

StarWind iSCSI Target for Microsoft Windows: Using StarWind with Microsoft Virtual Server

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INTRODUCTION

This document provides basic step-by-step instructions for configuring StarWind and Microsoft virtual machines. For information about Microsoft Virtual Server such as system requirements, compatibility, release notes, technical support, etc., please visit <http://www.Microsoft.com>

StarWind is an advanced, software-only iSCSI Target implementation for Microsoft Windows. StarWind enables just anyone to quickly install and configure complete IP SAN solution that delivers immediate benefits allowing storage to be consolidated, virtualized and centrally managed.

- **Storage Consolidation:** Consolidate all storage in the server room to increase application "up time" and simplify administration. The entire storage pool can be centrally managed eliminating the need to separately maintain "islands" of disks.
- **Disaster Recovery and Backups:** Dynamic volume snapshots and automatic incremental backups make disaster recovery and backup initiatives a breeze, completely eliminating the need for manual backup activities.
- **Leverage Existing Storage:** StarWind can leverage existing direct attached storage making it available as iSCSI storage.
- **Share Physical Devices:** Tape drives can be shared over a standard IP network, leveraging existing tape backup applications allowing backups to a remotely located tape drive. Also CD/DVD burners can be shared over a standard IP network and use existing CD/DVD burning applications on the client machines. Standard ISO and MDS images can be mounted to virtual CD/DVD drives.

MANUAL

The diagrams below illustrate the network architectures used throughout this document.

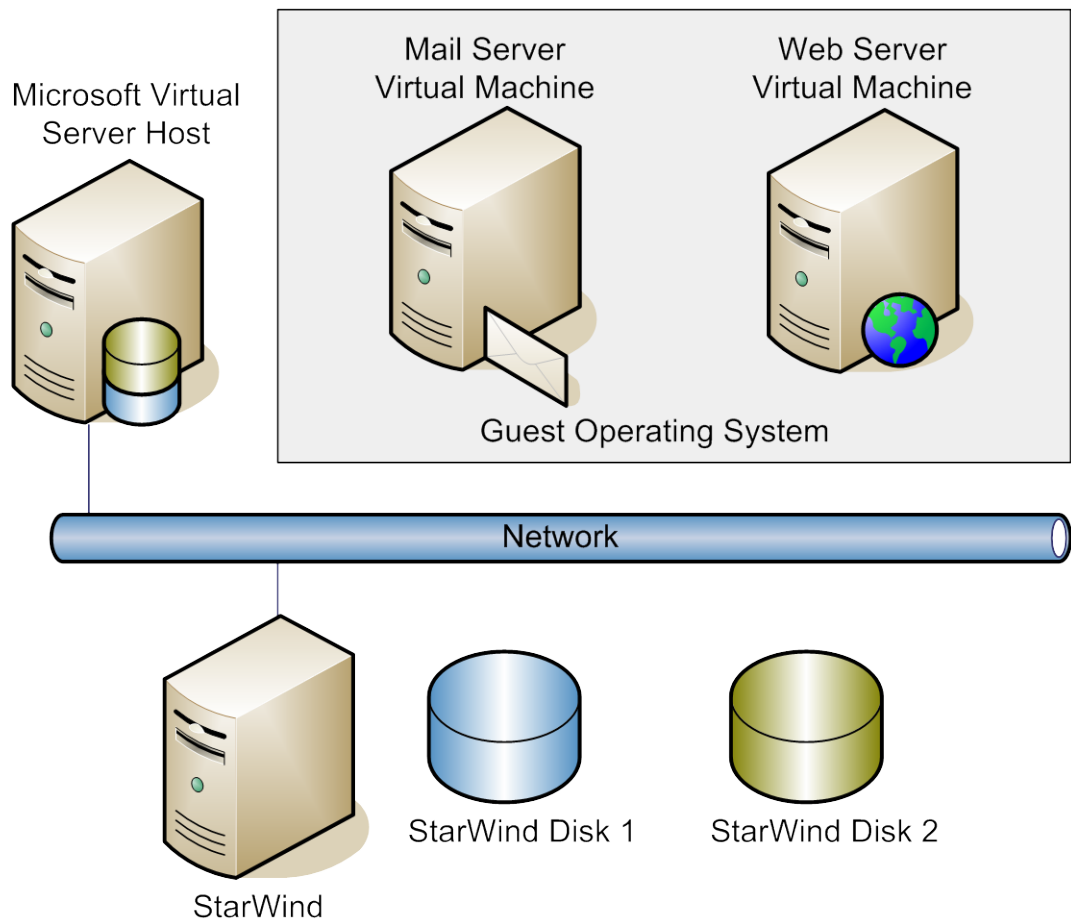


Figure 1. Using StarWind Disks to Store Virtual Machines

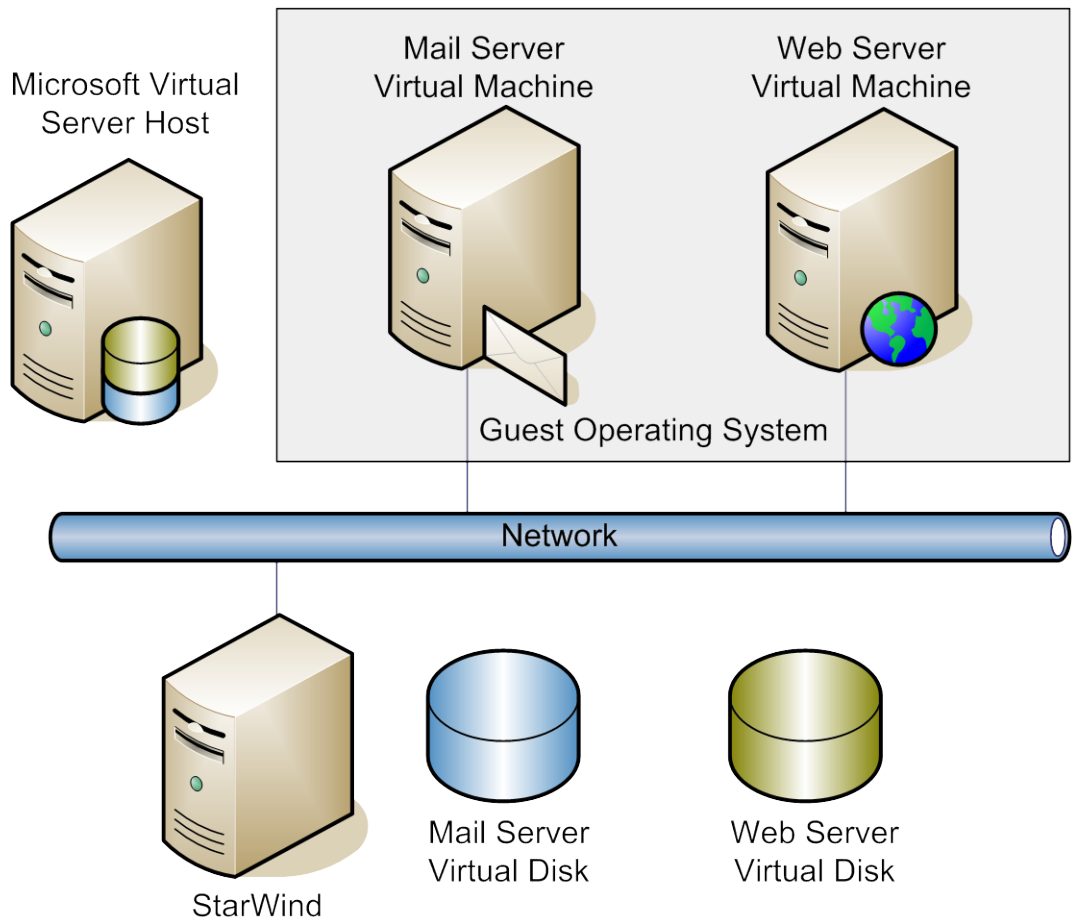


Figure 2. StarWind Providing iSCSI Storage to Virtual Machines

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CONFIGURING VIRTUAL SERVER HOST

You need to install the software that is required to create the virtual environment first. To set up the virtual server you will need the **Microsoft iSCSI Software Initiator** and **Microsoft Virtual Server (MSVS)**.

Please download the **MS iSCSI Software Initiator** at:

<http://www.microsoft.com/downloads/details.aspx?FamilyID=12cb3c1a-15d6-4585-b385-befd1319f825&DisplayLang=en> .

Once downloaded, please complete the following operations:

- Install the Microsoft iSCSI Software Initiator on the machine that will be hosting the virtual machines.
- When the installation is complete, install Microsoft Virtual Server on the same machine.
- Follow the instructions on the installation wizard to complete the process.

CONFIGURING ISCSI STORAGE

The **StarWind** configuration is outlined in this section. Before you start please ensure that **StarWind** is installed on the machine that is providing storage services to the Virtual Server.

Create StarWind Disk

MSVS needs a disk to store the settings of the virtual machine and a virtual hard drive to install a guest OS. With **StarWind** you can create the virtual disk using various methods. Depending on the physical type of the storage you use, you can use:

- Image File device
- SPTI device
- Disk Bridge device
- IBVolume device

Image File device

The **Image File** device creates a virtual iSCSI drive by utilising a limited amount of space on your physical Hard Disk Drive (HDD). The resulting iSCSI storage will have the same structure as a “normal” HDD. Users connecting to the **Image File** drive will be able to format it using a custom file system, copy data to/from it, install applications and so on.

Physically the **Image File** device is represented as a file on your HDD. When you connect to the machine with the **Image File Device** and mount the drive, it will appear as a standard HDD on the machine from which you have connected. On the system where the image file device is actually stored it will be represented as an ordinary file.

There are some limitations for the **Image File** device usage:

- As a virtual HDD uses the space of your real physical HDD the available volume is limited by the free space on that hard drive. If the size of your image file is close to the size of its host HDD you will not be able to store additional files on that disk.

- You cannot change the volume of the image file online (without disconnecting users from it). However, you can extend the volume while it is offline.

These limitations are obviously caused by the nature of the described method and actually no worse than using a physical HDD, which is limited by space and cannot be dynamically adjusted.

SPTI device

By using the **SPTI** device you can share any physical drive, be it a hard drive, CD burner, flash etc. The **SPTI** device support enables you to share a device as it is, no image files are required. All available space on a device is accessible. An **SPTI** device, physically located on a remote host, appears as a fully operational local drive on your machine.

Disk Bridge device

By using the **Disk Bridge** device you can share any physical drive. The **Disk Bridge** device support enables you to share a device as it is, no image files are required.

It works like sharing of the device with the SPTI module, but unlike the latter the Disk Bridge device does complete emulation of the SCSI layer that allows any type of hard drives (PATA/SATA/RAID) to be used by remote initiator clients that strongly demand iSCSI targets to be SCSI-3 compatible. For example, VMware ESX can work with **Disk Bridge** targets well.

All available space on a device is accessible. A **Disk Bridge** device, physically located on a remote host, appears as a fully operational local drive on your Machine.

IBVolume device

The **IBVolume** device support is the most advanced and powerful approach to sharing virtual drives. In contrast to the image file device, the **IBVolume** target does not allocate all required space on a hard drive at once. **IBVolume** target allocates as much space, as is required by the actual data. The allocated space is increased as more data is being written to the volume.

However, an **IBVolume** device cannot extend the volume, specified by the user at the beginning. If you specified 1 GB as the maximal **IBVolume** size than the **IBVolume** image will grow up to 1 GB but no more. Thus, if you plan to store

much data, specify a large volume limit when creating a new **IBVolume** target. The volume size is limited to a maximum of 2 TB.

IBVolume is not just a form of virtual storage, It provides you with the tools to create a robust backup system.

IBVolume can operate in one of the following modes:

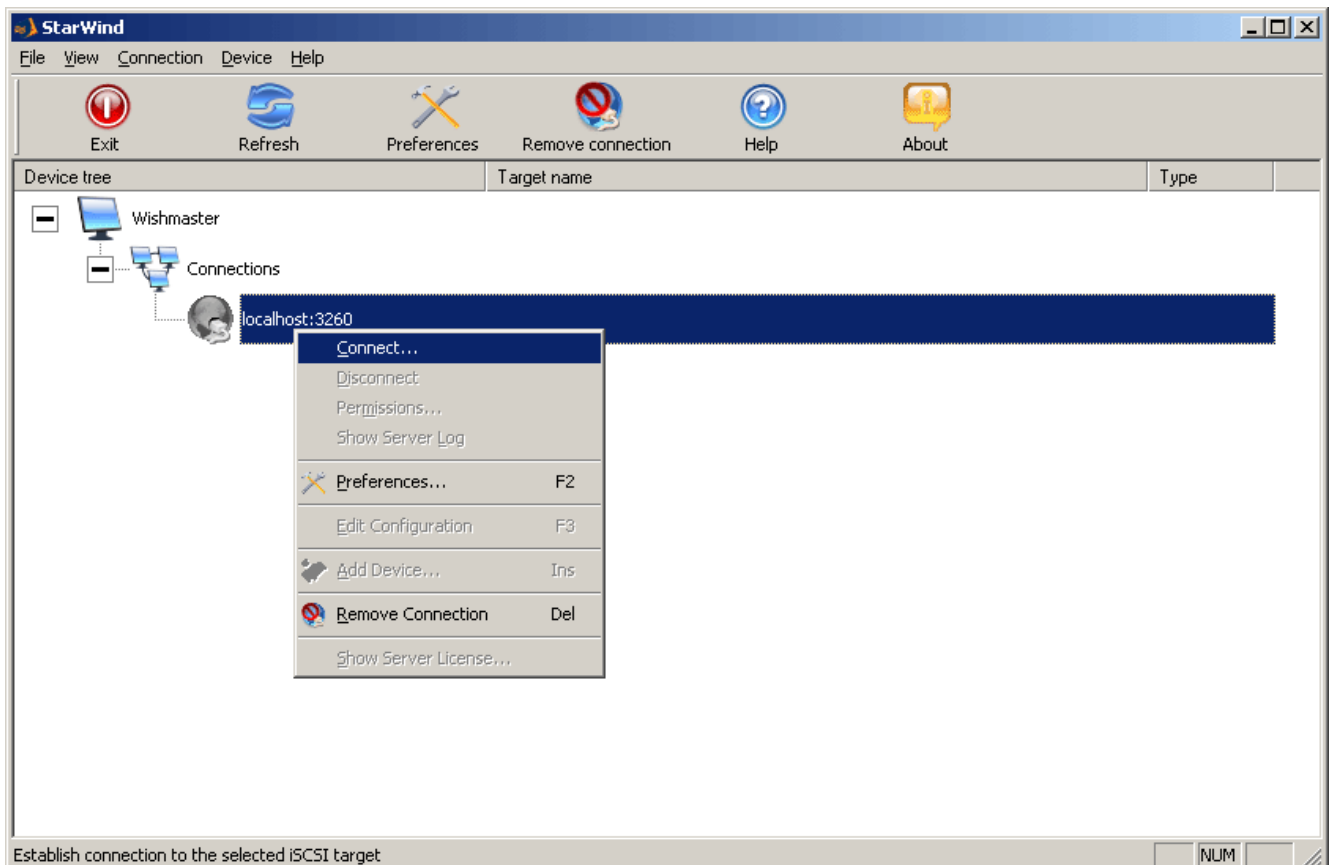
- In the **Growing Image** mode the **IBVolume** device operates as the **ImageFile** eliminating its main limitation. The disk space is allocated dynamically as the actual data is written. No space is allocated for unused sectors. The Growing Image mode does not include snapshot and recovery support
- In the **Incremental Backup Volume** mode each initiator session is written to a new journal. Journals are separate disk files that store data for user sessions. Use this option to add automatic backup to the basic functionality of **IBVolume**.
- The **Auto-Restored Snapshot** can be applied to support automatically restored images for environments like Internet cafes, remote training classes and so on. In this mode all changes done to the **IBVolume** device during an initiator session are discarded at the end of that session. When the new session is created it accesses a “clean” **IBVolume** device. All changes the user has done to the system during a session are discarded and a new session starts from the initial state.
- The **Read-Only** image mode enables you to secure read-only access, which eliminates the ability to write any data to a volume.

CONFIGURING STARWIND

Launch the StarWind console by selecting **Start->All Programs->Rocket Division Software->StarWind->StarWind**. After the console is launched its icon appears in the system tray. Double click the icon with the left mouse button or single click it with the right and select **Start Management** menu item from the pop-up menu.

From the **Connections** tree select the computer you wish to connect to. By default, there is a single item in the tree (localhost) which represents a loopback connection. Click the right mouse button over the desired host (computer) and select the **Connect...** menu item. You will be prompted to enter the login and password. Default is: Username: **test**, Password: **test**

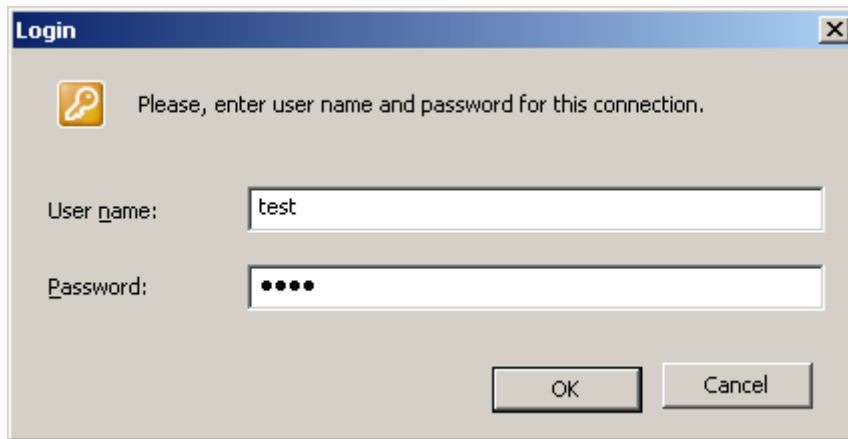
For security reasons it is recommended you change the username and password later.



Select **Connect...** menu item to continue.

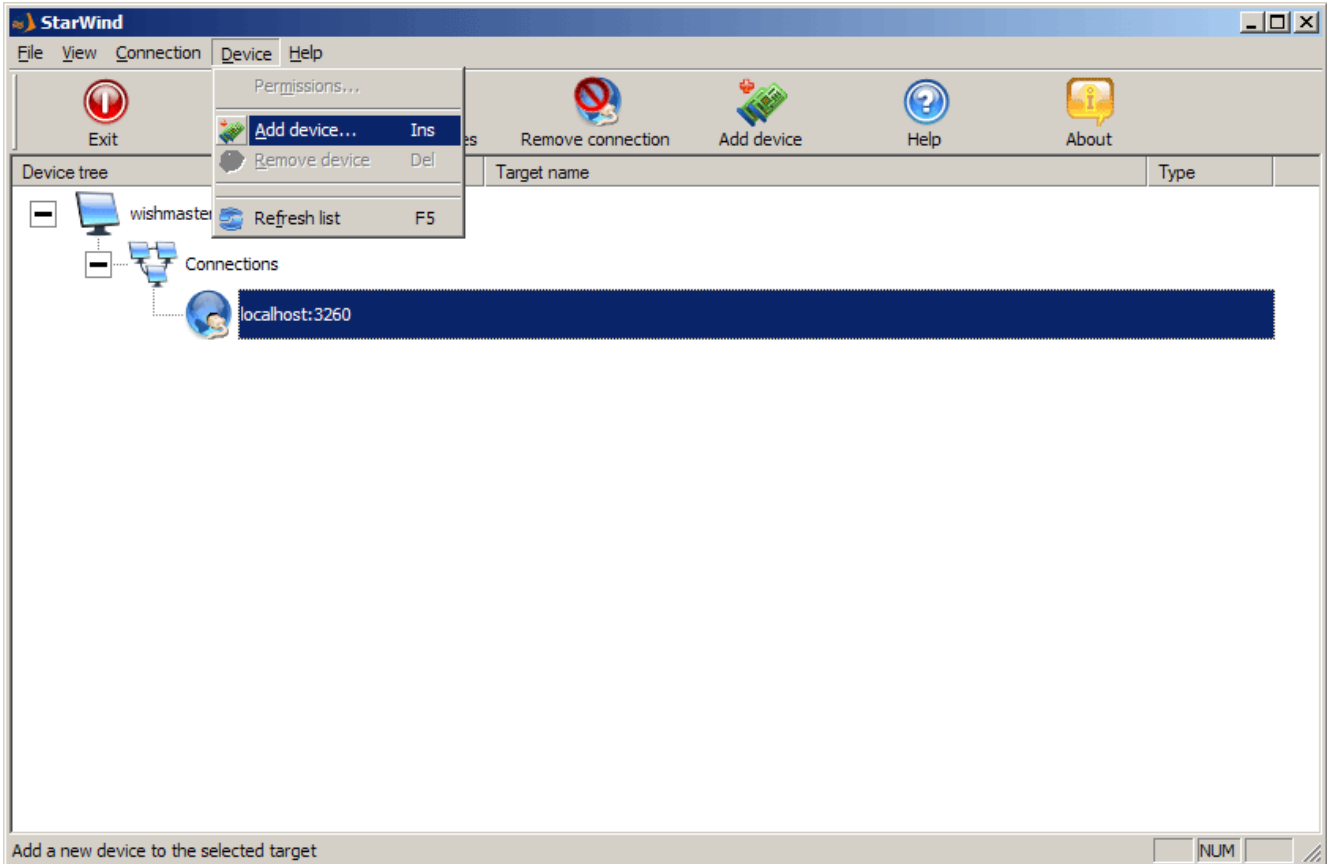
StarWind iSCSI Target for Microsoft Windows:
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The Login dialog asking for the **User name** and the **Password** will open.



Press the **OK** button to continue.

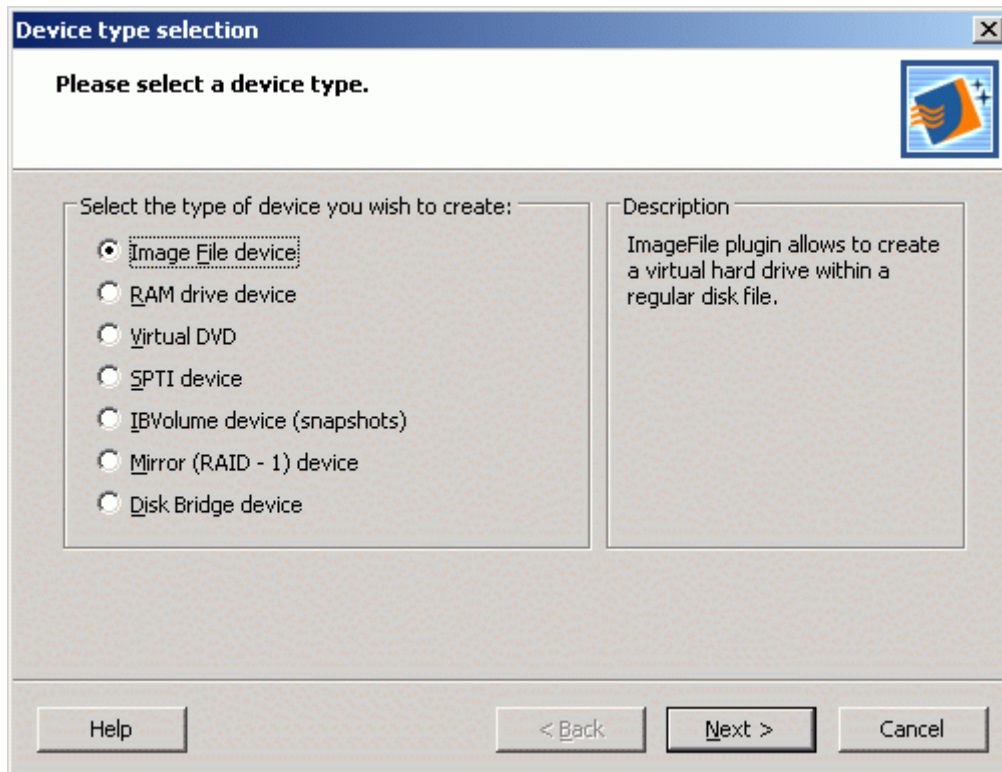
After you have successfully connected to the **StarWind** service on the remote machine, please select **Add device** from the popup menu.



Select **Add device...** menu item to continue.

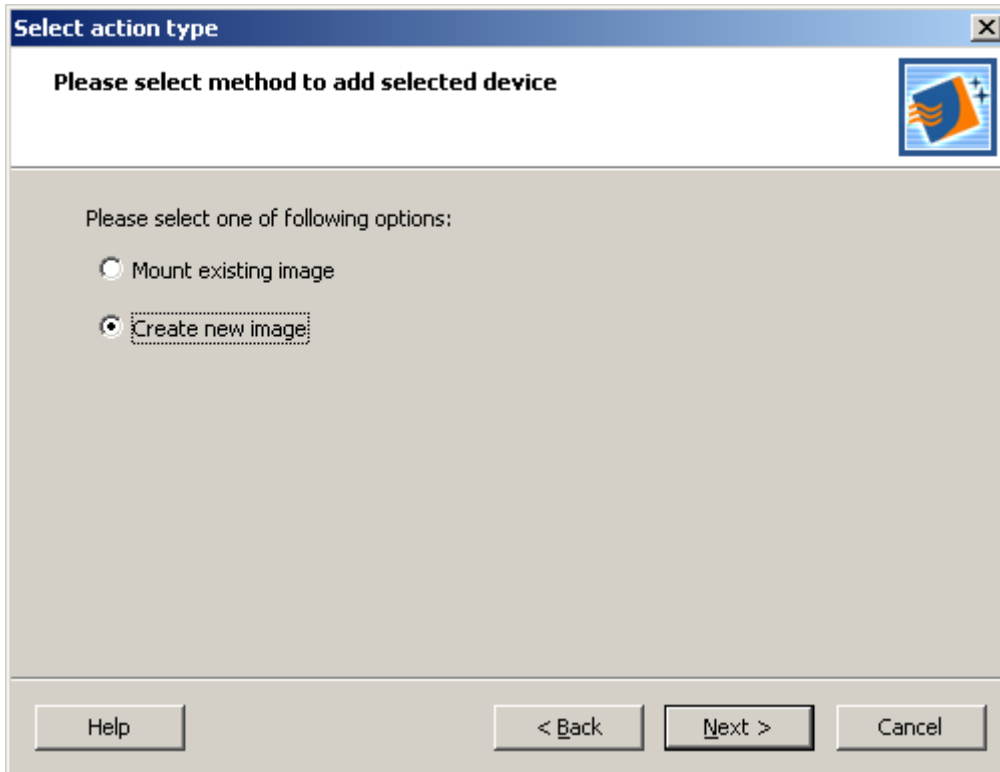
Creating an Image File image

In the wizard that appears, please select **Image File device** (the brief description of each option is displayed in the right area of the wizard window). You can display the online help by pressing the **Help** button.



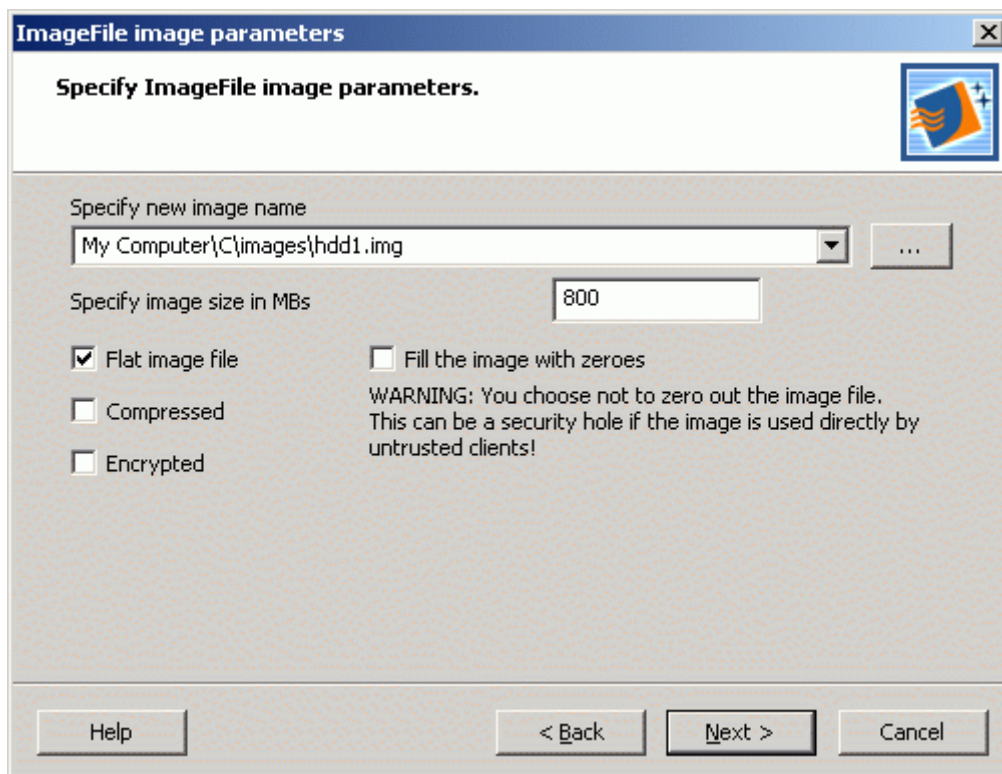
Press the **Next** button to continue.

Select **Create new image** to create a new hard disk image or **Mount existing image** to mount an existing image that you've prepared before.



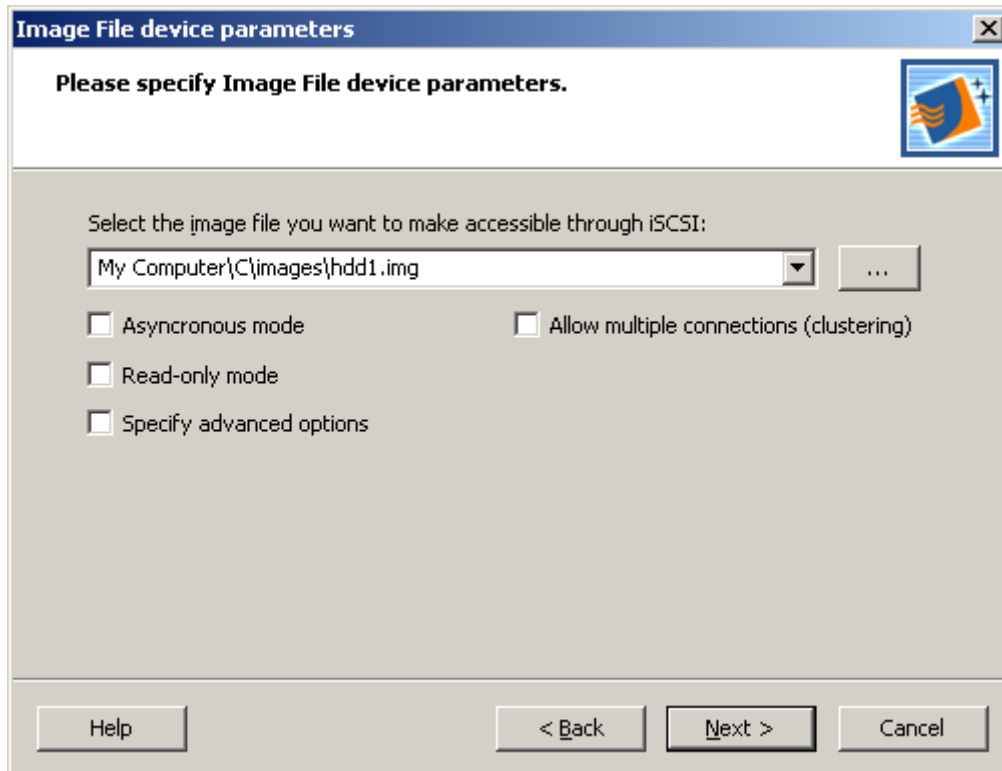
Press the **Next** button to continue.

If you have decided to create a new image file please specify the location and the name of the image you wish to be created. Also you have to provide the image size in megabytes. Check any additional parameters of the image you wish to create. Please refer to the online help for details regarding those additional parameters (**Flat image file**, **Compressed** and **Encrypted**).



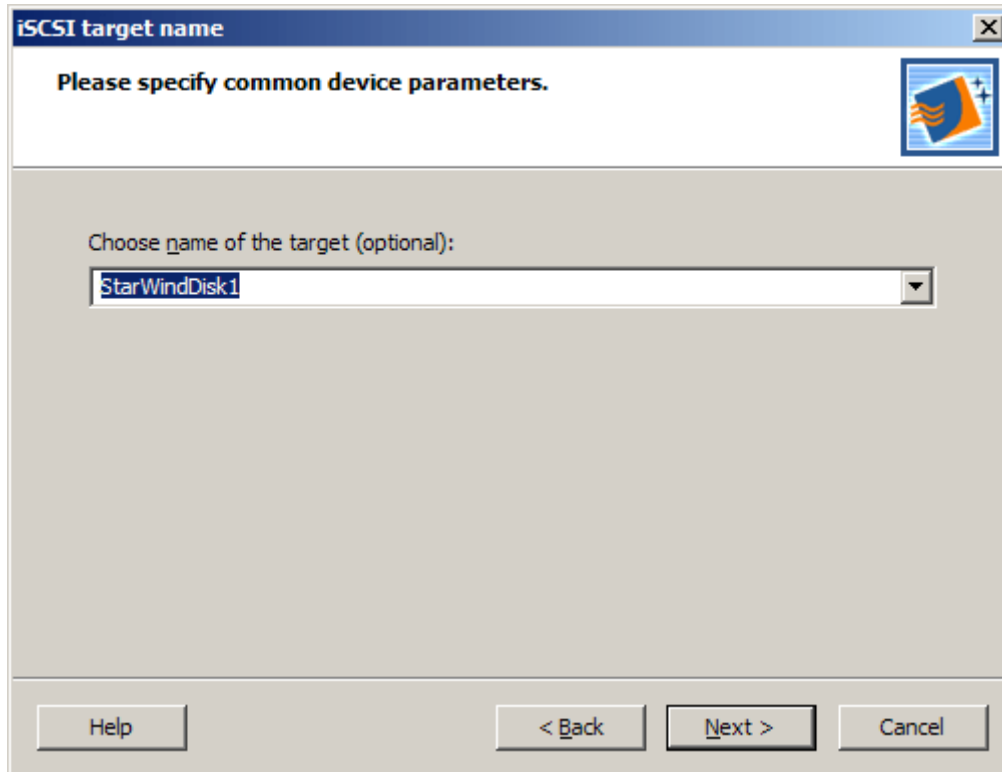
Press the **Next** button to continue.

Image file device has some extra parameters. Please refer to the online help for details regarding those additional parameters (**Asynchronous mode**, **Allow multiple connections (clustering)**, **Read-only mode** and **Specify advanced options**).



Press the **Next** button to continue.

Select an optional target name. Under this target name, the device will be declared to the iSCSI initiators connecting to the **StarWind** over an IP network.



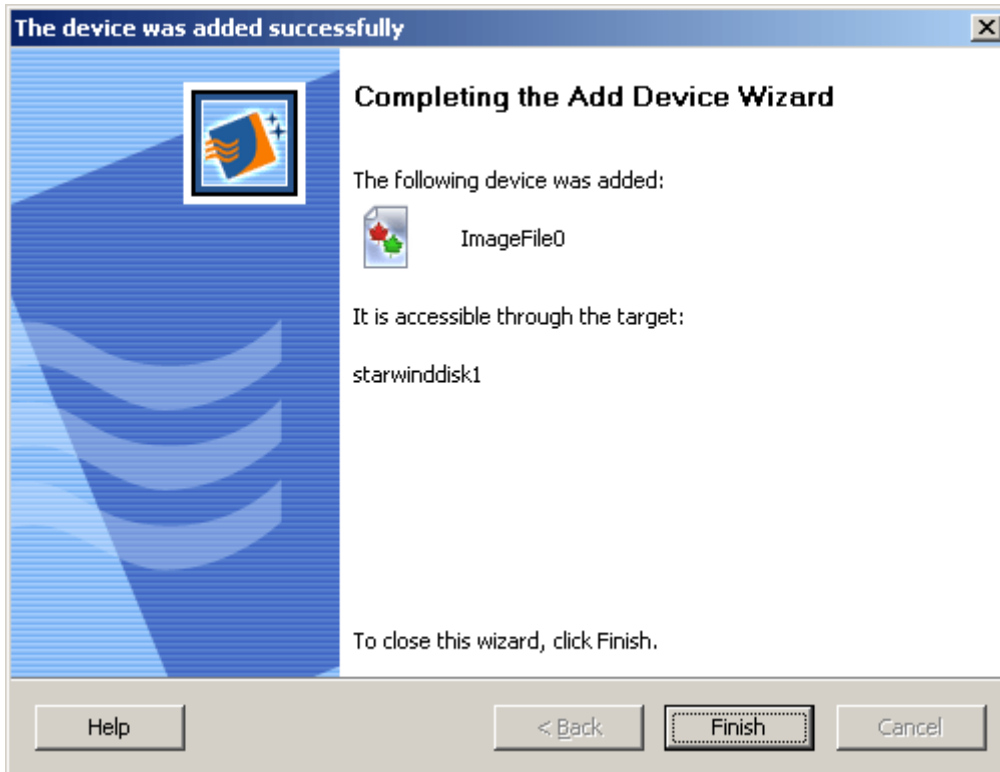
Press the **Next** button to continue.

Check if all of the device parameters are correct. Press the **Back** button if any changes are required.



Press the **Next** button to continue.

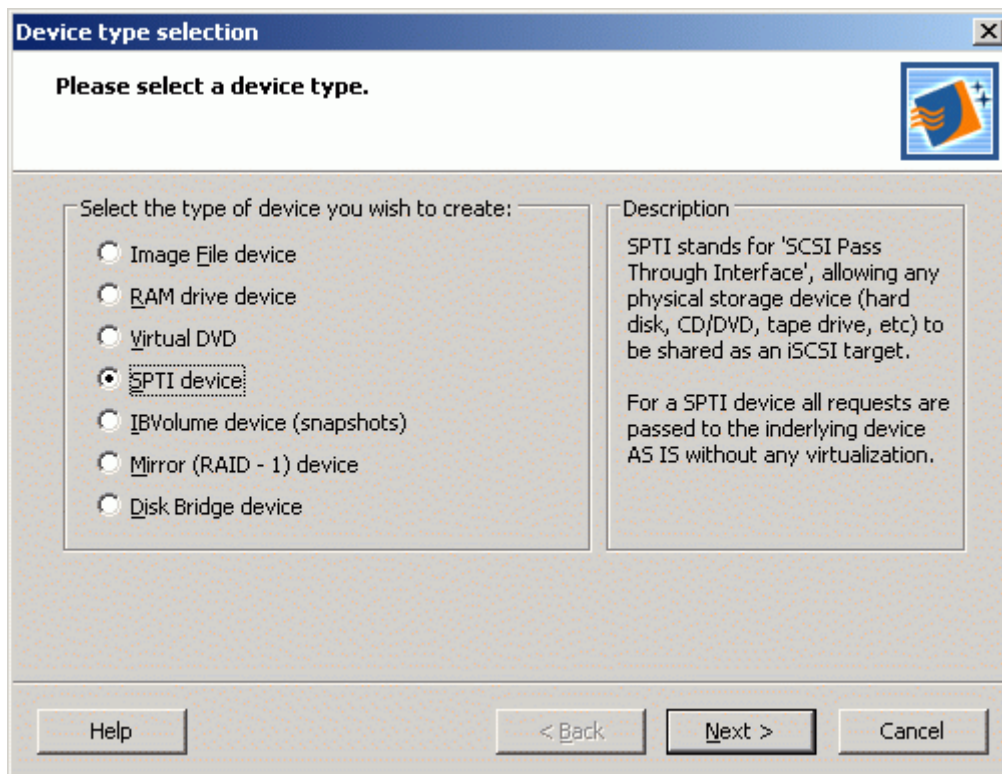
The information about the recently created device is displayed on the last wizard page (see image below).



Press the **Finish** button to close the wizard.

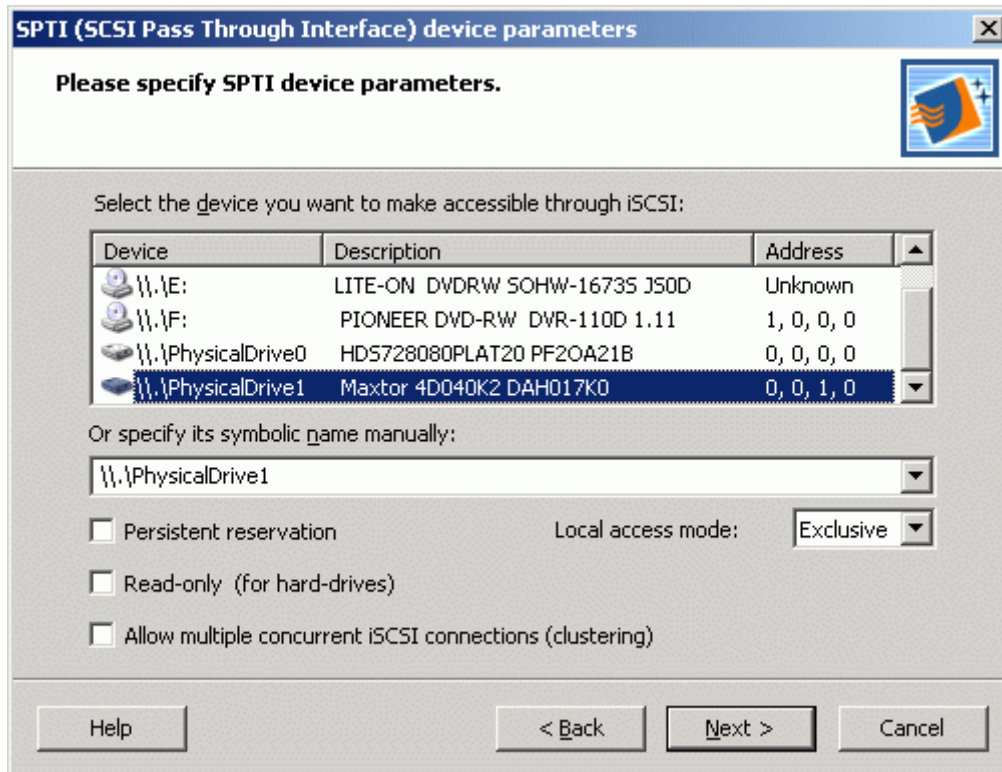
Creating a SPTI target

In the wizard that appears, please select **SPTI device** (the brief description of each option is displayed in the right area of the wizard window). You can display the online help by pressing the **Help** button.



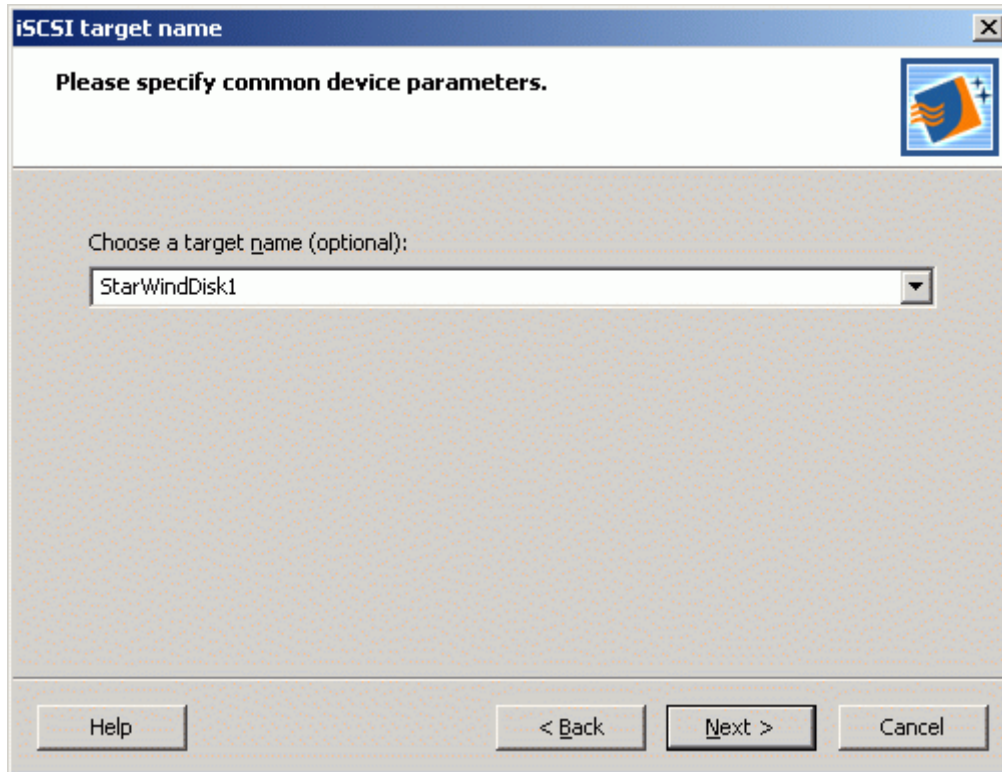
Press the **Next** button to continue.

Select the disk you want to make accessible through iSCSI.



Press the **Next** button to continue.

Select an optional target name. Under this target name, the device will be declared to the iSCSI initiators connecting to the **StarWind** over an IP network.



Press the **Next** button to continue.

Check if all of the device parameters are correct. Press the **Back** button if any changes are required.



Press the **Next** button to continue.

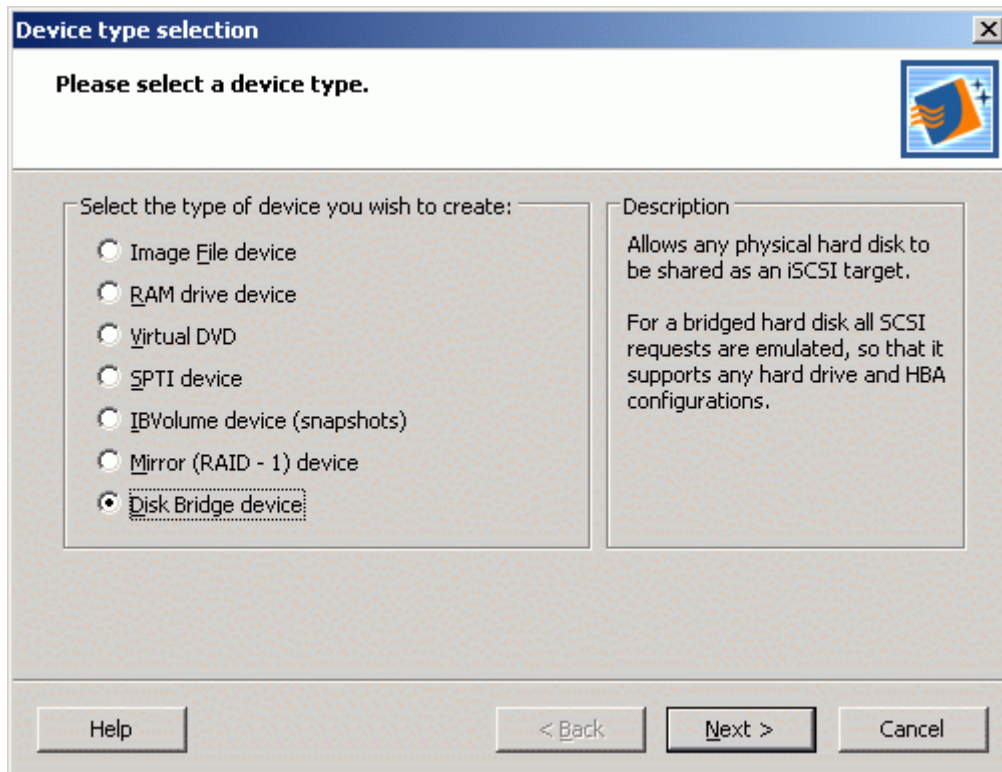
The information about the recently created device is displayed on the last wizard page (see image below).



Press the **Finish** button to close the wizard.

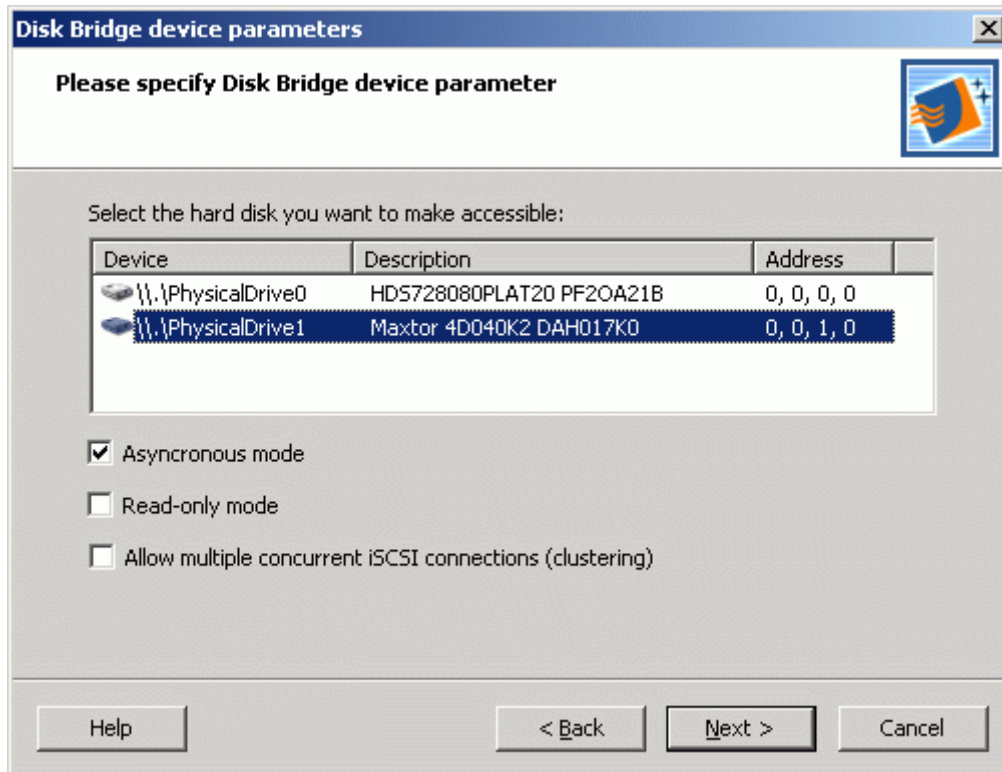
Creating a Disk Bridge target

In the wizard that appears, please select **Disk Bridge device** (the brief description of each option is displayed in the right area of the wizard window). You can display the online help by pressing the **Help** button.



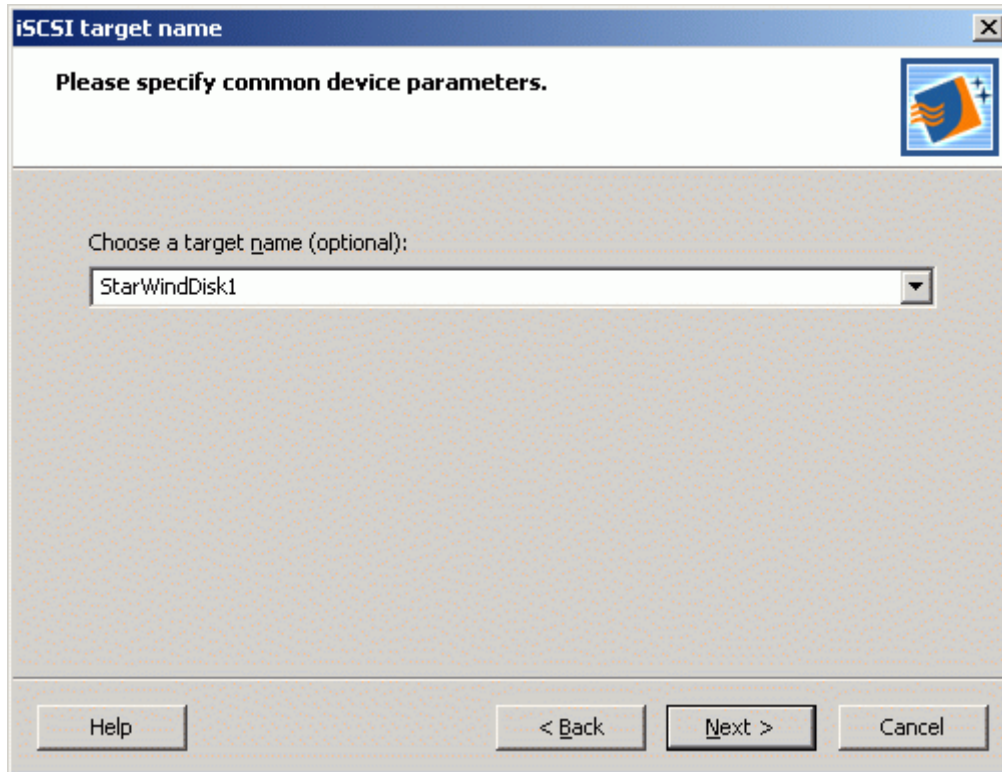
Press the **Next** button to continue.

Select the disk you want to make accessible through iSCSI.



Press the **Next** button to continue.

Select an optional target name. Under this target name, the device will be declared to the iSCSI initiators connecting to the **StarWind** over an IP network.



Press the **Next** button to continue.

Check if all of the device parameters are correct. Press the **Back** button if any changes are required.



Press the **Next** button to continue.

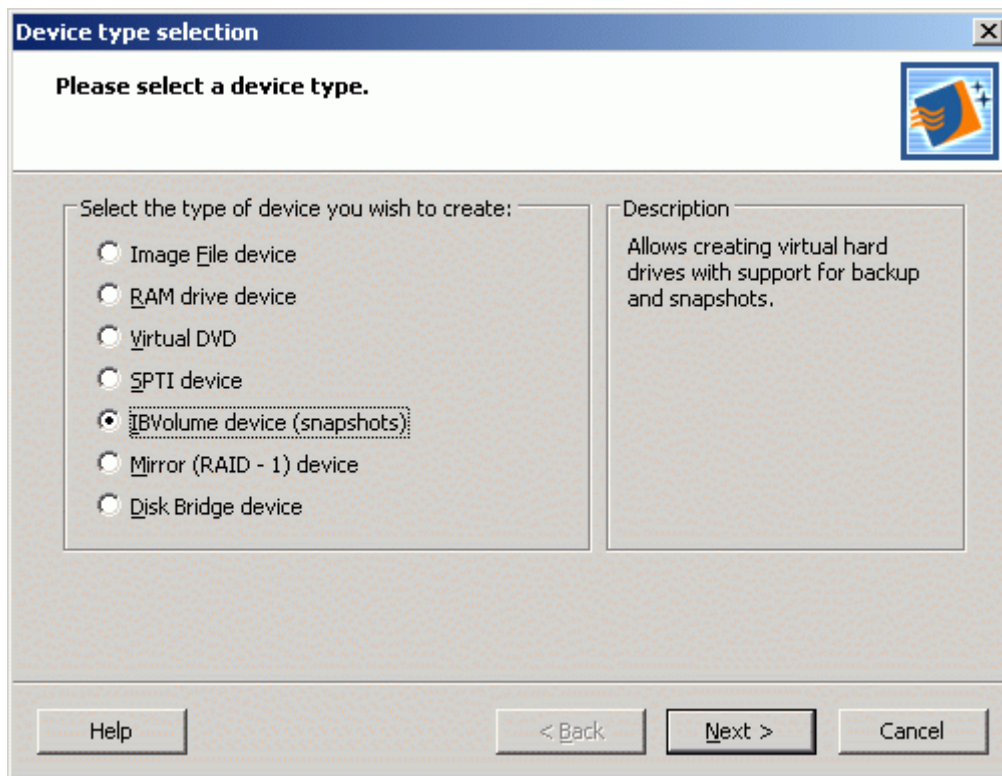
The information about the recently created device is displayed on the last wizard page (see image below).



Press the **Finish** button to close the wizard.

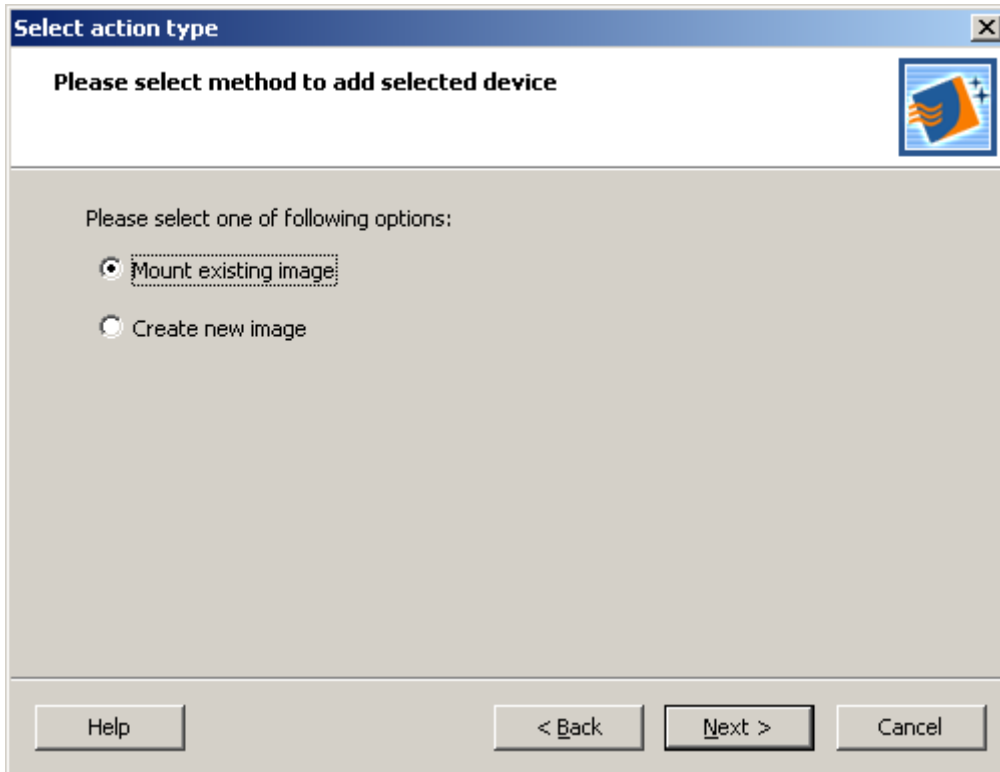
Creating an IBVolume image

Creating the IBVolume image is similar to the image file creating. On the third step of this Wizard you will be asked to input parameters which are specific to creating an **IBVolume**. These options will be described later.



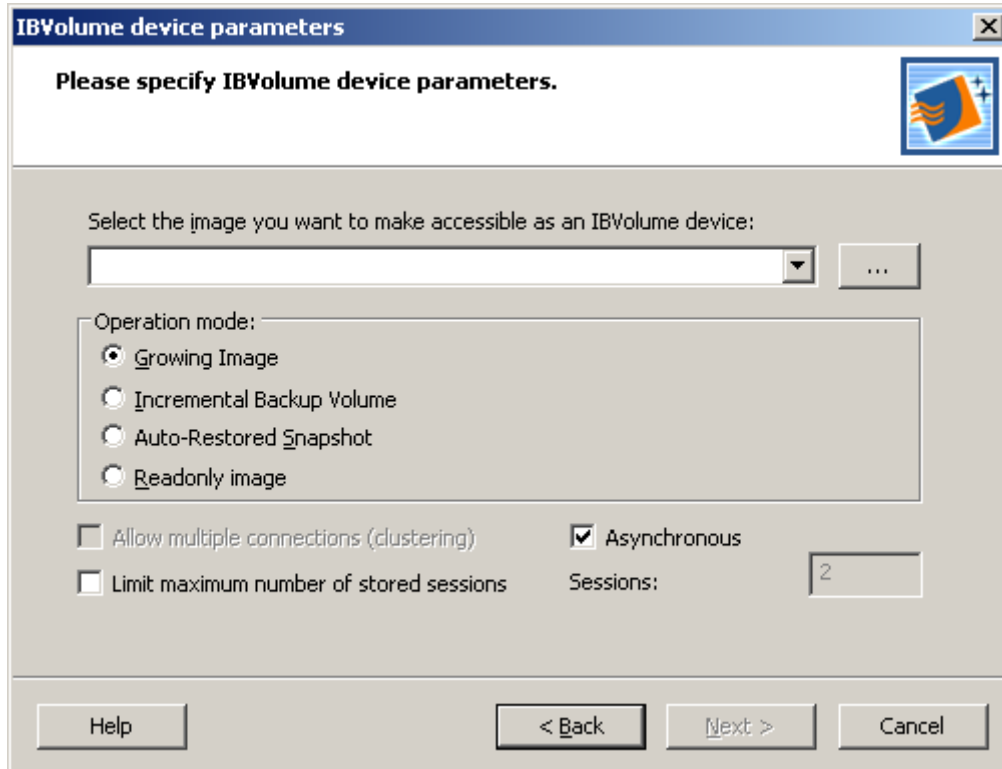
Press the **Next** button to continue.

Select **Create new image** to create a new hard disk image or **Mount existing image** to mount an existing image that you've prepared before.



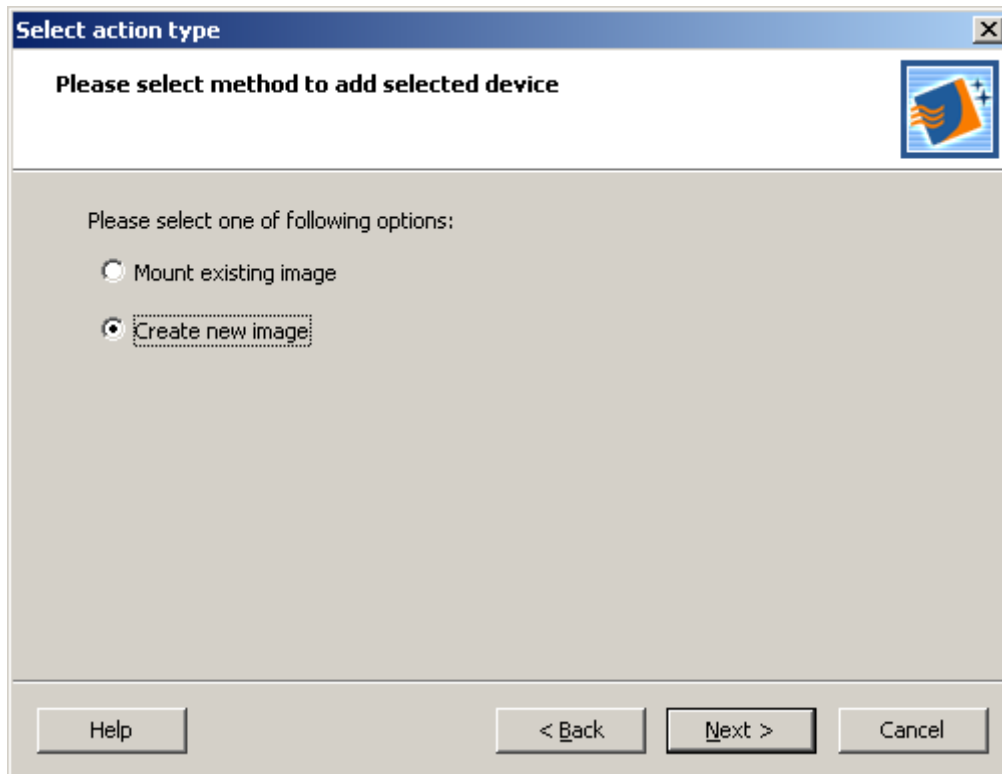
Press the **Next** button to continue.

Select the image, which you would like to share. Specify the path to the existing image.



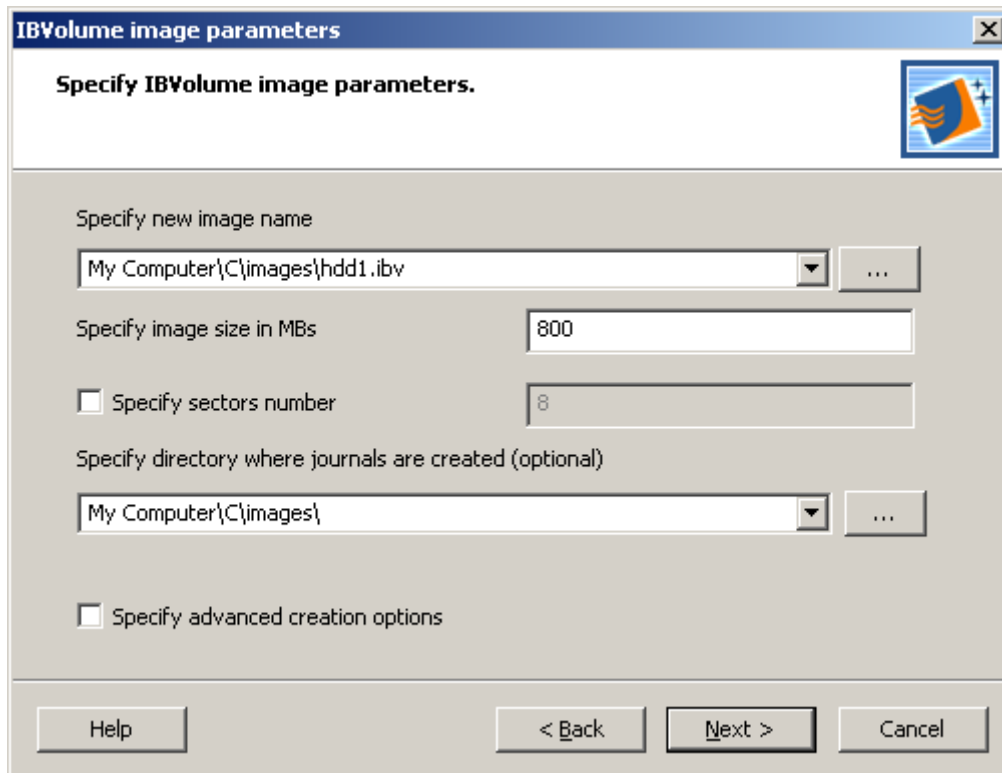
Press the **Next** button to continue.

You can create an **IBVolume** image by making a new image or cloning of the existing one. Select **Create new image** to create a new hard disk image (cloning of the existing images is explained later).



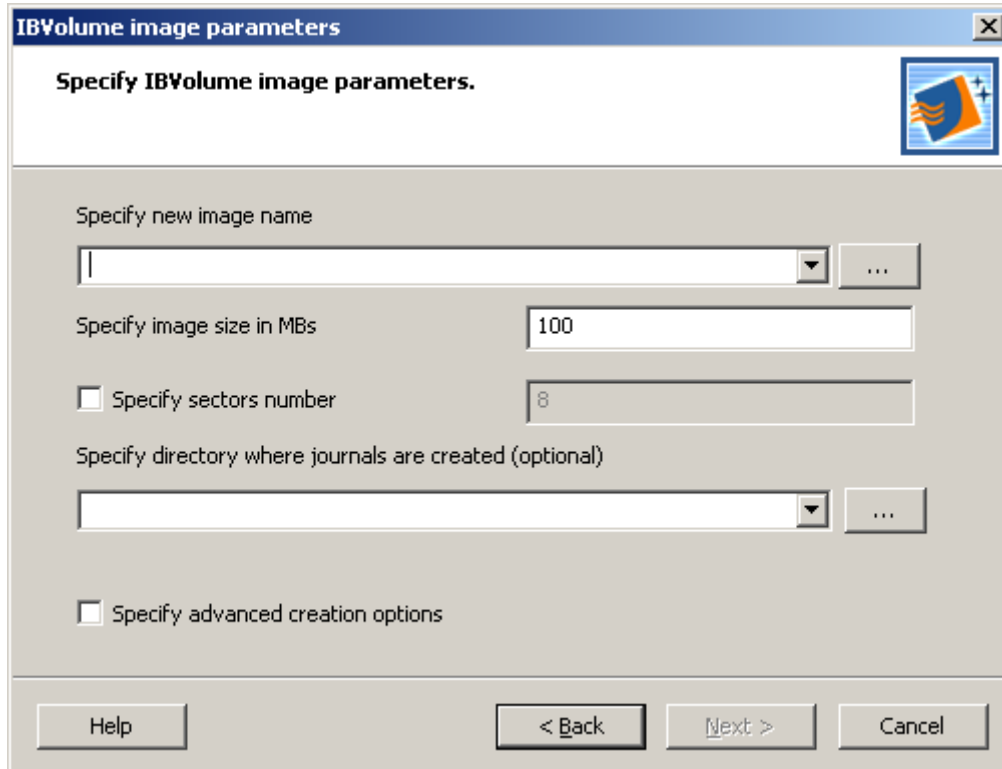
Press the **Next** button to continue.

If you have decided to create a new image file, please specify the location and the name of the image you wish to be created. You have to provide the image size in megabytes. Check any additional parameters of the image you wish to create. Please refer to the online help for details regarding those additional parameters (**Specify sectors number, Specify directory where journals are created**).

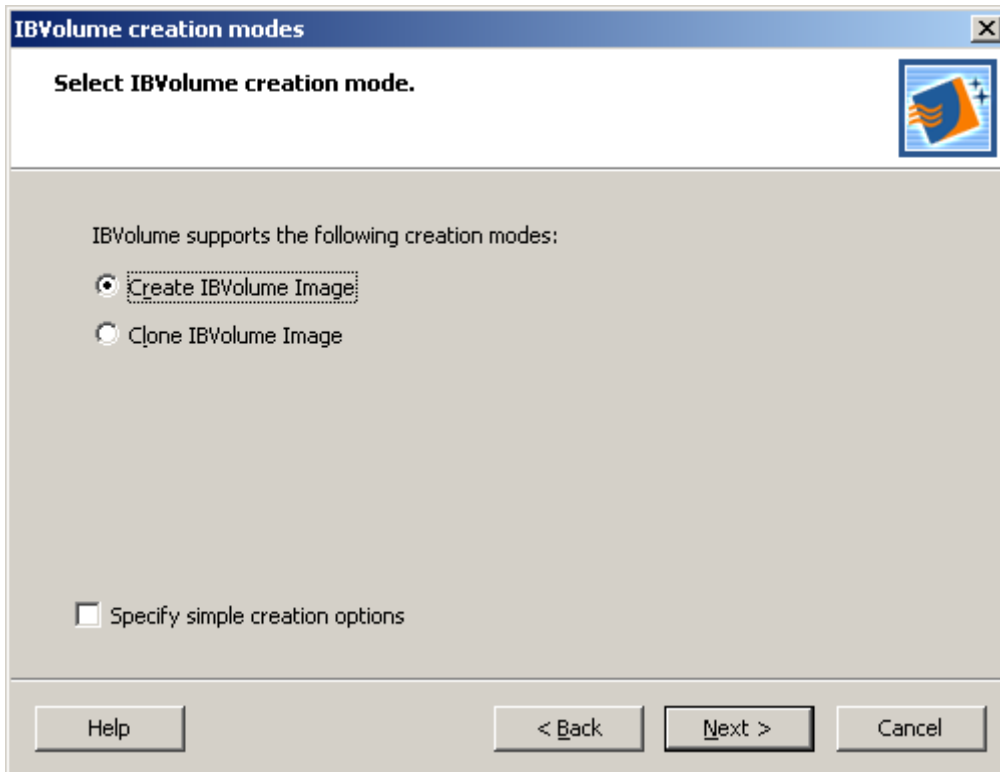


Press the **Next** button to continue.

Also it is possible to create an **IBVolume** image from an existing **ImageFile** image. To do so check **Specify advanced creation options**.

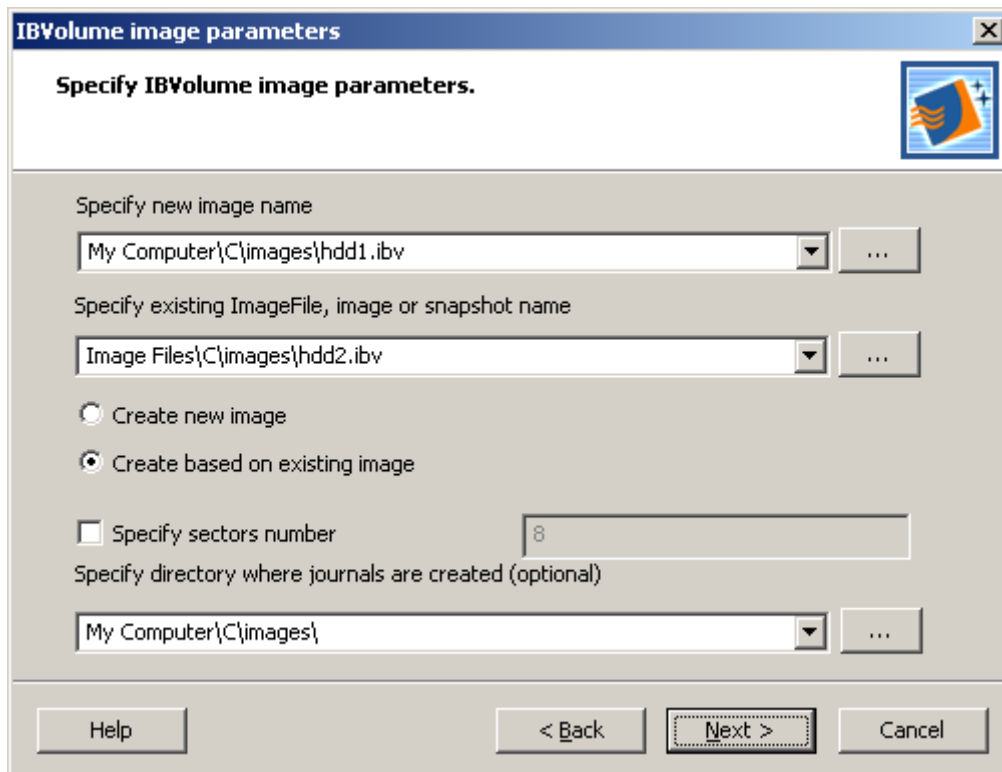


Select **Create IBVolume Image**.



Press the **Next** button to continue.

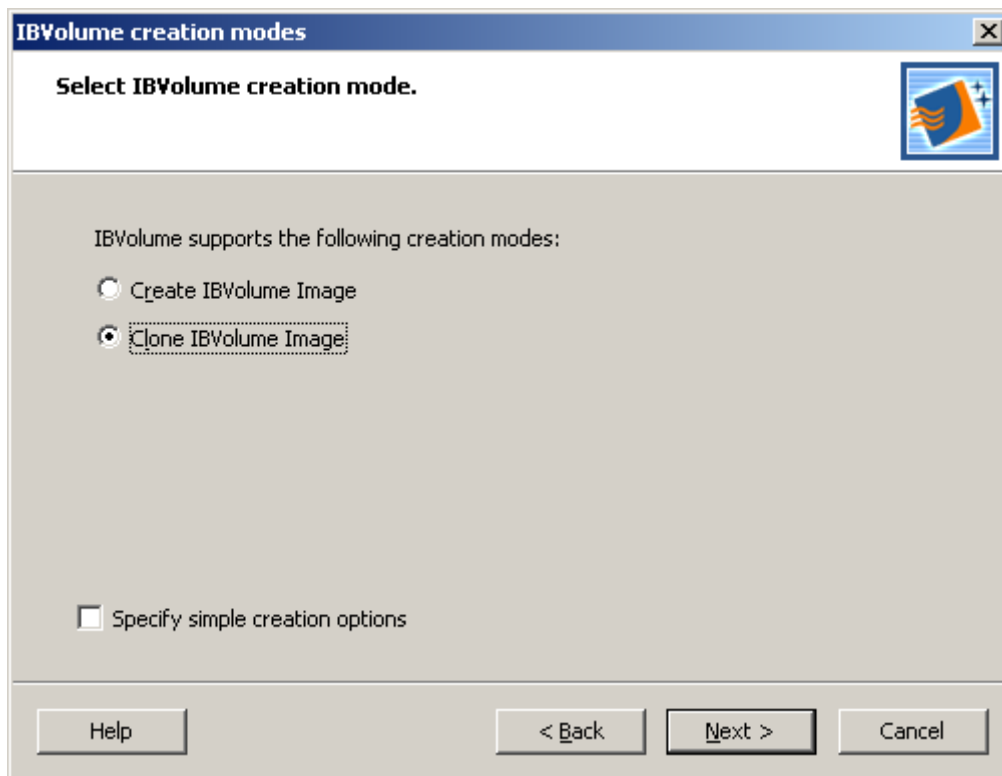
Select the **Create based on existing ImageFile image** and specify the name of an existing images file. Check any additional parameters of the image you wish to create. Please refer to the online help for details regarding those additional parameters (**Specify sectors number**, **Specify directory where journals are created**). The resulting **IBVolume** image will be of the same size as the source **ImageFile** image.



Press the **Next** button to continue.

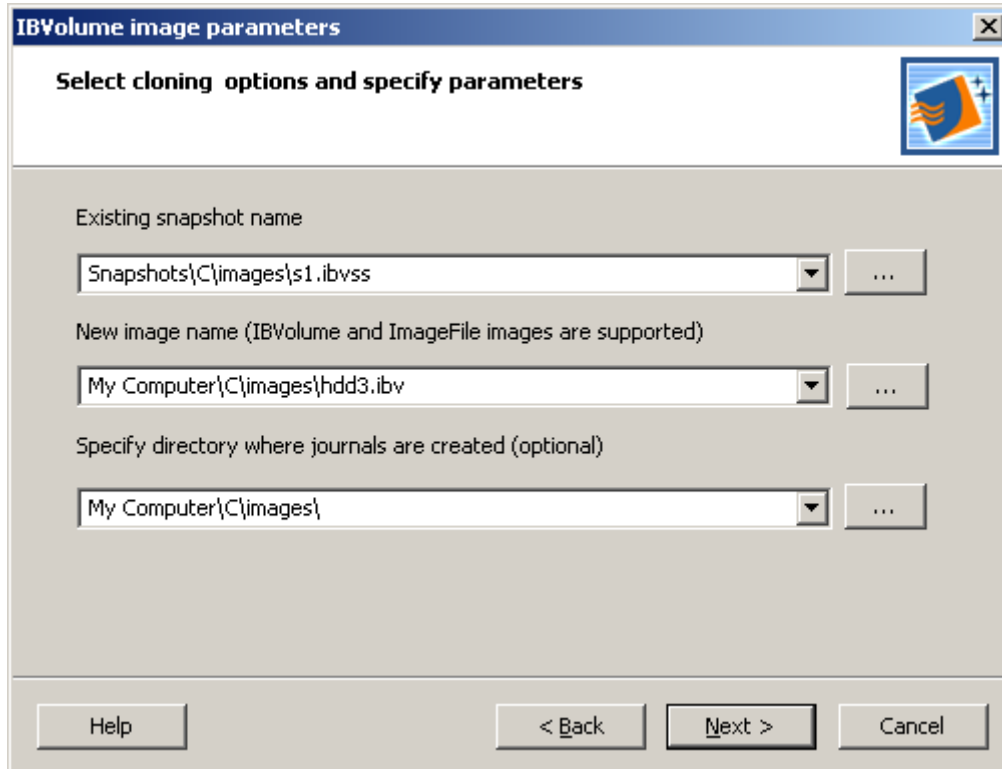
If you have selected to **Clone IBVolume Image**, a snapshot can be used to create a new **IBVolume** image. The basic snapshot data will be shared with the new **IBVolume** image, but any changes of the new volume will be stored separately.

Select **Clone IBVolume Image**.



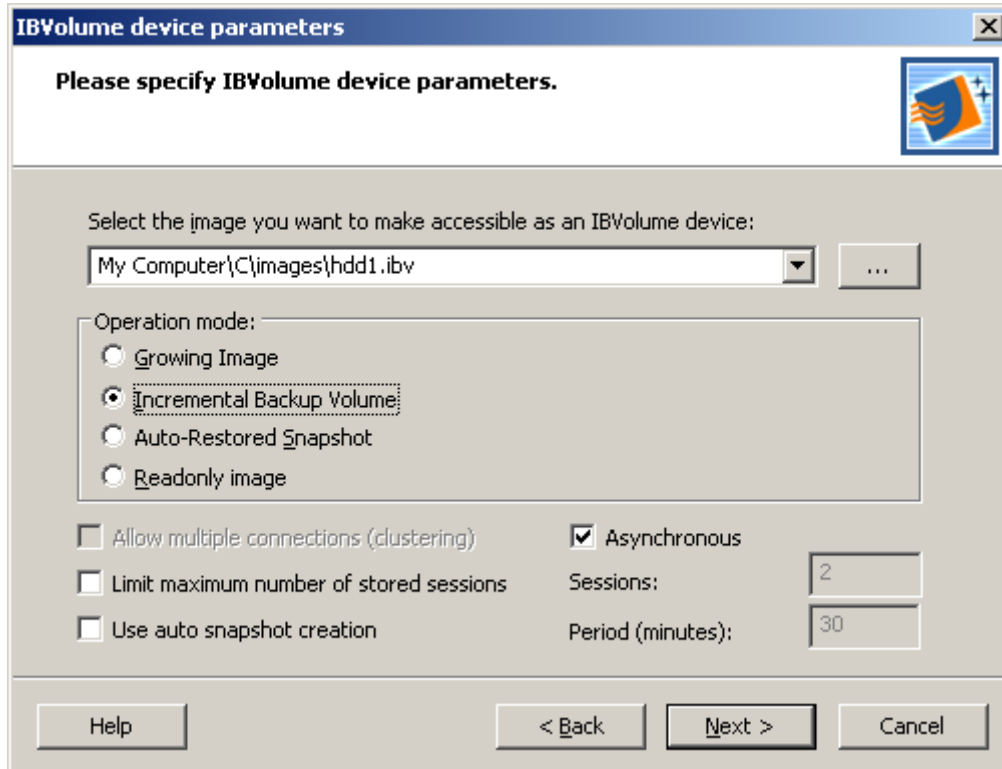
Press the **Next** button to continue.

Specify the existing snapshot name and new image name. You can also specify the folder to store the journal files.



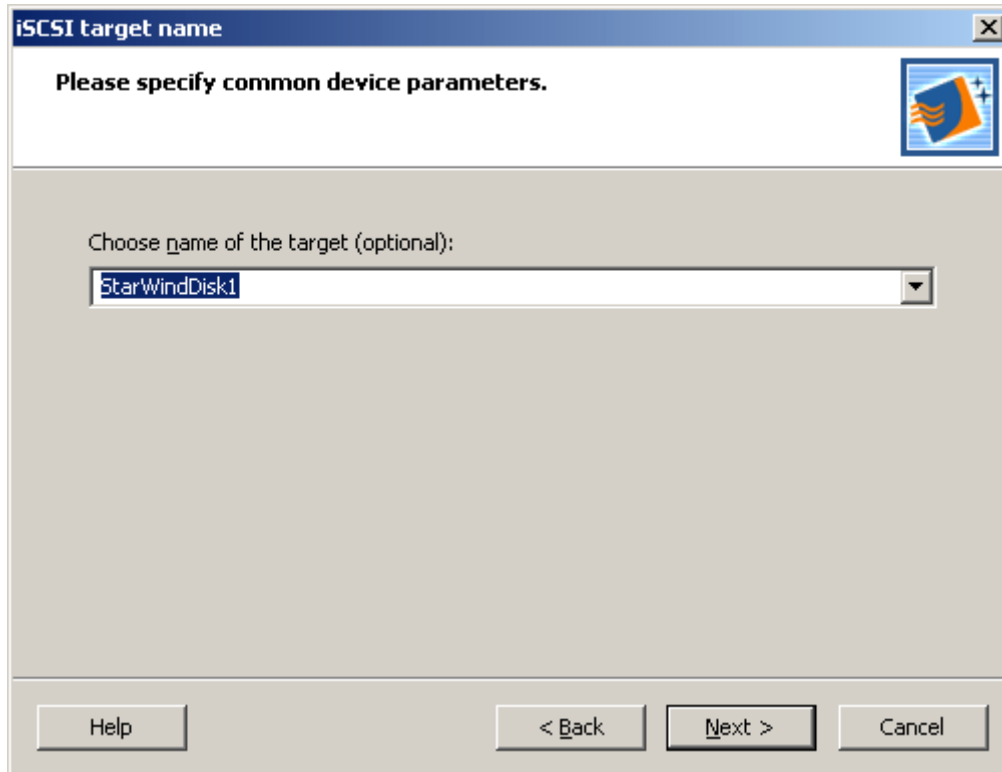
Press the **Next** button to continue.

After the image is created, you can select the **device operation mode** and other relevant options (please refer to the online help for details)



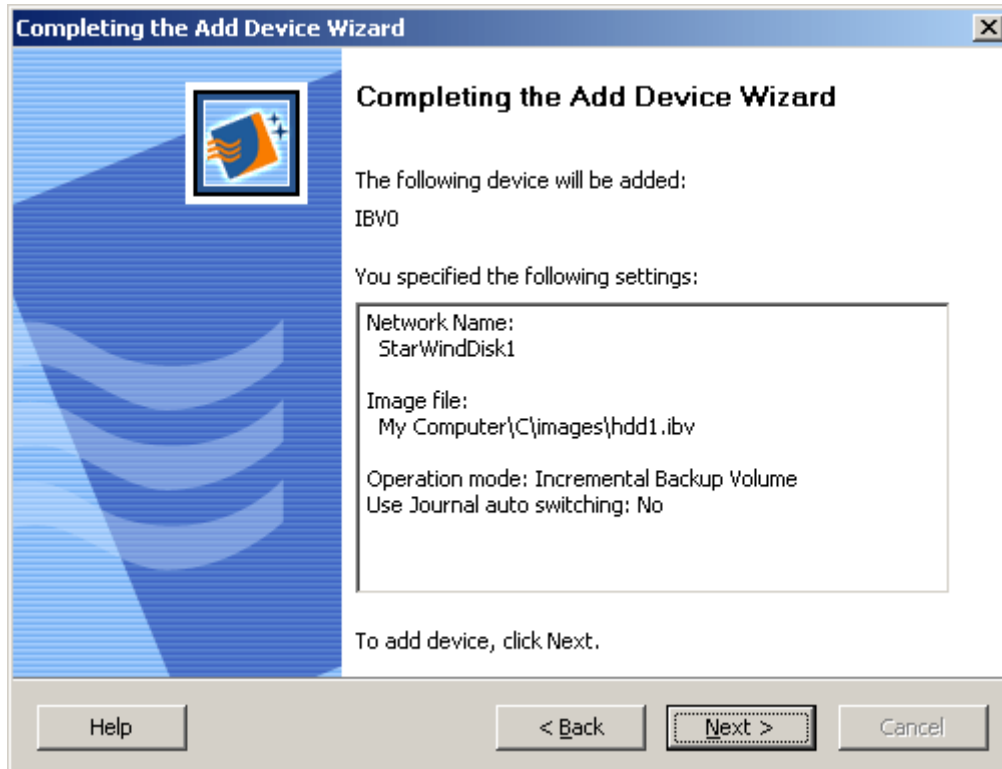
Press the **Next** button to continue.

Select a target name, this step is optional. The device will be identified to the iSCSI initiators connecting to the **StarWind** over an IP network, with this name.



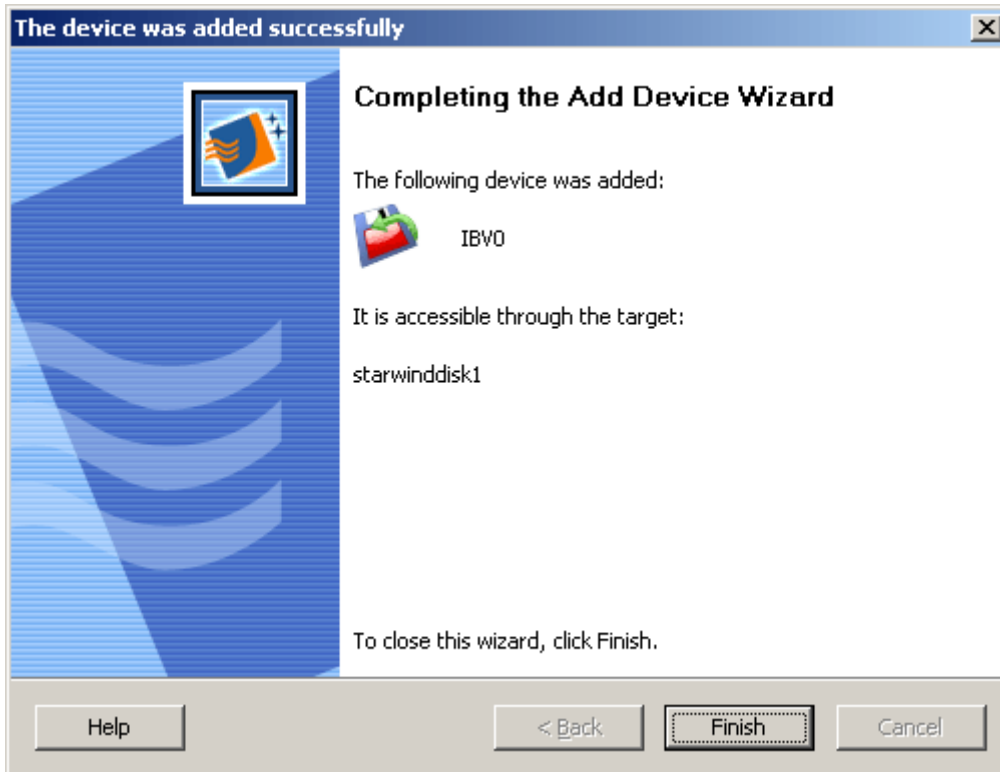
Press the **Next** button to continue.

Check if all of the device parameters are correct. Press the **Back** button if any changes are required.



Press the **Next** button to continue.

The information about the recently created device is displayed on the last wizard page (see image below).



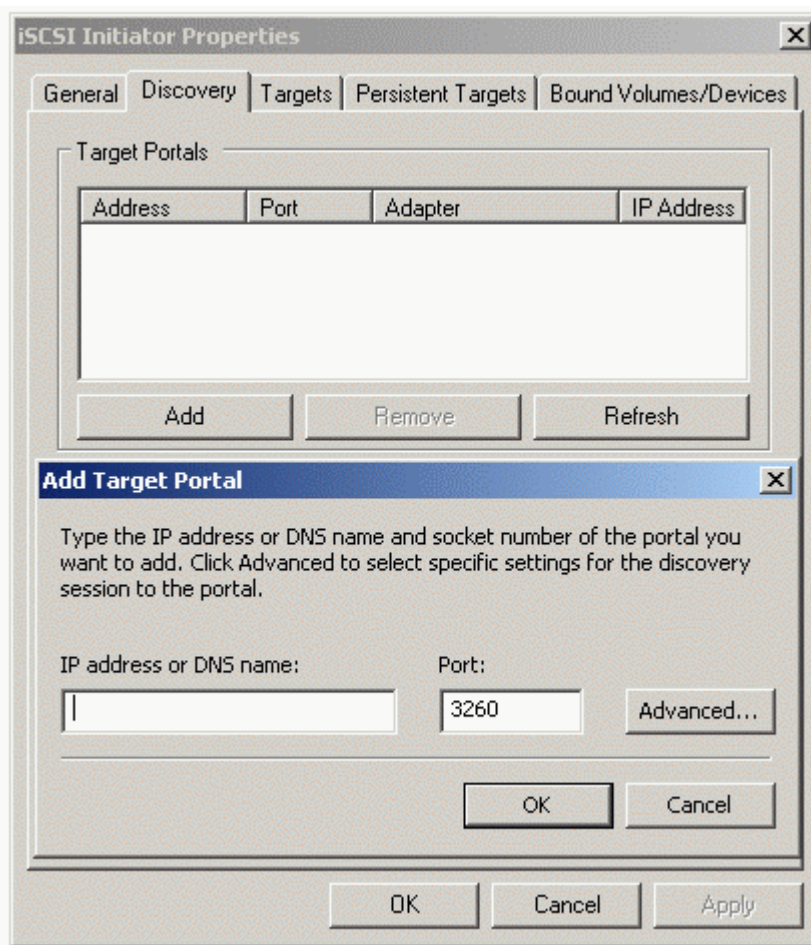
Press the **Finish** button to close the wizard.

CONFIGURING HOST

After you have created a **StarWind** iSCSI target, it is ready to service connections. After you have established a connection to an iSCSI target, it appears as a new disk resource in the Disk Management Console. This section describes the operations you need to complete to create and format the partition in the way that MSVS can create and install virtual machines on it.

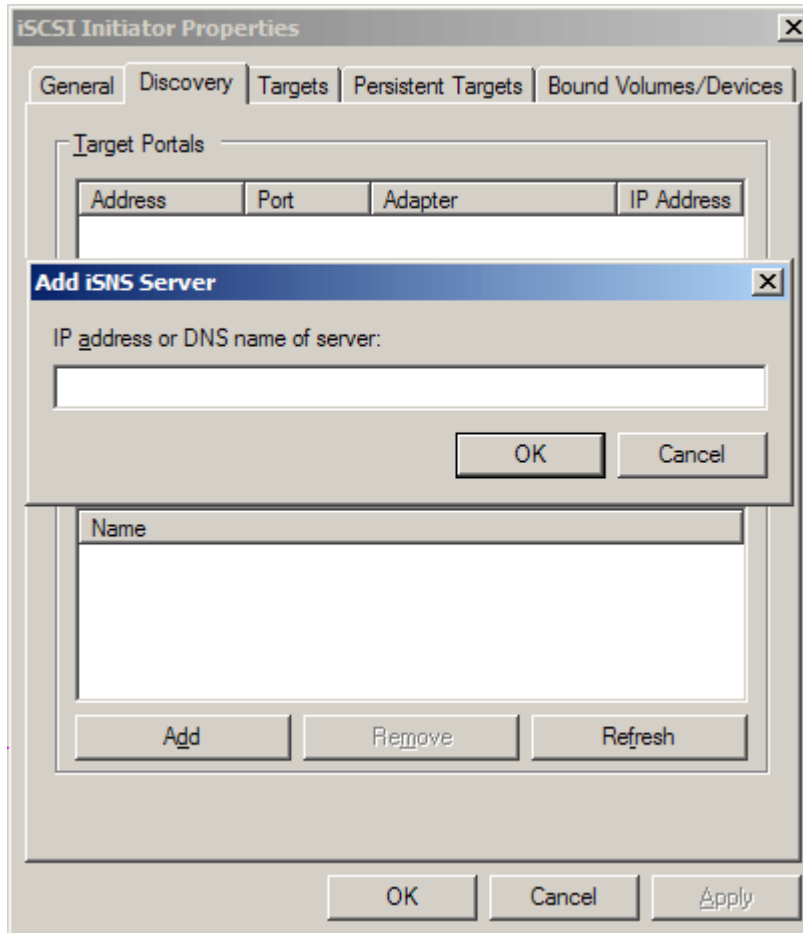
INITIALIZING ISCSI DEVICE

Launch the Microsoft iSCSI Software Initiator application. Switch to the Discovery tab. Click **Add** in the Target Portals group.



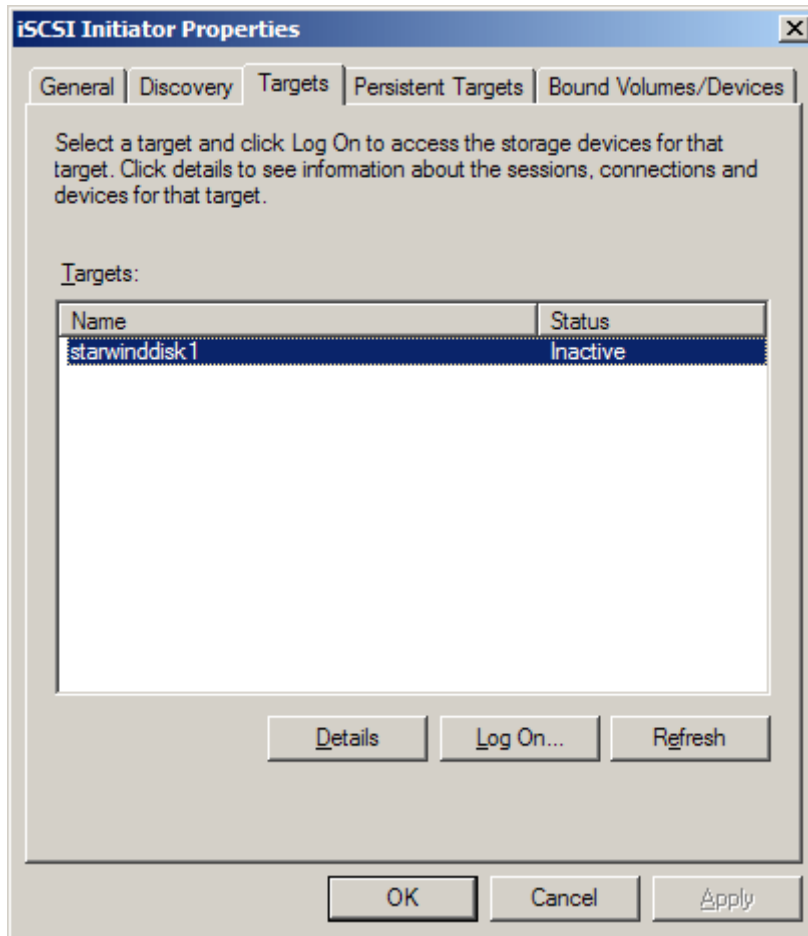
Specify the IP address of the host, on which **StarWind** is installed.

Alternatively, you may specify the IP address of the iSNS Server (if there is one configured over your network).



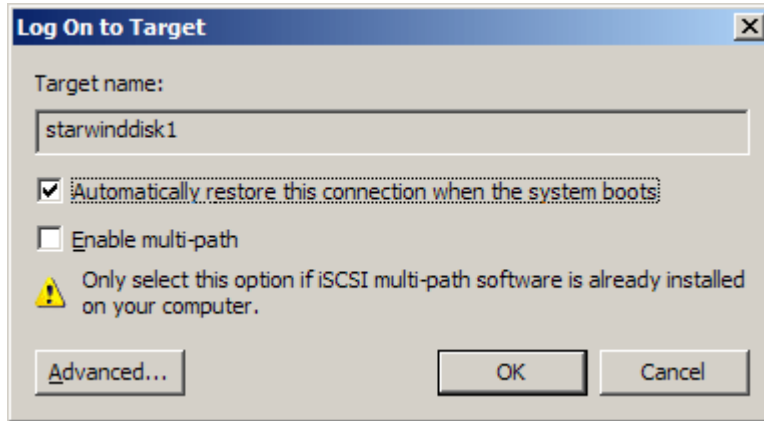
Press the **OK** button to continue.

Switch to the Targets tab. Select the target name from the list.



Click the '**Log On...**' button.

In the '**Log On to Target**' dialog box enable the **Automatically restore this connection when the system boots** checkbox.



Press the **OK** to logon to **StarWind**.

If the logon is successful the new iSCSI device will appear in the system after a few seconds.

Launch the **Computer Management Console** and expand the **Disk Management** group in the **Storage** section.

If the new iSCSI disk is not initialized yet, the **Initialize and Convert Disk Wizard** will appear (on Windows 2000 systems the **Write Disk Signature Wizard** will appear). If the disk has already been initialized, the Wizard will not appear.



Follow the instructions on the wizard to initialize the disk. Keep the disk as a **Basic Disk**. Use **Disk Management** to create and format the partition.

CONFIGURING MICROSOFT VIRTUAL SERVER

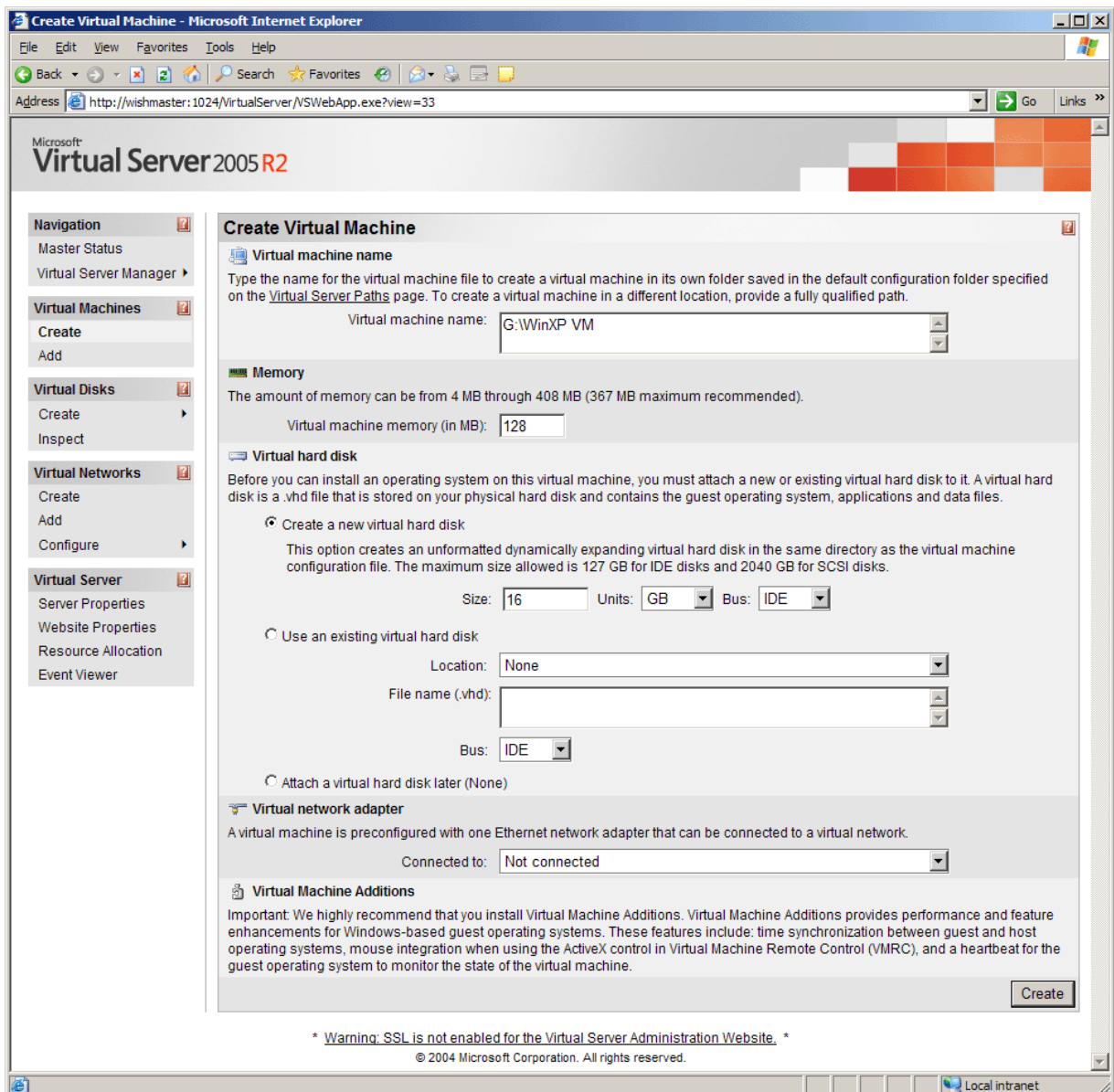
After you have partitioned and formatted the iSCSI disk, you can start configuring MSVS to use it. This section describes the steps that you need to take to create a virtual machine and install the guest operating system onto the newly created drive. For more detailed information about MSVS, please refer to the MSVS help resources.

Open the **Microsoft Virtual Server Administration Website**. Select **Create** from the **Virtual Machines** menu.

The **Create Virtual Machine Wizard** appears.

Specify the full path of the virtual machine, which you wish to create, in the **Virtual machine name** field. For example, if you have assigned G letter to the your iSCSI drive, the path may look like this: G:\WinXP VM

Select the **Create a new virtual hard disk** option in the Virtual hard disk section. If needed, customize the other options (for example, network adapter, memory etc.).



Press **Create** to create a new virtual machine and a virtual hard drive.

After the virtual machine is created the **Status and Configuration** window appears. Click the thumbnail to turn the virtual machine on. Click the thumbnail again to launch the remote administration of the virtual machine.

On the remote console you will be provided with instructions on the procedure of the operating system installation for the virtual machine. Please follow the given instructions. After the operating system is installed, user software and other business applications can be installed and configured.

MOVING VIRTUAL MACHINES

When a physical host is upgraded, taken off-line for maintenance or upgraded it may be required to move a virtual machine from one system to another.

StarWind is able to reduce the downtime for applications running on the virtual machine from hours to minutes.

This section details the operations that you need to complete to move a virtual machine to another host.

Re-assign StarWind Disk

- Follow the instructions given in the **Configure Virtual Server Host** section to install the initiator and MSVS on a new host machine.
- Shutdown the “old” virtual server host machine. Make sure that the services are not running and the system is off before continuing.

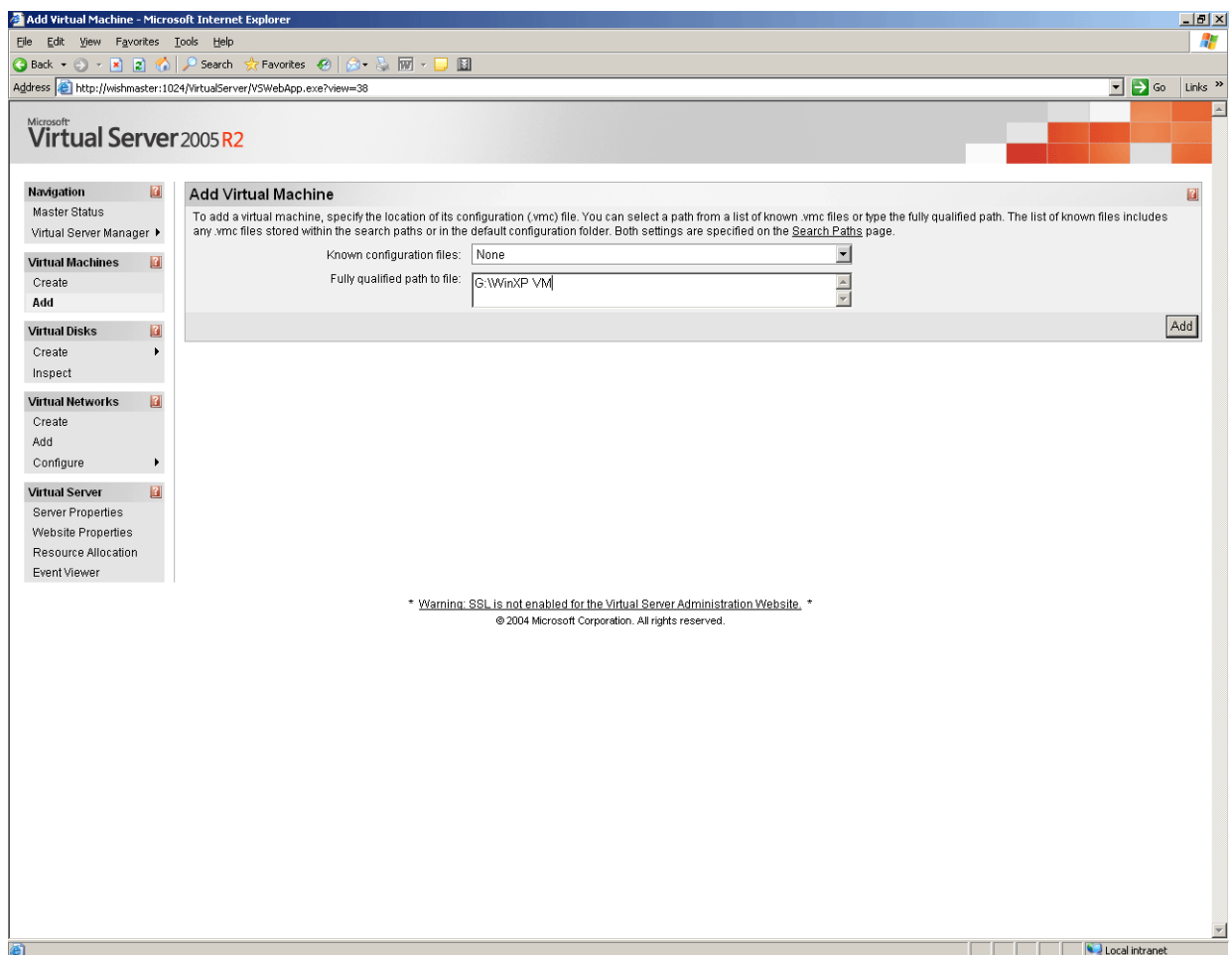
Mount iSCSI Device

- Run the **Microsoft iSCSI Software Initiator** on the new virtual server host machine.
- Add the target portal and logon to **StarWind** (follow the instructions detailed in the **Initialize iSCSI Device** section).
- Open the **Computer Management Console** and expand the Disk Management node in the Storage section.
- A new physical disk should appear. This is the same disk that was previously used on the “old” virtual server host. The volume on this disk may or may not have a drive letter assigned to it. If a drive letter is not assign, use **Disk Management** to map a drive letter to the volume. To avoid application path conflicts, use the same drive letter as on the “old” host.

ADDING A VIRTUAL MACHINE

This section details the operations that you need to complete to add an existing virtual machine to MSVS. For more information, please refer to MSVS help resources.

- Launch the MSVS Virtual Server Administration Website.
- Select Add from the Virtual Machines menu. The Add Virtual Machine Wizard appears.
- Specify the full path of the virtual machine or select it from the dropdown list. Click **Add** to add the virtual machine. The virtual machine **Status and Configuration** window appears.



- Update the rest of the configuration options such as network adapter, memory, etc. as needed to describe the new system hardware.

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Using StarWind with Microsoft Virtual Server

PROVIDING ISCSI STORAGE TO A VIRTUAL MACHINE

You may also benefit from using **StarWind** with MSVS by providing storage for a virtual machine.

The virtual machine will obtain a block storage device, which will not physically reside on the host machine.

- Login to the virtual machine and install the Microsoft iSCSI Software Initiator.
- Follow section in this manual “Create **StarWind** Disk”.
- Connect the initiator to **StarWind**. See the Initialize iSCSI Device for the exact steps in this process.
- Once the initiator successfully logs on and the new drive is initialized and formatted, it is ready for use by this virtual machine.

CONCLUSION

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