StarWind Virtual SAN®

Installation and Configuration of HyperConverged 2 Nodes with Hyper-V Cluster

AUGUST 2016 TECHNICAL PAPER



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In 2016, Gartner named StarWind "Cool Vendor for Compute Platforms".

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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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Introduction

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 existing server's storage and RAM between the participating storage cluster nodes. The mirrored storage resource is then connected to all cluster nodes and treated just as local storage by all hypervisors and clustered applications. High Availability 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.

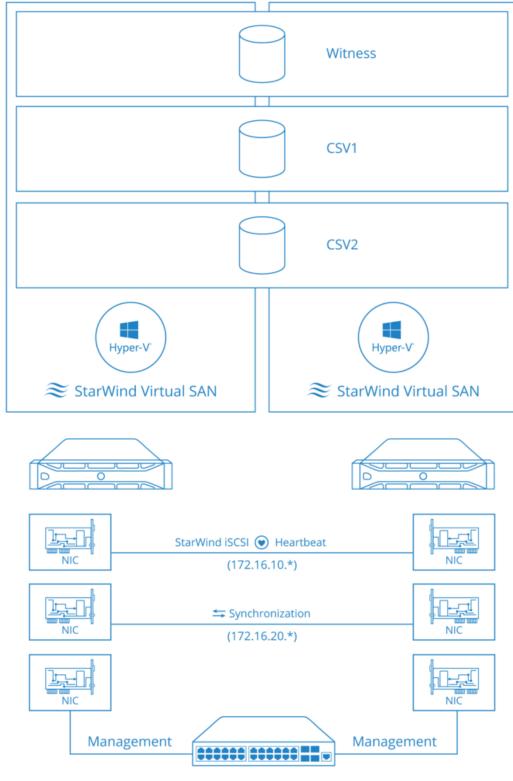
This guide was written for experienced Windows Server users or system administrators. It provides detailed instructions on how to setup 2 node HyperConverged Hyper-V Cluster with **StarWind Virtual SAN** as a storage provider.

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

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

Pre-Configuring the Servers

Here is a reference network diagram of the configuration described in this guide.



* - number of a node

Additional network connections may be necessary depending on the cluster setup and applications requirements.

- 1. Make sure you have a domain controller and that you have added the servers to the domain.
- 2. Install **Failover Clustering** and **Multipath I/O** features, as well as the **Hyper-V** role on both servers. That can be done through **Server Manager (Add Roles and Features** menu item).
- 3. In order to allow **StarWind Virtual SAN** use the Loopback accelerator driver and access the local data faster, you should add a minor modification to the StarWind configuration file.

Locate the StarWind Virtual SAN configuration file and open it using Notepad.

The default path is:

C:\Program Files\StarWind Software\StarWind\StarWind.cfg

Find the string «<!--<iScsiDiscoveryListInterfaces value=»1»/> -->» and uncomment it (should look as follows: <iScsiDiscoveryListInterfaces value=»1»/>). Save the changes and exit Notepad.

Note that is case there are any issues with saving the recently changed *.cfg file, launch Notepad with Administrator rights and then load the starwind.cfg file to make modifications.

Restart StarWind Virtual SAN Service after the *.cfg modification.

Enabling Multipath Support

- 4. Open the MPIO manager: Start->Administrative Tools->MPIO.
- 5. Go to **the Discover Multi-Paths** tab.
- 6. Tick **the Add support for iSCSI devices** checkbox.

| | Discourse Martha Deather | | |
|--------------|--------------------------|-------------|------------------------|
| 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 | | |
| | | | |
| | | | |
| | | | |
| | | | Add |
| | | | |
| | | | |

Click **Add**.

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

NOTE: Repeat the procedure on the second server as well.

Downloading, Installing, and Registering the Software

8. Download the StarWind setup executable file from our website by following next link: <u>https://www.starwind.com/registration-starwind-virtual-san</u>

NOTE: The setup file is the same for x86 and x64 systems, as well as for all Virtual SAN deployment scenarios.

Launch the downloaded setup file on the server where you wish to install
 StarWind Virtual SAN or one of its components. The Setup wizard will appear:

| 0 | Setup - StarWind Virtual SAN 📃 🗖 🗙 |
|---|---|
| | <section-header><section-header><text><text><text></text></text></text></section-header></section-header> |
| | Next > Cancel |

Click **Next** to continue.

10. Read and accept the License Agreement.

| | 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 Software | | | | |
| | StarWind Virtual SAN End User License Agreement | | | | |
| IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING | | | | | |
| | Do not use or load install this software the StarWind Virtual SAN or any associated materials (collectively refered to as, the "Software") until you have carefully read the following terms and conditions. By loading installing or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree with the | | | | |
| | • I accept the agreement | | | | |
| | \bigcirc I do not accept the agreement | | | | |
| | < Back Next > Cancel | | | | |

Click **Next** to continue.

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

| informa Please | read the following important information before continuing. | C |
|-------------------|--|---|
| When | you are ready to continue with Setup, click Next. | |
| Star\ | Vind Virtual SAN V8 | ^ |
| New | Features and Improvements | |
| New | Log-structured File System container | |
| lt imp | lements thin-provisioning, snapshots, optional deduplication. | |
| - C - | nronous and asynchronous replication can be configured for a device. | |
| LSFS | device is flash-friendly. It eliminates multiple rewrites of same | ~ |

Click **Next** to continue.

12. Click Browse to modify the installation path if necessary.

| 0 | Setup - StarWind Virtual SAN 📃 🗖 🗙 |
|------------|--|
| | hould StarWind Virtual SAN be installed? |
| 444 | Setup will install StarWind Virtual SAN into the following folder. |
| | nue, dick Next. If you would like to select a different folder, dick Browse. ram Files\StarWind Software\StarWind Browse |
| | |
| At least 1 | 1.5 MB of free disk space is required. |
| | < Back Next > Cancel |

Click **Next** to continue.

- 13. Specify one of the following installation types:
 - StarWind Virtual SAN Server (recommended)

Full installation includes both StarWind Service and Management Console elements. It allows users to manage storage resources on the machine where StarWind Virtual SAN is installed, as well as manage other StarWind Virtual SAN installations on the network.

StarWind Virtual SAN Service

This installation type is designed for Core OS editions. StarWind Service is the core of the software. It can create iSCSI targets as well as share virtual and physical devices. Service can be managed using StarWind Management Console from any Windows computer on the network that has StarWind Management Console installed.

StarWind Management Console

The 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 connected to the network StarWind Virtual SAN servers).

| Select Components Which components should be installed? | | 0 |
|--|------------|---|
| Select the components you want to install; clear the components you do install. Click Next when you are ready to continue. | not want t | o |
| StarWind Virtual SAN Server | | ~ |
| Service | 11.0 MB | ~ |
| Loopback Accelerator Driver | | |
| StarWind Management Console | 31.8 MB | |
| Configure user account for Web-access to Management Console | 0.1 MB | = |
| Integration Component Library | 13.3 MB | |
| PowerShell Management Library | 5.5 MB | |
| SMI-S Agent | 62.9 MB | |
| Software VSS Provider | 0.1 MB | _ |
| Hardware VSS Provider | 0.2 MB | ~ |

Click **Next** to continue.

14. Specify the Start Menu folder.

| Setup - StarWind Virtual SAN X |
|--|
| 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 |
| |
| |
| |
| < Back Next > Cancel |

Click **Next** to continue.

15. Enable the checkbox if you want to create a desktop icon.

| Setup - StarWind Virtual SAN |
|--|
| Select Additional Tasks Which additional tasks should be performed? |
| Select the additional tasks you would like Setup to perform while installing StarWind Virtual SAN, then click Next. |
| Additional icons: |
| Create a desktop icon |
| |
| |
| |
| |
| |
| |
| |
| < Back Next > Cancel |

Click **Next** to continue.

You will be prompted to request a time-limited fully functional evaluation key, or a FREE version key, or a fully commercial license key sent to you with the purchase of **StarWind Virtual SAN**. Select the appropriate option.

| 0 | Setup - Sta | arWind Virtual | SAN | - 🗆 X |
|----------------------------------|--|--|--------|--------|
| License key Get your license | e key | | | |
| key or FREÉ ve you don't have | have installed StarWin rsion key or commercia any key it's time to rec | l license key you've g juest one now! | | |
| | me-limited fully function | al evaluation key | | |
| O Request Fl | REE version key | | | |
| U Thank you | , I do have a key alrea | ay | | |
| | | | | |
| | | | | |
| | | < Back | Next > | Cancel |

Click **Next** to continue.

| 17. | |
|-----|---|
| 0 | Setup - StarWind Virtual SAN 📃 🗖 🗙 |
| | Select your license key Where is license key located? |
| | Select where license key is located, then click Next. Location of StarWind license file: Browse |
| | |
| | |
| | |
| | < Back Next > Cancel |

17. Click **Browse** to locate the license file.

Click **Next** to continue.

18. Review the licensing information.

| 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: 2 |
| | < Back Next > Cancel |

Click **Next** to apply the license key.

19. Verify the installation settings. Click **Back** to make any changes.

| Setup - StarWind Virtual SAN - | x |
|---|----------|
| Ready to Install Setup is now ready to begin installing StarWind Virtual SAN on your computer. | |
| Click Install to continue with the installation, or click Back if you want to review or change any settings. | |
| Destination location: C:\Program Files\StarWind Software\StarWind | ^ |
| Setup type: StarWind Virtual SAN Server | = |
| Selected components: Service Loopback Accelerator Driver StarWind Management Console Integration Component Library PowerShell Management Library | _ |
| < | |
| < Back Install | Cancel |

Click **Install** to continue.

20. Select the appropriate checkbox to launch the **StarWind Management Console** immediately after setup wizard is closed.

| S S | etup - StarWind Virtual SAN 📃 🗖 🗙 |
|-----|--|
| | Completing the StarWind Virtual Setup has finished installing StarWind Virtual SAN on your computer. The application may be launched by selecting the installed icons. Click Finish to exit Setup. ✓ Launch StarWind Management Console |
| | Finish |

Click **Finish** to close the wizard.

Repeat steps 2 to 12 on the partner node.

NOTE: To manage **StarWind Virtual SAN** installed on a Server Core OS edition, StarWind Management console should be installed on a different computer running the GUI-enabled Windows edition.

Configuring Shared Storage

21. Launch the **StarWind Management Console:** double-click the StarWind tray icon.

NOTE: StarWind Management Console cannot be installed on an operating system without a GUI. You can install it on any of the GUI-enabled Windows Editions including the desktop versions of Windows.

| 0 | | | StarWir | nd Manageme | ent Consol | e | | - 0 | × |
|----------------------------|----------------------------|---|-----------------|-------------|------------|-------------------|----------------------|-----|---|
| FILE HOST TARGET TOO | LS OPTIONS HELP | | | | | | | | |
| Refresh Connect Disconnect | Add Server Remove Server A | dd Device Add Device (a | dvanced) Remove | | | | | | |
| Servers | General Configuration | CHAP Permissions | Access Rights | Server Log | Events | Performance | | | |
| SW-SUP-NODE1 | | 1 (127.0.0.1) : 3 K <u>Remove Server</u> & Manager ORefresh | Add Target | Add Device | Add [| Device (advanced) | 러 Add Control Device | | |
| | Address | 127.0.0.1 | | | | | | | |
| | Server Name | SW-SUP-NO | DDE1 | | | | | | |
| | Port | 3261 | | | | | | | |
| | Authentication | Basic | | | | | | | |
| | Status | Logged-in | | | | | | | |

If **StarWind Service** and **Management Console** are installed on the same server, the **Management Console** will automatically add the local StarWind instance to the Console tree after the first launch. Then, the **Management Console** automatically connects to it using the default credentials. To add remote StarWind servers to the console, use the **Add Server** button on the control panel.

22. StarWind Management console will ask you to specify the default storage pool on the server you're connecting to for the first time. Please configure the default storage pool to use one of the volumes you have prepared earlier. All the devices created through the Add Device wizard will be stored on it. Should you decide to use an alternative storage path for your StarWind virtual disks, please use the **Add Device (advanced)** menu item.

| D car i i i i i i i i i | Management Cor | |
|--|------------------------|-------------------|
| Storage pool is no Would you like to pool to My Comp | set the default locati | on of the storage |
| | | |

Press **Yes** button to configure the storage pool. Should you require to change the storage pool destination, press **Choose path...** and point the browser to the necessary disk.

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

- initialized as GPT
- Have a single NTFS-formatted partition
- Have a drive letter assigned
- 23. Select the StarWind server where you wish to create the device.
- 24. Press the **Add Device (advanced)** button on the toolbar.
- 25. Add Device Wizard will appear. Select Hard Disk Device and click Next.
- 26. Select Virtual disk and click Next.
- 27. Specify the virtual disk location, name and size.

| Create a New Virtual Disk Name: Witness Location: My Computer\E\ Size: 1 GB O Use an Existing Virtual Disk Location: V Read-Only Mode | irtual Disk Loc | ation | |
|--|-------------------|----------------|---|
| Location: My Computer \E\ Size: 1 GB V O Use an Existing Virtual Disk Location: V | Create a New | Virtual Disk | |
| Size: 1 GB V O Use an Existing Virtual Disk Location: V | Name: | Witness | |
| O Use an Existing Virtual Disk | Location: | My Computer \E | |
| Location: | Size: | 1 GB ¥ | |
| | O Use an Existing | i Virtual Disk | |
| Read-Only Mode | Location: | | × |
| | Read-Or | ly Mode | |
| | | | |
| | | | |

Click **Next**.

28. Specify virtual disk options.

| | ? | x |
|---|-----|------|
| Add Device Wizard | | |
| Virtual Disk Options | | |
| Thick-provisioned | | |
| | | |
| Block Size | | _ |
| ○ Use 512 bytes sector size | | |
| • Use 4096 bytes sector size. May be incompatible with some clients | | |
| | | |
| | | |
| | | |
| | | |
| Next | Car | ncel |

Click **Next**.

29. Define the caching policy and specify the cache size (in MB).

| | Device Wiz Device RAI | | Parameters | | |
|-------|--------------------------|---------------|------------------|---------------------|---------------------|
| Mode | Write-Bac | | vnchronously, ad | tual Writes to Disk | care delayed, Reads |
| 0 | are cached Write-Thr | ough | nchronously, Rei | | ,.,., |
| 0 | N/A Reads and \ | Writes are no | ot cached | | |
| | Maximum availa | | ٦ | | |
| Size: | 128 | MB ♥ | | | |
| | | | | | Next Can |

Click Next.

30. Define the **Flash Cache Parameters** and size if necessary. Choose SSD location in the wizard.

| e Ade | d Device V | Wizard | ? X |
|--------|----------------------------------|-------------------|--------|
| Specif | y Flash Ca | ache Parameters | |
| | Io Flash Cache Jse Flash Cach | - | |
| Ĩ | Name: | Flash-Witness | |
| | Location: | My Computer \E\ . | |
| | Size: | 1 GB ~ | |
| | | | |
| | | | |
| | | Next | Cancel |

Click **Next** to continue.

NOTE: It is recommended to put 1 GB of L1 cache in write-back mode per 1 TB storage capacity. The recommended size of L2 cache is 10% of initial StarWind device size.

31. Specify target parameters.

Select the **Target Name** checkbox to customize the target name. Otherwise, the name will be generated automatically basing on the target alias.

| | | | ? |
|------------------------------|------------------------|---------------------|---------|
| Add Device Wizard | | | |
| arget Parameters | | | |
| riger i arameters | | | |
| Choose a Target Attachment M | Method | | |
| Create new Target | | | v |
| Target Alias | | | |
| Witness | | | |
| Target Name | | | |
| iqn.2008-08.com.starwindsof | tware:sw-sup-node1.sta | rwind.local-witness | |
| Allow multiple concurrent iS | CSI Connections | | |
| | | | Next Ca |

Click **Next** to continue.

- 32. Click **Create** to add a new device and attach it to the target. Then click **Close** to close the wizard.
- 33. Right-click on the servers field and click **Add Server** button. Add new StarWind Server, which will be used as the second HA node.

| đ | Add new Star | Wind Server | ? X |
|-------|--------------|-------------|--------|
| Host: | SW-SUP-NODE2 | | : 3261 |
| Adva | anced >> | OK | Cancel |

Click **OK** and **Connect** button to continue.

34. Right-click on the device you have just created and select **Replication Manager.**

| 8 | | StarWind Management Console |
|--------------------------------|---|---|
| FILE HOST TARGET TOOLS | CT CTt | ice Add Device (advanced) Remove Device Help |
| | | Serce remove Device St Attach to Target 8-08.com.starwindsoftware:sw-sup-node1.starwind.local-witness St Extend Image Size |
| 양+ Attao 양* Deta 츛 Exter | ch to Target ch from iqn.2008-08.com.starwindsof nd Image Size ication Manager | iter\E\Witness\Witness.img ftware:sw-sup-n |
| | Serial Id Asynchronous Mode CACHE Mode Size | 99D72694119D06DA Yes Write-Back 128 MB |

Replication Manager Window will appear. Press the **Add Replica** button.

35. Select Synchronous two-way replication.

| e | Replication Manager for imagefile1 | ? X |
|---|--|-------|
| Refresh Add Replica | Remove Replica | |
| Replication Partner | Replication 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 Asynchronous "One-Way" Replication | |
| PROPERTIES | 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 | |
| Host Name Target Name Mode Priority Synchronization Statu | | |
| Synchronization Chan | Next Cancel |] |
| | | Close |

Click **Next** to proceed.

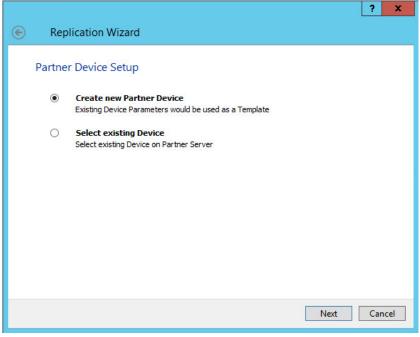
36. Specify the partner server IP address.

Default StarWind management port is 3261. If you have configured a different port, please type it in the **Port number** field.

| Replication Wizard | | ? X |
|--|---|--------|
| Add Partner Node | | |
| Specify Partner Host Nam | e or IP Address where Replication Node would be created | |
| Host Name or IP Address | SW-SUP-NODE2 | |
| Port Number | 3261 | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | Next | Cancel |

Click **Next**.

37. Choose Create new Partner Device



Click Next.

38. Specify partner device location if necessary. You can also modify the target name of the device.

| | ? X |
|---|--------|
| Replication Wizard | |
| Partner Device Setup | |
| Location: My Computer\E\ | |
| iqn.2008-08.com.starwindsoftware:sw-sup-node2-witness | |
| Modify Target Name | |
| | |
| | |
| | |
| | |
| | |
| Next | Cancel |

Click **Next**.

39. On this screen you can select the synchronization and heartbeat channels for the HA device. You can also modify the ALUA settings.

| | ? | x |
|--|----|------|
| Example 2 Replication Wizard | | |
| Network Options for Replication | | |
| Networks for Synchronization and Heartbeat | | |
| Networks for Heartbeat | | |
| Change Network Settings ALUA preferred SW-SUP-NODE1.STARWIND.LOCAL, SW-SUP-NODE2 | | |
| Change ALUA Settings | | |
| | | |
| | | |
| Next | Ca | ncel |

Click Change network settings.

40. Specify the interfaces for synchronization and Heartbeat.

| Interfaces | Networks | Synchronization and H | Heartbeat |
|-----------------|---------------------|-----------------------|-----------|
| 🖃 Host Name: SW | -SUP-NODE1.STARWIND | LOCAL | |
| 172.16.10.10 | 172.16.10.0 | | V |
| 172.16.20.10 | 172.16.20.0 | v | |
| 192.168.0.213 | 192.168.0.0 | | |
| 🖃 Host Name: SW | | | |
| 172.16.10.20 | 172.16.10.0 | | V |
| 172.16.20.20 | 172.16.20.0 | | |
| 192.168.0.69 | 192.168.0.0 | | |
| | | | |
| | | | |

Click **OK**. Then click **Next.**

41. Select partner device initialization mode **Synchronize from existing Device**.

| | ? X |
|--|--------|
| E 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. | |
| Next | Cancel |

Click **Next**.

- 42. Press the **Create Replica** button. Then click **Close** to close the wizard.
- 43. The added devices will appear in the **StarWind Management Console**.

| HAImage1 Keplication Manager Extend Size of HA (High Availability) Device SW-SUP-NODE2 SW-SUP-NODE2 Size HAImage1 Size GB Target Name iqn.2008-08.com.starwindsoftware:sw-sup-node2-witness Virtual Disk imagefile1 Serial Id Start Bard Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Failure | 0 | | StarWind Management Console |
|--|----------------------------|-------------------------------------|---|
| Servers Sw-SUP-NODE1 Witness HAIMAGE1 Sw-SUP-NODE2 Sw-SUP-NODE2 Sw-SUP-NODE2 Sw-SUP-NODE2 Maimage1 Size I GB Target Name Iqn.2008-08.com.starwindsoftwaresw-sup-node2-witness Virtual Disk Imagefile1 Serial Id Srite I d Srite I d Size Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Failove | FILE HOST TARGET TOOL | S OPTIONS HELP | |
| Sw-SUP-NODE1 Witness HAIMage1 Sw-SUP-NODE2 Sw-SUP-NODE2 Sw-SUP-NODE2 HAImage1 Size HAImage1 Size GB Target Name iqn.2008-08.com.starwindsoftware:sw-sup-node2-witness Virtual Disk imagefile1 Serial Id SizeId Size Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Failure | Refresh Connect Disconnect | Add Server Remove Server Add Device | Add Device (advanced) Remove Device Help |
| SW-SUP-NODE1 Witness HAIMAGE1 Kemove Device Sorce remove Device II Change Partner Authentication Setting Replication Manager Settend Size of HA (High Availability) Device SW-SUP-NODE2 SW-SUP-NODE2 Sw-SUP-NODE2 Witness HAImage1 Size 1 G8 Target Name ign.2008-08.com.starwindsoftware/sw-sup-node2-witness Virtual Disk imagefile1 Serial Id SizeI Id Synchronous Failover Strategy Heartbeat Auto Synchronization after Failore | Servers | | |
| ► HAImage1 ► Replication Manager ► Extend Size of HA (High Availability) Device ► SW-SUP-NODE2 ► Witness ► HAImage1 Size ► Target Name Light of the second second | SW-SUP-NODE1 | HAIMAGE1 | |
| ▲ ● Device HAImage1 Size 1 GB Target Name iqn.2008-08.com.starwindsoftware:sw-sup-node2-witness ▶ HAImage1 Size ▶ HAImage1 imagefile1 Serial Id 37417B875484ECFE ▶ Priority Second Mode Synchronous ▶ Failover Strategy Heartbeat Auto Synchronization after Yes | ▲ | Remove Device | orce remove Device III Change Partner Authentication Settings |
| ▲ SW-SUP-NODE2 ▲ Witness ▲ Witness ▲ HAImage1 Size 1 GB Target Name iqn.2008-08.com.starwindsoftware:sw-sup-node2-witness Virtual Disk imagefile1 Serial Id Serial Id Serial Id Size Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Failure | HAImage1 | | 🛱 Extend Size of HA (High Availability) Device |
| Size 1 GB Target Name ign.2008-08.com.starwindsoftware:sw-sup-node2-witness Virtual Disk imagefile1 Serial Id 37417B875484ECFE Priority Second Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Failure Yes | | Device | HAImage1 |
| Virtual Disk imagefile1 Serial Id 37417B875484ECFE Priority Second Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Failure Yes | | Size | 1 GB |
| Serial Id 37417B875484ECFE Priority Second Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Yes Failure | Witness | Target Name | iqn.2008-08.com.starwindsoftware:sw-sup-node2-witness |
| Serial Id 37417B875484ECFE Priority Second Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Yes Failure | HAlmage1 | Virtual Disk | imagefile1 |
| Mode Synchronous Failover Strategy Heartbeat Auto Synchronization after Yes Failure Failure | | Serial Id | 37417BB75484ECFE |
| Failover Strategy Heartbeat Auto Synchronization after Ves Failure | | Priority | Second |
| Auto Synchronization after Yes Failure | | Mode | Synchronous |
| Failure | | Failover Strategy | Heartbeat |
| | | | Yes |
| Synchronization Status Synchronized | | Synchronization Status | Synchronized |
| HEALTH STATUS | | HEALTH STATUS | |

Repeat steps 3 – 23 for the remaining virtual disks that will be used as Cluster Shared Volumes.

Once all devices are created, the Management console should look as follows:

| 0 | StarWind Management Console | _ 🗇 🗙 |
|-----------------------------|--|-------|
| FILE HOST TARGET TOO | LS OPTIONS HELP | |
| Refresh Connect Disconnect | Add Server Remove Server Add Device (advanced) Remove Target | |
| Servers | | |
| SW-SUP-NODE1 | Add Server | |
| ▲ ↓ Witness | This Option allows you to add local or remote | |
| HAlmage1 | StarWind Server Hosts to StarWind Management Console | |
| ▲ 🔶 CSV1 | | |
| HAImage2 | | |
| ▲ 🔶 csv2 | | |
| HAImage3 | | |
| SW-SUP-NODE2 | | |
| ▲ 🔶 Witness | | |
| HAlmage1 | | |
| ▲ 🔶 CSV1 | | |
| HAImage2 | | |
| ▲ 🔶 csv2 | | |
| HAImage3 | | |
| | | |

Discovering Target Portals

In this chapter, we will connect the previously created disks to the servers which will be added to the cluster:

- 44. Launch Microsoft iSCSI Initiator: Start > Administrative Tools > iSCSI Initiator or iscsicpl from the command line interface. The iSCSI Initiator Properties window appears.
- 45. Navigate to the **Discovery** tab.
- 46. Click the **Discover Portal** button. Discover Target Portal dialog appears. Type in 127.0.0.1.

| Discover | Target Portal |
|---|--|
| Enter the IP address or DNS name want to add. | and port number of the portal you |
| To change the default settings of t the Advanced button. | the discovery of the target portal, dick |
| IP address or DNS name: | Port: (Default is 3260.) |
| 127.0.0.1 | 3260 |
| | |

Click the **Advanced** button. Select **Microsoft ISCSI Initiator** as your **Local adapter** and select your **Initiator IP** (leave default for 127.0.0.1).

| eral IPsec | | |
|-------------------|---------------------------|---|
| Connect using | | |
| ocal adapter: | Microsoft iSCSI Initiator | ~ |
| Initiator IP: | Default | ~ |
| Target portal IP: | | ~ |
| CRC / Checksum | | |
| Data digest | Header digest | |

Click **OK.** Then click **OK** again to complete the Target Portal discovery.

- 47. Click the **Discover Portal**... button again.
- 48. Discover Target Portal dialog appears. Type in the first IP address of the partner node you will use to connect the secondary mirrors of the HA devices.

| Discover | Target Portal |
|--|---|
| Enter the IP address or DNS name want to add. | and port number of the portal you |
| To change the default settings of t the Advanced button. | he <mark>discovery of the target portal, d</mark> ick |
| IP address or DNS name: | Port: (Default is 3260.) |
| | FOIL, (DEIduit is J200,) |
| 172.16.10.20 | 3260 |

Click Advanced.

49. Select **Microsoft ISCSI Initiator** as your **Local adapter**, select the **Initiator IP** in the same subnet as the IP address of the partner server from the previous step.

| eneral IPsec | | |
|-------------------|---------------------------|---|
| Connect using | | |
| Local adapter: | Microsoft iSCSI Initiator | ~ |
| Initiator IP: | 172.16.10.10 | ~ |
| Target portal IP: | | ~ |
| CRC / Checksum | | |
| Data digest | Header digest | |

Click **OK.** Then click **OK** again to complete the Target Portal discovery.

Now all target portals are added on the first node.

| The s Addre 127.0 172. To ad | ess).0.1 16.10.20 | ok for Targets on fo Port 3260 3260 | ollowing portals: Adapter Microsoft iSCSI Initiator Microsoft iSCSI Initiator | |
|--|-----------------------------|--|--|-----------------|
| 127.0 172. To ad |).0.1 16.10.20 | 3260 3260 | Microsoft iSCSI Initiator | Default |
| 172. To ad | 16.10.20 | 3260 | | |
| To rea | d a target p | the second second | | |
| | | ortal, click Discover | Portal. | Discover Portal |
| | nove a targe dick Remove | | address above and | Remove |
| 4 | | | | |
| To ad | d an iSNS se | erver, dick Add Serv | /er. [| Add Server |
| | nove an iSN dick Remove | S server <mark>, se</mark> lect the | e server above and | Remove |
| | | | | |

50. Go through the same steps for the second node.

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

| Targe | t portals | Favorite Targets | Volumes and Devices | | Configuration |
|-----------|-----------------------------|-------------------------------------|------------------------|--------|---------------|
| 52 | 6.2 | ok for Targets on fo | bllowing portals: | | Refresh |
| Addr | | Port | Adapter | 1 | P address |
| 127.0.0.1 | | 3260 | Microsoft iSCSI Initia | tor [| Default |
| 172. | 16.10.10 | 3260 | Microsoft iSCSI Initia | itor : | 172.16.10.20 |
| To ac | ld a target p | ortal, <mark>c</mark> lick Discover | Portal. | Disco | over Portal |
| | move a targ click Remove | | address above and | | Remove |
| | | | | | |
| To ac | dd an iSNS se | rver, <mark>click Add Ser</mark> v | /er. | Ad | d Server |
| | move an iSN dick Remove | | e server above and | | Remove |
| | | | | | |

Connecting Targets

52. 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)**.

| argets | Discovery | Favorite Targets | Volumes and Devices | RADIUS | Configuration |
|---|---------------|-----------------------|--------------------------|------------|---------------|
| Quick (| Connect | | 8 | | |
| To disc | over and log | g on to a target usin | g a basic connection, ty | ype the IP | address or |
| DNS na | ame of the ta | arget and then dick | Quick Connect. | | |
| | 2 | | | | |
| Target | : | | | Qu | iick Connect |
| Discourse | | | | | |
| DISCOV | ered targets | | | _ | |
| - | | | | | Refresh |
| Name | | | | Status | |
| ign.2 | 008-08.com. | starwindsoftware:s | w-sup-node1-csv1 | Inactive | |
| iqn.2 | 008-08.com. | starwindsoftware:s | w-sup-node1-csv2 | Inactive | |
| iqn.2 | 008-08.com. | starwindsoftware:s | w-sup-node1-witness | Inactive | |
| iqn.2 | 008-08.com. | starwindsoftware:s | w-sup-node2-csv1 | Inactive | |
| iqn.2 | 008-08.com. | starwindsoftware:s | w-sup-node2-csv2 | Inactive | |
| 100000000000000000000000000000000000000 | 008-08.com. | starwindsoftware:s | w-sup-node2-witness | Inactive | |
| ign.2 | | | | | |

53. Select a target of witness located on the local server and click **Connect**.

54. Enable checkboxes as on the image below.

| Connect T | o Target | x |
|---|----------------------|--------|
| Target name: | | |
| ign.2008-08.com.starwindsoftware:sw-su | up-node1-witness | |
| Add this connection to the list of Favori This will make the system automatically connection every time this computer res | attempt to restore t | the |
| ✓ Enable multi-path | | |
| Advanced | ОК | Cancel |

Click Advanced.

55. Select Microsoft iSCSI Initiator in the Local adapter text field.

Select 127.0.0.1 in the **Target portal IP**.

| eneral TPsec | | | | |
|---------------------------------------|---|---------|--|--|
| IPsec | | | | |
| Connect using | | | | |
| Local adapter: | Microsoft iSCSI Initiator | ~ | | |
| Initiator IP: | Default | ~ | | |
| Target portal IP: | 127.0.0.1 / 3260 | | | |
| CRC / Checksum | Header digest | | | |
| Enable CHAP log o | n | | | |
| CHAP Log on inform | | | | |
| CHAP helps ensure co an initiator. | nnection security by providing authentication between a tar | get and | | |
| | ame name and CHAP secret that was configured on the targo ill default to the Initiator Name of the system unless another | | | |

Click **OK.** Then click **OK** again.

Do not connect the partner-target for **Witness** device from the other StarWind node.

- 56. Select another target located on the local server and click **Connect**.
- 57. Enable checkboxes as on the image below.

| Cor | nect To Target | | × |
|---|----------------------|-----------|---|
| Target name: | | | |
| iqn.2008-08.com.starwindsoftwa | re:sw-sup-node1-csv1 | | |
| Add this connection to the list This will make the system auto | | store the | |
| connection every time this con | puter restarts. | | |

Click **Advanced**.

58. Select Microsoft iSCSI Initiator in the Local adapter text field.

Select 127.0.0.1 in the **Target portal IP**.

| | | Advanced Settings | |
|-----------------|-------------------------|--|-----------|
| General | IPsec | | |
| Conne | ect using | | |
| Local a | adapter: | Microsoft iSCSI Initiator | ~ |
| Initiat | or IP: | Default | ~ |
| Targe | t portal IP: | 127.0.0.1 / 3260 | ~ |
| | / Checksum ta digest | Header digest | |
| En | able CHAP log o | n | |
| CHA | P Log on inform | ation | |
| CHAP an init | | nnection security by providing authentication between a ta | arget and |
| | or. The name w | me name and CHAP secret that was configured on the tar ill default to the Initiator Name of the system unless anoth | |

Click **OK**. Then click **OK** again.

59. Select the partner-target from the other StarWind node and click **Connect**.

60. Enable checkboxes as on the image below.

| Conne | ect To Target | × |
|--|--------------------------|--------|
| Target name: | | |
| ign.2008-08.com.starwindsoftware: | sw-sup-node2-csv1 | |
| Add this connection to the list of F This will make the system automa connection every time this compu | tically attempt to resto | re the |
| Enable multi-path | | |
| Advanced | ОК | Cancel |

Click **Advanced.**

61. Select Microsoft iSCSI Initiator in the Local adapter text field. In the **Initiator IP** field select the IP address for ISCSI channel. In the **Target portal IP** select the corresponding portal IP from the same subnet.

| Connect using | | |
|-------------------|---------------------------|---|
| Local adapter: | Microsoft iSCSI Initiator | ~ |
| Initiator IP: | 172.16.10.10 | ~ |
| Target portal IP: | 172.16.10.20 / 3260 | * |
| CRC / Checksum | | |
| Data digest | Header digest | |

62. Repeat actions described in the steps above for all HA devices. The result should look like the screenshot below.

| rgets Discovery | Favorite Targets | Volumes and Devices | RADIUS | Configuration |
|--------------------|--|---|---------------------------|---------------|
| Duick Connect | | | | |
| | g on to a target usir arget and then dick | ng a basic connection, ty Quick Connect. | y <mark>pe th</mark> e IP | address or |
| Target: | | | Qu | uick Connect |
| Discovered targets | | | | |
| | | | | Refresh |
| Name | | | Status | |
| iqn.2008-08.com. | starwindsoftware:s | w-sup-node1-csv1 | Connecte | d |
| iqn.2008-08.com. | starwindsoftware:s | w-sup-node1-csv2 | Connected | d |
| iqn.2008-08.com. | starwindsoftware:s | w-sup-node 1-witness | Connecte | d |
| iqn.2008-08.com. | starwindsoftware:s | w-sup-node2-csv1 | Connecte | d |
| iqn.2008-08.com. | starwindsoftware:s | w-sup-node2-csv2 | Connecte | d |
| ign.2008-08.com. | starwindsoftware:s | w-sup-node2-witness | Inactive | |
| | | elect a target and then | - | Connect |

63. Repeat all the steps of this section on the second StarWind node, specifying corresponding local and data channel IP addresses. The result should look like the screenshot below.

| argets | Discovery | Favorite Targets | Volumes and Devices | RADIUS | Configuration |
|--------------------------------------|--|--|---|---|---------------|
| To disc | Connect | | g a basic connection, t Quick Connect. | ype the IP | |
| Target | | | | Qu | uick Connect |
| Discove | ered targets | | | | Refresh |
| Name | 0 | | | Status | |
| iqn.20 iqn.20 iqn.20 iqn.20 | 008-08.com.: 008-08.com.: 008-08.com.: 008-08.com.: | starwindsoftware:s starwindsoftware:s | w-sup-node1-csv2 w-sup-node1-witness w-sup-node2-csv1 | Connecter Connecter Inactive Connecter Connecter Connecter | d d |
| | nect using a | dvanced options, se | elect a target and then | | Connect |
| To com | nletely disco | nnect a target, sel | ect the target and | | Disconnect |

Multipath Configuration

64. Configure the MPIO policy for each device, specifying localhost (127.0.0.1) as the active path. Select a target located on the local server and click **Devices**.

| argets Quick C | Discover Connect | y Favor | te Targets | Volume | s and D | evices | RAD | IUS | Config | uration | |
|---|--|---|--|--|---|----------------------------------|---------------------------------------|--------|---------|---------|---|
| | | | a target usi d then click | | | | type th | e IP a | ddress | or | |
| Target | : [| | | | | | 1 | Qui | ck Con | nect | |
| Discove | ered targe | ts | | | | | | | | | |
| | | | | | | | 1 | | Refre | sh | |
| Name | 9 | | | | | | Statu | IS | | | 1 |
| iqn.20 iqn.20 iqn.20 iqn.20 iqn.20 To con dick Co To com | 008-08.cor 008-08.cor 008-08.cor 008-08.cor 008-08.cor | n.starwin n.starwin n.starwin n.starwin advance | dsoftware: | sw-sup-n sw-sup-n sw-sup-n sw-sup-n | ode1-cs ode1-wi ode2-cs ode2-cs ode2-wi | v2 thess v1 v2 thess | Conn Conn Conn Conn Inact | | | | |
| | | | ding config Properties. | uration o | f sessio | ns, | 1 | Pr | roperti | es |] |
| | nfiguration get and th | | s associate evices. | d with a | target, | select | l | [| Device | s |] |
| | | | | | | | | ancel | | | 1 |

65. Devices dialog appears. Click **MPIO**.

| | | | Device | S | | x |
|----------------|---------------|-------------|-----------------|-------------|------------------|--------|
| | | | | | | |
| Name | Address | | | | | |
| Disk 3 | Port 3: Bus | : 0: Targe | et 0: LUN 0 | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Volume path r | names: | | | | | |
| Legacy device | a namer | 11.106- | unional Deixona | | | |
| Legacy device | e name. | W. Pri | ysicalDrive3 | | | |
| | | \\?\mp | io#disk&ve | n_starwind& | prod_starwind&re | ev_000 |
| Device interfa | ace name: | | | | | |
| | | < | III | | | > |
| Configure Mu | ltipath IO (N | MPIO) | | | | |
| To configure | the MPIO p | olicy for a | а | | MDTO | |
| selected dev | ice, click MP | IO. | | | MPIO. | •• |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | OK | |
| | | | | | OK | |

66. Select **Fail Over Only** load balance policy, and then designate the local path as active.

| oad balance | e policy: | | | |
|-------------------------|---------------|----------------------------|------------|---|
| Fail Over Or | nly | | | ~ |
| other path round-rob | ver policy en | oy. The sta upon failur | ndby paths | and designates all will be tried on a ive path until an |
| 'his device h | nas the follo | | Weight | Session ID |
| Path Id | Status | Type | | |
| 0x7703 | | Active | n/a n/a | ffffe000015b5020-4000 ffffe000015b5020-4000 |
| 0x7703 | Conne | Active | n/a | |

67. You can check that 127.0.0.1 is the active path by selecting it from the list and clicking **Details**.

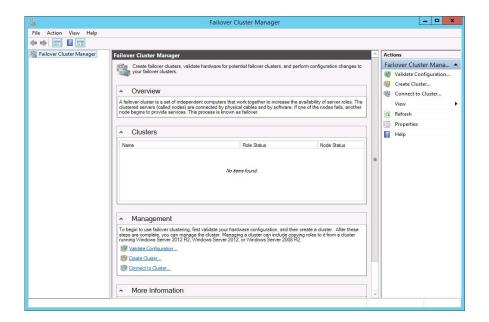
| ath identifier: | 0x77030000 | | | |
|--|-------------------------------------|---------------|--|--|
| ession identifier: ffffe000015b5020-4000013700000014 | | | | |
| nitiator: | nitiator: Microsoft iSCSI Initiator | | | |
| The identified path h | las une rollowing conner | country | | |
| The identified path h Source Portal | Target Portal | Connection ID | | |
| | - | | | |

- 68. Repeat the same steps for each device on the current and the second node.
- 69. Initialize the disks and create partitions on them using the **Disk Management** snap-in. The disk devices are required to be visible on both nodes in order to create the cluster.

NOTE: it is recommended to initialize the disks as GPT.

Creating a Cluster

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



- 71. Click the **Create Cluster** link in the Actions section of the Failover Cluster Manger.
- 72. Specify the servers to be added to the cluster.

| ii | | Create Cluster Wizard | |
|---------------------------------------|-------------------------|---|----------------------------|
| Select S | ervers | | |
| Before You Begin | Add the names of all th | e servers that you want to have in the cluster. You mus | t add at least one server. |
| Select Servers | | | |
| Validation Warning | | | |
| Access Point for Administering the | Enter server name: | | Browse |
| Cluster | Selected servers: | sw-sup-Node 1.starwind.local sw-sup-node2.starwind.local | Add |
| Confirmation | | | Remove |
| Creating New Cluster | | | |
| Summary | | | |
| | | | |
| | | - | 1 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | < Previous | Next > Cancel |
| | | Crievious | Calicei |

Click **Next** to continue.

73. Validate the configuration by passing the cluster validation tests: select "Yes..."

| 49 1 | 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 | View Report 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 | | | | |

Click **Next** to continue.

74. Specify a 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, you need to set a cluster IP address manually.

| 4 9 | Create Cluster Wizard | | | | x |
|--|---|---------------------------|----------------|--------------------------------|---|
| Access I | Point for Admin | isterin <mark>g</mark> th | e Cluster | | |
| Before You Begin Select Servers | Type the name you want to use when administering the cluster. | | | | |
| Access Point for Administering the Cluster | | 1 | | were configured automatically. | 1 |
| Confirmation Creating New Cluster | | Net | vorks | Address | 1 |
| Summary | | | 192.168.0.0/24 | 192 . 168 . 0 . 100 | 1 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | < Pre | vious Next > Cancel | |

Click **Next** to continue.

75. Make sure that all of the settings are correct. Click **Previous** to make any changes.

| 4 9 | Create Cluster Wizard | | | |
|--|---|---|----------|--|
| Confirma | tion | | | |
| Before You Begin Select Servers Access Point for | You are ready to create The wizard will create y | e a cluster. Your cluster with the following settings: | | |
| Access Point for Administering the Cluster | Cluster: Node: | StarWindCluster sw-sup-node2.starwind.local | ~ | |
| Confirmation | Node: | sw-sup-Node1.starwind.local | | |
| Creating New Cluster | IP Address: | 192.168.0.100 | | |
| Summary | | | | |
| | | | Ŷ | |
| | Add all eligible stora | ge to the cluster. | | |
| | To continue, click Next | | | |
| | | < Previous Next | > Cancel | |

NOTE: If checkbox "**Add all eligible storage to the cluster**" is selected, the wizard will try to add all disks to the cluster automatically. The smallest device will be assigned as Witness. It is recommended to uncheck it before you click **Next** and add **Witness** manually

76. The process of cluster creation starts. Upon completion, the system displays a report with detailed information.

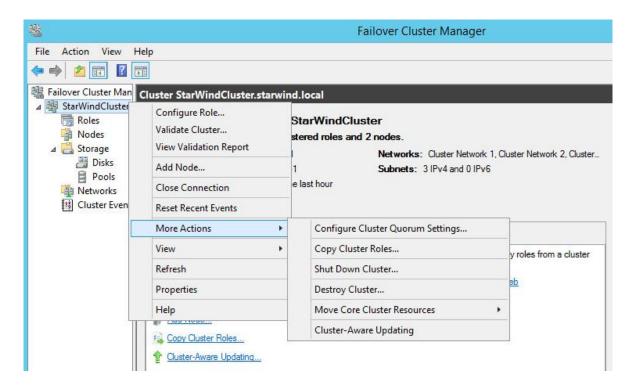


Click **Finish** to close the wizard.

Adding Witness and Cluster Shared Volumes

To add Cluster Shared Volumes (CSV) that is necessary to work with Hyper-V virtual machines:

- 77. Open Failover Cluster Manager.
- 78. Go to Cluster->Storage -> Disks.
- 79. Click **Add Disk** in the Actions panel, choose StarWind disks from the list, and click OK.
- 80. To configure Witness drive, right click the Cluster->More Actions->Configure Cluster Quorum Settings, follow the wizard, and use default quorum configuration



81. Right-click the required disk and select **Add to Cluster Shared Volumes**.

| 墨 | Failover Cluster Manager | | | | |
|---|--------------------------|---|------------------------|---------------|---------------|
| 🗢 🄿 🖄 📰 🛛 | Help | | | | |
| Hailover Cluster Man ▲ Hailover Cluster Man ▲ StarWindCluster. ■ Roles | Disks (3) Search | | | P Querie | s 🕶 🖶 👻 👻 |
| Nodes | Name | Status | Assigned To | Owner Node | Disk Number C |
| ⊿ 📇 Storage | 📇 Cluster Disk 1 | () Online | Disk Witness in Quorum | sw-sup-Node1 | 5 |
| 🔠 Disks | 📇 Cluster Disk 2 | | Available Storage | sw-sup-Node1 | 3 |
| Pools Networks | Cluster Disk 3 | Bring Online Take Offline Add to Cluster SH Information Deta Show Critical Eve More Actions Remove Properties | ils | sw-sup-Node 1 | 4 |
| | < | ш | | | > |
| | v 🦉 Cluster [|)isk 2 | | | |

Once the disks are added to the cluster shared volumes list, you can start creating highly available virtual machines on them.

NOTE: to avoid unnecessary CSV overhead configure, each CSV to be owned by one cluster node. This node should also be the preferred owner of the VMs running on that node.

Conclusion

This Cluster will increase the availability of the services or applications on it, as well as exclude the downtime during the maintenance.

In case you need help or have any additional questions, visit our Support Forum, and our technical support department will gladly provide answers to Your questions.

Contacts

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