

StarWind Virtual SAN[®] 2-node Hyperconverged Scenario with Windows Server 2012 R2

2025

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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IMPORTANT NOTE: Windows Server 2012 R2 is no longer supported by Microsoft (Mainstream End Date is Oct 9, 2018). This guide should be used for informational, test, and educational purposes only.

Starting from the 14869 build, the Asynchronous replication and LSFS features were excluded and deprecated. Please remove all Asynchronous replicas and LSFS devices before the update. See more information in the release notes: https://www.starwindsoftware.com/release-notes-build

Introduction To Starwind Virtual San For Hyper-V

StarWind Virtual SAN is a native Windows hypervisor-centric hardware-less VM storage solution. It creates a fully fault-tolerant and high performing storage pool built for the virtualization workloads by mirroring the existing server's storage and RAM between the participating storage cluster nodes. The mirrored storage resources are then connected to all cluster nodes and treated just as a local storage by all hypervisors and clustered applications. High Availability (HA) is achieved by providing multipath access to all storage nodes. StarWind Virtual SAN delivers supreme performance compared to any dedicated SAN solution since it runs locally on the hypervisor and all I/O is processed by local RAM, SSD cache, and disks. This way it never gets bottlenecked by storage fabric.

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

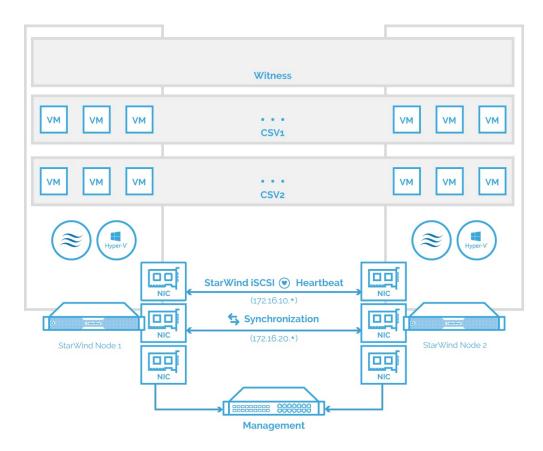
Recommended RAID settings for HDD and SSD disks: https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-h dd-and-ssd-disks/

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 2012 R2 Hosts

The network interconnection diagram is demonstrated below:





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

3. Configure network interfaces on each node to make sure that Synchronization and iSCSI/StarWind heartbeat interfaces are in different subnets and connected according to the network diagram above. In this document, 172.16.10.x subnet is used for iSCSI/StarWind heartbeat traffic, while 172.16.20.x subnet is used for the Synchronization traffic.

4. In order to allow iSCSI Initiators to discover all StarWind Virtual SAN interfaces, the StarWind configuration file (StarWind.cfg) should be changed after stopping the StarWind service on the node where it will be edited. Locate the StarWind Virtual SAN configuration file (the default path is "C:\Program Files\StarWind

Software\StarWind\StarWind.cfg") and open it via WordPad as Administrator. Find the *<iScsiDiscoveryListInterfaces value="0"/>* string and change the value from 0 to 1 (should look as follows: *<iScsiDiscoveryListInterfaces value="1"/>*). Save the changes and exit Wordpad. Once StarWind.cfg is changed and saved, the StarWind service can be restarted.

Enabling Multipath Support



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

mpiocpl

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

SPC-3 comp	liant	 		
Device Ha	rdware Id			
Add sup	port for <u>i</u> SCSI devices		- I	
	port for SAS devices			
		<u>A</u> dd		
Others		Add		
<u>O</u> thers	rdware Id	Add		
<u>O</u> thers	rdware Id	Add		
<u>O</u> thers	rdware Id	Add		
<u>O</u> thers	rdware Id	Add		

restart the server, click Yes to proceed.

8. Repeat the same procedure on the other server.

Installing Starwind Vsan For Hyper-V

 Download the StarWind setup executable file from the StarWind website: https://www.starwind.com/registration-starwind-virtual-san
 NOTE: The setup file is the same for x86 and x64 systems, as well as for all Virtual SAN



deployment scenarios.

2. Launch the downloaded setup file on the server to install StarWind Virtual SAN or one of its components. The Setup wizard will appear. Read and accept the License Agreement.

8	Setup - StarWind Virtual SAN 📃 🗖 🗙
	License Agreement Please read the following important information before continuing.
	Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.
	STARWIND® LICENSE AGREEMENT
	● <u>I accept the agreement</u> ○ I <u>d</u> o not accept the agreement
	Next > Cancel

3. Carefully read the information about the new features and improvements. Red text indicates warnings for users who are updating the existing software installations.



Setup - St	arWind Virtual SAN 📃 🗖 🗙			
Information Please read the following important in	oformation before continuing.			
When you are ready to continue with	Setup, dick Next.			
StarWind Virtual SAN V8	^			
Installation notes				
Installation: Previous versions c over the existing installation.	an be updated by installing this version			
In case of upgrade from v6.0 an Deduplication devices are not s	nd earlier versions: Mirror, IBV and supported in v8.0!			
Data from existing Mirror, IBV an migrated to new ImageFile device	d Deduplication devices must be ces before installation.			
< <u>B</u> ack <u>N</u> ext > Cancel				

4. Select Browse to modify the installation path if necessary. Click Next to continue.

8	Setup - StarWind Virtual SAN	x
	Pestination Location e should StarWind Virtual SAN be installed?	
	Setup will install StarWind Virtual SAN into the following folder.	
To cont	ntinue, click Next. If you would like to select a different folder, click Browse.	
C:\Pro	ogram Files\StarWind Software\StarWind Browse	
At leas	st 2.4 MB of free disk space is required.	
	< <u>B</u> ack <u>N</u> ext > C	Cancel



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

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

Setup - StarWind Virtual SAN	_ 🗆 🗙			
Select Components Which components should be installed?				
Select the components you want to install; clear the components you do install. Click Next when you are ready to continue.	o not want to			
StarWind Virtual SAN Server	~			
Service Loopback Accelerator Driver	170.8 MB 🔨			
Cloud Replicator for VTL	158.8 MB ≡			
StarWind Management Console	29.4 MB 0.1 MB			
Integration Component Library SMI-S Agent	7.8 MB 2.6 MB 51.5 MB			
Current selection requires at least 207.3 MB of disk space.				
< <u>B</u> ack Next >	Cancel			

6. Specify Start Menu Folder.



8	Setup - StarWind Virtual SAN	_ 🗆 🗙
	ect Start Menu Folder /here should Setup place the program's shortcuts?	
	Setup will create the program's shortcuts in the following Sta	art Menu folder.
Т	o continue, click Next. If you would like to select a different folder, o	lick Browse.
	starWind Software\StarWind	Browse
	< <u>B</u> ack <u>N</u> ext	> Cancel

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

Setup - StarWind Virtual SAN - 🗆 🗙
Select Start Menu Folder Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
StarWind Software \StarWind Browse
< <u>B</u> ack <u>N</u> ext > Cancel



- 8. When the license key prompt appears, choose the appropriate option:
 - request time-limited fully functional evaluation key.
 - request FREE version key.
 - select the previously purchased commercial license key.

Setup - StarWind Virtual SAN	
License key Get your license key	3
Now when you have installed StarWind Virtual SAN you need to apply either evaluation key or FREE version key or commercial license key you've got with your purchase. If you don't have any key it's time to request one now!	
Request time-limited fully functional evaluation key	
Request FREE version key	
Thank you, I do have a key already	
< <u>B</u> ack <u>Next</u> > Cancel]

9. Click Browse to locate the license file. Click Next to continue.



8	Setup - StarWind Virtual SAN 📃 🗖 🗙
2	Select your license key Where is license key located?
	Select where license key is located, then click Next.
	C:\StarWind_Virtual_SAN_Trial_License_Key\sw8_18072014_QA_St Browse
	< <u>B</u> ack <u>N</u> ext > Cancel

10. Review the licensing information. Click Next to continue.

8	Setup - StarWind Virtual SAN 📃 🗖 🗙
	Apply your license key Here is listed information about license key file that you provided. Press "Next" to apply this license key.
	Product: StarWind Virtual SAN Name: QA Organization: StarWind Number of servers: 5
	< <u>B</u> ack <u>Next</u> > Cancel



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

Setup - StarWind Virtual SAN	- 🗆 X
Ready to Install Setup is now ready to begin installing StarWind Virtual SAN on your compu	ter.
Click Install to continue with the installation, or click Back if you want to rev change any settings.	view or
Destination location: C:\Program Files\StarWind Software\StarWind	^
Setup type: StarWind Virtual SAN Server	=
Selected components: Service StarWind Management Console Integration Component Library PowerShell Management Library	
<	>
< <u>B</u> ack <u>I</u> nstall	Cancel

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





13. Repeat the installation steps on the partner node.

Creating Starwind Devices

1. In the StarWind Management Console click to Add Device (advanced) button and open Add Device (advanced) Wizard.

2. Select Hard Disk Device as the type of device to be created.



			?	×
\leftarrow	Add I	Device Wizard		
	Select	Device Type you want to create or export as iSCSI Target		
	۲	Hard Disk Device		
	0	Tape Device		
	0	Optical Disc Drive		
		Next	Car	ncel

3. Select Virtual Disk.



			?	×
←	Add [Device Wizard		
	Select I	Disk Device Type		
	۲	Virtual Disk		
		Virtual Disk stores User Data in File		
	0	Physical Disk		
		Export existing physical Disk as iSCSI Target		
	0	RAM Disk		
		Virtual Disk with Memory Storage		
		Next	Can	icel

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



			?	×
←	Add Device Wiza	d		
	Virtual Disk Loc	ation		
	Create a New \	irtual Disk		
	Name:	<pre></pre> device name>]	
	Location:	My Computer\D\		
	Size:	<size> GB ~</size>		
	OUse an Existing	Virtual Disk		
	Location:	~		
	Read-On	ly Mode		
		Next	Cano	el

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

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

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



			?	×
←	Add De	vice Wizard		
	Specify [Device RAM Cache Parameters		
	Mode			1
	0	Write-Back Writes are performed asynchronously, actual Writes to Disk are delayed, Read are cached	S	
	0	Write-Through Writes are performed synchronously, Reads are cached		
	۲	N/A Reads and Writes are not cached		
	Set	1aximum available Size		
	Size;	128 MB ~		
		Next	Can	cel

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



		?	×
←	Add Device Wizard		
	Target Parameters		
	Choose a Target Attachment Method		
	Create new Target	~	
	Target Alias		_
	<target alias="" name=""></target>		
	Target Name		
	iqn.2008-08.com.starwindsoftware:sw1- <target alias="" name=""></target>		
	Allow multiple concurrent iSCSI Connections		
	<u>N</u> ext	Can	icel

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



	? >	(
←	Add Device Wizard	
	Creation Page	
	Press "Create" to add new Device and attach it to new Target	
	Progress	
	Creating Device Folder	
	Creating Image File	
	Creating Header	
	Creating Device	
	Creating Target and attaching Device	
	Create Cancel	

9. Click Close to finish the device creation.

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

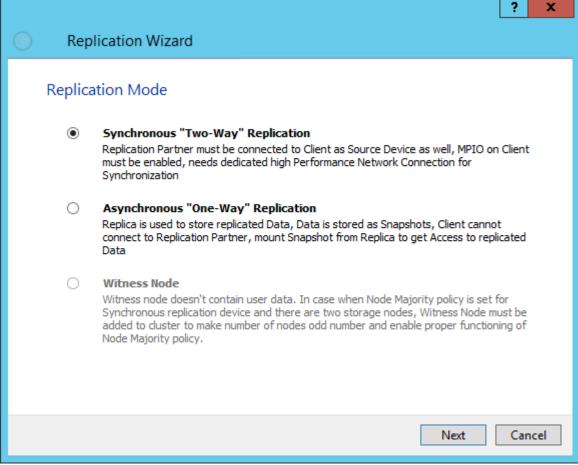
Select The Required Replication Mode

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



Synchronous "Two-Way" Replication

1. Select Synchronous "Two-Way" replication as a replication mode.



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

Asynchronous "One-Way" Replication

NOTE: Asynchronous replication requires minimum 100 MbE network bandwidth or higher. The Asynchronous node uses the LSFS device by design. Please, make sure that the Asynchronous node meets the LSFS device requirements:

https://knowledgebase.starwindsoftware.com/explanation/lsfs-container-technical-description/

1. Select Asynchronous "One-Way" Replication.



C Rep	ication Wizard				
Replication Mode					
 Synchronous "Two-Way" Replication Replication Partner must be connected to Client as Source Device as well, MPIO on Client must be enabled, needs dedicated high Performance Network Connection for Synchronization 					
۲	Asynchronous "One-Way" Replication Replica is used to store replicated Data, Data is stored as Snapshots, Client cannot connect to Replication Partner, mount Snapshot from Replica to get Access to replicated Data				
0	Witness Node Witness node doesn't contain user data. In case when Node Majority policy is set for Synchronous replication device and there are two storage nodes, Witness Node must be added to cluster to make number of nodes odd number and enable proper functioning of Node Majority policy.				
	Next Cancel				

2. Enter Host name or IP address of the Asynchronous node.

3. Choose the Create New Partner Device option.

4. Specify the partner device Location . Optionally, modify the target name by clicking the appropriate button.

5. Click Change Network Settings.

6. Specify the network for asynchronous replication between the nodes. Click OK and then click Next.

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

8. Specify Scheduler Settings and click Next.

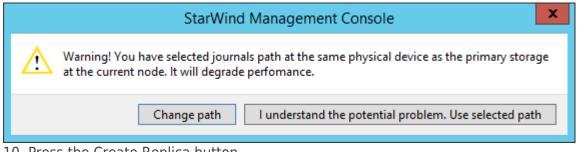
NOTE: The size of journal files and number of snapshots depends on the settings specified in this step.

9. Specify the path for journal files and click Next.

NOTE: By default, the journal files will be located on the node with the original device. However, it is highly recommended not to store journal files on the same drive where the original device is located. Additionally, the C:\ drive should not be used as the path for journal files to avoid any issues with Windows OS.

If the same drive where the StarWind device is located is selected, the warning message about possible performance issues will pop up. If there is no additional volume available for storing the journals, click I understand the potential problem. Use the selected path.





10. Press the Create Replica button.

11. Wait until StarWind service creates a device and click Close to complete the device creation.

Selecting The Failover Strategy

StarWind provides 2 options for configuring a failover strategy:

Heartbeat

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

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

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

Node Majority

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

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



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

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

Heartbeat

1. Select Failover Strategy.

	?	x	
Example 2 Replication Wizard			
Failover Strategy			
 Heartbeat Process node and communication failures using additional communication channel (heartbeat). At least one synchronization or heartbeat channel must be function proper failover processing. Loss of all communication channels may lead to split lissue, so it's recommended to use client iSCSI connection interfaces as heartbeat channel. Node Majority 	nal for prain t		
Process node and communication failures using majority policy: node stays activ sees more than half of nodes including itself. In case of 2 storage nodes, require configuring additional witness node. Does not require additional heartbeat chan	es	it	
Next	Ca	ncel]

- 2. Select Create new Partner Device and click Next.
- 3. Select a partner device Location.
- 4. Select Synchronization Journal Strategy and click Next.



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

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

https://knowledgebase.starwindsoftware.com/explanation/reasons-why-full-synchronizati on-may-start/

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

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

Failure journal

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

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

5. Click Change Network Settings.



	? X
Replication Wizard	
Network Options for Replication	
Networks for Synchronization and Heartbeat	
Press "Change Network Settings" to configure Interfaces	
Networks for Heartbeat	\equiv
Press "Change Network Settings" to configure Interfaces	
Change Network Settings	
ALUA preferred 127.0.0.1, SW2.test.local	
Change ALUA Settings	
Next	Cancel
<u></u>	

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



nterfaces	Networks	Synchronization and H	Heartbeat
 Host Name: 12 	7.0.0.1		
172.16.10.10	172.16.10.0		v
172.16.20.10	172.16.20.0	v	
192.168.12.10	192.168.12.0		V
- Host Name: SV	V2		
72.16.10.20	172.16.10.0		•
72.16.20.20	172.16.20.0		
192.168.12.20	192.168.12.0		

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

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

The successfully added device appears in StarWind Management Console.

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

Node Majority

There are two ways to configure Witness for 2-nodes StarWind HA device, created with Node Majority Failover Strategy: File Share (SMB) as Witness and additional server as Witness Node.

- Creating HA device with File SHare(SMB) as Witness:

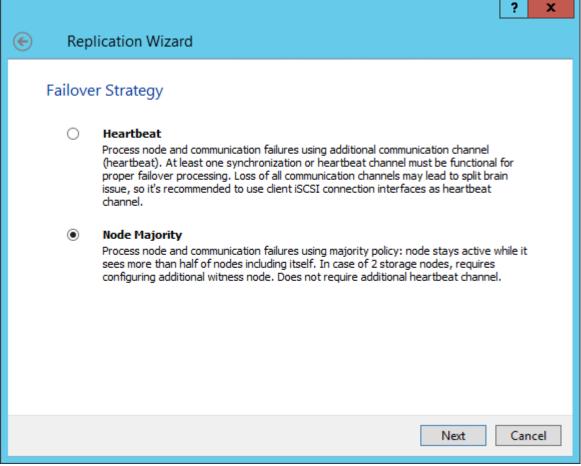


SMB Witness is a file, located on SMB share, which can be accessed by both nodes and help them to eliminate the split-brain issue in case of synchronization connection interruption between the nodes. To set up the SMB file share as a Witness for 2-nodes HA device with Node Majority Failover Strategy, perform the actions, described on this page:

https://www.starwindsoftware.com/help/ConfiguringFileShareSMBasWitness.html

- Creating HA device with Witness Node:

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



2. Choose Create new Partner Device and click Next.

3. Specify the partner device Location and modify the target name if necessary. Click Next. Select Synchronization Journal strategy and location and click Next.

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

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

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

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

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



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

Adding Witness Node

Witness node can be configured on a separate host or as a virtual machine in a cloud. It requires StarWind Virtual SAN service installed on it.

NOTE: Since the device created in this guide is replicated between 2 active nodes with the Node Majority failover strategy, a Witness node must be added to it.

1. Open StarWind Management Console, right-click on the Servers field and press the Add Server button. Add a new StarWind Server which will be used as the Witness node and click OK.

C† 👘	Add new StarWind Server		?	x
Host:	witness-sw	: 3	261	
Adva	anced >> OK		Cano	el

2. Right-click on the HA

device with the configured Node Majority failover policy and select Replication Manager and press the Add Replica button.

3. Select Witness Node.

0	? X
. тер	plication Wizard
Replic	ation Mode
۲	Synchronous "Two-Way" Replication Replication Partner must be connected to Client as Source Device as well, MPIO on Client must be enabled, needs dedicated high Performance Network Connection for Synchronization
0	Asynchronous "One-Way" Replication Replica is used to store replicated Data, Data is stored as Snapshots, Client cannot connect to Replication Partner, mount Snapshot from Replica to get Access to replicated Data
۲	Witness Node Witness node doesn't contain user data. In case when Node Majority policy is set for Synchronous replication device and there are two storage nodes, Witness Node must be added to cluster to make number of nodes odd number and enable proper functioning of Node Majority policy.
	Next Cancel

4. Specify the Witness node Host Name or IP address. The default Port Number is 3261.



Replication Wizard	i	? ×
Add Partner Node		
Specify Partner Host Nam	e or IP Address where Replication Node would be created	
Host Name or IP Address	witness-sw 🗸	
Port Number	3261	
	Next	Cancel

5. In Partner Device Setup, specify the Witness device Location. Optionally, modify the target name by clicking the appropriate button.

6. In Network Options for Replication, select the synchronization channel with the Witness node by clicking the Change Network Settings button.

7. Specify the interface for Synchronization and Heartbeat and click OK.

8. Click Create Replica and then close the wizard.

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

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

How to extend Image File or High Availability device

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.

iSCSI Initiator Properties					
Targets Discovery Fa	avorite Targets	Volumes and Devices	RADIUS Configuration	n	
Target portals			R <u>e</u> fresh	- I	
The system will look	The system will look for <u>T</u> argets on following portals:				
Address	Port	Adapter	IP address		
To add a target port	al, click Discover I	Portal.	Discover Portal		
To remove a target p then dick Remove.	oortal, select the	address above and	<u>R</u> emove		
iSNS servers The system is registe Name	ered on the follow	ing įSNS servers:	Re <u>f</u> resh		
To add an iSNS serve	To add an iSNS server, dick Add Server.				
To remove an iSNS s then click Remove.	To remove an iSNS server, select the server above and then click Remove.				
		ОК	Cancel	ply	



3. Click the Discover Portal button. The Discover Target Portal dialog appears. Type 127.0.0.1.

Discover Target Portal					
Enter the IP address or DNS name and port number of the portal you want to add.					
To change the default settings of the discovery of the target portal, click the Advanced button.					
IP address or DNS name:	Port: (Default is 3260.)				
127.0.0.1	3260				
<u>A</u> dvanced	OK <u>C</u> ancel				

4. Click the Advanced button. Select Microsoft iSCSI Initiator as a Local adapter and select Initiator IP (leave default for 127.0.0.1). Confirm the actions to complete the Target Portal discovery.



	Advanced Settings
eneral IPsec	
Connect using	
Connect using	
Local adapter:	Microsoft iSCSI Initiator
Initiator IP:	Default 🗸
Target portal IP:	✓
CRC / Checksum	
Data digest	Header digest
specified.	will default to the Initiator Name of the system unless another name is
Name:	iqn.1991-05.com.microsoft:sw1
Name: Target secret:	iqn.1991-05.com.microsoft:sw1
Target secret: Perform mutual To use mutual CHAI RADIUS. Use RADIUS to g	

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

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



Discover Target Portal				
Enter the IP address or DNS name and port number of the portal you want to add.				
To change the default settings of the discovery of the target portal, click the Advanced button.				
IP address or DNS name:	Port: (Default is 3260.)			
172.16.10.20	3260			
Advanced	OK Cancel			

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



	Advanced Settings
eneral IPsec	
Connect using	
_	
Local adapter:	Microsoft iSCSI Initiator
Initiator IP:	172.16.10.10 🗸
Target portal IP:	✓
CRC / Checksum	
Data digest	Header digest
specified. Name:	iqn. 1991-05.com.microsoft:sw 1
Name: Target secret: Perform mutual au To use mutual CHAP, RADIUS. Use RADIUS to ge	iqn.1991-05.com.microsoft:sw1

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



	iSCSI Ir	nitiator Properties	
rgets Discovery	Favorite Targets	Volumes and Devices	RADIUS Configuration
Target portals The system will look			Refresh
Address	Port	Adapter	IP address
127.0.0.1 172.16.10.20	3260 3260	Microsoft iSCSI Initiat Microsoft iSCSI Initiat	
To add a target po			Discover Portal
To remove a target then dick Remove.	portal, select th	e address above and	Remove
To add an iSNS ser	ver, click Add Ser	ver.	Add Server
		ver. e server above and	Add Server Remove
To remove an iSNS			

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	RADIUS	Configuration	
	over and log	on to a target usin rget and then click	g a basic connection, t Quick Connect.	ype the IP	address or	
Target:	: I			Qu	uick Connect	
Discove	red targets					ā I
News				Chabur	Refresh	
Name	~~ ~~			Status		
		tarwindsoftware:s		Inactive		
		tarwindsoftware:s		Inactive		
		tarwindsoftware:s		Inactive		
		tarwindsoftware:s		Inactive		
		tarwindsoftware:s tarwindsoftware:s		Inactive Inactive		
To conr click Co		lvanced options, se	elect a target and then		Connect	
	pletely disco ck Disconneo	nnect a target, sele :t.	ect the target and		Disconnect	
		es, including configu ad click Properties.	ration of sessions,		Properties	
		f devices associated dick Devices.	d with a target, select		Devices	
			ОК	Cance	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	x
Target name: iqn.2008-08.com.starwindsoftware:sw1-witness	
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

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



	Advanced Settings
neral IPsec	
Connect using	
connect using	
Local adapter:	Microsoft iSCSI Initiator V
Initiator IP:	Default 🗸
Target portal IP:	127.0.0.1 / 3260 🗸
CRC / Checksum	
Data digest	Header digest
specified.	ign. 1991-05.com.microsoft:sw1
namon	
Target secret:	
Perform mutual au To use mutual CHAP, RADIUS. Use RADIUS to ge	uthentication either specify an initiator secret on the Configuration page or use enerate user authentication credentials uthenticate target credentials

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

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



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

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

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

9. Repeat the step 6.

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



	Advanced Settings
neral IPsec	
Connect using	
Local adapter:	Microsoft iSCSI Initiator
	172.16.10.10
Initiator IP:	172.18.10.10
Target portal IP:	172.16.10.20 / 3260 🗸
CRC / Checksum	
Data digest	Header digest
an initiator. To use, specify the sa	onnection security by providing authentication between a target and
CHAP helps ensure co an initiator. To use, specify the sa	onnection security by providing authentication between a target and
CHAP helps ensure co an initiator. To use, specify the sa initiator. The name w specified.	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 helps ensure co an initiator. To use, specify the sa initiator. The name w specified.	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 helps ensure co an initiator. To use, specify the sa initiator. The name w specified. Name: Target secret: Perform mutual au To use mutual CHAP, RADIUS. Use RADIUS to ge	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 iqn. 1991-05.com.microsoft:sw1
CHAP helps ensure co an initiator. To use, specify the sa initiator. The name w specified. Name: Target secret: Perform mutual au To use mutual CHAP, RADIUS. Use RADIUS to ge	ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:sw1 uthentication either specify an initiator secret on the Configuration page or use emerate user authentication credentials

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 local and 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 except for Witness 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.

		D	evices			x
Name Addr						
Disk 3 Port	3: Bus 0: Ta	arget 1:	LUN 0			
Volume path names						
Legacy device name	e: \\.\	Physica	lDrive3			
	112	\mpio#c	lisk&ven	starwind&	prod_starwind&rev_	000
Device interface na			-			
	<	l	III			>
Configure Multipath	1 IO (MPIO)					
To configure the M selected device, di	IPIO policy f	for a			MPIO	
selected device, cl	ICK MPIO.				<u>H</u> r10	_
· · · · · · · · · · · · · · · · · · ·						
						_
					<u>O</u> K	

3. Select the appropriate load balancing policy.



		Device	e Details	×
MPIO				
Load balance	e policy:			
Least Queu	e Depth			~
Description	n			
	g proportion g paths.	nately more		r uneven loads by s to lightly loaded
Path Id	Status	Type	Weight	Session ID
0x7703	Conne	Active	n/a	ffffe00155fee010-4000
0x7703	Conne	Active	n/a	ffffe00155fee010-4000
<		Ш		>
			Det	tails <u>E</u> dit
		0	к	Cancel <u>Apply</u>

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

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

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

Connecting Disks to Servers

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



8			Di	sk Manag	gement			_ □	x
<u>F</u> ile <u>A</u> ction <u>V</u> i	ew <u>H</u> elp								
I I I I I I I I I I I I I I I I I I I	57 🕼 🗳 🖥	3							
Volume	Layout	Туре	File	System	Status	Capacity	Free Spa	% Free	
📼 Data (D:)	Simple	Basic	NTF	S	Healthy (P		2.91 GB	7 %	
📼 System (C:)	Simple	Basic	NTF	-	Healthy (B		5.61 GB	23 %	
📾 System Reserve	d Simple	Basic	NTF	S	Healthy (S	350 MB	74 MB	21 %	
Disk 0									
Basic	System Reserv	ed		System	(C:)				
25.00 GB	350 MB NTFS			24.66 GB	NTFS				
Online	Healthy (System	n, Active, Prir	mary P	Healthy	(Boot, Page File	e, Crash Dump,	Primary Partition	on)	
									_
Basic									- 11
40.00 GB	Data (D:) 40.00 GB NTFS								
Online	Healthy (Primar	v Partition)							
									≡
Disk 2									
Unknown									
1.00 GB	1.00 GB								
Offline 🕕	Unallocated								
GDisk 3									
Unknown 21.00 GB									
Offline (1)	21.00 GB Unallocated								
	onunocated								
Disk 4 Unknown									
15.00 GB	15.00 GB								
Offline 🕕	Unallocated								
									\sim
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:
○ <u>M</u> BR (Master Boot Record)
<u>GPT (GUID Partition Table)</u>
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: Browse Do not assign a drive letter or drive path
< <u>B</u> ack <u>N</u> ext > Cancel

8. Select NTFS in the File System dropdown menu. Keep Allocation unit size as Default.



Set the Volume Label of choice. Click Next.

New Simple Volume Wizard				
Format Partition To store data on this partition, you must format it first.				
Choose whether you want to form	at this volume, and if so, what settings you want to use) .		
◯ <u>D</u> o not format this volume				
 Format this volume with the 	following settings:			
<u>F</u> ile system:	NTFS V			
<u>Allocation unit size:</u>	Default 🗸			
<u>V</u> olume label:	CSV1			
✓ Perform a quick forma	at			
Enable file and folder compression				
	< <u>B</u> ack <u>N</u> ext > Cano	;el		

9. Press Finish to complete.

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



New Simple Volume Wizard
Assign Drive Letter or Path For easier access, you can assign a drive letter or drive path to your partition.
 Assign the following drive letter: Mount in the following empty NTFS folder: Browse Do not assign a drive letter or drive path
< <u>B</u> ack <u>N</u> ext > 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 2012 R2

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

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



<u> </u>	Server Manager	
Server M	lanager • Dashboard •	- 🕝 🚩 Manage Tools View Help
Dashboard	WELCOME TO SERVER MANAGER	Cluster-Aware Updating Component Services
Local Server	1 Configure this local ser	Computer Management Defragment and Optimize Drives Disk Cleanup
■File and Storage Services ▷	QUICK START	Failover Cluster Manager iSCSI Initiator
	3 Add other servers to man	Local Security Policy Microsoft Azure Services
	WHAT'S NEW 4 Create a server group	MPIO ODBC Data Sources (32-bit)
	5 Connect this server to clo	ODBC Data Sources (64-bit) loud services Performance Monitor Resource Monitor
	LEARN MORE	Security Configuration Wizard Services
	ROLES AND SERVER GROUPS Roles: 1 Server groups: 1 Servers total: 1	System Configuration System Information
	File and Storage	Task Scheduler Windows Firewall with Advanced Security
	Services Image: Construction Image: Manageability Image: Manageability	Windows Memory Diagnostic Windows PowerShell
	Events Events Performance 1 Services	Windows PowerShell (x86) Windows PowerShell ISE
	BPA results Performance	Windows PowerShell ISE (x86) Windows Server Backup
	e Cluster link in the Actions sectior	
a File Action View Help	Failover Cluster Manager	er 📃 🗖 🗙
閣 Failover Cluster Manager		
	Failover Cluster Manager	Actions
	Failover Cluster Manager Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters.	
	Create failover clusters, validate hardware for potential failover clusters, an	and perform Failover Cluster Manager
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters.	and perform Failover Cluster Manager View Refresh Properties Properties Help Help
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. Overview A failover cluster is a set of independent computers that work together to increase availability of server roles. The clustered servers (called nodes) are connected by cables and by software. If one of the nodes fails, another node begins to provide	and perform Failover Cluster Manager View Refresh Properties Properties Help Help
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. Overview A failover cluster is a set of independent computers that work together to increase availability of server roles. The clustered servers (called nodes) are connected by cables and by software. If one of the nodes fails, another node begins to provide This process is known as failover.	and perform Failover Cluster Manager View Refresh Properties Properties Help Help
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. Overview A failover cluster is a set of independent computers that work together to increase variability of server roles. The clustered servers (called nodes) are connected by cables and by software. If one of the nodes fails, another node begins to provide t This process is known as failover. Clusters	and perform Failover Cluster Manager View Refresh Properties Properties Help Help
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. Overview A failover cluster is a set of independent computers that work together to increase availability of server roles. The clustered servers (called nodes) are connected by coles and by software. If one of the nodes fails, another node begins to provide This process is known as failover. Clusters Name Role Status	and perform Failover Cluster Manager View Refresh Properties Properties Help Help
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. Overview A failover cluster is a set of independent computers that work together to increase availability of server roles. The clustered servers (called nodes) are connected by this process is known as failover. Clusters Name Role Status No tems found.	and perform view Failover Cluster Manager View Refresh Properties Properties Help Help
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. A failover cluster is a set of independent computers that work together to increase variability of server roles. The clustered servers (called endors) are connected by cables and by software. If one of the nodes fails, another node begins to provide a This process is known as failover. Name Role Status No items found. Output No items found.	and perform see the by physical le services. ■ md then md managing a
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. A failover cluster is a set of independent computers that work together to increase variability of server roles. The clustered servers (called nodes) are connected by cables and by software. If one of the nodes fails, another node begins to provide a This process is known as failover. Name Role Status No tems found. No tems found.	and perform see the by physical le services. ■ md then md managing a
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. A failover cluster is a set of independent computers that work together to increase variability of server roles. The clustered servers (called nodes) are connected by cables and by software. If one of the nodes fails, another node begins to provide to This process is known as failover. Name Role Status No tems found. Object to use failover clustering, first validate your hardware configuration, and create a cluster. After these steps are complete, you can manage the cluster. Me duster can include copying roles to it from a cluster running Windows Server 2018 Windows Server 2018, and the cluster 2018	and perform see the by physical le services. ■ md then md managing a
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. Configuration changes to your failover clusters. Coverview A failover cluster is a set of independent computers that work together to increase availability of server soles. The clustered everys (called nodes) are connected by cables and by software. If one of the nodes fails, another node begins to provide a This process is known as failover. Coverview Coverview Name Role Status No tems found. Coverview Cove	and perform see the by physical le services. ■ md then md managing a
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. Configuration changes to your failover clusters. Coverview A failover cluster is a set of independent computers that work together to increase availability of server roles. The clustered servers (called nodes) are connected by cables and by software. If one of the nodes fails, another node begins to provide this process is known as failover. Clusters Name Role Status No tems found. Management To begin to use failover clustering, first validate your hardware configuration, and create a cluster. After these steps are complete, you can manage the cluster. Me cluster set and cluster conting Windows Server 2001 Windows Server 2001 R2. Waldate Configuration Context to Cluster Context to Cluster	and perform see the by physical le services. ■ md then md managing a
	Create failover clusters, validate hardware for potential failover clusters, an configuration changes to your failover clusters. Configuration changes to your failover clusters. A failover cluster is a set of independent computers that work together to increase availability of server roles. The clustered servers (called nodes) are connected by cables and by software. If one of the nodes fails, another node begins to provide a tribit process is known as failover. Clusters Name Role Status No tems found. Management To begin to use failover clustering, first validate your hardware configuration, and create a cluster. After these steps are complete, your hardware configuration, and create a cluster. After these steps are complete, your hardware 2011 Windows Server 2012, or Windows Server 2008 R2. Catele Ouster Connect to Cluster More Information	and perform see the by physical le services. ■ md then md managing a

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



10 10		Create Cluster Wizard	X
Select Se	ervers		
Before You Begin Select Servers Validation Warning	Add the names of all the s	ervers that you want to have in the cluster. You must add at least o	one server.
Access Point for Administering the	Enter server name:		Browse
Cluster	Selected servers:	SW1.starwind.local SW2.starwind.local	Add
Confirmation		S vv 2.starwind.iocal	Remove
Creating New Cluster			
Summary			
		< <u>P</u> revious <u>N</u> ext >	Cancel

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

- R	Create Cluster Wizard
Validation	n Warning
Before You Begin Select Servers Validation Warning Access Point for Administering the Cluster	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. Do you want to run configuration validation tests before continuing?
Confirmation Creating New Cluster Summary	 Yes. When I click Next, run configuration validation tests, and then return to the process of creating 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

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 Wizard		x
Access P	oint for Adminis	erin	g the Cluster		
Before You Begin Select Servers Access Point for Administering the Cluster Confirmation	Cluster N <u>a</u> me:	s-clus	use when administering the cluster. ter nited to 15 characters. All networks were	configured automatically.	
Creating New Cluster Summary		v	Networks 192.168.12.0/23	Address 192.168.12.86	
			< <u>P</u> revious	Next > Cancel	

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



a		Create Cluster Wizard	×
Summary			
Before You Begin Select Servers Access Point for	You have succ	cessfully completed the Create Cluster Wizard.	
Access Point for Administering the Cluster		Create Cluster	^
Confirmation			
Creating New Cluster	Cluster:	s-cluster	
Summary	Node:	SW1.starwind.local	
	Node:	SW2.starwind.local	
	IP Address:	192.168.12.86	
	Warnings		~
	, To view the report crea To close this wizard, cl	ated by the wizard, click View Report. ick Finish.	<u>Vi</u> ew Report
			<u>F</u> inish

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

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

Adding Storage to the Cluster

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



电			Failover Cluster Ma	pagar		_ 🗆 X
File Action View Help			Tallovel Cluster Ma	nagei		
Failover Cluster Manager	Disks (0)				Actions	
Roles	Search		P	Queries 🔻 🕁 👻	Disks	^
Nodes	Name	Status	Assigned To	Owner Node	🛃 Add Disk	
⊿ 📇 Storage ﷺ Disks					📑 Move Available Storage	•
Pools					View	•
🙀 Networks			Add Disks to a Clus	ster	x	
Cluster Events	Select the disk or disks	that you want to add				
	Select the diak of diaka	inat you want to add.				
	Available disks:					
	Resource Name	Disk Info Disk 3 on node SW2	Capacity 21.0 GB	Signature/Id {1ae58c13-65ab-489a-9	L 00 - 210250	
		Disk 3 on node SW2 Disk 4 on node SW2	15.0 GB	{2363dbd2-de80-4667-9		
	🗹 📇 Cluster Disk 3	Disk 2 on node SW2	1.00 GB	{504aaa14-76a5-48ff-ab	11-b77dc6737974}	
					OK Cancel	
This action enables you to add					th.	

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

- <u>Ra</u>		Failover Cluster Manag	ger				
File Action View	/ Help						
🗢 🄿 🙍 🖬 🚺	? 🗖						
Railover Cluster N		r.starwind.local		<u>^</u>	Act	tions	-1
⊿ is-cluster.stan	Configure Role		s-0	cluster.starwind.local	•		
👼 Roles 🏺 Node	Validate Cluster	y of Cluster s-cluster as 0 clustered roles and 2 nodes.			-	Configure Role	
⊿ 📇 Stora	View Validation Report	arwind local Networks: Cluster Network	4 1 Chuster Networ		120	Validate Cluster	
🔠 Di		ver: SW2 Subnets: 3 IPv4 and 0 IPv				View Validation Report	
E Pe	Add Node	vents: None in the last hour			- 	Add Node	-
Netw Cluste	Close Connection				5		-
in cont	Reset Recent Events				Close Connection		
	More Actions	Configure Cluster Quorum Settings			9	Reset Recent Events	- 1
	View +	Copy Cluster Roles	ers (nodes), or		Ð	More Actions	<u>*</u>
	Refresh	Shut Down Cluster	r 2012, or	≡		View	*
	Properties	Destroy Cluster	the Web		Q	Refresh	
		Move Core Cluster Resources				Properties	
	Help				?	Help	
	Copy Cluster	Cluster-Aware Updating					
	Cluster-Aware						
	 Navigat 	e					
	Roles	Nodes					
	Storage	Networks					
	Cluster Ever						
	▲ Cluster	Core Resources					
				~			
These actions are used	d less frequently than other cluster	ractions.					

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



巃	Configure Cluster Quorum Wizard
Select Qu	uorum Configuration Option
Before You Begin Select Quorum Configuration Option Select Quorum Witness Confirmation Configure Cluster Quorum Settings Summary	 Select a quorum configuration for your cluster. Use default quorum configuration The cluster determines quorum management options, including the quorum witness. Select the quorum witness You can add or change the quorum witness. The cluster determines the other quorum management options. Advanced quorum configuration You determine the quorum management options, including the quorum witness.
	Failover Cluster Quorum and Witness Configuration Options < Previous
4. Select Configu	re a disk witness. Click Next.
	Configure Cluster Quorum Wizard
Select Qu	uorum Witness
Before You Begin Select Quorum Configuration Option Select Quorum Witness Configure Storage Witness Configure Cluster Quorum Settings Summary	 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. Configure a disk witness Adds a quorum vote of the disk witness Configure a file share witness Adds a quorum vote of the file share witness Do not configure a quorum witness
	< <u>P</u> revious <u>N</u> ext > Cancel

5. Select the Witness disk to be assigned as the cluster witness disk. Click Next and



press Finish to complete the operation.

龍	Configu	ıre Cluster Quoru	m Wizard		x
Configure	e Storage Witness				
Before You Begin Select Quorum Configuration Option	Select the storage volume the	nat you want to assign a	s the disk witness.		
Select Quorum	Name	Status	Node	Location	
Witness	🔲 🗆 📇 Cluster Disk 1	🕥 Online	SW2	Available Storage	
Configure Storage	Volume: (E)	File System: NTFS	20.8 GB free of 20.9 GB		
Witness	🔲 🗆 📇 Cluster Disk 2	🕥 Online	SW2	Available Storage	
Confirmation	Volume: (F)	File System: NTFS	14.9 GB free of 15.0 GB		
Configure Cluster	🔽 🖃 📇 Cluster Disk 3	🕤 Online	SW2	Available Storage	
Quorum Settings	Volume: (\\?\	. File System: NTFS	959 MB free of 990 MB		
Summary					
ounnury					
			< <u>P</u> revious <u>N</u> e	ext > Cancel	

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

- 44		F	Failover Cluster I	Manager		_ 🗆 🗙
File Action View Help						
 Hailover Cluster Manager ▲ A B s-cluster.starwind.local 	Disks (3) Search			P Queries 🔻 🕁 👻	Actions Disks	_
 ▲ S-cluster.starwind.local Roles Nodes ▲ Storage ④ Pools ● Pools ● Cluster Events 	Name 전luster Disk 1 편 Cluster Disk 2 편 Cluster Disk 5	Status	Add Disk Available Storage isk 1 Cluster Shared Volumes			
	< III			>	Show Critical Events More Actions Remove Properties	•

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.



R.		F	ailover Cluste	er Manage	er					_	x
File Action View Help						Cluster E	isk 1 Propertie	s	x		
🗢 🄿 🙎 📰 🚺			_	General							
Failover Cluster Manager Dis	sks (3)				Name:	CSV1					
▲ 💐 s-cluster.starwind.local Se	earch			-	Type:	Physical I	Disk				
Lope	ame	Status	Assigned To		Status:	Online					
🔺 📇 Storage	Cluster Disk 1	Online	Cluster Share								•
📇 Disks	Cluster Disk 2	 Online 	Available Sto				-				—
Pools	Cluster Disk 5	Online	Disk Witness	Volum		age\Volume1	Redirected access No	Capacity 20.9 GB			- 1
Cluster Events				C. 1	Cluster Store	age (volume i	140	20.5 GD	20.0 00		-1
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~	Cluster Disk 1			L							_
							OK Car	icel	Apply		
N 1	Volumes (1)									I	
	CSV1 (C:\ClusterSt	orage\Volume1)									- 1
	CSVFS 20.8 GB fre										

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.

ч.		Fa	ailover Cluster Manager	•		_ D X
Eile Action View Help Image: Constraint of the second seco						
 Bailover Cluster Manager ▲ ♥ s-cluster.starwind.local Roles 	Disks (3) Search			P Querie	s 🕶 🕁 👻 👽	Actions Disks
Nodes Storage Disks Pools Networks Cluster Events	Name CSV1 CSV2 CSV2	Status (a) Online (b) Online (c) Online (c) Online III	Assigned To Cluster Shared Volume Cluster Shared Volume Disk Witness in Quorum	Owner Node SW1 SW2 SW2 SW2	Disk Number	Add Disk Move Available Storage View
Disks: CSV1		usterStorage\Volume1) GB free of 20.9 GB		5		?:: Take Offline ::: Information Details ::: Show Critical Events ::: More ::: More Actions ::: Remove from Cluster Shar ::: normation

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



4월			Failover Cluster	Ma	nager		- 0	X
File Action View Help						Cluster Network 2 Properties		
🗢 🄿 🙍 📰 🚺				6	General			
 Bailover Cluster Manager ▲ P s-cluster.starwind.local Roles 	Networks (3) Search				ų.	Cluster Network 2		•
Nodes	Name	Status	Cluster Use		Name:		JS	
⊿ 📇 Storage ﷺ Disks	Cluster Network 1	🕤 Up	None		Sync			•
Pools	Cluster Network 2	🕑 Up	Cluster Only			\bigcirc Allow cluster network communication on this network		
Networks	Cluster Network 3	🕜 Up	Cluster and Cl			Allow clients to connect through this network		
関 Cluster Events						Do not allow cluster network communication on this network		-
					Orture			
	<				Status: Subnets			
	Cluster Network	: 2			Jubricca	172.16.20.0/24		
	Name							
	🕀 💽 SW1-sync-20-10							
	<					OK Cancel Apply		
	Summary Network Connecti	ions				OK Calicer Apply		
			-					
2. Rename other	networks as d	lescrib	ed above	, i	f re	quired.		
輼			Failover Cluster	Ma	nager		- 0	x
<u>File Action View H</u> elp								
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File Action View Help							
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▲ i s-cluster.starwind.local	Search			ç.	Queries 👻 🔛 🔻	•	Networks
🛗 Roles 🃫 Nodes	Name	Status	Cluster Use 🔺	Information			Live Migration Settings
⊿ 🛃 Storage	Management	Dialus ()	Cluster and Client	Information			View
- Disks	iSCSI	💽 Up	None				
Pools		0					Q Refresh
Networks	🔢 Sync	🕜 Up	None				🕐 Help
Cluster Events							Management 🔺
							🚮 Information Details
							Show Critical Events
	<		ш			>	Properties
							🕐 Help
	Management						
	Name			Status	Owner Node	Infa	
	🕀 🛒 SW1 - managemer	nt		🕥 Up	SW1		
	🕀 🛒 SW2 - manageme	nt		🕥 Up	SW2		
	<	ш				>	
	Summary Network Conne	ections					
Networks: Management							

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 – 🗖 🗴							
File Action View Help				Live Migration Settings			
🗢 🔿 🙍 🖬 🚺				Networks for Live Migration			
Failover Cluster Manager	Networks (3)			Select one or more networks for virtual machines to use for live migration. Use the buttons to list them in order from most preferred at the top to			
Roles	Search			least preferred at the bottom.			
Nodes	Name	Status	Cluster Use 🔺	JS			
⊿ 📇 Storage	Management	🕥 Up	Cluster and Cl				
Disks	iSCSI	🕥 Up	None	Name Up			
Networks	👪 Sync	🕥 Up	None	V ■ Down			
Cluster Events							
	<		ш				
	Management	1					
	Name						
	🕀 🌉 SW1 - manageme	ent					
	🗉 🌉 SW2 - managem	ent		OK Cancel Apply			
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	Summary Network Conr	nections					



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