

# **iStorage Server: High-Availability iSCSI SAN for Windows Server 2008 & Hyper-V Clustering**

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KernSafe Technologies, Inc.

[www.kernsafe.com](http://www.kernsafe.com)

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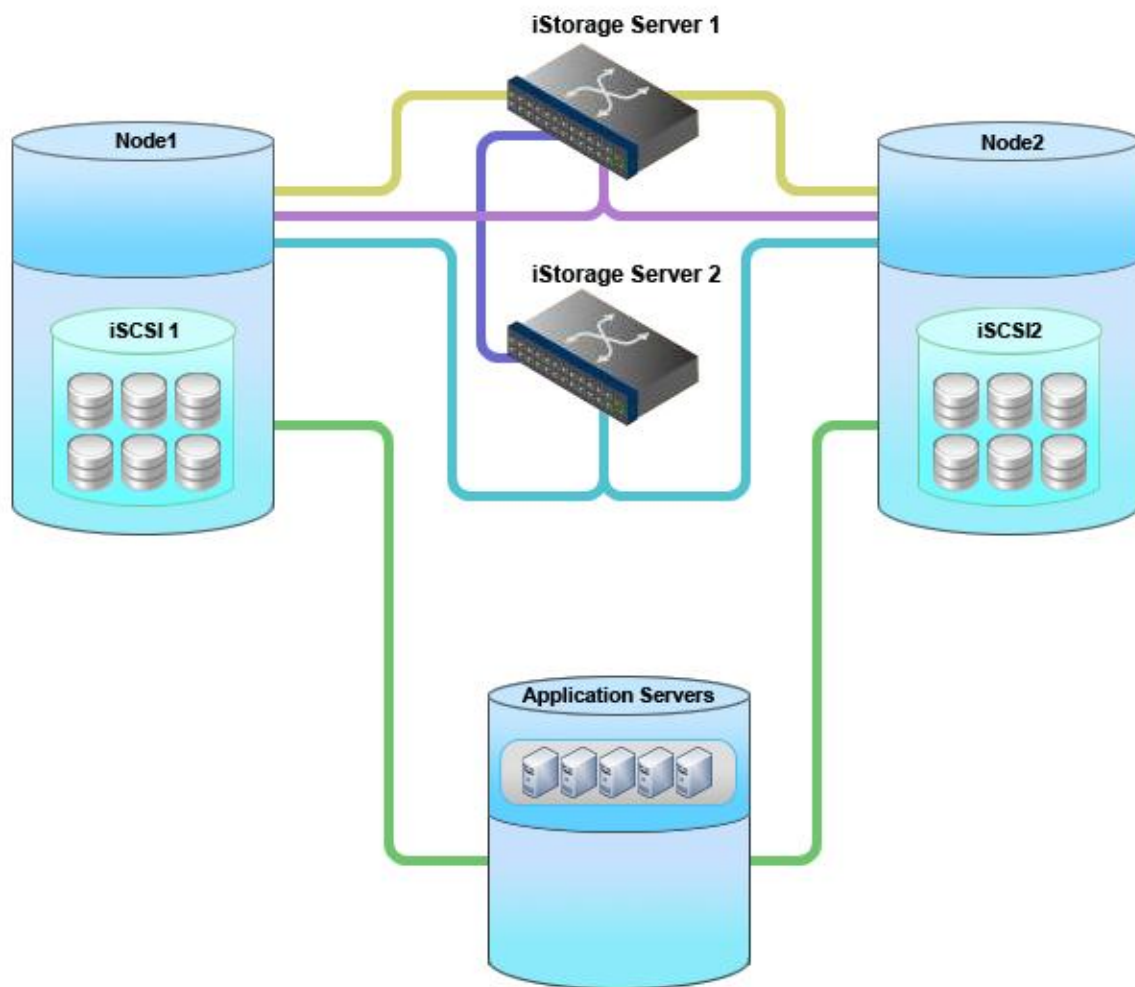
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# Overview

KernSafe iStorage Server is an advanced and powerful, full-featured software-only iSCSI Target that fully conforms to the latest iSCSI Standard 1.0 (former Draft 20). It is an IP SAN solution allowing you to quickly export existing storages such as disk images, VHD files, physical disks, partitions, CD/DVD-ROMs, tapes or any other type of SCSI based devices and even a variety of popular CD/DVD images to the client machines. The software thus delivers immediate benefits, as it allows storage to be consolidated, virtualized and centrally managed. iStorage Server also provides RAID-1 (mirror) feature enabling you to create two iSCSI devices for mirror backup. Furthermore, iStorage Server also supports a lot of features such as: VHD (Virtual Hard Disk) target, snapshots, STPI, RAID-1 and failover, these features are very important and popular in storage industry world and make iStorage Server is suitable for any size of business.

High-availability clusters (also known as HA Clusters or Failover Clusters) are computer clusters that are implemented primarily for the purpose of providing high availability of services which the cluster provides. They operate by having redundant computers or nodes which are then used to provide service when system components fail. Normally, if a server with a particular application crashes, the application will be unavailable until someone fixes the crashed server. HA clustering remedies this situation by detecting hardware/software faults, and immediately restarting the application on another system without requiring administrative intervention, a process known as Failover. As part of this process, clustering software may configure the node before starting the application on it. For example, appropriate file systems may need to be imported and mounted, network hardware may have to be configured, and some supporting applications may need to be running as well.

After iStorage Server 2.0, it supports server side mirroring, synchronous replication and failover which allows user to create a high-availability iSCSI SAN for Windows Server 2008 clustering and Hyper-v.



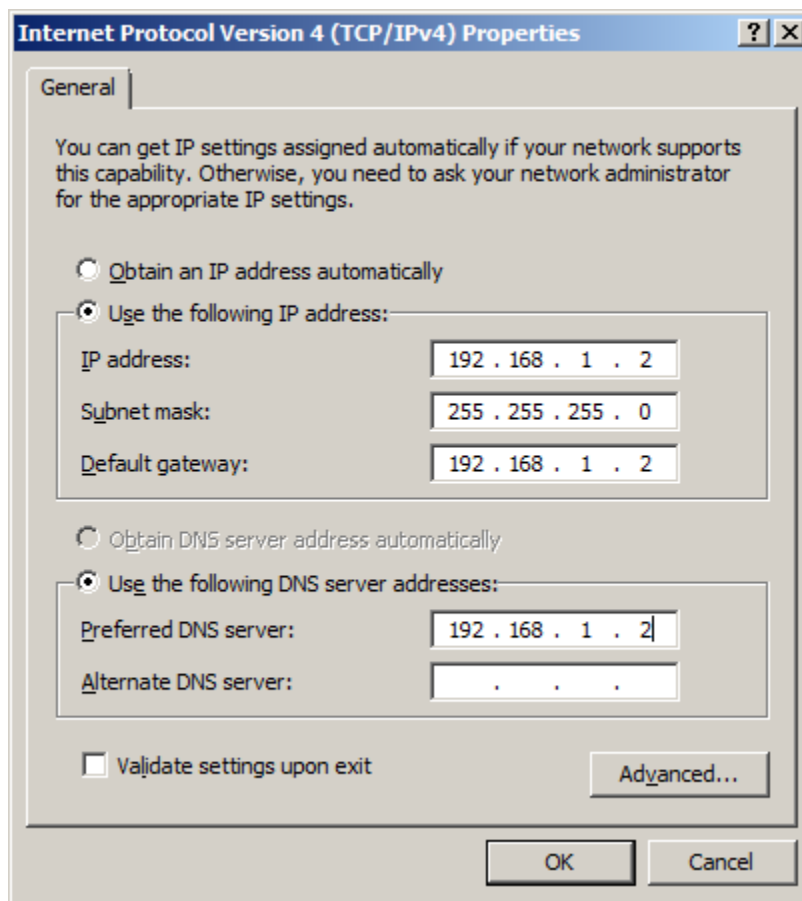
This document gives you detailed step-by-step instructions on KernSafe iStorage Server configuring for Windows Server 2008 or Windows Server 2008 R2 failover clusters. Before to do so, prepare the following four computers or virtual machine in Hyper-v:

Name	IP Address	Detail
08DC	192.168.1.2	Domain Controller
08Node1	192.168.1.101	Failover Node 1
08Node2	192.168.1.102	Failover Node 2
KernStorage1	192.168.0.2	iStorage Server1
KernStorage2	192.168.0.5	iStorage Server2

# Configuring on Domain Controller

## Network Adapter

For working in clustering environment, the network adapter must be assigned a static IP address. Select the **Internet Protocol Version 4(TCP/IPv4)** and then press the **Properties** button, the **Internet Protocol Version 4 (TCP/IPv4)** dialog is shown. As Active Directory requires DNS, an address must be provided, in this case we can specify itself IP address. DNS will be installed later after installed Active Directory.

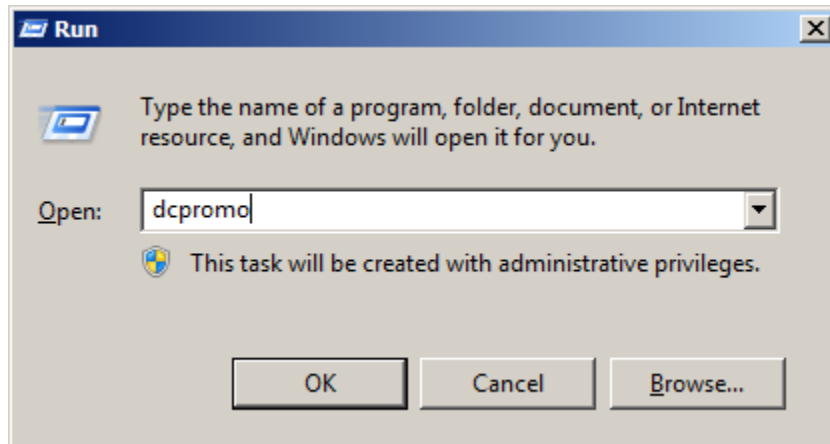


Type the IP address and DNS server address.

Press the **OK** button to continue.

# Install Active Directory

Select **Start->Run** and type **dcpromo** in the **Open** input box.



Press the **OK** button to continue.

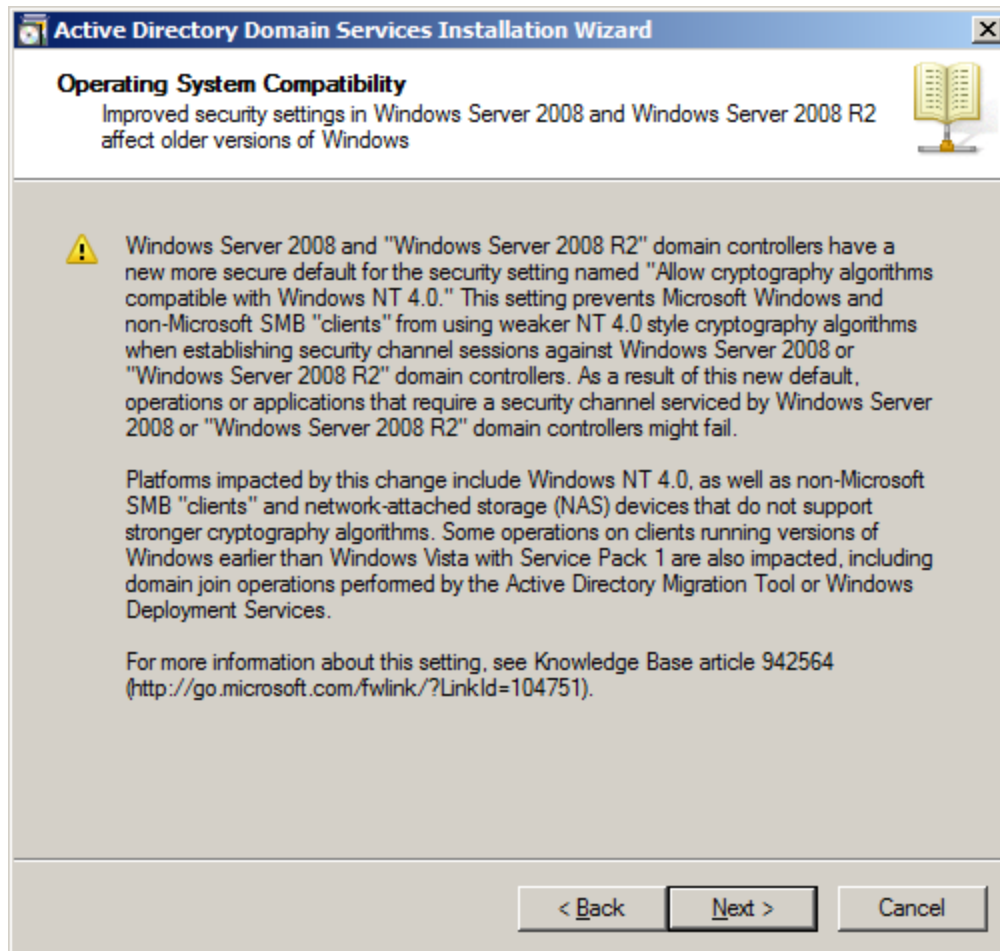
The **Active Directory Domain Services Installation Wizard** is shown.



Press the **Next** button to continue.

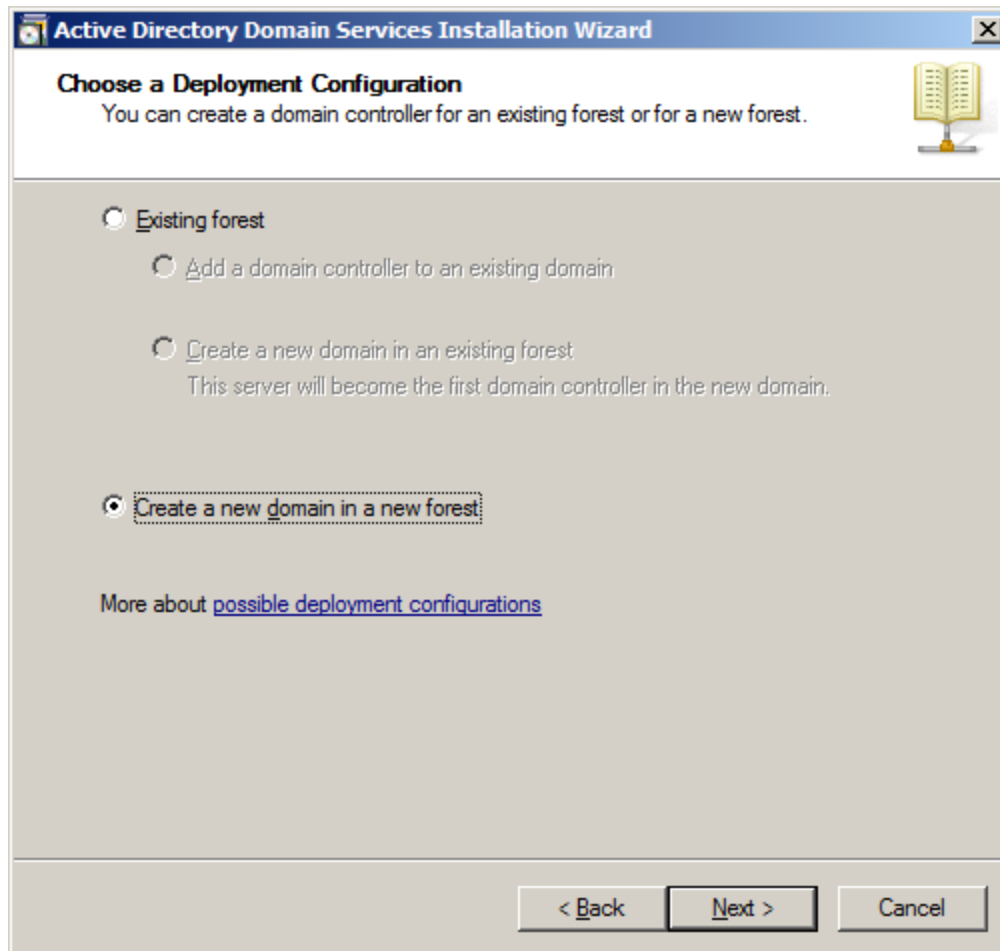
The **Active Directory Domain Services Installation Wizard** is shown, before clicking on **Next** button, please read the introducing instructions carefully.





Press the **Next** button to continue.

Because we are creating Active Directory, Select the **Create a new domain in a new forest** option.



Press the **Next** button to continue.

Specify the name of Forest Root Domain.

**Active Directory Domain Services Installation Wizard**

**Name the Forest Root Domain**

The first domain in the forest is the forest root domain. Its name is also the name of the forest.

Type the fully qualified domain name (FQDN) of the new forest root domain.

FQDN of the forest root domain:

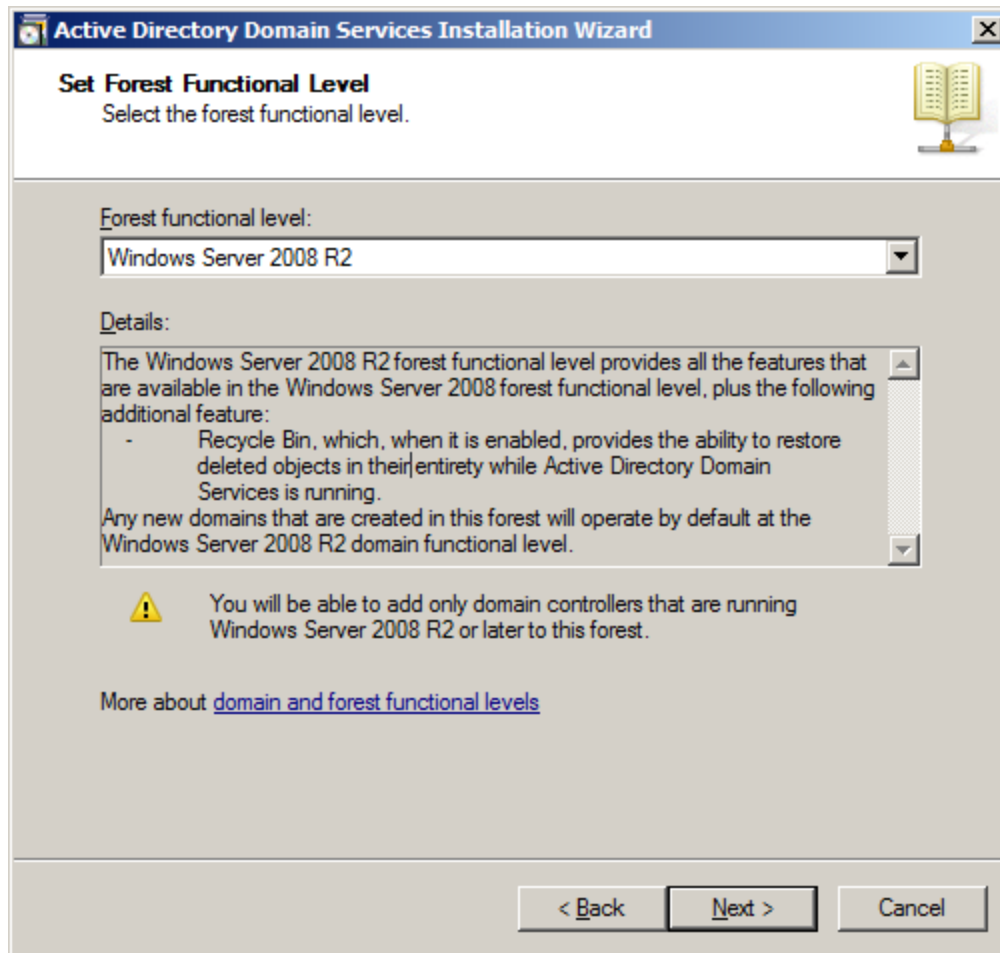
KemSafe.Local

Example: corp.contoso.com

< Back   Next >   Cancel

Press the **Next** button to continue.

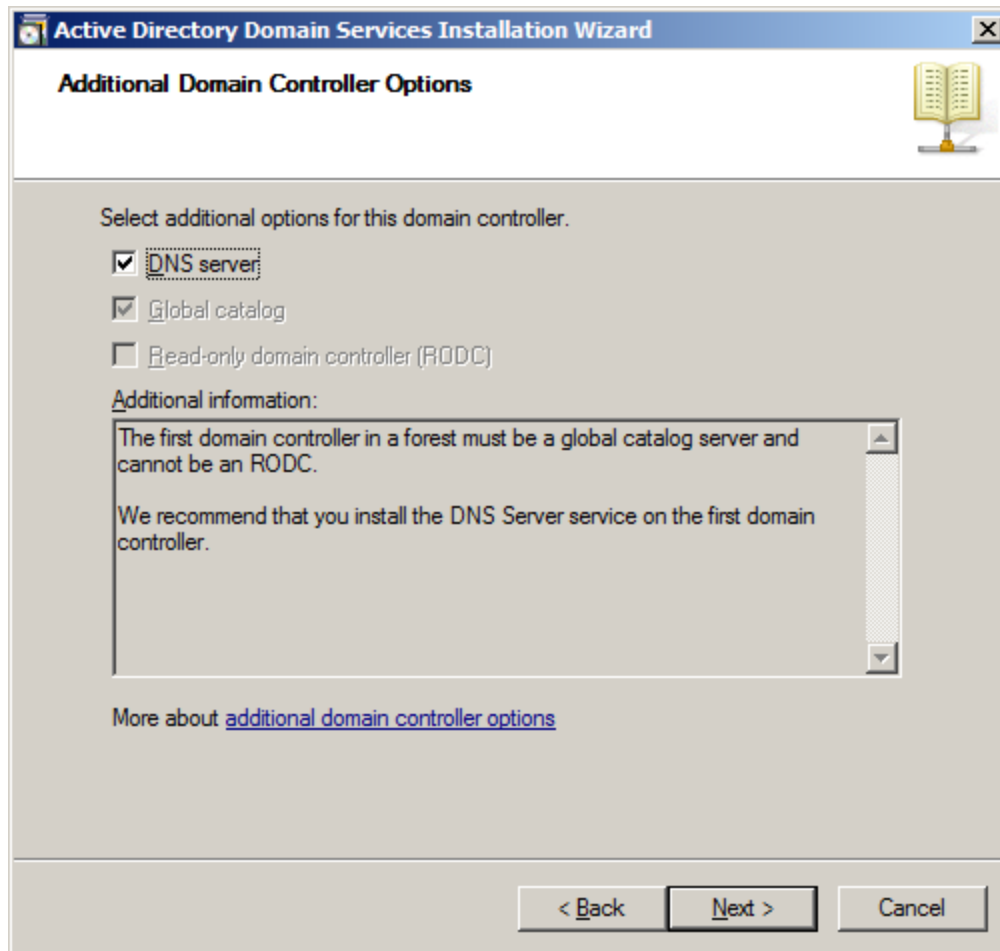
Select the Forest functional level.



Select Windows Server 2008 or Windows Server 2008 R2 if building Windows Server 2008 R2 clustering.

Press the **Next** button to continue.

Select the additional options for this domain controller.



Keep the selection of the **DNS Server**.

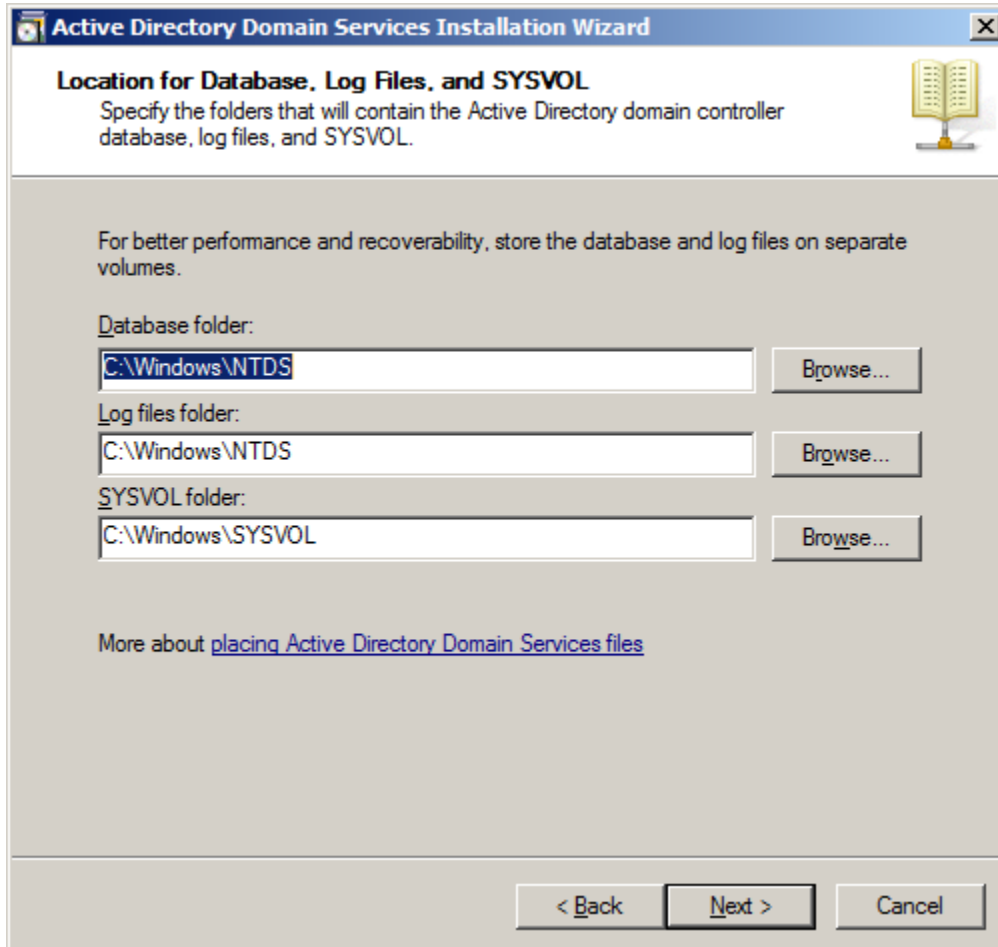
Press the **Next** button to continue.

The **Active Directory Domain Services Installation Wizard** is shown.



Press the **Yes** button to continue.

Customize the directories for Database folder, Log files folder and SYSVOL folder.



The image shows a screenshot of the 'Active Directory Domain Services Installation Wizard' window. The title bar reads 'Active Directory Domain Services Installation Wizard'. The main heading is 'Location for Database, Log Files, and SYSVOL'. Below this, it says 'Specify the folders that will contain the Active Directory domain controller database, log files, and SYSVOL.' There is a small icon of an open book with a pencil. The main area contains a note: 'For better performance and recoverability, store the database and log files on separate volumes.' Below this, there are three sections for folder selection: 'Database folder:' with a text box containing 'C:\Windows\NTDS' and a 'Browse...' button; 'Log files folder:' with a text box containing 'C:\Windows\NTDS' and a 'Browse...' button; and 'SYSVOL folder:' with a text box containing 'C:\Windows\SYSVOL' and a 'Browse...' button. At the bottom, there is a link: 'More about [placing Active Directory Domain Services files](#)'. The bottom of the window has three buttons: '< Back', 'Next >', and 'Cancel'.

**Active Directory Domain Services Installation Wizard**

**Location for Database, Log Files, and SYSVOL**  
Specify the folders that will contain the Active Directory domain controller database, log files, and SYSVOL.

For better performance and recoverability, store the database and log files on separate volumes.

Database folder:  
C:\Windows\NTDS Browse...

Log files folder:  
C:\Windows\NTDS Browse...

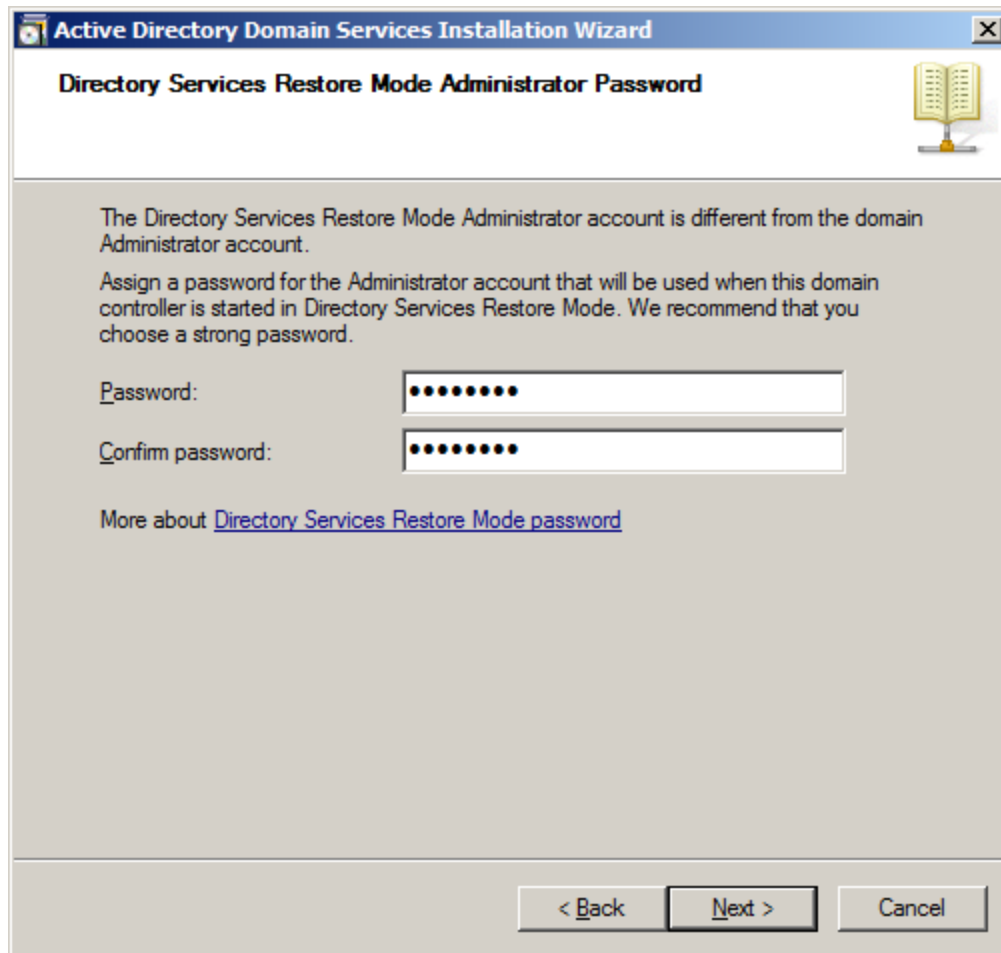
SYSVOL folder:  
C:\Windows\SYSVOL Browse...

More about [placing Active Directory Domain Services files](#)

< Back Next > Cancel

Press the **Next** button to continue.

Specify the **Directory Services Restore Mode Administrator Password**.



The screenshot shows a Windows XP-style window titled "Active Directory Domain Services Installation Wizard". The subtitle is "Directory Services Restore Mode Administrator Password". In the top right corner, there is a small icon of an open book. The main text area contains two paragraphs: "The Directory Services Restore Mode Administrator account is different from the domain Administrator account." and "Assign a password for the Administrator account that will be used when this domain controller is started in Directory Services Restore Mode. We recommend that you choose a strong password." Below this text are two input fields. The first is labeled "Password:" and the second is labeled "Confirm password:". Both fields contain ten black dots, indicating masked text. Below the input fields is a blue hyperlink that reads "More about [Directory Services Restore Mode password](#)". At the bottom of the window, there are three buttons: "< Back", "Next >", and "Cancel". The "Next >" button is highlighted with a darker border.

Active Directory Domain Services Installation Wizard

Directory Services Restore Mode Administrator Password

The Directory Services Restore Mode Administrator account is different from the domain Administrator account.

Assign a password for the Administrator account that will be used when this domain controller is started in Directory Services Restore Mode. We recommend that you choose a strong password.

Password:

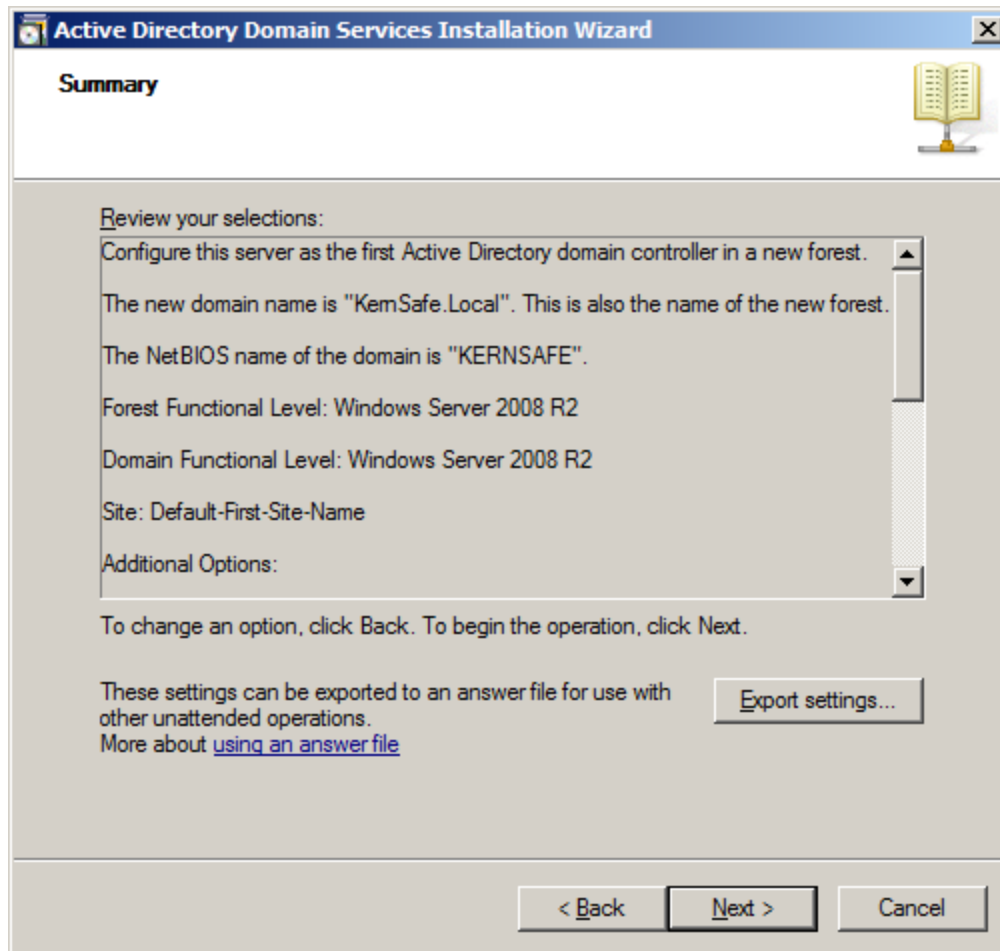
Confirm password:

More about [Directory Services Restore Mode password](#)

< Back Next > Cancel

Press the **Next** button to continue.

Check if all of the parameters are correct; press the **Back** button if any change is required.



Press the **Next** button to continue.

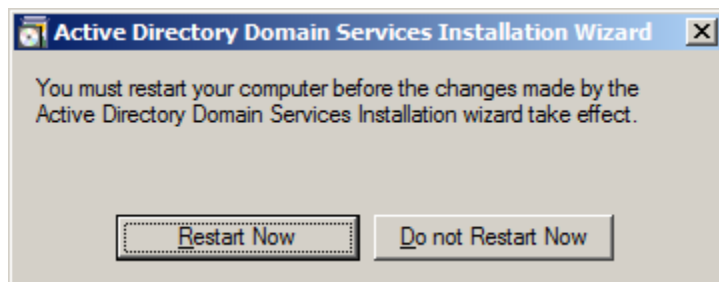
After a while, Active Directory Domain Services Installation is completed.





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

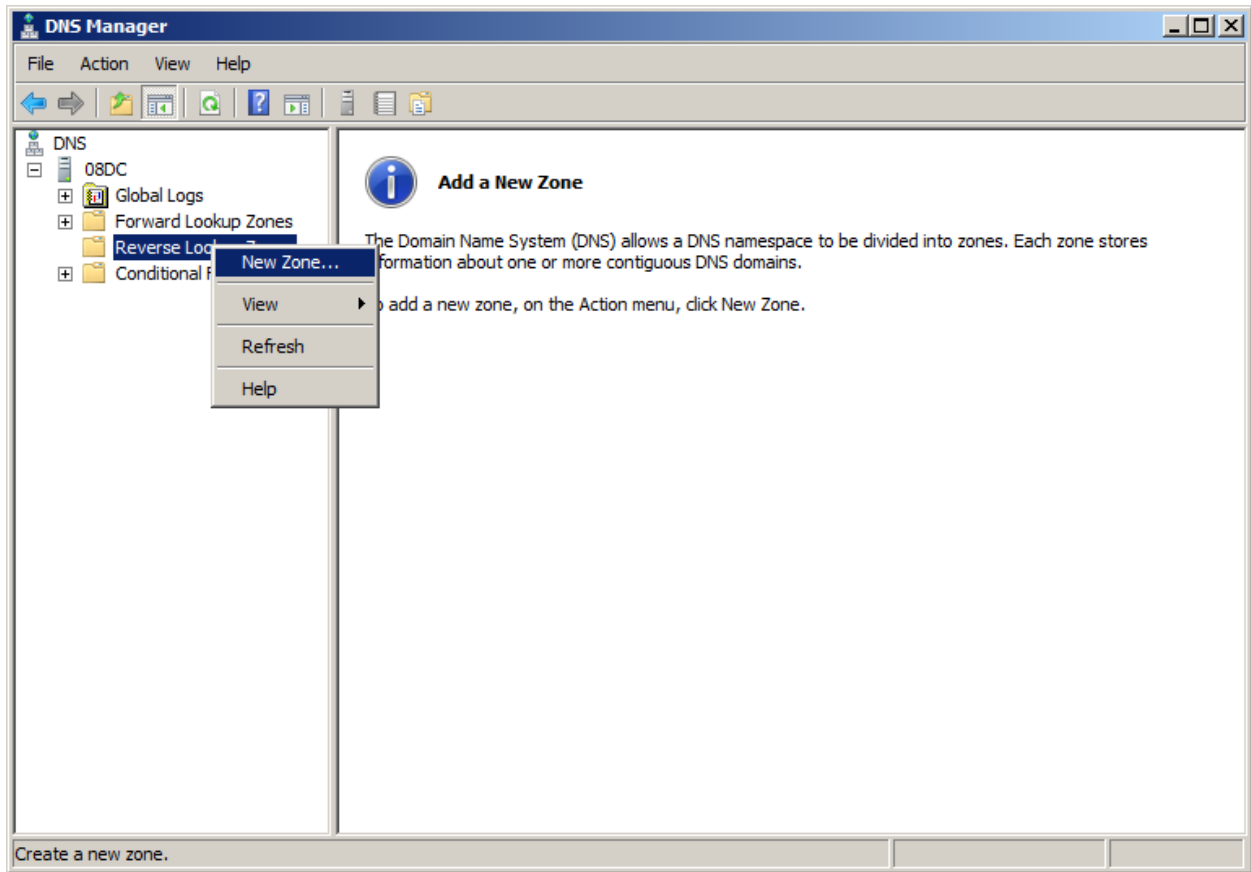
Restart is required.



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

## Install DNS

Use administrator role to log on to the Domain controller machine and launch the **DNS Manager**.



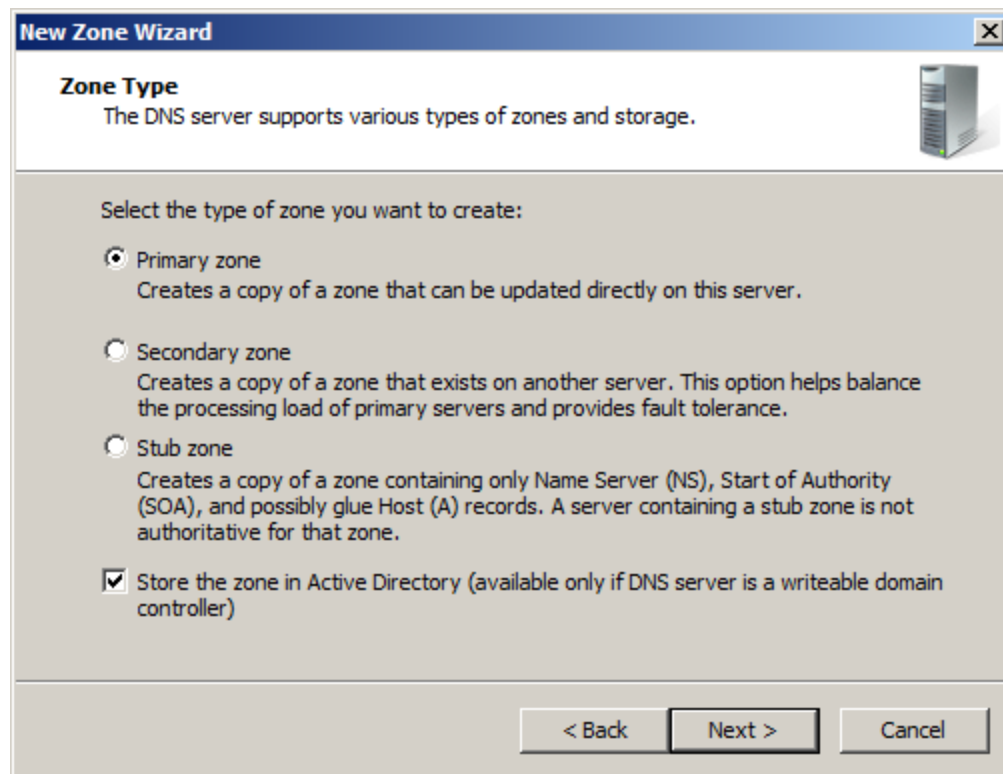
Right click on the **Reverse Lookup Zone** in the left tree view and then select **New Zone...** menu item.

The **New Zone Wizard** is shown.



Press the **Next** button to continue.

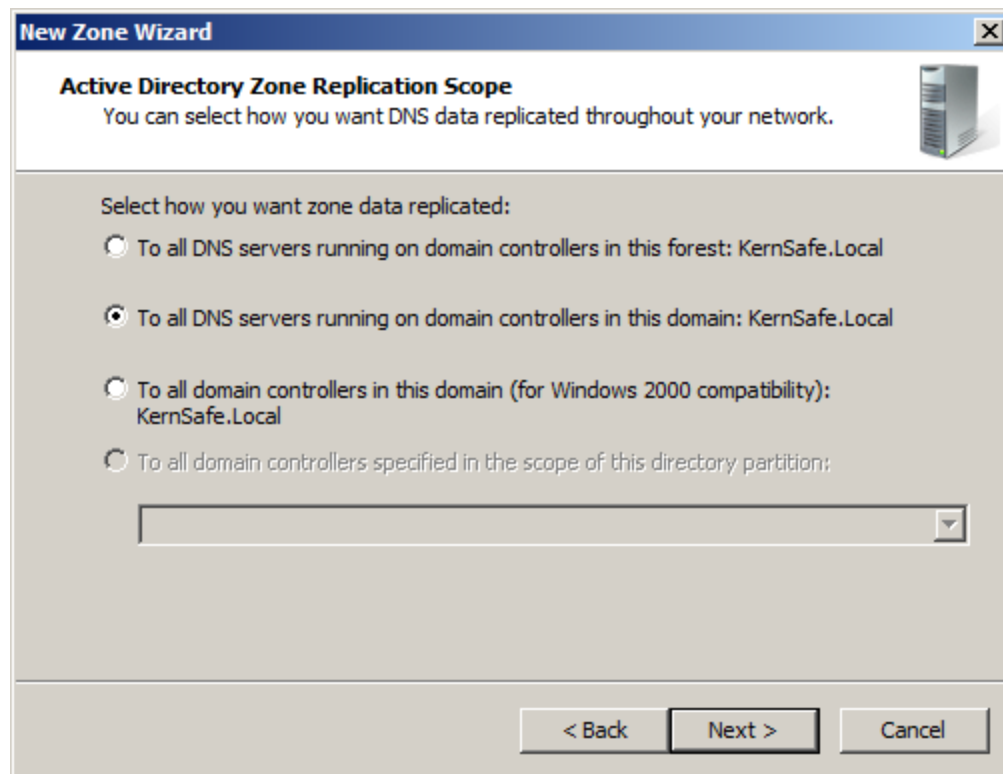
Select zone type.



Select the **Primary zone** and keep the selection of **Store the zone in Active Directory**.

Press the **Next** button to continue.

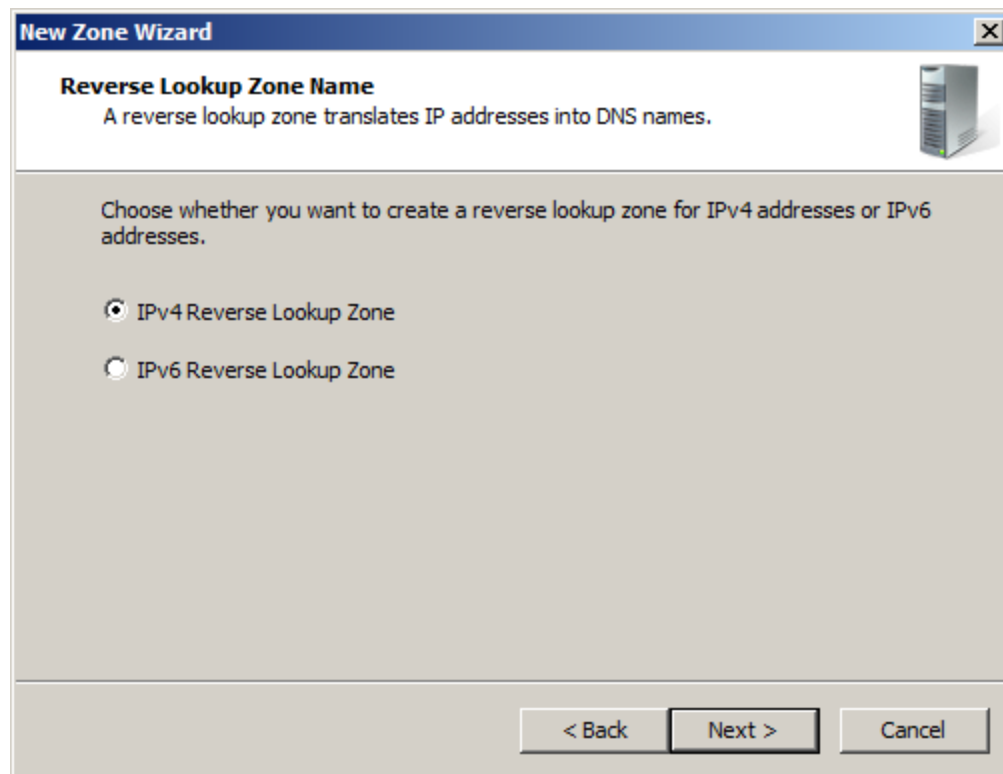
Select zone replication scope.



Keep the default selection.

Press the **Next** button to continue.

Choose **Reverse Lookup Zone Name**.



Select **IPv4 Reverse Lookup Zone**.

Press the **Next** button to continue.

Type the network ID or zone name.

**New Zone Wizard**

**Reverse Lookup Zone Name**  
A reverse lookup zone translates IP addresses into DNS names.

To identify the reverse lookup zone, type the network ID or the name of the zone.

☒ Network ID:

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.

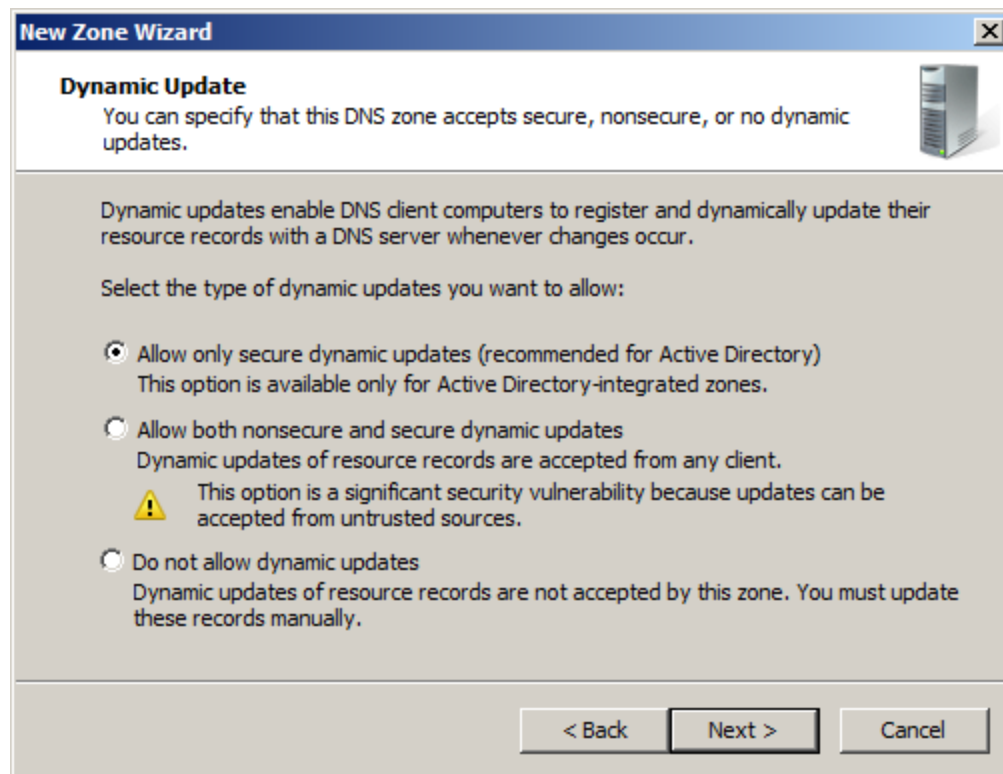
☐ Reverse lookup zone name:

< Back   Next >   Cancel

Select the **Network ID** and then type IP address in the **Network ID**.

Press the **Next** button to continue.

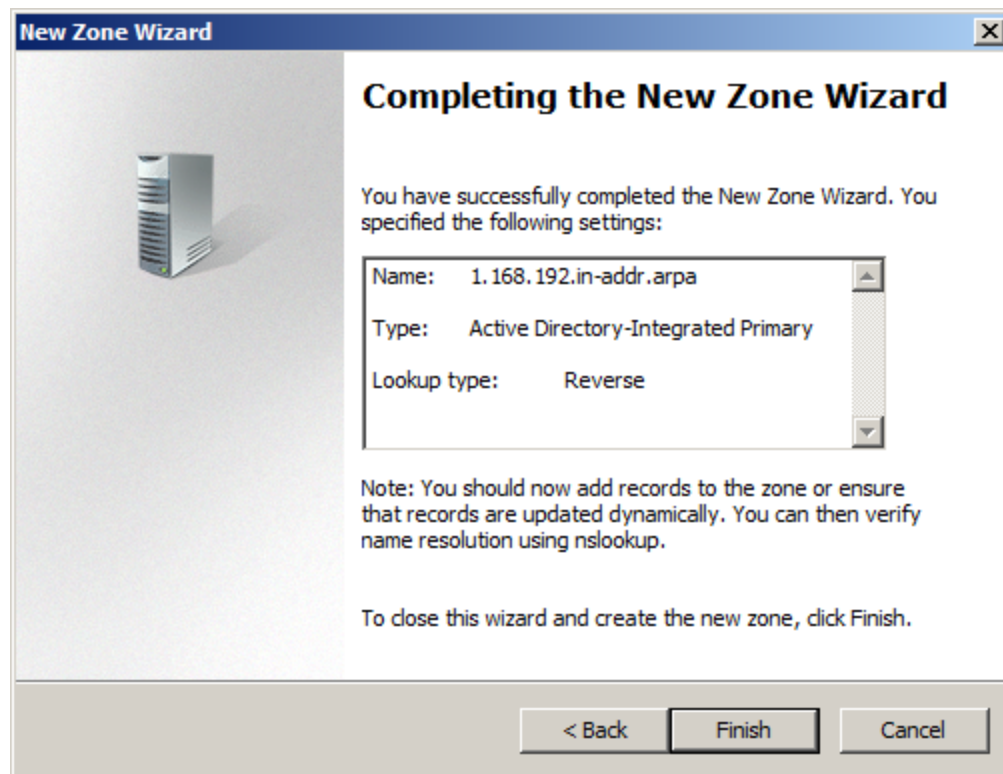
Specify dynamic update options.



Press the **Next** button to continue.

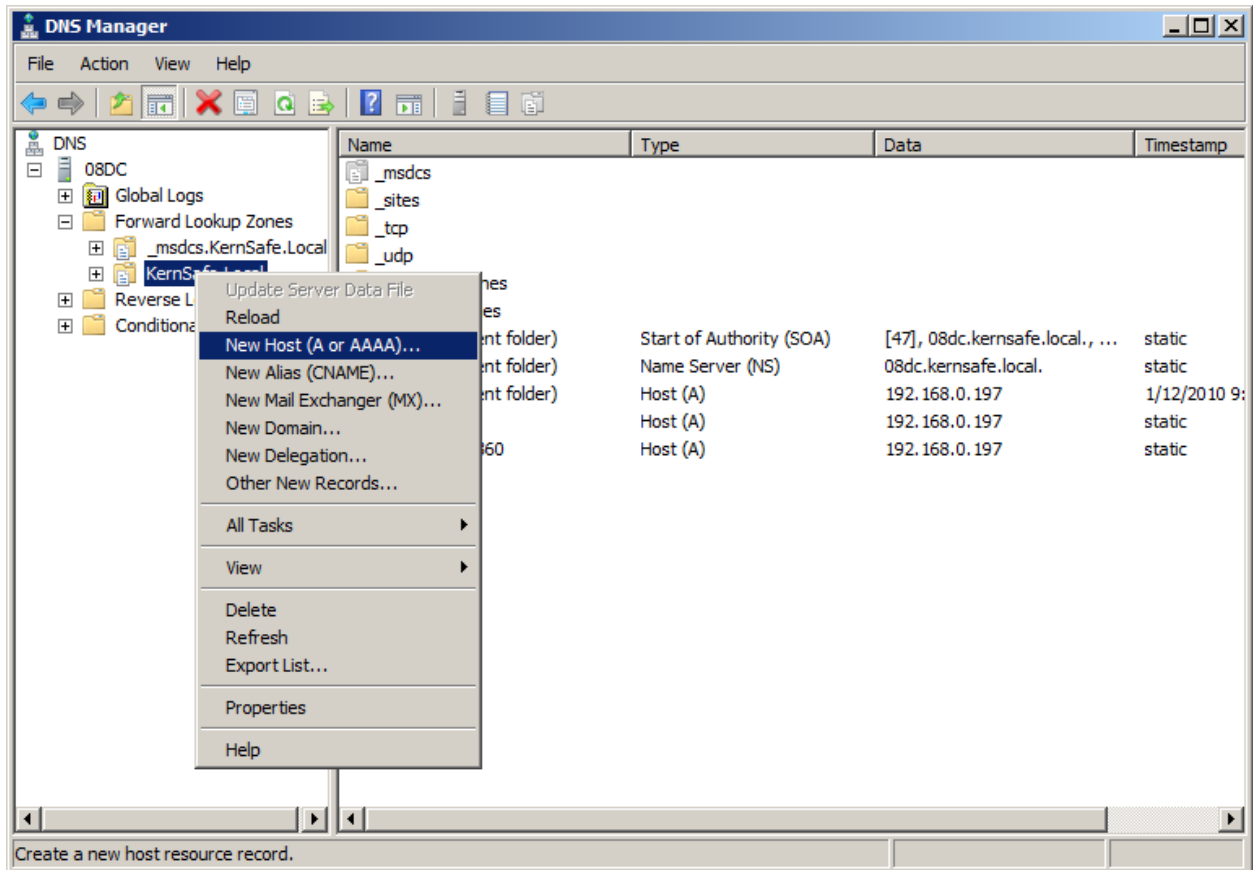
Check if all of the parameters are correct, press the **Back** button if any change is required.



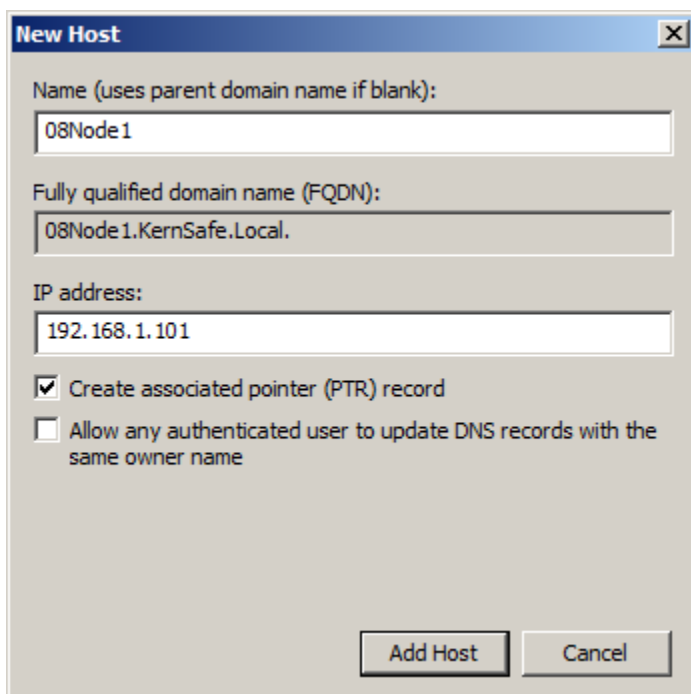


Press the **Finish** button to close the **New Zone Wizard**.

Right click on the **KernSafe.Local** in the left tree view of **DNS Manager**, then select **New Host (A or AAA)...** menu item.



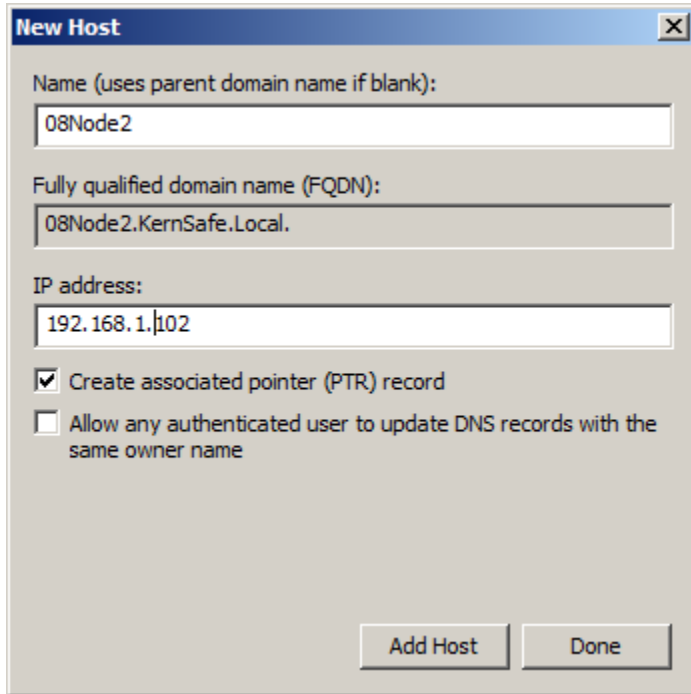
The **New Host** dialog is shown.



Type host name in the **Name** and IP address in the **IP address** field for the **08Node1** machine.

Check the **Create associated pointer (PTR) record** checkbox.

Press the **Add Host** button to add 08Node1 DNS record.



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

- Name (uses parent domain name if blank):** 08Node2
- Fully qualified domain name (FQDN):** 08Node2.KernSafe.Local.
- IP address:** 192.168.1.102
- ☒ **Create associated pointer (PTR) record**
- ☐ **Allow any authenticated user to update DNS records with the same owner name**
- Add Host** button
- Done** button

Type host name in the **Name** and IP address in the **IP address** field for the **08Node2** machine.

Check the **Create associated pointer (PTR) record** checkbox.

Press the **Add Host** button to add 08Node2 DNS record.

Press the **Done** button to close **New Host** dialog.

Now we will see the two records in the **DNS Manager**.

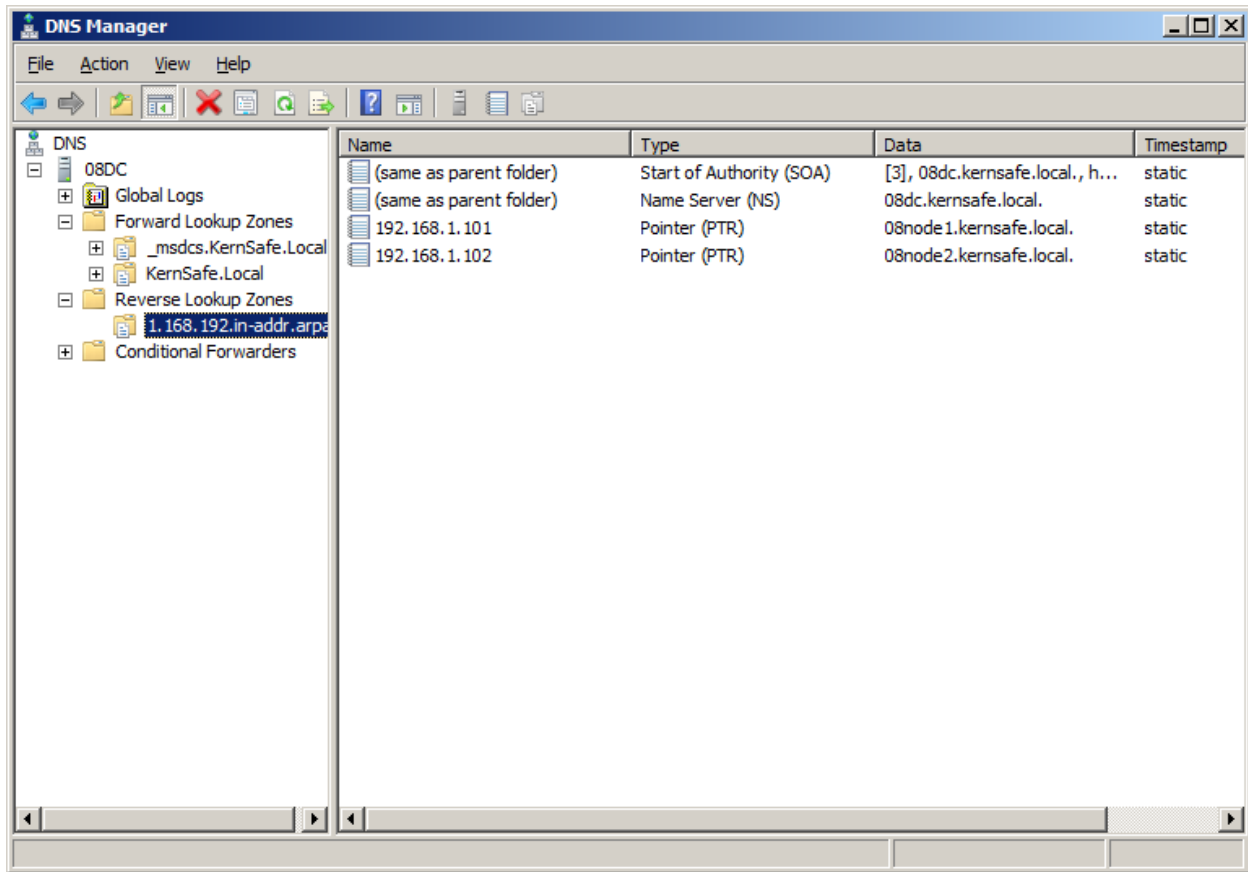
DNS Manager

File Action View Help

DNS

- 08DC
  - Global Logs
  - Forward Lookup Zones
    - \_msdcs.KernSafe.Local
    - KernSafe.Local**
  - Reverse Lookup Zones
  - Conditional Forwarders

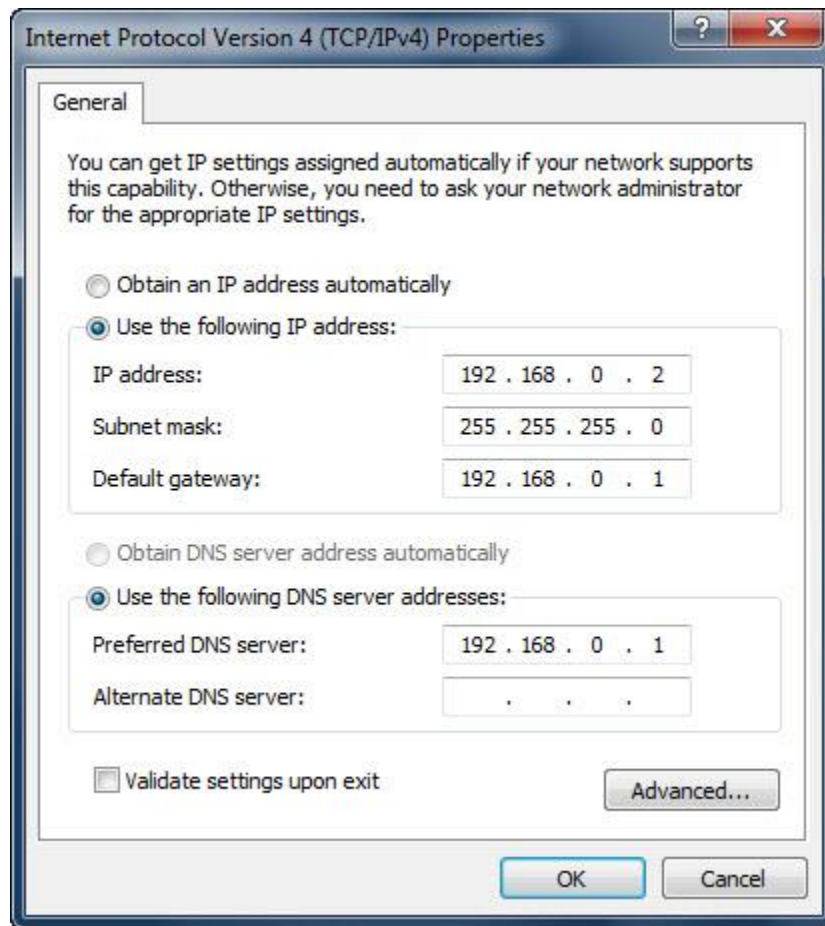
Name	Type	Data	Timestamp
_msdcs			
_sites			
_tcp			
_udp			
DomainDnsZones			
ForestDnsZones			
(same as parent folder)	Start of Authority (SOA)	[47], 08dc.kernsafe.local., ...	static
(same as parent folder)	Name Server (NS)	08dc.kernsafe.local.	static
(same as parent folder)	Host (A)	192.168.0.197	1/12/2010 9:
08dc	Host (A)	192.168.0.197	static
win-ak3i2gk1360	Host (A)	192.168.0.197	static
08Node1	Host (A)	192.168.1.101	
08Node2	Host (A)	192.168.1.102	



## Configuring on iStorage Server1

### Network Adapter

For working in clustering environment, the network adapter must be assigned a static IP address. Select the **Internet Protocol Version 4(TCP/IPv4)** and then press the **Properties** button, the **Internet Protocol Version 4 (TCP/IPv4)** dialog is shown.

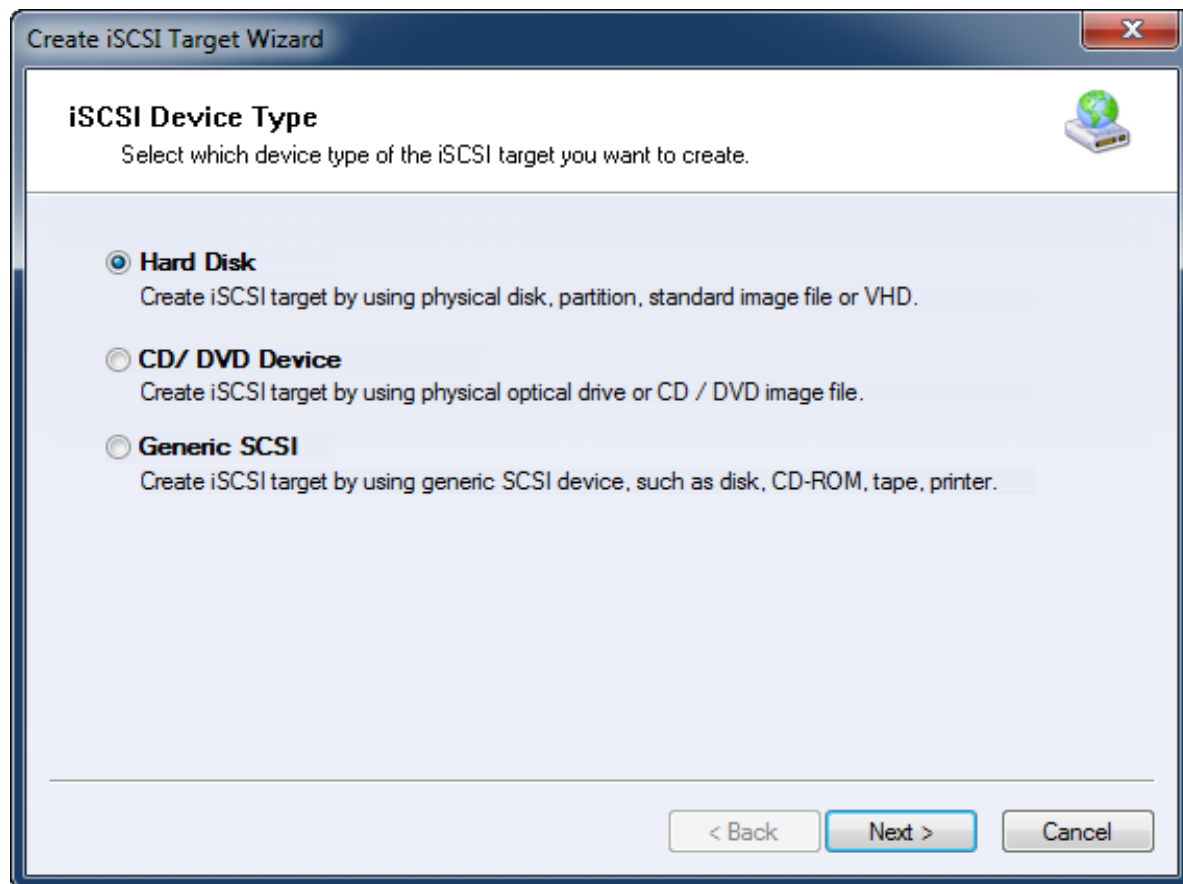


Set the network adapter of KernStorage1 as shown in the figure. IP address is set as 192.168.0.2 and Subnet mask is set as 255.255.255.0.

## Preparing Quorum Volume

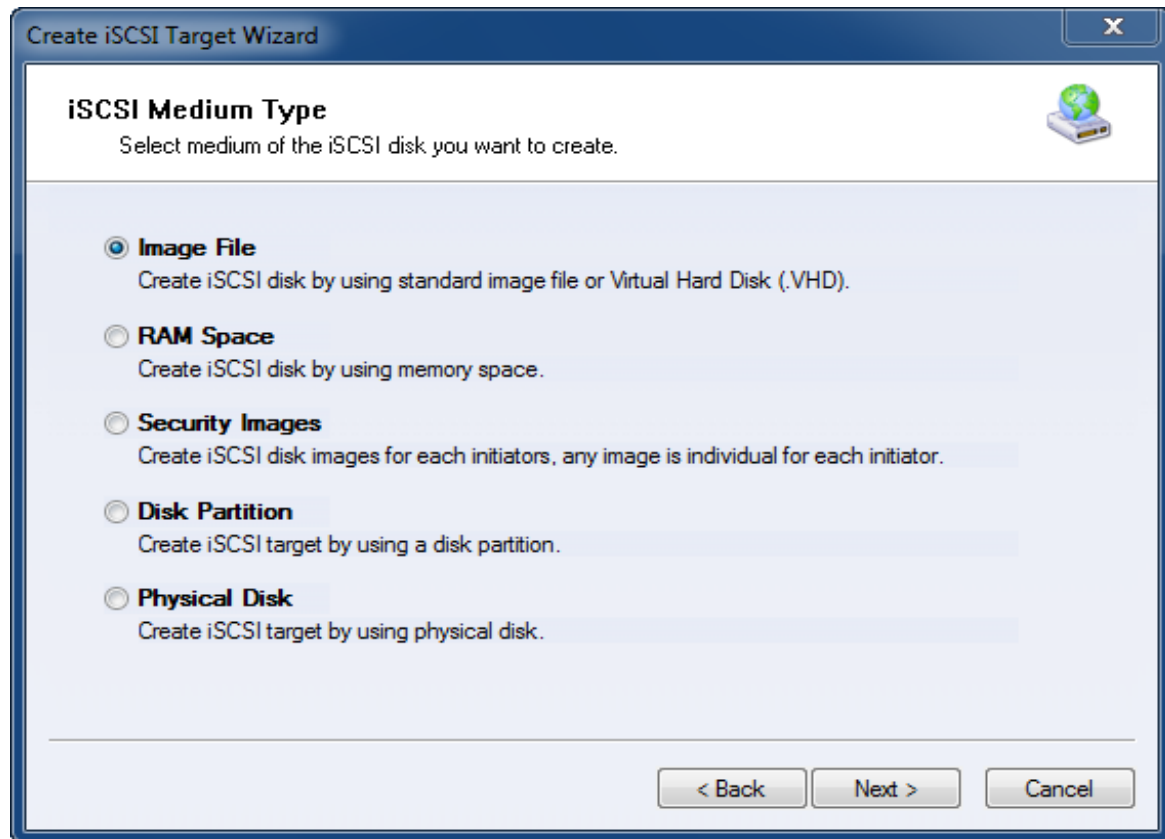
Launch the **iStorage Server management console**, press the **Create** button on the toolbar of iStorage Server management console, the **Create Device Wizard** is shown.

Select a device type



Choose **Hard Disk**.

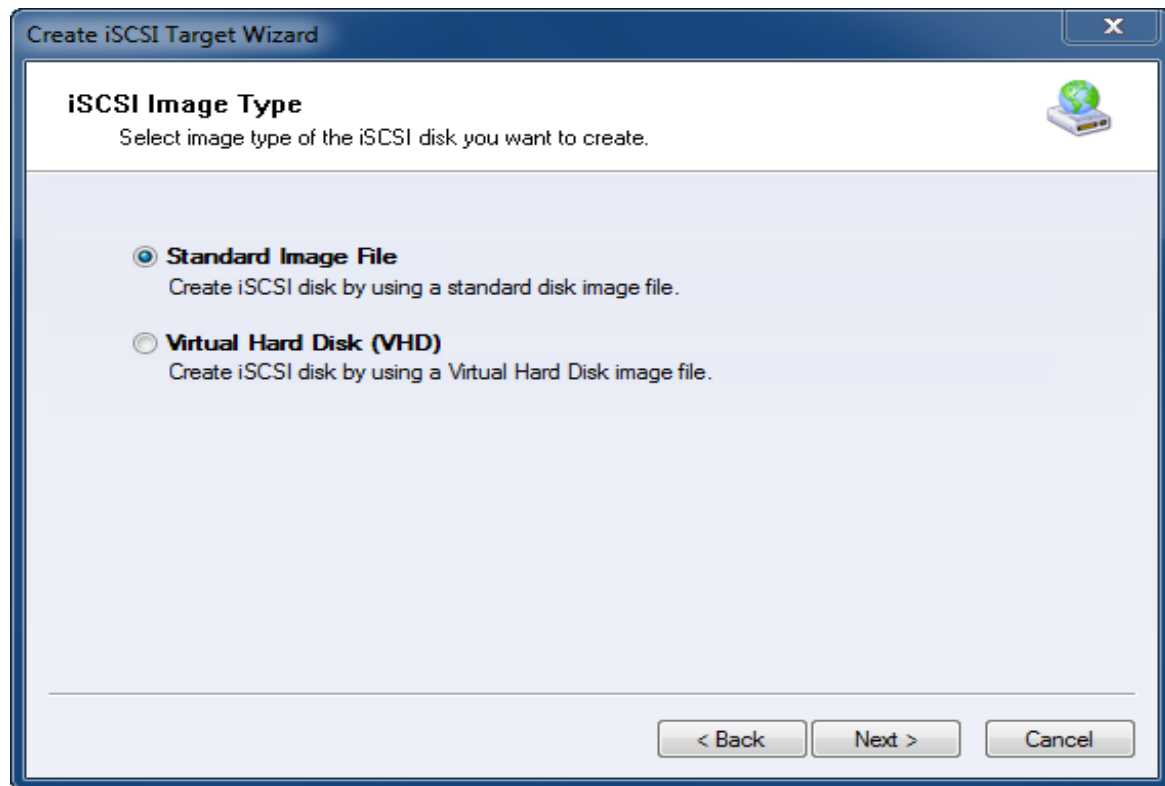
Press the **Next** button to continue.



Choose **Image File** in **iSCSI Medium Type** page.

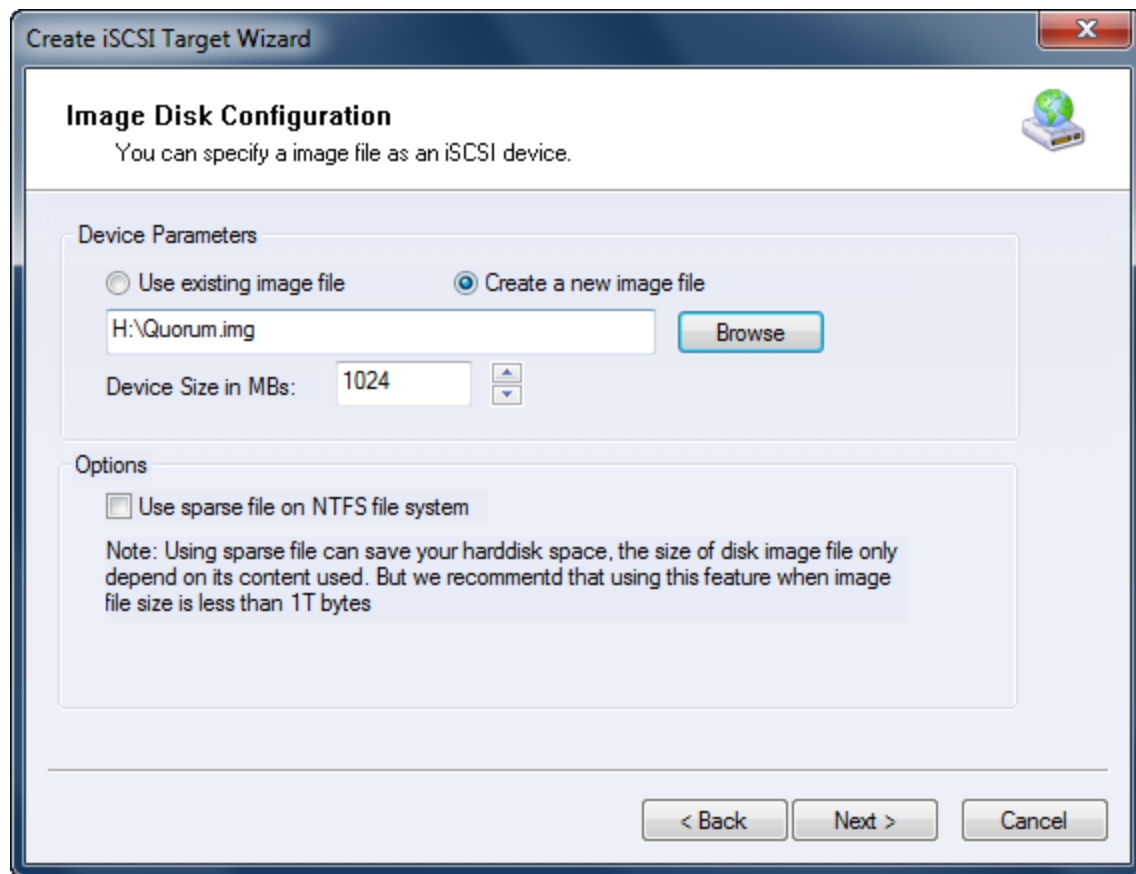
Then press **Next** button to continue.





We choose **Standard Image File** and then press the **Next** button to continue.

Specify image file path and size.

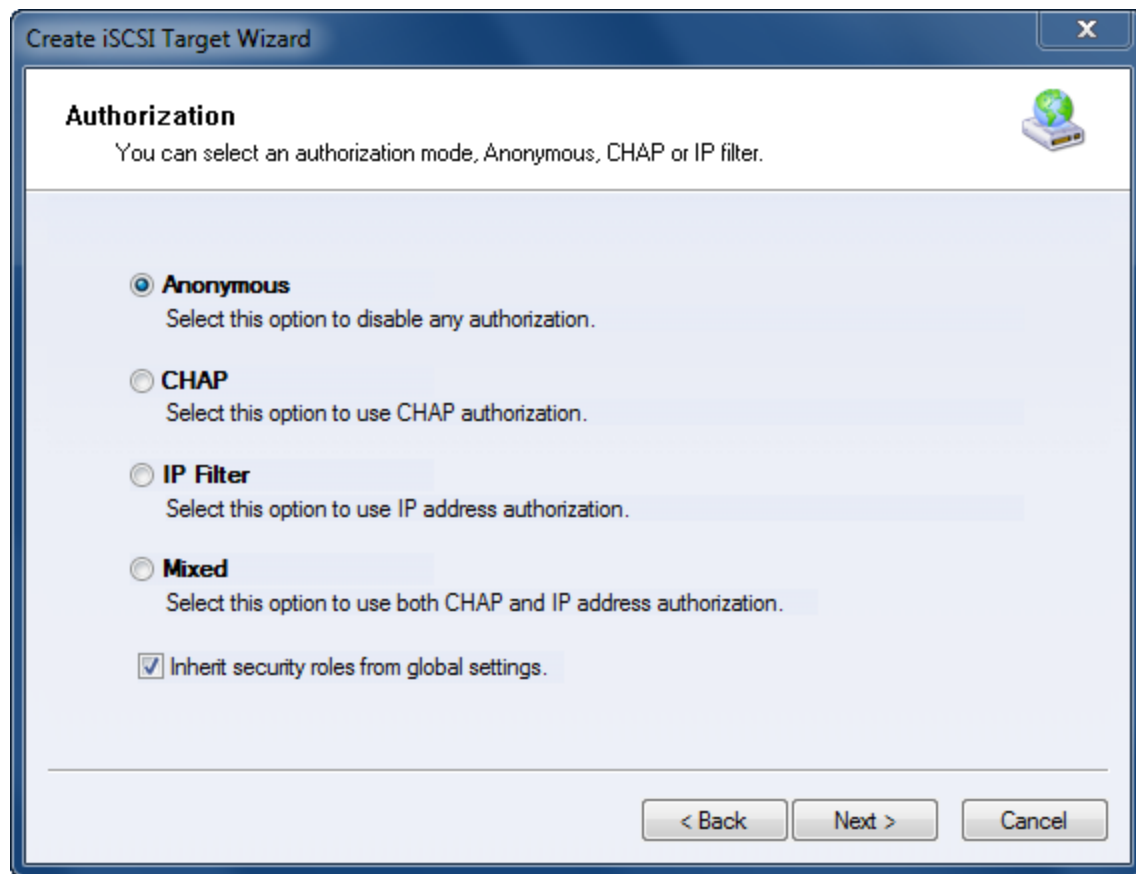


Select **Create a new image file** or **Use existing image file** if you already have one.

Specify the device size.

Press the **Next** button to continue.

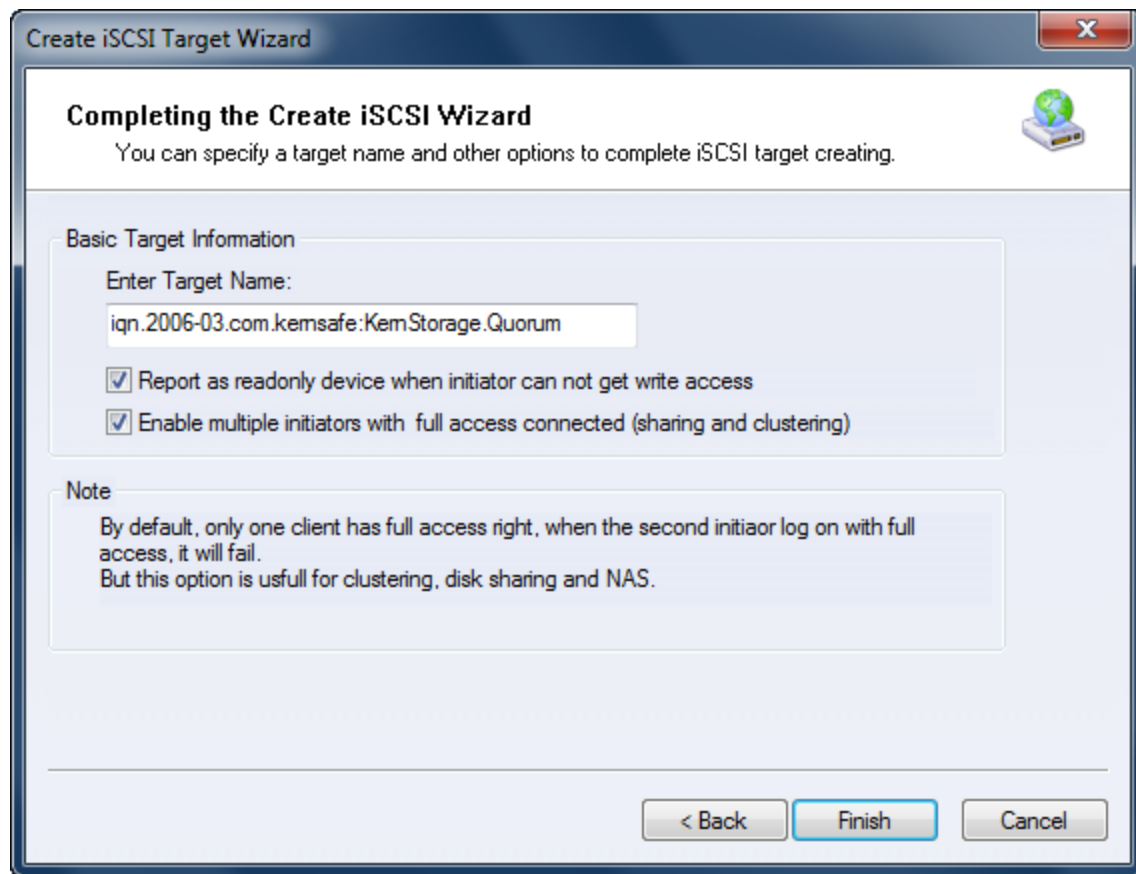
Set authorization mode.



Specify authorization mode as you required, we take **Anonymous** as an example.

Press the **Next** button to continue.

Finish creating iSCSI Target



Type a target name in the Target Name field, or use the default.

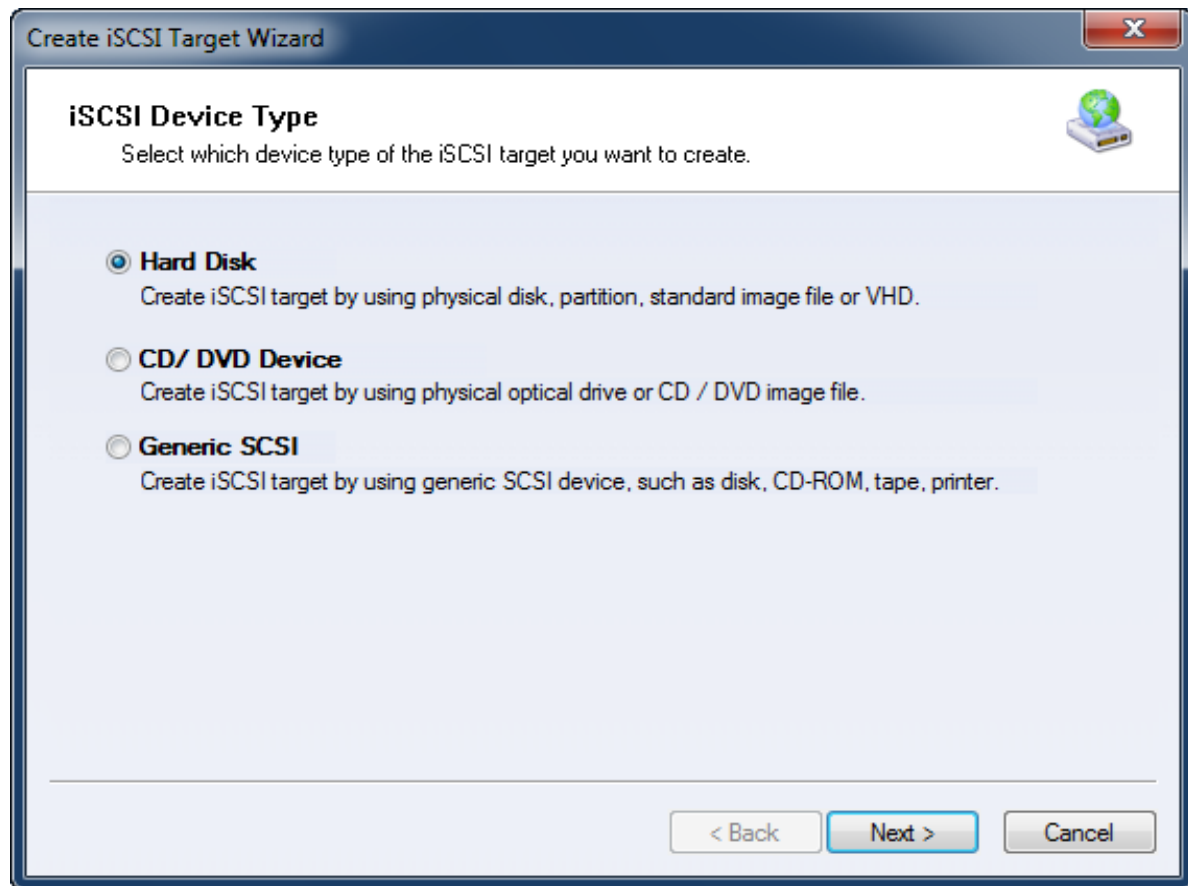
Check the **Enable multiple initiators with full access connected (sharing and clustering)** check box.

Press the **Finish** button to continue.

## Preparing Generic Volume

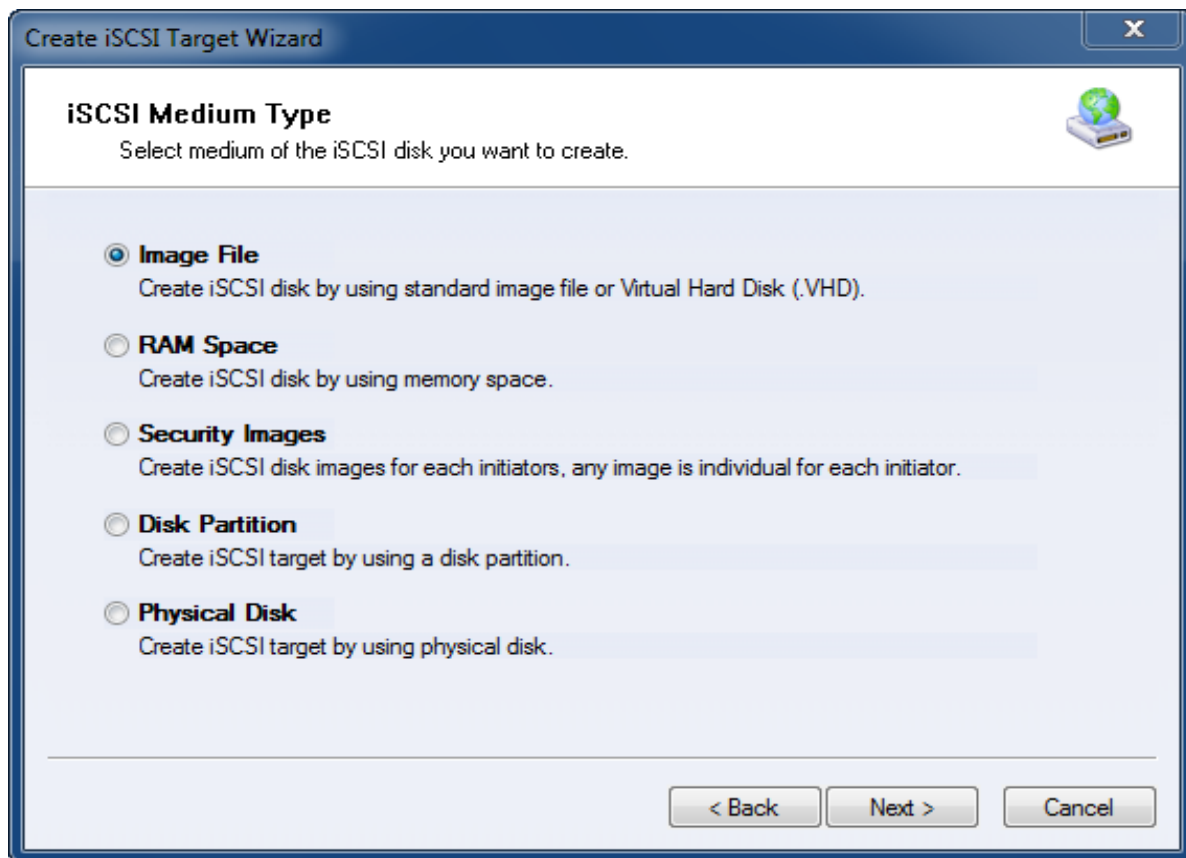
Launch the **iStorage Server management consolle**, press the **Create** button on the toolbar of iStorage Server management console, the **Create Device Wizard** is shown.

Select a device type



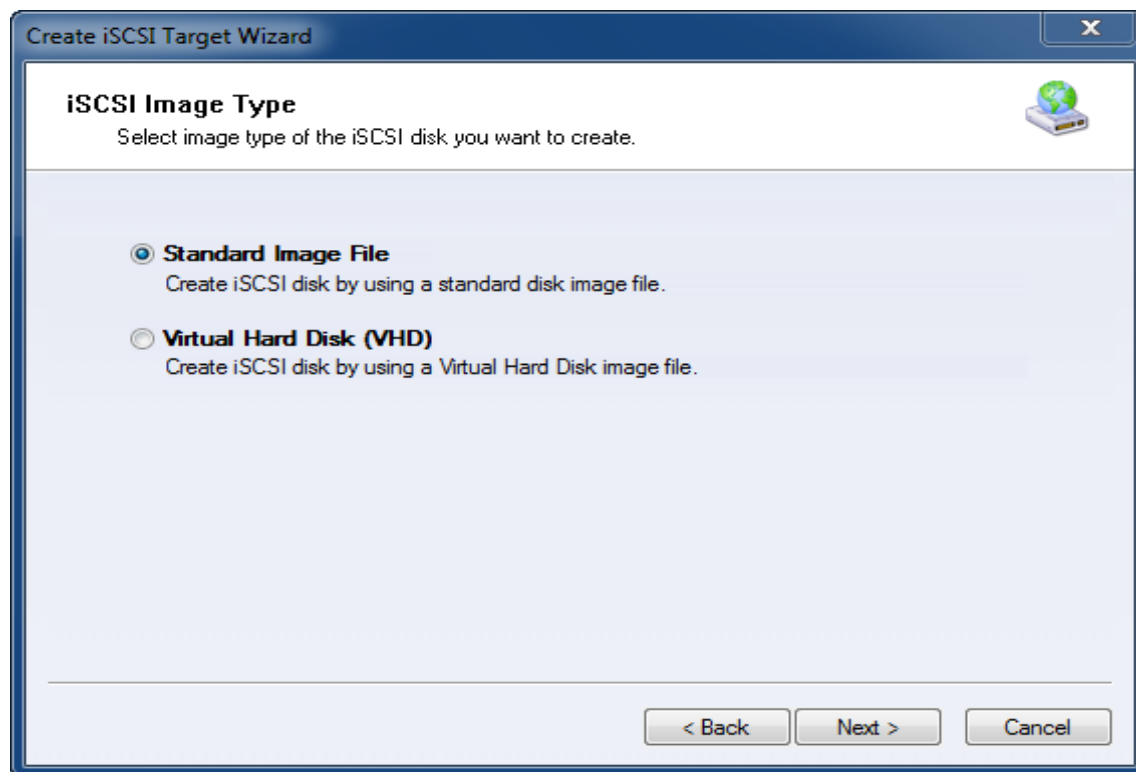
Choose **Hard Disk**.

Press the **Next** button to continue.



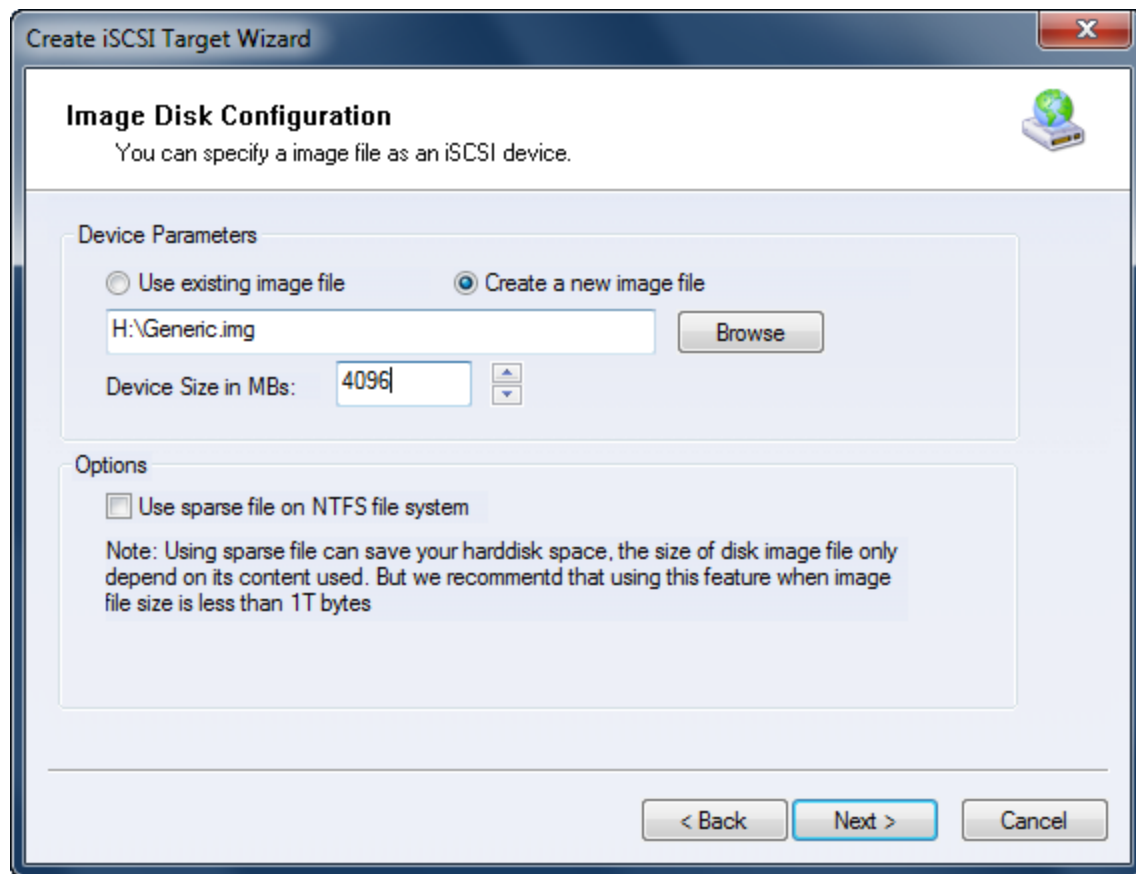
Choose **Image File** in **iSCSI Medium Type** window.

Then press **Next** button to continue.



We choose **Standard Image File** and then press **Next** button.

Specify image file path and size.



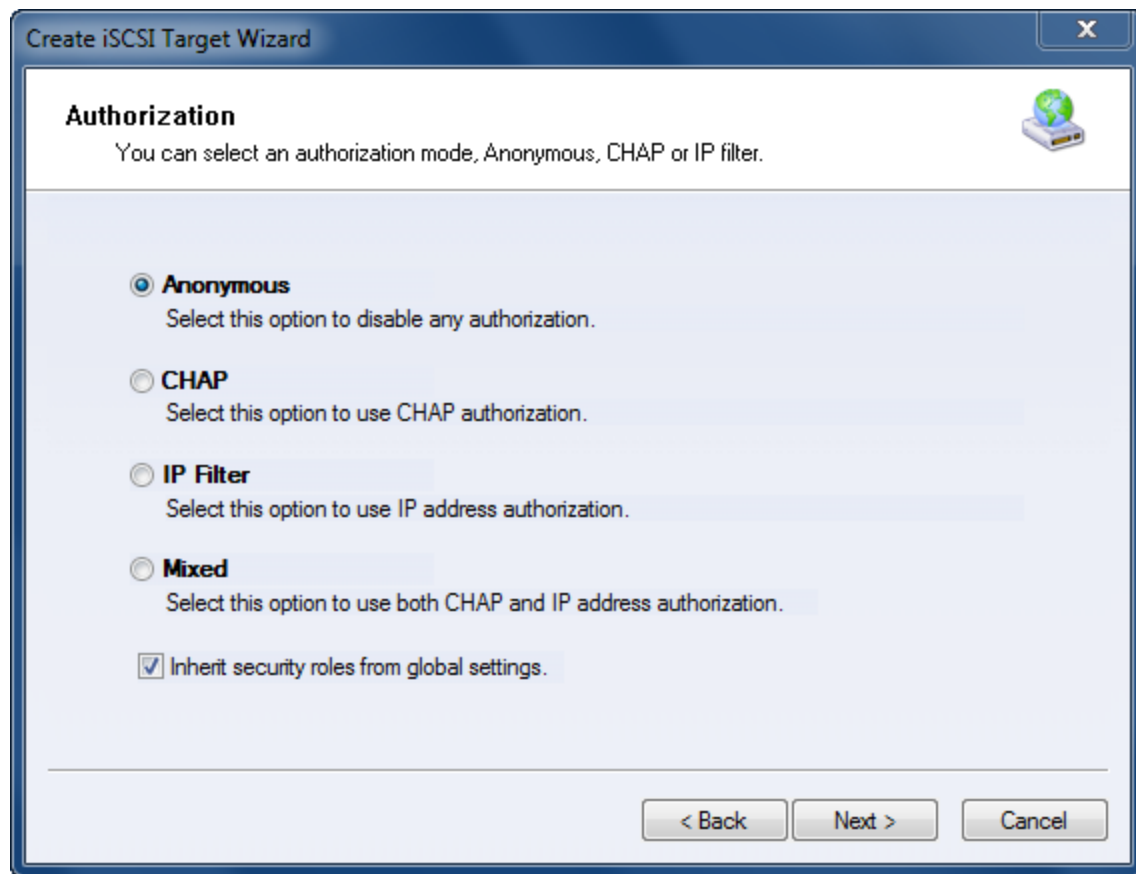
Select **Create a new image file** or **Use existing image file** if you already have one.

Specify the device size.

Press the **Next** button to continue.

Set authorization mode.

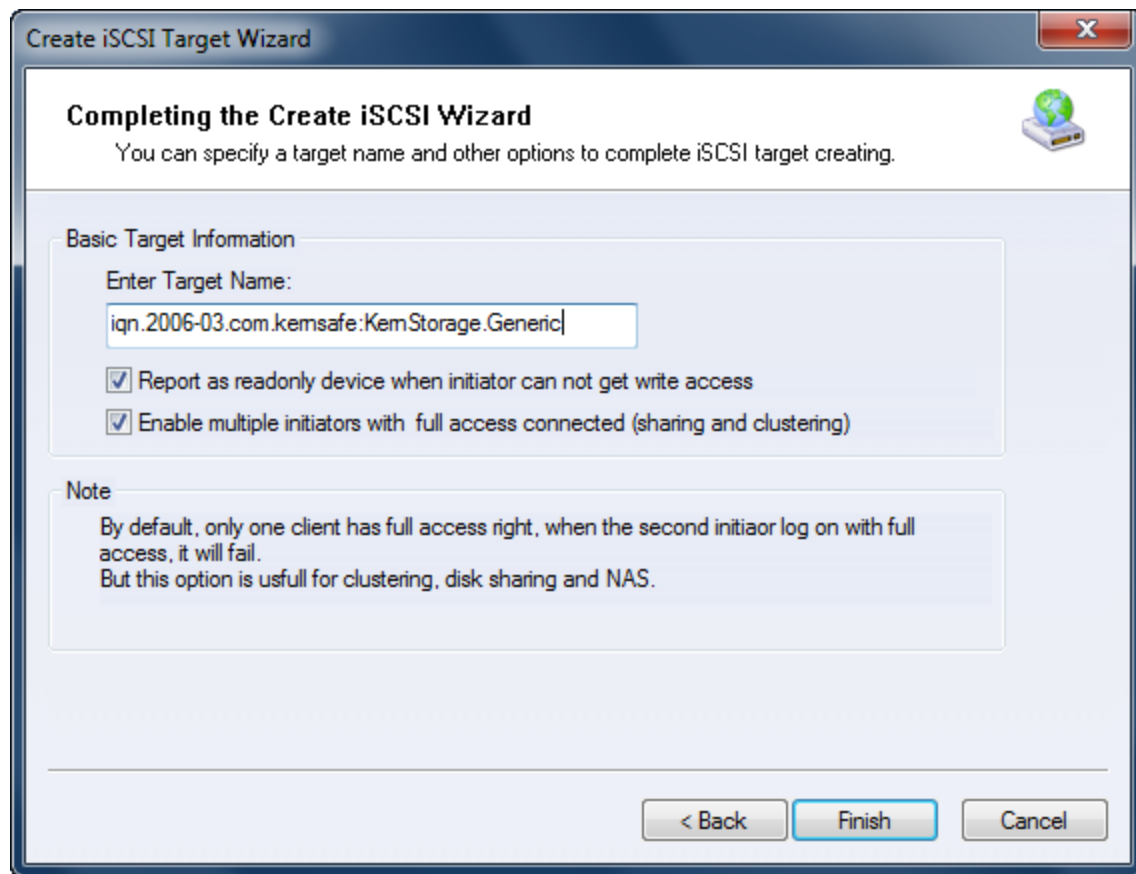




Specify authorization mode as you required, here we use **Anonymous**.

Press the **Next** button to continue.

Finish creating iSCSI Target

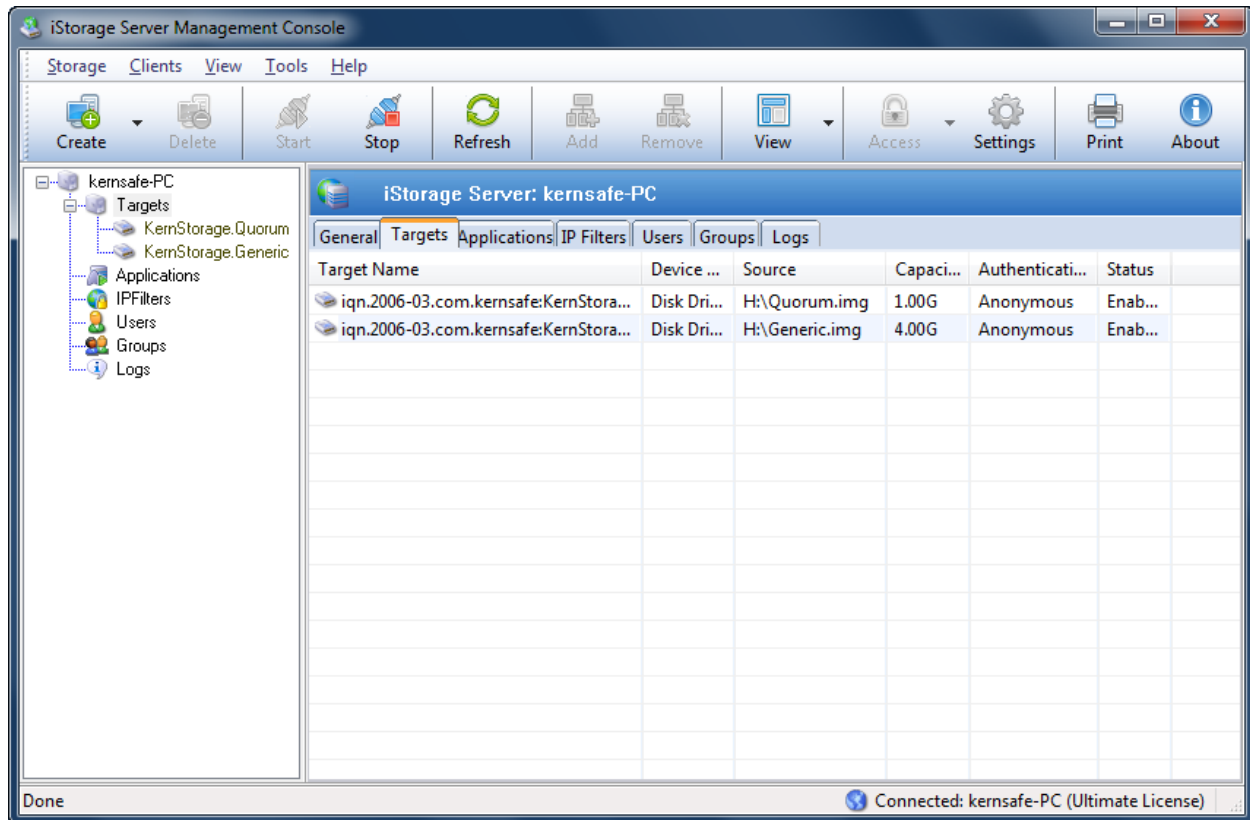


Type a target name in the Target Name field, or use the default.

Check the **Enable multiple initiators with full access connected (sharing and clustering)** check box.

Press the **Finish** button.

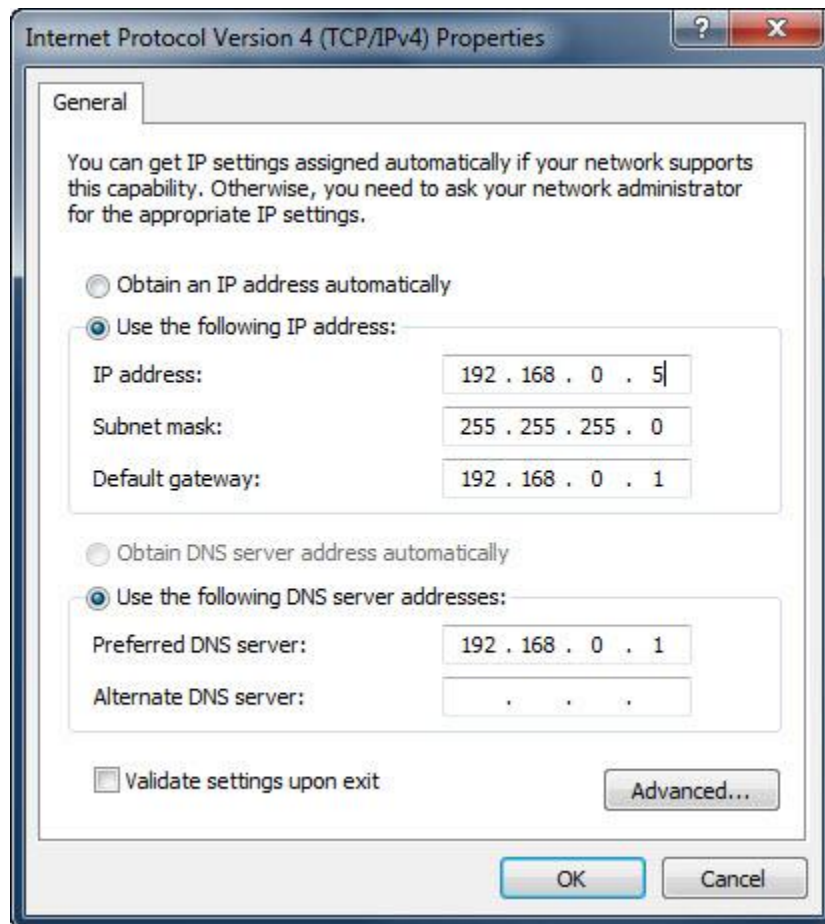
Now the sample images are shown in the iStorage Server management console if successful.



## Configuring on iStorage Server2

### Network Adapter

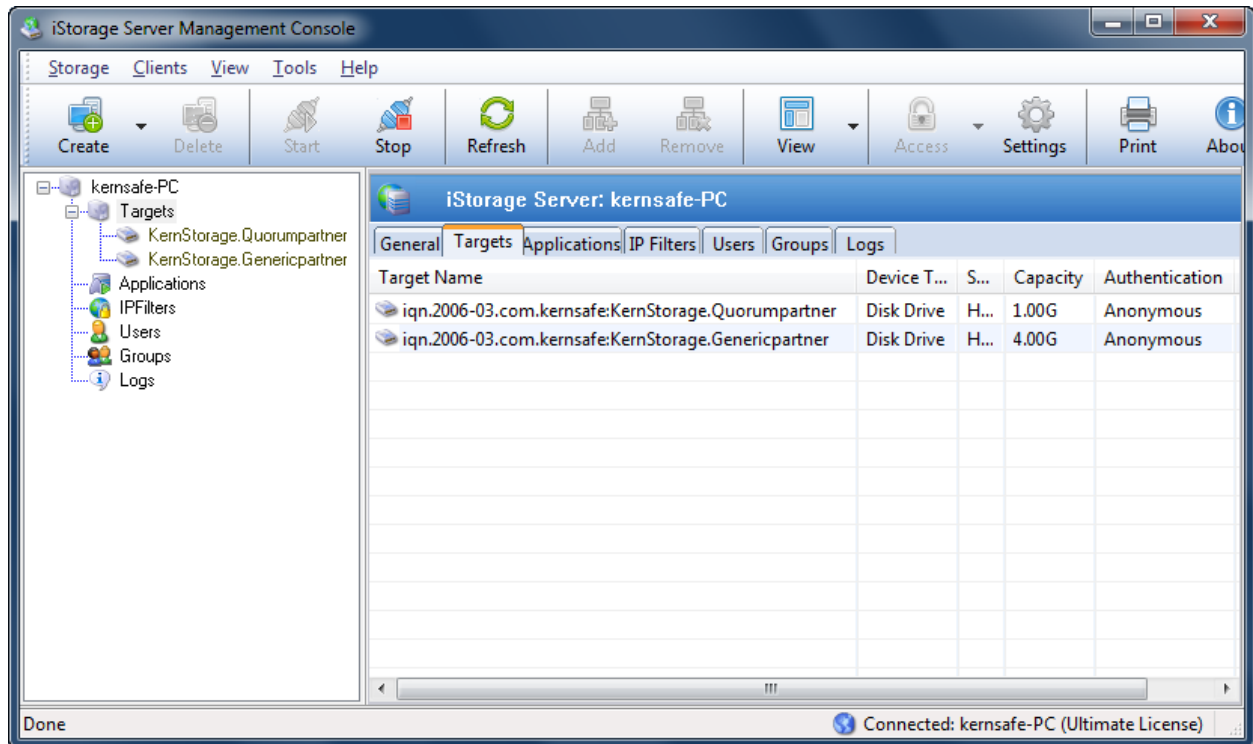
For working in clustering environment, the network adapter must be assigned a static IP address. Select the **Internet Protocol Version 4(TCP/IPv4)** and then press the **Properties** button, the **Internet Protocol Version 4 (TCP/IPv4)** dialog is shown.



Set the network adapter of KernStorage1 as shown in the figure. IP address is set as 192.168.0.3 and Subnet mask is set as 255.255.255.0.

## Preparing Volume

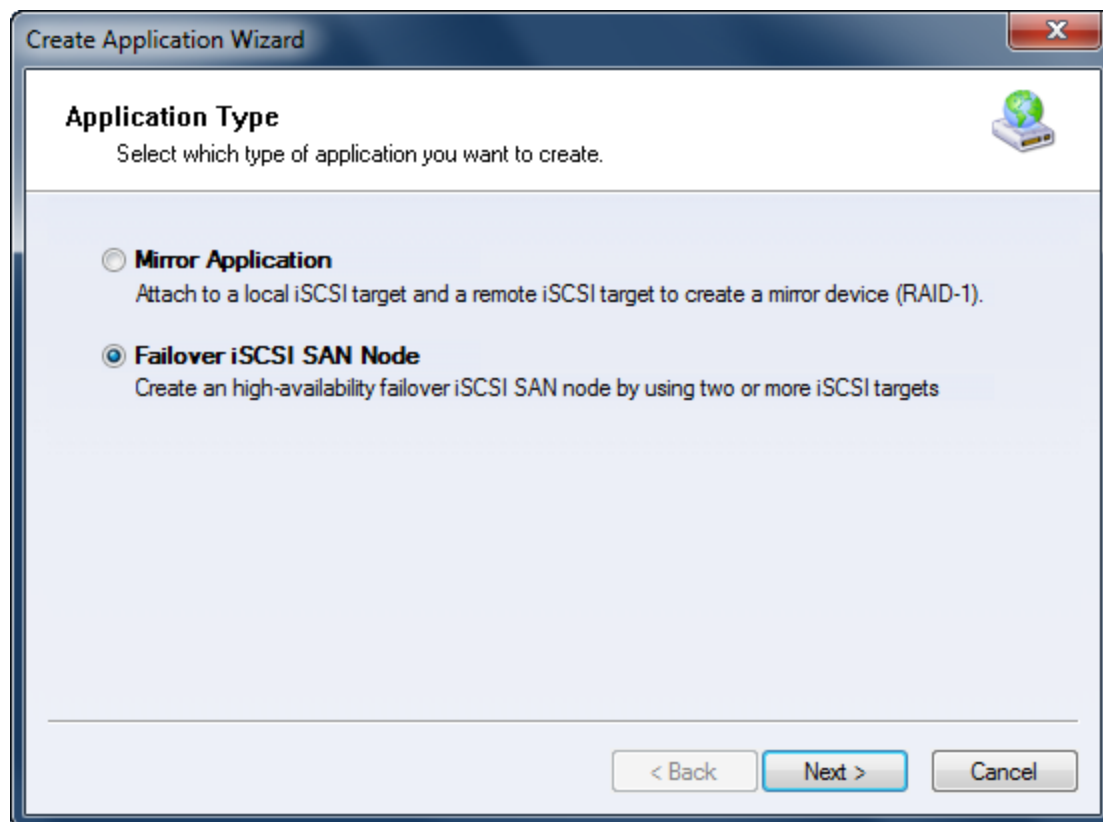
We also need two volumes on iStorage Server2, we named them KernStorage.Qunrumpartner and KernStorage.Genericpartner which has the same size as volumes on iStorage Server1. We create them as we do on iStorage Server1. The main interface is shown as follows if successful.



## Creating Application

### Creating Quorum application

On iStorage Server1, right click **Applications** on the left tree of the main interface, choose **Create Application** on the pop-up menu, the **Create Application Wizard** window will be shown.



Choose **Failover iSCSI SAN Node**.

Then press **Next** to continue.

**Create Application Wizard**

### Fail Over Configuration

You can specify two servers to fail over each other.

**Base Target**

Target Name	Device Type
<input checked="" type="checkbox"/> iqn.2006-03.com.kemsafe:KemStorage.Quorum	Disk
<input type="checkbox"/> iqn.2006-03.com.kemsafe:KemStorage.Generic	Disk

**Mirror Target**

**Edit**

< Back   Next >   Cancel

Check the HA storage and click **Edit** to find the mirror target.

**Select iSCSI Target**

**iSCSI Source**

Host Name: 192.168.0.5   Port: 3260

**CHAP**

☐ Use CHAP to login

User Name:  

Secret:  

**Target**

Target: iqn.2006-03.com.kemsafe:KemStorage.Quorumpartner ▼

Discovery   OK   Cancel

Input the IP and port of server2 in **iSCSI Source** tab, then click **Discovery** on the bottom of the window to find the mirror target, choose the **HApartner** in the down-list.

Press **OK** button to continue.

**Note:** If the target needs CHAP authorization, you should provide User name and secret to logon.

**Create Application Wizard**

**Fail Over Configuration**  
You can specify two servers to fail over each other.

**Base Target**

Target Name	Device Type	
<input checked="" type="checkbox"/> iqn.2006-03.com.kemsafe:KemStorage.Quorum	Disk	
<input type="checkbox"/> iqn.2006-03.com.kemsafe:KemStorage.Generic	Disk	

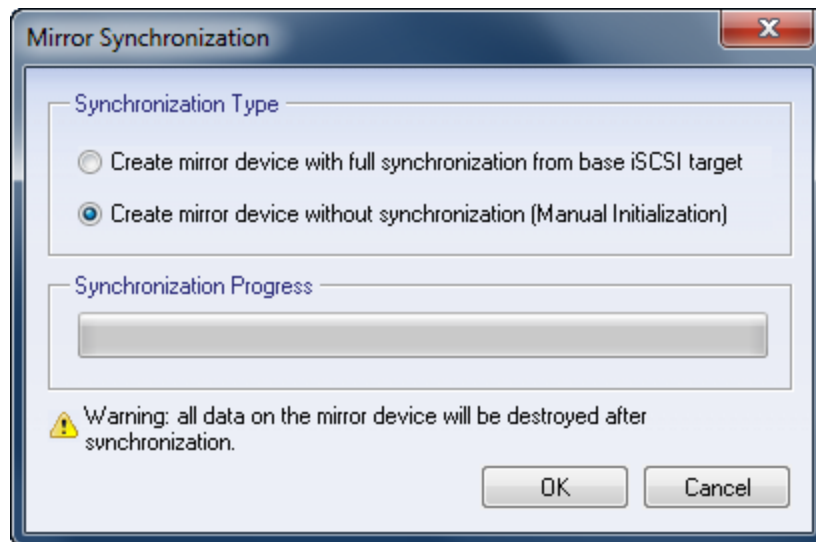
**Mirror Target**

iqn.2006-03.com.kemsafe:KemStorage.Quorumpartner Edit

< Back Next > Cancel

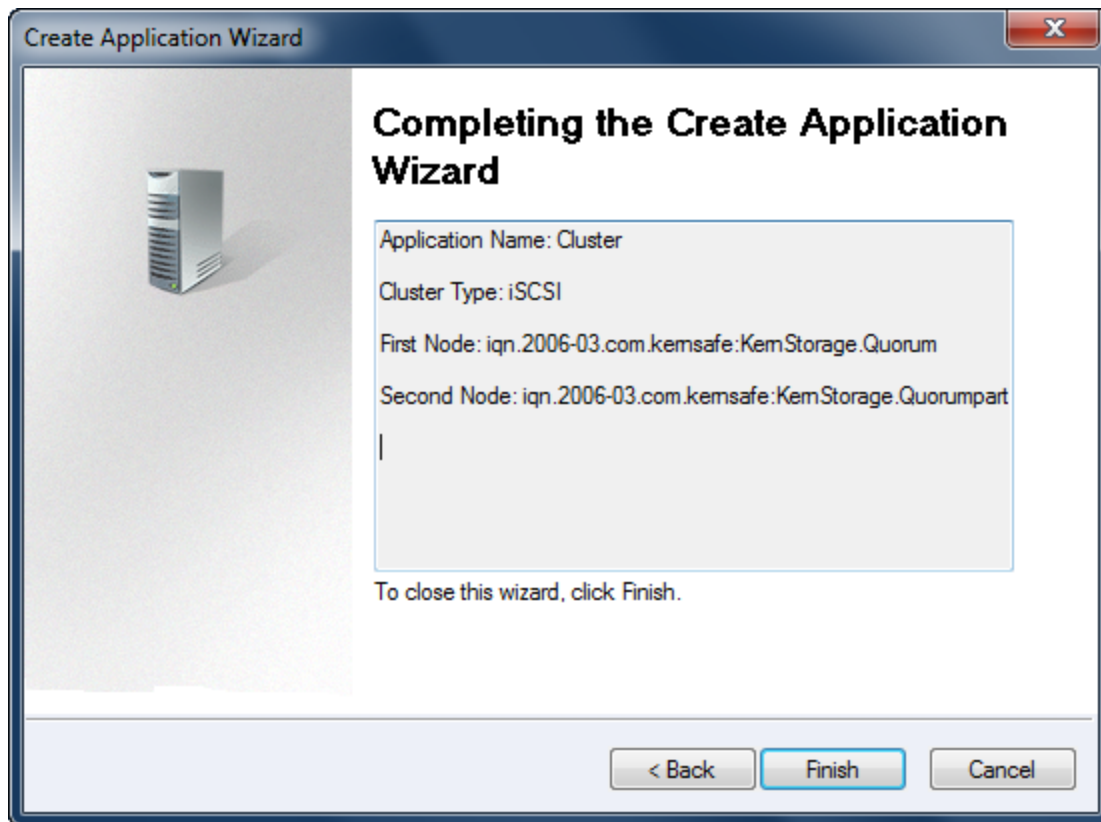
The mirror target will be added to the window, then click **Next** button to continue.





Now, the mirror target should be synchronization to the base target, if the two targets are both the new one and do not be initialized, we can choose **Create mirror device without synchronization (Manual Initialization)**, otherwise, we must choose **Create mirror device with full synchronization from base iSCSI target**.

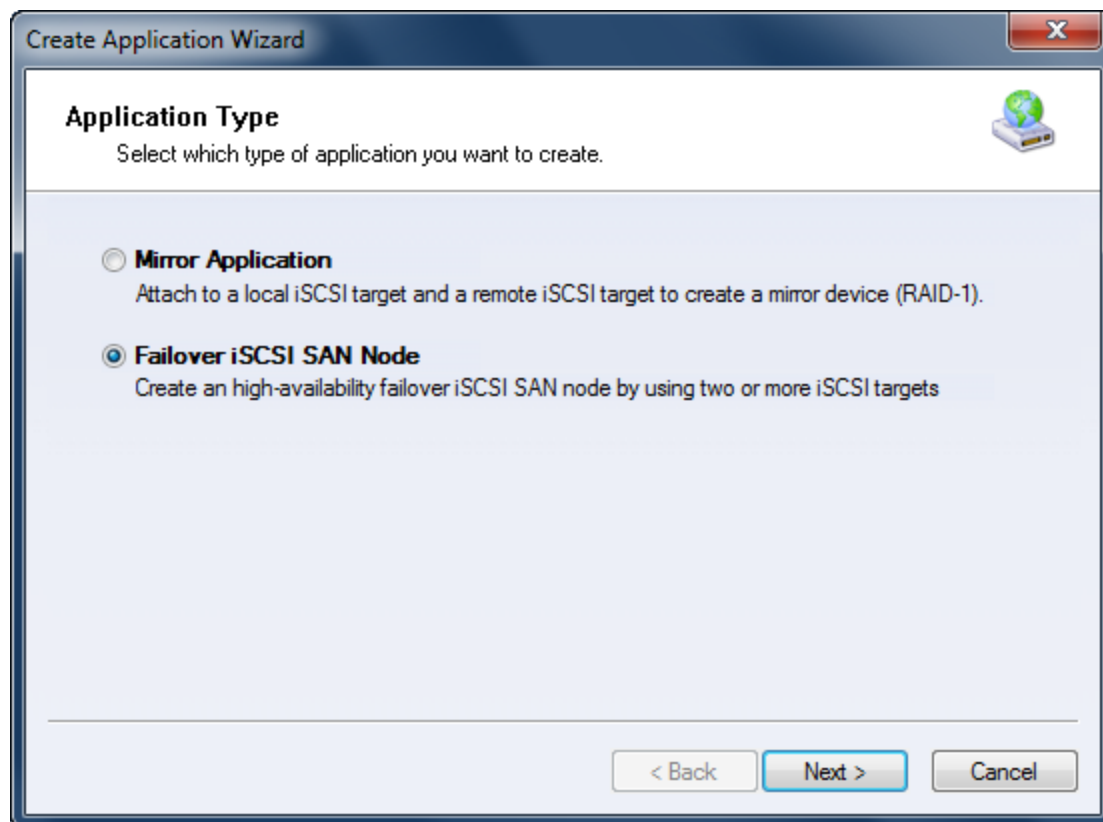
Press **OK** button to continue.



Click **Finish** button to complete the application creation.

## Creating Generic application

On iStorage Server1, right click **Applications** on the left tree of the main interface, choose **Create Application** on the pop-up menu, the **Create Application Wizard** window will be shown.



Choose **Failover iSCSI SAN Node**.

Then press **Next** to continue.

**Create Application Wizard**

### Fail Over Configuration

You can specify two servers to fail over each other.

**Base Target**

Target Name	Device Type
<input type="checkbox"/> iqn.2006-03.com.kemsafe:KemStorage.Quorum	Disk
<input checked="" type="checkbox"/> iqn.2006-03.com.kemsafe:KemStorage.Generic	Disk

**Mirror Target**

**Edit**

< Back   Next >   Cancel

Check the HA storage and click **Edit** to find the mirror target.

**Select iSCSI Target**

**iSCSI Source**

Host Name: 192.168.0.5   Port: 3260

**CHAP**

☐ Use CHAP to login

User Name:  

Secret:  

**Target**

Target: iqn.2006-03.com.kemsafe:KemStorage.Genericpartner ▼

Discovery   OK   Cancel

Input the IP and port of server2 in **iSCSI Source** tab, then click **Discovery** on the bottom of the window to find the mirror target, choose the **HApartner** in the down-list.

Press **OK** button to continue.

**Note:** If the target needs CHAP authorization, you should provide User name and secret to logon.

**Create Application Wizard**

**Fail Over Configuration**  
You can specify two servers to fail over each other.

**Base Target**

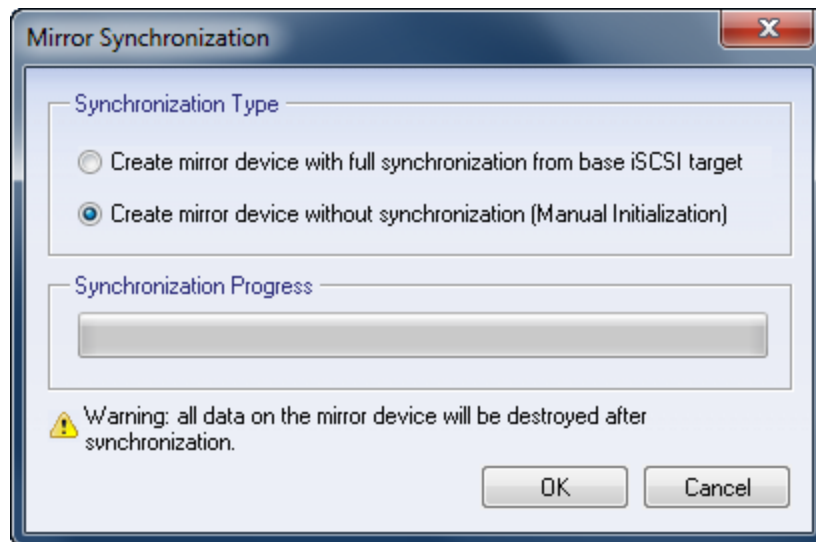
Target Name	Device Type
<input type="checkbox"/> iqn.2006-03.com.kemsafe:KemStorage.Quorum	Disk
<input checked="" type="checkbox"/> iqn.2006-03.com.kemsafe:KemStorage.Generic	Disk

**Mirror Target**

iqn.2006-03.com.kemsafe:KemStorage.Genericpartner Edit

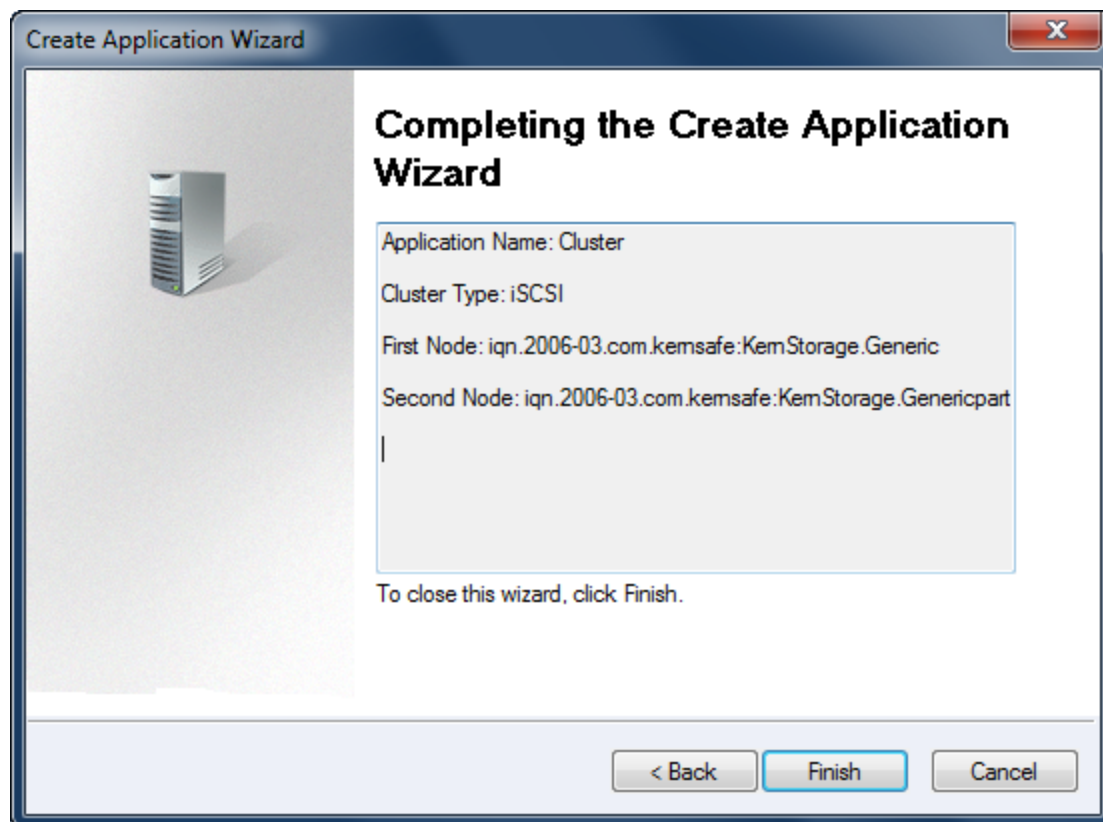
< Back Next > Cancel

The mirror target will be added to the window, then click **Next** button to continue.

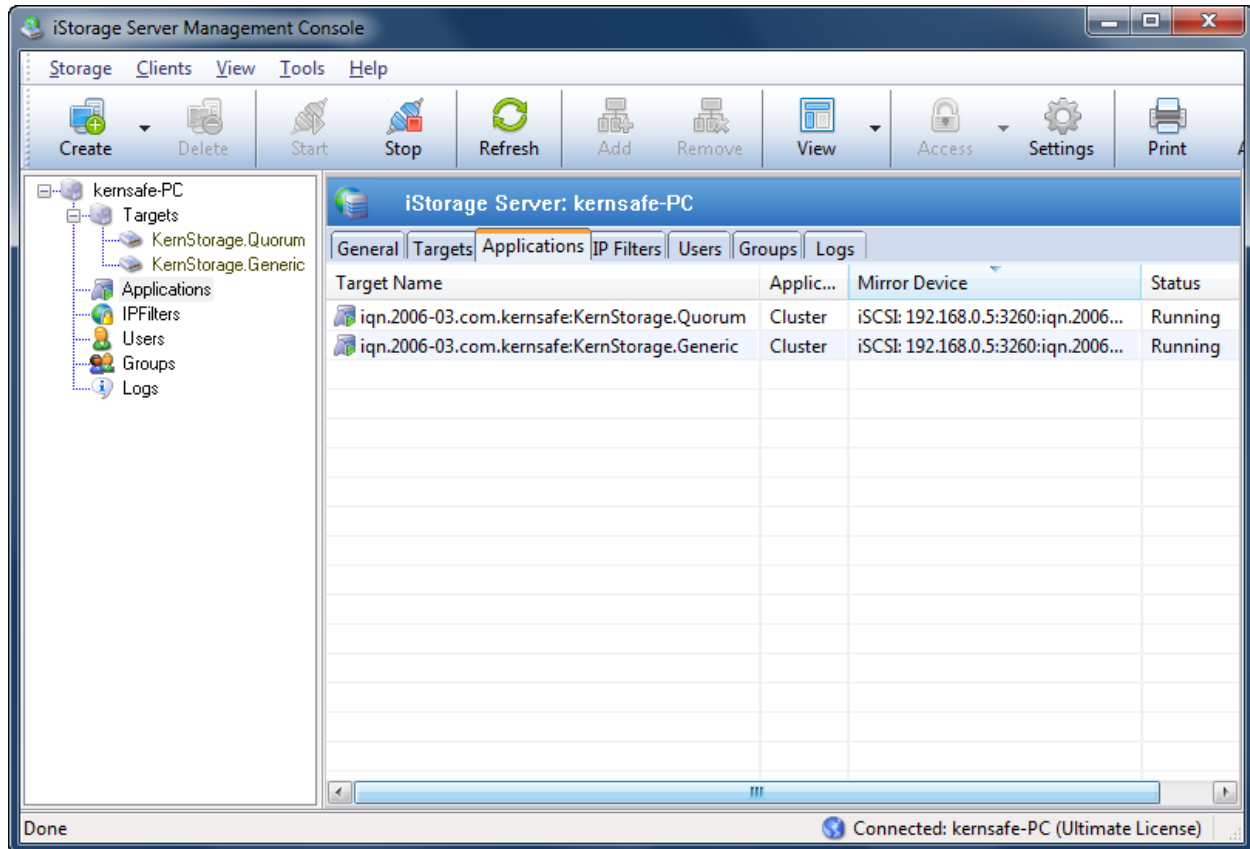


Now, the mirror target should be synchronized to the base target, if the two targets are both the new one and do not be initialized, we can choose **Create mirror device without synchronization (Manual Initialization)**, otherwise, we must choose **Create mirror device with full synchronization from base iSCSI target**.

Press **OK** button to continue.

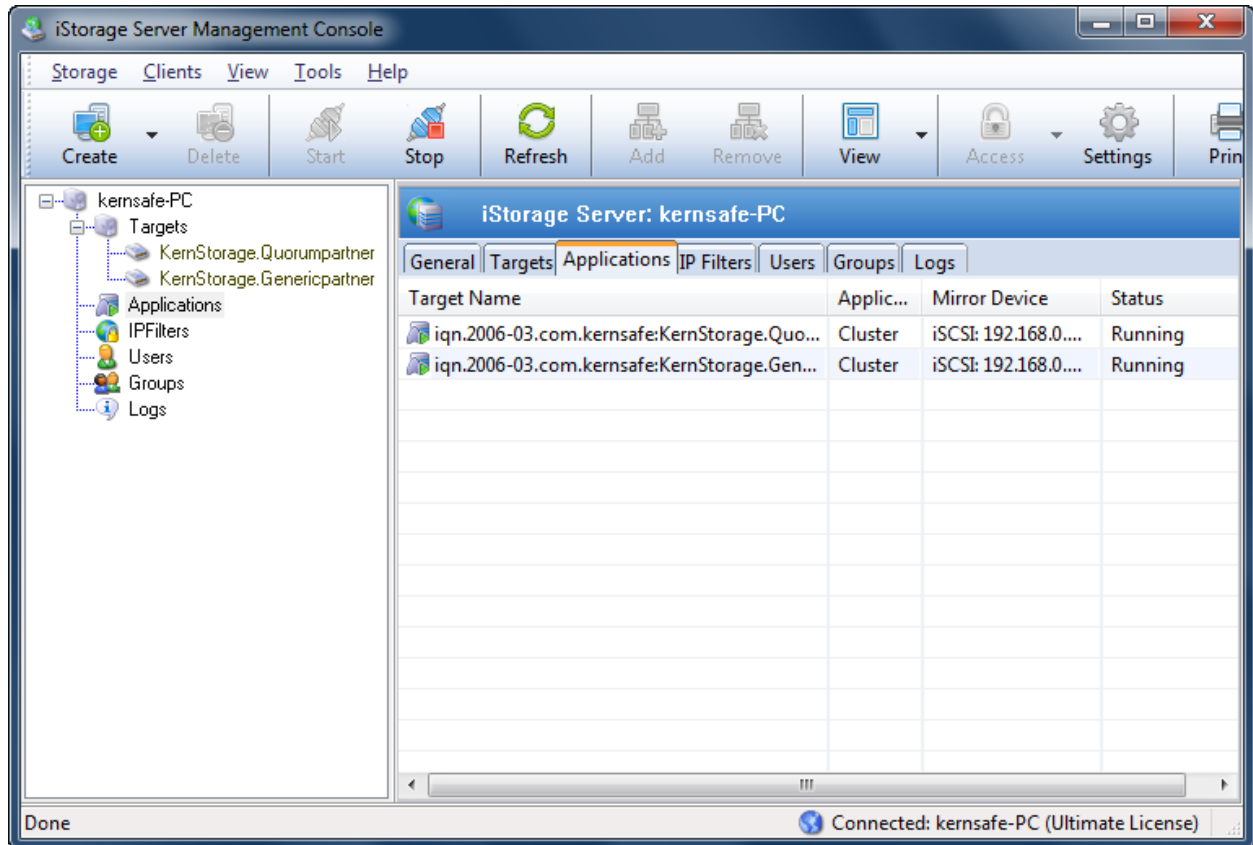


Click **Finish** button to complete the application creation.



Now the two applications will be shown in the main interface if successful and the configuration on the iStorage Server1 is completed. We do the same operations on iStorage Server2 to create applications, after the creation, the main interface will be shown as follows:





## Configuring on Cluster Node 1

### Network Adapter

For working in clustering environment, the network adapter must be assigned a static IP address. Select the **Internet Protocol Version 4(TCP/IPv4)** and then press the **Properties** button, the **Internet Protocol**

Version 4 (TCP/IPv4) dialog is shown.

The screenshot shows the 'Internet Protocol Version 4 (TCP/IPv4) Properties' dialog box with the 'General' tab selected. The dialog contains instructions on how to obtain IP settings. Two radio buttons are present: 'Obtain an IP address automatically' (unselected) and 'Use the following IP address:' (selected). Below the selected radio button are three text input fields: 'IP address' (192 . 168 . 1 . 101), 'Subnet mask' (255 . 255 . 255 . 0), and 'Default gateway' (192 . 168 . 1 . 2). Another set of radio buttons is located below: 'Obtain DNS server address automatically' (unselected) and 'Use the following DNS server addresses:' (selected). Below the selected radio button are two text input fields: 'Preferred DNS server' (192 . 168 . 1 . 2) and 'Alternate DNS server' (empty, showing four dots). At the bottom left, there is a checkbox for 'Validate settings upon exit' which is unchecked. At the bottom right, there is an 'Advanced...' button. The 'OK' and 'Cancel' buttons are at the very bottom.

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 1 . 101

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 1 . 2

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 192 . 168 . 1 . 2

Alternate DNS server: . . .

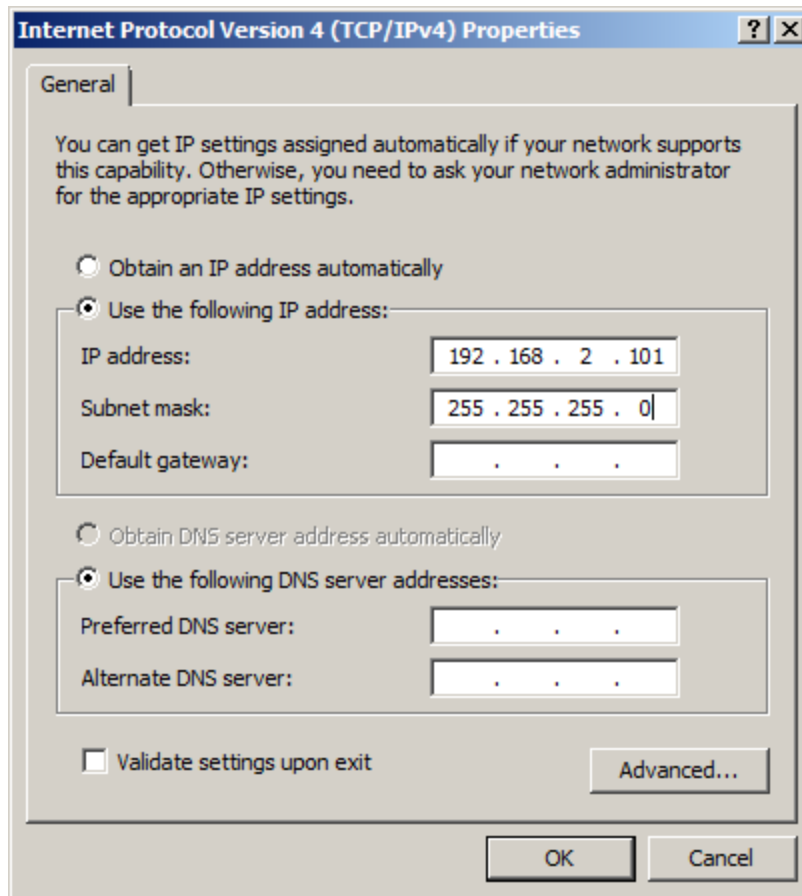
☐ Validate settings upon exit

Advanced...

OK Cancel

Type in the **IP address**, **Subnet mask**, **Default gateway** and **Preferred DNS server**.

Set the second network adapter of 08Node.



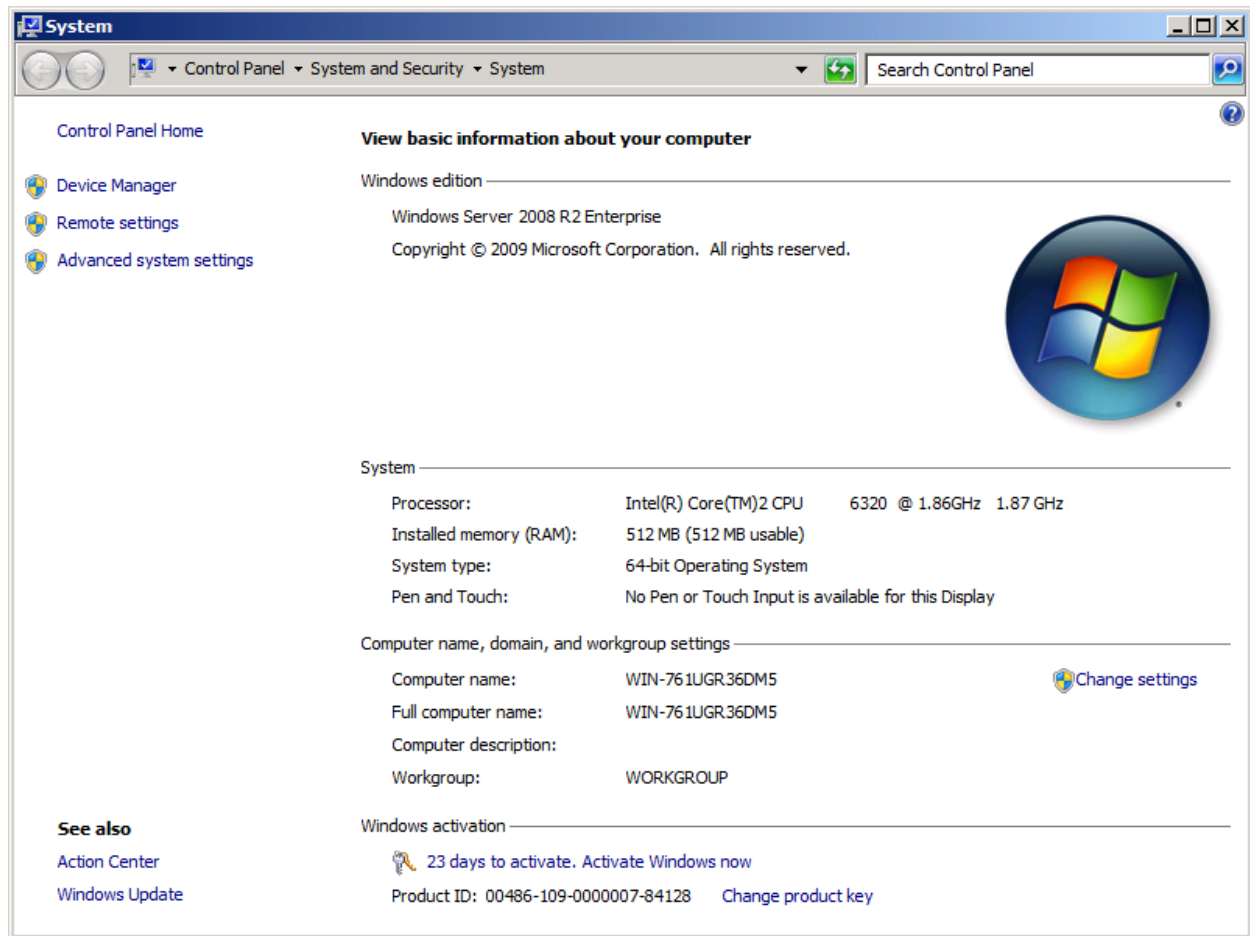
Type in the IP address and Subnet mask.

Press the **OK** button to change IP address.

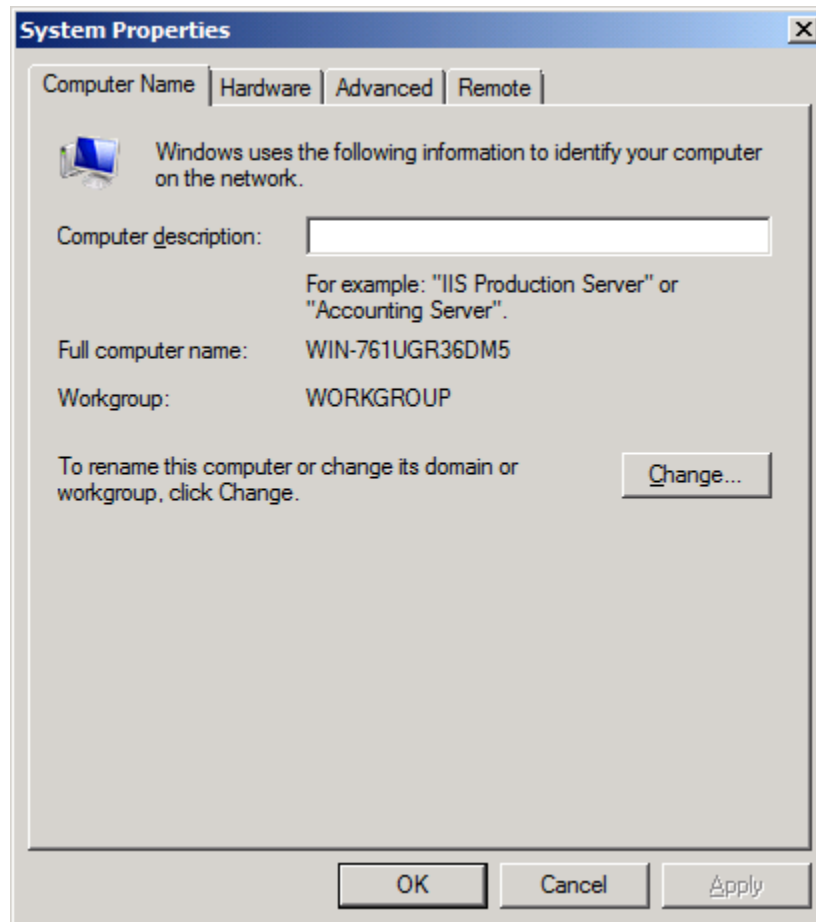
## Join to the domain

Press the **OK** button to change IP address.

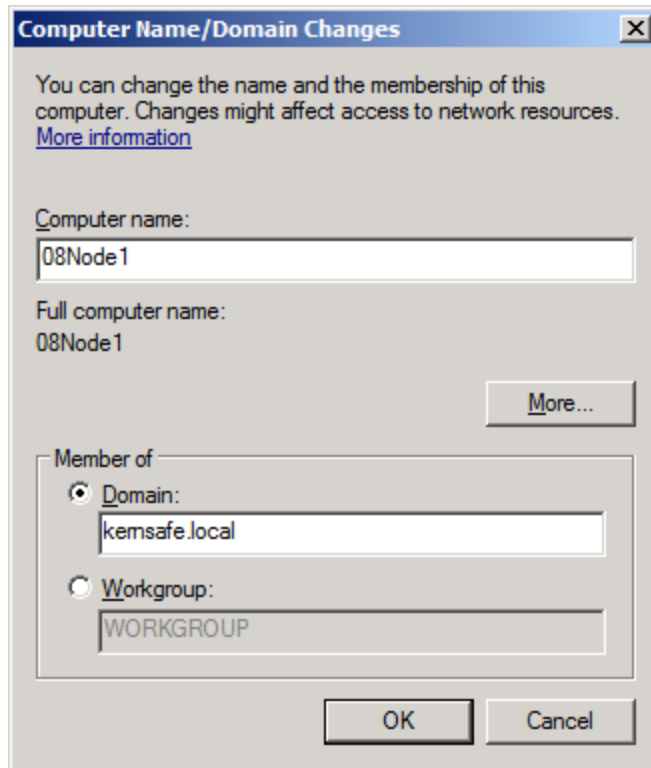
Open System Properties page.



Click on the **Change settings** link, the **System Properties** Dialog is shown.



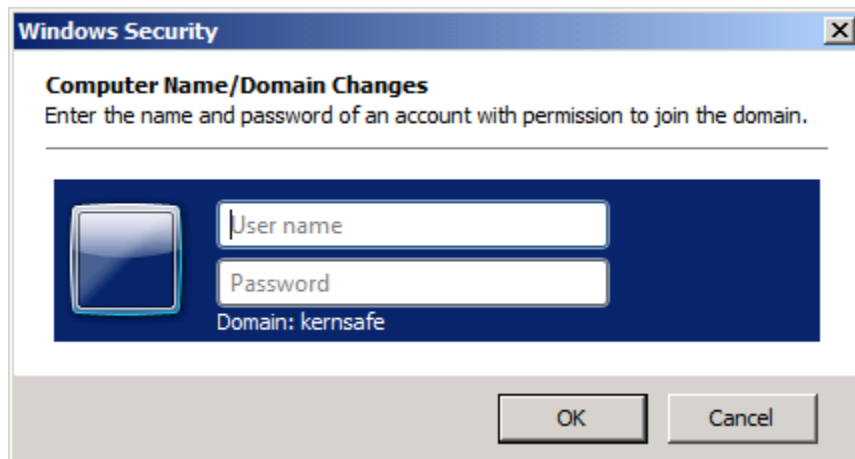
Press the **Change...** button.



Type 08Node1 in the **Computer name** and kernsafe.local in the **Domain**.

Press the **OK** button to change computer name and join the domain.

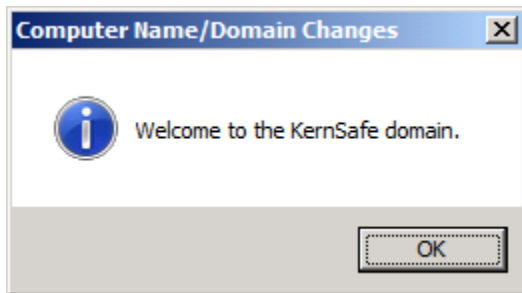
Domain controller account is required to join the domain.



Type your user name and password.

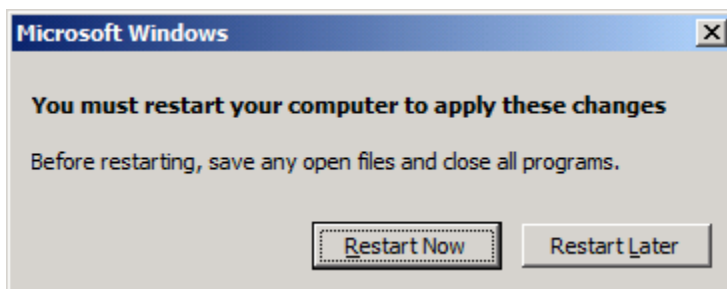
Press the **OK** button to continue.

If successful, the **Computer Name/Domain Changes** notification dialog is shown as below.



Press the **OK** button to continue.

Restart is required.

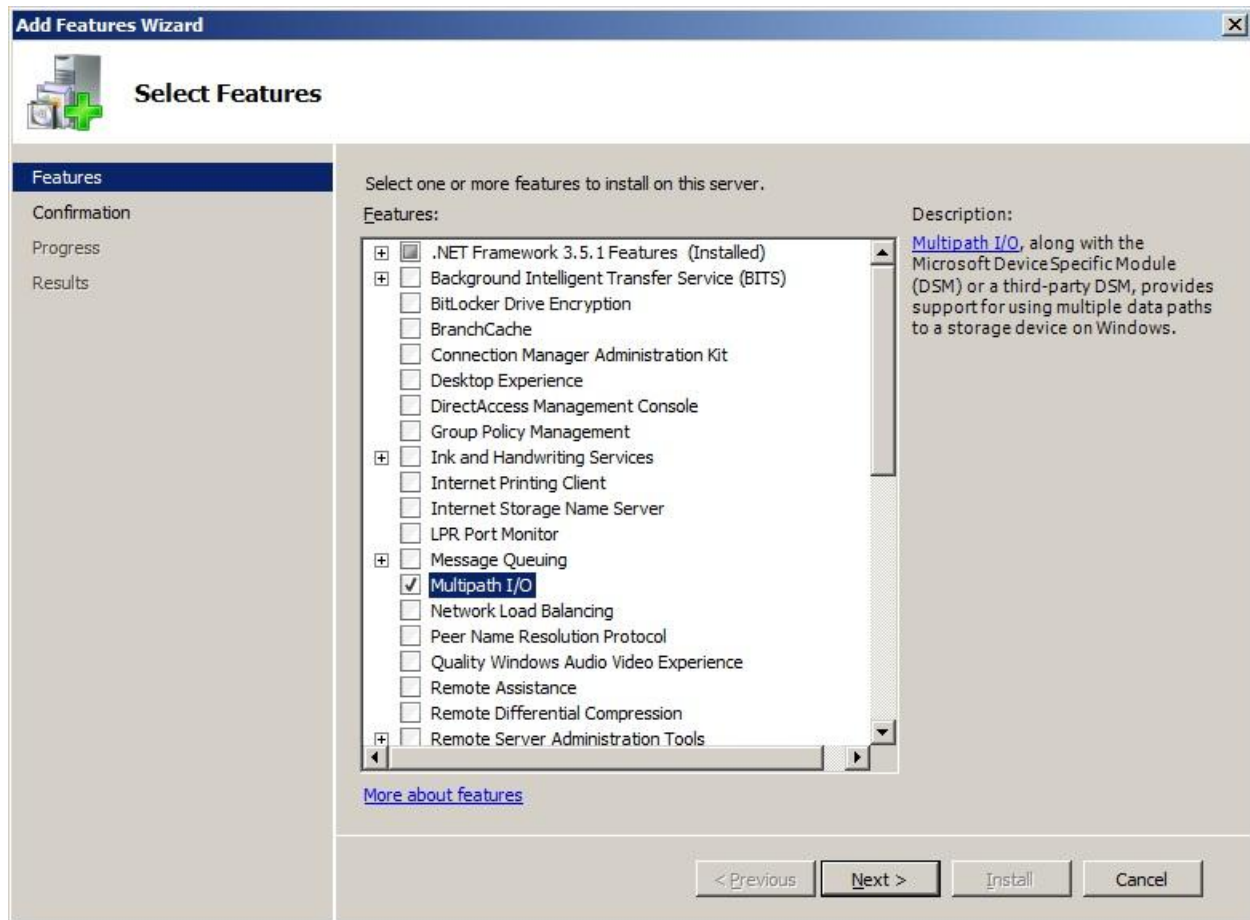


Press the **Restart Now** button to restart the computer.

## Install MPIO Feature

Launch **Start->Administrative Tools->Server Manager**, go to **Features** item, and click **Add** Features.

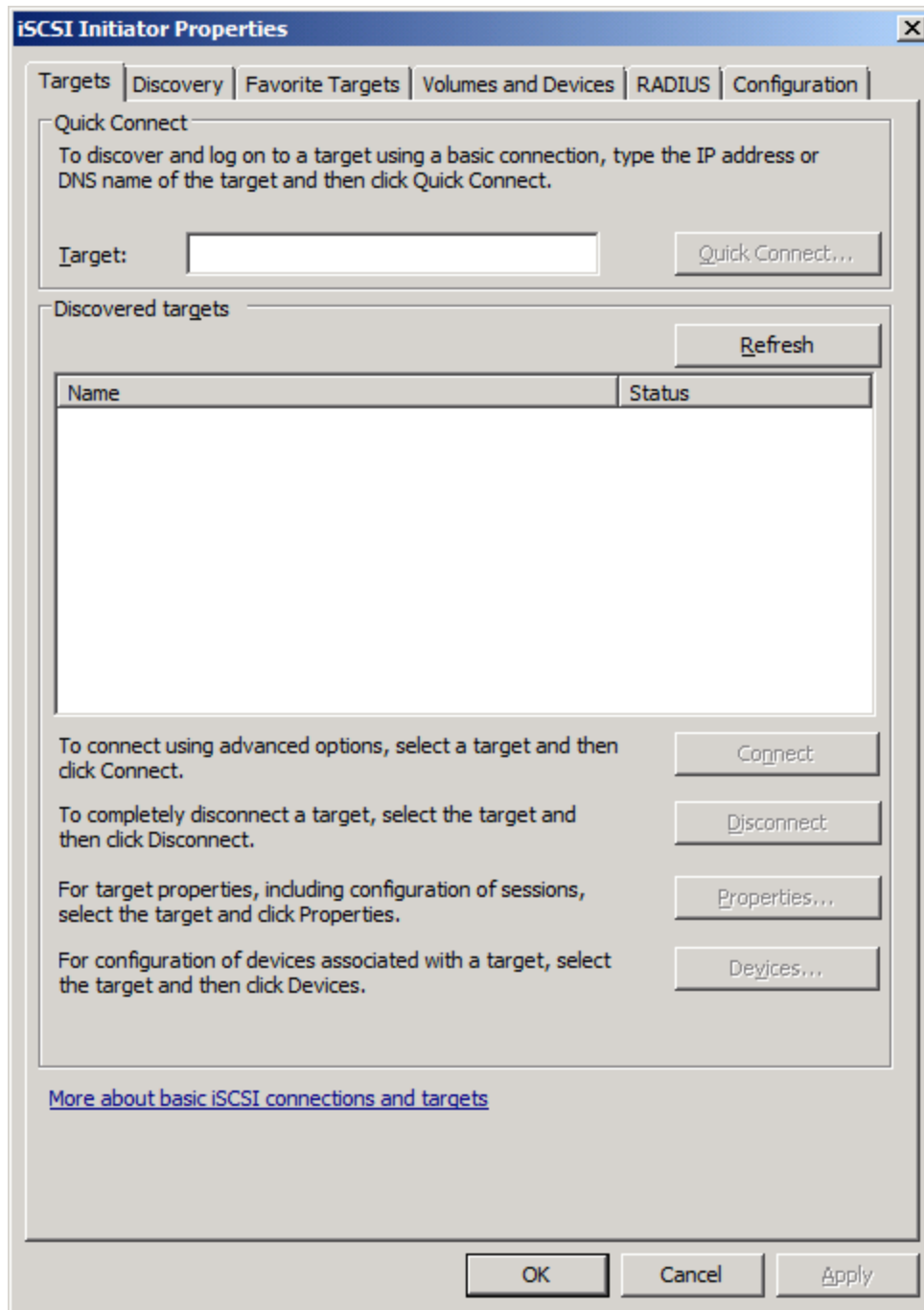
An **Add Features Wizard** will appear. In the features list select **Multipath I/O** feature and install it.



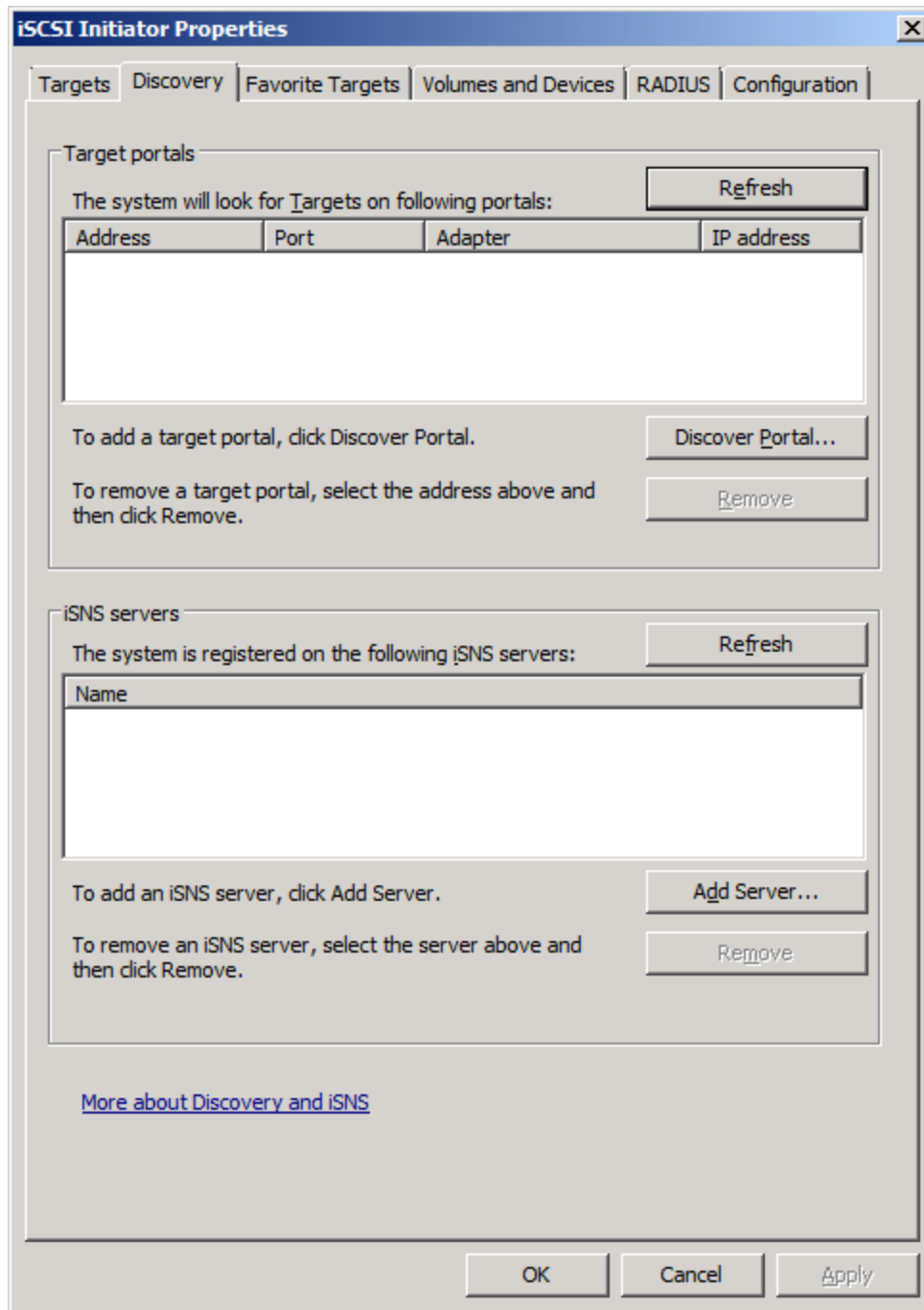
## Log in to iSCSI disks

Launch the Administrative Tools -> Microsoft iSCSI initiator.

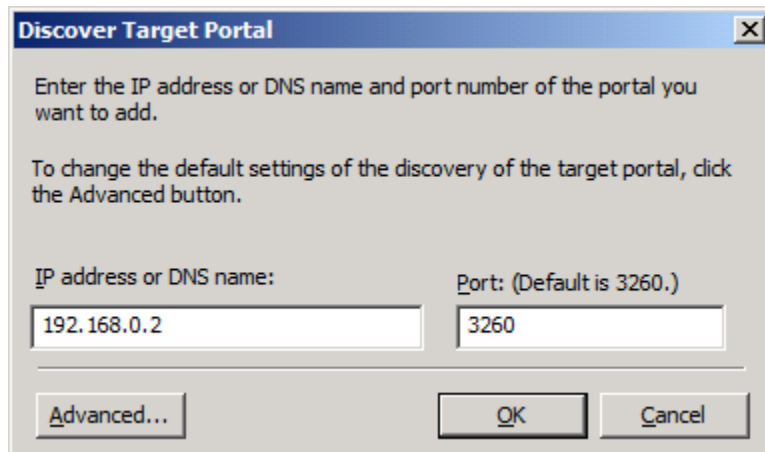




Select the **Discovery** page.



Press the **Discover Portal** button, the **Discover Target Portal** dialog is shown.



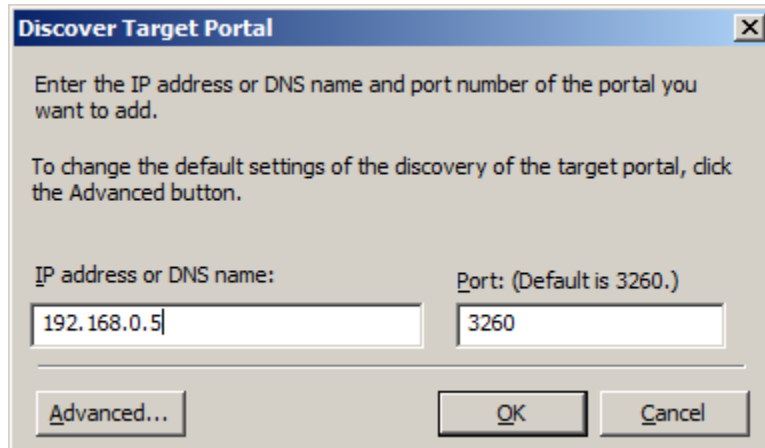
**Discover Target Portal** [X]

Enter the IP address or DNS name and port number of the portal you want to add.

To change the default settings of the discovery of the target portal, click the Advanced button.

IP address or DNS name: 192.168.0.2 Port: (Default is 3260.) 3260

Advanced... OK Cancel



**Discover Target Portal** [X]

Enter the IP address or DNS name and port number of the portal you want to add.

To change the default settings of the discovery of the target portal, click the Advanced button.

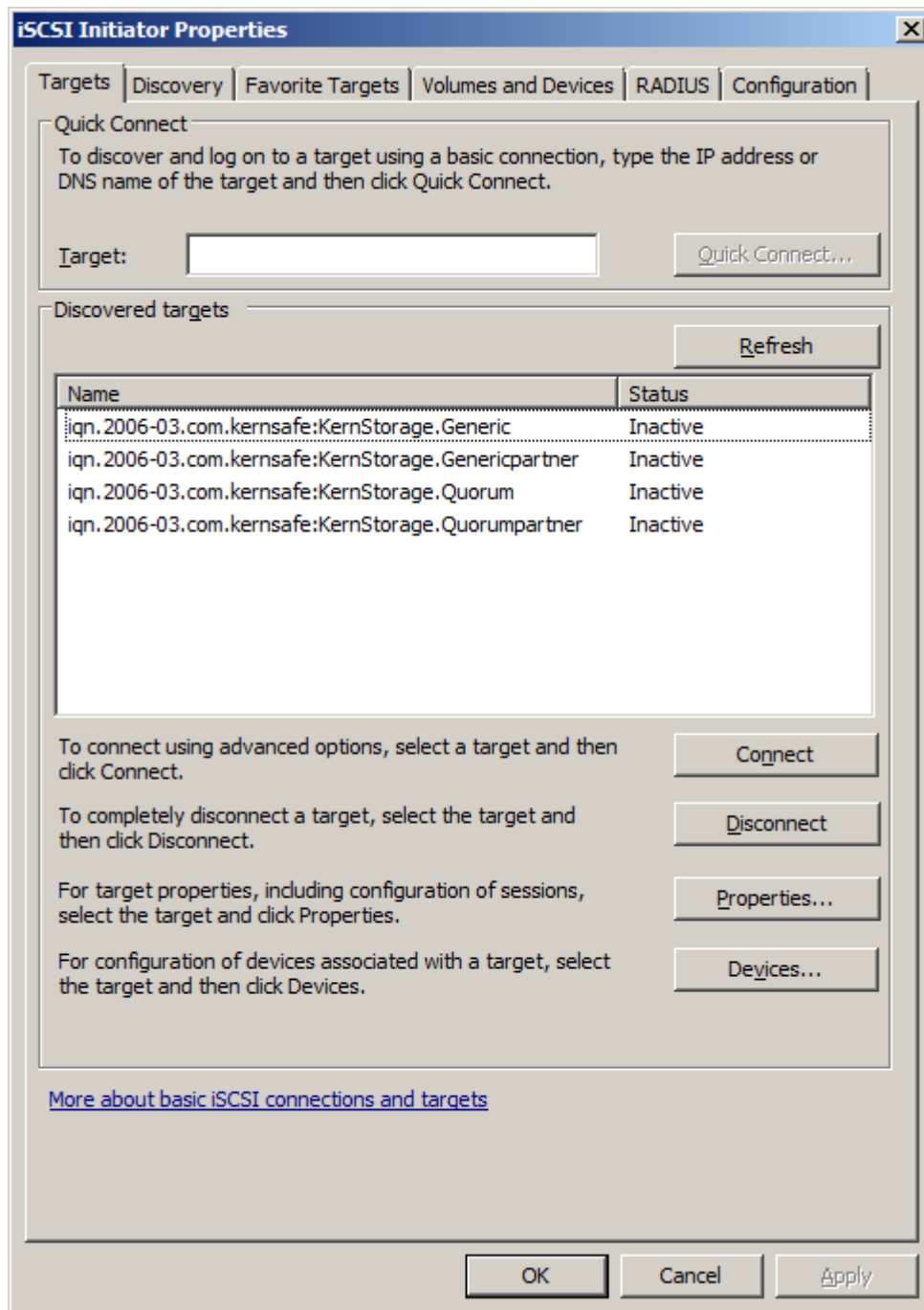
IP address or DNS name: 192.168.0.5 Port: (Default is 3260.) 3260

Advanced... OK Cancel

Type **IP address or NDS name** and **Port** of the iStorage Server in the required fields.

Press the **OK** button to add.

Select the **Targets** page.



Select the targets just added and then press the **Connect** button.

**Connect To Target** [X]

Target name:  
iqn.2006-03.com.kernsafe:KernStorage.Quorum

☒ Add this connection to the list of Favorite Targets.  
This will make the system automatically attempt to restore the connection every time this computer restarts.

☒ Enable multi-path

Advanced... OK Cancel

**Connect To Target** [X]

Target name:  
iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner

☒ Add this connection to the list of Favorite Targets.  
This will make the system automatically attempt to restore the connection every time this computer restarts.

☒ Enable multi-path

Advanced... OK Cancel

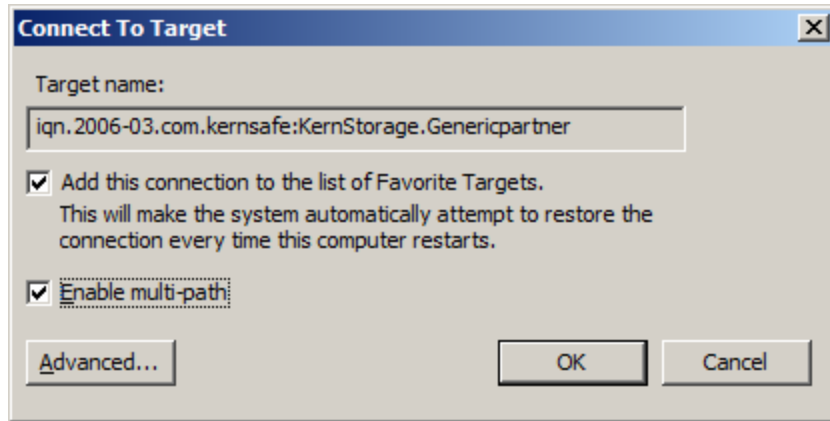
**Connect To Target** [X]

Target name:  
iqn.2006-03.com.kernsafe:KernStorage.Generic

☒ Add this connection to the list of Favorite Targets.  
This will make the system automatically attempt to restore the connection every time this computer restarts.

☒ Enable multi-path

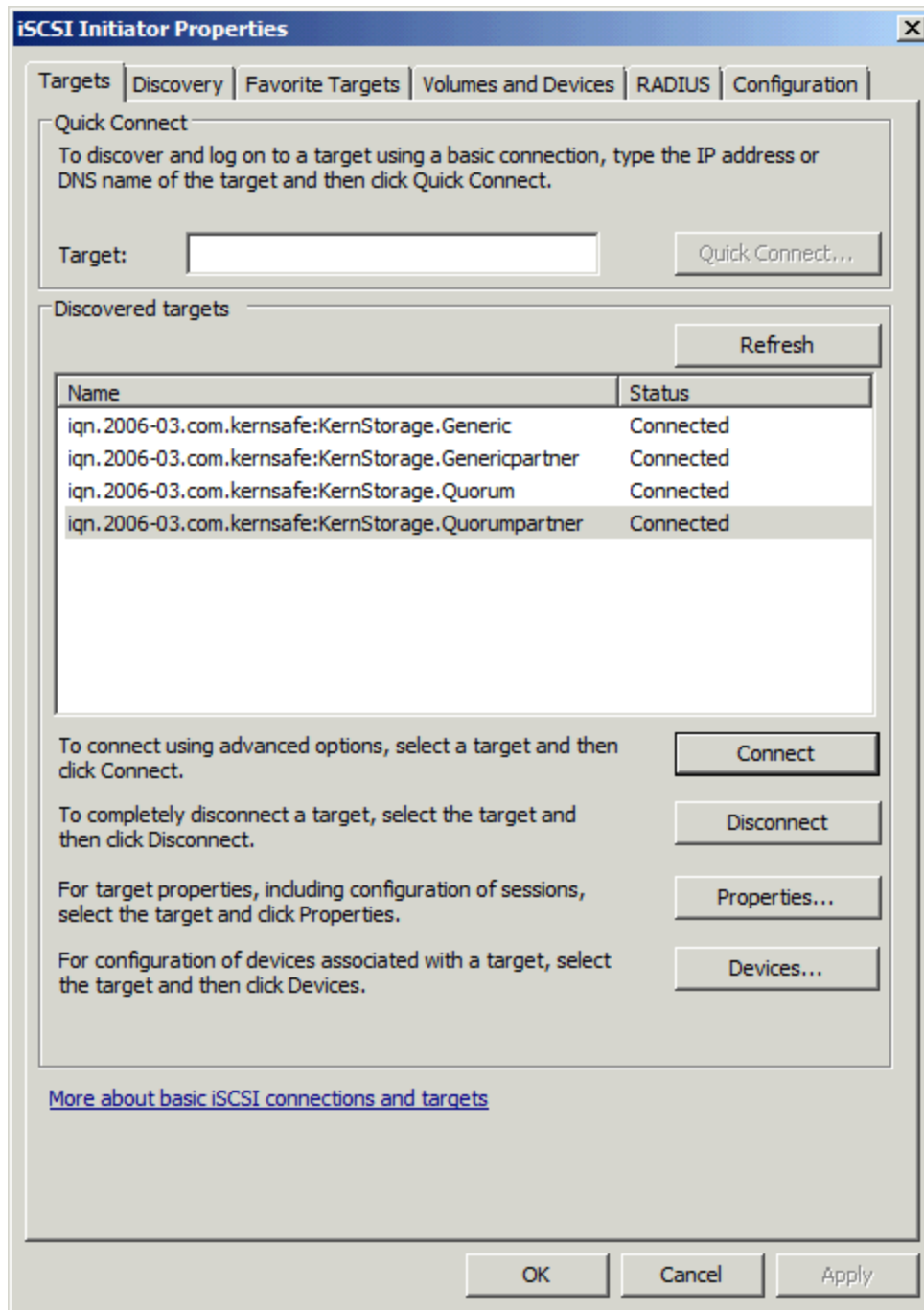
Advanced... OK Cancel



Keep selection of the **Add this connection to the list of Favorite Targets**.

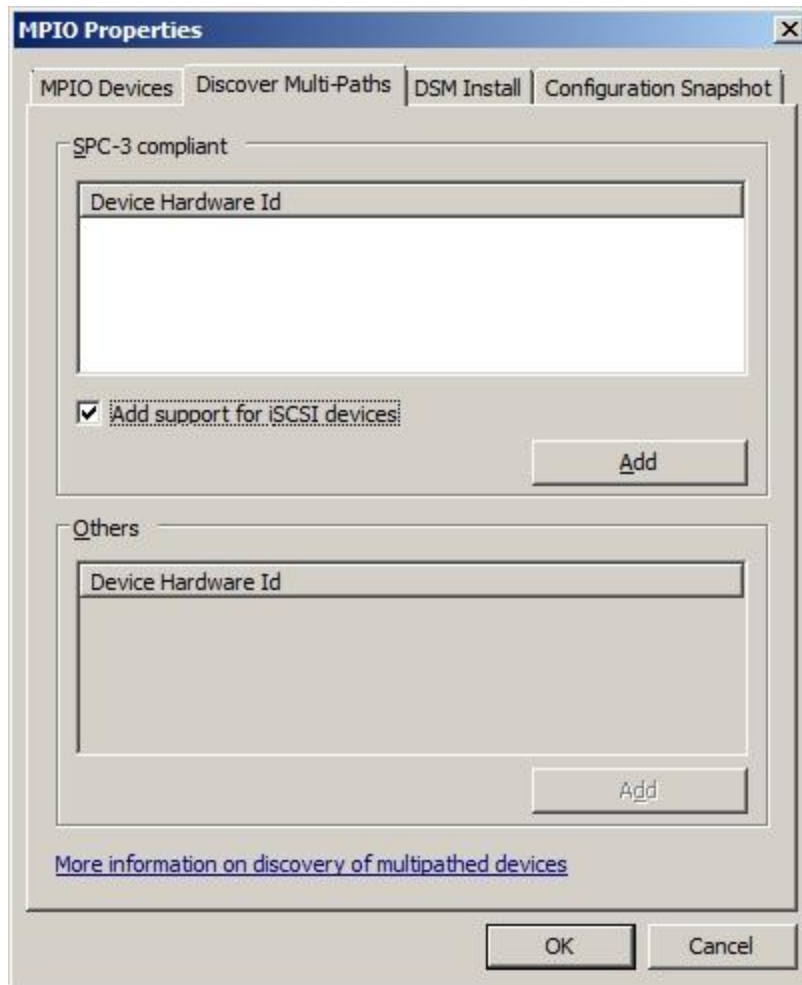
Press the **OK** button to continue.

If successful, the logged on targets are shown in the figure.



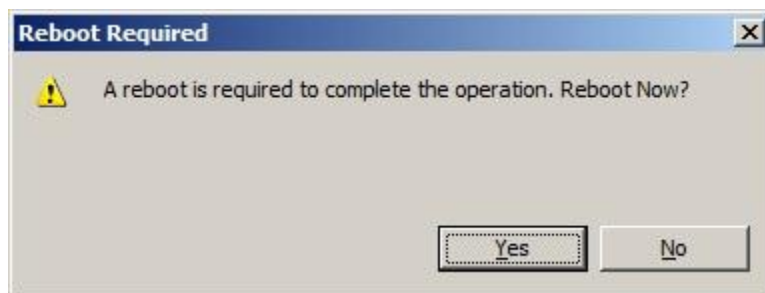
## Enable Multipath Support

Launch MPIO manager by clicking **Start->Administrative Tools->MPIO**. Go to **Discover Multi-Paths** tab, check **Add support for iSCSI devices**.



Click the **Add** button.

Windows will prompt you to reboot the server.

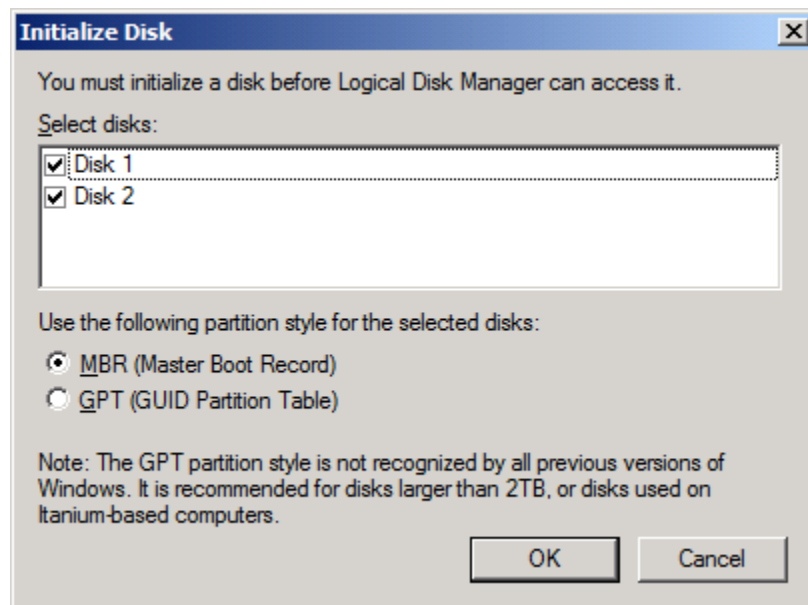


Click the **Yes** button to restart your server.

Launch the **Windows Computer Management Console**.



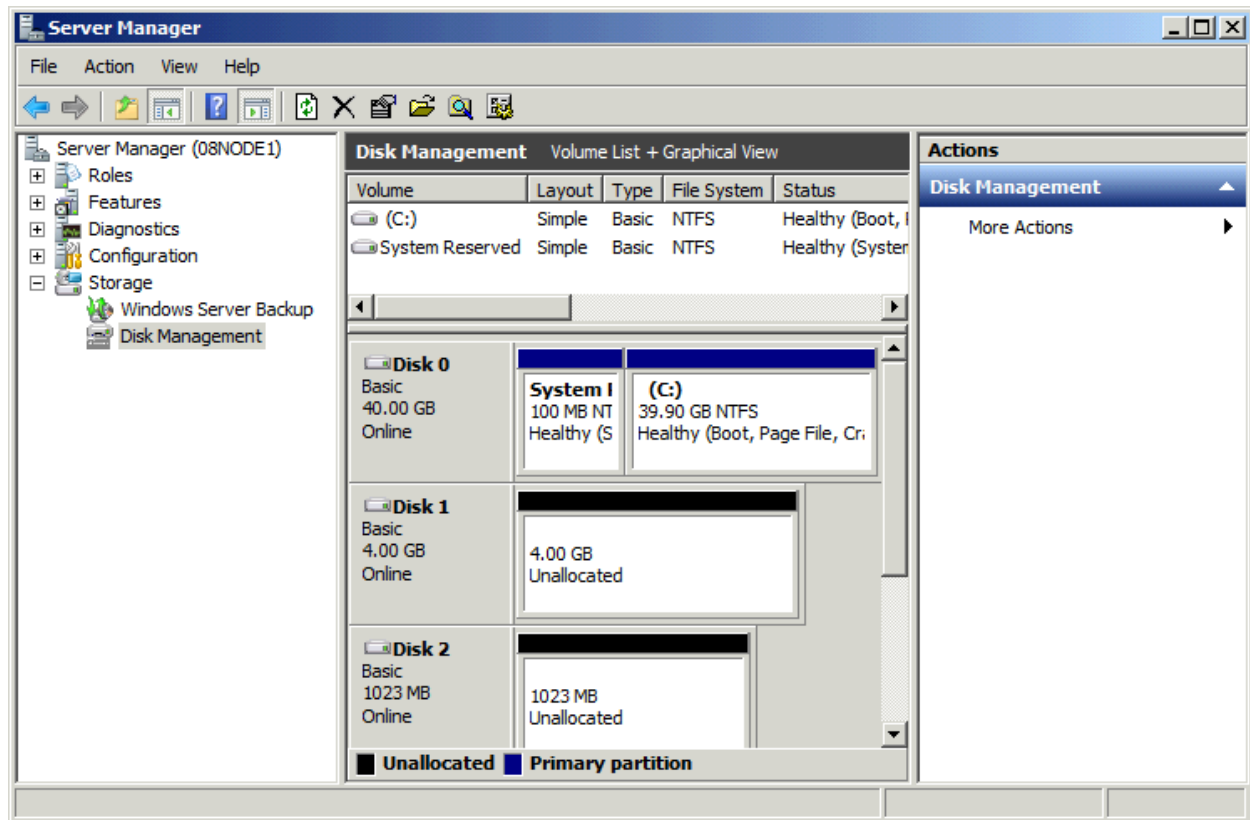
An **Initialize Disk** dialog is shown.



Keep the selection of the tow disks.

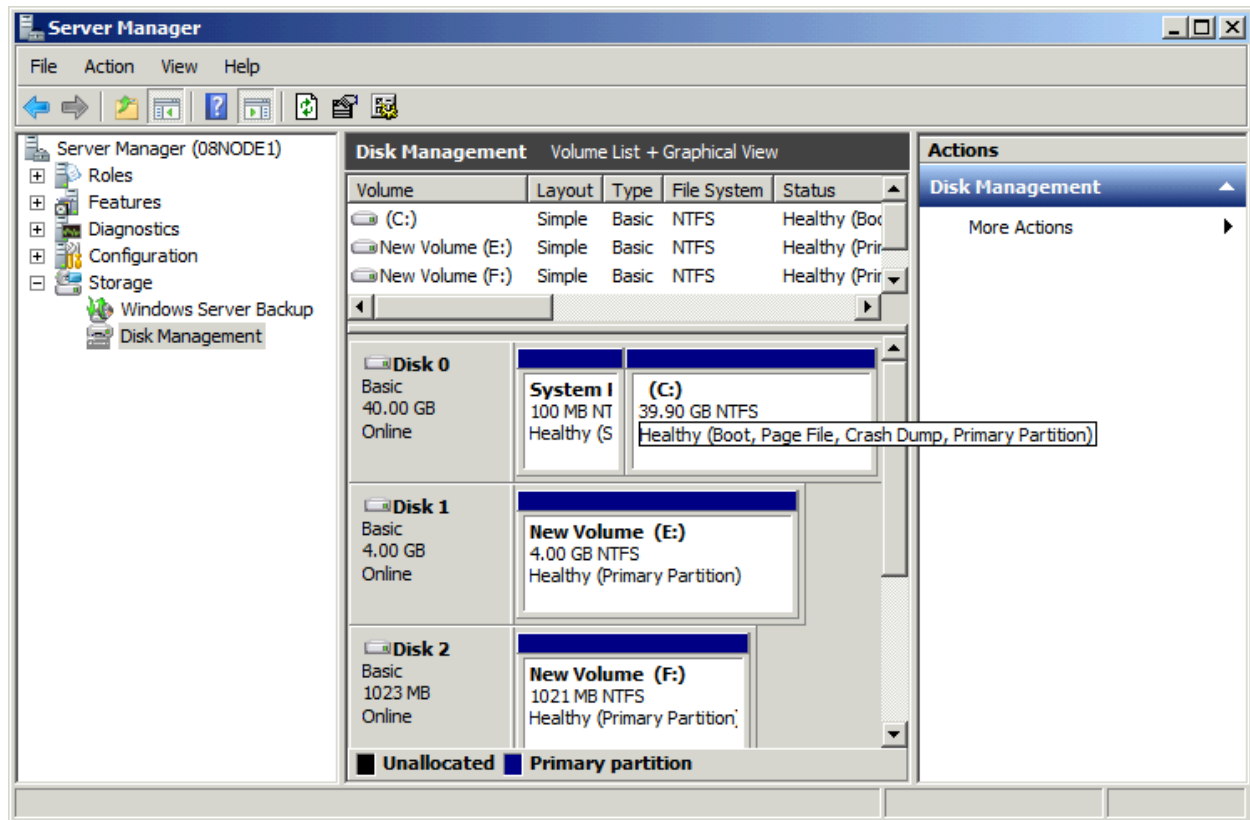
Select partition style for the selected disks.

Press the **OK** button to continue.



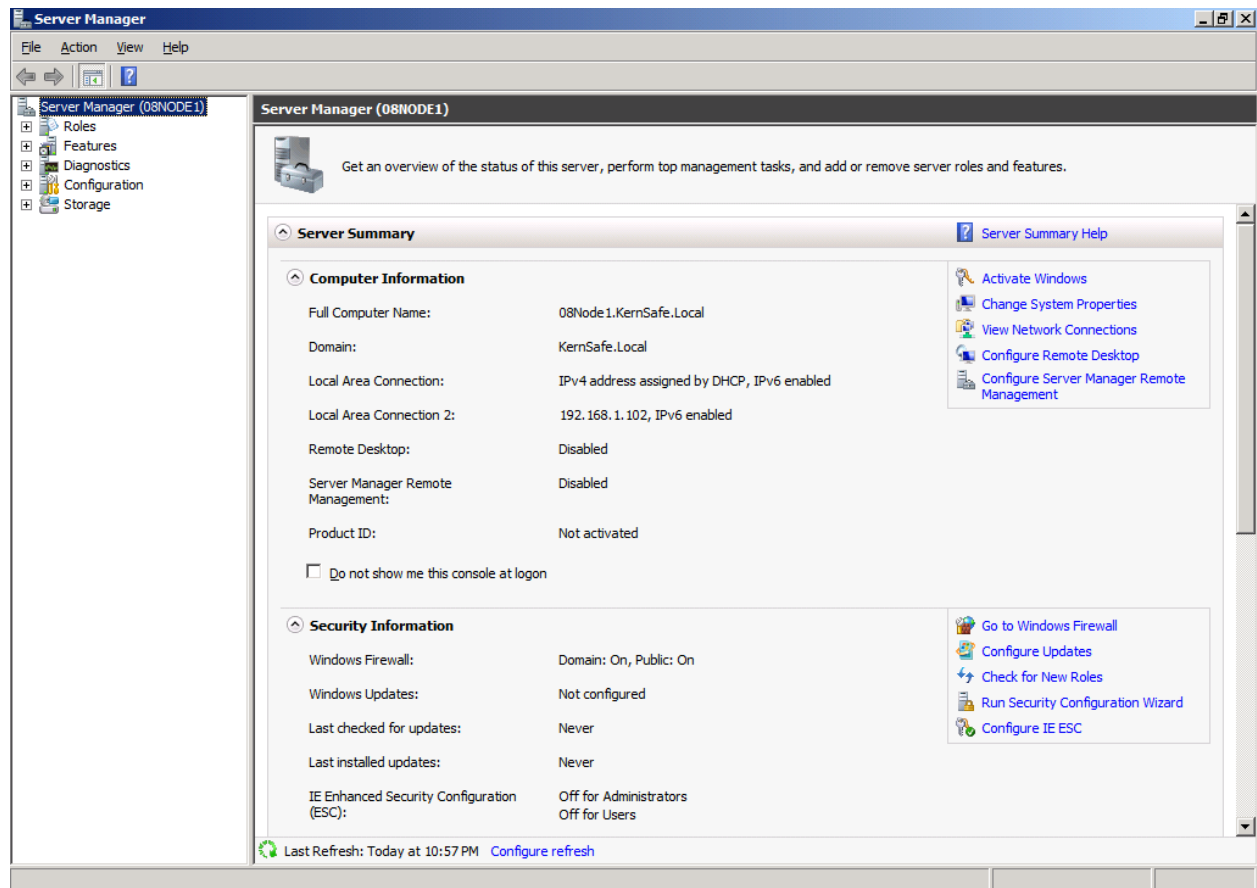
Right click on the Disks and then select New Simple Volume, partition and format the two disks followed by wizard.

If successful, the new volumes created are shown in the figure below.

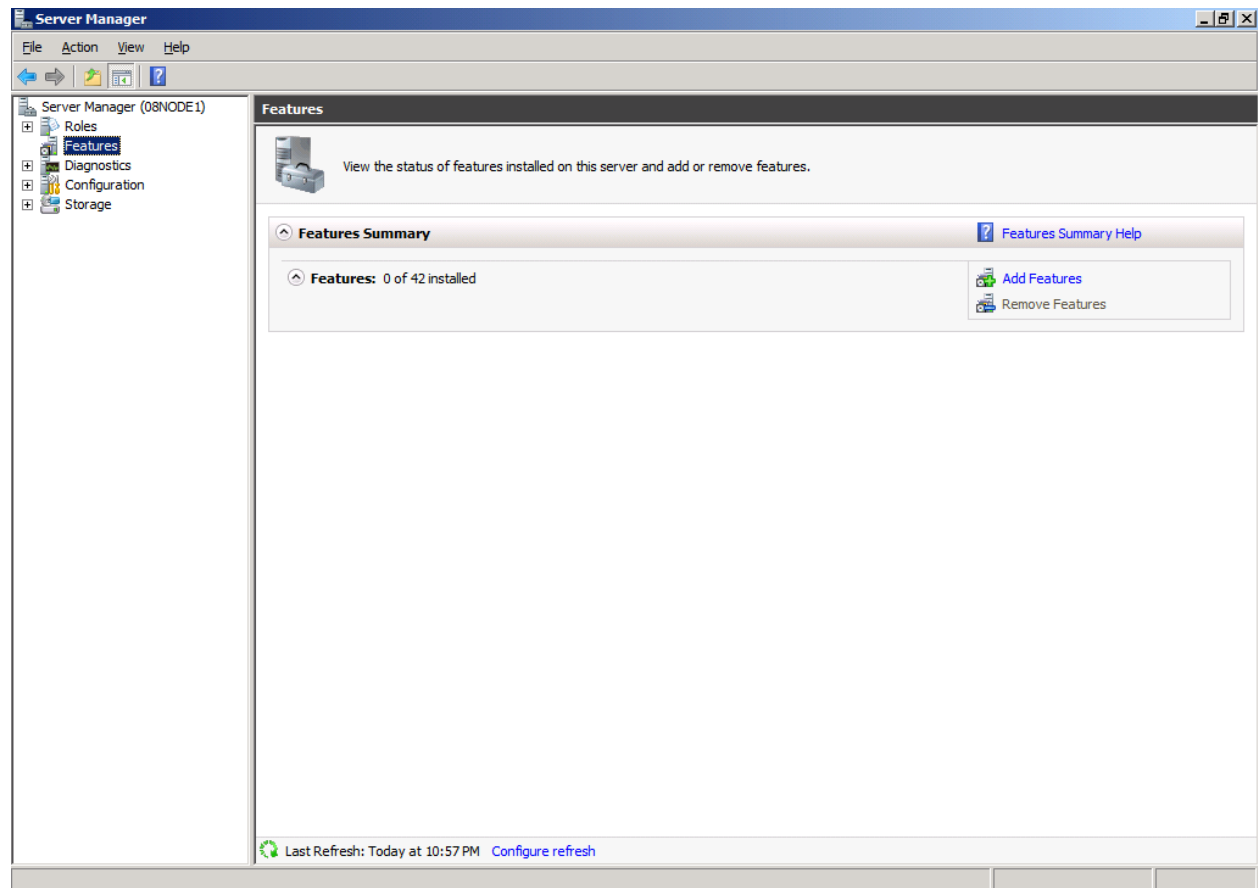


## Installing Failover Clustering Service

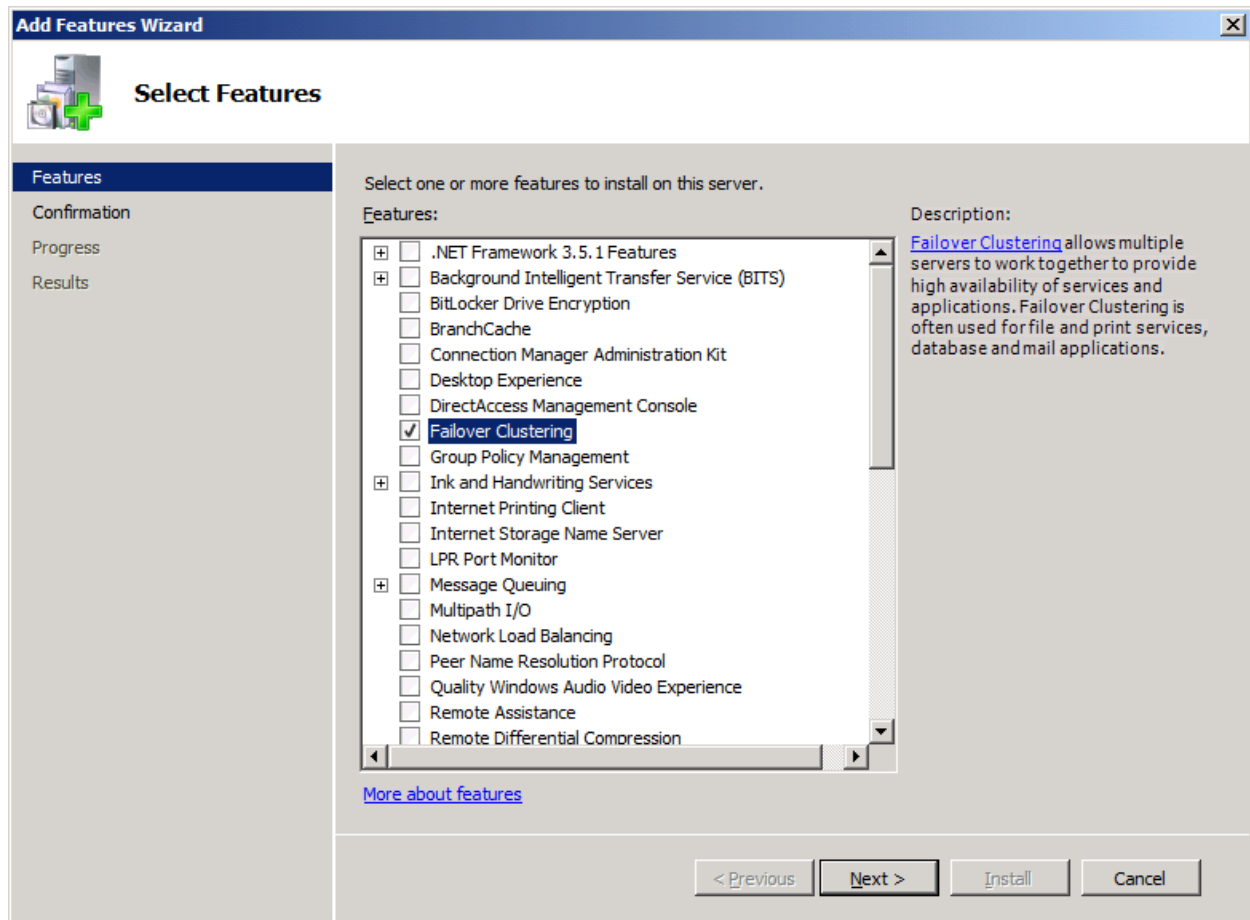
Launch the **Windows Server manager Console**.



Select the **Features** node from the left tree view.

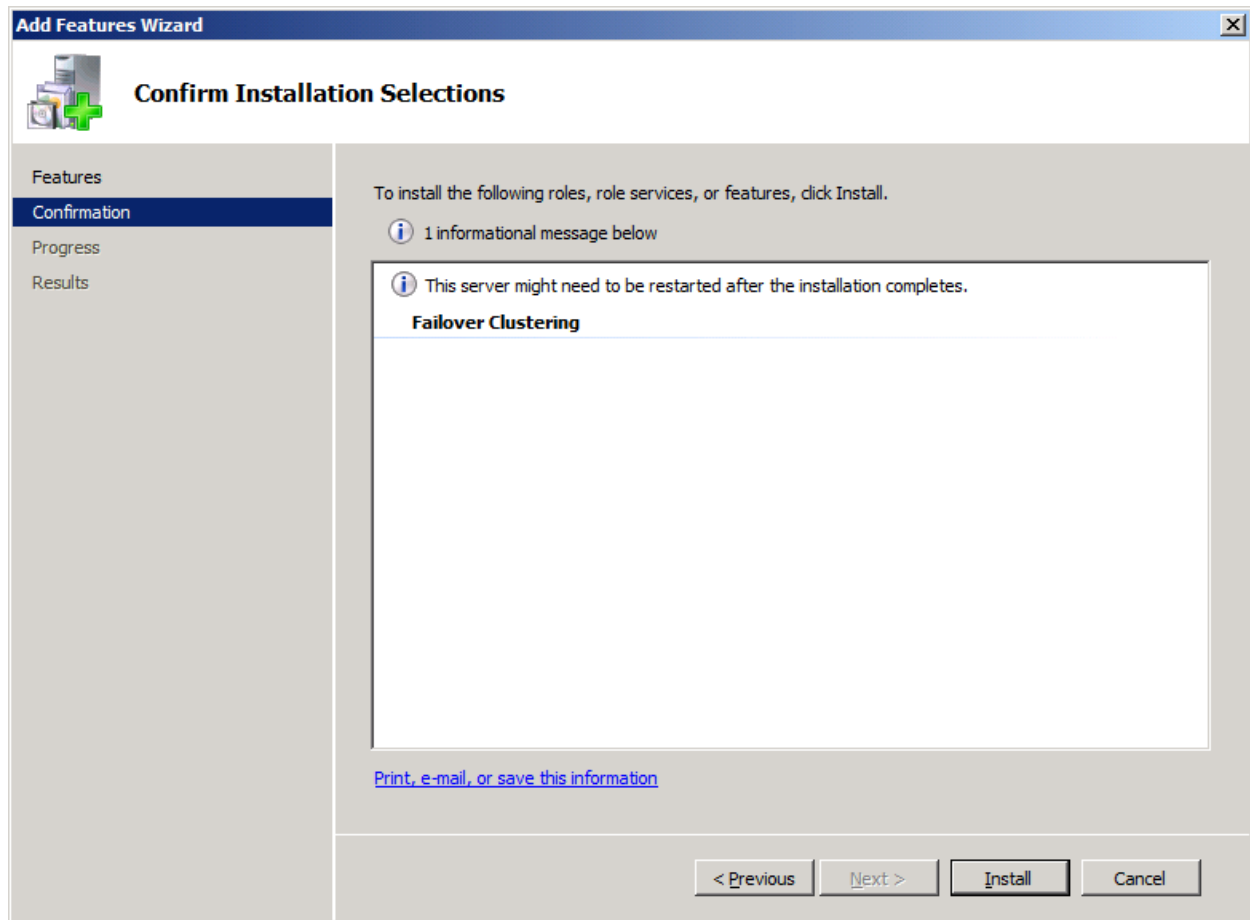


Click the **Add Features** link, the **Add Features Wizard** is shown.



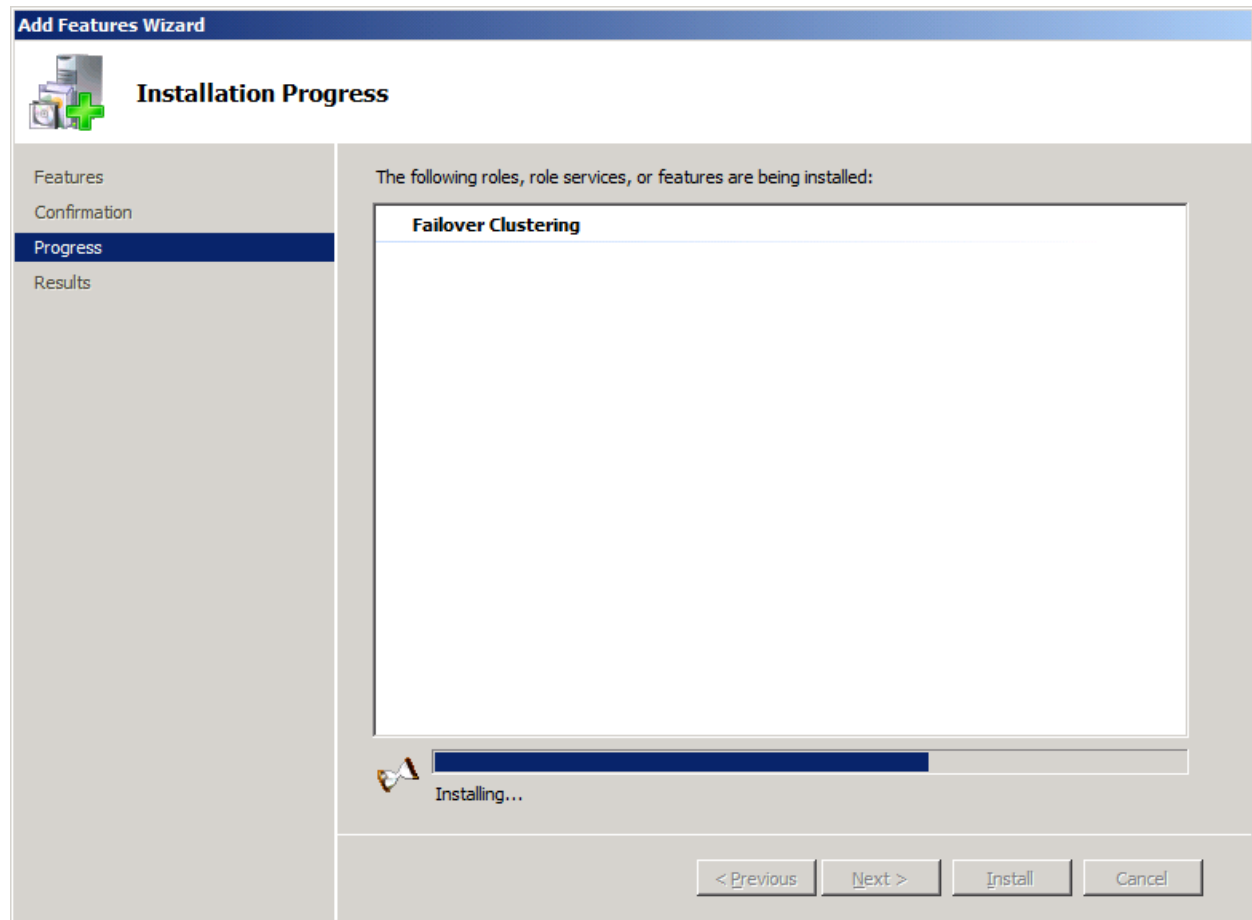
Select the **Failover Clustering**.

Press the **Next** button to continue.



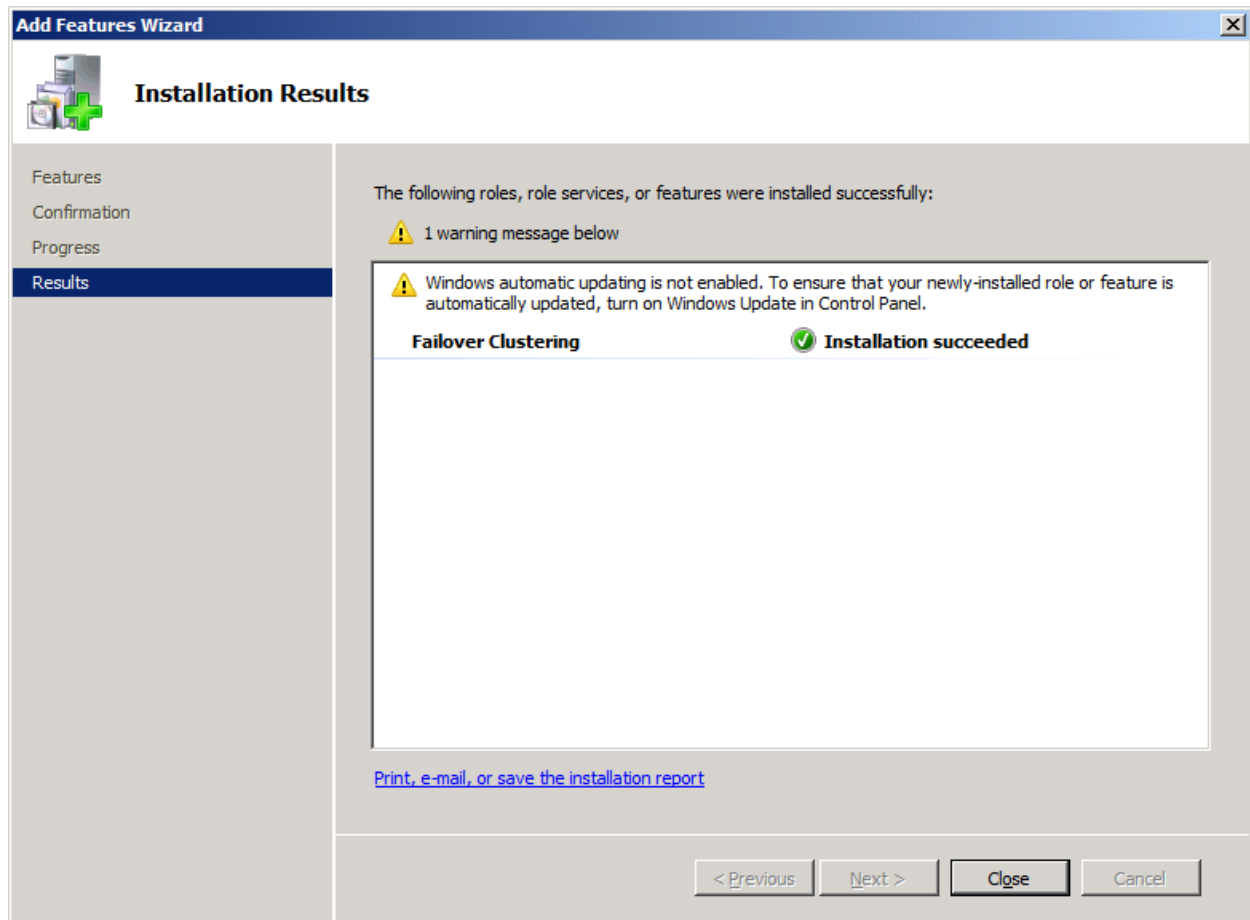
Press the **Install** button to install the **Failover Clustering** feature.

The installation of the Failover Clustering is going on.



If successful, the wizard will complete and show as the figure below.





Press the **Close** button.

## Configuring on Cluster Node 2

### Network Adapter

For working in clustering environment, the network adapter must be assigned a static IP address. Select the **Internet Protocol Version 4(TCP/IPv4)** and then press the **Properties** button, the **Internet Protocol**

Version 4 (TCP/IPv4) dialog is shown.

The screenshot shows the 'Internet Protocol Version 4 (TCP/IPv4) Properties' dialog box with the 'General' tab selected. The dialog has a title bar with a question mark and a close button. Below the title bar, the 'General' tab is active. A text box explains: 'You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.' There are two radio buttons: 'Obtain an IP address automatically' (unselected) and 'Use the following IP address:' (selected). Below the selected radio button, there are three text boxes: 'IP address:' with the value '192 . 168 . 1 . 102', 'Subnet mask:' with the value '255 . 255 . 255 . 0', and 'Default gateway:' with the value '192 . 168 . 1 . 2'. Below these, there are two more radio buttons: 'Obtain DNS server address automatically' (unselected) and 'Use the following DNS server addresses:' (selected). Below the selected radio button, there are two text boxes: 'Preferred DNS server:' with the value '192 . 168 . 1 . 2' and 'Alternate DNS server:' with the value '. . .'. At the bottom left, there is a checkbox 'Validate settings upon exit' which is unchecked. At the bottom right, there is an 'Advanced...' button. At the very bottom, there are 'OK' and 'Cancel' buttons.

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 1 . 102

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 1 . 2

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 192 . 168 . 1 . 2

Alternate DNS server: . . .

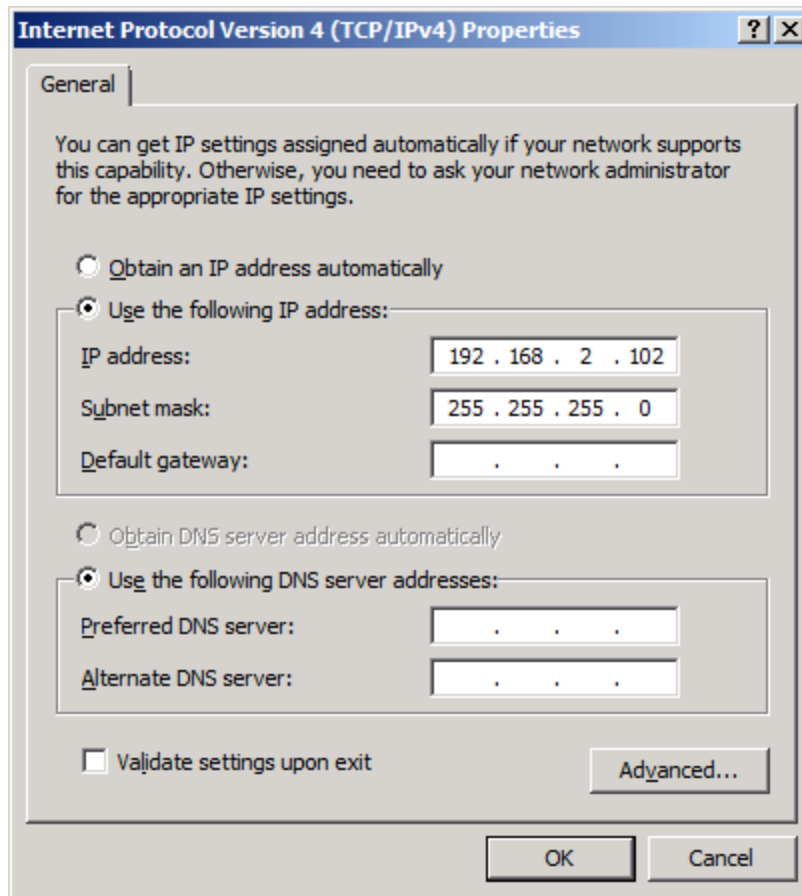
☐ Validate settings upon exit

Advanced...

OK Cancel

Type in the **IP address**, **Subnet mask**, **Default gateway** and **Preferred NDS server**.

Set the second network adapter of 08Node.



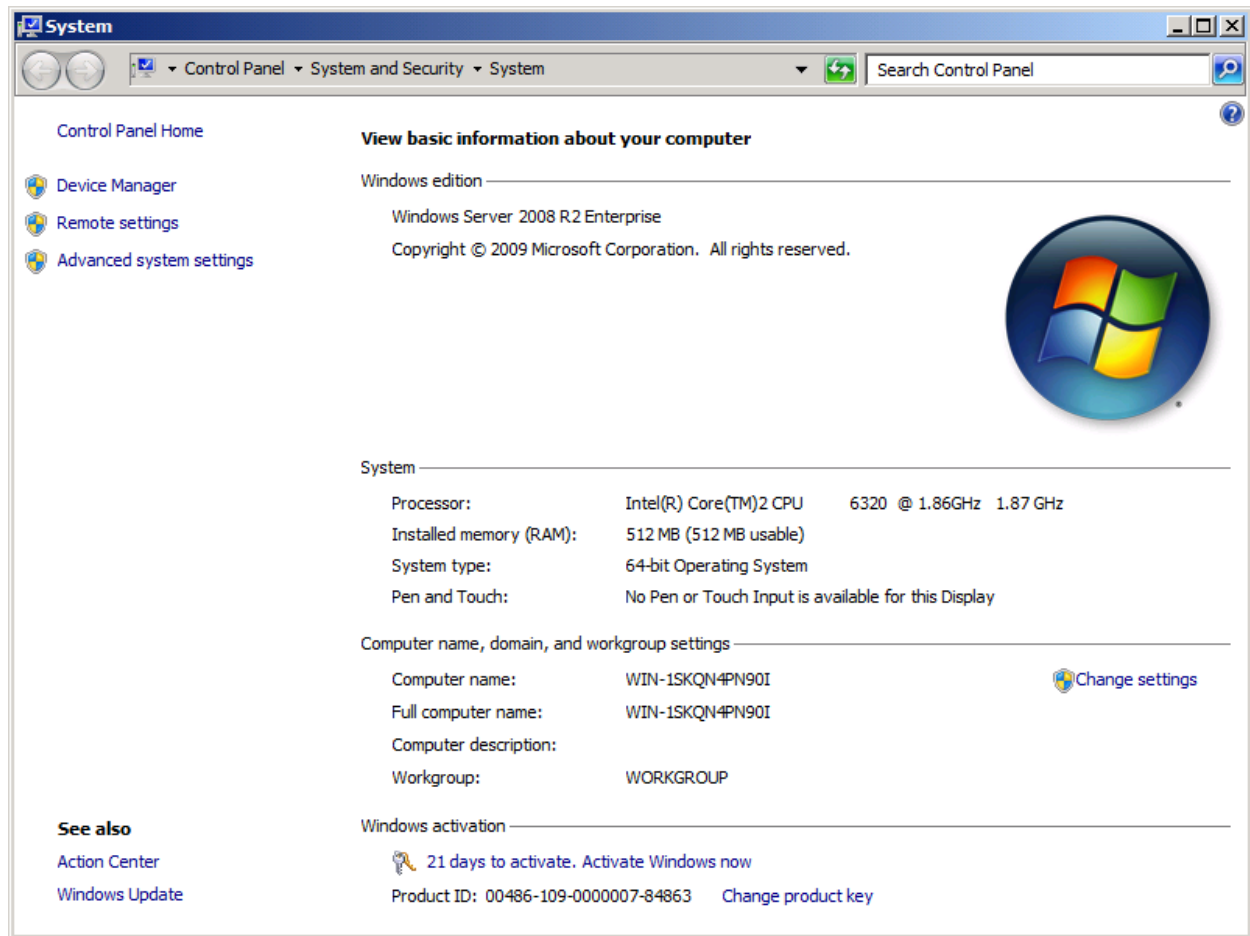
Type in the IP address and Subnet mask.

Press the **OK** button to change IP address.

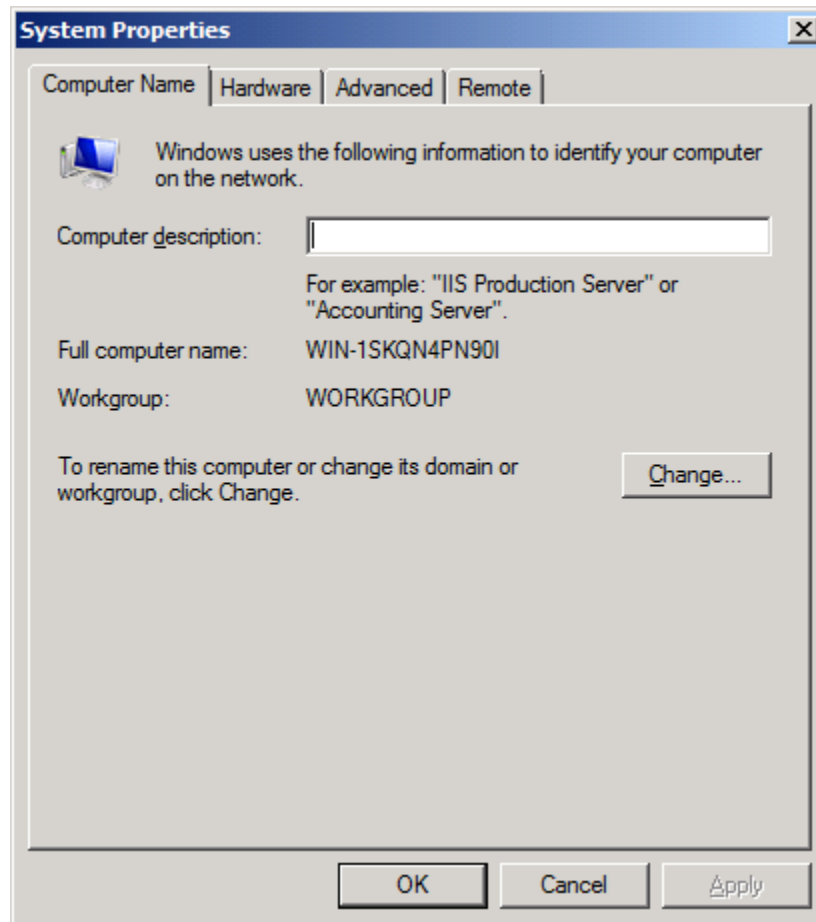
## Join to the domain

Press the **OK** button to change IP address.

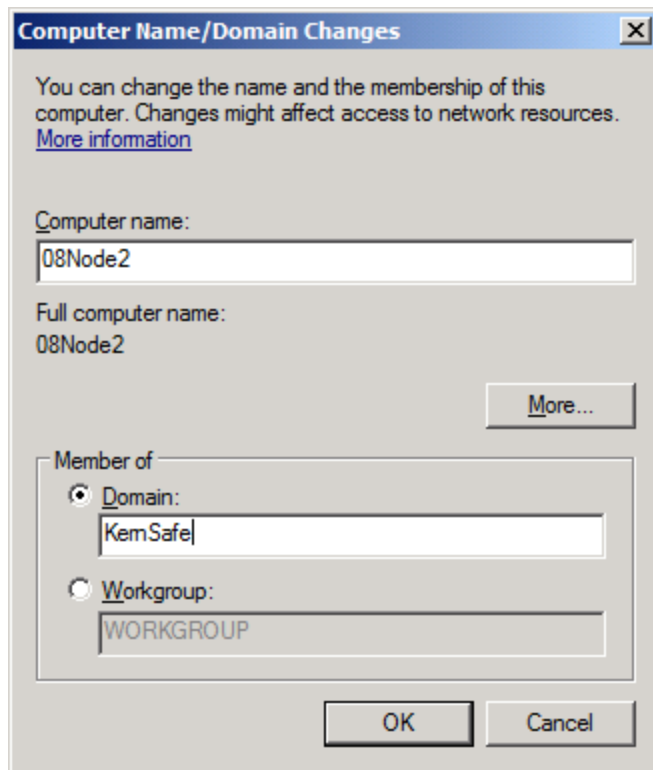
Open System Properties page.



Click on the **Change settings** link, the **System Properties** dialog is shown.



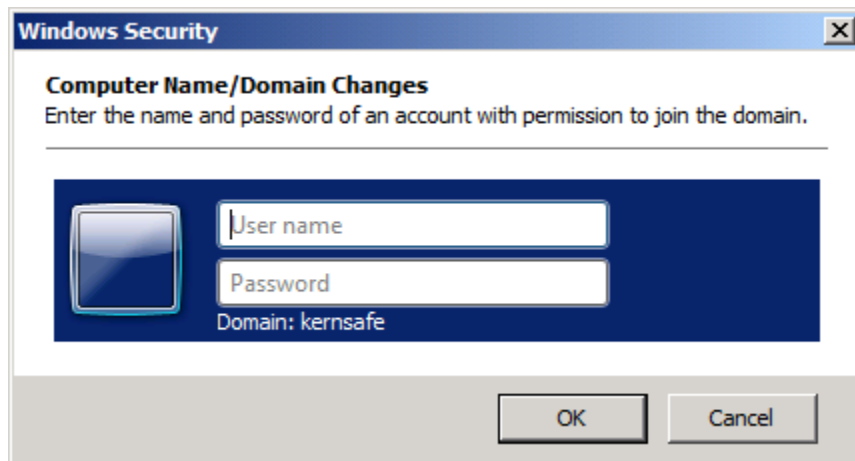
Press the **Change...** button.



Type 08Node2 in the **Computer name** and kernsafe.local in the **Domain**.

Press the **OK** button to change computer name and join the domain.

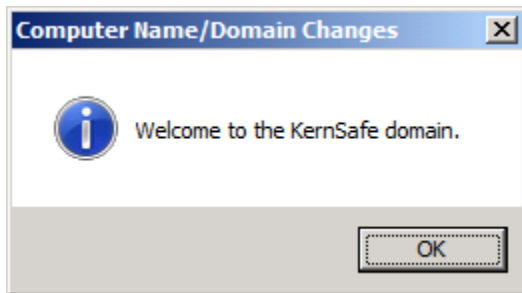
Domain controller account is required to join the domain.



Type your user name and password.

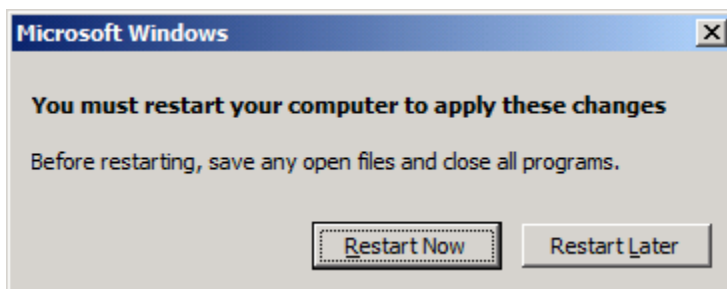
Press the **OK** button to continue.

If successful, the **Computer Name/Domain Changes** notification dialog is shown as below.



Press the **OK** button to continue.

Restart is required.

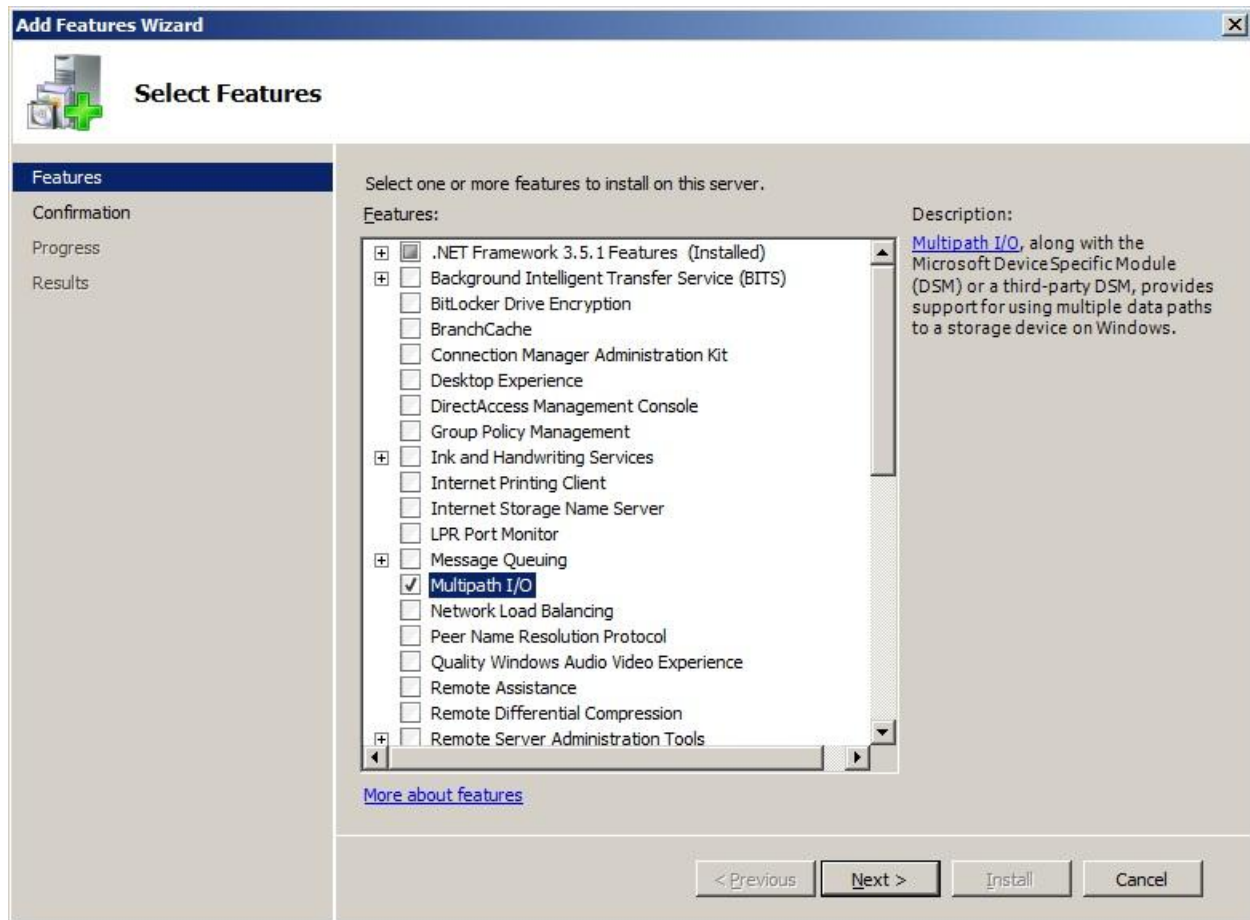


Press the **Restart Now** button to restart the computer.

## Install MPIO Feature

Launch **Start->Administrative Tools->Server Manager**, go to **Features** item, and click **Add** Features.

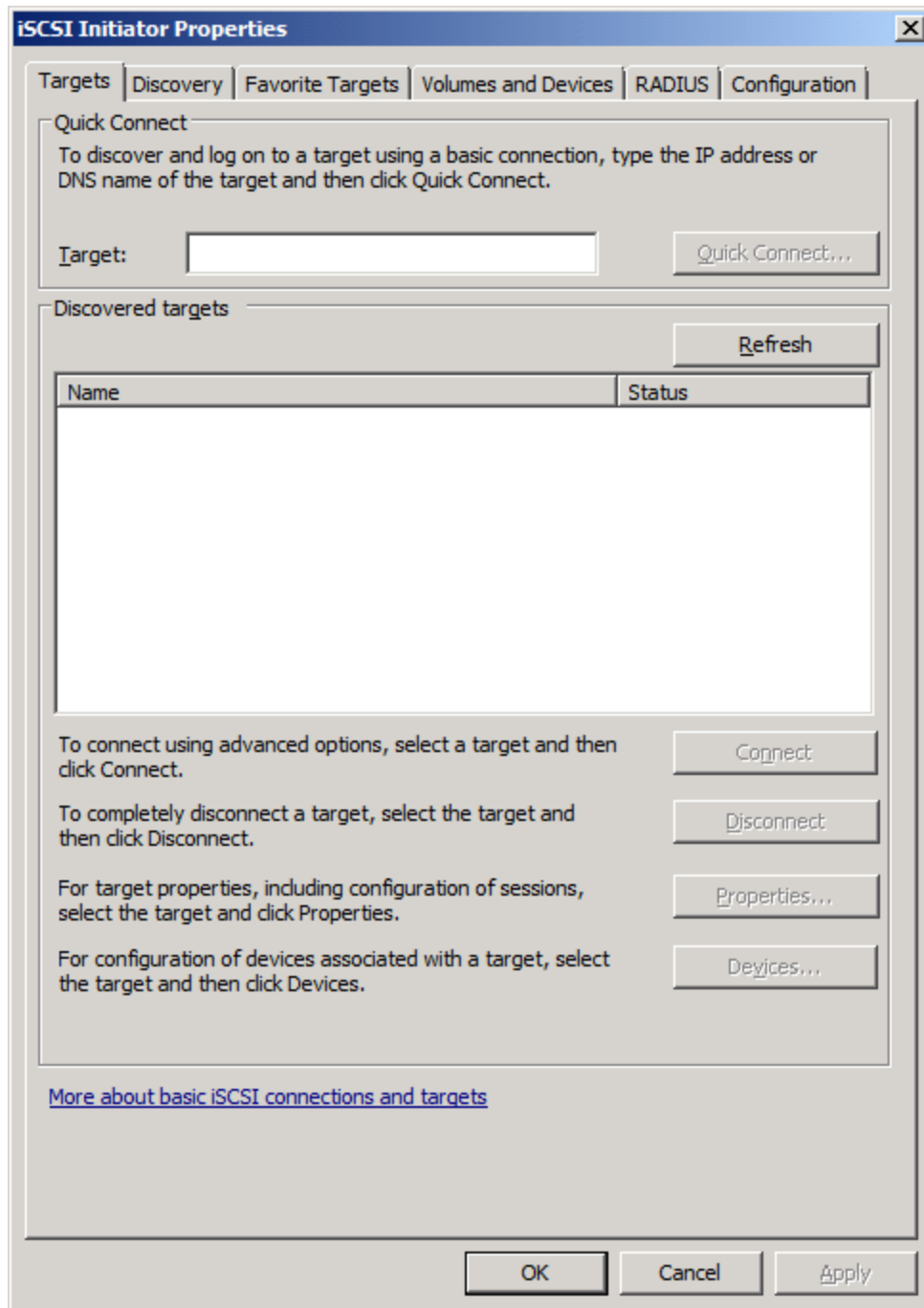
An **Add Features Wizard** will appear. In the features list select **Multipath I/O** feature and install it.



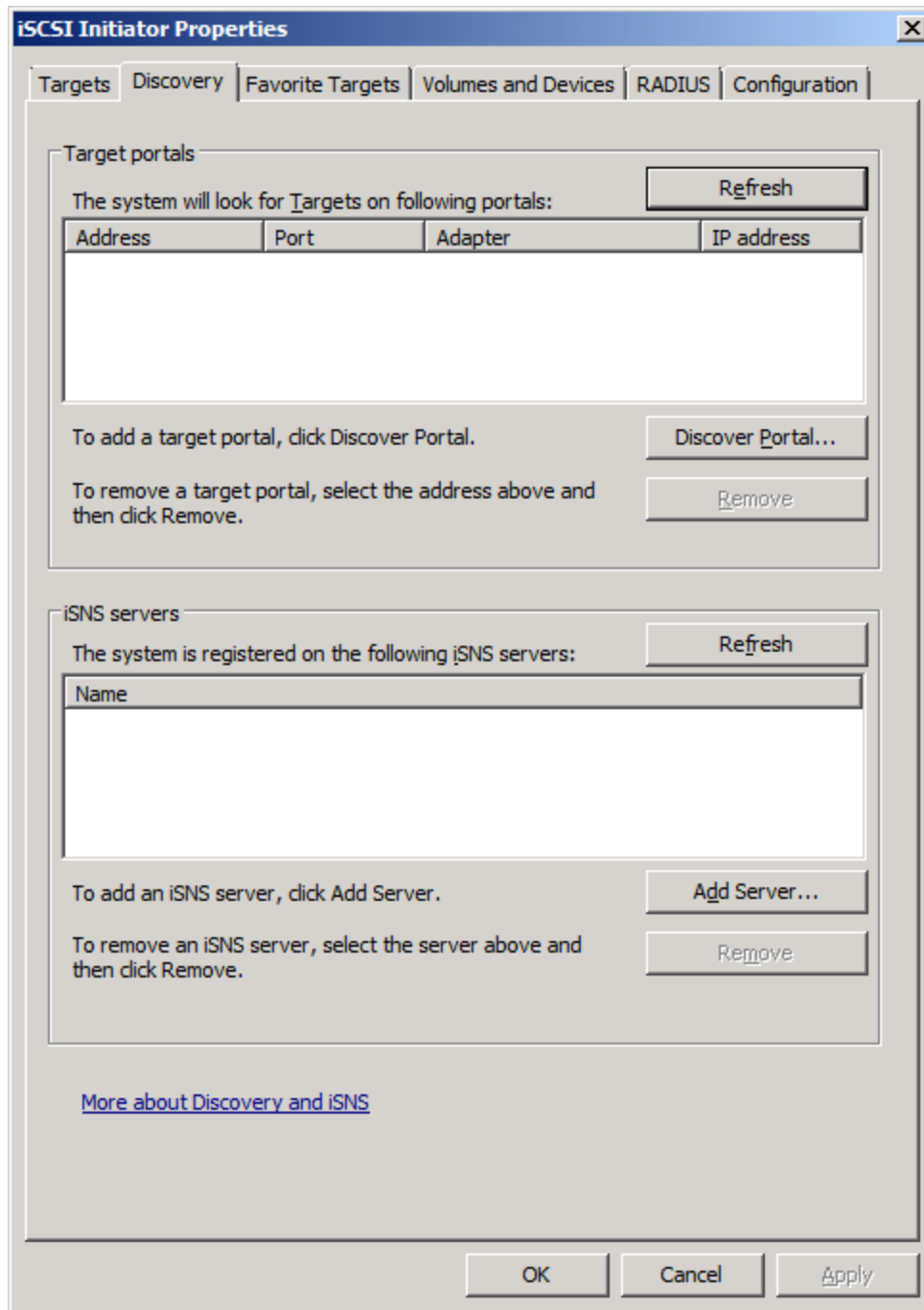
## Log in to iSCSI disks

Launch the Administrative Tools -> Microsoft iSCSI initiator.

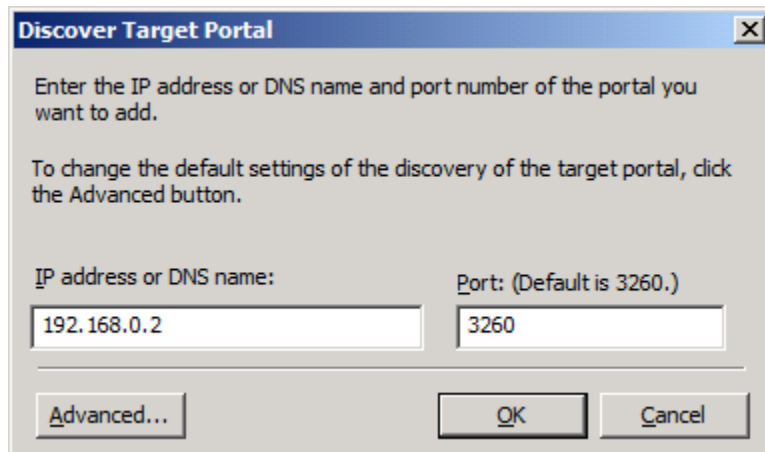




Select the **Discovery** page.



Press the **Discovery Portal** button, the **Discovery Target Portal** dialog is shown.



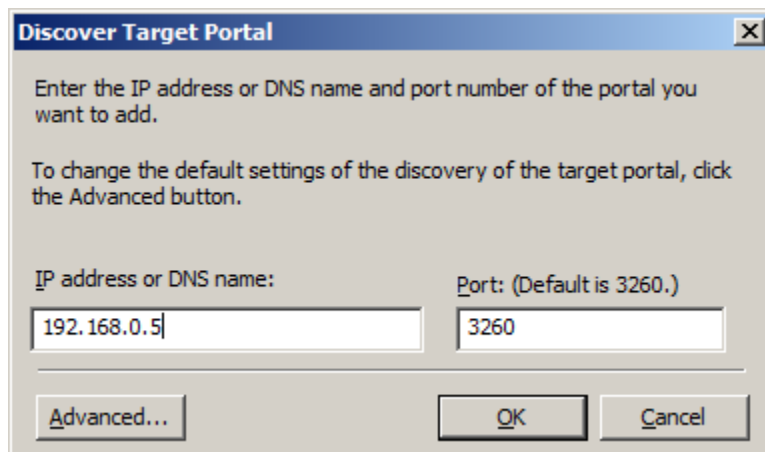
**Discover Target Portal** [X]

Enter the IP address or DNS name and port number of the portal you want to add.

To change the default settings of the discovery of the target portal, click the Advanced button.

IP address or DNS name: 192.168.0.2 Port: (Default is 3260.) 3260

Advanced... OK Cancel



**Discover Target Portal** [X]

Enter the IP address or DNS name and port number of the portal you want to add.

To change the default settings of the discovery of the target portal, click the Advanced button.

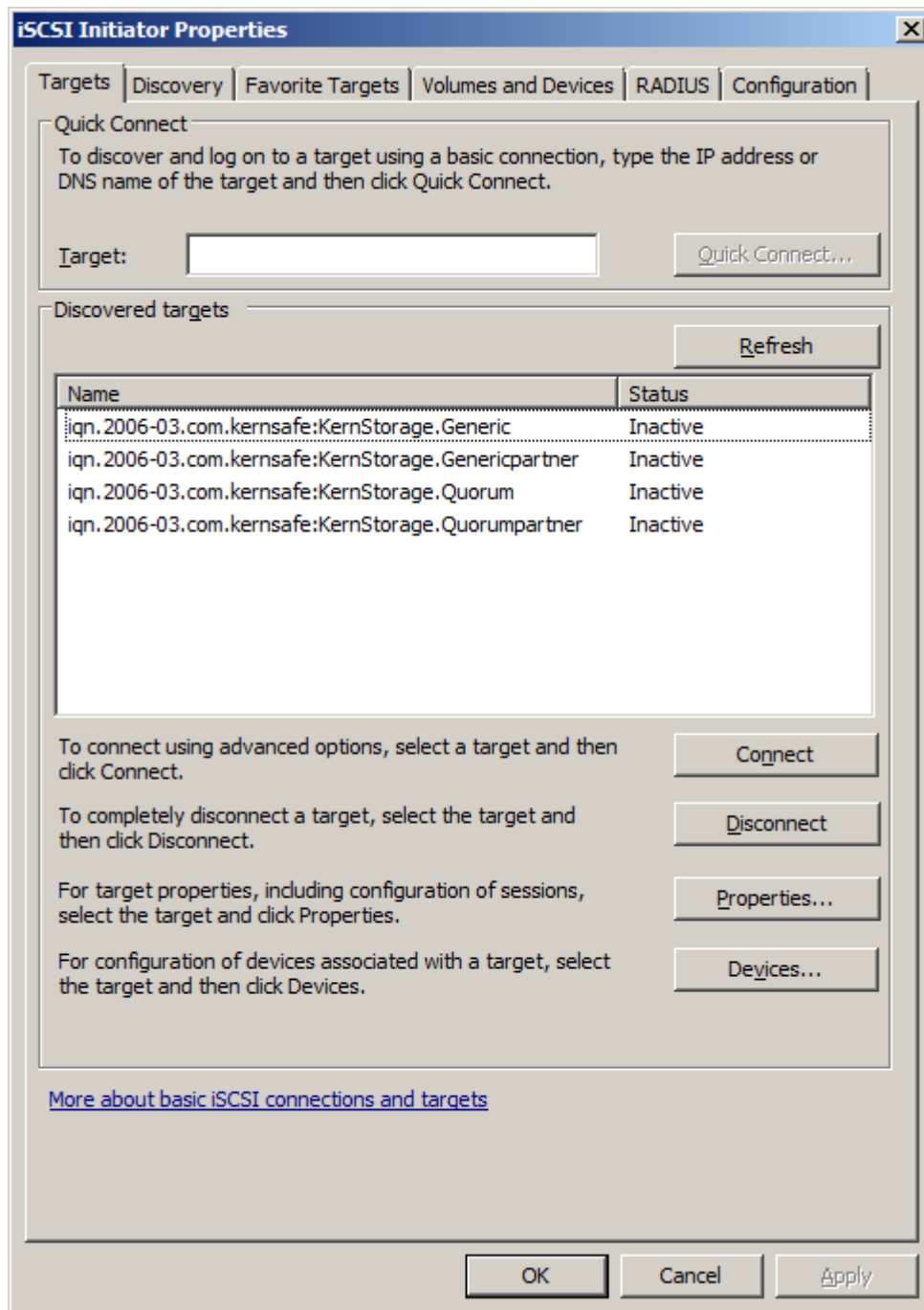
IP address or DNS name: 192.168.0.5 Port: (Default is 3260.) 3260

Advanced... OK Cancel

Type **IP address or NDS name** and **Port** of the iStorage Server in the required fields.

Press the **OK** button to add.

Select the **Targets** page.



Select the targets just added and then press the **Connect** button.

**Connect To Target** [X]

Target name:  
iqn.2006-03.com.kernsafe:KernStorage.Quorum

☒ Add this connection to the list of Favorite Targets.  
This will make the system automatically attempt to restore the connection every time this computer restarts.

☒ Enable multi-path

Advanced... OK Cancel

**Connect To Target** [X]

Target name:  
iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner

☒ Add this connection to the list of Favorite Targets.  
This will make the system automatically attempt to restore the connection every time this computer restarts.

☒ Enable multi-path

Advanced... OK Cancel

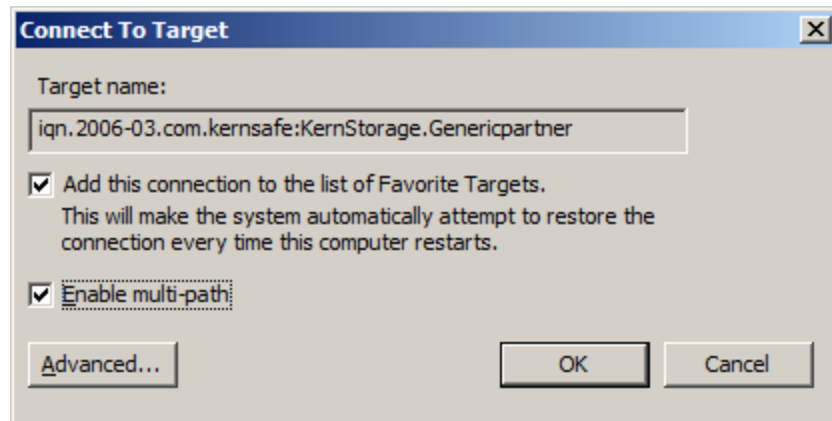
**Connect To Target** [X]

Target name:  
iqn.2006-03.com.kernsafe:KernStorage.Generic

☒ Add this connection to the list of Favorite Targets.  
This will make the system automatically attempt to restore the connection every time this computer restarts.

☒ Enable multi-path

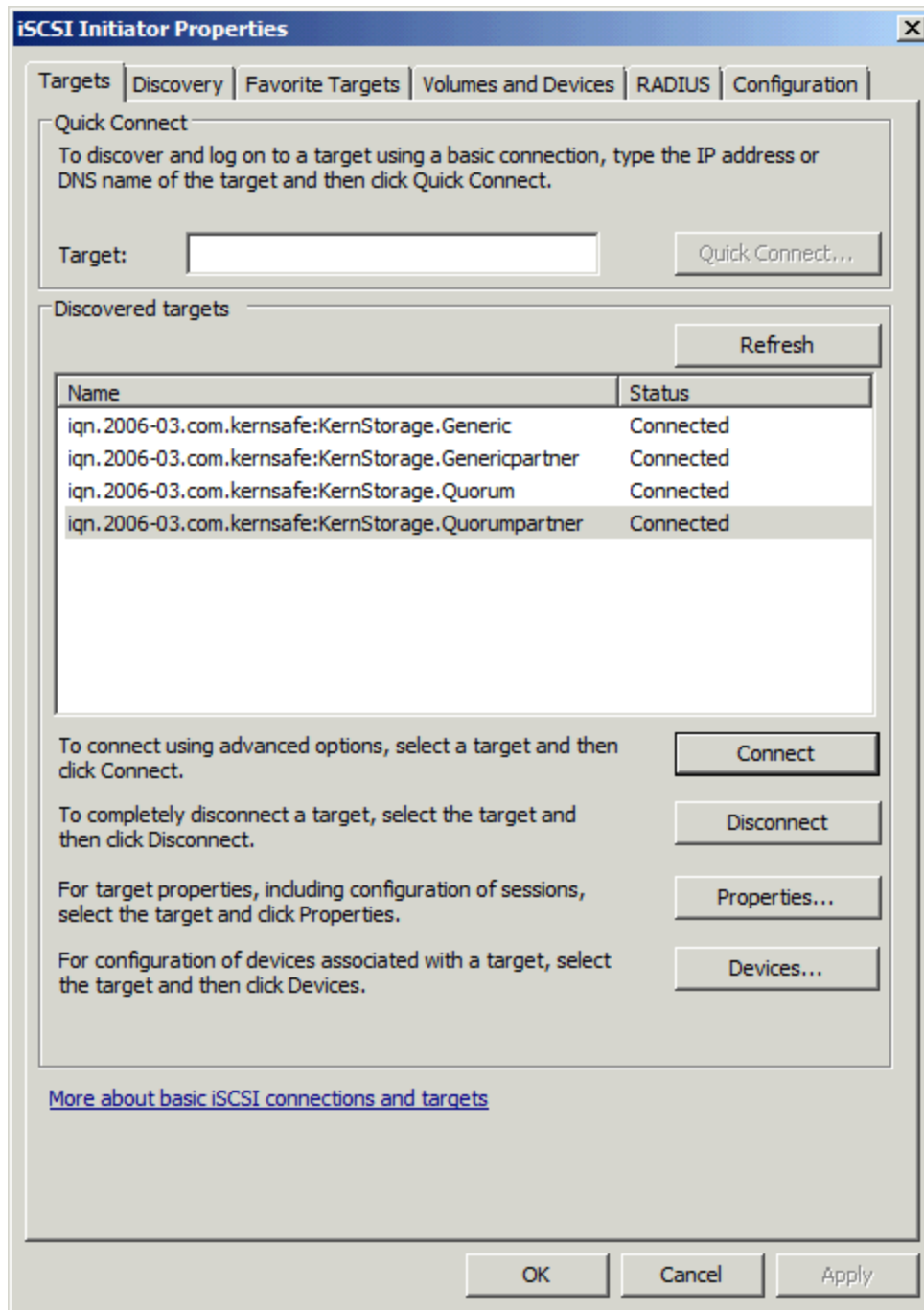
Advanced... OK Cancel



Keep selection of **the Add this connection to the list of Favorite Targets.**

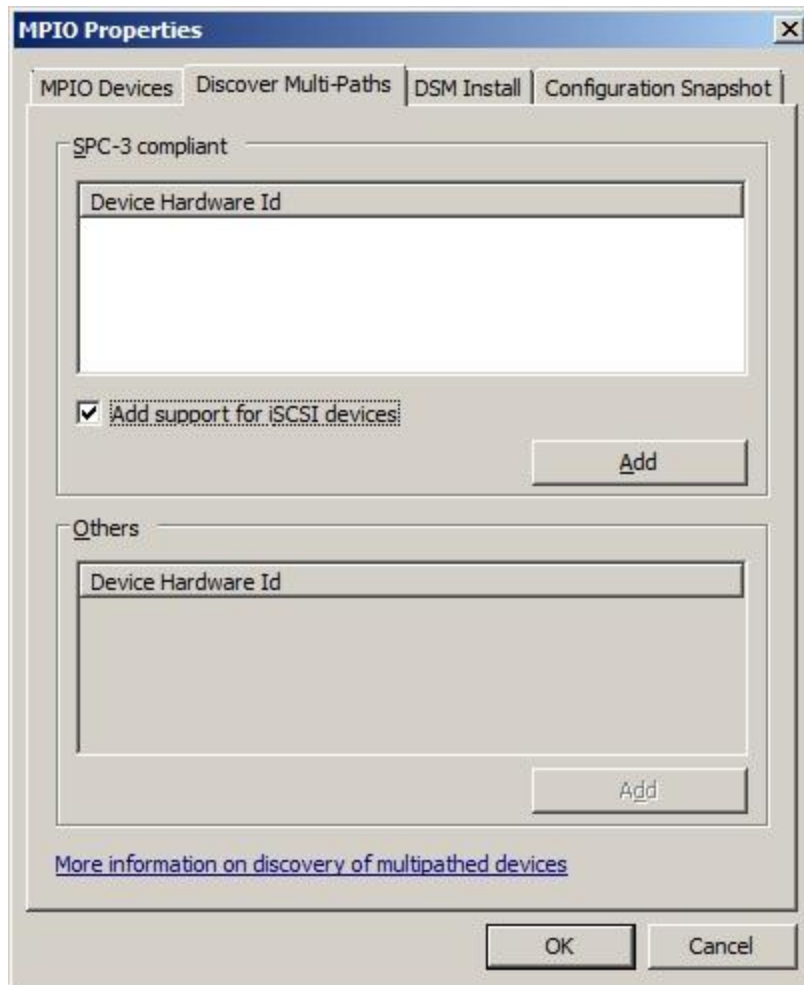
Press the **OK** button to continue.

If successful, the logged on targets are shown in the figure.



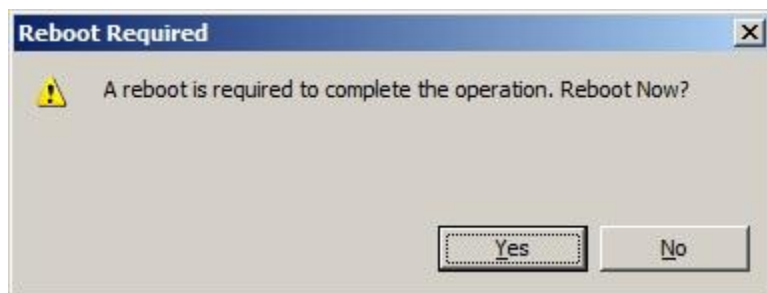
## Enable Multipath Support

Launch MPIO manager by clicking **Start->Administrative Tools->MPIO**. Go to **Discover Multi-Paths** tab, check **Add support for iSCSI devices**.



Click the **Add** button.

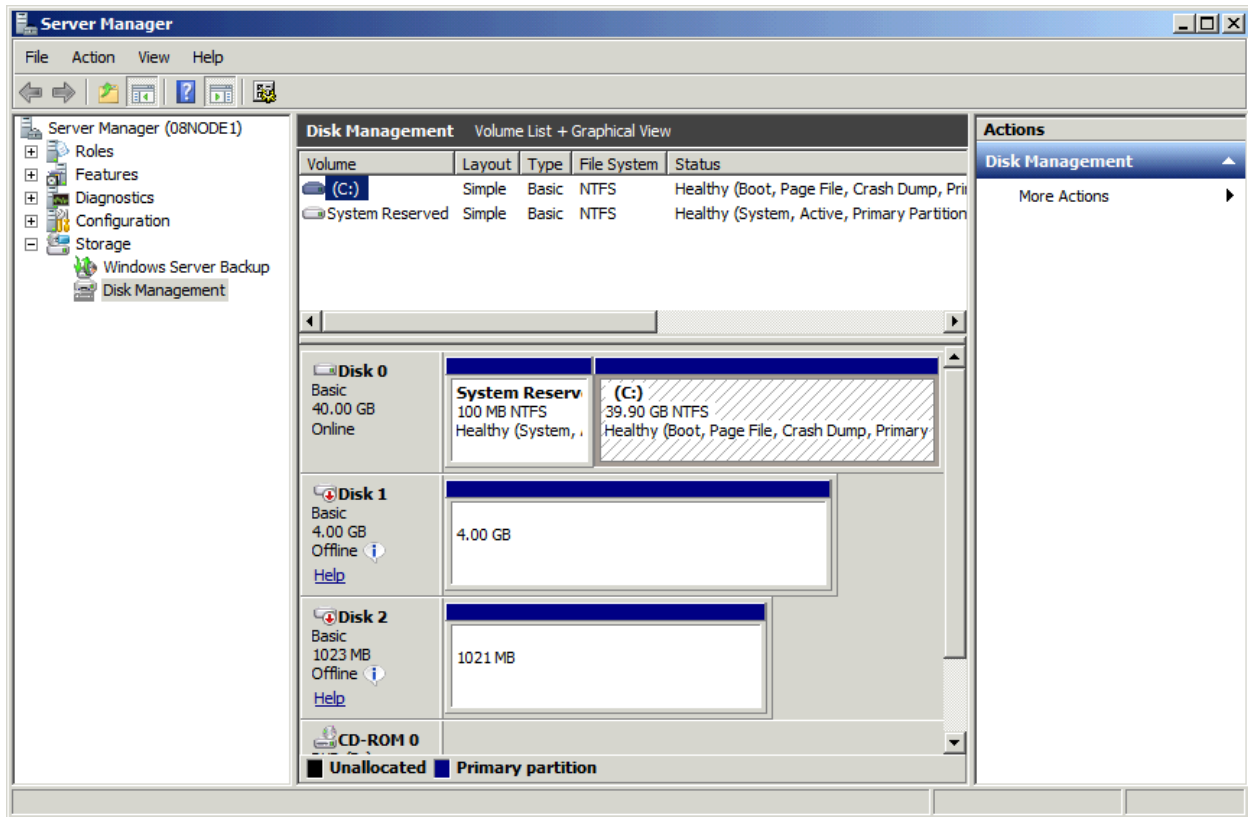
Windows will prompt you to reboot the server.



Click the **Yes** button to restart your server.



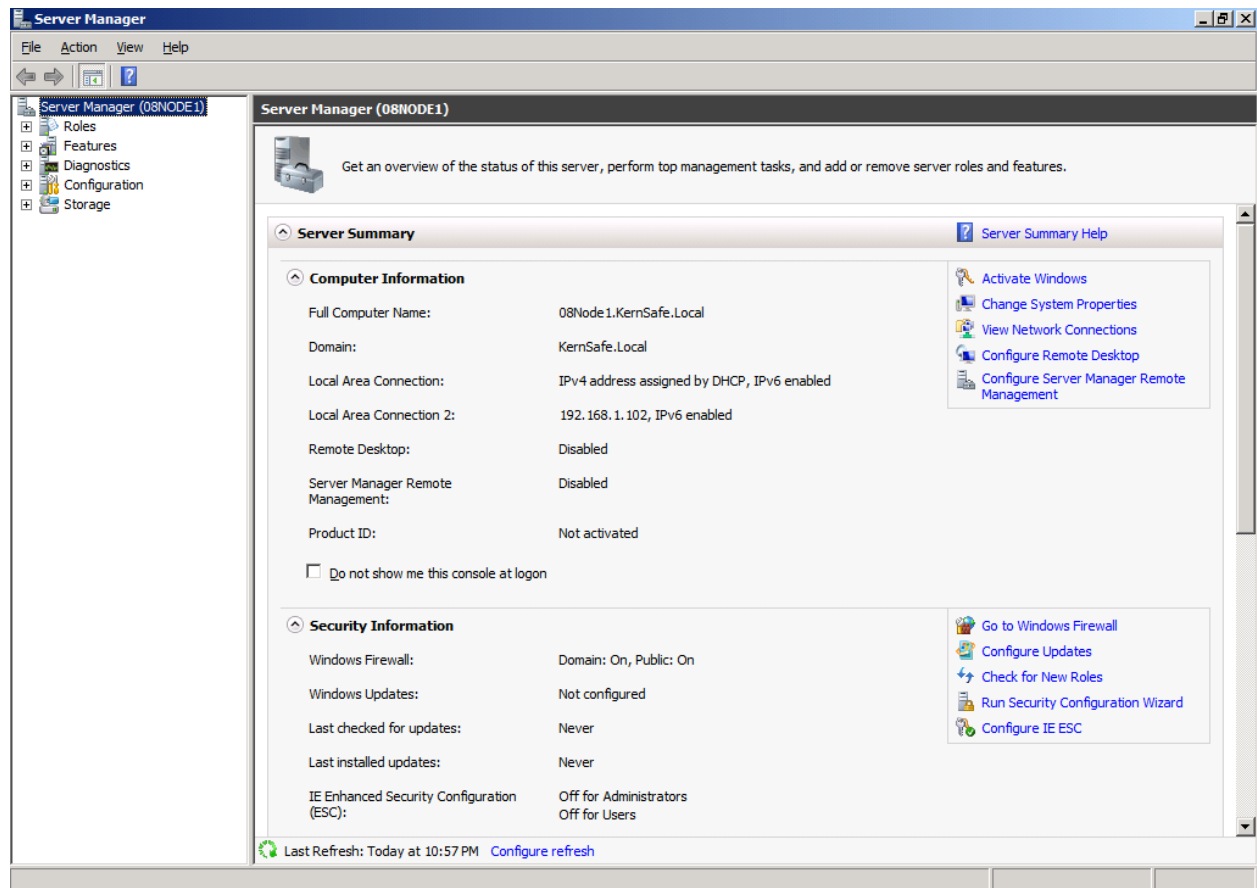
Launch the **Windows Computer Management Console**.



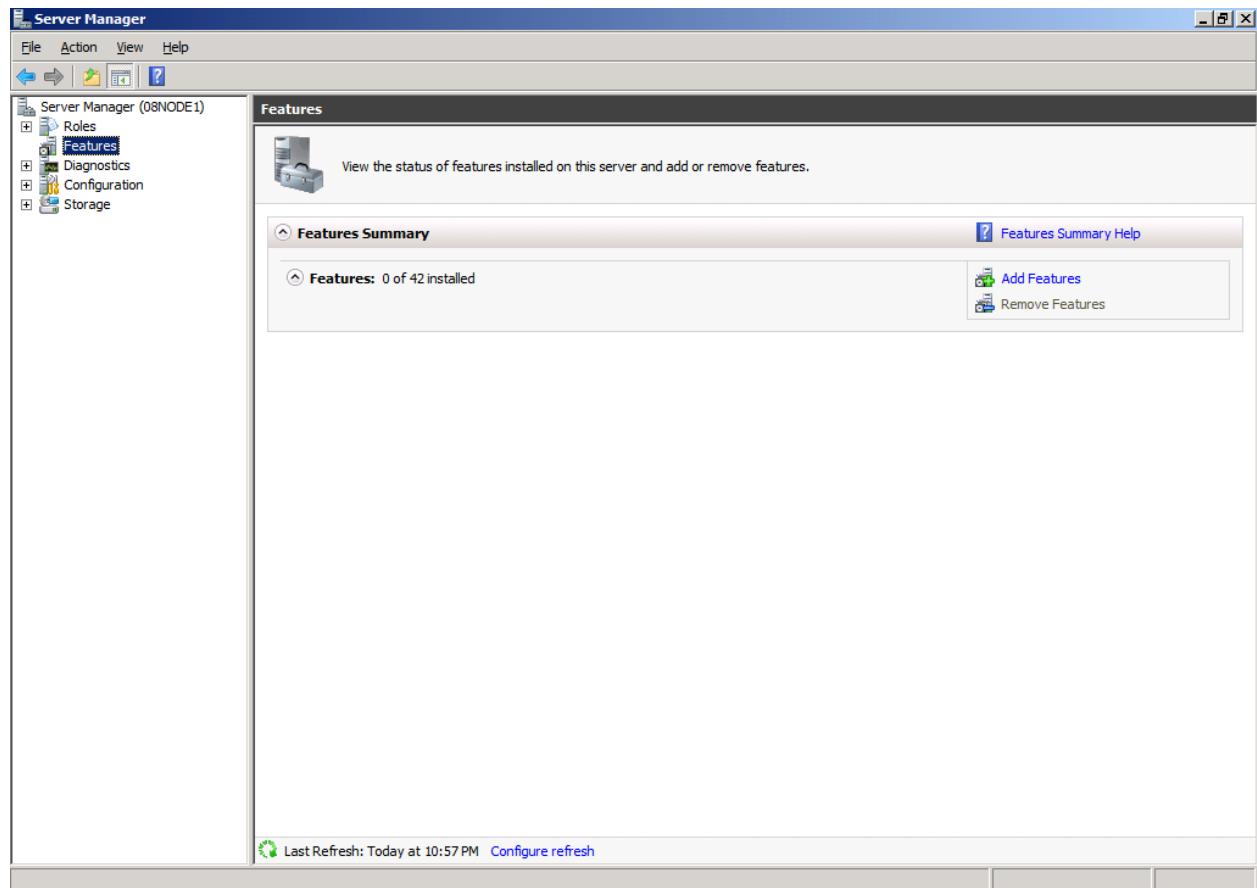
Disk1 and Disk2 are offline, we should not bring them online.

## Installing Failover Clustering Service

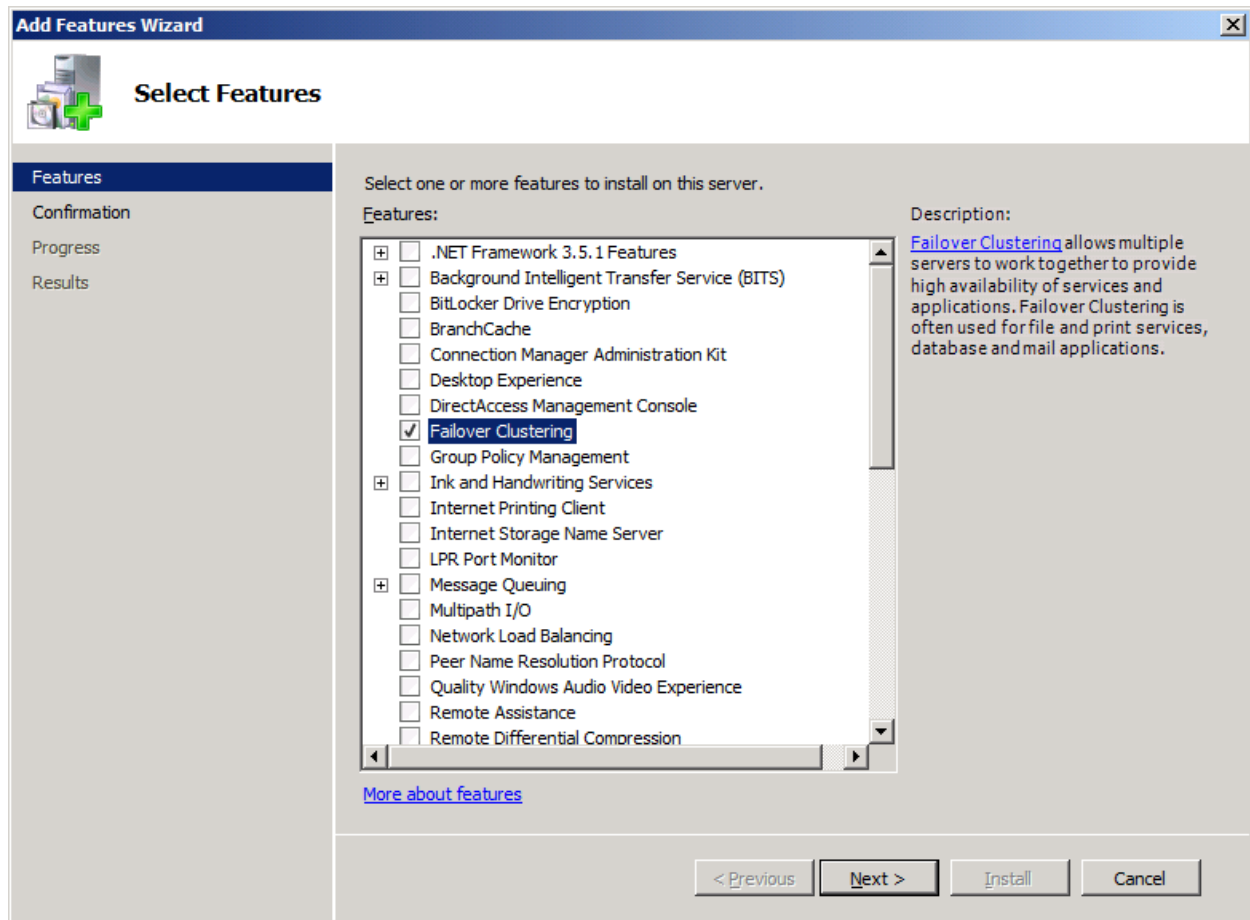
Launch the **Windows Server manager Console**.



Select the **Features** node from the left tree view.

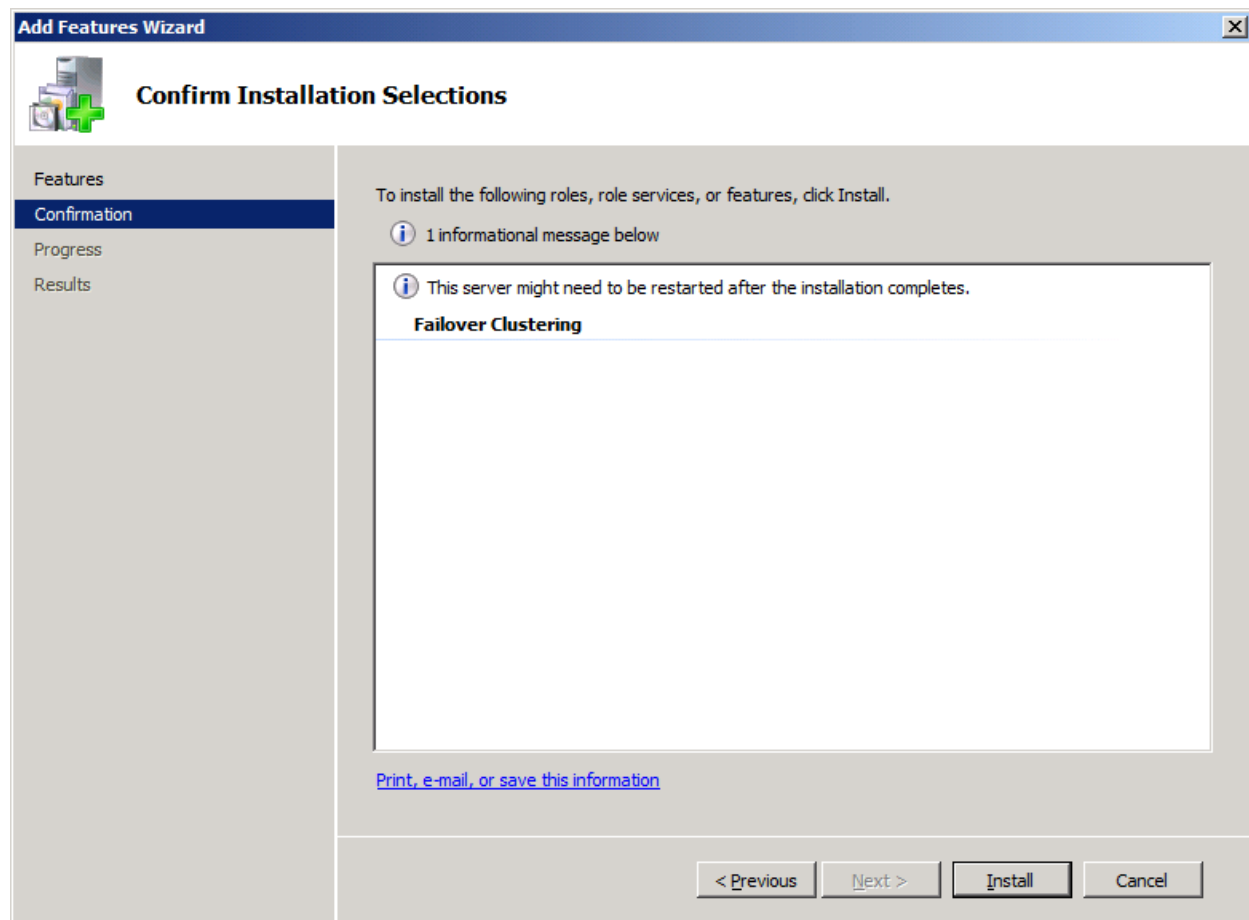


Click the **Add Features** link, the **Add Features Wizard** is shown.



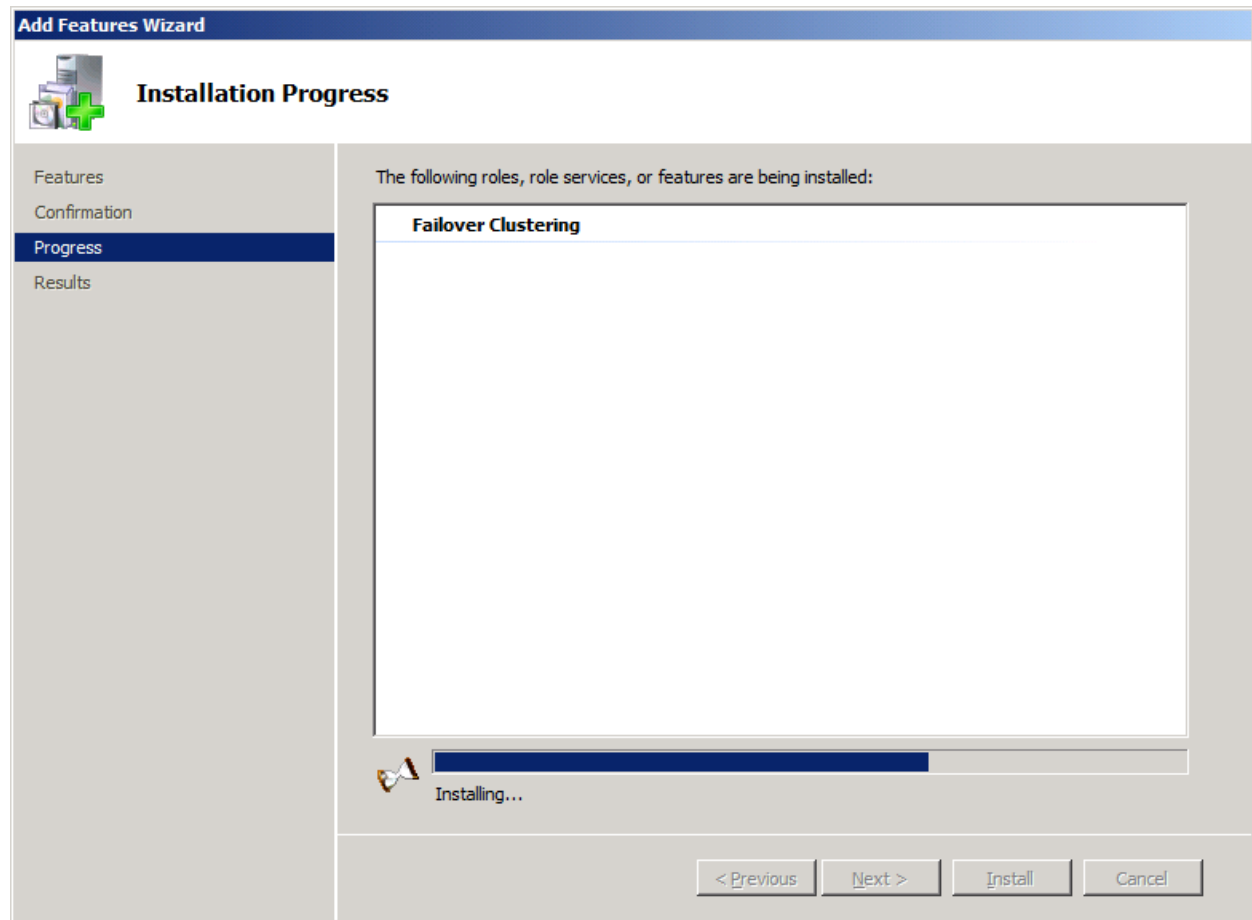
Select the **Failover Clustering**.

Press the **Next** button to continue.

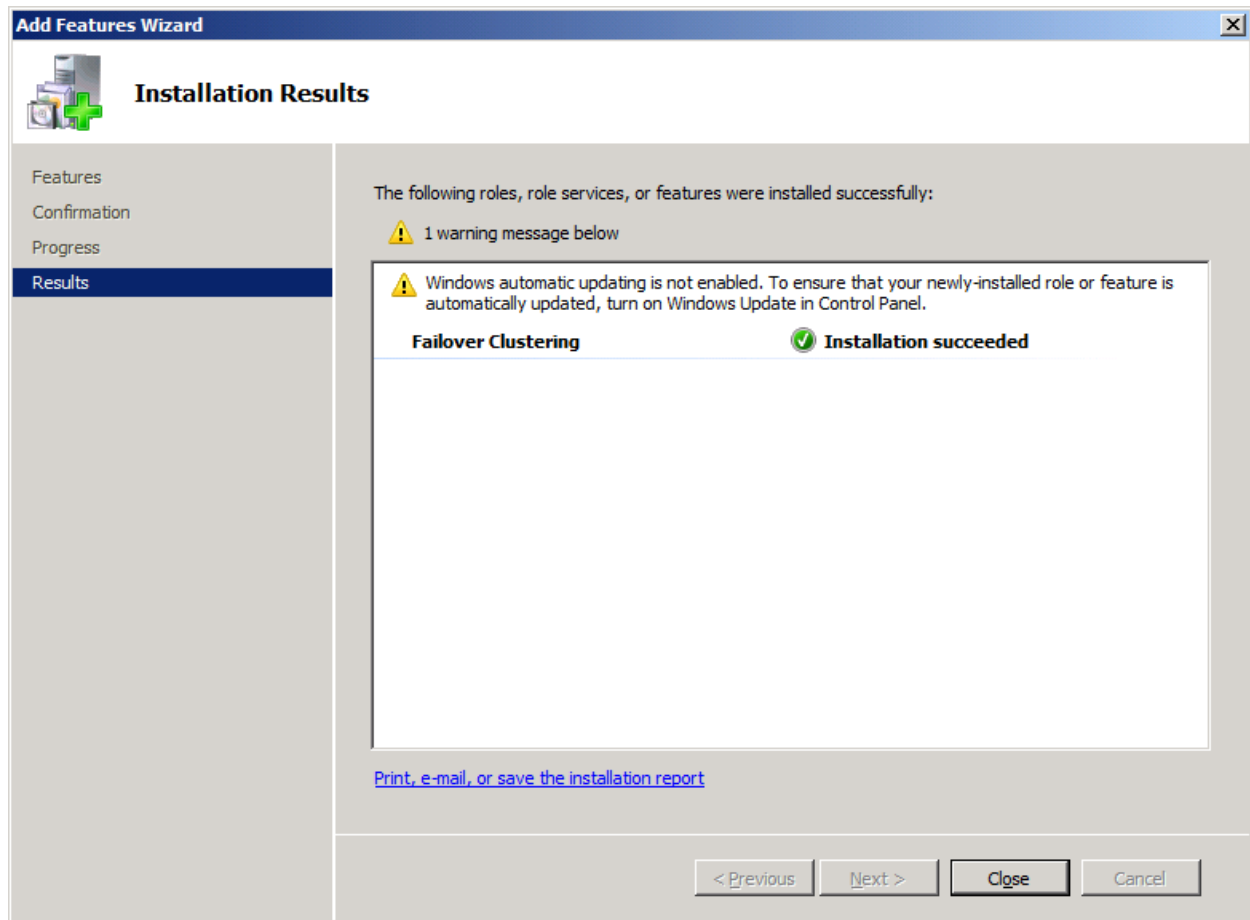


Press the **Install** button to install the **Failover Clustering** feature.

The installation of the Failover Clustering is going on.



If successful, the wizard will complete and show as the figure below.



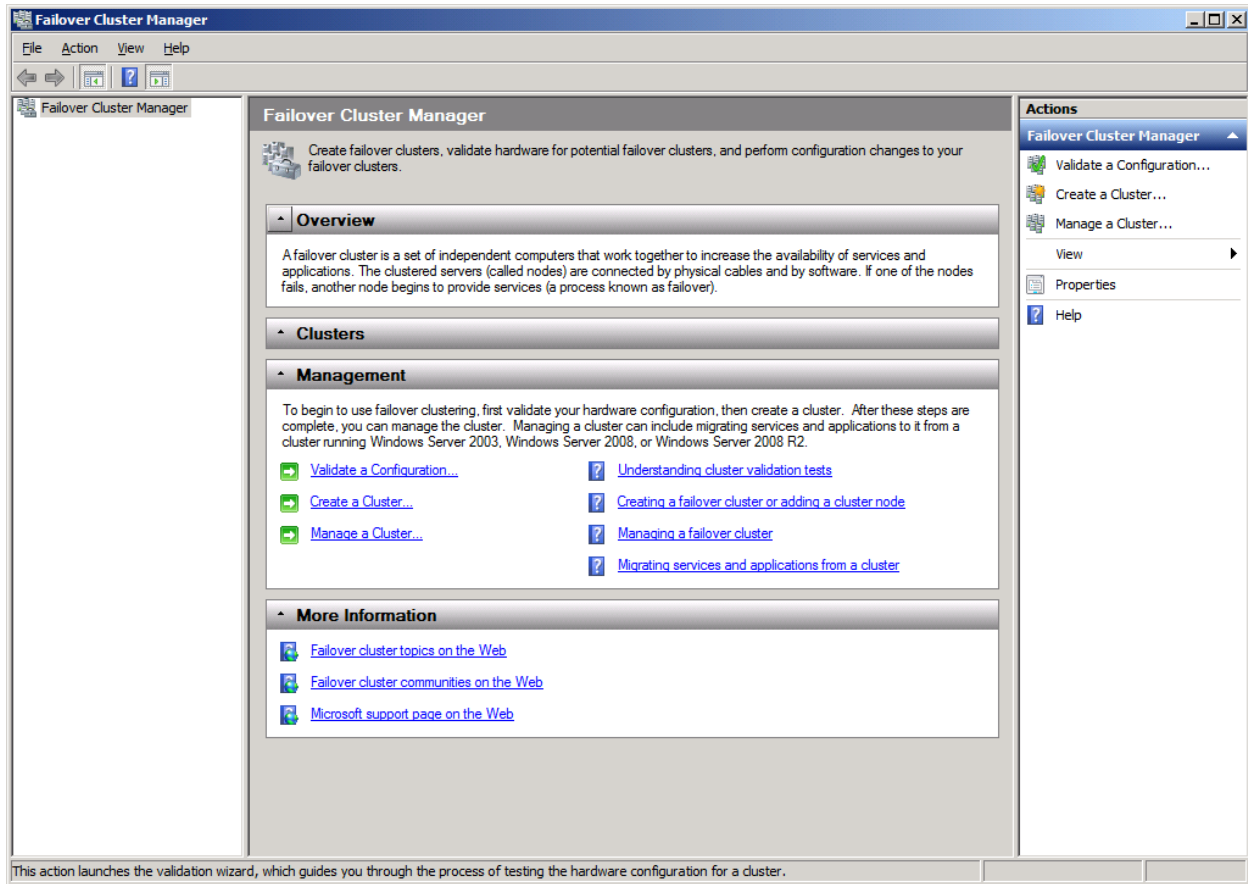
Press the **Close** button.

## Configuring Failover Clustering

### Validate a Configuration

Note that this step is not necessary for creating a cluster, but it ensures that the configuration is suitable for failover clustering.

Launch to the **Windows Failover Cluster Manager** console in node 1 or node 2 machines.




Click on the **Validate a Configuration...** link.

The **Validate a Configuration Wizard** is shown.



**Validate a Configuration Wizard**

 **Before You Begin**

**Before You Begin**

Select Servers or a Cluster

Testing Options

Confirmation

Validating

Summary

This wizard runs validation tests to determine whether this configuration of servers and attached storage is set up correctly to support failover. A cluster solution is supported by Microsoft only if the complete configuration (servers, network, and storage) passes all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2008 R2".

If you want to validate a set of unclustered servers, you need to know the names of the servers. Important: the storage connected to the selected servers will be unavailable during validation tests.

If you want to validate an existing failover cluster, you need to know the name of the cluster or one of its nodes.

You must be a local administrator on each of the servers you want to validate.

To continue, click Next.

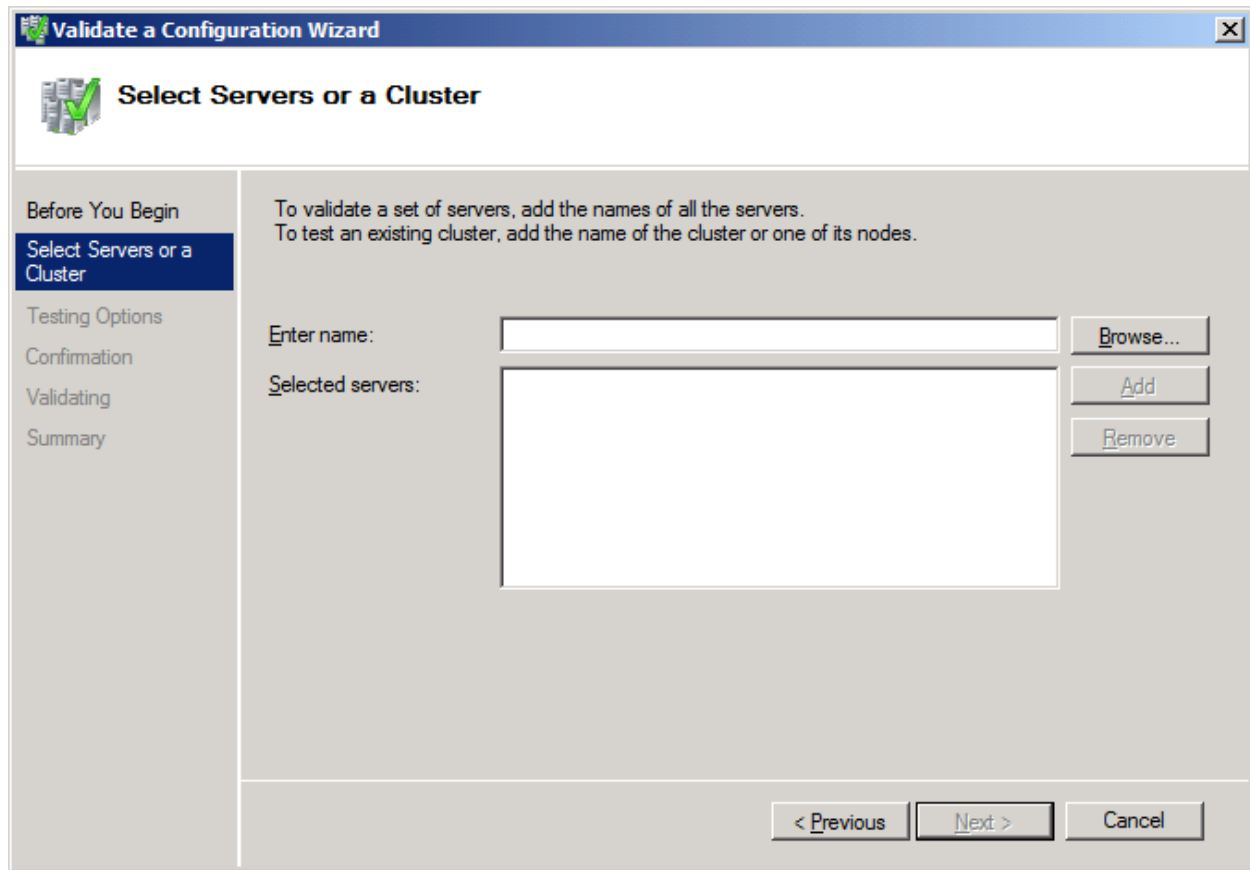
[More about preparing your hardware for validation](#)  
[More about cluster validation tests](#)

☐ Do not show this page again

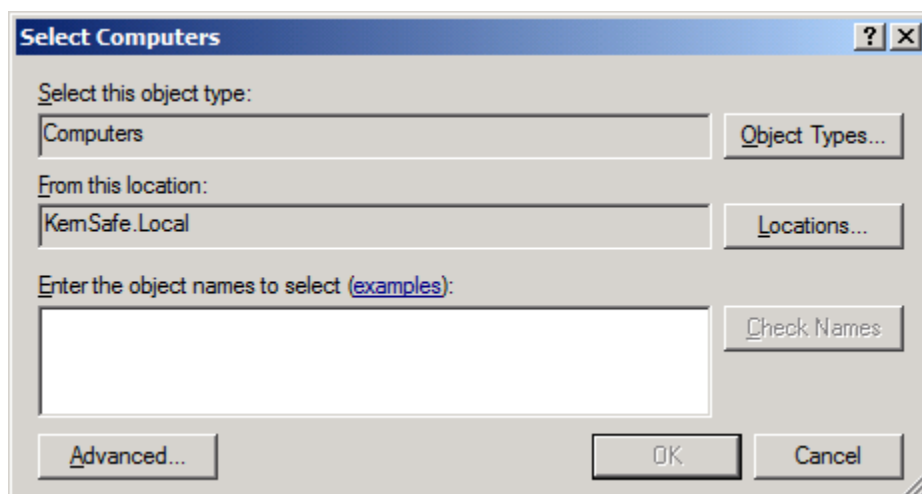
**Next >** **Cancel**

Press the **Next** button to continue.

Add nodes to the cluster.



Press the **Browse** button, the **Select Computers** dialog is shown.



Press the **Advanced...** button.

**Select Computers** [?] [X]

Select this object type:  
Computers [Object Types...]

From this location:  
KemSafe.Local [Locations...]

Common Queries

Name: Starts with [ ] [Columns...]  
Description: Starts with [ ] [Find Now]  
☐ Disabled accounts [Stop]  
☐ Non expiring password  
Days since last logon: [ ] [ ]

Search results:

Name (RDN)	In Folder
08DC	KemSafe.Local/...
<b>08NODE1</b>	KemSafe.Local/...
08NODE2	KemSafe.Local/...

Select the **08NODE1** item and then press the **OK** button to add.

**Select Computers**

Select this object type:  
Computers Object Types...

From this location:  
KernSafe.Local Locations...

Enter the object names to select (examples):  
08NODE1 Check Names

Advanced... OK Cancel

Press the **OK** button.

**Validate a Configuration Wizard**

**Select Servers or a Cluster**

Before You Begin  
**Select Servers or a Cluster**  
Testing Options  
Confirmation  
Validating  
Summary

To validate a set of servers, add the names of all the servers.  
To test an existing cluster, add the name of the cluster or one of its nodes.


Enter name:  Browse...

Selected servers:  
08node1.kernsafe.local Add Remove

< Previous Next > Cancel

Press the **Browse...** button and add **08NODE2** by through the same way.

**Validate a Configuration Wizard**

 **Select Servers or a Cluster**

**Before You Begin**

**Select Servers or a Cluster**

Testing Options

Confirmation

Validating

Summary

To validate a set of servers, add the names of all the servers.  
To test an existing cluster, add the name of the cluster or one of its nodes.

Enter name:

Selected servers:

- 08node1.kemsafe.local
- 08node2.kemsafe.local

<

Press the **Next** button to continue.

The screenshot shows a Windows-style dialog box titled "Validate a Configuration Wizard". The window has a blue title bar with a close button (X) in the top right corner. Below the title bar, there is a header area with a green checkmark icon and the text "Testing Options".

On the left side, there is a vertical navigation pane with the following items: "Before You Begin", "Select Servers or a Cluster", "Testing Options" (which is highlighted with a blue background), "Confirmation", "Validating", and "Summary".

The main content area of the wizard is divided into two sections. The top section contains the following text:

Choose between running all tests or running selected tests.

The tests include Inventory tasks, Network tests, Storage tests, and System Configuration tests.

Microsoft supports a cluster solution only if the complete configuration (servers, network, and storage) can pass all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2008 R2".

Below this text, there are two radio button options:

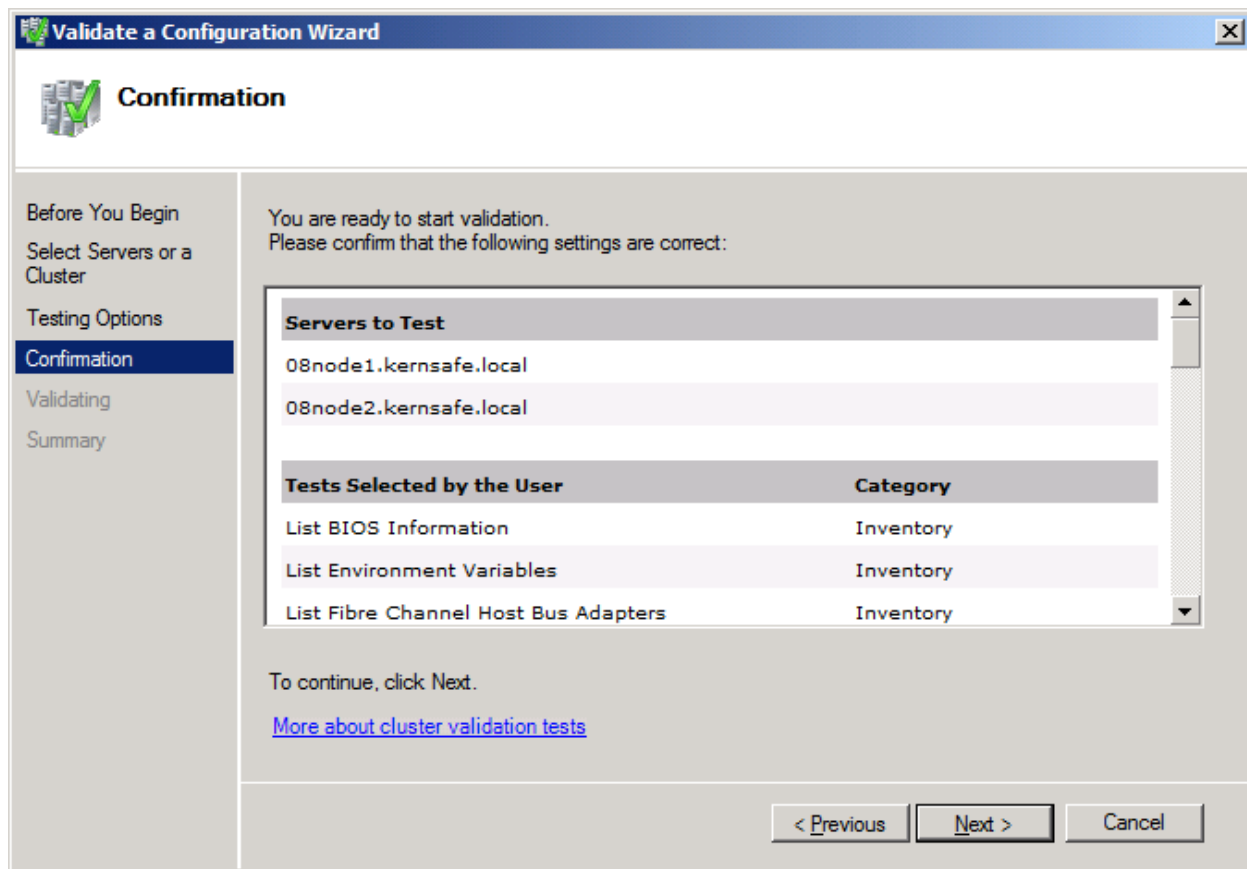
- ☒ Run all tests (recommended)
- ☐ Run only tests I select

At the bottom of the main content area, there is a blue hyperlink that reads: [More about cluster validation tests](#)

At the bottom right of the window, there are three buttons: "< Previous", "Next >", and "Cancel".

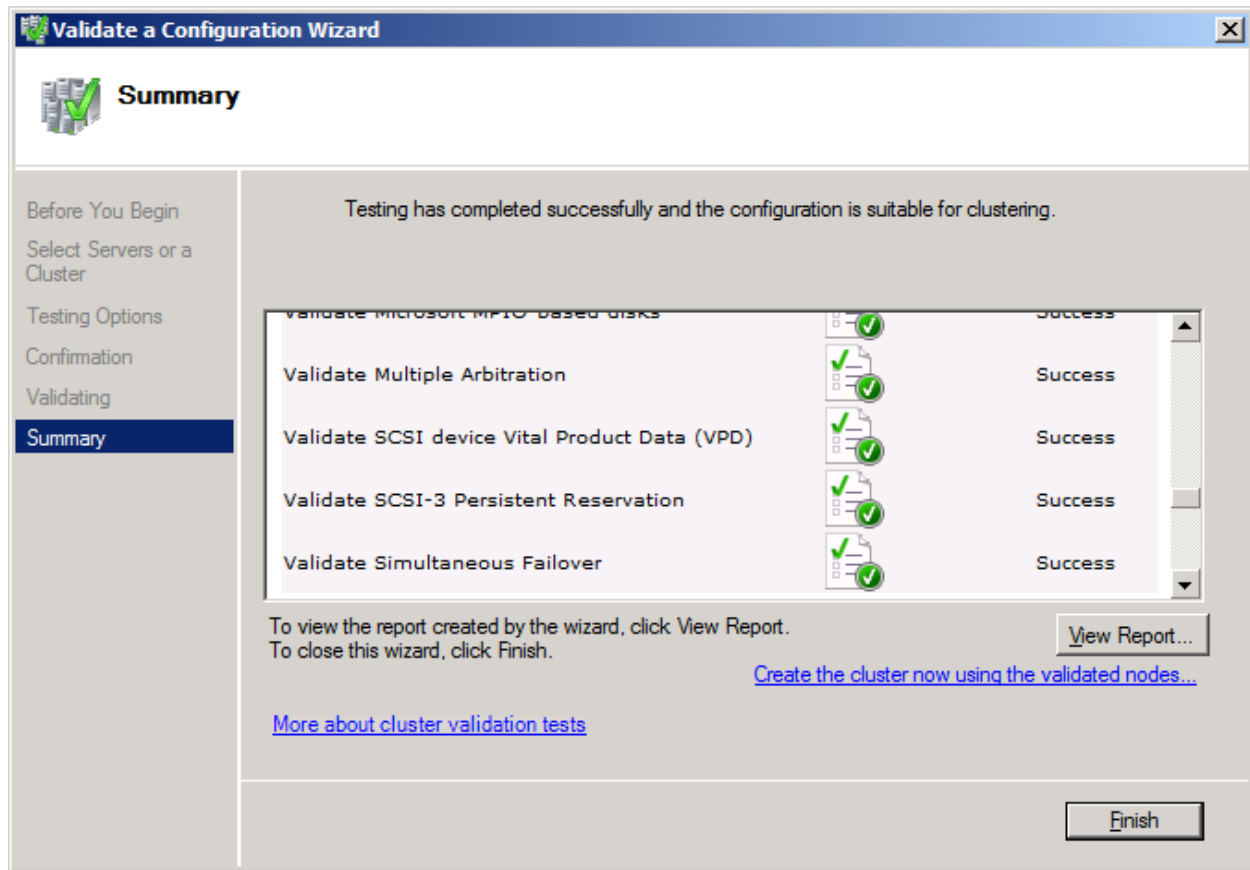
Select **Run all tests (recommended)**.

Press the **Next** button to continue.



Press the **Next** button to continue.

If successful, all the tests include **SCSI-3 Persistent Reservation** are valid and shown as the figure below.

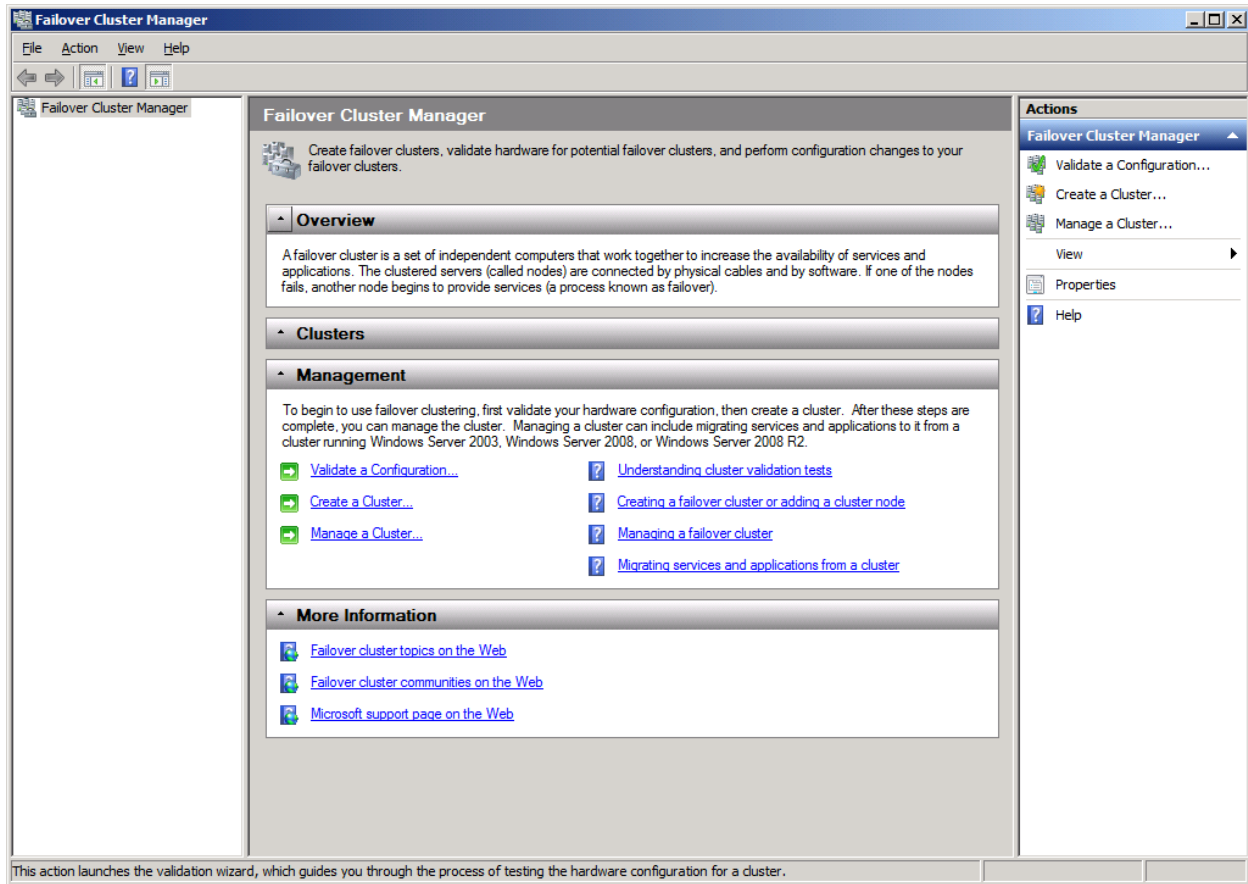


Press the **Finish** button to complete configuration validation.

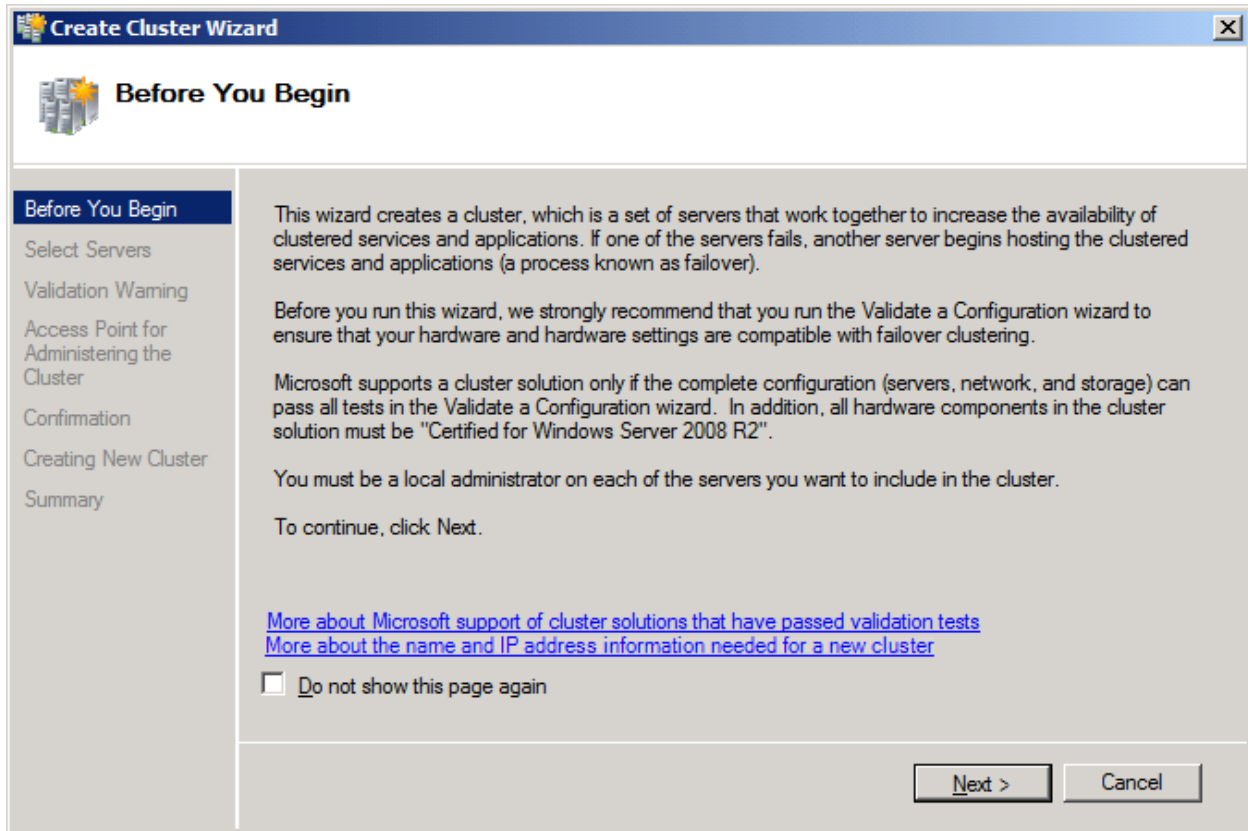
## Create a Failover Cluster

Click on the **Create a Cluster...** item in the **Actions** panel of **Failover Cluster Manager**.





The **Create Cluster Wizard** is shown.



Press the **Next** button to continue.

**Create Cluster Wizard**

**Select Servers**

Before You Begin

**Select Servers**

Validation Warning

Access Point for Administering the Cluster

Confirmation

Creating New Cluster

Summary

Add the names of all the servers that you want to have in the cluster. You must add at least one server.

Enter server name:

Selected servers:

< Previous Next > Cancel

Press the **Browse...** button and the **Add** button to add nodes to this cluster.

**Create Cluster Wizard**

**Select Servers**

Before You Begin

**Select Servers**

Access Point for Administering the Cluster

Confirmation

Creating New Cluster

Summary

Add the names of all the servers that you want to have in the cluster. You must add at least one server.

Enter server name:

Browse...

Selected servers:

08node1.kemsafe.local

08node2.kemsafe.local

Add

Remove

< Previous

Next >

Cancel

Press the **Next** button to continue.

Specify IP address for the cluster.

**Create Cluster Wizard**

**Access Point for Administering the Cluster**

Before You Begin  
Select Servers  
**Access Point for Administering the Cluster**  
Confirmation  
Creating New Cluster  
Summary

Type the name you want to use when administering the cluster.

Cluster Name:

One or more DHCP IPv4 addresses were configured automatically. One or more IPv4 addresses could not be configured automatically. For each network to be used, make sure the network is selected, and then type an address.

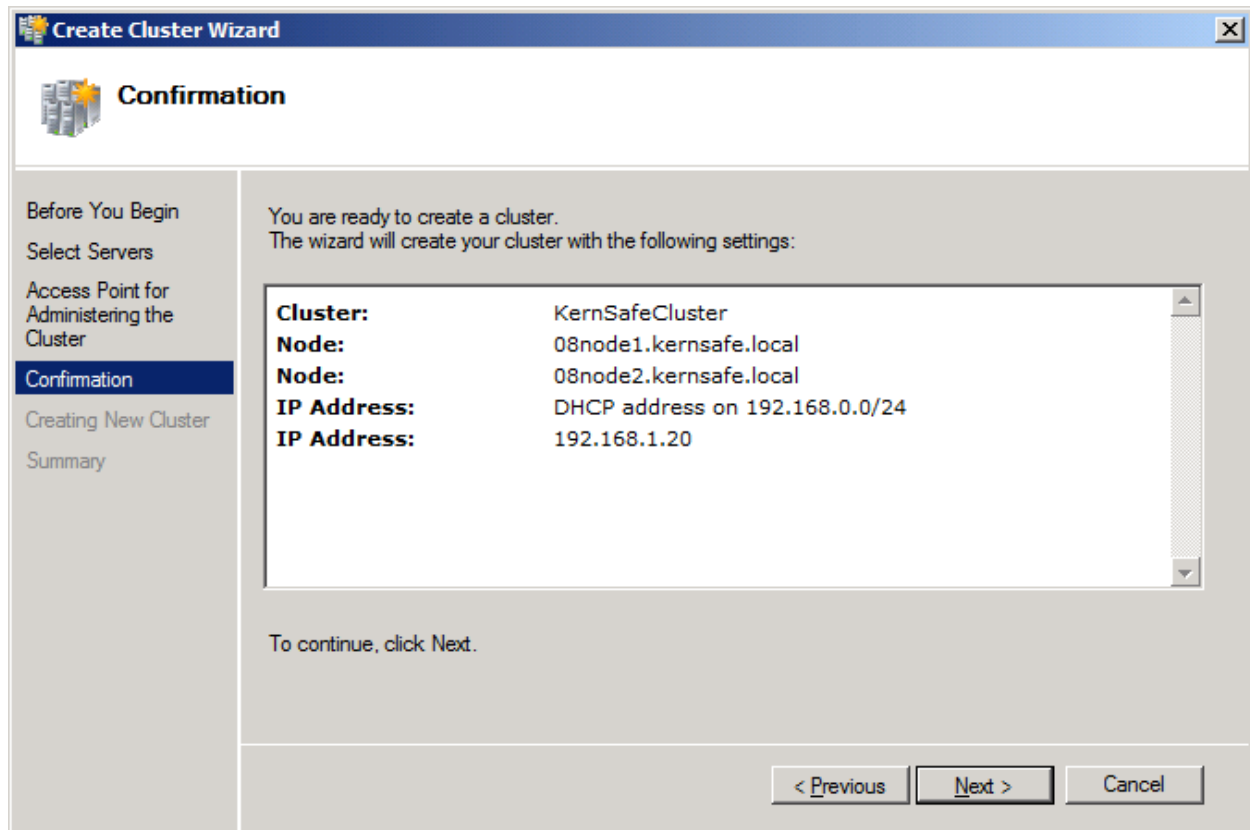
	Networks	Address
<input checked="" type="checkbox"/>	192.168.1.0/24	192.168.1.20

[More about the administrative Access Point for a cluster](#)

< Previous   Next >   Cancel

Type an IP address in the **Address** field.

Press the **Next** button to continue.

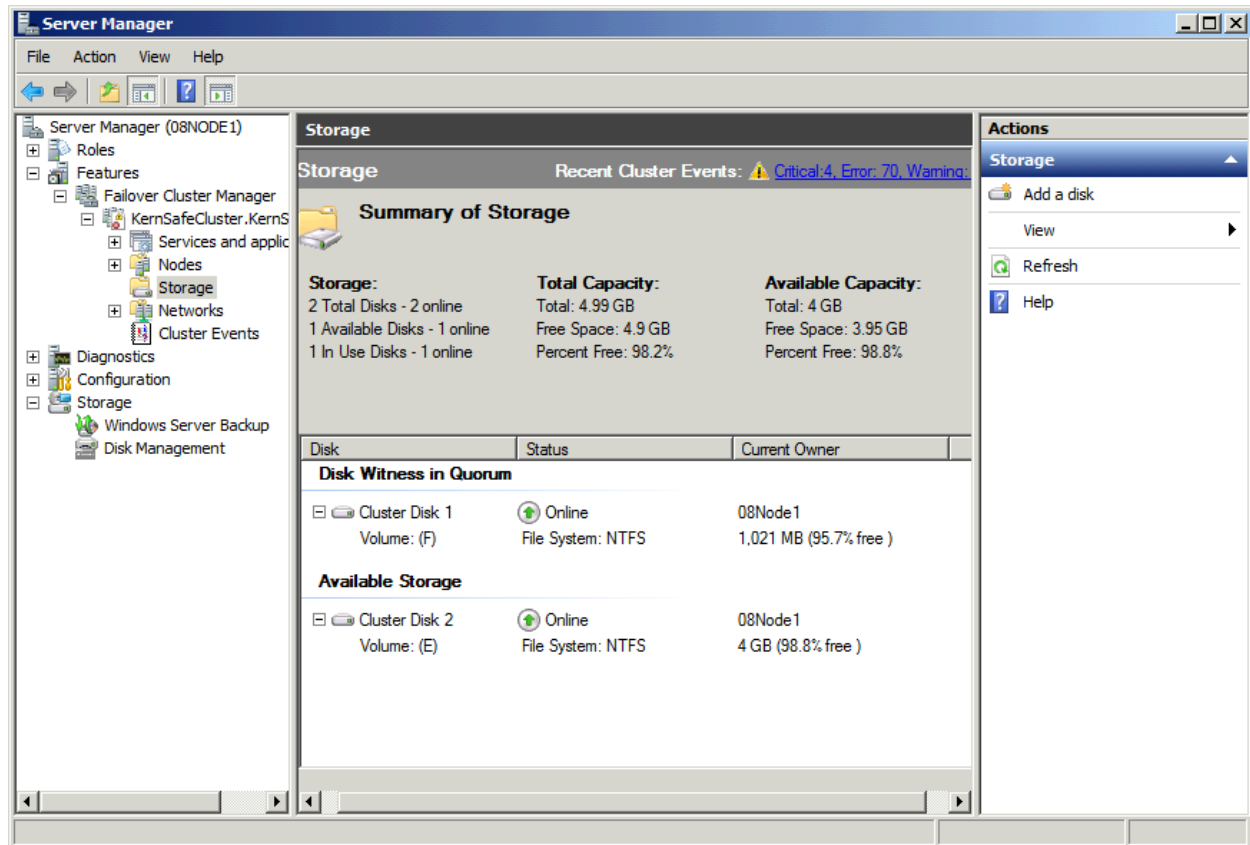


Press the **Next** button to continue or press the **Previous** button if any changes are needed.

If successful, the **Create Cluster Wizard** is complete as shown in the figure below.



Press the **Finish** button to continue.



Now the creation of the cluster is completed, expand the cluster node and select the Storage node, it will shown as the figure below, both cluster disks are shown online.



## Contact

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Sales: [sales@kernsafe.com](mailto:sales@kernsafe.com)  
Home Page: <http://www.kernsafe.com/>  
Product Page: <http://www.kernsafe.com/product/istorage-server.aspx>  
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