

StarWind Virtual SAN: Configuration Guide for VMware vSphere [ESXi], VSAN Deployed as a VM (CVM) using GUI

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TECHNICAL PAPERS





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About StarWind

StarWind is a pioneer in virtualization and a company that participated in the development of this technology from its earliest days. Now the company is among the leading vendors of software and hardware hyper-converged solutions. The company's core product is the years-proven StarWind Virtual SAN, which allows SMB and ROBO to benefit from cost-efficient hyperconverged IT infrastructure. Having earned a reputation of reliability, StarWind created a hardware product line and is actively tapping into hyperconverged and storage appliances market. In 2016, Gartner named StarWind "Cool Vendor for Compute Platforms" following the success and popularity of StarWind HyperConverged Appliance. StarWind partners with world-known companies: Microsoft, VMware, Veeam, Intel, Dell, Mellanox, Citrix, Western Digital, etc.

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Annotation

Relevant Products

StarWind Virtual SAN(VSAN)

Purpose

This guide outlines the process for deploying and configuring StarWind Virtual SAN (VSAN) as a virtual machine (CVM) within VMware vSphere environments. It focuses on creating a VM-centric and high-performing storage pool for VMware clusters, detailing requirements, pre-configuration steps, and specific settings for successful implementation.

Audience

This guide is intended for system administrators, virtualization specialists, and IT professionals responsible for managing and optimizing VMware vSphere environments, especially those looking to implement advanced storage solutions like StarWind Virtual SAN.

Expected Result

By following the guide, users will successfully deploy StarWind Virtual SAN as a VM on vSphere, achieving a high-performance and fault-tolerant storage pool that integrates seamlessly with VMware clusters.

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

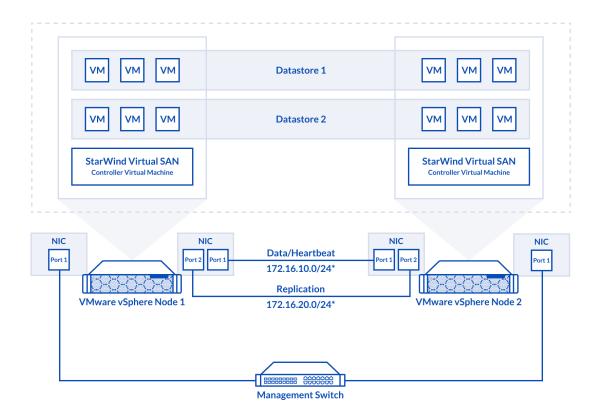
Recommended RAID settings for HDD and SSD disks: https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-h dd-and-ssd-disks/



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

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-vsan-for-vmware-vsphere

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.

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		
> 🗗 Virtual Machines 🗾 0	Name	~	Port groups
Storage	vSwitch0		2
Setworking			
	Add standard virtual switch - v Sv	witch1	
	Add uplink		
	vSwitch Name	vSwitch1	
	МТО	9000	
	Uplink 1	vmnic1 - Up, 10000 mbps	•
	Link discovery	Click to expand	
	▶ Security	Click to expand	
			Add Cancel

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

💁 sw-mar-pc3.starwind.loca	I - Networking	
Port groups Virtual sw	vitches 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 removed - dismiss. for_VMs						
▼ 🗐 Host	Port groups Virtual switches	Physical NICs VMkerne	el NICs TCP/IP stacks	Firewall rules		
Manage Monitor	🔮 Add port group 🥒 Edit settings 📔 🥐 Refresh 📔 🍈 Actions					
> 🖶 Virtual Machines 🛛 🕕	Name	~	Active ports ~	VLAN ID		
Storage	Q VM Network		0	0		
🔹 💇 Networking 📃 🚺	Management Network		1	0		
▼ Q ISCSI_for_VMs	SCSI_VMKernel		1	0		
Monitor More networks	Add port group - ISC SI_for_VMs					
	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.

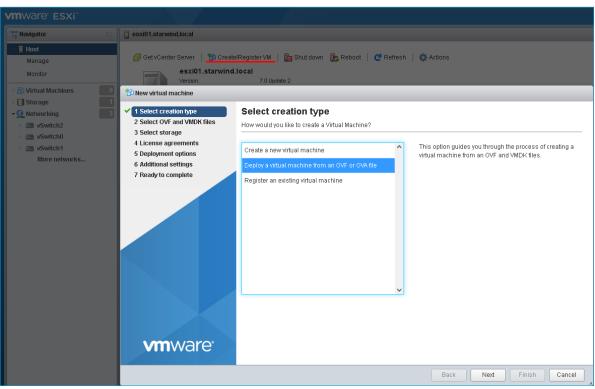
Deploying Starwind Virtual San For Vsphere

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

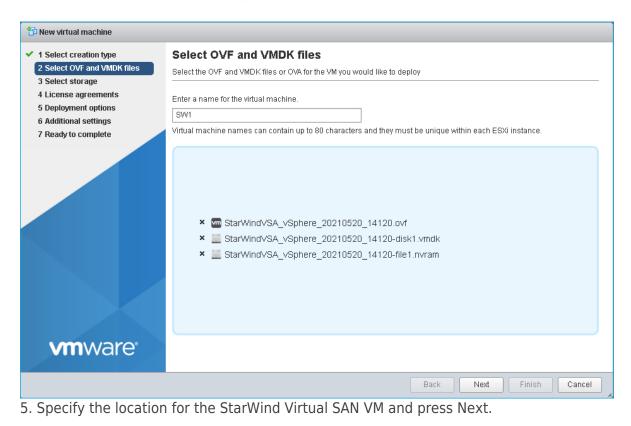
2. Extract virtual machine files from the downloaded archive.

3. Deploy a virtual machine on each ESXi host using the "Create/Register VM" button. Select "Deploy a virtual machine from an OVF or OVA file" in the Select creation type section and press Next.





4. Specify the name for the virtual machine with StarWind VSAN, drag and drop the extracted files to the wizard, and press Next.





1 Select creation type	Select storage							
2 Select OVF and VMDK files	Select the storage type and datastore							
3 Select storage								
4 License agreements	Standard Persistent Memory							
5 Deployment options								
6 Additional settings	Select a datastore for the virtual mach	ine's configuration fi	iles and all of it:	s' virtual dis	ks.			
7 Ready to complete								
	Name	🗸 Capacity 🗸	Free ~	Туре	ΥT	Thin pro 🗸	Access	\sim
	datastore1	49.75 GB	48.34 GB	VMFS6	S	Supported	Single	
								,
							1 it	tems
							1 i	tems
							1 ii	tems
							1 i	tems
							1 i	tems
							1 i	tems
							1 i	tems
							1 ii	tems
							1 ii	tems
							1 ii	tems
							11	tems
							11	tems
vm ware [*]							11	tems

6. Read and accept the license agreements by pressing on "I agree" button. Press Next to continue.

🔁 New virtual machine - SW1		
 1 Select creation type 2 Select OVF and VMDK files 3 Select storage 4 License agreements 	License agreements Read and accept the license agreements An end-user licens	
5 Deployment options 6 Ready to complete	An end-user incers STARWIND LICENSE AGREEMENT FOR COWMERCIAL PRODUCTS This StarWind License Agreement (the "Agreement") is a legal agreement between the entity indicated on th Licensee is subject to the terms and conditions of this Agreement whether Licensee accesses or obtains St	
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	c). All right, title and interest in and to all mask works, copyrights, other literary property or author	
vm ware [®]	l agree	
	Back Next Finish Cance	el 🛛

7. Choose the proper networks for the VM by their purpose and other options.



🔁 New virtual machine - SW1		
 1 Select creation type 2 Select OVF and VMDK files 3 Select storage 	Deployment options Select deployment options	
 4 License agreements 5 Deployment options 6 Ready to complete 	Network mappings	Management VM Network iSCSI ISCSI_for_VMs Sync SYNC_for_VMs
	Disk provisioning	O Thin I Thick
	Power on automatically	
vm ware [.]		
		Back Next Finish Cancel

8. Review the settings and click Finish to start the deployment process.

🔁 New virtual machine - SW1		
 1 Select creation type 2 Select OVF and VMDK files 3 Select storage 	Ready to complete Review your settings selection before fi	inishing the wizard
4 License agreements5 Deployment options	Product	StarWindVSA_vSphere_20210520_14120
✓ 6 Ready to complete	VM Name	SW1
	Files	StarWindVSA_vSphere_20210520_14120-disk1.vmdk StarWindVSA_vSphere_20210520_14120-file1.nvram
	Datastore	datastore1
	Provisioning type	Thick
	Network mappings	Management: VM Network, iSCSI: ISCSI_for_VMs, Sync: SYNC_for_VMs
	Guest OS Name	Red Hat Enterprise Linux 7 (64-bit)
	Do not refresh your brov	vser while this VM is being deployed.
vm ware*		
		Back Next Finish Cancel

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

NOTE: In some cases, it's recommended to reserve memory for StarWind VSAN VM.

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.

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.

VMWare' ESXi~			
🕒 Navigator	esxi01.starwind.local - Manage		
→ 📳 Host Manage	System Hardware Licens	ing Packages Services	Security & users
Monitor	Advanced settings	🥒 Edit settings	
Virtual Machines		Enabled	No
 ► Storage ▲ Q Networking 	Time & date	🥖 Change autostart configuration	
 Switch2 Switch0 		Enabled	● Yes O 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.



vm ware [®] ESXi [™]				root@
Navigator	sxi01.starwind.local - Manage		🔂 SW1	
▼ 🗐 Host	System Hardware Lice	nsing Packages	🍈 Power	•
Manage Monitor	Advanced settings	🥖 Edit settings	👼 Guest OS ն Snapshots	
> 🔂 Virtual Machines	Autostart Swap	Enabled	Console	>
Image 1 Image 1 Image 3	Time & date	Start delay	👸 Autostart	•
 Image: Switch2 Image: Switch0 		Stop delay Stop action	🐴 Upgrade VM Compatibility	
More networks		Wait for heartbea		
		🙀 Enable 🛛 🙀 Si	ij Edit settings	🕴 🕻 🕻 Refresh 🏠 Actions
		Virtual machine	🥁 Edit notes	~ E
		🚯 SW1	🔊 Rename	s
		Quick filters	Answer question	
			廚 Unregister 🔂 Delete	
			Help	
	😨 Recent tasks		🖶 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 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	* 😩 :
	StarWind
StarWind Virtual SAN	
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.	227:9090/users#/user			☆		:
STARWIND VIRTUAL SAN						💄 us	er 🗸
🗐 starwindvsa-84	Accounts > user	Set Password			1		
System	user	Old Password New Password	[ssion	Delete	•
Logs Storage	Full Name User Name u	Confirm New Password					
Networking	Roles 🖌						
Accounts	Last Login N			Cancel Set			
Services	Access	Lock Account	Never lock account	_			
Terminal	Password	Set Password Force Chang	Never expire password				
	Authorized Pub	lic SSH Keys				÷	
	There are no a	uthorized public keys for this	account.				
	There are no a	uthorized public keys for this	account.				
	There are no a	uthorized public keys for this	account.				
	There are no a	uthorized public keys for this	account.				
	There are no a	uthorized public keys for this	account.				
	There are no a	uthorized public keys for this	account.				

4. On the left sidebar, click Networking.



≈ Networking - starwindvsa-84	4697° × +			• - □ ×
← → C ▲ Not secu	are 192.168.12.227:9090/	network		☆ 😩 :
STARWIND VIRTUAL SAN				🔓 Privileged 💄 user 🗸
starwindvsa-84	Kbps Sending		Kbps Receiving	A
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			0
Accounts	0 Active Rules			
Services				
Terminal	Interfaces		Add Bond Ad	dd Team Add Bridge Add VLAN
renninai	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".



≈ Networking - starwindvsa	84697: × +	o –	
\leftrightarrow \rightarrow C \blacktriangle Not set	cure 192.168.12.227:9090/network#/ens224	☆	. .
STARWIND VIRTUAL SAN			🛓 user 🗸
starwindvsa-84	Networking > ens224		
System	Kbps Sending Kbps Receiving		
Logs	400 400		
Storage	。		
Networking	04:24 04:25 04:26 04:27 04:28 04:24 04:25	04:26 04:27	04:28
Accounts	ens224 VMware VMXNET3 Ethernet Controller vmxnet3 00:0C:29:A6:D6:F6		
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:



	4697: × +			• - • ×
← → C ▲ Not secu	ure 192.168.12.10:9090/network			☆ 😩 :
STARWIND VIRTUAL SAN				🔓 Privileged 💄 user 🗸
🗐 starwindvsa-84	Kbps Sending		Kbps Receiving	
System Logs	400		400	
Storage	0 06:02 06:03	06:04 06:05 06:06	0 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	× +	o –	
\leftarrow \rightarrow C S https:	://192.168.12.10:9090/network#/ens224		. :
STARWIND VIRTUAL SAN		Privileged	💄 user 🗸
🗐 sw1	Networking > ens224		
System	Kbps Sending Kbps Receiving		
Logs	400 400		
Storage			
Networking		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 Z 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 ⊗
Web console: https://starwindvsa-84697911:9898/ or https://192.168.12.227:9898/	
starwindvsa-84697911 login: Password: Last login: Tue Aug 17 44:43:59 on tty1 [user@starwindvsa-84697911 715] 5 /etc/sysconfig/network-scripts/	
ifcfg-ens192 ifdown ifdown-ppp ifdown-TeamPort ifup-bpe ifup-post ifup-ream init.ipvG-global ifcfg-ens224 ifdown-bep ifdown-routes ifdown-routes ifdown-routes ifup-routes ifup-reamPort init.ipvG-global ifcfg-ens254 ifdown-bep ifdown-routes ifdown-routes ifdown-routes ifup-routes ifup-reamPort heutowrk-functions ifcfg-ens256 ifdown-route ifup-routes ifup-routes ifup-routes ifup-tumrel network-functions ifcfg-lo ifdown-routes ifup-routes ifup-routes ifup-wireless network-functions ifcg-lo ifdown-routes ifup-routes ifup-sit ifup-wireless network-functions ifcg-lo ifdown-routes ifup-routes ifup-sit ifup-wireless user0starvindvasa-04607911 ifcomting ifcom ifup-sit ifup-wireless	
ens192: flags=4163(UP,BR0BDCAST,RUNNING,MULTICAST> mtu 1500 inet 192.168.12.227 netwarask 255.255.4.0 broadcast 192.168.13.255 ether 08:06:23:46:46:ec txqueuelen 108000 (Ethernet) BX packets 3057 bytes 277047 (271.3 KiB) IX errors 0 dropped 0 overruns 0 frame IX packets 1067 bytes 1554055 (1.4 MiB) IX errors 0 dropped 0 overruns 0 garrier 0 collisions 0	
device interrupt 19 memory 0xfd3a0000-fd3c0000 ens224: flags=4163 <up,broadcast,running,multicast> mtu 1500 ether 00:8c:23:a6:46:f6 txqueuelen 100000 (Ethernet) RX packets 2 bytes 120 (128.0 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</up,broadcast,running,multicast>	
ens256: flags=4163 <up,bb0adcast,running,multicast> mtu 1500 ether 00:46::29:a6::46:00 txqueuelen 100000 (Ethernet) RX parkets 2: bytes 120 (123.0.8) RX errors 0 dropped 0 overruns 0 frame 0 TX packets 0 bytes 0 (0.0.8) TX errors 0 dropped 0 carrier 0 collisions 0</up,bb0adcast,running,multicast>	
lo: flags=73(UP,LOOPBACK,RUNNING> mtu 65536 inet 127.0.0.1 metmask 255.0.0.0 loop txqueuelen 1000 (Local Loopback) RX packets 172 bytes 147506 (144.1 K1B) RX errors 0 dropped 0 overruns 0 frame 0 TX packets 172 bytes 147506 (144.1 K1B) TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0	
fuser@starwindvsa-84697911 ~1\$ sudo nano /etc/sysconfig/network-scripts/ifcfg-ens192	až

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					
GNU nano 2.3.1			1 4 10 0 400		🖬 🖬 🔤 🍓 Actions 🛞
GNU nano 2.3.1	r1	le: /etc/sysconfig/network-se	cripts/ifcfg-ens192		Modified
TYPE=Ethernet					
PROXY_METHOD=none					
BROWSER_ONLY=no					
BOOTPROTO=static					
DEFROUTE=yes IPV4_FAILURE_FATAL=no					
IPV6INIT=yes					
IPV6_AUTOCONF=yes					
IPV6_DEFROUTE=yes					
IPV6_FAILURE_FATAL=no					
IPV6_ADDR_GEN_MODE=stable NAME=ens192	-privacy				
UUID=bcf81314-50a7-4bc3-a	3ba-76e317a7bd1e				
DEVICE=ens192					
ONBOOT=yes					
IPU6_PRIUACY=no					
IPADDR=192.168.12.10 NETMASK=255.255.255.0					
GATEWAY=192.168.12.1					
DNS1=192.168.1.1					
Ğ Get Help	🔟 WriteOut	B Read File	🍟 Prev Page	🔭 Cut Text	C Cur Pos
^X Exit	^J Justify	<mark>^W</mark> Where Is	^U Next Page	[•] U UnCut Text	To Spell 😪

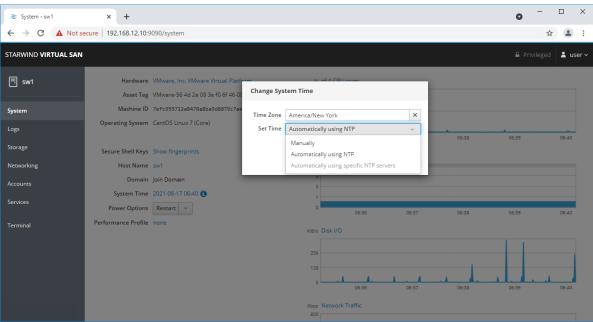
9. Restart interface using the following cmdlet: sudo ifdown ens192, sudo ifup ens192 or restart the VM.

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					

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			
Refresh Connect Disconnect Add Server Remove Server Add Device Add Device (advanced) Add VTL Device Remove Target	? Help		
Servers			
Console Add Server Dis Option allows you to add local or remote StarWind Management Console Server Hosts to StarWind Management Console			
<			>
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	Can	cel

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



StarWind Manag	jement Console
IF FF 00 BF 4D A3 EE D CC1	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
	Close Apply Rey

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 View Tools Debug Add-ons Help	
InstallLicense.ps1 X	
1 #	~
2 # The following example shows how to apply license on a server 3 #	
4 Import-Module StarWindX	
5 6 Enable-SWXLog	
7 8 Sserver = New-SWServer -host 127.0.0.1 -port 3261 -user root -password starwind	
9	
10 try 11 ⊡{	
12 \$server.Connect() 13	
14 Get-SWLicense Sserver	
15 16 Remove-SWLicense \$server	
17 18 #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 }	
20 L3 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 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 by editing its settings. Make sure it is Thick Provisioned Eager Zeroed. Virtual Disk should be located on the datastore provided by hardware RAID.



🗗 Edit settings - SW1 (ESXi 5.5 virtual m	nachine)	
Virtual Hardware VM Options		
🔜 Add hard disk 🛛 🎫 Add network ada	apter 🛛 🚍 Add other device	
> 🗖 CPU	4 ~ ()	
Memory	4 GB ~	
▶ 🛄 Hard disk 1	16 GB ~	E.
▼ 🛄 New Hard disk	20 GB ~	
Maximum Size	41.75 GB	
Location	[datastore1] SW1/ Browse	
Disk Provisioning	 Thin provisioned Thick provisioned, lazily zeroed Thick provisioned, eagerly zeroed 	
Shares	Normal ~ 1000 ~	
Limit - IOPs	Unlimited ~	
Controller location	SCSI controller 0 v SCSI (0:1) v	
Disk mode	Dependent ~	
Sharing	None ~	
SCSI Controller 0	LSI Logic SAS 🗸	
SATA Controller 0	8	
	Save	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



≈ Storage - sw1	× +	• - • •
\leftrightarrow \rightarrow C S https://	192.168.12.10:9090/storage	2
STARWIND VIRTUAL SAN		🔒 Privileged 💄 user
🗐 sw1	KB/s Reading KB/s Writing	RAID Devices +
System Logs Storage	64 32 0 10:58 10:59 11:00 11:01 11:02 0 10:58 10:59 11:00 11:01 11:02	Volume Groups
Networking	Filesystems Name Mount Point Size	VDO Devices
Services	/dev/centos/root / 2.78 / 13.4 GiB	No storage set up as VDO
Terminal	/dev/sda1 /boot 158 / 1014 MiB	Drives
	Storage Logs August 17, 2021	VMware Virtual disk 16 GiB Hard Disk R: 0 B/s W: 0 B/s
	07:87 g_object_notify: object class 'UDisksLinuxBlockO_ udisksd 07:87 g_object_notify: object class 'UDisksLinuxBlockO_ udisksd 07:87 g_object_notify: object class 'UDisksLinuxLogica_ udisksd	VMware Virtual SATA CD Optical Drive R: 0 B/s W: 0 B/s
	07:07 g_object_notify: object_class 'UDiskslinuxUguca_ Udisksd 07:07 g_object_notify: object_class 'UDiskslinuxVolume_ udisksd 07:07 g_object_notify: object_class 'UDisksObjectSkele_ udisksd 07:07 g_object_notify: object_class 'UDisksObjectSkele_ udisksd	VMware Virtual disk 20 GiB Hard Disk R: 0 B/s W: 0 B/s

the Virtual Disk that was recently added and choose it.

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 - sw1	× +	• - • ×
\leftrightarrow \rightarrow C O https:/	/192.168.12.10:9090/storage#/sdb	A :
STARWIND VIRTUAL SAN		🔒 Privileged 💄 user 🗸
🗏 sw1	Storage > VMware Virtual disk	
System	Drive	
Logs	Model Virtual disk Firmware Version 1.0	
Storage	Capacity 20 GiB, 21.5 GB, 21474836480 bytes	
Networking	Device File /dev/sdb	
Accounts		
Services	Content	Create Partition Table
Terminal	✓ 20 GiB Unrecognized Data /dev/sdb	
	Unrecognized Data	Format
	Usage -	
	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	× +			• [–]	
\leftarrow \rightarrow C S https:/	//192.168.12.10:9090/storage#/sdb				1 :
STARWIND VIRTUAL SAN					💄 user 🗸
🗐 sw1	Storage > VMware Virtual disk	Format /dev/sd	b		
System Logs	Drive Model Virtual disk Firmware Version 1.0	Erase Type	Overwrite existing data with zeros v XFS - Recommended default v		
Storage Networking	Capacity 20 GiB, 21.5 Device File /dev/sdb	Name Mounting	disk1 Encrypt data Custom		
Accounts		Mount Point	/mnt/disk1		
Services Terminal	Content		✓ Mount at boot ☐ Mount read only	Create Partitio	on Table
remunal	20 GB Unrecognized Da Unrecognized Data Usage - Type -	_	Custom mount options Formatting a storage device will erase all data on it. Cancel Format		Format

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

Storage - sw1	× +	o –		×
\leftrightarrow \rightarrow C O https://	/192.168.12.10:9090/storage#/sdb			:
STARWIND VIRTUAL SAN			💄 use	er 🗸
🗐 sw1	Storage > VMware Virtual disk			
System	Drive			
Logs	Model Virtual disk Firmware Version 1.0			
Storage	Capacity 20 GiB, 21.5 GB, 21474836480 bytes			
Networking	Device File /dev/sdb			
Accounts				
Services	Content	Create Partition	n Table	
Terminal	✓ 20 GiB xfs File System //dev/sdb			
	Filesystem		Format	
	Name disk Mount Point /mnt/disk1 Mount Mount Options <u>defaults</u> Used -			

6. Using StarWind Management Console, connect to StarWind Virtual SAN VM and configure storage pool (default storage for StarWind devices) by clicking Yes.



StarWind Management Console	×	
Storage pool is not configured! Would you like to configure it?		
Yes	Disconnect	7. Select the disk whi

recently mounted.

Open				×
👔 Back 🝌 New Folder 🚬 Delete				
VSA Storage media	Name	Size	Date 05/10/2019 07:24	Attributes
File name:			✓	pen 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 VM is deployed on the ESXi server and turned off
- StarWind Virtual SAN VM is installed on a separate storage device available to the ESXi host (e.g. SSD, HDD etc.)
- HBA or RAID controller can be added via a DirectPath I/O passthrough device to a StarWind Virtual SAN VM without affecting ESXi host work

PCI Device Configuration



1. Login to the ESXi host where StarWind Virtual SAN VM is installed.

2. In the Navigator, go to Manage, and in the Hardware tab, select PCI Devices.

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

📕 esxi01.starwind.local - VMware E 🗙	+						0	- 0	>
> C 🔺 Not secure 19	2.168.12.225/u	i/#/host/ma	anage/hardwa	are/pci-devi	res			☆ 💄	
m ware" ESXi"					root@192.168.	.12.225 👻 Help	🚽 🔍 Sea	arch	
🖫 Navigator 🔹	esxi01.starw	vind.local - Ma	anage						
▼ 📱 Host	System	Hardware	Licensing	Package	Services Security & users				
Manage Monitor	PCI Devices Power Mana		\$	Toggle passth	rough 🥒 Configure SR-IOV 🥒 Hardwar	e label 🛛 🖹 💦 Reboot	host C R	lefresh	D
✓ ∯ SW1				Address 🗸	Description	SR-IOV	Passt 🗸	Hardw 🗸	
Monitor				0000:00	Intel Corporation Virtual Machine Chipset	Not cap	Not cap	(0
More VMs				0000:00	Intel Corporation 440BX/ZX/DX - 82443BX/2	ZX/D Not cap	Not cap		
Storage 1				0000:00	Intel Corporation Virtual Machine Chipset	Not cap	Not cap		11-
			Qu	ick filters	~			42 items	
	Recent tasks								

- 4. Restart ESXi host to make PCI device available to VMs.
- 5. Right-click on the StarWind Virtual SAN VM to Edit Settings.
- 7. Click ADD NEW DEVICE. Select PCI Device.



📃 Add hard disk 🛛 🛤 Add netwo	rk adapter	🚍 Add other device		
CPU	1	 CD/DVD drive Floppy drive 		
Memory	102	-		
🔚 Hard disk 1	16	🖻 Parallel port		6
SCSI Controller 0	LSI	USB controller	▼	(
SATA Controller 0		Sound controller		
USB controller 1	US	PCI device	v	
Network Adapter 1	VM		▼ Connect	
S CD/DVD Drive 1	Ho	SATA controller	Connect	

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.

 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.



≈ sw1	× +		• - • ×
\leftrightarrow \rightarrow C \odot h	https://192.168.12.10:9090/		. :
StarW	ind Virtual SAN	and a second sec	Star Wind
User name	user	Server: sw1	1 and 1
Password		Log in with your server user 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 - sw1	× +	•	
\leftrightarrow \rightarrow C O https:	://192.168.12.10:9090/storage		. :
STARWIND VIRTUAL SAN		🔓 Privileged	💄 user 🗸
🗐 sw1	KIB/s Reading KIB/s Writing	RAID Devices	• Î
System	64 64	No storage set up as RAID	- 1
Logs	32 32	Volume Groups	•
Storage	10:58 10:59 11:00 11:01 11:02 10:58 10:59 11:00 11:01 11:02	centos 15.0 G/B	
Networking	Filesystems		
Accounts	Name Mount Point Size	VDO Devices	•
Services	/dev/centos/root / 2.78 / 13.4 GiB	No storage set up as VDO	
Terminal	/dev/sda1 /boot 158 / 1014 MiB	Drives	
	Storage Logs August 17, 2021	VMware Virtual disk 16 GiB Hard Disk R: 0 B/s W: 0 B/s	
	07:07 g_object_notify: object class 'UDisksLinuxBlockO udisksd	VMware Virtual SATA CD	- 1
	07:07 g_object_notify: object_class 'UDisksLinuxBlockO_ udisksd 21	Optical Drive R: 0 B/s W: 0 B/s	
	07:07 g_object_notify: object class 'UDisksLinuxLogica udisksd 2>		- 1
	07:07 g_object_notify: object class 'UDisksLinuxVolume udisksd 07:07 g_object_notify: object class 'UDisksObjectSkele udisksd	20 GiB Hard Disk	
	07:07 g_object_notify: object class 'UDisksObjectSkele udisksd	R: 0 B/s W: 0 B/s	

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



RA	AID 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
	D 4 17	S 1 1 11	

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-92154	428: × +			-		×
\leftrightarrow \rightarrow C \square https://19	92.168.12.10:9	090/system	☆			:
STARWIND VIRTUAL SAN			🔒 Privi		-	root ~
StarWindVSA-92	Create RAID	Device				
System Logs Storage	Name RAID Level Chunk Size Disks	RAID10 RAID 10 (Stripe of Mirrors) 512 KiB I 6 GIB DELL PERC H710F		/de	v v	
Networking Accounts		 I6 GIB DELL PERC H710F I6 GIB DELL PERC H710F 			v/sdd v/sde	
Services Terminal		I6 GiB DELL PERC H710F		/de	ev/sdf	
		No storage set up as VDO	Cancel	С	reate	
		/Mware Virtual disk 6 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-921	5428: × +	-		×
\leftrightarrow \rightarrow C $$ https://	192.168.12.10:9090/system	☆		:
STARWIND VIRTUAL SAN		🔓 Privileged	2 r	oot ~
StarWindVSA-92	Storage » RAID10			*
System	RAID Device RAID10	Stop De	elete	
Logs	Device /dev/md/RAID10			
Storage	UUID fd81b6ab:31d1c828:1f0cbefb:a84290b3			
Networking	Capacity 32.0 GiB, 34.3 GB, 34324086784 bytes RAID Level RAID 10, 4 Disks, 512 KiB Chunk Size			
Accounts	Bitmap ON			
Services	State Running			
Terminal				
				-

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-9215428: × + - □ ×					×
← → C					:
STARWIND VIRTUAL SAN			🔓 Privileged	:	root ~
StarWindVSA-92	Format /dev/m	d/RAID10			Т
System	Erase	Don't overwrite existing data		~	
Logs	Туре	XFS - Red Hat Enterprise Linux 7 default		~	
Storage	Name Mounting	raid10 Custom		~	
-	Mount Point	mnt/raid10			1
Networking	Mount options	Mount at boot			-
Accounts		Mount read only			
Services		Custom mount options noatime			
Terminal		F	in cillenne elle		
		Formatting a storage dev		rmat	
			currect		
	Unrecognized I	Data			
	Usage -		Fo	rmat	
	Туре -				

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



Storage - StarWindVSA-921	5428: × +	-		×
← → 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.

StarWin	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 media mnt	Name	Size	Date 05/10/2019 07:24	Attributes
File name:				ven Cancel

Creating Starwind Devices

1. In the StarWind Management Console click to Add Device (advanced) button and open Add Device (advanced) Wizard.

2. Select Hard Disk Device as the type of device to be created.



			?	×
\leftarrow	Add [Device Wizard		
	Select	Device Type you want to create or export as iSCSI Target		
	۲	Hard Disk Device		
	0	Tape Device		
	0	Optical Disc Drive		
		<u>N</u> ext	Ca	ncel

3. Select Virtual Disk.



			?	×
←	Add [Device Wizard		
	Select I	Disk Device Type		
	۲	Virtual Disk		
		Virtual Disk stores User Data in File		
	0	Physical Disk		
		Export existing physical Disk as iSCSI Target		
	0	RAM Disk		
		Virtual Disk with Memory Storage		
		Next	Can	cel

4. Specify a virtual disk Name, Location, and Size.



			?	×
←	Add Device Wiza	rd		
	Marcal Distance			
	Virtual Disk Loc	ation		
	Create a New	/irtual Disk		
	Name:	<pre><device name=""></device></pre>]	
	Location:	My Computer\D\		
	Size:	<size> GB ~</size>		
	OUse an Existing	Virtual Disk		
	Location:	~		
	Read-On	ly Mode		
		Next	Cano	:el

5. Select the Thick provisioned disk type and block size.

NOTE: Use 4096 sector size for targets, connected on Windows-based systems and 512 bytes sector size for targets, connected on Linux-based systems (ESXi/Xen/KVM).

6. Define a caching policy and specify a cache size (in MB). Also, the maximum available cache size can be specified by selecting the appropriate checkbox. Optionally, define the L2 caching policy and cache size.



			?	×
←	Add Dev	vice Wizard		
	Specify [Device RAM Cache Parameters		
	Mode			1
	0	Write-Back Writes are performed asynchronously, actual Writes to Disk are delayed, Read are cached	S	
	0	Write-Through Writes are performed synchronously, Reads are cached		
	۲	N/A Reads and Writes are not cached		
	Set M	laximum available Size		
	Size:	128 MB ~		
		Next	Can	cel

7. Specify Target Parameters. Select the Target Name checkbox to enter a custom target name. Otherwise, the name is generated automatically in accordance with the specified target alias.



		?	×
←	Add Device Wizard		
	Target Parameters		
	Choose a Target Attachment Method		
	Create new Target	~	
	Target Alias		_
	<target alias="" name=""></target>		
	Target Name		
	iqn.2008-08.com.starwindsoftware:sw1- <target alias="" name=""></target>		
	Allow multiple concurrent iSCSI Connections		
	<u>N</u> ext	Car	icel

8. 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 Can	icel

9. Click Close to finish the device creation.

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

Select The Required Replication Mode

The replication can be configured using Synchronous "Two-Way" Replication mode: Synchronous or active-active replication ensures real-time synchronization and load balancing of data between two or three cluster nodes. Such a configuration tolerates the failure of two out of three storage nodes and enables the creation of an effective business continuity plan. With synchronous mirroring, each write operation requires control confirmation from both storage nodes. It guarantees the reliability of data transfers but is demanding in bandwidth since mirroring will not work on high-latency networks.



Synchronous "Two-Way" Replication

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

2. Select the Add Replica button in the top menu.

😴 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	ie .

3. Select Synchronous "Two-Way" replication as a replication mode.



		?	×
\leftarrow	Replication Wizard		
	Replication Mode		
	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	
	Witness Node Witness node doesn't contain user data. In case when Node Majority policy is set f Synchronous replication device and there are two storage nodes, Witness Node m added to cluster to make number of nodes odd number and enable proper function Node Majority policy.	ust be	
	Next	Canc	el

4. Specify a partner Host name or IP address and Port Number.

Selecting The Failover Strategy

StarWind provides 2 options for configuring a failover strategy:

Heartbeat

The Heartbeat failover strategy allows avoiding the "split-brain" scenario when the HA cluster nodes are unable to synchronize but continue to accept write commands from the initiators independently. It can occur when all synchronization and heartbeat channels disconnect simultaneously, and the partner nodes do not respond to the node's requests. As a result, StarWind service assumes the partner nodes to be offline and continues operations on a single-node mode using data written to it.

If at least one heartbeat link is online, StarWind services can communicate with each other via this link. The device with the lowest priority will be marked as not synchronized and get subsequently blocked for the further read and write operations until the synchronization channel resumption. At the same time, the partner device on the



synchronized node flushes data from the cache to the disk to preserve data integrity in case the node goes down unexpectedly. It is recommended to assign more independent heartbeat channels during the replica creation to improve system stability and avoid the "split-brain" issue.

With the heartbeat failover strategy, the storage cluster will continue working with only one StarWind node available.

Node Majority

The Node Majority failover strategy ensures the synchronization connection without any additional heartbeat links. The failure-handling process occurs when the node has detected the absence of the connection with the partner.

The main requirement for keeping the node operational is an active connection with more than half of the HA device's nodes. Calculation of the available partners is based on their "votes".

In case of a two-node HA storage, all nodes will be disconnected if there is a problem on the node itself, or in communication between them. Therefore, the Node Majority failover strategy requires the addition of the third Witness node or file share (SMB) which participates in the nodes count for the majority, but neither contains data on it nor is involved in processing clients' requests. In case an HA device is replicated between 3 nodes, no Witness node is required.

With Node Majority failover strategy, failure of only one node can be tolerated. If two nodes fail, the third node will also become unavailable to clients' requests. Please select the required option:

Heartbeat

1. Select Failover Strategy.



		?	×
←	Replication Wizard		
	Failover Strategy		
	 Heartbeat Process node and communication failures using additional communication channel (heartbeat). At least one synchronization or heartbeat channel must be function proper failover processing. Loss of all communication channels may lead to splicisue, so it's recommended to use client iSCSI connection interfaces as heartbe channel. Node Majority Process node and communication failures using majority policy: node stays act sees more than half of nodes including itself. In case of 2 storage nodes, require configuring additional witness node. Does not require additional heartbeat channel communicational meantbeat channel. 	onal for t brain eat ive while i ires	it
	Next	Can	icel

2. Select Create new Partner Device and click Next.

3. Select a partner device Location and click Next.

4. 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.

	?	×
←	Replication Wizard	
	Synchronization Journal Setup	
	RAM-based journal Synchronization journal placed in RAM. Synchronization with RAM journal provides good IO performance in any scenario.	
	O Disk-based journal Synchronization journal placed on disk.	
	 Failure journal The strategy provides good IO performance while all device nodes are in a health state. 	у
	 Continuous journal The strategy guarantees fast synchronization and data consistency in all cases. 	
	Current Node My Computer\C\	
	Partner Node My Computer\C\	
	<u>N</u> ext Car	ncel

5. Click Change Network Settings.



	?	×
Replication Wizard		
Network Options for Replication		
Networks for Synchronization and Heartbeat		
Press "Change Network Settings" to configure Interfaces		
Networks for Heartbeat		
Press "Change Network Settings" to configure Interfaces		
Change Network Settings		
ALUA preferred		
Change ALUA Settings		
	<u>N</u> ext Can	cel

6. Specify the interfaces for Synchronization and Heartbeat Channels. Click OK and then click Next.



elect synchronizatior	n channel		
nterfaces	Networks	Synchronization and H	Heartbeat
- Host Name: 12	7.0.0.1		
172.16.10.10	172.16.10.0		~
172.16.20.10	172.16.20.0		
192.168.12.10	192.168.12.0		v
Host Name: SW	12		
172.16.10.20	172.16.10.0		~
172.16.20.20	172.16.20.0		
192.168.12.20	192.168.12.0		~

7. In Select Partner Device Initialization Mode, select Synchronize from existing Device and click Next.

8. Click Create Replica. Click Finish to close the wizard. The successfully added device appears in StarWind Management Console.

9. Follow the same procedure for the creation of other virtual disks that will be used as storage repositories.

Node Majority

There are two ways to configure Witness for 2-nodes StarWind HA device, created with Node Majority Failover Strategy: File Share (SMB) as Witness and additional server as Witness Node.

- Creating HA device with File SHare(SMB) as Witness:

SMB Witness is a file, located on SMB share, which can be accessed by both nodes and help them to eliminate the split-brain issue in case of synchronization connection



interruption between the nodes. To set up the SMB file share as a Witness for 2-nodes HA device with Node Majority Failover Strategy, perform the actions, described on this page:

https://www.starwindsoftware.com/help/ConfiguringFileShareSMBasWitness.html

- Creating HA device with Witness Node:

1. Select the Node Majority failover strategy and click Next.

7	?	×
← Replication Wizard		
Failover Strategy		
Heartbeat Process node and communication failures using additional communication channel (heartbeat). At least one synchronization or heartbeat channel must be functional for proper failover processing. Loss of all communication channels may lead to split brain issue, so it's recommended to use client iSCSI connection interfaces as heartbeat channel.		
Node Majority Process node and communication failures using majority policy: node stays active wh sees more than half of nodes including itself. In case of 2 storage nodes, requires configuring additional witness node. Does not require additional heartbeat channel.	hile it	
Next	Cance	:1

2. Choose Create new Partner Device and click Next.

3. Specify the partner device Location and modify the target name if necessary. Click Next. Select Synchronization Journal strategy and location and click Next.

4. In Network Options for Replication, press the Change network settings button and select the synchronization channel for the HA device.

5. In Specify Interfaces for Synchronization Channels, select the checkboxes with the appropriate networks and click OK. Then click Next.

6. Select Synchronize from existing Device as the partner device initialization mode.



7. Press the Create Replica button and close the wizard.

8. The added devices will appear in StarWind Management Console. Repeat the steps above to create other virtual disks if necessary.

Adding Witness Node

Witness node can be configured on a separate host or as a virtual machine in a cloud. It requires StarWind Virtual SAN service installed on it.

NOTE: Since the device created in this guide is replicated between 2 active nodes with the Node Majority failover strategy, a Witness node must be added to it.

1. Open StarWind Management Console, right-click on the Servers field and press the Add Server button. Add a new StarWind Server which will be used as the Witness node and click OK.

📑 Ad	d new StarWind Server			?	×
Host:	witness-sw		:	3261	
Adva	anced >>	ОК]	Cano	cel

2. Right-click on the HA device with the configured Node Majority failover policy and select Replication Manager and press the Add Replica button.

3. Select Witness Node.



		? >	×
÷	Repli	cation Wizard	
	Replica	ation Mode	
	0	Synchronous "Two-Way" Replication Replication Partner must be connected to Client as Source Device as well, MPIO on Client must be enabled, needs dedicated high Performance Network Connection for Synchronization	
	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 replicated Data	
	۲	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 must be added to cluster to make number of nodes odd number and enable proper functioning of Node Majority policy.	
		Next Cancel	

4. Specify the Witness node Host Name or IP address. The default Port Number is 3261.



		?	×
Replication Wizard			
Add Partner Node			
Specify Partner Host Name	e or IP Address where Replication Node would be created		
Host Name or IP Address	witness-sw 🗸		
Port Number	3261		
	Next	Car	ncel

5. In Partner Device Setup, specify the Witness device Location. Optionally, modify the target name by clicking the appropriate button.

6. In Network Options for Replication, select the synchronization channel with the Witness node by clicking the Change Network Settings button.

7. Specify the interface for Synchronization and Heartbeat and click OK.

8. Click Create Replica and then close the wizard.

9. Repeat the steps above to create other virtual disks if necessary. NOTE: To extend an Image File or a StarWind HA device to the required size, please check the article below:

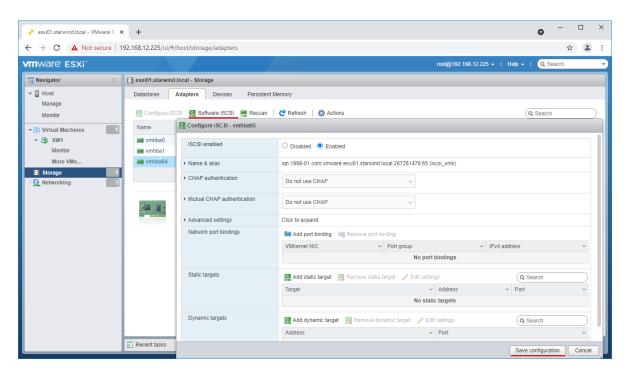
https://knowledgebase.starwindsoftware.com/maintenance/how-to-extend-image-file-orhigh-availability-device/



Preparing Datastores

Adding Discover Portals

1. To connect the previously created devices to the ESXi host, click on the Storage -> Adapters -> Software iSCSI and in the appeared window choose the Enabled option to enable Software iSCSI storage adapter. Push the Save configuration button.



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



esxi01.starwind.local - VMware E	+			• - • ×
← → C ▲ Not secure 1	92.168.12.225/ui/#/	host/storage/adapters		☆ 🏝 :
vmware" ESXi"			rool@192.168.1	2.225 • Help • Q Search •
Navigator	esxi01.starwind.	local - Storage		
✓ ☐ Host Manage		Adapters Devices Persistent Me		
Monitor	Configure iSC	SI 💆 Software iSCSI 💻 Rescan 🌘	C Refresh d Ctions	Q Search
🕶 🔁 Virtual Machines 📃 🚺	Name	Configure iSCSI	v Model v Statu	s v Driver v
- ∰ SW1	🛤 vmhba0	Computer ac ar	Ulsabled S Erlabled	
Monitor More VMs	vmhba1	▶ Name & alias	iqn.1998-01.com.vmware:esxi01.starwind.local:267261470:65 (iscsi_vmk)	
Storage 1 Storage 3		CHAP authentication	Do not use CHAP v	
	for mi	 Mutual CHAP authentication 	Do not use CHAP V	
		Advanced settings	Click to expand	
		Network port bindings	Add port binding 🛛 🛤 Remove port binding	
			VMkernel NIC ~ Port group	✓ IPv4 address ✓
			No port bindings	
		Static targets	💯 Add static target 🛛 🕺 Remove static target 🥜 Edit settings	Q Search
			Target ~ Address	~ Port ~
			No static targets	
		Dynamic targets	💆 Add dynamic target 🛛 👰 Remove dynamic target 🌙 Edit settings	Q Search
			Address v Port	~
			Click to add address 3260	
	🗊 Recent tasks			Save configuration Cancel
https://192.168.12.225/ui/				A

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

🙋 Add dynamic target 🛛 👰 Remove dynamic target 🥒 Edit s	ettings Q Search
Address ~	Port ~
172.16.10.10	3260
Click to add address	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 Enabled					
Name & alias	iqn.1998-01.com.vmware:sw-mar-pc3-6fbab	48a				
 CHAP authentication 	Do not use CHAP	T				
 Mutual CHAP authentication 	Do not use CHAP	T				
 Advanced settings 	Click to expand					
Network port bindings	🕍 Add port binding 🛛 💐 Remove port bin	ding				
	VMkernel NIC ~	Port group	~	IPv4 addr	ess	~
		No port l	bindings			
Static targets	🙋 Add static target 🛛 🧟 Remove static ta	rget 🥖 Edit settings			Q Search	
	Target	~	Address	~	Port	~
	iqn.2008-08.com.starwindsoftware:sw1-ds	1	172.16.10.10		3260	
	iqn.2008-08.com.starwindsoftware:sw1-ds	2	172.16.10.10		3260	
	iqn.2008-08.com.starwindsoftware:sw2-ds	1	172.16.10.20		3260	
	iqn.2008-08.com.starwindsoftware:sw2-ds	2	172.16.10.20		3260	
Dynamic targets	🛃 Add dynamic target 🛛 🧕 Remove dyna	amic target 🥜 Edit s	ettings		Q Search	
	Address	~	Port			~
	172.16.10.10		3260			
	172.16.10.20		3260			
				5	Save configuration	Cancel

5. Click on the Rescan button to rescan storage.

Datastores Adapters Devices Persistent Memor	у			
🖺 New datastore 🗈 Increase capacity 🚊 Rescan 🧲	Refresh 💠 Actions			
Name	✓ Status ▲	~ Туре	~ Capacity	Ŷ
Local NECVMWar CD-ROM (mpx.vmhba1:C0:T0:L0)	📀 Normal	CDROM	Unknown	
Local VMware Disk (mpx.vmhba0:C0:T1:L0)	📀 Normal	Disk	50 GB	
Local VMware Disk (mpx.vmhba0:C0:T0:L0)	📀 Normal	Disk	40 GB	
STARWIND iSCSI Disk (eui.60e7edcceeae5b4e)	Normal	Disk	3 GB	
STARWIND iSCSI Disk (eui.4649d8befbe79223)	📀 Normal	Disk	3 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.



	v 🗗 Register a VM 🛛 🛱 Datastore browser C	Refresh 🏘 Actions
 New datastore Select creation type Select device Select partitioning options Ready to complete 	Select creation type How would you like to create a datastore? Create new VMFS datastore Add an extent to existing VMFS datastore Expand an existing VMFS datastore extent Mount NFS datastore	Create a new VMFS datastore on a local disk device
		Back Next Finish Cancel

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

省 New datastore 🛛 Increase capacit	y 📋 🚰 Register a VM 🛛 📆 Datastore browse	er C Refrest	n 🏠 Actio	ns		
Name	~	Drive Type	~	Capacity	`	Provisioned
🔁 New datastore - DS1						
 1 Select creation type 2 Select device 3 Select partitioning options 4 Ready to complete 	Select device Select a device on which to create a new VMF Name DS1	FS partition				
	The following devices are unclaimed and can Name	~	Туре	~ Capacity		ree space 🗸 🗸
	STARWIND ISCSI Disk (eui.22ae584be2		Disk Disk	5 GB 6 GB		GB GB 2 items
vm ware [®]			R	ack Next		inish Cancel

3. Enter datastore size and click Next.



🗄 New datastore - DS1				
 1 Select creation type 2 Select device 3 Select partitioning options 4 Ready to complete 	Select partitioning option Select how you would like to partition to Use full disk			
vmware [.]	Before, select a partition Free space (5 f	Aft	ter 1. VMFS (5 GB)
			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 Actions 🛩 🏠 -				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	н									
Networking		=								
Virtual switches		Device Details								
VMkernel adapters		Properties Paths								
Physical adapters		> Logical Pathuons U								
TCP/IP configuration										
		Multipathing Policies Edit Multipathing								
Advanced		Path Selection Policy Most Recently Used (VMware)								
Advanced Virtual Machines		Yath Selection Policy Most Recently Used (VMWare) Storage Array Type Policy VMW SATP ALUA								

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

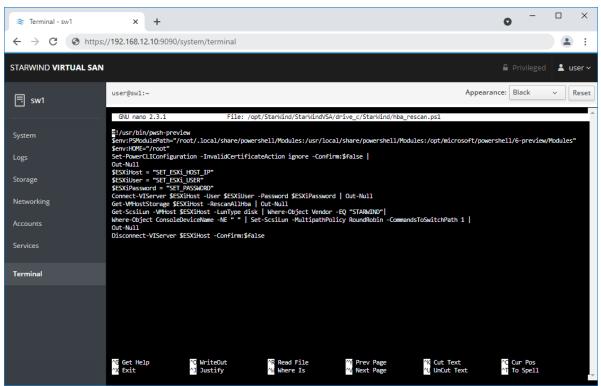
Configuring An Automatic Storage Rescan

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/secu	rity/users		\$:
vm ware" ESXi"		root@1	92.168.12.225 👻 Help 👻 🝳 Sear	ch	P
📲 Navigator 👘	esxi01.starwind.local - Manage				
 Host Manage Monitor Virtual Machines SW1 Monitor SW1 Monitor SV7 SU1 Storage more VMs Storage more storage Networking 3 	System Hardware Licensing Acceptance level Authentication Certificates Users Roles Lockdown mode	Packages Services Sec Add user Edit user Remove user Iser Name Name Dot Description Password (required) Confirm password (required)	user CRefresh Q Search Description Administrator	1 items	
			Add Cancel		
	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.

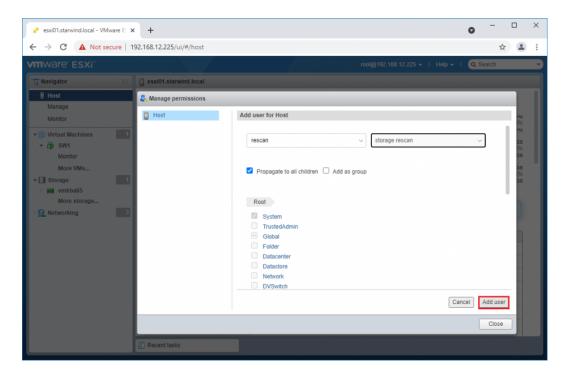
esxi01.starwind.local - VMware E	+		0	- 0	×
← → C ▲ Not secure 1	92.168.12.225/ui/#/host/manage/sec	urity/roles		\$:
			root@192.168.12.225 🗸 Help 🗸 🝳 Sea	rch	P
Navigator ▼ Host	esxi01.starwind.local - Manage	an Packagen Sanison San	with Pusers		
Virtual Machines Virtual Machines Virtual Machines Virtual Machines SW1 Monitor More VMs Storage More storage	Authentication	Image Services Services Add role Edit role Remove role Add a role Role name (required) Privileges	storage rescan Root System		2
9 🧟 Networking 3			TrustedAdmin Global Folder Datacenter Datastore Network DVSwitch DVPortgroup Host VirtualMachine Resource		
	Recent tasks		Add	Cancel	<i>A</i>



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.



	🥒 Edit option 🔋 😴 Refresh 🛛 🔹 Actions	
Autostart	Кеу 🔺	✓ Name
wap		 Indite Delay in miniseconds for completion or commences with a DOOT status
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	ensing Packages Services	Security & users
Advanced settings Autostart Swap Time & date		Actions
	🛃 Edit option - Disk.DiskMaxIOSiz	ze
	New value	512 (long integer)
		Save Cancel
	Quick filters	T

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



licensed.

Betting Started	Summary Monitor Co	nfigure Permissions	s Hosts VMs	Datast	ores Networks Up	odate Manager
••	SWVCluster - Edit Clu	ster Settings		_		(?)
 Services 	vSphere DRS	vSphere	Availability			
v Sphere Di v Sphere Av	vSphere Availability	vSpher	e Availability is com	prised c	of vSphere HA and Pro	active HA. To enable Proactive
▼ vSAN General	Failures and Response Proactive HA Failures		n ON vSphere H	A		
Disk Mana	and Responses Admission Control	🗌 Turi	n on Proactive H	ia	Turn on DRS to enabl	e
Fault Doma Cluster	Heartbeat Datastores	Failure	6	Re	sponse	Details
Health and	Advanced Options	Hostf	ailure	0	Restart VMs	Restart VMs using V
iSCSI Targ		Proact	tive HA	•	Disabled	Proactive HA is not e
iSCSI Initia		Host	solation	•	Disabled	VMs on isolated hos
Configurat			tore with Permaner e Loss	nt 🔶	Disabled	Datastore protection disabled.
Updates Configurat		Datas Down	tore with All Paths	•	Disabled	Datastore protection disabled.
General Licensing		Guest	not heartbeating	•	Disabled	VM and application r
VMware EV						
VM/Host G		4				
VM/Host R						
VM Overrig	4					•

Conclusion

The Configuration Guide for StarWind Virtual SAN on VMware vSphere provides a detailed roadmap for IT professionals to enhance their virtualized infrastructure with advanced storage solutions. By leveraging StarWind VSAN, organizations can achieve significant improvements in storage performance, efficiency, and resilience, ensuring a robust foundation for their virtualization workloads.



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