

StarWind Virtual SAN: Feature Configuration Guide for SQL Server 2017 Failover Cluster Instances on Microsoft Windows Server [Hyper-V]

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

Annotation

Relevant Products

StarWind Virtual SAN

Purpose

The purpose of this document is to guide on how to configure Windows Server Failover Cluster and SQL Server Failover Cluster Instance (FCI) with StarWind VSAN as a cluster shared storage used by SQL Server FCI.

Audience

This guide is intended for experienced Windows system administrators, IT professionals, and the SQL Server database administrators who would like to install and configure a 2-node Windows Server Failover Cluster that will host SQL Server Failover Cluster Instance (FCI).

Expected Result

The expected result is a successfully configured Windows Server Failover Cluster hosting SQL Server 2017 FCI. The document covers hardware and software requirements, cluster setup, and the use of StarWind Virtual SAN for storage.

Prerequisites

This guide is intended for experienced Windows system administrators, IT professionals, and the SQL Server database administrators who would like to install and configure a 2-node Windows Server Failover Cluster that will host SQL Server Failover Cluster Instance (FCI).

The Windows Server hosted storage that will be used for building Windows Server Failover Cluster leverages StarWind Virtual SAN for the implementation of a block-level replication.



This document assumes that:

- Windows Server is installed on each server that would be joined to the cluster and to the Active Directory (AD) domain.
- The disks (LUNs) are exposed to the servers that should be clustered and are configured according to the StarWind Virtual SAN High Availability Best Practices documentation.
- Cluster witness will be located on file share;
- SQL Cluster can be created as a stand-alone server and HA as well. It is useful for the case of achieving high availability in the current infrastructure.

A full set of up-to-date technical documentation can always be found here, or by pressing the Help button in StarWind Management Console.

For any technical inquiries please visit our online community, Frequently Asked Questions page, or use the support form to contact our technical support department.

Solution Diagram

The diagram below illustrates the network and storage configuration of the solution described in this guide.





The diagram of a 2-node HA SQL Cluster based on StarWind Virtual SAN

NOTE: Additional network connections may be necessary, depending on the cluster setup and application requirements. For any technical help in regards to configuring additional networks, please, do not hesitate to contact the StarWind Support Department via online community forum, or via support form (depending on the support plan).

1. Make sure to have a domain controller and the servers added to the domain.

2. Install Failover Clustering and Multipath I/O features on both servers.

3. Configure network interfaces on each node to make sure that the Synchronization and iSCSI/StarWind Heartbeat interfaces are in different subnets and connected according to the network diagram above. In this document, 10.1.1.x subnet is used for the iSCSI/StarWind Heartbeat traffic, while 10.1.2.x subnet is used for the Synchronization traffic.

The procedures mentioned above can be performed by following the instructions below.



Sql Server 2017 Windows System Requirements

Make sure that the server used for the SQL Server 2017 deployment satisfies the requirements listed below.

Hardware Requirements

Memory: 512 MB minimum for Express, 1 GB for Standard, Developer & Enterprise.

File System: NTFS or ReFS.

Please note that other file systems, such as FAT32, are not supported.

Disk space: 6 GB minimum.

Processor speed: Clockspeed of 2 GHz or more. 1.4 GHz minimum.

Processor cores: 2 cores (virtual or physical).

Processor type: 64-bit x64-compatible AMD or Intel CPU only.

Software Requirements

- A minimum of .NET 4.6.1 is required. The SQL Server 2017 setup will install the necessary files before the actual installation.
- The SQL Server setup supports files and the native client should be installed first.
- Client versions of Windows 10 or 8.1 and Windows Server 209, Windows Server 2016 or Windows Server 2012 R2. Windows Server Essentials and Foundation Editions are also supported.
 However, the SQL Server setup requires a GUI and will not work on the Core
- editions.To install all the components, 8030 MB of the hard disk space is required.
- The supported storage types are the following:
- Local
- Shared
- Storage Spaces (including S2D)
- SMB (supported with certain limitations)
 - SQL Server has limitations when installing on a domain controller (DC). Failover



clustering is not supported on DC.

The SQL Server Core engine is 64-bit only and does not support the 32-bit editions of Windows 8 or Windows 10. Barring a few 32-bit components (such as Client Tools, Data Quality Client), all other parts require the native 64-bit support.

Enabling Multipath Support

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

mpiocpl

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

MPIO Properti	es			\times
MPIO Devices	Discover Multi-Paths	DSM Install	Configuration	Snapshot
SPC-3 comp	liant			
Device Ha	ardware Id			
Add sup	port for iSCSI devices			
Add sup	port for SAS devices			
			Add	
Others				
Device Ha	ardware Id			
			٨dd	
			Aud	
			ОК	Cancel

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



NOTE: Repeat the same procedure on the other server.

Installing And Configuring Starwind Virtual San

7. 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 StarWind Virtual SAN deployment scenarios.

The process outlined below should be performed on both SQLNODE1 and SQLNODE2 nodes. To install StarWind Virtual SAN, run the setup file on SQLNODE1.

8. Read and accept the License Agreement. Click Next to continue.

Setup - StarWind Virtual SAN -	×
License Agreement Please read the following important information before continuing.	Ð
Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.	
STARWIND® SOFTWARE LICENSE AGREEMENT	^
This Software License Agreement (the "Agreement") is a legal agreement between StarWind Virtual SAN End User, (the "Licensee") and Starwind Software, Inc., a State of Delaware, USA corporation ("Starwind"), that is entered into as of the date of acceptance hereof by Starwind (the "Effective Date"). Starwind will notify Licensee about Effective Date by electronic mail after acceptance of this Agreement.	
Licensee is subject to the terms and conditions of this Agreement whether	~
I accept the agreement	
○ I <u>d</u> o not accept the agreement	
<u>N</u> ext > C	ancel

9. Carefully read the information about new features and improvements. The text highlighted in red indicates warnings for users who are updating existing software installations. Click Next to continue.



Setup - StarWind Virtual SAN —		×
Information Please read the following important information before continuing.	(Ð
When you are ready to continue with Setup, click Next.		
StarWind Virtual SAN V8	^	
New Features and Improvements		
New Log-structured File System container		
It implements thin-provisioning, snapshots, optional deduplication. Synchronous and asynchronous replication can be configured for a LSFS device.		
LSFS device is flash-friendly. It eliminates multiple rewrites of same	~	,
< <u>B</u> ack <u>N</u> ext >	Car	ncel

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

Setup - StarWind Virtual SAN			_		×
Select Destination Location Where should StarWind Virtual SAN be	installed?				Ð
Setup will install StarWind Virtu	ual SAN into th	ne following	folder.		
To continue, click Next. If you would lik C:\Program Files\StarWind Software\S	te to select a d	lifferent fold	ler, click I	Browse. Browse	,
At least 2.4 MB of free disk space is rec	quired.				
	< <u>B</u> a	ick [<u>V</u> ext >	C	ancel

11. In the Select Components dialog box, select Full in the drop-down list and click Next.



Which components should be installed?		(
elect the components you want to install; clear the components you nstall. Click Next when you are ready to continue.	do not want t	0
Full		~
Service	36,5 MB	^
└── └── Loopback Accelerator Driver └── └── Cloud Replicator for VTL └── SPTD Driver (Alternative driver for exporting physical devices)	25,5 MB	
StarWind Management Console	34,0 MB	
	0,1 MB	
Configure user account for Web-access to Management Console		
Configure user account for Web-access to Management Console Integration Component Library	7,8 MB	
Configure user account for Web-access to Management Console Integration Component Library PowerShell Management Library	7,8 MB 2,6 MB	

12. Specify the Start Menu Folder. Click Next to continue.

Setup - StarWind Virtual SAN	_		\times
Select Start Menu Folder Where should Setup place the program's shortcuts?			Ð
Setup will create the program's shortcuts in the following Star	t Menu	ı folder.	
To continue, click Next. If you would like to select a different folder, cli	ck Brov	wse.	
StarWind Software\StarWind	Bro	owse	
< <u>B</u> ack <u>N</u> ext :	>	Ca	ncel

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



Setup - StarWind Virtual SAN	_		×
Select Additional Tasks Which additional tasks should be performed?		Q	
Select the additional tasks you would like Setup to perform while in Virtual SAN, then click Next.	stalling St	arWind	
Additional icons:			
Create a desktop icon			
< <u>B</u> ack <u>N</u> e	ext >	Can	icel

14. In the License key dialog box, provide the appropriate license key. Click Next.

Setup - StarWind Virtual SAN	—		×
License key Get your license key		¢	
Now when you have installed StarWind Virtual SAN you need to ap key or FREE version key or commercial license key you've got with you don't have any key it's time to request one now!	ply either your purc	evaluatio hase. If	n
Request time-limited fully functional evaluation key			
O Request FREE version key			
○ Thank you, I do have a key already			
< Back Ne	ext >	Car	ncel

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



Setup - StarWind Virtual SAN		_		×
Select your license key Where is license key located?				ð
Select where license key is located, then click	Next.			
Location of StarWind license file:				
			Browse	
			-	
	< Pack	Next >		ancel
		Mext >		Jancel

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

💿 Setup - StarWind Virtual SAN		_		×
Apply your license key Here is listed information about license key file to apply this license key.	that you provid	ed. Press "Next	t"	
Product: StarWind Virtual SAN Name: QA Organization: StarWind Expire Date: 20180302 Number of servers: 2				
	< Back	Next >	Ca	ancel

17. Verify the installation settings. Click Back to make any changes. Click Install to



proceed with the installation.

Setup - StarWind Virtual SAN —		×
Ready to Install Setup is now ready to begin installing StarWind Virtual SAN on your computer.	6	
Click Install to continue with the installation, or click Back if you want to review change any settings.	or	
Setup type: StarWind Virtual SAN Server	^	
Selected components: Service Loopback Accelerator Driver StarWind Management Console Integration Component Library PowerShell Management Library		
Start Menu folder: StarWind Software\StarWind	•	
<	>	
< <u>B</u> ack Install	Can	cel

18. Enable the appropriate checkbox to launch StarWind Management Console right after the Setup Wizard is closed. Click Finish to close the Wizard.





19. After completing the installation, repeat all the steps to set up StarWind Virtual SAN on the second node (in this case, SQLNODE2).

Configuring Starwind Virtual San

After StarWind Virtual SAN has been installed on both SQLNODE1 and SQLNODE2 nodes, the hyperconverged storage for Windows Server Failover Cluster should be configured. These steps can be performed on any of the virtual machine with StarWind Virtual SAN installed. In this part, these steps will be performed on SQLNODE1.

20. StarWind Management Console will ask to specify the default storage pool on the server to which it connects for the first time. Configure the default storage pool to use one of the volumes that have been prepared previously. All devices created through the Add Device Wizard will be stored on it. In case an alternative storage path is required for StarWind virtual disks, use the Add Device (advanced) menu item.



StarWind Management Console	×
Storage pool is not configured! Would you like to set the default location of the storage pool t	o My Computer\D?
Yes Choose path	Disconnect

21. Press the Yes button to configure the storage pool. If the storage pool destination needs to be changed, click Choose path... and point the browser to the necessary disk.

NOTE: Any of the arrays which will be used by StarWind Virtual SAN to store virtual disk images should meet the following requirements:

- Be initialized as GPT;
- Have a single NTFS-formatted partition;
- Have a drive letter assigned.

The steps below cover the procedure of an HA device creation for SQL-DISK-1 drive. Other devices should be created in the same way.

22. In StarWind Management Console, right-click the Servers field and press the Add Server button. Add a new StarWind Server which will be used as the second StarWind VSAN node.

📑 Add	I new StarWind Server		?	×
Host:	SQLNODE2		: 3261	
Adva	anced >>	ОК	Can	cel

23. Select the StarWind Server where the device needs to be created and press the Add Device (advanced) button on the toolbar.

24. Add Device Wizard will appear. Select Hard Disk Device and click Next.



			?	×
~	Add D	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	Cano	cel

25. Select Virtual Disk as a disk device type and click Next.



			?	×
←	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

Cancel

26. Specify the Virtual Disk Name, Location, and Size. Click Next.



			?	×
←	Add Device Wiza	rd		
	Virtual Disk Loc	ation		
	Create a New \	/irtual Disk		
	Name:	SQL-DISK-1		
	Location:	My Computer \D \		
	Size:	1 GB ~		
	Use an Existing	Virtual Disk		
	Location:	~		
	Read-On	ly Mode		
			6	
		Next	Can	tel

27. Specify the Virtual Disk Options and click Next.



	?	×
← Add Device Wizard		
Virtual Disk Options		
Thick-provisioned		
Olsfs		
Deduplication		
StarPack Cache Size: 16 MB ~		
Block Size		
Use 512 bytes sector size		
Use 4096 bytes sector size. May be incompatible with some clients		
<u>N</u> ext	Car	ncel

28. Define the caching policy and specify the cache size (in GB). Click Next to continue.

NOTE: The basic recommendation is to assign 1 GB of L1 cache in Write-Back or Write-Through mode per 1 TB of storage capacity. The cache size should correspond to the storage working set of the servers.



		?	×
←	Add Dev	rice Wizard	
	Specify D	Device RAM Cache Parameters	
	Mode		
	0	Write-Back Writes are performed asynchronously, actual Writes to Disk are delayed, Reads are cached	
	0	Write-Through Writes are performed synchronously, Reads are cached	
	۲	N/A Reads and Writes are not cached	
	Set M	laximum available Size	
	Size:	128 MB ~	
		Next	Cancel

29. Define Flash Cache Parameters and Size if necessary. Specify the SSD Location in the Wizard and click Next.

NOTE: The recommended size of the L2 cache is 10% of the initial StarWind device capacity.



							?	×
÷	Add	Device Wizar	d					
	Specif	fy Flash Ca	che Parar	neters				
		No Flash Cache						
	O	Jse Flash Cache	2					_
		Name:	Flash-SQL-D	DISK-1				
		Location:	My Comput	er\D\				
		Size:	1	$_{\rm GB}$ \sim				
						<u>N</u> ext	Cano	el:

30. Specify the Target Parameters. Enable the Target Name checkbox to customize the target name. Otherwise, the name will be generated automatically based on the target alias. Click Next.



		?	×
←	Add Device Wizard		
	Target Parameters		
	Choose a Target Attachment Method		
	Create new Target	~	
	Target Alias		
	SQL-DISK-1		
	☑ Target Name		
	iqn.2008-08.com.starwindsoftware:sqlnode1-sql-disk-1		
	Allow multiple concurrent iSCSI Connections		
	Next	Can	cel

31. Click Create to add a new device and attach it to the target. Then click Close to complete the Wizard.

32. Right-click the newly created device and select Replication Manager. In the appeared window, press the Add Replica button.



StarWind Management Console	-	×
FILE HOST TARGET TOOLS OPTIONS HELP		
Refrech Connect Disconnect Add Server Remove Server Add Device (advanced) Add VTL Device Remove Device Help		
Servers SqLNODE1 IMAGEFILE1		
* SQL-DIS 👌 Remove Device 👌 Force remove Device 🕹 Attach to Target. 🔅 Detach from ign 2008-08.com starwindsoftwareidb.iobit.com-sql-disk-1 🗘 Extend Image Size		
in Kernove Device		
P _ SQLNOC ← Force remove Device		
Attach to Target		
Petach from ign.2008-08.com.starwindsoftwareidb.iobit.com-sql-disk-1		
Extend Image Size		
Replication Manager		
Senal id 392433591273CLB		
CACHE		-
mue rea		
StarWind Software Ready		

33. Select the Synchronous "Two-Way" Replication mode. Click Next to proceed.

			?	\times
÷	Replie	cation Wizard		
	Replica	ation Mode		
	۲	Synchronous "Two-Way" Replication Replication Partner must be connected to Client as Source Device as well, MPIO o must be enabled, needs dedicated high Performance Network Connection for Synchronization.	n Client	
	0	Witness Node Witness node doesn't contain user data. In case when Node Majority policy is set Synchronous replication device and there are two storage nodes, Witness Node n added to cluster to make number of nodes odd number and enable proper function Node Majority policy.	for nust be ning of	
		<u>N</u> ext	Cano	cel

34. Specify the partner server Host Name or IP address. The default StarWind



management port is 3261. If a different port has been configured, type it in the Port Number field. Click Next to continue.

					?	×
←	Replication Wizard					
	Add Partner Node					
	Specify Partner Host Name	e or IP Address where Replication No	de would be o	reated		
	Host Name or IP Address	SQLNODE2	~			
	Port Number	3261				
				<u>N</u> ext	Cano	el

35. Select the Failover Strategy for the HA device. For the purposes of this document, the Heartbeat failover strategy is used. Click Next to continue.

NOTE: With the Heartbeat failover strategy, one node remains active, even in case of all partner nodes failure.

With the Node Majority failover strategy, the system can tolerate failure of only one node. If two nodes fail, the third one will become unavailable to clients' requests.

The creation of an HA device with the Node Majority failover strategy is covered in the following document:

https://www.starwindsoftware.com/resource-library/creating-highly-available-device-usin g-node-majority-failover-strategy



	?	×
~	Replication Wizard	
	Failover Strategy	
	Heartbeat Process node and communication failures using additional communication channel (heartbeat). At least one synchronization or heartbeat channel must be functional for proper failover processing. Loss of all communication channels may lead to split brain issue, so it's recommended to use client iSCSI connection interfaces as heartbeat channel.	or
	Node Majority Process node and communication failures using majority policy: node stays active wh sees more than half of nodes including itself. In case of 2 storage nodes, requires configuring additional witness node. Does not require additional heartbeat channel.	ile it
	Next	Cancel

36. Select Create new Partner Device and click Next.



		?	×
←	Replication Wizard		
	Partner Device Setup		
	Create new Partner Device Existing Device Parameters would be used as a Template		
	Select existing Device Select existing Device on Partner Server		
	<u>N</u> ext	Can	cel

37. Specify the partner device Location if necessary, and/or modify the target name of the device. Click Next.



		?	×
←	Replication Wizard		
	Partner Device Setup		
	Location: My Computer\D\]
	iqn.2008-08.com.starwindsoftware:sqlnode2-sql-disk-1		
	Modify Target Name		
	Next	Can	cel

Select the Synchronization and Heartbeat networks for the HA device by clicking Change Network Settings.



	?	×
Replication Wizard		
Network Options for Replication		
Networks for Synchronization and Heartbeat		_
Press "Change Network Settings" to configure Interfaces		
Networks for Heartbeat		
Press "Change Network Settings" to configure Interfaces		
Change Network Settings		
ALUA preferred SQLNODE1, SQLNODE2		
Change ALUA Settings		
Next	Can	cel

38. Specify the interfaces for Synchronization and Heartbeat. Press OK. Then click Next.

NOTE: It is recommended to configure the Heartbeat and iSCSI networks on the same interfaces to avoid the split-brain issue. If the Synchronization and Heartbeat interfaces are located on the same network adapter, it is recommended to assign one more Heartbeat interface to a separate adapter.



Specify Interfaces for Synchronization Channels

 \times

		Heartbear
1.SW.LOCAL		
10.1.1.0		Γ
10.1.2.0		
10.4.0.0		
169.254.0.0		
192.168.0.0		
192.168.0.0		
192.168.0.0		
2		
10.1.1.0		
10.1.1.0 10.1.2.0		
10.1.1.0 10.1.2.0 10.4.0.0		
10.1.1.0 10.1.2.0 10.4.0.0 169.254.0.0		
	10.1.1.0 10.1.2.0 10.4.0.0 169.254.0.0 192.168.0.0 192.168.0.0 192.168.0.0	10.1.1.0 1 10.1.2.0 1 10.4.0.0 1 169.254.0.0 1 192.168.0.0 1 192.168.0.0 1

39. Select Synchronize from existing Device as a partner device initialization mode. Click Next.



		?	×
 Replication Wizard 			
Select Partner Device Initialization Mode			
Synchronize from existing Device All Data from existing Device would be copied to new Device			
O Do not Synchronize Data on HA Nodes remains unchanged.			
	<u>N</u> ext	Cano	el

40. Press the Create Replica button and then click Close. The added devices will appear in StarWind Management Console.

StarWind Management Console	1		-	×
FILE HOST TARGET TOOLS	OPTIONS HELP			
Refresh Connect Disconnect Ac	d Server Remove Server Add Device	Add Device Galvanced) Add VIL Device Remove Device VHp		
Servers	HAIMAGE1			^
A C SQL-DISK-1	≓ <u>Remove Device</u> ▲ Forc 량 <u>Replication Manager</u> ♀	e remove Device 🔝 Change Partner Authentication Settings 🔦 Change Synchronization Priority 🔯 Replication Node Interfaces Extend Size of HA (High Availability) Device 🛆 Enter Maintenance Mode		
SQLNODE2 (1	Device	HAlmage1		
A C SOL-DISK-1	Size	1 GB		
	Virtual Disk	ight.com/scientificationality.com/scientification/com/scientification		
HAimage	Serial Id	26472E88.ABF55928		
	Priority	First		
	Mode	Synchronous		
	Failover Strategy	Heartbeat		
	Auto Synchronization after	Yes		
	Synchronization Status	Synchronized		
	HEALTH STATUS			
	 Storage is working properly 			
				- 11
S	TORAGE			
	Device	imagefile1		
	Virtual Disk	My Computer\D\SQL-DISK-1\SQL-DISK-1.img		
	Persistent Reservations	Yes		
	Size	1 GB		
	Virtual Disk Sector Size	512 Bytes		
	Read-Only Mode	No		
	Serial Id	26472EB8ABF55928		
	Asynchronous Mode	Yes		~
StarWind Software Ready				



Discovering Target Portals

This part describes how to connect the iSCSI storage to the servers that will be added to the cluster.

NOTE: Windows Server comes with the iSCSI Initiator software that enables connection of a Windows host to the iSCSI storage array using network adapters. In this example, the iSCSI target is the same as the WSFC nodes. To launch the tool from the Server Manager dashboard, in the Tools tab, select iSCSI Initiator.

Also, make sure that Windows Firewall is configured to allow the iSCSI traffic on both SQLNODE1 and SQLNODE2 nodes.

🚡 Server Manager			– 🗆 🗙
Server M	anager • Dashboard	• 🍘 🚩 Manage	Tools View Help
Server M Cashboard Local Server All Server Hyper-V Server M	WELCOME TO SERVER MANAGER WELCOME TO SERVER MANAGER OUICK START	Image 1 1 <th>Bools View Hop Cluster-Aware Updating Component Services Computer Management Defragment and Optimize Drives Dirk Cleanup Event Viewer Failover Cluster Manager View Provide State Sta</th>	Bools View Hop Cluster-Aware Updating Component Services Computer Management Defragment and Optimize Drives Dirk Cleanup Event Viewer Failover Cluster Manager View Provide State Sta
	Events Events Performance Services BPA results Performance BPA results BPA results	Events 2 Services Performance BPA results	Windows PowerShell Windows PowerShell (x86) Windows PowerShell ISE Windows PowerShell ISE (x86) Windows Server Backup

The steps below are performed initially on SQLNODE1.

41. The message informing that the Microsoft iSCSI service is not running appears. Ignore it and click Yes to continue.

42. In the iSCSI Initiator Properties window, select the Discovery tab.

43. Click the Discover Portal... button. The Discover Target Portal dialog box appears.



iSCSI Initiator Pro	perties				×
SCSI Initiator Properties × Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Target portals The system will look for Targets on following portals: Refresh Address Port Adapter IP address To add a target portal, click Discover Portal. Discover Portal. Remove To remove a target portal, select the address above and then click Remove. Remove Remove ISNS servers The system is registered on the following ISNS servers: Refresh Name To add an ISNS server, click Add Server. Add Server To remove an ISNS server, select the server above and then click Remove. Remove					
Target portals					
The system wil	look for <u>T</u> argets on fo	ollowing portals:		R <u>e</u> fresh	
Address	Port	Adapter	I	P address	
To add a target portal, click Discover Portal. Discover Portal					
To add a target portal, click Discover Portal. Discover Portal To remove a target portal, select the address above and then click Remove. Remove					
iSNS servers The system is r Name	iSNS servers The system is registered on the following <u>i</u> SNS servers: Name			Refresh	
The system is registered on the following iSNS servers: Refresh Name					
		OK	Cancel	Apply	

44. Type in the first IP address of the partner node that will be used to connect to the highly-available iSCSI devices. For this example, a loopback IP address of SQLNODE1 is 127.0.0.1.



Discover Target Portal	×
Enter the IP address or DNS name and po want to add.	ort number of the portal you
To change the default settings of the disc the Advanced button.	overy of the target portal, click
IP address or DNS name:	Port: (Default is 3260.) 3260
<u>A</u> dvanced	<u>O</u> K <u>C</u> ancel

45. 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.



Ivanced Settings		?	×
eneral IPsec			
Connect using			
	Minner & ICCCI Triketor		
Local adapter:		~	
Initiator <u>I</u> P:	Default	~	
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	: is	
<u>N</u> ame:	ign.1991-05.com.microsoft:sqlnode1.starwind.local		
Target <u>s</u> ecret:			
Perform mutual auth To use mutual CHAP, el RADIUS. Use RADIUS to gene Use <u>R</u> ADIUS to auth	nentication ther specify an initiator secret on the Configuration page or use erate user authentication credentials menticate target credentials		
	OK Cancel	Арр	ly

Click OK. Then click OK again to close the Discover Target Portal dialog box.

46. Click the Discover Portal button once again. The Discover Target Portal dialog appears.

47. Type in the IP address of the partner node that will be used to connect to the HA iSCSI devices. For this example, the IP address of SQLNODE2 is 10.1.1.202. Click the Advanced... button.



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 dis the Advanced button.	covery of the target portal, click
<u>IP</u> address or DNS name: 10. 1. 1. 202	<u>P</u> ort: (Default is 3260.) 3260
<u>A</u> dvanced	<u>O</u> K <u>C</u> ancel

48. 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. Click OK to confirm the actions and complete the Target Portal discovery.



dvanced Settings		?	×
eneral IPsec			
Connect using			
y			
Local adapter:	Microsoft iSCSI Initiator	~	
Initiator <u>I</u> P:	10.1.1.201	\sim	
Target portal IP:		\sim	
CRC / Checksum			
Data digest	Header digest		
specified.	default to the initiator Name of the system unless another name	: 15	
Name:	iqn.1991-05.com.microsoft:sqlnode1.starwind.local		
Target <u>s</u> ecret:			
Perform mutual auth To use mutual CHAP, ei RADIUS. Use RADIUS to gene Use <u>R</u> ADIUS to auth	entication ther specify an initiator secret on the Configuration page or use crate user authentication credentials enticate target credentials		
	OK Cancel	App	oly

Then click OK again to close the Discover Target Portal dialog box.

SQLNODE1 should be connected to both iSCSI Targets via the following target portals.


iSCSI Initiator Properties	×				
Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration					
Target portals					
The system will look for <u>T</u> argets on following portals: Refresh					
Address Port Adapter IP address					
127.0.0.1 3260 Microsoft iSCSI Initiator Default					
10.1.1.202 3260 Microsoft iSCSI Initiator 10.1.1.201					
To add a target portal, click Discover Portal. Discover Portal To remove a target portal, select the address above and then click Remove. Remove					
iSNS servers The system is registered on the following <u>i</u> SNS servers: Refresh Name					
To add an iSNS server, dick Add Server. Add Server					
To remove an iSNS server, select the server above and then click Remove.					
OK Cancel Apoly					

49. Repeat the same steps for the second node SQLNODE2 to add all target portals.

NOTE: SQLNODE2 should be also connected to both iSCSI Targets via the following target portals.



SCSI Initiator Prope	rties				×
Targets Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
Target portals					
The system will lo	ok for <u>T</u> argets on fo	blowing portals:		R <u>e</u> fresh	
Address	Port	Adapter	1	IP address	
127.0.0.1	3260	Microsoft iSCSI Initia	tor [Default	
10.1.1.201	3260	Microsoft iSCSI Initia	tor	10.1.1.202	
To add a target p	oortal, click Discover	Portal.	Disco	over <u>P</u> ortal	
To remove a targ then click Remove	et portal, select the e.	address above and		<u>R</u> emove	
iSNS servers The system is reg Name	pistered on the follow	wing įSNS servers:		Refresh	
To add an iSNS se	erver, dick Add Serv	/er.	Ad	d Server	
To remove an iSN then click Remove	IS server, select the e.	e server above and		Re <u>m</u> ove	
		ОК	Cance	<u>A</u> pply	/

Connecting Targets And Configuring Multipathing

This part describes how to connect the servers to the iSCSI targets and configure



multipathing.

NOTE: The steps below are performed initially on SQLNODE1.

50. In the iSCSI Initiator Properties window, open the Targets tab. The iSCSI targets configured should be listed in the Discovered targets section.

iSCSI Initiator Properties	×
Targets Discovery Favorite Targets Volumes and Device	ces RADIUS Configuration
Quick Connect To discover and log on to a target using a basic connectio DNS name of the target and then click Quick Connect.	n, type the IP address or
Target:	Quick Connect
Discovered targets	Refresh
Name	Status
iqn.2008-08.com.starwindsoftware:sqlnode1-sql-disk-1	Inactive
iqn.2008-08.com.starwindsoftware:sqlnode1-sql-disk-2	Inactive
ign.2008-08.com.starwindsoftware:sqlnode2-sql-disk-1	Inactive
To connect using advanced options, select a target and t	hen Co <u>n</u> nect
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, sele the target and then click Devices.	ect De <u>v</u> ices
ОК	Cancel Apply

51. Select the first target from the list and then click Connect.



52. Enable both checkboxes and click Advanced...

Connect To Target	×
Target name:	
Iqn. 2008-08.com.starwindsoftware:sqlnode1-sql-disk-1	
This will make the system automatically attempt to restore the connection every time this computer restarts.	
✓ Enable multi-path	
Advanced OK C	ancel

53. Select Microsoft iSCSI Initiator in the Local adapter drop-down menu. In Target portal IP, select 127.0.0.1. Confirm the actions.



Connect using	
ocal adapter:	Microsoft iSCSI Initiator $\qquad \qquad \lor$
nitiator IP:	Default \checkmark
arget portal IP:	127.0.0.1/3260 ×
CRC / Checksum	
<u>D</u> ata digest	<u>H</u> eader digest
CHAP Log on inform CHAP helps ensure co in initiator. To use, specify the sa itiator. The name w pecified.	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is
CHAP Log on inform CHAP helps ensure co an initiator. 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 iqn.1991-05.com.microsoft:sqlnode1.starwind.local
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa nitiator. The name w specified. Jame:	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 iqn.1991-05.com.microsoft:sqlnode1.starwind.local

54. Select the partner target from another StarWind node (SQLNODE2) and click Connect. In this case, 10.1.1.x subnet is used to connect the target.

55. Enable both checkboxes and click Advanced...



Connect To Target	×
Target name:	
iqn.2008-08.com.starwindsoftware:sqlnode2-sql-disk-1	
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 Ca	ncel

56. Select Microsoft iSCSI Initiator in the Local adapter drop-down 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.



vanced Settings	?)
neral IPsec		
Connect using		
Local adapter:	Microsoft iSCSI Initiator	
Initiator IP:	10.1.1.201	
T		
larget portal IP:	10.1.1.202/3260	
CRC / Checksum		
Data digest	Header digest	
initiator. The name specified.	will default to the Initiator Name of the system unless another name is	
<u>N</u> ame:	iqn. 1991-05.com.microsoft:sqlnode 1.starwind.local	
Target <u>s</u> ecret:		
Perform mutual a To use mutual CHAP RADIUS. Use RADIUS to g Use <u>R</u> ADIUS to a	uthentication , either specify an initiator secret on the Configuration page or use enerate user authentication credentials uthenticate target credentials	
	unenucate target credentials	

57. Repeat the steps above for all HA device targets remaining. The result should look like in the screenshot below.



iSCSI Initiator Properties						×
Targets Discovery Fa	vorite Targets	Volumes and Devic	tes RAD	IUS	Configuration	
Quick Connect To discover and log on DNS name of the targe	to a target usin t and then click	g a basic connectio Quick Connect.	n, type th	ne IP a	address or	
Target:				Qui	ick Connect	
Discovered targets					<u>R</u> efresh	
Name iqn.2008-08.com.starv iqn.2008-08.com.starv iqn.2008-08.com.starv	windsoftware:s windsoftware:s windsoftware:s windsoftware:s	qInode 1-sql-disk-1 qInode 1-sql-disk-2 qInode 2-sql-disk-1 qInode 2-sql-disk-2	Status Connect Connect Connect	ed ed ed		
To connect using advar click Connect.	nced options, se	elect a target and t	nen		Co <u>n</u> nect]
To completely disconne then click Disconnect.	ct a target, sele	ect the target and		ļ	<u>D</u> isconnect	
For target properties, i select the target and d	ncluding configu ick Properties.	uration of sessions,		P	properties]
For configuration of de the target and then dic	vices associated k Devices.	d with a target, sele	ect		De <u>v</u> ices]
		ОК	С	ancel	Apply	

58. Repeat the steps described in this section on SQLNODE2.

59. Configure the MPIO policy for each target with the Failover Only. Select the target located on the local server and click Devices.

60. Click the Devices... button and then click MPIO...



iSCSI Initiator Prop	oerties					×
Targets Discover	y Favorite Targets	Volumes and Devic	es RAI	DIUS	Configuration	
Quick Connect						
To discover and DNS name of the	log on to a target usir target and then click	ng a basic connection Quick Connect.	n, type t	he IP a	address or	
Target:				Qui	ick Connect	
Discovered targe	ts					- 1
					<u>R</u> efresh	
Name			Status			
ign.2008-08.com	m.starwindsoftware:s	qlnode 1-sql-disk-1	Connec	ted		
ign.2008-08.co	m.starwindsoftware:s	qlnode1-sql-disk-2	Connec	ted		
iqn.2008-08.co	m.starwindsoftware:s	qlnode2-sql-disk-1	Connec	ted		
iqn.2008-08.co	m.starwindsoftware:s	qlnode2-sql-disk-2	Connec	ted		
To connect using click Connect.	advanced options, s	elect a target and th	nen		Co <u>n</u> nect	
To completely dis then click Discon	sconnect a target, sel nect.	ect the target and		ļ	<u>D</u> isconnect	
For target prope select the target	rties, including config and click Properties.	uration of sessions,	_	P	roperties	
For configuratior the target and t	n of devices associate nen click Devices.	d with a target, sele	ect		De <u>v</u> ices	
			_			
		OK	(Cancel	Apply	Y



Devices			×
Name	Address		
Disk 3	Port 4: Bus	0: Target 1: LUN 0	1
Volume path	names:		
Legacy devic	e name:	\\.\PhysicalDrive3	
Device interf	ace name:	\\?\mpio#disk&ven_starwind&pro	d_starwind&rev_000
		<	>
Configure Mu	ultipath IO (M	PIO)	
To configure selected dev	the MPIO po vice, click MPI	licy for a O.	<u>M</u> PIO
			<u>O</u> K

61. Select the appropriate load balancing policy.

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



Device Details	;					\times
MPIO						
Load balance	e policy:					
Fail Over Or	nly				~	
Description	ı —					
The fail ov other pati round-rob available p	ver policy en hs as standb in approach path is found	nploys one a by. The stan upon failure d.	ctive path a adby paths w of the activ	nd design vill be trie ve path ur	ates all d on a ntil an	
This device h	nas the follo	wing paths:				
Path Id	Status	Туре	Weight	Session	ID	
0x7704	Conne	Active	n/a	ffffdc85	5e7d78010-	4000
0.001/104	conne	Stanuby	пја	mucoa	e/u/ou10-	-000
<						>
			Det	ails	Edit	
MPIO Path	Details					×
Path identifi	er:	0x770	40003			
Session iden	ntifier:	ffffdc8	85e7d78010	-4000013	700000004	
Initiator:		Micros	oft iSCSI Init	tiator		
Connectio	ns					
The identi	fied path ha	s the followi	ng connectio	ons:		
Source F	Portal	Target Po	rtal	Connect	ion ID	
0.0.0/	41186	127.0.0.1	1/3260	0x3		
					-	
					OK	

Initialize And Format The Disks

This part describes how to initialize and format the iSCSI disks. To launch the tool from



the Server Manager dashboard, select Computer Management in the Tools tab.

62. Open the Disk Management tool.

63. When the Initialize Disk dialog box appears, make sure that all iSCSI disks previously configured are selected. Click OK to initialize the disks as GPT.

Initialize Disk	Х
You must initialize a disk before Logical Disk Manager can access it.	
Select disks:	
☑ Disk 2	
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	

64. Right-click any of the disks that need to be configured. Select Online.

* O Disk 6 Basic 992 MB Offline ()	990 MB	^
Olisk 7 Unknown 6.00 GB Offline	6.00 GB Online	
CD-I DVD (D: No Media	Properties Help	
Unalloca	ed Primary partition	~

65. To create a disk partition, right-click the unallocated space and select New Simple Volume.

66. In the Welcome to the New Simple Volume Wizard dialog box, click Next.



 New Simple Volume Wizard
 X

 Welcome to the New Simple Colume Canada a simple volume on a disk.
 A simple volume can only be on a single disk.

 To continue, click Next.
 Cancel

67. In the Specify Volume Size dialog box, enter the volume size and click Next.

68. In the Assign Drive Letter or Path dialog box, specify the drive letter to be used and click Next.



		-				5 8 8 1	
N	lew 5	Imr	ole	Vol	ume	WIZ	ard

 \times

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:	F	\sim	
O Mount in the following empty NTFS folder:	Browse	·	
O Do not assign a drive letter or drive path			
	< Back	Next >	Cancel

69. In the Format Partition dialog box:

- Make sure that the NTFS file system is selected.
- According to Microsoft Best Practices on allocation unit size, the unit size should be 64K.
- In the Volume label text box, enter the appropriate name. In this example, SQL_DATA is used. This volume label will be used to verify the configuration on the other cluster node.

Click Next.



New Simple Volume Wizard	×
Format Partition To store data on this partition, you r	nust 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:	64К ~
Volume label:	SQL_DATA
Perform a quick format	
Enable file and folder c	ompression
	< Back Next > Cancel

70. In the Completing the New Simple Volume Wizard dialog box, review the configuration settings and click Finish.

New Simple Volume Wizard		\times
	Completing the New Simple Volume Wizard	
	You have successfully completed the New Simple Volume Wizard. You selected the following settings: Volume type: Simple Volume Disk selected: Disk 1 Volume size: 5086 MB	
	Drive letter or path: F: File system: NTFS Allocation unit size: 65536 Volume label: SQL_DATA Quick format: Yes To close this wizard, click Finish.	
	< Back Finish Cance	



71. Repeat the steps above on all iSCSI disks that will be configured as part of the cluster.

72. Repeat steps described in this part on SQLNODE2. There is no need to initialize the iSCSI disks.

Running Failover Cluster Validation Wizard

This part describes how to run Failover Cluster Validation Wizard from the Failover Cluster Management console. To launch the tool from the Server Manager dashboard, select Failover Cluster Manager in the Tools tab.

NOTE: These steps can be performed on any of

the servers that will act as the WSFC nodes. The steps below are performed on SQLNODE1.

73. In the Failover Cluster Manager console, in the Management section, click the Validate Configuration... link to run Validate a Configuration Wizard.

🍓 Failover Cluster Manager			-	- 🗆	×
File Action View Help					
🔶 🋶 💼 🛃 🖬					
💐 Failover Cluster Manager	Failover Cluster Manager	^	Actions		
	Create failover clusters, validate hardware for poter	tial failover clusters,	Failover Cluster Manager		•
	and perform configuration changes to your failover c	clusters.	Validate Configuration		
			🙀 Create Cluster		
	Overview		👹 Connect to Cluster		
	A failover cluster is a set of independent computers that w increase the availability of server roles. The clustered server	ork together to ers (called nodes)	View		•
	are connected by physical cables and by software. If one of another node begins to provide services. This process is le	of the nodes fails, nown as failover.	Refresh		
	C		Properties		
	Clusters		👔 Help		
	Name	Role Status			
	No items found.				
	Management				
	To begin to use failover clustering, first validate your hard and then create a cluster. After these steps are complete cluster. Manging a cluster can include copying roles to it Windows Server 2016 or supported previous versions of V Will Validate Configuration. Create Cluster	vare configuration, you can manage the from a cluster running /indows Server.			
	More Information				
	Failover cluster topics on the Web				
	7 - 1 - Pice				



74. In the Select Servers or a Cluster dialog box, enter the host names of the nodes that will be added as members of the cluster. Click Next.

Validate a Configu	uration Wizard ervers or a Cluster			×
Before You Begin Select Servers or a Cluster Testing Options	To validate a set of serve To test an existing cluste	ers, add the names of all the servers. r, add the name of the cluster or one of its no	des.	
Confirmation	Enter name:			Browse
Validating	Selected servers:	SQLNODE1.TESTDOMAIN.COM SQLNODE2.TESTDOMAIN.COM		Add
Summary				Remove
		< Previous	Next >	Cancel

75. In the Testing Options dialog box, click Next to run all the necessary tests to validate whether the nodes are ready for clustering.



💐 Validate a Configu	Validate a Configuration Wizard		
Testing O	ptions		
Before You Begin	Choose between running all tests or running selected tests.		
Select Servers or a Cluster	The tests examine the Cluster Configuration, Hyper-V Configuration, Inventory, Network, Storage, and System Configuration.		
Testing Options Confirmation Validating Summary	Microsoft supports a cluster solution only if the complete configuration (servers, network, and storage) can pass all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2016."		
	Run all tests (recommended)		
	O Run only tests I select		
	More about cluster validation tests		
	< Previous Next > Cancel]	

76. In the Confirmation dialog box, click Next to run all the necessary validation tests.



💐 Validate a Config	uration Wizard		×
Confirma	tion		
Before You Begin Select Servers or a Cluster	You are ready to start validation. Please confirm that the following settings are correct:		_
Testing Options	Servers to Test		^
Confirmation Validating	SQLNODE1.TESTDOMAIN.COM SQLNODE2.TESTDOMAIN.COM		
Summary	Tests Selected by the User	Category	
	List Information About Servers Running Hyper-V	Hyper-V Configuration	
	Validate Compatibility of Virtual Fibre Channel SANs for Hyper-V	Hyper-V Configuration	
	Validate Hyper-V Memory Resource Pool Compatibility	Hyper-V Configuration	
	Validate Hyper-V Network Resource Pool And Virtual Switch Compatibi	Hyper-V Configuration	~
	To continue, click Next.		
	< Previous	Next > Cance	1

77. In the Summary dialog box, verify that the report returned successful results. Click Finish to create the Windows Server Failover Cluster.



💐 Validate a Config	guration Wizard		×
Summar	Y .		
Before You Begin Select Servers or a Cluster	Testing has completed for the tests you selected. You shou cluster solution is supported by Microsoft only if you run all succeed (with or without warnings).	uld review the warnings in th cluster validation tests, and	e Report. A all tests
Testing Options	Node		^
Test Selection	SQLNODE1.TESTDOMAIN.COM	Validated	
Confirmation	SQLNODE2.TESTDOMAIN.COM	Validated	
Validating	Result		
Currently	List BIOS Information	Success	
Summary	List Disks	Success	
	List Disks To Be Validated	Success	
	List Environment Variables	Success	2.
	List Eles Channel Hest Rus Adaptors	Sussess	~
	Create the cluster now using the validated nodes		
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	View	Report
		C	Finish

NOTE: Validate a Configuration Wizard may report warning messages pertaining to the storage. Resolve all errors prior to proceeding with the next steps and ignore the storage warnings since in this case the replicated storage is used instead of shared disks.

Creating Windows Server Failover Cluster

This part describes how to create Windows Server Failover Cluster from the Failover Cluster Manager console. To launch the tool from the Server Manager dashboard, select Failover Cluster Manager in the Tools tab. Alternatively, the Create Cluster Wizard will automatically run after the Failover Cluster Validation Wizard is completed. NOTE: These steps can be performed on any server that will act as the WSFC nodes. The steps below are performed on SQLNODE1.

78. In the Management section, click the Create a Cluster... link to run Create Cluster Wizard.



📲 Failover Cluster Manager		– 🗆 ×
File Action View Help		
🗢 🔿 🛛 🖬 🚺		
🔠 Failover Cluster Manager	Failover Cluster Manager	Actions
	Create failover clusters, validate hardware for potential failover clusters, and perform configuration changes to your failover clusters.	Failover Cluster Manager
	Overview A failover cluster is a set of independent computers that work together to increase the availability of server roles. The clustered servers (called nodes) are connected by physical	Connect to Cluster View
	cables and by software. If one of the nodes fails, another node begins to provide services. This process is known as failover.	Refresh
	© Clusters	I Help
	No items found.	
	Management To begin to use failover clustering, first validate your hardware configuration, and then create a cluster. After these steps are complete, you can manage the cluster. Managing a cluster revious or private of the cluster running Vindows Server 2016 or supported previous versions of Vindows Server. Source Cluster. Connect to Cluster. More Information Fallover cluster topics on the Web	
	Failover cluster communities on the Web Microsoft support page on the Web	v

79. In the Select Servers dialog box, enter the host names of the nodes that will be added as members of the cluster. Click Next.



🚏 Create Cluster Wizard \times Select Servers Add the names of all the servers that you want to have in the cluster. You must add at least one server. Before You Begin Select Servers Validation Warning Access Point for Enter server name: Browse. Administering the SQLNODE1.TESTDOMAIN.COM SQLNODE2.TESTDOMAIN.COM Cluster Selected servers: Confirmation Creating New Cluster Summary < Previous Cancel

In the Access Point for Administering the Cluster dialog box, enter the WSFC virtual host name/client access point that will be used to administer the cluster. The WSFC will use a DHCP-assigned IP address for the virtual host name since both SQLNODE1 and SQLNODE2 use DHCP-requested IP addresses, not statically assigned. Click Next.





🚏 Create Cluster Wiz	zard	\times
Access P	oint for Administering the Cluster	
Before You Begin Select Servers Validation Warning	Type the name you want to use when administering the cluster. Cluster Name: WINCLUSAZURE	
Access Point for Administering the Cluster	The NetBIOS name is limited to 15 characters. One or more DHCP IPv4 addresses were configured automatically. All networks were configured automatically.	
Confirmation		
Creating New Cluster		
Summary		
	< Previous Next > Cancel]

81. In the Confirmation dialog box, click Next. This will configure Failover Clustering on both nodes of the cluster, add the configured replicated storage, add Active Directory and DNS entries for the WSFC virtual host name/client access point.



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	-
Confirmation	Node	
Creating New Cluster Summary	SQLNODE2.TESTDOMAIN.COM SQLNODE1.TESTDOMAIN.COM	
	Cluster registration	
	DNS and Active Directory Domain Services	

82. In the Summary dialog box, verify that the report returns successful results. According to Microsoft Best Practices, rename all the cluster shared volumes and networks for ease of identification during the installation of the SQL Server Failover Cluster Instance.



韂 Create Cluster Wi	zard	×
Summary		
Before You Begin Access Point for Administering the	You have successfully completed the Create Cluster Wizard.	
Cluster	Node	^
Confirmation	SOLNODE2.TESTDOMAIN.COM	
Creating New Cluster	SQLNODE1.TESTDOMAIN.COM	
Summary	Cluster	
	WINCLUSAZURE	
	Quorum	
	Node and Disk Majority (Cluster Disk 2)	
	IP Address	
	10.1.1.0/24 10.1.0.0/24	~
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	View Report
		Finish

Configuring Cluster Quorum Settings

This part describes how to configure the cluster quorum setting using a file share witness since for WSFC it is needed to add another vote to the form for maintaining the quorum. The file share must be created on the domain controller for this purpose and granted the Windows Failover Cluster virtual server name Read/Write permissions.



Previou	us Versions	Cus	stomize	
General	Network	Sharing	Security	
Object name: \\TEST-COMPUTER-1.starwind.local\FileShareWi				
Group or user n	ames:			
🞎 Users (TE	ST-COMPUTER-1\L	lsers)		
WINCLUSA	ZURE (TESTDOMAIN	WINCLUSAZU	RE\$)	
To change per	missions click Edit		F In	
re ondrige poi	nicelene, ellert Lait.		Edit	
Permissions for	Users	Allow	Deny	
Full control		~	^	
Modify		~		
Read & exec	ute	~		
List folder co	ntents	~		
Read		~		
Write		~		
Special perm	issions		~	
For special per click Advanced	nissions or advanced I.	d settings,	Advanced	
			_	
	OK	Cancel	Apply	

NOTE: These steps can be performed on any of the servers that will act as WSFC nodes. The steps below are performed on SQLNODE1.

83. Open the Failover Cluster Manager console in the Administrator mode.

84. Select the WSFC virtual host name/client access point.

85. Right-click the cluster name and select More Actions. Then click Configure Cluster Quorum Settings... to open Configure Cluster Quorum Wizard.



	Configure Role Validate Cluster View Validation Report Add Node Close Connection Reset Recent Events	F WINCLUSAZURE) clustered roles and 2 nodes. OMAIN.COM E1 tical: 1, Emor: 21, Warning: 1	
	More Actions	Configure Cluster Quorum Settings	
	View	Copy Cluster Roles	copy roles from a clu
	Refresh	Shut Down Cluster	
	Properties	Destroy Cluster	
	Help	Move Core Cluster Resources	
	Cluster-Aware Updating.	Cluster-Aware Updating	
	▲ Navigate		

86. In the Select Quorum Configuration Option dialog box, choose the Select the quorum witness option. Clck Next.

📲 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. The cluster Quorum and Witness Configuration Options Yervious Next >	

87. In the Select Quorum Witness dialog box, choose the Configure a file share witness option. Click Next.



📲 Configure Cluster Quorum Wizard

 \times

Select Q	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	○ Configure a disk witness
Witness	Adds a quorum vote of the disk witness
Configure File Share Witness	Configure a file share witness
Confirmation	Adds a quorum vote of the file share witness
Configure Cluster Quorum Settings	Configure a cloud witness Adds a guorum vote of the cloud witness
Summary	O Do not configure a quorum witness
	Failover Cluster Quorum and Witness Configuration Options < Previous Next > Cancel

88. In the Configure File Share Witness dialog box, type the path of the File Share Path. Click Next.





遣 Configure Cluster	Quorum Wizard	×
Configure	File Share Witness	
Before You Begin Select Quorum Configuration Option	Please select a file share that will be used by the file share witness resource. This file share must no hosted by this cluster. It can be made more available by hosting it on another cluster.	t be
Select Quorum Witness	File Share Path:	
Configure File Share Witness	\\AD-DC1\FileShareWitness Brows	e
Confirmation		
Configure Cluster Quorum Settings		
Summary		
	< Previous Next > Can	icel

89. In the Confirmation dialog box, review the configuration settings and click Next.



Real Configure Cluster Quorum Wizard			
Confirmat	ion		
Before You Begin Select Quorum Configuration Option	You are ready to configure the quorum settings of th	he cluster.	
Select Quorum	Configure Cluster Quorum Settings		^
Witness	File Share Witness	\\AD-DC1\FileShareWitness	
Configure File Share Witness	Cluster Managed Voting	Enabled	
Confirmation	Voting Nodes:		
Configure Cluster Quorum Settings	All nodes are configured to have quorum votes		
Summary			~
	To continue, click Next.		_
		< Previous Next > Cancel	

90. In the Summary dialog box, verify that the entire configuration is successful.

Installing Sql Server 2017 On The Failover Cluster

This part describes how to install an SQL Server 2017 Failover Cluster default instance on Windows Server. The installation process will be performed on the first node of the cluster, SQLNODE1.

91. Run setup.exe from the SQL Server 2017 installation media to launch SQL Server Installation Center. Click on the Installation link on the left side.

92. Click on the New SQL Server failover cluster installation link to run the SQL Server 2017 Setup Wizard.





93. In the Product Key dialog box, enter the product key that came with the installation media and click Next.



🏗 Install a SQL Server Failover Clust	er	-		×
Product Key Specify the edition of SQL Serve	er 2017 to install.			
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Failover Cluster Rules Feature Selection Feature Rules Feature Configuration Rules Ready to Install Installation Progress Complete	Validate this instance of SQL Server 2017 by entering the 25-character key from the M of authenticity or product packaging. You can also specify a free edition of SQL Server Evaluation, or Express. Evaluation has the largest set of SQL Server features, as docum Books Online, and is activated with a 180-day expiration. Developer edition does not I has the same set of features found in Evaluation, but is licensed for non-production d development only. To upgrade from one installed edition to another, run the Edition I © Specify a free edition: Evaluation C Enter the product key: C =	licrosoft T Develo ented in have an atabase Jpgrade	certificate per, SQL Serv expiration applicatic Wizard.	e ver l, bn
	< Back Next >		Cancel	

94. Read the License Terms dialog box and enable the I accept the license terms. Click Next.



📸 Add a Failover Cluster Node	— D	Х
License Terms To install SQL Server 2017, y	ou must accept the Microsoft Software License Terms.	
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Add Node Rules Cluster Node Configuration Feature Rules Ready to Add Node Add Node Progress Complete	MICROSOFT EVALUATION SOFTWARE LICENSE TERMS MICROSOFT SQL SERVER 2017 EVALUATION These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. Please read them. They apply to the evaluation software named above, which includes the media on which you received it, if any. The terms also apply to any Microsoft • updates, • supplements, • Internet-based services, and	▲
	☑ I accept the license terms. SQL Server 2017 transmits information about your installation experience, as well as other usage and performance data, to Microsoft to help improve the product. To learn more about SQL Server 2017 data processing and privacy controls, please see the Privacy Statement. < Back	

95. In the Global Rules dialog box, validate that the tests return successful results and click Next.



髋 Install a SQL Server Failover Clust	r	-	
Global Rules			
Setup Global Rules identify pro corrected before Setup can con	lems that might occur when you install SQL Server Setup support files. Failures r nue.	must be	
Product Key License Terms Global Rules Microsoft Update Product Updates	Operation completed. Passed: 8. Failed 0. Warning 0. Skipped 0. Hide details << <u>View detailed report</u>		Re-run
Install Setup Files Install Failover Cluster Rules Feature Selection Feature Rules Feature Configuration Rules Ready to Install Installation Progress Complete	Rule Status Setup administrator Passed Setup account privileges Passed Restart computer Passed Windows Management Instrumentation (WMI) service Passed Consistency validation for SQL Server registry keys Passed Long path names to files on SQL Server installation media Passed SQL Server Setup Product Incompatibility Passed INET 2.0 and .NET 3.5 Service Pack 1 update for Windows 2008 Passed		
	< Back	Next >	Cancel

96. In the Microsoft Update dialog box, click Next.



髋 Install a SQL Server Failover Clust	er	<u> </u>		×
Microsoft Update	for important updates			
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Failover Cluster Rules Feature Selection Feature Rules Feature Configuration Rules Ready to Install Installation Progress Complete	Microsoft Update offers security and other important updates for Windows and software, including SQL Server 2017. Updates are delivered using Automatic Up the Microsoft Update website. Use Microsoft Update to check for updates (recommended) <u>Microsoft Update FAQ</u> <u>Microsoft Update Privacy Statement</u>	other Mi	crosoft you can v	isit
	< Back Next	>	Cance	1

97. In the Install Failover Cluster Rules dialog box, validate that the tests return successful results. If the tests return warnings, make sure they are fixed before proceeding with the installation. Click Next.



nstall a SQL Server Failover Cluster		-		×
Install Failover Cluster	Rules			
Setup rules identify potential p can continue.	oblems that might occur while running Setup. Failures must be corrected before	Setup		
Product Key License Terms	Operation completed. Passed: 19. Failed 0. Warning 1. Skipped 0.			
Global Rules				
Microsoft Update	Hide details <<		Re-	run
Product Updates	View detailed report			
Install Setup Files				
Install Failover Cluster Rules	Rule Status			^
Feature Selection	Distributed Transaction Coordinator (MSDTC) service Passed			
Feature Rules	Microsoft Cluster Service (MSCS) cluster verification errors Passed			
Feature Configuration Rules	Microsoft Cluster Service (MSCS) cluster verification warnings	1		
Ready to Install	Remote registry service (SWTESTSECOND) Passed			
Installation Progress	Opmain controller Passed			_
Complete	Windows Firewall Passed			-
	ONS settings (SWTESTSECOND) Passed			-
	WOW64 setup Passed			-
	Windows Management Instrumentation (WMI) service (SWTES Passed			-
	Cluster Remote Access (SWTESTONE2) Passed			
	Distributed Transaction Coordinator (MSDTC) installed (SWTES Passed			~
	< Back	Next >	Cance	I.

98. In the Feature Selection dialog box, select Database Engine Services and Management Tools. Click Next.
| StarWind |
|------------------|
| HYPERCONVERGENCE |

🏗 Install a SOL Server Failover Clust	er		— П Х	ĸ
Feature Selection Select the Evaluation features to	o install.			
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Setup Files Install Failover Cluster Rules Feature Selection Feature Rules Instance Configuration Cluster Resource Group Cluster Disk Selection Cluster Network Configuration Server Configuration Database Engine Configuration Feature Configuration Rules Ready to Install Installation Progress Complete	 Looking for Reporting Servit Features: Instance Features Database Engine Services SQL Server Replication Full-Text and Semant Data Quality Services Charlysis Services Shared Features Data Quality Client Client Tools Connectivity Select All Unselect All Instance root directory: Shared feature directory (x86): 	cees? <u>Download it fro</u> n ic Extractions for Sea ce for External Data ce for External Data <u>C:\Program Files\Mid</u> <u>C:\Program Files\Mid</u> <u>C:\Program Files\Mid</u>	m the web Feature description: The configuration and operation of each instance feature of a SQL Server instance is Prerequisites for selected features: Already installed: Windows PowerShell 3.0 or higher Microsoft .NET Framework 4.6 Disk Space Requirements Drive C: 1620 MB required, 113735 MB available crosoft SQL Server\ S)(Microsoft SQL Server\	
			< Back Next > Cancel	

99. In the Feature Rules dialog box, verify that all the rules have passed. If the rules return warnings, make sure they are fixed before proceeding with the installation. Click Next.



髋 Install a SQL Server Failover Clust	2r	_	
Feature Rules Feature rules identify problems	that might block this setup operation based on the features selected.		
Product Key License Terms Global Rules Microsoft Update Install Setup Files	Operation completed. Passed: 2. Failed 0. Warning 0. Skipped 0. Hide details << <u>View detailed report</u>		Re-run
Install Failover Cluster Rules Feature Selection Feature Rules Instance Configuration Cluster Resource Group Cluster Disk Selection Cluster Network Configuration Server Configuration Database Engine Configuration Feature Configuration Rules Ready to Install Installation Progress Complete	Rule Image: Cluster supported for edition Image: Supported for editinge Image:	Status Passed Passed	
	< Back	Next >	Cancel

100. In the Instance Configuration dialog box, enter the following details:

SQL Server Network Name: type the name of the cluster

Instance ID: MSSQLSERVER

Click Next.



1	Insta	all a SQ	L Server Failove	er Cluster		_ □	x
Instance Configuration	n						
Specify the name and instance	e ID for the instance o	of SQL Ser	ver. Instance ID be	comes part of the	installation path.		
Global Rules Microsoft Update	Specify a network your failover clust	name for er on the	the new SQL Serve network.	er failover cluster.	This will be the nar	ne used to identify	,
Install Setup Files	SQL Server Netwo	rk Name:	SQLCluster2017				
Install Failover Cluster Rules Product Key	 Default instance 	e					
Elicense Terms Feature Selection	O Named instance	e:	MSSQLSERVER				
Feature Rules							
Instance Configuration	Instance ID:		MSSQLSERVER				
Cluster Resource Group Cluster Disk Selection Cluster Network Configuration	SQL Server directo	ny:	C:\Program Files\	Microsoft SQL Ser	ver\MSSQL14.MSS	QLSERVER	
Server Configuration	Detected SQL Serv	ver instand	es and features on	this computer:			
Database Engine Configuration	Instance	Cluster	Network Name	Features	Edition	Version	Inst
Feature Configuration Rules	MSSQLSERVER			SQLEngine	Evaluation	14.0.1000.169	MSS
Ready to Install							
Complete							
	<		III				>
				<	Back Nex	t > Cano	el

101. To make sure that a new Resource Group for the SQL Server Failover Cluster Instance can be created, check the resources availability in the Cluster Resource Group dialog box. To specify an existing SQL Server cluster resource group name, use the dropdown box or type the name of a new group to create it. Accept all the defaults and click Next.



髋 Install a SQL Server Failover Clust	er					_		×
Cluster Resource Group	p							
Create a new cluster resource g	roup for your	SQL Server failover cluster.						
Product Key License Terms Global Rules	Specify a n failover clu or enter a n	ame for the SQL Server cluster ster resources will be placed. Yo new cluster resource group nam	resc ou c ne to	ource group. The cluster reso an choose to use an existing be created.	urce group is v cluster resour	where ce gro	e SQL Ser oup nam	ver e
Microsoft Update	SQL Sen	ver cluster resource group name	e:	SQL Server (MSSQLSERVER)				~
Product Updates								
Install Setup Files	Qualified	Name	Me	essage				
Feature Selection	۲	Available Storage	The	cluster group 'Available Sto	rage' is reserved	d by V	Windows	Fai
Feature Rules		Cluster Group	The	cluster group 'Cluster Group	o' is reserved by	Win	dows Fail	ov
Instance Configuration								
Cluster Resource Group								
Cluster Disk Selection								
Cluster Network Configuration								
Server Configuration								
Database Engine Configuration								
Feature Configuration Rules								
Ready to Install								
Complete							Refres	h
				< Back	Next >		Cance	

102. In the Cluster Disk Selection dialog box, select the available disk groups that are to be used in the cluster for SQL Server 2017. Click Next.



髋 Install a SQL Server Failover Clust	ter					_		×
Cluster Disk Selection	irces for your S	Ol Server failover	cluster.					
	inces for your s							
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Failover Cluster Rules Feature Selection	Specify the sused as the Services con	shared disks to be default drive for a figuration pages. Jisk 1 ared disks:	included in the SQL Server Il databases, but this can b	r resource cluster e changed on the	group. The fi e Database En	rst drive gine or	e will be Analysis	
Instance Configuration	Qualified	Disk	Message					
Cluster Resource Group		Cluster Disk 1						_
Cluster Disk Selection								
Cluster Network Configuration								
Server Configuration								
Database Engine Configuration								
Ready to Install								
Installation Progress		_		_	_			
Complete							Refresh	1
				< Back	Next >		Cancel	

103. In the Cluster Network Configuration dialog box, enter the virtual IP address that the SQL Server 2017 Failover Cluster Instance will use. The checkbox next to the IPv4 column will be used as a static IP address instead of the DHCP-assigned one. Click Next.

104. Type the IP address: 10.4.0.15 (similar to the virtual IP address for the virtual host name/client access point, the IP address could be any within the range of the Production subnet as long as it is available).



髋 Install a SQL Server Failover Cluste	er						_		×
Cluster Network Config	guration								
Select network resources for you	ur SQL Server fa	ilover clus	ster.						
Product Key	Specify the n	etwork set	tings for this fai	lover cluster:					
License Terms	✓ IP Ty	DHCP	Address	Subnet Mask	Subnet(s)		Netv	vork	
Global Rules	IPv4		10.4.0.15	255.255.255.0	10.4.0.0/24		Clust	er Netwo	ork 1
Des dust Un date							-		_
Product Updates									
Install Setup Files									
Fasture Selection									
Feature Puler									
Instance Configuration									
Cluster Resource Group									
Cluster Nesource Group									
Cluster Disk Selection									
Server Configuration									
Database Engine Configuration									
Feature Configuration Rules									
Ready to Install									
Installation Progress									
Complete								Refr	esh
					< Back	Next >		Cancel	

NOTE: The network adapter settings that will be displayed in this dialog box will depend on how the cluster network adapters are configured. Make sure to configure the Heartbeat-iSCSI network adapters with the Do not allow cluster network communication on this network option.

105. In the Server Configuration dialog box, use the following credentials for the SQL Server service accounts in the Service Accounts tab:

SQL Server Agent: SWTEST\sqlservice

SQL Server Database Engine: SWTEST\sqlservice

Make sure that both SQL Server Agent and SQL Server Database Engine services have the Manual Startup Type. The Windows Server Failover Cluster will take care of stopping and starting the service. Also, set the Collation property for the instance according to the application requirement. Click Next.



Server Configuration					
Specify the service accounts an	d collation configuration.				
Product Key License Terms Global Rules	Service Accounts Collation Microsoft recommends that you use	a separate account for each	SQL Server service		
Microsoft Update	Service	Account Name	Password	Startup 1	Гуре
Product Updates	SQL Server Agent	SWTEST\sqlservice	•••••	Manual	~
Install Setup Files	SQL Server Database Engine	SWTEST\sqlservice	•••••	Manual	~
Install Failover Cluster Rules	SQL Full-text Filter Daemon Launc	NT Service\MSSQLFDLa		Manual	
Feature Selection Feature Rules	SQL Server Browser	NT AUTHORITY\LOCAL		Automati	ic ~

106. In the Database Engine Configuration dialog box, select the appropriate Authentication Mode in the Server Configuration tab. To add the currently logged on user to the SQL Server administrators group, click the Add Current User button. Otherwise, add the appropriate domain accounts or security groups.



髋 Install a SQL Server Failover Cluster								×
Database Engine Config Specify Database Engine authent	uration	administrators, data	a directori	es and TempDB settings.				
Product Key	Server Configuration	Data Directories	TempDB	FILESTREAM				
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Failover Cluster Rules Feature Selection Feature Rules Instance Configuration Cluster Resource Group	Specify the authenti Authentication Moc Windows authen Mixed Mode (SQ Specify the password Enter password: Confirm password:	ication mode and a le tication mode L Server authenticat d for the SQL Serve	dministrat tion and V r system a	vors for the Database Engi Vindows authentication) Idministrator (sa) account	ine.			
Cluster Disk Selection	Specify SQL Server a	idministrators			1			
Server Configuration					SQL Serv	/er adm restricte	inistrator	rs
Database Engine Configuration					to the Da	atabase	Engine.	
Feature Configuration Rules								
Ready to Install								
Installation Progress	Add Current User	Add Rei	move					
Complete								
				< Back	Next >		Cancel	

107. In the Data Directories tab, enter the following data (based on the available cluster disks):

Data root directory: J:\

User database directory: J:\MSSQL12.MSSQLSERVER\MSSQL\Data

User database log directory: L:\MSSQL12.MSSQLSERVER\MSSQL\Data

Temp DB directory: J:\MSSQL12.MSSQLSERVER\MSSQL\Data

Temp DB log directory: L:\MSSQL12.MSSQLSERVER\MSSQL\Data

Backup directory: J:\MSSQL12.MSSQLSERVER\MSSQL\Backup

NOTE: SQL Server 2012 has an option to store the tempdb database on a local drive instead of the cluster drive. For WSFC on Microsoft Windows Server, it is recommended to store the tempdb database on a local drive instead of the replicated storage. Make sure that all the nodes in the cluster contain the same directory structure and that the SQL Server service account has Read/Write permissions for those folders.



108. In the Feature Configuration Rules dialog box, click Next.

hand wat Kan	0	which a second day of the second of the seco			
icence Terms	Ope	ration completed, Passed: 2. Palled 0. Warning 0. Ski	pped 0.		
Slobal Rules					
Microsoft Undate	Hi	de details <<			Re-run
nstall Setup Files	Man	- detailed execut			
nstall Failover Cluster Rules	view	v detailed report			
Setup Role		Rule	St	atus	
eature Selection	0	FAT32 File System	Pa	essed	
eature Rules	0	Cluster Resource DLL Update Restart Check	Pa	essed	
stance Configuration	-				
luster Resource Group					
luster Disk Selection					
luster Network Configuration					
erver Configuration					
atabase Engine Configuration					
eature Configuration Rules					
eady to Install					
stallation Progress					
lata					

109. In the Ready to Install dialog box, verify that all configurations are correct. Click Next.





110. Once the installation is finished, in the Complete dialog box, click Close.

🐮 Install a SQL Server Failover Clu	ter		-		\times
Complete Your SQL Server 2017 failover	cluster installation is complete with product updates.				
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Failover Cluster Rules Feature Selection Cluster Rules Instance Configuration Cluster Resource Group Cluster Disk Selection Cluster Retwork Configuration Server Configuration Database Engine Configuration Feature Configuration Ready to Install Installation Progress Complete	Information about the Setup operation or possible next steps Feature	Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded Succeeded			
	Summary log file has been saved to the following location: C\Program Files\Microsoft SQL Server\140\Setup Bootstrap\	Log\20180312_200354\Summary_swtestsecond_20180312_200354.txt			
			[Clos	e



Adding Node To Sql Server 2017 Failover Cluster

This part describes how to add a node to the SQL Server 2017 Failover Cluster default instance on Windows Server Failover Cluster. The installation process will be performed on the second node of the cluster, SQLNODE2.

To add a node to the SQL Server 2017 Failover Cluster Instance:

111. Run setup.exe from the installation media to launch SQL Server Installation Center.

112. Click on the Installation link on the left side. Click the Add node to a SQL Server failover cluster link to run the SQL Server 2017 Setup Wizard.

🐮 SQL Server Installation Center	- 0	\times
Planning Installation Maintenance	 Launch a download page that provides a link to install SQL Server Data Tools (SSDT). SSDT provides Visual Studio integration including project system support for Azure SQL Database, the SQL Server Database Engine, Reporting Services, Analysis Services and Integration Services. An internet connection is required to install SSDT. New SQL Server failover cluster installation 	^
Tools	Launch a wizard to install a single-node SQL Server 2017 failover cluster.	
Advanced	Add node to a SQL Server failover cluster Launch a wizard to add a node to an existing SQL Server 2017 failover cluster.	
Options	Upgrade from a previous version of SQL Server Launch a wizard to upgrade a previous version of SQL Server to SQL Server 2017. New Machine Learning Server (Standalone) installation Launch a wizard to install Machine Learning Server (Standalone) on a Windows machine. This is typically used by data scientists as a standalone analysis server or as SQL Server Machine Learning Services client.	a
Microsoft SQL Server 2017		v

113. In the Product Key dialog box, enter the product key that came with the installation media and click Next.

114. Read and accept the License Terms and click Next.

115. In the Global Rules dialog box, validate that the tests return successful results and click Next.



116. In the Microsoft Update dialog box, click Next.

117. In the Add Node Rules dialog box, validate that the tests return successful results. If the tests return warnings, make sure to fix them before proceeding with the installation. Click Next.

118. In the Cluster Node Configuration dialog box, validate that the information for the existing SQL Server 2017 Failover Cluster Instance is correct. Click Next.

🃸 Add a Failover Cluster Node				
Cluster Node Configura Add a node to an existing SQL S	erver failover cluste	er.		
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Add Node Rules Cluster Network Configuration Service Accounts Feature Rules Ready to Add Node Add Node Progress Complete	SQL Server Ins Name of this r Disk Space Re Instance Name MSSOLSERVER	stance name: node: quirements: Cluster Network Network SQLCLUST	MSSQLSERVER SWTESTONE2 Drive C: 1620 MB requ Features TER SQLEngine, SQ	uired, 113917 MB available Nodes
				< Back Next > Cancel

119. In the Cluster Network Configuration dialog box, review the configuration of the SQL Server Failover Cluster Instance. Click Next.



📸 Add a Failover Cluster Node									
Cluster Network Configuration The current node that is being added does not require any additional or new IP addresses. The IP addresses and subnets shown are the previously configured settings for the SQL Server cluster, and cannot be modified. Review and click Next to continue.									
Product Key License Terms	Specify the ne	Specify the network settings for this failover cluster:							
Global Rules	IP Ty	DHCP	Address	Subnet Mask	Subnet(s)			1	Vetwork
Microsoft Update	IPv4		10.4.0.15	255.255.255.0	10.4.0.0/24			C	luster Network
Product Updates									
install Setup Files									
Add Node Rules									
Cluster Node Configuration									
Cluster Network Configuration									
Service Accounts									
Feature Rules									
Ready to Add Node									
Add Node Progress									
Complete									
									Refresh
							< Back	Next >	Cancel

120. In the Service Accounts dialog box, verify that the information of the configuration is the same as what was used to configure the first node. Provide the appropriate password for the SQL Server service accounts. Click Next.



🐮 Add a Failover Cluster Node								
Service Accounts Specify the service accounts a	nd collation configuration.							
Product Key	Microsoft recommends that you use a separate account for each SQL Server service.							
License Terms	Service	Account Name	Password	Startup Type				
Global Rules	SQL Full-text Filter Daemon Launcher	NT Service\MSSQLFDLauncher		Manual				
Microsoft Update	SQL Server Database Engine	SWTEST\sqlservice		Manual				
Product Updates	SQL Server Browser	NT AUTHORITY\LOCAL SERVICE		Automatic 🗸				
Install Setup Files	SQL Server Agent	SWTEST\sqlservice	•••••	Manual				
Cluster Network Configuration Service Accounts Feature Rules Ready to Add Node Add Node Progress Complete								
			< Back No	ext > Cancel				

121. In the Feature Rules dialog box, click Next.

122. In the Ready to Add Node dialog box, verify that all settings are correct and click Install.



TAdd a Failover Cluster Node

Ready to Add Node	ures to be installed as part of the add node operation.			
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Add Node Rules Cluster Node Configuration Cluster Network Configuration Service Accounts Feature Rules Ready to Add Node Add Node Progress Complete	Ready to add this node to the SQL Server 2017 failover cluster: — Summary Edition: Evaluation Action: AddNode (Product Update) Prerequisites Already installed: Windows PowerShell 3.0 or higher Microsoft. NET Framework 4.6 General Configuration — Database Engine Services — SQL Server Replication — Full-Text and Semantic Extractions for Search — Data Quality Services — Cluster Tools Connectivity — Instance Onfiguration — Instance ID: MSSQLSERVER — Instance ID: MSSQLSERVER — SQL Database Engine: MSSQL14.MSSQLSERVER — Product Update — Update Enabled: True — Update Source: MU 			
	Configuration file path:			
	C:\Program Files\Microsoft SQL Server\140\Setup Bootstrap\Log\20180312_204109\ConfigurationFile.ini			
		< Back	Install	Cancel

123. Once the installation is finished, click Close in the Complete dialog box. This performs by adding a node to the SQL Server 2017 Failover Cluster.

NOTE: When storing the tempdb database on a local drive instead of a replicated drive, make sure that:

- The same drive letter and folder structure exist on all nodes in the cluster.
- The SQL Server service account has the appropriate permissions for the folder where tempdb will be created.



📸 Add a Failover Cluster Node							
Complete Your SQL Server 2017 failover	cluster add node operation is complete with product updates.						
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Add Node Rules Cluster Note Configuration Cluster Network Configuration Service Accounts Feature Rules Ready to Add Node Add Node Progress Complete	Information about the Setup operation or possible next steps: Feature Data Quality Services Solution Services Solution Services Solution Services Solution Services Solution Connectivity Solution Connectivity Solution Connectivity Solution Connectivity SDK Solution Connectivity SDK Setup Support Files: Details: Install successful.	Status Succeeded Succeeded					
	Summary log file has been saved to the following location:						
	C:\Program Files\Microsoft SQL Server\140\Setup Bootstrap\Lo	pg\20180312_204109\Summary_swtestone2_20180312_204109.txt					
			Close				

Conclusion

The steps described in this guide allow successfully configuring a 2-node Windows Server Failover Cluster that will host SQL Server Failover Cluster Instance (FCI). StarWind Virtual SAN was taken as the basis for use in the Windows Server hosted storage during the implementation of a block-level replication and creating Windows Server Failover Cluster. StarWind Virtual SAN provides data safety and maintains continuous application availability



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