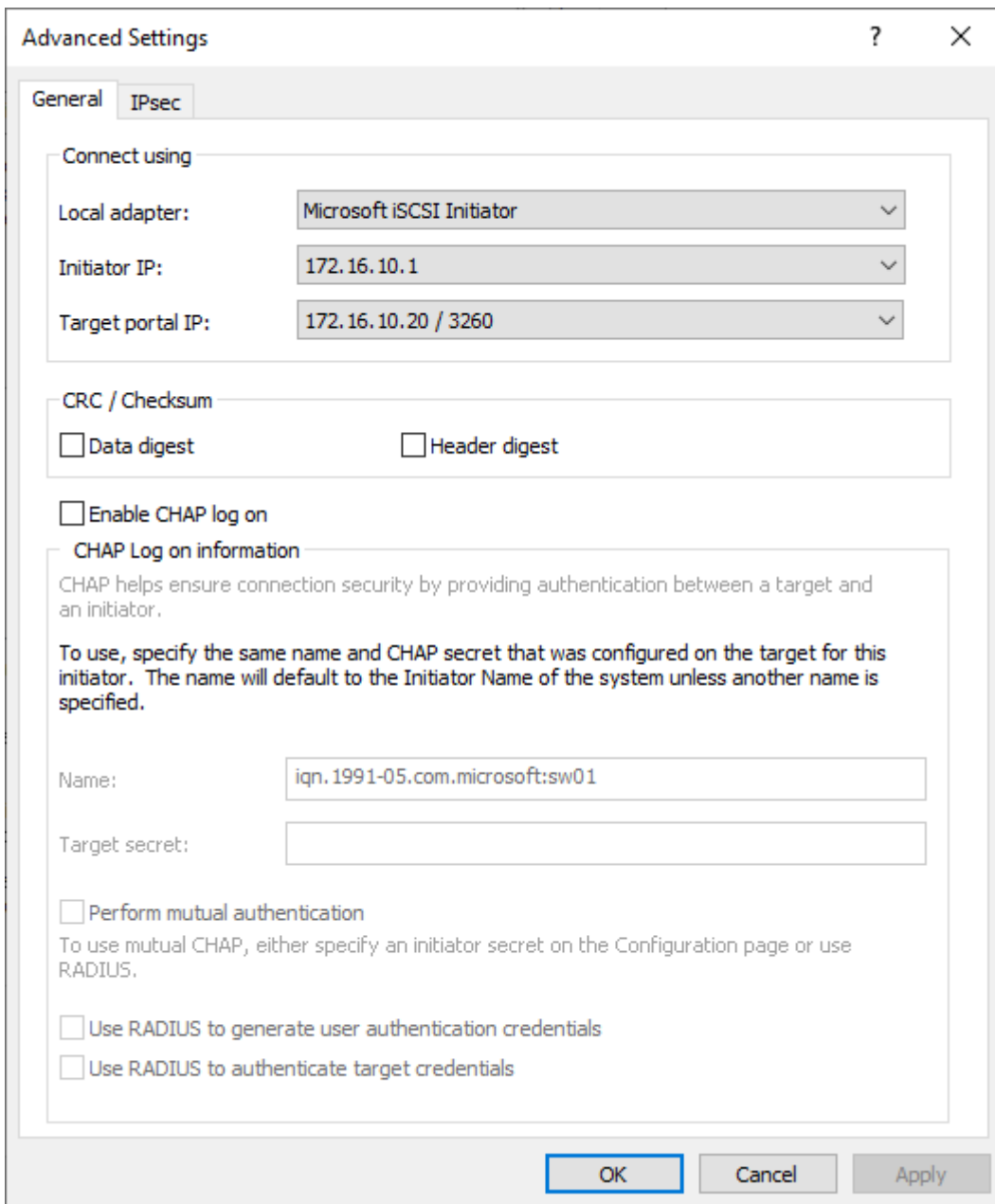


4. Select Microsoft iSCSI Initiator in the Local adapter dropdown menu. In the Initiator IP field, select the IP address for the Data network. In the Target portal IP, select the portal IP from the same subnet. Confirm the actions.



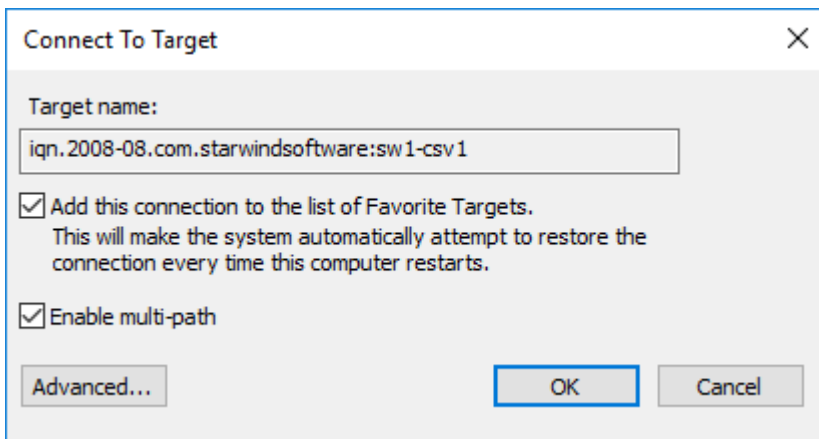
5. Repeat the steps 2-4 to connect the Witness target from the partner node.

Advanced settings should look like in the picture below with the target portal IP 172.16.10.20:

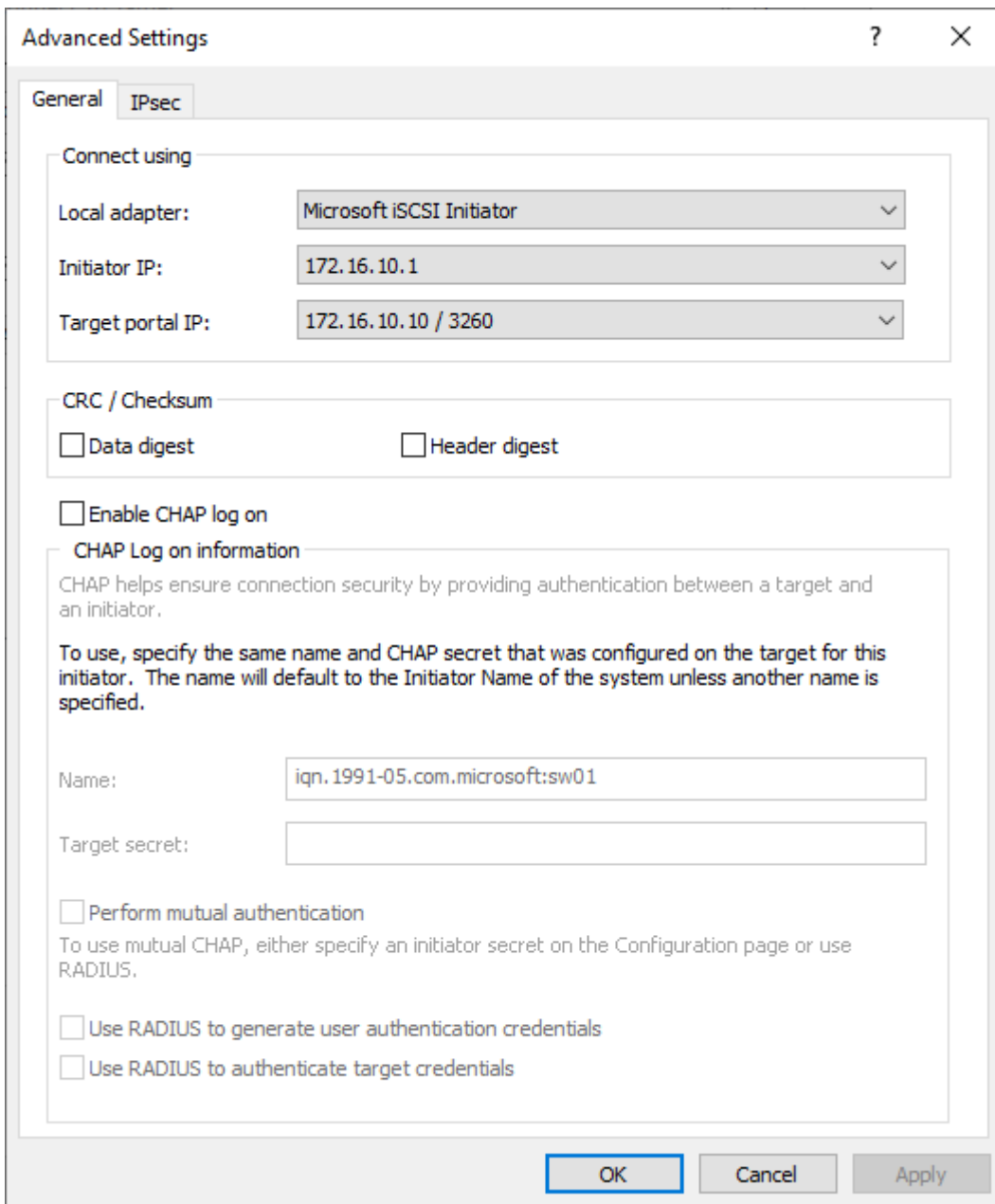


6. Select the CSV1 target discovered from the local server and click Connect.

7. Enable checkboxes as shown in the image below. Click Advanced.



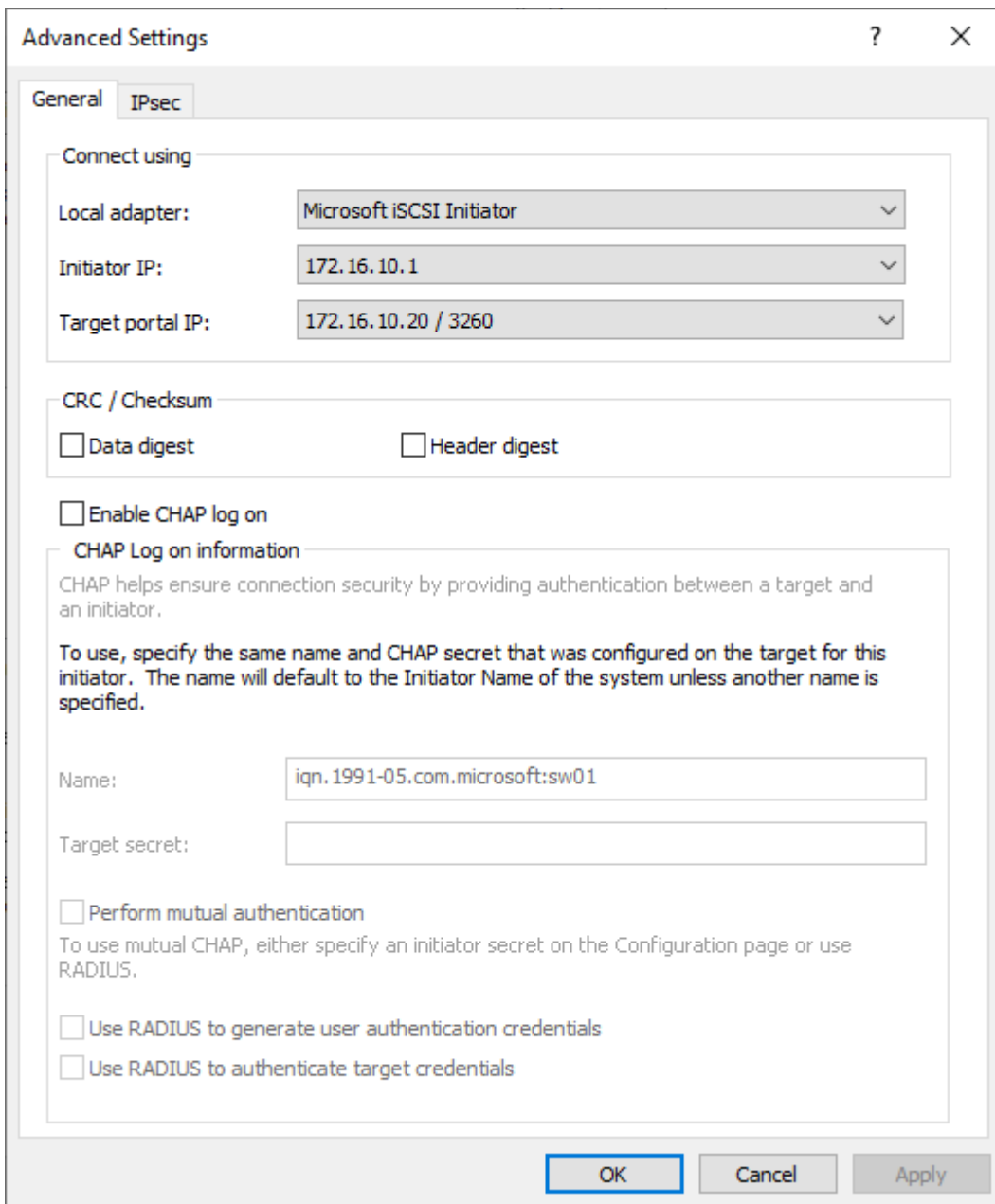
8. Select Microsoft iSCSI Initiator in the Local adapter dropdown menu. In Target portal IP, select 172.16.10.10. Confirm the actions.



9. Select the CSV1 target from the partner StarWind node and click Connect.

10. Enable checkboxes Add this connection to the list of Favorite Targets... and Enable multi-path. Click Advanced.

11. Select Microsoft iSCSI Initiator in the Local adapter dropdown menu. In the Initiator IP field, select the IP address for the Data network. In the Target portal IP, select the portal IP from the same subnet. Confirm the actions.



12. Repeat the steps 1-11 for all remaining HA device targets.

13. Repeat steps 1-12 on the other StarWind node, specifying corresponding Data network IP addresses.

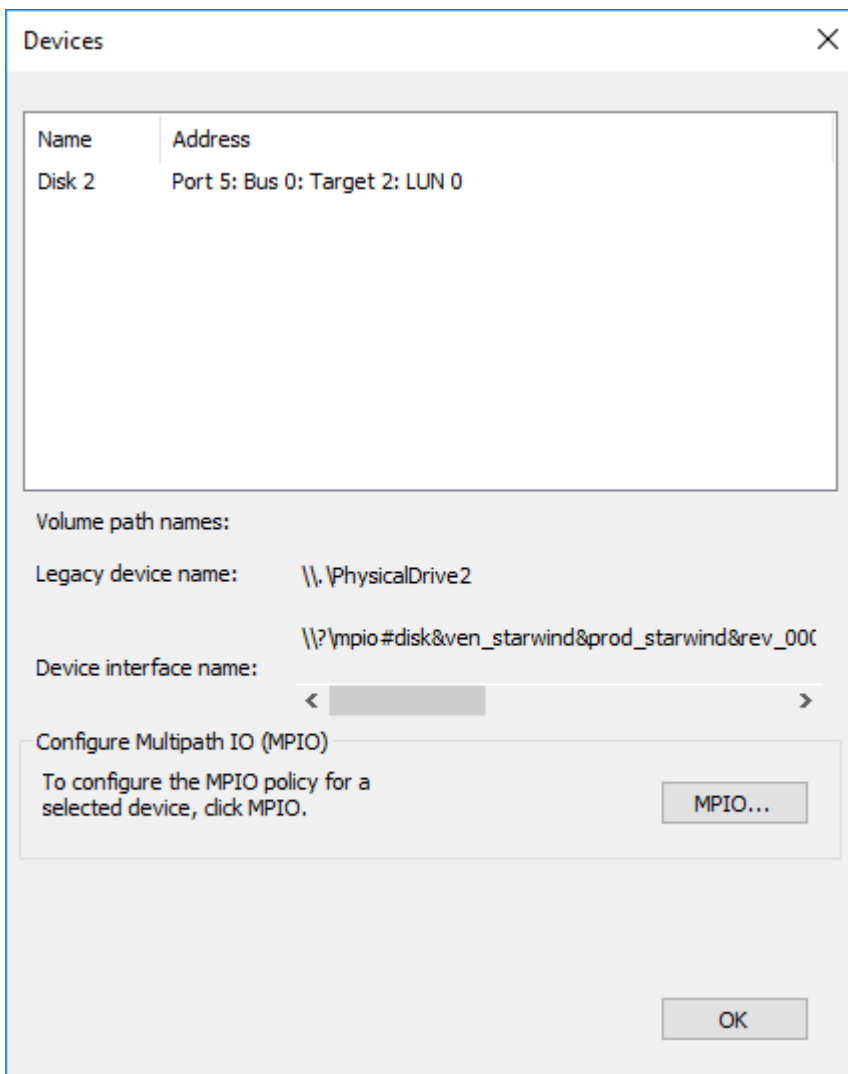
NOTE: Multiple (2,3 or 4) identical iSCSI connections to the same target might be configured depending on the network throughput used for Data and Replication, underlying storage performance, or CPU performance.

## Configuring Multipath

It is recommended to configure the different MPIO policies depending on iSCSI channel throughput. It is recommended to set Least Queue Depth MPIO load balancing policy.

NOTE: Different MPIO policies can be set depending on the network throughput, storage performance or setup peculiarities.

1. Configure the MPIO policy for each target with the load balance policy of choice. Select the Target located on the local server and click Devices.
2. In the Devices dialog, click MPIO.

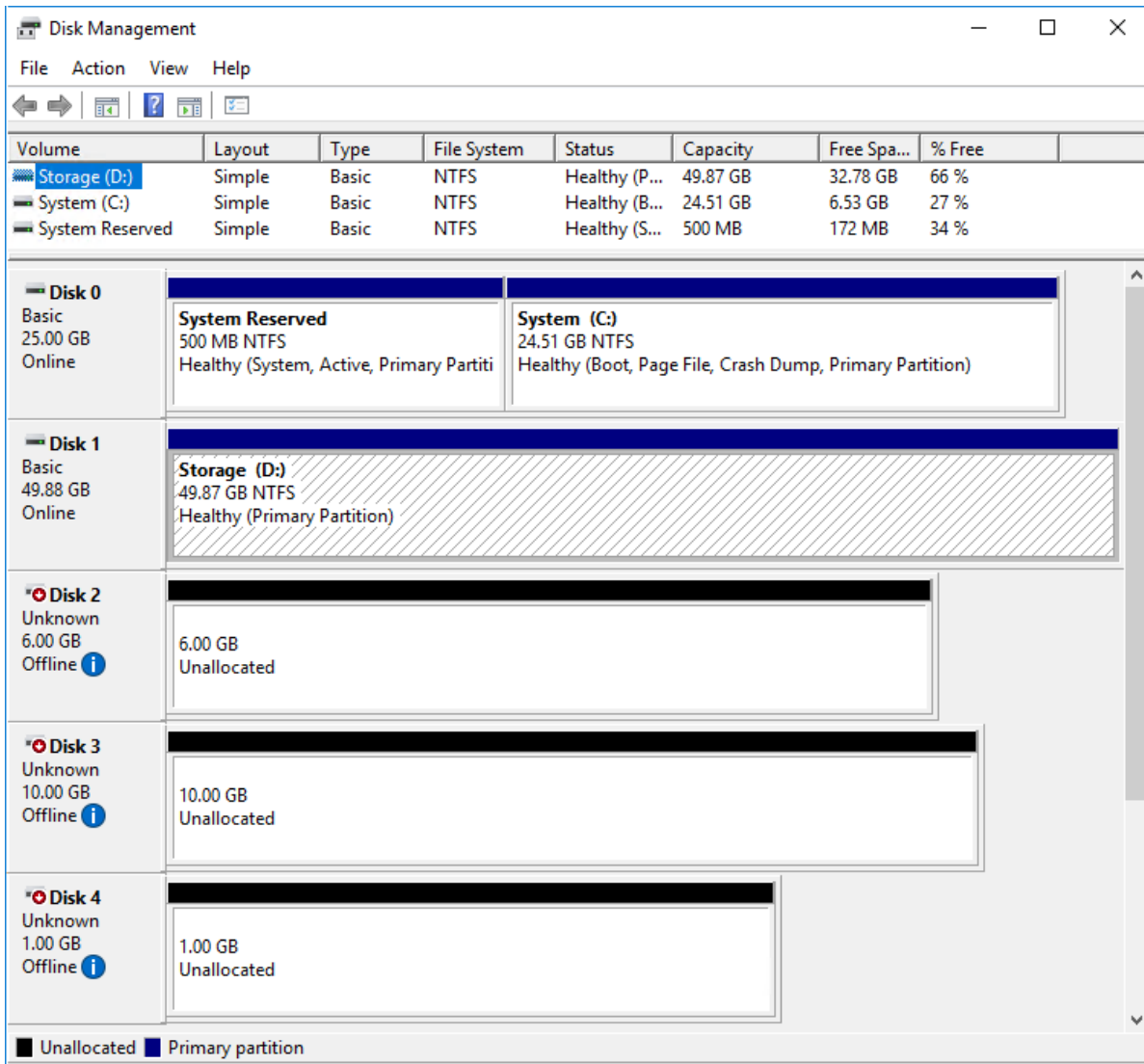


3. Select the appropriate load balancing policy.

4. Repeat the steps 1-3 for configuring the MPIO policy for each remaining device on the current node and on the partner node.

### Connecting Disks to Servers

1. Open the Disk Management snap-in. The StarWind disks will appear as unallocated and offline.

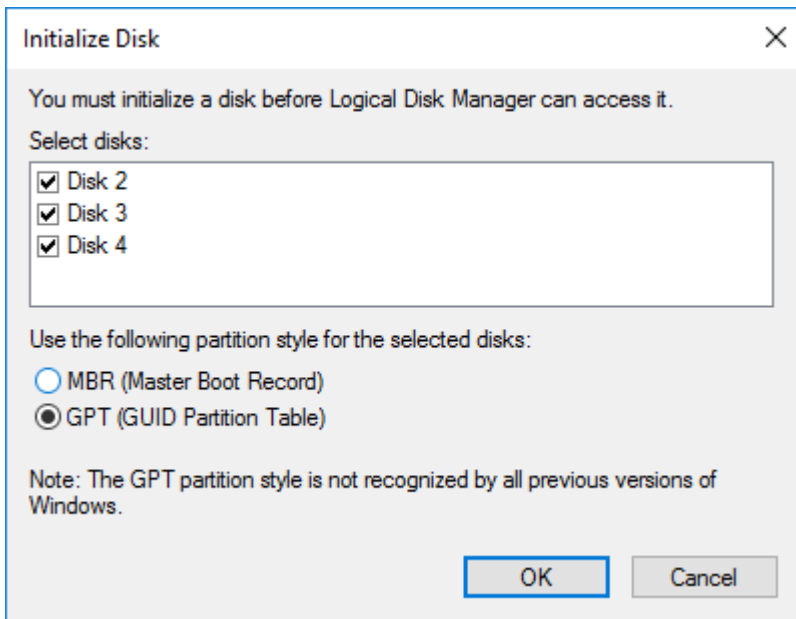


2. Bring the disks online by right-clicking on them and selecting the Online menu option.

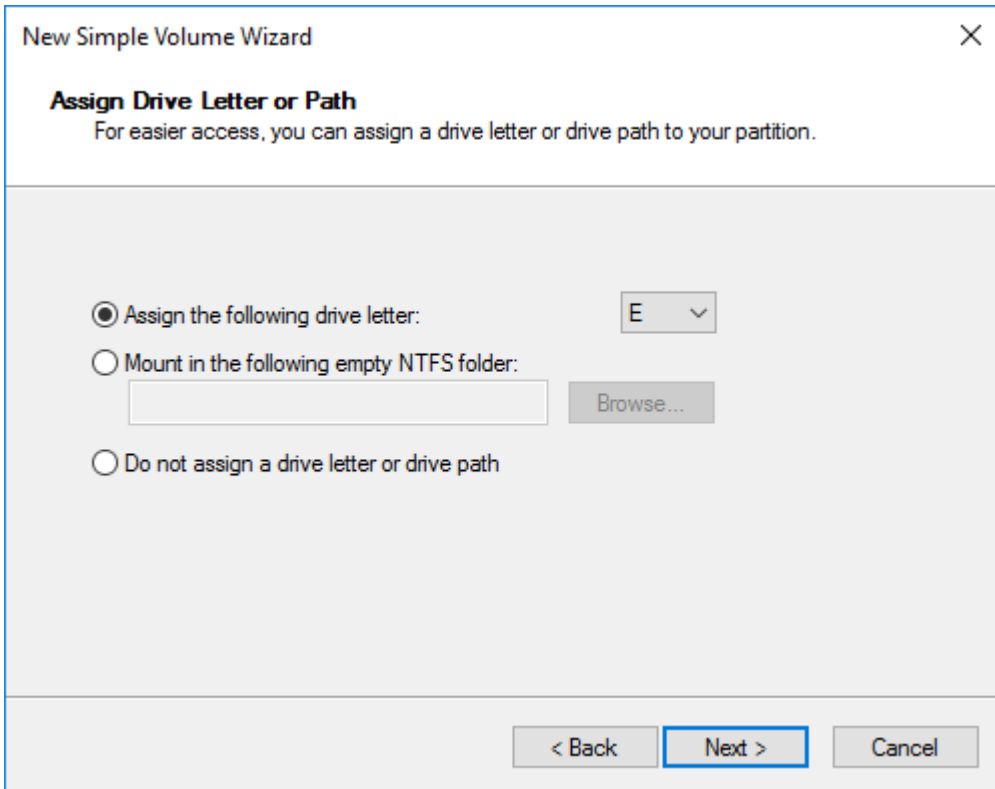
3. Select the CSV disk (check the disk size to be sure) and right-click on it to initialize.

4. By default, the system will offer to initialize all non-initialized disks. Use the Select

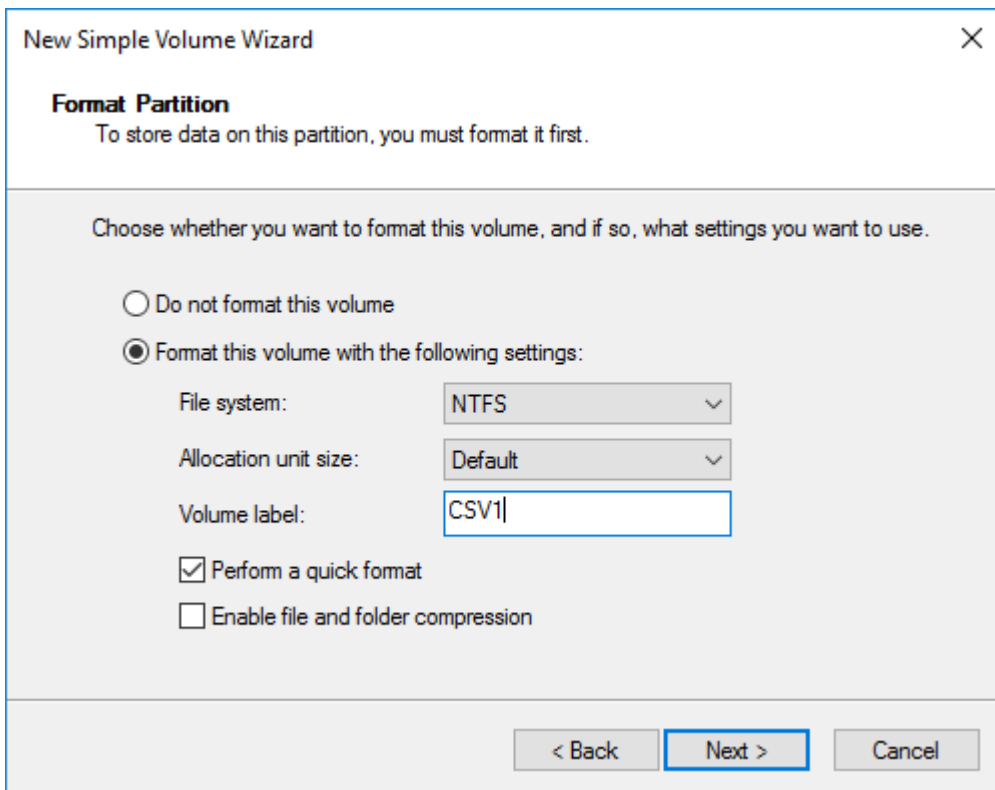
Disks area to choose the disks. Select GPT (GUID Partition Style) for the partition style to be applied to the disks. Press OK to confirm.



5. Right-click on the selected disk and choose New Simple Volume.
6. In New Simple Volume Wizard, indicate the volume size. Click Next.
7. Assign a drive letter to the disk. Click Next.

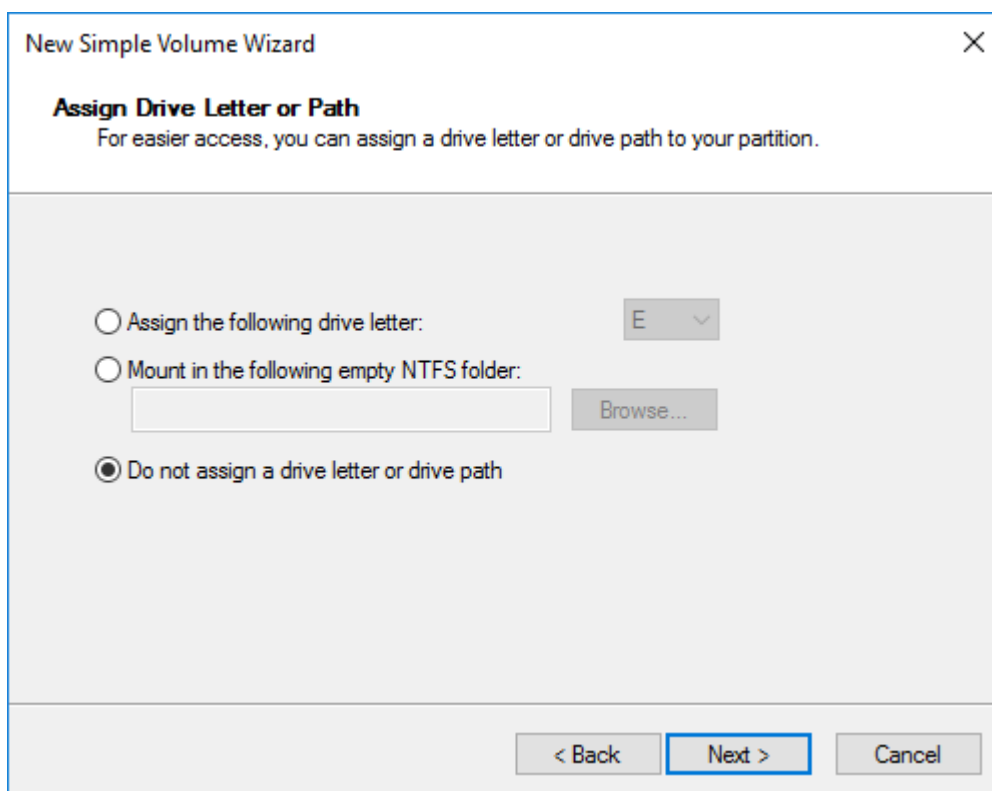


8. Select NTFS in the File System dropdown menu. Keep Allocation unit size as Default. Set the Volume Label of choice. Click Next.



9. Press Finish to complete.

10. Complete the steps 1-9 for the Witness disk. Do not assign any drive letter or drive path for it.



11. On the partner node, open the Disk Management snap-in. All StarWind disks will appear offline. If the status is different from the one shown below, click Action->Refresh in the top menu to update the information about the disks.

12. Repeat steps from the 2nd to bring all the remaining StarWind disks online.

## Creating A Failover Cluster In Windows Server

NOTE: To avoid issues during the cluster validation configuration, it is recommended to install the latest Microsoft updates on each node.

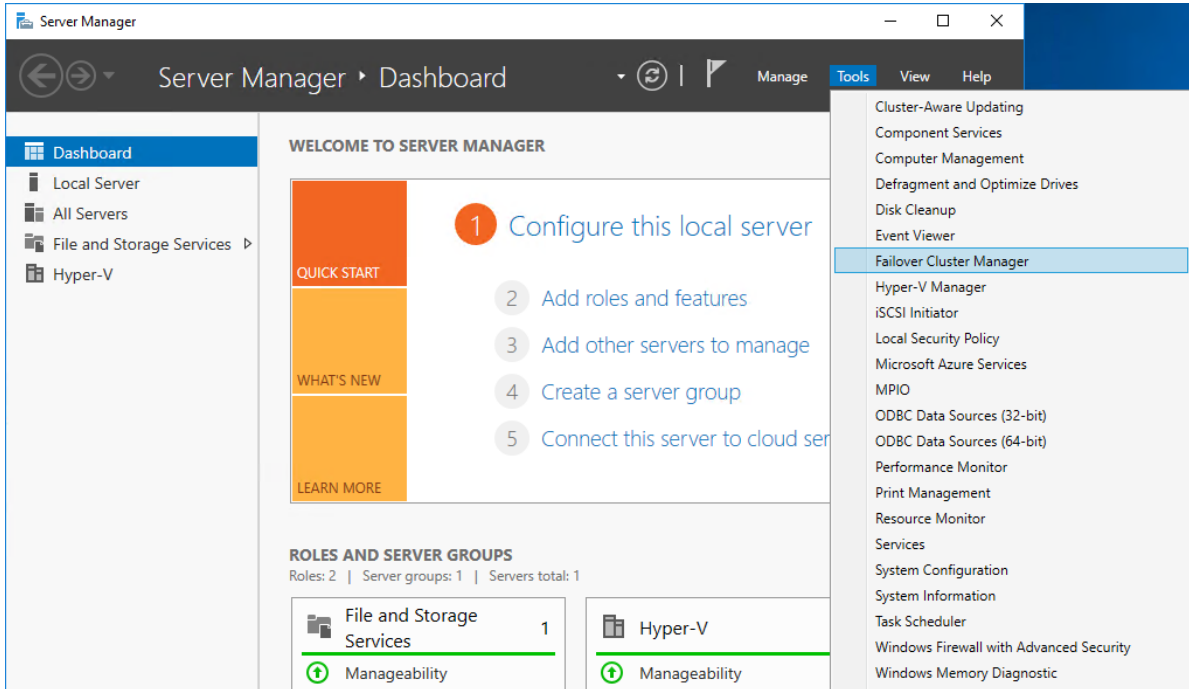
NOTE: Server Manager can be opened on the server with desktop experience enabled (necessary features should be installed). Alternatively, the Failover cluster can be managed with Remote Server Administration Tools:

<https://docs.microsoft.com/en-us/windows-server/remote/remote-server-administration-tools>

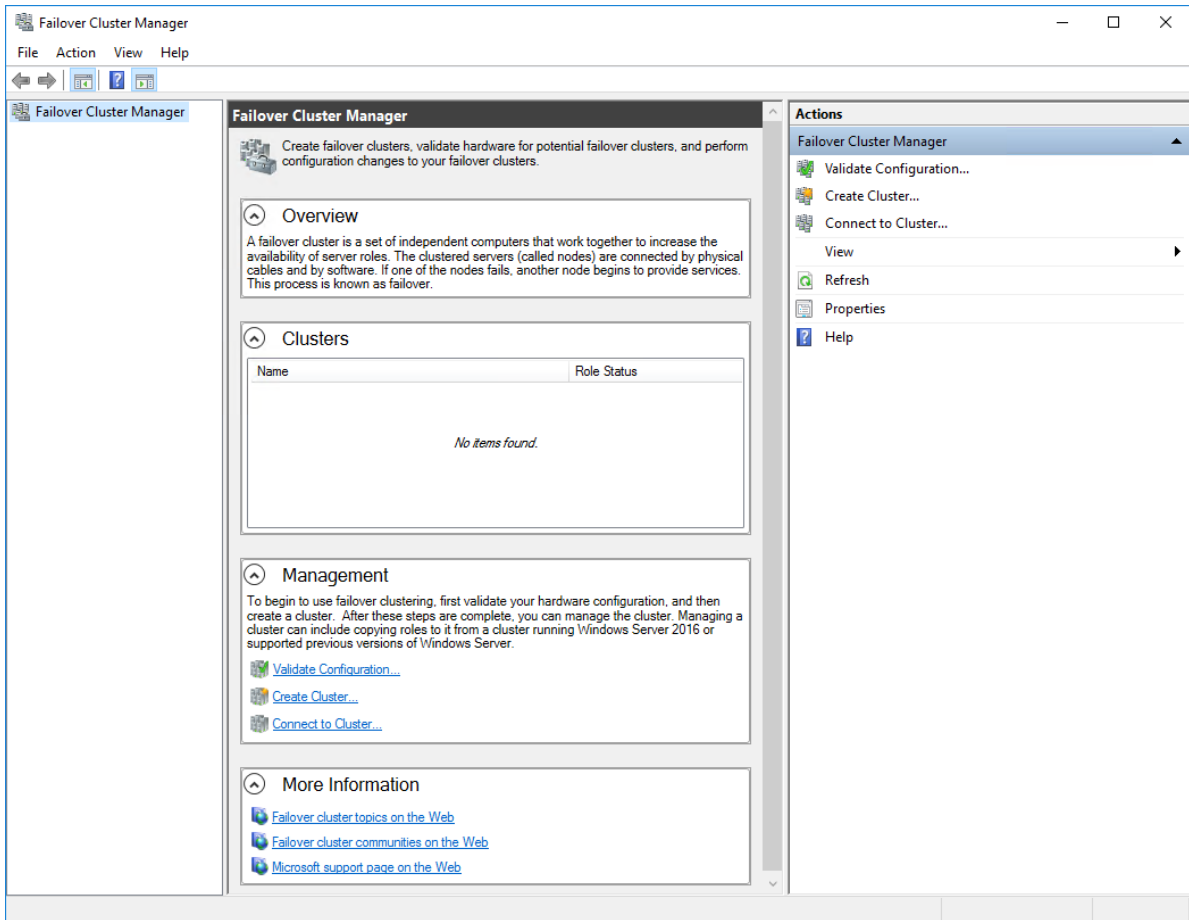
NOTE: For converged deployment (SAN & NAS running as a dedicated storage cluster) the Microsoft Failover Cluster is deployed on separate computing nodes. Additionally, for the converged deployment scenario, the storage nodes that host StarWind SAN & NAS as

CVM or bare metal do not require a domain controller and Failover Cluster to operate.

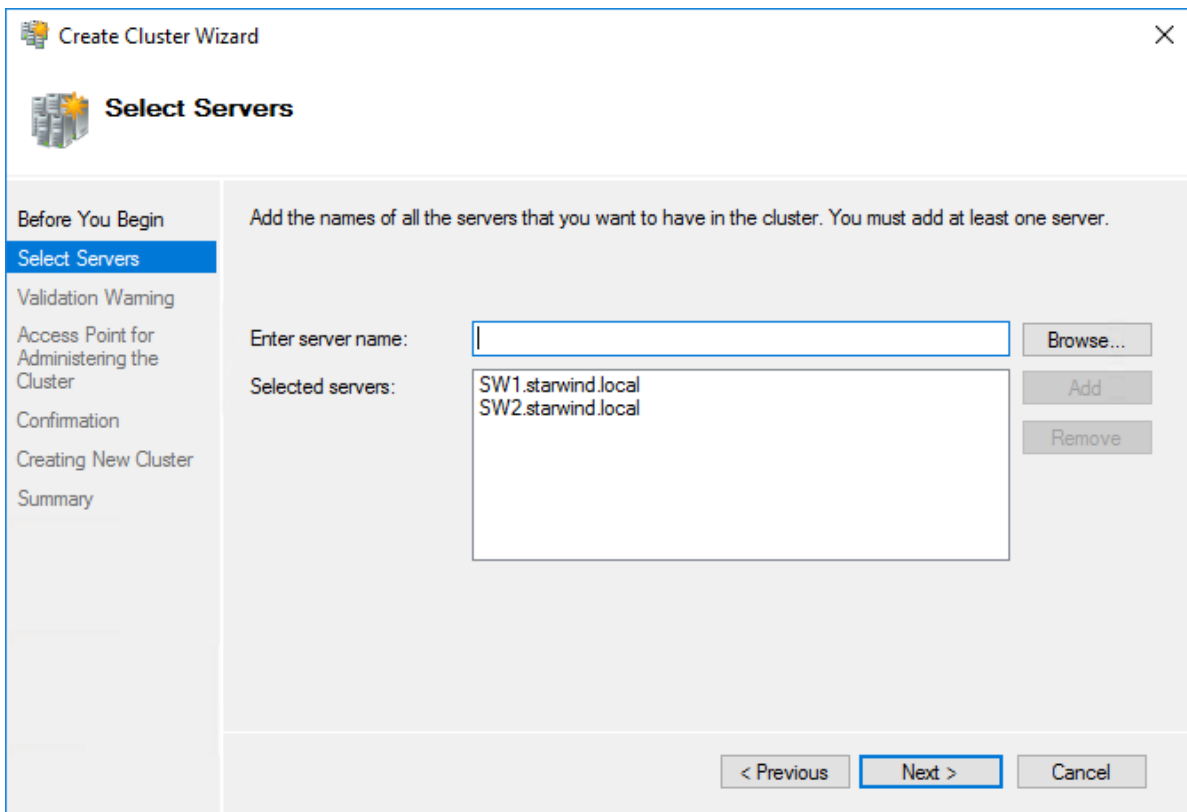
1. Open Server Manager. Select the Failover Cluster Manager item from the Tools menu.



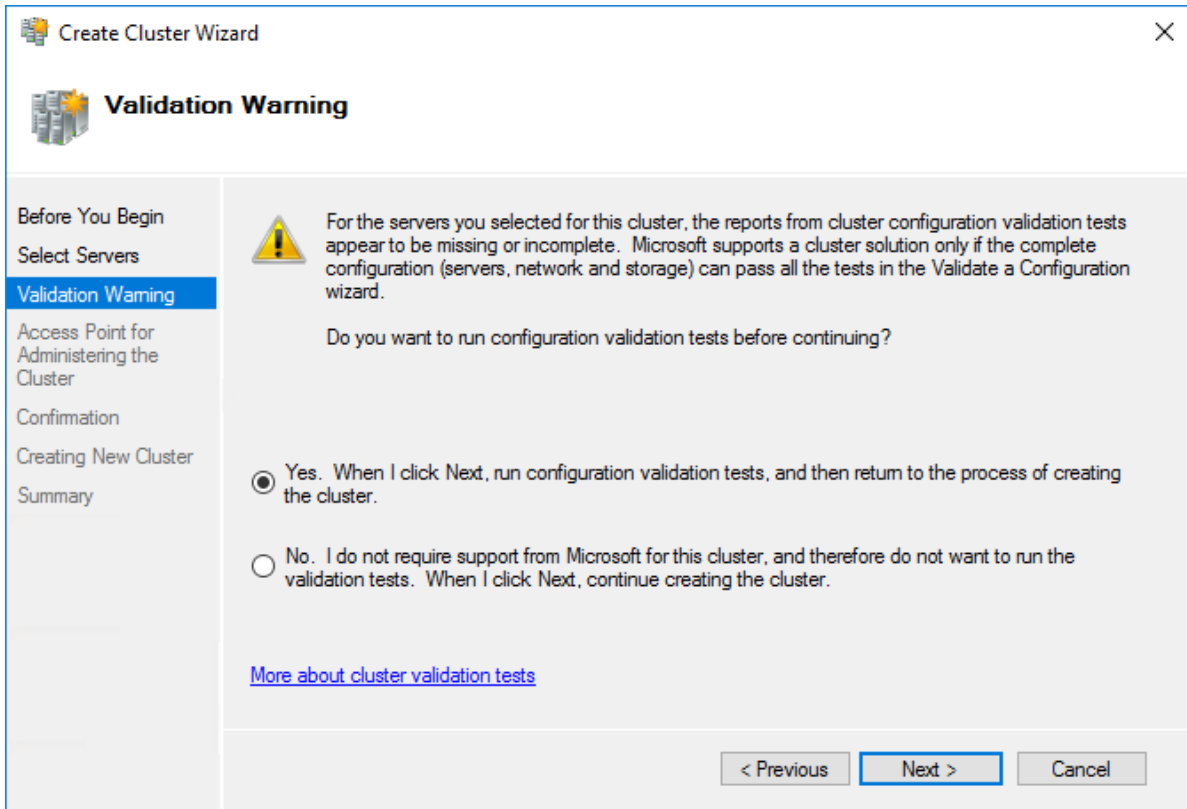
2. Click the Create Cluster link in the Actions section of Failover Cluster Manager.



3. Specify the servers to be added to the cluster. Click Next to continue.

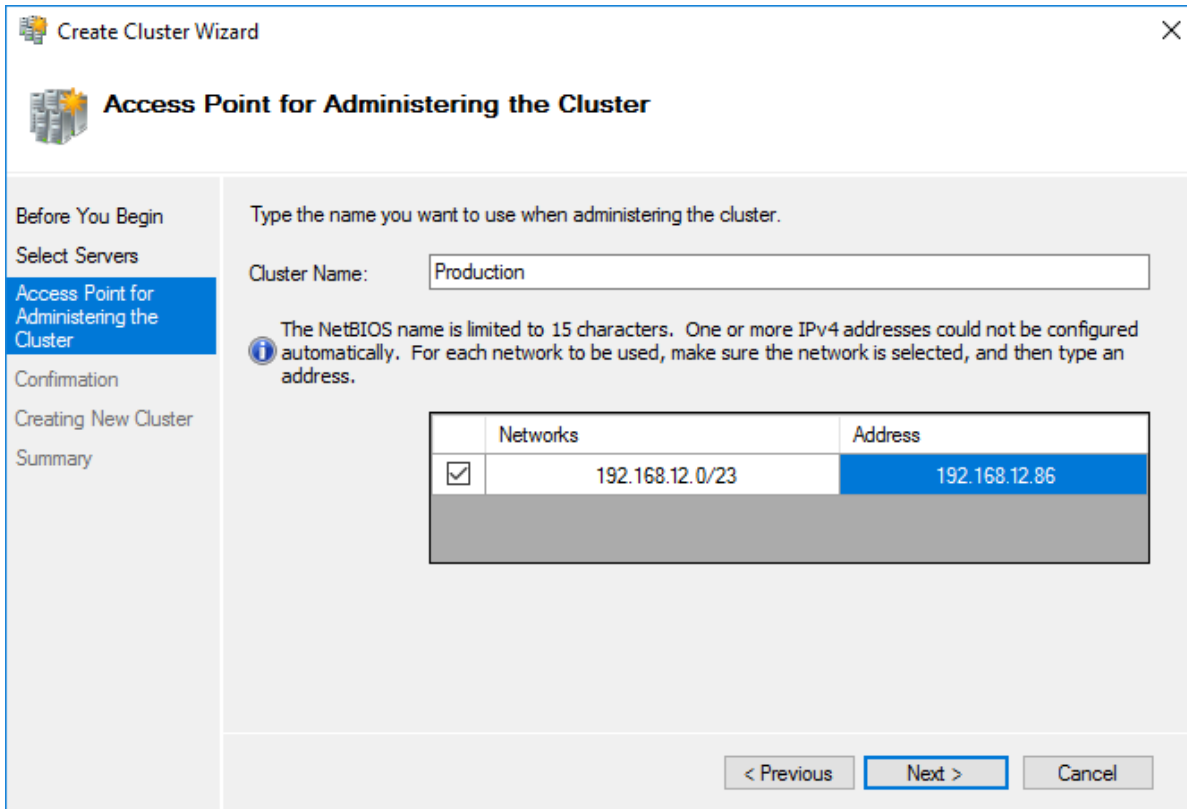


4. Validate the configuration by running the cluster validation tests: select Yes... and click Next to continue.

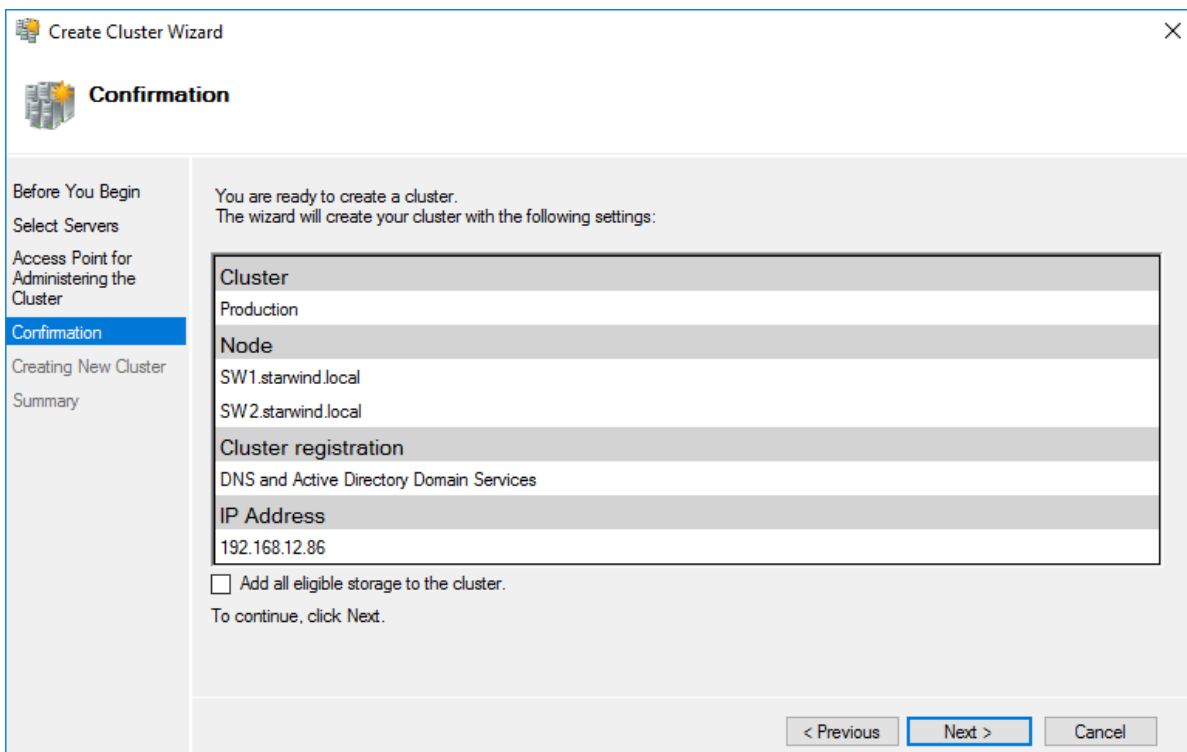


5. Specify the cluster name.

NOTE: If the cluster servers get IP addresses over DHCP, the cluster also gets its IP address over DHCP. If the IP addresses are set statically, set the cluster IP address manually.

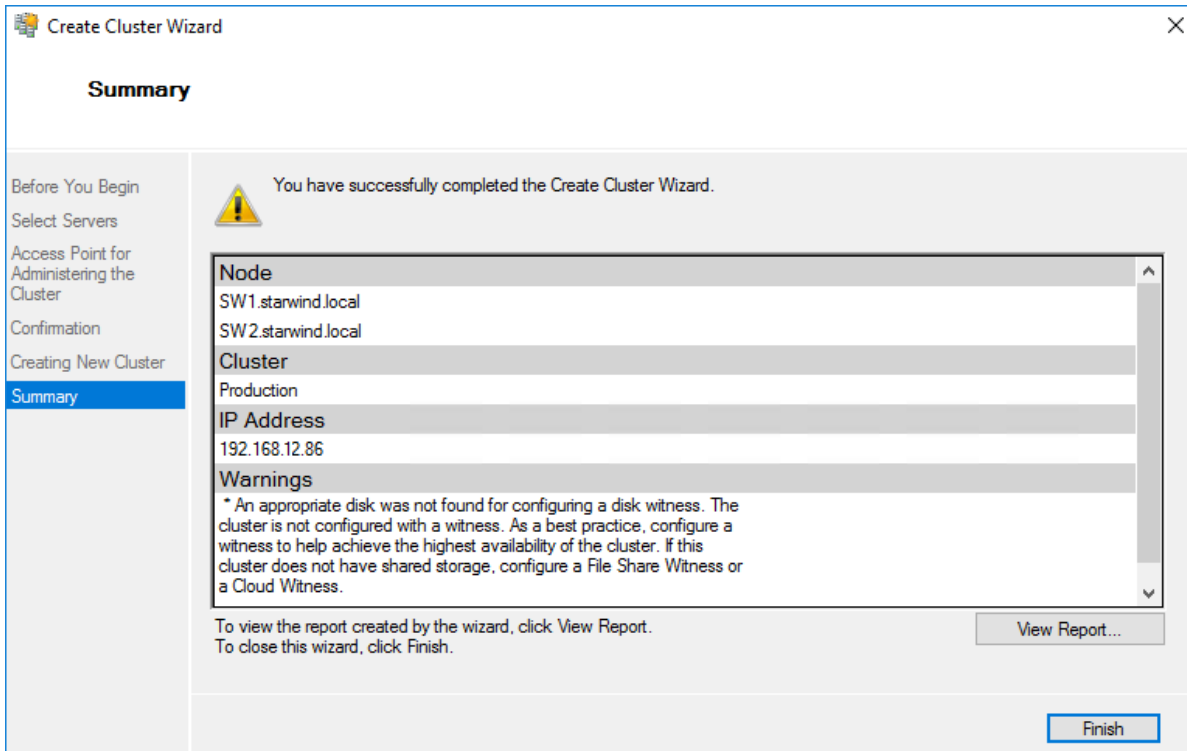


6. Make sure that all settings are correct. Click Previous to make any changes or Next to proceed.



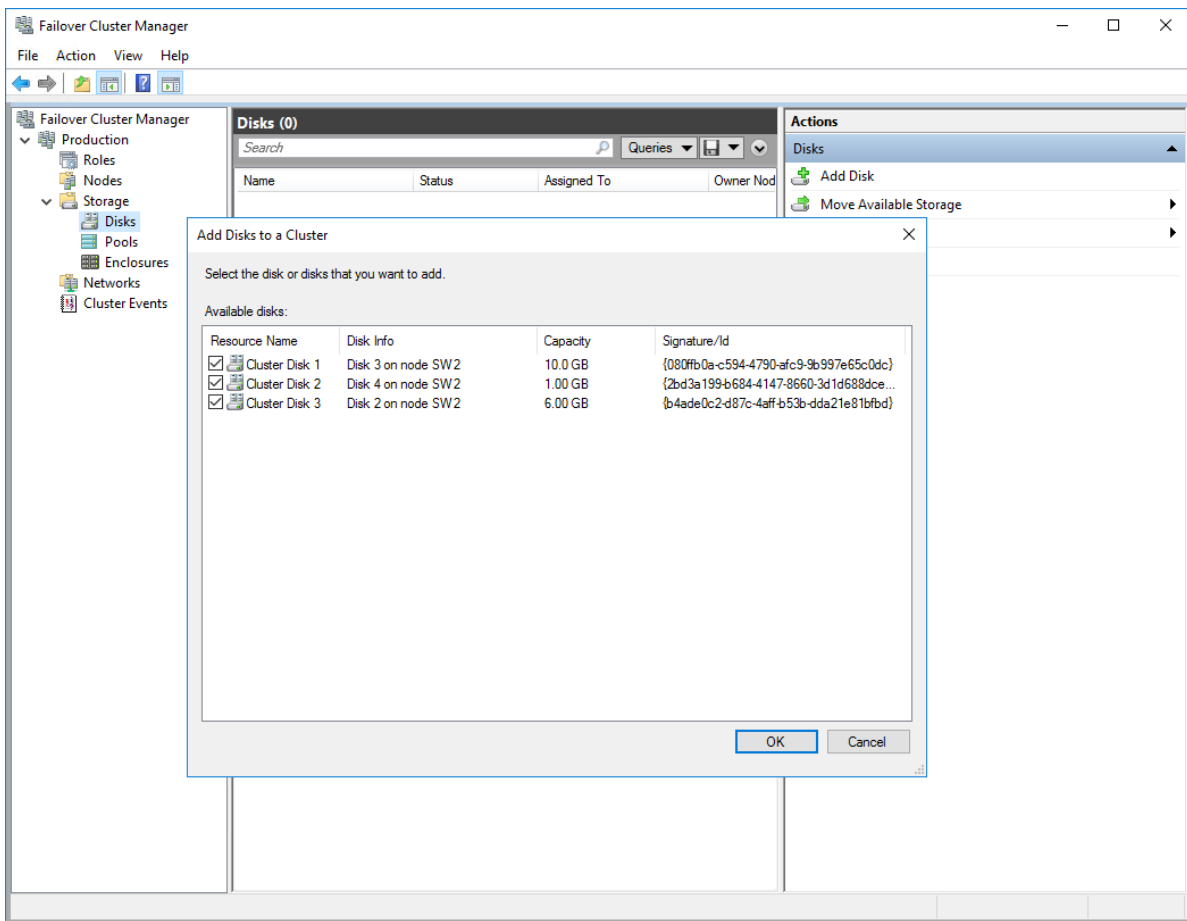
NOTE: If checkbox Add all eligible storage to the cluster is selected, the wizard will add all disks to the cluster automatically. The device with the smallest storage volume will be assigned as a Witness. It is recommended to uncheck this option before clicking Next and add cluster disks and the Witness drive manually.

7. The process of the cluster creation starts. Upon the completion, the system displays the summary with the detailed information. Click Finish to close the wizard.

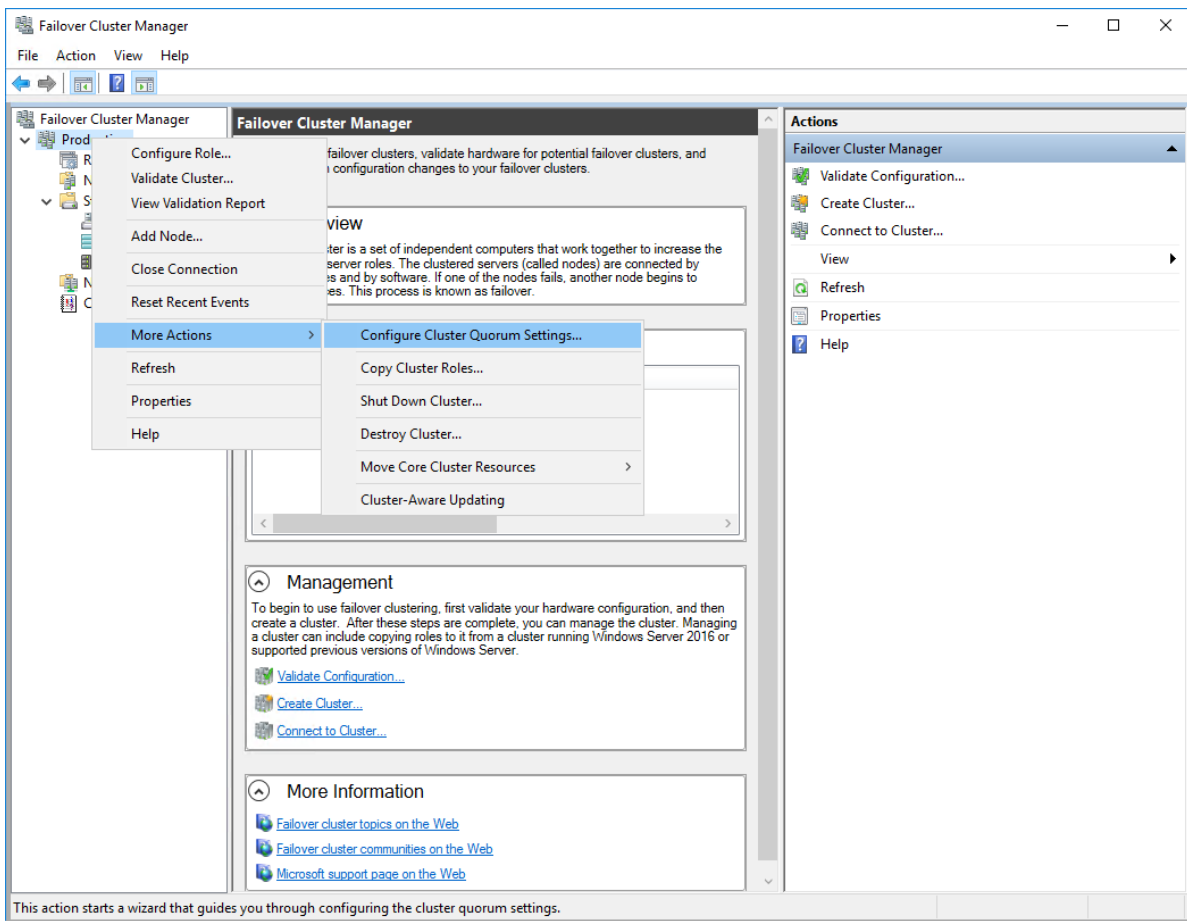


## Adding Storage to the Cluster

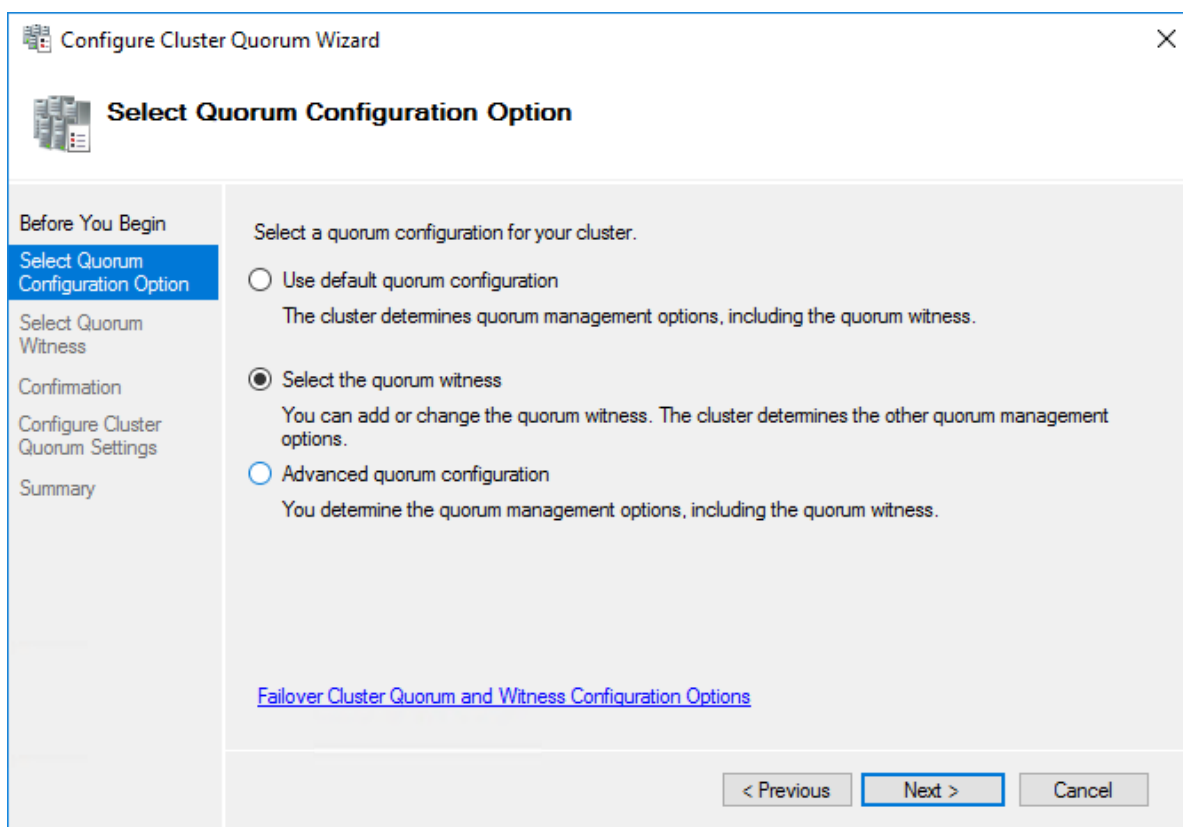
1. In Failover Cluster Manager, navigate to Cluster -> Storage -> Disks. Click Add Disk in the Actions panel, choose StarWind disks from the list and confirm the selection.



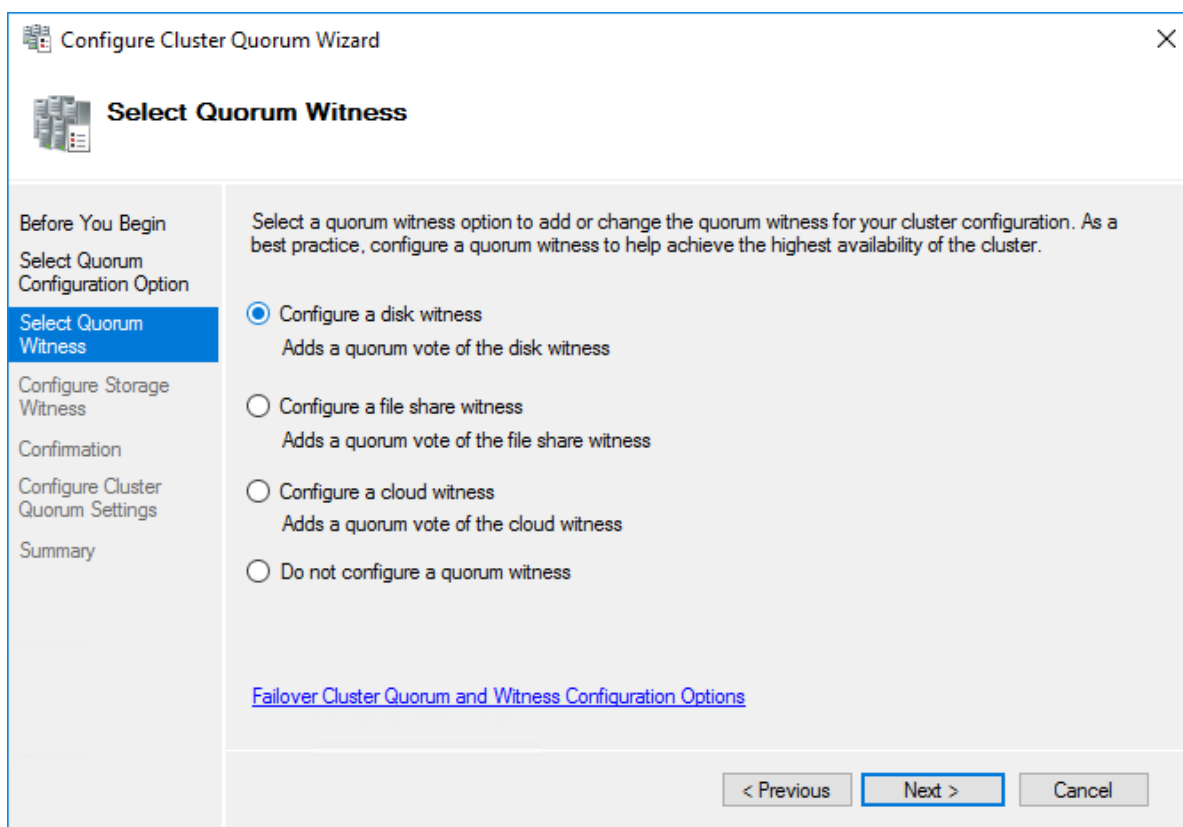
2. To configure the cluster witness disk, right-click on Cluster and proceed to More Actions -> Configure Cluster Quorum Settings.



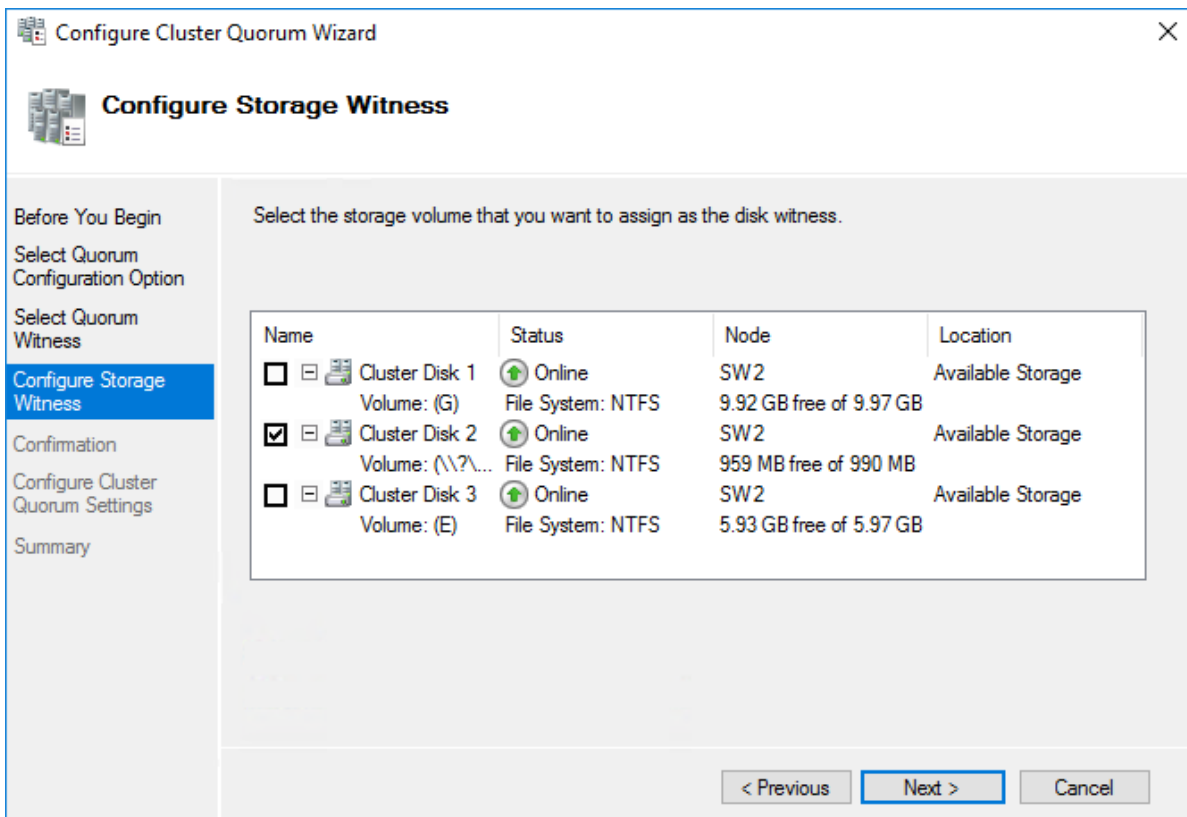
3. Follow the wizard and use the Select the quorum witness option. Click Next.



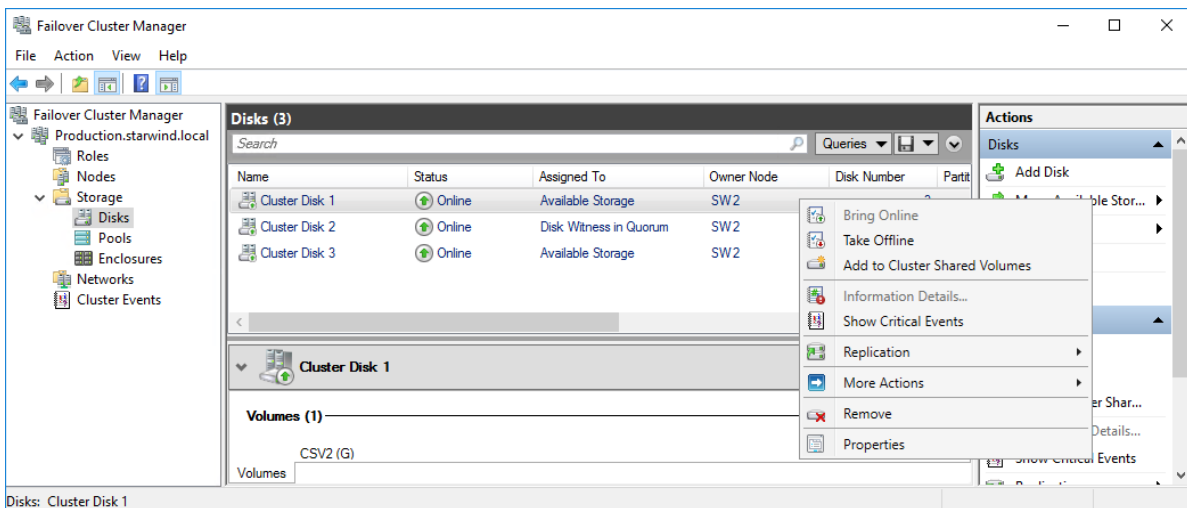
4. Select Configure a disk witness. Click Next.



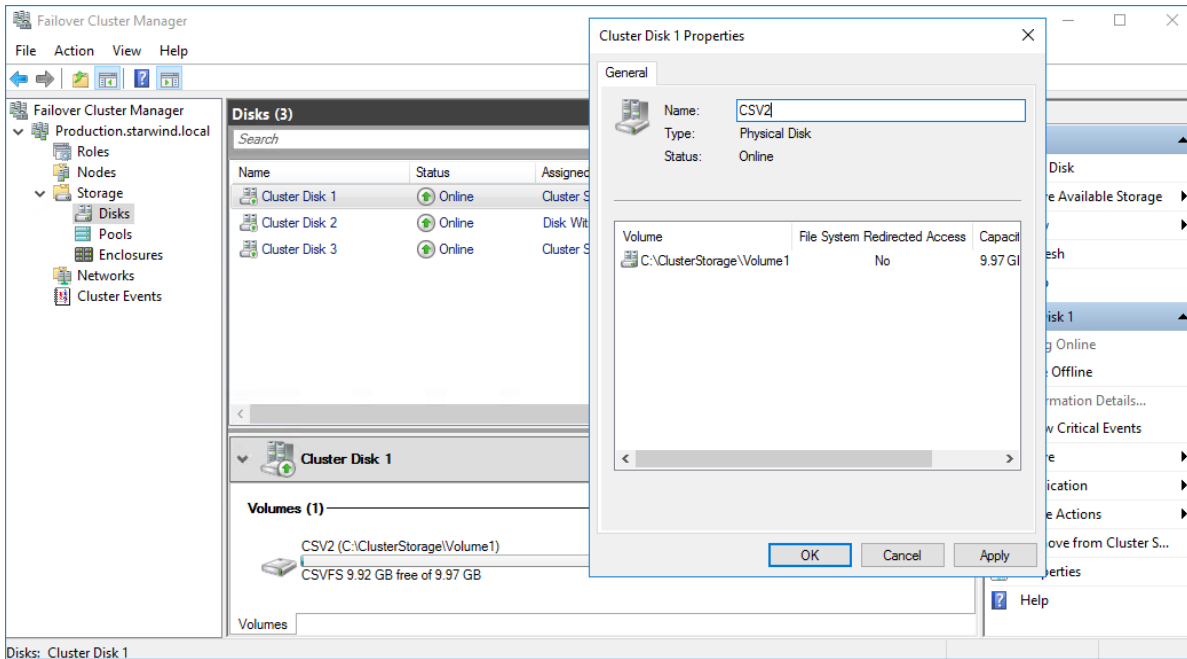
5. Select the Witness disk to be assigned as the cluster witness disk. Click Next and press Finish to complete the operation.



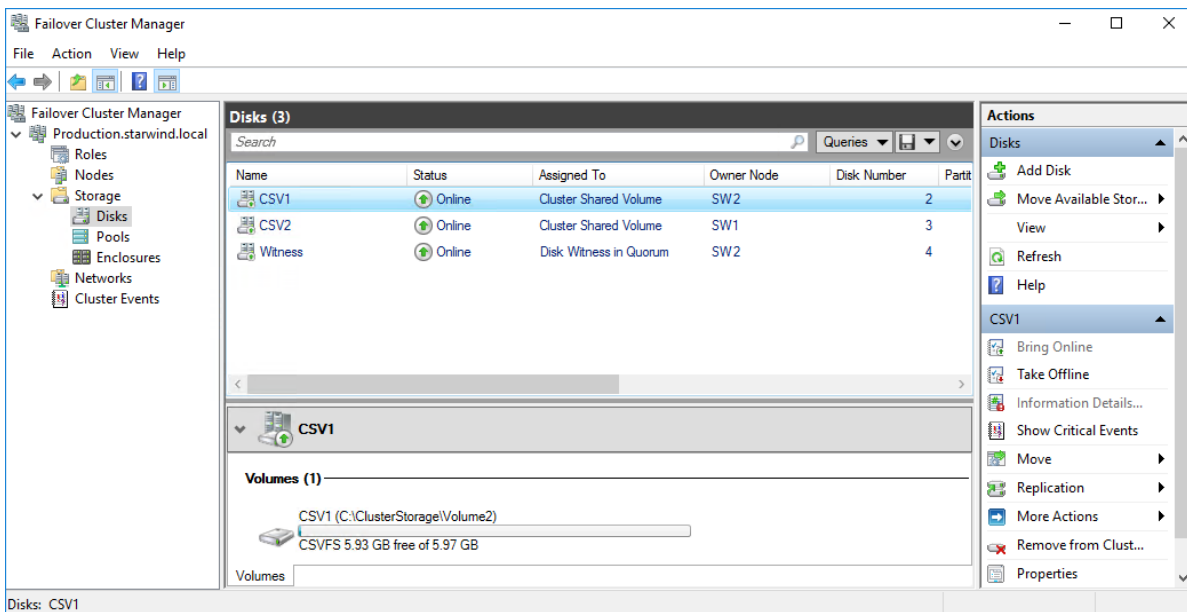
6. In Failover Cluster Manager, Right-click the disk and select Add to Cluster Shared Volumes.



7. If renaming of the cluster shared volume is required, right-click on the disk and select Properties. Type the new name for the disk and click Apply followed by OK.



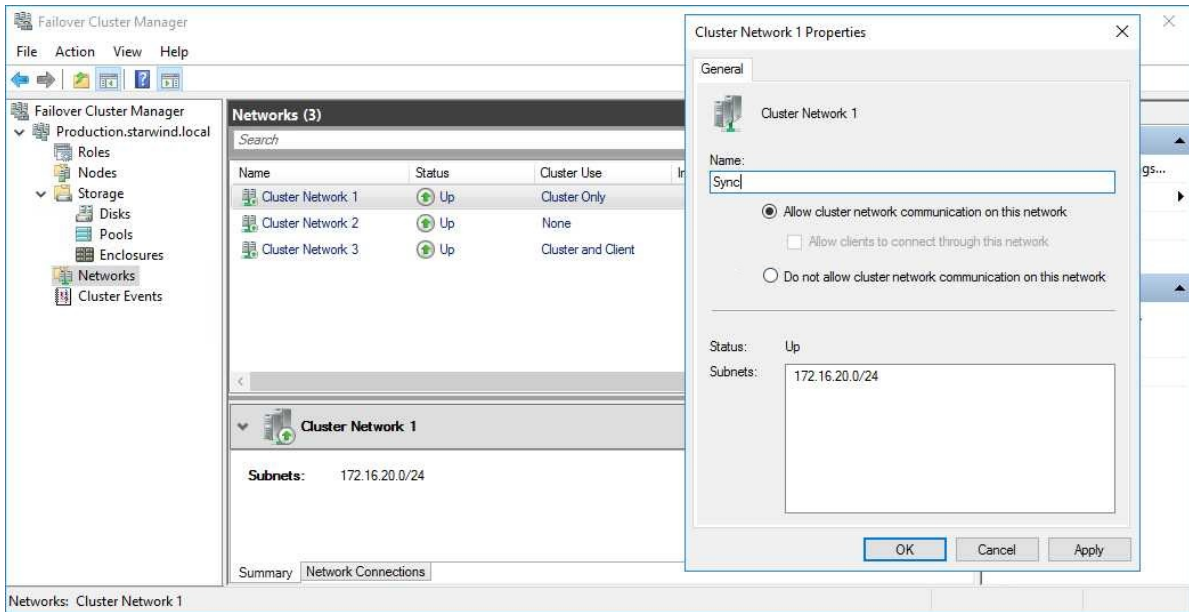
8. Perform the steps 6-7 for any other disk in Failover Cluster Manager. The resulting list of disks will look similar to the screenshot below.



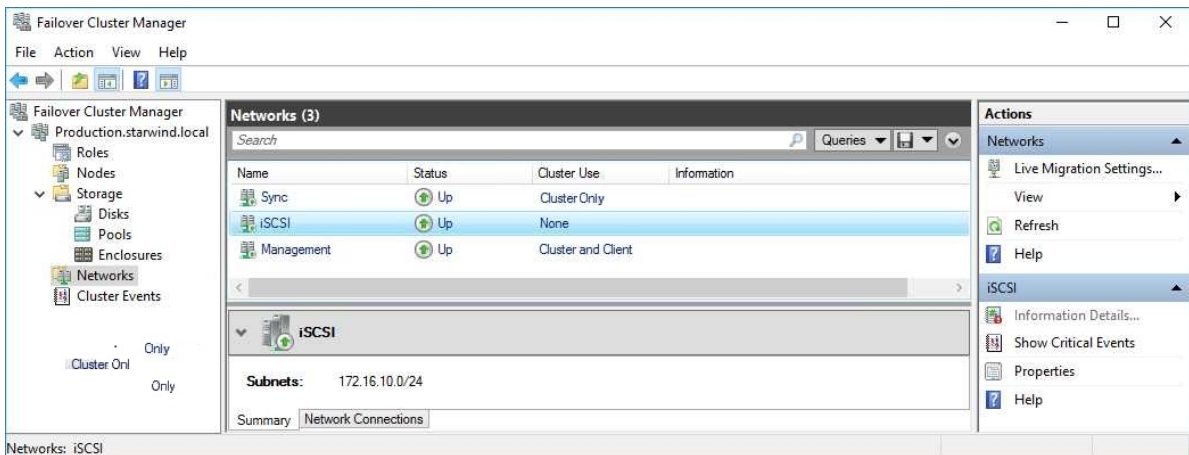
## Configuring Cluster Network Preferences

1. In the Networks section of the Failover Cluster Manager, right-click on the network from the list. Set its new name if required to identify the network by its subnet. Apply the change and press OK.

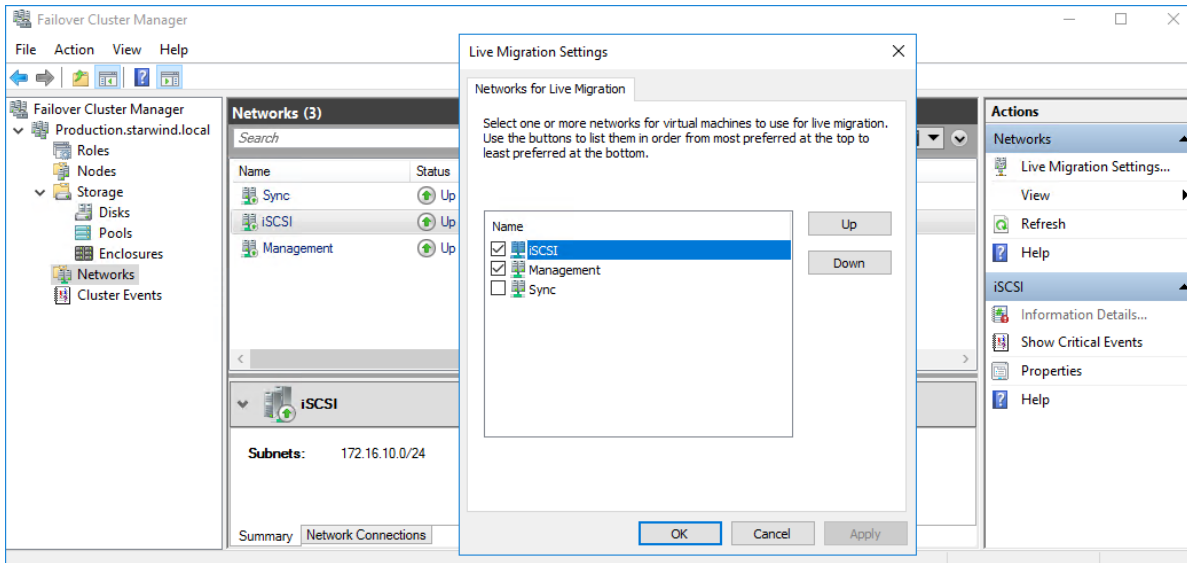
NOTE: Double-check that cluster communication is configured with redundant networks: <https://docs.microsoft.com/en-us/windows-server/failover-clustering/smb-multichannel>



2. Rename other networks as described above, if required.



3. In the Actions tab, click Live Migration Settings. Uncheck the synchronization network, while the iSCSI network can be used if it is 10+ Gbps. Apply the changes and click OK.



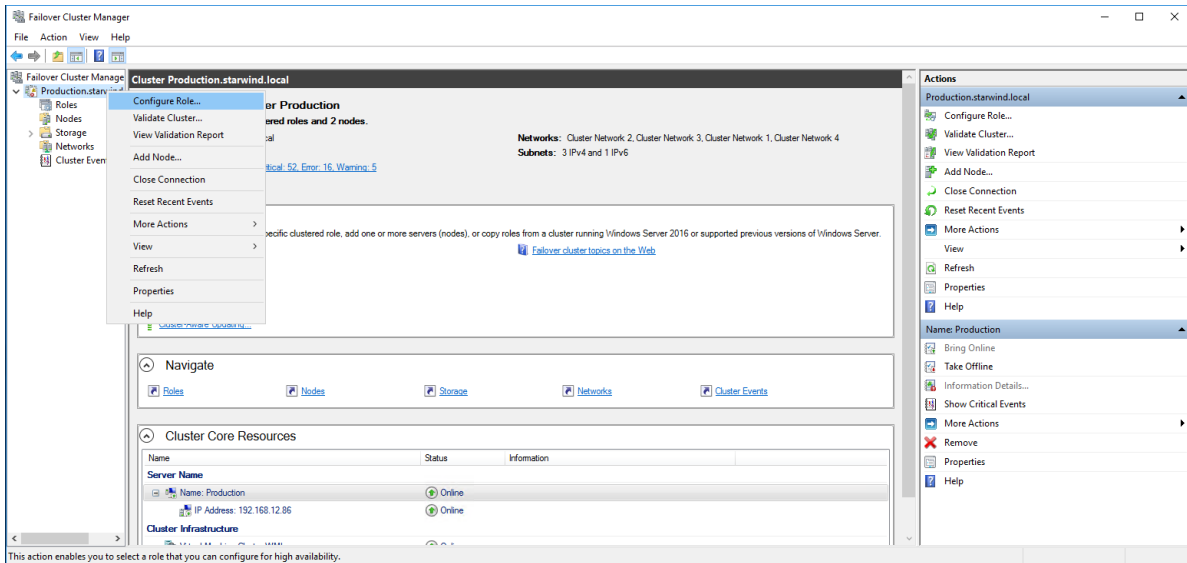
The cluster configuration is completed and it is ready for virtual machines deployment. Select Roles and in the Action tab, click Virtual Machines -> New Virtual Machine. Complete the wizard.

## Configuring File Shares

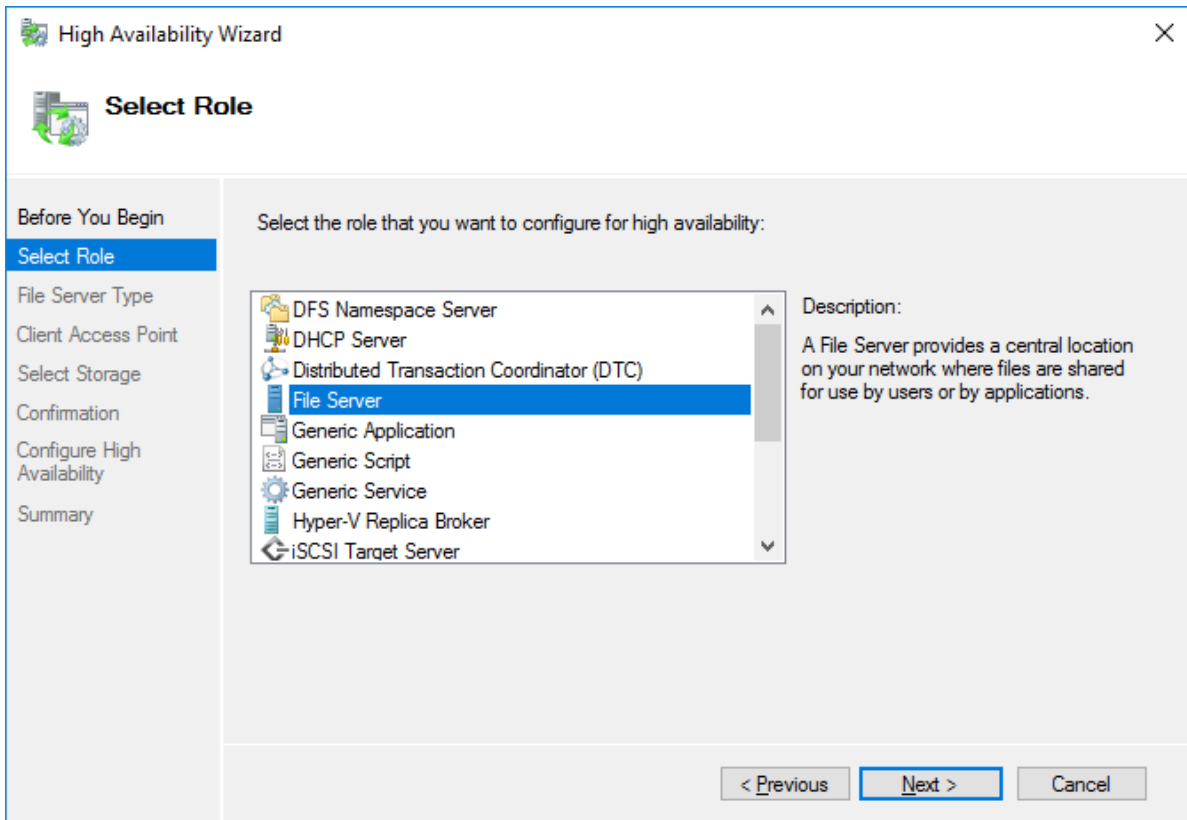
Please follow the steps below if file shares should be configured on cluster nodes.

## Configuring The Scale-Out File Server Role

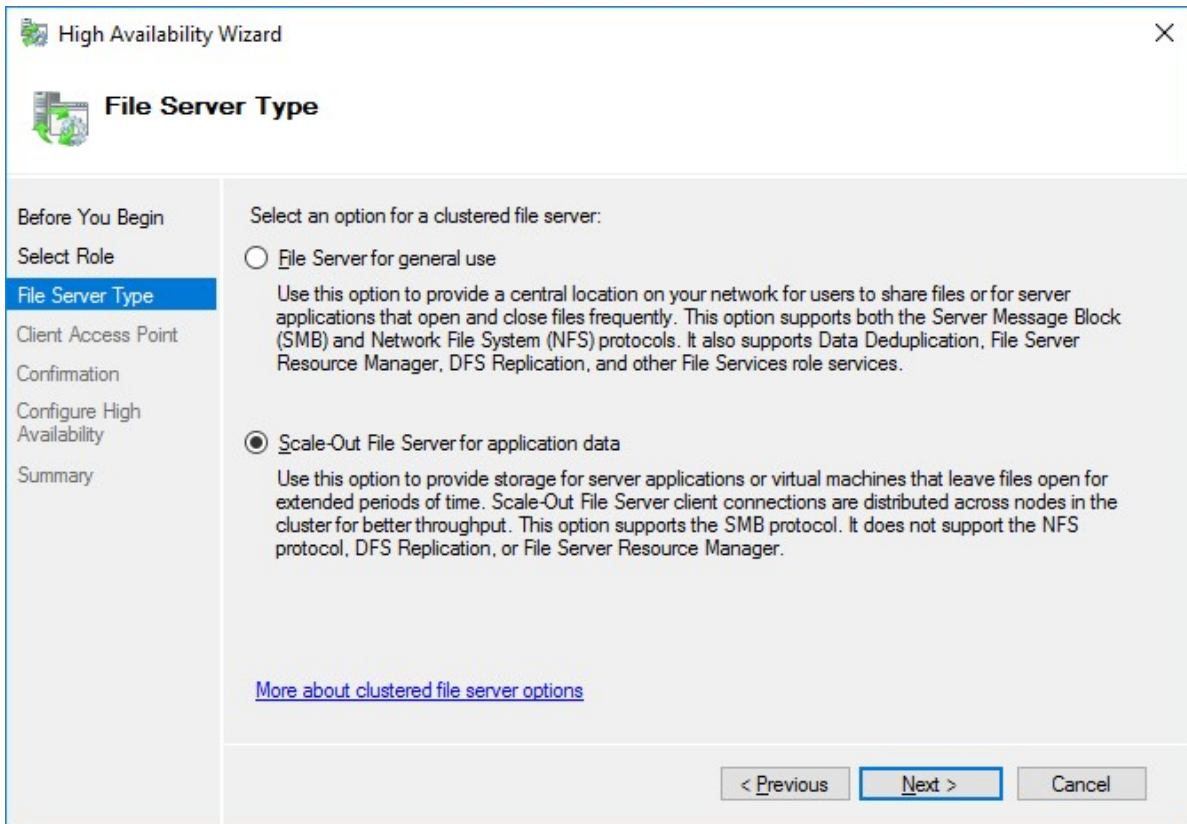
1. To configure the Scale-Out File Server Role, open Failover Cluster Manager.
2. Right-click the cluster name, then click Configure Role and click Next to continue.



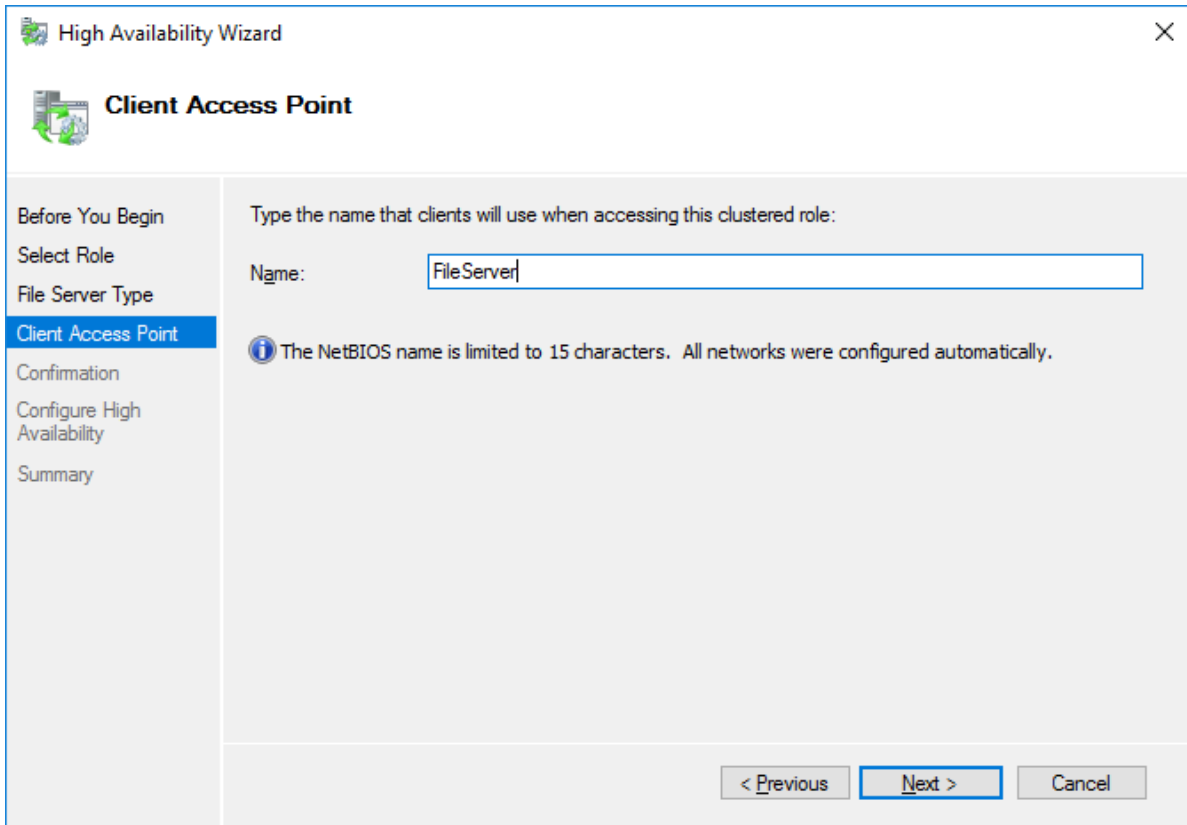
3. Select the File Server item from the list in High Availability Wizard and click Next to continue.



4. Select Scale-Out File Server for application data and click Next.

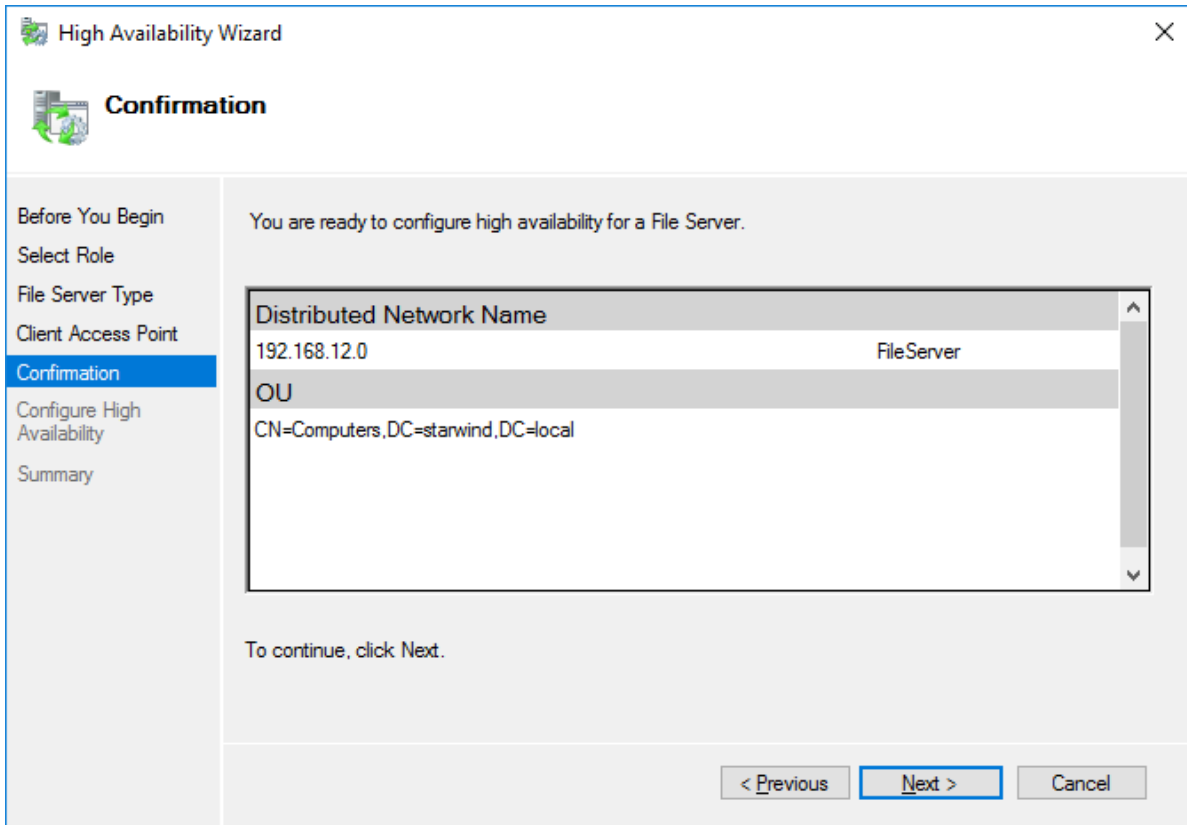


5. On the Client Access Point page, in the Name text field, type the NetBIOS name that will be used to access a Scale-Out File Server.



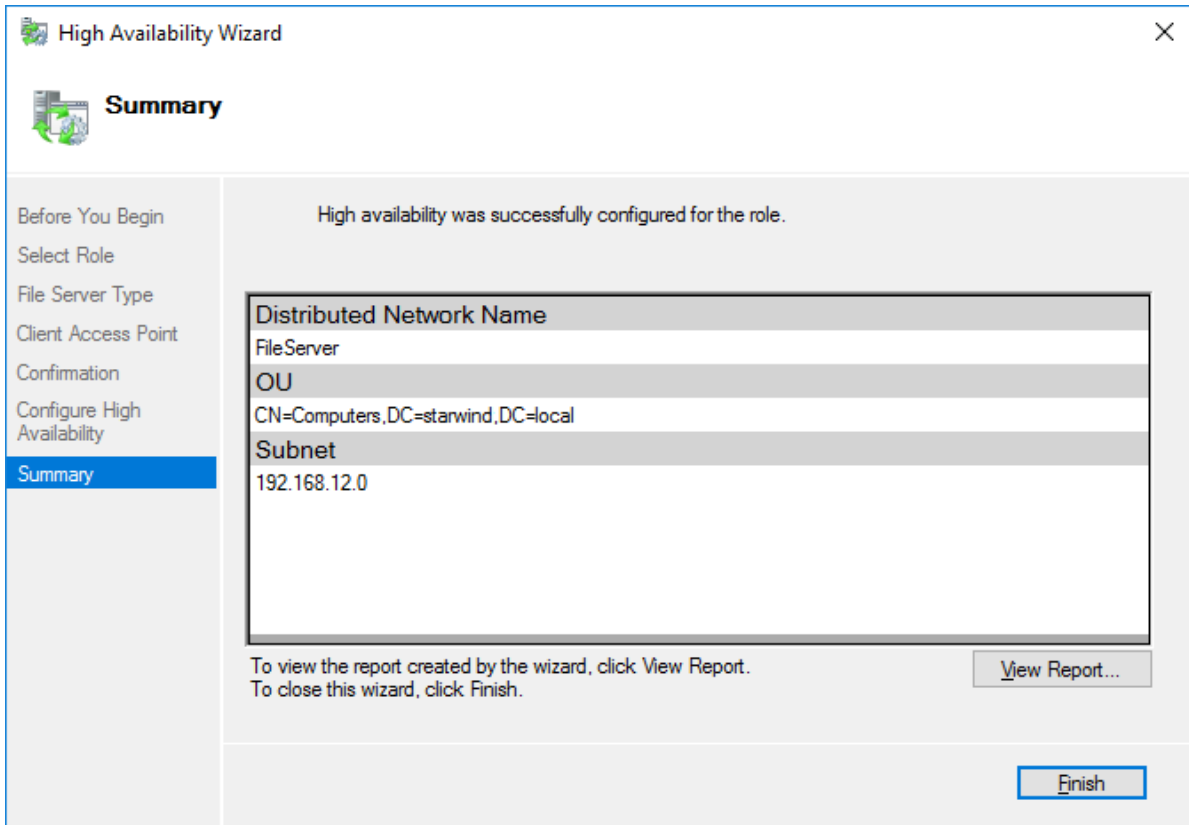
Click Next to continue.

6. Check whether the specified information is correct. Click Next to continue or Previous to change the settings.

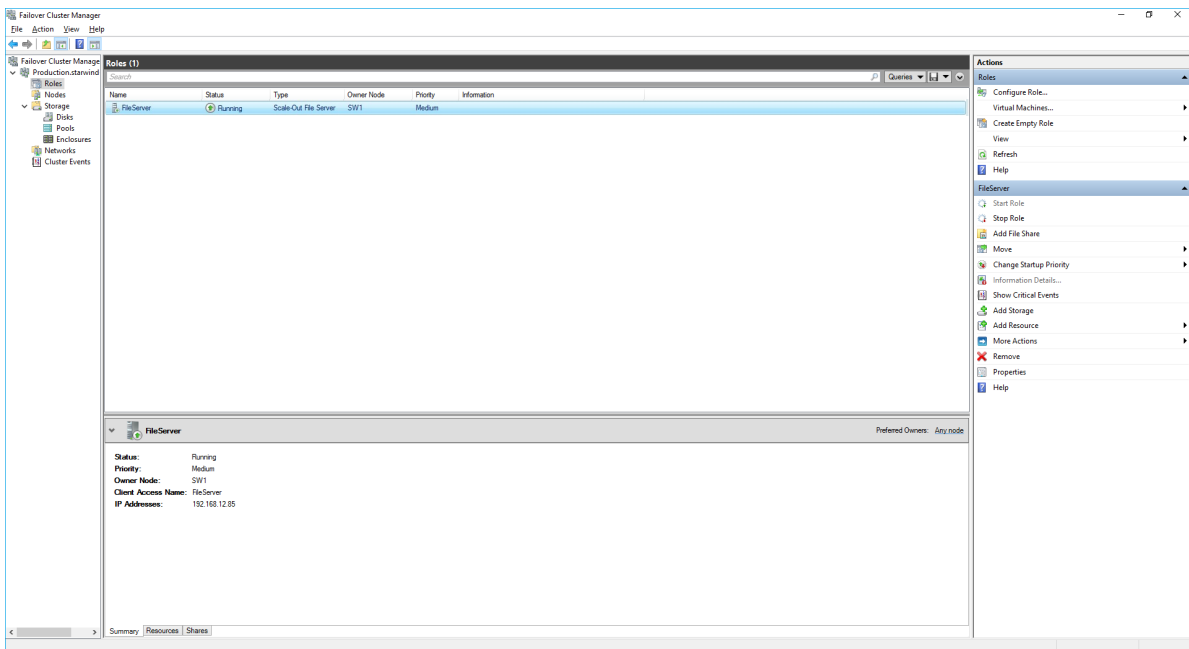


7. Once the installation is finished successfully, the Wizard should now look like the screenshot below.

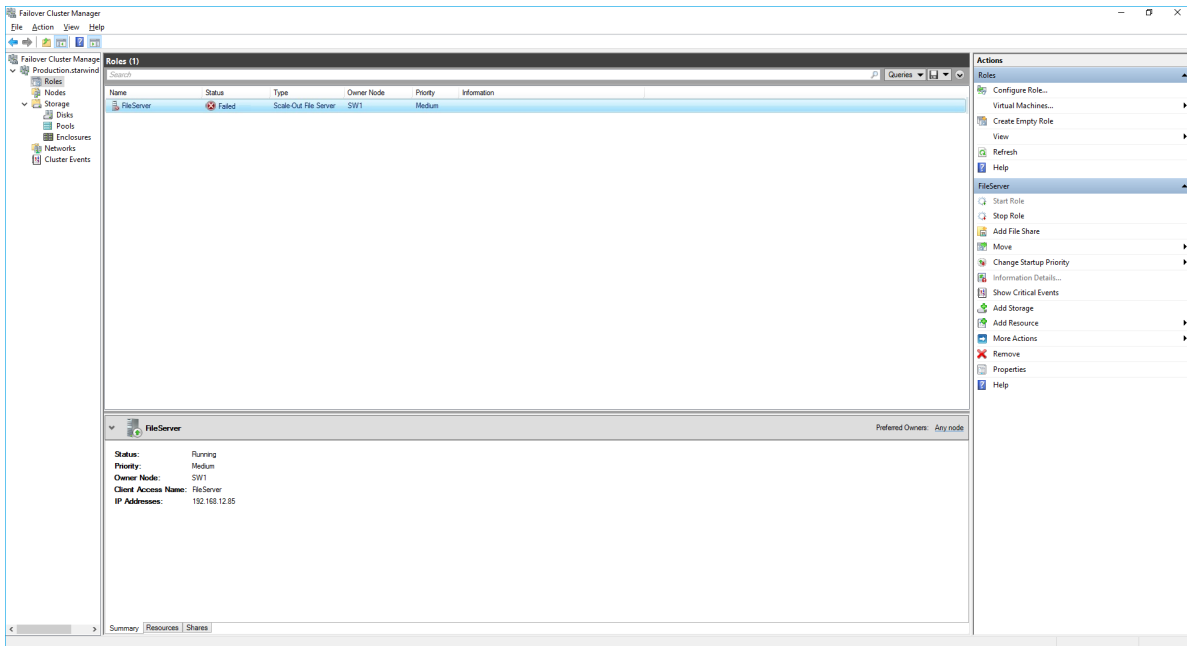
Click Finish to close the Wizard.



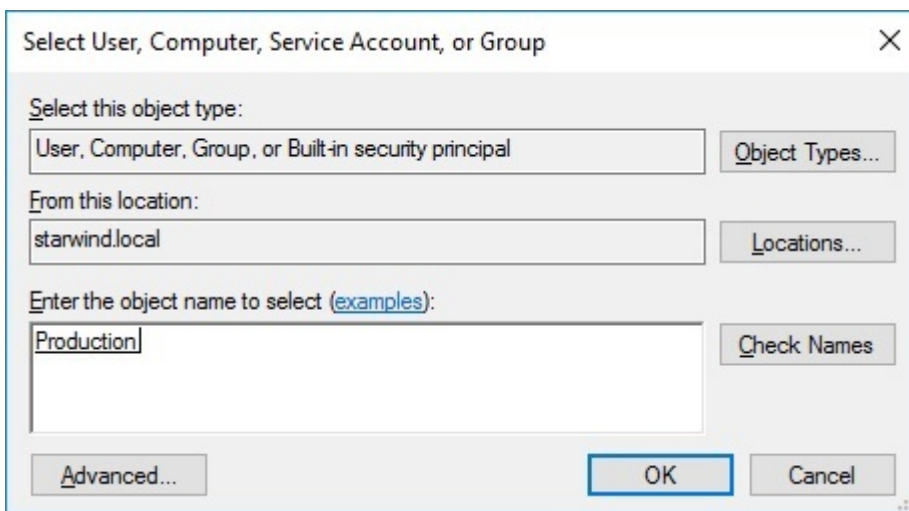
8. The newly created role should now look like the screenshot below.



NOTE: If the role status is Failed and it is unable to Start, please, follow the next steps:

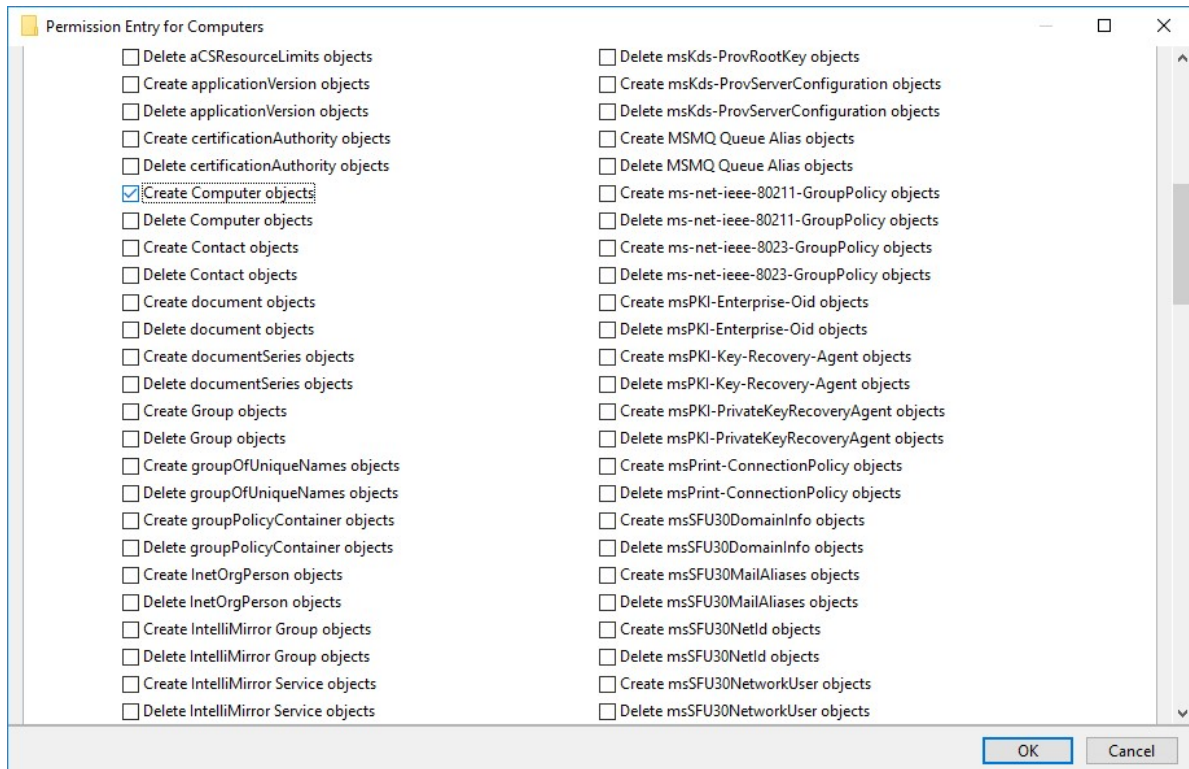


- open Active Directory Users and Computers
- enable the Advanced view if it is not enabled
- edit the properties of the OU containing the cluster computer object (in this case - Production)
- open the Security tab and click Advanced
- in the appeared window, press Add (the Permission Entry dialog box opens), click Select a principal
- in the appeared window, click Object Types, select Computers, and click OK
- enter the name of the cluster computer object (in this case - Production)



- go back to Permission Entry dialog, scroll down, and select Create Computer

Objects,

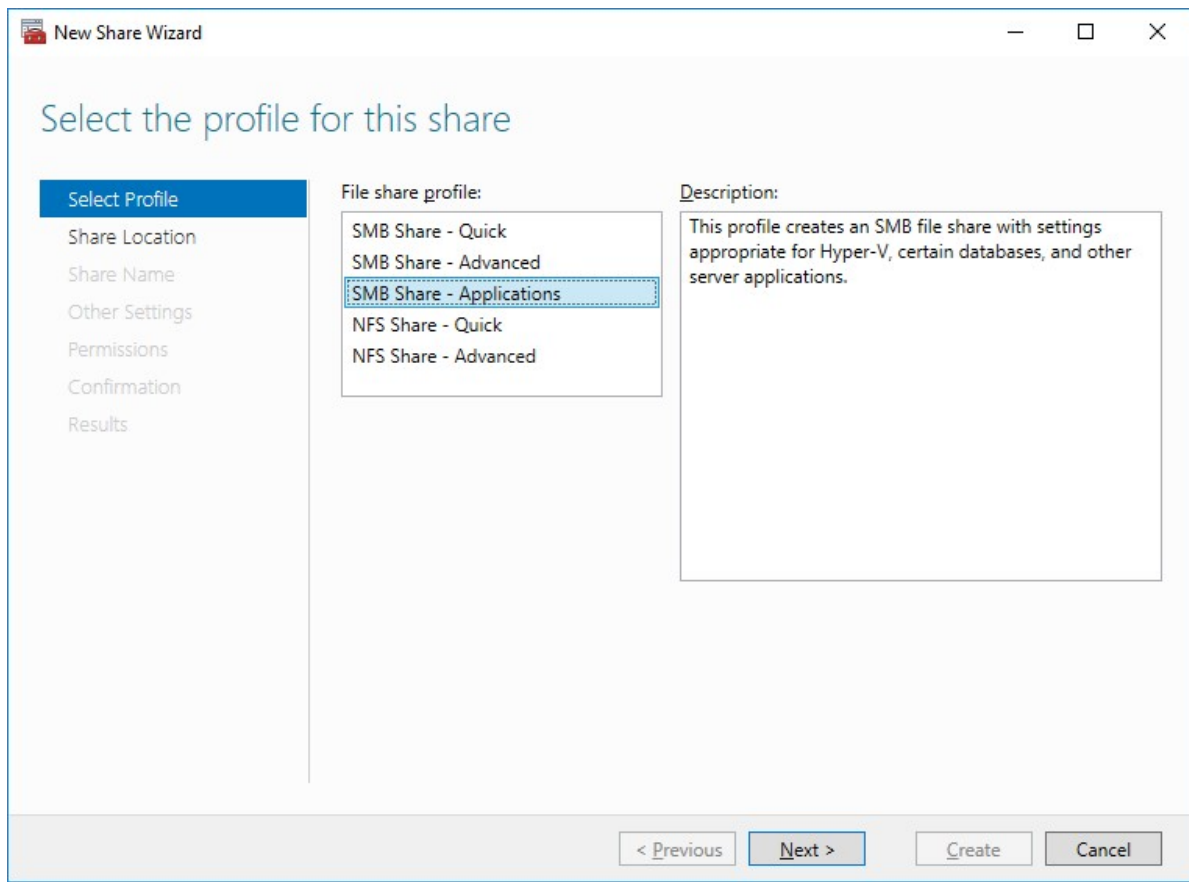


- click OK on all opened windows to confirm the changes
- open Failover Cluster Manager, right-click SOFS role and click Start Role

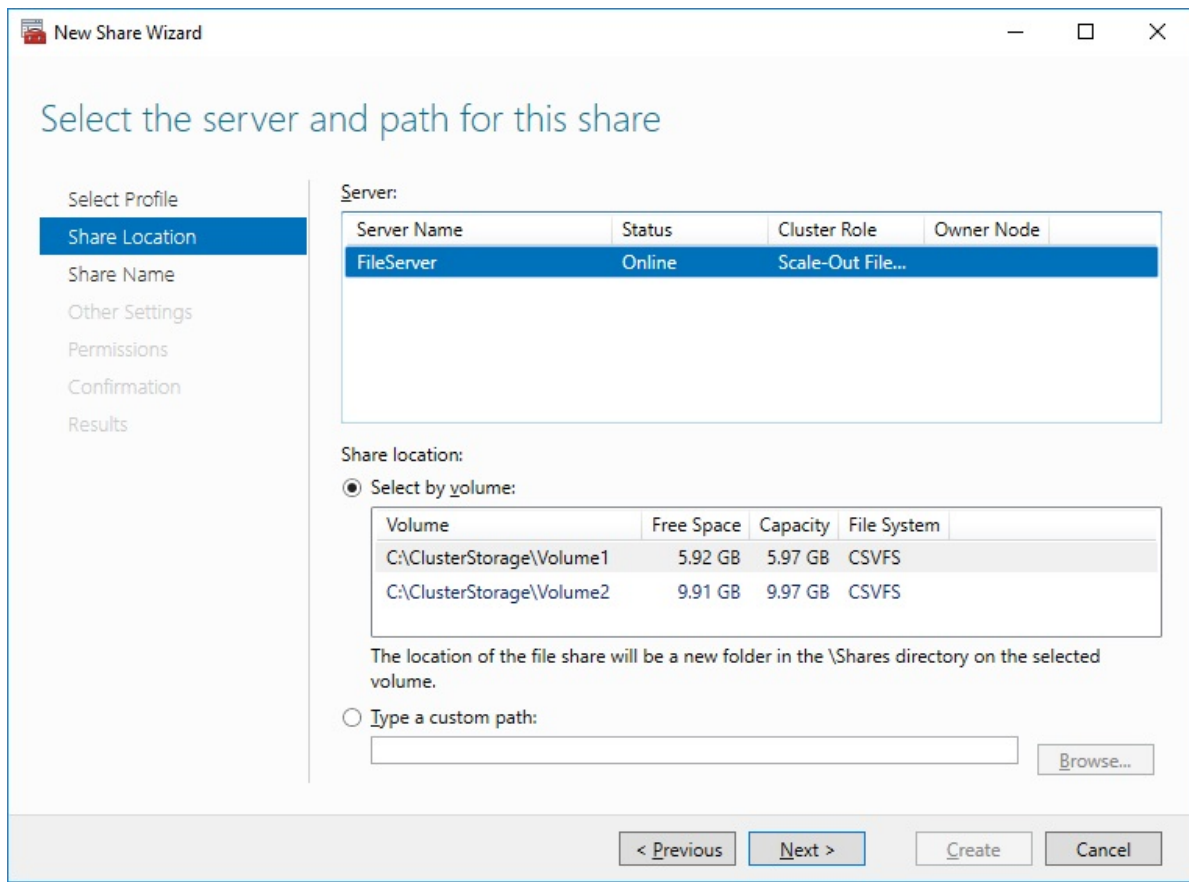
Configuring File Share

To Add File Share:

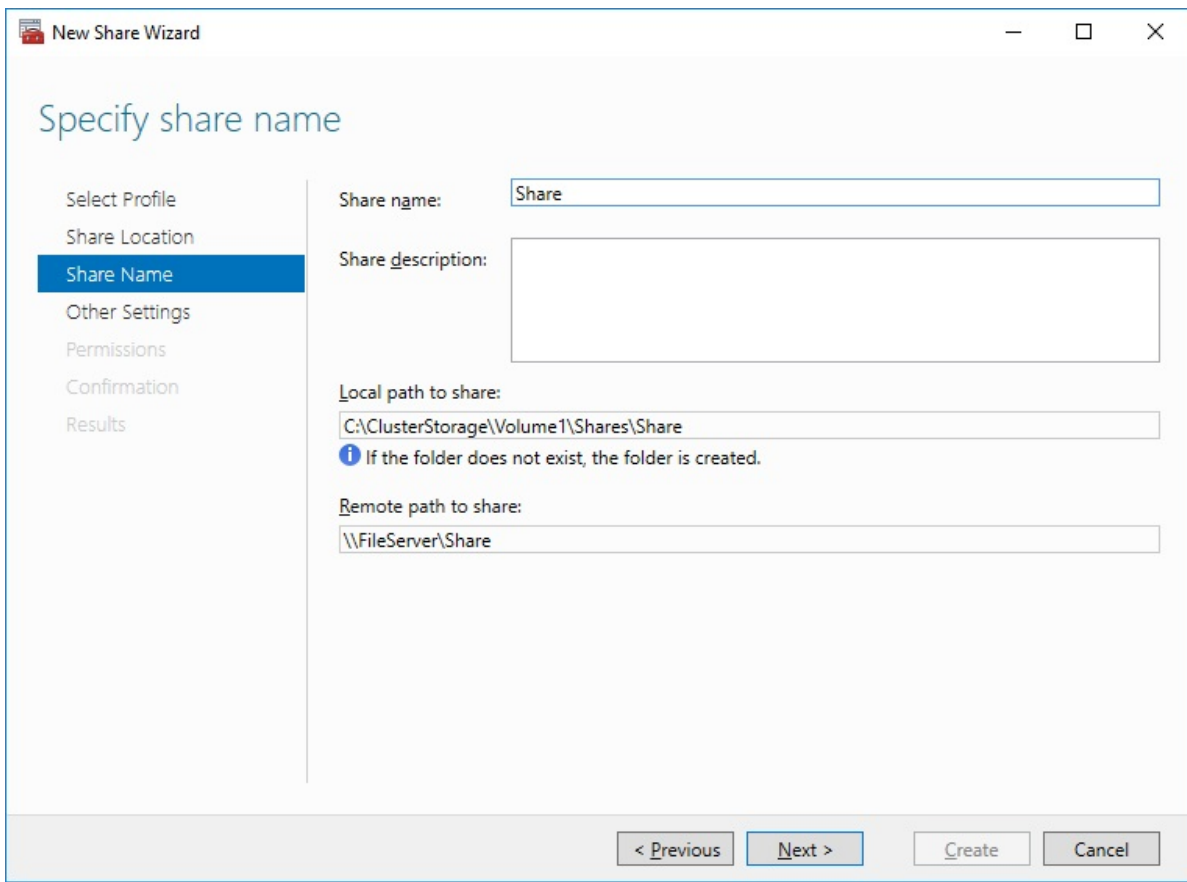
- open Failover Cluster Manager
- expand the cluster and then click Roles
- right-click the file server role and then press Add File Share
- on the Select the profile for this share page, click SMB Share – Applications and then click Next



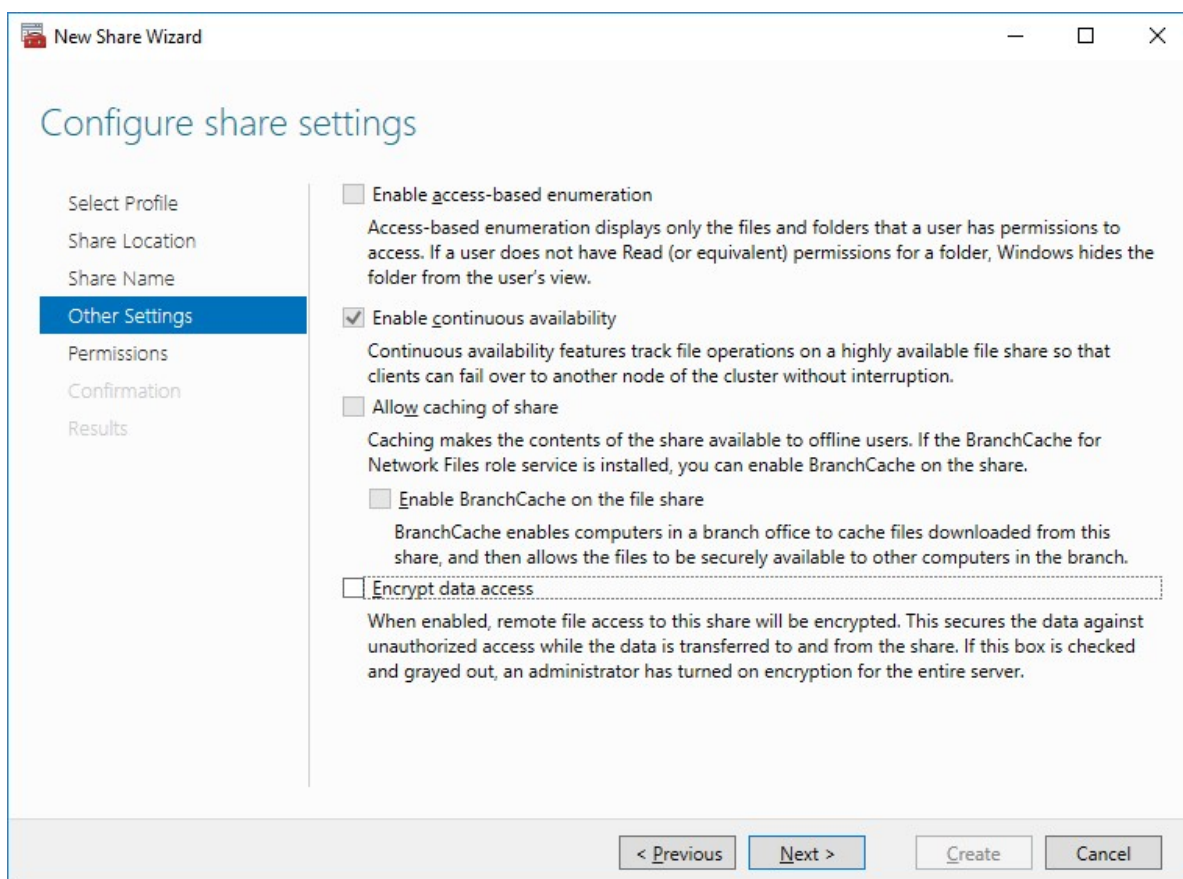
5. Select a CSV to host the share. Click Next to proceed.



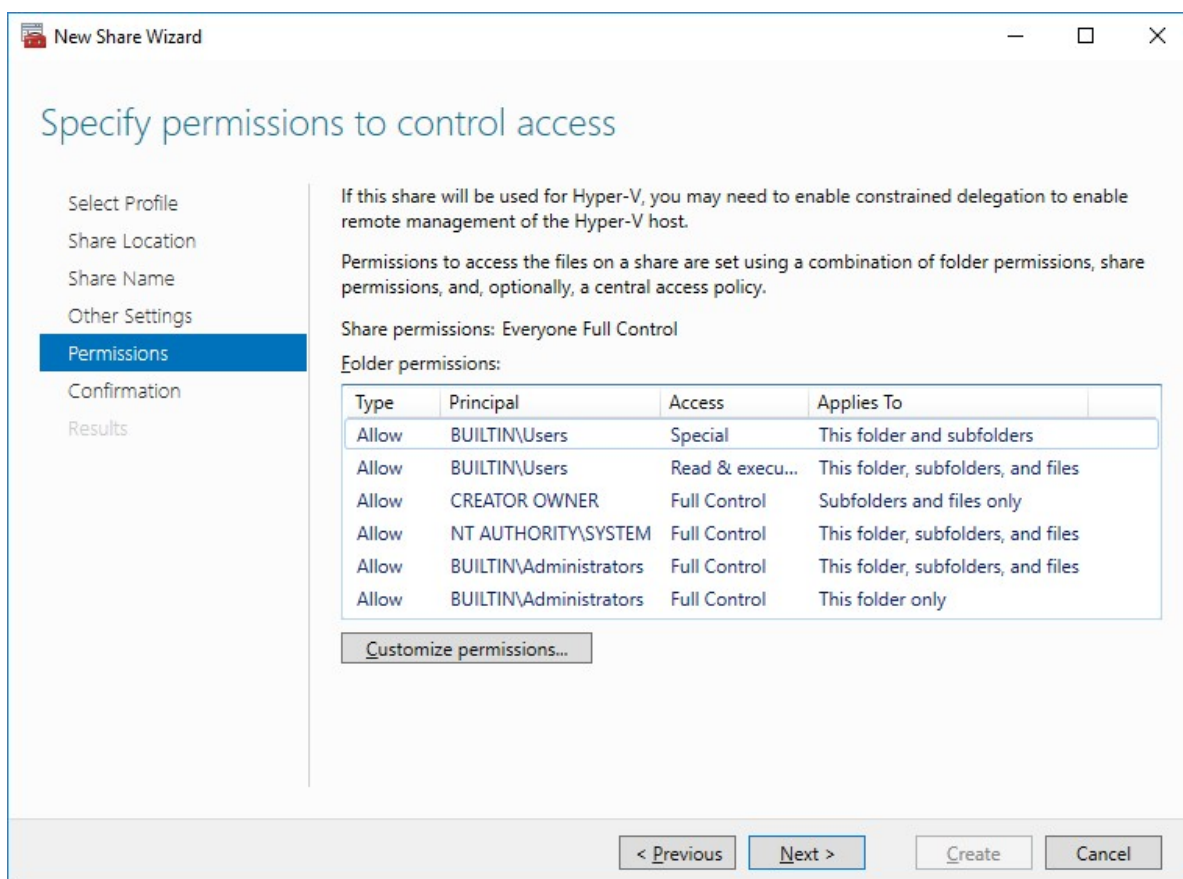
6. Type in the file share name and click Next.



7. Make sure that the Enable Continuous Availability box is checked. Click Next to proceed.



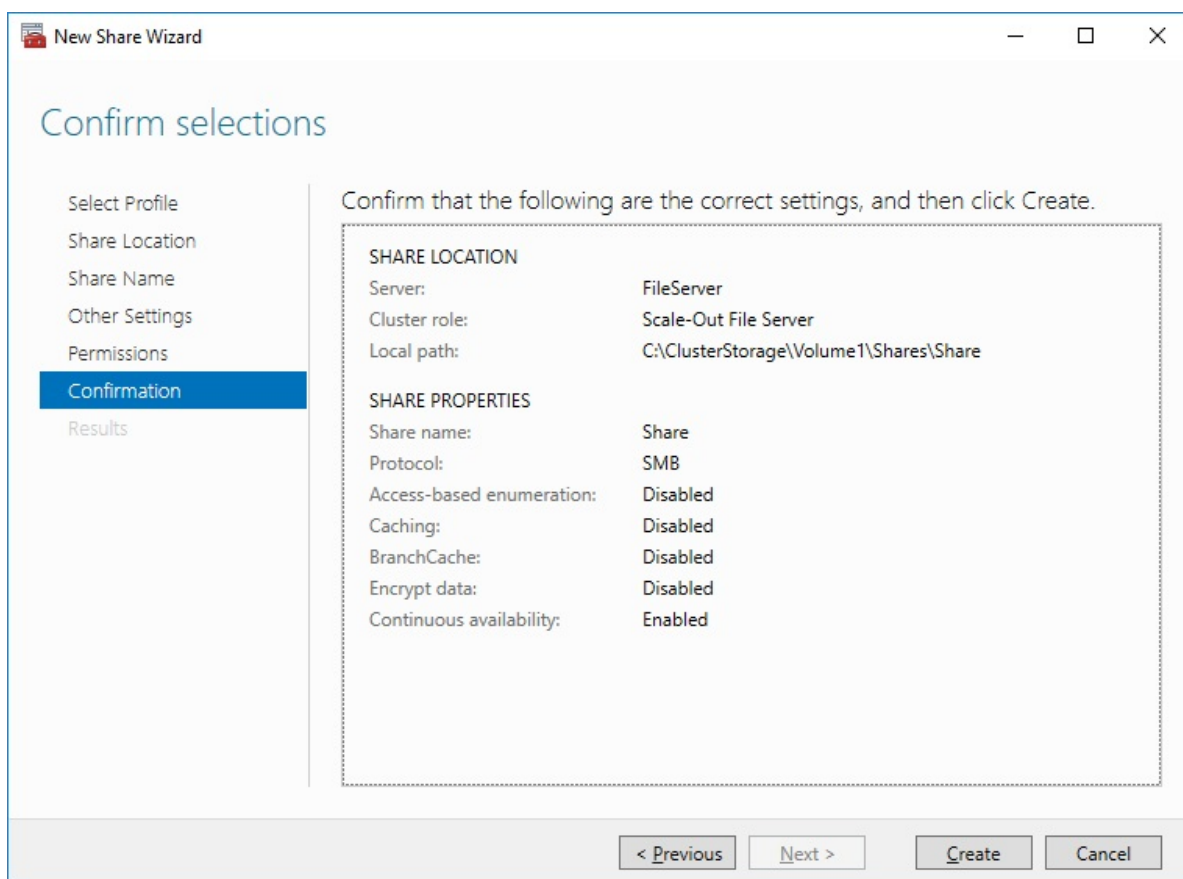
8. Specify the access permissions for the file share.



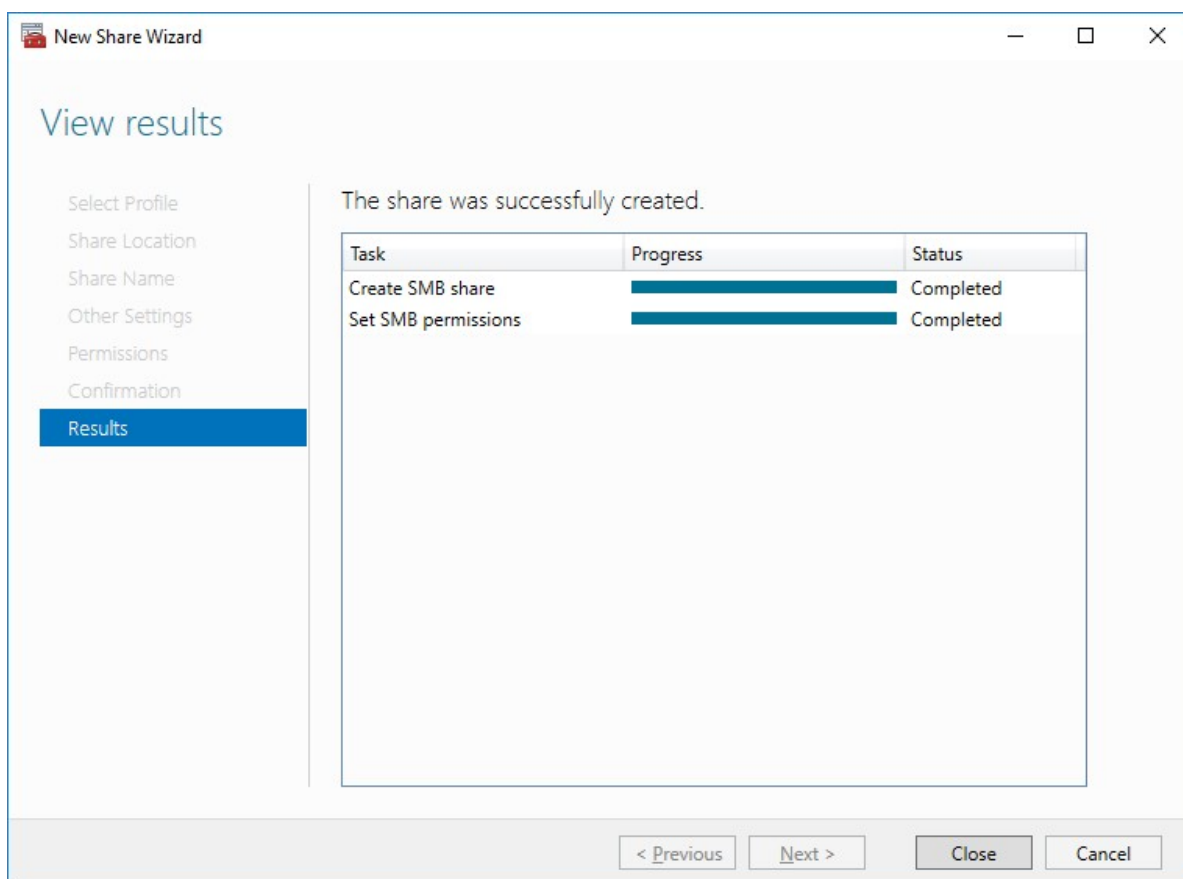
**NOTE:**

- for the Scale-Out File Server for Hyper-V, all Hyper-V computer accounts, the SYSTEM account, and all Hyper-V administrators must be provided with the full control on the share and file system
- for the Scale-Out File Server on Microsoft SQL Server, the SQL Server service account must be granted full control on the share and the file system

9. Check whether specified settings are correct. Click Previous to make any changes or click Create to proceed.

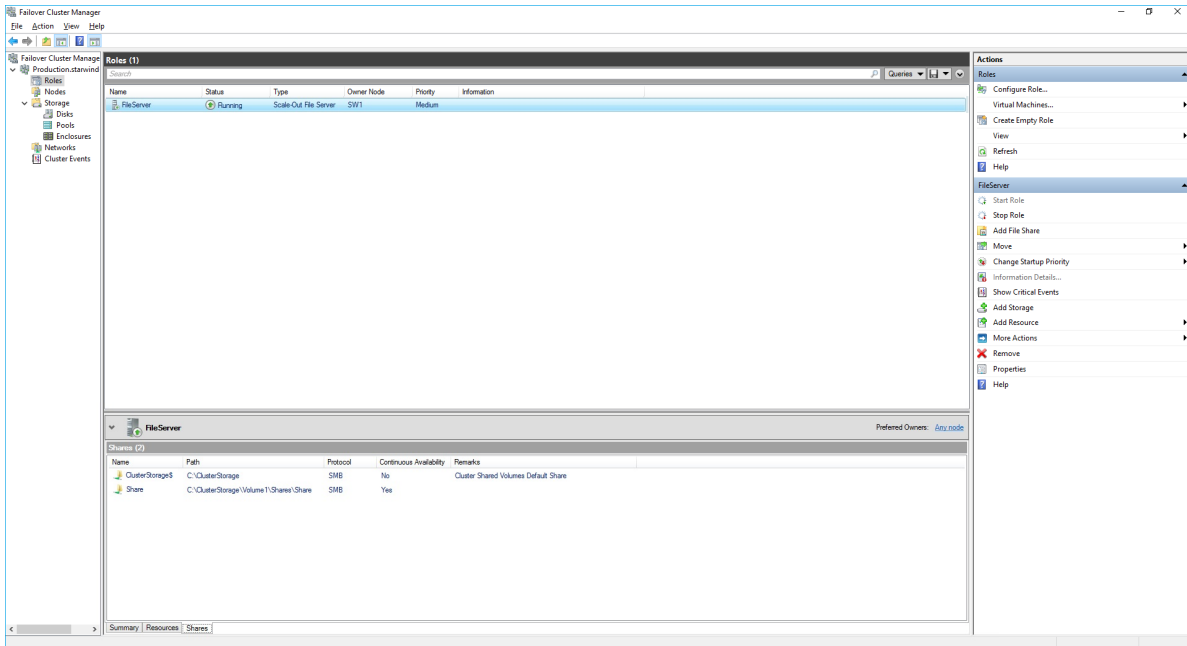


10. Check the summary and click Close to close the Wizard.



To Manage Created File Shares:

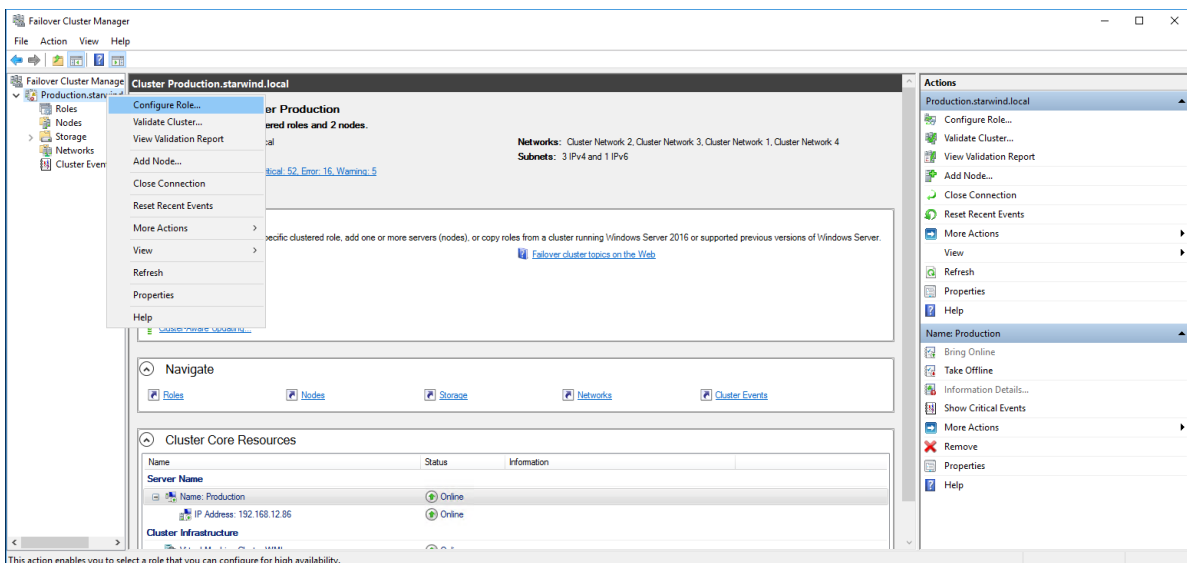
- open Failover Cluster Manager
- expand the cluster and click Roles
- choose the file share role, select the Shares tab, right-click the created file share, and select Properties:



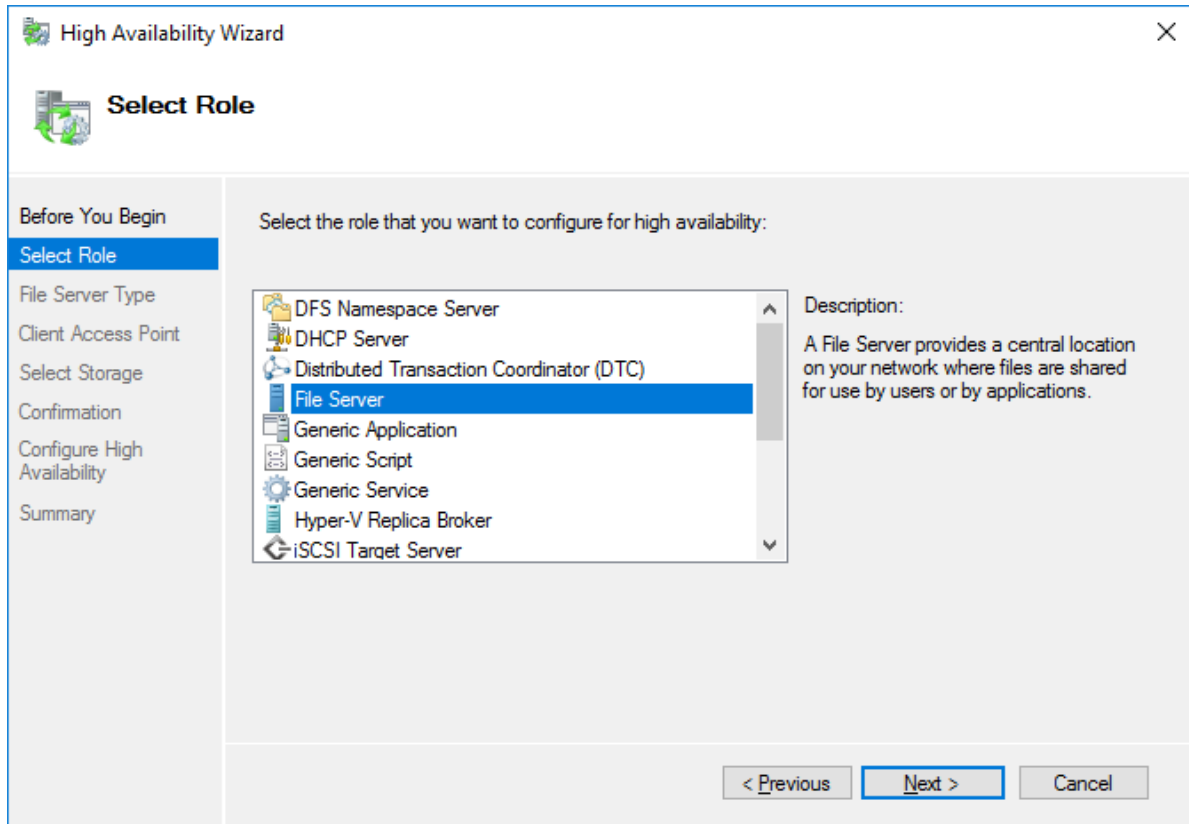
## Configuring The File Server For General Use Role

NOTE: To configure File Server for General Use, the cluster should have available storage

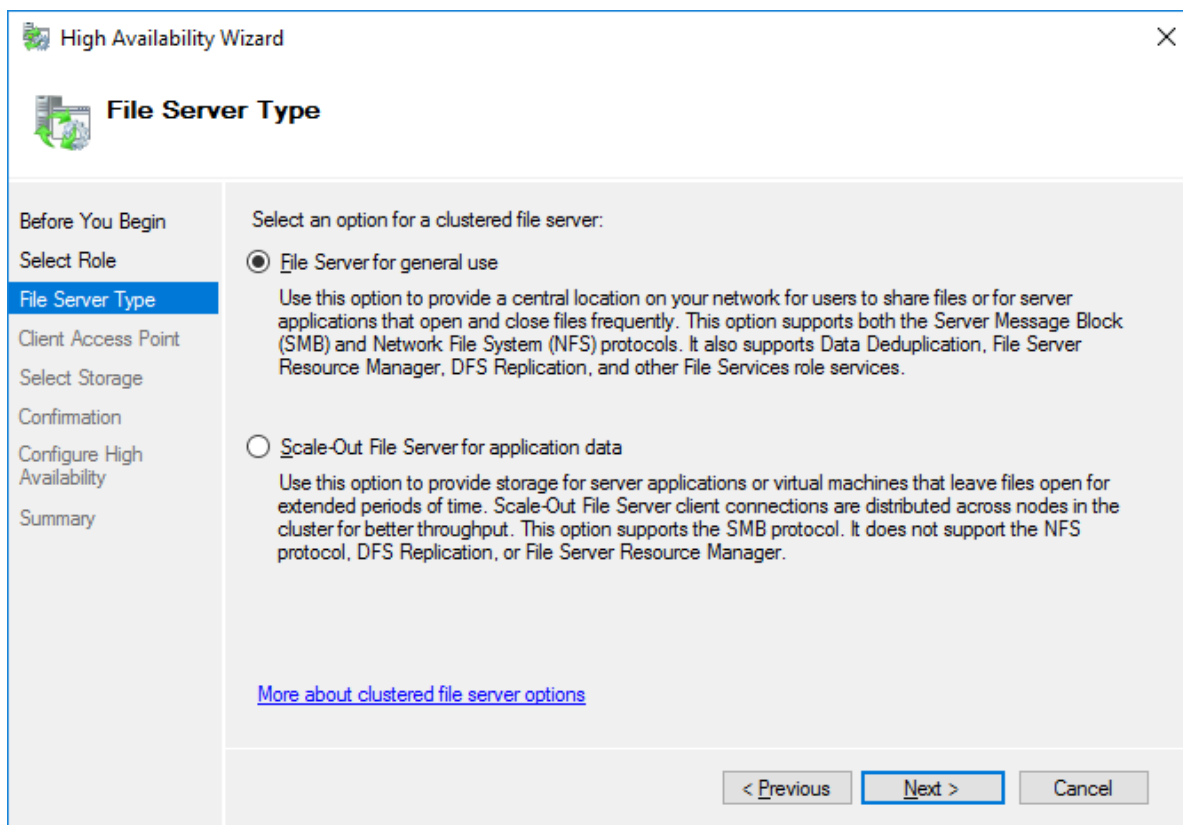
1. To configure the File Server for General Use role, open Failover Cluster Manager.
2. Right-click on the cluster name, then click Configure Role and click Next to continue.



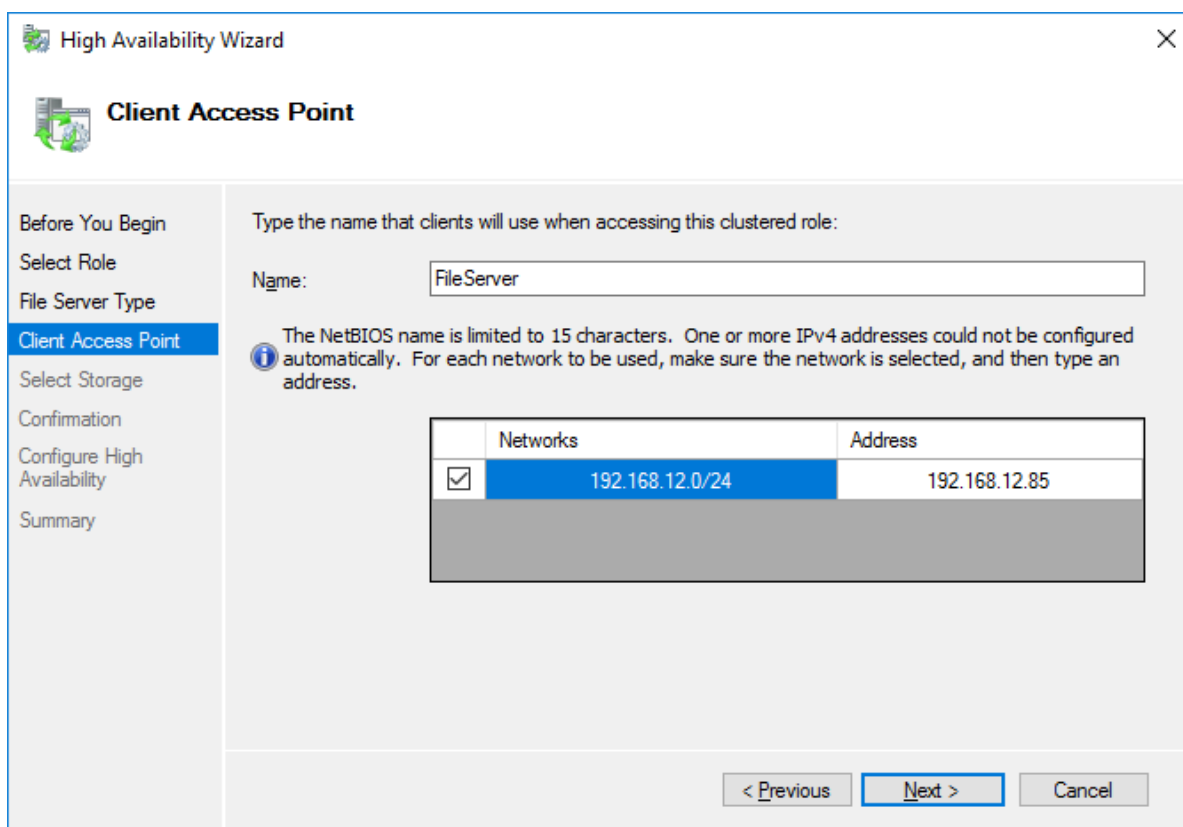
3. Select the File Server item from the list in High Availability Wizard and click Next to continue.



4. Select File Server for general use and click Next.

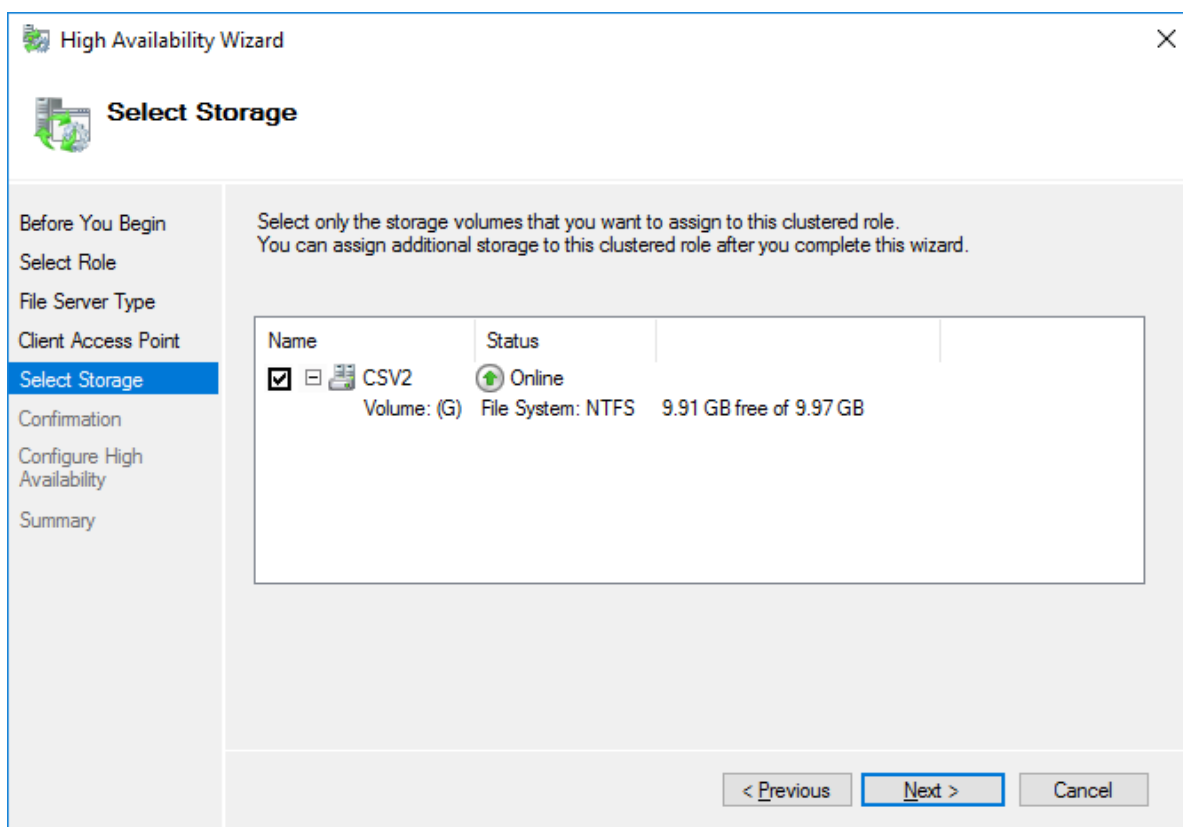


5. On the Client Access Point page, in the Name text field, type the NETBIOS name that will be used to access the File Server and IP for it.

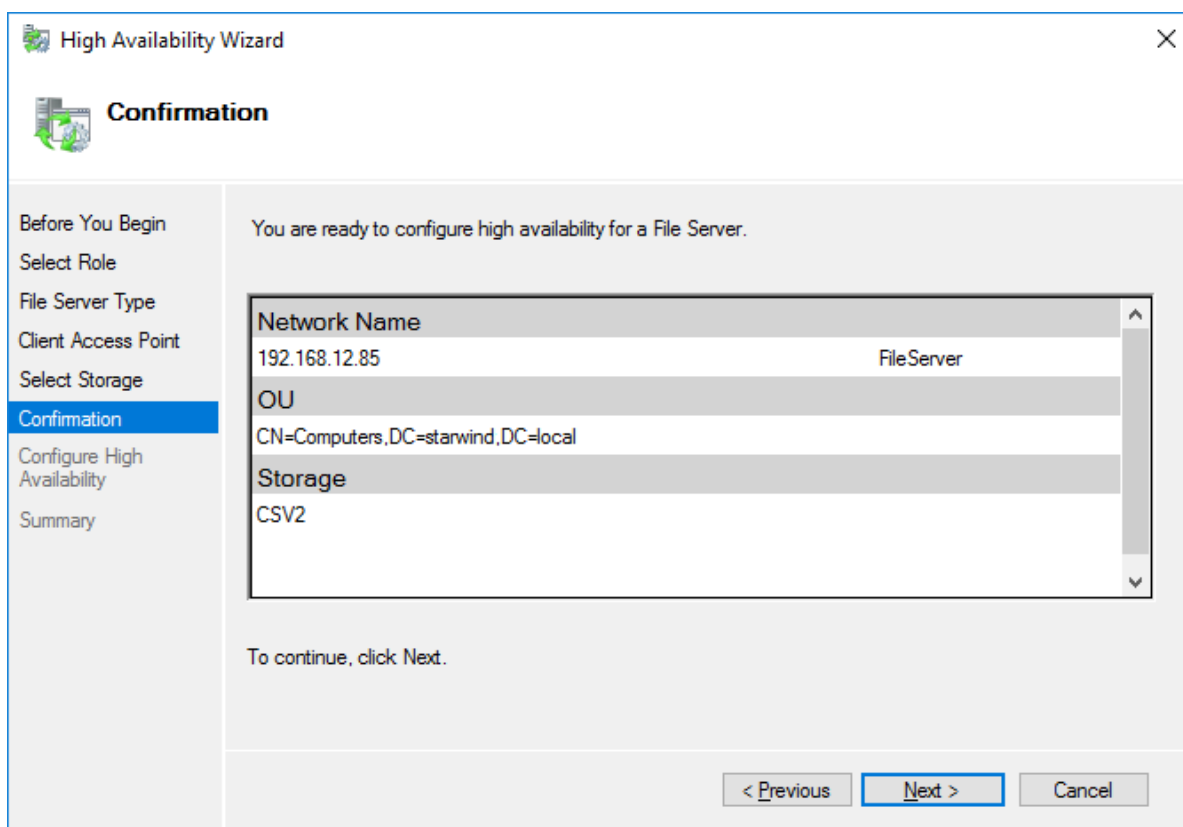


Click Next to continue.

6. Select the Cluster disk and click Next.

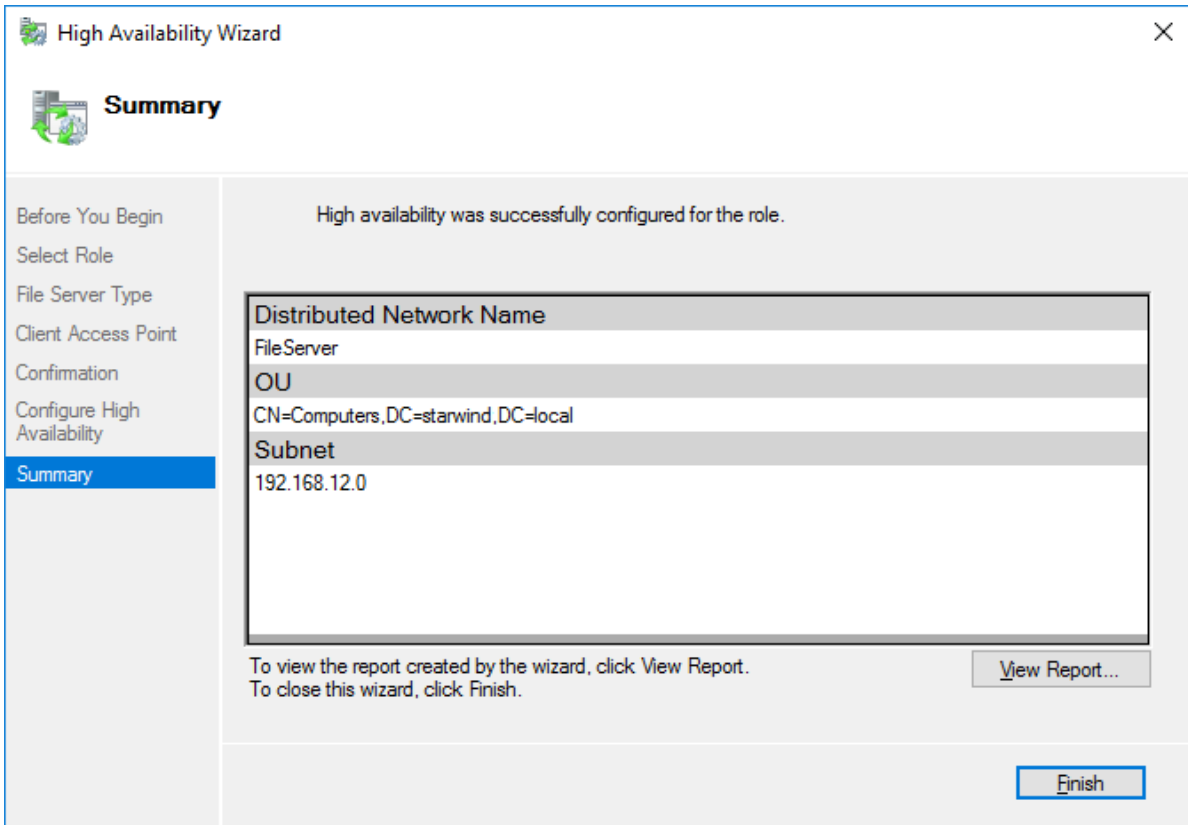


7. Check whether the specified information is correct. Click Next to proceed or Previous to change the settings.

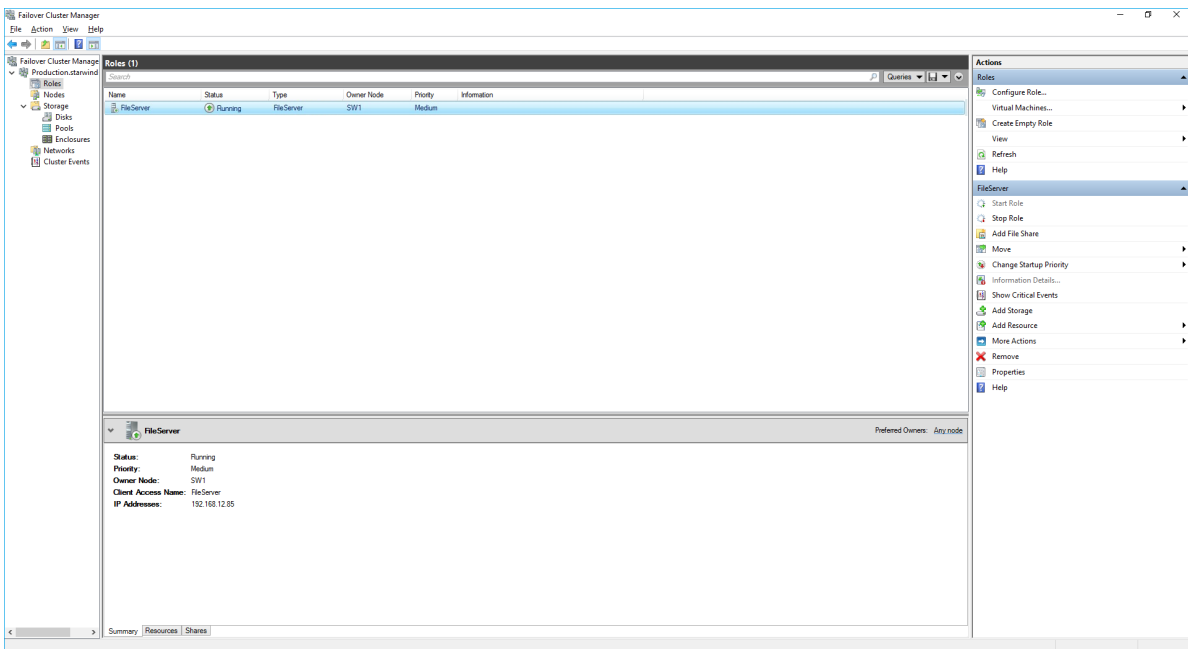


8. Once the installation has been finished successfully, the Wizard should now look like the screenshot below.

Click Finish to close the Wizard.

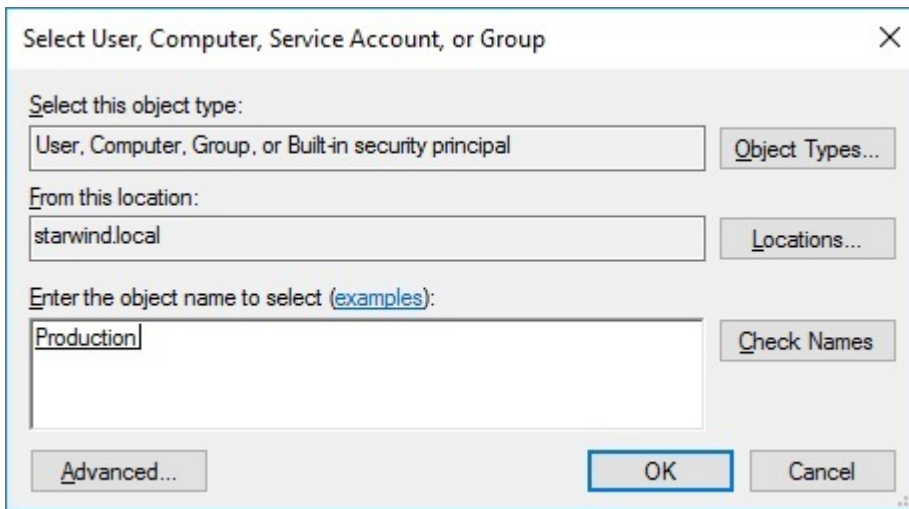


9. The newly created role should now look like the screenshot below.

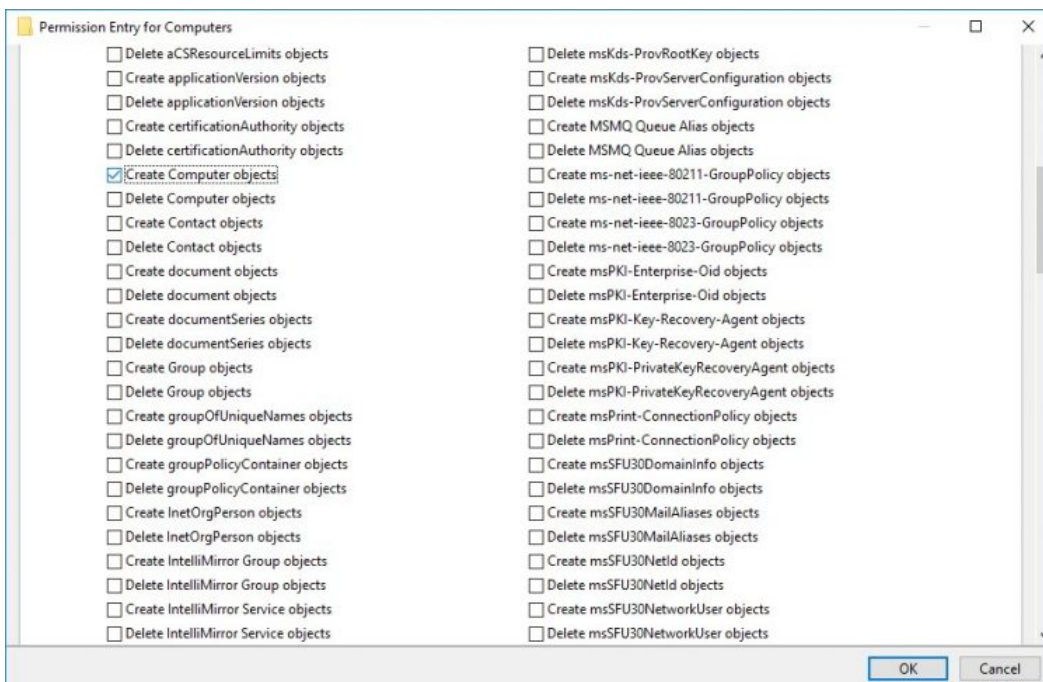


NOTE: If the role status is Failed and it is unable to Start, please, follow the next steps:

- open Active Directory Users and Computers
- enable the Advanced view if it is not enabled
- edit the properties of the OU containing the cluster computer object (in this case - Production)
- open the Security tab and click Advanced
- in the appeared window, press Add (the Permission Entry dialog box opens), click Select a principal
- in the appeared window, click Object Types, select Computers, and click OK
- enter the name of the cluster computer object (in this case - Production)



- go back to Permission Entry dialog, scroll down, and select Create Computer Objects

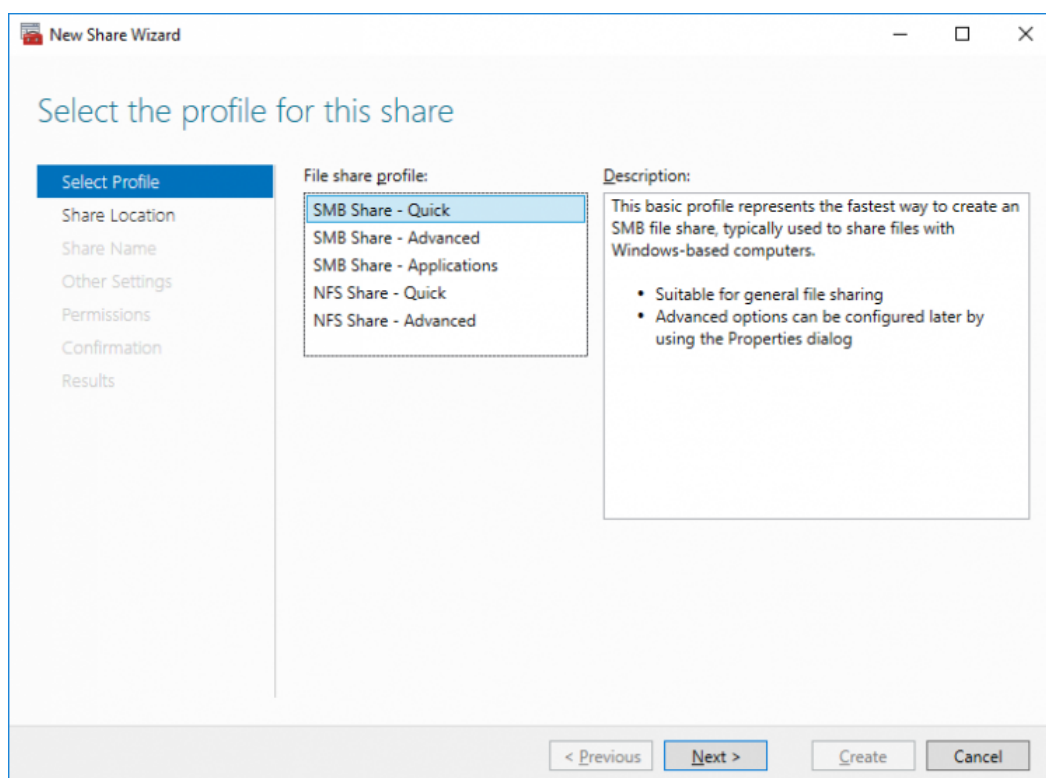


- click OK on all opened windows to confirm the changes
- open Failover Cluster Manager, right-click File Share role and click Start Role

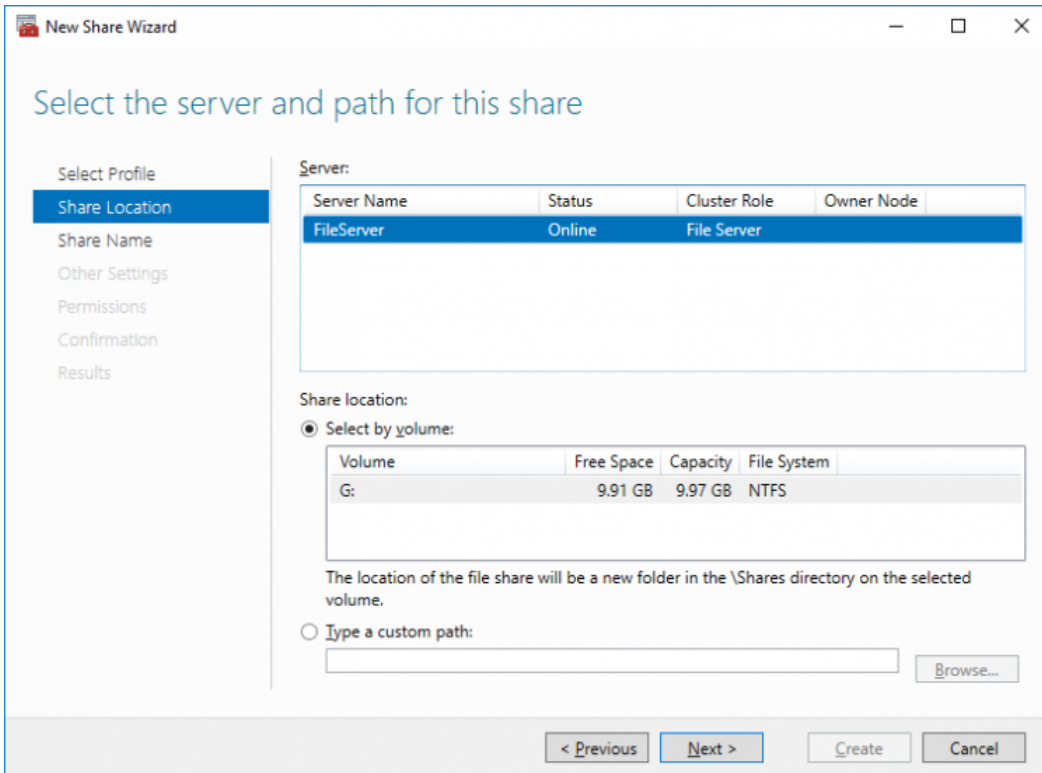
## Configuring Smb File Share

To Add SMB File Share

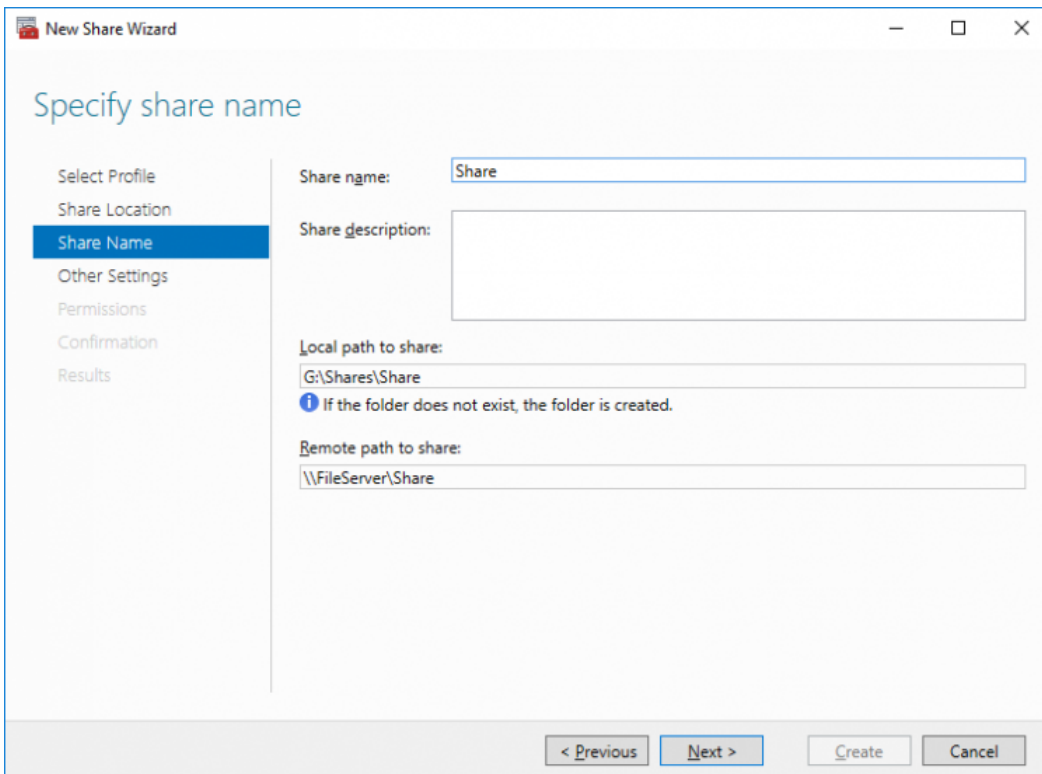
1. Open Failover Cluster Manager.
2. Expand the cluster and then click Roles.
3. Right-click the File Server role and then press Add File Share.
4. On the Select the profile for this share page, click SMB Share – Quick and then click Next.



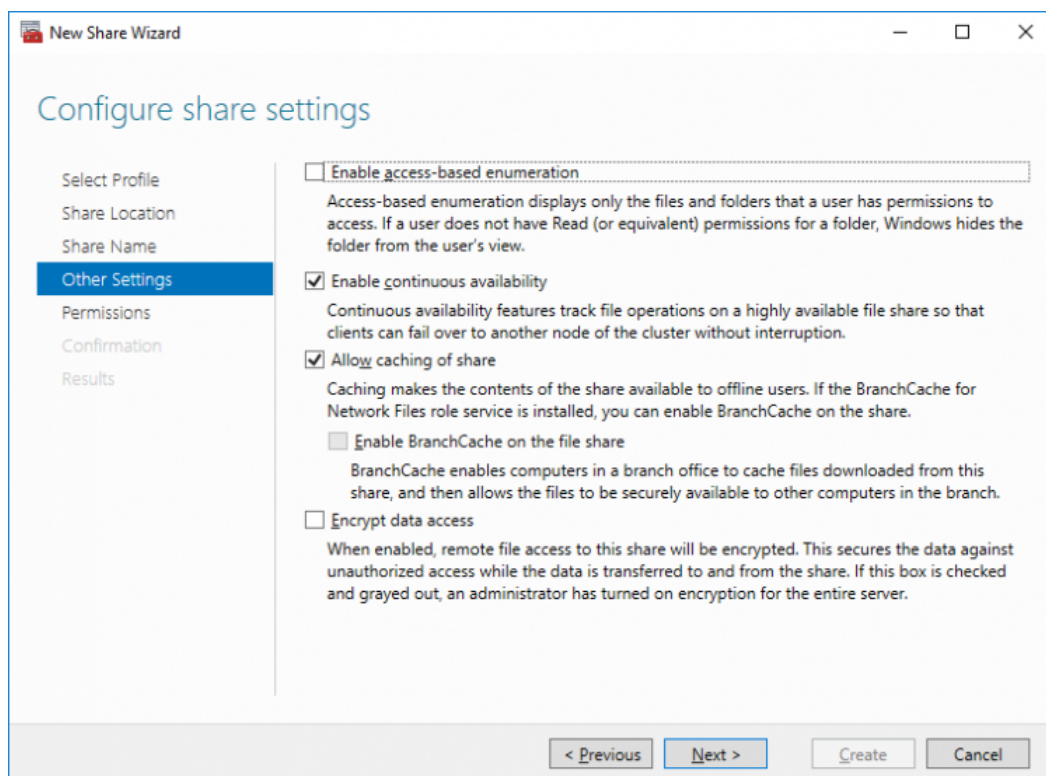
5. Select available storage to host the share. Click Next to continue.



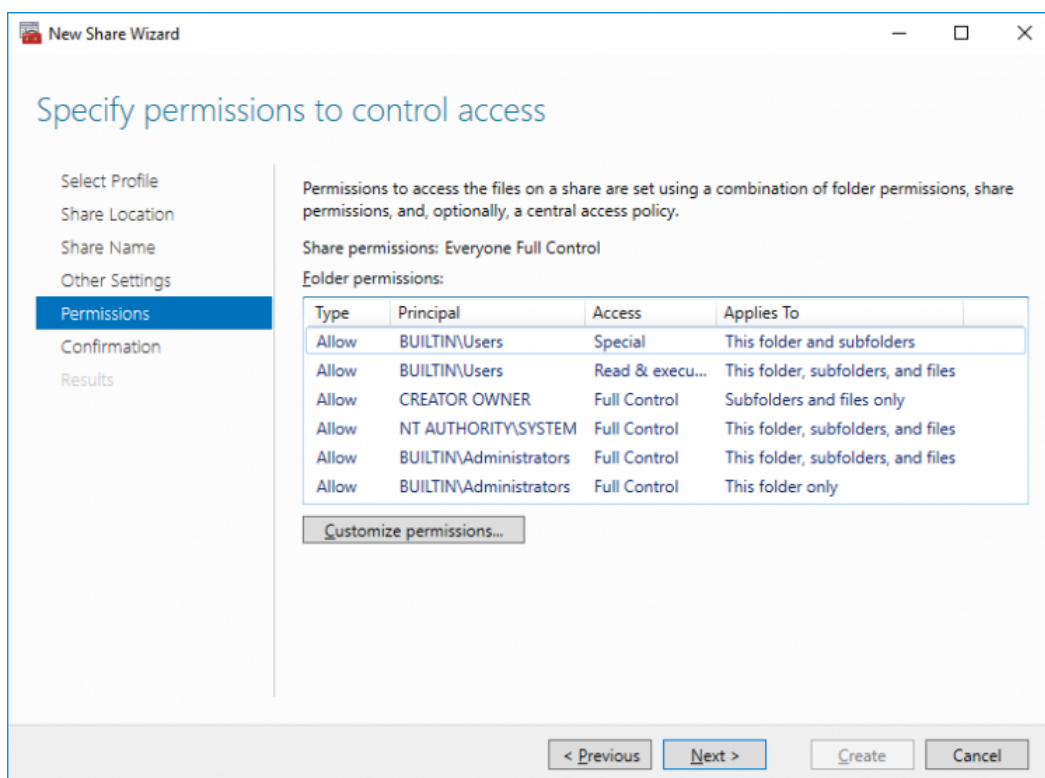
6. Type in the file share name and click Next.



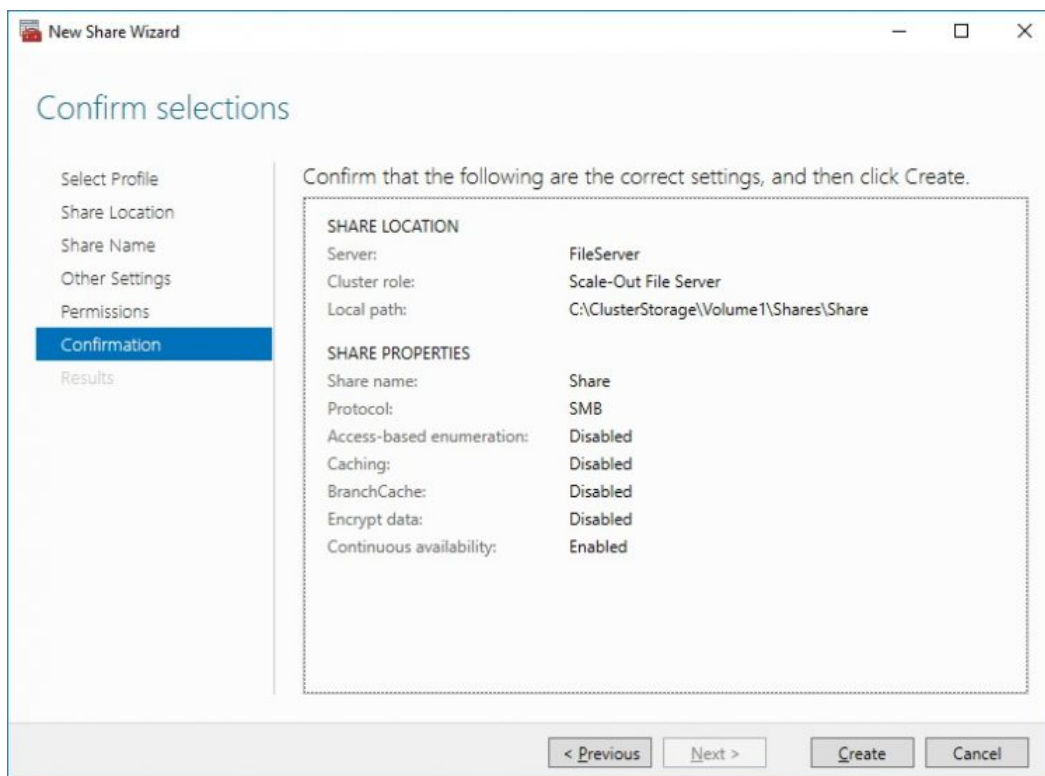
7. Make sure that the Enable Continuous Availability box is checked. Click Next to continue.



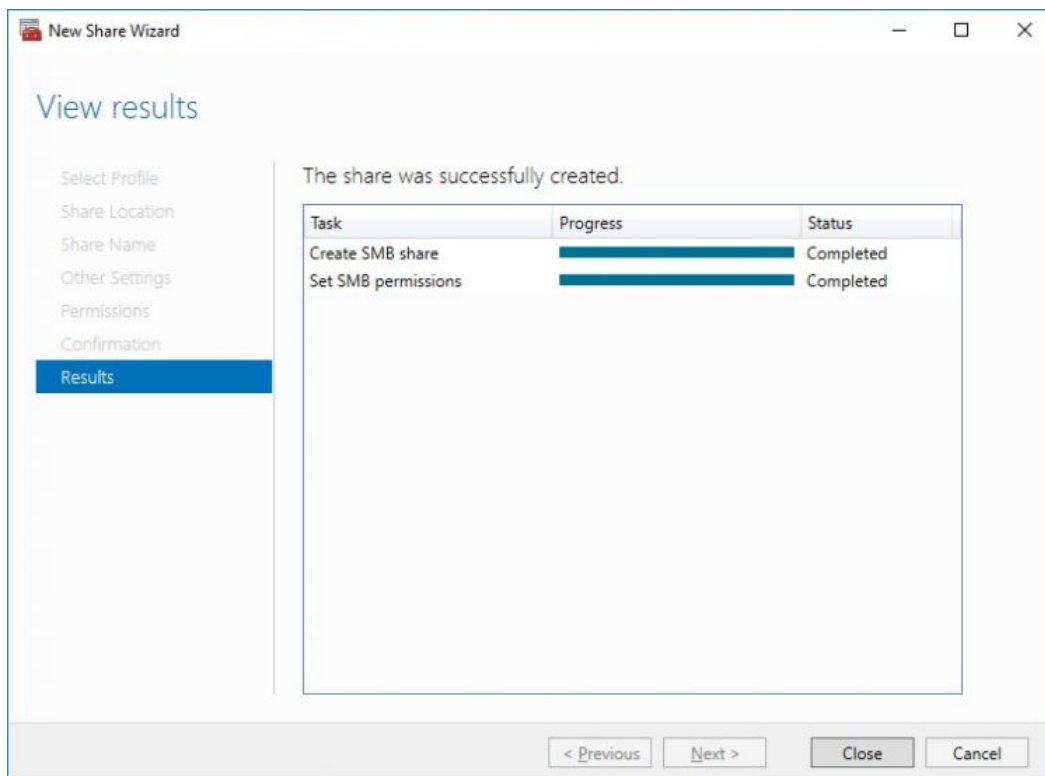
8. Specify the access permissions for the file share.



9. Check whether specified settings are correct. Click Previous to make any changes or Next/Create to continue.



10. Check the summary and click Close.

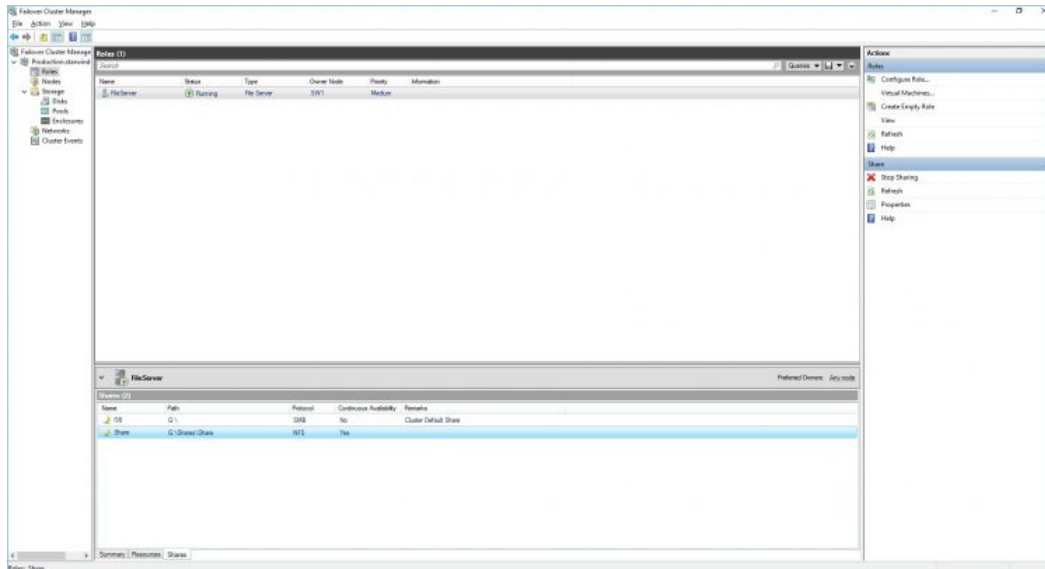


To manage created SMB File Shares

11. Open Failover Cluster Manager.

12. Expand the cluster and click Roles.

13. Choose the File Share role, select the Shares tab, right-click the created file share, and select Properties.



## Configuring Nfs File Share

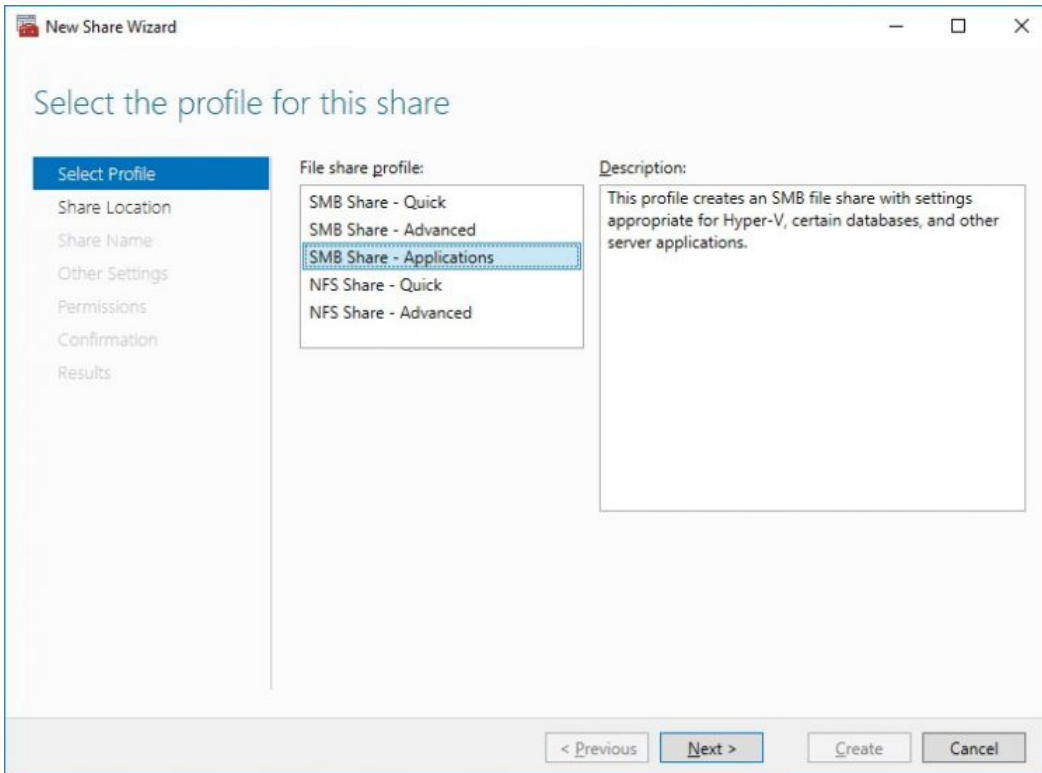
To Add NFS File Share

1. Open Failover Cluster Manager.

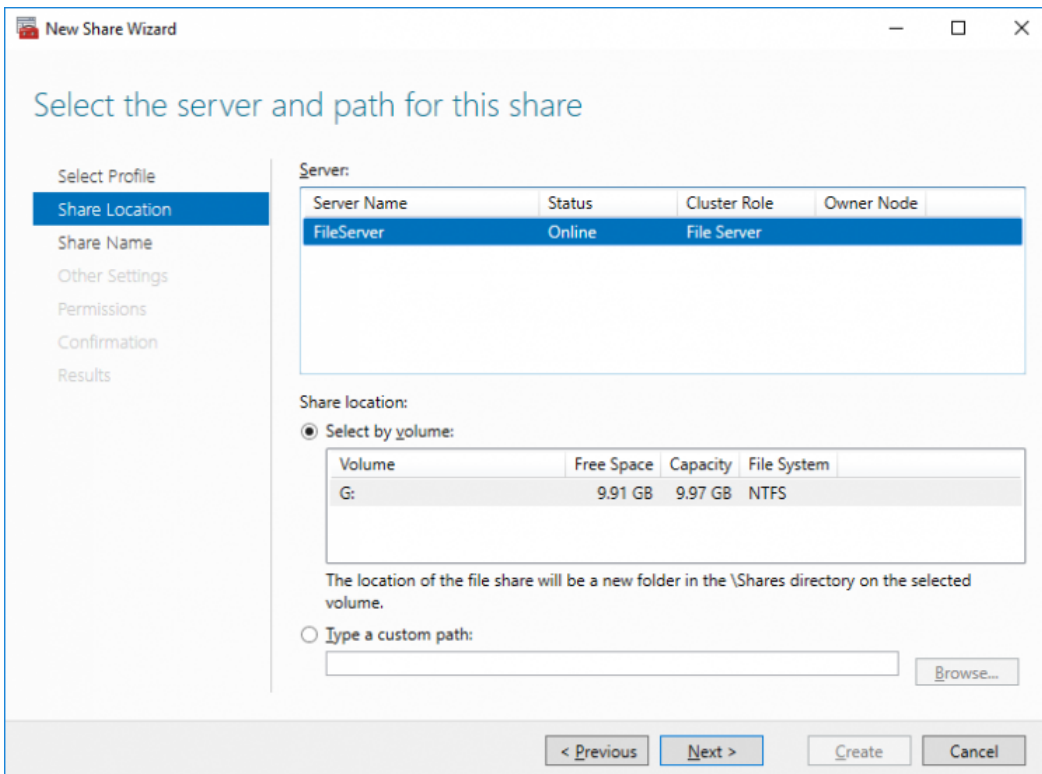
2. Expand the cluster and then click Roles.

3. Right-click the File Server role and then press Add File Share.

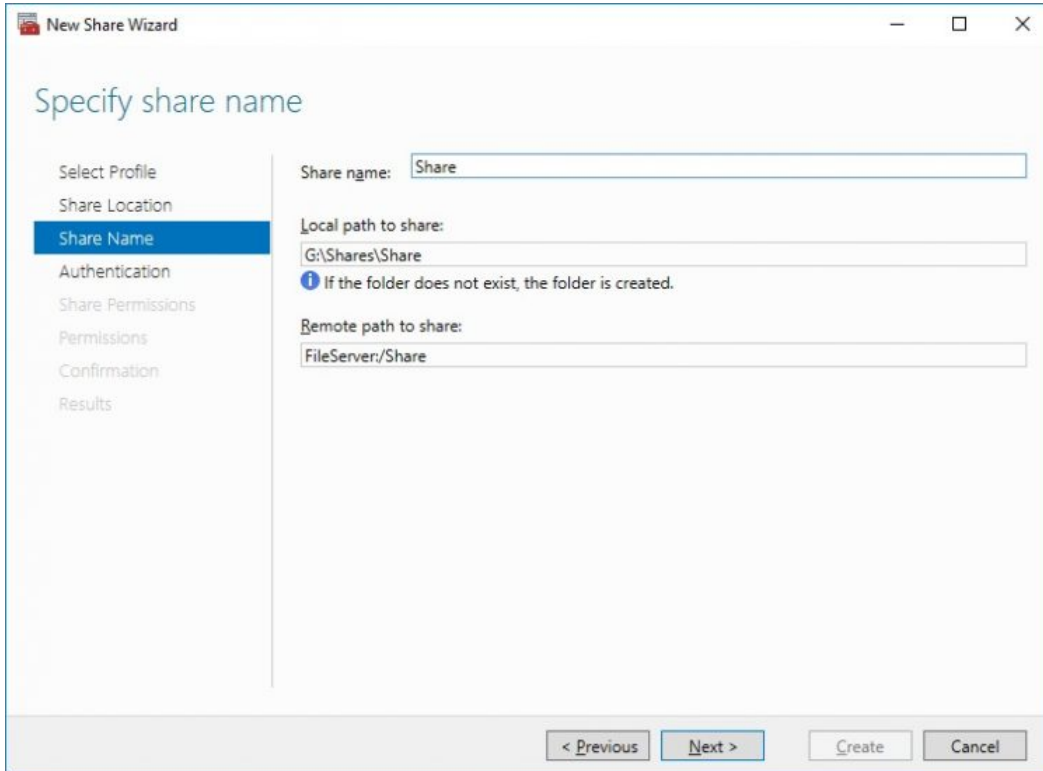
4. On the Select the profile for this share page, click NFS Share – Quick and then click Next.



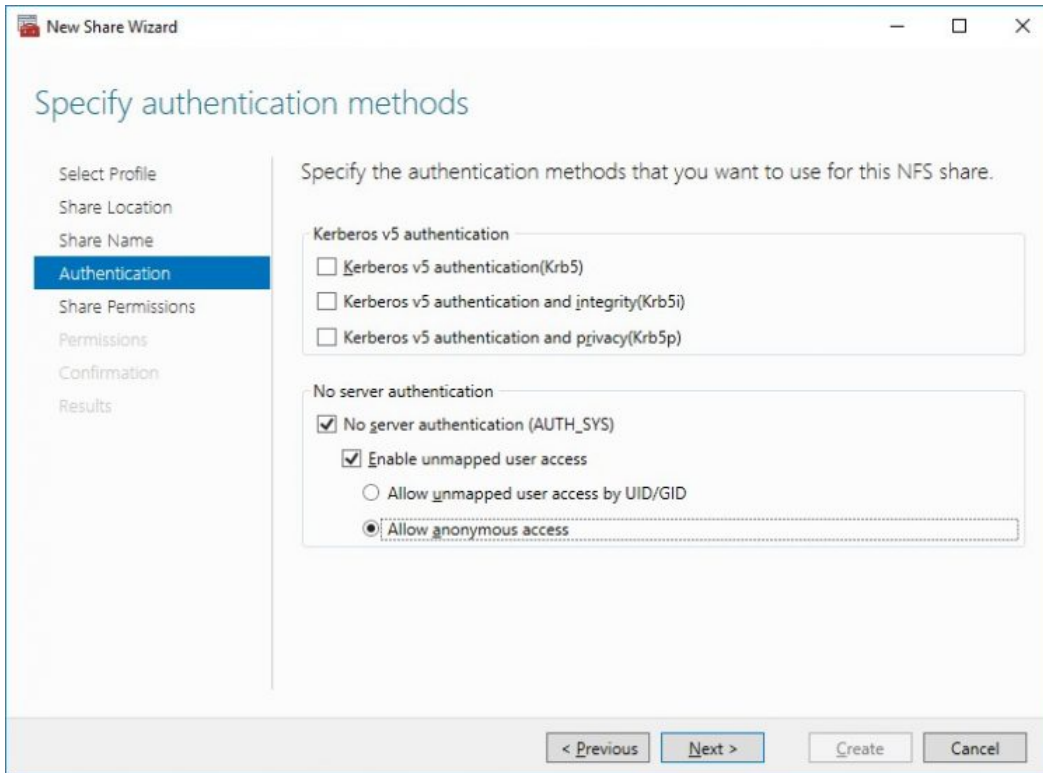
5. Select available storage to host the share. Click Next to continue.



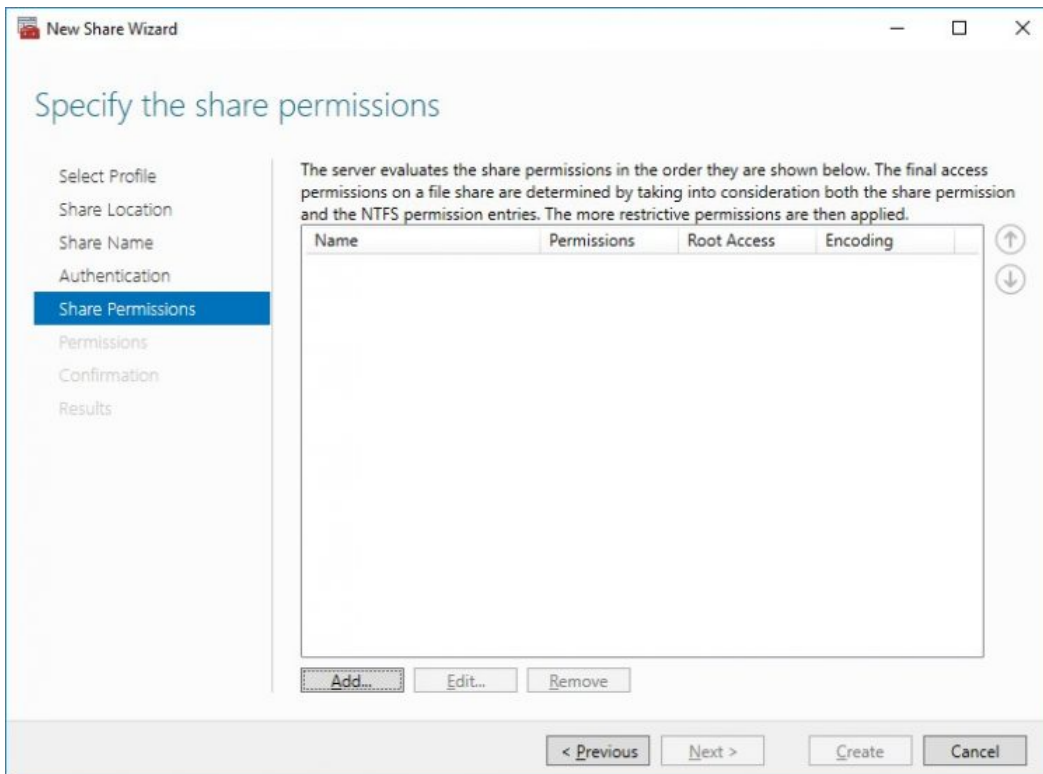
6. Type in the file share name and click Next.



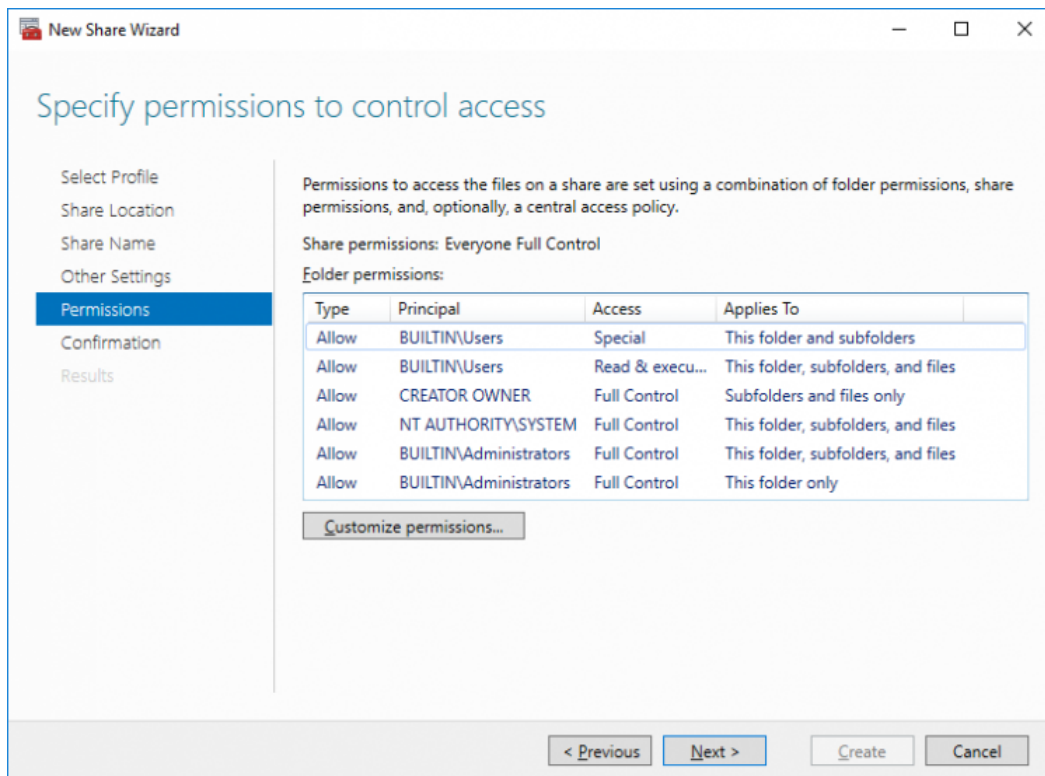
7. Specify the Authentication. Click Next and confirm the message in pop-up window to continue.



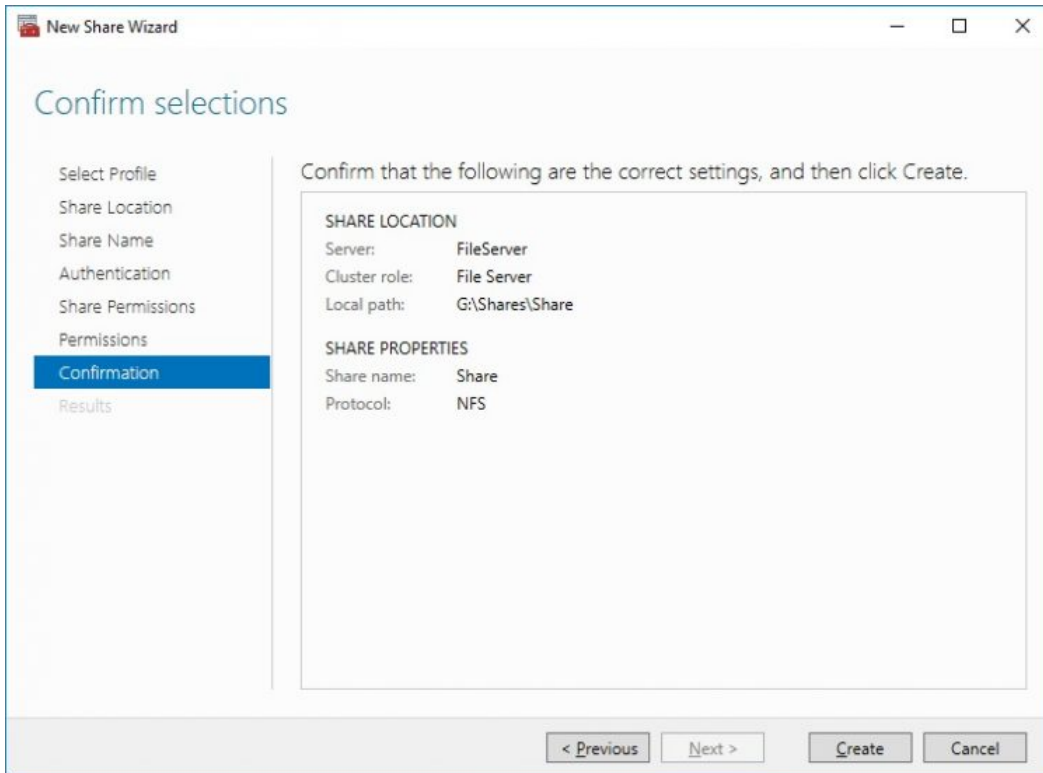
8. Click Add and specify Share Permissions.



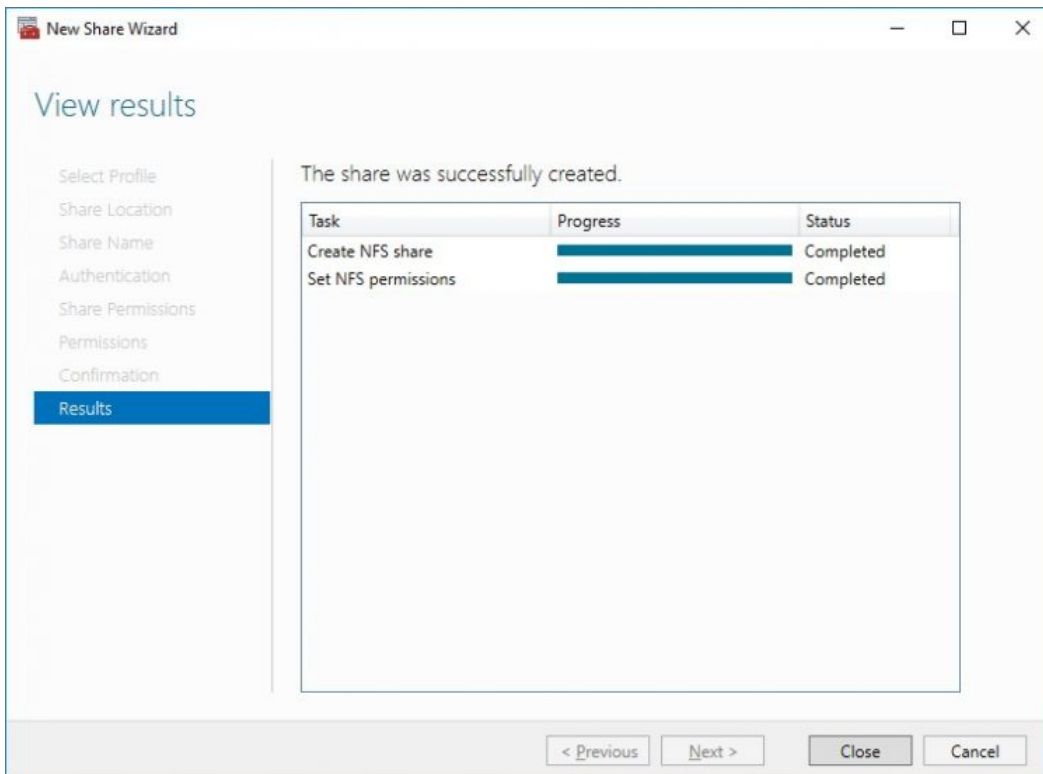




10. Check whether specified settings are correct. Click Previous to make any changes or click Create to continue.

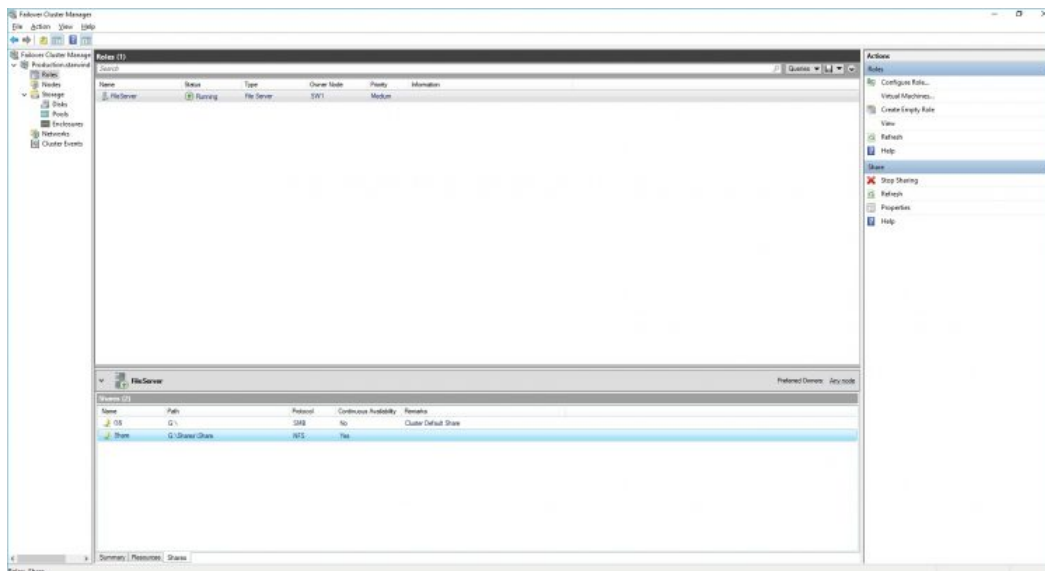


11. Check a summary and click Close to close the Wizard.



To manage created NFS File Shares:








- open Failover Cluster Manager
- expand the cluster and click Roles
- choose the File Share role, select the Shares tab, right-click the created file share, and select Properties



## Conclusion

Following this guide, a 2-node Failover Cluster was deployed and configured with StarWind Virtual SAN (VSAN) running in a CVM on each host. As a result, a virtual shared storage “pool” accessible by all cluster nodes was created for storing highly available virtual machines.

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