≋ **StarWind**
S O F T W A R E

StarWind Virtual SAN™:
Installation and Configuration of Hyper-Converged 2 Nodes with Hyper-V Cluster

JUNE 2014

vmware® **READY**   CITRIX® ready™   Windows Server 2012 Certified

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

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CONTENTS

INTRODUCTION

StarWind Virtual SAN™ is a native Windows hypervisor-centric hardware-less VM storage solution. It creates a fully fault tolerant and high performing storage pool purpose built for the virtualization workloads by mirroring existing server's storage and RAM between the participating storage cluster nodes. The mirrored storage resource is then connected to all cluster nodes treated just as local storage by both hypervisors and clustered applications. Fault tolerance is achieved by providing multipathed access to all storage nodes. **StarWind Virtual SAN** delivers supreme performance compared to any dedicated SAN solution since it runs locally on the hypervisor and all IO is processed by local RAM, SSD cache, and disks and never bottlenecked by storage fabric.

This guide provides detailed instructions on installation, registration, and detailed steps that are need to be taken to create **StarWind Virtual SAN** High-Availability Device. It also highlights how to connect to the StarWind HA data store with the Microsoft iSCSI initiator. Additionaly you can find step-by-step guidance on how to create the Hyper-V cluster and configure the StarWind shared storage as the Cluster Shared Volumes.

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

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

PRE-CONFIGURING THE SERVERS

Here is a reference network diagram of the configuration described in this guide.
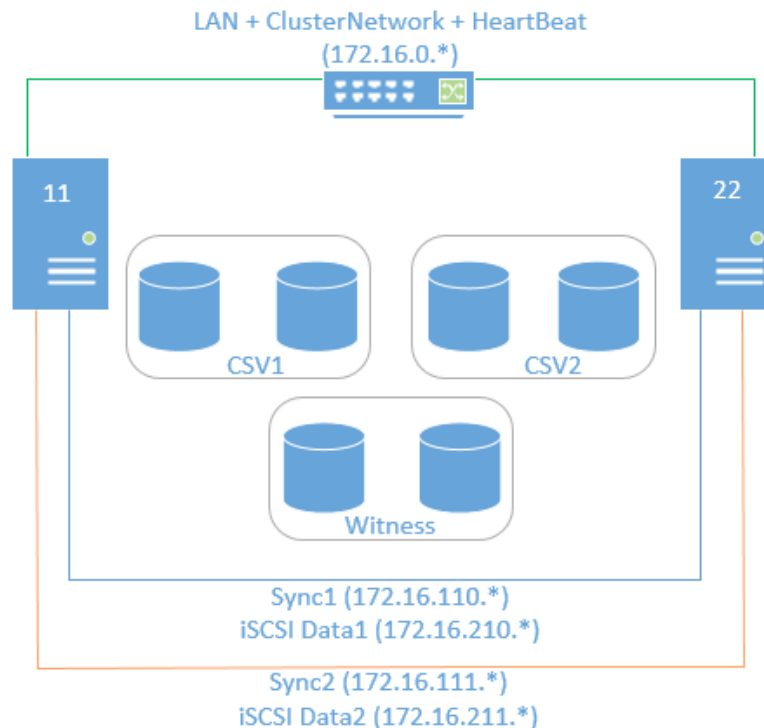
The **Sync** and **iSCSI data** are direct links between the servers with 2 VLANs dedicated in each link.

This document assumes that you have a domain controller and you have added the servers to the domain. It also assumes that you have installed the **Failover Clustering** and **Multipath I/O** features, as well as the **Hyper-V** role on both servers. These actions can be performed using **Server Manager** (the **Add Roles and Features** menu item).

1. In order to allow **StarWind Virtual SAN** to use the Loopback accelerator driver and access the local copy of the data faster you have to add a minor modification to the StarWind configuration file. Locate the configuration and open it using Notepad. The default path is:

    C:\Program Files\StarWind Software\StarWind\StarWind.cfg

2. Find the string «<!--<iScsiDiscoveryListInterfaces value=»1»/> -->» and uncomment it (should look as follows: <iScsiDiscoveryListInterfaces value=»1»/>). Save the changes and exit Notepad.

    Should there be any issues saving the document, launch Notepad with Administrator rights and then load the starwind.cfg file to do the modifications.

3. Restart the **StarWind Service** and repeat the same procedure on the second StarWind node.

DOWNLOADING, INSTALLING, AND REGISTERING THE SOFTWARE

1. Download the StarWind setup executable file from our website:
   http://www.starwindsoftware.com/registration-starwind-virtual-san
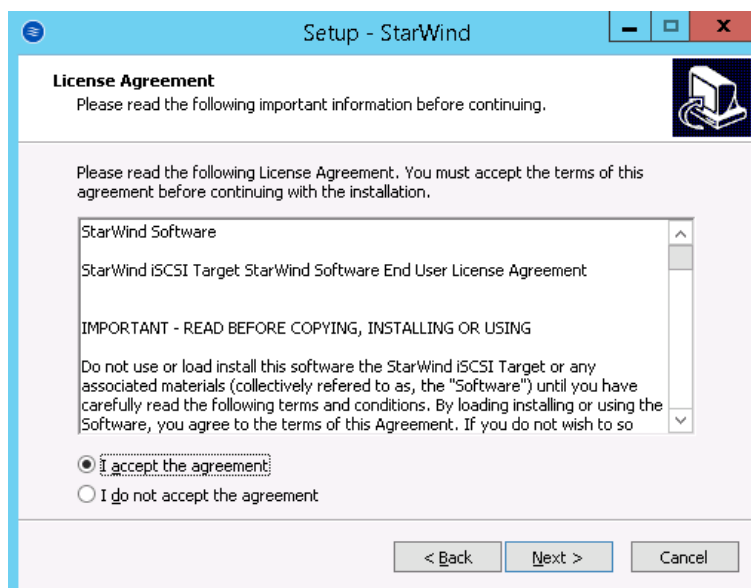
   Note: The setup file is unified for x86 and x64 systems, as well as for all Virtual SAN deployment scenarios.

2. Launch the downloaded setup file on the server where you wish to install **StarWind Virtual SAN** or one of its components. The **Setup** wizard will appear:
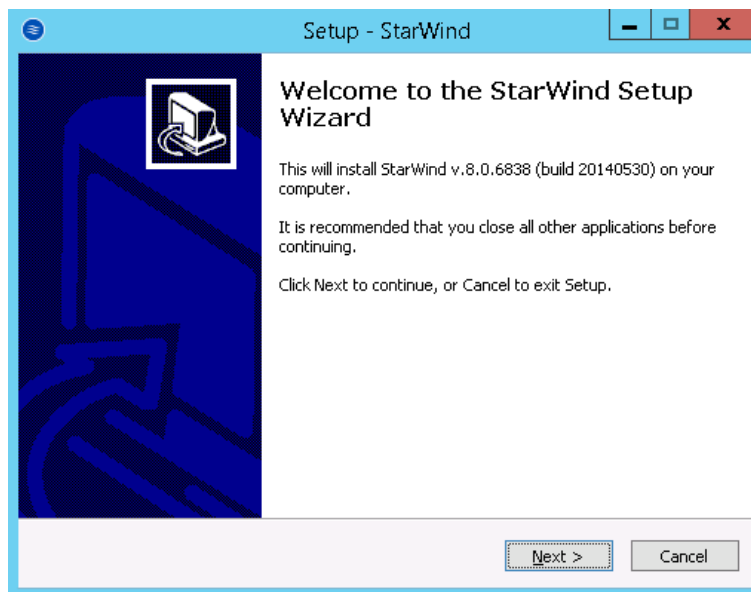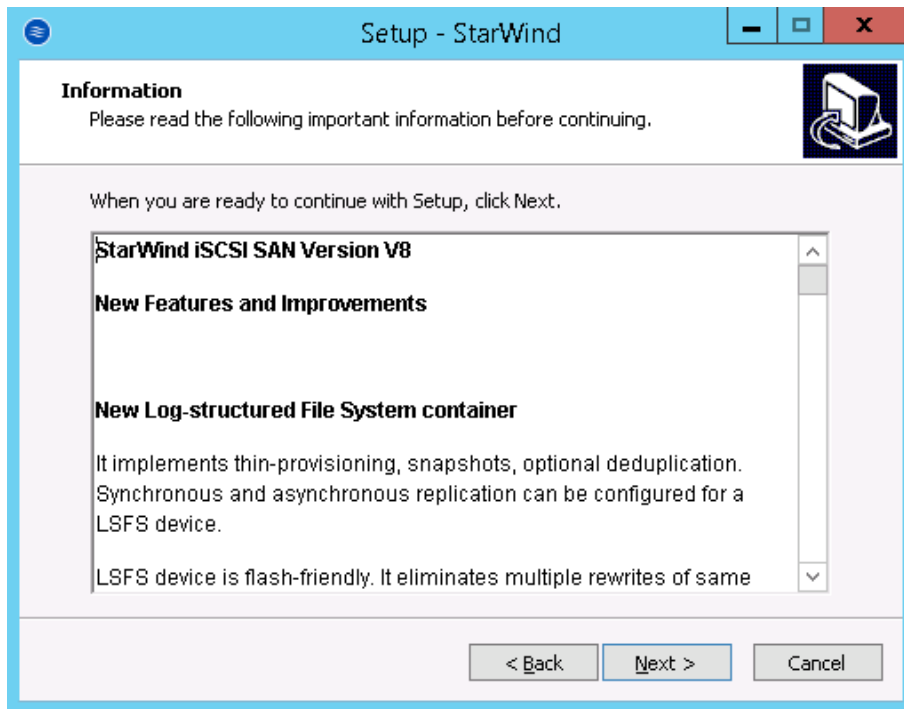

Click **Next** to continue.

3. Read and accept the License Agreement.

Click **Next** to continue.

4. Carefully read the information about new features and improvements.
Red text indicates warnings for users who are updating existing software installation.

Click **Next** to continue.

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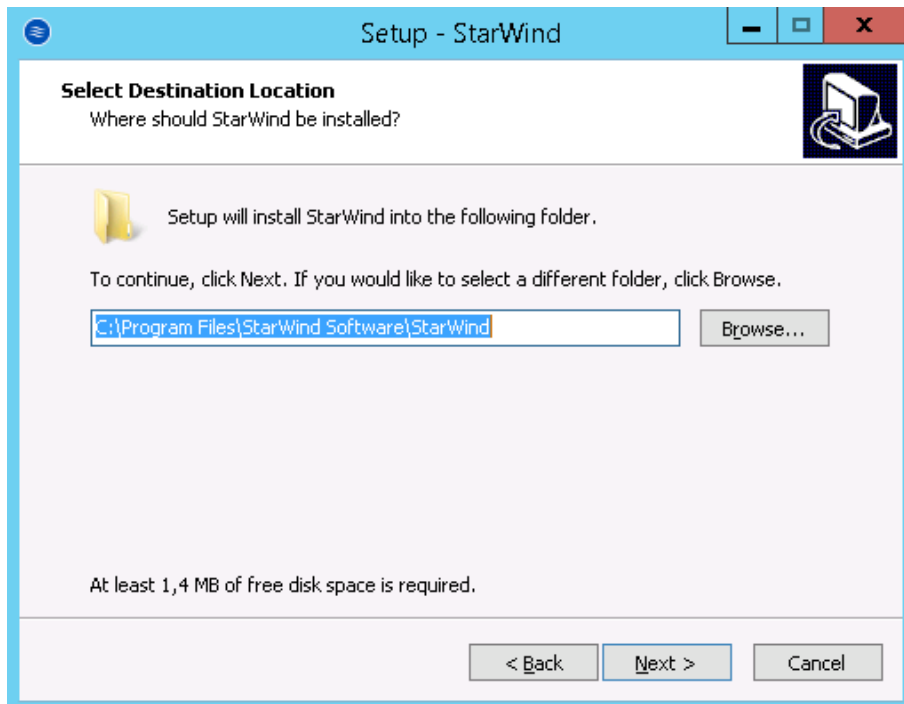
Click **Next** to continue.

6. Specify one of the following installation types:

- Full installation (recommended)
  Full installation includes both StarWind Service and the 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. The service can be managed using StarWind Management Console from any Windows computer on the network.

- StarWind Management Console
  The 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**.
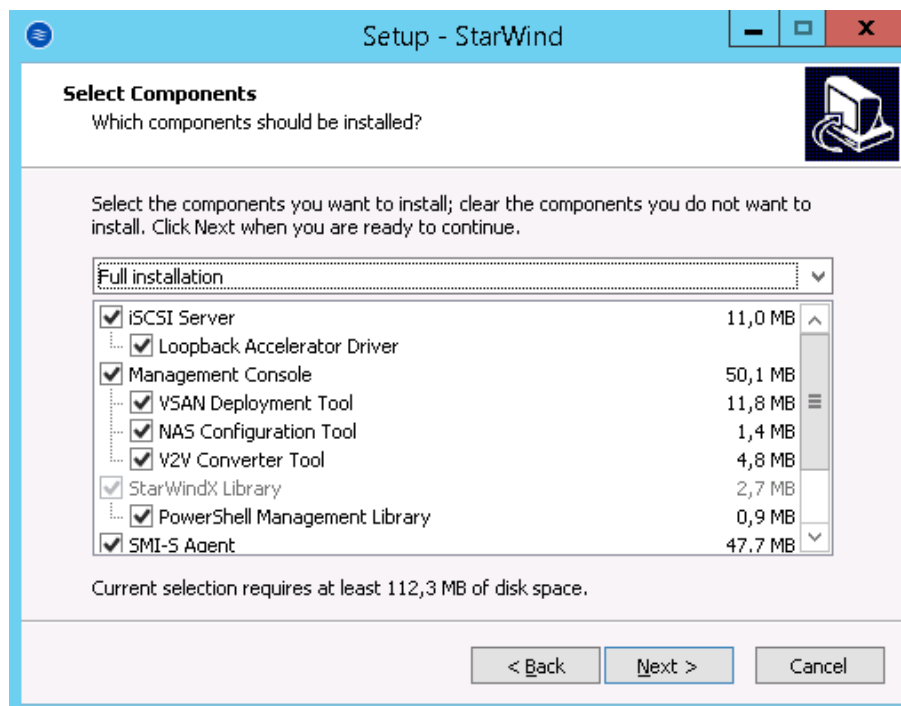
Click **Next** to continue.

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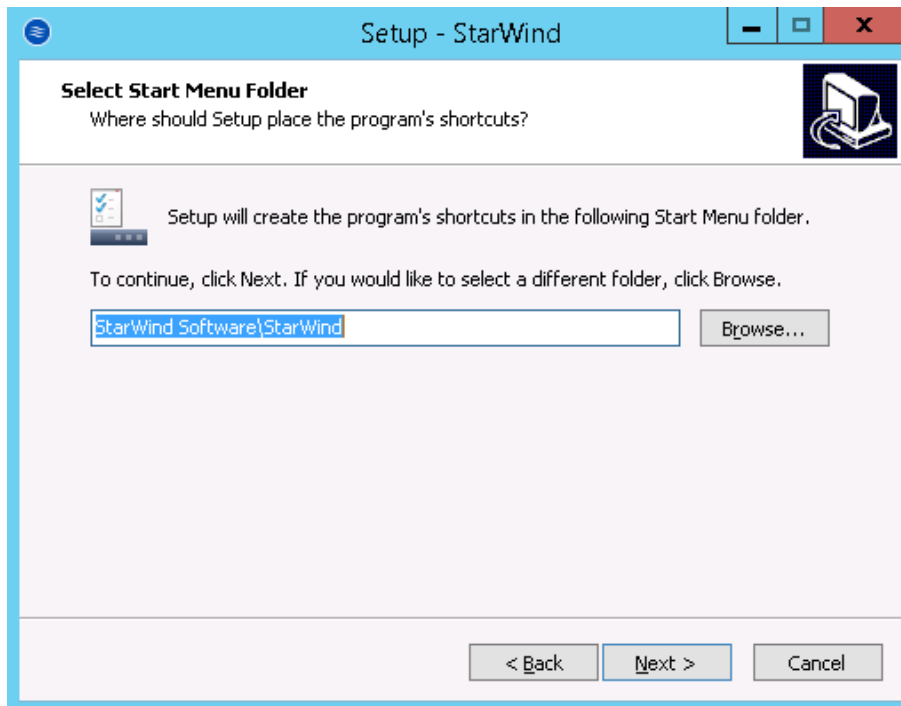
Click **Next** to continue.

8. Enable the checkbox if you want to create a desktop icon.
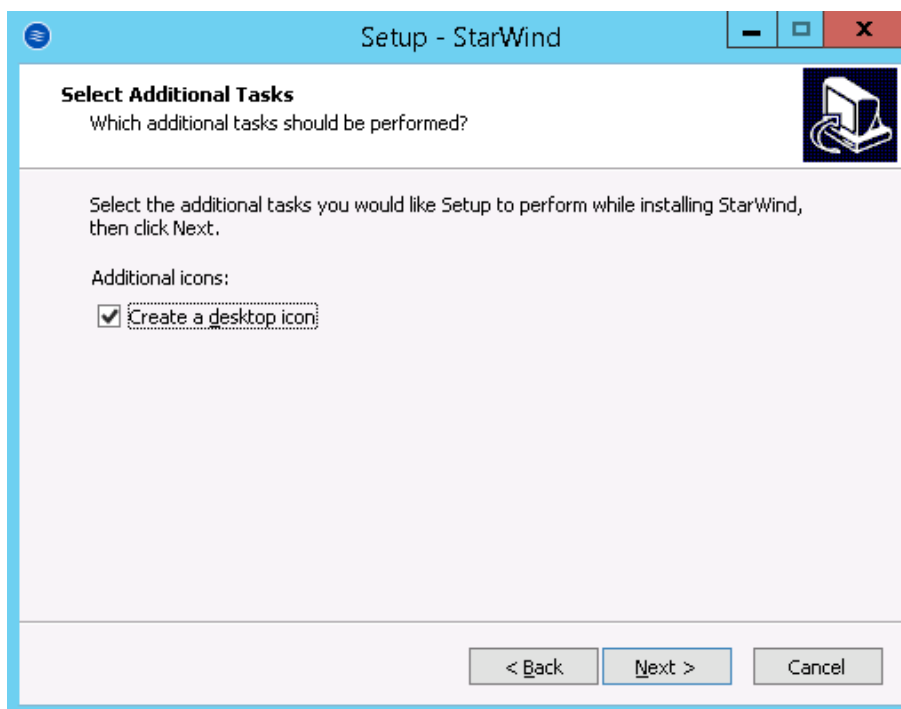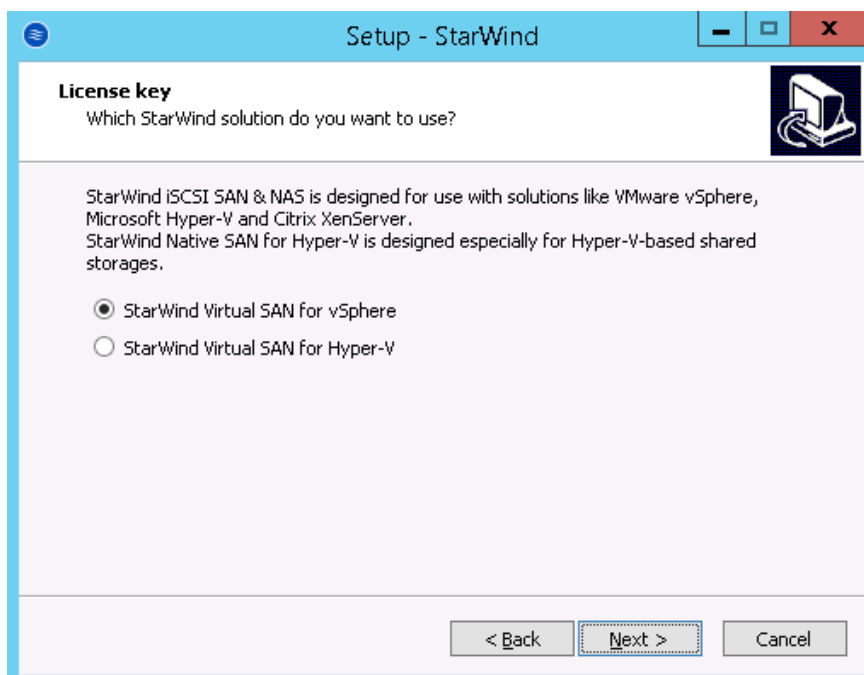

Click **Next** to continue.

9. You will be prompted to request a time-limited fully functional evaluation key, or a FREE version key, or a fully commercial license key sent to you with the purchase of **StarWind Virtual SAN**. Select the appropriate option.
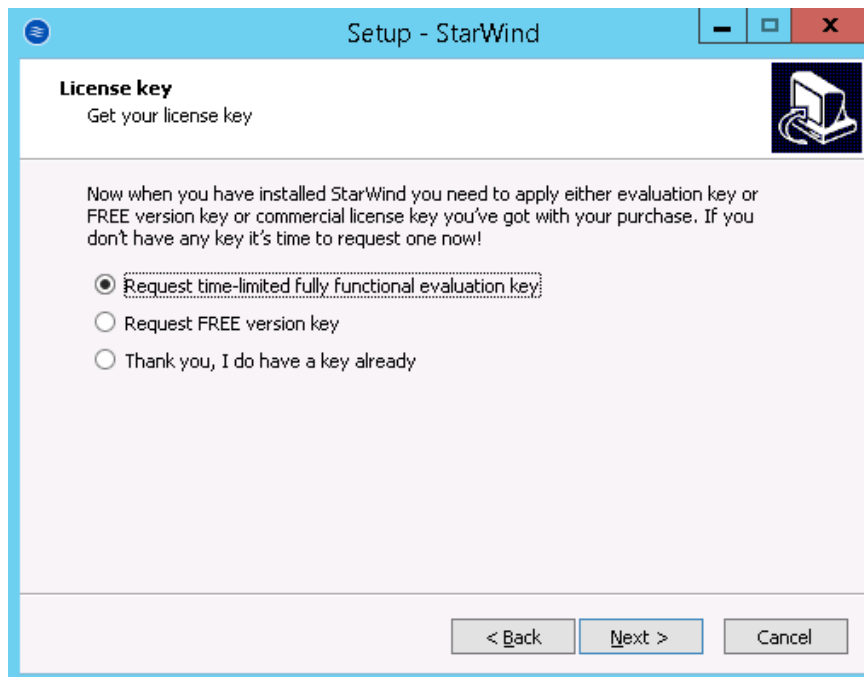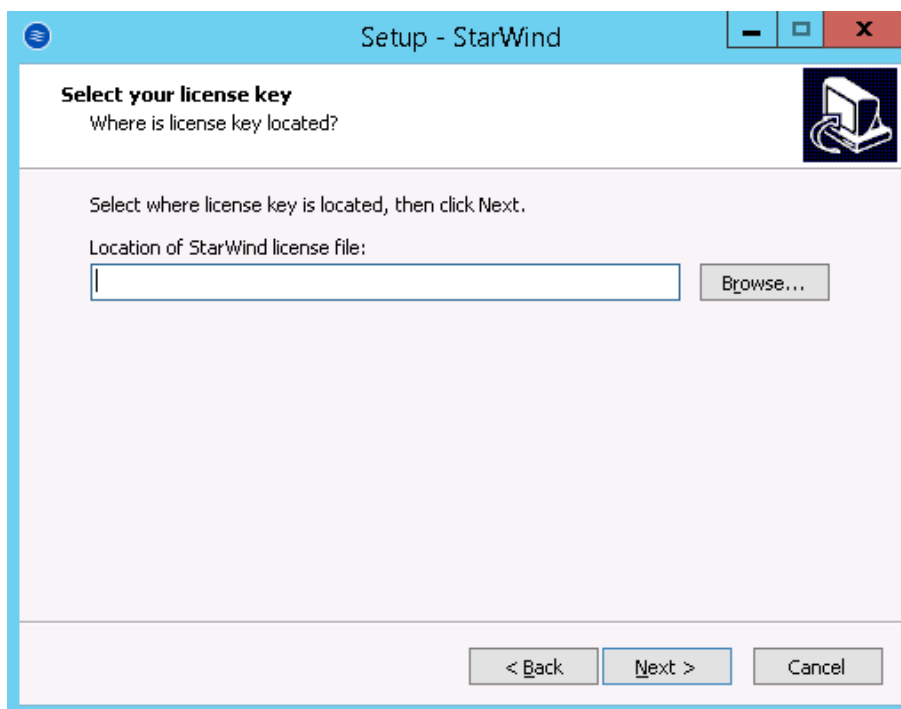

Click **Next** to continue.

10. Select the hypervisor you are going to use primarily with **StarWind Virtual SAN**.

Note: For all non-virtualized Microsoft applications e.g. SQL or Exchange, as well as other hypervisors like Xen or VirtualBox, select the **StarWind Virtual SAN for Hyper-V** option.

Click **Next** to continue.

11. Click **Browse** to locate the license file.

Click **Next** to continue.

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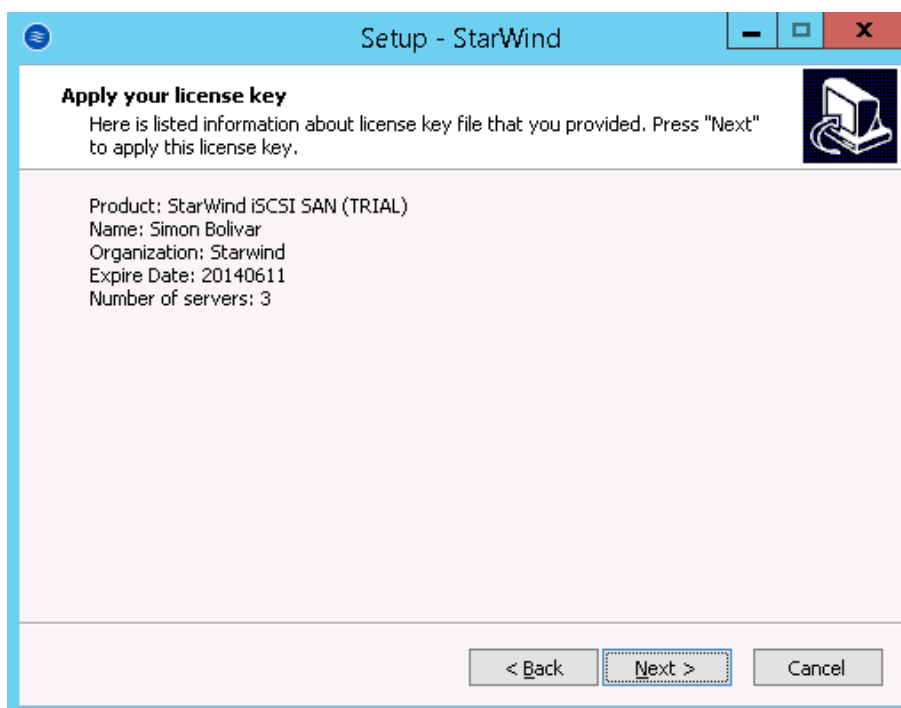
Click **Next** to apply the license key.

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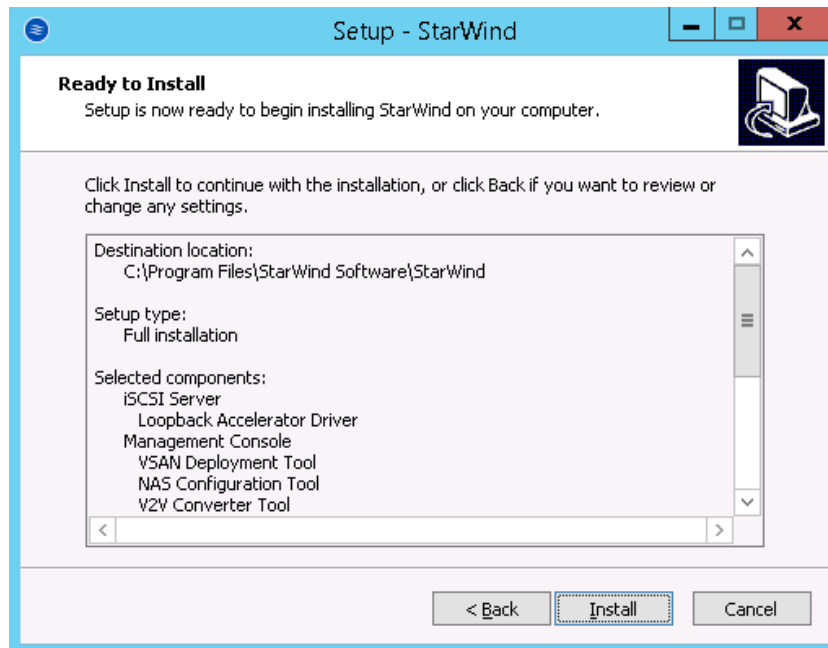
Click **Install** to continue.

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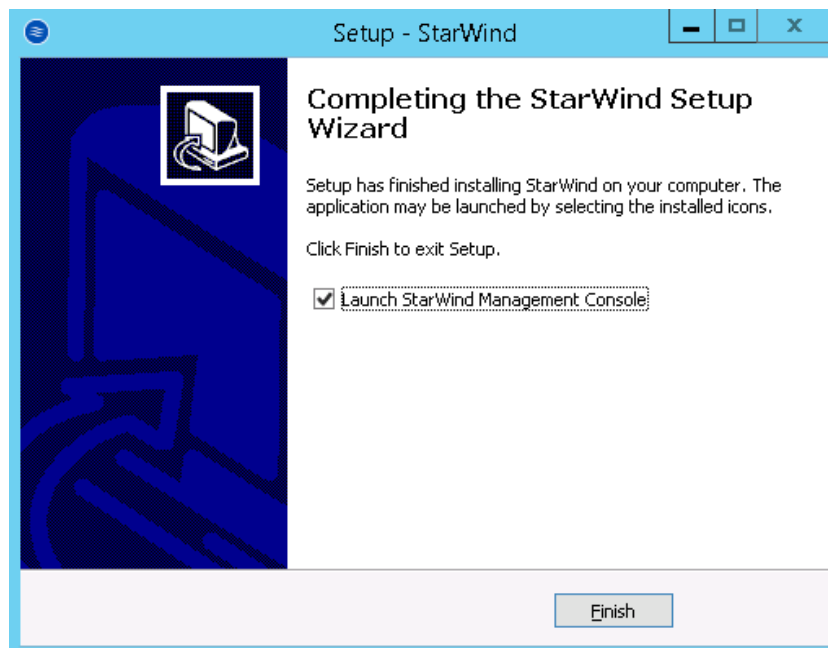
Click **Finish** to close the wizard.

Repeat steps **2** to **14** on the second server where you wish to install **StarWind Virtual SAN**.

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

CREATING HIGHLY AVAILABLE STORAGE FOR THE FAILOVER CLUSTER

1. Launch the **StarWind Management Console**: double-click the StarWind tray icon.

   Note: **StarWind Management Console** cannot be installed on an operating system without a GUI. You can install it on any of the GUI-enabled Windows Editions including the desktop versions of Windows.
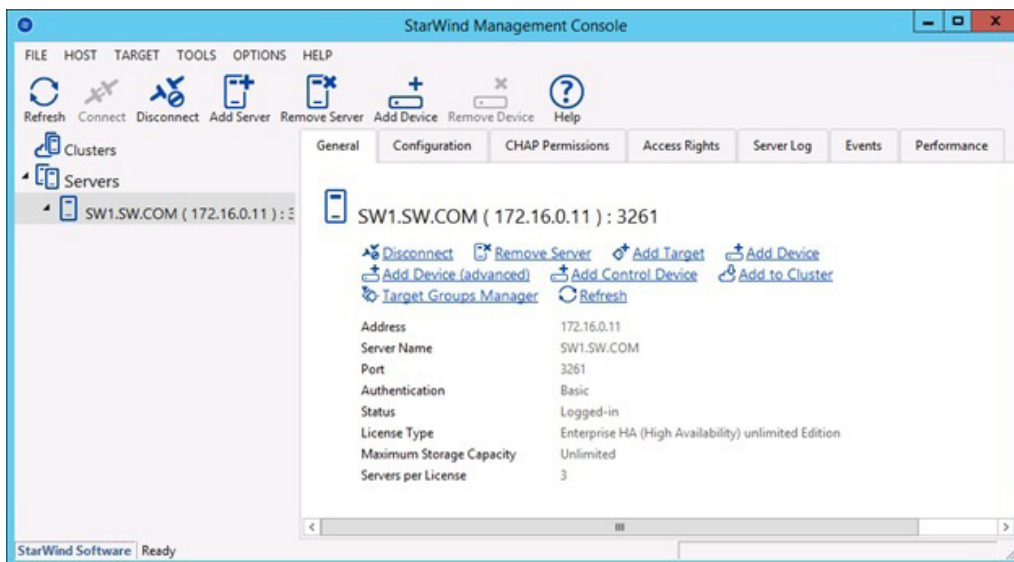
If **StarWind Service** and **Management Console** are installed on the same server, the **Management Console** will automatically add the local StarWind instance to the **Console tree** after the first launch. Then, the **Management Console** automatically connects to it using the default credentials. To add remote StarWind servers to the console use the **Add Server** button on the control panel.

   Note: The default login and password are "root" and "starwind". You can always change them later. It's strongly recommended to change the default username/password to protect your StarWind Server from unauthorized access!

2. StarWind Management console will ask you to specify the default storage pool on the server you're connecting to for the first time. Please configure the storage pool to use the one of the volumes you've prepared earlier. All the devices created through the **Add Device** wizard will be stored on it. Should you decide to use an alternative storage path for your StarWind virtual disks, please use the **Add Device (advanced)** menu item.
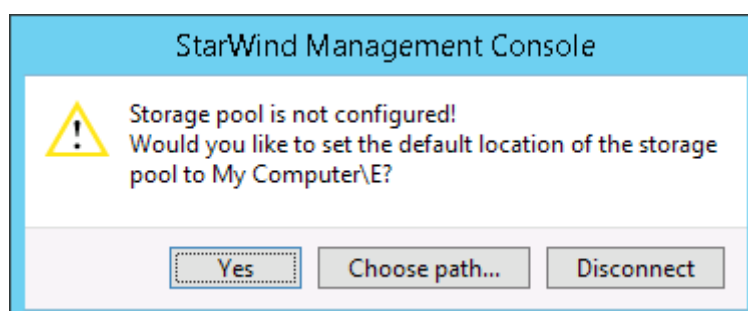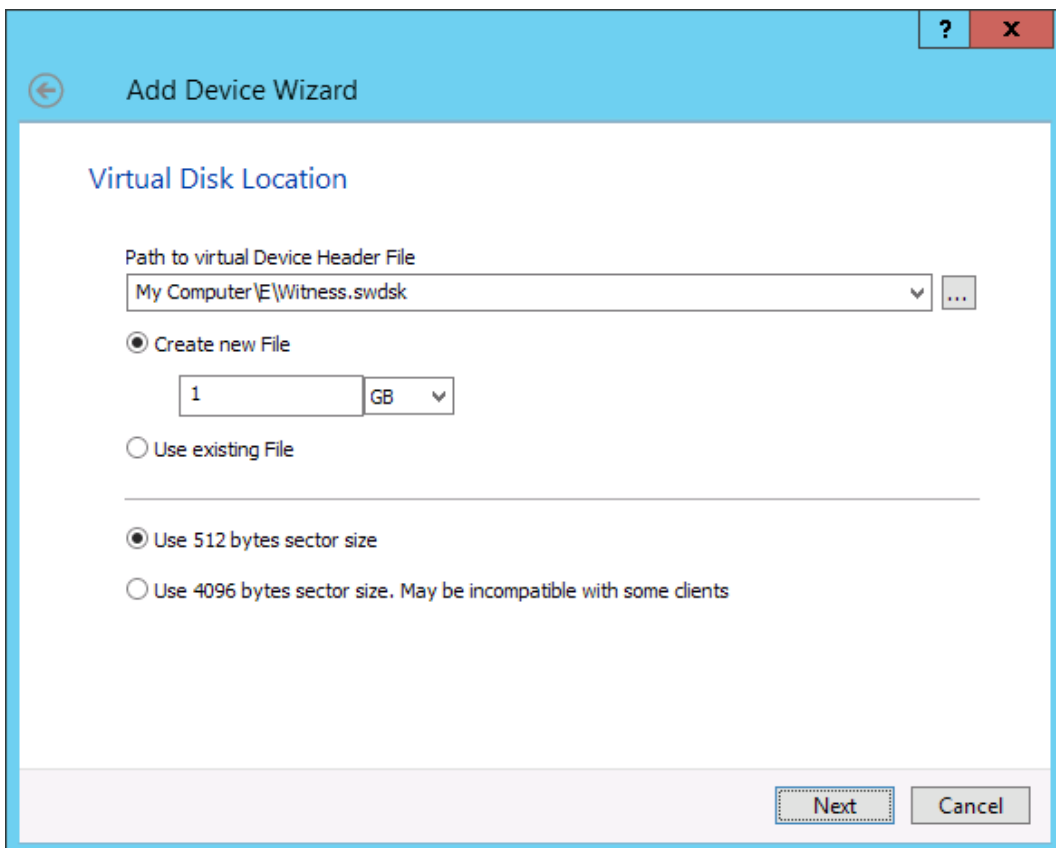
Press **Yes** button to configure the storage pool. Should you require to change the storage pool destination, press **Choose path**... and point the browser to the necessary disk.

> **Note:** Each of the arrays which will be used by **StarWind Virtual SAN** to store virtual disk images has to meet the following requirements:
>
> - initialized as GPT
> - Have a single NTFS-formatted partition
> - Have a drive letter assigned

3. Select the StarWind server where you wish to create the device.

4. Press the **Add Device (advanced)** button on the toolbar.

5. **Add Device Wizard** will appear. **Select Hard disk** device and click **Next**.

6. Select **Virtual disk** and click **Next**.

7. Specify the virtual disk location and size.

Click **Next**.

8. Specify virtual disk options.
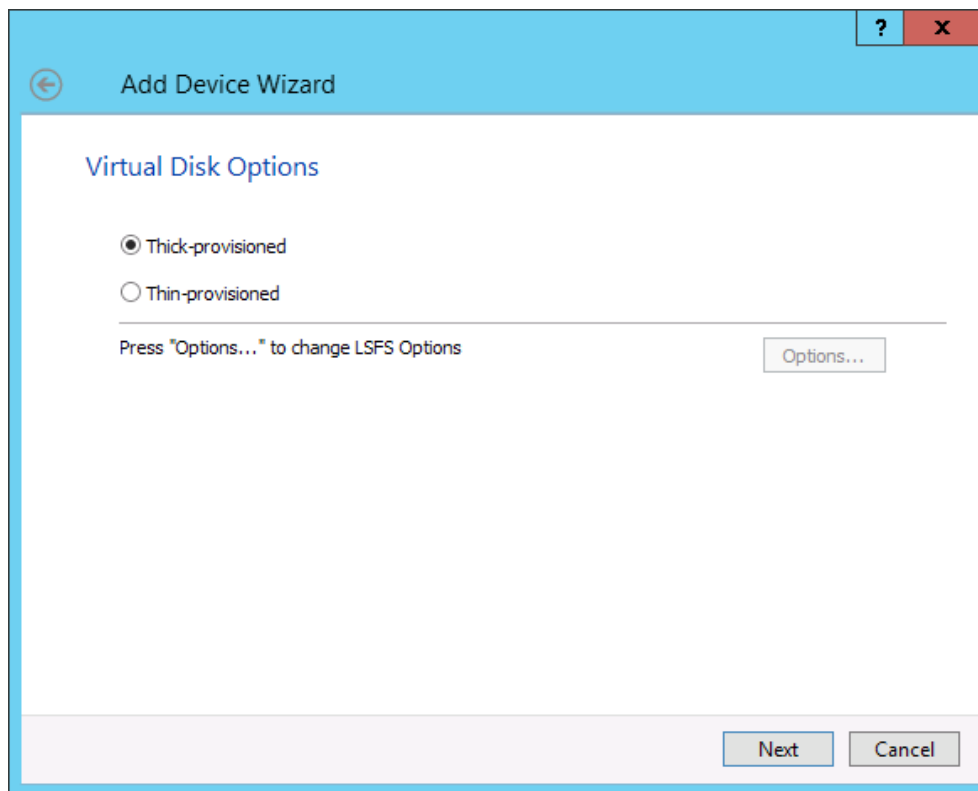
Click **Next**.

9. Define the caching policy and specify the cache size (in MB).
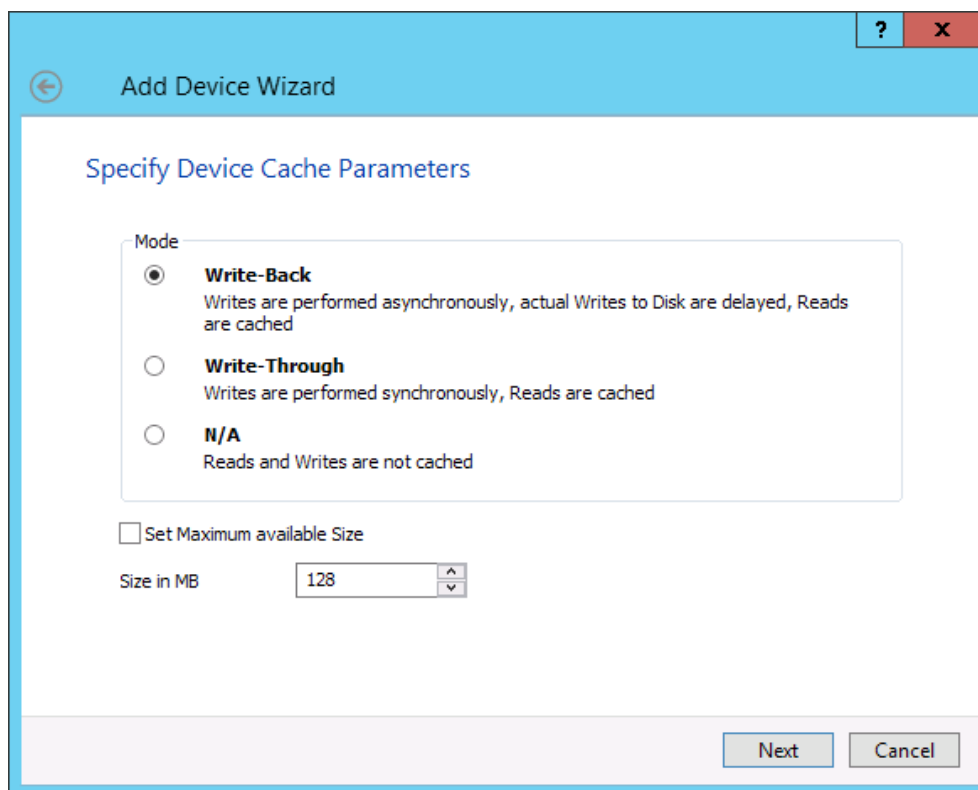
Click **Next**.

10. Define the L2 caching policy and size if necessary. Click **Next** to continue.
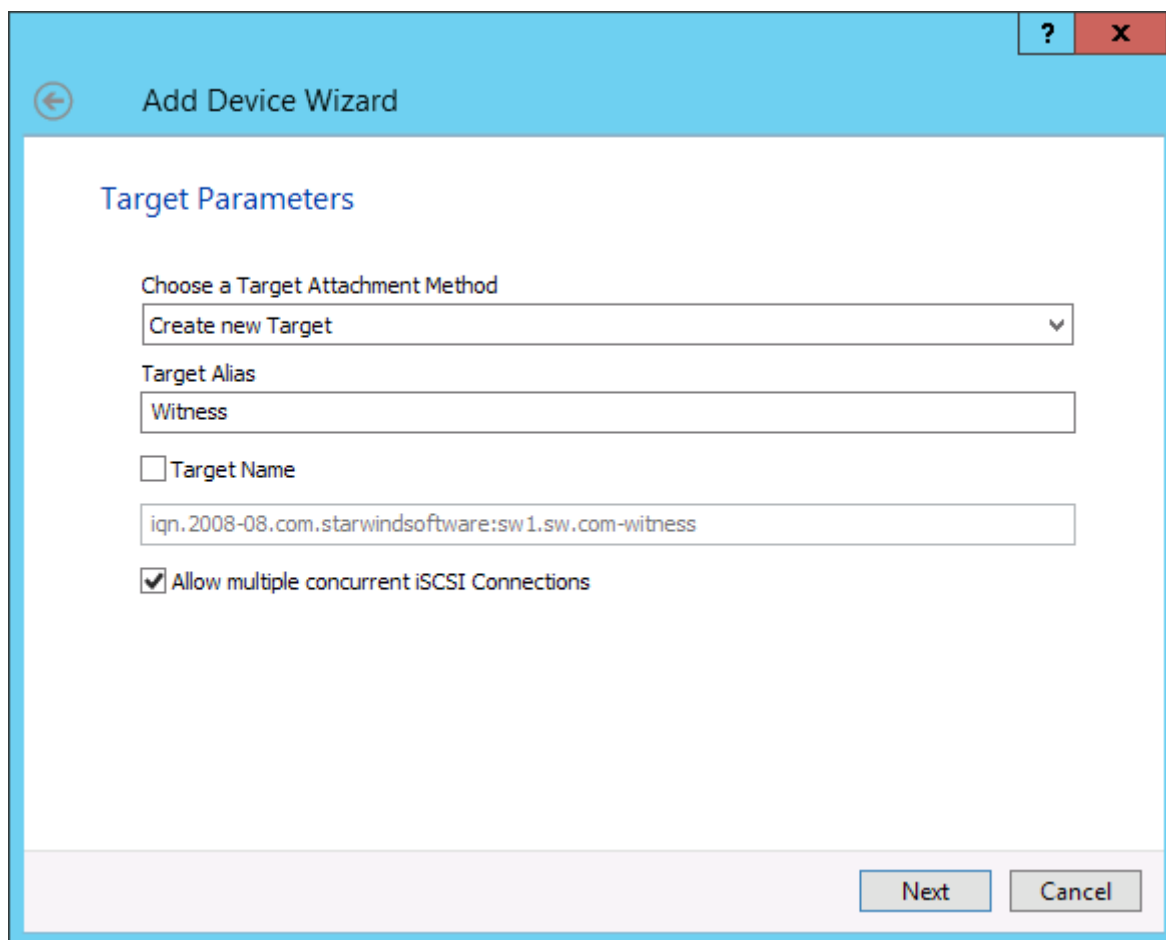
11. Specify the destination directory for the L2 cache, if any.

   Note: It is strongly recommended to use SSD-based storage for L2 caching.

12. 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.

13. Click **Create** to add a new device and attach it to the target. Then click **Finish** to close the wizard.

14. Right-click on the device you just created and select **Replication Manager**.
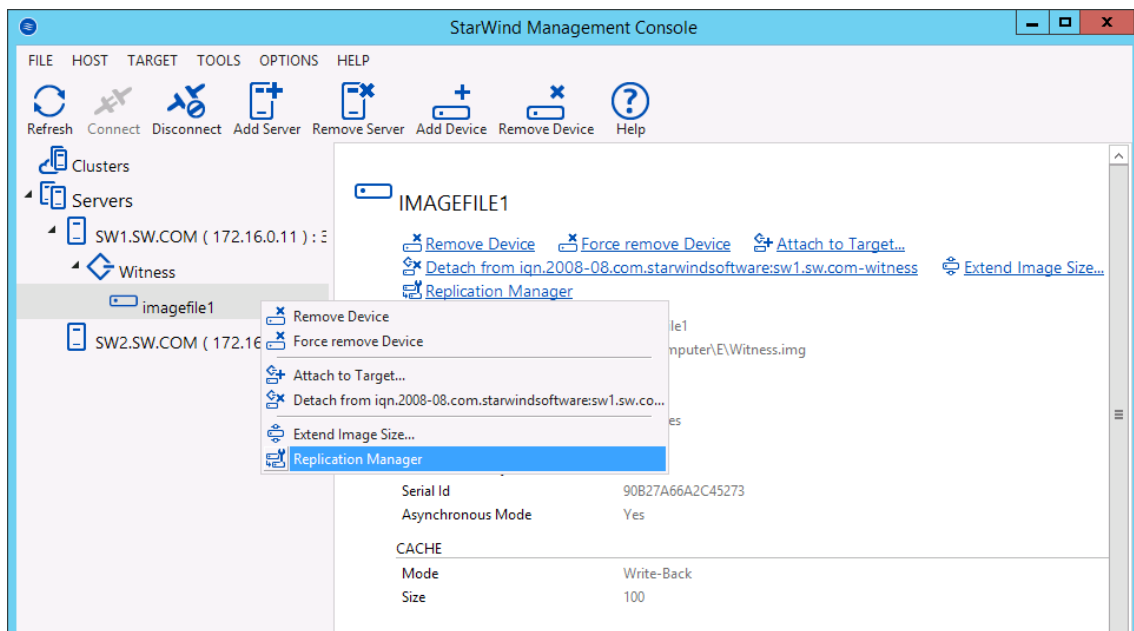
15. **Replication Manager** Window will appear. Press the **Add Replica** button.
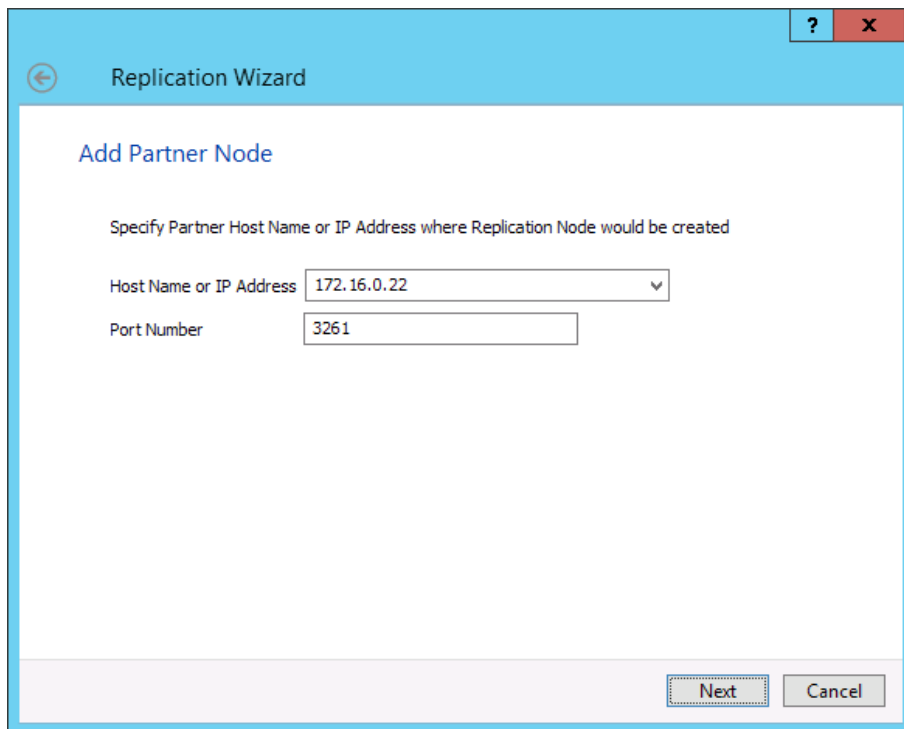
16. Select **Synchronous two-way replication**.
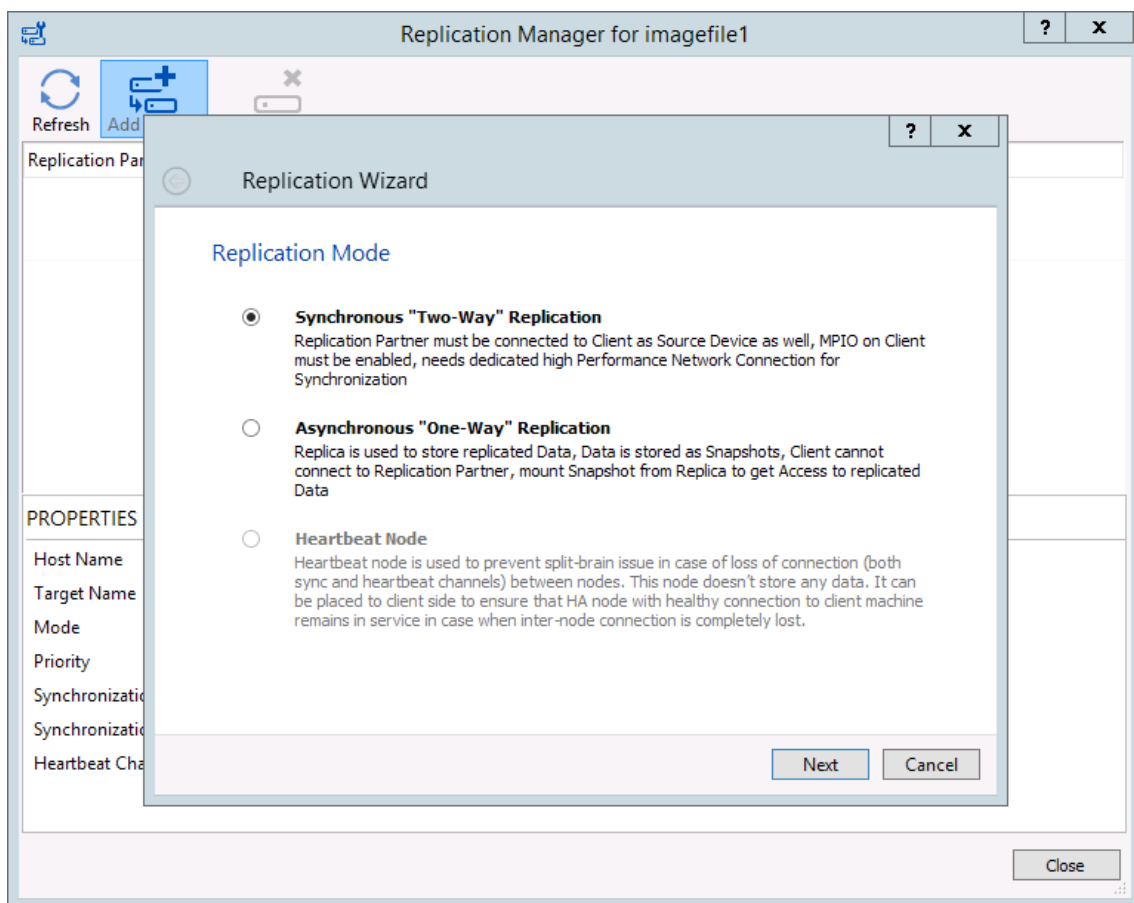
Click **Next** to proceed.

17. Specify the partner server IP Address or Host name.
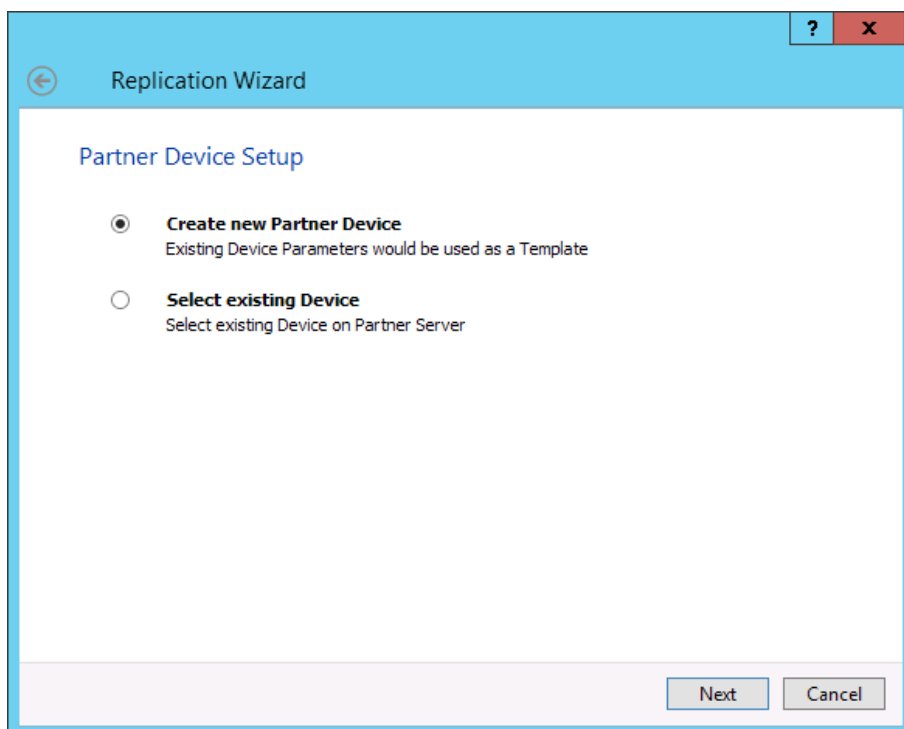
Default StarWind management port is 3261. If you have configured a different port, please type it in the **Port number** field.

Click **Next**.

18. Choose **Create new Partner Device**

Click **Next**.

19. On this screen you can select the synchronization and heartbeat channels for the HA device. You can also modify the ALUA settings and modify the target name of the device.
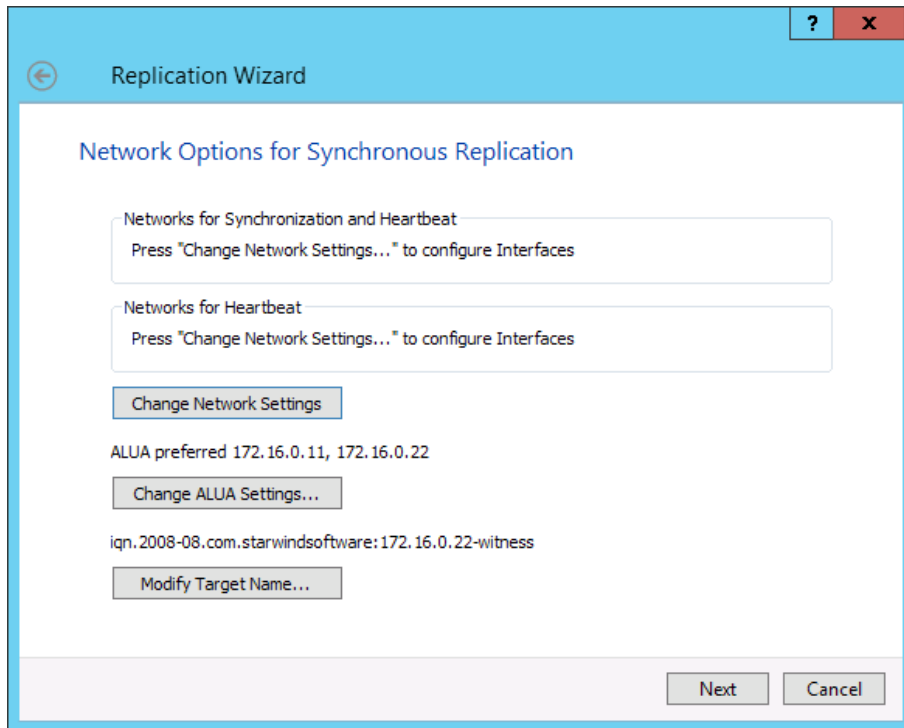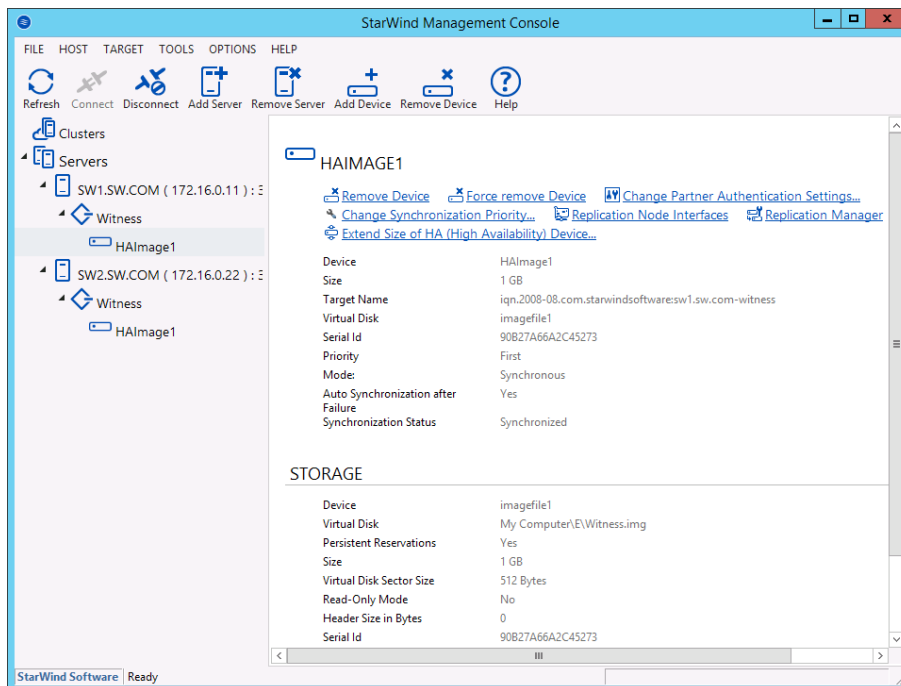

Click **Change network settings**....

**20.** Specify the interfaces for synchronization and Heartbeat.
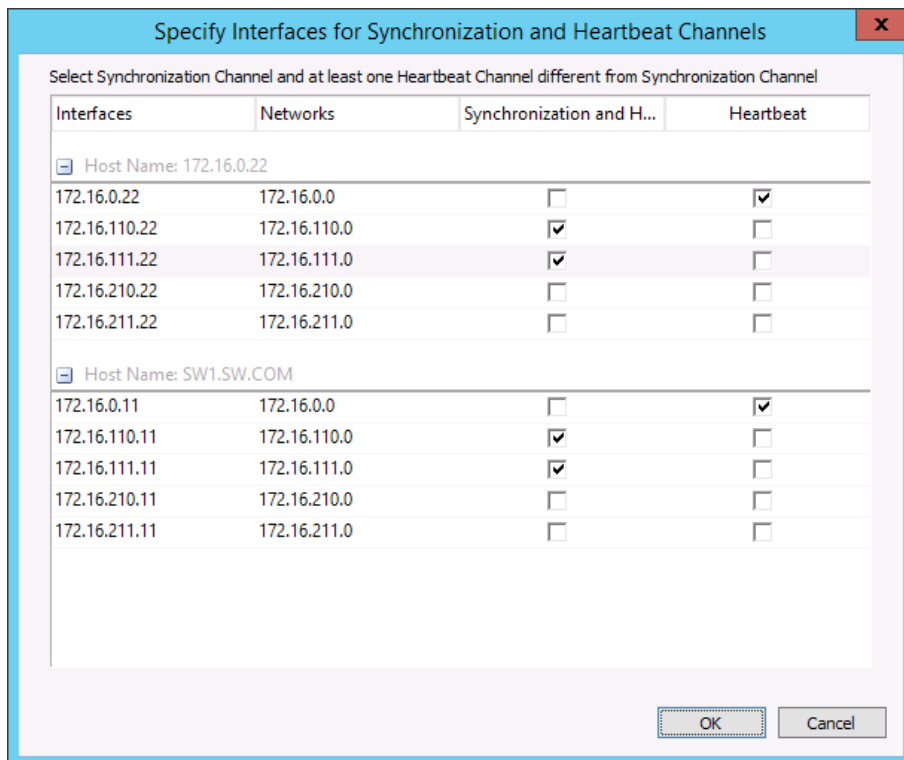
Click **OK**. Then click **Next**.

21. Press the **Create Replica button**. Then click **Finish** to close the wizard.

22. The added device will appear in the **StarWind Management Console**.

Repeat the steps 3 – 20 for the remaining virtual disks that will be used as Cluster Shared Volumes.

Once all devices are created the Management console should look as follows:
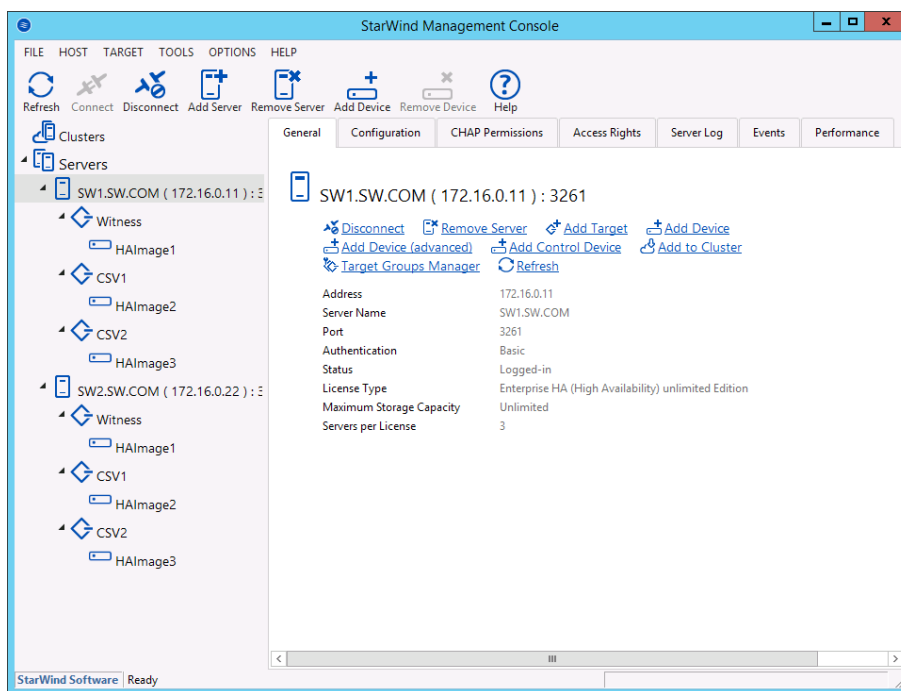
**Note:** It is recommended to create at least one CSV volume per cluster node according to **StarWind Virtual SAN** best practices.

DISCOVERING TARGET PORTALS

In this chapter we will connect the previously created disks to the servers that will be added to the cluster:

1. Launch **Microsoft iSCSI Initiator**: **Start** > **Administrative Tools** > **iSCSI Initiator** or **iscsicpl** from the command line interface. The **iSCSI Initiator Properties** window appears.

2. Navigate to the **Discovery** tab.

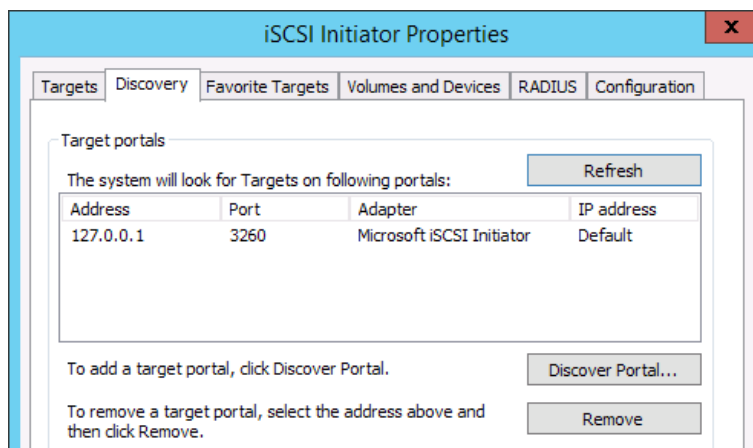3. Click the **Discover Portal** button. Discover Target Portal dialog appears. Type in 127.0.0.1.
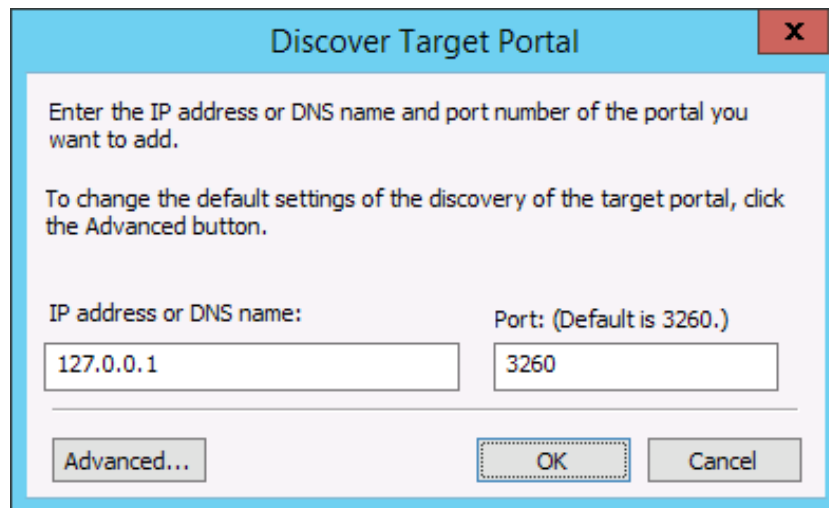
Click the **Advanced button**. Select **Microsoft ISCSI Initiator** as your **Local adapter** and select your **Initiator IP** (leave default for 127.0.0.1).
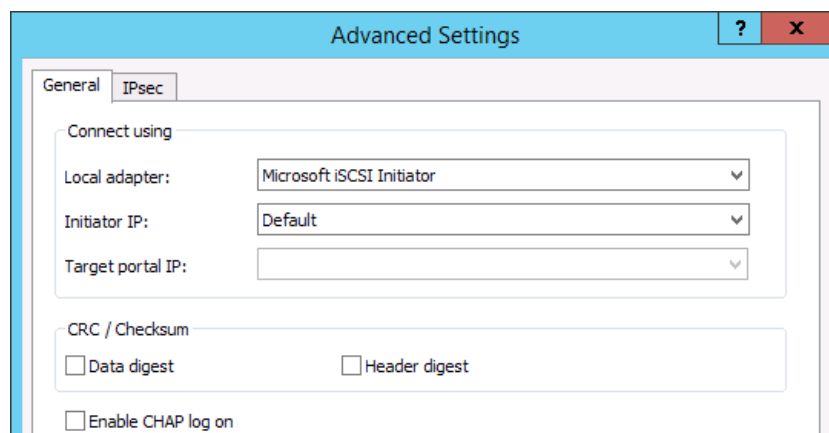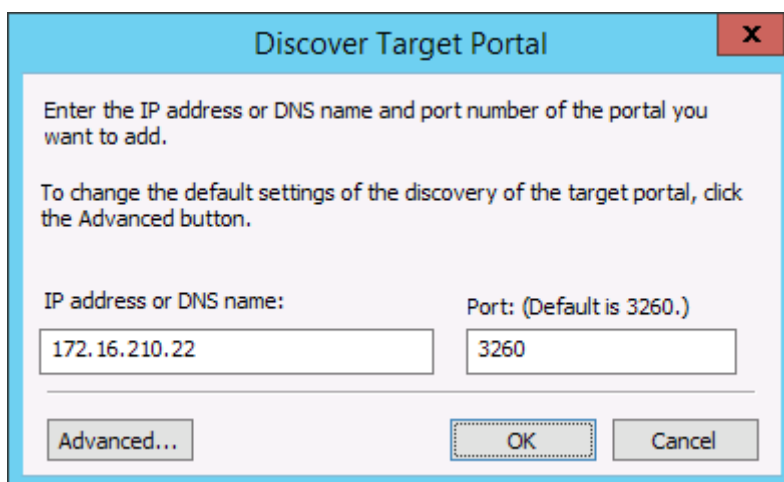
Click **OK**. Then click **OK** again to complete the Target Portal discovery.

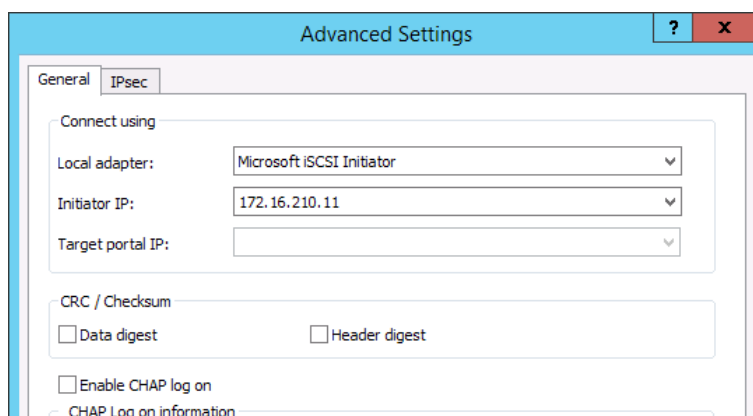**4.** Click the **Discover Portal**... button again.

5. Discover Target Portal dialog appears. Type in the first IP address of the partner node you will use to connect the secondary mirrors of the HA devices.

Click **Advanced**.

6. Select **Microsoft ISCSI Initiator** as your **Local adapter**, select the **Initiator IP** in the same subnet as the IP address on the partner server from the previous step.
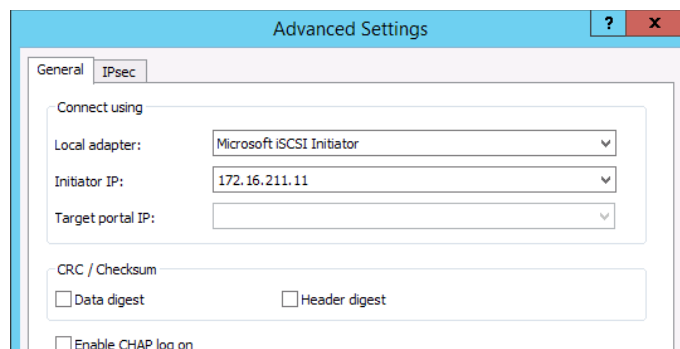

Click **OK**. Then click **OK** again to complete the Target Portal discovery.

**7.** Click the **Discover Portal** button once again.

Discover Target Portal dialog appears. Discover Target Portal dialog appears. Type in the second IP address of the partner node you will use to connect the secondary mirrors of the HA devices.

Select **Microsoft ISCSI Initiator** as your **Local adapter**, select the **Initiator IP** in the same subnet as the IP address on the partner server from the previous step.

Click **OK**. Then click **OK** again to complete the Target Portal discovery.

8. All target portals added on the first node.
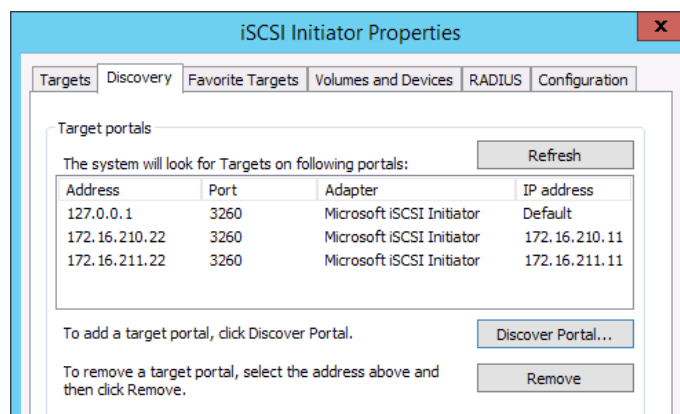
9. Complete the same steps for the second node.

**10.** All target portals added on the second node.
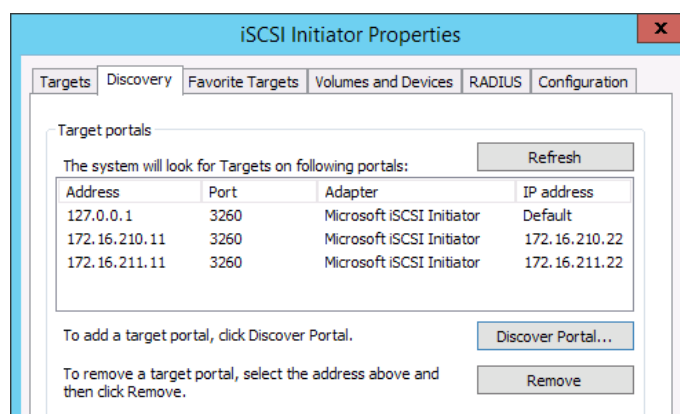
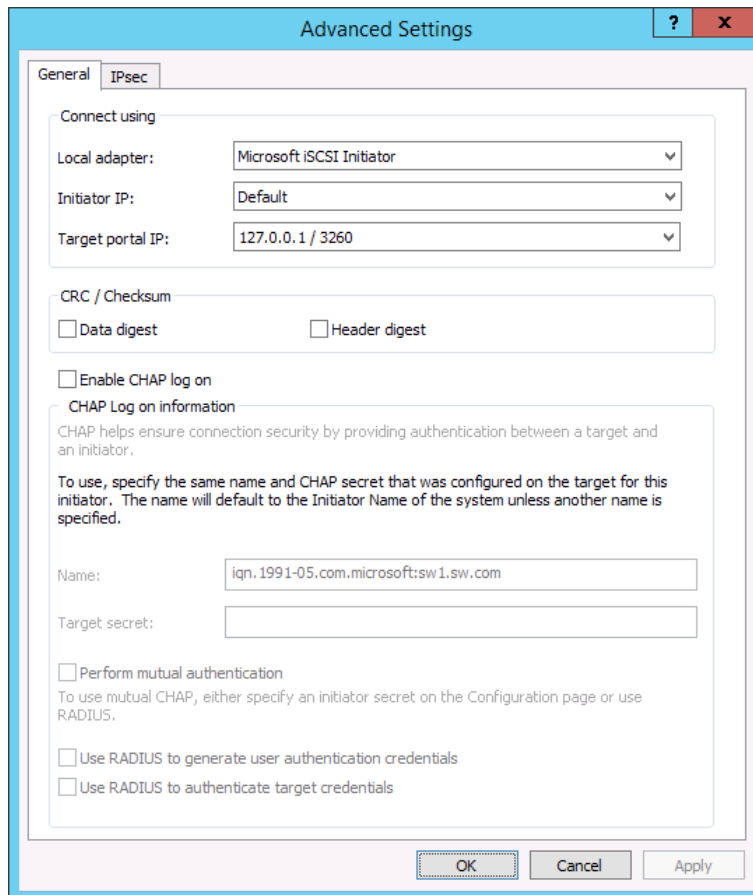## CONNECTING TARGETS AND CONFIGURING MULTIPATHING

1. Click the **Targets** tab. The previously created targets are listed in the **Discovered Targets** section.
   Note: If the created targets are not listed, check the firewall settings of the StarWind Server as well as the list of networks served by the StarWind Server (go to **StarWind Management Console** -> **Configuration** -> **Network**).
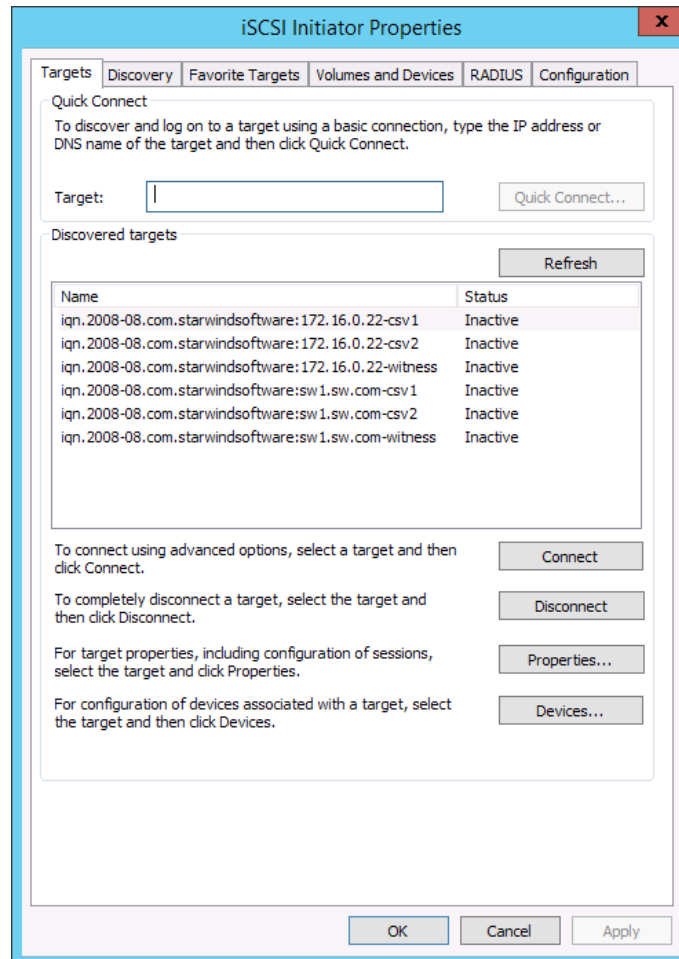
2. Select a target located on the local server and click **Connect**.
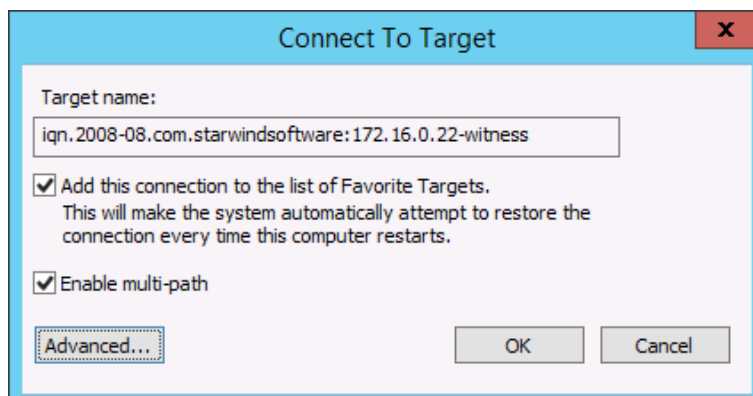
3. Enable both checkboxes. Click **Advanced**...
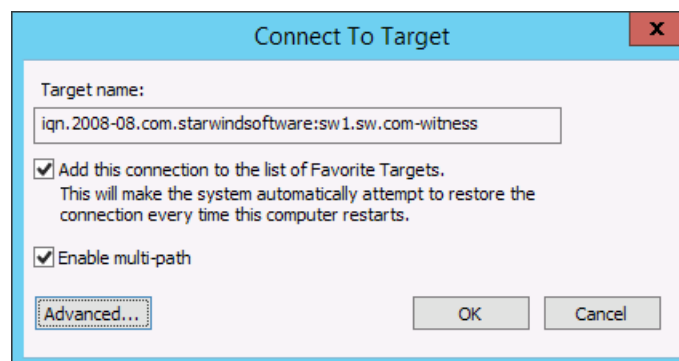
4. Select Microsoft iSCSI Initiator in the Local adapter text field.

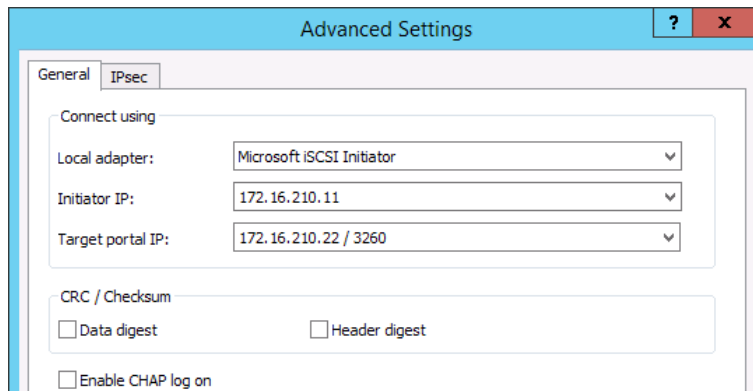**5.** In the **Target portal IP** select 127.0.0.1. Click **OK**.

6. Select the partner-target from other StarWind node and click **Connect**..

7. Select Microsoft iSCSI Initiator in the Local adapter text field. In the **Initiator IP** field select the IP address. In the **Target portal IP** select the corresponding portal IP from the same subnet.
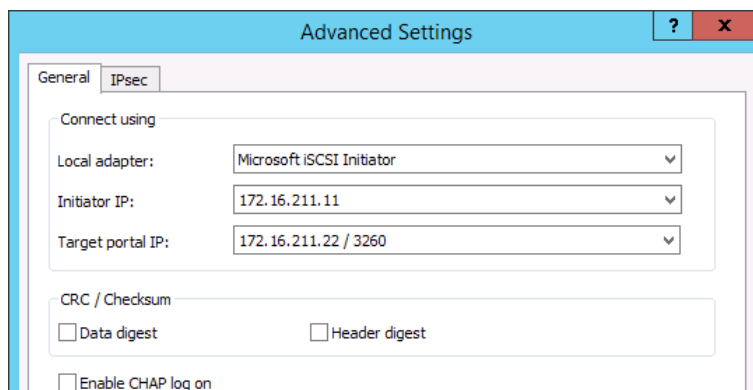
Click **OK**.

8. Select the same target like in step before and again click **Connect**.
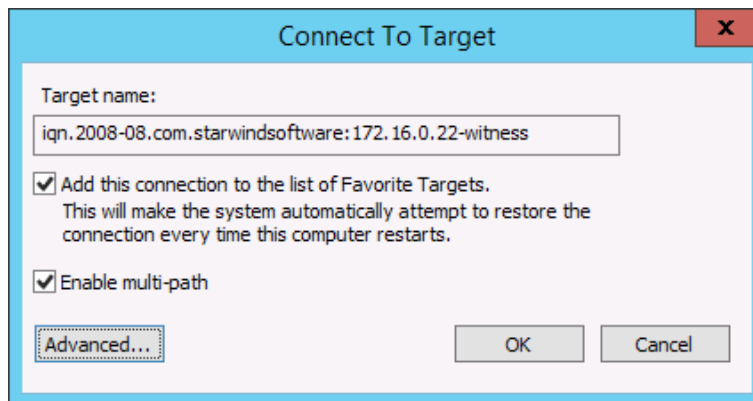
Press **Advanced**.

9. This time in target portal IP in dropdown list select another data channel IP addresses for initiator and target portal.

Click **OK**, click **OK** again to connect to the target.

10. Repeat actions described in the steps above for other HA devices (CSV1 and CSV2).

11. Repeat steps 1-10 of this section on the second StarWind node, specifying corresponding local and data channel IP addresses. The result should look like on the screenshot below.
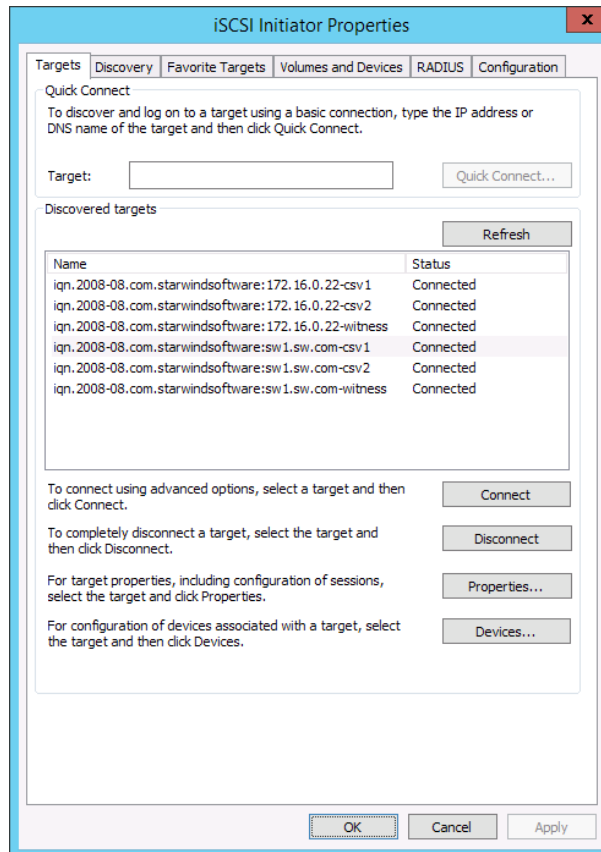

12. Once all targets are connected, launch the **MPIO manager**: **Start** > **Administrative Tools** > **MPIO** Or **mpiocpl** from the command line interface. MPIO manager window will appear.

Go to the **Discover Multi-Paths** tab and enable the **Add support for iSCSI devices** checkbox.
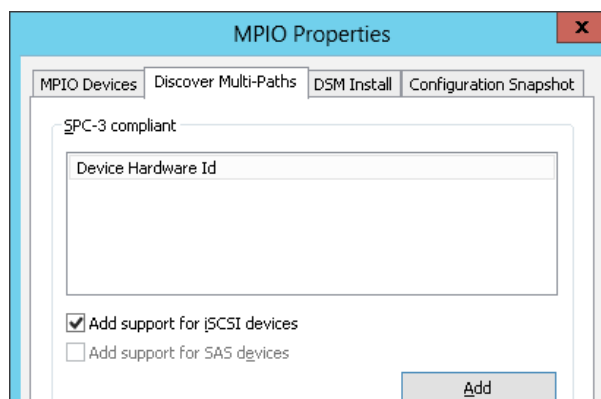
Press the **Add** button. Restart the server to apply the changes. After the server is restarted, wait for the HA devices to resynchronize. Repeat step 12 on the second StarWind node once the synchronization is finished.

13. After both StarWind nodes are restarted and the MPIO support is enabled you have to configure the MPIO policy for each device specifying localhost (127.0.0.1) as the active path.
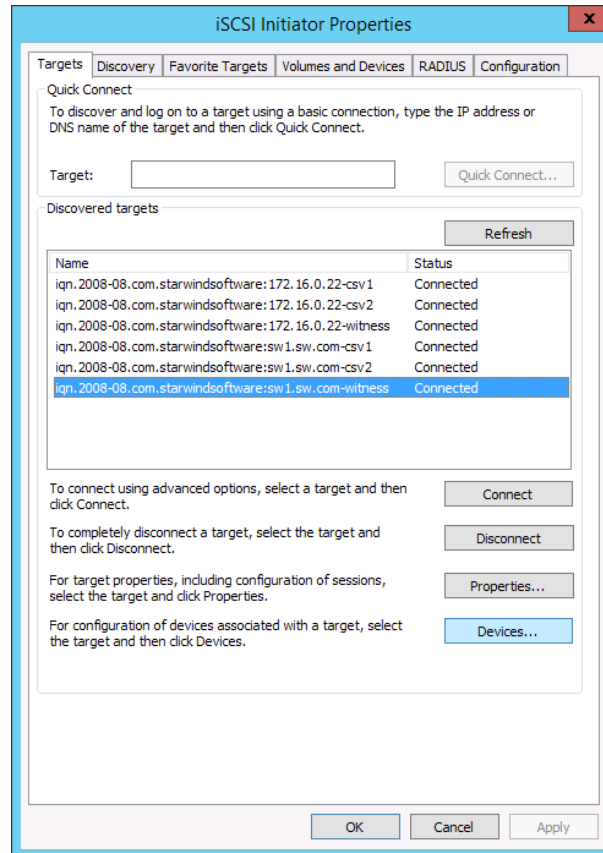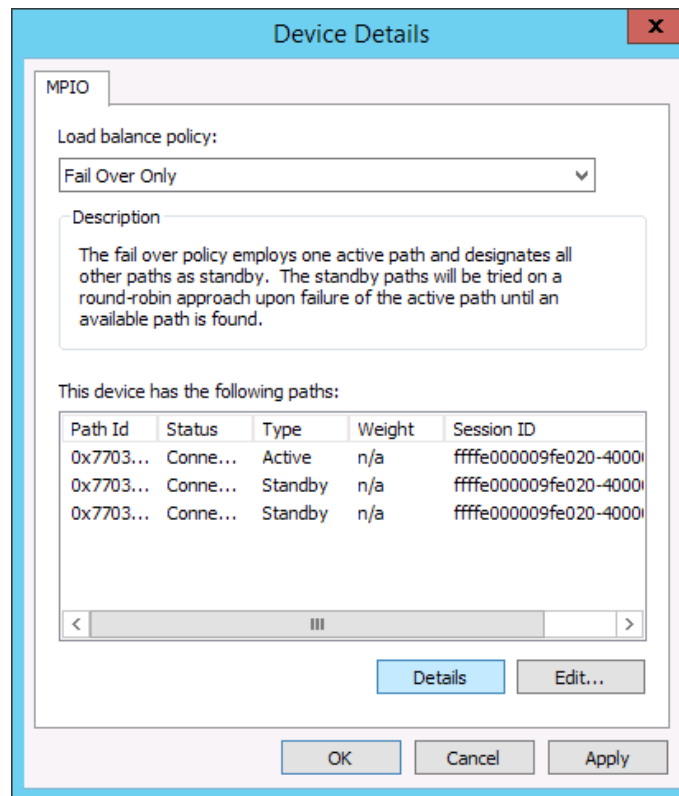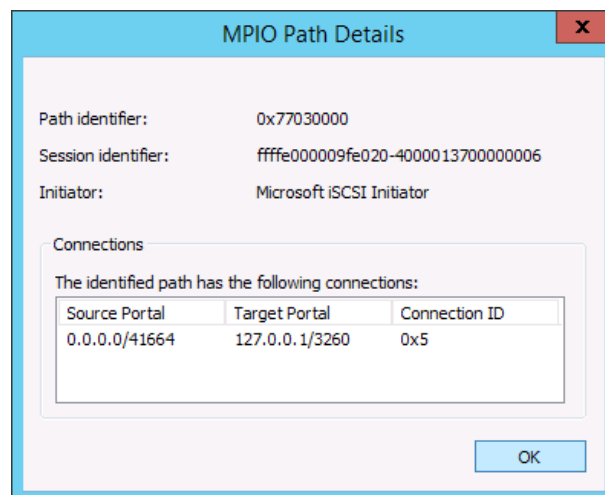

Select a target and click **Devices**...

14. Devices dialog appears. Click **MPIO**.
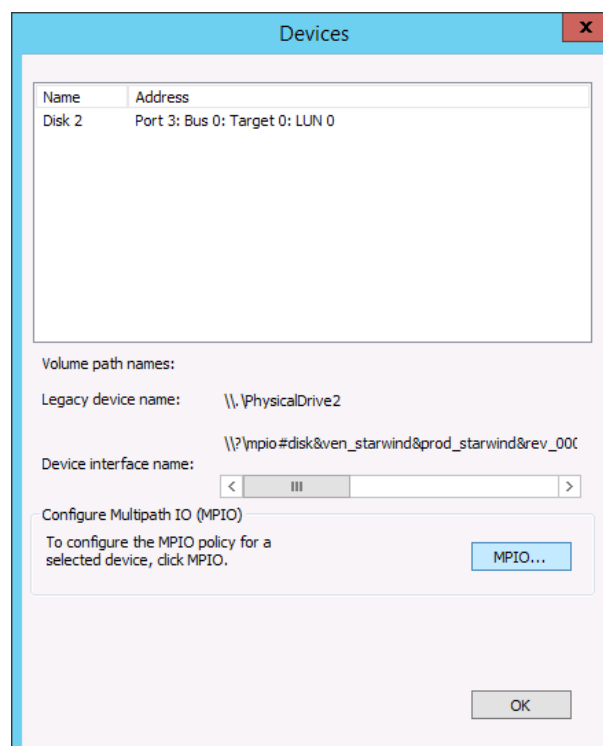
15. Select **Fail Over Only** load balance policy and then designate the local path as active.

16. You can check that 127.0.0.1 is the active path by selecting it from the list and clicking **Details**


17. Repeat the same steps on the second node.

18. Initialize the disks and create partitions on them using the computer management snap-in. It is required that the disk devices are visible on both nodes to create the cluster.

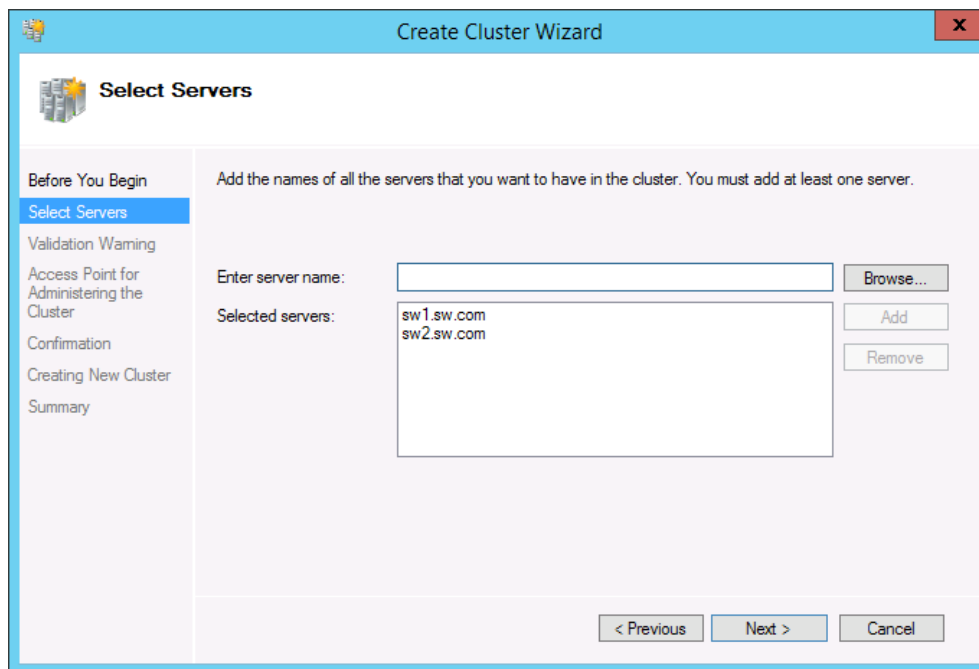**Note:** it is recommended to initialize the disks as GPT.

CREATING A CLUSTER

1. Open **Server Manager**. Select the **Failover Cluster Manager** item from the **Tools** menu.
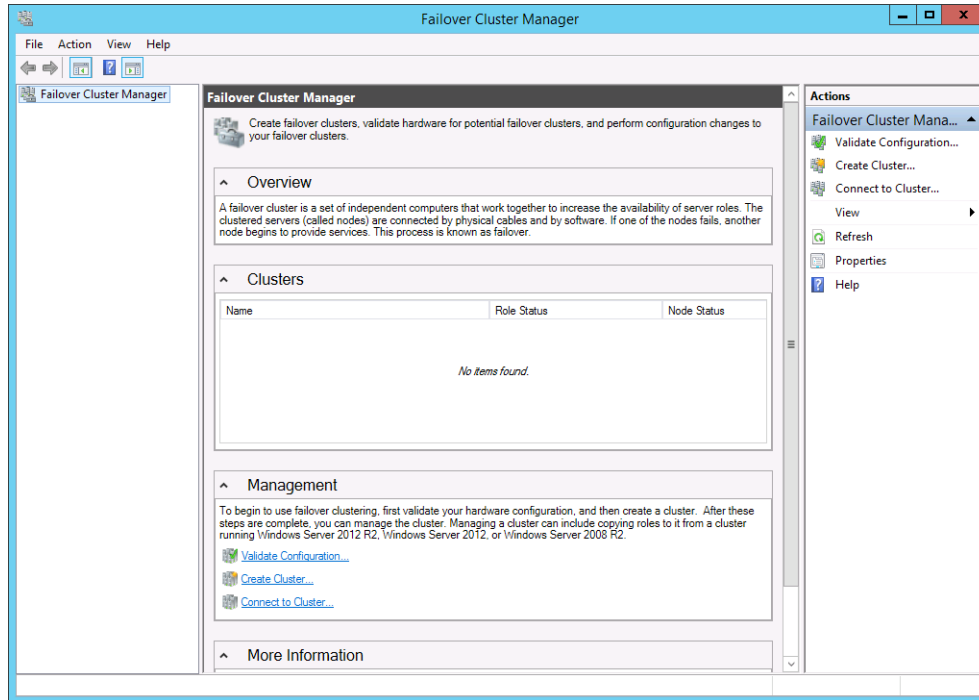
Click the **Create Cluster** link in the Actions section of the Failover Cluster Manger.

2. Specify the servers to be added to the cluster.

Click **Next** to continue.
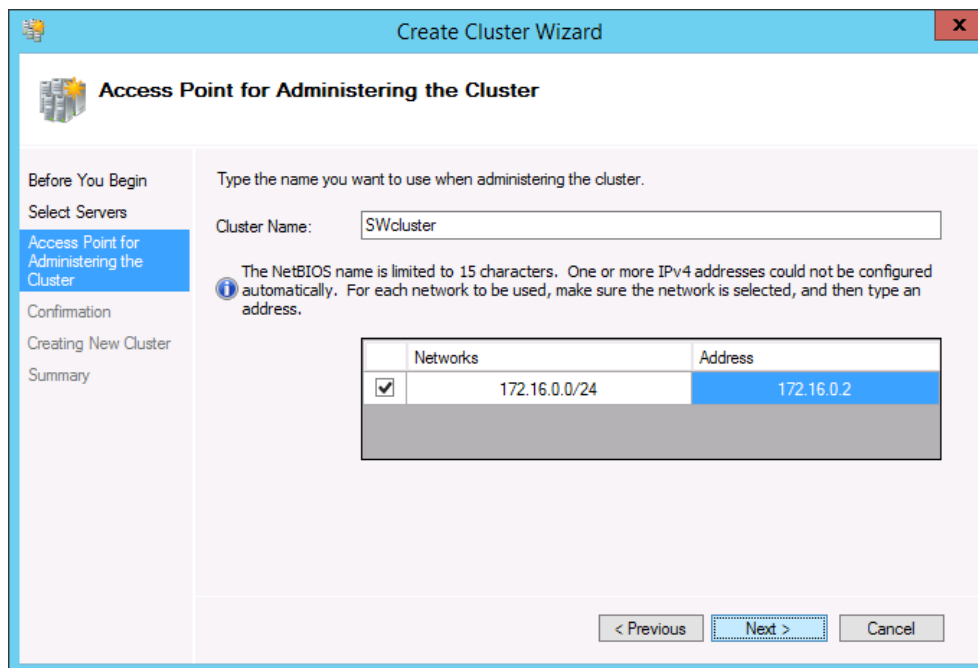
3. Validate the configuration by passing the cluster validation tests: select "Yes..."
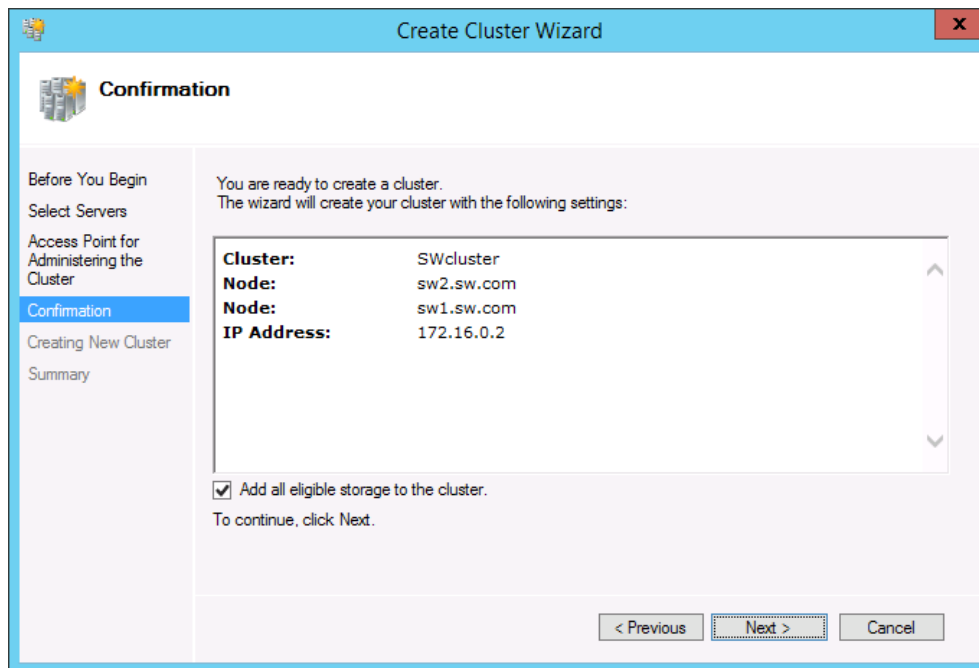

Click **Next** to continue.

4. Specify a cluster name.

Note: If the cluster servers get IP addresses over DHCP, the cluster also gets its IP address over DHCP. If the IP addresses are set statically, you need to set a cluster IP address manually as well.
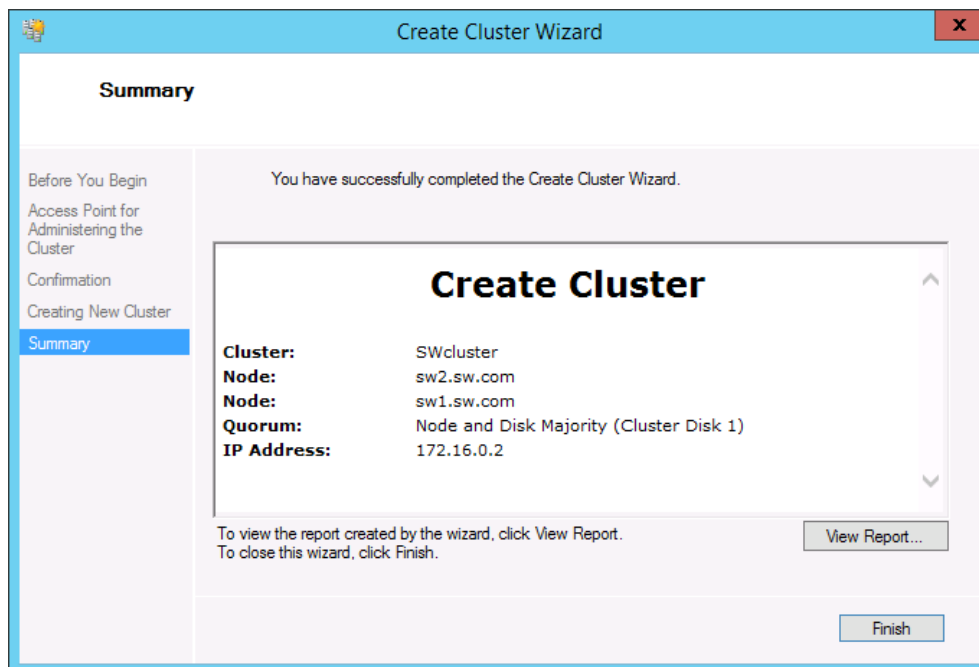

Click **Next** to continue.

5. Make sure that all of the settings are correct. Click **Previous** to make any changes.

6. The process of cluster creation starts. After it is completed, the system displays a report with detailed information.
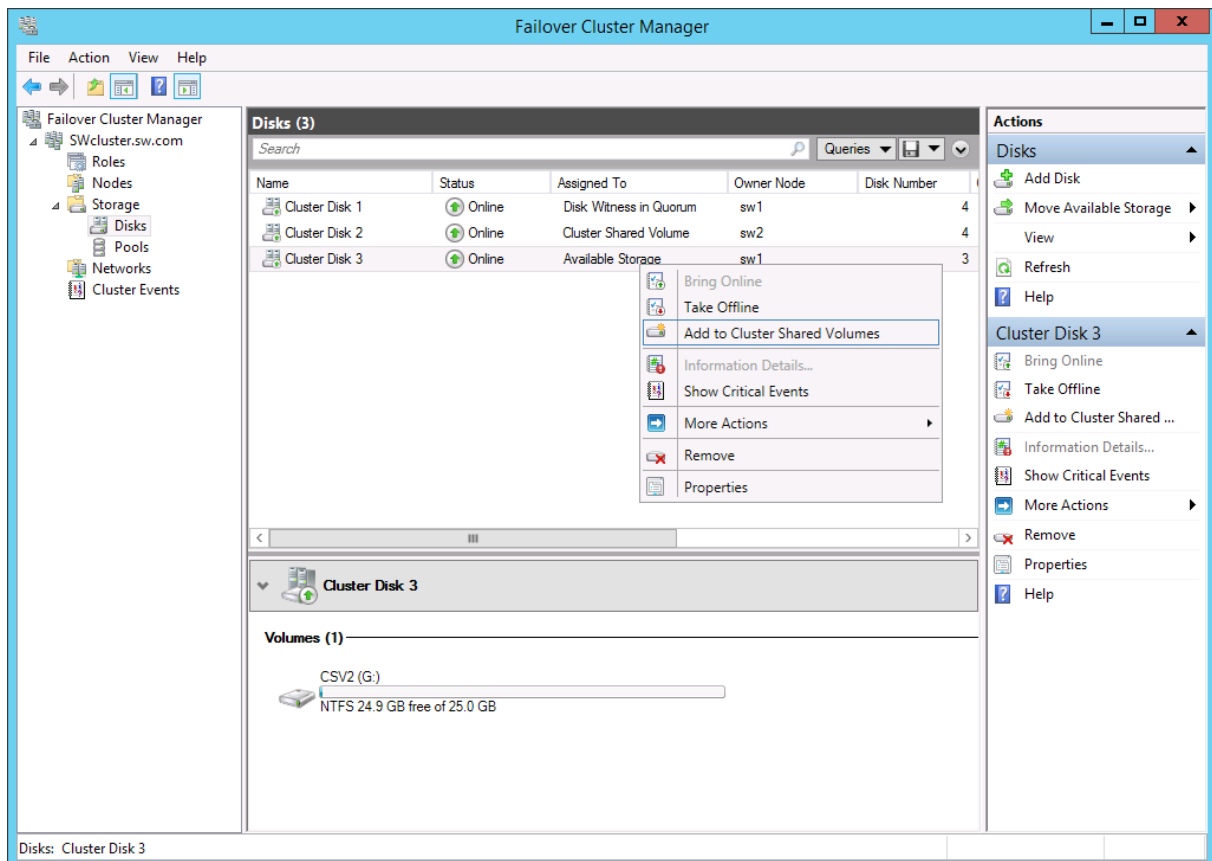

Click **Finish** to close the wizard.

ADDING CLUSTER SHARED VOLUMES

To add Cluster Shared Volumes (CSV) that is necessary to work with Hyper-V virtual machines:

1. Open **Failover Cluster Manager**.

2. Go to Cluster->Storage -> Disks.

3. Right-click the required disk and select **Add to Cluster Shared Volumes**.

Once the disks are added to the cluster shared volumes list you can start creating highly available virtual machines.

> **Note:** to avoid unnecessary CSV overhead configure each CSV to be owned by one cluster node. This node should also be the preferred owner of the VMs running on that node.

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