

StarWind Virtual SAN: Configuration Guide for Oracle Linux Virtualization Manager [KVM], VSAN Deployed as a Controller Virtual Machine (CVM) using Web UI

2024

TECHNICAL PAPERS





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

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Annotation

Relevant Products

StarWind Virtual SAN (VSAN)

Purpose

This guide offers a walkthrough for deploying and configuring StarWind Virtual SAN® Controller Virtual Machine (CVM) within the Oracle Linux Virtualization Manager [KVM] using the Web UI to create StarWind HA devices. It mentions the key elements such as system prerequisites, RAID configurations, best practices, and preliminary steps, ensuring a streamlined and effective setup.

Audience

The guide is created for IT specialists, system administrators, and VMware professionals who are keen on deploying and configuring StarWind Virtual SAN with Oracle Linux Virtualization Manager [KVM].

Expected Result

By completing this guide, users will possess an in-depth understanding of the deployment and configuration procedures of StarWind Virtual SAN CVM within the Oracle Linux Virtualization Manager [KVM] environment.

Introduction To Starwind Virtual San Cvm

StarWind Virtual SAN Controller Virtual Machine (CVM) comes as a prepackaged Linux Virtual Machine (VM) to be deployed on any industry-standard hypervisor. It creates a VM-centric and high-performing storage pool for a VM cluster.

This guide describes the deployment and configuration process of the StarWind Virtual SAN CVM.

Starwind Vsan System Requirements

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

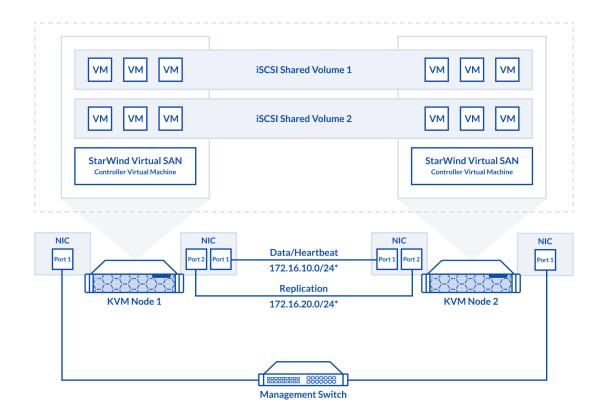


Recommended RAID settings for HDD and SSD disks: https://knowledgebase.starwindsoftware.com/guidance/recommended-raid-settings-for-h dd-and-ssd-disks/

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 Kvm Hosts

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



1. Make sure that a oVirt engine is installed on a separate host.

2. Deploy oVirt on each server and add them to oVirt engine.

3. Define at least 2x network interfaces on each node that will be used for the Synchronization and iSCSI/StarWind heartbeat traffic. Do not use ISCSI/Heartbeat and Synchronization channels over the same physical link. Synchronization and iSCSI/Heartbeat links can be connected either via redundant switches or directly between the nodes (see diagram above).



4. Separate Logical Networks should be created for iSCSI and Synchronization traffic based on the selected before iSCSI and Synchronization interfaces. Using oVirt engine Netowrking page create two Logical Networks: one for the iSCSI/StarWind Heartbeat channel (iSCSI) and another one for the Synchronization channel (Sync).

5. Add physical NIC to Logical network on each host and configure static IP addresses. In this document, the 172.16.10.x subnet is used for iSCSI/StarWind heartbeat traffic, while 172.16.20.x subnet is used for the Synchronization traffic.

NOTE: In case NIC supports SR-IOV, enable it for the best performance. Contact support for additional details.

Enabling Multipath Support

8. Connect to server via ssh.

9. Create file /etc/multipath/conf.d/starwind.conf with the following content:

```
devices{
    device{
        vendor "STARWIND"
        product "STARWIND*"
        path_grouping_policy multibus
        path_checker "tur"
        failback immediate
        path_selector "round-robin 0"
        rr_min_io 3
        rr_weight uniform
        hardware_handler "1 alua"
    }
}
```

10. Restart multipathd service.

systemctl restart multipathd

11. Repeat the same procedure on the other server.

Creating NFS share

- 1. Make sure that each host has free storage to create NFS share.
- 2. Enable nfs server and rpcbind services.



systemctl enable -- now nfs-server rpcbind

3. Create directory for NFS share.

mkdir -p /mnt/nfs

4. Change rights and owner of the share to KVM

chmod 0775 /mnt/nfs/ chown -R nobody:users /mnt/nfs/

5. Add NFS share to /etc/exports file.

```
vi /etc/exports
/mnt/nfs/ *(rw,anonuid=36,anongid=36)
```

6. Restart NFS server service.

systemctl restart nfs-server

7. Check that share has been exported.

exportfs -rvv

8. Add firewall rules for NFS.

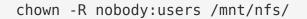
```
firewall-cmd --add-service={nfs,nfs3,rpc-bind} --permanent
firewall-cmd --reload
```

Deploying Starwind Virtual San Cvm

1. Download StarWind VSAN CVM KVM: VSAN by StarWind: Overview



- 2. Extract the VM StarWindCVM.ova file from the downloaded archive.
- 3. Upload StarWindCVM.ova file to the oVirt Host via any SFTP client.
- 4. Change owner of the StarWindCVM.ova.



5. Login to oVirt and open Compute -> Virtual Machines page. Choose Import.

O oVirt Open Virtualization Mana	ige x +							∨ – □ ×
← → C ▲ Not secure	https://sw-ovirt-engine.sw.local	/ovirt-engine/wel	badmin/?locale=en_US#	/ms			e i	🖬 🚨 🗍 Update 🚦
≡ oVirt open virtu	UALIZATION MANAGER						۱	≣° # ° 0 - ≜ -
🚯 Dashboard	Compute > Virtual Machines							
🗮 Compute 🛛	Vms:	New Edit	► Run 🗸 🕓 Suspend	×☆ ∽		- Console -	Create	Snapshot Migrate
Retwork >	2 - Name	Comment	Host IP /	Addresses	FQDN	Cluster	Data Cer	Import Clone VM
	Varine	comment	nost iP7	addresses	PQDN	sw-cl	sw-dc	Remove
Storage >	•							Change CD
🏟 Administration >								Cancel Migration Cancel Conversion
								Make Template
► Events								Export to Export Domain Export to Data Domain Export as OVA
								Assign Tags Guide Me
Javascript:								

6. Specify path to .ova file and choose VM to import. Click Next.



O oVirt Open Virtualization Manage			∨ – □ X
← → C ▲ Not secure	https://sw-ovirt-engine.sw.local/ovirt-engine/webadmin/?locale=en_US#vms;name=StarWindCVM		🖻 🖈 🔲 😩 (Update 🔅
≡ oVirt open virtua			S ≡ ⁰ ♣ ² Ø × ≜ ×
🚯 Dashboard	c Import Virtual Machine(s)	×	
🏢 Compute 🔰	Data Center sw-dc v Source Virtual Appliance (OVA) v		Create Snapshot Migrate
磊 Network >	Host sw-demo-node-01.sw.local	~	1 - 2 <
Storage >	File Path //mt/mvme01/StarWindCVM.ova		w-dc
🏟 Administration 🗦	Load Virtual Machines on Source Virtual Machines to Import Name Name		
> Events	StarWindCVM	Þ	
	0		
	Next Ca	ncel	

7. Verify VM settings and configure networks. Click OK.

									•	≡ • ,	P 0 -
	1	Compute > Virt	ual Machines								
	Import Vi	rtual Machine(s)								×	
Compute	Storage Dor	nain	node01 (67 GiB	free of 82 GiB) v	Allocation Policy		Auto Det	tect	~		t Migrate
	Target Clust	er	sw-cl	~	Attach VirtIO-Drivers						1-2 <
Network	CPU Profile		sw-cl	~					V		Memory
	Clone	Name	SWICI	Origin	Memory		CPUs	Architecture Di	-la	1	
Storage		StarWindCVM		-					SKS		
Administra				oVirt	💼 8192 MB		8	x86_64 1	÷		
	General	Network Interfa	es Disks	OVIR	6 8192 MB		8	x86_64 1	¢		
	General Name:	Network Interfac				Cluster	8	4.7	*		
		_	ces Disks StarWindCVM-01	Physical Memory Guaranteed:	¢	Compatib			ĉ		
	Name:	[StarWindCVM-01	Physical Memory	¢				•		
		[Physical Memory Guaranteed:	• 8192 MB	Compatit Version:		4.7 14b7f2af-5605 4295-983e-	• . Î		
	Name:	system:	StarWindCVM-01	Physical Memory Guaranteed: Number of CPU	• 8192 MB	Compatit Version:		4.7 14b7f2af-5605	• •		
	Name: Operating	: system:	StarWindCVM-01	Physical Memory Guaranteed: Number of CPU Cores:	e 8192 MB 8 (2:4:1)	Compatit Version:		4.7 14b7f2af-5605 4295-983e-	• • •		

8. Repeat all the steps from this section on other oVirt hosts.



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..."

Your connection is not private	
four connection is not private	
Attackers might be trying to steal your information from 192.168.12.2 passwords, messages, or credit cards). <u>Learn more</u>	06 (for example,
NET::ERR_CERT_AUTHORITY_INVALID	
(Hide advanced	Back to safety
This server could not prove that it is 192.168.12.206 ; its security certii by your computer's operating system. This may be caused by a misco attacker intercepting your connection.	
Proceed to 192.168.12.206 (unsafe)	

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



		Welcome to StarWind Applia	ance	
	Follow the Initial co	onfiguration wizard and complete the require	d steps of the appliance setup	
		Start		

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

StarWind Appliance Initial confi	uration		
• 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:		
	Upload file StarWind license file (.swk)		
		Back Next	

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



StarWind Appliance Initial configu	ation	
✓ License	Review end-user license agreement	
• EULA	Review and accept the following license agreement to continue	
	Nevew 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 "Licenses" or the license entity on whose behalf this Agreement is electronically executed by the authorized user (the "License") and StarWind Software, Inc., a State of Delwave, USA coponation ("StarWind") and Collectively with	
	Licensee, the "Parties" and each, (a "Party")), that is entered into as of the date of acceptance hereof by both Parties hereto (the "Effective Date").	
	Licensee is subject to the terms and conditions of this Agreement whether Licensee accesses or obtains StarWind Product. directly from Watels, or through any other sources by Using, installing, and/or Operating the SarWind Product. Lernere agrees to be bound by the terms of this Agreement if Licensee does not agree to the terms and conditions of this Agreement, StarWind is unmilling to license SharWind Product to Licensee in such versu. License en you to be install in the source of t	
	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 confi	guration				
License EULA Management network Static hostname Administrator account Summary Configuration	Configure management netwo Specify the unique IP address (static is recom The Management network is used to communica IP mode Static NIC Model	mended) and configure other netw		clients. Gateway	
	ensi60 82574L Gigabit Ne Name servers (optional): DMS 3 192.168.12.17 Time settings (optional): NTP server Separate servers with commas, maximum 3 serve	1 GBit 00:50:56:9C:E DNS 2 Time zone UTC	<u>192.168.12.206</u> 255.255.254.0	192.168.12.1	
			Back	Next	

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



StarWind Appliance Initial confi	guration	
 License EULA Management network Static hostname Administrator account Summary Configuration 	Perify hostname Check the current appliance hostname and modify it if required Image: Contract the c	

9. Create an administrator account. Click Next.

StarWind Appliance Initial configu	uration			
✓ License				
	Create administrator account			
🗸 EULA				
	Specify new credentials for the appliance administrate	or account		
 Management network 				
✓ Static hostname	admin			
Administrator account				
 Administrator account 				
	Confirm password			
	Additional information (optional)			
			Back Next	
			Dack Next	

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



StarWind Appliance Initial config	uration		
			• • • • • • • • • • • • • • • • • • •
✓ License			
	Review summary		
🗸 EULA			
 Management network 	License type		
	License	Paid 3 Nodes	
 Static hostname 			
✓ Administrator account	Network settings		
	Network settings		
Summary	Interface	ens160 (82574L Gigabit Network Connection)	
	Bandwidth	1 Gbit	
	IP address		
	Appliance hostname		
	Credentials		
	Administrator username		
		Back Configure	

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

StarWind Appliance Initial config	uration		
✓ License	Configuring settings		
✓ EULA	Please wait until all specified settings are applied		
 Management network 			
✓ Static hostname	Progress: 0%	Ö Time remaining: ~ 3 sec	
 Administrator account 	Applying license		
 Summary Configuration 	Configuring management network		
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.



1		
and the second		
	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.	
	Finish	

13. Repeat the initial configuration on other StarWind CVMs that will be used to create 2node 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 🛪
	App Add appliance		
	Credentials	Credentials	
		Specify the appliance IP address and its administrator credentials The newly added appliance will be linked to already connected partners.	
		k Cancel Next	

2. Provide credentials of partner appliance.

StarWind		
USERS	App Add appliance × • Credentials Summary Specify the appliance IP address and its administrator oredentials • The newly added appliance will be linked to already connected partners. IP address	
Tasks and events *	192.168.12.166 Administrator username admin Administrator password	
	Cancel	
< Minimize		

3. Wait for connection and validation of settings.



StarWind hyperconvergence		🗉 🌲 🔅 admin 👻
		α =
		Raw capacity © 0 Bytes
	192.168.12.166 Adminutration summaries admin Adminutration password Connecting to appliance	
	Caricel	
4 Minimize		

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

StarWind Hyperconvergence			
👜 Dashboard	App Add appliance		
🗟 Storage 📼	CredentialsSummary	Summary	
Appliances Users Tasks and events	•	Appliance name SW2 Storage capacity 0.68 Storage pools 0 Volumes 0	
		Back Add appliance	
< Minimize			



Configure Ha Networking

1. Launch the "Configure HA Networking" wizard.

StarWind Hyperconvergence							E	🌲 🏟 admin 🕶
🙆 Dashboard	Network							
🗟 Storage 🛛 🔻	Selected 0 of 6	onfigure HA networking						
👫 Network	🗌 Interface 🖨	Adapter model 💠	Link status 🗢	Bandwidth 🗘	MAC address 🗢	Role ≑	IP address 💠	Appliance 🖨
Appliances	🔲 🛄 ens160	82574L Gigabit Net	Up		00:50:56:9C:E5:A5	Management		
LUsers I Users I Tasks and events I ▼	🔲 📜 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.

StarWind hyperconvergence					🗐 🜲 🏠 admin 💌
 Dashboard Storage 	Configure HA networking				
Storage Ketwork Appliances	Appliances Data network Replication network	Appliances Select appliances for network configuration. Y	ou can configure up to three appliances at a time.		
💄 Users		Appliance 🗢	Status 🗢	Adapters 🗢	
📋 Tasks and events 🛛 🔻		🔽 😂 SW1	Online		
		✓	Online		
				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.

StarWind										H	🕽 🏠 admin	Ŧ
😂 Dashboard	Configure HA networking											
🗧 Storage 🛛 🔻	Appliances O Show.sample.network.diagram Data network E SW1											
Appliances			▲ Interface	Model	Bandwidth	MAC address	IP address	Netmask 0	Link status			
Tasks and events				VMXNET3 Ethernet	10 Gbit	00:50:56:9C:21:E1			Up			
		SW2		VMXNET3 Ethernet	10 Gbit	00:50:56:9C:C4:73	172.16.20.10		Down			
			Interface	Model	Bandwidth	MAC address	IP address	Netmask 🕕	Link status	S		
				VMXNET3 Ethernet	10 Gbit 10 Gbit	00:50:56:9C:D8:13 00:50:56:9C:91:2C			Up Down	S		
		Cluster M	TU size:									
		мти 9000										
								Back	Next			
∢ Minimize												

5. Click Next to validate Data network settings.



StarWind						🗐 🌲 🏠 admin 🕶
 Dashboard Storage 						
Network						Q Ξ ···· Appliance ≑
 Appliances Users 						SW1 SW2
📋 Tasks and events 🛛 🔻			Only 1 Data networ	ant configuration ×		SW1
				Inte We recommended assigning at least two data network Paddre		SW2 SW1
			Acknowledge and con	e a single point of failure. tinue?		SW2
				No, cancel Yes, continue		
∢ Minimize					k	

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.



Configure HA networking									
 Appliances Data network Replication network 	Data network Assign and configure at least one interface on each node tensure interfaces are connected to client hosts directly or through redundant switches								
Summary	● <u>Show sample net</u> ■ SW1 ▲	<u>vork diagram</u>						SW1 SW2	
	■ Interface ✓ ens256	Model VMXNET3 Ethernet	Bandwidth 10 Gbit		IP address	Netmask 0	Link status Down	SW1 SW2	
	🗮 SW2 🔺	Model	Bandwidth	MAC address	IP address	Netmask 0	Link status	SW1 SW2	
	ens256 Cluster MTU size: MTU 9000	VMXNET3 Ethernet	10 Gbit	00:50:56:9C:91:2C	172.16.20.20		Down		
						Back	Next		

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



StarWind		🗐 🌲 🍄 admin 🛩
		Q ± ··· Appliance ≑
		SW1
		SW2 SW1
		SW2
	SW2 . SW2 . Interface Model Bandwidth MAC address IP address Netmask Link status	SW1.
< Minimize	k	

9. Review the summary and click Configure.

StarWind hyperconvergence					
Dashboard	Configure HA networking				
A Network	 ✓ Appliances ✓ Data network ✓ Replication network Summary 	Summary			
 Appliances Users Tasks and events 		Appliance name ISW1 Data networks 172.16.30.10 Replication networks 172.16.20.10			
La rasis and erens		Appliance name Data networks Replication networks	₩ SW2 172.16.10.20 172.16.20.20		
				Back	
				batx Compgee	
∢ 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-nasconsole/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				
 Appliances Users 	🗌 💻 sdd			Ready				
Tasks and events								
 Minimize 								

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 -
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 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 🛛			
		 ■ Disk name Medi ✓ ■ sdb HDD ✓ ■ sdc HDD 		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.

StarWind Hyperconvergence			
🙆 Dashboard	Sto Create storage pool		
 Storage File shares EUNs 	Selectec Appliance Physical disks 	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		 High capacity (recommended) Maximize redundancy while maintaining high 9.9 GB 1 = 0 + storage capacity (Software RAID (RAID-5) 	
🚓 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	
Ele shares 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
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Create Volume

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



StarWind		🗐 🌲 🍄 admin 🕶
🍄 Dashboard	Volumes	
🗟 Storage 🔺	Selected 0 of 0 + Create a new volume nage VHR user	
LUNs	There are no volumes yet	
🕒 Volumes	Start sharing your storage resources to clients by creating a new one	
Storage pools		
Physical disks A Network		
Appliances		
Lusers		
📋 Tasks and events 🔻		
4 Minimize		

StarWind hyperconvergence					
🙆 Dashboard	Voll Create volume				
Storage A	Selectro • Storage pool Settings Filesystem type	Select storage pool Select one or more (in HA configurations) storage pools			
Volumes Volumes III Storage pools Physical disks		Name ≎ Type ≎ Image: SW1:md0 Software RA Image: SW2:md0 Software RA	ID Online RAID-5	Free \$ 9.98 GB 9.98 GB	
Network Appliances Osers Tasks and events *					
			Cancel	Next	
< Minimize					

3. Specify volume name and capacity.



StarWind					🗐 🌲 🏟 admin 🔻
	Volu 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	
∢ Minimize					

4. Select the Standard volume type.

StarWind			
😂 Dashboard	Voli Create volume		
 Storage File shares UUts Volumes Storage pools Physical disks Physical disks Appliances Users Users 	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	
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5. Review "Summary" and click the "Create" button to create the pool.



StarWind Hyperconvergence			🗐 🌲 🏠 admin 💌
	Voli Create volume		
	Selector 🗸 Storage pool 🗸 Storage pool 🗸 Filesystem type	Review summary Review your settings before creating a volume	Q = = ····
	• Summary	Storage pool SVLmd0 Volume name volume0 Size 5 GB Filesystem settings Standard	
		Eii SW2	
		Storage pool 📑 SW2:md0 Volume name volume0 Size 5 GB Filesystem settings Standard	
		Back Create	
< Minimize			

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		é (¢	admin 🔻
🙅 Dashboard	LUNs			
Storage File shares	Selected 0 of 0 + Create a new LUN > LUN			
👮 LUNs	There are no LUNs yet			
🕒 Volumes	Start sharing your storage resources to clients by creating a new one			
Storage pools				
💻 Physical disks				
🏭 Network				
Appliances				
Lusers				
📋 Tasks and events 🛛 🔻				
◀ Minimize				

2. Select the protocol.

	LUN Create LUN		
Elle shares	Selectre • Protocol LUN availability Appliances	Protocol Select the required Protocol	
Volumes Storage pools Physical disks	Volumes Failover strategy LUN settings Summary	NVMe-oF NVMe-oF Tabrics (NVMe-oF) is a recommended option for high-performance SSD or NVMe setups. Before you proceed, make sure that your clients are NVMe-oF compatible.	
Network Appliances Users	summary	iscsi iscsi i iscsi a recommended protocol for most HDD based setups or medium performance SSD based setups. This option offers broader compatibility for storage clients.	
Tasks and events *			
		Close	
∢ Minimize			

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



StarWind			📋 🌲 🏠 admin 👻
	LUN Create LUN		
	LUN availability	EUN availability Better the required LUN availability • • Planaability (two-way replication) Charts a synchronously replicated LUN housed on two or three identical appliances. The UN stays accessible if one of the replication partners becomes unavailable. Planaability (UN housed on a single appliance. The UN will not be accessible if its Nota becomes unavailable.	

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

StarWind Hyperconvergence						🖽 🌲 🏠 admin 🔻
🖗 Dashboard 🛛 📙	JN Create LUN					
🛑 Storage 🌰 Sele	✓ Protocol ✓ LUN availability	Appliances Select two or three replication parts	ners that should host the i	HALUN		
SE LUNS	Appliances Volumes			s, including CPU, RAM, storage, and	networking	
Storage poolsPhysical disks	Failover strategy LUN settings	Appliance	Status Online	Software version 1.5.460.5391+76fc51b	Capacity 15 GB	
🚓 Network	Summary	 ■ 3W1 ■ 5W2 	Online	1.5.460.5391+76fc51b	15 GB	
Users						
📋 Tasks and events 🛛 🔻						
				Back	Next	
< Minimize						

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



StarWind hyperconvergence			🗉 🌲 🛟 admin 🔻
	LUN Create LUN		
	Selector 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	Image SW1 ▲ Volume ÷ State ¢ RAID le ¢ Capacity ¢ Free Sp ¢ Type ¢ • • volume0 Mounted RAID-5 5 GB 4.92 GB Standard	
		III SW2 ▲ Volume ≑ State ≑ RAID le ≑ Capacity ≑ Free Sp ≑ Type ≑	
		Volume0 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			⊟ ≜ ;	🎽 admin 🔻
🙆 Dashboard	LUN Create LUN			
E Storage	Selecter Protocol LUN availability Failover strategy Appliances base a UPS unit at your disposal.	ou do not		
 Volumes Storage pools Physical disks 	✓ Volumes Failover strategy LUN settings LUN settings To minimice the chances of Split bain' during blackats, configure UPS to prevent the simultaneous shuddown			
 Appliances Users 	Summary I both appliances. Node witness A thred appliance acts as a "router" for replication partners. The working witness node excludes the possibility of a "split brain" condition.			
💼 Tasks and events 🛛 👻				
	Back			
∢ Minimize				

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



StarWind			🖽 🌲 🛟 admin 🔻
	LUN Create LUN		
	Suttern V LUN availability Appliances Volumes Failover strategy LUN settings Summary	LUN settings Decive the HA LUN settings Lun name Lun state Lun st	
• Minimize			

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

StarWind				
🕮 Dashboard	Create LUN			
 torage File shares UNs Volumes Storage pools Physical disks Network Appliances Users Tasks and events 	 Protocol LUN availability Appliances Volumes Failover strategy LUN settings Summary 	Summary Protocol LUN availability Appliance 1 Appliance 2 Volume names Volume names Volume sizes Failover strategy LUN name LUN size MPIO Create VMF56 datastore IQNS	iSCSI High availability (two-way replication) S SW1 SW2 volume0, volume0 S G8 Heartbeat Lun0 4 G8 Enabled Faabled No Iqn.2006.08,com.starwindsoftware:192.166.12.206-lun0 jan.2008.08,com.starwindsoftware:192.166.12.166-lun0	
			Back Create LUH	
< Minimize				



Provisioning Starwind Ha Storage To Ovirt Hosts

1. Login to oVirt engine and open Storage -> Domain. Clock New Domain.

→ C A Not secur	e https://sw-r	ovirt-engine.sw.local/ovirt-e	ngine/webad	min/?locale=en US	#storage			3
	c maps() sir i	onre engineisinioest onre e	ingine, neoda		listorage			~
E OVirt OPEN VIRT	UALIZATION MA	ANAGER					📕 🗞 🎫 🦨 Ø~	
Dashboard	Storage > Sto	orage Domains						
	Storage:						X ☆ ~	Q
Compute >					New Domain Imp	oort Domain Ma	anage Domain Remove Connection	
Network >	2 ~						1-3 <	>
	Status	Domain Name	Comment	Domain Type	Storage Type	Format	Cross Data Center Status	
		node01		Data (Master)	NFS	V5	Active	
Storage >		node02		Data	NFS	V5	Active	
		ovirt-image-repository		Image	OpenStack Glance	V1	Unattached	
	4							
Administration >								
Administration >								

2. Choose Storage Type – iSCSI, Host and Name of Storage Domain. Discover targets via iSCSI links, which were previously configured. Click Login All.

O oVirt	t Open Vi	rtualization Manage × +						~	·	-		×
\leftrightarrow	C	A Not secure https://sw-ovirt-eng	ine.sw.local/ovirt-engine/weba	admin/?lo	cale=en_US#storage			e t	γ.	± 0	з 🔕	:
	- Vint							_0	47	~		
≡	New	Domain								×	Ĩ	
<i>∰</i> ∎ D	Data	Center	sw-dc (V5)	~	Name		SD01				Q	
::::: C	Dom	ain Function	Data	~	Description						ns :	
	Stora	ge Type	iSCSI	~	Comment							
R N	Host	0	sw-demo-node-01.sw.local	~							> 1	
											tus	
🥃 s		-) Discover Targets										
	^								Logir	n All		
() A		Target Name iqn.2008-08.com.starwindsoftware:17	72.16.2.47-sd01			Address 172.16.10.10		Port 260	+	^		
	NN	iqn.2008-08.com.starwindsoftware:17				172.16.10.20		3260	+			
P E	s>Ll											
	Targets > LUNs											
	F											
	ets											
	Targ											
	LUNs > Targets											
	3									-		
		dvanced Parameters										
	-	arancea i di di licici o										



3. Add LUN from each iSCSI target. Click OK.

Data	Center	sw-dc (V5)		~	Name			SD01				
D Dom	ain Function	Data		~	Descript	ion						Q
Stora	age Type	iSCSI		~	Commer	nt					٦	ns :
C Host	•	sw-demo-node-01.s	w.local	~								tus
N												
^	- Discover Targets									Login	All	
S	Target Name						Address		Port			
	⊜ iqn.2008-08.com.starwindsoft	ware:172.16.2.47-sd01					172.16.10.10		3260	÷	-	
A	LUN ID	Size	#path	Vendor ID	Product ID	Serial		Add				
7	22ebe1f66db375fb0	500 GiB	2	STARWINI	STARWINI	SSTARWINDSTARWIN	D_2EBE1F6	Add				
Targets >	e iqn.2008-08.com.starwindsoft	ware:172.16.2.48-sd01					172.16.10.20		3260	>		
1 <u>1</u>	LUN ID	Size	#path	Vendor ID	Product ID	Serial		Add				
	22ebe1f66db375fb0	500 GiB	2	STARWIN	STARWINI	SSTARWINDSTARWIN	D_2EBE1F6	Add				
LUNs > Targets												
۵ ه	Advanced Parameters										Ŧ	

4. Storage Domain will be added to the list of Domain and can be used as a storage for VMs.



	1.1.1.11									-	
→ C ▲ Not secur	e https ://sw-o	ovirt-engine.sw.local/ovirt-e	ngine/webad	Imin/?locale=en_US#	fstorage			₫ \$	ٹ		•
E OVirt OPEN VIRT	UALIZATION MA	ANAGER						s ≡•	1	0 ~	•
Dashboard	Storage > Sto	orage Domains									
	Storage:								×	☆ ~ C	٤
Compute >					New Domain Impor	rt Domain	Manage Domain	n Remove	Con	nections	:
Network	2 ~								1	-4 <	
Network /	Status	Domain Name	Comment	Domain Type	Storage Type	Forma	t	Cross Data C	enter	Status	
Storage >		node02		Data	NFS	V5		Active			
	•	ovirt-image-repository		Image	OpenStack Glance	V1		Unattached			
	4	SD01		Data	ISCSI	V5		Active			
	4	SD01		Data	ISCSI	V5		Active			
	4	SD01		Data	ISCSI	V5		Active			
	C C	SD01		Data	15C51	V5		Active			
		SD01		Dəta	15C51	V5		Active			
	4	SD01		Data	ISCSI	V5		Active			
	<	SD01		Data	<u>16031</u>	V5		Active			
	<	SD01		Data	<u>16031</u>	V5		Active			
	<	5001		Data	<u>16031</u>	V5		Active			
	<	5001		Data	<u>1651</u>	V5		Active			
	4	5001		Data	<u>1651</u>	V5		Active			
	4	5001		Data	<u>1651</u>	V5		Active			
	4	5001		Data	<u>665</u>	V5		Active			

5. Login to each host and verify that multipathing policy has been applied using the following command.

```
multipath -ll
```

```
[root@sw-demo-node-01 ~]# multipath -ll
22ebelf66db375fb0 dm-13 STARWIND,STARWIND
size=500G features='1 queue_if_no_path' hwhandler='1 alua' wp=rw
`-+- policy='round-robin 0' prio=50 status=active
|- 16:0:0:0 sdb 8:16 active ready running
`- 17:0:0:0 sdc 8:32 active ready running
```

Conclusion

Deploying and configuring StarWind Virtual SAN CVM within the Oracle Linux Virtualization Manager [KVM] environment using the Web UI is a pivotal step for organizations aiming to leverage a robust, VM-centric storage solution. This guide ensures IT professionals are equipped with the essential knowledge and resources for a seamless setup.



Contacts

US Headquarters	EMEA and APAC
 +1 617 829 44 95 +1 617 507 58 45 +1 866 790 26 46 	 +44 2037 691 857 (United Kingdom) +49 800 100 68 26 (Germany) +34 629 03 07 17 (Spain and Portugal) +33 788 60 30 06 (France)
	https://www.starwind.com/support https://www.starwind.com/forums

General Information: info@starwind.com

Sales: sales@starwind.com



StarWind Software, Inc. 100 Cummings Center Suite 224-C Beverly MA 01915, USA www.starwind.com ©2024, StarWind Software Inc. All rights reserved.