

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

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TECHNICAL PAPERS



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About StarWind

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

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Annotation

Relevant Products

This guide 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.

Introduction To Starwind Virtual San Cvm

StarWind Virtual SAN Controller Virtual Machine (CVM) comes as a prepackaged Linux Virtual Machine (VM) to be deployed on any industry-standard hypervisor. It creates a VM-centric and high-performing storage pool for a VM cluster.

This guide describes the deployment and configuration process of the StarWind Virtual SAN CVM.

Starwind Vsan 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

Pre-Configuring The Windows Server Hosts

The diagram below illustrates the network and storage configuration of the solution:





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 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 Switch Manager for SW01	- 🗆 X
 ★ Virtual Switches ✓ New virtual network switch MGMT Intel(R) 82574L Gigabit Network C Sync Intel(R) 82574L Gigabit Network C Sync Intel(R) 82574L Gigabit Network C Since State S	Virtual Switch Properties Name: MGMT Notes:
MAC Address Range 00-15-5D-0C-39-00 to 00-15-5D-0	Connection type What do you want to connect this virtual switch to?
	OK Cancel Apply

5. Configure and set the IP address on each virtual switch interface. In this document, the 172.16.10.x subnet is used for iSCSI/StarWind heartbeat traffic, while 172.16.20.x subnet is 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.

Enabling Multipath Support

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	:
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		- 🗆 ×
Select server roles		DESTINATION SERVER SW1.starwind.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 iSCSI Services ✓ file Server BranchCache for Network Files Data Deduplication DFS Namespaces DFS Replication File Server VSS Agent Service iSCSI Target Server iSCSI Target Storage Provider (VDS and VSS Server for NFS W Work Folders	File Server manages shared folders and enables users to access files on this computer from the network.
	Storage Services (Installed) V	
	< <u>P</u> revious <u>N</u> ext >	Install 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		- 🗆 ×
Select server roles		DESTINATION SERVER SW1.stanvind.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 Fax Server File and Storage Services (1 of 12 installed) File and Storage Services File Server BranchCache for Network Files Data Deduplication DFS Namespaces DFS Replication File Server VSS Agent Service iSCSI Target Server Server for NFS Work Folders Storage Services (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		- 🗆 ×
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 Fax Server Fax Server File and Storage Services (1 of 12 installed) File and Storage Services (1 of 12 installed) File Server File	DESTINATION SERVER SW1.starwind.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.
	File Server Resource Manager File Server Resource Manager Sits Server Resource Manager Sits Server for VSS Agent Service Sits Storage Provider (VDS and VSS Server for NFS Work Folders Storage Services (Installed) Server Services (Installed) Services (Installed) Server Server Services (Installed) Server Server Server Server Services (Installed) Server S	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 ← ⇒ 2 Image: Base State S									- 0	×
🔢 Hyper-V Manager									Actions	
MIS2010	Virtual N	Vachines					-		WS2019	
Import Vistual Machine		Sta	ate	CPU Usage	Assigned Memory	Uptime	Status	Configurati	New	•
63					No virtual machines were	found on this server.			🛝 Import Virtual Machine	
Hyper-V Settings									Hyper-V Settings	
Virtual SAN Manager									🟭 Virtual Switch Manager	
The second secon									🔒 Virtual SAN Manager	
Edit Disk									Edit Disk	
inspect Disk									Inspect Disk	
Stop Service									Stop Service	
Remove Server		ints						۲	X Remove Server	
Keiresii		-			No vitual month				🖏 Refresh	
View	>				No vitual machi	ne selected.			View	•
Help		12 Help								
	Details									
					No item sel	ected.				
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 Folde	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	

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. Image: Store the virtual machine in a different location Virtual machine configuration folder: C: \Hyper-V\StarWindAppliance\Virtual Machines Browse C: \Hyper-V\StarWindAppliance\Snapshots Browse Smart Paging folder: C: \Hyper-V\StarWindAppliance	
	<pre> Previous Next > Finish Cancel </pre>	



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 I	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	Import file:	C:\Users\Administrator\Downloads\StarWindAppliance\Virtual M
Choose Destination	Import Type: Virtual machine configuration folder:	Copy (generate new ID) C:\Hyper-V\StarWindAppliance\Virtual Machines\
Choose Storage Folders	CH	pliance (Snapshots
Summary	Sm Copying file F of F (starwind) Vir	vizard, click Finish.
	1	< 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 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 Management 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	
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:	operation. StarWind SAN & NAS C:\Users\sw\Downloads\Star Copy (generate new ID) C:\Hyper-V VMs\StarWind S/ C:\Hyper-V VMs\StarWind S/ C:\Hyper-V VMs\StarWind S/ C:\Hyper-V VMs\StarWind S/ Management Virtual Switch Data Virtual Switch	rWind SAN & NAS\Virtual Machines\ AN & NAS\Virtual Machines\ AN & NAS\Snapshots\ AN & NAS\ AN & NAS\Virtual Hard Disks\
	To complete the import and close this v	vizard, click Finish. < Previous Next >	> Finish 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 confi	guration	
License	licence	
	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 configuration	
✓ License Deview and user license agreement	
Review end-user license agreement	
EULA Review and accept the following license agreement to continue	
Static hostname STARWIND LICENSE AGREEMENT FOR COMMERCIAL PRODUCTS	
This Parallic at Linear A second life, of Parameter Mice Lead a second with the second se	
Administrator account page as "Lienses" the liense entry in outsour the liense entry inducted on the signature	
(the "Licensee") and StarWind Software, Inc., a State of Delaware, USA corporation ("StarWind," and collectively with	
Summary Licensee, the "Parties" and each, (a "Party")), that is entered into as of the date of acceptance hereof by both Parties	
hereto (the "Effective Date").	
Configuration 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 obuind by the terms of this agreement. If Licensee obes not agree to the terms and conditions of this Arreement. Start/ind is inversitient to the start of the terms start/ind product to Licensee may not this, install.	
and/or Operate the StartWind Product in any way. The StartWind 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 Leense accepts the terms of this Arrenement Liensee may also reveive a row of this forement by northering Statistical at inforestancial or on	
THIS DOCUMENT, UNTIL CONFIRMED BY STARWIND, CONSTITUTES AN OFFER BY LICENSEE, AND LICENSEE, BY EXECUTING	
THIS AGREEMENT TO THE TERMIS SET FOR THE TERMIS SET FOR THE TERMIS AND THE UTERS A THE TERMIS AND THE TERMIS AN	
IE EVERITED EL ECTRONICA I VI I CENEEL MILL UNE THE ORDODTINITY TO ACCED DE ACREEVENT	
THROUGH ACLICKTINHOULD PROCEDURE. IT LICENSE TO DOS NOT WIN TO ACCEPT THE STRENG OF THIS AGREEMENT	
I accept the terms of the license agreement	
Back	

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	Configure management netw	vork					
Management network	Specify the unique IP address (static is reco The Management network is used to commun	ommended) and icate with service	d configure other netw s such as DNS and NTP an	work settings. nd to access the applianc			
	IP mode Static						
	NIC Model	Bandwidth	MAC address	IP address	Netmask O	Gateway	
	ens160 82574L Gigabit Ne			192.168.12.206	255.255.254.0	192.168.12.1	
	Name servers (optional):						
	192.168.12.17						
	Time settings (optional):		Time zone				
					Back	Next	

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

StarWind Appliance Initial confi	guration	
 License 		
	Verify hostname	
🗸 EULA		
	Check the current appliance hostname and modify it if required	
 Management network 	A Like Little Little Revenues and doch	
	Ose caunteres, numbers, and dash	
 Static hostnamo 		
Statte nostriante		
	SW1	
	Back Next	

9. Create an administrator account. Click Next.



and the second second			
	StarWind Appliance Initial config	uration	
	Starwind Appliance Initiat coming		
	✓ License		
		Create administrator account	
	✓ EOLA	Specify new credentials for the appliance administrator account	
	 Management network 		
	 Static hostname 	admin	
	Administrator account		
			a second a second s
		Additional information (optional)	
		Full name	
		E-mail	
		Back	

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

StarWind Appliance Initial config	guration			
 License 				
	Review summary			
🗸 EULA				
	License type			
 Management network 	Elective cype			
 Static hostname 	License	Paid 3 Nodes		
 Administrator account 	Management and the second			
	Network settings			
Summary				
	Interface	ens160 (82574L Gigabit Network Connection)		
	Deedwidth			
	Bandwidun			
	MTU			
	IP address	192.168.12.206		
	Appliance bestrame			
	Appliance nostraine			
	Credentials			
	A desta la base de su se se se s			
	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 	• And the lines		
 Summary Configuration 	Apprying ucense Configuring management network		
• Longuration		×	

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 🔻			
🚠 Network	Credentials	Credentials	
Annliances		Specify the appliance IP address and its administrator credentials	
		The newly added appliance will be linked to already connected partners.	
Lusers			
📋 Tasks and events 🛛 🔻			
		Administrator username	
		Administrator naroword	
		k	
		Cancel	
∢ Minimize			

2. Provide credentials of partner appliance.



StarWind			🗉 🌲 🏠 admin 💌
	App Add appliance		
	Credentials	Credentials	Q ±
		Specify the appliance IP address and its administrator credentials The newly addred anniliance will be linked to already connected partners.	Raw capacity 🗢
		IP address 192,168,12,166	
		Administrator usemame admin	
		Cancel	

3. Wait for connection and validation of settings.

StarWind		
Control Contr	Add appliance • credentials summary • Credentials specify the appliance VP address and its administrator credentials. • The newly added appliance will be larked to already connected partners. • Use the appliance connected partners. • Diministrator connected partners. • Other newly added appliance will be larked to already connected partners. • Diministrator connected partners. • Diministrator connected partners. • Diministrator connected partners. • Other newly added appliance will be larked to already connected partners. • Diministrator connection of appliance. • Other newly added appliance connected partners.	L N L CC
< Minimize		

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	

Configure Ha Networking

1. Launch the "Configure HA Networking" wizard.

StarWind							8	🌲 🍄 admin 🕶
🙆 Dashboard	Network							
🛢 Storage 🔻		Configure HA networking						
A Network	🗌 Interface 🖨	Adapter model 💠	Link status 🗢	Bandwidth 🗘	MAC address 🗢	Role ≑	IP address 💠	Appliance ≑
Appliances	🗌 🔚 ens160	82574L Gigabit Net	Up		00:50:56:9C:E5:A5	Management		
Tasks and events	🔲 📜 ens160	82574L Gigabit Net				Management		
	🗌 📜 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. You car	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										8 . ¢	admin 🔻
	Configure HA networking										
	✓ Appliances	Show	sample netw	ork diagram							
	Data network	📑 SW1									
			Interface	Model	Bandwidth	MAC address	IP address	Netmask	Link status	SW1	
				VMXNET3 Ethernet	10 Gbit	00:50:56:9C:21:E1			Up		
				VMXNET3 Ethernet		00:50:56:9C:C4:73			Down	SW1	
		📑 SW2								SW2	
			Interface	Model	Bandwidth	MAC address	IP address	Netmask 🚯	Link status	SW1	
				VMXNET3 Ethernet	10 Gbit	00:50:56:9C:D8:13			Up	SW2	
				VMXNET3 Ethernet					Down		
		Cluster P	ATU size:								
		мти 9000									
								Dealt	Hard		
								Back	L		
(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			
Dashboard	Configure HA networking		
Appliances Users	Appliances	Select interfaces to carry data replication traffic, configure them with unique IP addresses, and specify subnet masks.	Q ≇ ··· Appliance ¢ SW1
📋 Tasks and events 🛛 🔻		Interface Model Bandwidth MAC address IP address Netmask O Link status ens256 VMXNET3 Ethermet 10 Gbit 0050569C.C4.73 172.16.20.10 24 Down	SW2 SW1 SW2
		Interface Model Bandwidth MAC address IP address Netmask ● Link status	SW1 SW2
		ens256 VMXNET3 Ethernet 10 Gbit 00:50:56:9C:91:2C 172.16.20.20 24 Down Cluster MTU size:	
		Back Not s	
< Minimize			

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

StarWind		🗐 🌲 🏟 admin 🔻
🙆 Dashboard		
🗧 Storage 🛛 🔻		
🚑 Network		
Appliances		
Users Tacks and overthe Tacks	SW1 ▲ Non-redundant configuration ×	
asks and events	Inte Only 1 Replication network is configured. Configure more Paddress Netmask I Link status	
	em: Replication networks to eliminate a single point of failure. 72.16.20.10 24 Down	
	SW2 A We recommended assigning at least two data network	
	Interfaces to eliminate a single point of failure. P address Netmask O Link status Acknowledge and continue?	
	en: 12.16.20.20 24 Down	
	Cluster MTU si	
< Minimize		



StarWind			
Dashboard			
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 	 Replication network Summary 	Appliance name Data networks Replication networks	₩ SW1 172.16.10.10 172.16.20.10			
		Appliance name Data networks	■ SW2 172.16.10.20			
		Replication networks	112.10.20.20			
				Back		
< Minimize						



Add Physical Disks

Attach physical storage to StarWind Virtual SAN Controller VM:

- Ensure that all physical drives are connected through an HBA or RAID controller.
- Deploy StarWind VSAN CVM on each server that will be used to configure faulttolerant standalone or highly available storage.
- Store StarWind VSAN CVM on a separate storage device accessible to the hypervisor host (e.g., SSD, HDD).
- Add HBA, RAID controllers, or NVMe SSD drives to StarWind CVM via a passthrough device.

Learn more about storage provisioning guidelines in the KB article.

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 File shares	Selected 0 of 0 + Create a new pool pool	
는 LUNs	There are no storage pools yet	
🕒 Volumes	Start building your storage infrastructure by creating a new one	
Storage pools		
Physical disks		
Annliances		
Lusers		
🗖 Tasks and events 🔻		
∢ Minimize		



						o desire an
StarWind hyperconvergence						
	Stol Create storage pool				×	
	Appliance	Appliance				
		Select one or more storage nodes	o create a storage pool 🕜			
		😑 Node name 🗢	Status 🗢	Available disks 🌲 🖌	Available capa 🗢	
		✓ SW1	Online			
		🖌 🧮 SW2	Online			
				Cancel	Next	
∢ Minimize						

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.

StorWend			🗉 🌲 🍪 admin 🔻
HYPERCONVERGENCE			
🙆 Dashboard	Stol Create storage pool		
🗧 Storage 🔺	Selected at Appliance		
🚊 File shares	Physical disks	Physical disks	
S LUNS		Select physical disks to include in storage pools on each node 💿	
Uolumes		≣ SW1 ▲	
III Storage pools		■ Disk name	
Physical disks		🗹 🚨 sdb HDD SAS 5 GB 32:0:1:0 SAS1068 PC	
Network		Z 🛋 sdc HDD SAS 5 GB 32:0:2:0 SAS1068 PC	
Appliances		SAS 5 GB 32:0:3:0 SAS1068 PC	
🚊 Users		Total raw capacity of selected disks: 15 GB	
Technologia (≣ SW2 ▲	
Tasks and events 👻		■ Disk name	
		✓ ▲ sdb HDD SAS 5 GB 32:0:1:0 SAS1068 PC	
		✓ ▲ sdc HDD SAS 5 GB 32:0:2:0 SAS1068 PC	
		Selected number of disks is equal	
∢ 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							l 🔅 admin	•
	Create storage pool							
	 Appliance Physical disks Profile 	Profile Choose an optimal storage pool profile. Selected disks let	't unused will be assi	gned to hot spares.				
		Storage pool profile	Usable capacity	Fault tolerance 😯	Hot spares			
		 High capacity (recommended) Maximize redundancy while maintaining high storage capacity (Software RAID\RAID-5) 	9.9 GB					
		 High performance Maximize storage performance while maintaining redundancy (Software RAID(RAID-1) 	4.95 GB					
		Manual Allows you to configure the storage pool layout manually.						
				Back	Next			
4 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.



Sto Create storage pool				
Selecte: Appliance Physical disks Profile	Summary Review specified settings a ≌ SW1	nd create storage pools.		
• Summary	Storage pool layout Raw capacity Usable capacity			
	📑 SW2			
	Storage pool layout Raw capacity			
	Usable capacity		Back	

Create Volume

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


StarWind		🗉 🌲 🏟 admin 🕶
🔯 Dashboard	Volumes	
🛢 Storage 🔺	Selected 0 of 0 🕂 Create a new volume nage VHR user	
💻 File shares		
🞐 LUNs	There are no volumes yet	
🔮 Volumes	Start sharing your storage resources to clients by creating a new one	
III Storage pools		
Physical disks		
🏭 Network		
Appliances		
💄 Users		
🖹 Tasks and events 🔻		
 Minimize 		

StarWind hyperconvergence			
🙆 Dashboard	Voli Create volume		
Storage A	Selected • Storage pool Settings Filesystem type	Select storage pool Select one or more (in HA configurations) storage pools to create a volume Name Type State Resiliency Free	
Storage pools Physical disks		III SW1:md0 Software RAID Online RAID-5 9.98 GB III SW2:md0 Software RAID Online RAID-5 9.98 GB	
Appliances			
😩 Users			
		Cancel	
∢ Minimize			

3. Specify volume name and capacity.



StarWind					🗐 🌲 🏠 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 dush Size Available storage pool capacity: 9.98 GB	nt. 3 v		
			Back	Next	
∢ Minimize					

4. Select the Standard volume type.

StarWind hyperconvergence			
😂 Dashboard	Voli Create volume		
 Fileshares UNis UNis Volumes Storage pools Physical disks Hetwork Appliances Users Tasks and events * 	Selector Storage pool Settings In Filesystem type Summary	Choose filesystem settings Choose the preferred filesystem settings for the new volume Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance Image: Standard Back and the Standard Settings: Recommended for general use and the highest performance	
< Minimize			

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



StarWind Hyperconvergence			🗐 🌲 🏠 admin 💌
	Voli Create volume		
	Selector 🗸 Storage pool 🗸 Storage pool 🗸 Filesystem type	Review summary Review your settings before creating a volume	Q = = ····
	• Summary	Storage pool SVLmd0 Volume name volume0 Size 5 GB Filesystem settings Standard	
		Eii SW2	
		Storage pool 📑 SW2: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		e ^r 1	• •	admin 🔻	
🔯 Dashboard	LUNs				
Storage	Selected 0 of 0 🕂 🛃 Greate a new LUN				
E LUNS	There are no LUNs yet				
🔮 Volumes	Start sharing your storage resources to clients by creating a new one				
III Storage pools					
📕 Physical disks					
🚓 Network					
Appliances					
🛓 Users					
🖹 Tasks and events 🔻					
▲ Minimize					

2. Select the protocol.

StarWind		
	LUN Create LUN	
 Storage Fileshares UDIs Volumes III Storage pools Physical disks Applaness Applaness Users Tasks and events 	Create LIN Create LIN Create LIN Create	

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



StarWind			iii ⁰ ≜ 🎄 admin ▼
	LUN Create LUN		
	Selecter Protocol LUN availability Appliances Volumes Failover strategy LUN settings Summary	EUCH availability Set the required LUN availability In the availability (two.way replication) Case asynchronosouly replicated LUN hosted on too or three identical appliances. The LUN ways accessible if one of the replication partners becomes unavailable. In stadau C Stada	

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

StarWind									e (¢.	admin 💌
🔮 Dashboard	LUN Cre	ate LUN						×			
Storage +	Selectec v Pro v LU Ap	otocol N availability pliances	Applia Select tw	INCES to or three replication partners that liances must have identical hardw	it should host the HA	LUN ncluding CPU, RAM, storage, and n	etworking				
Votames Storage pools Physical disks	Vo Fai LU Su	umes lover strategy N settings mmary		Appliance	Status Online	Software version 1.5.460.5391+76fc51b	Capacity 15 GB				
🚓 Network Moriances Users				₿ SW2	Online	1.5.460.5391+76fc51b					
Tasks and events 👻											
						Back	Next				
< Minimize											

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



StarWind										目 ≜ ✿	admin 🔻
	LUN	Create LUN									
		 ✓ Protocol ✓ LUN availability ✓ Appliances Volumes 	Volum Select or configura	IES ne volume on each ations.	appliance to stor	e the HA LUN data. S	elected volumes n	nust have identical	storage		
		Failover strategy LUN settings	Volum	es have identical c	onfigurations						
		Summary		Volume 🗢	State 🗢	RAID le \$	Capacity 🗢 5 GB	Free Sp \$	Type ¢ Standard		
			≣ SW2	Volume 🗢	State \$	RAID le 🗢	Capacity \$ 5 GB	Free Sp \$	Type 🖨		
								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		囯 🌲 🎄 admin.▼
HYPERCONVERGENCE	LUN Create LUN	
Storage A	Protocol Protocol Failover strategy LUN availability Select the preferred failover strategy. The default is "Heartbeat". However, you can choose another meth have a UPS unit at your disposal.	Q 👳 🚥
Storage pools Physical disks	Volumes Failover strategy LUN settings LUN settings Summary	utdown
Appliances	Node witness A third appliance acts as a "router" 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		
	Setters • Protocol • LUN availability • Appliances • Volumes • Failover strategy • LUN settings Summary	LUN settings Berity the HA LUN settings Lun name Lun Lun <th></th>	
• 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 avaitability 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				



Creating Starwind Ha Luns Using Powershell

1. Open PowerShell ISE as Administrator.

2. Open StarWindX sample CreateHA_2.ps1 using PowerShell ISE. It can be found here: C:\Program Files\StarWind Software\StarWind\StarWindX\Samples\



2. Configure script parameters according to the following example:



```
$bmpStrategy=0,
#primary node
        $imagePath="VSA Storage\mnt\crypted1",
        $imageName="testha02",
        $createImage=$true,
        $storageName="",
        $targetAlias="target02",
        $autoSynch=$true,
        $poolName="pool1",
        $syncSessionCount=1,
        $aluaOptimized=$true,
        $cacheMode="none",
        $cacheSize=0,
        $syncInterface="#p2={0}:3260" -f "172.16.20.20",
        $hbInterface="#p2={0}:3260" -f "172.16.10.20",
        $createTarget=$true,
        $bmpFolderPath="",
#secondary node
        $imagePath2="VSA Storage\mnt\crypted1",
        $imageName2="testha02",
        $createImage2=$true,
        $storageName2="",
        $targetAlias2="target02",
        $autoSynch2=$true,
        $poolName2="pool1",
        $syncSessionCount2=1,
        $aluaOptimized2=$false,
        $cacheMode2=$cacheMode,
        $cacheSize2=$cacheSize,
        $syncInterface2="#p1={0}:3260" -f "172.16.20.10",
        $hbInterface2="#p1={0}:3260" -f "172.16.10.10",
        $createTarget2=$true,
        $bmpFolderPath2=""
Import-Module StarWindX
try
{
        Enable-SWXLog -level SW LOG LEVEL DEBUG
        $server = New-SWServer -host $addr -port $port -user
$user -password $password
        $server.Connect()
```



```
$firstNode = new-Object Node
```

```
$firstNode.HostName = $addr
        $firstNode.HostPort = $port
        $firstNode.Login = $user
        $firstNode.Password = $password
        $firstNode.ImagePath = $imagePath
        $firstNode.ImageName = $imageName
        $firstNode.Size = $size
        $firstNode.CreateImage = $createImage
        $firstNode.StorageName = $storageName
        $firstNode.TargetAlias = $targetAlias
        $firstNode.AutoSynch = $autoSynch
        $firstNode.SyncInterface = $syncInterface
        $firstNode.HBInterface = $hbInterface
        $firstNode.PoolName = $poolName
        $firstNode.SyncSessionCount = $syncSessionCount
        $firstNode.ALUAOptimized = $aluaOptimized
        $firstNode.CacheMode = $cacheMode
        $firstNode.CacheSize = $cacheSize
        $firstNode.FailoverStrategy = $failover
        $firstNode.CreateTarget = $createTarget
        $firstNode.BitmapStoreType = $bmpType
        $firstNode.BitmapStrategy = $bmpStrategy
        $firstNode.BitmapFolderPath = $bmpFolderPath
        #
       # device sector size. Possible values: 512 or 4096(May
be incompatible with some clients!) bytes.
       #
        $firstNode.SectorSize = $sectorSize
        $secondNode = new-Object Node
        $secondNode.HostName = $addr2
        $secondNode.HostPort = $port2
        $secondNode.Login = $user2
        $secondNode.Password = $password2
        $secondNode.ImagePath = $imagePath2
        $secondNode.ImageName = $imageName2
        $secondNode.CreateImage = $createImage2
        $secondNode.StorageName = $storageName2
        $secondNode.TargetAlias = $targetAlias2
        $secondNode.AutoSynch = $autoSynch2
        $secondNode.SyncInterface = $syncInterface2
        $secondNode.HBInterface = $hbInterface2
```



```
$secondNode.SyncSessionCount = $syncSessionCount2
        $secondNode.ALUAOptimized = $aluaOptimized2
        $secondNode.CacheMode = $cacheMode2
        $secondNode.CacheSize = $cacheSize2
        $secondNode.FailoverStrategy = $failover
        $secondNode.CreateTarget = $createTarget2
        $secondNode.BitmapFolderPath = $bmpFolderPath2
        $device = Add-HADevice -server $server -firstNode
$firstNode -secondNode $secondNode -initMethod $initMethod
        while ($device.SyncStatus -ne
[SwHaSyncStatus]::SW HA SYNC STATUS SYNC)
        {
                $syncPercent =
$device.GetPropertyValue("ha synch percent")
                Write-Host "Synchronizing: $($syncPercent)%" -
foreground yellow
                Start-Sleep -m 2000
                $device.Refresh()
        }
}
catch
{
        Write-Host $_ -foreground red
}
finally
{
        $server.Disconnect()
}
```

Detailed explanation of script parameters:

-addr, -addr2 — partner nodes IP address.
Format: string. Default value: 192.168.0.1, 192.168.0.1
allowed values: localhost, IP-address
-port, -port2 — local and partner node port.
Format: string. Default value: 3261
-user, -user2 — local and partner node user name.
Format: string. Default value: root
-password, -password2 — local and partner node user password.
Format: string. Default value: starwind

#common



-initMethod -Format: string. Default value: Clear -size – set size for HA-devcie (MB) Format: integer. Default value: 12 -sectorSize - set sector size for HA-device Format: integer. Default value: 512 allowed values: 512, 4096 -failover - set type failover strategy Format: integer. Default value: 0 (Heartbeat) allowed values: 0, 1 (Node Majority) -bmpType - set bitmap type, is set for both partners at once Format: integer. Default value: 1 (RAM) allowed values: 1, 2 (DISK) -bmpStrategy – set journal strategy, is set for both partners at once Format: integer. Default value: 0 allowed values: 0, 1 – Best Performance (Failure), 2 – Fast Recovery (Continuous) *#primary node* -imagePath - set path to store the device file Format: string. Default value: My computer\C\starwind". For Linux the following format should be used: "VSA Storage\mnt\mount point" -imageName - set name device Format: string. Default value: masterImg21 -createlmage - set create image file Format: boolean. Default value: true -targetAlias - set alias for target Format: string. Default value: targetha21 -poolName – set storage pool Format: string. Default value: pool1 -aluaOptimized – set Alua Optimized Format: boolean. Default value: true -cacheMode - set type L1 cache (optional parameter) Format: string. Default value: wb allowed values: none, wb, wt -cacheSize – set size for L1 cache in MB (optional parameter) Format: integer. Default value: 128 allowed values: 1 and more -syncInterface - set sync channel IP-address from partner node Format: string. Default value: "#p2={0}:3260" -hbInterface - set heartbeat channel IP-address from partner node Format: string. Default value: "" -createTarget - set creating target Format: string. Default value: true Even if you do not specify the parameter -createTarget, the target will be created



automatically.

If the parameter is set as -createTarget \$false, then an attempt will be made to create the device with existing targets, the names of which are specified in the -targetAlias (targets must already be created) -bmpFolderPath – set path to save bitmap file Format: string.

#secondary node

-imagePath2 - set path to store the device file Format: string. Default value: "My computer\C\starwind". For Linux the following format should be used: "VSA Storage\mnt\mount point" -imageName2 - set name device Format: string. Default value: masterImg21 -createImage2 - set create image file Format: boolean. Default value: true -targetAlias2 - set alias for targetFormat: string. Default value: targetha22 -poolName2 – set storage pool Format: string. Default value: pool1 -aluaOptimized2 - set Alua Optimized Format: boolean. Default value: true -cacheMode2 - set type L1 cache (optional parameter) Format: string. Default value: wb allowed values: wb, wt -cacheSize2 – set size for L1 cache in MB (optional parameter) Format: integer. Default value: 128 allowed values: 1 and more -syncInterface2 – set sync channel IP-address from partner node Format: string. Default value: "#p1={0}:3260" -hbInterface2 - set heartbeat channel IP-address from partner node Format: string. Default value: "" -createTarget2 - set creating target Format: string. Default value: true Even if you do not specify the parameter -createTarget, the target will be created automatically. If the parameter is set as -createTarget \$false, then an attempt will be made to create the device with existing targets, the names of which are specified in the targetAlias (targets must already be created) -bmpFolderPath2 - set path to save bitmap file Format: string.

Selecting The Failover Strategy

StarWind provides 2 options for configuring a failover strategy:

Heartbeat

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

If at least one heartbeat link is online, StarWind services can communicate with each other via this link. The device with the lowest priority will be marked as not synchronized and get subsequently blocked for the further read and write operations until the synchronization channel resumption. At the same time, the partner device on the synchronized node flushes data from the cache to the disk to preserve data integrity in case the node goes down unexpectedly. It is recommended to assign more independent heartbeat channels during the replica creation to improve system stability and avoid the "split-brain" issue.

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

Node Majority

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

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

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

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



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	
	To re then	move a targ click Remove	et portal, select the	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	dd 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 p want to add.	port number of the portal you
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		
initiator. The name will specified.	default to the Initiator Name of the system unless another name	e is	
Name:	iqn.1991-05.com.microsoft:sw01		
Target secret:			
Perform mutual aut To use mutual CHAP, e RADIUS. Use RADIUS to gen	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 p want to add.	ort number of the portal you
To change the default settings of the disc the Advanced button.	covery 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
Enable CHAP log o CHAP Log on inform HAP helps ensure co n initiator. o use, specify the sa ititator. The name w pecified.	on 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
Enable CHAP log of CHAP Log on inform HAP helps ensure co in initiator. o use, specify the sa initiator. The name w pecified.	ation 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 ign, 1991-05, com, microsoft; sw01
Enable CHAP log of CHAP Log on inform CHAP helps ensure co an initiator. Fo use, specify the sa nitiator. The name w specified. Jame:	on nation connection security by providing authentication between a target and ame 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 iqn.1991-05.com.microsoft:sw01

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



iSC	SI Initi	ator Proper	ties				\times
Та	rgets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
	Targe	portals					
	The s	· ystem will lo	ok for Targets on fo	llowing portals:		Refresh	
	Addr	ess	Port	Adapter	1	(P address	
	172.	16.10.10	3260	Microsoft iSCSI Initia	tor	172.16.10.1	
	172.	16.10.20	3260	Microsoft iSCSI Initia	tor	172.16.10.1	
	To ad To re then	d a target p move a targ click Remove	ortal, click Discover et portal, select the e.	Portal. address above and	Disc	over Portal Remove	
	iSNS s The s Name	ervers ystem is reg	istered on the follow	ving iSNS servers:		Refresh	
	To ad	d an iSNS se	rver, dick Add Serv	er.	Ad	d Server	
	To re then	move an iSN click Remove	S server, select the	server above and		Remove	
							_
				OK	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 basis connection	RADIUS Configuration
DNS name of the target and then click Quick Connect.	type the IP address or
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
1q1.2000-00.com.stal wirksortware.sw2-withess	Indeave
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.	s. o restore the
∑ 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	
ocal adapter:	Microsoft iSCSI Initiator \checkmark
nitiator IP:	172.16.10.1 ~
Farget portal IP:	172.16.10.10 / 3260 🗸
CRC / Checksum	
Data digest	Header digest
CHAP Log on inform CHAP helps ensure co in initiator. To use, specify the sa initiator. The name w pecified.	on 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 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 ign. 1991-05.com.microsoft:sw01
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa nitiator. The name w specified. Vame:	nation onnection security by providing authentication between a target and ame 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 iqn.1991-05.com.microsoft:sw01

- 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.



Connect using	
	Manual R (2001 Taillada)
Local adapter:	
Initiator IP:	172.16.10.1 ~
Target portal IP:	172.16.10.20 / 3260 \checkmark
CRC / Checksum	
Data digest	Header digest
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa nitiator. The name w specified.	on nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this ill 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 nitiator. The name w specified.	ation 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 nitiator. The name w specified.	action connection security by providing authentication between a target and connection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this ill default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:sw01
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa initiator. The name w specified. Name: Target secret:	ation panetion security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this ill default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:sw01

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_00(
Device interi	ace name.	<	>
Configure Mu	ultipath IO (M	IPIO)	
To configure selected dev	e the MPIO po vice, click MPI	olicy for a IO.	MPIO
			OK
			- OK

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 Management — 🗆 🗙					×					
File Action Vie	ew 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	24.51 GB	6.53 GB	27 %		
System Reserved	I Simple	Basic	NTFS		Healthy (S	500 MB	172 MB	34 %		
Disk 0	Custom Deserve			Europ						^
25.00 GB Online	System Reserved System (C:) 500 MB NTFS 24,51 GB NTFS Healthy (System, Active, Primary Partition) Healthy (Boot, Page File, Crash Dump, Primary Partition)									
— Disk 1 Basic 49.88 GB Online	Storage (D:) 49.87 GB NTFS Healthy (Primary Partition)									
C Disk 2 Unknown 6.00 GB Offline	6.00 GB Unallocated									
Olisk 3 Unknown 10.00 GB Offline	10.00 GB Unallocated									
[©] Disk 4 Unknown 1.00 GB Offline (i	1.00 GB Unallocated									v
Unallocated	Primary partition									

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 > Can	cel



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		\times		
Format Partition To store data on this partition, you must format it first.				
Choose whether you want to format	this volume, and if so, what settings you want to use.			
O Do not format this volume				
Format this volume with the format	ollowing settings:			
File system:	NTFS ~			
Allocation unit size:	Default ~			
Volume label:	CSV1			
Perform a quick format				
Enable file and folder c	ompression			
	< 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: 	E ~
O Mount in the following empty NTFS folder:	
	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		– o x
Server M	anager 🛚 Dashboard 🛛 🗣 🕼 Mana	ge <mark>Tools</mark> View Help
Tashboard	WELCOME TO SERVER MANAGER	Cluster-Aware Updating Component Services Computer Management
Local Server All Servers File and Storage Services	1 Configure this local serve	Defragment and Optimize Drives Disk Cleanup Event Viewer
Hyper-V	QUICK START 2 Add roles and features	Failover Cluster Manager Hyper-V Manager iSCSI Initiator
	3 Add other servers to manag	Je Local Security Policy Microsoft Azure Services
	4 Create a server group 5 Connect this server to cloud	ODBC Data Sources (32-bit) ODBC Data Sources (64-bit)
	LEARN MORE	Performance Monitor Print Management Recourse Monitor
	ROLES AND SERVER GROUPS Roles: 2 Server groups: 1 Servers total: 1	Services System Configuration
	File and Storage 1	System Information Task Scheduler Windows Firewall with Advanced Security
	Manageability Manageability	Windows Memory Diagnostic

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



刷 Evileurs Cluster Manager			_	×
Sin Artise Manager				^
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		
O Overview	聯	Connect to Cluster		
a valiability of server roles. The clustered servers (called nodes) are connected by physical		View		•
Cables and by somware, it one of the nodes falls, 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				
Ealover cluster communities 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	🚏 Create Cluster Wizard 🔶		
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	The NetBIOS nan automatically. Fo address.	ne is limited to 15 char or each network to be	acters. One or more IPv4 used, make sure the netw	addresses could not be configuor ork is selected, and then type a	ured an
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.

韂 Create Cluster Wiz	zard	×
Summary		
Before You Begin Select Servers	You have successfully completed the Create Cluster Wizard.	
Access Point for Administering the	Node	^
Cluster	SW1.starwind.local	
Confirmation	SW2.starwind.local	
Creating New Cluster	Cluster	
Summary	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.



Failover Cluster Manager File Action View Help	ar Ip	- [×
Failover Cluster Manager Production Roles Nodes Storage Disks Pools Enclosures Networks Networks	er Disks (0) Actions Disks Name Status Assigned To Owner Nod Add Disk Add Disks to a Cluster X Select the disk or disks that you want to add.		•
	Available disks: Resource Name Disk Info Capacity Signature/Id Image: Signature Disk 1 Disk 3 on node SW2 10.0 GB (080ffb0a-c594.4790-afc-9-9b997e65c0dc) Image: Signature Disk 2 Disk 2 on node SW2 1.00 GB (2043a199-b684.4147-8660-3a146583dce) Image: Signature Disk 3 Disk 2 on node SW2 6.00 GB (b4ade0c2-d87c-4aff-b53b-dda21e81bfbd)		
	OK Cancel		

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.



遣 Configure Cluster	r Quorum Wizard	×
Select Q	uorum Configuration Option	
Before You Begin Select Quorum Configuration Option Select Quorum Witness Confimation 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.



📲 Configure Cluster	Quorum Wizard	×
Select Qu	uorum Witness	
Before You Begin Select Quorum Configuration Option	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.	
Select Quorum Witness	 Configure a disk witness Adds a quorum vote of the disk witness 	
Configure Storage Witness Confirmation	 Configure a file share witness Adds a quorum vote of the file share witness 	
Configure Cluster Quorum Settings	 Configure a cloud witness Adds a quorum vote of the cloud witness 	
Summary	O Do not configure a quorum witness	
	Failover Cluster Quorum and Witness Configuration Options	
	< Previous Next > Cancel	

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



遣 Configure Cluster	Quorum Wizard			×
Configure	e Storage Witness			
Before You Begin Select Quorum Configuration Option	Select the storage volume th	at you want to assign a	s the disk witness.	
Select Quorum Witness	Name	Status	Node	Location
Configure Storage Witness Configure Cluster Quorum Settings Summary	 □ I Cluster Disk 1 Volume: (G) ☑ □ I Cluster Disk 2 Volume: (\\?\ □ I Cluster Disk 3 Volume: (E) 	 Online File System: NTFS Online File System: NTFS Online File System: NTFS 	SW2 9.92 GB free of 9.97 GB SW2 959 MB free of 990 MB SW2 5.93 GB free of 5.97 GB	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.

Hie Failover Cluster Manager File Action View Help						_		×
 ➡ Failover Cluster Manager ➡ Production.starwind.local 	Disks (3) Search				Queries ▼ ↓ ▼	Actions Disks		<u>^</u>
Notes Nodes Storage 2001	Name 문 Cluster Disk 1 클 Cluster Disk 2 클 Cluster Disk 3	Status Online Online Online Online 	Assigned To Available Storage Disk Witness in Quorum Available Storage	Owner Node SW2 SW2 SW2	Disk Number	Parta	'ple Stor	
	Volumes (1) CSV2 (G) Volumes	1			Replication Replication Replication Remove Remove Properties		- er Shar Details d Events	

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			1						д — П — Х	
File Action View Help				Cluster D	isk 1 Proper	ties		×		
♦ ♦ 2 □ 2 □				General						_
 Failover Cluster Manager Folover Cluster Manager Roles Nodes Storage Disks Pools Enclosures 	Disks (3) Search Name 문 Cluster Disk 1 문 Cluster Disk 2 문 Cluster Disk 3	Status Online Online Online Online	Assigned Cluster S Disk Wit Cluster S	Volun 2 C:	Name: Type: Status: le	CSV2 Physical I Online ge\Volume1	Disk File System Redirected Access No	Capacit 9.97 GI	Disk e Available Storage 7	•
🍓 Networks 國 Cluster Events	<								isk 1 g Online Offline mation Details v Critical Events	
	V 🛃 Cluster Disk 1			<				>	e	۲
									ication	۲
	Volumes (1)								e Actions	۲
	CSV2 (C:\ClusterS	torage\Volume1) ee of 9.97 GB					OK Cancel	Apply	ove from Cluster S Jerties	
Disks: Cluster Disk 1										

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			۹,	Queries 🔻 🕁	• •	Disks	^ ^
🍯 Nodes	Name	Status	Assigned To	Owner Node	Disk Number	Partit	🛃 Add Disk	
✓ Call Storage	ESV1	🕥 Online	Cluster Shared Volume	SW2		2	📑 Move Available Sto	r 🕨
E Disks	ESV2	💿 Online	Cluster Shared Volume	SW1		3	View	•
Enclosures	📇 Witness	Online	Disk Witness in Quorum	SW2		4	Q Refresh	
Networks Cluster Events							👔 Help	
							CSV1	•
							🚱 Bring Online	
	4					>	🙀 Take Offline	
						-	🚯 Information Details	
	🗸 🕌 CSV1						Show Critical Event	s
							🐼 Move	•
	Volumes (1)						🐮 Replication	•
	CSV1 (C:\CI	usterStorage\Volume2)					More Actions	•
	CSVFS 5.93	GB free of 5.97 GB		J			Remove from Clust	i
	Volumes						Properties	
Disks: CSV1	J. B						,	

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

醫 Failover Cluster Manager				Cluster	Vetw	ork 1 Properties	Х	×
				General				
 Failover Cluster Manager Production.starwind.local Roles 	Networks (3) Search			Ŵ	Ch	luster Network 1		
Nodes	Name Cluster Network 1 Cluster Network 2 Cluster Network 3 Cluster Network 3 Cluster Network 3 Cluster Network 1 Cluster Network 2 Cluster	Status Up Up Up Up Up Status Status	Cluster Use Cluster Only None Cluster and Client	kane Synci Status Subne	C : ts:	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.

File Action View Help	1						
Hailover Cluster Manager	Networks (3)					Actions	
Roles	Search			P Que	eries 🕶 🔛 🐨 😔	Networks	-
Nodes	Name	Status	Cluster Use	Information		Live Migration Settin	gs
🗸 🛗 Storage	Sync .	🛞 Up	Cluster Only			View	•
Disks	iscsi	🛞 Up	None			Refresh	
Enclosures	🚆 Management	🛞 Up	Cluster and Client			👔 Help	
La Cluster Events	<				>	iscsi	*
· Only ICluster Onl Only	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 Production.starwind.local Roles Nodes Storage Disks Pools Sinc @ U; ISCSI @ U; Management @ U; Cluster Events 	Select one or more networks for virtual machines to use fo Use the buttons to list them in order from most preferred least preferred at the bottom.	Apply	Actions Networks Ive Migration Settings View Image: Refresh Image: Help iSCSI Image: Show Critical Events Image: Properties Image: Help

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 Manage	r		– 🗆 ×
File Action View Hel	p		
🗢 🔿 🙍 🖬 📓 🖬			
📲 Failover Cluster Manage	Cluster Production.starwind	nd.local	^ Actions
Production.stary	Configure Role	a Developing	Production.starwind.local
Nodes	Validate Cluster	ered miss and 2 nodes	len Configure Role
> 📇 Storage	View Validation Report	al Networks: Cluster Network 2. Cluster Network 3. Cluster Network 1. Cluster Network 4	¥ Validate Cluster
Networks	Add Node	Subnets: 3 IPv4 and 1 IPv6	View Validation Report
Egi Cluster Even	Class Connection	tical: 52, Error: 16, Warring: 5	P Add Node
	close connection		Close Connection
	Reset Recent Events		Reset Recent Events
	More Actions >	sectic clustered role, add one or more servers (nodes) or conv roles from a cluster running Windows Server 2016 or supported previous versions of Windows Server.	More Actions
	View >	Fallover cluster topics on the Web	View +
	Refresh		Refresh
	Properties		Properties
	Help		Help
	E Consei Junaie Obraniid		Name: Production
			録 Bring Online
	Navigate		Take Offline
	The Pales	Madea Managa Maturate Maturate Maturate	Information Details
	le noies	(*) INDES (*) SUBJE (*) INDES (*) UNDER CONTRACT	Show Critical Events
			More Actions
	 Cluster Core Reso 	sources	× Remove
	Name	Status Information	Properties
	Server Name		👔 Help
	Name: Production	() Online	
	IP Address: 192.16	168.12.86 🕐 Onîne	
< >	Cluster Infrastructure		~ I
This action enables you to se	lect a role that you can configure t	e for high availability.	

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

Righ Availability Wizard						
Select Ro	ble					
Before You Begin Select Role	Select the role that you want to configure for high a	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 CSI Target Server	~	Description: A File Server provides a central location on your network where files are shared for use by users or by applications.			
		< <u>P</u> re-	vious <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>Fi</u> le 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	ccess 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	(i) 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 Wizard							
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						
Availability	CN=Computers,DC=starwind,DC=local						
Summary							
,							
			~				
	To continue, click Next.						
		< Previous Next > Can	cel				

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

Click Finish to close the Wizard.



Nigh Availability Wizard						
ty Summary						
Before You Begin Select Role	High availability was successfully configured for the role.					
Client Assess Deint	Distributed Network Name					
Client Access Point	FileServer					
Confirmation	OU					
Configure High Availability	CN=Computers,DC=starwind,DC=local					
Commonly	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.

								-
ç								
Roles (1)								Actions
Search						P	Queries 💌 🔛 💌	Roles
Name	Status	Type	Owner Node	Priority	Information			😽 Configure Role
RieServer	Running	Scale-Out File Server	SW1	Medium				Virtual Machines
								Treate Empty Role
								View
								Refresh
								👔 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
								X Remove
								Properties
								Help
w III EleConus						Duel	anad Outpart: Any pode	
							and omitine Builtings	
Status:	Running							
Priority:	Medium							
Client Access Narr	e: FileServer							
IP Addresses:	192.168.12.85							

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	Roles (1)							Actions	
Production.starwind Poler	Search						🔎 Queries 🔻 🔛 👻	Roles	
Nodes	Name	Status	Туре	Owner Node	Priority	Information		Nonfigure Role	
🗸 📇 Storage	B FileServer	🔞 Failed	Scale-Out File Server	SW1	Medium			Virtual Machines	•
Pools								Treate Empty Role	
Enclosures								View	•
Networks III Cluster Functs								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	
								I Help	
	v III. ElaConus						Preferred Ourserr: Any pode		
	· III · IIII · IIII						The office of the second secon		
	Status:	Running							
	Priority:	Medium							
	Owner Node: Olient Access Name:	FileServer							
	IP Addresses:	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 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	
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	SMB Share - Quick SMB Share - Advanced	This profile creates an SMB file share with settings appropriate for Hyper-V, certain databases, and other compared applications						
Other Settings	SMB Share - Applications	server applications.						
	NFS Share - Quick							
Confirmation	NFS Share - Advanced							

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								
	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 <mark>on the</mark> se	elected	

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



藩 New Share Wizard			_		×
Specify share nam	e				
Select Profile	Share n <u>a</u> me:	Share			
Share Location					
Share Name	Share description:				
Other Settings					
Permissions					
Confirmation	Local path to share:				
Results	C:\ClusterStorage\\	olume1\Shares\Share			
	🕕 If the folder doe	not exist, the folder is created.			
	Remote path to sha	re:			
	\\FileServer\Share				
		< <u>P</u> revious <u>N</u> ext >	Create	Cance	el

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. Enable 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.
	< <u>P</u> revious <u>N</u> ext > <u>C</u> reate Cancel

8. Specify the access permissions for the file share.



Select Profile Share Location Share Name Other Settings Permissions	If this shar remote ma Permission permission Share perm Folder per	e will be used for Hyper-V, y anagement of the Hyper-V h is to access the files on a sha is, and, optionally, a central nissions: Everyone Full Cont missions:	rou may need to e ost. are are set using a access policy. rol	nable constrained delegation to enable combination of folder permissions, sha
Confirmation Results	Type Allow Allow Allow	Principal BUILTIN\Users BUILTIN\Users CREATOR OWNER	Access Special Read & execu Full Control	Applies To This folder and subfolders This folder, subfolders, and files Subfolders and files only
	Allow Allow Allow	NT AUTHORITY\SYSTEM BUILTIN\Administrators BUILTIN\Administrators	Full Control Full Control Full Control	This folder, subfolders, and files This folder, subfolders, and files 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.

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

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



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				
		< <u>P</u> revious <u>N</u> ex	t > Close Ca	ncel

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:

📲 Failover Cluster Manager										- ø ×
File Action View Help	,									
(= =) 🖄 💼 🖬 🖬										
Failover Cluster Manage	Roles (1)								Actions	
Production.starwind Palas	Search						P Q	ieries 🔻 🔛 👻 🔍	Roles	
Nodes	Name	Status Type	0	Owner Node Priority	Information				Nonfigure Role	
✓ 📇 Storage	RieServer	Running Scale-Ou	ut File Server S	5W1 Medium					Virtual Machines	,
Disks Pools									Create Empty Role	
Enclosures									View	,
Networks									Refresh	
[s] Cluster Events									🛛 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	
	* FileServer	r					Prefer	ed Owners: Any node		
	Shares (2)									
	Name	Path	Protocol	Continuous Availabil	y Remarks					
	_ CusterStorage\$	C:\OusterStorage	SMB	No	Cluster Shared Volumes Default Share					
	2 share	C:\LusterStorage\Volume1\Shares\S	ihare SMB	Yes						
(Summary Resources	Shares]		
		- Landard and								

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 Manag	er							-	×
File Action View He	lp								
🗢 🔿 🙇 📅 📓 🖬	1								
📲 Failover Cluster Manage	Cluster Production.starwing	i.local				^	Actions		
Production.stary Polor	Configure Role	or Broduction					Production.starwind.local		•
Nodes	Validate Cluster	ered roles and 2 nodes.					igure Role		
> 📇 Storage	View Validation Report	al		Networks: Cluster Network 2, Cluster	r Network 3, Cluster Network 1, Cluster Network 4		Walidate Cluster		
Networks Networks Networks	Add Node			Subnets: 3 IPv4 and 1 IPv6			View Validation Report		
en en er er er er	Close Connection	tical: 52, Error: 16, Warning: 5					🍄 Add Node		
							Close Connection		
	Reset Recent Events					ידר	Reset Recent Events		
	More Actions >	recific clustered role, add one or mo	re servers (nodes), or copy	roles from a cluster running Windows Ser	ver 2016 or supported previous versions of Windows Server.		More Actions		•
	View >			Failover cluster topics on the Web			View		•
	Refresh						Q Refresh		
	Properties						Properties		
	Help						👔 Help		
							Name: Production		
							🚱 Bring Online		
	Navigate						🙀 Take Offline		
	Roles	Nodes	Torace	Networks	Cluster Events		🚯 Information Details		
						_	Show Critical Events		
						- 1	More Actions		•
	Cluster Core Res	ources					🗙 Remove		
	Name		Status	Information			Properties		
	Server Name		0				👔 Help		
	Name: Production	20.20.00	Online						
	Cluster Infrastructure	N. 16.00	U Grane						
< >	BLU. IN I. A.		A			~			
This action enables you to se	elect a role that you can configure	for high availability.							

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



iigh Availability	Wizard	ka 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 Corst ScSI Target Server	▲	Description: A File Server provides a central location on your network where files are shared for use by users or by applications.]			

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



igh Availability	Wizard	×
File Serv	ег Туре	
Before You Begin	Select an option for a clustered file server:	
Select Role	<u>Fi</u> le Server for general use	
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. Scale-Out File Server for application data Use this option to provide storage for server applications or virtual machines that leave files open for extended periods of time. Scale-Out File Server client connections are distributed across nodes in the cluster for better throughput. This option supports the SMB protocol. It does not support the NFS protocol, DFS Replication, or File Server Resource Manager. 	
	< <u>P</u> revious <u>N</u> ext > 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.



ka 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	Name:	FileServer			1
File Server Type					
Client Access Point	The NetBIOS nan	ne is limited to 15 d	haracters. One or more IPv4	addresses could not be configured	
Select Storage	address.	or each network to	be used, make sure the netw	ork is selected, and then type an	
Confirmation		Networks		Address	1
Configure High Availability			192 168 12 0/24	Address 192.168.12.85	
Summary					
			< <u>P</u> revious	<u>N</u> ext > Cancel	

Click Next to continue.

6. Select the Cluster disk and click Next.



🧱 High Availability	🗞 High Availability Wizard					
Select St	orage					
Before You Begin Select Role File Server Type	Select only the storage vo You can assign additional	olumes that you want t storage to this cluste	to assign to this clustered role red role after you complete th	e. iis wizard.		
Client Access Point	Name	Status				
Select Storage Confirmation Configure High Availability Summary	Volume: (G)	Online File System: NTFS	9.91 GB free of 9.97 GB			
			< <u>P</u> revious	<u>N</u> ext >	Cancel	

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



🧞 High Availability \	🗱 High Availability Wizard					
tonfirmat	ion					
Before You Begin Select Role	You are ready to configure high availability for a File	e 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.					
		< <u>P</u> revious <u>N</u> ext > Canc	el			

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 Wizard					
Summary					
Before You Begin Select Role	High availability was successfully configured for the role.				
Client Access Point	Distributed Network Name				
Client Access Foint	FileServer				
Confirmation	OU				
Availability	CN=Computers,DC=starwind,DC=local				
Summany	Subnet				
Janimary	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.

Aanager						- 0
w <u>H</u> elp						
2 📰						
Vanage Roles (1)						Actions
arwind Search					P Queries 🔻 🖬 👻 🖸	Roles
Name	Status	Туре	Owner Node	Priority	Information	in Configure Role
Rie Server	Running	FileServer	SW1	Medium		Virtual Machines
						Treate Empty Role
sures						View
metr						Refresh
						🛛 Help
						FileServer
						🗘 Start Role
						🗘 Stop Role
						Add File Share
						1 Move
						1 Change Startup Priority
						🚯 Information Details
						Show Critical Events
						Add Storage
						Add Resource
						More Actions
						× Remove
						Properties
						🛛 Help
50						1
* TileServe					Preferred Owners: Any node	
Salue	Bunoina					1
Priority:	Medium					
Owner Node:	SW1					
Dient Access Nar	e: HeServer 192 168 12 85					
	102.100.12.00					
-						
Summary Resources	Shares					Л

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
	_	_
<u>A</u> dvanced	OK	Cancel

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

mission Entry for Computers			>
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		
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.

New Share Wizard		- 0
elect the profi	le for this share	
Select Profile	File share profile:	Description:
Share Location	SMB Share - Quick	This basic profile represents the fastest way to create an
Share Name	SMB Share - Advanced	SMB file share, typically used to share files with Windows-based computers.
	SMB Share - Applications	
	NFS Share - Quick	 Suitable for general file sharing Advanced options can be configured later by
	Ni o Share " Advanced	using the Properties dialog
		< Previous Next > Create Cancel

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



Server Name	Status			
		Cluster Role	Owner Node	
FileServer	Online	File Server		
Share location:				
Select by volume:				
Volume	Free Space	Capacity File Sys	tem	
G:	9.91 GB	9.97 GB NTFS		
The location of the f	ile share will be a new fold	der in the \Shares d	irectory on the se	lected
	Share location: Select by volume: Volume G: The location of the f	Share location: Share location: Select by yolume: Volume G: 9.91 GB The location of the file share will be a new fol	Share location: Select by yolume: Volume Free Space Capacity File Sys G: 9.91 GB 9.97 GB NTFS The lectric of the file shore will be a new folder in the Scheme of	Share location: Select by yolume: Volume Free Space Capacity File System G: 9.91 GB 9.97 GB NTFS The location of the 5le characteril has new folder in the VShare director on the second

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.

ᡖ New Share Wizard		-		×
Configure share s	settings			
Select Profile	Enable access-based enumeration]
Share Location Share Name	Access-based enumeration displays only the files and folders that a user h access. If a user does not have Read (or equivalent) permissions for a folde folder from the user's view.	as permis r, Windo	ssions to ws hides	the
Other Settings	Enable continuous availability			
Permissions Confirmation	Continuous availability features track file operations on a highly available f clients can fail over to another node of the cluster without interruption. Allow caching of share	ile share	so that	
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	ranchCac share.	he for	
	Enable BranchCache on the file share BranchCache enables computers in a branch office to cache files downl share, and then allows the files to be securely available to other compute Encrypt data access	oaded fro ters in th	om this e branch	
	When enabled, remote file access to this share will be encrypted. This secu 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 s	res the d this box i erver.	ata agair is checke	nst d
	< <u>Previous</u> <u>N</u> ext >	ate	Cance	4

8.Specify the access permissions for the file share.

elect Profile hare Location	Permissior permissior	ns to access the files on a sha ns, and, optionally, a central	are are set using a access policy.	combination of folder permissions, s
hare Name	Share perr	missions: Everyone Full Cont	rol	
ther Settings	Folder per	Principal	Access	Applies To
onfirmation	Allow	BUILTIN\Users	Special	This folder and subfolders
aulta	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
	Custom	ize permissions		



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

Share Location Share Name Other Settings	SHARE LOCATION Server:	F1. 6
Other Settings		FileServer
	Cluster role:	Scale-Out File Server
Permissions	Local path:	C:\ClusterStorage\Volume1\Shares\Share
Confirmation	SHARE PROPERTIES	
	Share name: Protocol:	Share SMB
	Access-based enumeration:	Disabled
	Caching:	Disabled
	BranchCache:	Disabled
	Encrypt data:	Disabled
	Continuous availability:	Enabled
	Access-based enumeration: Caching: BranchCache: Encrypt data: Continuous availability:	Disabled 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			
	3Ř		
		< <u>P</u> revious <u>N</u> ext >	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.

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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	
Select the profile Share Location Share Name Other Settings Permissions Confirmation	e for this share File share grofile: SMB Share - Quick SMB Share - Advanced SMB Share - Applications 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.	
	[< <u>P</u> revious <u>N</u> ext > <u>C</u> reate 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:				
	Salast huushumat				
	Select by volume:				
	Volume	Free Space	Capacity File Sys	tem	
	Volume G:	Free Space 9.91 GB	Capacity File Sys 9.97 GB NTFS	tem	
	Volume G:	Free Space 9.91 GB	Capacity File Sys 9.97 GB NTFS	tem	
	Volume G:	Free Space 9.91 GB	Capacity File Sys 9.97 GB NTFS	item	alected
	€ volume G: The location of the fivolume.	Free Space 9.91 GB le share will be a new fold	Capacity File Sys 9.97 GB NTFS der in the \Shares d	item	elected

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

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

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

continue.

Specify authent	ication methods
Select Profile Share Location Share Name Authentication Share Permissions Permissions Confirmation Results	Specify the authentication methods that you want to use for this NFS share. Kerberos v5 authentication Kerberos v5 authentication and integrity(Krb5i) Kerberos v5 authentication and privacy(Krb5p) No server authentication No server authentication (AUTH_SYS) Enable unmapped user access Allow unmapped user access by UID/GID Allow anonymous access
	< Previous Next > Create Cancel

8. Click Add and specify Share Permissions.

permissions on a file s	ne share permissions in the	order they are sho	wh below. The fina	AL ALLER
	nare are determined by tak	ing into considerat	ion both the share	permissio
and the NTFS permiss	ion entries. The more restric	ctive permissions ar	e then applied.	
Name	Permissions	Root Access	Encoding	
				(
	Name	Name Permission	Name Permissions Root Access	Name Permission Root Access Encoding



Grant permissions to access th netgroup. Select the access an	ne NFS sh nd langua	hare to a host, client grou age encoding for the shar	p, or e.
O <u>H</u> ost:			
Netgroup:			
			Ý
Client group:			
			Ŷ
All <u>M</u> achines			
Language encoding:		Share permissions:	
ANSI	~	No Access	Ŷ
Allow root access (not reco	ommend	ed)	

9. Specify the access permissions for the file share.

Select Profile Share Location Share Name	Permissior permissior Share perr Folder per	ns to access the files on a sha ns, and, optionally, a central missions: Everyone Full Cont missions:	are are set using a access policy. rol	combination of folder permissions,
Permissions	Type	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		
Select Profile Share Location Share Name Authentication Share Permissions Permissions	Confirm that ti SHARE LOCATI Server: Cluster role: Local path:	ne following are the correct settin ON FileServer File Server G:\Shares\Share	igs, and then click Create.
Confirmation Results	Share name: Protocol:	Share NFS	

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



🖀 New Share Wizard			- 0	×
View results				
Select Profile	The share was success	fully created.		
	Task	Progress	Status	
Share Name	Create NFS share		Completed	
	Set NFS permissions		Completed	
Results				
7 .				
		Denieur Dini		
		< Previous Next	Close Cance	

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

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Contacts

US Headquarters	EMEA and APAC
 +1 617 829 44 95 +1 617 507 58 45 +1 866 790 26 46 	 +44 2037 691 857 (United Kingdom) +49 800 100 68 26 (Germany) +34 629 03 07 17 (Spain and Portugal) +33 788 60 30 06 (France)
Customer Support Portal: Support Forum:	https://www.starwind.com/support https://www.starwind.com/forums

General Information: info@starwind.com

Sales: sales@starwind.com



StarWind Software, Inc. 100 Cummings Center Suite 224-C Beverly MA 01915, USA www.starwind.com ©2024, StarWind Software Inc. All rights reserved.