

StarWind Virtual SAN[®] Creating VVols HA Datastore with StarWind Cluster

2024

TECHNICAL PAPERS





Trademarks

"StarWind", "StarWind Software" and the StarWind and the StarWind Software logos are registered trademarks of StarWind Software. "StarWind LSFS" is a trademark of StarWind Software which may be registered in some jurisdictions. All other trademarks are owned by their respective owners.

Changes

The material in this document is for information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, StarWind Software assumes no liability resulting from errors or omissions in this document, or from the use of the information contained herein. StarWind Software reserves the right to make changes in the product design without reservation and without notification to its users.

Technical Support and Services

If you have questions about installing or using this software, check this and other documents first - you will find answers to most of your questions on the Technical Papers webpage or in StarWind Forum. If you need further assistance, please contact us .

About StarWind

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

Copyright ©2009-2018 StarWind Software Inc.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written consent of StarWind Software.



Introduction

This guidance will tell you how to configure HA VVols Datastore registering the StarWind VASA Provider in VMware vCenter Server and thereby facilitating communication between vCenter and the Storage. The paper will walk you through the creation of the HA Datastore using WMI and describe how to create a VVols Datastore to the vCenter.

vSphere Storage APIs for Storage Awareness (VASA) – a set of application program interfaces that supplies information for the VMware ecosystem. This integration allows to configure StarWind Virtual SAN resources as storage containers for virtual machines and provide more efficient management for the architecture simplifying storage provisioning and consumption.

This guide is intended for experienced VMware and Windows system administrators and IT professionals who would like to configure StarWind HA VVols Datastore for vSphere deployments. It also provides a step-by-step guidance describing how to register StarWind VASA Provider in VMware vCenter Server to convert local storage of the ESXi hosts into StarWind HA VVols Datastore for ESXi.

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

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

Solution Diagram

The below picture illustrates the interconnection diagram of the feature described in the guidance below.





Installing Starwind Cluster Service And Creating Targets

1. To install StarWind Cluster Service, launch StarWind Virtual SAN setup and choose components specified on the screenshot below.



54	elect Components	
	Which components should be installed?	¢
	Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.	0
	StarWind Virtual SAN Server	v
	SPTD Driver (Alternative driver for exporting physical devices)	^
	StarWind Management Console 31.7 MB	
	✓ Intergation Component Library 5.1 MB	
	PowerShell Management Library 1.4 MB	
	SMI-S Agent 62.9 MB	_
	Software VSS Provider 0.1 MB	-
	Hardware VSS Provider 0.2 MB	
	StarWind Cluster Service 19.2 MB	
		v

2. Create 2 VVols-type targets on both StarWind nodes.

NOTE: Target aliases have to match on both nodes.

	? X
Add Target Wizard	
Target Parameters	
Target Alias	
vvols	
Target Name	
ign. 2008-08.com.starwindsoftware:vvols	
Allow multiple concurrent iSCSI Connections	
Select target type vvols	~
Numa Node: Auto V	
Next	Cancel

Configuring Starwind Ha Datastore

1. Log into StarWind VM Controller under user with administrator rights and open command prompt.



2. To create the cluster, run the following command in the cmd specifying cluster name: wmic /namespace: "\\root\starwind" path STARWIND_ClusterService call CreateCluster name="StarwindDemo" login="root" password="starwind"

NOTE: make sure to save the clusterUid value received once the command is executed to a text file, as you will need it further in the guide.



3. To add nodes to the StarWind cluster, use the following commands:

For the first node:

wmic /namespace:"\\root\starwind" path STARWIND_ClusterService call BindStorageNode name="HA Node 1" ipAddress="192.168.1.211" login="root" password="starwind" port="3261" description="HA Node 1 Desc"

Specify the IP address of the first node and save the storageNodeUid value to the previously mentioned text file.



For the second node:

wmic /namespace:"\\root\starwind" path STARWIND_ClusterService call BindStorageNode name="HA Node 2" ipAddress="192.168.0.144" login="root" password="starwind" port="3261" description="HA Node 2 Desc"





Specify the IP address of the second node and save the storageNodeUid value to the previously mentioned text file.

4. Create profiles for the storage nodes. Each node's profile specifies resources allowed to be used, as well as the purpose of the network interfaces used. Execute the following commands:

For the first node:

wmic /namespace:"\\root\starwind" path STARWIND_ClusterService call CreateStorageNodeProfile storageNodeUid="88952B3E-FEB1-4A02-8729-ADA7AFF7D4BD" creationStrategy="LoadAll" name="HA Node 1 Profile" description="HA Node 1 Profile Description"

Specify the storageNodeUid of the first node and save the storageNodeUid value to the previously mentioned text file.



For the second node:

wmic /namespace: "\\root\starwind" path STARWIND_ClusterService callCreateStorageNodeProfilestorageNodeUid="70F3959B-C8FD-45A6-B8D7-03A38CABF61F"creationStrategy="LoadAll" name="HA Node 2 Profile"description="HA Node 2 Profile Description"

Specify the storageNodeUid of the second node and save the storageNodeUid value to the previously mentioned text file.



5. Configuring the purposes of the network interfaces.

5.1 Network interfaces can be used for the following purposes: SyncChannel,



HeartbeatChannel, DataChannel. The current implementation has a requirement that prohibits creating multiple SyncChannel or HeartbeatChannel network interfaces within a single profile.

NOTE: Network SyncChannel or HeartbeatChannel usages cannot repeat in a single profile.

5.2 Run the next command specifying the storageNodeUid to see the current purposes of the network interfaces:

wmic /namespace: "\\root\starwind" path STARWIND_ClusterService call GetStorageNodeProfileNetworkInterfaces b32ab2f26f59850c" profileUid="7354b0fc-cc8f-4551-



5.3 On the first node configure one interface to be the HeartbeatChannel and Datachannel. Then, configure the second interface to be the Sync Channel.

The first interface:

wmic /namespace: "\\root\starwind" path STARWIND_ClusterService call
SetStorageNodeProfileNetworkInterfaceUsage profileUid="7354b0fc-cc8f-4551b32ab2f26f59850c" netAddress="192.168.1.211:3260" usage="DataChannel |
HeartbeatChannel"

Specify the necessary profileUid and IP address.



e second interface:

wmic /namespace:"\\root\starwind" path STARWIND_ClusterService call SetStorageNodeProfileNetworkInterfaceUsage profileUid="7354b0fc-cc8f-4551-



b32ab2f26f59850c" netAddress="10.10.11.166:3260" usage="SyncChannel"

Specify the necessary profileUid and IP address.



5.4 Repeat step 7.3 on the second node specifying the necessary profileUid and IP address.

Creating Datastore

1. Run the following command to create a datastore:

```
wmic /namespace: "\\root\starwind" path STARWIND_ClusterService call
CreateDatastore name= "TestDatastore" sizeInMb="97280"
storageNodeProfileUid="7354b0fc-cc8f-4551-b32a-b2f26f59850c"
capabilityProfileUid="4E19F23A-0A84-486C-A516-DF96140C8000"
```

Specify the datastore name, size in MB, and the storageNodeProfileUid of the first node. Set capabilityProfileUid equal to "4E19F23A-0A84-486C-A516-DF96140C8000" – this is the HA profile.



Save the datastoreUid to the previously mentioned text file.

2. Add the second node to the datastore: wmic /namespace: "\\root\starwind" path STARWIND_ClusterService call AddStorageNodeProfileToDatastore d a t a s t o r e U i d = "73231771-01ba-40e4-8f6a-7c73d462ecf6"



profileUid="6cc465a2-3f25-4b5e-a2c9-3dad4464bfd8"

Specify the storageNodeProfileUid of the second node and datastoreUid received in the previous step.

Binding Vasa Provider

1. The Vasa Provider can be bound to the MAC address of the network interface card or a Hostname.

NOTE: if using the hostname, the StarWind VM should be joined to a domain.

2. Run the following command to bind Vasa Provider to the MAC address. wmic -namespace:\\root\starwind path STARWIND_ClusterService call ResetVASA bindToInterfaceMAC=<target MAC>

Specify the NIC MAC address of the StarWind VM that will be used to register with the vCenter.



3. If using the Hostname, run the following command: wmic -namespace:\\root\starwind path STARWIND_ClusterService call ResetVASA

4. Run the following command to get the URL required to register the VASA Provider: *wmic -namespace:\\root\starwind path STARWIND_ClusterService call GetVASAInfo*



C:\Users\Administrator>wmic -namespace:\\root\starwind path STARWIND_ClusterServ ice call GetVASAInfo Executing (STARWIND_ClusterService>->GetVASAInfo(> Method execution successful. Out Parameters: instance ofPARAMETERS
<pre>ReturnValue = "Success"; serverCertificateHash = "A80296820063ECC19E679AC861223417DF90CDE0"; VASAUrl = "https://192.168.": :9991/vasa"; >;</pre>

Configuring Iscsi-Connections

1. Log into the vCenter Server using the vSphere Web Client.

2. Connect the iSCSI Targets, created in step 2, to the ESXi hosts: add the IP addresses of StarWind nodes on each ESXi host. In our case, they are 192.168.1.211 and 192.168.0.144.

2HCA_N D	Getting Started Summary Illor	Nor Manage Related Objects			
172.16.0.13	Settings Networking Storage	Aarm Definitions Tags Permiss	ions		
	el <u>Storage Adacters</u> Storage Devices Host Cache CostSysration Protocol Endpoints	Storage Adapters + Ga L Q Constraints Adapter Box Peak 2 port SATA DE Contr Vinite 23 Vinite 24 Vinite 24 Control Control Control	Tion Block SCSI Block SCSI Block SCSI Block SCSI Block SCSI Block SCSI	Status Unknown Unknown	ldentillar
		ISCSI Software Adapter	ISCS	Online	ign 1998-01 com vmware s.3n39-0s29e60
		Properties Devices Paths Dynamic Discovery Static D	Tarcets Net	work Port Bin	ding Advanced Options
		rough server			

3. Re-scan Storage Adapters.



T72.16.0.40 Actions -				
Getting Started Summary Mo	nitor Manage Related Object	5		
Settings Networking Storage	Alarm Definitions Tags Permis	sions		
	Storage Adapters			
Storage Adapters	+ 6 . 0 • •			
Storage Devices	Adapter	Type	Status	Identifier
Host Cache Configuration	Ibex Peak 2 port SA	the host's stor	age adapter	to
Protocol Endpoints	G vmhba33	Block SCSI	Unknown	es.
	Vmhba1	Block SCSI	Unknown	
	Ibex Peak 4 port SATA IDE Con	troller		
	@ vmhba0	Block SCSI	Unknown	
	G vmhba32	Block SCSI	Unknown	
	iSCSI Software Adapter			
	🔕 vmhba34	ISCSI	Online	ign.1998-01.com.vmware
	Adapter Details			
	Properties Devices Paths	Targets Net	work Port Bind	ing Advanced Options
	Dynamic Discovery Static	Discovery		

4. Check for STARWIND iSCSI Disks on each ESXi host.

ings Networking Starag	Alarn Definitions Tags Permissi	Ins Schedule	d Tasks Up	tate Manager							
	Storage Adapters										
Borage Adapters	+ 🔯 💷 🔯 🖬 -									Q. Filter	
Honage Devices	Adapter	Тура	Dates	Martillar			Targets	Devices	Palls		
lest Cache Configuration	S www.buz	808	Untreven			(0, Filter •)					
Protocol Endpoints	Pataburg 4-Port SATA Storage C	etrol Unit									
	🖸 umhba0	909	Usknown				0	0	0		
	USB Storage Controller										
	G www.bu32	Block SCB	Uliknewn				1	1	1		
	157.51 Software Adorder										
	Cadimy 🔯	1909	Online	ign.1998-01.com	vmware:sw-sed-esxi-01-	844%s9de	2	1	2		
	Adaptor Dolaits										
	Properties Devices Polhs	Torgets Net	work Part Bin	Ing Advanced Op	tions						
	E) E) =) 🖓 Al Actions	- B-								Q. Filter	
	Name	Type	Ceperaty	Operational	Hardware Acceleration	One Tops					
	STARWIND ISCSI Disk (eul.000	disk	515	00 B Attached	Supported	HDD					

Registering Starwind Vasa Provider With Vcenter

1. To register StarWind Storage Provider, click Storage Providers and enter VASA URL you received in step 13. To fill the User name and Password fields, enter the data used in step 4, when the cluster was created.



	Settings Scheduled Tasks Storage Providers	Aarm Definitions Ta	gs Permissions	Sessions Sto	rage Providers
172.160.39	🛨 🔂 💷 🗙				
	Storage Providen Storage System	n Status	Active/Standby	Priority	URL
					This list is empty.
	🕝 172.16.0.13 - N	ew Storage Provider			3
	Name: URL:	Starwind https://	.9991/vasa		
	User name:	root			
	All Password:	******			
	Use storage pr	ovider certificate			
	Certificate location				Browse
					OK Cancel
				No s	torage providers selecte

2. Accept the certificate and verify that the Provider has been successfully registered.

sw-sed-ecenter.starwind.loca	Actions +										
etting Started Summary III	nitor Manage	Related Objects									
Settings Scheduled Tasks Al	am Definitions 1	Tags Permissions	Sessions 8	torage Providers Up	date Hanager						
Storage Previders											
+⊠! <u>.</u> ×									Group by:	Storage provider	• Q.R
Storage Provider/Storage System	Status	Active/Standby	Priority	URL		Last Rescan Time	VASA API Version	Certificate Expiry			_
 WOLS 	Online	-		https://	:9991/vasa	03.11.2016 1	2.0	364 days			
StarwindDemo (1/1 online)		Adve	0								
	_										
84											
Torano Bastan Dataka											
strade street nerges											
Name	StarwindDemo										
Cetting Starled Summary Nonlaw Name Starled Starled Name Starled Starled<											
Vendor ID	StarWind										
Model ID	StarWind										
Firmware	8.0.2										
Alternative names	Starillind Virtual S vSAN, Starillind Virtual 1	SAN, Volumes									

Creating Vvols Datastore

1. Right-click the server and select Storage > New Datastore from the drop-down menu.



₩ № ₽ № √ 2 172.16.0.13	Settings	Networking	Storage	Alarm Definitions	Tags	Permi
Cluster_N Cluster_N T2.16 Actions - 172.16.0.39 New Virtual Machine New vApp New Resource Pool Deploy OVF Template Connection Maintenance Mode Power	44 Stora	oe Adanters ces onfigu points	uration	Storage Devices	(t10.ATA (t10.ATA	0 @ v "
Certificates Storage Add Networking Add Diagnostic Partition	1	•	lew Datas Rescan Sto Idd Virtual	tore prage Flash Resource Ca	apacity]

2. Choose the Datastore Type- VVOL. Enter the new VVols Datastore name and click Finish.

44	Storage D	Devices	
Stor	rage Adapters 📪 R		
Stor	New Datastore		? +> v= T)
Hos	A me and container Selection Ready to complete	Type VMFS Create a VMFS datastore on a disk/LUN. NFS Create an NFS datastore on an NFS share over the network. VVOL Create a Virtual Volumes datastore on a storage container connected to a storage provider.	pa n DO ash
	•	H Back Next Finish	Cancel

3. The Datastore is successfully created.



	ummary Monitor Manage	Related Objects					
	StarWindDatastoreDemo						
	Type: VVOL						
	URL: ds:///vmfs/volumes/vvol	17323177101ba40e4-8f6a7c73d462	ecf6/				
 Details 				 Tags 			1
 Details 				Tags Assigned Tag	Category	Description	0
 Details Storage Cape 	ability Profiles		-	Tags Assigned Tag	Category This list is empty.	Description	0
Details Storage Cape Profile Name	ability Profiles Free Space	Used Space	0	 Tags Assigned Tag 	Category This list is empty.	Description	0
Details Storage Capa Profile Name	sbility Profiles Free Space This list is e	Used Space	-	Tags Assigned Tag	Category This list is empty.	Description	0
Details Storage Cape Profile Name	ability Profiles Free Space This list is e	Used Space	-	Tags Assigned Tag	Category This list is empty.	Description	1
Details Storage Cape Profile Name	ability Profiles Free Space This list is e	Used Space	-	Tags Assigned Tag	Calegory This list is empty.	Description	c
 Details Storage Cape Profile Name 	ability Profiles Free Space This list is e	Uted Space		Tags Assigned Tag	Category This list is empty.	Description	c
Details Storage Cape Profile Name	ability Profiles Free Space This list is e	Uted Space		Tags Assigned Tag	Category This list is empty.	Description	c

Capability Profiles

StarWind VVOLs allows you creation of two capability profiles. There are only standalone embedded preconfigured profile and highly available one.

Capability profiles define performance and capacity specifications of the VVols datastores. Such information as type of storage, caching and provisioning method can be found at profiles. For StarWind VVols datastores, these characteristics are based on storage devices. When a virtual volume is created, it is assigned a storage policy profile. The VVols datastore will show as compatible storage in vCenter or the vSphere Web Client if the associated capability profiles meet VMware storage policy requirements.

IMPORTANT NOTE: Capability profiles has to be created before you can create a VVols datastore.

StarWind supports this list of Capabilities:

- Drive Type
- L1 Cache
- L2 Cache
- Synchronous Replication
- Asynchronous Replication
- Snapshot
- Deduplication



ime and description	Rule-Set 1 Select rules specific for a datastore type. Rules The VM storage policy will match datastores the	can be based on data services provided by datastore or based on tags, it satisfy all the rules in at least one of the rule-sets.				
orage compatibility	Rules based on data services com.starwin	d,vsan.vasaprovider 🔹				
μζ	L1 Cache 10 L1 Cache Mode 10 L1 Cache Size (MB)	ViriteBack Ninimum: 0 Maximum: 0				
	L2 Cache Size (MB)	Minimum: 0 Maximum: 0				
	Snapshot 0	Yes 🔻	0			
	Thin Deduplication	Enabled •	0			
	Synchronous Replication	2-way •	0			
	Asynchronous Replication	1-way •				
		Add another rule set. Remove this	rule			

Create Storage Policy

1. In the center panel, click the VM Storage Policies icon.

2. In the center panel, review the storage policies created by default and click the Create new VM storage policy icon.

3. In the Create New VM Storage Policy window, click the vCenter Server drop-down menu and select your assigned VMware vCenter Server name.

4. In the Name text box, specify the name for Policy and click Next.

5. On the Rule-Sets page, click Next.

6. Configure the virtual machine storage policy.

7. On the Rule-Set 1 page, click the Rules based on data services drop-down menu and select the assigned virtual volume service provider.

8. Click the Add rule drop-down menu and select capability that you want to use.

9. Repeat if you want to add additional of capabilities.

10. Click Next.

11. Click Finish.

Deploying Virtual Machine With Storage Policy

1. In the center panel, click the VMs and Template icon.

2. In the left panel, right-click your data center and select New Virtual Machine > New Virtual Machine.

3. On the select storage page, click the VM Storage Policy drop-down menu and select the preferred policy configured earlier. The virtual volume datastores are the only compatible storage options. 4. In the datastore list, select StarWind VVOL datastore and click Next.

5. On the Ready to complete page, click Finish.

6. After virtual machine creation task is completed, in the left panel, select earlier configured virtual machine.

7. In the center panel, scroll down to show the VMStoragePolicies panel. The virtual machine is in compliance with its storage policy.

Troubleshooting

To reset StarWind target settings and delete all devices you should run this command in cmd shell with administrator rights inside StarWind VM:

C:\Program Files\StarWind Software\Starwind\starwind_reset.cmd

In order to recreate the VASA Provider and all certificates for it you should use one of these commands. There are two ways how to VASA Provider can be registered – by IP address or by DNS name. Also, it would be needed to register VASA provider at another vCenter.

If you want to use IP address or you don't have Active Directory service running, you should run this command in cmd shell with administrator rights inside StarWind VM (Before this you need to get know MAC address of management NIC):

wmic -namespace:\\root\starwind path STARWIND_ClusterService call ResetVASA BindToInterfaceMAC=<TargetMAC>

In case if you have Active Directory, service implemented in your infrastructure you should use domain name. Add StarWind VM to Active Directory and use domain name for the Storage Provider registration. To reset VASA Provider by name, you should run this command in cmd shell with administrator rights inside StarWind VM:

wmic -namespace:\\root\starwind path STARWIND_ClusterService call ResetVASA

Also, there is command to get know information of VASA Provider – URL, certificate:

wmic -namespace:\\root\starwind path STARWIND_ClusterService call GetVASAInfo



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)
Customer Support Portal: Support Forum:	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.