

# StarWind Virtual SAN<sup>®</sup>

## Asynchronous replication and Disaster Recovery

JANUARY 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 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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## Introduction

Having a disaster recovery site is crucial for companies that care about their data safety, and it's a MUST for ones which are under the regulatory requirements. On-site Redundancy (RAID, Synchronous Mirroring, etc.) does not guarantee data protection from hurricanes, floods, and earthquakes that can completely destroy the primary datacenter. To reach the maximum data security, StarWind provides asynchronous replication functionality.

The combination of StarWind data-compression and replication technologies enable to eliminate the typical for conventional DR implementations issues: high cost, performance drops, and risk of data discontinuity. Allowing the installation to take place in the cloud VM for DR purposes and moving the replication and data compression to the background, it prevents the common pitfalls found in traditional DR solutions.

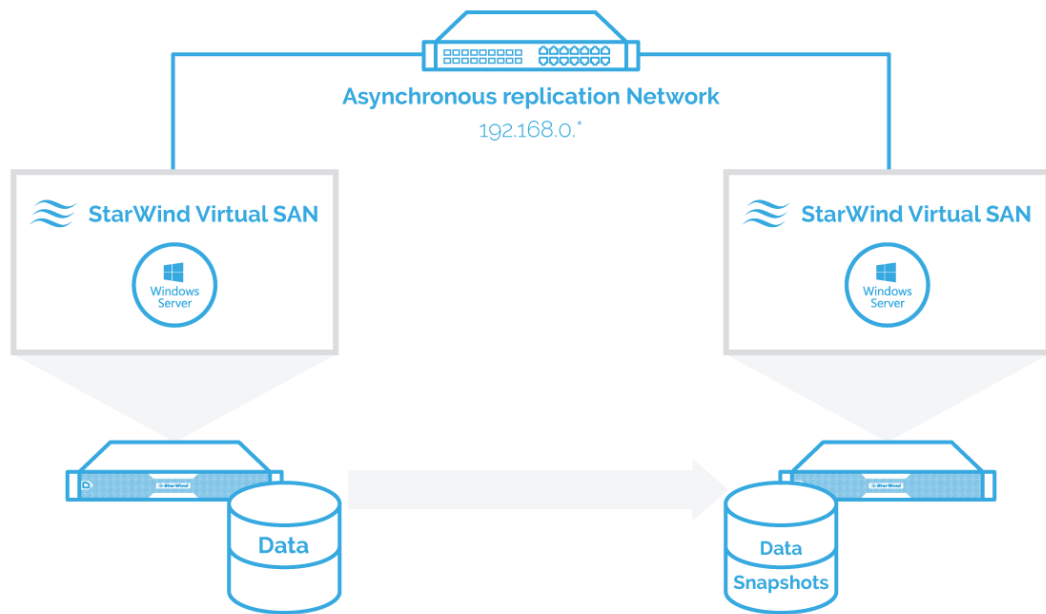
This document is intended for StarWind users who want to learn to set up asynchronous replication, and the basics of snapshot management. It describes the process in detail, being a comprehensive step-by-step instruction that is good for beginners and seasoned professionals.

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

The reference network diagram of the configuration described further in this guide is provided below.



Please, make sure that servers fit Asynchronous replication requirements specified on this page: <https://www.starwindsoftware.com/system-requirements>

Since Asynchronous node uses LSFS device by design, please, make sure that you are aware of LSFS device features and the node hardware fits LSFS device requirements, described here: <https://knowledgebase.starwindsoftware.com/explanation/lfs-device-technical-description/>

**NOTE:** Additional network connections may be necessary, depending on the cluster setup and applications requirements. For any technical help with configuring the additional networks, please, do not hesitate to contact StarWind support department via the [online community](#) forum, or via the [support form](#) (depends on your support plan).

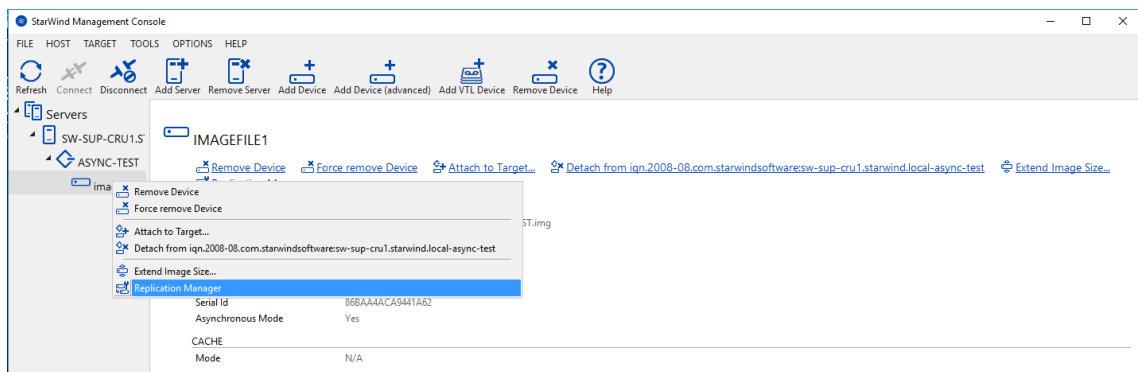
## Creating Asynchronous Replication

**NOTE:** Asynchronous replica can be added to a standalone or an HA device. In this document, the asynchronous replica is created for a standalone device. Before replica creation, please, install StarWind VSAN and necessary devices according to these guides:

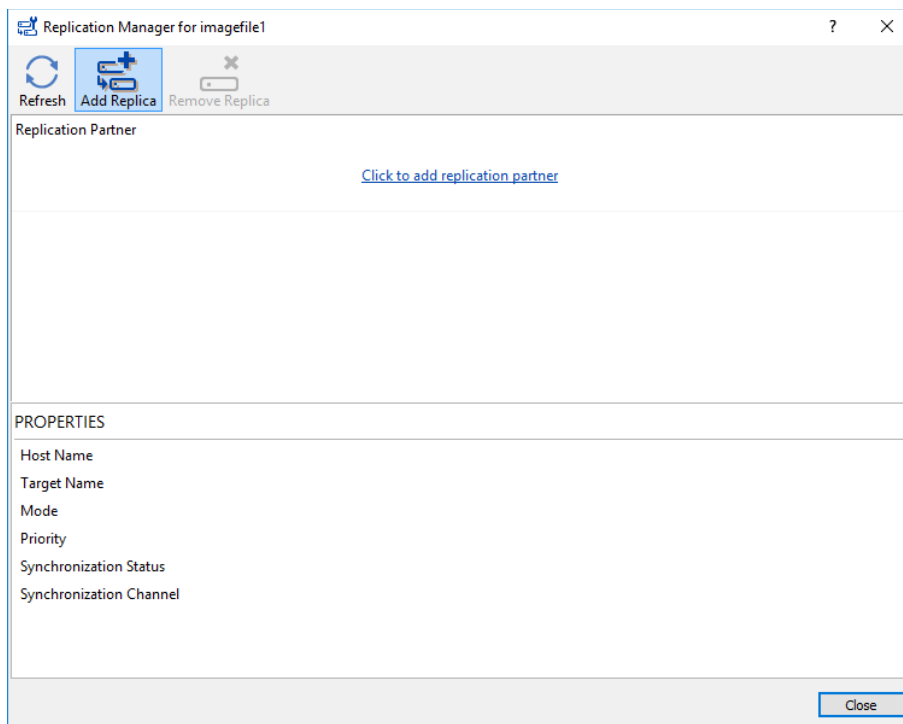
<https://www.starwindsoftware.com/resource-library/starwind-virtual-san%20-%20creating-stand-alone-image-file-device>

<https://www.starwindsoftware.com/resource-library/quick-start-guide-creating-ha-device-with-starwind-virtual-san>

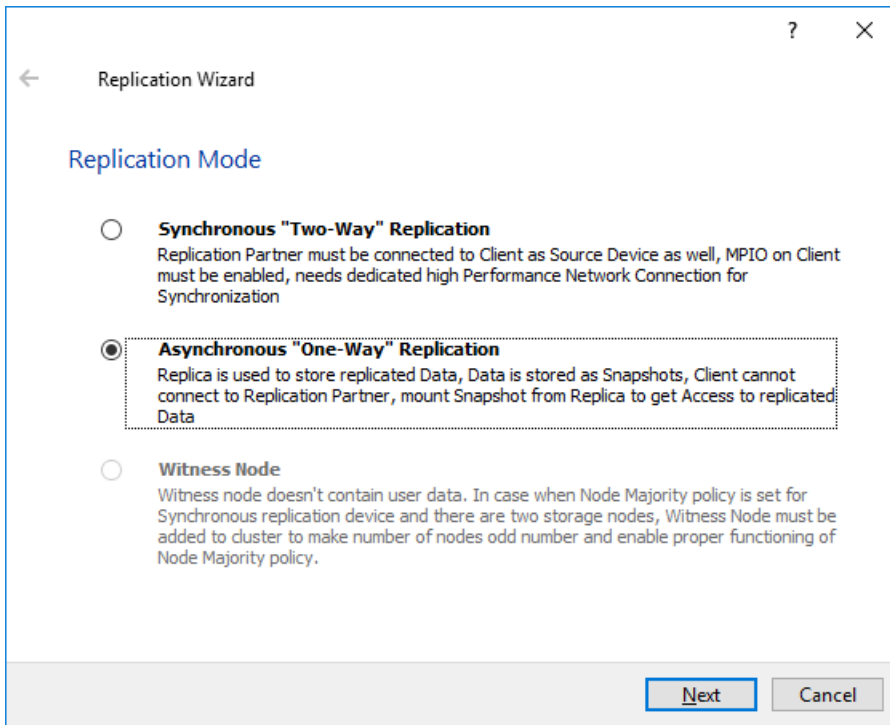
1. Open StarWind Management Console, select device and right click on it to select the **Replication Manager**.



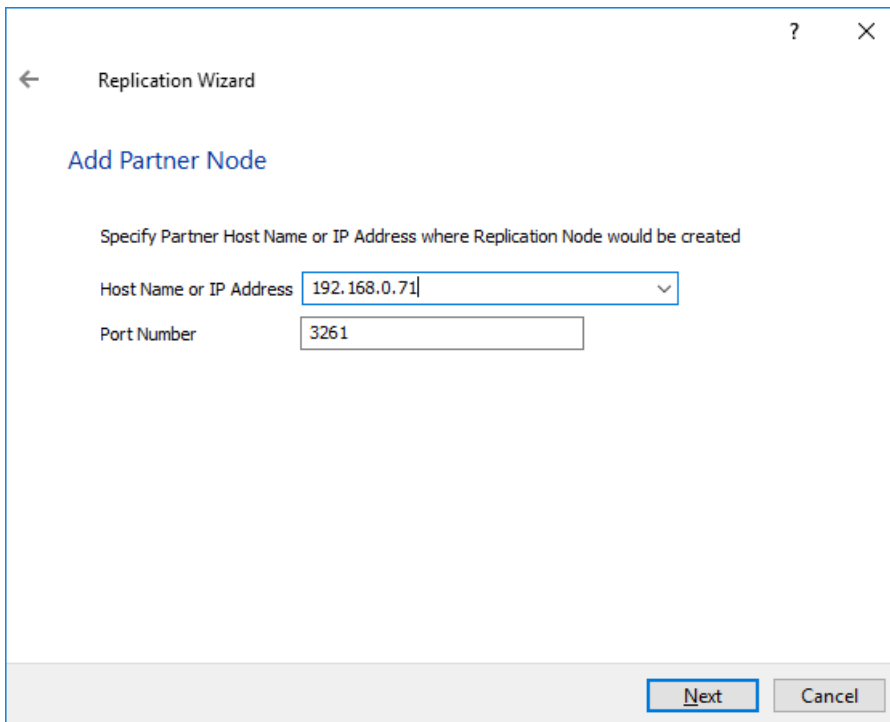
2. The **Replication Manager** window will appear. Press the **Add Replica** button.



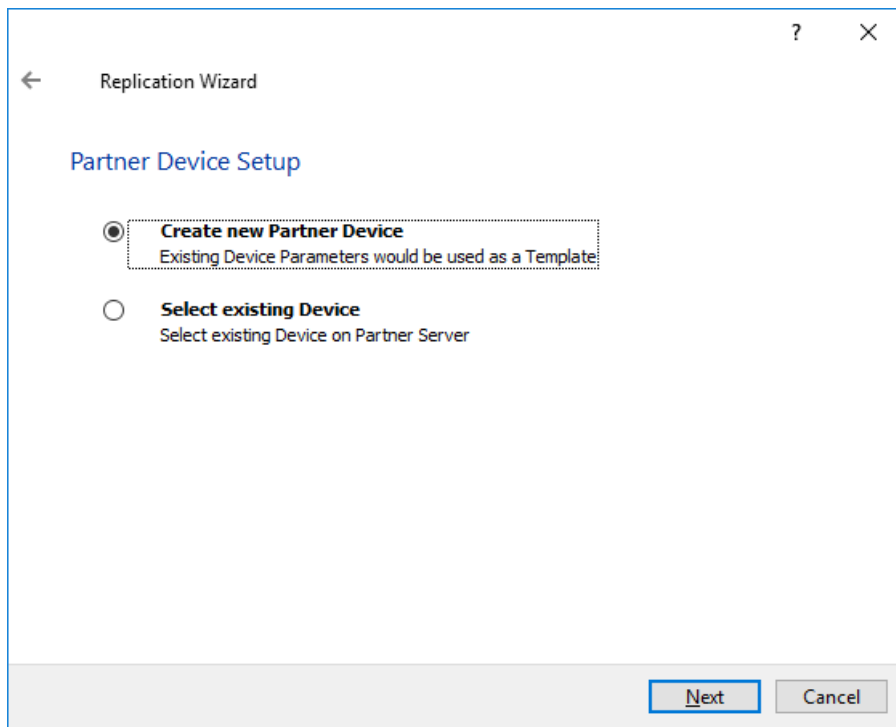
3. Select Asynchronous "One-Way" Replication and click Next to proceed.



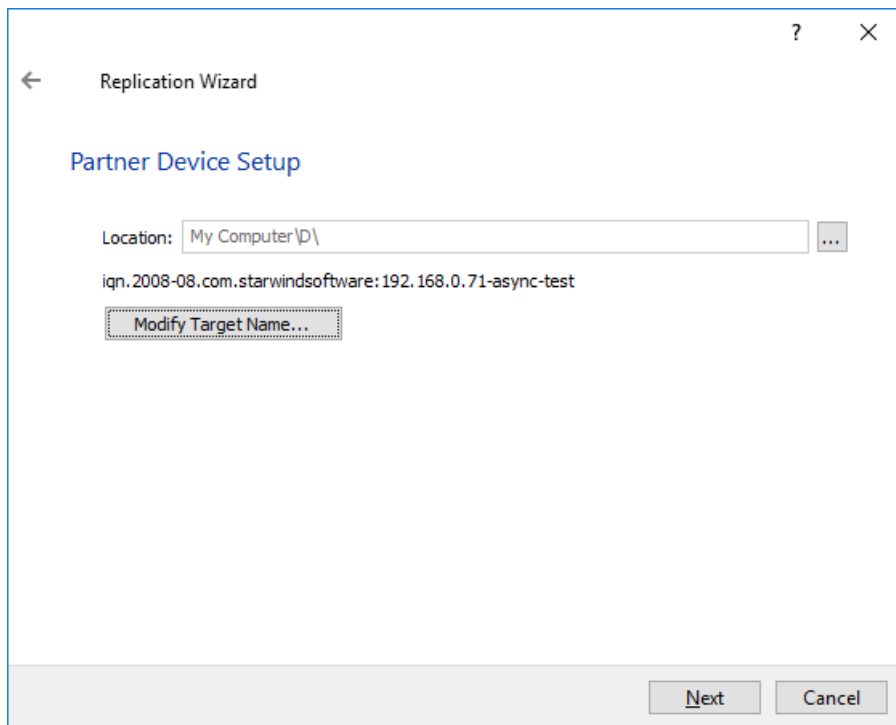
4. Enter the IP address of the Asynchronous node.



5. Choose the **Create New Partner Device** option and click **Next**.

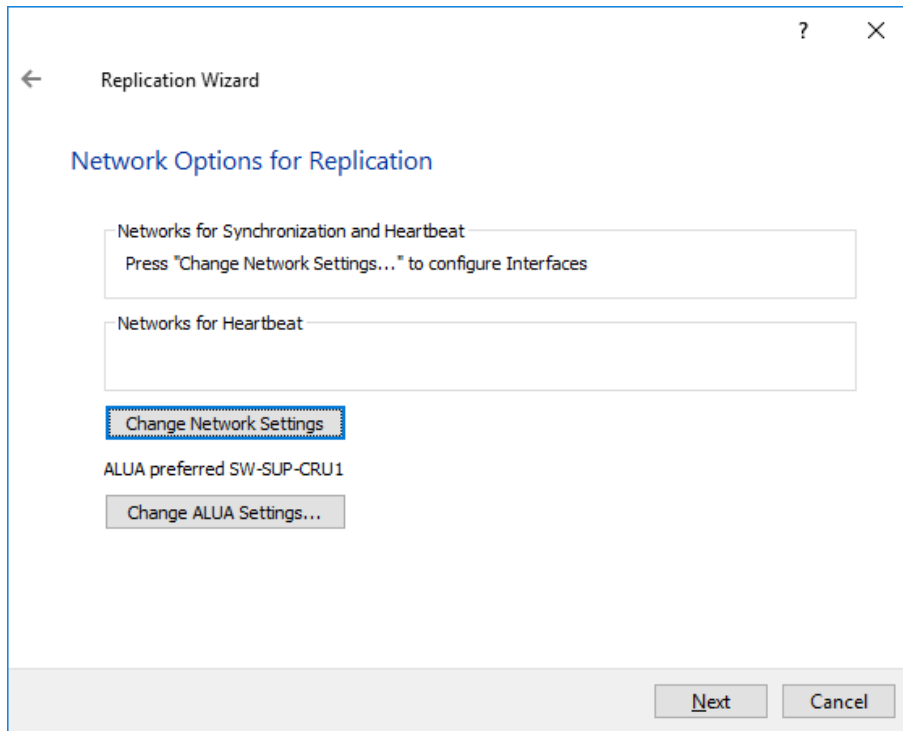


6. Specify the partner device location if necessary. You also can modify the device target name.

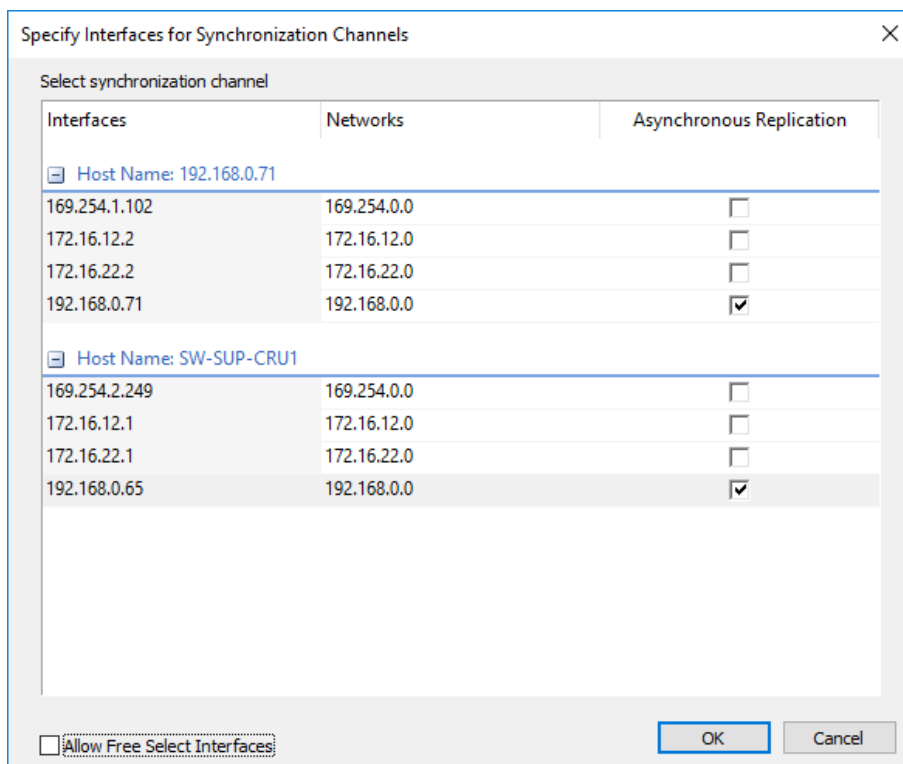




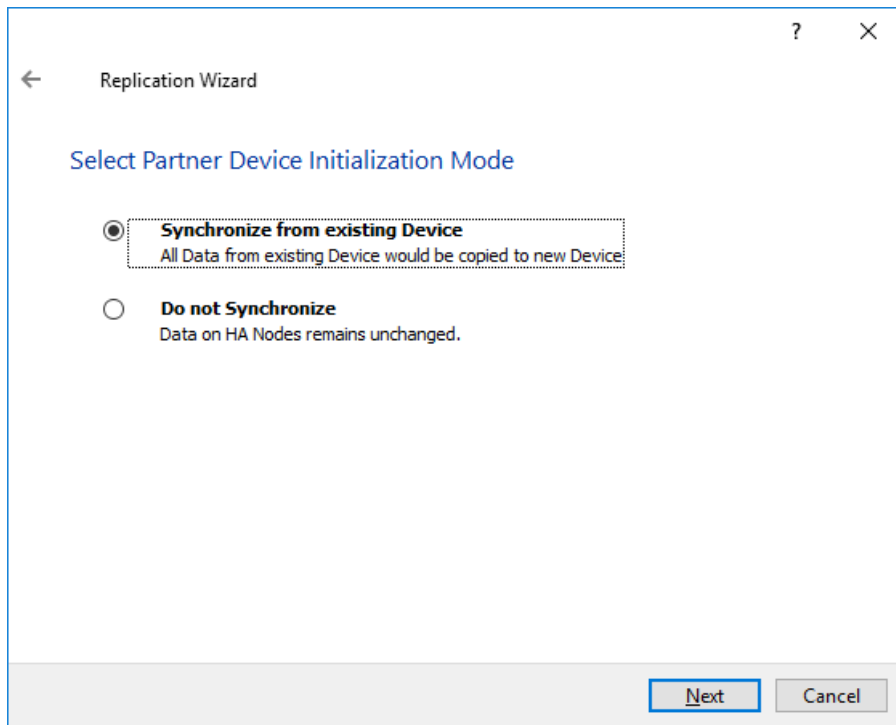
- Click **Change Network Settings**.



- Specify the proper network for asynchronous replication between two nodes, click **OK** and then **Next**.

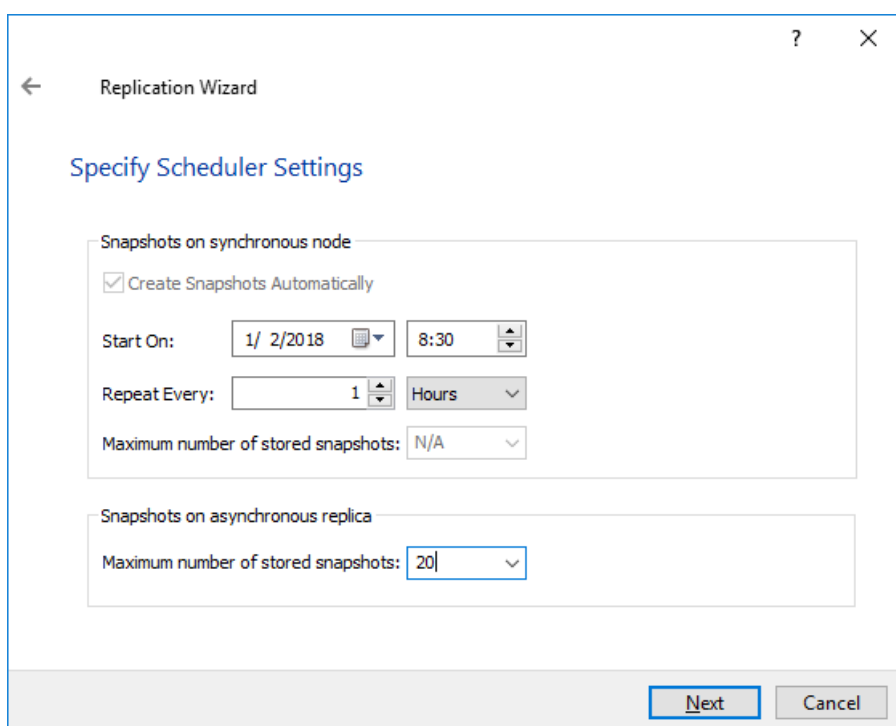


9. Select **Synchronize from existing Device** as a partner device initialization mode and click **Next**.



10. Specify Scheduler settings and click **Next**.

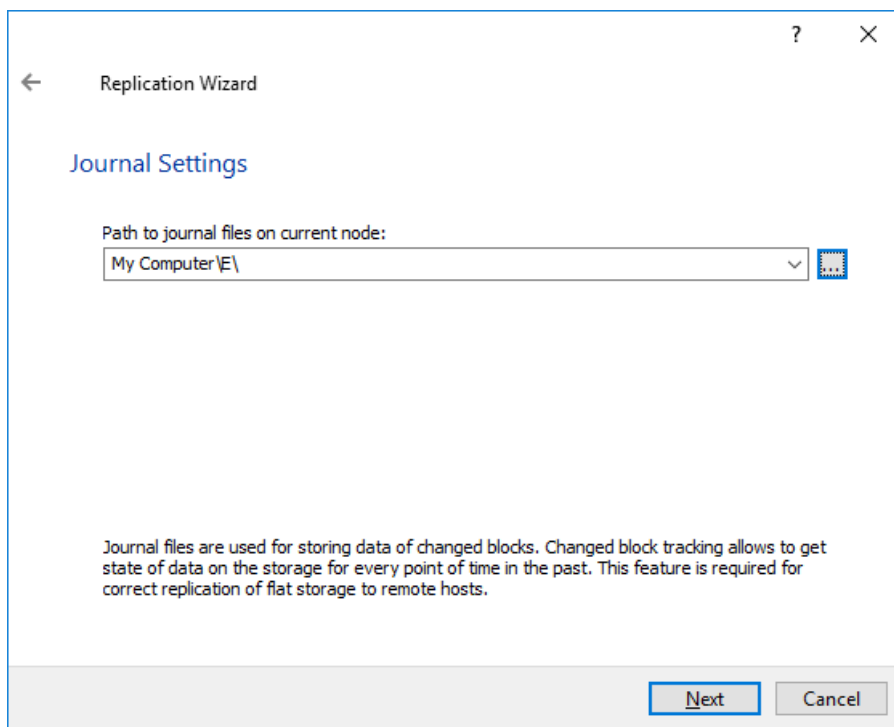
**NOTE:** The size of journal files and number of snapshots depends on the settings, specified in this window.



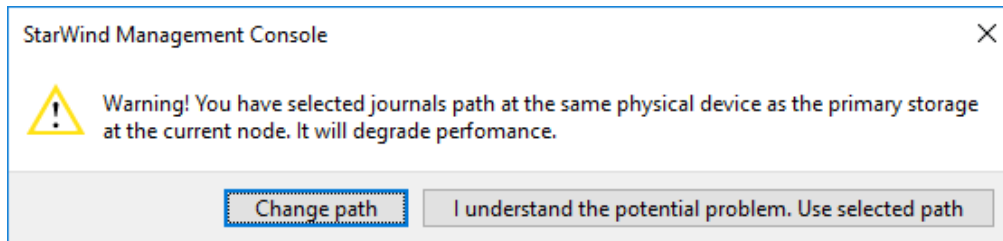
11. Specify the path for journal files and click **Next**

**NOTE:** The journal files will be located on the node which has the original device. However, it is highly recommended do not store journal files on the same drive where the original device is located.

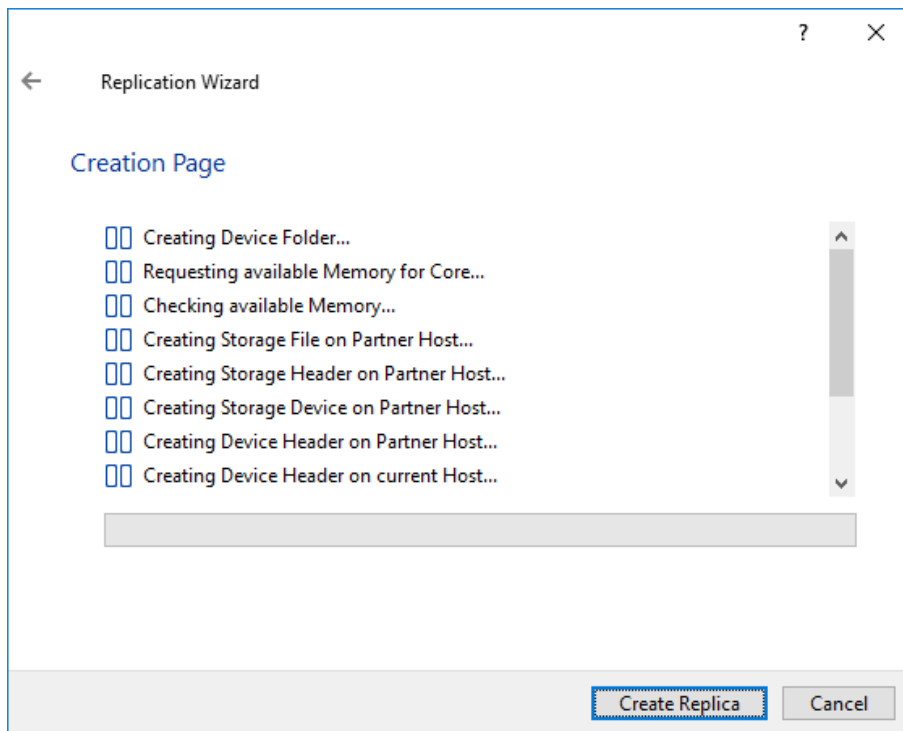
Also, do not use C:\ drive as the path for journal files to avoid any issues with Windows OS.



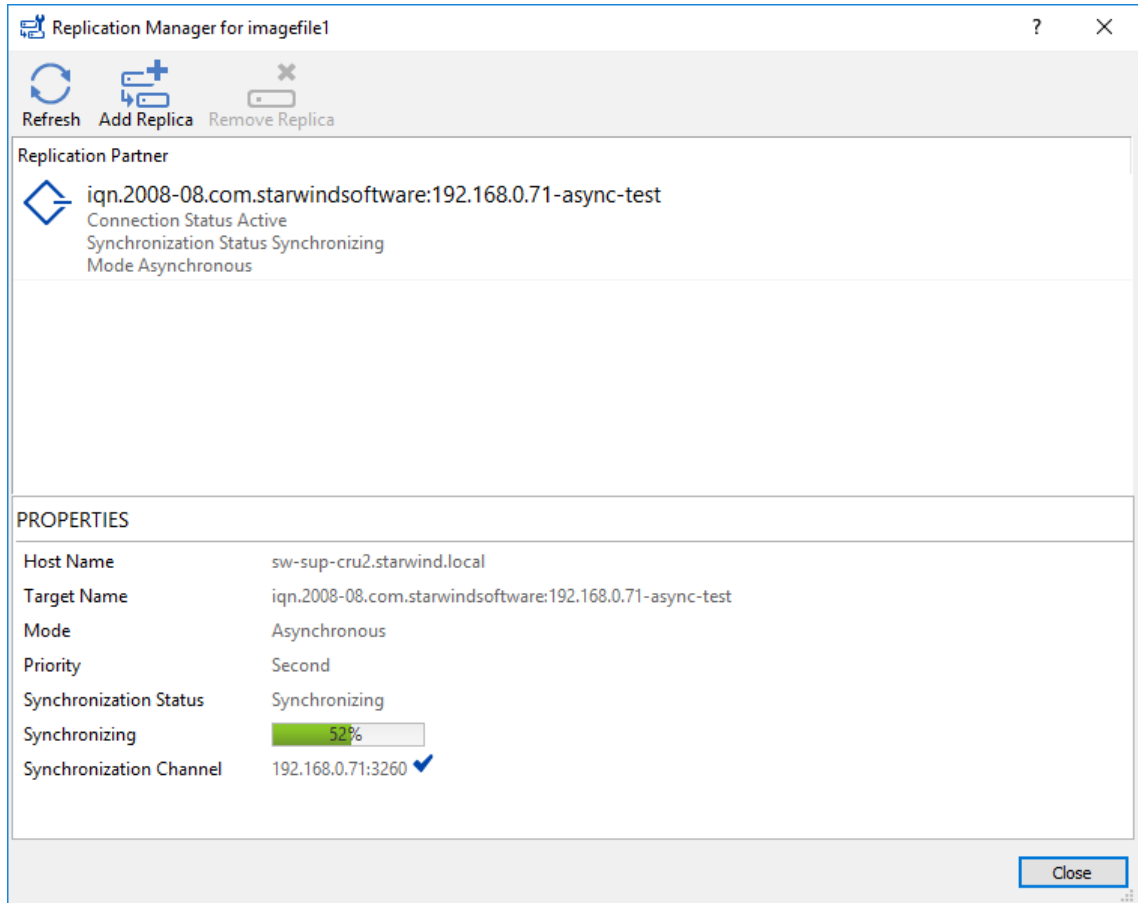
12. If you choose the same drive where the StarWind device is located, you will receive the warning about possible performance issues. If you do not have the additional volume to store the journals, you can click **I understand the potential problem. Use selected path**.



13. Press the **Create Replica** button.



14. Wait until StarWind service creates a device and click **Close** to complete the device creation.

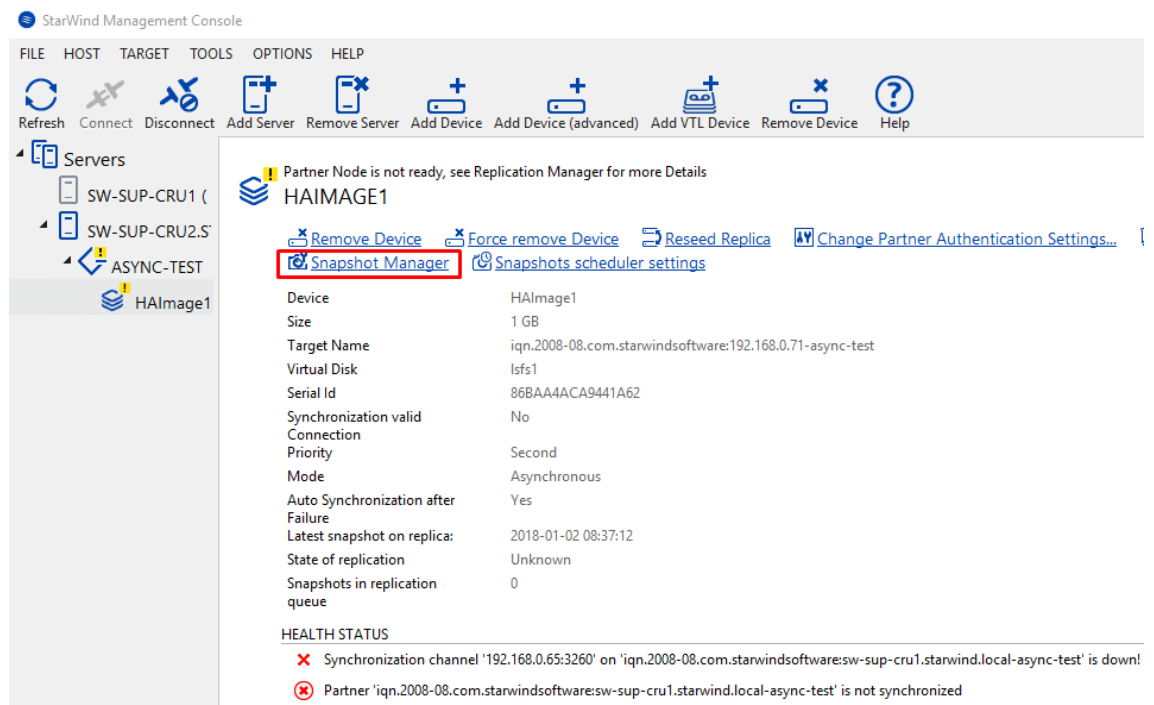


## Restoring from an Asynchronous Replica

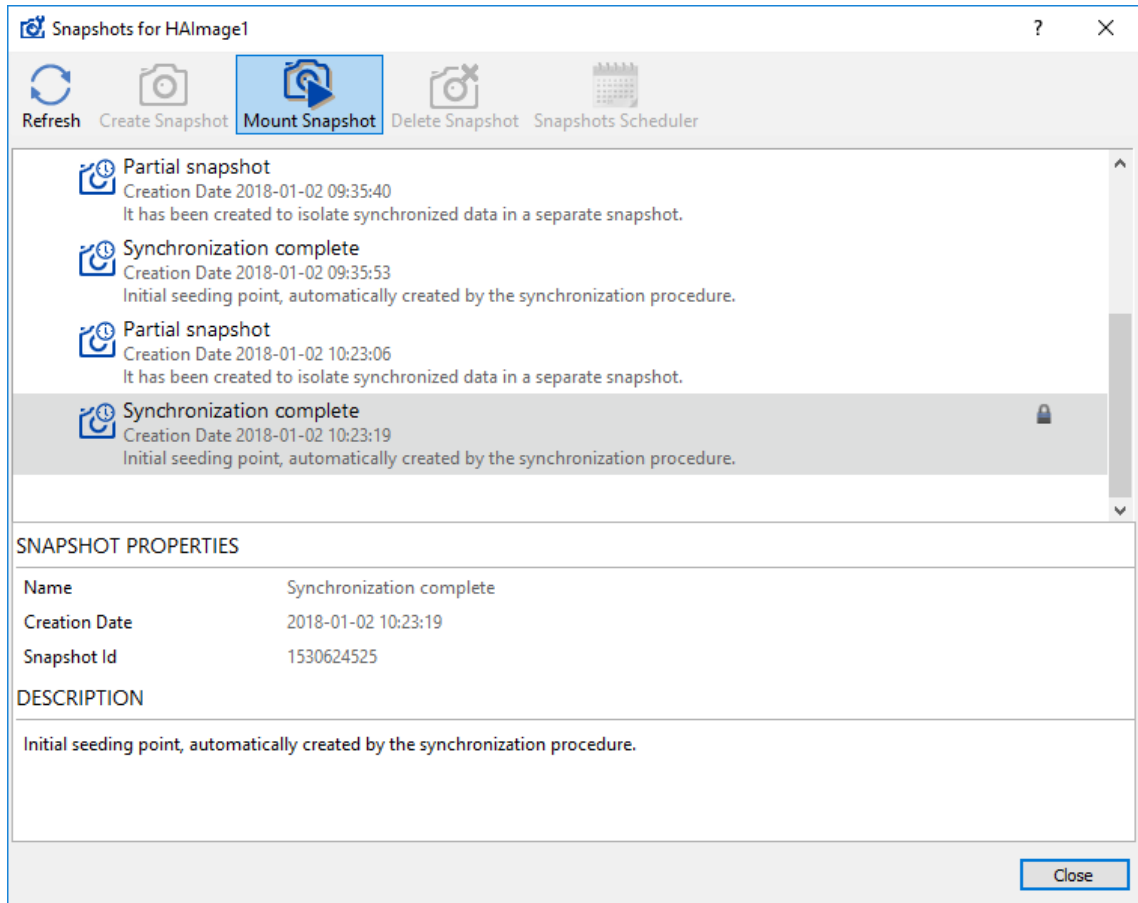
There are two possible ways for Hyper-V environment to bring the production online from an asynchronously-replicated node if the primary nodes are unavailable because of a disaster. The way to restore depends on particular needs.

- **Restoring Virtual Machines from a Read-Only Snapshot:**

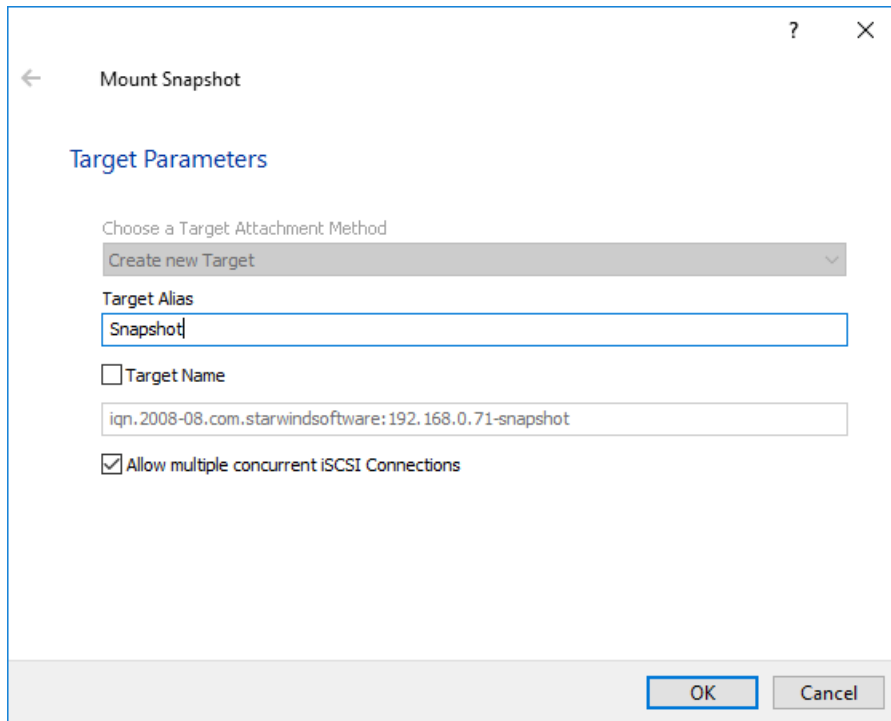
15. In [StarWind Management console](#) open device on the Asynchronous node, and click **Snapshot Manager**.



16. Select the Snapshot from the list and click **Mount Snapshot**. Snapshot will be mounted as a separate device in the **Read-Only** mode.



17. In the emerged window, specify target parameters. Target alias, as well as the target name, can be modified if needed.



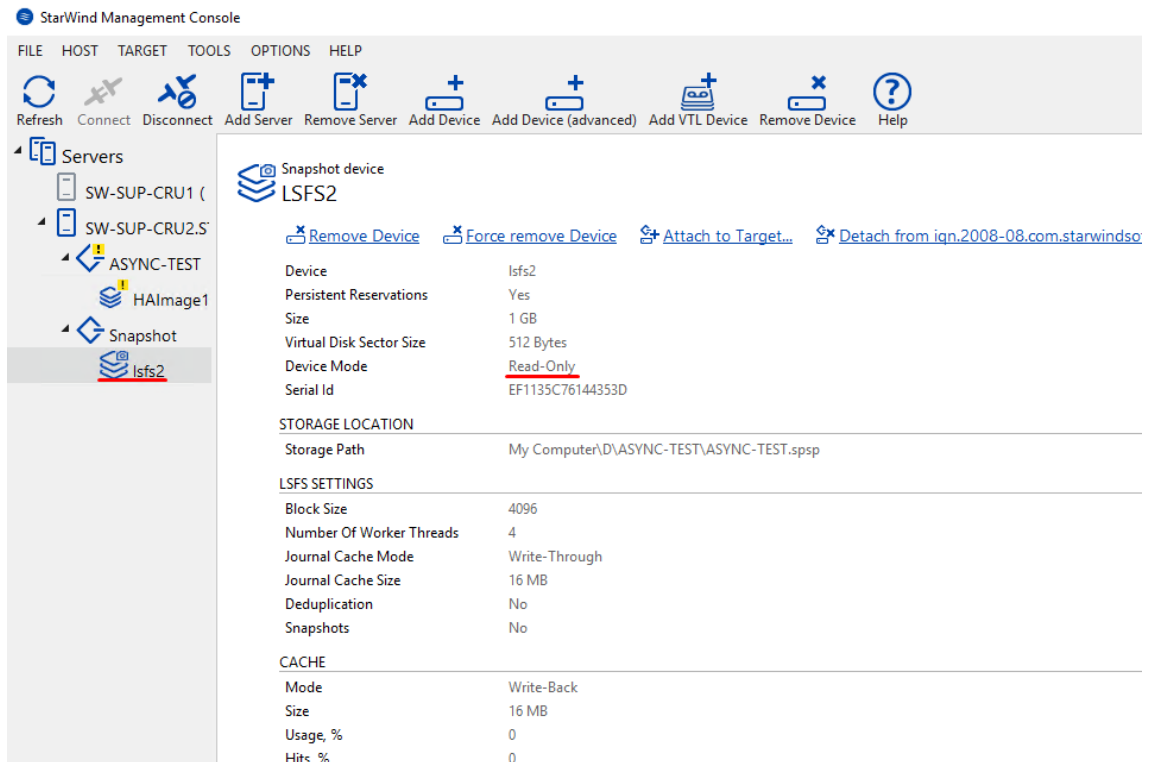
The screenshot shows a dialog box titled "Mount Snapshot" with a back arrow on the left and a help icon and close button on the right. The main section is titled "Target Parameters". It contains a dropdown menu labeled "Choose a Target Attachment Method" with "Create new Target" selected. Below this is a text input field for "Target Alias" containing the text "Snapshot". There is an unchecked checkbox for "Target Name" and a text input field containing the iSCSI target name "iqn.2008-08.com.starwindsoftware:192.168.0.71-snapshot". At the bottom, there is a checked checkbox for "Allow multiple concurrent iSCSI Connections". The dialog box has "OK" and "Cancel" buttons at the bottom right.

Click **OK** to mount the snapshot.



18. Device mounted from the snapshot should look like one in **StarWind Management Console** (look the figure below).

**NOTE:** Device mounted from a snapshot is in the **Read-Only** mode by design.

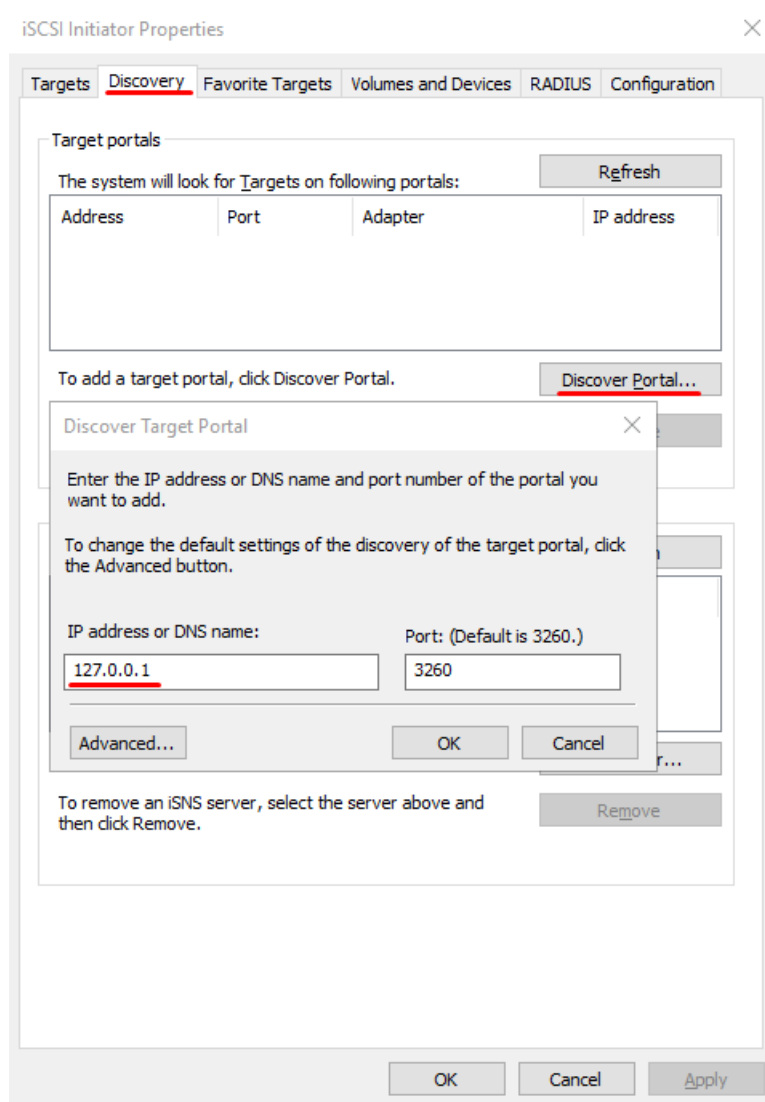


19. To access data on the read-only device, the target should be connected in Microsoft iSCSI Initiator.

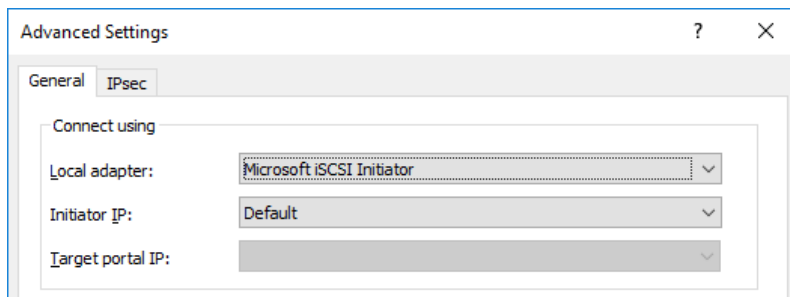
Launch Microsoft iSCSI Initiator in Server Management tools or by deploying iscsicpl in the command line interface.

20. Navigate to the **Discovery** tab in the **iSCSI Initiator Properties** window.

21. Click the **Discover Portal** button. Once **Discover Target Portal** dialog appears, type in 127.0.0.1 to discover targets from the local host and click the **Advanced** button.

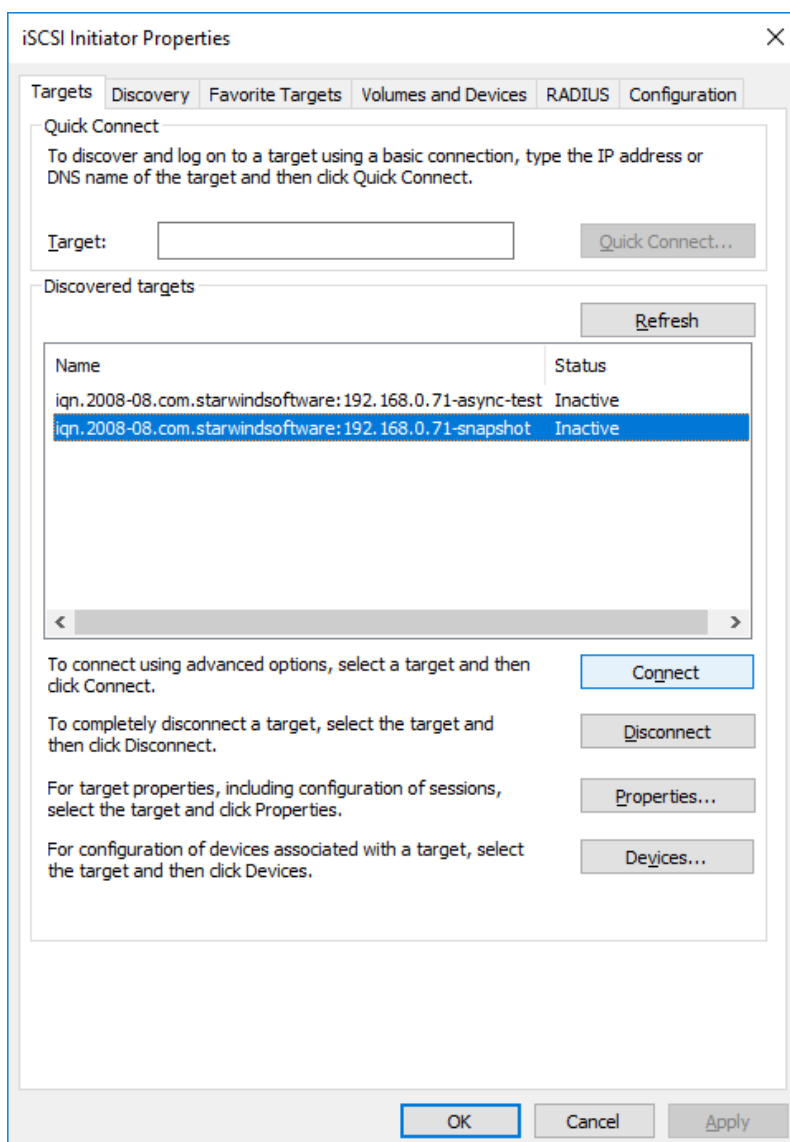


22. Select **Microsoft iSCSI Initiator** as the Local adapter and click **OK** twice.

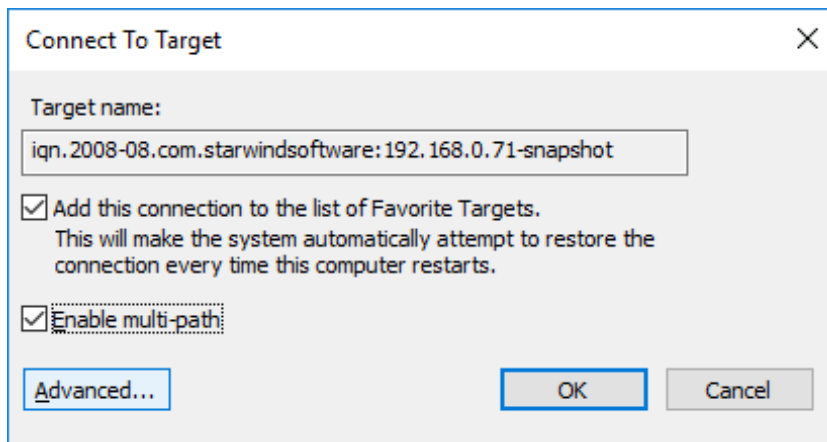


23. Navigate to the **Targets** tab, select the Snapshot target and click **Connect**.

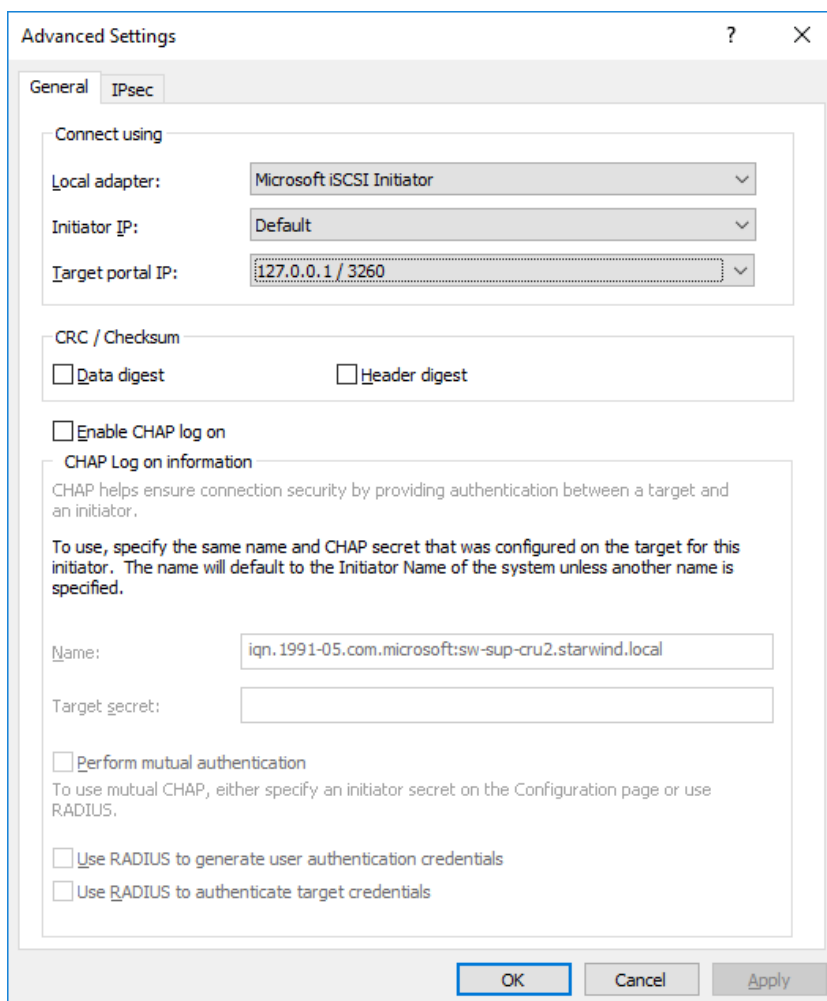
**NOTE:** If targets are not listed, check the firewall settings of the StarWind Server and the list of networks served by the StarWind Server (go to StarWind Management Console -> Configuration -> Network).



24. Add the target to the Favorites list and enable multi-path. Click **Advanced**.

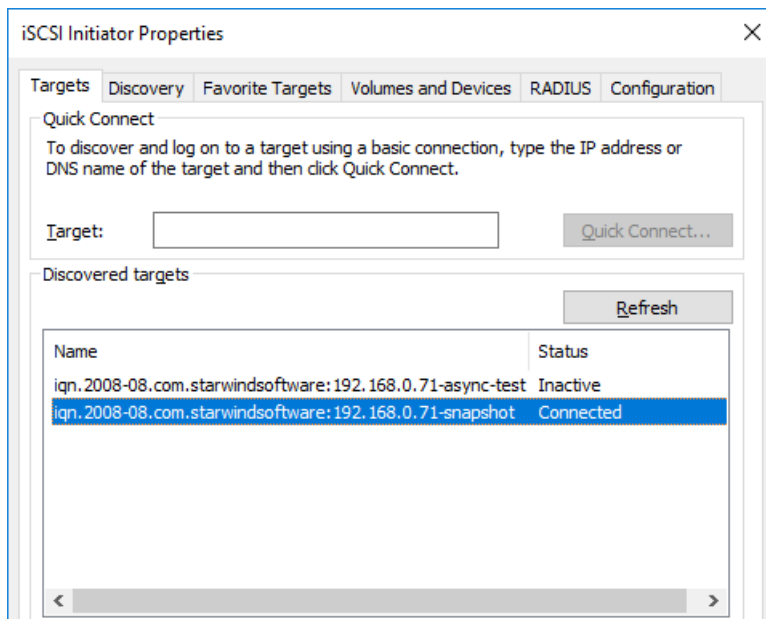


25. Select 127.0.0.1 from the Target portal IP drop-down list and set Microsoft iSCSI Initiator as the default initiator.

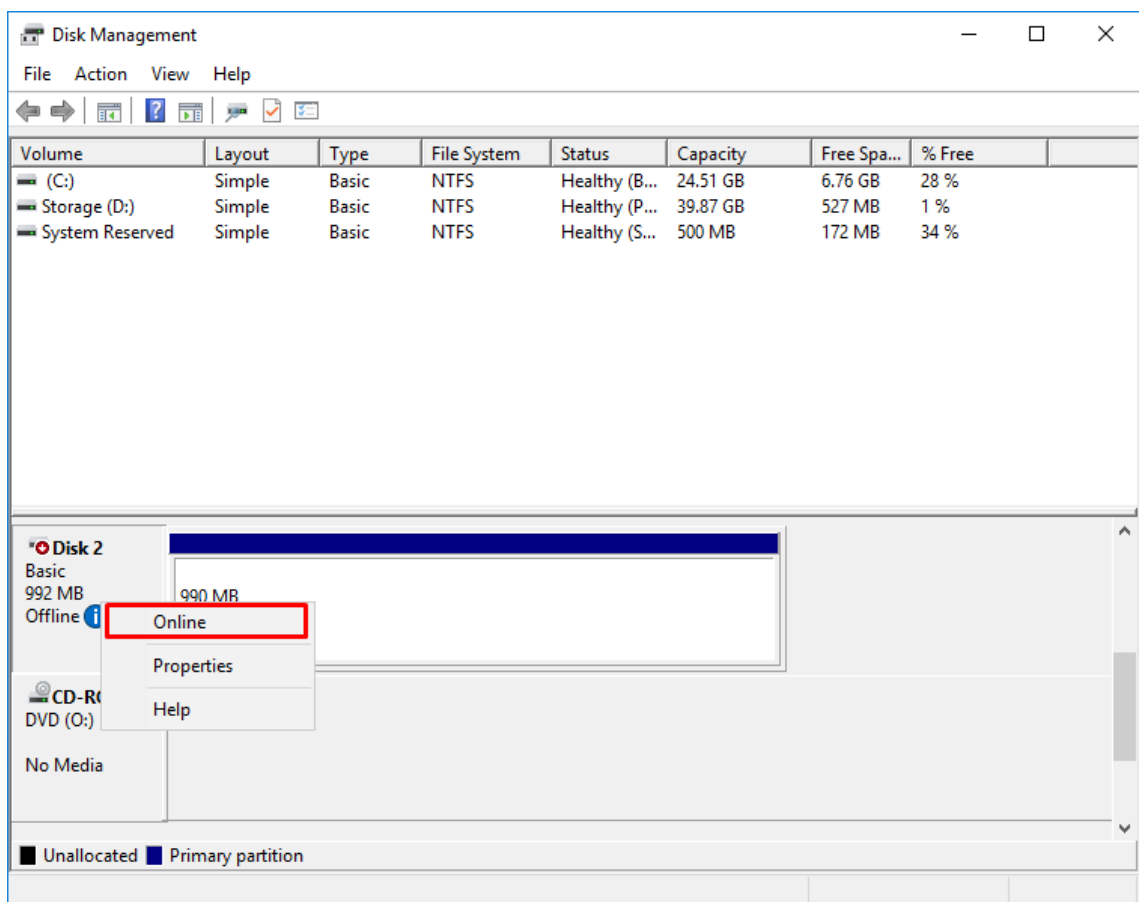


Click **OK** twice and complete the connection process.

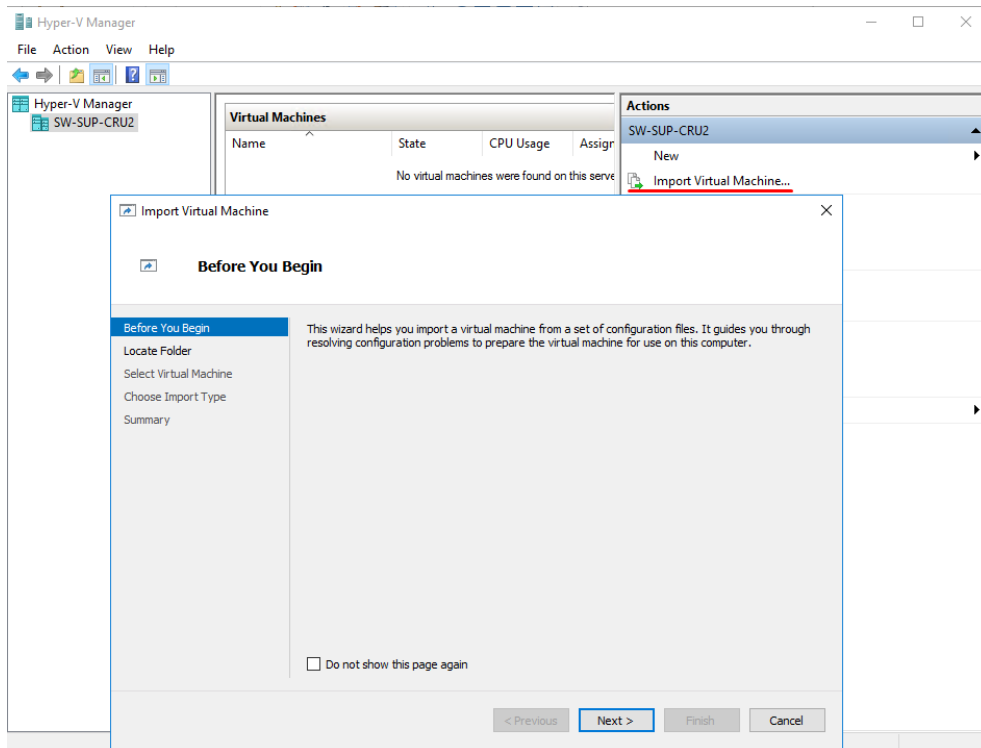
26. Make sure that target is connected as in the picture below:



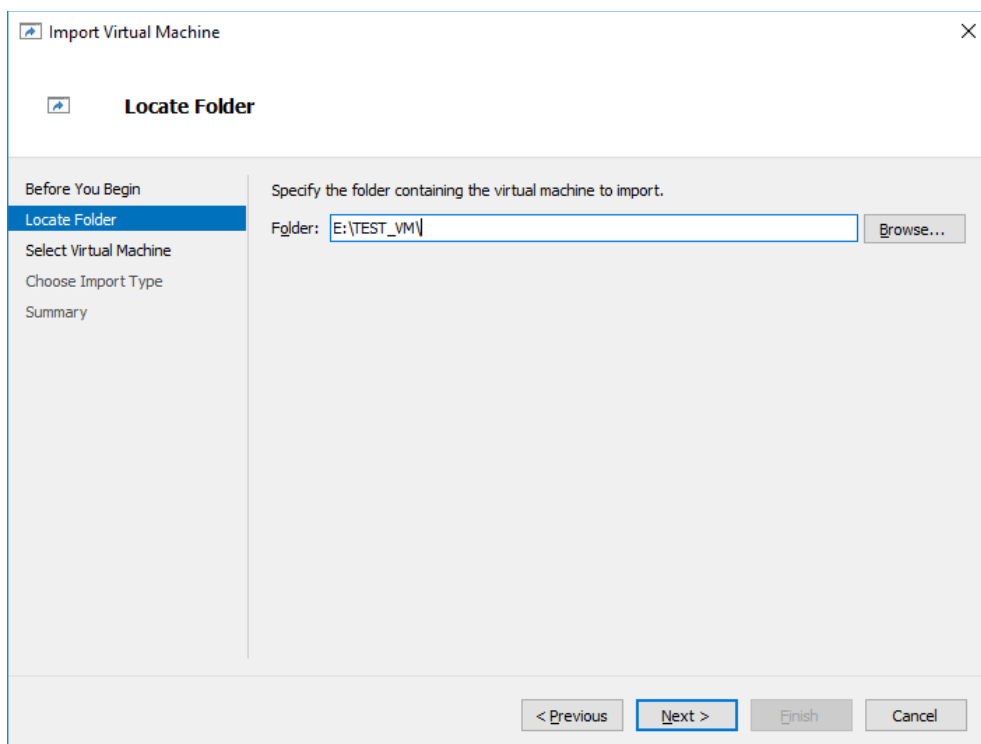
27. Open the Disk Management tab and bring the new disk online.



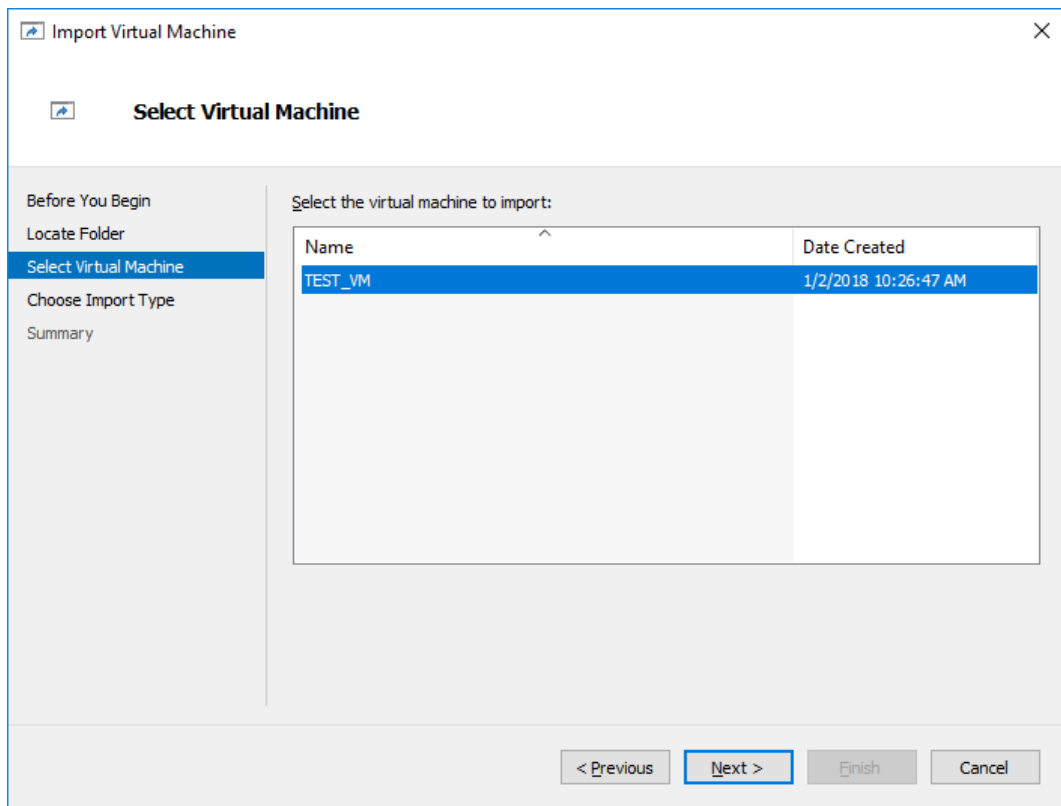
28. Once the Volume with the Virtual Machines or files is available, open **Hyper-V Manager** and click **Import Virtual Machine...**



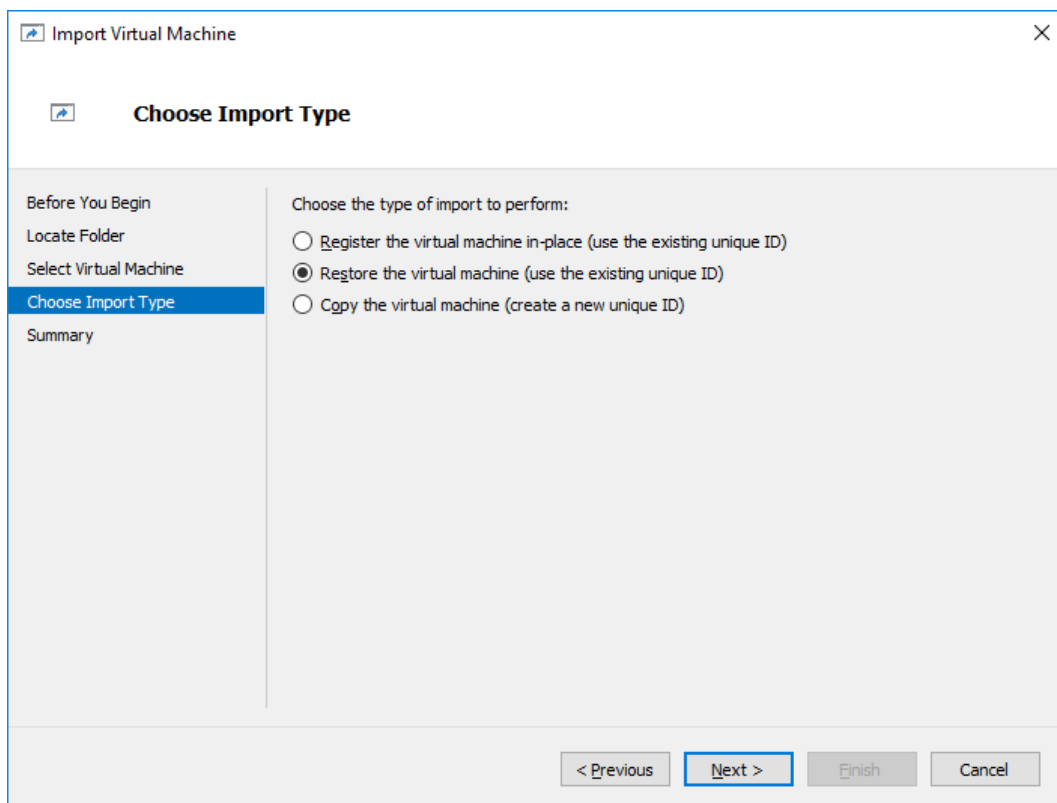
29. Specify the path to the Virtual Machine located on the Read-Only disk (mounted from snapshot) and click **Next**.



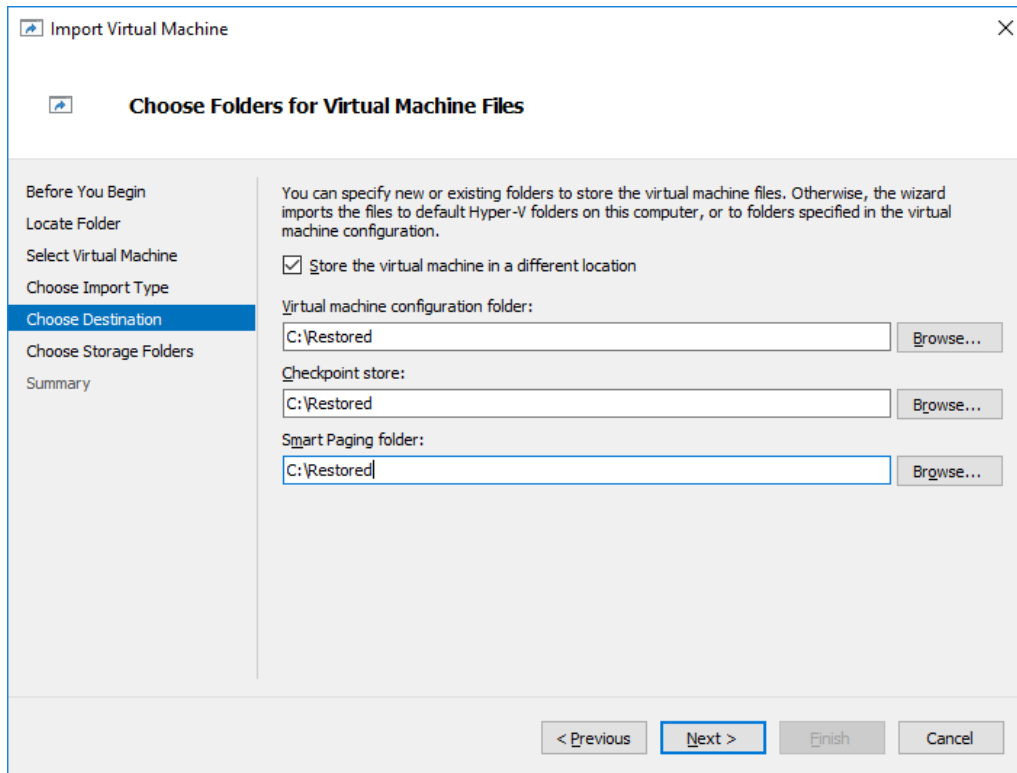
30. Select Virtual Machine and click **Next**.



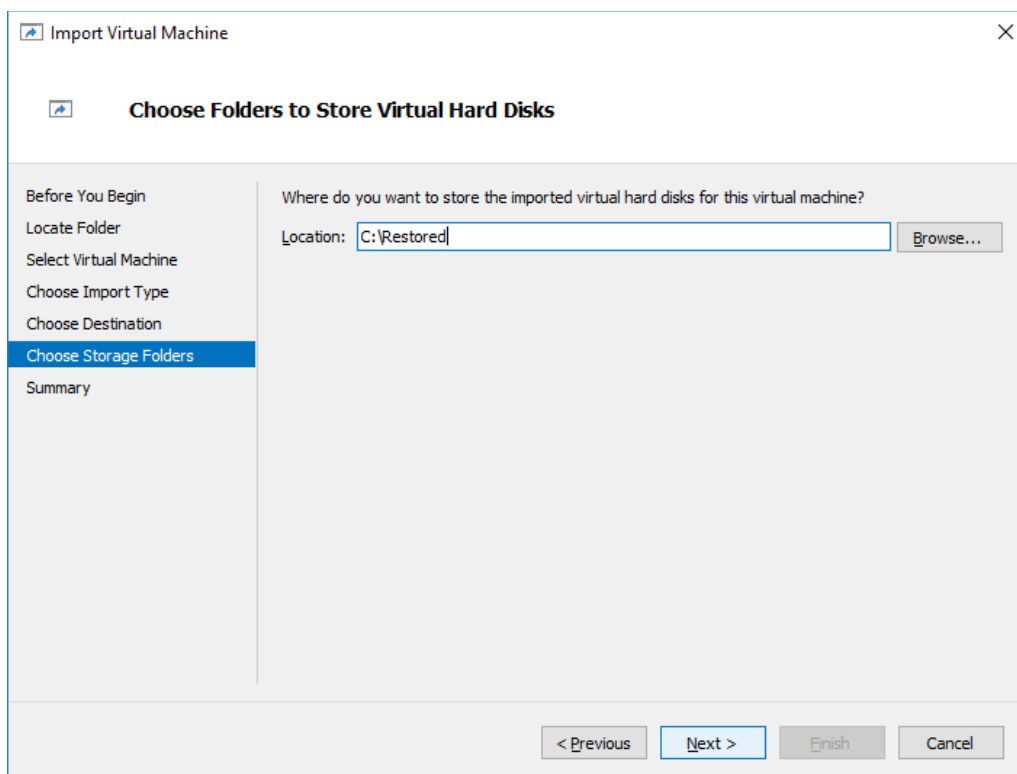
31. Choose the **Restore the Virtual Machine** option.



32. In **Choose Destination** check **Store the Virtual Machine in a different location**, specify the **local** path on the DR node and click **Next**.



33. Choose a folder to store the Virtual Hard Disk and click **Next**.



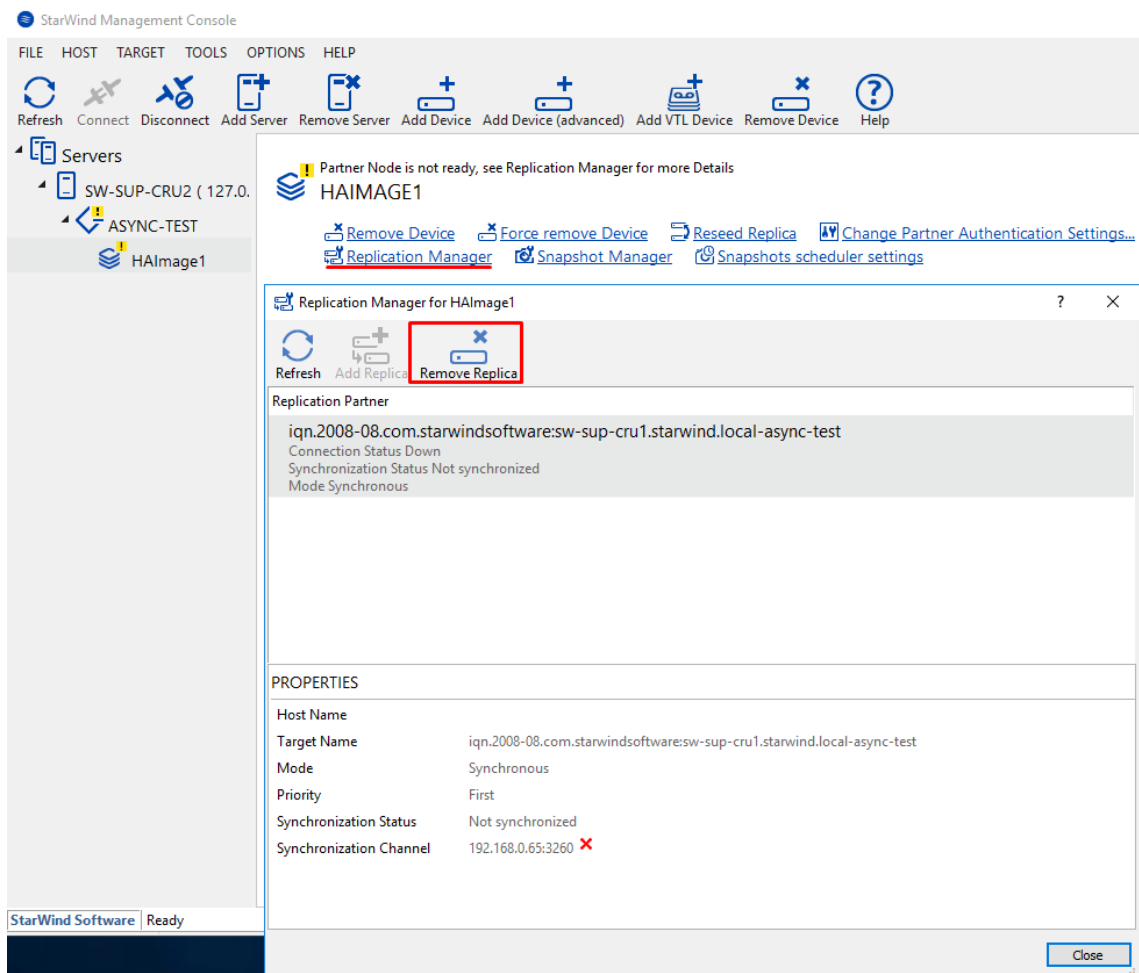


34. Check the Import details and click **Finish** to complete and close the wizard. Once Virtual Machine import is done you can start the Virtual Machine in Hyper-V Manager.

- **Restoring Virtual Machines from the replicated device on the Asynchronous node:**

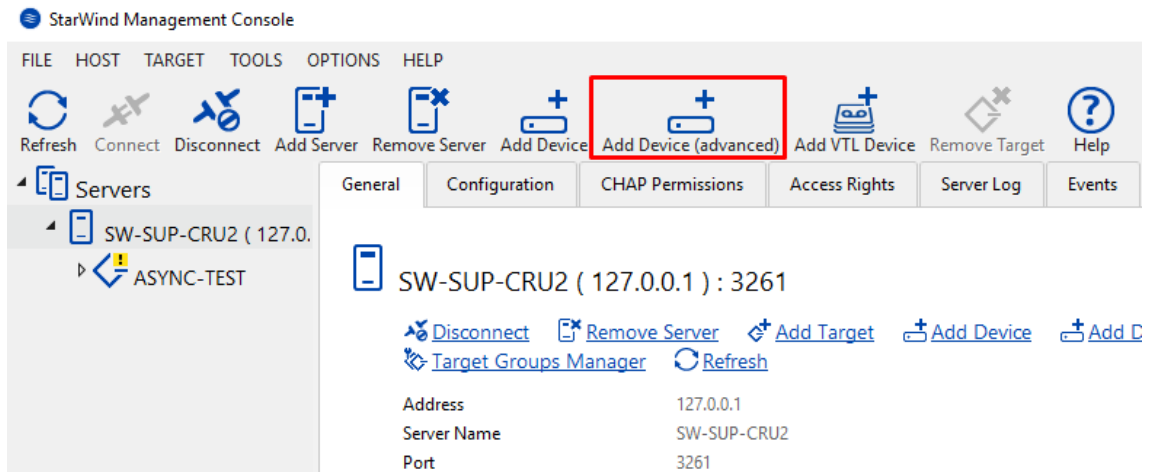
By design, the replicated device on the Asynchronous node is not allowed for any clients' connections while the replica is not fixed at the specific time point. To make the target available for the client connections, it has to be re-added in StarWind Management console.

35. Open StarWind Management console, choose a device with Asynchronous replication mode, click **Replication Manager** and click **Remove Replica** in the appeared window.

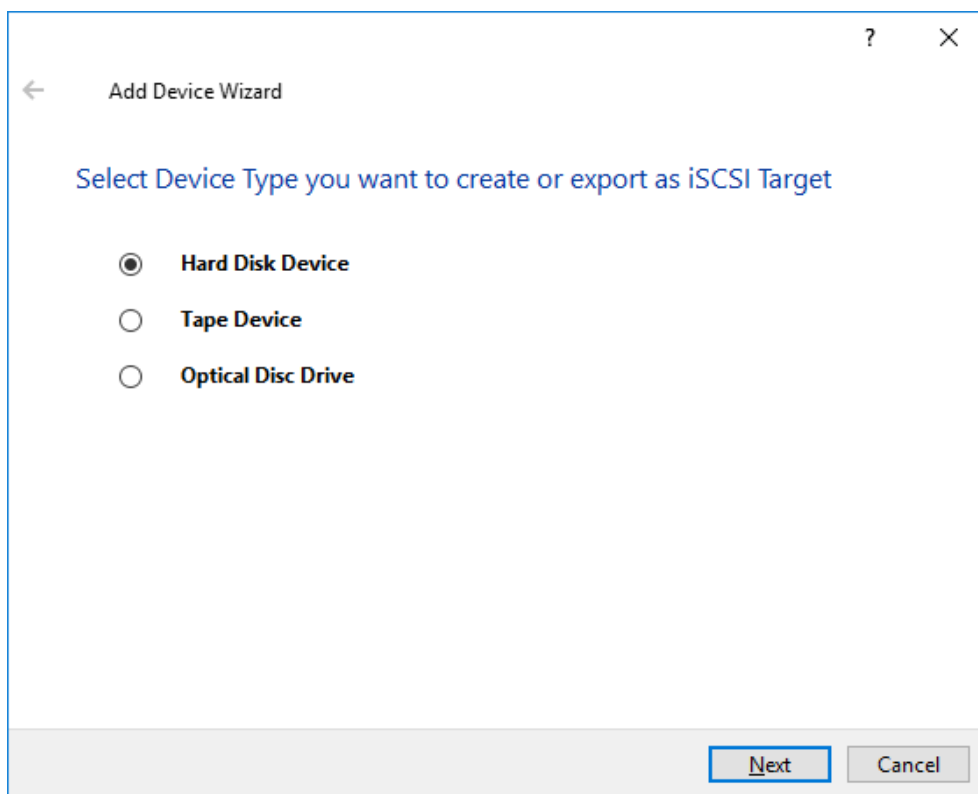


36. Confirm the replica removal by clicking **Yes** button.

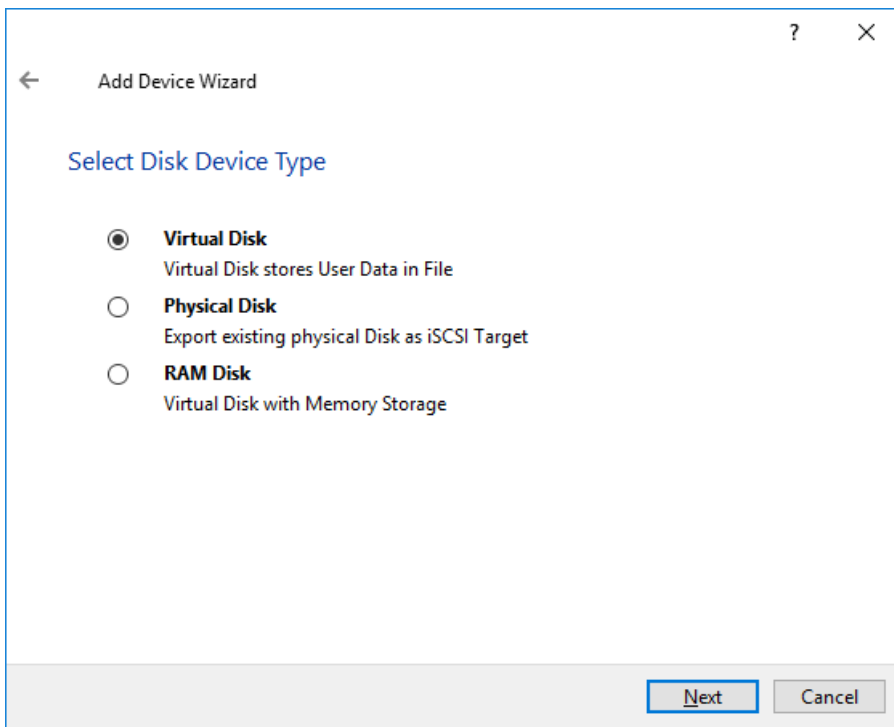
37. Open StarWind Management console and click **Add Device (advanced)** to add the device in Asynchronous replication mode one more time



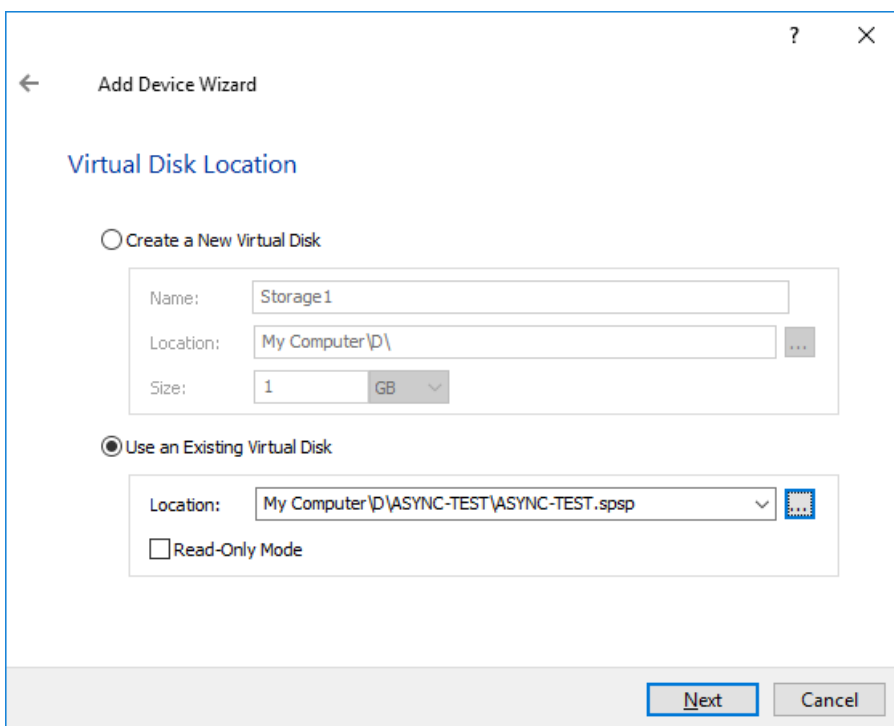
38. **Add Device Wizard** will appear. **Select Hard Disk Device** and click **Next**.



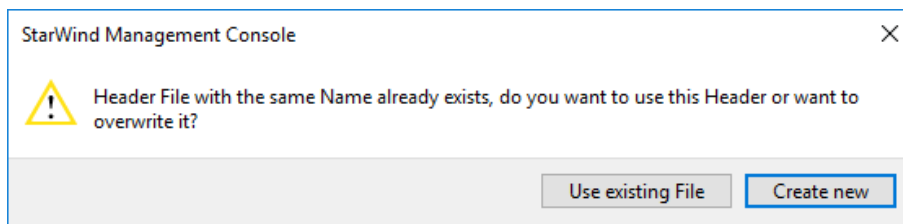
39. Select a Virtual disk and click Next.



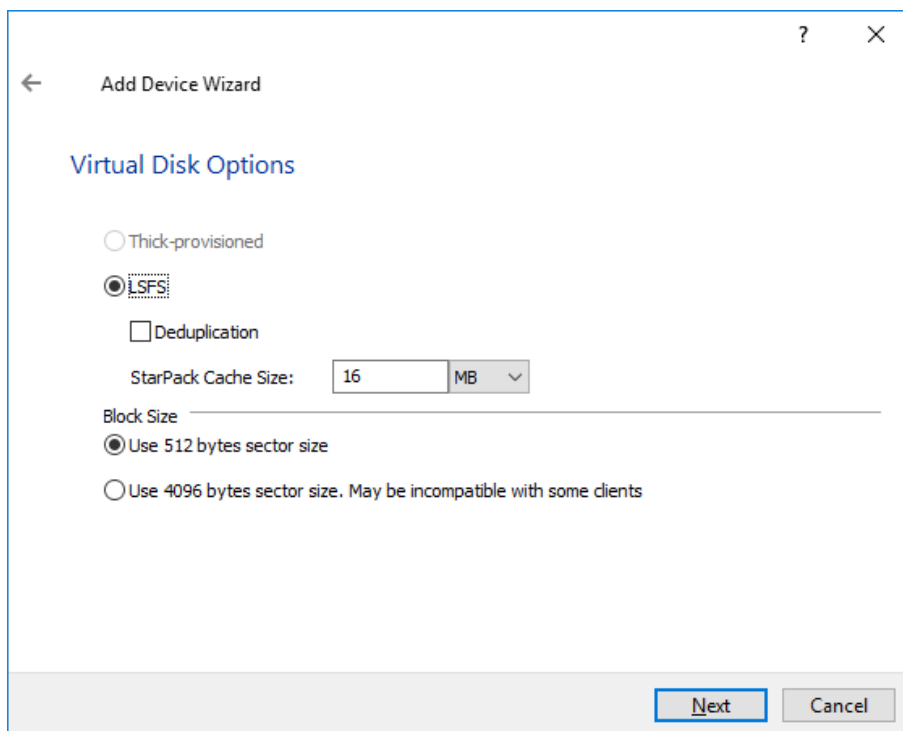
40. In the Virtual Disk Location window, choose **Use an Existing Virtual Disk** and specify the path to the device in Asynchronous replication mode. The path to file with the spsp extension should be specified and the Read-Only Mode checkbox should be unchecked.



41. Press **Create New** to create the header file for the device which will be added.



42. Specify the same **Block Size** and click **Next**.



43. Modify LSFS settings, if required, and click **Next**.

44. Define the caching policy, specify the cache size, and click **Next**.

The screenshot shows the 'Add Device Wizard' dialog box with the title 'Specify Device RAM Cache Parameters'. It features three radio button options under the 'Mode' section: 'Write-Back' (Writes are performed asynchronously, actual Writes to Disk are delayed, Reads are cached), 'Write-Through' (Writes are performed synchronously, Reads are cached), and 'N/A' (Reads and Writes are not cached). The 'N/A' option is selected. Below this, there is a checkbox for 'Set Maximum available Size' which is unchecked. A 'Size' field is set to '128' with a unit dropdown menu set to 'MB'. At the bottom right, there are 'Next' and 'Cancel' buttons.

**NOTE:** It is not recommended to configure the cache in Write-Back mode on Standalone devices in order to avoid possible data corruption upon power outage or incorrect service shutdown.

45. Define the Flash Cache Parameters policy and size if necessary. Choose SSD location in the wizard.

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

The screenshot shows the 'Add Device Wizard' dialog box with the title 'Specify Flash Cache Parameters'. It features two radio button options: 'No Flash Cache' (selected) and 'Use Flash Cache'. Below these, there is a form with three fields: 'Name' (Flash-ASYNC-TEST1), 'Location' (My Computer\D\), and 'Size' (1 GB). At the bottom right, there are 'Next' and 'Cancel' buttons.

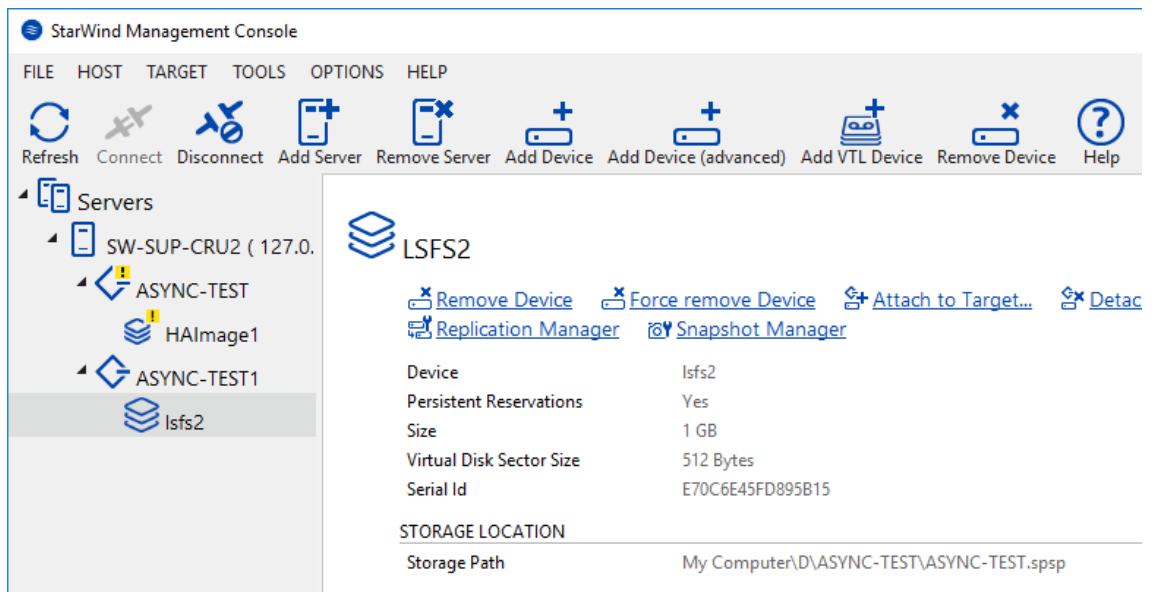
46. Modify the **Target Alias** and target name, if needed, and click **Next**.

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 'ASYNC-TEST1', a checkbox for 'Target Name' which is unchecked, a text field for the target name containing 'iqn.2008-08.com.starwindsoftware:sw-sup-cru2-async-test1', and a checked checkbox for 'Allow multiple concurrent iSCSI Connections'. At the bottom right, there are 'Next' and 'Cancel' buttons.

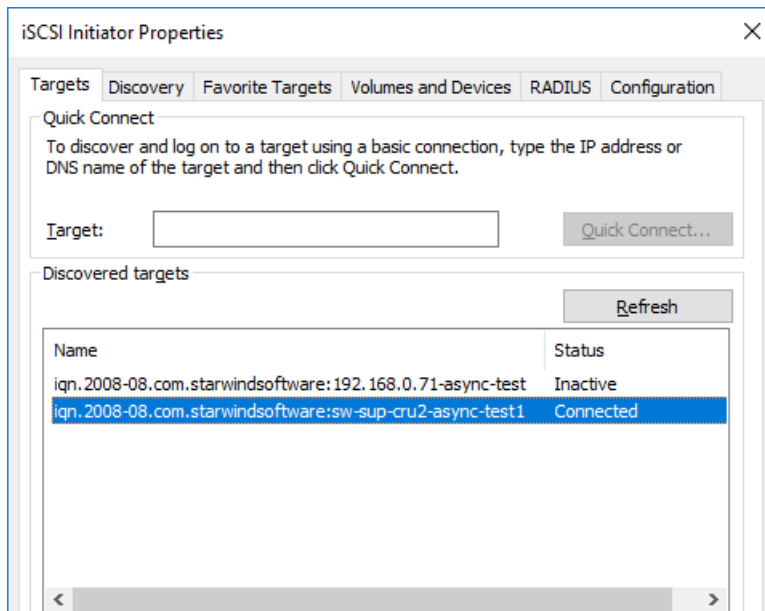
47. Click **Create** and **Close** to add a new device.

The screenshot shows the 'Add Device Wizard' dialog box with the 'Creation Page' section. It contains the instruction 'Press "Create" to add new Device and attach it to new Target', a 'Progress' section with three progress bars labeled 'Creating Header...', 'Creating Device...', and 'Creating Target and attaching Device...', and a large empty progress bar at the bottom. At the bottom right, there are 'Create' and 'Cancel' buttons.

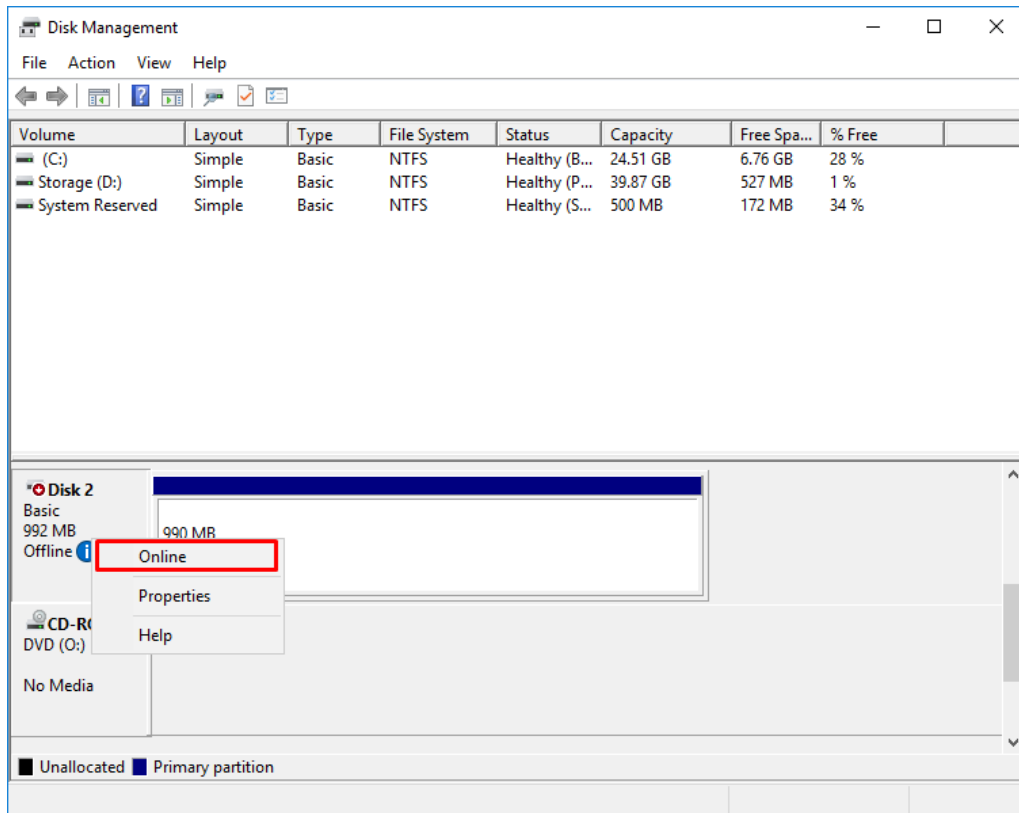
48. The re-added device should look like as one in the figure below.



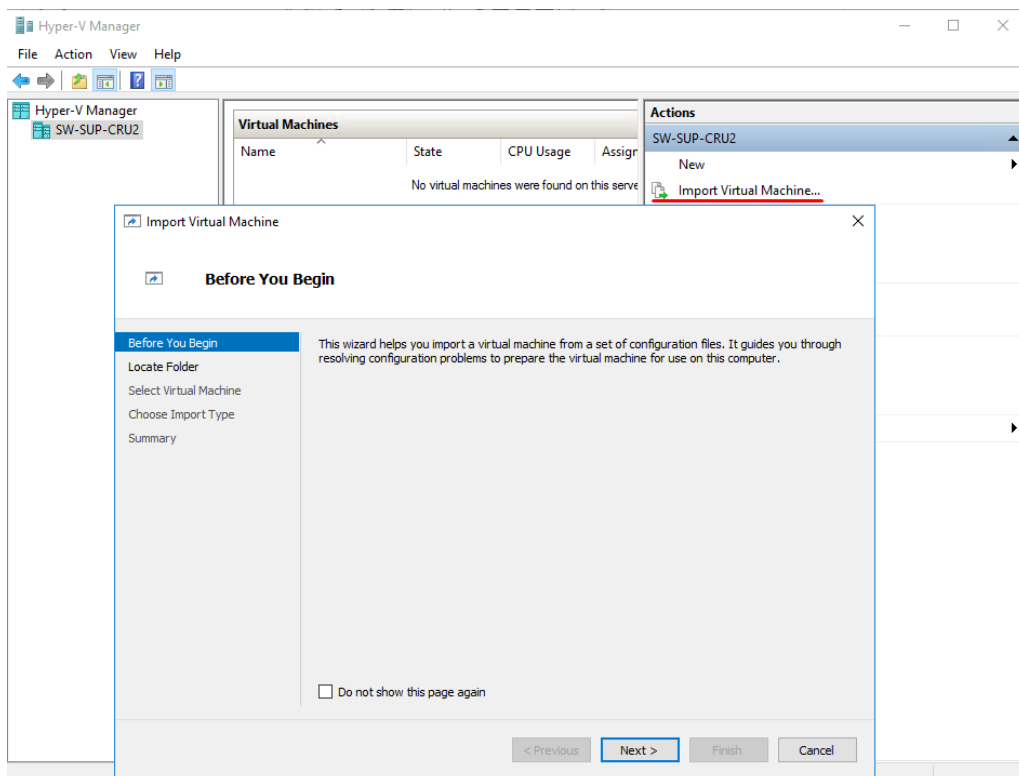
49. Discover targets and connect the newly-created target to iSCSI initiator as it is described in steps 19-25. The connected target should look like one in the screenshot below:



50. Open Disk Management and bring the new disk online.

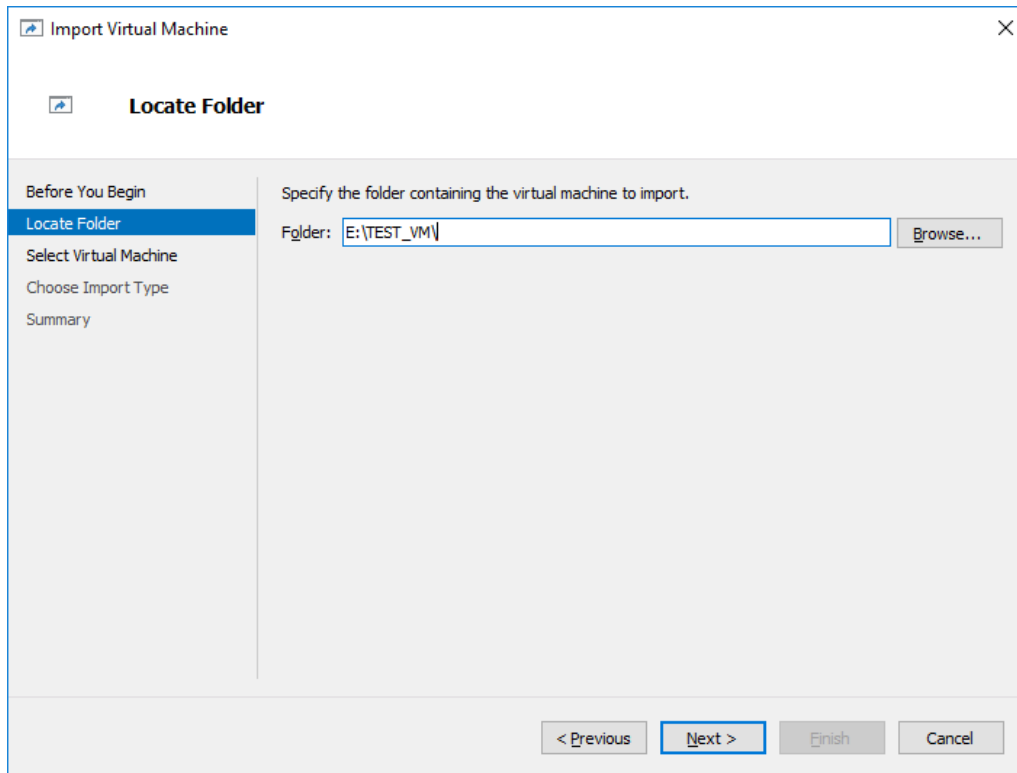


51. Once the Volume with Virtual Machines or files is available, open the **Hyper-V Manager** and click **Import Virtual Machine...**

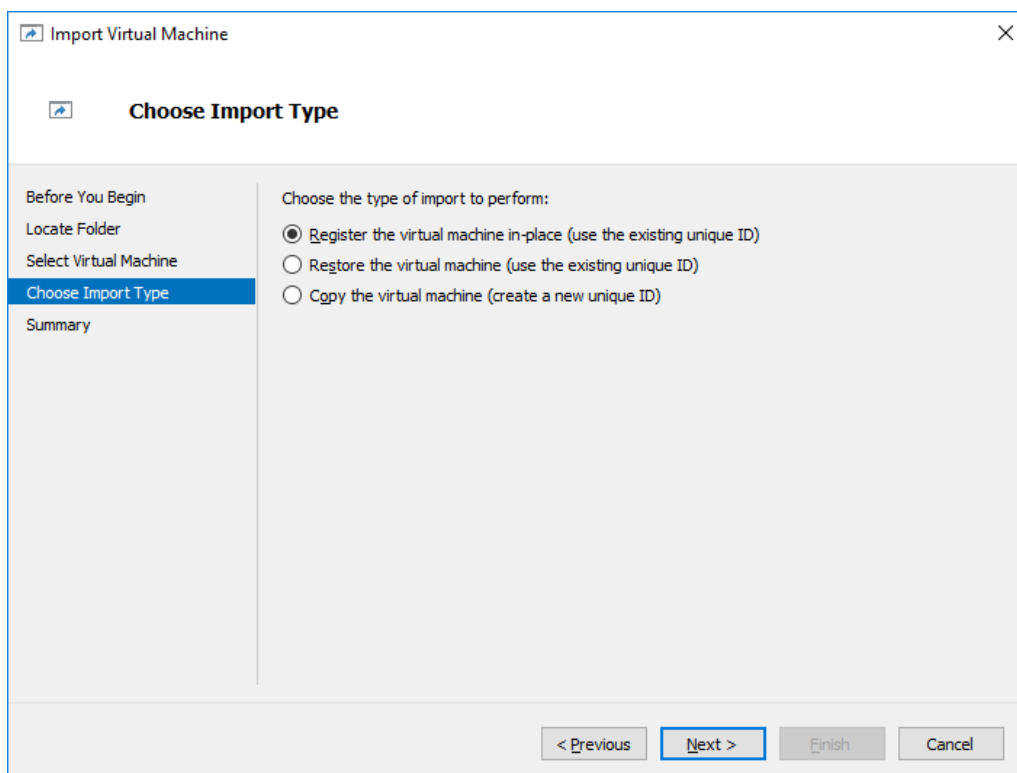




- Specify the path to the Virtual Machine which is located on the recently connected disk (mounted from snapshot) and click **Next**.








- Select Virtual Machine, click **Next**, and choose the **Register the Virtual Machine in-place** option. Complete the wizard to register the Virtual Machine.



## Conclusion

This technical paper describes setting up asynchronous replication for a disaster recovery scenario using StarWind Virtual SAN. Having this feature enabled allows building a disaster recovery site that ensures safe data storing and recovery when it is necessary.

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