

StarWind Virtual SAN: Configuration Guide for Microsoft Windows Server [Hyper-V], VSAN Deployed as a Controller Virtual Machine (CVM) using Web UI

2024

TECHNICAL PAPERS



StarWind Virtual SAN: Configuration Guide for Microsoft Windows Server [Hyper-V], VSAN Deployed as a Controller Virtual Machine (CVM) using Web UI



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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 is applicable to StarWind Virtual SAN and StarWind Virtual SAN Free (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

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.

NOTE: This guide universally applies to both 2-node and 3-node clusters. Please follow the quick notes within the configuration steps to carry out the necessary actions required for each 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

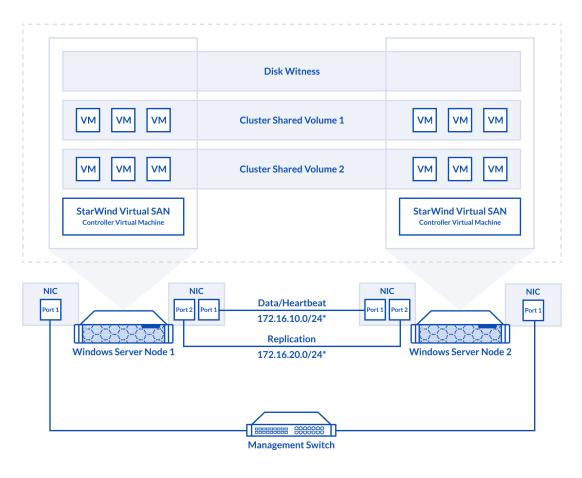
Recommended RAID settings for HDD and SSD disks: https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-h dd-and-ssd-disks/

Please read StarWind Virtual SAN Best Practices document for additional information: https://www.starwindsoftware.com/resource-library/starwind-virtual-san-best-practices

Solution Diagram

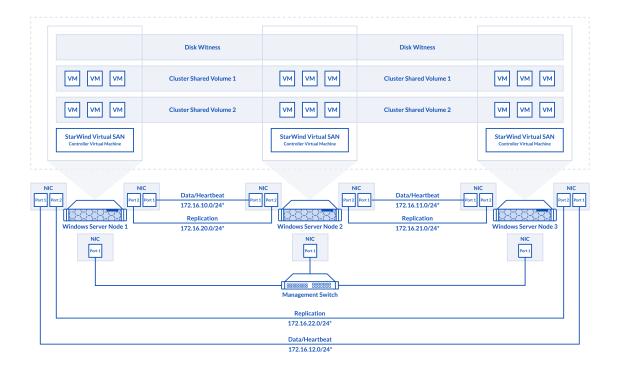
The diagrams below illustrate the network and storage configuration of the solution:





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).

Virtual Switches	🛃 Virtual Switch Properties
🚢 New virtual network switch	
MGMT	Name:
Intel(R) 82574L Gigabit Network C	MGMT
Sync Intel(R) 82574L Gigabit Network C	No <u>t</u> es:
📕 iSCSI	
Intel(R) 82574L Gigabit Network C	
Global Network Settings	
MAC Address Range	Connection type
00-15-5D-0C-39-00 to 00-15-5D-0	What do you want to connect this virtual switch to?
	External network:
	Intel(R) 82574L Gigabit Network Connection
	Allow management operating system to share this network adapter
	Enable single-root I/O virtualization (SR-IOV)
	O Private network
	VLAN ID
	Enable virtual LAN identification for management operating system
	The VLAN identifier specifies the virtual LAN that the management operating system will use for all network communications through this network adapter. This setting does not affect virtual machine networking.
	Remove SR-IOV can only be configured when the virtual switch is created. An external virtual switch with SR-IOV enabled cannot be converted to an internal or private switch.

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.



MPIO Properti	es			×
MPIO Devices	Discover Multi-Paths	DSM Install	Configuration Snapshot	t
SPC-3 comp	bliant			
Device Ha	ardware Id			
Add sup	port for iSCSI devices			
Add sup	port for SAS devices			
			Add	
Others				
Device Ha	ardware Id			
			Add	
			OK Cancel	

- 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:

📥 Add Roles and Features Wizard		- 🗆 X
Select server roles Before You Begin Installation Type	Select one or more roles to install on the selected server.	DESTINATION SERVER SW1.stanwind.local
Server Selection Server Roles Features Confirmation Results	Active Directory Rights Management Services Device Health Attestation DHCP Server DNS Server Fax Server Fax Server File and Storage Services (1 of 12 installed) ✓ File and iSCSI Services ✓ File and iSCSI Services ✓ File Server BranchCache for Network Files Data Deduplication DFS Namespaces DFS Replication File Server VSS Agent Service iSCSI Target Server iSCSI Target Server iSCSI Target Server Server for NFS Work Folders ✓ Storage Service (Installed) ✓	File Server manages shared folders and enables users to access files on this computer from the network.
	< <u>P</u> revious <u>N</u> ext >	Cancel

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:



🔁 Add Roles and Features Wizard		- 🗆 X
Select server roles		DESTINATION SERVER SW1.stanwind.local
Before You Begin	Select one or more roles to install on the selected server.	
Installation Type	Roles	Description
Server Selection Server Roles Features Confirmation Results	Active Directory Rights Management Services Device Health Attestation DHCP Server DNS Server Fax Server File and Storage Services (1 of 12 installed) File and Storage Services (1 of 12 installed) File and Storage Services File Server BranchCache for Network Files Data Deduplication DFS Replication DFS Replication File Server WSS Agent Service iSCSI Target Server iSCSI Target Server Work Folders Vork Folders Storane Service (Installed)	File Server manages shared folders and enables users to access files on this computer from the network.
	< Previous Next >	Install Cancel

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:



Add Roles and Features Wizard		- 🗆 X
Add Roles and Features Wizard Select server roles Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Select one or more roles to install on the selected server. Roles Active Directory Rights Management Services Device Health Attestation DHCP Server DNS Server Fax Server Fax Server File and Storage Services (1 of 12 installed) File and Storage Services File Server BranchCache for Network Files Data Deduplication DFS Namespaces OFS Namespaces	DESTINATION SERVER SWI.stanwind.local Description Server for NFS enables this computer to share files with UNIX- based computers and other computers that use the network file system (NFS) protocol.
	DFS Replication File Server Resource Manager File Server VSS Agent Service iSCSI Target Server iSCSI Target Storage Provider (VDS and VSS Server for NTS Work Folders Vork Folders Storane Services (Installed) <	Install

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 that contains StarWind Virtual SAN CVM https://www.starwindsoftware.com/vsan#download

2. Extract the virtual machine files.

3. Deploy the control virtual machine to the Microsoft Hyper-V Server using the "Import Virtual Machine" wizard in Hyper-V Manager.



 IHyper-V Manager File Action View Help 								- 0	×
Hyper-V Manager	Virtual	Machines						Actions	
New New New New New New New Normal Switch Manage Virtual Switch Manage Virtual Switch Manage Virtual Switch Manage Virtual South Manage Virtual South New Kersh View Help	> e : :	State	CPU Usage	Assigned Memory No vitual machines were No vitual machines are set of the set		Status	Configurati	WS2019 New Import Virtual Machine Hyper-V Settings Wirtual Saitch Manager Virtual Saitch Manager Virtual Saitch Manager Edit Disk Inspect Disk Stop Service Kernove Server Steffesh View Image: Help	•
	Details			No item se	lected.				
Displays the Import Wizard.									

4. On the second page of the wizard, point to the location of the VM template. Select the VM folder and click Next.

Import Virtual Machine		×
Locate Folder	r	
Before You Begin	Specify the folder containing the virtual machine to import.	
Locate Folder	Folder: C:\Users\Administrator\Downloads\StarWindAppliance\	Browse
Select Virtual Machine		
Choose Import Type		
Summary		
	< Previous Next > Finish	Cancel



5. Click Next on the "Select Virtual Machine" step.

Import Virtual Machine		\times
Select Virtual	Machine	
Before You Begin	Select the virtual machine to import:	
Locate Folder Select Virtual Machine	Name Date Created	
Choose Import Type	StarWindAppliance 10/15/2023 11:25:26 AM	
Summary		
	< Previous Next > Finish Cancel	

6. Select the "Copy the virtual machine" import type and click Next.



Import Virtual Machine		×
Choose Impo	ort Type	
Before You Begin	Choose the type of import to perform:	
Locate Folder	\bigcirc Register the virtual machine in-place (use the existing unique ID)	
Select Virtual Machine	\bigcirc Restore the virtual machine (use the existing unique ID)	
Choose Import Type	Opy the virtual machine (create a new unique ID)	
Summary		
	< Previous Next > Finish Cancel	
	6	

7. Specify new or existing folders to store virtual machine files, such as configuration, snapshots, smart paging, and virtual disk. Click Next.



Import Virtual Machine		\times
Choose Folders for	Virtual Machine Files	
Before You Begin Locate Folder Select Virtual Machine Choose Import Type Choose Destination Choose Storage Folders Summary	You can specify new or existing folders to store the virtual machine files. Otherwise, the wizard imports the files to default Hyper-V folders on this computer, or to folders specified in the virtual machine configuration.	
	< Previous Next > Finish Cance	I



Import Virtual Machine		×
Choose Folders to	Store Virtual Hard Disks	
Before You Begin Locate Folder Select Virtual Machine Choose Import Type Choose Destination	Where do you want to store the imported virtual hard disks for this virtual machine? Location: C:\Hyper-V\StarWindAppliance\Virtual Hard Disks\	Browse
Choose Storage Folders Summary		
	< Previous Next > Finish	Cancel



Import Virtual Machine		×
Completing In	mport Wizard	
Before You Begin Locate Folder	You are about to perform the following Description:	g operation.
Select Virtual Machine	Virtual Machine:	StarWindAppliance
Choose Import Type Choose Destination	Import file: Import Type:	C: \Users\Administrator\Downloads\StarWindAppliance\Virtual M Copy (generate new ID)
Choose Storage Folders	Virtual machine configuration folder:	C:\Hyper-V\StarWindAppliance\Virtual Machines\
Summary	Ch Sm Copying file 1 of 1 (StarWind/ Vir	pliance \Virtual Hard Disks \
		< Previous Next > Finish Cancel

8. In the second step of the wizard, the "VM import" wizard will validate the network.

The default naming for virtual switches:

- the Management virtual switch is "Management vSwitch"
- the iSCSI virtual switch is "Data/iSCSI vSwitch"
- the Synchronization virtual switch is "Replication/Sync vSwitch "

If existing virtual switches have different names, specify corresponding network connections. Click Next.



Import Virtual Machine		×
Connect Net	work	
Before You Begin Locate Folder Select Virtual Machine Choose Import Type Choose Destination Choose Storage Folders Connect Network Connect Network Summary	This page allows you to connect to virtual switches that are available on the destination computer. The following configuration errors were found for virtual machine 'StarWindAppliance'. Could not find Ethernet switch 'Management vSwitch'. Specify the virtual switch you want to use on computer "WS2019". Connection: Not Connected Not Connected Management Virtual Switch New Virtual Switch New Virtual Switch	
	< Previous Next > Einish Cancel	



Import Virtual Machine		×
Connect Net	work	
Before You Begin Locate Folder Select Virtual Machine Choose Import Type Choose Destination Choose Storage Folders Connect Network	This page allows you to connect to virtual switches that are available on the destination computer. The following configuration errors were found for virtual machine 'StarWindAppliance'. Could not find Ethernet switch 'Data/ISCSI vSwitch'. Specify the virtual switch you want to use on computer "WS2019". Connection: Not Connected Not Connected	
Connect Network Summary	Management Virtual Switch Data Virtual Switch	
	< Previous Next > Finish Cancel	

9. Review the import configuration and click Finish to complete the import.



Import Virtual Machine				×
Completing I	mport Wizard			
Before You Begin Locate Folder Select Virtual Machine Choose Import Type Choose Destination Choose Storage Folders Connect Network Connect Network Summary	You are about to perform the following Description: Virtual Machine: Import file: Import Type: Virtual machine configuration folder: Checkpoint folder: Smart Paging file store: Virtual hard disk destination folder: Network connection: Network connection:	StarWind SAN & NAS C:\Users\sw\Downloads\Sta Copy (generate new ID) C:\Hyper-V VMs\StarWind S/ C:\Hyper-V VMs\StarWind S/ C:\Hyper-V VMs\StarWind S/	AN & NAS\Snapshots\	s
	To complete the import and close this v	vizard, dick Finish. < Previous Next >	Cancel	

10. Repeat the VM deployment on each partner server which is used for configuring 2node or 3-node highly available storage according to your licensing.

Initial Configuration Wizard

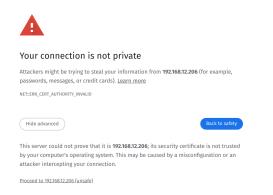
1. Start StarWind Virtual SAN CVM.

2. Launch VM console to see the VM boot process and get the IPv4 address of the Management network interface.

NOTE: in case VM has no IPv4 address obtained from a DHCP server, use the Text-based User Interface (TUI) to set up a Management network.

3. Using the web browser, open a new tab and enter the VM IPv4 address to open StarWind VSAN Web Interface. Click "Advanced" and then "Continue to..."





4. StarWind VSAN web UI welcomes you, and the "Initial Configuration" wizard will guide you through the deployment process.

Welcome to StarWind Appliance	
Follow the initial configuration wizard and complete the required steps of the appliance setup	
Start	

5. In the following step, upload the license file.



StarWind Appliance Initial conf	guration	
• License	License	
	Provide StarWind license file to continue	
	If you cannot find the license file, please contact your StarWind Sales Representative or send the request to: sales@starwind.com	
	Upload file StarWind license file (.swk)	
	Back Next	

6. Read and accept the End User License Agreement to proceed.

	StarWind Appliance Initial configu	Iration	
· · · · · · · · · · · · · · · · · · ·	✓ License	Review end-user license agreement	
		Review end-user license agreement	
	• EULA	Review and accept the following license agreement to continue	
		STARWIND LICENSE AGREEMENT FOR COMMERCIAL PRODUCTS	
	Administrator account	This StarWind License Agreement (the "Agreement") is a legal agreement between the entity indicated on the signature page as "Licensee" or the licensee entity on whose behalf this Agreement is electronically executed by the authorized user	
		(the "Licensee") and StarWind Software, Inc., a State of Delaware, USA corporation ("StarWind," and collectively with	
		Licensee, the "parties" and each, (a "Party")), that is entered into as of the date of acceptance hereof by both Parties	
		hereto (the <i>"Effective Date"</i>).	
		Licensee is subject to the terms and conditions of this Agreement whether Licensee accesses or obtains StarWind Product	
		directly from Website, or through any other source. By Using, installing, and/or Operating the StarWind Product, Licensee	
		agrees to be bound by the terms of this Agreement. If Licensee does not agree to the terms and conditions of this Agreement, StarWind is unwilling to license StarWind Product to Licensee. In such event, Licensee may not Use, install,	
		and/or Operate the StarWind Product in any way. The StarWind Product will not install and shall not be installed on any	
		computers, workstations, personal digital assistants, smartphones, mobile phones, hand-held devices, or other electronic	
		devices for which the Product was designed (each a <i>"Client Device"</i>), unless or until Licensee accepts the terms of this Agreement. Licensee may also receive a copy of this Agreement by contacting StarWind at: info@starwind.com.	
		THIS DOCUMENT, UNTIL CONFIRMED BY STARWIND, CONSTITUTES AN OFFER BY LICENSEE, AND LICENSEE, BY EXECUTING THIS DOCUMENT AGREES TO THE TERMS SET FORTH HEREIN. PROVIDED THAT LICENSEE HEREBY EXPRESSLY AGREES THAT	
		THIS DOCEMENT AGREES TO THE TERMS SET FORTH HEREIN, PROVIDED THAT ILLEWISE HEREDE EXPRESSION AGREES THAT THIS AGREEMENT ONLY BECOMES EFFECTIVE UPON STARWING'S FINAL ACCEPTANCE. APPROVAL AND EXECUTION	
		IF EXECUTED ELECTRONICALLY, LICENSEE WILL HAVE THE OPPORTUNITY TO ACCEPT THIS OFFER OF AGREEMENT	
		THROUGH A CLICK THROUGH PROCEDURE. IF LICENSEE DOES NOT WISH TO ACCEPT THE TERMS OF THIS AGREEMENT	
		✓ I accept the terms of the license agreement	
		Back	
		Datk Prest	

7. Review or edit the Network settings and click Next.

NOTE: Static network settings are recommended for the configuration.



	StarWind Appliance Initial configu	ration						
	✓ License ✓ EULA	Configure management net						
	 Management network 	 Specify the unique IP address (static is re The Management network is used to commit 						
= 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1		IP mode Static						
		NIC Model	Bandwidth	MAC address	IP address	Netmask 🛈	Gateway	
		ens160 82574L Gigabit Ne…	1 Gbit		192.168.12.206	255.255.254.0	192.168.12.1	
		Name servers (optional):						
		DNS 1 192.168.12.17						
		Time settings (optional):						
				Time zone UTC				
						Back	Next	

8. Specify the hostname for the virtual machine and click Next.

StarWind Appliance Initial config	guration	
 License 		
	Verify hostname	
✓ EULA	Check the current appliance hostname and modify it if required	
 Management network 	i) Use Latin letters, numbers, and dash	
Static hostname		
 Static nostname 		
Administrator account	SW1	
	Back Next	
	DdCK NKK	

9. Create an administrator account. Click Next.



StarWind Appliance Initial config		
Starwind Appliance Initial config	uration	
✓ License		
	Create administrator account	
🗸 EULA	Specify new credentials for the appliance administrator account	
✓ Management network		
 Management network 		
 Static hostname 	admin	
Administrator account		
	Additional information (optional)	
	Back Next	

10. Review your settings selection before setting up StarWind VSAN.

StarWind Appliance Initial config	guration			
✓ License	Review summary			
✓ EULA	Review summary			
◆ EOLA				
 Management network 	License type			
 Static hostname 	License			
 Administrator account 	Network settings			
Summary	Interface	ens160 (82574L Gigabit Network Connection)		
	Bandwidth			
	MTU			
	IP address			
	IP address			
	Appliance hostname			
	Credentials			
	Credentials			
	Administrator username	admin		
	Administrator username			
			Back Configure	

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



StarWind Appliance Initial configu	ration		
✓ License	Configuring settings		
✓ EULA	Please wait until all specified settings are applied		
 Management network 			
✓ Static hostname	Progress: 0%	👌 Time remaining: 🛛 - 3 sec	
 Administrator account 	 Applying license 		
✓ Summary	 Apprying ucense Configuring management network 		
• Configuration		×	

12. The appliance is set and ready. Click on the Done button to install the StarWind vCenter Plugin right now or uncheck the checkbox to skip this step and proceed to the Login page.

StarWind Appliance Initial configuration	
Initial configuration completed The essential settings were successfully configured. Press "Finish" to close the wizard and navigate to the login page.	
You can also install the StarWind vSphere plug-in if you want to access the StarWind Appliance web UI from your vSphere console.	
Launch the StarWind vCenter plug in installation wizard.	
t Tritish	

13. Repeat the initial configuration on other StarWind CVMs that will be used to create 2-node or 3-node HA shared storage.



Add Appliance

To create 2-way or 3-way synchronously replicated highly available storage, add partner appliances that use the same license key.

1. Add StarWind appliance(s) in the web console, on the Appliances page. NOTE: The newly added appliance will be linked to already connected partners.

StarWind			
🚔 Dashboard	App Add appliance		
🛢 Storage 🔻	Credentials		
🚑 Network		Credentials	
🗮 Appliances		Specify the appliance IP address and its administrator credentials The newly added appliance will be linked to already connected partners.	
🚊 Users		The newly added appliance will be linked to already connected partners.	
📋 Tasks and events 🛛 🔻			
		k	
		Cancel Next	
< Minimize			

2. Provide credentials of partner appliance.



StarWind Hyperconvergence			🗐 🌲 🏟 admin 💌
	Add appliance		
	Credentials	Credentials	Q #
		Specify the appliance IP address and its administrator credentials The newly added appliance will be linked to already connected partners.	Raw capacity \$ 0 Bytes
		IP address 192.168.12.166 Administrator username admin Administrator password 	
		Cancel	
< Minimize			

3. Wait for connection and validation of settings.

 App Adaptine (Comparison of the paper of the pap
Cancel

4. Review the summary and click "Add appliance".



StarWind hyperconvergence			🖽 🌲 🎄 admin 💌
	App Add appliance		
	CredentialsSummary	Summary	
		Appliance name SW2 Storage capacity 0.68 Storage pools 0 Volumes 0	
		Back Add appliance	

Configure Ha Networking

1. Launch the "Configure HA Networking" wizard.

StarWind							E	l 🌲 🏟 admir	in 🔻
Dashboard	Network								
🖥 Storage 🛛 🔻		Configure HA networking							
Network	🗌 Interface 🗢	Adapter model 🗢	Link status 👙	Bandwidth 🗘	MAC address 🗢	Role ≑	IP address 💠	Appliance 🗘	
	🔲 📜 ens160	82574L Gigabit Net	Up		00:50:56:9C:E5:A5	Management			
asks and events 🛛 🔻	🔲 📜 ens160	82574L Gigabit Net				Management			
isks and events	🗌 📜 ens224	VMXNET3 Ethernet	Up			Unassigned			
	🔲 📜 ens224	VMXNET3 Ethernet				Unassigned			
	🔲 📜 ens256	VMXNET3 Ethernet	Down			Unassigned			
	🔲 📜 ens256	VMXNET3 Ethernet				Unassigned			
Minimize									[



2. Select appliances for network configuration.

NOTE: the number of appliances to select is limited by your license, so can be either two or three appliances at a time.

StarWind					🗏 🌲 🏟 admin 🝷
🕮 Dashboard	Configure HA networking				
 Storage Network Appliances 	Appliances Data network Replication network	Appliances Select appliances for network configuration. Yo	u can configure up to three appliances at a time.		
🔔 Users		Appliance ≑	Status 🗢	Adapters 💠	
📋 Tasks and events 🔹		🔽 🗮 SW1	Online		
		🗹 🧮 SW2	Online		
				Close Next	
∢ Minimize					

3. Configure the "Data" network. Select interfaces to carry storage traffic, configure them with static IP addresses in unique networks, and specify subnet masks:

- assign and configure at least one interface on each node
- for redundant configuration, select two interfaces on each node
- ensure interfaces are connected to client hosts directly or through redundant switches

4. Assign MTU value to all selected network adapters, e.g. 1500 or 9000. Ensure the switches have the same MTU value set.



StarWind									🗐 🌲 🏠 admin 🔻
 Dashboard Storage 	Configure HA networking								
🚆 Network	AppliancesData network	 Show sample netw SW1 . 	ork diagram						
AppliancesUsers		Interface	Model	Bandwidth	MAC address	IP address	Netmask	Link status	
📋 Tasks and events 🔹 🔻			VMXNET3 Ethernet	10 Gbit 10 Gbit	00:50:56:9C:21:E1 00:50:56:9C:C4:73			Up Down	
		₩2 ▲							
		Interface ens224	Model VMXNET3 Ethernet	Bandwidth 10 Gbit	MAC address 00:50:56:9C:D8:13	IP address 172.16.10.20	Netmask ①	Link status	
			VMXNET3 Ethernet					Down	
		Cluster MTU size: MTU 9000							
							Back	Next	
4 Minimize									

5. Click Next to validate Data network settings.

6. Configure the "Replication" network. Select interfaces to carry storage traffic, configure them with static IP addresses in unique networks, and specify subnet masks:

- assign and configure at least one interface on each node
- for redundant configuration, select two interfaces on each node



 ensure interfaces are connected to client hosts directly or through redundant switches

7. Assign MTU value to all selected network adapters, e.g. 1500 or 9000. Ensure the switches have the same MTU value set.

StarWind			
	Configure HA networking		
	Select interfaces to carry data replication traffic, configure them with unique IP addresses, and specify subnet masks.	Q ≞ … Appliance ¢ SW1	
📋 Tasks and events 🛛 🔻		SW1 * Interface Model Bandwidth MAC address IP address Netmask • Link status Image: ens256 VMXNET3 Ethermet 10 Gbit 00:50:56:9C:C4:73 172:16:20:10 24 Down	SW2 SW1 SW2
		SW2 Interface Model Bandwidth MAC address IP address Netmask 0 Link status	SW1 SW2
		Back Next	
4 Minimize			

8. Click Next to validate the Replication network settings completion.

StarWind						🗐 🌲 🏟 admin 🔻			
Dashboard									
🖹 Storage 🔻									
A Network									
AppliancesUsers									
Tasks and events		SW1 🖈 🔺 Non-redundant configuration	on ×						
		Only 1 Replication network is configured. Replication networks to eliminate a single	a point of						
		failure.	72.16.20						
		We recommended assigning at least two dat interfaces to eliminate a single point of failur							
		Acknowledge and continue?							
		Cluster MTU si	Yes, continue						
4 Minimize									



StarWind			
 Dashboard Storage 			
Appliances Users			
📋 Tasks and events 🛛 🔻			
		SW2 . Testing network settings	
4 Minimize		×	

9. Review the summary and click Configure.

StarWind					E] 🌲 🍪 admin 🔻
💭 Dashboard	Configure HA networking					
Storage 👻	✓ Appliances ✓ Data network	Summary				
 Appliances Users Tasks and events 	 Replication network Summary 	Appliance name Data networks Replication networks	₩ SW1 172.16.10.10 172.16.20.10			
		Appliance name Data networks Replication networks	₩ SW2 172.16.10.20 172.16.20.20			
		Replication networks	112.10.20.20			
				Back Configure		
< Minimize						



Add Physical Disks

Attach storage to StarWind Virtual SAN Controller VM:

- the physical hosts have all the drives connected through an HBA or RAID controller
- HBA or RAID controller will be added via a DirectPath I/O passthrough device to a StarWind CVM. Follow the instructions from the VMware on how to add a RAID controller as a PCI device to StarWind VM: https://docs.vmware.com/en/VMware-vSphere/8.0/vsphere-esxi-host-client/GUID-2 B6D43A6-9598-47C4-A2E7-5924E3367BB6.html
- StarWind CVM is installed on each server that is used to configure highly available storage.
- it is recommended to install StarWind CVM on a separate storage device available to the hypervisor host (e.g. SSD, HDD, etc.).
- for VMware vSphere environments, the disks can be added to StarWind VM as RDM. The link to VMware documentation is below: https://docs.vmware.com/en/VMware-vSphere/7.0/com.vmware.vsphere.vm_admin .doc/GUID-4236E44E-E11F-4EDD-8CC0-12BA664BB811.html

NOTE: In order to make RDM and VMDK disks available for StarWind devices in StarWind CVM Version 20231016 (build 15260), please follow the steps below.

stop service

sudo systemctl stop starwind-san-and-nas-console

• get VMDK/RDM/ device letter using lsblk command

lsblk |grep -v sda # sda - is excluded system drive.

• edit config file

sudo nano /opt/starwind/starwind-san-and-nasconsole/appsettings.json

• add lines to the file, previously setting the disk letters to config (e.g. sdb, sdc)

```
"HardwareRaidImulation": {"PhysicalDisks": [ "sdb", "sdc" ]
},
```



• start service

sudo systemctl start starwind-san-and-nas-console

StarWind Hyperconvergence								🌲 🏟 admin 🔻
🛱 Dashboard	Physical disks							
🛢 Storage 🔺	Selected 0 of 6 Rescan							
👮 File shares	🗌 Disk name 💠	Media type 🗢	Size ≑	State ≑	Bus protocol 💠	Slot number 💠	Pool name 💠	Appliance ≑
🚊 LUNS	🗌 💻 sdb			Ready				
Uolumes	🗌 💻 sdb			Ready				
 Storage pools Physical disks 	🔲 💻 sdc			Ready				
A Network	🗖 💻 sdc			Ready				
Appliances	🔲 🛋 sdd			Ready				
Lusers	🔲 💻 sdd			Ready				
🖹 Tasks and events 🔻								
4 Minimize								

Create Storage Pool

- 1. Click the "Add" button to create a storage pool.
- 2. Select two storage nodes to create a storage pool on them simultaneously.



StarWind		🗐 🌲 🍄 admin 🕶
🗳 Dashboard	Storage pools	
🛢 Storage 🔺	Selected 0 of 0 + Create anew pool	
	There are no storage pools yet	
🕒 Volumes	 Start building your storage infrastructure by creating a new one 	
III Storage pools		
💻 Physical disks		
🏭 Network		
Appliances		
💄 Users		
🖹 Tasks and events 🔻		
4 Minimize		

Stol Create storage pool				
Selecto: Appliance Physical disks Profile Summary	Appliance Select one or more storage nodes to create a storage pool Image: The storage nodes to create a storage pool Image: The storage nodes to create a storage pool Image: The storage nodes to create a storage pool Image: The storage nodes to create a storage nodes to create a storage pool Image: The storage nodes to create a storage node to create a storage node to create a storage nodes to create a storage nodes to create a storage node to	Available disks 🏶 Available i 3	tapa ¢ 15 GB	
	🗷 🗮 SW2 🛛 Online			
		Cancel	Next	

3. Select physical disks to include in the storage pool name and click the "Next" button. NOTE: Select identical type and number of disks on each storage node to create identical storage pools.

StarWind Virtual SAN: Configuration Guide for Microsoft Windows Server [Hyper-V], VSAN Deployed as a Controller Virtual Machine (CVM) using Web UI



StarWind hyperconvergence						🗉 🌲 🏠 admin 💌
	Stol Create storage pool					
	Selector Appliance Physical disks Profile Summary	Physical disks Select physical disks to include in st	torage pools on each node 🛛			
		 ■ Disk name Medi ✓ ■ sdb HDD ✓ ■ sdc HDD 		Size \$ Slot \$ Slot \$ Size \$ Slot \$ Size \$ 32:0:1:0 \$ 5 GB \$ 32:0:2:0 \$ Size \$ 32:0 \$ Size \$ 32:0:2:	Contro \$ SAS1068 PC	
		Sdd HDD			SAS1068 PC	
		Sdb HDD		Size \$ Slot \$	Contro \$ SAS1068 PC	
		Selected number of disks is eq		5 GB 32:0:2:0	SAS1068 PC	
< Minimize						

4. Select one of the preconfigured storage profiles or create a redundancy layout for the new storage pool manually according to your redundancy, capacity, and performance requirements.

StarWind Hyperconvergence			
🙆 Dashboard	Sto Create storage pool		
 Storage File shares EUNs 	Selectec Appliance Physical disks 	Profile Choose an optimal storage pool profile. Selected disks left unused will be assigned to hot spares.	
Volumes	Profile Summary	Storage pool profile Usable capacity Fault tolerance 🗨 Hot spares	
Storage pools Physical disks		 High capacity (recommended) Maximize redundancy while maintaining high 9.9 GB 1 = 0 + storage capacity (Software RAID (RAID-5) 	
🚓 Network		High performance Maximize storage performance while maintaining 4.95 GB 1 1	
🚊 Users		Manual Allows you to configure the storage pool layout monumbly.	
		Back	
< Minimize			

Hardware RAID, Linux Software RAID, and ZFS storage pools are supported and integrated into the StarWind CVM web interface. To make easier the storage pool configuration, the preconfigured storage profiles are provided to configure the



recommended pool type and layout according to the direct-attached storage:

- hardware RAID configures Hardware RAID's virtual disk as a storage pool. It is available only if a hardware RAID controller is passed through to the CVM
- high performance creates Linux Software RAID-10 to maximize storage performance while maintaining redundancy
- high capacity creates Linux Software RAID-5 to maximize storage capacity while maintaining

redundancy

- better redundancy creates ZFS Stripped RAID-Z2 (RAID 60)) to maximize redundancy while maintaining high storage capacity
- manual allows users to configure any storage pool type and layout with attached storage

5. Review "Summary" and click the "Create" button to create the pools on storage servers simultaneously.

StarWind			
Dashboard	Stol Create storage po	ગ	
Eleshares ELUNs UNus UNus	Selecter ✓ Appliance ✓ Physical disks ✓ Profile	Summary Review specified settings and create storage pools. 晉 SW1	
Volumes Storage pools Physical disks	• Summary	Storage pool layout Software RAID\RAID-S Raw capacity 10 GB Usable capacity 9.9 GB	
_å, Network Ⅲ Appliances ▲ Users		Storage pool layout Software RAID\RAID-S Raw capacity 10 GB Usable capacity 9.9 GB	
Tasks and events *			
		Ba	ck Crrate
< Minimize			

Create Volume

- 1. To create volumes, click the "Add" button.
- 2. Select two identical storage pools to create a volume simultaneously.



StarWind		🗐 🌲 🍄 admin 🕶
o Dashboard	Volumes	
🛢 Storage 🔺	Selected 0 of 0 🛧 Create a new volume nage VHR user	
File shares EUNs		
🕑 Volumes	There are no volumes yet Start sharing your storage resources to clients by creating a new one	
Storage pools		
Physical disks A Network		
Appliances		
Lusers		
💼 Tasks and events 🔻		
∢ Minimize		

StarWind hyperconvergence							
🙆 Dashboard	Volt Create volume						
Storage *	Selecter • Storage pool Settings Filesystem type	Select storage pool Select one or more (in HA configuratio	ns) storage pools to cr	reate a volume (9		
Volumes		 Name \$ SW1:md0 	Type 💠 Software RAID	State ≑ Online	Resiliency 🗢	Free 🗢 9.98 GB	
Physical disks		🗹 🏾 SW2:md0	Software RAID	Online	RAID-5	9.98 GB	
📲 Network							
Appliances							
📋 Tasks and events 🛛 🔫							
					Cancel	Next	
∢ Minimize							

3. Specify volume name and capacity.



StarWind hyperconvergence					🗐 🌲 🏟 admin 🔻
	Volu Create volume				
	Selector Storage pool • Settings Filesystem type Summary	Specify settings Specify the volume name and size volume0 You can use Latin letters, numbers, and dash Size 5 Available storage pool capacity: 9.98 GB			
			Back	Next	
∢ Minimize					

4. Select the Standard volume type.

StarWind			
😂 Dashboard	Volt Create volume		
 Storage File shares UUts Volumes Storage pools Physical disks Physical disks Appliances Users Users 	Selector Storage pool Settings In Filesystem type Summary	Choose filesystem settings Choose the preferred filesystem settings for the new volume Image: Standard Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the new volume Image: Choose the preferred filesystem settings for the preferred file	
< Minimize			

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



StarWind hyperconvergence			🖽 🌲 🎄 admin 💌
	Volt Create volume		
	Selective 🗸 Storage pool 🗸 Settings V Filesystem type	Review summary Review your settings before creating a volume	
	e Summary	Storage pool 🛛 SW1:md0 Volume name volume0 Size 5 GB Filesystem settings Standard	
		≣ sw2	
		Storage pool 🔮 SV2:md0 Volume name volume0 Size 5 GB Filesystem settings Standard	
		Back	Create
< Minimize			

Create Ha Lun

The LUN availability for StarWind LUN can be Standalone and High availability (2-way or 3-way replication) and is narrowed by your license.

1. To create a virtual disk, click the Add button.



StarWind		é (¢	admin 🔻
🙅 Dashboard	LUNs			
Storage File shares	Selected 0 of 0 + Create a new LUN > LUN			
👮 LUNs	There are no LUNs yet			
🕒 Volumes	Start sharing your storage resources to clients by creating a new one			
Storage pools				
💻 Physical disks				
🏭 Network				
Appliances				
Lusers				
📋 Tasks and events 🛛 🔻				
◀ Minimize				

2. Select the protocol.

LUN Create LUN		
Selecter LUN availability Appliances	Protocol Select the required Protocol	
Volumes Failover strategy LUN settings Summary	NV/Me-oF NVMe of is a recommended option for high-performance SSD or NVMe setups. Before you proceed, make sure that your clients are NVMe-of compatible.	
	iscsi is a recommended protocol for most HDD based setups or medium performance SSD based setups. This option offers broader compatibility for storage clients.	
	Close Next	

3. Choose the "High availability" LUN availability type.



StarWind			📋 🌲 🏠 admin 👻
	LUN Create LUN		
	LUN availability	EUN availability Better the required LUN availability • • Planaability (two-way replication) Charts a synchronously replicated LUN housed on two or three identical appliances. The UN stays accessible if one of the replication partners becomes unavailable. Planaability (UN housed on a single appliance. The UN will not be accessible if its Nota becomes unavailable.	

4. Select the appliances that will host the LUN. Partner appliances must have identical hardware configurations, including CPU, RAM, storage, and networking.

StarWind						🗐 🌲 🏟 admin 💌
	UN Create LUN					
Sc	electec ✓ Protocol ✓ LUN availability	Appliances Select two or three replication partne	rs that should host the	HALUN		
E LUNS	Appliances Volumes	All appliances must have identical h	ardware configuration	s, including CPU, RAM, storage, and	networking	
Storage pools Physical disks	Failover strategy LUN settings	Appliance	Status Online	Software version 1.5.460.5391+76fc51b	Capacity 15 GB	
≜≣a Network	Summary	SW1	Online	1.5.460.5391+76fc51b	15 GB	
 Appliances Users 						
📋 Tasks and events 🛛 👻						
				Back	Next	
< Minimize						

5. Select a volume to store the LUN data. Selected volumes must have identical storage configurations.



StarWind hyperconvergence			🗄 🌲 🏠 admin 🔻
	LUN Create LUN		
	Selecto: V Protocol V LUN availability V Appliances Volumes	Volumes Select one volume on each appliance to store the HA LUN data. Selected volumes must have identical storage configurations. Volumes have identical configurations	
	Failover strategy LUN settings Summary	SW1 ▲ Volume ⊕ State ⊕ RAID le ⊕ Capacity ⊕ Free Sp ⊕ Type ⊕ @ € volume0 Mounted RAID-5 5 GB 4.92 GB Standard	
		ﷺ SW2 ▲ Volume ⊕ State ⊕ RAID le ⊕ Capacity ⊕ Free Sp ⊕ Type ⊕	
		Control Mounted RAID-5 5 GB 4.92 GB Standard	
		Back Next	

6. Select the "Heartbeat" failover strategy.

NOTE: To use the Node witness or the File share witness failover strategies, the appliances should have these features licensed.

StarWind Hyperconvergence		🗐 🌲 🎲 admin *
🛱 Dashboard	LUN Create LUN	
File shares	Clock Protocol ✓ LUN availability Failover strategy ✓ LUN availability Select the preferred failover strategy. The default is "Heartbeat". However, you can choose another method ✓ Appliances have a UPS unit at your disposal.	Q 🚓 🗤
 Volumes Storage pools Physical disks 	Volumes Failover strategy i "Heartbeat" (Recommended) LUN settings	
💼 Network 📰 Appliances 🚨 Users	Summary Node witness A third applance sets as a "number" for replication partners. The working witness node excludes the possibility of a "split brain" condition.	
📋 Tasks and events 🤍 👻		
	Back	Next
 Minimize 		

7. Specify the HA LUN settings, e.g. name, size, and block size. Click Next.



StarWind			🗐 🌲 🛟 admin 🔻
	LUN Create LUN		
	Stetter Y Protocol LUN availability Appliances Y Volumes Failover strategy LUN settings Summary	LUN settings Specify the HA LUN settings Lun same Lun Lun </th <th></th>	
4 Minimize			

8. Review "Summary" and click the "Create" button to create the LUN.

StarWind				
🕮 Dashboard	Create LUN			
 torage File shares UNs Volumes Storage pools Physical disks Network Appliances Users Tasks and events 	 Protocol LUN availability Appliances Volumes Failover strategy LUN settings Summary 	Summary Protocol LUN availability Appliance 1 Appliance 2 Volume names Volume names Volume sizes Failover strategy LUN name LUN size MPIO Create VMF56 datastore IQNS	iSCSI High availability (two-way replication) S SW1 SW2 volume0, volume0 S G8 Heartbeat Lun0 4 G8 Enabled Faabled No Iqn.2006.08,com.starwindsoftware:192.166.12.206-lun0 jan.2008.08,com.starwindsoftware:192.166.12.166-lun0	
			Back Create LUH	
< Minimize				



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.



MP	IO Properti	es			×
MP	PIO Devices	Discover Multi-Paths	DSM Install	Configuration Snaps	hot
	SPC-3 comp	liant			
	Device Ha	ardware Id			
	Add sup	port for iSCSI devices			
	Add sup	port for SAS devices			.
				Add	
Lr	Others				
	Device Ha	ardware Id			
				Add	
				OK Cance	el
				Cante	

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.



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 dis the Advanced button.	covery of the target portal, dick				
IP address or DNS name: 172.16.10.100	Port: (Default is 3260.) 3260				
<u>A</u> dvanced	<u>Q</u> K <u>C</u> ancel				

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.



Connect using	
ocal adapter:	Microsoft iSCSI Initiator
nitiator IP:	172.16.10.10 ~
_ [arget portal IP:	~
CRC / Checksum	
Data digest	<u>H</u> eader digest
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa nitiator. The name w	
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa nitiator. The name w specified.	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this
EHAP helps ensure co an initiator. Fo use, specify the si	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the si- nitiator. The name w specified. Mame: Target secret: Perform mutual au To use mutual CHAP, RADIUS.	nation connection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is iqn.1991-05.com.microsoft:ws2019

5. The target portals are added on this server.



iSC	SI Initi	ator Proper	tie	5						Х
Та	rgets	Discovery	Fa	vorite Targets	Volumes	and Devices	RADIU	S Con	figuration	
	Targe	t portals —								
			ok f	or <u>T</u> argets on fo	ollowing po	rtals:		R <u>e</u> fre	sh	
	Addr	ess		Port	Adapte	r		IP add	lress	
	172.	16.10.100		3260	Microso	ft iSCSI Initia	ator	172.1	6.10.10	
	To ad	ld a target p	orta	al, click Discover	Portal.		Dis	cover <u>F</u>	ortal	
		move a targ click Remove		ortal, select the	address a	bove and		<u>R</u> emo	ve	
	iSNS s	ervers								
	The s	ystem is reg	iste	red on the follo	wing <u>i</u> SNS s	servers:		Refre	sh	
	Name	2								
	To ad	ld an iSNS se	erve	r, click Add Serv	/er.		4	\ <u>d</u> d Ser	ver	
				erver, select the		ove and				
		click Remove		,				Re <u>m</u> o	ive	
						011	-			
						OK	Can	tel	Apply	

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



iSCSI Initiator Properties	×
Targets Discovery Favorite Targets Volumes and Devices RADIUS Configurat	ion
Quick Connect To discover and log on to a target using a basic connection, type the IP address or DNS name of the target and then dick Quick Connect.	
Target: Quick Connect	
Discovered targets	
<u>R</u> efresh	_
Name Status ign. 2008-08.com.starwindsoftware: 192, 168, 12, 158: 3261-sw-virtual-disk Inactiv	
iq1,2006-06.com.stal windsoftwale, 192, 106, 12, 106, 5201-5w-vill dahusk - 11acuv	
<	>
To connect using advanced options, select a target and then Connect.	
To completely disconnect a target, select the target and then dick Disconnect.	
For target properties, including configuration of sessions, select the target and click Properties.	
For configuration of devices associated with a target, select Devices	
OK Cancel	<u>pply</u>

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.



Connect To Target			
Target name:			
18-08.com.starwindsoftware: 192.168.12.158:3261-sw-virtual-disk			
Add this connection to the list of Favorite Targets. This will make the system automatically attempt to restore the connection every time this computer restarts.			
Enable multi-path			
Advanced OK C	ancel		

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.



	?	
ieral IPsec		
Connect using		
ocal adapter:	Microsoft iSCSI Initiator $\qquad \qquad \lor$	
initiator <u>I</u> P:	172.16.10.10 ~	
[arget portal IP:	172.16.10.100 / 3260 \checkmark	
CRC / Checksum		
Data digest	Header digest	
pecified.		
Jame:	iqn.1991-05.com.microsoft:ws2019	
_		
larget <u>s</u> ecret:		

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.

C 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.

Provisioning Starwind Ha Storage To Windows Server Hosts

1. Launch Microsoft iSCSI Initiator: Start -> Windows Administrative Tools -> iSCSI Initiator. Alternatively, launch it using the command below in the command line interface:

iscsicpl

2. Navigate to the Discovery tab.



iSC	SI Init	iator Prope	ties				×
Та	argets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
	Targe	t portals					
	The s	system will lo	ok for Targets on fo	llowing portals:	l l	Refresh	
	Addr	ess	Port	Adapter	I	P address	
	To ac	ld a target p	ortal, click Discover	Portal.	Disco	ver Portal	
		move a targ click Remove		address above and	F	Remove	
	iSNS s	ervers					
	The s	system is reg	istered on the follow	wing iSNS servers:	I	Refresh	
	Nam	e					
	To ac	ld an iSNS se	erver, click Add Serv	ver.	Add	d Server	
	To re then	move an iSN click Remove	S server, select the e.	server above and	F	Remove	
				ОК	Cancel	Apply	

3. Click the Discover Portal button. The Discover Target Portal dialog appears. Type 172.16.10.10.



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 dis the Advanced button.	covery of the target portal, dick				
IP address or DNS name: 172.16.10.10	Port: (Default is 3260.) 3260				
Advanced	OK Cancel				

4. Click the Advanced button. Select Microsoft iSCSI Initiator as a Local adapter and select Initiator IP. Confirm the actions to complete the Target Portal discovery.



dvanced Settings		?	Х
General IPsec			
Connect using			
Local adapter:	Microsoft iSCSI Initiator	~	
Initiator IP:	172.16.10.1	\sim	
Target portal IP:		\sim	
CRC / Checksum			
Data digest	Header digest		
	ne name and CHAP secret that was configured on the target for I default to the Initiator Name of the system unless another name		
Name:	iqn.1991-05.com.microsoft:sw01		
Target secret:			
RADIUS.	hentication ither specify an initiator secret on the Configuration page or use erate user authentication credentials henticate target credentials		
	OK Cancel	Арр	oly

5. Click the Discover Portal... button once again.

6. In Discover Target Portal dialog, type in the iSCSI interface IP address of the partner 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 disc the Advanced button.	overy of the target portal, click				
IP address or DNS name: 172.16.10.20	Port: (Default is 3260.) 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.



Connect using	
ocal adapter:	Microsoft iSCSI Initiator \sim
nitiator IP:	172.16.10.1 ~
arget portal IP:	\sim
CRC / Checksum	
Data digest	Header digest
n initiator. o use, specify the sa nitiator. The name w	
CHAP Log on inform CHAP helps ensure co in initiator. To use, specify the sa nitiator. The name w pecified.	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is
CHAP Log on inform CHAP helps ensure co an initiator.	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this

8. Now, all the target portals are added on the first node.



iSCSI Initiator Properties						\times	
Та	rgets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
	Targe	t portals					
	The s	ystem will lo	ok for Targets on fo	ollowing portals:		Refresh	
	Addr	ess	Port	Adapter	I	P address	
	172.	16.10.10	3260	Microsoft iSCSI Initia	tor	172.16.10.1	
	172.16.10.20 3260		3260	Microsoft iSCSI Initia	tor 1	172.16.10.1	
				Portal. address above and		over Portal Remove	
	then	click Remove					
	The s		istered on the follow	wing iSNS servers:		Refresh	
	Name						
	To ad	d an iSNS se	rver, dick Add Serv	/er.	Ad	d Server	
	To remove an iSNS server, select the server above and then dick Remove.					Remove	
				ОК	Cance	Apply	,

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

iSCSI Initiator Properties	×
Targets Discovery Favorite Targets Volumes and Devices Quick Connect To discover and log on to a target using a basic connection,	
DNS name of the target and then click Quick Connect.	type the 1P address of
Target:	Quick Connect
Discovered targets	
	Refresh
Name	Status
iqn.2008-08.com.starwindsoftware:sw1-csv1	Inactive
iqn.2008-08.com.starwindsoftware:sw1-csv2	Inactive
iqn.2008-08.com.starwindsoftware:sw1-witness	Inactive
iqn.2008-08.com.starwindsoftware:sw2-csv1	Inactive
iqn.2008-08.com.starwindsoftware:sw2-csv2	Inactive
iqn.2008-08.com.starwindsoftware:sw2-witness	Inactive
To connect using advanced options, select a target and ther click Connect.	n Connect
To completely disconnect a target, select the target and then click Disconnect.	Disconnect
For target properties, including configuration of sessions, select the target and click Properties.	Properties
For configuration of devices associated with a target, select the target and then click Devices.	Devices
ОК	Cancel Apply

2. Select the Witness target from the local server and click Connect.

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



Connect To Target	×			
Target name:				
iqn.2008-08.com.starwindsoftware:sw1-witness				
Add this connection to the list of Favorite Target: This will make the system automatically attempt t connection every time this computer restarts.				
∑ Enable multi-path				
<u>A</u> dvanced	OK Cancel			

4. 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.



Connect using	
Local adapter:	Microsoft iSCSI Initiator \checkmark
Initiator IP:	172.16.10.1 ~
Target portal IP:	172.16.10.10 / 3260 \checkmark
CRC / Checksum	
Data digest	Header digest
an initiator. To use, specify the sa nitiator. The name w	
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa nitiator. The name w specified.	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa initiator. The name w specified. Name:	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa initiator. The name w specified.	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is

- 5. Repeat the steps 2-4 to connect to partner node.
- 6. Select the CSV1 target discovered from the local server and click Connect.
- 7. Enable checkboxes as shown in the image below. Click Advanced.



Connect To Target	×
Target name:	
iqn.2008-08.com.starwindsoftware:sw1-csv1	
Add this connection to the list of Favorite Targets. This will make the system automatically attempt to restore the connection every time this computer restarts.	
Enable multi-path	
Advanced OK	Cancel

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 partner target from the other StarWind node and click Connect.

10. Repeat the step 6.

11. 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.



eral IPsec	
Connect using	
.ocal adapter:	Microsoft iSCSI Initiator $\qquad \qquad \lor$
nitiator IP:	172.16.10.1 ~
Farget portal IP:	172.16.10.20 / 3260 🗸
CRC / Checksum	
Data digest	Header digest
CHAP Log on inform CHAP helps ensure c in initiator. To use, specify the s nitiator. The name v	
CHAP helps ensure c an initiator. To use, specify the s nitiator. The name v	nation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is
CHAP Log on inform CHAP helps ensure c an initiator. Fo use, specify the s	nation connection security by providing authentication between a target and came name and CHAP secret that was configured on the target for this
CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s nitiator. The name w specified.	nation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is

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

12. Repeat the steps 1-11 on the other StarWind node, specifying corresponding data channel IP addresses.

Configuring Multipath

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



load balancing policy.

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.

Devices			×
	1		
Name	Address		
Disk 2	Port 5: Bus	0: Target 2: LUN 0	
Volume path	names:		
Legacy devic	e name:	\\.\PhysicalDrive2	
Device interf	face name:	\\?\mpio#disk&ven_starwind&pro	od_starwind&rev_000
Device interi	ace name.	<	>
Configure Mu	ultipath IO (M	IPIO)	
	e the MPIO po vice, click MPI		MPIO
			ОК

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.



📅 Disk Managem	ient							_	×
File Action View Help									
🔶 🔿 📰 📝									
Volume	Layout	Туре	File Syster	m	Status	Capacity	Free Spa	% Free	
Storage (D:)	Simple	Basic	NTFS		Healthy (P	49.87 GB	32.78 GB	66 %	
- System (C:)	Simple	Basic	NTFS		Healthy (B		6.53 GB	27 %	
- System Reserved	d Simple	Basic	NTFS		Healthy (S	500 MB	172 MB	34 %	
- Disk 0									^
Basic 25.00 GB Online	System ReservedSystem (C:)500 MB NTFS24.51 GB NTFSHealthy (System, Active, Primary PartitiHealthy (Boot, Page File, Crash Dump, Primary Partition)								
Disk 1 Basic 49.88 GB Online	Storage (D:) 49.87 GB NTFS Healthy (Prima	y Partition)							
Obisk 2 Unknown 6.00 GB Offline	6.00 GB Unallocated								
Obisk 3 Unknown 10.00 GB Offline	10.00 GB Unallocated								1
*O Disk 4 Unknown 1.00 GB Offline i	1.00 GB Unallocated							1	
Unallocated	Primary partition]			Ý

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.



Initialize Disk	×
You must initialize a disk before Logical Disk Manager can access it.	
Select disks:	
☑ Disk 2	
☑ Disk 3	
✓ Disk 4	
Use the following partition style for the selected disks:	
MBR (Master Boot Record)	
GPT (GUID Partition Table)	
Note: The GPT partition style is not recognized by all previous versions of Windows.	
OK Cancel	

- 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.

New Simple Volume Wizard	×		
Assign Drive Letter or Path For easier access, you can assign a drive letter or drive path to your partition.			
 Assign the following drive letter: Mount in the following empty NTFS folder: 			
O Do not assign a drive letter or drive path			
< Back Next > Ca	incel		



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				
Format Partition To store data on this partition, you m	ust format it first.			
Choose whether you want to format	this volume, and if so, what settings you want to use.			
O Do not format this volume				
Format this volume with the format	llowing 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.



New Simple Volume Wizard	×		
Assign Drive Letter or Path For easier access, you can assign a drive letter or drive path to your partition.			
 Assign the following drive letter: Mount in the following empty NTFS folder: 	E v		
	Browse		
Do not assign a drive letter or drive path			
	< Back Next > Cancel		

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.

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-t ools

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.

Server Manager > Dashboard Image Tools View Help Image Cluster-Aware Updating Component Services Component Services Component Services Computer Management Defragment and Optimize Drives Disk Cleanup Image Hyper-V Image Configure this local server Defragment and Optimize Drives Disk Cleanup Image Hyper-V Image Add roles and features Image Image Hyper-V Image Hyper-V Image Add other servers to manage Hyper-V Manager Image Image Image Hyper-V Image Hatt's NEW Image Create a server group ODBC Data Sources (32-bit) ODBC Data Sources (32-bit) ODBC Data Sources (32-bit) ODBC Data Sources (32-bit) Print Management Image LEARN MORE Image File counce Print Management Print Management	🚡 Server Manager		– 🗆 X
Image: Dashboard WELCOME TO SERVER MANAGER Cluster-Aware Updating Image: Local Server Image: Local Server Component Services Image: Local Server Image: Local Server Disk Cleanup Image: Local Servers Image: Local Server Disk Cleanup Image: File and Storage Services ▷ Image: Local Server Disk Cleanup Image: Hyper-V Image: Local Server Disk Cleanup Image: Unick START Image: Local Server Event Viewer Image: Unick START Image: Local Server Hyper-V Image: Unick START Image: Local Server Hyper-V Image: Unick START Image: Local Server Hyper-V Image: Unick START Image: Local Server Local Server Image: Unick START Image: Local Server Hyper-V Image: Unick START Image: Local Server Hyper-V Image: Unick START Image: Local Server Hyper-V Image: Unick START Image: Local Server Local Server Image: Unick Start Image: Local Server Local Server Image: Unick Start Image: Local Server Local Server Image: Unick Start Im	Server Ma	anager 🕨 Dashboard 🛛 🗸 🕫 🖡 Manag	e <mark>Tools</mark> View Help
 All Servers File and Storage Services ▷ Hyper-V Add roles and features Add other servers to manage Add other server group Connect this server to cloud ser Microsoft Azure Services MPIO ODisk Cleanup Event Viewer Failover Cluster Manager iSCSI Initiator Local Security Policy Microsoft Azure Services MPIO ODBC Data Sources (32-bit) ODBC Data Sources (64-bit) Performance Monitor Print Management 	The second secon		Component Services Computer Management
Hyper-V QUICK START 2 Add roles and features Hyper-V Manager 3 Add other servers to manage Local Security Policy WHAT'S NEW 4 Create a server group MPIO 5 Connect this server to cloud ser ODBC Data Sources (32-bit) Performance Monitor Performance Monitor Print Management Print Management	All Servers	1 Configure this local serve	Disk Cleanup Event Viewer
WHAT'S NEW 4 Create a server group Microsoft Azure Services 5 Connect this server to cloud ser ODBC Data Sources (64-bit) LEARN MORE Performance Monitor	🖪 Hyper-V	2 Add roles and features	Hyper-V Manager iSCSI Initiator
LEARN MORE 5 Connect this server to cloud ser ODBC Data Sources (64-bit) Performance Monitor Print Management		WHAT'S NEW	Microsoft Azure Services
		5 Connect this server to cloud	SET ODBC Data Sources (64-bit)
ROLES AND SERVER GROUPS Services			Resource Monitor
Roles: 2 Server groups: 1 Servers total: 1 System Configuration File and Observer System Information		Roles: 2 Server groups: 1 Servers total: 1	System Information
File and Storage Services Manageability File and Storage Manageability File and Storage Manageability Task Scheduler Windows Firewall with Advanced Security Windows Memory Diagnostic		Services 1 Hyper-V	Windows Firewall with Advanced Security

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



🖏 Failover Cluster Manager			_	×
				^
File Action View Help				
Failover Cluster Manager	Ac	tions		
Create failover clusters, validate hardware for potential failover clusters, and perform	Fai	ilover Cluster Manager		•
Configuration changes to your failover clusters.	1	Validate Configuration		
	1	Create Cluster		
	聯	Connect to Cluster		
A failover cluster is a set of independent computers that work together to increase the availability of server roles. The clustered servers (called nodes) are connected by physical		View		•
cables and by software. If one of the nodes fails, another node begins to provide services. This process is known as failover.	Q	Refresh		
		Properties		
O Clusters	?	Help		
Name Role Status				
No items found.				
Management				
To begin to use failover dustering, first validate your hardware configuration, and then create a cluster. After these steps are complete, you can manage the cluster. Managing a cluster can include copying roles to it from a cluster running Windows Server 2016 or supported previous versions of Windows Server.				
More Information				
Follower cluster topics on the Web				
Failover cluster copics on the Web				
Microsoft support page on the Web				

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



🏶 Create Cluster Wiz	zard		×
Select Se	ervers		
Before You Begin Select Servers	Add the names of all the s	ervers that you want to have in the cluster. You must add at least one server.	
Validation Warning Access Point for Administering the Cluster Confirmation Creating New Cluster Summary	Enter server name: Selected servers:	SW1.starwind.local Add SW2.starwind.local Remove	
		< Previous Next > Cancel]

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



Create Cluster Wi	zard	×
Validation	n Warning	
Before You Begin Select Servers Validation Warning	For the servers you selected for this cluster, the reports from cluster configuration validation tests appear to be missing or incomplete. Microsoft supports a cluster solution only if the complete configuration (servers, network and storage) can pass all the tests in the Validate a Configuration wizard.	
Access Point for Administering the Cluster	Do you want to run configuration validation tests before continuing?	
Confirmation		
Creating New Cluster	• Yes. When I click Next, run configuration validation tests, and then return to the process of creating	
Summary	• the cluster.	
	No. I do not require support from Microsoft for this cluster, and therefore do not want to run the validation tests. When I click Next, continue creating the cluster.	
	More about cluster validation tests	
	< Previous Next > Cancel]

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.



🚏 Create Cluster Wi	zard				×
Access P	oint for Adminis	tering the Clus	ter		
Before You Begin	Type the name you w	vant to use when admi	nistering the cluster.		
Select Servers	Cluster Name:	Production			
Access Point for Administering the Cluster Confirmation				addresses could not be config ork is selected, and then type	
Creating New Cluster		Networks		Address	
Summary		19	2.168.12.0/23	192.168.12.86	
			< Previous	Next > Canc	;el

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

🏶 Create Cluster Wiz	zard X
Confirmat	tion
Before You Begin Select Servers	You are ready to create a cluster. The wizard will create your cluster with the following settings:
Access Point for Administering the	Cluster
Cluster	Production
Confirmation	Node
Creating New Cluster	SW1.starwind.local
Summary	SW2.starwind.local
	Cluster registration
	DNS and Active Directory Domain Services
	IP Address
	192.168.12.86
	Add all eligible storage to the cluster.
	To continue, click Next.
	< Previous Next > Cancel

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.

🚏 Create Cluster Wi	zard	×
Summary	,	
Before You Begin Select Servers	You have successfully completed the Create Cluster Wizard.	
Access Point for Administering the Cluster Confirmation Creating New Cluster Summary	Node SW1.starwind.local SW2.starwind.local Cluster Production IP Address 192.168.12.86 Warnings * An appropriate disk was not found for configuring a disk witness. The cluster is not configured with a witness. As a best practice, configure a witness to help achieve the highest availability of the cluster. If this cluster does not have shared storage, configure a File Share Witness or a Cloud Witness.	
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	View Report Finish

Adding Storage to the Cluster

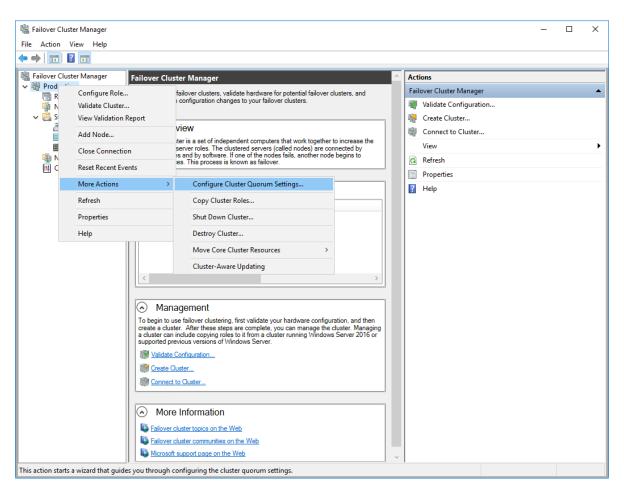
1. In Failover Cluster Manager, navigate to Cluster -> Storage -> Disks. Click Add Disk in the Actions panel, choose StarWind disks from the list and confirm the selection.



Eailover Cluster Manager File Action View Help						- 🗆 X
Þ 🧼 🖄 📰 🛛 🖬	Disks (0)				Actions	
 Production Roles 	Search		PG	lueries 🔻 🕞 👻 👻	Disks	
📫 Nodes	Name	Status	Assigned To	Owner Nod	🛃 Add Disk	
✓ Constant Storage Constant Storage Constant Storage					🍰 Move Available Storage	
Pools	Add Disks to a Cluster				×	
Enclosures 🎬 Enclosures	Select the disk or disks t	hat you want to add.				
Cluster Events	Available disks:					
	Resource Name	Disk Info	Capacity	Signature/Id		
	🗹 📇 Cluster Disk 1 🗹 📇 Cluster Disk 2	Disk 3 on node SW2 Disk 4 on node SW2	10.0 GB	{080ffb0a-c594-4790-a		
	Cluster Disk 2	Disk 4 on node SW2 Disk 2 on node SW2	1.00 GB 6.00 GB	{2bd3a199-b684-4147 {b4ade0c2-d87c-4aff-t		
				OK	Cancel	
l						

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.



Configure Cluster	r Quorum Wizard	×
Select Qu	uorum Configuration Option	
Before You Begin Select Quorum Configuration Option Select Quorum Witness Confirmation Configure Cluster Quorum Settings Summary	 Select a quorum configuration for your cluster. Use default quorum configuration The cluster determines quorum management options, including the quorum witness. Select the quorum witness You can add or change the quorum witness. The cluster determines the other quorum management options. Advanced quorum configuration You determine the quorum management options, including the quorum witness. 	
	< Previous Next > Cancel	

4. Select Configure a disk witness. Click Next.



遣 Configure Cluster	Quorum Wizard	×
Select Qu	Jorum Witness	
Before You Begin Select Quorum Configuration Option Select Quorum	Select a quorum witness option to add or change the quorum witness for your cluster configuration. As a best practice, configure a quorum witness to help achieve the highest availability of the cluster.	
Witness Configure Storage Witness Confirmation Configure Cluster Quorum Settings Summary	Adds a quorum vote of the disk witness Configure a file share witness Adds a quorum vote of the file share witness Configure a cloud witness Adds a quorum vote of the cloud witness Do not configure a quorum witness 	
	Failover Cluster Quorum and Witness Configuration Options < Previous	

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



體 Configure Cluster Quorum Wizard						
Configure	e Storage Witness					
Before You Begin Select Quorum Configuration Option	Select the storage volume th	nat you want to assign a	is the disk witness.			
Select Quorum Witness	Name	Status	Node	Location		
Configure Storage Witness Confirmation Configure Cluster Quorum Settings Summary	 □ I Cluster Disk 1 Volume: (G) □ I Cluster Disk 2 Volume: (\\?\ □ I Cluster Disk 3 Volume: (E) 	File System: NTFS The Online File System: NTFS	SW2 959 MB free of 990 MB SW2	Available Storage Available Storage Available Storage		
			< Previous Ne	xt > Cancel		

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

闂 Failover Cluster Manager						_		×
File Action View Help								
🗢 🔿 🖄 🖬 🚺 🗊								
🝓 Failover Cluster Manager	Disks (3)					Actions		
 Production.starwind.local Roles 	Search				🔎 Queries 🔻 🕁 👻	Disks		<u>^</u> ^
🍯 Nodes	Name	Status	Assigned To	Owner Node	Disk Number Partit	🛃 Add Disk		
 Storage Disks Pools Enclosures Ketworks Cluster Events 	0 Cluster Disk 1 0 Cluster Disk 2 0 Cluster Disk 3 <	 Online Online Online 	Available Storage Disk Witness in Quorum Available Storage	SW2 SW2 SW2	Image: Second		ble Stor	►
	Cluster Disk 1 Volumes (1) CSV2 (G) Volumes				Replication More Actions Remove Properties	F	er Shar Details Events	
Disks: Cluster Disk 1	Jr					Jean North		•

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.



📲 Failover Cluster Manager] —	×
File Action View Help				Cluster D	isk 1 Prope	rties		×		
·				General						
Failover Cluster Manager Production.starwind.local Roles Nodes Storage Storage Pools Enclosures Metworks El Cluster Events	Disks (3) Search Name 군국 Cluster Disk 1 관국 Cluster Disk 2 관국 Cluster Disk 3	Status (*) Online (*) Online (*) Online	Assigned Cluster S Disk Wit Cluster S	Volun		CSV2 Physical (Online age\Volume1	File System Redirected Access	Capacii 9.97 Gi	Disk e Available Storage ; =sh ; isk 1 g Online	•
Disks: Cluster Disk 1	Cluster Disk 1 Volumes (1) CSV2 (C:\ClusterS CSVFS 9.92 GB fr Volumes			٢			OK Cancel	Apply Apply He	offline mation Details v Critical Events e ication e Actions ove from Cluster S verties	• •

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.

闂 Failover Cluster Manager							- 0	×	-
File Action View Help									
🗢 🄿 🙍 🖬 🚺									
📲 Failover Cluster Manager	Disks (3)						Actions		-
 Production.starwind.local Roles 	Search			P	Queries 🔻 🕁	• •	Disks	•	^
🖷 Nodes	Name	Status	Assigned To	Owner Node	Disk Number	Partit	🛃 Add Disk		
🗸 🔚 Storage	📇 CSV1	🕜 Online	Cluster Shared Volume	SW2		2	🍰 Move Available St	or 🕨	
Disks	📇 CSV2	Online	Cluster Shared Volume	SW1		3	View	•	
Enclosures	🔠 Witness	💿 Online	Disk Witness in Quorum	SW2		4	Refresh		
Networks							🕐 Help		
<u></u>							CSV1	•	
							🚱 Bring Online		
	<					>	🙀 Take Offline		
	*100						🚯 Information Detail	s	
	👻 🌉 CSV1						Show Critical Ever	its	
							Move Move	•	
	Volumes (1)						🐮 Replication	•	
	CSV1 (C:\Cl	usterStorage\Volume2)					More Actions	•	
	CSVFS 5.93	GB free of 5.97 GB		J			Remove from Clu	st	
	Volumes						Properties		v
Disks: CSV1							-		

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



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

職 Failover Cluster Manager File Action View Help		Cluster	Netw	vork 1 Properties	Х	×		
				Genera				
 Failover Cluster Manager Production.starwind.local 	Networks (3) Search			Ŵ	a	luster Network 1		-
Roles Nodes Storage Brools Enclosures Networks Cluster Events	Name Custer Network 1 Custer Network 2 Custer Network 3 Subnets: 172.16.2 Summary Network Conn	20.0/24	Cluster Use Cluster Only None Cluster and Client	Ir Sync	((Allow cluster network communication on this network Allow cluster network communication on this network Do not allow cluster network communication on this network Up 172.16.20.0/24 OK Cancel Apply		gs)

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

 Failover Cluster Manager File Action View Help Pile Pile Pile 							X
 ➡ Failover Cluster Manager ➡ Production.starwind.local 	Networks (3) Search			P	Queries 🕶 🔛 💌 🕹	Actions Networks	
Roles Nodes Storage Disks Pools Enclosures Networks Cluster Events Only Cluster Onl Only	Name 룊 Sync 룊 ISCSI 뤺 Management	Status	Cluster Use Cluster Only None Cluster and Client	Information	>	 Live Migration Settings. View Refresh Help iSCSI 	•
	iscsi iscsi subnets: 172.1 Summary Network Co	6.10.0/24 nnections				 Information Details Show Critical Events Properties Help 	

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.



📱 Failover Cluster Manager			- 🗆 X
File Action View Help	Live Migration Settings Networks for Live Migration	×	
Failover Cluster Manager Failover Cluster Manager Folos Cluster Events Production.starwind.local Roles Storage Disks Pools Enclosures Cluster Events Search Name Sync Up Sync Up Management Up Cluster Events Subnets: 172.16.10.0/24 Summary Network Connections	Name		SCSI Information Details Show Critical Events Properties
	1		

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.



📲 Failover Cluster Manager		- 🗆 X
File Action View Help		
🗢 🔿 🙍 🖬 🖬 🖬		
Hailover Cluster Manage Cluster Produ	oduction.starwind.local	
Production.stary Configure Role	Productions Production	arwind.local
Nodes Validate Cluste		re Role
> 🛃 Storage View Validation	ion Report 🛛 🔰 Networks: Cluster Network 2, Cluster Network 3, Cluster Network 1, Cluster Network 4 😻 Validate	Cluster
Networks Cluster Even Add Node		idation Report
Close Connect	tical: 52. Error: 16. Warring: 5	le
	Close G	nnection
Reset Recent E	S Reset Re	cent Events
More Actions	ns > ecific clustered role, add one or more servers (nodes), or copy roles from a cluster running Windows Server 2016 or supported previous versions of Windows Server.	tions 🕨
View	Falover duster topics on the Web View	+
Refresh	G. Refresh	
Properties	Properti	25
Help	2 Help	
	Name Produ	action 🔺
	R Bring Or	line
Navi	vigate Take Off	
Roles	s 🖻 Nodes 🖻 Storage 🖻 Networks 🖻 Cluster Events	ion Details
roles	E Proces Proces Prevents Public Proces	itical Events
		tions 🕨
 Clust 	Ister Core Resources	
Name	Status Information	25
Server Nat	Help	
	Name: Production	
	🐩 IP Address: 192.168.12.86 🛞 Online	
This action enables you to select a role that yo		

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

🧞 High Availability	Nizard		×
Select Ro	ble		
Before You Begin Select Role	Select the role that you want to configure for high a	vailability:	
File Server Type Client Access Point Select Storage Confirmation Configure High Availability Summary	DFS Namespace Server DHCP Server Distributed Transaction Coordinator (DTC) File Server Generic Application Generic Script Generic Service Hyper-V Replica Broker Corrigination Server	A Fil	cription: e Server provides a central location our network where files are shared se by users or by applications.
		< <u>P</u> revious	<u>N</u> ext > Cancel

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



igh Availability 🙀	/ Wizard	×
File Ser	ver Type	
Before You Begin	Select an option for a clustered file server:	
Select Role	<u>File</u> Server for general use	
File Server Type Client Access Point Confirmation Configure High Availability Summary	Use this option to provide a central location on your network for users to share files or for server applications that open and close files frequently. This option supports both the Server Message Block (SMB) and Network File System (NFS) protocols. It also supports Data Deduplication, File Server Resource Manager, DFS Replication, and other File Services role services.	
	More about clustered file server options < Previous	

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.



🧓 High Availability	Wizard	×
Client Ac	cess Point	
Before You Begin Select Role File Server Type	Type the name that clients will use when accessing this clustered role: Name: FileServer]
Client Access Point Confirmation Configure High Availability Summary	(1) The NetBIOS name is limited to 15 characters. All networks were configured automatically.	
	< Previous Next > Cancel	

Click Next to continue.

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



🧱 High Availability	Nizard		×
Confirmat	tion		
Before You Begin Select Role	You are ready to configure high availability for a	File Server.	
File Server Type	Distributed Network Name		^
Client Access Point	192.168.12.0	FileServer	
Confirmation	OU		
Configure High Availability	CN=Computers,DC=starwind,DC=local		
Summary			
			~
	To continue, click Next.		
		< Previous Next > Cance	el

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

Click Finish to close the Wizard.



🧞 High Availability \	Nizard	Х
ty Summary		
Before You Begin Select Role	High availability was successfully configured for the role.	
File Server Type Client Access Point	Distributed Network Name	
	FileServer	
Confirmation	OU	
Configure High Availability	CN=Computers,DC=starwind,DC=local	
	Subnet	
Summary	192.168.12.0	
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	
	<u> </u>	

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

職 Failover Cluster Manager												- a ×
File Action Yiew Help	•											
(+ +) 🖄 🖬 🖬 🖬												
📲 Failover Cluster Manage											Actions	
 Production.starwind Roles 	Search									👂 Queries 🔻 🔜 👻 😪	Roles	*
Nodes	Name	Status	Туре	Owner Node	Priority	Information]			😽 Configure Role	
🗸 📇 Storage	Rie Server	Running	Scale-Out File Server	SW1	Medium						Virtual Machines	•
Disks											Create Empty Role	
Enclosures											View	•
Networks B Cluster Events											Refresh	
Es cluster crents											🛛 Help	
											FileServer	•
											🗘 Start Role	
											😳 Stop Role	
											Add File Share	
											1 Move	•
											🐞 Change Startup Priority	•
											🚯 Information Details	
											Show Critical Events	
											Add Storage	
											Add Resource	•
											More Actions	•
											🗙 Remove	
										Properties		
											Help	
	Y 🕌 FileServer									Preferred Owners: Any node		
	* in Heserver									Preferred Owners: Any noge		
	Status:	Running										
	Priority:	Medium										
	Owner Node: Client Access Name:	SW1										
	IP Addresses;	192.168.12.85										
< >	Summary Resources	Shares										
< >	Constituting a second case .										1	

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

🖏 Failover Cluster Manager									-	σ×
File Action View Help										
🗢 🌩 🖄 📰 📓 📼										
Failover Cluster Manage									Actions	
 Production.starwind Roles 	Search							🔎 Queries 🔻 🔜 👻 🐼	Roles	
Nodes	Name	Status	Туре	Owner Node	Priority	Information			Nonfigure Role	
	B FileServer	🔞 Failed	Scale-Out File Server	SW1	Medium				Virtual Machines	•
Pools									Treate Empty Role	
Enclosures									View	•
Networks Cluster Events									Refresh	
tig cluster events									👔 Help	
									FileServer	
									🔅 Start Role	
									🗘 Stop Role	
									Add File Share	
									Move Move	,
									🐞 Change Startup Priority	•
									🚯 Information Details	
									Show Critical Events	
									Add Storage	
									Add Resource	•
									More Actions	,
							× Remove			
								Properties		
								Help		
	Y 🕌 FileServer							Preferred Owners: Any node		
	· III · IIII · IIII							The office of the state of the		
		Running								
		Medium SW1								
	Client Access Name:									
		192.168.12.85								
< >>	Summary Resources S	ihares								

- 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)

elect User, Computer, Service Account, or Group	
Select this object type:	
User, Computer, Group, or Built-in security principal	Object Types
rom this location:	
starwind.local	Locations
Enter the object name to select (<u>examples</u>): Production	Check Names
	Check Maines

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



Delete aCSResourceLimits objects	Delete msKds-ProvRootKey objects	
	Create mskds-ProvRoticey objects	
Create application Version objects	_	
Delete applicationVersion objects	Delete msKds-ProvServerConfiguration objects Constant MSMO Occurre Alice ship sta	
Create certificationAuthority objects	Create MSMQ Queue Alias objects	
Delete certificationAuthority objects	Delete MSMQ Queue Alias objects	
Create Computer objects	Create ms-net-ieee-80211-GroupPolicy objects	
Delete Computer objects	Delete ms-net-ieee-80211-GroupPolicy objects	
Create Contact objects	Create ms-net-ieee-8023-GroupPolicy objects	
Delete Contact objects	Delete ms-net-ieee-8023-GroupPolicy objects	
Create document objects	Create msPKI-Enterprise-Oid objects	
Delete document objects	Delete msPKI-Enterprise-Oid objects	
Create documentSeries objects	Create msPKI-Key-Recovery-Agent objects	
Delete documentSeries objects	Delete msPKI-Key-Recovery-Agent objects	
Create Group objects	Create msPKI-PrivateKeyRecoveryAgent objects	
Delete Group objects	Delete msPKI-PrivateKeyRecoveryAgent objects	
Create groupOfUniqueNames objects	Create msPrint-ConnectionPolicy objects	
Delete groupOfUniqueNames objects	Delete msPrint-ConnectionPolicy objects	
Create groupPolicyContainer objects	Create msSFU30DomainInfo objects	
Delete groupPolicyContainer objects	Delete msSFU30DomainInfo objects	
Create InetOrgPerson objects	Create msSFU30MailAliases objects	
Delete InetOrgPerson objects	Delete msSFU30MailAliases objects	
Create IntelliMirror Group objects	Create msSFU30NetId objects	
Delete IntelliMirror Group objects	Delete msSFU30NetId objects	
Create IntelliMirror Service objects	Create msSFU30NetworkUser objects	
Delete IntelliMirror Service objects	Delete msSFU30NetworkUser 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



Select Profile	File share profile:	Description:
Share Location Share Name	SMB Share - Quick SMB Share - Advanced	This profile creates an SMB file share with settings appropriate for Hyper-V, certain databases, and other
Share Name Other Settings	SMB Share - Applications	server applications.
	NFS Share - Quick	
Confirmation	NFS Share - Advanced	
Results		

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



Select Profile	Ser	ver:						
Share Location	S	erver Name	Status	Cluster	Role	Owner Node		
Share Name	F	ileServer	Online	Scale-C	Out File			
Other Settings								
Permissions								
Confirmation								
Results								
	Sha	are location:						
	۲	Select by volume:						
		Volume	Free Space	Capacity	File Syster	n		_
		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 volume.	will be a new fold	ler in the \	Shares dire	ctory on the se	elected	

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



藩 New Share Wizard				-		×		
Specify share nam	е							
Select Profile	Share name:	Share						
Share Location						_		
Share Name	Share <u>d</u> escription:							
Other Settings								
Permissions								
Confirmation	Local path to share:							
Results	C:\ClusterStorage\Volume1\Shares\Share							
	🕕 If the folder doe	not exist, the folder is created.						
	Remote path to sha	e:						
	\\FileServer\Share							
		< <u>P</u> revious <u>N</u> e	ext > Create	-	Cancel			

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



🖀 New Share Wizard	– 🗆 X
Configure share	settings
Select Profile Share Location Share Name Other Settings Permissions Confirmation Results	 Enable access-based enumeration Access-based enumeration displays only the files and folders that a user has permissions to access. If a user does not have Read (or equivalent) permissions for a folder, Windows hides the folder from the user's view. Inable continuous availability Continuous availability features track file operations on a highly available file share so that clients can fail over to another node of the cluster without interruption. Allow caching of share Caching makes the contents of the share available to offline users. If the BranchCache for Network Files role service is installed, you can enable BranchCache on the share. Enable BranchCache on the file share BranchCache enables computers in a branch office to cache files downloaded from this share, and then allows the files to be securely available to other computers in the branch. Encrypt data access When enabled, remote file access to this share will be encrypted. This secures the data against unauthorized access while the data is transferred to and from the share. If this box is checked and grayed out, an administrator has turned on encryption for the entire server.
	< Previous Next > Create Cancel

8. Specify the access permissions for the file share.



Select Profile Share Location Share Name Other Settings Permissions	remote ma Permissior permissior	anagement of the Hyper-V h is to access the files on a sha is, and, optionally, a central nissions: Everyone Full Cont	ost. are are set using a access policy.	nable constrained delegation to enable combination of folder permissions, sha
Confirmation	Type	Principal	Access	Applies To
Results		BUILTIN\Users	Special	This folder and subfolders
	Allow	BUILTIN\Users	Read & execu	This folder, subfolders, and files
	Allow	CREATOR OWNER	Full Control	Subfolders and files only
	Allow	NT AUTHORITY\SYSTEM	Full Control	This folder, subfolders, and files
	Allow	BUILTIN\Administrators	Full Control	This folder, subfolders, and files
	Allow	BUILTIN\Administrators	Full Control	This folder only
	Custor	ize permissions		

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.

Select Profile	Confirm that the following	are the correct settings, and then click Create.
Share Location Share Name	SHARE LOCATION	FileServer
Other Settings	Cluster role:	Scale-Out File Server
Permissions	Local path:	C:\ClusterStorage\Volume1\Shares\Share
Confirmation Results	SHARE PROPERTIES Share name: Protocol: Access-based enumeration: Caching: BranchCache: Encrypt data: Continuous availability:	Share SMB Disabled Disabled Disabled Enabled

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



藩 New Share Wizard			- 0	×
View results				
Select Profile	The share was success	fully created.		
Share Location	Task	Progress	Status	
Share Name	Create SMB share		Completed	
Other Settings	Set SMB permissions		Completed	
Permissions				
Confirmation				
Results				
(C)				
		< <u>P</u> revious <u>N</u> ext	> Close Can	cel

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:



1 2 51											
ter Manage on.starwind							 			Actions	
368/07								<i>و</i>	Queries 🔻 🔛 🔻 🗸	Roles	
s Name			Туре	Owner Node	Priority	Information				89 Configure Role	
ge 📑 FileSer	wr.	Running	Scale-Out File Server	SW1	Medium					Virtual Machines	
ools										Treate Empty Role	
nclosures										View	
orks er Events										Refresh	
										😰 Help	
										FileServer	
										🗘 Start Role	
										🗘 Stop Role	
										Add File Share	
										Move	
										😵 Change Startup Priority	
										1 Information Details	
										Show Critical Events	
										Add Storage	
										Add Resource	
										More Actions	
										× Remove	
										Properties	
										Help	
										-	
·	FileServer								Preferred Owners: Any node		
Shares (2											
Name		Path	Prof	ocol Conti	inuous Availability	Remarks					
		C:\ClusterStorage	SM			Cluster Shared Volumes Default Share					
🌙 Shan		C:\ClusterStorage\Volume1\S	Shares\Share SM	B Yes							

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.

🖏 Failover Cluster Mana	ger							- 0	ı ×
File Action View H	lelp								
🗢 🔿 🙍 📷 🖬 🖬	1								
📲 Failover Cluster Manag	Cluster Production.stary	vind.local				^ Actions			
 Production.starv Roles 	Configure Role	er Production				Product	ion.starwind.local		
Nodes	Validate Cluster	ered roles and 2 nodes.			🧑 Co	nfigure Role			
> 🚊 Storage	View Validation Report	al		Networks: Cluster Network 2, Cluster	Network 3, Cluster Network 1, Cluster Network 4	Validate Cluster View Validation Report			
Networks	Add Node			Subnets: 3 IPv4 and 1 IPv6					
ensue eren	Close Connection	tical: 52, Error: 16, Warning: 5		🚰 Ad					
				🔑 Clo	se Connection				
Reset Recent Events More Actions					S Re:	et Recent Events			
	> pecific clustered role, add one or mo	re servers (nodes), or copy n	oles from a cluster running Windows Serv	er 2016 or supported previous versions of Windows Serve	🗖 Ma	re Actions		•	
	View	>	Failover cluster topics on the Web						•
Refresh	Refresh					Q Rel	resh		
Properties									
	Help				👔 He	p			
						Name:	Production		
						Bri	ng Online		
	Navigate					😪 Tal	e Offline		
	Roles	R Nodes	Storage	Networks	Cluster Events	🚮 Inf	ormation Details		
						- B Shi	ow Critical Events		
						🖸 Mo	re Actions		•
	 Cluster Core F 	esources				🗙 Rei	nove		
	Name		Status	Information		📄 Pro	perties		
	Server Name		0			🛛 🛛 He	p		
	Name: Production PAddress: 1		Online Online						
	Cluster Infrastructure	12.105.12.00	() Unine						
< 3			@ . ·			- v			
his action enables you to :	select a role that you can config	ure for high availability.							

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

StarWind

continue.

🧓 High Availability	Wizard	×
Select Ro	ble	
Before You Begin Select Role	Select the role that you want to configure for high availability:	
File Server Type Client Access Point Select Storage Confirmation Configure High Availability Summary	DFS Namespace Server DHCP Server Distributed Transaction Coordinator (DTC) File Server Generic Application Generic Script Generic Service Hyper-V Replica Broker SCSI Target Server	
	< <u>P</u> revious <u>N</u> ext > Cancel	

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



🖏 High Availability	Wizard	×
File Serv	ег Туре	
Before You Begin	Select an option for a clustered file server:	
Select Role	<u>File Server for general use</u>	
File Server Type Client Access Point Select Storage Confirmation Configure High Availability Summary	Use this option to provide a central location on your network for users to share files or for server applications that open and close files frequently. This option supports both the Server Message Block (SMB) and Network File System (NFS) protocols. It also supports Data Deduplication, File Server Resource Manager, DFS Replication, and other File Services role services.	
	< <u>Previous</u> <u>Next</u> > Cancel	

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.



🧞 High Availability	Wizard				×
Client Ac	cess Point				
Before You Begin	Type the name that o	lients will use when	accessing this clustered role:		
Select Role File Server Type	Name:	FileServer			
Client Access Point	The NetBIOS nan	ne is limited to 15 ch	haracters. One or more IPv4	addresses could not be configured ork is selected, and then type an	
Select Storage	address.		be abea, make bare the net	on to selected, and then type an	
Confirmation		Networks		Address	1
Configure High Availability			192.168.12.0/24	192.168.12.85	
Summary					
			< Previous	Next > Cancel	

Click Next to continue.

6. Select the Cluster disk and click Next.



🧱 High Availability	Wizard				×
Select St	orage				
Before You Begin Select Role			o assign to this clustered role red role after you complete th		
File Server Type Client Access Point	Name	Status			
Client Access Point Select Storage Confirmation Configure High Availability Summary	Vame CSV2 Volume: (G)	Online	9.91 GB free of 9.97 GB		
			< <u>P</u> revious	<u>N</u> ext > C	Cancel

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



🧞 High Availability V	Vizard		\times
tonfirmat	ion		
Before You Begin Select Role	You are ready to configure high availability for a File	Server.	
File Server Type	Network Name		^
Client Access Point	192.168.12.85	FileServer	
Select Storage	OU		
Confirmation	CN=Computers,DC=starwind,DC=local		
Configure High Availability	Storage		
Summary	CSV2		
			~
	To continue, click Next.		
		< Previous Next > Cancel	

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

Click Finish to close the Wizard.



🧓 High Availability \	Nizard	×
ty Summary		
Before You Begin Select Role	High availability was successfully configured for the role.	
File Server Type	Distributed Network Name	
Client Access Point	FileServer	
Confirmation	OU	
Configure High Availability	CN=Computers,DC=starwind,DC=local	
-	Subnet	
Summary	192.168.12.0	
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	
	<u> </u>	

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

Failover Cluster Manager								- o ×
File Action View Hel								
🗢 🔶 🙇 📰 🖬 🖬								
Railover Cluster Manage	Roles (1)							Actions
Production.starwind Roles	Search						P Queries 🔻 🛃 👻	
Nodes	Name	Status	Type	Owner Node	Priority	Information		leg Configure Role
V 🧸 Storage	Rie Server	Running	FileServer	SW1	Medium			Virtual Machines
Pools								time Create Empty Role
Enclosures								View
Networks								@ Refresh
taj cluste crens								🛛 Help
								FileServer
								🖓 Start Role
								🔅 Stop Role
								Add File Share
								😰 Move 🕨
								😵 Change Startup Priority 🕨
								🚯 Information Details
								Show Critical Events
								Add Storage
								Add Resource
								More Actions
								× Remove
								Properties
								Help
	- IlleServer							1
	Y FileServer						Preferred Owners: Any node	
	Status:	Running						
	Priority:	Medium						
	Owner Node: Client Access Name	SW1						
	IP Addresses:	192,168,12,85						
< >	Summary Resources	Shares						-1
```````````````````````````````````````	I commony intercent in							1

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)

Select User, Computer, Service Account, or Group		×
Select this object type:		
User, Computer, Group, or Built-in security principal		Object Types
From this location:		
starwind.local		Locations
Enter the object name to select ( <u>examples</u> ):		
Production		Check Names
	_	_
Advanced	OK	Cancel

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

mission Entry for Computers		- 0	×
Delete aCSResourceLimits objects	Delete msKds-ProvRootKey objects		
Create applicationVersion objects	Create msKds-ProvServerConfiguration objects		
Delete applicationVersion objects	Delete msKds-ProvServerConfiguration objects		
Create certificationAuthority objects	Create MSMQ Queue Alias objects		
Delete certificationAuthority objects	Delete MSMQ Queue Alias objects		
Create Computer objects	Create ms-net-ieee-80211-GroupPolicy objects		- 11
Delete Computer objects	Delete ms-net-ieee-80211-GroupPolicy objects		
Create Contact objects	Create ms-net-ieee-8023-GroupPolicy objects		
Delete Contact objects	Delete ms-net-ieee-8023-GroupPolicy objects		
Create document objects	Create msPKI-Enterprise-Oid objects		
Delete document objects	Delete msPKI-Enterprise-Oid objects		
Create documentSeries objects	Create msPKI-Key-Recovery-Agent objects		
Delete documentSeries objects	Delete msPKI-Key-Recovery-Agent objects		
Create Group objects	Create msPKI-PrivateKeyRecoveryAgent objects		
Delete Group objects	Delete msPKI-PrivateKeyRecoveryAgent objects		
Create groupOfUniqueNames objects	Create msPrint-ConnectionPolicy objects		
Delete groupOfUniqueNames objects	Delete msPrint-ConnectionPolicy objects		
Create groupPolicyContainer objects	Create msSFU30DomainInfo objects		
Delete groupPolicyContainer objects	Delete msSFU30DomainInfo objects		
Create InetOrgPerson objects	Create msSFU30MailAliases objects		
Delete InetOrgPerson objects	Delete msSFU30MailAliases objects		
Create IntelliMirror Group objects	Create msSFU30NetId objects		
Delete IntelliMirror Group objects	Delete msSFU30NetId objects		
Create IntelliMirror Service objects	Create msSFU30NetworkUser objects		
Delete IntelliMirror Service objects	Delete msSFU30NetworkUser 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.

Select Profile	File share profile:	Description:
Share Location	SMB Share - Quick	This basic profile represents the fastest way to create a SMB file share, typically used to share files with
Share Name	SMB Share - Advanced	Windows-based computers.
Other Settings	SMB Share - Applications NFS Share - Ouick	<ul> <li>Suitable for example file sharing</li> </ul>
	NFS Share - Advanced	<ul> <li>Suitable for general file sharing</li> <li>Advanced options can be configured later by</li> </ul>
		using the Properties dialog

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



Share Location	Server Name	Status	Cluster Role	Owner Node	
Share Name	FileServer	Online	File Server		
Other Settings					
	Share location:				
	Select by volume:				
	Volume	Free Space	Capacity File Syst	tem	
	G:	9.91 GB	9.97 GB NTFS		
	The location of the fi	le share will be a new fold	der in the \Shares di	rectory on the se	lected
	Volume			tem	
	The location of the fi	la chara will be a new fal	dar in the \Charac di	easters on the co	lacted
	The location of the fi	le share will be a new fold	der in the \Shares di	rectory on the se	lected
	volume.				

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

New Share Wizard			-		×
Specify share nan	ne				
Select Profile	Share name:	Share			
Share Location					_
Share Name	Share description:				
Other Settings					
Permissions					
Confirmation	Local path to share:				
Results	G:\Shares\Share				
	If the folder doe	s not exist, the folder is created.			
	Remote path to sha	re:			
	\\FileServer\Share				
		< Previous Next >	eate	Cance	el

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

continue.

🔚 New Share Wizard		-		×
Configure share s	settings			
Select Profile	Enable access-based enumeration			]
Share Location	Access-based enumeration displays only the files and folders that a user access. If a user does not have Read (or equivalent) permissions for a fold			the
Share Name	folder from the user's view.			
Other Settings	✓ Enable <u>c</u> ontinuous availability			
Permissions	Continuous availability features track file operations on a highly available clients can fail over to another node of the cluster without interruption.	file share	so that	
Confirmation	Allow caching of share			
Results	Caching makes the contents of the share available to offline users. If the B Network Files role service is installed, you can enable BranchCache on the		he for	
	Enable BranchCache on the file share			
	BranchCache enables computers in a branch office to cache files down share, and then allows the files to be securely available to other compu-			
	Encrypt data access			
	When enabled, remote file access to this share will be encrypted. This sec unauthorized access while the data is transferred to and from the share. If and grayed out, an administrator has turned on encryption for the entire	this box		
	< <u>P</u> revious <u>N</u> ext >	ate [	Cance	ł

8.Specify the access permissions for the file share.

Decify permis Select Profile Share Location	Permission		-	combination of folder permissions,	sha
Share Name		missions: Everyone Full Cont	rol		
Other Settings Permissions	Eolder per Type	Principal	Access	Applies To	
Confirmation Results	Allow Allow Allow Allow Allow <u>C</u> uston	BUILTIN\Users BUILTIN\Users CREATOR OWNER NT AUTHORITY\SYSTEM BUILTIN\Administrators BUILTIN\Administrators	Special Read & execu Full Control Full Control Full Control Full Control	This folder and subfolders This folder, subfolders, and files Subfolders and files only This folder, subfolders, and files This folder, subfolders, and files This folder only	



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

Select Profile	Confirm that the following	are the correct settings, and then click Create.
Share Location Share Name Other Settings	SHARE LOCATION Server: Cluster role:	FileServer Scale-Out File Server
Permissions	Local path:	C:\ClusterStorage\Volume1\Shares\Share
Confirmation	SHARE PROPERTIES	
	Share name: Protocol: Access-based enumeration: Caching: BranchCache: Encrypt data: Continuous availability:	Share SMB Disabled Disabled Disabled Enabled

10. Check the summary and click Close.



New Share Wizard			- 🗆 X
View results			
Select Profile	The share was success	fully created.	
	Task	Progress	Status
Share Name	Create SMB share		Completed
	Set SMB permissions		Completed
Results			
		< Previous Next >	Close Cancel

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.

Jond	Search									Actions	
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## **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.

New Share Wizard		- 🗆 X
New Share Wizard Select the profile Share Location Share Name Other Settings Permissions Confirmation Results	e for this share File share profile: SMB Share - Quick SMB Share - Advanced SMB Share - Advanced NFS Share - Quick NFS Share - Advanced	Description: This profile creates an SMB file share with settings appropriate for Hyper-V, certain databases, and other server applications.
		< Previous Next > Create Cancel

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



Share Location	Server Name	Status	Cluster Role	Owner Node	
Share Name	FileServer	Online	File Server		
Other Settings					
	Share location:				
	Select by volume:				
	Select by <u>v</u> olume:     Volume	Free Space	Capacity File Sys	tem	
		Free Space 9.91 GB		tem	
	Volume			tem	
	Volume G:		9.97 GB NTFS		elected
	Volume G:	9.91 GB	9.97 GB NTFS		elected

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

New Share Wizard	>
Specify share n	ame
Select Profile Share Location	Share name: Share
Share Name	Local path to share:
	G:\Shares\Share
Authentication Share Permissions Permissions	If the folder does not exist, the folder is created.           Bemote path to share:
	FileServer:/Share
	< Previous Next > Create Cancel
	< <u>Previous</u> <u>Next</u> <u>Create</u> Cancel

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

continue.

occity durition	ication methods
Select Profile	Specify the authentication methods that you want to use for this NFS share.
Share Location	Kerberos v5 authentication
Share Name	
Authentication	<u>K</u> erberos v5 authentication(Krb5)
Share Permissions	Kerberos v5 authentication and integrity(Krb5i)
	Kerberos v5 authentication and p <u>r</u> ivacy(Krb5p)
	No server authentication
	✓ No server authentication (AUTH_SYS)
	✓ Enable unmapped user access
	Allow unmapped user access by UID/GID
	Allow anonymous access

8. Click Add and specify Share Permissions.

The server evaluates	the share nermissions in the	order they are sho	wn below. The fina	access
permissions on a file	share are determined by tak	ing into considerat	ion both the share	
Name	Permissions	ROOT ACCESS	Encoding	
	permissions on a file	permissions on a file share are determined by tak and the NTFS permission entries. The more restri	permissions on a file share are determined by taking into considerat and the NTFS permission entries. The more restrictive permissions are	The server evaluates the share permissions in the order they are shown below. The fina permissions on a file share are determined by taking into consideration both the share and the NTFS permission entries. The more restrictive permissions are then applied.           Name         Permissions         Root Access         Encoding



Grant permissions to access the netgroup. Select the access an			
O <u>H</u> ost:			
Netgroup:			
			v
Client group:			
			Ŷ
All <u>M</u> achines			
Language encoding:		Share permissions:	
ANSI	~	No Access	Ý
Allow <u>r</u> oot access (not reco	ommend	ed)	

9. Specify the access permissions for the file share.

Select Profile Share Location Share Name Other Settings	Permissior permissior	ns to access the files on a sha ns, and, optionally, a central missions: Everyone Full Cont	access policy.	combination of folder permissions,	sha
Permissions	Туре	Principal	Access	Applies To	
Confirmation Results	Allow Allow Allow Allow Allow Allow	BUILTIN\Users BUILTIN\Users CREATOR OWNER NT AUTHORITY\SYSTEM BUILTIN\Administrators BUILTIN\Administrators	Special Read & execu Full Control Full Control Full Control Full Control	This folder and subfolders This folder, subfolders, and files Subfolders and files only This folder, subfolders, and files This folder, subfolders, and files This folder only	



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

onfirm selectio	ons		- 0
Select Profile Share Location Share Name Authentication Share Permissions Permissions	SHARE LOCATI Server: Cluster role: Local path:	FileServer File Server G:\Shares\Share	ngs, and then click Create.
Confirmation	SHARE PROPE Share name:	RTIES Share	
	Protocol:	NFS	

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



🖀 New Share Wizard			>	×
View results				
Select Profile	The share was success	fully created.		
	Task	Progress	Status	
Share Name	Create NFS share		Completed	
	Set NFS permissions		Completed	
Results				
<i>9</i> :				
				1
		< <u>P</u> revious <u>N</u> ext	t > Close Cancel	1

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

Roles (1)								Actions
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Nere	Status	Tare	Overer Node	Printy	Monation			R) Configure Role
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## 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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