

# **StarWind Virtual SAN** Compute and Storage Separated 2 Nodes with VMware vSphere

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# **INTRODUCTION**

Traditionally VMware requires having some sort of the shared storage to guarantee the data safety, allow the virtual machines migration, enables continuous application availability and eliminates any single point of failure within IT environment. VMware users have to choose between two options when choosing the shared storage:

- Hyper-Converged solutions, that allows sharing the same hardware resources for the application (i.e. hypervisor, database) and the shares storage, thus decreasing the TCO and achieving the outstanding performance results
- Compute and Storage separated solutions that keeps the compute and storage layers separately from each other, thus making the maintenance easier, increasing the hardware usage efficiency and allows building the system accurately for solving the task

This guide is intended for experienced VMware and 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 2-node vSphere cluster using **StarWind Virtual SAN** to convert storage resources of the separated general purpose servers into a fault tolerant shared storage resource for ESXi.

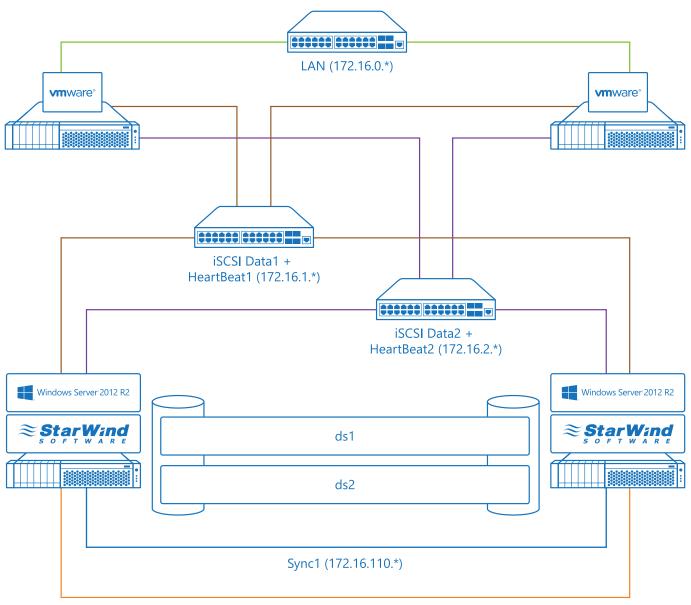
A full set of up-to-date technical documentation can always be found **here**, or by pressing the Help button in the StarWind Management Console.

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



## **SOLUTION DIAGRAM**

The diagram bellow illustrates the network and storage configuration of the resulting solution described in the guide.



Sync2 (172.16.111.\*)



## **CREATING AN HA DEVICE**

- Launch StarWind Management Console.
   Note: When Console is launched, the StarWind Console icon appears in the system tray.
- 2. To open **StarWind Management Console**, double-click the icon. You may also right-click the icon and click **Start Management Console** on the shortcut menu.
- **3.** Select the server from the **Console tree**.
- 4. Double-click the hosts to connect it.
- 5. Open Add Device Wizard through one of the following ways:
  - Right-click a StarWind server and select Add Device (advanced) from the shortcut menu.
  - Select a StarWind server and click the **Add Device (advanced)** button on the toolbar.
- 6. As Add Device Wizard appears, follow the instructions to complete creation of a new image device.
- 7. Select Hard disk device as the type of a device to be created and click Next to continue.
- 8. Select the Virtual disk option as a disk device type and click Next to continue.
- 9. Specify a virtual disk location and its size. Alternatively, use the existing virtual disk.

	? X
Add Device Wizard	
Virtual Disk Location Path to virtual Device Header File My Computer\E\DS1.swdsk © Create new File 30 GB V O Use existing File	<b>→</b>
<ul> <li>Use Existing File</li> <li>Use 512 bytes sector size</li> <li>Use 4096 bytes sector size. May be incompatible with some clients</li> </ul>	
Next	Cancel

#### 10. Click Next to continue



11. Select Thick provisioned.

		? X
€	Add Device Wizard	
	Virtual disk options	
	$\bigcirc$ Thin provisioned	
	To change the LSFS options, click "Options"	Options
		<u>N</u> ext Cancel

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

	?	x
e Add Device Wizard		
Specify device cache parameters		
Cache mode:		
<ul> <li>Write-back caching         Data write is done to the memory, then client request is completed. Modified         memory blocks are stored on disk later. Each result of read request is cached in         memory too.     </li> </ul>		
<ul> <li>Write-through caching</li> <li>Data write is done synchronously to the memory and to the disk. Each result of read request is cached in memory too.</li> </ul>		
<ul> <li>No caching Read and write requests are processed by the disk storage without caching.</li> </ul>		
Set maximum available cache size		
Cache size (MB) 128		
Next	Ca	ncel

**13.** Click **Next** to continue.



14. Optionally define the L2 caching policy and the cache size.

	Add D	evice Wizard	x
	Auu D		
Spe	ecify L2	2 cache parameters	
	-Cache r	mode:	
	0	Write-back caching Data write is done to the memory, then client request is completed. Modified memory blocks are stored on disk later. Each result of read request is cached in memory too.	
	0	Write-through caching Data write is done synchronously to the memory and to the disk. Each result of read request is cached in memory too.	
	۲	No caching Read and write requests are processed by the disk storage without caching.	
(	Cache siz	re; 1 GB ∨	)
		<u>N</u> ext Ca	incel

- 15. Click Next to continue.
- **16.** Specify target parameters and select the **Allow multiple concurrent iSCSI connections** (**clustering**) checkbox to enable several clients to connect simultaneously to the target.

		? X
€	Add Device Wizard	
	Target Parameters	
	Choose a Target Attachment Method	
	Create new Target	~
	Target Alias	
	DS1	
	Target Name	
	iqn.2008-08.com.starwindsoftware:sw1-ds1	
	Allow multiple concurrent iSCSI Connections	
		Next Cancel
		Next Cancel

17. Click Next to continue.



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

	?	x
Creation page		
Press Create button to add new device and attach it to new target.		
Progress:		
Creating image file		
Creating header		
Creating device		
Creating target and attach device		
Create	Car	ncel

- 19. Click Finish to close the wizard.
- **20.** Right-click the needed device and select **Replication Manager** from the shortcut menu.
- 21. As Replication Manager is opened, click Add replica or the Click to add replication partner link.

	Replication manager for imagefile1		x
Refresh Add replica Remove replica			
Replication partner			
	Click to add replication partner		
			_
PROPERTIES			
Host Name:			
Target Name:			
Mode:			
Priority:			
Synchronization status:			
Synchronization channel:			
Heartbeat channel:			
		Help Close	_
		Lose Close	

- 22. Select Synchronous two-way replication as a replication mode.
- **23.** Click **Next** to proceed.



24. Specify a partner hostname, IP address and port number.

e Replication Wizard	1	? X
Add Partner Node		
Specify Partner Host Nam	e or IP Address where Replication Node would be created	
Host Name or IP Address	172.15.0.22 🗸	
Port Number	3261	
	· · · · · · · · · · · · · · · · · · ·	
	Next	Cancel

- **25.** Click **Next** to proceed.
- **26.** Create a new partner device or select an existing device.

		? X	
Example 2 Replication Wizard			
Partner device setup			
Create new partner device     Parameters of the existing device will be used as a template.			
<ul> <li>Select existing device</li> <li>Select existing device on the partner server.</li> </ul>			
	<u>N</u> ext	Cancel	

- **27.** Click **Next**.
- **28.** Click Change network settings...

**29.** Specify interfaces for synchronization and Heartbeat channels.

**Note:** At least one Heartbeat channel must be separated from a synchronization channel due to availability consideration.

Interfaces	Networks	Synchronization a	Heartbeat	Asynchronous Re
🖃 Host Name: 1	172.16.0.22			
172.16.0.22	172.16.0.0		Γ	
172.16.1.22	172.16.1.0		<b>v</b>	
172.16.110.22	172.16.110.0	<b>v</b>		
172.16.111.22	172.16.111.0	<b>v</b>		
172.16.2.22	172.16.2.0		~	
🖃 Host Name:				
172.16.0.11	172.16.0.0			
172.16.1.11	172.16.1.0		~	
172.16.110.11	172.16.110.0	<b>v</b>		
172.16.111.11	172.16.111.0	<b>v</b>		
172.16.2.11	172.16.2.0		<b>~</b>	

- **30.** Click **OK**.
- **31.** Click Create Replica.
- **32.** Click **Finish** to close the wizard.
- **33.** Create one more thick provisioned virtual hard drive with configured synchronous replication.



# **CONFIGURING ESX SEVERS**

- 1. Launch web browser and the address of VMware vSphere Client.
- 2. Enter login and password.

🚱 vSphere Web Client 🛛 🗙		- 8 ×
← → C ▲ bttps://172.1	6.0.3:9443/vsphere-client/#	☆ =
<b>vm</b> ware:		
User name: Password: Use Window	VMware vSphere Web Client	
Download the Client Integration	n Plug-in 🚯   Help	

- 3. Click Login to enter.
- 4. Click the Hosts and Clusters icon from the Inventory panel of the vSphere Client window.
- 5. Right-click an existing datacenter and select **New Cluster**. If needed, first click **New Datacenter** to create a new datacenter.
- 6. The New Cluster Wizard appears. Specify a name of the cluster.

- 7. Keep on clicking OK.
- 8. Right-click the cluster to add a host and select Add Host from the shortcut menu.



9. Add Host Wizard appears. Specify a host name or IP address.

1 Add Host								(?) ₩
1 Name and location         2 Connection settings         3 Host summary         4 Ready to complete	Enter the name or IP address Host name or IP address: Location:	is of the host to add 172.16.0.77	d to vCenter Server.	2				
					Back	Next	Finish	Cancel

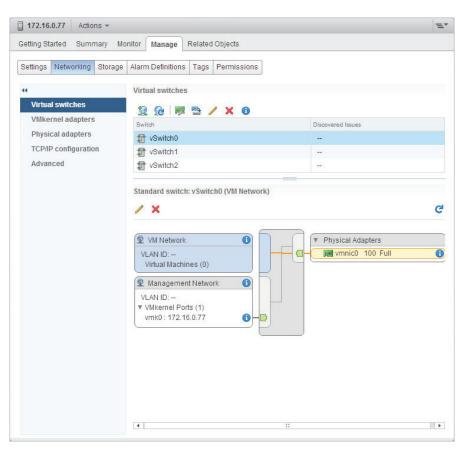
**10.** Enter username and password. Click **Next** to continue.

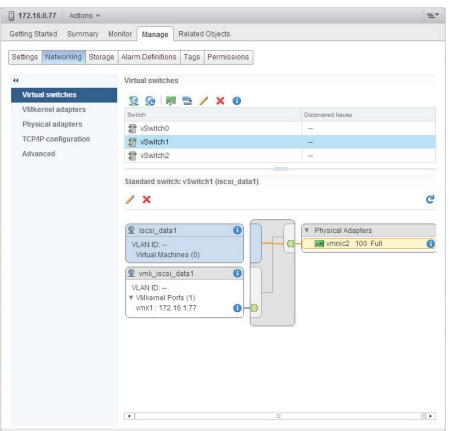
1 Add Host	(?)	+ •
<ul> <li>1 Name and location</li> <li>2 Connection settings</li> <li>3 Host summary</li> <li>4 Ready to complete</li> </ul>	Enter the administrative account information for the host. The vSphere Web Client will use this information to connect to the host and establish a permanent account for its operations. User name: root Password: *******	
	Back Next Finish Cancel	]_

- 11. Check whether the specified information is correct and click **Next** to continue.
- 12. Assign the license key to the host.
- **13.** Click **Next** to continue.
- 14. Click Finish to close the wizard.
- **15.** Follow the same procedure for another host.
- 16. Select a host.



17. Select the Manage tab and choose the Networking item. Configure your Virtual switches like on screens below





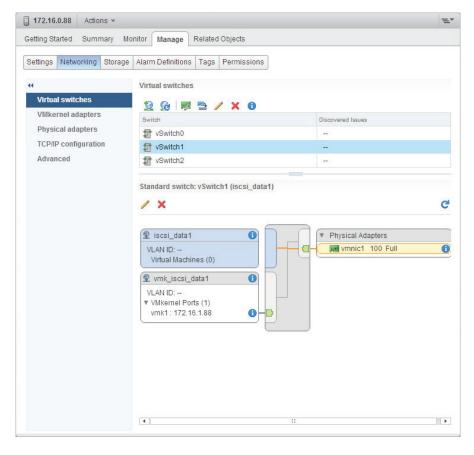


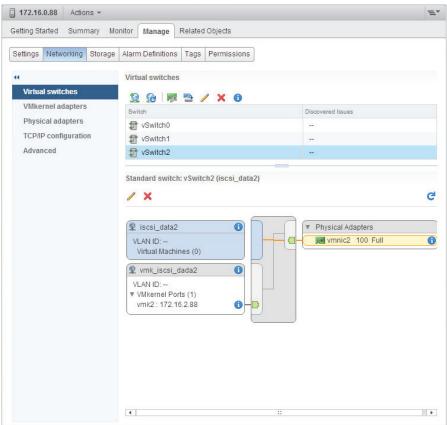
T72.16.0.77 Actions -		≡*
Getting Started Summary Mo	nitor Manage Related Objects	
Settings Networking Storage	Virtual switches Switch Virtual switch Vswitch Vswitch Vswitch2 Standard switch: vSwitch2 (iscsi_data2) X Standard switch: vSwitch2 (iscsi_data2) X VLAN ID: Virtual Machines (0) VLAN ID: VIAN ID: VLAN ID	Discovered Issues    Physical Adapters V Physical Adapters V Physical Adapters S V Vmnic3 100 Full S
	•	Þ

**18.** Follow the same procedure for another host. On second host Configure your Virtual switches as shown below:

T72.16.0.88 Actions -		≡*
Getting Started Summary Mo	nitor Manage Related Objects	
Getting Started Summary Mo Settings Networking Storage 4 Virtual switches VMkernel adapters Physical adapters TCP/IP configuration Advanced	Manage Related Objects     Alarm Definitions Tags     Virtual switches     Image     Image     Image     Image <td>Discovered Issues          -</td>	Discovered Issues          -
	4	:









# Configuring the iSCSI Initiator

- 1. Select a host.
- 2. Click the Manage tab and select the Storage inset and Storage Adapters item.
- 3. Click Add and select Add Software iSCSI Adapter. Click OK.
- 4. The list of the available storage adapters appears. Select **iSCSI Software Adapter**. Open **Targets**.

172.16.0.77 Actions -				=			
Getting Started Summary M	onitor Manage Related Objects						
Settings Networking Storage	Alarm Definitions Tags Permiss	sions					
**	Storage Adapters						
Storage Adapters	+ 6 1 0 1 -			Q Filter			
Storage Devices	Adapter	Туре	Status	Identifier			
Host Cache Configuration	Cougar Point 2 port SATA IDE C		otatos	New Market			
	Vmhba33	Block SCSI	Unknown				
	🚱 vmhba1	Block SCSI	Unknown				
	Cougar Point 4 port SATA IDE C	ontroller					
	♦ vmhba0	Block SCSI	Unknown				
	🚱 vmhba32	ba32 Block SCSI Unknown					
	iSCSI Software Adapter						
	🚱 vmhba34	ISCSI	Online	ign.1998-01.com.vmware:53			
	4			•			
	Adapter Details						
	Adapter Details						
	Properties Devices Paths	Targets Ne	twork Port Bin	ding Advanced Options			
	Dynamic Discovery Static Di	iscoverv					
	Dynamic Discovery Counce Di						
		Add Re	move Aut	hentication Advanced			
	iSCSI server						
		This list is e	empty.				

5. Click the Add... button. Enter IP address of StarWind node. Click OK.

vmhba34 - Add S	Send Target Server	?
iSCSI Server: Port:	172.16.1.11 3260	
Authentication	Settings	
✓ Inherit settin	gs from parent	
		OK Cancel



6. Do same for each StarWind server by clicking Add and specifying the server IP address.

T72.16.0.77 Actions -					=*
Getting Started Summary Mor	nitor Manage Related Objects				
	Alarm Definitions Tags Permis	sions			
Storage Adapters	Storage Adapters				
Storage Devices	+ 🛃 📃 🖾 🕩 -			Q Filter	
Host Cache Configuration	Adapter	Туре	Status	Identifier	*
Host Cache Configuration	Cougar Point 2 port SATA IDE C	ontroller			
	🔄 vmhba33	Block SCSI	Unknown		
	🔄 vmhba1	Block SCSI	Unknown		
		ontroller			
	🔄 vmhba0	Block SCSI	Unknown		
	🔄 vmhba32	Block SCSI	Unknown		
	iSCSI Software Adapter				*
		ides, a rescan of	this storage a	dapter is recommended	
	Adapter Details	=			
	Properties Devices Paths	Targets Net	twork Port Bin	ding Advanced Option	IS
	Dynamic Discovery Static D	iscovery			
		Add Re	move Aut	hentication Advan	ced
	iSCSI server				
	172.16.1.11:3260				
	172.16.2.11:3260				
Image: Second secon					
	172.16.2.22:3260	ontroller Block SCSI Unknown Block SCSI Unknown Dontroller Block SCSI Unknown Block SCSI Unknown Block SCSI Unknown Ges, a rescan of this storage adapter is recommended. Targets Network Port Binding Advanced Options scovery			

7. Click **Rescan**. In the Rescan dialog click **OK**.

172.16.0.77 - Rescan Storage	?
Scan for new Storage Devices	
Rescan all host bus adapters for new storage devices. Rescanning all adapters can be slow.	
Scan for new VMFS Volumes	
Rescan all known storage devices for new VMFS volumes that have been added since the last scan. Rescanning known storage for new file systems is faster than rescanning for new storage.	
ОК Сапсе	

8. Repeat the same procedure for another cluster host.



# Setting up a Datastore

- 1. Right Click on host and select **New datastore**.
- 2. New Datastore wizard appears.

🔁 New Datastore							? •
✓ 1 Location	Location:	172.16.0.77					
2 Type							
3 Name and device selection							
4 Partition configuration							
5 Ready to complete							
				Back	Maut	Tiniah	Cancel
				Back	Next	Finish	Cancel

# 3. Select VMFS.

1	New Datastore					() ()
~	1 Location 2 Type 3 Name and device selection 4 Partition configuration 5 Ready to complete	Type • VMFS Create a VMFS datastore on a disk/LUN. • NFS Create an NFS datastore on an NFS share over the network.				
			Back	Next	Finish	Cancel

## 4. Click next.



5. Enter name of datastore (i.e. DS1) and device for datastore.

1 Location	on	Datastore name: DS1					
2 Type					(	<b>2</b> Filter	
3 Name a	and device selection	Name	LUN	Capacity	Hardware Acceler	Drive Type	Snapshot Vo.
4 VMFS v	resion	Local ATA Disk (t10.ATASamsung_SSD_840_PR	0	238.47 GB	Unknown	SSD	
5 Partitio	n configuration	STARWIND iSCSI Disk (eui.9c6c5a4bacc99744)	0	23.00 GB	Supported	Non-SSD	
6 Ready	to complete	Local ATA Disk (t10.ATASamsung_SSD_840_PR	0	238.47 GB	Unknown	SSD	
		STARWIND iSCSI Disk (eui.7f0bbed8d053ecb8)	0	30.00 GB	Supported	Non-SSD	
		Local ATA Disk (t10.ATAWDC_WD1002FAEX2D0	0	931.51 GB	Unknown	Non-SSD	
		10					5 item

- 6. Click next.
- 7. Select VMFS 5

🔁 New Datastore		?₩
<ul> <li>1 Location</li> <li>2 Type</li> <li>3 Name and device selection</li> <li>4 VMFS version</li> <li>5 Partition configuration</li> <li>6 Ready to complete</li> </ul>	• VMFS 5 enables 2+TB LUN support. • VMFS 3 WMFS 3 allows the datastore to be accessed by ESX/ESXI hosts of version earlier than 5.0.	
	Back Next Finish C	Cancel

8. Click next.



9. Enter datastore size.

🔁 New Datastore							(?) ₩
✓ 1 Location	Partition Layout		Datastore Details				
✓ 2 Type			Partition Configuration	Use all available par	rtitions		•
✓ 3 Name and device selection			Datastore Size		30.00	GB	
✓ 4 VMFS version							
✓ 5 Partition configuration							
6 Ready to complete							
	Datastore						
	Capacity:	30.00 GB	] }				
	Free Space:	30.00 GB	1				
				Back	Next	Finish	Cancel

# 10. Click next.

**11.** Verify the settings. Click **Finish**.

1 New Datastore		(?)			
✓ 1 Location	General:				
✓ 2 Type	Name	DS1			
<ul> <li>3 Name and device selection</li> </ul>	Туре	VMFS			
✓ 4 VMFS version	Datastore size	30.00 GB			
<ul> <li>5 Partition configuration</li> <li>6 Ready to complete</li> </ul>	Device and Forma	tting:			
	Disk/LUN	STARWIND iSCSI Disk (eui.7f0bbed8d053ecb8)			
	Partition Format	GPT			
	VMFS Version	VMFS 5			
		Back Next Finish Cancel			



12. Check another host for a new datastore. If a new datastore is not listed among the existing datastores, click **Rescan All**.

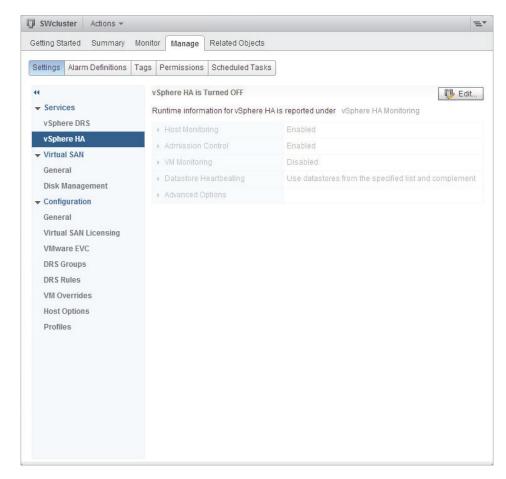


**13.** On other host add another Datastore (DS2) in the same way and check first host for a new datastore.





To add the HA feature select the cluster and open Manage -> Settings -> vSphere HA. Click Edit... button.



15. In the Cluster Settings window select the Turn ON vSphere HA checkbox.

SWcluster - Edit Cluster Settings			(?) <b>}</b>
vSphere DRS	Turn ON vSphere HA		
vSphere HA	▹ Host Monitoring	Enable Host Monitoring	
	Admission Control	☑ Enable Admission Control	
	▶ VM Monitoring	Disabled 🔹	
	<ul> <li>Datastore Heartbeating</li> </ul>	Use datastores from the specified list and complement automatically if needed	
	<ul> <li>Advanced Options</li> </ul>	None	
		ОК Са	ncel

**16.** Click **OK**.



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