

# StarWind Virtual SAN: Configuration Guide for VMware vSphere [ESXi], VSAN Deployed as a Controller Virtual Machine (CVM) using Web UI

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**TECHNICAL PAPERS** 



StarWind Virtual SAN: Configuration Guide for VMware vSphere [ESXi], VSAN Deployed as a Controller Virtual Machine (CVM) using Web UI



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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 a comprehensive outline on how to deploy and configure StarWind Virtual SAN within the VMware vSphere environment and create StarWind devices using the Web UI. It includes links to the system requirements, RAID settings, best practices, and steps to ensure a seamless setup and integration.

Audience

The guide is created for IT specialists, system administrators, and VMware professionals who are keen on deploying and configuring StarWind Virtual SAN on VMware vSphere.

**Expected Result** 

Users will possess a robust understanding of the steps and best practices for deploying and configuring StarWind Virtual SAN in a VMware vSphere environment.

#### **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

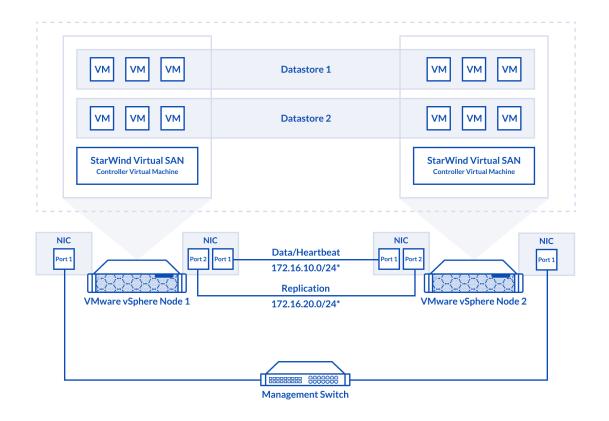
Recommended RAID settings for HDD and SSD disks: https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-h dd-and-ssd-disks/

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).

<b>vm</b> ware <sup>®</sup> ESXi <sup>®</sup>							
Navigator	Networking						
✓ ☐ Host Manage Monitor	Port groups Virtual switches						
> 🗗 Virtual Machines	0 Name	~	Port groups				
E Storage	1 vSwitch0		2				
Setworking							
	Add standard virtual switch - v Sv	Add standard virtual switch - v Switch1					
	vSwitch Name	vSwitch1					
	MTU	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.l	ocal - Networking	
Port groups Virtua	Il switches Physical NICs	VMkernel 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 📄 Provisioning 📄 Fault tolerance logging 📄 Management
		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 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				
✓ <u></u> ISCSI_for_VMs Monitor More networks	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.

# **Deploying Starwind Virtual San For Vsphere**

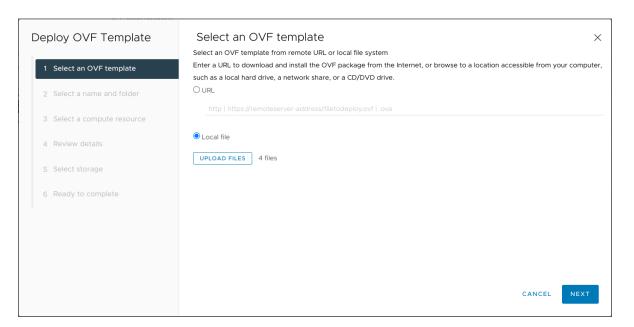
1. Download zip archive that contains StarWind Virtual SAN for vSphere: https://www.starwindsoftware.com/starwind-virtual-san#download

2. Extract the virtual machine files.

3. Deploy the control virtual machine to the VMware vSphere. Right-click on the Datacenter, cluster, or node menu and select the "Deploy OVF Template..." option from a drop-down menu.

vSphere - Datacer	nter - Summary 🗙 🕂												-		×
$\leftarrow \rightarrow $ C	A Not secure	https://192.168	12.242/u	ii/app/datac	enter;nav=v/ur	n:vmomi:Datacenter:c	latacent	er-3:00850be0-4	4c08-4437-97a	19 to	₹_≡	9	œ		
vm vSphere				environment	s			C	? ~ Ad	ministrator∉	) VSPHEF	RE.LOC	AL 🗸		٢
☐		r	osts:	s: 2	✓ Permissions	Hosts & Clusters	VMs	Datastores	Networks	Update: CPU Used: 6.62 Gi Memory Used: 15.75 G Storage	Hz		Capacity Free Capa Free	14.18 GH 7: 20.8 GH 8: 18.25 G noity: 32 G 8: 213.2 G	Hz 3B 3B 3B
	<ul> <li>New Virtual Macl</li> <li>Deploy OVF Ten</li> <li>Storage</li> </ul>		s		Value	^	Tag	IS ssigned Tag	Category	Used: 686.3 G	Descri	ption	Capacity	/: 899.5 G	8
	Edit Default VM ( Migrate VMs to A Move To Rename														
Recent Tasks	Tags & Custom A Add Permission Alarms		•	Details	~ Initiato	r v Queue	d For	<ul> <li>✓ Start Time</li> </ul>	•↓ ~	Completion Ti	ime 🗸	Sen	ver		<b>×</b>
All 🗸	🗙 Delete													More Ta	asks

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



5. Specify the VM name and target location.

Deploy OVF Template	Select a name and folder × Specify a unique name and target location
1 Select an OVF template	Virtual machine name: SW1
2 Select a name and folder	Select a location for the virtual machine.
3 Select a compute resource	
4 Review details	
5 Select storage	
6 Ready to complete	
	CANCEL BACK NEXT

6. Select a compute resource intended to run the StarWind vSAN CVM



Deploy OVF Template	Select a compute resource Select the destination compute resource for this operation	×
1 Select an OVF template		
2 Select a name and folder	> []] Production Cluster	
3 Select a compute resource		
4 Review details		
5 Select storage		
6 Ready to complete		
	Compatibility	
	✓ Compatibility checks succeeded.	
	CANCEL BACK NEXT	

7. Review the template details. Click Next.

Deploy OVF Template	Review details Verify the template details.	×
1 Select an OVF template	The OVF package contains advanced configuration options below. Click next to acc	uration options, which might pose a security risk. Review the advanced
2 Select a name and folder		
3 Select a compute resource	Publisher	No certificate present
	Product	StarWind Appliance
4 Review details	Vendor	StarWind Software Inc.
5 Select storage	Download size	Unknown
6 Select networks	Size on disk	Unknown (thin provisioned) 30.0 GB (thick provisioned)
7 Customize template	Extra configuration	disk.EnableUUID = true nvram = ovf./file/file2
8 Ready to complete		
		CANCEL BACK NEXT

8. In the second step of the wizard, specify the virtual machine provisioning type, VM Storage Policy, and select the direct-attached storage for the appliance system drive. Click Next.



Deploy OVF Template	Select storage X	
1 Select an OVF template	Select virtual disk format         Thick Provision Lazy Zeroed            VM Storage Policy	
2 Select a name and folder	Disable Storage DRS for this virtual machine	
3 Select a compute resource	Name         ¥         Storage Compatibility         Y         Provisioned         ¥         Free         ¥         Type         ¥         Cluster	Ŧ
4 Review details	●   億) Datastore 10 TB 3.38 TB 6.61 TB	
5 Select storage		
6 Select networks	Image: Contract of the second	3
7 Customize template	Compatibility	
8 Ready to complete	✓ Compatibility checks succeeded.	
	CANCEL BACK NEXT	

9. Select the destination network for each network adapter assigned to the VM.

The default naming for virtual switches:

- the Management virtual switch is "Management vSwitch",
- the iSCSI virtual switch is "Data/iSCSI vSwitch",
- the Synchronization virtual switch is "Replication/Sync vSwitch ".

Specify corresponding network connections according to your virtual network naming. Click Next.

Deploy OVF Template	Select networks Select a destination network for each source	e network.			×
1 Select an OVF template	Source Network	Destination Network			
2 Select a name and folder	Management Network	Management	~		
3 Select a compute resource	Data Network	Data network	~		
4 Review details	Replication Network	Replica network	~		
5 Select storage					3 items
6 Select networks	IP Allocation Settings				
7 Customize template	IP allocation: IP protocol:	Static - Manual IPv4			
8 Ready to complete					
			CANCEL	ВАСК	NEXT

10. Specify the hostname, static IPv4 address, gateway, DNS, and additional network



settings for Management and iSCSI/Data network interfaces:

Deploy OVF Template	Customize template Customize the deployment properties of this softw	vare solution.		
1 Select an OVF template	O All properties have valid values	×		
2 Select a name and folder	✓ Management interface network settings	5 settings		
3 Select a compute resource	Hostname	Hostname of StarWind Appliance		
4 Review details	IPv4 address for Management interface	IPv4 address for Management interface (example 192.168.1.100)		
5 Select storage	192168.12.206 IPv4 netmask for Management interface IPv4 netmask for Management interface (example 24)			
6 Select networks		23		
7 Customize template	IPv4 gateway for Management interface	IPv4 gateway for Management interface (example 192.168.1.1) 192.168.12.1		
8 Ready to complete	DNS Server for Management interface	DNS Server for Data interface (example 8.8.8.8) 192.168.12.17		
		CANCEL BACK NEXT		

NOTE: To manage the StarWind appliances via the StarWind vCenter plugin, the static IPv4 address must be assigned.

Deploy OVF Template	Customize template	192,168,12,1
1 Select an OVF template	DNS Server for Management interface	DNS Server for Data interface (example 8.8.8.8)
2 Select a name and folder	✓ Data Interface network settings	192.168.12.17 3 settings
3 Select a compute resource	IPv4 address for Data interface	IPv4 address for Data interface (example 172.16.10.10)
4 Review details		172.16.10.100
5 Select storage	IPv4 netmask for Data interface	IPv4 netmask for Data interface (example 24) 24
6 Select networks	MTU for Data interface	MTU for Data interface (example 9000)
7 Customize template		9000
	✓ Enable additional services	1 settings
8 Ready to complete	Enable SSH	SSH is disabled by default. Select the checkbox to enable it ☑
		CANCEL BACK NEXT

NOTE: if a DHCP server is available on the given network, you can skip setting the additional parameters for that interface.

11. Review the deployment summary information and click to start the VM creation.



Deploy OVF Template	Ready to comp ~ Select networks	lete			×
1 Select an OVF template	Network mapping	3			
2 Select a name and folder	Management Network	Management			
	Data Network	Data network			
3 Select a compute resource	Replication Network	Replica network			
4 Review details	IP allocation settings				
	IP protocol	IPV4			
5 Select storage	IP allocation	Static - Manual			
6 Select networks	✓ Customize template	11			
	Properties	Hostname = SW1 IPv4 address for Management interface = 192.168.12.206 IPv4 netmask for Management interface = 23			
7 Customize template		IPv4 gateway for Management interface = 192.168.12.1 DNS Server for Management interface = 192.168.12.17			
8 Ready to complete		DN3 Server 100 IPV4 address for Data interface = 172.16.10.100 IPV4 netmask for Data interface = 24 MTU for Data interface = 9000 Enable SSH = True			
			CANCEL	ВАСК	FINISH

12. Repeat the VM deployment on each 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 is under load may lead to split-brain issues in synchronous replication devices, thus to data corruption.

## **Initial Configuration Wizard**

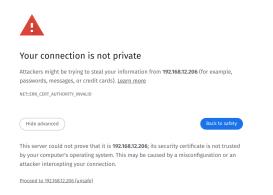
1. Start StarWind Virtual SAN CVM.

2. Launch VM console to see the VM boot process and get the IPv4 address of the Management network interface.

NOTE: in case VM has no IPv4 address obtained from a DHCP server, use the Text-based User Interface (TUI) to set up a Management network.

3. Using the web browser, open a new tab and enter the VM IPv4 address to open StarWind VSAN Web Interface. Click "Advanced" and then "Continue to..."





4. StarWind VSAN web UI welcomes you, and the "Initial Configuration" wizard will guide you through the deployment process.

Welcome to StarWind Appliance	
Follow the initial configuration wizard and complete the required steps of the appliance setup	
Start	

5. In the following step, upload the license file.



StarWind Appliance Initial confi	iguration	
• License	License	
	Provide StarWind license file to continue	
	i If you cannot find the license file, please contact your StarWind Sales Representative or send the request to: sales@starwind.com	
	Upload file StarWind license file (.swk)	
	Back Next	

6. Read and accept the End User License Agreement to proceed.

StarWind Appliance Initial confi	guration	
✓ License	Review end-user license agreement	
• EULA	Review and accept the following license agreement to continue	
	STARWIND LICENSE AGREEMENT FOR COMMERCIAL PRODUCTS	
	This StarWind License Agreement the "Agreement" is a legal agreement between the entity indicated on the signature page as "License" of the license entity on whose behavior this Agreement is deticnically executed by the authoritod user (the "License") and StarWind Software, Inc., a State of Delaware, USA corporation ("StarWind," and collectively with	
	Licensee, the " <b>Parties</b> " and each, (a " <b>Party</b> ")), that is entered into as of the date of acceptance hereof by both Parties hereto (the " <b>Effective Date</b> ").	
	Learnee is subject to the terms and conditions of this Agreement whether Learnee a consister or abains StaWiki Product directly from Washis, or through any other source, by Using Inabiling, and/or Operaing the SaWiki Product, Licrosee agrees to be bound by the terms of this Agreement, fillconce does not agree to the terms and conditions of this Agreement, SaWiki of swelling less titemes 3 staWiki Product to Learnee. In case, we may construct the statistic and/or Operate the SaWiki of swelling less tabults. The SaWiki of Learnee, how the term of the Installed on any computers, workdations, personal digital assistants, annumphanes, mobile phone, hundheid docsee, so other electronic devices for which the Product was designed learch. <b>*Clean Device</b> <sup>1</sup> , unless or until Learnee accepts the terms of this Agreement, License may also exceed a solg of the Agreement by conducting Bawiki art. Hould baw de	
	THIS ARREVENTIONLY BECOMES EFFECTIVE UPON STARWIND S FINAL ACCEPTANCE, APPROVAL AND EXECUTION THERIOF. IF EXECUTED ELECTRONICALLY, LICENSEE WILL HAVE THE OPPORTUNITY TO ACCEPT THIS OFFER OF AGREEMENT THROUGH A CLICK THROUGH PROCEDURE. IF LICENSEE DOES NOT WISH TO ACCEPT THE TERMS OF THIS AGREEMENT	
	I accept the terms of the license agreement	
	Back	

7. Review or edit the Network settings and click Next.

NOTE: Static network settings are recommended for the configuration.



	StarWind Appliance Initial configu	ration						
	✓ License ✓ EULA	Configure management net						
	<ul> <li>Management network</li> </ul>	<ul> <li>Specify the unique IP address (static is re</li> <li>The Management network is used to commit</li> </ul>						
= 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1		IP mode Static						
		NIC Model	Bandwidth	MAC address	IP address	Netmask 🛈	Gateway	
		ens160 82574L Gigabit Ne…	1 Gbit		192.168.12.206	255.255.254.0	192.168.12.1	
		Name servers (optional):						
		DNS 1 192.168.12.17						
		Time settings (optional):						
				Time zone UTC				
						Back	Next	

8. Specify the hostname for the virtual machine and click Next.

StarWind Appliance Initial config	guration	
✓ License		
	Verify hostname	
🗸 EULA		
	Check the current appliance hostname and modify it if required	
<ul> <li>Management network</li> </ul>	i Use Latin letters, numbers, and dash	
	Ose caunteres, numbers, and dash	
Static hostname		
Statte nostriante		
	SW1	
	Back Next	

9. Create an administrator account. Click Next.



and the second second			
	StarWind Appliance Initial config	uration	
	Starwind Appliance Initiat coming		
	✓ License		
	🗸 EULA	Create administrator account	
	✓ EOLA	Specify new credentials for the appliance administrator account	
	<ul> <li>Management network</li> </ul>		
	<ul> <li>Static hostname</li> </ul>	admin	
	Administrator account		
			a second a second s
		Confirm password	
		Additional information (optional)	
		Back Next	

10. Review your settings selection before setting up StarWind VSAN.

StarWind Appliance Initial config	guration			
<ul> <li>License</li> </ul>				
	Review summary			
🗸 EULA				
	the second second			
<ul> <li>Management network</li> </ul>	License type			
<ul> <li>Static hostname</li> </ul>	License			
<ul> <li>Administrator account</li> </ul>				
	Network settings			
C				
Summary	Interface	ens160 (82574L Gigabit Network Connection)		
	Bandwidth			
	MTU			
	MIU			
	IP address	192.168.12.206		
	Appliance hostname			
	Credentials			
	Administrator username			
			Back Configure	

11. Please standby until the Initial Configuration Wizard configures StarWind VSAN for you.



StarWind Appliance Initial configu	ration		
✓ License	Configuring settings		
✓ EULA	Please wait until all specified settings are applied		
<ul> <li>Management network</li> </ul>			
✓ Static hostname	Progress: 0%	👌 Time remaining: 🛛 - 3 sec	
<ul> <li>Administrator account</li> </ul>	<ul> <li>Applying license</li> </ul>		
✓ Summary	<ul> <li>Apprying ucerise</li> <li>Configuring management network</li> </ul>		
• Configuration		×	

12. The appliance is set and ready. Click on the Done button to install the StarWind vCenter Plugin right now or uncheck the checkbox to skip this step and proceed to the Login page.

StarWind Appliance Initial configuration	
Initial configuration completed The essential settings were successfully configured. Press "Finish" to close the wizard and navigate to the login page.	
You can also install the StarWind vSphere plug-in if you want to access the StarWind Appliance web UI from your vSphere console.	
Launch the StarWind vCenter plug-in Installation wizard.	
<b>k</b>	

13. Repeat the initial configuration on other StarWind CVMs that will be used to create 2-node or 3-node HA shared storage.



# **Add Appliance**

To create 2-way or 3-way synchronously replicated highly available storage, add partner appliances that use the same license key.

1. Add StarWind appliance(s) in the web console, on the Appliances page. NOTE: The newly added appliance will be linked to already connected partners.

StarWind			🗐 🌲 🏠 admin 🛩
<ul> <li>Dashboard</li> <li>Storage</li> </ul>	App Add appliance		
Network     Appliances	Credentials     Summary	Credentials Specify the appliance IP address and its administrator credentials	
Lusers		The newly added appliance will be linked to already connected partners.	
📋 Tasks and events 👻			
		k Cancel Next	
< Minimize			

2. Provide credentials of partner appliance.



<b>StarWind</b> Hyperconvergence				🗄 🌲 🏟 admin 💌
Dashboard     App     Storage	Add appliance			
	Credentials	Credentials		Q = ±+
		Specify the appliance IP address and its administrator credentials The newly added appliance will be linked to already connected partners.		Raw capacity 🗢 0 Bytes
		IP address 192.166 Administrator username admin Administrator password 	cel	
< Minimize				

3. Wait for connection and validation of settings.

StarWind		
Control Contr	Add appliance         • credentials         summary         • Credentials         Specify the appliance VP address and its administrator credentials.         • The newly added appliance will be larked to already connected partners.         • Use the appliance connected partners.         • Diministrator connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.         • Other newly added appliance will be larked to already connected partners.	
< Minimize		

4. Review the summary and click "Add appliance".



<b>StarWind</b> hyperconvergence			🖽 🌲 🎄 admin 💌
	App Add appliance		
	<ul><li>Credentials</li><li>Summary</li></ul>	Summary	
		Appliance name SW2 Storage capacity 0.68 Storage pools 0 Volumes 0	
		Back Add appliance	

## **Configure Ha Networking**

1. Launch the "Configure HA Networking" wizard.

StarWind							Ē	l 🌲 🛟 admin 🕶
💁 Dashboard	Network							
🗟 Storage 🛛 🔻		Configure HA networking						
A Network	🗌 Interface 🗘	Adapter model 💲	Link status 🗢	Bandwidth 💠	MAC address 💠	Role ≑	IP address 💠	Appliance 🗢
<ul> <li>Appliances</li> <li>Users</li> </ul>	🔲 📜 ens160	82574L Gigabit Net	Up		00:50:56:9C:E5:A5	Management		
Tasks and events	🔲 📜 ens160	82574L Gigabit Net				Management		
	🔲 📜 ens224	VMXNET3 Ethernet	Up			Unassigned		
	🔲 📜 ens224	VMXNET3 Ethernet				Unassigned		
	🔲 📜 ens256	VMXNET3 Ethernet	Down			Unassigned		
	🔲 📜 ens256	VMXNET3 Ethernet				Unassigned		
< Minimize								

2. Select appliances for network configuration.



NOTE: the number of appliances to select is limited by your license, so can be either two or three appliances at a time.

<b>StarWind</b> Hyperconvergence					🗏 🌲 🛟 admin 🔻
<ul> <li>Dashboard</li> <li>Storage</li> </ul>	Configure HA networking				
A Network	Appliances     Data network	Appliances Select appliances for network configuration. You c	an configure un to three annliances at a time		Q ≞ … Appliance ≑
<ul> <li>Appliances</li> <li>Users</li> </ul>		Appliance \$	Status 🗢	Adapters 🗢	SW1
📋 Tasks and events 🛛 🔻		Sw1	Online		SW2 SW1
		✓ B SW2	Online		SW2
					SW1
				Close Next	
< Minimize					

3. Configure the "Data" network. Select interfaces to carry storage traffic, configure them with static IP addresses in unique networks, and specify subnet masks:

- assign and configure at least one interface on each node
- for redundant configuration, select two interfaces on each node
- ensure interfaces are connected to client hosts directly or through redundant switches

4. Assign MTU value to all selected network adapters, e.g. 1500 or 9000. Ensure the switches have the same MTU value set.



	Configure HA networking								
	<ul> <li>✓ Appliances</li> <li>Data network</li> </ul>	● <u>Show sample net</u>	work diagram						
		SWI 🖌	Model	Bandwidth	MAC address	IP address	Netmask 🛈	Link status	SW1
			VMXNET3 Ethernet	10 Gbit				Up	SW2
			VMXNET3 Ethernet		00:50:56:9C:C4:73			Down	SW1
		SW2 🔺	Model	Bandwidth	MAC address	IP address	Netmask 🚯	Link status	SW2 SW1
			VMXNET3 Ethernet	10 Gbit	00:50:56:9C:D8:13			Up	SW2
			VMXNET3 Ethernet					Down	
		Cluster MTU size: MTU 9000							
							Back	Next	
4 Minimize									

5. Click Next to validate Data network settings.

StarWind		🗎 🐥 🛟 admin 🔻
StartWind Interconverse Dushboard Dushboard Interconverse	Store sample network diagram Styl *  Interface Model Bandwidth MAC address   P address Nietmask @ Link status  Interface Model Bandwidth MAC address   P address Nietmask @ Link status  Interface Model Bandwidth MAC address   P address Nietmask @ Link status  Interface Model Bandwidth MAC address   P address Nietmask @ Link status  Interface Model Bandwidth MAC address   P address Nietmask @ Link status  Interface Model Bandwidth MAC address   P address Nietmask @ Link status  Interface Model Bandwidth MAC address   P address Nietmask @ Link status  Interface Model Bandwidth MAC address   P address Nietmask @ Link status  Interface to eliminate a single point of failure  Acknowledge and continue?  Interface to eliminate a single point of failure  No, cancel Yes, continue  No	
	Back Next or D	
∢ Minimize		

6. Configure the "Replication" network. Select interfaces to carry storage traffic, configure them with static IP addresses in unique networks, and specify subnet masks:

- assign and configure at least one interface on each node
- for redundant configuration, select two interfaces on each node



 ensure interfaces are connected to client hosts directly or through redundant switches

7. Assign MTU value to all selected network adapters, e.g. 1500 or 9000. Ensure the switches have the same MTU value set.

StarWind			
Dashboard Storage	Configure HA networking		
storage     Appliances     Users	✓ Data network ● Replication network Summary	Select interfaces to carry data replication traffic, configure them with unique IP addresses, and specify subnet masks.	Q ± ··· Appliance ¢ SW1 SW2
		■       Interface       Model       Bandwidth       MAC address       IP address       Netmask ●       Link status         ■       ens256       VMXNET3 Ethernet       10 Gbit       00:50:56:9C:C4:73       172:16:20:10       24       Down	SW1 SW2
		Interface         Model         Bandwidth         MAC address         IP address         Netmask •         Link status           ens:256         VMXNET3 Ethernet         10 Gbit         00:50:56:9C:91:2C         172.16.20.20         24         Down	SW1 SW2
		Cluster MTU size: 9000	
		Back Next	
< Minimize			

8. Click Next to validate the Replication network settings completion.

Star Wind			🗎 🌲 🏟 admin 🔻
🚔 Dashboard			
🗧 Storage 💌			
💼 Network			
Appliances			
Lusers		SW1 → ▲ Non-redundant configuration ×	
Tasks and events		Intr Only 1 Replication network is configured. Configure more Paddress Netmask O Link status	
		ens Replication networks to eliminate a single point of failure. 72.16.20.10 24 Down	
		SW2 A We recommended assigning at least two data network	
		Inter interfaces to eliminate a single point of failure. P address Netmask O Link status Acknowledge and continue?	
		ens: 72.16.20.20 24 Down	
		Cluster MTU s	
< Minimize			



StarWind			
🙆 Dashboard			
Appliances			
😩 Users			
		SW2 * Testing network settings	
< Minimize		ţ	

9. Review the summary and click Configure.

StarWind							🗐 🌲 🏟 admin 🕶
🙆 Dashboard	Configure HA networking						
Storage 👻	<ul> <li>✓ Appliances</li> <li>✓ Data network</li> <li>✓ Replication network</li> <li>● Summary</li> </ul>	Summary					
Appliances     Users     Tasks and events		Appuance name = SW1					
		Appliance name Data networks Replication networks	₩ SW2 172.16.10.20 172.16.20.20				
					Back	Configure	
∢ Minimize							



# **Add Physical Disks**

Attach storage to StarWind Virtual SAN Controller VM:

- the physical hosts have all the drives connected through an HBA or RAID controller
- HBA or RAID controller will be added via a DirectPath I/O passthrough device to a StarWind CVM. Follow the instructions from the VMware on how to add a RAID controller as a PCI device to StarWind VM: https://docs.vmware.com/en/VMware-vSphere/8.0/vsphere-esxi-host-client/GUID-2 B6D43A6-9598-47C4-A2E7-5924E3367BB6.html
- StarWind CVM is installed on each server that is used to configure highly available storage.
- it is recommended to install StarWind CVM on a separate storage device available to the hypervisor host (e.g. SSD, HDD, etc.).
- for VMware vSphere environments, the disks can be added to StarWind 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/GUID-4236E44E-E11F-4EDD-8CC0-12BA664BB811.html

NOTE: In order to make RDM and VMDK disks available for StarWind devices in StarWind CVM Version 20231016 (build 15260), please follow the steps below.

stop service

sudo systemctl stop starwind-san-and-nas-console

• get VMDK/RDM/ device letter using lsblk command

lsblk |grep -v sda # sda - is excluded system drive.

• edit config file

```
sudo nano /opt/starwind/starwind-san-and-nas-
console/appsettings.json
```

• add lines to the file, previously setting the disk letters to config (e.g. sdb, sdc)

```
"HardwareRaidImulation": {"PhysicalDisks": [ "sdb", "sdc" ]
},
```



• start service

sudo systemctl start starwind-san-and-nas-console

StarWind							E	🌲 🏟 admin 🛩
🔹 Dashboard	Physical disks							
🛢 Storage 🔺	Selected 0 of 6 Rescan							
🗎 File shares	🔲 Disk name 🖨	Media type 🗢	Size ≑	State 🗢	Bus protocol 🗘	Slot number ¢	Pool name  ≑	Appliance ≑
👮 LUNs	🗌 🚔 sdb			Ready				
🔮 Volumes	🗌 💻 sdb			Ready				
III Storage pools	🗌 🚨 sdc			Ready				
Physical disks	🗌 💻 sdc			Ready				
A Network	🔲 🚨 sdd			Ready				
<ul> <li>Appliances</li> <li>Users</li> </ul>	🗌 💻 sdd			Ready				
Tasks and events								
<ul> <li>Minimize</li> </ul>								

#### **Create Storage Pool**

- 1. Click the "Add" button to create a storage pool.
- 2. Select two storage nodes to create a storage pool on them simultaneously.



StarWind		🗐 🌲 🏟 admin <del>-</del>
o Dashboard	Storage pools	
Storage 🔺	Selected 0 of 0 + Create anew pool pool	
File shares LUNs	There are no storage pools yet	
🔮 Volumes	Start building your storage infrastructure by creating a new one	
Storage pools		
Physical disks A Network		
Appliances		
Lusers		
🖹 Tasks and events 🔻		
✓ Minimize		

Stoi Create storage pool					
Selected • Appliance Physical disks Profile	Appliance Select one or more storage nodes to	o create a storage pool 🕜			
	– Node name 🗢	Status ≑	Available disks 🗢	Available capa 🗢	
	✓ SW1	0nline			
	🗹 🗟 SW2	Online			
			Cancel	Next	

3. Select physical disks to include in the storage pool name and click the "Next" button. NOTE: Select identical type and number of disks on each storage node to create identical storage pools.

StarWind Virtual SAN: Configuration Guide for VMware vSphere [ESXi], VSAN Deployed as a Controller Virtual Machine (CVM) using Web UI



StarWind hyperconvergence						🗉 🌲 🏠 admin 💌
	Stol Create storage pool					
	Selector Appliance Physical disks Profile Summary	Physical disks Select physical disks to include in st	torage pools on each node 🛛			
		<ul> <li>■ Disk name   Medi</li> <li>✓ ■ sdb</li> <li>HDD</li> <li>✓ ■ sdc</li> <li>HDD</li> </ul>		Size  \$ Slot  \$ Slot  \$ Size \$ Slot \$ Size \$ 32:0:1:0 \$ 5 GB \$ 32:0:2:0 \$ Size \$ 32:0 \$ Size \$ 32:0:2:	Contro \$ SAS1068 PC	
		Sdd HDD			SAS1068 PC	
		Sdb HDD		Size \$ Slot \$	Contro \$ SAS1068 PC	
		Selected number of disks is eq		5 GB 32:0:2:0	SAS1068 PC	
< Minimize						

4. Select one of the preconfigured storage profiles or create a redundancy layout for the new storage pool manually according to your redundancy, capacity, and performance requirements.

<b>StarWind</b> Hyperconvergence			
Dashboard	Sto Create storage pool		
<ul> <li>Storage</li> <li>File shares</li> <li>EUNs</li> </ul>	Selectec <ul> <li>Appliance</li> <li>Physical disks</li> </ul>	Profile Choose an optimal storage pool profile. Selected disks left unused will be assigned to hot spares.	
Volumes	Profile     Summary	Storage pool profile Usable capacity Fault tolerance 🗨 Hot spares	
Storage pools           Physical disks		<ul> <li>High capacity (recommended) Maximize redundancy while maintaining high</li> <li>9.9 GB</li> <li>1 = 0 +</li> <li>storage capacity (Software RAID (RAID-5)</li> </ul>	
🚓 Network		High performance Maximize storage performance while maintaining     4.95 GB     1      1	
🚊 Users		Manual     Allows you to configure the storage pool layout     monumbly.	
		Back	
< Minimize			

Hardware RAID, Linux Software RAID, and ZFS storage pools are supported and integrated into the StarWind CVM web interface. To make easier the storage pool configuration, the preconfigured storage profiles are provided to configure the



recommended pool type and layout according to the direct-attached storage:

- hardware RAID configures Hardware RAID's virtual disk as a storage pool. It is available only if a hardware RAID controller is passed through to the CVM
- high performance creates Linux Software RAID-10 to maximize storage performance while maintaining redundancy
- high capacity creates Linux Software RAID-5 to maximize storage capacity while maintaining

redundancy

- better redundancy creates ZFS Stripped RAID-Z2 (RAID 60)) to maximize redundancy while maintaining high storage capacity
- manual allows users to configure any storage pool type and layout with attached storage

5. Review "Summary" and click the "Create" button to create the pools on storage servers simultaneously.

StarWind			
Dashboard	Stol Create storage po	ગ	
Eleshares ELUNs UNus UNus	Solector ✓ Appliance ✓ Physical disks ✓ Profile	Summary Review specified settings and create storage pools. 晉 SW1	
Volumes     Storage pools     Physical disks	• Summary	Storage pool layout         Software RAID\RAID-S           Raw capacity         10 GB           Usable capacity         9.9 GB	
_å, Network Ⅲ Appliances ▲ Users		Storage pool layout Software RAID\RAID-S Raw capacity 10 GB Usable capacity 9.9 GB	
Tasks and events *			
		Ba	ck Crrate
< Minimize			

## **Create Volume**

- 1. To create volumes, click the "Add" button.
- 2. Select two identical storage pools to create a volume simultaneously.



StarWind		🗐 🌲 🏠 admin 🕶
o Dashboard	Volumes	
🛢 Storage 🔺	Selected 0 of 0 🛧 Create a new volume nage VHR user	
File shares LUNs	There are no volumes yet	
🕒 Volumes	Start sharing your storage resources to clients by creating a new one	
<ul><li>Storage pools</li><li>Physical disks</li></ul>		
A Network		
Appliances		
💄 Users 📋 Tasks and events 🛛 🔻		
4 Minimize		

<b>StarWind</b> hyperconvergence							
👛 Dashboard	Voli Create volume						
Elle shares	Selectre • Storage pool Settings Filesystem type	Select storage pool Select one or more (in HA configuratio	ns) storage pools to cr Type 🗢	eate a volume <table-cell></table-cell>		Free 💠	
Volumes  Storage pools  Physical disks		Kuine     SW1:md0     III SW2:md0     IIII SW2:md0	Software RAID	Online	RAID-5 RAID-5	9.98 GB	
🚓 Network E Appliances							
Tasks and events							
					Cancel	Next	
∢ Minimize							

3. Specify volume name and capacity.



<b>StarWind</b> hyperconvergence				🗉 🌲 🛟 admin 💌
	Volt Create volume			
	Selector Storage pool • Settings Filesystem type Summary	Specify settings Specify the volume name and size Volume0 You can use Latin letters, numbers, and dash Size Available storage pool capacity: 9.98 GB		
			Back Next	
4 Minimize				

4. Select the Standard volume type.

StarWind			
😂 Dashboard	Volt Create volume		
<ul> <li>Storage</li> <li>File shares</li> <li>UUts</li> <li>Volumes</li> <li>Storage pools</li> <li>Physical disks</li> <li>Physical disks</li> <li>Appliances</li> <li>Users</li> <li>Users</li> </ul>	Selector Storage pool Settings In Filesystem type Summary	Choose filesystem settings         Choose the preferred filesystem settings for the new volume         Image: Standard Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the new volume         Image: Choose the preferred filesystem settings for the preferred file	
< Minimize			

5. Review "Summary" and click the "Create" button to create the pool.



Star Wind			🗉 🌲 🏟 admin 💌
	Volt Create volume		
	Selector Storage pool Settings Filesystem type	Review summary Review your settings before creating a volume	
	• Summary	Storage pool ESVIImd0 Volume name volume0 Size 5 G8 Filesystem settings Standard	
		≣ SW2	
		Storage pool 📑 SW2:md0 Volume name volume0 Size 5 GB Filesystem settings Standard	
		Back	

#### **Create Ha Lun**

The LUN availability for StarWind LUN can be Standalone and High availability (2-way or 3-way replication) and is narrowed by your license.

1. To create a virtual disk, click the Add button.



StarWind		💼 🌲 🏟 admin <del>-</del>
🔯 Dashboard	LUNs	
Storage File shares	Selected 0 of 0 + Greate a new LUN > LUN	
E LUNS	There are no LUNs yet	
- Volumes	Start sharing your storage resources to clients by creating a new one	
III Storage pools		
📕 Physical disks		
🚓 Network		
Appliances		
🛓 Users		
🖹 Tasks and events 🔻		
✓ Minimize		

2. Select the protocol.

LUN Create LUN		
Cleate UN Selector LUN availability Appliances Volumes Failover strategy LUN settings Summary	✓ Fretacial  Jetic the required Protocol  VMe oF  Wide oF  Wide of a recommended option for high performance SD or Wide setup: biory op proceed, make size that your clients are WMA-of compatible.   I Star secommended protocol for most HDD based setups or medium performance SD-based setups.  This option affers broader compatibility for storage clients.	
	Close	

3. Choose the "High availability" LUN availability type.



StarWind			🛱 🌲 🎄 admin 💌
	LUN Create LUN		
	LUN availability	State the required LUN availability          Image: Imag	
∢ Minimize			

4. Select the appliances that will host the LUN. Partner appliances must have identical hardware configurations, including CPU, RAM, storage, and networking.

<b>StarWind</b> Hyderconvergence						🗐 🌲 🏠 admin 🕶
Dashboard LU	Create LUN					
Storage * Select File shares	<ul> <li>✓ Protocol</li> <li>✓ LUN availability</li> </ul>	Appliances Select two or three replication parts	ers that should host the i	HALUN		
👮 LUNs	Appliances     Volumes	All appliances must have identica	hardware configurations	i, including CPU, RAM, storage, and r	networking	
Storage pools     Physical disks	Failover strategy LUN settings Summary	Appliance	Status Online	Software version	Capacity 15 GB	
Appliances	Junnary		Online	1.5.460.5391+76fc51b		
😩 Users 💼 Tasks and events 🛛 🔻						
				Back	Next	
4 Minimize						

5. Select a volume to store the LUN data. Selected volumes must have identical storage configurations.



StarWind hyperconvergence			🗄 🌲 🏠 admin 🔻
	LUN Create LUN		
	Selecto: V Protocol V LUN availability V Appliances Volumes	Volumes Select one volume on each appliance to store the HA LUN data. Selected volumes must have identical storage configurations. Volumes have identical configurations	
	Failover strategy LUN settings Summary	SW1 ▲     Volume ⊕ State ⊕ RAID le ⊕ Capacity ⊕ Free Sp ⊕ Type ⊕     @ € volume0 Mounted RAID-5 5 GB 4.92 GB Standard	
		ﷺ SW2 ▲ Volume ⊕ State ⊕ RAID le ⊕ Capacity ⊕ Free Sp ⊕ Type ⊕	
		Columno Mounted RAID-5 5 GB 4.92 GB Standard	
		Back Next	

6. Select the "Heartbeat" failover strategy.

NOTE: To use the Node witness or the File share witness failover strategies, the appliances should have these features licensed.

StarWind Hyperconvergence		🗉 🌲 🎝 admin 🔻
Dashboard Storage	LUN Create LUN	
File shares	Protocol     Failover strategy     LUN availability     Select the preferred failover strategy. The default is     Appliances     have a UPS unit at your disposal.	🔍 👳 🚥
<ul> <li>Volumes</li> <li>Storage pools</li> <li>Physical disks</li> </ul>	Volumes Failover strategy LUN settings LUN settings	artbeat" networks. Ing blackouts, configure UPS to prevent the simultaneous shutdown
<ul> <li>Network</li> <li>Appliances</li> <li>Users</li> </ul>	Summary  Node witness Athind appliance acts as a "rooter" for replic The working witness node excludes the poss	
Tasks and events *		
		Back
<ul> <li>Minimize</li> </ul>		

7. Specify the HA LUN settings, e.g. name, size, and block size. Click Next.



StarWind			🗏 🌲 🛟 admin 🔻
	LUN Create LUN		
	Stetter Y Protocol LUN availability Appliances Y Volumes Failover strategy LUN settings Summary	LUN settings   Specify the HA LUN settings   Lun same   Lun   Lun </th <th></th>	
4 Minimize			

8. Review "Summary" and click the "Create" button to create the LUN.

StarWind				
🕮 Dashboard	Create LUN			
<ul> <li>torage</li> <li>File shares</li> <li>Fuls shares</li> <li>Cuits</li> <li>Volumes</li> <li>Storage pools</li> <li>Physical disks</li> <li>Network</li> <li>Appliances</li> <li>Users</li> <li>Tasks and events</li> </ul>	<ul> <li>Protocol</li> <li>LUN availability</li> <li>Appliances</li> <li>Volumes</li> <li>Failover strategy</li> <li>LUN settings</li> <li>Summary</li> </ul>	Summary Protocol LUN availability Appliance 1 Appliance 2 Volume names Volume sizes Failover strategy LUN name LUN size MPIO Create VMF56 datastore IQNS	iSCSI High availability (two-way replication) Solutioned, volumed Solutioned, volumed Solutioned Heartbeat Lund A G8 Enabled Faabled No Iqn.2008-08.com.starwindsoftware:192.168.12.206-lund Iqn.2008-08.com.starwindsoftware:192.168.12.166-lund	
			Back Create LUH	
< Minimize				



#### **Connecting Starwind Luns To Vmware Vsphere Servers**

1. Log in to VMware vSphere Client.

2. Select the ESXi server in the sidebar-menu, then navigate to the "Configure" tab and open the "Storage Adapters" submenu page.

3. Click the "+Add Software Adapter" button to launch the corresponding wizard.

🕑 vSphere - 192.168.12.154 - Stora 🗙 🛃 vSpher	re - 192.168.12.205 - Virtua 🗙   +	-	
$\leftarrow$ $\rightarrow$ C $\triangle$ https://192.168.12.	242/ui/app/host;nav=h/urn:vmomi:Ho	stSystem:host-26:dd2967e6-1d51-41bf-92a0-c7a0362479bf/co 🤌 🏠 🖆 🔞 🌘	•
vm vSphere Client Menu v	Q Search in all environments	C (?) v Administrator@VSPHERELOCAL v	
	🚡 192.168.12.154 🛛 асти	DNS 🗸	
192.168.12.242	Summary Monitor Configure	Permissions VMs Datastores Networks Updates	
✓ In Datacenter ✓ In Cluster	Storage 🗸 🗸	Storage Adapters	
192.168.12.154	Storage Adapters	+ Add Software Adapter 🗟 Refresh 🖏 Rescan Storage   💐 Rescan Adapter 🗙 Remove	
192.168.12.172	Storage Devices	Adapter Type y Status y Identifier y Tar y Dev y	P
192.168.12.205	Host Cache Configuration	<ul> <li>Model: PIIX4 for 430TX/440BX/MX IDE Controller</li> </ul>	
🗄 swi	Protocol Endpoints	🚱 vmhba1 Block S Unknown 1 1	1
🕞 VMware vCenter Server	I/O Filters	🚱 vmhba64 Block S Unknown 0 0	С
	Networking 🗸	Model: PVSCSI SCSI Controller	
	Virtual switches	Copy All 3 ite	ems
	VMkernel adapters		
	Physical adapters		
	TCP/IP configuration		
	Virtual Machines 🗸 🗸	No items selected	
Recent Tasks Alarms			
ask Name v Target v St	tatus ~ Details ~		`
eploy OVF template 📅 SW1	✓ Completed	VSPHERE.LOCALLvp 24 ms 03/04/2021, 7:09:19 03/04/2021, 7:24:35 192:168:12:24 AM AM AM	2
nport OVF package 🔲 192.168.12.205	✓ Completed	vsphere.local\Admin 102 ms 03/04/2021, 7:07:39 03/04/2021, 7:24:36 192:168:12.24:	2
ps://192.168.12.242/ui/			More Task

4. Mark the "Add software iSCSI adapter" option and click OK.



🕑 vSphere - 192.168.12.154 - Stora 🗙	🕑 vSphere - 192.168.12.205 - Virtua 🗙   +						-		×
$\leftarrow$ $\rightarrow$ C $$ https://19	2.168.12.242/ui/app/host;nav=h/urn:v	momi:HostSystem:host-26:dd2	967e6-1d51-41bf-92a0-c7a0362479bf/co.	. P	ŵ	£ €	) @		
vm vSphere Client Me	nu 🗸 🛛 📿 Search in all environmen	nts	C @~	Adminis	trator@V	SPHERE.	LOCAL 🗸		٢
10 2 9 9 ✓ 192.168.12.242	Add Software Adapter	192.168.12.154		×					
<ul> <li>✓</li></ul>			en added, select the adapter and use the Adapt	er	× Rei				
<ul> <li>№ 192.168.12.172</li> <li>192.168.12.205</li> <li>№ SW1</li> </ul>	O Add software NVMe over RDMA ada		IA devices.		T	Tar 🔻	Dev y	Pat	
🛱 VMware vCenter Server	O Add Software FCoE Adapter								
	Discover software FCoE adapters a	associated with the following physi	ical network adapter.				Copy All	3 items	
	Physical Network Adapter:	vmnicO	~						
	VLAN ID:	0	Range: 0 - 4094						
	Priority Class:	3	Range: 0 - 7						
	Controller MAC Address:	00:50:56:9c:7a:06							
Recent Tasks Alarms Task Name V Target					on Time	~	Server		Ň
Deploy OVF template			CANCEL	ок d <sup>Im</sup>	021, 7:24		192.168.12.2	42	
Import OVF package 192.168.12.20	05 V Completed	vsphere.local\Admin	03/04/2021, 7:07:39 102 ms	03/04 AM	# <b>z</b> 021, 7:24	1:36	192.168.12.2	42	
								More T	asks

5. Add the IPv4 address of StarWind CVM Data\iSCSI network interface to the "Dynamic Discovery". Save the configuration

🕑 vSphere - 192.168.12.154 - Stora 🗙 🕑 vSpher	re - 192.168.12.205 - Virtu ×   +	- 1	
$\leftarrow$ $\rightarrow$ C $\textcircled{a}$ https://192.168.12.	.242/ui/app/host;nav=h/urn:vmomi:HostSystem:host-26:dd2967e6-1d51-41bf-92a0-c7a0362479bf/co 🖉 🏠 😫	9 @	•
vm vSphere Client Menu v	Q Search in all environments C (?) v Administrator@VSPHER		6
	Image:		
192.168.12.242	Summary Monitor Configure Permissions VMs Datastores Networks Updates		
Datacenter	storage 🗸 Storage Adapters		
✓ ☐ Cluster ▲ 192.168.12.154	Storage Adapters 🕂 Add Software Adapter 🗟 Refresh 🖏 Rescan Storage 🔍 Rescan Adapter 🗙 Remove		
192.168.12.172	Storage Devices Adapter y Type y Status y Identifier y Tar	T Dev T	Pat
192.168.12.205	Host Cache Configuration A Model: ISCSI Software Adapter		
品 sw1	Protocol Endpoints G vmhba65 ISCSI Online Iqn.1998-01.com.vmware:6040 0	0	0
🕞 VMware vCenter Server	I/O Filters  Model: PIIX4 for 430TX/440BX/MX IDE Controller		
	Networking V Swmba1 Block S Unknown 1	1	1
	Virtual switches	0	0
		Copy All 4 i	items
	Physical adapters Properti Devic Paths Dynamic Discove Static Discove Network Port Bindi	Advanced C	Optio
	TCP/IP configuration		
	Virtual Machines		
	ISCSI Server		~
	VM Startup/Shutdown 172:16.10.110/3260		_
	Default VM Compatibility		
	Swap File Location		
	System V Licensing	11	items
ecent Tasks Alarms			

6. Click on the "Rescan" button to discover StarWind virtual disk.



→ C		HostSystem:host-26:dd2967e6-1d51-41bf-92a0-c7a0362479bf/co 🖉 🏠 🎓 🔂 🔒 🕷
O I nttps://192.168.1	rz.z4z/ui/app/nost;nav=n/um.vmom.i	HostSystem:host-26:dd2967e6-1d51-41bf-92a0-c7a0362479bf/co 🖉 🏠 🎓 🙆 🌘 📳 🔹
vm vSphere Client Menu v	Q Search in all environments	C 2 Administrator@VSPHERELOCAL >
	№ 192.168.12.154 AC	TIONS V
192.168.12.242	Summary Monitor Configu	ure Permissions VMs Datastores Networks Updates
Datacenter	Storage 🗸 🗸	Storage Adapters
✓ [] Cluster ▲ 192.168.12.154	Storage Adapters	🕂 Add Software Adapter 🗧 Refresh 🚜 Rescan Storage 🛛 🗟 Rescan Adapter 🗙 Remove
192.168.12.172	Storage Devices	Adapter y Type y Status y Identifier y Tar y Dev y Pat
192.168.12.205	Host Cache Configuration	Model: ISCSI Software Adapter
🗗 swi	Protocol Endpoints	C vmhba65 ISCSI Online Iqn.1998-01.com.vmware:6040 0 0 0
🕞 VMware vCenter Server	I/O Filters	Model: PIIX4 for 430TX/440BX/MX IDE Controller
	Networking 🗸	Image: withbasis         Block S         Unknown          1         1         1           Image: withbasis         Block S.         Unknown         0
	Virtual switches	
	VMkernel adapters	Properti Devic Paths Dynamic Discove Static Discove Network Port Bindi Advanced Optio
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7. Once scanned, the created StarWind LUNs appear on the "Storage Devices" submenu page.



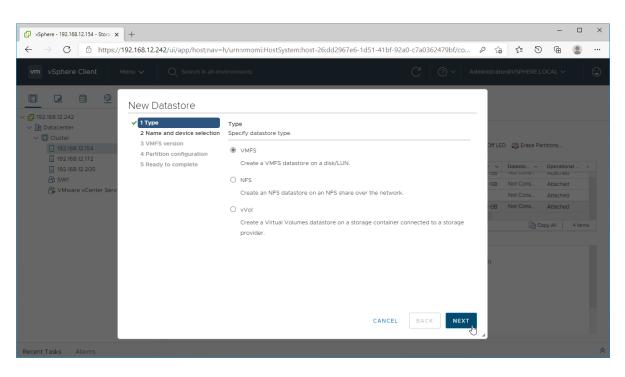
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	TCP/IP configuration     General       Virtual Machines     Name     STARWIND iSCSI Disk (eui.717e59bbd42796a3)       VM Startup/Shutdown     Type     eui.717e59bbd42796a3       VM Startup/Shutdown     Type     disk       Agent VM Settings     Location     /vmfs/devices/disks/eui.717e59bbd42796a3       Default VM Compatibility     Capacity     20.00 GB       Swap File Location     Hardware Acceleration     Supported	
	System Transport ISCSI Owner NMP Licensing Sector Format 512n	

8. Right-click on the ESXi server to open the "Actions" menu, click on "Storage" and click the "New datastore" button.

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	Move To	It VM Compatibility File Location		Drive Type Hardware Acceleration	HDD Supported							
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	Remove from Inventory	ing		Sector Format	512n							
Recent Tasks Alarm	Add Permission											*

9. The Datastore creation wizard appears. Specify the Datastore type as VMFS.



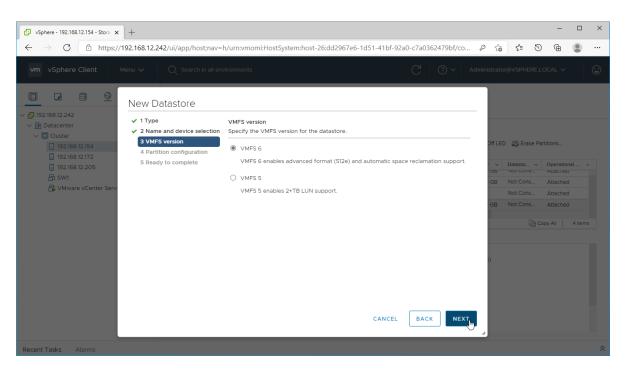


10. Specify the datastore name. Select the StarWind virtual disk.

wsphere Client       Menu v       Q. Search in all environments       C       Q v       Administrator@VSPHERELOCAL v         Image: Search in all environments       C       Image: VSPHERELOCAL v       Image: Search in all environments         Image: Search in all environments       C       Image: VSPHERELOCAL v       Image: Search in all environments         Image: Search in all environments       New Datastore       Image: VSPHERELOCAL v       Image: Search in all environments         Image: Search in all environments       New Datastore       Image: Search in all environments       Image: Search in all environments         Image: Search in all environments       New Datastore       Image: Search in all environments       Image: Search in all environments         Image: Search in all environments       New Datastore       Image: Search in all environments       Image: Search in all environments         Image: Search in all environments       New Datastore       Image: Search in all environments       Image: Search in all environments         Image: Search in all environments       New Datastore       Image: Search in all environments       Image: Search in all environments         Image: Search in all environments       New Datastore       Image: Search in all environments       Image: Search in all environments         Image: Search in all environments       New Datastore       Image: Search in all environments       <	vSphere - 192.168.12.154 - Stora × +										-	>
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11. Specify the VMFS6 version for the datastore.



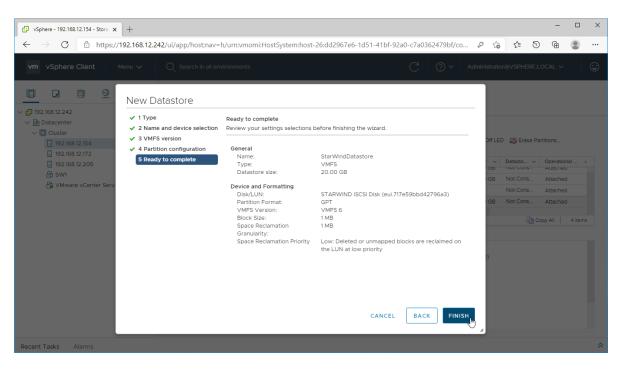


12. Specify the datastore size using the entire disk capacity.

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			- 88				
		CANCEL BACK NEXT					
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13. Review the configuration summary and click "Finish" to create the datastore.





14. Check the StarWind datastore in the Datastores tab.

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rocess VMFS 192.168.12.172 V latastore updates	' Completed System	9 ms 03/04/2021, 7:42:53 AM	03/04/2021, 7:42:54 AM	192.168.12.242	
Create VMFS	Completed VSPHERE.LOCALVA	5 ms 03/04/2021, 7:42:45	03/04/2021, 7:42:53	192.168.12.242	

15. Repeat the configuration steps 6-13 to add newly created StarWind LUNs as datastores on your VMware vSphere cluster.



### **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 <sup>®</sup> ESXi <sup>®</sup>			root@1
Navigator	esxi01.starwind.local - Manage		
Kangator     Kangator     Kangator     Kangator     Monitor     Storage     Storage     Storage     vswitch2     vswitch0     More networks	System Hardware Licens Advanced settings Autostart Swap Time & date	Packages Services   Edit settings   Enabled   Change autostart configuration   Enabled   Start delay   Stop delay   Stop action   Wait for heartbeat	Security & users No  Yes O No  120 © seconds  120 © seconds  Shut down Ves O No  Yes O No
			Save Cancel

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

vmware <sup>,</sup> ESXi <sup>**</sup>		rooté
📲 Navigator 🔹	🔋 esxi01.starwind.local - Manage	🛐 SW1
▼ 🗐 Host	System Hardware Licensing	Packages 🐴 Power
Manage Monitor Virtual Machines Storage Networking Switch2 Switch0 More networks	Advanced settings Autostart Swap Time & date Stop Stop Wait Final Stop Stop Stop Stop Stop Stop Stop Stop Stop Stop Stop Stop Stop	t settings led © Guest OS Snapshots Console delay delay delay delay Dygrade VM Compatibility action for heartbes bible © S machine © Edit notes © Edit notes
	😨 Recent tasks	<ul> <li>Help</li> <li>Open in a new window</li> </ul>

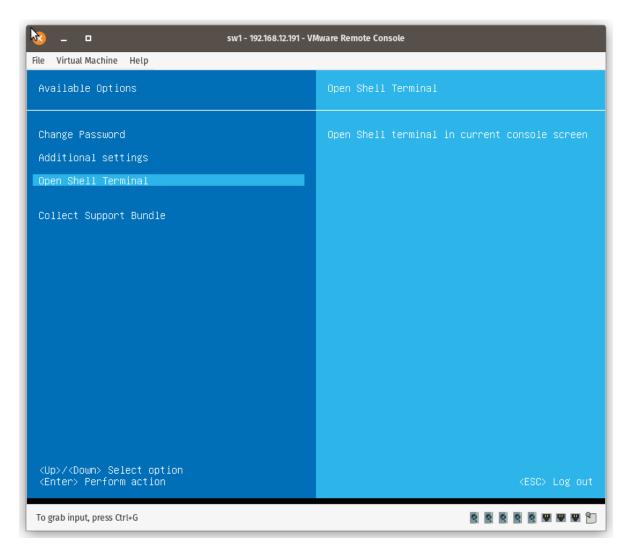
3. Complete the actions above on StarWind VM located on all ESXi hosts.



4. Start the virtual machines on all ESXi hosts.

## **Configuring An Automatic Storage Rescan**

1. Connect to the appliance via Shell Terminal in a Text-based User Interface (TUI) or using a remote SSH terminal.



2. Edit file /opt/starwind/starwind-virtual-san/drive\_c/starwind/hba\_rescan.py with the following command: sudo nano /opt/starwind/starwind-virtual-san/drive\_c/starwind/hba\_rescan.py



<mark>8 - ¤</mark>	sw1 - 192.168.12.191 - VMware Remote Console
File Virtual Machine Help	
starwind@sw1:~\$ nano ∕op†	:/starwind/starwind-virtual-san/drive_c/starwind/hba_rescan.py_
Terminal in focus	Release terminal: 'CTRL X'.
	Quit: 'ESC' when terminal not in focus.
To grab input, press Ctrl+G	

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:

\$esxi\_host = "IP address"
\$username = "Login"
\$password = "Password"



8	_ 0	sw1 - 192.168.12.191 - VMware Remote Console
File	Virtual Machine	Help
#!/ ###	NU nano 4.8 /usr/bin/env # his script r et 'VMW_PSP_ #	
fro		mport vim, vmodl mect import SmartConnect, Disconnect
con con	itext = ssl.c itext.check_h	vertificate verification for simplicity reate_default_context() nostname = False mode = ssl.CERT_NONE
# v esx use	Sphere conne center_serve i_host = '19 rname = 'roo sword = 'SW@	
def	storage_sys	rage(host): stem = host.configManager.storageSystem stem.RescanAllHba() stem.RescanVmfs()
^X	Get Help Exit Terminal in f	[Read 55 lines] ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos ^R Read File ^\ Replace ^U Paste Text ^T To Spell ^_ Go To Line Focus Quit: 'ESC' when terminal not in focus.
Τo g	grab input, press C	Ctrl+G

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:

4. 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/secur	rity/users		\$	:
<b>vm</b> ware" ESXi"		root@1	92.168.12.225 👻   Help 👻   🝳 Sear	ch	P
📲 Navigator 👘	esxi01.starwind.local - Manage				
<ul> <li>Host Manage Monitor</li> <li>Virtual Machines</li> <li>Virtual Machines</li> <li>SW1 Monitor More VMs</li> <li>Storage</li> <li>Storage</li> <li>vmhba65 More storage</li> <li>Networking</li> </ul>	System Hardware Licensing Acceptance level Authentication Certificates Users Roles Lockdown mode	Packages     Services     Sec       Add user     Edit user     Remove user       Iser Name     Add a user       Add a user     Description       Password (required)     Confirm password (required)	urity & users user C Refresh Q Search Description Administrator rescan Storage rescan 	1 items	
			Add Cancel		
	E Recent tasks				

5. 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.

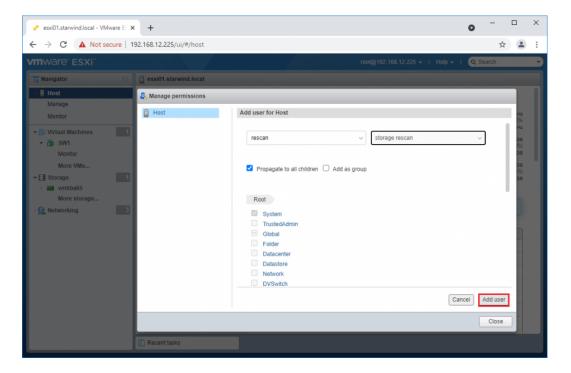
The following privileges might be assigned: Host – Inventory, Config, Local Cim, and Global – Settings.

esxi01.starwind.local - VMware E	+		0	-		×
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			root@192.168.12.225 🗸   Help 🗸   🔍	Search		P
Navigator       Host       Manage       Monitor       Virtual Machines       With Monitor       Monitor       Monitor       Monitor       More VMs       E Storage       Withba65       More storage       More Nore Nore Storage	Authentication	g Packages Services Sec Add role / Edit role X Remove ro Add a role Role name (required) Privileges	curity & users     Q Search       ols     C Refresh     Q Search       storage rescan     Root			
	Recent tasks		Folder Datacenter Datastore Network DVSwitch DVPortgroup Host VirtualMachine Resource Add	Can	ICEL	

6. 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.

7. 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 python3 /opt/starwind/starwind-virtual-san/drive\_c/starwind/hba\_rescan.py

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	Кеу 🔺	✓ Name
wap		<ul> <li>Induite</li> <li>Delay in miniseconds for completion or commands with a DOST status</li> </ul>
ime & 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 perm
	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	✓ Edit option   C Refresh   Actions           Key ▲         ~           Disk.DeviceReclaimTime         ~
	Disk.DisableVSCSIPollInBH Disk.DiskDelayPDLHelper Disk.DiskMaxIOSize
	Edit 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



licensed.

SWVCluster	🖞 🕒 🎦 🔠 Ad	tions 👻				
Getting Started	Summary Monitor Configure	Permissions	Hosts VMs	Datast	tores Networks Up	odate Manager
44	🚯 SWVCluster - Edit Cluster Sett	ings				?)
Services	vSphere DRS	vSphere /	Availability			
v Sphere Di v Sphere Av	vSphere Availability	vSphere	Availability is com	orised (	of vSphere HA and Pro	active HA. To enable Proactive
v SAN	Failures and Responses Proactive HA Failures		ON vSphere H			
General	and Responses	Turn	on Proactive H	A 🔴	Turn on DRS to enabl	le.
Disk Mana	Admission Control					-
Fault Doma Cluster	Heartbeat Datastores	Failure		Re	sponse	Details
Health and	Advanced Options	Host fai	ilure	0	Restart VMs	Restart VMs using V
iSCSI Targ		Proactiv	ve HA	•	Disabled	Proactive HA is not e
iSCSI Initia		Hostils	olation	•	Disabled	VMs on isolated hos
Configurat		Datasto Device	ore with Permanen Loss	t 🔶	Disabled	Datastore protection disabled.
Updates Configurat		Datasto Down	ore with All Paths	•	Disabled	Datastore protection disabled.
General Licensing		Guestr	not heartbeating	•	Disabled	VM and application r
VMware EV						
VM/Host G		4				
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## **Installing Starwind Vcenter Plugin**

NOTE: This step is optional. StarWind vCenter plugin integrates the Controller Virtual Machines management into VMware vSphere user interface allowing managing compute and storage resources from a single web console.

1. To install the StarWind Plugin ensure that the version of your VMware vCenter Server Appliance 7.0 or newer, then click Next.



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⋧ StarWind vCe	nter Plugin						
	Welcome						
	This installer allows you to deploy StarWind vCenter Plugin to your VMware vCenter Server Appliance						
	Prerequisites: • VMware vCenter Server Appliance 6.7u3 or higher • StarWind SAN & NAS v1 For additional information regarding StarWind vCenter Plugin installation, see: https://www.starwindsoftware.com/resource-library/starwind-san-and-nas/						
			N	ext			

2. Specify the vCenter Server FQDN or IP Address and administrator credentials and click Next.

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	≋ StarWind vCenter Plugin							
	1 PLUGIN DEPLOYMENT TARGET	Plugin Deployment Target						
		Specify the plugin deployment target settings. The target is the vCenter Server Appliance instance on which the plugin will be installed						
		VMware vCenter Server FQDN or IP address						
		Administrator username						
		Administrator password						
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*	StarWind vCenter Plugin						
	PLUGIN DEPLOYMENT TARGET	Plugin Deployment Target					
		Specify the plugin deployment target settings. The target is the vCenter Server Appliance instance on which the plugin will be installed					
		VMware vCenter Server FQDN or IP address 192.168.13.236					
		Administrator username administrator@vsphere.local					
		Administrator password					
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3. Confirm the connection to your vCenter Server Appliance.

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≷ StarWind vCenter Plugin						
2 SUMMARY						
	192.1 Certificate Warning					
(4) INSTALLATION COMPLETED	If an untrusted SSL certificate is installed on 192.168.13.236, secure communication cannot be guaranteed. Depending on your security policy, this issue does not represent a security concern.					
	The SHA1 thumbprint of the certificate is: 03:D6:66:C4:30:A3:69:2C:18:AD:C4:D1:AD:13:71:CD:F4:B5:29:2C					
	Cancel Confirm					

4. Review Summary and click the Install button.



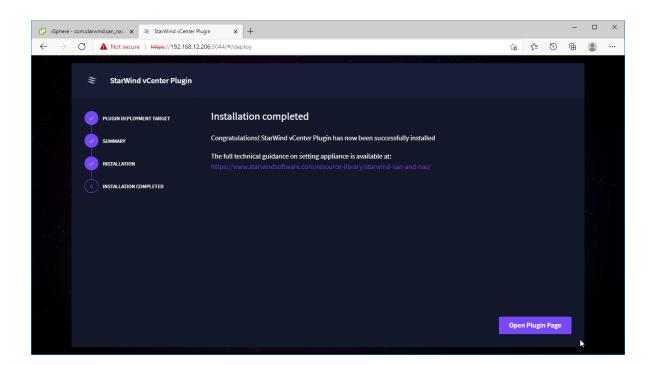
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	≋ StarWind vCenter Plugin								
	PLUGIN DEPLOYMENT TARGET	Summary							
	2 SUMMARY	Review your settings selection	on before deploying the StarWind vCenter P	lugin					
		vCenter Server IP address	192.168.13.236						
		Administrator username Administrator password	administrator@vsphere.local						
				Back	In	stall	•		

5. Wait until the plugin is installed.

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	🗧 StarWind vCenter Plugin						
	PLUGIN DEPLOYMENT TARGET	Installation					
	SUMMARY	Please wait until the Setup Wizard deploys StarWind vCenter Plugin					
	3 INSTALLATION	Install progress:			100 %		
				🗸 Cor	mpleted		
		Cancel		N	lext		
						_	

6. Click the Open Plugin page to start using StarWind SAN & NAS via the vCenter Plugin interface.





# Conclusion

By following this guide, StarWind Virtual SAN was deployed and configured in a VMware vSphere environment. As a result, the highly-avaialble datastores were created for storing the virtual machines in VMware vSphere cluster. Also, VMware vSphere plugin was deployed to manage StarWind storage from vSphere Web UI.



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