StarWind Virtual HCI Appliance: Configuration Guide for VMware vSphere [ESXi]

2025

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 HCI Appliance (VHCA)

Purpose

This document outlines how to configure a StarWind Virtual HCI Appliance (VHCA) based on VMware vSphere [ESXi], with VSAN running as a Controller Virtual Machine (CVM). The guide includes steps to prepare ESXi hosts for clustering, configure physical and virtual networking, and set up the Virtual SAN Controller Virtual Machine.

Audience

This technical guide is intended for storage and virtualization architects, system administrators, and partners designing virtualized environments using StarWind Virtual HCI Appliance (VHCA).

Expected result

The end result of following this guide will be a fully configured high-availability StarWind Virtual HCI Appliance (VHCA) powered by VMware vSphere [ESXi] that includes virtual machine shared storage provided by StarWind VSAN.

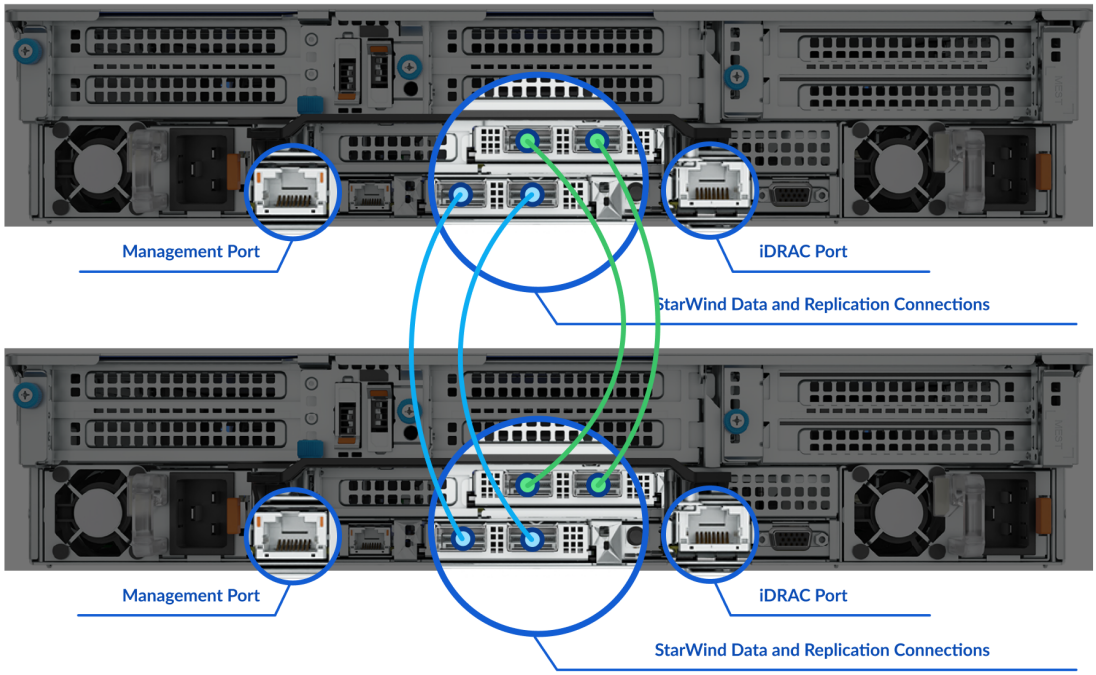
Prerequisites

Prior to configuring StarWind Virtual HCI Appliance (VHCA), 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-hdd-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

Solution Diagram:



Prerequisites:

1. 2 servers with local storage, which have direct network connections for Synchronization and iSCSI/StarWind heartbeat traffic.

2. Servers should have local storage available for VMware vSphere [ESXi] and StarWind VSAN Controller Virtual Machine. CVM utilizes local storage to create replicated shared storage connected to VMware vSphere [ESXi] nodes via iSCSI.

3. StarWind HA devices require at least 2 separate network links between the nodes. The first one is used for iSCSI traffic, the second one is used for Synchronization traffic. Note. 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.

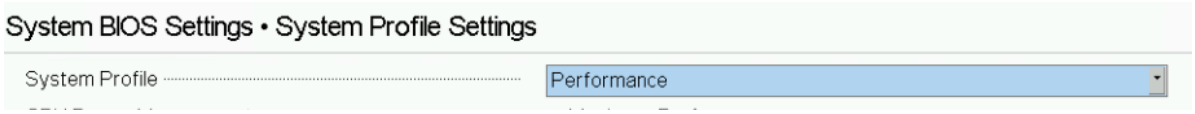
Hardware Configuration

Access the BIOS on each server:

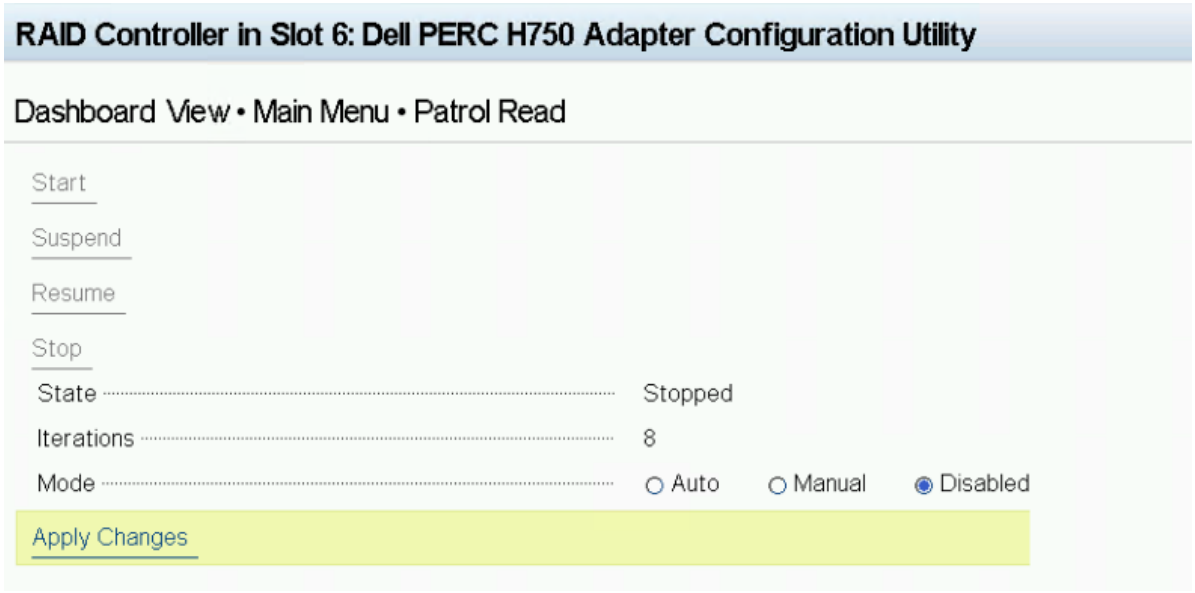
1. Change “Boot mode select” to [UEFI]

2. Enable AC Power Recovery to On;

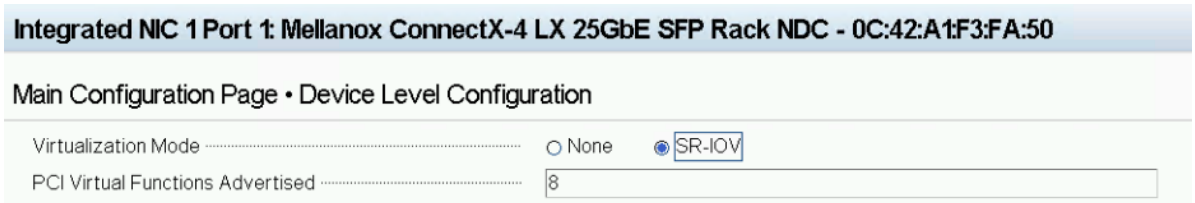
3. Set System Profile Settings to Performance;



4. Disable Patrol Read in case of SSD disks;

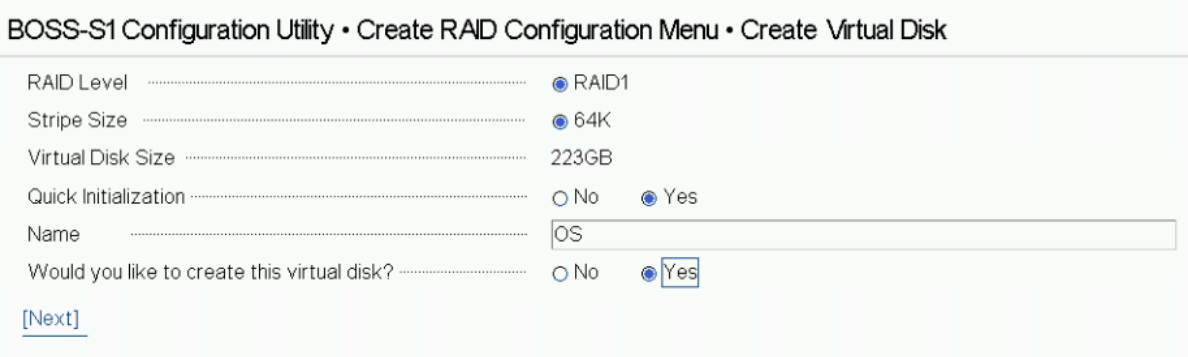


5. Enable SR-IOV for network cards;

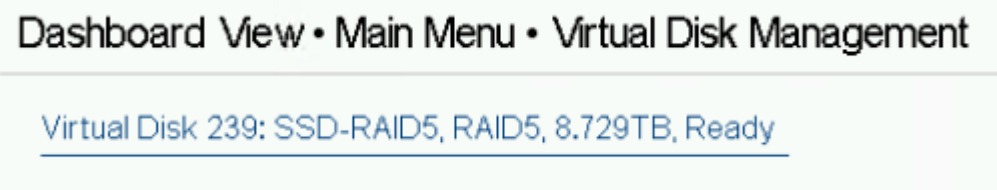


6. Configure the storage for OS and for data, or single RAID for OS and Data according to Supported RAID configurations here.

Settings for OS RAID1:
Virtual disk name: OS
Disk cache policy: Default (enabled by default)
Write policy: Write Through
Read policy: No read ahead
Stripe Size: 64K



Storage for data:
Find supported RAID configurations for main data storage here.

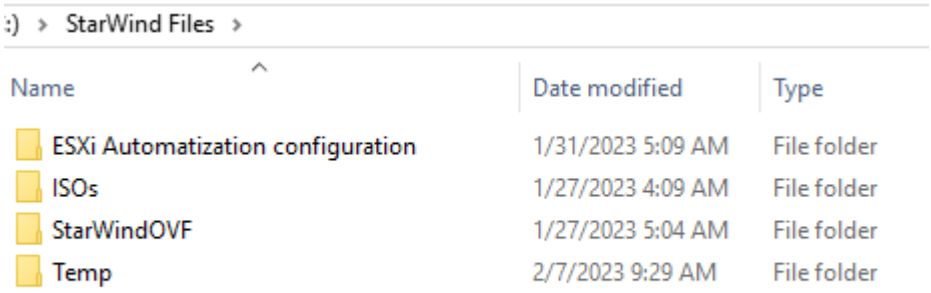


Files For Starwind Vhci Configuration:

The StarWind files for vHCI configuration should be downloaded to Windows machine, which will be used for configuration. Run “StarWind Folders.ps1” script to form StarWind Files folder.

Structure of the StarWind Files folder:
C:\StarWind Files
C:\StarWind Files\ESXi Automatization configuration
C:\StarWind Files\ISOs
C:\StarWind Files\StarWindOVF

C:\StarWind Files\Temp



Scripts that are included in the “StarWind Folders.ps1” script.
C:\StarWind Files\ESXi Automatization configuration\Esxi+configuration.ps1
C:\StarWind Files\Temp\ISOs Download.ps1
ISOs Download.ps1 allows to download the customized ISOs and OVF for vHCI configuration:

Windows 2019/2022
ESXi 7/8 / vCenter 7/8
StarWind VSAN for vSphere OVF
The Esxi+configuration.ps1 allows performing the ESXi configuration.

Esxi Configuration Part:

Node 1

1. Start the “C:\StarWind Files\ESXi Automatization configuration\Esxi+configuration.ps1” with administrator rights.

2. Installation of the components:
Nuget provider
PSGallery for Modules
.net 3.5
PowerCLI Module
BitsTransfer Module

```
Installing NuGet package provider       OK
Allow to install modules from PSGallery to install powercli module      OK
Downloading .Net 3.5 framework  OK
Installing .Net 3.5 framework   OK
Check VMware PowerCLI module
PowerCLI module is installed
          Welcome to VMware PowerCLI!

Log in to a vCenter Server or ESX host:              Connect-VIServer
To find out what commands are available, type:       Get-VICommand
To show searchable help for all PowerCLI commands:   Get-PowerCLIHelp
Once you've connected, display all virtual machines: Get-VM
If you need more help, visit the PowerCLI community: Get-PowerCLICommunity

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Import-Module BitsTransfer
```

3. ESXi server details:
IP address/user/password

```
Type IP address of the local ESXi server: 172.16.2.33
Type user of the local ESXi server: root
Please enter your password: ************
```

4. Connection to the server

```
Connect ESXI server

Perform operation?
Performing operation 'Update PowerCLI configuration.'?
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): a
WARNING:
   The Get-EsxCli cmdlet provides a new interface to the ESXCLI functionality.
   Use the -V2 parameter to switch to the new cmdlet interface.
   Check the cmdlet help for more information.

   Scripts that use the old cmdlet interface may not be compatible across two different versions of the ESX server.
   The old cmdlet interface is deprecated and will be removed in a future version.
```

Type “a” to perform the operation.

5. Choose [1] to change the ESXi server name:

```
 Change ESXi Host Name
 Do you want to change the ESXi Host name? [y/n] : y
Do you want a specific ESXi Host name ? [y/n] : n
Enter the Appliance type[]: Node1 (ESXi01)[1]; Node2 (ESXi02)[2]; Node3 (ESXi03)[3]; Backup (ESXi-BA)[4]; VTL (ESXi-VTL)[5]; :
true
```

The specific name for ESXi could be set when you choose it:

```
 Change ESXi Host Name
 Do you want to change ESXi Host name? [y/n] : y
Do you want a specific ESXi Host name ? [y/n] : y_
```

6. Set the ‘CommunitySupported’ level for ESXi and install VIBs.

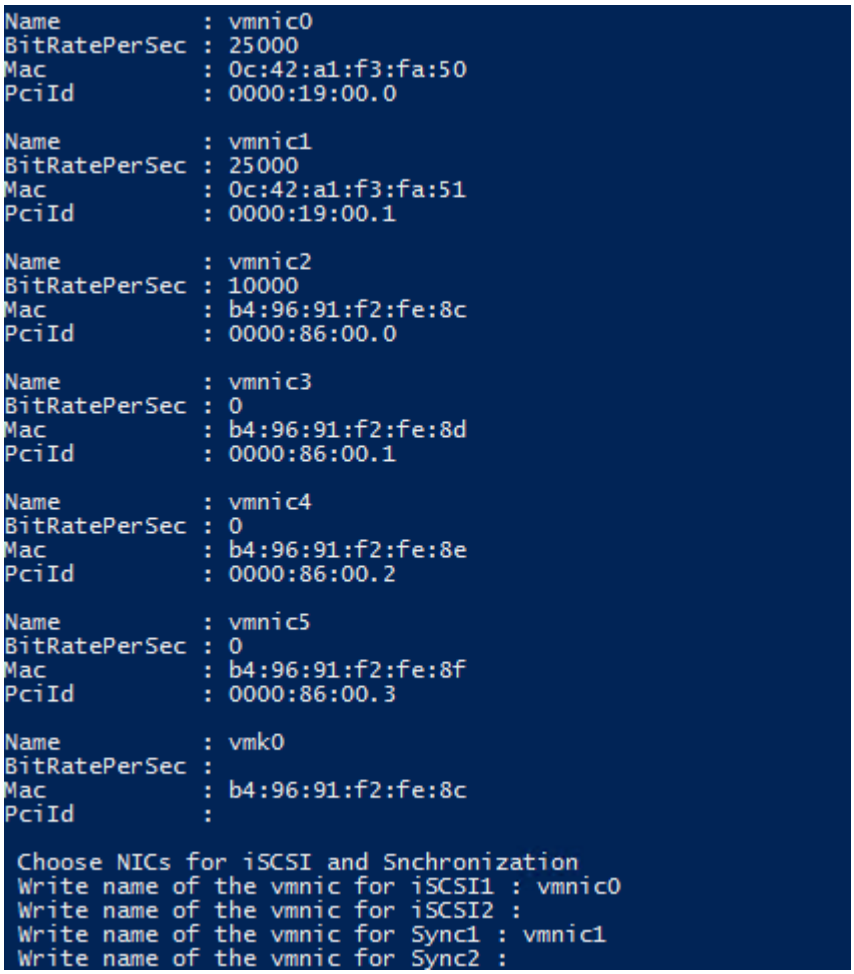
```
Change the acceptance level
Host acceptance level changed to 'CommunitySupported'.
 Who is the hardware vendor? Please specify [D] for Dell ESXI 7,  [S] for SuperMicro ESXi 7, [D8] for Dell ESXi8,  [S8] for SuperMicro ESXi8 or [none]: *_
```

```
Message         : Operation finished successfully.
RebootRequired  : false
VIBsInstalled   : {DEL_bootbank_mrvl9230_1.0.13.1003-1OEM.800.1.0.20143090}
VIBsRemoved     :
VIBsSkipped     :

Message         : Operation finished successfully.
RebootRequired  : false
VIBsInstalled   : {DEL_bootbank_racadm_11.0.0.0.5139-DEL.700.0.0.15843807}
VIBsRemoved     :
VIBsSkipped     :

Message         : Operation finished successfully.
RebootRequired  : false
VIBsInstalled   : {BCM_bootbank_vmware-perccli64-esxi8_007.2110.0000.0000-02}
VIBsRemoved     :
VIBsSkipped     :
```

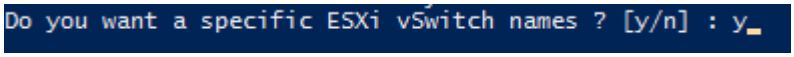
7. Autostart for ESXi server and default NTP server

```
 Host VMs autostart

VMHost                    Enabled  StartDelay StopAction StopDelay  WaitForHeartbeat
------                    -------  ---------- ---------- ---------  ----------------
HostSystem-ha-host        True     120        GuestSh... 120        False
 Set NTP server and start it
Configure NTP service
pool.ntp.org

VMHostId       : HostSystem-ha-host
VMHost         : 172.16.2.33
Name           : NTP Client
Enabled        : True
IncomingPorts  :
OutgoingPorts  : 123
Protocols      : UDP
ServiceRunning : False
Uid            : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VMHostFirewallException=NTP Client/
ExtensionData  : VMware.Vim.HostFirewallRuleset


Key            : ntpd
Label          : NTP Daemon
Policy         : off
Required       : False
Ruleset        : {ntpClient}
Running        : True
Uninstallable : False
VMHostId       : HostSystem-ha-host
VMHost         : 172.16.2.33
VMHostUid      : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/
Uid            : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/HostService=ntpd/
ExtensionData : VMware.Vim.HostService


Key            : ntpd
Label          : NTP Daemon
Policy         : automatic
Required       : False
Ruleset        : {ntpClient}
Running        : True
Uninstallable : False
VMHostId       : HostSystem-ha-host
VMHost         : 172.16.2.33
VMHostUid      : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/
Uid            : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/HostService=ntpd/
ExtensionData : VMware.Vim.HostService
```

8. Choose network interfaces for iSCSI and Synchronization.
For 2 node configuration (1 iSCSI and 1 Sync) we need to choose iSCSI1 and Sync1
For 3 node configuration (2 iSCSI and 2 Sync) we need to choose iSCSI1, iSCSI2, and Sync1, Sync2



9. The script will create vSwitches, VMKernel, and Port Groups with default StarWind names if you did not
choose the ‘specific ESXi vSwitch name’. When ‘specific ESXi vSwitch name’ is chosen, vSwitches,
VMKernel, Port Groups, and iSCSI discovery will need specific names and IP addresses.



```
Do you want a specific ESXi vSwitch names ? [y/n] : n
 Creating vSwitches
 Creating vSwitche vSwitch-iSCSI-1-2
Id                : key-vim.host.VirtualSwitch-vSwitch-iSCSI-1-2
Key               : key-vim.host.VirtualSwitch-vSwitch-iSCSI-1-2
Name              : vSwitch-iSCSI-1-2
NumPorts          : 9216
NumPortsAvailable : 9204
Nic               : {vmnic0}
Mtu               : 9000
VMHostId          : HostSystem-ha-host
VMHost            : 172.16.2.31
VMHostUid         : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/
Uid               : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-iSCSI-1-2/
ExtensionData     : VMware.Vim.HostVirtualSwitch

 Creating vSwitche vSwitch-Sync-1-2
Id                : key-vim.host.VirtualSwitch-vSwitch-Sync-1-2
Key               : key-vim.host.VirtualSwitch-vSwitch-Sync-1-2
Name              : vSwitch-Sync-1-2
NumPorts          : 9216
NumPortsAvailable : 9202
Nic               : {vmnic1}
Mtu               : 9000
VMHostId          : HostSystem-ha-host
VMHost            : 172.16.2.31
VMHostUid         : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/
Uid               : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-Sync-1-2/
ExtensionData     : VMware.Vim.HostVirtualSwitch
```

10. VMKernel will be created automatically in case of default names.

```
VMotionEnabled               : True
FaultToleranceLoggingEnabled : False
ManagementTrafficEnabled     : False
IPv6                         : {fe80::250:56ff:fe6e:a18b/64}
AutomaticIPv6                : False
IPv6ThroughDhcp              : False
IPv6Enabled                  : False
Mtu                          : 9000
VsanTrafficEnabled           : False
PortGroupName                : iSCSI-1-2
Id                           : key-vim.host.VirtualNic-vmk1
VMHostId                     : HostSystem-ha-host
VMHost                       : 172.16.2.31
VMHostUid                    : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/
DeviceName                   : vmk1
Mac                          : 00:50:56:6e:a1:8b
DhcpEnabled                  : False
IP                           : 172.16.10.249
SubnetMask                   : 255.255.255.0
Uid                          : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/HostVMKernelVirtualNic=key-vim.host.VirtualNic-vmk1/
Name                         : vmk1
ExtensionData                : VMware.Vim.HostVirtualNic
```

11.Port Groups will be created automatically in case of default names.

```
Name             : iSCSI-1-2-for-VMs
VirtualSwitchId  : key-vim.host.VirtualSwitch-vSwitch-iSCSI-1-2
VirtualSwitchUid : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-iSCSI-1-2/
VirtualSwitch    : vSwitch-iSCSI-1-2
Key              : key-vim.host.PortGroup-iSCSI-1-2-for-VMs
Port             :
VlanId           : 0
VirtualSwitchName : vSwitch-iSCSI-1-2
VMHostId         : HostSystem-ha-host
VMHostUid        : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/
Uid              : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-iSCSI-1-2/VirtualPortGroup=key-vim.host.PortGroup-iSCSI-1-2-for-VMs/
ExtensionData    : VMware.Vim.HostPortGroup

Name             : Sync-1-2-for-VMs
VirtualSwitchId  : key-vim.host.VirtualSwitch-vSwitch-Sync-1-2
VirtualSwitchUid : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-Sync-1-2/
VirtualSwitch    : vSwitch-Sync-1-2
Key              : key-vim.host.PortGroup-Sync-1-2-for-VMs
Port             :
VlanId           : 0
VirtualSwitchName : vSwitch-Sync-1-2
VMHostId         : HostSystem-ha-host
VMHostUid        : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/
Uid              : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-Sync-1-2/VirtualPortGroup=key-vim.host.PortGroup-Sync-1-2-for-VMs/
ExtensionData    : VMware.Vim.HostPortGroup
```

12. iSCSI initiator and iSCSI discovery IP addresses will be created automatically in case of default names.

```
VMHost                : 172.16.2.31
FileSystemVolumeInfo : {datastore1, OSDATA-6411c30a-049f29d0-f38f-b49691f2fe8c, BOOTBANK1, BOOTBANK2}
SoftwareIScsiEnabled : True
ScsiLun               : {mpx.vmhba33:C0:T0:L0, mpx.vmhba33:C0:T0:L1, t10.NVMe____Dell_Express_Flash_NVMe_P4800X_375GB_SFF000142FD7AE4D25C, naa.6f4ee0803e09f4002b5d249ae91d0291...}
Id                    : HostStorageSystem-storageSystem
VMHostId              : HostSystem-ha-host
Uid                   : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VMHostStorage=HostStorageSystem-storageSystem/
ExtensionData         : VMware.Vim.HostStorageSystem
Name                  :

Address                 : 172.16.10.1
Port                    : 3260
IScsiHbaKey             : key-vim.host.InternetScsiHba-vmhba64
AuthenticationProperties : Chap:Prohibited
Type                    : Send
Uid                     : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/Hba=key-vim.host.InternetScsiHba-vmhba64/IScsiHbaTarget=172.16.10.1:3260:Send/
Name                    : 172.16.10.1:3260
IScsiHbaName            : iqn.1998-01.com.vmware:esxi01:[redacted]3703096:64
ExtensionData           : VMware.Vim.HostInternetScsiHbaSendTarget
VmHostId                : HostSystem-ha-host
HostStorageSystemId     : HostStorageSystem-storageSystem

Address                 : 172.16.10.2
Port                    : 3260
IScsiHbaKey             : key-vim.host.InternetScsiHba-vmhba64
AuthenticationProperties : Chap:Prohibited
Type                    : Send
Uid                     : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/Hba=key-vim.host.InternetScsiHba-vmhba64/IScsiHbaTarget=172.16.10.2:3260:Send/
Name                    : 172.16.10.2:3260
IScsiHbaName            : iqn.1998-01.com.vmware:esxi01:653703096:64
ExtensionData           : VMware.Vim.HostInternetScsiHbaSendTarget
VmHostId                : HostSystem-ha-host
HostStorageSystemId     : HostStorageSystem-storageSystem
```

13. StarWind ESXi user for ProActive monitoring creation.

```
Create ESXi User / Role / Permission
Description   : StarWind
IsSystem      : False
PrivilegeList : {Global.CancelTask, Global.CapacityPlanning, Global.Diagnostics, Global.DisableMethods...}
ServerId      : /VIServer=root@172.16.2.31:443/
Server        : 172.16.2.31
Id            : 10
Name          : StarWind
Uid           : /VIServer=root@172.16.2.31:443/Role=10/
ExtensionData : VMware.Vim.AuthorizationRole
```

14. StarWind Virtual Machine installation. Choose “l” for StarWind Virtual SAN (vSAN) for vSphere.
It is possible to change the default ESXi name by specifying a name for Virtual Machine.

```
 Set name for StarWind VM
ESXi01
 StarWind VM Creation
 Choose type of the StarWind VM Windows[w] / Linux [l] : l
StarWind OVF exist
WARNING: The size of the file 'StarWindVSA_vSphere_20211124_14398-disk1.vmdk' is 2019257856 bytes where 2188326400 bytes is expected.

Confirm
Are you sure you want to perform this action?
Performing the operation "Setting NetworkName: iSCSI-1-2-for-VMs" on target "Network adapter 2".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): a

Confirm
Are you sure you want to perform this action?
Performing the operation "Setting NetworkName: Sync-1-2-for-VMs" on target "Network adapter 3".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): a
```

```
Confirmation
Proceed to configure the following parameters of the virtual machine with name 'SW-HCA-VM-01'?
New NumCpu: 8
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): a
WARNING: The 'Version' property of VirtualMachine type is deprecated. Use the 'HardwareVersion' property instead.

PowerState              : PoweredOff
Version                 : v10
HardwareVersion         : vmx-10
Notes                   : StarWind Virtual SAN for vSphere
Guest                   : SW-HCA-VM-01:
NumCpu                  : 8
CoresPerSocket          : 4
MemoryMB                : 8192
MemoryGB                : 8
VMHostId                : HostSystem-ha-host
VMHost                  : 172.16.2.33
VApp                    :
FolderId                : Folder-ha-folder-vm
Folder                  : vm
ResourcePoolId          : ResourcePool-ha-root-pool
ResourcePool            : Resources
PersistentId            : 526bb498-0410-739c-a2b9-c9e0b3a79687
UsedSpaceGB             : 16.000008087605237960815429688
ProvisionedSpaceGB      : 16.993893573991954326629638672
DatastoreIdList         : {Datastore-641c3db7-60d58d0a-d8d0-b49691f2fe8c}
HARestartPriority       :
HAIsolationResponse     :
DrsAutomationLevel      :
VMSwapfilePolicy        : Inherit
VMResourceConfiguration : CpuShares:Normal/8000 MemShares:Normal/81920
GuestId                 : rhel7_64Guest
CreateDate              : 3/23/2023 12:23:18 PM
SEVEnabled              : False
Name                    : SW-HCA-VM-01
CustomFields            : {}
ExtensionData           : VMware.Vim.VirtualMachine
Id                      : VirtualMachine-1
Uid                     : /VIServer=root@172.16.2.33:443/VirtualMachine=VirtualMachine-1/

Recerve RAM for VM

Type  : Task
Value : haTask-1-vim.VirtualMachine.reconfigure-130

Autostart for VM
WARNING: The 'VirtualMachineId' property of VMStartPolicy type is deprecated. Use the 'VMId' property instead.

VirtualMachineId            : VirtualMachine-1
VMId                        : VirtualMachine-1
VM                          : SW-HCA-VM-01
VirtualMachineName          : SW-HCA-VM-01
VmHostId                    : HostSystem-ha-host
StartAction                 : PowerOn
StartDelay                  : 120
StartOrder                  : 1
StopAction                  : GuestShutdown
StopDelay                   : 120
WaitForHeartbeat            : False
IsStartDelayInherited       : True
IsStopActionInherited       : False
IsStopDelayInherited        : True
IsWaitForHeartbeatInherited : True
Uid                         : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VMStartPolicy=VirtualMachine-1/
ExtensionData               : VMware.Vim.AutoStartPowerInfo
```

Note: OVF will be downloaded if it is not present. CPU and RAM memory will be configured according to our best practices.
Storage drives for StarWind devices should be added manually.

Node 2
1. Start the “C:\StarWind Files\ESXi Automatization configuration\Esxi+configuration.ps1” with administrator rights.

2. Installation of the components:
Nuget provider
PSGallery for Modules
.net 3.5
PowerCLI Module
BitsTransfer Module

```
Installing NuGet package provider       OK
Allow to install modules from PSGallery to install powercli module      OK
Downloading .Net 3.5 framework  OK
Installing .Net 3.5 framework   OK
Check VMware PowerCLI module
PowerCLI module is installed
Update PowerCLI module
          Welcome to VMware PowerCLI!

Log in to a vCenter Server or ESX host:              Connect-VIServer
To find out what commands are available, type:       Get-VICommand
To show searchable help for all PowerCLI commands:   Get-PowerCLIHelp
Once you've connected, display all virtual machines: Get-VM
If you need more help, visit the PowerCLI community: Get-PowerCLICommunity

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Import-Module BitsTransfer
```

3. ESXi server details:
IP address/user/password

```
Import-Module BitsTransfer
Type IP address of the local ESXi server: 172.16.2.31
Type user of the local ESXi server: root
Please enter your password: ************
```

4. Connection to the server

```
Connect ESXI server

Perform operation?
Performing operation 'Update PowerCLI configuration.'?
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): a
```

Type “a” to perform the operation.
5. Changing the ESXi server name: We need to choose [2]

```
 Change ESXi Host Name
 Do you want to change ESXi Host name? [y/n] : y
Do you want a specific ESXi Host name ? [y/n] : n
Enter the Applience type: Node1 [1]; Node2 [2]; Node3 [3]; Backup [4]; VTL [5]; : 2
true
```

The specific name for ESXi could be set when you choose it:

```
 Change ESXi Host Name
 Do you want to change ESXi Host name? [y/n] : y
Do you want a specific ESXi Host name ? [y/n] : y
```

6. Set the ‘CommunitySupported’ level for ESXi and install VIBs.

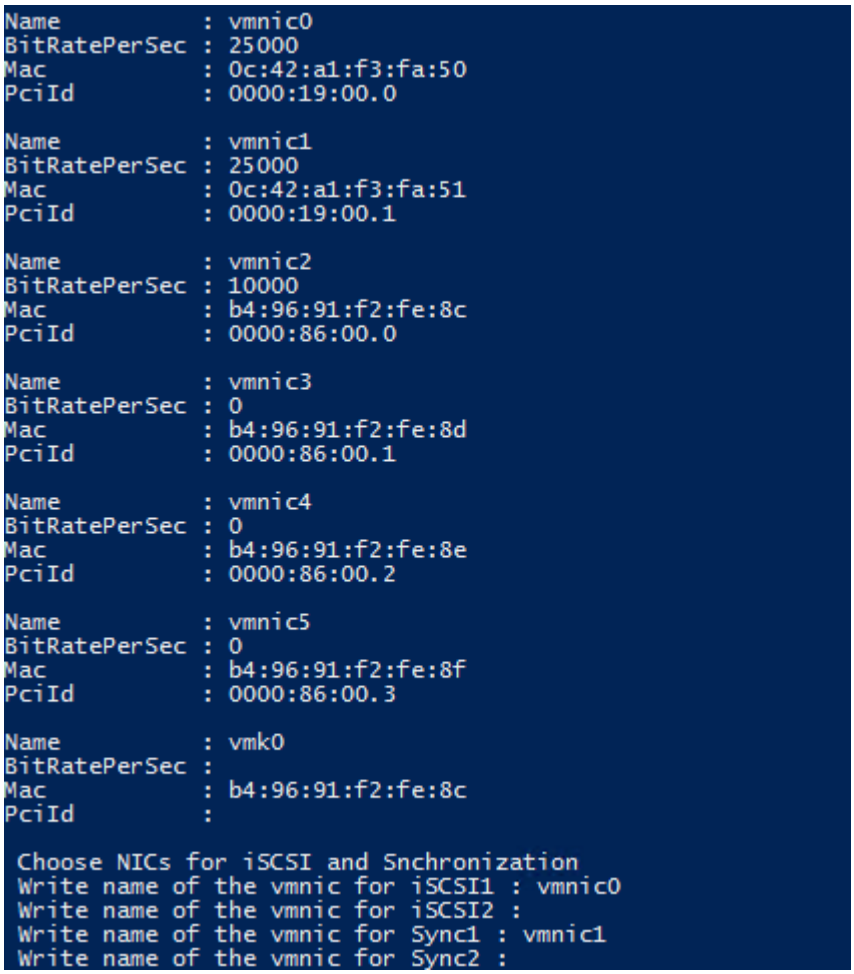
```
Host acceptance level changed to 'CommunitySupported'.
 Who is the hardware vendor? Please specify [D] for Dell ESXI 7,  [S] for SuperMicro ESXi 7, [D8] for Dell ESXi8,  [S8]
for SuperMicro ESXi8 or [none]:
```

```
Message         : Operation finished successfully.
RebootRequired  : false
VIBsInstalled   : {DEL_bootbank_mrvl9230_1.0.13.1003-1OEM.800.1.0.20143090}
VIBsRemoved     :
VIBsSkipped     :

Message         : Operation finished successfully.
RebootRequired  : false
VIBsInstalled   : {DEL_bootbank_racadm_11.0.0.0.5139-DEL.700.0.0.15843807}
VIBsRemoved     :
VIBsSkipped     :

Message         : Operation finished successfully.
RebootRequired  : false
VIBsInstalled   : {BCM_bootbank_vmware-perccli64-esxi8_007.2110.0000.0000-02}
VIBsRemoved     :
VIBsSkipped     :
```

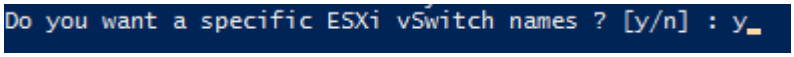
7. Autostart for ESXi server and default NTP server

```
VMHostId         : HostSystem-ha-host
VMHostUid        : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/
Enabled          : True
StartDelay       : 120
StopAction       : GuestShutdown
StopDelay        : 120
WaitForHeartbeat : False
Uid              : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VMHostStartPolicy=/
ExtensionData    : VMware.Vim.HostAutoStartManager

Configure NTP service
pool.ntp.org
VMHostId       : HostSystem-ha-host
VMHost         : 172.16.2.31
Name           : NTP Client
Enabled        : True
IncomingPorts  :
OutgoingPorts  : 123
Protocols      : UDP
ServiceRunning : False
Uid            : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/VMHostFirewallException=NTP Client/
ExtensionData  : VMware.Vim.HostFirewallRuleset

Key            : ntpd
Label          : NTP Daemon
Policy         : off
Required       : False
Ruleset        : {ntpClient}
Running        : True
Uninstallable  : False
VMHostId       : HostSystem-ha-host
VMHost         : 172.16.2.31
VMHostUid      : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/
Uid            : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/HostService=ntpd/
ExtensionData  : VMware.Vim.HostService

Key            : ntpd
Label          : NTP Daemon
Policy         : automatic
Required       : False
Ruleset        : {ntpClient}
Running        : True
Uninstallable  : False
VMHostId       : HostSystem-ha-host
VMHost         : 172.16.2.31
VMHostUid      : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/
Uid            : /VIServer=root@172.16.2.31:443/VMHost=HostSystem-ha-host/HostService=ntpd/
ExtensionData  : VMware.Vim.HostService
```

8. Choose network interfaces for iSCSI and Synchronization.
For 2 node configuration (1 iSCSI and 1 Sync) we need to choose iSCSI1 and Sync1
For 3 node configuration (2 iSCSI and 2 Sync) we need to choose iSCSI1, iSCSI2, and Sync1, Sync2



9. The script will create vSwitches, VMKernel, and Port Groups with default StarWind names if you did not
choose the ‘specific ESXi vSwitch name’. When ‘specific ESXi vSwitch name’ is chosen vSwitches,
VMKernel, Port Groups, and iSCSI discovery will need specific names and IP addresses.



```
Do you want specific ESXi vSwitch names? [y/n] : n
 Creation vSwitches
 Creating vSwitche vSwitch-iSCSI-2-1

Id                : key-vim.host.VirtualSwitch-vSwitch-iSCSI-2-1
Key               : key-vim.host.VirtualSwitch-vSwitch-iSCSI-2-1
Name              : vSwitch-iSCSI-2-1
NumPorts          : 9216
NumPortsAvailable : 9204
Nic               : {vmnic0}
Mtu               : 9000
VMHostId          : HostSystem-ha-host
VMHost            : 172.16.2.33
VMHostUid         : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/
Uid               : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-iSCSI-2-1/
ExtensionData     : VMware.Vim.HostVirtualSwitch

 Creating vSwitche vSwitch-Sync-2-1

Id                : key-vim.host.VirtualSwitch-vSwitch-Sync-2-1
Key               : key-vim.host.VirtualSwitch-vSwitch-Sync-2-1
Name              : vSwitch-Sync-2-1
NumPorts          : 9216
NumPortsAvailable : 9202
Nic               : {vmnic1}
Mtu               : 9000
VMHostId          : HostSystem-ha-host
VMHost            : 172.16.2.33
VMHostUid         : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/
Uid               : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-Sync-2-1/
ExtensionData     : VMware.Vim.HostVirtualSwitch
```

10. VMKernel will be created automatically in case of default names.

```
 Creation VMKernel

VMotionEnabled               : True
FaultToleranceLoggingEnabled : False
ManagementTrafficEnabled     : False
IPv6                         : {fe80::250:56ff:fe6b:6ee/64}
AutomaticIPv6                : False
IPv6ThroughDhcp              : False
IPv6Enabled                  : False
Mtu                          : 9000
VsanTrafficEnabled           : False
PortGroupName                : iSCSI-2-1
Id                           : key-vim.host.VirtualNic-vmk1
VMHostId                     : HostSystem-ha-host
VMHost                       : 172.16.2.33
VMHostUid                    : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/
DeviceName                   : vmk1
Mac                          : 00:50:56:6b:06:ee
DhcpEnabled                  : False
IP                           : 172.16.10.250
SubnetMask                   : 255.255.255.0
Uid                          : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/HostVMKernelVirtualNic=key-vim.host.VirtualNic-vmk1/
Name                         : vmk1
ExtensionData                : VMware.Vim.HostVirtualNic
```

11. Port Groups will be created automatically in case of default names.

```
 Creation Port Groups
WARNING: The 'VMHostId' property of VirtualPortGroup type is deprecated. Access the host id through the VirtualSwitch property instead (e.g. 'VirtualSwitch.VMHostId').

Name              : iSCSI-2-1-for-VMs
VirtualSwitchId   : key-vim.host.VirtualSwitch-vSwitch-iSCSI-2-1
VirtualSwitchUid  : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-iSCSI-2-1/
VirtualSwitch     : vSwitch-iSCSI-2-1
Key               : key-vim.host.PortGroup-iSCSI-2-1-for-VMs
Port              :
VlanId            : 0
VirtualSwitchName : vSwitch-iSCSI-2-1
VMHostId          : HostSystem-ha-host
VMHostUid         : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/
Uid               : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-iSCSI-2-1/VirtualPortGroup=key-vim.host.PortGroup-iSCSI-2-1-for-VMs/
ExtensionData     : VMware.Vim.HostPortGroup


Name              : Sync-2-1-for-VMs
VirtualSwitchId   : key-vim.host.VirtualSwitch-vSwitch-Sync-2-1
VirtualSwitchUid  : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-Sync-2-1/
VirtualSwitch     : vSwitch-Sync-2-1
Key               : key-vim.host.PortGroup-Sync-2-1-for-VMs
Port              :
VlanId            : 0
VirtualSwitchName : vSwitch-Sync-2-1
VMHostId          : HostSystem-ha-host
VMHostUid         : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/
Uid               : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VirtualSwitch=key-vim.host.VirtualSwitch-vSwitch-Sync-2-1/VirtualPortGroup=key-vim.host.PortGroup-Sync-2-1-for-VMs/
ExtensionData     : VMware.Vim.HostPortGroup
```

12. iSCSI initiator and iSCSI discovery IP addresses will be created automatically in case of default names.

```
 Enable iSCSI initiator
WARNING:  The 'ScsiLun' property of VMHostStorageInfo type is deprecated. Use 'Get-ScsiLun' cmdlet instead.

VMHost               : 172.16.2.33
FileSystemVolumeInfo : {datastore1, OSDATA-641c3db7-3c2d243e-231d-b49691f2fe8c, BOOTBANK1, BOOTBANK2}
SoftwareIScsiEnabled : True
ScsiLun              : {t10.NVMe____Dell_Express_Flash_NVMe_P4800X_375GB_SFF000142FD7AE4D25C, naa.6f4ee0803e09f4002b5d249ae91d0291, t10.ATA_____DELLBOSS_VD_____674f916e681d001000000000,
                       t10.NVMe____Dell_Express_Flash_NVMe_P4800X_375GB_SFF00014F24AEE4D25C...}
Id                   : HostStorageSystem-storageSystem
VMHostId             : HostSystem-ha-host
Uid                  : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VMHostStorage=HostStorageSystem-storageSystem/
ExtensionData        : VMware.Vim.HostStorageSystem
Name                 :


Address                  : 172.16.10.1
Port                     : 3260
IScsiHbaKey              : key-vim.host.InternetScsiHba-vmhba64
AuthenticationProperties : ChapProhibited
Type                     : Send
Uid                      : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/Hba=key-vim.host.InternetScsiHba-vmhba64/IScsiHbaTarget=172.16.10.1:3260:Send/
Name                     : 172.16.10.1:3260
IScsiHbaName             : iqn.1998-01.com.vmware:esxi01:1937441933:64
ExtensionData            : VMware.Vim.HostInternetScsiHbaSendTarget
VmHostId                 : HostSystem-ha-host
HostStorageSystemId      : HostStorageSystem-storageSystem


Address                  : 172.16.10.2
Port                     : 3260
IScsiHbaKey              : key-vim.host.InternetScsiHba-vmhba64
AuthenticationProperties : ChapProhibited
Type                     : Send
Uid                      : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/Hba=key-vim.host.InternetScsiHba-vmhba64/IScsiHbaTarget=172.16.10.2:3260:Send/
Name                     : 172.16.10.2:3260
IScsiHbaName             : iqn.1998-01.com.vmware:esxi01:1937441933:64
ExtensionData            : VMware.Vim.HostInternetScsiHbaSendTarget
VmHostId                 : HostSystem-ha-host
HostStorageSystemId      : HostStorageSystem-storageSystem
```

13. StarWind ESXi user for ProActive monitoring creation.

```
Create ESXi User / Role / Permission
Description    : StarWind
IsSystem       : False
PrivilegeList : {Global.CancelTask, Global.CapacityPlanning, Global.Diagnostics, Global.DisableMethods...}
ServerId       : /VIServer=root@172.16.2.31:443/
Server         : 172.16.2.31
Id             : 10
Name           : StarWind
Uid            : /VIServer=root@172.16.2.31:443/Role=10/
ExtensionData : VMware.Vim.AuthorizationRole
```

14. StarWind Virtual Machine installation. Choose “l” for StarWind Virtual SAN (vSAN) for vSphere

You can specify the specific name for Virtual Machine in case of not default ESXi name.

```
 Set name for StarWind VM
ESXi02
 StarWind VM Creation
 Choose type of the StarWind VM Windows[w] / Linux [l] : l
StarWind OVF exist
WARNING: The size of the file 'StarWindVSA_vSphere_20211124_14398-disk1.vmdk' is 2019257856 bytes where 2188326400 bytes is expected.

Confirm
Are you sure you want to perform this action?
Performing the operation "Setting NetworkName: iSCSI-2-1-for-VMs" on target "Network adapter 2".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): a

Confirm
Are you sure you want to perform this action?
Performing the operation "Setting NetworkName: Sync-2-1-for-VMs" on target "Network adapter 3".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): a
```

```
Confirmation
Proceed to configure the following parameters of the virtual machine with name 'SW-HCA-VM-02'?
New NumCpu: 8
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): a
WARNING: The 'Version' property of VirtualMachine type is deprecated. Use the 'HardwareVersion' property instead.

PowerState              : PoweredOff
Version                 : v10
HardwareVersion         : vmx-10
Notes                   : StarWind Virtual SAN for vSphere
Guest                   : SW-HCA-VM-02:
NumCpu                  : 8
CoresPerSocket          : 4
MemoryMB                : 8192
MemoryGB                : 8
VMHostId                : HostSystem-ha-host
VMHost                  : 172.16.2.33
VApp                    :
FolderId                : Folder-ha-folder-vm
Folder                  : vm
ResourcePoolId          : ResourcePool-ha-root-pool
ResourcePool            : Resources
PersistentId            : 5270c85c-73d7-5195-42fb-6e19d06aea2d
UsedSpaceGB             : 16.000008087605237960815429688
ProvisionedSpaceGB      : 16.993893573991954326629638672
DatastoreIdList         : {Datastore-641c3db7-60d58d0a-d8d0-b49691f2fe8c}
HARestartPriority       :
HAIsolationResponse     :
DrsAutomationLevel      :
VMSwapfilePolicy        : Inherit
VMResourceConfiguration : CpuShares:Normal/8000 MemShares:Normal/81920
GuestId                 : rhel7_64Guest
CreateDate              : 3/23/2023 12:42:13 PM
SEVEnabled              : False
Name                    : SW-HCA-VM-02
CustomFields            : {}
ExtensionData           : VMware.Vim.VirtualMachine
Id                      : VirtualMachine-2
Uid                     : /VIServer=root@172.16.2.33:443/VirtualMachine=VirtualMachine-2/

Recerve RAM for VM

Type  : Task
Value : haTask-2-vim.VirtualMachine.reconfigure-319

Autostart for VM
WARNING: The 'VirtualMachineId' property of VMStartPolicy type is deprecated. Use the 'VMId' property instead.

VirtualMachineId            : VirtualMachine-2
VMId                        : VirtualMachine-2
VM                          : SW-HCA-VM-02
VirtualMachineName          : SW-HCA-VM-02
VmHostId                    : HostSystem-ha-host
StartAction                 : PowerOn
StartDelay                  : 120
StartOrder                  : 1
StopAction                  : GuestShutdown
StopDelay                   : 120
WaitForHeartbeat            : False
IsStartDelayInherited       : True
IsStopActionInherited       : False
IsStopDelayInherited        : True
IsWaitForHeartbeatInherited : True
Uid                         : /VIServer=root@172.16.2.33:443/VMHost=HostSystem-ha-host/VMStartPolicy=VirtualMachine-2/
ExtensionData               : VMware.Vim.AutoStartPowerInfo
```

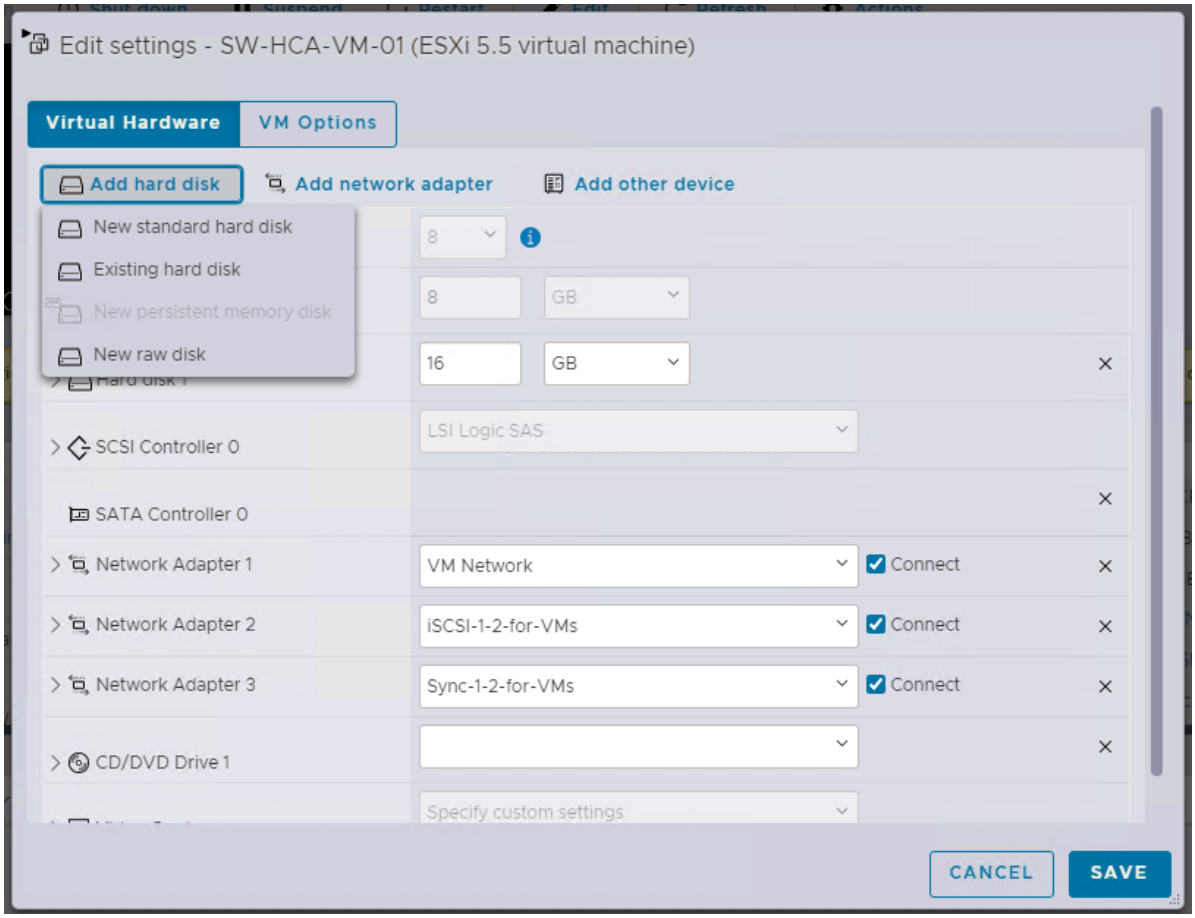
Note: OVF will be downloaded if it is not present. CPU and RAM memory will be configured according to our best practices.
Storage drives for StarWind devices should be added manually.

Storage Configuration Part

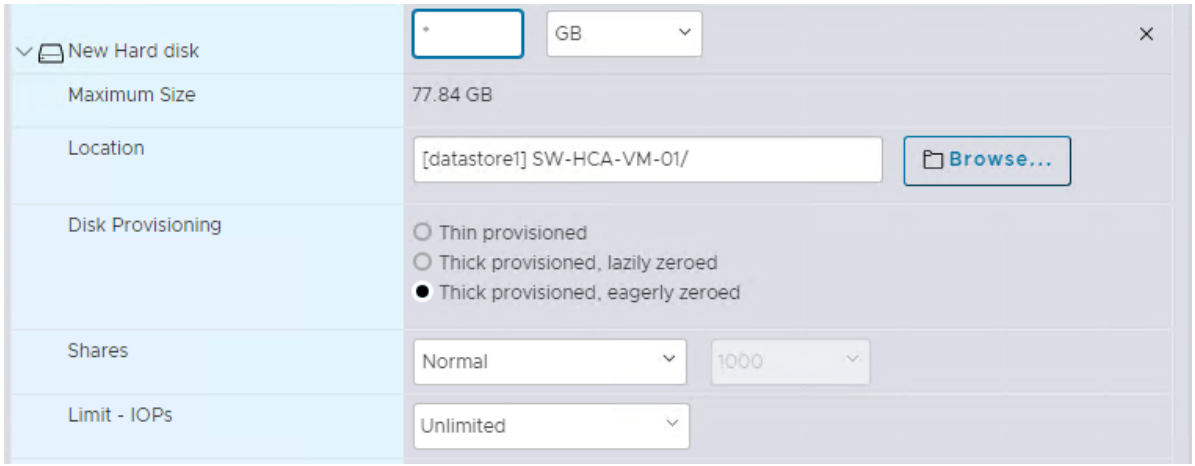
Three options to add storage for StarWind VM:
VMDK when ESXI is located on the same RAID array with DATA.
RDM when ESXI RAID array and DATA RAID array are located on the same RAID Controller,
PCI when servers have two RAID controllers one for ESXi and the second for DATA or HBA physical disks.

VDMK

1. Add the new standard hard disk to StarWind VM from the existing datastore:



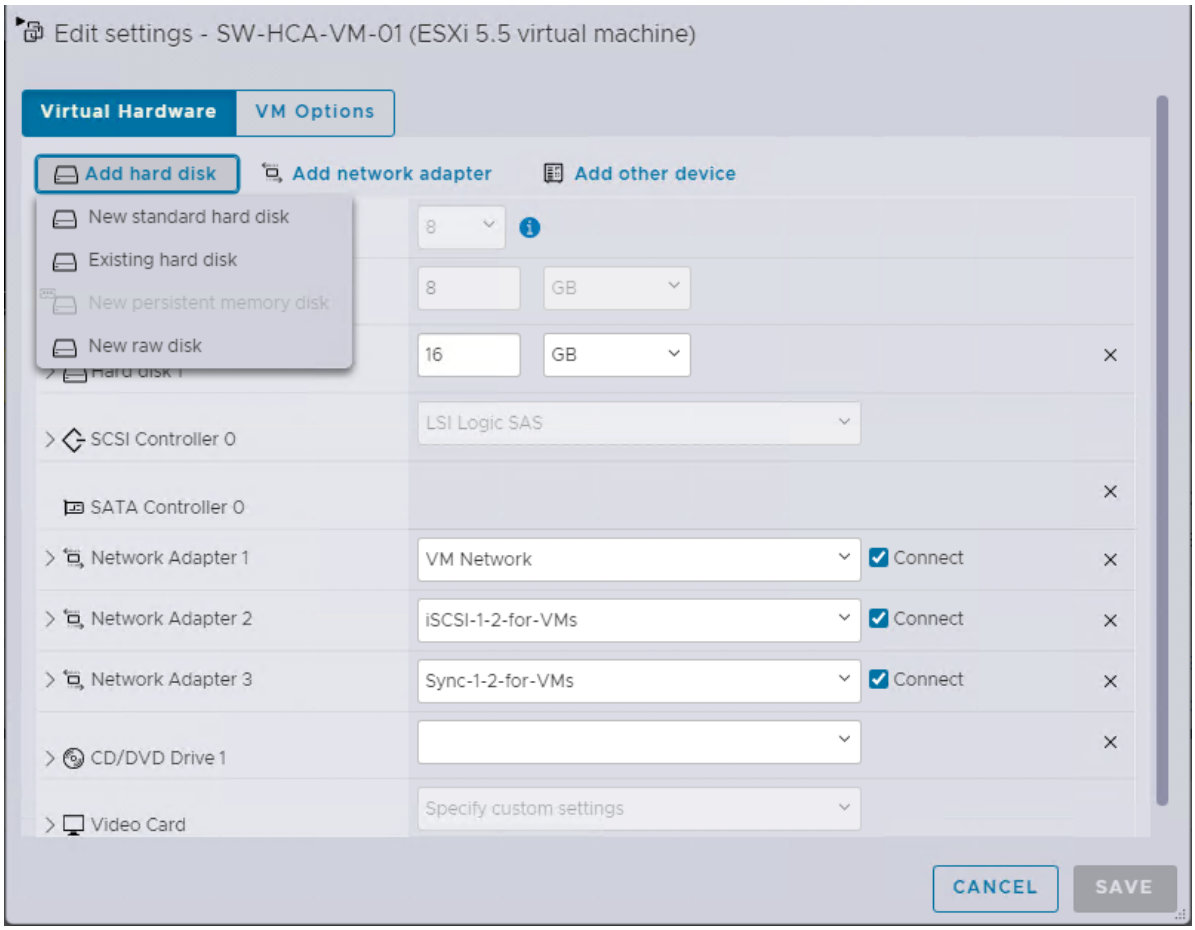
2. Specify the size and type of the new hard disk.
The type of Disk Provisioning should be Thick Provision Eager Zeroed



3. Modify the StarWind VM file to resolve the issue with ESXI: VMware Knowledge Base

Edit and save the VMX file of the StarWind VM by adding the following lines:

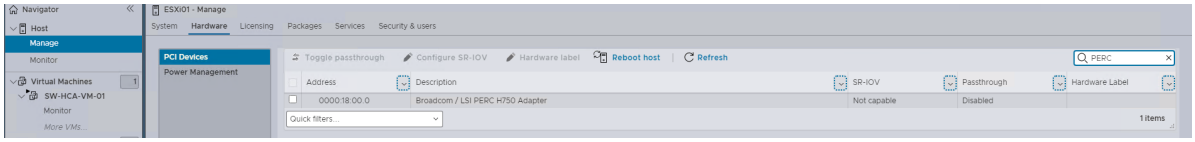
scsi0.async = “FALSE”
scsi0:0.canBlock = “TRUE”
scsi0:1.canBlock = “TRUE”
Line 1 shall be introduced for every SCSI controller your VM has got (0, 1, or whatever its number is). Line 2 shall be introduced for every port on that controller (here is why we use line 3 – just for example purposes in case of two disks attached to the VM using 1 SCSI controller).
In this example, VM got one SCSI adapter and two disks assigned to it.
RDM
1. Add the new raw disk to StarWind VM.



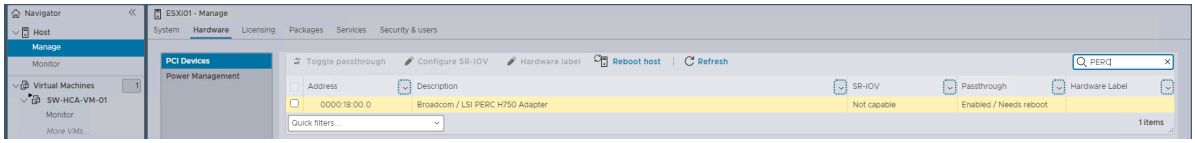
2. Select the RAID array for StarWind devices

PCI

1. Open ESXI web → Manage → Hardware → PCI Devices. Find the RAID Controller or HBA disks.

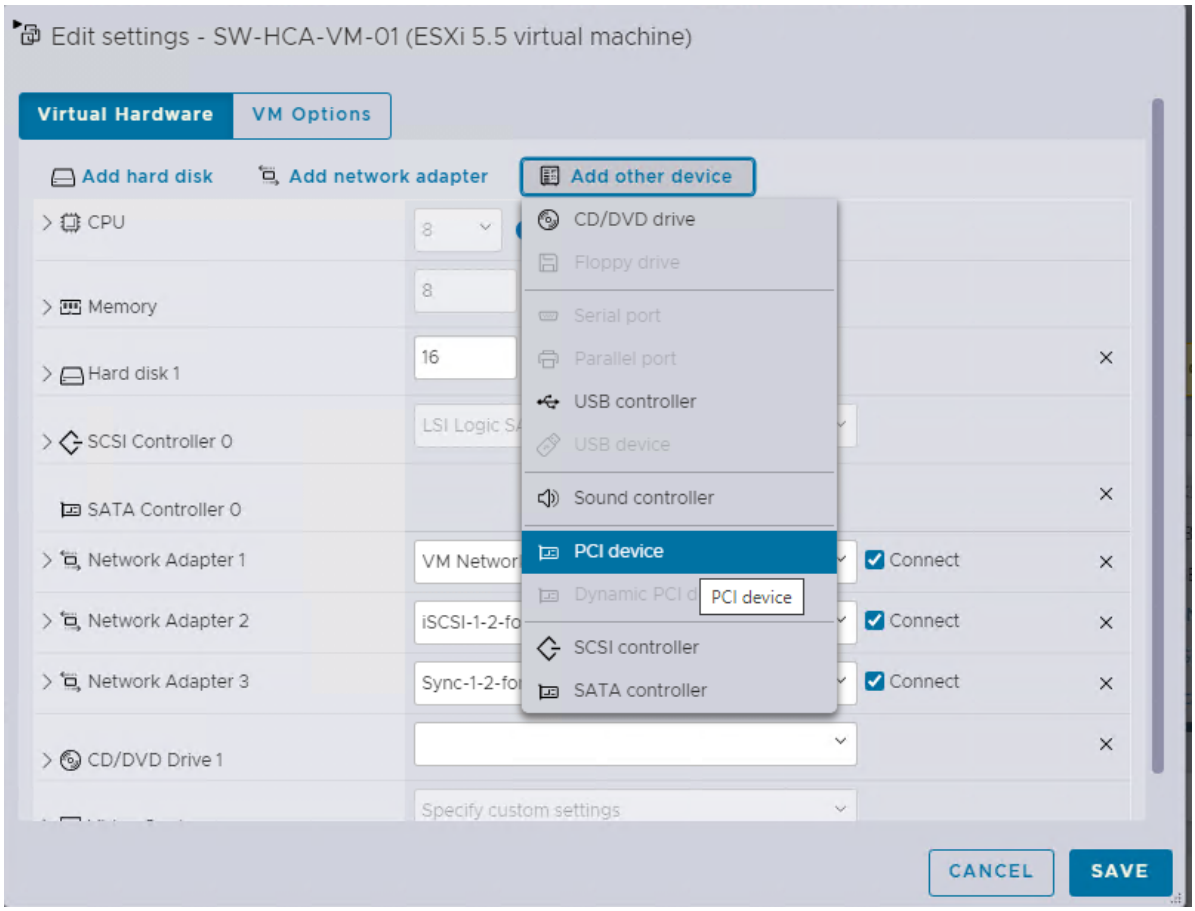


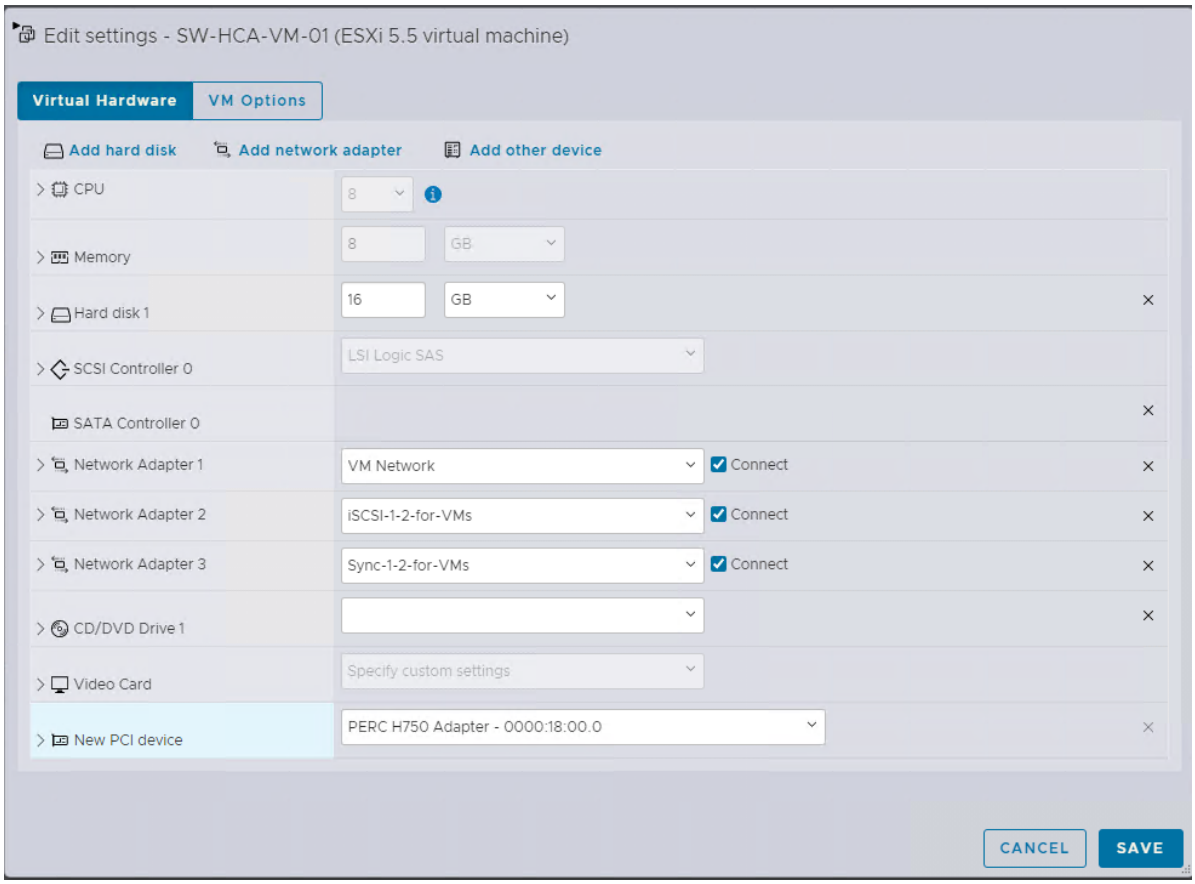
2. Toggle passthrough for the RAID Controller or HBA disks, and refresh a page.



3. Reboot the ESXi server.

4. Add PCI devices to StarWind VM.


Edit settings - SW-HCA-VM-01 (ESXi 5.5 virtual machine)
Virtual Hardware
VM Options
Add hard disk
Add network adapter
Add other device
CPU
8
Memory
8
Hard disk 1
16
SCSI Controller 0
LSI Logic SA
SATA Controller 0
Network Adapter 1
VM Networ
Connect
Network Adapter 2
iSCSI-1-2-fo
Connect
Network Adapter 3
Sync-1-2-fo
Connect
CD/DVD Drive 1
Specify custom settings
CD/DVD drive
Floppy drive
Serial port
Parallel port
USB controller
USB device
Sound controller
PCI device
Dynamic PCI d
PCI device
SCSI controller
SATA controller
CANCEL
SAVE



5. Save the configuration.

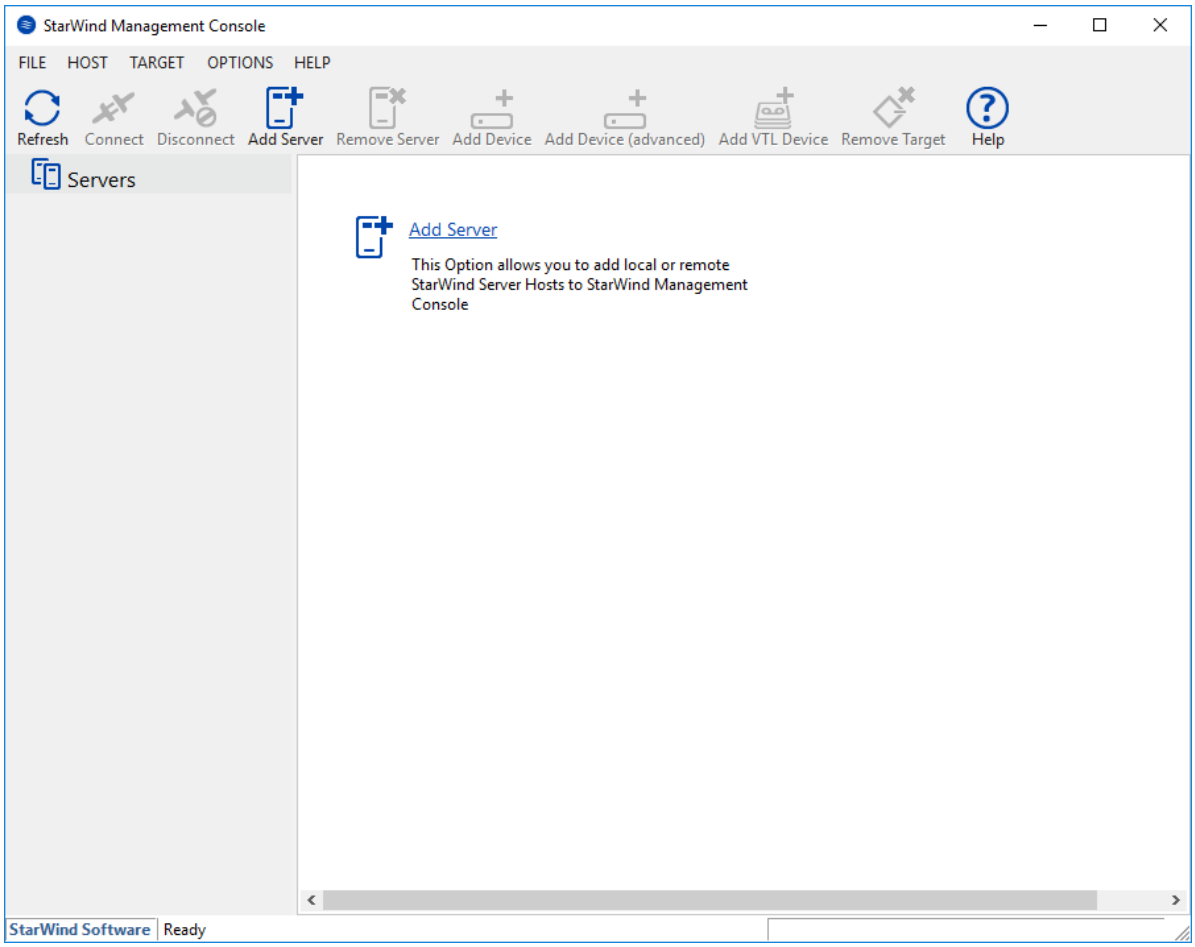
Starwind Configuration Part

To manage StarWind service you need to download and install StarWind Management Console.

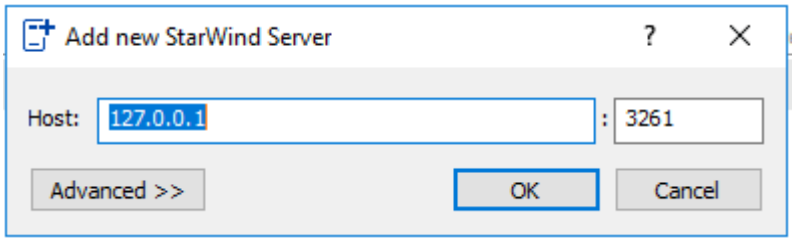
1. Install StarWind Management Console on a workstation with Windows OS (Windows 7 or higher, Windows Server 2008 R2 and higher) using the installer available here.
NOTE: StarWind Management Console and PowerShell Management Library components are required.

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

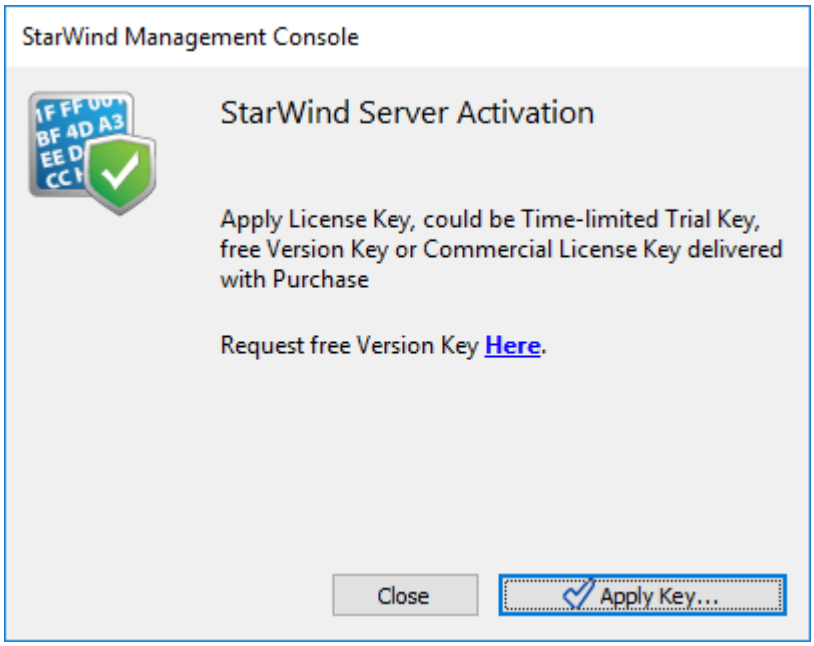
3. Open StarWind Management Console and click Add Server.



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



5. Select the server and click Connect.

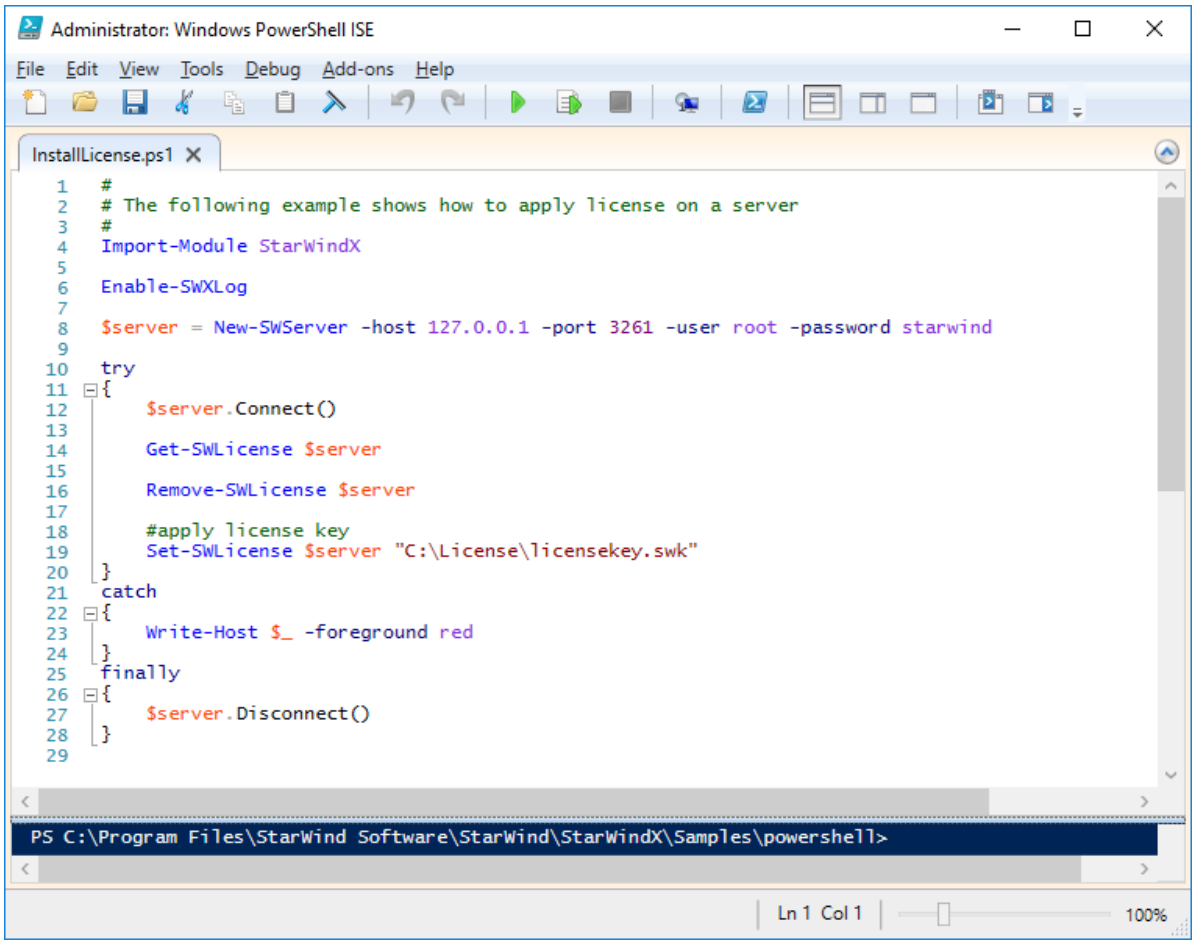


6. Click Apply Key… on the pop-up window.

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

8. Select the appropriate license key.

As an alternative, PowerShell can be used. Open StarWind InstallLicense.ps1 script with PowerShell ISE as administrator. It can be found here:
C:\Program Files\StarWind Software\StarWind\StarWindX\Samples\powershell\InstallLicense.ps1
Type the IP address of StarWind Virtual SAN VM and credentials of StarWind Virtual SAN service (defaults
login: root, password: starwind).
Add the path to the license key.

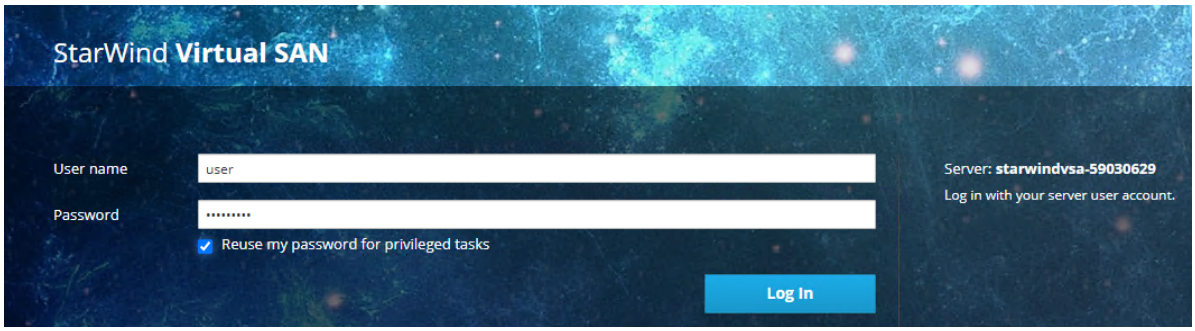


9. After the license key is applied, StarWind devices can be created.
NOTE: In order to manage StarWind Virtual SAN service (e.g. create ImageFile devices, VTL devices, etc.), StarWind Management Console can be used.

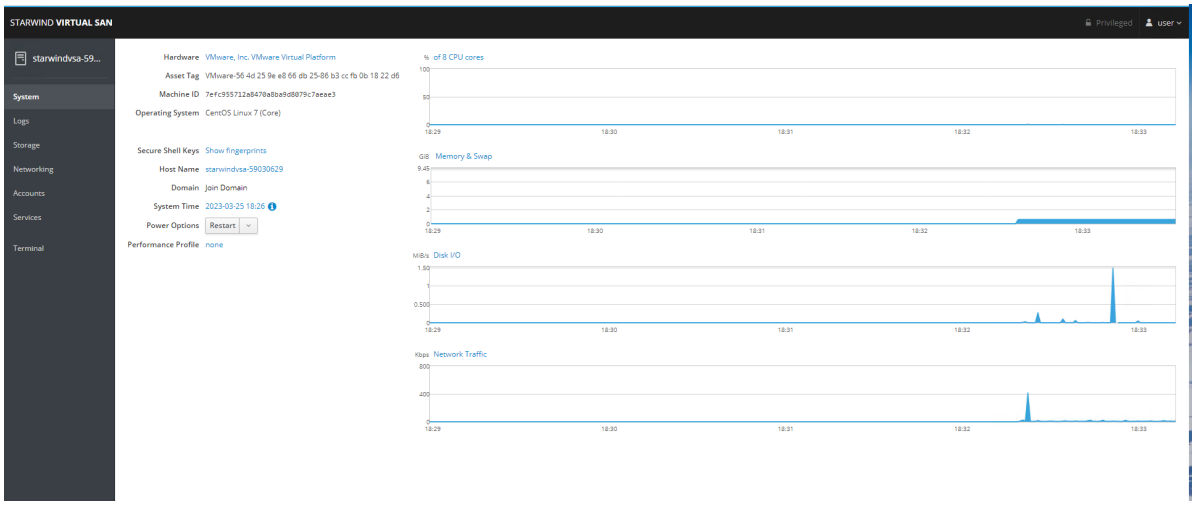
Configure Starwind Vm

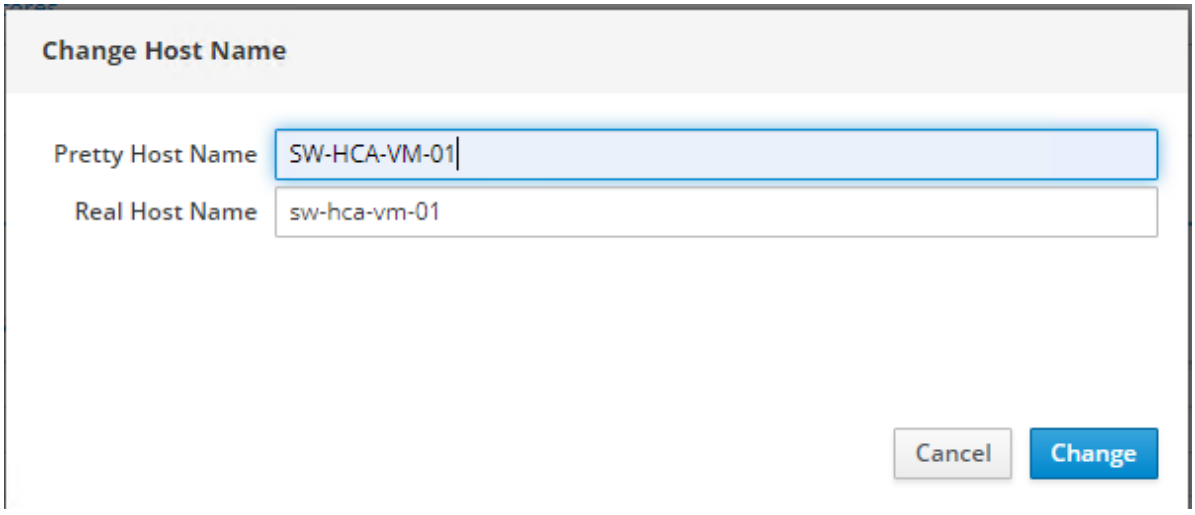
Names:

1. To log in to the StarWind VSAN VM web console you need to type the VM IP address and port 9090
Example: 192.168.1.1:9090
The default credentials:
Login: user
Password: rds123RDS



2. On the “System” page click on the “Host Name” and change it according to the default StarWind names or a specific name.

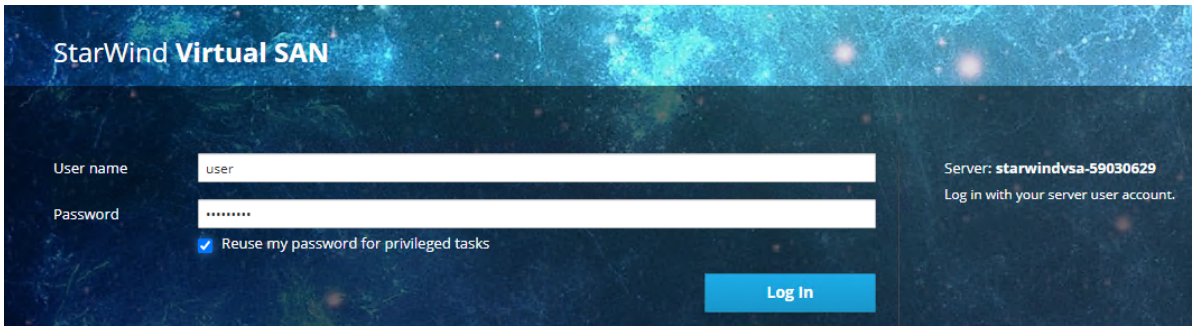




Networks:

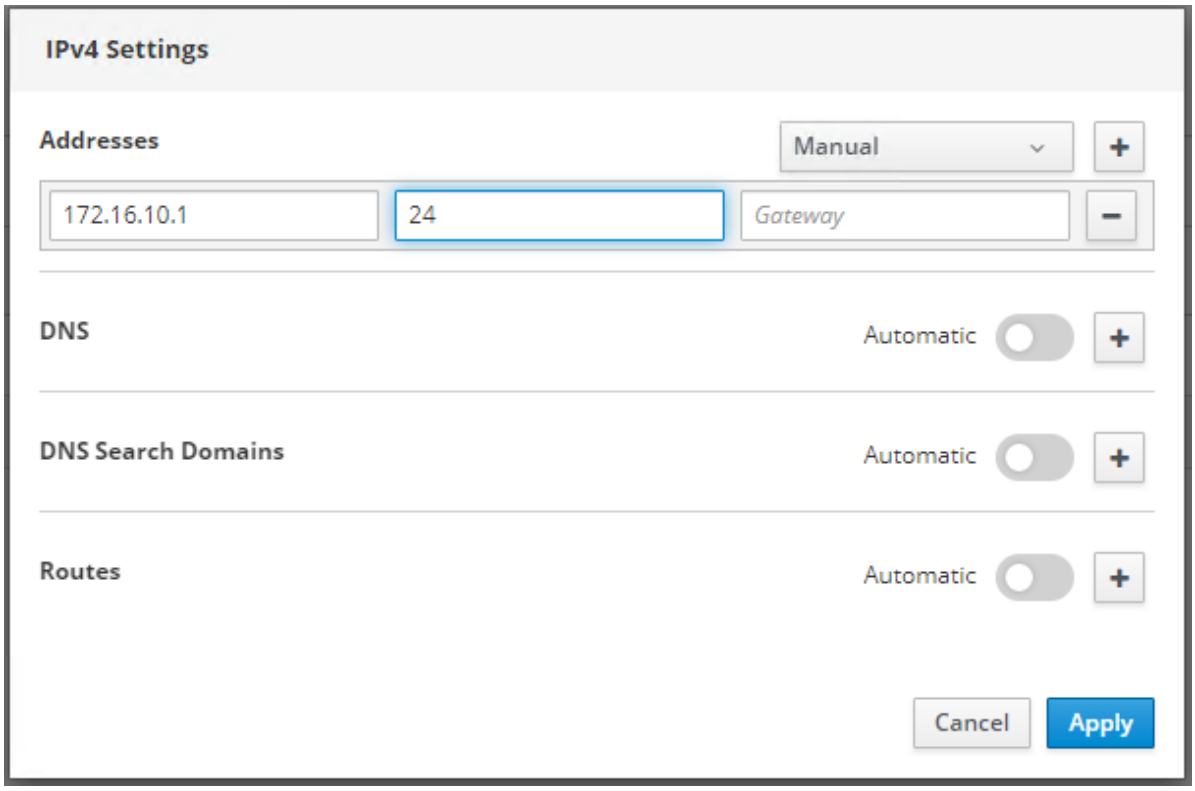
1. To log in to the StarWind VSAN VM web console you need to type the VM IP address and port 9090

Example: 192.168.1.1:9090
The default credentials:
Login: user
Password: rds123RDS

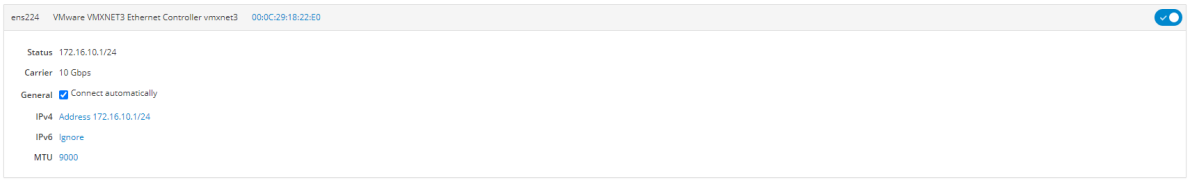


2. On the “Networking” page click on the “ens192” to set the management IP-address.
”ens224” – is for iSCSI and should have the following IP-address 172.16.10*/24
”ens256” – is for Synchronization and should have following IP-address 172.16.20*/24

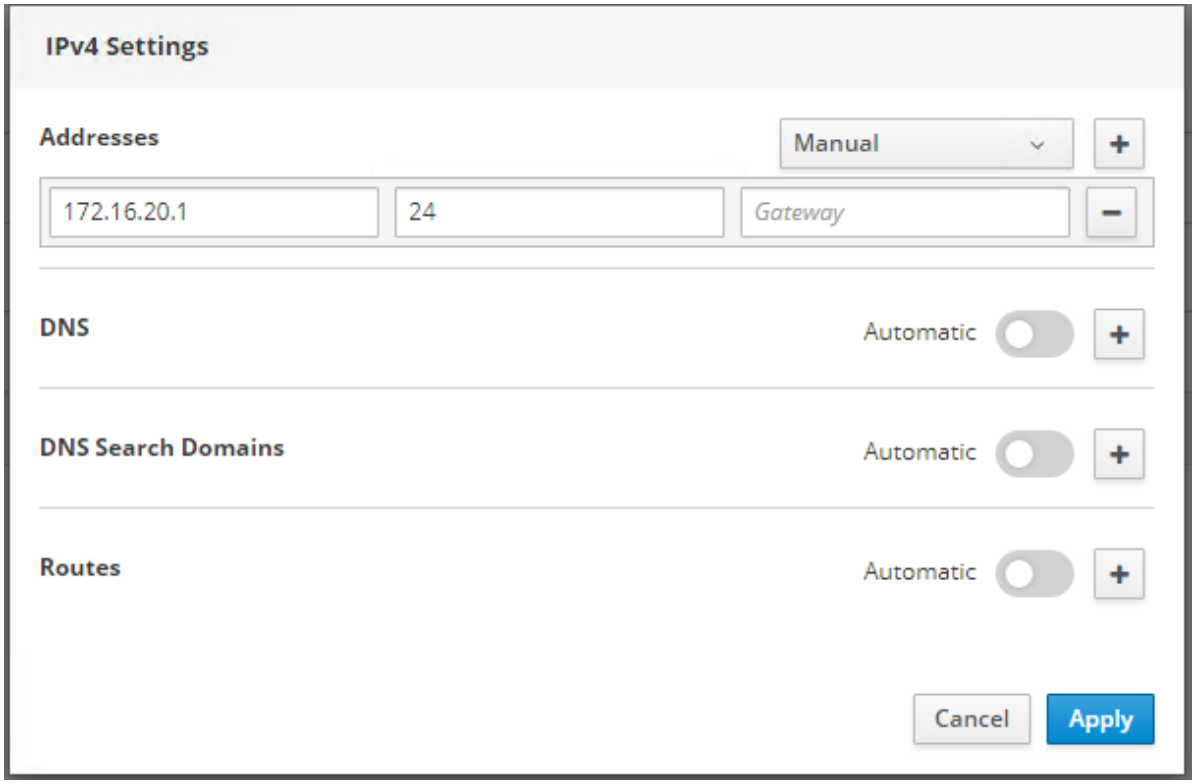
3. iSCSI and Synchronization networks should have the following settings:
Node 1:
iSCSI 172.16.10.1/24



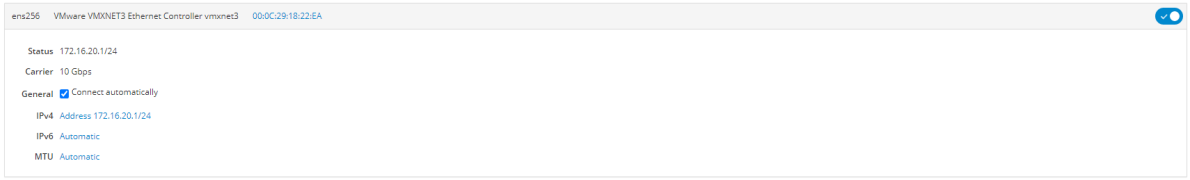
IPv6 should be disabled and MTU set to 9000.



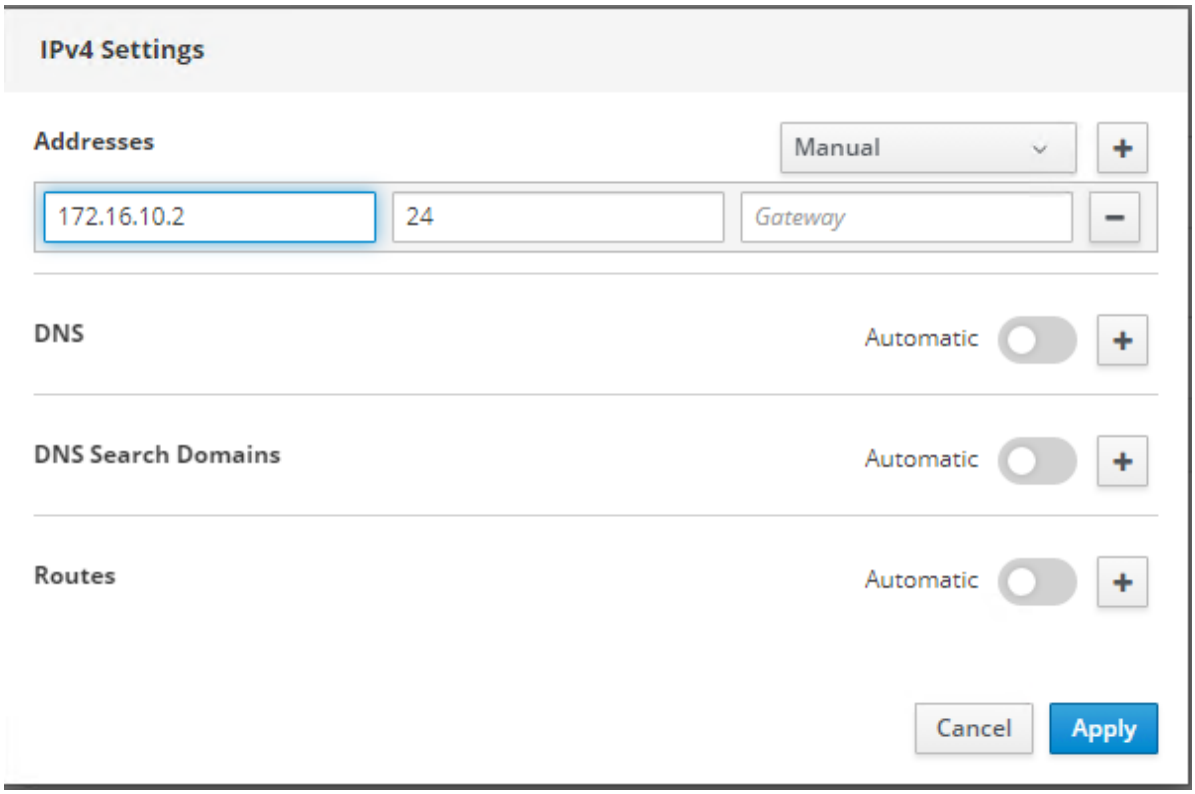
Synchronization 172.16.20.1/24



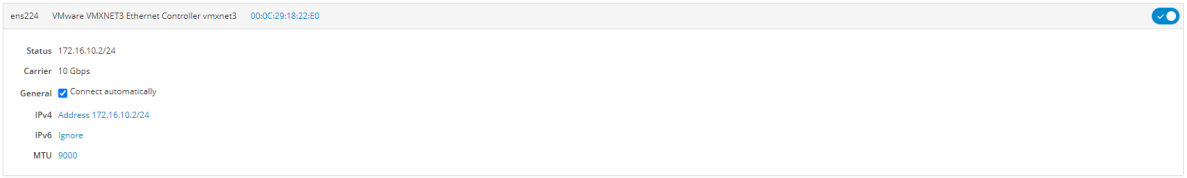
IPv6 should be disabled and MTU set to 9000.



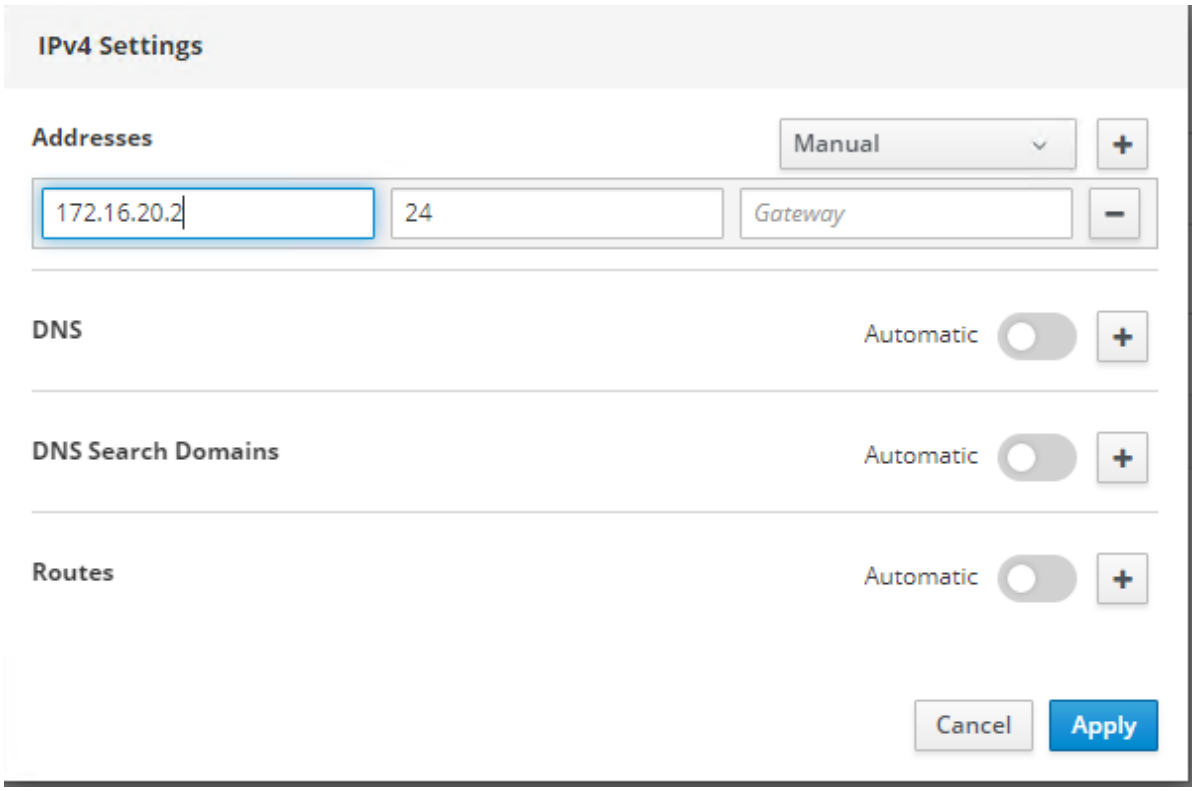
Node 2:
iSCSI 172.16.10.2/24



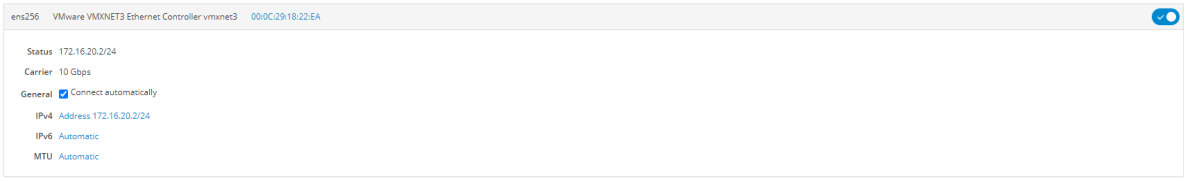
IPv6 should be disabled and MTU set to 9000.



Synchronization 172.16.20.2/24



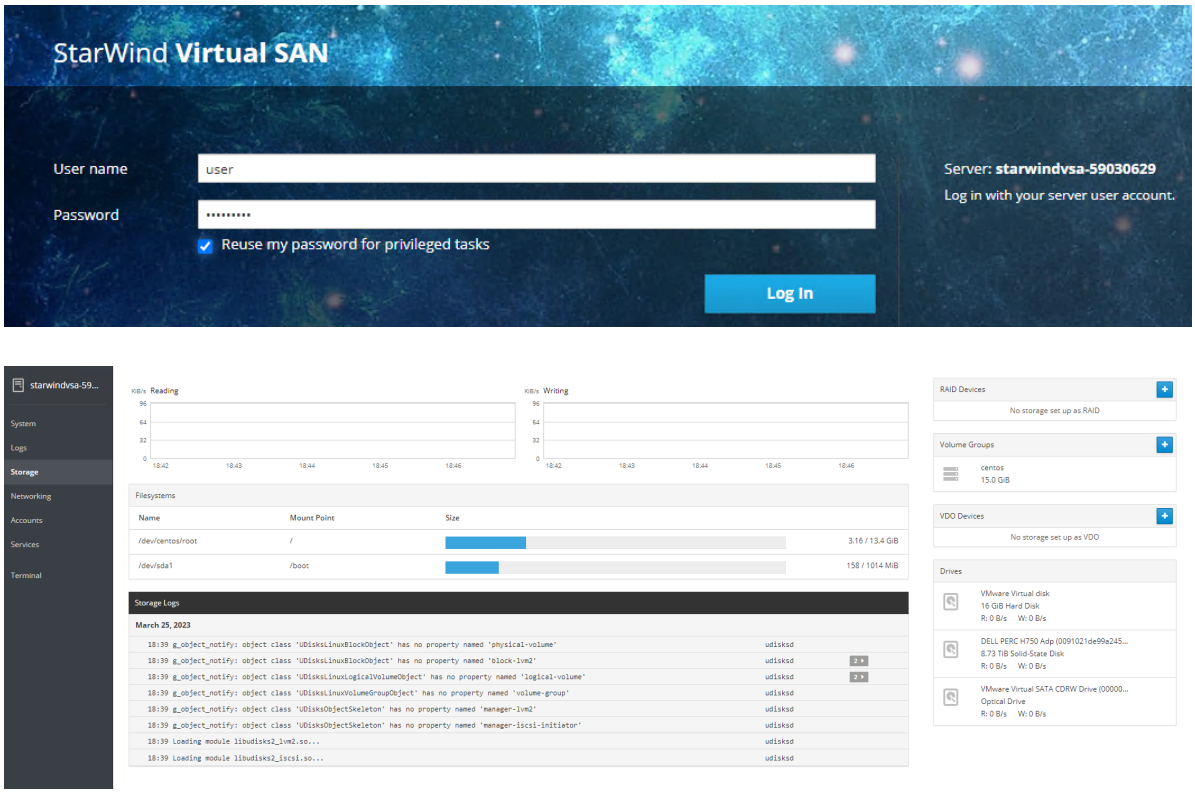
IPv6 should be disabled and MTU set to 9000.



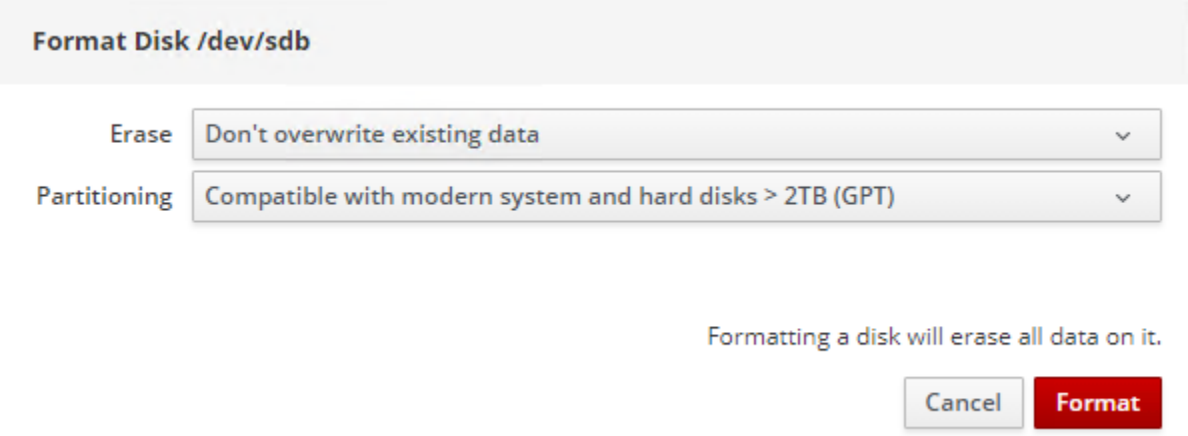
Storage:

Single disk based on hardware:

1. Login to StarWind VSAN VM web console and find in the Storage section under Drives the Disk that was recently added and choose it.
Note: To log in to the StarWind VSAN VM web console you need to type the VM IP address and port 9090
Example: 192.168.1.1:9090
The default credentials:
Login: user
Password: rds123RDS

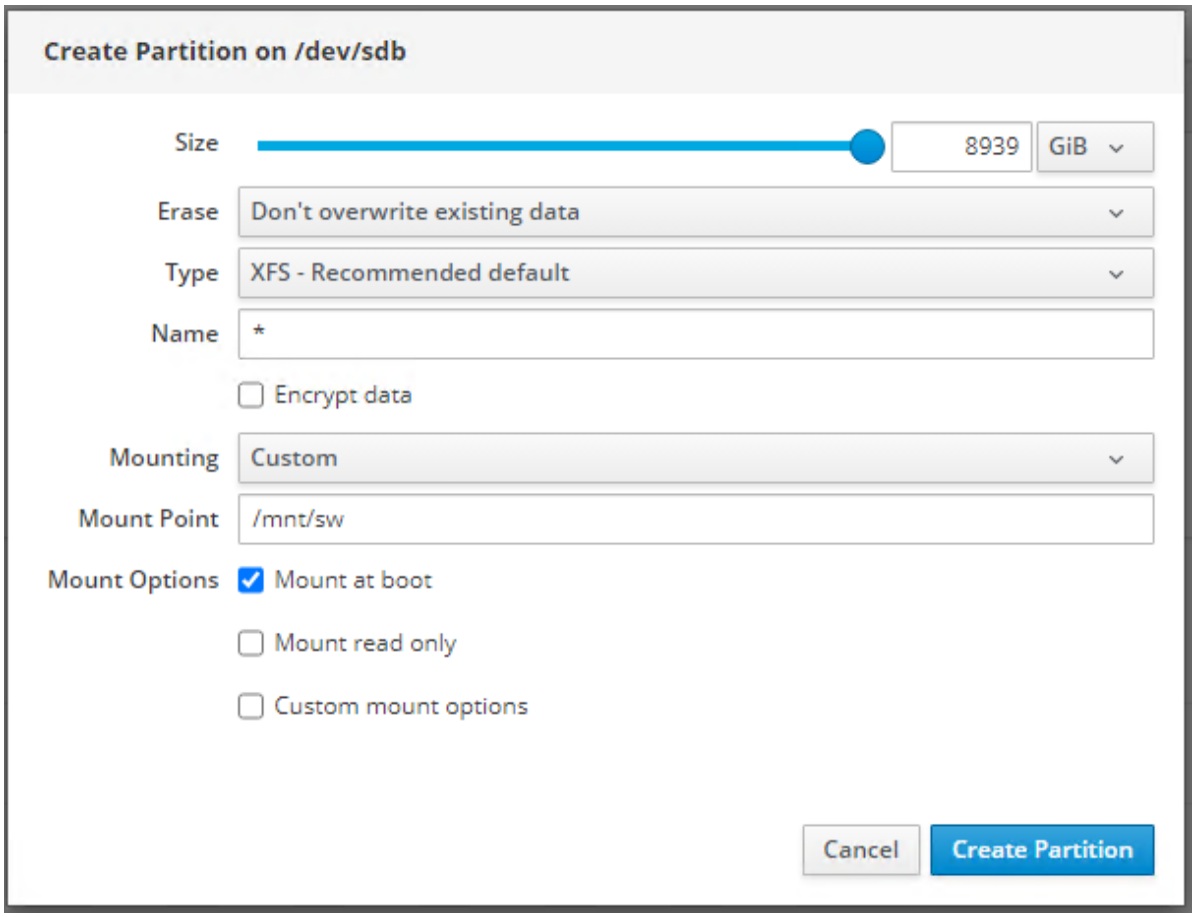


2. The added disk does not have any partitions and filesystem.
Press on Create Partition Table button to create the partition and format it.

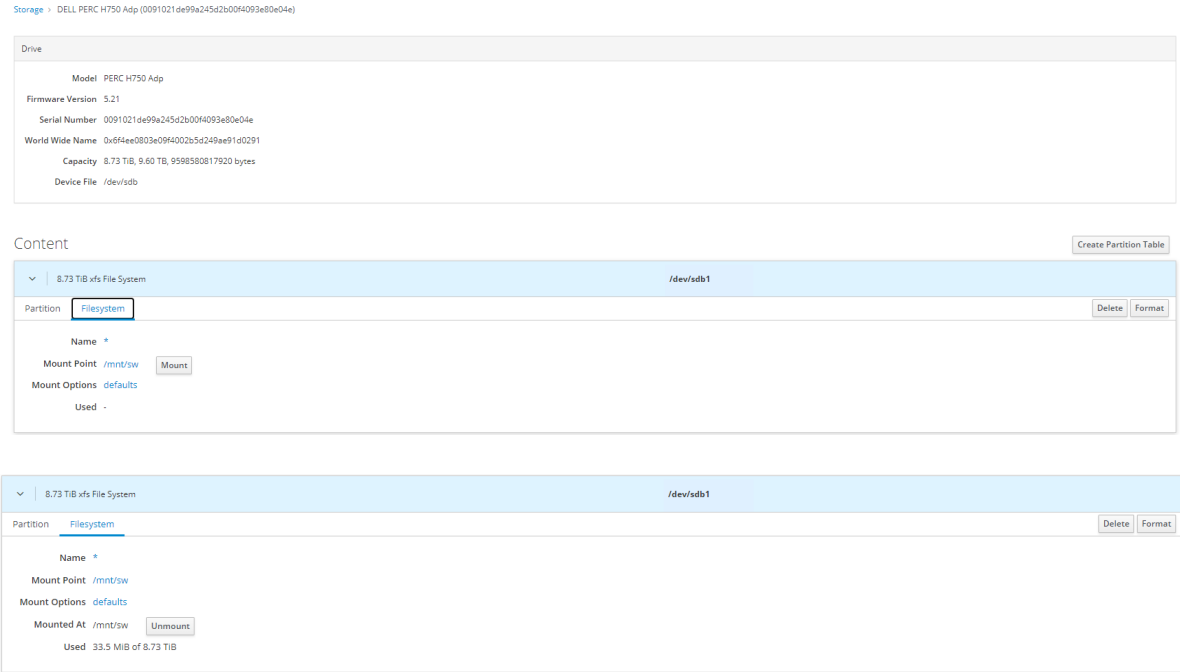


Press on Format button to create the partition and format it.

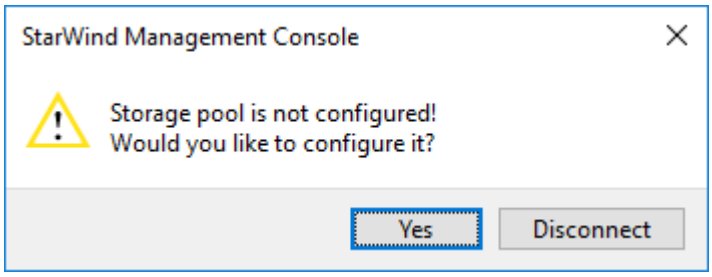
3. Press on Create Partition button to create the partition and format it.
Create the XFS partition. Specify the name and erase option. The mount point should be as following: /mnt/sw . Click Create Partition.



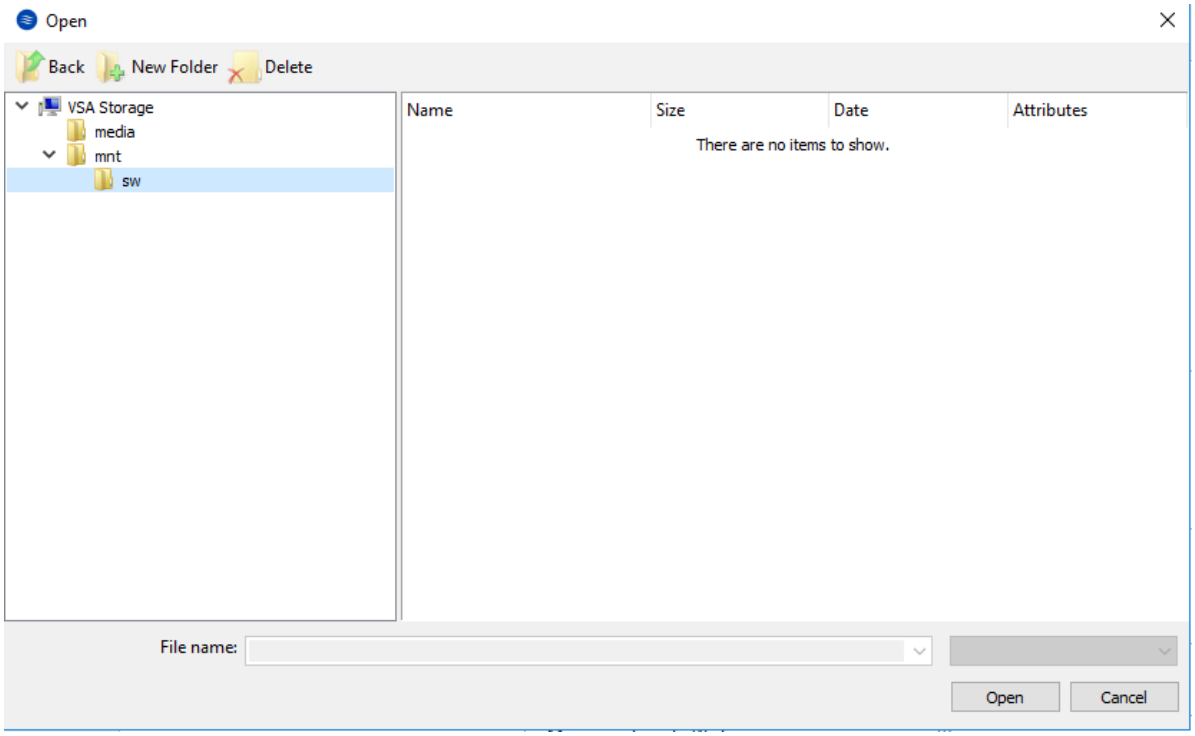
4. On the storage page of the disk, navigate to the Filesystem tab. Click Mount.



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

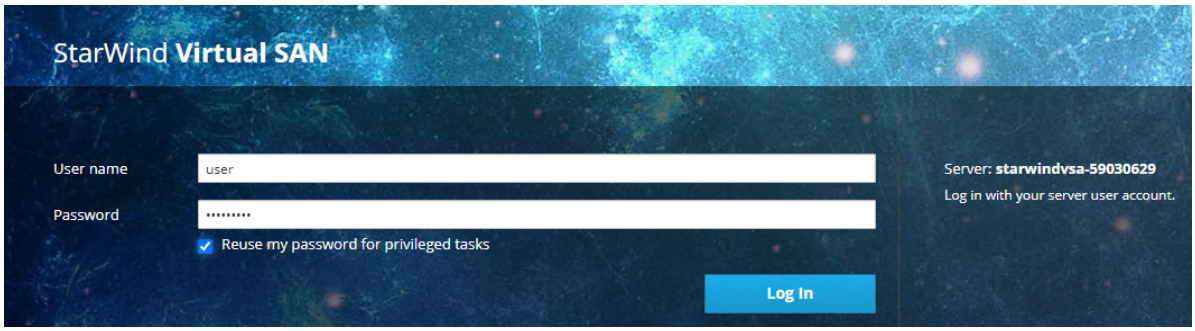


6. Select the disk which was recently mounted.

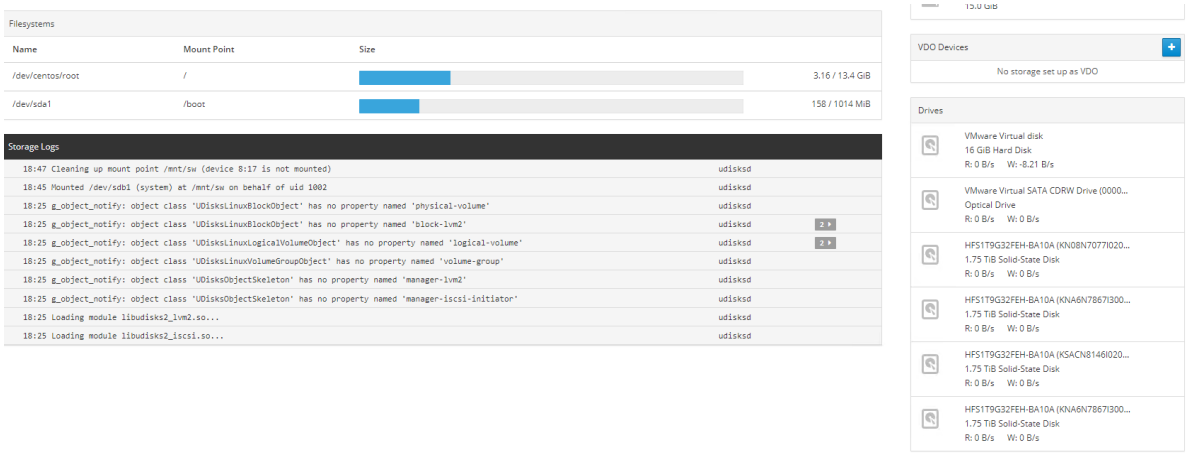


Several disks for Software RAID:

1. Login to StarWind VSAN VM web console and find in the Storage section under Drives the Virtual Disk that was recently added and choose it.
Note: To log in to the StarWind VSAN VM web console you need to type the VM IP address and port 9090
Example: 192.168.1.1:9090
The default credentials:
Login: user
Password: rds123RDS



2. Go to the Storage page. The Drives section shows the drives connected to HBA/RAID Controller (if available).

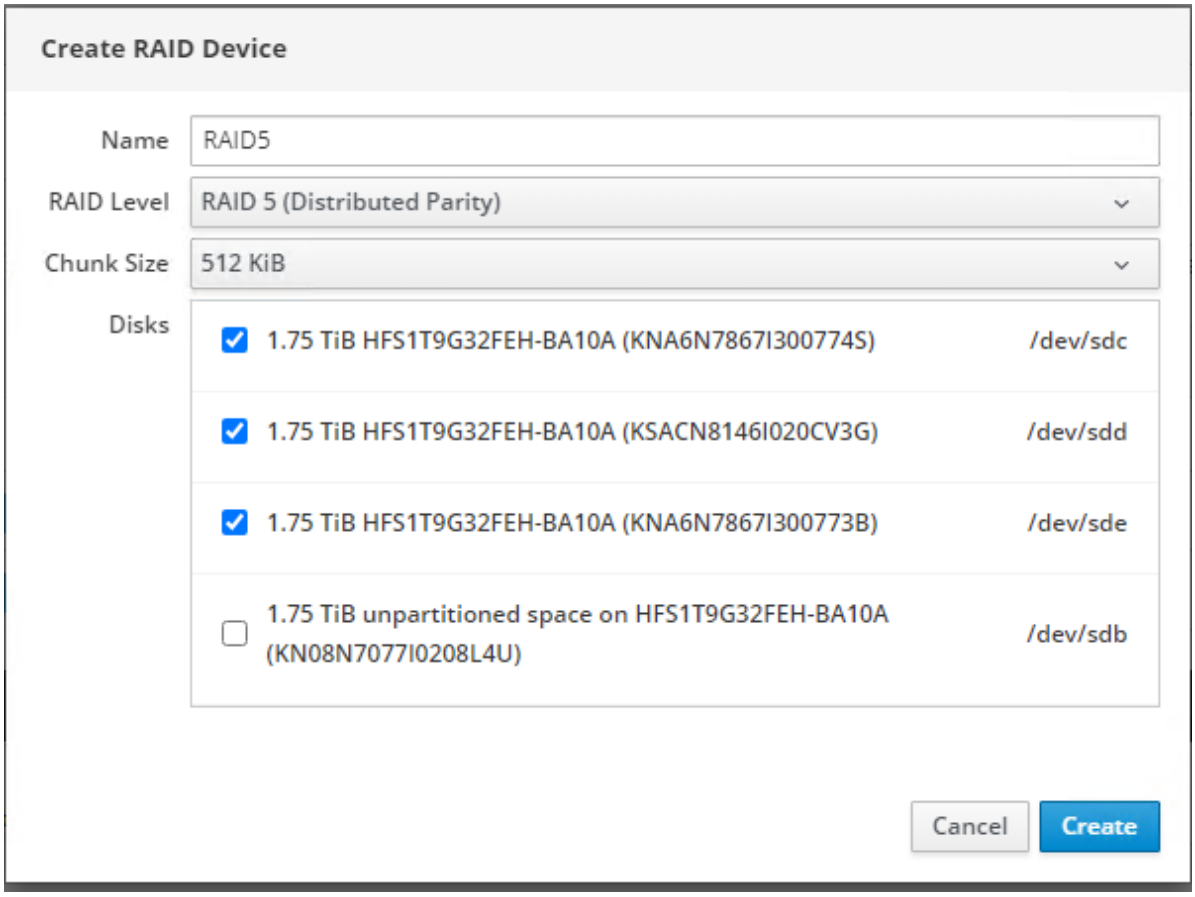


3. Click “+” in the RAID Devices section to create Software RAID. (In the current example, RAID 10 will be created with 4 HDD drives). StarWind recommendations of RAID configurations depending on the number of disks, chunk size, and array level are shown in the table below:

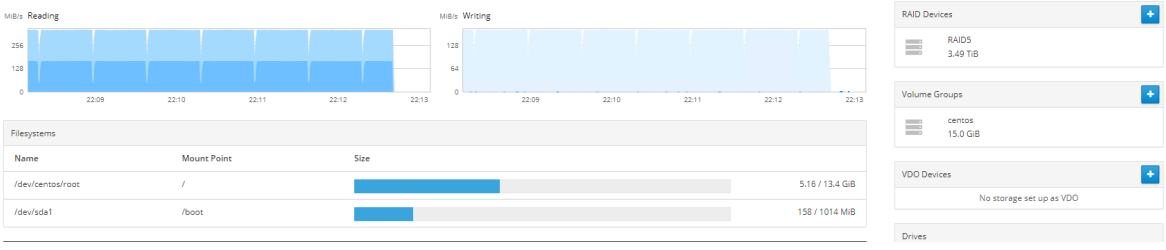
RAID Level	Chunk size for HDD Arrays	Chunk size for SSD Arrays
0	Disk quantity * 4Kb	Disk quantity * 8Kb
5	(Disk quantity – 1) * 4Kb	(Disk quantity – 1) * 8Kb
6	(Disk quantity – 2) * 4Kb	(Disk quantity – 2) * 8Kb
10	(Disk quantity * 4Kb)/2	(Disk quantity * 8Kb)/2

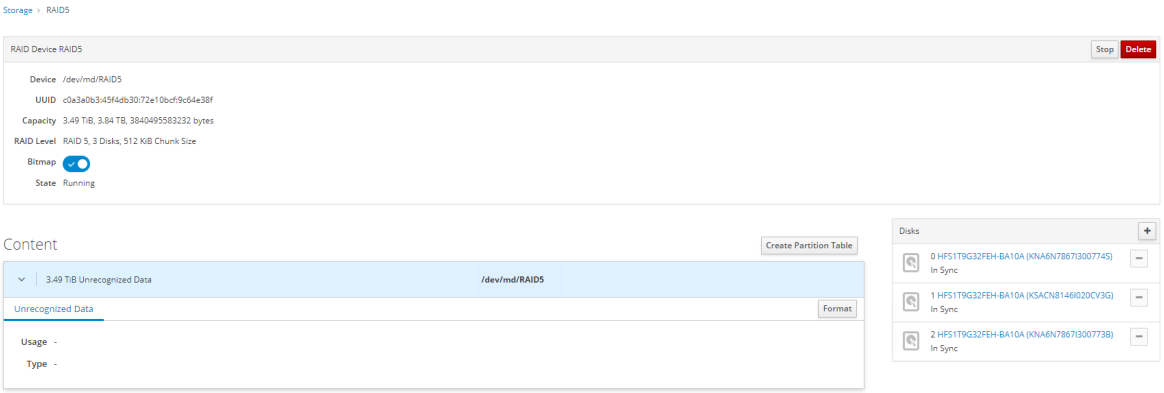
StarWind Software RAID recommended settings can be found here:
Recommended RAID settings for HDD and SSD disks – StarWind Knowledge Base

4. Select the drives to add to the array.



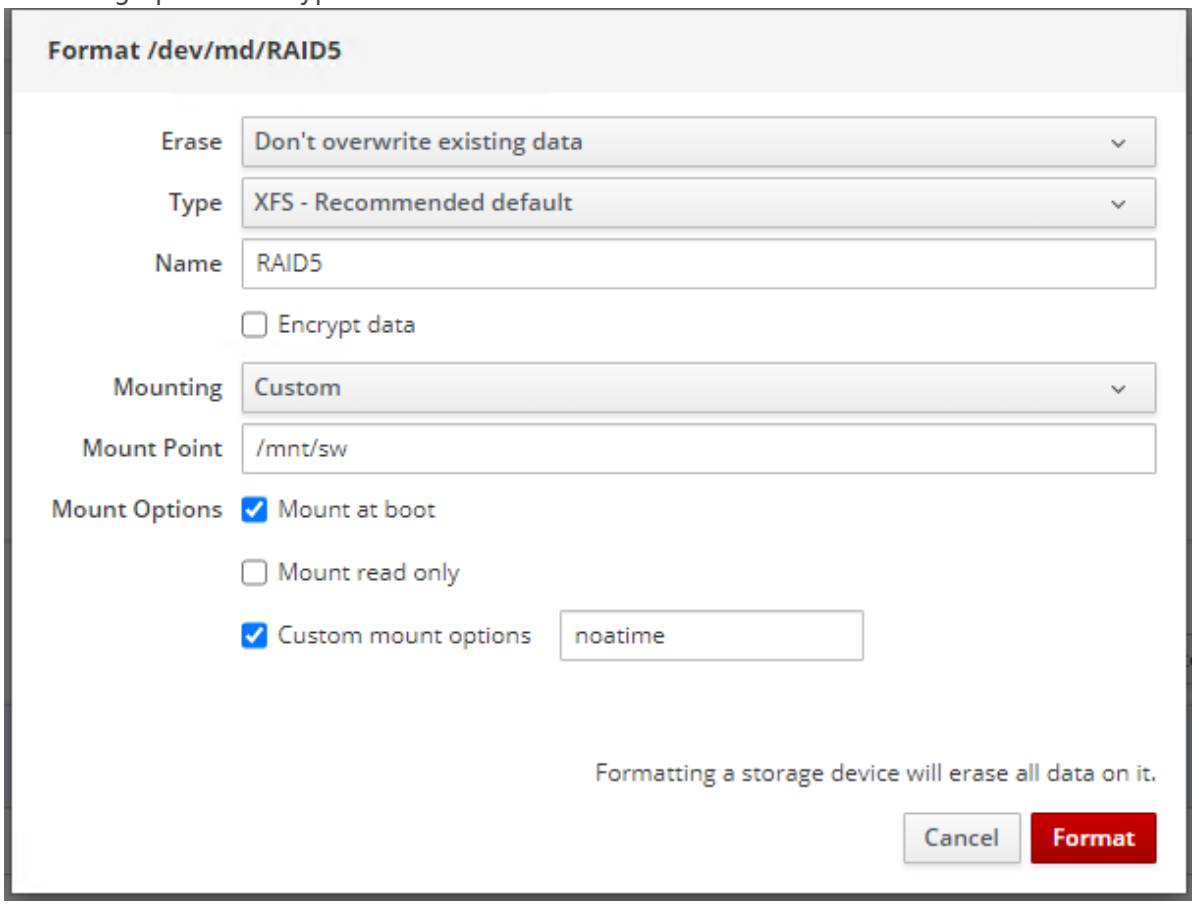
5. After the synchronization is finished, find the RAID array created.



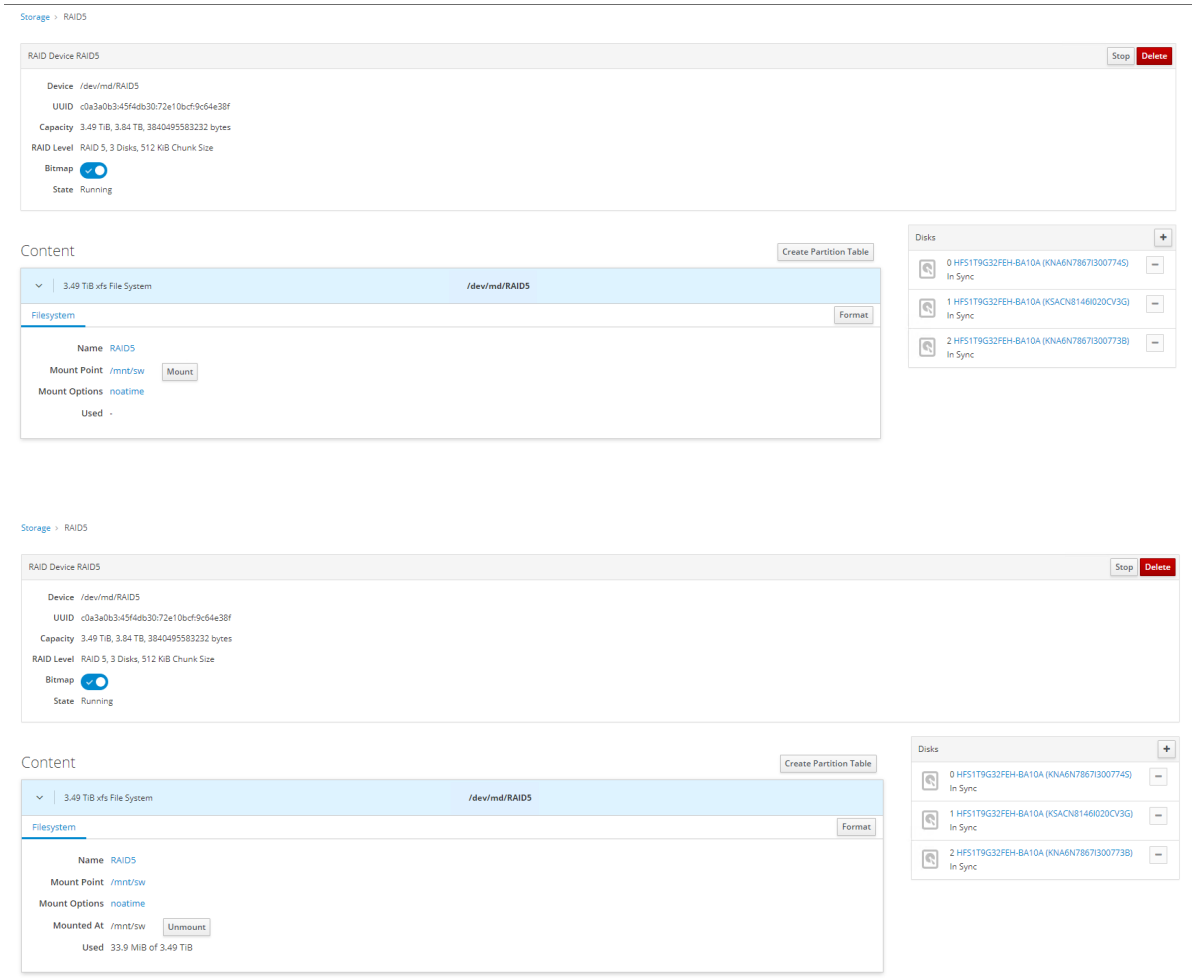


NOTE: The disk created will not have any partitions and file system. Click Format.

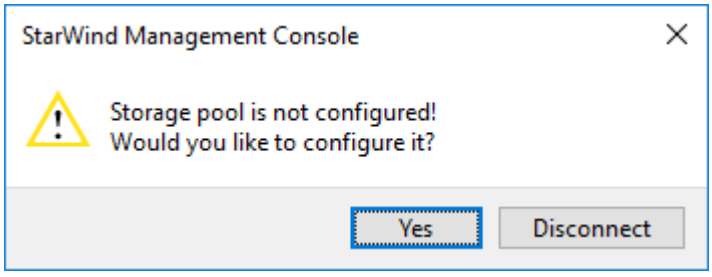
6. Create the XFS partition. Mount point should be as follows: /mnt/sw. Select the Custom mounting option and type noatime. Click Format.



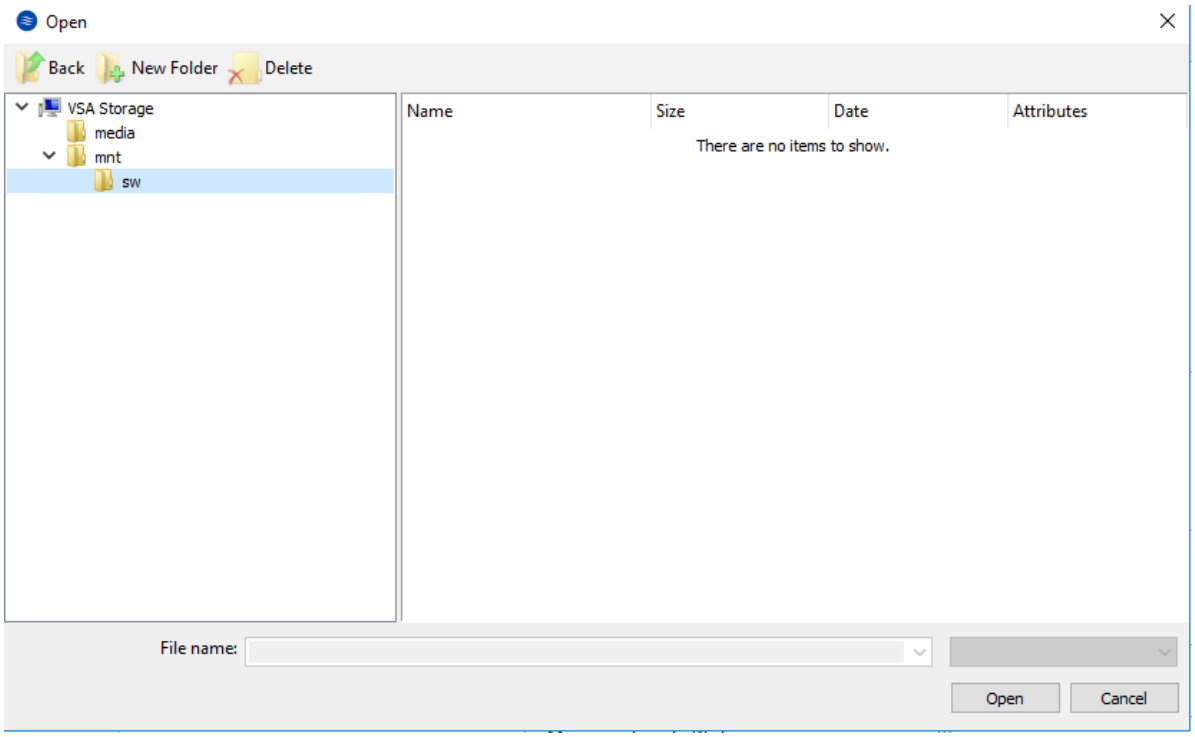
7. On the storage page of the disk, navigate to the Filesystem tab. Click Mount.



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



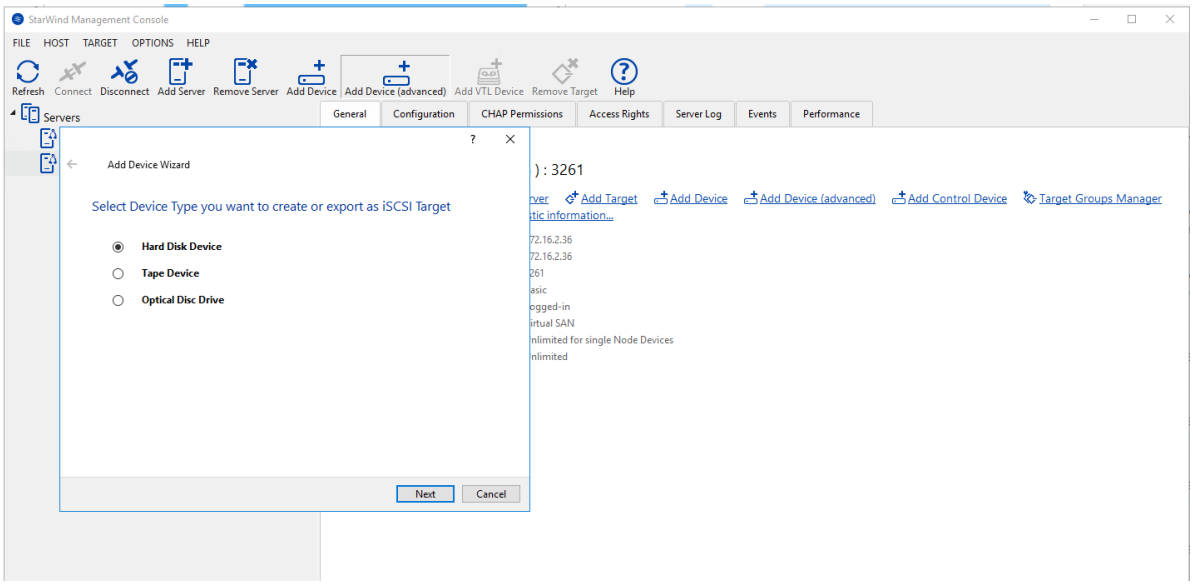
9. Select the disk recently mounted.



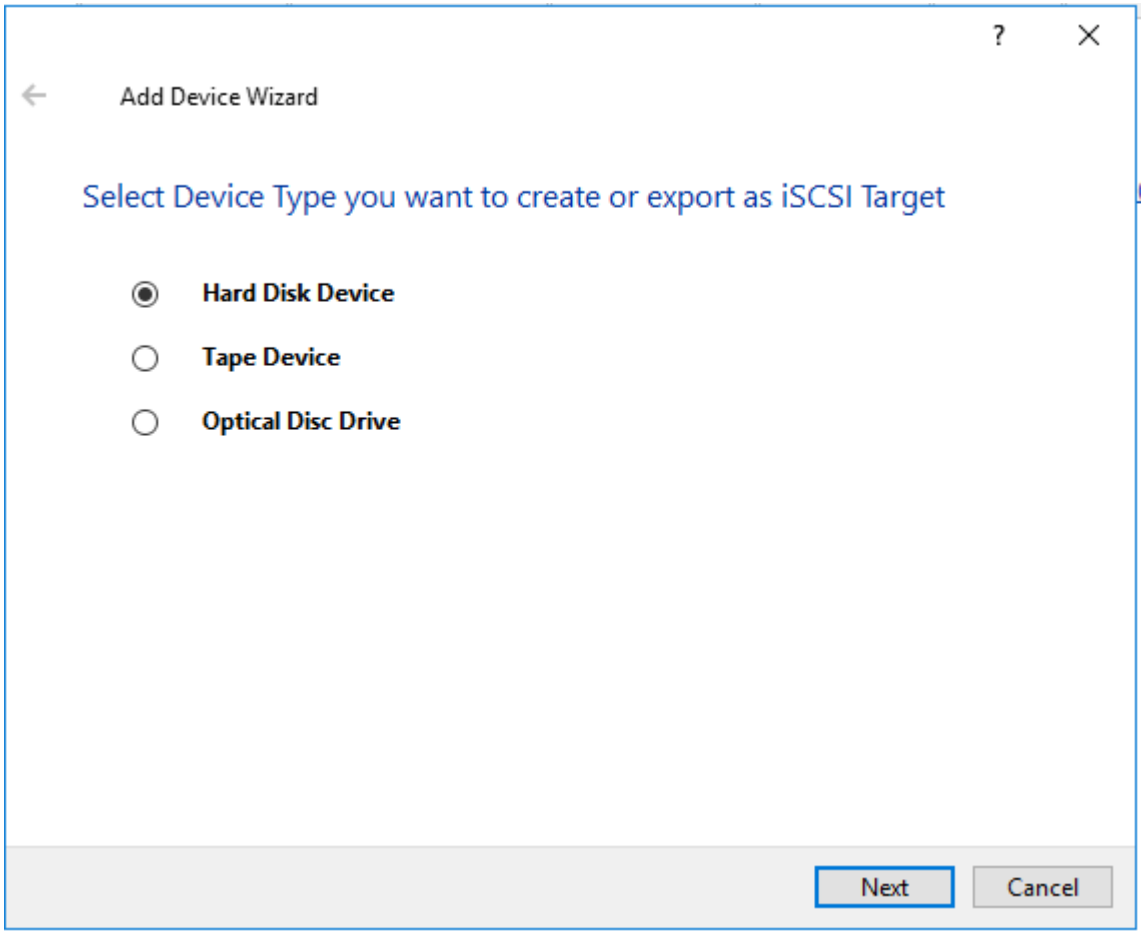
Starwind Devices Creation

For VMware the default number of StarWind devices is two DS1 and DS2.

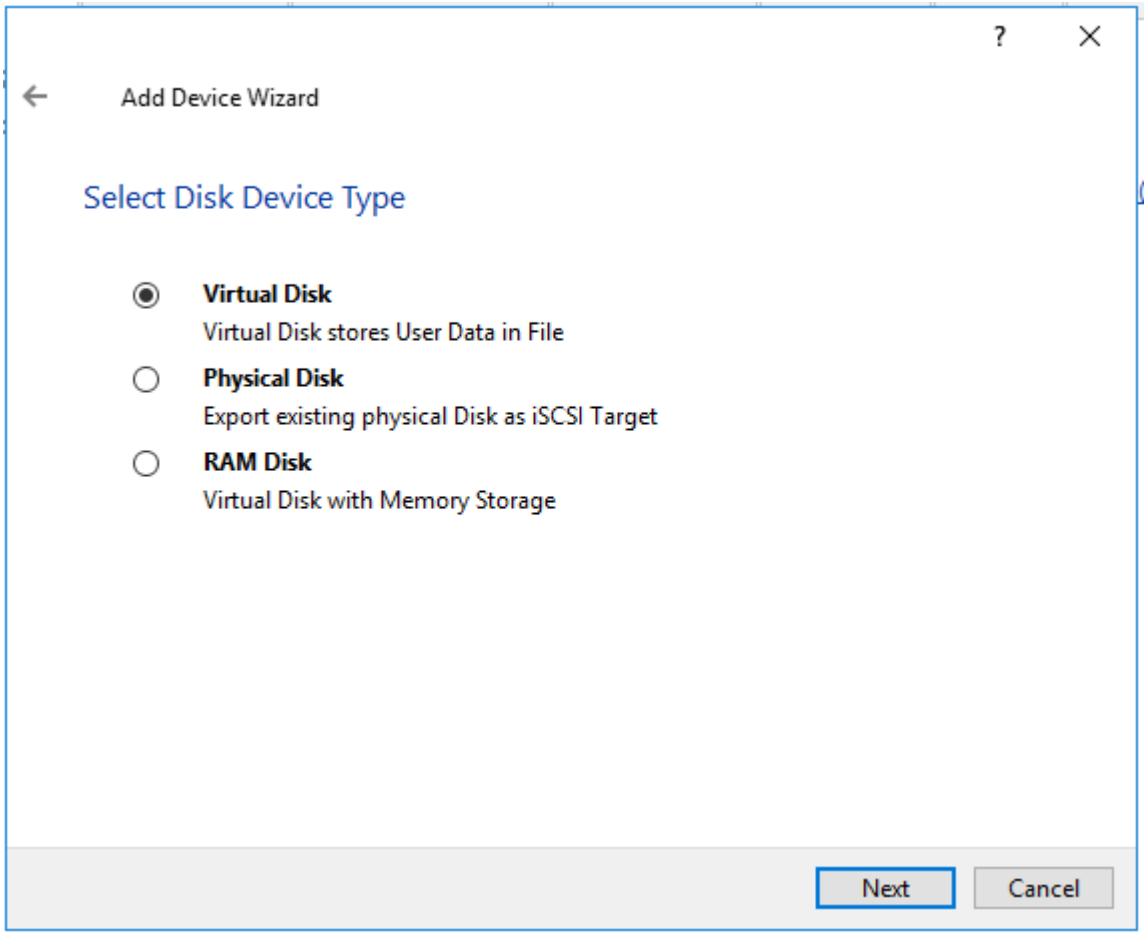
1. In the StarWind Management Console click on to Add Device (advanced) button and open Add Device (advanced) Wizard.



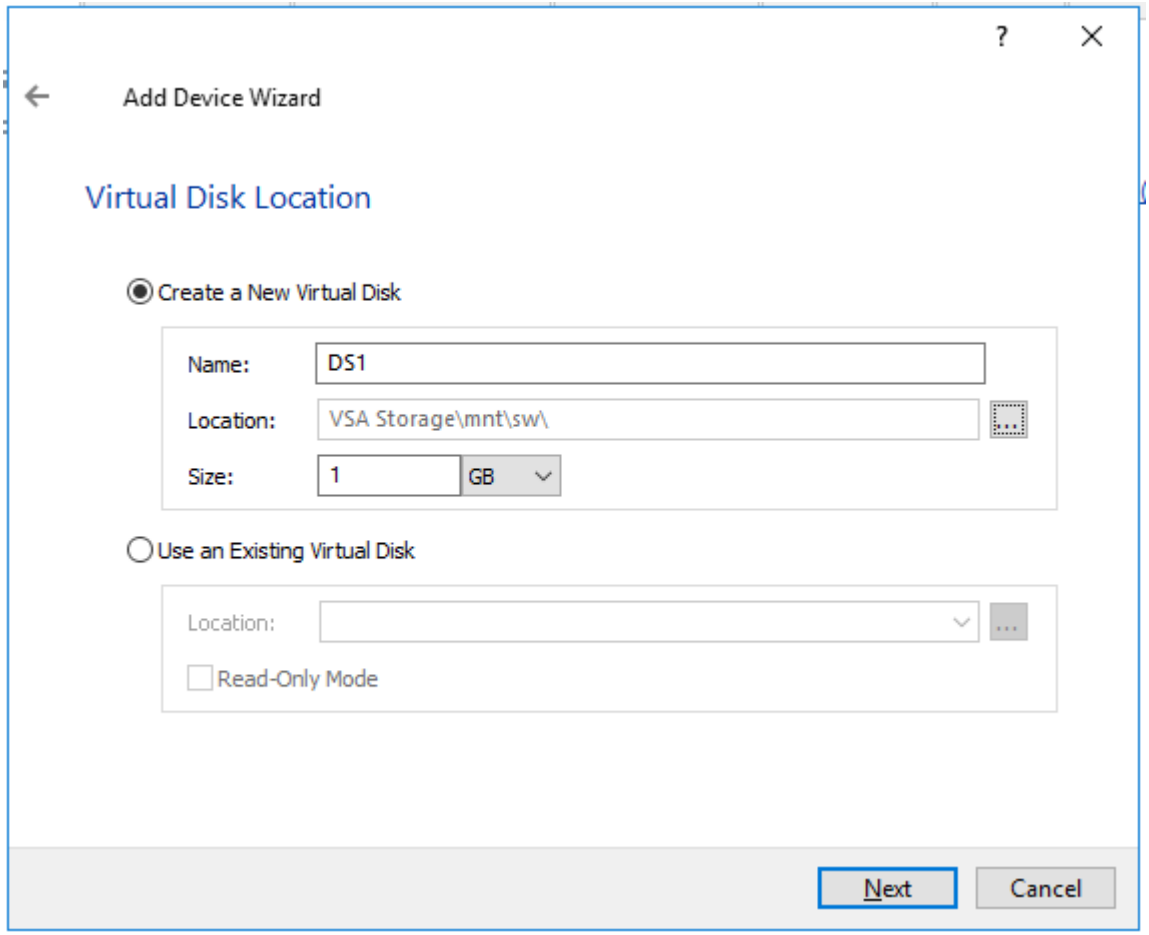
2. Select Hard Disk Device as the type of device to be created.



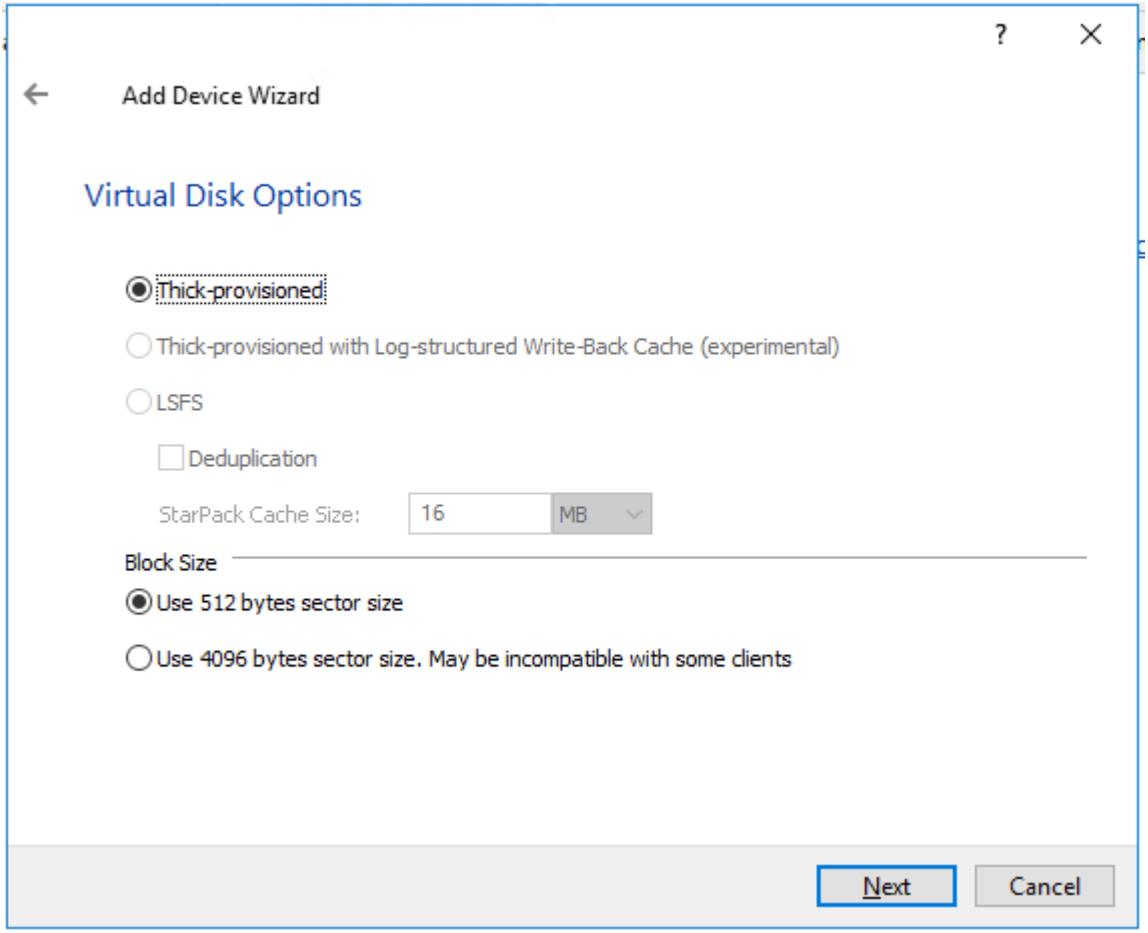
3. Select Virtual Disk.



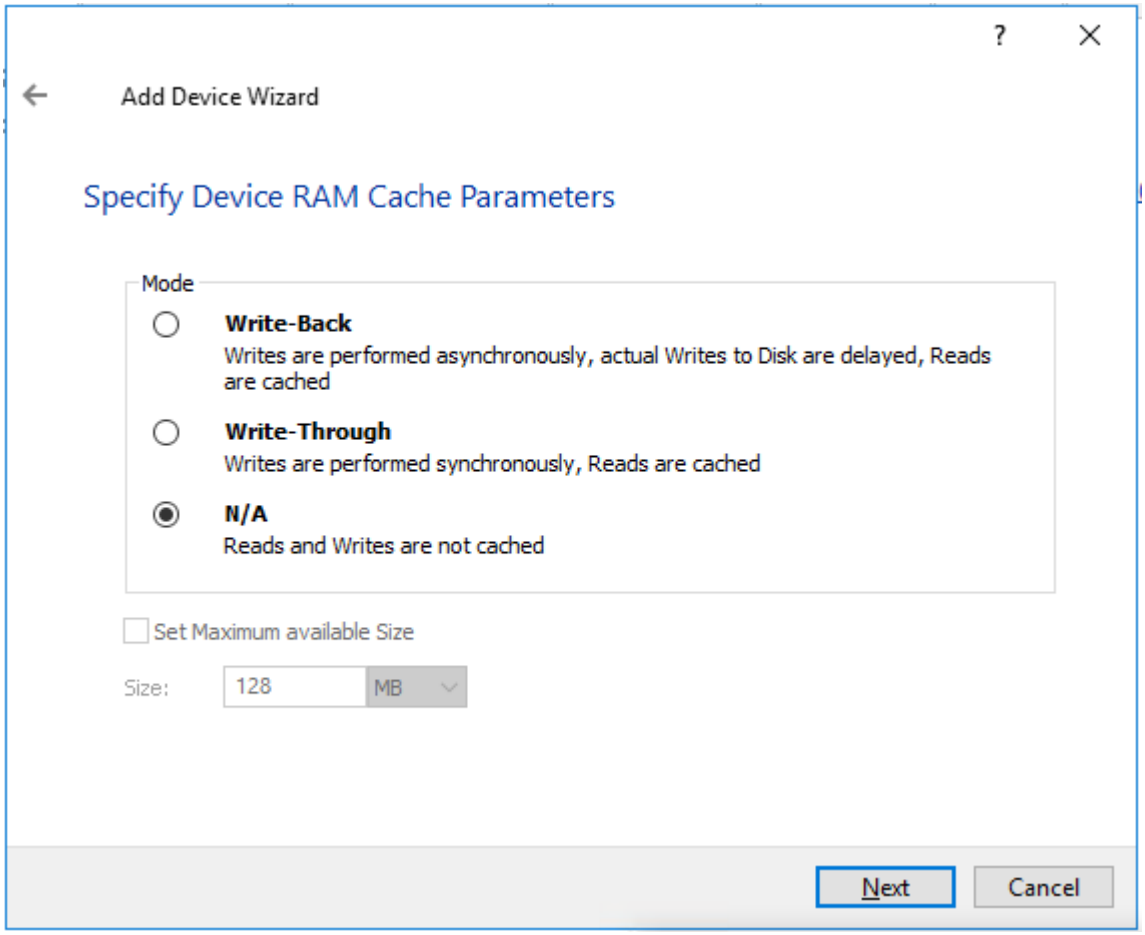
4. Specify a virtual disk Name, Location, and Size.
The size should be 1GB to do a quick synchronization.

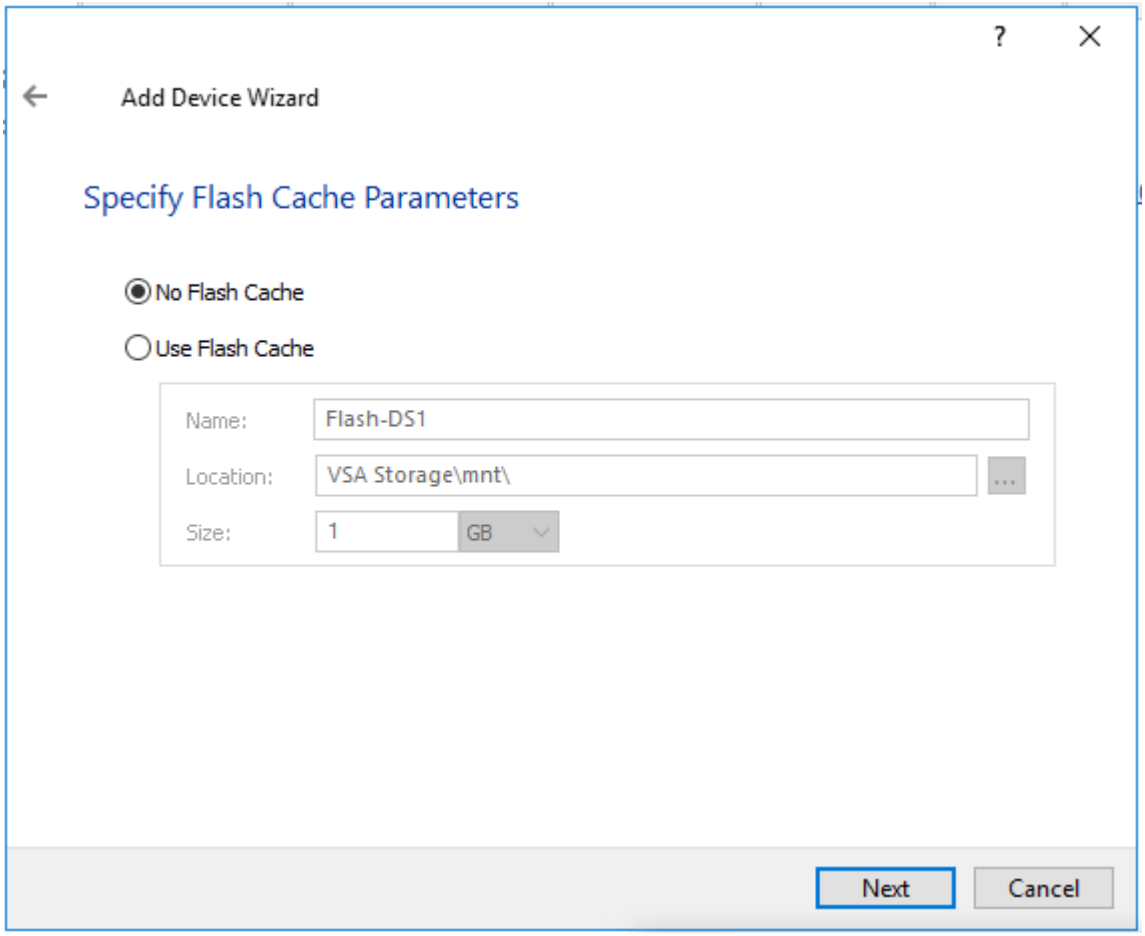


5. Select the Thick provisioned disk type and block size.
NOTE: Use 4096 sector size for targets, connected on Windows-based systems and 512 bytes sector size for targets, connected on Linux-based systems (ESXi/Xen/KVM).

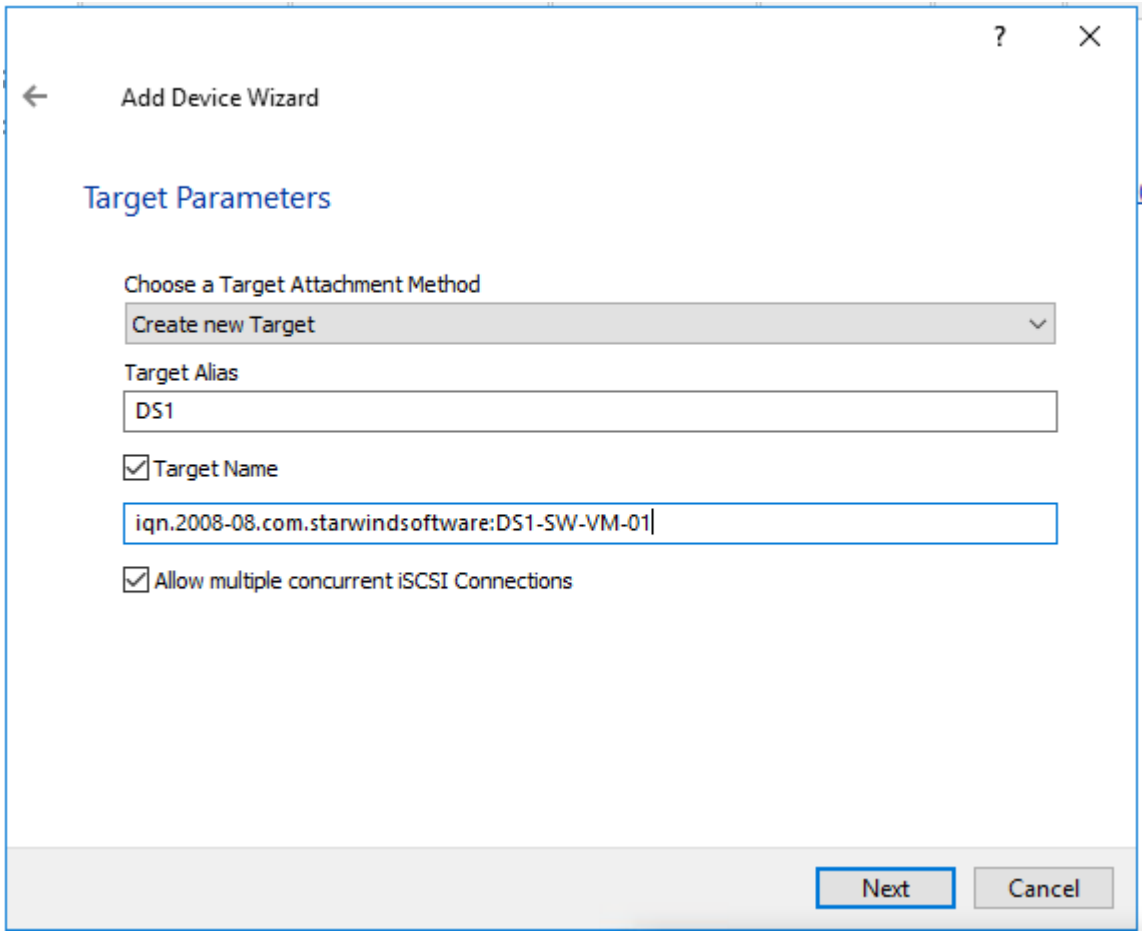


6. Define a caching policy and specify a cache size (in MB). Also, the maximum available cache size can be specified by selecting the appropriate checkbox. Optionally, define the L2 caching policy and cache size.

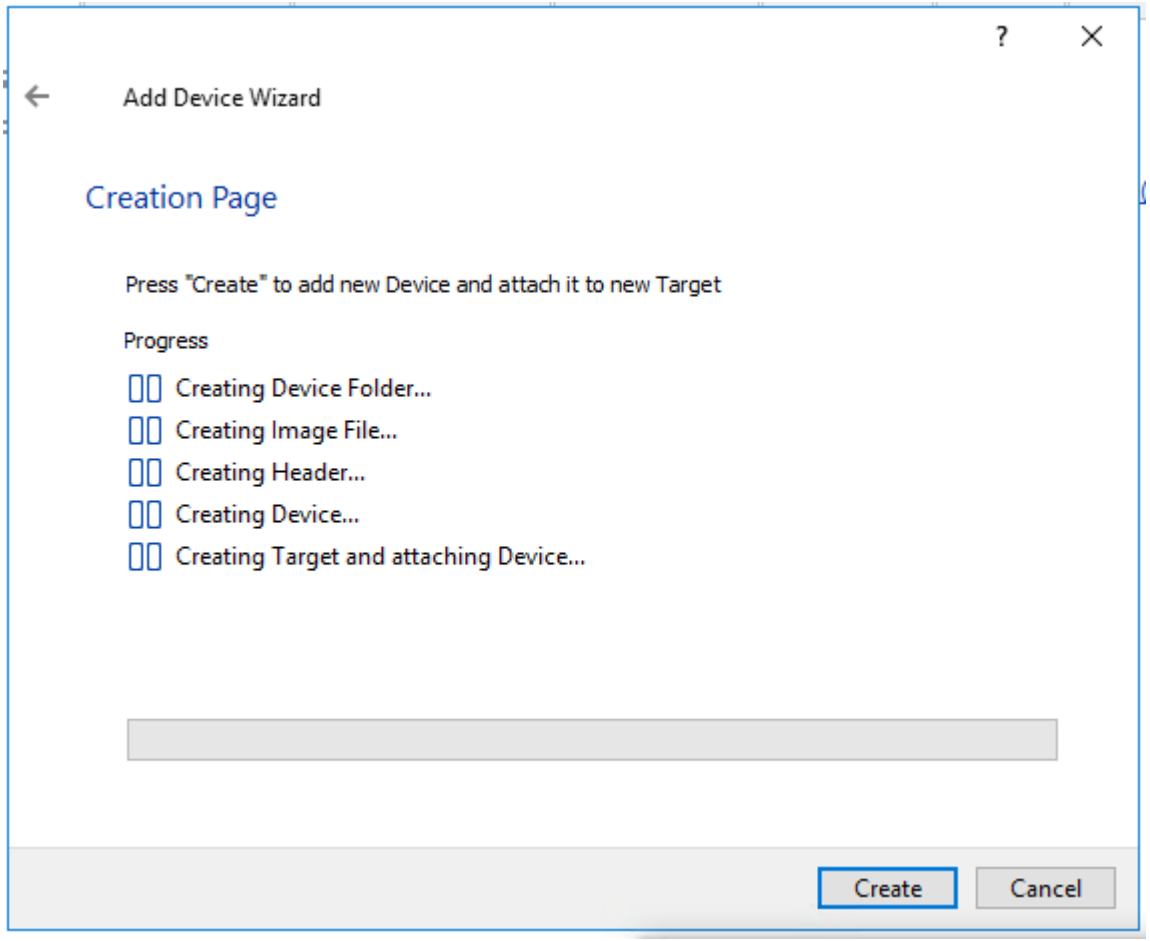

Add Device Wizard
Specify Device RAM Cache Parameters
Mode
Write-Back
Writes are performed asynchronously, actual Writes to Disk are delayed, Reads are cached
Write-Through
Writes are performed synchronously, Reads are cached
N/A
Reads and Writes are not cached
Set Maximum available Size
Size:
128
MB
Next
Cancel



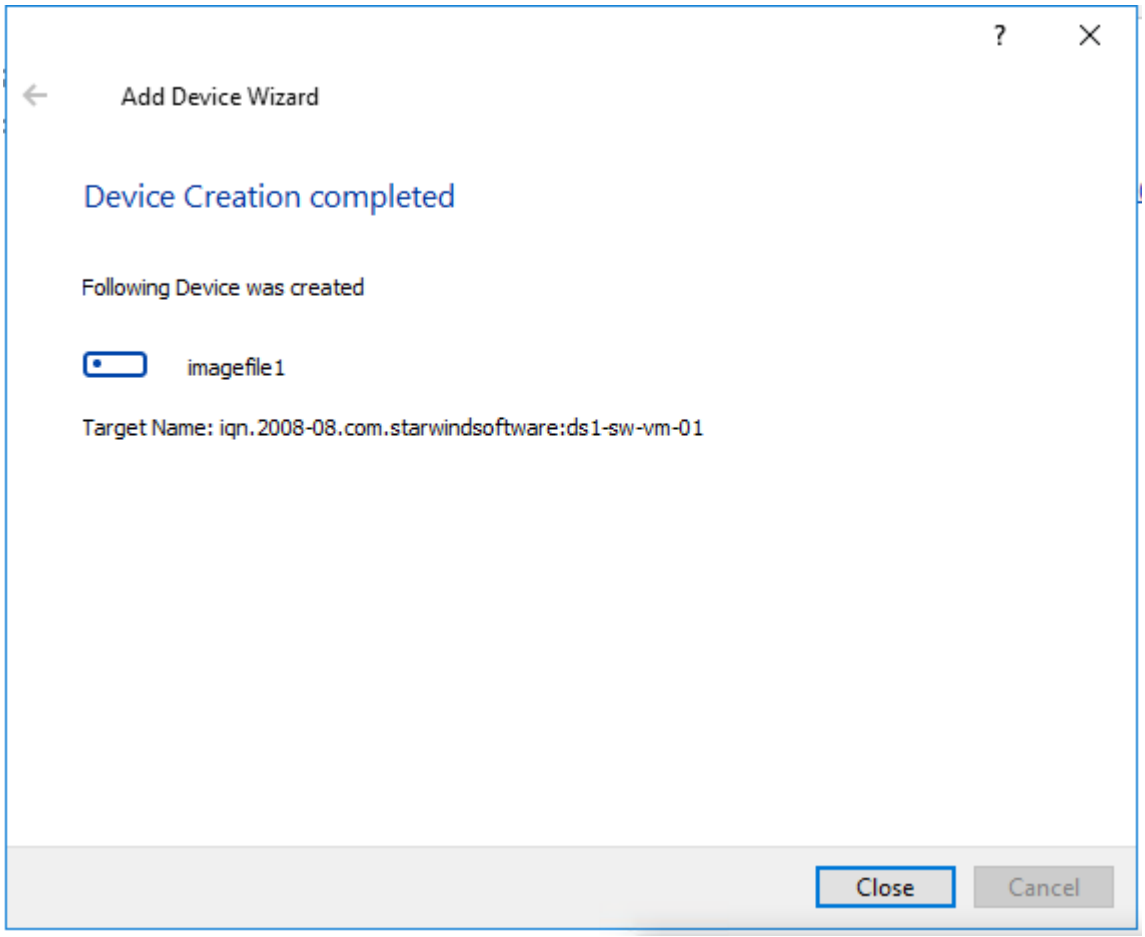
7. Specify Target Parameters. Select the Target Name checkbox to enter a custom target name. Otherwise, the name is generated automatically in accordance with the specified target alias.



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

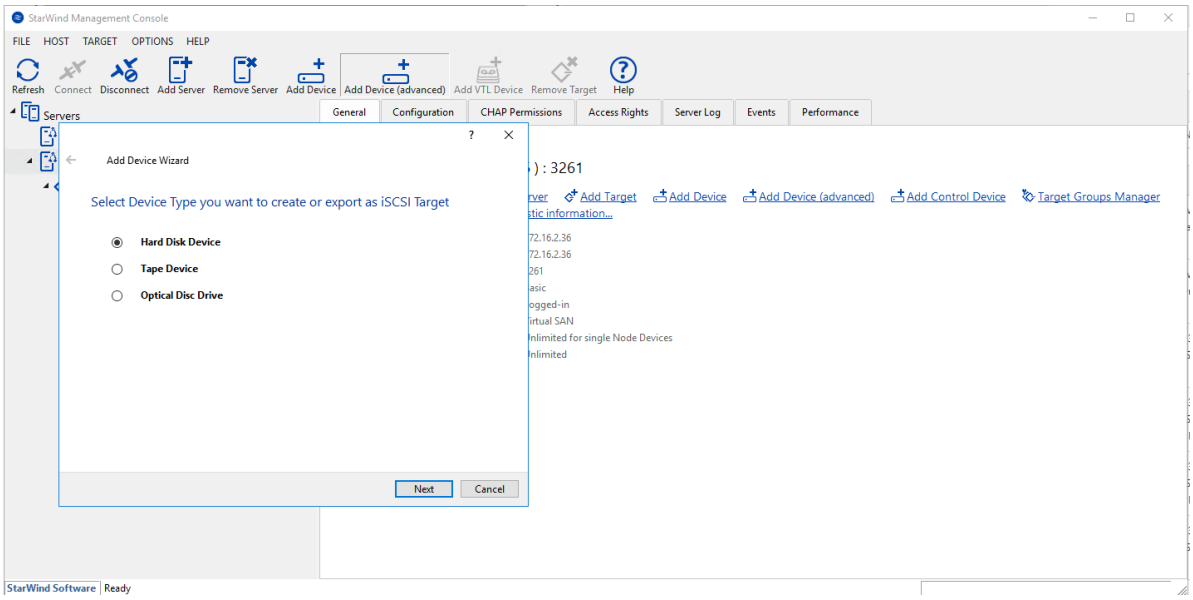


9. Click Close to finish the device creation.

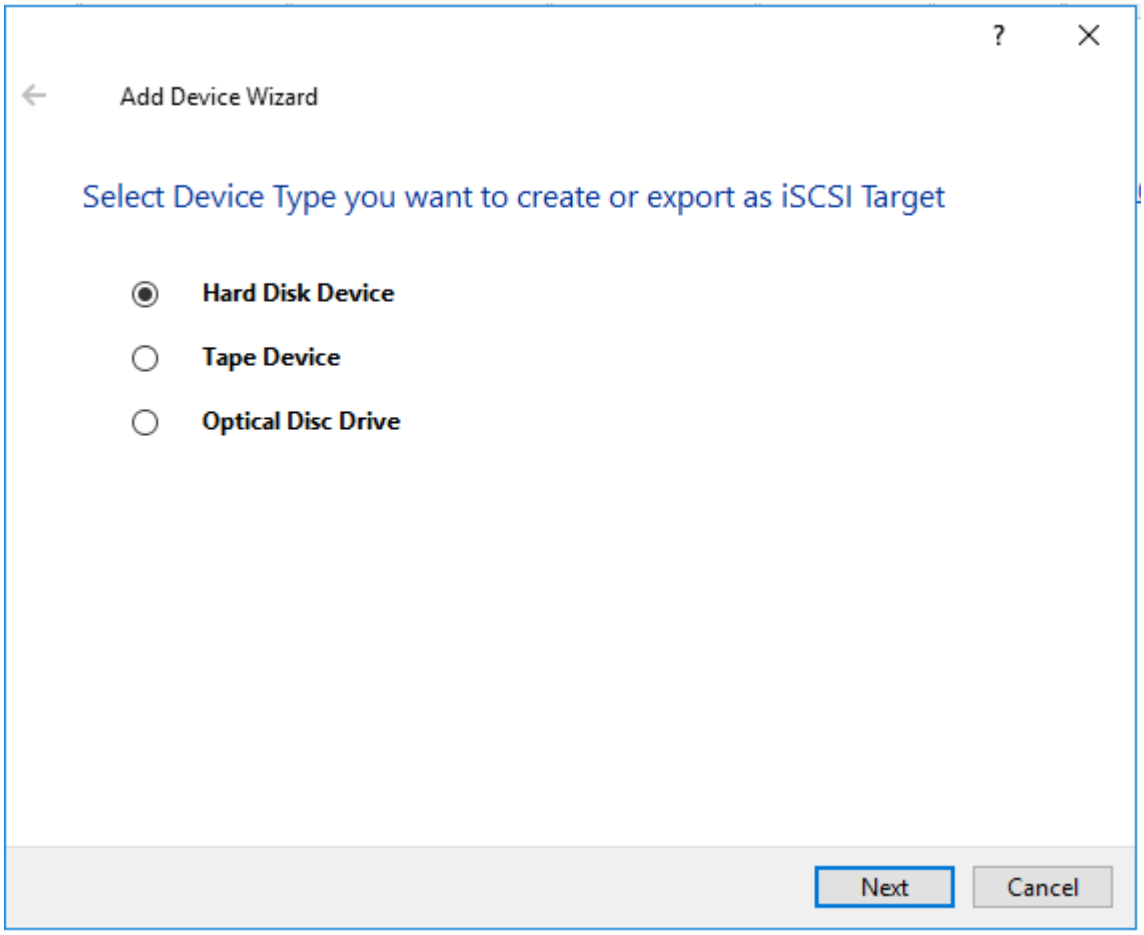


10. The successfully added devices appear in the StarWind Management Console.

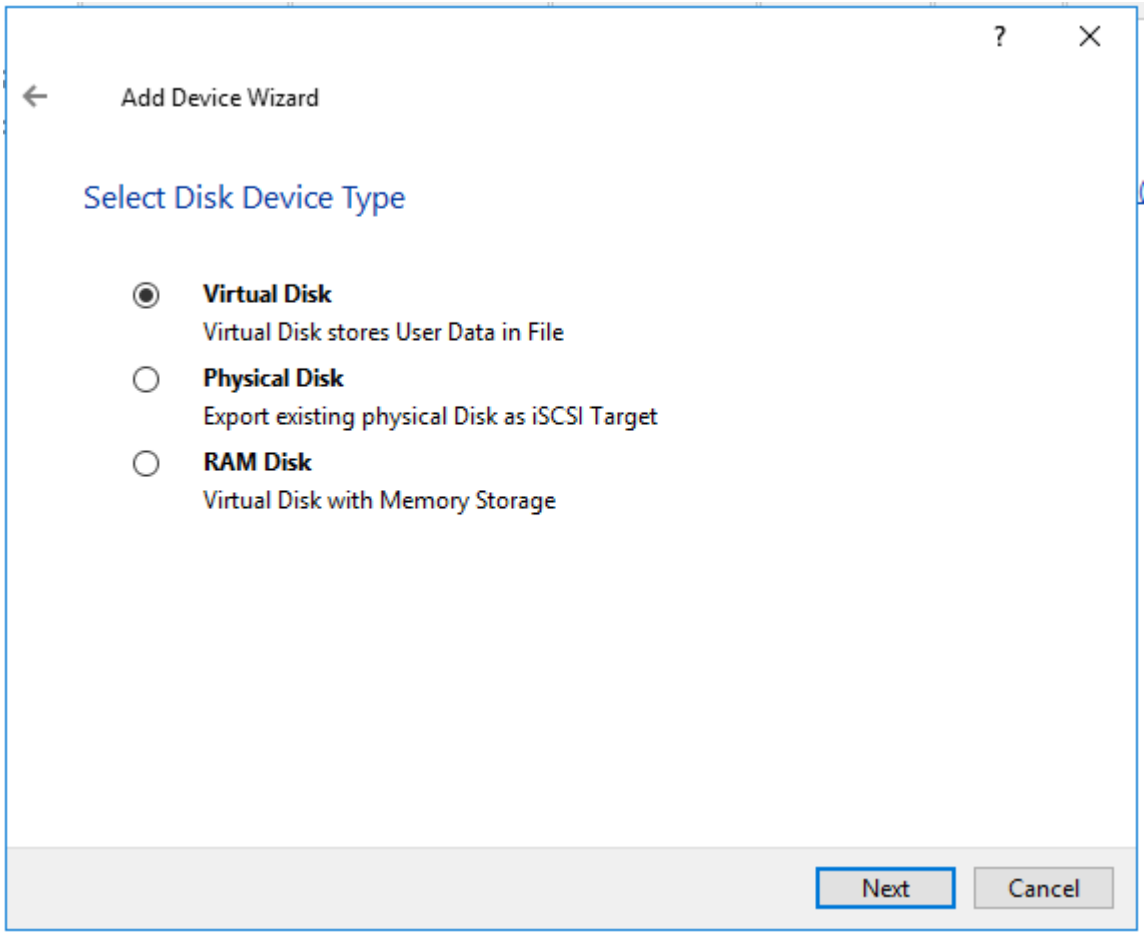
11. Click on to Add Device (advanced) button and open Add Device (advanced) Wizard.



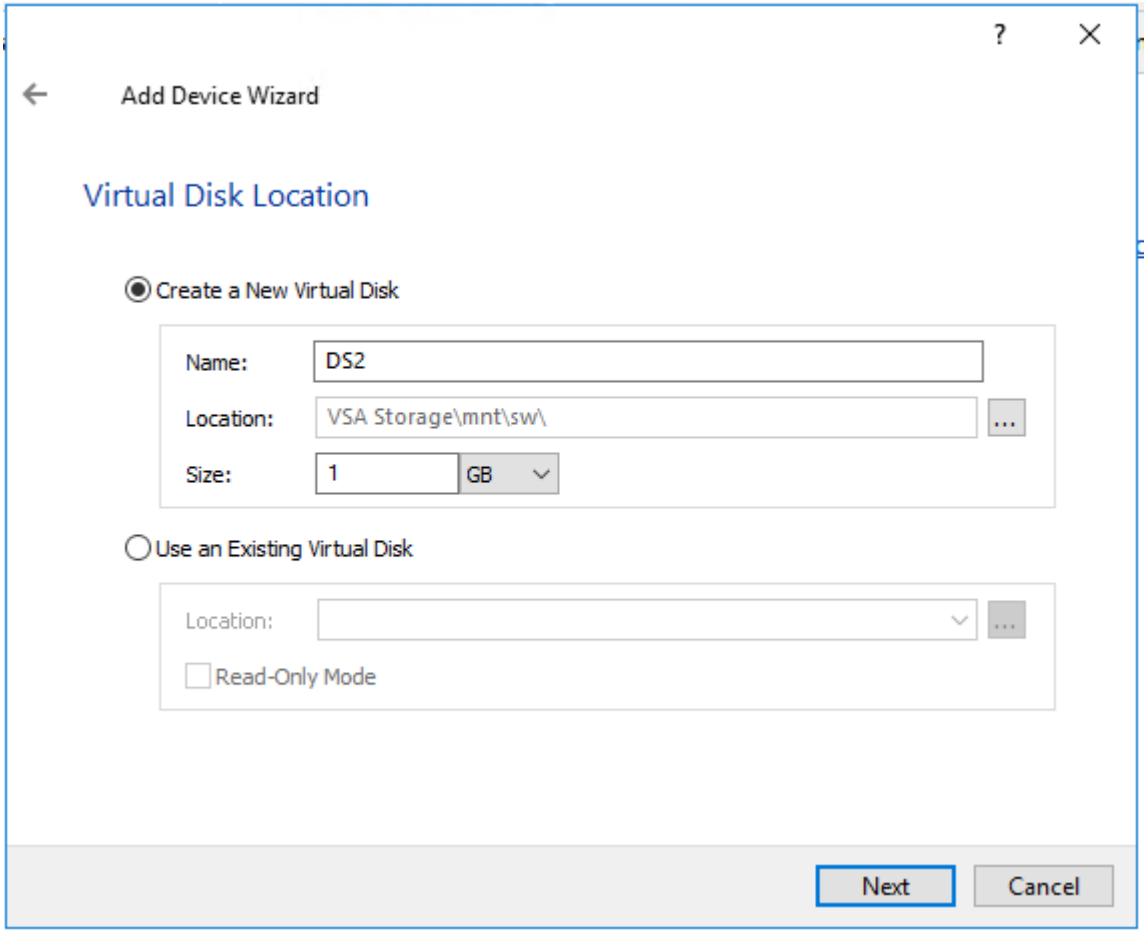
12. Select Hard Disk Device as the type of device to be created.



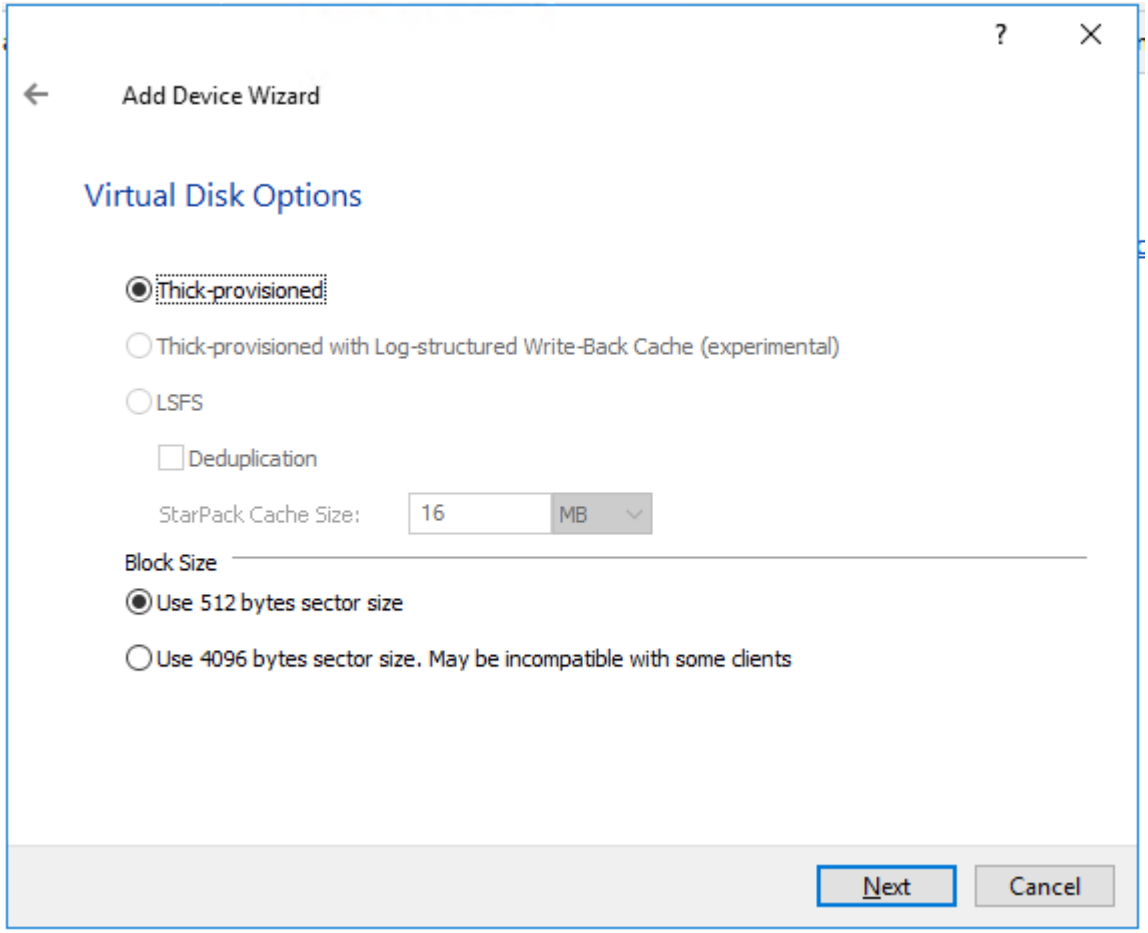
13. Select Virtual Disk.



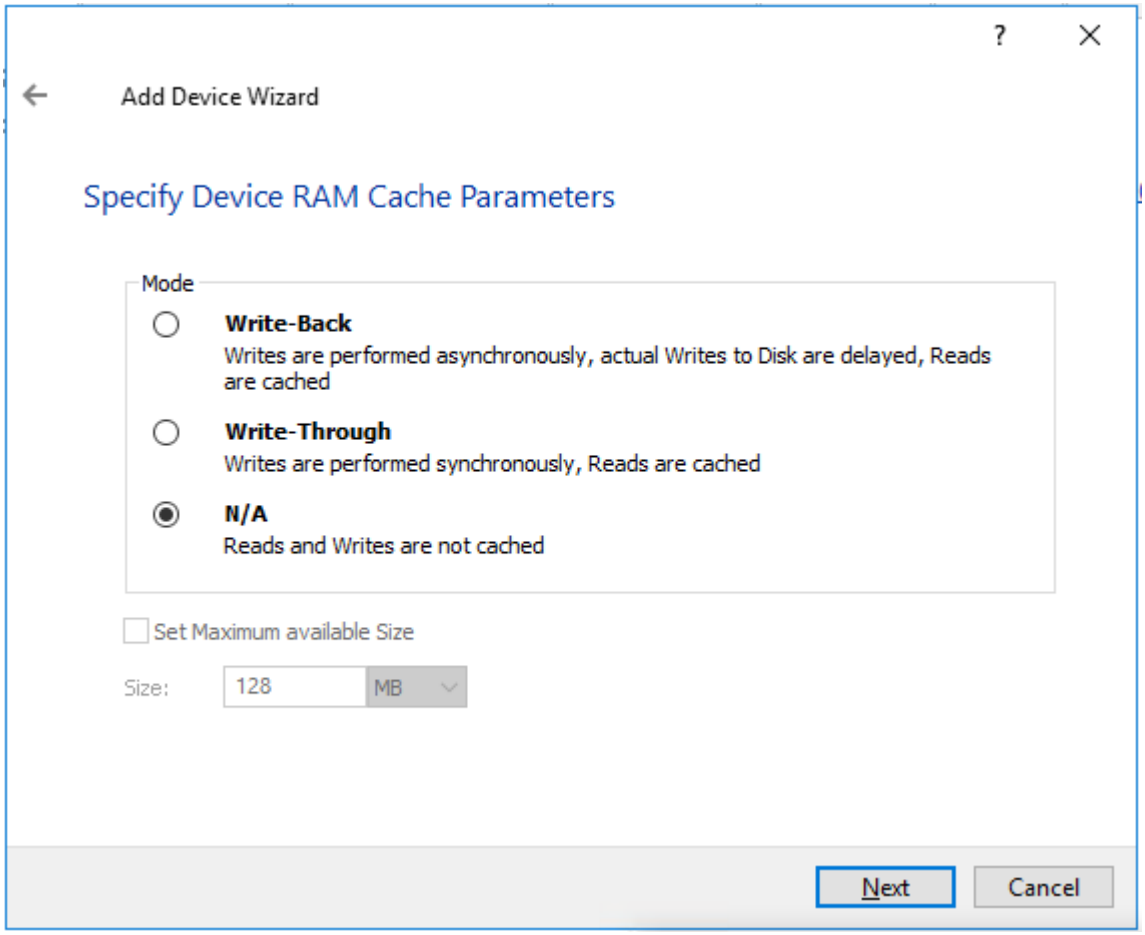
14. Specify a virtual disk Name, Location, and Size.
The size should be 1GB to do a quick synchronization.

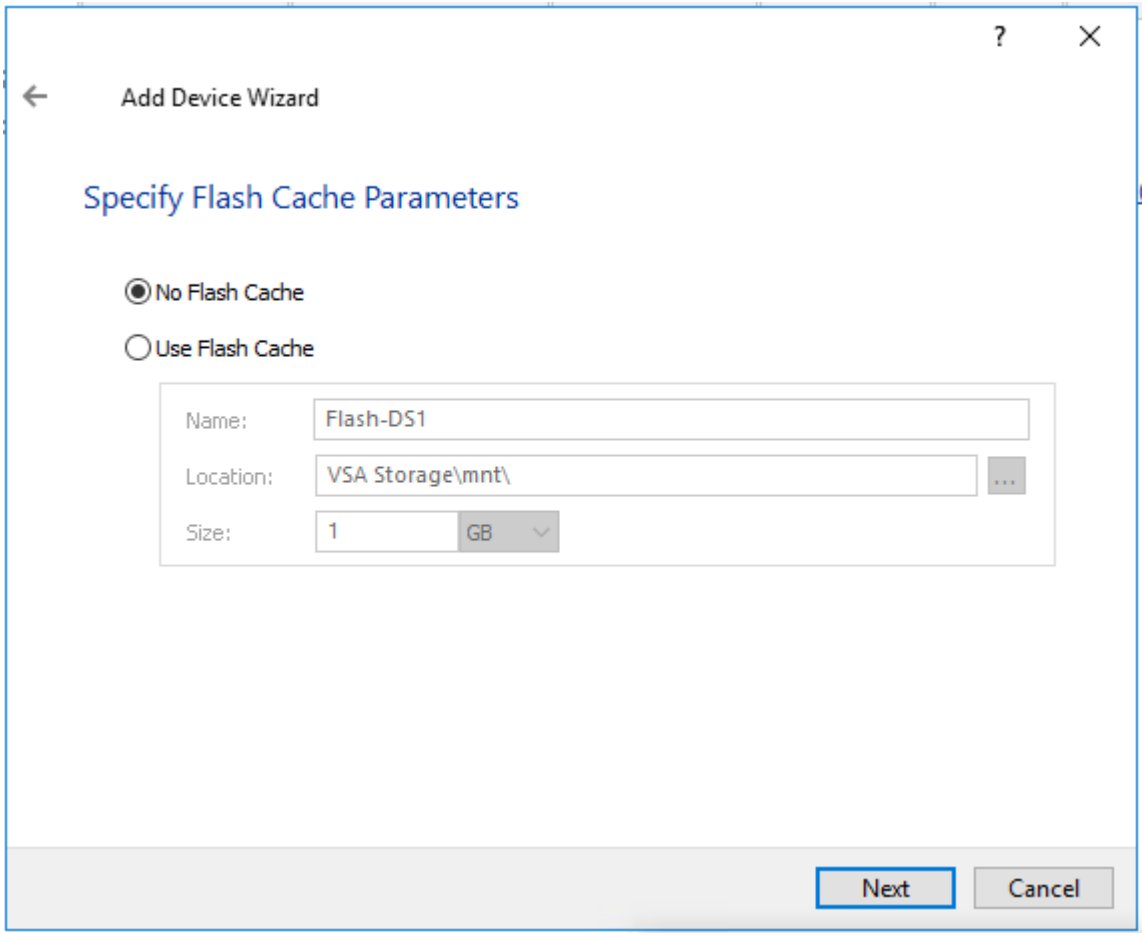


15. Select the Thick provisioned disk type and block size.
NOTE: Use 4096 sector size for targets, connected on Windows-based systems and 512 bytes sector size for targets, connected on Linux-based systems (ESXi/Xen/KVM).

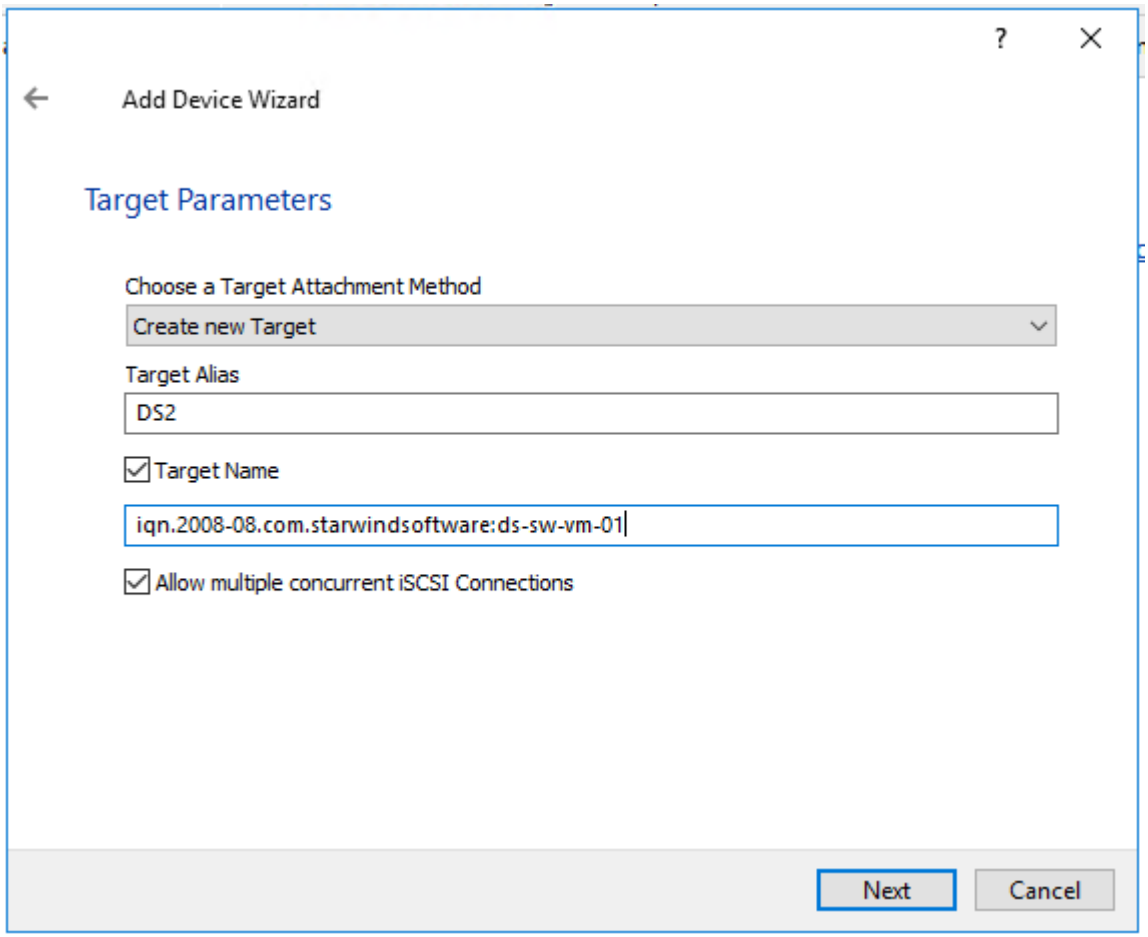


16. Define a caching policy and specify a cache size (in MB). Also, the maximum available cache size can be specified by selecting the appropriate checkbox. Optionally, define the L2 caching policy and cache size.

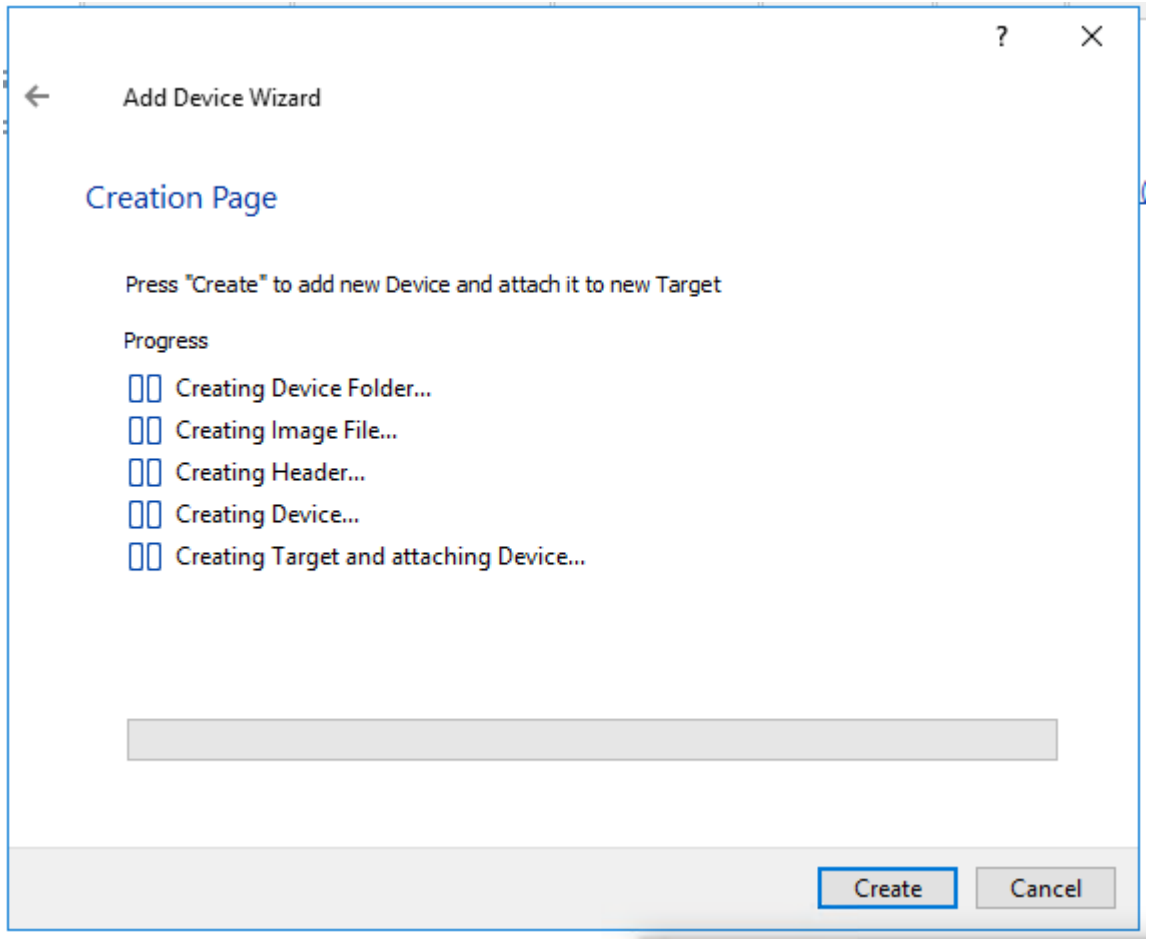

Add Device Wizard
Specify Device RAM Cache Parameters
Mode
Write-Back
Writes are performed asynchronously, actual Writes to Disk are delayed, Reads are cached
Write-Through
Writes are performed synchronously, Reads are cached
N/A
Reads and Writes are not cached
Set Maximum available Size
Size:
128
MB
Next
Cancel



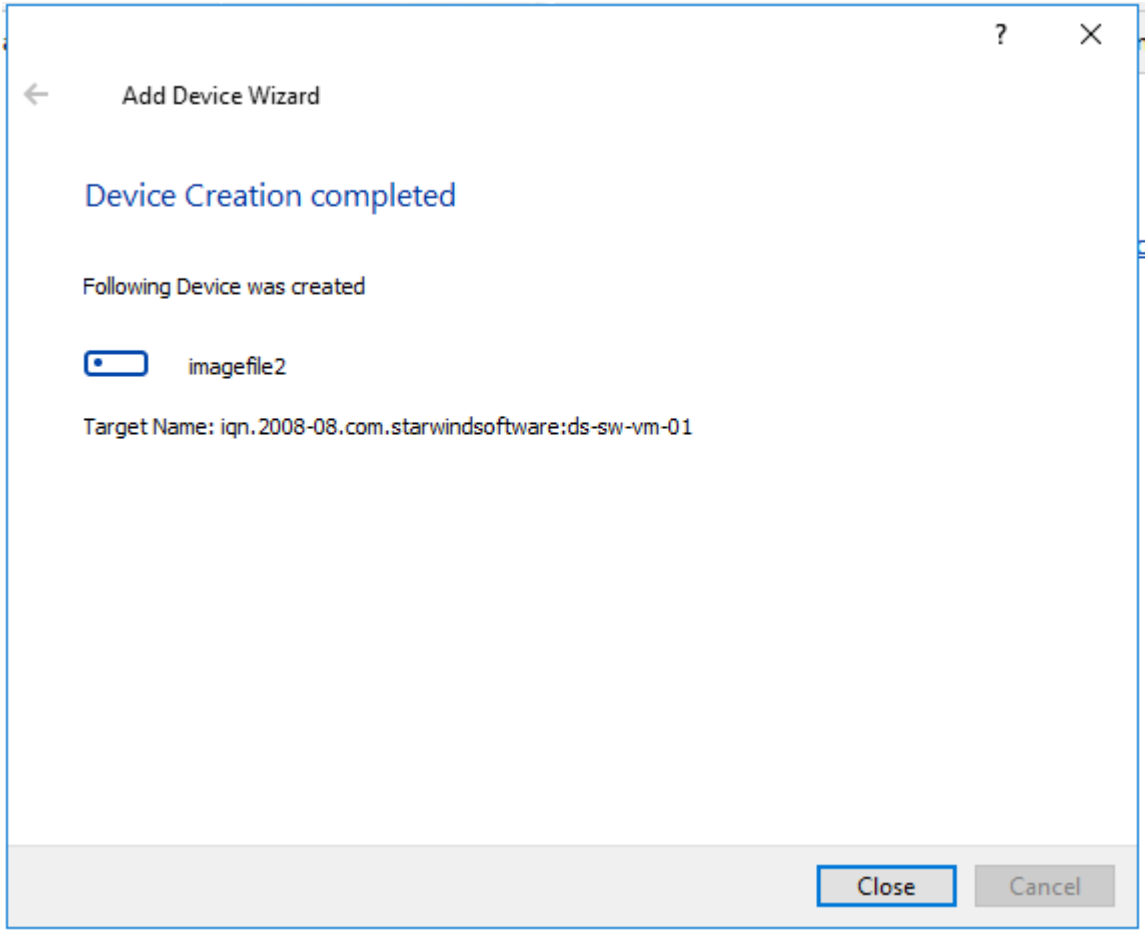
17. Specify Target Parameters. Select the Target Name checkbox to enter a custom target name. Otherwise, the name is generated automatically in accordance with the specified target alias.



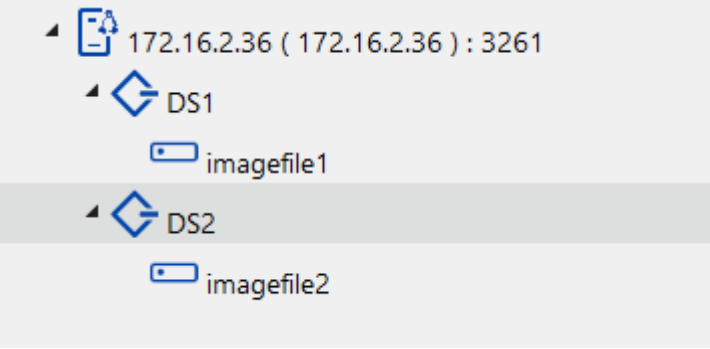
18. Click Create to add a new device and attach it to the target.



19. Click Close to finish the device creation.



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

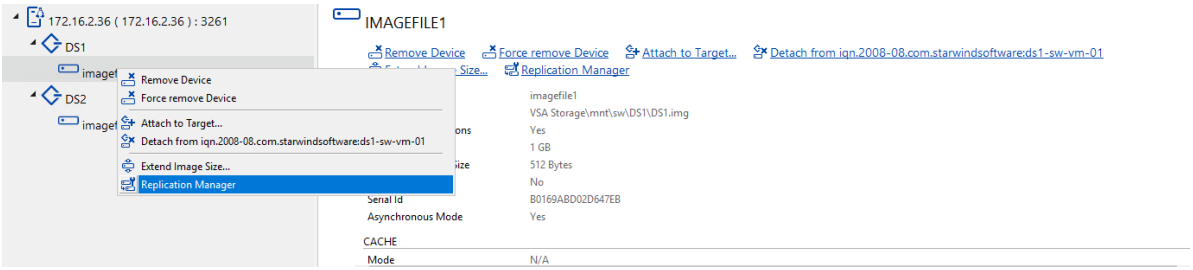


Starwind Replication Of Devices

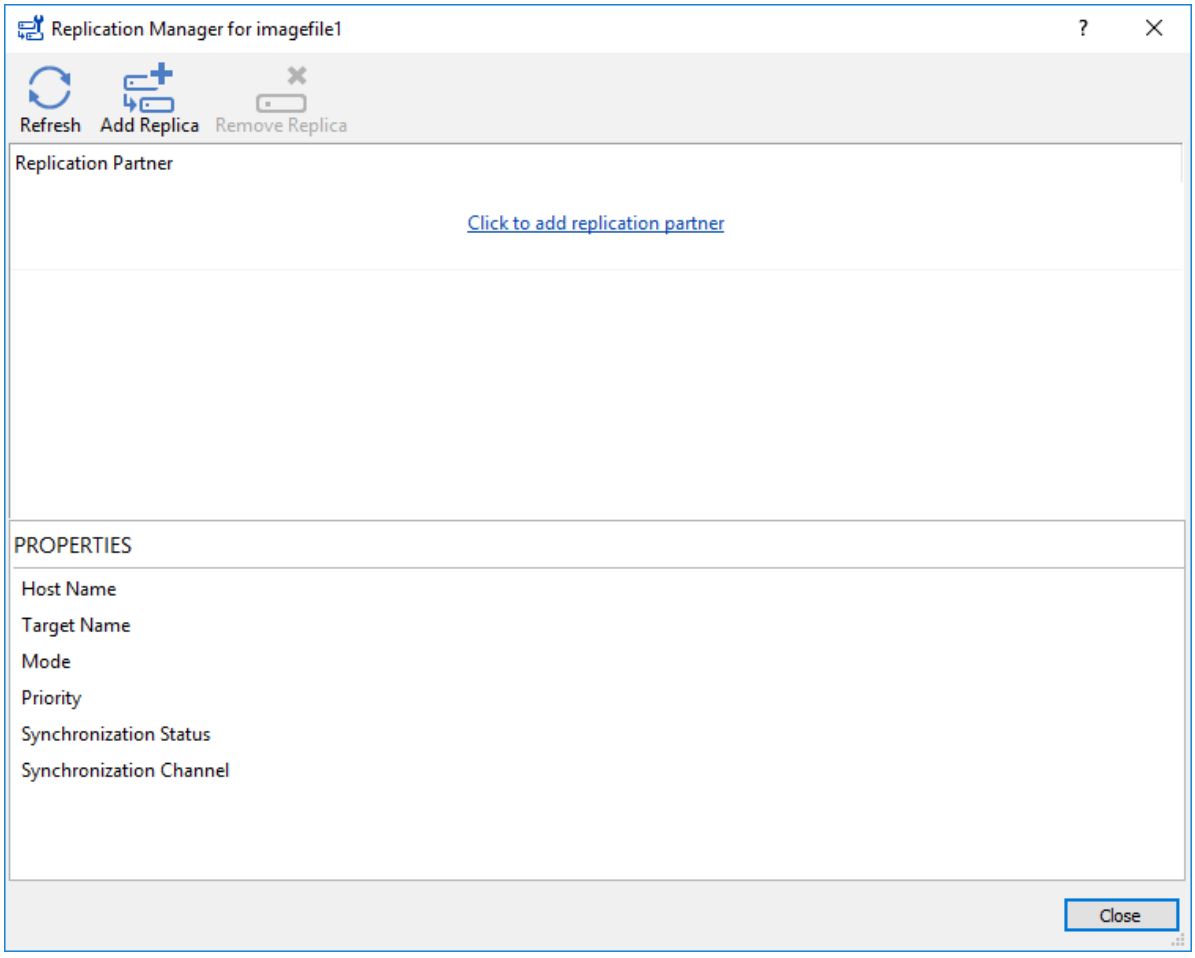
The replication should be configured using Synchronous “Two-Way” Replication mode: Synchronous or active-active replication ensures real-time synchronization and load balancing of data between two or three cluster nodes. Such a configuration tolerates the

failure of two out of three storage nodes and enables the creation of an effective business continuity plan. With synchronous mirroring, each write operation requires control confirmation from both storage nodes. It guarantees the reliability of data transfers but is demanding in bandwidth since mirroring will not work on high-latency networks.

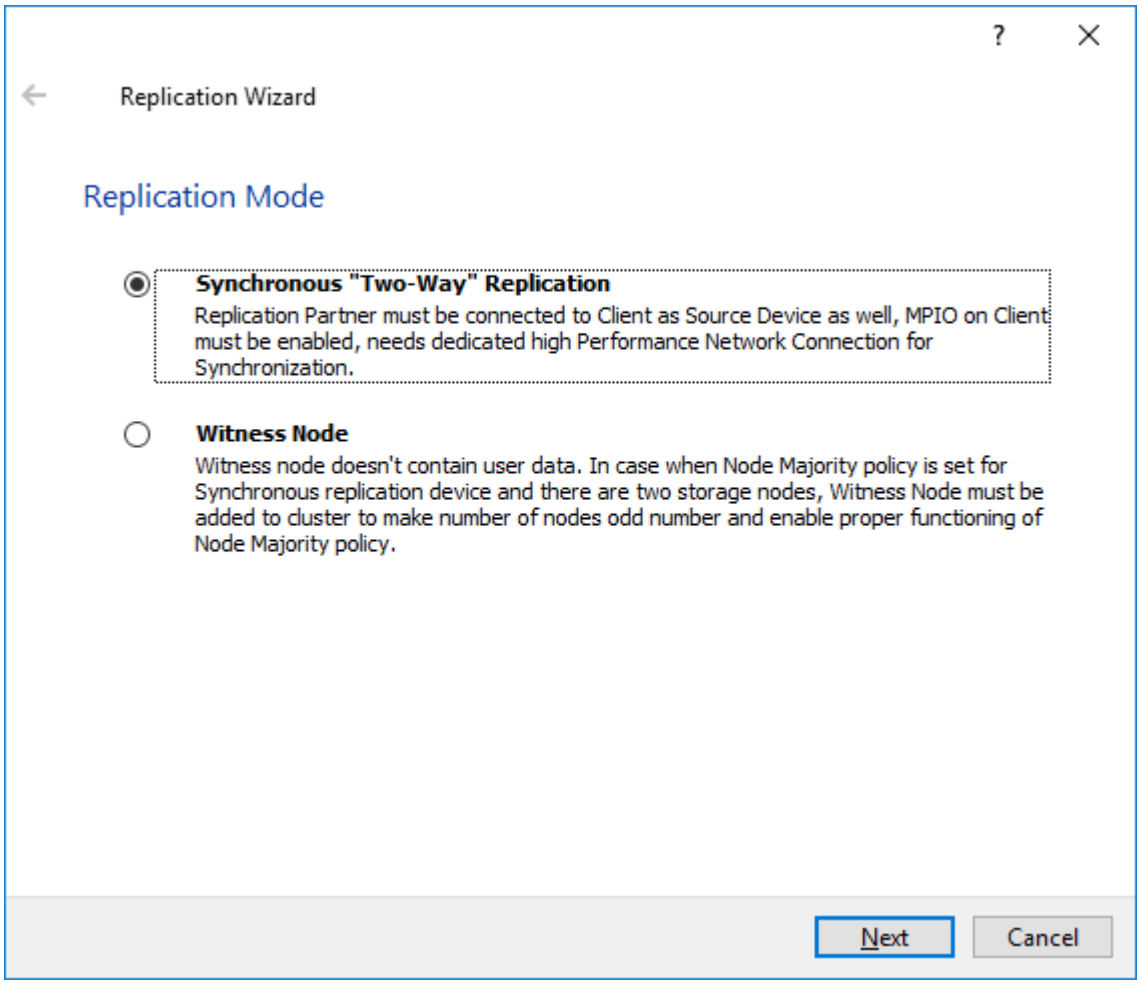
1. Right-click on the DS1 device and select Replication Manager from the shortcut menu.



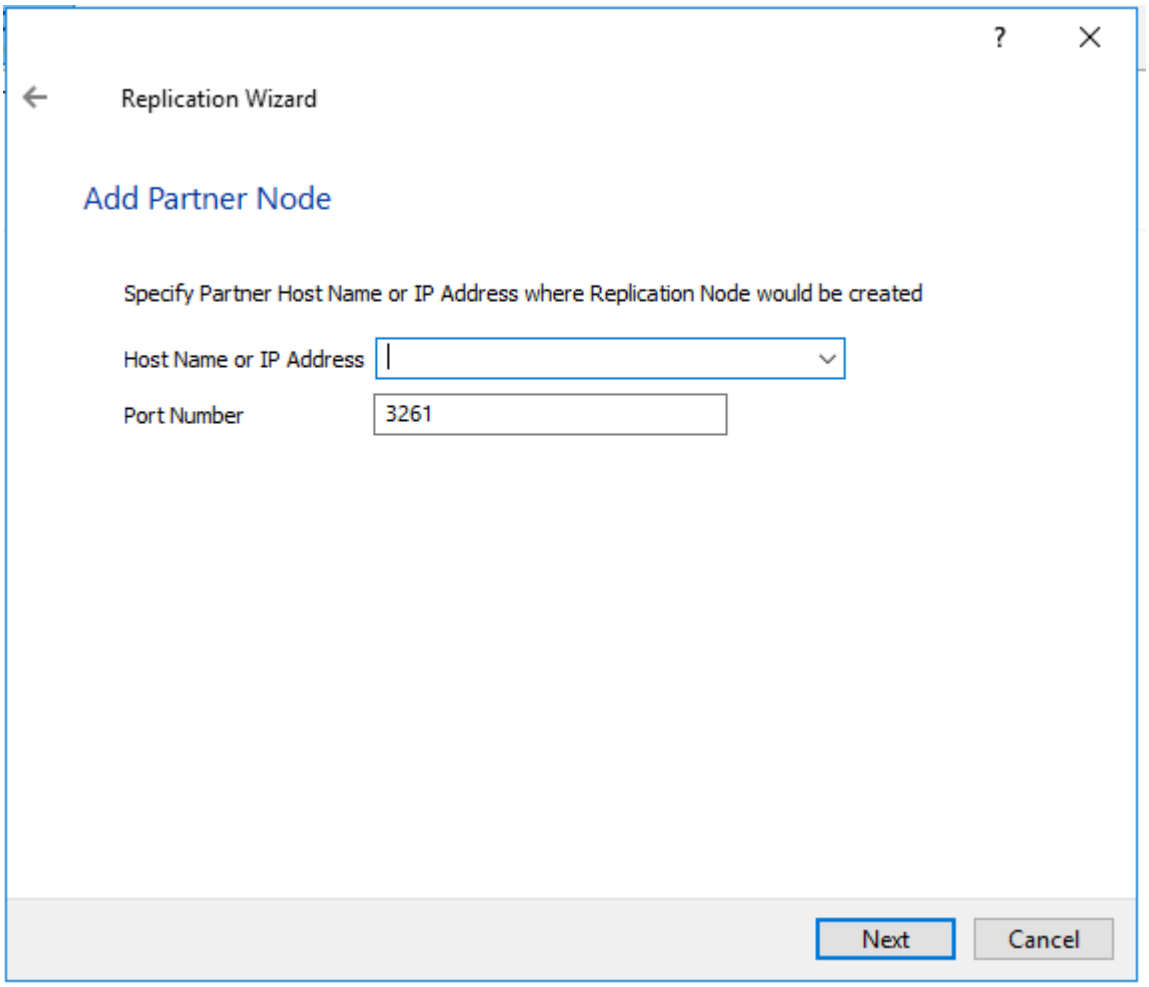
2. Select the Add Replica button in the top menu.



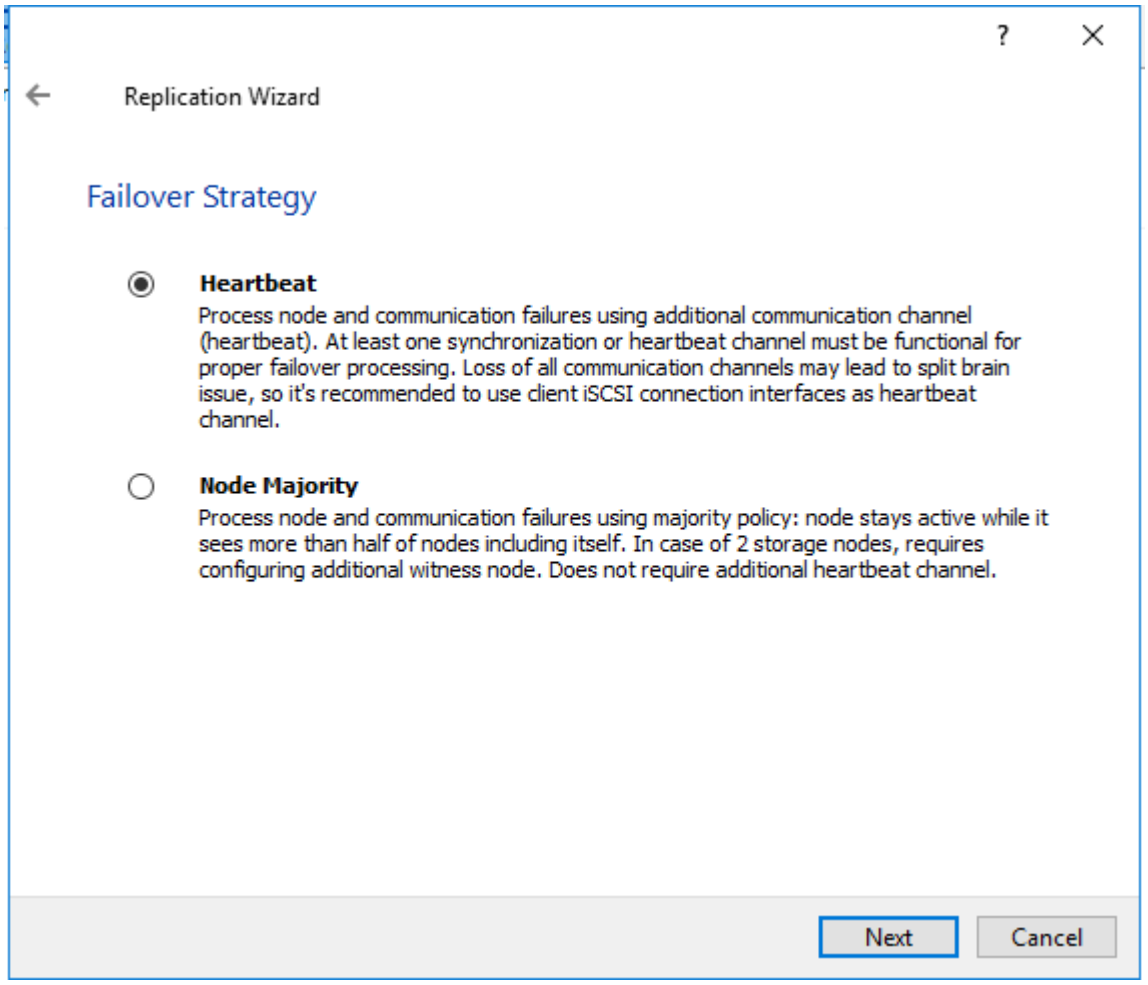
3. Select Synchronous “Two-Way” replication as a replication mode.



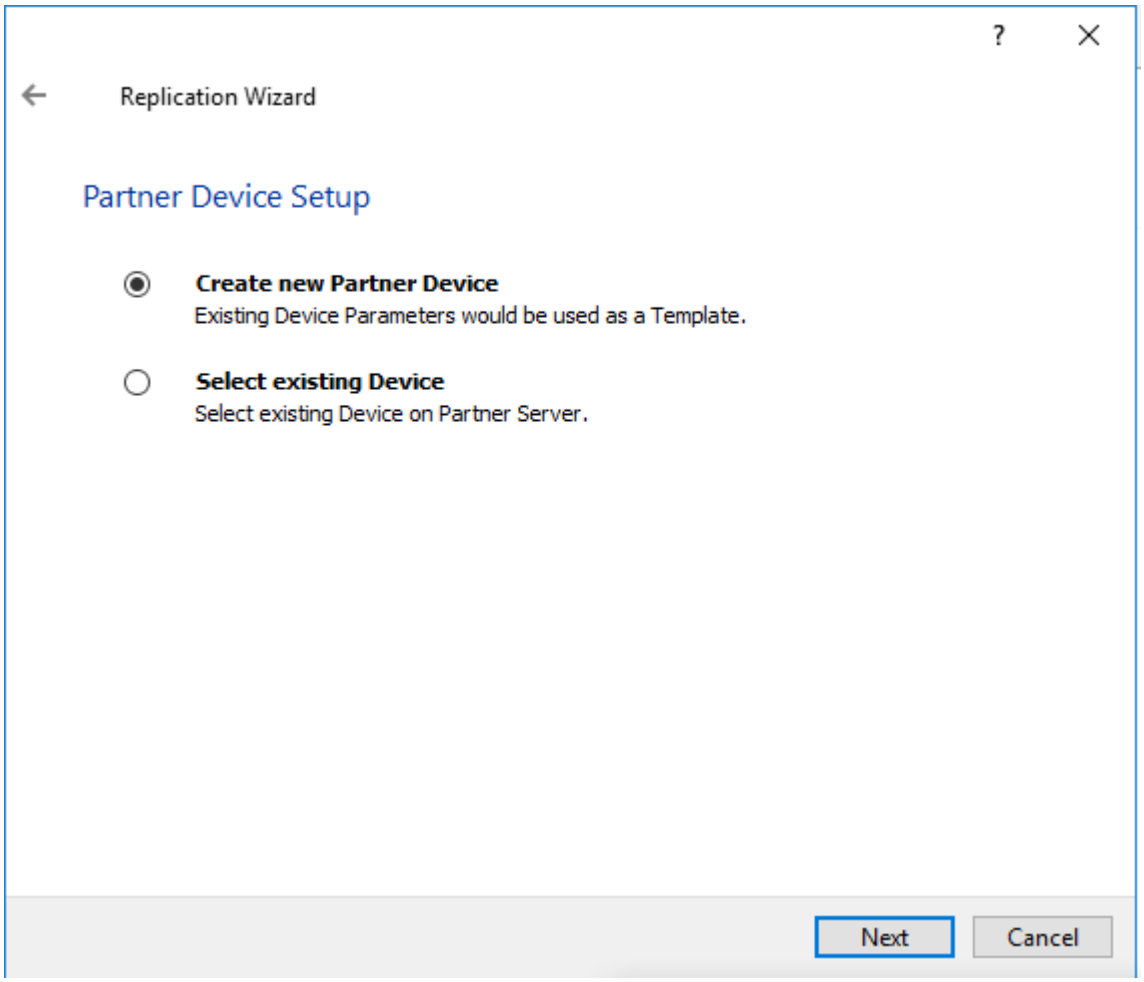
4. Specify a partner Host name or IP address and Port Number.



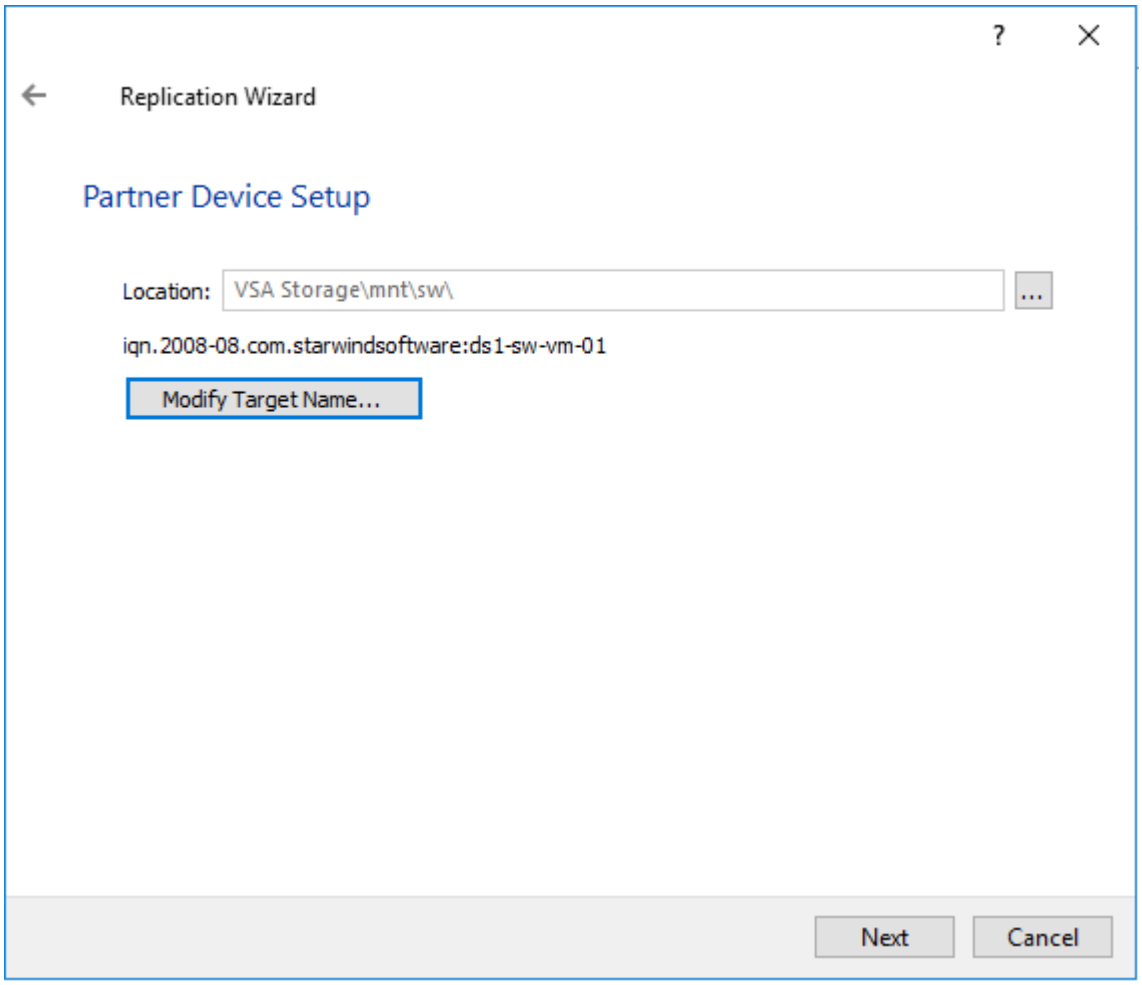
5. Select Failover Strategy.



6. Select Create new Partner Device and click Next.



7. Select a partner device Location and click Next.



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

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of HA device size for 3-way replication.

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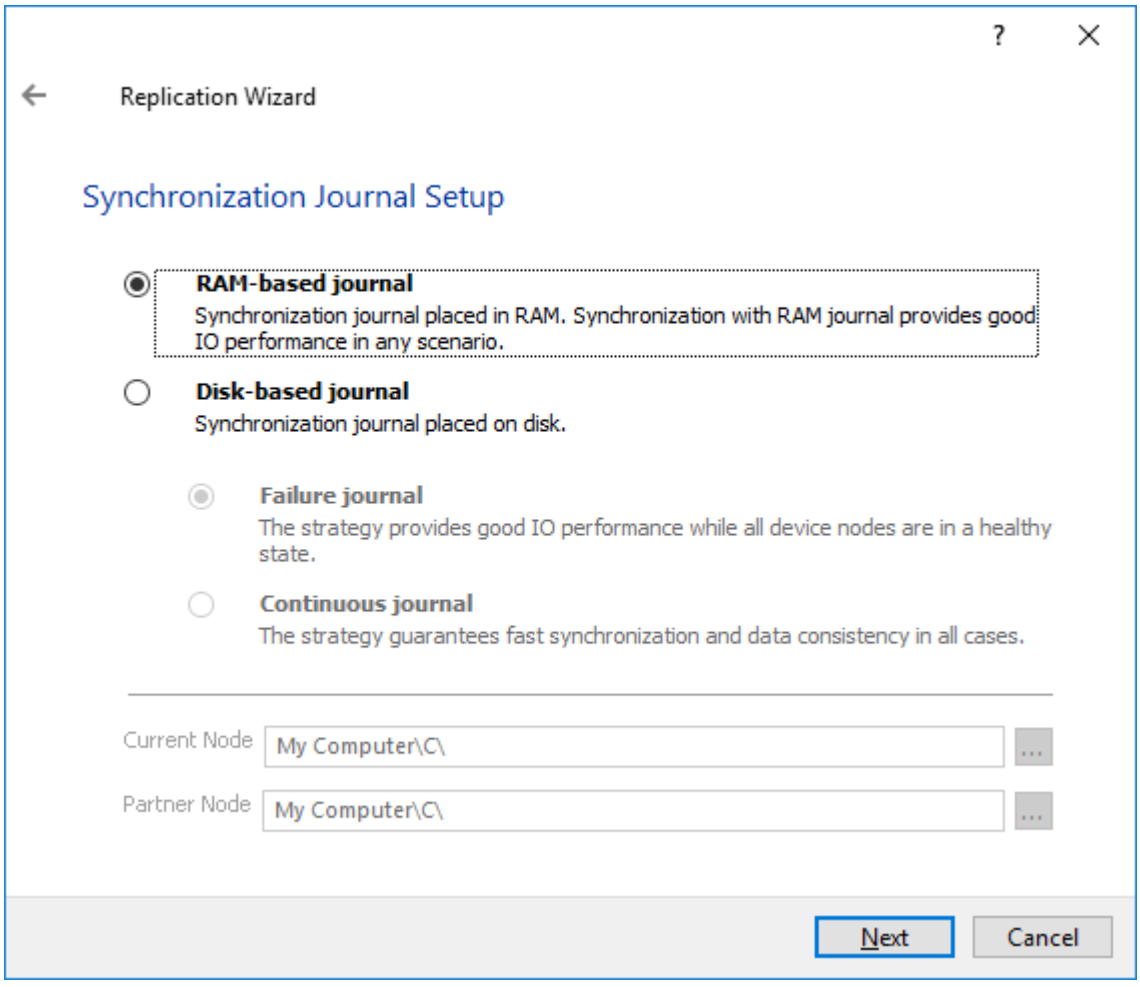
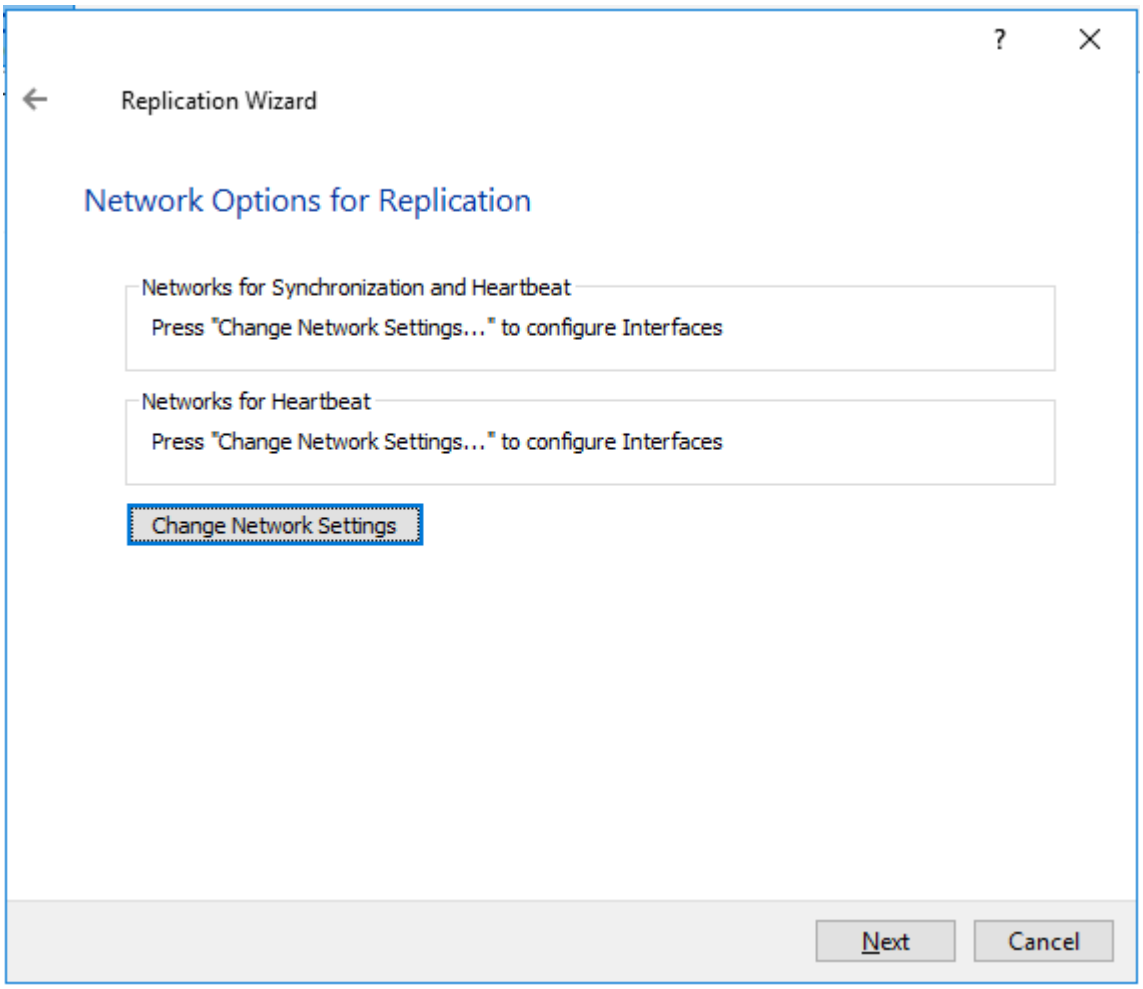
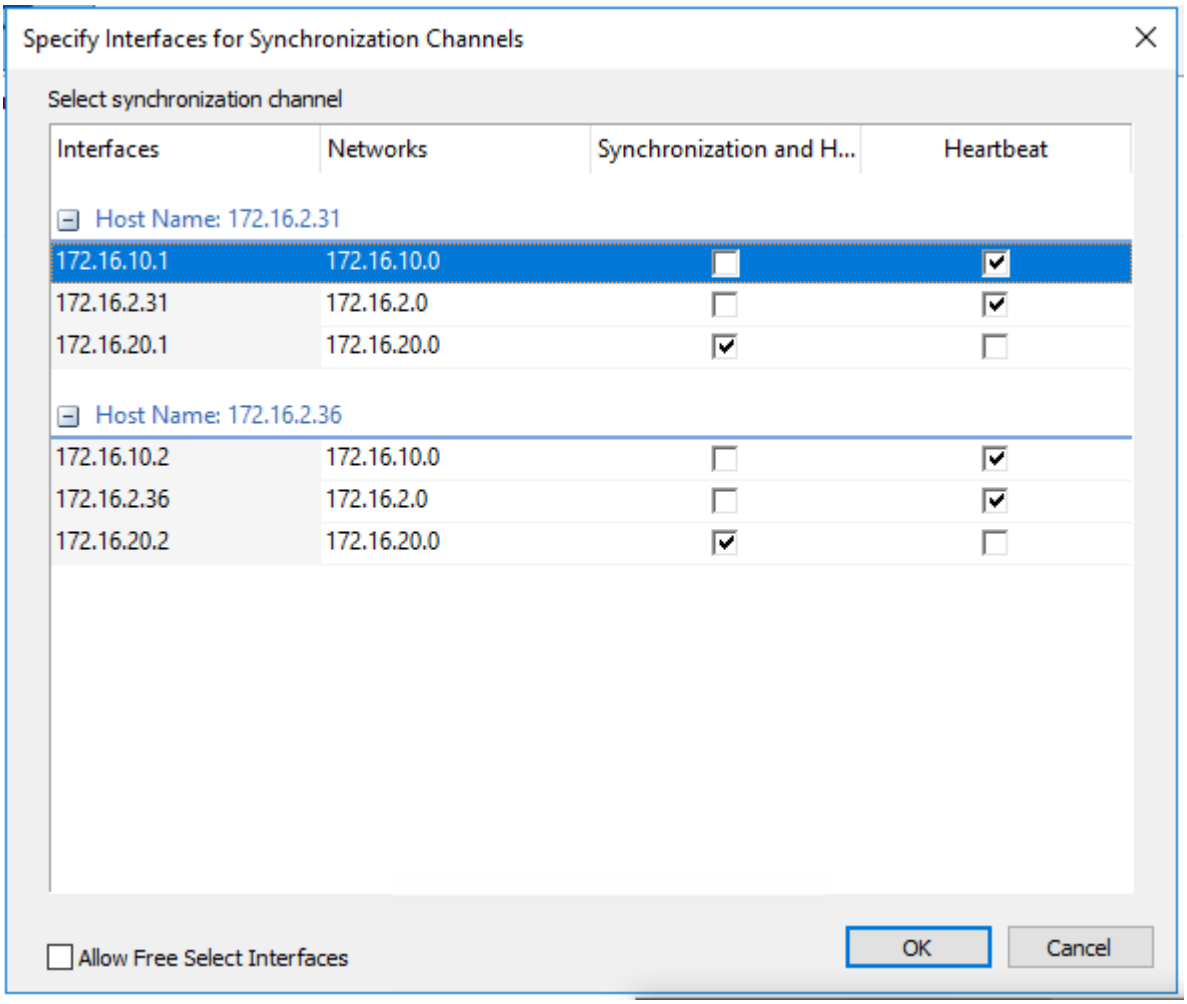
Continuous journal – guarantees fast synchronization and data consistency in all cases. Although, this strategy has the worst I/O performance, because of frequent write operations to the journal, located on the disk, where the journal is located.

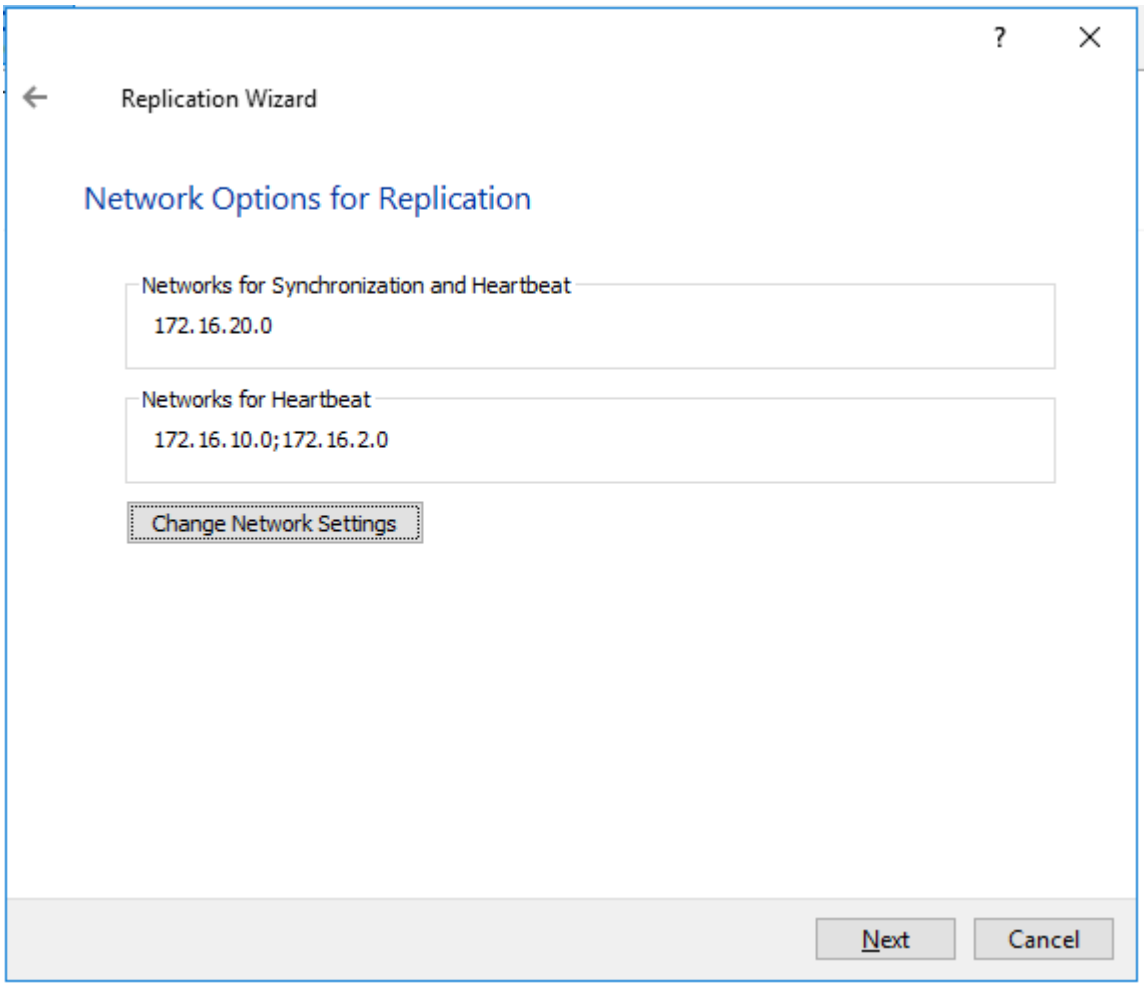


9. Click Change Network Settings.

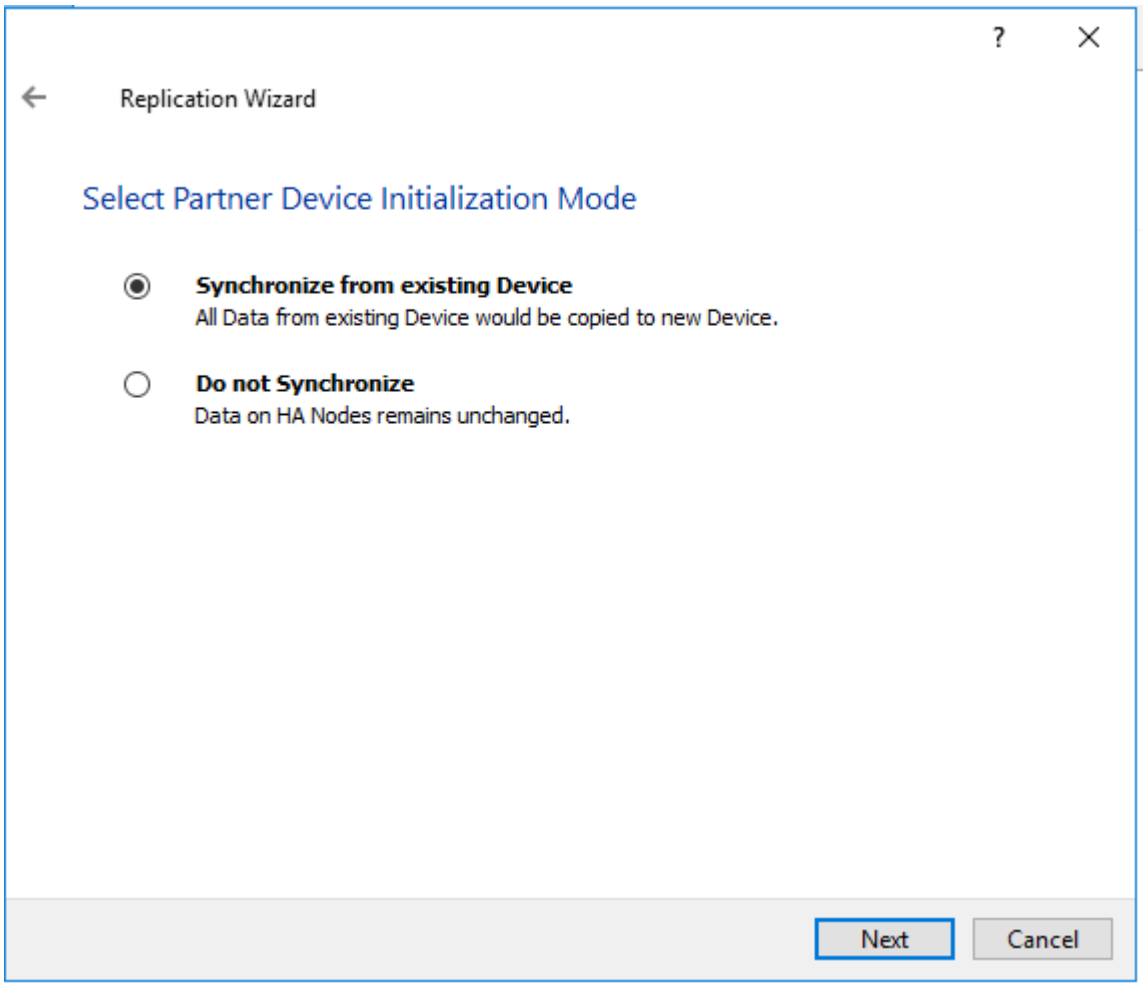


10. Specify the interfaces for Synchronization and Heartbeat Channels. Click OK and then click Next.
172.16.20.* -Synchronization
172.16.10.* and Management as HeartBeat

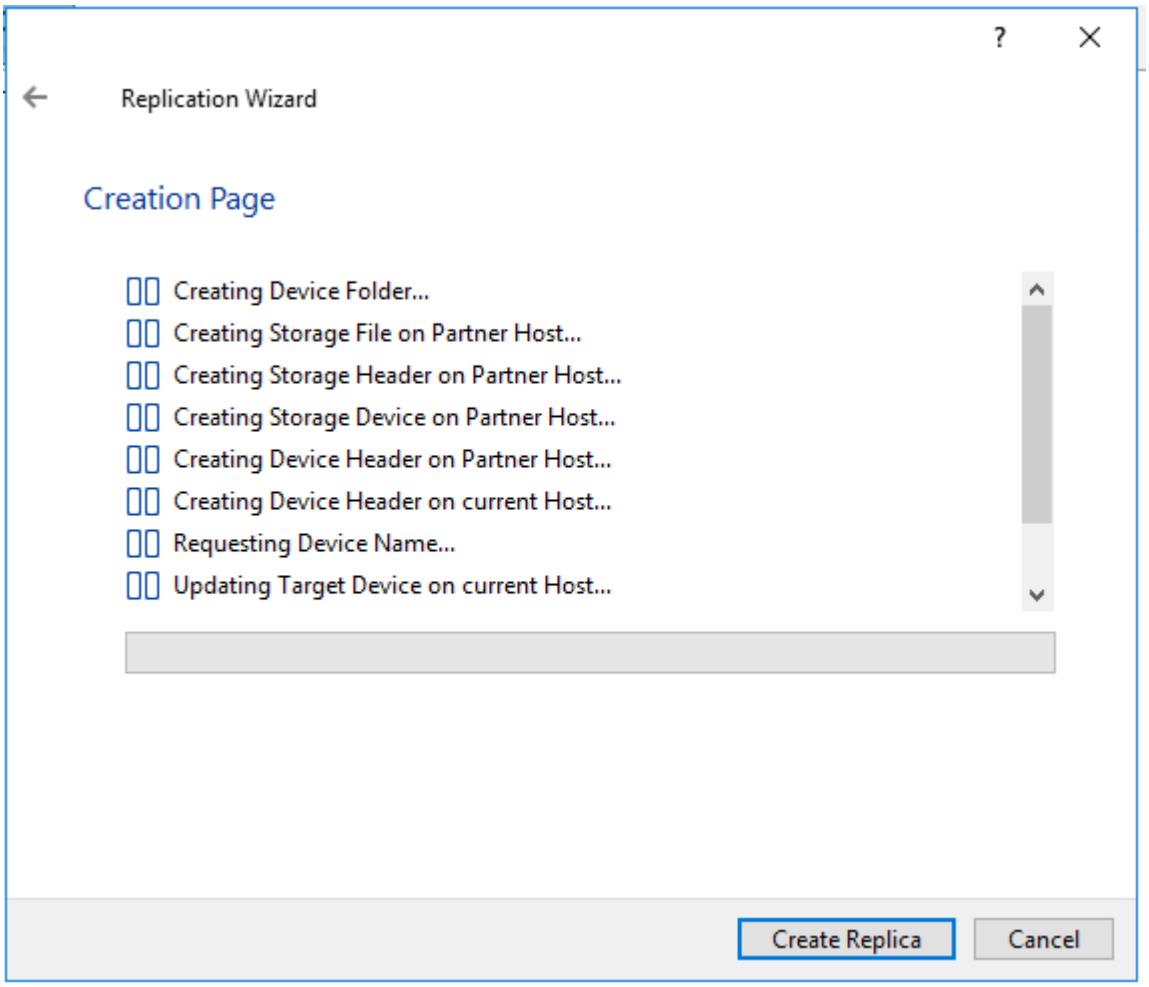

Specify Interfaces for Synchronization Channels
Select synchronization channel
Interfaces
Networks
Synchronization and H...
Heartbeat
Host Name: 172.16.2.31
172.16.10.1
172.16.10.0
172.16.2.31
172.16.2.0
172.16.20.1
172.16.20.0
Host Name: 172.16.2.36
172.16.10.2
172.16.10.0
172.16.2.36
172.16.2.0
172.16.20.2
172.16.20.0
Allow Free Select Interfaces
OK
Cancel



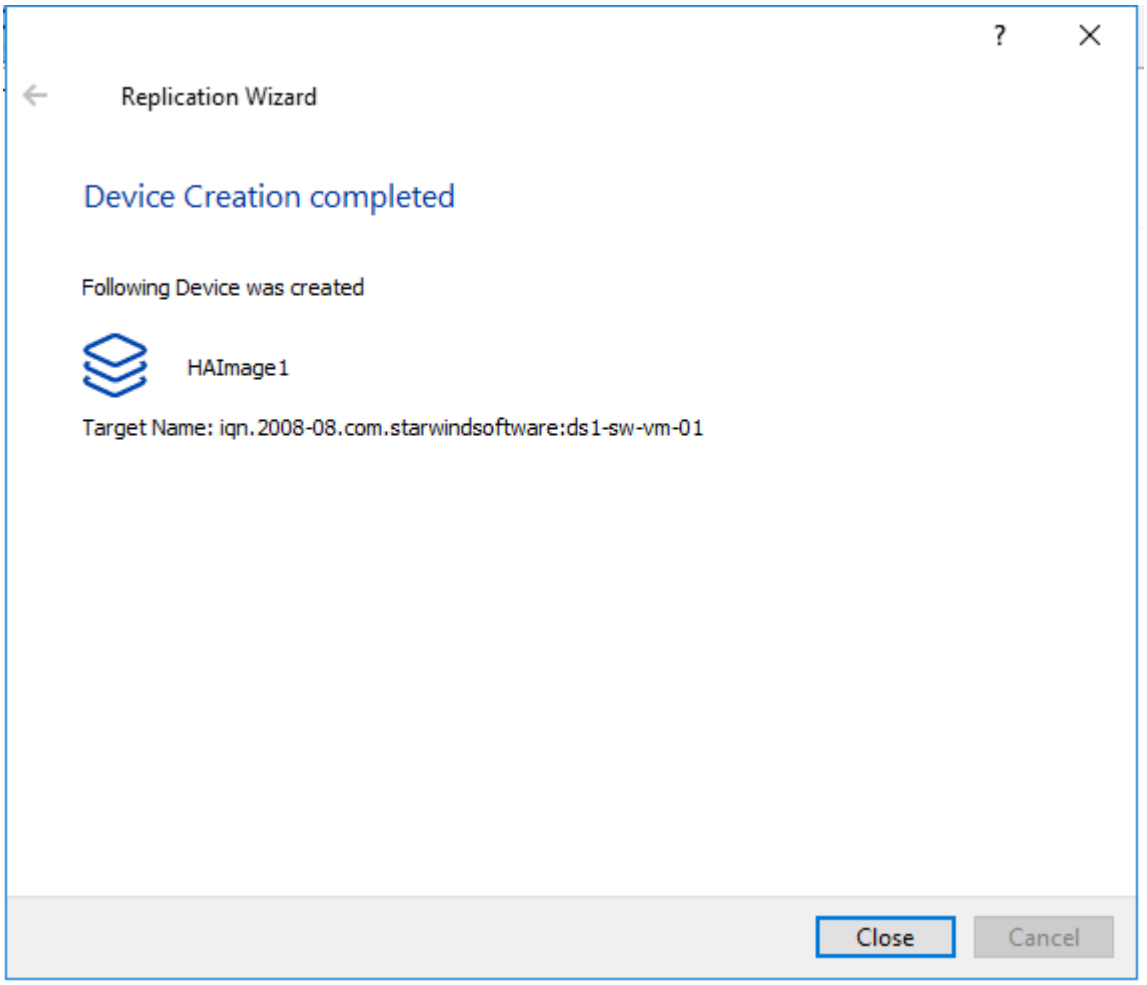
11. In Select Partner Device Initialization Mode, select Synchronize from existing Device and click Next.

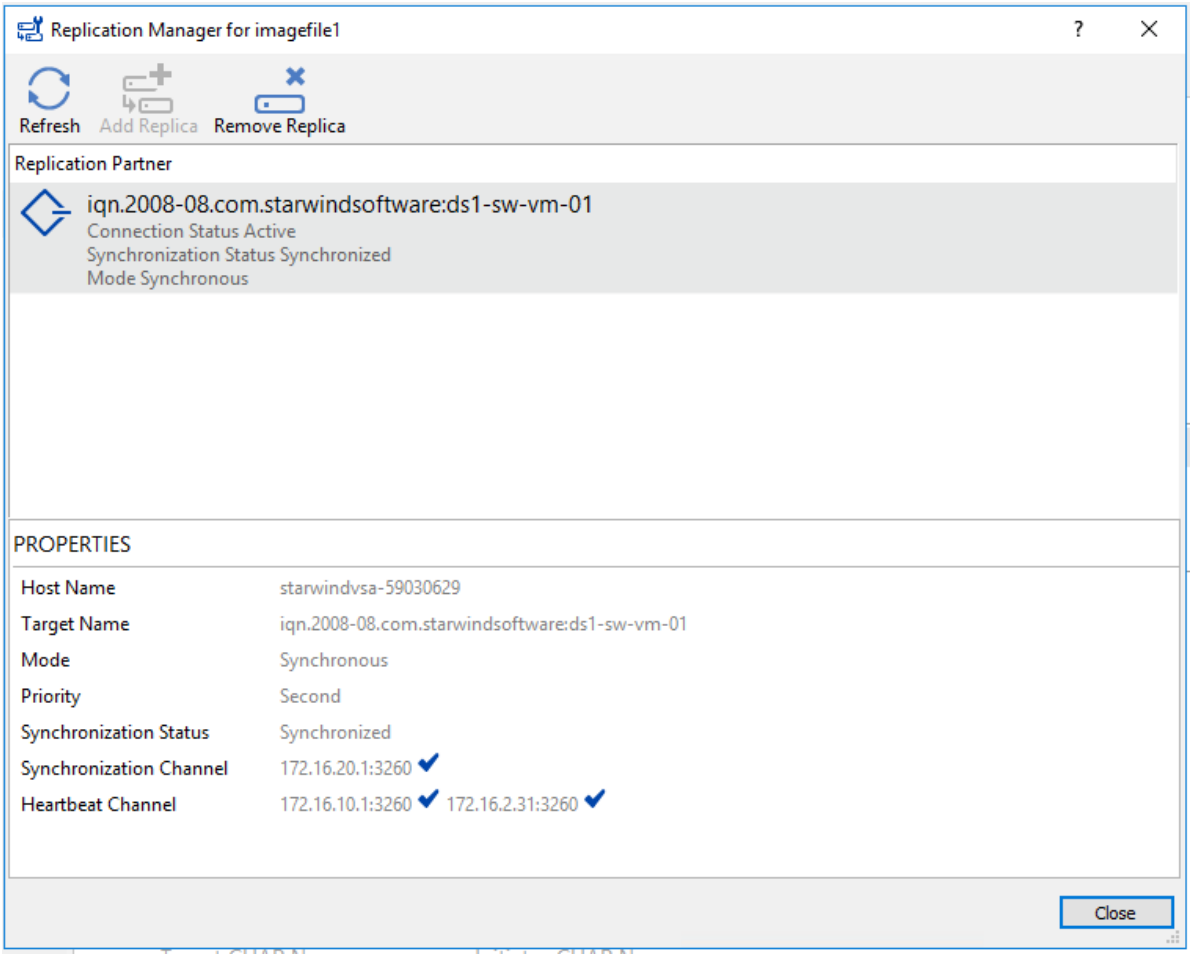


12. Click Create Replica.

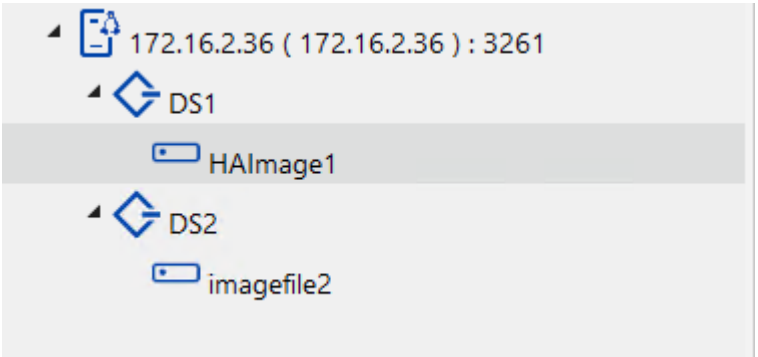


13. Click Close to close the wizard.

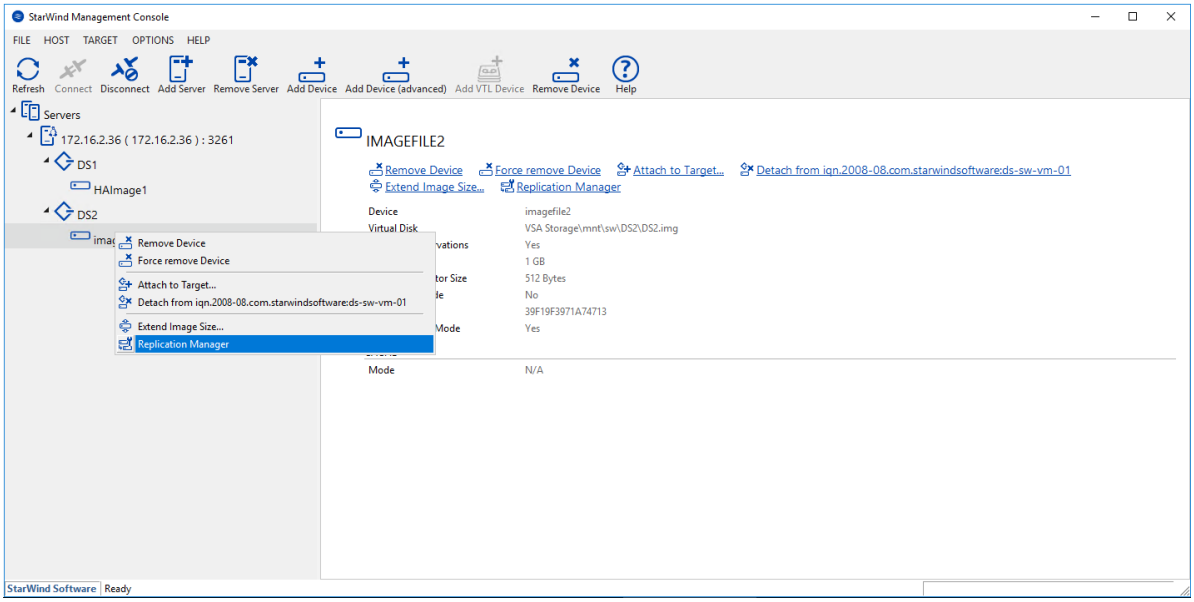

Replication Wizard
Device Creation completed
Following Device was created
HAImage1
Target Name: iqn.2008-08.com.starwindsoftware:ds1-sw-vm-01
Close
Cancel



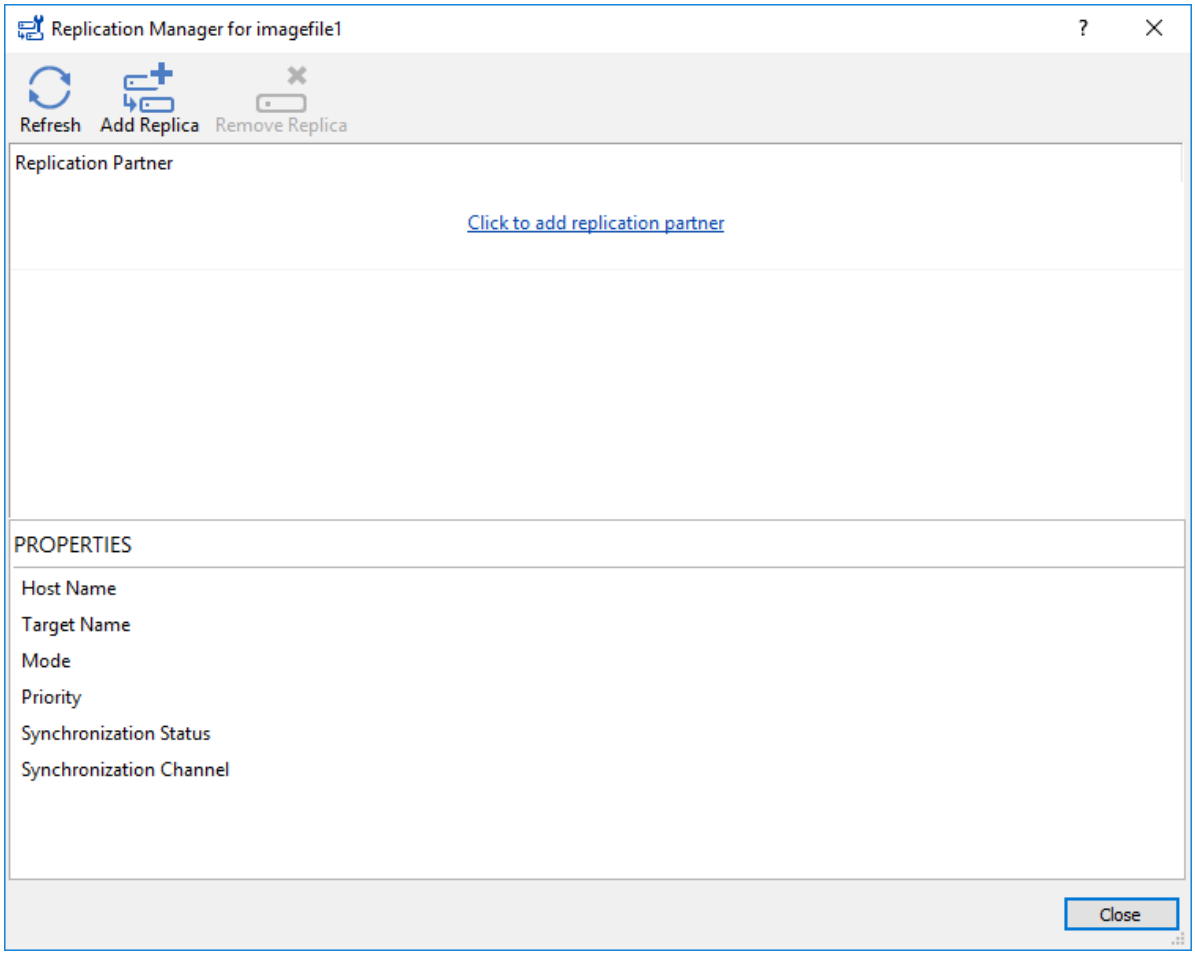
14. The successfully added device appears in StarWind Management Console.



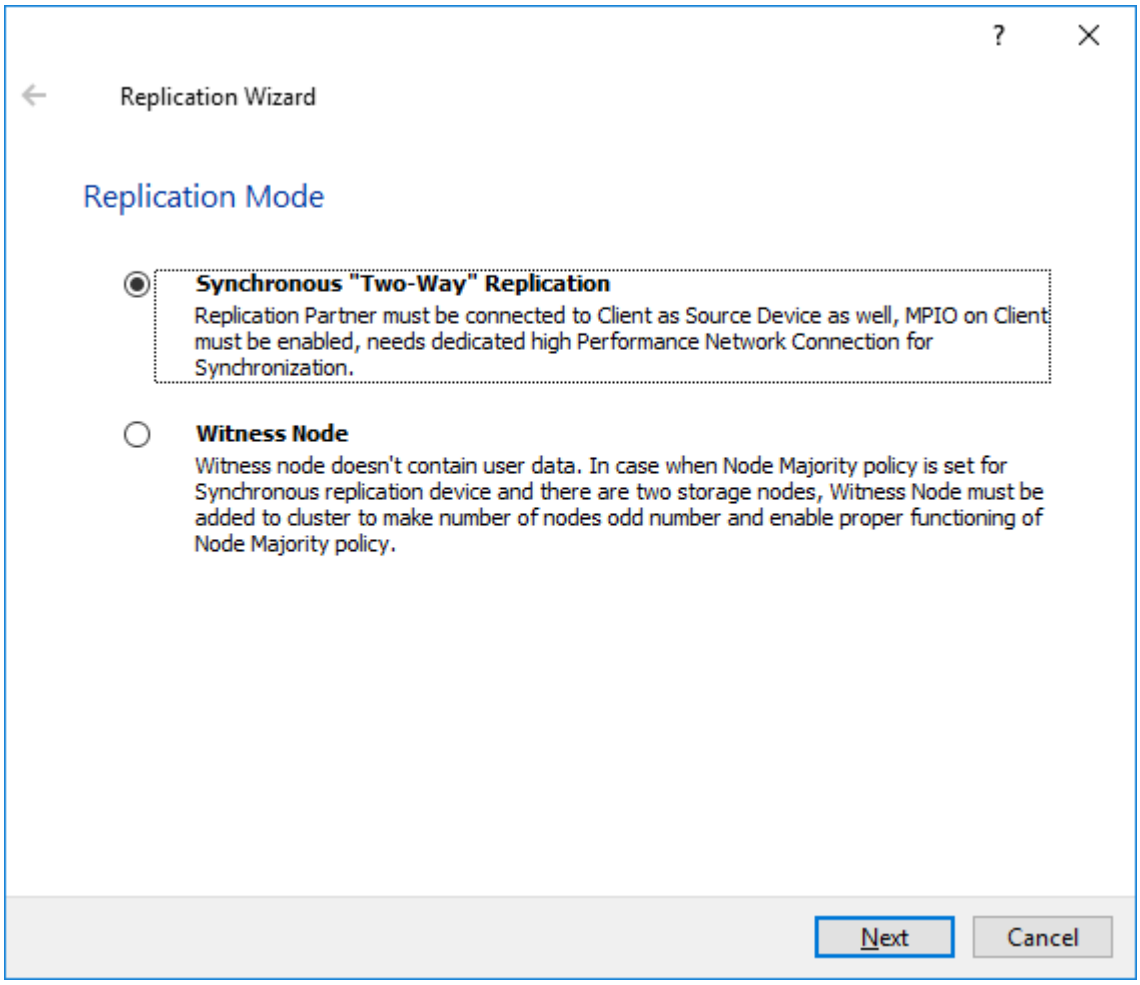
15. Right-click on the DS2 device and select Replication Manager from the shortcut menu.



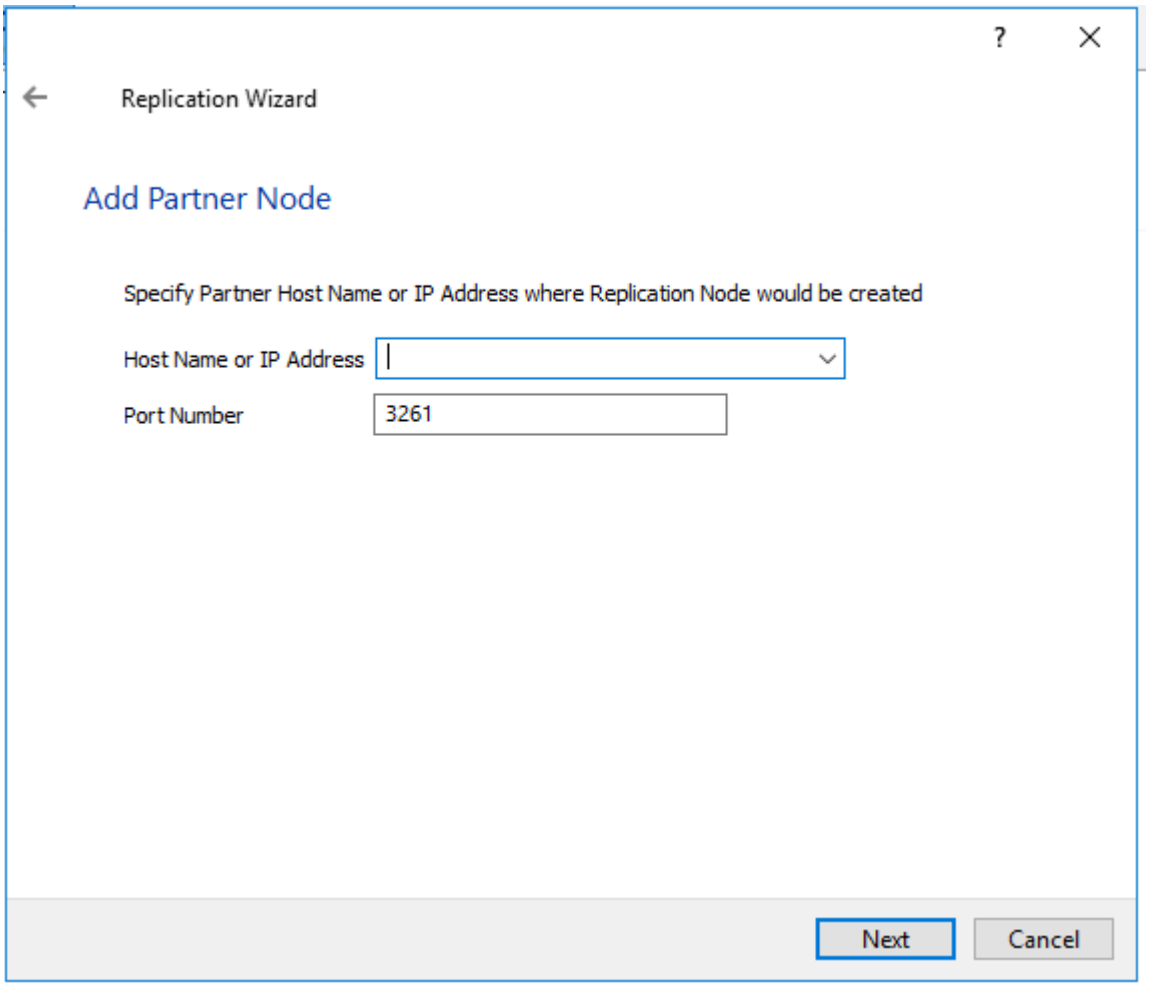
16. Select the Add Replica button in the top menu.



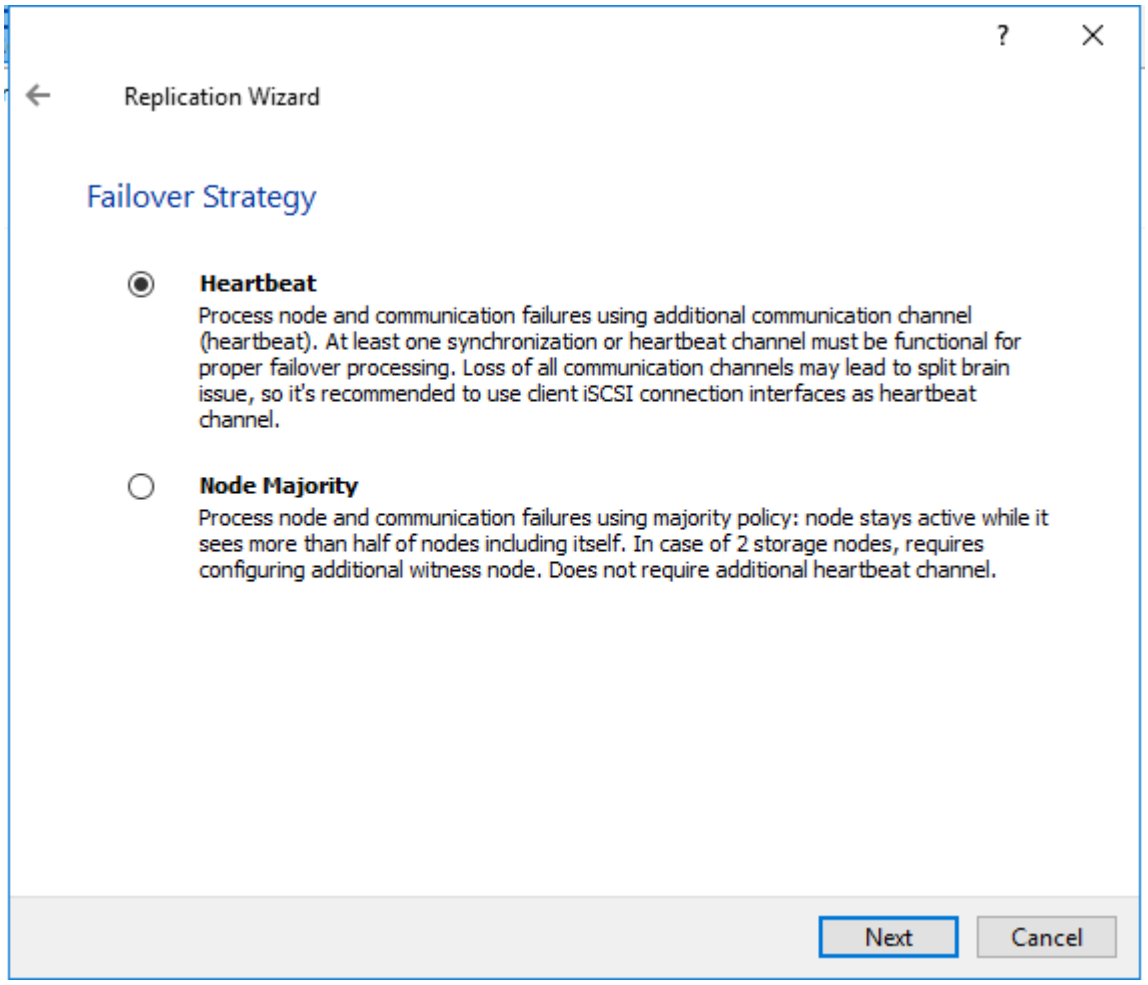
17. Select Synchronous “Two-Way” replication as a replication mode.



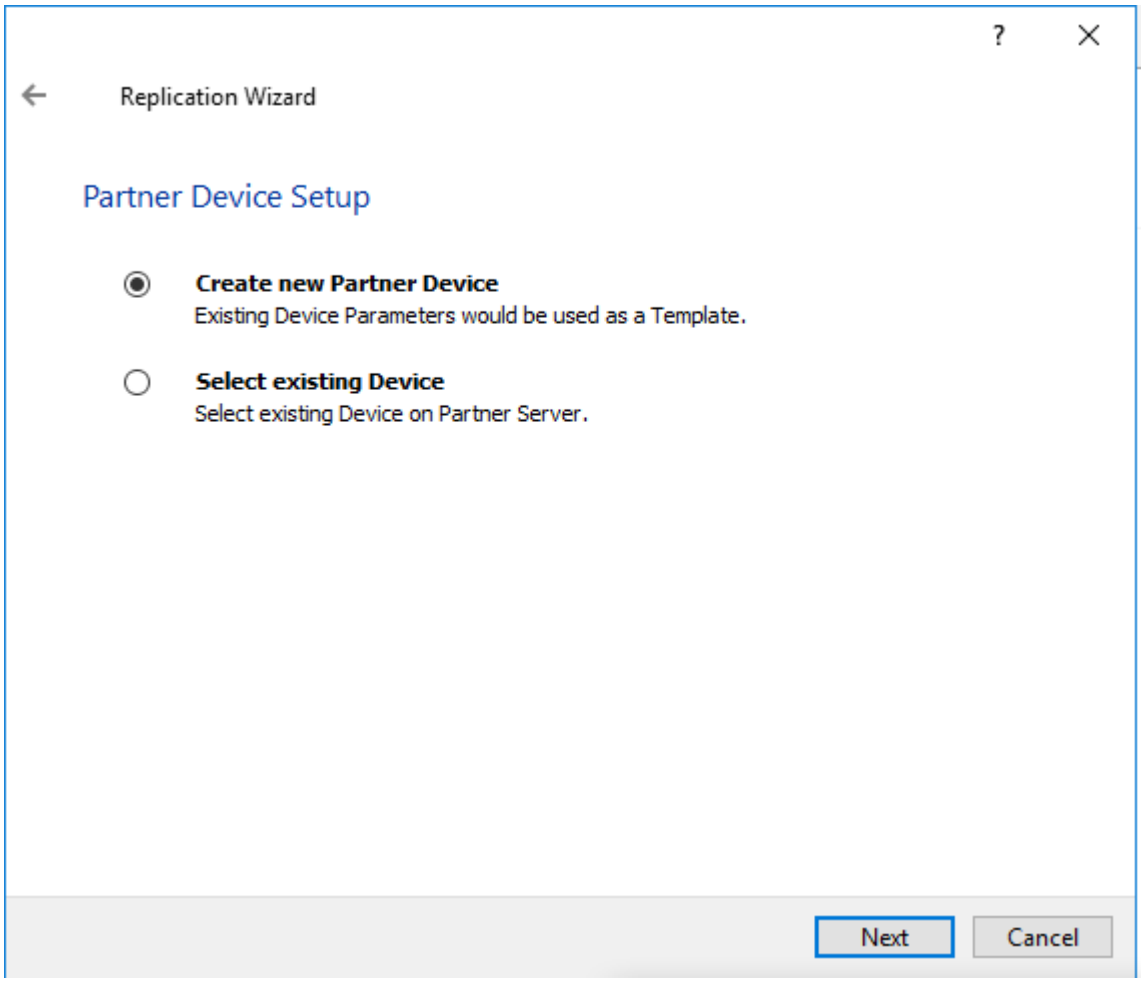
18. Specify a partner Host name or IP address and Port Number.



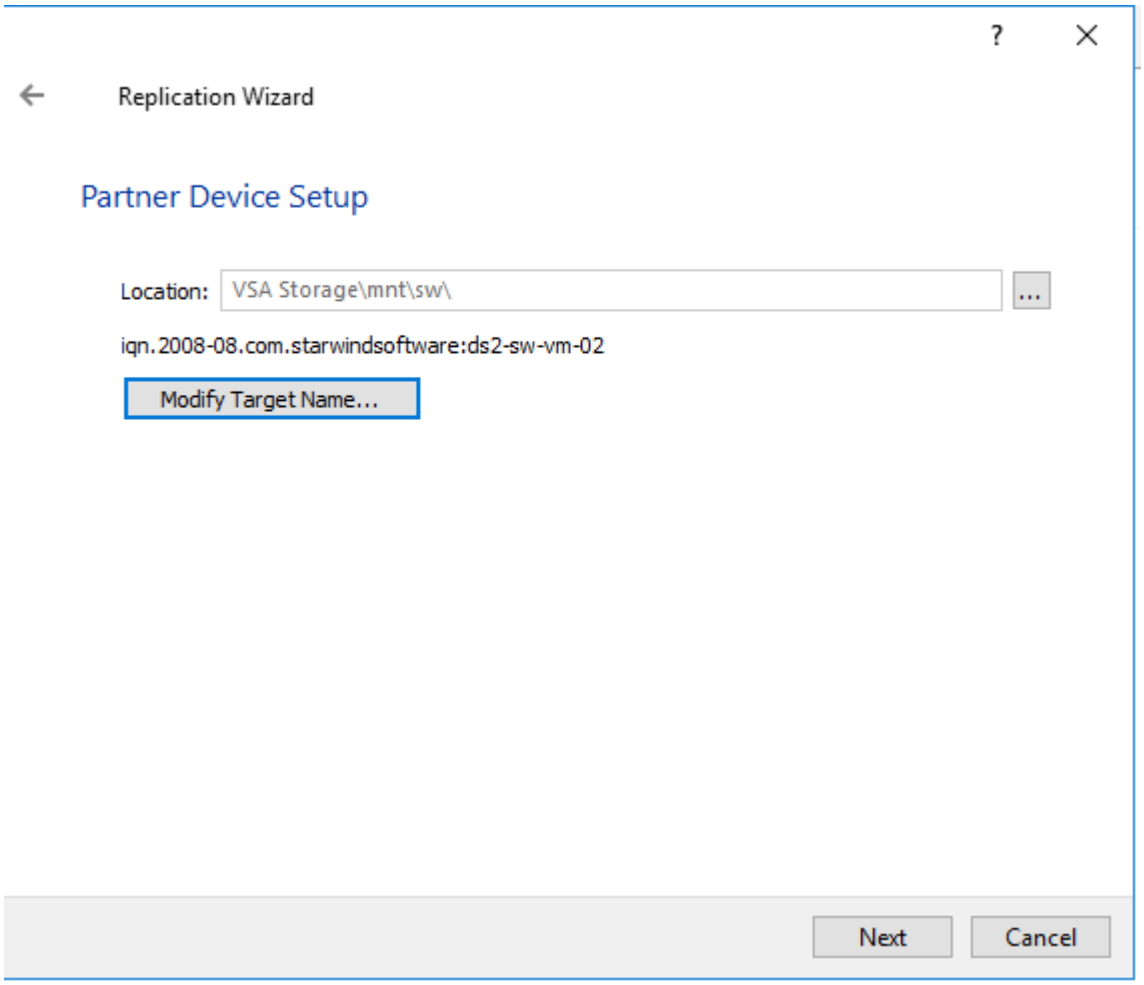
19. Select Failover Strategy.



20. Select Create new Partner Device and click Next.



21. Select a partner device Location and click Next.



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

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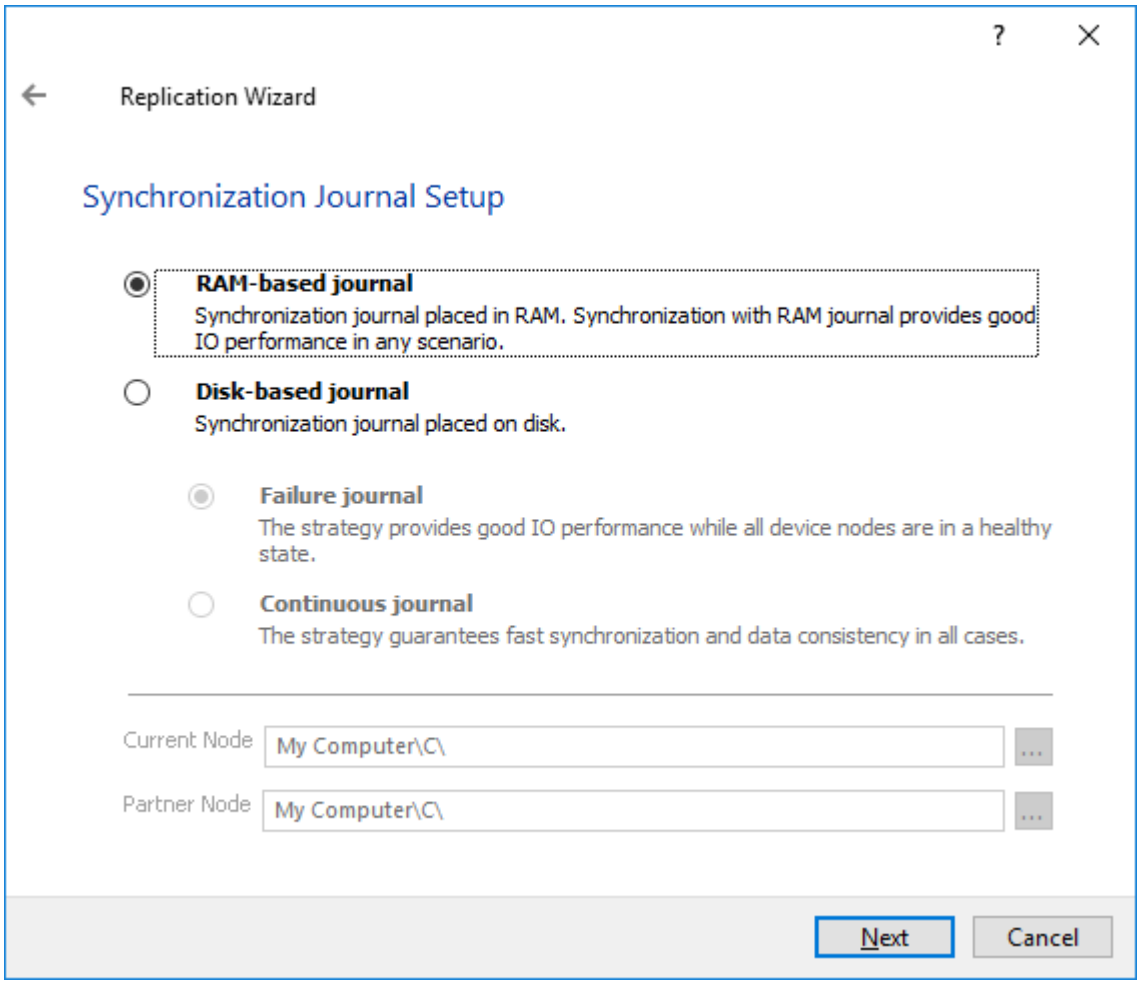
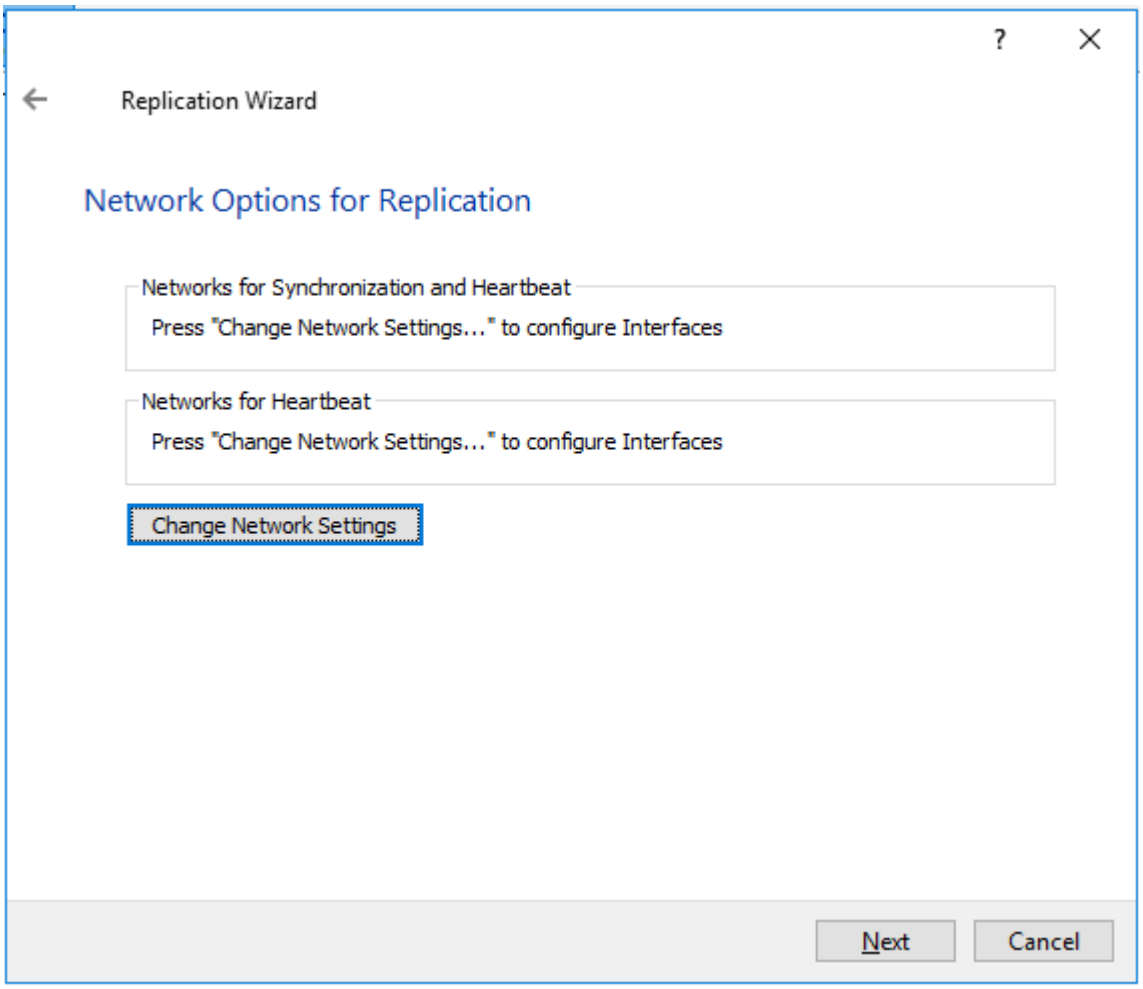
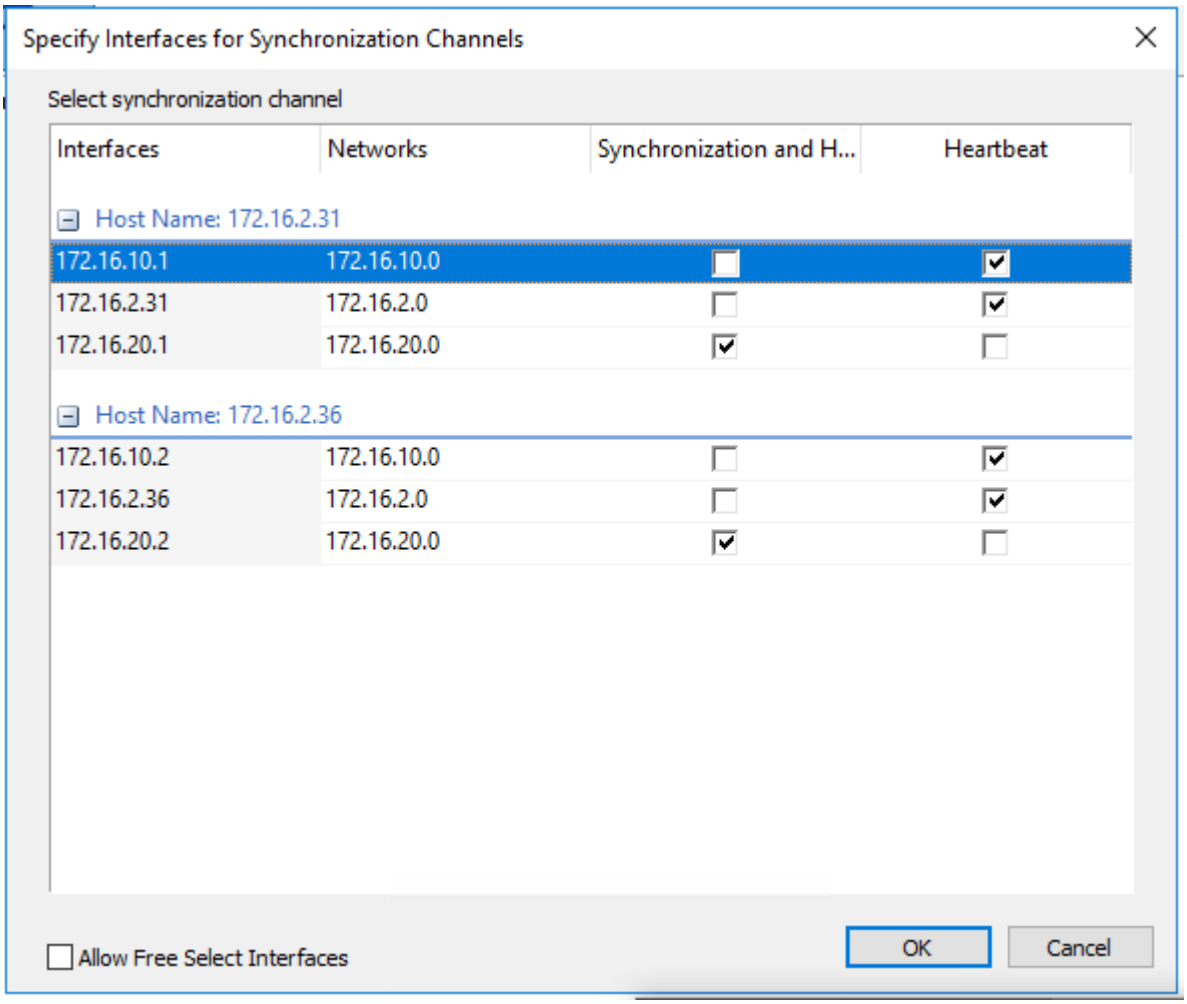
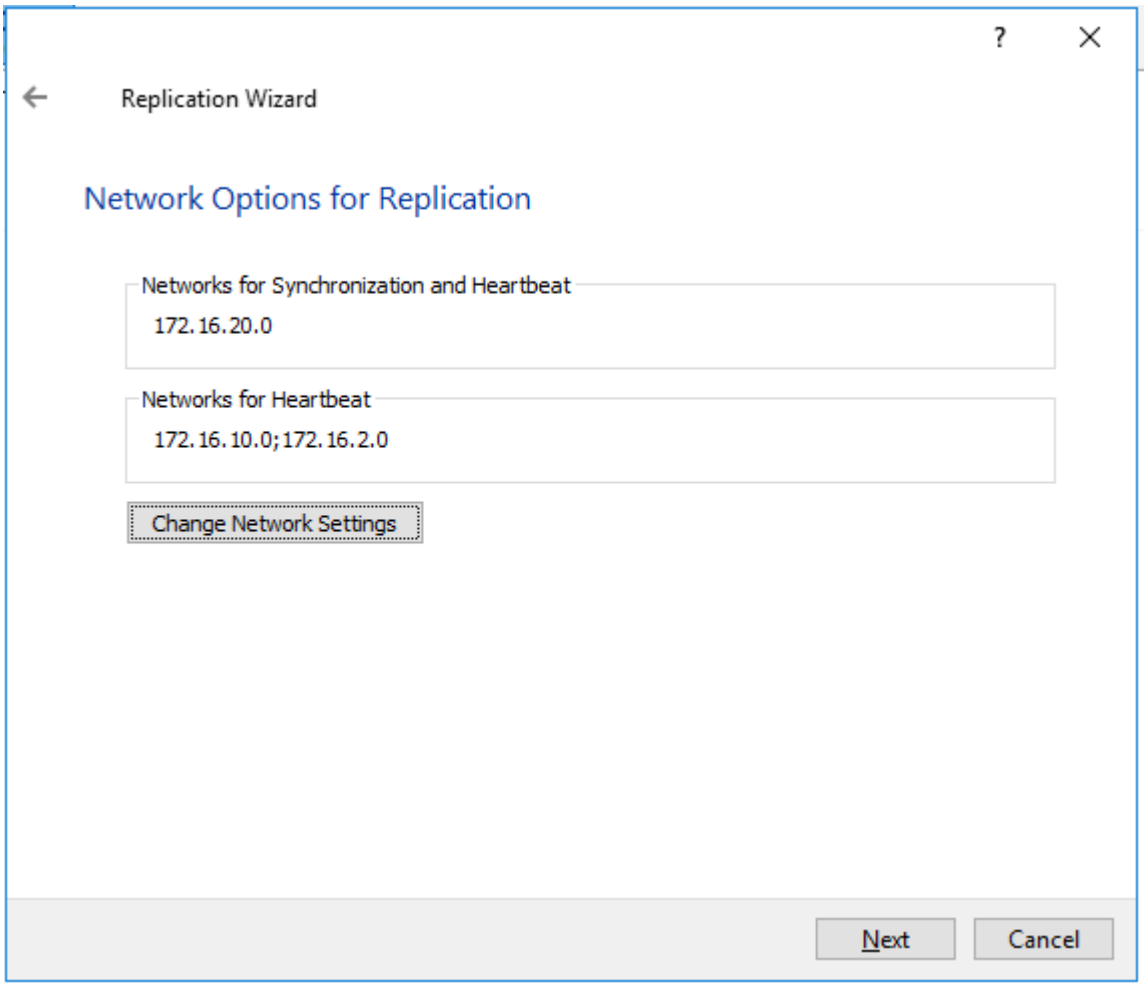


23. Click Change Network Settings.

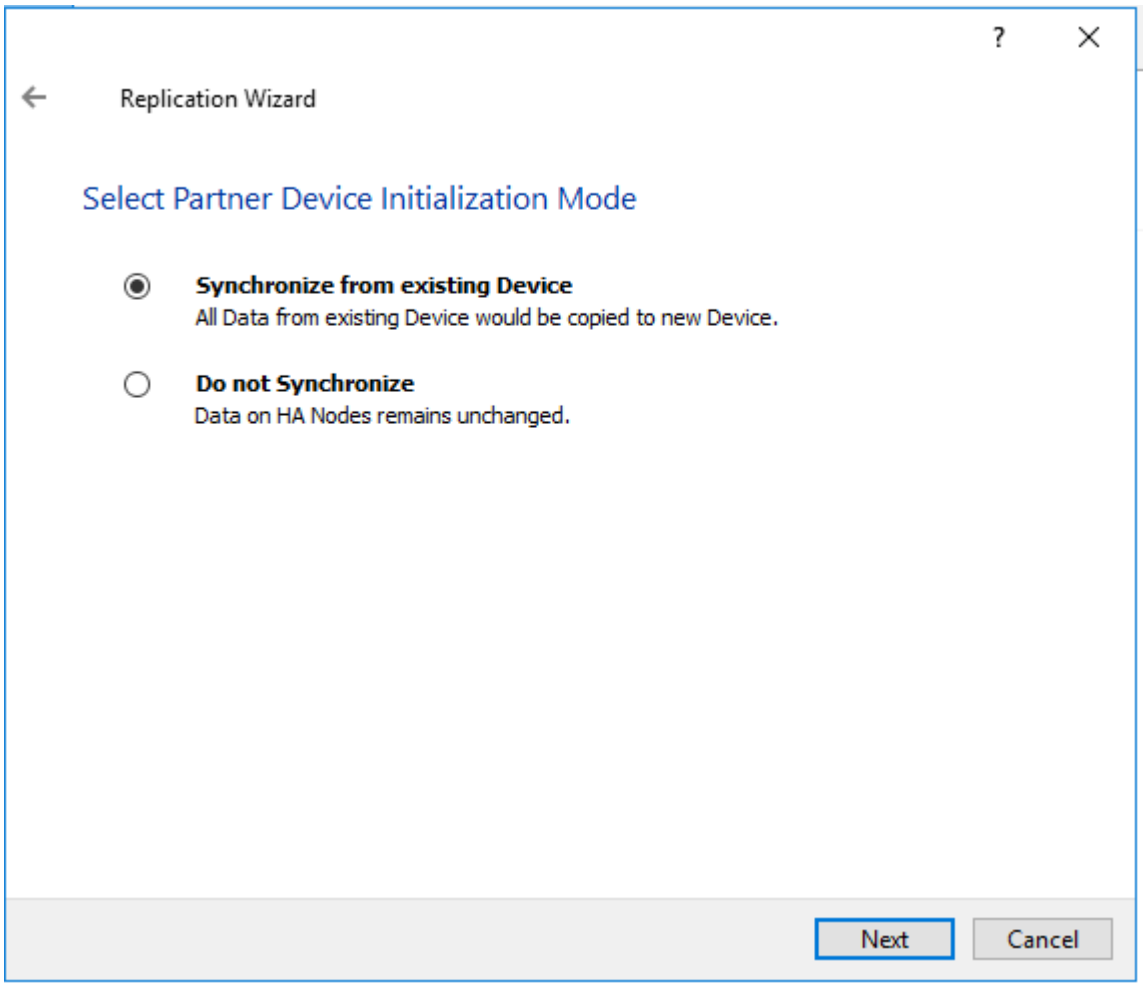


24. Specify the interfaces for Synchronization and Heartbeat Channels. Click OK and then click Next.
172.16.20.* -Synchronization
172.16.10.* and Management as HeartBeat

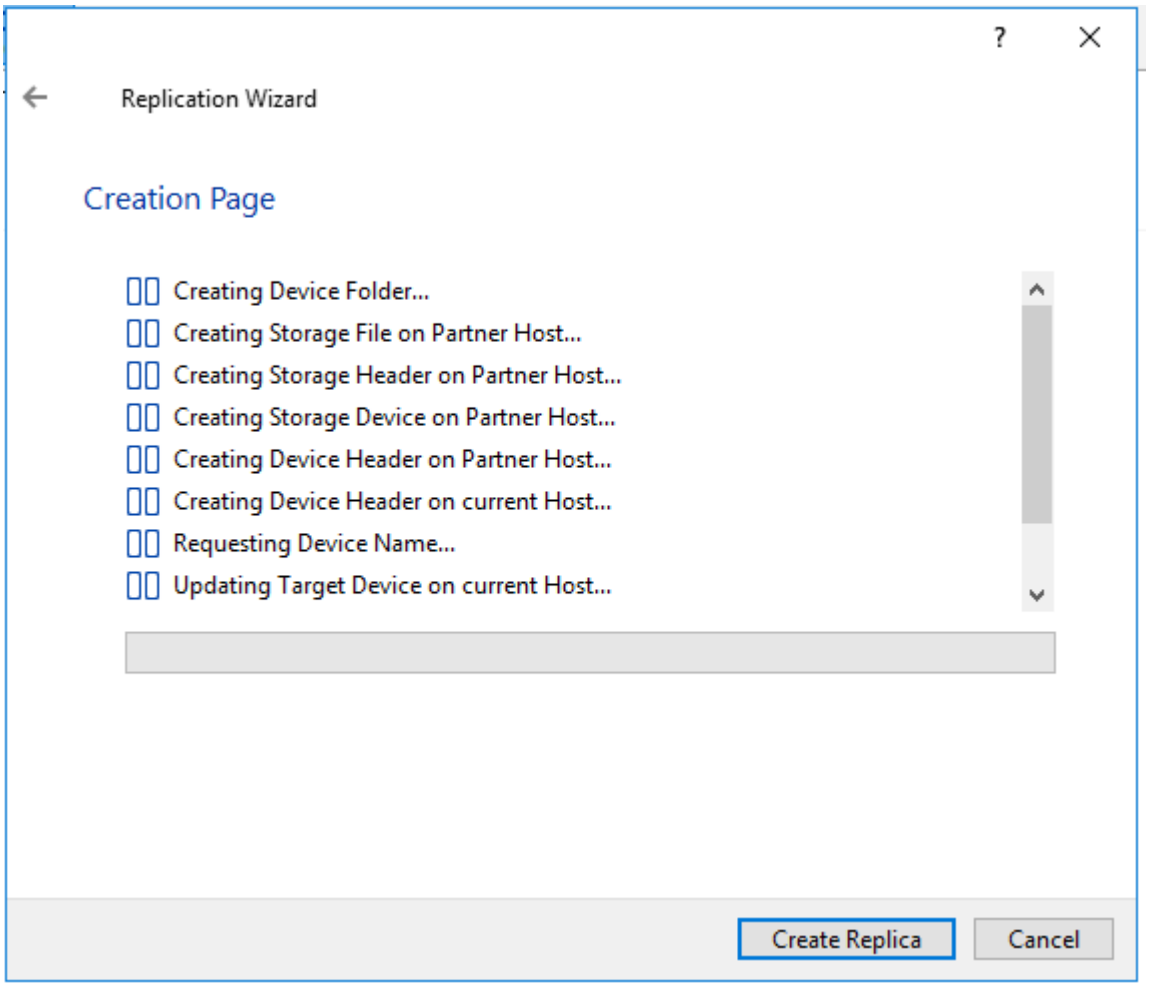

Specify Interfaces for Synchronization Channels
Select synchronization channel
Interfaces
Networks
Synchronization and H...
Heartbeat
Host Name: 172.16.2.31
172.16.10.1
172.16.10.0
172.16.2.31
172.16.2.0
172.16.20.1
172.16.20.0
Host Name: 172.16.2.36
172.16.10.2
172.16.10.0
172.16.2.36
172.16.2.0
172.16.20.2
172.16.20.0
Allow Free Select Interfaces
OK
Cancel



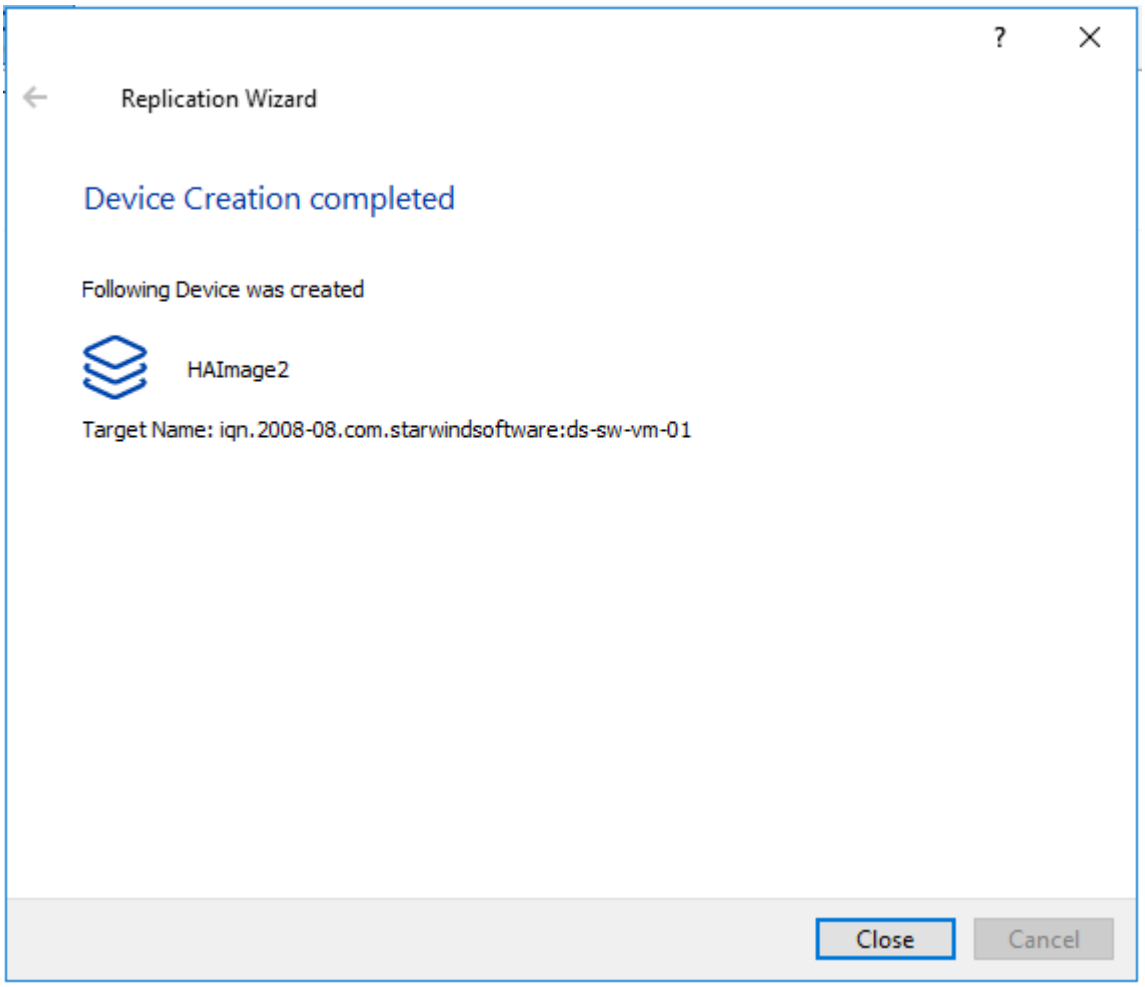
25. In Select Partner Device Initialization Mode, select Synchronize from existing Device and click Next.

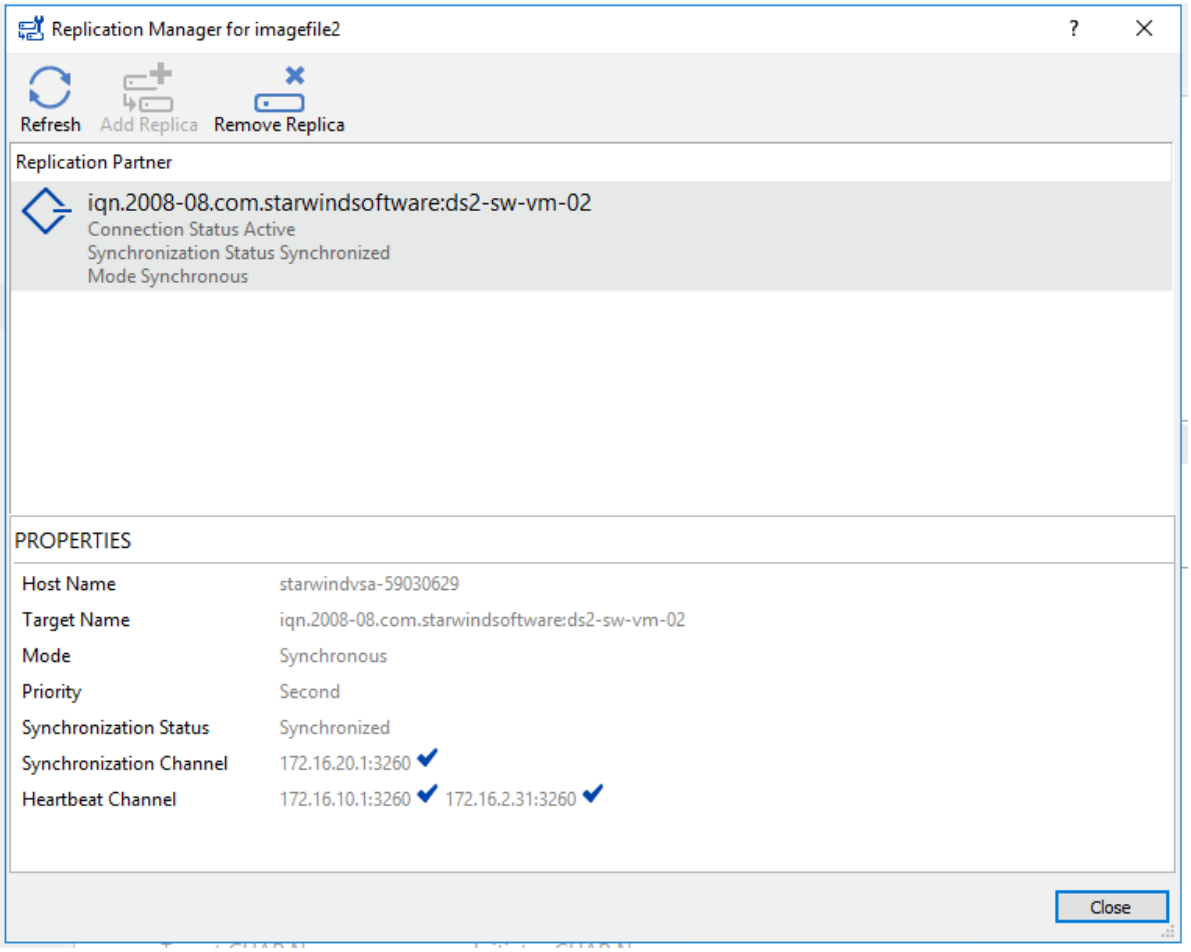


26. Click Create Replica.

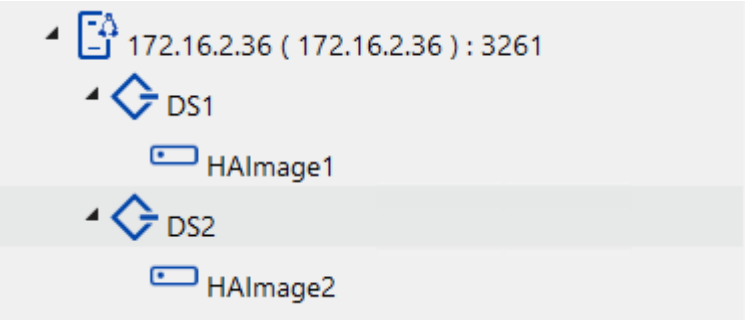


27. Click Close to close the wizard.


Replication Wizard
Device Creation completed
Following Device was created
HAImage2
Target Name: iqn.2008-08.com.starwindsoftware:ds-sw-vm-01
Close
Cancel

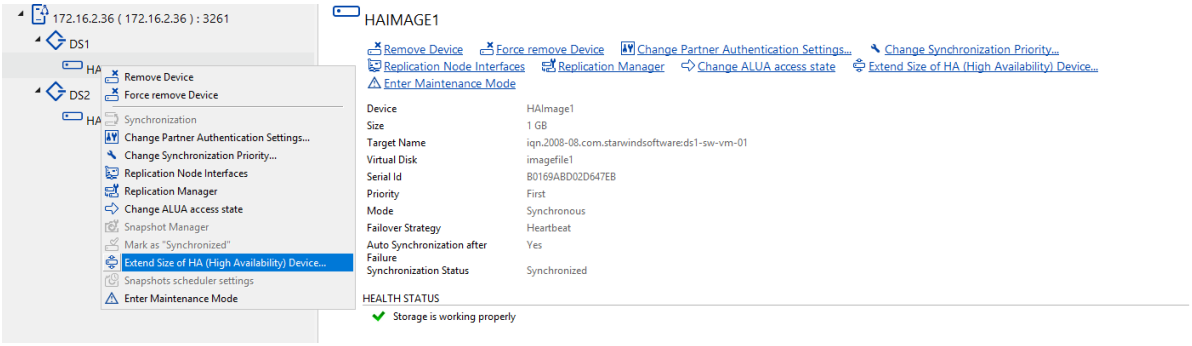


28. The successfully added device appears in StarWind Management Console.



Extend StarWind devices:

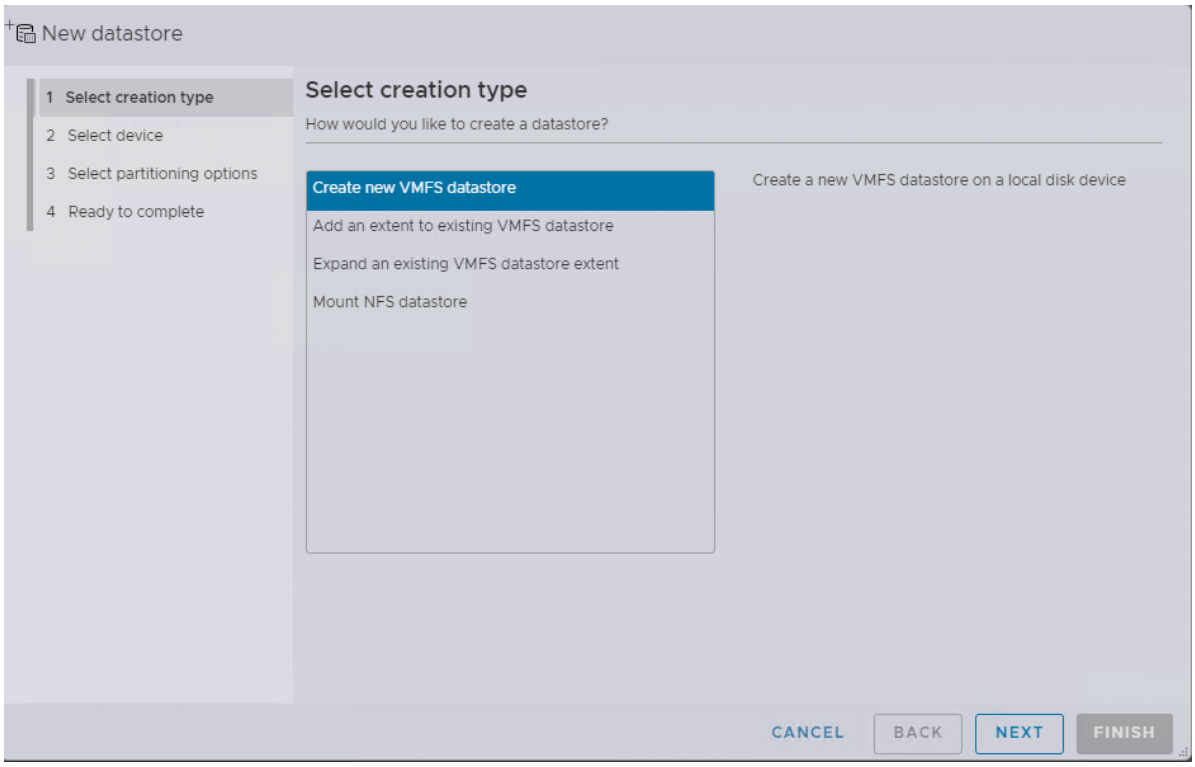
1. Right-click on the DS1 device and select (Extending Size of HA (High Availability Device) from the shortcut menu.



2. Enter the Amout of space to extend.
DS1 need to add 511GB
DS2 need to add 1023GB

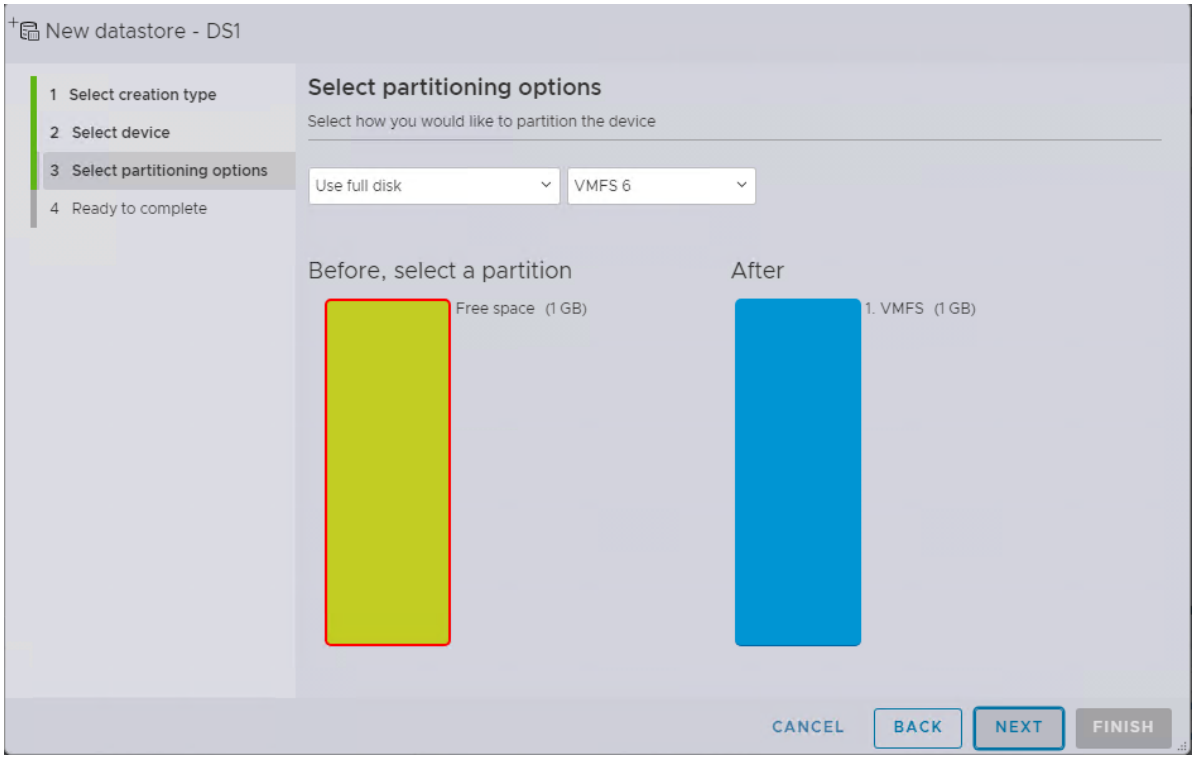
Datastore Creation On Top Of Starwind Devices

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

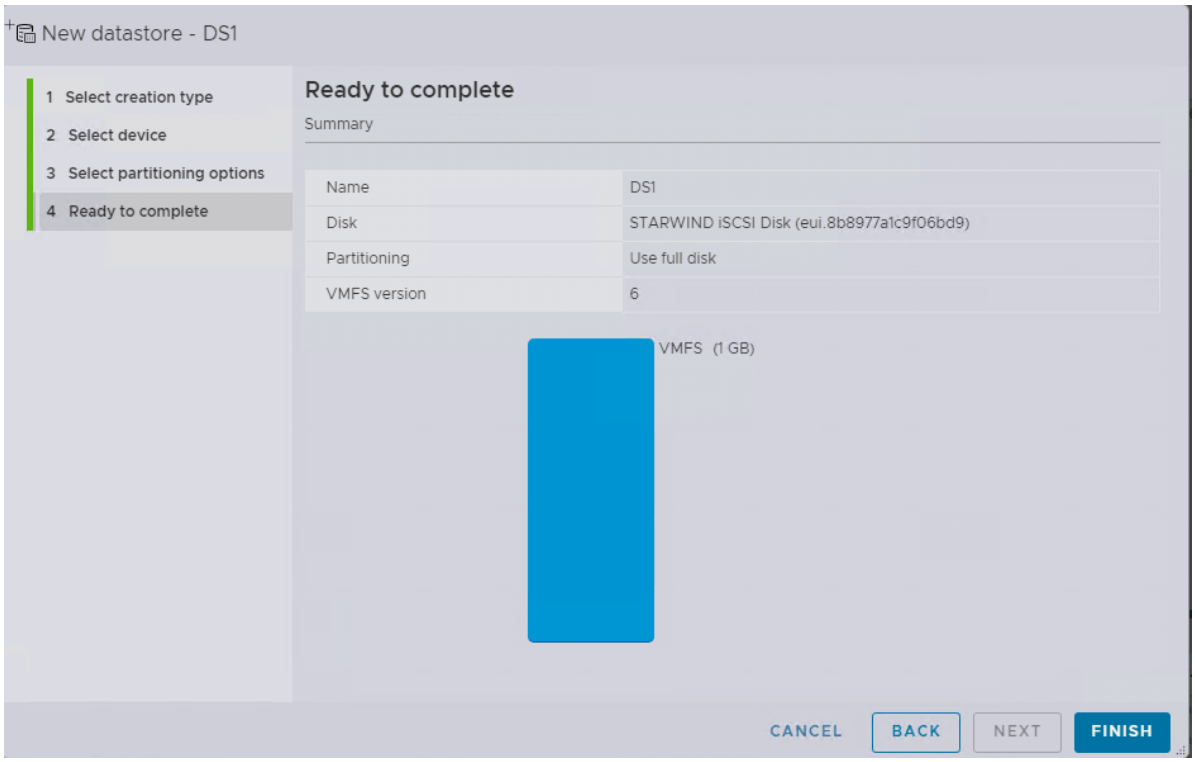


2. Specify the Datastore name, select the previously discovered StarWind device, and click Next.

3. Enter the datastore size and click Next.



4. Verify the settings and click Finish.



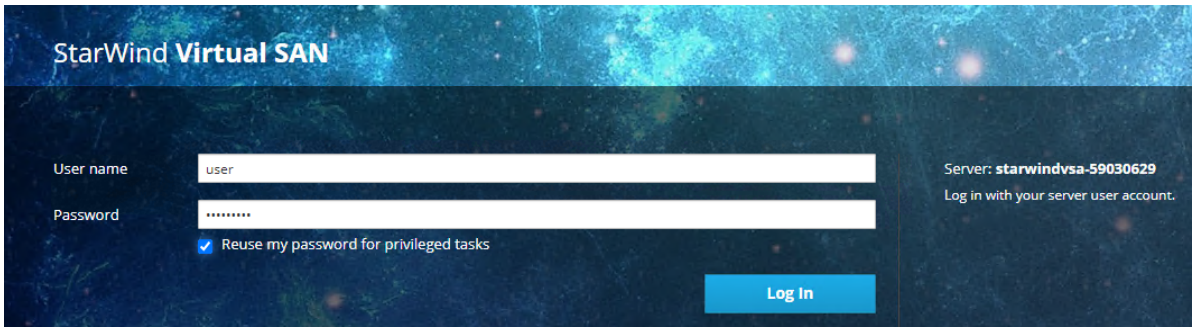
5. Add another Datastore (DS2) in the same way but select the second device for the second datastore.

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

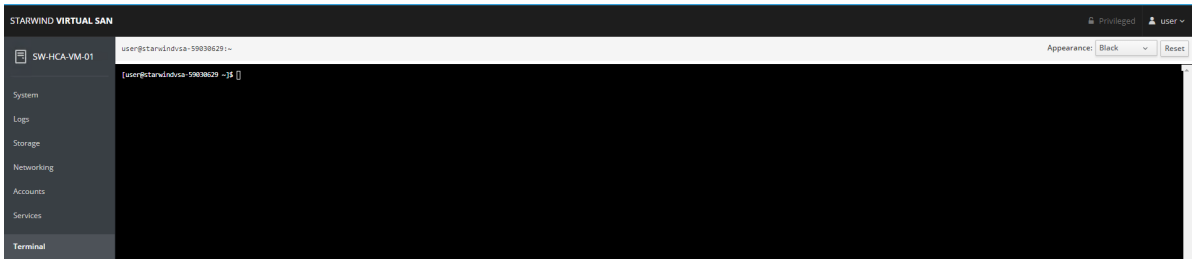
NOTE: Path Selection Policy changing for Datastores from Most Recently Used (VMware) to Round Robin (VMware) is added into the Rescan Script, and this action is performed automatically.

Configuration Of I/o Scheduler

1. Login to StarWind VSAN VM web console and find in the Storage section under Drives the Virtual Disk that was recently added and choose it.
Note: To log in to the StarWind VSAN VM web console you need to type the VM IP address and port 9090
Example: 192.168.1.1:9090
The default credentials:
Login: user
Password: rds123RDS



2. Open the “Terminal” page.



3. Check the storage to identify the disks, type lsblk.

```
user@sw-hca-vm-01:~
```

```
[user@sw-hca-vm-01 ~]$ lsblk
NAME            MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda               8:0    0   16G  0 disk
├─sda1            8:1    0    1G  0 part /boot
└─sda2            8:2    0   15G  0 part
  ├─centos-swap 253:0    0  1.6G  0 lvm  [SWAP]
  └─centos-root 253:1    0 13.4G  0 lvm  /
sdb               8:16   0  8.7T  0 disk
└─sdb1            8:17   0  8.7T  0 part /mnt/sw
sr0              11:0    1 1024M  0 rom
[user@sw-hca-vm-01 ~]$
```

4. Checking the scheduler settings: type cat /sys/block/sd*/queue/scheduler.

```
user@sw-hca-vm-01:~
```

```
[user@sw-hca-vm-01 ~]$ lsblk
NAME            MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda               8:0    0   16G  0 disk
├─sda1            8:1    0    1G  0 part /boot
└─sda2            8:2    0   15G  0 part
  ├─centos-swap 253:0    0  1.6G  0 lvm  [SWAP]
  └─centos-root 253:1    0 13.4G  0 lvm  /
sdb               8:16   0  8.7T  0 disk
└─sdb1            8:17   0  8.7T  0 part /mnt/sw
sr0              11:0    1 1024M  0 rom
[user@sw-hca-vm-01 ~]$ cat /sys/block/sdb/queue/scheduler
noop [deadline] cfq
[user@sw-hca-vm-01 ~]$
```

Result: [[bfq] mq-deadline none] OR [noop deadline [cfq]]

5. Set the scheduler settings:
type sudo nano /etc/udev/rules.d/89-disk-scheduler.rules.

```
[user@sw-hca-vm-01 ~]$ sudo nano /etc/udev/rules.d/89-disk-scheduler.rules
[sudo] password for user:
```

Password: rds123RDS

#Set none scheduler for non-rotating disks

```
user@sw-hca-vm-01:~

 GNU nano 2.3.1                File: /etc/udev/rules.d/89-disk-scheduler.rules

#Set none scheduler for non-rotating disks
#ACTION=="add|change", SUBSYSTEM=="block", KERNEL=="sd[a-z]", ATTR{queue/rotational}=="0", ATTR{queue/scheduler}="none", ATTR{queue/read_ahead_kb}="0"
#ACTION=="add|change", SUBSYSTEM=="block", KERNEL=="sd[b-d]", ATTR{queue/scheduler}="noop", ATTR{queue/read_ahead_kb}="0"

#Set bfq scheduler, rq_affinity, read_ahead_kb, nr_requests for rotating disks
ACTION=="add|change", SUBSYSTEM=="block", KERNEL=="sd[a-z]", ATTR{queue/rotational}=="1", ATTR{queue/scheduler}="cfq", ATTR{queue/rq_affinity}="2", ATTR{queue/read_ahead_kb}="2048", ATTR{queue/nr_requests}="1024"
```

ACTION==”add|change”, SUBSYSTEM==”block”, KERNEL==”sd[b-d]“,
ATTR{queue/scheduler}=”noop”, ATTR{queue/read_ahead_kb}=”0″

where sd[b-d] are disks settings that should be applied. For a single disk use sdb or sdc .
Note: For SSD disks scheduler should be “noop” , for HDD “cfq“

6. Check the rule:
type udevadm test /sys/block/sd*

```
user@sw-hca-vm-01:~
```

```
[user@sw-hca-vm-01 ~]$ udevadm test /sys/block/sdb
```

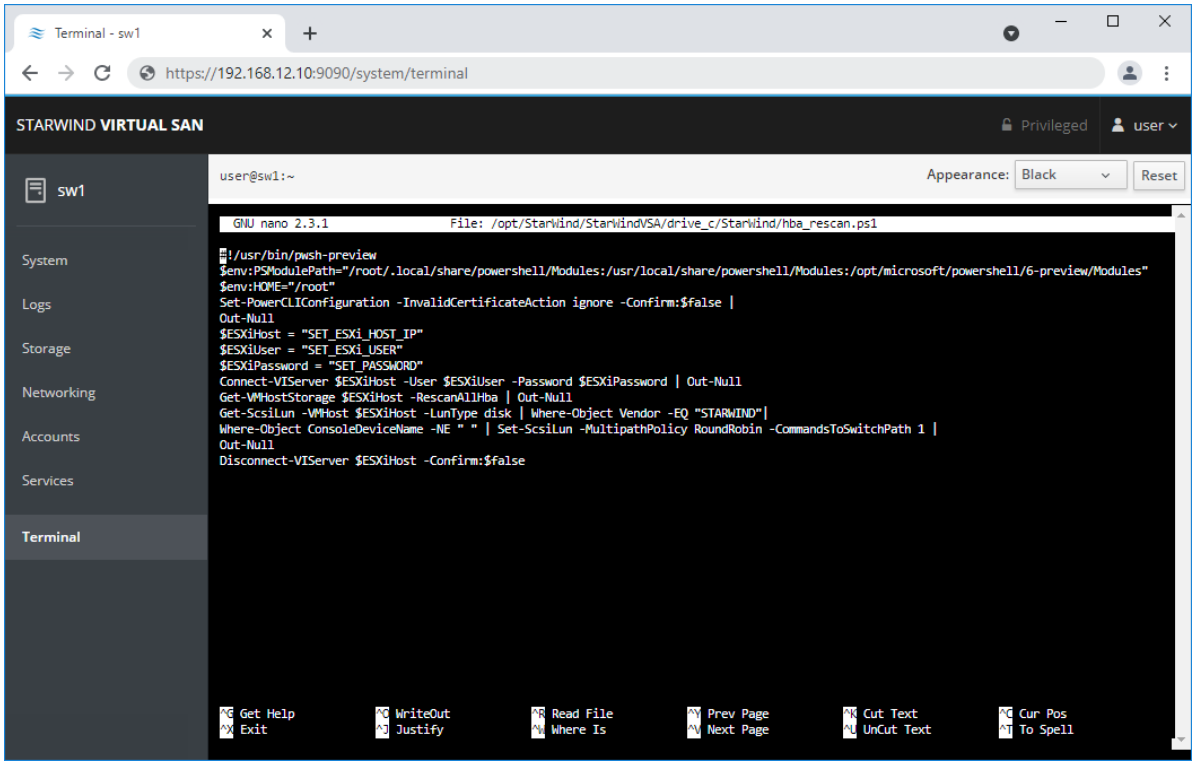
7. Check settings:
type cat /sys/block/sd*/queue/scheduler

8. Do the above changes for all StarWind Virtual machines.

Configuring An Automatic Storage Rescan

1. Open the Terminal page.

2. Edit file /opt/StarWind/StarWindVSA/drive_c/StarWind/hba_rescan.ps1 with the following command:
sudo nano /opt/StarWind/StarWindVSA/drive_c/StarWind/hba_rescan.ps1



3. In the appropriate lines, specify the IP address and login credentials of the ESXi host (see NOTE below) on which the current StarWind VM is stored and running:
$ESXiHost = “IP address”
$ESXiUser = “Health”
$ESXiPassword = “StarWind2015!”
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.

Make sure that rescan script is working and execute it from the VM:
sudo /opt/StarWind/StarWindVSA/drive_c/StarWind/hba_rescan.ps1

4. Repeat all steps from this section on the all other StarWind Virtual machines.

Proactive Agent Configuration

1. Stop the StarWindHealth
systemctl stop StarWindHealth.service

2. Change a line in /etc/systemd/system/StarWindHealth.service
ExecStart=/opt/StarWind/StarWindHealth/bin/nxagentd -d -c /etc/StarWindHealth.conf -M freepas.starwind.com
to
ExecStart=/opt/StarWind/StarWindHealth/bin/nxagentd -d -c /etc/StarWindHealth.conf -M pas.starwind.com

3. Reload the configuration for systemd
systemctl daemon-reload

4. Start the StarWindHealth
systemctl start StarWindHealth

5. Repeat all steps from this section on the all other StarWind Virtual machines.

Conclusion

Following this guide, a StarWind Virtual HCI Appliance (VHCA) powered by VMware vSphere was deployed and configured with StarWind Virtual SAN (VSAN) running in a CVM on each host. As a result, a virtual shared storage “pool” accessible by all cluster nodes was created for storing highly available virtual machines.

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