

StarWind Virtual SAN[®]

Quick Start Guide: Creating HA Device

AUGUST 2018

TECHNICAL PAPER



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About StarWind

StarWind is a pioneer in virtualization and a company that participated in the development of this technology from its earliest days. Now the company is among the leading vendors of software and hardware hyperconverged 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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Introduction

This technical paper describes how to create an HA device with **StarWind Virtual SAN®**. This virtualization software improves performance and fault tolerance of storage architecture. It eliminates the need in physical shared storage since **StarWind Virtual SAN®** mirrors the internal resources between the servers. Once StarWind iSCSI targets are connected to all cluster nodes, the HA devices are treated as local storage by both hypervisors and clustered applications. Fault tolerance is achieved by providing the multipath access to all storage nodes. Configuring **StarWind Virtual SAN®** not only simplifies management and operation of the storage infrastructure but also boosts its performance with no dedicated storage hardware or proprietary equipment required.

This guide is intended for experienced Windows system administrators and IT professionals who would like to configure the **StarWind Virtual SAN®** solution. This document provides detailed instructions on how to create a minimal 2-node highly-available shared storage configuration using **StarWind Virtual SAN®** running on top of Windows Server 2012 R2.

A full set of up-to-date technical documentation can always be found [here](#), or by clicking the **Help** button in the **StarWind Management Console**.

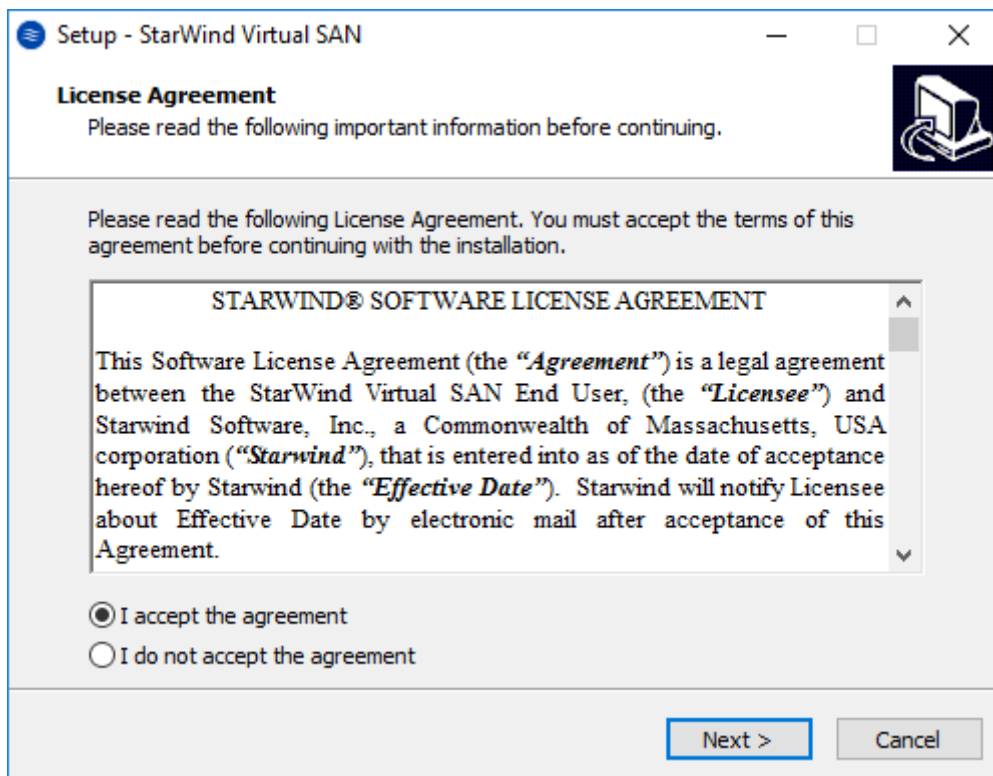
For any technical inquiries please visit our [online community](#), [Frequently Asked Questions](#) page, or use the [support form](#) to contact our technical support department.

Downloading, Installing, and Registering the Software

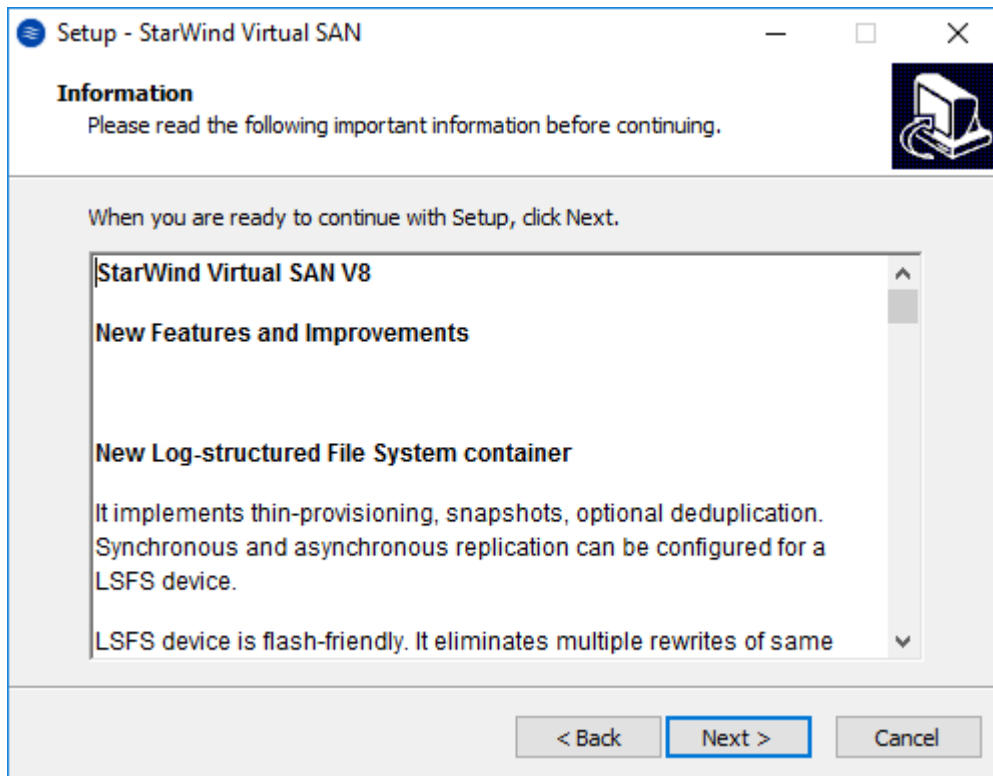
1. Download the StarWind setup executable file from StarWind website:
<http://www.starwindsoftware.com/registration-starwind-virtual-san>

NOTE: The setup file is unified for x86 and x64 systems, as well as for all Virtual SAN deployment scenarios.

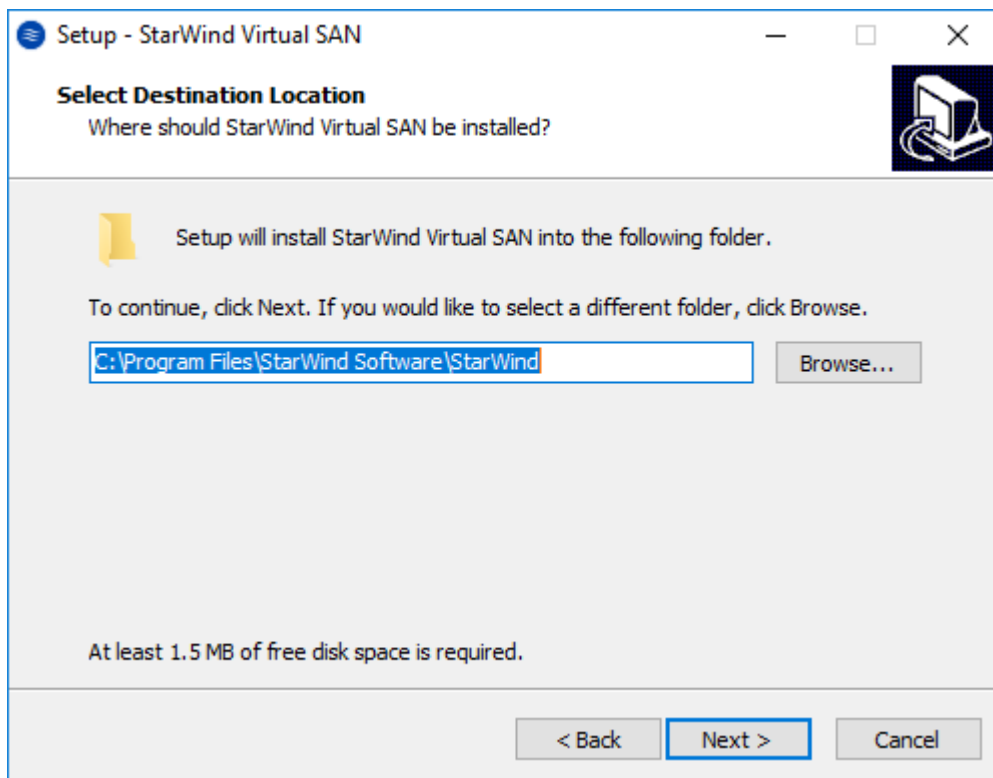
2. Launch the downloaded setup file on the server where **StarWind Virtual SAN** or one of its components needs to be installed. The **Setup** wizard will appear.
3. Read and accept the **License Agreement**. Click **Next**.



- Carefully read the information about new features and improvements. Red text indicates warnings for users who are updating the existing software installation. Click **Next** to continue.



5. Click **Browse** to modify the installation path if necessary. Click **Next** to continue.



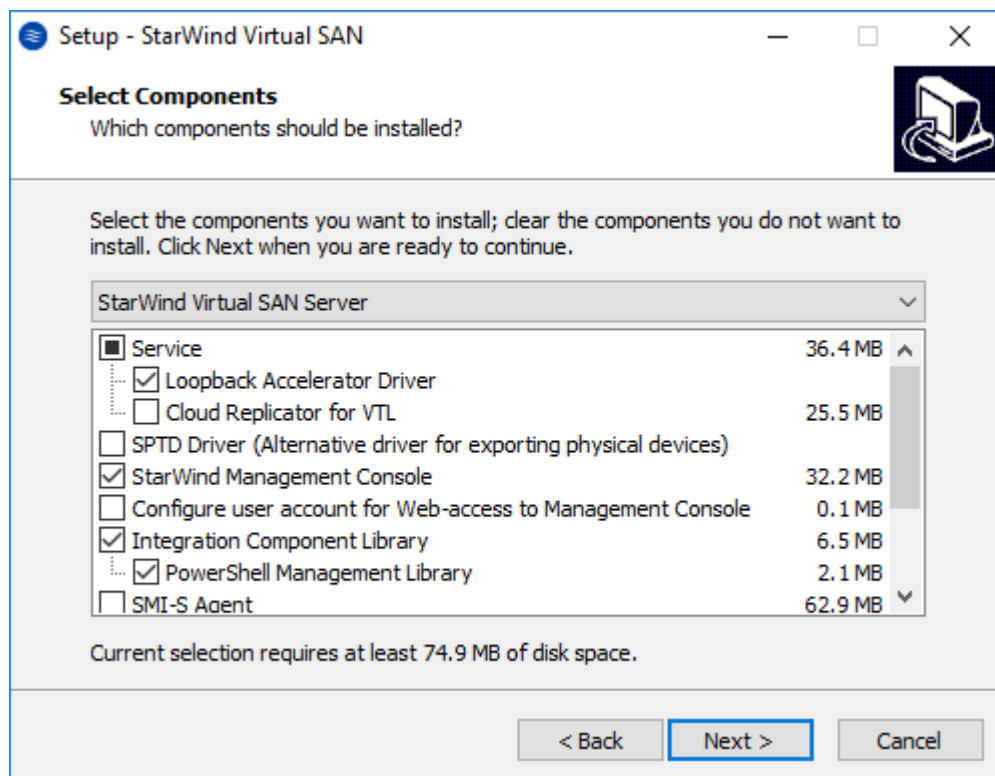
6. Specify one of the following installation types and the components which should be installed:

- **Full installation (recommended):**
Full installation includes both StarWind Service and the StarWind Management Console elements. It allows users to manage storage resources on the machine where StarWind Virtual SAN is installed, as well as manage other StarWind Virtual SAN installations on the network.
- **StarWind Virtual SAN Service:**
This installation type is designed for Core OS editions. StarWind Service is the “core” of the software. It enables the creation of iSCSI targets as well as sharing virtual and physical devices. StarWind Management Console installed on any Windows computer or virtual machine in the network can manage the service.

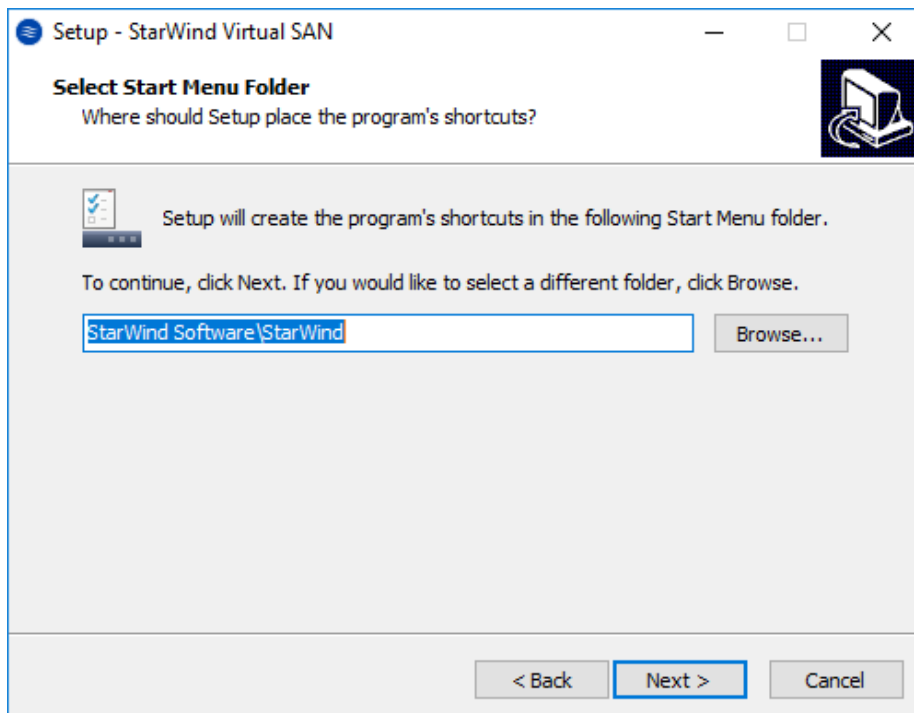
- **StarWind Management Console:**

StarWind Management Console is the Graphic User Interface (GUI) part of the software that controls and monitors all storage-related operations (e.g. allows users to create targets and devices on the available Virtual SAN servers). Once installed, StarWind Management Console is connected to the servers running StarWind Virtual SAN.

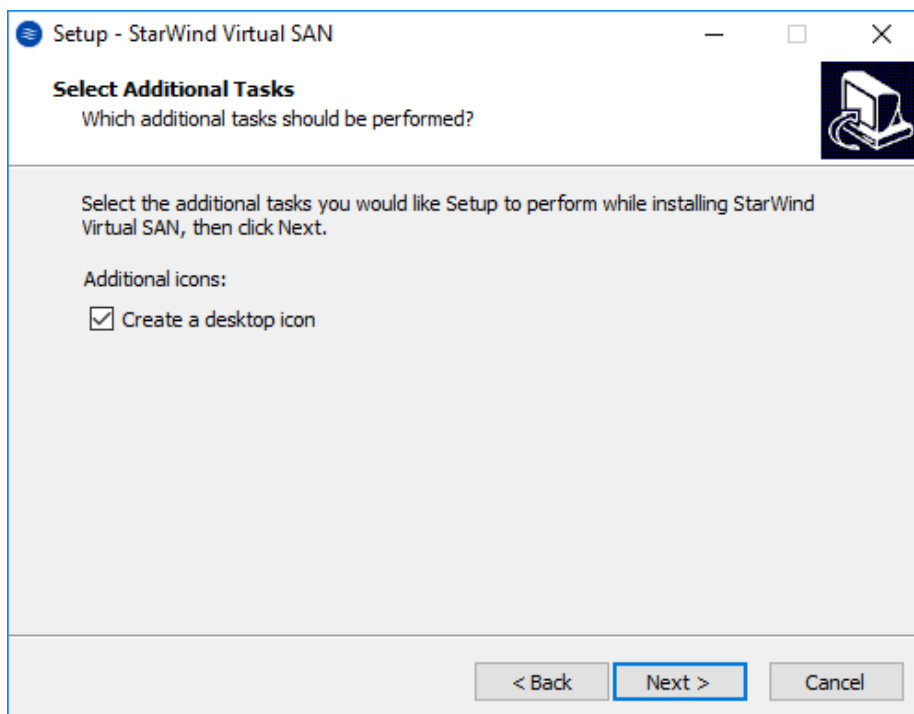
Click **Next** to continue.



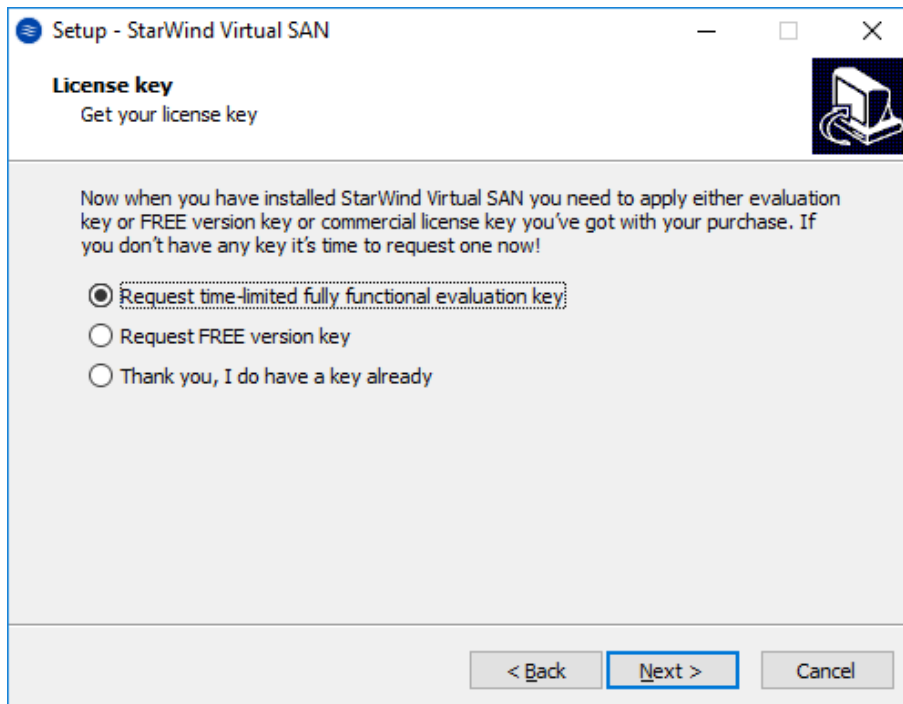
7. Specify the **Start Menu Folder**. Click **Next** to continue.



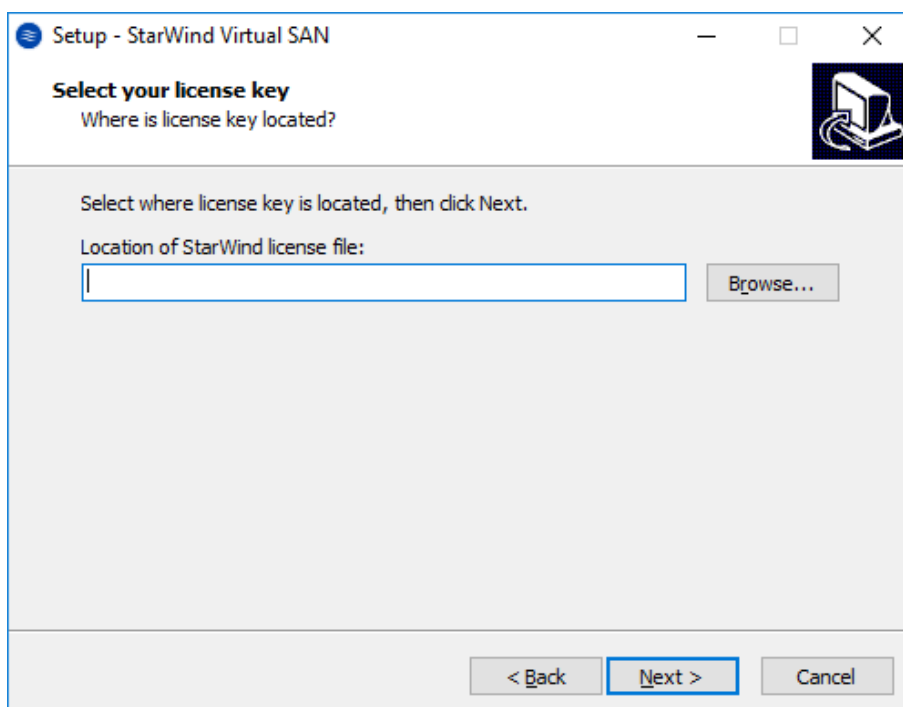
8. Enable the checkbox to create a desktop icon. Click **Next** to continue.



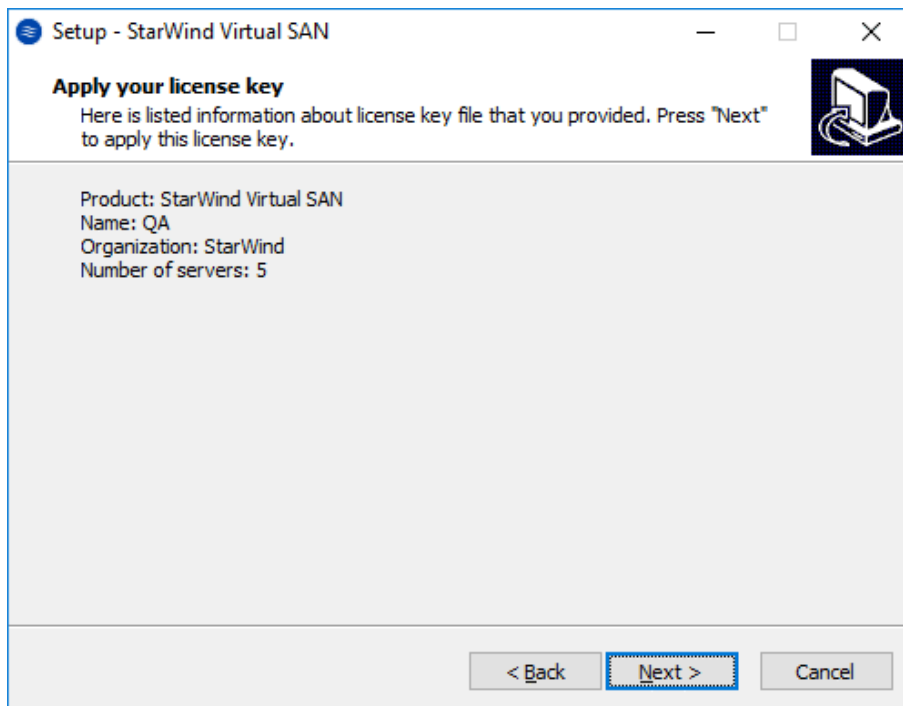
9. The appeared prompt will request a time-limited fully functional evaluation key, or a FREE version key, or a fully commercial license key sent with the purchase of **StarWind Virtual SAN**. Select the appropriate option. Click **Next** to continue.



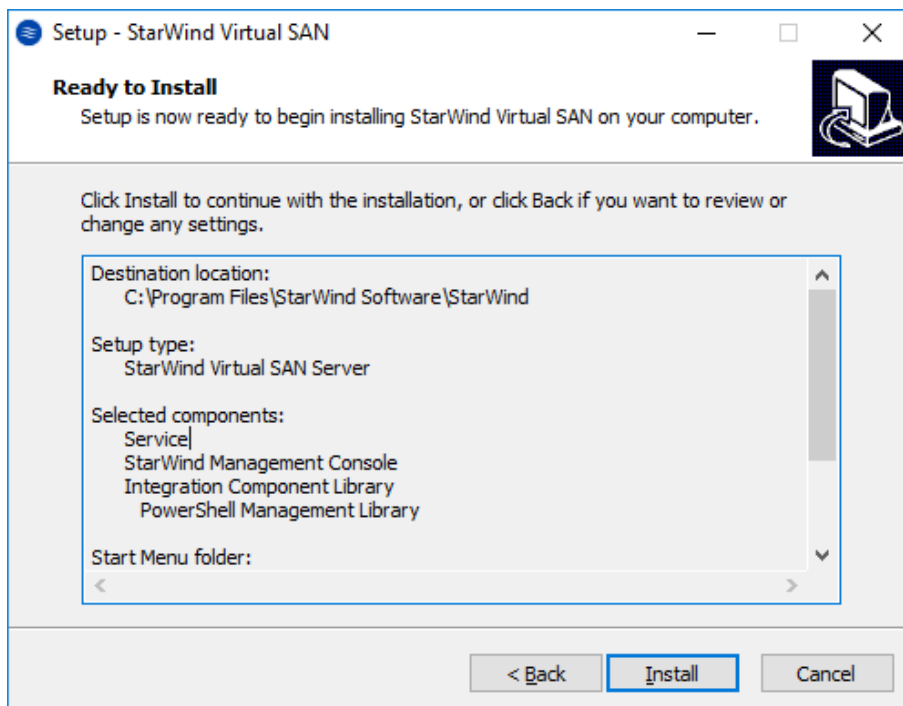
10. Click **Browse** to locate the license file. Click **Next** to continue.



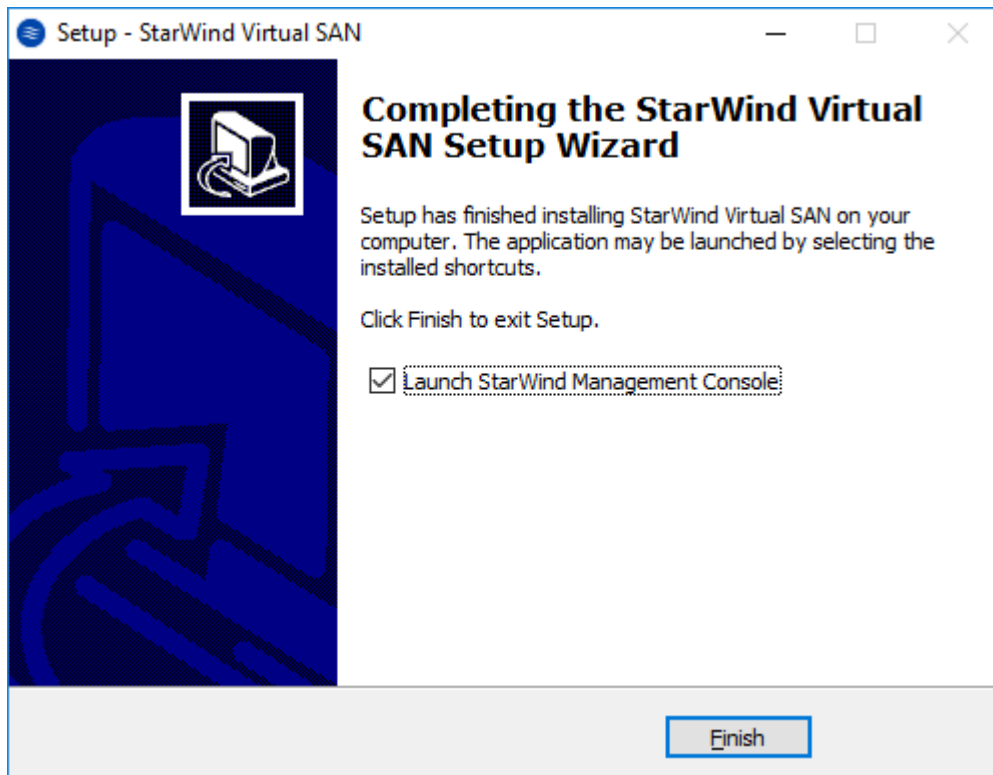
11. Review the licensing information. Click **Next** to apply the license key.



12. Verify the installation settings. Click **Back** to make any changes or **Install** to continue.



13. Select the appropriate checkbox to launch **StarWind Management Console** right after the setup wizard is closed. Click **Finish** to close the wizard.



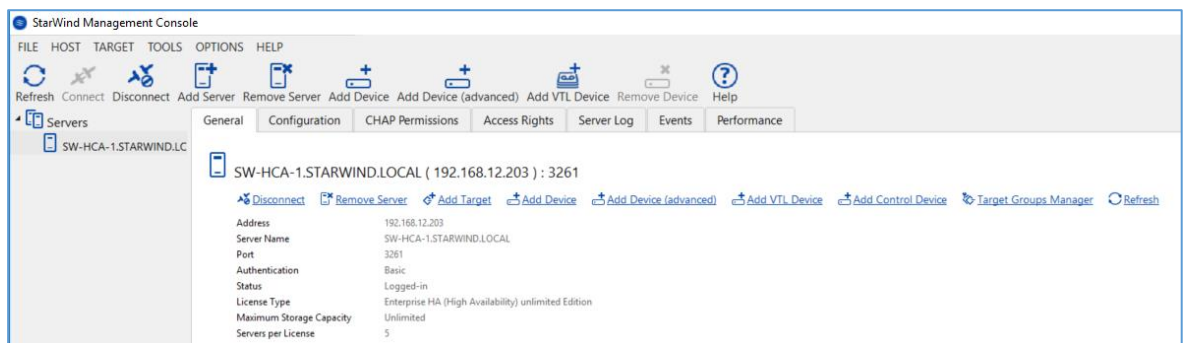
14. Repeat the steps above on the second server where **StarWind Virtual SAN** needs to be installed.

NOTE: To manage **StarWind Virtual SAN** installed on a Server Core OS edition, StarWind Management console must be installed on a different computer running the GUI-enabled Windows edition.

Creating Shared Storage

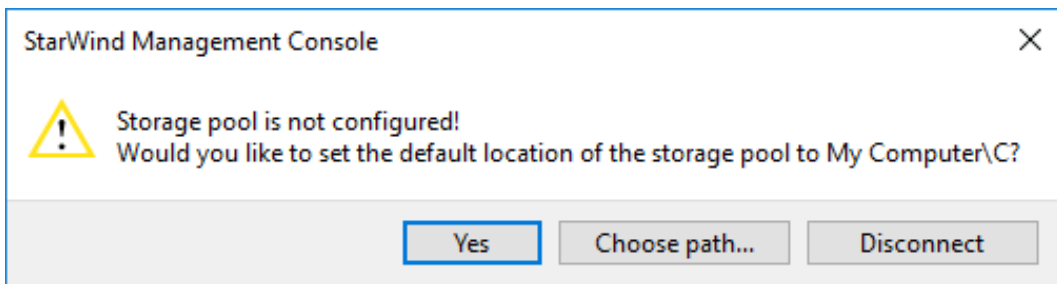
15. Launch **StarWind Management Console** by double-click on the StarWind tray icon.

NOTE: StarWind Management Console cannot be installed on a GUI-less OS. The console can be installed on any GUI-enabled Windows editions, including a desktop version of Windows.



If **StarWind Service** and **StarWind Management Console** are installed on the same server, **StarWind Management Console** automatically adds the local StarWind instance to the console tree after the first launch. Then, **StarWind Management Console** automatically connects to StarWind Service using default credentials. To add remote StarWind servers to the console, use the **Add Server** button on the control panel.

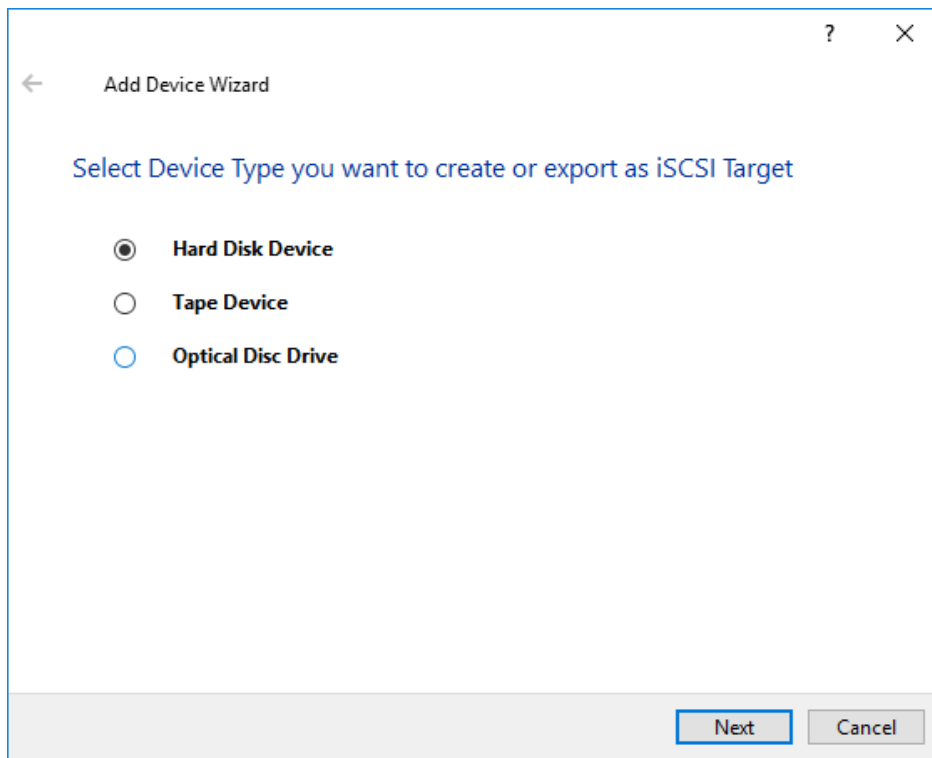
16. **StarWind Management Console** will ask to specify a default storage pool on the server to connect to for the first time. Configure the storage pool to use one of the volumes prepared earlier. All the devices created through the **Add Device** wizard will be stored on the configured storage pool. In case of using an alternative storage path for StarWind virtual disks, use the **Add Device (advanced)** menu item. Press the **Yes** button to configure the storage pool. In case the storage pool destination needs to be changed, press **Choose path...** and point the browser to the necessary disk.



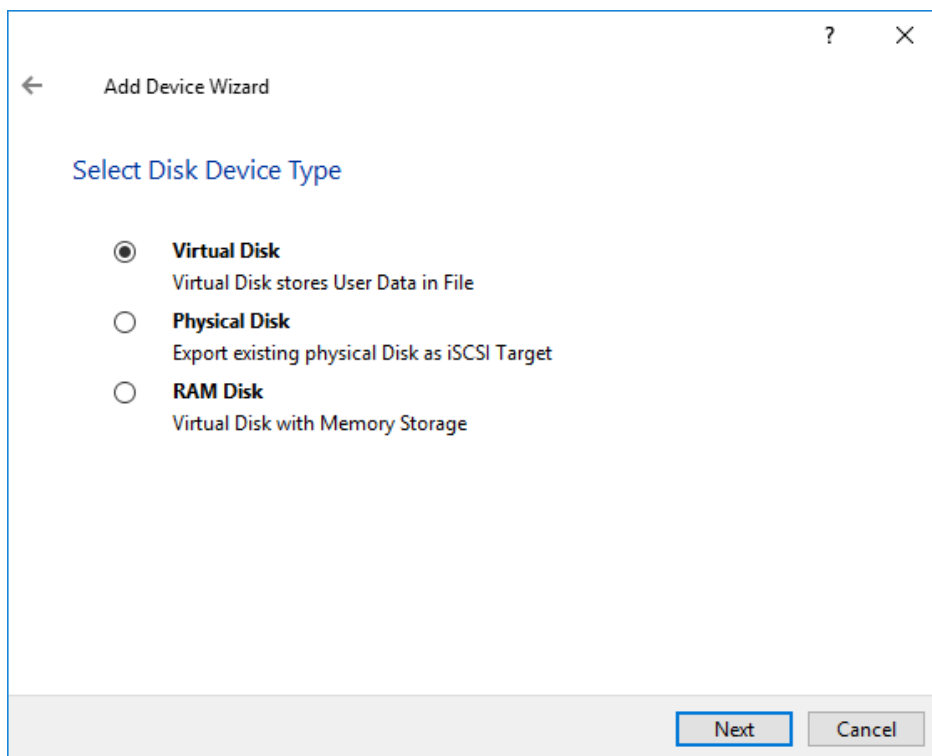
NOTE: Each of the arrays that will be used by **StarWind Virtual SAN** to store virtual disk images should meet the following requirements:

- Initialized as GPT;
 - Have a single NTFS-formatted partition;
 - Have a drive letter assigned.
17. Select the StarWind server where the device needs to be created.
18. Press the **Add Device (advanced)** button on the toolbar.

19. **Add Device Wizard** will appear. Select **Hard Disk Device** and click **Next**.



20. Select **Virtual Disk** and click **Next**.



21. Specify the virtual disk **Name**, **Location**, and **Size**. Click **Next** to continue.

The screenshot shows the 'Add Device Wizard' dialog box with the 'Virtual Disk Location' step selected. The 'Create a New Virtual Disk' radio button is selected. The 'Name' field contains 'Storage 1', the 'Location' field contains 'My Computer\E\' with a browse button, and the 'Size' field contains '1' GB. The 'Use an Existing Virtual Disk' radio button is unselected, and its 'Location' field is empty. A 'Read-Only Mode' checkbox is also unselected. 'Next' and 'Cancel' buttons are at the bottom right.

22. Specify **Virtual Disk Options**. Click **Next**.

The screenshot shows the 'Add Device Wizard' dialog box with the 'Virtual Disk Options' step selected. The 'Thick-provisioned' radio button is selected. The 'LSFS' radio button is unselected, and the 'Deduplication' checkbox is unselected. The 'StarPack Cache Size' field contains '16' MB. Under 'Block Size', the 'Use 4096 bytes sector size. May be incompatible with some clients' radio button is selected. The 'Numa Node' dropdown menu is set to 'Auto'. 'Next' and 'Cancel' buttons are at the bottom right.

23. Define the caching policy and specify the cache size. Click **Next**.

← 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:

Next Cancel

NOTE: The basic recommendation is to assign 1 GB of L1 cache in Write-Back or Write-Through mode per 1 TB of storage capacity. The cache size should correspond to the storage working set of the servers.

NOTE: The information on L1 cache implementing can be found by following the link: <https://www.starwindsoftware.com/resource-library/starwind-virtual-san-l1-and-l2-caches-operational-principles>

24. Define the **Flash Cache Parameters** policy and size if necessary. Select an SSD location in the wizard. Click **Next** to continue.

The screenshot shows a window titled "Add Device Wizard" with a back arrow on the left and help/question mark and close (X) icons on the right. The main heading is "Specify Flash Cache Parameters". There are two radio button options: "No Flash Cache" (which is selected) and "Use Flash Cache". Below these options is a form with three fields: "Name:" with the value "Flash-Storage 1", "Location:" with the value "My Computer\E\" and a browse button "...", and "Size:" with the value "1" and a unit dropdown menu set to "GB". At the bottom right of the window are two buttons: "Next" and "Cancel".

NOTE: The recommended size of the L2 cache is 10% of the initial StarWind device capacity.

NOTE: The information on L2 cache implementing can be found by following the link: <https://www.starwindsoftware.com/resource-library/starwind-virtual-san-l1-and-l2-caches-operational-principles>

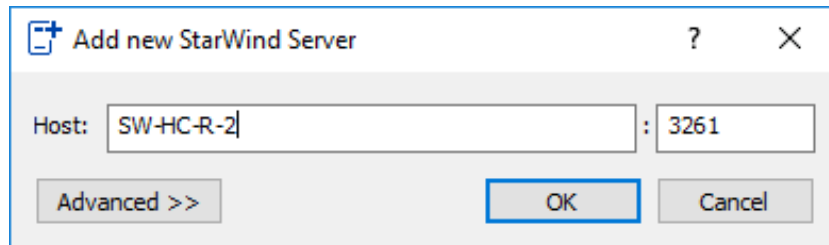
- Specify **Target Parameters**. Select the **Target Name** checkbox to enter a custom name of a target. Otherwise, the name will be generated automatically based on the target alias. Click **Next** to continue.

The screenshot shows the 'Add Device Wizard' dialog box with the 'Target Parameters' section. It includes a dropdown menu for 'Choose a Target Attachment Method' set to 'Create new Target', a text field for 'Target Alias' containing 'Storage1', an unchecked checkbox for 'Target Name' with a text field below it containing 'iqn.2008-08.com.starwindsoftware:sw-hc-r-1.starwind.local-storage.1', and a checked checkbox for 'Allow multiple concurrent iSCSI Connections'. 'Next' and 'Cancel' buttons are at the bottom right.

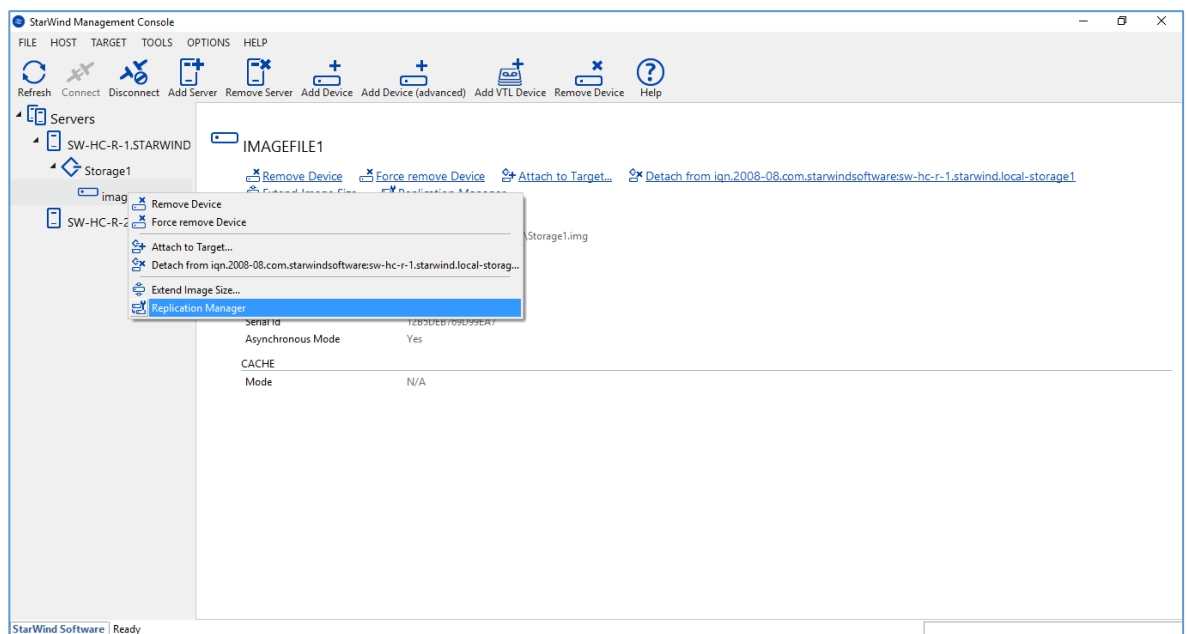
- Click **Create** to add a new device and attach it to the target. Click **Close** to close the wizard.

The screenshot shows the 'Add Device Wizard' dialog box with the 'Creation Page' section. It displays the instruction 'Press "Create" to add new Device and attach it to new Target' and a progress list with five items, each with a progress indicator: 'Creating Device Folder...', 'Creating Image File...', 'Creating Header...', 'Creating Device...', and 'Creating Target and attaching Device...'. A progress bar is visible below the list. 'Create' and 'Cancel' buttons are at the bottom right.

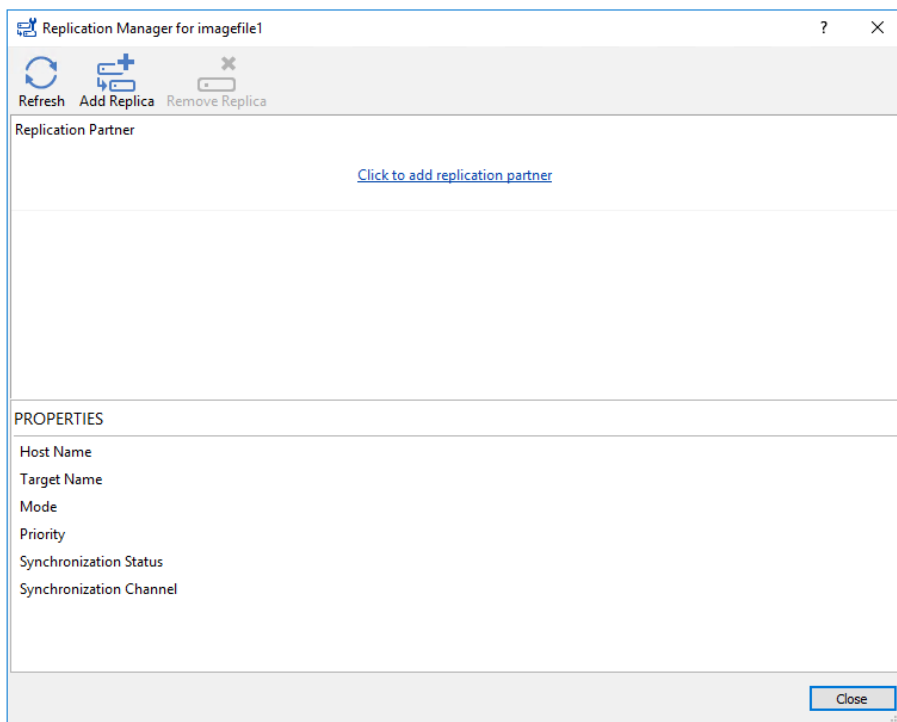
27. Right-click **Servers** and select **Add Server**. Add a new StarWind Server which will be used as the second HA node. Click **OK** and the **Connect** button to continue.



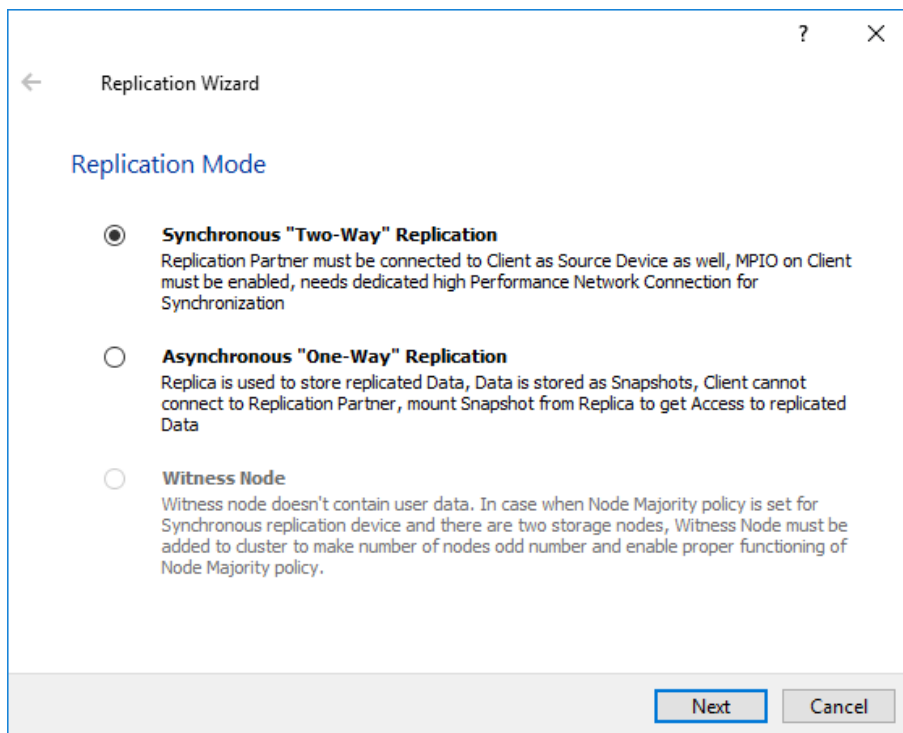
28. Right-click the recently created device and select **Replication Manager**.



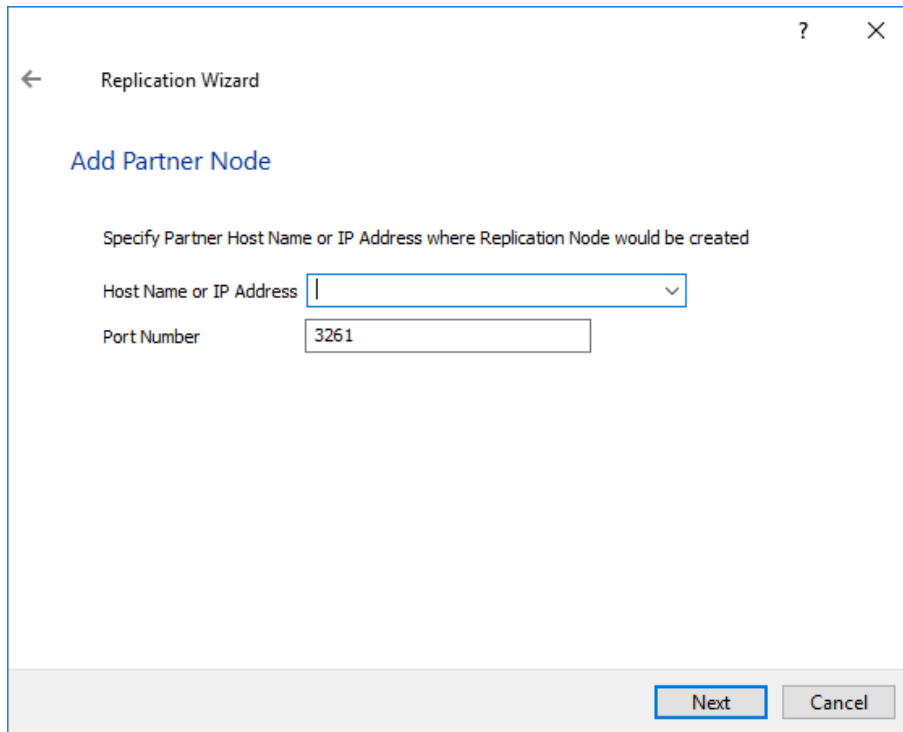
29. The **Replication Manager** window will appear. Press the **Add Replica** button.



30. Select **Synchronous "Two-Way" Replication** and click **Next** to proceed

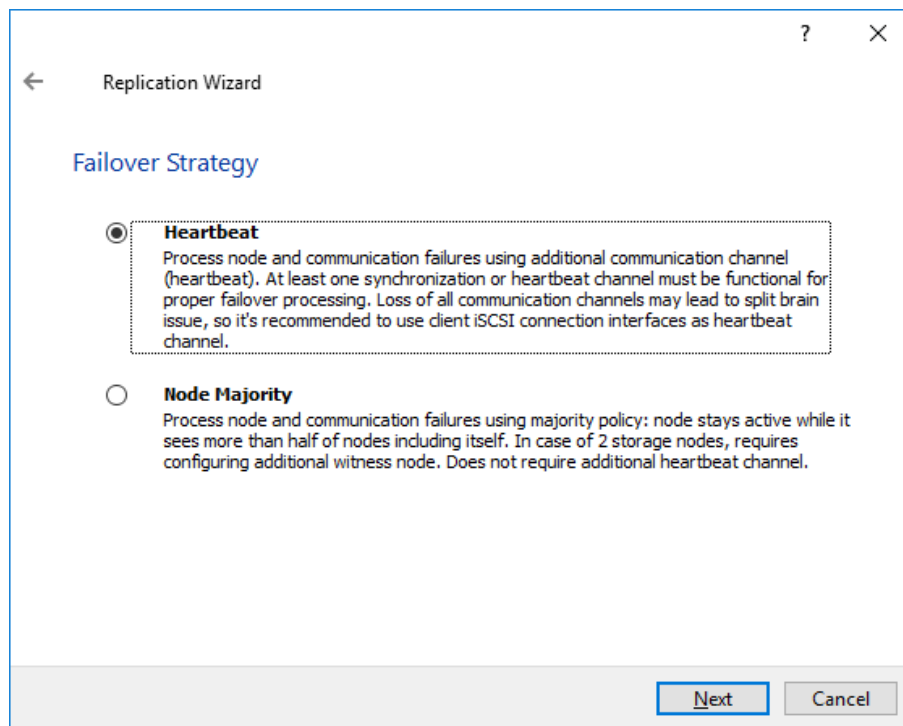


31. Specify the partner server IP address. The default StarWind management port is 3261. It can be changed in the **Port number** field. Click **Next**.



The screenshot shows a dialog box titled "Replication Wizard" with a back arrow on the left and help and close icons on the right. The main heading is "Add Partner Node". Below this, the instruction reads "Specify Partner Host Name or IP Address where Replication Node would be created". There are two input fields: "Host Name or IP Address" which is a dropdown menu currently empty, and "Port Number" which contains the value "3261". At the bottom right, there are two buttons: "Next" (highlighted with a blue border) and "Cancel".

32. Select the **Failover Strategy** policy.



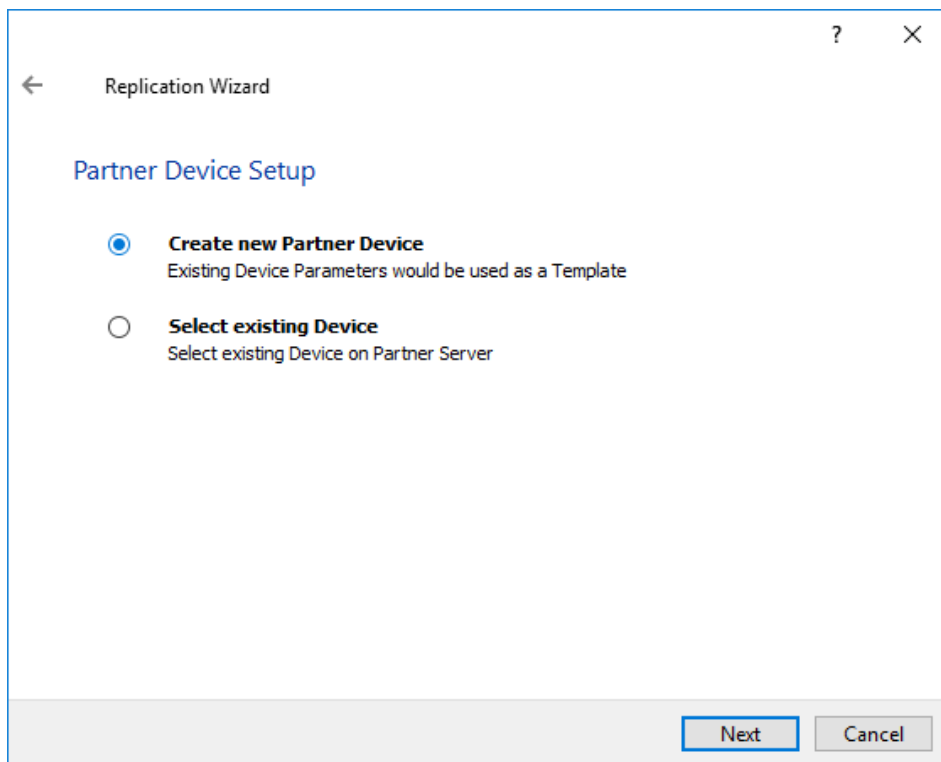
NOTE: With **Heartbeat** failover strategy, one node remains active, even in case of all partner nodes failure. With **Node Majority** failover strategy, failure of only one node can be tolerated. If two nodes fail, the third one will become unavailable to clients' requests.

This document describes the creation of an HA device with Heartbeat failover strategy.

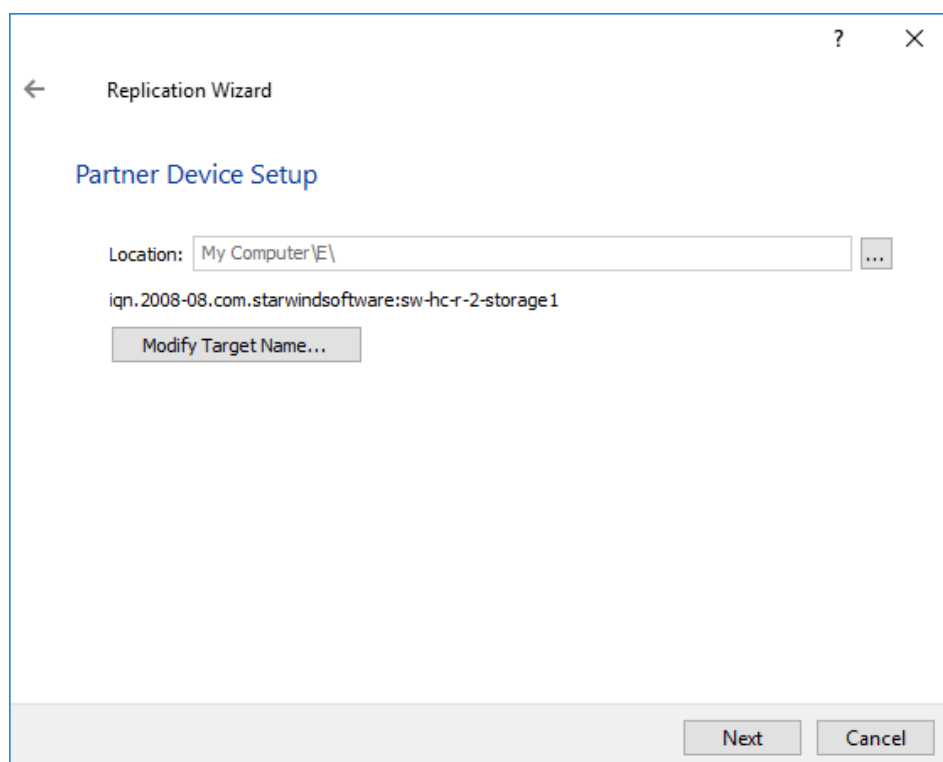
The creation of an HA device with Node Majority failover strategy is covered in the following document:

<https://www.starwindsoftware.com/resource-library/creating-highly-available-device-using-node-majority-failover-strategy>

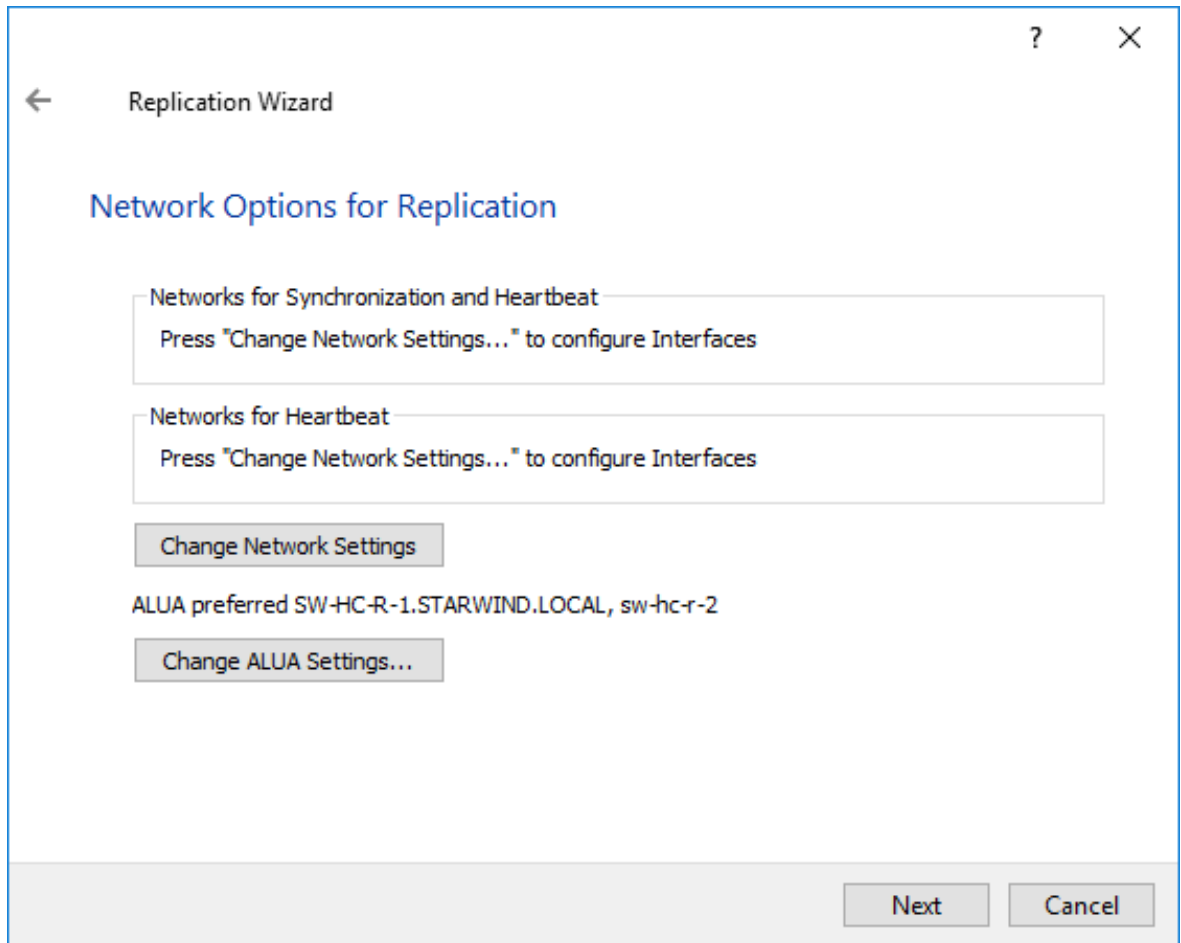
33. Select **Create new Partner Device** and click **Next**.



34. Specify the partner device location if necessary. The target name of the device can be modified by clicking on the appropriate button. Click **Next**.



35. Specify the Synchronization and Heartbeat channels for the HA device. The ALUA settings can be changed by clicking on the appropriate button.



36. Click **Change Network Settings** and specify the interfaces for Synchronization and Heartbeat. Click **OK** and **Next**.

Specify Interfaces for Synchronization Channels

Select synchronization channel

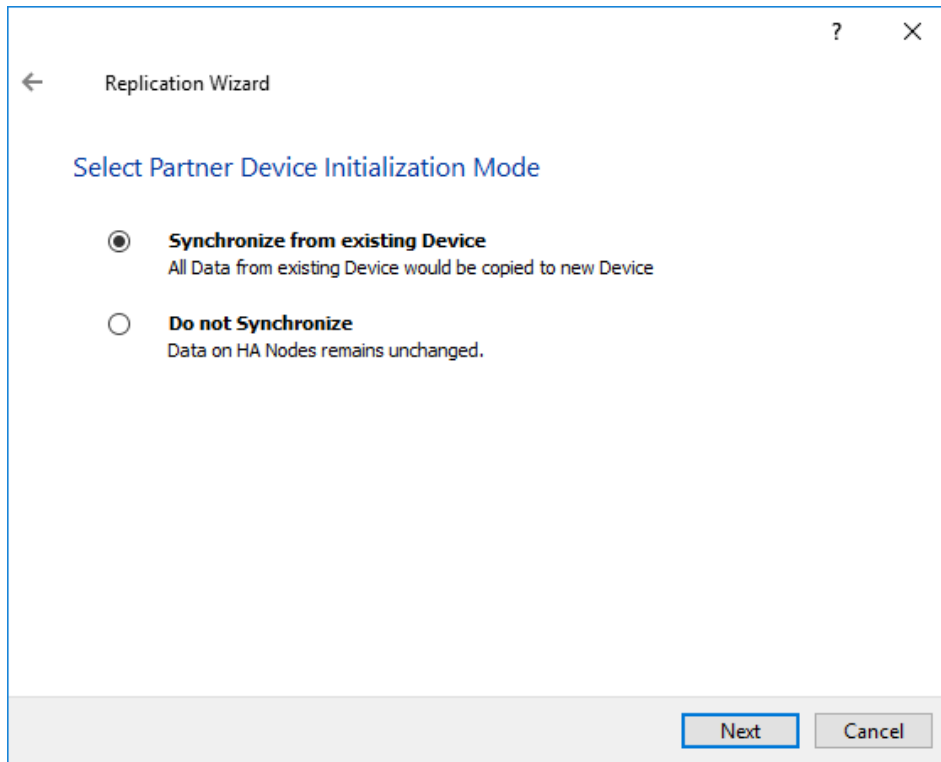
Interfaces	Networks	Synchronization and H...	Heartbeat
[-] Host Name: SW-HC-R-1.STARWIND.LOCAL			
169.254.2.225	169.254.0.0	<input type="checkbox"/>	<input type="checkbox"/>
172.16.10.12	172.16.10.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
172.16.20.12	172.16.20.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
192.168.12.220	192.168.12.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
[-] Host Name: sw-hc-r-2			
169.254.1.98	169.254.0.0	<input type="checkbox"/>	<input type="checkbox"/>
172.16.10.13	172.16.10.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
172.16.20.13	172.16.20.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
192.168.12.222	192.168.12.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Allow Free Select Interfaces

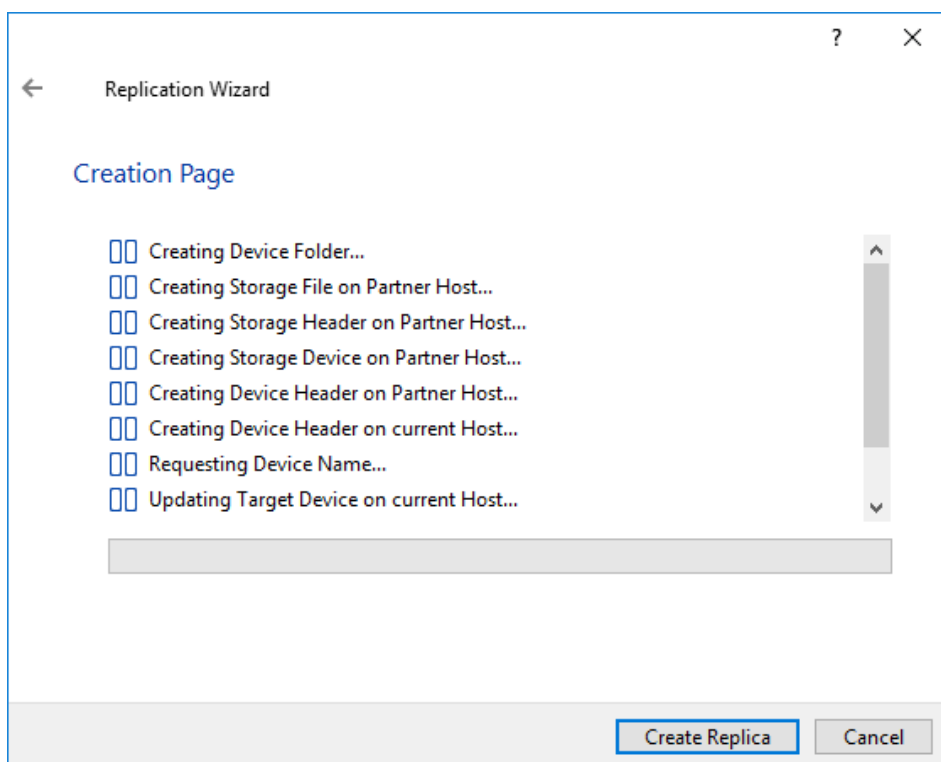
OK Cancel

NOTE: It is recommended to configure Heartbeat and iSCSI channels on the same interfaces to avoid the split-brain issue.

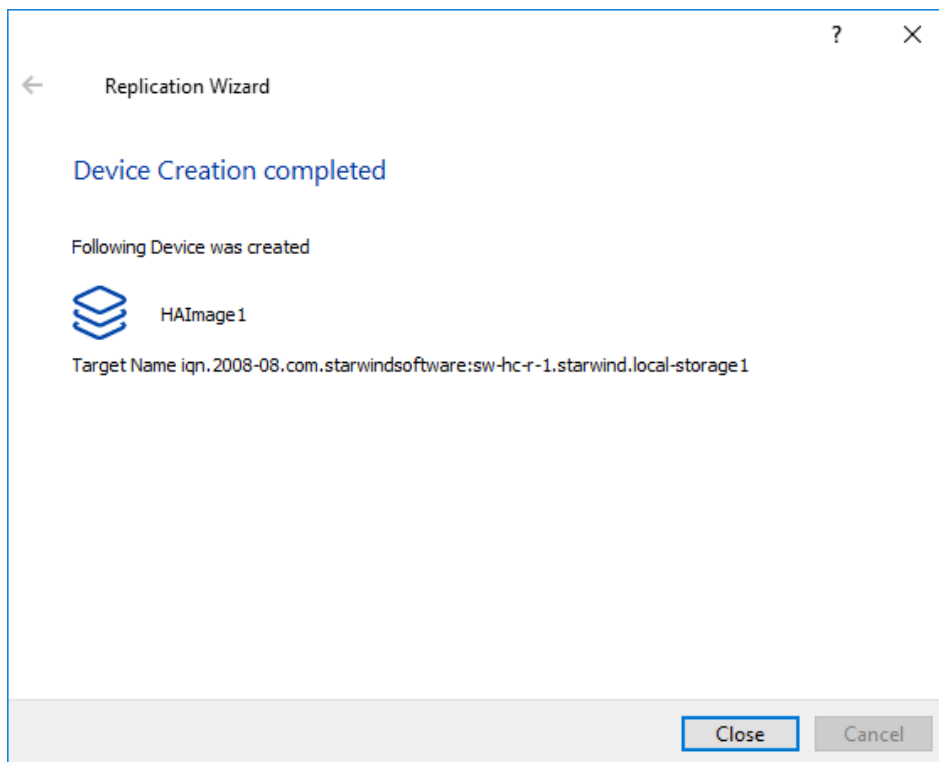
37. Select **Synchronize from existing Device** as a partner device initialization mode and click **Next**.



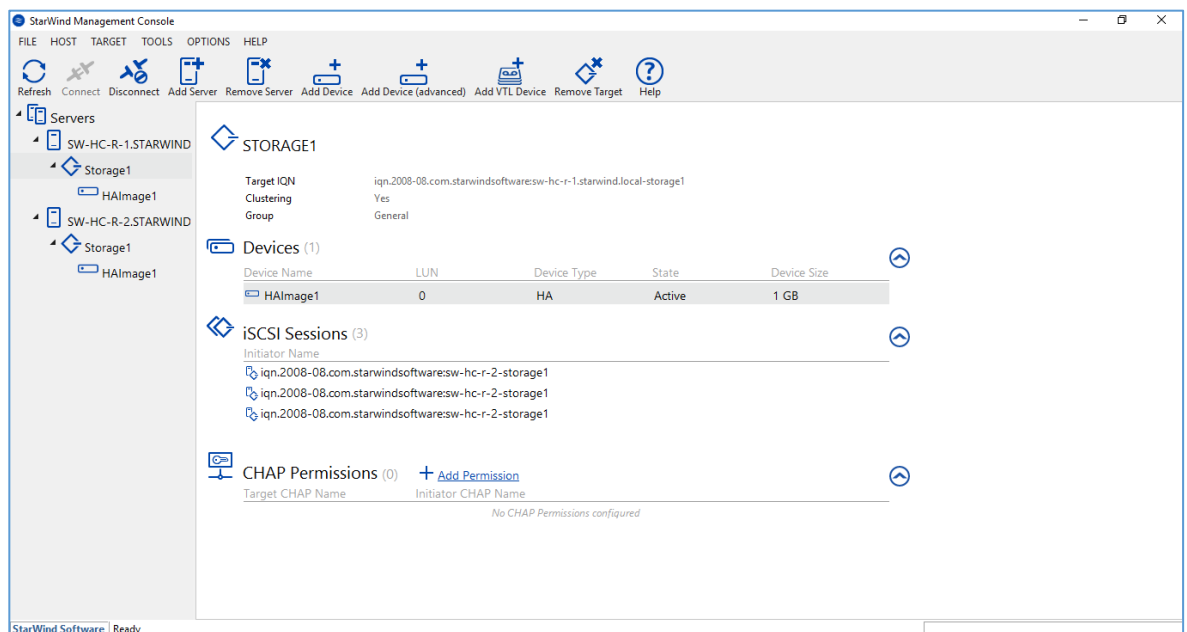
38. Press the **Create Replica** button.



39. Click **Close**.



40. The added device will appear in **StarWind Management Console**.








41. Discover and connect the created targets in iSCSI initiator that are used in the environment.

Conclusion

StarWind helps to achieve redundancy and fault tolerance in the storage environment with only 2 nodes available and no additional storage hardware or proprietary equipment required. With StarWind Virtual SAN, the HA shared storage configuration significantly improves data availability. In case of one node failure or network congestion, data remains available on a partner node. Thus, the HA storage allows avoiding the single point of failure in the virtual infrastructure and restarting the VM on the other host.

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General Information: info@starwind.com



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