

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.

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

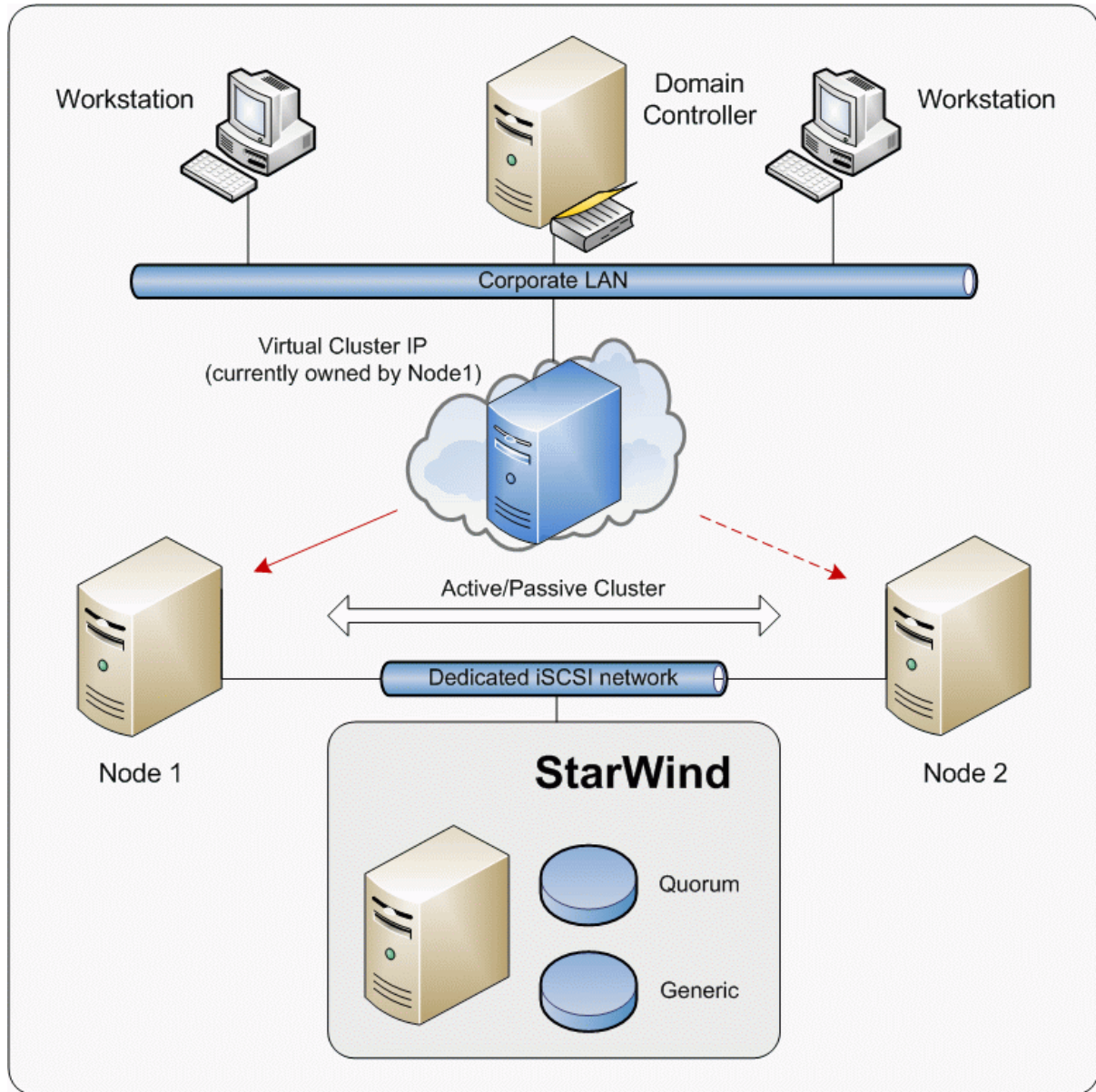
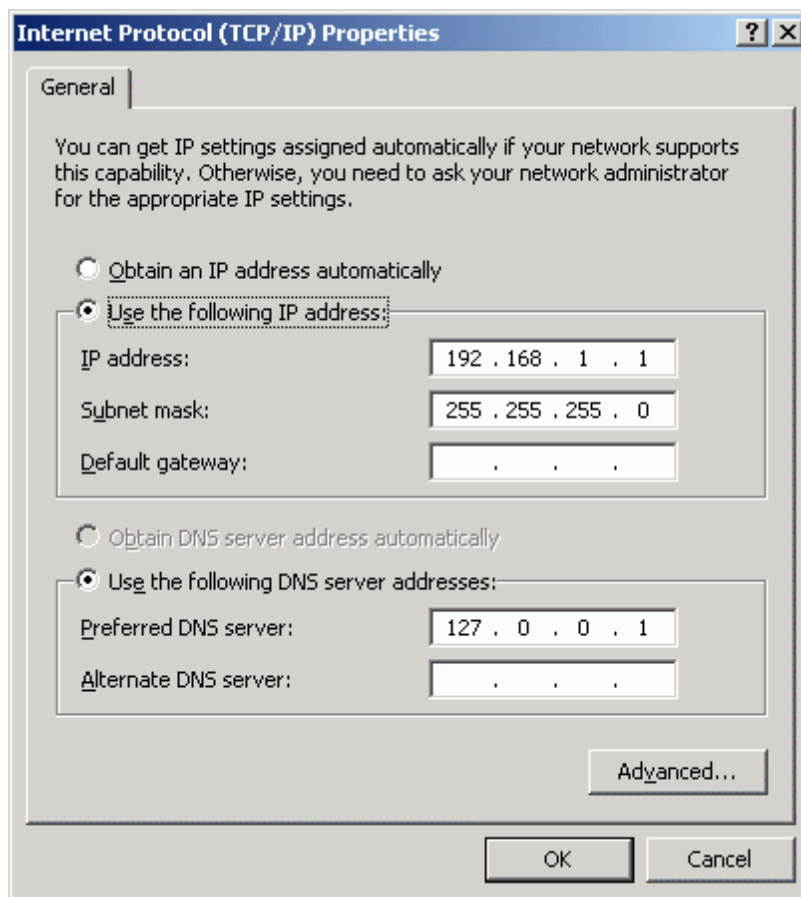


Figure 1. StarWind provides shared-disk resources to clusters

Configuring Domain Controller

Network Adapter

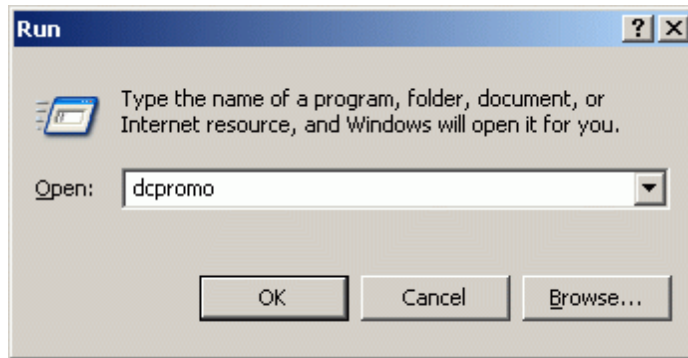
The network adapter must be assigned a static IP address. Select the **Use the following IP address** option and type in the IP address you wish to use. The Subnet mask must also be provided. Both values must be correctly chosen given the networking configuration of the Corporate LAN. As AD requires 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.

Active Directory

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



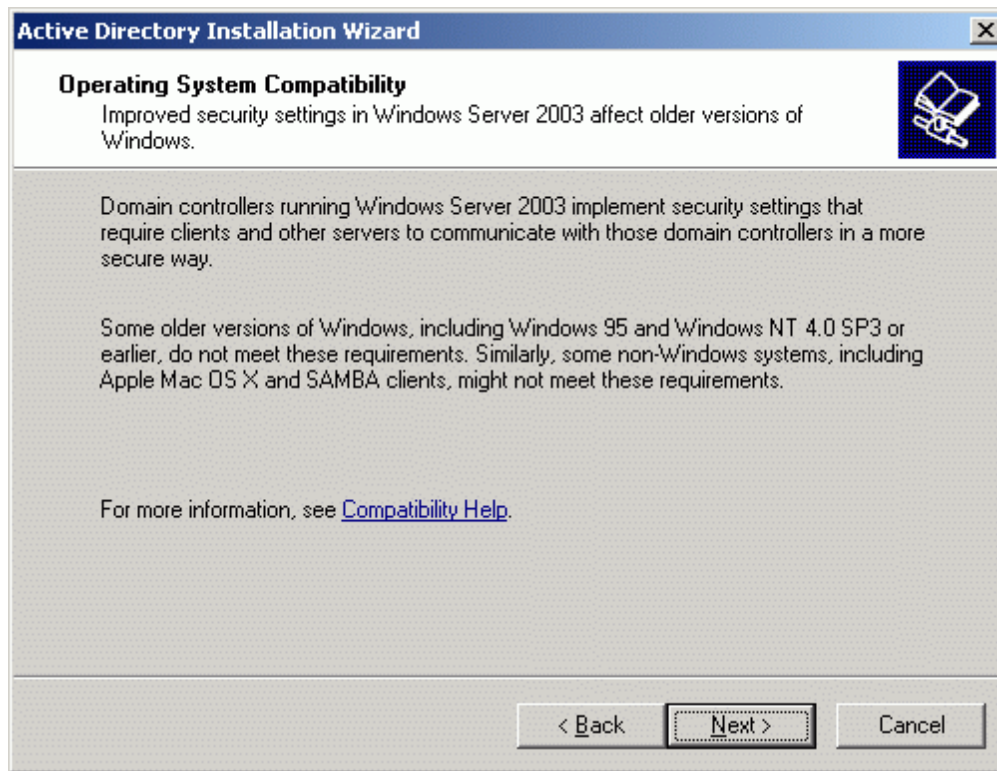
Press the **OK** button to continue.

The **Active Directory Installation Wizard** appears.



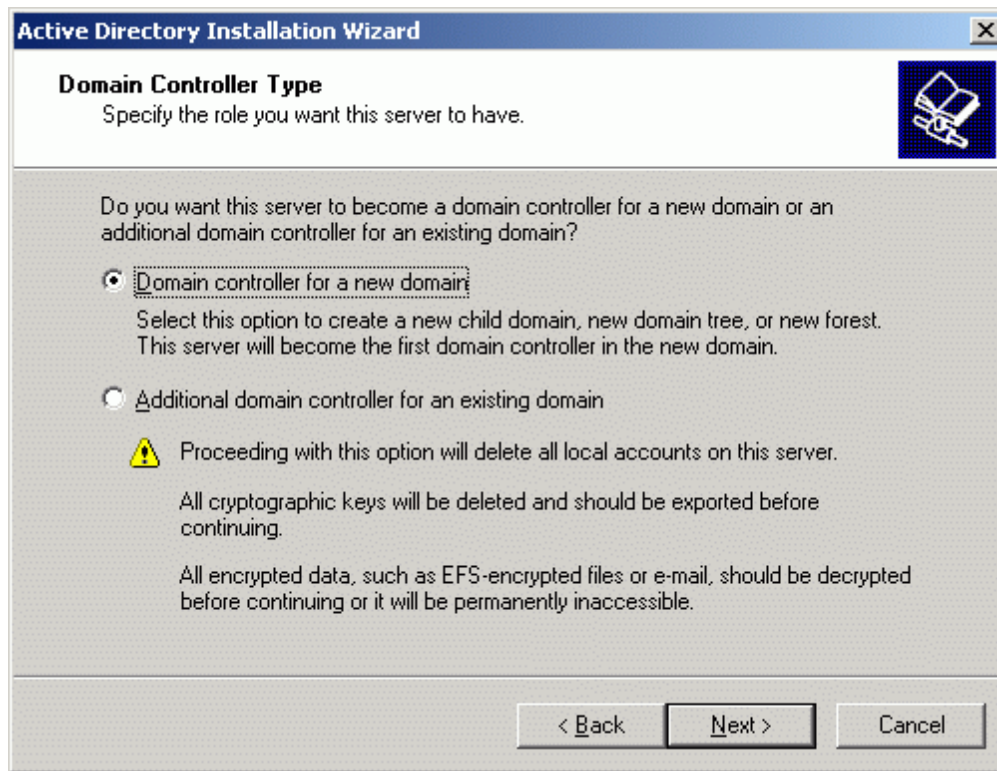
Press the **Next** button to continue.

In the wizard that appears please read the introducing instructions.



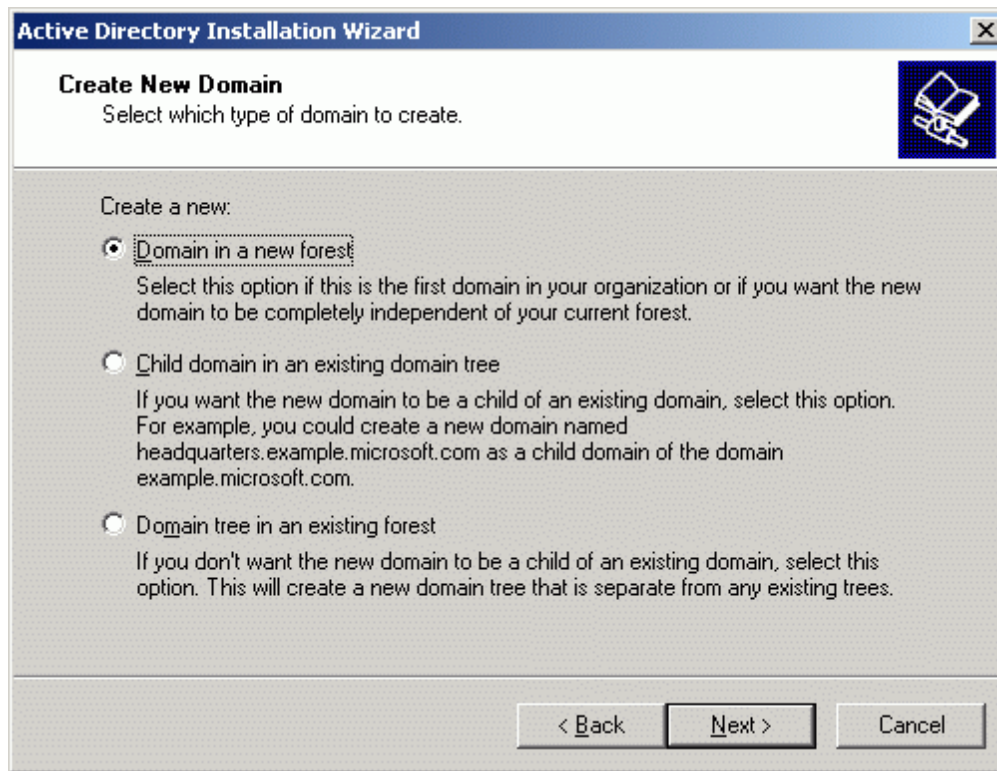
Press the **Next** button to continue.

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



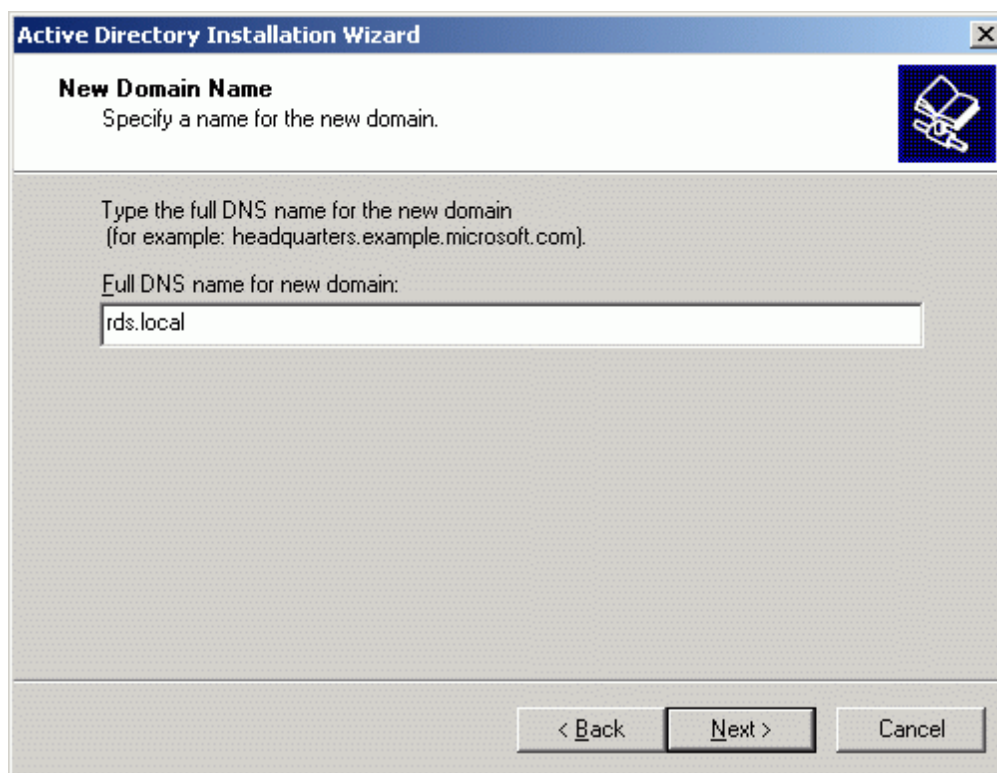
Press the **Next** button to continue.

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



Press the **Next** button to continue.

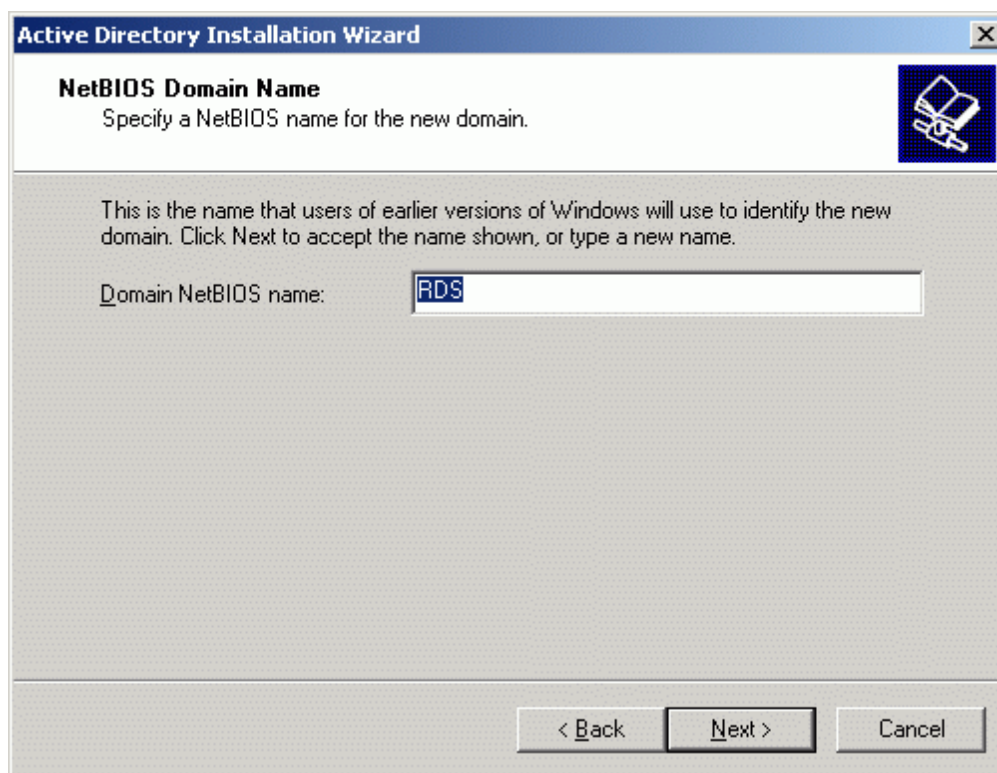
Specify the full DNS name of the domain to create.



The image shows a screenshot of the 'Active Directory Installation Wizard' window, specifically the 'New Domain Name' step. The window has a title bar with the text 'Active Directory Installation Wizard' and a close button. Below the title bar, the section is titled 'New Domain Name' with a subtitle 'Specify a name for the new domain.' and a small icon of a computer with a hand. The main area contains the instruction 'Type the full DNS name for the new domain (for example: headquarters.example.microsoft.com).' followed by the label 'Full DNS name for new domain:' and a text input field containing 'rds.local'. At the bottom of the window, there are three buttons: '< Back', 'Next >', and 'Cancel'.

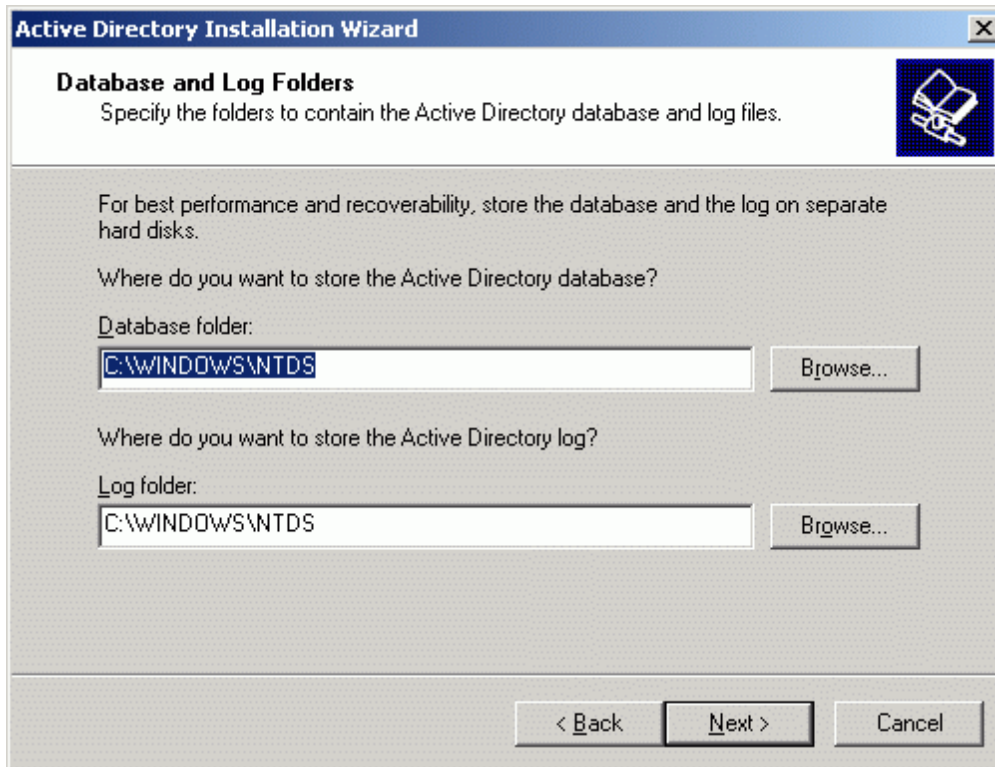
Press the **Next** button to continue.

Specify Domain NetBIOS name.



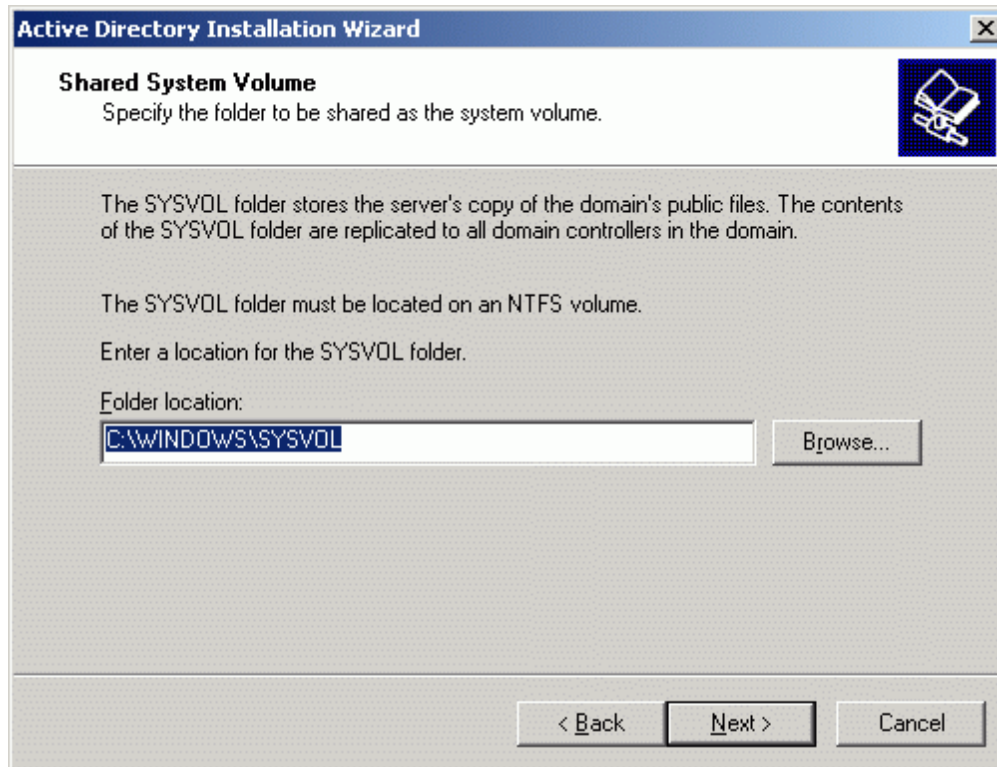
Press the **Next** button to continue.

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



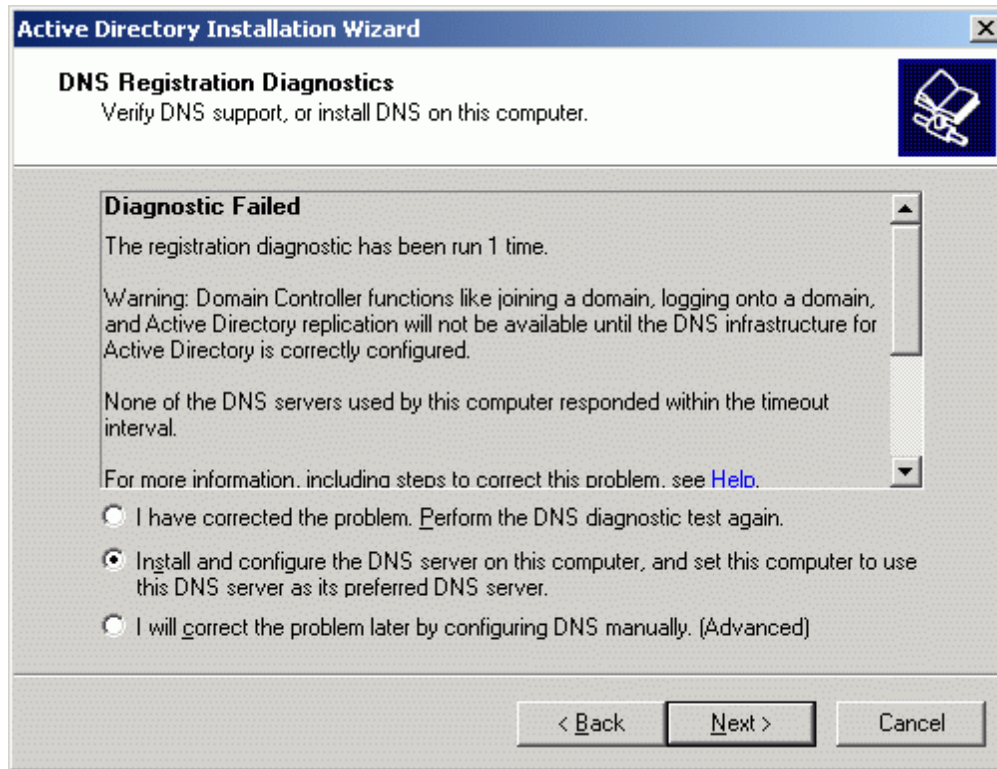
Press the **Next** button to continue.

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



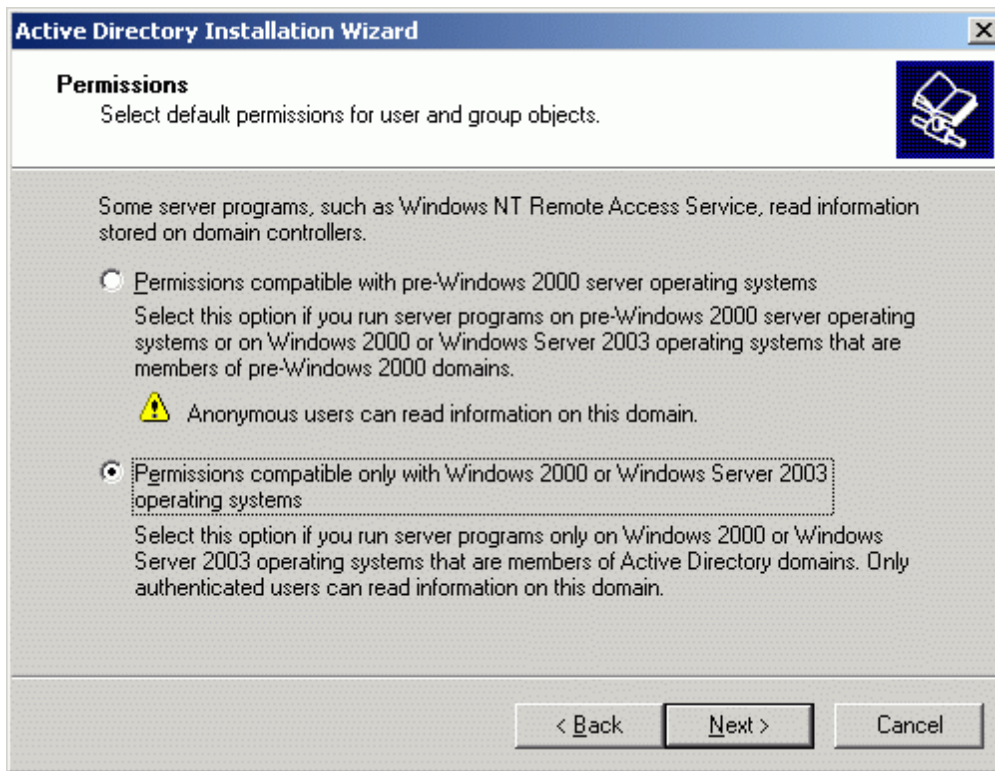
Press the **Next** button to continue.

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.



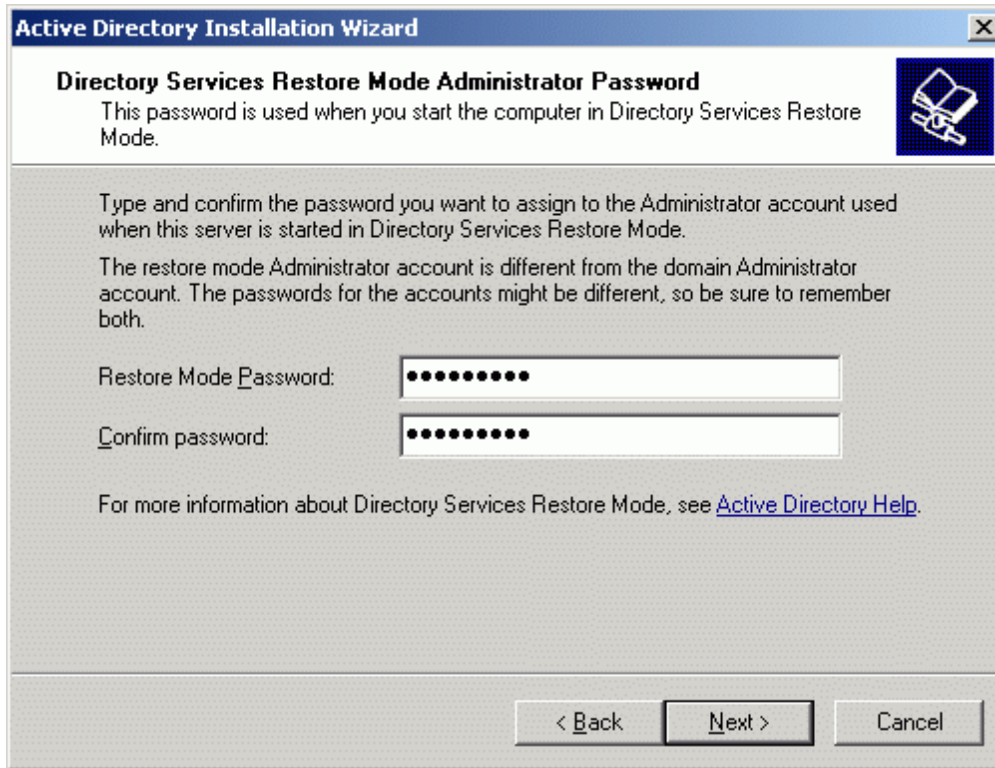
Press the **Next** button to continue.

Select default permissions for user and group objects.



Press the **Next** button to continue.

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



The screenshot shows a Windows-style dialog box titled "Active Directory Installation Wizard". The main heading is "Directory Services Restore Mode Administrator Password". Below the heading, it states: "This password is used when you start the computer in Directory Services Restore Mode." To the right of this text is a small icon of a computer with a key. The main area of the dialog contains instructions: "Type and confirm the password you want to assign to the Administrator account used when this server is started in Directory Services Restore Mode. The restore mode Administrator account is different from the domain Administrator account. The passwords for the accounts might be different, so be sure to remember both." Below this text are two password input fields. The first is labeled "Restore Mode Password:" and the second is labeled "Confirm password:". Both fields contain masked characters (dots). At the bottom of the dialog are three buttons: "< Back", "Next >", and "Cancel".

Active Directory Installation Wizard

Directory Services Restore Mode Administrator Password

This password is used when you start the computer in Directory Services Restore Mode.

Type and confirm the password you want to assign to the Administrator account used when this server is started in Directory Services Restore Mode. The restore mode Administrator account is different from the domain Administrator account. The passwords for the accounts might be different, so be sure to remember both.

Restore Mode Password:

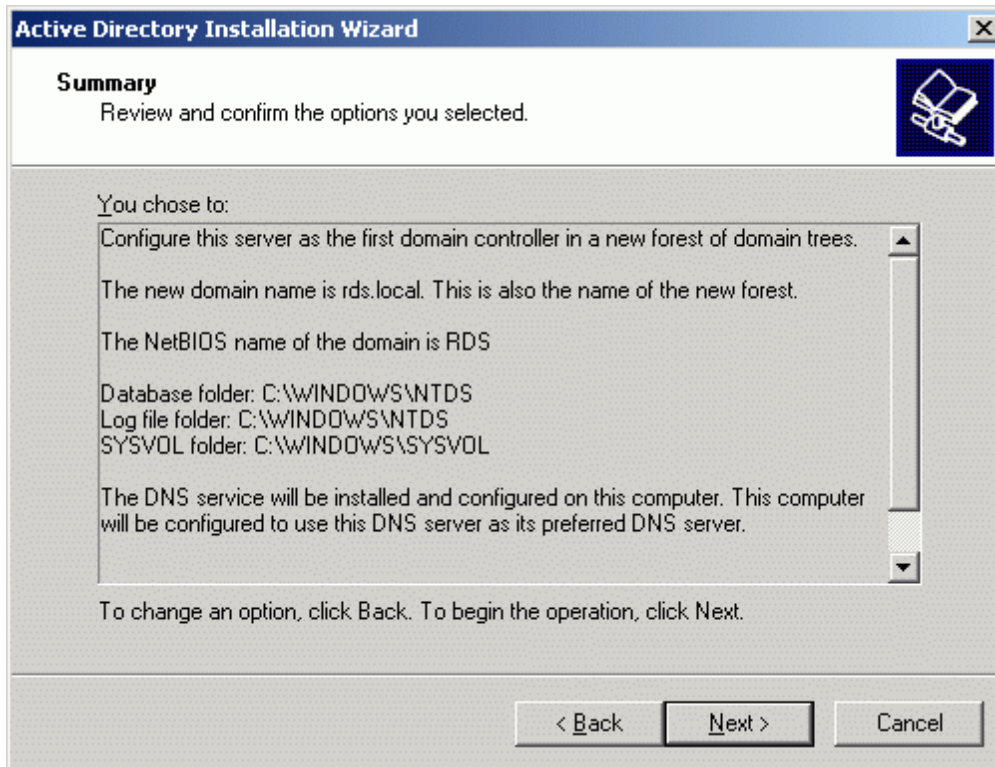
Confirm password:

For more information about Directory Services Restore Mode, see [Active Directory Help](#).

< Back Next > Cancel

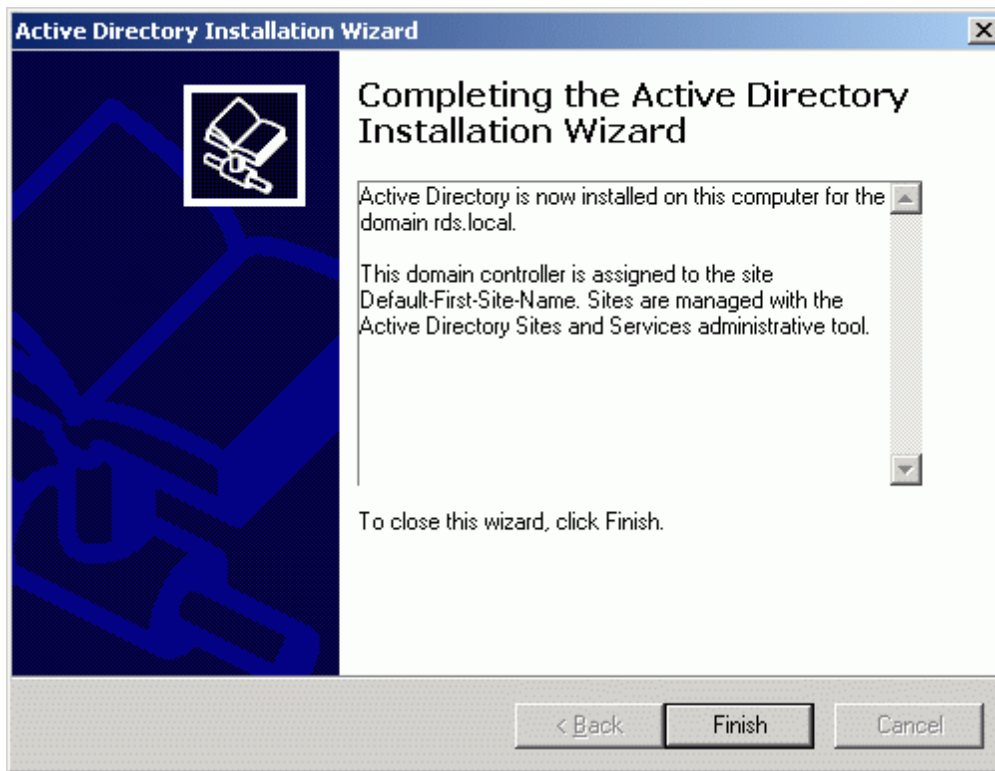
Press the **Next** button to continue.

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



Press the **Next** button to continue.

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



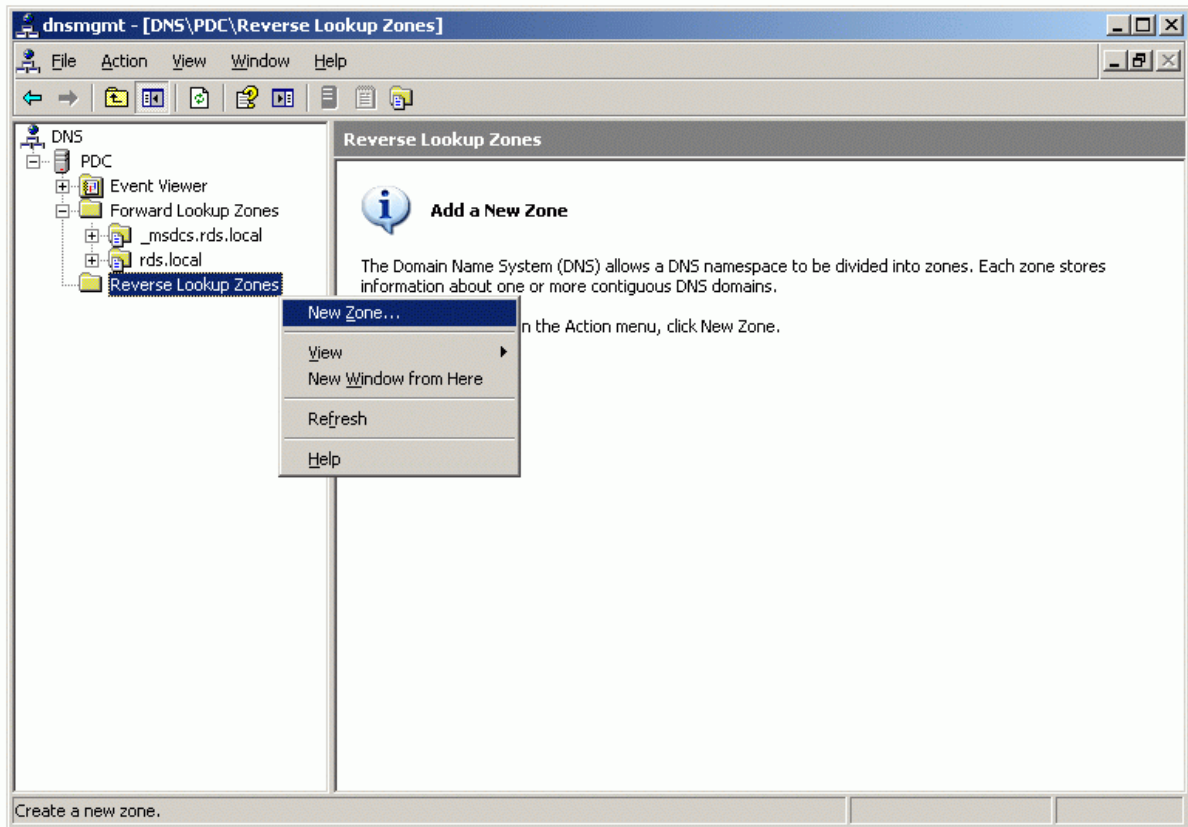
Press the **Finish** button to close the wizard.



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

DNS

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



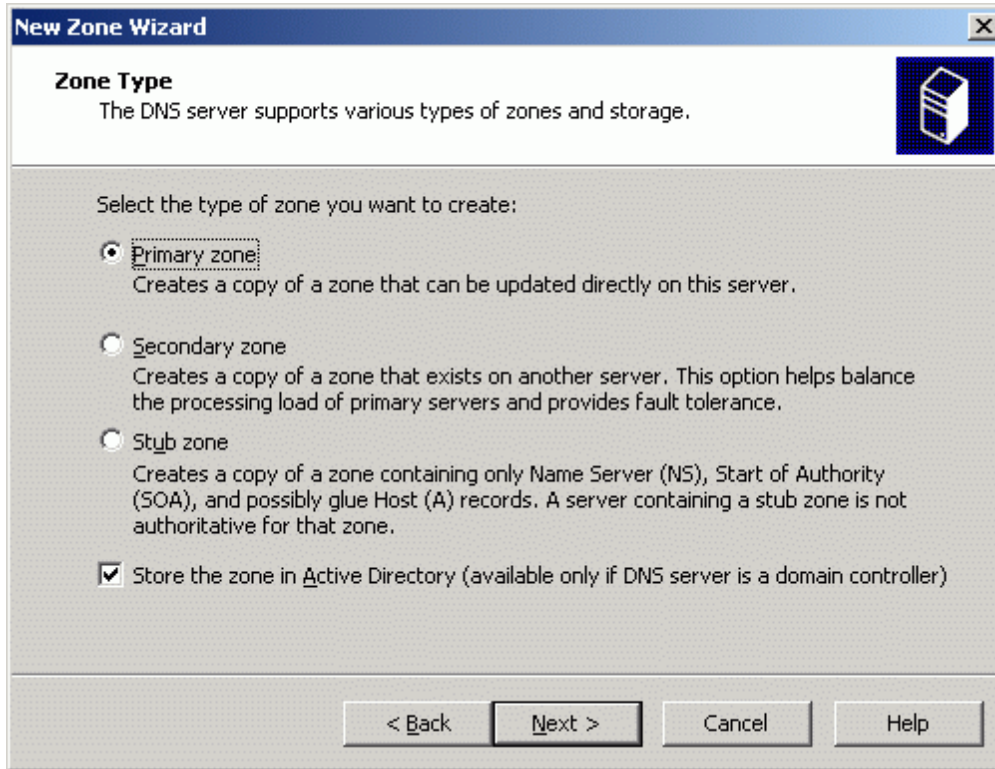
Press the right mouse button over the **Reverse Lookup Zone** node and select **New Zone...** popup menu item.

New Zone Wizard appears.



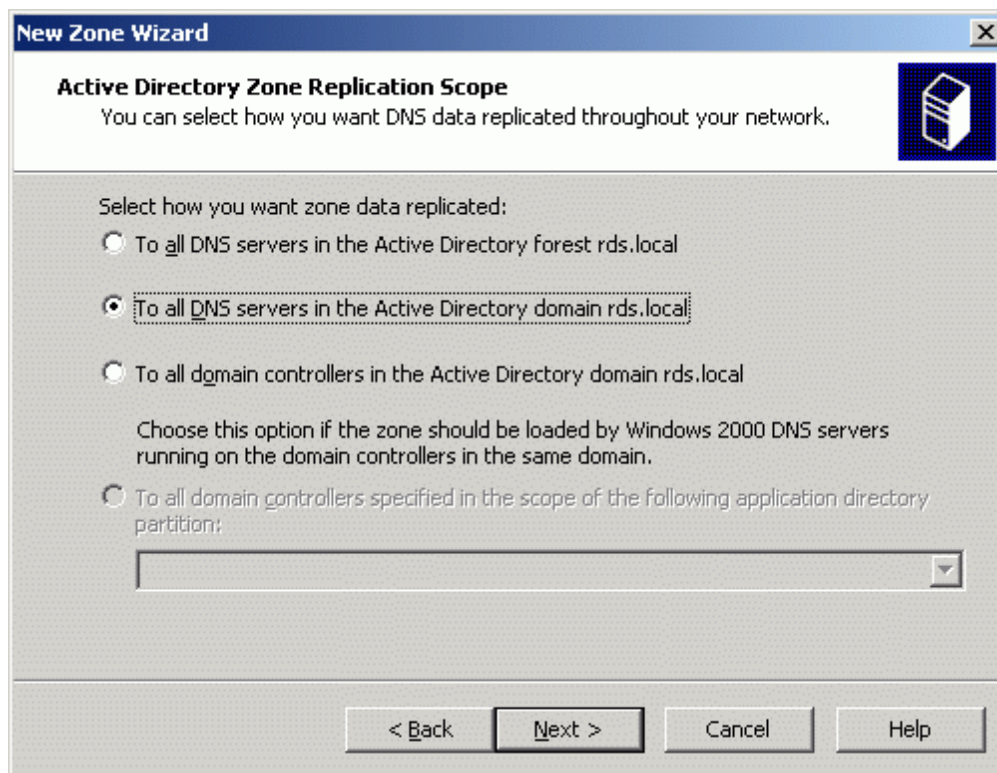
Press the **Next** button to continue.

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



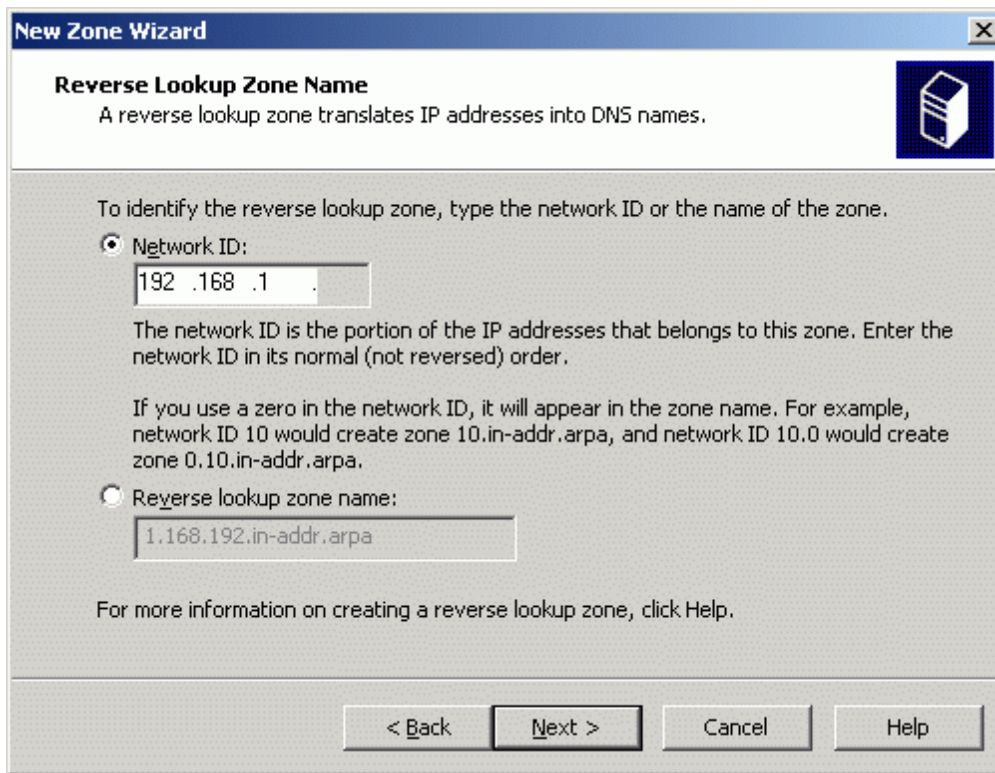
Press the **Next** button to continue.

Specify the replication scope or accept the default option.



Press the **Next** button to continue.

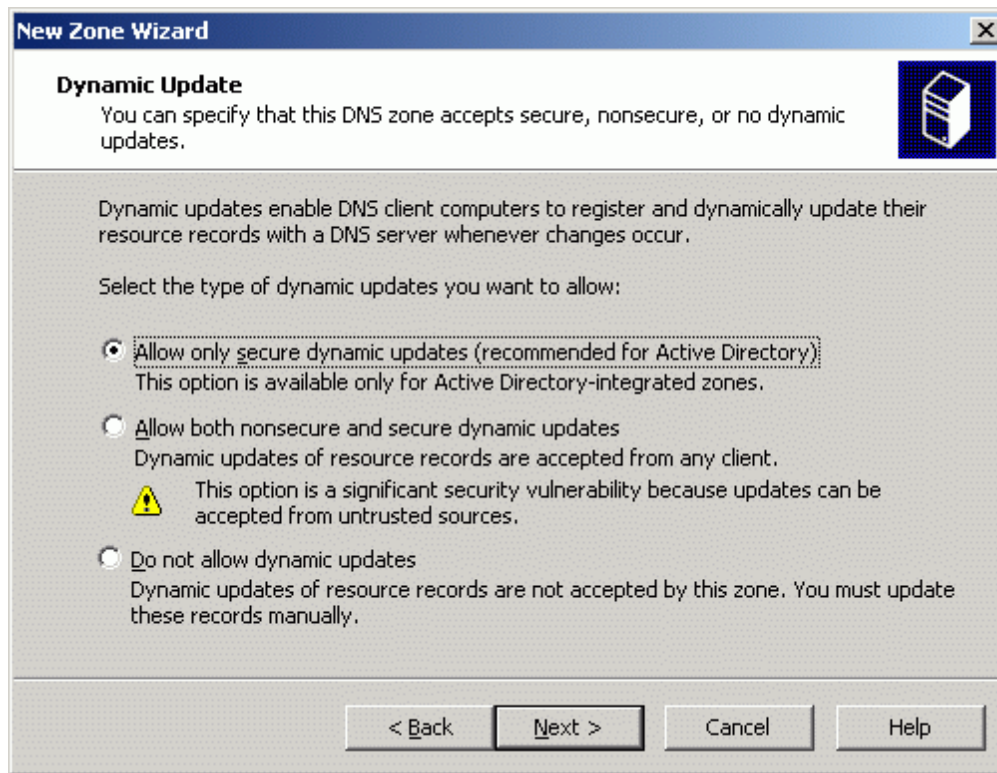
Type in the **Network ID** to identify the reverse lookup zone.



The screenshot shows a Windows-style dialog box titled "New Zone Wizard". The main heading is "Reverse Lookup Zone Name". Below it, a subtitle reads: "A reverse lookup zone translates IP addresses into DNS names." To the right of the text is a small icon of a server rack. The main content area has a light gray background and contains the following text: "To identify the reverse lookup zone, type the network ID or the name of the zone." There are two radio button options. The first option, "Network ID:", is selected. Below it is a text input field containing "192 .168 .1 .". Below the input field is a paragraph of explanatory text: "The network ID is the portion of the IP addresses that belongs to this zone. Enter the network ID in its normal (not reversed) order. If you use a zero in the network ID, it will appear in the zone name. For example, network ID 10 would create zone 10.in-addr.arpa, and network ID 10.0 would create zone 0.10.in-addr.arpa." The second option, "Reverse lookup zone name:", is not selected. Below it is a text input field containing "1.168.192.in-addr.arpa". At the bottom of the dialog box, there is a line of text: "For more information on creating a reverse lookup zone, click Help." Below this text are four buttons: "< Back", "Next >", "Cancel", and "Help".

Press the **Next** button to continue.

Specify dynamic update options.



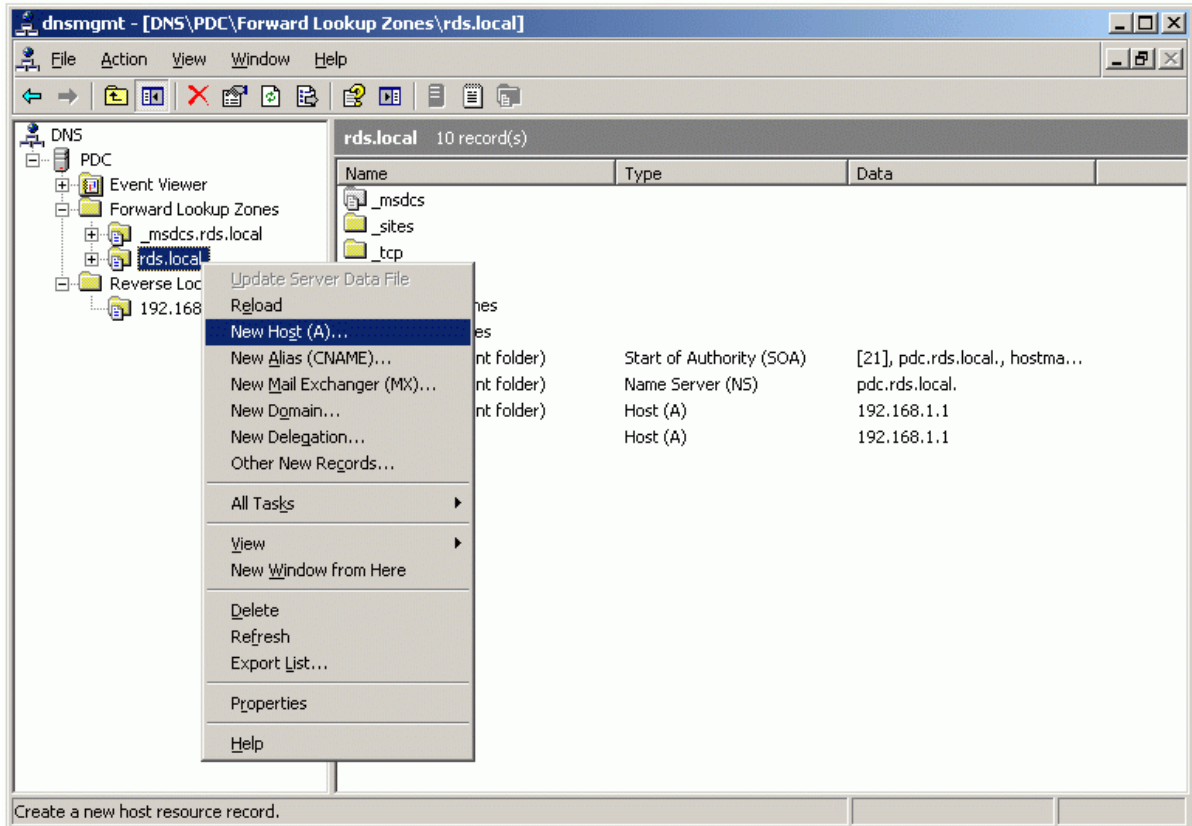
Press the **Next** button to continue.

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

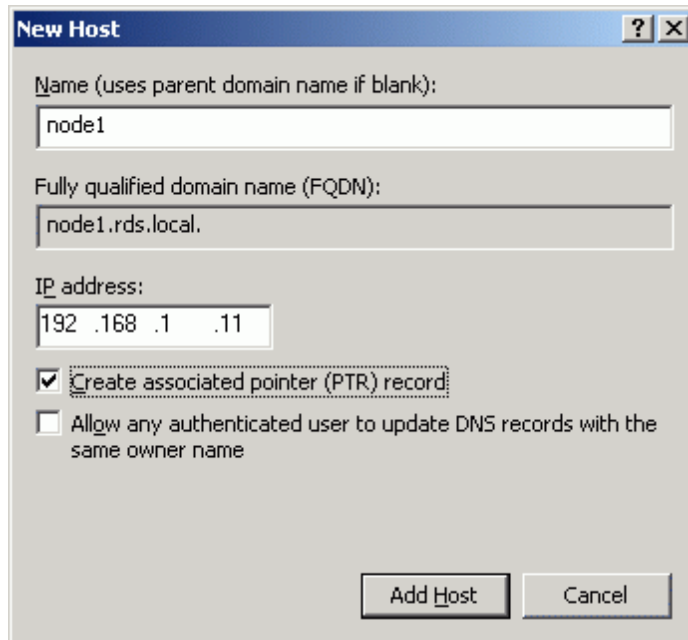


Press the **Finish** button.

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



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.

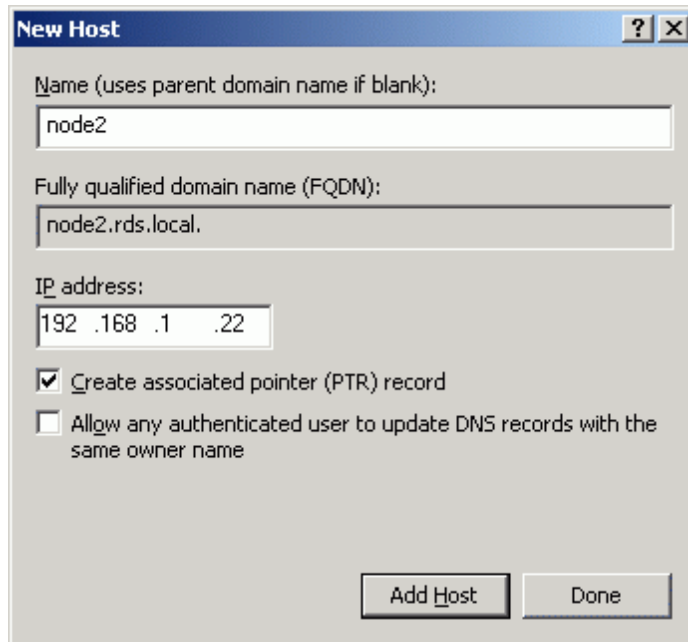


The image shows a 'New Host' dialog box with the following fields and options:

- Name (uses parent domain name if blank):** A text box containing 'node1'.
- Fully qualified domain name (FQDN):** A text box containing 'node1.rds.local'.
- IP address:** A text box containing '192 .168 .1 .11'.
- ☒ **Create associated pointer (PTR) record**
- ☐ **Allow any authenticated user to update DNS records with the same owner name**
- Add Host** button
- Cancel** button

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

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

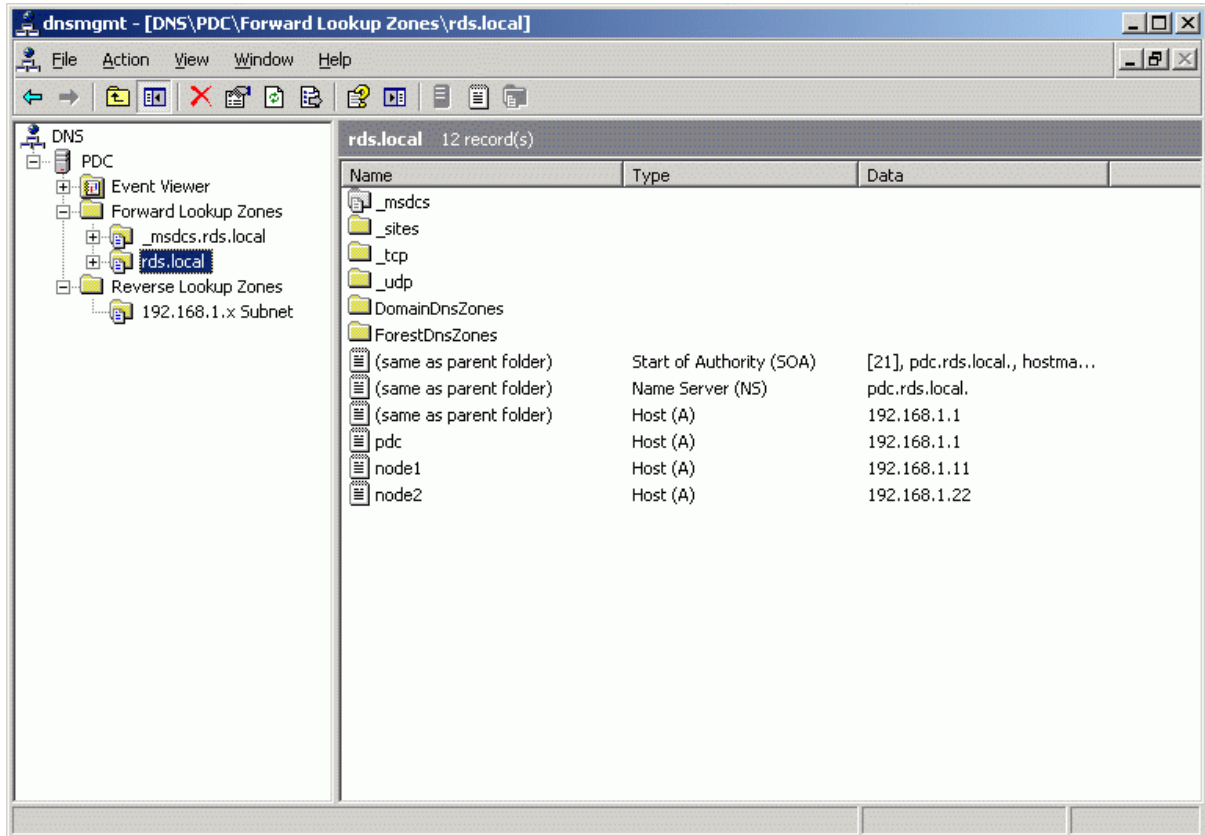


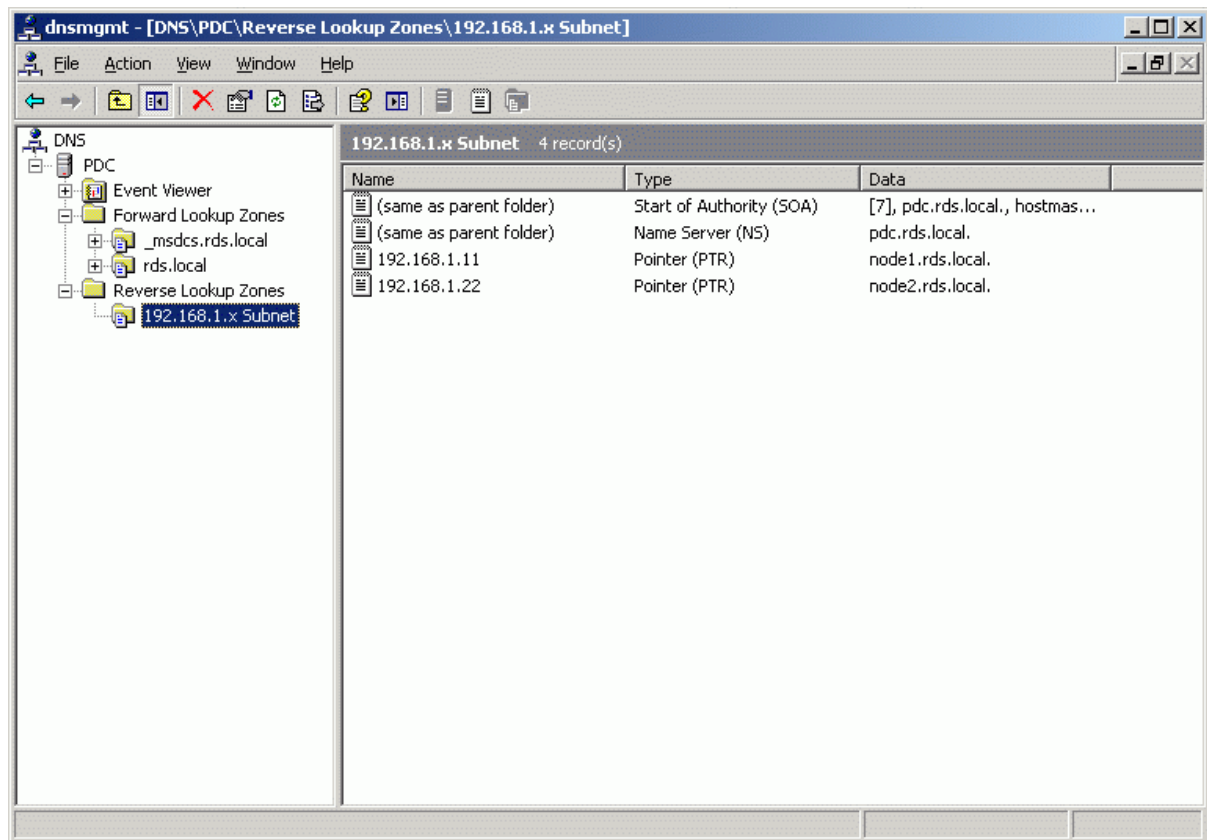
The image shows a 'New Host' dialog box with the following fields and options:

- Name (uses parent domain name if blank):** node2
- Fully qualified domain name (FQDN):** node2.rds.local.
- IP address:** 192 .168 .1 .22
- ☒ **Create associated pointer (PTR) record**
- ☐ **Allow any authenticated user to update DNS records with the same owner name**
- Add Host** button
- Done** button

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

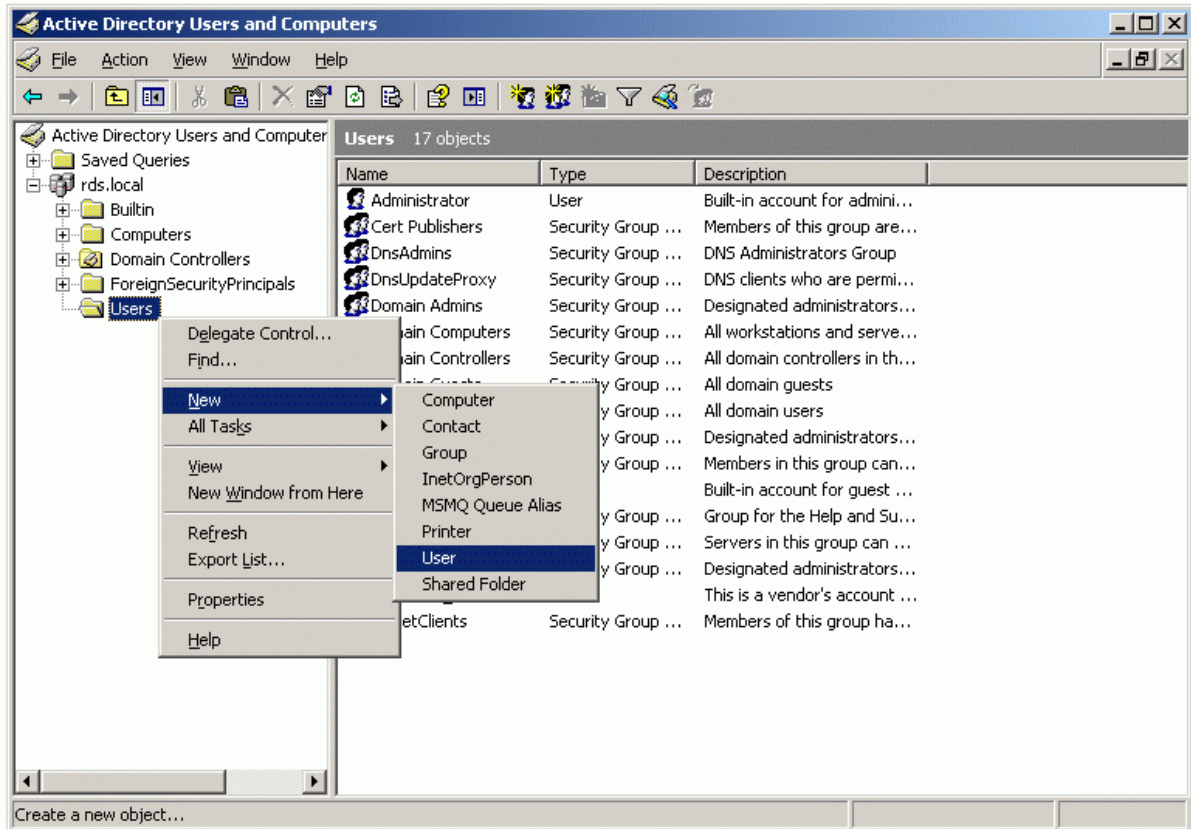
If successful, the **DNS Manager** console should look like the example images provided below.





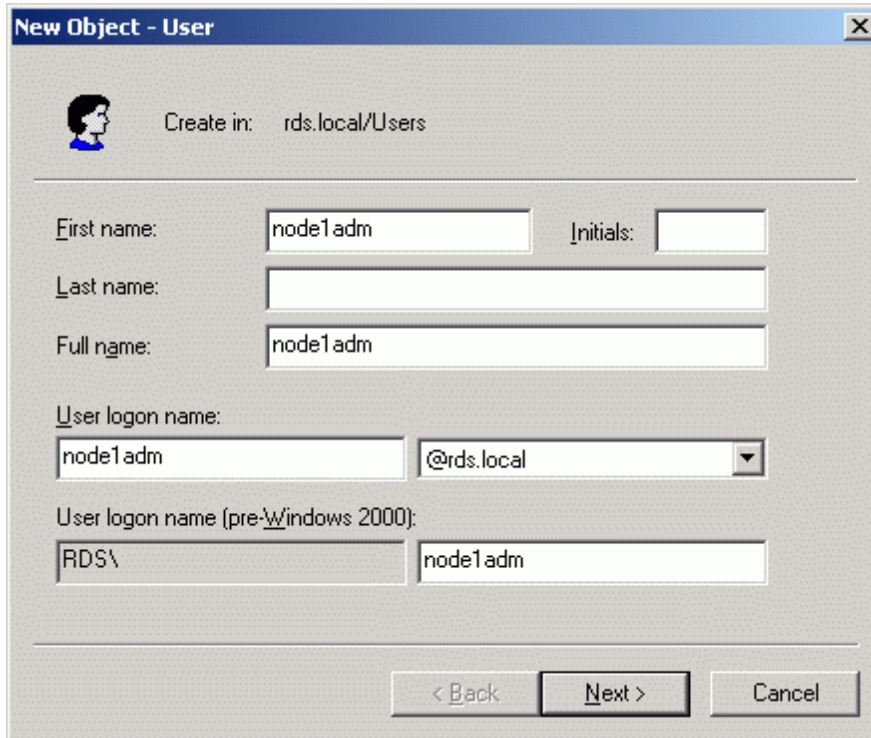
User Accounts

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**.

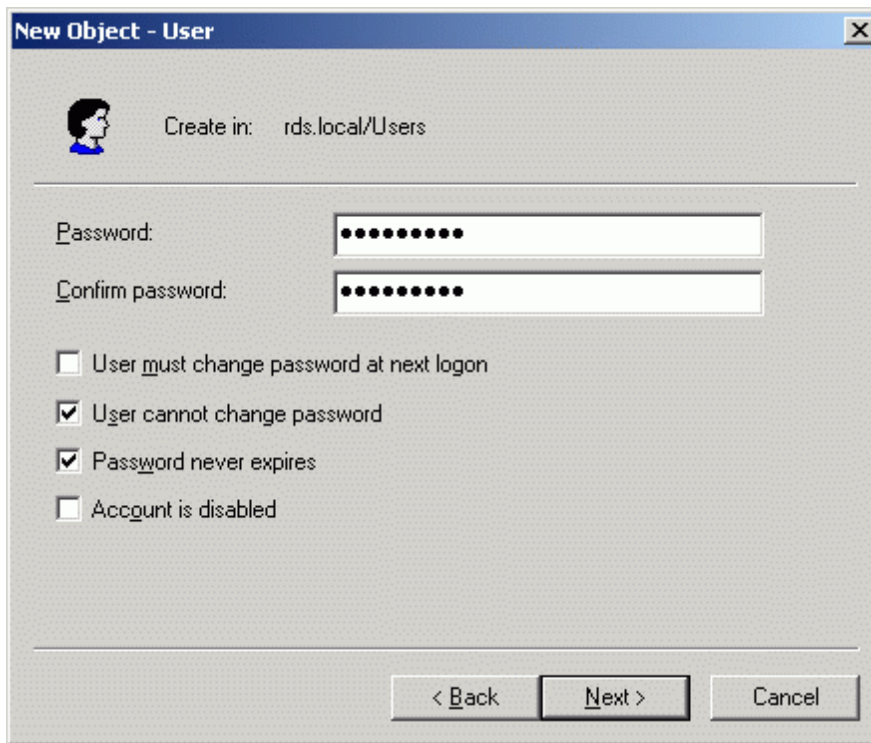
In the dialog that appears, enter the required fields as shown in the example image.



The image shows a Windows-style dialog box titled "New Object - User". It has a close button (X) in the top right corner. Below the title bar, there is a small icon of a person and the text "Create in: rds.local/Users". The dialog contains several input fields: "First name:" with the value "node1 adm", "Initials:" (empty), "Last name:" (empty), "Full name:" with the value "node1 adm", "User logon name:" with the value "node1 adm" and a dropdown menu showing "@rds.local", and "User logon name (pre-Windows 2000):" with the value "RDS\" and a text box containing "node1 adm". At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

Press the **Next** button to continue.

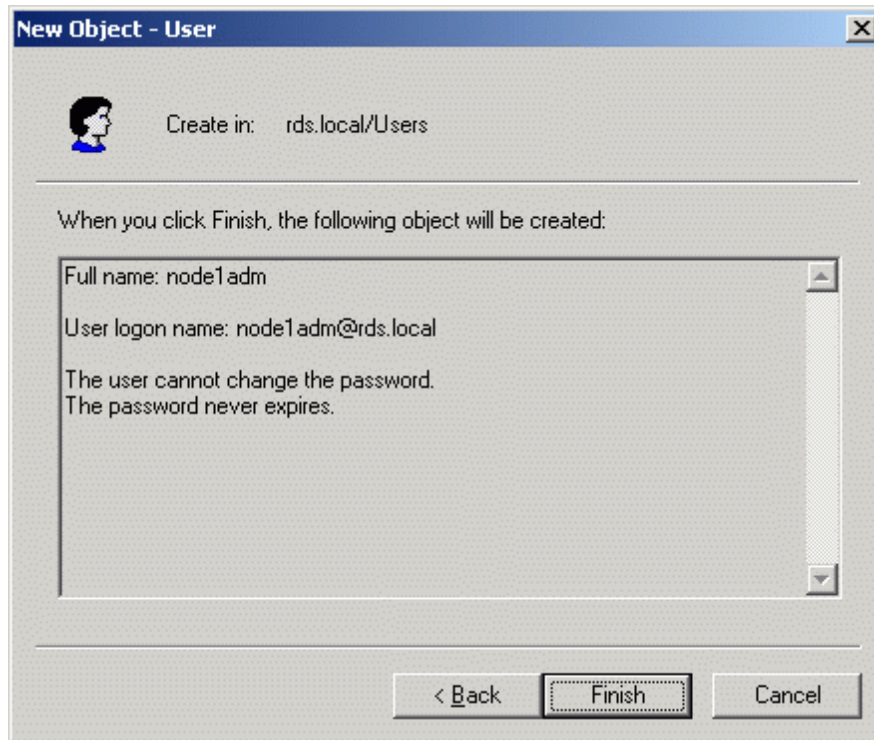
Enter the password and optionally set the additional options.



The image shows a Windows-style dialog box titled "New Object - User". It has a close button (X) in the top right corner. Below the title bar, there is a user icon and the text "Create in: rds.local/Users". A horizontal line separates this from the password section. The password section has two text boxes: "Password:" and "Confirm password:", both filled with dots. Below these are four checkboxes: "User must change password at next logon" (unchecked), "User cannot change password" (checked), "Password never expires" (checked), and "Account is disabled" (unchecked). At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

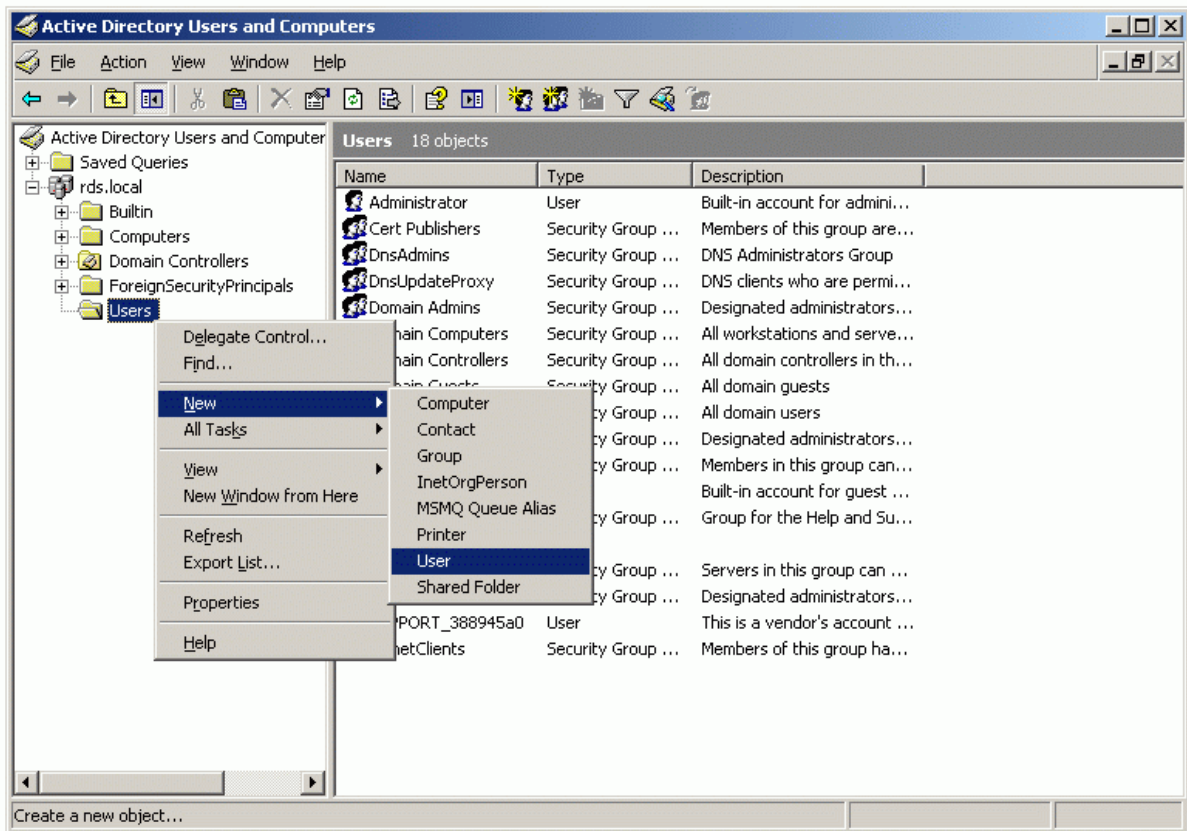
Press the **Next** button to continue.

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



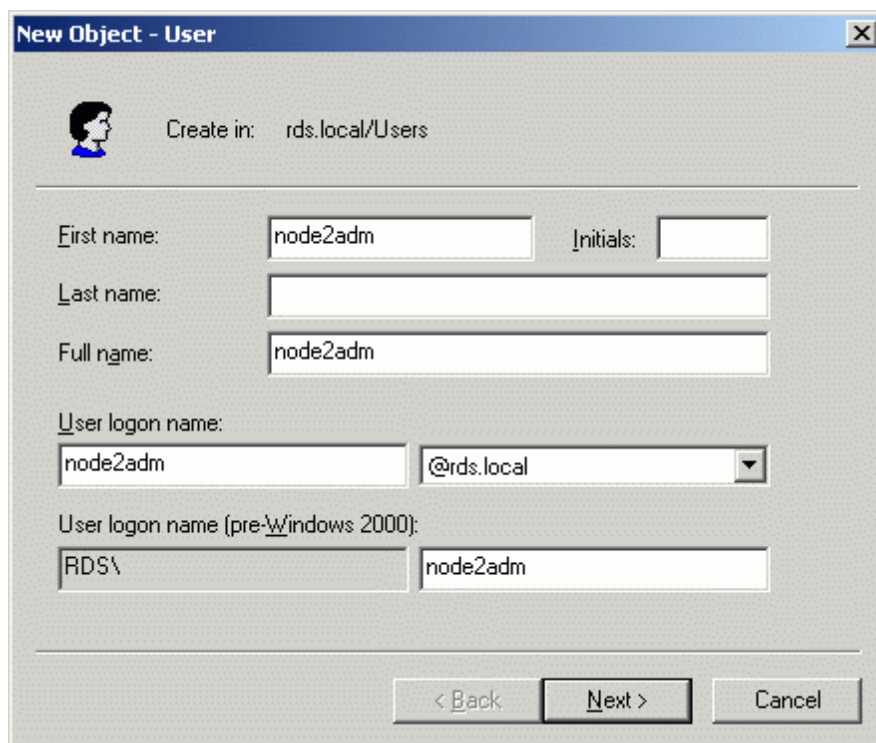
Press the **Finish** button to create new user.

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



Select **New->User**.

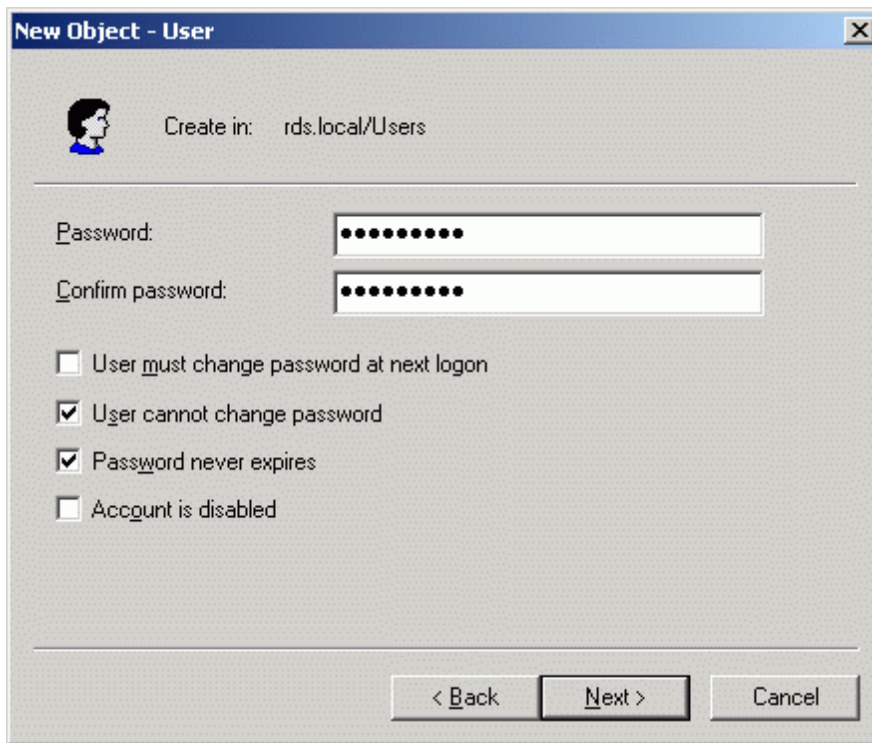
In the dialog that appears, enter the required fields as shown in the example image.



The image shows a 'New Object - User' dialog box. At the top, it says 'Create in: rds.local/Users'. Below this, there are several input fields: 'First name:' with 'node2adm', 'Initials:' (empty), 'Last name:' (empty), 'Full name:' with 'node2adm', 'User logon name:' with 'node2adm' and a dropdown menu showing '@rds.local', and 'User logon name (pre-Windows 2000):' with 'RDS\' and 'node2adm'. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

Press the **Next** button to continue.

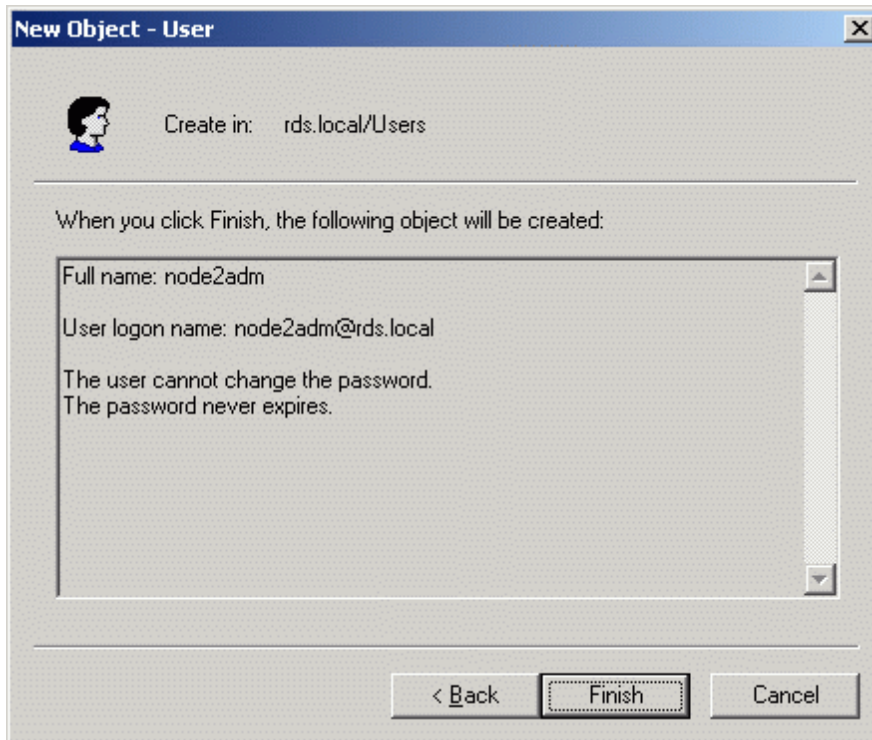
Enter the password and optionally set the additional options.



The image shows a Windows-style dialog box titled "New Object - User". It has a close button (X) in the top right corner. Below the title bar, there is a user icon and the text "Create in: rds.local/Users". A horizontal line separates this from the password section. The password section has two text boxes: "Password:" and "Confirm password:", both filled with dots. Below these are four checkboxes: "User must change password at next logon" (unchecked), "User cannot change password" (checked), "Password never expires" (checked), and "Account is disabled" (unchecked). At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

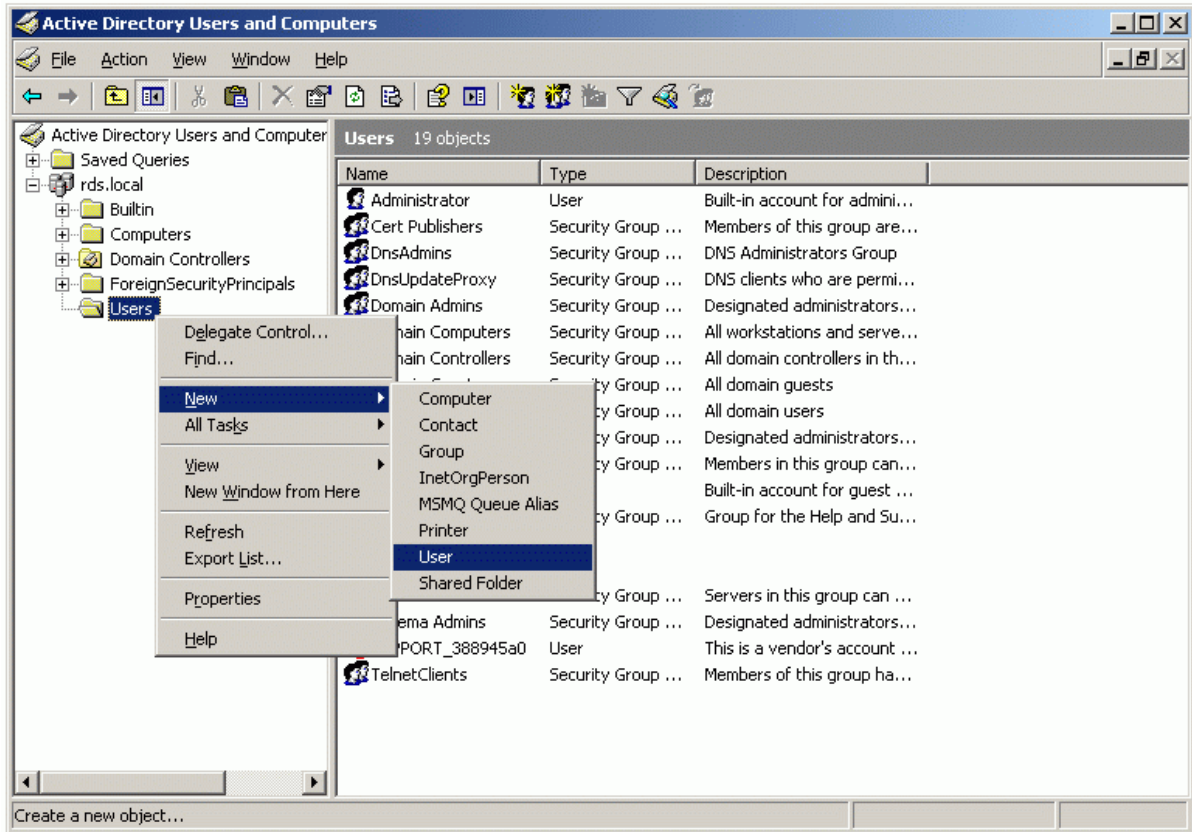
Press the **Next** button to continue.

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



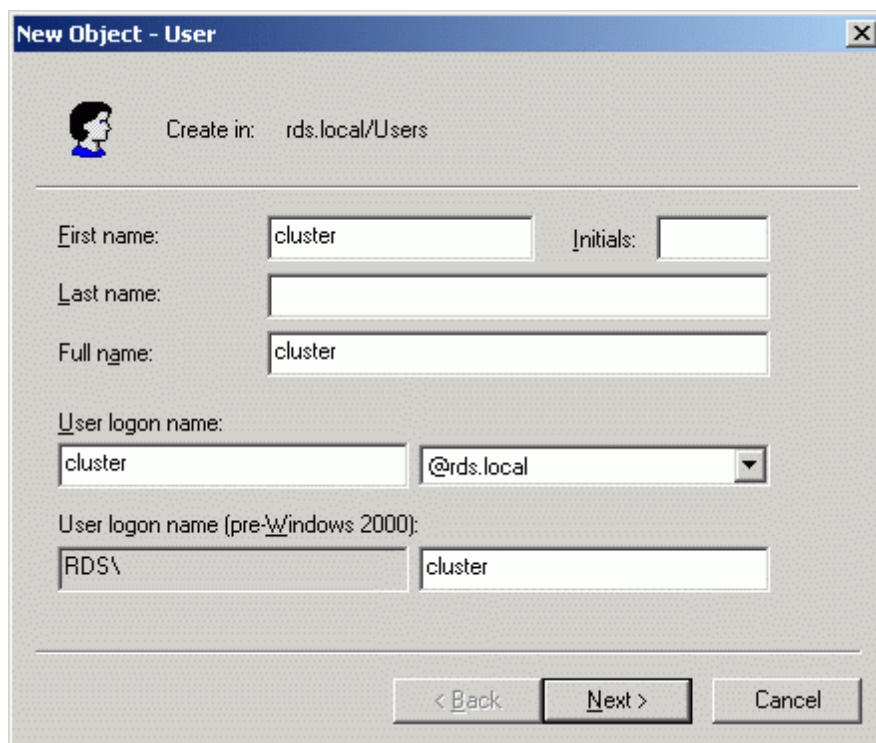
Press the **Finish** button to create new user.

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**.

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



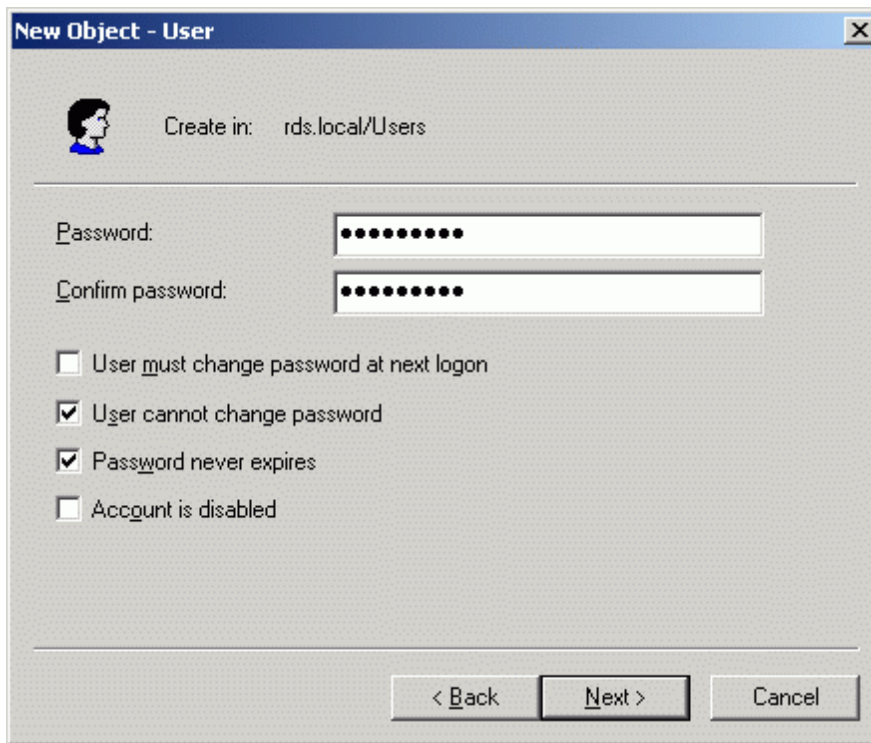
The image shows a Windows-style dialog box titled "New Object - User". It has a standard window frame with a close button (X) in the top right corner. Inside the dialog, there is a small icon of a person's head and shoulders on the left, followed by the text "Create in: rds.local/Users". Below this, there are several input fields and labels:

- First name:** A text box containing the word "cluster".
- Initials:** An empty text box.
- Last name:** An empty text box.
- Full name:** A text box containing the word "cluster".
- User logon name:** A text box containing the word "cluster".
- @rds.local:** A dropdown menu with the text "@rds.local" and a downward arrow.
- User logon name (pre-Windows 2000):** A text box containing "RDS\".
- cluster:** A text box containing the word "cluster".

At the bottom of the dialog, there are three buttons: "< Back", "Next >", and "Cancel". The "Next >" button is highlighted with a black border.

Press the **Next** button to continue.

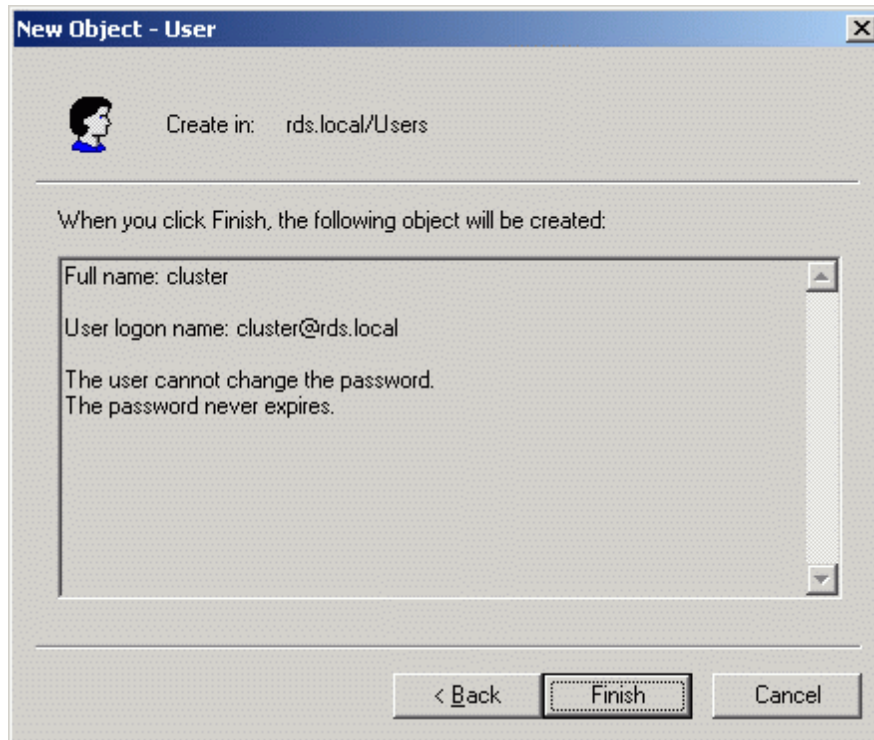
Enter the password and optionally set the additional options.



The image shows a Windows-style dialog box titled "New Object - User". It has a close button (X) in the top right corner. Below the title bar, there is a user icon and the text "Create in: rds.local/Users". A horizontal line separates this from the password section. The password section has two text boxes: "Password:" and "Confirm password:", both filled with dots. Below these are four checkboxes: "User must change password at next logon" (unchecked), "User cannot change password" (checked), "Password never expires" (checked), and "Account is disabled" (unchecked). At the bottom, there are three buttons: "< Back", "Next >", and "Cancel".

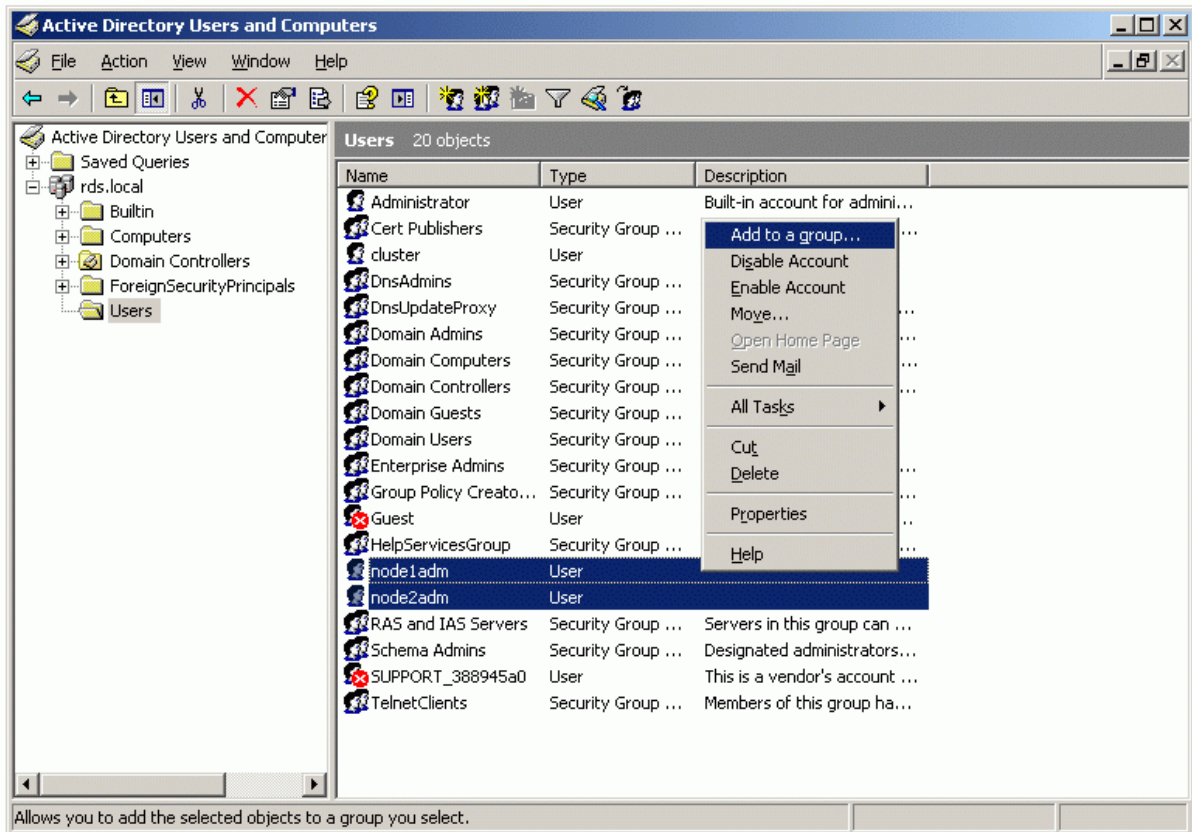
Press the **Next** button to continue.

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



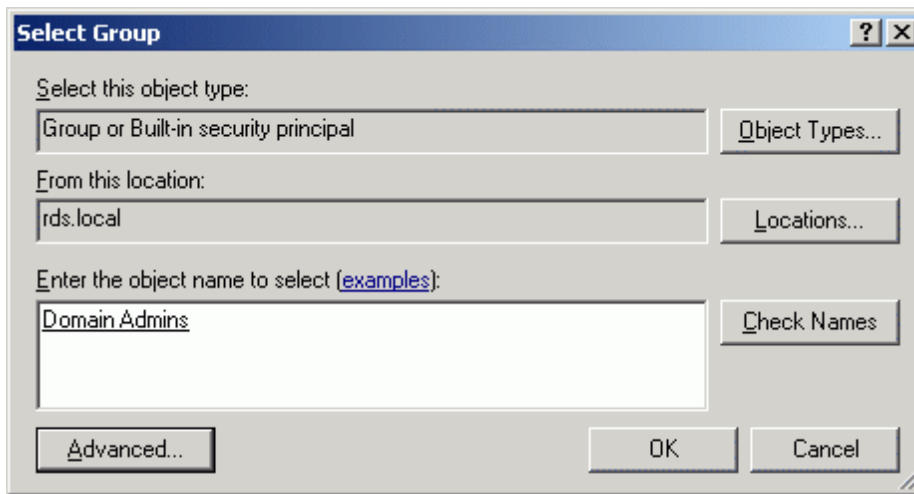
Press the **Finish** button to create new user.

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.



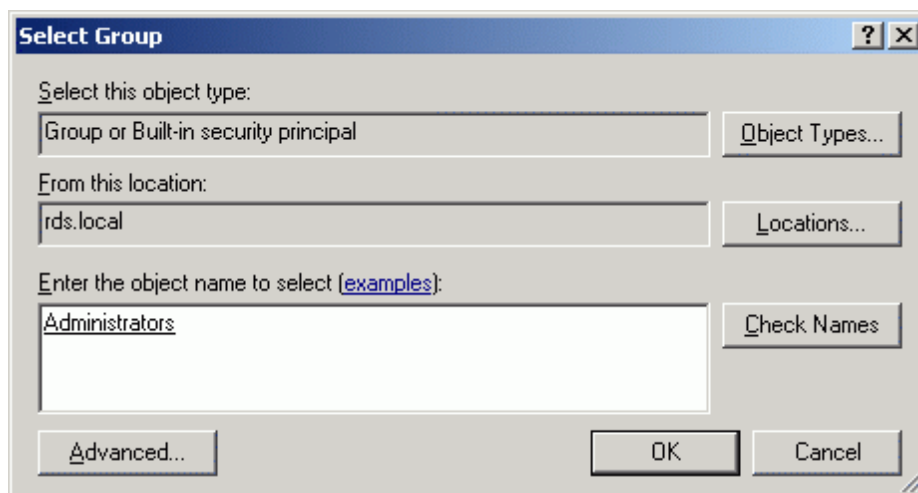
Select **Add to a group** option.

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



Press the **OK** button.

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

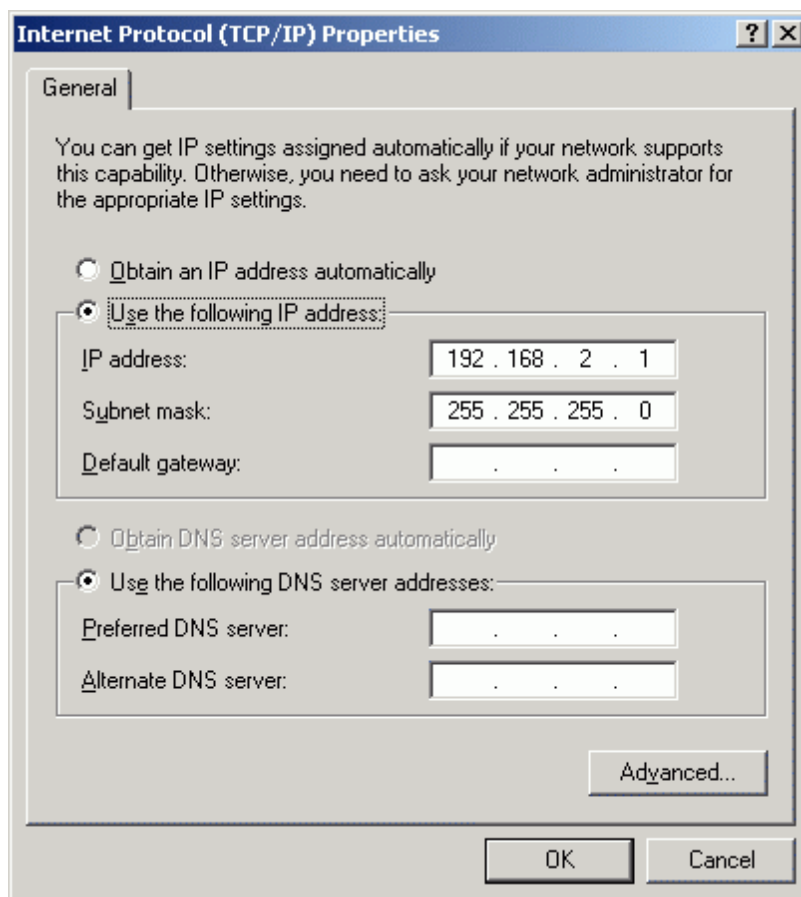


Press the **OK** button.

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.

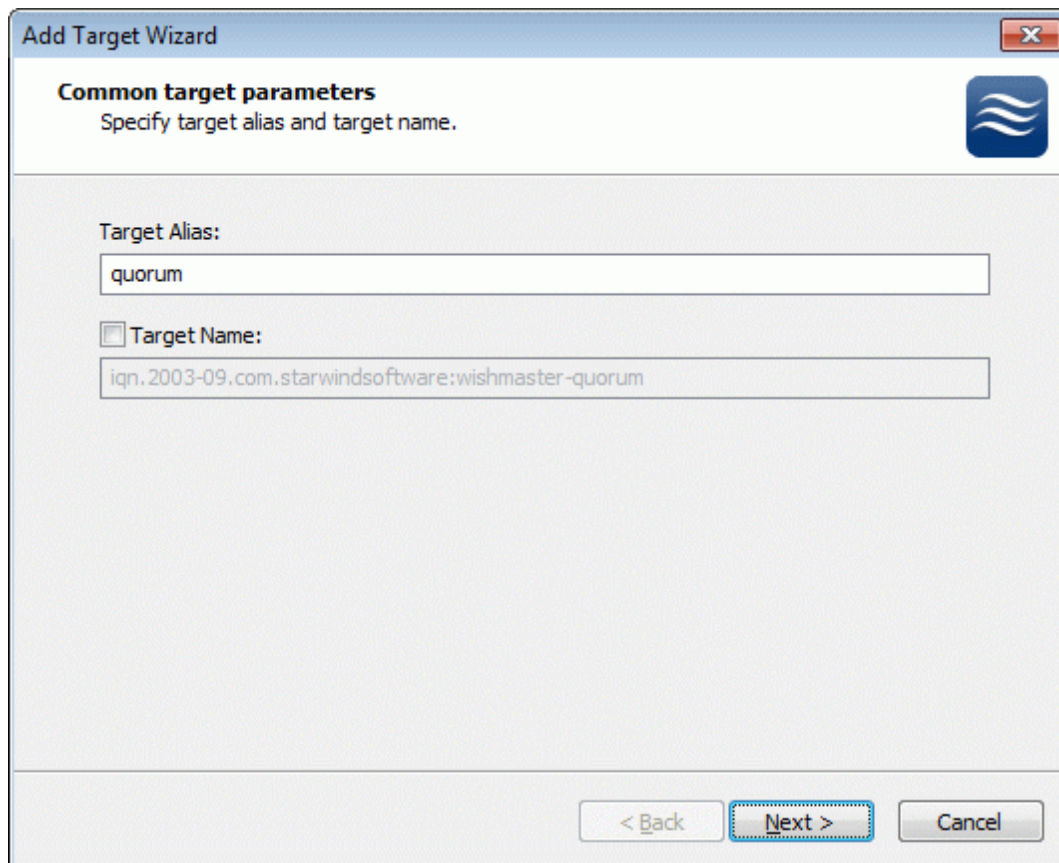


Press the **OK** button.

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.

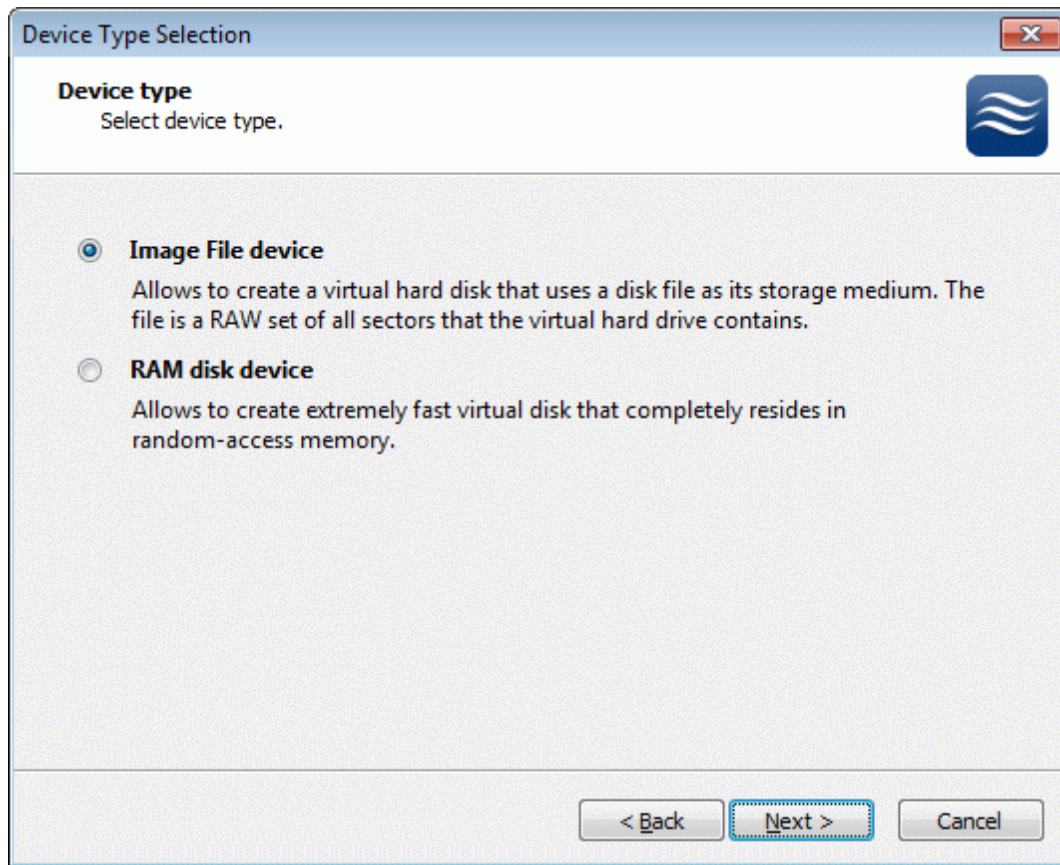
After you have successfully connected to the **StarWind Service**, please click the right mouse button over the desired host (computer) and select **Add Target** pop-up menu item. In the wizard that appears, select a target name. The name must be a unique name by which the device will be declared to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



The image shows a screenshot of the "Add Target Wizard" dialog box. The title bar says "Add Target Wizard" with a close button. The main area has a header "Common target parameters" with a sub-header "Specify target alias and target name." and a StarWind logo. Below this, there are two input fields. The first is labeled "Target Alias:" and contains the text "quorum". The second is labeled "Target Name:" with a checkbox to its left, and contains the text "iqn.2003-09.com.starwindsoftware:wishmaster-quorum". At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

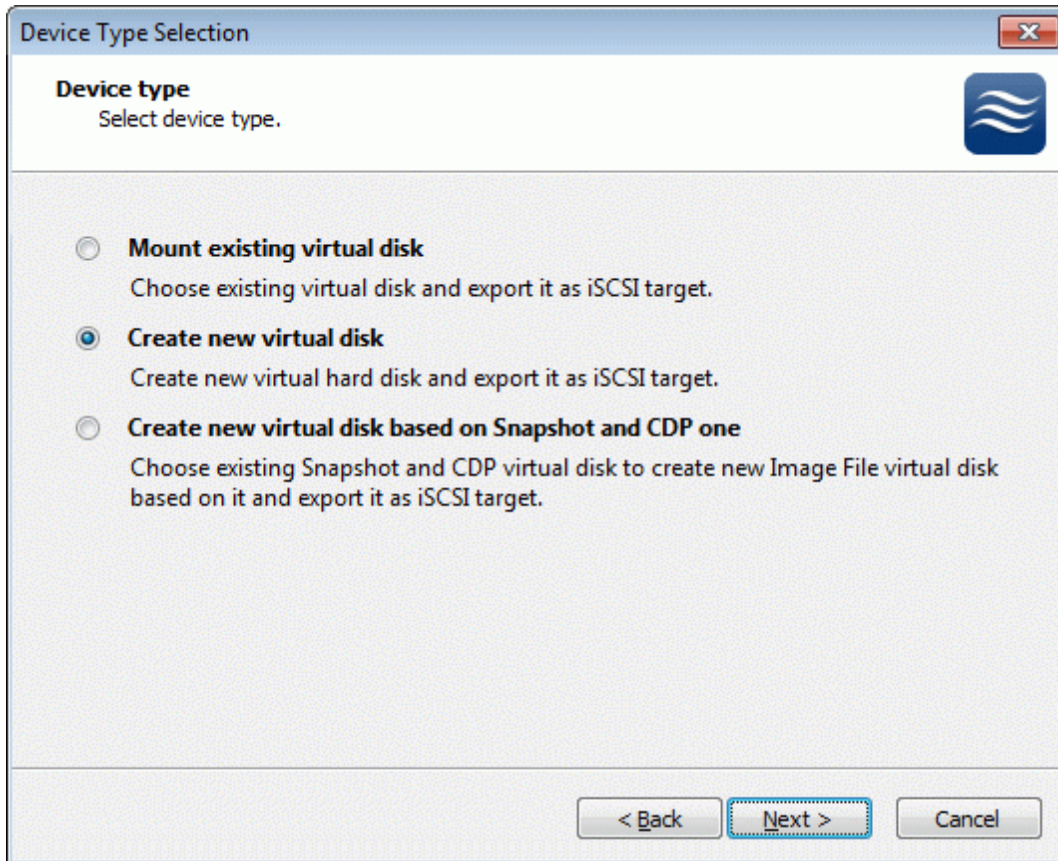
Press the **Next** button to continue.

Select **Image File device**.



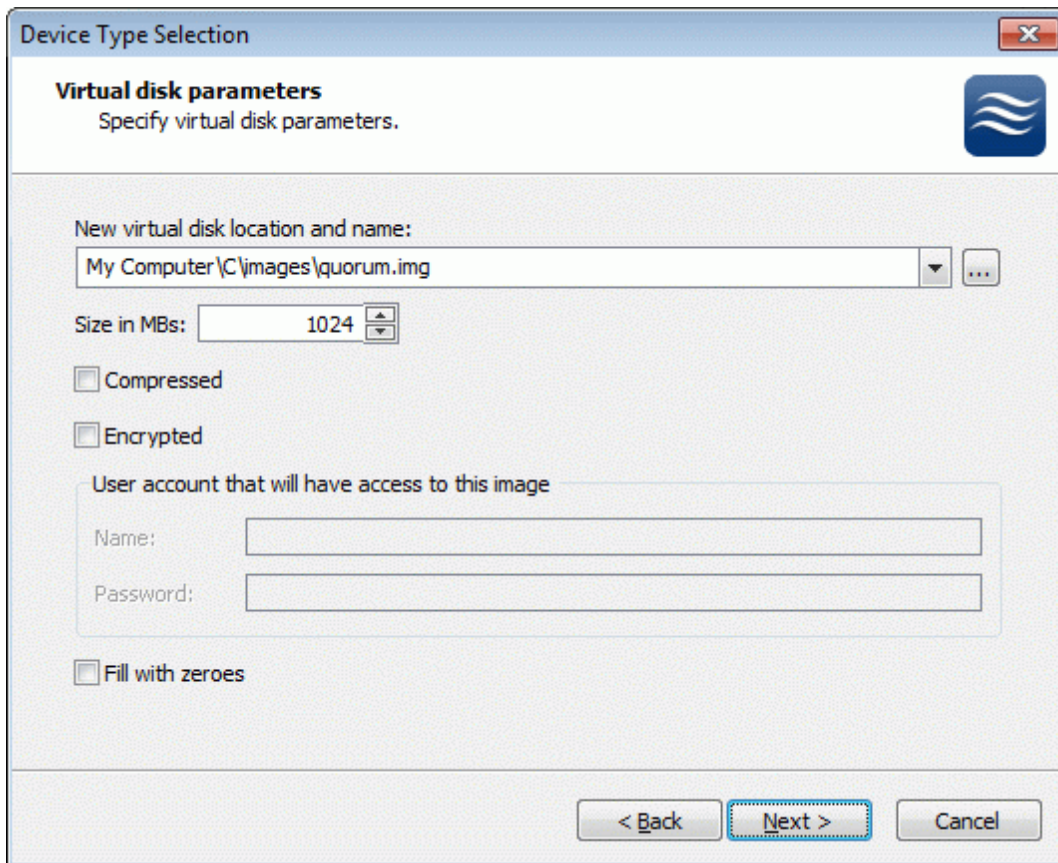
Press the **Next** button to continue.

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.

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**).



Device Type Selection

Virtual disk parameters
Specify virtual disk parameters.

New virtual disk location and name:
My Computer\C:\images\quorum.img

Size in MBs: 1024

☐ Compressed

☐ Encrypted

User account that will have access to this image

Name:

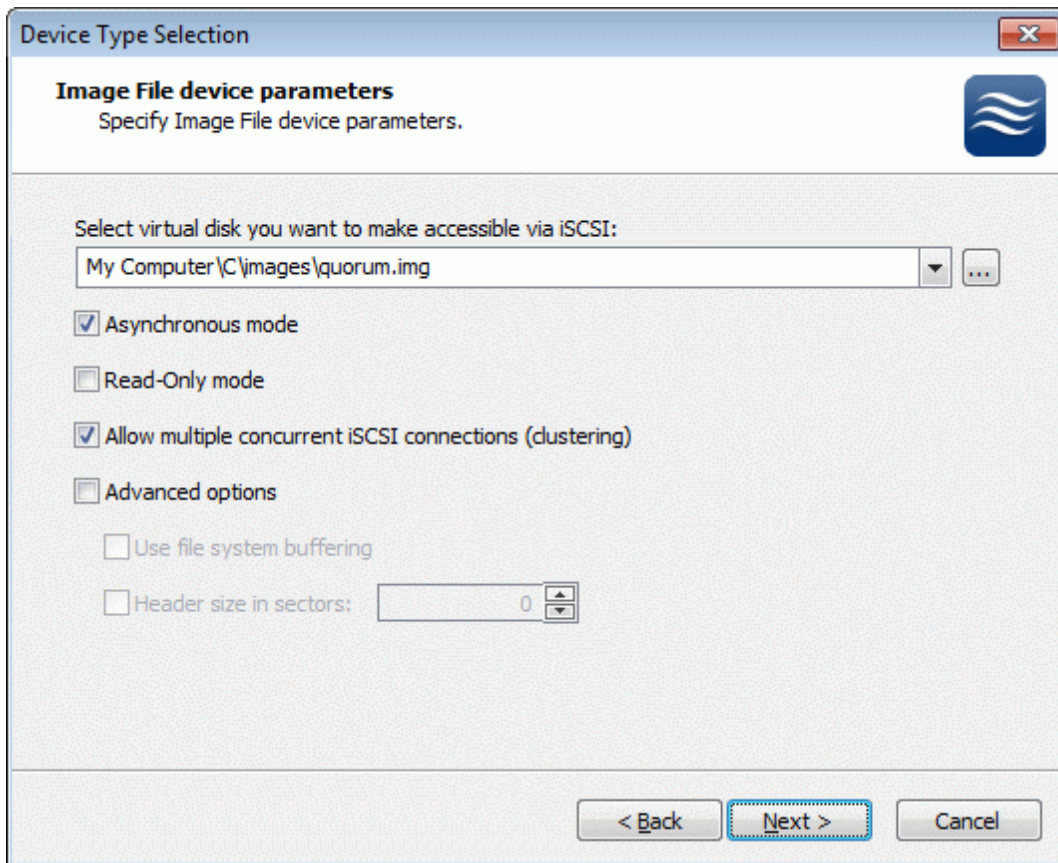
Password:

☐ Fill with zeroes

< Back Next > Cancel

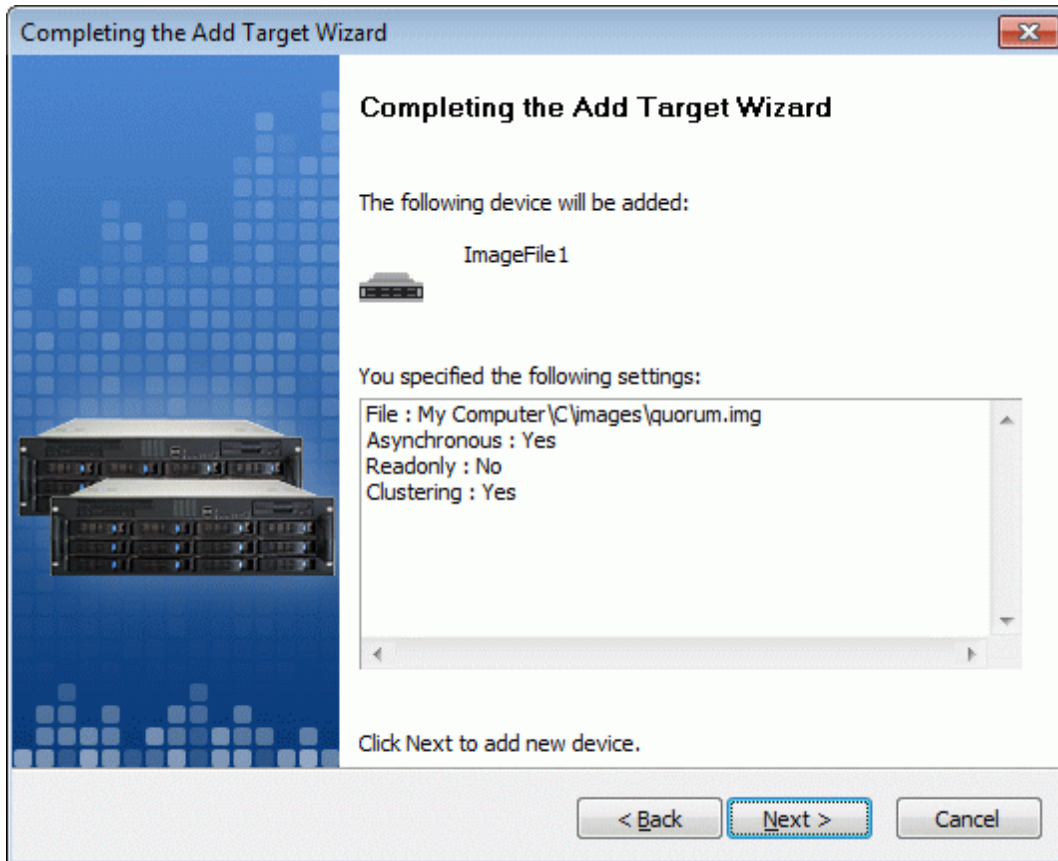
Press the **Next** button to continue.

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**).



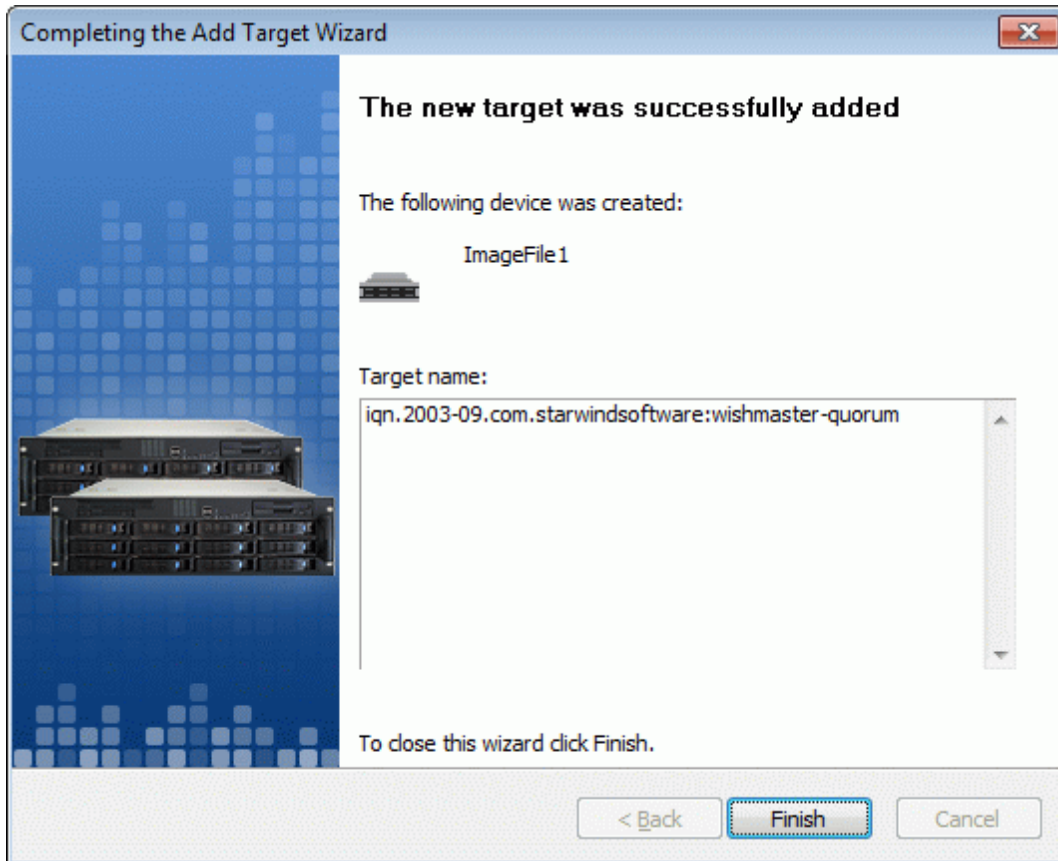
Press the **Next** button to continue.

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



Press the **Next** button to continue.

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

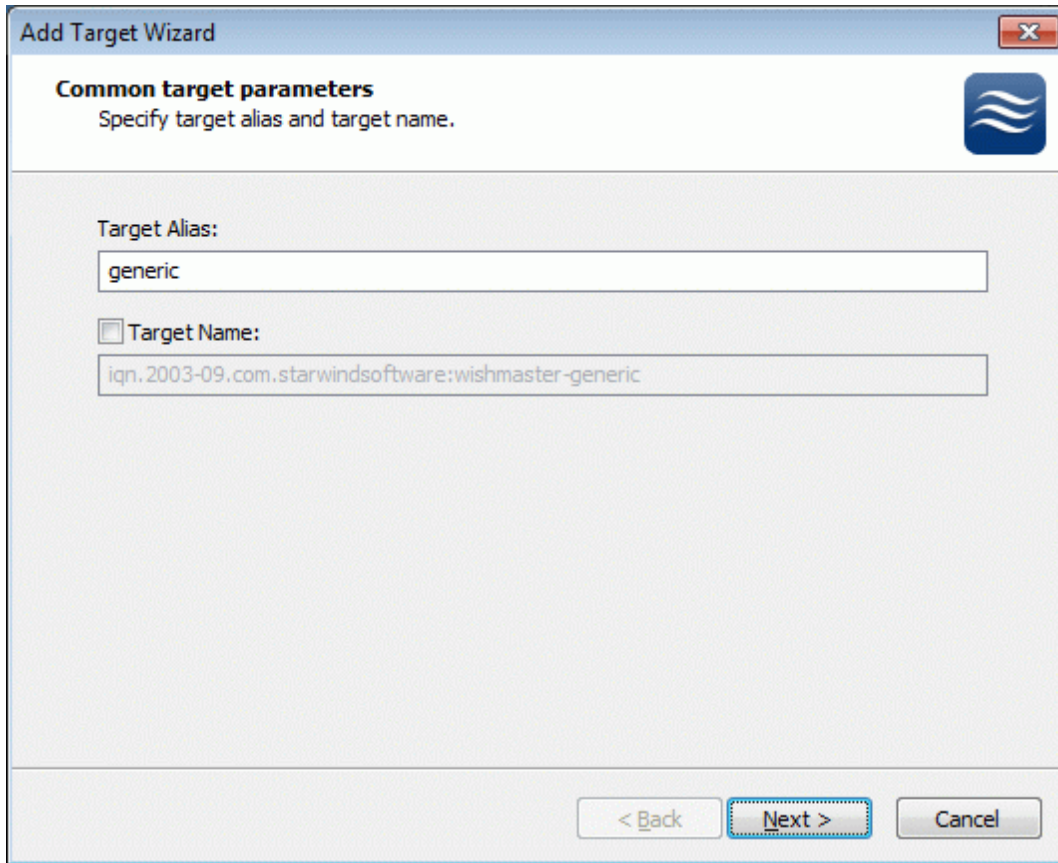


Press the **Finish** button to close the wizard.

Preparing Generic Volume

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

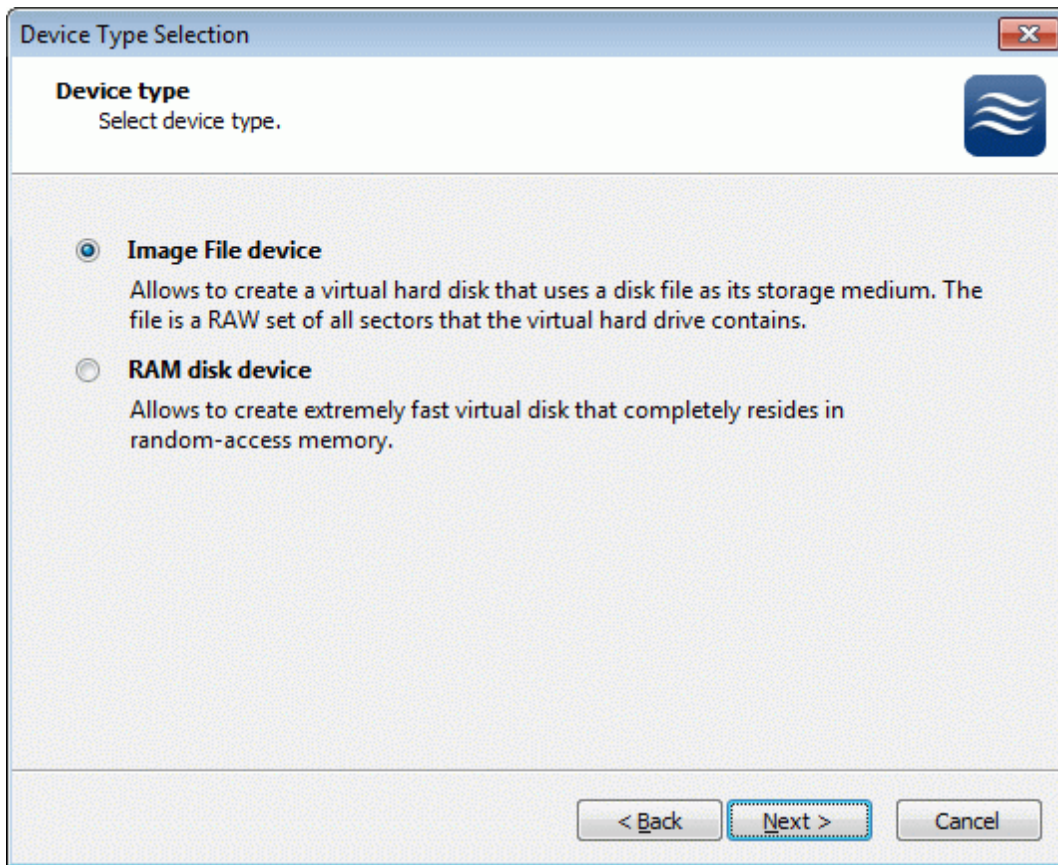
In the wizard that appears, select a target name. The name must be a unique name by which the device will be declared to the iSCSI initiators connecting to **StarWind** over an IP network.



The image shows a Windows-style dialog box titled "Add Target Wizard". It has a standard title bar with a close button (X). The main area is divided into two sections. The top section is titled "Common target parameters" and contains the instruction "Specify target alias and target name." followed by the StarWind logo. The bottom section contains two input fields. The first is labeled "Target Alias:" and contains the text "generic". The second is labeled "Target Name:" and contains the text "iqn.2003-09.com.starwindsoftware:wishmaster-generic". At the bottom of the dialog are three buttons: "< Back", "Next >" (which is highlighted with a blue border), and "Cancel".

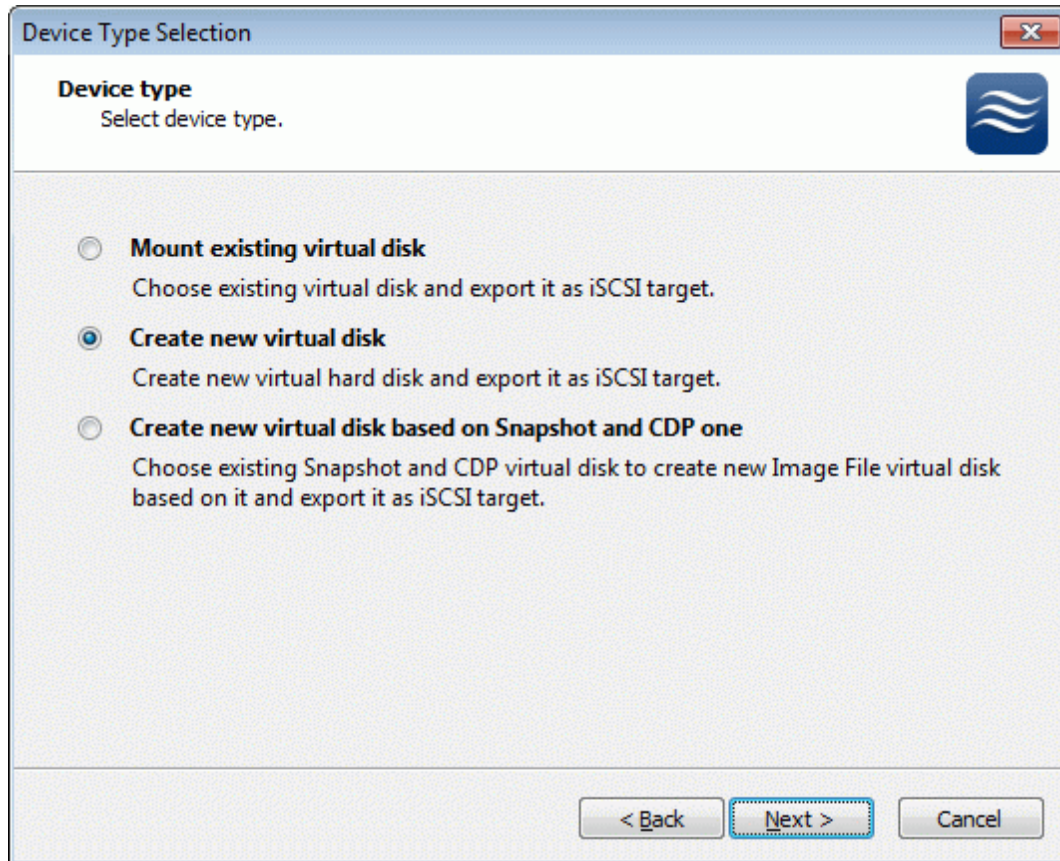
Press the **Next** button to continue.

Select **Image File device**.



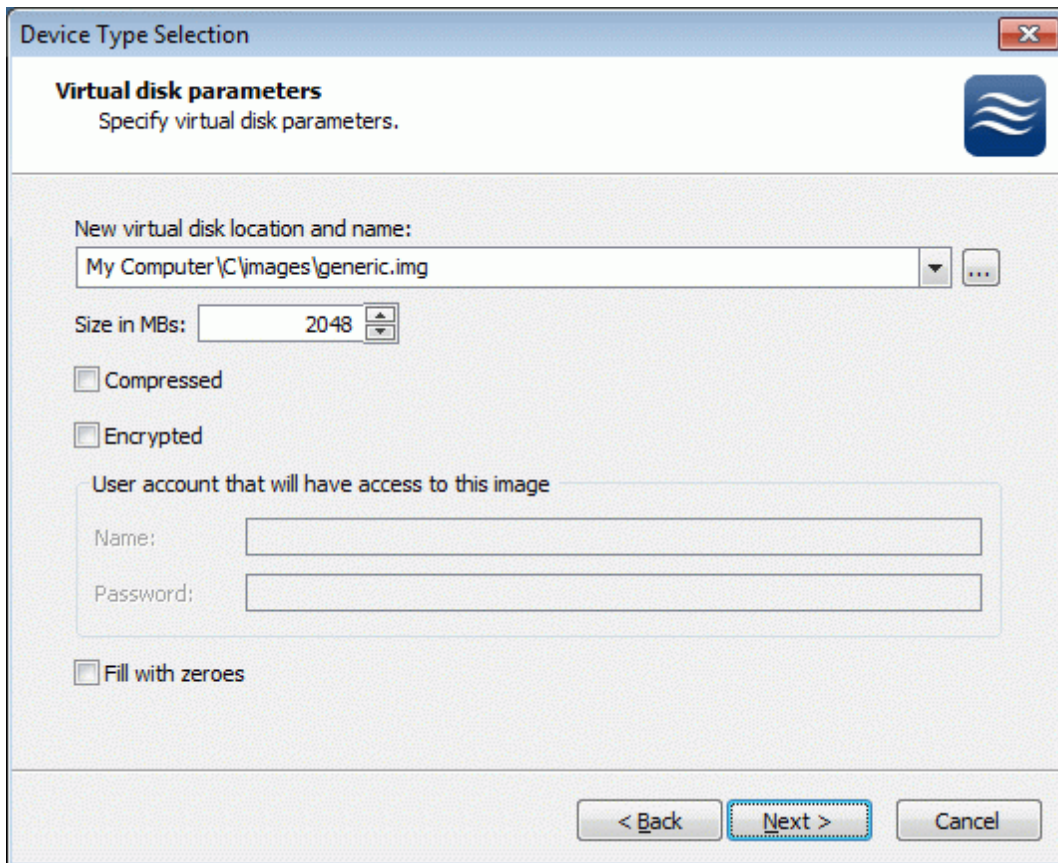
Press the **Next** button to continue.

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.

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**).



Device Type Selection

Virtual disk parameters
Specify virtual disk parameters.

New virtual disk location and name:
My Computer\C:\images\generic.img

Size in MBs: 2048

☐ Compressed

☐ Encrypted

User account that will have access to this image

Name:

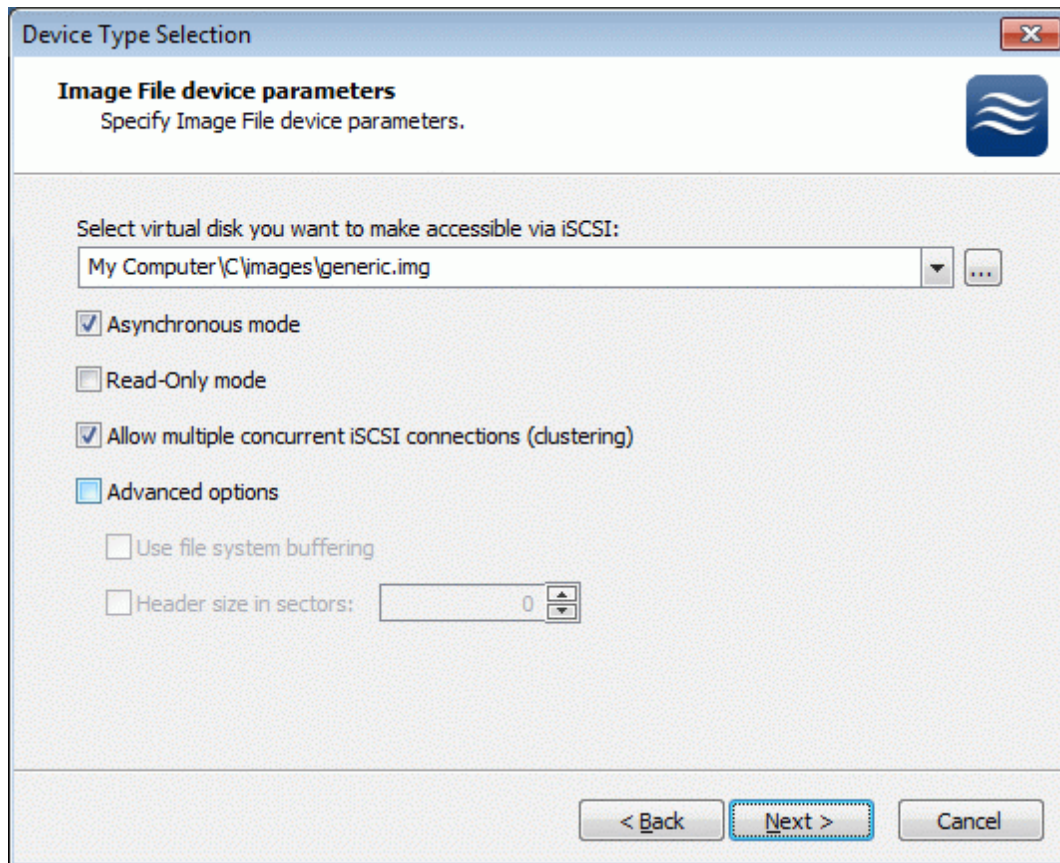
Password:

☐ Fill with zeroes

< Back **Next >** Cancel

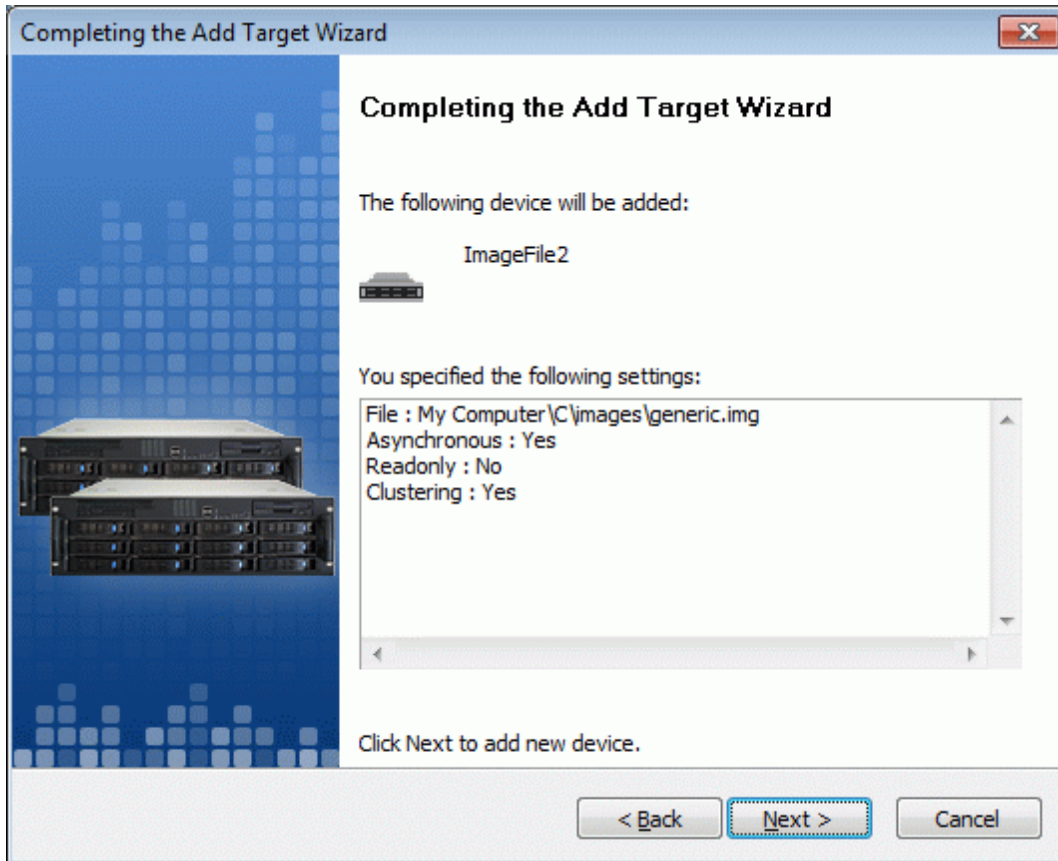
Press the **Next** button to continue.

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**).



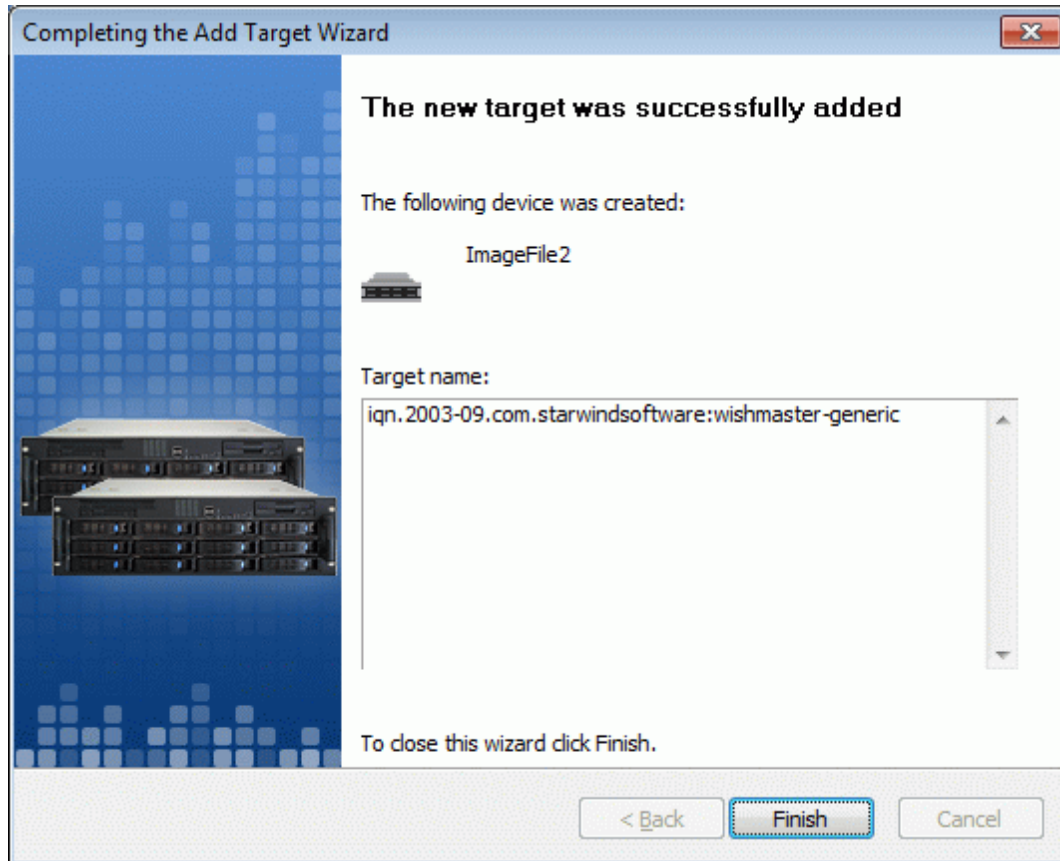
Press the **Next** button to continue.

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



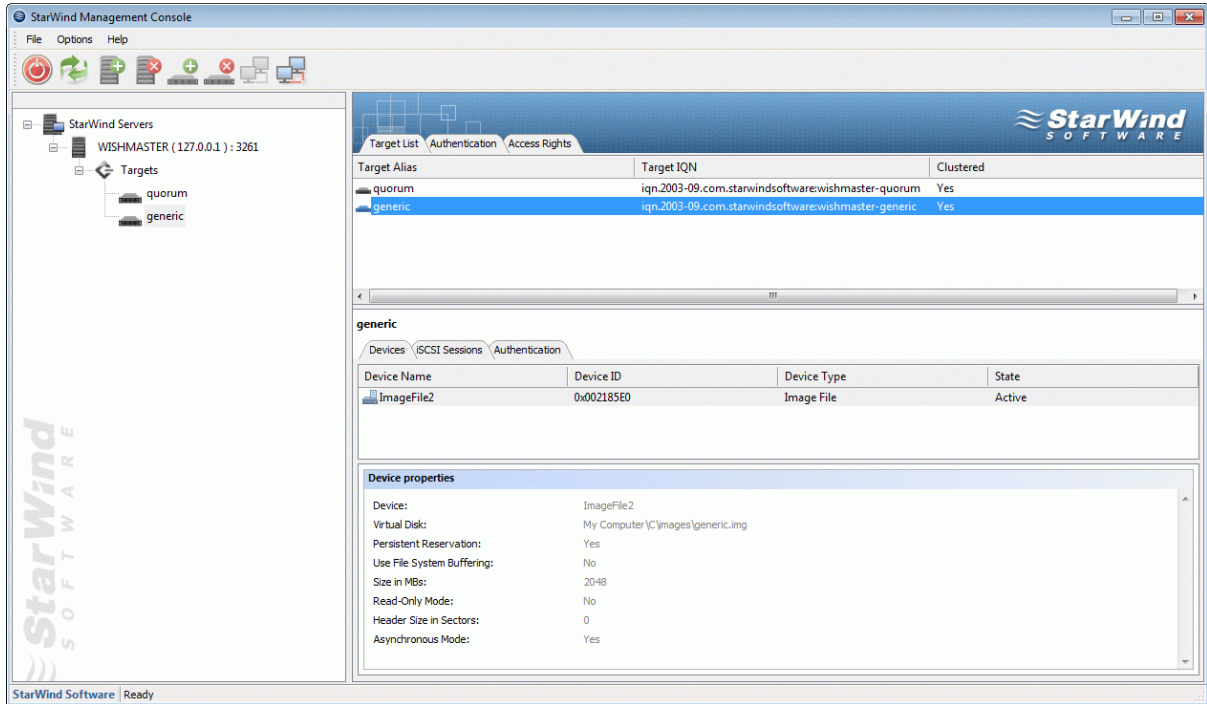
Press the **Next** button to continue.

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



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

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

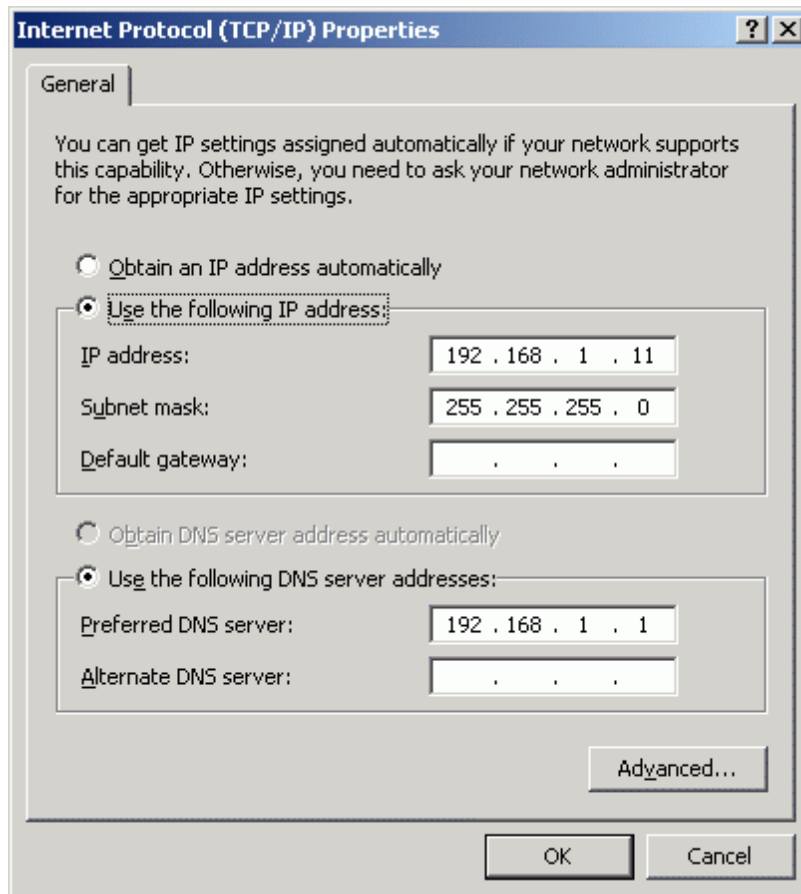


Preparing Cluster Nodes

Node 1

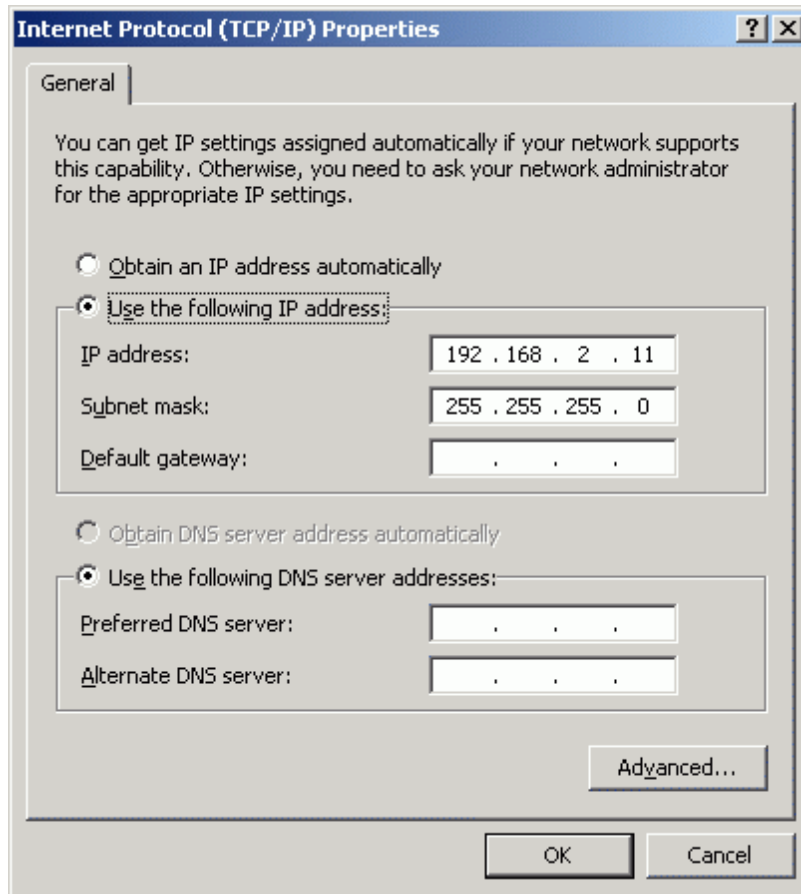
Configuring network interfaces

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.

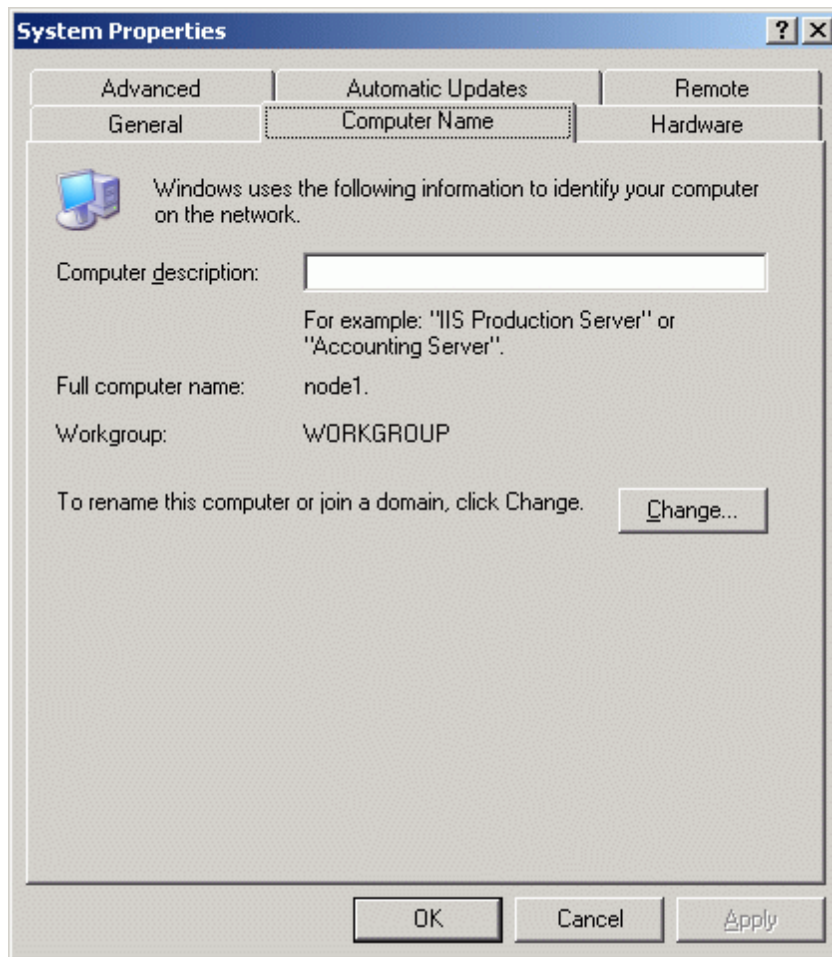
Just as was done for the first network adapter, assign appropriate values to the TCP/IP configuration of the second network adapter using the following example image as guidance. This interface is used for iSCSI target storage communications and a default gateway need not be specified.



Press the **OK** button.

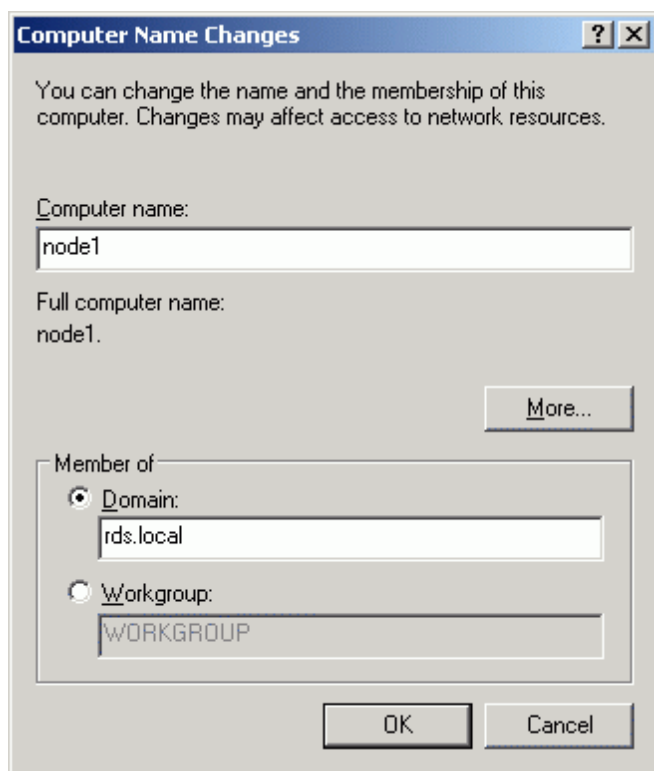
Joining the domain

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



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

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



Press the **OK** button.

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



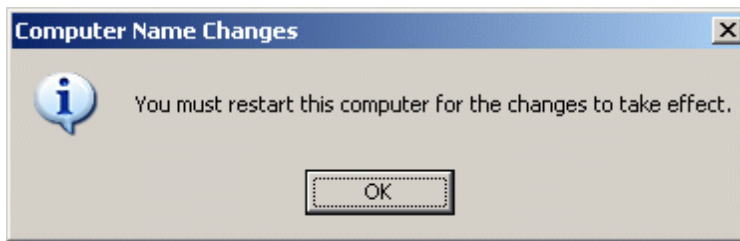
Press the **OK** button to join.

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



Press the **OK** button.

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



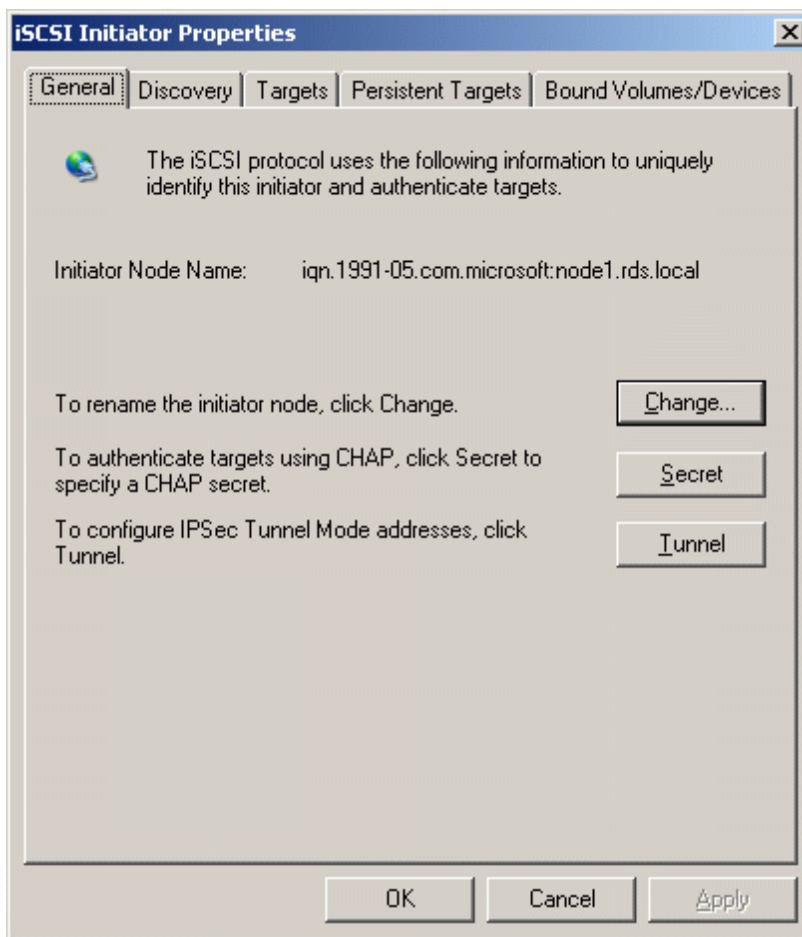
Restart the server. Log in as node1adm and install MS iSCSI Initiator.

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>.

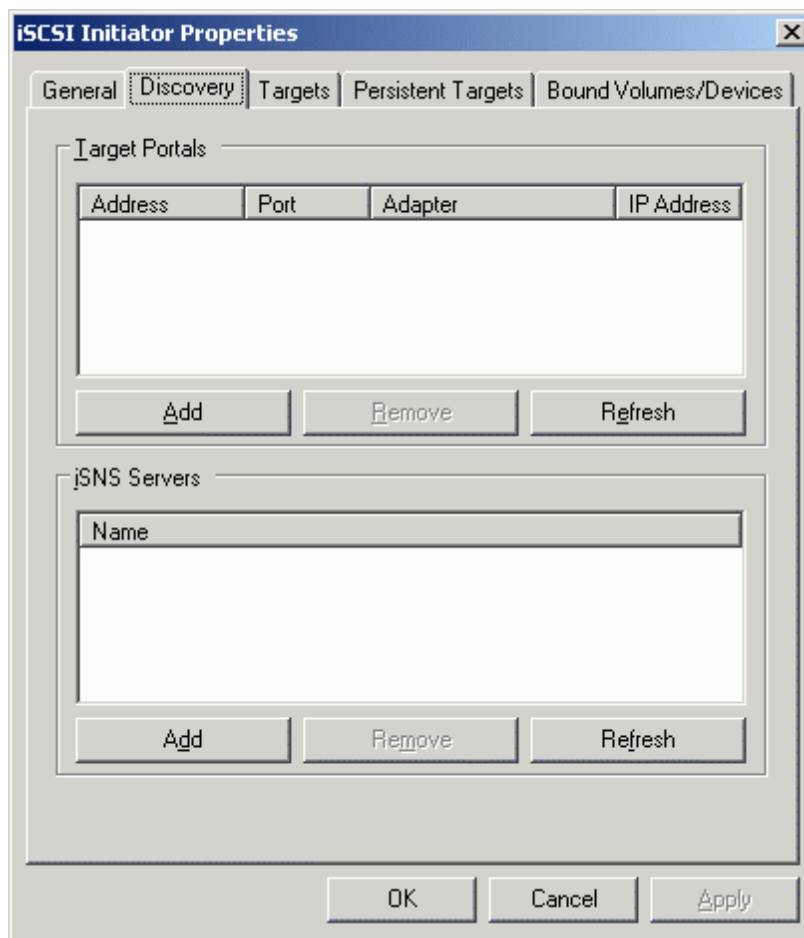
It is required to connect to the iSCSI devices. Before continuing, ensure that the **MS iSCSI Initiator** is installed.

Launch the Microsoft iSCSI Software Initiator application **Start->All Programs->Microsoft iSCSI Initiator-> Microsoft iSCSI Initiator**.



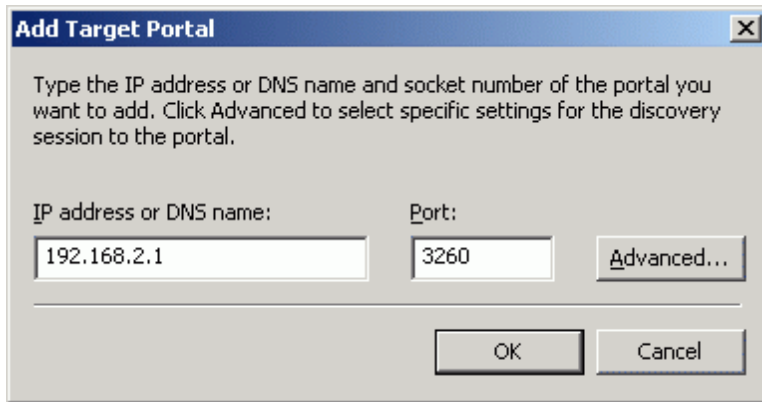
Select the **Discovery** Tab.

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



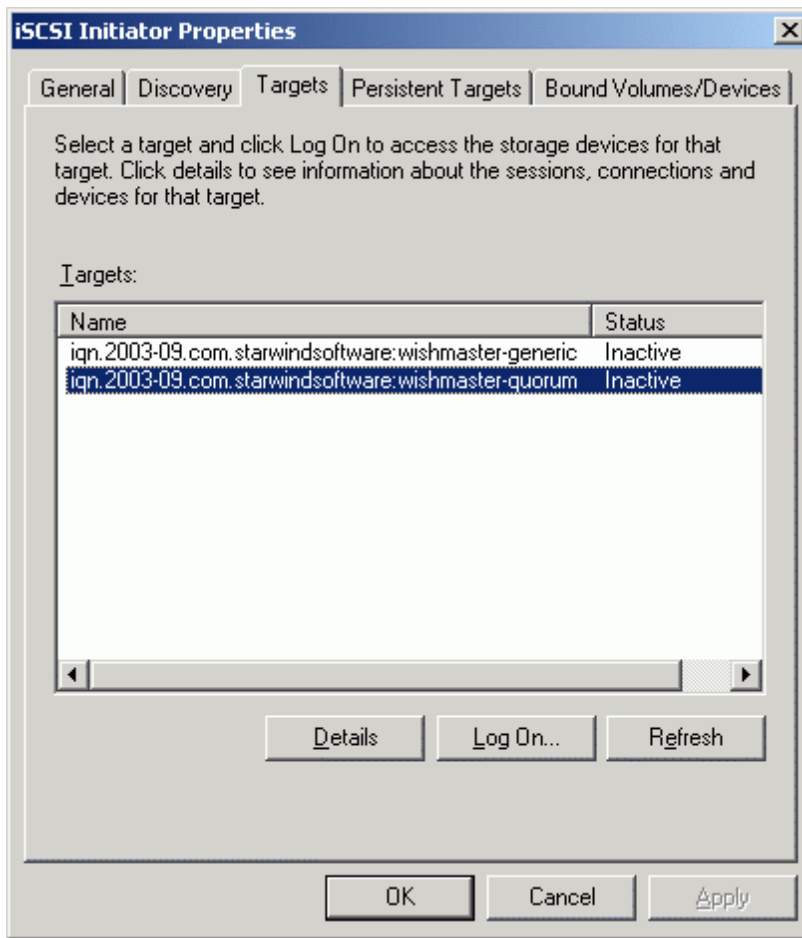
Press the **Add** button.

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



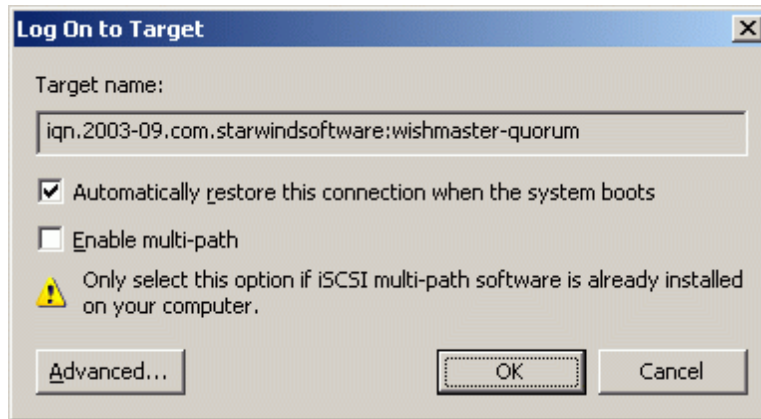
Press the **OK** button to continue.

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

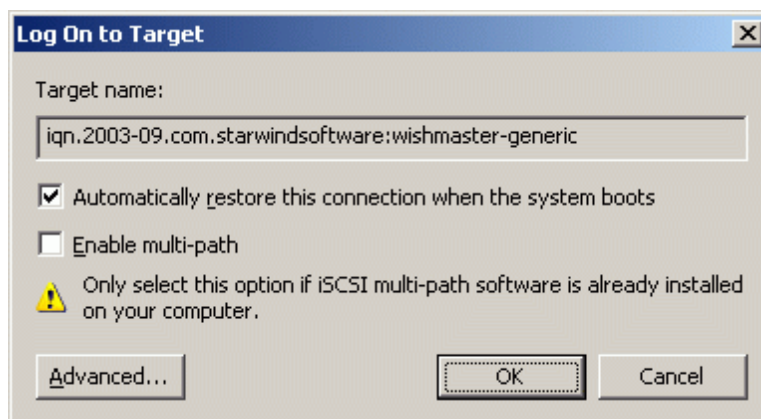


Press the **Log On...** button.

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.

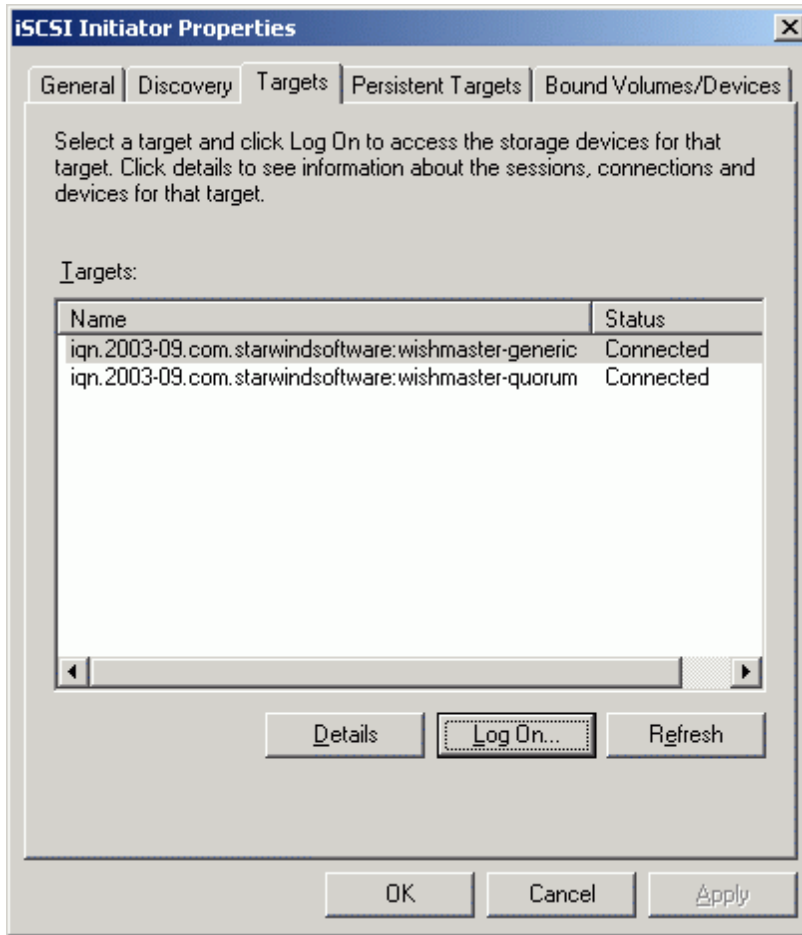


Press the **OK** button to continue.



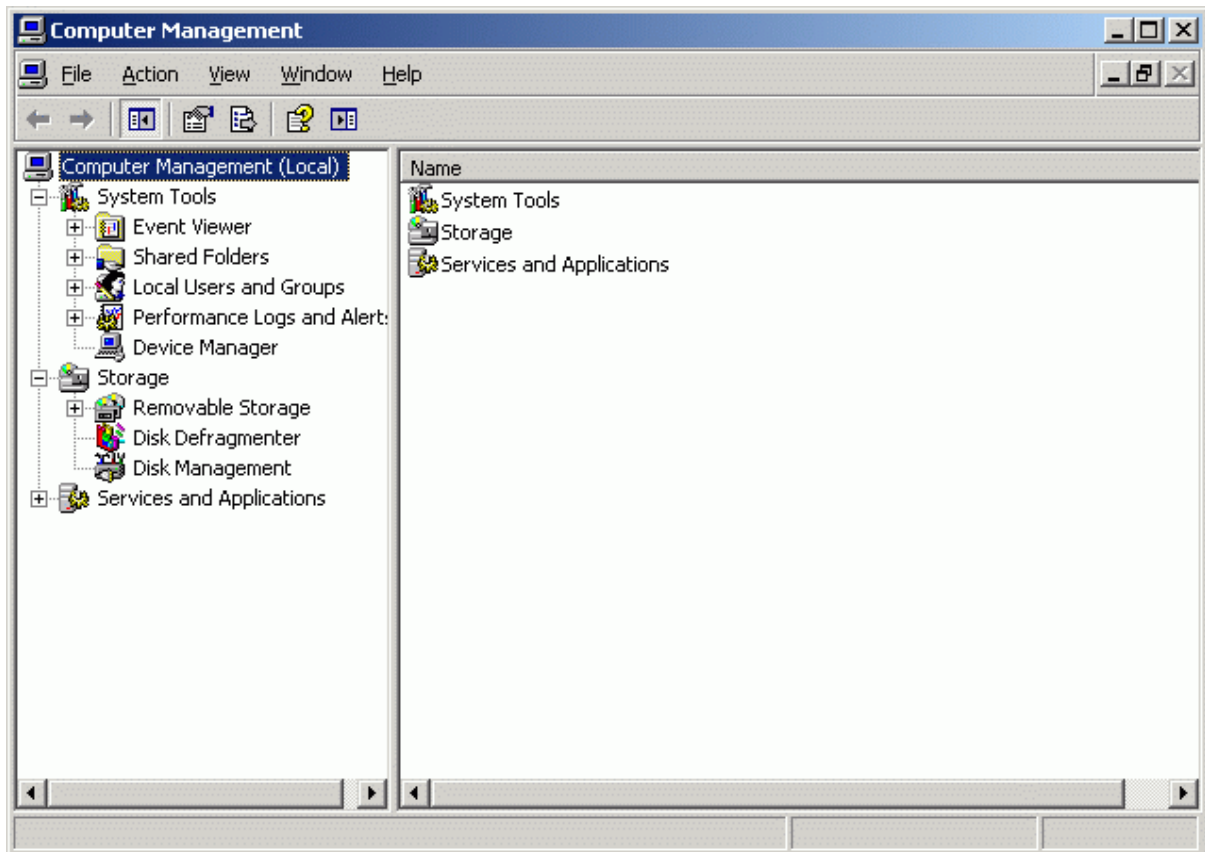
Press the **OK** button to continue.

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



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.

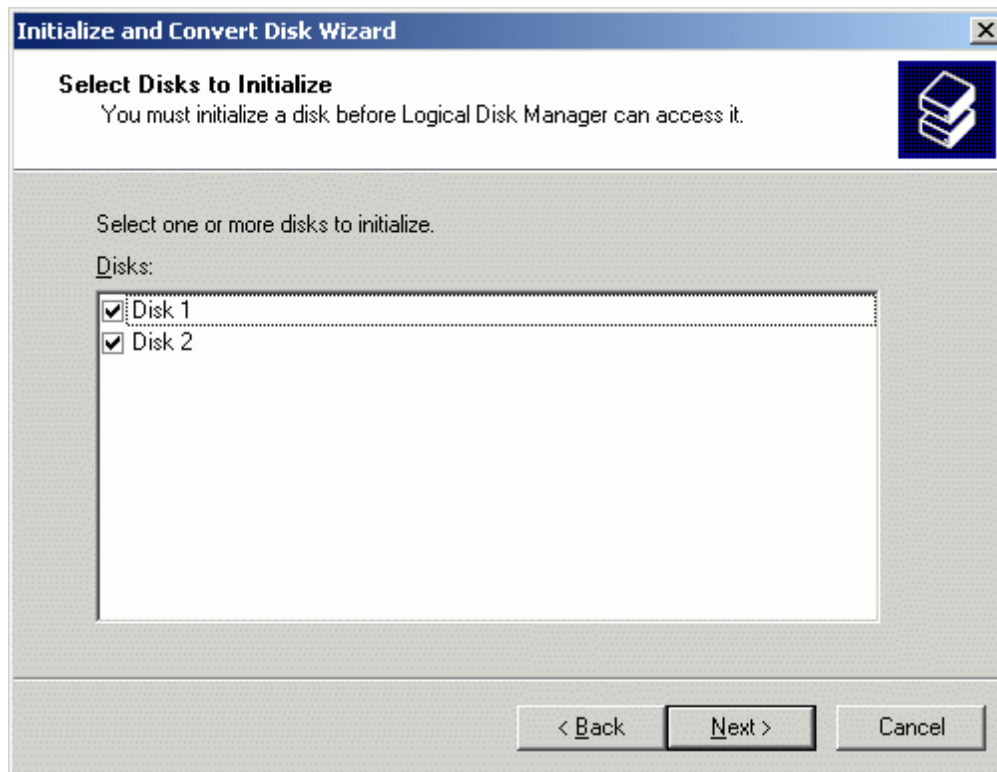


Select **Disk Management**.

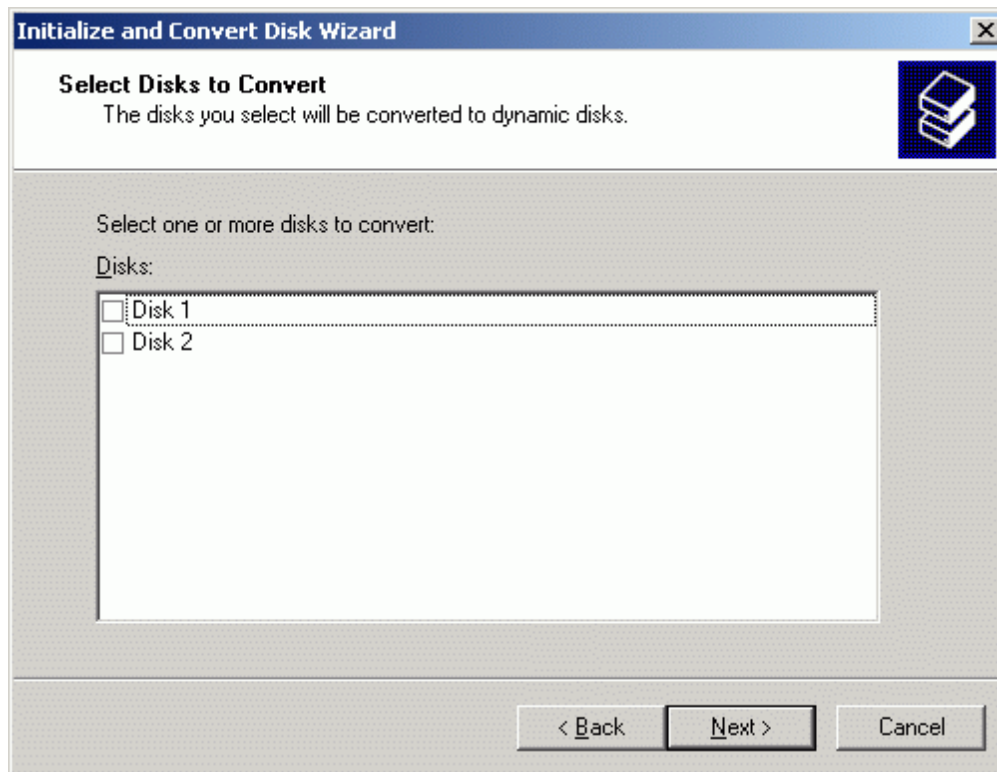
Follow the **Initialize and Convert Disk Wizard** to initialize the new disks. Use the default settings that Windows provides. By default the disk will be initialized as the basic disk. MSCS works only with the basic disks.



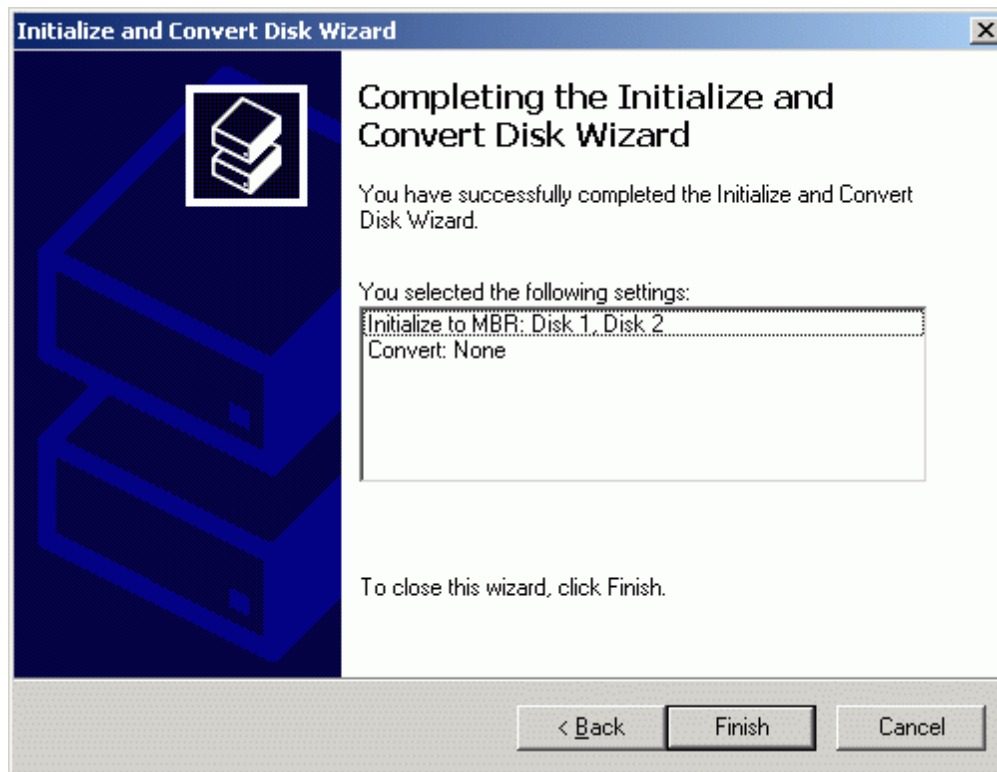
Press the **Next** button to continue.



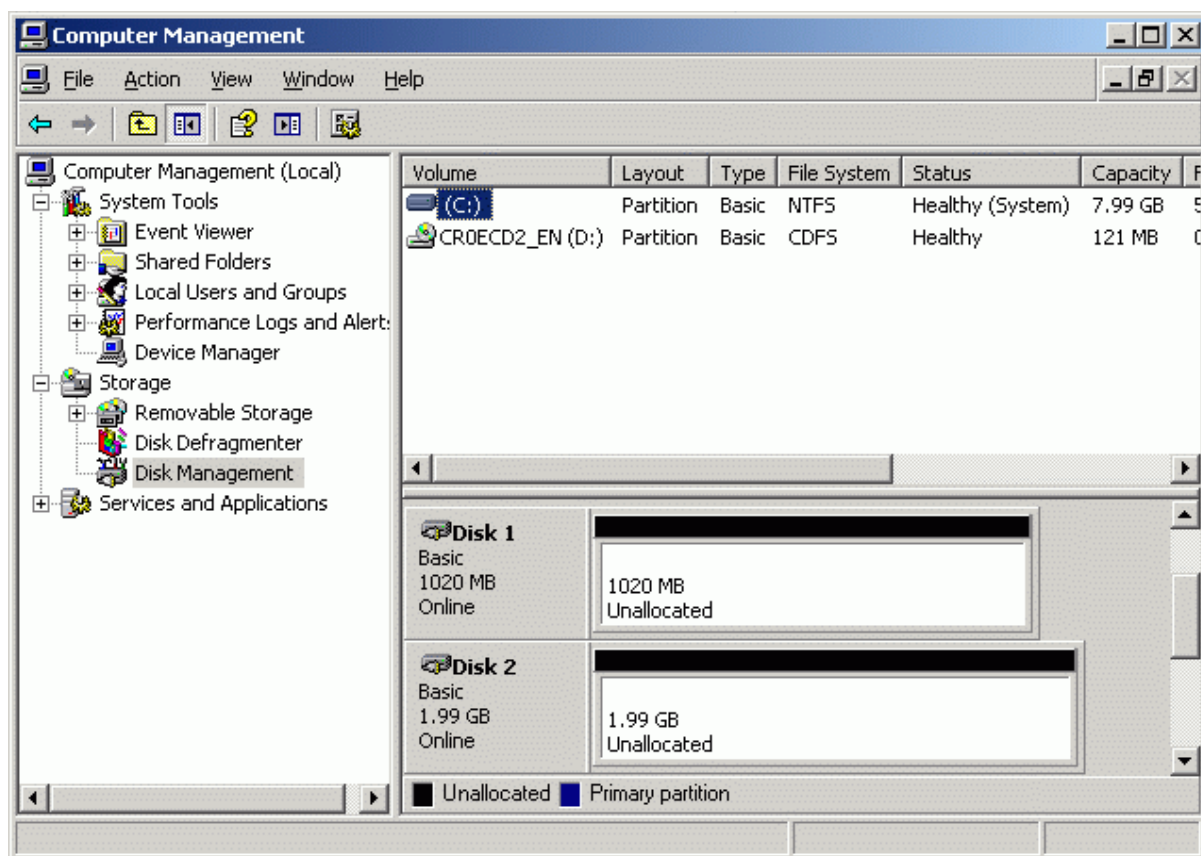
Press the **Next** button to continue.



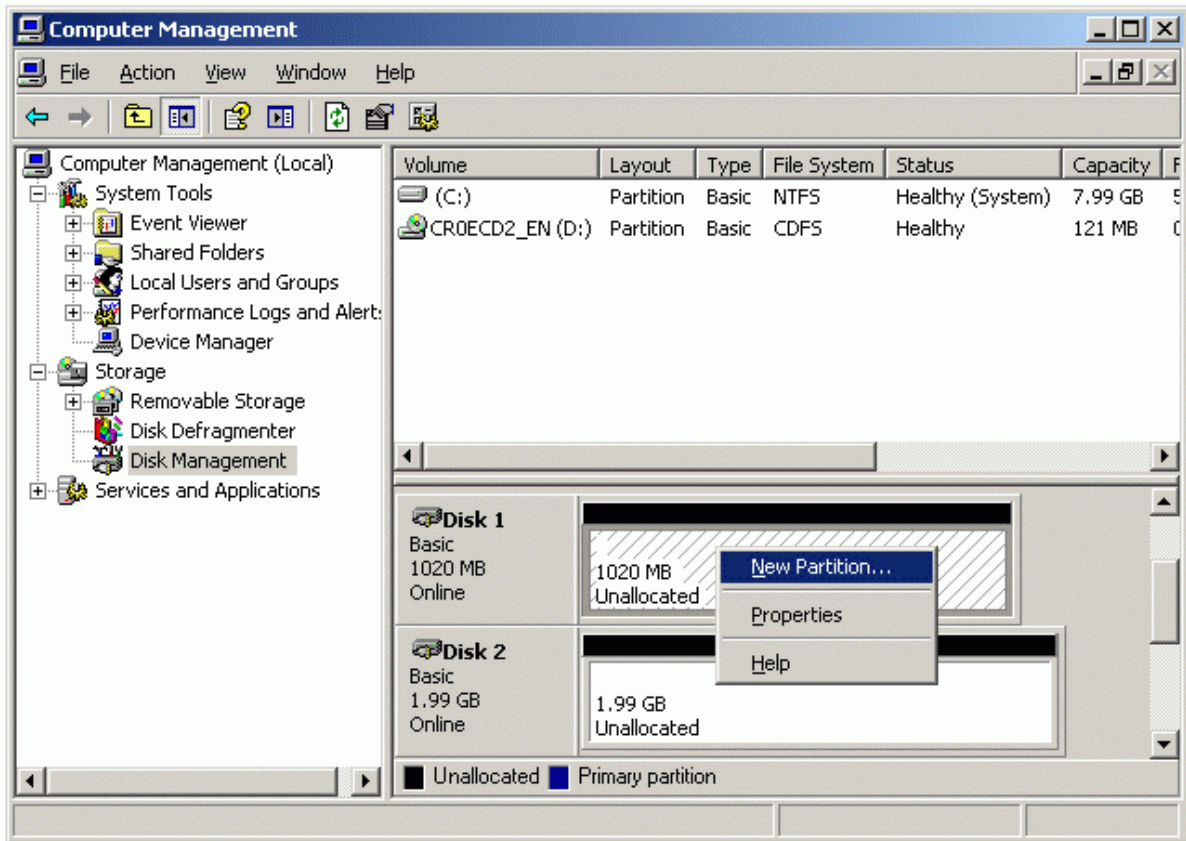
Press the **Next** button to continue.



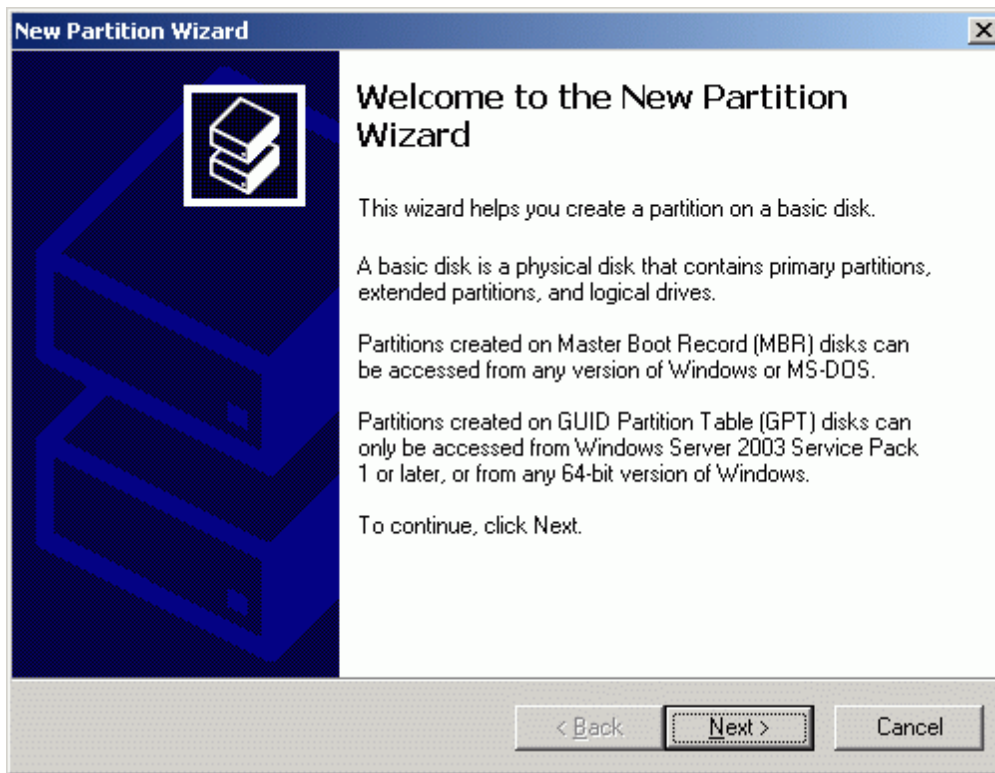
Press the **Finish** button to close the wizard.



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.)

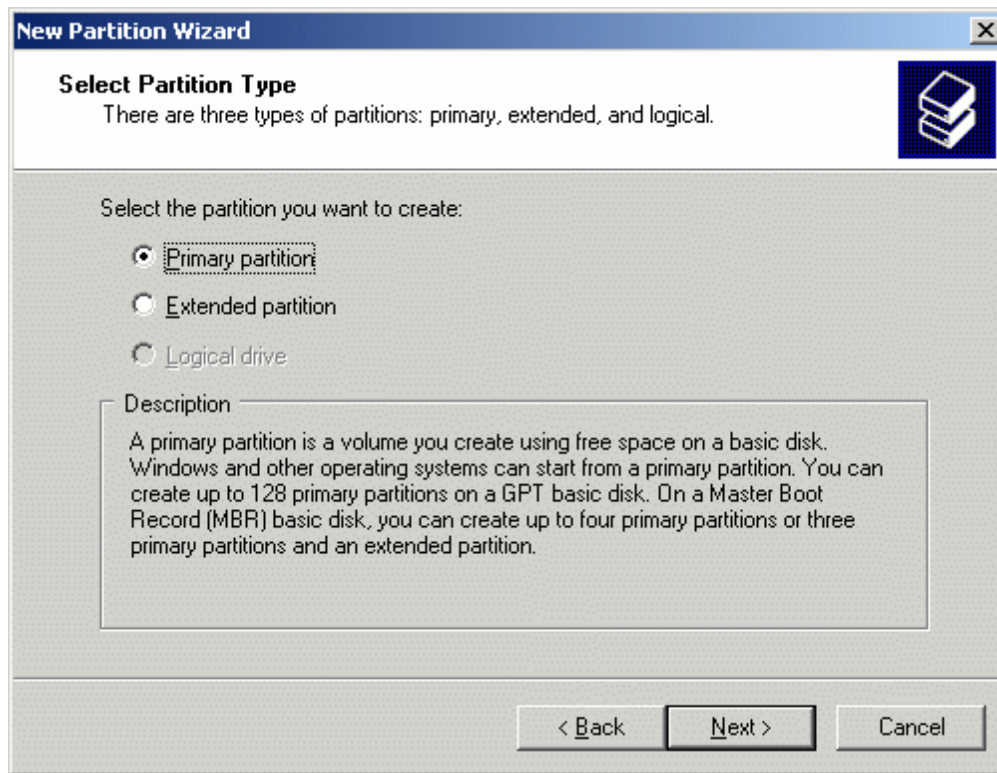


New Partition Wizard appears.



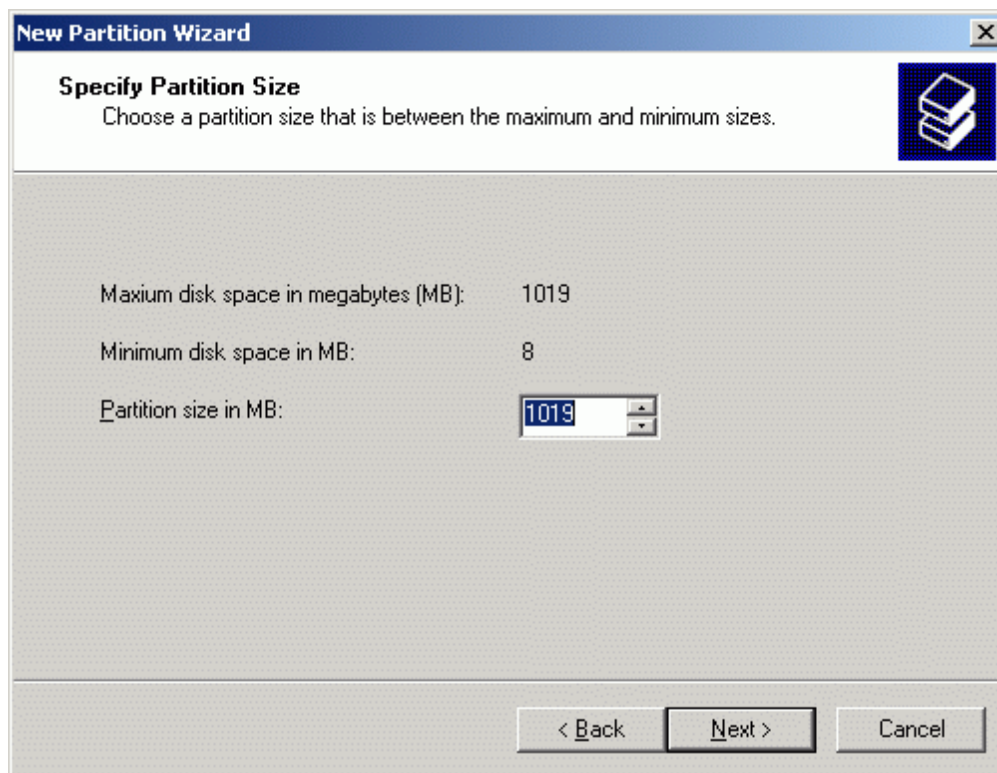
Press the **Next** button to continue.

Select partition type to create.



Press the **Next** button to continue.

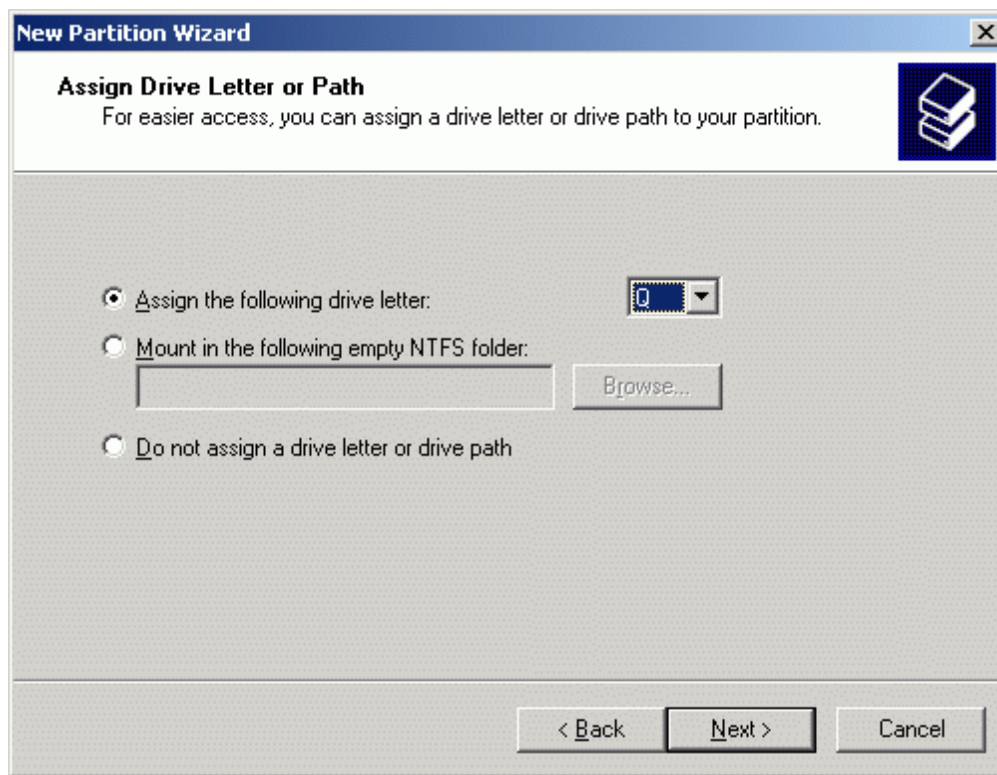
Specify new partition size in megabytes.



The image shows a Windows-style dialog box titled "New Partition Wizard". The main heading is "Specify Partition Size", followed by the instruction "Choose a partition size that is between the maximum and minimum sizes." In the center, there are three lines of text: "Maxium disk space in megabytes (MB): 1019", "Minimum disk space in MB: 8", and "Partition size in MB:". The "Partition size in MB:" line has a text input field containing "1019" with up and down arrow buttons to its right. At the bottom right, there are three buttons: "< Back", "Next >", and "Cancel". A small icon of a floppy disk is in the top right corner of the dialog area.

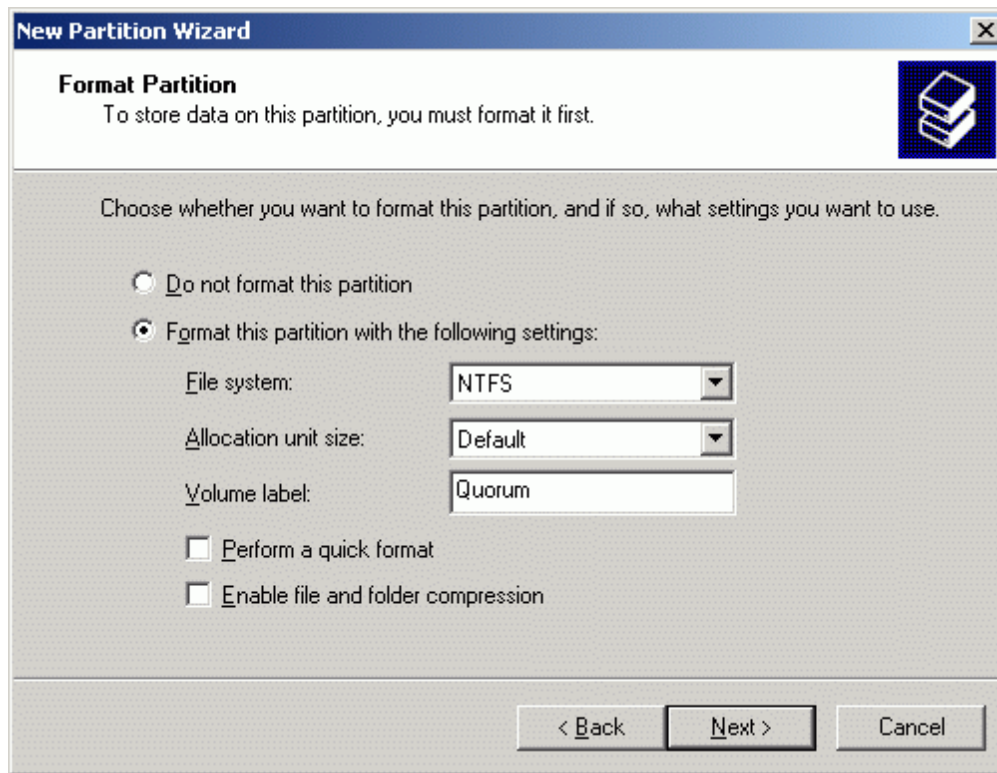
Press the **Next** button to continue.

Choose the **Drive Letter** to assign.



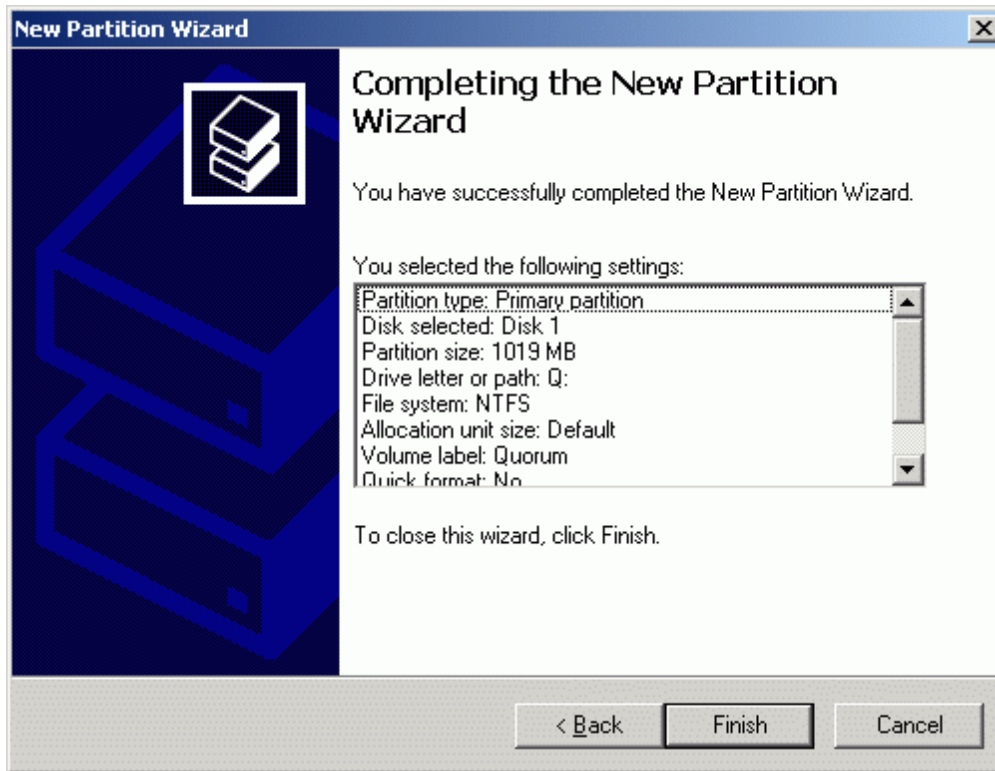
Press the **Next** button to continue.

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



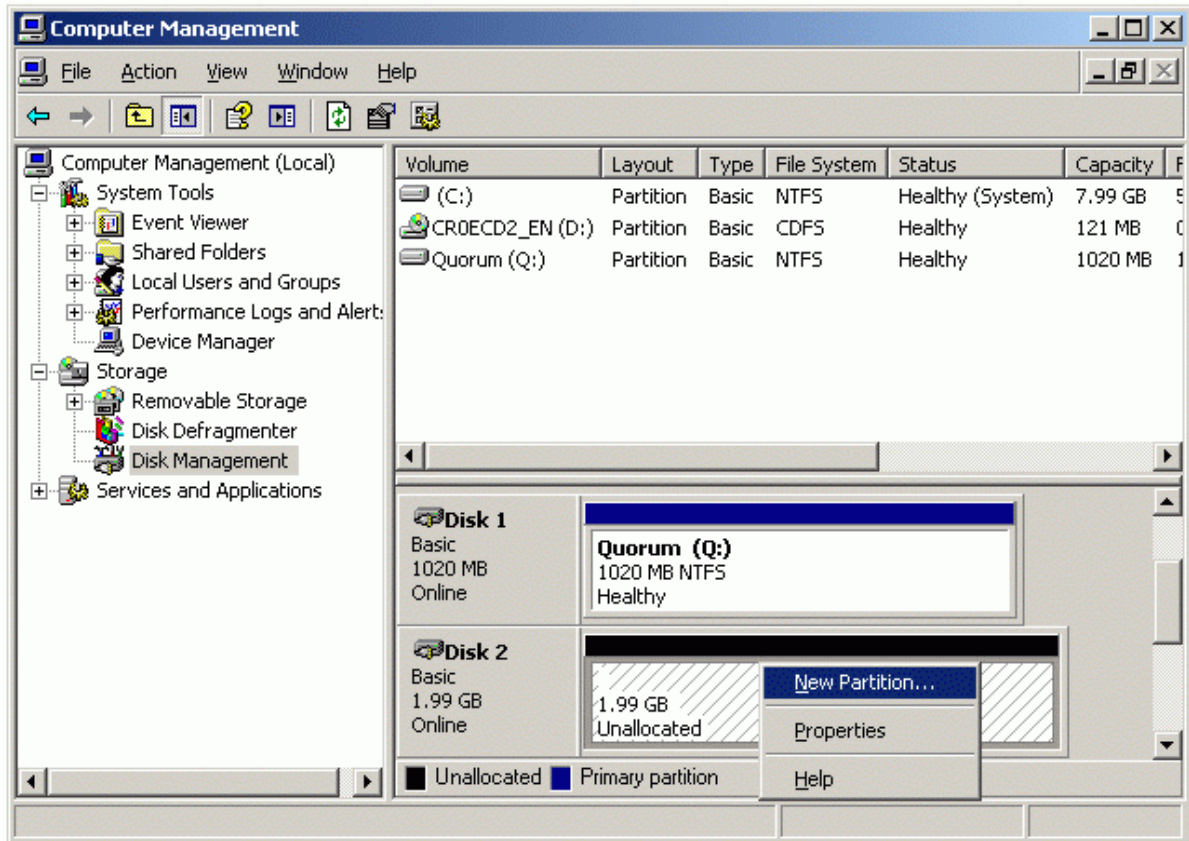
Press the **Next** button to continue.

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

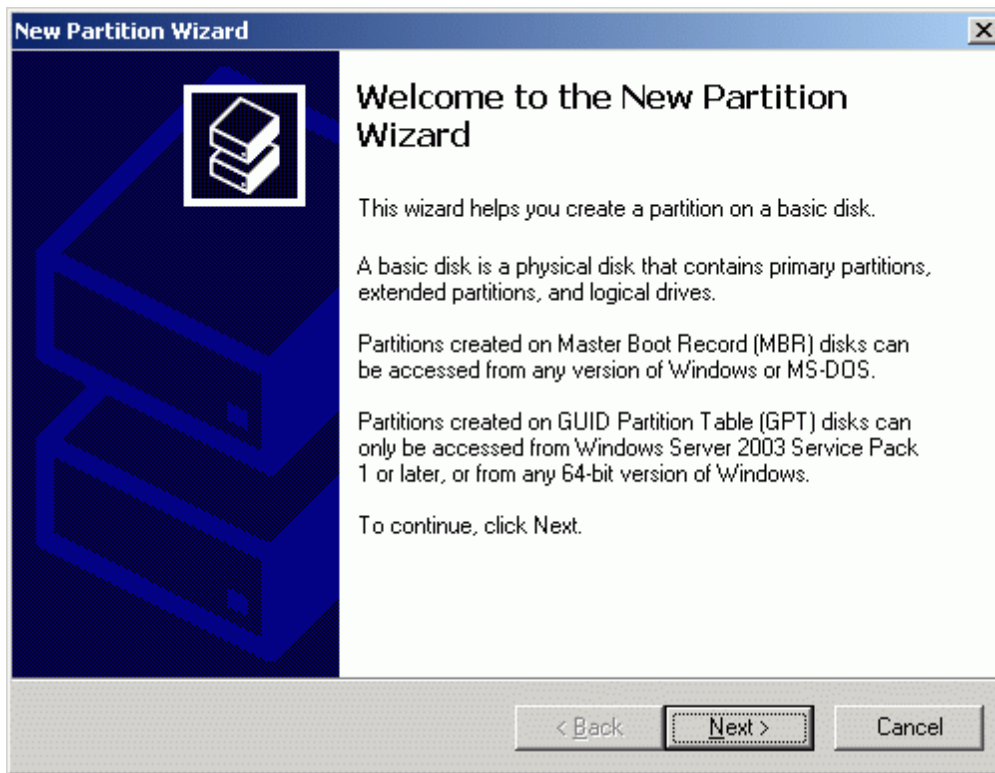


Press the **Finish** button to close the wizard.

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

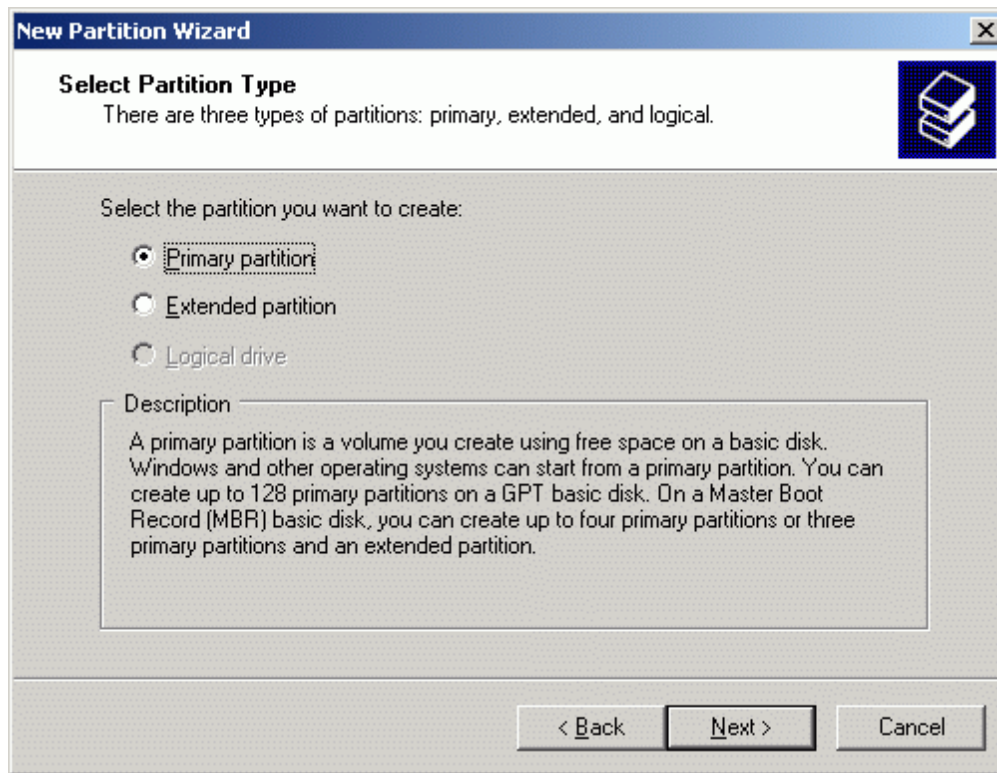


New Partition Wizard appears.



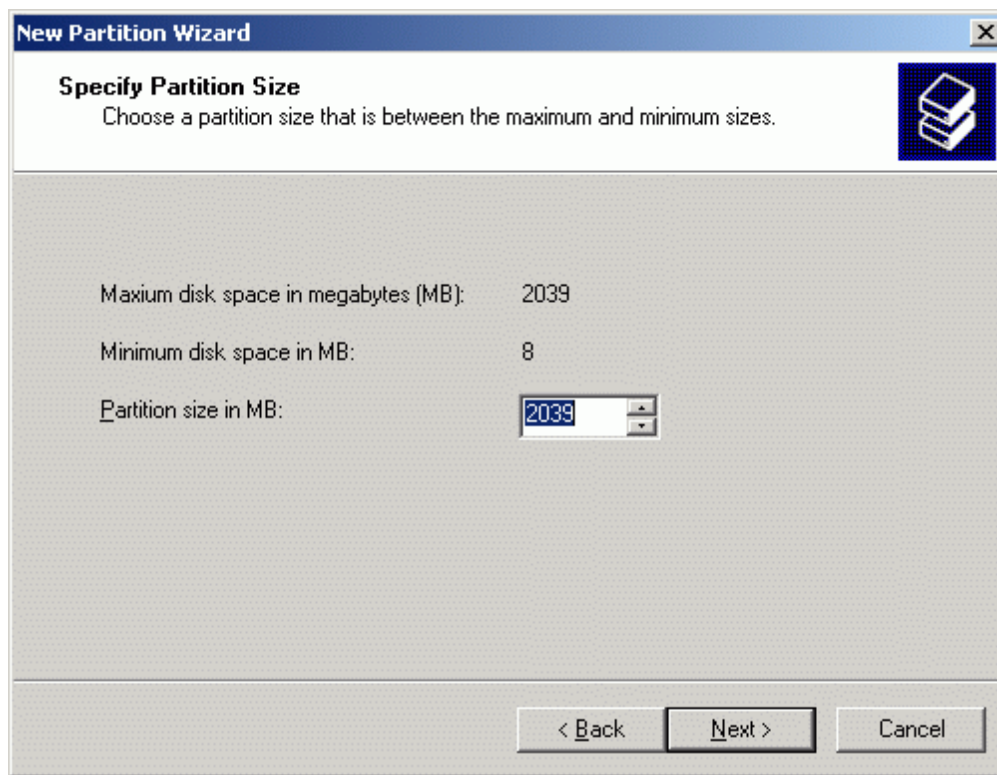
Press the **Next** button to continue.

Select partition type to create.



Press the **Next** button to continue.

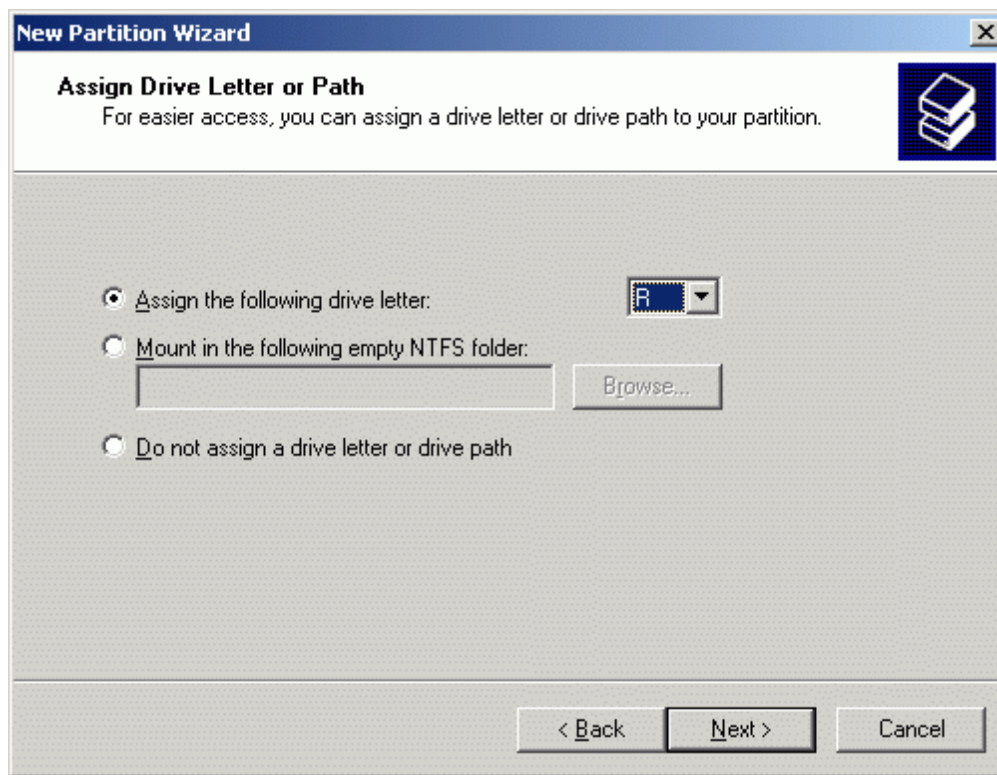
Specify new partition size in megabytes.



The image shows a Windows-style dialog box titled "New Partition Wizard". The main heading is "Specify Partition Size" with a sub-instruction: "Choose a partition size that is between the maximum and minimum sizes." To the right of the text is a small icon of a hard drive. Below the instruction, there are three lines of text: "Maxium disk space in megabytes (MB):" followed by the value "2039"; "Minimum disk space in MB:" followed by the value "8"; and "Partition size in MB:" followed by a text input field containing "2039" and a small spinner control. At the bottom of the dialog, there are three buttons: "< Back", "Next >", and "Cancel".

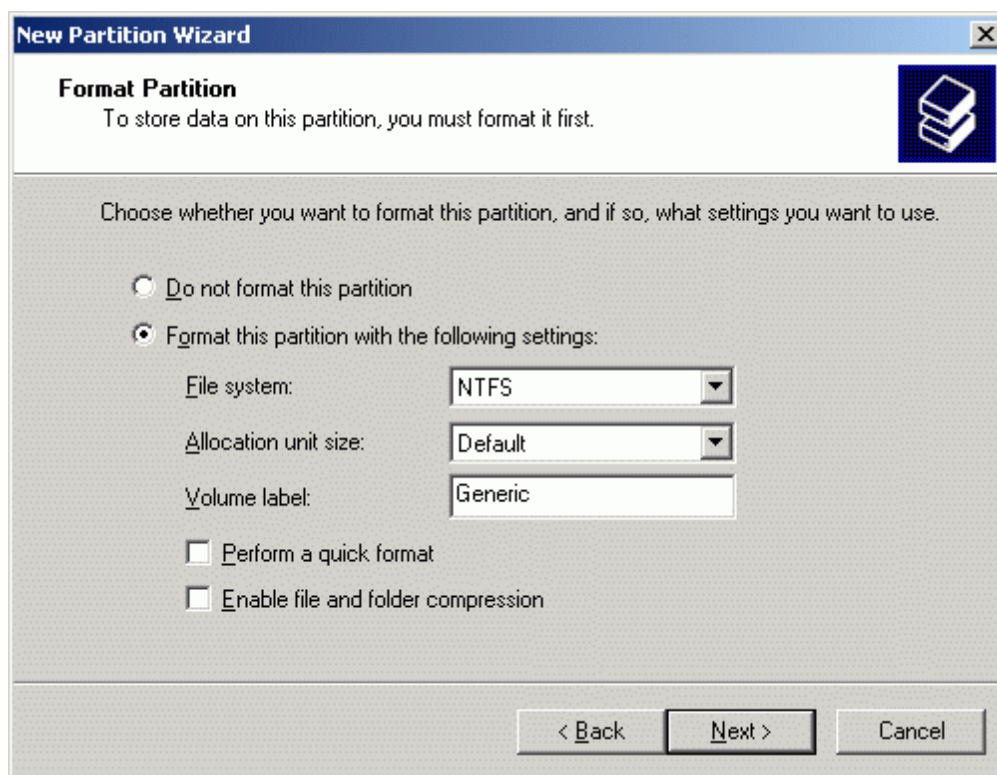
Press the **Next** button to continue.

Choose the **Drive Letter** to assign.



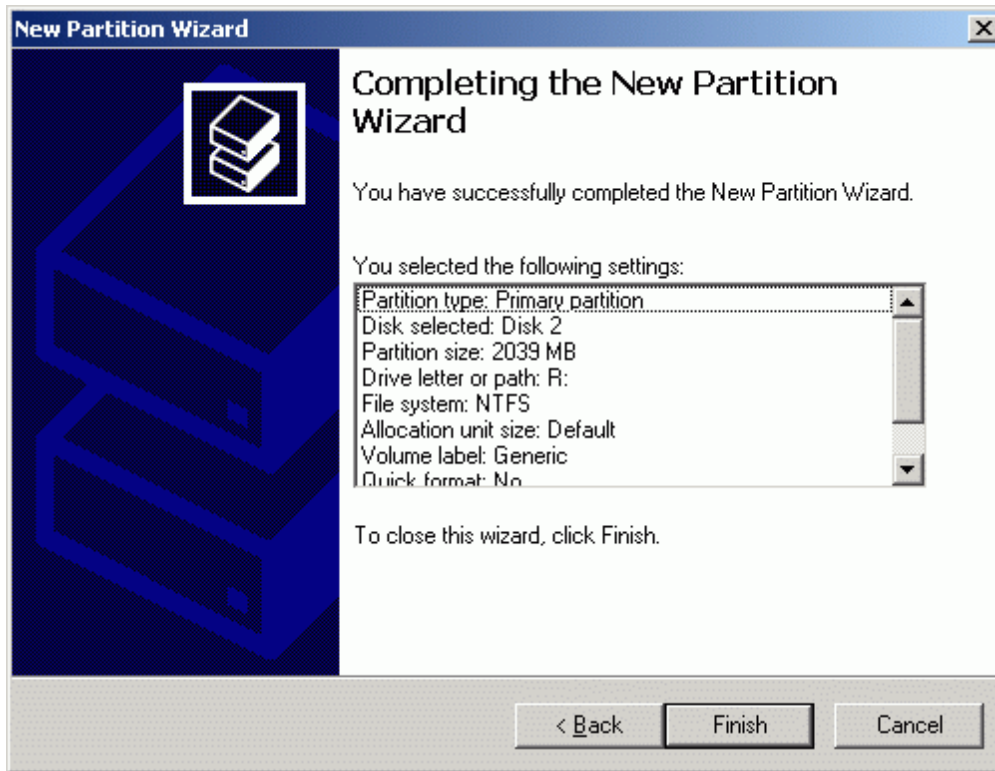
Press the **Next** button to continue.

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



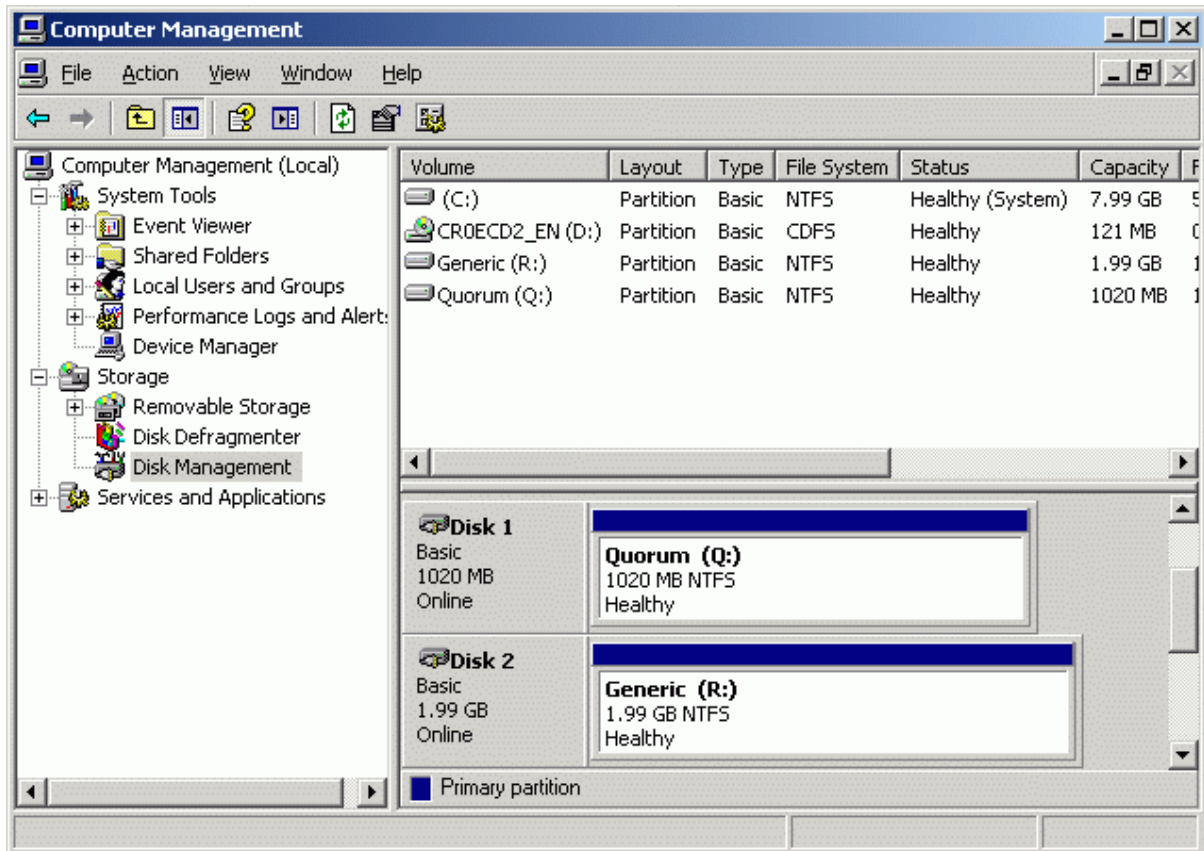
Press the **Next** button to continue.

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



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

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

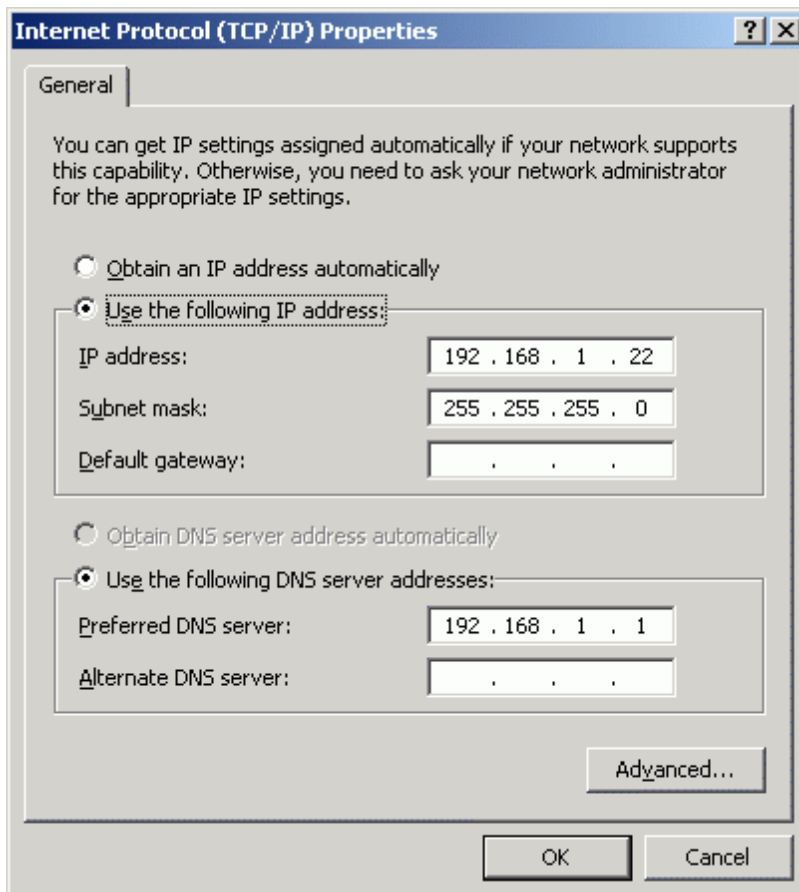


Shut down the server.

Node 2

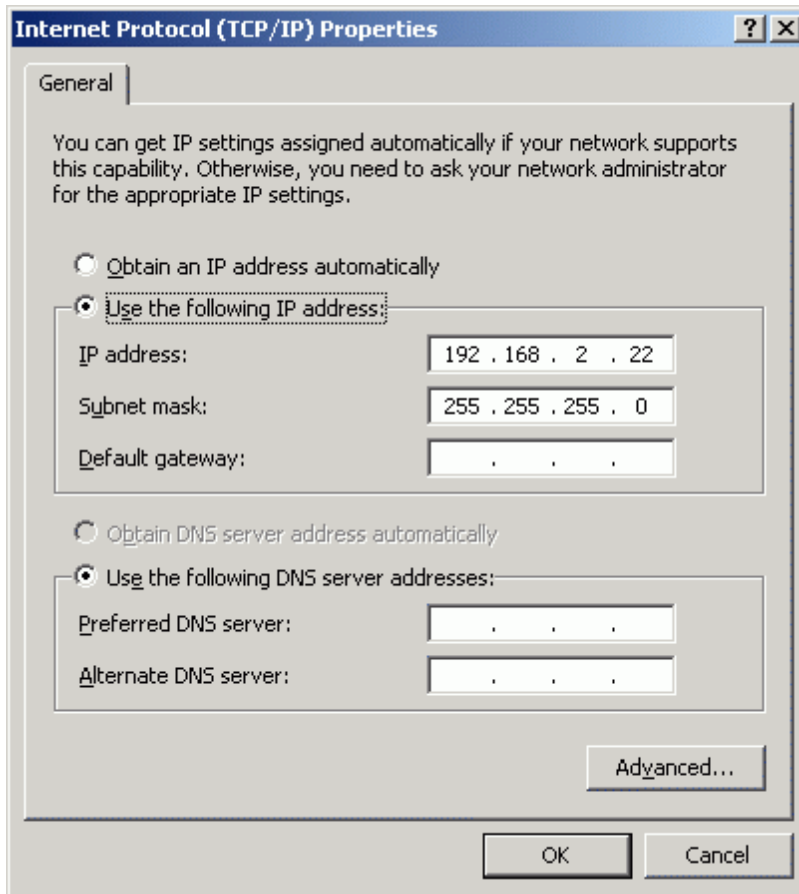
Configuring network interfaces

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.

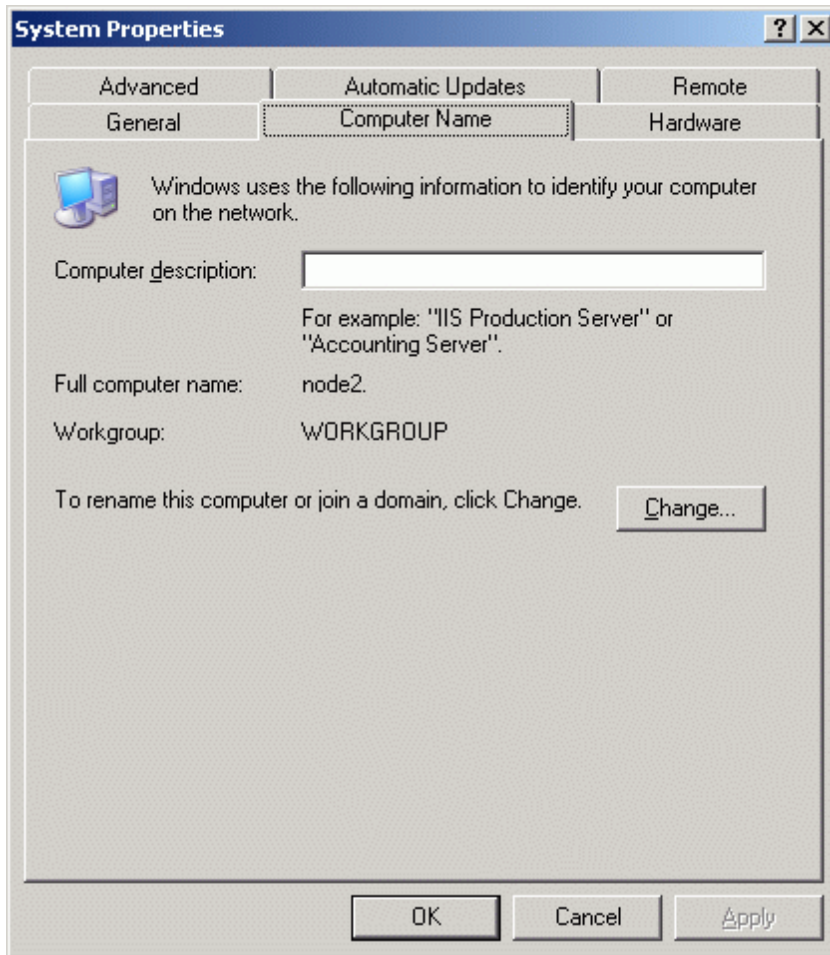
Just as was done for the first network adapter, assign appropriate values to the TCP/IP configuration of the second network adapter using the following example image as guidance. This interface is used for iSCSI target storage communications and a default gateway need not be specified.



Press the **OK** button.

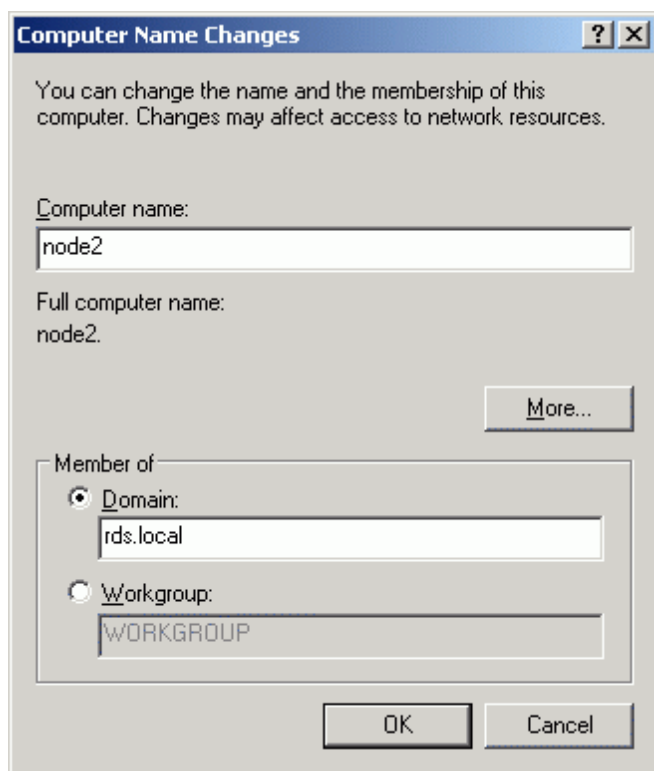
Joining the domain

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



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

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



Press the **OK** button.

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



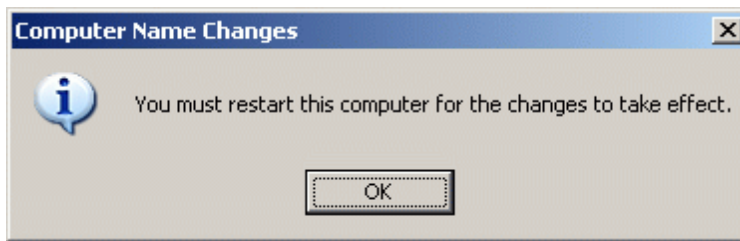
Press the **OK** button to join.

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



Press the **OK** button.

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



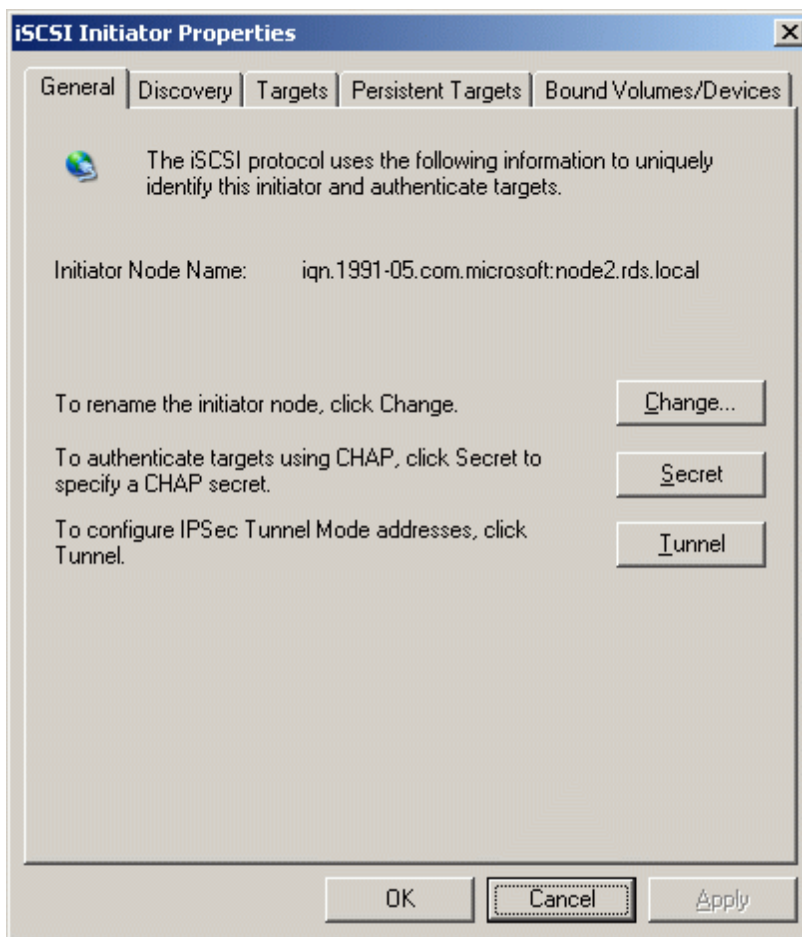
Restart the server. Log in as node2adm and install MS iSCSI Initiator.

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>.

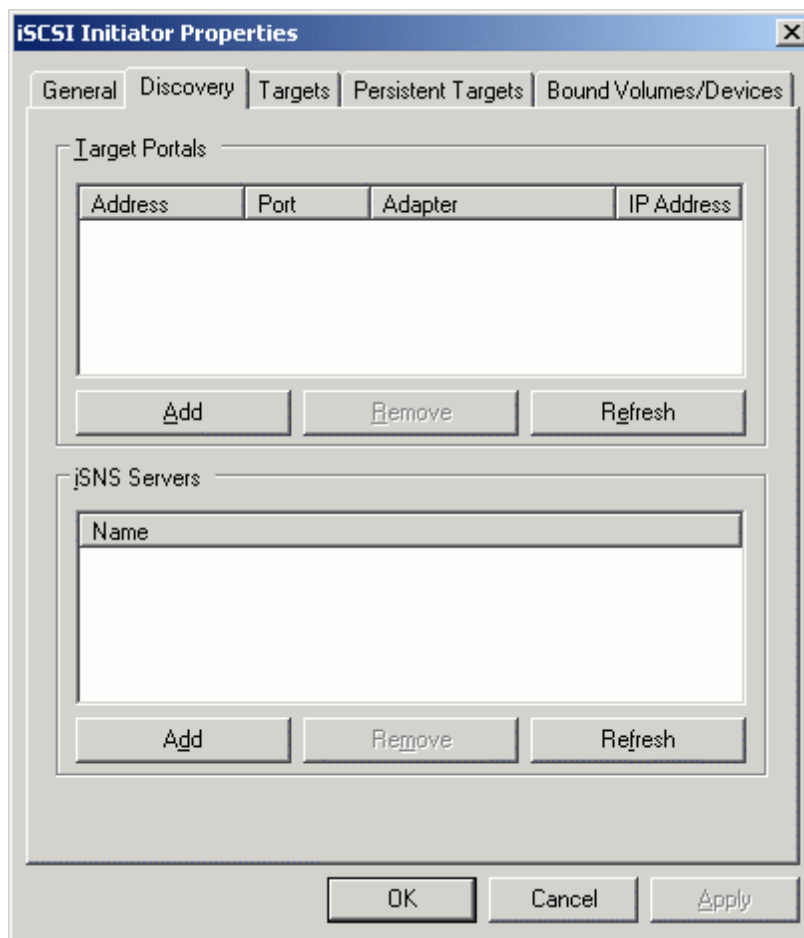
It is required to connect to the iSCSI devices. Before continuing, ensure that the **MS iSCSI Initiator** is installed.

Launch the Microsoft iSCSI Software Initiator application **Start->All Programs->Microsoft iSCSI Initiator-> Microsoft iSCSI Initiator**.



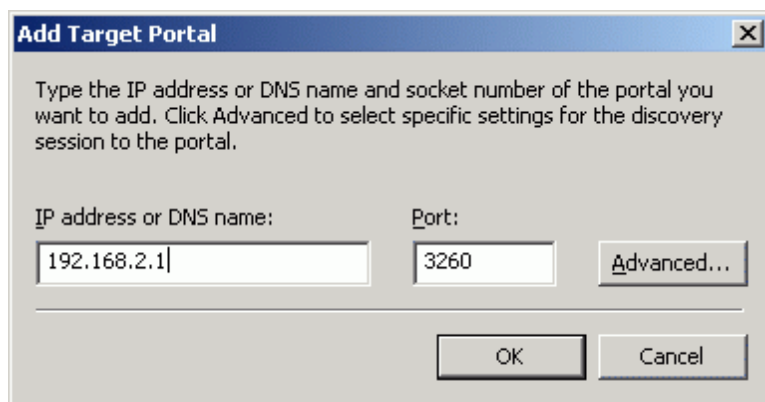
Select the **Discovery** Tab.

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



Press the **Add** button.

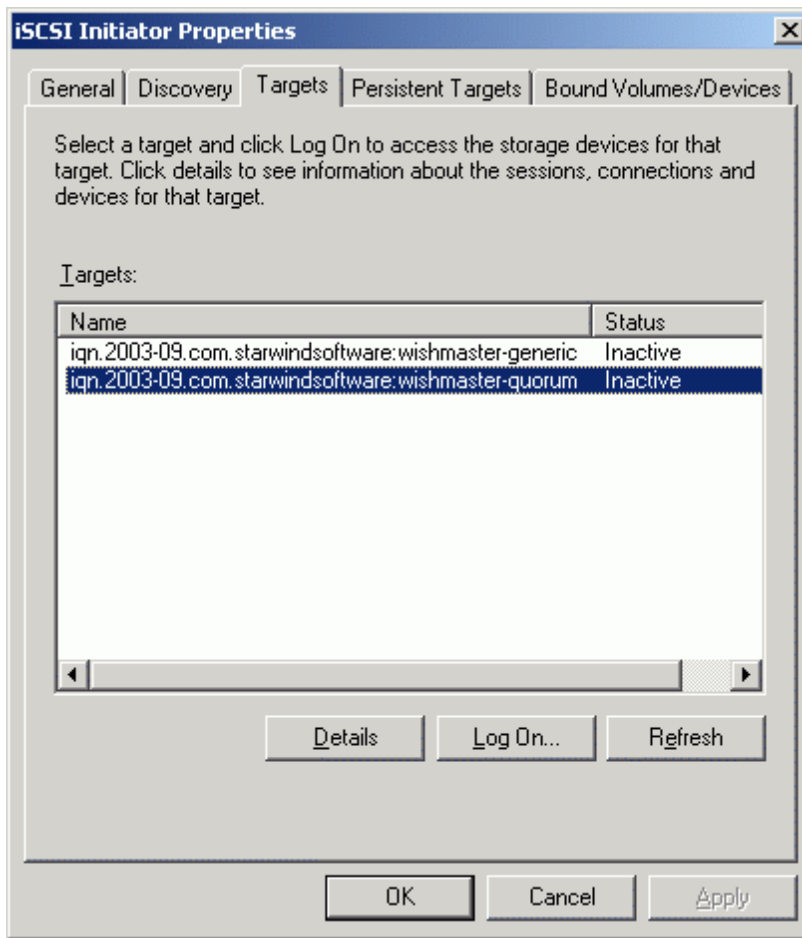
In the **Add Target Portal** dialog enter **IP address or DNS name** of the **StarWind** target server.



The image shows a Windows-style dialog box titled "Add Target Portal". It contains a text area with instructions: "Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal." Below this, there are two input fields: "IP address or DNS name:" with the value "192.168.2.1" and "Port:" with the value "3260". To the right of the port field is a button labeled "Advanced...". At the bottom of the dialog are two buttons: "OK" and "Cancel".

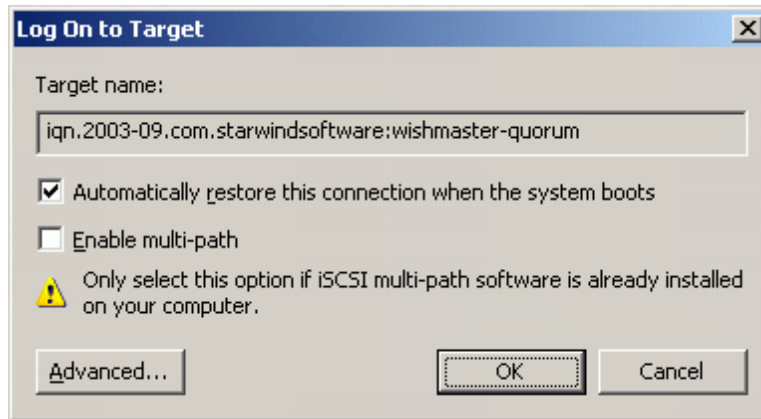
Press the **OK** button to continue.

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

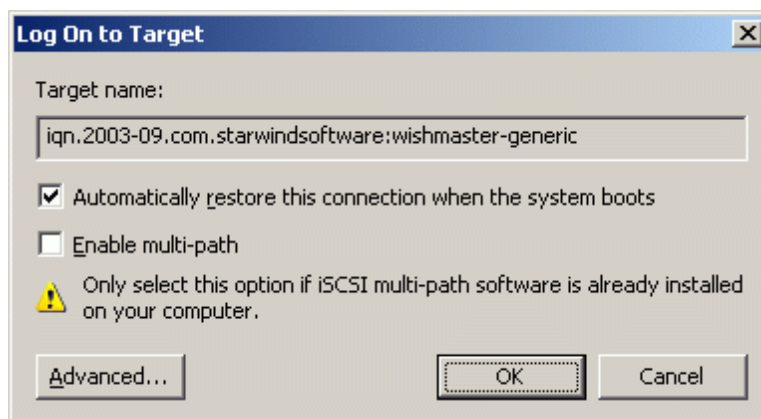


Press the **Log On...** button.

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.

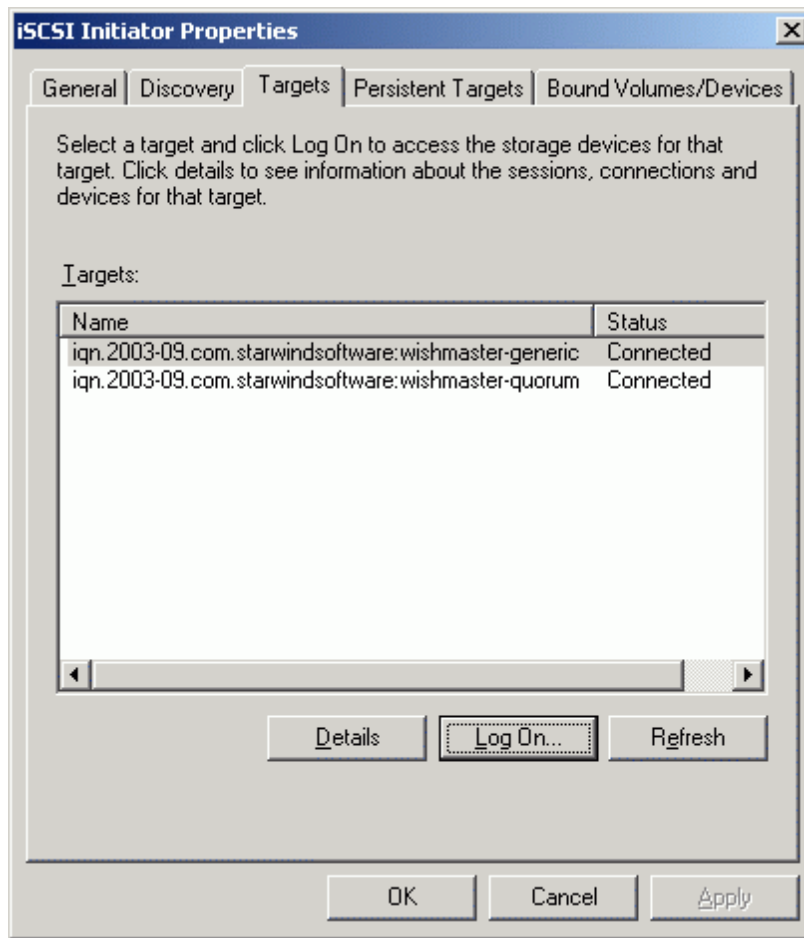


Press the **OK** button to continue.



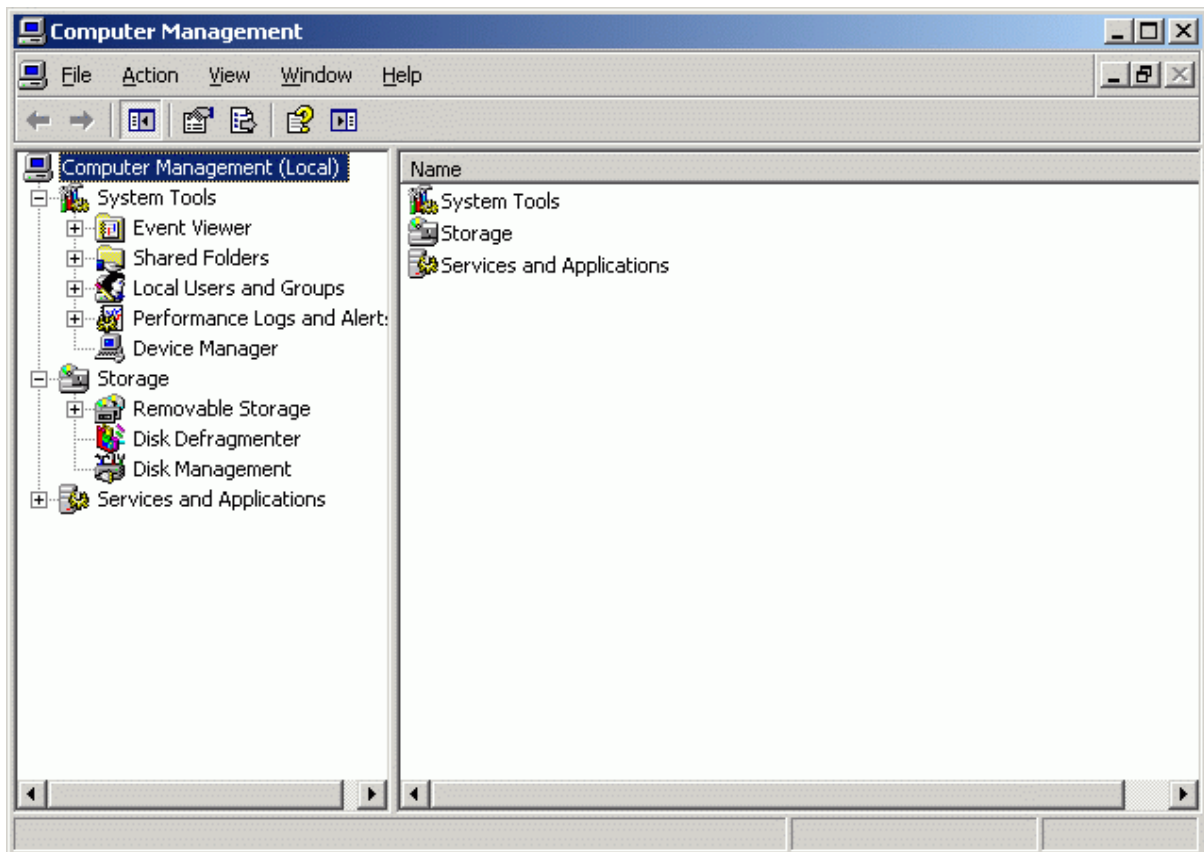
Press the **OK** button to continue.

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



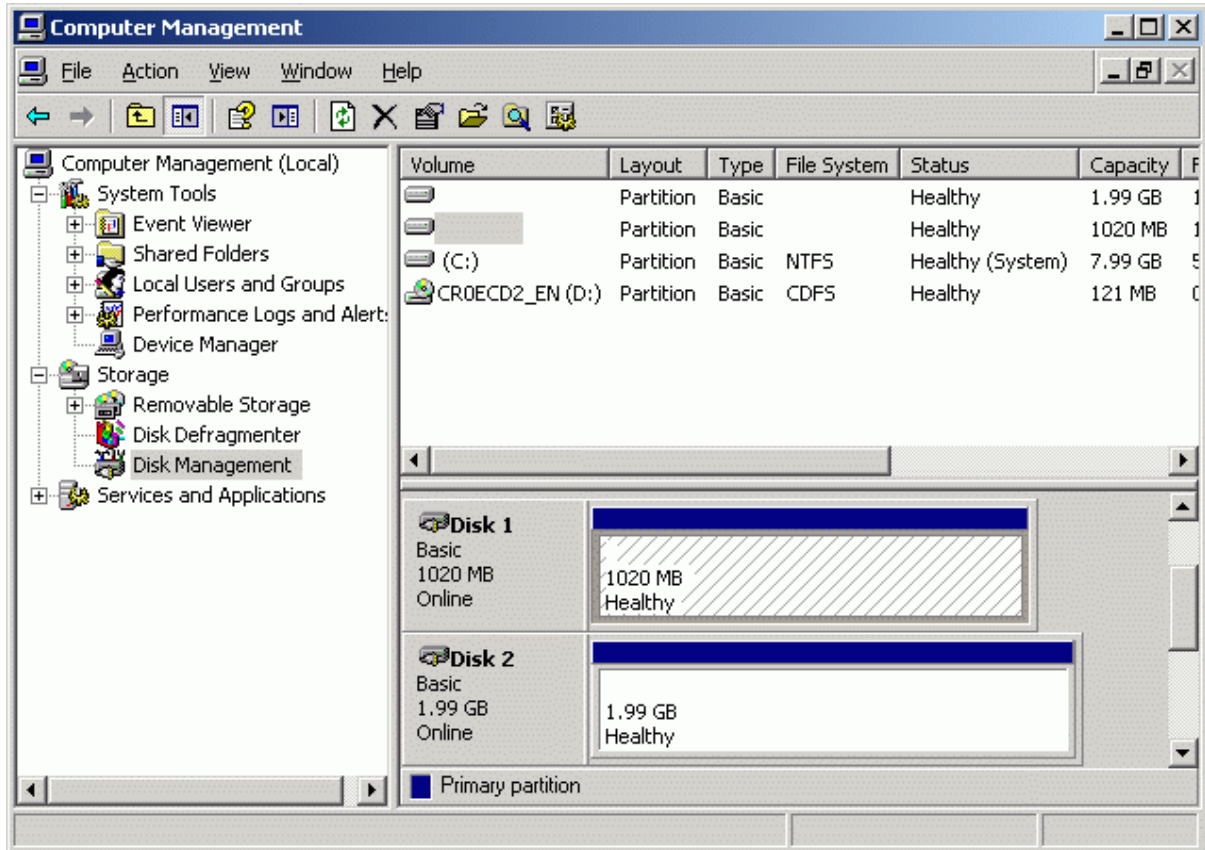
Assigning drive letters

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.

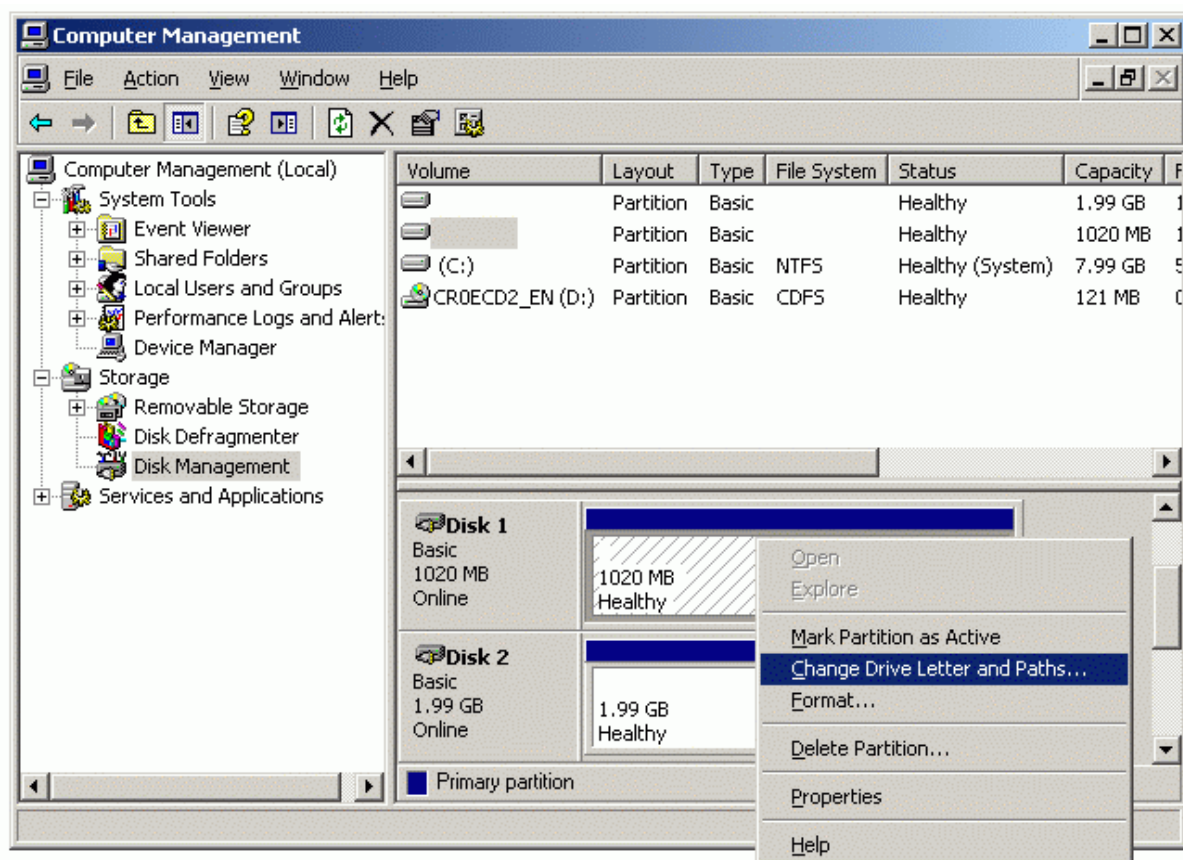


Select **Disk Management**.

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.

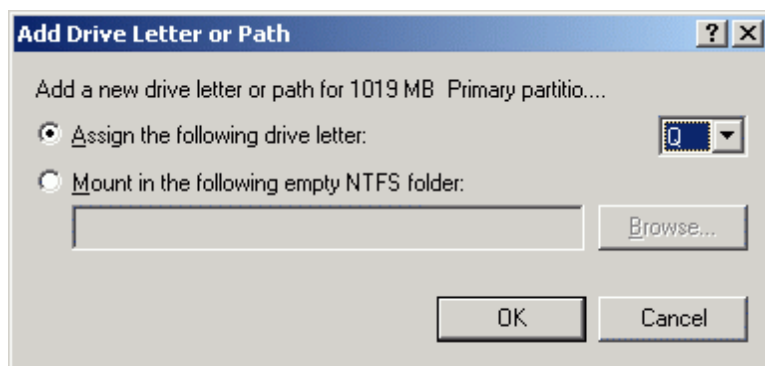
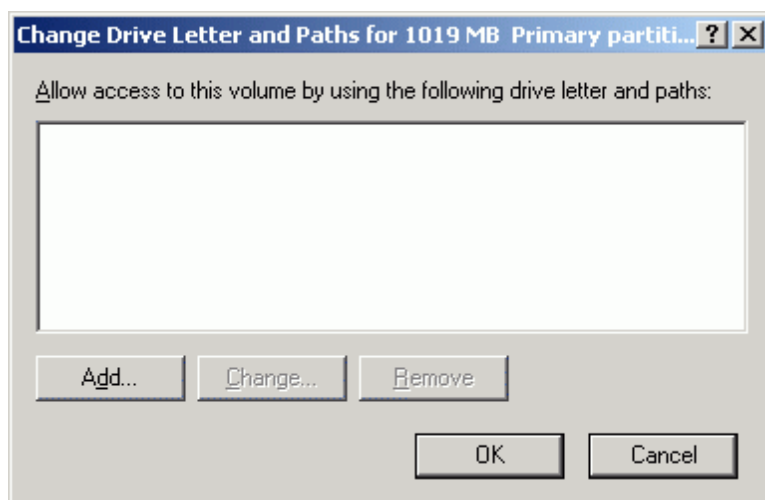


Press the right mouse button over the Quorum volume.

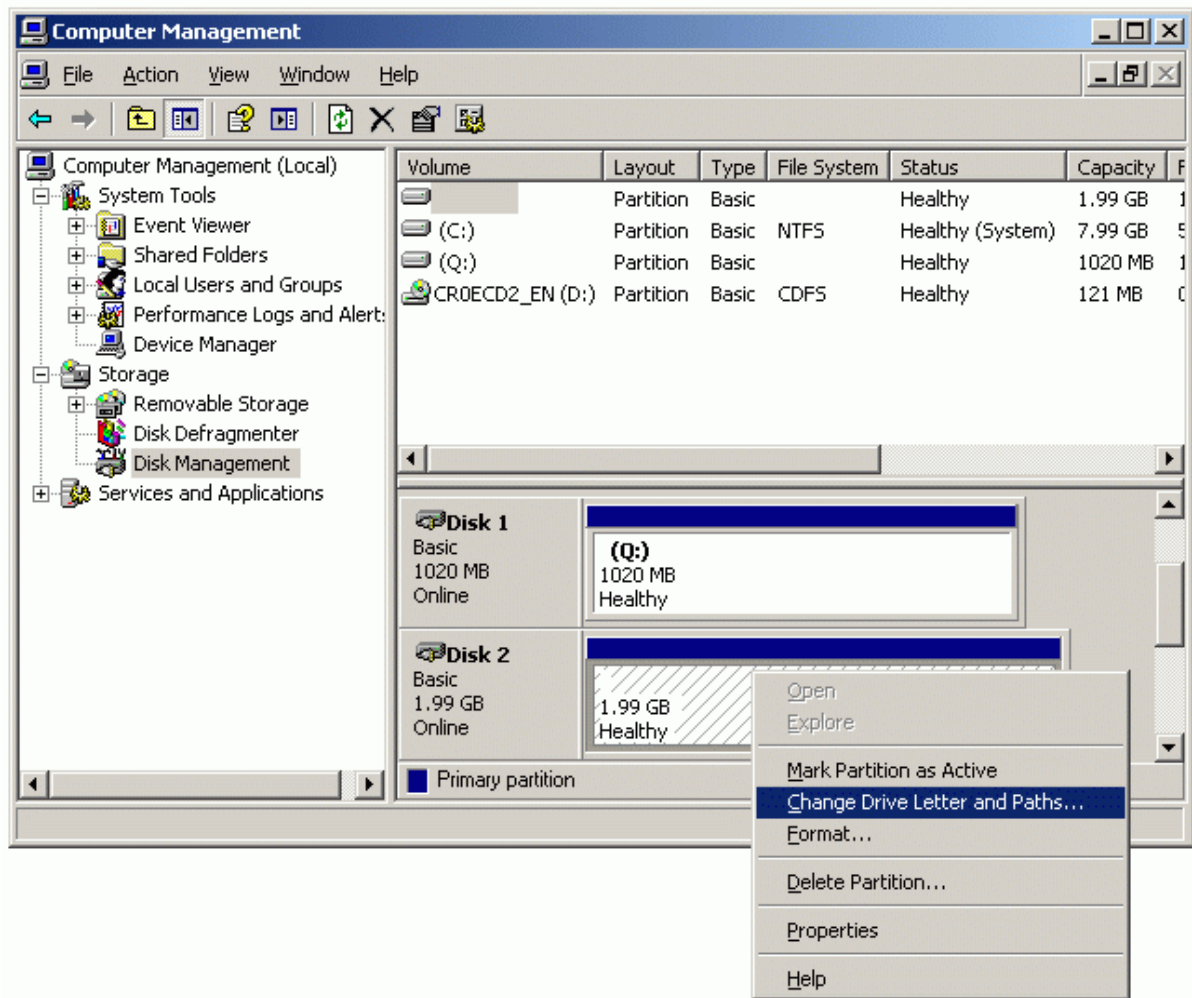


Select **Change Drive Letter and Paths...**

Change the Drive Letter for the Quorum to Q.

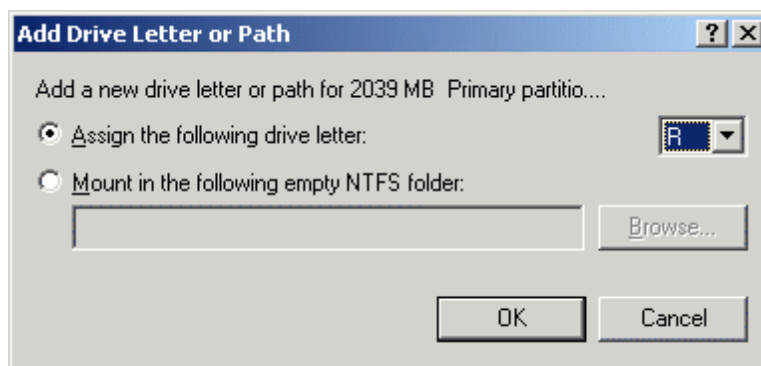
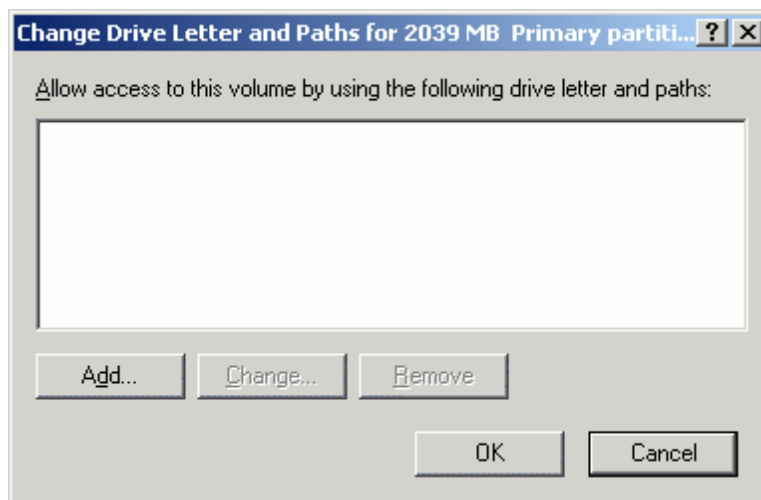


Press the right mouse button over the Generic volume.

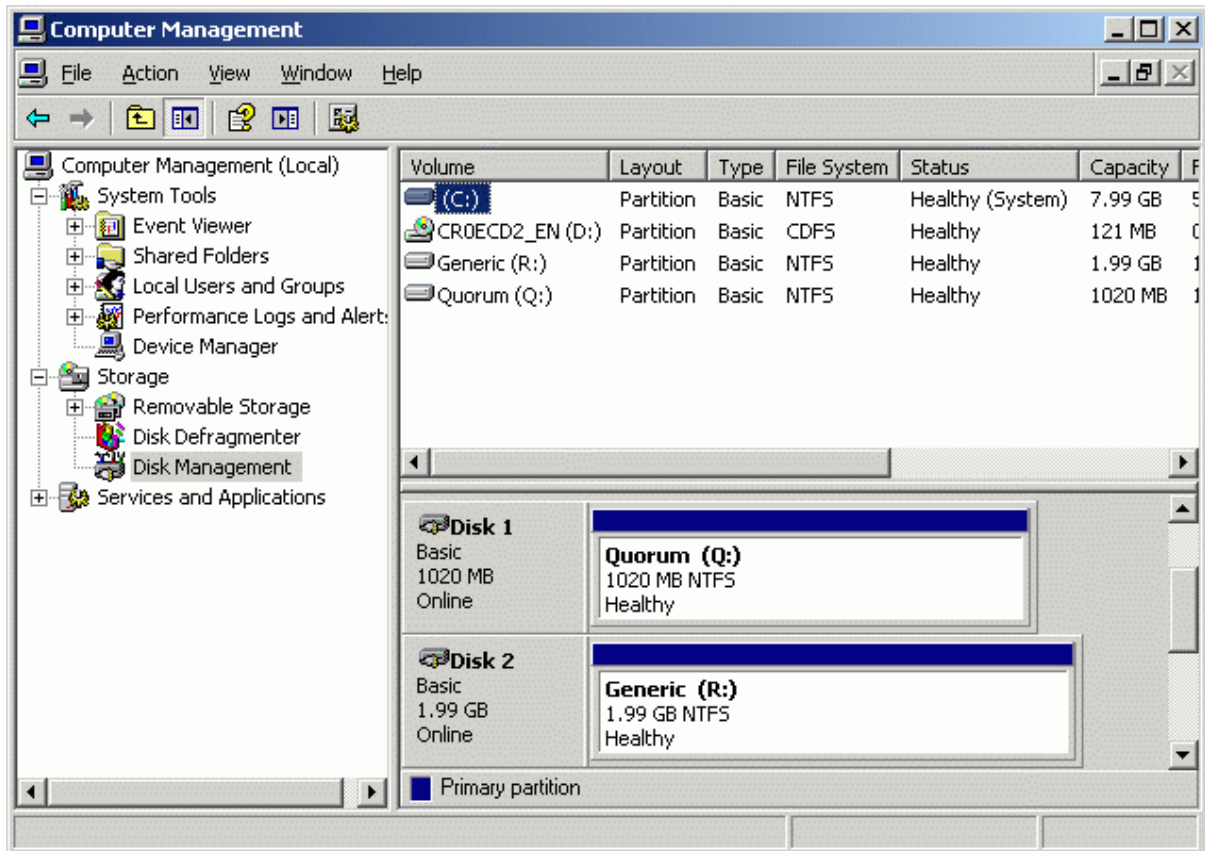


Select **Change Drive Letter and Paths...**

Change the Drive Letter for the Generic to R.



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



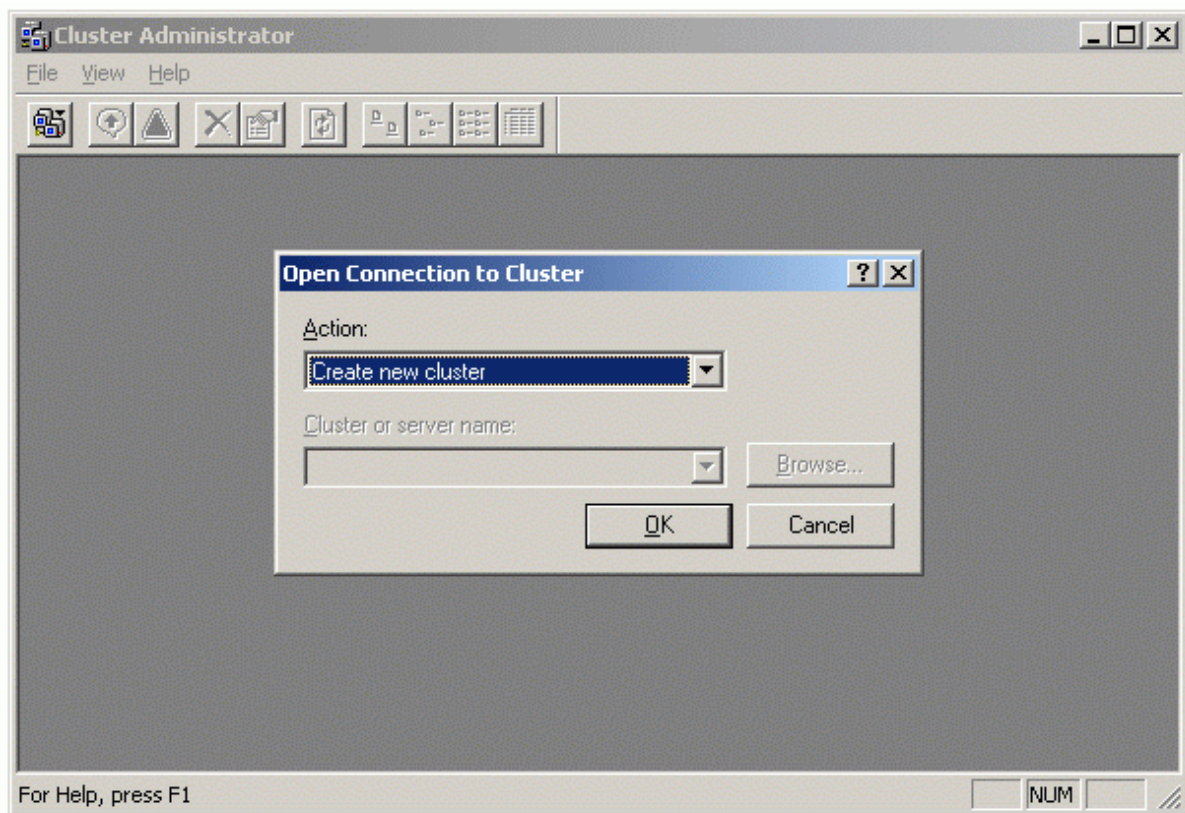
Shut down the server.

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.



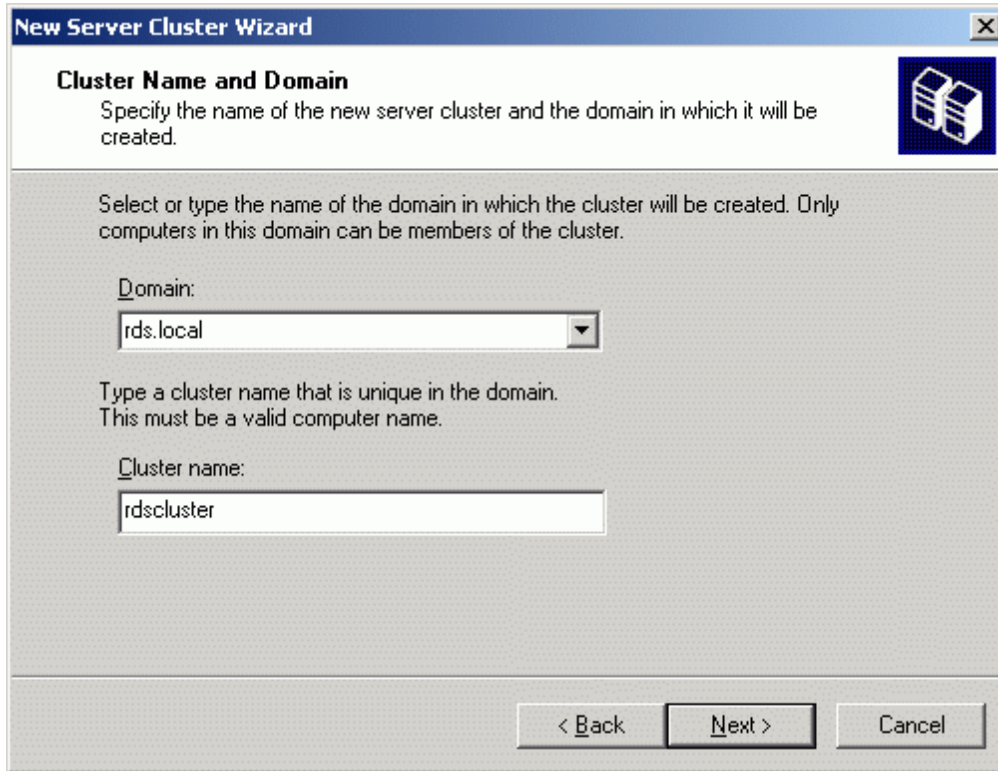
Press the **OK** button to continue.

New Server Cluster Wizard appears.



Press the **Next** button to continue.

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



The image shows a screenshot of the 'New Server Cluster Wizard' window, specifically the 'Cluster Name and Domain' page. The window has a title bar with the text 'New Server Cluster Wizard' and a close button. The main area is titled 'Cluster Name and Domain' and contains the following text: 'Specify the name of the new server cluster and the domain in which it will be created.' Below this, there is a section with the text: 'Select or type the name of the domain in which the cluster will be created. Only computers in this domain can be members of the cluster.' This is followed by a 'Domain:' label and a text box containing 'rds.local'. Below the domain box, there is another section with the text: 'Type a cluster name that is unique in the domain. This must be a valid computer name.' This is followed by a 'Cluster name:' label and a text box containing 'rdscluster'. At the bottom of the window, there are three buttons: '< Back', 'Next >', and 'Cancel'.

New Server Cluster Wizard

Cluster Name and Domain
Specify the name of the new server cluster and the domain in which it will be created.

Select or type the name of the domain in which the cluster will be created. Only computers in this domain can be members of the cluster.

Domain:
rds.local

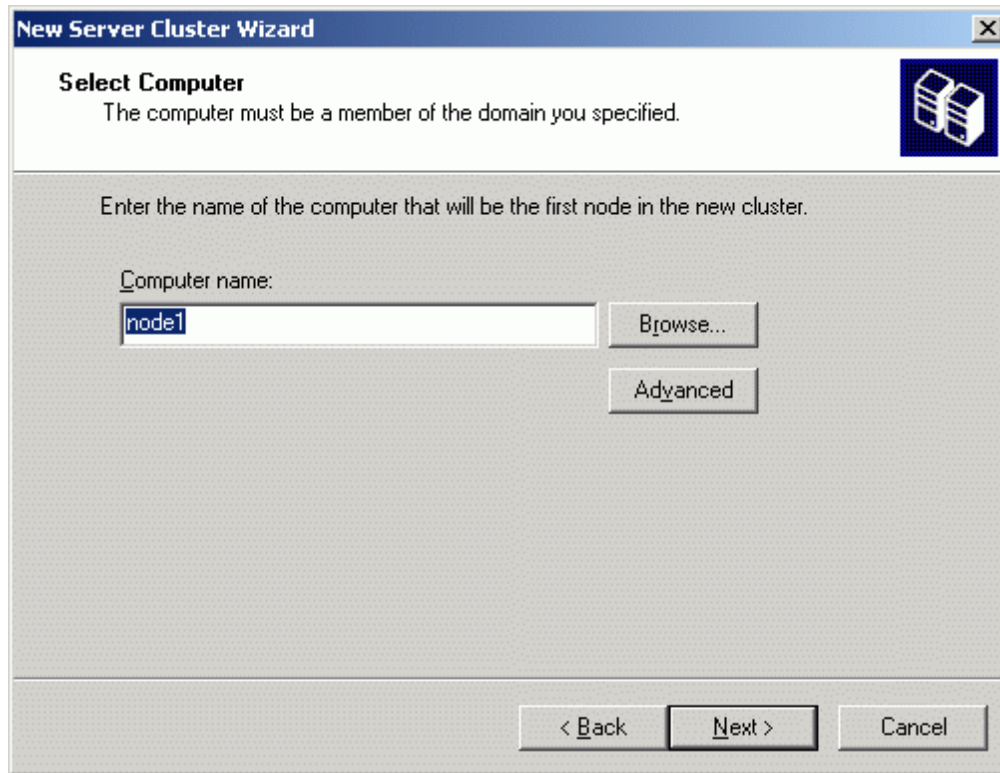
Type a cluster name that is unique in the domain.
This must be a valid computer name.

Cluster name:
rdscluster

< Back Next > Cancel

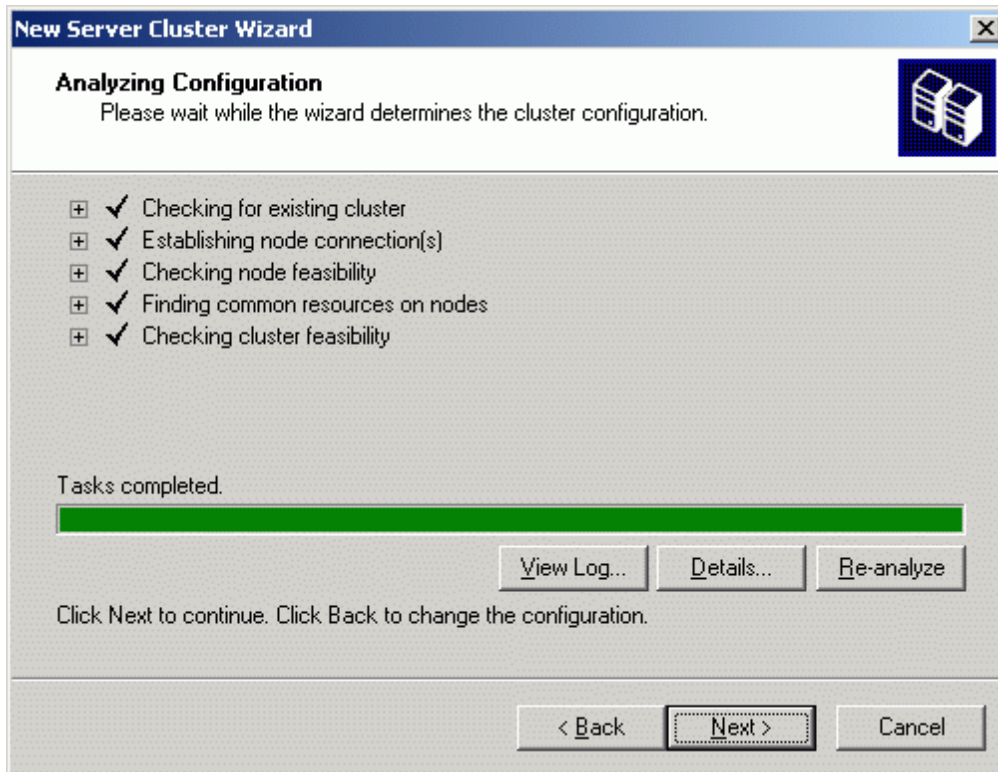
Press the **Next** button to continue.

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.



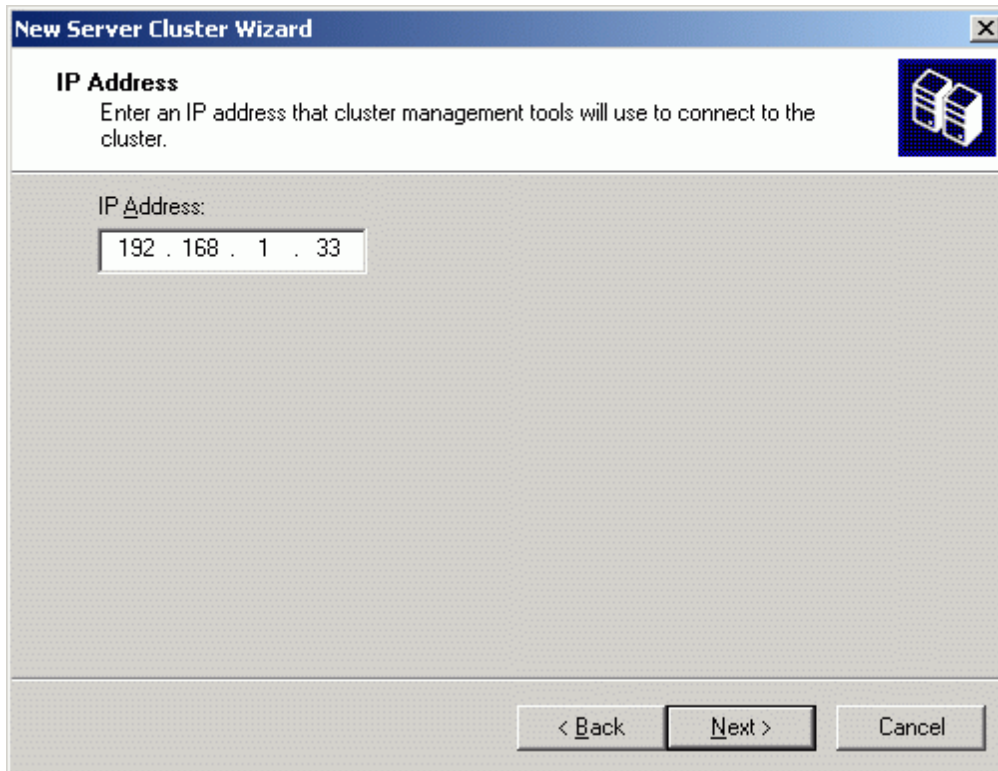
Press the **Next** button to continue.

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.

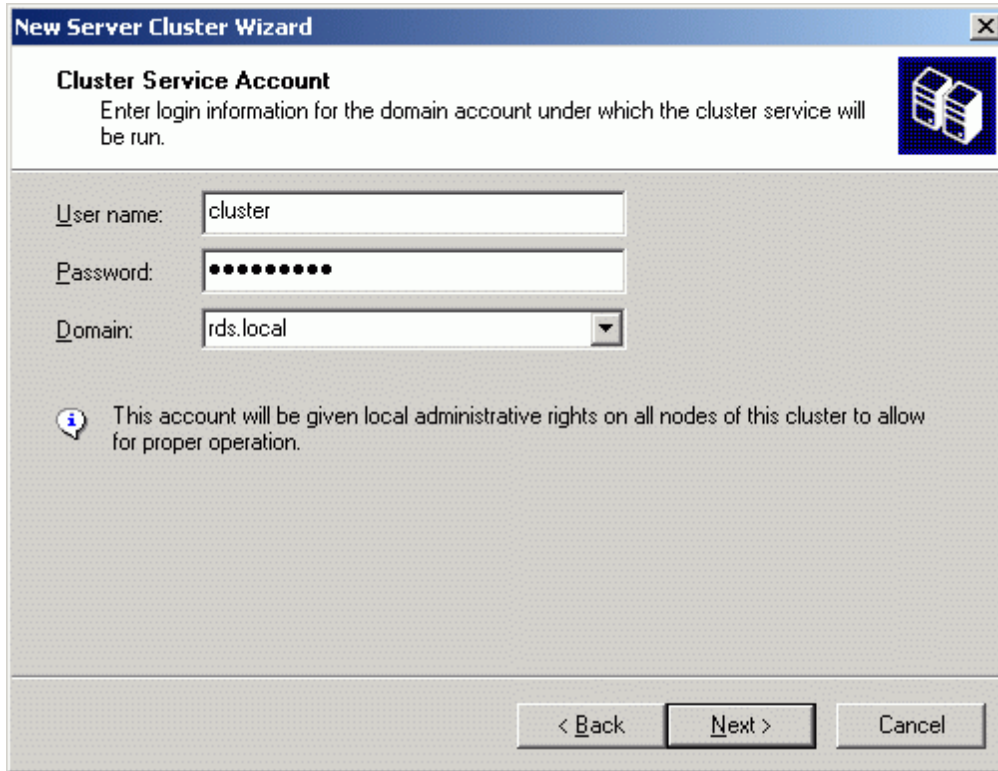
On the **IP Address** page, specify the IP address for the cluster. This address maps to the cluster name and should not be used by other computers.



The image shows a screenshot of the 'New Server Cluster Wizard' window, specifically the 'IP Address' step. The window has a title bar with the text 'New Server Cluster Wizard' and a close button. Below the title bar, the 'IP Address' section is highlighted. It contains the instruction: 'Enter an IP address that cluster management tools will use to connect to the cluster.' To the right of this text is an icon of two server racks. Below the instruction is a text input field labeled 'IP Address:' containing the value '192 . 168 . 1 . 33'. At the bottom of the window are three buttons: '< Back', 'Next >', and 'Cancel'.

Press the **Next** button to continue.

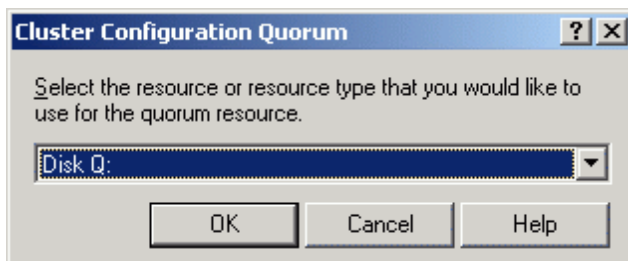
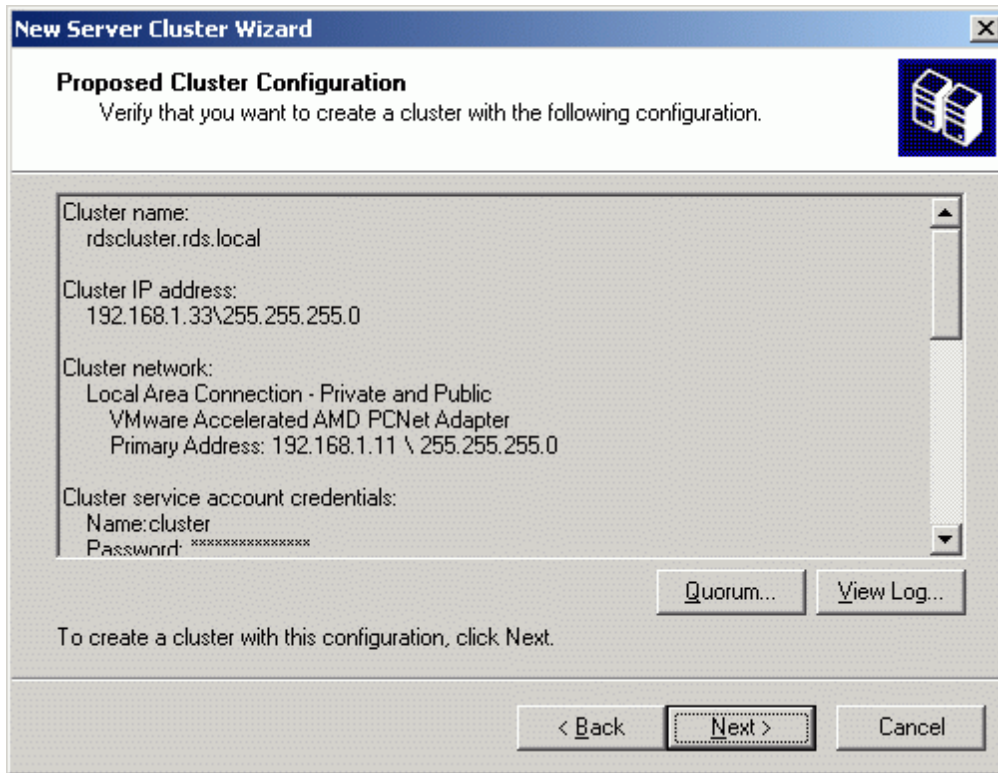
On the **Cluster Service Account** page specify the domain account that the service will run under. This account must be a domain user.



The image shows a screenshot of the 'New Server Cluster Wizard' window, specifically the 'Cluster Service Account' step. The window has a title bar with the text 'New Server Cluster Wizard' and a close button. Below the title bar, the section is titled 'Cluster Service Account' with a subtitle 'Enter login information for the domain account under which the cluster service will be run.' and an icon of two server racks. The main area contains three input fields: 'User name:' with the text 'cluster', 'Password:' with a masked password of ten dots, and 'Domain:' with a dropdown menu showing 'rds.local'. Below these fields is an information icon and a message: 'This account will be given local administrative rights on all nodes of this cluster to allow for proper operation.' At the bottom right, there are three buttons: '< Back', 'Next >', and 'Cancel'.

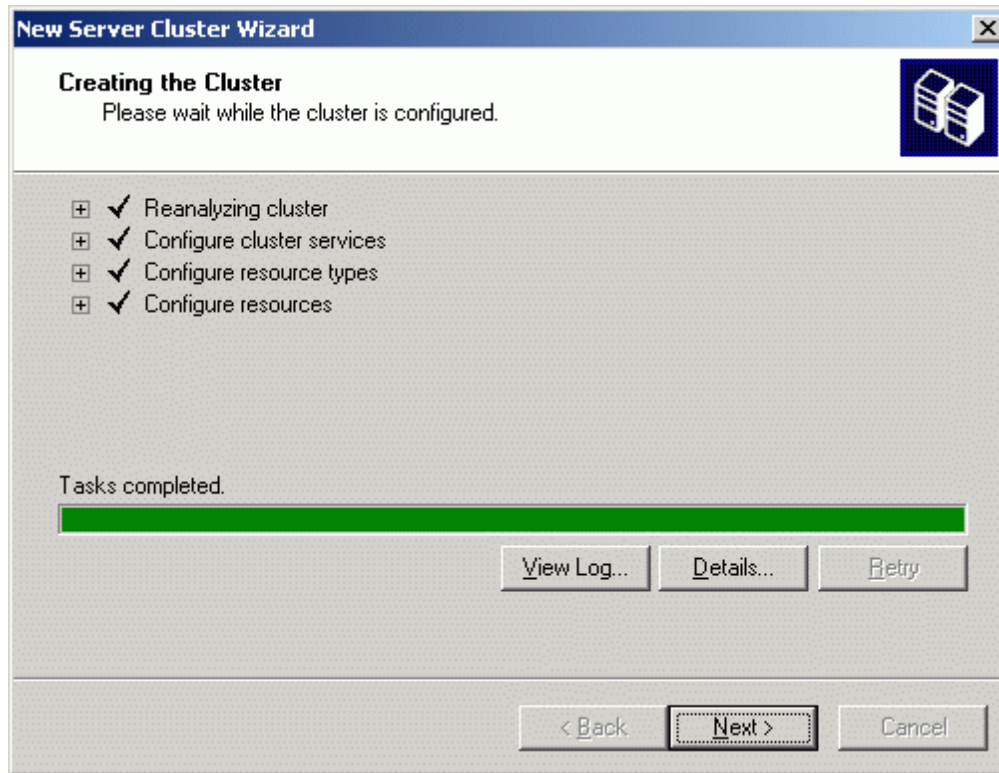
Press the **Next** button to continue.

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).



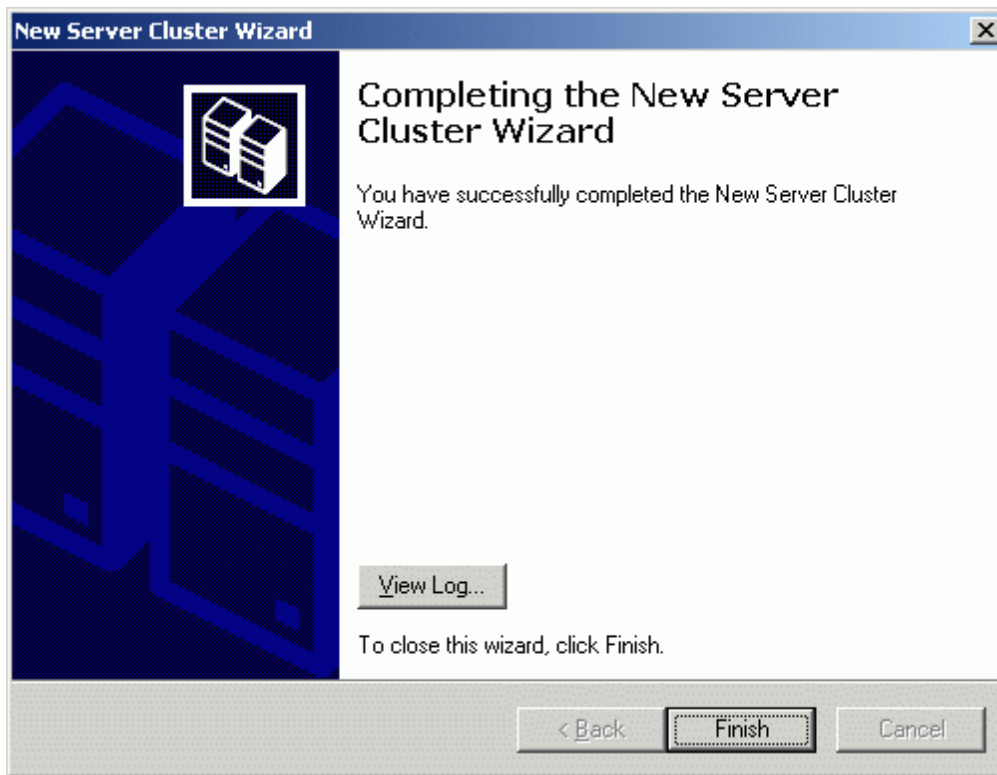
Press the **OK** button.
Press the **Next** button to create the cluster.

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.



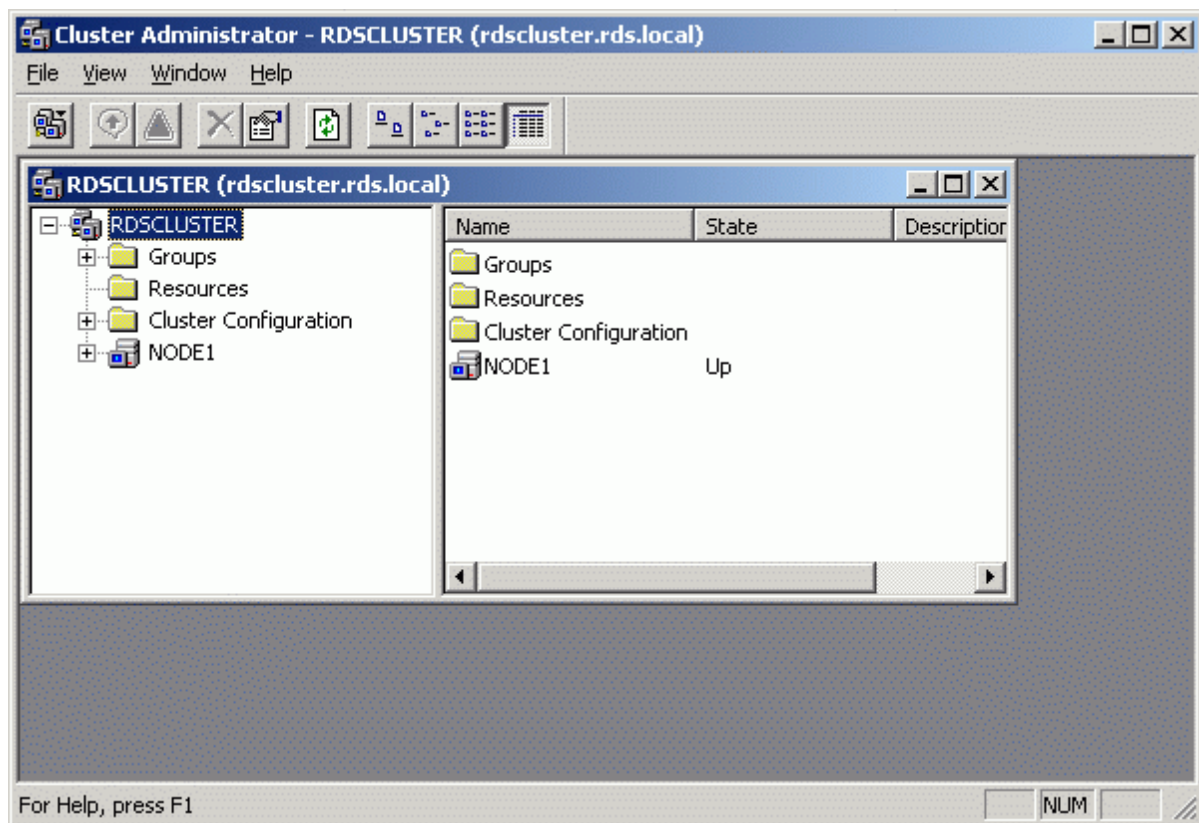
Press the **Next** button to continue.

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.

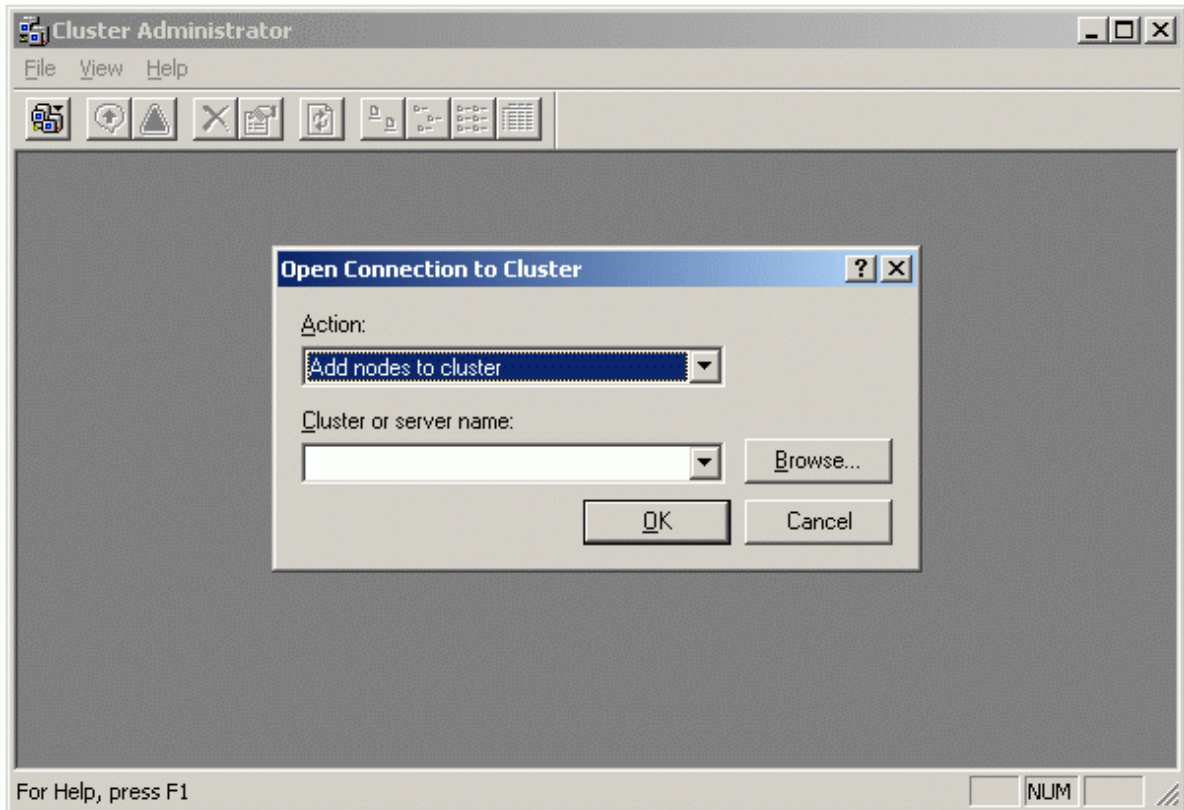
The new cluster is created.



Node 2

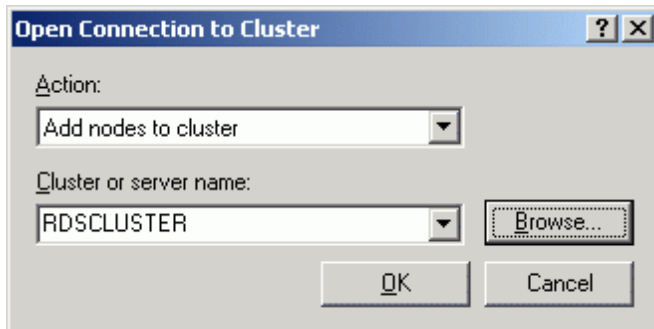
Turn on the **Cluster Node 2 Server**. Log in to the server using an account with administrative privileges (**node2adm**). Launch the **Cluster Administrator** console.

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.

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



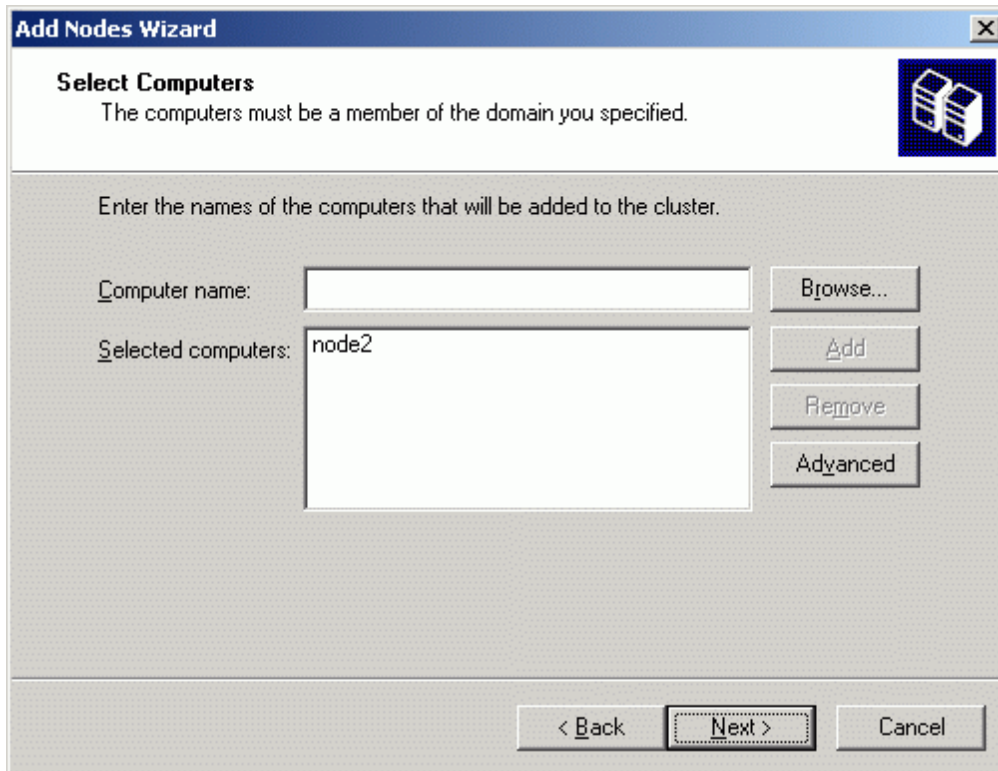
Press the **OK** button to add this server to the cluster.

Add Nodes Wizard appears.



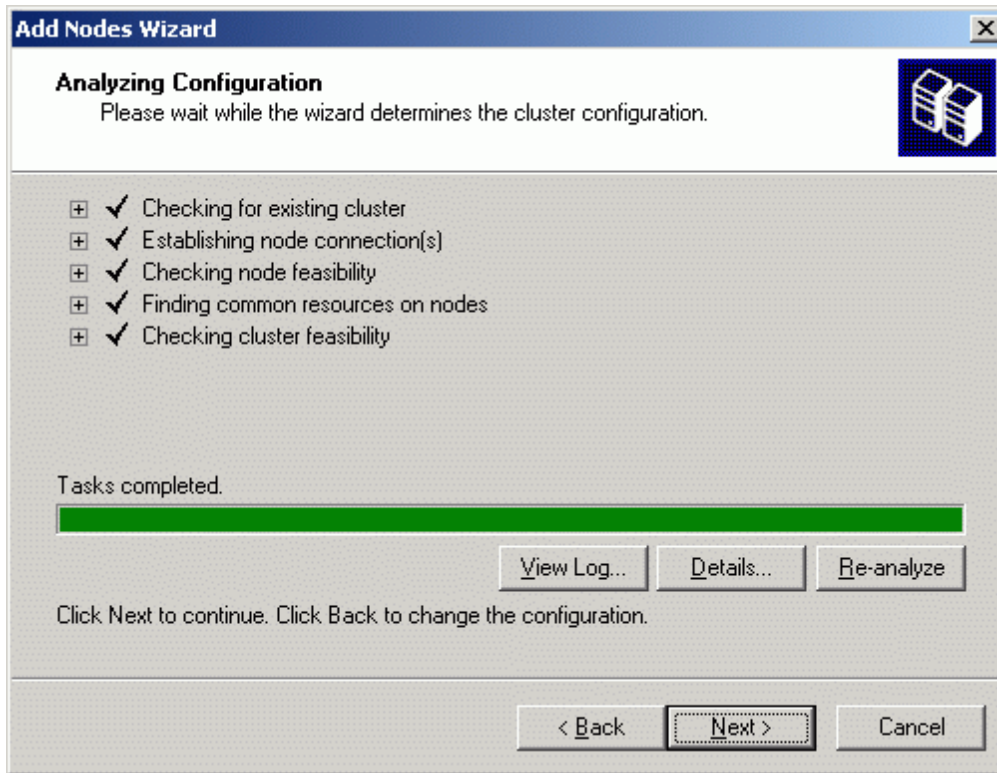
Press the **Next** button to continue.

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



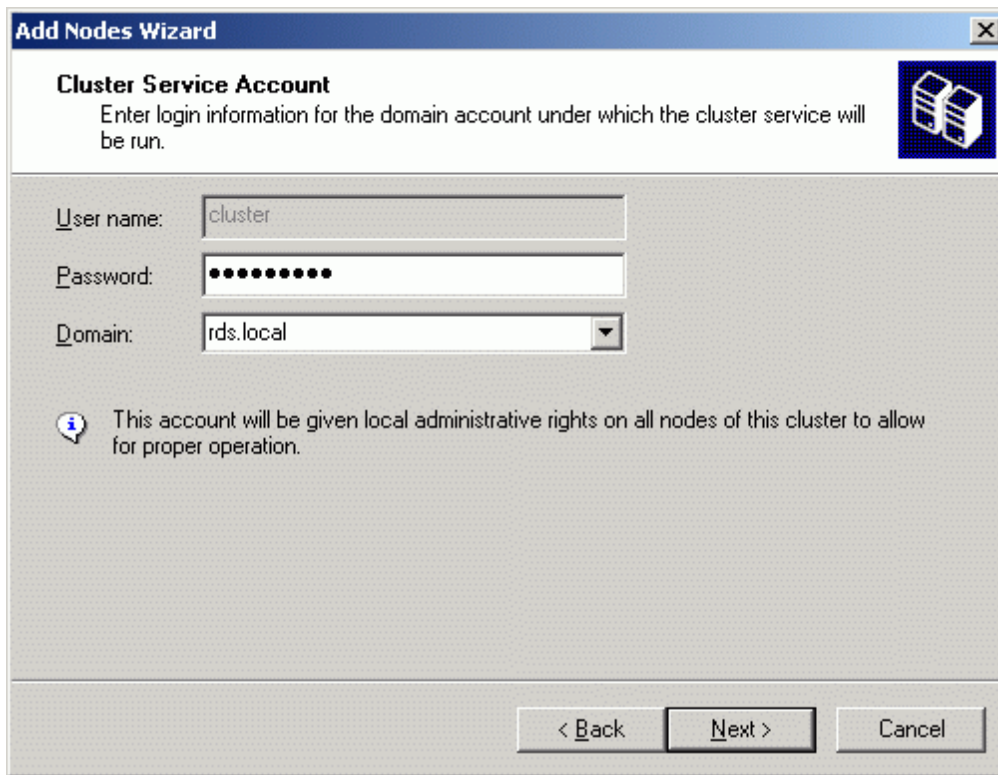
Press the **Next** button to continue.

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.

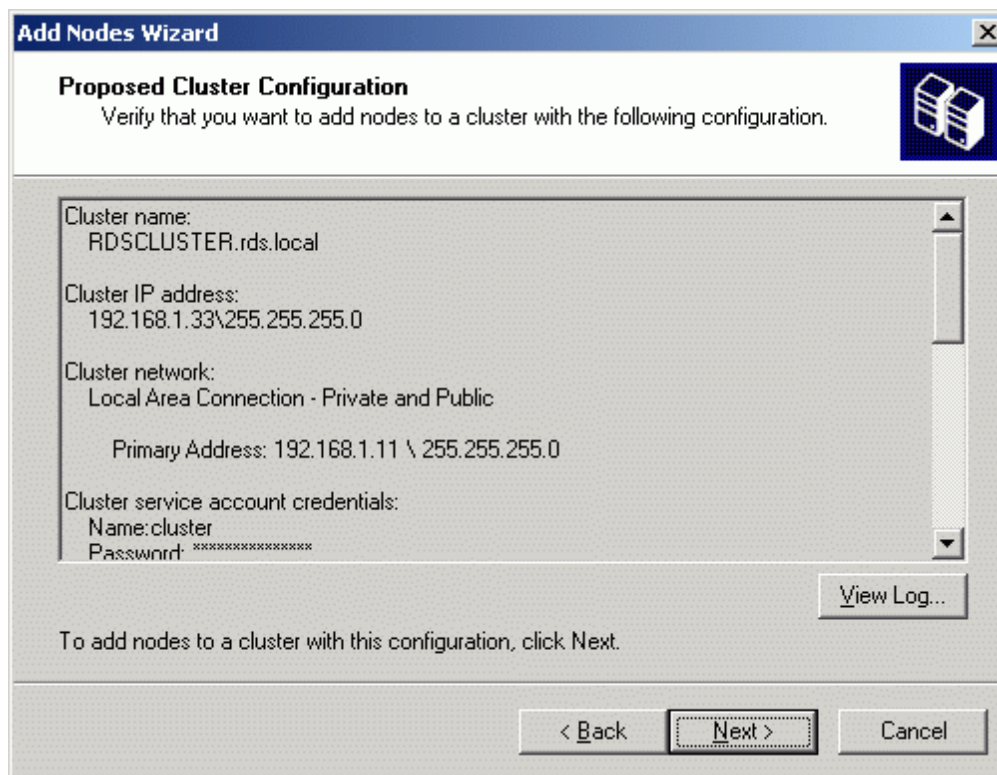
Enter the password for the user provided to run the cluster service.



The image shows a Windows-style dialog box titled "Add Nodes Wizard". The main heading is "Cluster Service Account". Below the heading is a sub-instruction: "Enter login information for the domain account under which the cluster service will be run." To the right of this text is a small icon of two server racks. The dialog contains three input fields: "User name:" with the text "cluster", "Password:" with ten black dots, and "Domain:" with the text "rds.local" and a dropdown arrow. Below these fields is an information icon (a lowercase 'i' in a circle) followed by the text: "This account will be given local administrative rights on all nodes of this cluster to allow for proper operation." At the bottom right of the dialog are three buttons: "< Back", "Next >", and "Cancel".

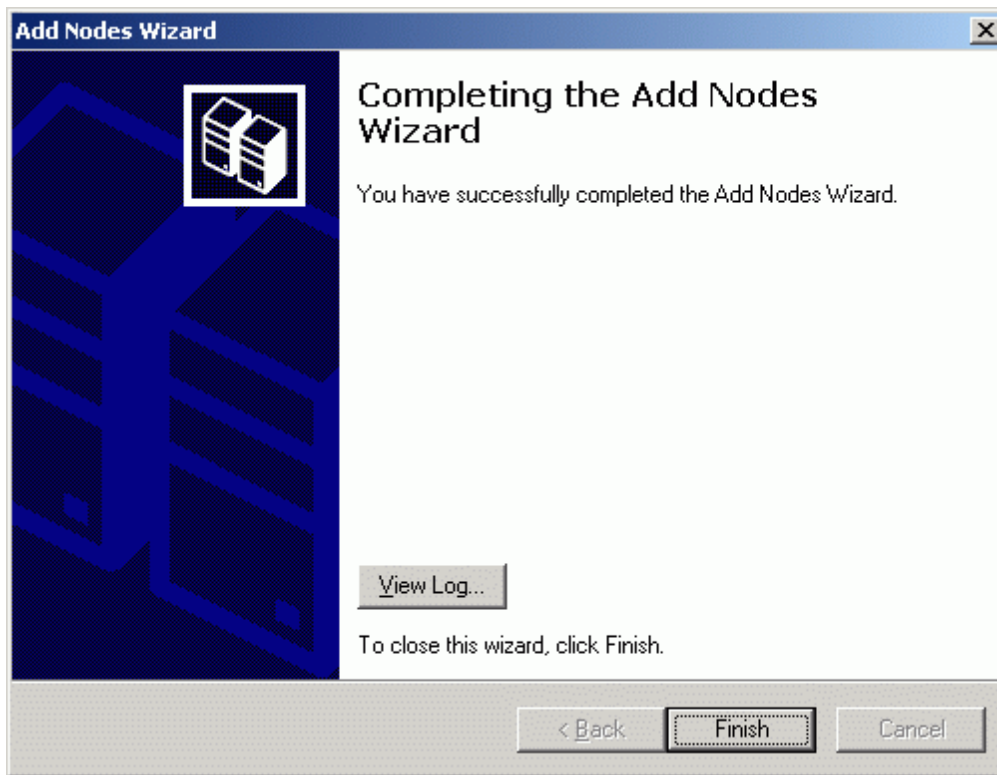
Press the **Next** button to continue.

The **Proposed Cluster Configuration** page appears.



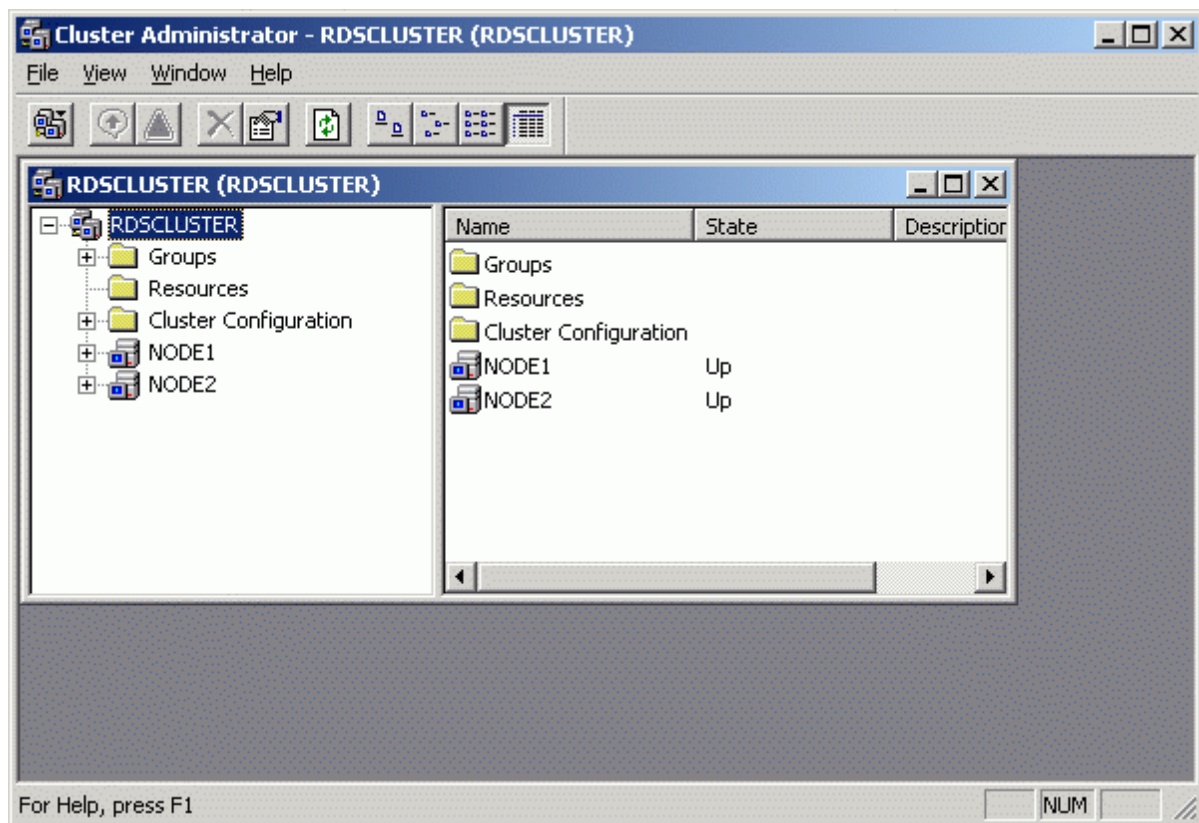
Press the **Next** button to add this server to the cluster.

Completing the Add Nodes Wizard page appears.



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

The new node is added to the cluster.

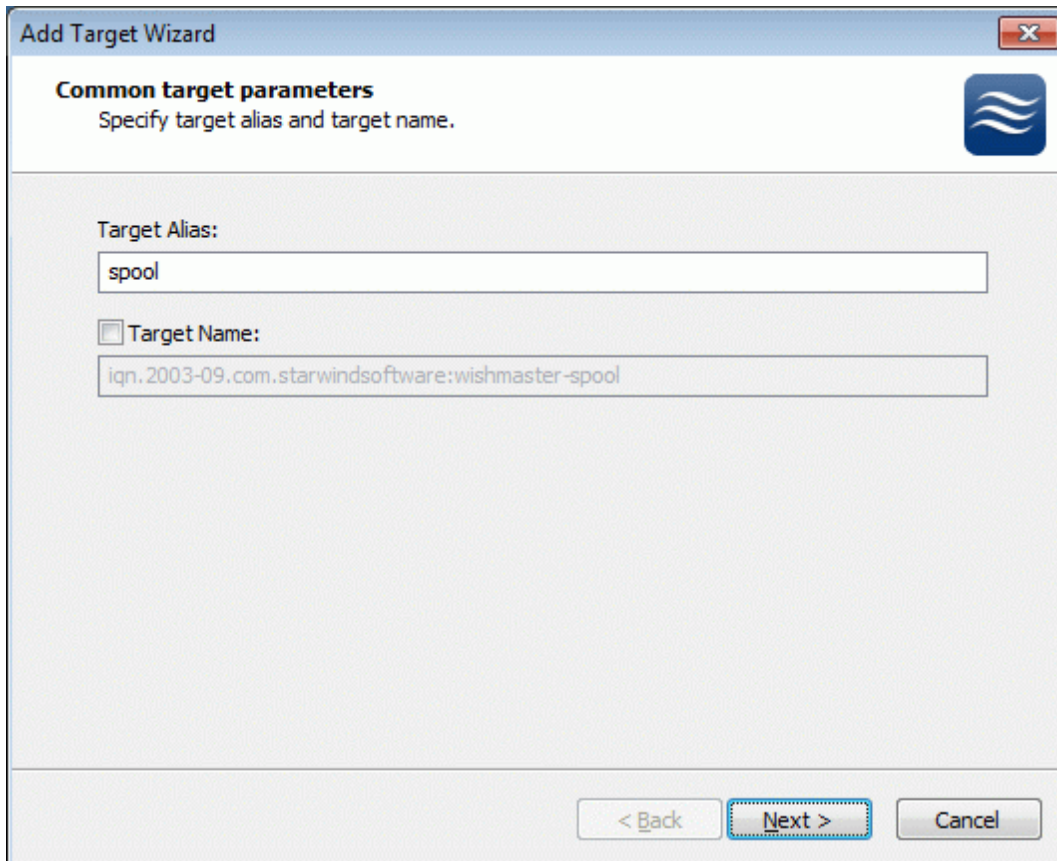


Adding New Shared Disk Resource

StarWind Target

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

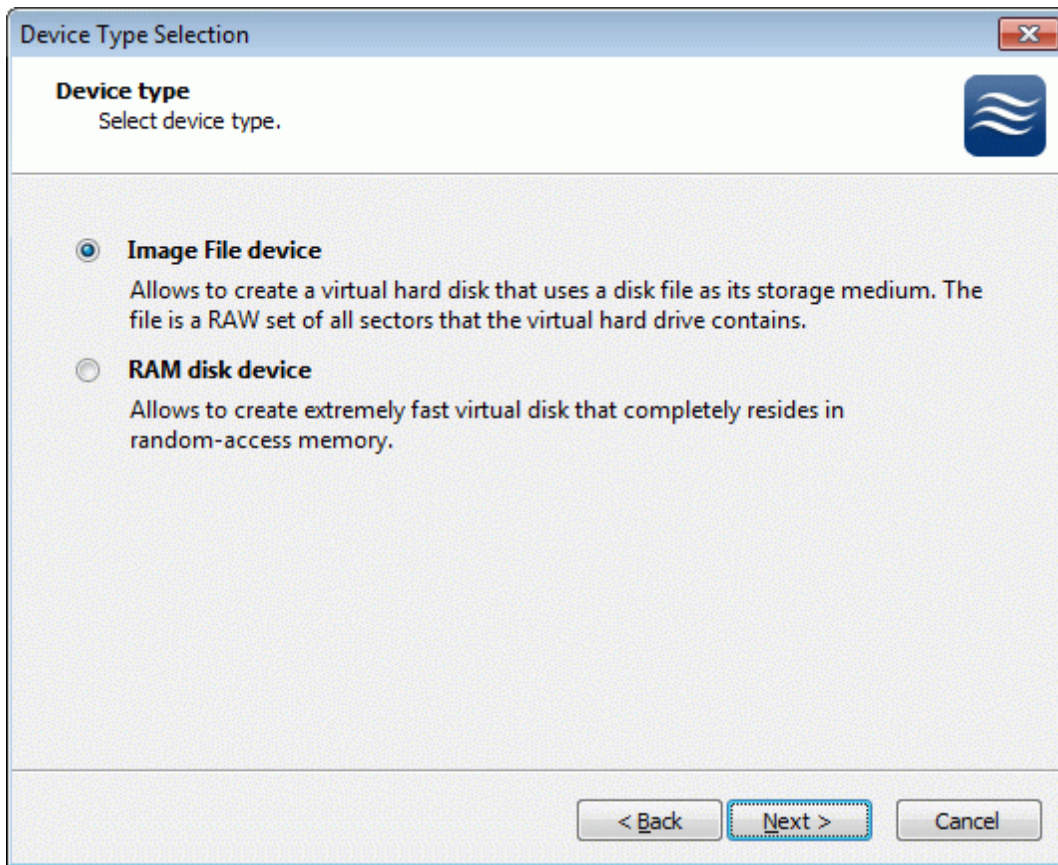
In the wizard that appears, select a target name. The name must be a unique name by which the device will be declared to the iSCSI initiators connecting to **StarWind** over an IP network.



The image shows a Windows-style dialog box titled "Add Target Wizard". It has a standard title bar with a close button (X). The main content area is divided into two sections. The top section is titled "Common target parameters" and contains the instruction "Specify target alias and target name." To the right of this text is a StarWind logo. Below this, there are two input fields. The first is labeled "Target Alias:" and contains the text "spool". The second is preceded by a checkbox labeled "Target Name:" and contains the text "iqn.2003-09.com.starwindsoftware:wishmaster-spool". At the bottom of the dialog, there are three buttons: "< Back", "Next >", and "Cancel". The "Next >" button is highlighted with a blue dashed border.

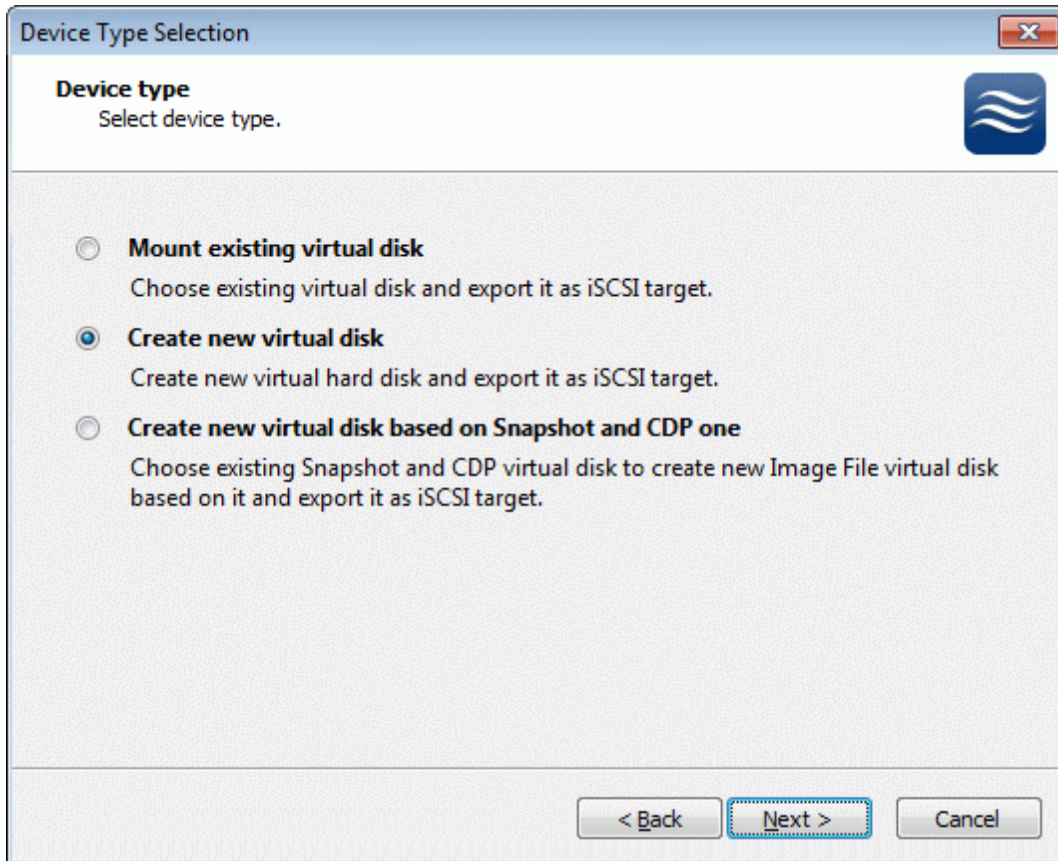
Press the **Next** button to continue.

Select **Image File device**.



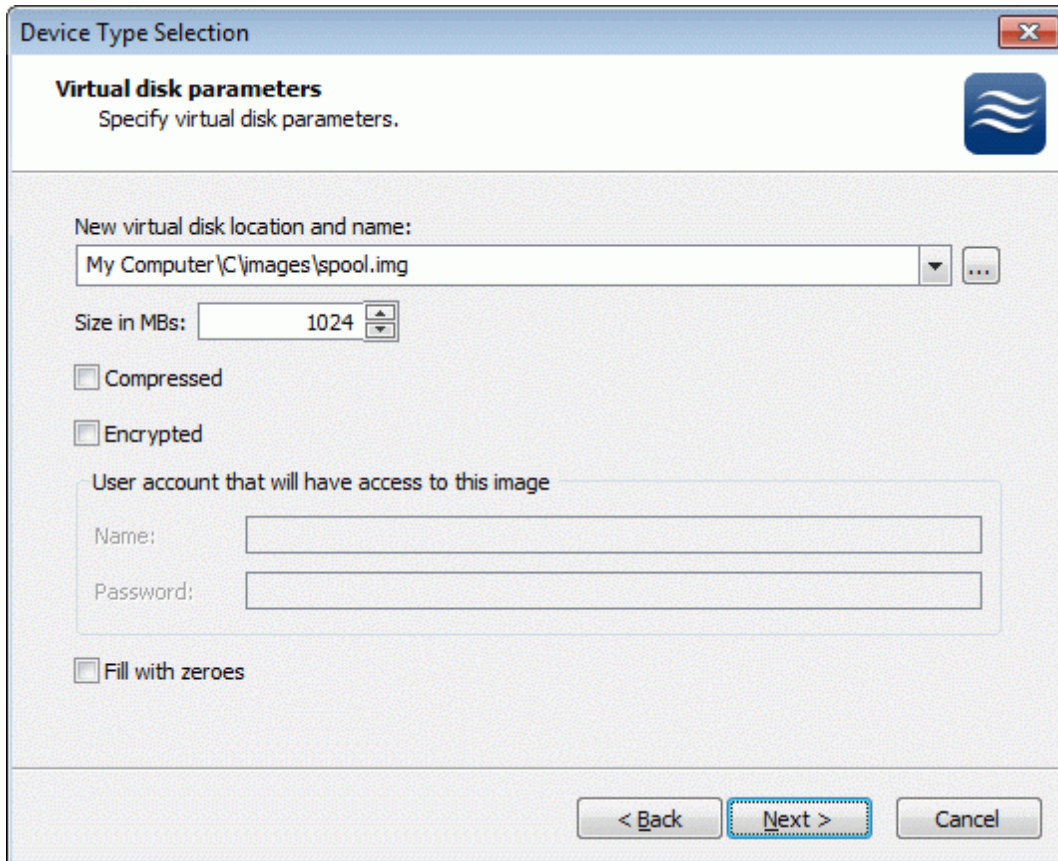
Press the **Next** button to continue.

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.

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**).



Device Type Selection

Virtual disk parameters
Specify virtual disk parameters.

New virtual disk location and name:
My Computer\C:\images\spool.img

Size in MBs: 1024

☐ Compressed

☐ Encrypted

User account that will have access to this image

Name:

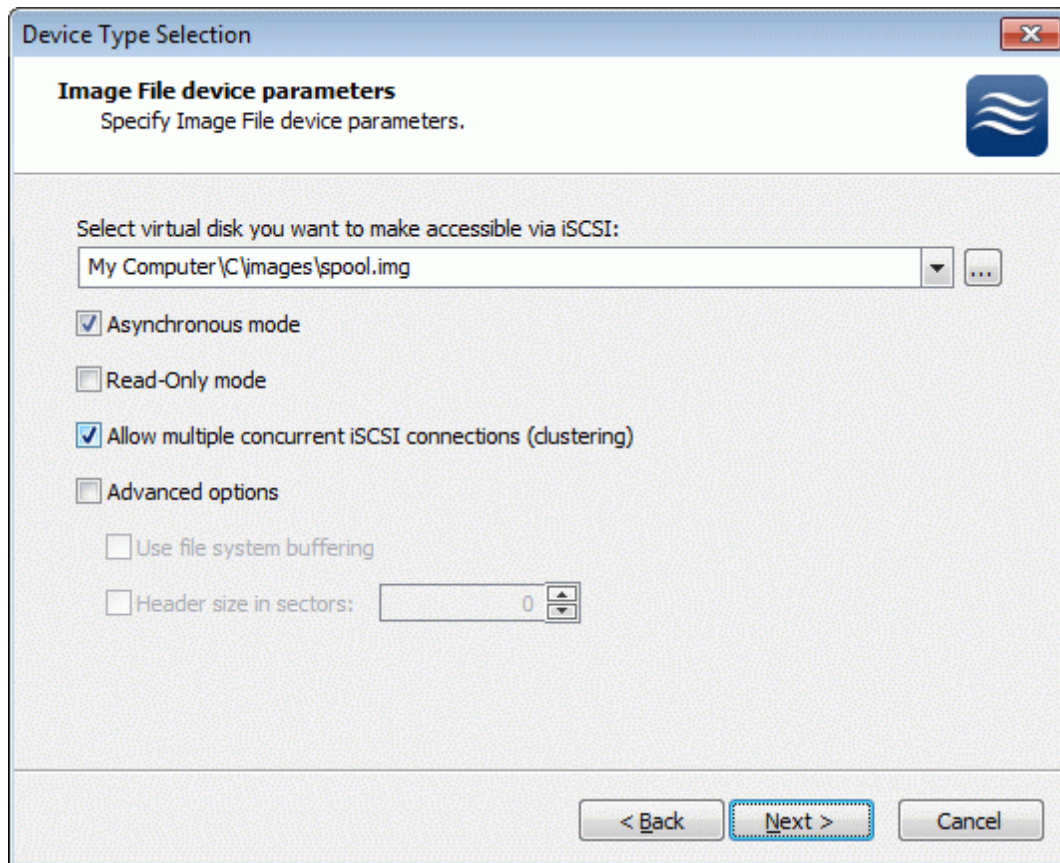
Password:

☐ Fill with zeroes

< Back **Next >** Cancel

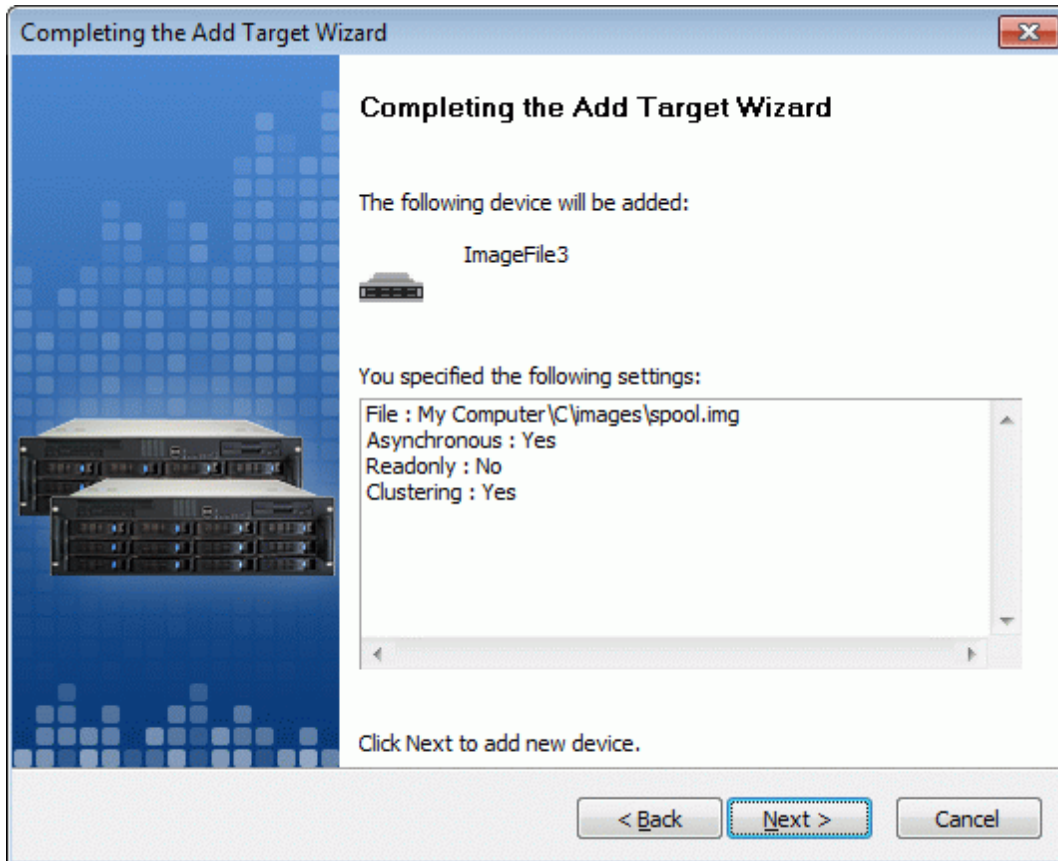
Press the **Next** button to continue.

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**).



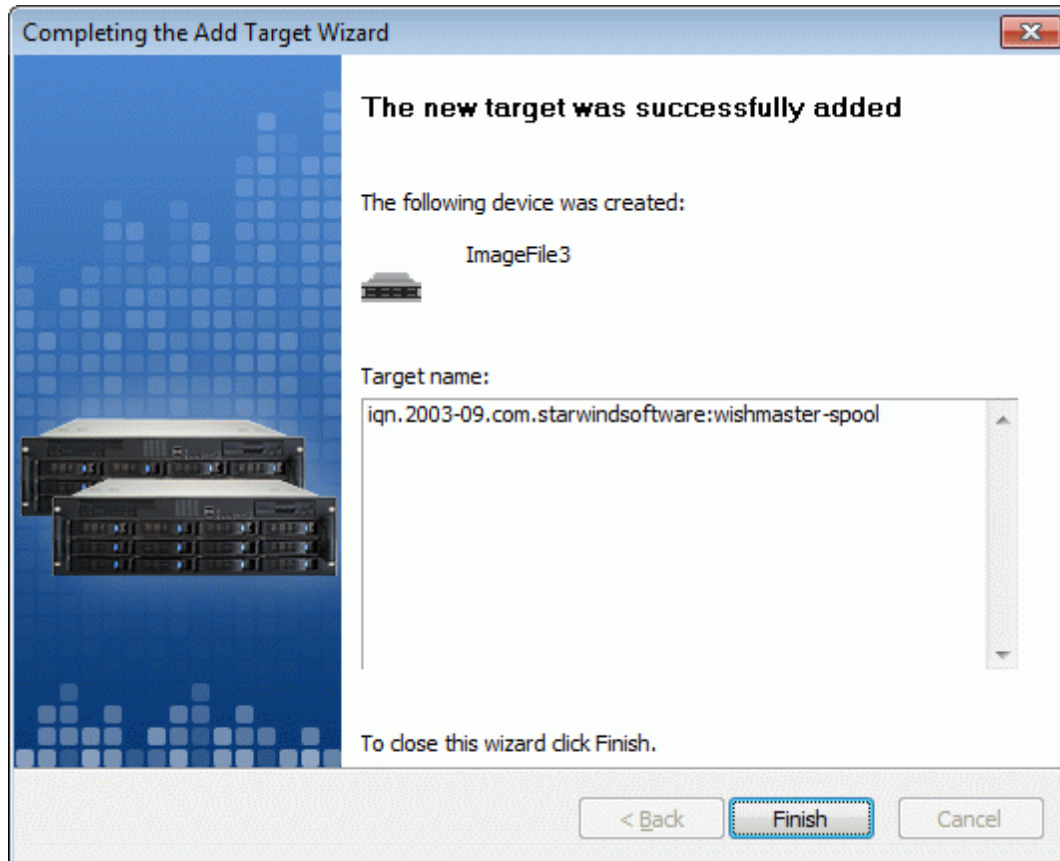
Press the **Next** button to continue.

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



Press the **Next** button to continue.

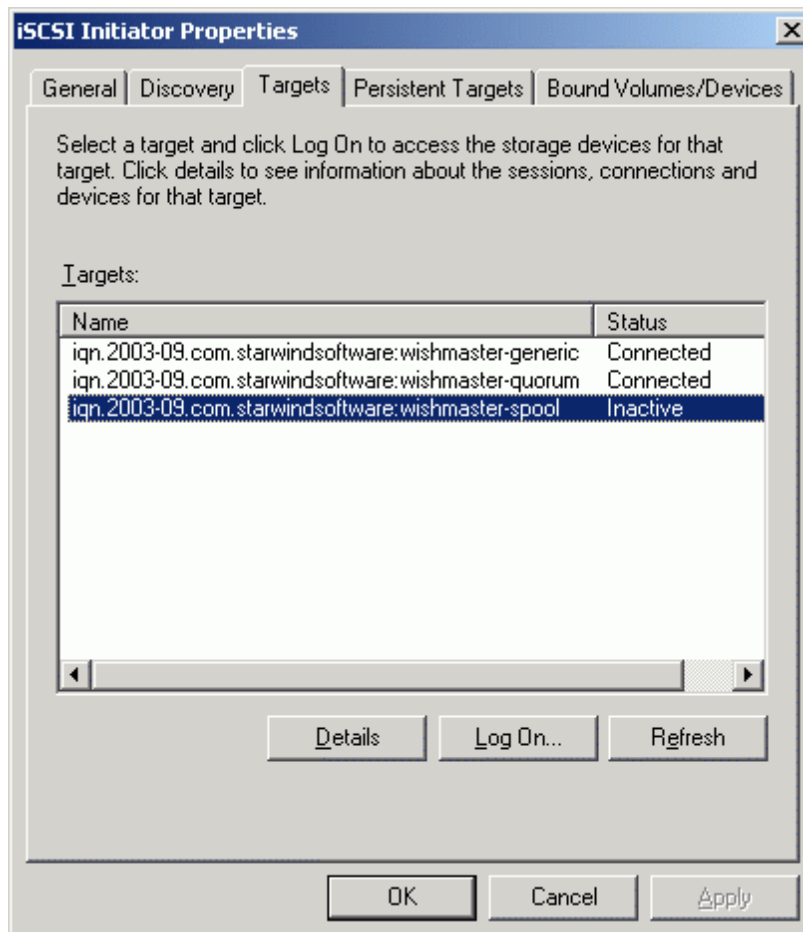
A summary of the created device is displayed on the last wizard page (see image below).



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

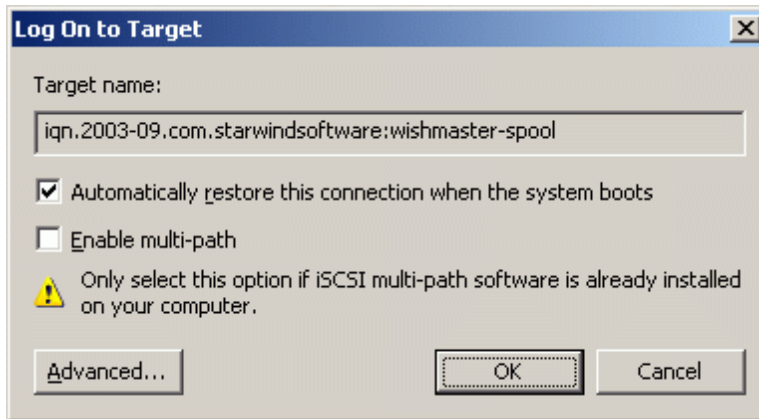
Node 1

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



Press the **Log On...** button.

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.



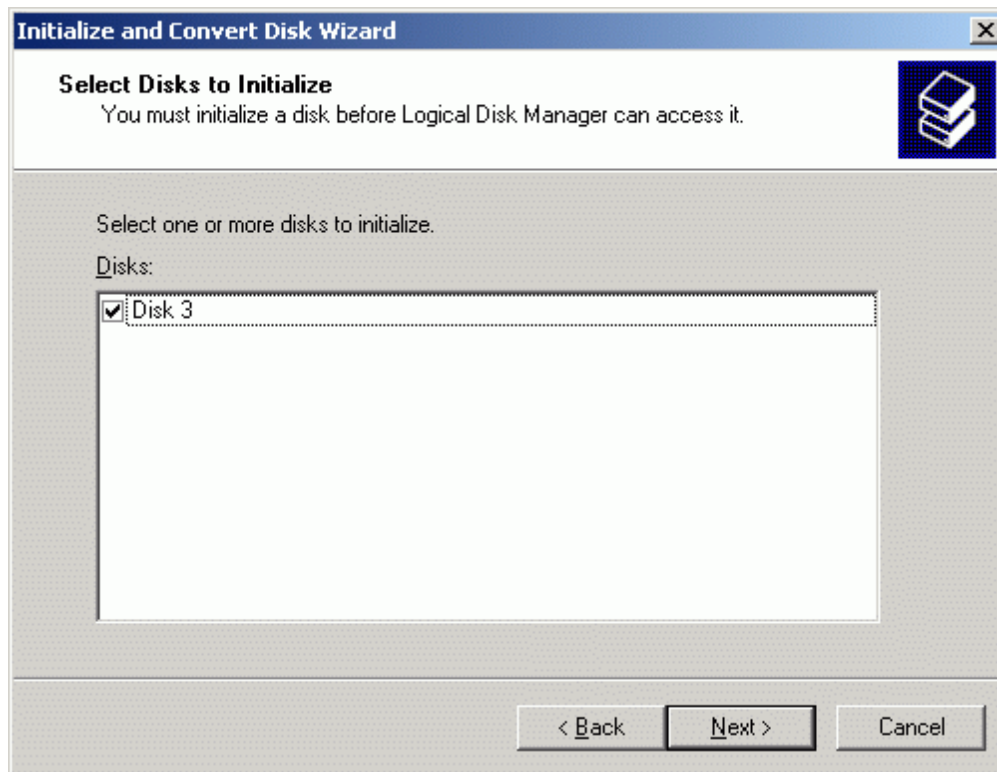
Press the **OK** button to continue.

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**.

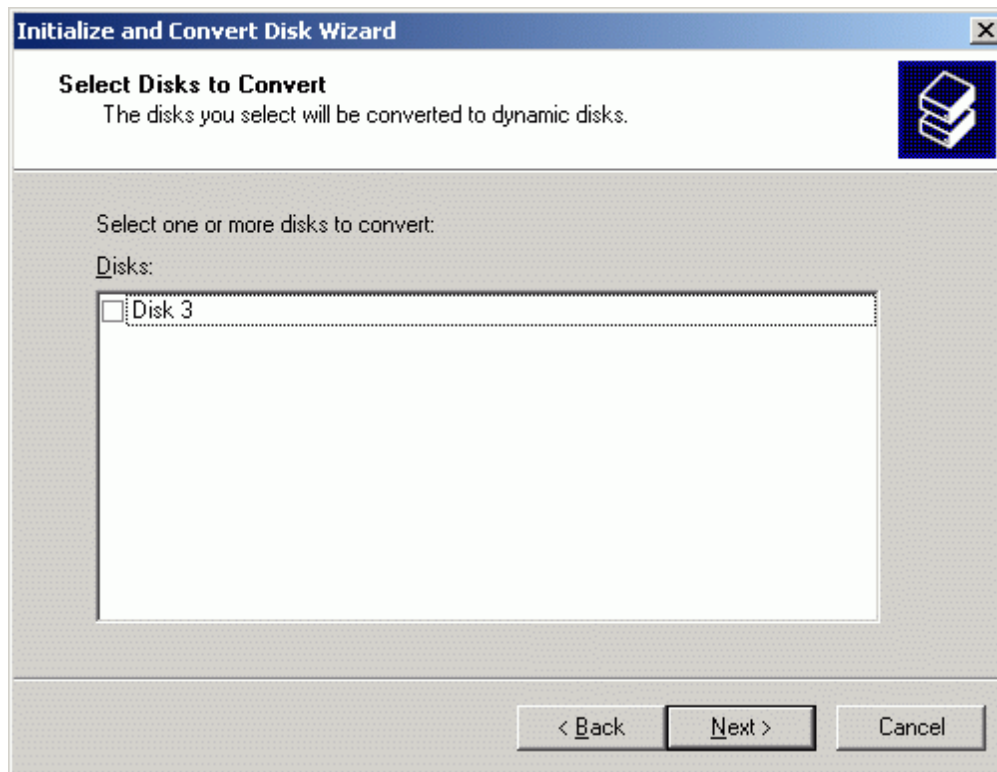
Follow the **Initialize and Convert Disk Wizard** to initialize the new disks. Use the default settings that Windows provides. By default the disk will be initialized as the basic disk. MSCS works only with the basic disks.



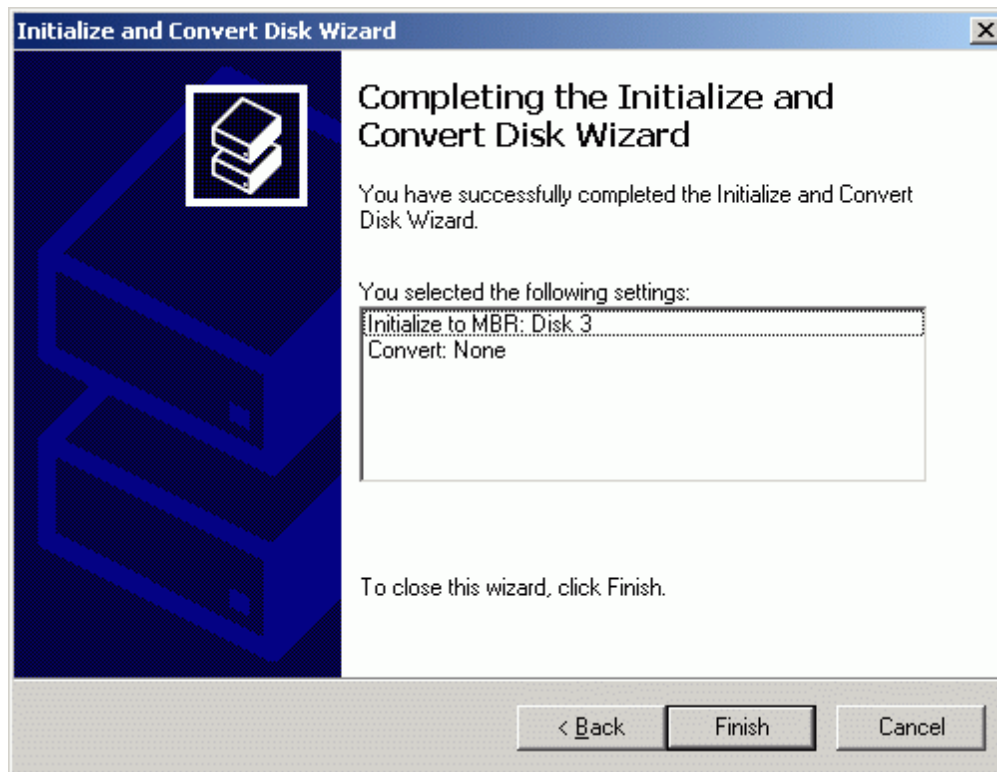
Press the **Next** button to continue.



Press the **Next** button to continue.

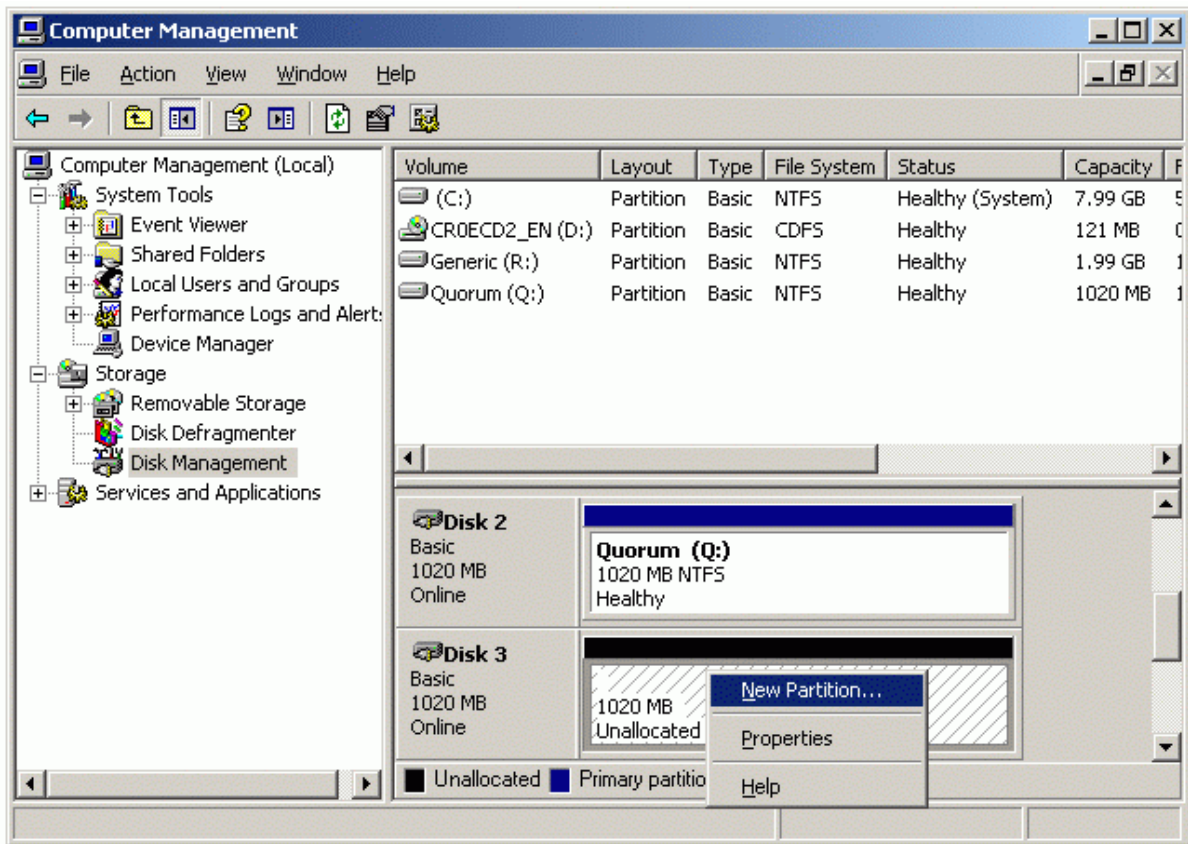


Press the **Next** button to continue.

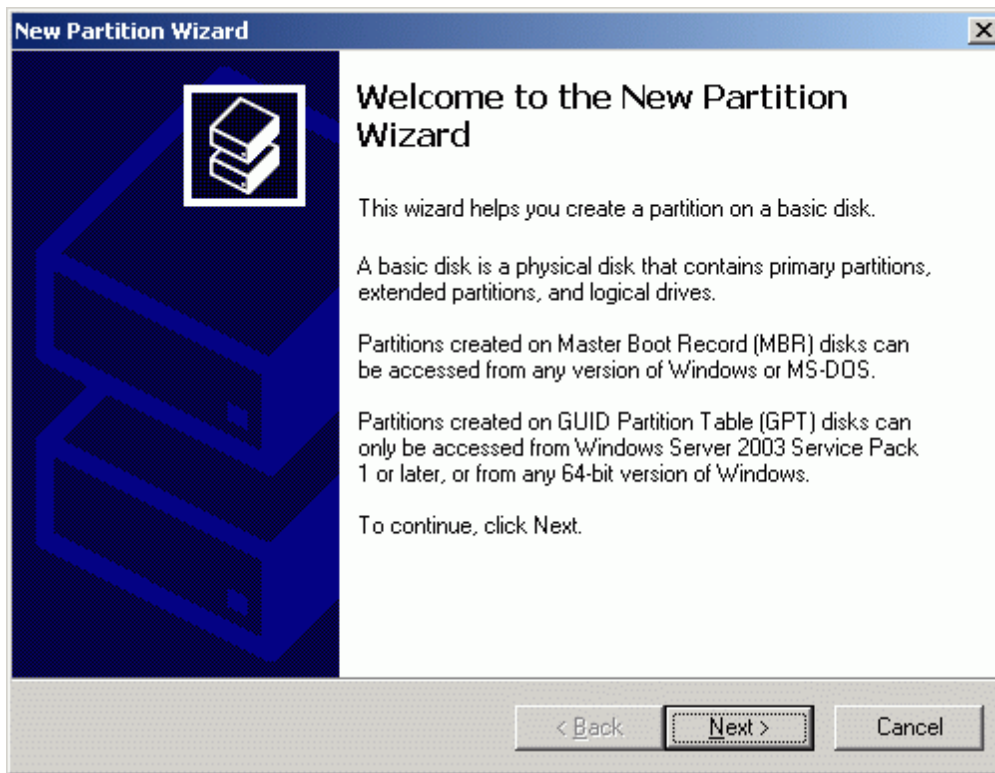


Press the **Finish** button to close the wizard.

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.)

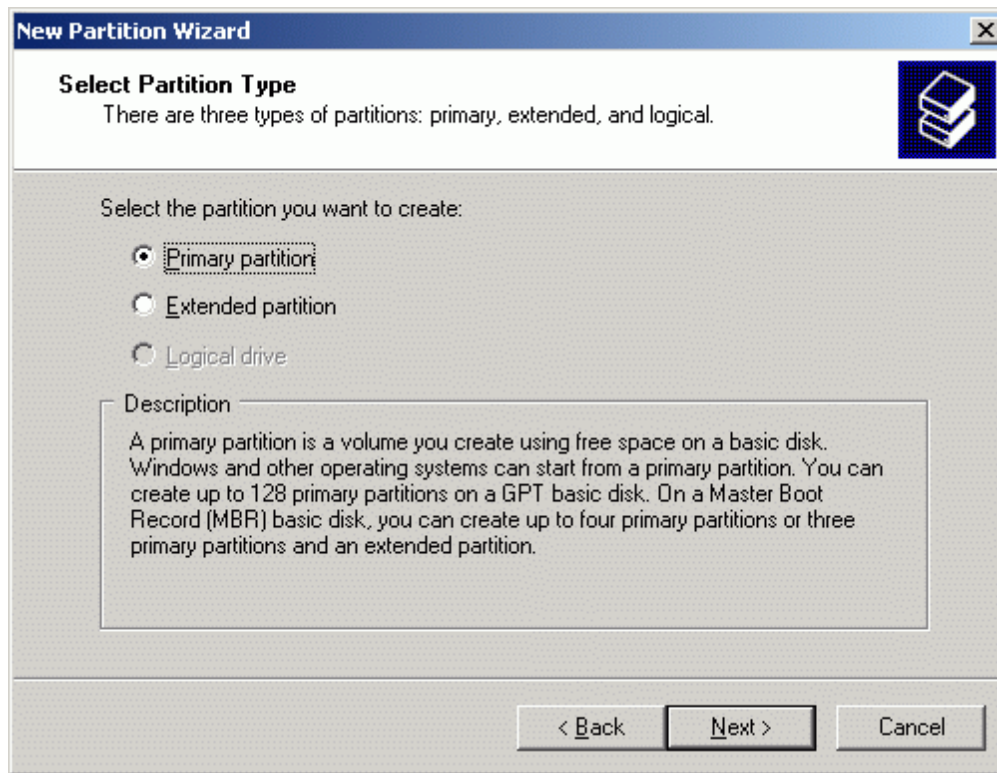


New Partition Wizard appears.



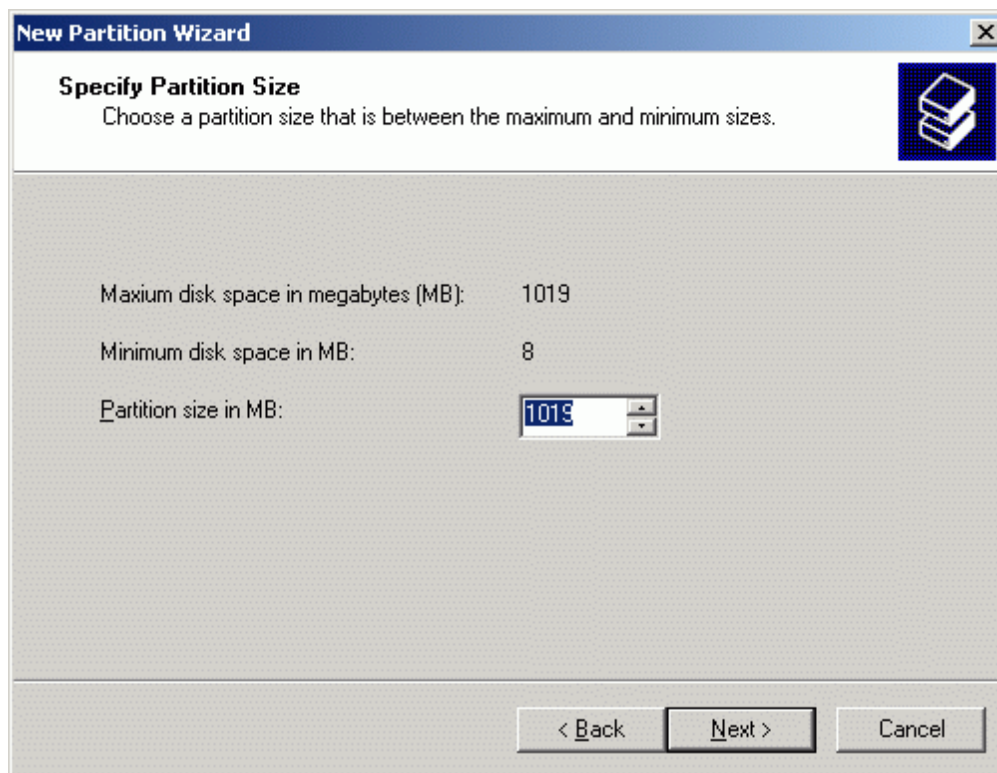
Press the **Next** button to continue.

Select partition type to create.



Press the **Next** button to continue.

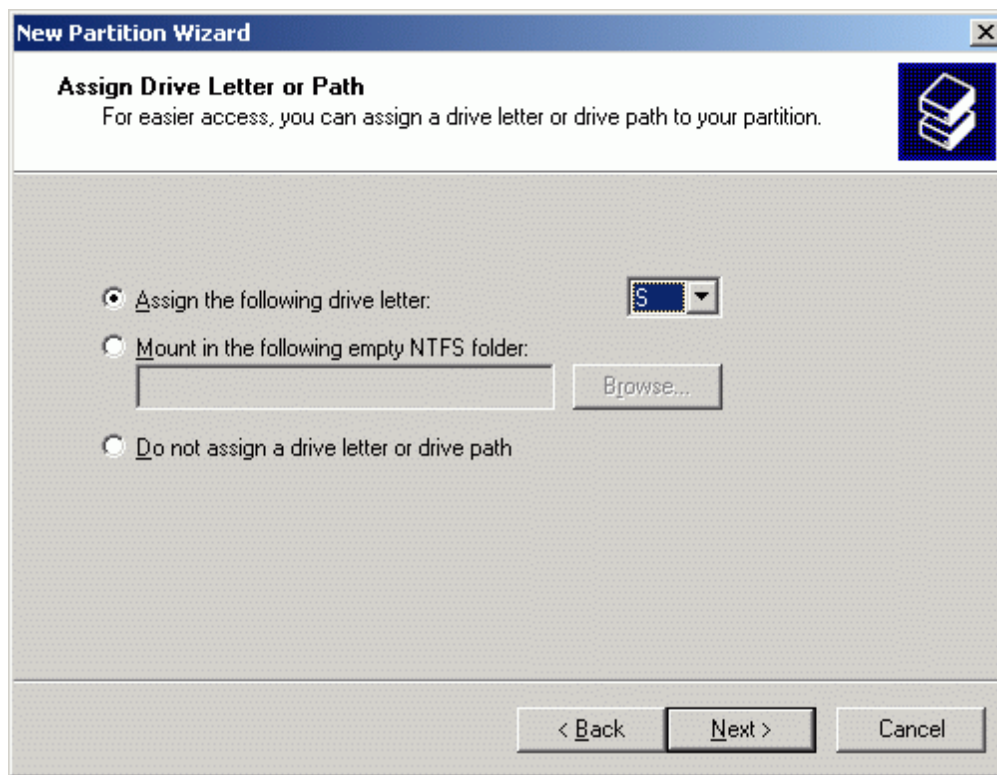
Specify new partition size in megabytes.



The image shows a Windows-style dialog box titled "New Partition Wizard". The main heading is "Specify Partition Size", followed by the instruction "Choose a partition size that is between the maximum and minimum sizes." In the center, there are three labels with corresponding values: "Maxium disk space in megabytes (MB):" with the value "1019", "Minimum disk space in MB:" with the value "8", and "Partition size in MB:" with a text box containing "1019" and a small spinner control to its right. At the bottom right, there are three buttons: "< Back", "Next >", and "Cancel". A small icon of a floppy disk is located in the top right corner of the dialog box.

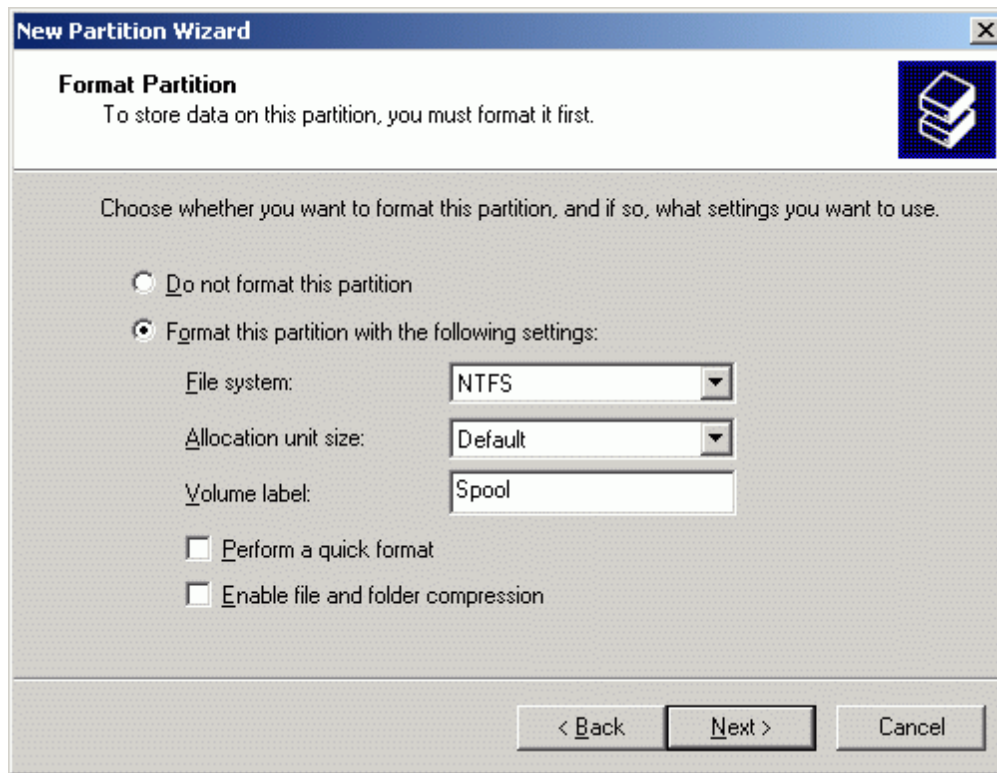
Press the **Next** button to continue.

Choose the **Drive Letter** to assign.



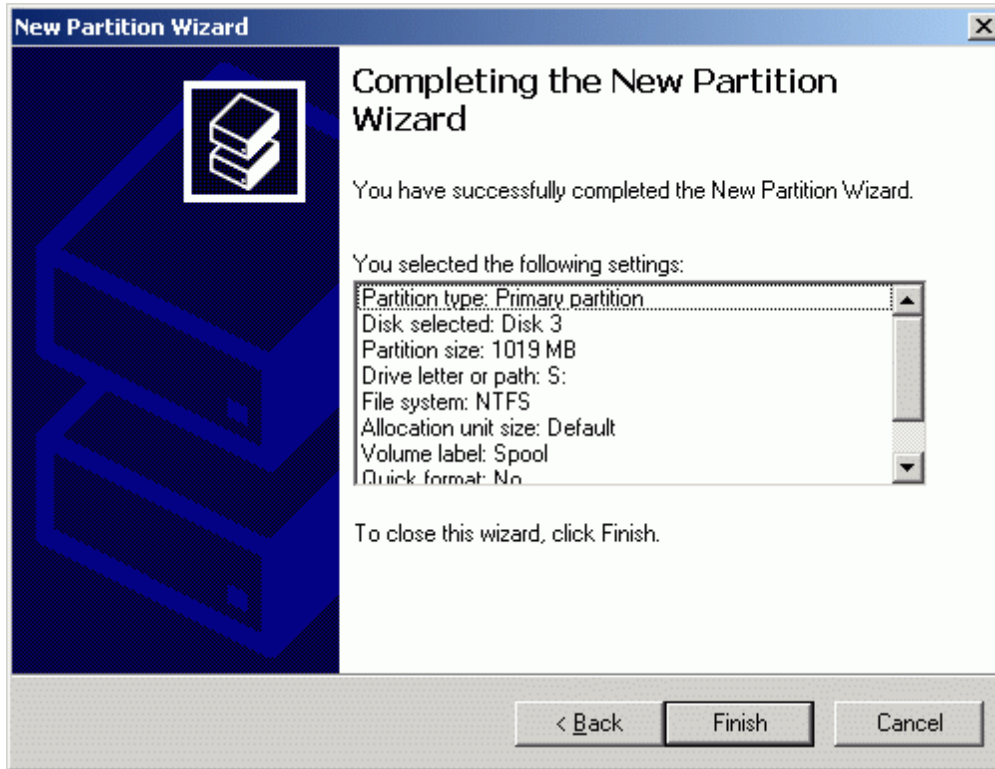
Press the **Next** button to continue.

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



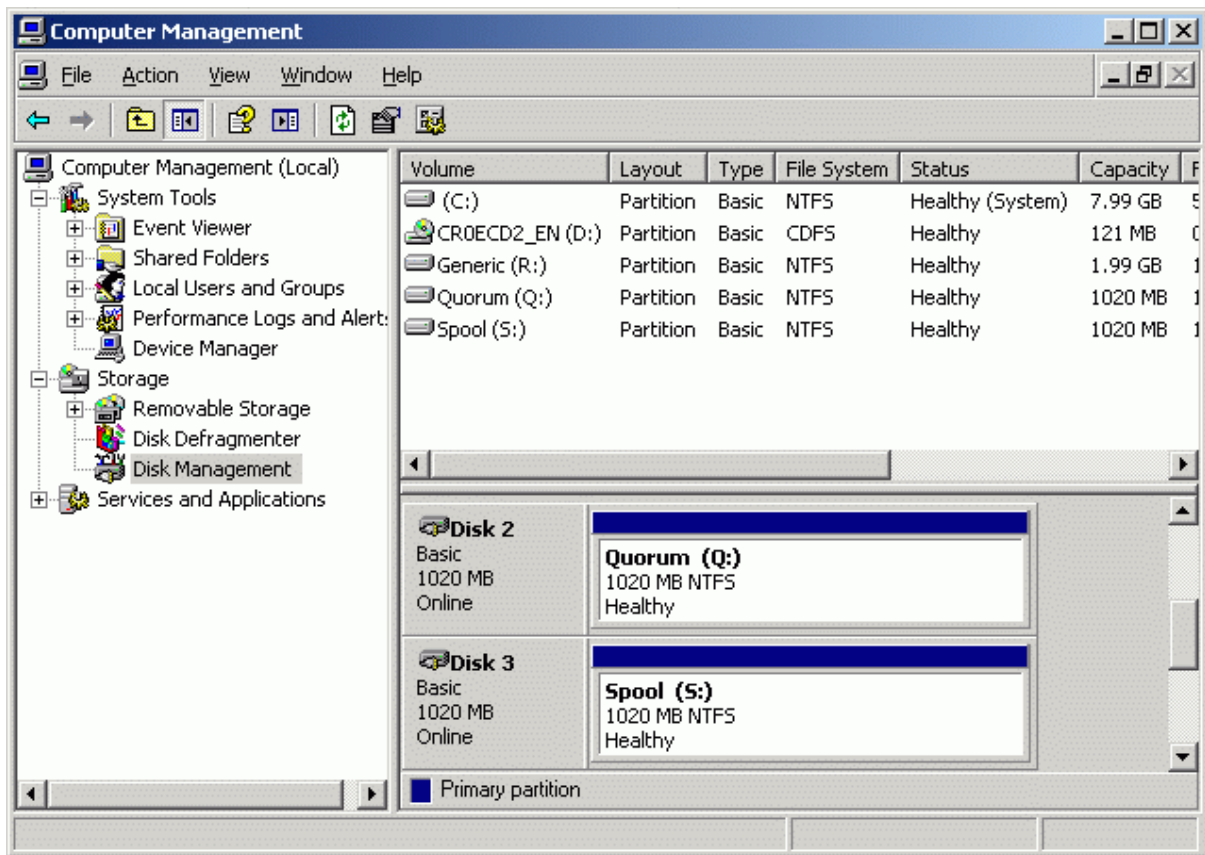
Press the **Next** button to continue.

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



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

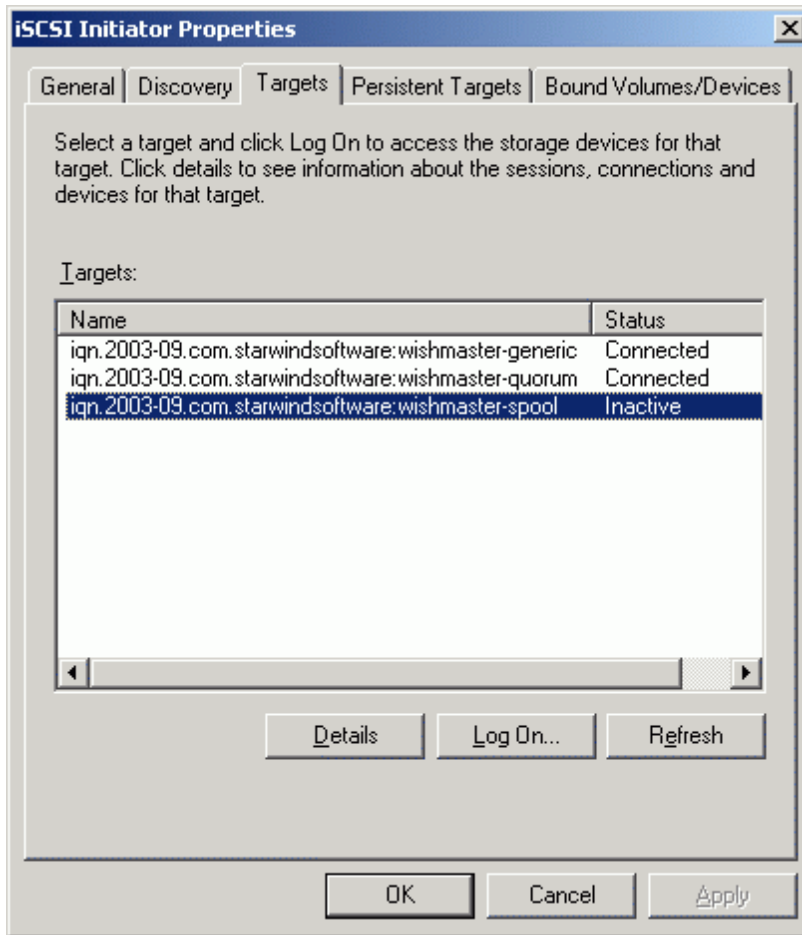
If successful, the disk is now formatted as shown in the example image below.



Shut down the node.

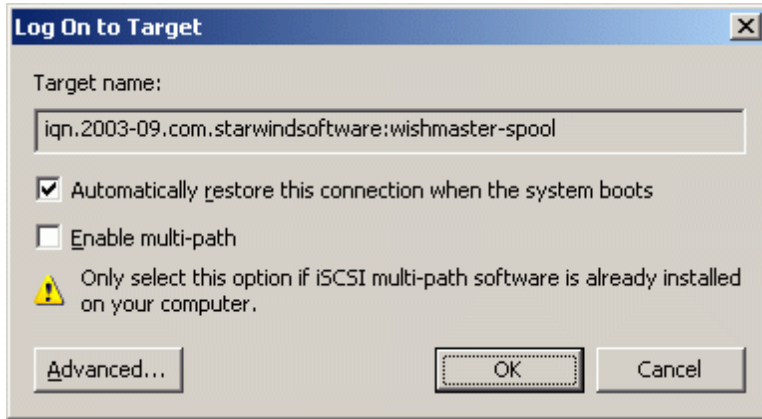
Node 2

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



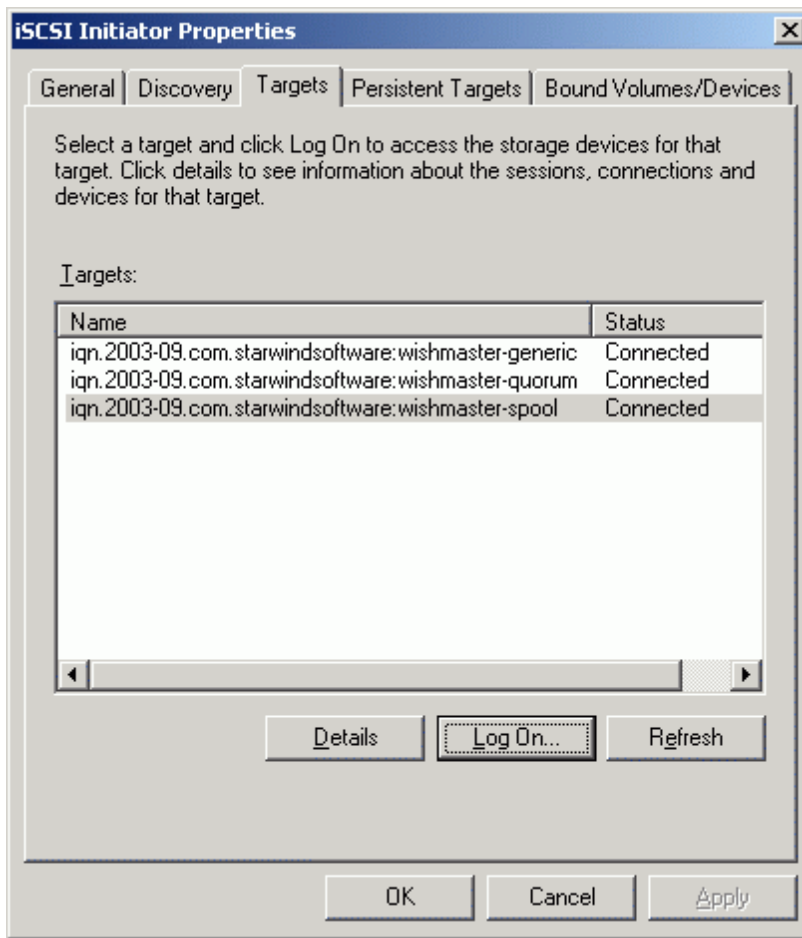
Press the **Log On...** button.

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.

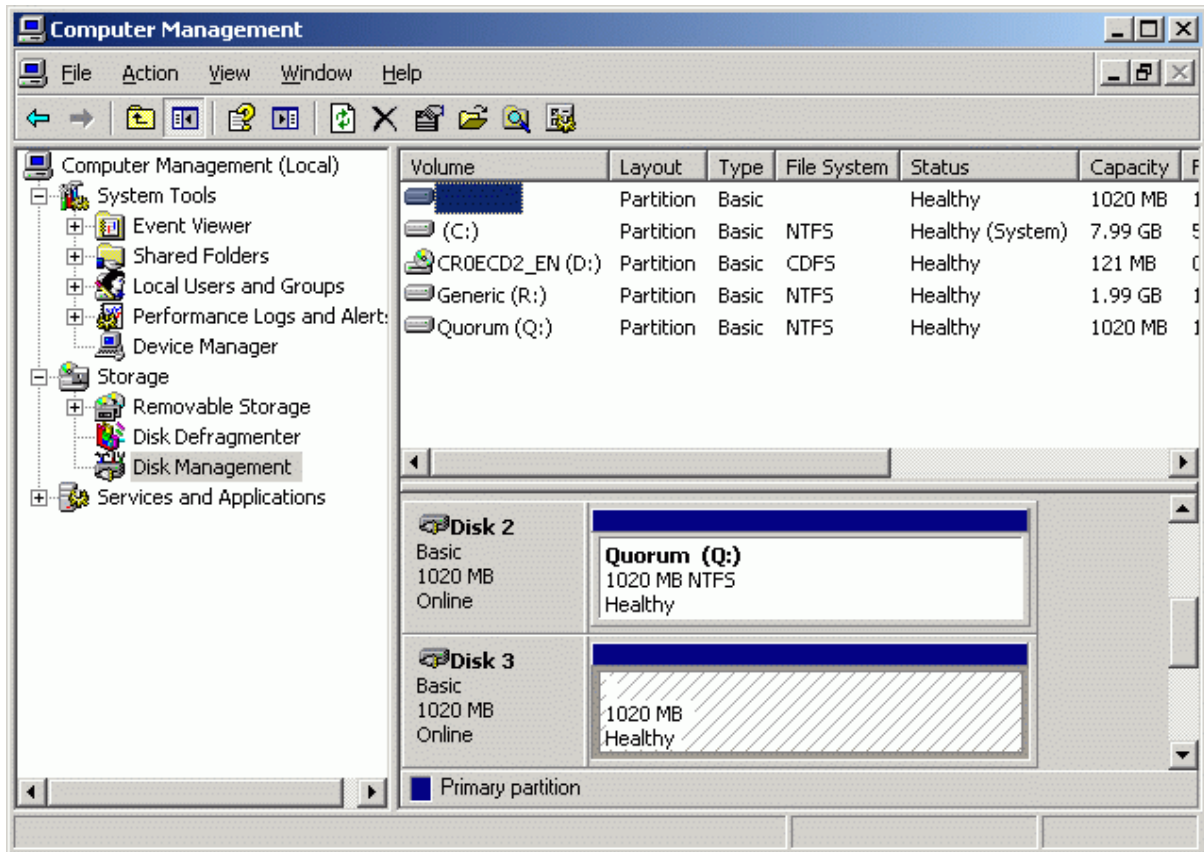


Press the **OK** button to continue.

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



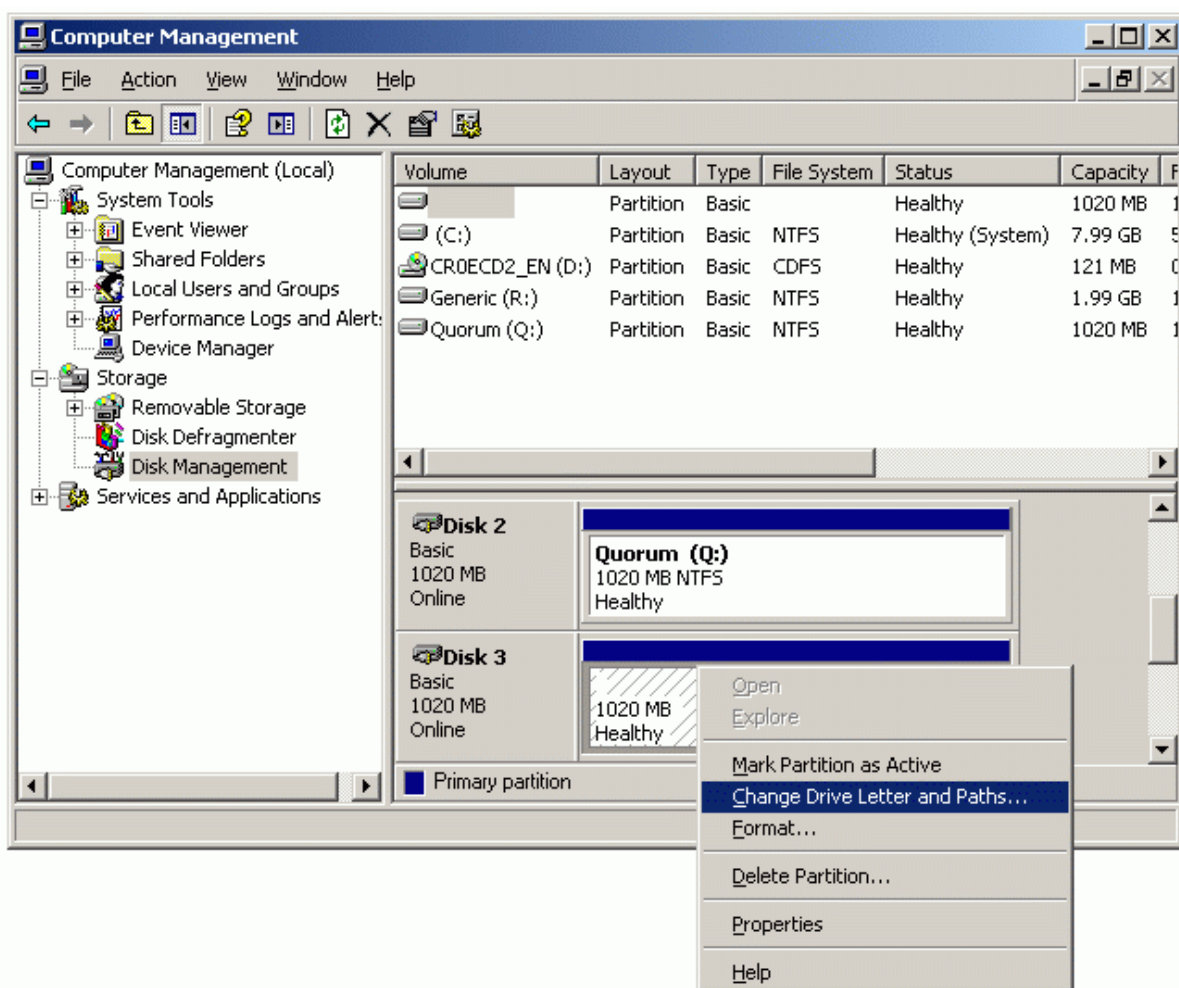
When the StarWind Disk is connected, it shows up on the initiator machine as new disk device. Before this devices can be used as cluster disk, it have to be mounted. Launch the **Computer Management** console.



Select **Disk Management**.

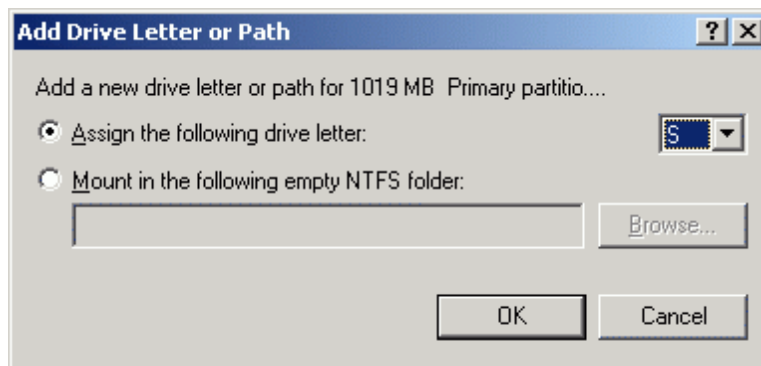
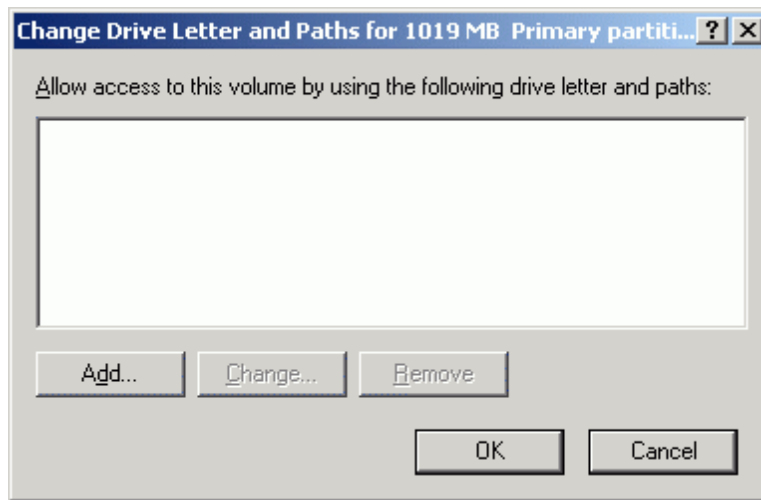
The disk that was formatted on the **Cluster Node 1 Server** should now appear without any drive letter mounted. Assign the same letter to this that was used when this drive was formatted.

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

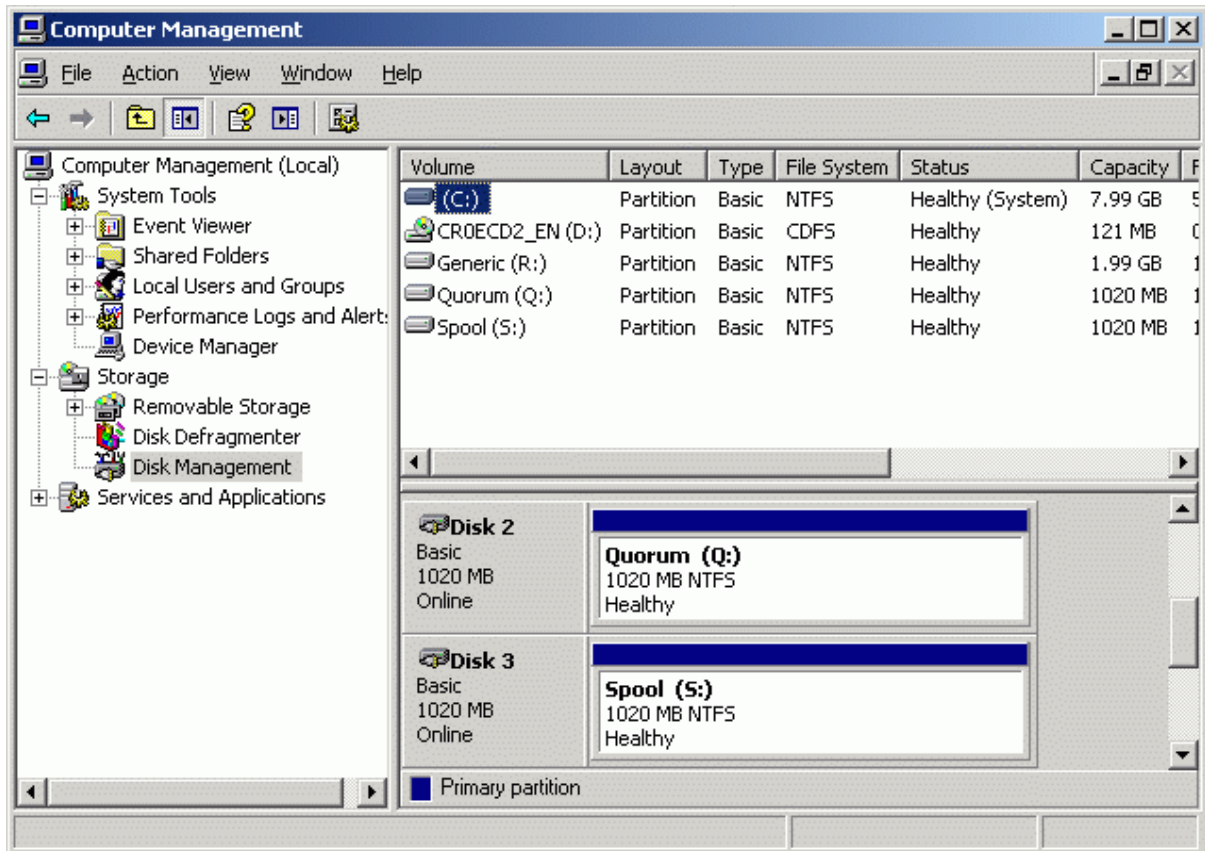


Select **Change Drive Letter and Paths...**

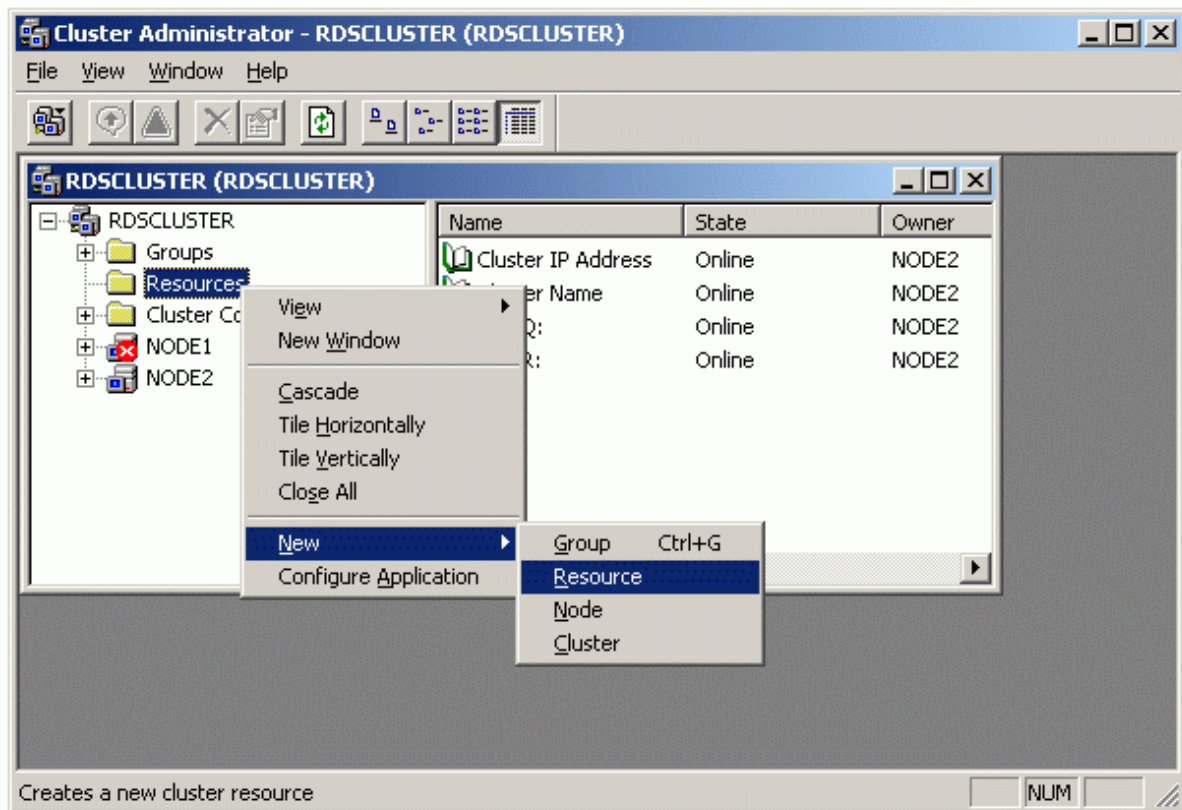
Change the Drive Letter for the Spool to S.



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

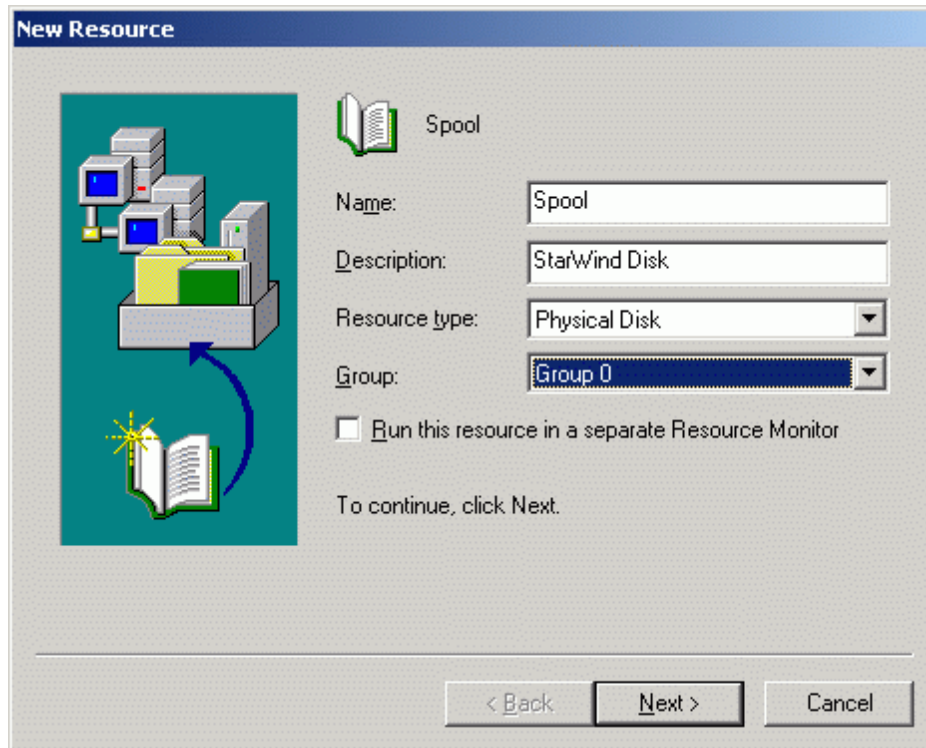


Launch the **Cluster Administrator** console and open connection to the cluster.



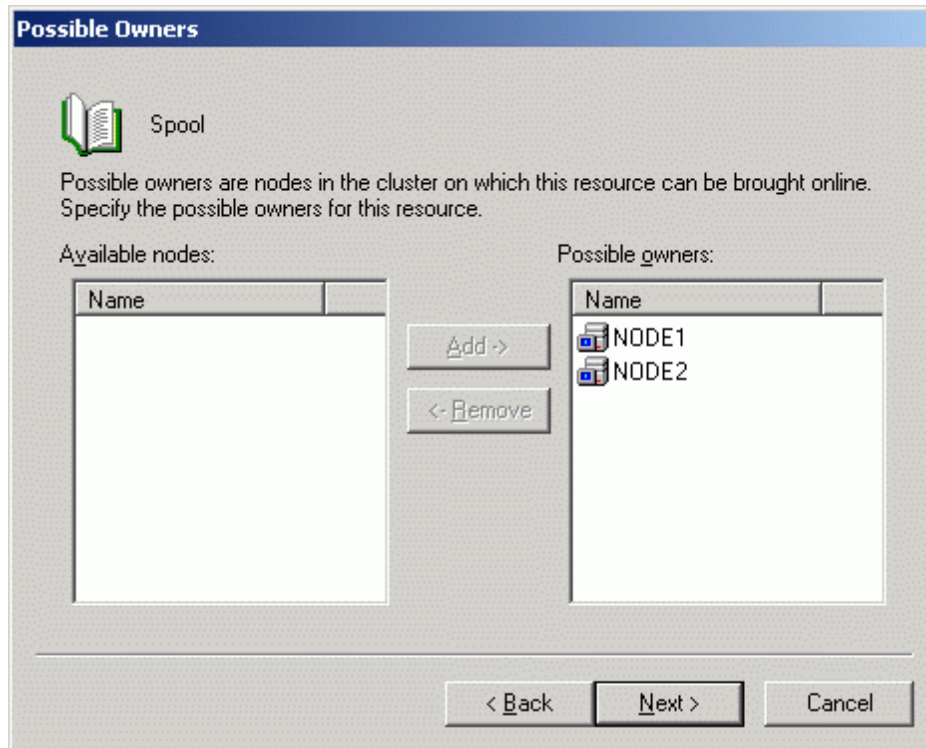
Right-click on the Resources node and select **New -> Resource**.

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.



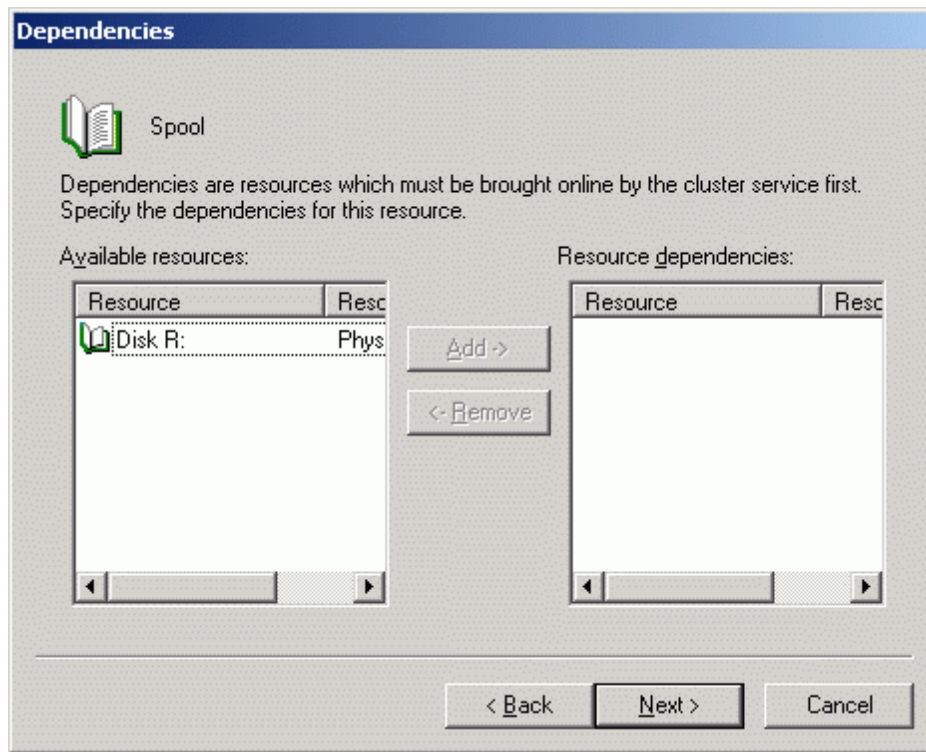
Press the **Next** button to continue.

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



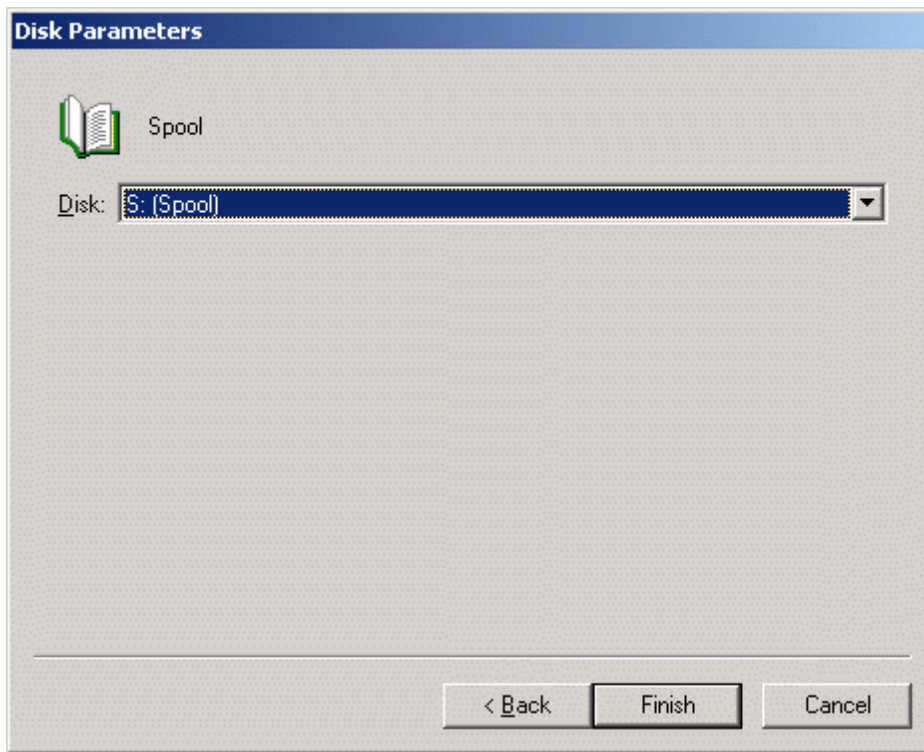
Press the **Next** button to continue.

The disk resource should not require any dependencies.

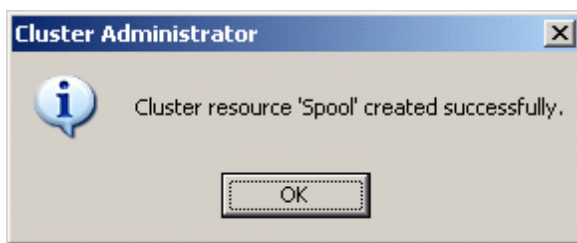


Press the **Next** button to continue.

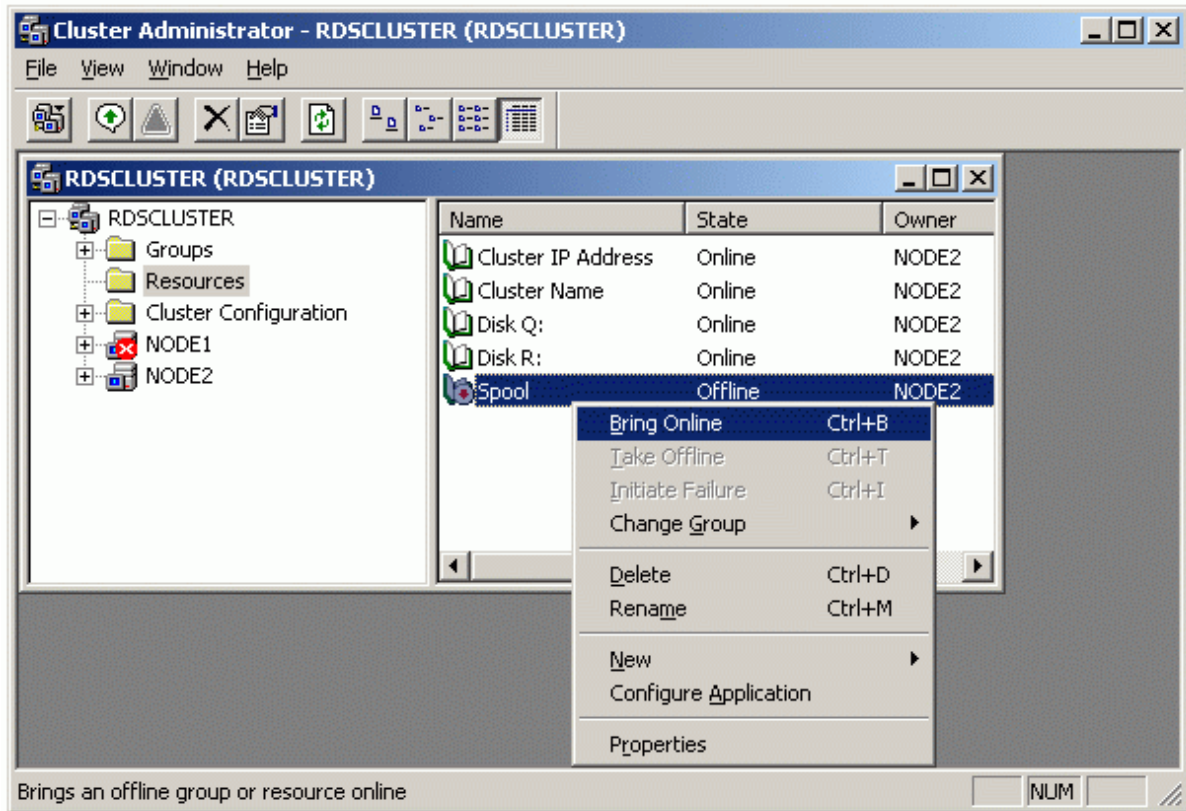
Select the recently created partition from the list of disks.



Press the **Finish** button to complete the operation.

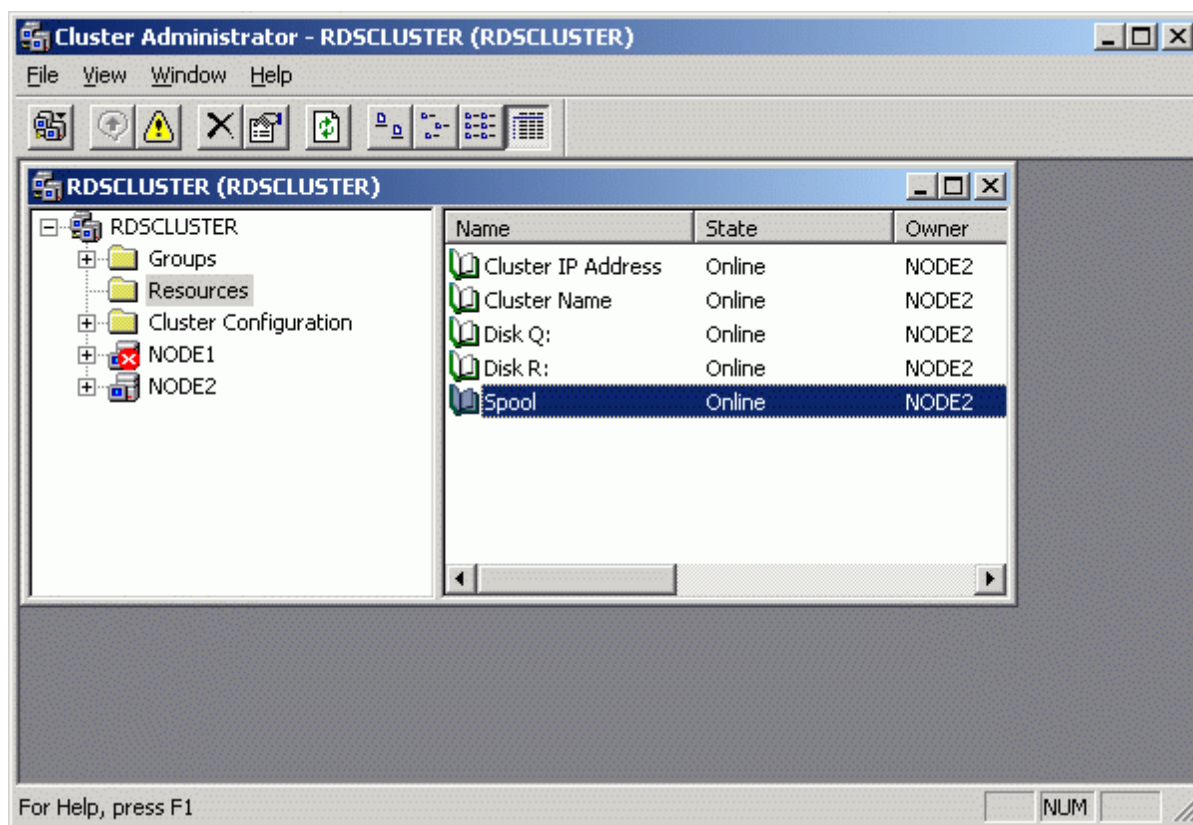


The new resource should appear as offline in the details view of the **Resource** node.

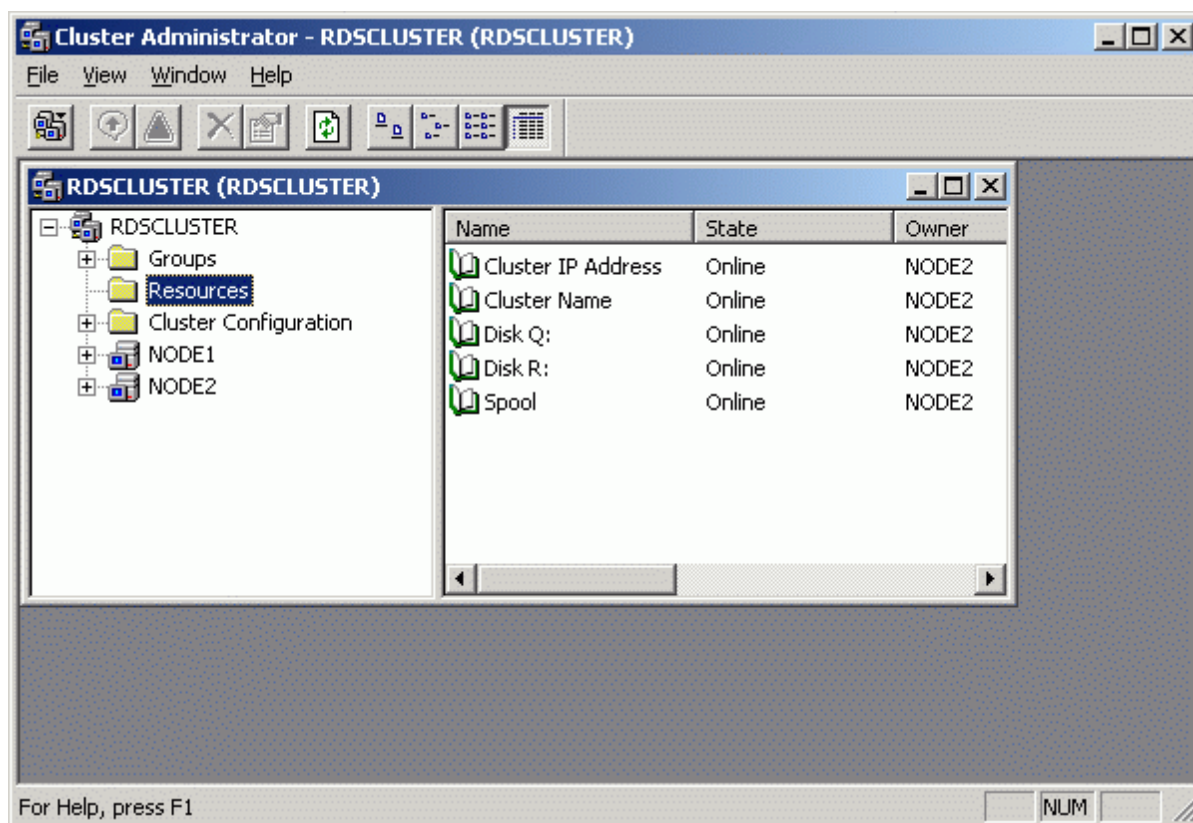


Right-press on the resource and select **Bring Online** item of the context menu.

When completed, the disk is now a cluster disk.



Start the other servers in the cluster.



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