

# StarWind Virtual SAN<sup>®</sup> 3-node Hyperconverged Scenario with Windows Server

2024

TECHNICAL PAPERS



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If you have questions about installing or using this software, check this and other documents first - you will find answers to most of your questions on the [Technical Papers](#) webpage or in [StarWind Forum](#). If you need further assistance, please [contact us](#) .

## 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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Applies To: Windows Server 2016, Windows Server 2019, Windows Server 2022

## Annotation

### Relevant products

This guide applies to StarWind Virtual SAN and StarWind Virtual SAN Free (Version V8 (build 15260) and earlier).

### Purpose

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

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

The end result of following this guide will be a fully configured high-availability Windows Failover Cluster that includes virtual machine shared storage provided by StarWind VSAN.

## 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:

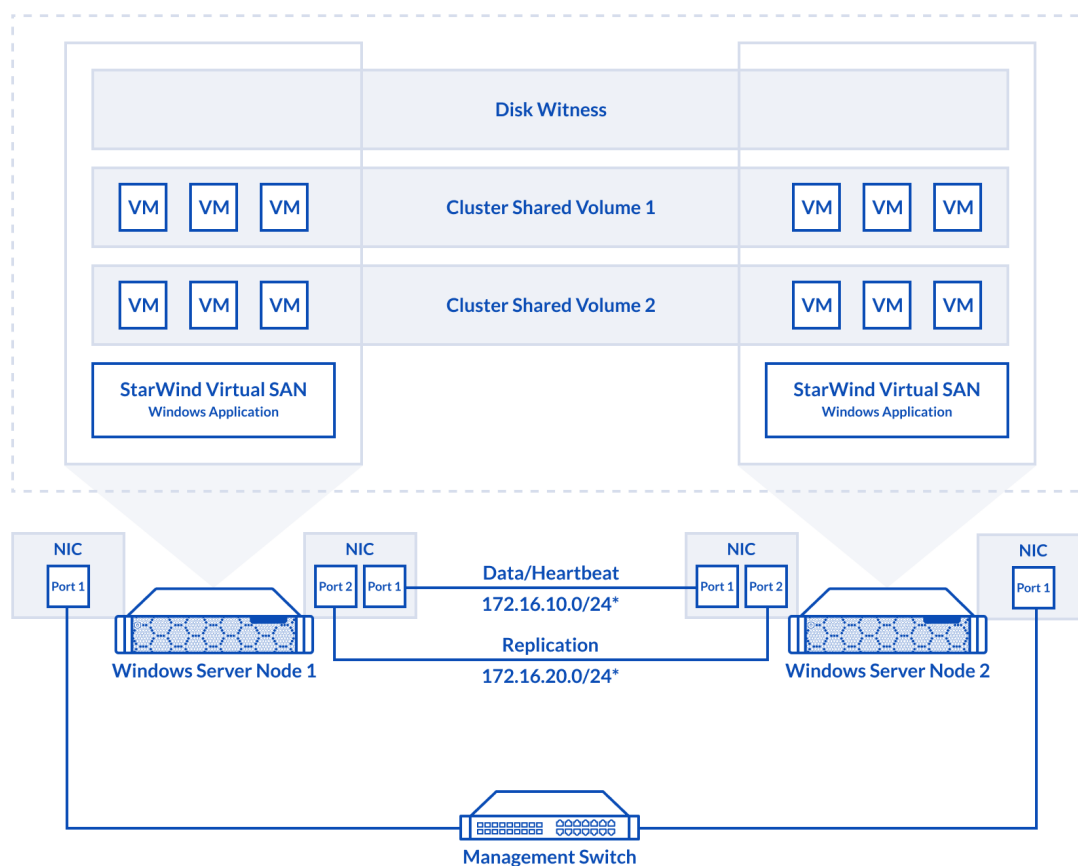
<https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-hdd-and-ssd-disks/>

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

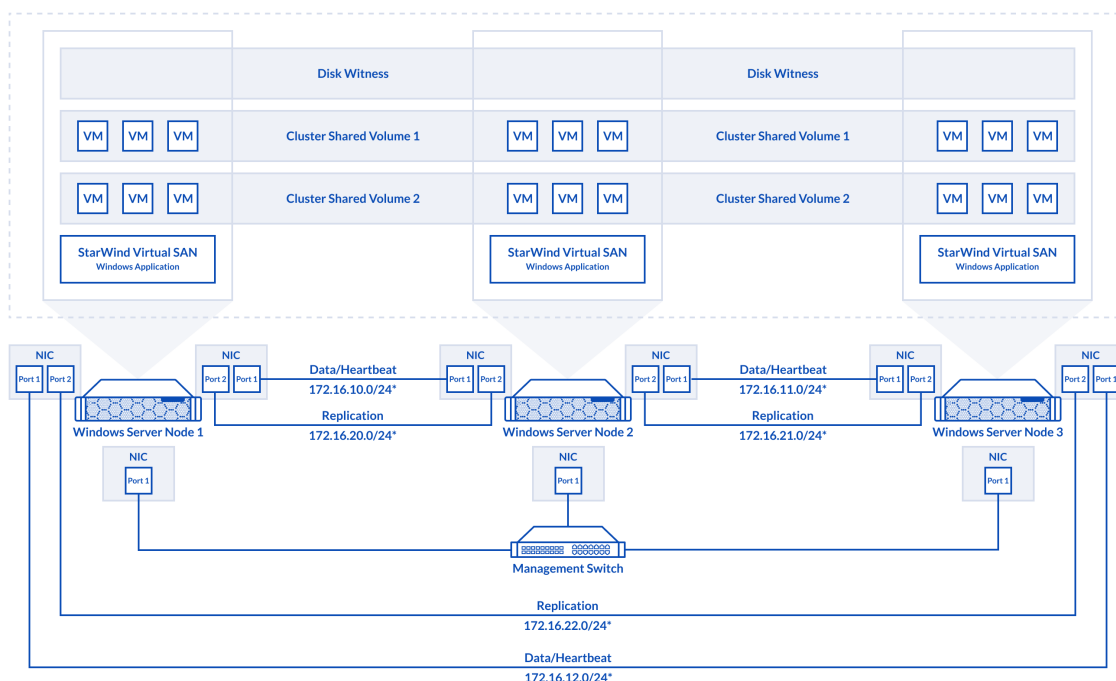
<https://www.starwindsoftware.com/resource-library/starwind-virtual-san-best-practices>

## 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).

For 2-node scenario, 172.16.10.x subnet is used for iSCSI/StarWind heartbeat traffic, while 172.16.20.x subnet is used for the Synchronization traffic.

For 3-node scenario, 172.16.10.x, 172.16.11.x, 172.16.12.x subnets are used for the

iSCSI/StarWind heartbeat traffic, while 172.16.20.x, 172.16.21.x, 172.16.22.x subnets are used for the Synchronization traffic.

4. Set MTU size to 9014 or 9000 depending on network cards vendor recommendations 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"
}
```

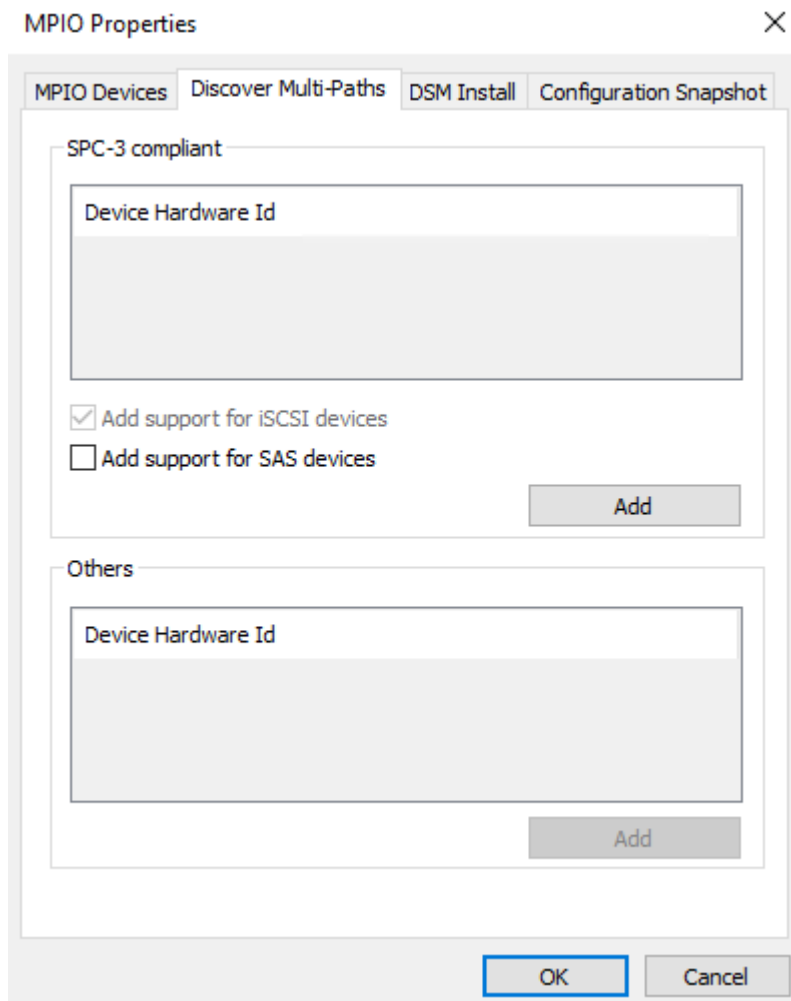
It will apply MTU 9014 (9000) to all iSCSI and Sync interfaces if they have iSCSI or Sync as part of their name.

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

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

```
mpiocpl
```

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



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

8. Repeat the same procedure on the other server.

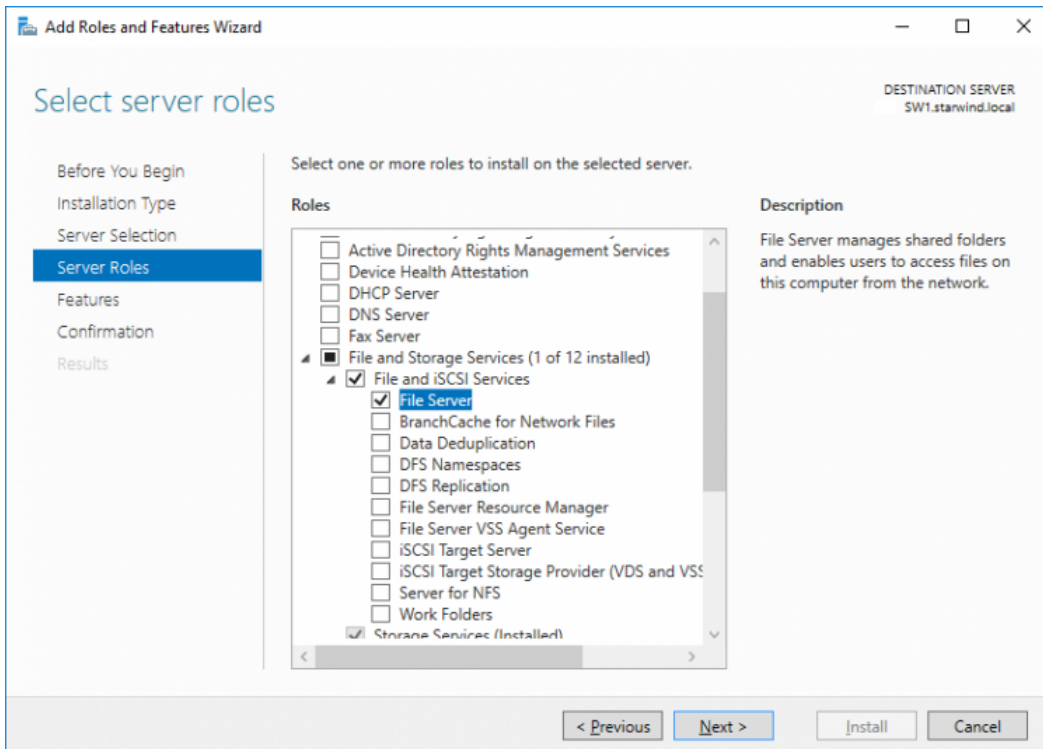
## Installing File Server Roles

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:

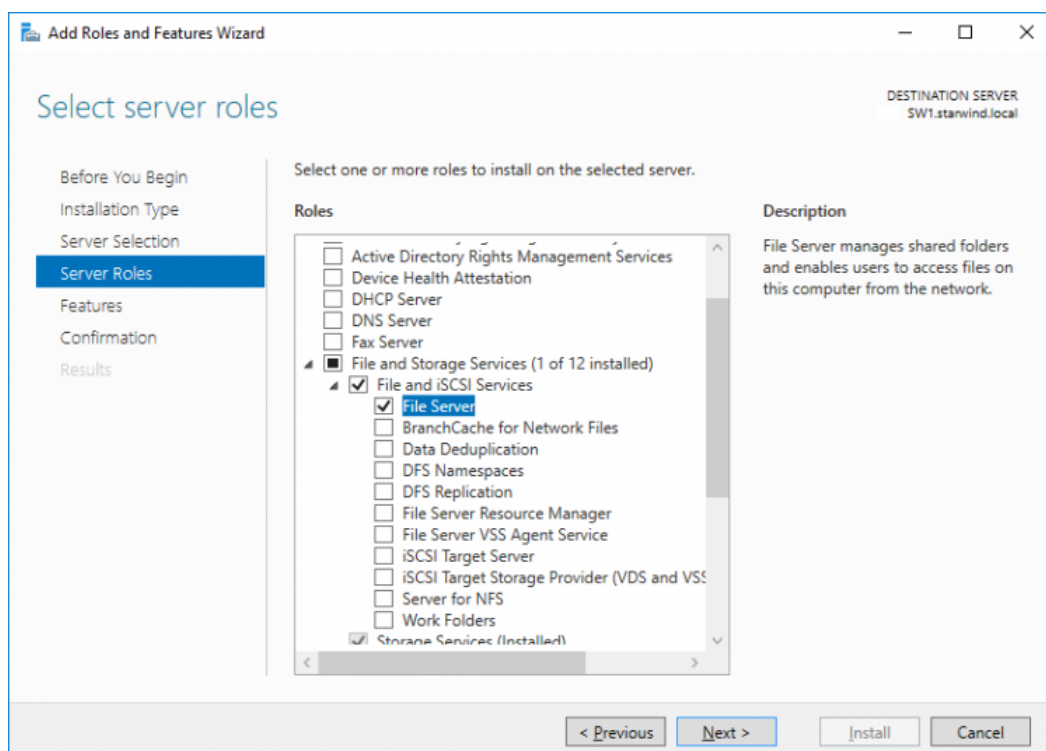


4. Restart the server after installation is completed and perform steps above on the each server.

## 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:

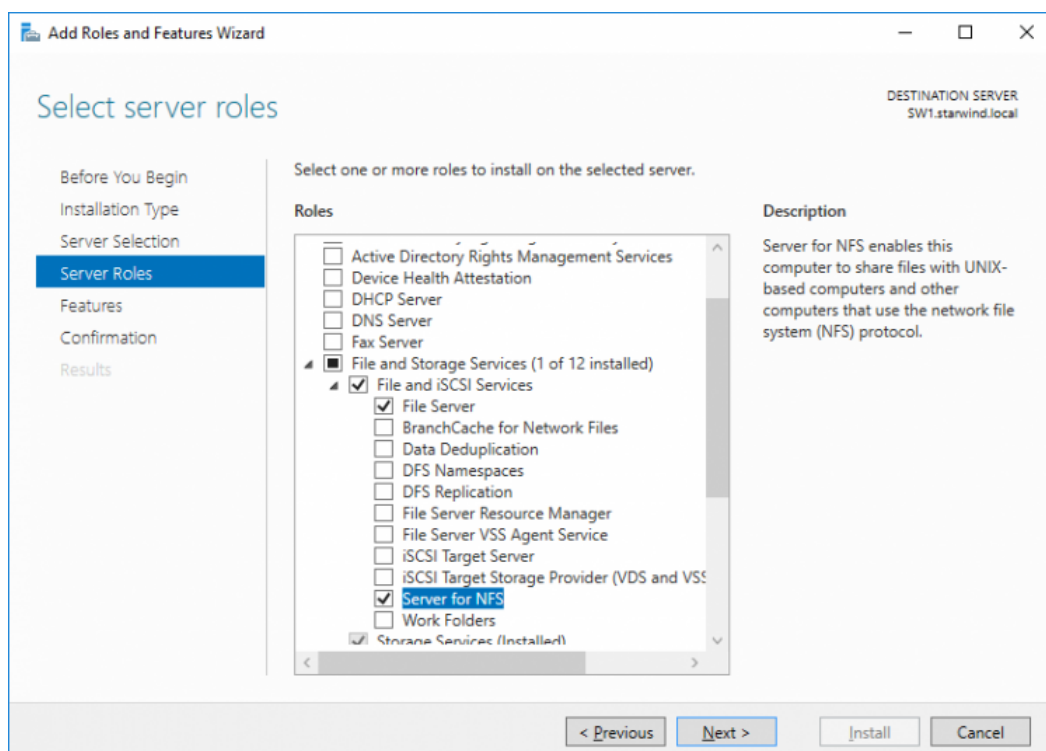




4. Restart the server after installation is completed and perform steps above on each server.

## File Server For General Use With Nfs Share

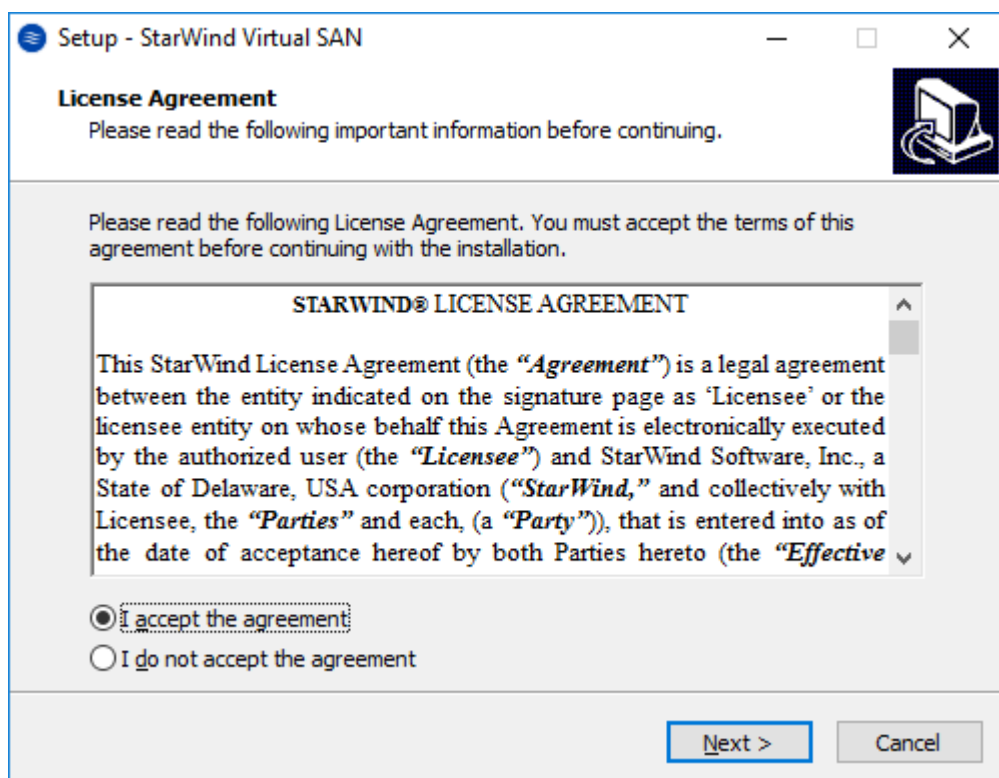
1. Open Server Manager: Start -> Server Manager.
2. Select: Manage -> Add Roles and Features.
3. Follow the installation wizard steps to install the roles selected in the screenshot below:



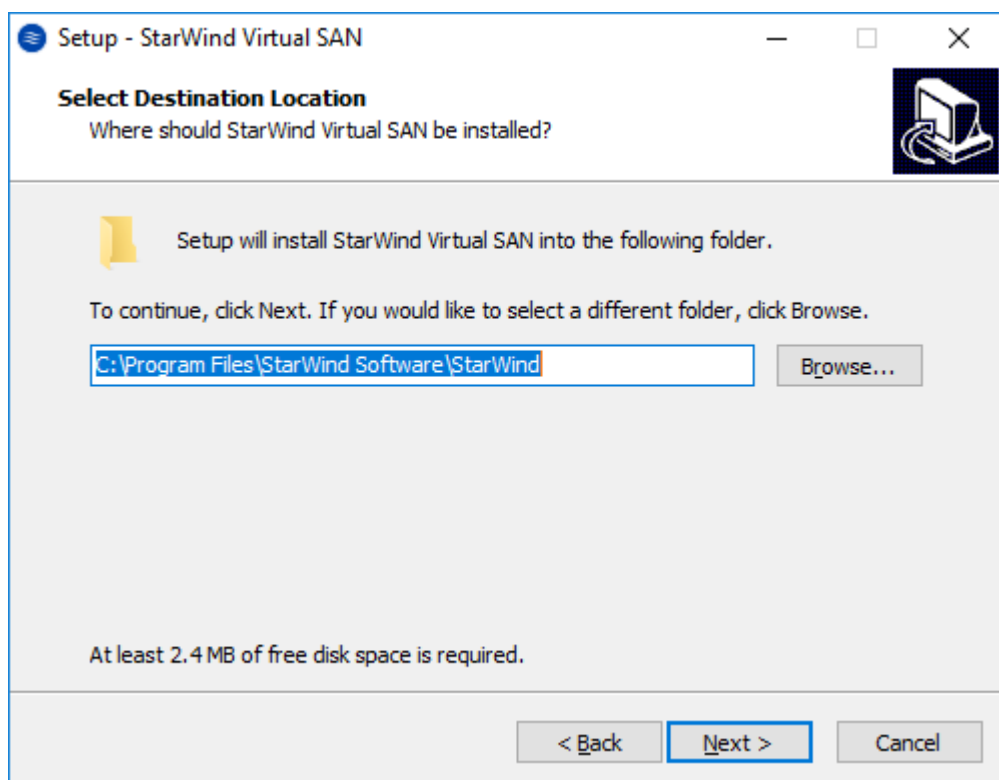
4. Restart the server after installation is completed and perform steps above on each server.

## Installing Starwind Vsan For Hyper-V

1. Download the StarWind setup executable file from the StarWind website:  
<https://www.starwind.com/registration-starwind-virtual-san>
2. Launch the downloaded setup file on the server to install StarWind Virtual SAN or one of its components. The Setup wizard will appear. Read and accept the License Agreement.



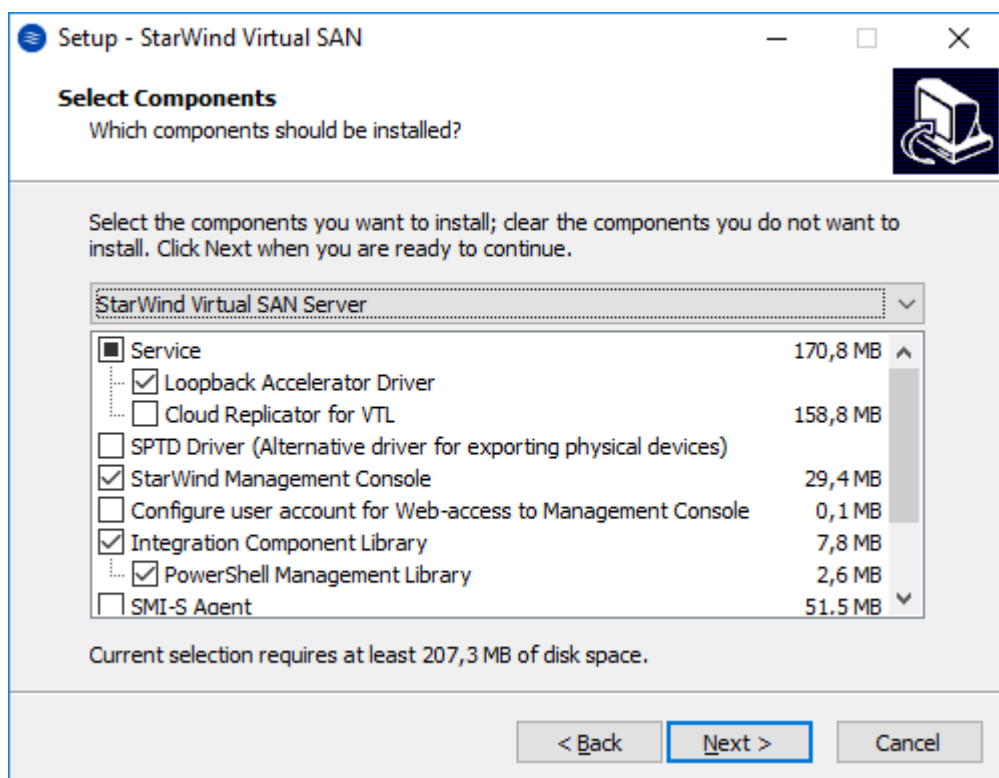
3. Carefully read the information about the new features and improvements. Red text indicates warnings for users that are updating the existing software installations.
4. Select Browse to modify the installation path if necessary. Click on Next to continue.



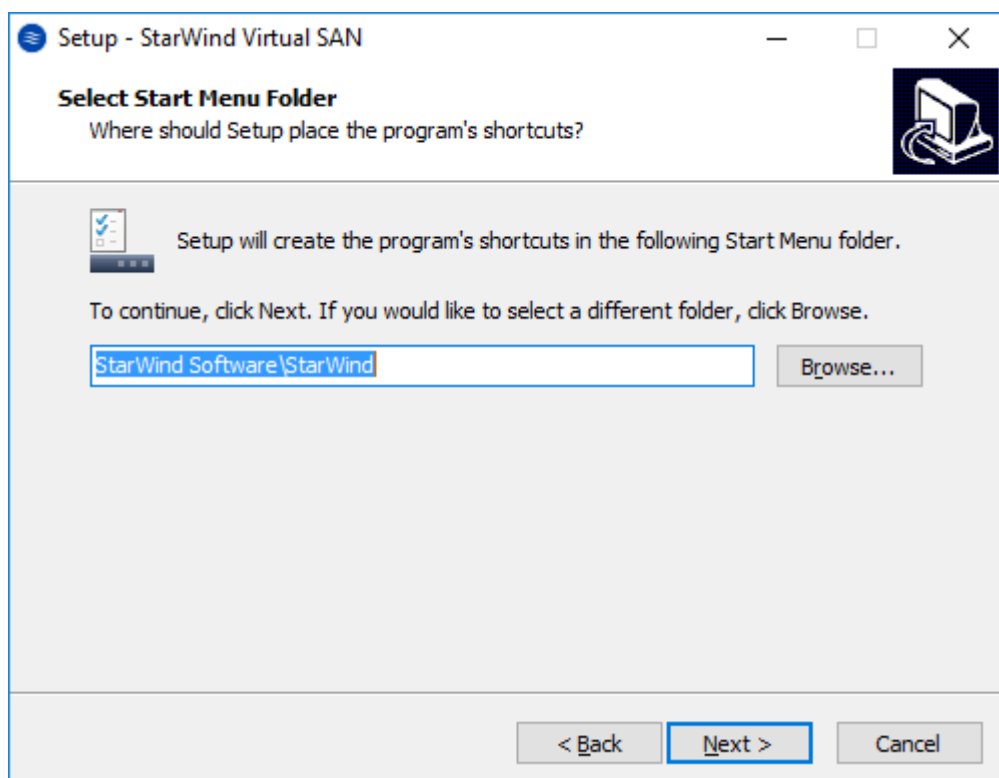
5. Select the following components for the minimum setup:

- StarWind Virtual SAN Service. The StarWind Virtual SAN service is the “core” of the software. It can create iSCSI targets as well as share virtual and physical devices. The service can be managed from StarWind Management Console on any Windows computer that is on the same network. Alternatively, the service can be managed from StarWind Web Console deployed separately.
- StarWind Management Console. Management Console is the Graphic User Interface (GUI) part of the software that controls and monitors all storage-related operations (e.g., allows users to create targets and devices on StarWind Virtual SAN servers connected to the network).

NOTE: To manage StarWind Virtual SAN installed on a Windows Server Core edition with no GUI, StarWind Management Console should be installed on a different computer running the GUI-enabled Windows edition.



6. Specify Start Menu Folder.



7. Enable the checkbox if a desktop icon needs to be created. Click on Next to continue.

8. When the license key prompt appears, choose the appropriate option:

- request time-limited fully functional evaluation key.
- request FREE version key.
- select the previously purchased commercial license key.

9. Click on the Browse button to locate the license file.

10. Review the licensing information.

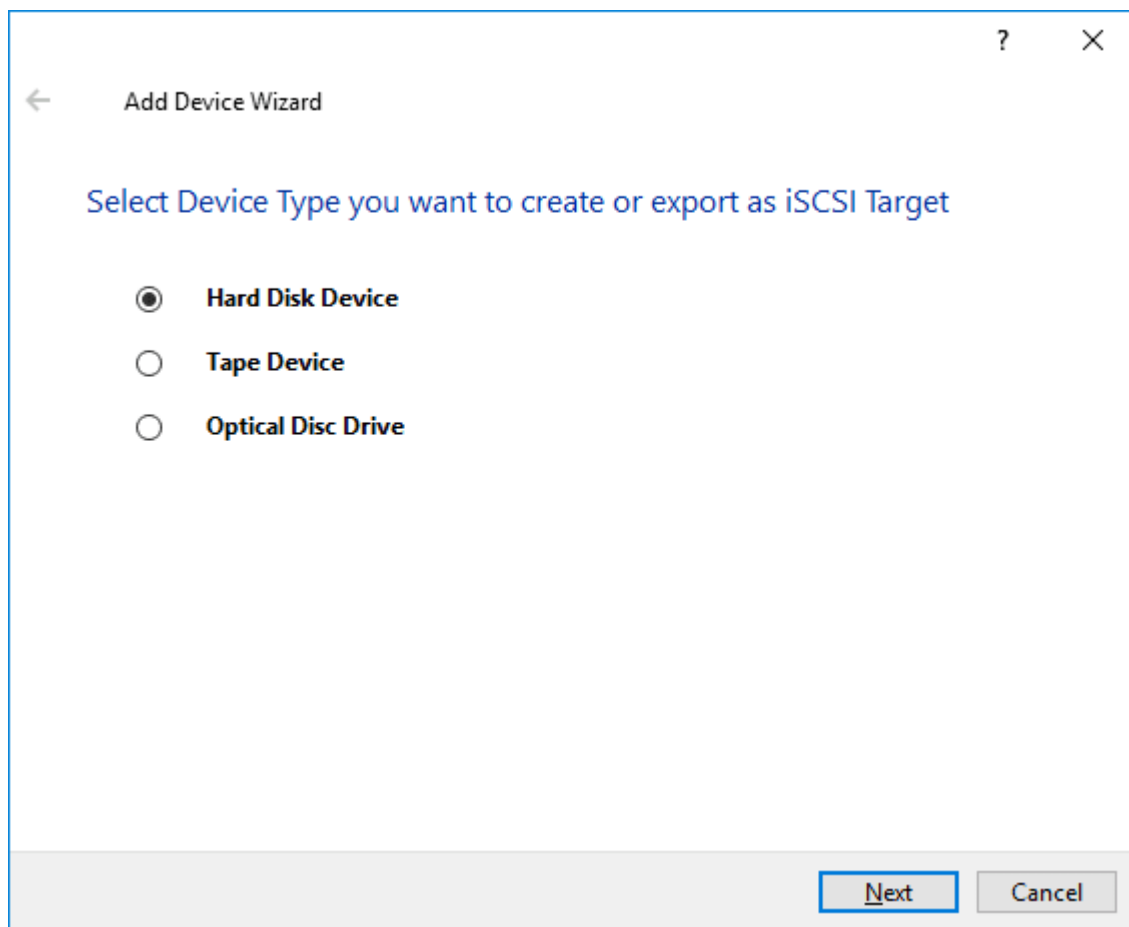
11. Verify the installation settings. Click on Back to make any changes or Install to proceed with installation.

12. Enable the appropriate checkbox to launch StarWind Management Console right after the setup wizard is closed and click on Finish.

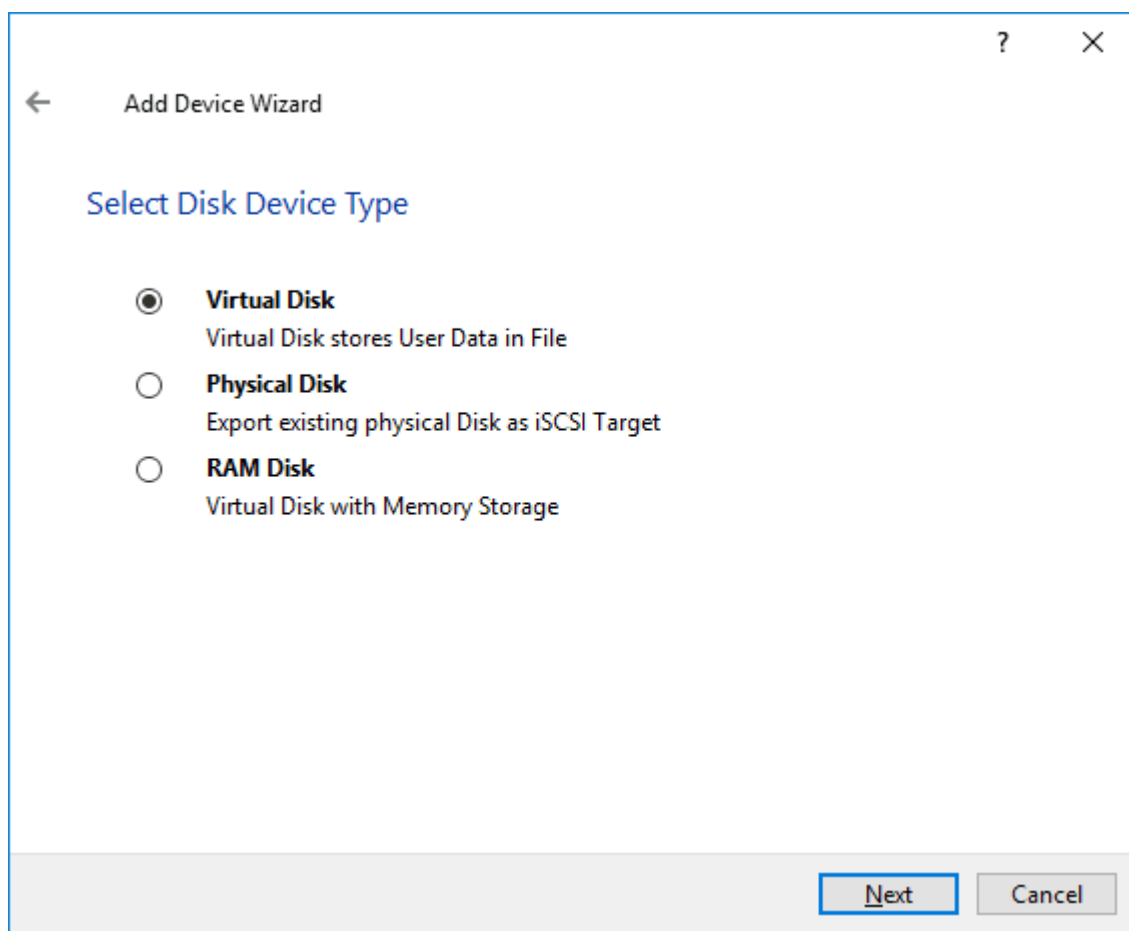
13. Repeat the installation steps on the partner node.

## Creating Starwind Devices

1. In the StarWind Management Console click to Add Device (advanced) button and open Add Device (advanced) Wizard.
2. Select Hard Disk Device as the type of device to be created.



3. Select Virtual Disk.



4. Specify a virtual disk Name, Location, and Size.



← Add Device Wizard

Virtual Disk Location

☒ Create a New Virtual Disk

Name: <device name>

Location: My Computer\D\

Size: <size> GB

☐ Use an Existing Virtual Disk

Location:

☐ Read-Only Mode

Next Cancel

5. Select the Thick provisioned disk type and block size.

NOTE: Use 4096 sector size for targets, connected on Windows-based systems and 512 bytes sector size for targets, connected on Linux-based systems (ESXi/Xen/KVM).

6. Define a caching policy and specify a cache size (in MB). Also, the maximum available cache size can be specified by selecting the appropriate checkbox. Optionally, define the L2 caching policy and cache size.

← Add Device Wizard

Specify Device RAM Cache Parameters

Mode

- ☐ **Write-Back**  
Writes are performed asynchronously, actual Writes to Disk are delayed, Reads are cached
- ☐ **Write-Through**  
Writes are performed synchronously, Reads are cached
- ☒ **N/A**  
Reads and Writes are not cached

☐ Set Maximum available Size

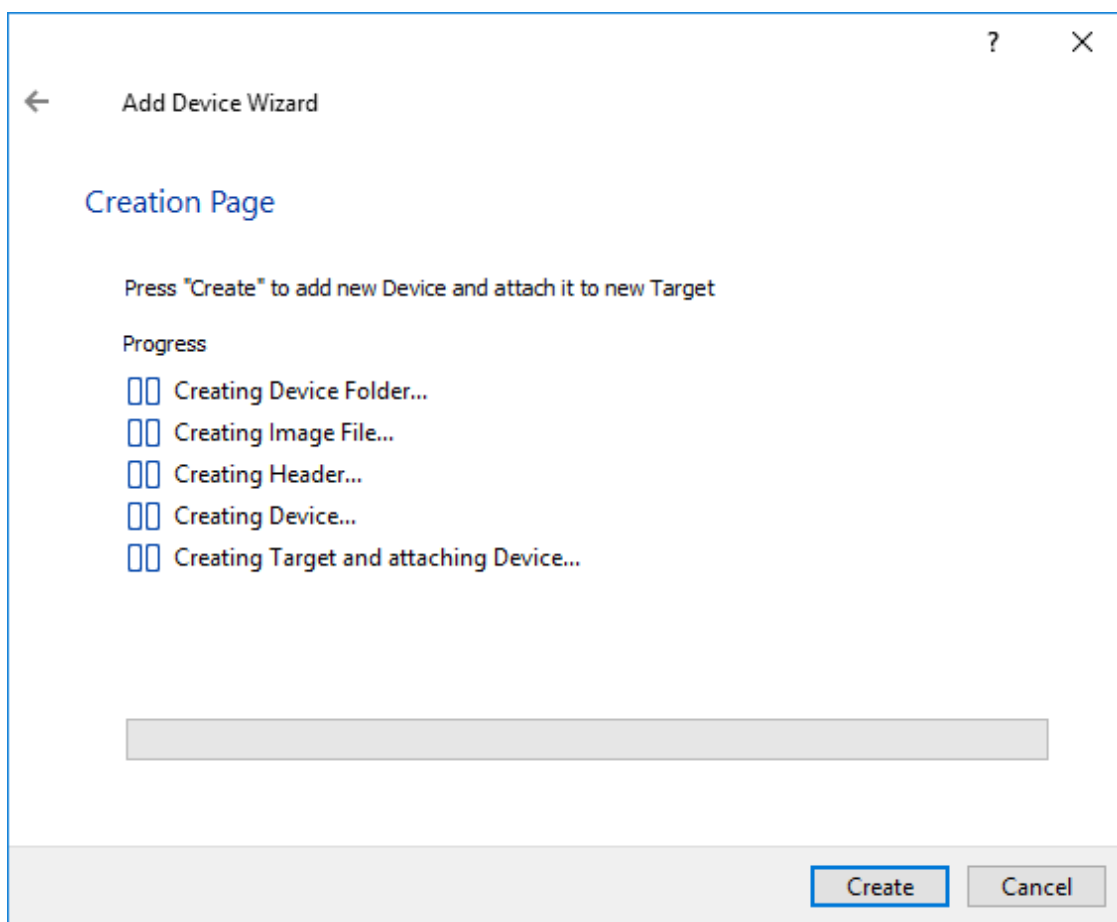
Size:  MB

Next Cancel

7. Specify Target Parameters. Select the Target Name checkbox to enter a custom target name. Otherwise, the name is generated automatically in accordance with the specified target alias.

The screenshot shows a window titled "Add Device Wizard" with a back arrow, a question mark, and a close button. The main heading is "Target Parameters". Below this, there is a section "Choose a Target Attachment Method" with a dropdown menu currently showing "Create new Target". Underneath is a text field for "Target Alias" containing the placeholder "<target alias name>". Below that is a checkbox labeled "Target Name" which is currently unchecked. Underneath the checkbox is a text field containing the iSCSI Qualified Name (QNAM) "iqn.2008-08.com.starwindsoftware:sw1- <target alias name>". At the bottom of the form is a checkbox labeled "Allow multiple concurrent iSCSI Connections" which is checked. At the bottom right of the window are two buttons: "Next" and "Cancel".

8. Click Create to add a new device and attach it to the target.



9. Click Close to finish the device creation.

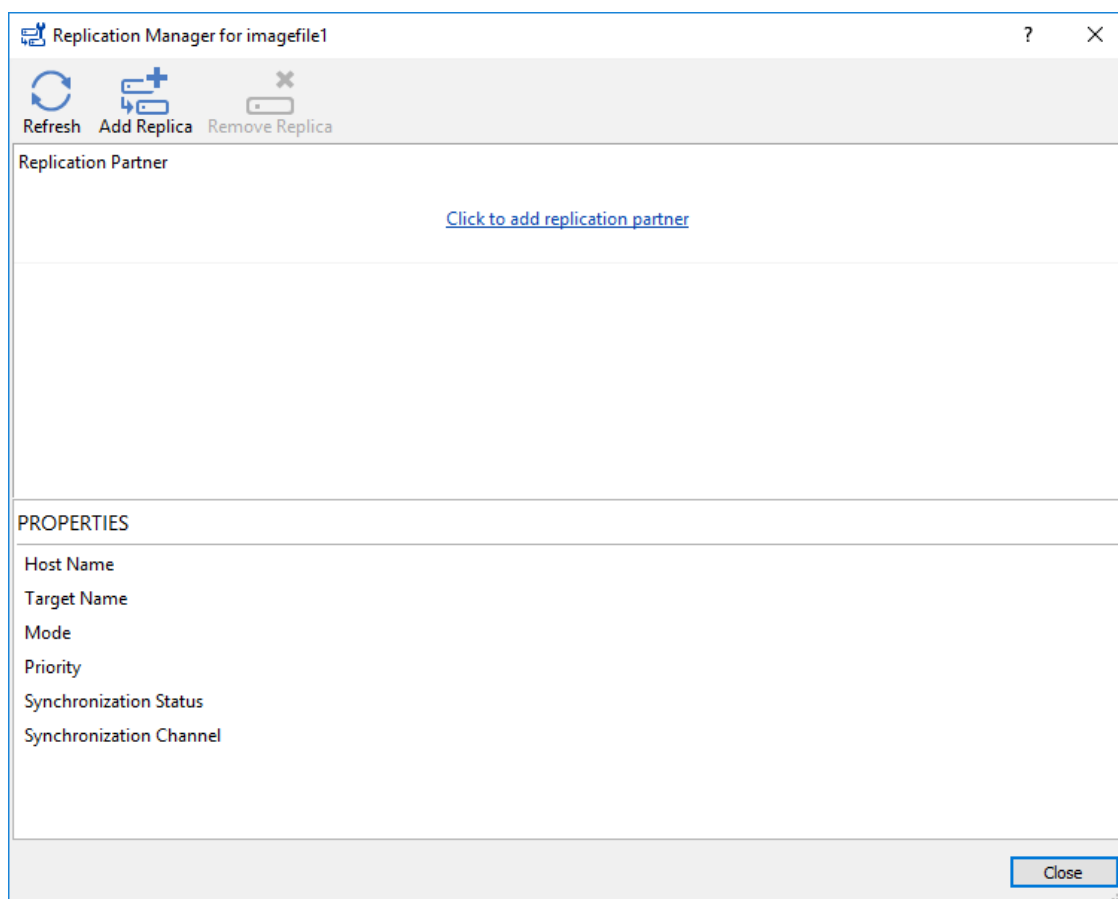
10. The successfully added devices appear in the StarWind Management Console.

## Select The Required Replication Mode

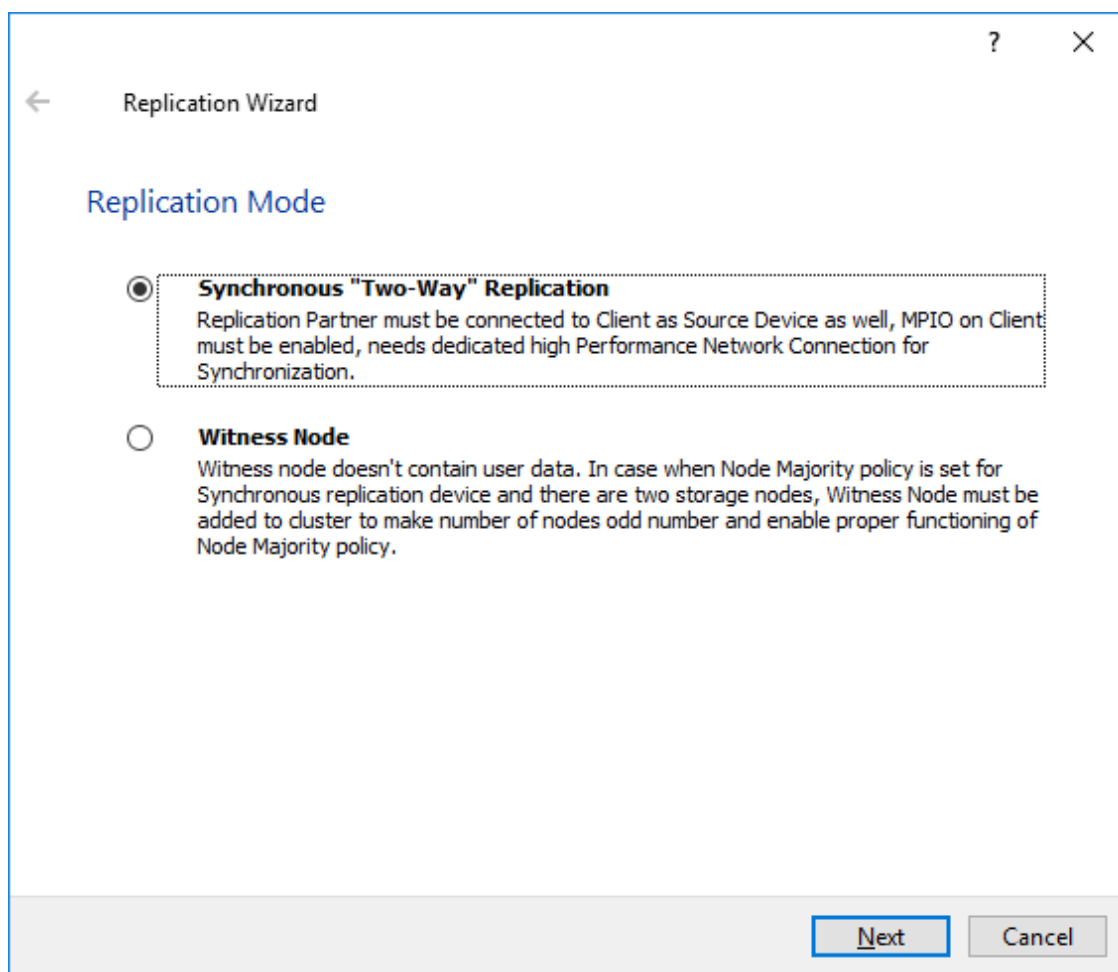
The replication can be configured using Synchronous “Two-Way” Replication mode: Synchronous or active-active replication ensures real-time synchronization and load balancing of data between two or three cluster nodes. Such a configuration tolerates the failure of two out of three storage nodes and enables the creation of an effective business continuity plan. With synchronous mirroring, each write operation requires control confirmation from both storage nodes. It guarantees the reliability of data transfers but is demanding in bandwidth since mirroring will not work on high-latency networks.

## Synchronous “Two-Way” Replication

1. Right-click the recently created device and select Replication Manager from the shortcut menu.
2. Select the Add Replica button in the top menu.



3. Select Synchronous “Two-Way” replication as a replication mode.



4. Specify a partner Host name or IP address and Port Number.

## Selecting The Failover Strategy

StarWind provides 2 options for configuring a failover strategy:

### Heartbeat

The Heartbeat failover strategy allows avoiding the “split-brain” scenario when the HA cluster nodes are unable to synchronize but continue to accept write commands from the initiators independently. It can occur when all synchronization and heartbeat channels disconnect simultaneously, and the partner nodes do not respond to the node’s requests. As a result, StarWind service assumes the partner nodes to be offline and continues operations on a single-node mode using data written to it.

If at least one heartbeat link is online, StarWind services can communicate with each other via this link. The device with the lowest priority will be marked as not synchronized and get subsequently blocked for the further read and write operations until the synchronization channel resumption. At the same time, the partner device on the

synchronized node flushes data from the cache to the disk to preserve data integrity in case the node goes down unexpectedly. It is recommended to assign more independent heartbeat channels during the replica creation to improve system stability and avoid the “split-brain” issue.

With the heartbeat failover strategy, the storage cluster will continue working with only one StarWind node available.

## Node Majority

The Node Majority failover strategy ensures the synchronization connection without any additional heartbeat links. The failure-handling process occurs when the node has detected the absence of the connection with the partner.

The main requirement for keeping the node operational is an active connection with more than half of the HA device’s nodes. Calculation of the available partners is based on their “votes”.

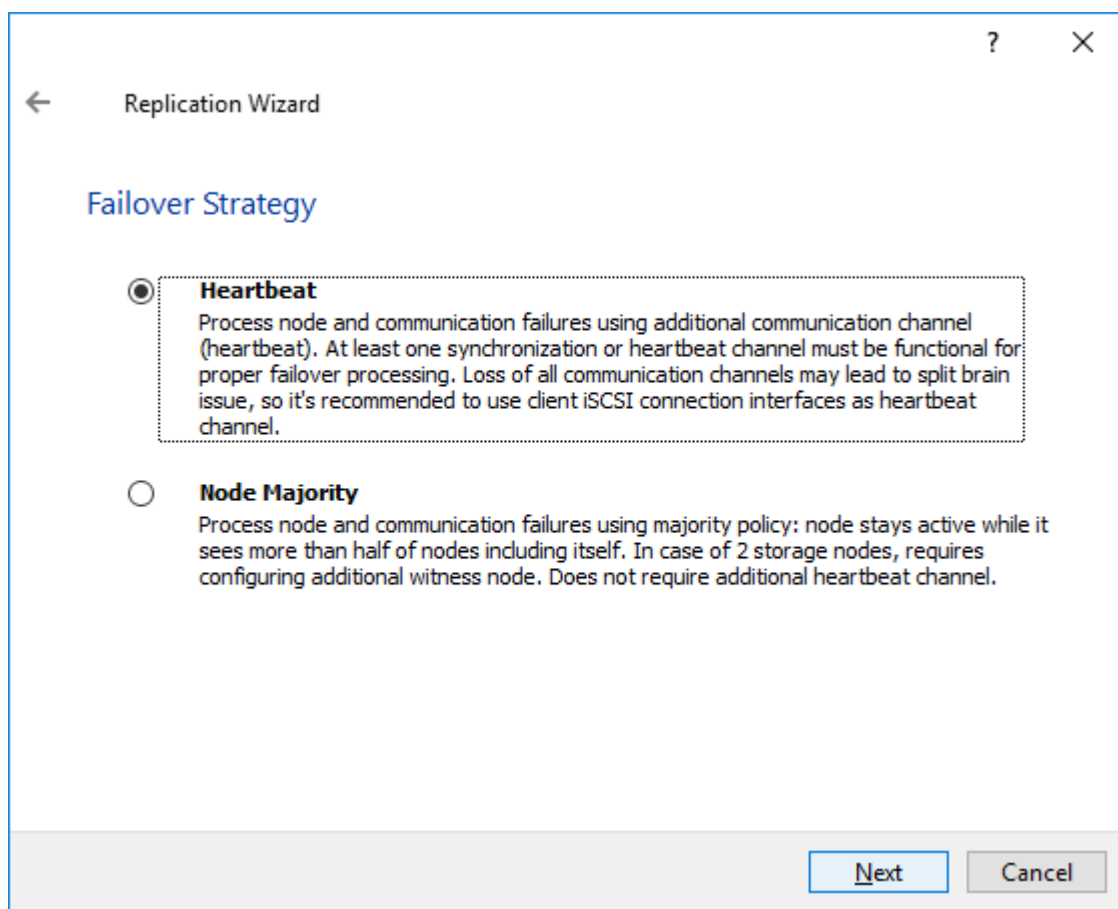
In case of a two-node HA storage, all nodes will be disconnected if there is a problem on the node itself, or in communication between them. Therefore, the Node Majority failover strategy requires the addition of the third Witness node or file share (SMB) which participates in the nodes count for the majority, but neither contains data on it nor is involved in processing clients’ requests. In case an HA device is replicated between 3 nodes, no Witness node is required.

With Node Majority failover strategy, failure of only one node can be tolerated. If two nodes fail, the third node will also become unavailable to clients’ requests.

Please select the required option:

## Heartbeat

1. Select Failover Strategy.



2. Select Create new Partner Device and click Next.

3. Select a partner device Location and click Next.

4. Select Synchronization Journal Strategy and click Next.

NOTE: There are several options – RAM-based journal (default) and Disk-based journal with failure and continuous strategy, that allow to avoid full synchronization cases.

RAM-based (default) synchronization journal is placed in RAM. Synchronization with RAM journal provides good I/O performance in any scenario. Full synchronization could occur in the cases described in this KB:

<https://knowledgebase.starwindsoftware.com/explanation/reasons-why-full-synchronization-may-start/>

Disk-based journal placed on a separate disk from StarWind devices. It allows to avoid full synchronization for the devices where it's configured even when StarWind service is being stopped on all nodes. Disk-based synchronization journal should be placed on a separate, preferably faster disk from StarWind devices. SSDs and NVMe disks are recommended as the device performance is defined by the disk speed, where the journal is located. For example, it can be placed on the OS boot volume.



It is required to allocate 2 MB of disk space for the synchronization journal per 1 TB of HA device size with a disk-based journal configured with 2-way replication and 4MB per 1 TB of HA device size for 3-way replication.

#### Failure journal

The strategy provides good I/O performance, as a RAM-based journal, while all device nodes are in a healthy synchronized state. If a device on one node went into a not synchronized state, the disk-based journal activates and a performance drop could occur as the device performance is defined by the disk speed, where the journal is located. Fast synchronization is not guaranteed in all cases. For example, if a simultaneous hard reset of all nodes occurs, full synchronization will occur.

#### Continuous journal

The strategy guarantees fast synchronization and data consistency in all cases. Although, this strategy has the worst I/O performance, because of frequent write operations to the journal, located on the disk, where the journal is located.

Replication Wizard

### Synchronization Journal Setup


☒ **RAM-based journal**  
Synchronization journal placed in RAM. Synchronization with RAM journal provides good IO performance in any scenario.


☐ **Disk-based journal**  
Synchronization journal placed on disk.

☐ **Failure journal**  
The strategy provides good IO performance while all device nodes are in a healthy state.

☐ **Continuous journal**  
The strategy guarantees fast synchronization and data consistency in all cases.

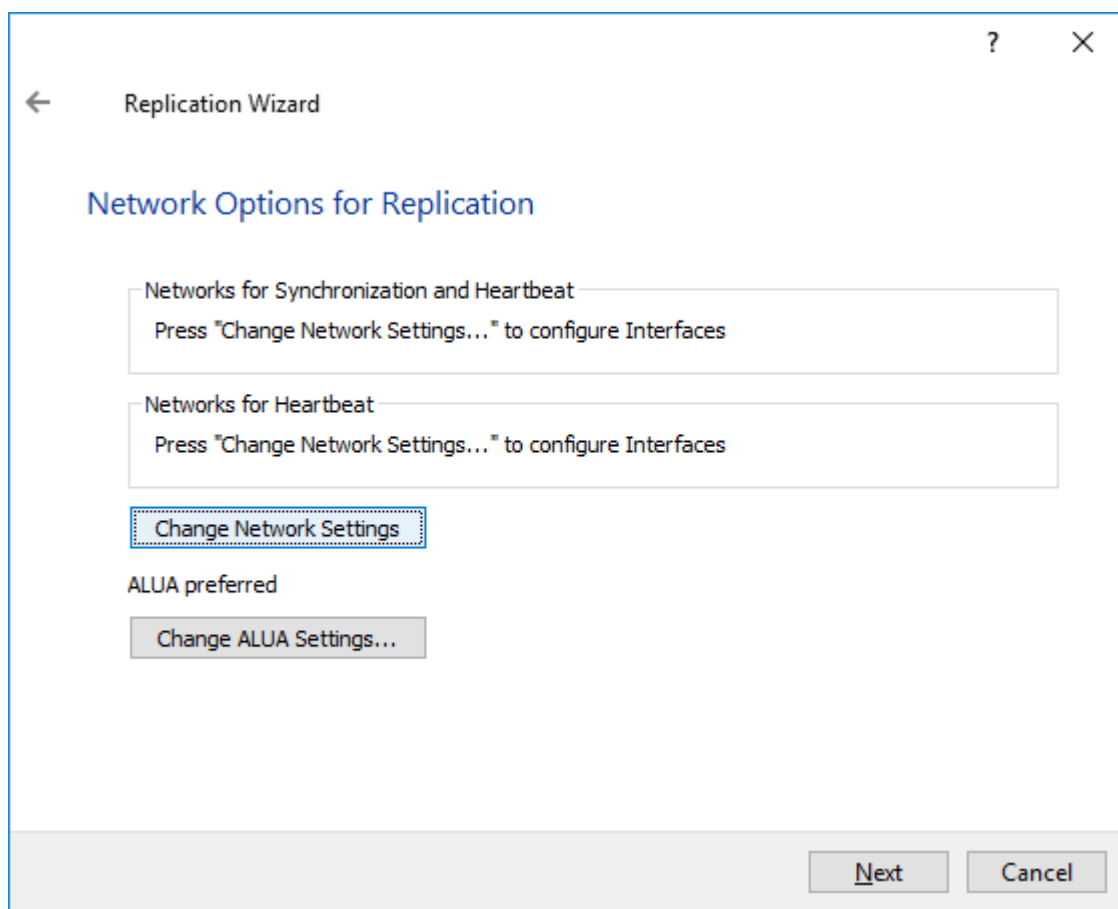
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Current Node:  

Partner Node:  

**Next** **Cancel**

5. Click Change Network Settings.



6. Specify the interfaces for Synchronization and Heartbeat Channels. Click OK and then click Next.

Specify Interfaces for Synchronization Channels

Select synchronization channel

Interfaces	Networks	Synchronization and H...	Heartbeat
[-] Host Name: 192.168.12.10			
172.16.10.10	172.16.10.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
172.16.12.10	172.16.12.0	<input type="checkbox"/>	<input type="checkbox"/>
172.16.20.10	172.16.20.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
172.16.22.10	172.16.22.0	<input type="checkbox"/>	<input type="checkbox"/>
192.168.12.10	192.168.12.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
[-] Host Name: SW2			
172.16.10.20	172.16.10.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
172.16.11.20	172.16.11.0	<input type="checkbox"/>	<input type="checkbox"/>
172.16.20.20	172.16.20.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
172.16.21.20	172.16.21.0	<input type="checkbox"/>	<input type="checkbox"/>
192.168.12.20	192.168.12.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>

☐ Allow Free Select Interfaces

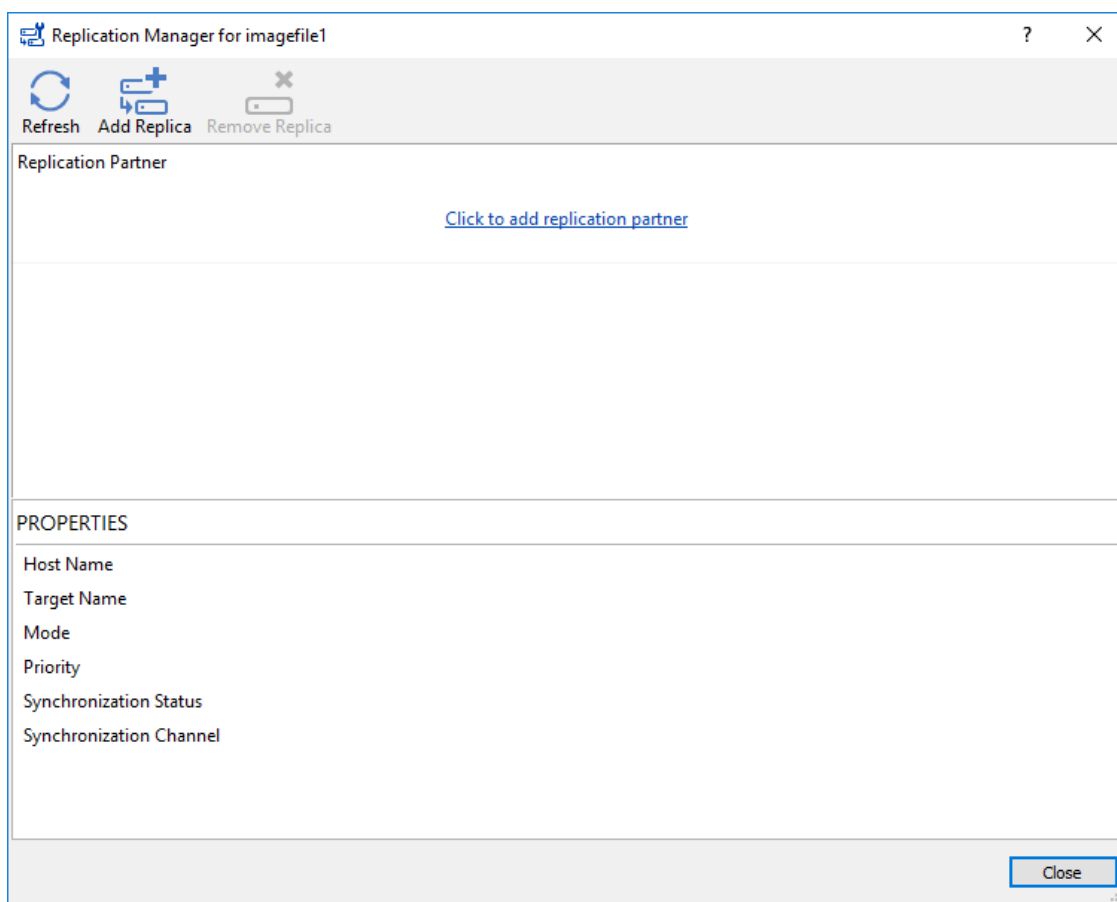
OK Cancel

7. In Select Partner Device Initialization Mode, select Synchronize from existing Device and click Next.

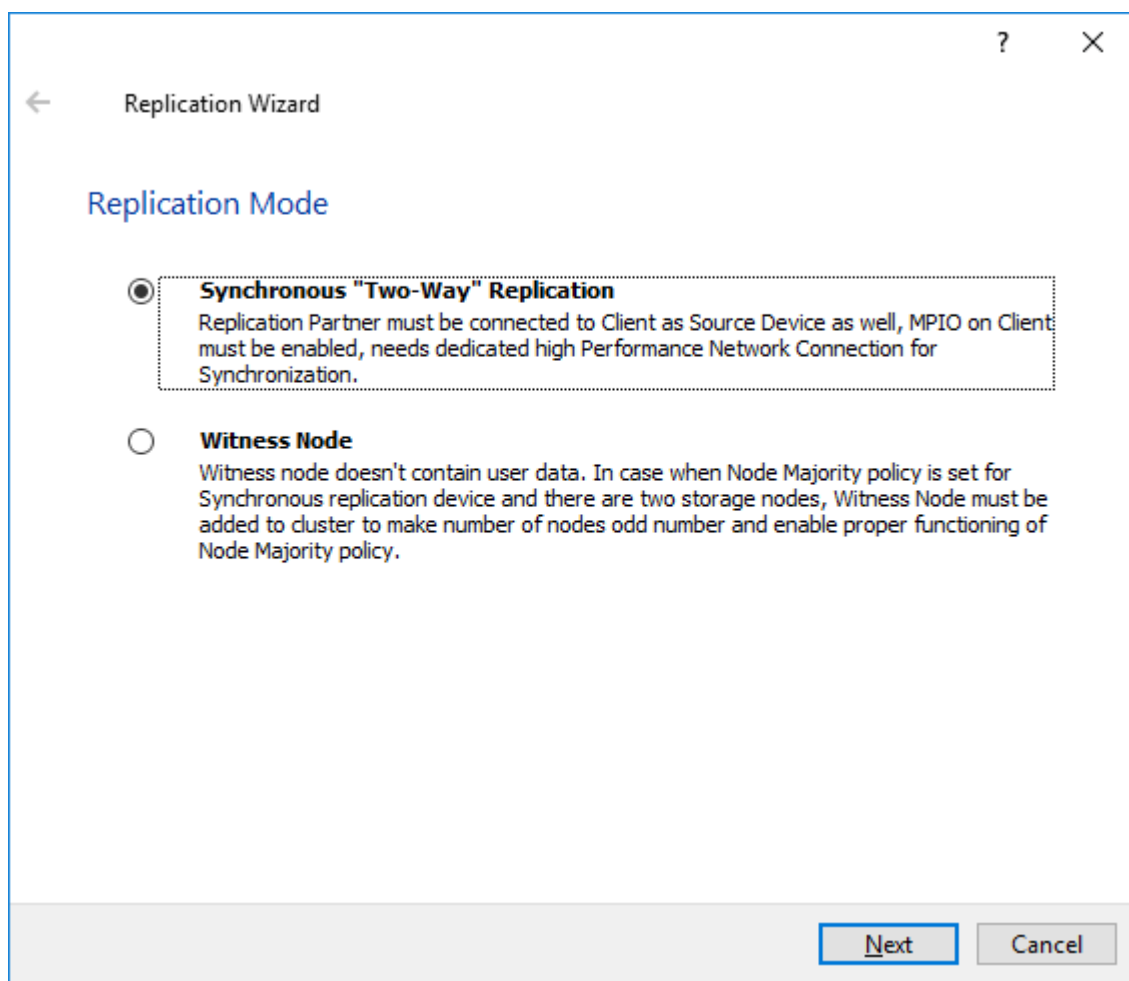
8. Click Create Replica. Click Finish to close the wizard.

9. The successfully added device appears in StarWind Management Console.

10. Choose device, open Replication Manager and click Add replica again.



11. Select Synchronous “Two-Way” Replication as a replication mode. Click Next to proceed.



12. Specify a partner Host name or IP address and Port Number.

?
×

←
Replication Wizard

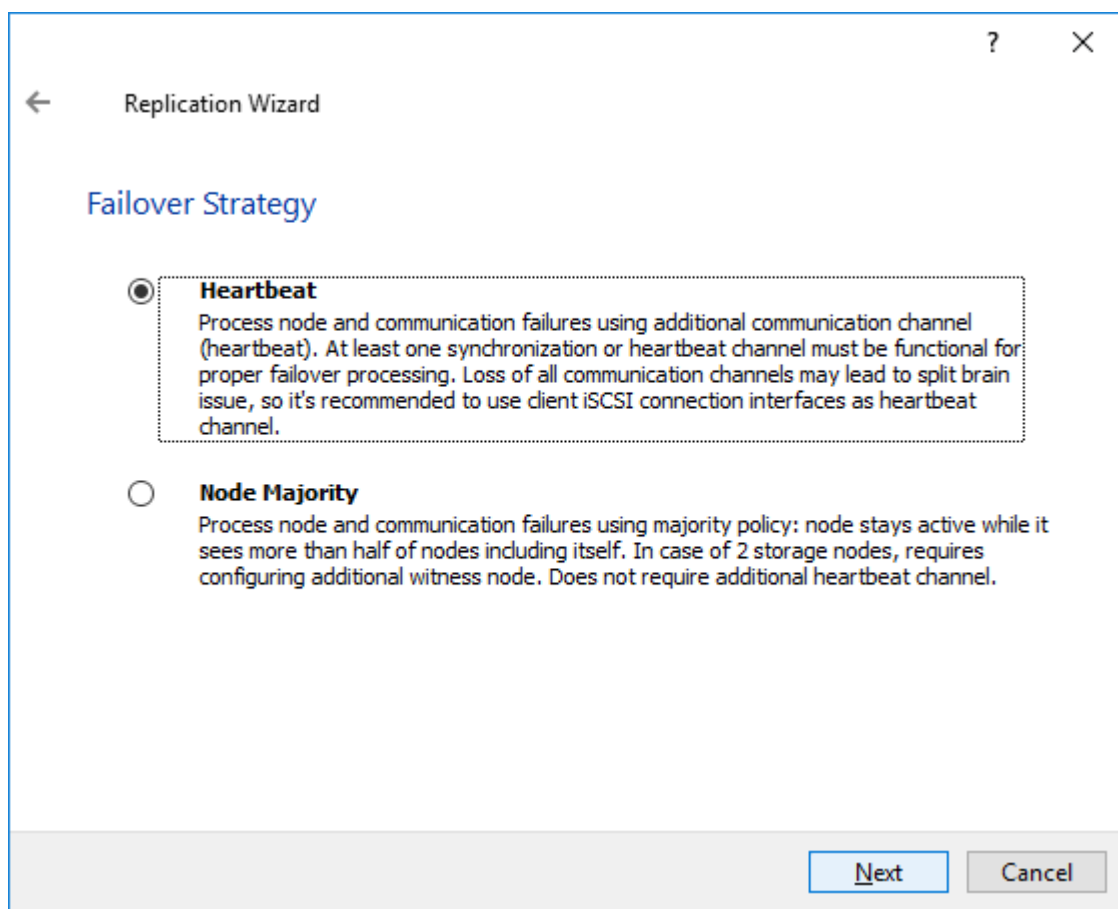
Add Partner Node

Specify Partner Host Name or IP Address where Replication Node would be created

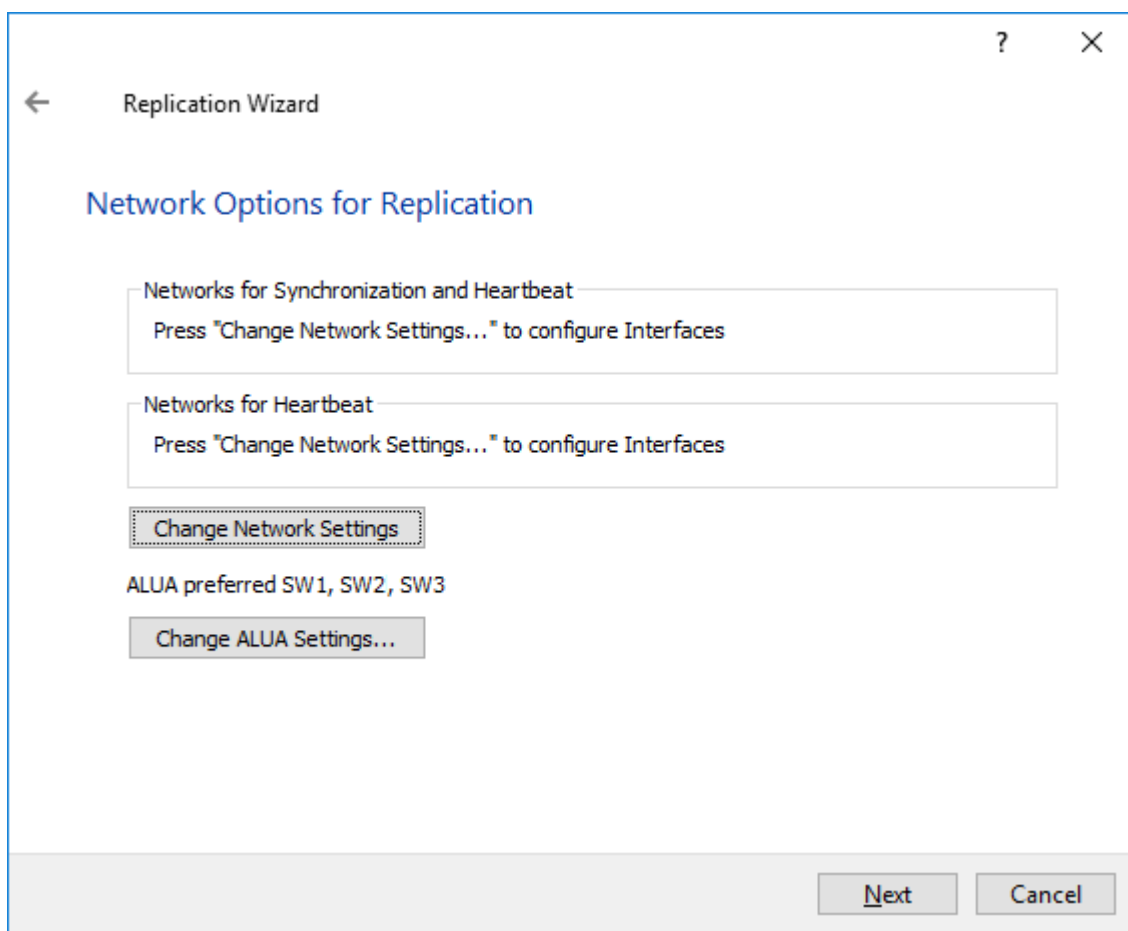
Host Name or IP Address

Port Number

13. Select Failover Strategy.



14. Select Create new Partner Device and click Next.
15. Select a partner device Location and click Next.
16. Select Synchronization Journal Strategy and click Next.
17. Click Change Network Settings.



18. Specify the interfaces for Synchronization and Heartbeat Channels. Click OK and then click Next.



Specify Interfaces for Synchronization Channels

Select synchronization channel

Interfaces	Networks	Synchronization and ...	Heartbeat
172.16.20.10	172.16.20.0	<input type="checkbox"/>	<input type="checkbox"/>
172.16.22.10	172.16.22.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
192.168.12.10	192.168.12.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Host Name: SW2.starwind.local			
172.16.10.20	172.16.10.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
172.16.11.20	172.16.11.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
172.16.20.20	172.16.20.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
172.16.21.20	172.16.21.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
192.168.12.20	192.168.12.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Host Name: SW3			
172.16.11.30	172.16.11.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
172.16.12.30	172.16.12.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
172.16.21.30	172.16.21.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
172.16.22.30	172.16.22.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
192.168.12.30	192.168.12.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>

☐ Allow Free Select Interfaces

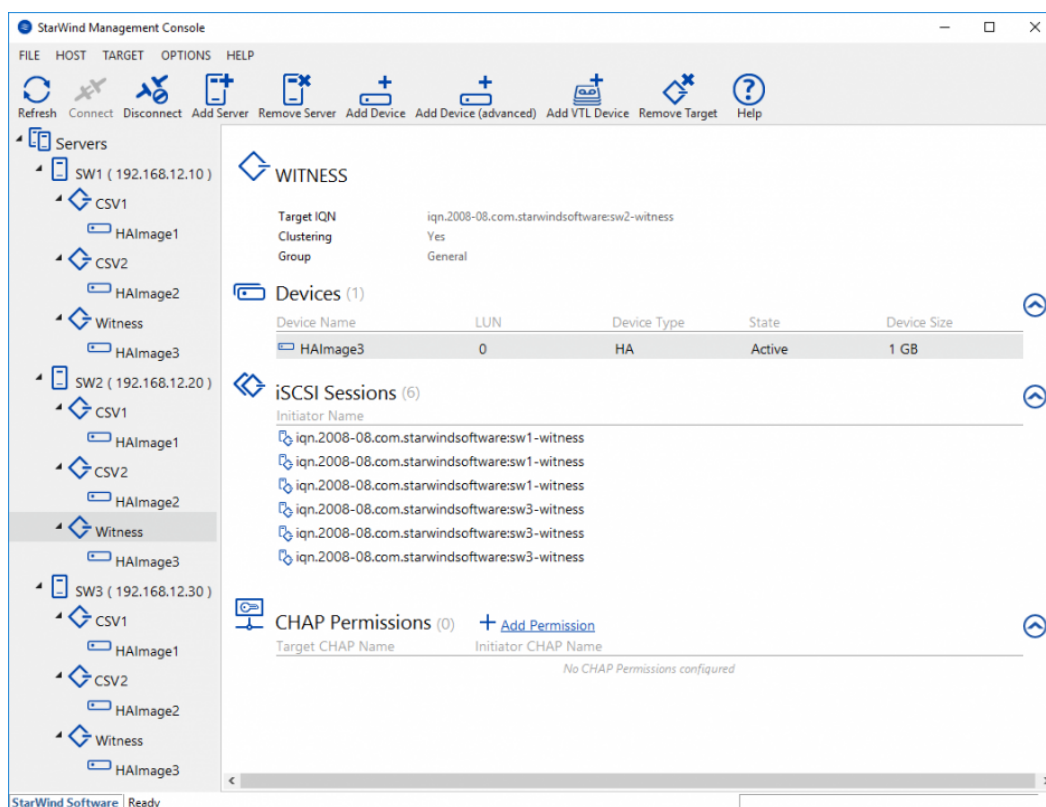
OK Cancel

NOTE: It is not recommended to configure the Heartbeat and iSCSI channels on the same interfaces to avoid the split-brain issue. If the Synchronization and Heartbeat interfaces are located on the same network adapter, it is recommended to assign one more Heartbeat interface to a separate adapter.

19. In Select Partner Device Initialization Mode, select Synchronize from existing Device and click Next.

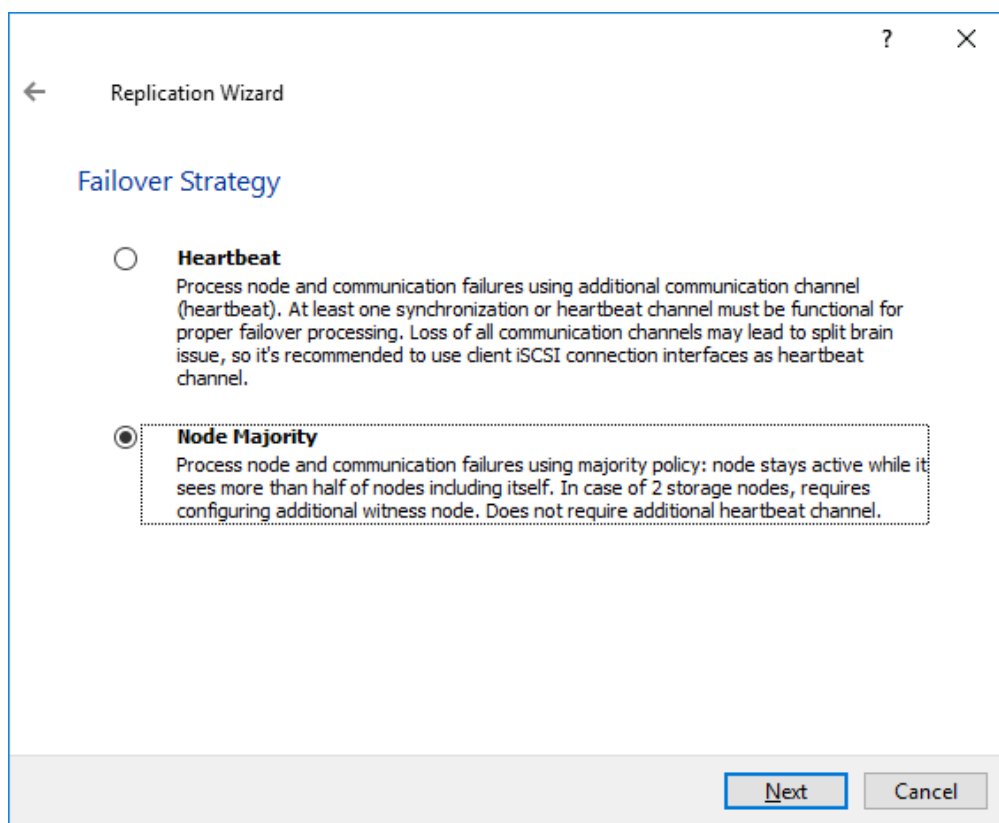
20. Click Create Replica. Click Finish to close the wizard.  
The successfully added device appears in StarWind Management Console.

21. Follow the similar procedure for the creation of other virtual disks that will be used as storage repositories.



## Node Majority

1. Select the Node Majority failover strategy and click Next.



2. Choose Create new Partner Device and click Next.

3. Specify the partner device Location and modify the target name if necessary. Click Next.

4. Select Synchronization Journal Strategy and click Next.

NOTE: There are several options – RAM-based journal (default) and Disk-based journal with failure and continuous strategy, that allow to avoid full synchronization cases.

RAM-based (default) synchronization journal is placed in RAM. Synchronization with RAM journal provides good I/O performance in any scenario. Full synchronization could occur in the cases described in this KB:

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Disk-based journal placed on a separate disk from StarWind devices. It allows to avoid full synchronization for the devices where it's configured even when StarWind service is being stopped on all nodes. Disk-based synchronization journal should be placed on a separate, preferably faster disk from StarWind devices. SSDs and NVMe disks are recommended as the device performance is defined by the disk speed, where the journal is located. For example, it can be placed on the OS boot volume.

It is required to allocate 2 MB of disk space for the synchronization journal per 1 TB of HA device size with a disk-based journal configured with 2-way replication and 4MB per 1 TB of HA device size for 3-way replication.

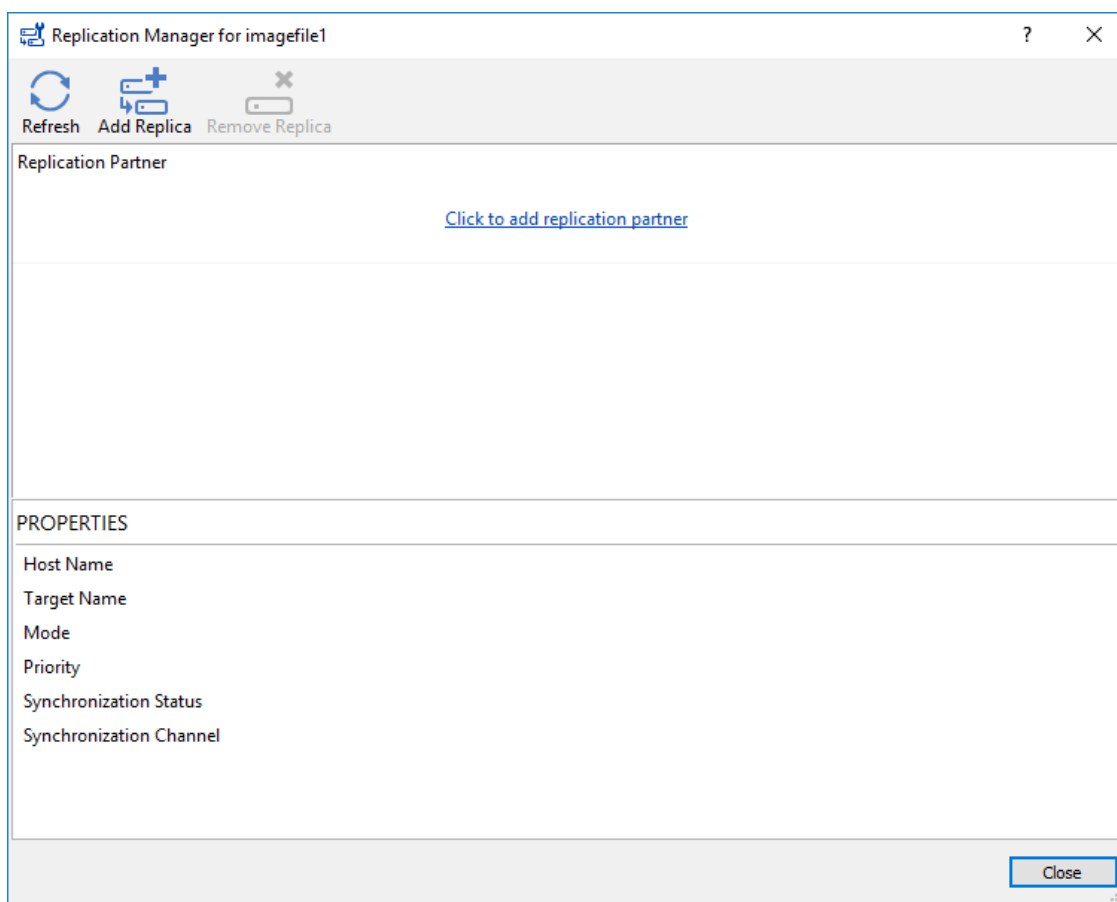
#### Failure journal

The strategy provides good I/O performance, as a RAM-based journal, while all device nodes are in a healthy synchronized state. If a device on one node went into a not synchronized state, the disk-based journal activates and a performance drop could occur as the device performance is defined by the disk speed, where the journal is located. Fast synchronization is not guaranteed in all cases. For example, if a simultaneous hard reset of all nodes occurs, full synchronization will occur.

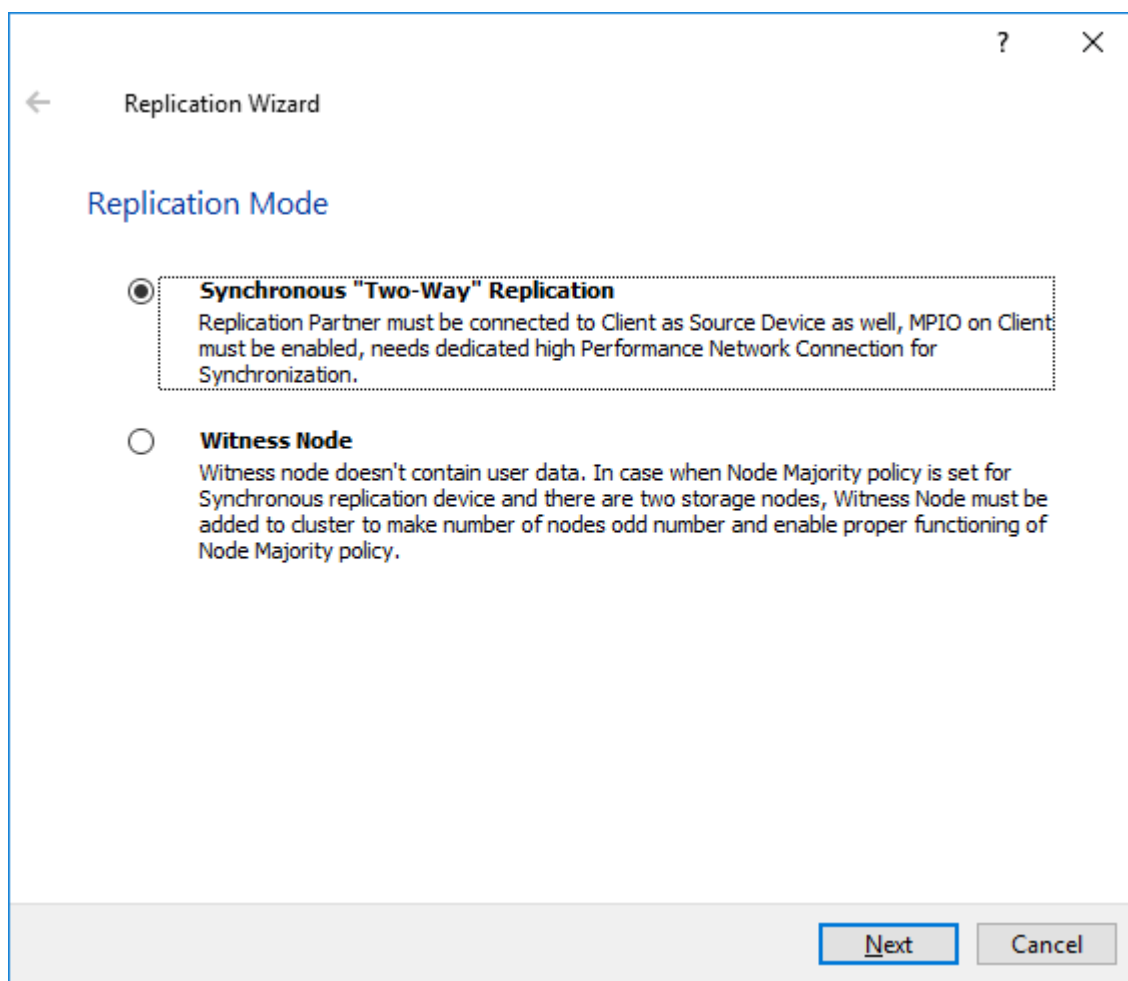
#### Continuous journal

The strategy guarantees fast synchronization and data consistency in all cases. Although, this strategy has the worst I/O performance, because of frequent write operations to the journal, located on the disk, where the journal is located.

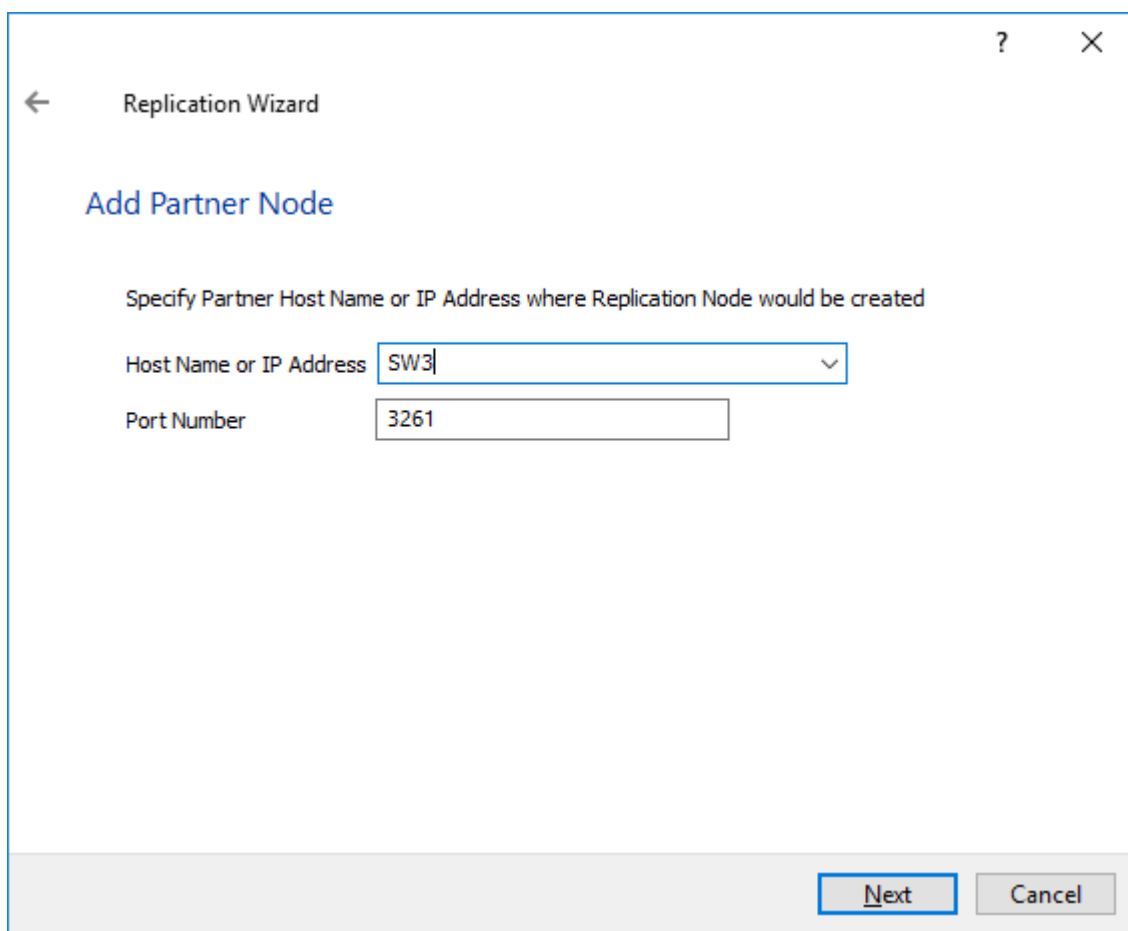
5. In Network Options for Replication, press the Change network settings button and select the synchronization channel for the HA device.
6. In Specify Interfaces for Synchronization Channels, select the checkboxes with the appropriate networks and click OK. Then click Next.
7. Select Synchronize from existing Device as the partner device initialization mode.
8. Press the Create Replica button and close the wizard.
9. The added devices will appear in StarWind Management Console.
10. Choose device, open Replication Manager and click Add replica again.



11. Select Synchronous “Two-Way” Replication as a replication mode. Click Next to proceed.

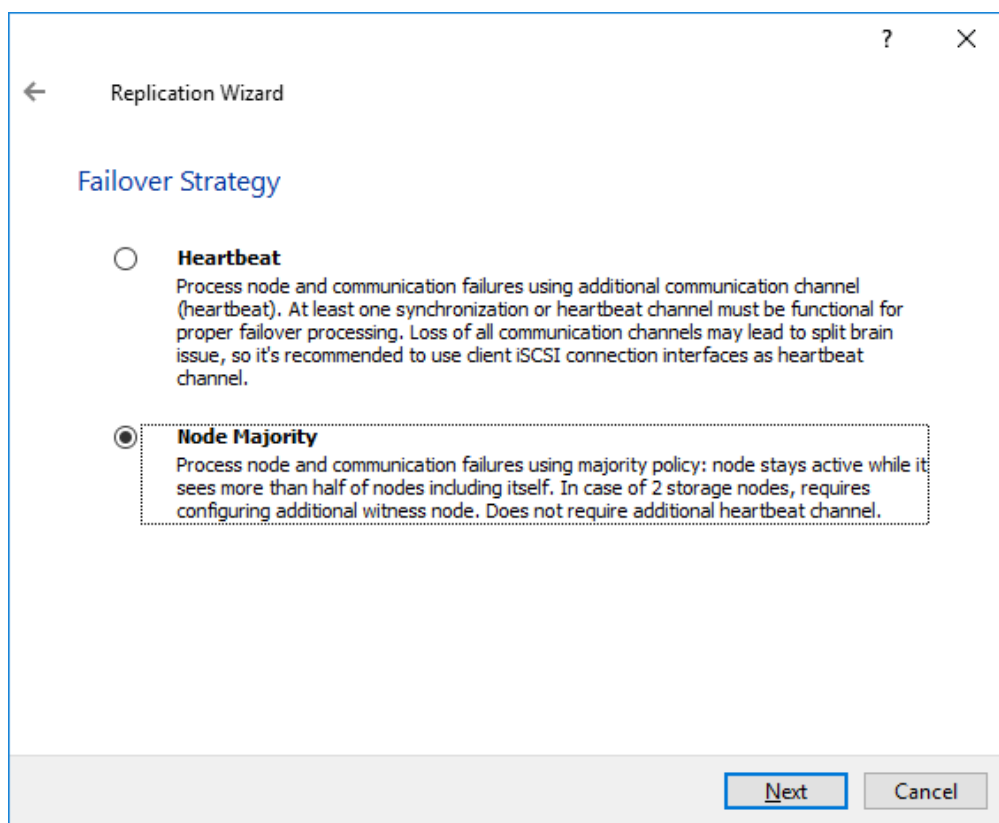


12. Specify a partner Host name or IP address and Port Number.



The image shows a 'Replication Wizard' window with a title bar containing a question mark and a close button. Inside the window, there is a back arrow and the text 'Replication Wizard'. Below this is the section header 'Add Partner Node'. A descriptive text reads: 'Specify Partner Host Name or IP Address where Replication Node would be created'. There are two input fields: 'Host Name or IP Address' with the value 'SW3' and a dropdown arrow, and 'Port Number' with the value '3261'. At the bottom right, there are 'Next' and 'Cancel' buttons. The 'Next' button is highlighted with a blue border.

13. Select the Node Majority failover strategy and click Next.



14. Choose Create new Partner Device and click Next.

15. Specify the partner device Location and modify the target name if necessary. Click Next.

16. Select Synchronization Journal Strategy and click Next.

17. In Network Options for Replication, press the Change network settings button and select the synchronization channel for the HA device.

18. In Specify Interfaces for Synchronization Channels, select the checkboxes with the appropriate networks and click OK. Then click Next.

19. Select Synchronize from existing Device as the partner device initialization mode.

20. Press the Create Replica button and close the wizard.

21. The added devices will appear in StarWind Management Console.

Repeat the steps above to create other virtual disks if necessary.

NOTE: To extend an Image File or a StarWind HA device to the required size, please check the article below:



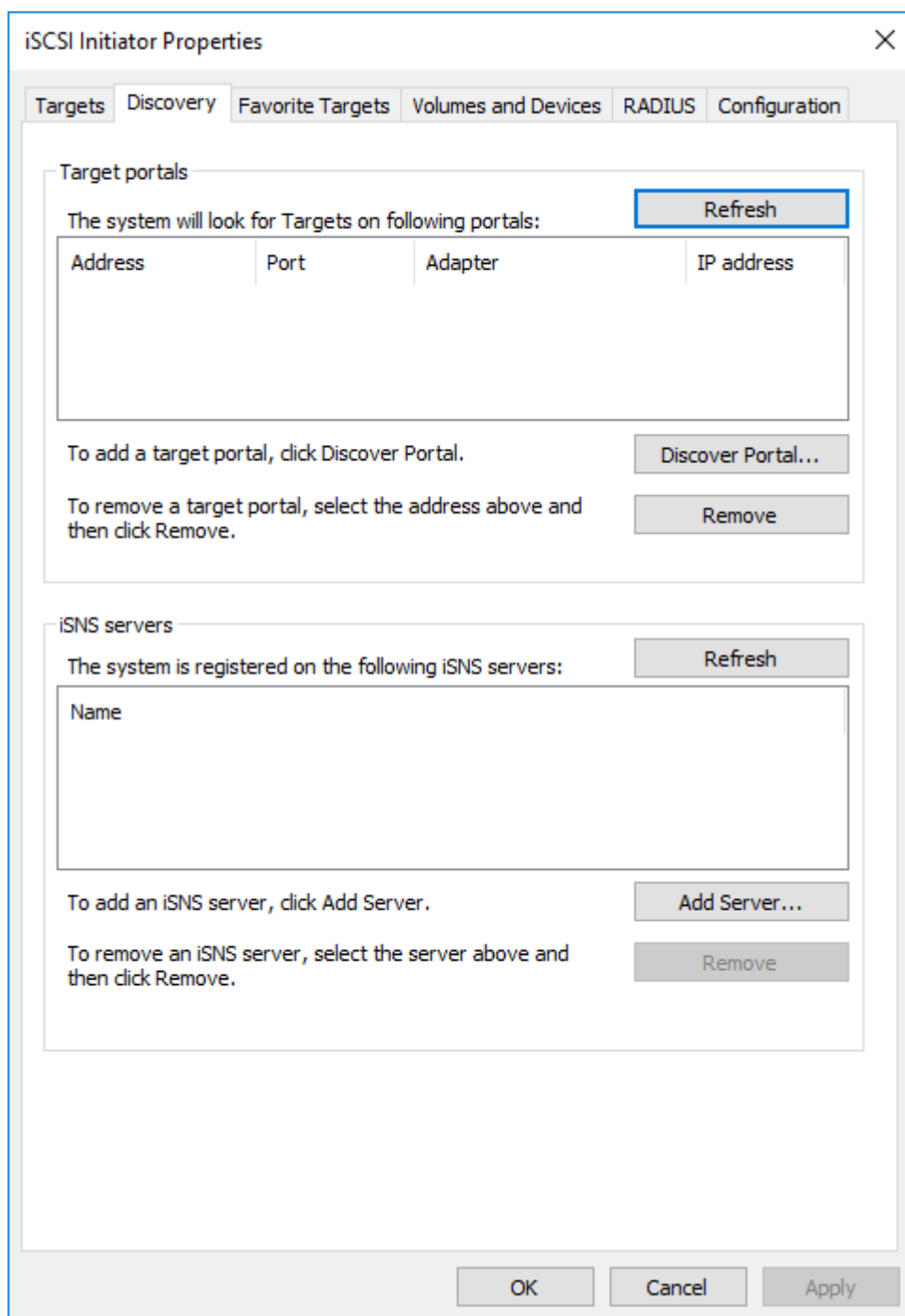
<https://knowledgebase.starwindsoftware.com/maintenance/how-to-extend-image-file-or-high-availability-device/>

## Provisioning Starwind Ha Storage To Windows Server Hosts

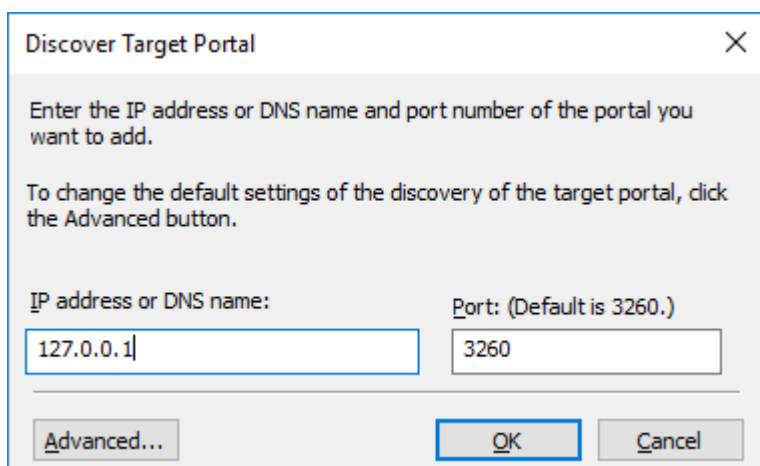
1. Launch Microsoft iSCSI Initiator by executing the following command in the CMD window:

```
iscsicpl
```

2. Navigate to the Discovery tab.



3. Click the Discover Portal button. The Discover Target Portal dialog will appear. Type in 127.0.0.1



The image shows a Windows-style dialog box titled "Discover Target Portal" with a close button (X) in the top right corner. Inside the dialog, there is instructional text: "Enter the IP address or DNS name and port number of the portal you want to add." and "To change the default settings of the discovery of the target portal, click the Advanced button." Below this text are two input fields. The first field is labeled "IP address or DNS name:" and contains the text "127.0.0.1". The second field is labeled "Port: (Default is 3260.)" and contains the number "3260". At the bottom of the dialog, there are three buttons: "Advanced...", "OK", and "Cancel". The "OK" button is highlighted with a blue border.

4. Click the Advanced button and select Microsoft iSCSI Initiator as a Local adapter and keep Initiator IP as it is set by default. Press OK twice to complete the Target Portal discovery.

The screenshot shows the 'Advanced Settings' dialog box with the 'IPsec' tab selected. The 'Connect using' section has three dropdown menus: 'Local adapter' set to 'Microsoft iSCSI Initiator', 'Initiator IP' set to 'Default', and 'Target portal IP' which is empty. Below this, the 'CRC / Checksum' section has two unchecked checkboxes: 'Data digest' and 'Header digest'. The 'Enable CHAP log on' checkbox is also unchecked. The 'CHAP Log on information' section contains explanatory text and two input fields: 'Name' (containing 'iqn.1991-05.com.microsoft:sw1.starwind-demo.local') and 'Target secret' (empty). At the bottom, there are three unchecked checkboxes: 'Perform mutual authentication', 'Use RADIUS to generate user authentication credentials', and 'Use RADIUS to authenticate target credentials'. The 'OK' button is highlighted with a blue border.

5. Click the Discover Portal button once again.

6. In the Discover Target Portal dialog, type in the iSCSI interface IP address of the second node that will be used to connect the StarWind provisioned targets. Click Advanced...

Discover Target Portal

Enter the IP address or DNS name and port number of the portal you want to add.  
  
To change the default settings of the discovery of the target portal, click the Advanced button.

IP address or DNS name:

Port: (Default is 3260.)

172.16.10.20

3260

Advanced...

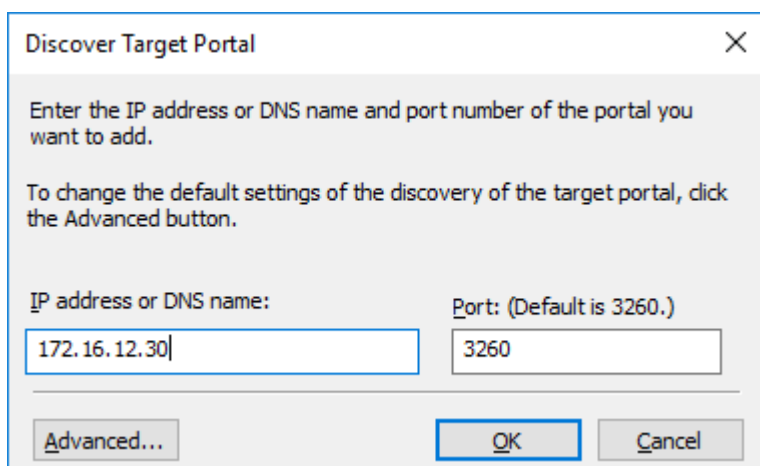
OK

Cancel

7. Select Microsoft iSCSI Initiator as the Local adapter, select the Initiator IP in the same subnet as the IP address of the partner server from the previous step. Confirm the actions to complete the Target Portal discovery.

The image shows a screenshot of the 'Advanced Settings' dialog box, which is part of a software interface. The dialog has a title bar with a question mark and a close button. It contains two tabs: 'General' and 'IPsec', with 'IPsec' currently selected. The 'IPsec' tab is divided into several sections. The first section, 'Connect using', contains three dropdown menus: 'Local adapter' (set to 'Microsoft iSCSI Initiator'), 'Initiator IP' (set to '172.16.10.10'), and 'Target portal IP' (empty). The second section, 'CRC / Checksum', contains two checkboxes: 'Data digest' and 'Header digest', both of which are unchecked. The third section, 'Enable CHAP log on', contains an unchecked checkbox. Below this is the 'CHAP Log on information' section, which includes a text box for 'Name' (containing 'iqn.1991-05.com.microsoft:sw1.starwind.local') and an empty text box for 'Target secret'. The final section contains three unchecked checkboxes: 'Perform mutual authentication', 'Use RADIUS to generate user authentication credentials', and 'Use RADIUS to authenticate target credentials'. At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Apply'.

8. In the Discover Target Portal dialog, type in the iSCSI interface IP address of the third node that will be used to connect the StarWind provisioned targets. Click Advanced...



The image shows a 'Discover Target Portal' dialog box with a close button (X) in the top right corner. The dialog contains the following text: 'Enter the IP address or DNS name and port number of the portal you want to add.' and 'To change the default settings of the discovery of the target portal, click the Advanced button.' Below this text are two input fields: 'IP address or DNS name:' with the value '172.16.12.30' and 'Port: (Default is 3260.)' with the value '3260'. At the bottom, there are three buttons: 'Advanced...', 'OK', and 'Cancel'.

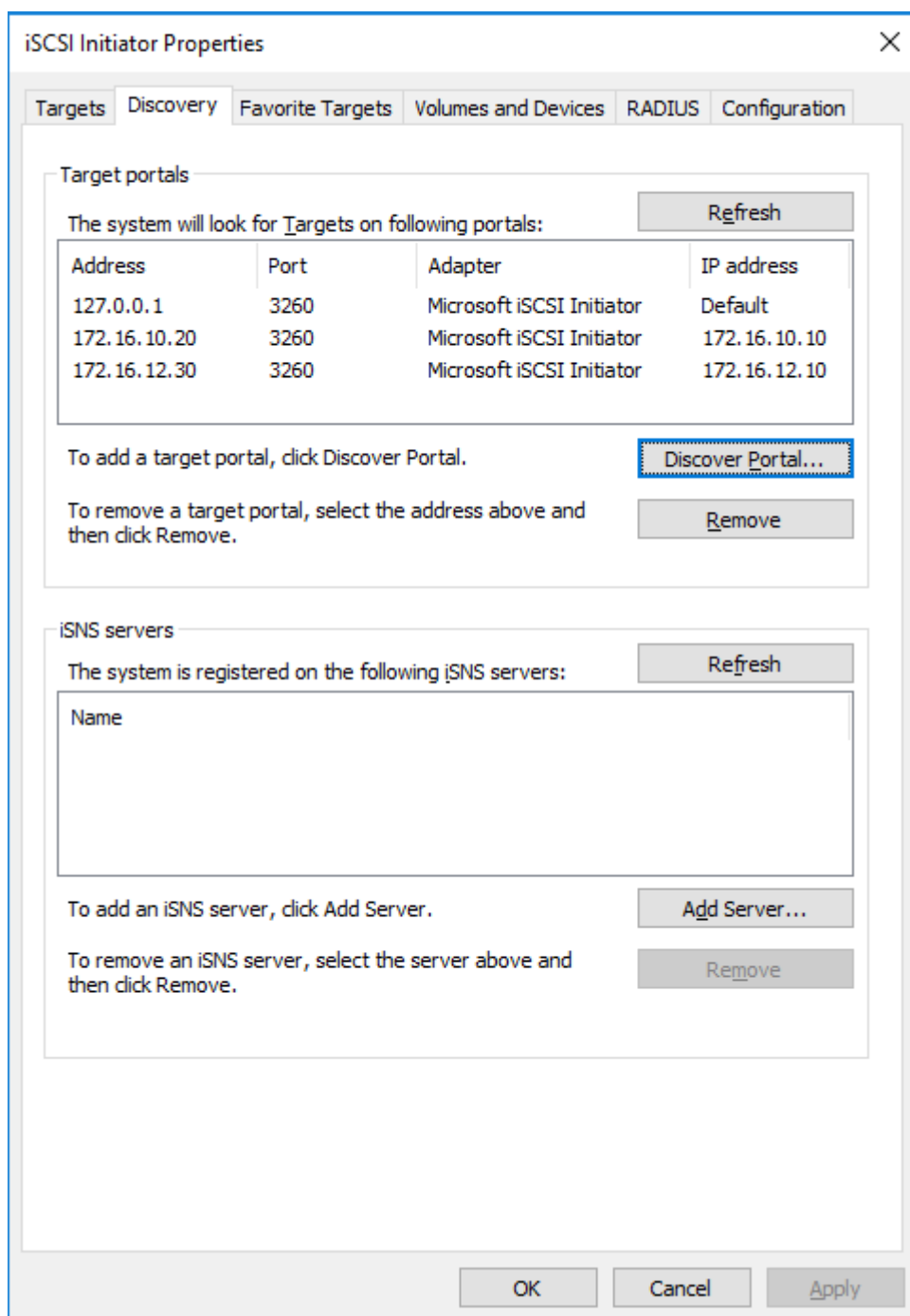
9. Select Microsoft iSCSI Initiator as the Local adapter, select the Initiator IP in the same subnet as the IP address of the partner server from the previous step. Confirm the actions to complete the Target Portal discovery.

The screenshot shows the 'Advanced Settings' dialog box with the 'IPsec' tab selected. The 'General' tab is also visible. The 'Connect using' section has three dropdown menus: 'Local adapter' set to 'Microsoft iSCSI Initiator', 'Initiator IP' set to '172.16.12.10', and 'Target portal IP' is empty. The 'CRC / Checksum' section has two checkboxes: 'Data digest' and 'Header digest', both of which are unchecked. The 'Enable CHAP log on' checkbox is also unchecked. The 'CHAP Log on information' section contains a text box for 'Name' with the value 'iqn.1991-05.com.microsoft:sw1.starwind.local' and an empty text box for 'Target secret'. Below this, there are three more checkboxes: 'Perform mutual authentication' (unchecked), 'Use RADIUS to generate user authentication credentials' (unchecked), and 'Use RADIUS to authenticate target credentials' (unchecked). At the bottom right, there are three buttons: 'OK', 'Cancel', and 'Apply'.

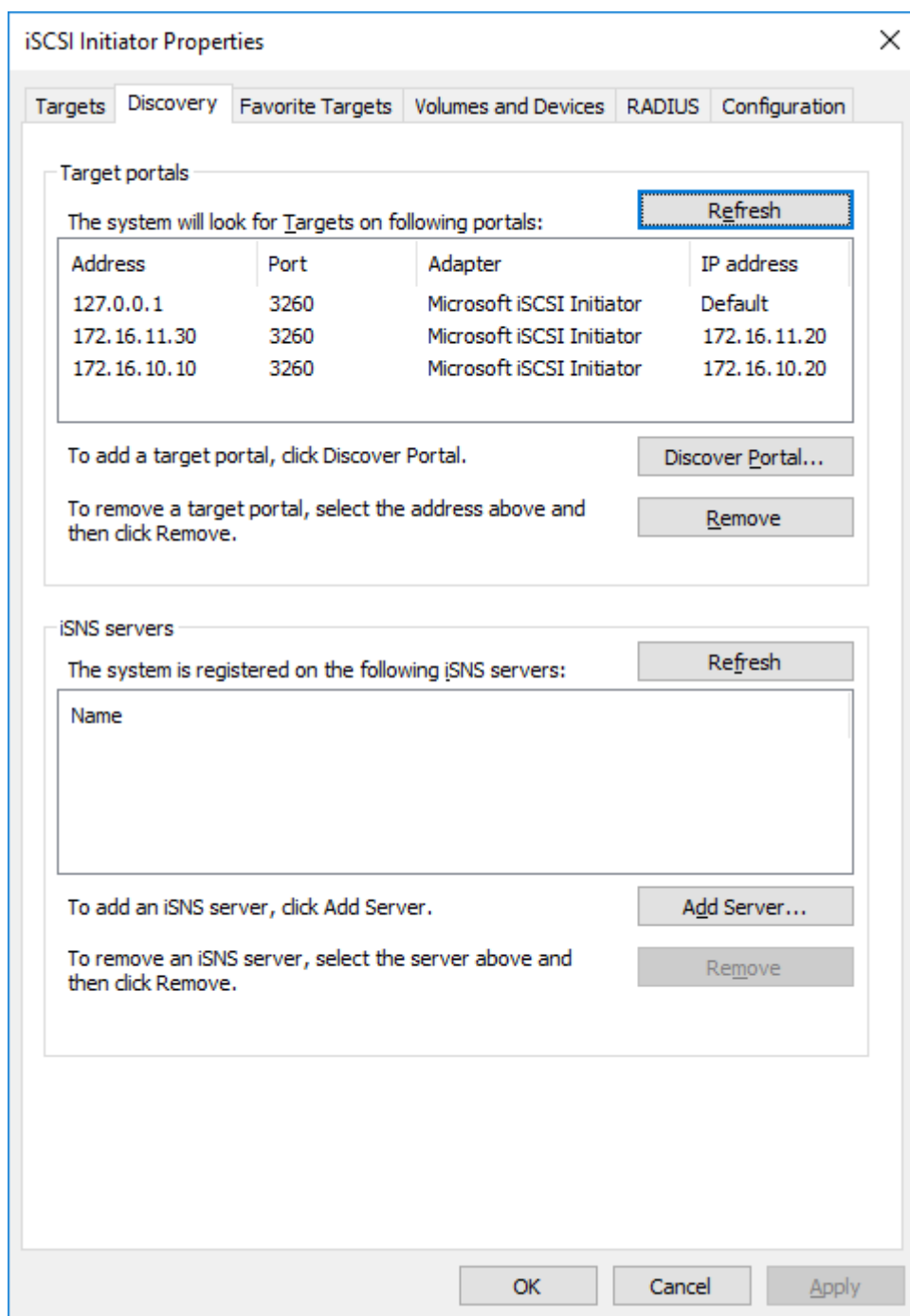
10. Repeat the steps 1-9 on the partner nodes.

11. All the target portals are added on the first node.

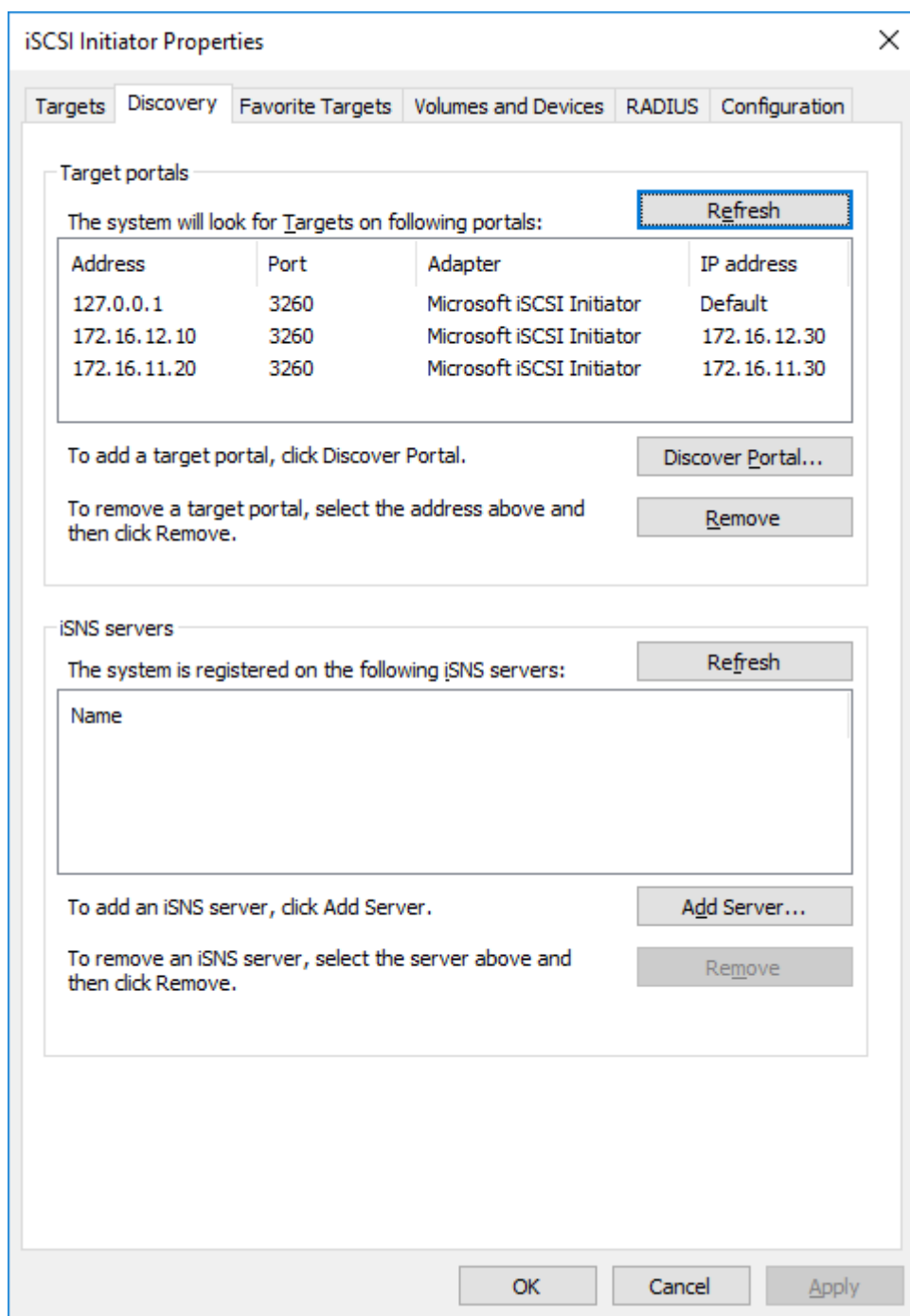




12. All the target portals are added on the second node.



13. All the target portals are added on the third node.

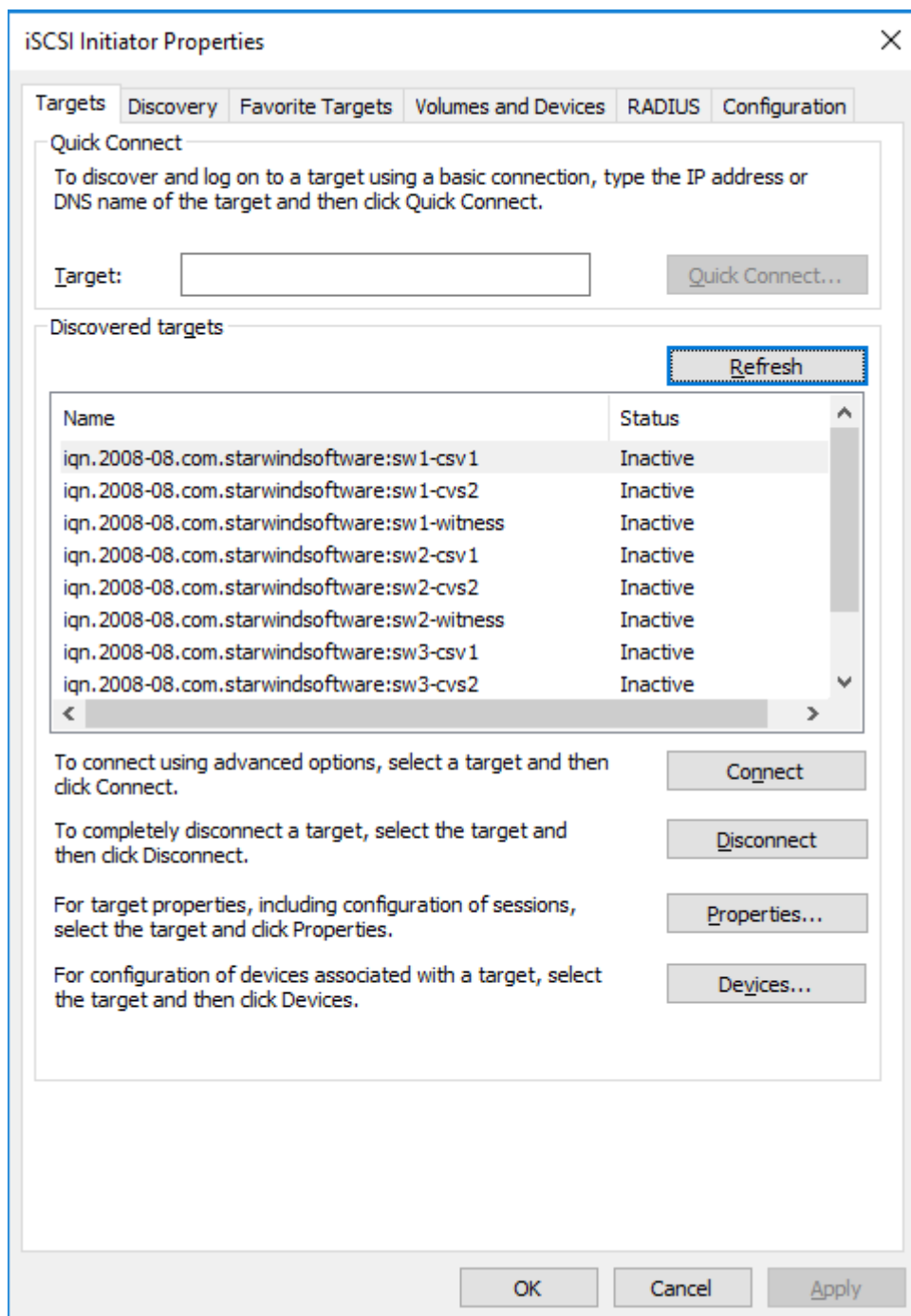


## Connecting Targets

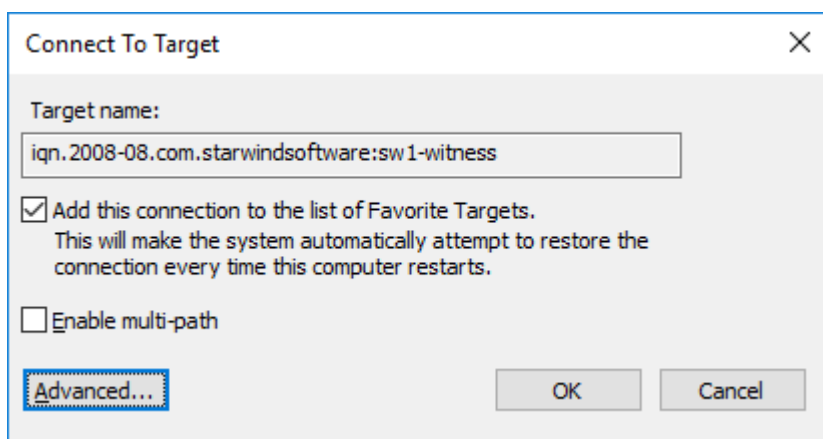
1. Click the Targets tab. The previously created targets are listed in the Discovered Targets section.

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 on the corresponding StarWind VSAN server 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 Target portal IP, select 127.0.0.1. Confirm the actions.

**Advanced Settings** ? X

**General** **IPsec**

**Connect using**

Local adapter: Microsoft iSCSI Initiator

Initiator IP: Default

Target portal IP: 127.0.0.1 / 3260

**CRC / Checksum**

☐ Data digest ☐ Header digest

☒ Enable CHAP log on

**CHAP Log on information**

CHAP helps ensure connection security by providing authentication between a target and an initiator.

To use, specify the same name and CHAP secret that was configured on the target for this initiator. The name will default to the Initiator Name of the system unless another name is specified.

Name: iqn.1991-05.com.microsoft:sw1.starwind.local

Target secret:

☒ Perform mutual authentication

To use mutual CHAP, either specify an initiator secret on the Configuration page or use RADIUS.

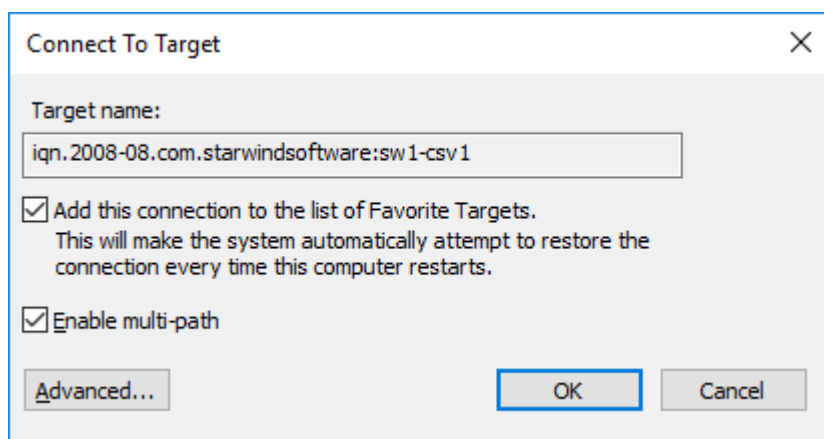
☐ Use RADIUS to generate user authentication credentials

☐ Use RADIUS to authenticate target credentials

OK Cancel Apply

NOTE: It is recommended to connect the Witness device only through the loopback (127.0.0.1) address. Do not connect the target to the Witness device from the partner StarWind node.

5. Select the CSV1 target discovered from the local server and click Connect.
6. Enable checkboxes as shown in the image below. Click Advanced...



7. Select Microsoft iSCSI Initiator in the Local adapter dropdown menu. In Target portal IP, select 127.0.0.1. Confirm the actions.

8. Select the partner target from the second StarWind node and click Connect.

9. Repeat the step 6.

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

The screenshot shows the 'Advanced Settings' dialog box with the 'IPsec' tab selected. The 'Connect using' section has three dropdown menus: 'Local adapter' set to 'Microsoft iSCSI Initiator', 'Initiator IP' set to '172.16.10.10', and 'Target portal IP' set to '172.16.10.20 / 3260'. The 'CRC / Checksum' section has two unchecked checkboxes: 'Data digest' and 'Header digest'. The 'Enable CHAP log on' checkbox is also unchecked. Below this is the 'CHAP Log on information' section, which includes a text box for 'Name' containing 'iqn.1991-05.com.microsoft:sw1.starwind.local' and an empty text box for 'Target secret'. At the bottom of the dialog are 'OK', 'Cancel', and 'Apply' buttons.

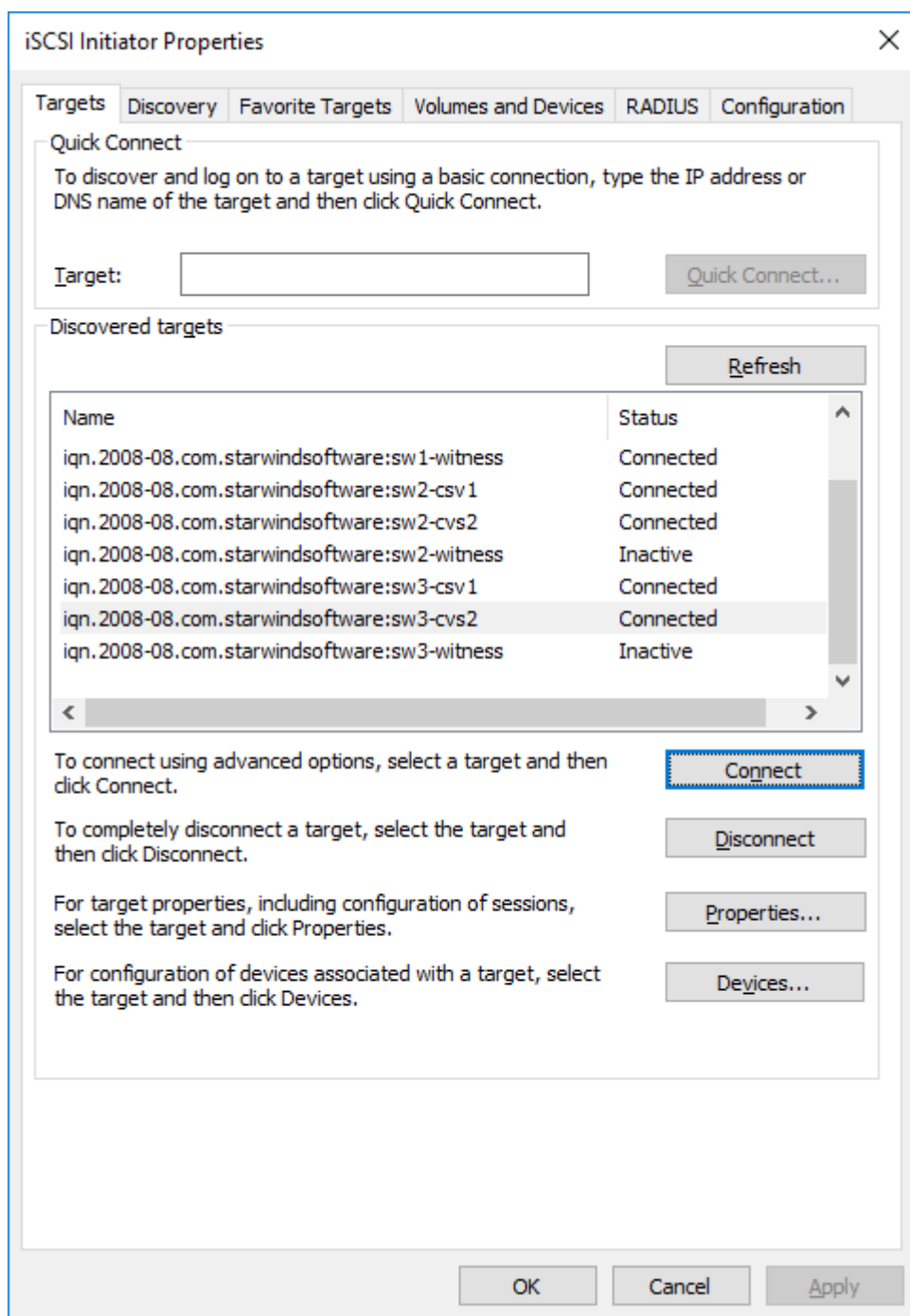
11. Select the partner target from the third StarWind node and click Connect.
12. Repeat the step 6.
13. Select Microsoft iSCSI Initiator in the Local adapter dropdown menu. In the Initiator IP field, select the IP address for the iSCSI channel. In the Target portal IP, select the corresponding portal IP from the same subnet. Confirm the actions.



The screenshot shows the 'Advanced Settings' dialog box with the 'IPsec' tab selected. The 'Connect using' section has three dropdown menus: 'Local adapter' set to 'Microsoft iSCSI Initiator', 'Initiator IP' set to '172.16.12.10', and 'Target portal IP' set to '172.16.12.30 / 3260'. The 'CRC / Checksum' section has two unchecked checkboxes: 'Data digest' and 'Header digest'. The 'Enable CHAP log on' checkbox is also unchecked. The 'CHAP Log on information' section contains a text box for 'Name' with the value 'iqn.1991-05.com.microsoft:sw1.starwind.local' and an empty 'Target secret' text box. Below this, there are three more unchecked checkboxes: 'Perform mutual authentication', 'Use RADIUS to generate user authentication credentials', and 'Use RADIUS to authenticate target credentials'. The dialog box has 'OK', 'Cancel', and 'Apply' buttons at the bottom right.

14. Repeat the steps 1-10 for all remaining HA device targets.

15. Repeat the steps 1-11 on the other StarWind nodes, specifying the corresponding local and data channel IP addresses. The result should look like in the screenshot below.



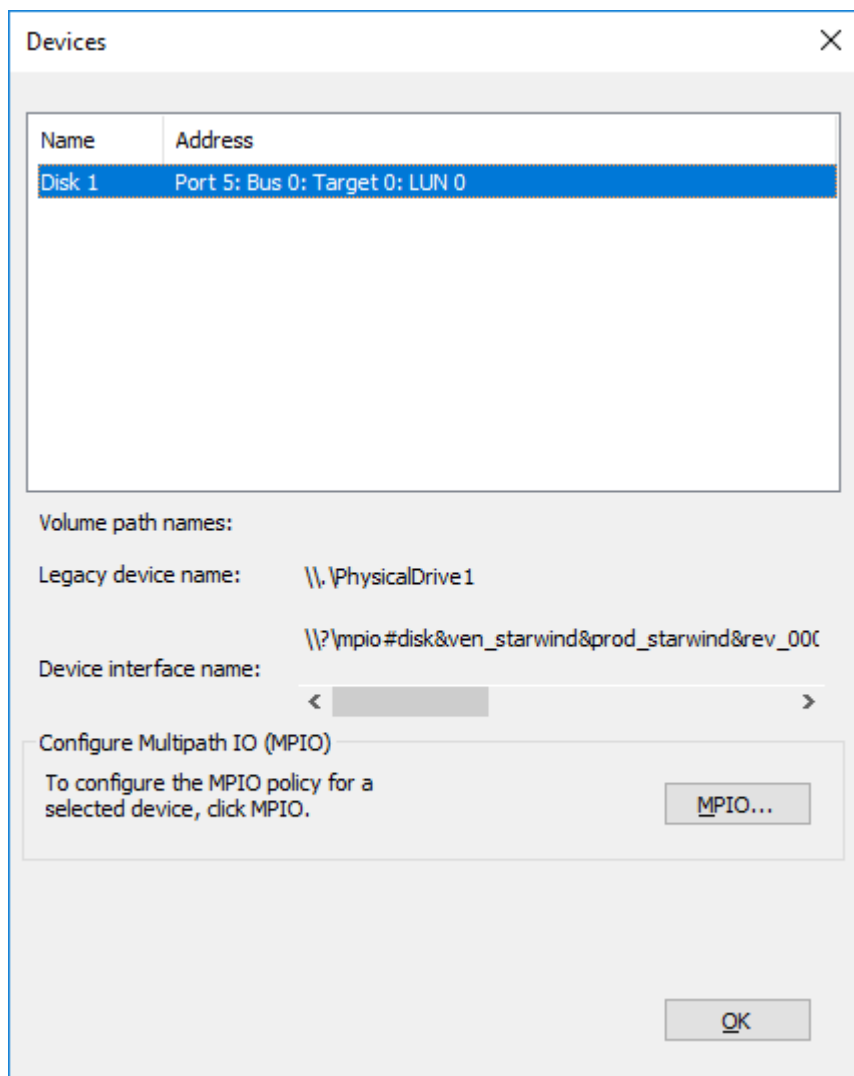
## Configuring Multipath

NOTE: It is recommended to configure different MPIO policies depending on the iSCSI channel throughput. For a 1 Gbps iSCSI channel throughput, it is recommended to set the Failover Only or Least Queue Depth MPIO load balancing policy. For a 10 Gbps iSCSI channel throughput, it is recommended to set the Round Robin or Least Queue Depth MPIO load balancing policy.

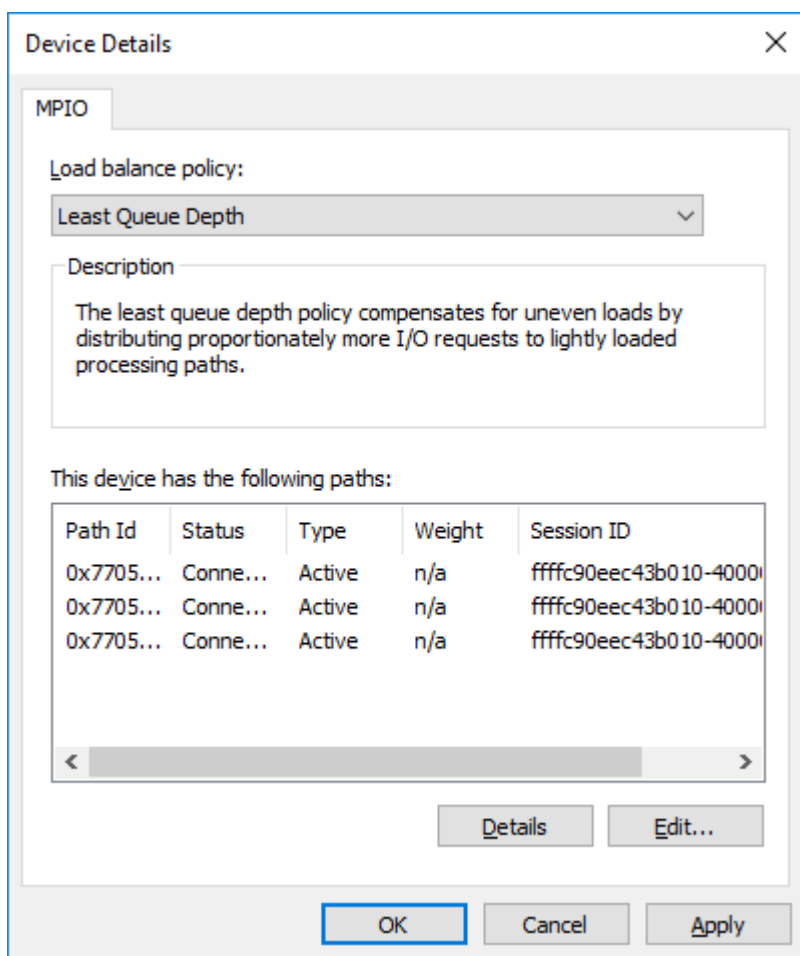
1. Configure the MPIO policy for every target except for Witness, leaving it with the load

balance policy of choice. Select the Target located on the local server and click Devices.

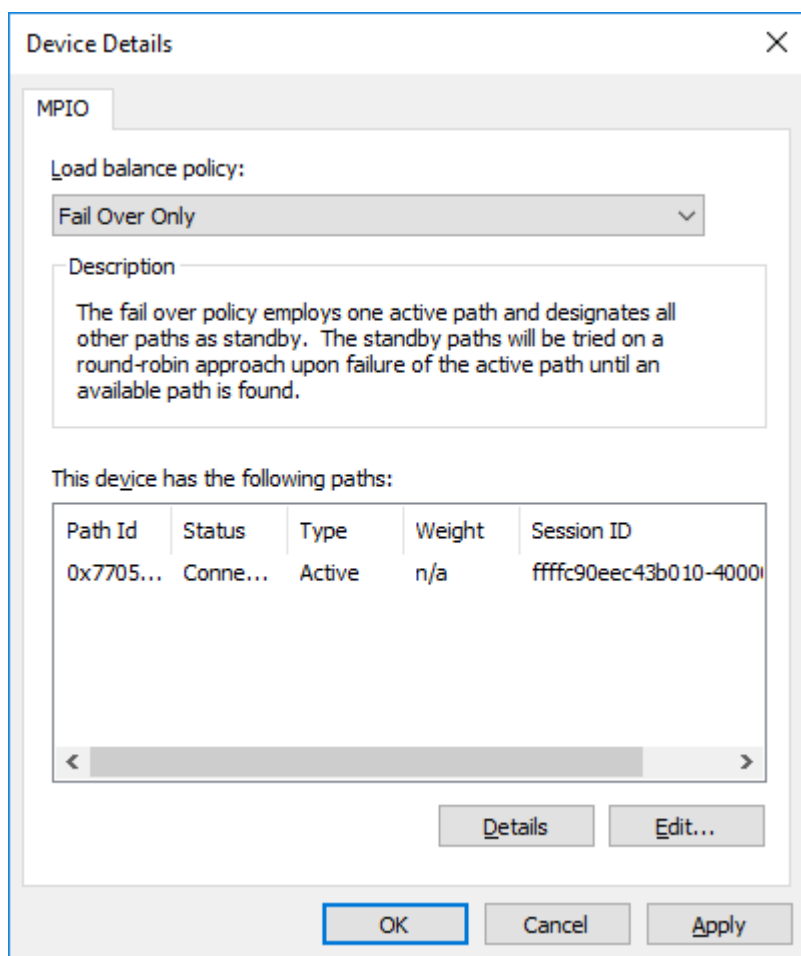
2. In the Devices dialog, click MPIO



3. Select the appropriate load balancing policy.



4. For the Witness target, set the load balance policy to Fail Over Only.

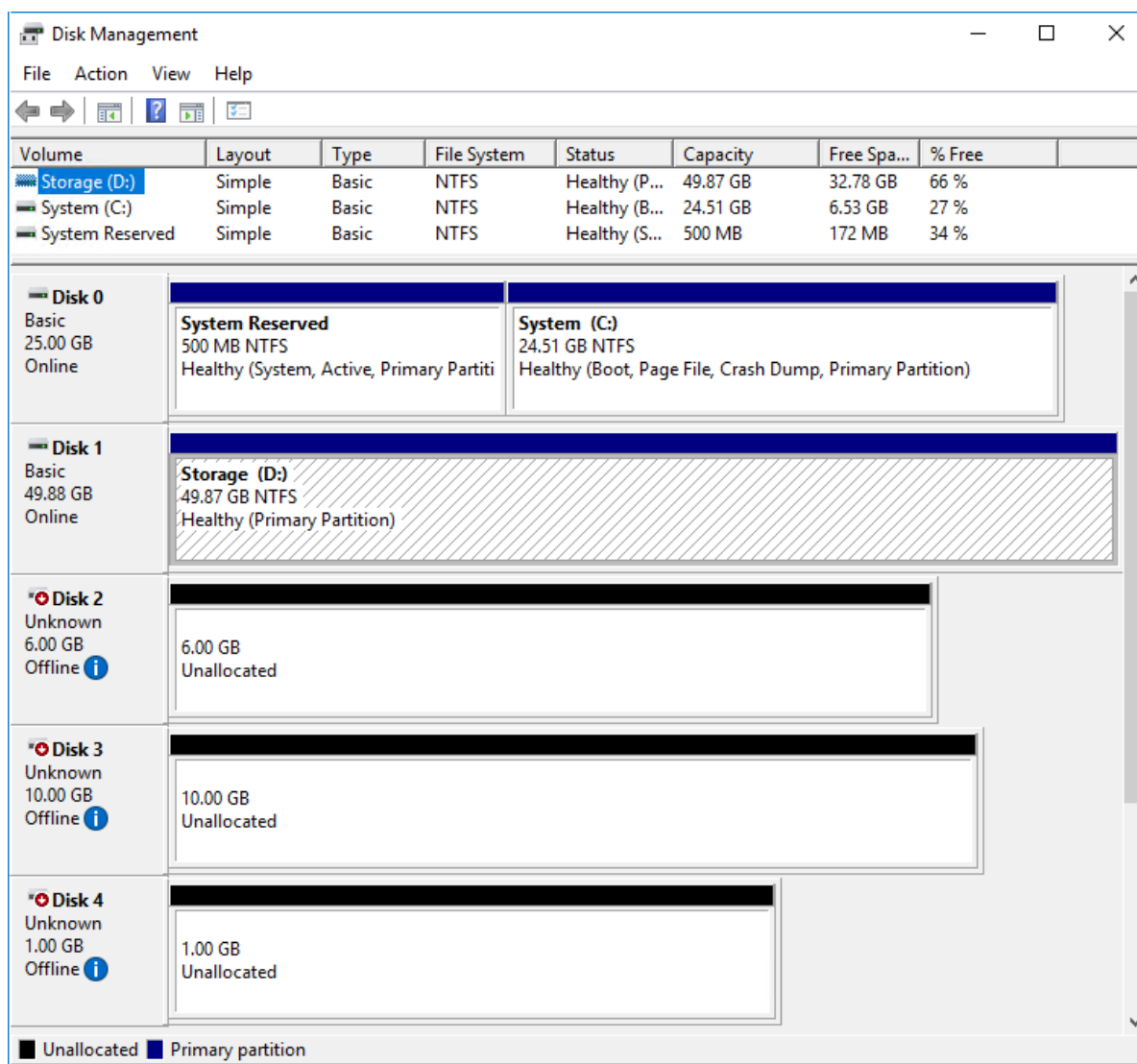


5. Repeat the steps 1-3 for configuring the MPIO policy for each remaining device on the current node and the partner node.

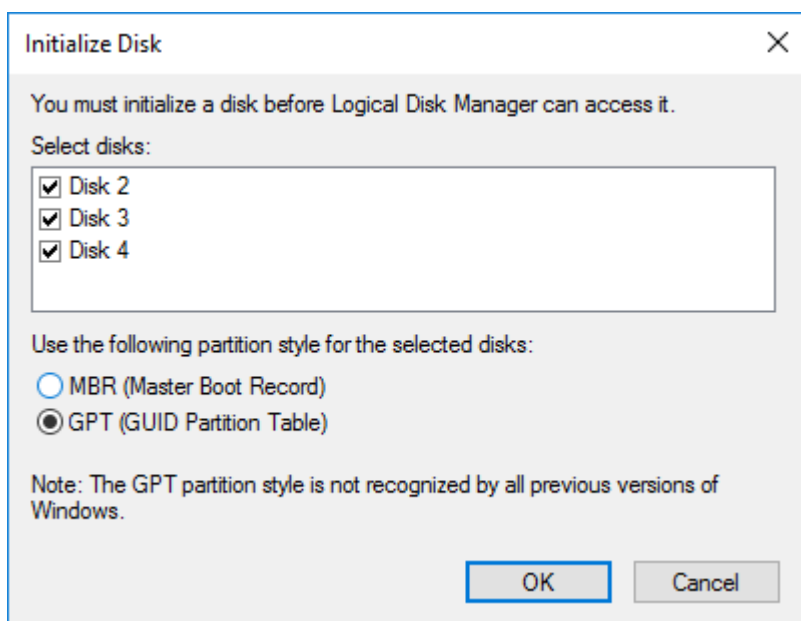
NOTE: In case the Failover Only MPIO policy is used, make sure to check that the local path (127.0.0.1) is set to Active, while the partner connection is set to Standby.

## Configuring Disks to Servers

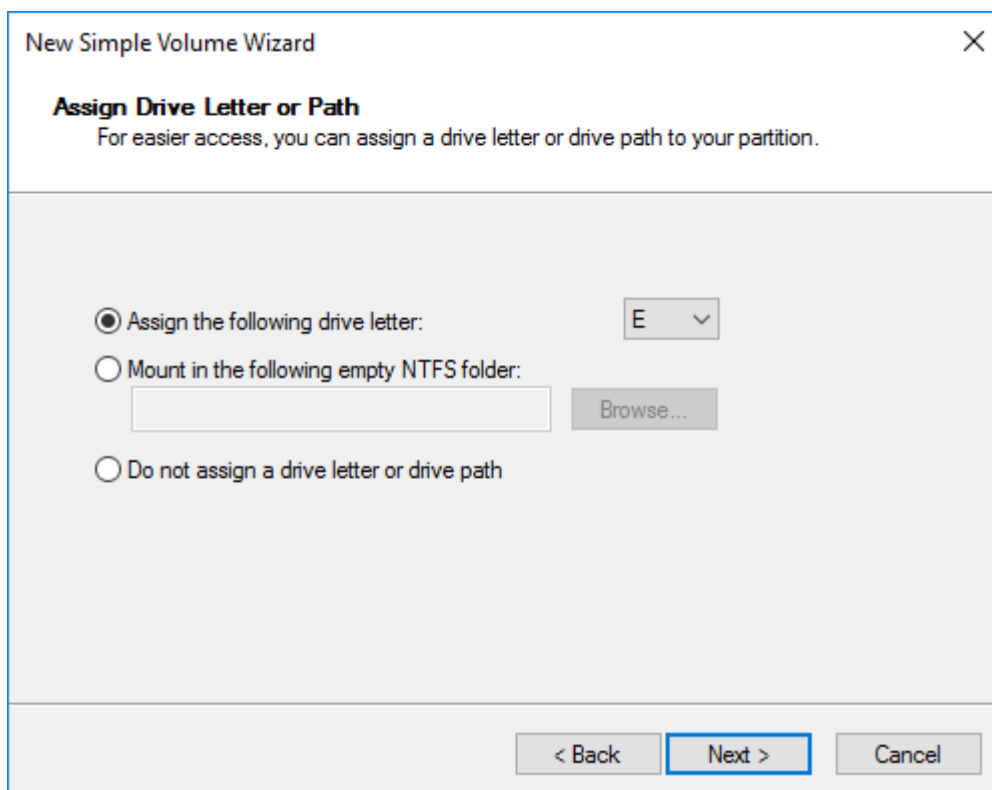
1. Open the Disk Management snap-in. The StarWind disks will appear as unallocated and offline.



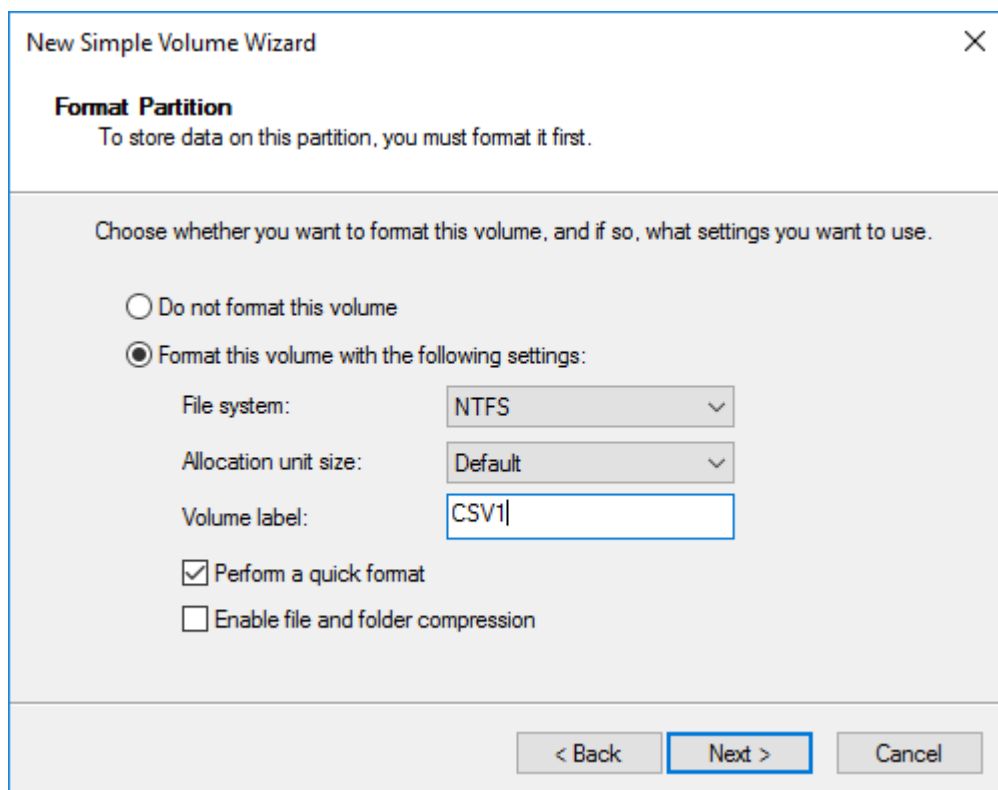
2. Bring the disks online by right-clicking on them and selecting the Online menu option.
3. Select the CSV disk (check the disk size to be sure) and right-click on it to initialize.
4. By default, the system will offer to initialize all non-initialized disks. Use the Select Disks area to choose the 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.



**New Simple Volume Wizard** [X]

**Format Partition**  
To store data on this partition, you must format it first.

Choose whether you want to format this volume, and if so, what settings you want to use.

☐ Do not format this volume

☒ Format this volume with the following settings:

File system: NTFS

Allocation unit size: Default

Volume label: CSV1

☒ Perform a quick format

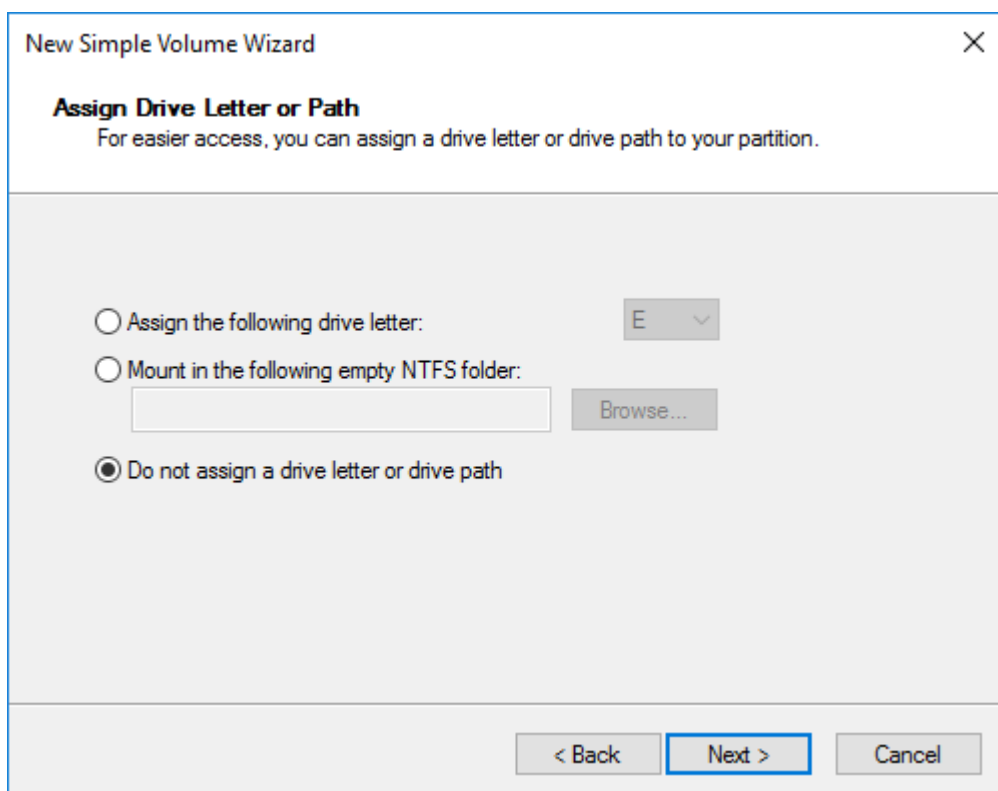
☐ Enable file and folder compression

< Back   **Next >**   Cancel

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.





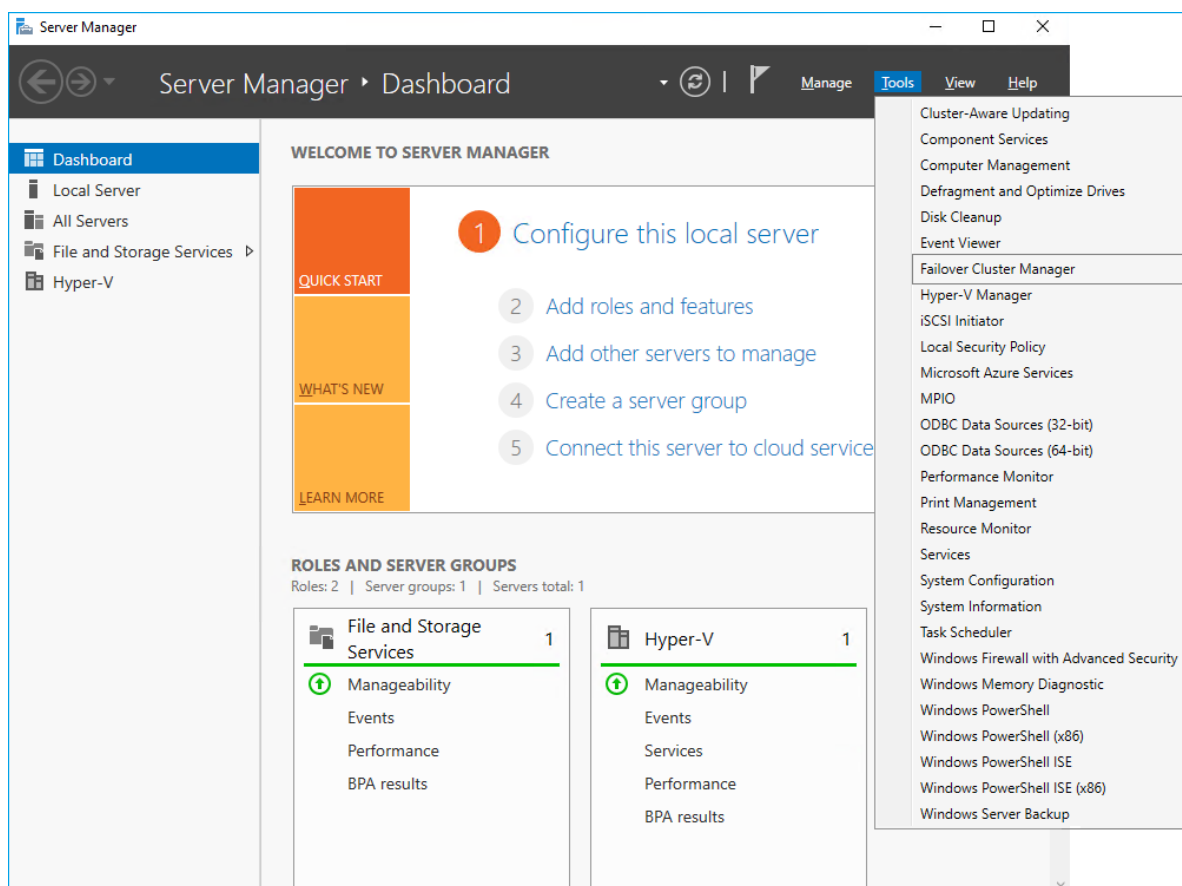
11. On the partner node, open the Disk Management snap-in. All StarWind disks will appear offline. If the status is different from the one shown below, click Action->Refresh in the top menu to update the information about the disks.

12. Repeat step 2 to bring all the remaining StarWind disks online.

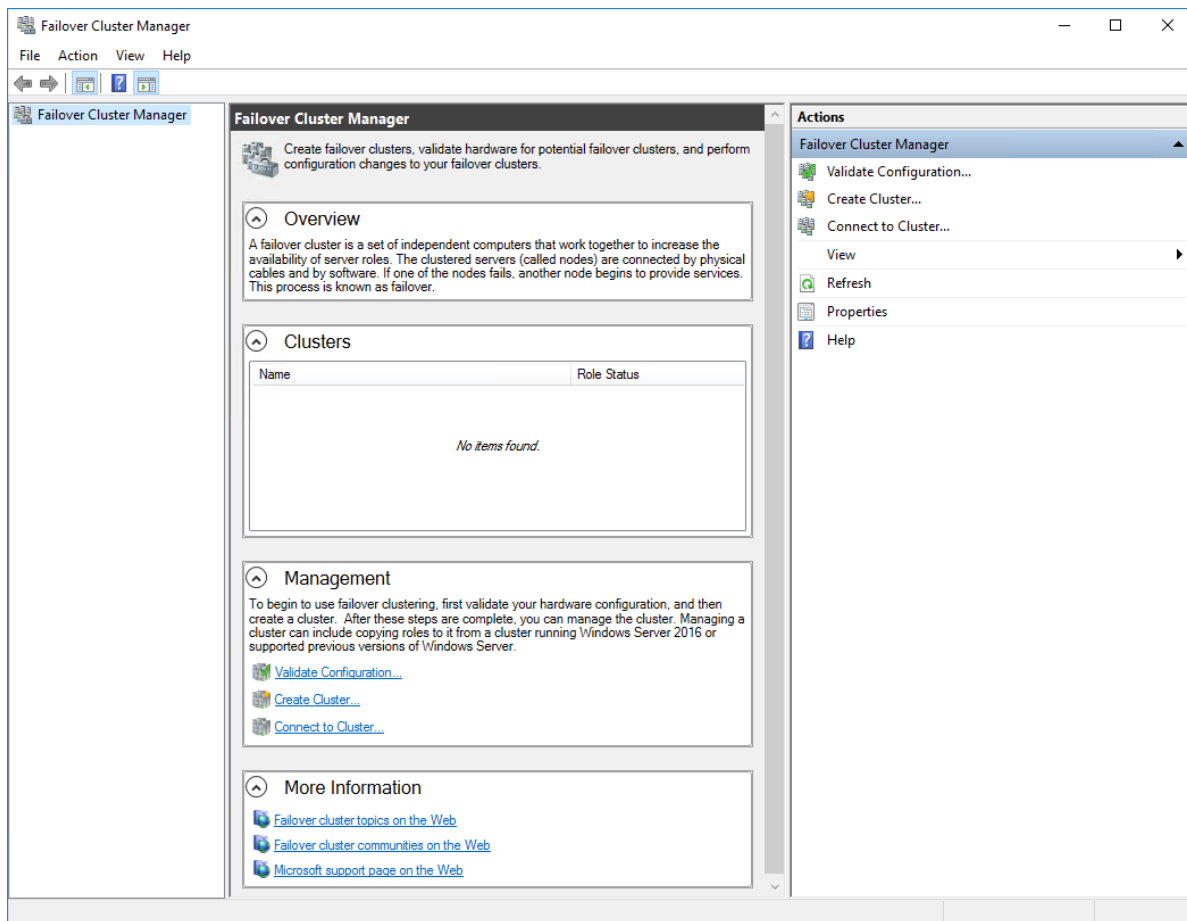
## Creating A Failover Cluster In Windows Server

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

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.

**Create Cluster Wizard**

**Select Servers**

Before You Begin  
**Select Servers**  
 Validation Warning  
 Access Point for Administering the Cluster  
 Confirmation  
 Creating New Cluster  
 Summary

Add the names of all the servers that you want to have in the cluster. You must add at least one server.

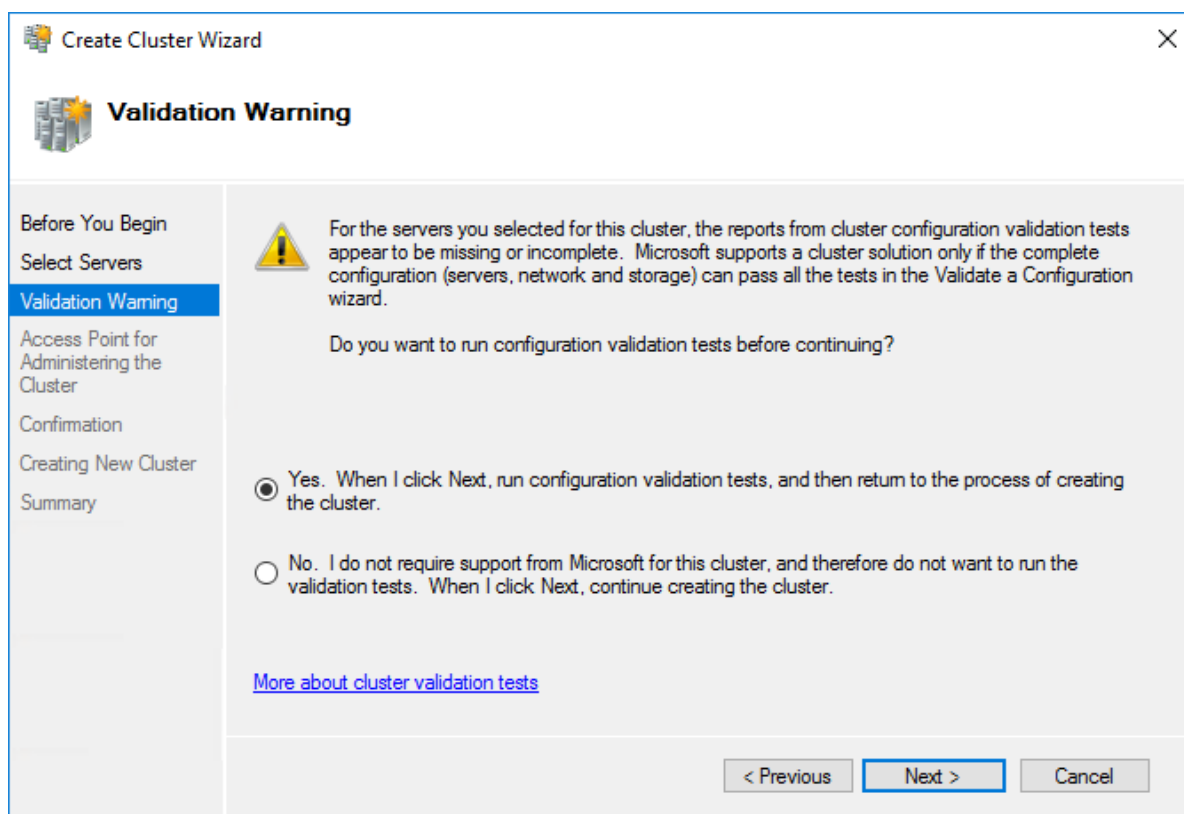
Enter server name:

Selected servers:

- SW1.starwind.local
- SW2.starwind.local
- SW3.starwind.local


< Previous **Next >** Cancel


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



#### 5. Specify 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.



**Create Cluster Wizard**
✕


**Access Point for Administering the Cluster**

Before You Begin  
Select Servers  
**Access Point for Administering the Cluster**  
Confirmation  
Creating New Cluster  
Summary

Type the name you want to use when administering the cluster.

Cluster Name:

 The NetBIOS name is limited to 15 characters. One or more IPv4 addresses could not be configured automatically. For each network to be used, make sure the network is selected, and then type an address.

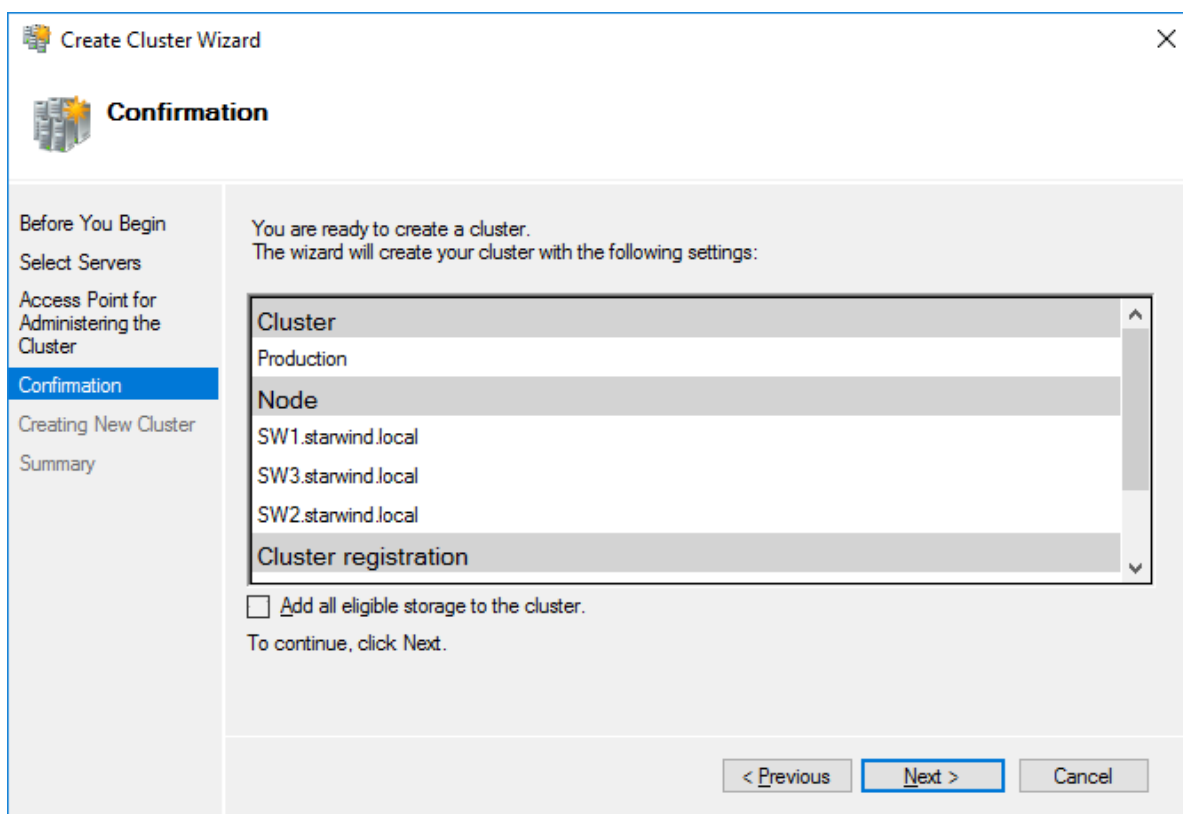
	Networks	Address
<input checked="" type="checkbox"/>	192.168.12.0/24	192.168.12.100

< Previous

Next >

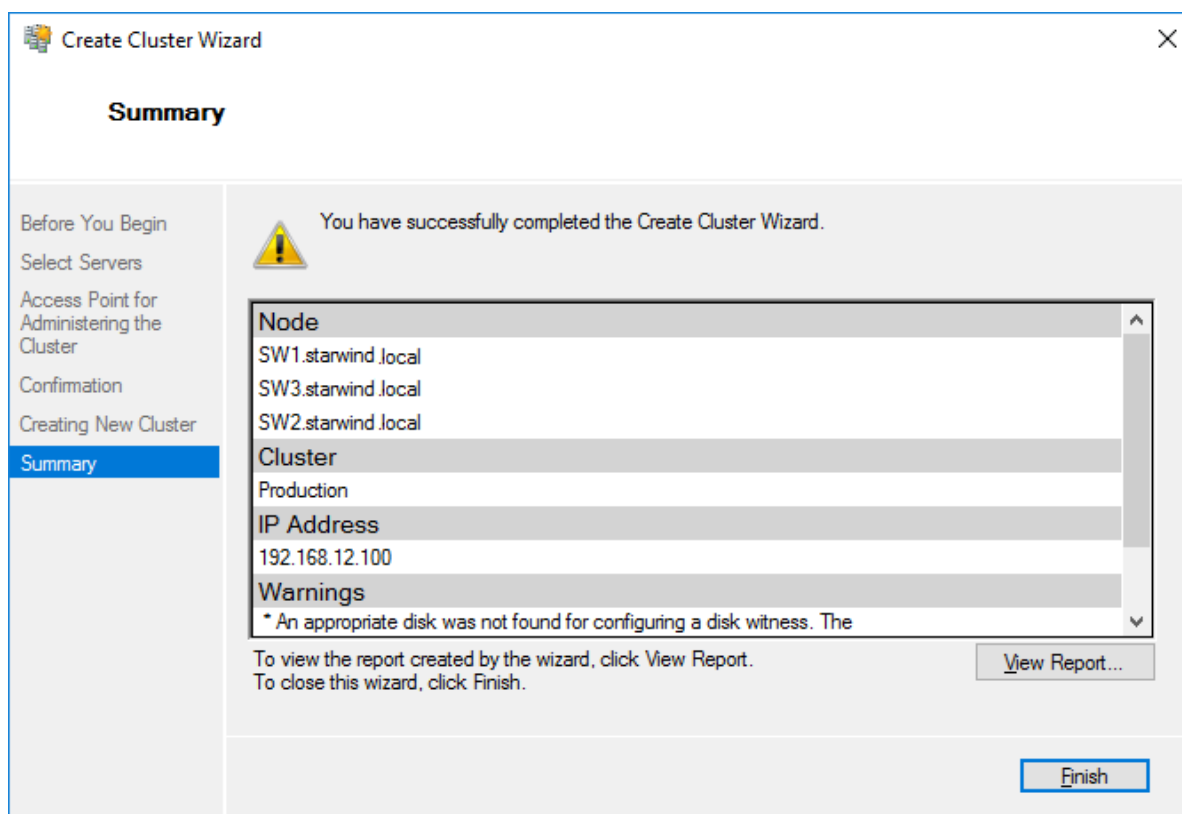
Cancel

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.

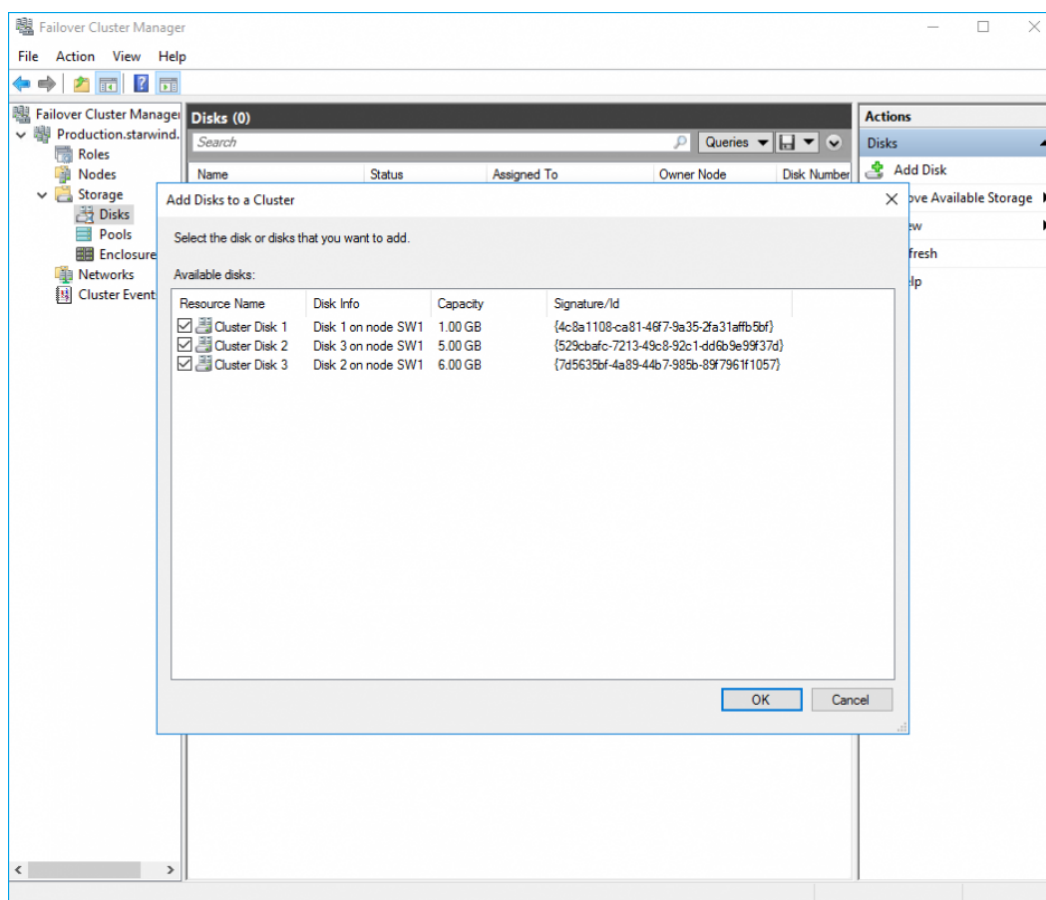
7. The process of the cluster creation starts. Upon the completion, the system displays the summary with the detailed information. Click Finish to close the wizard.



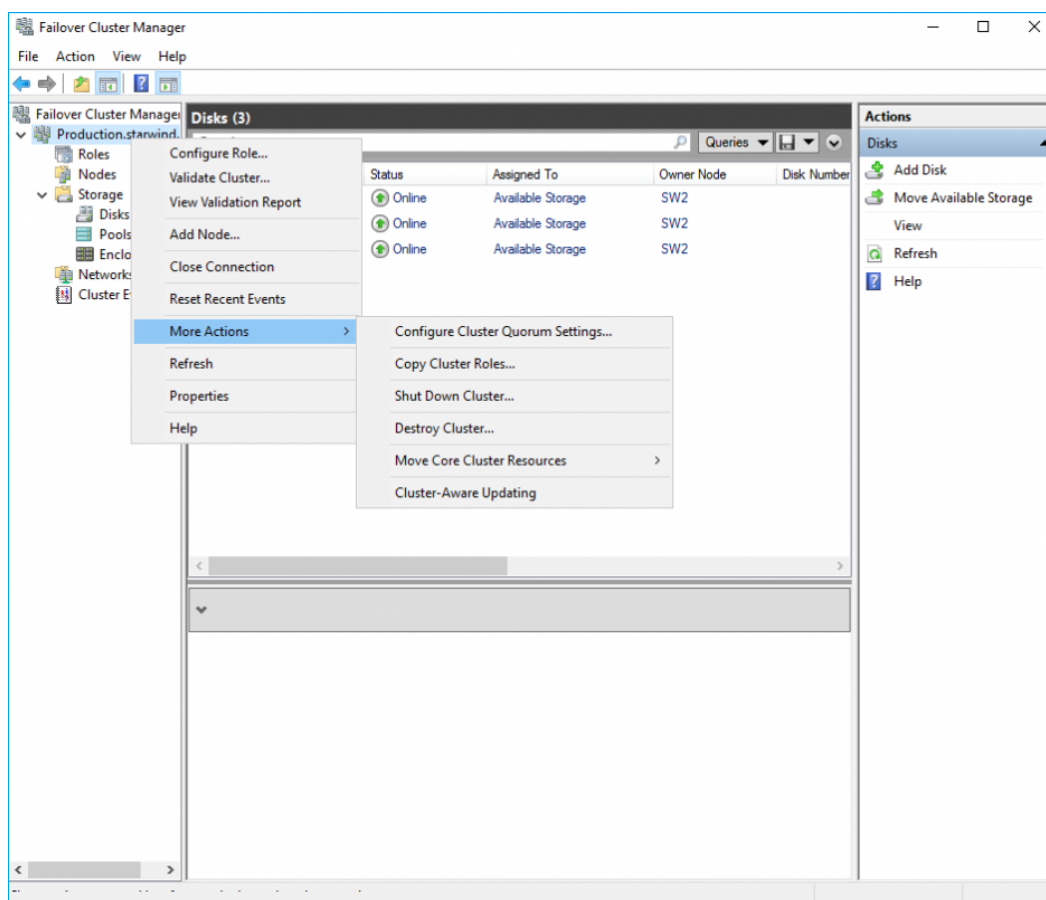
## Adding Storage to the Cluster

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.

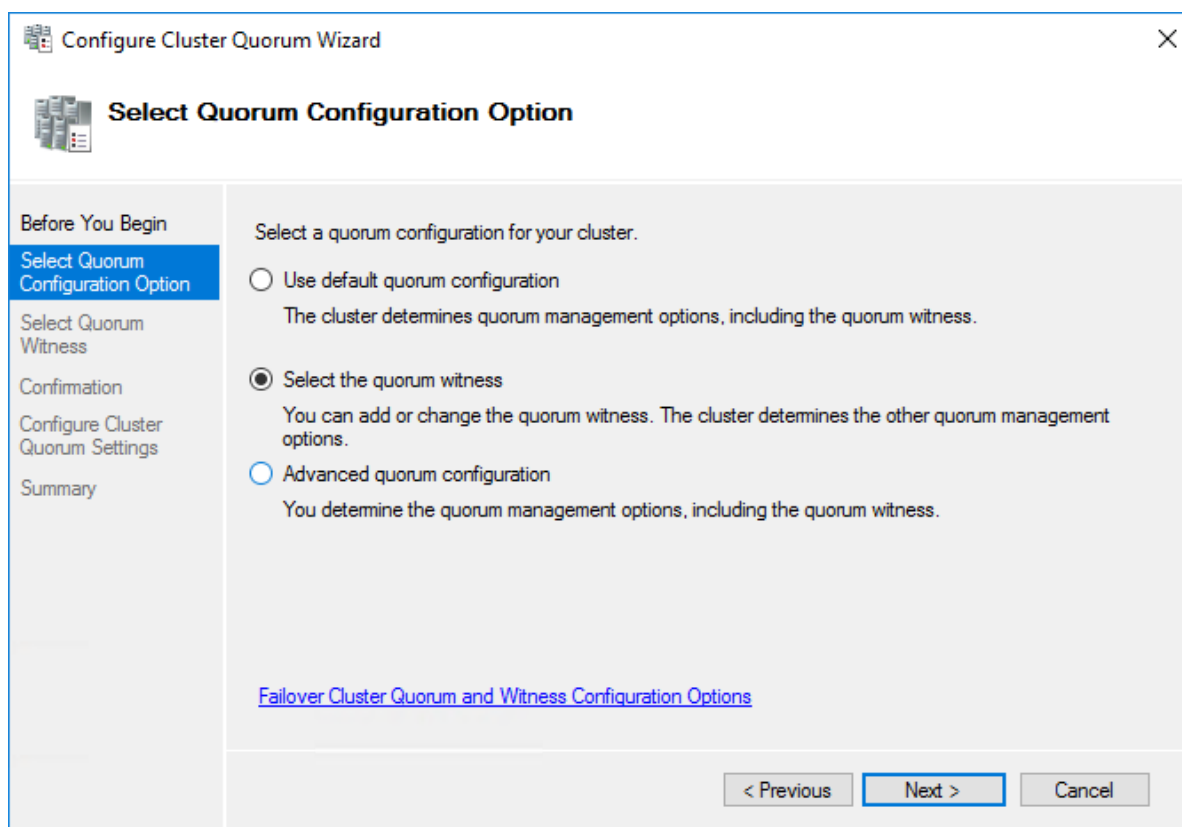




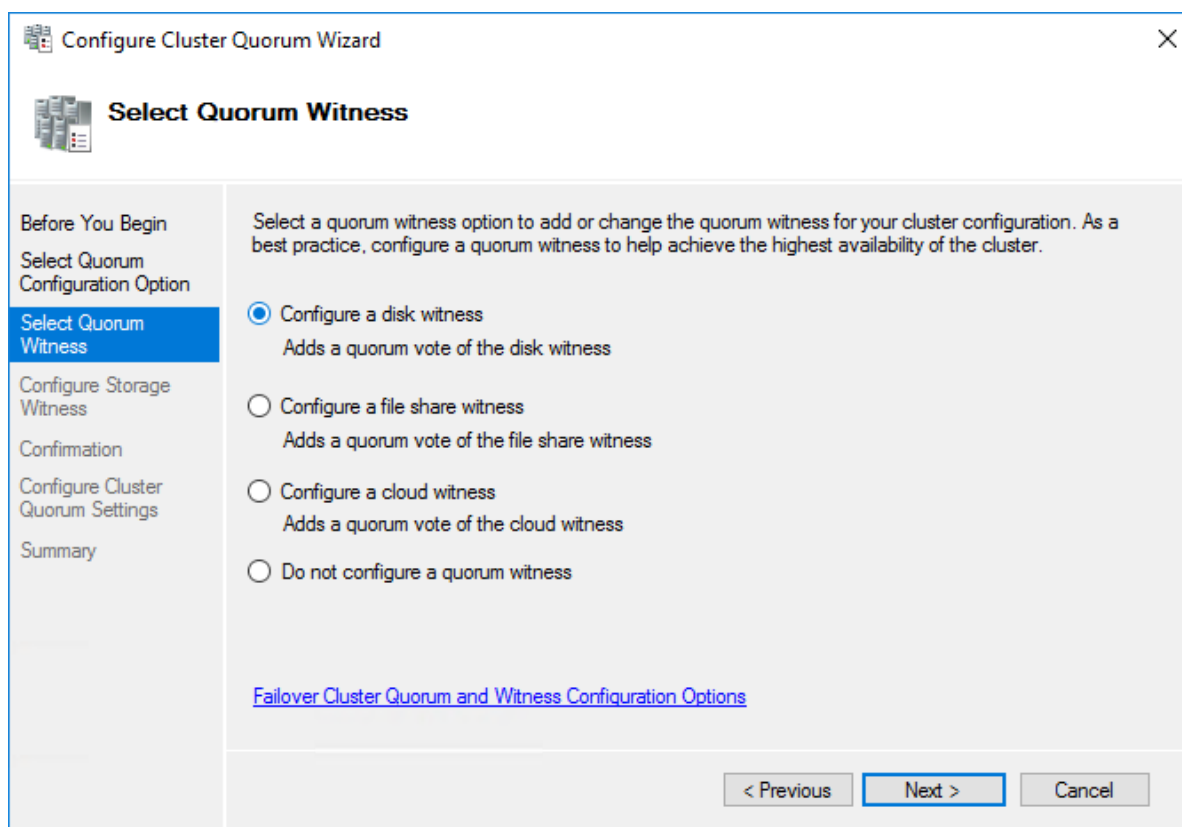
2. To configure the cluster witness disk, right-click on Cluster and proceed to More Actions -> Configure Cluster Quorum Settings.



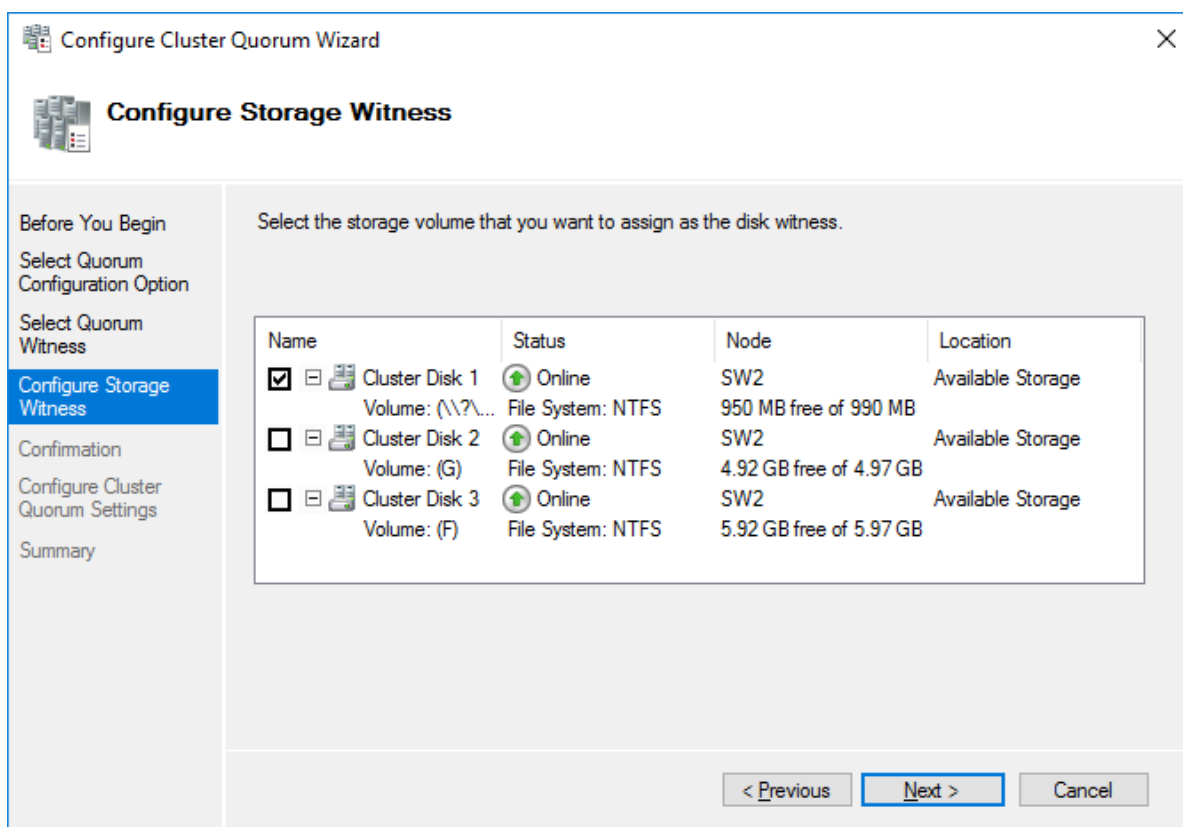
3. Follow the wizard and choose the Select the quorum witness option. Click Next.



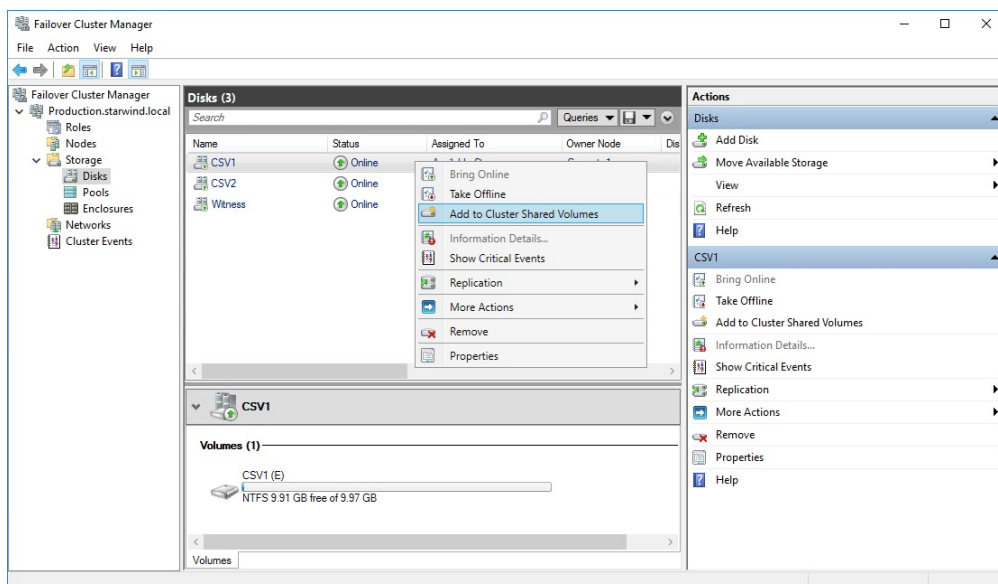
4. Select Configure a disk witness. Click Next.



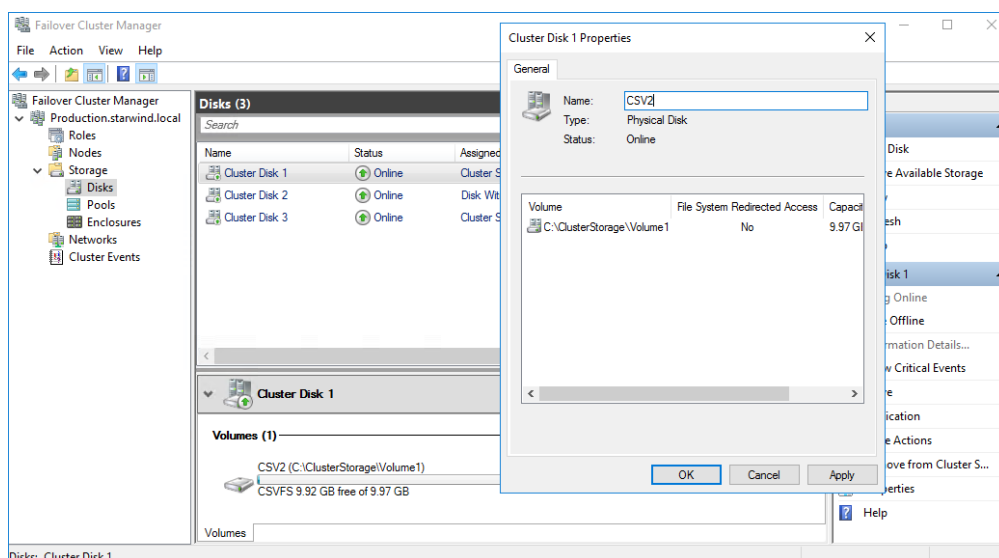
5. Select the Witness disk to be assigned as the cluster witness disk. Click Next and press Finish to complete the operation.



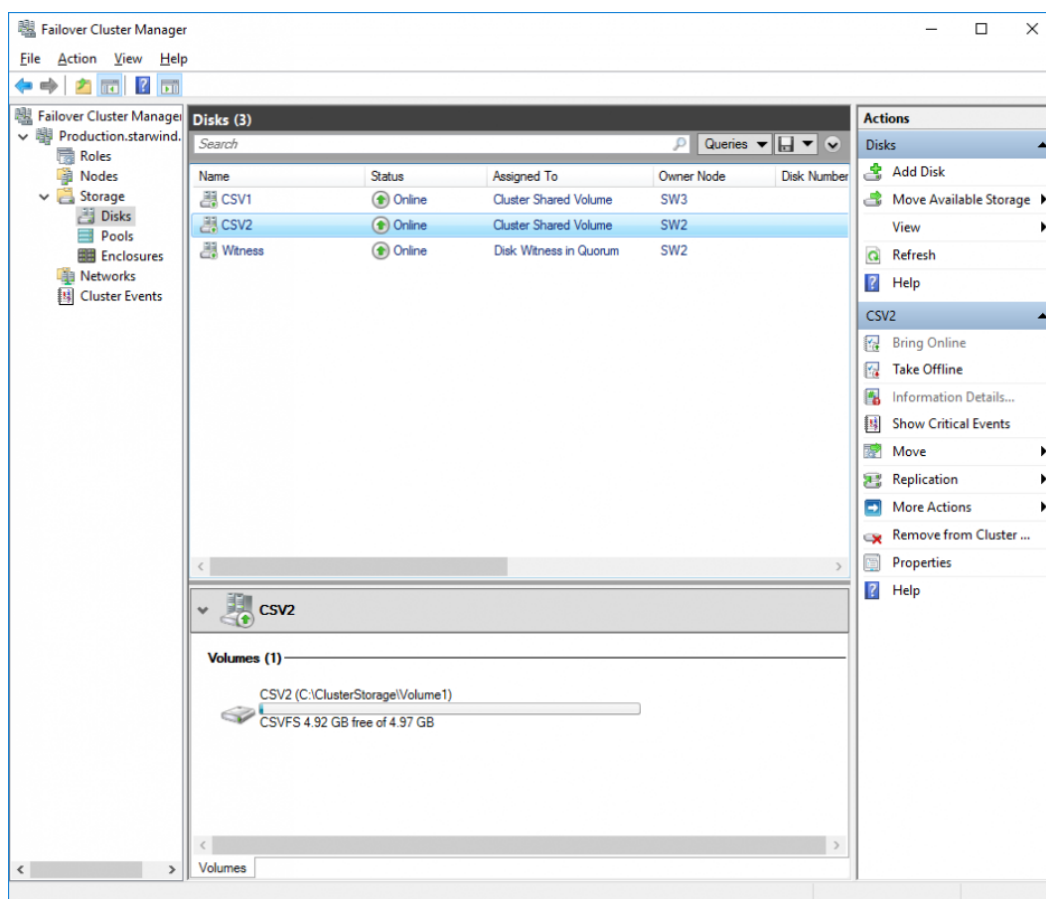
6. In Failover Cluster Manager, right-click the disk and select Add to Cluster Shared Volumes.



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.



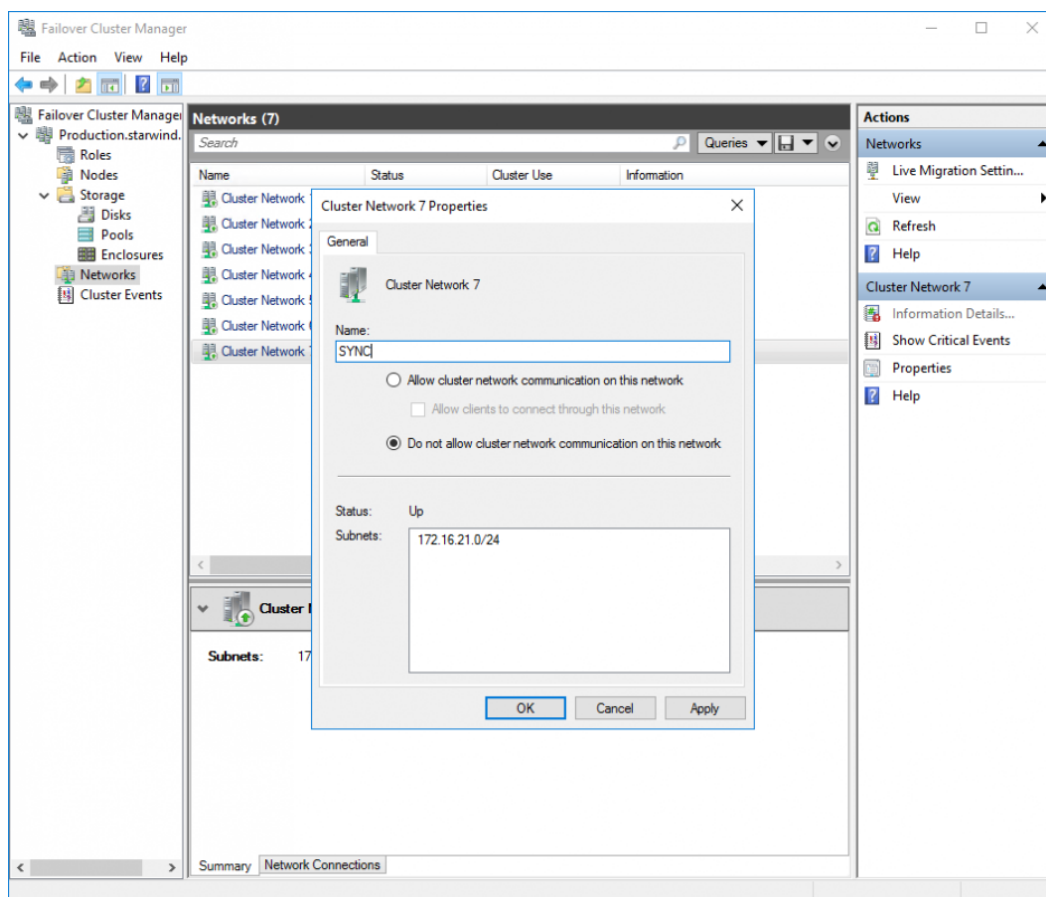
## Configuring Cluster Network Preferences

1. In the Networks section of the Failover Cluster Manager, right-click on the network

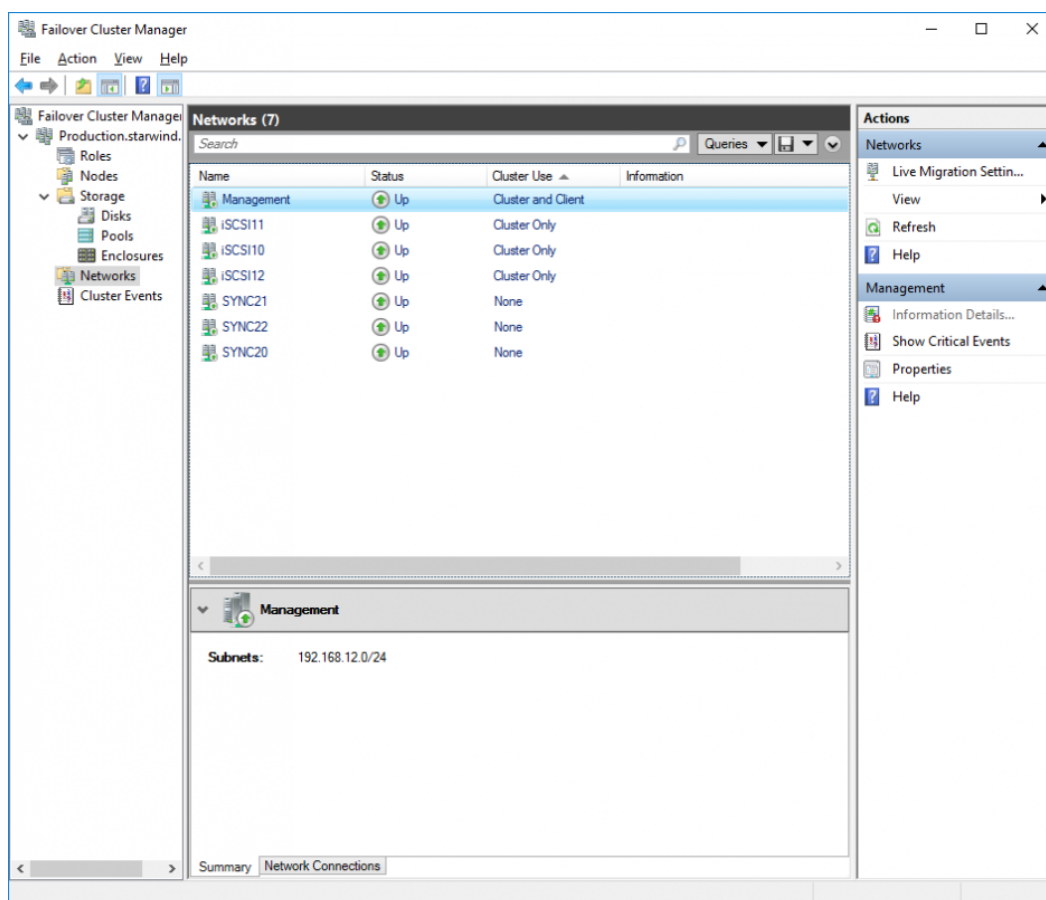
from the list. If required, set its new name to identify the network by its subnet. Apply the change and press OK.

NOTE: Please double-check that cluster communication is configured with redundant networks:

<https://docs.microsoft.com/en-us/windows-server/failover-clustering/smb-multichannel>

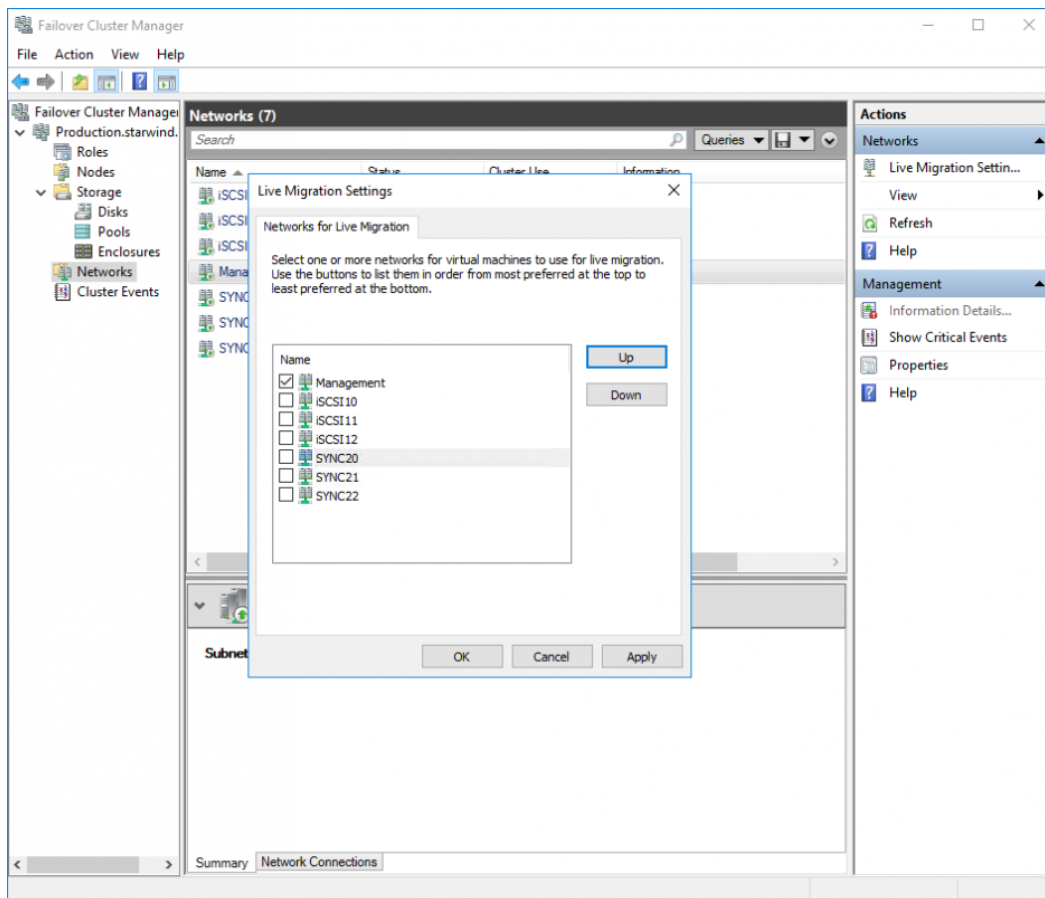


2. Rename other networks as described above, if required.



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.





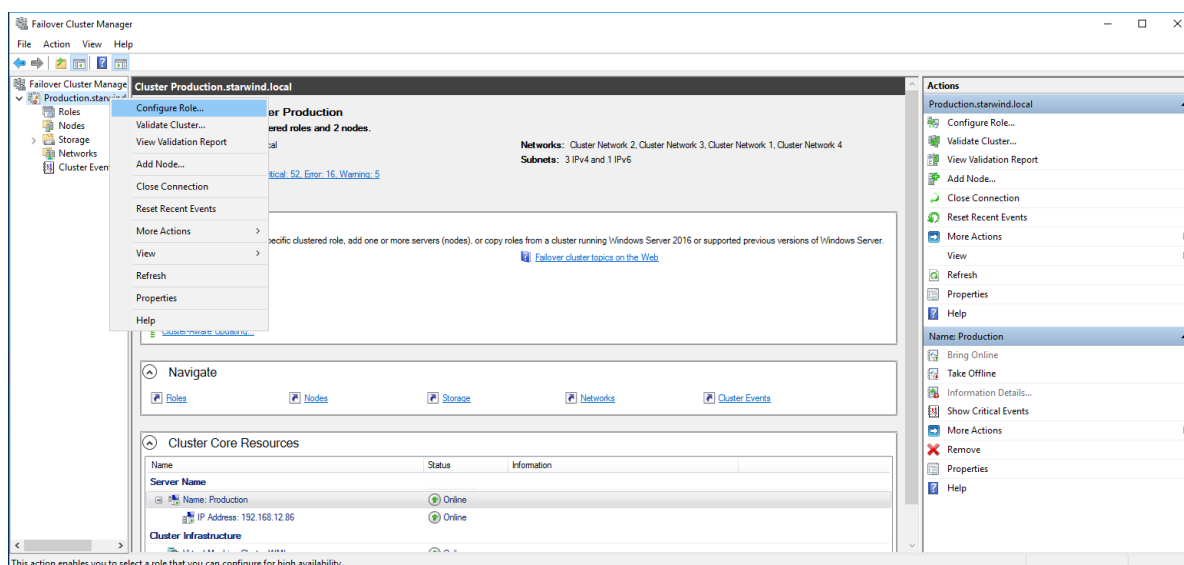
The cluster configuration is completed and it is ready for virtual machines deployment. Select Roles and in the Action tab, click Virtual Machines -> New Virtual Machine. Complete the wizard.

## Configuring File Shares

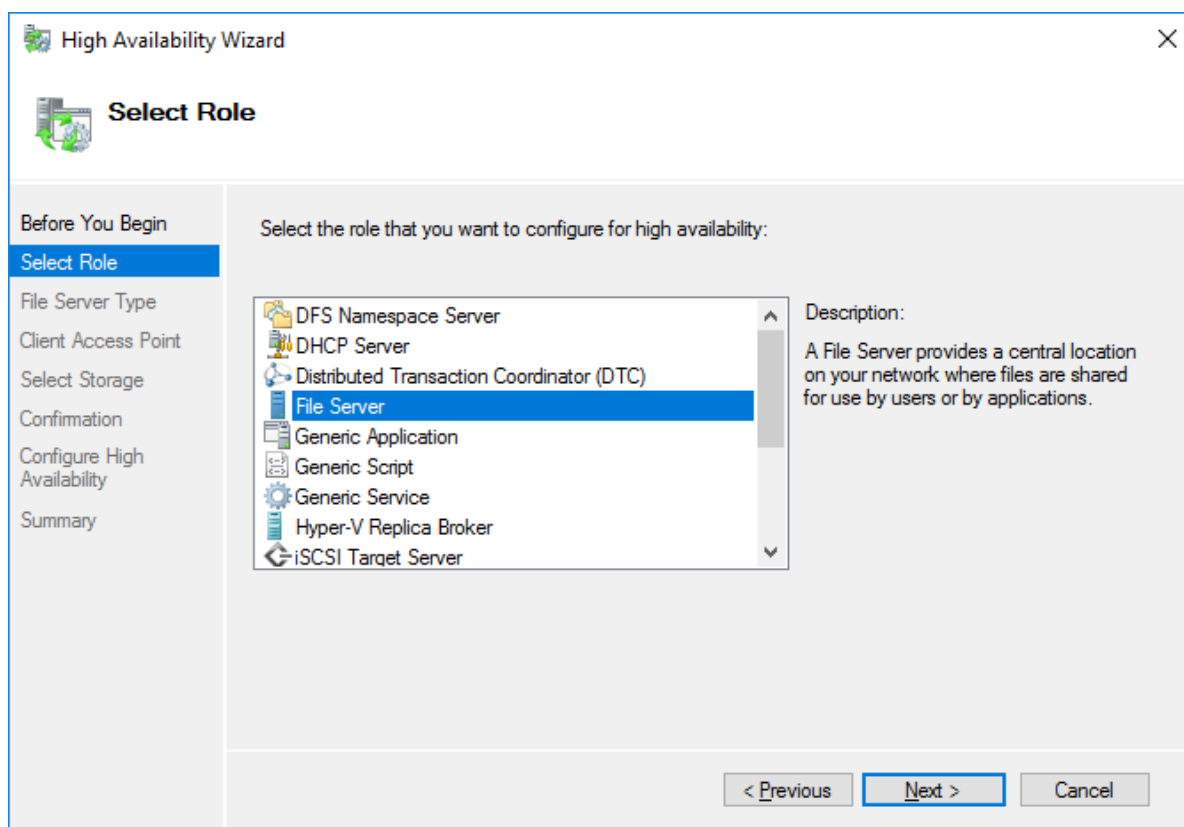
Please follow the steps below if file shares should be configured on cluster nodes.

## Configuring The Scale-Out File Server Role

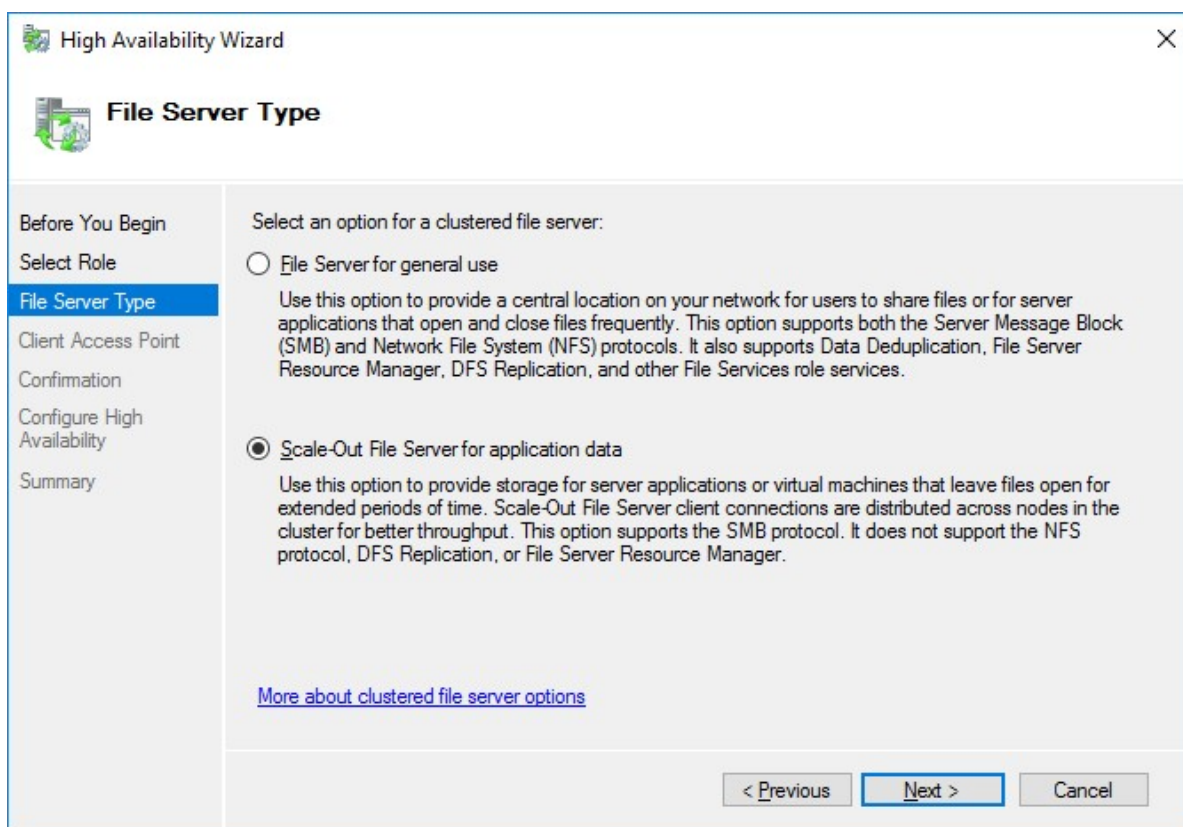
1. To configure the Scale-Out File Server Role, open Failover Cluster Manager.
2. Right-click the cluster name, then click Configure Role and click Next to continue.



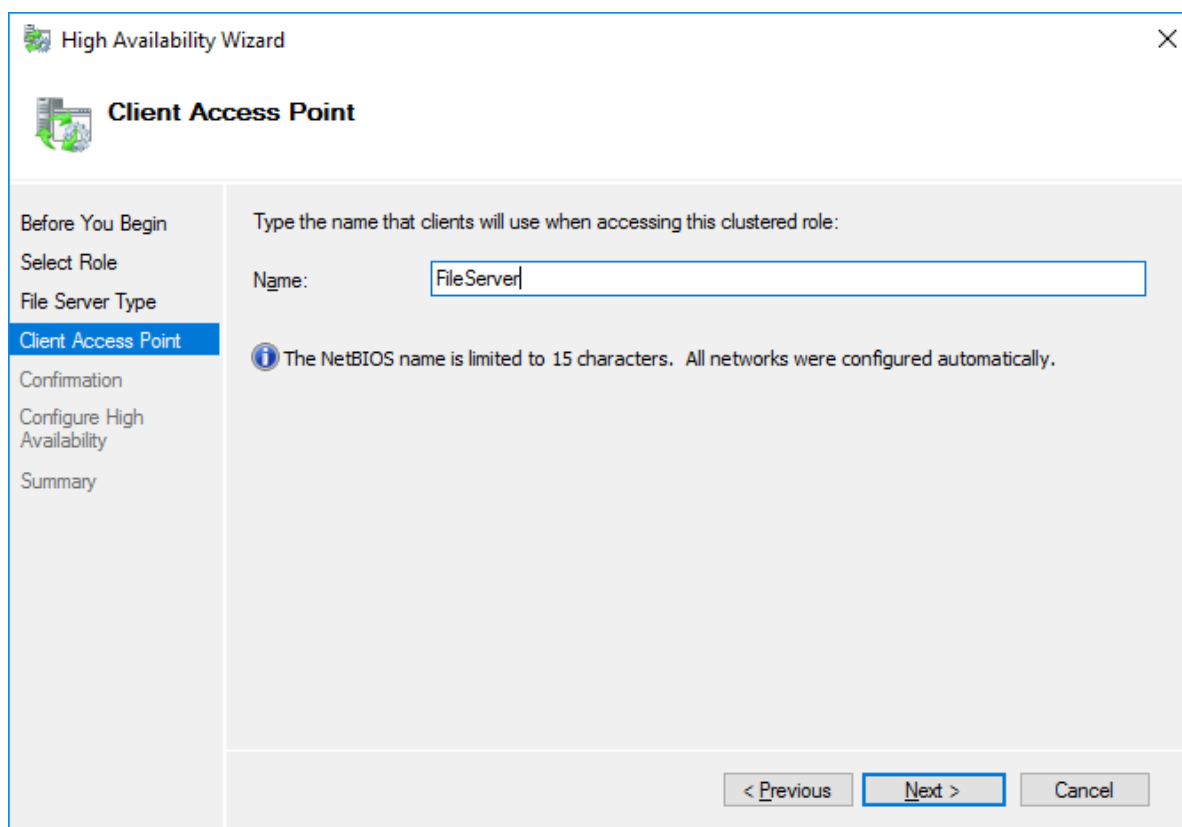
3. Select the File Server item from the list in High Availability Wizard and click Next to continue.



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



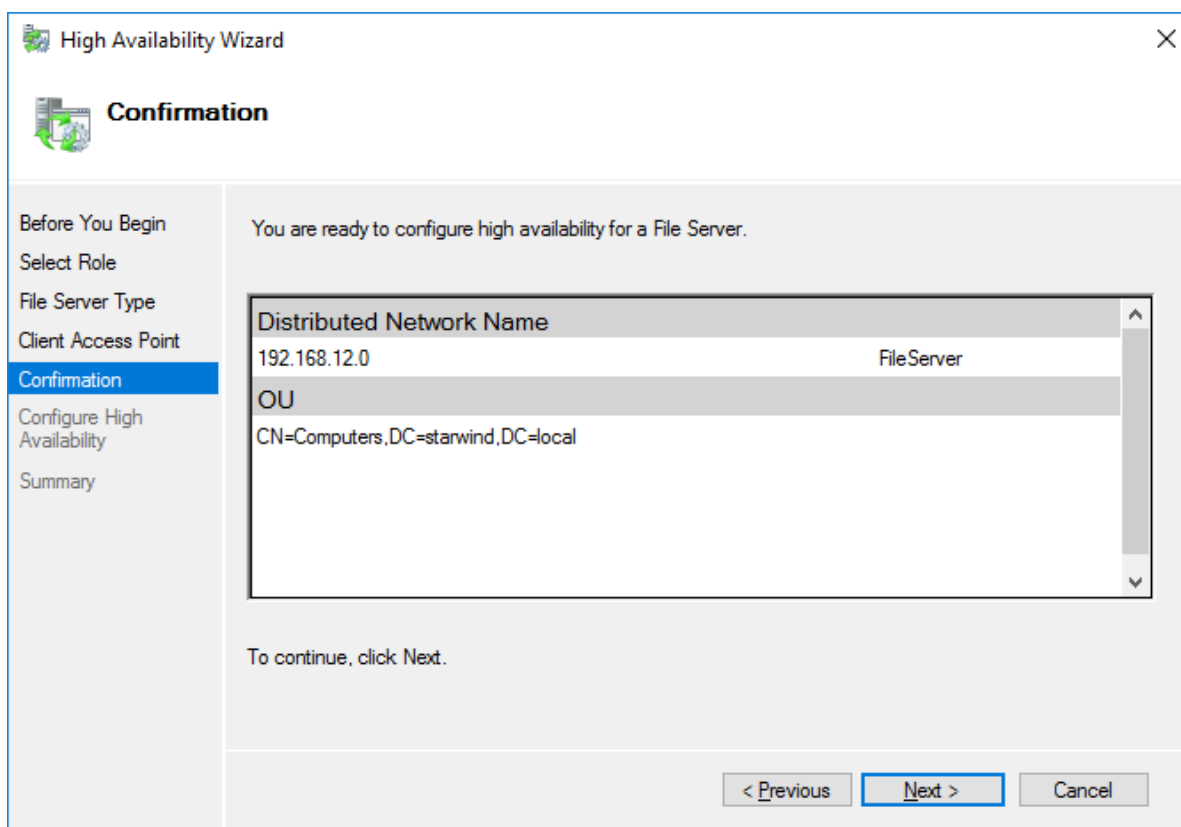
5. On the Client Access Point page, in the Name text field, type the NetBIOS name that will be used to access a Scale-Out File Server.



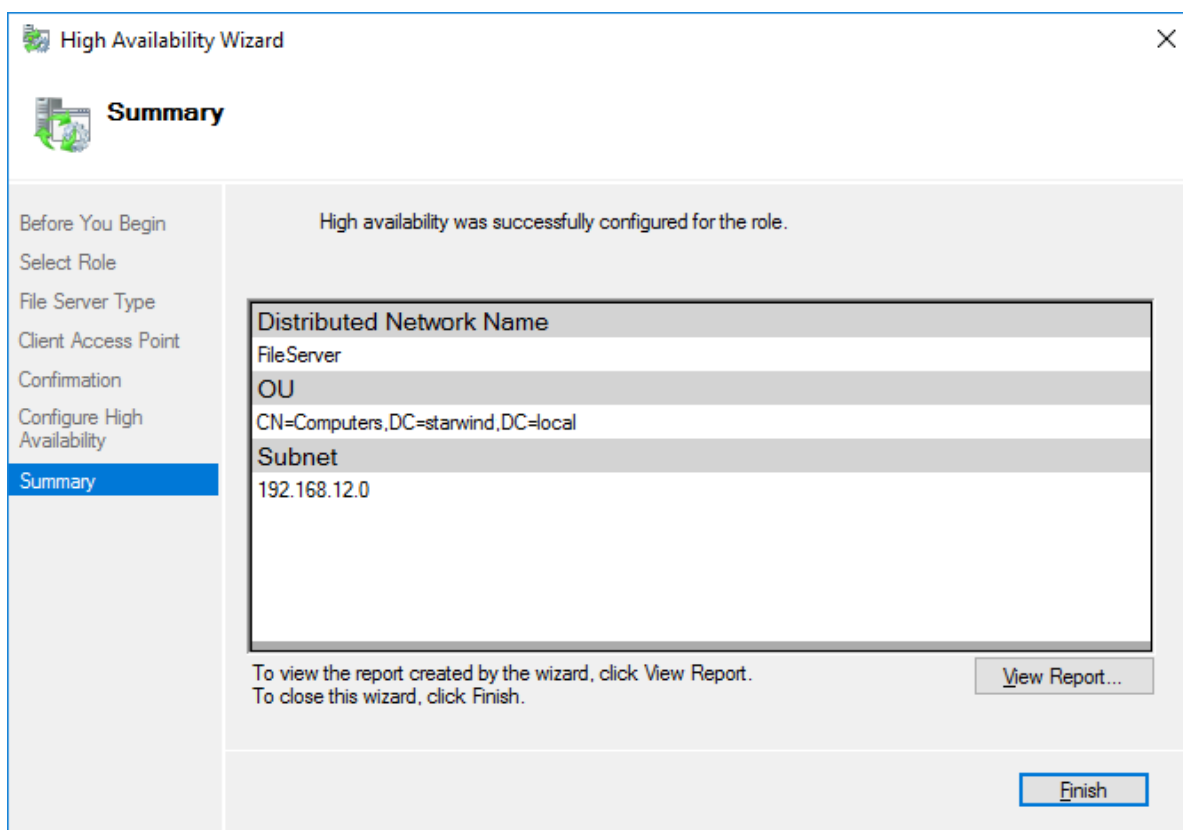
The image shows a screenshot of the 'High Availability Wizard' window, specifically the 'Client Access Point' step. The window has a title bar with the text 'High Availability Wizard' and a close button. Below the title bar is a header area with a server icon and the text 'Client Access Point'. On the left side, there is a vertical navigation pane with the following steps: 'Before You Begin', 'Select Role', 'File Server Type', 'Client Access Point' (which is highlighted with a blue background), 'Confirmation', 'Configure High Availability', and 'Summary'. The main area of the wizard contains the text 'Type the name that clients will use when accessing this clustered role:' followed by a text input field labeled 'Name:' containing the text 'FileServer'. Below the input field is an information icon (i) and a message: 'The NetBIOS name is limited to 15 characters. All networks were configured automatically.' At the bottom right of the main area, there are three buttons: '< Previous', 'Next >' (which is highlighted with a blue border), and 'Cancel'.

Click Next to continue.

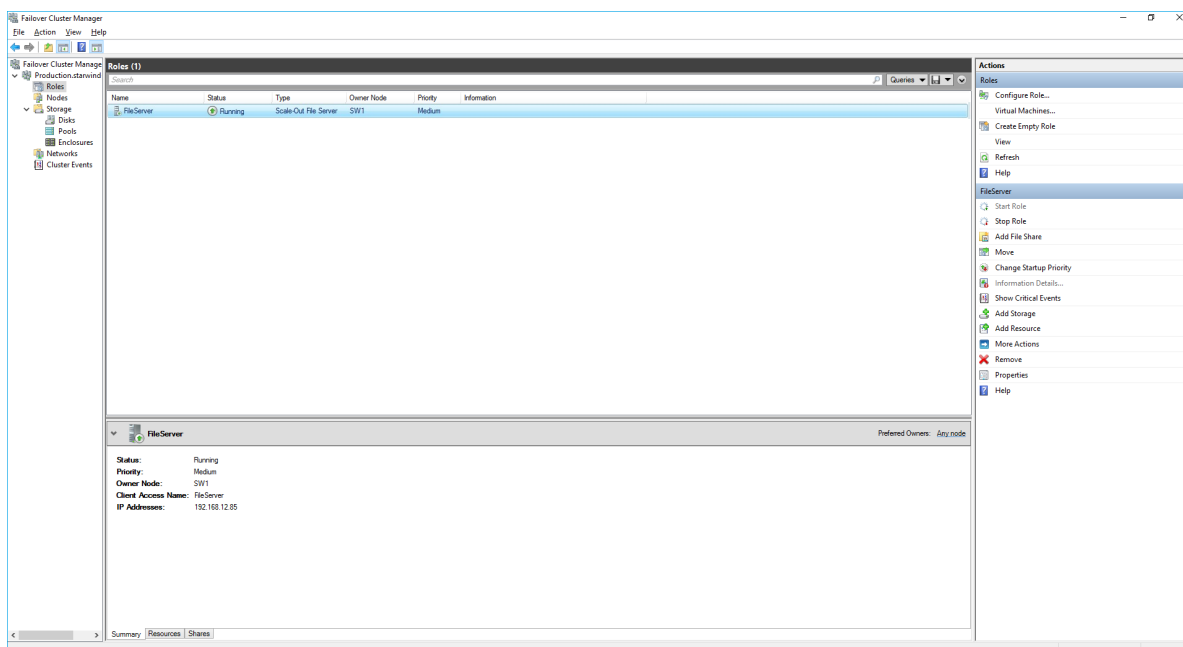
6. Check whether the specified information is correct. Click Next to continue or Previous to change the settings.



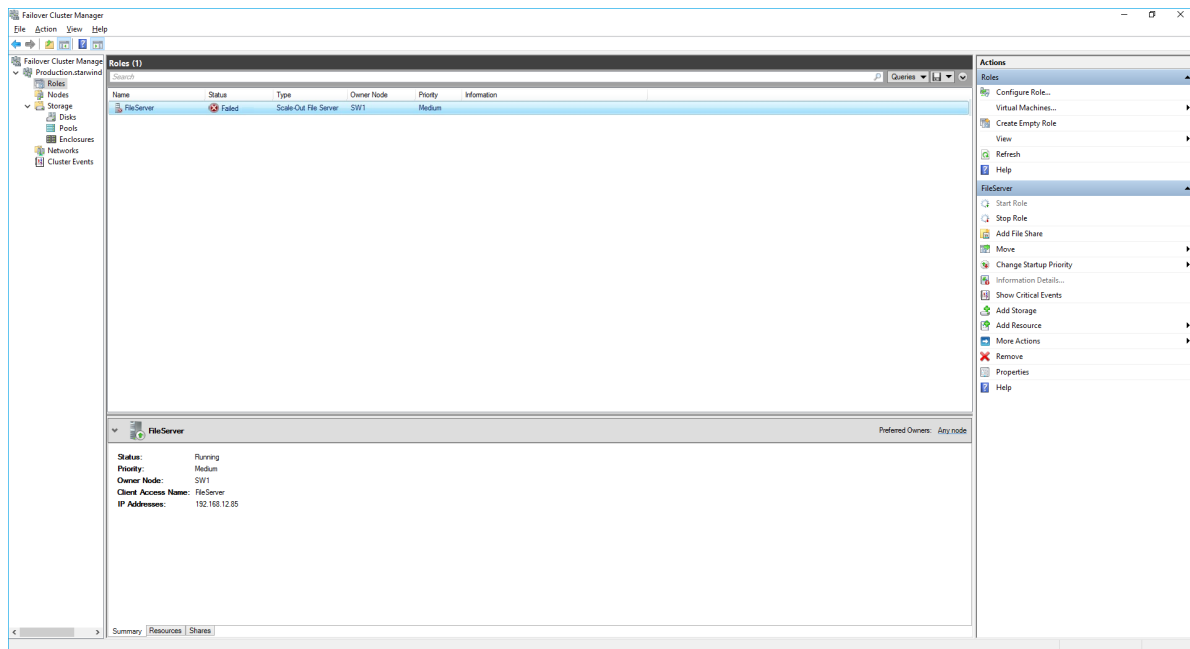
7. Once the installation is finished successfully, the Wizard should now look like the screenshot below.  
Click Finish to close the Wizard.



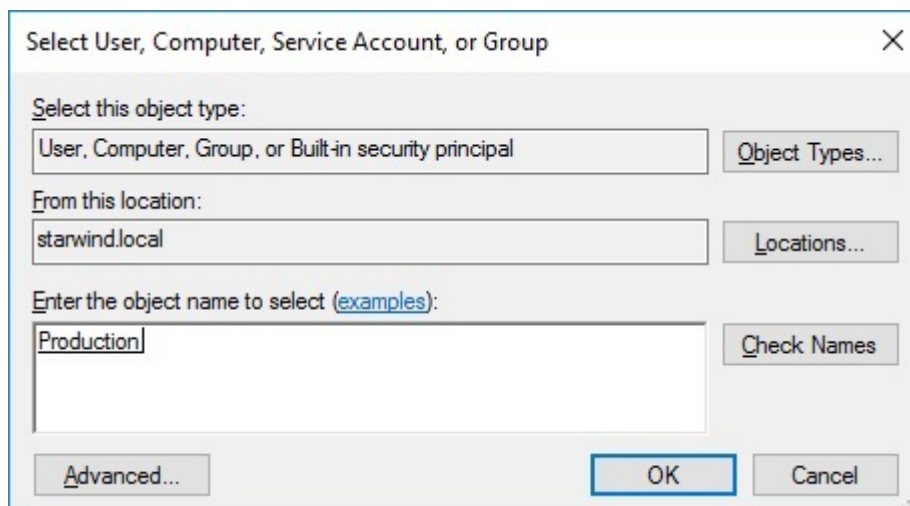
8. The newly created role should now look like the screenshot below.



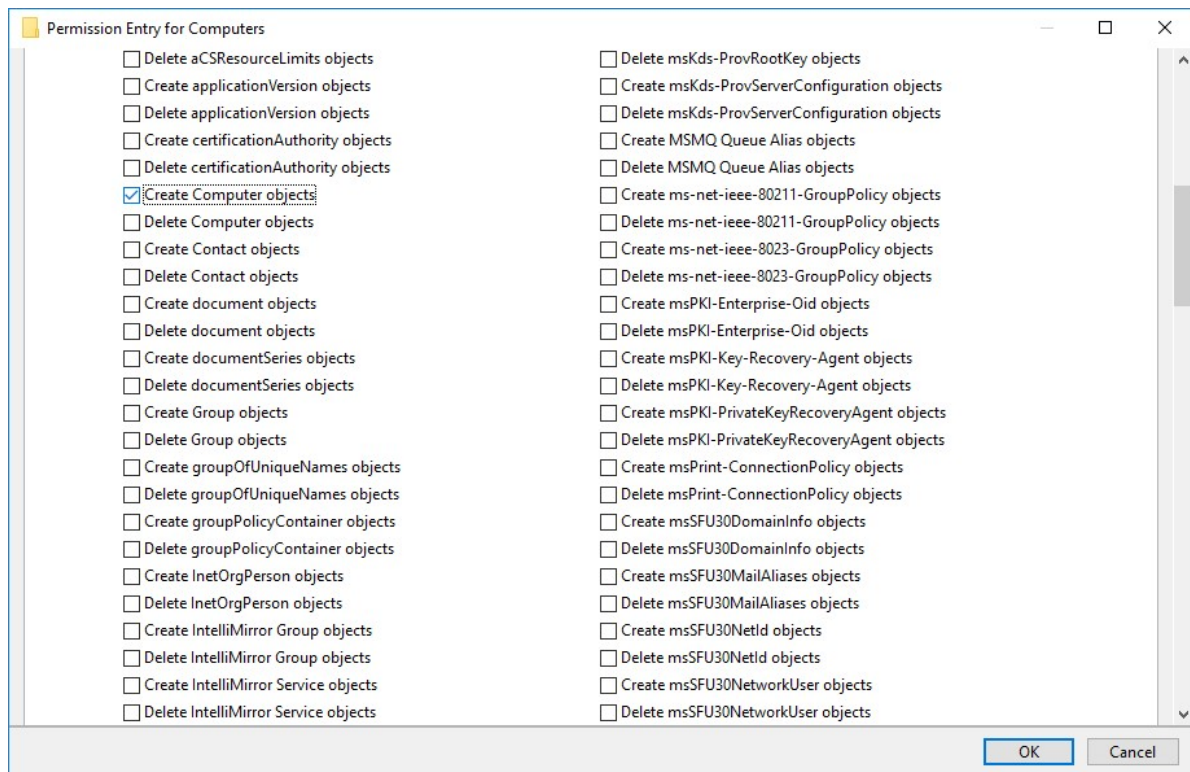
NOTE: If the role status is Failed and it is unable to Start, please, follow the next steps:



- 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,



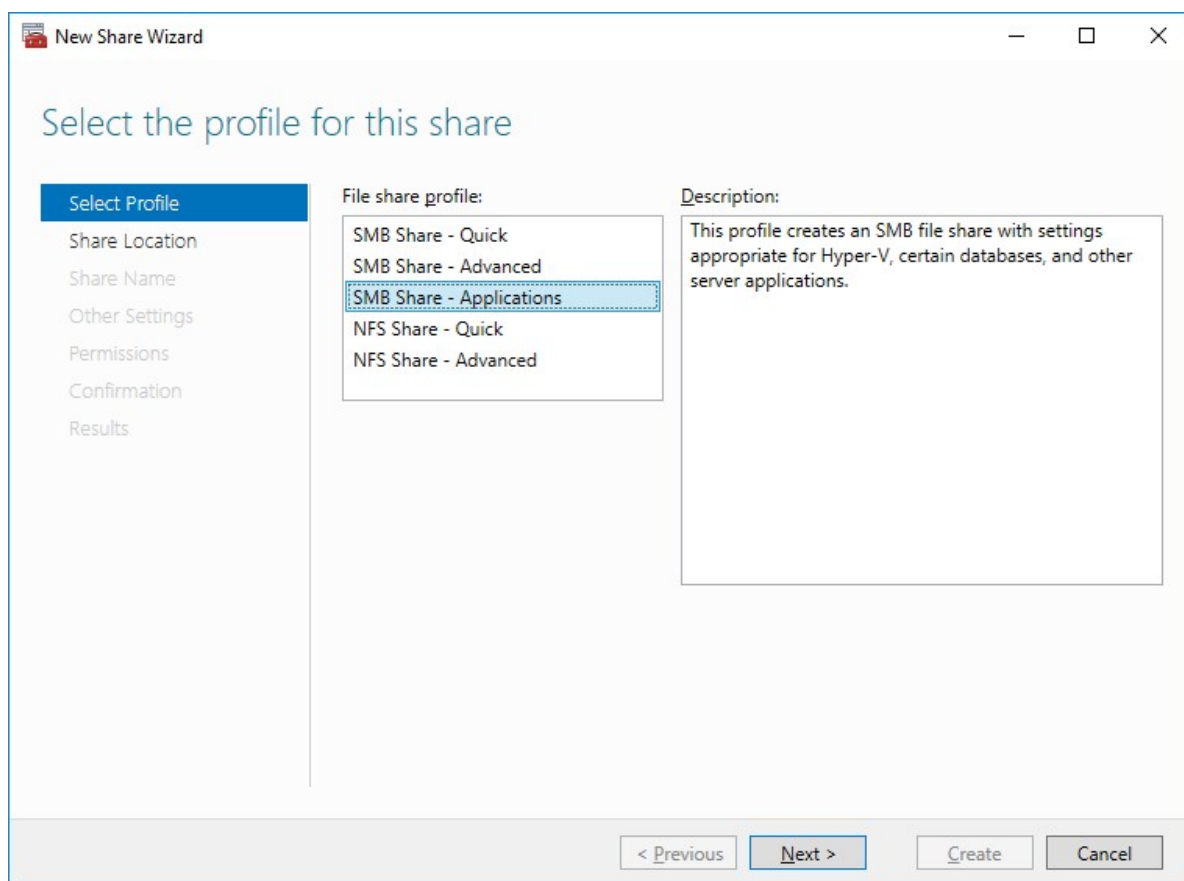
- click OK on all opened windows to confirm the changes
- open Failover Cluster Manager, right-click SOFS role and click Start Role

## 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.

New Share Wizard

Select the server and path for this share

Select Profile

**Share Location**

Share Name

Other Settings

Permissions

Confirmation

Results

Server:

Server Name	Status	Cluster Role	Owner Node
FileServer	Online	Scale-Out File...	

Share location:

☒ Select by volume:

Volume	Free Space	Capacity	File System
C:\ClusterStorage\Volume1	5.92 GB	5.97 GB	CSVFS
C:\ClusterStorage\Volume2	9.91 GB	9.97 GB	CSVFS

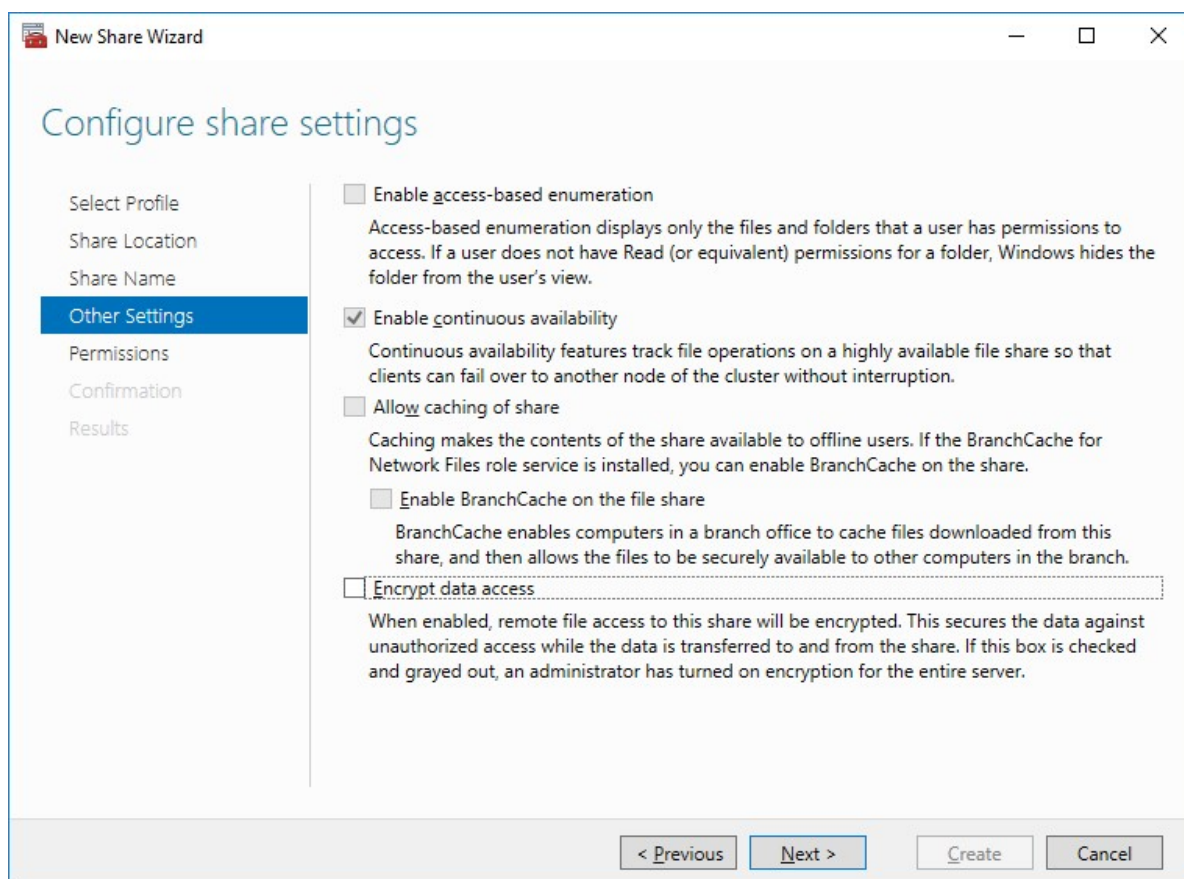
The location of the file share will be a new folder in the \Shares directory on the selected volume.

☐ Type a custom path:

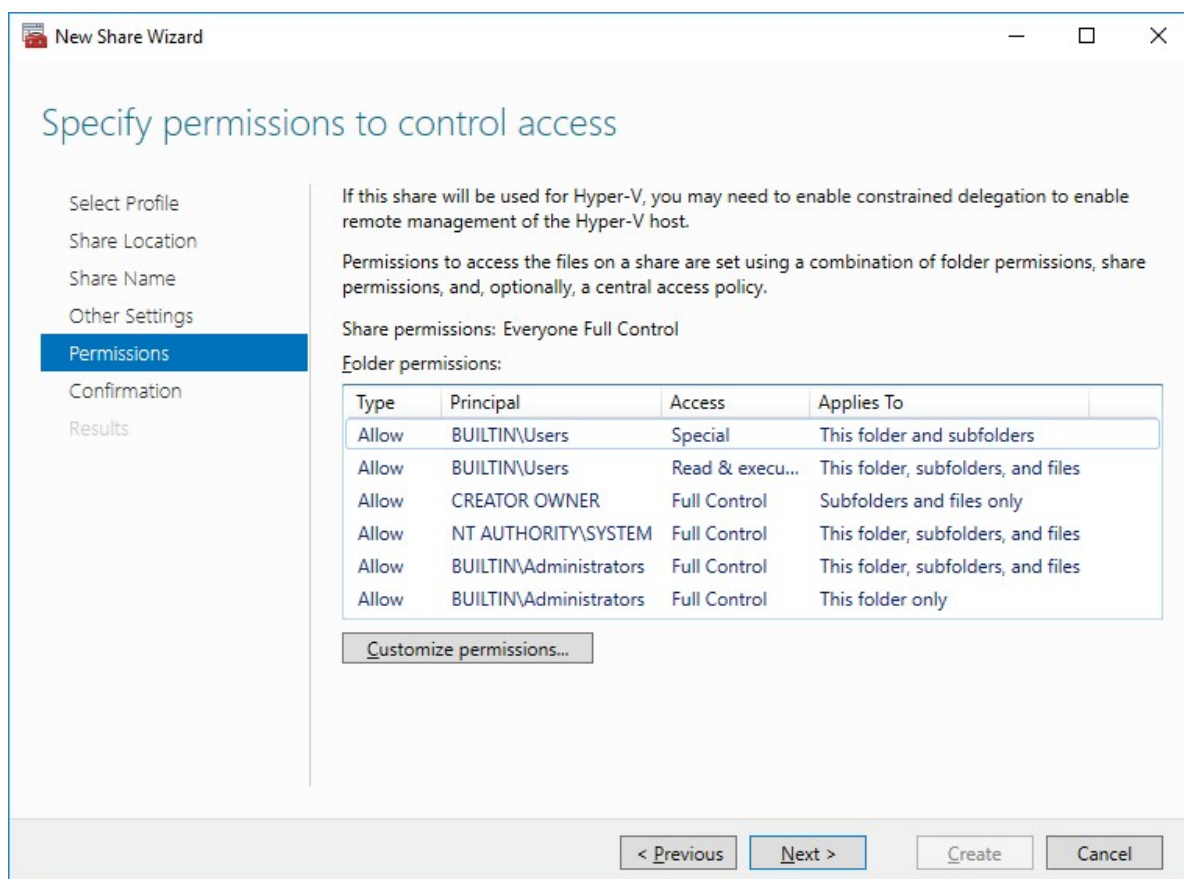
< Previous   Next >   Create   Cancel

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.



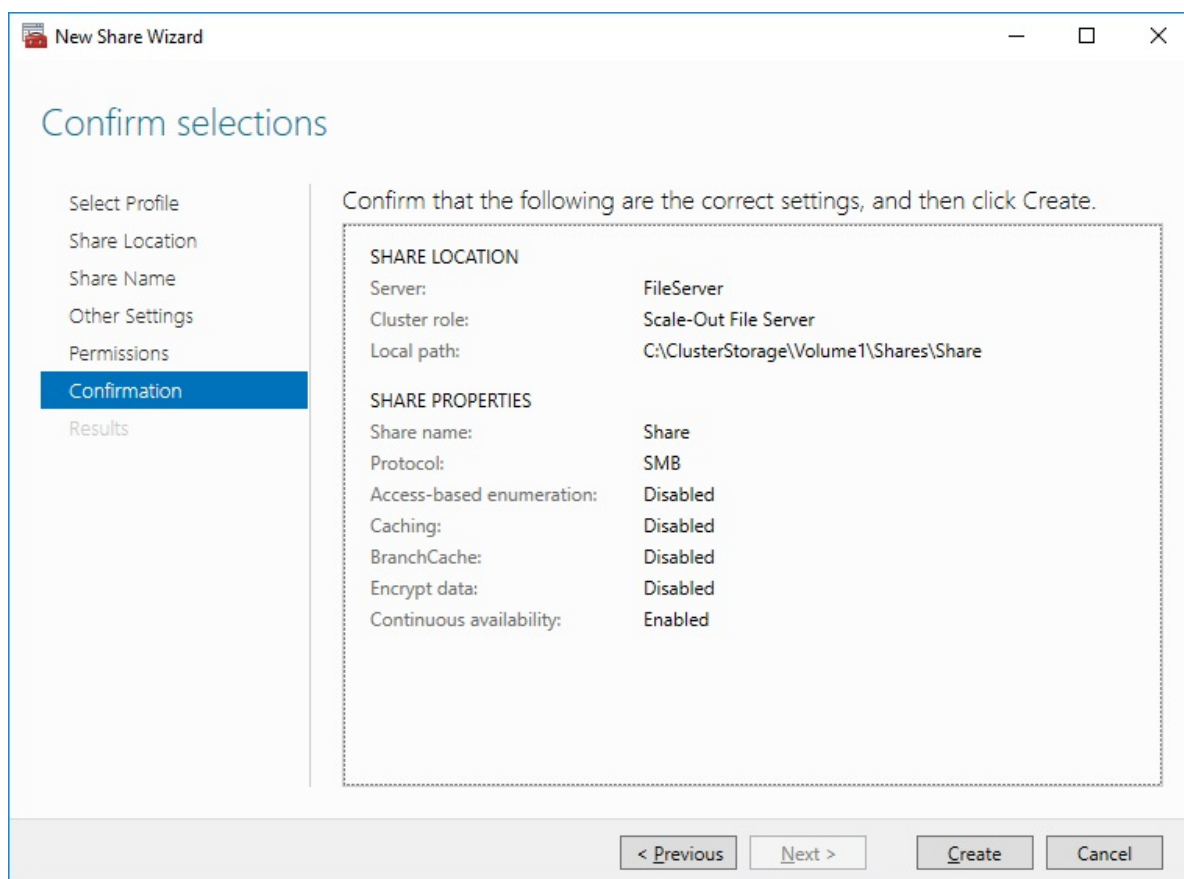
8. Specify the access permissions for the file share.



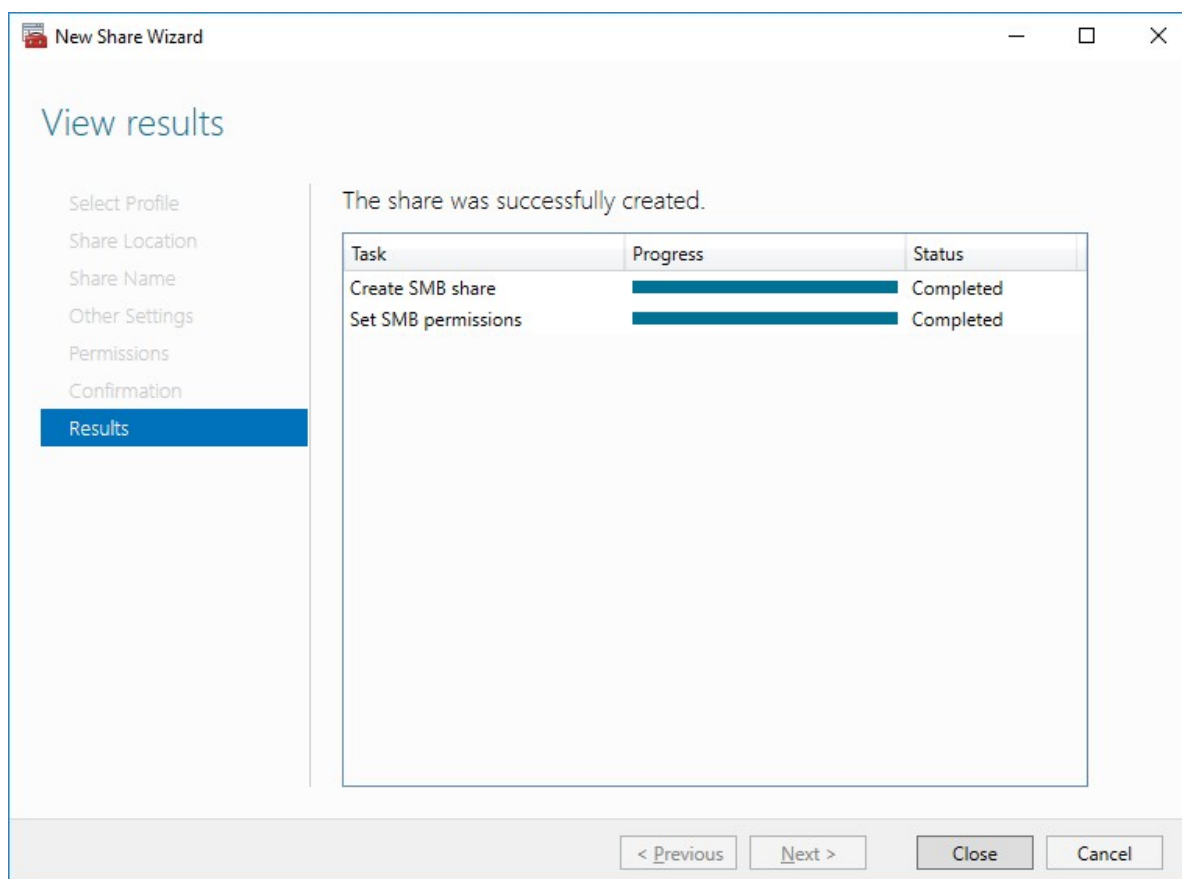
**NOTE:**

- 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.

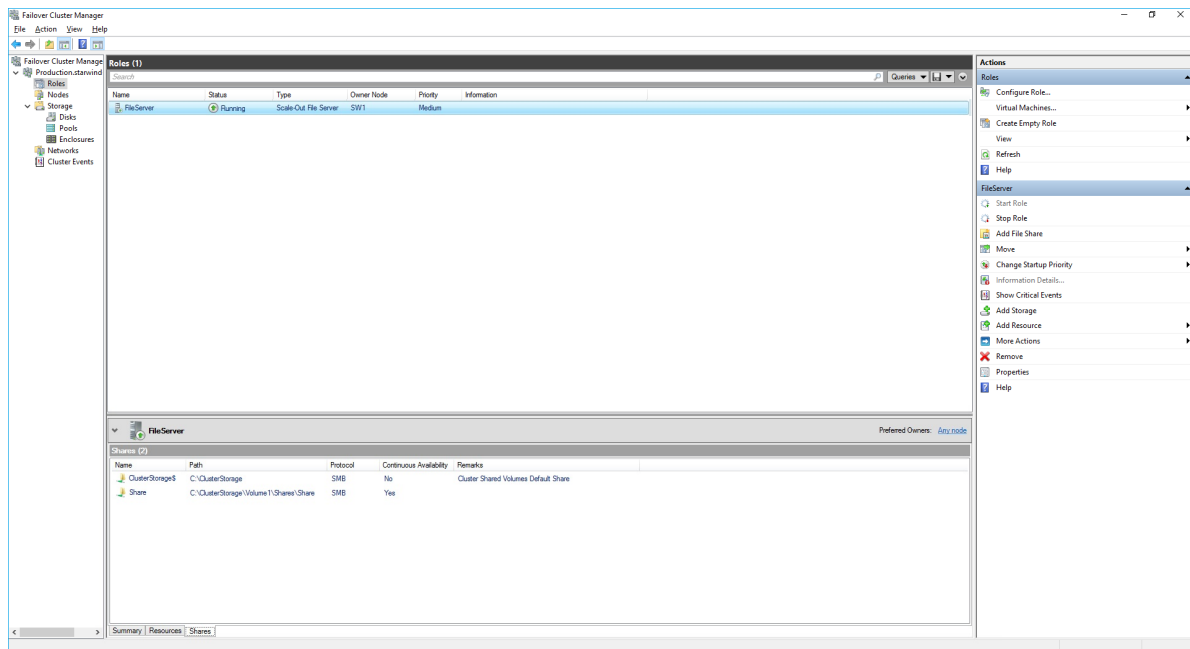


10. Check the summary and click Close to close the Wizard.



To Manage Created File Shares:

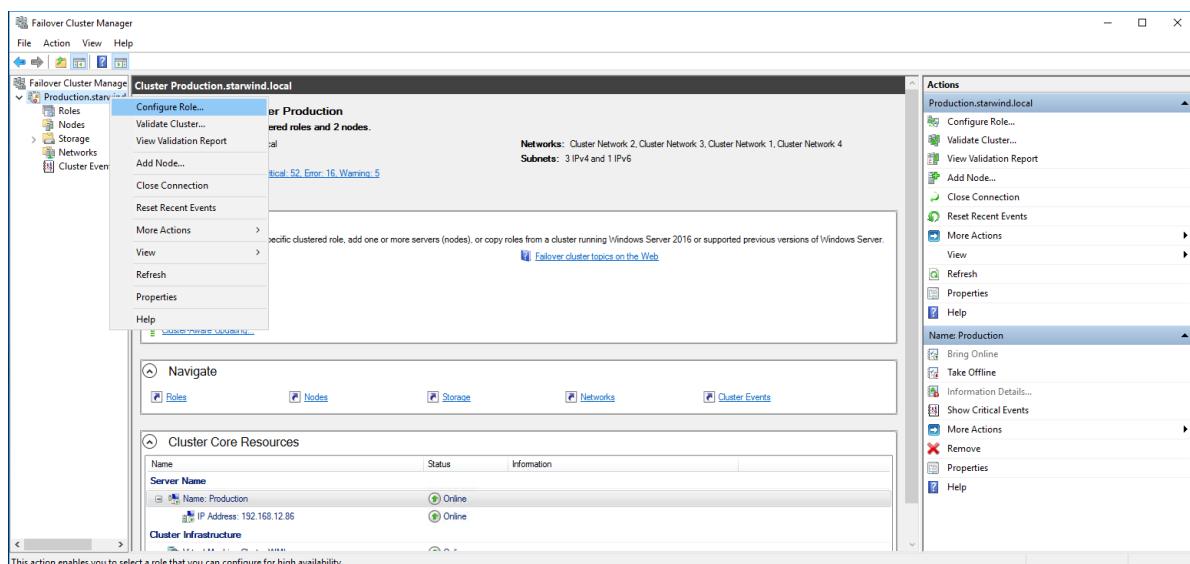
- open Failover Cluster Manager
- expand the cluster and click Roles
- choose the file share role, select the Shares tab, right-click the created file share, and select Properties:



## Configuring The File Server For General Use Role

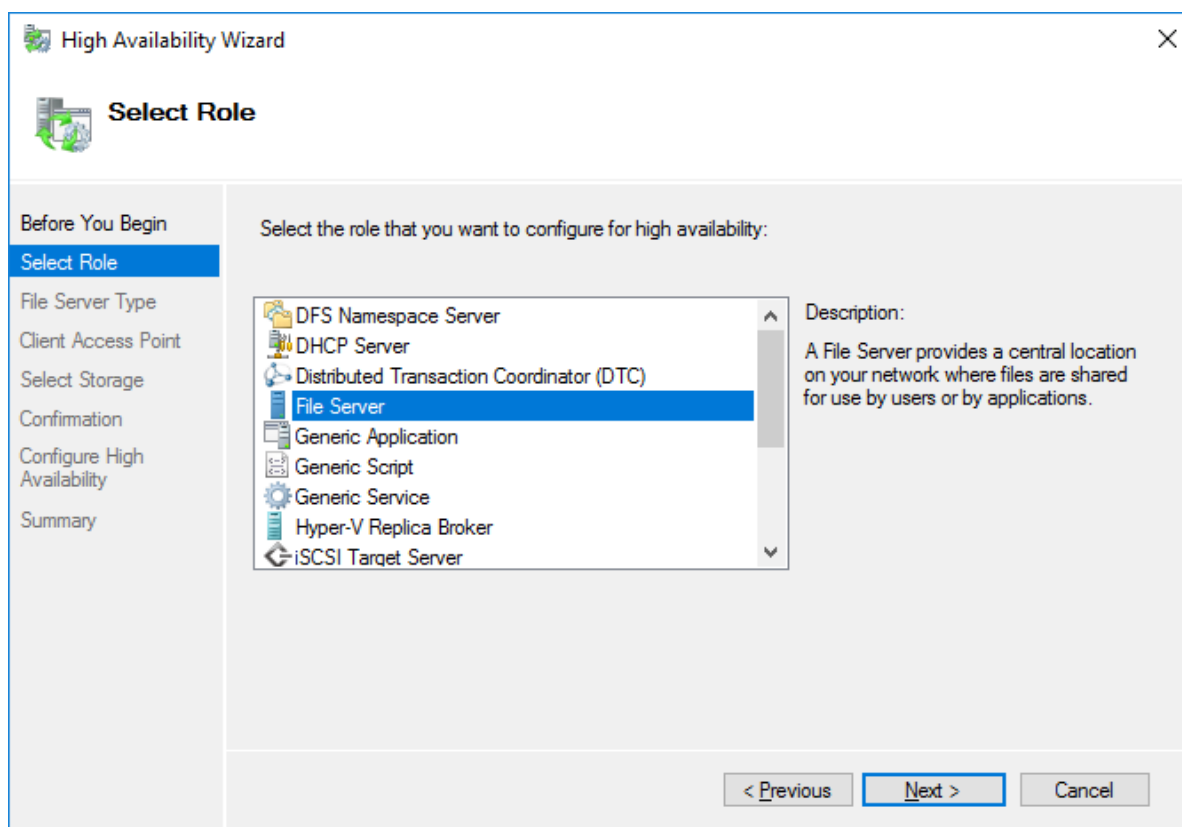
NOTE: To configure File Server for General Use, the cluster should have available storage

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.

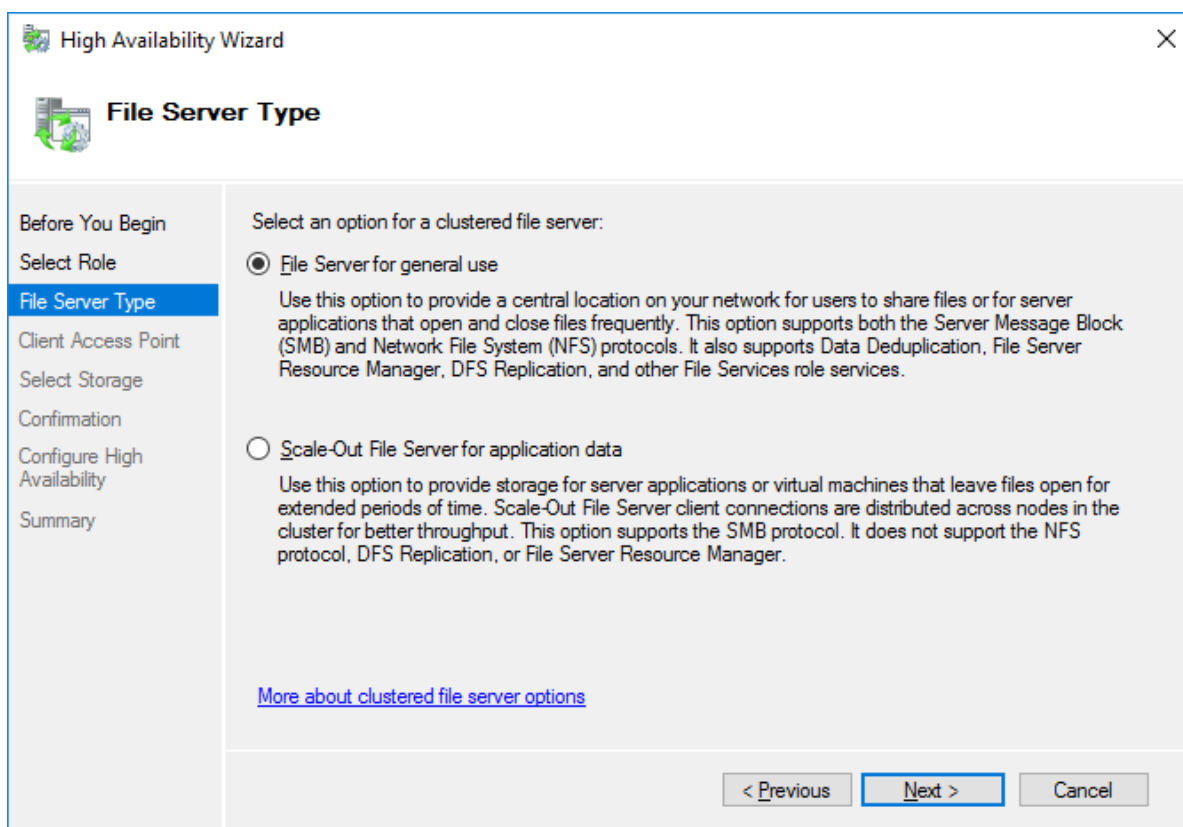


3. Select the File Server item from the list in High Availability Wizard and click Next to continue.

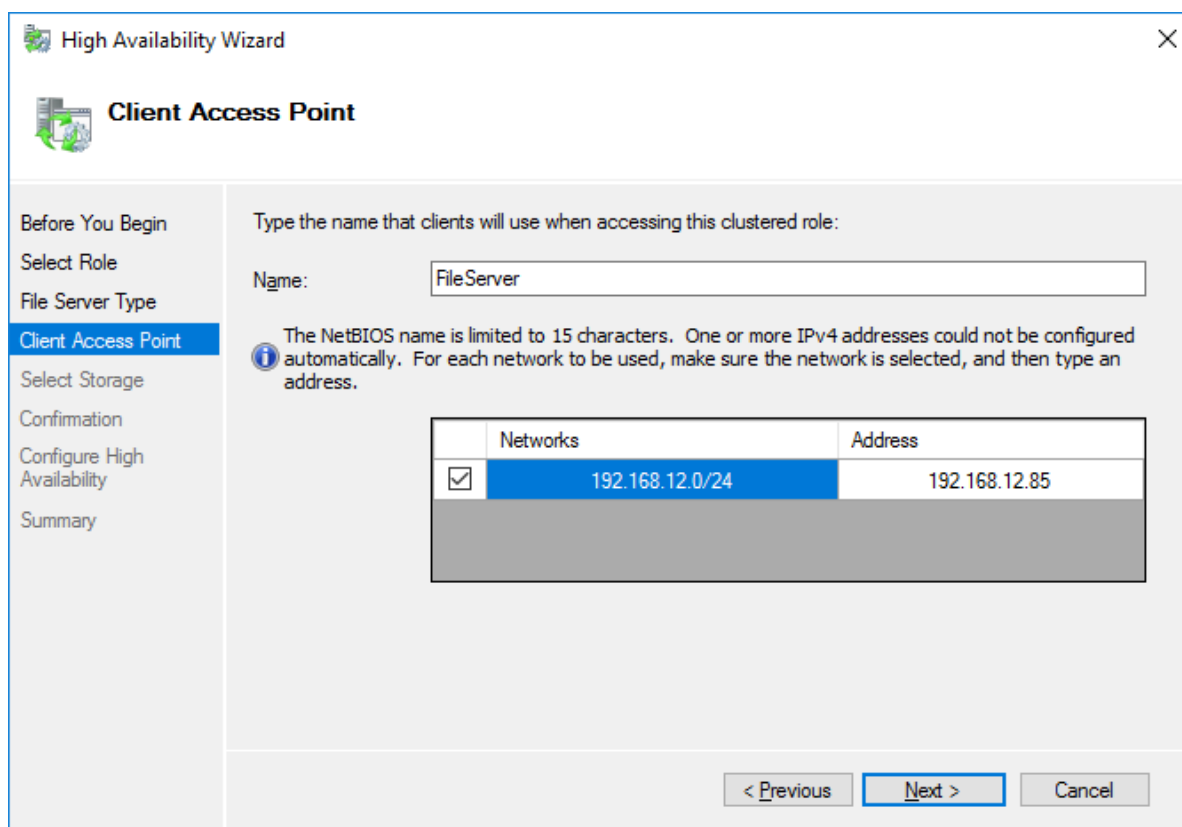




4. Select File Server for general use and click Next.



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.



The screenshot shows the 'High Availability Wizard' window, specifically the 'Client Access Point' step. On the left is a navigation pane with steps: 'Before You Begin', 'Select Role', 'File Server Type', 'Client Access Point' (highlighted), 'Select Storage', 'Confirmation', 'Configure High Availability', and 'Summary'. The main area has a title 'Client Access Point' and a sub-header 'Type the name that clients will use when accessing this clustered role:'. Below this is a 'Name:' label and a text box containing 'FileServer'. An information icon (i) is followed by a note: 'The NetBIOS name is limited to 15 characters. One or more IPv4 addresses could not be configured automatically. For each network to be used, make sure the network is selected, and then type an address.' Below the note is a table with two columns: 'Networks' and 'Address'. The first row has a checked checkbox in the 'Networks' column, the text '192.168.12.0/24', and the address '192.168.12.85'. At the bottom right are three buttons: '< Previous', 'Next >' (highlighted), and 'Cancel'.

High Availability Wizard

**Client Access Point**

Before You Begin  
Select Role  
File Server Type  
**Client Access Point**  
Select Storage  
Confirmation  
Configure High Availability  
Summary

Type the name that clients will use when accessing this clustered role:

Name:

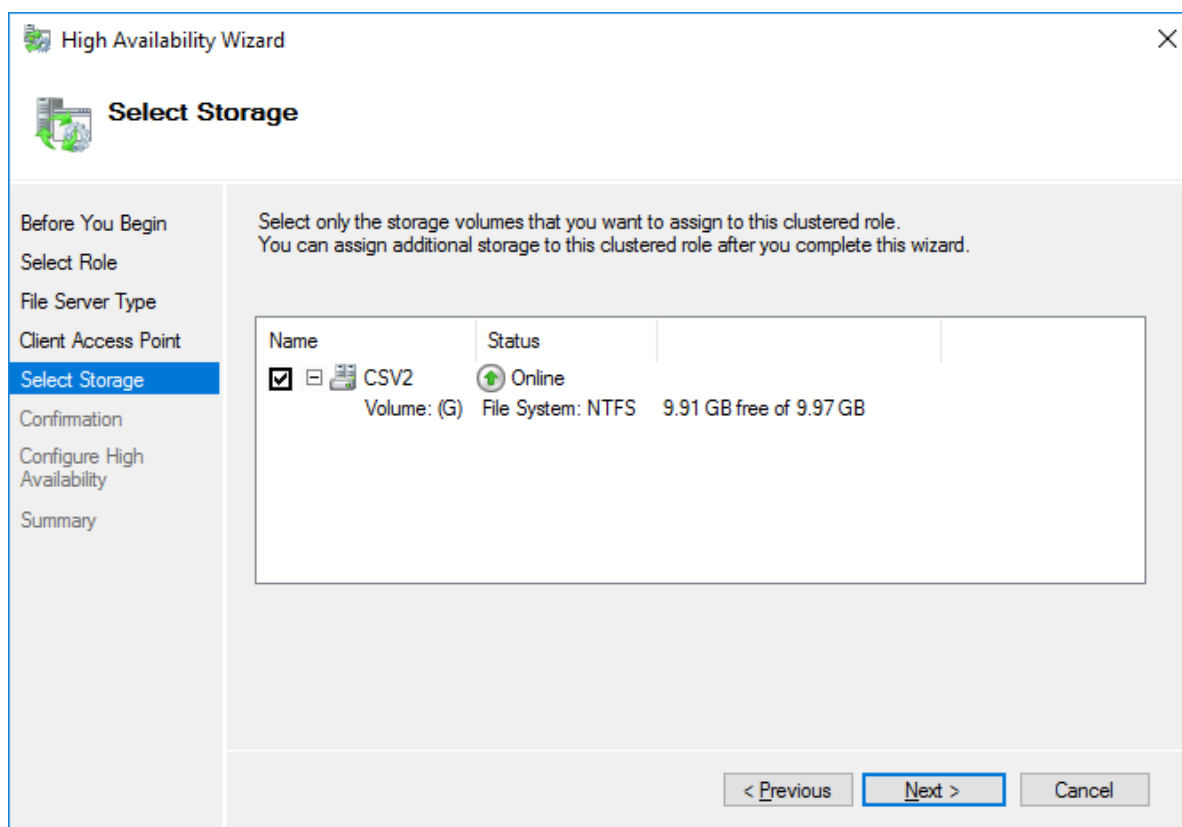
*i* The NetBIOS name is limited to 15 characters. One or more IPv4 addresses could not be configured automatically. For each network to be used, make sure the network is selected, and then type an address.

	Networks	Address
<input checked="" type="checkbox"/>	192.168.12.0/24	192.168.12.85

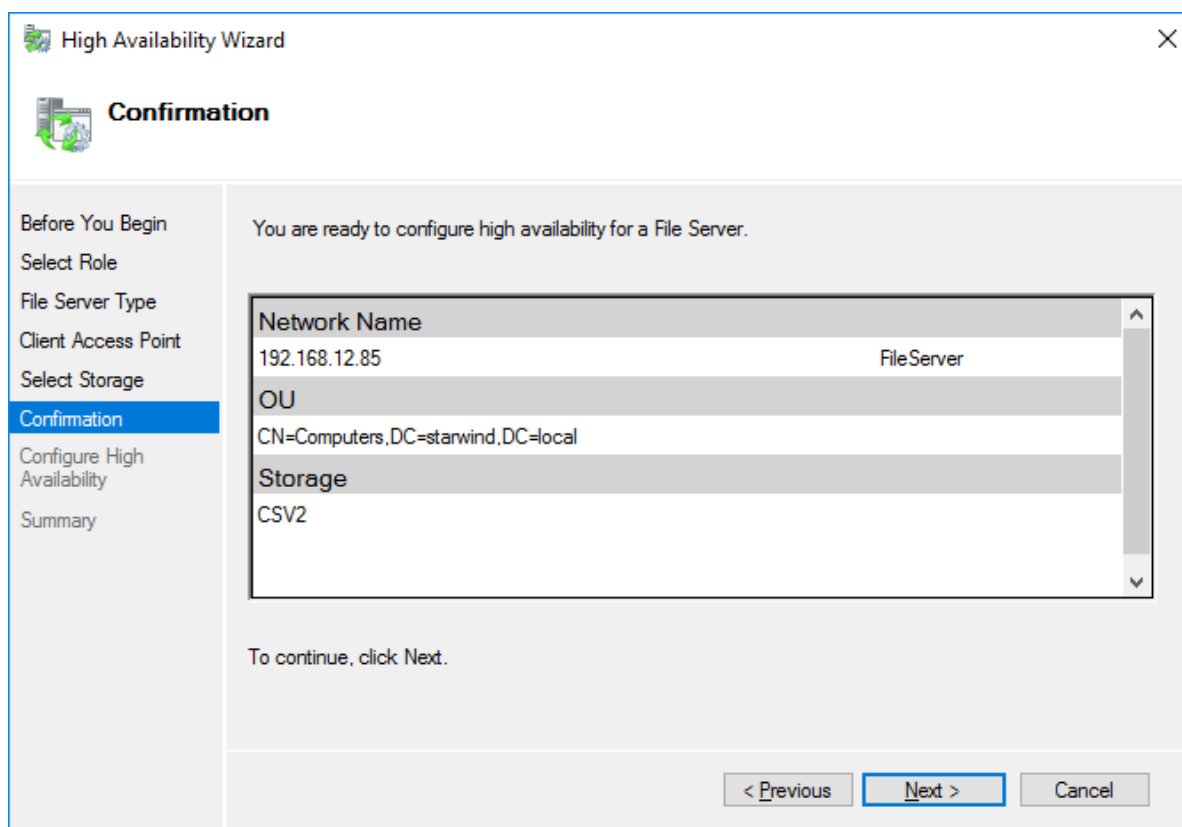
< Previous   **Next >**   Cancel

Click Next to continue.

6. Select the Cluster disk and click Next.

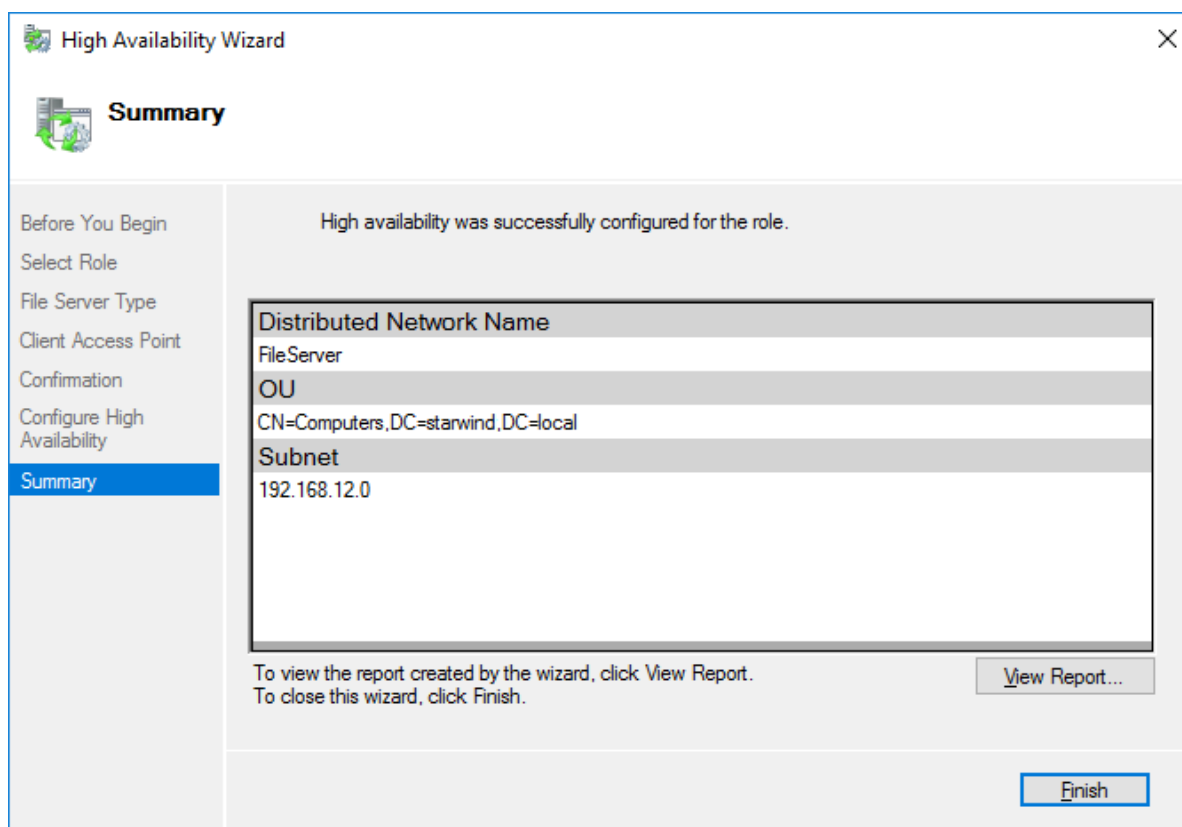


7. Check whether the specified information is correct. Click Next to proceed or Previous to change the settings.

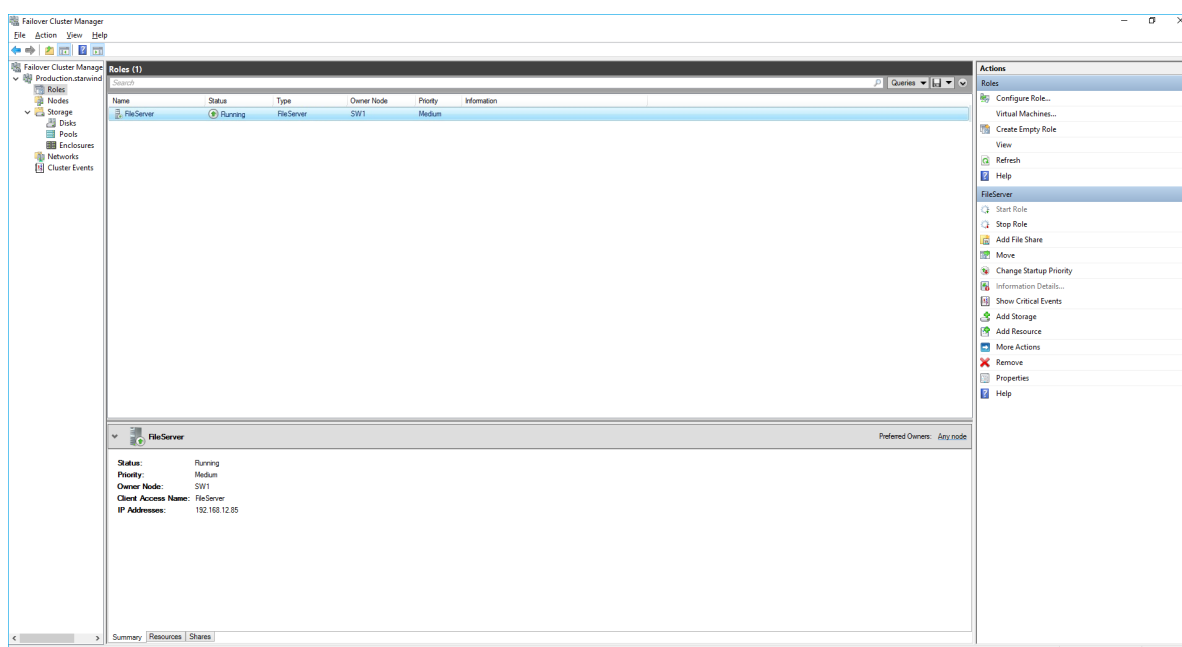


8. Once the installation has been finished successfully, the Wizard should now look like the screenshot below.

Click Finish to close the Wizard.



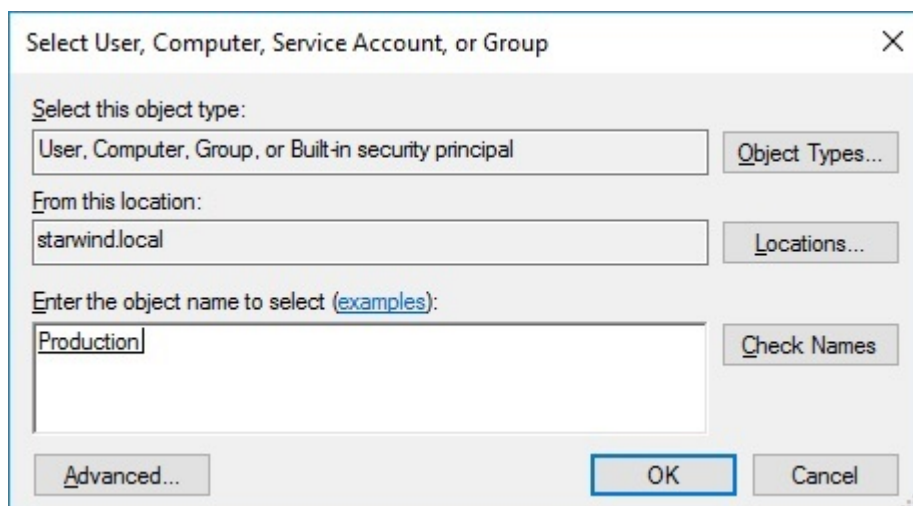
9. The newly created role should now look like the screenshot below.



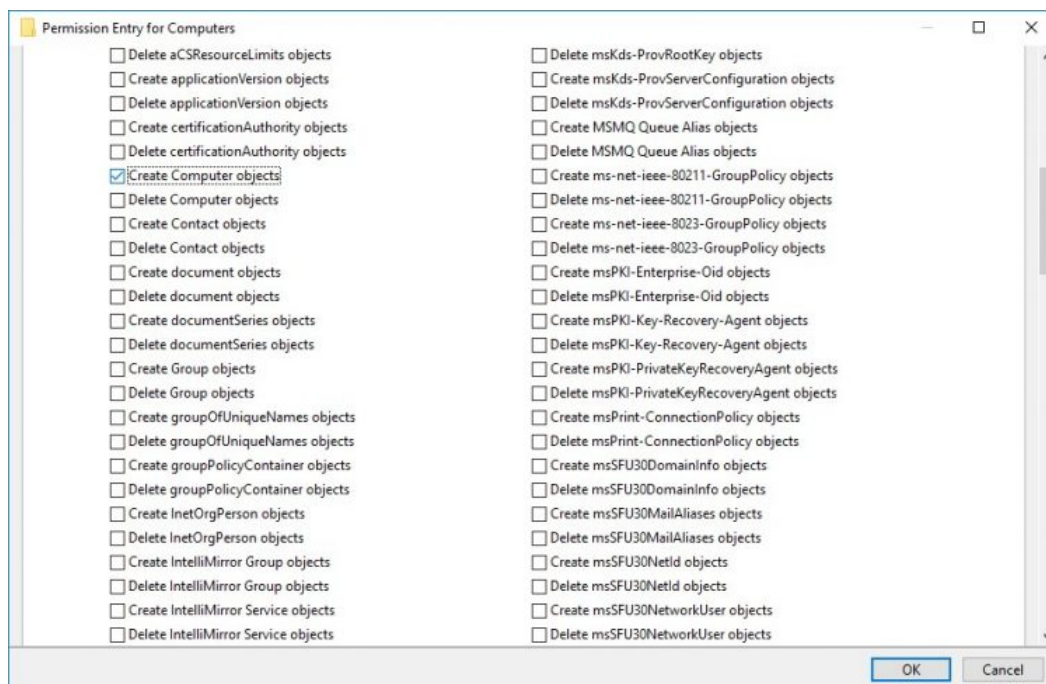
NOTE: If the role status is Failed and it is unable to Start, please, follow the next steps:

- 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



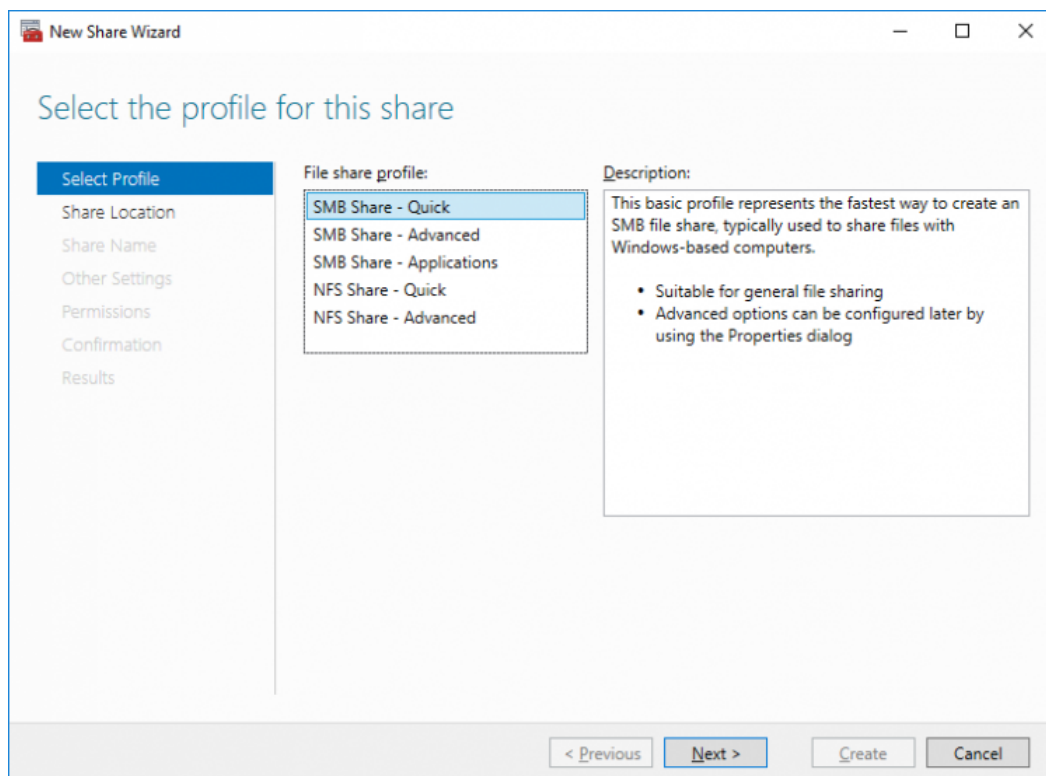
- click OK on all opened windows to confirm the changes

- 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.

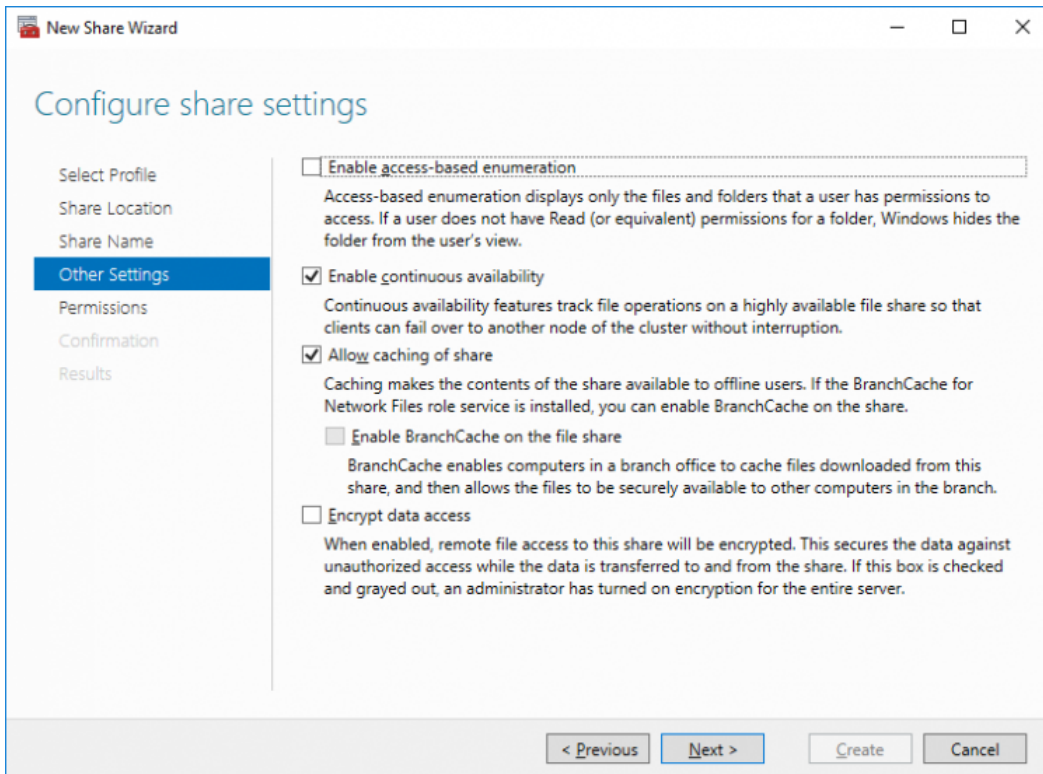


5. Select available storage to host the share. Click Next to continue.

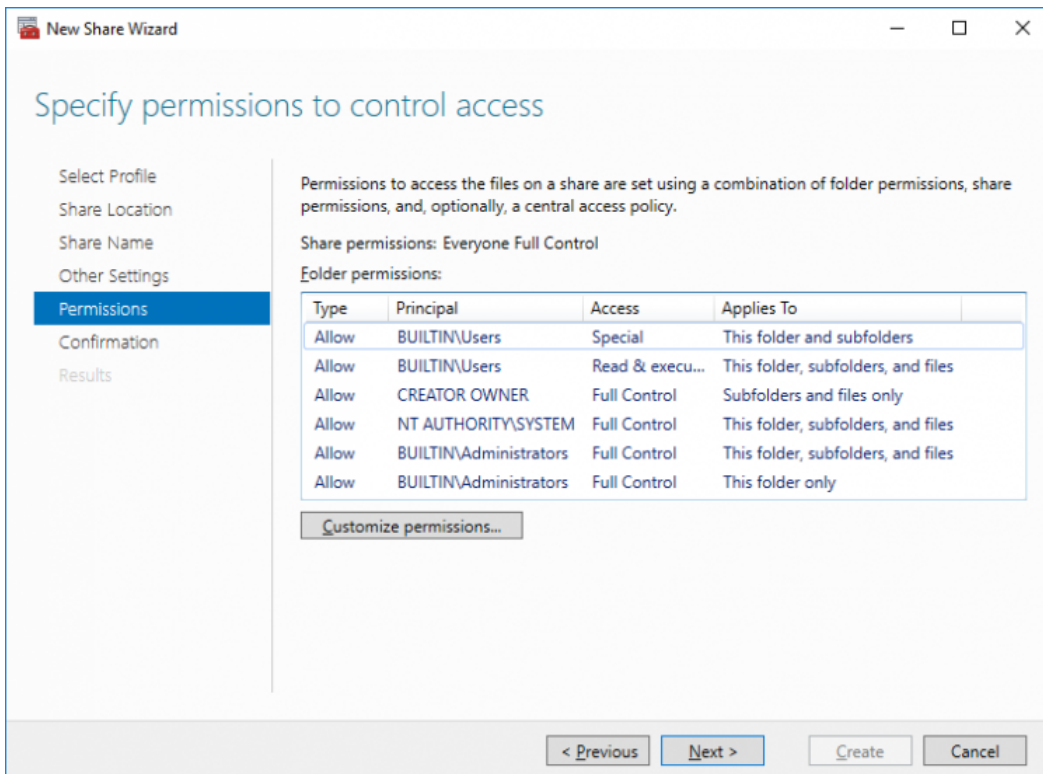




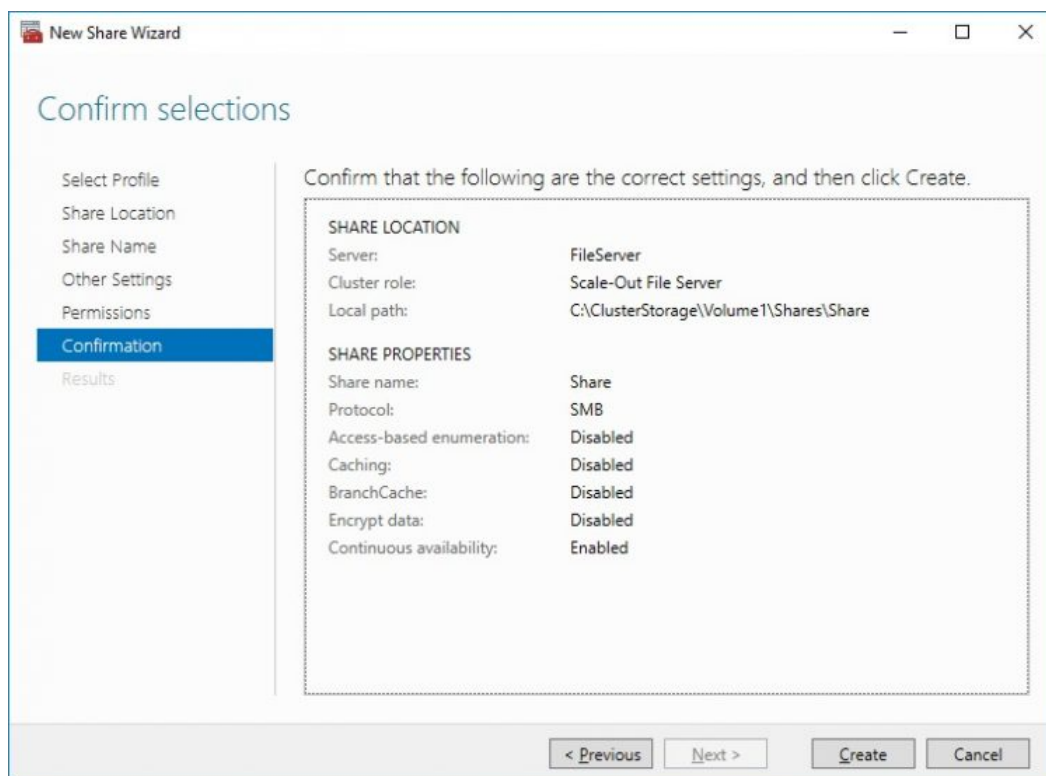
continue.



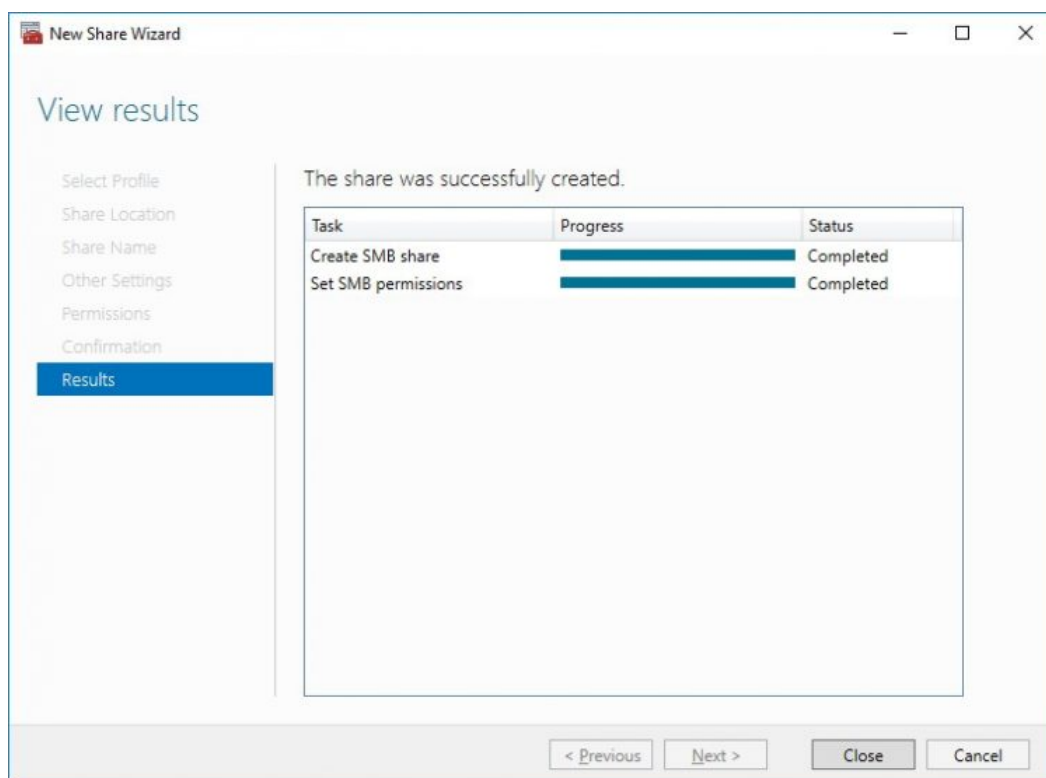
8.Specify the access permissions for the file share.



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.

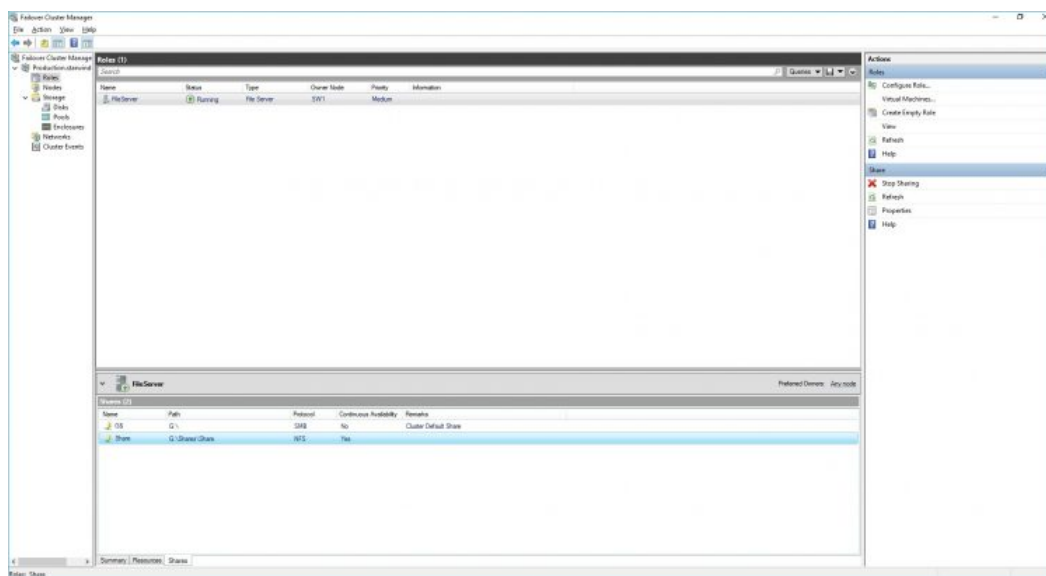


To manage created SMB File Shares

11. Open Failover Cluster Manager.

12. Expand the cluster and click Roles.

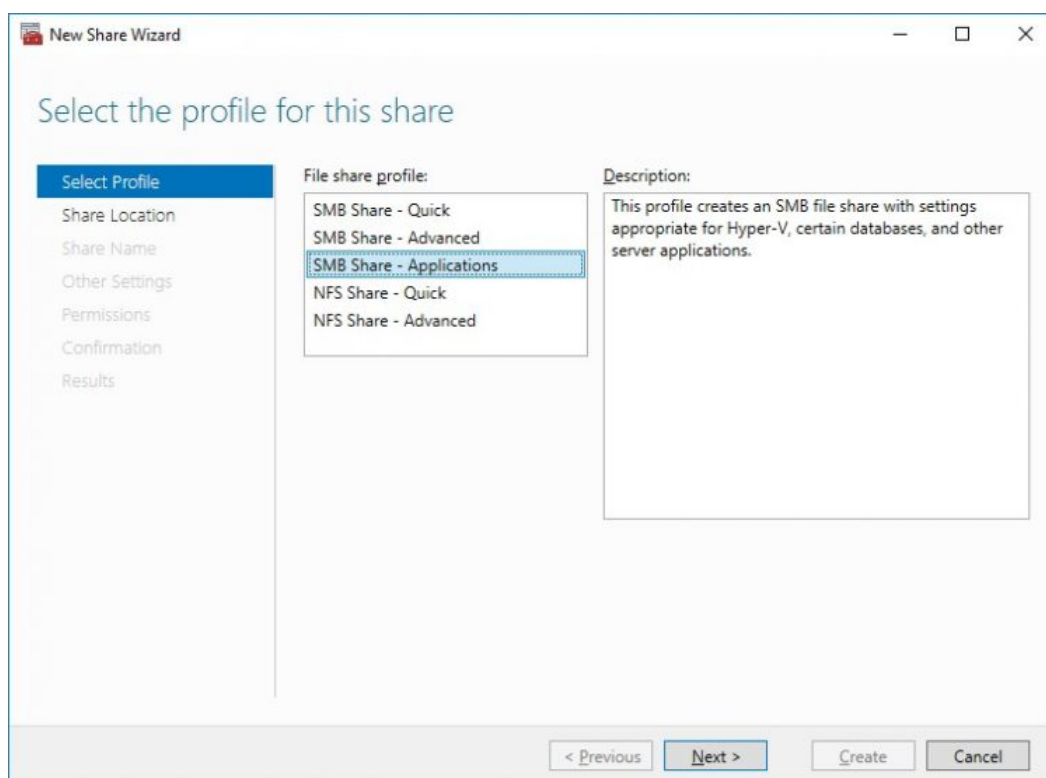
13. Choose the File Share role, select the Shares tab, right-click the created file share, and select Properties.



## 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.

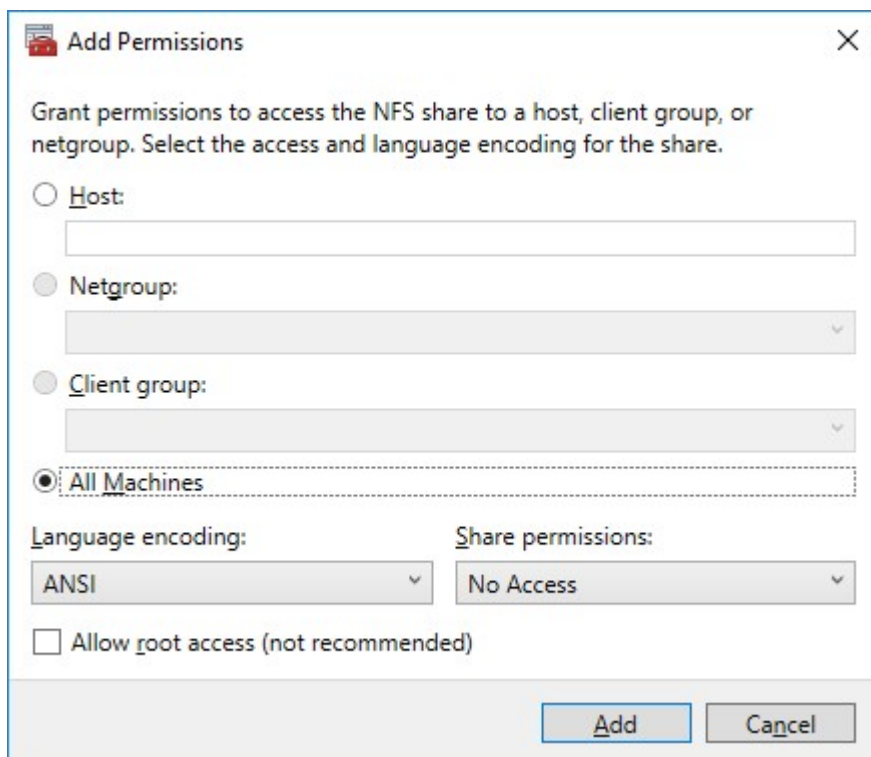


continue.

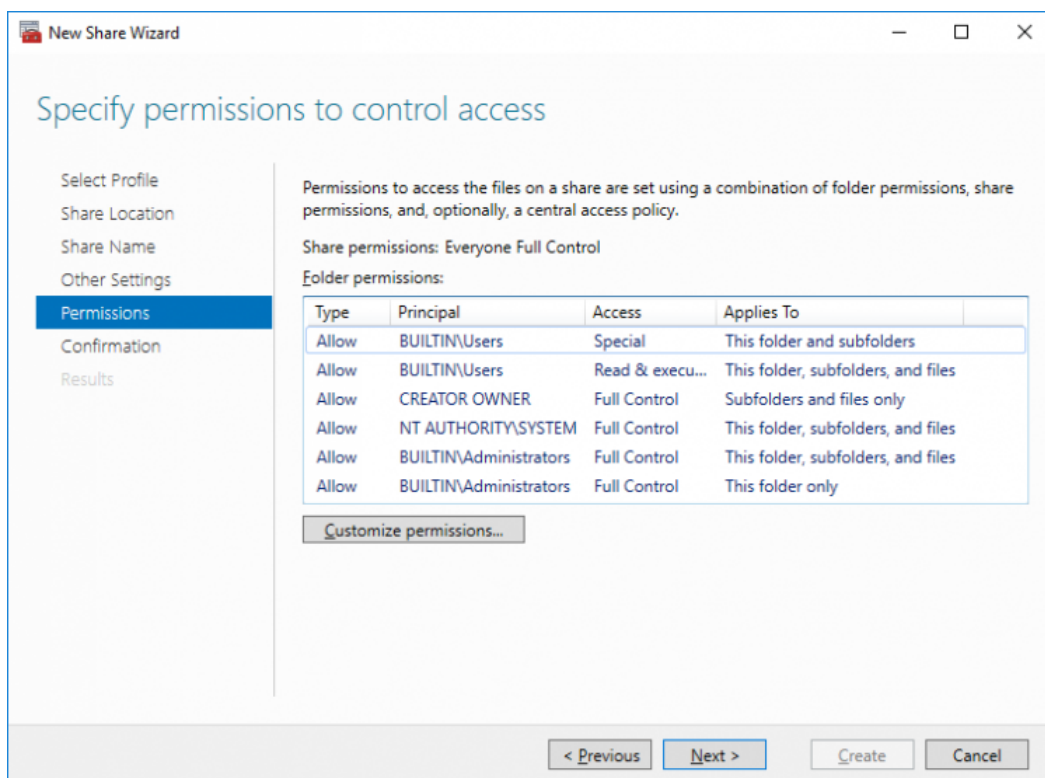
The screenshot shows the 'New Share Wizard' window at the 'Specify authentication methods' step. The left sidebar lists the steps: Select Profile, Share Location, Share Name, Authentication (highlighted), Share Permissions, Permissions, Confirmation, and Results. The main area has the title 'Specify authentication methods' and the instruction 'Specify the authentication methods that you want to use for this NFS share.' There are two sections: 'Kerberos v5 authentication' with three unchecked checkboxes, and 'No server authentication' with three checked options: 'No server authentication (AUTH\_SYS)', 'Enable unmapped user access', and 'Allow anonymous access' (which is selected with a radio button). At the bottom are buttons for '< Previous', 'Next >', 'Create', and 'Cancel'.

8. Click Add and specify Share Permissions.

The screenshot shows the 'New Share Wizard' window at the 'Specify the share permissions' step. The left sidebar highlights 'Share Permissions'. The main area has the title 'Specify the share permissions' and an explanatory text: 'The server evaluates the share permissions in the order they are shown below. The final access permissions on a file share are determined by taking into consideration both the share permission and the NTFS permission entries. The more restrictive permissions are then applied.' Below this is a table with columns: Name, Permissions, Root Access, and Encoding. The table is currently empty. To the right of the table are up and down arrow buttons. Below the table are 'Add...', 'Edit...', and 'Remove' buttons. At the bottom are buttons for '< Previous', 'Next >', 'Create', and 'Cancel'.

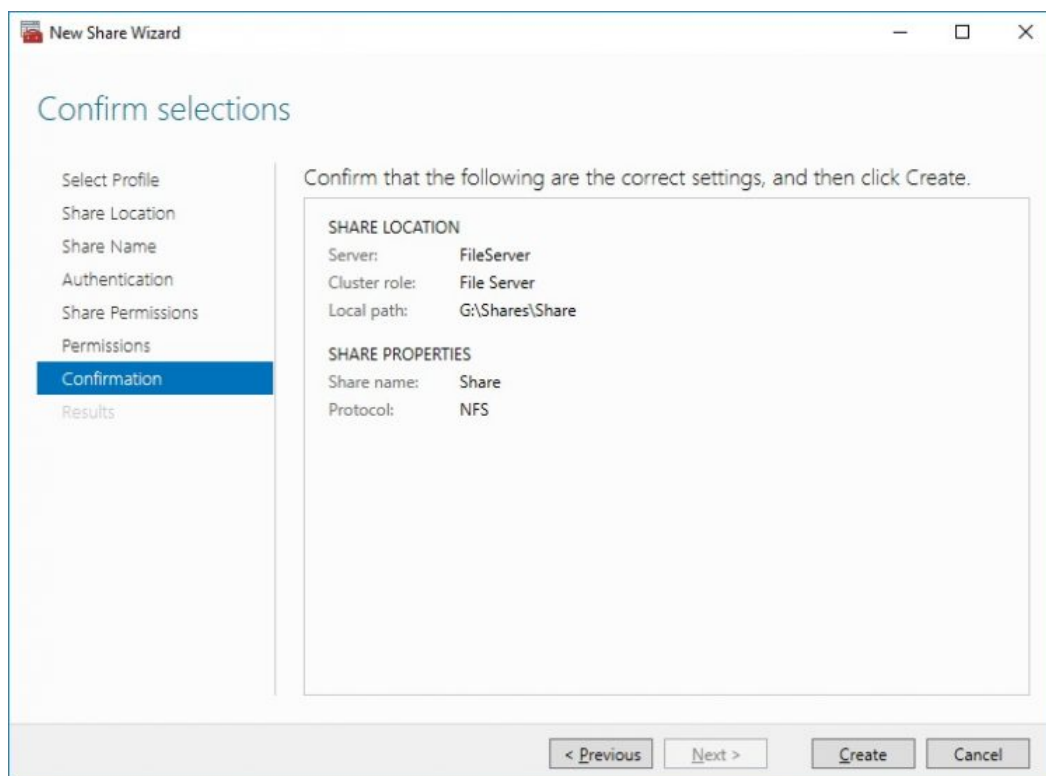


9. Specify the access permissions for the file share.

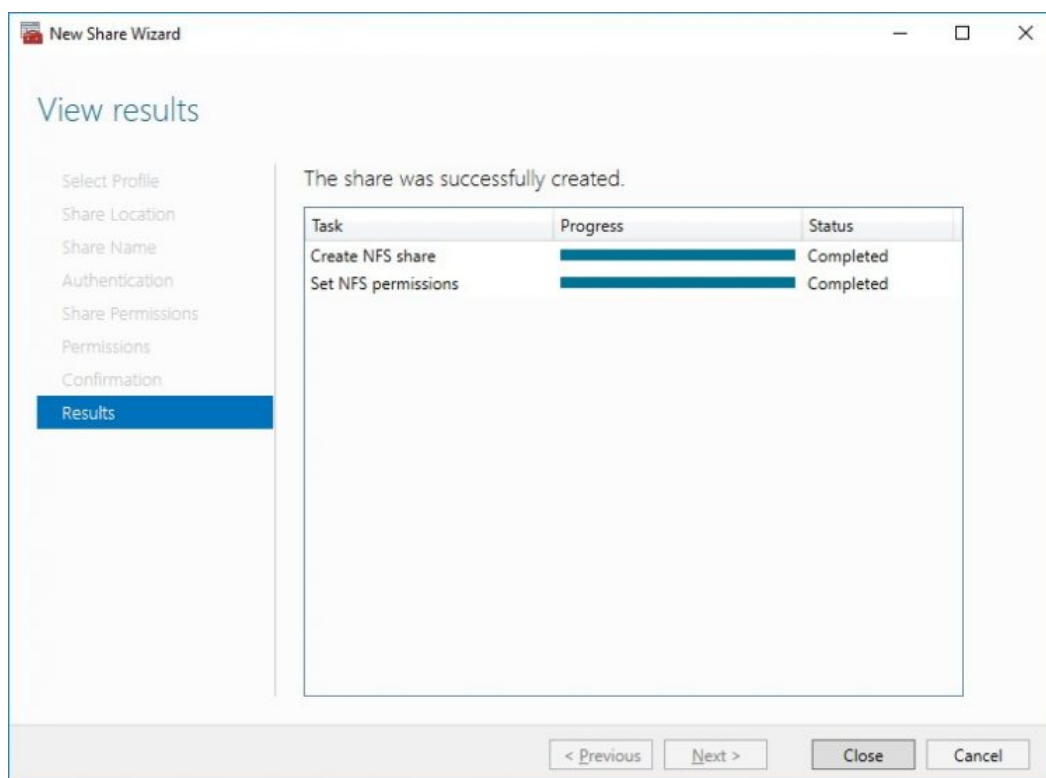




10. Check whether specified settings are correct. Click Previous to make any changes or click Create to continue.

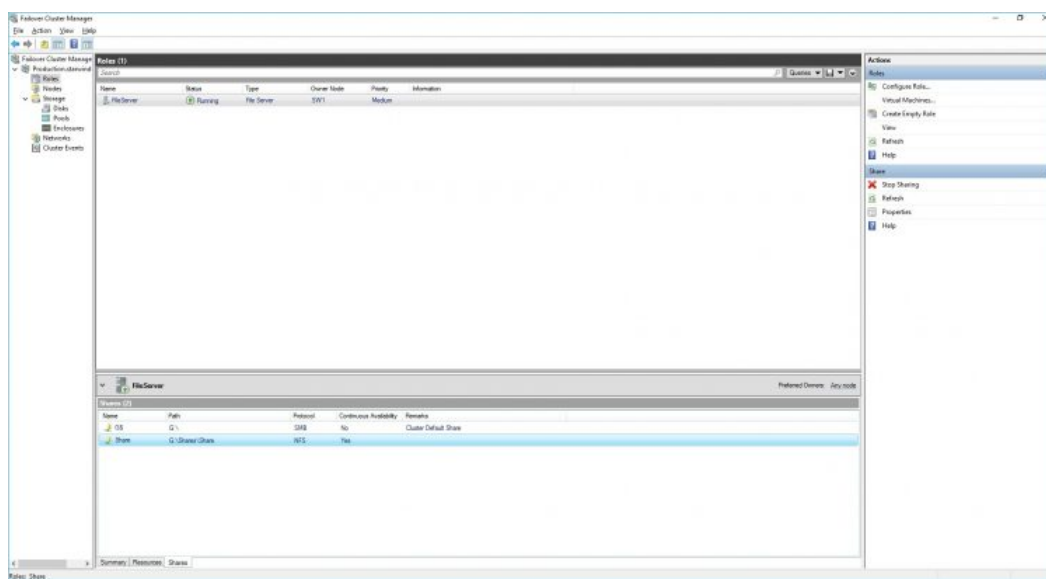


11. Check a summary and click Close to close the Wizard.



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, the Failover Cluster was deployed and configured with StarWind Virtual SAN (VSAN) running in Windows application 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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