# StarWind iSCSI SAN Software: Using StarWind with MS Cluster on Windows Server 2003

www.starwindsoftware.com

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# Guide

## Introduction

Software clustering technology enables you to make several servers to work as a unit. Various cluster configurations can be implemented. One of the most frequently used configurations is the failover cluster. This configuration assumes that if one of the cluster nodes fails, the reserved node automatically brings online, serving the applications. With that the workflow remains uninterrupted and secured.

Failover cluster configuration includes two (or more) server nodes that share an external storage. Based on the iSCSI technology, **StarWind Software Inc. StarWind** enables to create an external storage in Windows environment without implementation of expensive FC or external SCSI solutions. With **StarWind** you can create a shared disk array on a host running Microsoft Windows.

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This document gives you detailed step-by-step instructions on **StarWind** configuring for failover clusters.

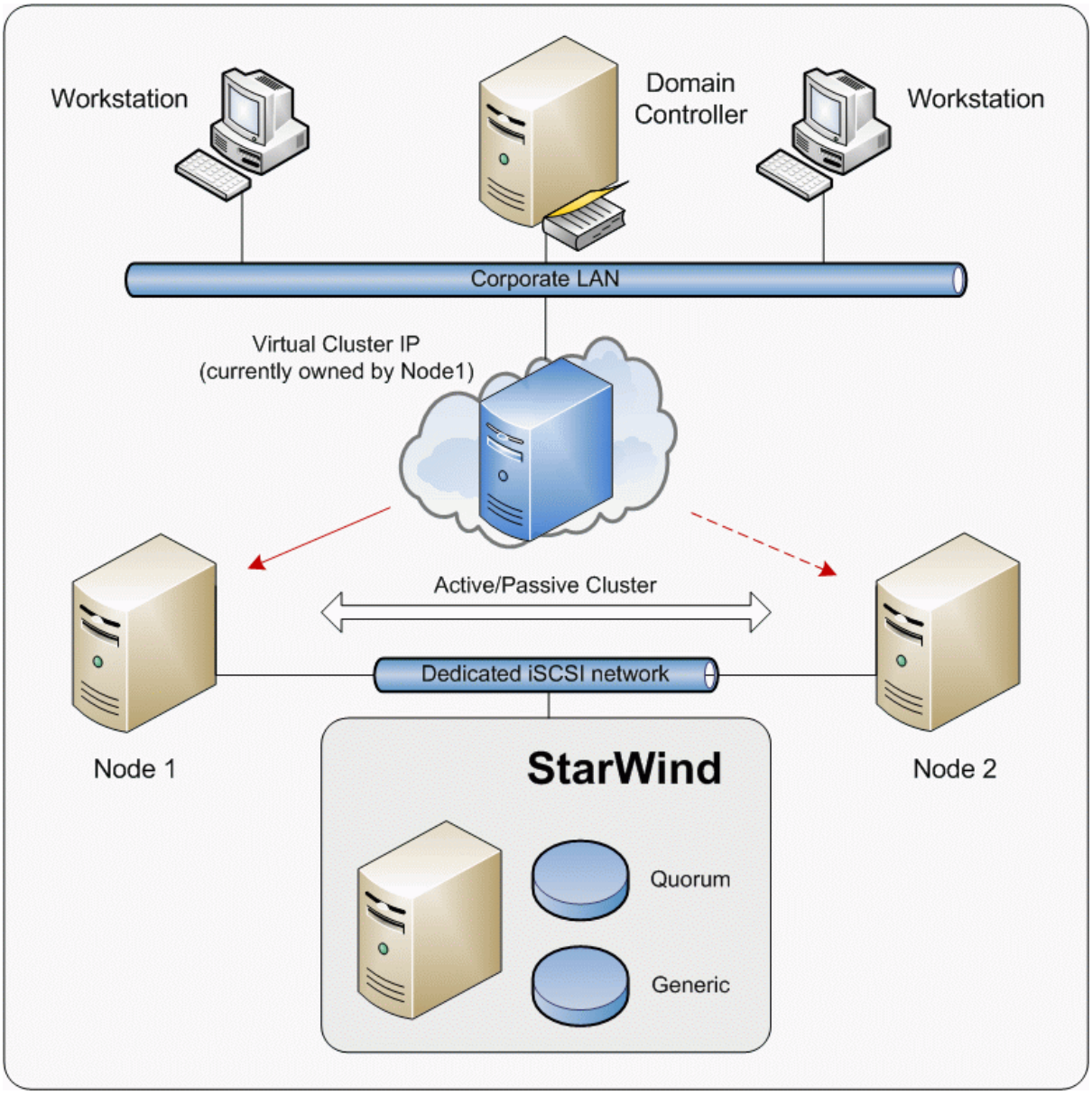


Figure 1. StarWind provides shared-disk resources to clusters

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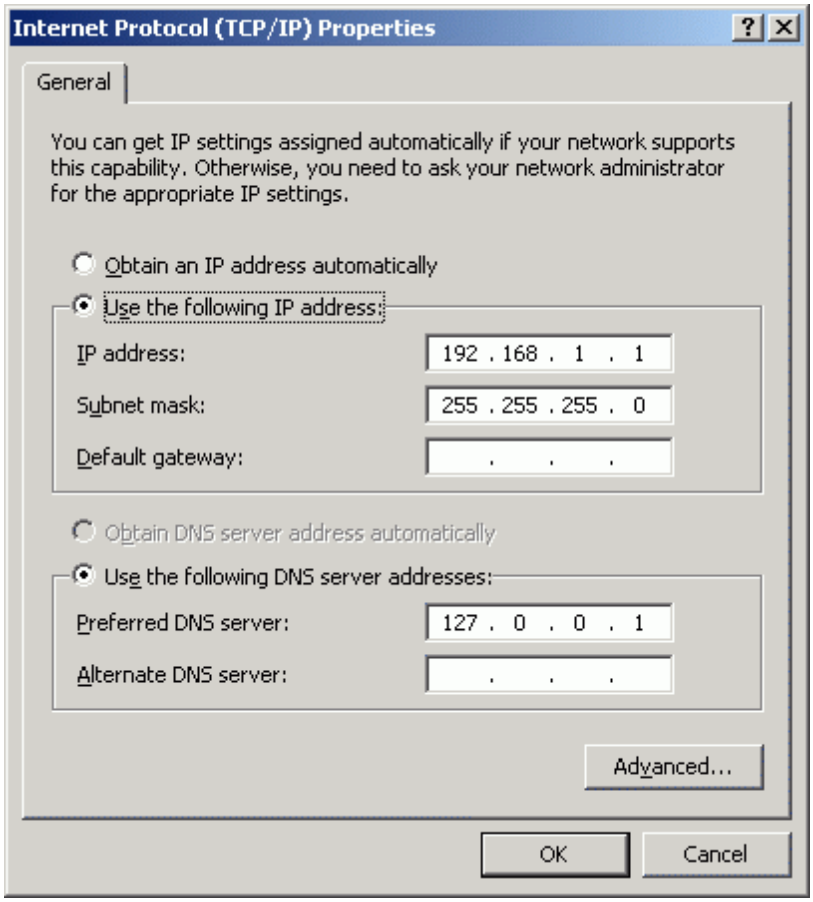
## Configuring Domain Controller

### Network Adapter

The network adapter must be assigned a static IP address. Select the **Use the following IP address** option and type in the IP address you wish to use. The Subnet mask must also be provided. Both values must be correctly chosen given the networking configuration of the Corporate LAN. As AD requires DNS, an address must be provided – in this case we can specify 127.0.0.1 (loopback interface address). DNS will be installed later with the other AD components.




Press the **OK** button.

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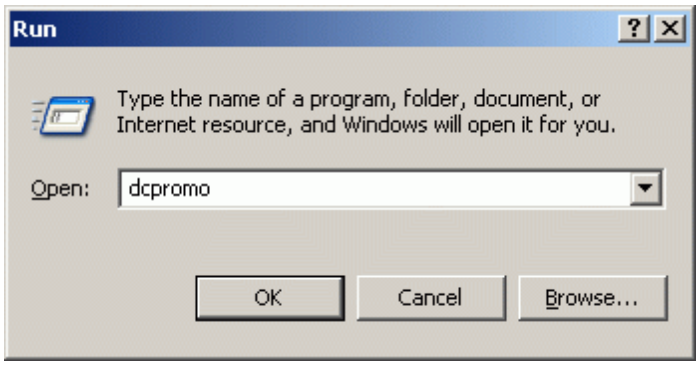
## Active Directory

Select **Start->Run** and type in **dcpromo**.




Press the **OK** button to continue.

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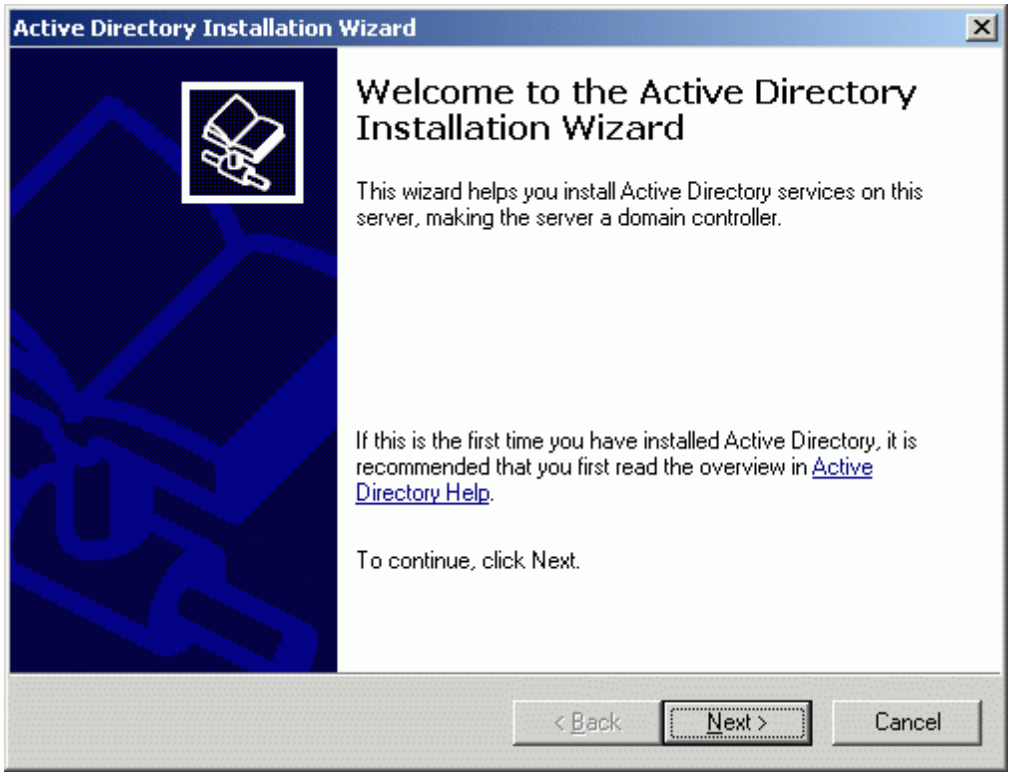
The **Active Directory Installation Wizard** appears.




Press the **Next** button to continue.

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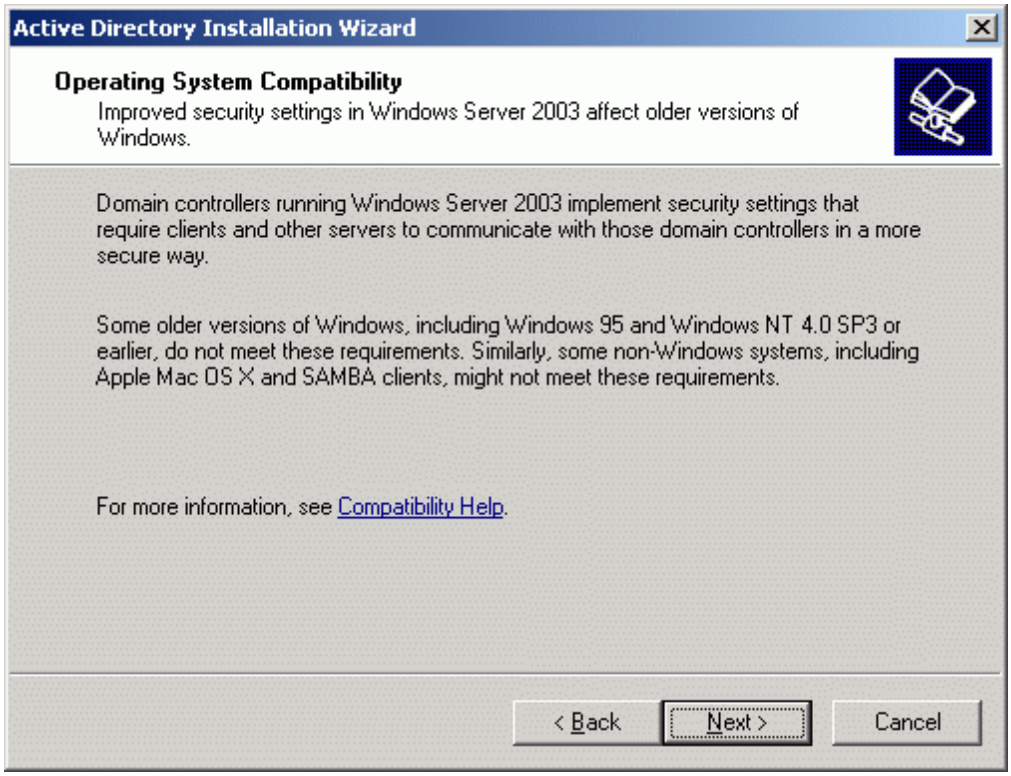
In the wizard that appears please read the introducing instructions.




Press the **Next** button to continue.

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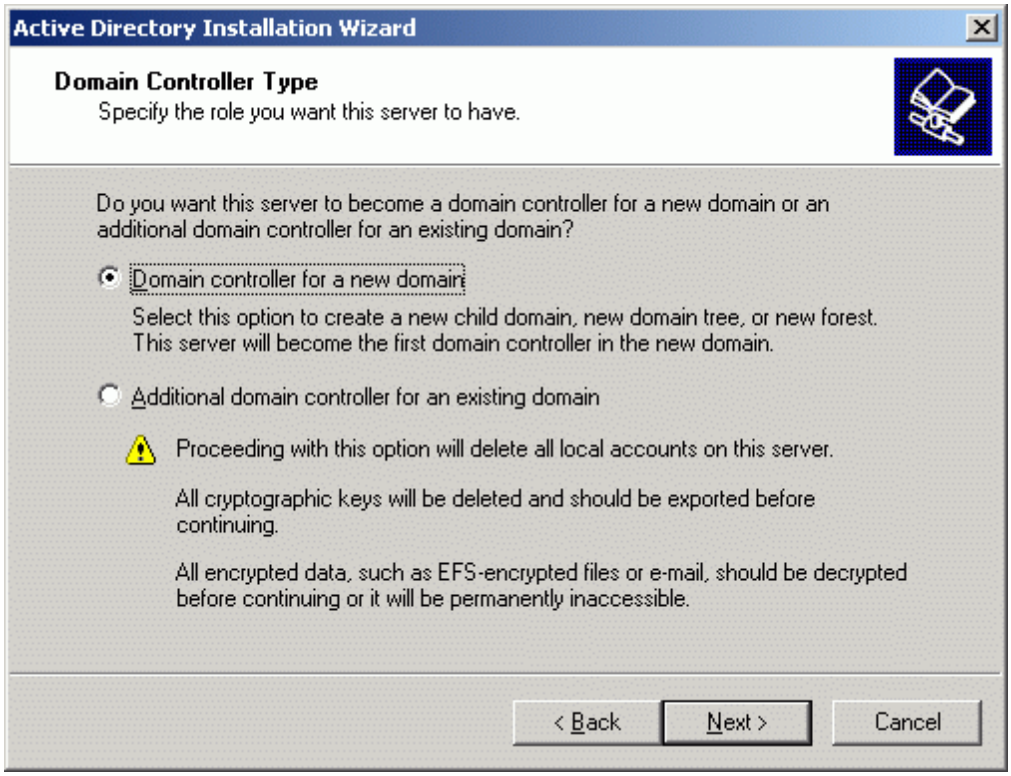
As we are creating a new domain, select **Domain controller for a new domain**.




Press the **Next** button to continue.

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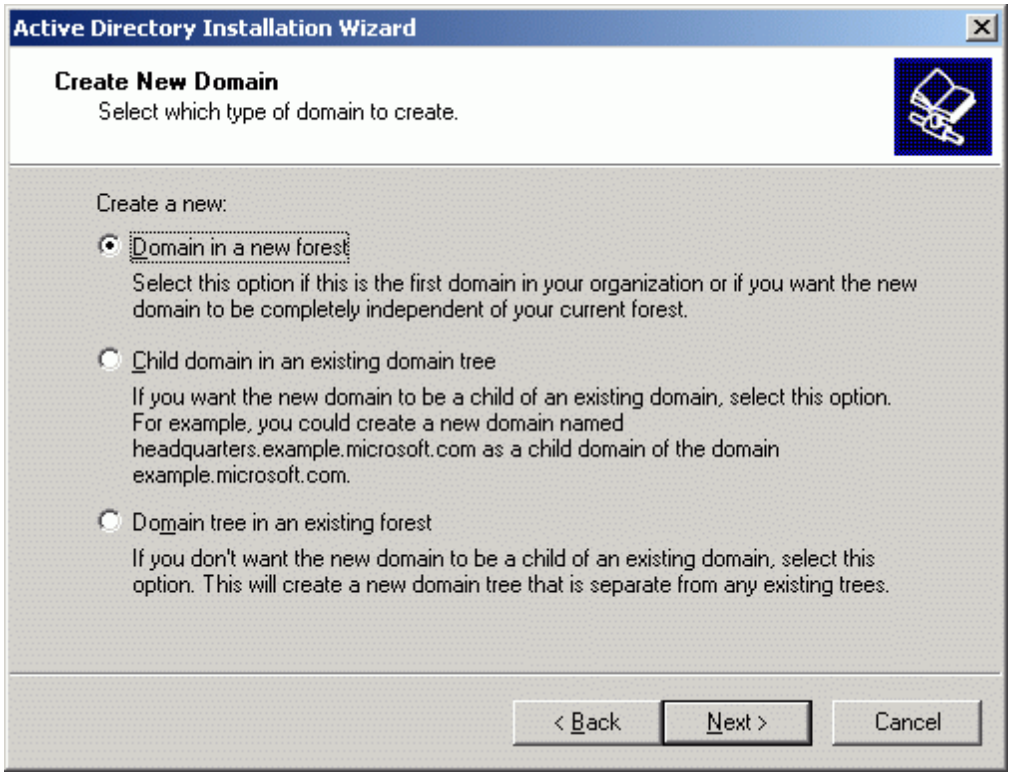
**Create New Domain** page appears. Select **Domain in a new forest** option.

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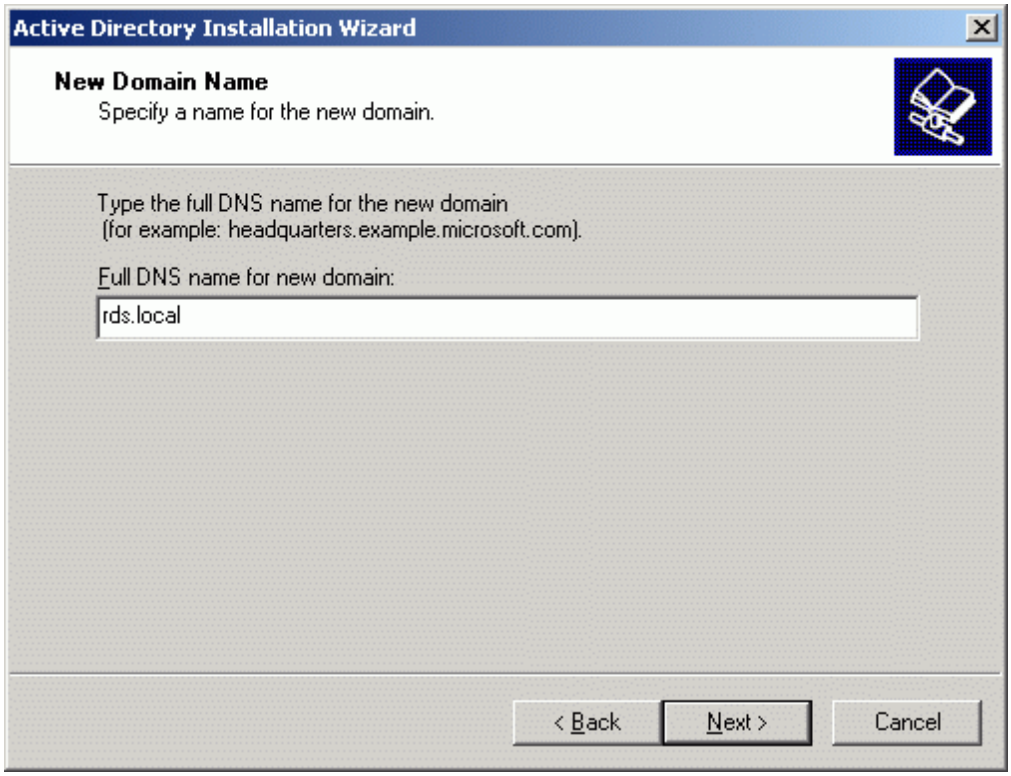
Specify the full DNS name of the domain to create.




Press the **Next** button to continue.

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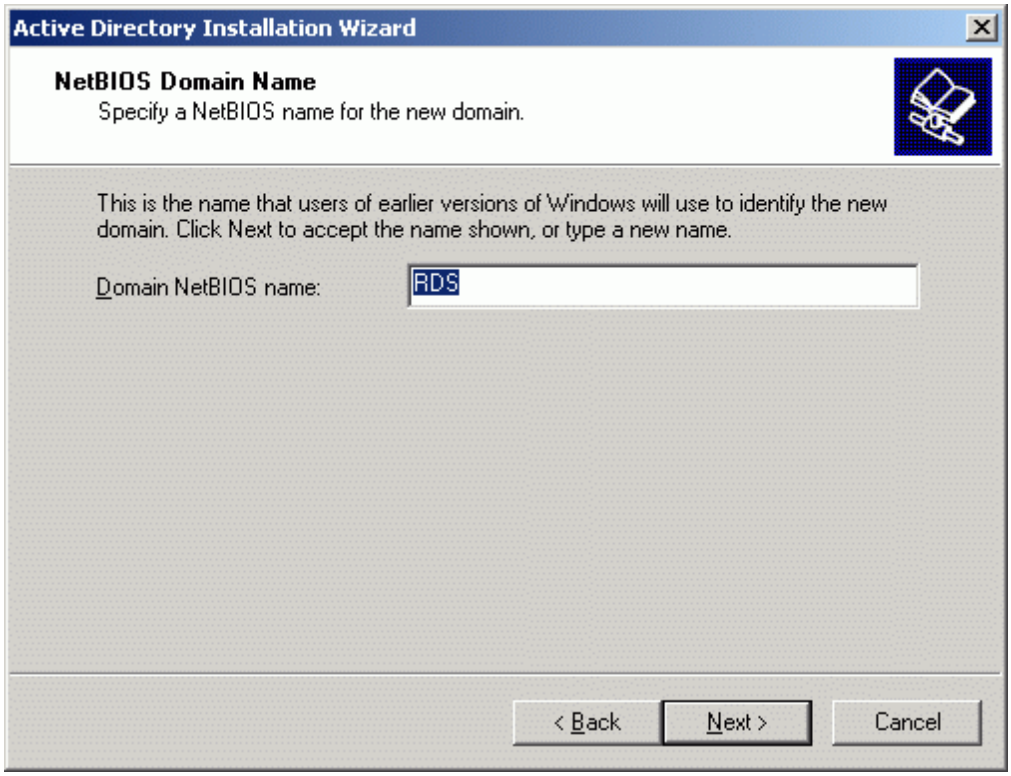
Specify Domain NetBIOS name.




Press the **Next** button to continue.

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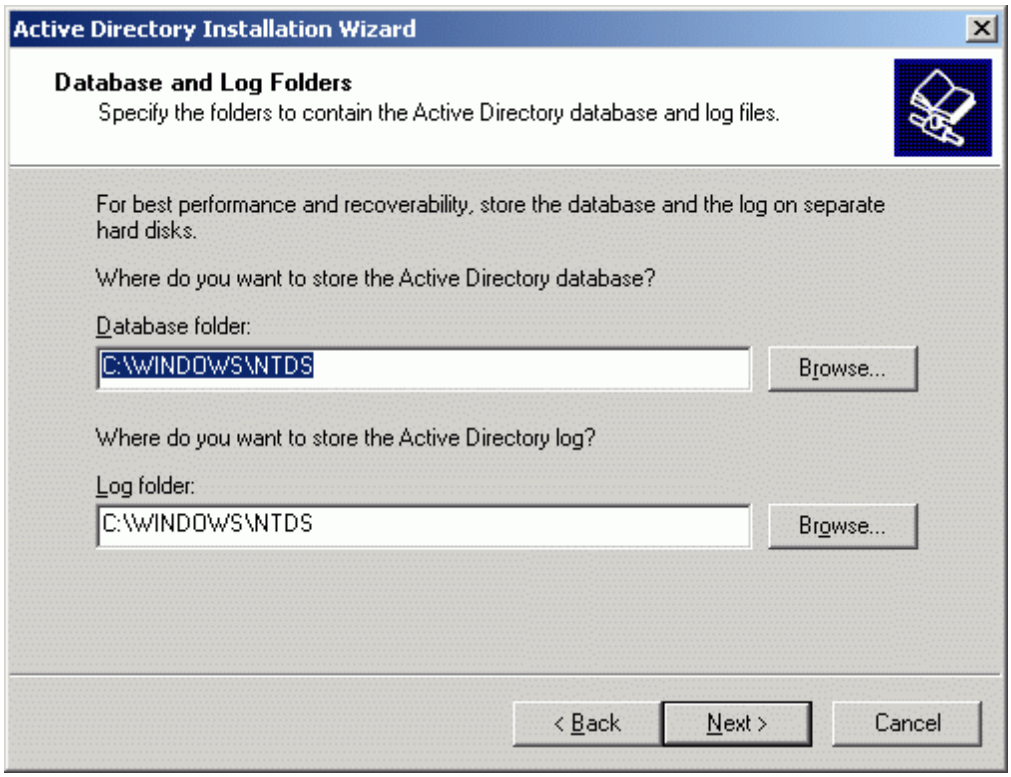
Customize the directories where the AD database and log files will be stored or leave the values at their defaults.




Press the **Next** button to continue.

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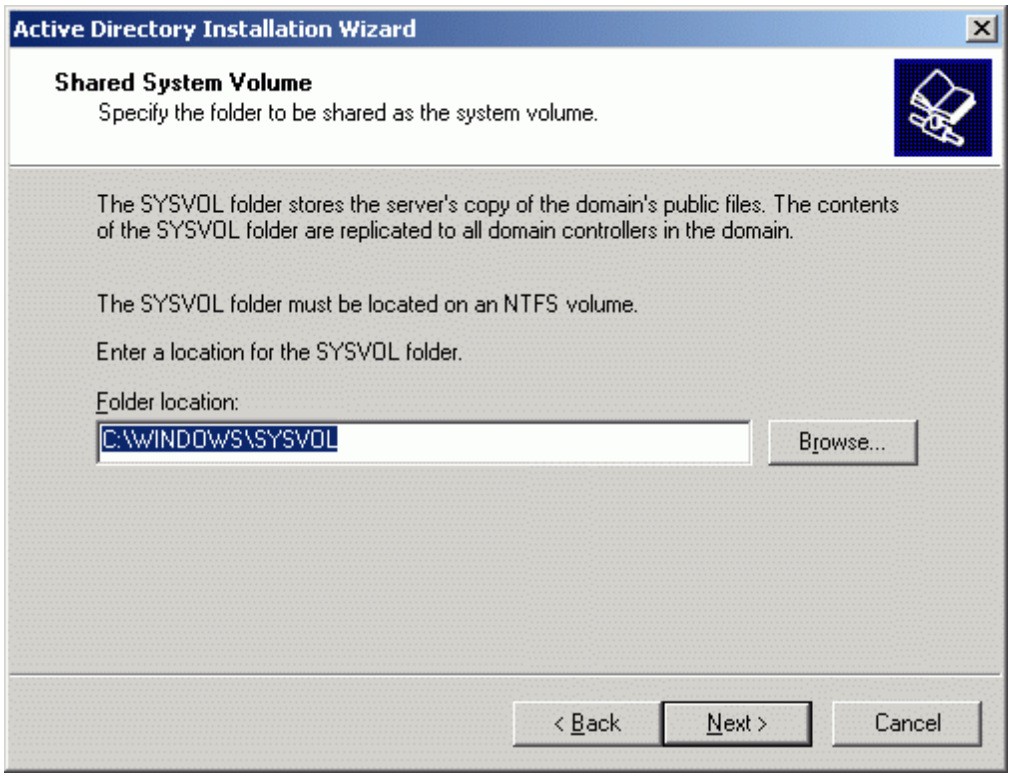
Customize the directory where the SYSVOL data will be stored or leave the value at its default.




Press the **Next** button to continue.

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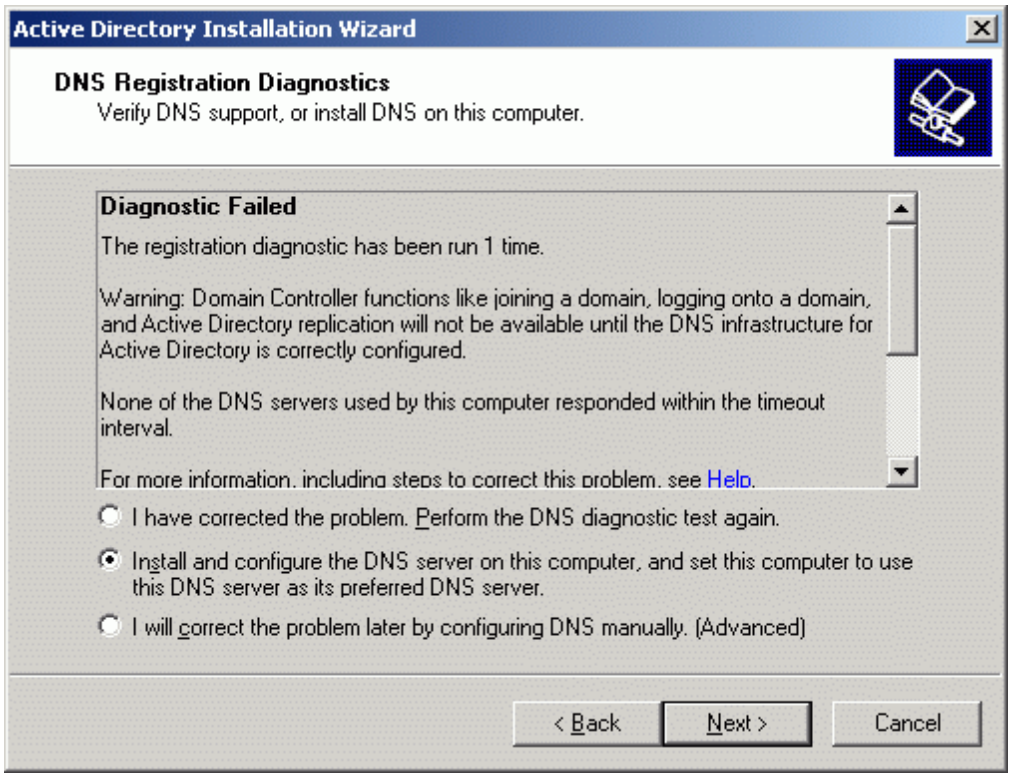
**DNS Registration Diagnostics** page appears. Select **Install and configure the DNS server on this computer, and set this computer to use this DNS server as its preferred DNS server** option.




Press the **Next** button to continue.

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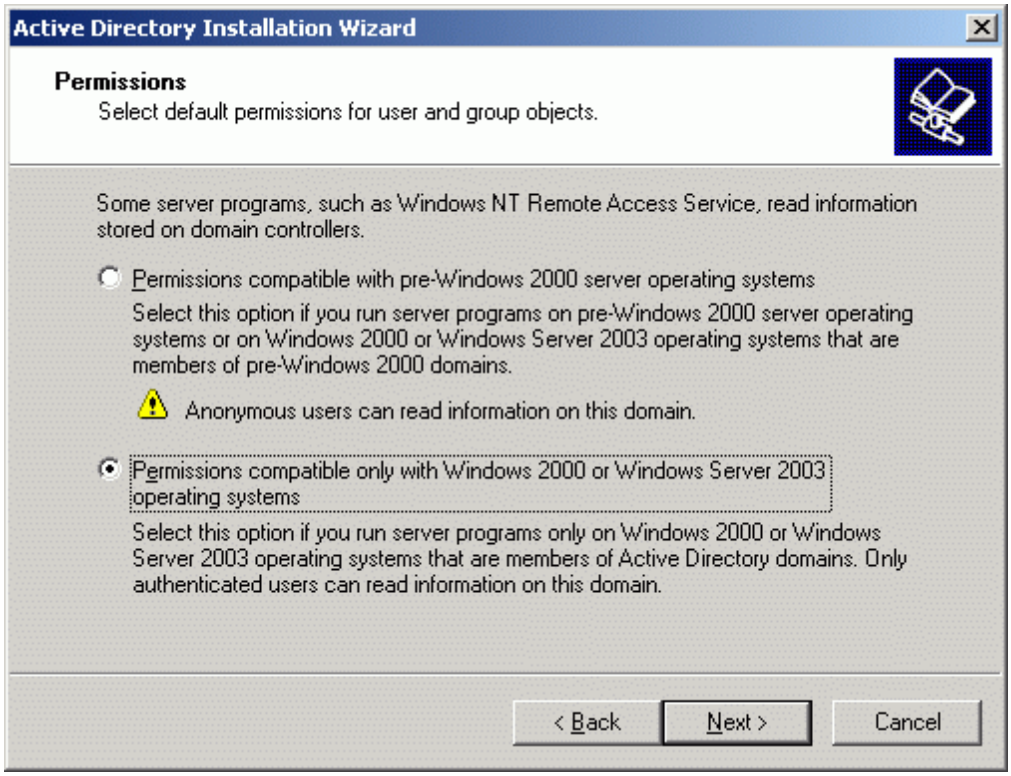
Select default permissions for user and group objects.




Press the **Next** button to continue.

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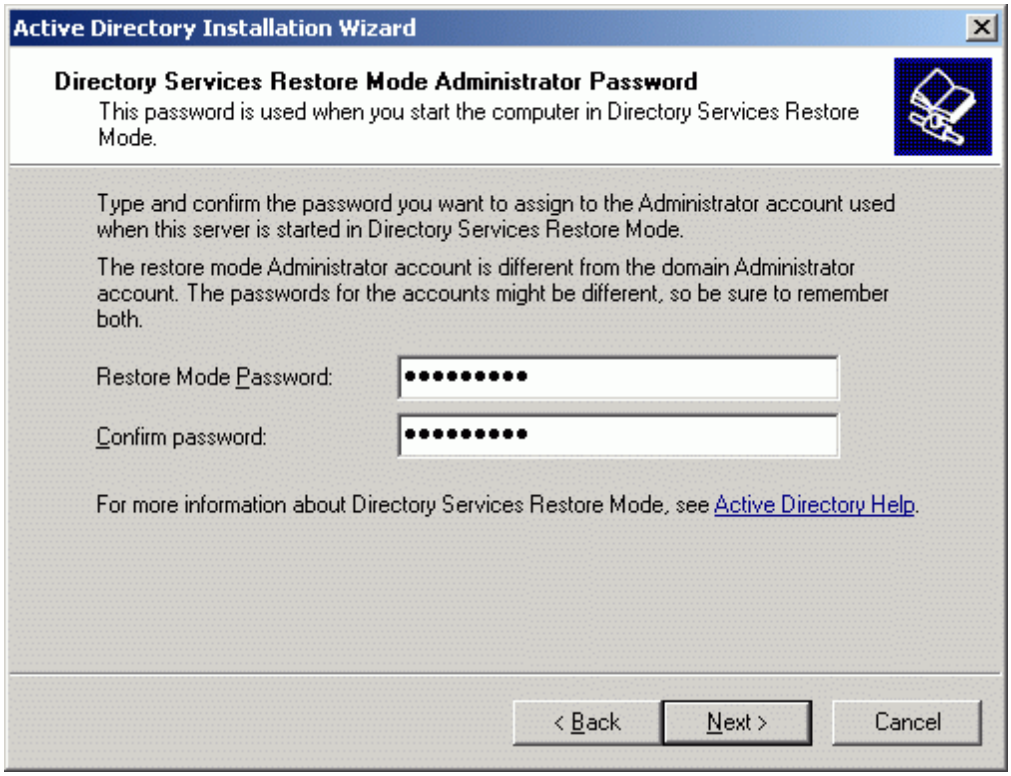
Type in the **Directory Services Restore Mode Administrator Password**.




Press the **Next** button to continue.

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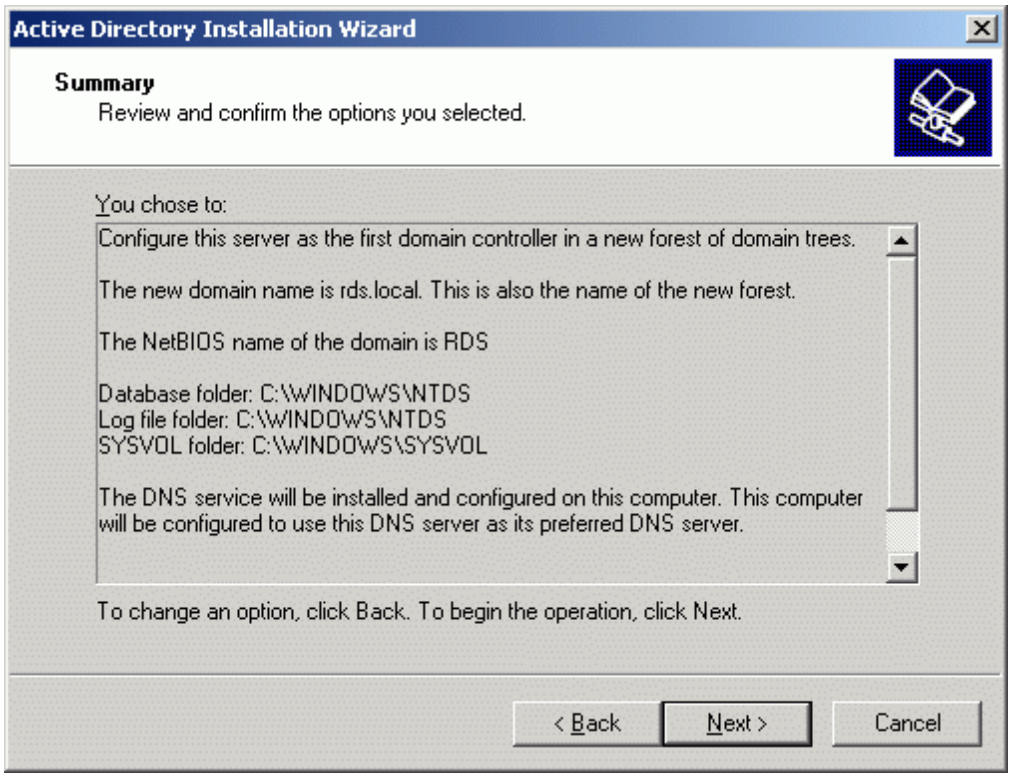
Review the options summary. Press the **Back** button should any changes be required.




Press the **Next** button to continue.

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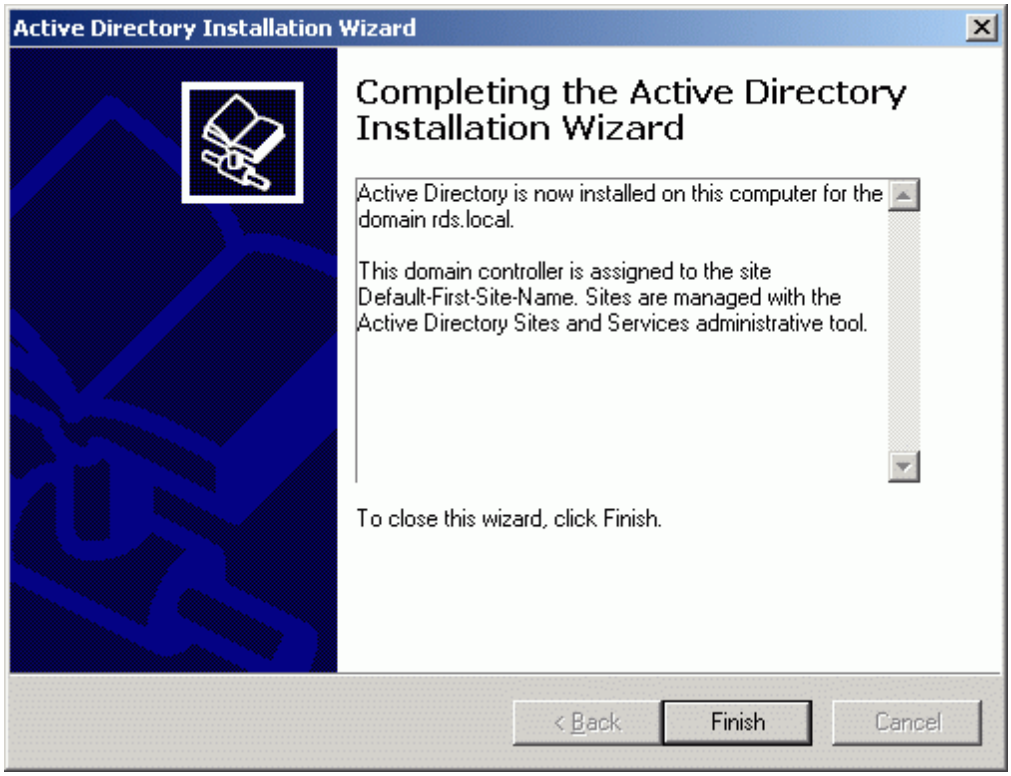
If successful, the wizard should look like the example image provided below.




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


Press the **Restart Now button** to restart the computer.

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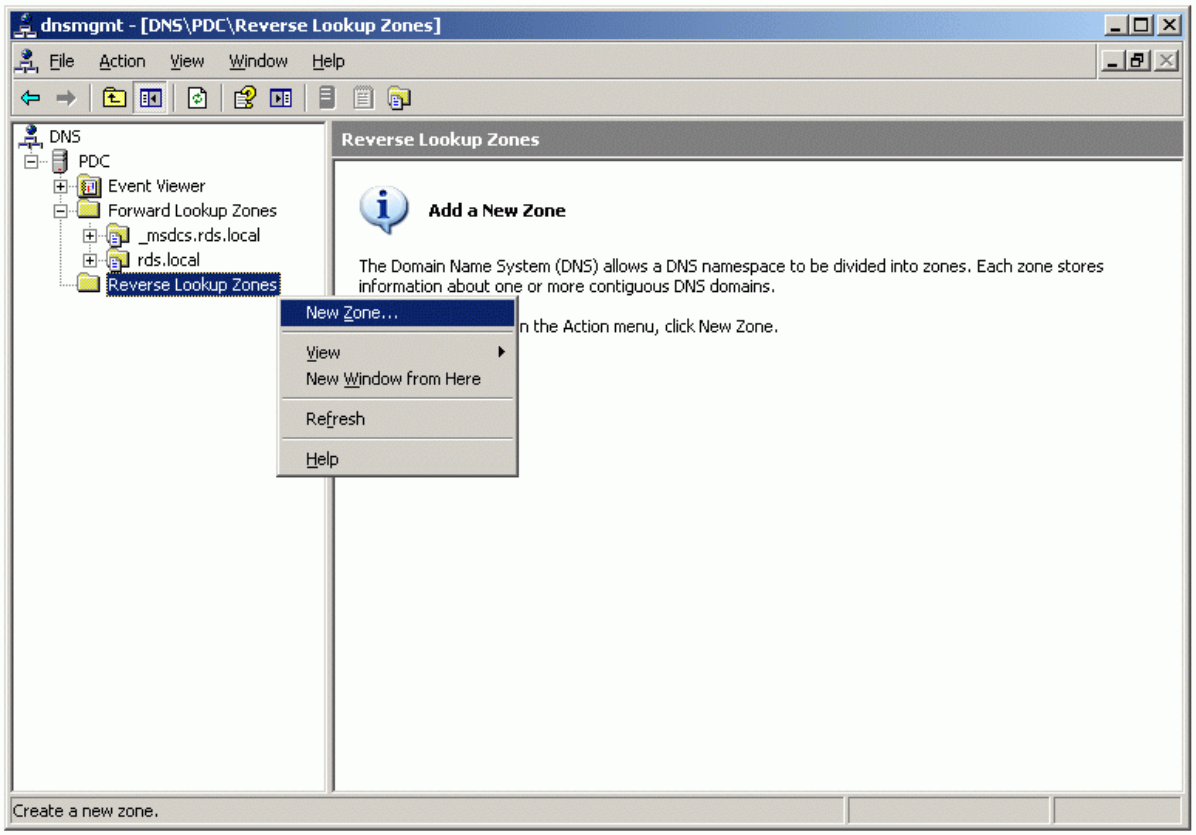
## DNS

Log on to the Domain controller using an account with administrative privileges. Launch the **DNS Manager** and configure the **Reverse Lookup Zone**.




Press the right mouse button over the **Reverse Lookup Zone** node and select **New Zone...** popup menu item.

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**New Zone Wizard** appears.


Press the **Next** button to continue.

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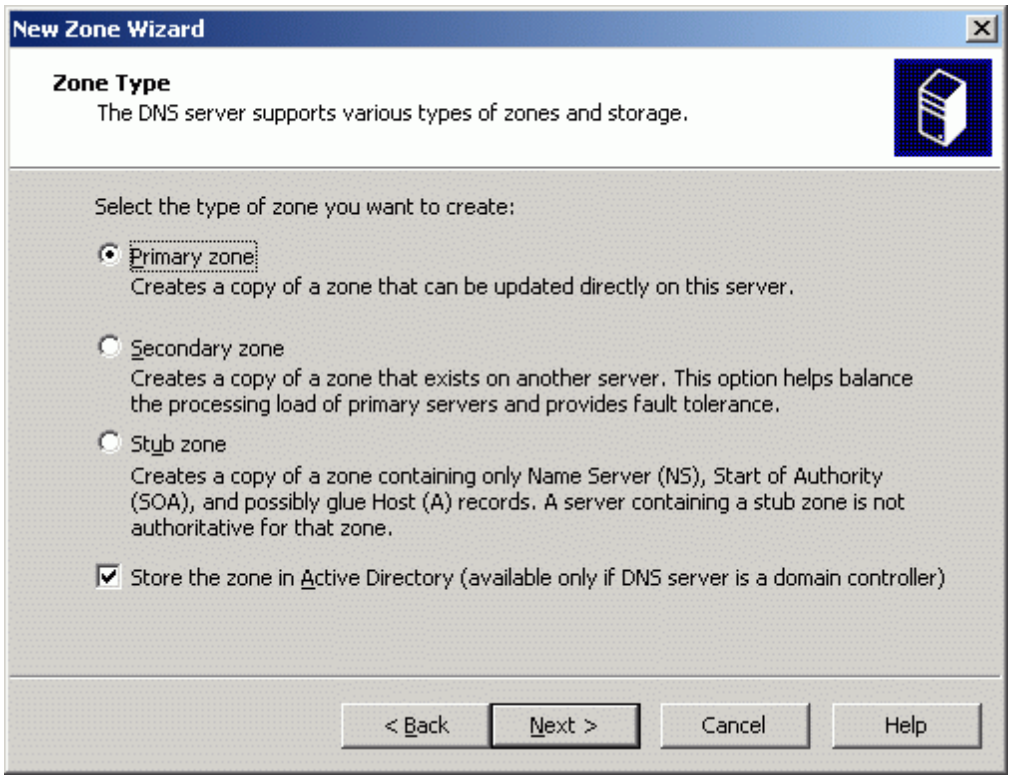
On the **Zone Type** page, select **Primary Zone** option and check the **Store the zone in the Active Directory** checkbox.




Press the **Next** button to continue.

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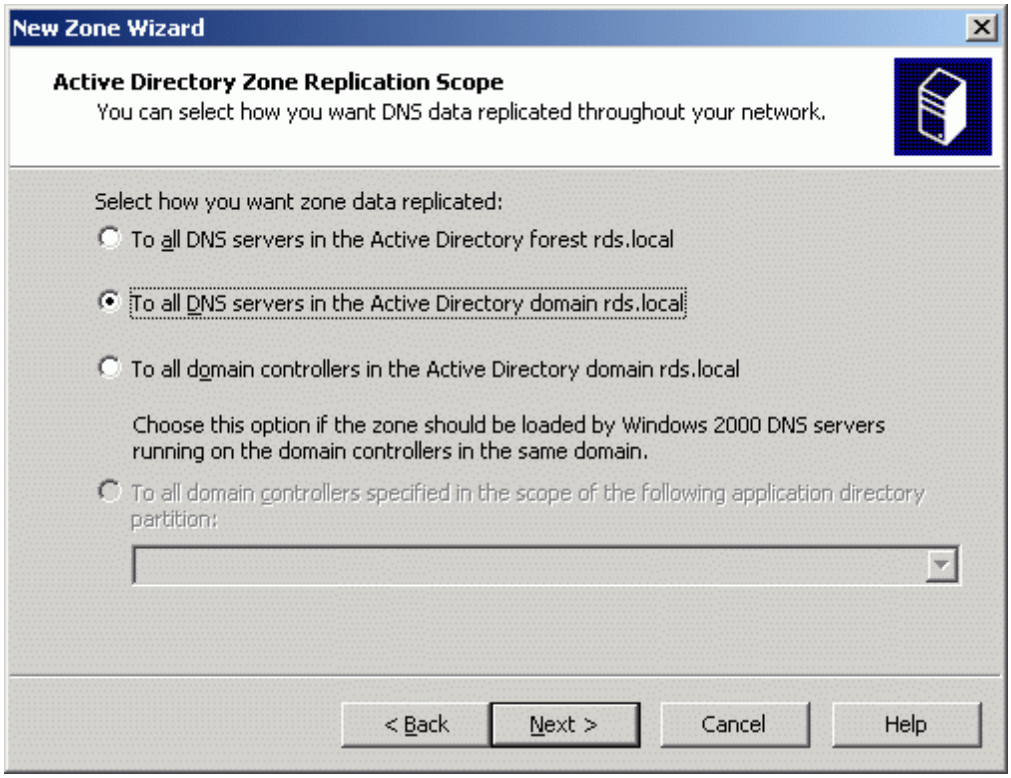
Specify the replication scope or accept the default option.




Press the **Next** button to continue.

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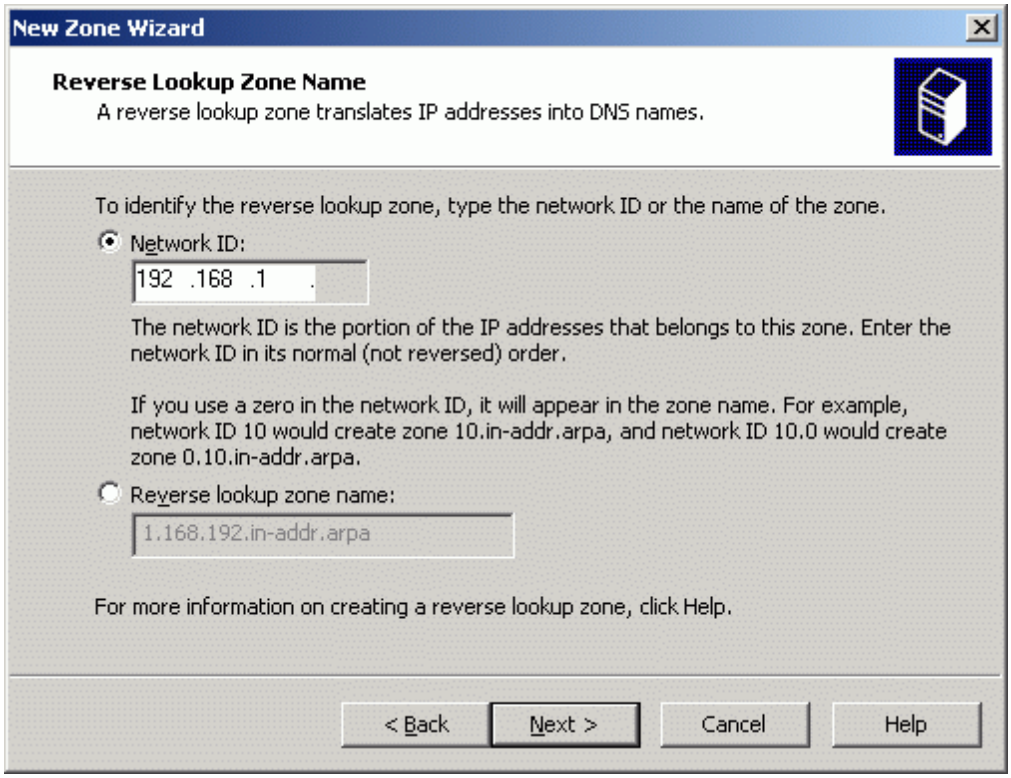
Type in the **Network ID** to identify the reverse lookup zone.




Press the **Next** button to continue.

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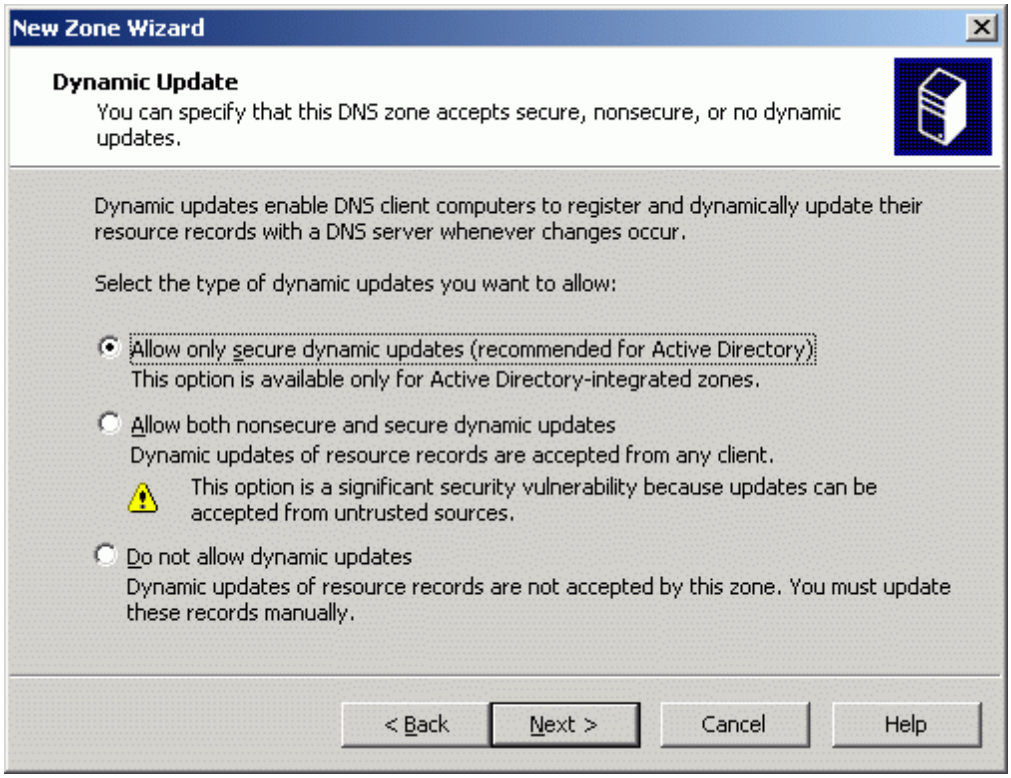
Specify dynamic update options.




Press the **Next** button to continue.

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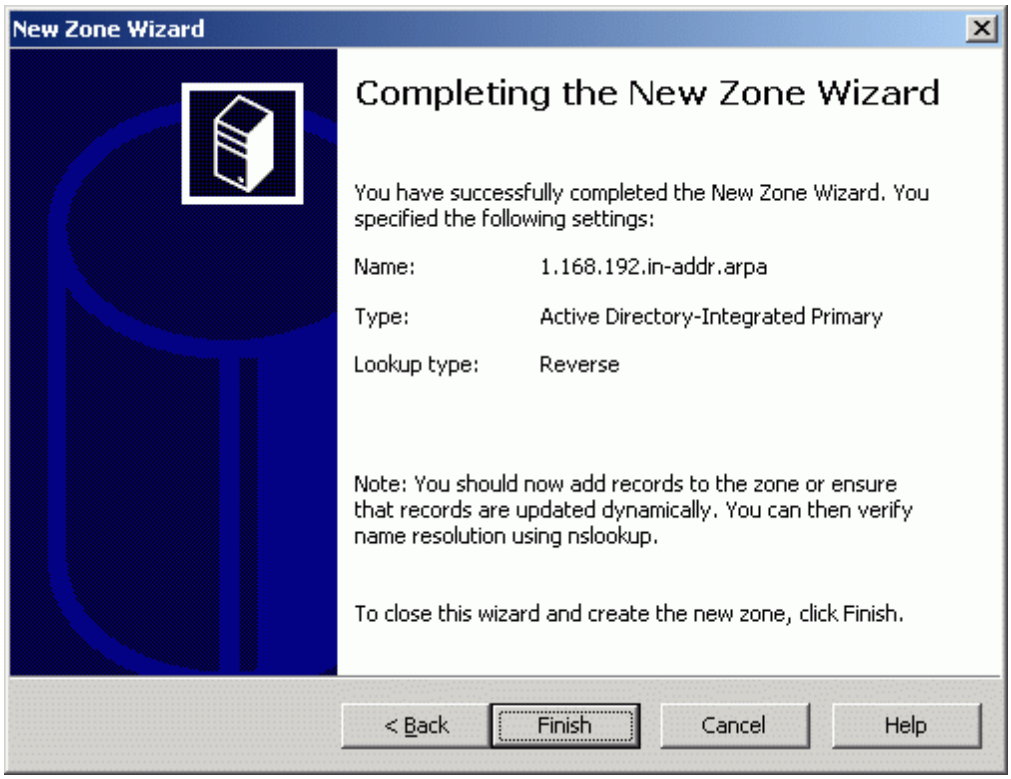
Check that all of the parameters are correct. Press the **Back** button should any change be required.




Press the **Finish** button.

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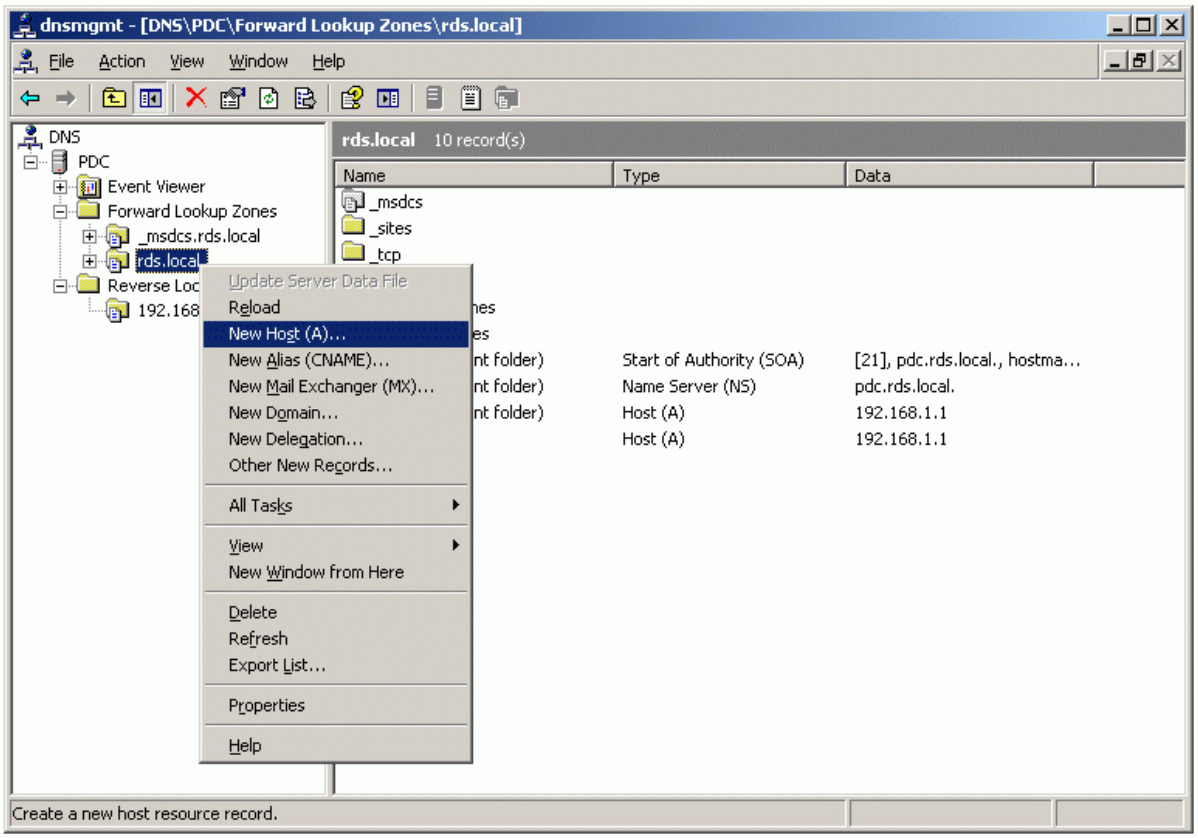
Press the right mouse button over **rds.local** forward lookup zone and select **New Host (A)...**.pop-up menu item.

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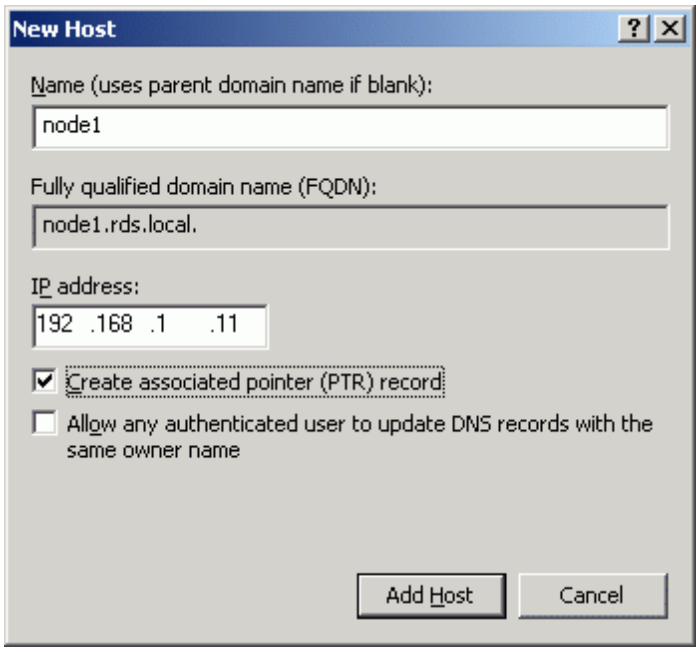
New Host dialog appears. Type in the **hostname** of the **Cluster Node 1 Server** and its **IP address**. Also please check the **Create associated pointer (PTR) record** checkbox.




Press the **Add Host** button to add **node1** DNS record.

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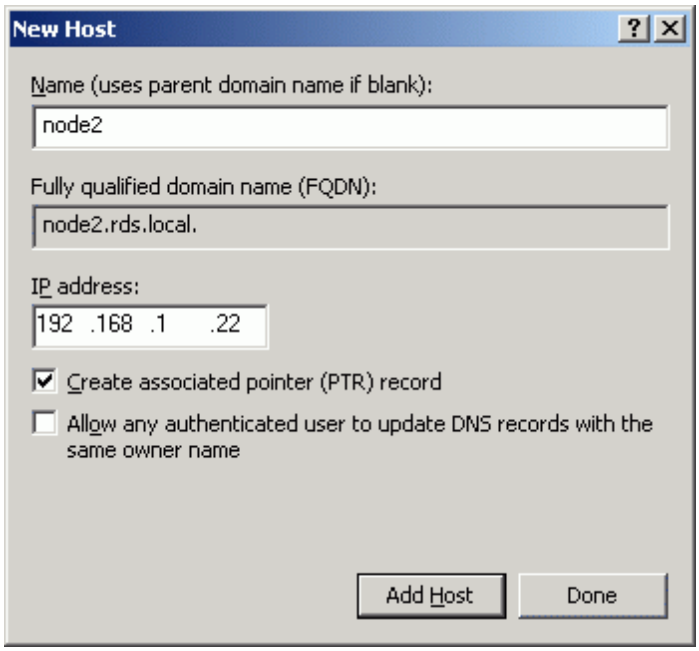
Type in the **hostname** of the **Cluster Node 2 Server** and its **IP address**. Also please check the **Create associated pointer (PTR) record** checkbox.




Press the **Add Host** button to add **node2** DNS record.

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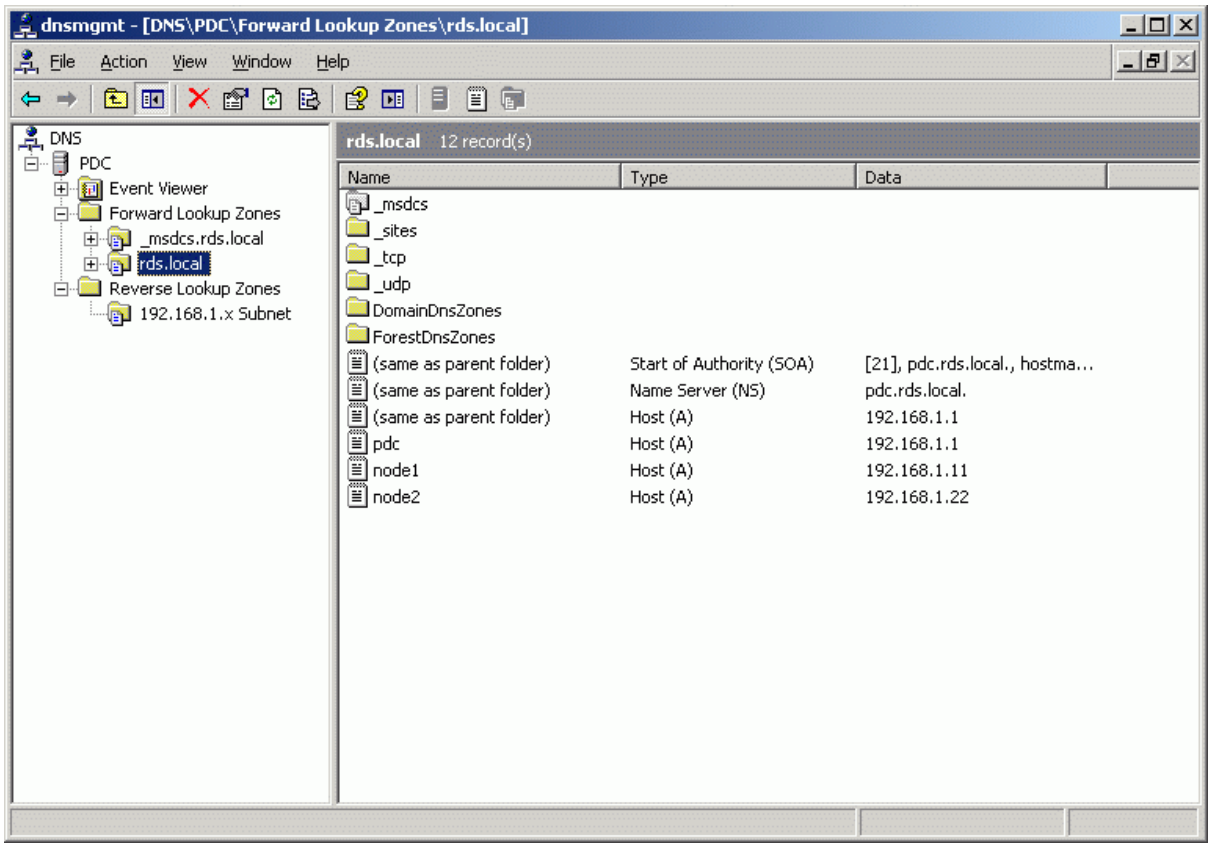
If successful, the **DNS Manager** console should look like the example images provided below.

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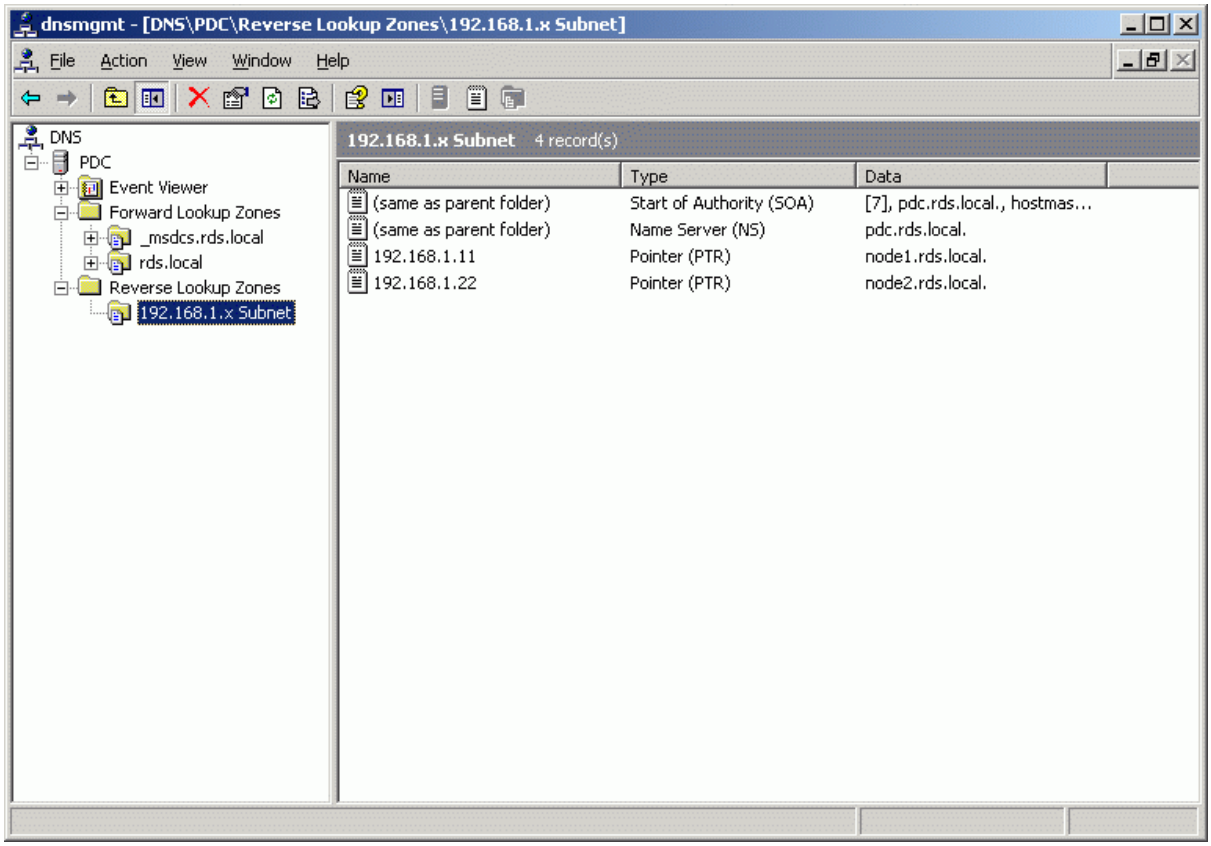


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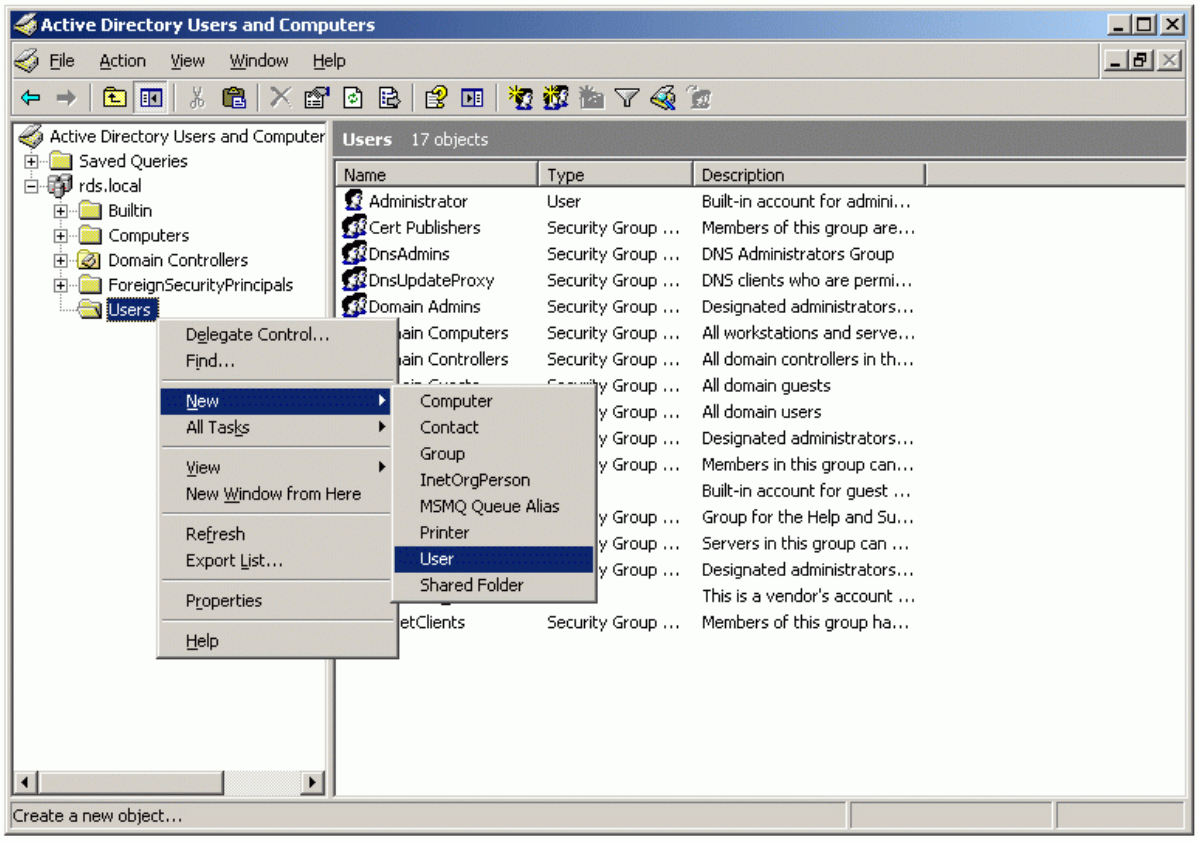
## User Accounts

Administrator accounts must now be created to manage first and the second cluster node servers. Launch the **Active Directory Users and Computers** management console.




Press the right mouse button over the **Users** node. Select **New->User**.

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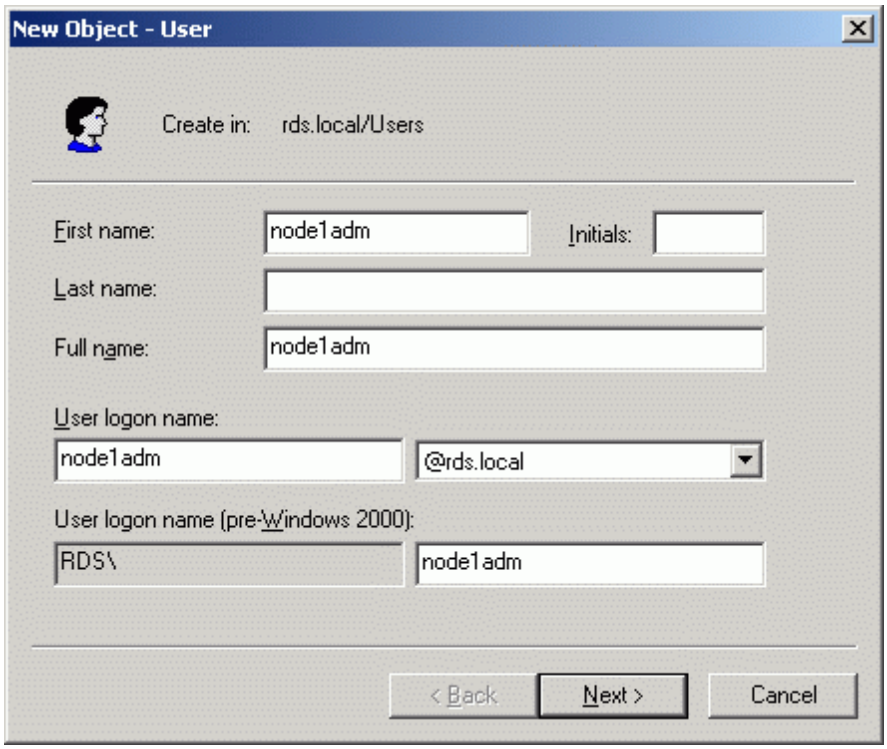
In the dialog that appears, enter the required fields as shown in the example image.




Press the **Next** button to continue.

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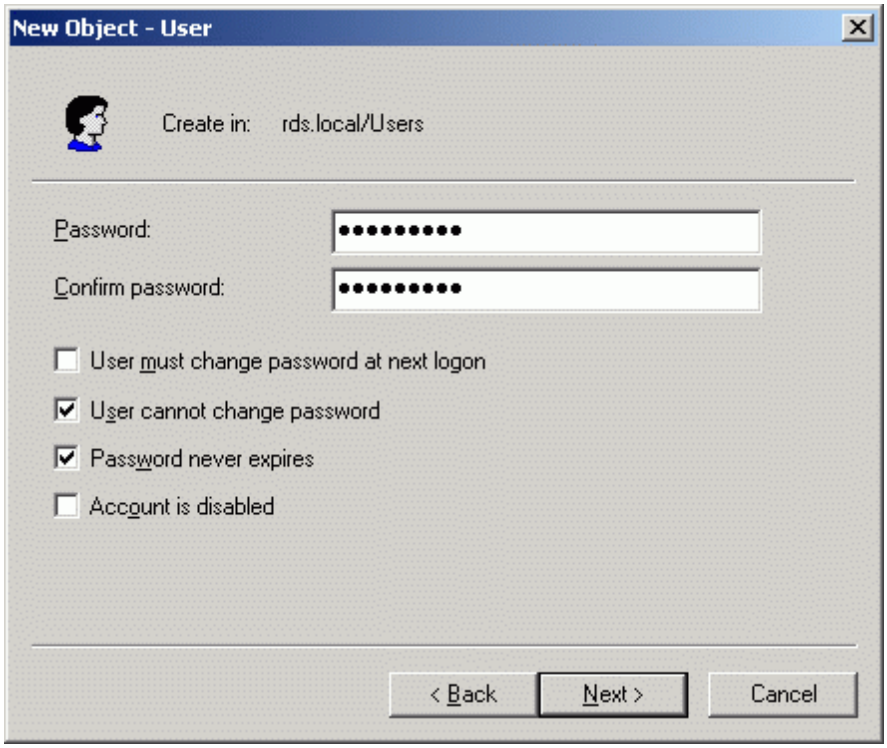
Enter the password and optionally set the additional options.




Press the **Next** button to continue.

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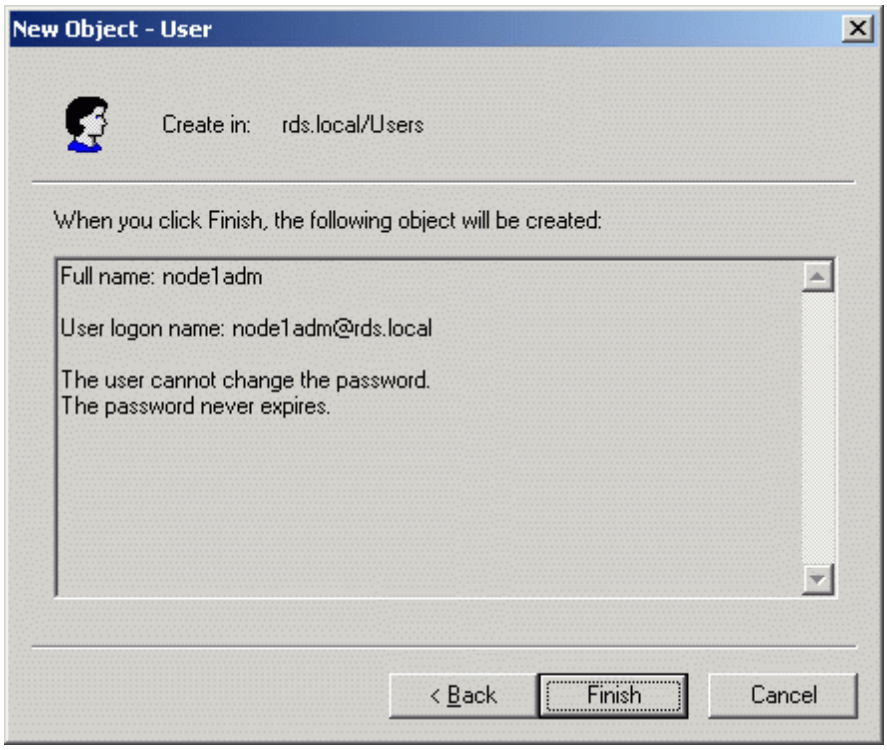
Check that all of the parameters are correct. Press the **Back** button should any change be required.




Press the **Finish** button to create new user.

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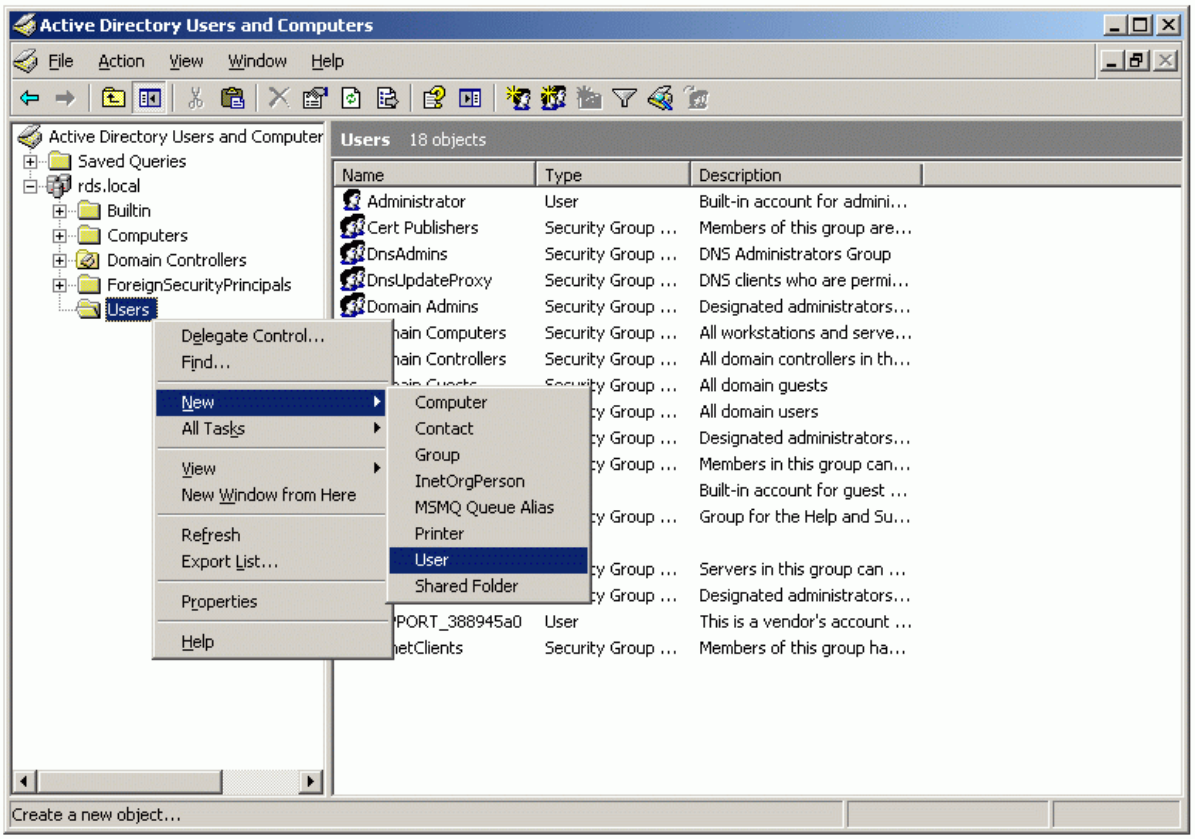
Once again press the right mouse button over the **Users** node.




Select **New->User**.

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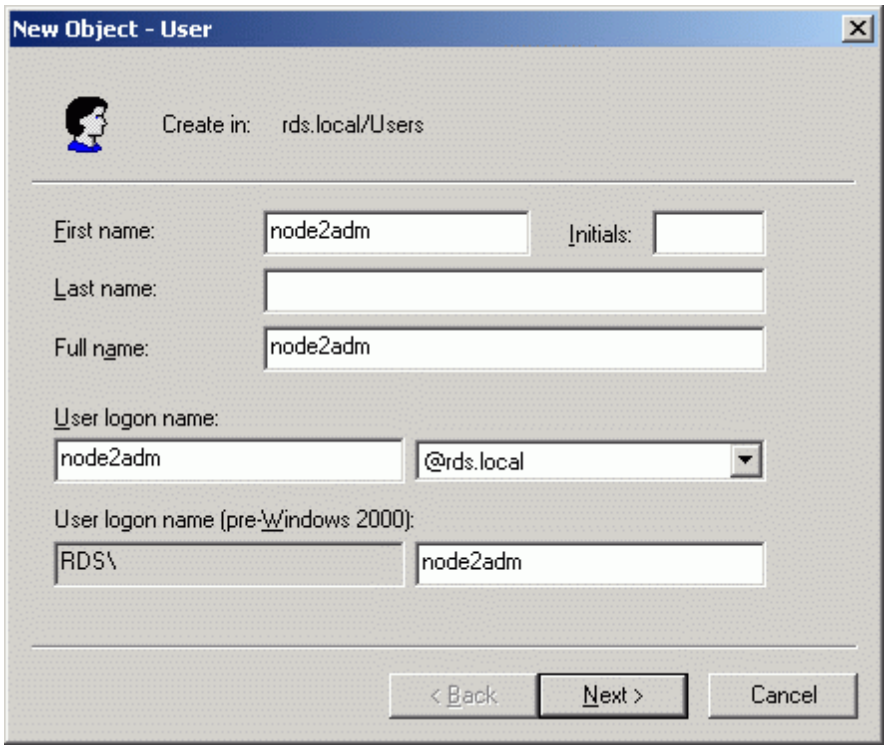
In the dialog that appears, enter the required fields as shown in the example image.




Press the **Next** button to continue.

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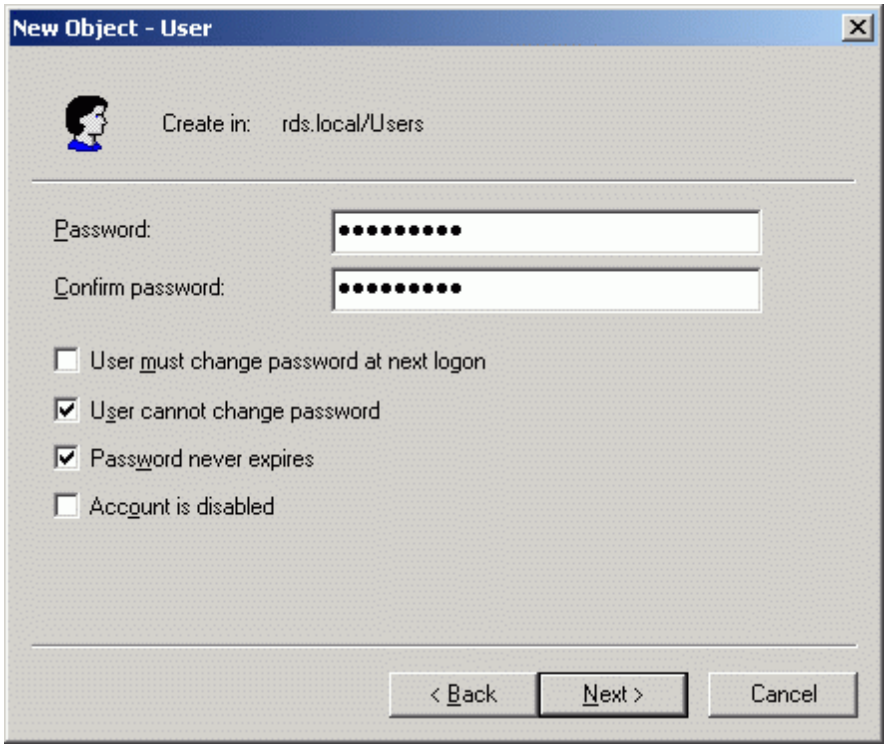
Enter the password and optionally set the additional options.




Press the **Next** button to continue.

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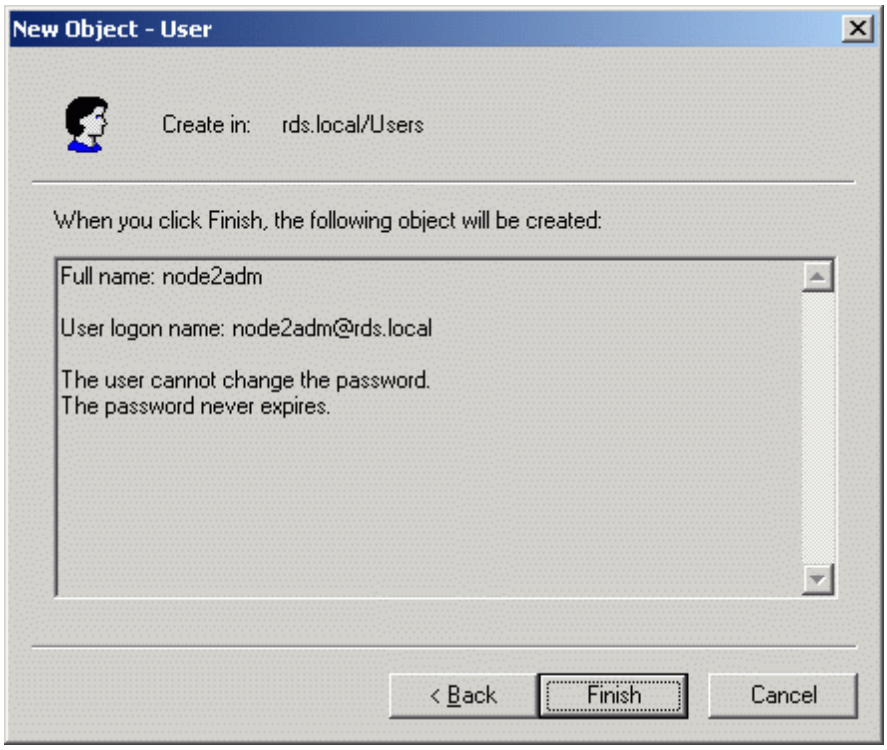
Check that all of the parameters are correct. Press the **Back** button should any change be required.




Press the **Finish** button to create new user.

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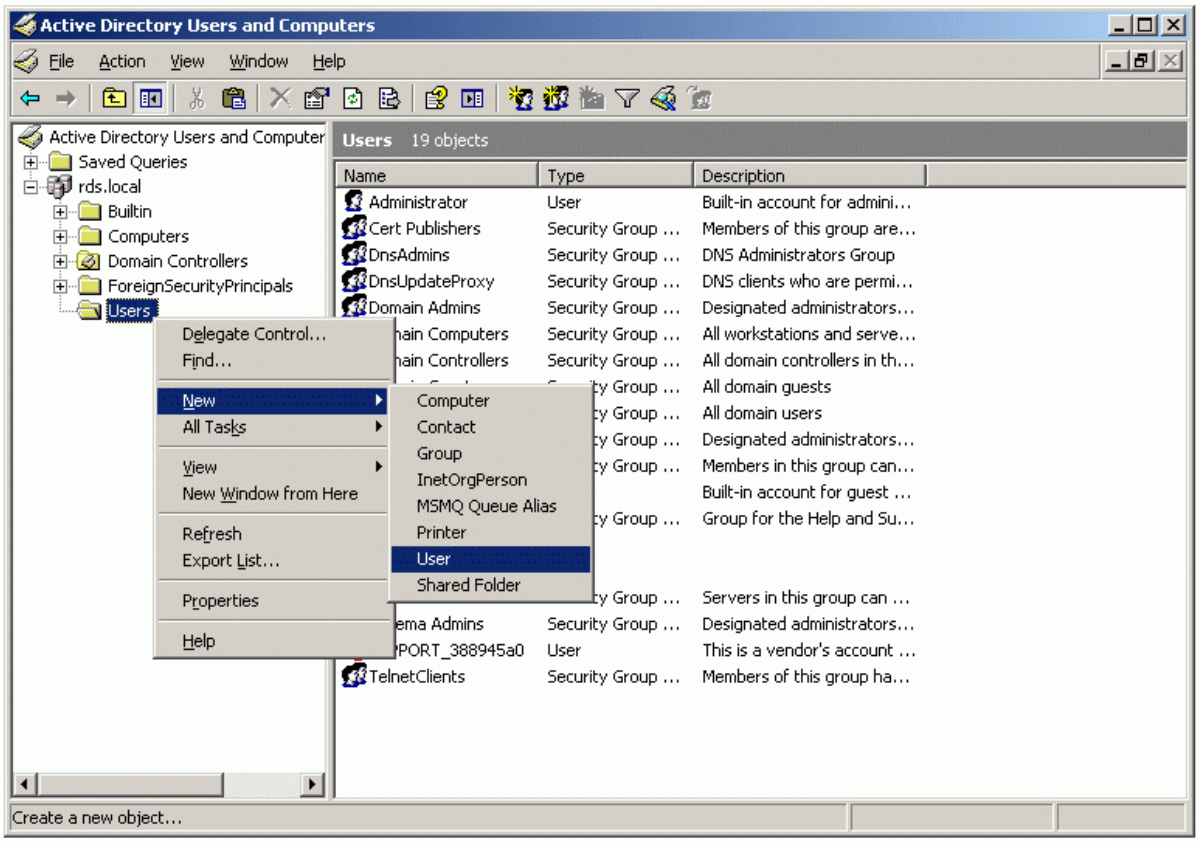
Also **Cluster Service Account** must now be created under which the cluster service will be run. Launch the **Active Directory Users and Computers** management console.




Press the right mouse button over the **Users** node. Select **New->User**.

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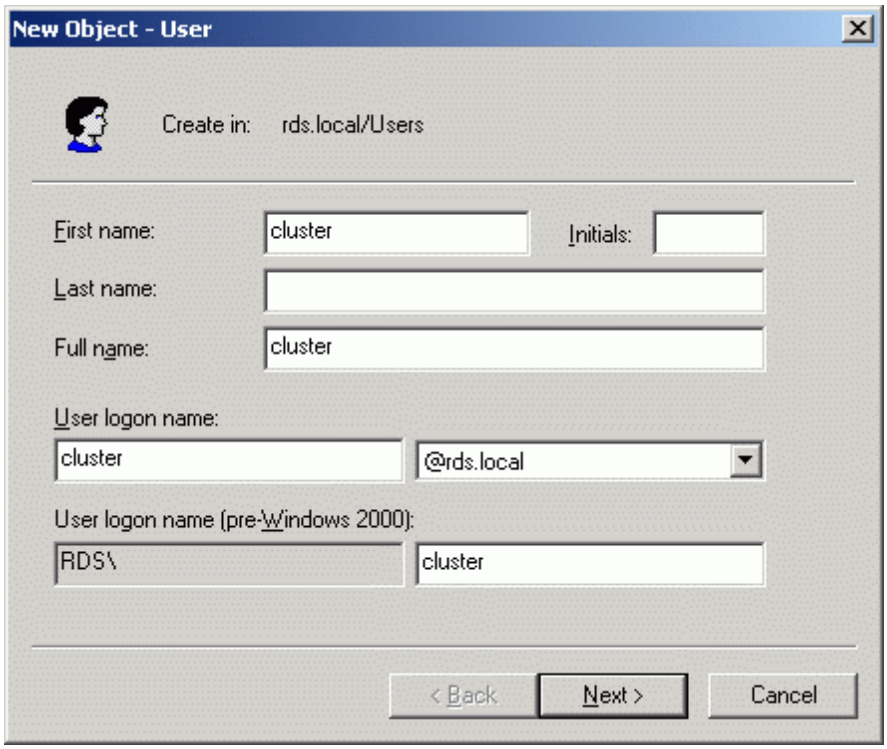
In the dialog that appears, enter the required fields as shown in the example image.




Press the **Next** button to continue.

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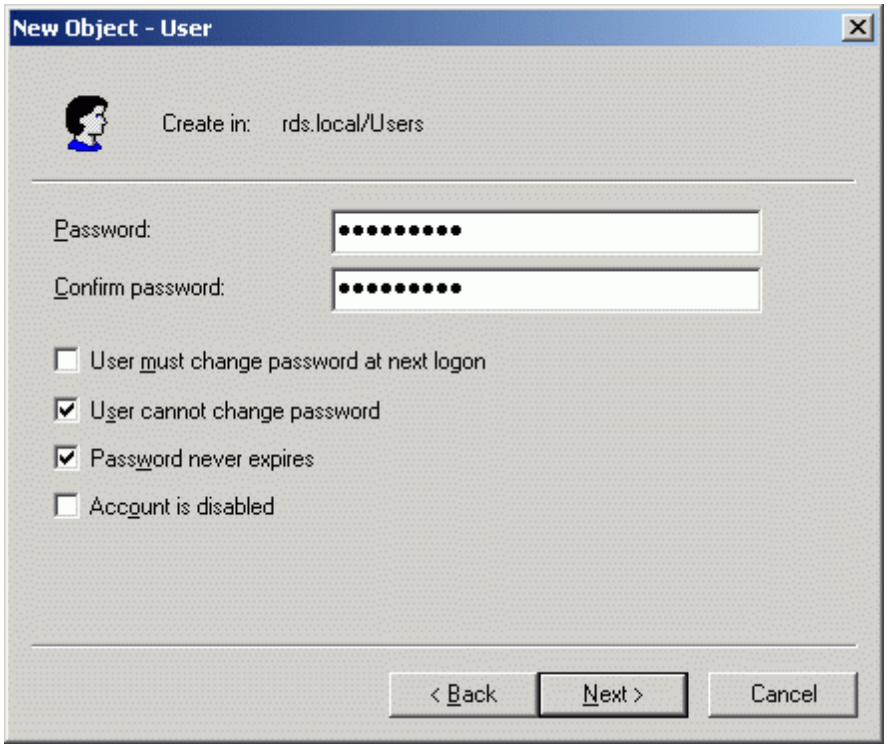
Enter the password and optionally set the additional options.




Press the **Next** button to continue.

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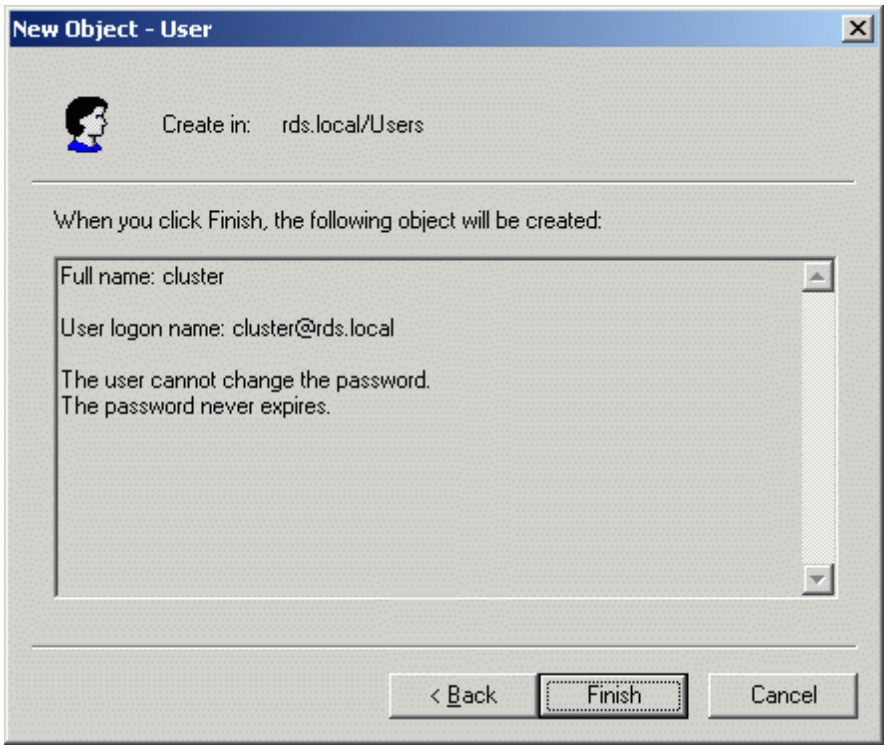
Check that all of the parameters are correct. Press the **Back** button should any change be required.




Press the **Finish** button to create new user.

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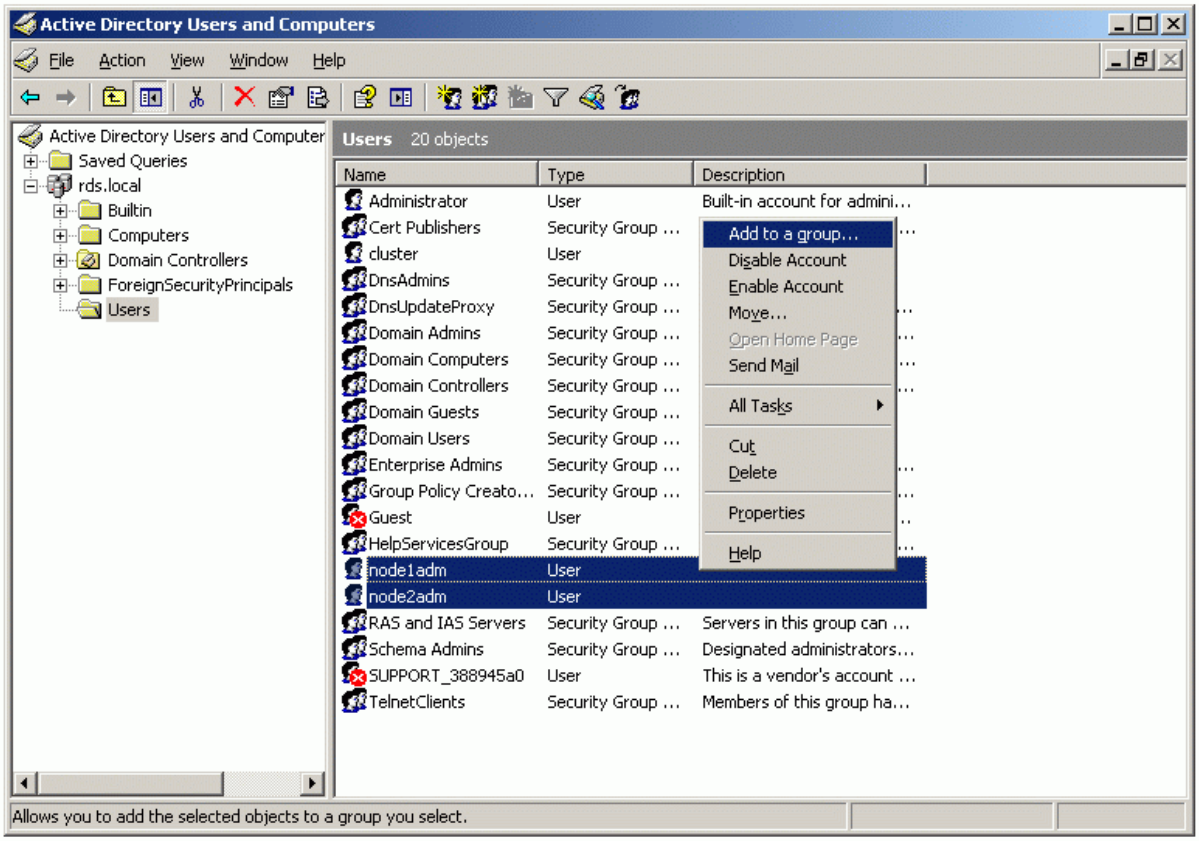
The two users, **node1adm** and **node2adm**, must be made members of both the **Administrators** and **Domain Admins** groups. Select both of the accounts and press the right mouse button over the selection as shown in the example image.




Select **Add to a group option**.

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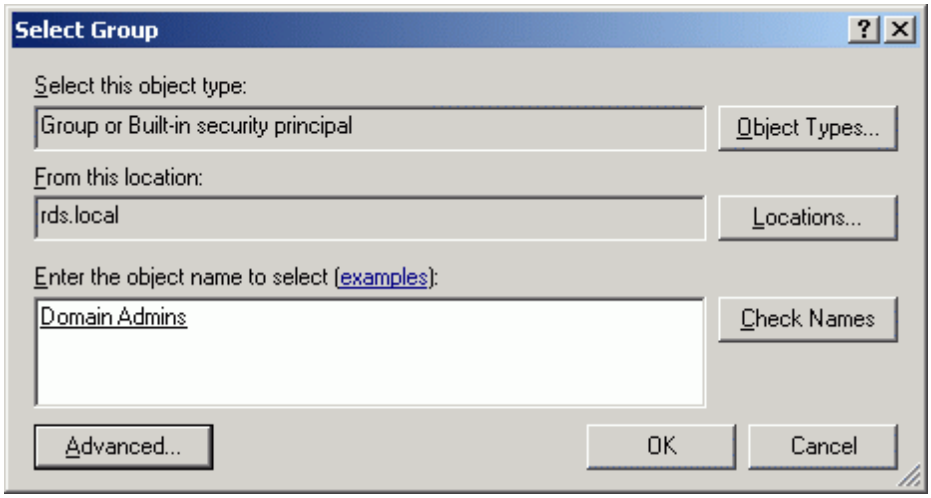
**Select Group** dialog appears. Enter **Domain Admins** as the name of the group.




Press the **OK** button.

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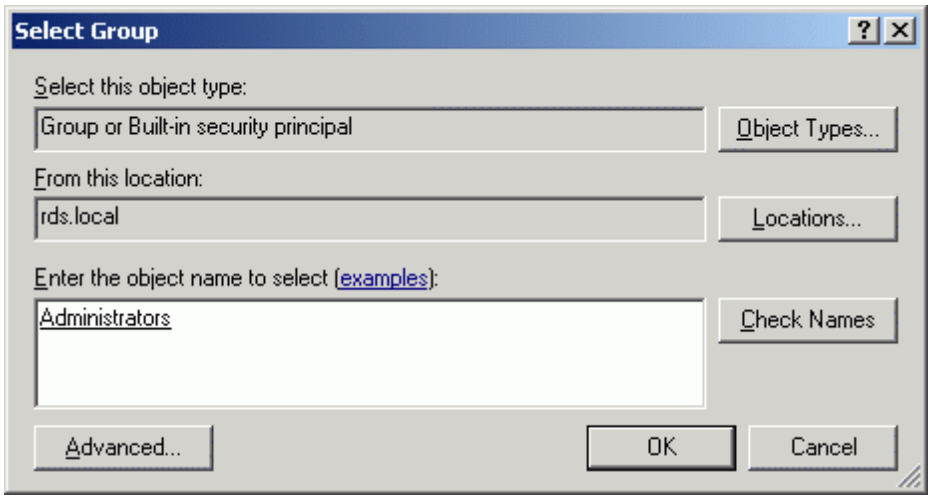
Repeat the same steps to to add **node1adm** and **node2adm** users to **Administrators** group.




Press the **OK** button.

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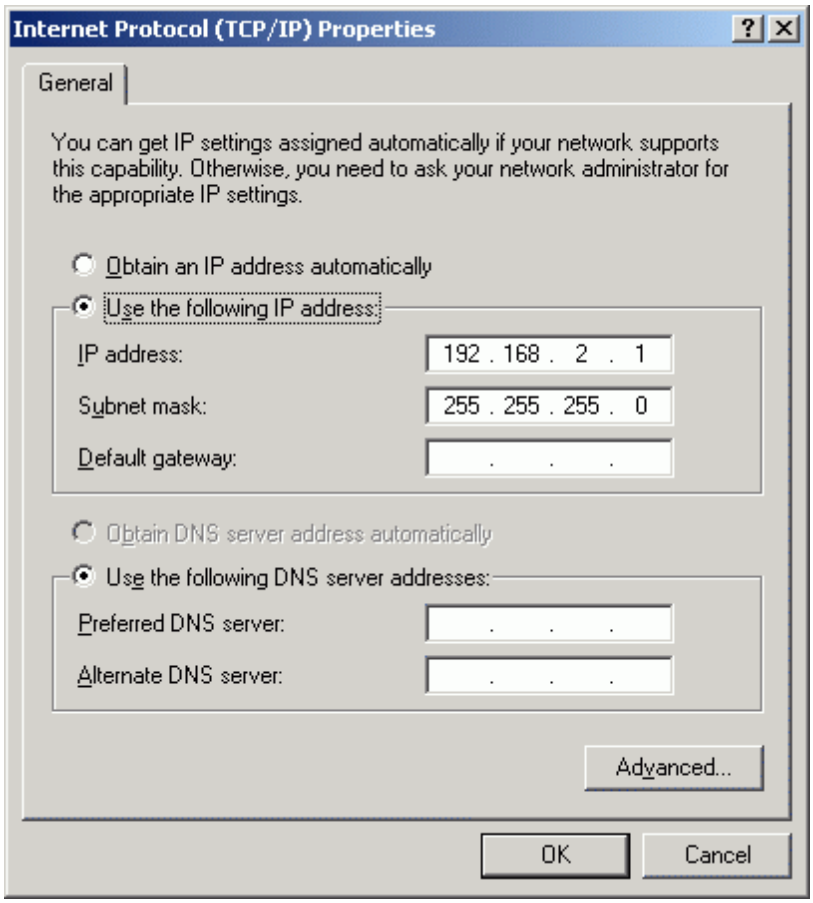
## Configuring StarWind Server

### Network Adapter

The network adapter must be assigned a static IP address. Select the **Use the following IP address** option and type in the IP address you wish to use. The Subnet mask must also be provided. Both values must be correctly chosen given the networking configuration of the dedicate iSCSI network that the cluster will be a part of. This interface is used for iSCSI target storage communications and a default gateway need not be specified.




Press the **OK** button.

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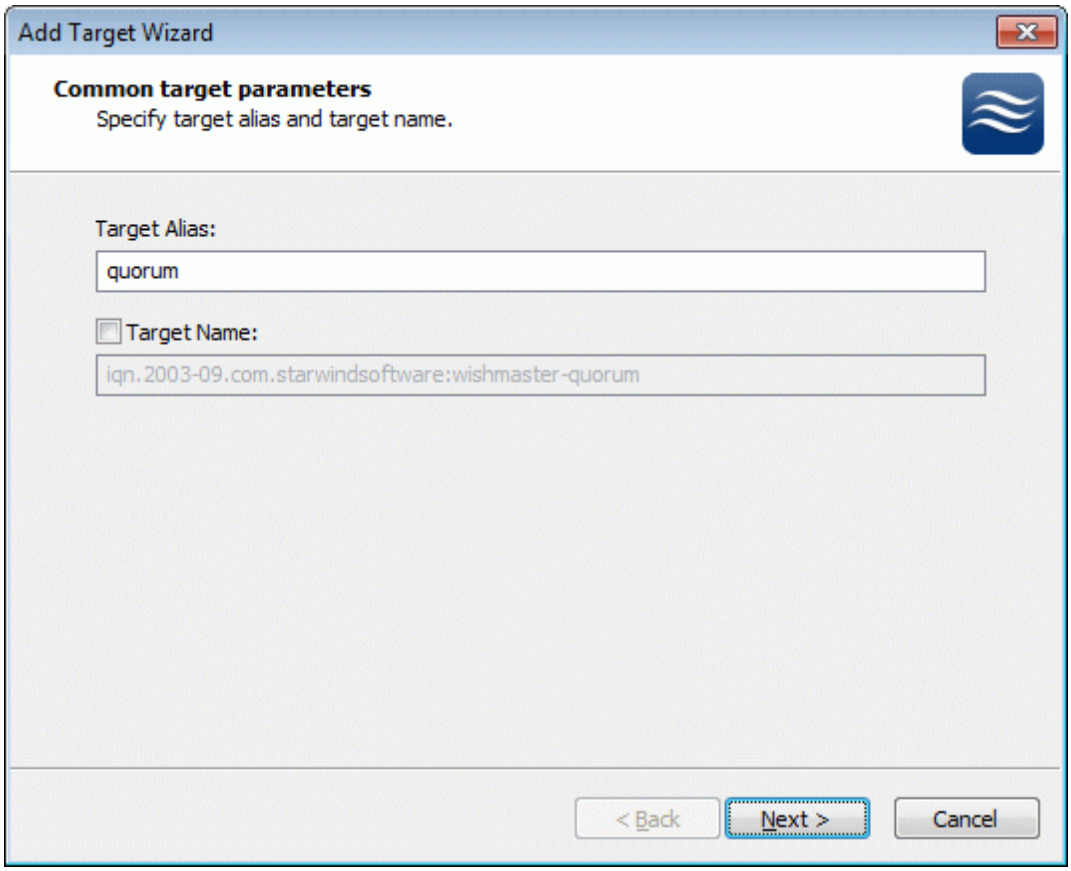
## Preparing Quorum Volume

Launch the **StarWind Management Console** selecting **Start -> All Programs -> StarWind 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** pop-up menu item. From the **StarWind Servers** tree please select the computer you wish to connect to. Press 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 ones are: root, starwind. You can always change them later.

After you have successfully connected to the **StarWind Service**, please click the right mouse button over the desired host (computer) and select **Add Target** pop-up menu item. In the wizard that appears, select a target name. The name must be a unique name by which the device will be declared to the iSCSI initiators connecting to **StarWind** over an IP network.




Press the **Next** button to continue.

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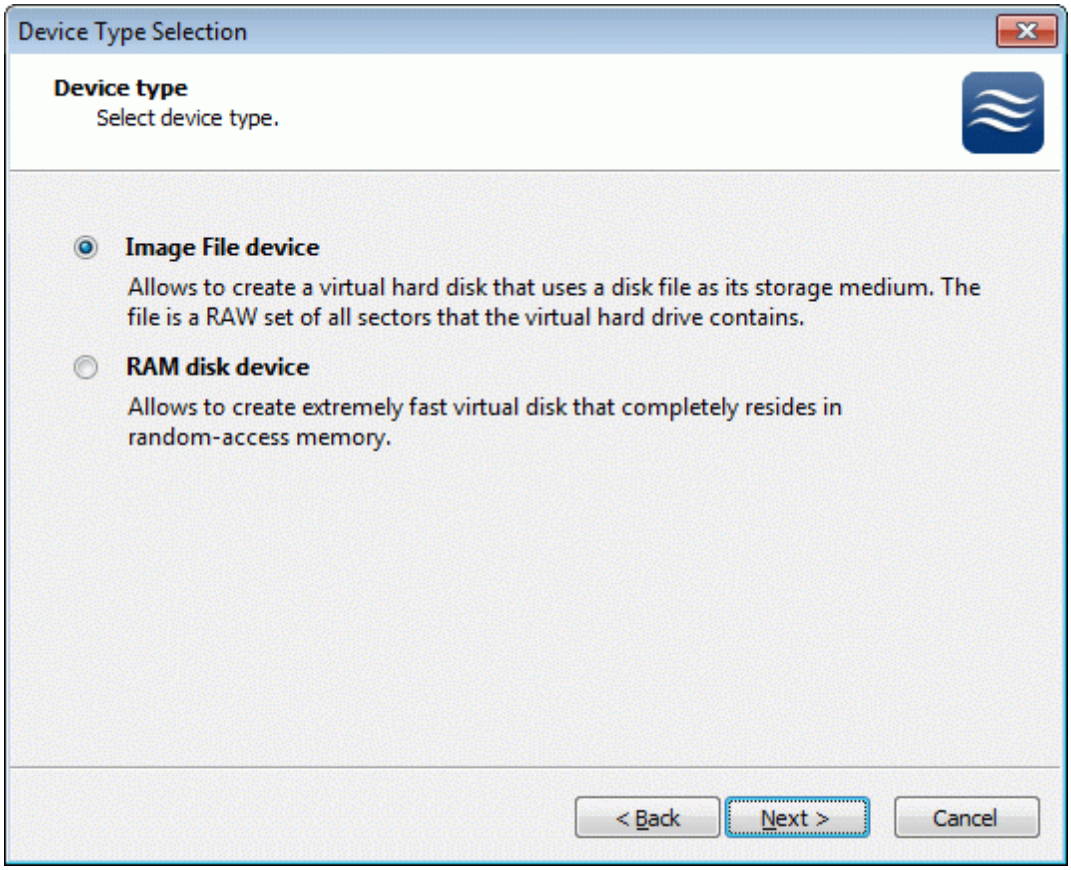
Select **Image File device**.




Press the **Next** button to continue.

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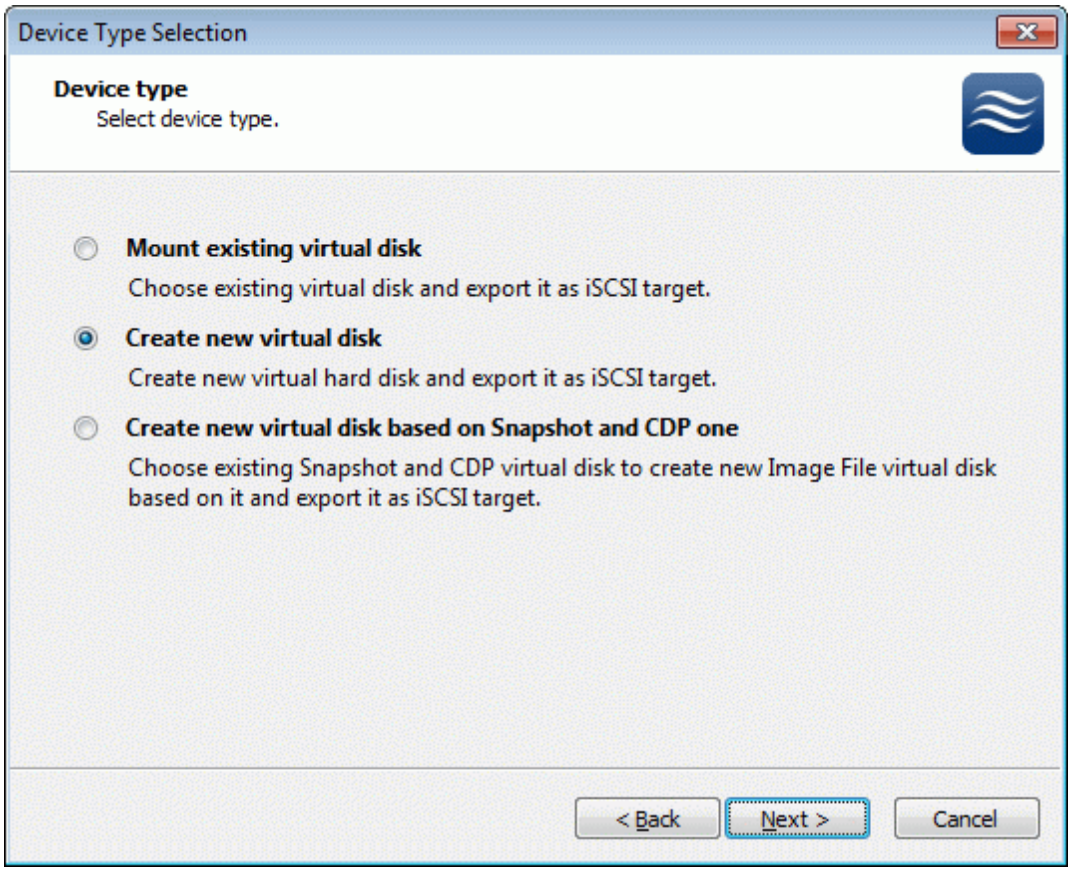
Select **Create new virtual disk** to create a new virtual hard disk or **Mount existing virtual disk** to mount an existing virtual disk that you've prepared before.




Press the **Next** button to continue.

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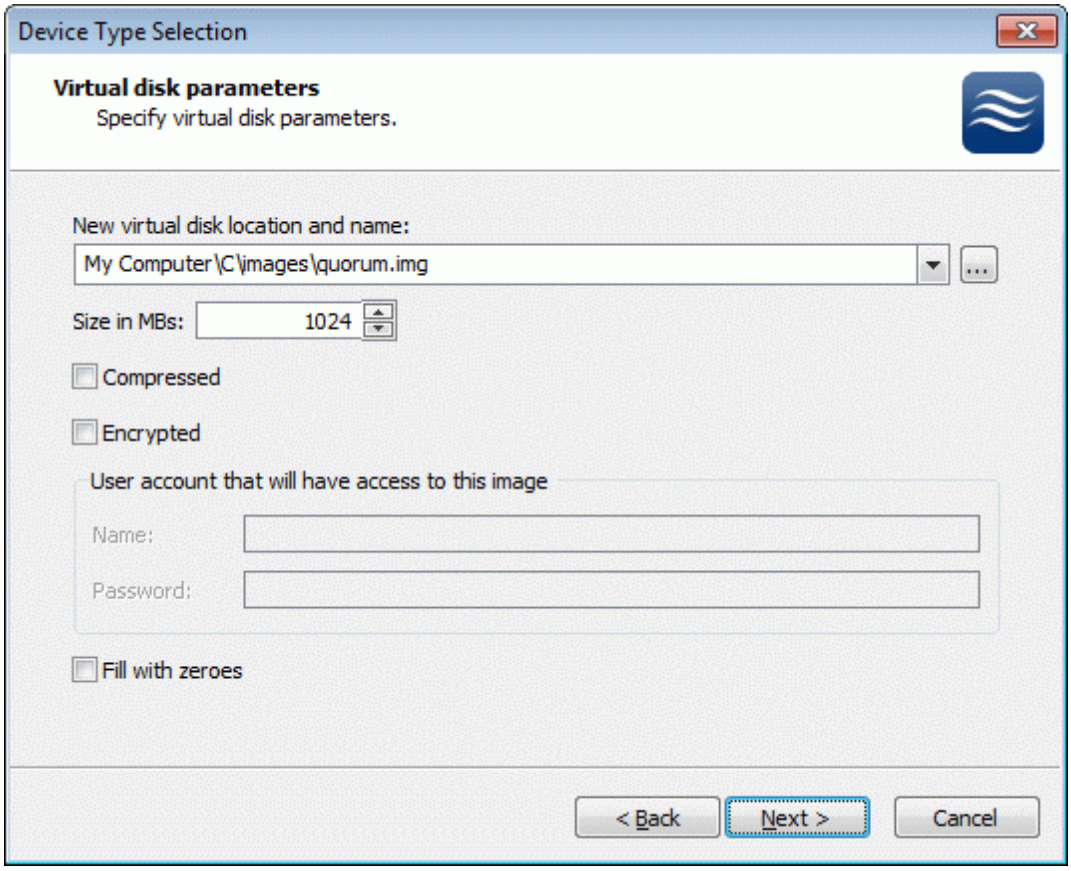
If you have decided to create a new virtual disk please specify the location and the name of the virtual disk you wish to be created. Also you have to provide the virtual disk size in megabytes. Check any additional parameters of the virtual disk you wish to create. Please refer to the online help for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




Press the **Next** button to continue.

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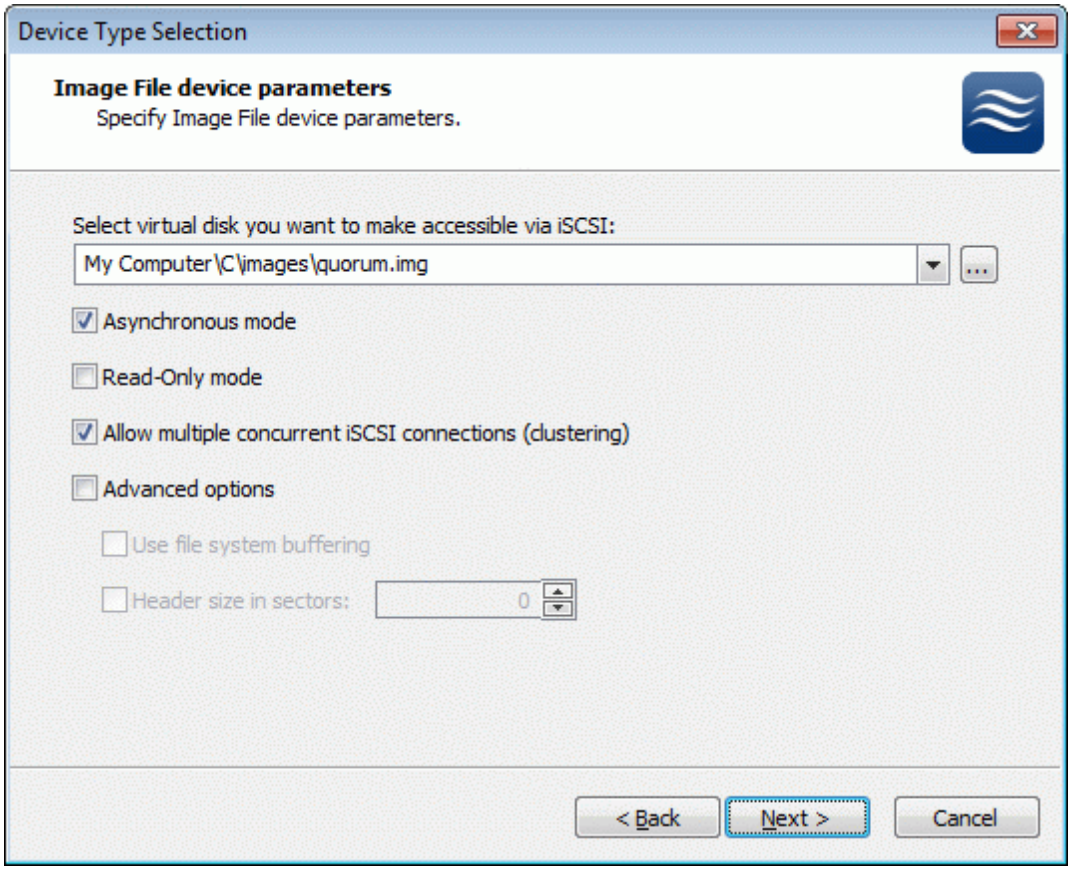
Image File device has some extra parameters. Check **Allow multiple concurrent iSCSI connections (clustering)** checkbox. Please refer to the online help for details regarding those additional parameters (**Asynchronous mode, Allow multiple connections (clustering), Read-only mode** and **Specify advanced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




Press the **Next** button to continue.

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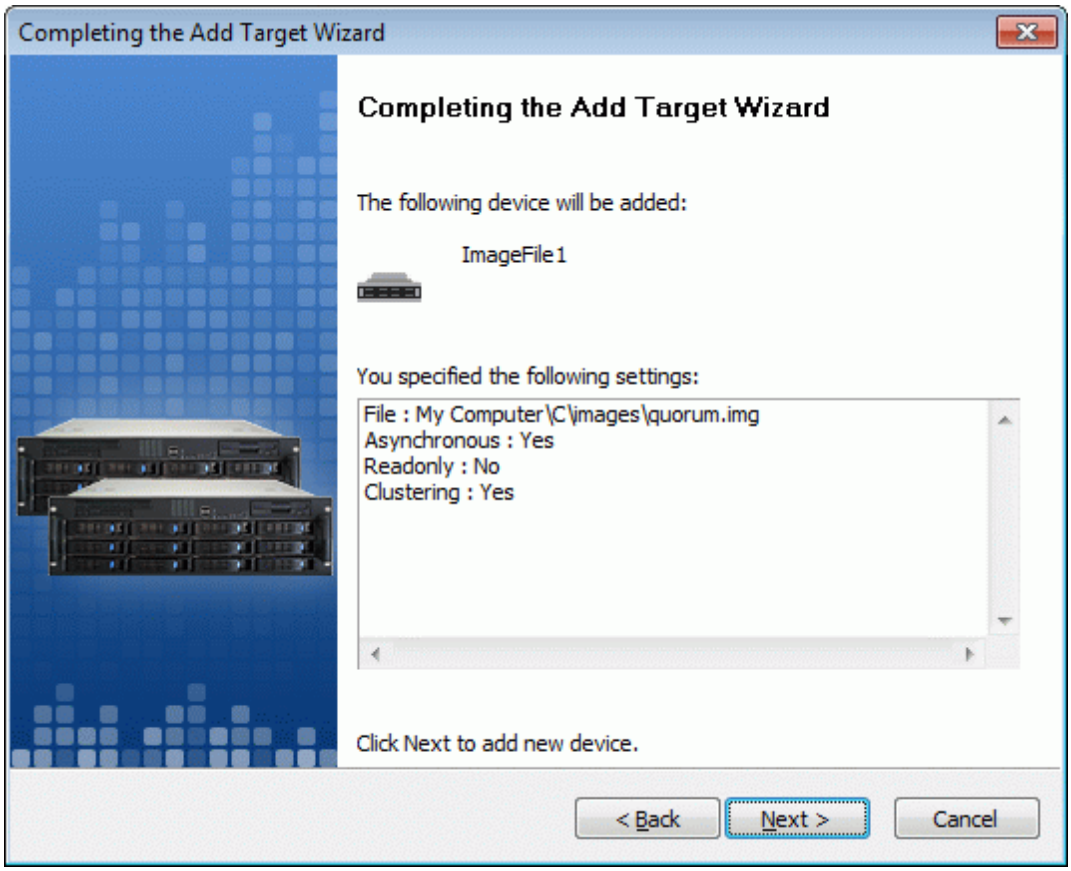
Check the device parameters are correct. Press the **Back** button should any changes be required.




Press the **Next** button to continue.

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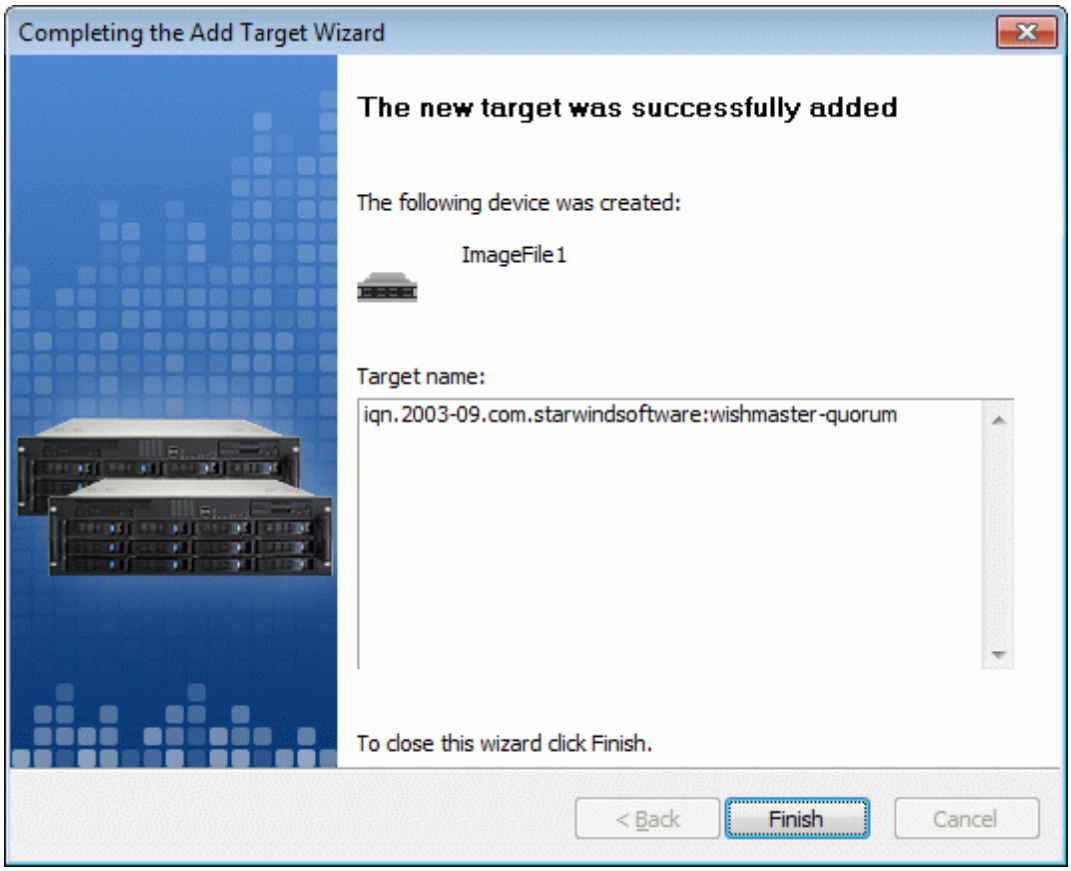
A summary of the created device is displayed on the last wizard page (see image below).




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

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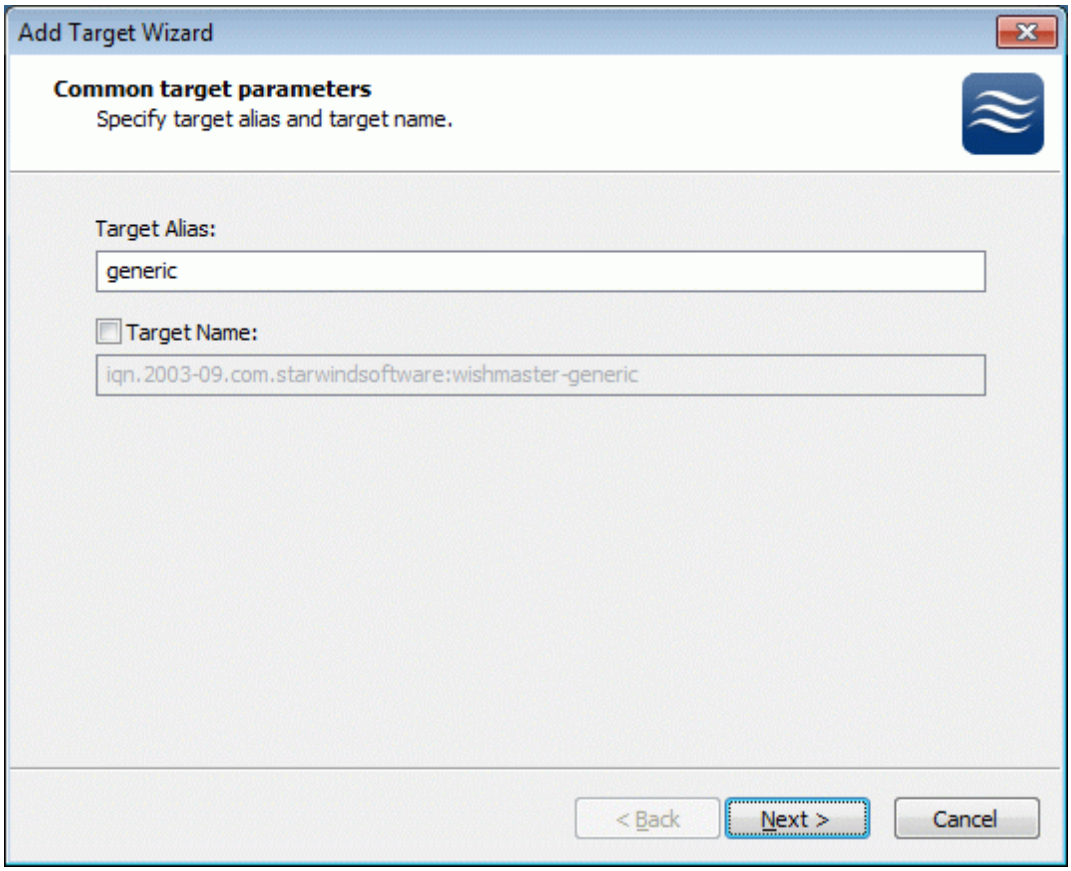
## Preparing Generic Volume

Click the right mouse button over the host and select **Add Target** pop-up menu item.

In the wizard that appears, select a target name. The name must be a unique name by which the device will be declared to the iSCSI initiators connecting to **StarWind** over an IP network.




Press the **Next** button to continue.

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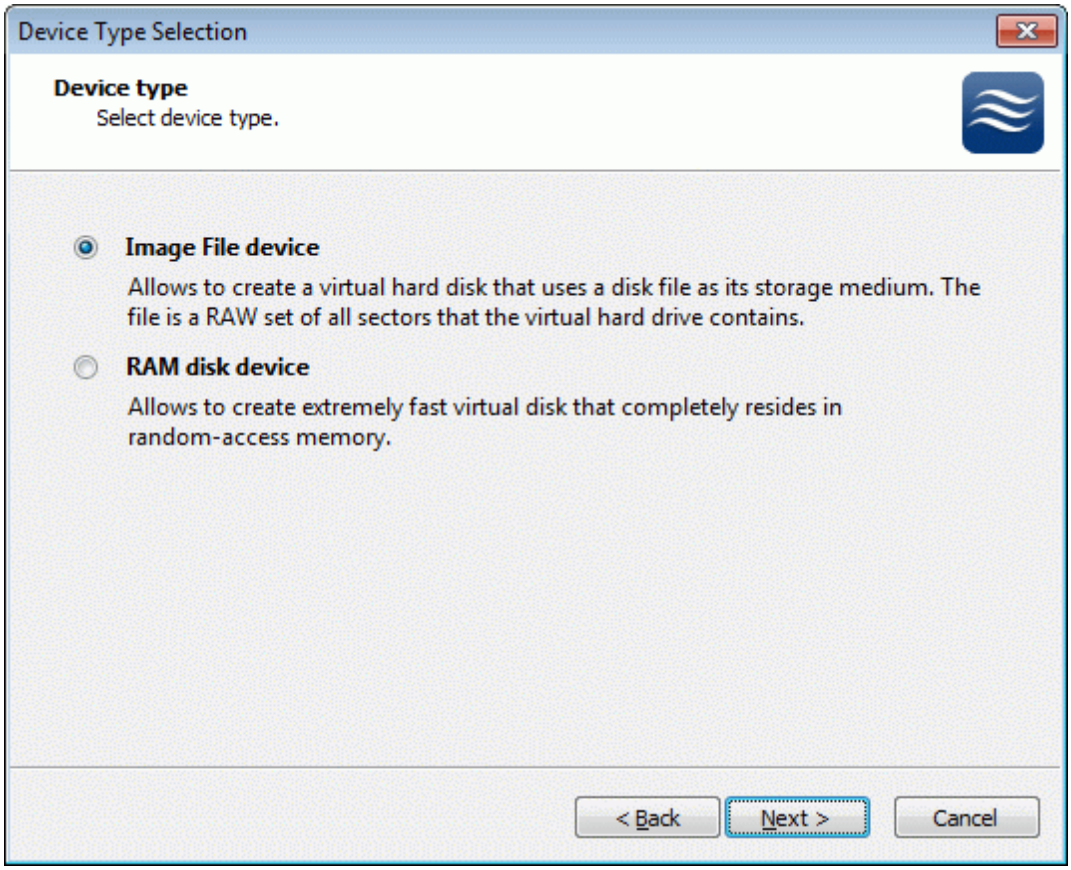
Select **Image File device**.




Press the **Next** button to continue.

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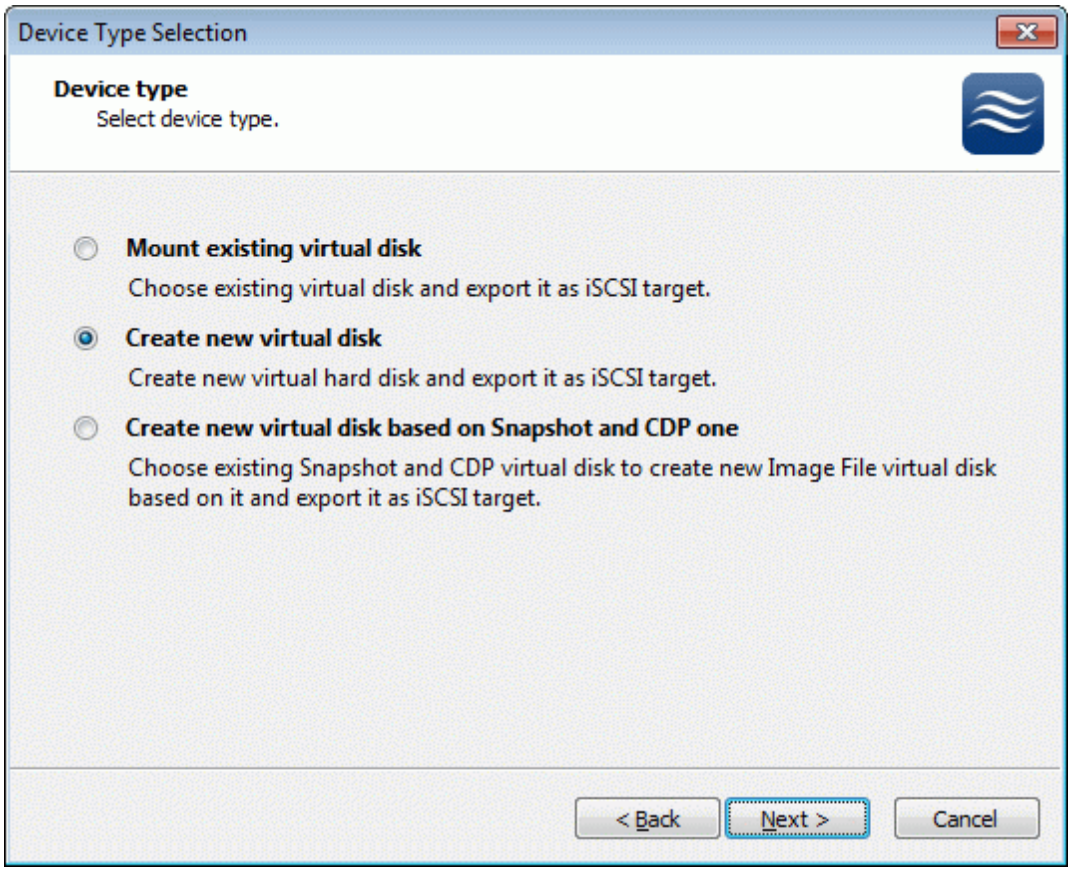
Select **Create new virtual disk** to create a new virtual hard disk or **Mount existing virtual disk** to mount an existing virtual disk that you've prepared before.




Press the **Next** button to continue.

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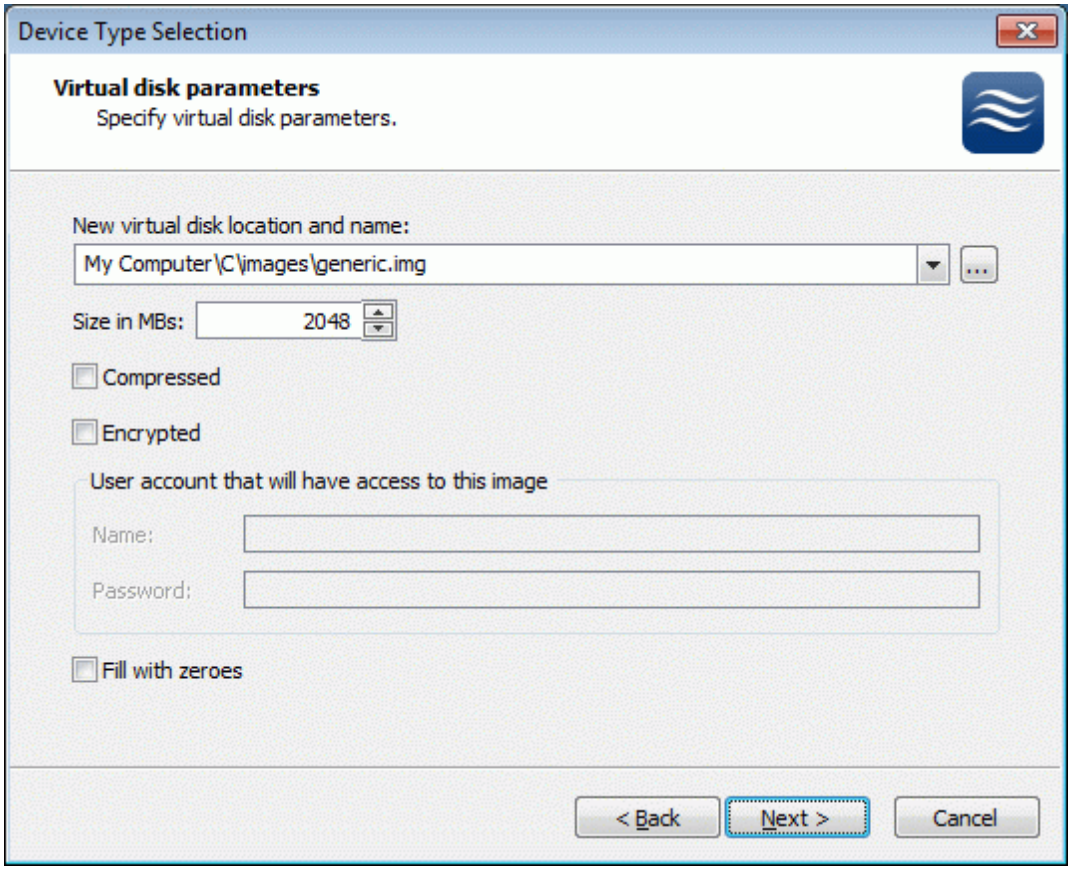
If you have decided to create a new virtual disk please specify the location and the name of the virtual disk you wish to be created. Also you have to provide the virtual disk size in megabytes. Check any additional parameters of the virtual disk you wish to create. Please refer to the online help for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




Press the **Next** button to continue.

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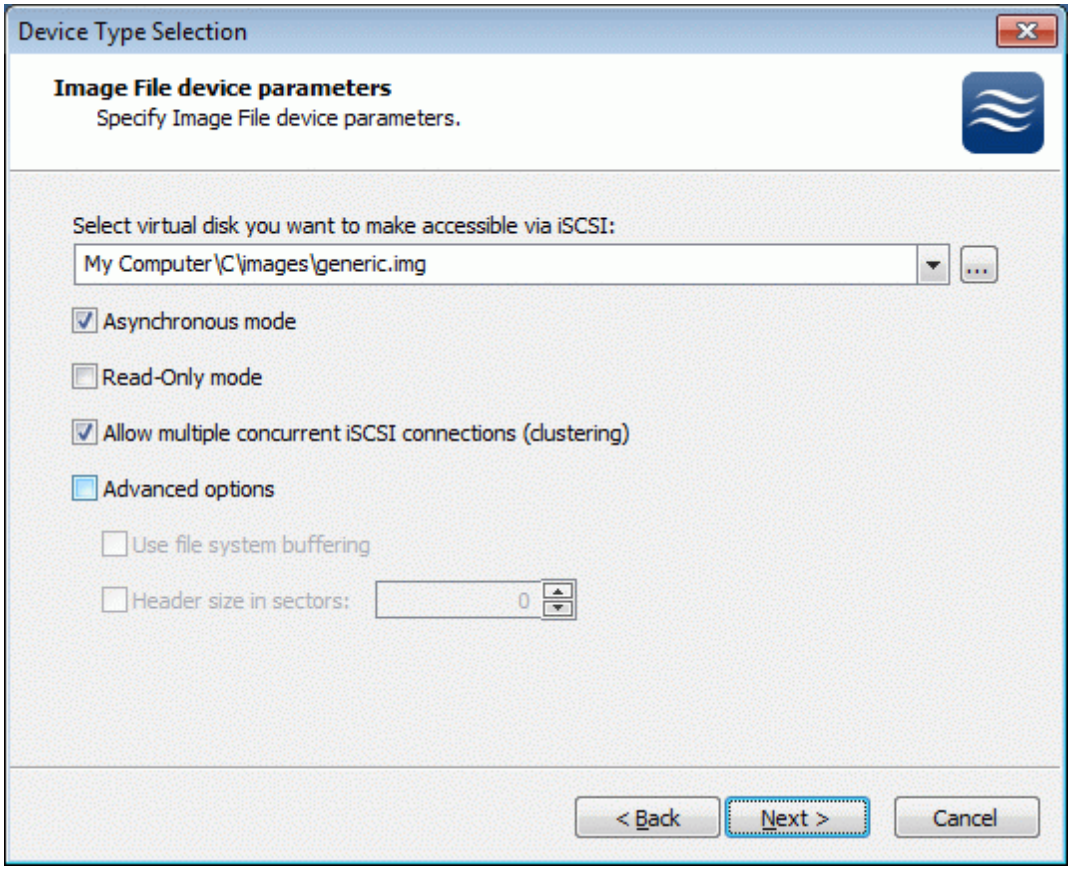
Image File device has some extra parameters. Check **Allow multiple concurrent iSCSI connections (clustering)** checkbox. Please refer to the online help for details regarding those additional parameters (**Asynchronous mode, Allow multiple connections (clustering), Read-only mode** and **Specify advanced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




Press the **Next** button to continue.

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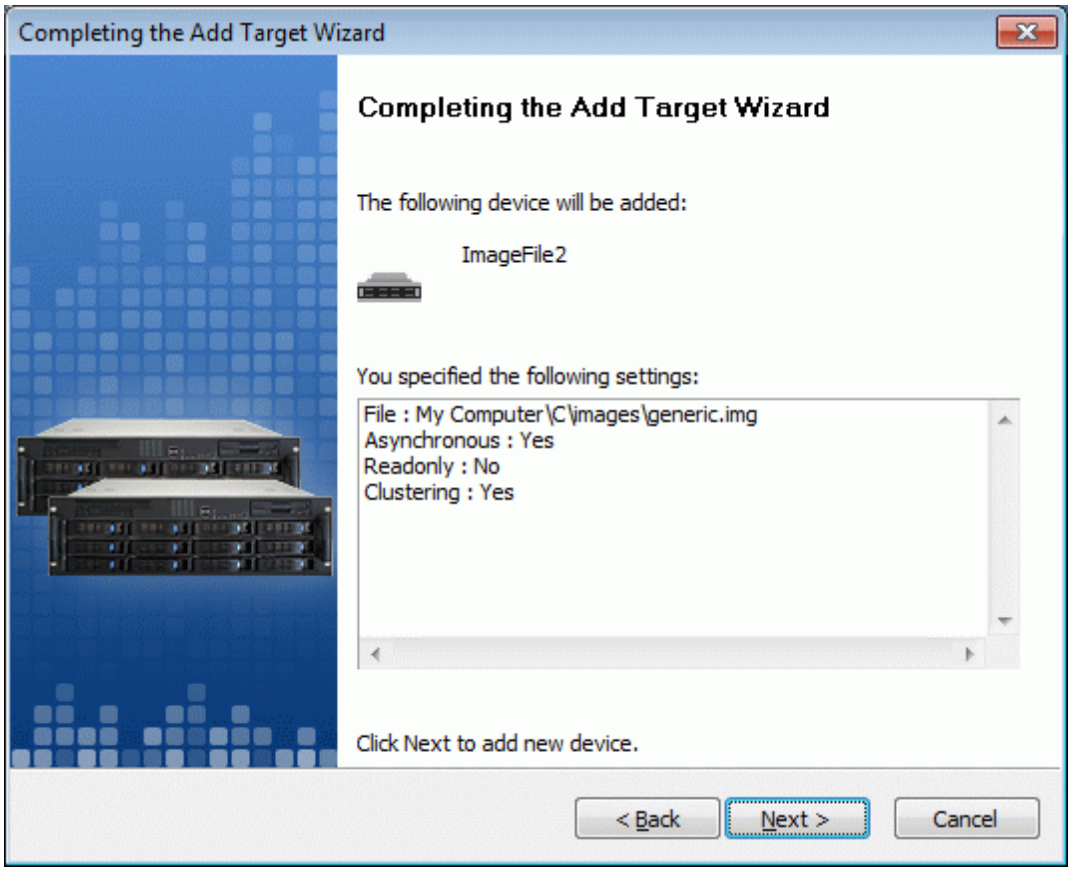
Check the device parameters are correct. Press the **Back** button should any changes be required.




Press the **Next** button to continue.

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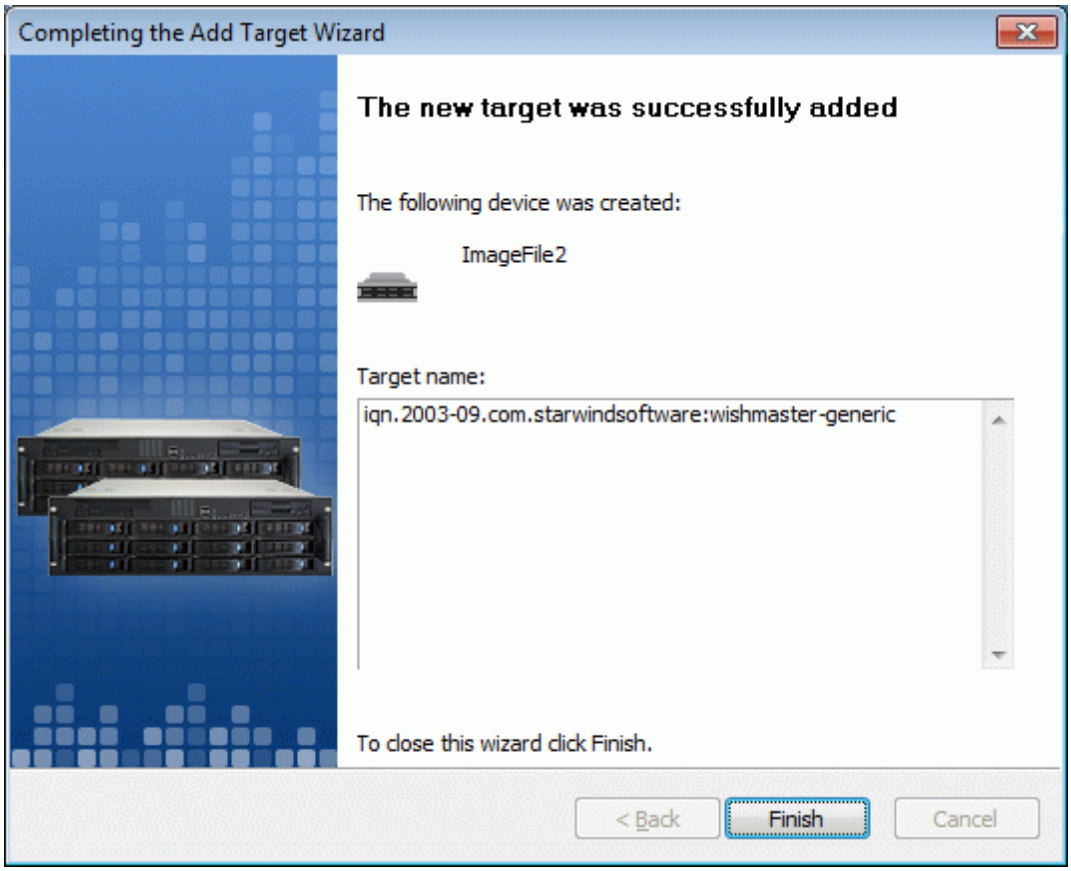
A summary of the created device is displayed on the last wizard page (see image below).




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

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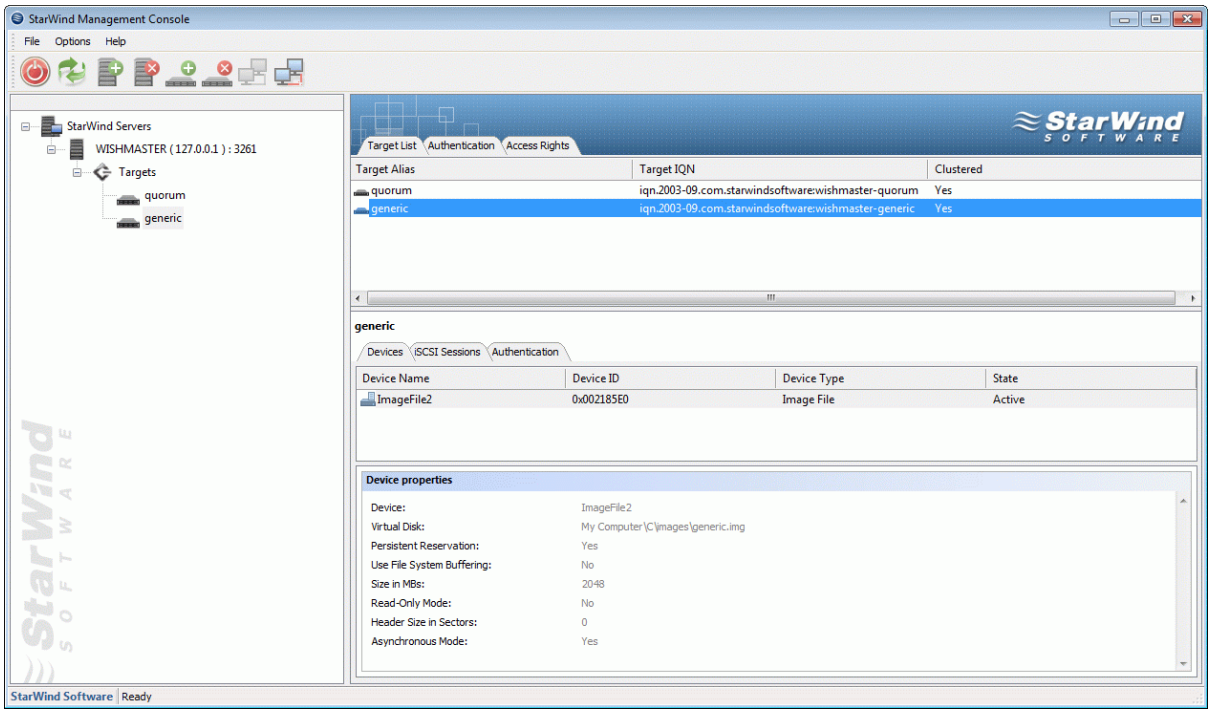
If successful, the **StarWind Console** should look like the sample image provided below.

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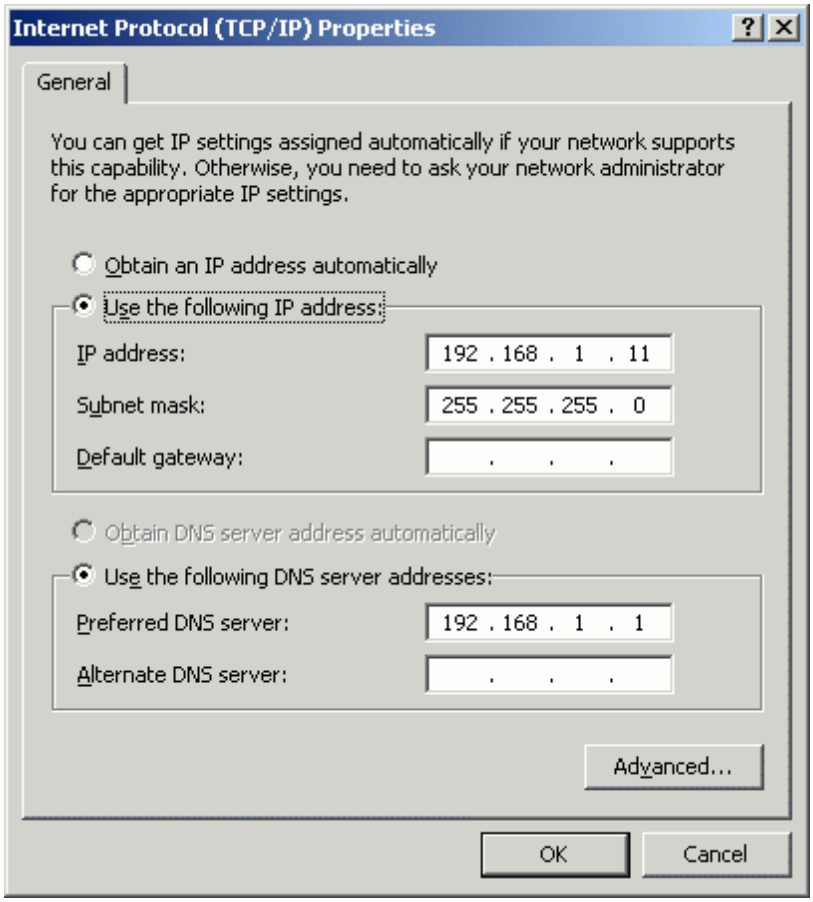
# Preparing Cluster Nodes

## Node 1

### Configuring network interfaces

Each adapter will be assigned a static IP address. Select the **Use the following IP address** option and type in the IP address you wish to use. The Subnet mask and DNS server address must also be provided. All the values must be correctly chosen given the networking configuration of the Corporate LAN that the cluster will be a part of.




Press the **OK** button.

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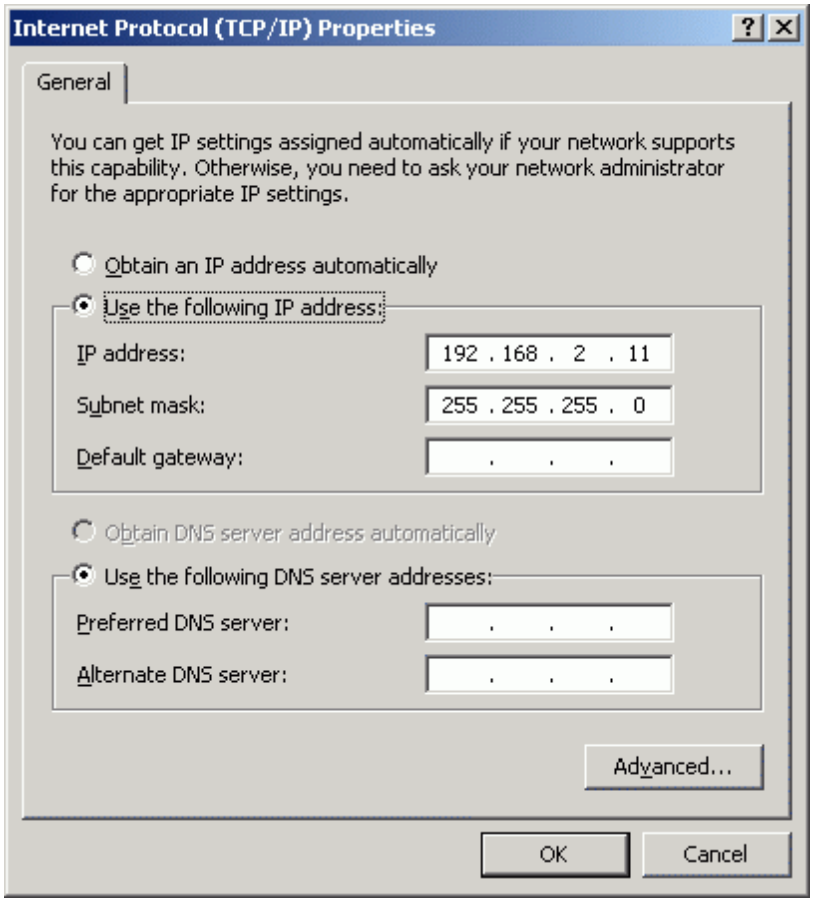
Just as was done for the first network adapter, assign appropriate values to the TCP/IP configuration of the second network adapter using the following example image as guidance. This interface is used for iSCSI target storage communications and a default gateway need not be specified.




Press the **OK** button.

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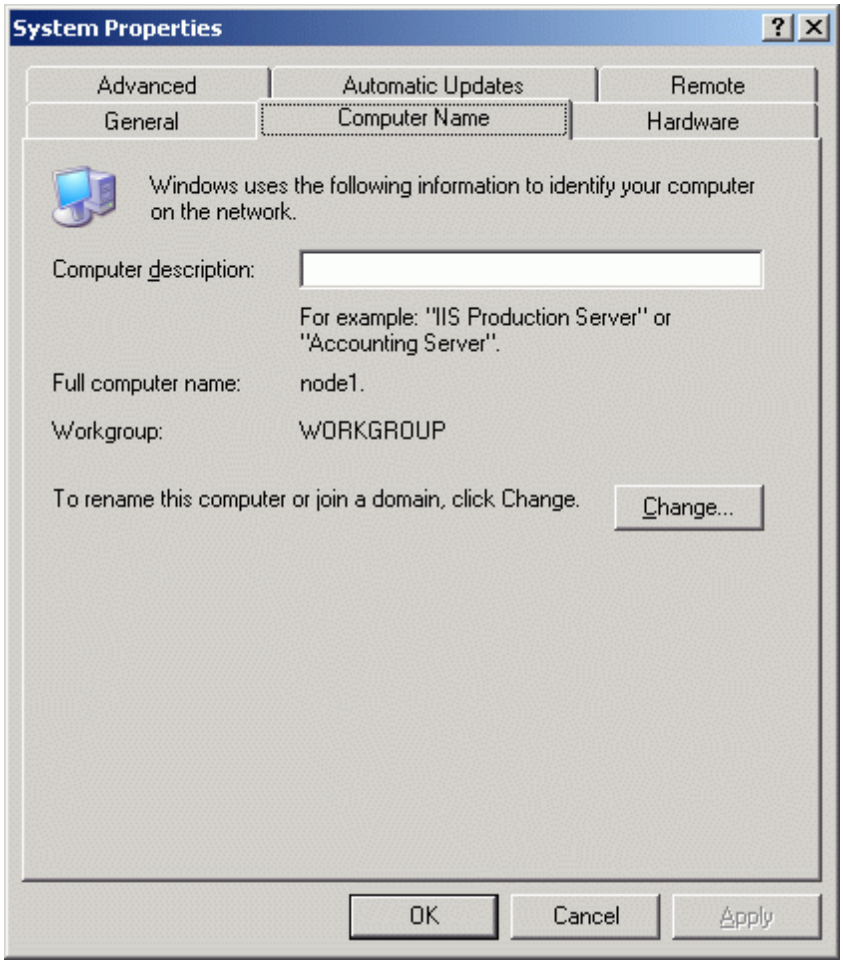
### Joining the domain

Launch **System Properties** tool selecting **Control Panel -> System**. Select **Computer Name** tab.




Press the **Change...** button.

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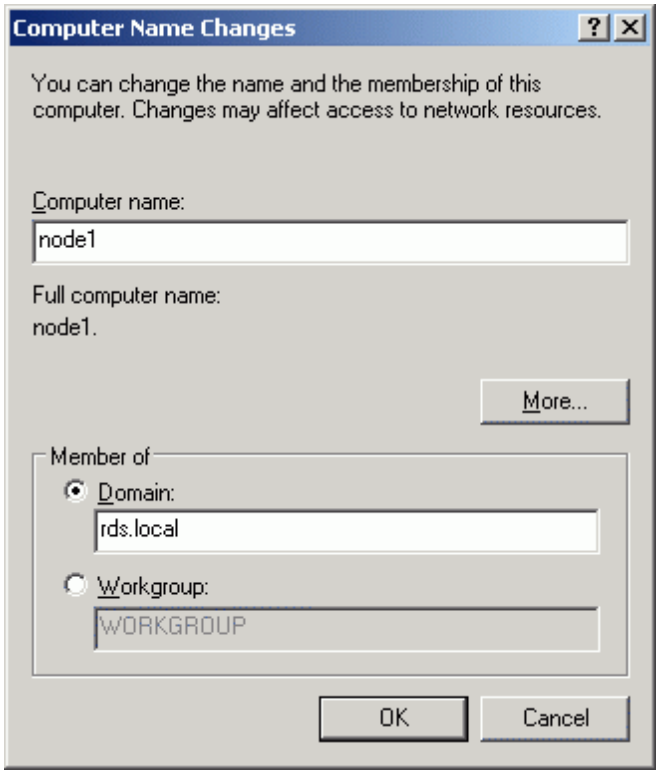
In the **Computer Name Changes** dialog enter domain to join.




Press the **OK** button.

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Enter the name and password of an account with permission to join to the domain (**node1adm**).


Press the **OK** button to join.

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If successful, the notification dialog like the one on the image shown below should appear.


Press the **OK** button.

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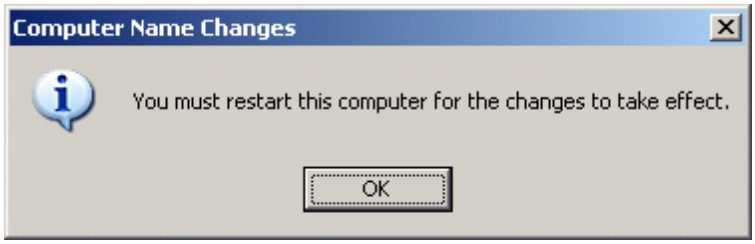
You must restart the computer for the changes to take effect.




Restart the server. Log in as node1adm and install MS iSCSI Initator.

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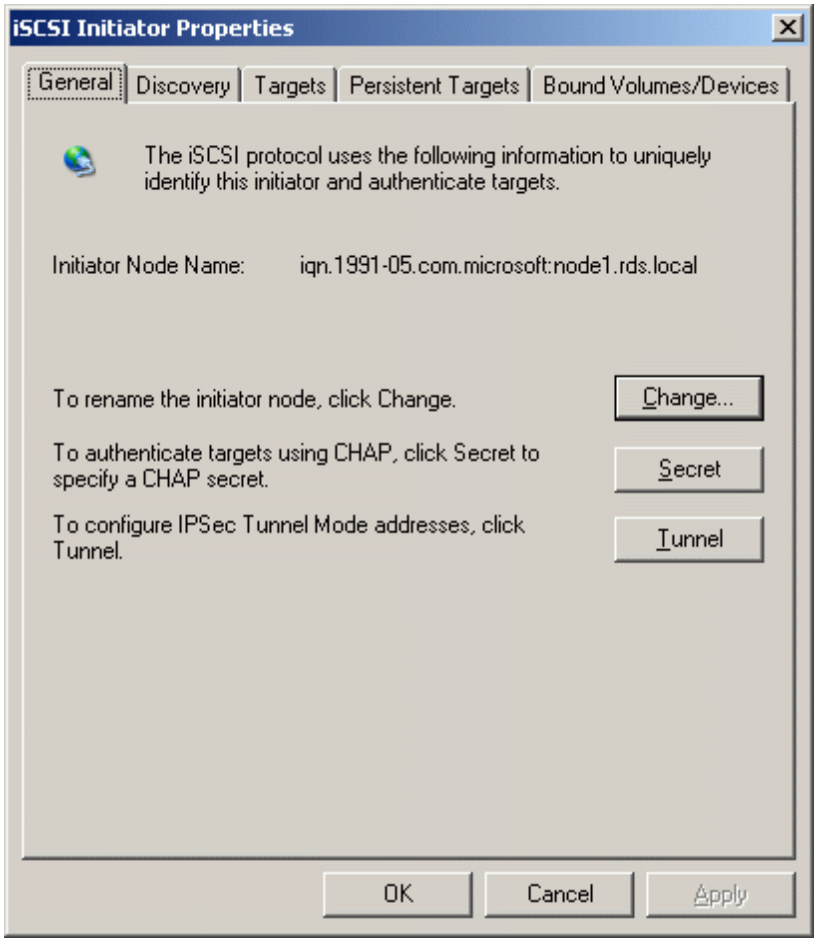
### Configuring iSCSI initiator

The **MS iSCSI Initiator** is a free application that is available for download from the **Microsoft** Web site http://www.microsoft.com/downloads/details.aspx?FamilyID=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en.
It is required to connect to the iSCSI devices. Before continuing, ensure that the **MS iSCSI Initiator** is installed.
Launch the Microsoft iSCSI Software Initiator application **Start->All Programs->Microsoft iSCSI Initiator-> Microsoft iSCSI Initiator**.




Select the **Discovery** Tab.

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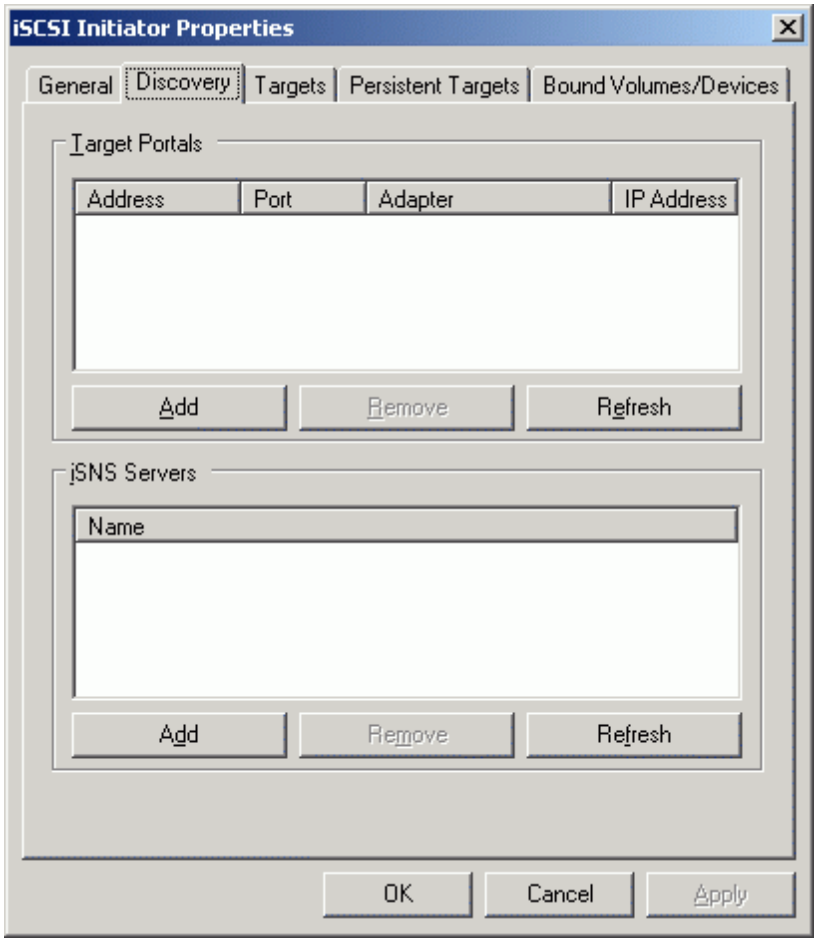
In the **Target Portals** group, click the **Add** button.




Press the **Add** button.

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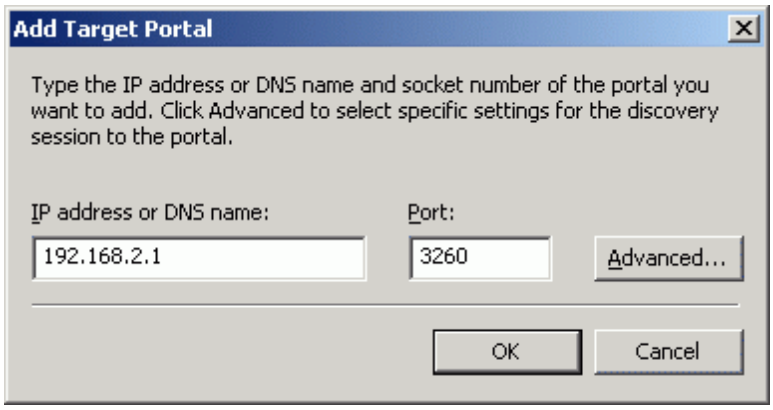
In the **Add Target Portal** dialog enter **IP address or DNS name** of the **StarWind** target server.




Press the **OK** button to continue.

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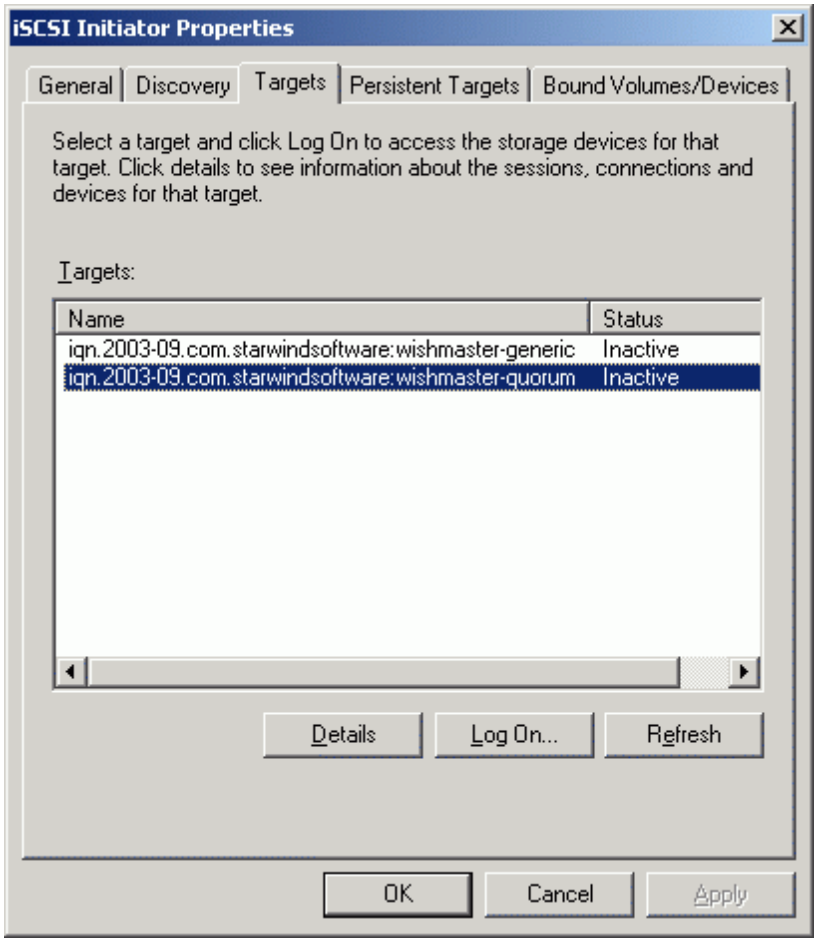
Click on the **Targets** tab. Select the IQN of the target just added.




Press the **Log On…** button.

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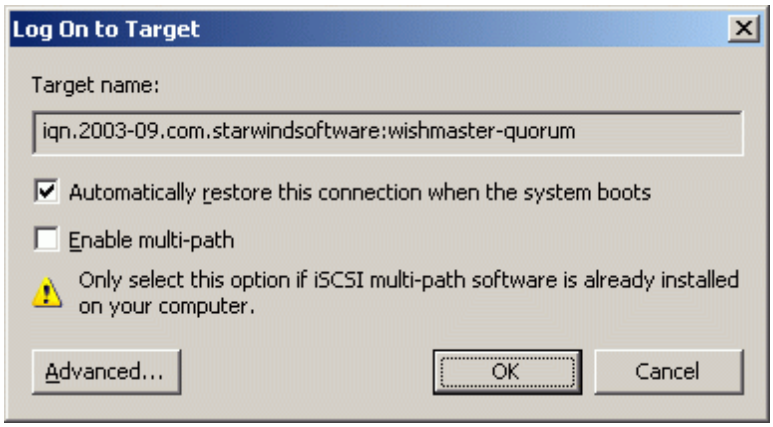
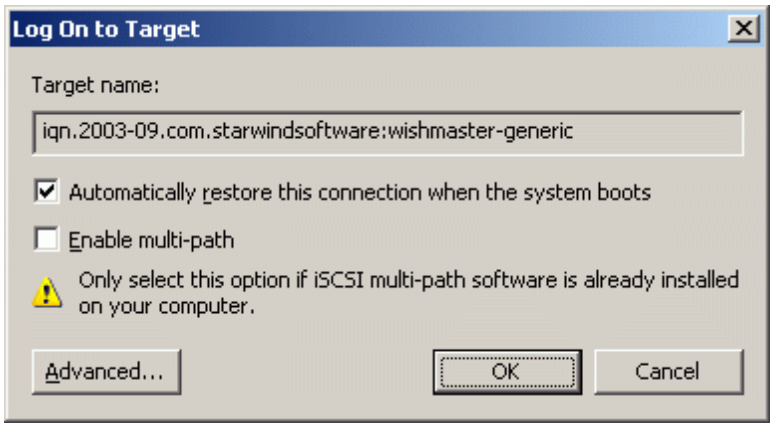
The **Log On to Target** dialog now appears. In this dialog click on the checkbox **Automatically restore this connection when the system boots** to make this connection persistent.




Press the **OK** button to continue.




Press the **OK** button to continue.

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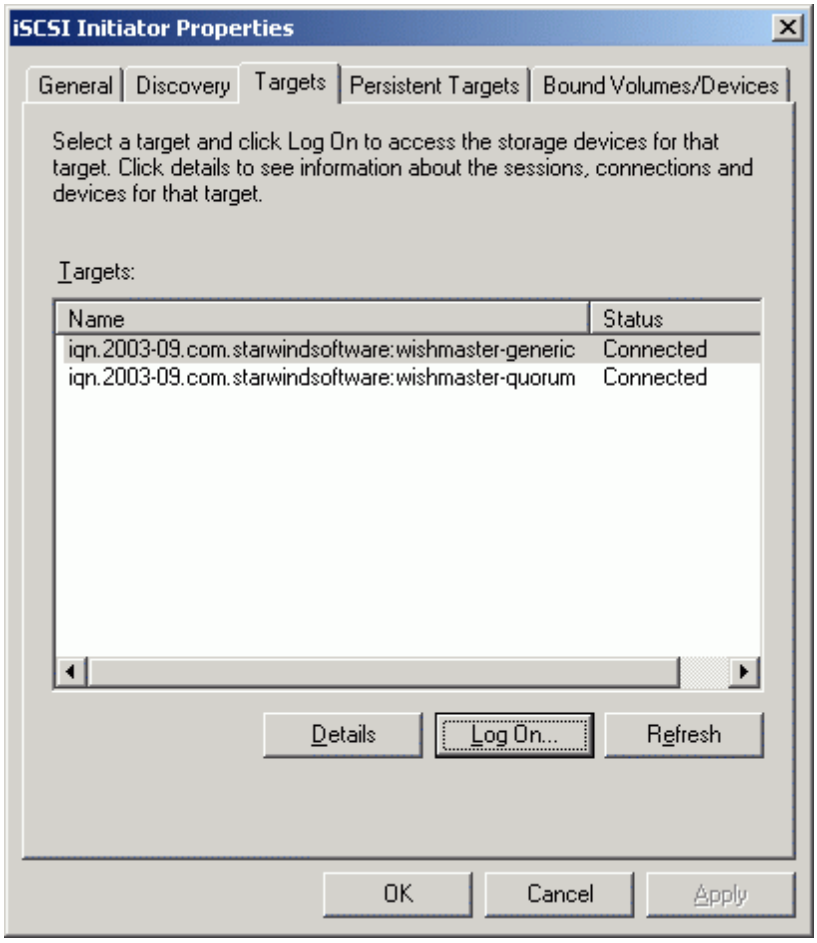
If successful, the initiator is now logged on to **StarWind**.

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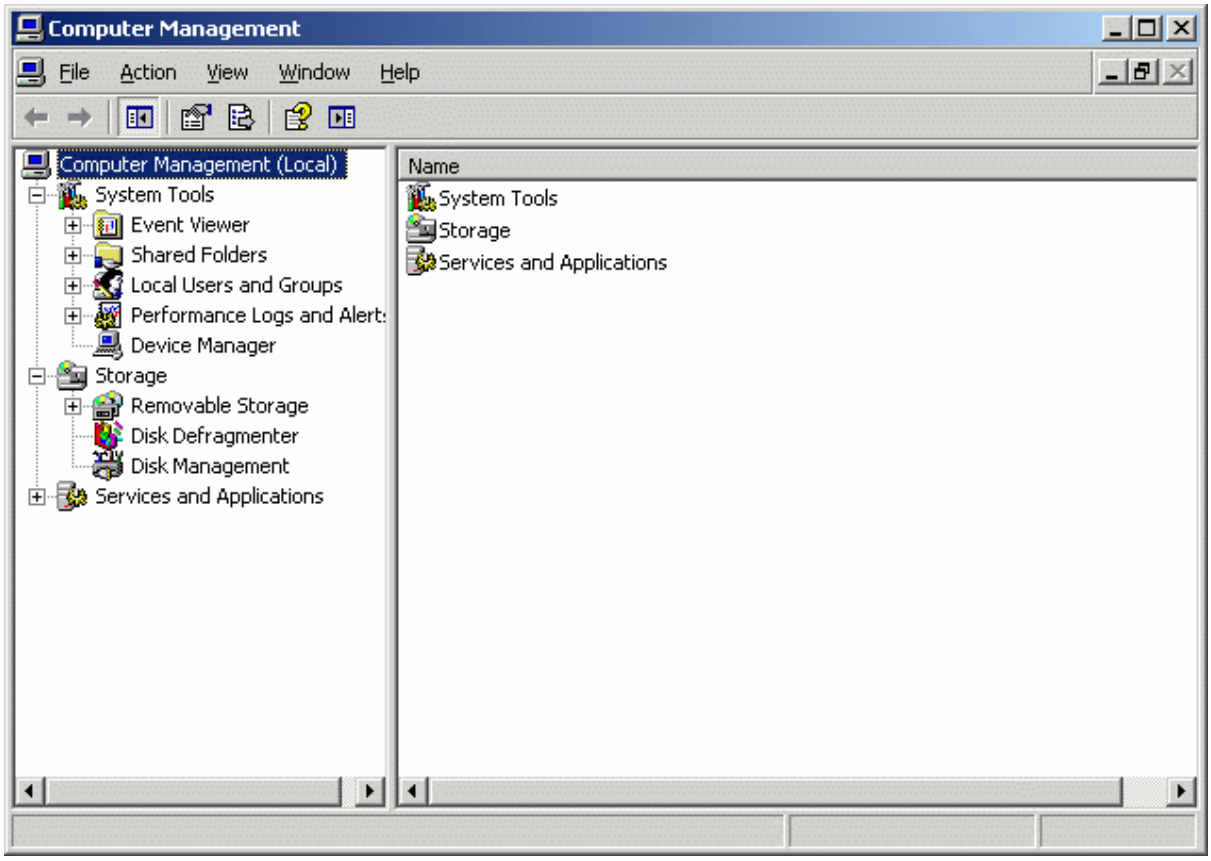
### Initializing, formatting and creating partitions

When the **StarWind** Disks are connected, they show up on the initiator machine as new disk devices. Before these devices can be used as cluster disks, they have to be initialized and formatted. Launch the **Computer Management** console.




Select **Disk Management**.

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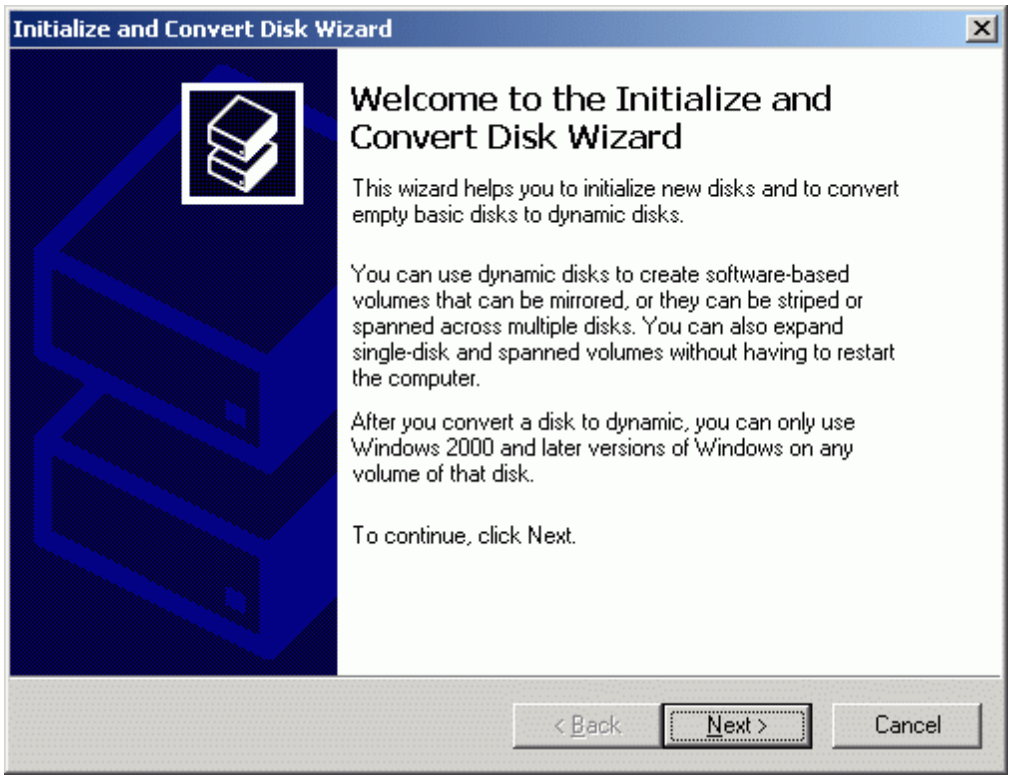
Follow the **Initialize and Convert Disk Wizard** to initialize the new disks. Use the default settings that Windows provides. By default the disk will be initialized as the basic disk. MSCS works only with the basic disks.




Press the **Next** button to continue.

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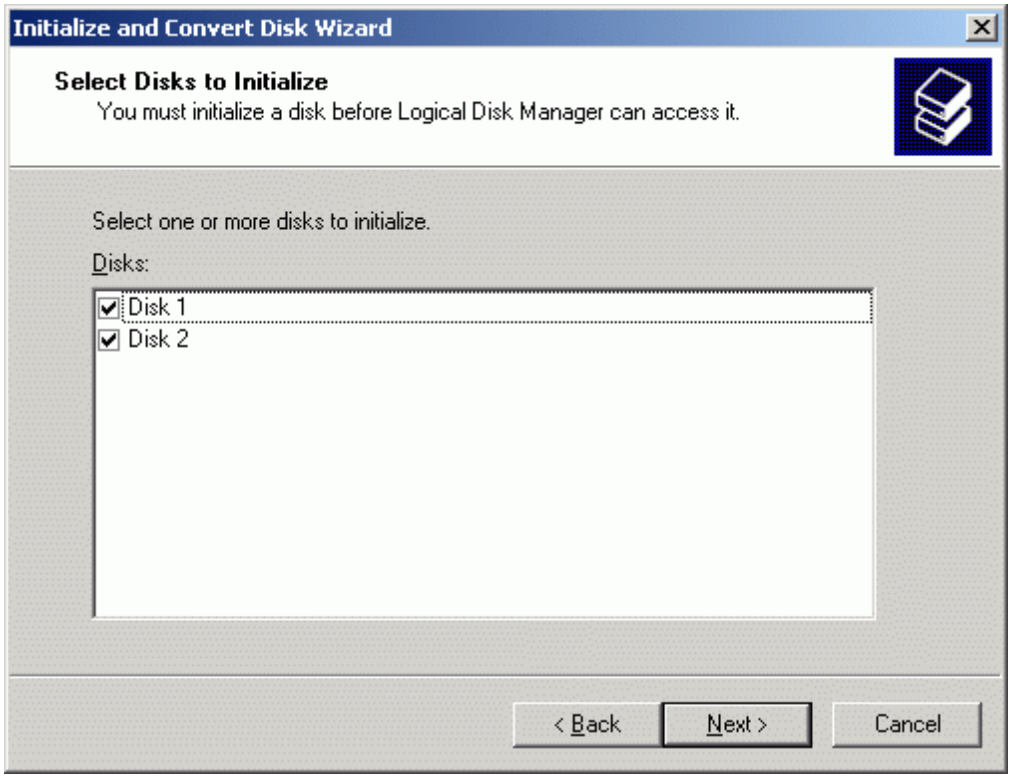


Press the **Next** button to continue.

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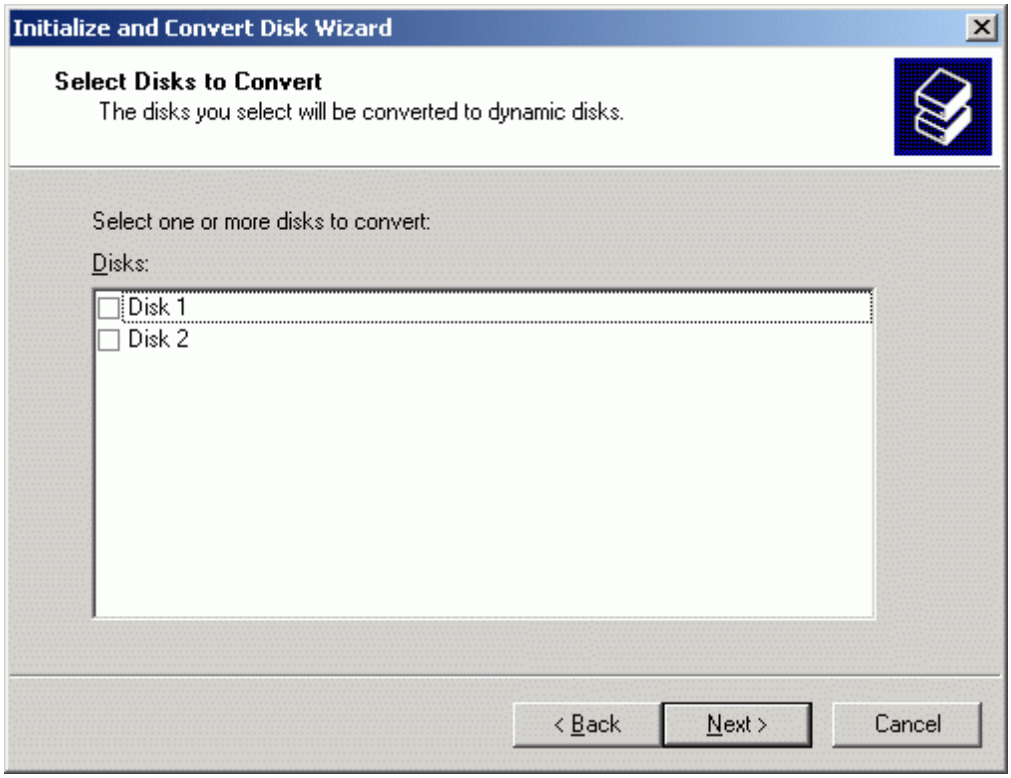


Press the **Next** button to continue.

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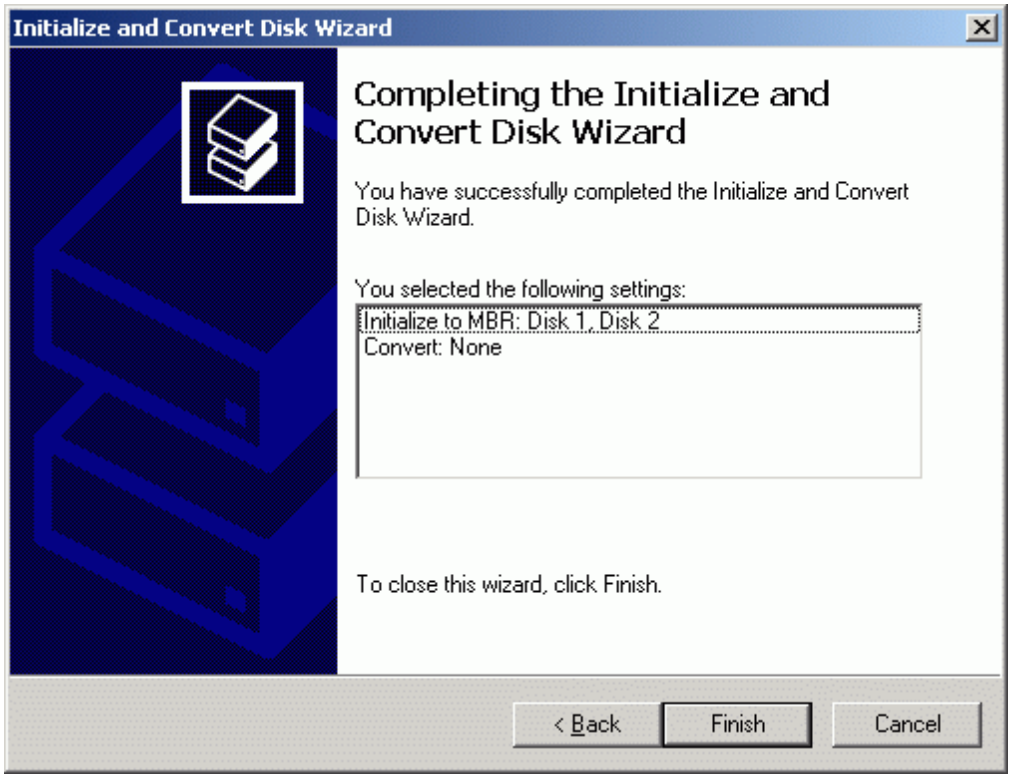


Press the **Finish** button to close the wizard.

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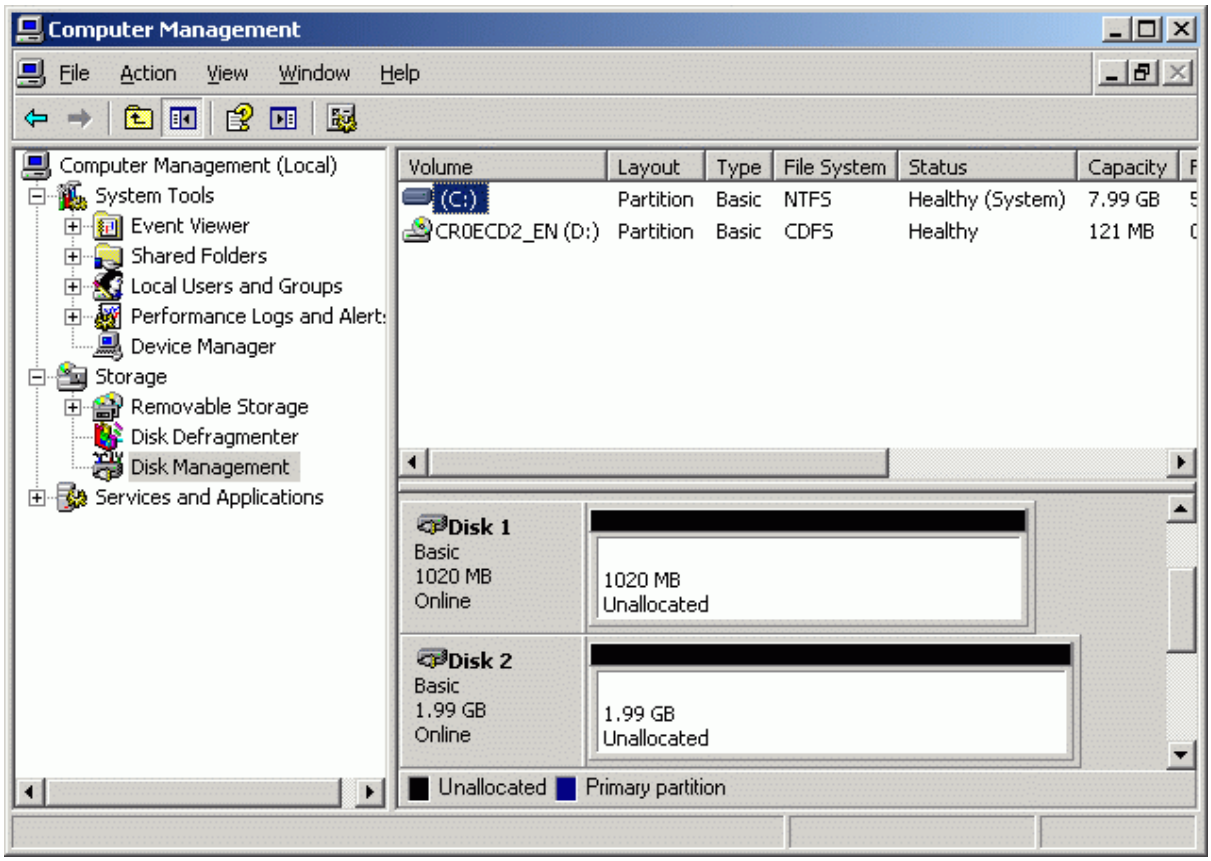


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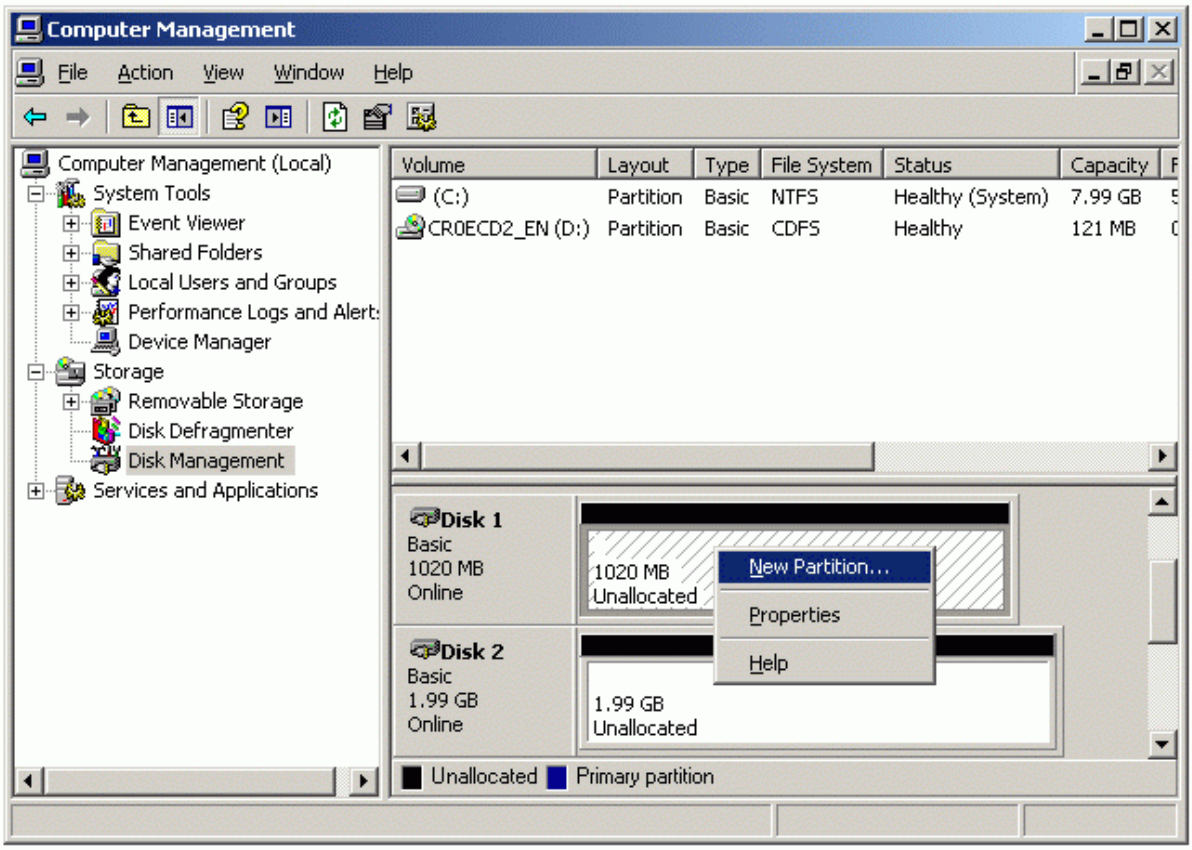
After the **Wizard** completes initialization, press the right mouse button on the unallocated space and select **New Partition** popup menu item. Follow the instructions of the wizard to create an **NTFS** partition for use as the quorum disk. Use the default settings that Windows provides. (The default settings are sufficient for most environments.)

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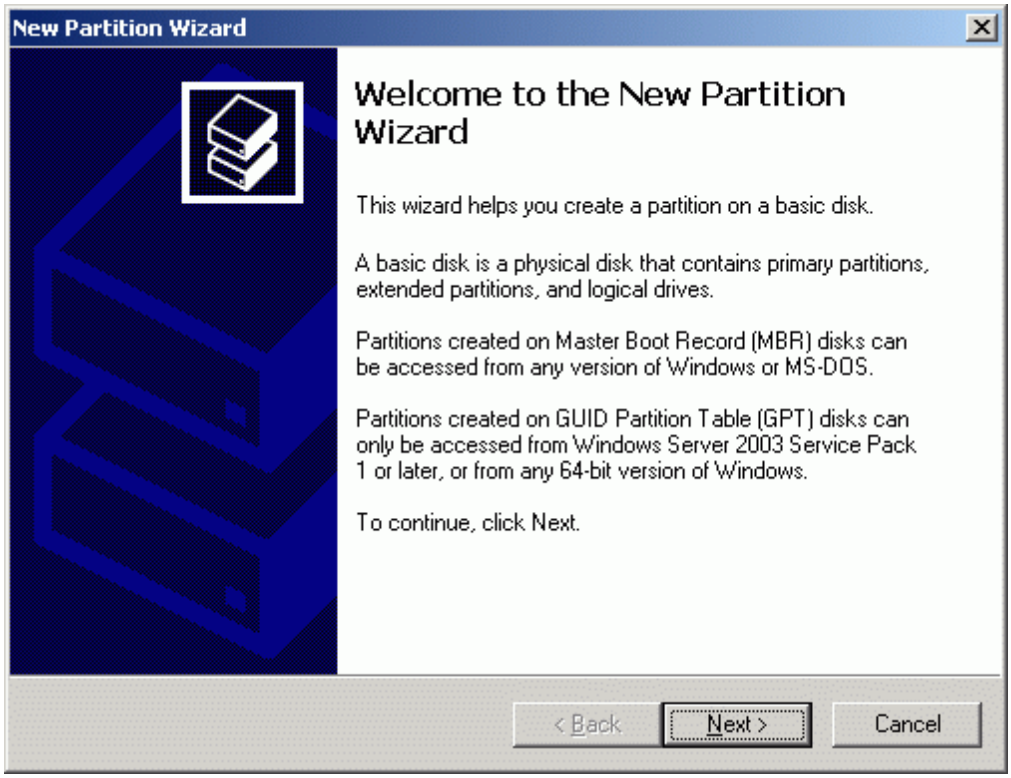
**New Partition Wizard** appears.




Press the **Next** button to continue.

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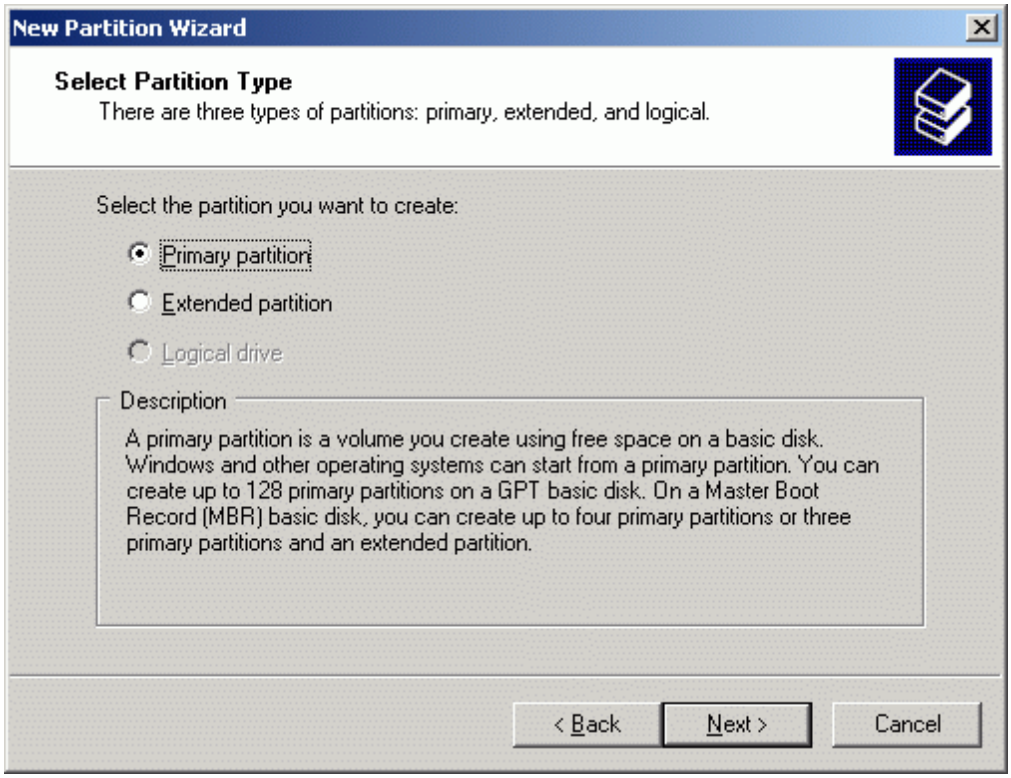
Select partition type to create.




Press the **Next** button to continue.

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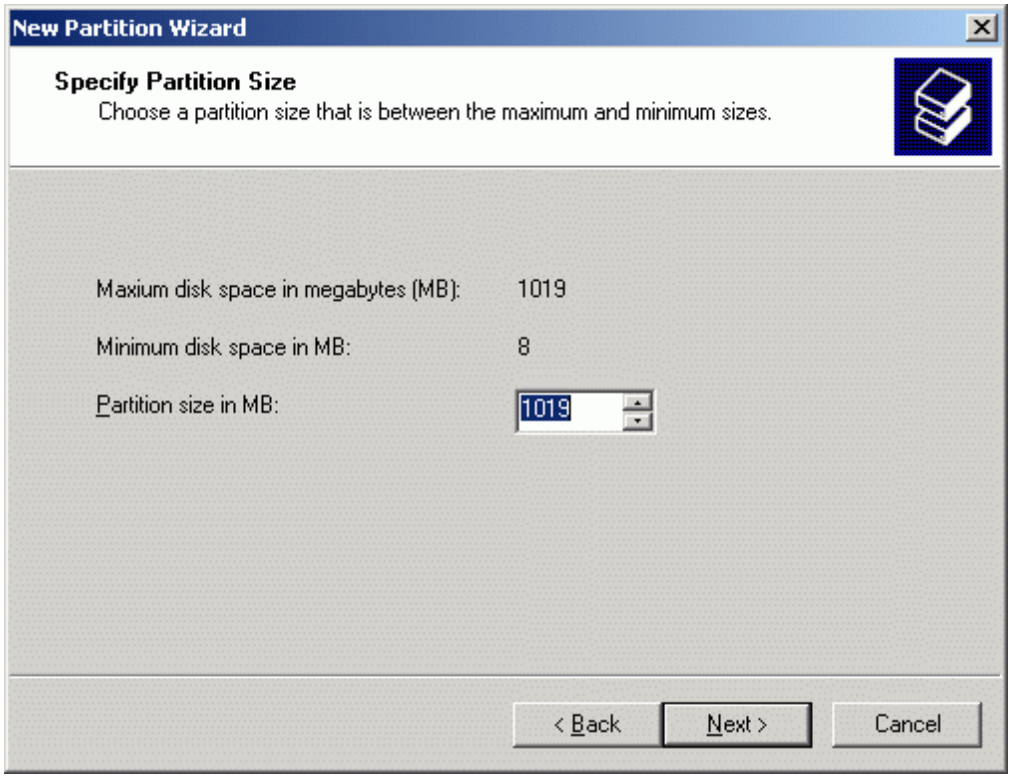
Specify new partition size in megabytes.




Press the **Next** button to continue.

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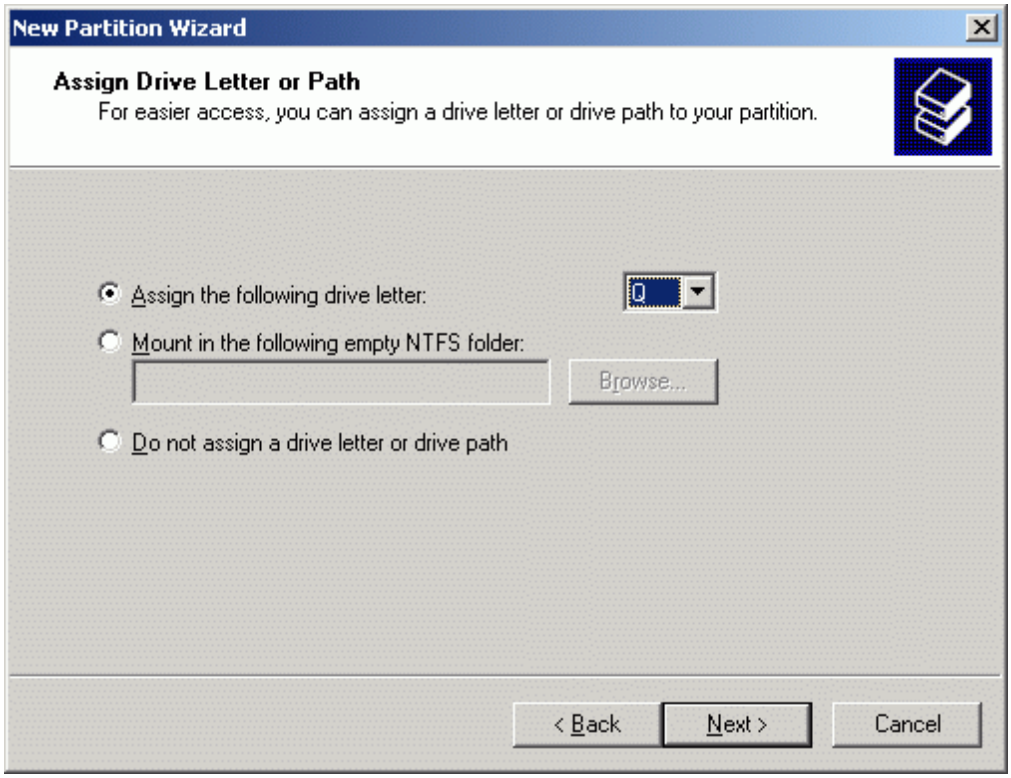
Choose the **Drive Letter** to assign.




Press the **Next** button to continue.

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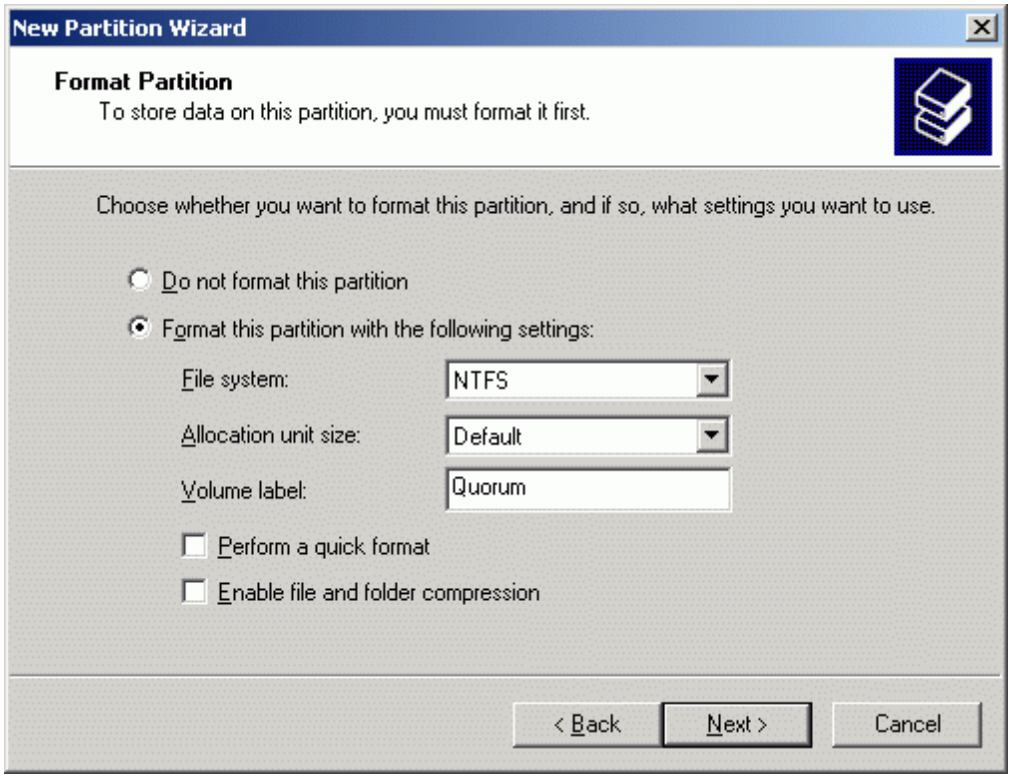
Specify format options. Provide the **Volume Label**.




Press the **Next** button to continue.

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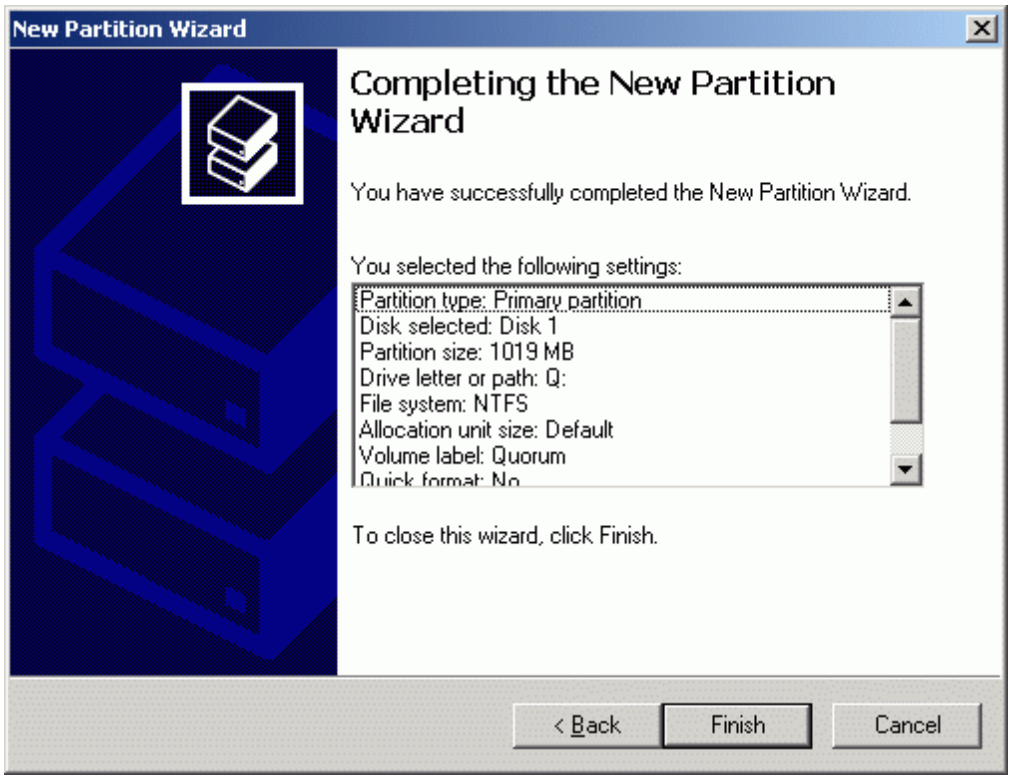
Check the settings are correct. Press the **Back** button should any changes be required.




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

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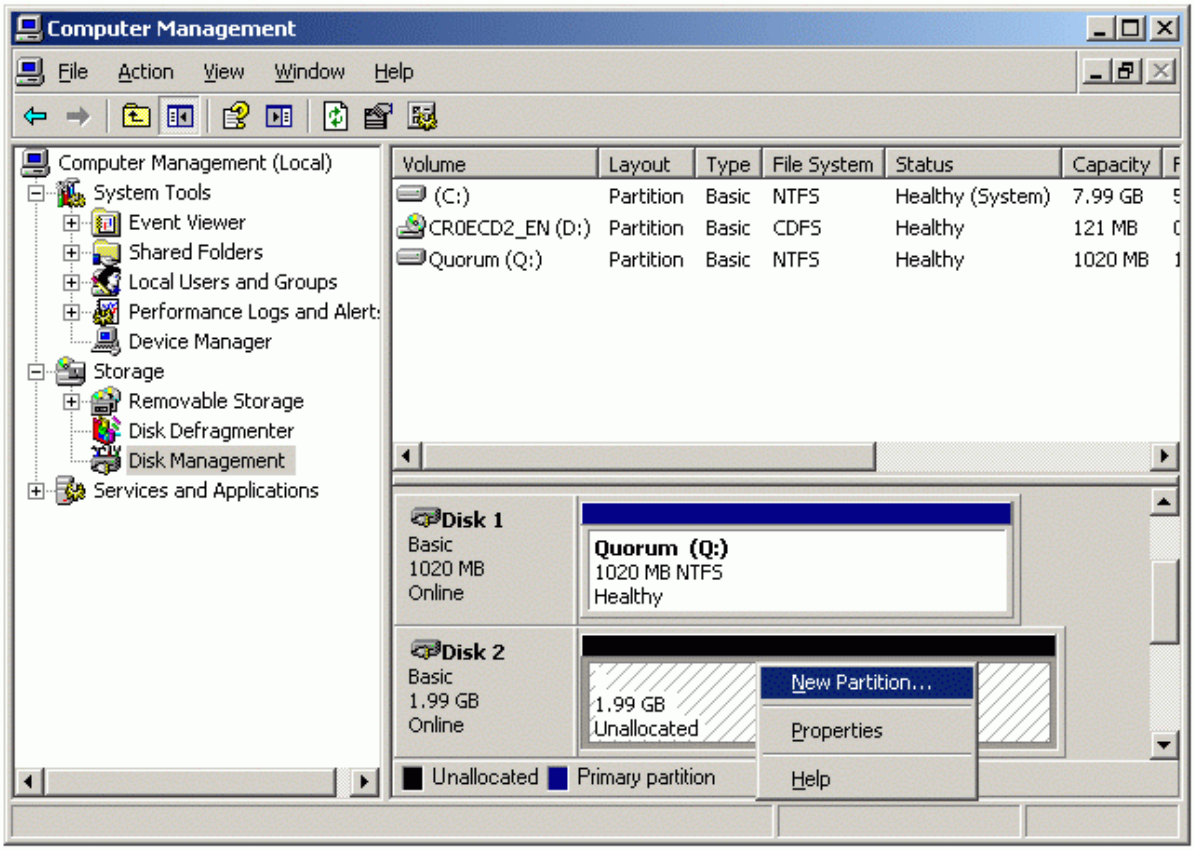
If successful, a new volume will be created as shown in the example image below. Repeat the same steps to create the second volume.

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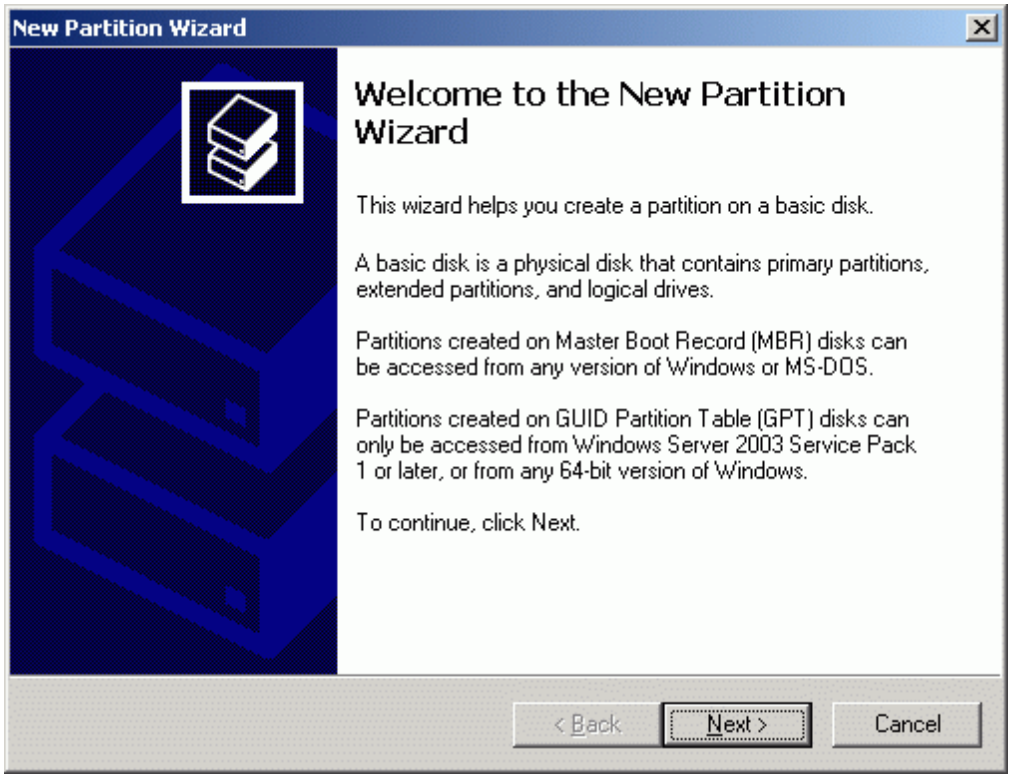
**New Partition Wizard** appears.




Press the **Next** button to continue.

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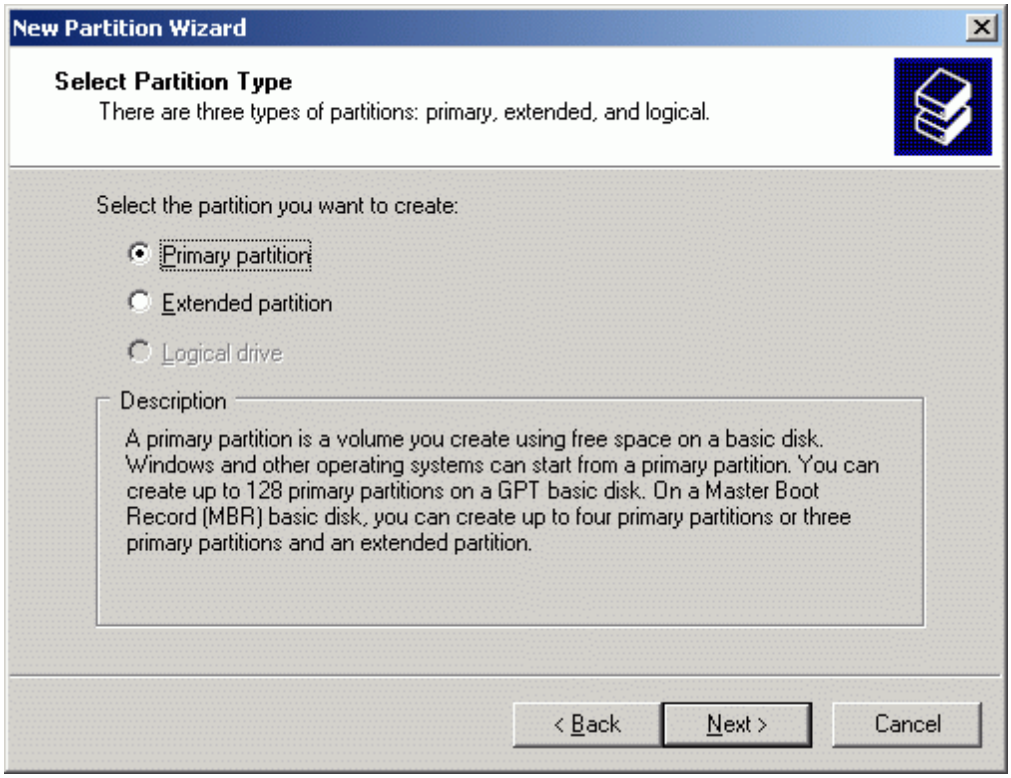
Select partition type to create.




Press the **Next** button to continue.

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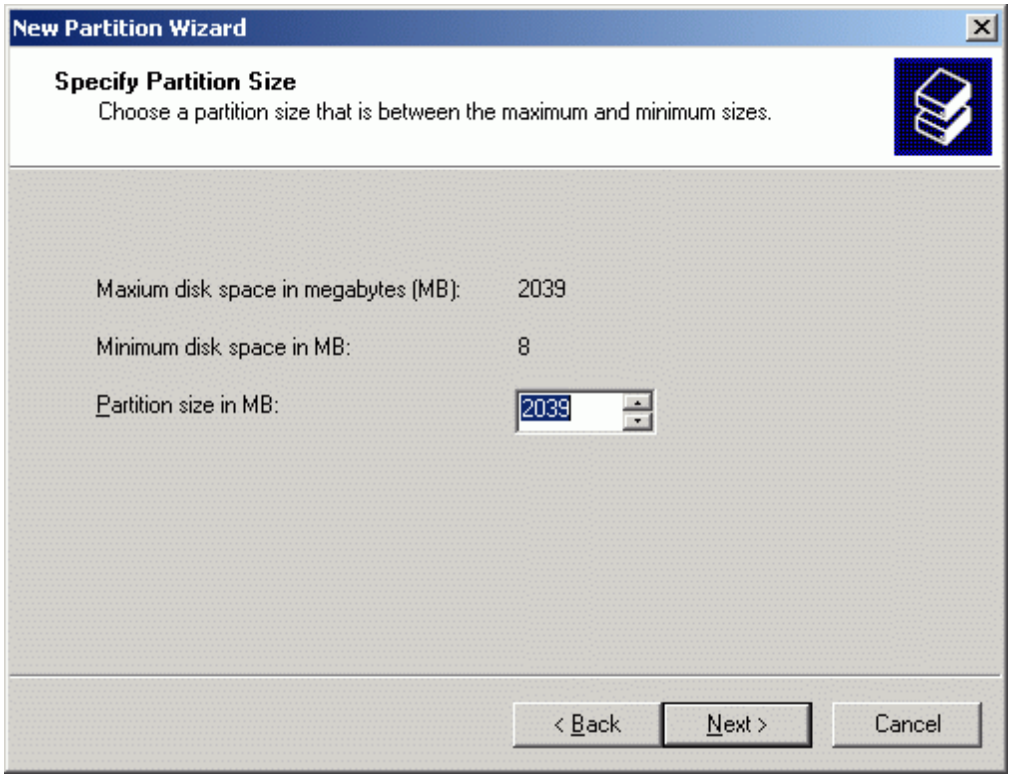
Specify new partition size in megabytes.




Press the **Next** button to continue.

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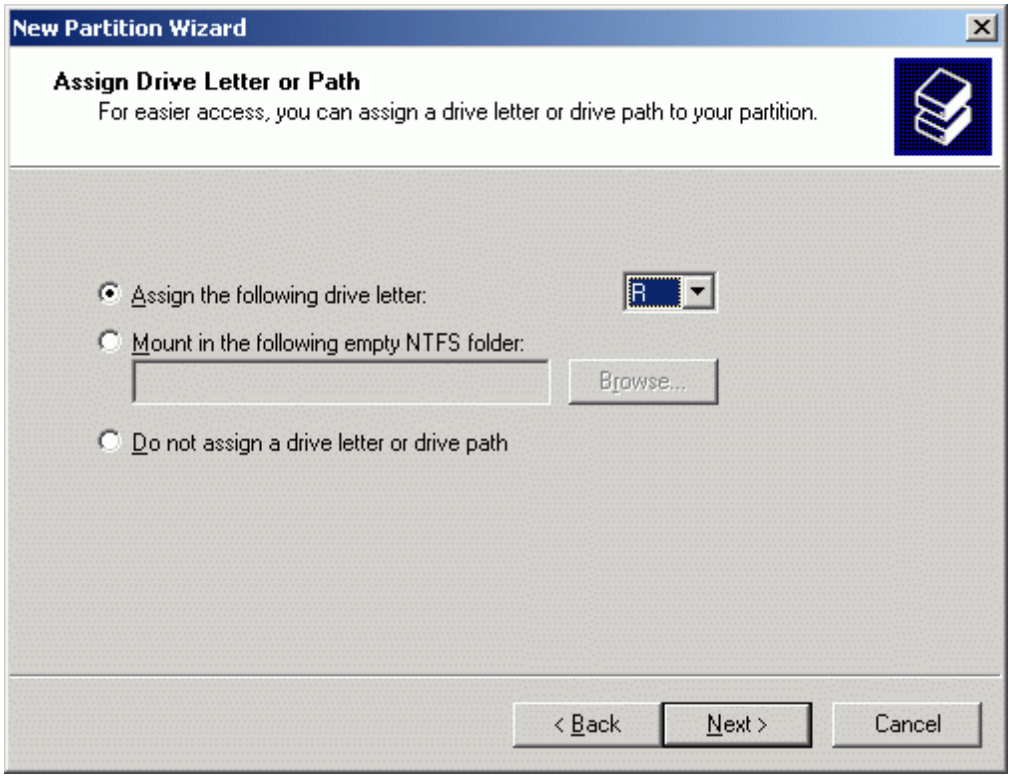
Choose the **Drive Letter** to assign.




Press the **Next** button to continue.

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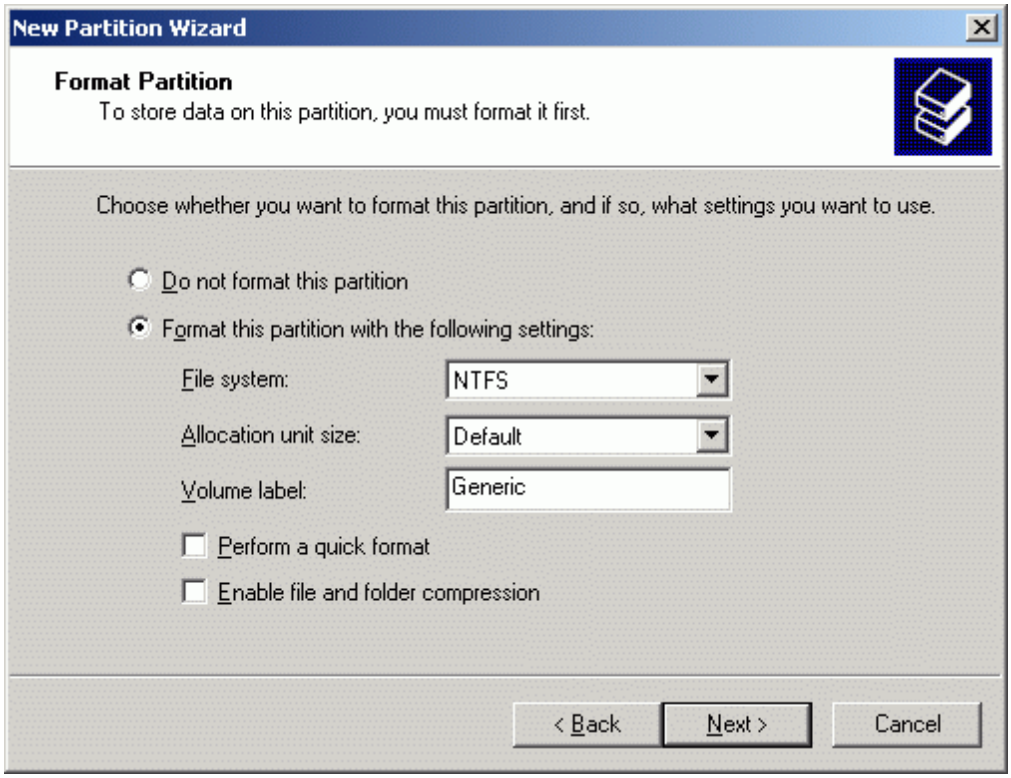
Specify format options. Provide the **Volume Label**.




Press the **Next** button to continue.

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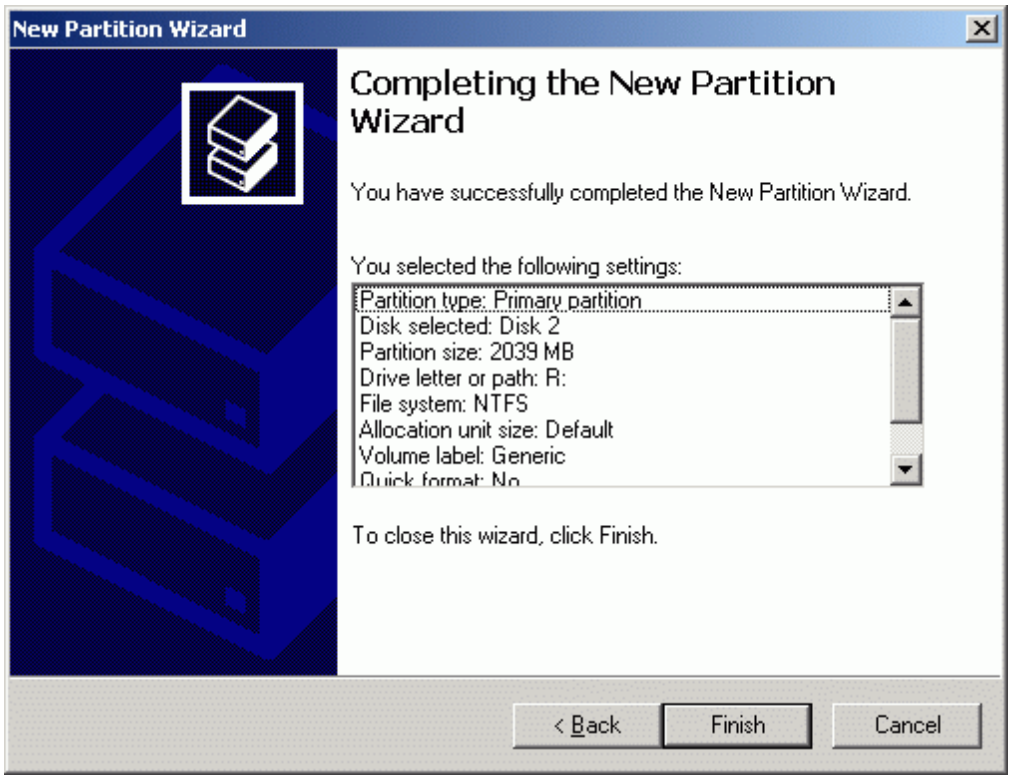
Check the settings are correct. Press the **Back** button should any changes be required.




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

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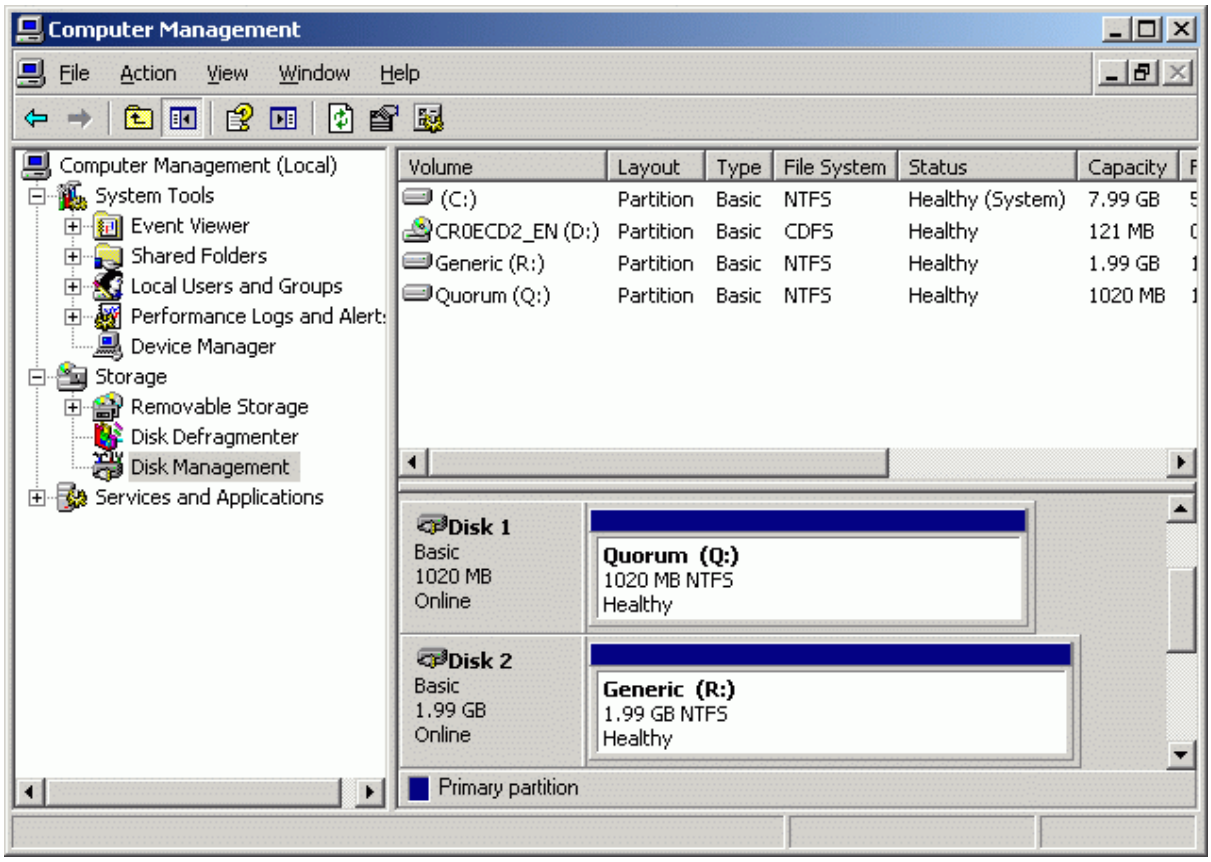
If successful, both of the disks are now formatted as shown in the example image below.




Shut down the server.

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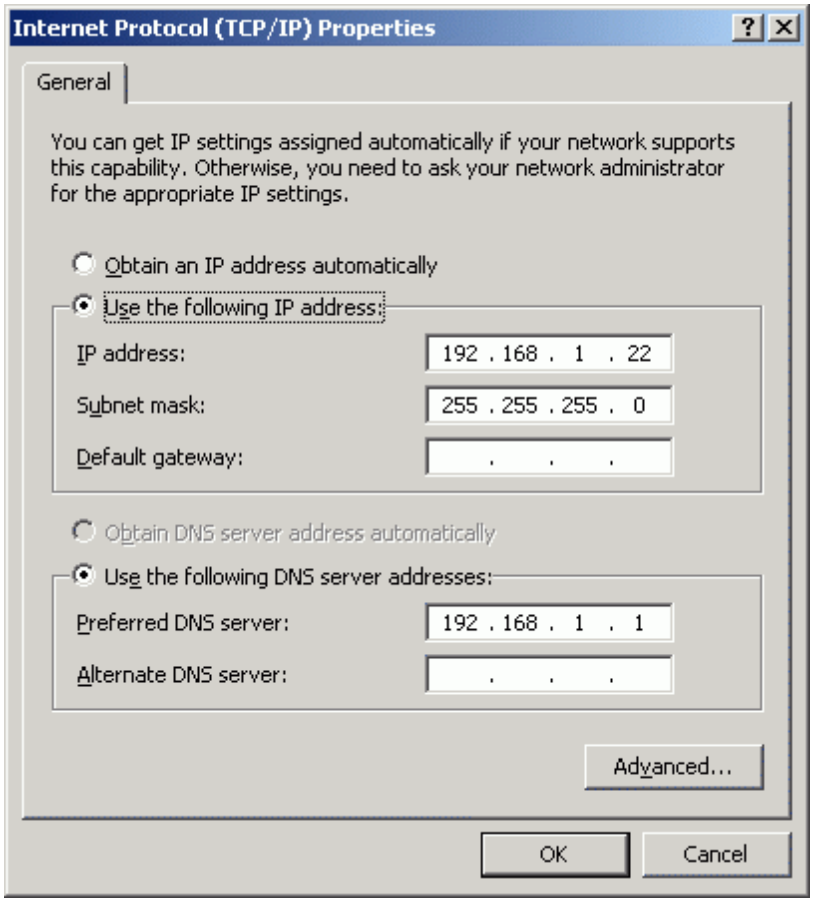
## Node 2

### Configuring network interfaces

Each adapter will be assigned a static IP address. Select the **Use the following IP address** option and type in the IP address you wish to use. The Subnet mask and DNS server address must also be provided. All the values must be correctly chosen given the networking configuration of the Corporate LAN that the cluster will be a part of.




Press the **OK** button.

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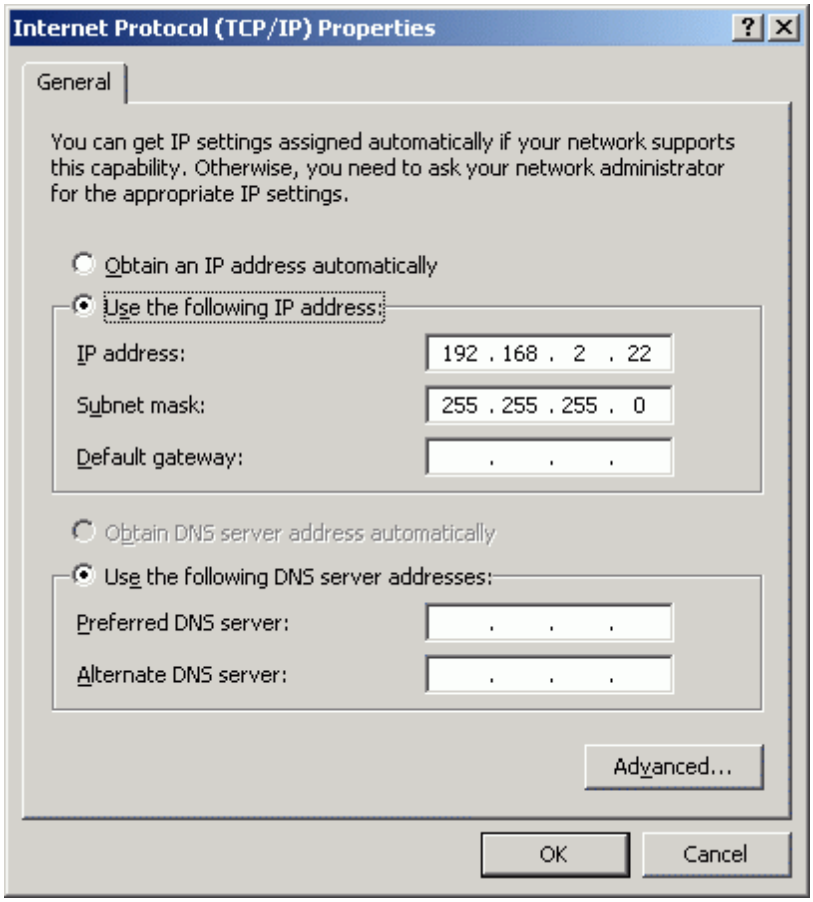
Just as was done for the first network adapter, assign appropriate values to the TCP/IP configuration of the second network adapter using the following example image as guidance. This interface is used for iSCSI target storage communications and a default gateway need not be specified.




Press the **OK** button.

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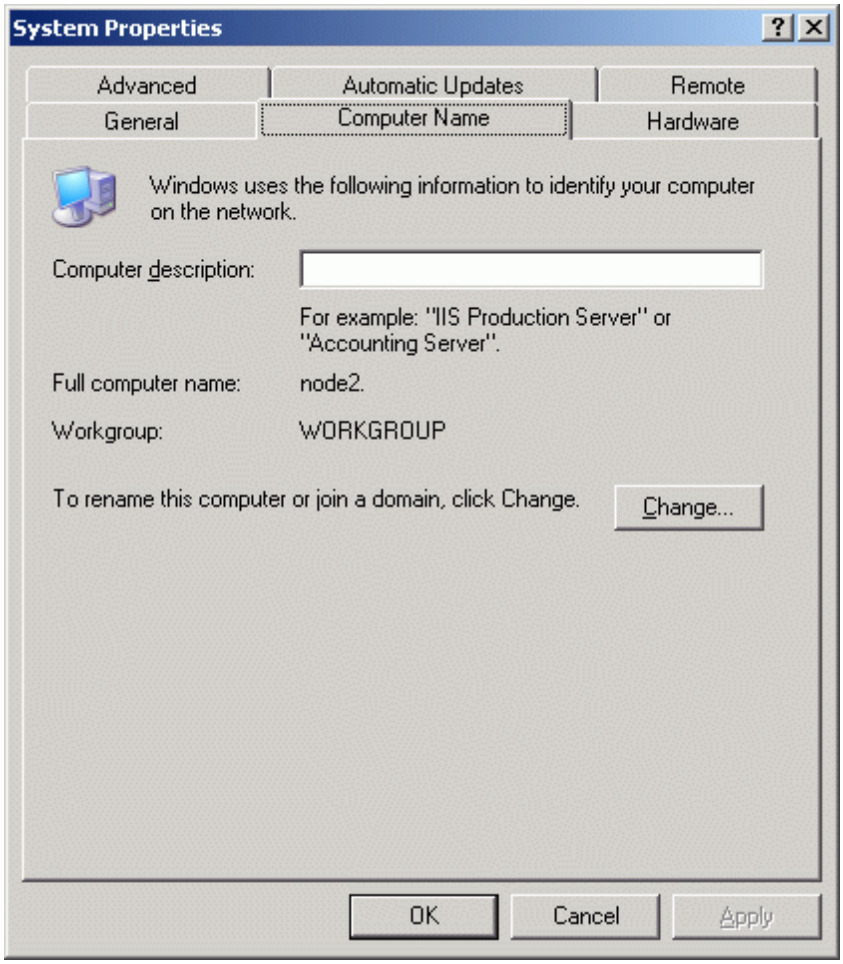
### Joining the domain

Launch **System Properties** tool selecting **Control Panel -> System**. Select **Computer Name** tab.




Press the **Change...** button.

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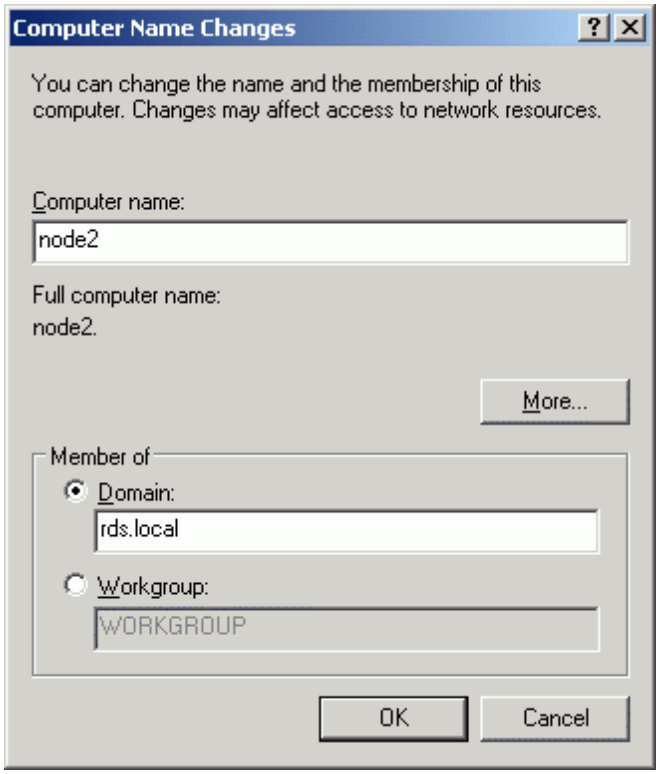
In the **Computer Name Changes** dialog enter domain to join.




Press the **OK** button.

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Enter the name and password of an account with permission to join to the domain (**node2adm**).


Press the **OK** button to join.

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If successful, the notification dialog like the one on the image shown below should appear.


Press the **OK** button.

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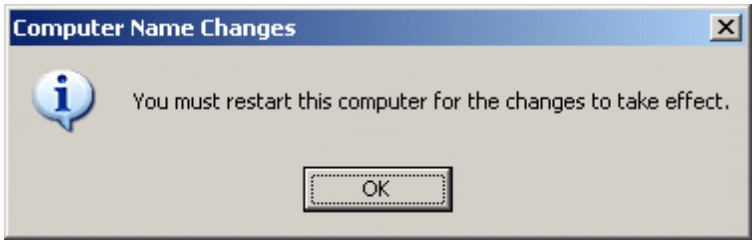
You must restart the computer for the changes to take effect.




Restart the server. Log in as node2adm and install MS iSCSI Initator.

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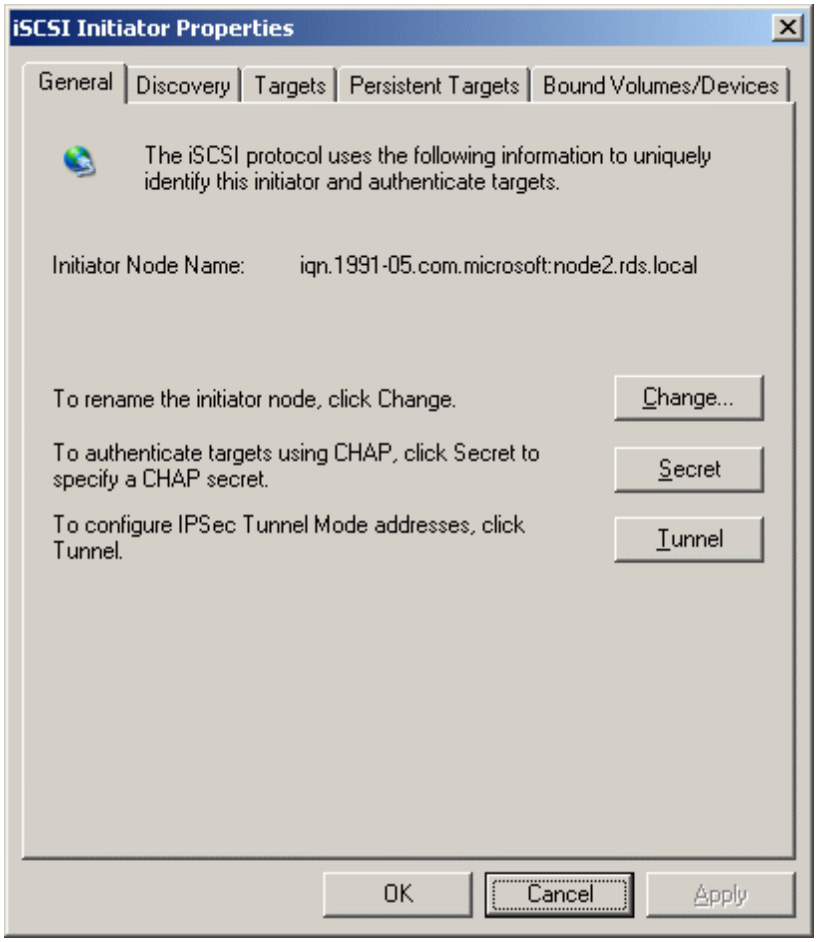
### Configuring iSCSI initiator

The **MS iSCSI Initiator** is a free application that is available for download from the **Microsoft** Web site http://www.microsoft.com/downloads/details.aspx?FamilyID=12cb3c1a-15d6-4585-b385-befd1319f825&displaylang=en.
It is required to connect to the iSCSI devices. Before continuing, ensure that the **MS iSCSI Initiator** is installed.
Launch the Microsoft iSCSI Software Initiator application **Start->All Programs->Microsoft iSCSI Initiator-> Microsoft iSCSI Initiator**.




Select the **Discovery** Tab.

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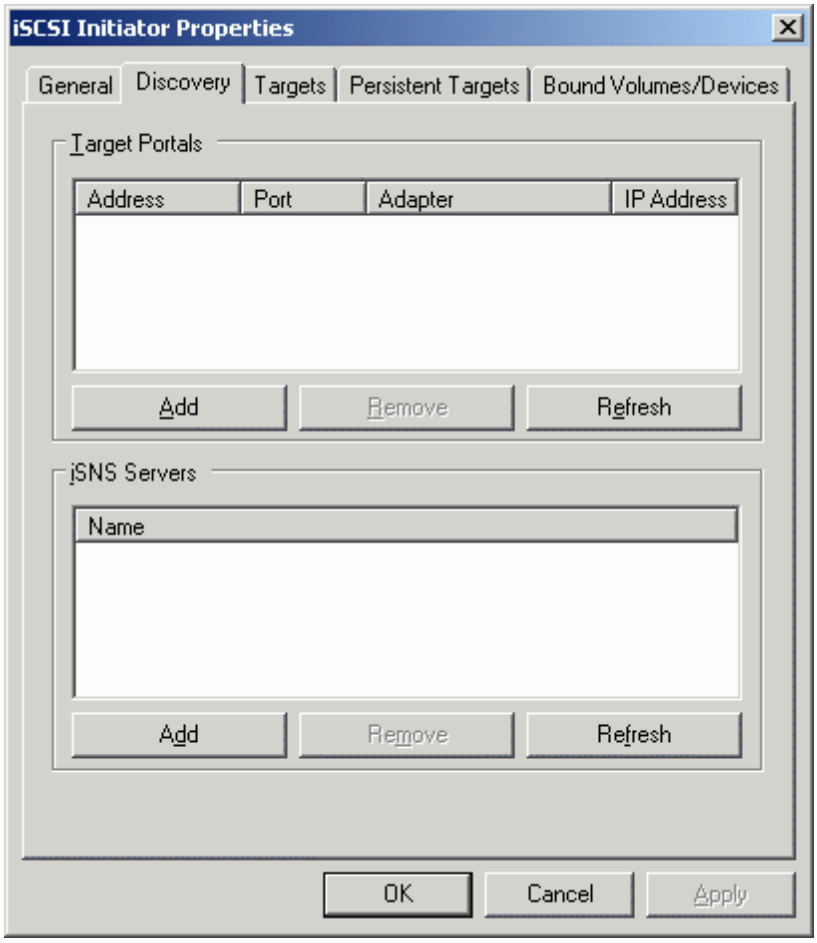
In the **Target Portals** group, click the **Add** button.




Press the **Add** button.

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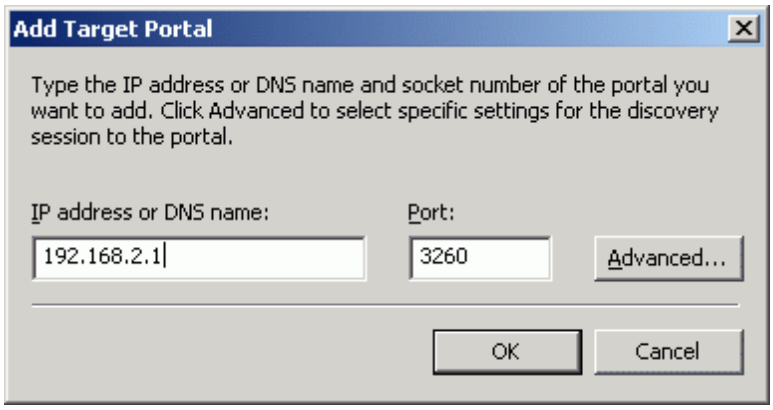
In the **Add Target Portal** dialog enter **IP address or DNS name** of the **StarWind** target server.




Press the **OK** button to continue.

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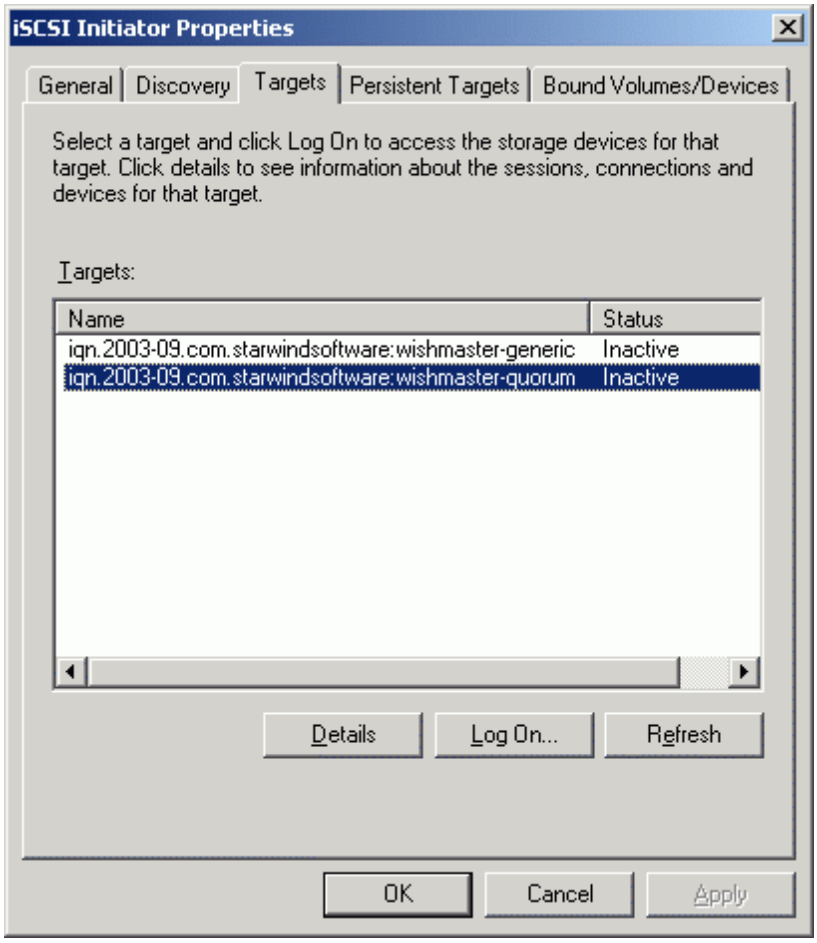
Click on the **Targets** tab. Select the IQN of the target just added.




Press the **Log On…** button.

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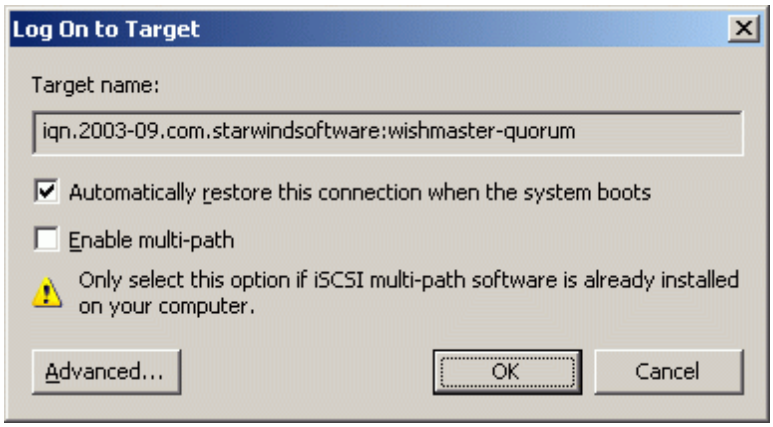
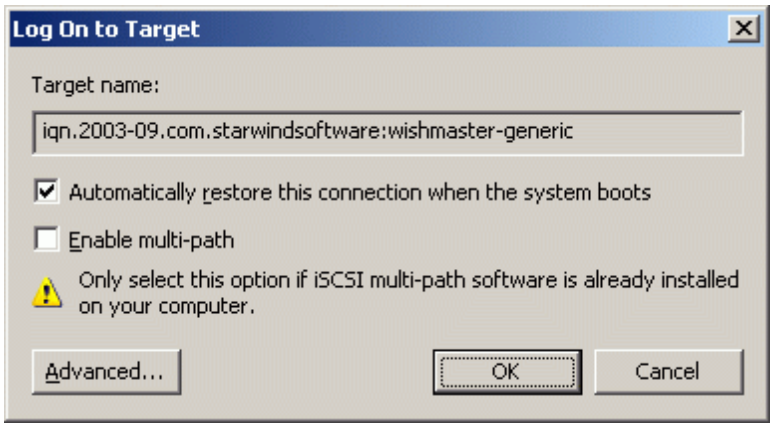
The **Log On to Target** dialog now appears. In this dialog click on the checkbox **Automatically restore this connection when the system boots** to make this connection persistent.




Press the **OK** button to continue.




Press the **OK** button to continue.

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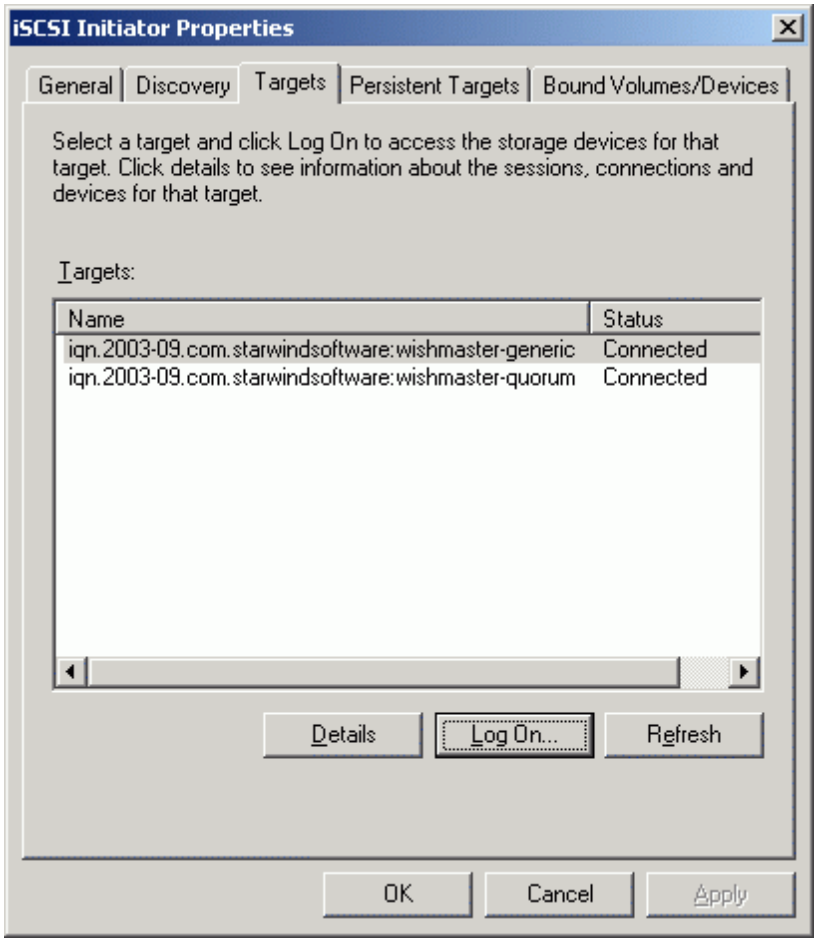
If successful, the initiator is now logged on to **StarWind**.

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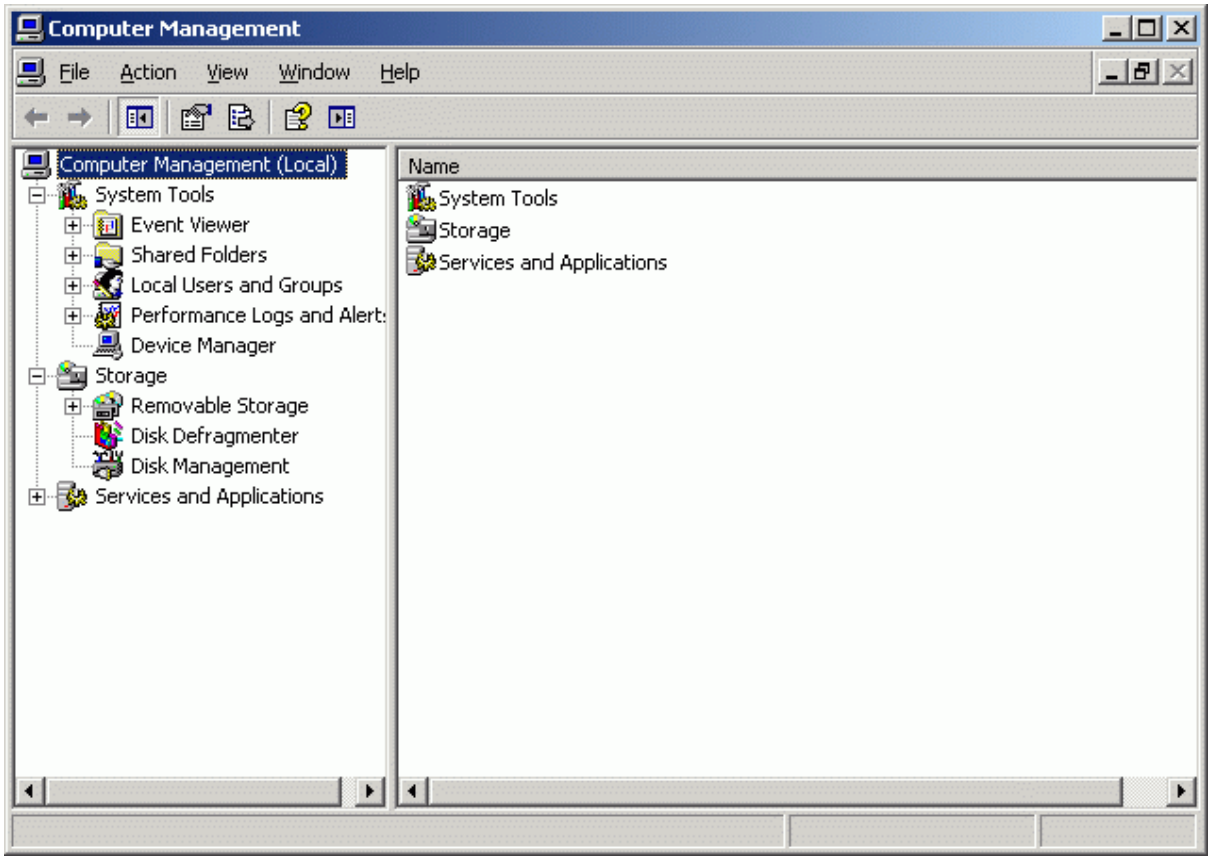
### Assigning drive letters

When the StarWind Disks are connected, they show up on the initiator machine as new disk devices. Before these devices can be used as cluster disks, they have to be mounted. Launch the **Computer Management** console.




Select **Disk Management**.

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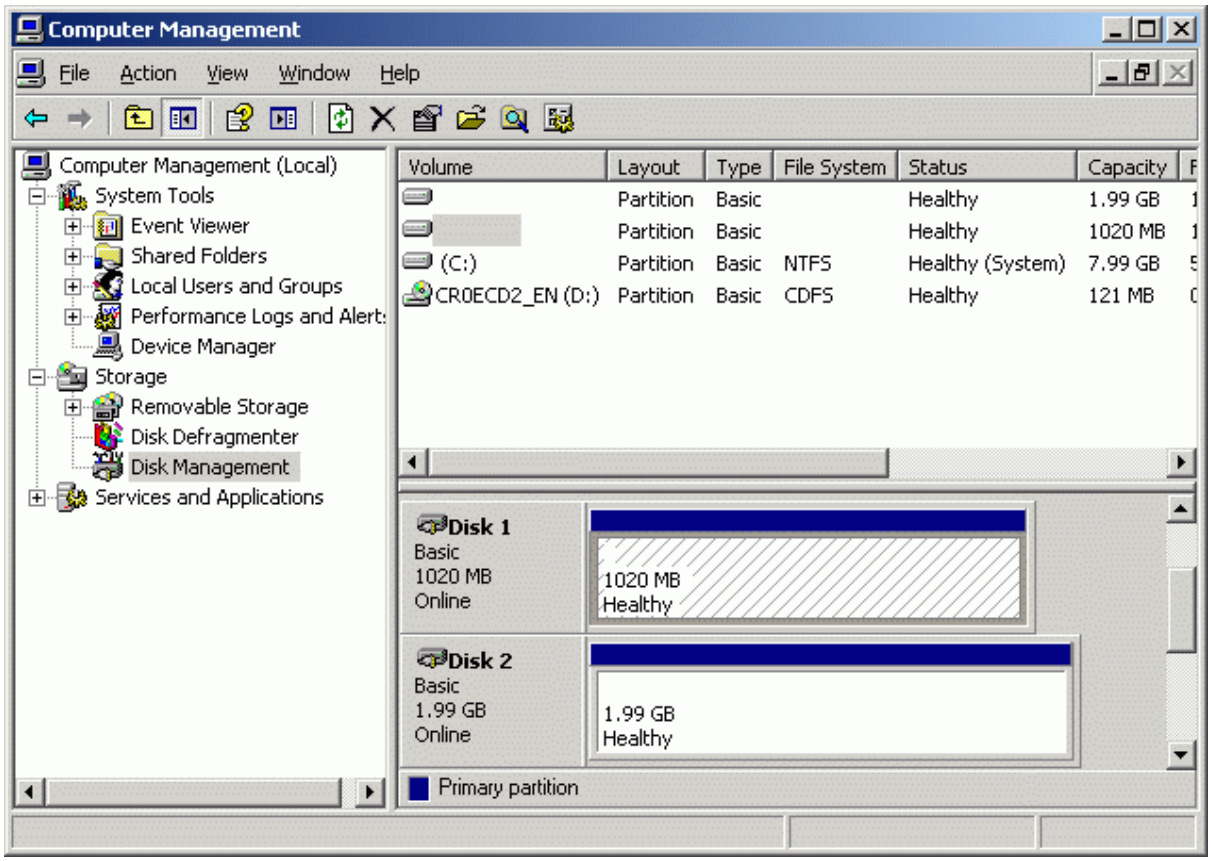
The two disks that were formatted on the **Cluster Node 1 Server** should now appear without any drive letter mounted. Assign the same letters to those that were used when these drives were formatted.

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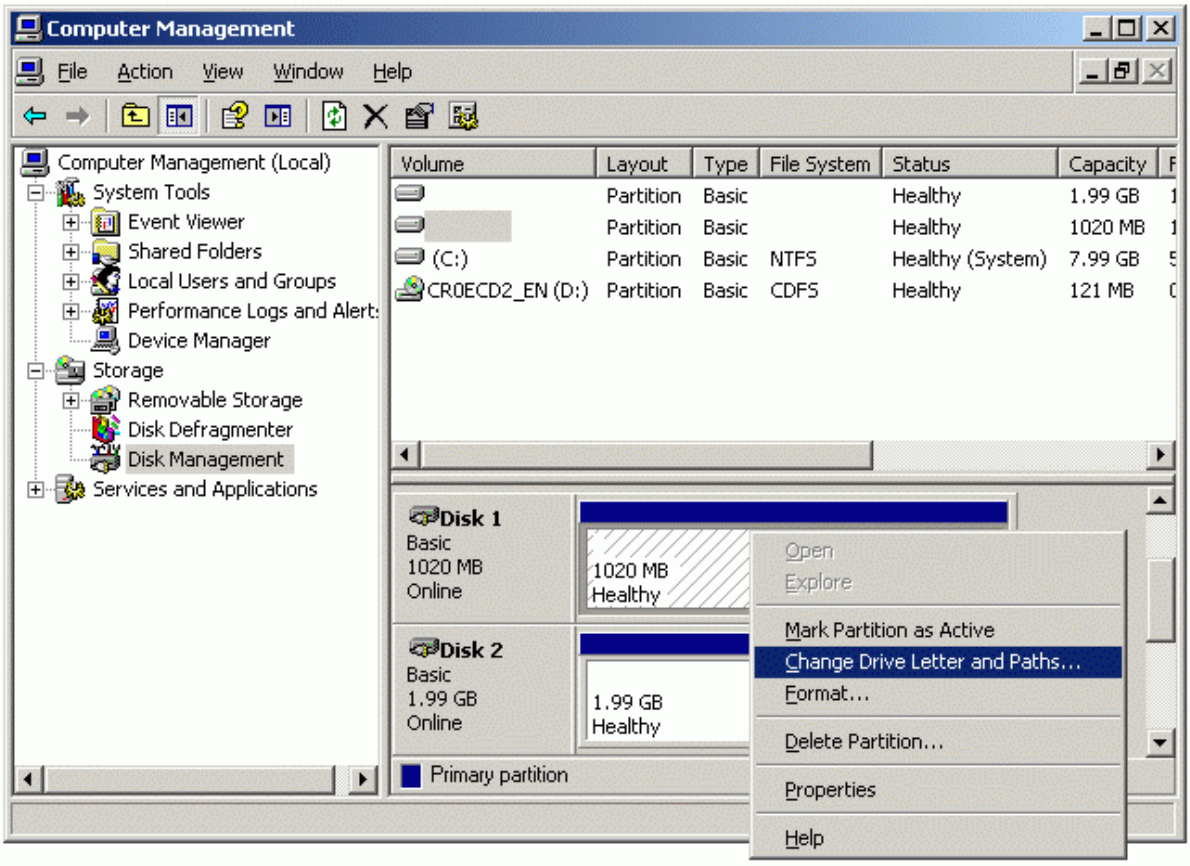
Press the right mouse button over the Quorum volume.




Select **Change Drive Letter and Paths...**

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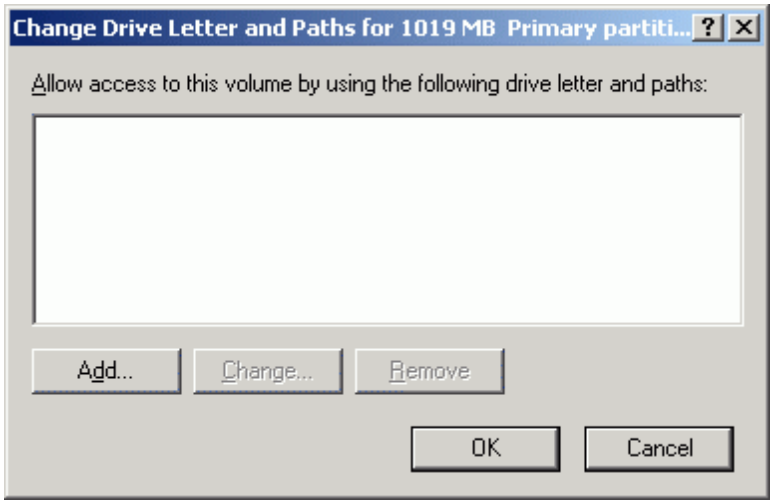
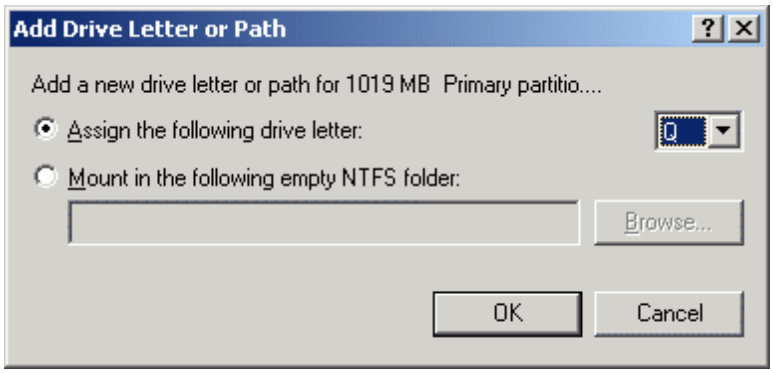
Change the Drive Latter for the Quorum to Q.

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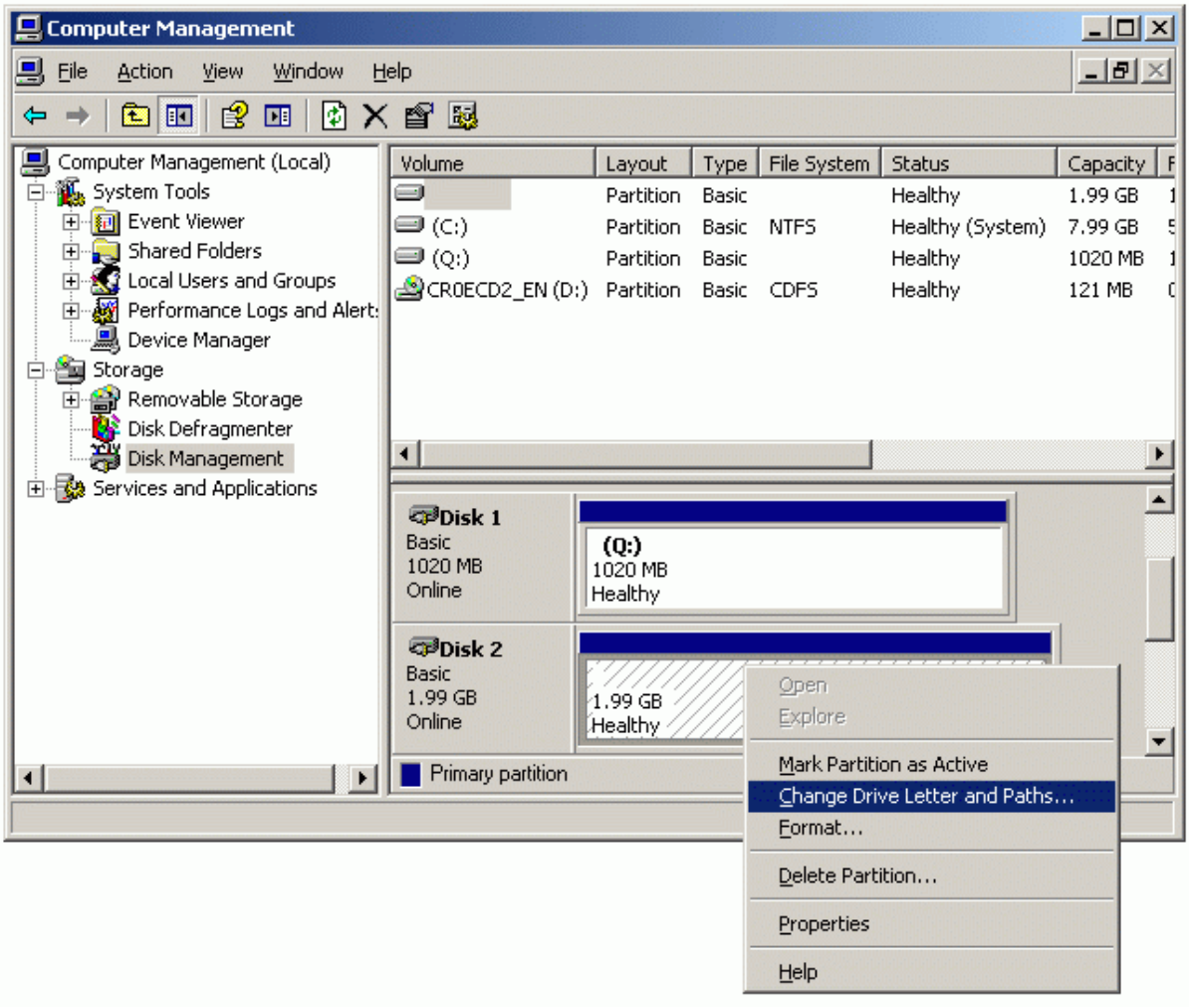
Press the right mouse button over the Generic volume.




Select **Change Drive Letter and Paths...**

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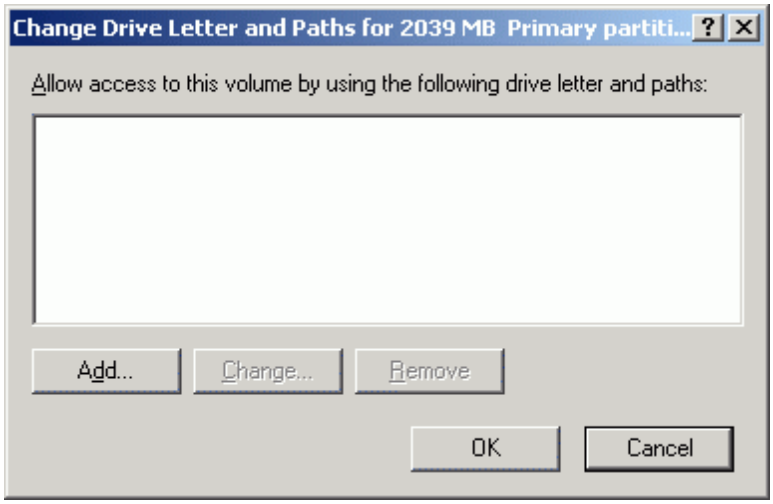
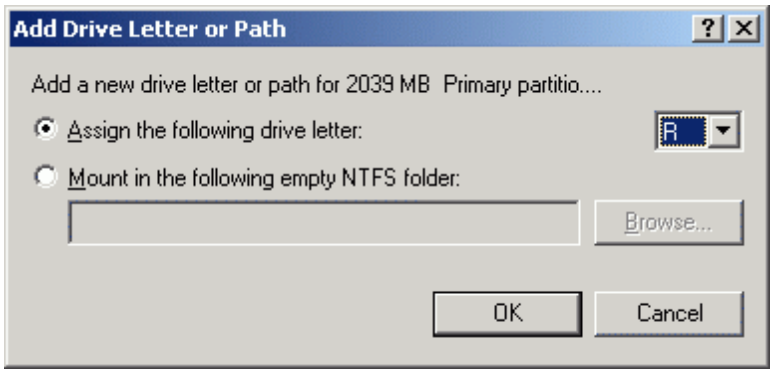
Change the Drive Latter for the Generic to R.

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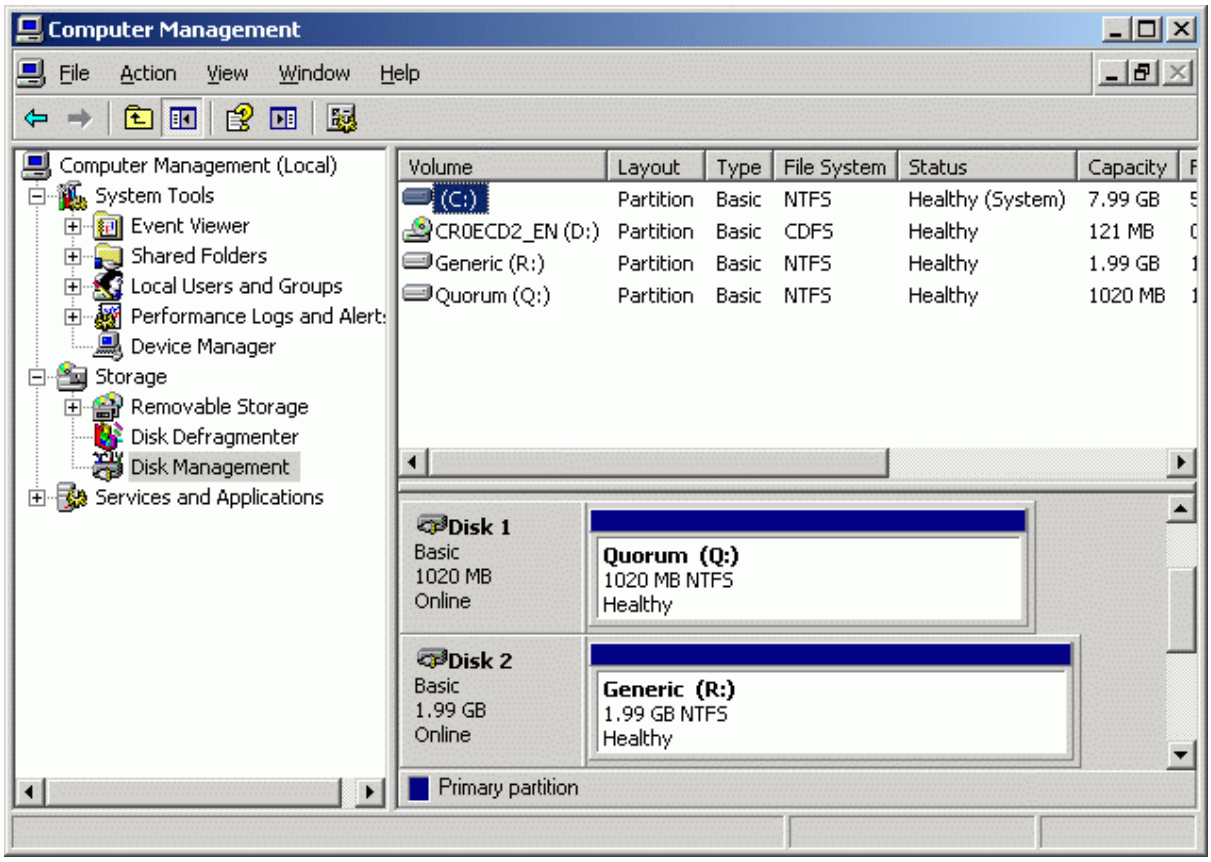
If successful, the **Computer Management** console should look like the sample image provided below.




Shut down the server.

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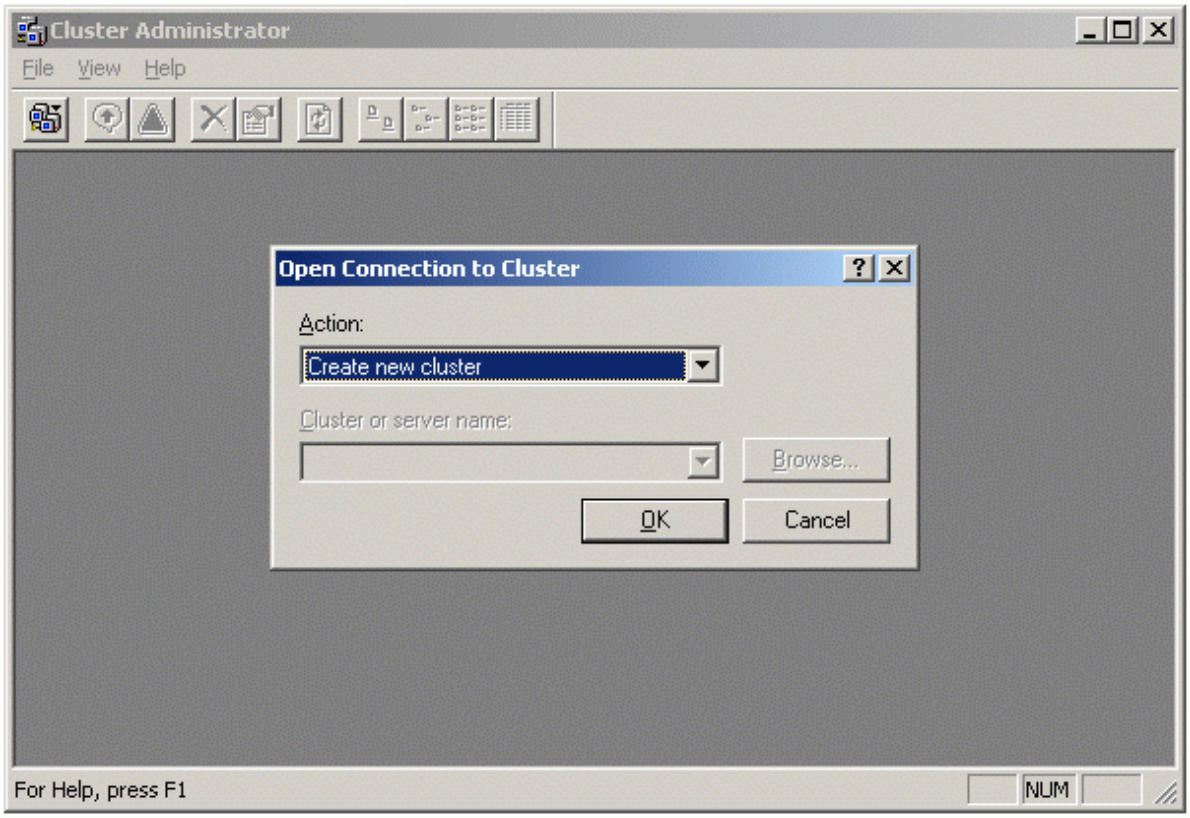
## Configuring Microsoft Cluster Service

### Node 1

Turn on the **Cluster Node 1 Server**. Log in to the server using an account with administrative privileges (**node1adm**). Launch the **Cluster Administrator** console.
Select **Create new cluster** item from the **Action** drop-down list of the **Open Connection to Cluster** dialog box.




Press the **OK** button to continue.

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**New Server Cluster Wizard** appears.


Press the **Next** button to continue.

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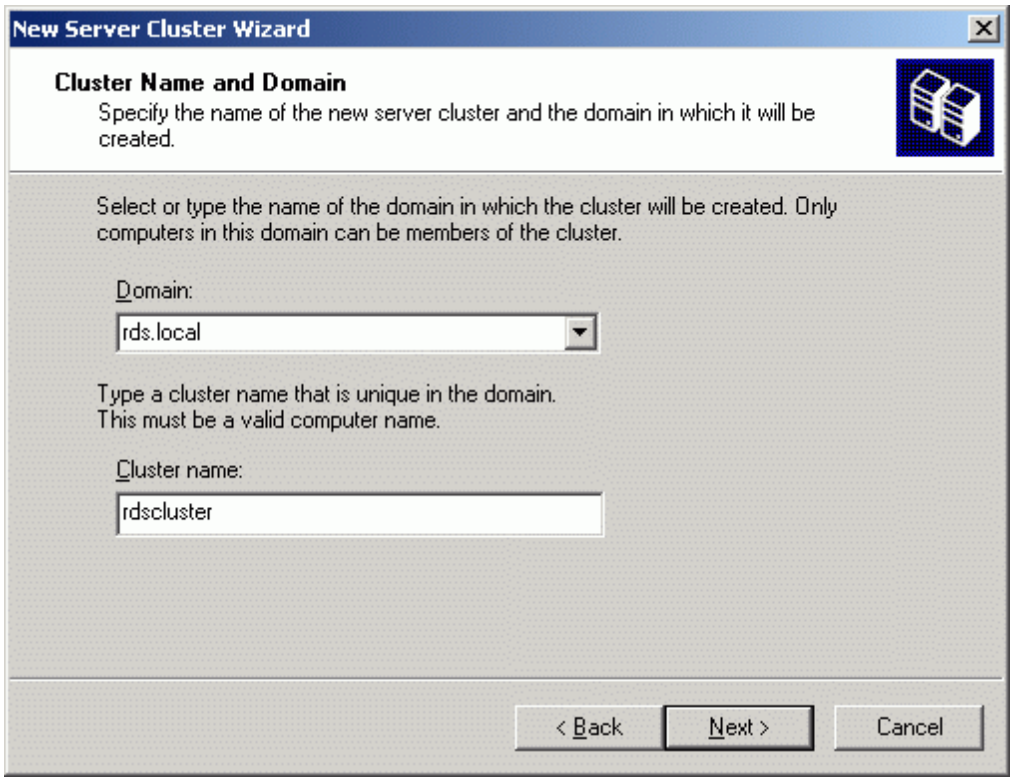
On the **Cluster Name and Domain** page, specify the appropriate cluster and domain names.




Press the **Next** button to continue.

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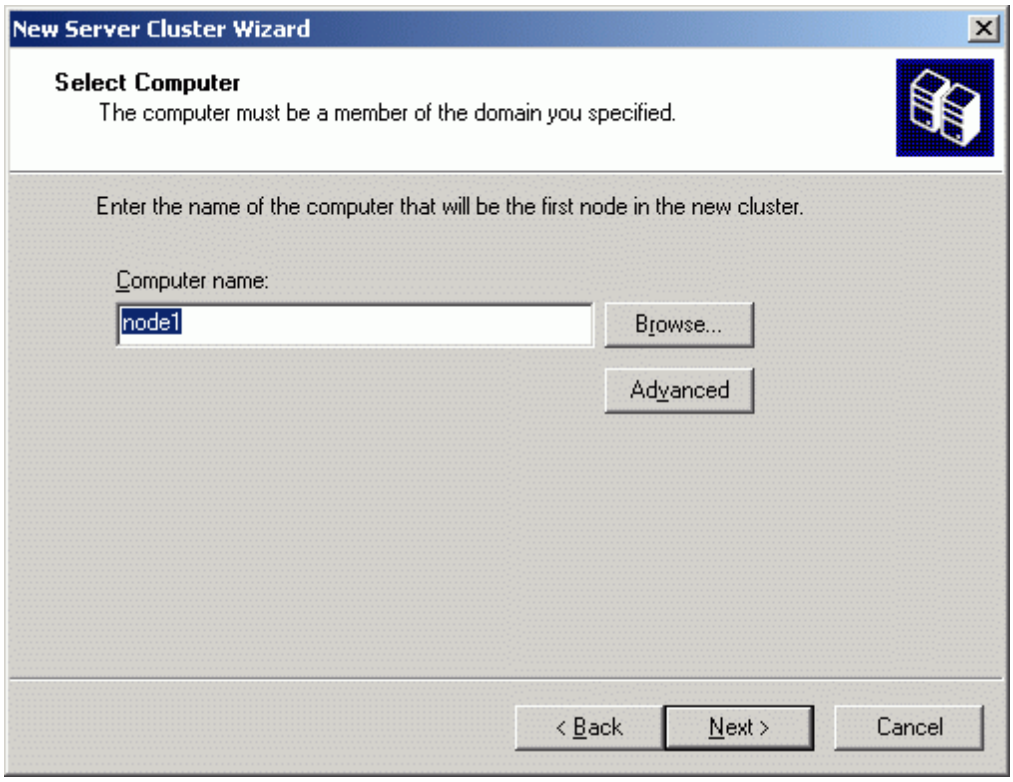
On the **Select Computer** page of the wizard the computer name of the first node in the cluster should already be filled in. If not, specify the name of the computer in the edit box.




Press the **Next** button to continue.

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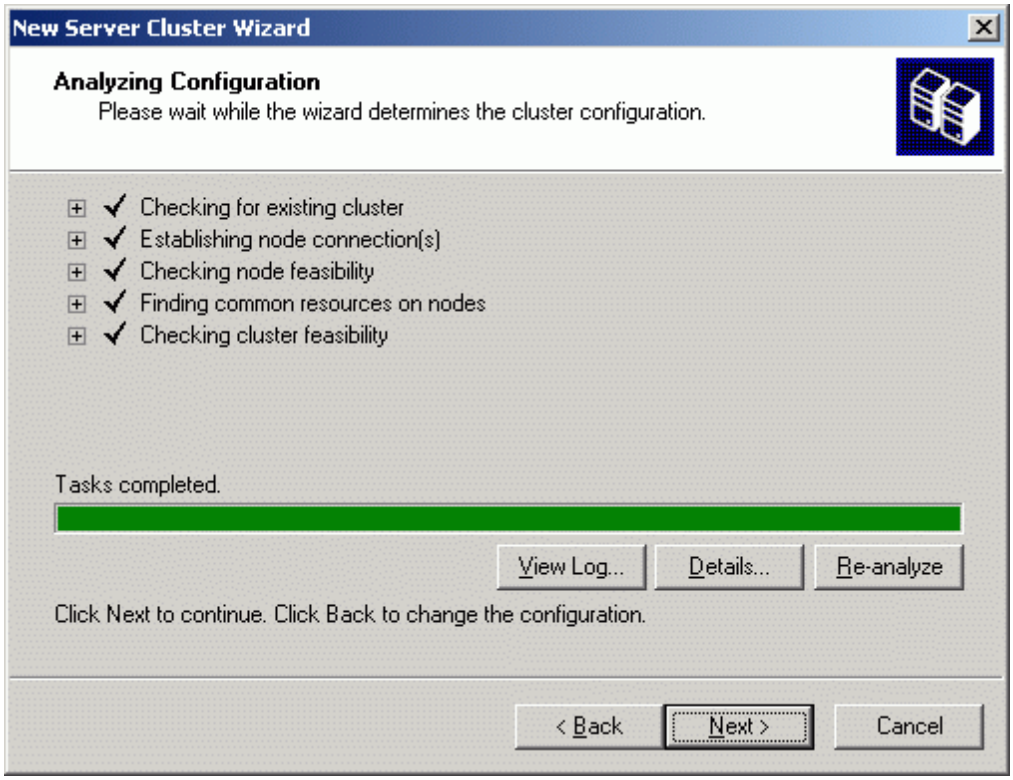
The wizard will analyze the settings, including the shared resource and network connectivity. If everything goes well, the **Next** button becomes enabled. If any errors occurred, review the information and correct the errors before proceeding.




Press the **Next** button to continue.

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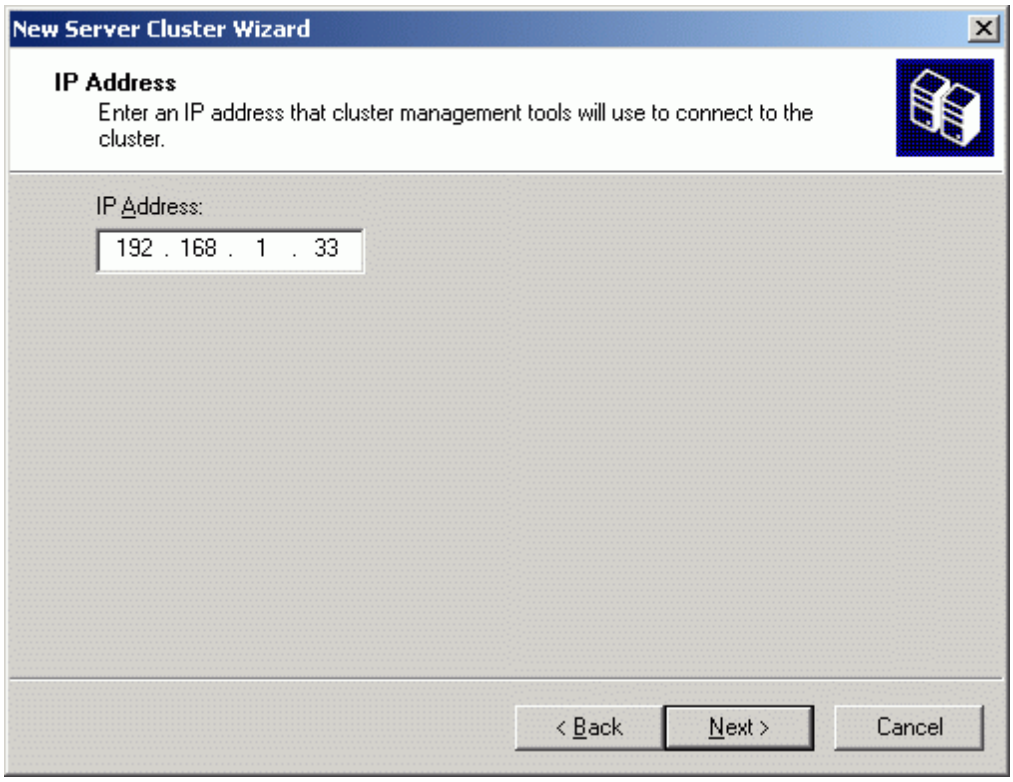
On the **IP Address** page, specify the IP address for the cluster. This address maps to the cluster name and should not be used by other computers.




Press the **Next** button to continue.

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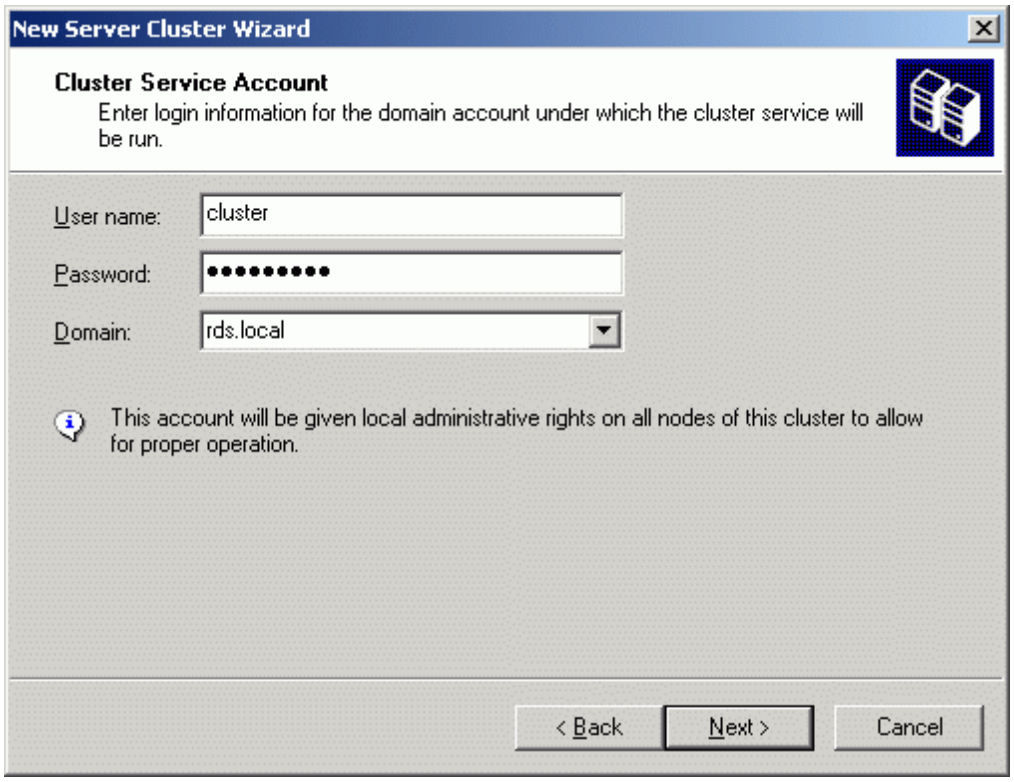
On the **Cluster Service Account** page specify the domain account that the service will run under. This account must be a domain user.




Press the **Next** button to continue.

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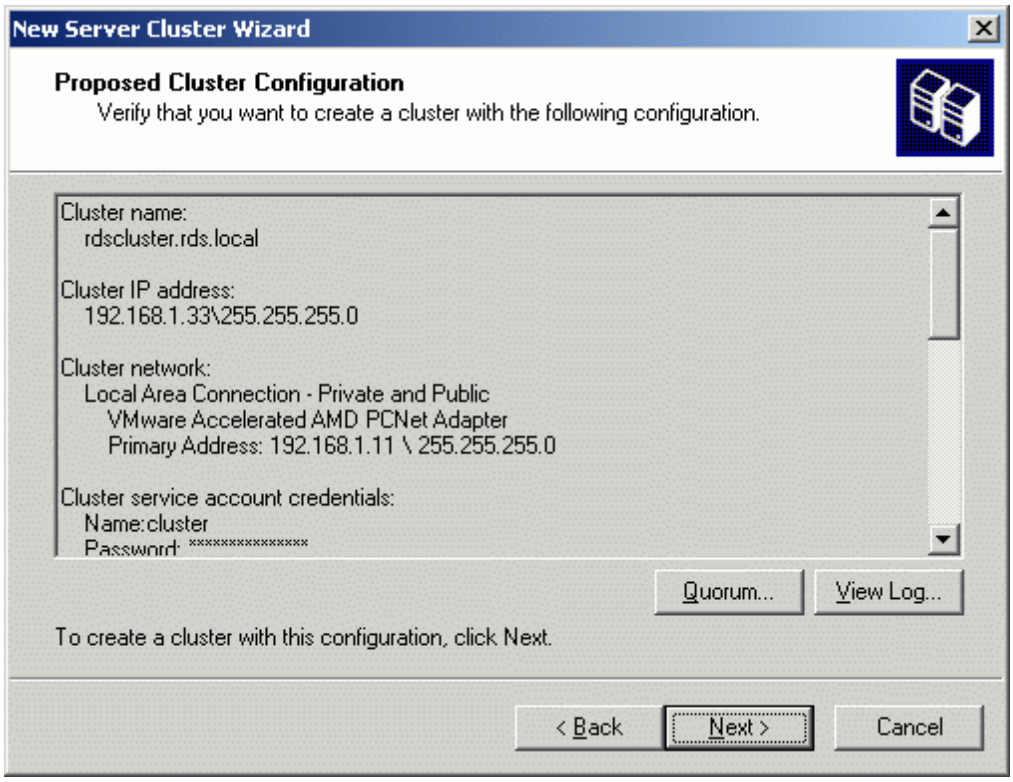
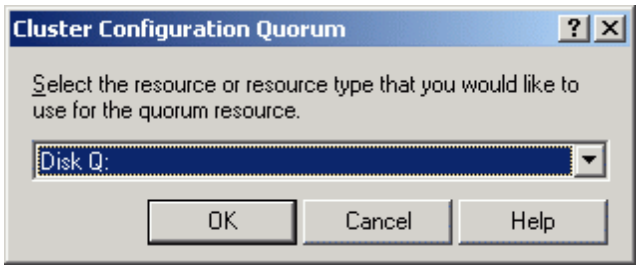
Verify that all information on the **Proposed Cluster Configuration** page is correct. Configure the quorum settings (Press the **Quorum…** button and select the disk to be used as quorum).




Press the **OK** button.
Press the **Next** button to create the cluster.

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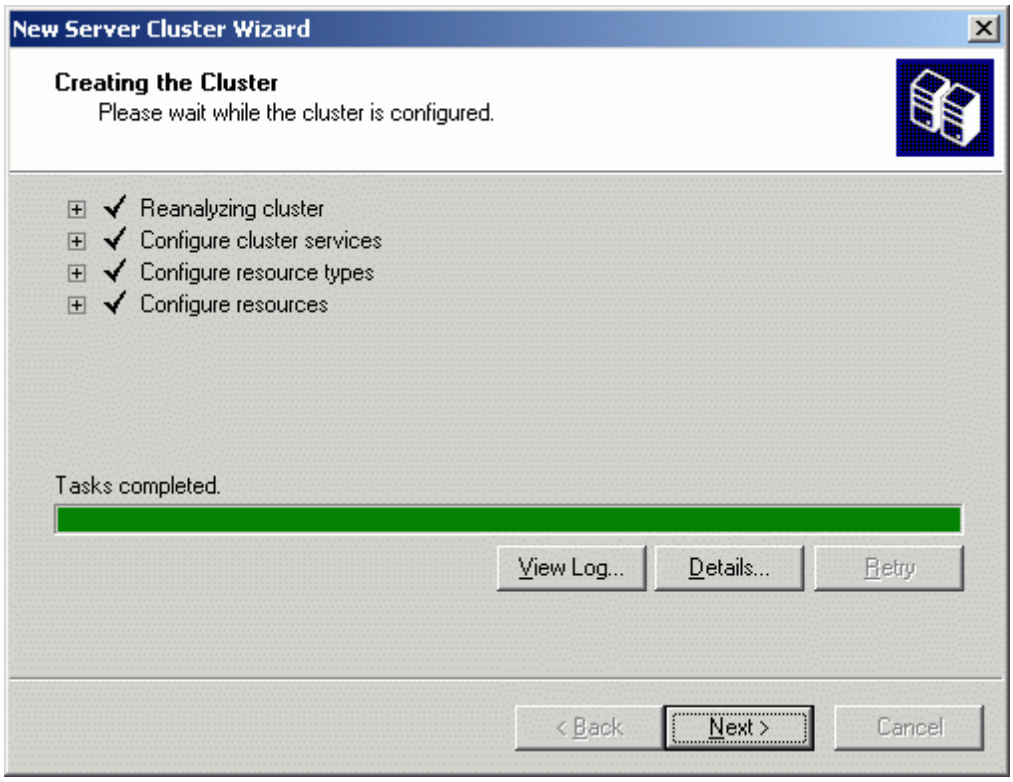
The wizard will attempt to create the cluster. The process may take a few minutes. If there any errors occurred, review the log and error messages to solve the problem. When complete, the **Next** button becomes enabled.




Press the **Next** button to continue.

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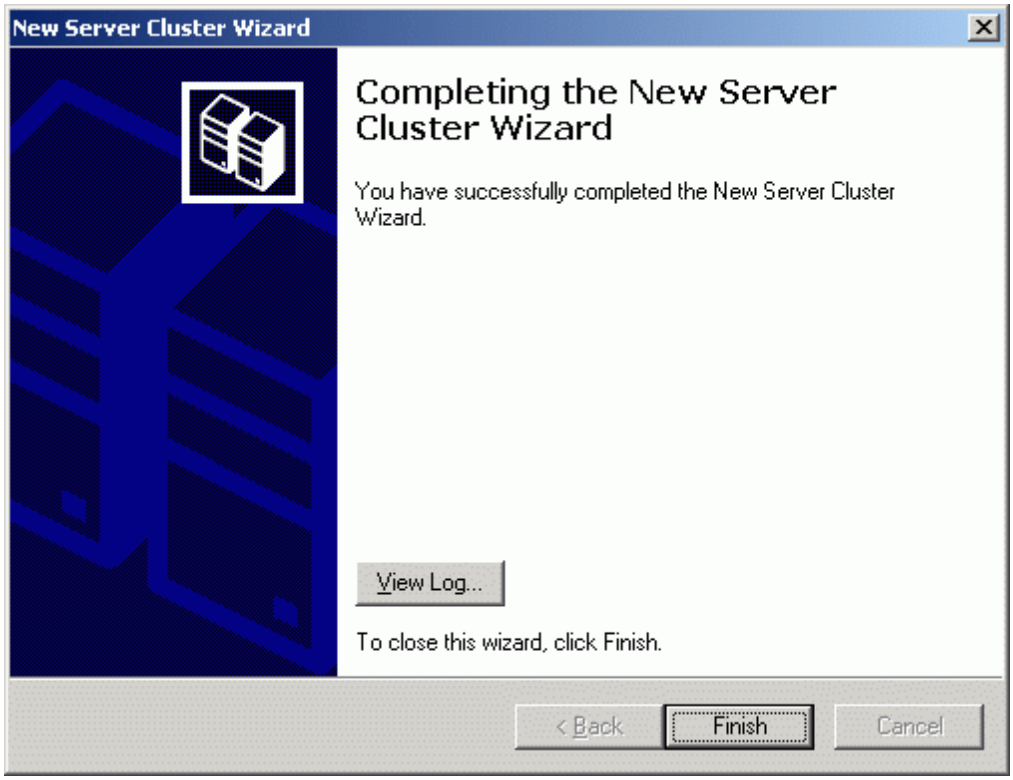
Completing the **New Server Cluster Wizard** page appears.




Press the **Finish** to complete the task. The cluster is now operational and additional nodes can be added to the cluster.

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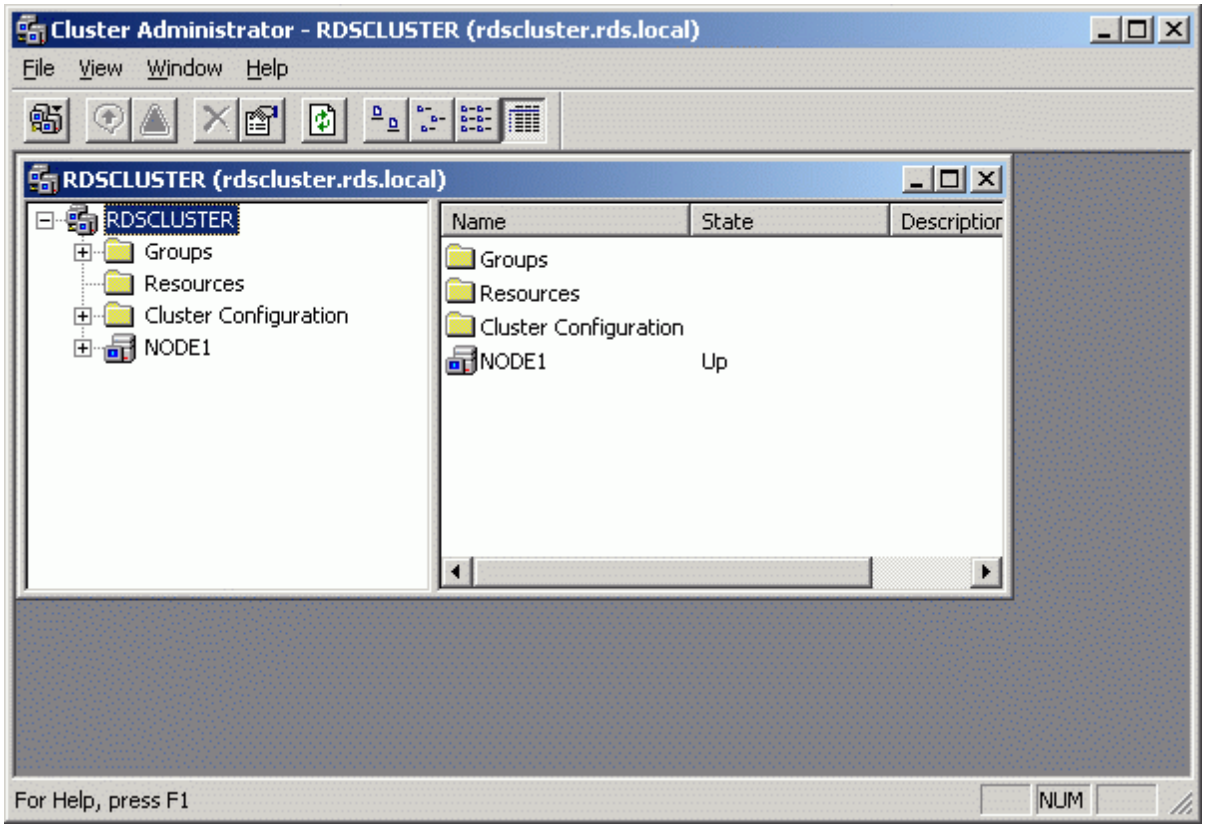
The new cluster is created.

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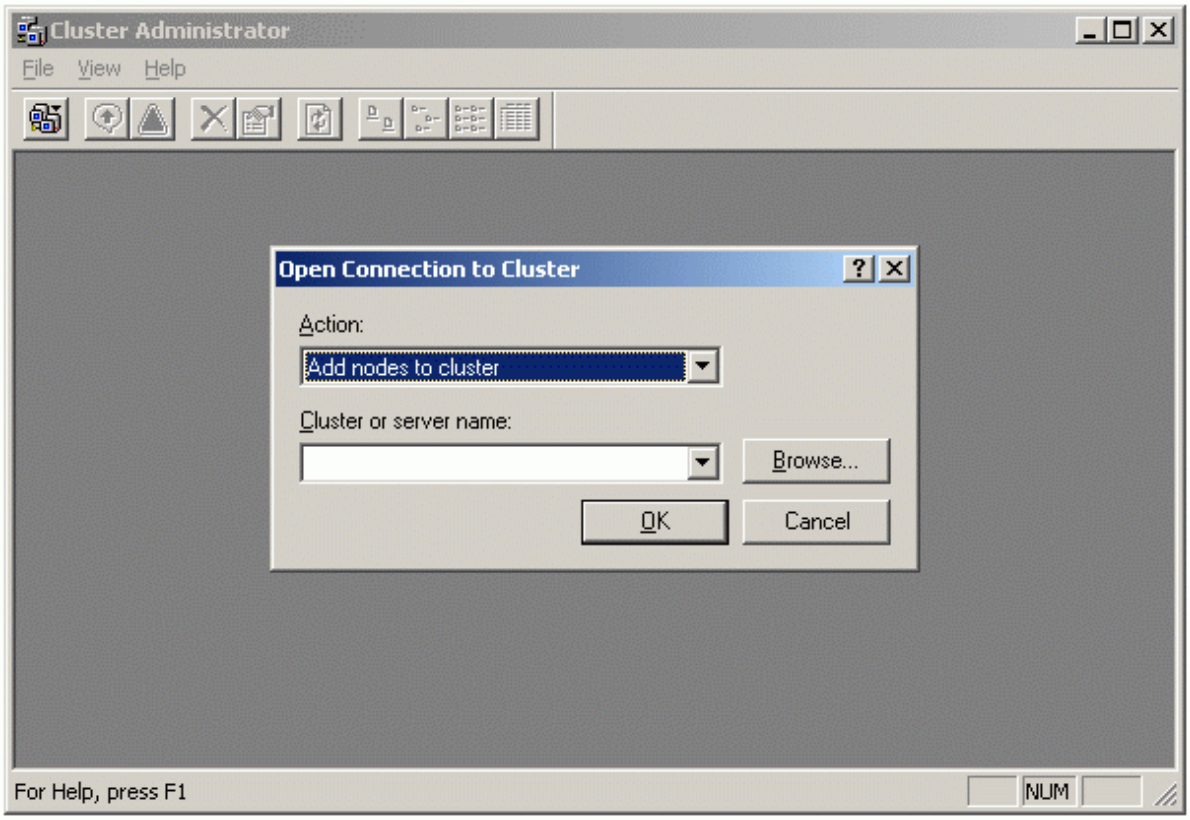
## Node 2

Turn on the **Cluster Node 2 Server**. Log in to the server using an account with administrative privileges (**node2adm**). Launch the **Cluster Administrator** console.

Select **Add nodes to cluster** item from the Action drop-down list of the **Open Connection to Cluster** dialog box.




Press the **OK** button to continue.

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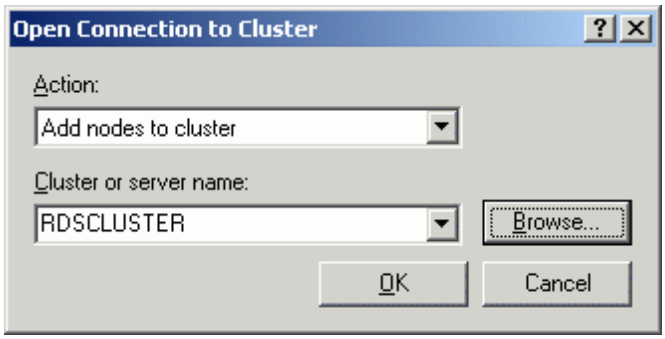
Press the **Browse** button and specify the name of the recently created cluster in the **Cluster or server name** list.




Press the **OK** button to add this server to the cluster.

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**Add Nodes Wizard** appears.


Press the **Next** button to continue.

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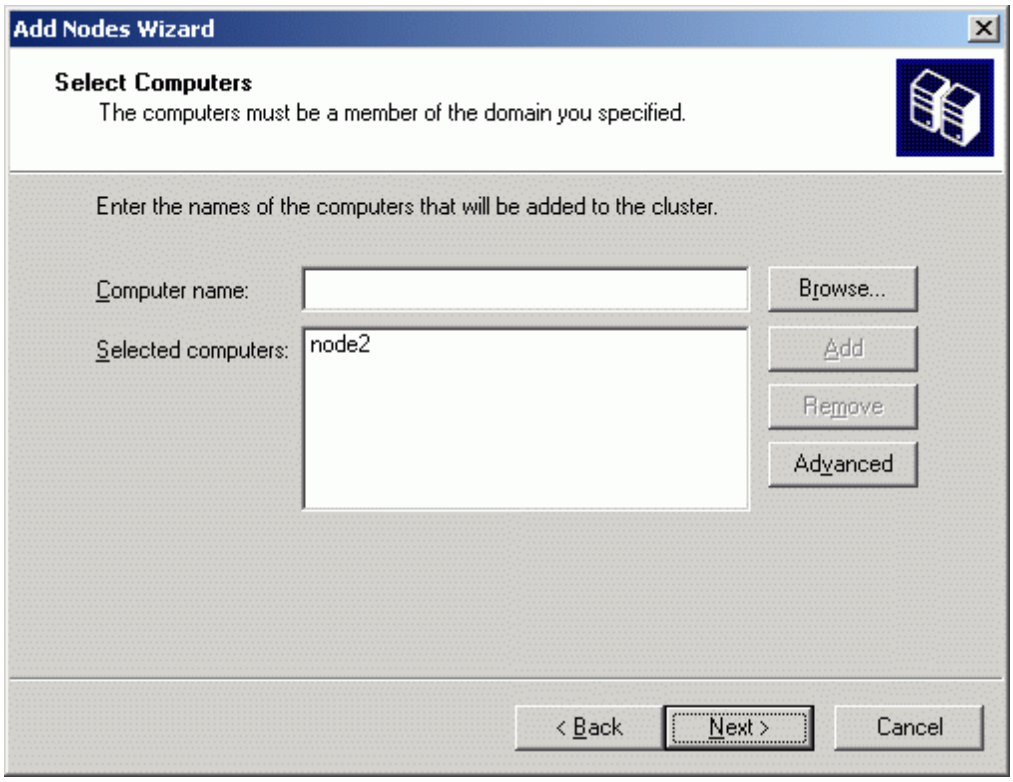
On the **Select Computers** page, press the **Add** button to add the server to the cluster.




Press the **Next** button to continue.

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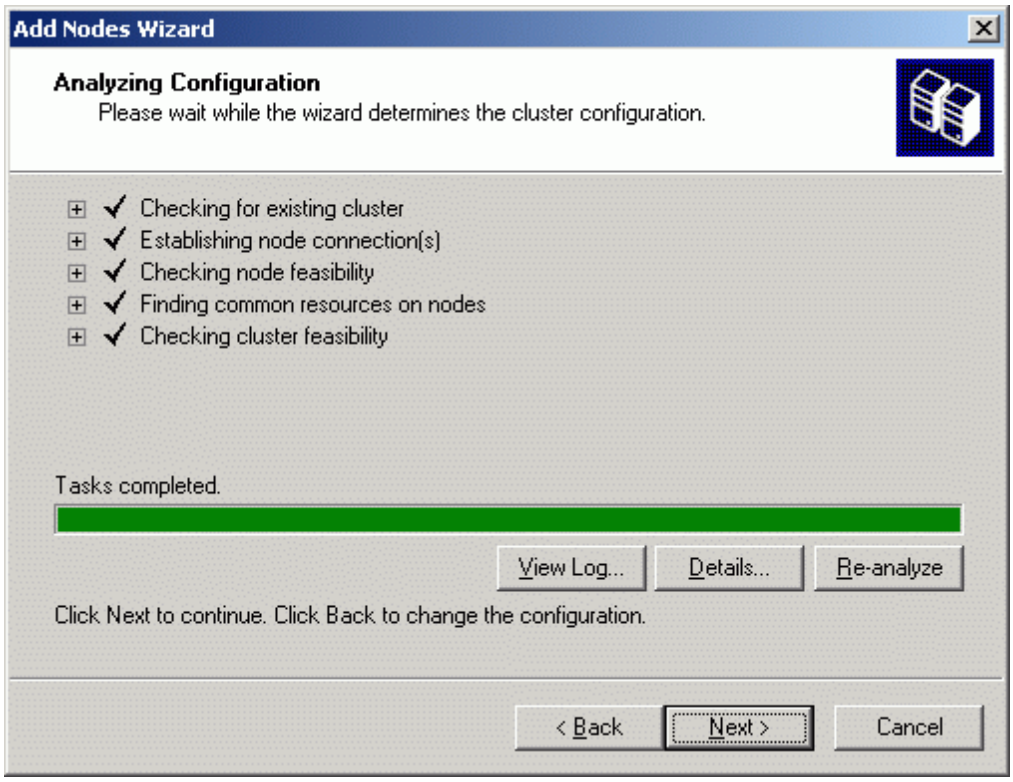
The wizard will start to analyze the configuration provided. If there are no errors, the **Next** button becomes enabled. If any errors occurred, review the detailed information and correct the errors before proceeding.




Press the **Next** button to continue.

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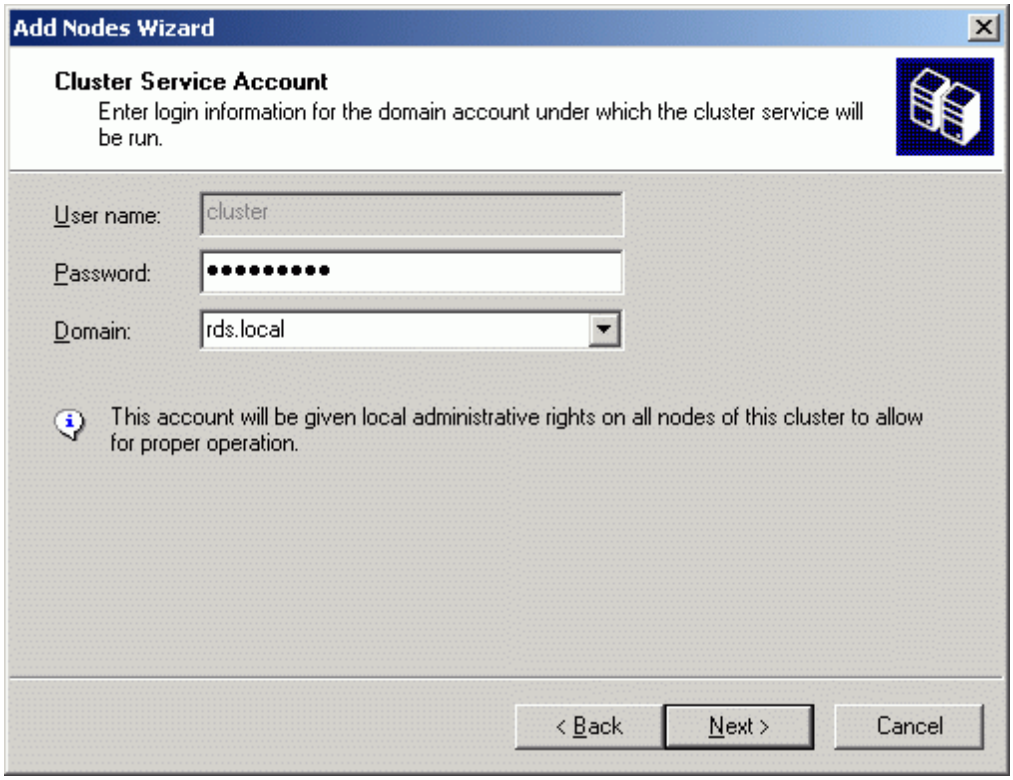
Enter the password for the user provided to run the cluster service.




Press the **Next** button to continue.

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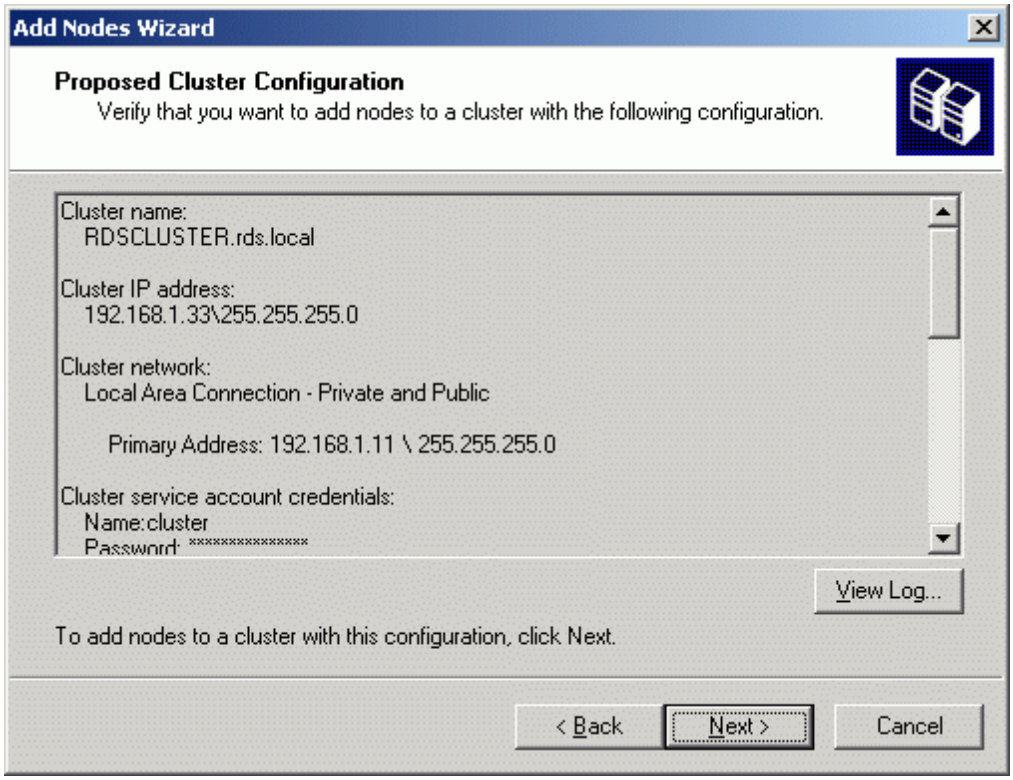
The **Proposed Cluster Configuration** page appears.




Press the **Next** button to add this server to the cluster.

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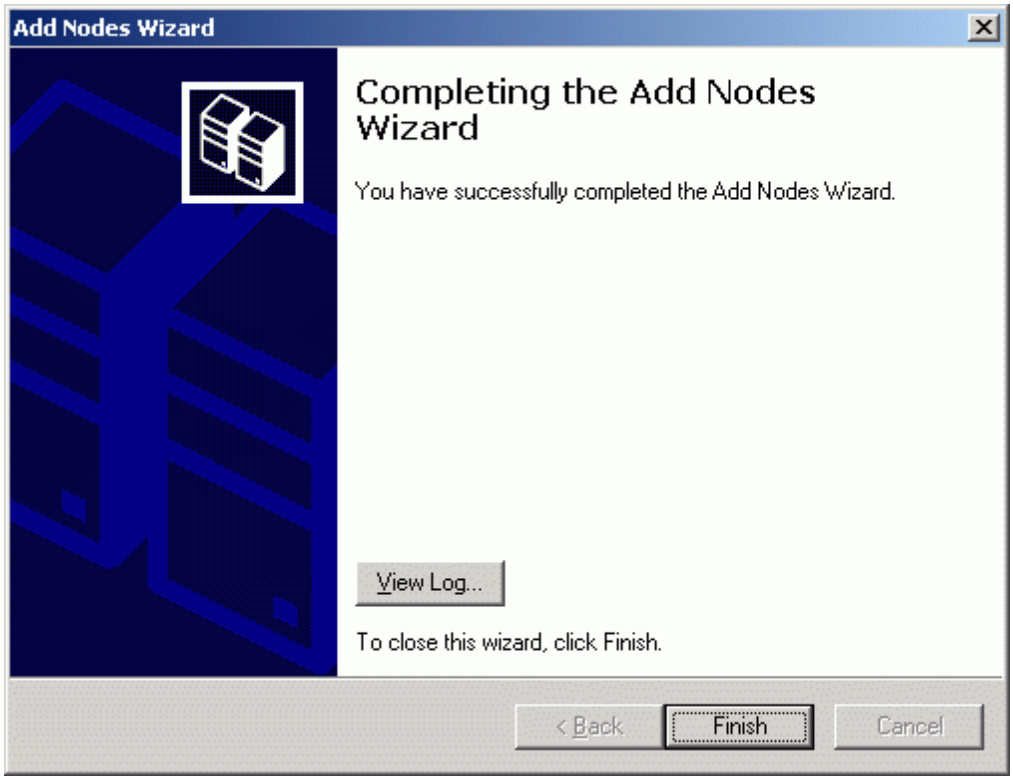
**Completing the Add Nodes Wizard** page appears.




Press **Finish** to complete the operation. The server is now a node in the cluster.

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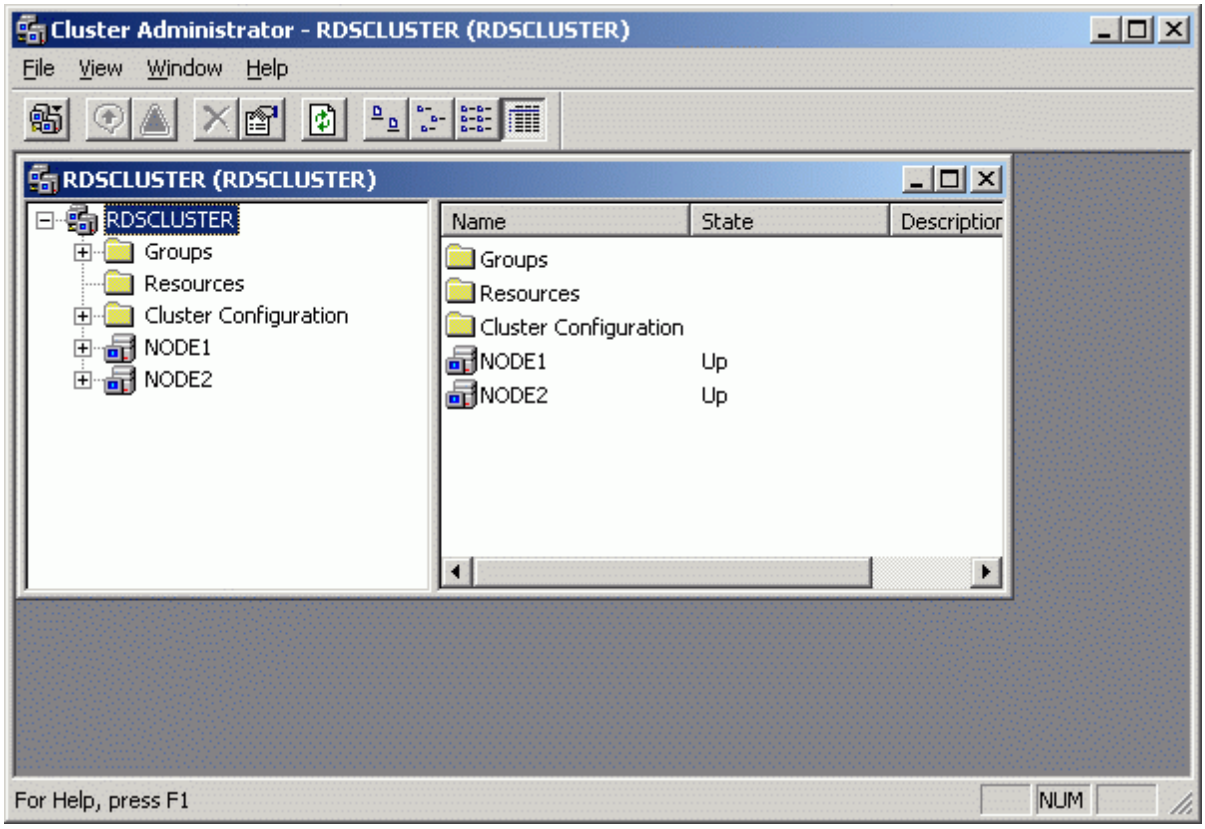
The new node is added to the cluster.

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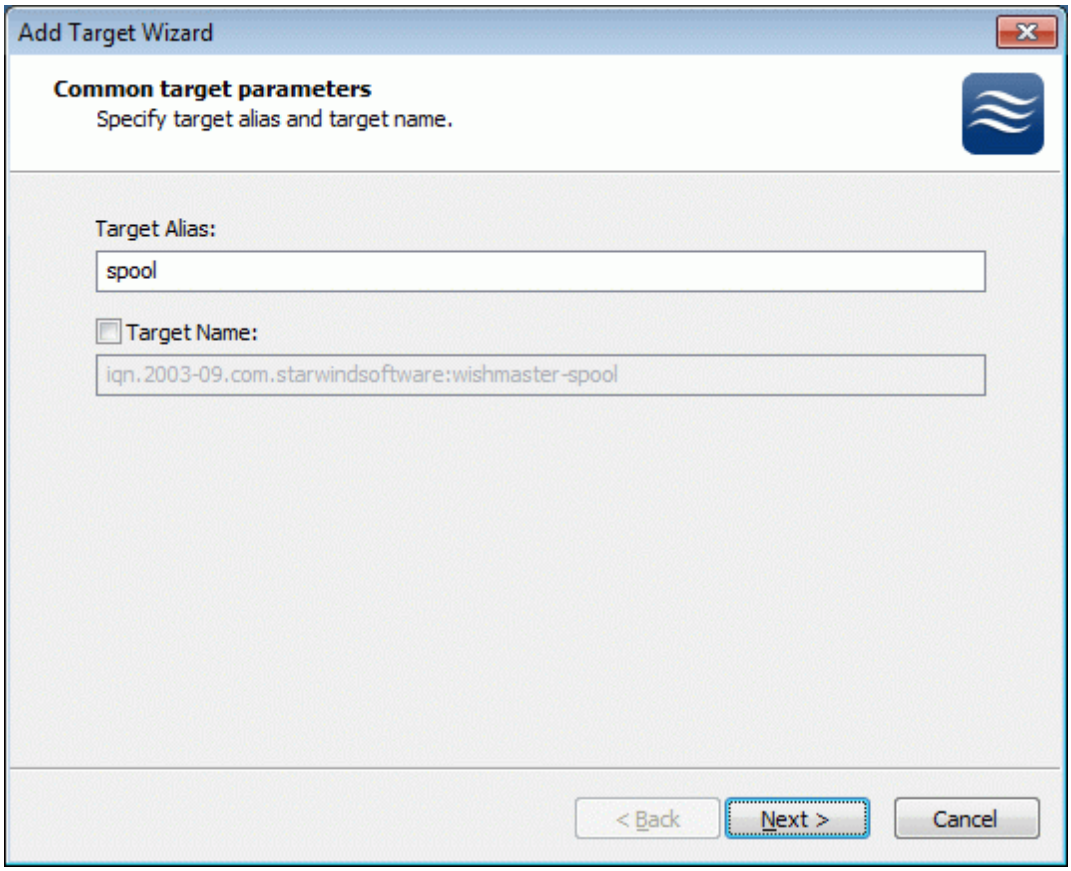
## Adding New Shared Disk Resource

### StarWind Target

Click the right mouse button over the host and select **Add Target** pop-up menu item.

In the wizard that appears, select a target name. The name must be a unique name by which the device will be declared to the iSCSI initiators connecting to **StarWind** over an IP network.




Press the **Next** button to continue.

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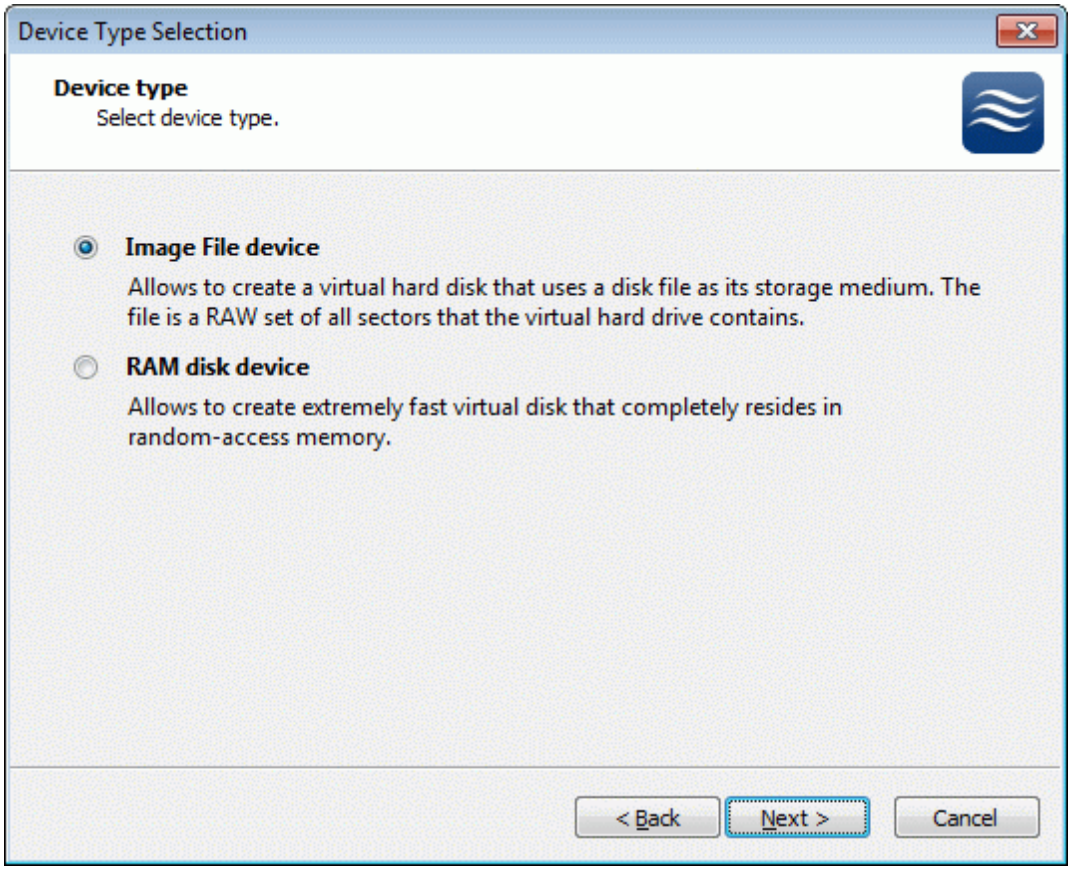
Select **Image File device**.




Press the **Next** button to continue.

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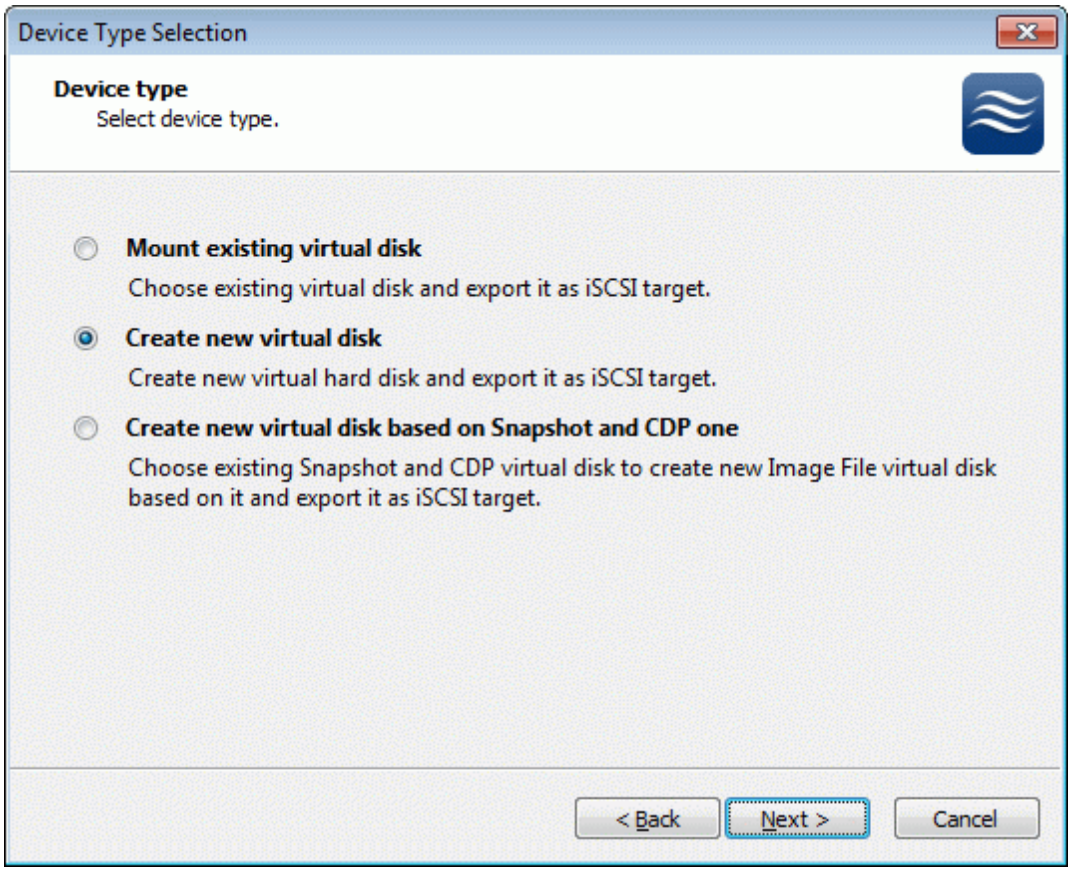
Select **Create new virtual disk** to create a new virtual hard disk or **Mount existing virtual disk** to mount an existing virtual disk that you've prepared before.




Press the **Next** button to continue.

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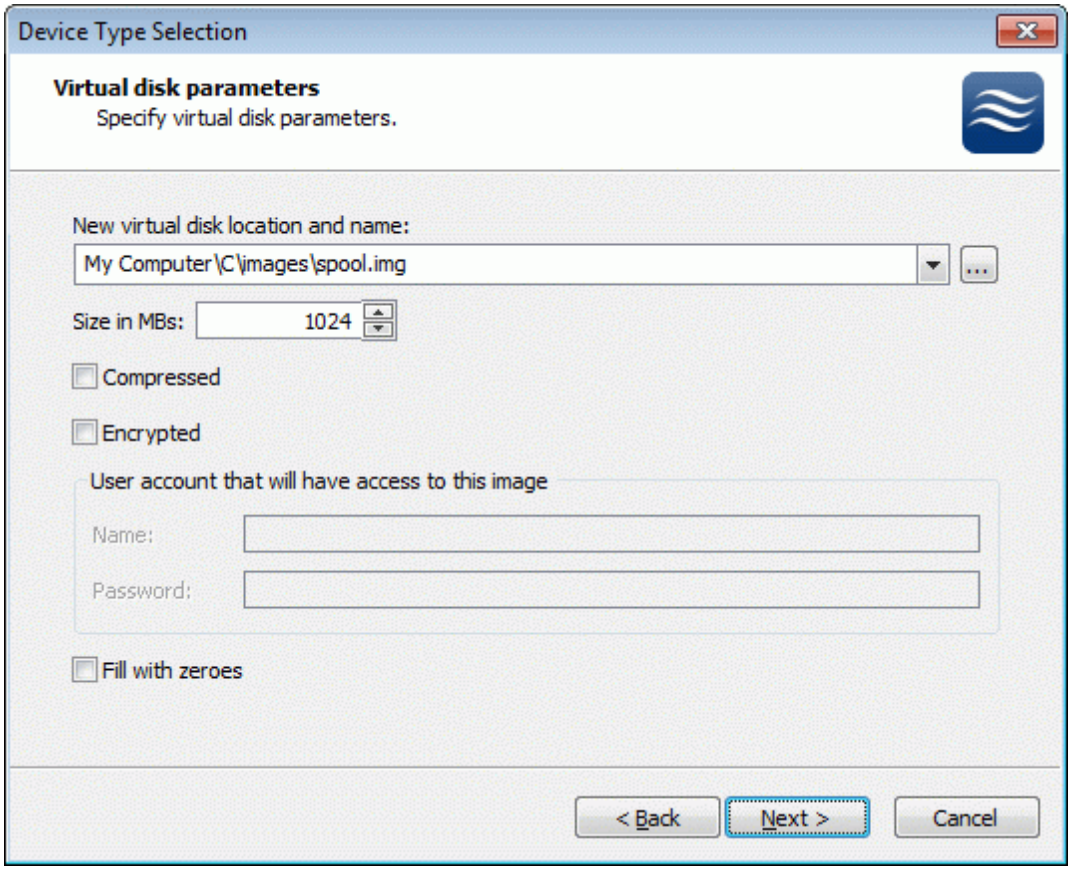
If you have decided to create a new virtual disk please specify the location and the name of the virtual disk you wish to be created. Also you have to provide the virtual disk size in megabytes. Check any additional parameters of the virtual dsik you wish to create. Please refer to the online help for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




Press the **Next** button to continue.

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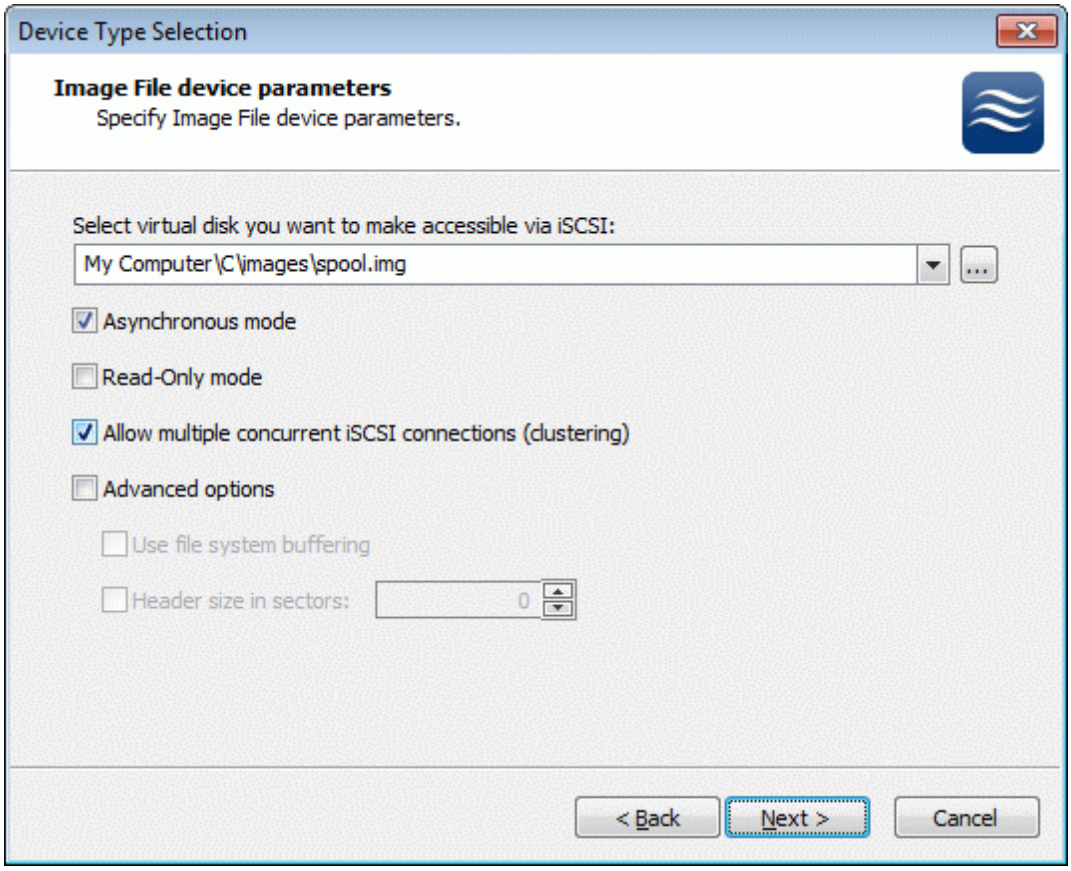
Image File device has some extra parameters. Check **Allow multiple concurrent iSCSI connections (clustering)** checkbox. Please refer to the online help for details regarding those additional parameters (**Asynchronous mode, Allow multiple connections (clustering), Read-only mode** and **Specify advanced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




Press the **Next** button to continue.

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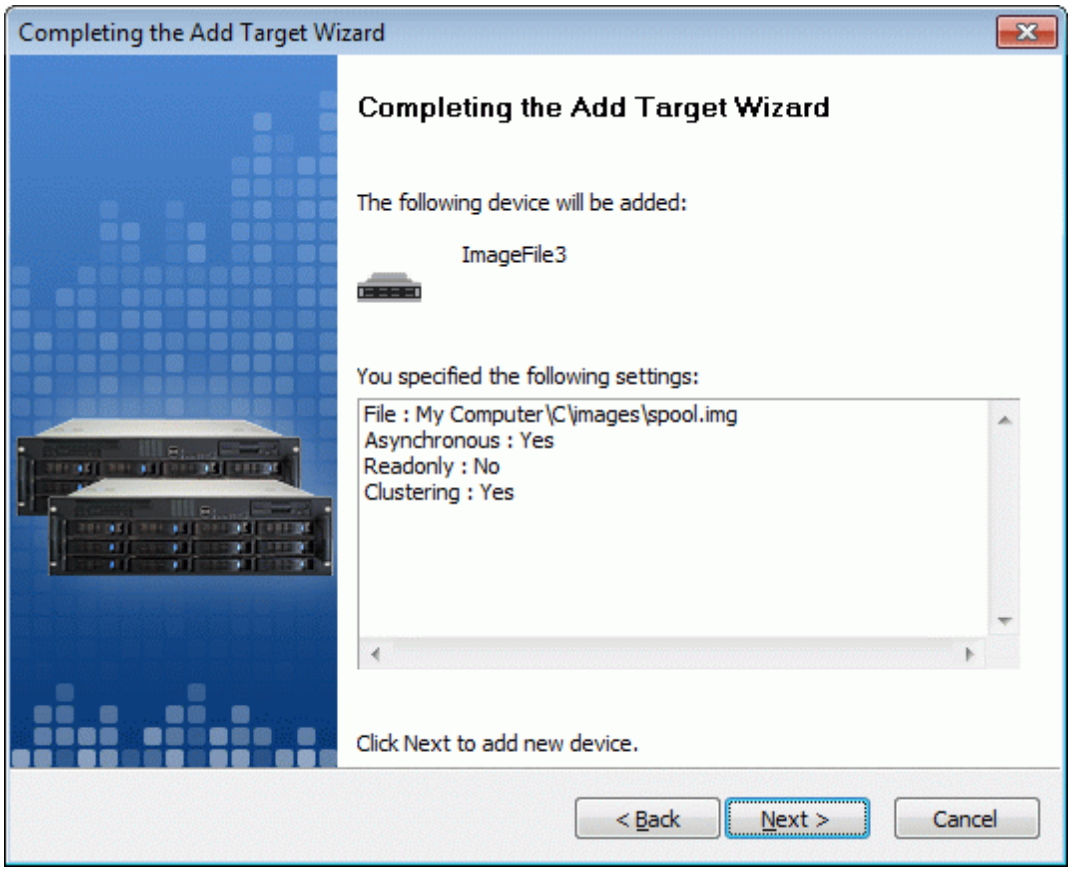
Check the device parameters are correct. Press the **Back** button should any changes be required.




Press the **Next** button to continue.

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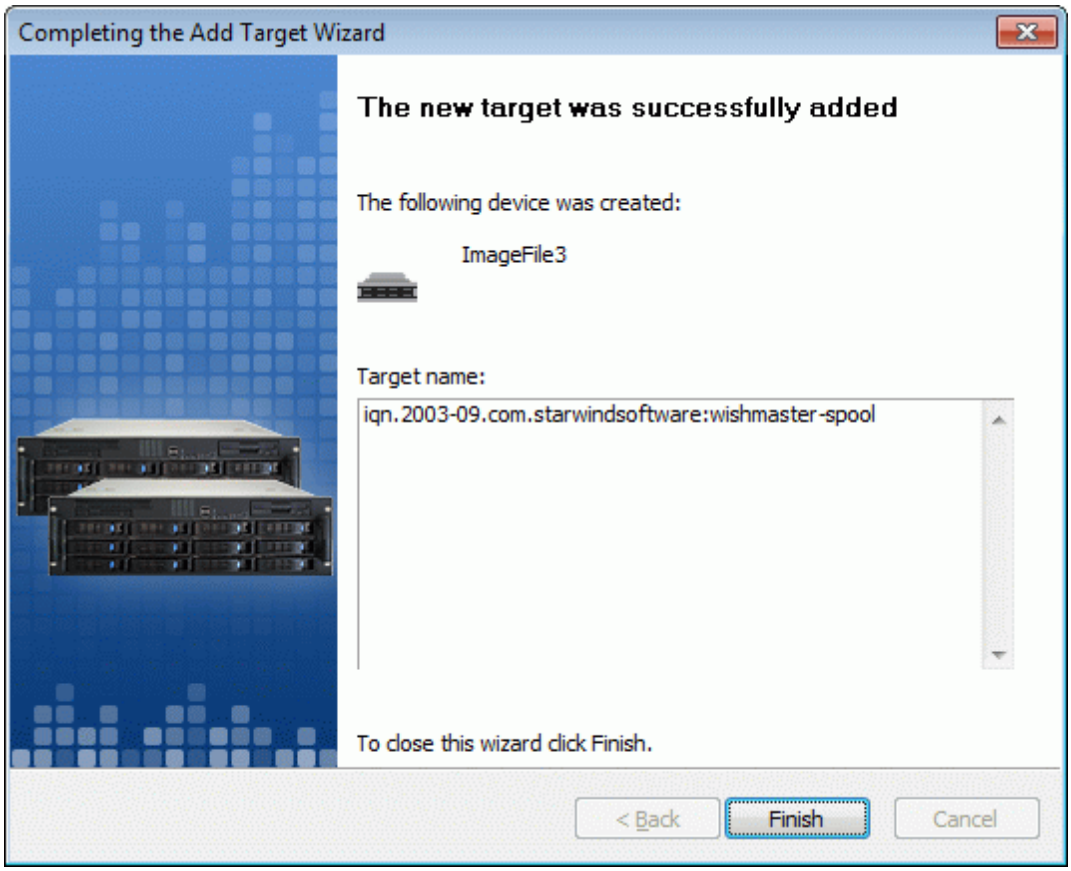
A summary of the created device is displayed on the last wizard page (see image below).




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

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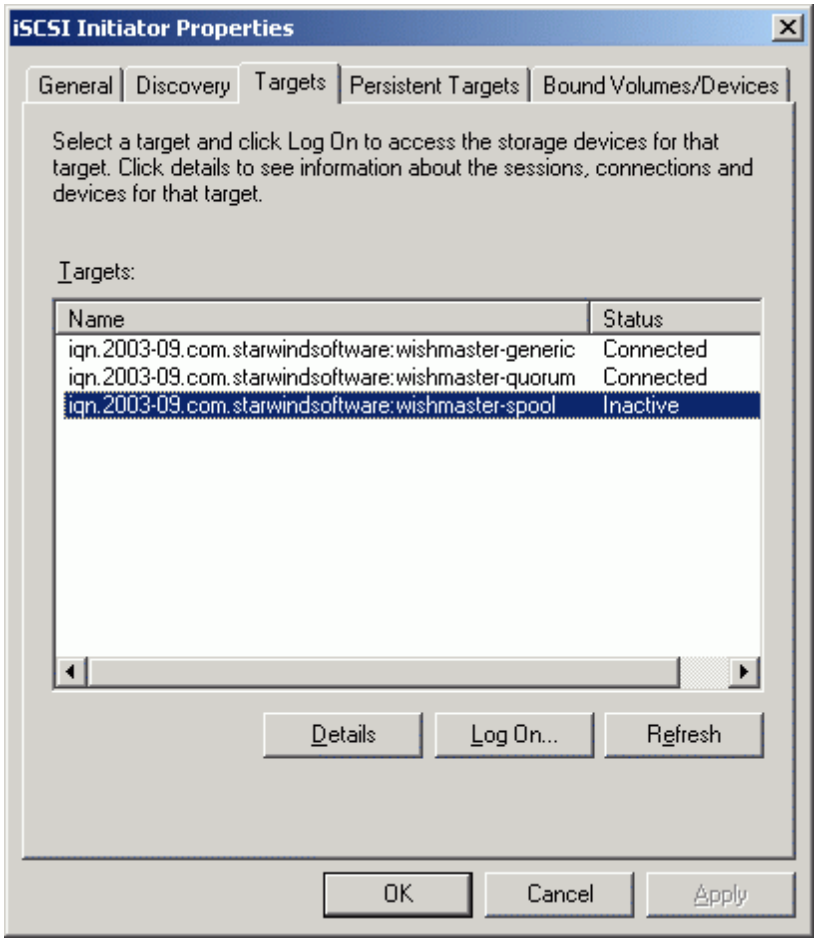
## Node 1

Launch the **MS iSCSI Initiator**. Click on the **Targets** tab. Select the IQN of the target just added.




Press the **Log On…** button.

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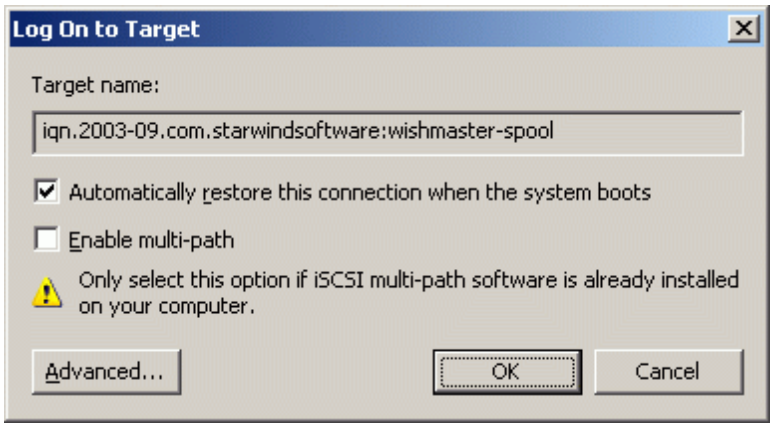
The **Log On to Target** dialog now appears. In this dialog click on the checkbox **Automatically restore this connection when the system boots** to make this connection persistent.




Press the **OK** button to continue.

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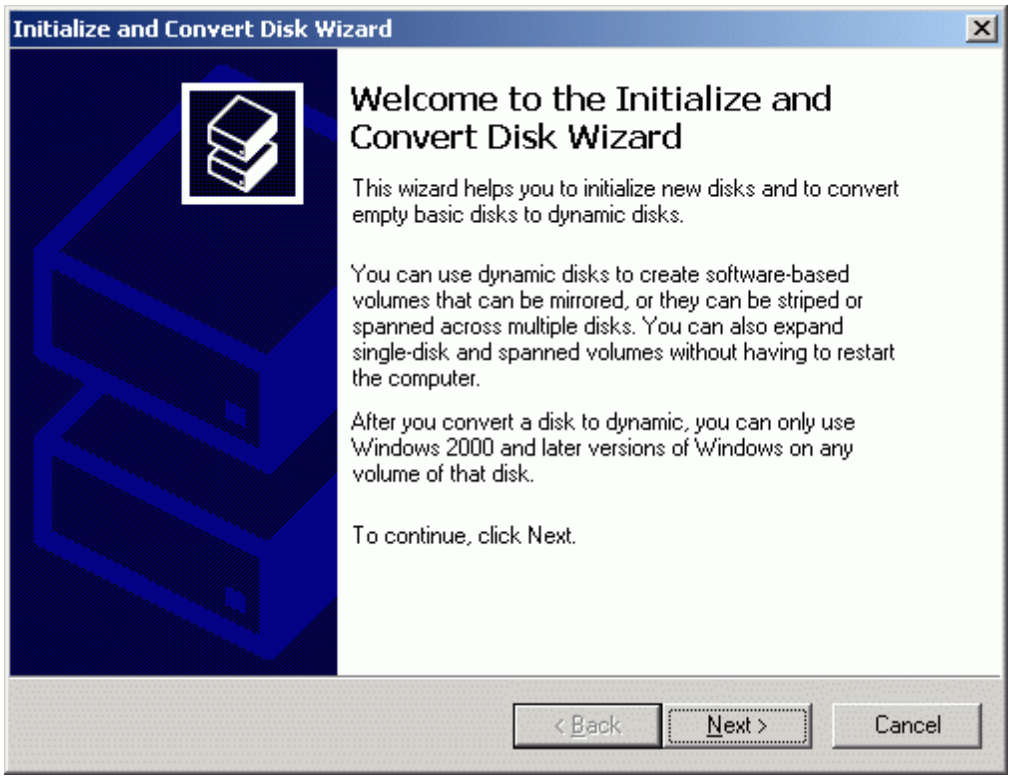
When the **StarWind** Disks is connected, it shows up on the initiator machine as new disk device. Before this device can be used as cluster disk, it have to be initialized and formatted. Launch the **Computer Management** console. Select **Disk Management**.

Follow the **Initialize and Convert Disk Wizard** to initialize the new disks. Use the default settings that Windows provides. By default the disk will be initialized as the basic disk. MSCS works only with the basic disks.




Press the **Next** button to continue.

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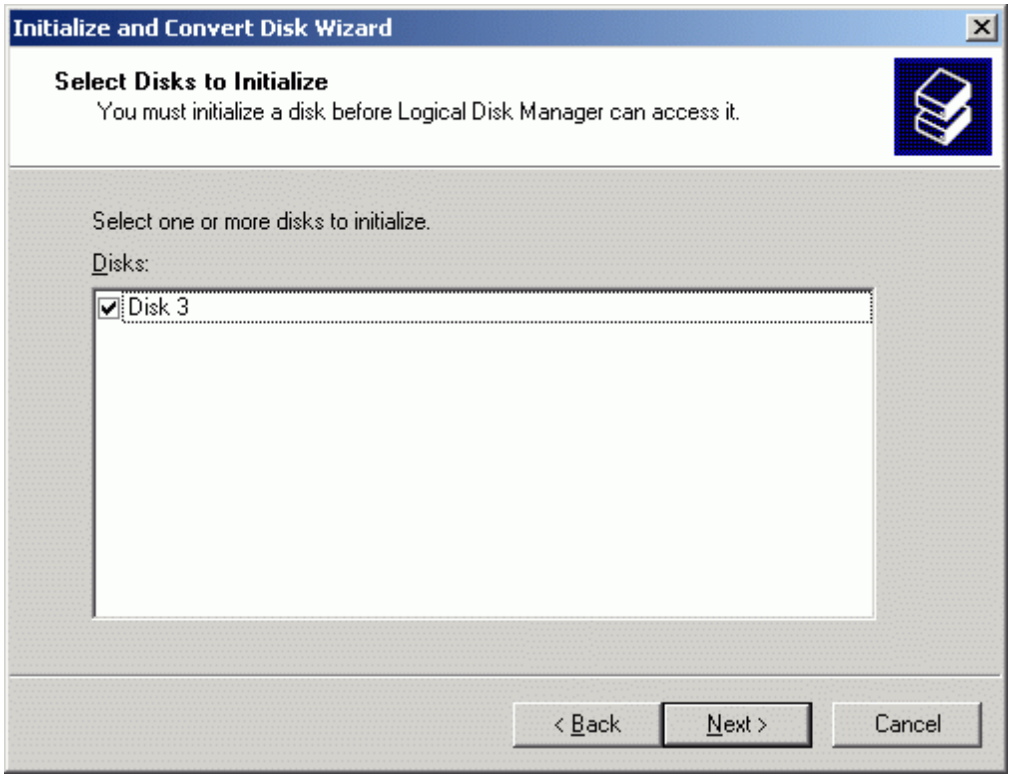


Press the **Next** button to continue.

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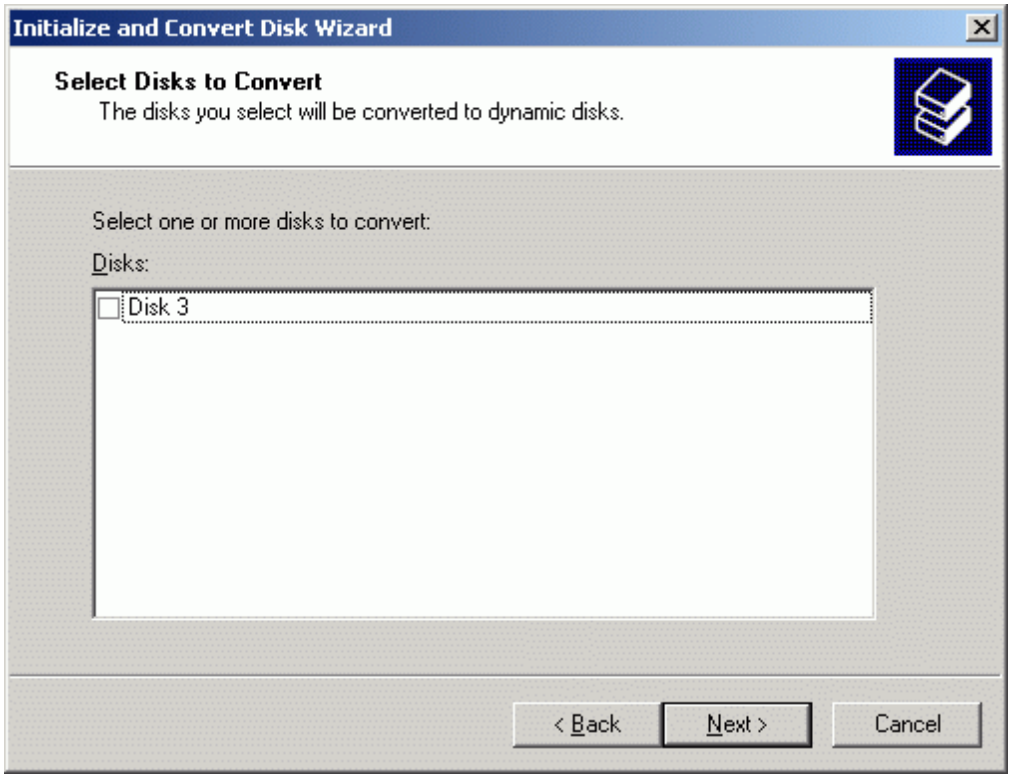


Press the **Next** button to continue.

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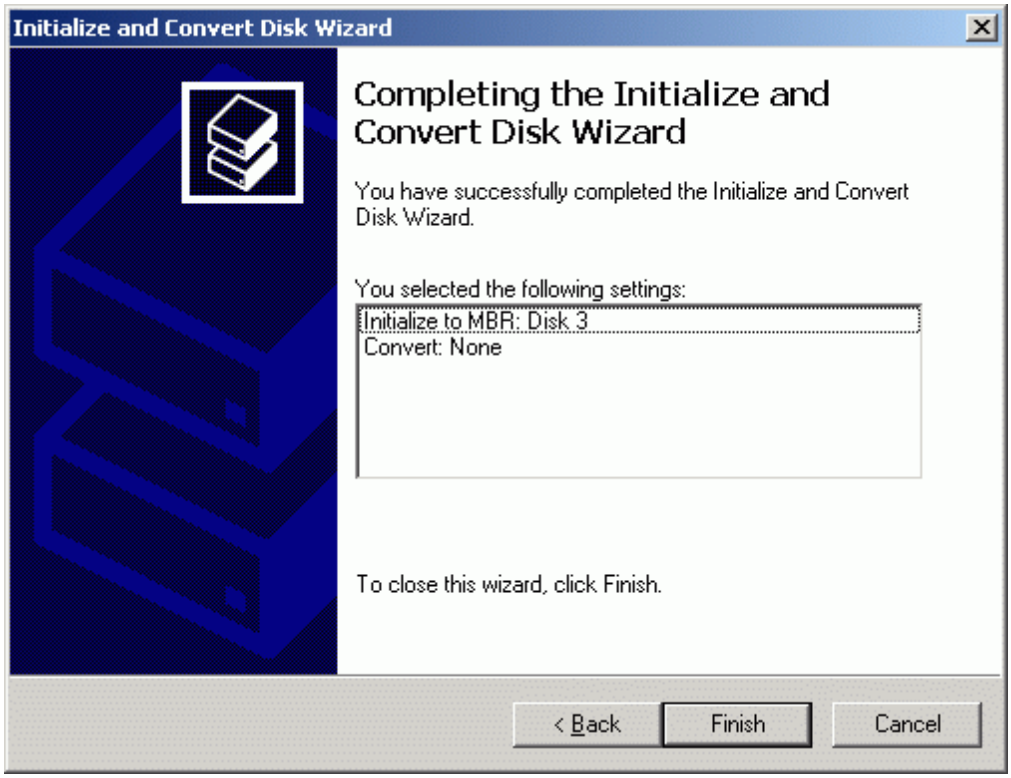


Press the **Finish** button to close the wizard.

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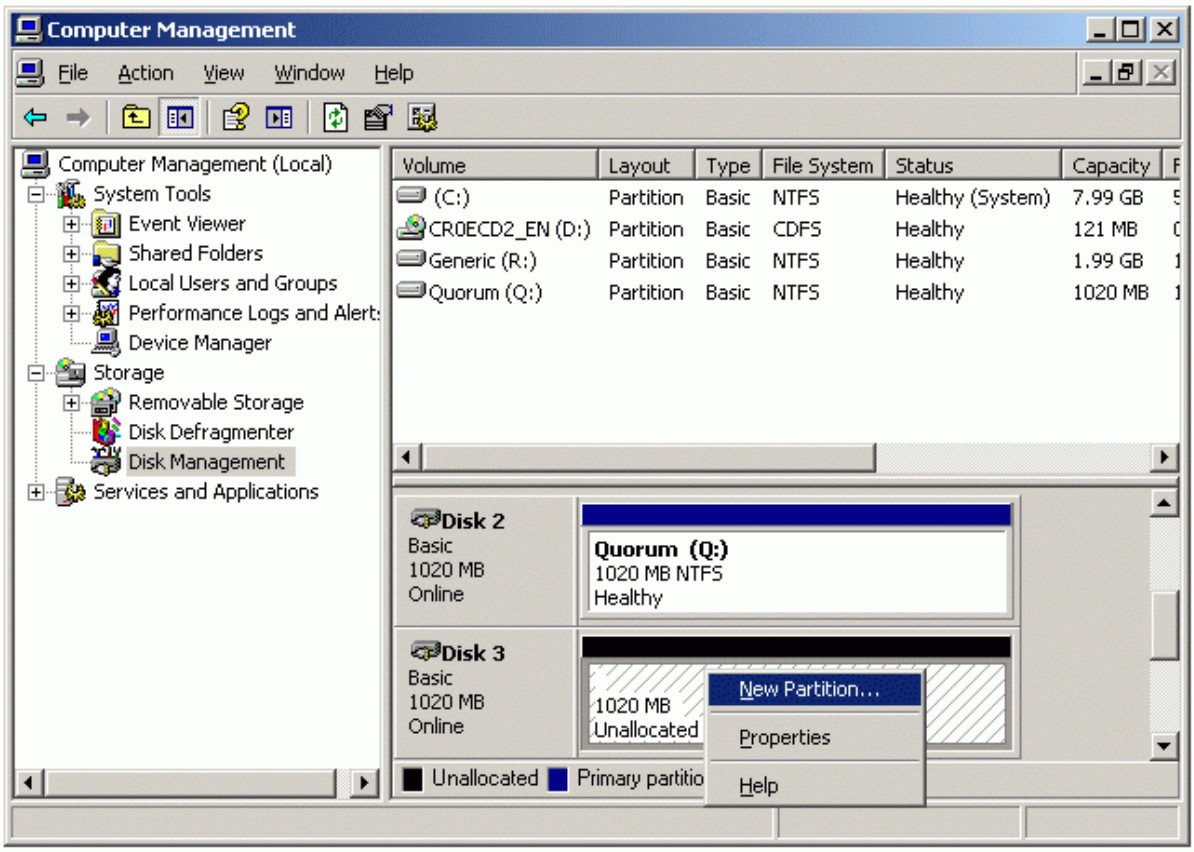
After the **Wizard** completes initialization, press the right mouse button on the unallocated space and select **New Partition** popup menu item. Follow the instructions of the wizard to create an **NTFS** partition for use as the quorum disk. Use the default settings that Windows provides. (The default settings are sufficient for most environments.)

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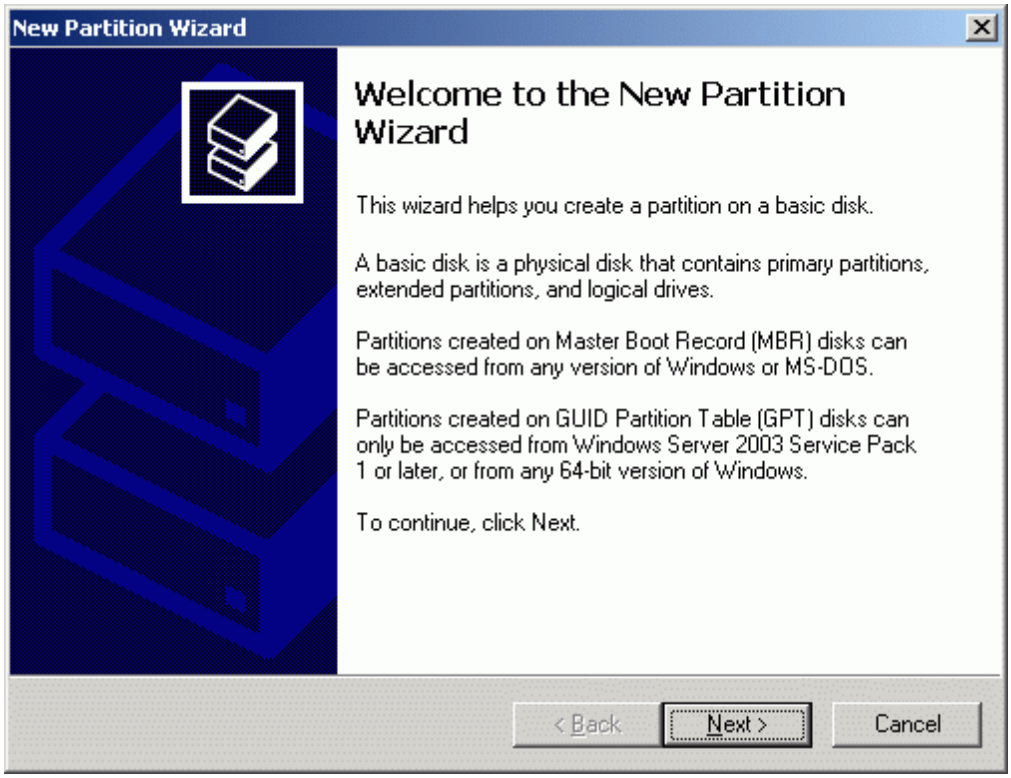
**New Partition Wizard** appears.




Press the **Next** button to continue.

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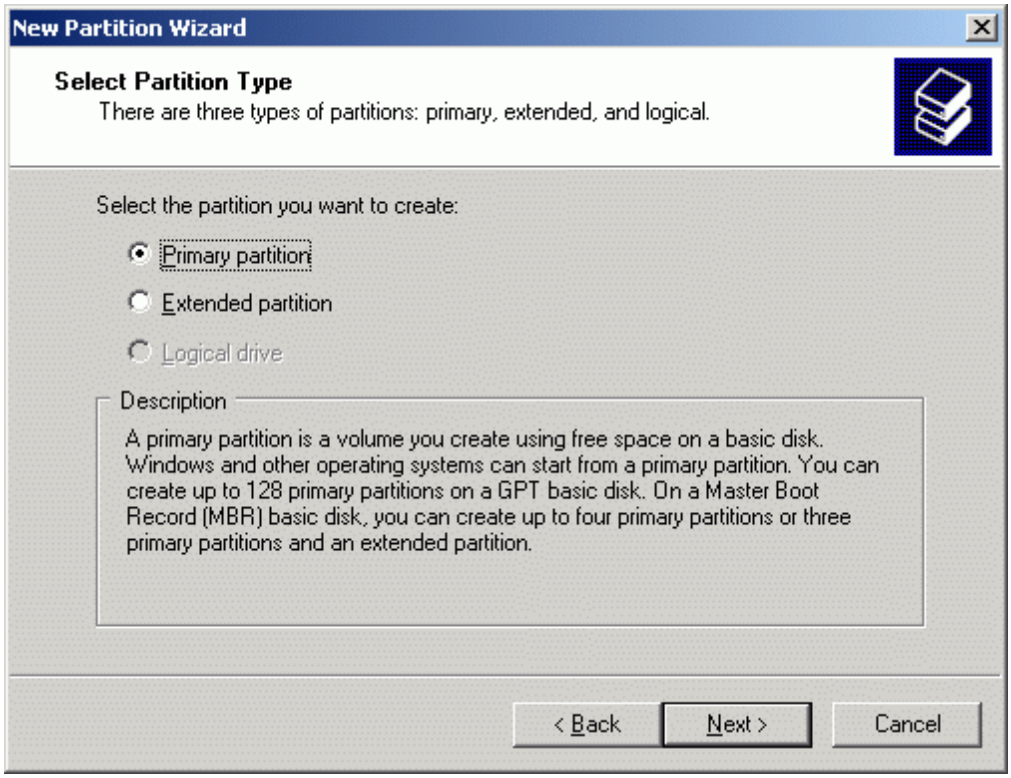
Select partition type to create.




Press the **Next** button to continue.

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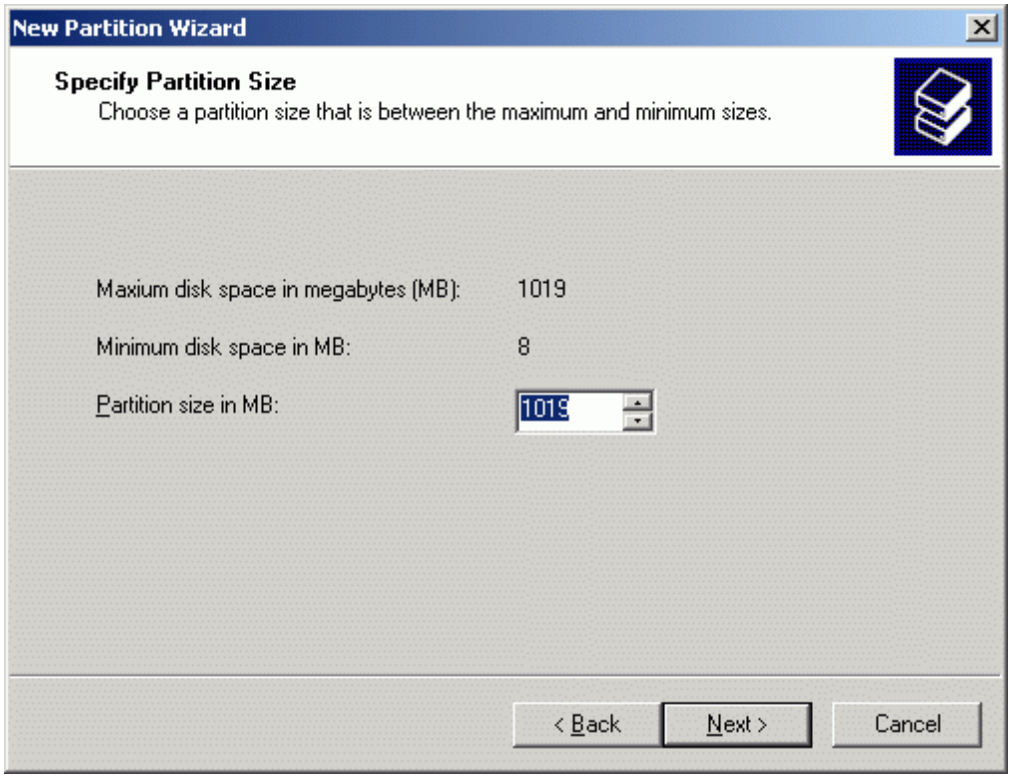
Specify new partition size in megabytes.




Press the **Next** button to continue.

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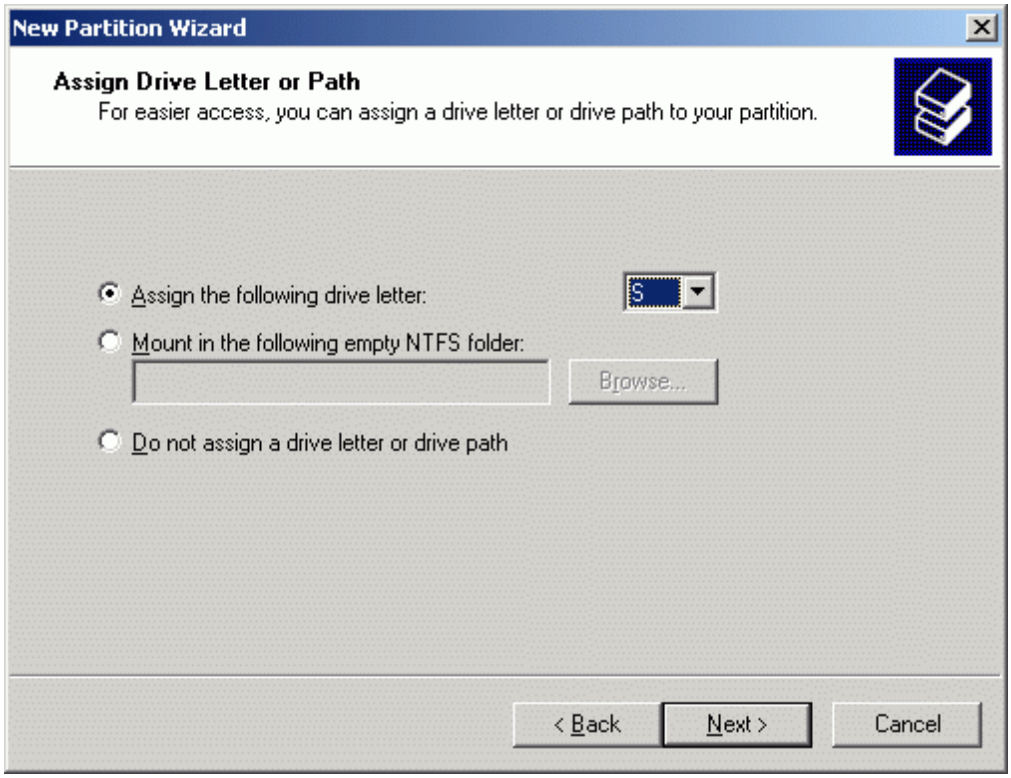
Choose the **Drive Letter** to assign.




Press the **Next** button to continue.

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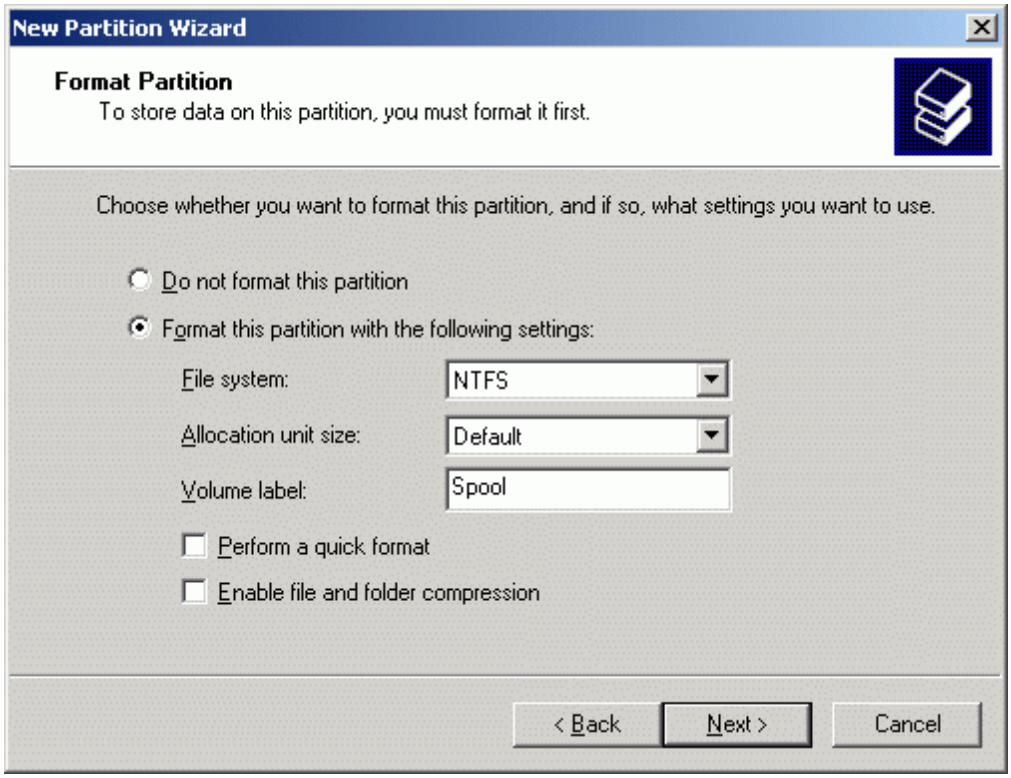
Specify format options. Provide the **Volume Label**.




Press the **Next** button to continue.

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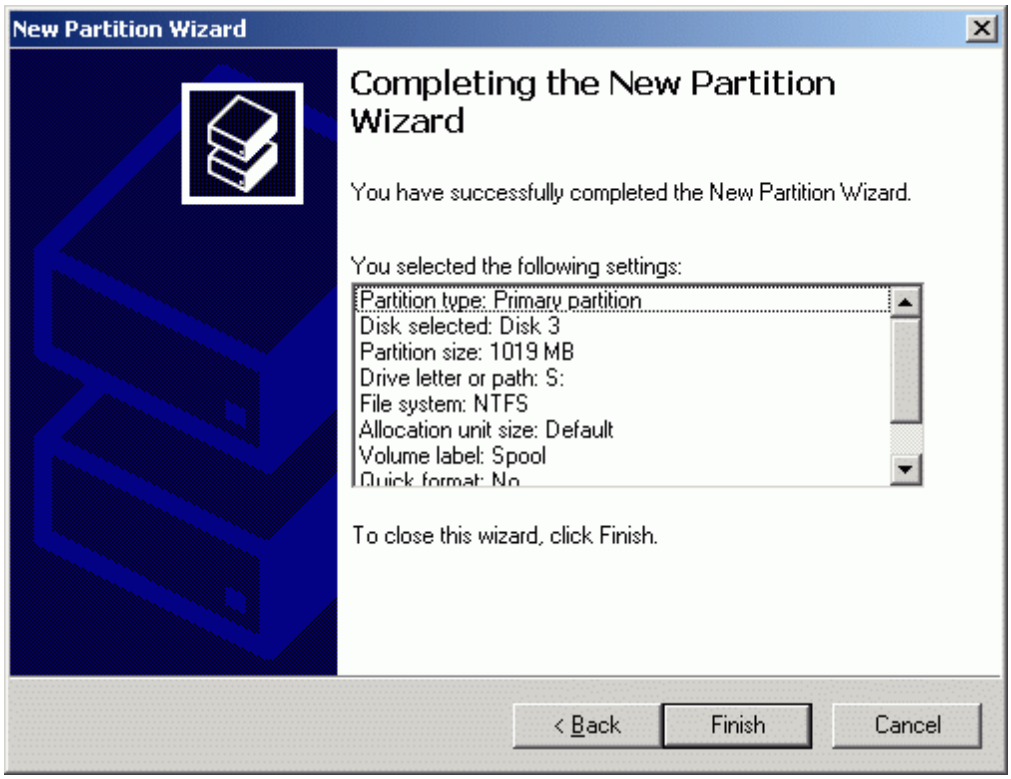
Check the settings are correct. Press the **Back** button should any changes be required.




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

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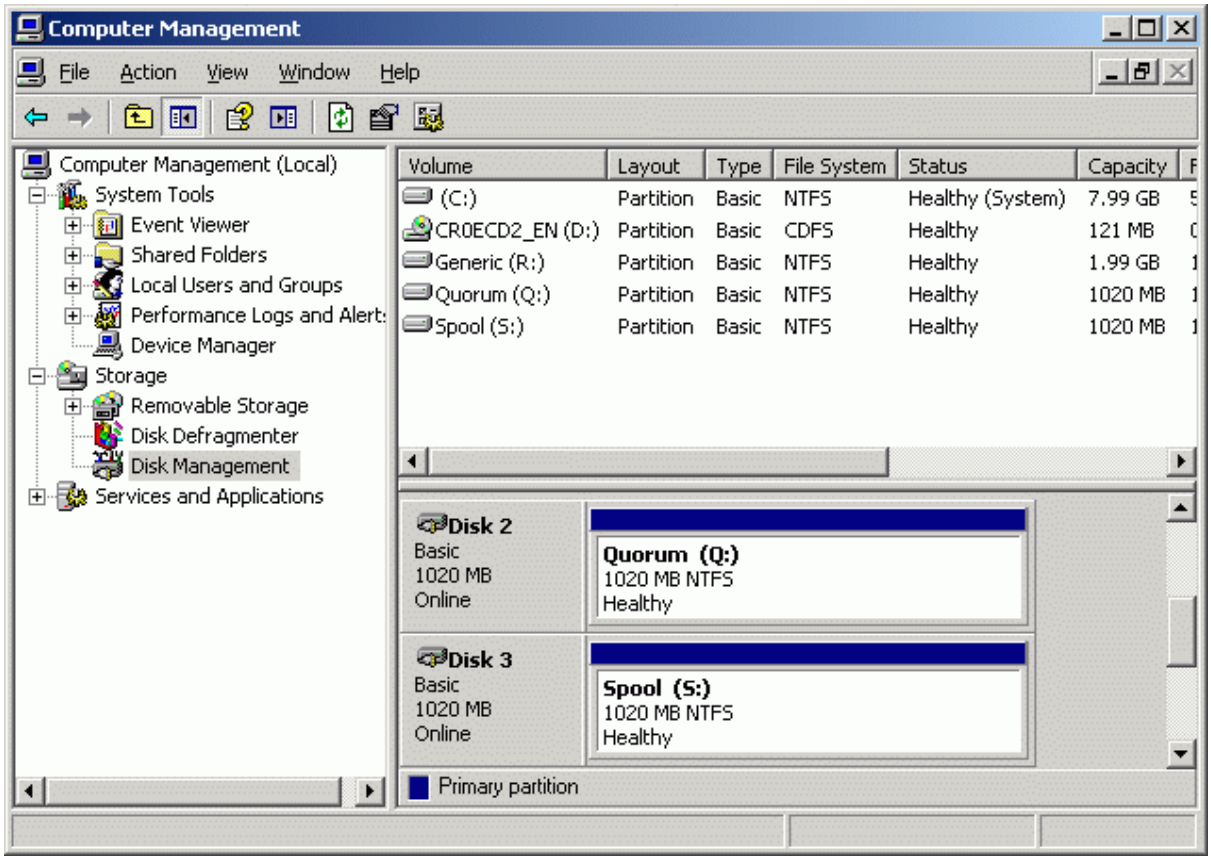
If successful, the disk is now formatted as shown in the example image below.




Shut down the node.

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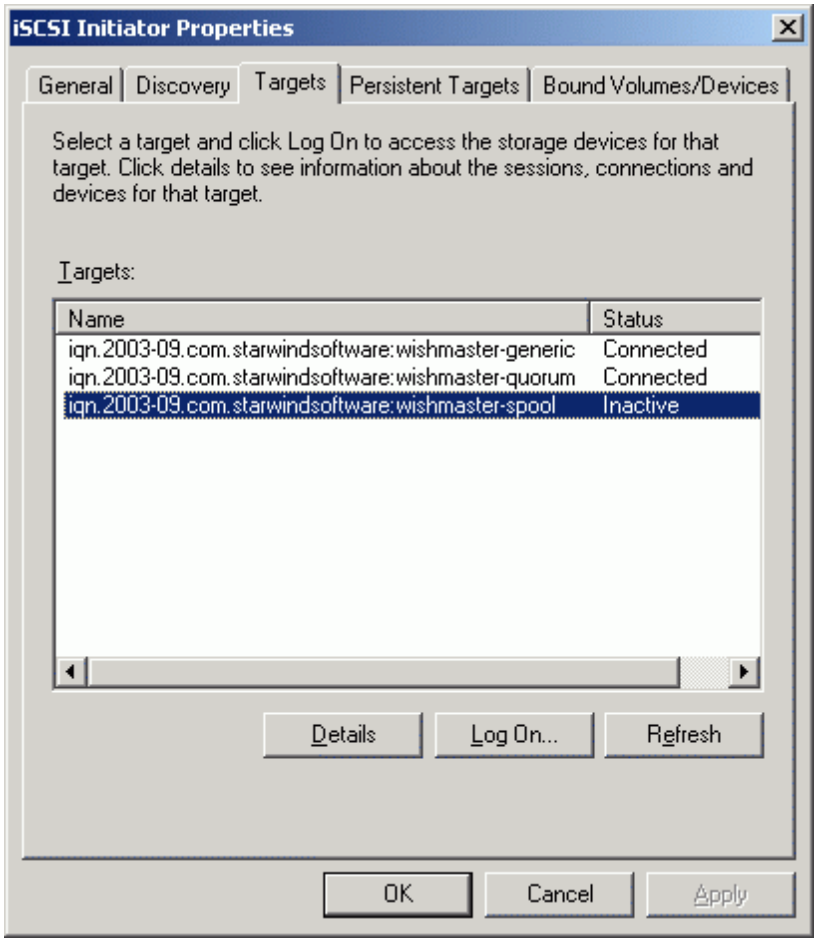
## Node 2

Launch the MS iSCSI Initiator. Click on the **Targets** tab. Select the IQN of the target just added.




Press the **Log On…** button.

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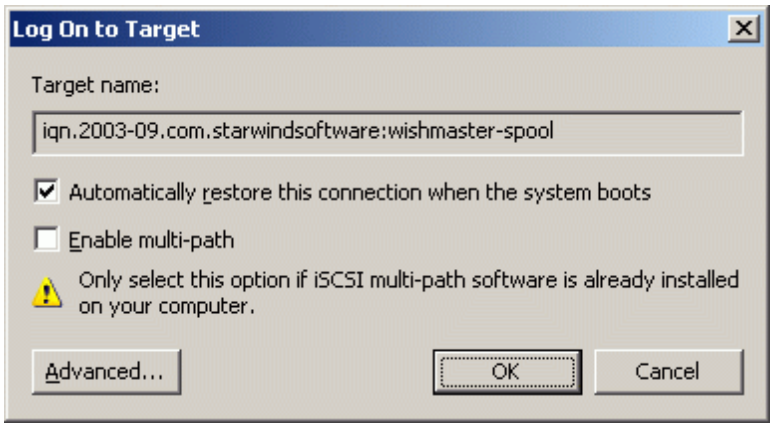
The **Log On to Target** dialog now appears. In this dialog click on the checkbox **Automatically restore this connection when the system boots** to make this connection persistent.




Press the **OK** button to continue.

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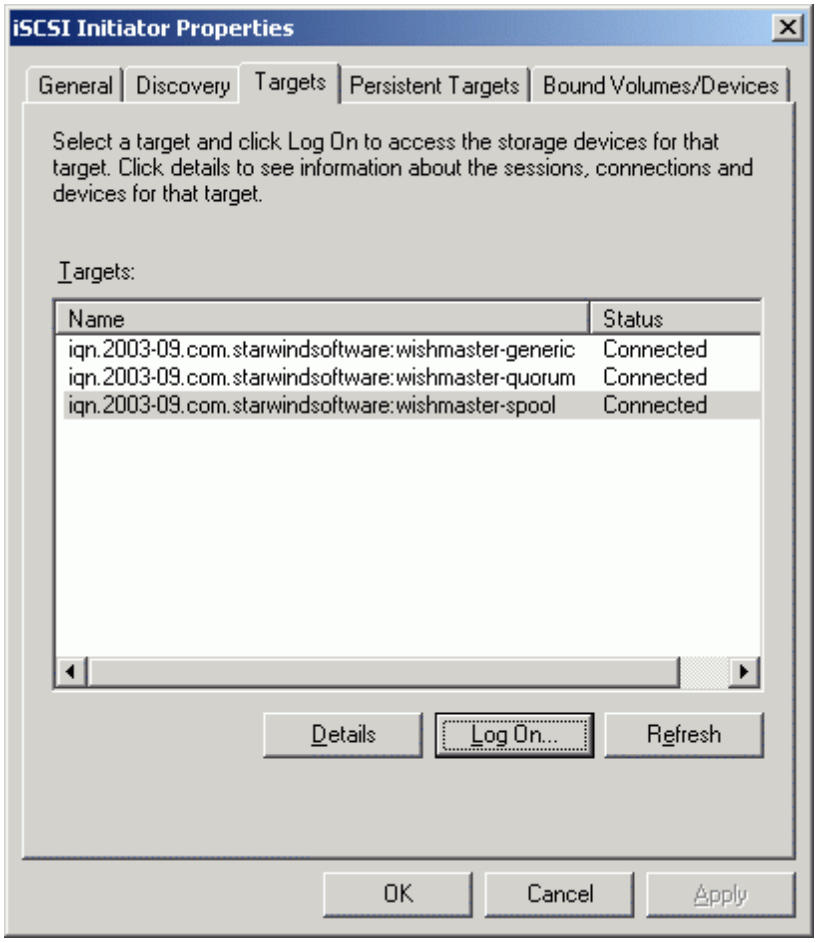
If successful, the initiator is now logged on to **StarWind**.

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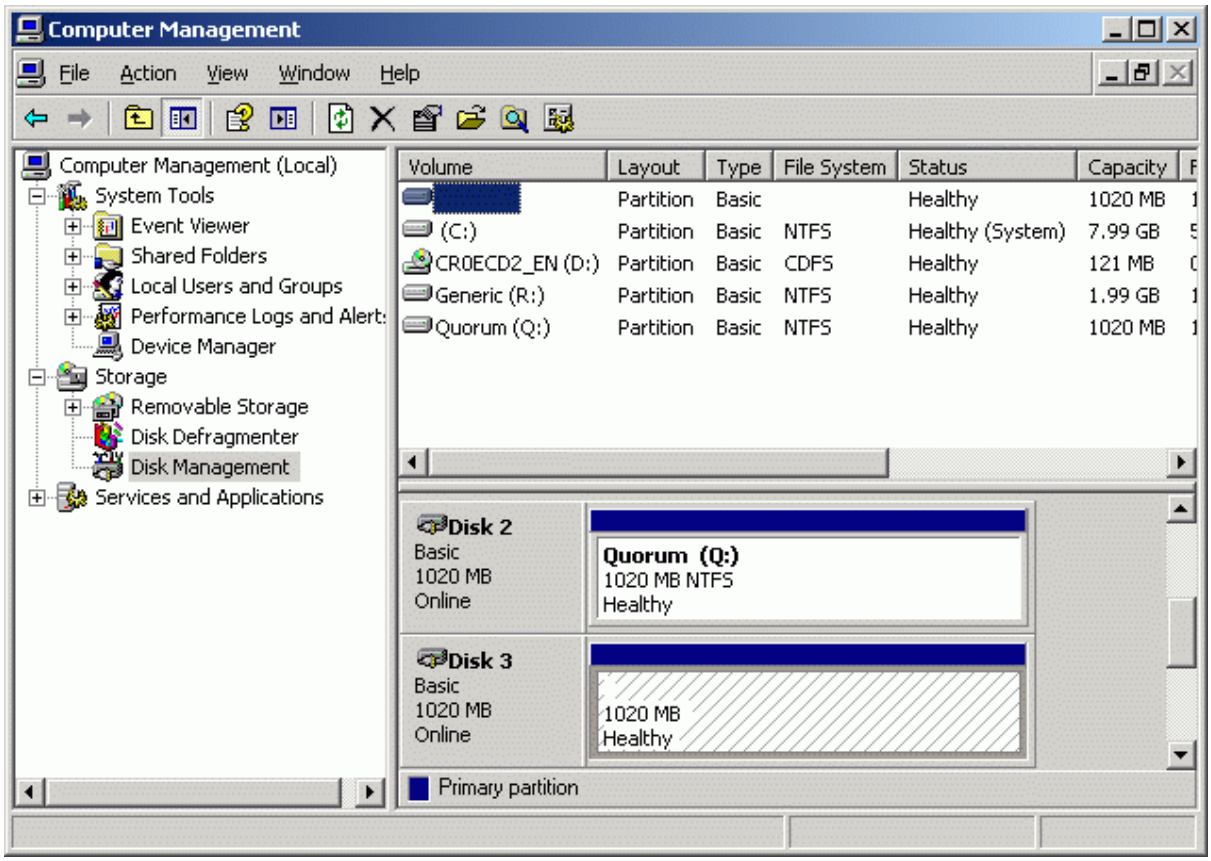
When the StarWind Disk is connected, it shows up on the initiator machine as new disk device. Before this devices can be used as cluster disk, it have to be mounted. Launch the **Computer Management** console.




Select **Disk Management**.

The disk that was formatted on the **Cluster Node 1 Server** should now appear without any drive letter mounted. Assign the same letter to this that was used when this drive was formatted.

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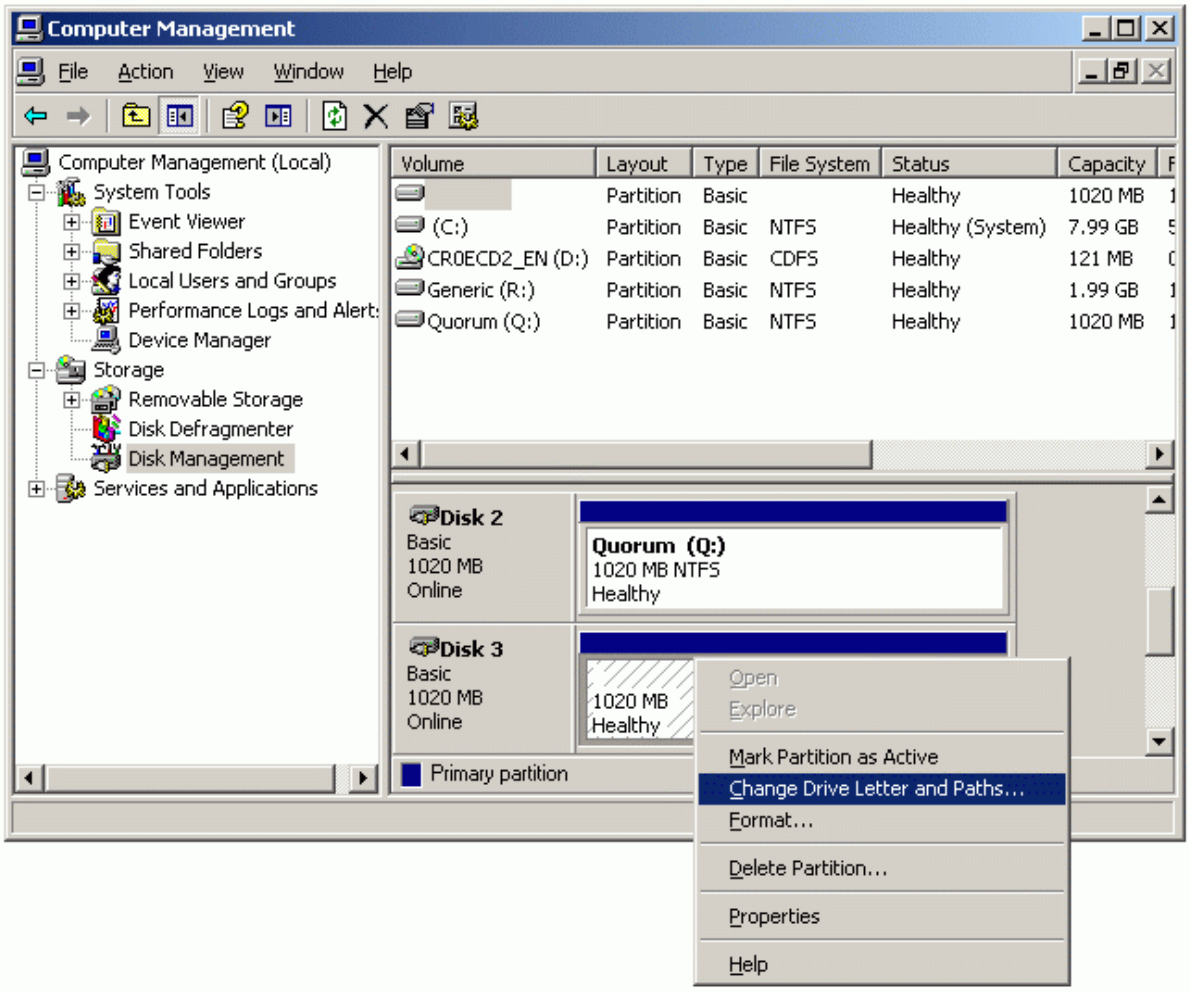
Press the right mouse button over the **Spool** volume.




Select **Change Drive Letter and Paths...**

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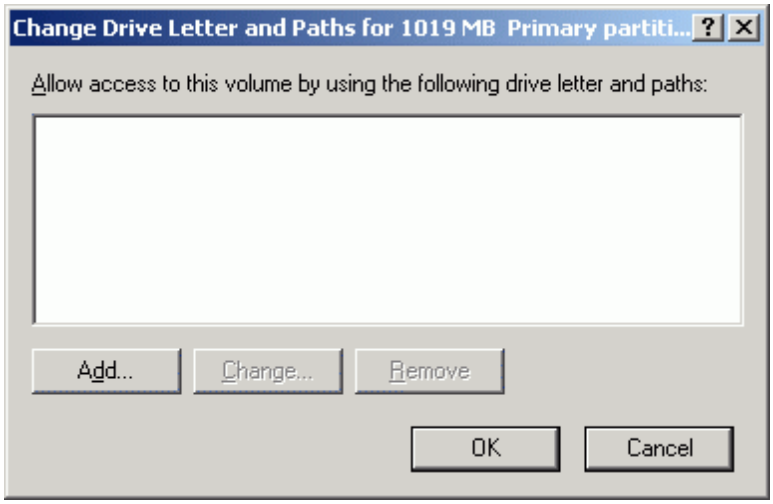
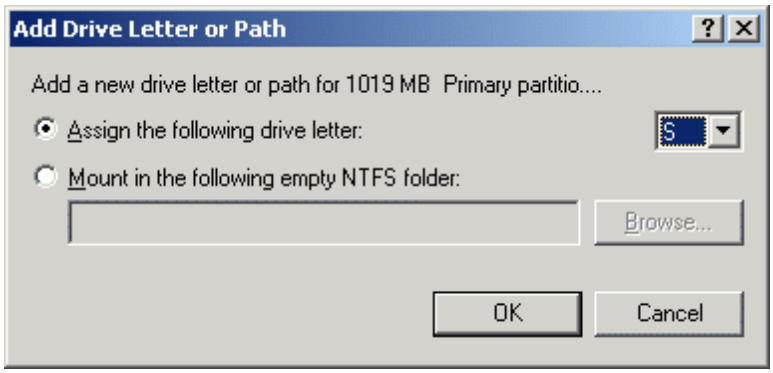
Change the Drive Latter for the Spool to S.

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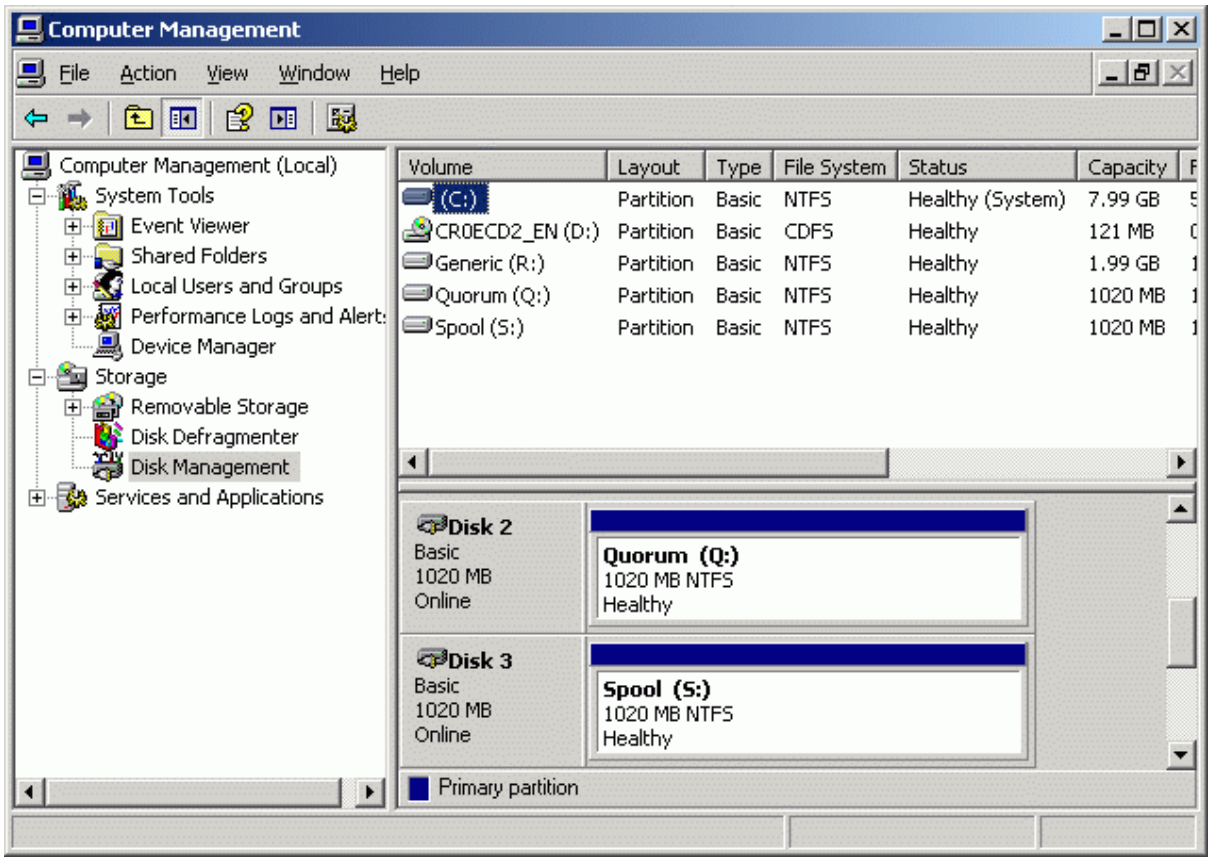
If successful, the **Computer Management** console should look like the sample image provided below.

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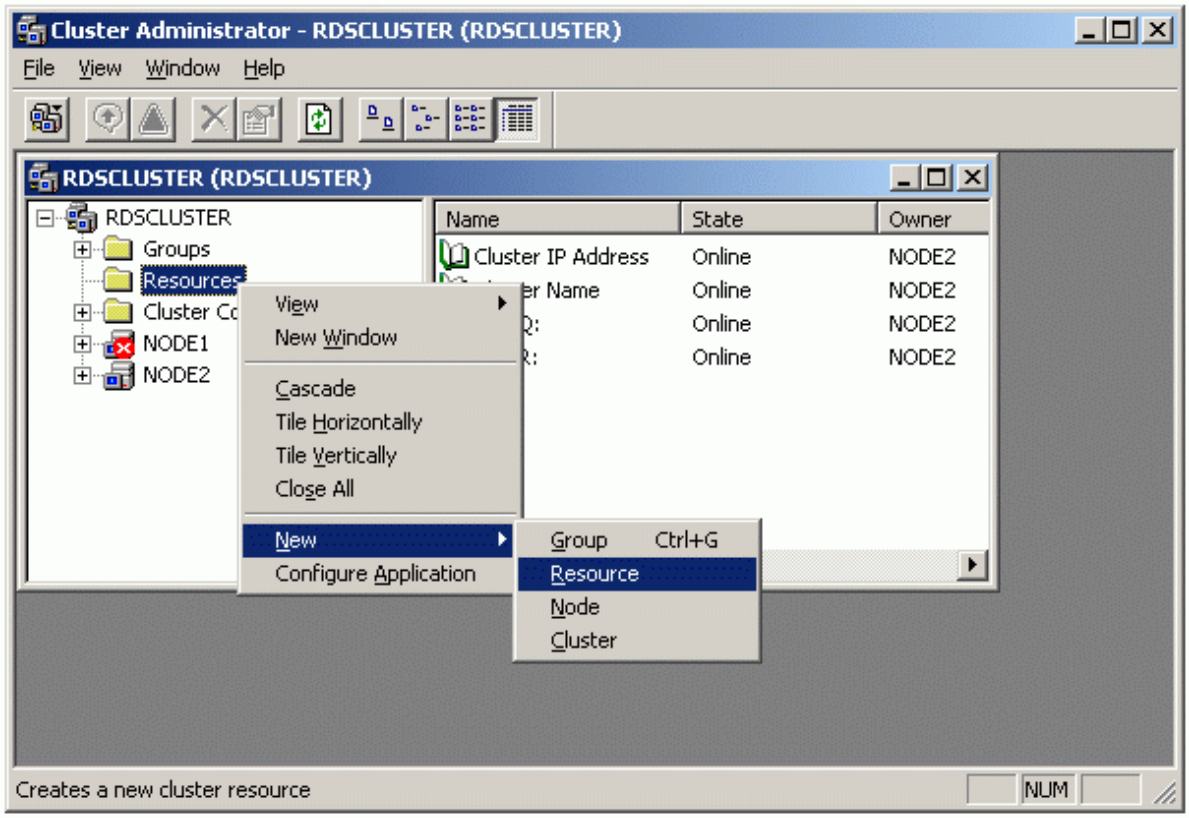
Launch the **Cluster Administrator** console and open connection to the cluster.




Right-press on the Resources node and select **New -> Resource**.

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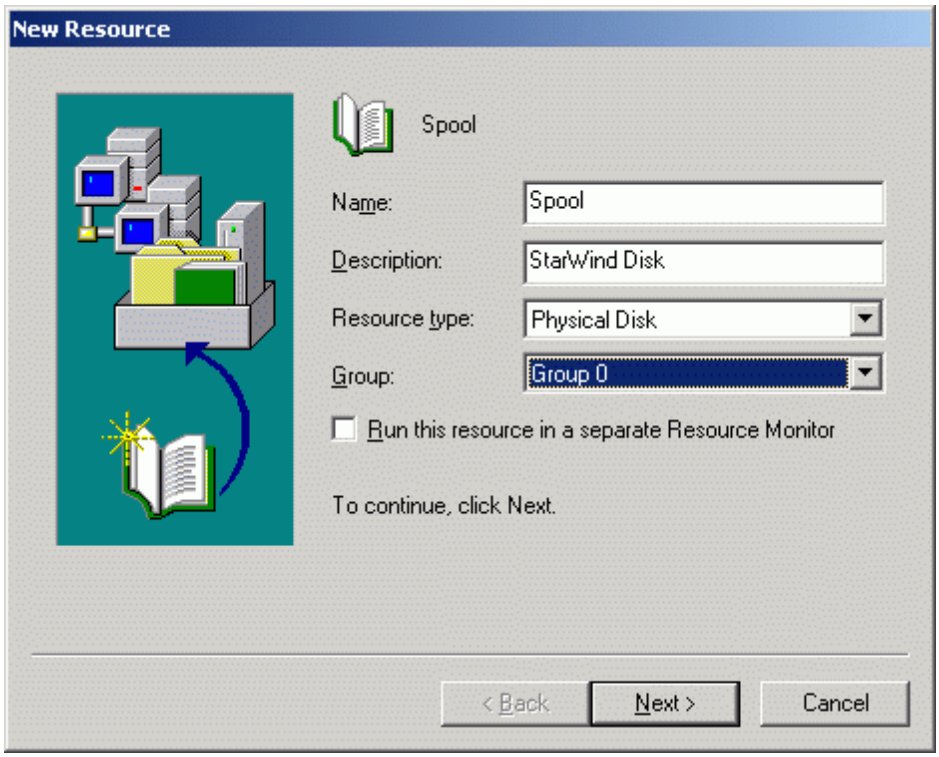
Specify a name for this new resource. For **Resource Type**, specify **Physical Disk** from the list. For **Group**, select the group to which this resource should belong.




Press the **Next** button to continue.

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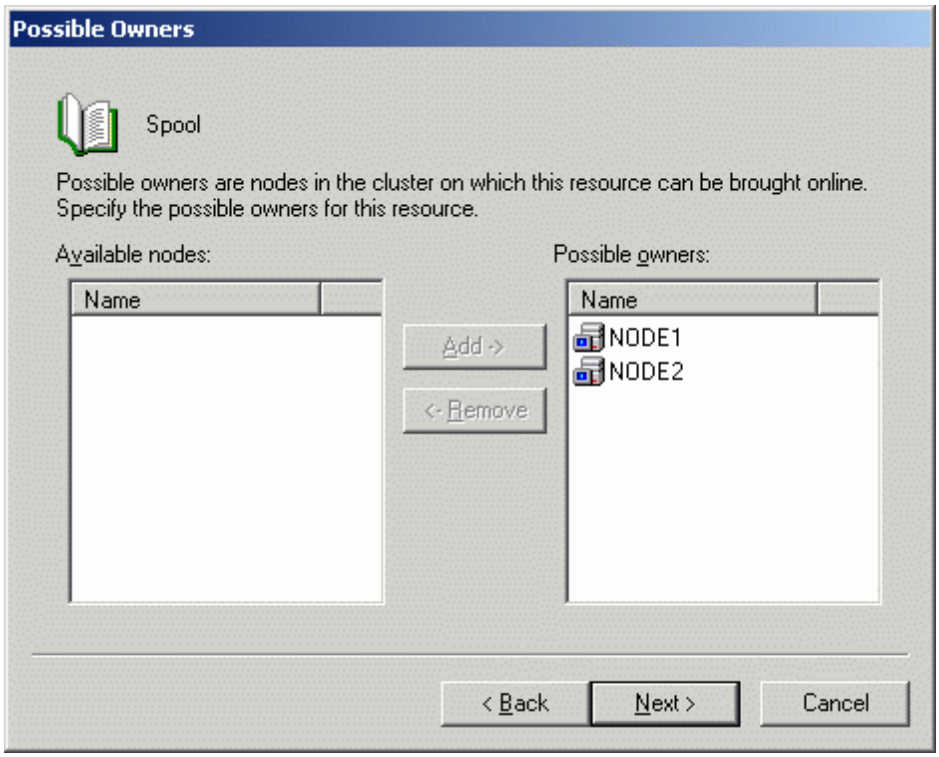
On the **Possible Owners** page, specify all nodes in the cluster as the possible owners.




Press the **Next** button to continue.

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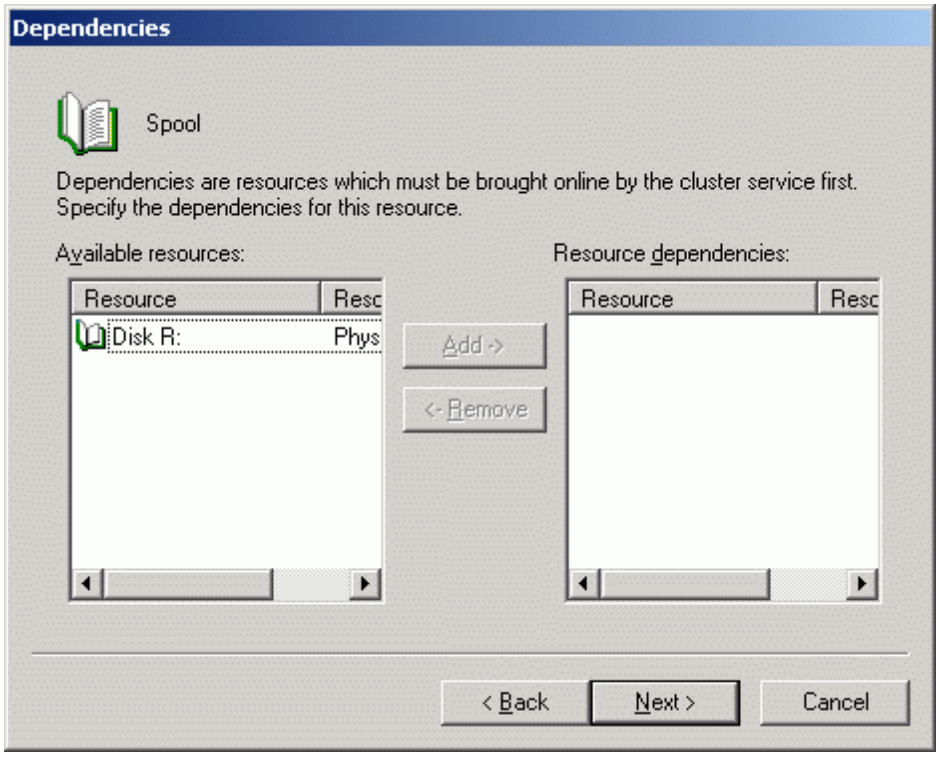
The disk resource should not require any dependencies.




Press the **Next** button to continue.

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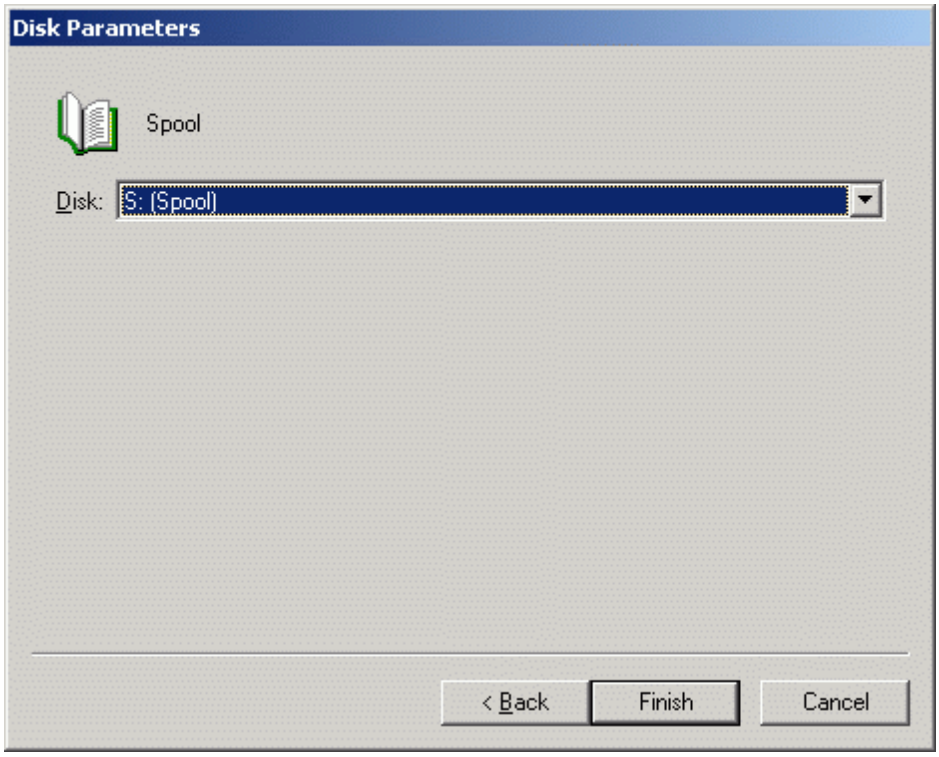
Select the recently created partition from the list of disks.




Press the **Finish** button to complete the operation.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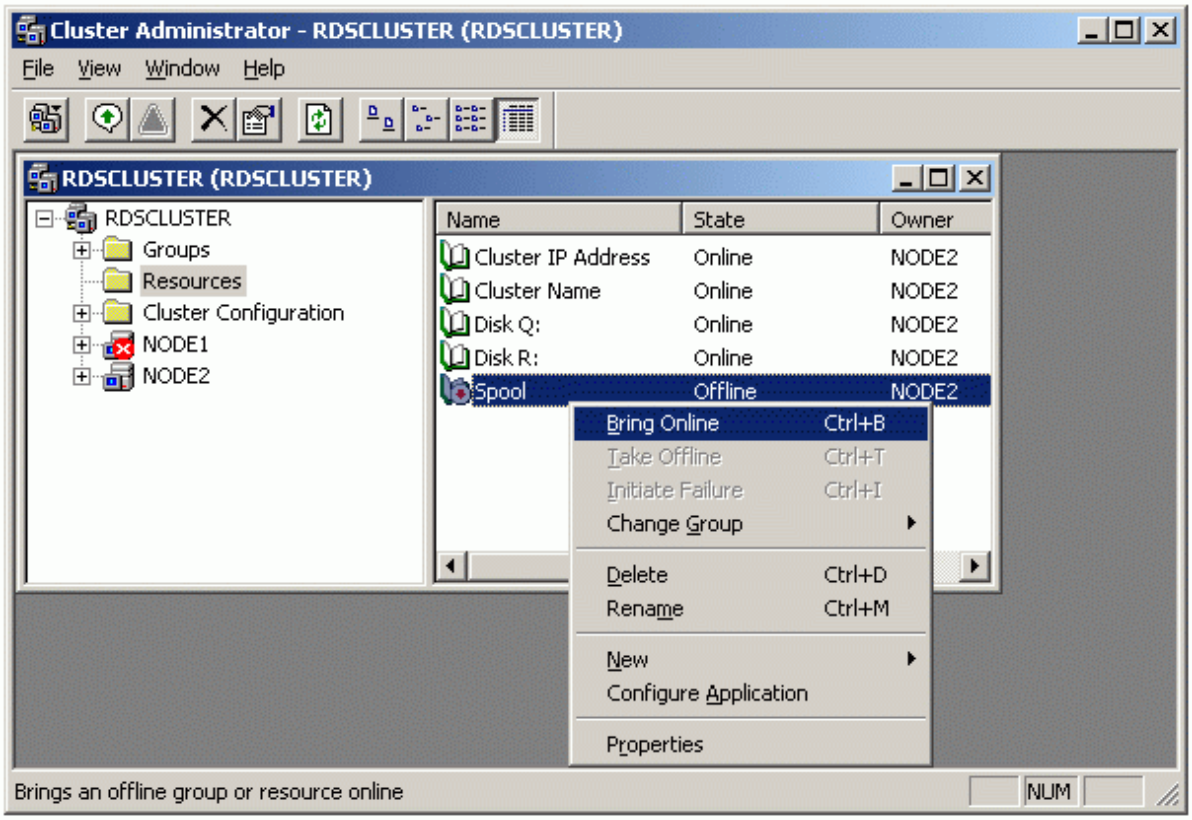
The new resource should appear as offline in the details view of the **Resource** node.




Right-press on the resource and select **Bring Online** item of the context menu.

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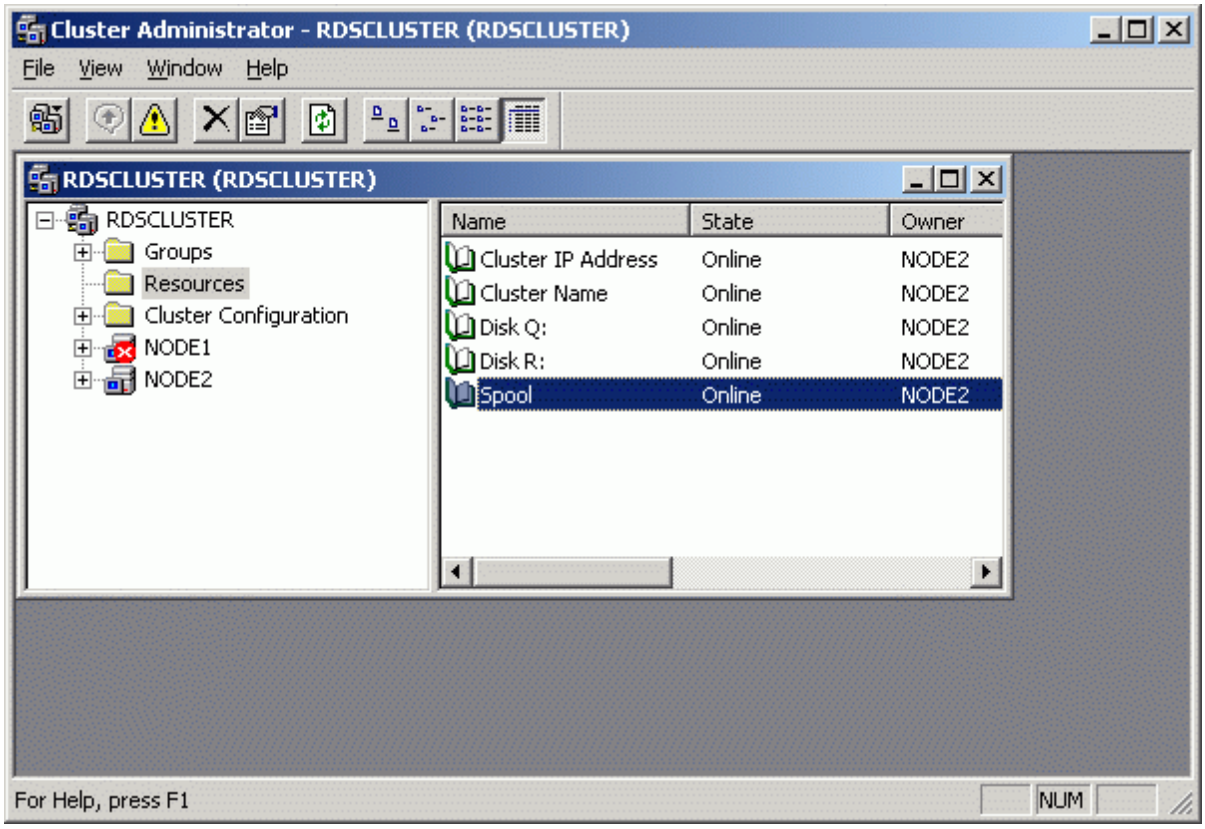
When completed, the disk is now a cluster disk.

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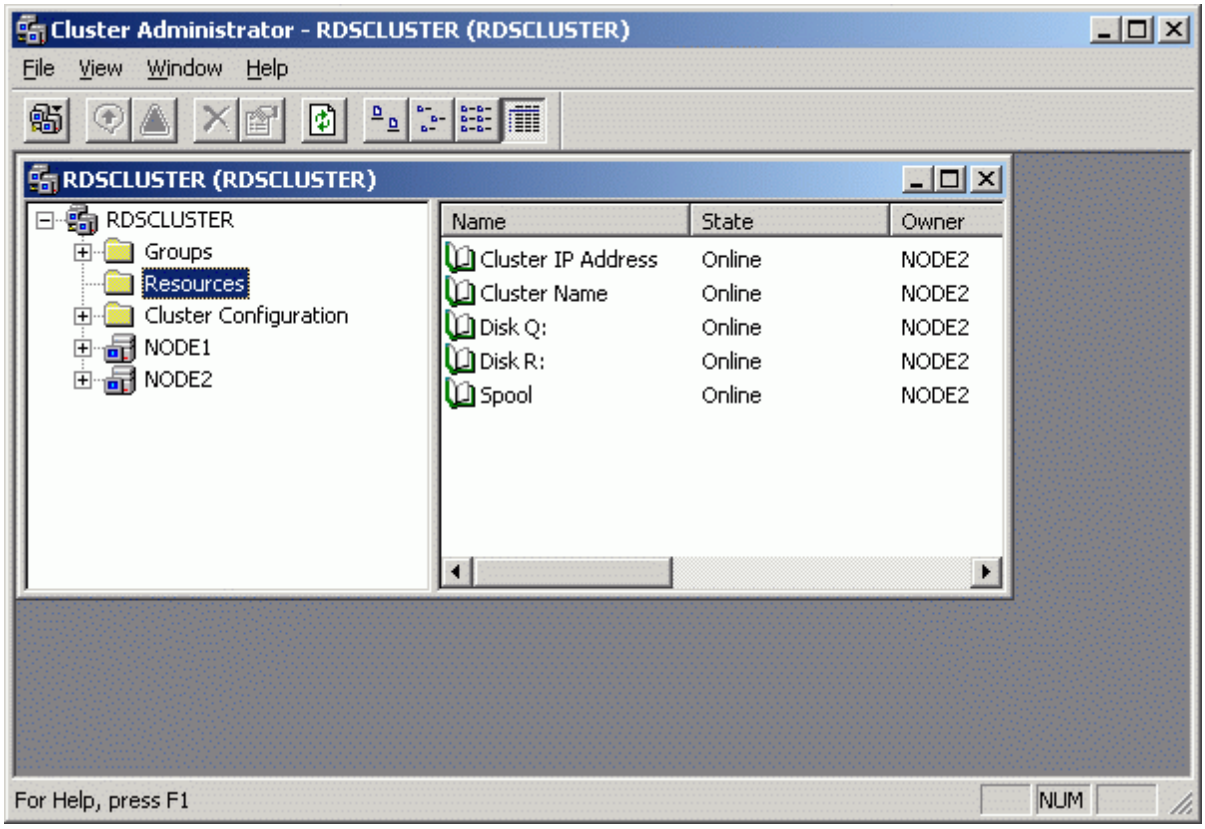
Start the other servers in the cluster.

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