StarWind Virtual SAN®

Hyper-Converged 2 Nodes Scenario with Hyper-V Cluster

APRIL 2015
TECHNICAL PAPER
Hyper-Converged 2 Nodes Scenario
2 Nodes with Hyper-V Cluster

Trademarks
“StarWind”, “StarWind Software” and the StarWind and the StarWind Software logos are registered trademarks of StarWind Software. “StarWind LSFS” is a trademark of StarWind Software which may be registered in some jurisdictions. All other trademarks are owned by their respective owners.

Changes
The material in this document is for information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, StarWind Software assumes no liability resulting from errors or omissions in this document, or from the use of the information contained herein. StarWind Software reserves the right to make changes in the product design without reservation and without notification to its users.

Technical Support and Services
If you have questions about installing or using this software, check this and other documents first - you will find answers to most of your questions on the Technical Papers webpage or in StarWind Forum. If you need further assistance, please contact us.

Copyright ©2009-2016 StarWind Software Inc.
No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written consent of StarWind Software.

In 2016, Gartner named StarWind “Cool Vendor for Compute Platforms”.
Gartner does not endorse any vendor, product or service depicted in its research publications, and does not advise technology users to select only those vendors with the highest ratings or other designation. Gartner research publications consist of the opinions of Gartner's research organization and should not be construed as statements of fact. Gartner disclaims all warranties, expressed or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose.

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.
# Contents

Introduction .................................................................................................................................................. 4  
Pre-Configuring the Servers........................................................................................................................ 5  
  - Enabling Multipath Support.................................................................................................................. 7  
  - Configuring Shared Storage ................................................................................................................ 8  
  - Discovering Target Portals ................................................................................................................ 18  
  - Connecting Targets ............................................................................................................................ 23  
  - Multipath Configuration ..................................................................................................................... 29  
Creating a Cluster ....................................................................................................................................... 31  
Adding Cluster Shared Volumes .................................................................................................................. 34  
Contacts ..................................................................................................................................................... 35
Introduction

Traditionally, minimal hardware requirement for a fault tolerant Hyper-V failover cluster setup is 2 Hyper-V hosts and at least 2 servers or SANs which will provide shared storage to the cluster and also replicate it in real time for data access redundancy. 3 JBOD Enclosures and proprietary SAS fabric interconnect is required if Clustered storage spaces are used as the storage layer. This often makes the setup complex and expensive to implement from both cost and management prospective.

StarWind Virtual SAN allows users to create a fully redundant, fault tolerant Hyper-V failover cluster and shared storage for it using just the 2 Hyper-V hosts and their local storage, without any dedicated storage hardware or proprietary equipment necessary. This introduces an added value compared to the native storage solutions available for Hyper-V.

This guide is intended for experienced StarWind users, Windows system administrators and IT professionals who would like to configure StarWind Virtual SAN solution. It provides a step-by-step guidance on configuring a hyper-converged 2-node Hyper-V cluster using StarWind Virtual SAN to convert local storage of the Hyper-V hosts into a fault tolerant shared storage resource for Hyper-V.

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

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

Additional network connections may be necessary depending on cluster setup and applications it's running.
1. This document assumes that you have a domain controller and you have added the servers to the domain. It also assumes that you have installed the **Failover Clustering** and **Multipath I/O** features, as well as the Hyper-V role on both servers. These actions can be performed using Server Manager (the Add Roles and Features menu item).

2. In order to allow **StarWind Virtual SAN** to use the Loopback accelerator driver and access the local copy of the data faster you have to add a minor modification to the StarWind configuration file.

   Locate the configuration and open it using Notepad. The default path is: `C:\Program Files\StarWind Software\StarWind\StarWind.cfg`

3. Find the string `<!-!<iScsiDiscoveryListInterfaces value="1"/> -->` and uncomment it (should look as follows: `<iScsiDiscoveryListInterfaces value="1"/>`). Save the changes and exit Notepad. Should there be any issues saving the document, launch Notepad with Administrator rights and then load the starwind.cfg file to do the modifications.

4. Restart the **StarWind Service** and repeat the same procedure on the second StarWind node.
Enabling Multipath Support

1. Open the MPIO manager: Start->Administrative Tools->MPIO.

2. Go to the Discover Multi-Paths tab.

3. Tick the Add support for iSCSI devices checkbox.

4. Click Add.

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

NOTE: Repeat procedures on the second server.
Configuring Shared Storage

1. 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.

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.
2. 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 storage pool to use the one of the volumes you’ve 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.

![StarWind Management Console](image)

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, has to meet the following requirements:

- Initialized as GPT
- Have a single NTFS-formatted partition
- Have a drive letter assigned

3. Select the StarWind server where you wish to create the device.

4. Press the Add Device (advanced) button on the toolbar.

5. **Add Device Wizard** will appear. Select Hard disk device and click Next.

6. Select Virtual disk and click Next.
7. Specify the virtual disk location and size.

Click Next.

8. Specify virtual disk options.

Click Next.
9. Define the caching policy and specify the cache size (in MB).

Click **Next**.

10. Define the **Flash Cache Parameters** policy and size if necessary.

Click **Next** to continue.
NOTE: It is strongly recommended to use SSD-based storage for “Flash Cache” caching.

11. Specify target parameters.

Select the Target Name checkbox to enter a custom name of a target. Otherwise, the name will be generated automatically based on the target alias.

Click Next to continue.

12. Click Create to add a new device and attach it to the target. Then click Close to close the wizard.

13. Right-click on the servers field and select Add Server. Add new StarWind Server, which will be used as second HA node.

Click OK to continue.
14. Right-click on the device you just created and select **Replication Manager**.

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

15. Select **Synchronous two-way replication**.

Click **Next** to proceed.
16. 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.

Click Next.

17. Choose Create new Partner Device

Click Next.
18. Specify partner device location if necessary. You can also modify the target name of the device.

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

Click Change network settings....
20. Specify the interfaces for synchronization and Heartbeat.

![Specify Interfaces for Synchronization and Heartbeat Channels](image)

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

21. Select partner device initialization mode **Do not Syncronize**.

   **NOTE**: Use this type of synchronization for adding partner to the device which doesn't contain any data only.

![Replication Wizard](image)

Click **Next**.
22. Press the Create Replica button. Then click Close to close the wizard.

23. The added device will appear in the StarWind Management Console.

Repeat the steps 3 – 23 for the remaining virtual disk that will be used for File Share.

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

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

1. **Launch** Microsoft iSCSI Initiator: Start > Administrative Tools > iSCSI Initiator or iscsicpl from the command line interface. The iSCSI Initiator Properties window appears.

2. **Navigate to the** Discovery tab.

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

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

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

5. 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](image1)

   Click Advanced.

6. Select Microsoft iSCSI Initiator as your Local adapter, select the Initiator IP in the same subnet as the IP address on the partner server from the previous step.

   ![Advanced Settings](image2)

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

7. Click the Discover Portal... button again.
8. 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 dialog](image)

Click Advanced.

9. Select **Microsoft iSCSI Initiator** as your **Local adapter**, select the **Initiator IP** in the same subnet as the IP address on the partner server from the previous step.

![Advanced Settings](image)

Click OK. Then click OK again to complete the Target Portal discovery.
10. All target portals added on the first node.
11. Complete the same steps for the second node.
12. All target portals added on the second node.
Connecting Targets

1. Click the **Targets** tab. The previously created targets are listed in the **Discovered Targets** section.

**NOTE:** If the created targets are not listed, check the firewall settings of the StarWind Server as well as the list of networks served by the StarWind Server (go to *StarWind Management Console* -> **Configuration** -> **Network**).

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

3. Enable checkbox as the image below.

   ![Connect To Target](image)

   Click **Advanced**.
4. Select Microsoft iSCSI Initiator in the Local adapter text field. Select 127.0.0.1 in the Target portal IP.

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

6. Enable checkbox as the image below.

Click Advanced.
7. Select Microsoft iSCSI Initiator in the Local adapter text field. In the Initiator IP field select the IP address. In the Target portal IP select the corresponding portal IP from the same subnet.

![Advanced Settings](image)

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

8. Select connected partner-target from other StarWind node and click **Connect** again.

![iSCSI Initiator Properties](image)
9. Enable checkbox as the image below.

![Connect To Target dialog box]

Click **Advanced**.

10. Select Microsoft iSCSI Initiator in the Local adapter text field. In the **Initiator IP** field select the IP address of the second iSCSI path. In the **Target portal IP** select the corresponding portal IP from the same subnet.

![Advanced Settings dialog box]

Click **OK**. Then click **OK** again.
11. Now Witness disk is connected to the first node by the three paths. Result should look like the image below. Repeat actions described in the steps above for all HA devices.

12. The result should look like the screenshot below.
13. Repeat steps 1-12 of this section on the second StarWind node, specifying corresponding local and data channel IP addresses. The result should look like the screenshot below.
Multipath Configuration

1. Configure the MPIO policy for each device specifying localhost (127.0.0.1) as the active path. Select a target of witness located on the local server and click Connect. ...

2. Devices dialog appears. Click MPIO.
3. Select **Fail Over Only** load balance policy and then designate the local path as active.

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

5. Repeat the same steps on the second node.

6. Initialize the disks and create partitions on them using the computer management snap-in. It is required that the disk devices are visible on both nodes to create the cluster.

**NOTE:** it is recommended to initialize the disks as GPT.
Creating a Cluster

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

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

3. Specify the servers to be added to the cluster.

   Click Next to continue.
4. Validate the configuration by passing the cluster validation tests: select “Yes...”

Click Next to continue.

5. 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 as well.

Click Next to continue.
6. Make sure that all of the settings are correct. Click Previous to make any changes.

NOTE: If checkbox “Add all eligible storage to the cluster” is selected, the wizard will try to add all StarWind devices to the cluster automatically. Smallest device will be assigned as Witness.

7. The process of cluster creation starts. After it is completed, the system displays a report with detailed information.

Click Finish to close the wizard.
Adding Cluster Shared Volumes

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

1. Open Failover Cluster Manager.
2. Go to Cluster->Storage -> Disks.
3. Right-click the required disk and select Add to Cluster Shared Volumes.

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

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.
# Contacts

<table>
<thead>
<tr>
<th>US Headquarters</th>
<th>EMEA and APAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-617-449-7717</td>
<td>+44 20 3769 1857 (UK)</td>
</tr>
<tr>
<td>1-617-507-5845</td>
<td>+49 302 1788 849 (Germany)</td>
</tr>
<tr>
<td></td>
<td>+33 097 7197 857 (France)</td>
</tr>
<tr>
<td></td>
<td>+7 495 975 94 39 (Russian Federation and CIS)</td>
</tr>
<tr>
<td></td>
<td>1-866-790-2646</td>
</tr>
</tbody>
</table>

Customer Support Portal: [https://www.starwind.com/support](https://www.starwind.com/support)
Support Forum: [https://www.starwind.com/forums](https://www.starwind.com/forums)
Sales: sales@starwind.com
General Information: info@starwind.com

---

**StarWind Software, Inc.**  35 Village Rd., Suite 100, Middleton, MA 01949
©2016, StarWind Software Inc. All rights reserved.