

# StarWind Virtual SAN: Feature Configuration Guide for Enabling Deduplication and Compression

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**TECHNICAL PAPERS** 





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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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# Annotation

**Relevant Products** 

StarWind Virtual SAN (VSAN)

Purpose

This guide provides detailed instructions for deploying and configuring StarWind Virtual SAN in a hyperconverged scenario. It focuses on setting up deduplication and compression, covering requirements, pre-configuration steps, and installation processes.

## Audience

The primary audience includes system administrators, IT professionals, and network engineers who are responsible for implementing and managing virtualized storage solutions.

## Expected Result

Upon successful implementation, users should have a fully functional StarWind Virtual SAN setup with optimized storage performance and capacity, thanks to deduplication and compression. This setup should enhance the efficiency and performance of VMware clusters.

## **Introduction To Starwind Virtual San For Vsphere**

StarWind Virtual SAN for vSphere comes as a prepackaged Linux virtual machine to be installed as a VM on vSphere. It creates a VM-centric and high performing storage pool for a VMware cluster.

This guide describes the deployment and configuration process of the StarWind Virtual SAN with VMware vSphere.

# **Starwind Virtual San For Vsphere Vm Requirements**

Prior to installing StarWind Virtual SAN Virtual Machines, please make sure that the system meets the requirements, which are available via the following link: https://www.starwindsoftware.com/system-requirements



Recommended RAID settings for HDD and SSD disks:

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

Please read StarWind Virtual SAN Best Practices document for additional information: https://www.starwindsoftware.com/resource-library/starwind-virtual-san-best-practices

NOTE: Enabling deduplication may impact the resultant storage performance. Please make sure that storage performance meets the requirements for the intended use.

Additional StarWind Virtual SAN VM requirements for deduplication:

Each VDO volume has the following additional memory requirements:

- 370 MB plus an additional 268 MB per each 1 TB of physical storage
- 250 MB per each 1 TB of physical storage, if deduplication is enabled (UDS index)

Example: 370MB + 4 \* 268MB + 4 \* 250MB = 2442 MB RAM for 4 TB underlaying usable physical storage. We recommend assigning StarWind Virtual SAN VM at least 8 GB of RAM (4GB for VM + 4 GB for VDO).

A single VDO volume can be configured to use up to 256 TB of physical storage. All-flash arrays or NVMe drives are strictly recommended as underlying storage when using a combination of StarWind VSAN for vSphere with VDO.

As a general rule, certain storage layers should be placed under VDO and others on top of VDO:

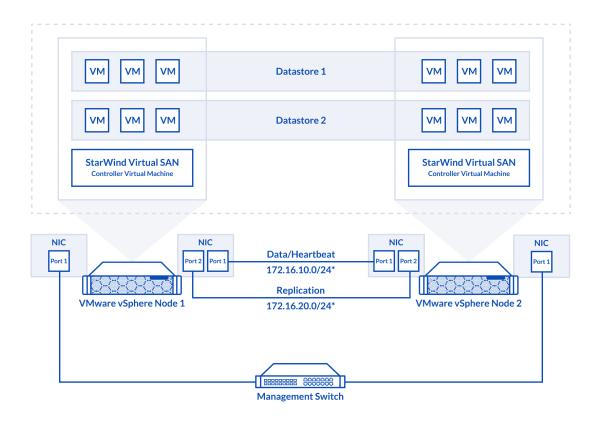
- under VDO: Hardware and software RAID (LVM or mdraid)
- on top of VDO: StarWind Virtual SAN Thick-Provisioned devices (stand-alone and HA)

VDO volume is a thinly provisioned block device, which can run out of space on underlying storage device. It is recommended to use physical storage, which can be extended in future (MD RAID, LVM).

## **Pre-Configuring The Servers**

The diagram below illustrates the network and storage configuration of the solution:





1. ESXi hypervisor should be installed on each host.

2. StarWind Virtual SAN for vSphere VM should be deployed on each ESXi host from an OVF template, downloaded on this page: https://www.starwindsoftware.com/release-notes-build

3. The network interfaces on each node for Synchronization and iSCSI/StarWind heartbeat interfaces should be in different subnets and connected directly according to the network diagram above. Here, the 172.16.10.x subnet is used for the iSCSI/StarWind heartbeat traffic, while the 172.16.20.x subnet is used for the Synchronization traffic. NOTE: Do not use iSCSI/Heartbeat and Synchronization channels over the same physical link. Synchronization and iSCSI/Heartbeat links and can be connected either via redundant switches or directly between the nodes.

vCenter Server can be deployed separately on another host or as VCSA on StarWind VSAN highly-available storage, created in this guide.



# **Installing Starwind Virtual San For Vsphere**

1. Download zip archive that contains StarWind Virtual SAN for vSphere. https://www.starwindsoftware.com/starwind-virtual-san#download

2. Extract virtual machine files.

3. Deploy a virtual machine to the vSphere. Right-click on the host and select "Deploy OVF template" from a drop-down menu.

<b>vm</b> vSph	Actions - 192.168.13.191	Search in all (	environmen C	? v	
	🚹 New Virtual Machine	Ŭ,	$\bigcirc$		
	讨 Deploy OVF Template		ACTIONS 🗸		
√ 🗗 sw-sup-vo	New Resource Pool	Moni Config	g Permissi V	/ Datasto	Netwo Upda
V 📑 Support	🚼 New vApp				
✓ ☐ Post-	Maintenance Mode	Hypervisor:	VMware ESXi, 6.7.0, 10302608	CPU Used: 10.5 GHz	Free: 24.69 GHz Capacity: 35.18 GHz
192	Connection ►	Model: Processor Type:	PowerEdge R720 Intel(R) Xeon(R) CPU E5	Memory	Free: 39 GB
192	Power •		2660 0 @ 2.20GHz	Used: 88.94 GB	Capacity: 127.94 GB
	Certificates ►	Logical Processors: NICs:	7 7	Storage	Free: 1.86 TB
	Storage 🕨	Virtual Machines: State:	25 Connected	Used: 4.49 TB	Capacity: 6.35 TB
	🧕 Add Networking	Jptime:	12 days		
	Host Profiles	DELLEI	MC 🛋		
	Export System Logs				~
	Reconfigure for vSpher	cturer	Dell Inc.		
	🖓 → Assign License	locurer	Deir Inc.		
	Settings		PowerEdge R72	20	
	Move To		16 CPUs x 2.	2 GHz	
	Tags & Custom Attribut 🕨	у	88.94 GB / 1	27.94 GB	
	Remove from Inventory	Flash Resource	0 B / 0 B		

4. In the first step of the wizard, point to the location of the OVF template. Select VM files and click Next.

1 Select an OVF template 2 Select a name and folder	Select an OVF template Select an OVF template from remote URL or local file system				
<ul><li>3 Select a compute resource</li><li>4 Review details</li><li>5 Select storage</li><li>6 Ready to complete</li></ul>	Enter a URL to download and install the OVF package from the Internet, or browse to a location accessible from your computer, such as a local hard drive, a network share, or a CD/DVD drive. O URL				
	http   https://remoteserver-address/filetodeploy.ovf   .ova				
	Choose Files       No file chosen				
	CANCEL BACK NEX				

5. Specify the name and location for the StarWind Virtual SAN VM.



<ul> <li>Select an OVF template</li> <li>Select a name and folder</li> <li>Select a compute resource</li> <li>Review details</li> <li>Select storage</li> <li>Ready to complete</li> <li>Select a location for the virtual machine.</li> </ul>	Deploy OVF Template	<u>5</u>
4 Review details     Virtual machine name:     SW1       5 Select storage     Select a location for the virtual machine.       6 Ready to complete     Select a location for the virtual machine.       V 🗗 sw-sup-vcenter.starwind.local		
6 Ready to complete     Select a location for the virtual machine.           B sw-sup-vcenter.starwind.local	4 Review details	Virtual machine name: SW1
		Select a location for the virtual machine.
CANCEL BACK NEXT		CANCEL BACK NEXT

6. Select a resource for the StarWind Virtual SAN VM.



Deploy OVF Template	ž
<ul> <li>1 Select an OVF template</li> <li>2 Select a name and folder</li> </ul>	Select a compute resource Select the destination compute resource for this operation
<ul> <li>3 Select a compute resource</li> <li>4 Review details</li> <li>5 Select storage</li> <li>6 Ready to complete</li> </ul>	<ul> <li>Support</li> <li>Post-Sale</li> <li>192.168.12.10</li> <li>192.168.12.20</li> <li>192.168.12.30</li> </ul>
	Compatibility  Compatibility checks succeeded.  CANCEL BACK NEXT

- 7. Review the information about the VM.
- 8. Select the storage for the VM.



<ul> <li>1 Select an OVF template</li> <li>2 Select a name and folder</li> </ul>	Select storage Select the storage for the configuration and disk files						
<ul> <li>3 Select a compute resource</li> <li>4 Review details</li> <li>5 License agreements</li> </ul>	Encrypt this virtual machine (Requires Key Management Server)						
6 Select storage	Select virtual disk format: VM Storage Policy:		Thick Provision La:	zy Zeroed 🗸 🗸			
7 Select networks			Datastore Default				
8 Ready to complete	Name	Capacity	Provisioned	Free	Tyr.		
	🗐 HDD	4.55 TB	3.41 TB	1.25 TB	VN 4		
	ISO	851.87 GB	702.82 GB	149.06 GB	NF		
	SSD SSD	893 GB	485.18 GB	432.23 GB	٧N		
	🗐 vCenter-DS	99.75 GB	54.88 GB	44.87 GB	VN		
	4				•		
	Compatibility						
		ucceeded.					
	✓ Compatibility checks su						

9. Select networks for the VM.



<ul> <li>Deploy OVF Template</li> <li>1 Select an OVF template</li> <li>2 Select a name and folder</li> </ul>	Select networks Select a destination network for each source network.						
<ul> <li>✓ 3 Select a compute resource</li> <li>✓ 4 Review details</li> </ul>	Source Network y Destination		Destination Network	Т			
<ul> <li>4 Review details</li> <li>5 License agreements</li> </ul>	ISCSI ISC		ISCSI_VMs	~	*		
<ul> <li>✓ 6 Select storage</li> </ul>	Management VN		VM Network	~			
7 Select networks	Sync Sync		Sync_VMs	~	-		
8 Ready to complete					ns		
	IP allocation: IP protocol:	Sta IPv	tic - Manual 4				
			CANCEL	ВАСК	EXT		

10. Click Finish to start the deployment process.

11. Add additional network interfaces for iSCSI and SYNC (can be configured for redundancy or 3-way replica, if required)



Edit Settings sw1						×
Virtual Hardware VM Options						
					ADD NEW DE	VICE
> CPU	4 ~					0
> Memory	8	GB	$\sim$			
> Hard disk 1	16	GB	$\sim$	-		
> SCSI controller 0	LSI Logic SAS					
> Network adapter 1	VM Network $ \smallsetminus $	_			Connected	
> Network adapter 2	iSCSI_VMs ∨				Connected	
> Network adapter 3	Sync_VMs ∨				Connected	
✓ New Network *	Sync_VMs ~				Connected	
Status	🗹 Connect At Po	ower O	n			
Adapter Type	VMXNET 3	~				
DirectPath I/O	Enable					
MAC Address				Automatic $ \smallsetminus $		
> CD/DVD drive 1	Client Device		~	-	Connected	-
					CANCEL	ок

12. Repeat all the steps from this section on the other ESXi hosts

NOTE: When using StarWind with the synchronous replication feature inside of a Virtual Machine, it is recommended not to make backups and/or snapshots of the Virtual Machine with the StarWind VSAN service installed, as this could pause the StarWind Virtual Machine. Pausing the Virtual Machines while the StarWind VSAN service in under load may lead to split-brain issues in synchronous replication devices, thus to data corruption.

# Preparing Environment For Starwind Vsan Deployment



# **Configuring Networks**

Configure network interfaces on each node to make sure that Synchronization and iSCSI/StarWind heartbeat interfaces are in different subnets and connected physically according to the network diagram above. All actions below should be applied to each ESXi server.

NOTE: Virtual Machine Port Group should be created for both iSCSI/ StarWind Heartbeat and the Synchronization vSwitches. VMKernel port should be created only for iSCSI traffic. Static IP addresses should be assigned to VMKernel ports.

NOTE: It is recommended to set MTU to 9000 on vSwitches and VMKernel ports for iSCSI and Synchronization traffic. Additionally, vMotion can be enabled on VMKernel ports.

1. Using the VMware ESXi web console, create two standard vSwitches: one for the iSCSI/ StarWind Heartbeat channel (vSwitch1) and the other one for the Synchronization channel (vSwitch2).

vmware' esxi"					
Navigator	Q Networking				
✓ ☐ Host Manage Monitor	Port groups Virtual switches	Physical NICs VMkernel NIC		rules	
> 🗗 Virtual Machines 🛛 0	Name	~	Port groups		
Storage	vSwitch0		2		
🔮 Networking 📃 1					
	Add standard virtual switch - v Swite	ch1			
	vSwitch Name vSwitch1				
	МТО	9000			
	Uplink 1	vmnic1 - Up, 10000 mbps	T	$\odot$	
	Link discovery	Click to expand			
	➤ Security	Click to expand			
			Add	Cancel	
			700	4	

2. Create a VMKernel port for the iSCSI/ StarWind Heartbeat channel.



👰 sw-mar-pc3.starwind.loca	al - Networking	
Port groups Virtual st	witches Physical NICs VMke	ernel NICs TCP/IP stacks Firewall rules
🞥 Add VMkernel NIC 🔋	Add VMkernel NIC	
Name	Port group	New port group
	New port group	ISCSI_VMKernel
	Virtual switch	vSwitch1
	VLAN ID	0
	MTU	9000
	IP version	IPv4 only
	▼ IPv4 settings	
	Configuration	O DHCP   Static
	Address	172.16.10.251
	Subnet mask	255.255.255.0
	TCP/IP stack	Default TCP/IP stack
	Services	✓ vMotion
		Create Cancel

3. Add a Virtual Machine Port Groups on the vSwitch for iSCSI traffic (vSwtich1) and on the vSwitch for Synchronization traffic (vSwitch2).

Portgroup ISCSI_for_VMs remove	ed - dismiss for _VMs			
✓ ☐ Host Manage Monitor	Port groups Virtual switches	Physical NICs VMkerne	el NICs TCP/IP stacks	Firewall rules
Virtual Machines     Virtual Machines     Storage     Networking	Name           With the second		Active ports ~ 0 1	VLAN ID 0 0
✓ Second Sec	ISCSI_VMKernel     Add port group - ISCSI_for_VMs	_	1	0
	Name	ISCSI_for_VMs		
	VLAN ID	0		
	Virtual switch	vSwitch1	•	
	▹ Security	Click to expand		
				Add Cancel

4. Repeat steps 1-3 for any other links intended for Synchronization and iSCSI/Heartbeat



traffic on ESXi hosts.

# **Configuring Starwind Virtual San Vm Settings**

By default, the StarWind Virtual SAN virtual machine receives an IP address automatically via DHCP. It is recommended to create a DHCP reservation and set a static IP address for this VM. In order to access StarWind Virtual SAN VM from the local network, the virtual machine must have access to the network. In case there is no DHCP server, the connection to the VM can be established using the VMware console and static IP address can be configured manually.

1. Open a web browser and enter the IP address of the VM, which it had received via DHCP (or had it assigned manually), and log in to StarWind Virtual SAN for vSphere using the following default credentials:

Username: user Password: rds123RDS NOTE: Make sure to tick Reuse my password for privileged tasks check box.



≈ starwindvsa-84697911 × +	• - • ×
← → C ▲ Not secure   192.168.12.227:9090/users#/user	* 😩 :
	<b>StarWind</b>
StarWind <b>Virtual SAN</b>	
User name user	Server: starwindvsa-84697911
Password ✓ Reuse my password for privileged tasks Log In	Log in with your server user account.

- 2. After the successful login, on the left sidebar, click Accounts.
- 3. Select a user and click Set Password.



	697911 × +					0	-		×
← → C ▲ Not see	cure   192.168.12.2	227:9090/users#/user					☆		:
STARWIND VIRTUAL SAN						🔒 Priv	vileged	💄 us	ser 🗸
🗐 starwindvsa-84	Accounts > user	Set Password					1		
System	user	Old Password	1				ssion	Delet	e
Logs Storage	Full Name	New Password Confirm New Password							
Networking	User Name u Roles 📱								
Accounts	Last Login N				Cancel	Set			
Services	Access	Lock Account		Never lock account					
Terminal	Password	Set Password Force Chang	ge	Never expire password					
	Authorized Publ	ic SSH Keys						Ŀ	3
	There are no au	uthorized public keys for this	account.						

4. On the left sidebar, click Networking.



≈ Networking - starwindvsa-84	4697° × +		0	– 🗆 X
← → C ▲ Not secu	ure   192.168.12.227:9090/	'network		☆ 😩 :
STARWIND VIRTUAL SAN				ileged 💄 user 🗸
starwindvsa-84	Kbps Sending		Kbps Receiving	<b>^</b>
System	400		400	
Logs	0		0	
Storage	03:48 03:49	03:50 03:51 03:52	03:48 03:49 03:50 03:51	03:52
Networking	Firewall			
Accounts	0 Active Rules			
Services				
Terminal	Interfaces		Add Bond Add Team Add Bridge	Add VLAN
Terminai	Name	IP Address	Sending Receiving	
	ens192	192.168.12.227/23	5.40 Kbps 4.60 Kbps	
	ens224		Inactive	
	ens256		Inactive	
	Networking Logs			

Here, the Management IP address of the StarWind Virtual SAN Virtual Machine, as well as IP addresses for iSCSI and Synchronization networks can be configured.

In case the Network interface is inactive, click on the interface, turn it on, and set it to "Connect automatically".



	84697: × +	o - 🗆 ×
← → C ▲ Not se	cure   192.168.12.227:9090/network#/ens224	☆ 💄 :
STARWIND VIRTUAL SAN		🔒 Privileged 💄 user 🗸
starwindvsa-84	Networking > ens224	
System	Kbps Sending Kbps Receiving	
Logs	400 400	
Storage	。	
Networking		04:25 04:26 04:27 04:28
Accounts	ens224 VMware VMXNET3 Ethernet Controller vmxnet3 00:0C:29:A6:D6:F6	0
Services	Status Inactive	
Terminal	Carrier 10 Gbps General Connect automatically IPv4 Automatic (DHCP) IPv6 Automatic MTU Automatic	

5. Click on Automatic (DHCP) to set the IP address (DNS and gateway – for Management).

Networking - starwindvsa	-846975 × +			• - • ×
$\epsilon \rightarrow c$ A Not se	ecure   192.168.12.227:9090/network#/	ens224		☆ 😩 :
STARWIND VIRTUAL SAN				🔓 Privileged 💄 user 🗸
starwindvsa-84	Networking > ens224	IPv4 Settings	_	
System	Kbps Sending	Addresses	Manual ~ +	
Logs	400	172.16.10.10 255.255.255.0	Ga Automatic (DHCP)	
Storage	0	DNS	Manual	06:00 06:01
Networking	05:57 05:58		Shared +	06:00 06:01
Accounts	ens224 VMware VMXNET3 Etherne	DNS Search Domains	Automatic +	
Services	Status Configuring IP			
Terminal	Carrier 10 Gbps General 🥑 Connect automatically	Routes	Automatic < 🔶 🛨	
	IPv4 Automatic (DHCP)		Cancel Apply	
	IPv6 Automatic MTU Automatic			

6. The result should look like on the picture below:



≈ Networking - starwindvsa-8-	4697° × +			o - 🗆 ×
← → C ▲ Not secu	ure   192.168.12.10:9090/network			☆ 😩 :
STARWIND VIRTUAL SAN				🔒 Privileged 🔺 user 🗸
🗐 starwindvsa-84	Kbps Sending		Kbps Receiving	
System	400		400	
Logs	0		0	
Storage	06:02 06:03	06:04 06:05 06:06	06:02 06:03	06:04 06:05 06:06
Networking	Firewall			
Accounts	0 Active Rules			
Services				
Terminal	Interfaces		/	Add Bond Add Team Add Bridge Add VLAN
	Name	IP Address	Sending	Receiving
	ens192	192.168.12.10/24	8.74 Kbps	7.54 Kbps
	ens224	172.16.10.10/24	0 bps	0 bps
	ens256	172.16.20.10/24	0 bps	0 bps
	Networking Logs			

NOTE: It is recommended to set MTU to 9000 on interfaces, dedicated for iSCSI and Synchronization traffic. Change Automatic to 9000, if required.

≈ Networking - sw1	× +	• <sup>–</sup>	
$\leftarrow$ $\rightarrow$ C S https:/	//192.168.12.10:9090/network#/ens224		<b>.</b> :
STARWIND VIRTUAL SAN		🔓 Privileged	🛓 user 🗸
🗐 sw1	Networking > ens224		
System	Kbps Sending Kbps Receiving		
Logs	400 400		
Storage			
Networking	18:44 18:45 18:46 18:47 18:48 18:44 18:45	18:46 18:47	18:48
Accounts	ens224 VMware VMXNET3 Ethernet Controller vmxnet3 00:0C:29:A6:D6:F6		
Services	Status 172.16.10.10/24		
Terminal	Carrier 10 Gbps General Connect automatically		
	IPv4 Address 172.16.10.10/24 IPv6 Automatic		
	MTU 9000		

6. Alternatively, log in to the VM via the VMware console and assign a static IP address by editing the configuration file of the interface located by the following path: /etc/sysconfig/network-scripts



📓 SW1	🖬 🖬 🔤 🍪 Actions ⊗
Meb console: https://starwindvsa-84697911:9090/ or https://192.168.12.227:9090/	
<pre>starwindvsa-84697911 login: Password: Last login: Tue Aug 12 04:43:59 on ttu1 Iuser@starwindvsa-84697911 ~ 15 is zetc/sysconfig/network-scripts/ Ifclg-ens122 ifdown ifdown-ippp ifdown-ppp ifdown-transfer ifup-th ifup-tion ifup-pps ifup-Team init.ipv6-global ifcfg-ens225 ifdown-beep ifdown-ipv ifdown-tutts ifdown-tunnel ifup-th ifup-tion ifup-pps ifup-TeamPort network-functions ifcfg-ens256 ifdown-eth ifdown-isdw ifdown-team ifup- aliases ifup-ippp ifup-plusb ifup-sit ifup-wireless Iuser@starwindvsa-84697911 ~ 3; foronfig ens192: flags=4163</pre> UP_BROADCAST, RUNNING, MULTICAST> mtu 1500 inet 192. 160.12.227 netwask 255.255.254.0 broadcast 192.168.13.255 ether 00:80:23:46:163:etx	iµv6
RX packets 3057 bytes 277047 (271.3 KiB) RX errors 0 dropped 0 overruns 0 frame 0 TX packets 1067 bytes 1554056 (1.4 MiB) TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0 device interrupt 19 memory 0xfd3a0000-fd3c0000	
ems224: flags=41634UP.BR60bCAST.RUNNING.MULTICAST> mtu 1500 ether 80:80:229:a6:46:f6 txqueuelen 100000 (Ethernet) RK packets 2 bytes 120 (120.0 B) RX errors 0 dropped 0 overruns 0 frame 0 TX packets 0 bytes 0 (0.0 B) TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0	
ens256: flags=4163 <up,broadcast,running,multicast> mtu 1500 ether 00:8c:23:a6:46:00 txqueuelen 10000 (Ethernet) RX packets 2 bytes 120 (122.0.8 B) RX errors 0 dropped 0 overruns 0 frame 0 TX packets 0 bytes 0 (0.8 B) TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0</up,broadcast,running,multicast>	
lo: flags=73(UP,LOOPBACK,RUNNING> mtu 65536 inet 127.0.0.1 netmask 255.0.0.0 loop tsqueuelen 1000 (Local Loopback) RX packets 172 bytes 147586 (144.1 KiB) RX errors 0 dropped 0 overruns 0 frame 0 TX packets 172 bytes 147586 (144.1 KiB) TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0	
Euser@starwindvsa-84697911 ~1\$ sudo nano /etc/sysconfig/network-scripts/ifcfg-ens192	.at.

7. Open the file, corresponding to the Management interface using text editor, for example:

sudo nano /etc/sysconfig/network-scripts/ifcfg-ens192

8. Edit the file:

Change the line BOOTPROTO=dhcp to: BOOTPROTO=static

Add the IP settings needed to the file: IPADDR=192.168.12.10 NETMASK=255.255.255.0 GATEWAY=192.168.12.1 DNS1=192.168.1.1 By default, the Management link should have an ens192 interface name. The configuration file should look as follows



SW1					💷 🗆 🚈 🏠 Ac	tions
GNU nano 2.3.1		File: /etc/sysconfig/networ	rk-scripts∕ifcfg-ens192		Modi	
	2-prívacy	File: /etc/sysconfig/networ	rk-scripts∕ifcfg-ens192			
^G Get Help ^X Exit	^D WriteOut ^J Justify	îE Bead File <sup>^</sup> ₩ Where Is	₩ Prev Page ₩ Next Page	îK Cut Text ^U UnCut Text	i Cur Pos 1 To Spell	

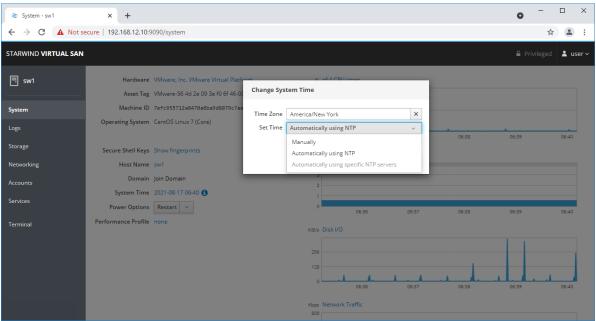
9. Restart interface using the following cmdlet: sudo if down ens192 , sudo if up ens192 or restart the VM.

10. Change the Host Name from the System tab by clicking on it

System - starwindvsa-846	97911 × +								•	- 0	×
$\leftrightarrow$ $\rightarrow$ C $\blacktriangle$ Not set	ecure   192.168.12.10:9	0090/system								\$	:
STARWIND VIRTUAL SAN									🔒 Priv	ileged 👗 u	user 🗸
🗐 starwindvsa-84		VMware, Inc. VM VMware-56 4d 2	Change Host Nam	ie	e of Al	DILCORE		_			
System	Machine ID	7efc955712a847	Pretty Host Name	sw1							
Logs	Operating System	CentOS Linux 7 (	Real Host Name								
Storage	Secure Shell Keys	Show fingerprin							06:08	06:09	
Networking		starwindvsa-846									
Accounts		Join Domain 2021-08-17 06:0					Cancel	Change			
Services	Power Options		_		0	06:05	06:06	06:07	06:08	06:09	
Terminal	Performance Profile	none			KiB/s Disk		06:06	06:07	06:08	06:09	
					128 96 64 32 0	06:05	06:06	06:07	06:08	06:09	
11 Character				· (	Kbps Netw	rork Traffic					1

11. Change System time and NTP settings if required





12. Repeat the steps above on each StarWind VSAN VM.

# **Configuring Starwind Management Console**

1. Install StarWind Management Console on a workstation with Windows OS (Windows 7 or higher, Windows Server 2008 R2 and higher) using the installator available here. NOTE: StarWind Management Console and PowerShell Management Library components are required.

Select the appropriate option to apply the StarWind License key.
 Once the appropriate license key has been received, it should be applied to StarWind Virtual SAN service via Management Console or PowerShell.

3. Open StarWind Management Console and click Add Server.



StarWind Management Console		_		×
FILE HOST TARGET OPTIONS HELP			_	
C 🛪 🔏 🚼 📑 📇 📥 🗳 🗘	<b>?</b> lelp			
Servers				
Image: Servers         Add Server         This Option allows you to add local or remote starWind Server Hosts to StarWind Management Console				
4				>
StarWind Software Ready				

4. Type the IP address of the StarWind Virtual SAN in the pop-up window and click OK.

📑 Ad	d new StarWind Server		?	×
Host:	192. 168. 12. 10		: 3261	
Adva	anced >>	ОК	Cano	el

- 5. Select the server and click Connect.
- 6. Click Apply Key... on the pop-up window.



StarWind Manag	gement Console
IF FF 00 BF 4D A3 EE D CCT	StarWind Server Activation
	Apply License Key, could be Time-limited Trial Key, free Version Key or Commercial License Key delivered with Purchase
	Request free Version Key <u>Here</u> .
	Close Apply Key

7. Select Load license from file and click the Load button.

8. Select the appropriate license key.

As an alternative, PowerShell can be used. Open StarWind InstallLicense.ps1 script with PowerShell ISE as administrator. It can be found here:

C:\Program Files\StarWind

Software\StarWind\StarWindX\Samples\powershell\InstallLicense.ps1

Type the IP address of StarWind Virtual SAN VM and credentials of StarWind Virtual SAN service (defaults login: root, password: starwind).

Add the path to the license key.



🔮 Administrator: Windows PowerShell ISE — 🗆	×
File       Edit       Yiew       Jools       Debug       Add-ons       Help         1       1       1 $\wedge$ 1       1 $\bullet$ 1       1	
InstallLicense.ps1 ×	<u></u>
<pre>1 # 2 # The following example shows how to apply license on a server 3 # 4 Import-Module StarWindX 5 Enable-SWXLog 7 \$ server = New-SWServer -host 127.0.0.1 -port 3261 -user root -password starwind 9 try 11 □{ 12 \$ server.Connect() 13 { Get-SWLicense \$server 15 Remove-SWLicense \$server 16 Remove-SWLicense \$server 17 # apply license key 19 \$ set-SWLicense \$server "C:\License\licensekey.swk" 20 ]} 21 catch 22 □{ 23 { Write-Host \$foreground red 24 ]} 25 finally 26 □{ 27 { \$server.Disconnect() 28 }</pre>	
29	~
PS C:\Program Files\StarWind Software\StarWind\StarWindX\Samples\powershell>	
	>
Ln 1 Col 1	100%

9. After the license key is applied, StarWind devices can be created. NOTE: In order to manage StarWind Virtual SAN service (e.g. create ImageFile devices, VTL devices, etc.), StarWind Management Console can be used.

# **Configuring Starwind Vms Startup/shutdown**

1. Setup the VMs startup policy on both ESXi hosts from Manage -> System tab in the ESXi web console. In the appeared window, check Yes to enable the option and choose the stop action as Shut down. Click Save to proceed.



<b>vm</b> ware' ESXi <sup>®</sup>			root@1
📲 Navigator 🗆	esxi01.starwind.local - Manage		
▼ 📱 Host	System Hardware Licens	ing Packages Services	Security & users
Manage Monitor	Advanced settings Autostart	Edit settings	No
→ <sup>1</sup> Virtual Machines               1               1               1               1                →             Ξ             Storage              1                →             Q             Networking              3	Swap Time & date	Change autostart configuration	
<ul> <li>Switch2</li> <li>Switch0</li> </ul>		Enabled	⊙Yes ○No
More networks		Start delay	120 💲 seconds
		Stop delay	120 🗘 seconds
		Stop action	Shut down 🗸
		Wait for heartbeat	🔿 Yes 💿 No
			Save Cancel

2. To configure a VM autostart, right-click on the VM, navigate to Autostart and click Enable.

<b>vm</b> ware <sup>®</sup> ESXi <sup>™</sup>				roo	ot⊚
"E" Navigator	sxi01.starwind.local - Manage		F SW1		
▼ 🗐 Host	System Hardware Licer	nsing Packages	Power	•	
Manage Monitor Gravital Machines Storage Networking Networking Networking Networks	System Hardware Licer Advanced settings Autostart Swap Time & date	Edit settings Edit settings Enabled Start delay Stop delay Stop action Wait for heartbest Enable & S Virtual machine Wittual machine Quick filters	Image: Guest OS         Image: Snapshots         Image: Console         Image: Autostart         Image: Opgrade VM Compatibility         Image: Export         Image: Export With Images         Image: Export With Images	Refresh   Actions	
			Help	· · ·	
	🗊 Recent tasks		둼 Open in a new window		

- 3. Complete the actions above on StarWind VM located on all ESXi hosts.
- 4. Start the virtual machines on all ESXi hosts.



# **Configuring Storage**

StarWind Virtual SAN for vSphere can work on top of Hardware RAID or Linux Software RAID (MDADM) inside of the Virtual Machine. Please select the required option:

# **Configuring Starwind Storage On Top Of Hardware** Raid

1. Add a new virtual disk to the StarWind Virtual SAN VM. Make sure it is Thick Provisioned Eager Zeroed. Virtual Disk should be located on the datastore provided by hardware RAID.

StarWindVSAN_vSphere - Edit	Settings	· ? 🕨
Virtual Hardware VM Options S	DRS Rules vApp Options	
▶	Client Device Connected	
▶ I Video card	Specify custom settings	
SATA controller 0		
▶ ∰ VMCI device		
<ul> <li>Other Devices</li> </ul>		
▶ Upgrade	Schedule VM Compatibility Upgrade	
👻 🥅 New Hard disk	20 GB 🔻	
Maximum Size	435,91 GB	
VM storage policy	Datastore Default	
Location	Store with the virtual machine	
Disk Provisioning	Thick provision eager zeroed	::
Sharing	Unspecified -	
Shares	Normal 🚽 1 000	
Limit - IOPs	Unlimited	
Virtual flash read cache	0 GB 🔻 Advanced	
Disk Mode	Dependent 🔹 🛈	
Virtual Device Node	SCSI controller 0 🛛 🔹 SCSI(0:1) 🔹	•
New device:	Add	
Compatibility: ESXi 5.5 and later (VM	version 10) OK C	ancel

NOTE: Alternatively, the disk can be added to StarWind VSAN VM as RDM. The link to



VMware documentation is below:

https://docs.vmware.com/en/VMware-vSphere/7.0/com.vmware.vsphere.vm\_admin.doc/G UID-4236E44E-E11F-4EDD-8CC0-12BA664BB811.html

NOTE: If a separate RAID controller is available, it can be used as dedicated storage for StarWind VM, and RAID controller can be added to StarWind VM as a PCI device. In this case RAID volume will be available as a virtual disk in the Drives section in the Web console. Follow the instructions in the section below on how to add RAID controller as PCI device to StarWind VM.

2. Login to StarWind VSAN VM web console and find in the Storage section under Drives the Virtual Disk that was recently added and choose it.

Storage - StarWindVSA-92154	28: × +	-		×
$\leftrightarrow$ $\rightarrow$ C $$ https://19	92.168.12.10:9090/system	☆		:
STARWIND VIRTUAL SAN		🔓 Privilege	d 🛓	root 🗸
StarWindVSA-92	RAID Devices		+	•
	No storage set up as RAID			
System Logs	Volume Groups		٠	
Storage	centos 15.0 GiB			
Networking				
Accounts	VDO Devices		+	
Services	No storage set up as VDO			
Terminal	Drives			
	VMware Virtual disk 16 GiB Hard Disk R: 0 B/s W: 10.0 KiB/s			
	VMware Virtual SATA CDRW Drive (000000000000000000000000000000000000	01)		
	VMware Virtual disk 20 GiB Hard Disk R: 0 B/s W: 0 B/s			
				*

3. The added disk does not have any partitions and filesystem. Press Create partition table and press Format afterward to create the partition and format it.

NOTE: It is not necessary to overwrite data while creating partition.



≋ Storage - StarWindVSA-921	5428: × +	-	
$\leftrightarrow$ $\rightarrow$ C $\square$ https://	/192.168.12.10:9090/system	☆	:
STARWIND VIRTUAL SAN		🔓 Privileged	💄 root 🗸
StarWindVSA-92	Storage » VMware Virtual disk		
System	Drive		
Logs	Model Virtual disk		
Storage	Firmware Version 1.0		
Networking	Capacity 20 GiB, 21.5 GB, 21474836480 bytes Device File /dev/sdb		
Accounts			
Services	Content	Create partitio	n table
Terminal	✓ 20 GiB Unrecognized Data /dev/sd	b	
	Unrecognized Data		
	Usage -		Format
	Туре -		

4. Create the XFS partition. Specify the name and erase option. The mount point should be as following: /mnt/%yourdiskname% . Click Format. To enable OS boot when mount point is missing (e.g., hardware failure), add *nofail* as a boot option.



📚 Storage - SW1	× +	-	
← → C 🔒 192.168	3.12.57:9090/storage	e#/sdb	☆ :
STARWIND VIRTUAL SAN			💄 root 🗸
🗐 sw1	Format /dev/so	lb	
System Logs	Erase Type Name	Overwrite existing data with zeros XFS - Recommended default disk1	~
Storage		Encrypt data	
Networking Accounts	Mounting Mount Point Mount Options	Custom /mnt/disk1 V Mount at boot	~
Services Terminal		Mount read only Custom mount options	
		Formatting a storage device will erase a	ll data on it. <b>Format</b>

5. On the storage page of the disk, navigate to the Filesystem tab. Click Mount.



Storage - StarWindVSA-9215	428 × +	-	
$\leftrightarrow$ $\rightarrow$ C $$ https://19	02.168.12.10:9090/system	\$	:
STARWIND VIRTUAL SAN		🔓 Privileged	💄 root 🗸
StarWindVSA-92	Storage » VMware Virtual disk		^
System	Drive		
Logs	Model Virtual disk		
Storage	Firmware Version 1.0 Capacity 20 GiB, 21.5 GB, 21474836480 bytes		
Networking	Device File /dev/sdb		
Accounts			
Services	Content	Create partition	table
Terminal	✓ 20 GiB xfs File System /dev/sdb		
	Filesystem		
	Name disk1	Fo	rmat
	Mount Point /mnt/disk1 Mount		
	Mount Options defaults		
	Used -		-

6. Connect to StarWind Virtual SAN from the StarWind Management Console. Click Yes.

StarWi	nd Management Console	×
	Storage pool is not configured! Would you like to configure it?	
	Yes Disconnect	

7. Select the disk which was recently mounted.



S Open				×
👔 Back 矈 New Folder 🚬	Delete			
VSA Storage media mnt	Nam	Size	Date 05/10/2019 07:24	Attributes
File name:			V	~
			Op	en Cancel

## **Configuring Starwind Storage On Top Of Software** Raid

Make sure that the prerequisites for deploying Software RAID with StarWind Virtual SAN are met:

- the ESXi hosts have all the drives connected through HBA or RAID controller in HBA mode
- StarWind Virtual SAN for vSphere is installed on the ESXi server
- StarWind Virtual SAN must be installed on a separate storage device available to the ESXi host (e.g. SSD, HDD etc.)
- HBA or RAID controller will be added via a DirectPath I/O passthrough device to a StarWind VM
- vCenter is installed in the environment to manage ESXi hosts

PCI Device Configuration

1. Login to the vCenter via vSphere Client. Select the host where StarWind Virtual SAN VM is installed.



🕗 vSphere Web Client	× +		- 🗆 X
← → C ▲ Not secu	ure   https://sw-sup-vcenter.starwind.loca	al/vsphere-client/?csp	<b>ħ</b> ☆ D ⊖ :
<b>vm</b> ware <sup>.</sup>			
User name: Password:	example@domain.local Use Windows session authentication	VMware®vCenter™ S	ingle Sign-On
Download Enhanced Auth	nentication Plugin		
d Download Enhanced Auth	renaction - rugin		



192.168.12.11	🛃 R. D. D.	) 📘 🔯 Actions	•	=*
Gettin Sum	Monitor Config	. Permi VMs	Datast Netwo	Updat
	192.168.12.11		CPU	FR.
6	Hypervisor:	VMw are ESXi, 6.7.0, 10302608	USED: 6,25 GHz	CAPAC
	Model:	Dell Inc. Pow erEdge R720	MEMORY	F
	Processor Type:	Intel(R) Xeon(R) CPU E5-2660 0 @	USED: 43,12 GB	CAPAC
		2.20GHz	STORAGE	
	Logical Processors:	32	USED: 3,36 TB	CAP.
	NICs:	7		
	Virtual Machines:	16		
	State:	Connected		
	Uptime:	24 days		
	<b>••••</b>			
Hardware		C	Configuration	
▼ Tags			Custom Attrib	outes
Assigned Tag	Category	Description	Attribute	Value
4	This list is empty ::		AutoDoploy Mo	•

2. Go to the Configure tab. In the Hardware section, select PCI Devices. Click Edit.



Betting S Summary Monitor	C	onfigure Permissio	VMs Datas	stores Netwo	rks Update
••		DirectPath I/O PCI Dev	ices Available to	VMs	
Power Management	*	/ 🖻 - C		Q Filter	
Advanced System Settings System Resource Reservation		D	Status	Vendor Name	Device Name
Security Profile System Swap					
Host Profile Hardware					
Processors Memory Power Management					
PCI Devices					
✓ Virtual Flash Virtual Flash Resource Management			No device s	elected	
Virtual Flash Host Swap Cache Configuration					

3. Locate the HBA/RAID Controller of the ESXi host. Check the box on the appropriate PCI device. Click OK.



<b>P</b> -				Q Filte	r	-
ID		Status	Vendor Name	Device Name	ESX Name	
0000:01	1:00.1	Unavailable	Broadcom Corporation	NetXtreme B		4
▼ 0000:0	0:02.2	Not Configurable	Intel Corporation	Xeon E5/Cor		
	0000:03:00.0	Available (pendi	LSI / Symbios Logic	PERC H710	vmhba1	
000 📷 📃	0:00:1A.0	Unavailable	Intel Corporation	C600/X79 ser		
000 📷 🗌	0:00:1D.0	Unavailable	Intel Corporation	C600/X79 ser		
- 0000:0	0:01.0	Not Configurable	Intel Corporation	Xeon E5/Cor		
	0000:02:00.1	Unavailable	Broadcom Corporation	NetXtreme B		:
	0000:02:00.0	Unavailable	Broadcom Corporation	NetXtreme B		
000 📷 🗌	0:00:1F.2	Unavailable	Intel Corporation	Patsburg 6 P		
This device is not Name		vill become available aft ini (for monolithics)		LSI / Symbios Logic	:	
Device ID	5B	,		1000	-	
Subdevice ID	1E38		Subvendor ID	1028		
Class ID	104		Subvenuor ID	1020		
Bus Location	104					
ID	0000:03:00.0		Slot	0		
Bus	3		Function	NAN		
ESX/ESXi Devic	e vmhba1					

4. The device will appear in the Direct I/O PCI Devices Available to VMs table in the Available (pending) status.



Betting Started Summary Moni	tor	Configure Permissi	ons VN	Is Datastor	es Networks Up	date Manager
DirectPath I/O PCI Devices Available to VMs						
	•	/ 🗈 - C			Q Filter	-
Storage Adapters			St	tatus	Vendor Name	Device Name
Storage Devices		▼ 0000:00:02.2	N			Xeon E5/Core
Datastores	::	0000:03:00	).0 A	vailable (pen.	LSI / Symbios	PERC H710 M
Host Cache Configuration						
Protocol Endpoints						
I/O Filters		1 device will become a	available	when this ho	st is rebooted. Ret	poot This Host
<ul> <li>Networking</li> </ul>				_		
Virtual switches		0000:00:02.2				
VMkernel adapters		This device cannot be	made av	ailable for VIV	ls to use	
Physical adapters		Name		5/Core i7	Vendor Name	Intel Corporation
TCP/IP configuration			Root Po	Express ort 2c	Vendor ID	8086
Advanced		Device ID	3C06		Subvendor ID	0
<ul> <li>Virtual Machines</li> </ul>		Subdevice ID	0			
			004			
VM Startup/Shutdown		Class ID	604			

5. Reboot ESXi host. After the reboot, the status changes to Available.

🔋 192.168.12.11 🛛 🛃 😓 🕞 🕼 🎲 Actions 🗸 🚍					
Getting Started Summary Monitor	Configure Permissi	ons VI	Vis Datastores N	etworks Update Ma	inager
	DirectPath I/O PCI De	vices Ava	ilable to VMs		
Storage     Storage Adapters	🥖 🗈 - C			Q Filte	r •)
Storage Devices	ID ▼ 📷 0000:00:02.2		Status Not Configurable	Vendor Name Intel Corporation	Device Name Xeon E5/Core i7
Datastores :: Host Cache Configuration	0000:03:00	0.0	Available	LSI / Symbios L	PERC H710 Mini
Protocol Endpoints					
I/O Filters					
✓ Networking Virtual switches	0000:00:02.2		_		
VMkernel adapters	This device cannot be	made a	vailable for VMs to us	е	
Physical adapters	Name	Xeon E	5/Core i7 IIO PCI Exp	ress Root Port 2c	
TCP/IP configuration	Device ID	3C06			
Advanced	Subdevice ID	0			
▼ Virtual Machines	Class ID	604			
VM Startup/Shutdown	Bus Location				
Agent VM Settings ▼ <ul> <li>Image: Agent VM Settings</li> </ul>	ID	0000:00	0:02.2		

6. Right-click on the StarWind Virtual SAN VM. Select Edit Settings.



Getting Started Summary Monito	r Permissions VMs Update Manager
✓      ✓      Sw-Sup-vc     Actions - StarWindVSAN_vSphere	
Ver Power	objects Folder
▶ 🔚 Bits Guest OS ▶	Folders
Dis Snapshots	
▶ Gat	ventory W.
▼ Oni Template	
▶ <mark></mark> Par	
Fault Tolerance	
► Rer VM Policies ►	
Compatibility	
▶ Tall	
Yur Export System Logs	•••
Edit Resource Settings	
Edit Settings	
Move To	
Rename	Explore Further
Edit Notes	Learn more about folders
Tags & Custom Attributes	

7. Click ADD NEW DEVICE. Select PCI Device.



StarWindVSAN_vSphere - Edit Settings     ? •					
Virtual Hardware VM C	Options SDRS Rules	vApp Options			
▶ 🔲 CPU	4	• 0			
Memory	NVDIMM	MB			
▶ □ Hard disk 1	🚐 New Hard Disk	GB 🚽			
▶ 🛄 Hard disk 2	Existing Hard Disk	GB			
▶ SCSI controller 0	RDM Disk				
Network adapter 1	Network	Connected			
Network adapter 2	[	Connected			
▶ 📻 Network adapter 3		Connected			
▶ <ol> <li>▶ CD/DVD drive 1</li> </ol>	Floppy Drive	Connected			
▶ Uideo card	Serial Port	•			
SATA Controller 0	Parallel Port				
<ul> <li>المجاه المحافظة المحافظ المحافظة المحافظة المحاف محافظة المحافظة المحافي محافظة المحافظة المحافظة المحافظة المحافظة المحافظة المحافظة المحافظة المحافظة المحافظ محافظة المحافظة المحافظة المحافظة المحافظة محافظة محافضي محافظة محافظة محافظة محافظة محافظة محافظة محافي محافظة محا</li></ul>	Host USB Device				
<ul> <li>Other Devices</li> </ul>	USB Controller				
▶ Upgrade	SCSI Device	ty Upgrade			
	PCI Device				
	SCSI Controller				
New device:	Select	Add			
Compatibility: ESXi 5.5 an	nd later (VM version 10)	ок	Cancel		

8. Add HBA/RAID Controller to the VM. Reserve memory for the StarWind Virtual Machine. Click OK.

9. Boot StarWind Virtual SAN VM.

10. Repeat steps 1-8 for all hosts where StarWind Virtual SAN for vSphere is deployed.

11. Login to StarWind Virtual SAN VM via IP. The default credentials:

Login: user Password: rds123RDS NOTE: Please make sure that the default password is changed.



StarWindVSA-92154285 × +	-		×
← → C 🔒 https://192.168.12.10:9090/system	☆		:
≈ Sta StarWind Virtual SAN	r Wan	đ	
	WindVSA-9215		
Password Log in with yo	our server user a	account.	
Reuse my password for privileged tasks			
Log In			

12. Go to the Storage page. The Drives section shows the drives connected to HBA/RAID Controller (if available). For each disk, create partition table.



≈ Storage - StarWindVSA-92	15428: × +	– 🗆 X
$\leftrightarrow$ $\rightarrow$ C $\square$ https://	192.168.12.10:9090/system	☆ :
STARWIND VIRTUAL SAN		🔒 Privileged 💄 root 🗸
StarWindVSA-92	MiB/s Reading	100
System Logs	512 256	
Storage	0 14:59 15:00 15:01	15:02 15:03
Networking Accounts	96 64 32	
Services	0 14:59 15:00 15:01	15:02 15:03
Terminal	Filesystems	
	Name Mount Point Size	
	/dev/centos/root /	2.35 / 13.4 GiB
	/dev/sda1 /boot	133 / 1014 MiB
	disk1 /mnt/disk1	0.0315 / 20.0 GiB

13. Click "+" in the RAID Devices section to create Software RAID. (In the current example, RAID 10 will be created with 4 HDD drives). StarWind recommendations of RAID configurations depending on the number of disks, chunk size, and array level are shown in the table below:

RA	ID Level	Chunk size for HDD Arrays	Chunk size for SSD Arrays
0		Disk quantity * 4Kb	Disk quantity * 8Kb
5		(Disk quantity – 1) * 4Kb	(Disk quantity – 1) * 8Kb
6		(Disk quantity – 2) * 4Kb	(Disk quantity – 2) * 8Kb
	10	(Disk quantity * 4Kb)/2	(Disk quantity * 8Kb)/2

StarWind Software RAID recommended settings can be found here: https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-h dd-and-ssd-disks/



14. Select the drives to add to the array.

Storage - StarWindVSA-92	15428: × +		- 🗆 ×
$\leftrightarrow$ $\rightarrow$ C $$ https://	192.168.12.10:9	090/system	\$
STARWIND VIRTUAL SAN			🔒 Privileged 💄 root 🗸
StarWindVSA-92	Create RAID	Device	
System	Name RAID Level	RAID10 RAID 10 (Stripe of Mirrors)	~
Logs	Chunk Size	512 KiB	~
Storage	Disks	I6 GiB DELL PERC H710F	/dev/sdc
Networking		✓ 16 GiB DELL PERC H710F	/dev/sdd
Accounts		✓ 16 GiB DELL PERC H710F	/dev/sde
Services		I6 GiB DELL PERC H710F	/dev/sdf
Terminal			
			Cancel Create
		No storage set up as VDO	
	Drives		
		/Mware Virtual disk 16 GiB Hard Disk R: 0 B/s W: 0 B/s	

15. After the synchronization is finished, find the RAID array created. Press Create partition table and press Format afterward to create the partition and format it.

NOTE: It is not necessary to overwrite data while creating a partition.



Storage - StarWindVSA-92154	428 × +	-	
$\leftrightarrow$ $\rightarrow$ $C$ $$ https://1	92.168.12.10:9090/system	☆	:
STARWIND VIRTUAL SAN		Privileged	💄 root 🗸
StarWindVSA-92	Storage » RAID10		A
System	RAID Device RAID10	Stop De	lete
Logs	Device /dev/md/RAID10		
Storage	UUID fd81b6ab:31d1c828:1f0cbefb:a84290b3		
Networking	Capacity 32.0 GiB, 34.3 GB, 34324086784 bytes		
Networking	RAID Level RAID 10, 4 Disks, 512 KiB Chunk Size		
Accounts	Bitmap ON		
Services	State Running		
Terminal			
			_
Services	Bitmap ON		

16. Create the XFS partition. Mount point should be as follows: /mnt/%yourdiskname% . Select the Custom mounting option and type noatime. To enable OS boot when mount point is missing (e.g., hardware failure), add *nofail* as a boot option. Click Format.



Storage - StarWindVSA-921	5428: × +		-		×
$\leftarrow$ $\rightarrow$ C $\square$ https://	/192.168.12.10:909	0/system	☆		:
STARWIND VIRTUAL SAN	🔓 Privileged	:	root ~		
StarWindVSA-92	Format /dev/m	d/RAID10			Т
System	Erase Type	Don't overwrite existing data XFS - Red Hat Enterprise Linux 7 default		~	
Logs Storage	Name Mounting	raid10			
Networking	Mount Point	mnt/raid10		~	
Accounts		<ul> <li>Mount at boot</li> <li>Mount read only</li> </ul>			
Services		Custom mount options noatime			
Terminal		Formatting a storage device		ta on i ormat	t.
	Unrecognized I Usage - Type -	Data	Fc	ormat	]

17. On the storage page of the disk, navigate to the Filesystem tab. Click Mount.



Storage - StarWindVSA-921	5428: × +	-		×
$\leftrightarrow$ $\rightarrow$ C $$ https://	/192.168.12.10:9090/system	☆		:
STARWIND VIRTUAL SAN		🔓 Privileged	💄 ro	oot ~
StarWindVSA-92	Content	Create partition	table	•
System	✓ 32.0 GiB xfs File System /dev/md/RAID10			
Logs	Filesystem			
Storage	Name raid10	F	ormat	
Networking	Mount Point mnt/raid10 Mount			
Accounts	Mount Options noatime Used -			
Services				
Terminal				
4				

18. Connect to StarWind Virtual SAN from StarWind Management Console or from Web Console. Click Yes.

StarWi	nd Management Console X	
	Storage pool is not configured! Would you like to configure it?	
	Yes Disconnect	

19. Select the disk recently mounted.



S Open					Х
👔 Back 🝌 New Folder 🚽	Delete				
VSA Storage		Name	Size	Date 05/10/2019 07:24	Attributes
File name:		1			en Cancel
				0	Concel

# **Configuring Deduplication**

To configure VDO please choose a disk, where to place vdo device, logical size (recommended up to x3 of physical storage) and index memory size. NOTE: It is recommended to use a sparse UDS index for all production use cases. This is an extremely efficient indexing data structure, requiring approximately one-tenth of a byte of DRAM per block in its deduplication window. On disk, it requires approximately 72 bytes of disk space per block. The minimum configuration of this index uses 256 MB of DRAM and approximately 25 GB of space on disk. To use this configuration, specify the —-sparseIndex=enabled —-indexMem=0.25 options to the vdo create command. This configuration results in a deduplication window of 2.5 TB (meaning it will remember a history of 2.5 TB). For most use cases, a deduplication window of 2.5 TB is appropriate for deduplicating storage pools that are up to 10 TB in size.

1. Open Terminal and paste the following command with your parameters:

```
vdo create --name=%name% --device=%yourdevice% --
vdoLogicalSize=%size% --verbose --deduplication=enabled --
emulate512=enabled --compression=disabled
vdo modify -n %name% --vdoAckThreads=4 --vdoCpuThreads=4 --
vdoLogicalThreads=4 --vdoPhysicalThreads=4 --
vdoHashZoneThreads=2 --vdoBioThreads=4 --
blockMapCacheSize=2048M
```



vdo stop -n %name%; vdo start -n %name%

2. Click Create.

Wait until creation is finished. And find new VDO devices in the corresponding section.

Hint: Created VDO device will not have any partitions and filesystem.

🛃 vSphere - demo-vdo - Summ	no X 💐 Steringe - Starlinditisk-Demoi: X +	- σ ×
€ → ሮ ŵ	0 🔒 https://192.168.13.865/950/storage#/vdo/vdo0	··· ⊘ ☆ II\ ① ≡
STARWIND VIRTUAL SAN		🛓 root v
TitarWindVSA-D	Savage > vdo0	
System	VDD Device visio	Stop Delete
Logs Storage	Device Hie Adeulinespeer/eds0 Backing Device: Withware Visual disk Physical: 0 data + 4.06 GB overhead used of 100 GB (4%)	
Neovorking Accounts Services	logical Quard of 300 Gall (- saved) Grown Index Merrory 25 MB Compression CM	
Terminal	Content	
	Unrecognized Data	
	Ulage - 7ура -	Format

3. Click Format



#### Format /dev/md/RAID10

Erase	Overwrite existing data with zeros ~
Туре	XFS - Red Hat Enterprise Linux 7 default 🗸 🗸 🗸
Name	Disk1
Mounting	Custom ~
Mount Point	/mnt/disk1
Mount options	Mount at boot
	Mount read only
	Custom mount options
	Formatting a storage device will erase all data on it.
	Cancel Format

4. Create XFS partition. Mount point should be as following: /mnt/%yourdiskname%

Add following custom mounting options to keep mount persistent across reboots: defaults,discard,x-systemd.requires=vdo.service and click Format

5. On the storage page of the disk, navigate to the Filesystem tab. Click Mount

Content	
✓ 300 GiB xfs File System	/dev/mapper/vdo0
Filesystem	
Name VDOdisk1 Mount Point /mnth/dodisk Mount Mount Options defaults Used -	Format



# **Provisioning Storage With Starwind Vsan**

#### Creating StarWind HA devices

- 1. Open StarWind Management Console and click on the Add Device (advanced) button.
- 2. Select Hard disk device as the type of device to be created. Click Next to continue.
- 3. Select Virtual disk. Click Next to continue.
- 4. Specify virtual disk Name, Location, and Size.

			?	×
←	Add Device Wiza	rd		
	Virtual Disk Loc	ation		
	Create a New \	/irtual Disk		
	Name:	DS1	]	
	Location:	VSA Storage\mnt\ssd\		
	Size:	1 GB ~		
	OUse an Existing	Virtual Disk		
	Location:	~		
	Read-On	ly Mode		
		Next	Can	cel

NOTE: Image file device and HA device can be extended later according to the steps in KB article:

#### How to extend Image File or High Availability device

5. Specify virtual disk options.



		?	×
←	Add Device Wizard		
	Virtual Disk Options		
	Thick-provisioned		
	O Thick-provisioned with Write Log (experimental)		
	Olsfs		
	Deduplication		
	StarPack Cache Size: 16 MB $\checkmark$		
	Block Size		_
	○ Use 4096 bytes sector size. May be incompatible with some clients		
	Next	Can	cel

NOTE: Sector size should be 512 bytes in case of using ESXi.

6. Define the RAM caching policy and specify the cache size (in the corresponding units) and click Next to continue.



			?	Х
←	Add De	vice Wizard		
	Specify [	Device RAM Cache Parameters		
	Mode			
	0	Write-Back Writes are performed asynchronously, actual Writes to Disk are delayed, Reads are cached	5	
	0	Write-Through Writes are performed synchronously, Reads are cached		
	۲	N/A Reads and Writes are not cached		
	Set M	1aximum available Size		
	Size:	128 MB ~		
		Next	Cano	:el

7. Define the Flash caching policy and the cache size. Click Next to continue.



				?	×
←	Add	l Device Wizard	1		
	Specif	fy Flash Ca	che Parameters		
		No Flash Cache			
	Ou	Jse Flash Cache			
		Name:	Flash-DS1		
		Location:	VSA Storage\mnt\ssd\		
		Size:	1 GB $\vee$		
			<u>N</u> ext	Cano	:el

8. Specify Target Parameters and select the Allow multiple concurrent iSCSI connections checkbox to enable several clients to connect simultaneously to the target.



×
_
$\sim$
_
ancel
a

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



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

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

11. Click Finish to close the wizard.

12. Right-click on the recently created device and select Replication Manager from the shortcut menu.

13. Click Add replica.



😴 Replication Manager for imagefile1	?	×
Refresh Add Replica Remove Replica		
Replication Partner		
Click to add replication partner		
PROPERTIES		
Host Name		
Target Name		
Mode		
Priority		
Synchronization Status		
Synchronization Channel		
	Clos	æ

14. Select Synchronous "Two-Way" Replication as a replication mode.



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

15. Specify Partner Hostname or IP Address and Port Number. Click Next.



			?	×
←	Replication Wizard			
	Add Partner Node			
	Specify Partner Host Name	or IP Address where Replication Node would be created		
	Host Name or IP Address	sw2 v		
	Port Number	3261		
		Next	Cano	cel

16. Choose 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		
Numa Node: Auto ~		
Ne	xt C	ancel

17. Choose the device Location and specify the target name if required. Otherwise, the name is generated automatically in accordance with the specified target alias.



		? ×	
÷	Replication Wizard		
	Partner Device Setup		
	Location: VSA Storage\mnt\ssd\		
	iqn.2008-08.com.starwindsoftware:sw-hca-vm-02-ds1		
	Modify Target Name		
	<u>N</u> ext	Cancel	18

Select Synchronization Journal Strategy and click Next.

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

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

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

Disk-based journal placed on a separate disk from StarWind devices. It allows to avoid full synchronization for the devices where it's configured even when StarWind service is being stopped on all nodes.

Disk-based synchronization journal should be placed on a separate, preferably faster disk from StarWind devices. SSDs and NVMe disks are recommended as the device performance is defined by the disk speed, where the journal is located. For example, it can be placed on the OS boot volume.

It is required to allocate 2 MB of disk space for the synchronization journal per 1 TB of HA



device size with a disk-based journal configured and 2-way replication and 4MB per 1 TB of HA device size for 3-way replication.

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

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

		?	$\times$
÷	Replication	Wizard	
	Synchroniza	ation Journal Setup	
	Synch	I- <b>based journal</b> nronization journal placed in RAM. Synchronization with RAM journal provides goo erformance in any scenario.	d
	<u> </u>	-based journal pronization journal placed on disk.	
	۲	Failure journal The strategy provides good IO performance while all device nodes are in a heal state.	thy
	0	<b>Continuous journal</b> The strategy guarantees fast synchronization and data consistency in all cases	
	Current Node	B My Computer\C\	
	Partner Node	My Computer\C\	
		<u>N</u> ext C	ancel

19. Click Change Network Settings.



	?	×
	<ul> <li>Replication Wizard</li> </ul>	
-	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 SW-HCA-01, SW-HCA-02	
	Change ALUA Settings	
	<u>N</u> ext Cance	I

20. Specify the interfaces for Synchronization and Heartbeat channels. Click OK. Then click Next.



Interfaces	Networks	Synchronization and H	Heartbeat
		,	
Host Name: SV	V-HCA-01		
172.16.10.1	172.16.10.0		•
172.16.2.111	172.16.2.0		•
172.16.20.1	172.16.20.0	<b>V</b>	
Host Name: SV	V-HCA-02		
172.16.10.2	172.16.10.0		<b>v</b>
172.16.2.112	172.16.2.0		✓
172.16.20.2	172.16.20.0		

21. Choose Synchronize from existing Device



				?	×
←	Repli	cation Wizard			
	Select	Partner Device Initialization Mode			
	۲	Synchronize from existing Device All Data from existing Device would be copied to new Device			
	0	<b>Do not Synchronize</b> Data on HA Nodes remains unchanged.			
			Next	Cano	el

22. Click Create Replica.



	?	×
Replication Wizard		
Creation Page		
Creating Device Folder		^
Creating Storage File on Partner Host		
Creating Storage Header on Partner Host		
Creating Storage Device on Partner Host		
Creating Device Header on Partner Host		
Creating Device Header on current Host		
Requesting Device Name		
Updating Target Device on current Host		×
Create Replica	Ca	ancel

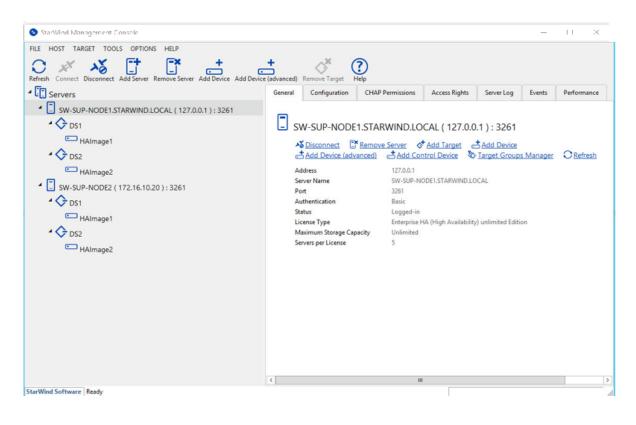
Click Finish to close the wizard.

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



StarWind Management Console -		×
		~
FILE HOST TARGET TOOLS OPTIONS HELP		
Refresh Connect Disconnect Add Server Remove Server Add Device (advanced) Remove Target		
Servers		
▲ 🗍 SW-SUP-NODE1.STARWIND.LOCAL (127.0.0.1): 3261		
4 S DS1		
Target IQN iqn.2008-08.com.starwindsoftware:sw-sup-node2-ds1 HAImage1 Clustering Ves		
Image: Instrument of the second sec		
Device Name         LUN         Device Type         State           Image1         0         HA         Activ	_	
	1	
iscsi Sessions (2)		
Initiator Name		
ign.2008-08.com.starwindsoftware:sw-sup-node1.starwind.local-ds1 ign.2008-08.com.starwindsoftware:sw-sup-node1.starwind.local-ds1		
i Qiqn.2008-06.com.starwindsortwaretsw-sup-node it.starwindsocal-ds i		
CHAP Permissions (0) + Add Permission		
Target CHAP Name Initiator CHAP Name		
No CHAP Permissions configured		
<		>

24. Follow the similar procedure to create other virtual disks that will be used as datastores.





# **Preparing Datastores**

### **Adding Discover Portals**

1. To connect the previously created devices to the ESXi host, click on the Storage -> Adapters -> Configure iSCSI and choose the Enabled option to enable Software iSCSI storage adapter.

Datastores	Adapters Devices	
Configure is	SCSI 💻 Rescan   🧲 Refresh   🛉	Actions
Name	Configure iSCSI - vmhba65	
飅 vmhba0		
对 vmhba1	iSCSI enabled	O Disabled   Enabled
Minimizer with the second seco	▶ Name & alias	iqn.1998-01.com.vmware:sw-mar-pc3-6fbab48a
	▶ CHAP authentication	Do not use CHAP
	<ul> <li>Mutual CHAP authentication</li> </ul>	Do not use CHAP
	<ul> <li>Advanced settings</li> </ul>	Click to expand
	Network port bindings	http://www.communications.com/communications/communicati
		VMkernel NIC v Port group v IPv4 address v
		· · · · · · ·
	Static targets	🔯 Add static target 🛛 👰 Remove static target 🥒 Edit settings
		Q Search

2. In the Configure iSCSI window, under Dynamic Targets, click on the Add dynamic target button to specify iSCSI interfaces.



	Configure i SC SI - vmhba65		
vmhba0 vmhba1	iSCSI enabled	O Disabled   Enabled	
vmhba64	Name & alias	iqn.1998-01.com.vmware:sw-mar-pc3-6fbab48a	
	▶ CHAP authentication	Do not use CHAP	
	Mutual CHAP authentication	Do not use CHAP	
	<ul> <li>Advanced settings</li> </ul>	Click to expand	
	Network port bindings	🕍 Add port binding 🛛 🛒 Remove port binding	
		VMkernel NIC ~ Port group ~	<ul> <li>IPv4 address</li> </ul>
	Static targets	🔯 Add static target 🛛 👰 Remove static target 🥒 Edit se	ttings
			Q Search
		Target ~ Address	~ Port ~

3. Enter the iSCSI IP addresses of all StarWind nodes for the iSCSI traffic.

	🕎 Remove dynamic target 🏼 🥒 Edit s	ettings	Q Search
Address	~	Port	~
172.16.10.10		3260	
Click to add address		3260	

🙋 Add dynamic target 🛛 👰 Remove dynamic target 🥒 Edit s	settings Q Search
Address ~	Port ~
172.16.10.10	3260
172.16.10.20	3260
	Save configuration Cancel

Confirm the actions by pressing Save configuration.

4. The result should look like in the image below:



Configure iSCSI			
iSCSI enabled	O Disabled		
Name & alias	iqn.1998-01.com.vmware:sw-mar-pc3-6fbab48a		
<ul> <li>CHAP authentication</li> </ul>	Do not use CHAP		
Mutual CHAP authentication	Do not use CHAP		
<ul> <li>Advanced settings</li> </ul>	Click to expand		
Network port bindings	Add port binding 🛛 🙀 Remove port binding		
	VMkernel NIC ~ Port group	✓ IPv4 addr	ress ~
	No port l	bindings	
Static targets	💆 Add static target 🛛 👰 Remove static target 🥜 Edit settings	5	Q Search
	Target ~	Address ~	Port ~
	iqn.2008-08.com.starwindsoftware:sw1-ds1	172.16.10.10	3260
	iqn.2008-08.com.starwindsoftware:sw1-ds2	172.16.10.10	3260
	iqn.2008-08.com.starwindsoftware:sw2-ds1	172.16.10.20	3260
	iqn.2008-08.com.starwindsoftware:sw2-ds2	172.16.10.20	3260
Dynamic targets	🔯 Add dynamic target 🛛 👰 Remove dynamic target 🥒 Edit s	ettings	Q Search
	Address ~	Port	~
	172.16.10.10	3260	
	172.16.10.20	3260	
			Save configuration Cancel

5. Click on the Rescan button to rescan storage.

atastores Adapters Devices				
🗐 New datastore 🛛 Increase capacity 📕 Rescan 📔 🤁 Refresh 📔 🏠 Actions				
Name	~ Status	~ Туре	~ Capacity	
STARWIND ISCSI Disk (eui.f8289e52a311c08d)	Normal	Disk	3 GB	
Local NECVMWar CD-ROM (mpx.vmhba64:C0:T0:L0)	Normal	CDROM	Unknown	
STARWIND ISCSI Disk (eui.ccdb82632aff4068)	📀 Normal	Disk	3 GB	
Local VMware Disk (mpx.vmhba0:C0:T0:L0)	Normal	Disk	40 GB	

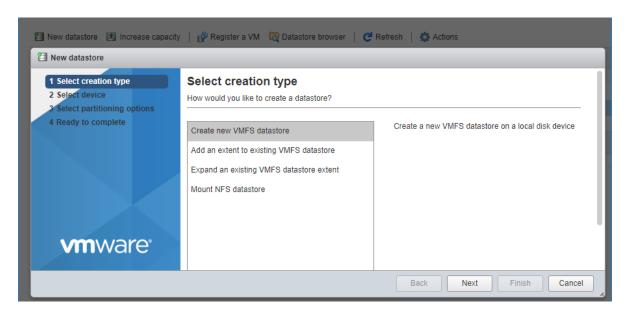
6. Now, the previously created StarWind devices are visible to the system.

7. Repeat all the steps from this section on the other ESXi host, specifying corresponding IP addresses for the iSCSI subnet.

### **Creating Datastores**

1. Open the Storage tab on one of your hosts and click on New Datastore.





2. Specify the Datastore name, select the previously discovered StarWind device, and click Next.

省 New datastore 📧 Increase capaci	ty 🕴 🚰 Register a VM 🛛 🤯 Datastore browse	r   C Refresi	n   🏠 Act	tions			
Name	~	Drive Type	`	Capacity		~ Provisio	ned
New datastore - DS1							
<ul> <li>1 Select creation type</li> <li>2 Select device</li> <li>3 Select partitioning options</li> <li>4 Ready to complete</li> </ul>	Select device Select a device on which to create a new VMF Name DS1 The following devices are unclaimed and can		e a new VMF	-S datastore			
	Name STARWIND ISCSI Disk (eui.22ae584be2 STARWIND ISCSI Disk (eui.8d6cd81bcc		Type Disk Disk	Capacit 5 GB 6 GB	y ~	Free space 5 GB 6 GB	~
						:	2 items
<b>vm</b> ware <sup>®</sup>				Back	Next	Finish	Cancel

3. Enter datastore size and click Next.



🗐 New datastore - DS1				
<ul> <li>1 Select creation type</li> <li>2 Select device</li> <li>3 Select partitioning options</li> <li>4 Ready to complete</li> </ul>	Select partitioning optic Select how you would like to partition to Use full disk	the device	T	
	Before, select a partition	,	After	MFS (5 GB)
<b>vm</b> ware				
			Back	Next Finish Cancel

4. Verify the settings and click Finish.

5. Add another Datastore (DS2) in the same way but select the second device for the second datastore.

6. Verify that your storages (DS1, DS2) are connected to both hosts. Otherwise, rescan the storage adapter.

🗊 New datastore 📧 Increase capacity   💕 Register a VM 🛛 🧔 Datastore browse	r 📔 Ċ Refresh 📔 💮 Actio	ns		
Name ~	Drive Type ~	Capacity ~	Provisioned ~	Free
atastore1 (1)	Non-SSD	32.5 GB	972 MB	31.55 GB
DS1	Non-SSD	4.75 GB	1.41 GB	3.34 GB
DS2	Non-SSD	5.75 GB	1.41 GB	4.34 GB

NOTE: Path Selection Policy changing for Datastores from Most Recently Used (VMware) to Round Robin (VMware) is added into the Rescan Script, and this action is performed automatically. For checking and changing this parameter manually, the hosts should be connected to vCenter.

Multipathing configuration can be checked only from vCenter. To check it, click the Configure button, choose the Storage Devices tab, select the device, and click the Edit Multipathing button.



		Storage Devices								
Storage	^	🛃 🚊   🗟 🗟 🛋 🥥 🥥 📧   🎆 All Ac	tions ¬	•	-				Q	Filter
Storage Adapters		Name	LUN		Туре	Capacity	Operational State	Hardware Acceleration	Drive Type	Transport
Storage Devices		Local VMware Disk (mpx.vmhba0:C0:T0:L0)		0	disk	40,00 GB	Attached	Not supported	HDD	Parallel SCSI
Datastores	::	Local NECVMWar CD-ROM (mpx.vmhba64:C0:T0		0	cdrom		Attached	Not supported	HDD	Block Adapter
Host Cache Configuration		STARWIND iSCSI Disk (eui.22ae584be2580eda)		0	disk	5,00 GB	Attached	Supported	HDD	iSCSI
Protocol Endpoints		STARWIND iSCSI Disk (eui.8d6cd81bccb9730d)		0	disk	6,00 GB	Attached	Supported	HDD	iSCSI
I/O Filters	H									
Networking		Device Details				=				
Virtual switches		Device Details								
VMkernel adapters		Properties Paths								
Physical adapters		Logical Partitions     U								
TCP/IP configuration										
		Multipathing Policies								Edit Multipathing
Advanced		Path Selection Policy Most Recently Used	(VMwa	re)						
Advanced Virtual Machines		F Tauroelecuorrollicy Wost Recently Oseu								

Path selection policy: Round Robin (VMware)				
Select the preferred path f	or this policy:			
<b>•</b> •		٩	Filter	-
Runtime Name	Status	Target	LUN	Preferred
vmhba65:C0:T3:L0	<ul> <li>Active</li> </ul>	iqn.2008-08.com.starwindsoftware:sw	0	
vmhba65:C0:T1:L0	<ul> <li>Active (I/O)</li> </ul>	iqn.2008-08.com.starwindsoftware:sw	0	

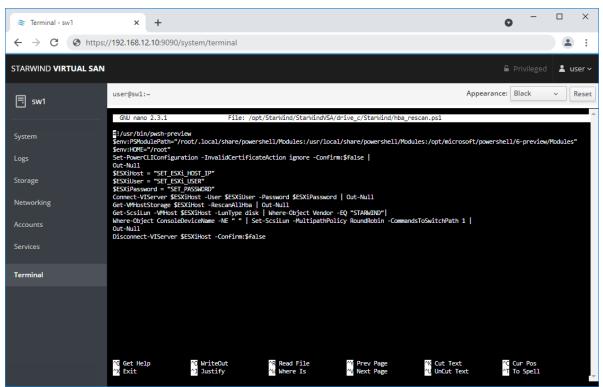
# **Configuring An Automatic Storage Rescan**

1. Open the Terminal page.

2. Edit file /opt/StarWind/StarWindVSA/drive\_c/StarWind/hba\_rescan.ps1 with the following command:



sudo nano /opt/StarWind/StarWindVSA/drive\_c/StarWind/hba\_rescan.ps1



3. In the appropriate lines, specify the IP address and login credentials of the ESXi host (see NOTE below) on which the current StarWind VM is stored and running:
\$ESXiHost = "IP address"
\$ESXiUser = "Login"
\$ESXiPassword = "Password"

NOTE: In some cases the rescan script can be changed and storage rescan added for another ESXi host. Appropriate lines should be duplicated and changed with properly edited variables if required.

NOTE: In some cases, it makes sense to create a separate ESXi user for storage rescans. To create the user, please follow the steps below:

Log in to ESXi with the VMware Host Client. Click Manage, and under Security & users tab, in the Users section click Add user button. In the appeared window, enter a user name, and a password.



🔮 esxi01.starwind.local - VMware 🗄 🗙	+		0	- 0	×
← → C ▲ Not secure   19	2.168.12.225/ui/#/host/manage/securi	ity/users		\$	:
vmware <sup>,</sup> ESXi <sup>,,</sup>			02.168.12.225 👻   Help 👻   🔍 Sea	rch	P
Ravigator	esxi01.starwind.local - Manage				
✓ ☐ Host Manage	System Hardware Licensing	Packages Services Secu	urity & users		
Monitor		Add user 🥒 Edit user 🛛 🛔 Remove us	ser C Refresh		
👻 🗄 Virtual Machines 🗾 1	Authentication Certificates	ser Name	~ Description	~	
✓ ∰ SW1 Monitor	Users	ot	Administrator		
More VMs	Roles			1 items 🦼	
✓ ■ Storage	Lockdown mode	Add a user			
vmhba65					
More storage    More storage  More		User name (required)	rescan		
		Description	Storage rescan		
		Password (required)			
		Confirm password (required)			
			Add Cancel		
	E Recent tasks				

Create a new Role, under Roles section, and click New Role button. Type a name for the new role. Select privileges for the role and click OK.

The following privileges might be assigned: Host – Inventory, Config, Local Cim, and Global – Settings.

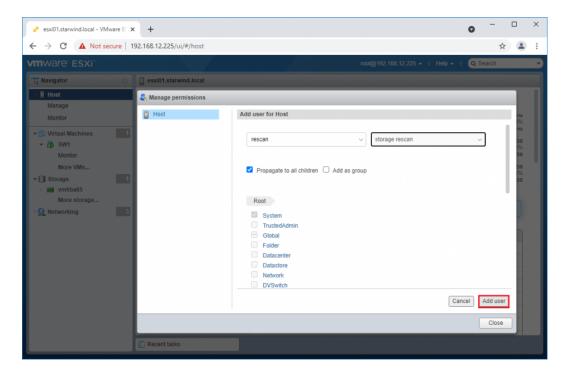
🚅 esxi01.starwind.local - VMware E 🗙	+			• -		×
← → C ▲ Not secure   19	92.168.12.225/ui/#/host/manage/sec	urity/roles			*	:
				Q Search		P
<ul> <li>Navigator</li> <li>Host</li> <li>Manage</li> <li>Monitor</li> <li>Virtual Machines</li> <li>Virtual Machines</li> <li>SW1 Monitor</li> <li>SW1 More VMs</li> <li>Storage</li> <li>More storage</li> <li>Networking</li> <li>3</li> </ul>	esxi01.starwind.local - Manage         System       Hardware       Licensir         Acceptance level       Authentication       Certificates         Users       Users       E         Lockdown mode       Image: Certificate start       Image: Certificate start	ng Packages Services See Add role Zelit role Remove ro Add a role Role name (required) Privileges	curity & users	Q Search		
			Host     VirtualMachine     Resource			I
	🕄 Recent tasks		[	Add	Cancel	*



Assign permission to the storage rescan user for an ESXi host – right-click Host in the VMware Host Client inventory and click Permissions. In the appeared window click Add user.

Click the arrow next to the Select a user text box and select the user that you want to assign a role to. Click the arrow next to the Select a role text box and select a role from the list.

(Optional) Select Propagate to all children or Add as group. Click Add user and click Close.



Make sure that rescan script is working and execute it from the VM: sudo /opt/StarWind/StarWindVSA/drive\_c/StarWind/hba\_rescan.ps1

4. Repeat all steps from this section on the other ESXi hosts.

### **Performance Tweaks**

1. Click on the Configuration tab on all of the ESXi hosts and choose Advanced Settings.



Advanced settings	🥒 Edit option 📔 🤁 Refresh 🛛 🔹 Actions	
Autostart	Key 🔺	~ Name
wap		<ul> <li>Institute</li> <li>Delay in millipeconds for completion or commands with a boot status</li> </ul>
me & date	Disk.DeviceReclaimTime	The number of seconds between device re-claim attempts
	Disk.DisableVSCSIPollInBH	Disable VSCSI_Poll in bottom half. Set to 1 to disable.
	Disk.DiskDelayPDLHelper	Delay PDL helper in secs
	Disk.DiskMaxIOSize	Max Disk READ/WRITE I/O size before splitting (in KB)
	Disk.DiskReservationThreshold	Time window within which refcounted reservations on a device are per
	Disk.DiskRetryPeriod	Retry period in milliseconds for a command with retry status
	Disk.DumpMaxRetries	Max number of I/O retries during disk dump
	Disk.DumpPollDelay	Number of microseconds to wait between polls during a disk dump.
	Disk.DumpPollMaxRetries	Max number of device poll retries during disk dump
	Disk.EnableNaviReg	Enable automatic NaviAgent registration with EMC CLARiiON and Invis
	Disk.FailDiskRegistration	Fail device registration if disk has only standby paths and supports only
	Disk.FastPathRestoreInterval	Time interval (in msec) to monitor the IO latency to evaluate eligibility for
	Disk.IdleCredit	Amount of idle credit that a virtual machine can gain for I/O requests

2. Select Disk and change the Disk.DiskMaxIOSize parameter to 512.

System Hardware Lice	nsing Packages Services Security & users
Advanced settings Autostart	🖌 Edit option 📔 🥐 Refresh 📔 🏠 Actions
Swap	Key ▲ ~
Time & date	Disk.DeviceReclaimTime
	Disk.DisableVSCSIPollInBH
	Disk.DiskDelayPDLHelper
	Disk.DiskMaxIOSize
	Bdit option - Disk.DiskMaxIOSize
	New value 512 (long integer)
	Save Cancel
	Quick filters

3. To optimize performance change I/O scheduler options according to the article below: https://knowledgebase.starwindsoftware.com/guidance/starwind-vsan-for-vsphere-changi ng-linux-i-o-scheduler-to-optimize-storage-performance/

NOTE: Changing Disk.DiskMaxIOSize to 512 might cause startup issues with Windowsbased VMs, located on the datastore where specific ESX builds are installed. If the issue with VMs start appears, leave this parameter as default or update the ESXi host to the next available build.

NOTE: To provide high availability for clustered VMs, deploy vCenter and add ESXi hosts to the cluster.

Click on Cluster -> Configure -> Edit and check the turn on vSphere HA option if it's



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SWVCluster	1 🖪 🕞 🎦 👯 🤣   🎯 A	ctions 👻			
Getting Started	Summary Monitor Configure	Permissions Hosts VMs D	atastores Networks Updat	te Manager	
44	🚯 SWVCluster - Edit Cluster Settings				
- Services	vSphere DRS	vSphere Availability			
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# Conclusion

This guide provides comprehensive instructions for setting up StarWind Virtual SAN with deduplication and compression in hyperconverged scenario. It offers a detailed path for IT professionals to enhance their VMware storage infrastructure, leading to improved storage optimization and performance.



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