iStorage Server: Working with Windows Cluster

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KernSafe Technologies, Inc.

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1. 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 poplar in storage industry world and make iStorage Server is suitable for any size of business.

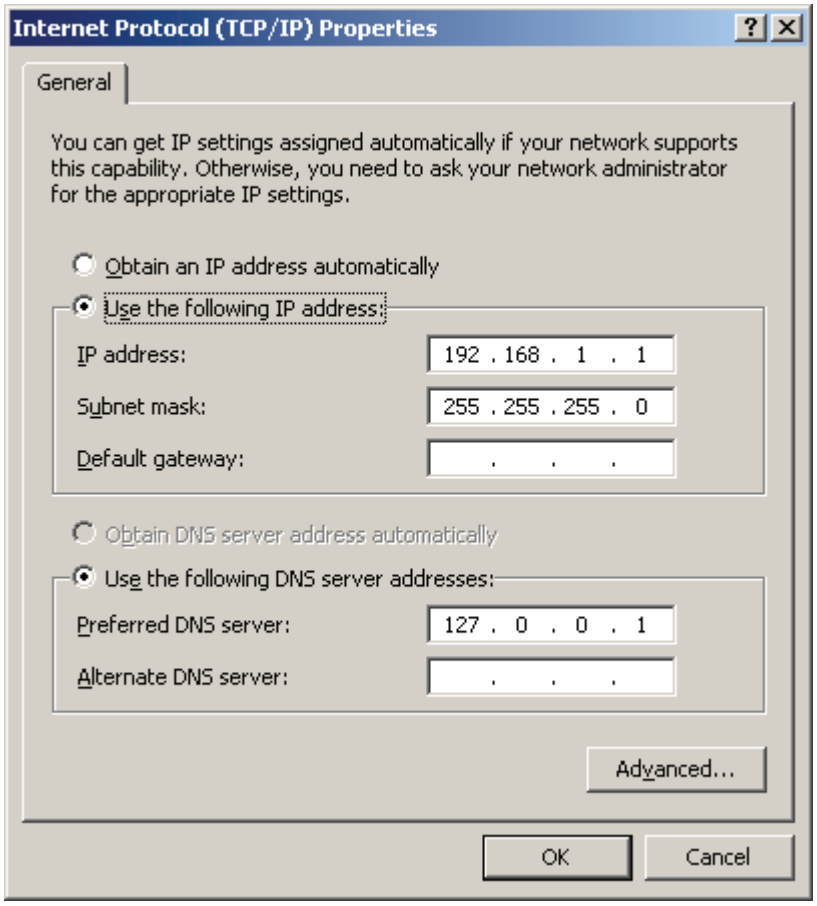
High-availability clusters (also known as HA Clusters or Failover Clusters) are computer clusters that are implemented primarily for the purpose of providing high availability of services which the cluster provides. They operate by having redundant computers or nodes which are then used to provide service 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 2003 clustering.

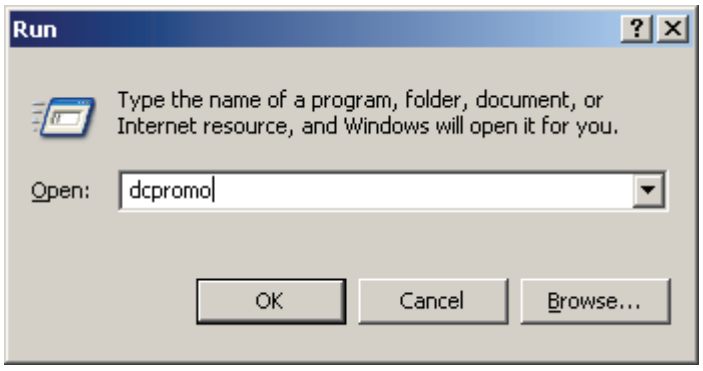
This article demonstrates how to build Windows Server 2003 high availability cluster by using KernSafe iSCSI Target. In this case, at least three computers are needed, respectively domain controller, node 1 and node 2. Each computer requires two network adapters. The computer names here are 03DCx64, node 1 and node 2.

2. Domain Controller Settings

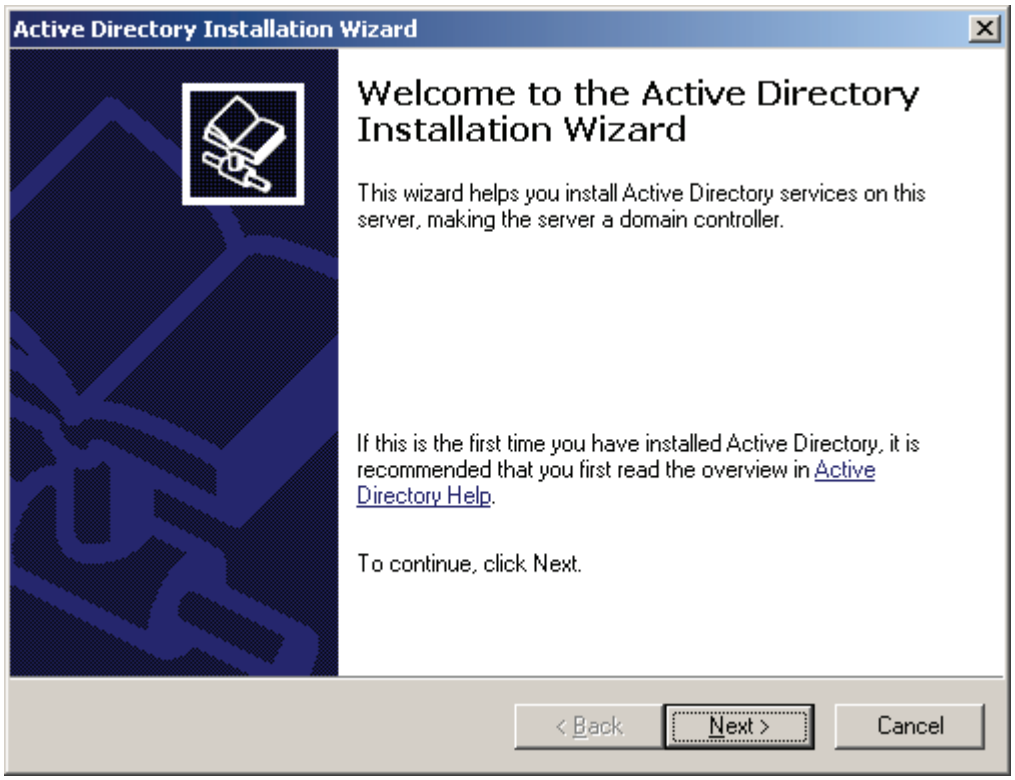
Domain Controller Network Settings



Select 03DCx64 as the Domain Controller and the first network adapter of this computer shall be set as shown in the figure below.
IP address shall be set as 192.168.1.1.
Subnet mask is set as 255.255.255.0.
Preferred DNS server is set as 127.0.0.1。

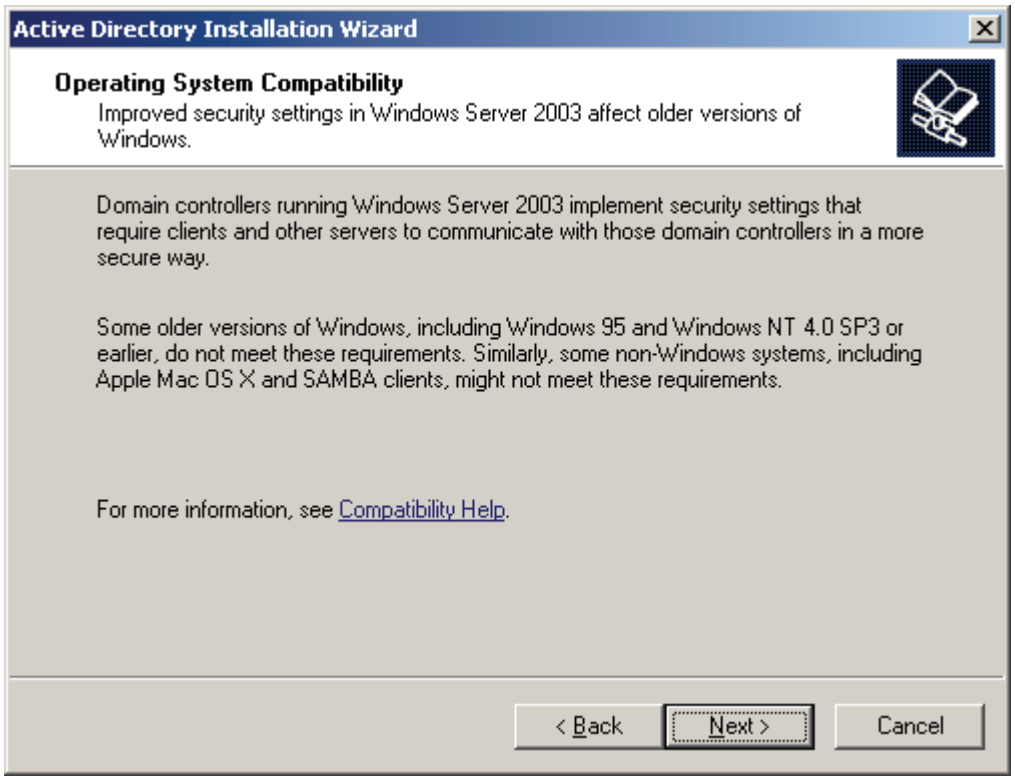


Enter **dcpromo** in Start - > Run and the **Domain Controller setup wizard** is shown.



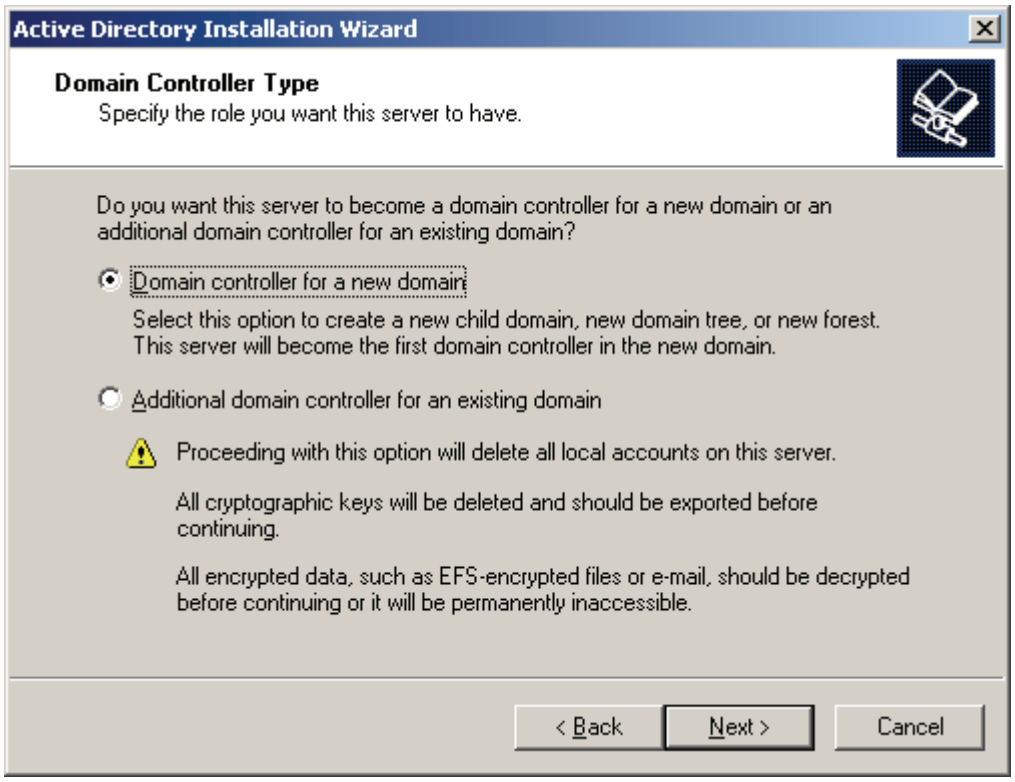
Press the **Next** button in the pop-up wizard to continue.

Check operation system compability



Press the **Next** button to continue

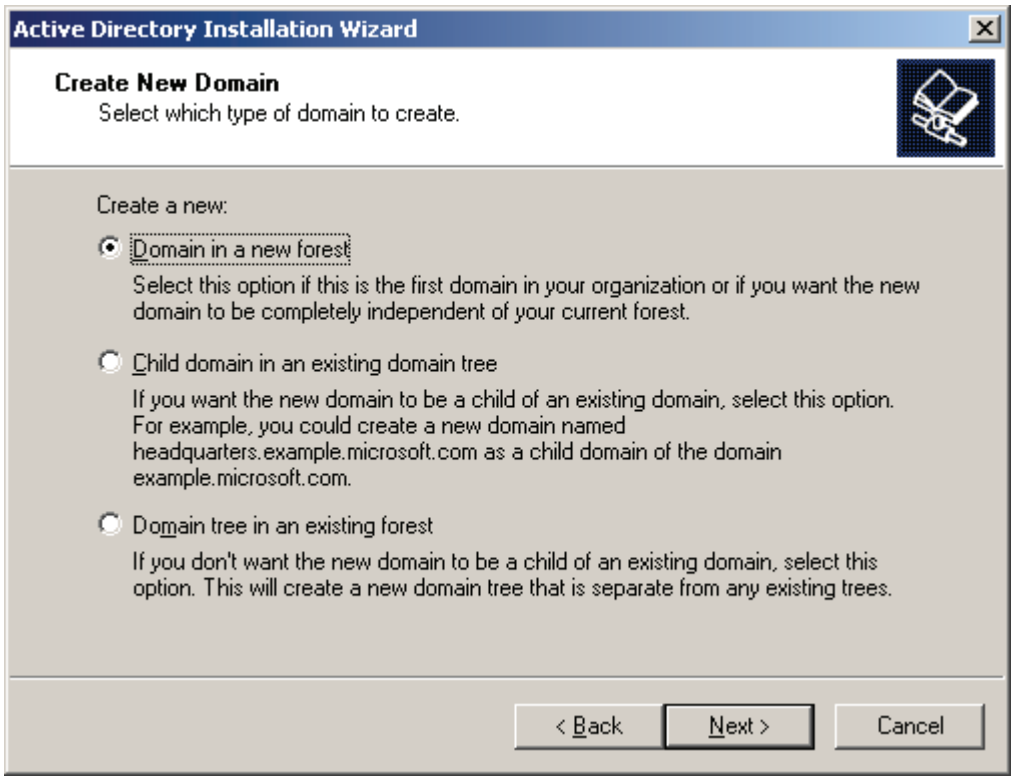
Specify domain controller type



Select Domain controller for a new domain.

Press the **Next** button to continue.

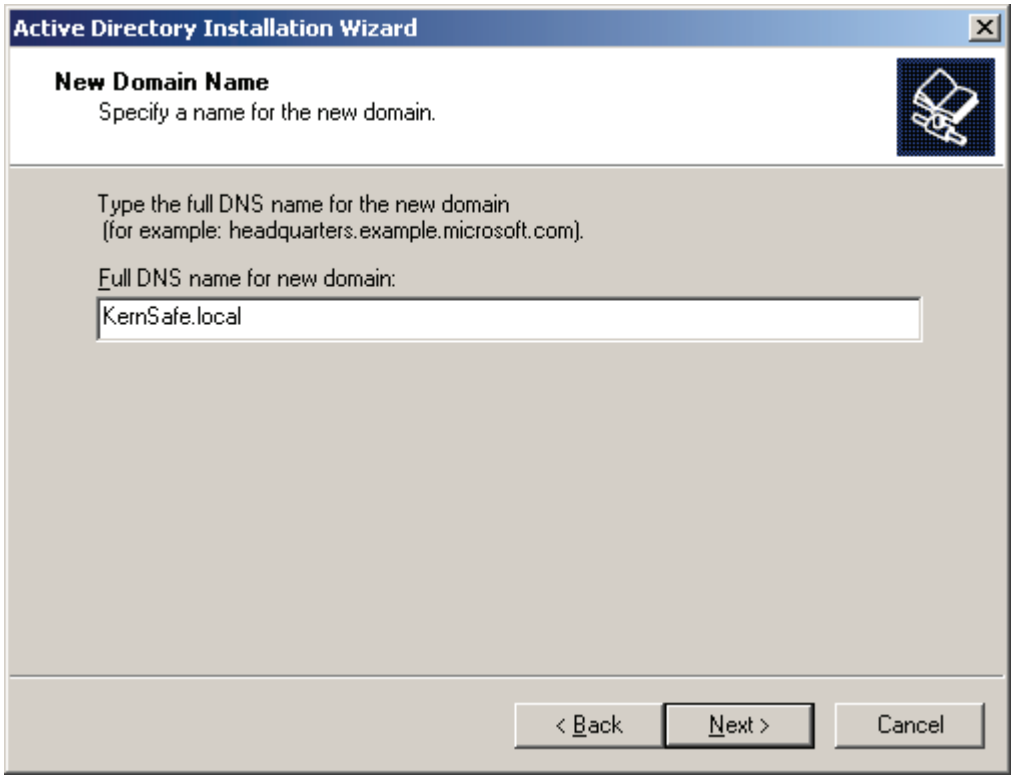
Select which type of domain to create



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

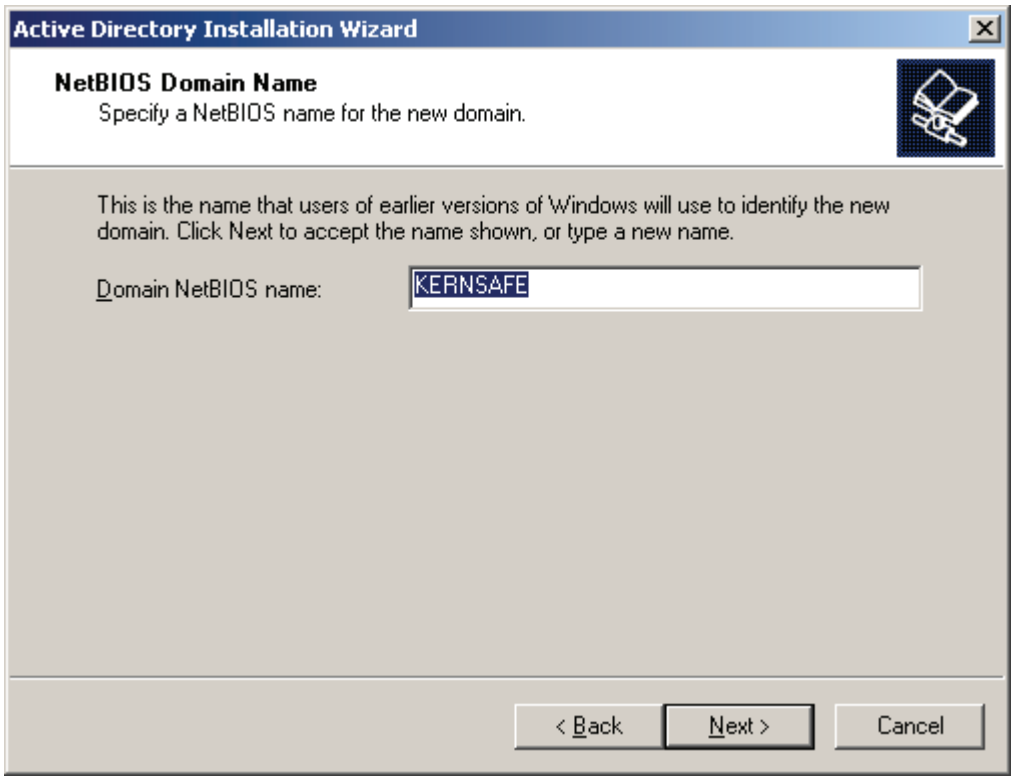
Press the **Next** button to continue.

Type new domain name



Enter the name of DNS. Take KernSafe.local as an example and press the **Next** button to continue.

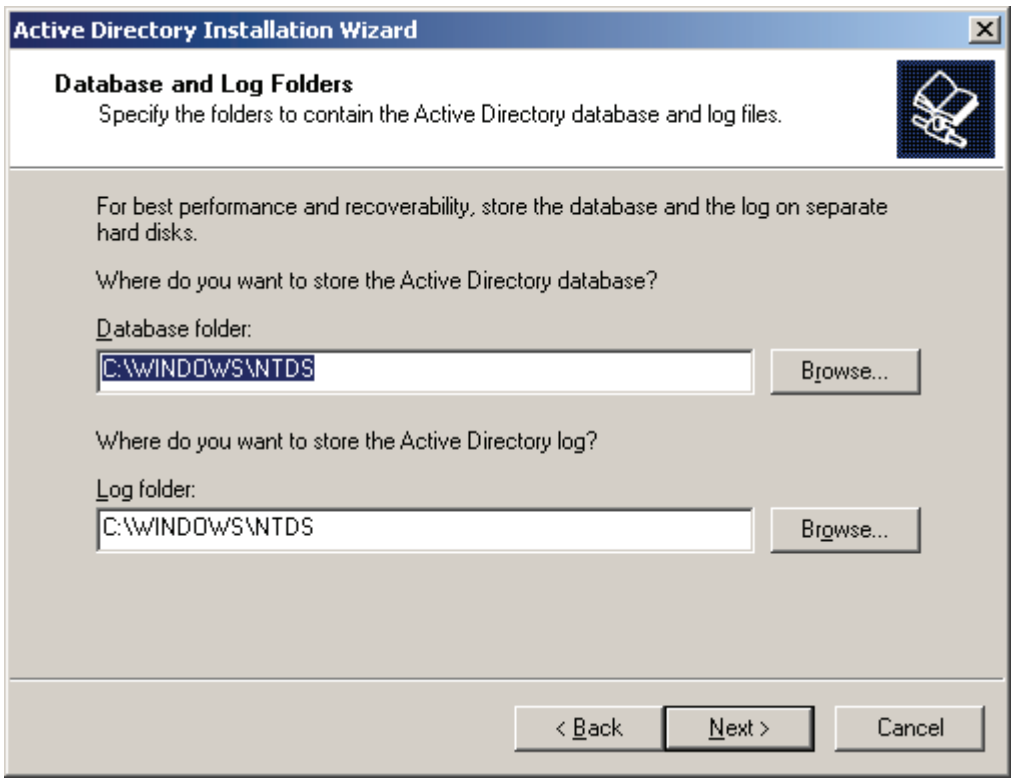
Specify NetBIOS name



Enter the name of NetBIOS, which is KERNSAFE here.

Press the **Next** button to continue.

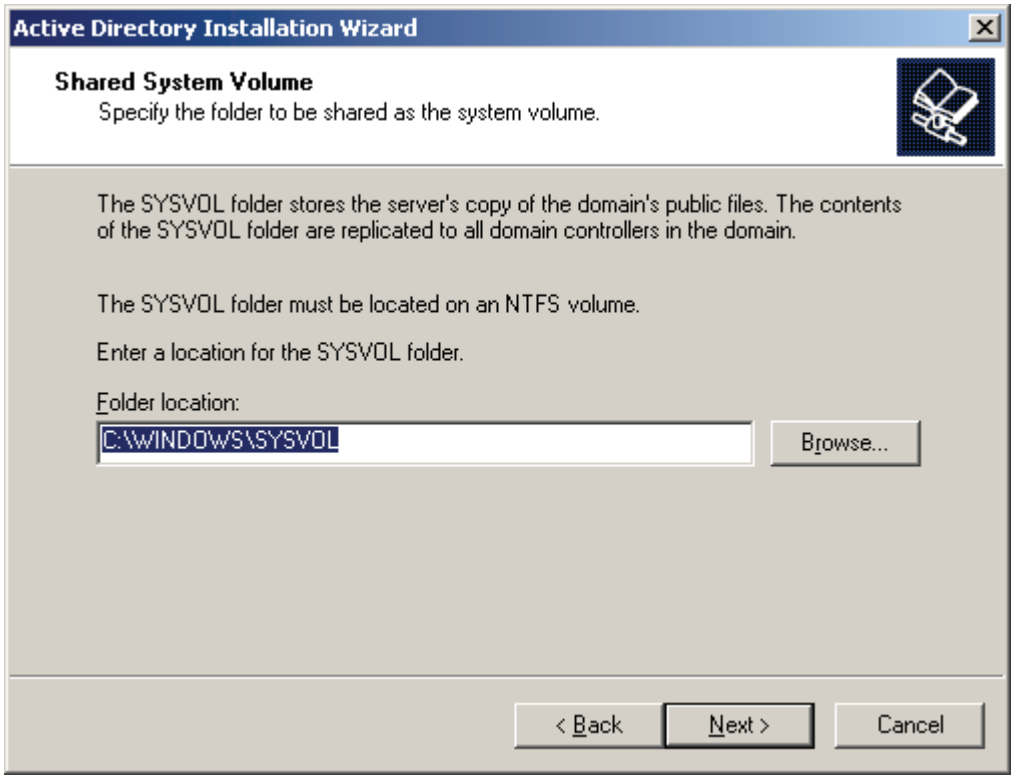
Specify the folders to contain the Active Direcorty database and log file



Select the storage location of Database and Log Folders.

Press the **Next** button to continue.

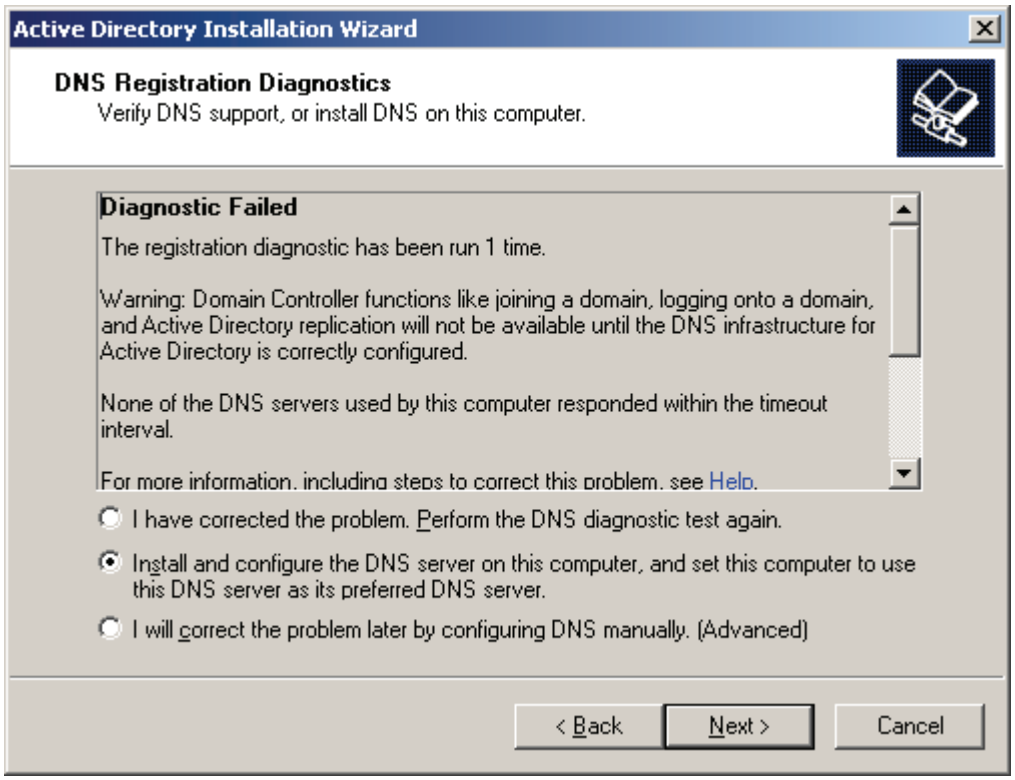
Specify the folder to be shared as the system volume



Select the storage location of file SYSVOL.

Press the **Next** button to continue.

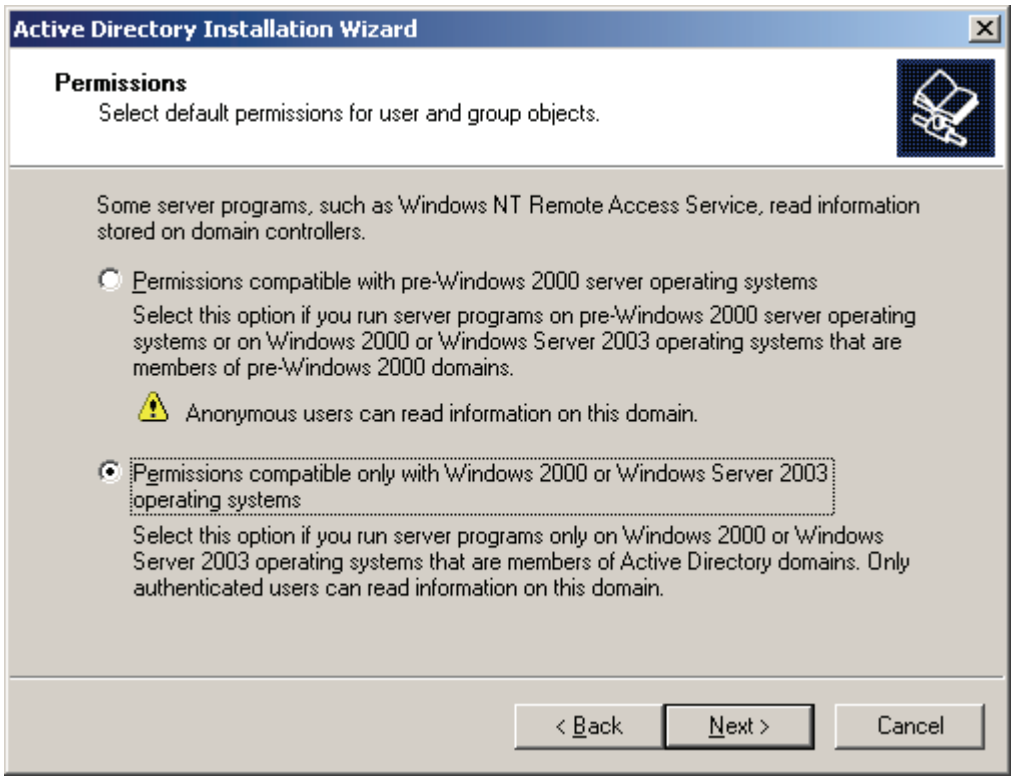
Diagnostic DNS registration



Select **Install and configure the DNS server on this computer, and set this computer to use this DNS server as its preferred DNS server**.

Press the **Next** button to continue.

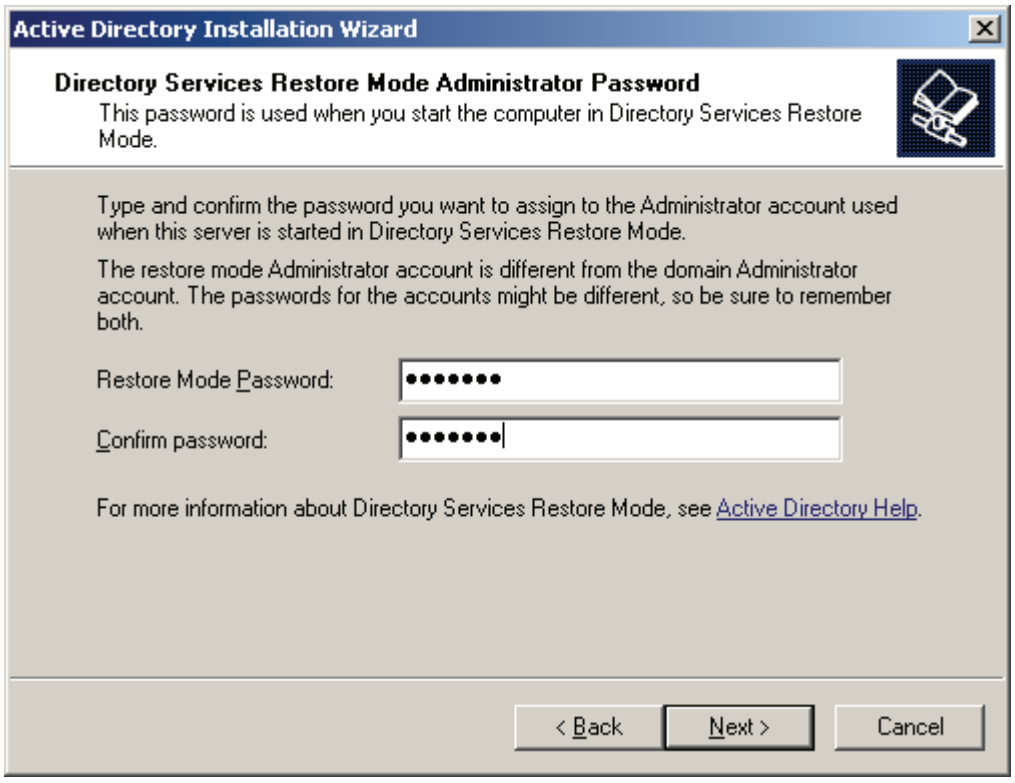
Select default permissions for user and group objects



Select **Permissions compatible only with Windows 2000 or Windows Server 2003 operating systems**.

Press the **Next** button to continue.

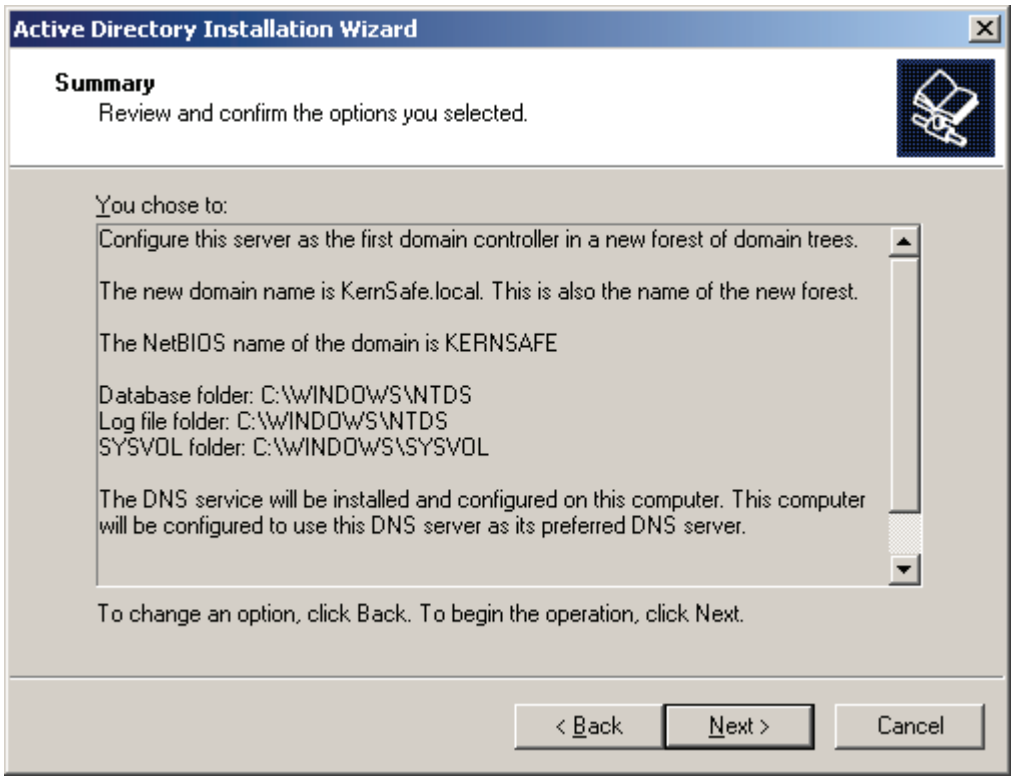
Specify resore mode administrator password



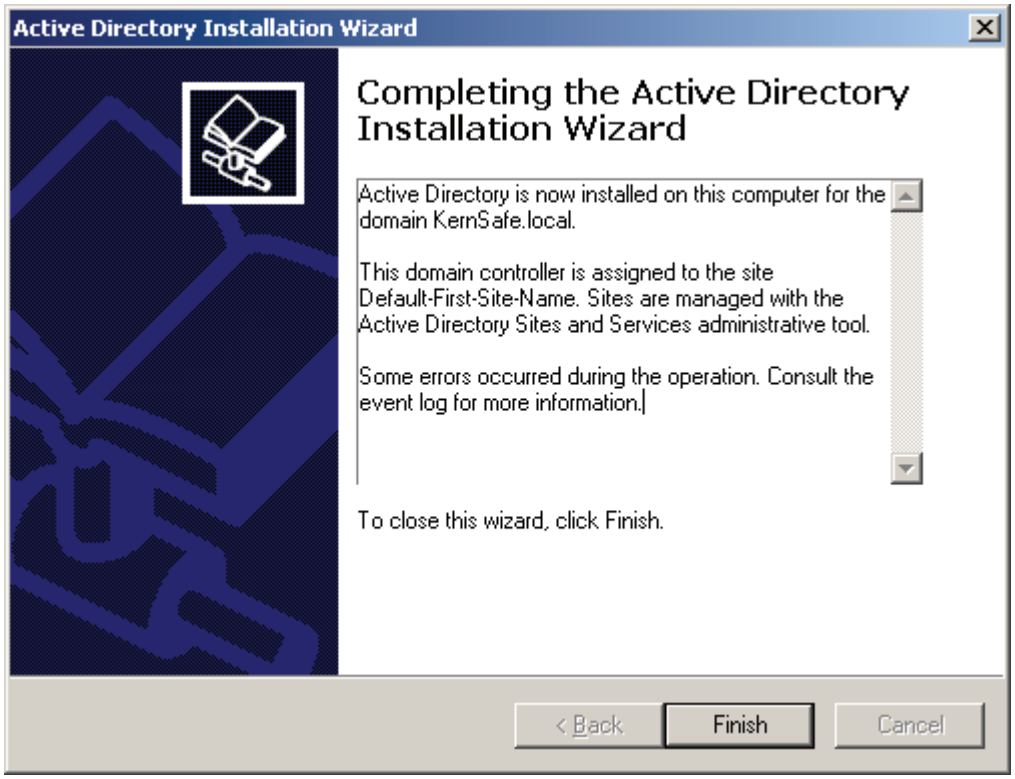
Set the administrator password, take abc.123 for example here.

Press the **Next** button to continue.

Finish Active Directory installation wizard



Press the **Next** button to continue.



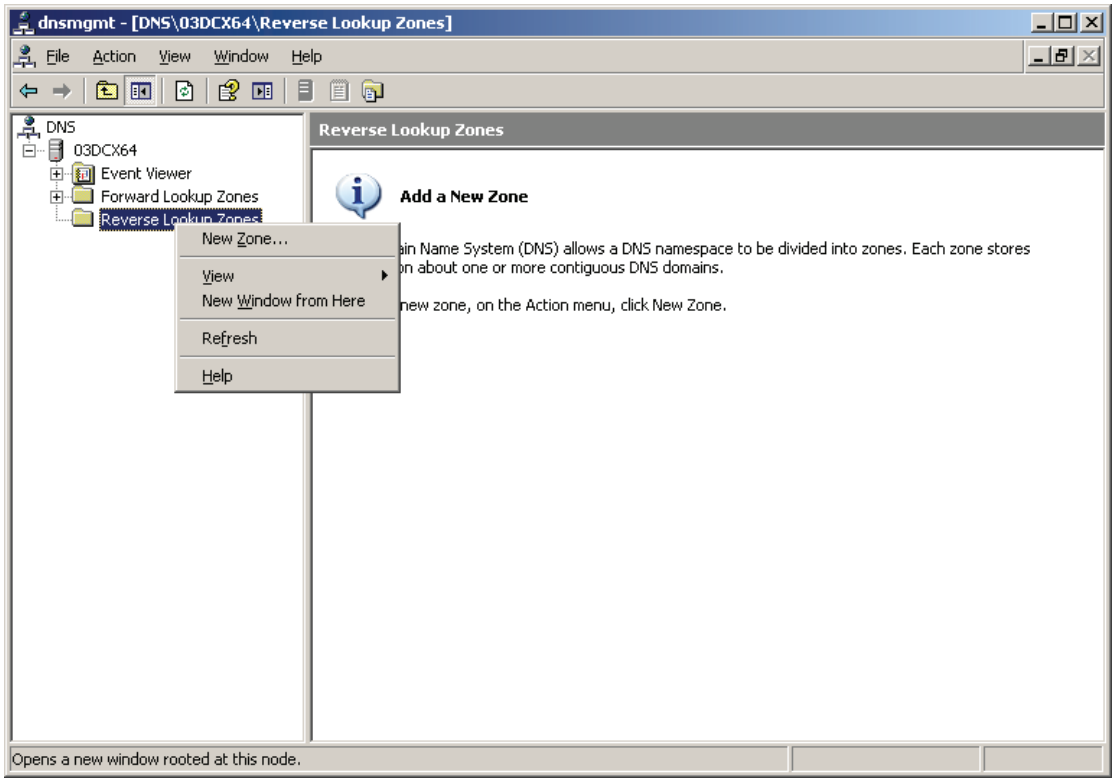
Press the **Finish** button.

Restart operation system

Now restart the computer and the new settings will take effect.

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

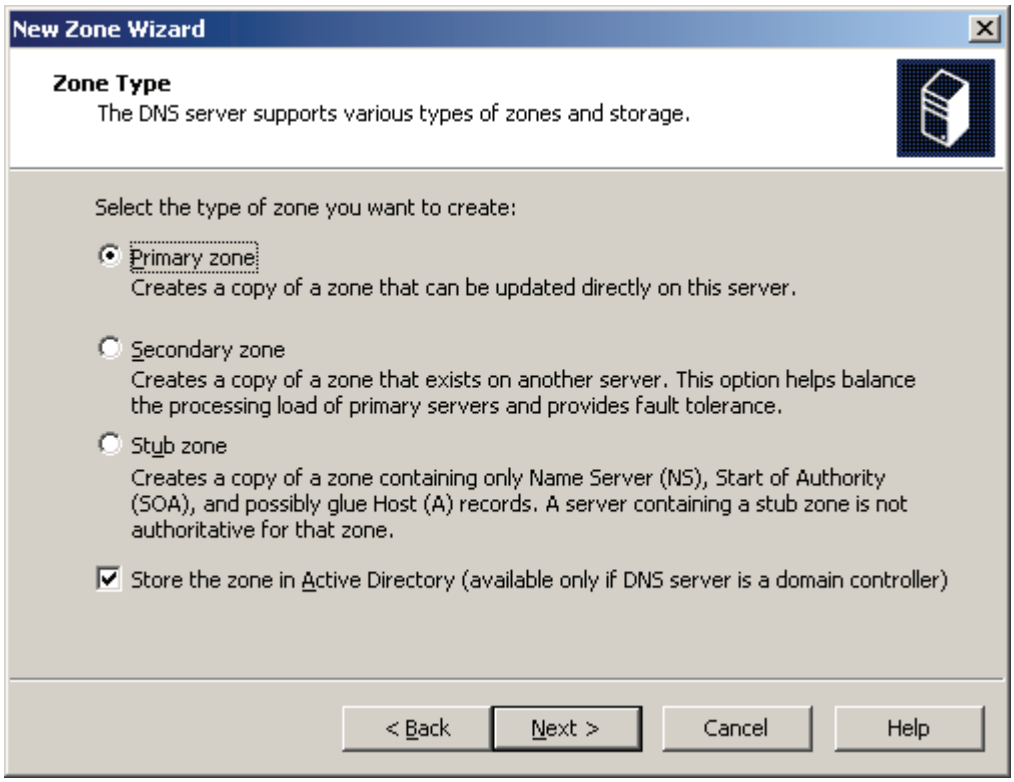
Enter **dcpromo** in Start - > Run and the **Domain Controller setup wizard** is shown.



Open **DNS Manager,** right click on **Reverse Lookup Zone** and select **New Zone**, the **New Zone Wizard** is shown.

Press the **Next** button to continue.

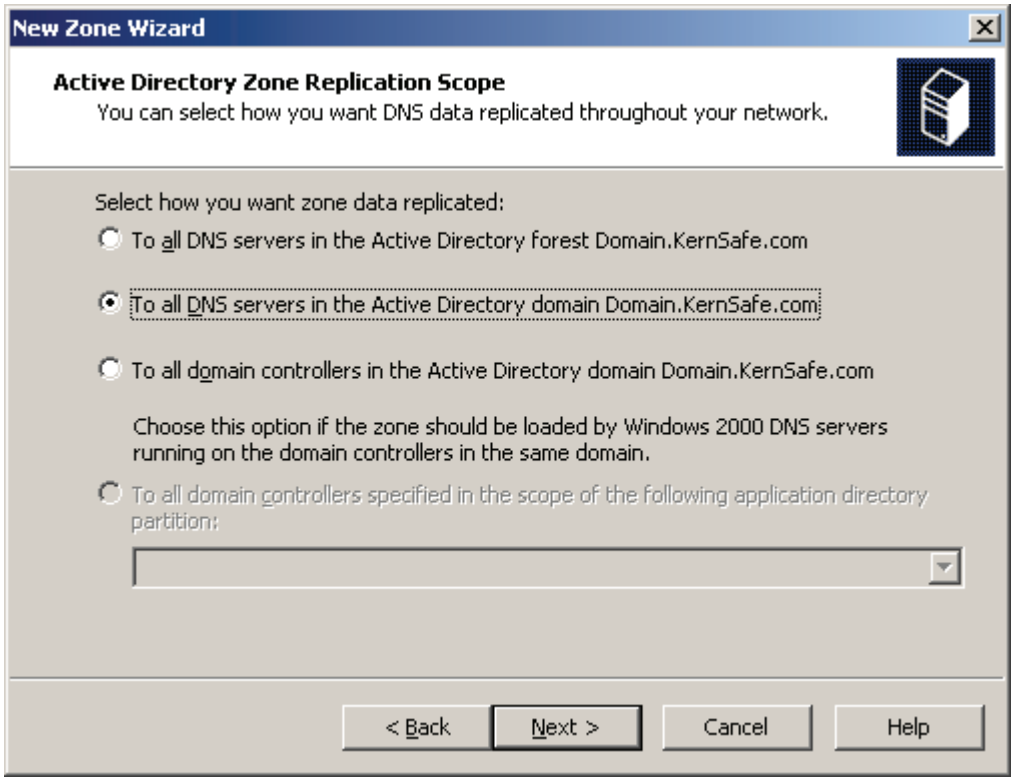
Select zone type



Select **Primary zone**.

Press the **Next** button to continue.

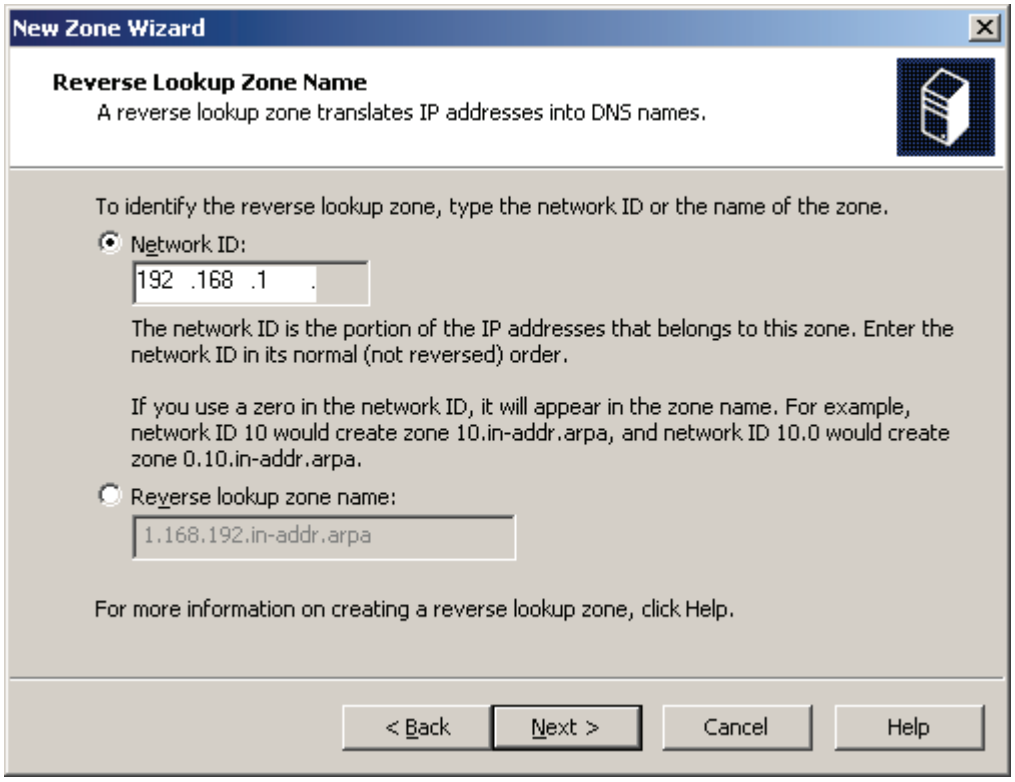
Select zone data replicated



Select **To all DNS servers in the Activity Directory domain Domain.KernSafe.com**.

Press the **Next** button to continue.

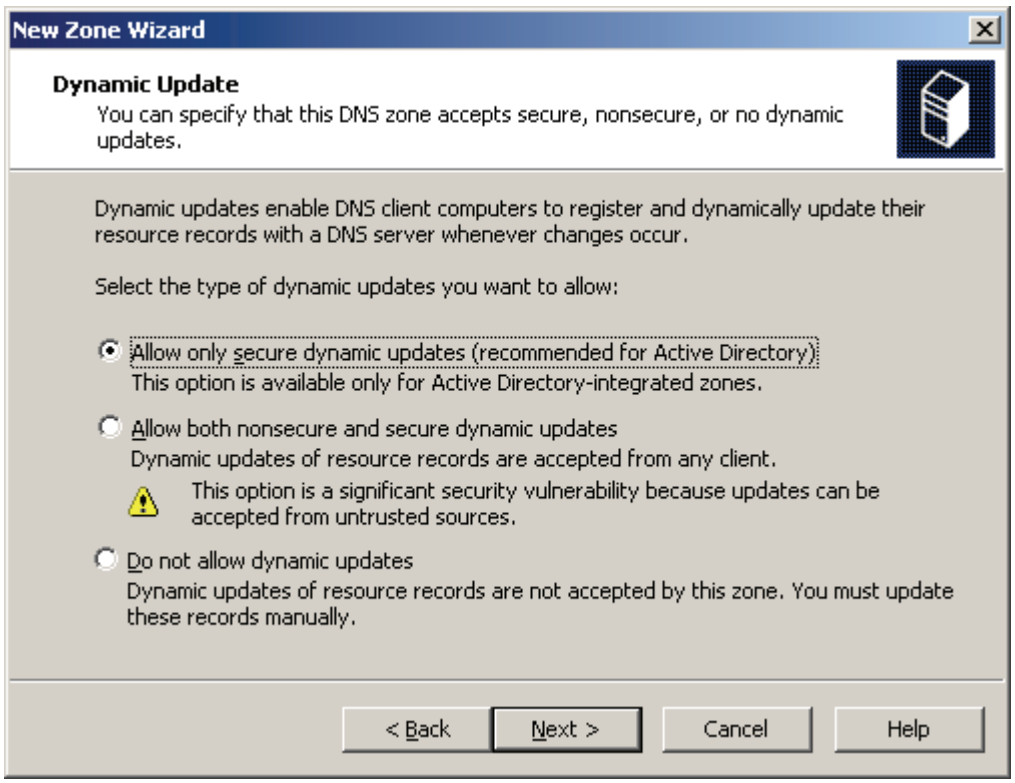
Specify reverse lookup zone name



Select Network ID, enter 192.168.1.

Press the **Next** button to continue.

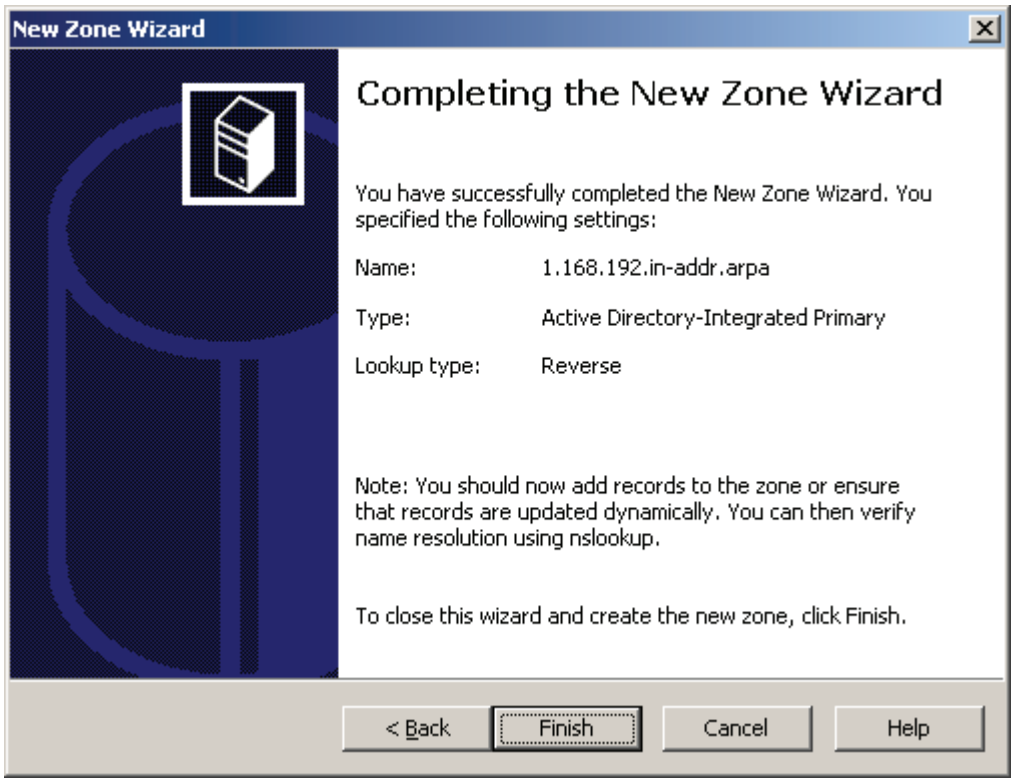
Set Dynamic update types



Select **Allow only secure dynamic updates (recommended for Active Directory)**.

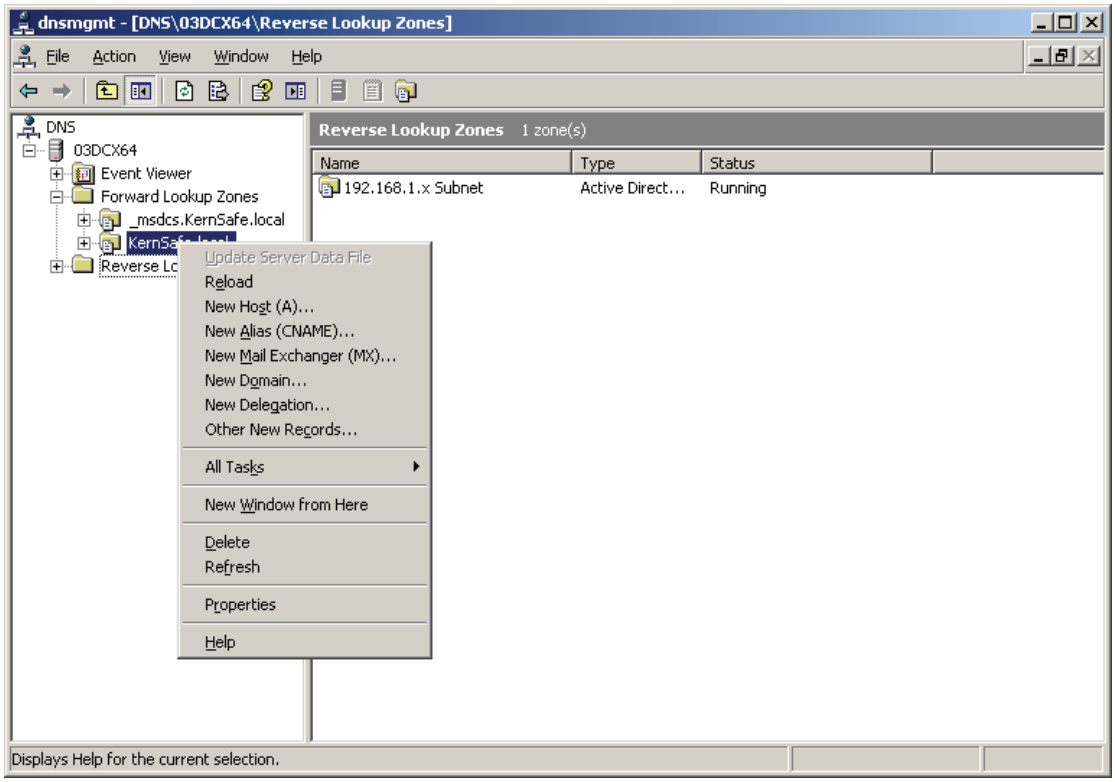
Press the **Next** button to continue.

Complete the **New Zone Wizard**

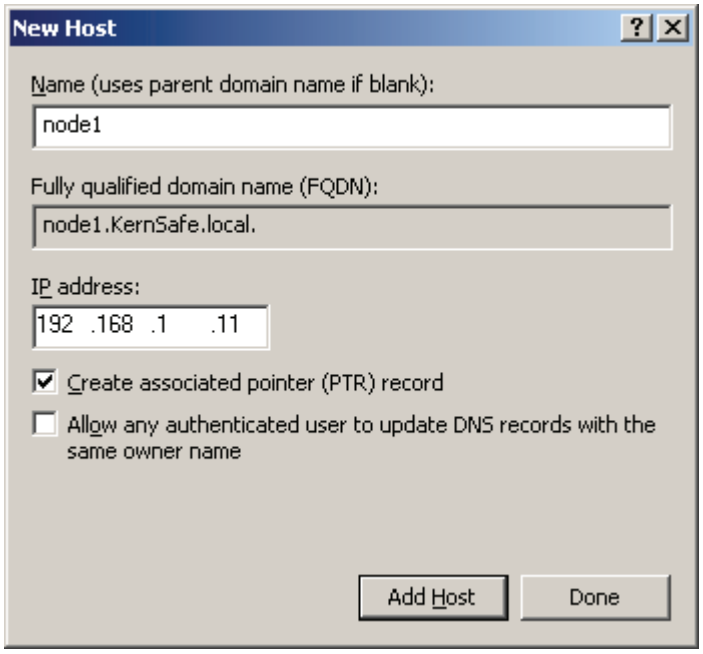


Press the **Finish** button.

Come back to the domain controller management console.

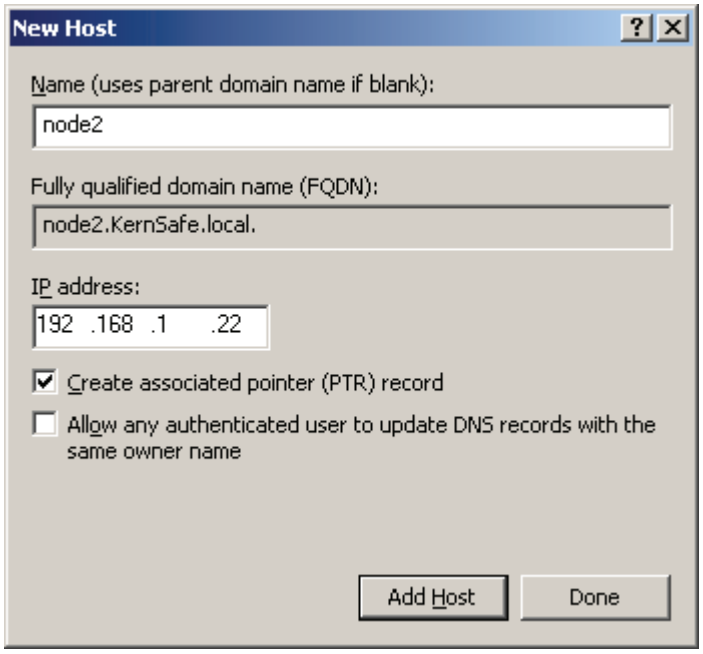


Right click on **KernSafe.local and select New Host (A)**, the **New Host dialog** is shown.



Type node in Name field, 192.168.1.11 in the IP address field and check **Create associated pointer (PTR) record**.

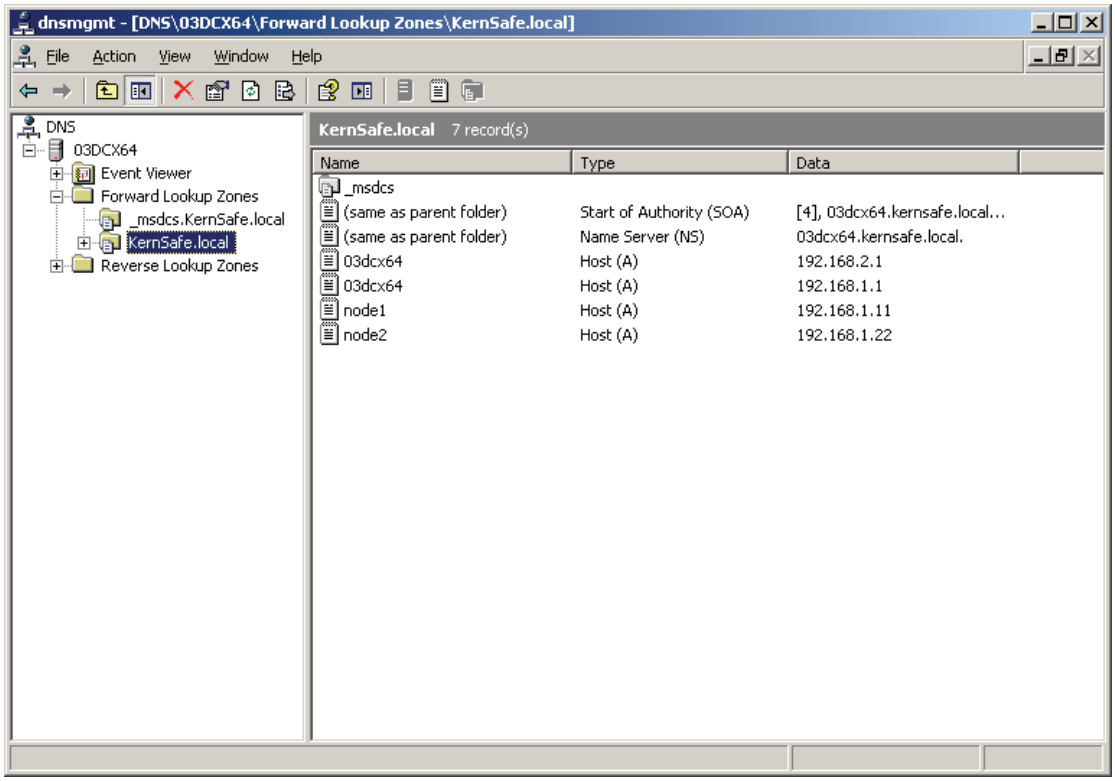
Press the **Add Host** button to continue.



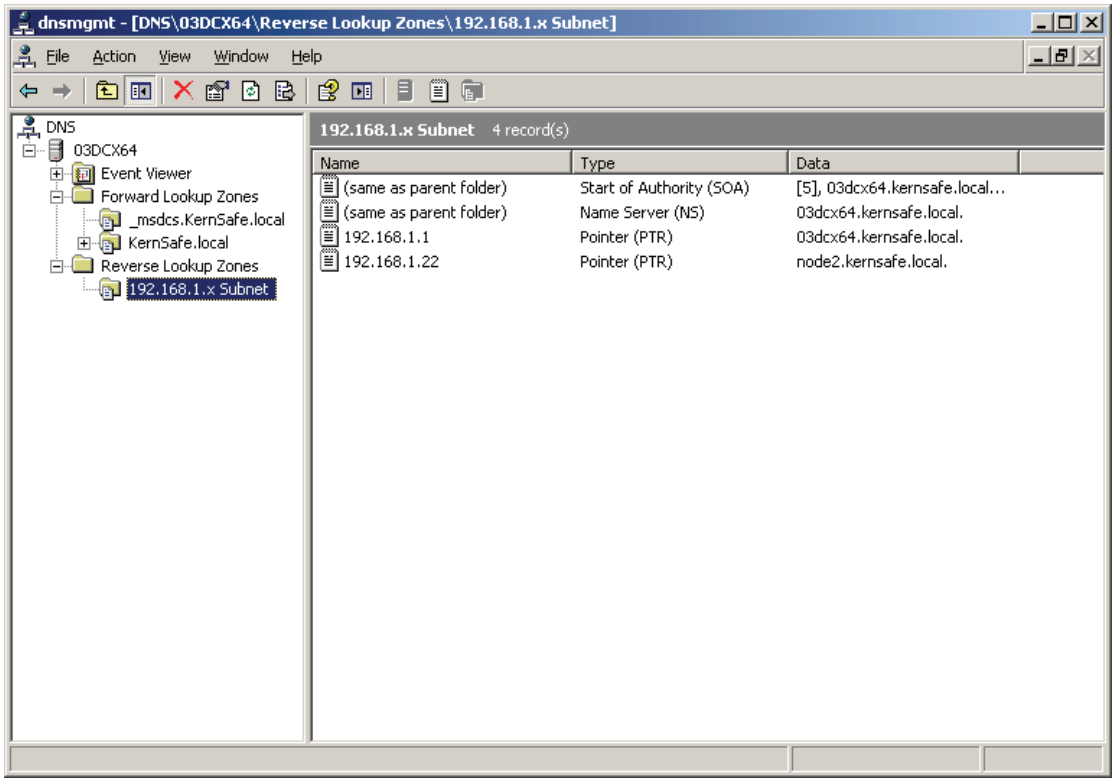
Type node2 in Name field, 192.168.1.22 in the IP address field and check **Create associated pointer (PTR) record.**

Press the **Add Host** button to continue.

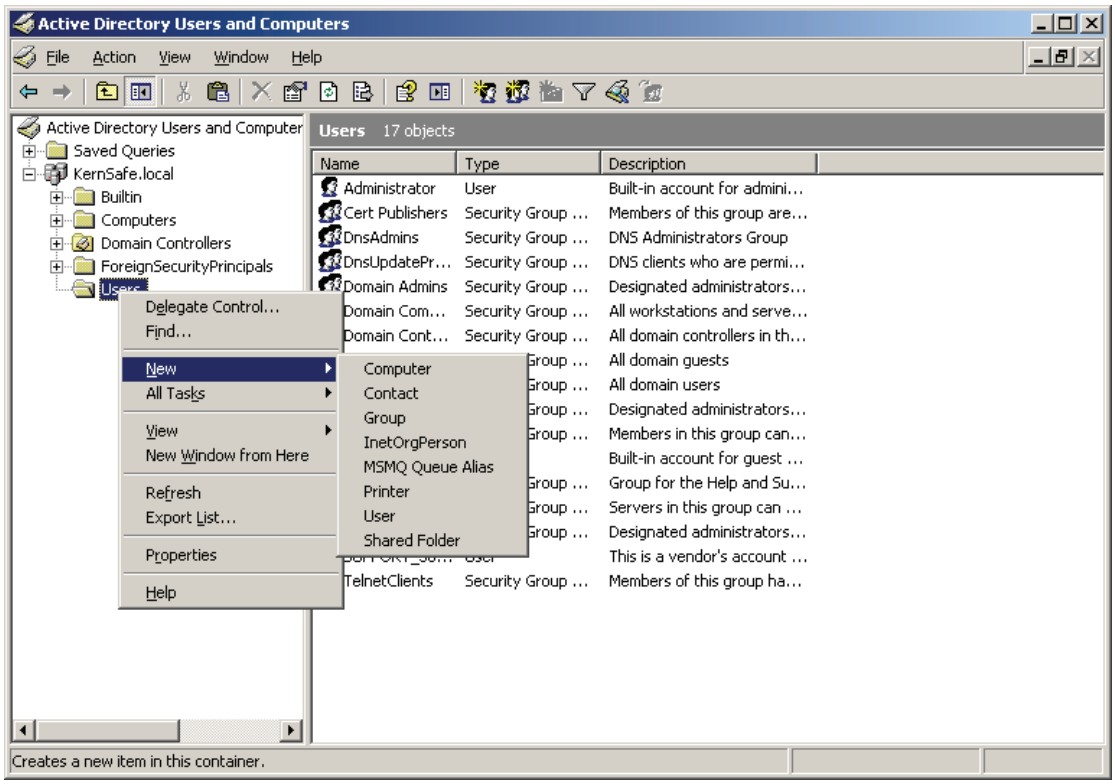
Come back to the domain controller management console.



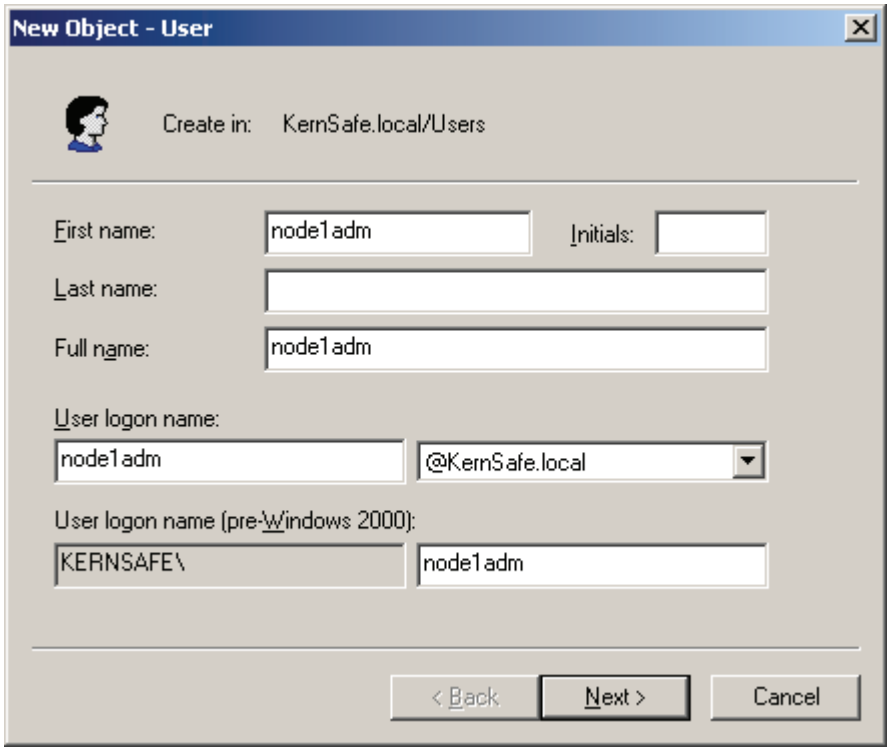
After all the above operations are done successfully, the status of DNS Manager is shown as in the figure below.



Open Active Directory Users and Computers console



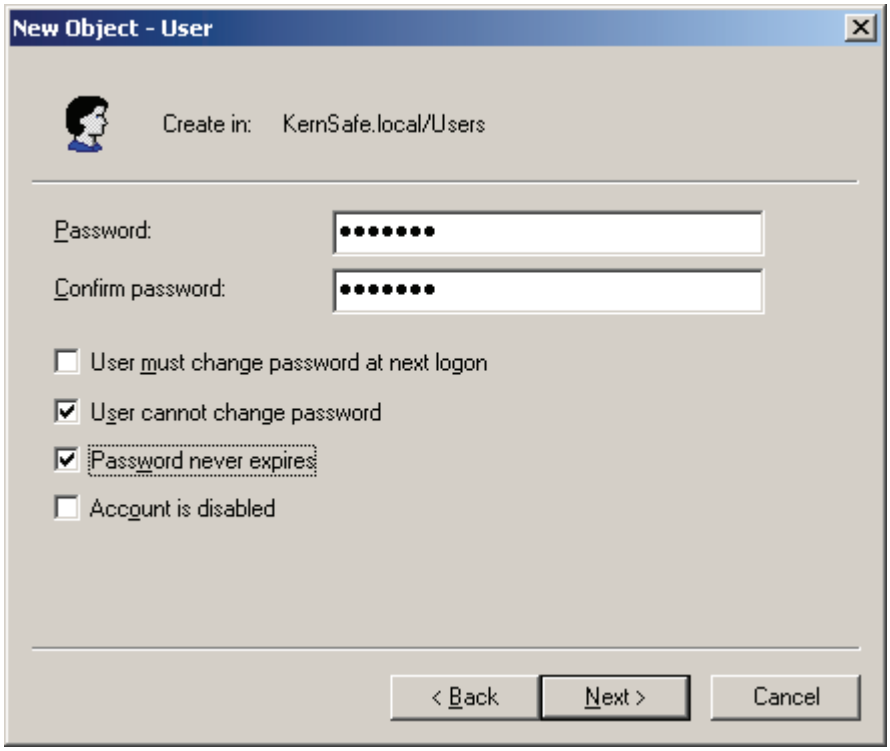
Right click on Users and select New - > User, the **New Object-User** dialog is shown



Create any user as shown in the picture, take node1adm as an example.

Press the **Next** button to continue.

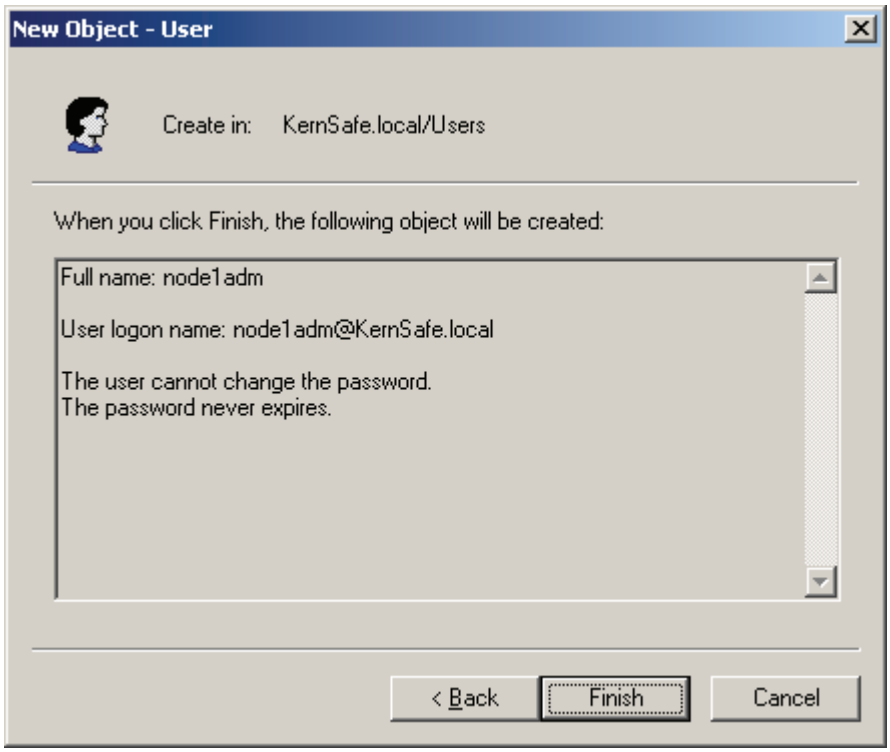
Sepecify user's password



Enter password, take abc.123 for example here, check **User cannot change password and Password never expires**.

Press the **Next** button to continue.

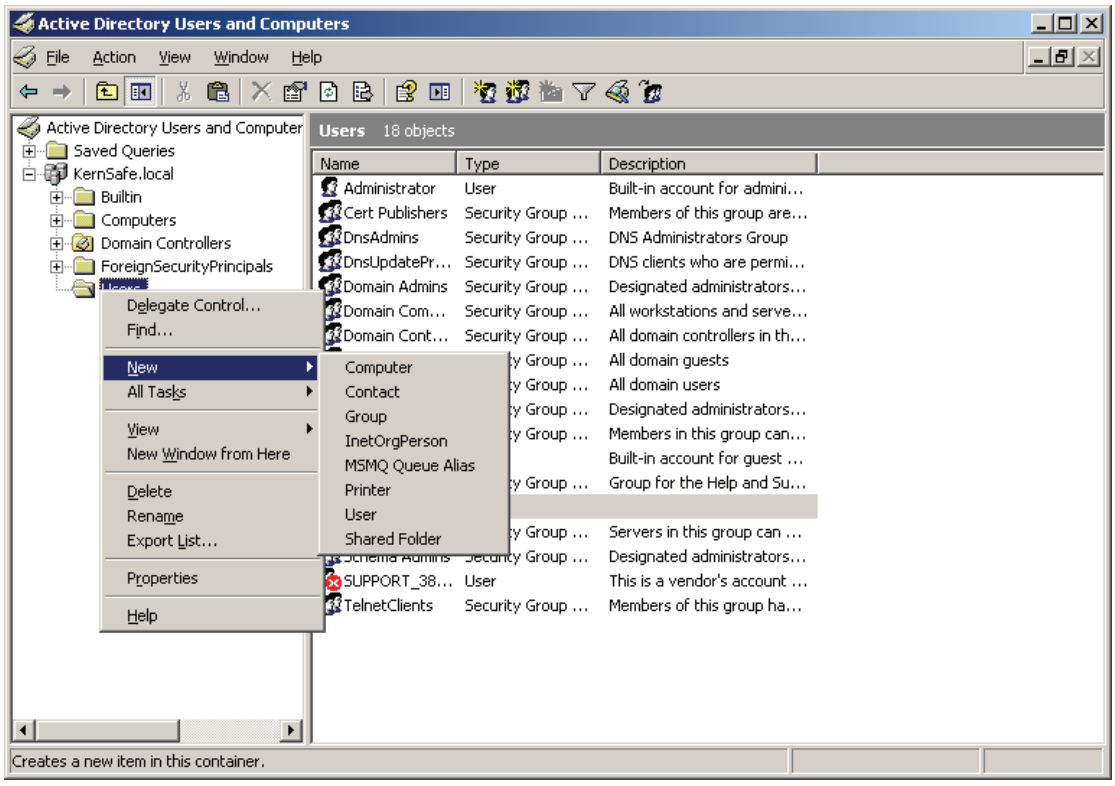
Finish creating user



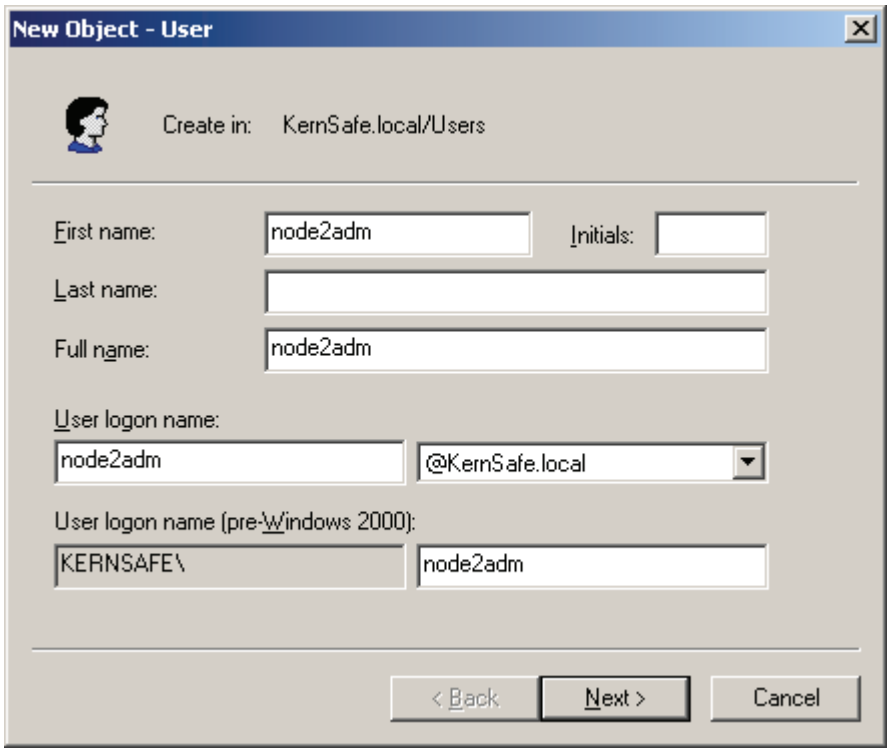
Press the **Finish** button.

Come back to Active Directory Users and Computers console

Create the second user.



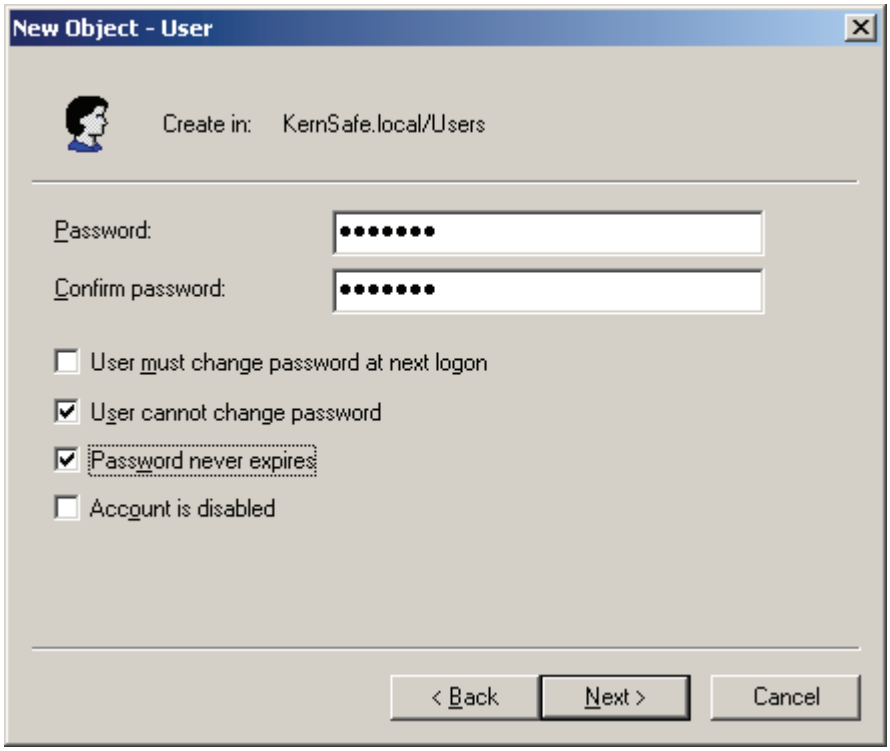
Right click on **Users** and select **New** - > **User**, the **New Object-User dialog** is shown.



Create any user as shown in the figure, take node2adm as an example.

Press the Next button to continue.

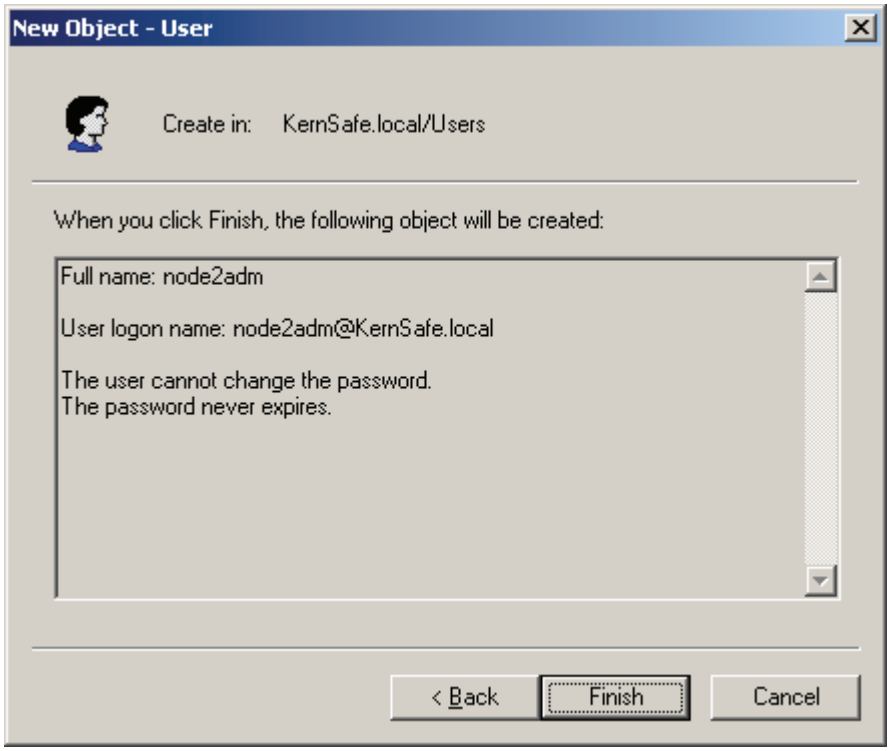
Sepecify user's password



Enter password, take abc.123 as a example, check **User cannot change password and Password never expires**.

Press the **Next** button to continue.

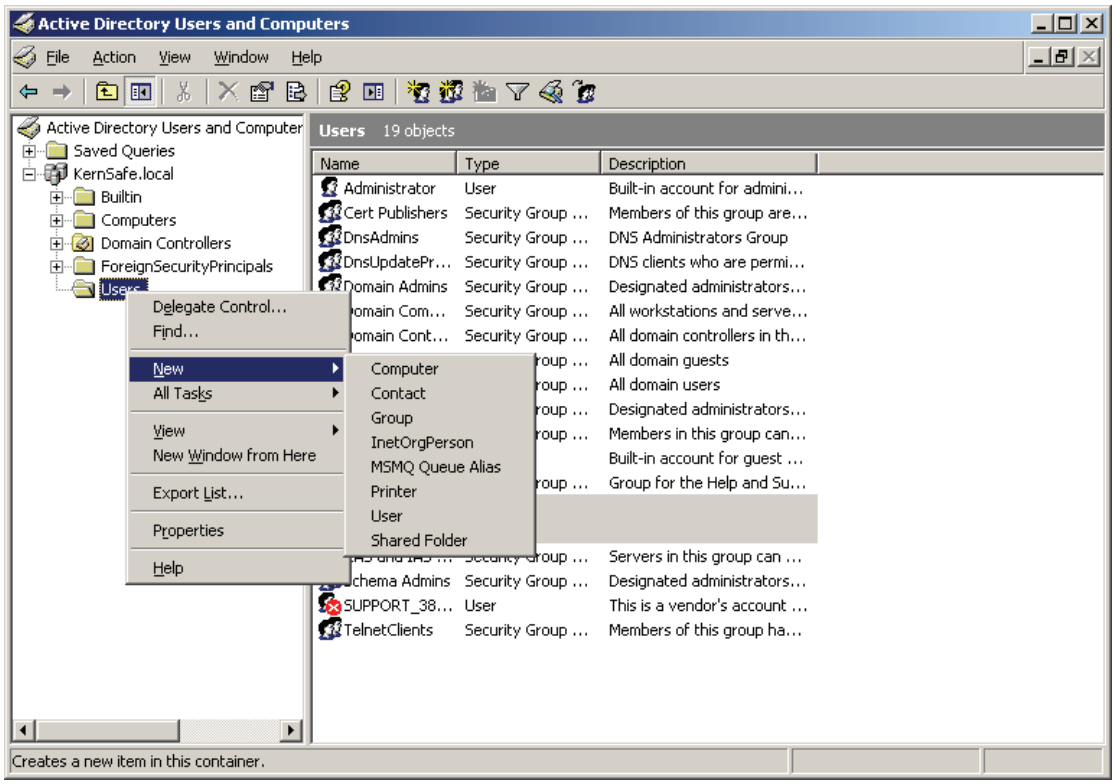
Finish creating user



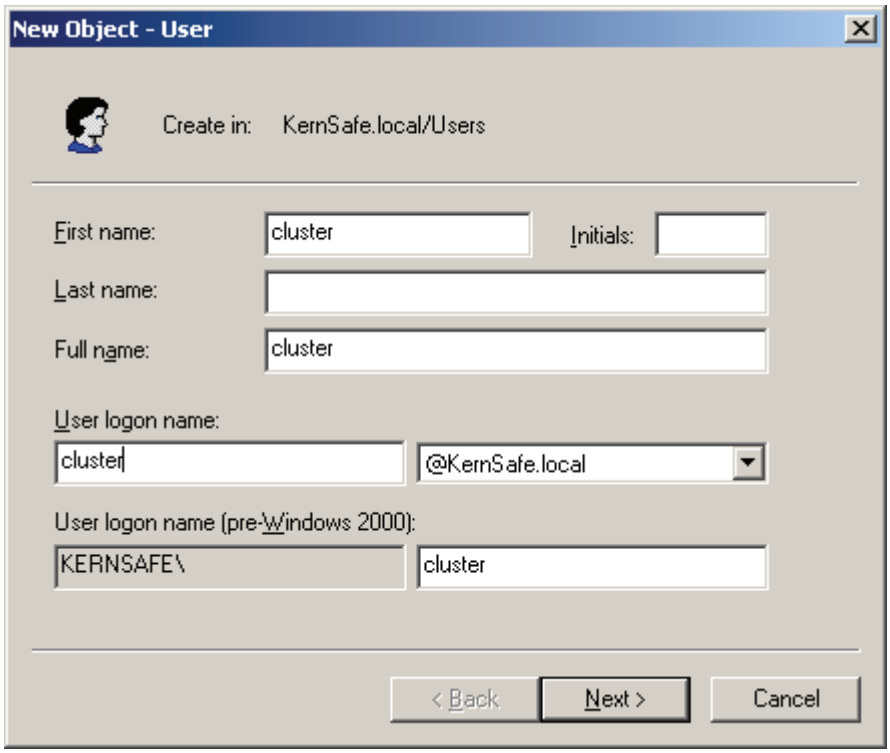
Press the **Finish** button to finish user creating.

Come back to Active Directory Users and Computers console

Create a user cluster



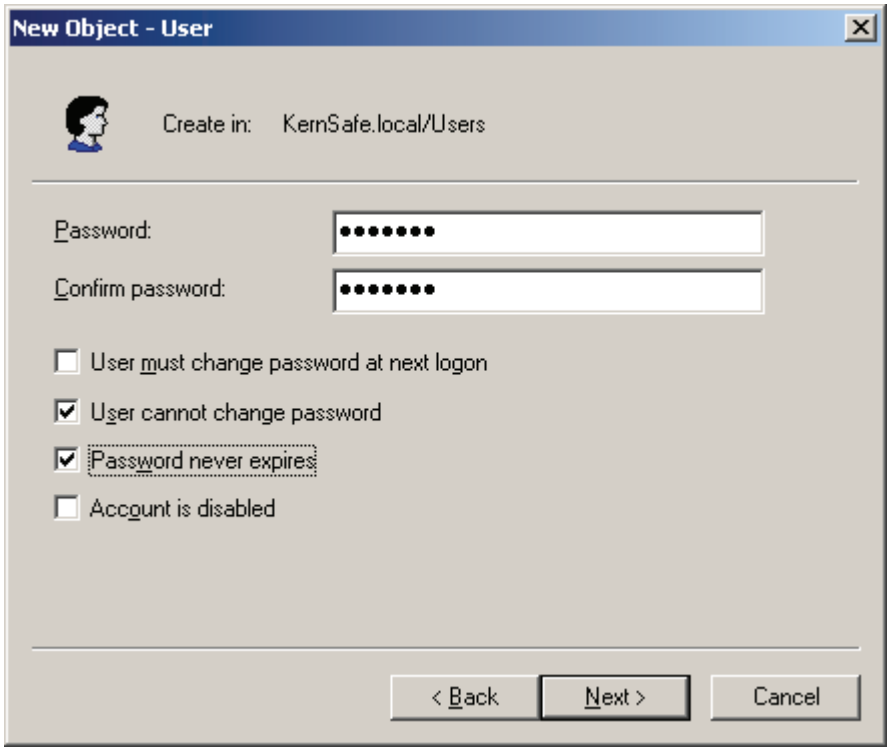
Right click on **Users** and select **New** - > **User**, the **New Object-User dialog** is shown



Create any user as shown in the figure, take cluster as an example.

Press the **Next** button to continue.

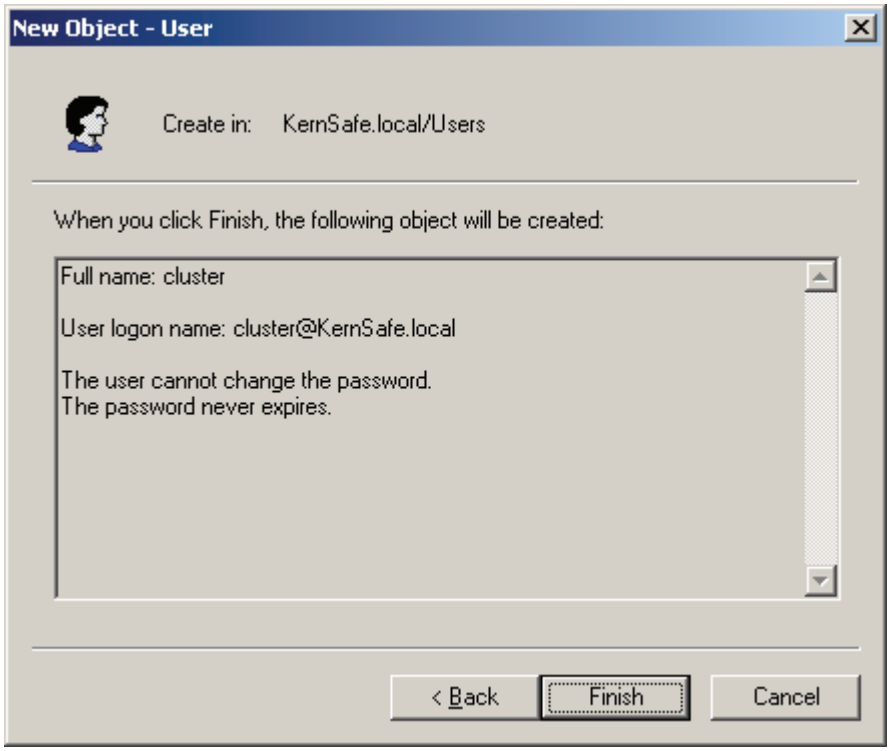
Sepecify user's password



Enter password, take abc.123 as an example, check **User cannot change password and Password never expires.**

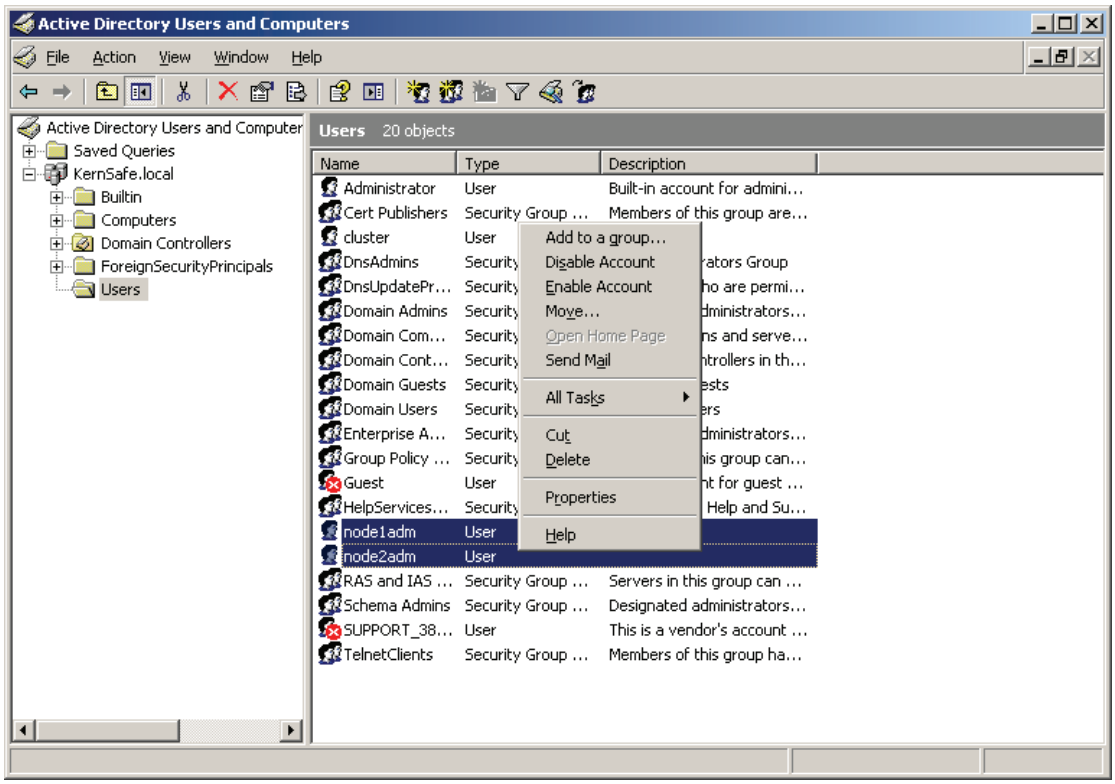
Press the Next button to continue.

Finish creating user



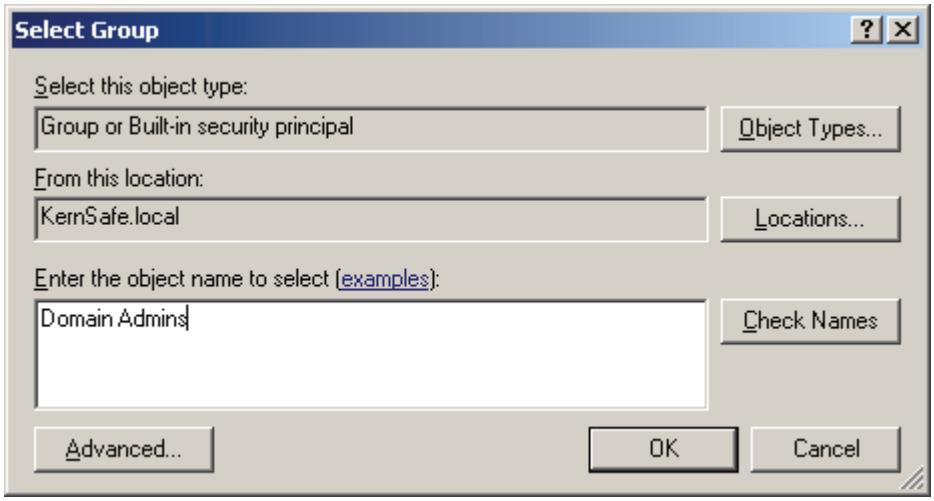
Press the Finish button.

Come back to Active Directory Users and Computers console

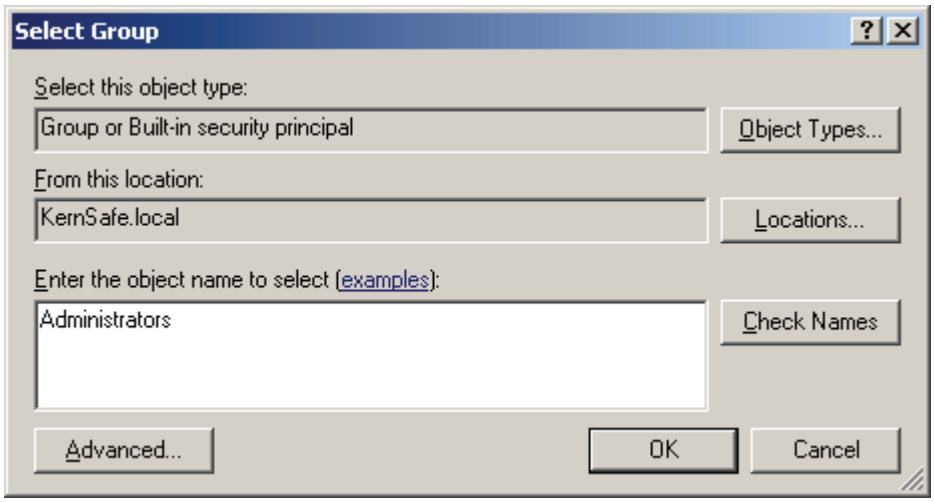


Add node1adm and node2adm to **Domain Admins** and **Administrators** groups.

Select node1adm and node2adm and right click to select Add to a group, the **Select Group dialog** is shown.



Enter Domain Admins and press the **OK** button.

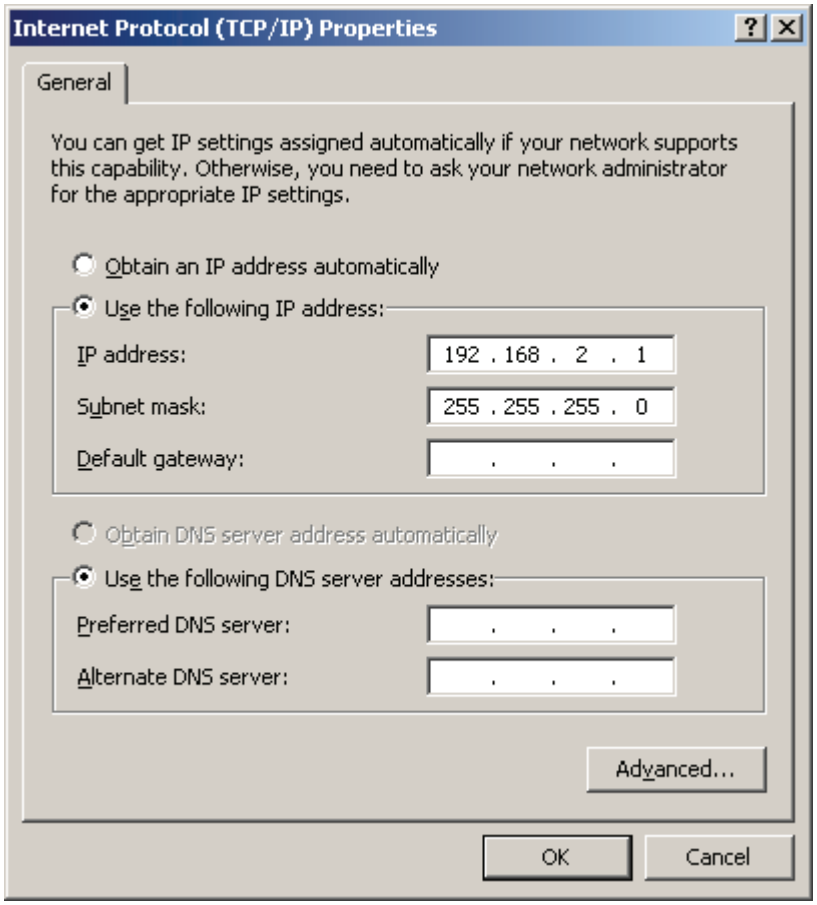


Enter Administrators and press the **OK** button.

3. KernSafe iStorage Server Settings

If three computers are used, you can install KernSafe iStorage Server on the Domain Controller, or use a fourth computer to install KernSafe iStorage Server. Taking three computers for example, this article installs KernSafe iStorage Server on the Domain Controller.

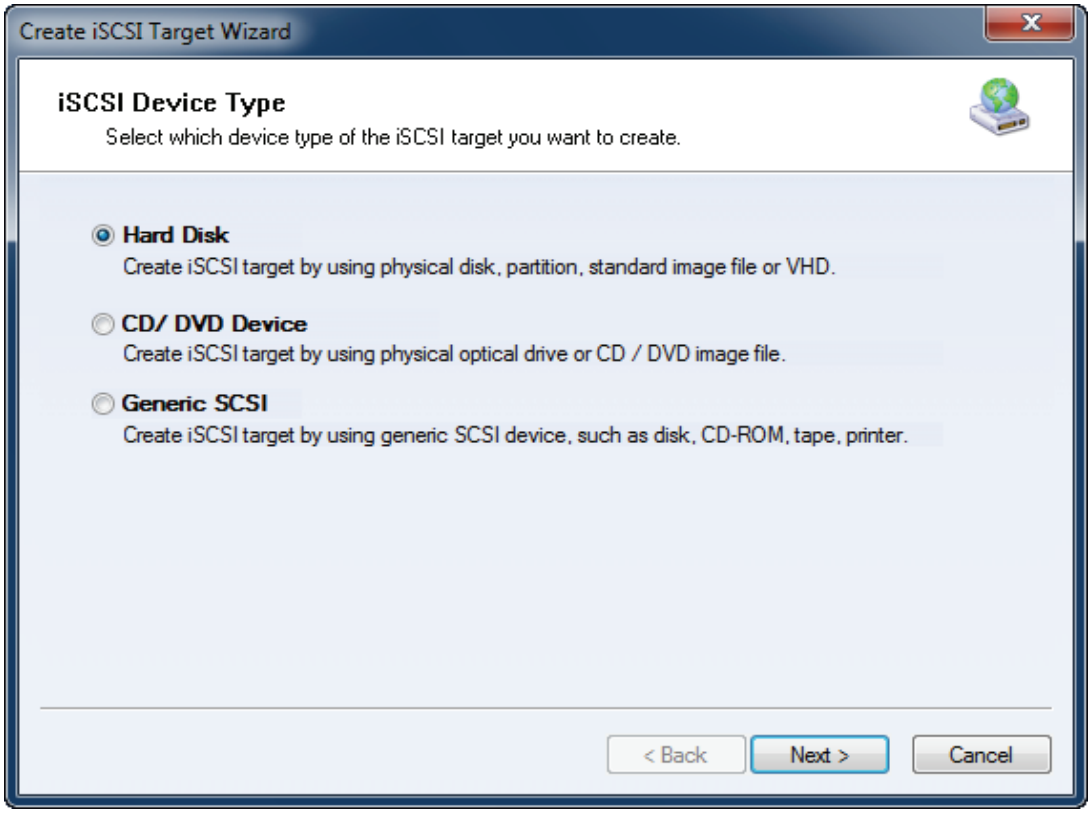
Network setting



Set the second network adapter of Domain Controller as shown in the figure. IP address is set as 192.168.2.1 and Subnet mask is set as 255.255.255.0.

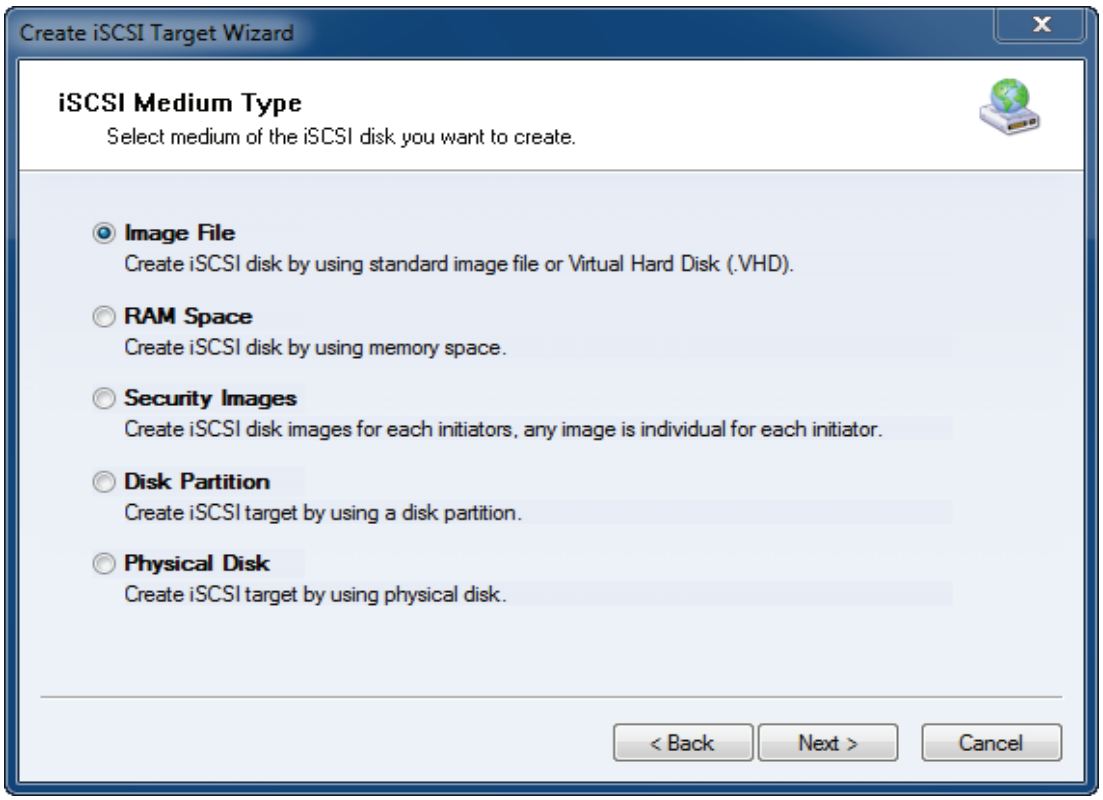
Create iSCSI device, press the **Create** button on the toolbar of iStorage Server management console, the **Create Device Wizard** is shown.

Select a device type



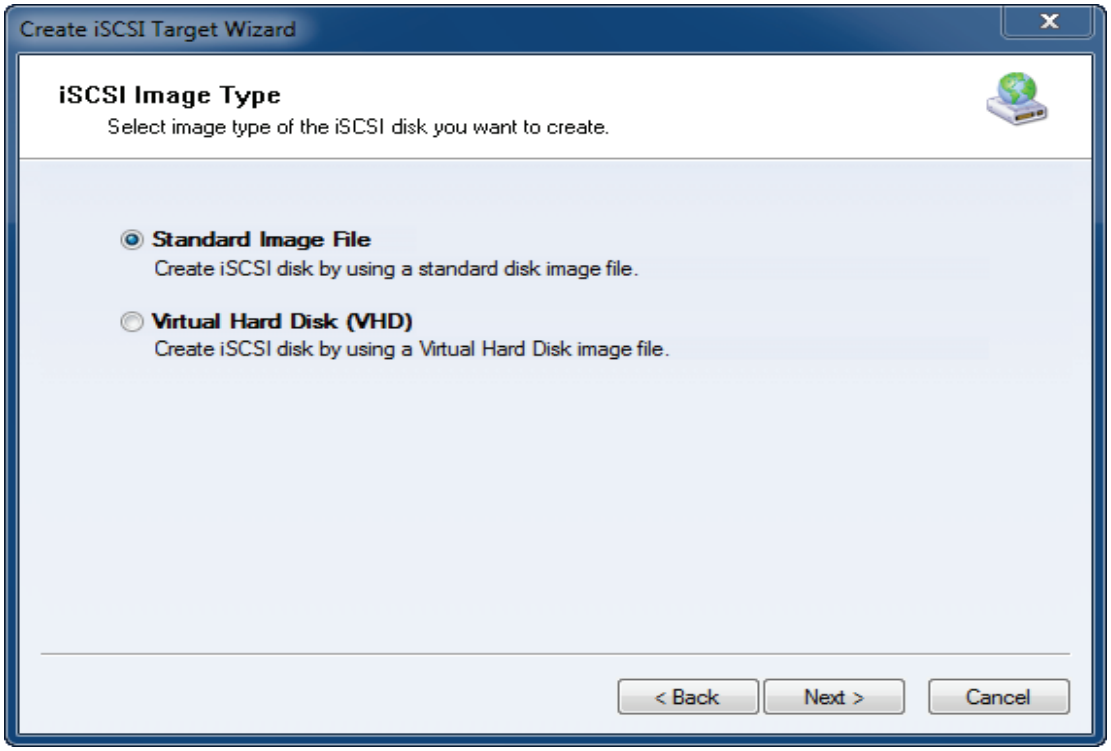
Choose **Hard Disk**.

Press the **Next** button to continue.



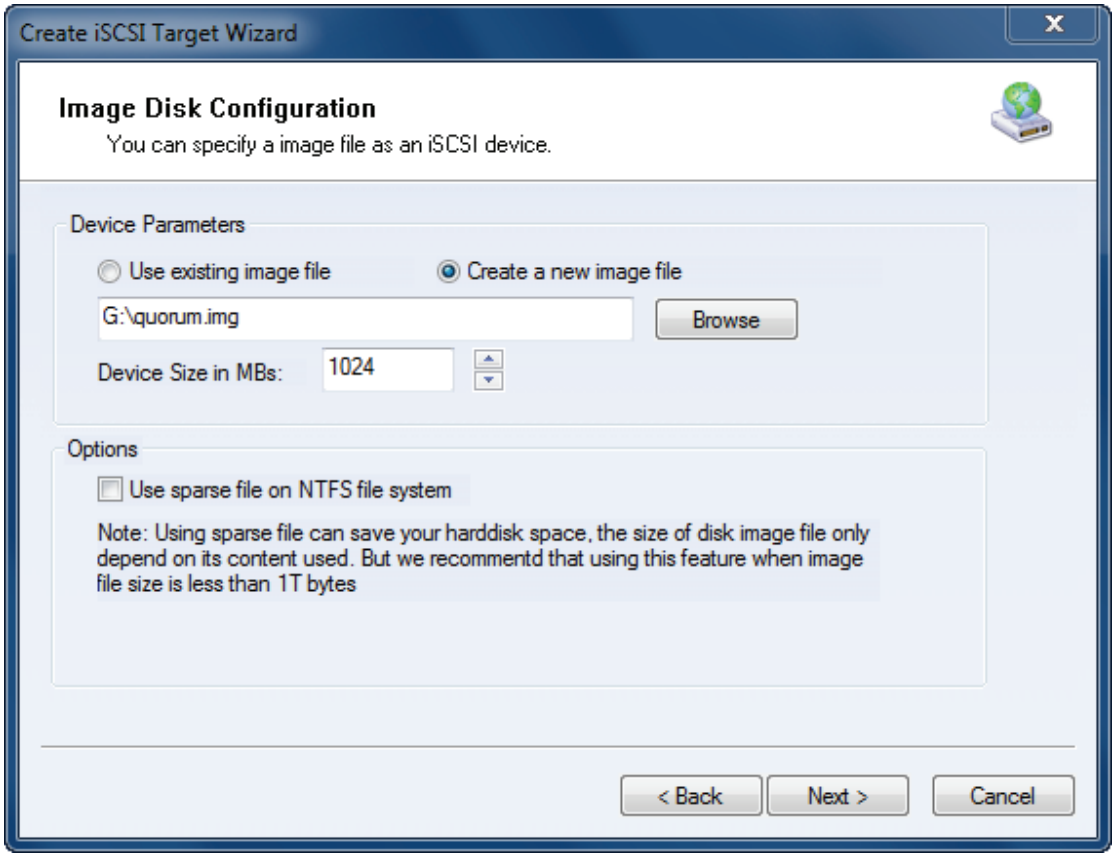
Choose **Image File** in **iSCSI Medium Type** window.

Press the **Next** button to continue.



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

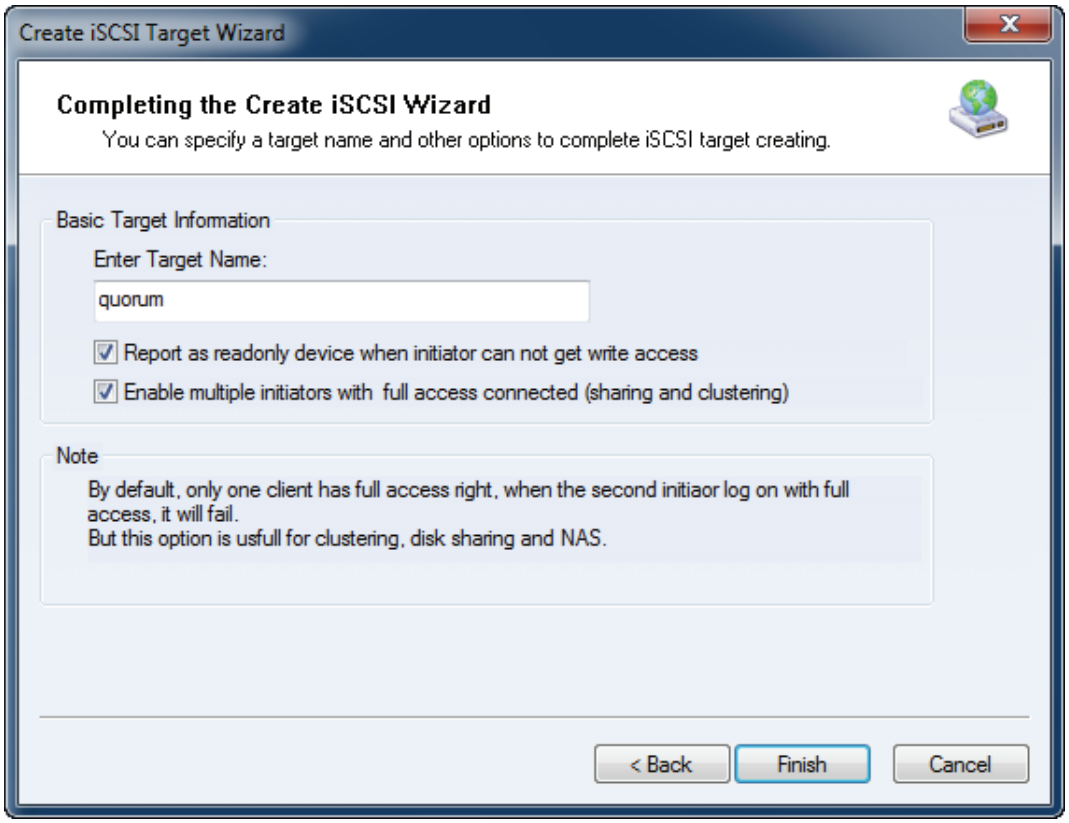
Set image disk parameters



Create an .img file named quorum with a size of 1024MB as an example.

Press the **Next** button to continue.

Finish creating iSCSI Target

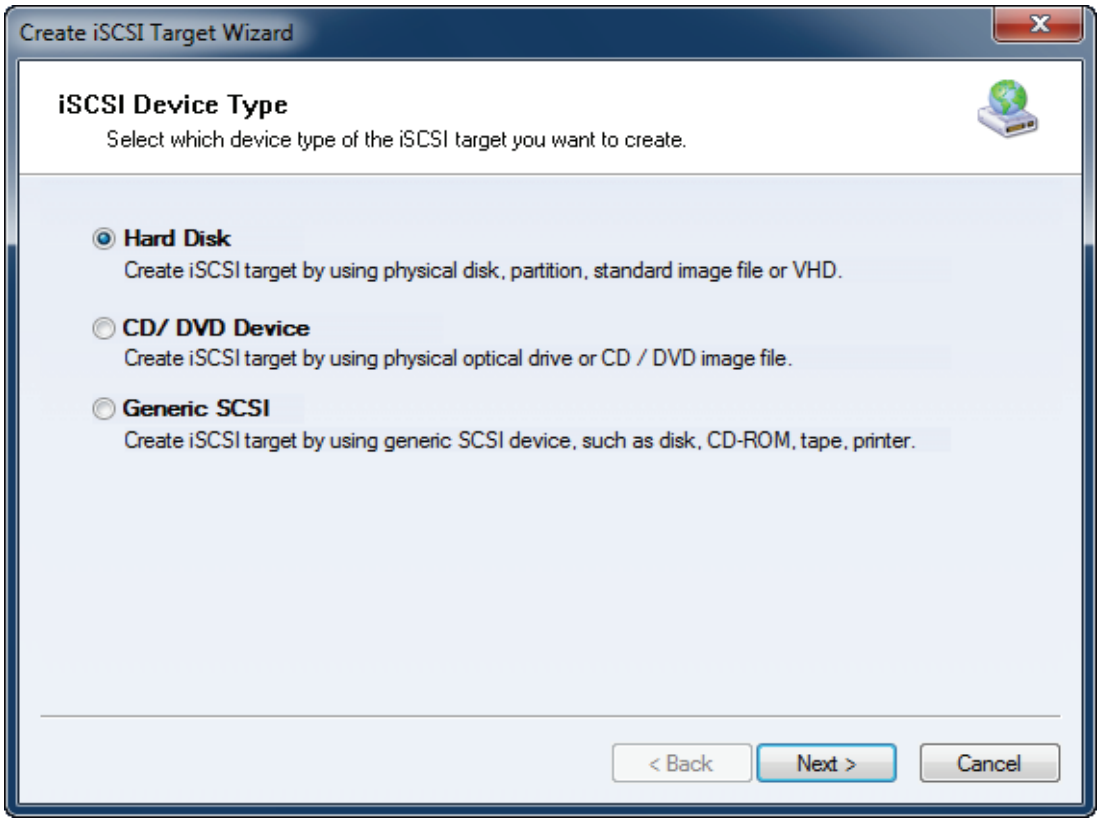


Enter quorum as the name of Target, check Enable multiple initiators with full access connected (sharing and clustering).

Press the **Finish** button to complete target creation.

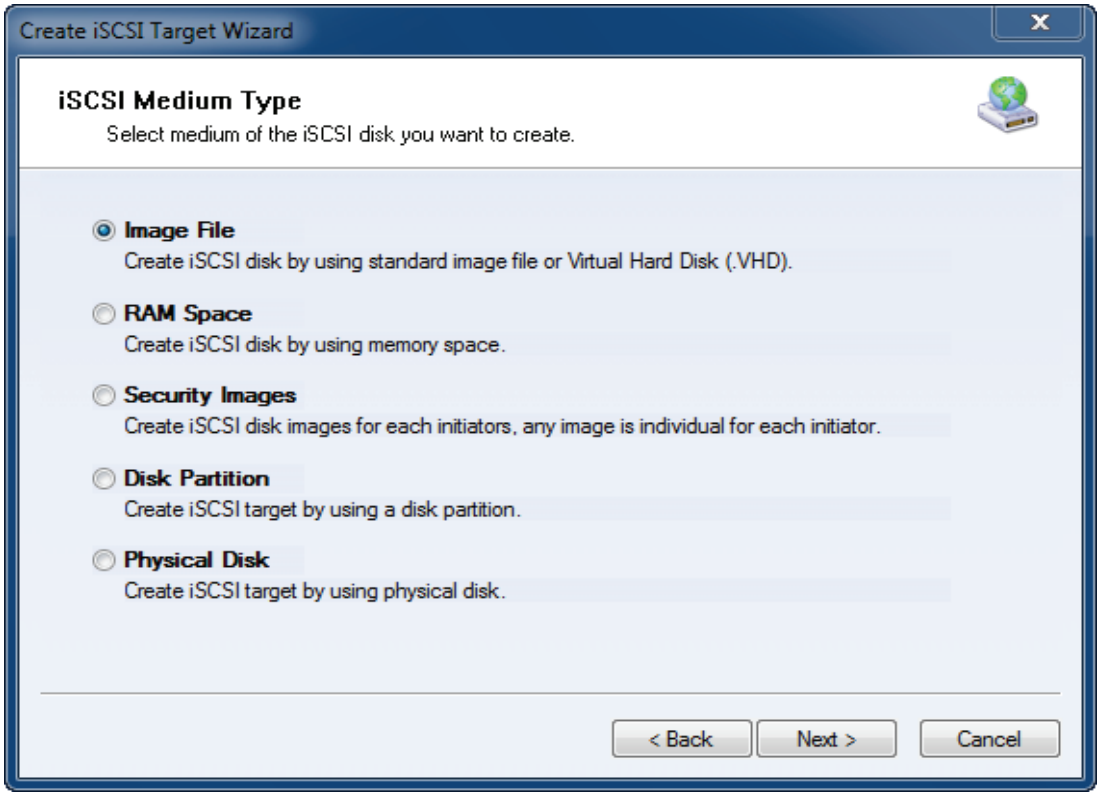
Create the second iSCSI Target.

Select a device type



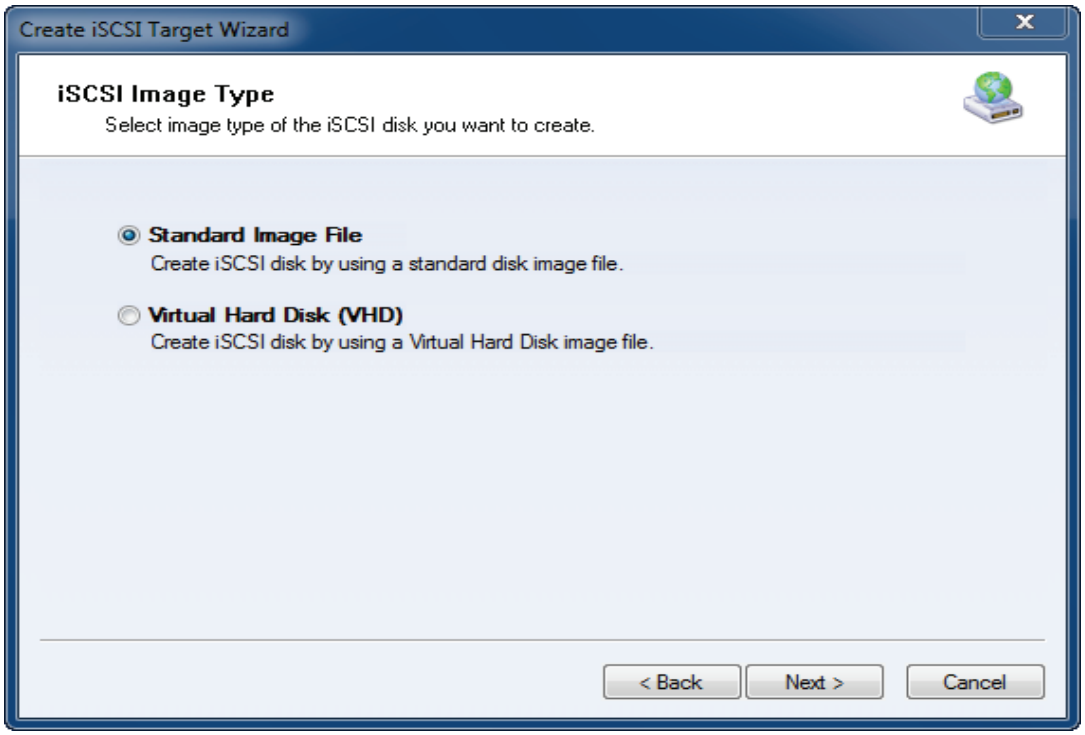
Choose **Hard Disk**.

Press the **Next** button to continue.



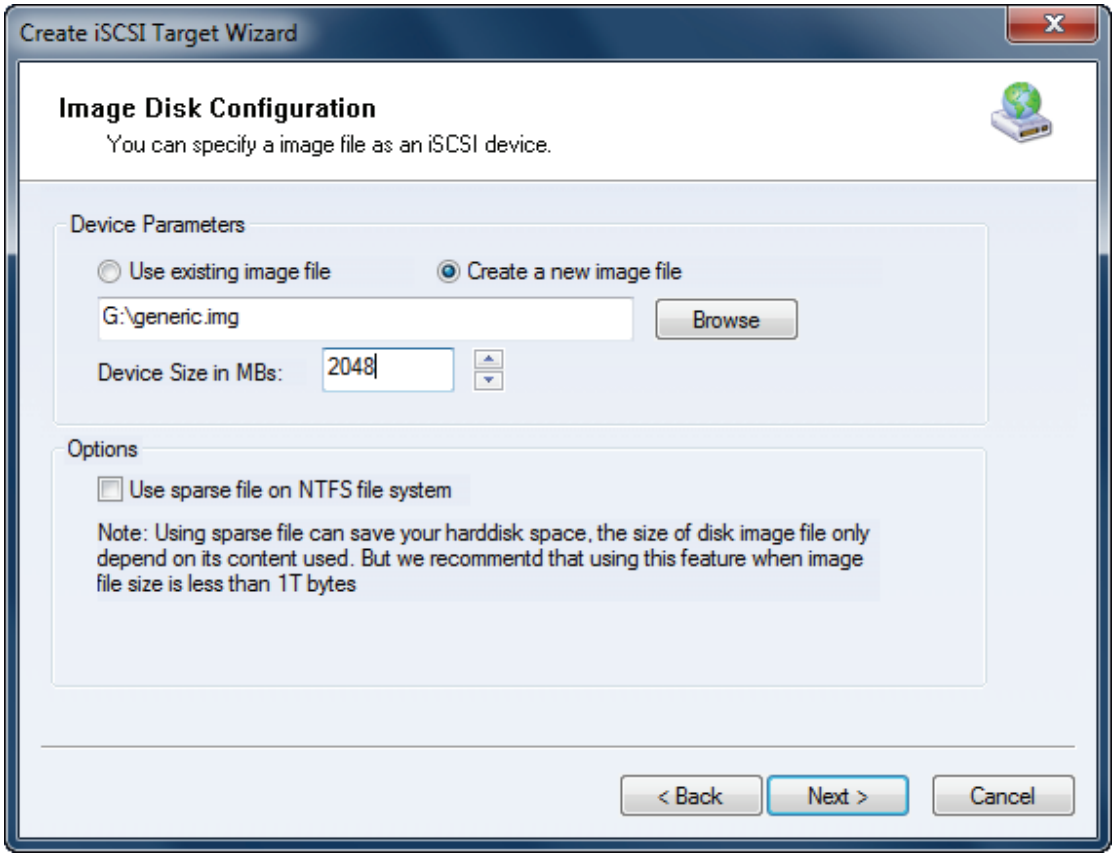
Choose **Image File** in **iSCSI Medium Type** window.

Then press **Next** button to continue.



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

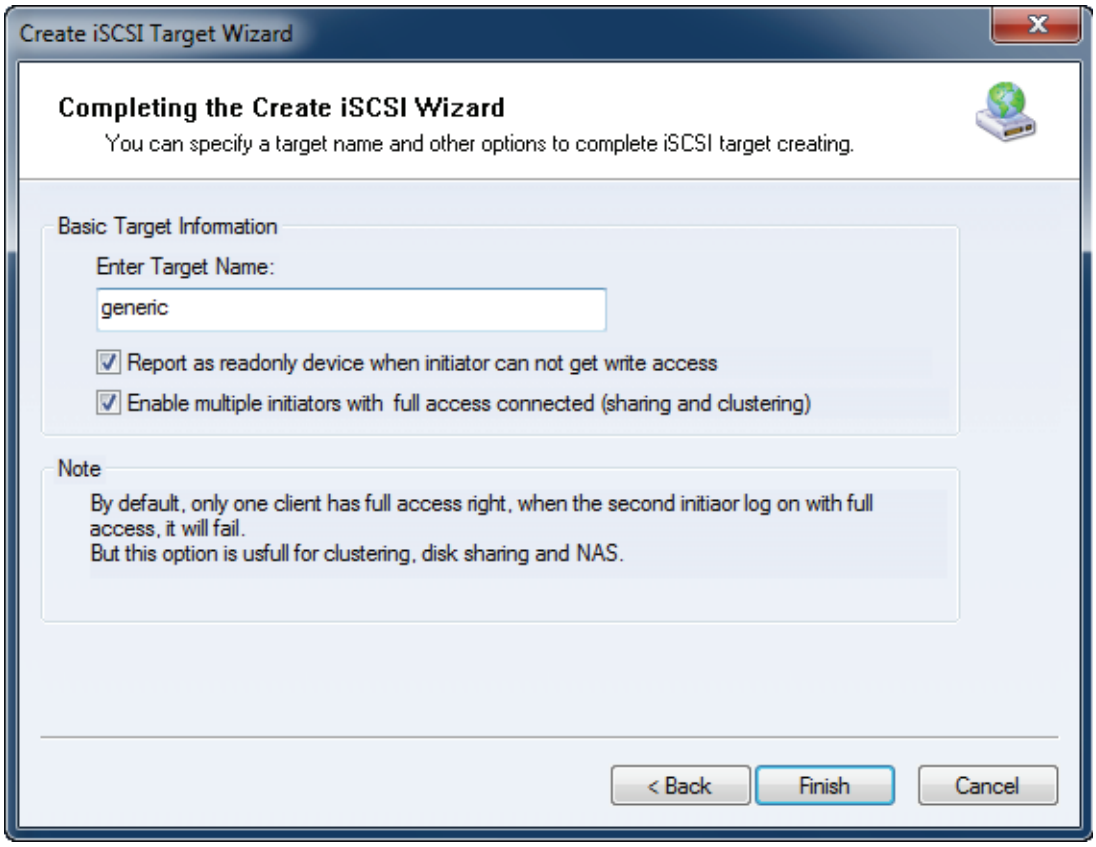
Set image disk parameters



Create an image file named generic with a size of 2048MB as an example.

Press the Next button to continue.

Finish creating iSCSI Target

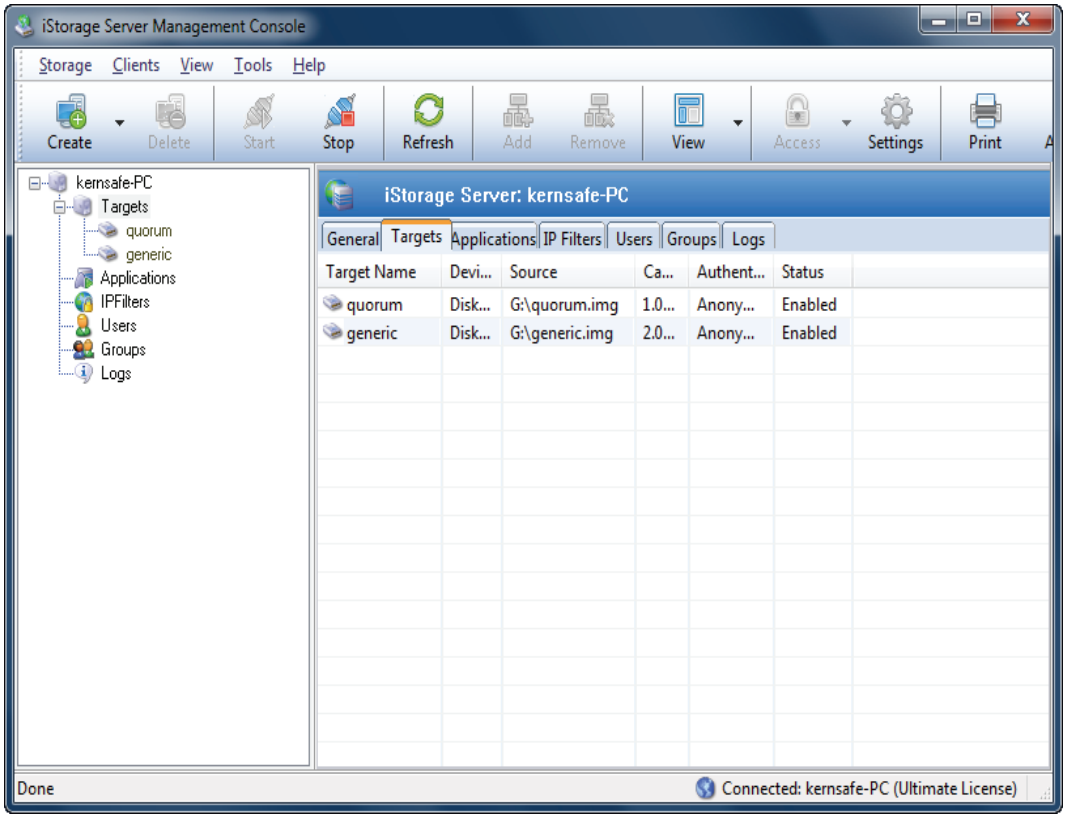


Enter generic as the name of Target, check Enable multiple initiators with full access connected (sharing and clustering).

Press the **Finish** button to finish creating iSCSI Targets.

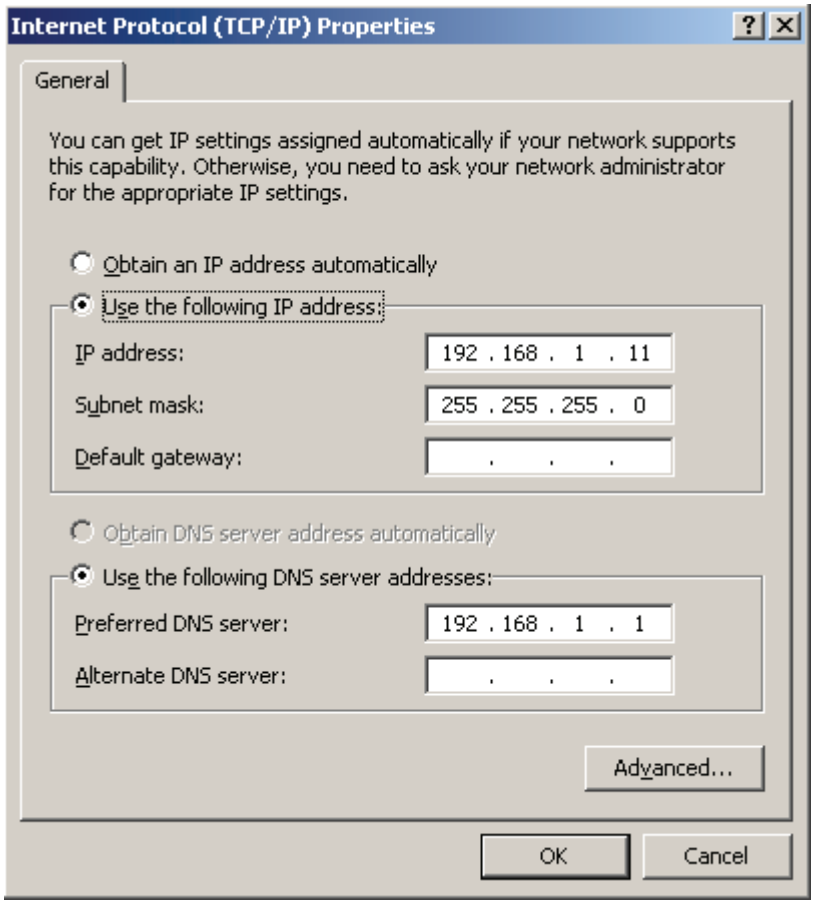
Come back to iStorage Server management console.

After the successful creation, the detail shown in the figure.


iStorage Server Management Console
Storage
Clients
View
Tools
Help
Create
Delete
Start
Stop
Refresh
Add
Remove
View
Access
Settings
Print
kernsafe-PC
Targets
quorum
generic
Applications
IPFilters
Users
Groups
Logs
iStorage Server: kernsafe-PC
General
Targets
Applications
IP Filters
Users
Groups
Logs
Target Name
Devi...
Source
Ca...
Authent...
Status
quorum
Disk...
G:\quorum.img
1.0...
Anony...
Enabled
generic
Disk...
G:\generic.img
2.0...
Anony...
Enabled
Done
Connected: kernsafe-PC (Ultimate License)

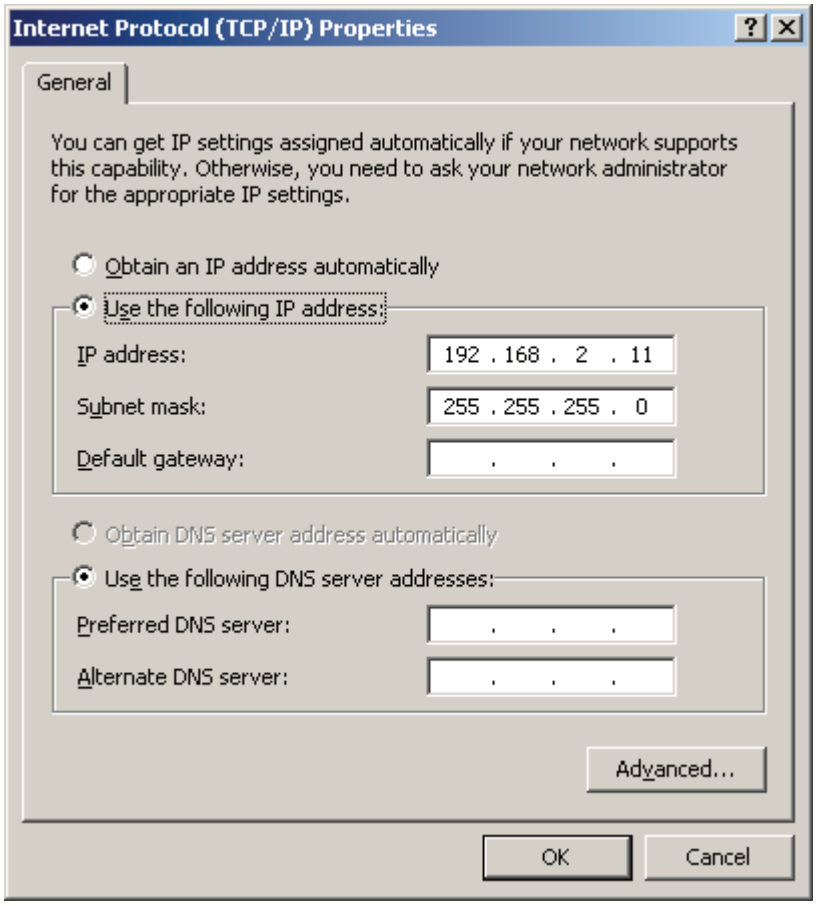
4. Node1 Settings

Network settings



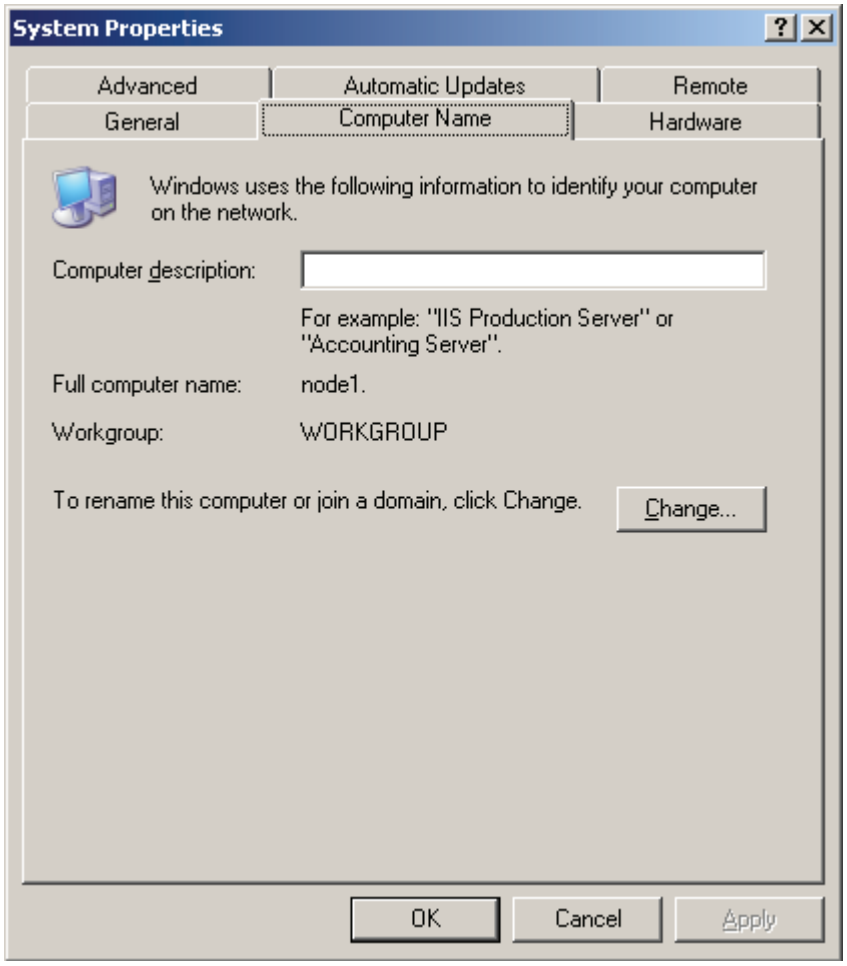
Set the first network adapter of node1 as shown in the picture.

IP address is set as 192.168.1.11, Subnet mask is set as 255.255.255.0 and Rreferred DNS Server is set as 192.168.1.1.

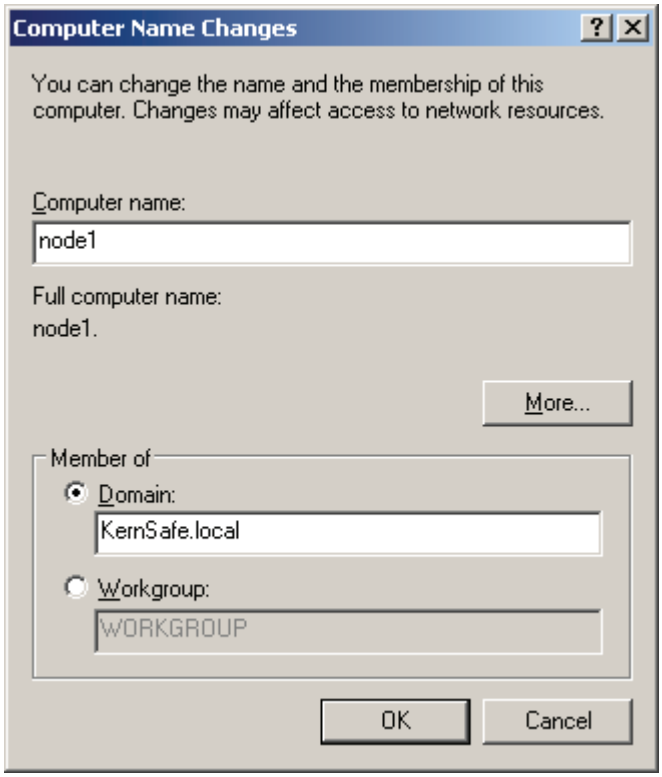


Set the second network adapter of node1 as shown in the picture.
IP address is set as 192.168.2.11 and Subnet mask is set as 255.255.255.0.

Add nodes to domain, open **System Properties page**



Click **Change** in the page of Computer Name, the **Computer Name Changes dialog** is shown.



Select Domain and enter Domain name, here the name is KernSafe.local.
Press the **OK** button to continue.

Type domain user and password

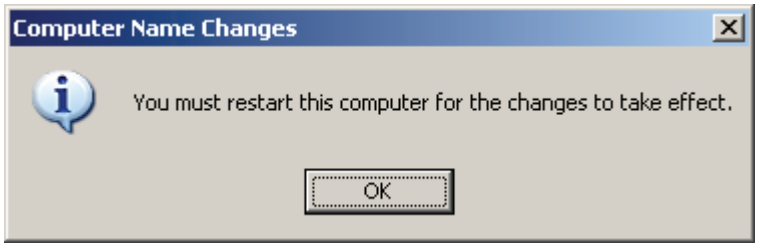
Enter the username and password of node1.

Press the **OK** button to continue.

The **Computer Name Changes** message dialog is shown

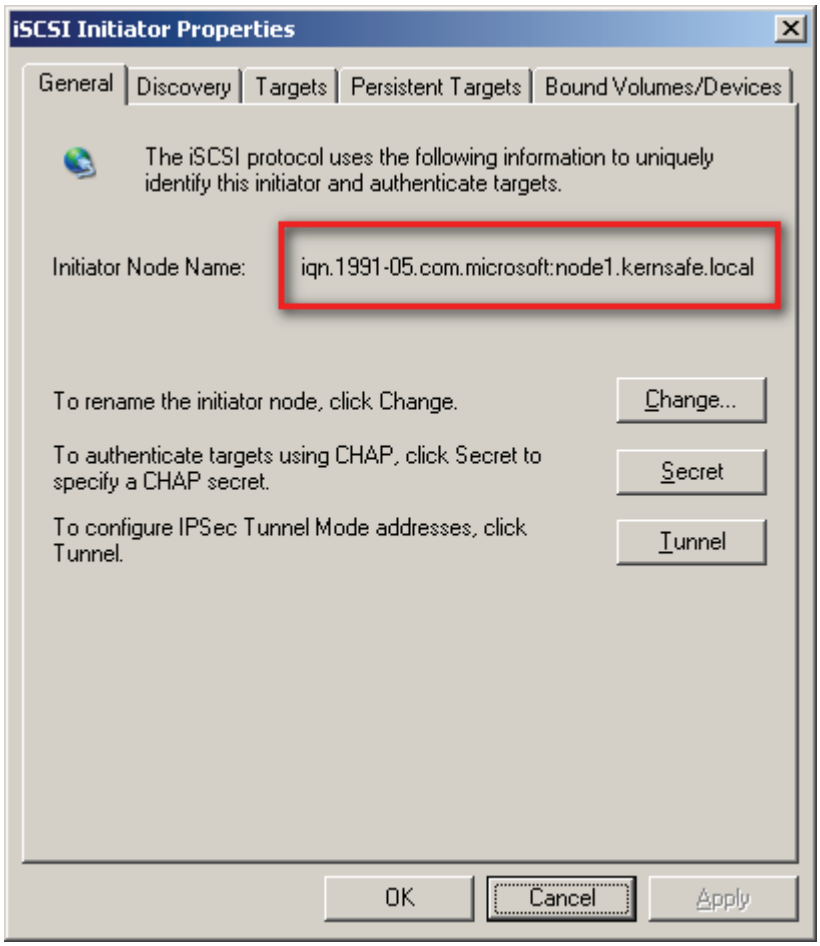
Press the **OK** button to continue.

Restarting computer is needed.

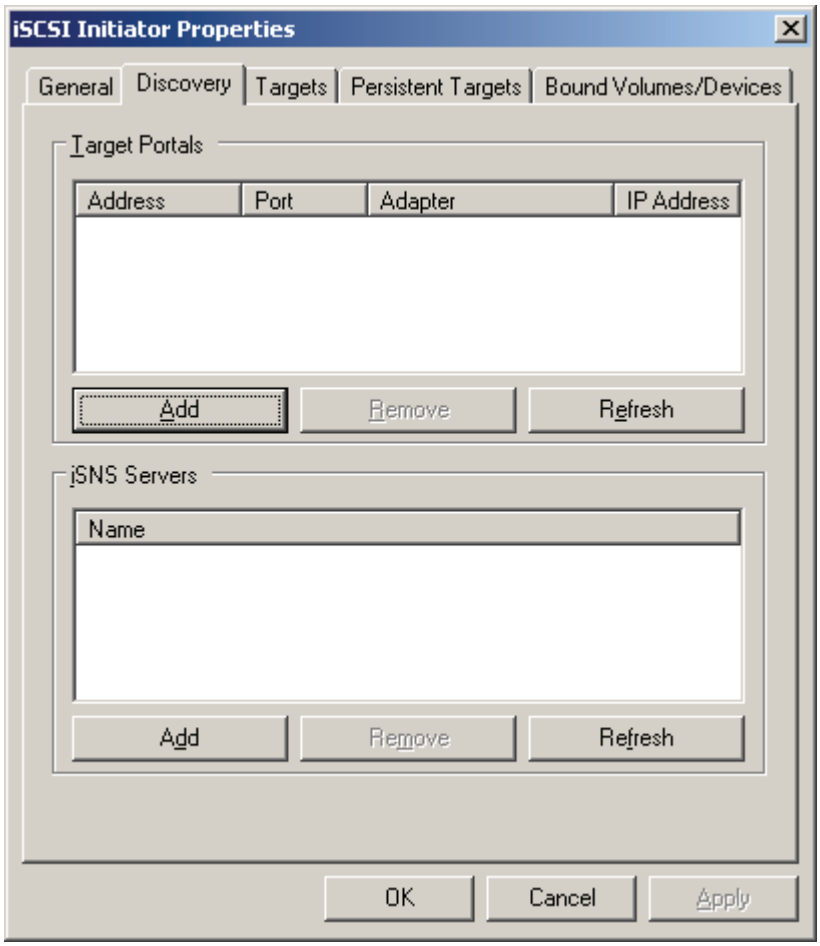


Press the **OK** button to restart computer.

Open iSCSI Initator.

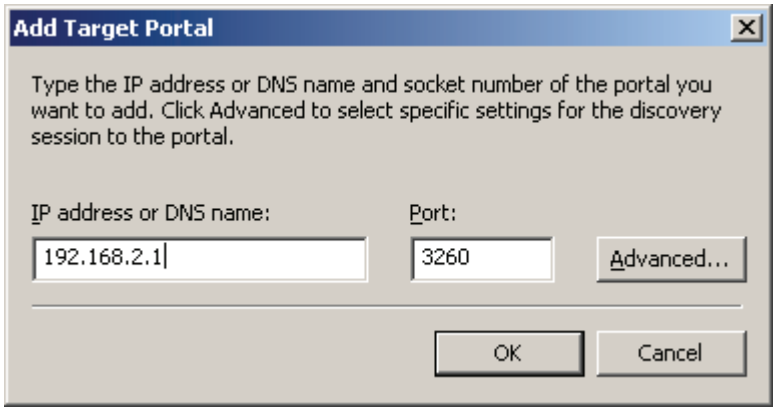


Change to Discovery page



Press the Add button in the Discovery page.

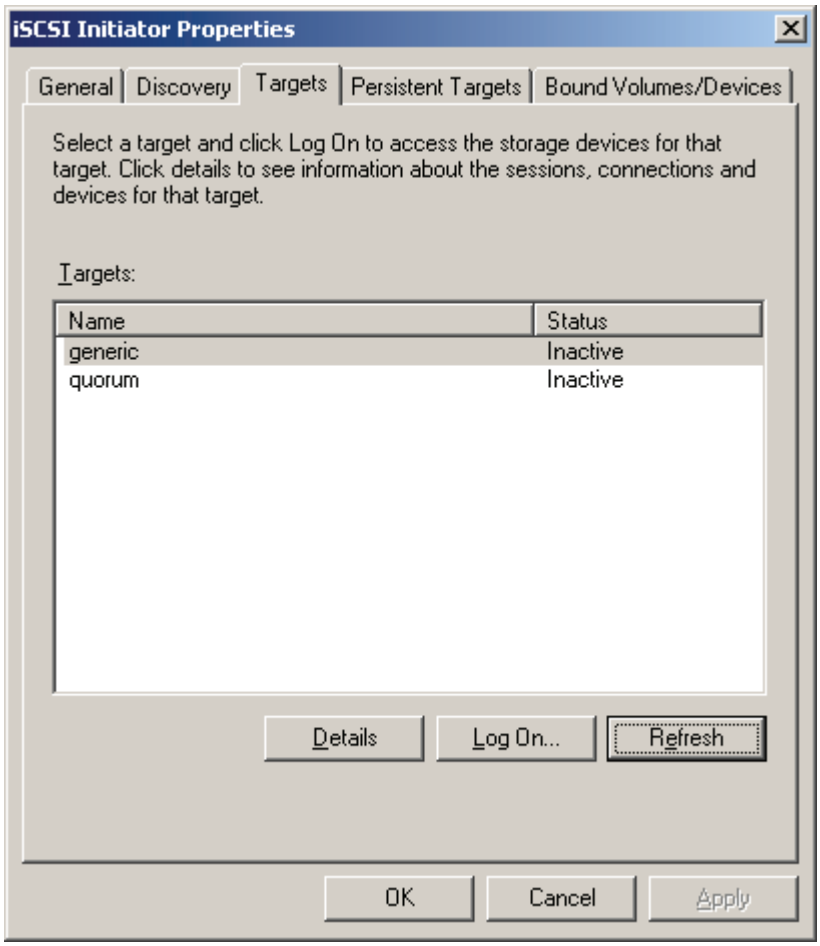
The **Add Target Portal dialog** is shown.



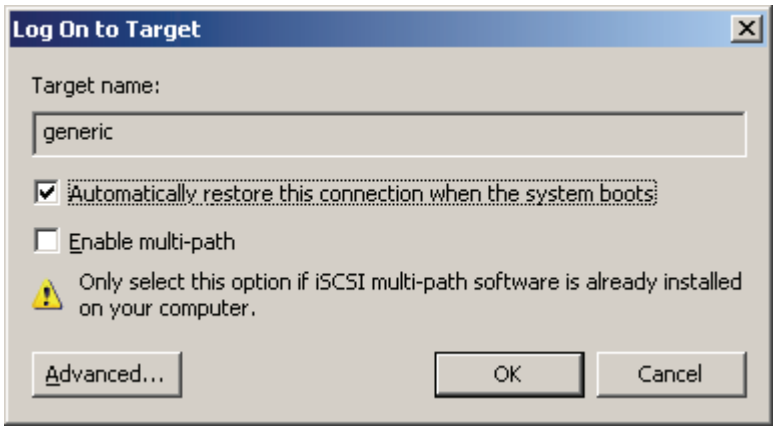
Press the Add button and enter the IP address of KernSafe iStorage Server, which is 192.168.2.1 here.

Press the **OK** button to continue.

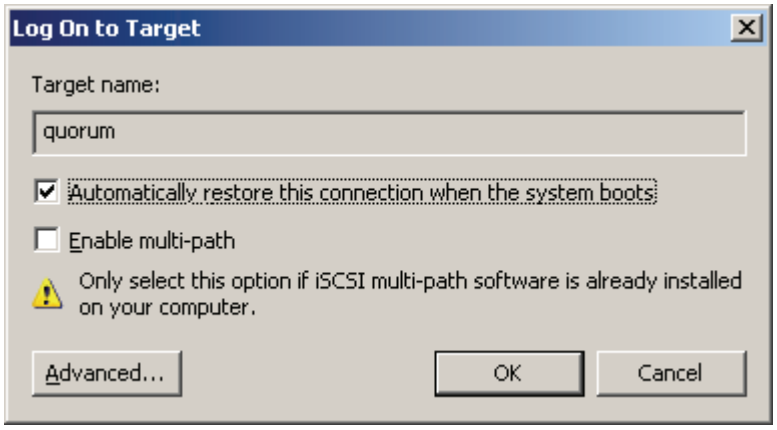
Change to Targets page



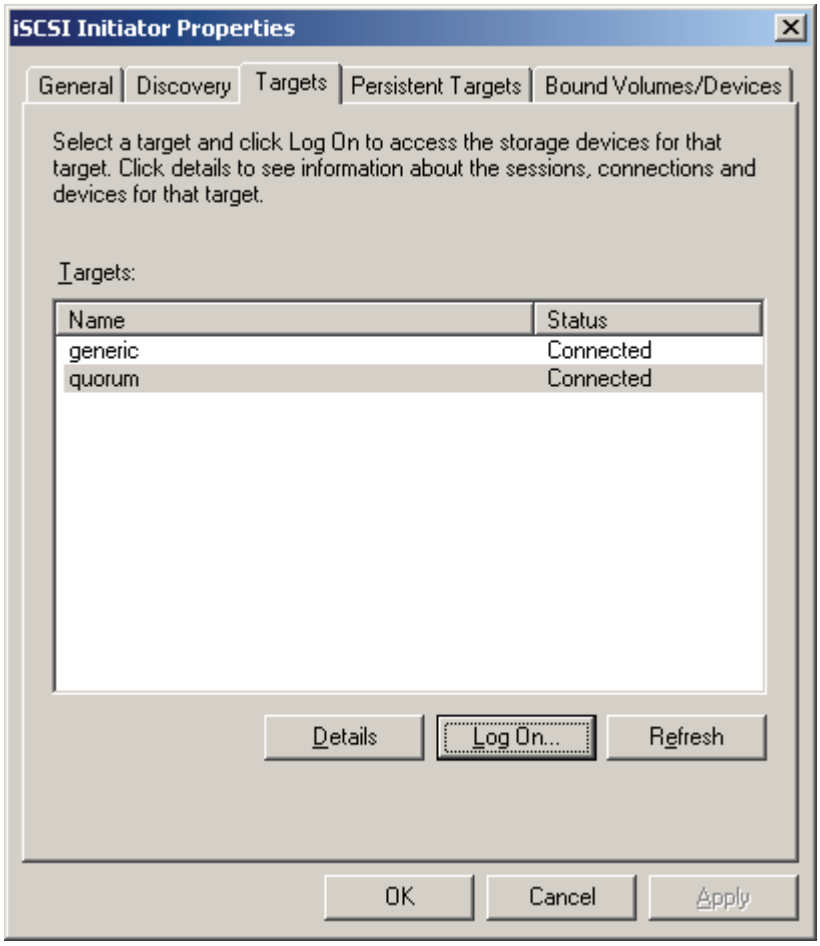
Select one Target and then press the **Log On** button, the **Log On to Target dialog** is shown.



Select generic and click Log On. Check **Automatically restore this connection when the system boots**.

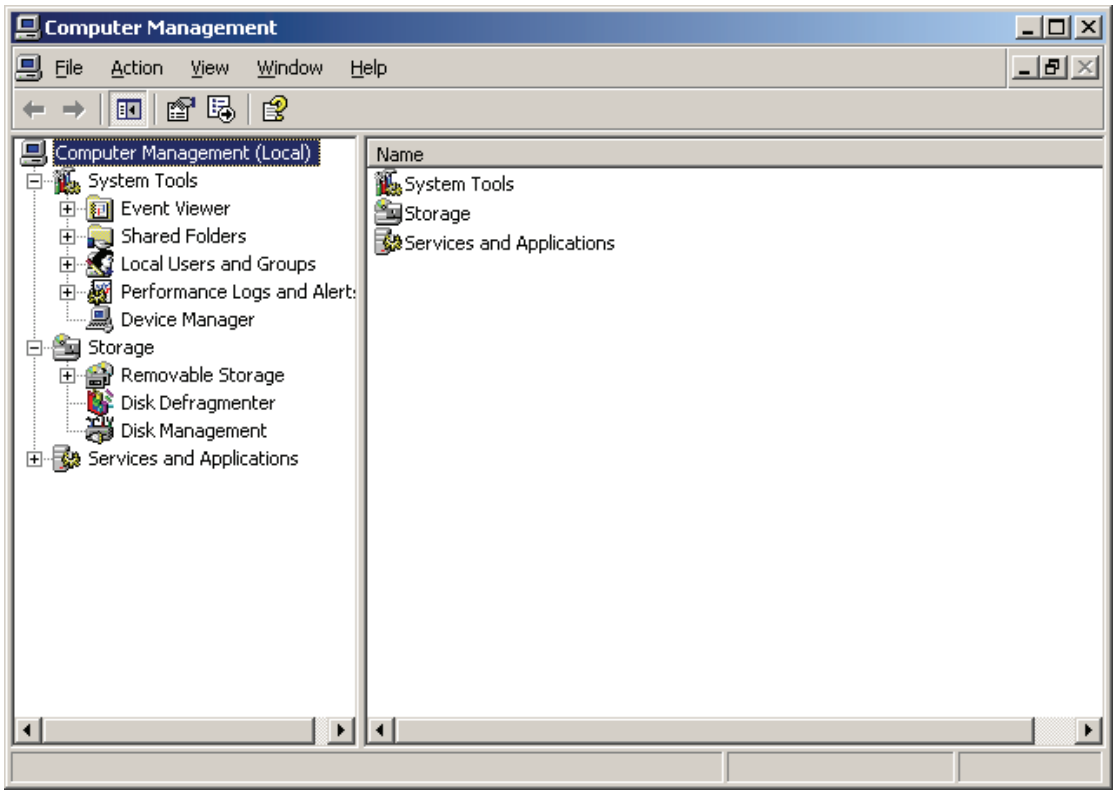


Select quorum and Log On. Check **Automatically restore this connection when the system boots** .

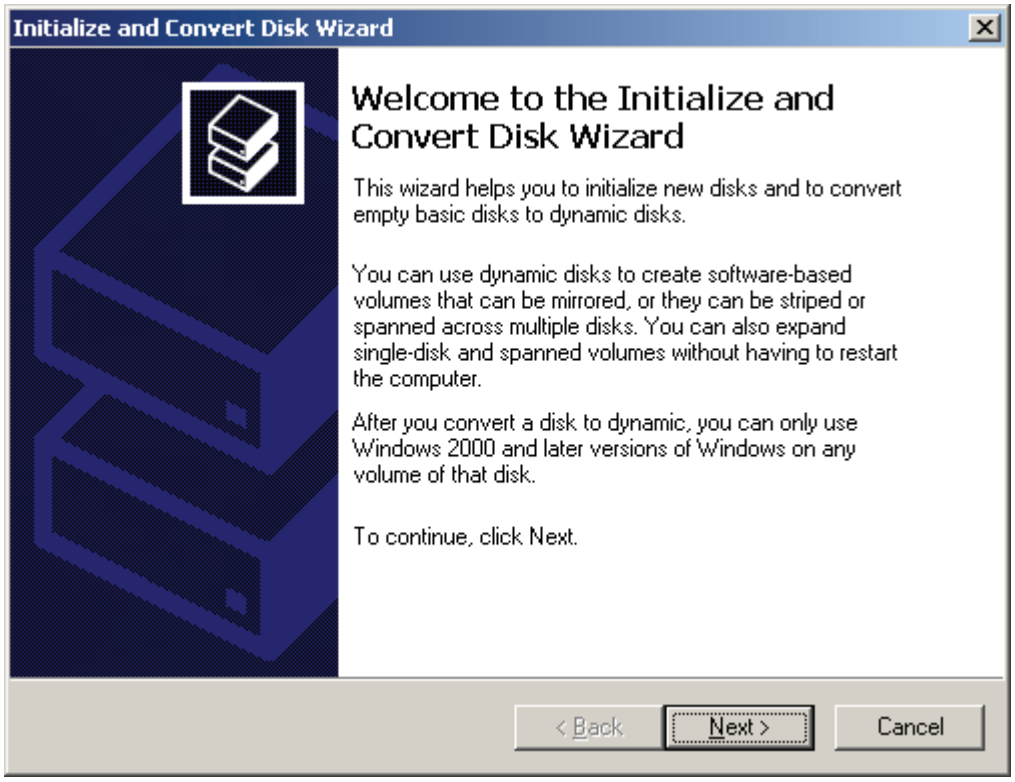


After the successful operation, the status is shown as in the picture.

Open Computer Management

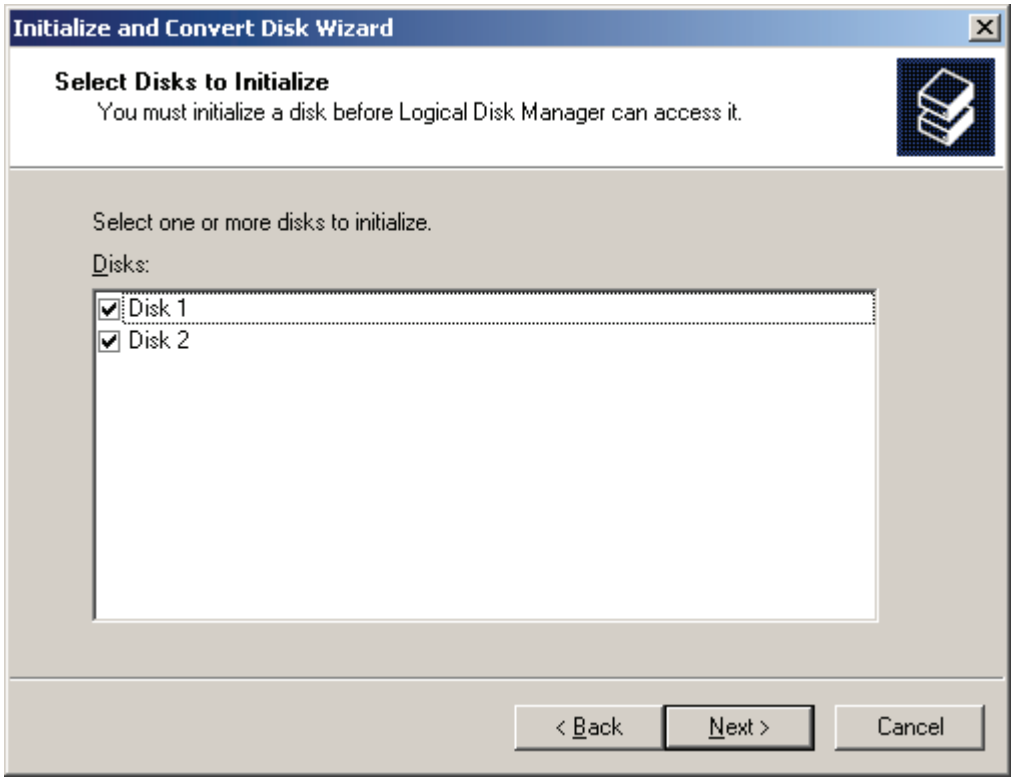


Select Disk Management, the **Initialize and Convert Disk Wizard** is shown.



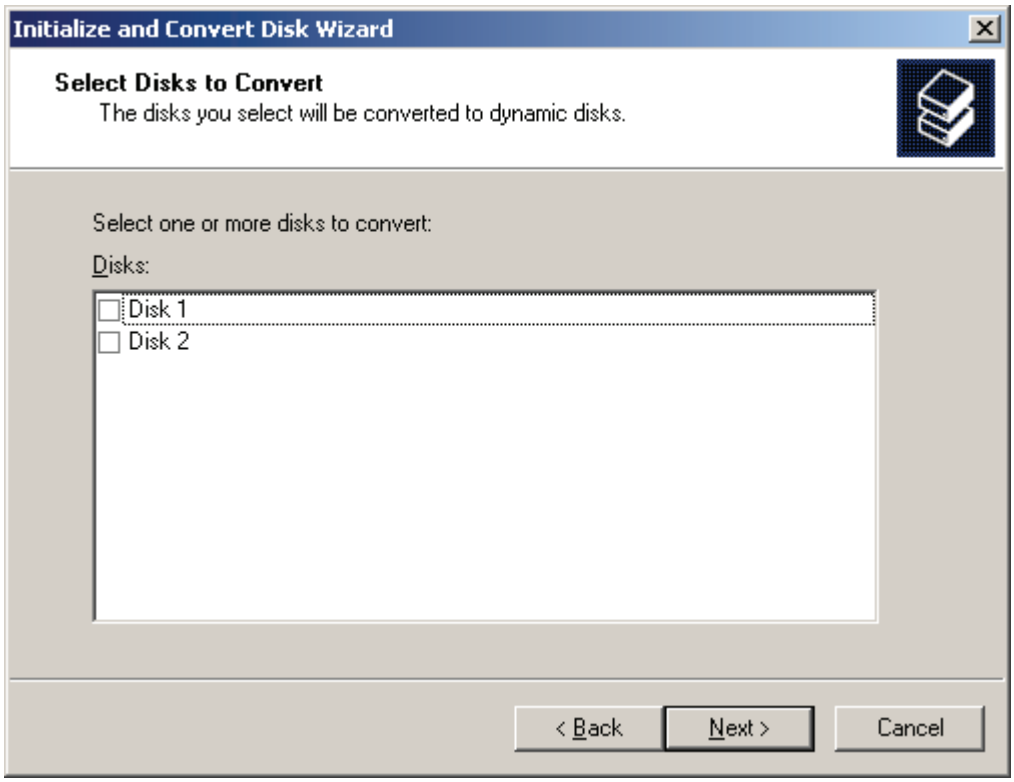
Press the **Next** button to continue.

Select disks to be initialized



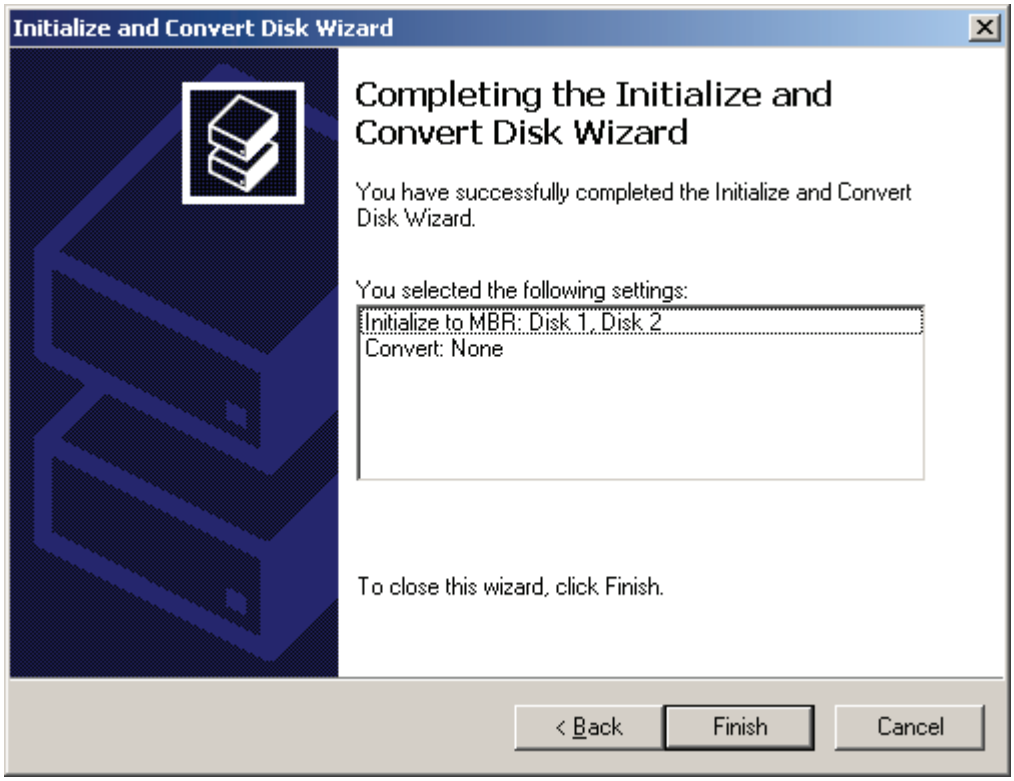
Press the **Next** button to continue.

Select disks to be converted



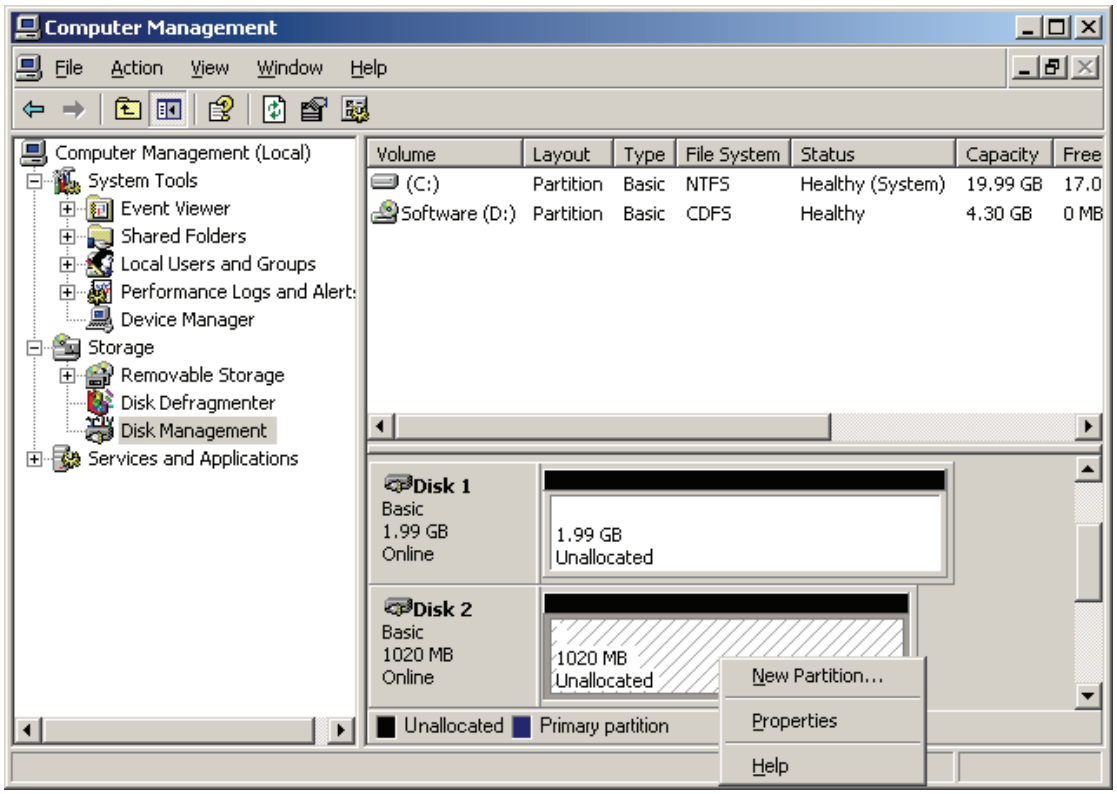
Do not select any one of them, press the **Next** button to continue.

Finish disks initialization

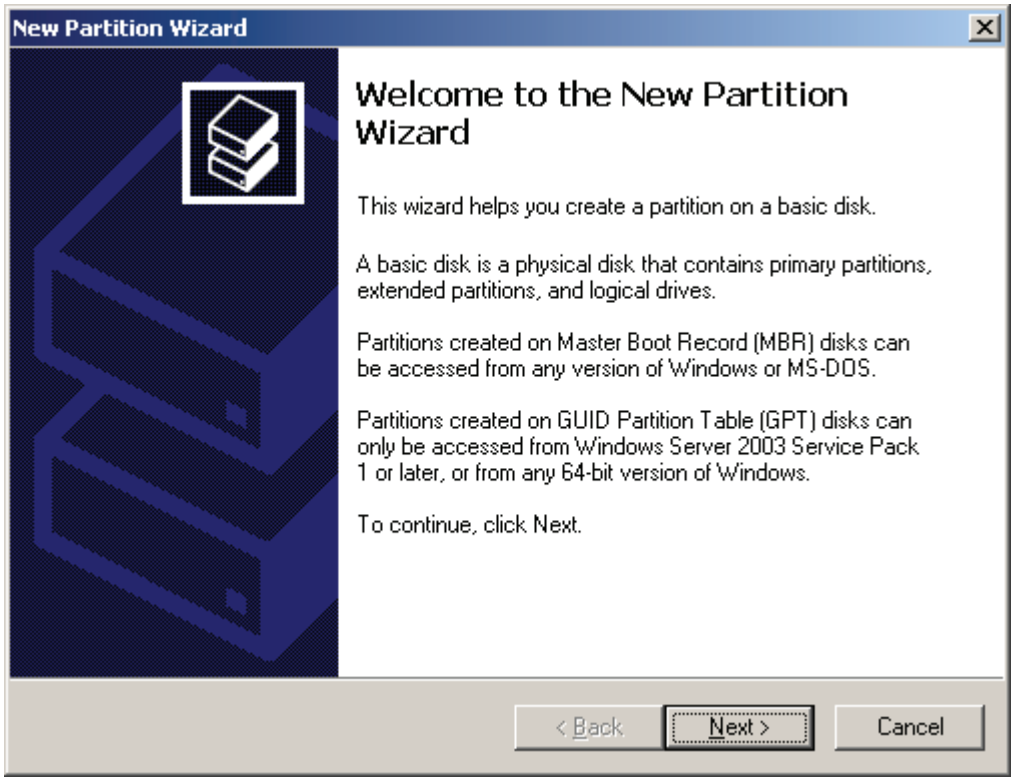


Press the **Finish** button.

Partition the quorum disk.

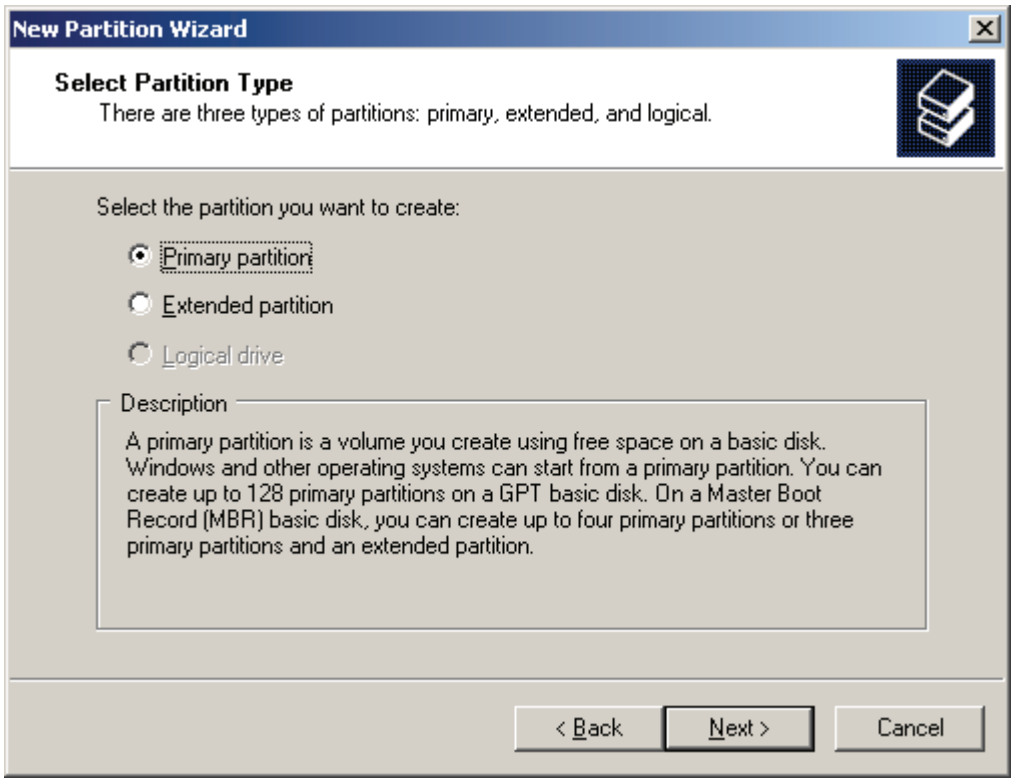


Right click on the disk and select New Partition, the **New Partition Wizard** is shown.



Press the **Next** button to continue.

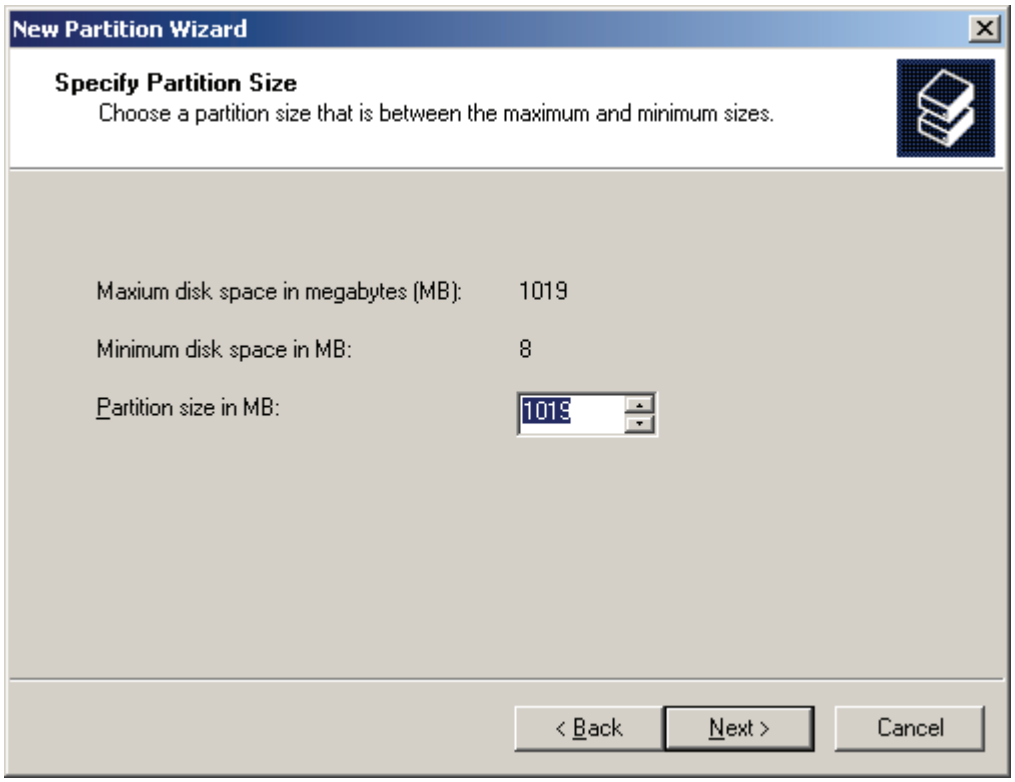
Select Partition Type



Select Primary partition.

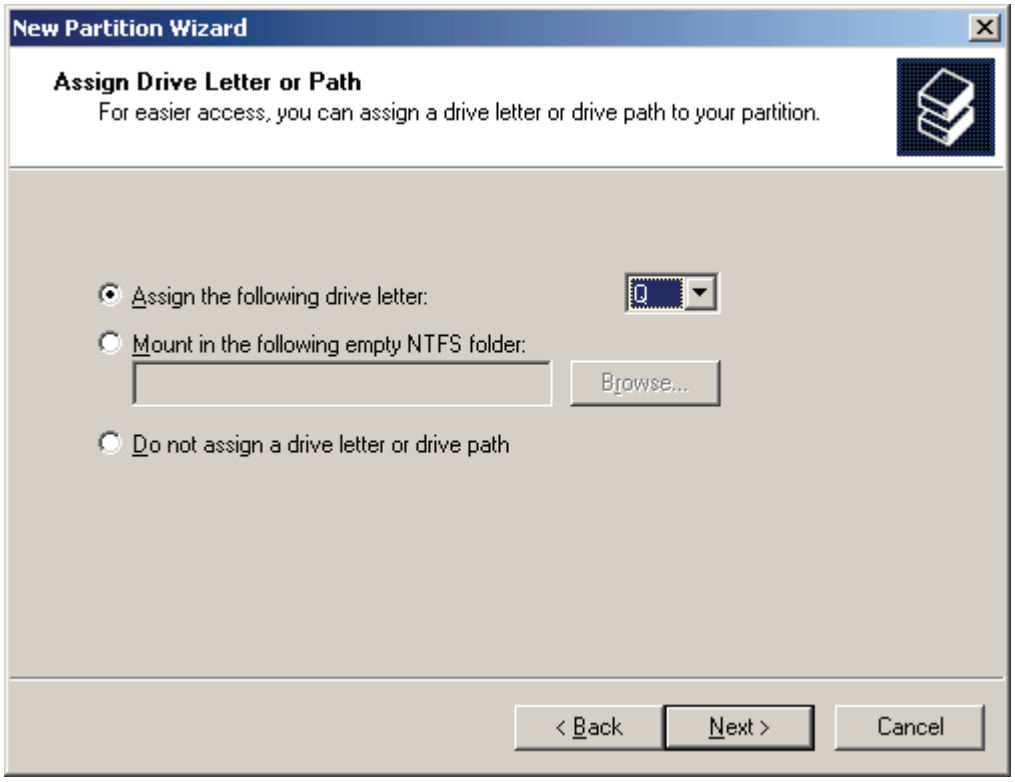
Press the **Next** button to continue.

Specify partition size



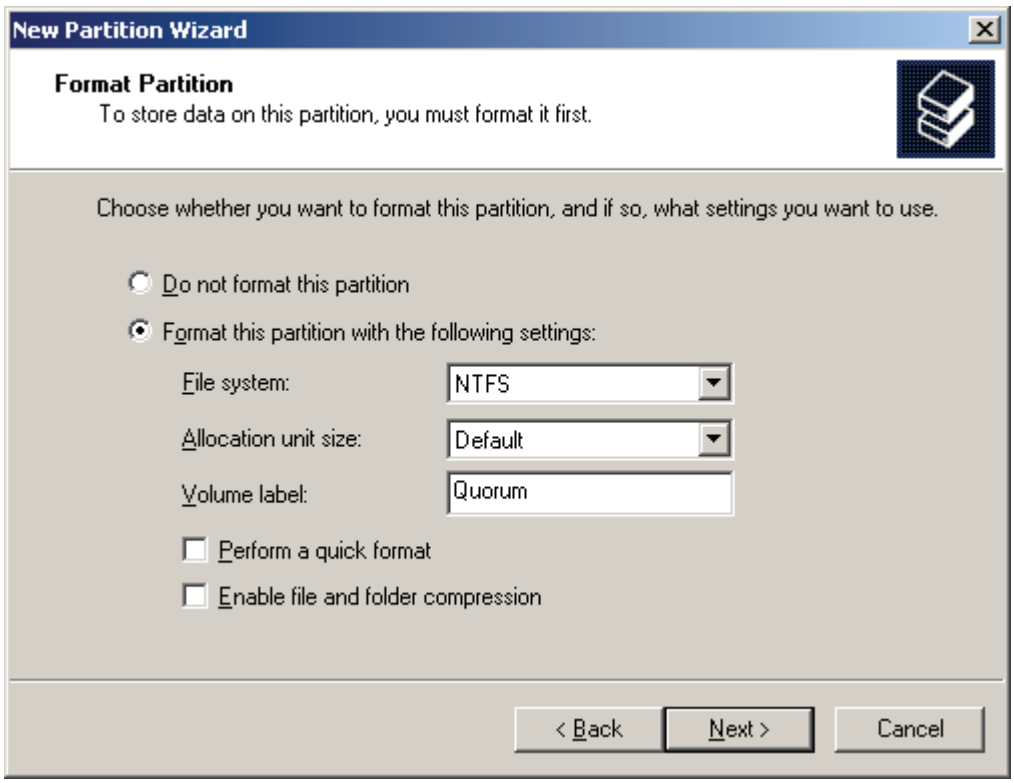
Press the **Next** button to continue.

Assign drive letter



Assign Q as the drive letter.
Press the **Next** button to continue.

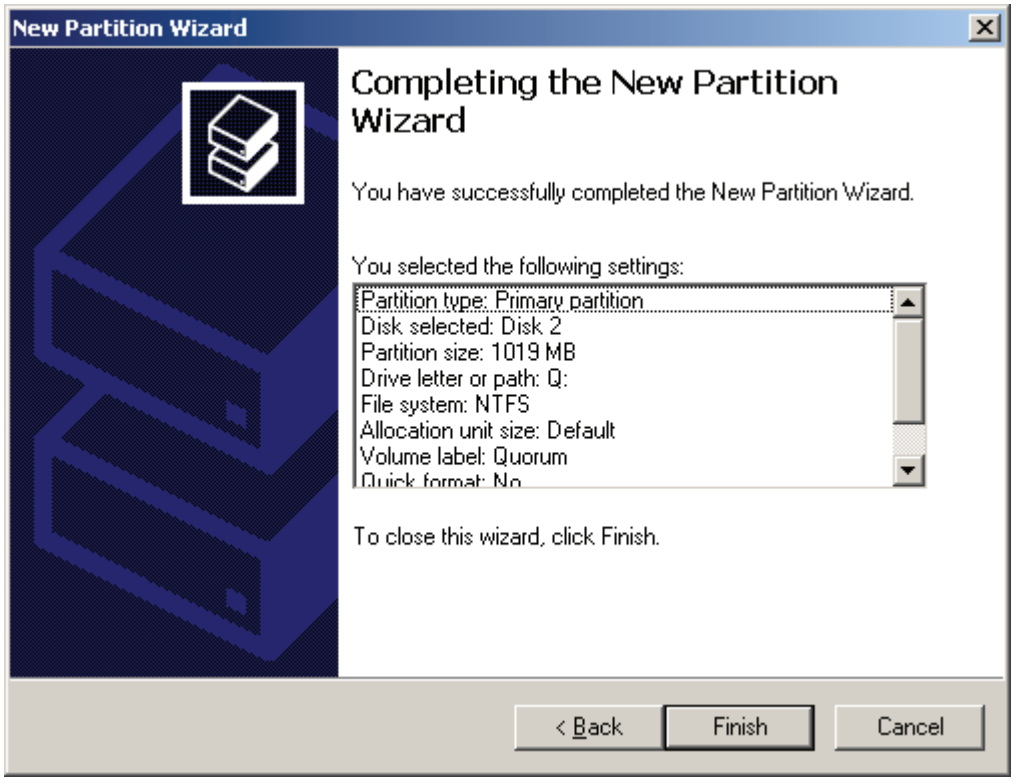
Format disk



Enter Quorum as Volume label.

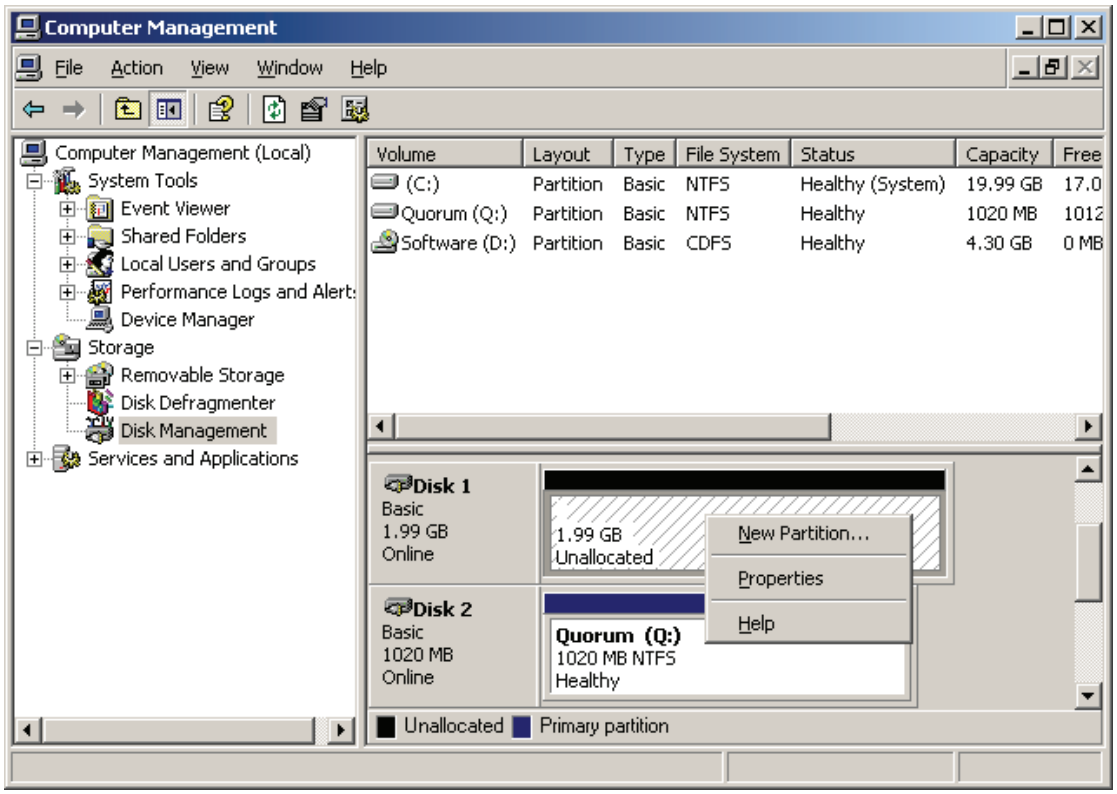
Press the **Next** button to continue.

Finish disk formatting

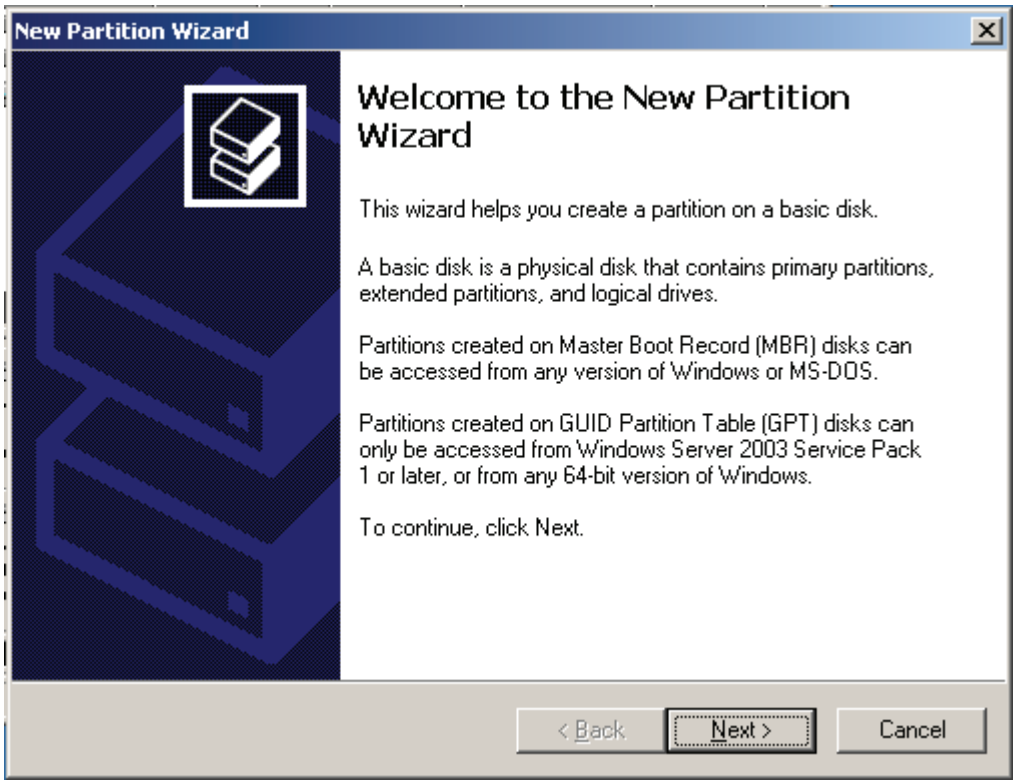


Press the **Finish** button to format the disk.

Partition the generic disk.

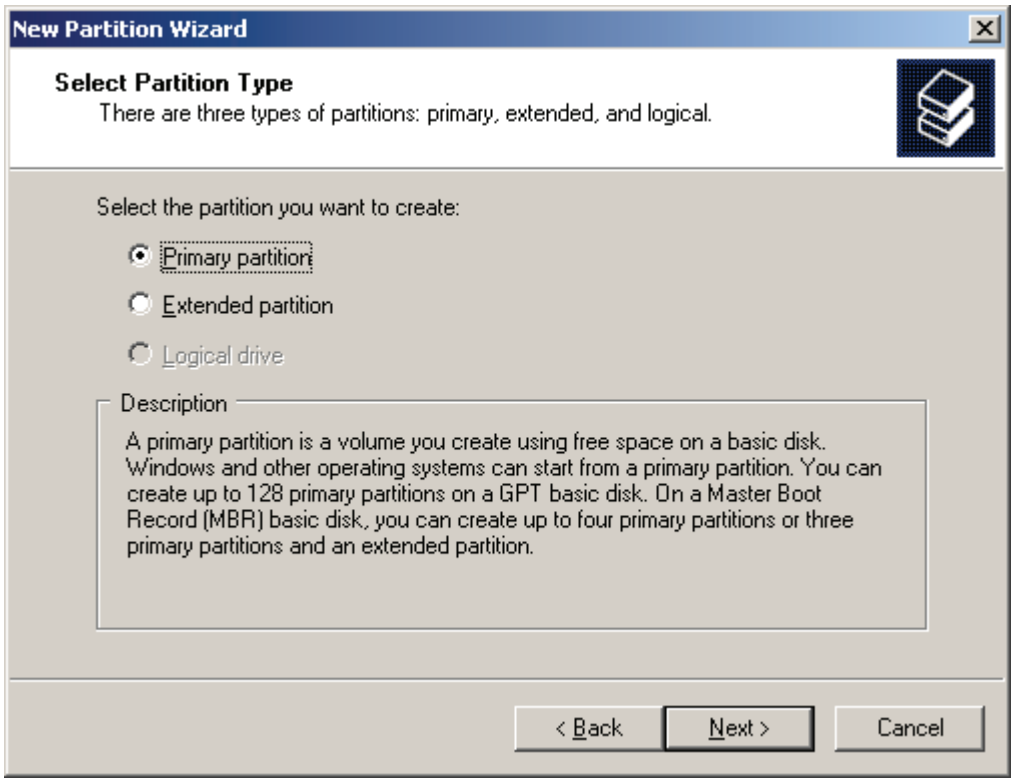


Right click on the disk and select **New Partition**, the **New Partition Wizard** is shown.



Press the **Next** button to continue.

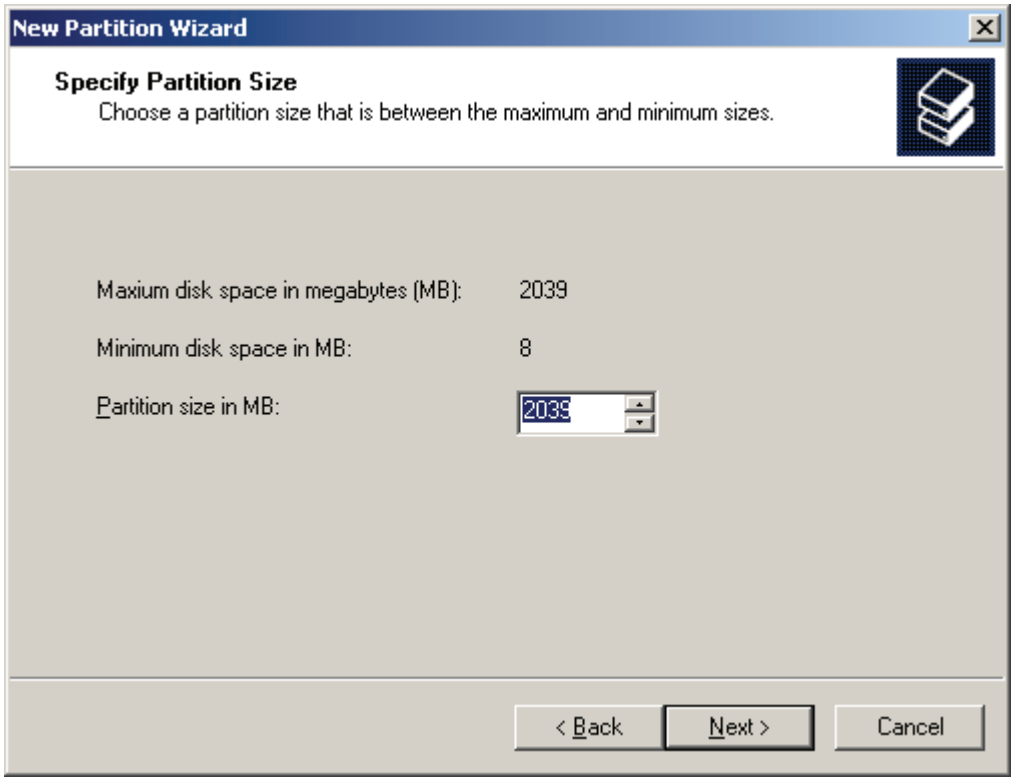
Select partition type



Select Primary partition.

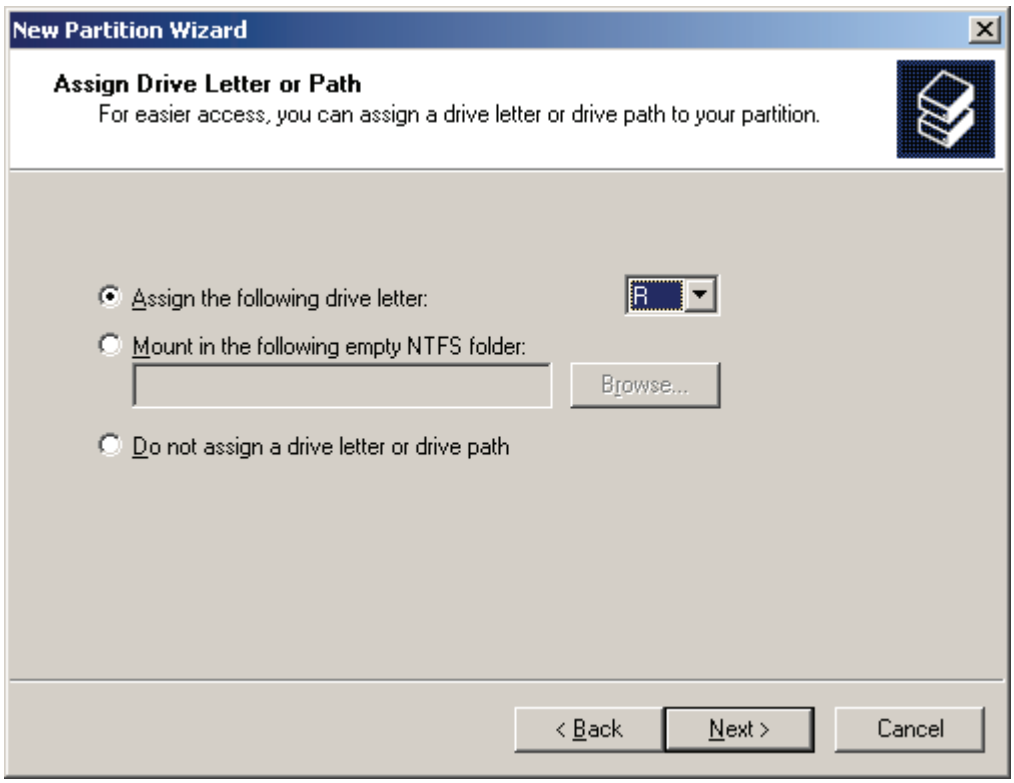
Press the **Next** button to continue.

Specify partition size



Press the **Next** button to continue.

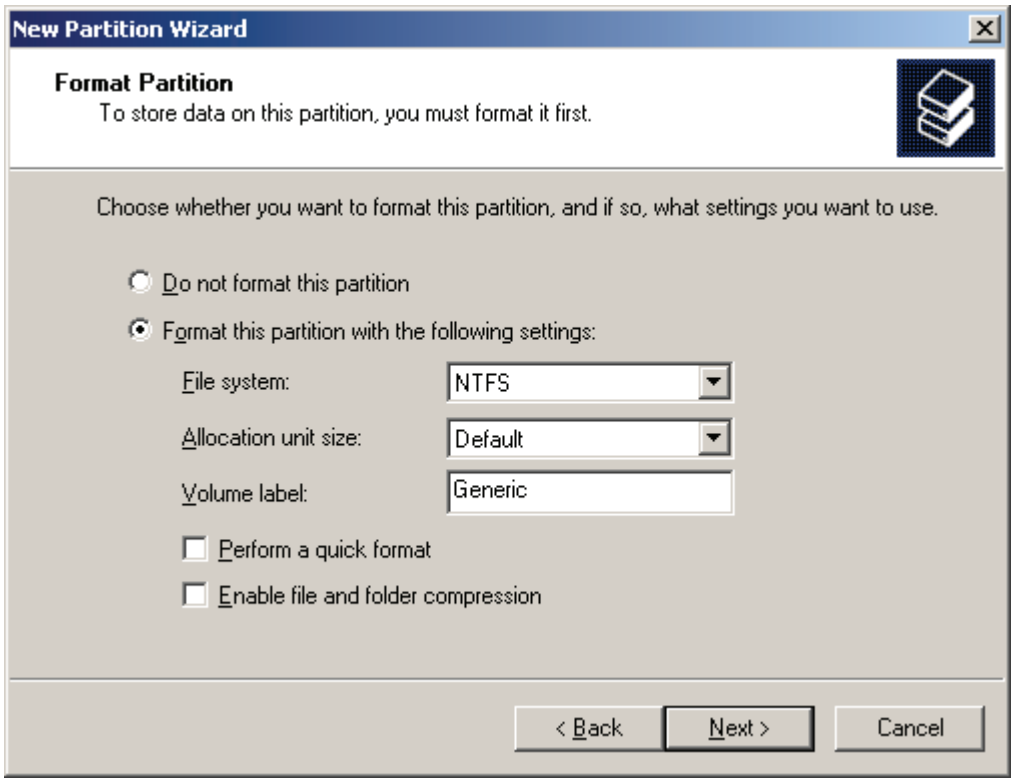
Assign a drive letter



Assign Q as the drive letter.

Press the **Next** button to continue.

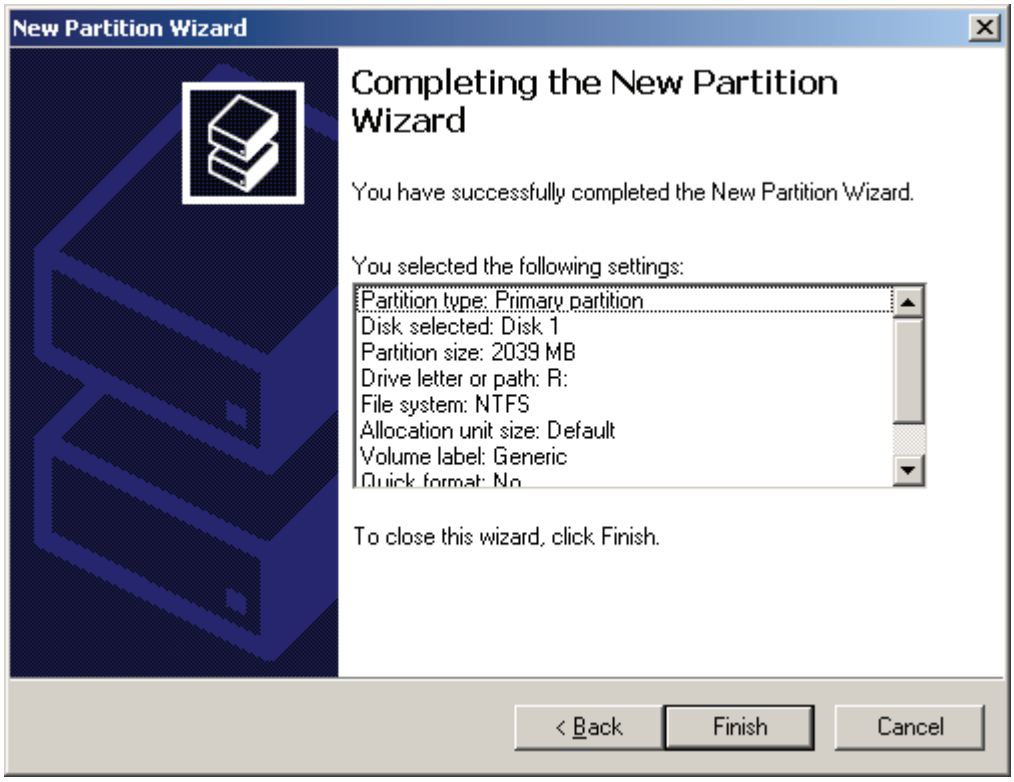
Format the disk



Enter Generic as Volume label.

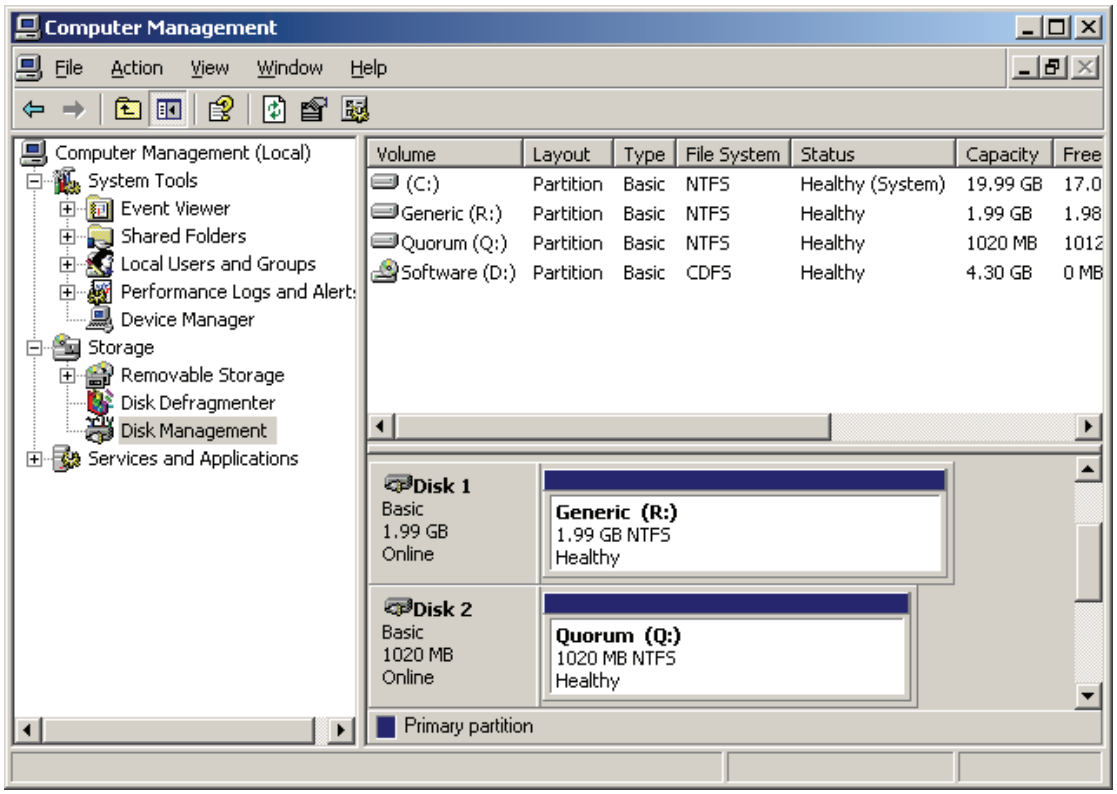
Press the **Next** button to continue

Finish partition disk.



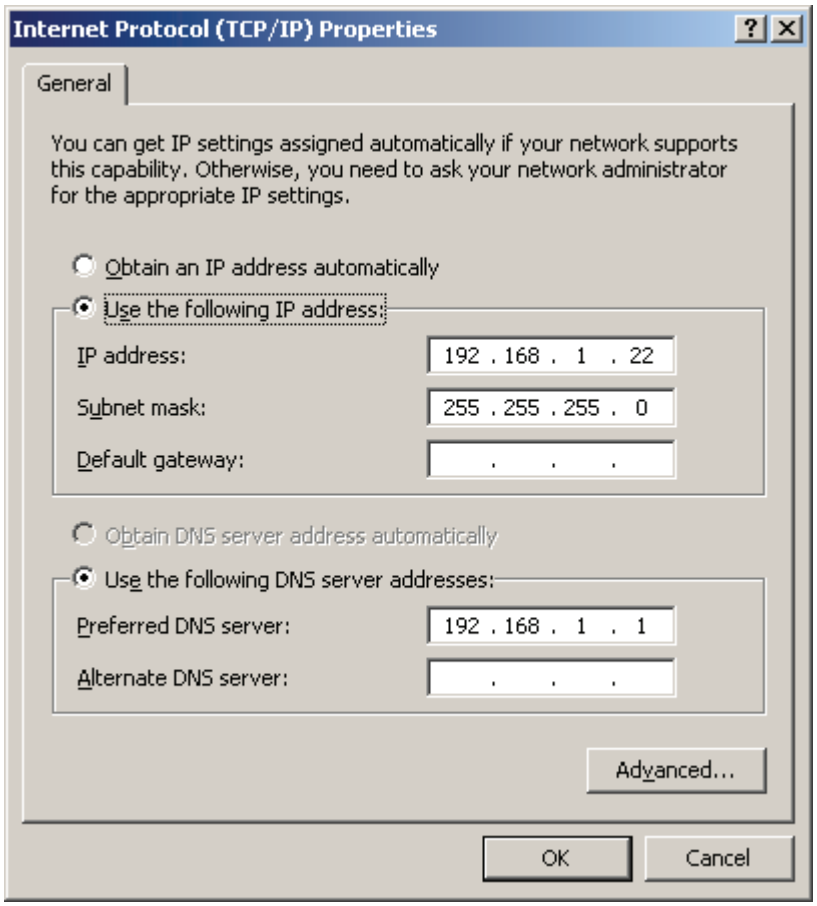
Press the **Finish** button.

Come back to the Computer Management console, after the successful operation, the status is shown as in the figure.



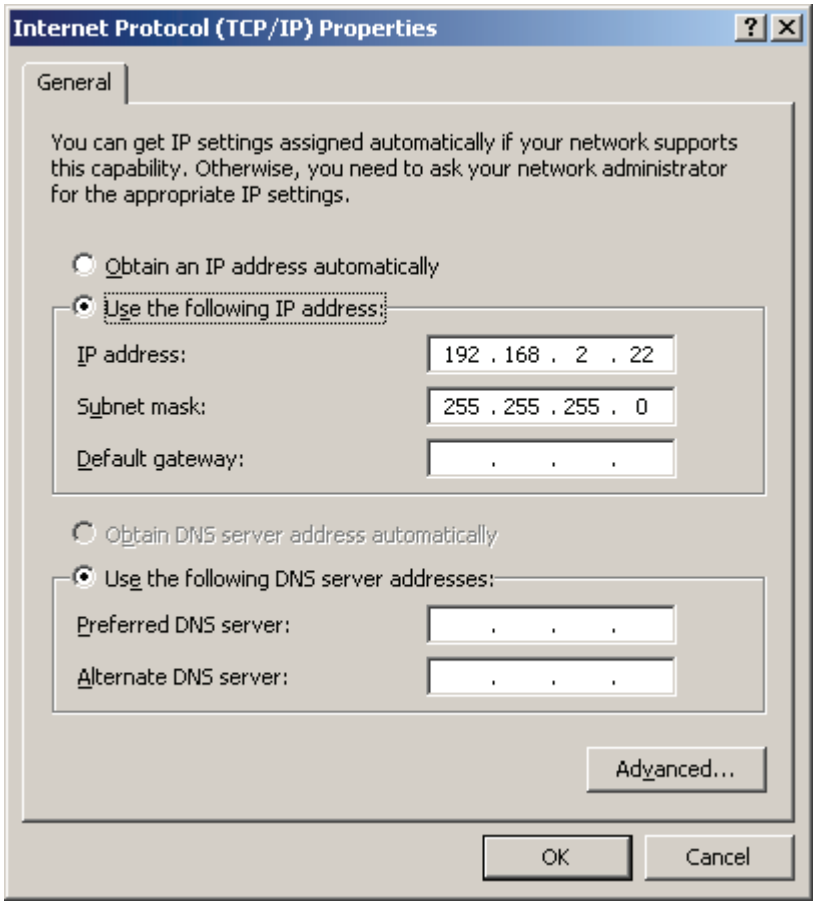
5. Node2 Settings

Networking settings



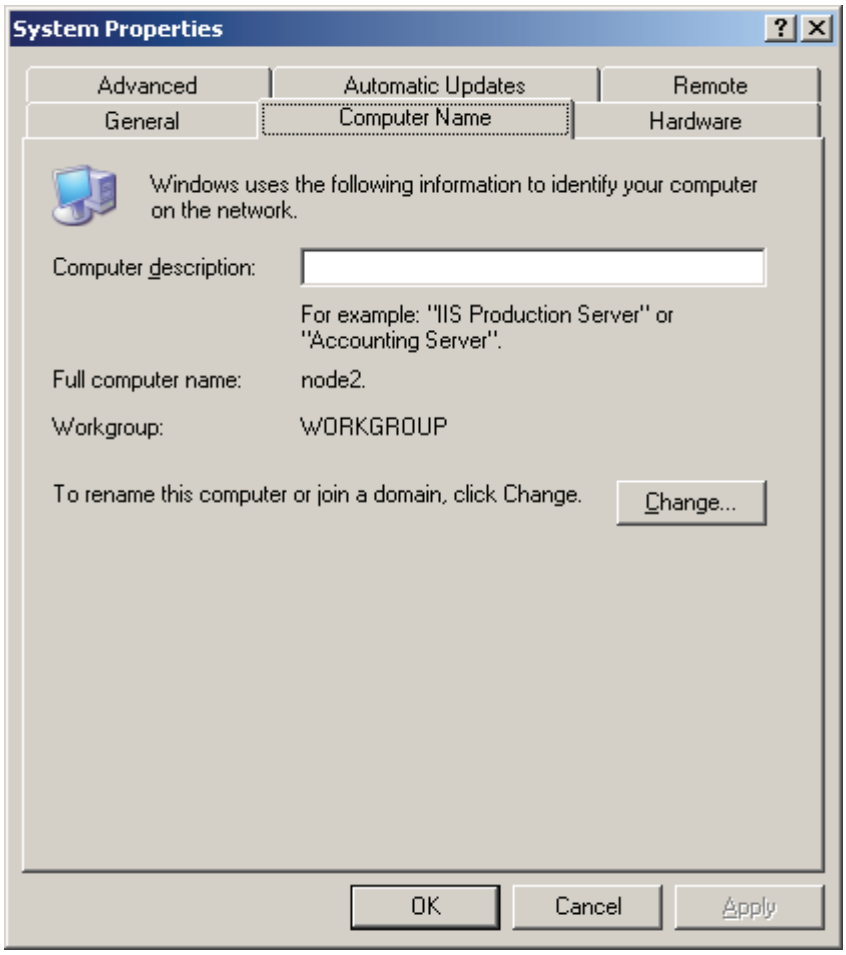
Set the first network adapter of node2 as shown in the figure.

IP address is set as 192.168.1.22, Subnet mask is set as 255.255.255.0 and **Rreferred DNS Server** is set as 192.168.1.1.

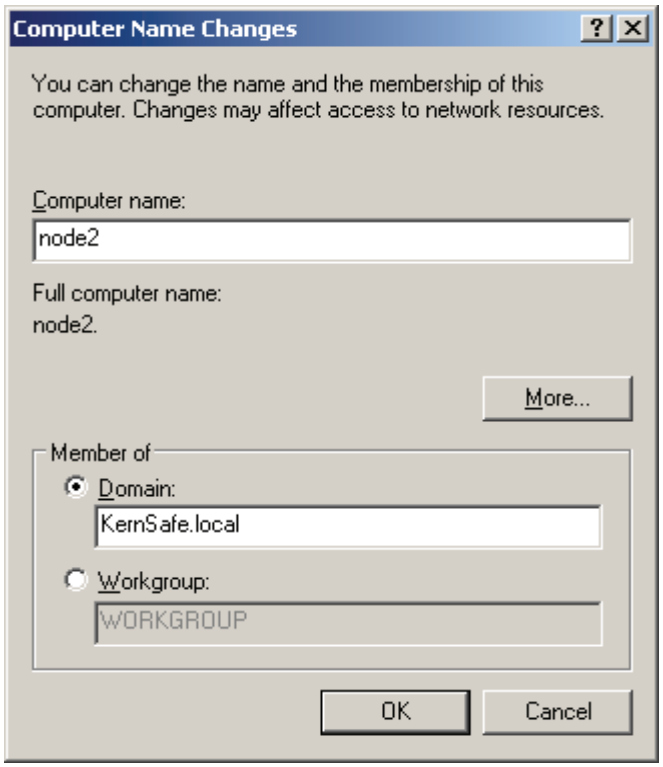


Set the second network adapter of node2 as shown in the picture.
IP address is set as 192.168.2.22 and Subnet mask is set as 255.255.255.0.

Add nodes to domain, open **System Properties page**



Click Change in the page of Computer Name, the **Computer Name Changes dialog** is shown.



Select Domain and enter Domain name, which is KernSafe.local here.

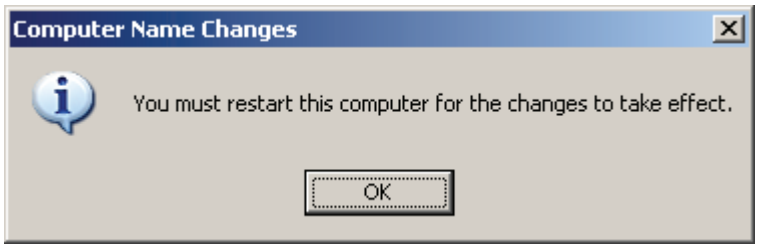
Press the **OK** button, the **Computer Names Changes dialog** is shown.

Specify user and password

Enter the username and password of node2.

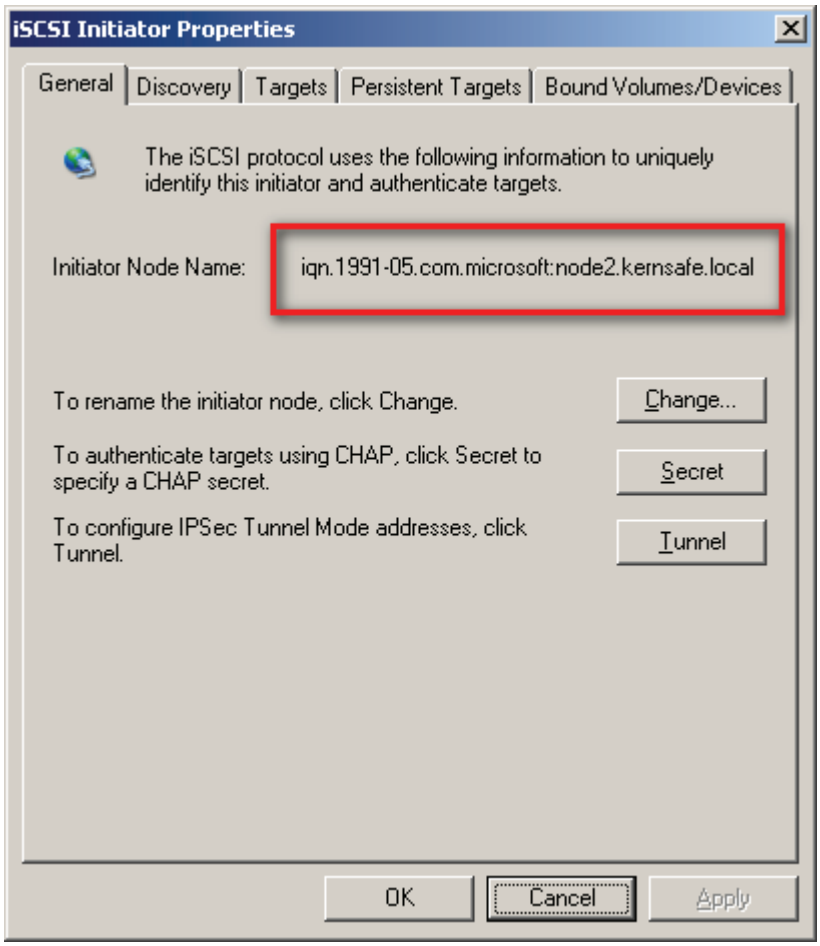
Press the **OK** button, and then the **Computer Name Changes** message dialog is shown.

Press the OK button, and then the **Computer Name Changes** dialog is shown.

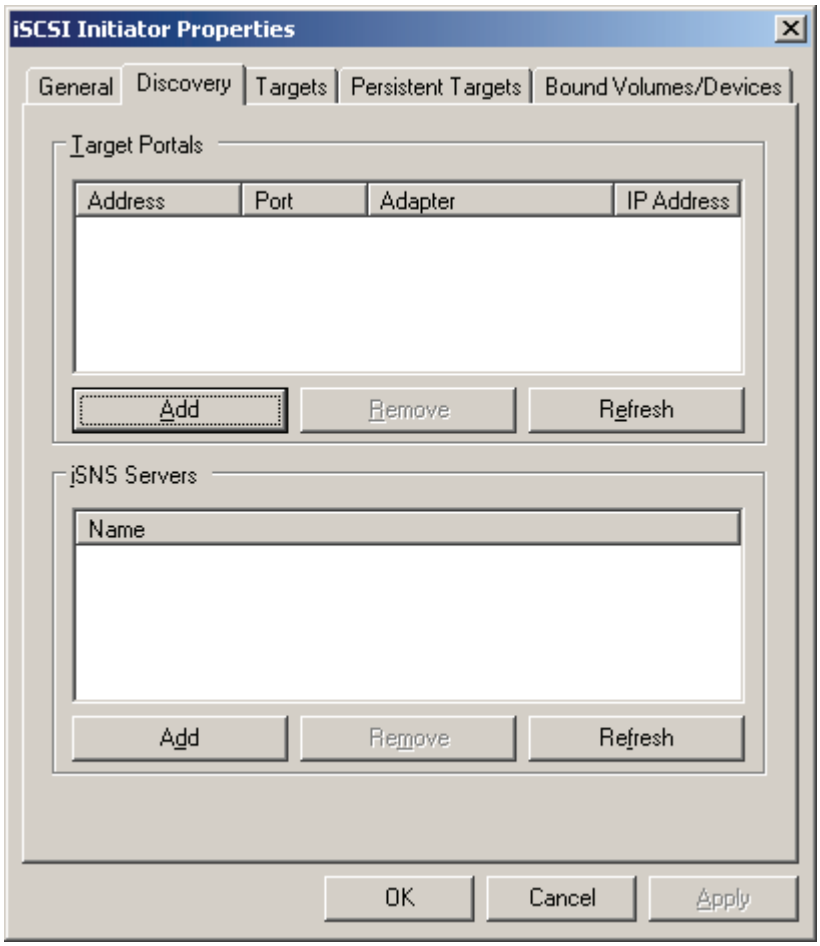


Press the OK button to restart the computer.

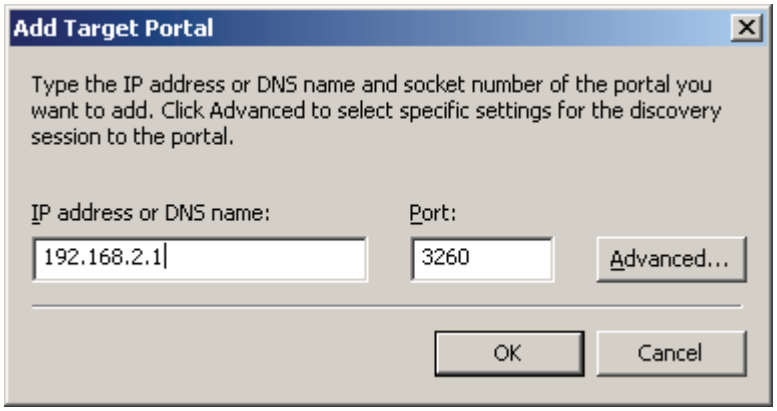
Launch Microsoft iSCSI Initator.



Change to **Discovery** page



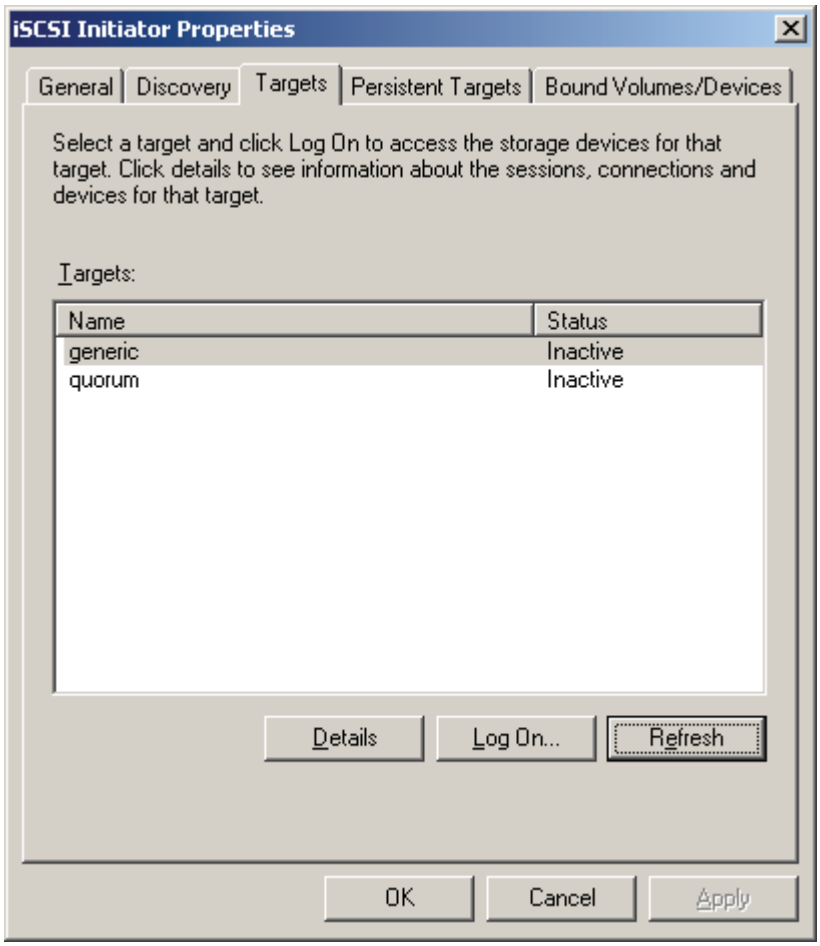
Press the **Add** button in the Discovery page and then the **Add Target Portal dialog** is shown.



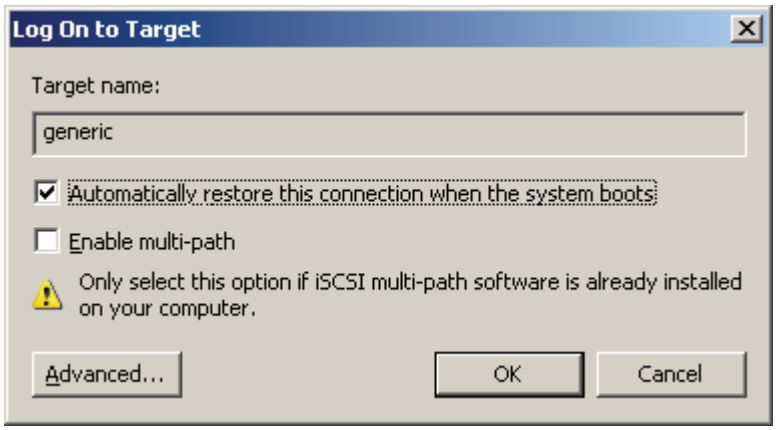
Press the **Add** button and enter the IP address of KernSafe iStorage Server, which is 192.168.2.1 here.

Press the **OK** button to continue.

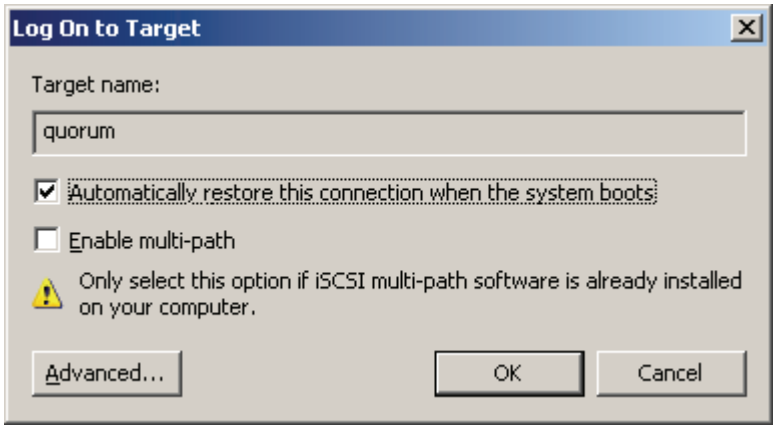
Change to the **Targets** page



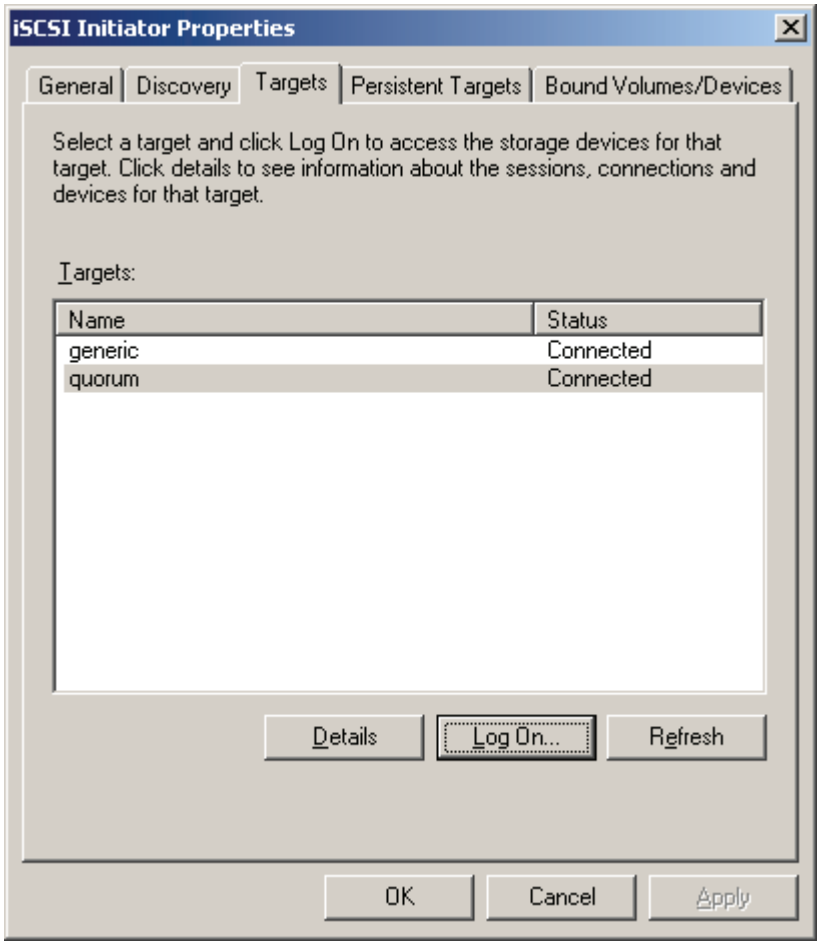
Select a Target and then press the **Log On** button, the **Log On to Target dialog** is shown.



Select generic and click the **Log On** button. Check **Automatically restore this connection when the system boots**.

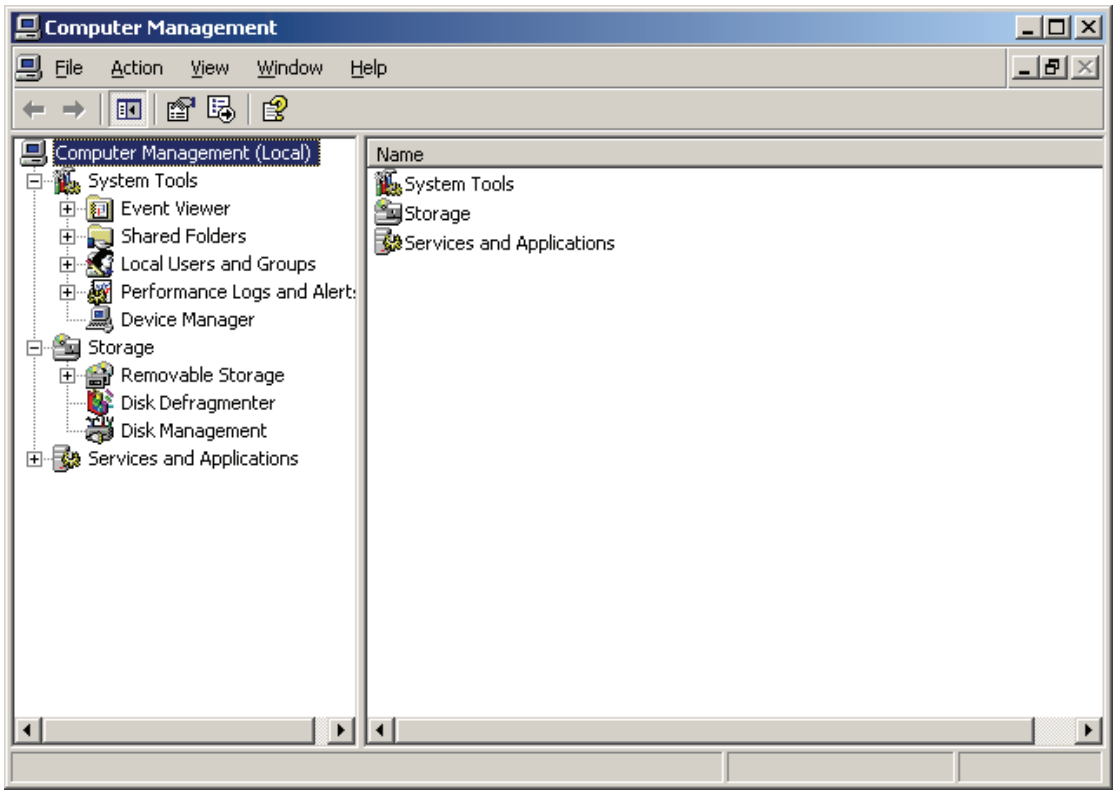


Select quorum and click the **Log On** button. Check **Automatically restore this connection when the system boots**.

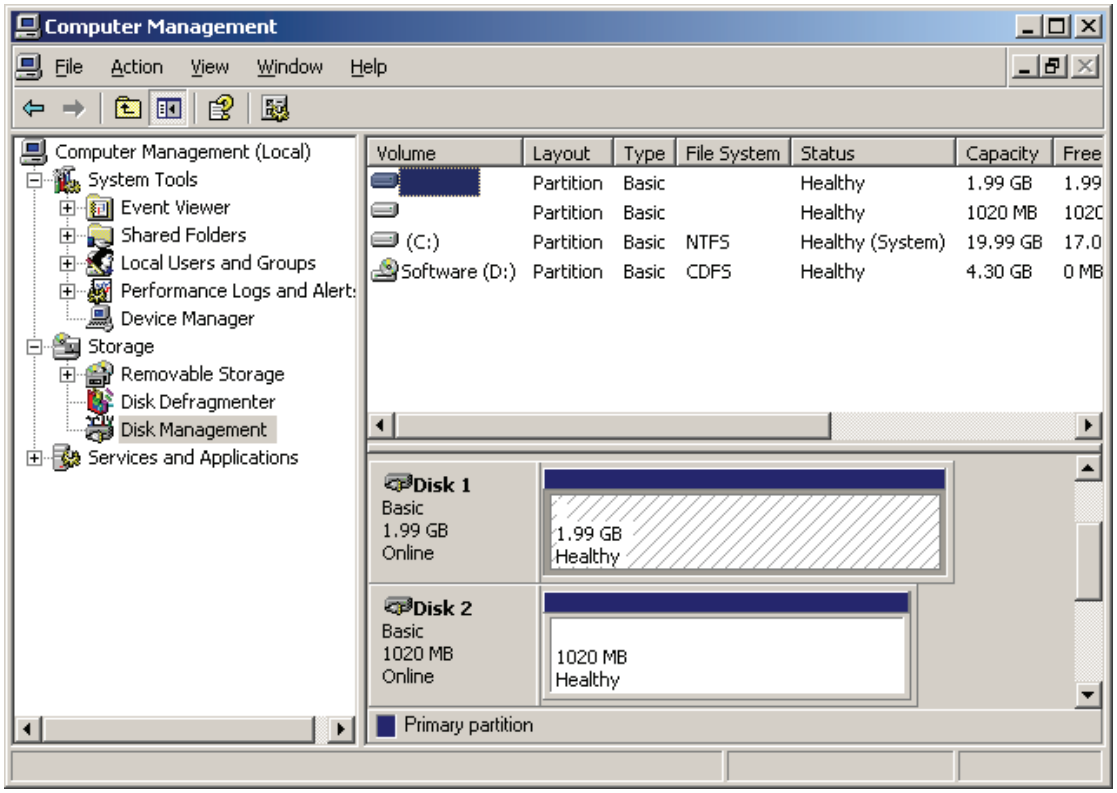


After the successful operation, the status is shown as in the figure.

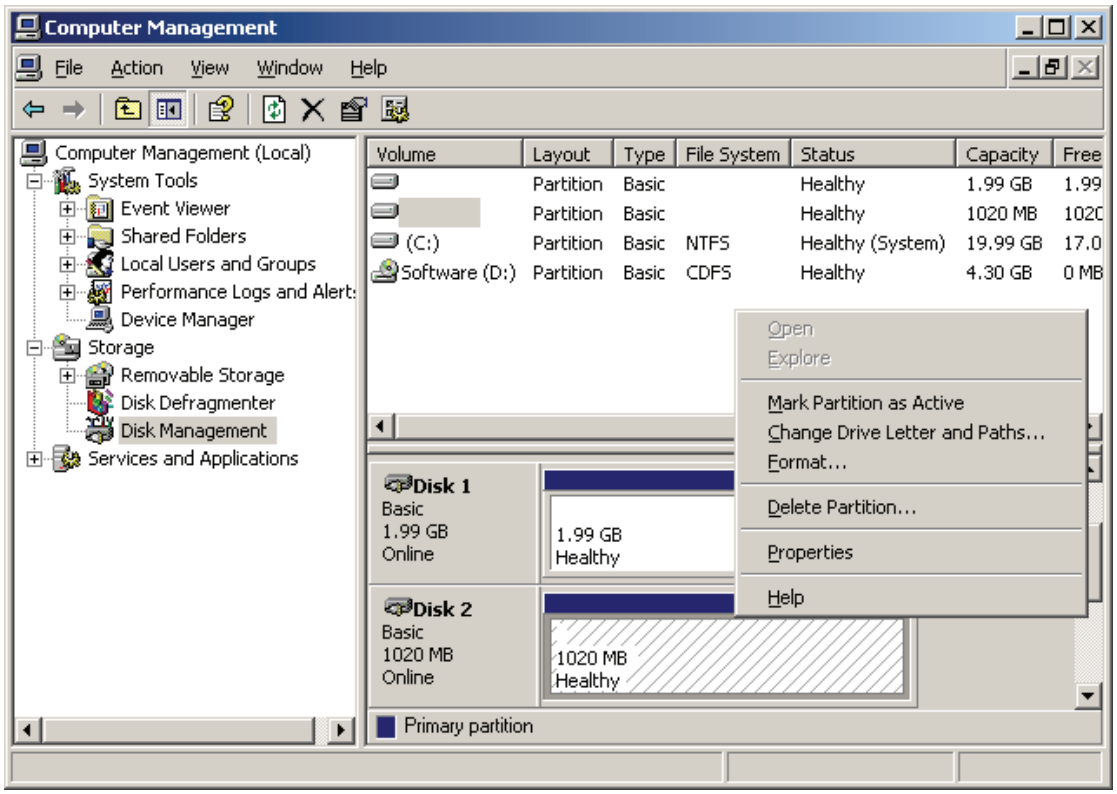
Open **Computer Management Console**



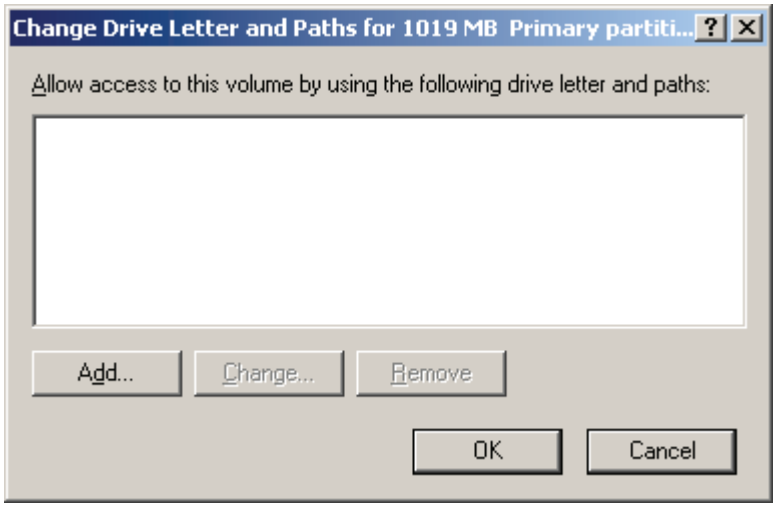
Open Computer Management and select Disk Management.



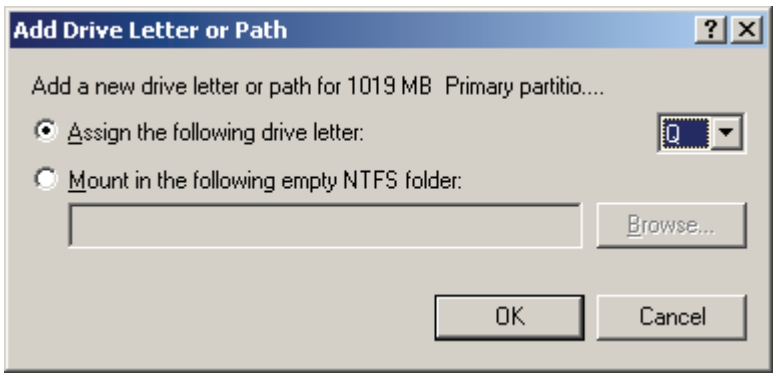
Assign drive letters



Right click on quorum disk and select Change Drive Letter and Paths.



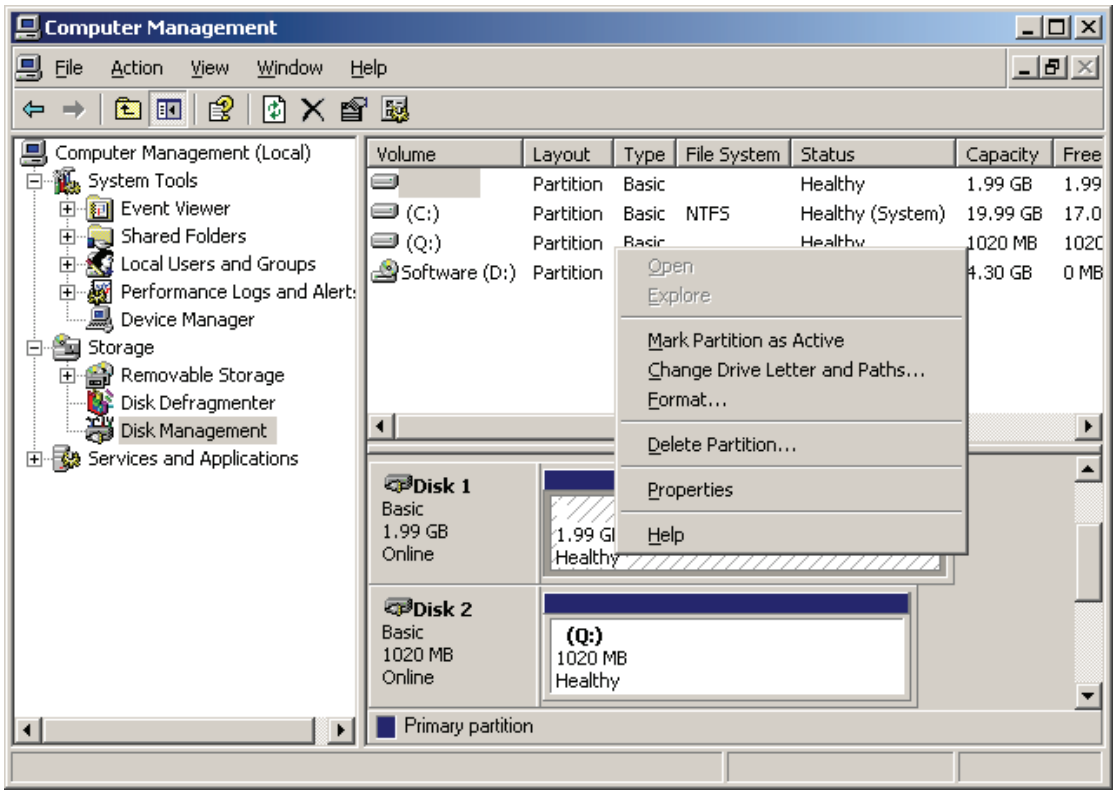
Click the **Add** button, and the **Add Drive Letter or Path dialog** is shown.



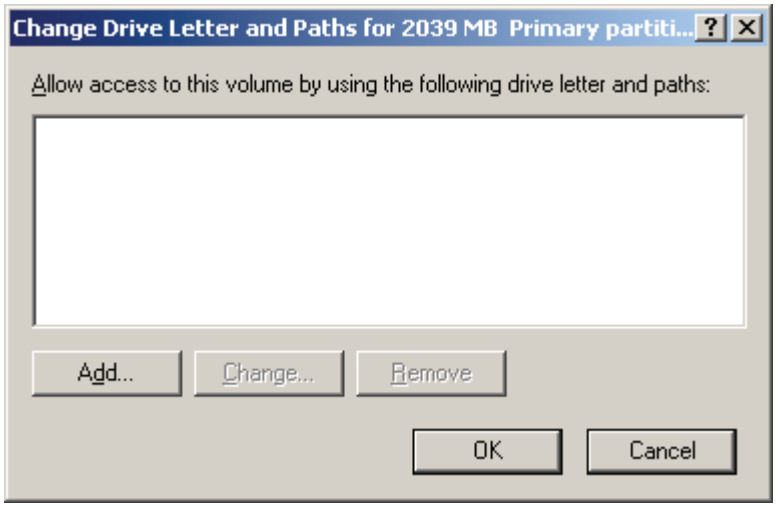
Assign **Q** as drive letter.

Press the **OK** button.

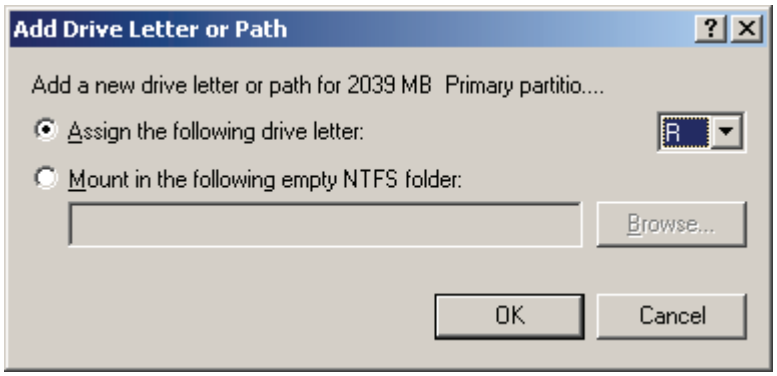
Come back to the Computer Management Console



Right click on generic disk and select Change Drive Letter and Paths.



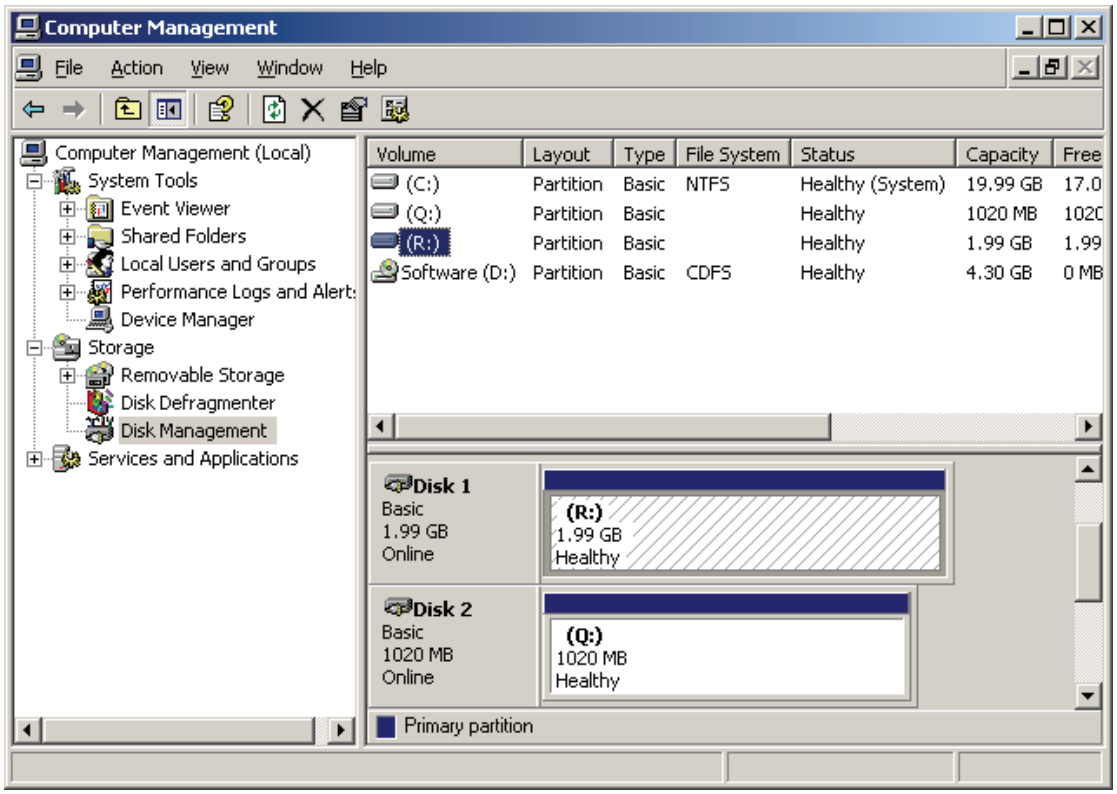
Click the **Add** button, the Add Drive Letter or Path dialog is shown.



Assign **R** as drive letter.

Press the **OK** button to continue.

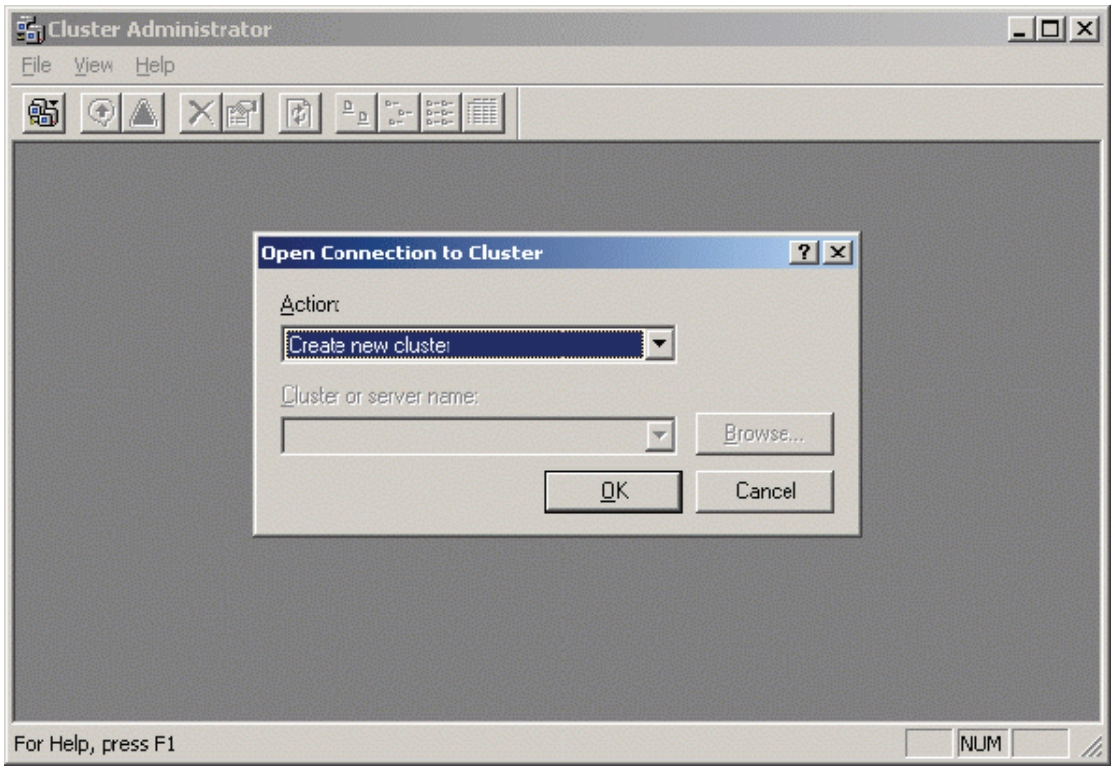
Come back to the Computer Management Console



After the successful operation, the status is shown as in the figure.

6. Creating Cluster

Open Cluster Administrator on node1.

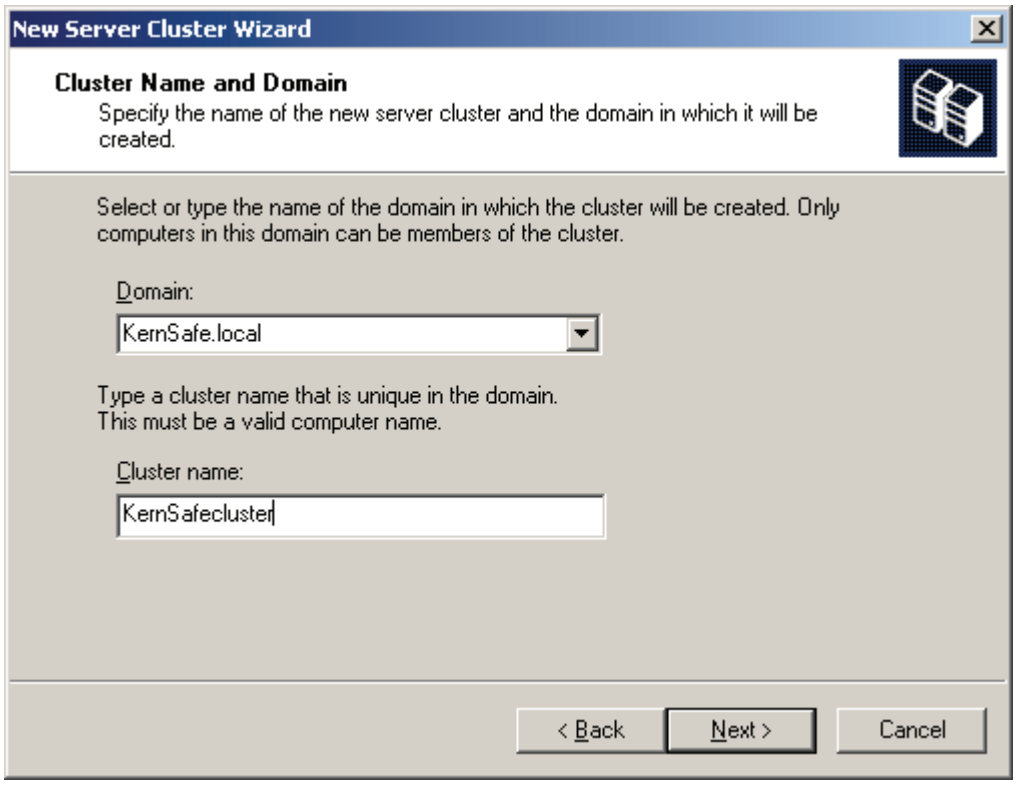


Select Create new cluster.

Press the **OK** button, the **New Server Cluster Wizard** is shown.

Press the **Next** button to continue.

Specify cluster name

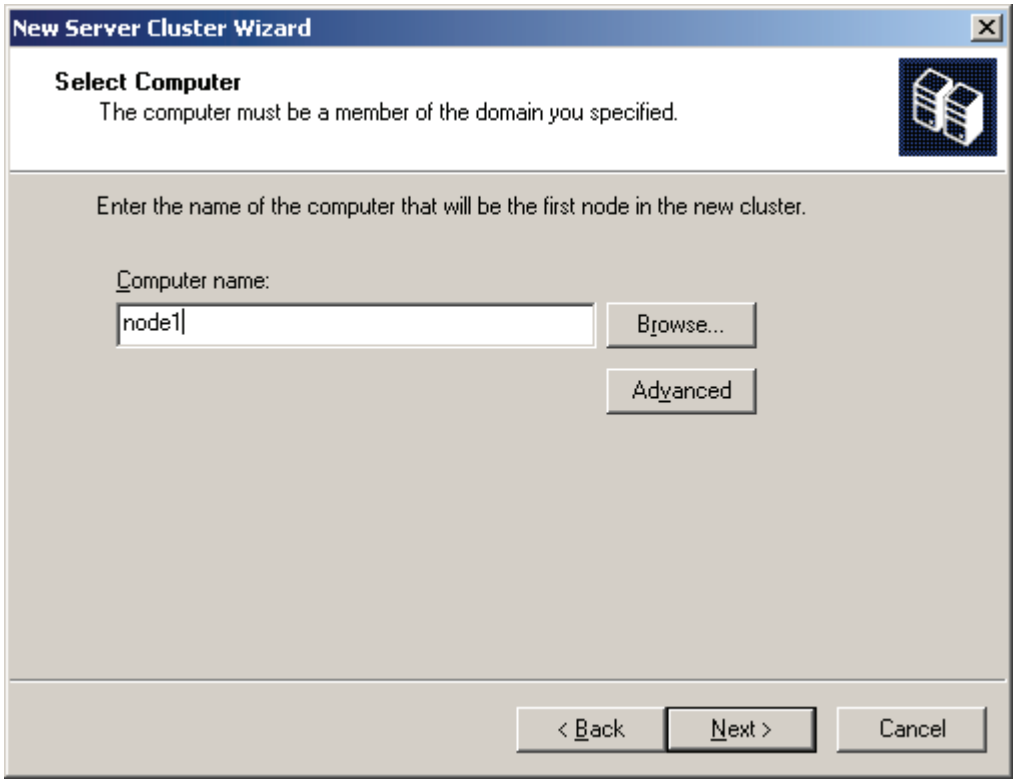


Select Domain and enter Cluster name, KernSafe.local is selected here and the Cluster name is

KernSafecluster.

Press the **Next** button to continue.

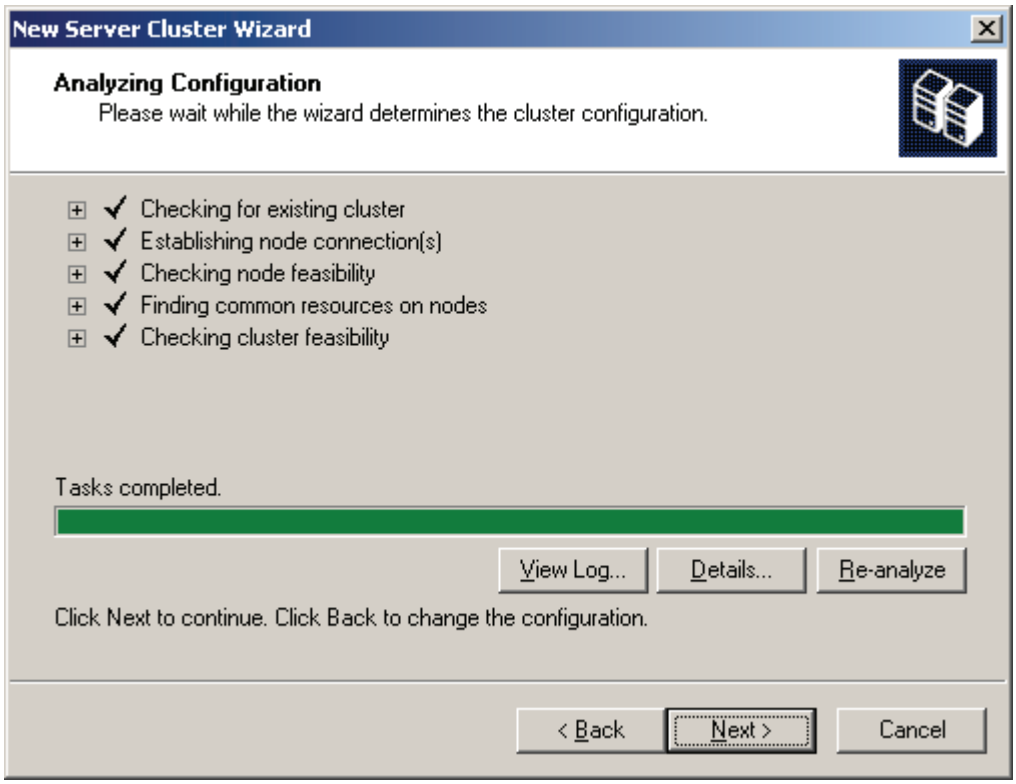
Select computer



Enter node1.

Press the **Next** button to continue.

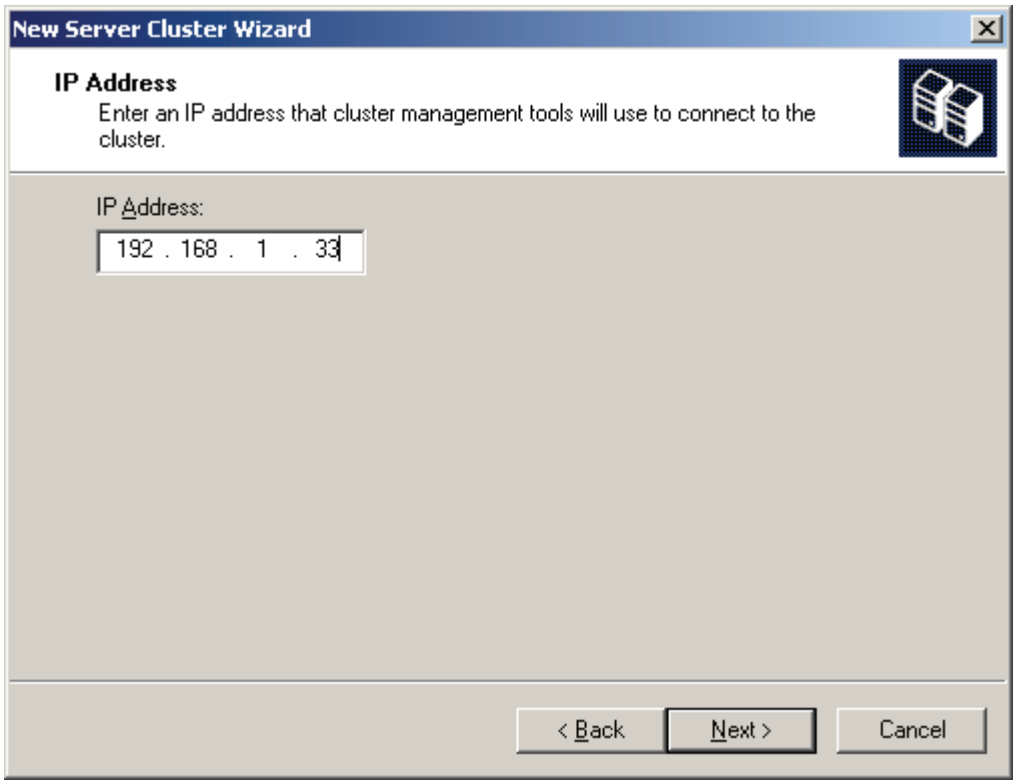
Analyzing configuration



If there is any problem during the testing process, press the **Back** button to change the configuration.

When all the tests are passed, press the **Next** button to continue.

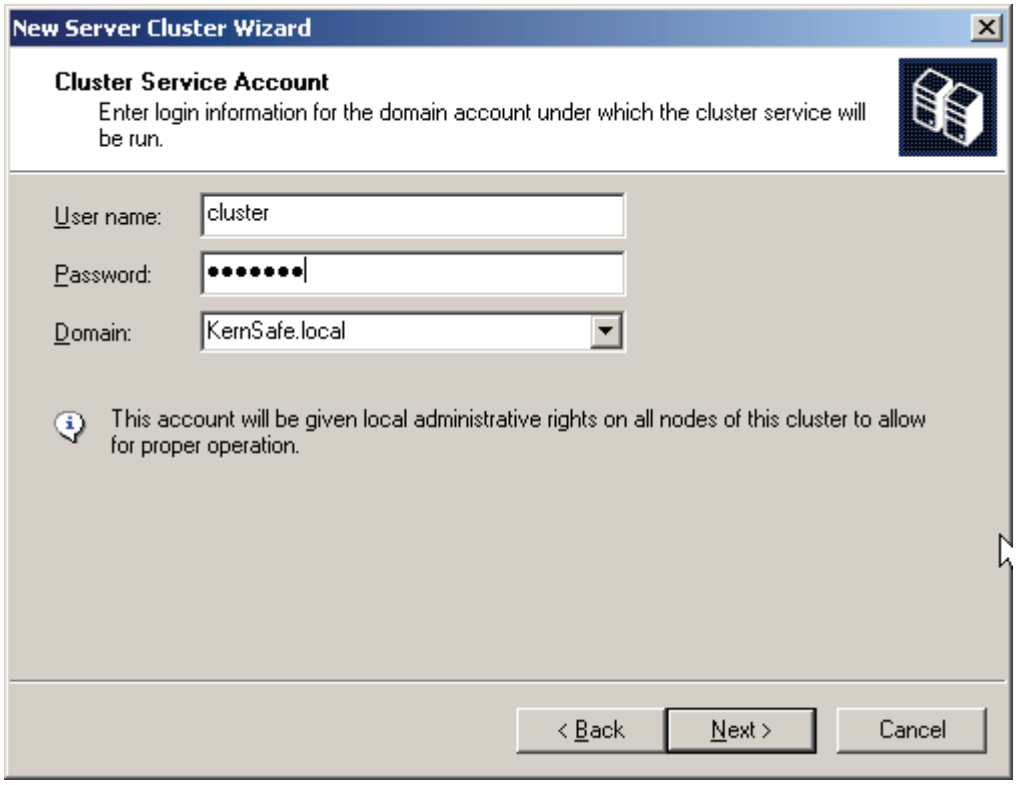
Enter an IP address of the cluster



Enter the IP address of Cluster., take 192.168.1.33 for example here.

Press the **Next** button to continue.

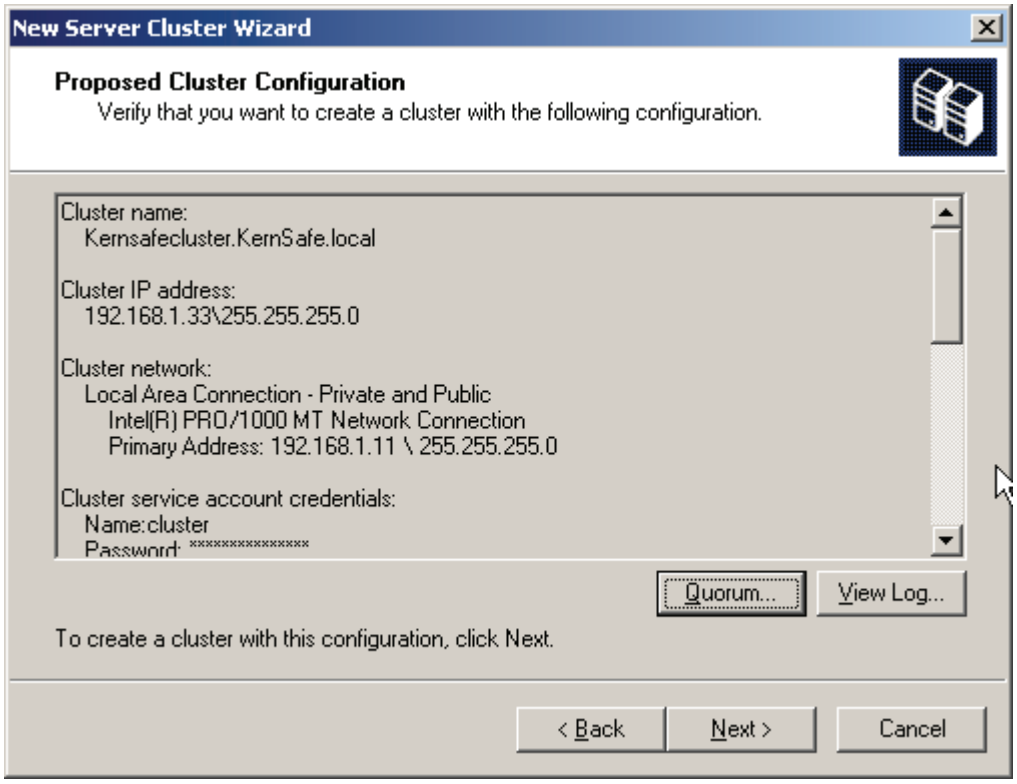
Type cluster service account



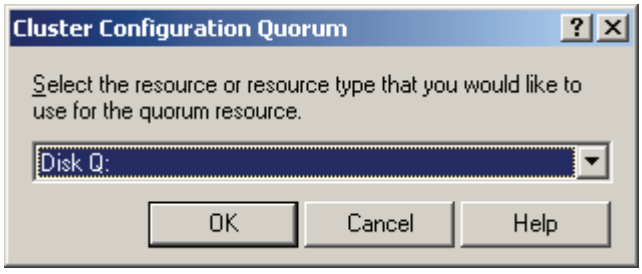
Enter the username and password of cluster.

Press the **Next** button to continue.

Proposed cluster configuration



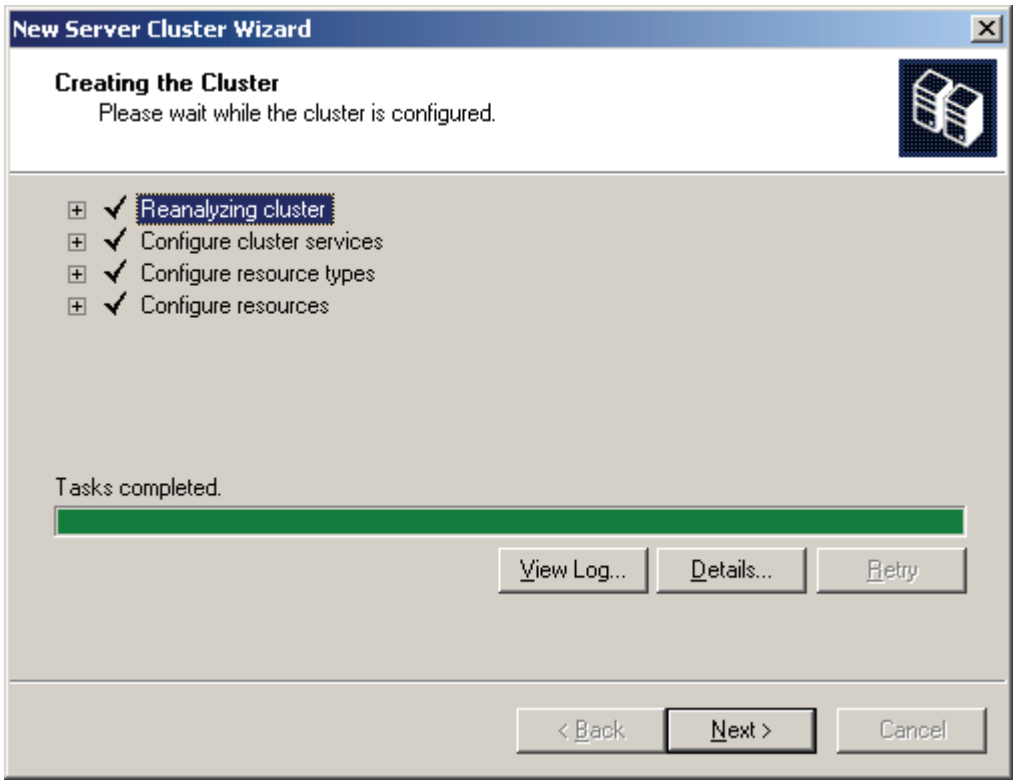
Click the **Quorum** button, the **Cluster Configuration Quorum dialog** is shown.



Select **Disk Q**.

Press the **OK** button to continue.

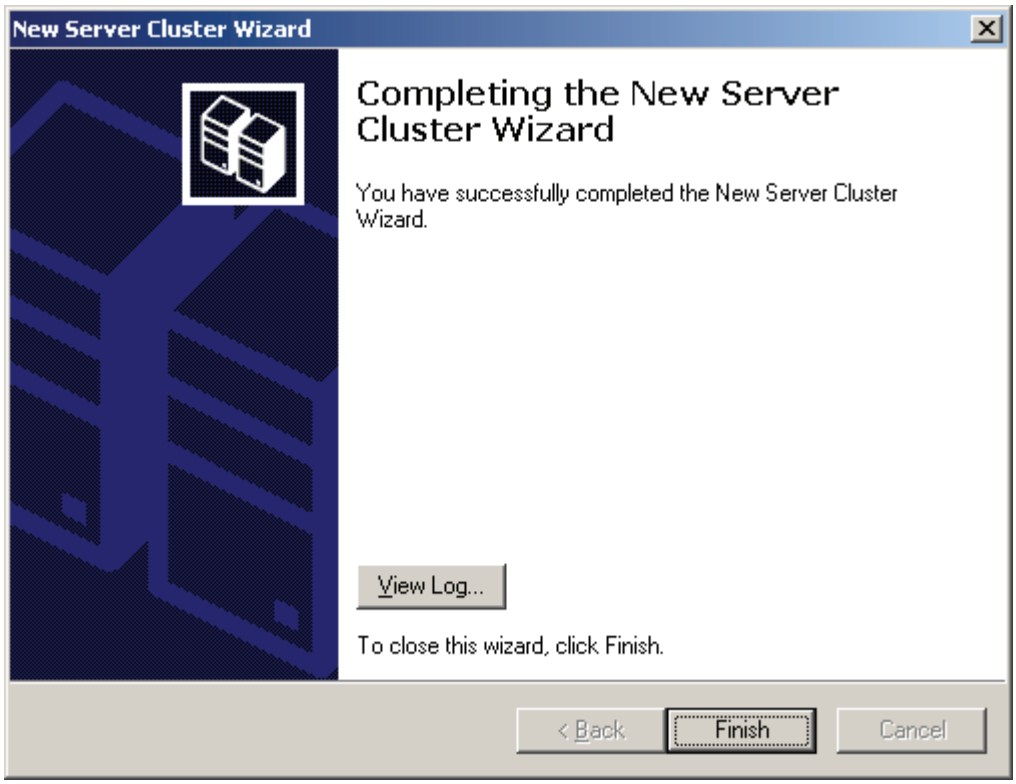
Creating cluster



If there is any problem during the testing process, press the **Back** button to change the configuration.

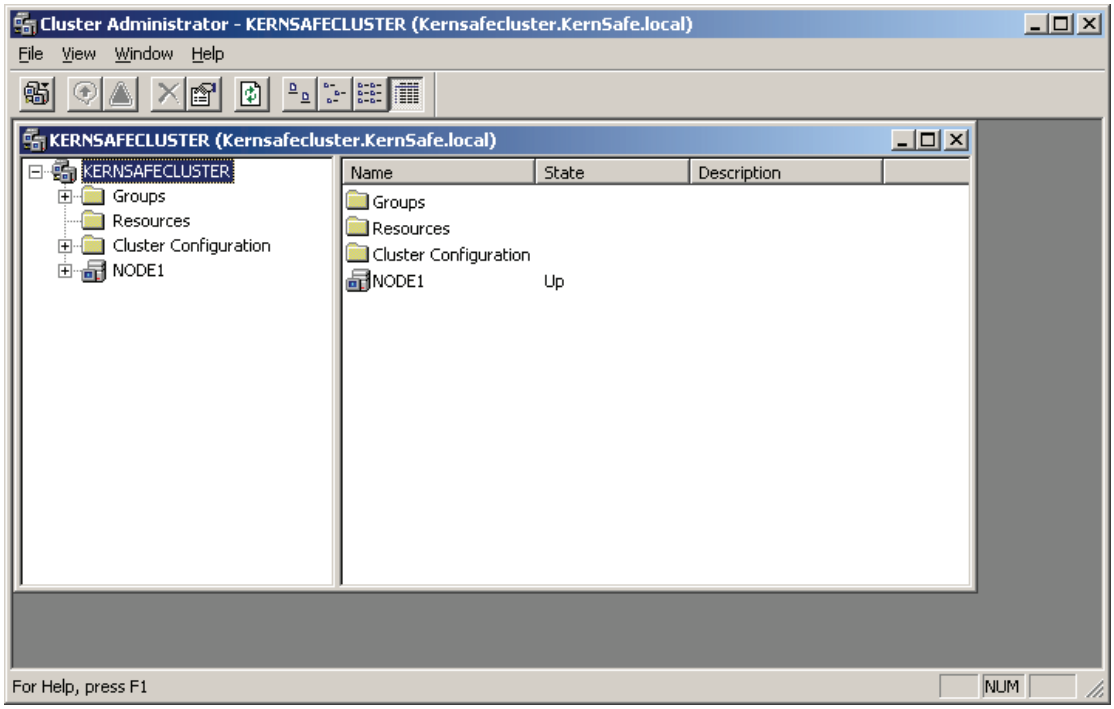
When all the tests are passed, press the **Next** button to continue.

Complete cluster creating



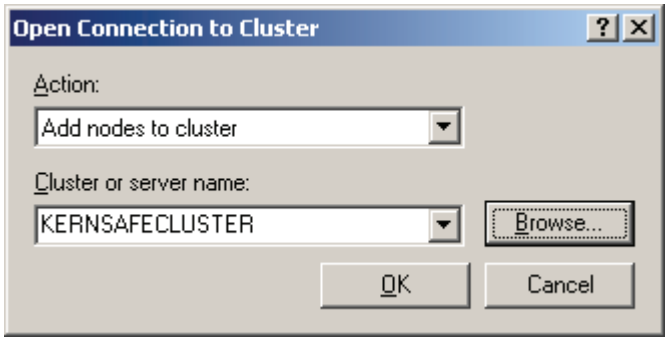
Press the **Finish** button to finish.

Come back to the Cluster Administrator Console



After the successful operation, the status is shown as in the figure.

Add node2 to the cluster



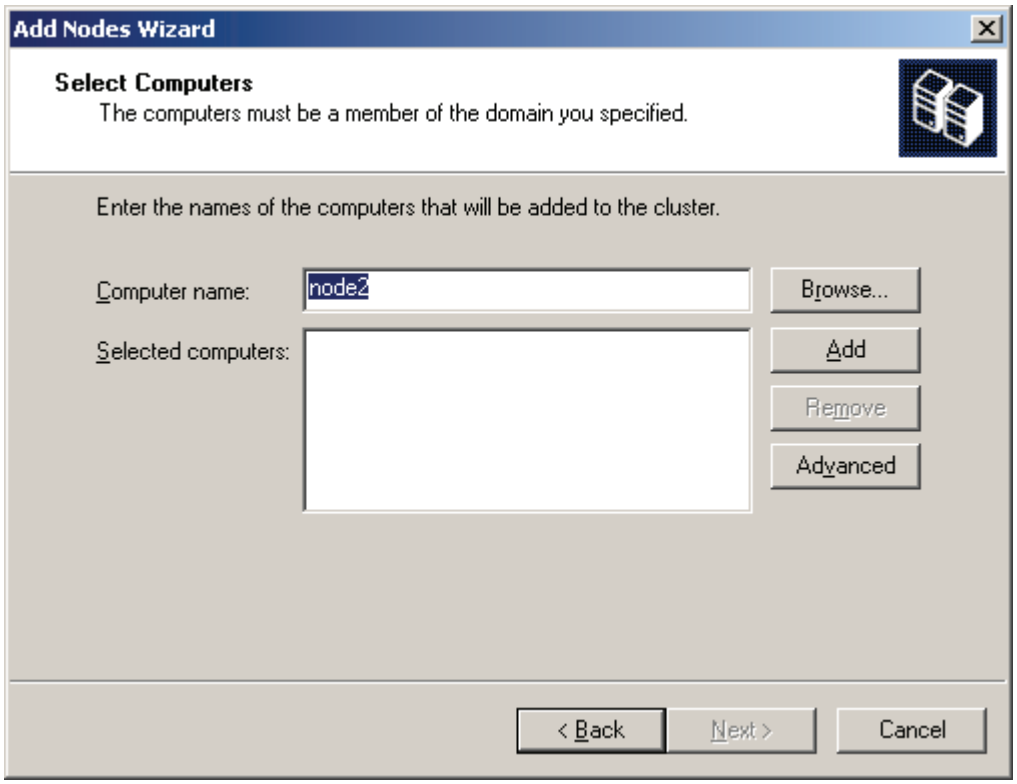
Open Cluster Administrator on node2, select Add nodes to cluster and Cluster name, which is KERNSAFECLUSTER here.

Press the **OK** button to continue.

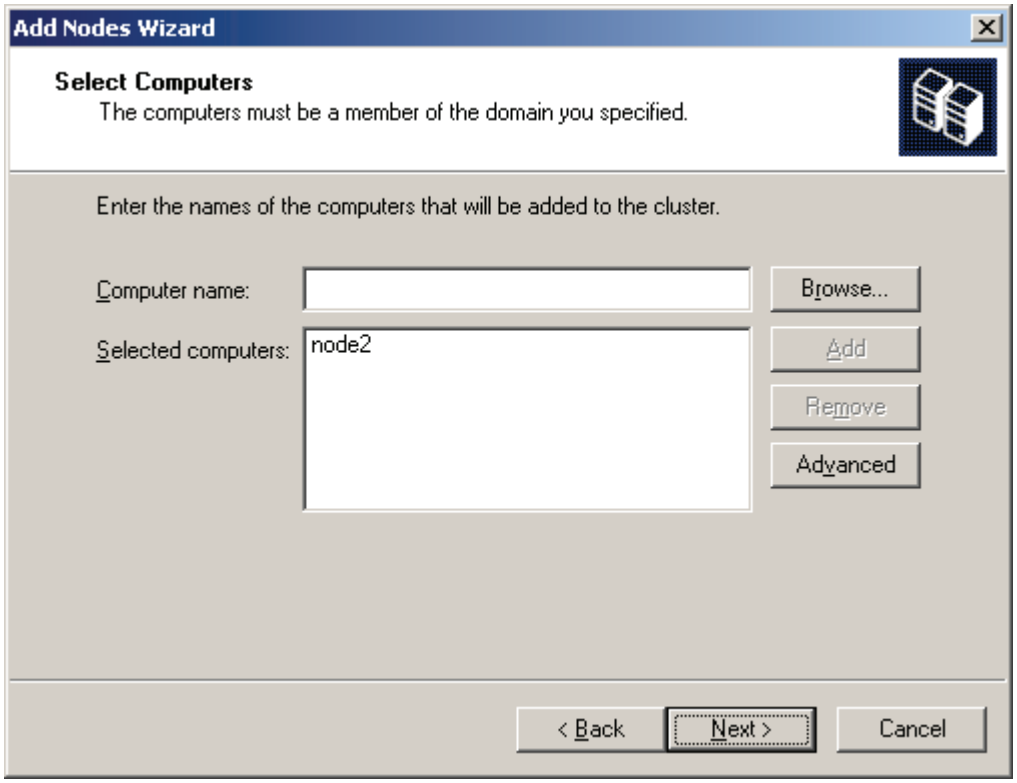
The **Add Nodes Wizard** is shown

Press the **Next** button to continue.

Select Computers

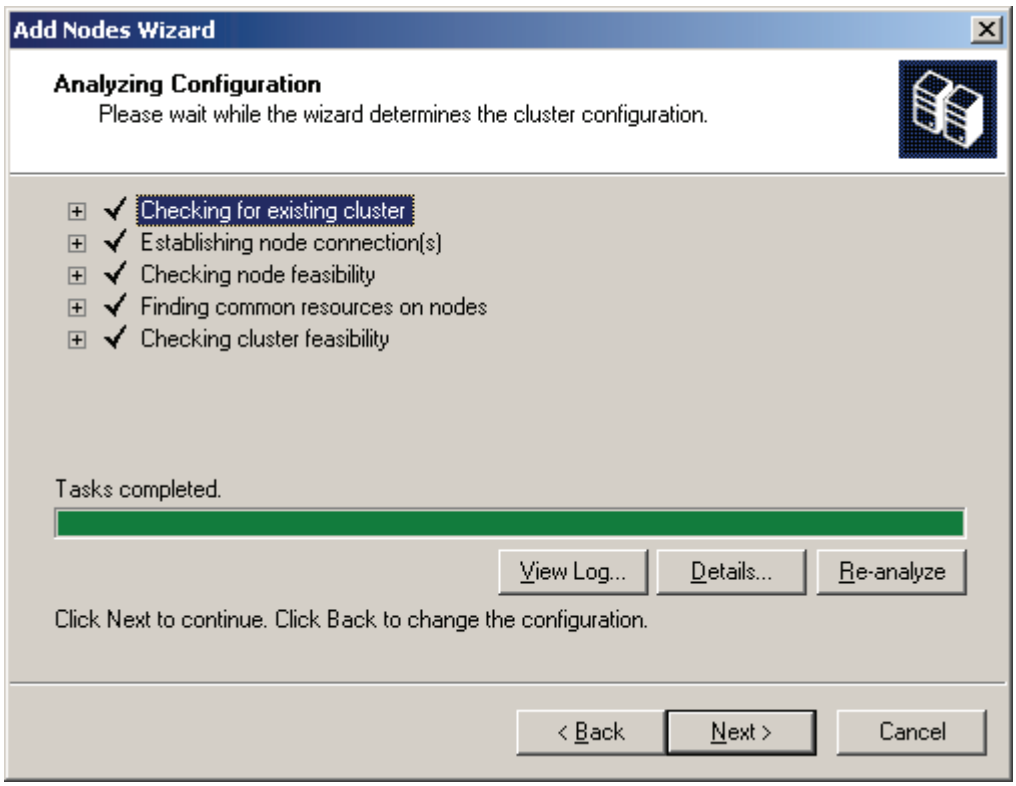


Enter node2 in Computer name and click Add to add node2 into selected computers.



Press the **Next** button to continue.

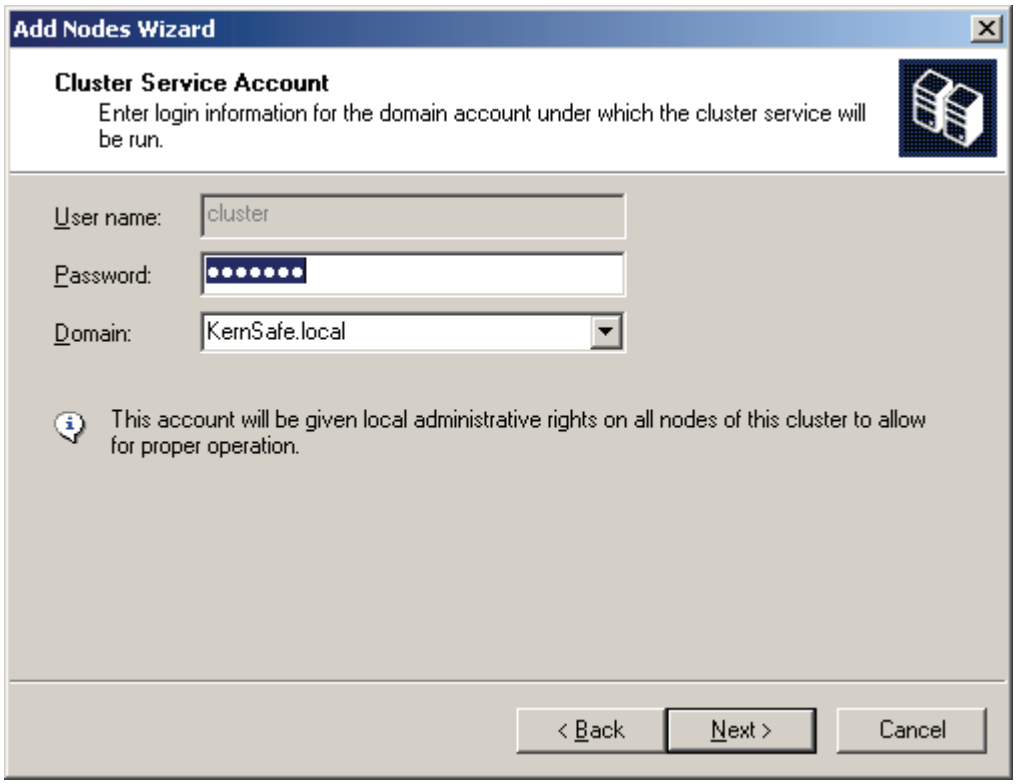
Analyzing configuration



If there is any problem during the testing process, press the Back button to change the configuration.

When all the tests are passed, press the **Next** button to continue.

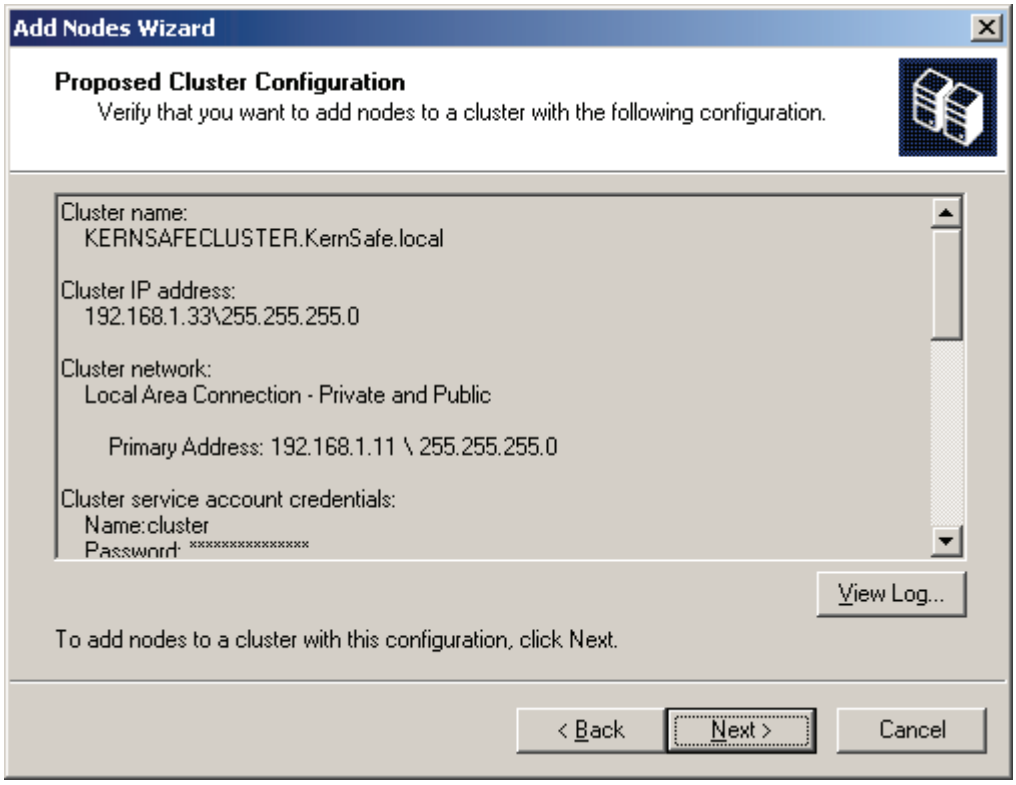
Specify cluster service account



Enter the password of cluster user.

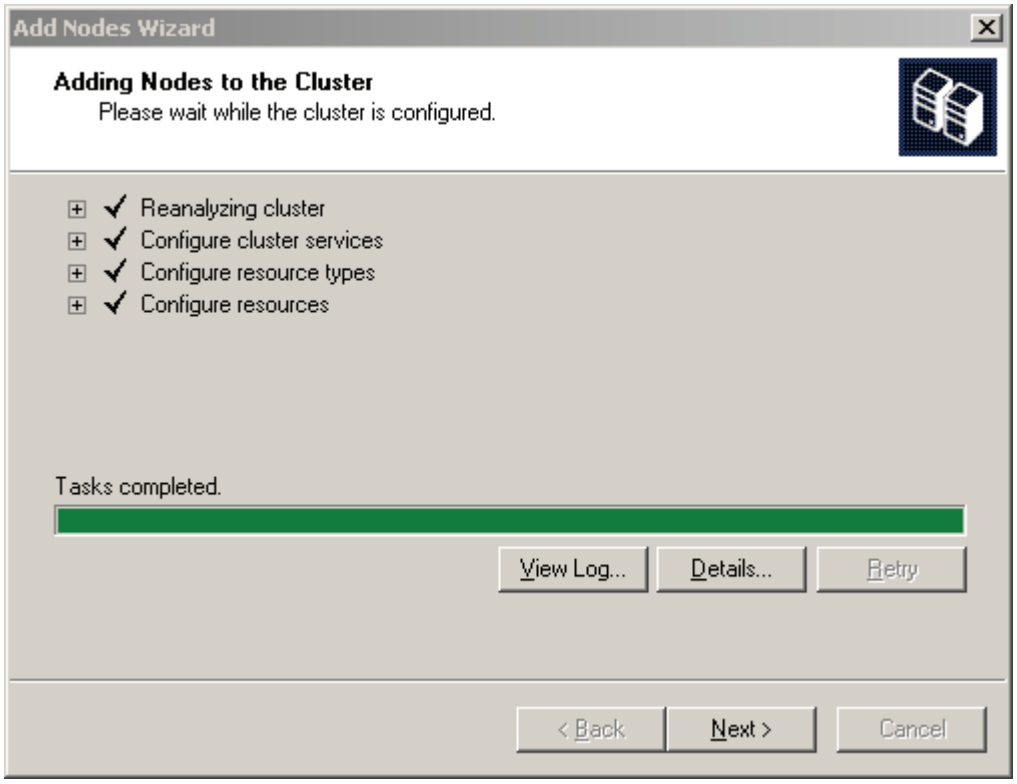
Press the **Next** button to continue.

Proposed cluster configuration



Press the **Next** button to continue.

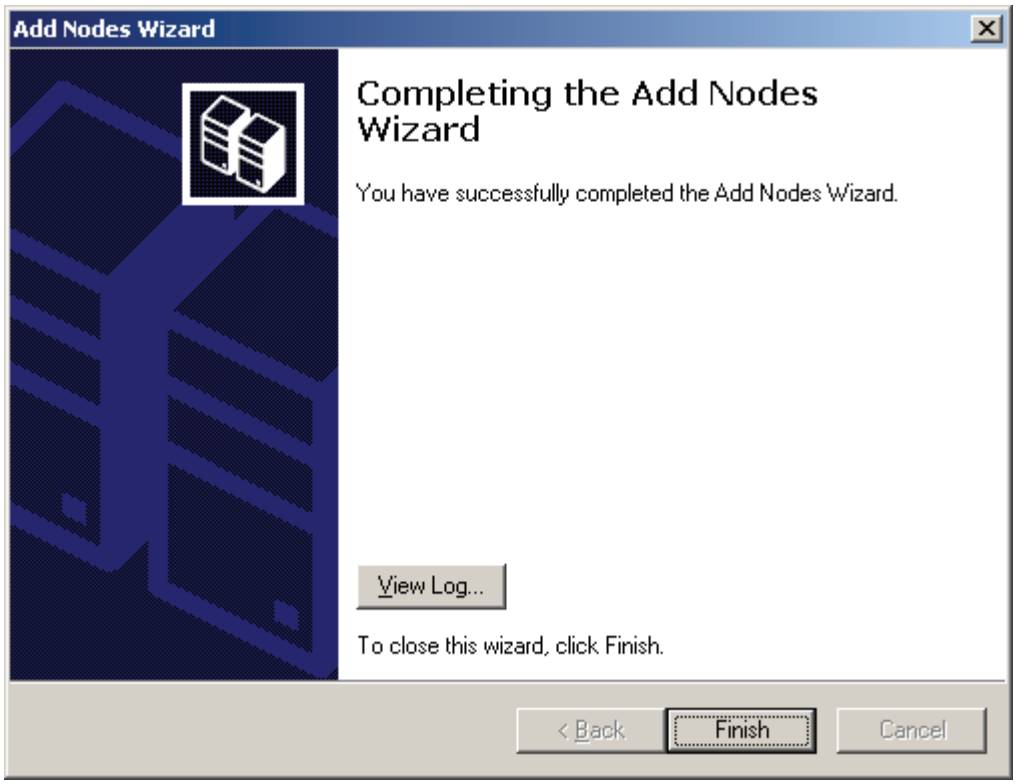
Adding nodes to the cluster



If there is any problem during the testing process, press the **Back** button to change the configuration.

When all the tests are passed, press the **Next** button to continue.

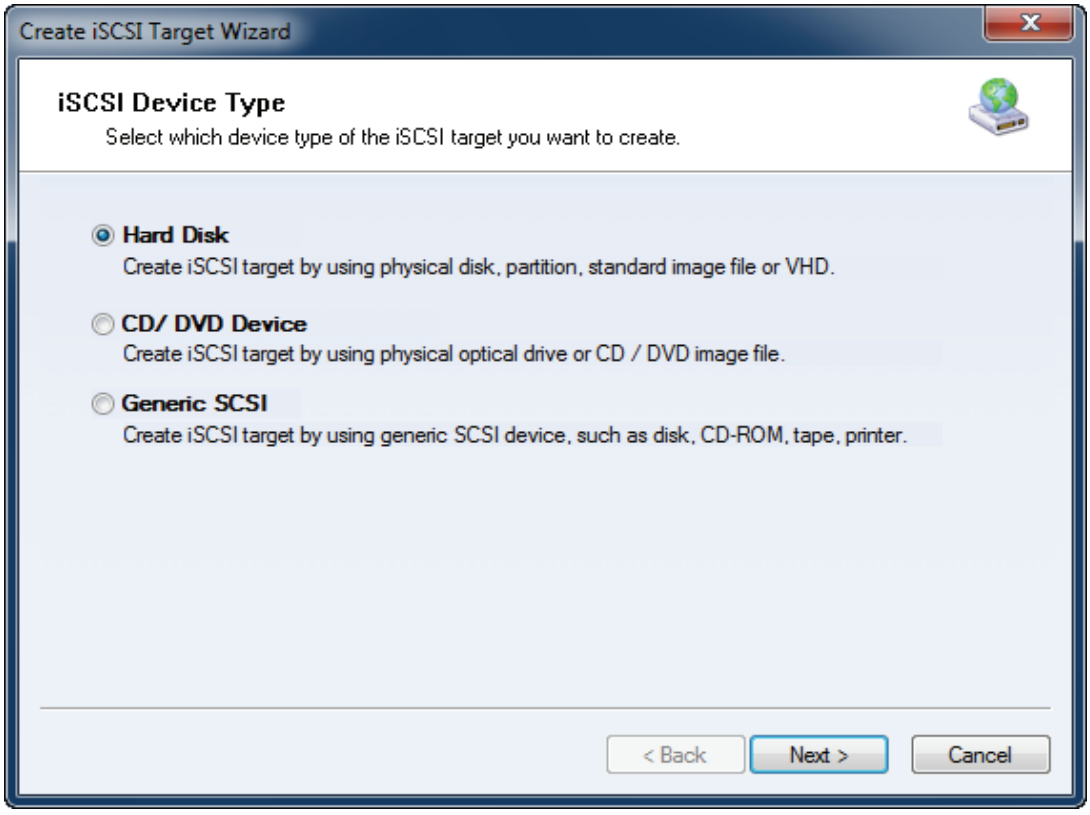
Finish adding node to the cluster.



Press the **Finish** button.

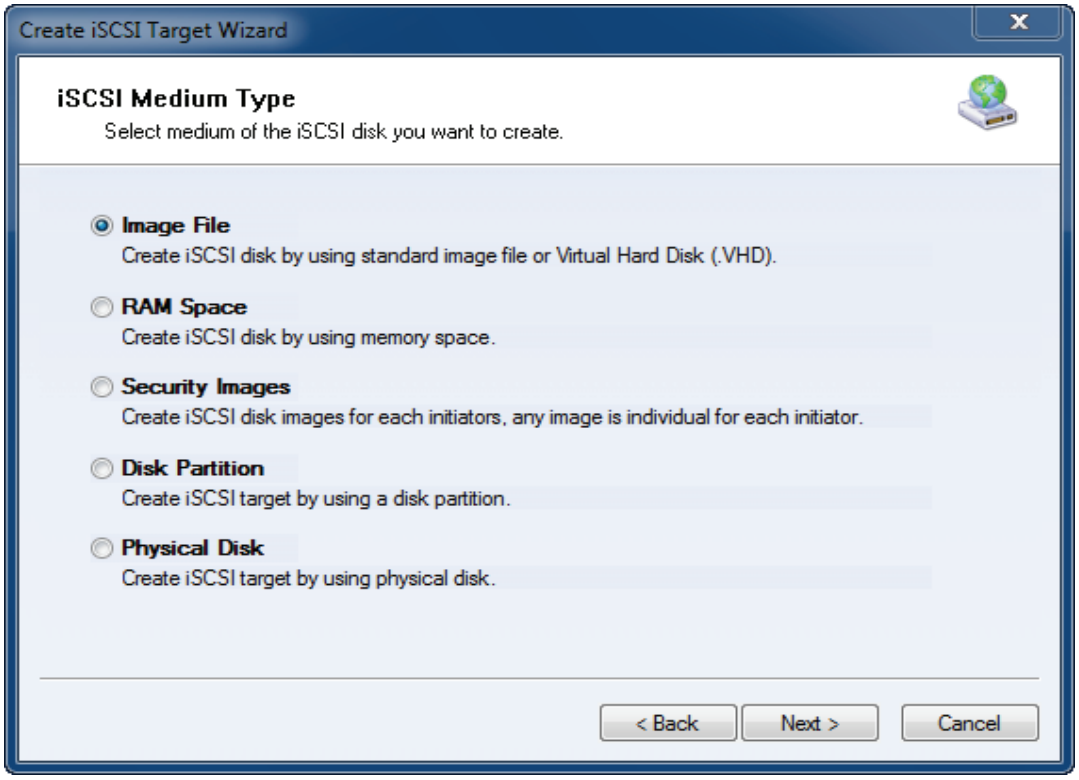
7. Add new shared resources

Open iStorage Server Console and then press the Create button on the toolbar, and then the Create Device Wizard is shown.



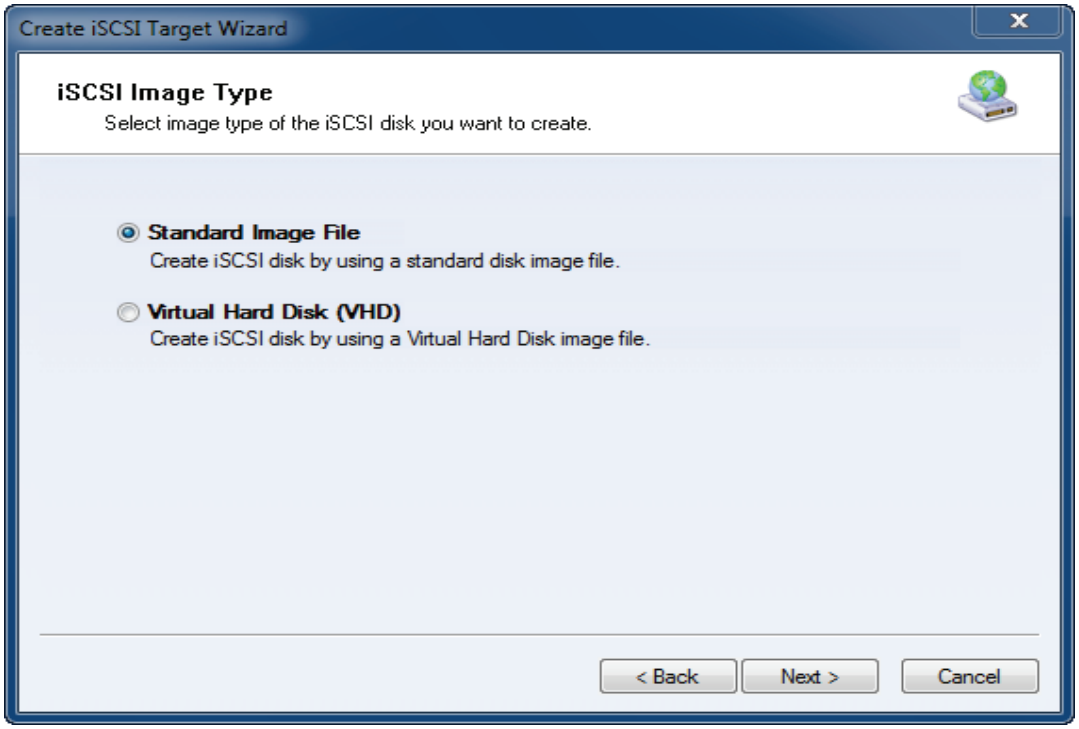
Choose **Hard Disk**.

Press the **Next** button to continue.



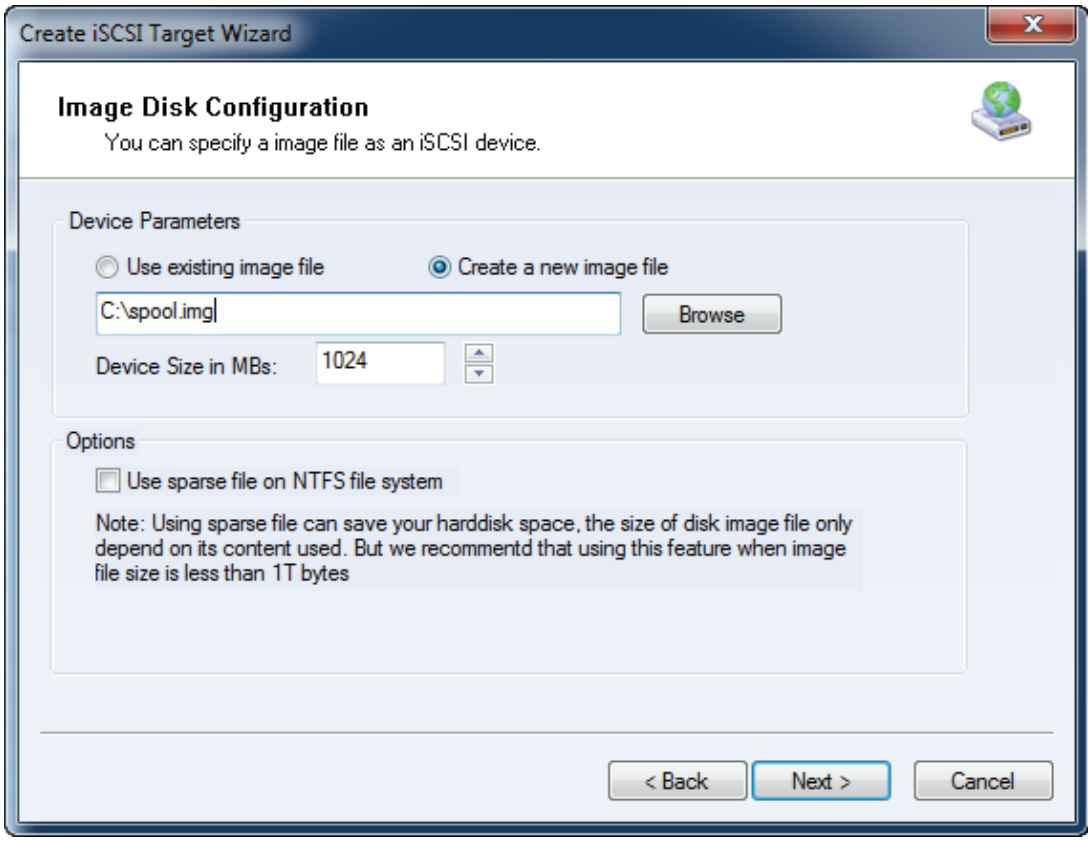
Choose **Image File** in **iSCSI Medium Type** window.

Press the **Next** button to continue.



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

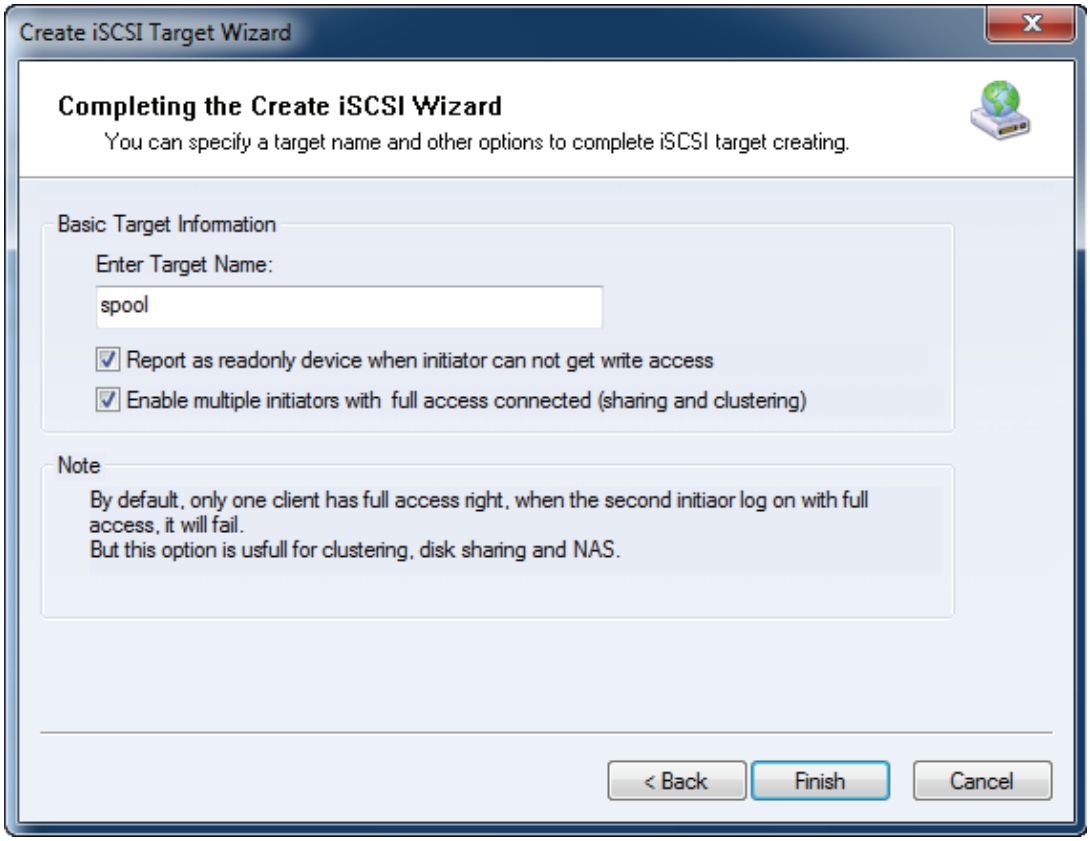
Set image disk parameters



Create an .img file named spool with a size of 1024MB as an example.

Press the **Next** button to continue.

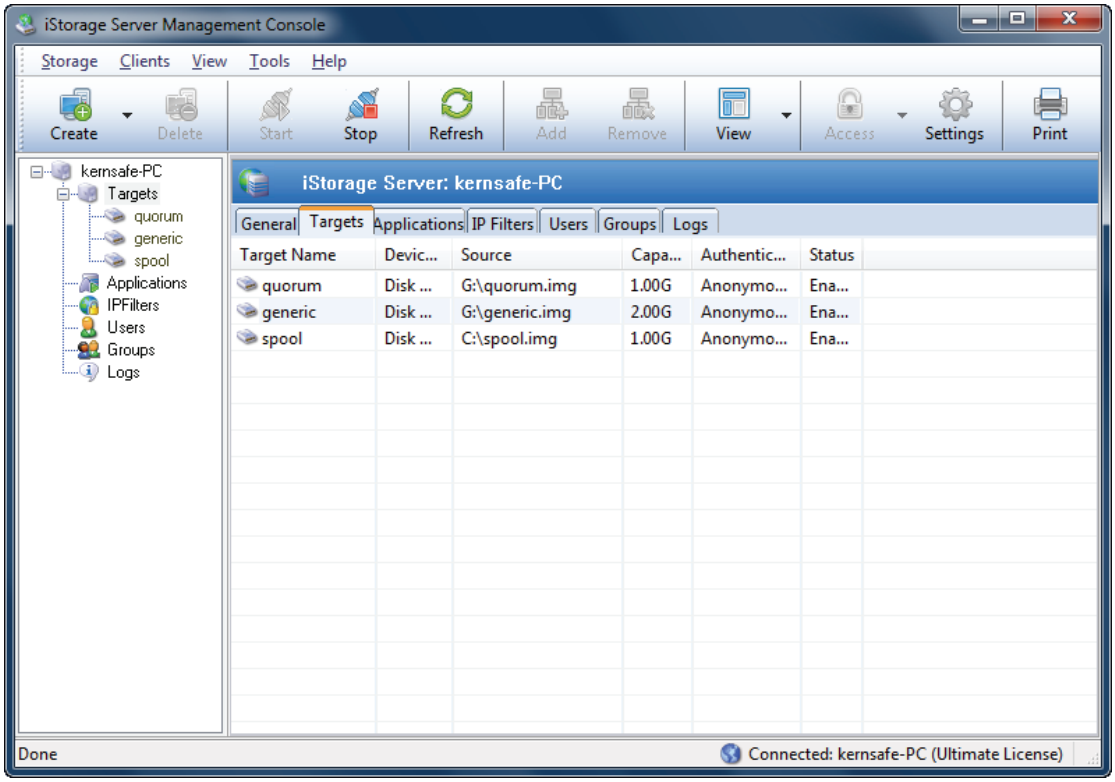
Finish creating iSCSI Target



Enter spool as the Target name, Choose the **Enable multiple initiators with full access connected (sharing and clustering).**

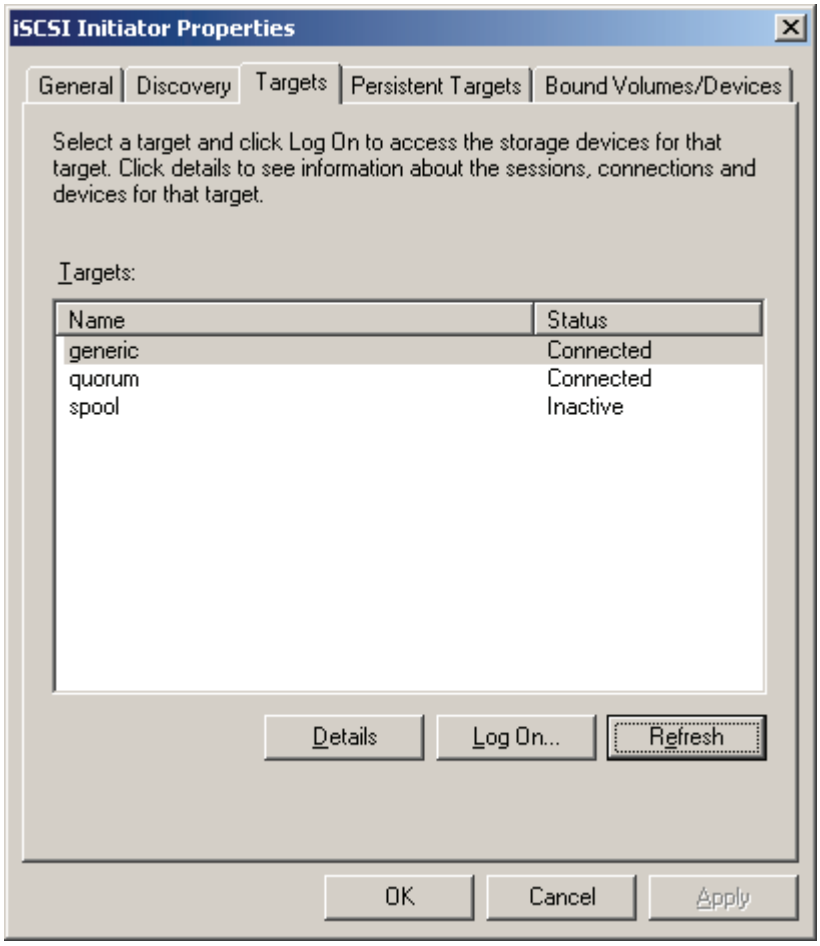
Press the **Finish** button to complete iSCSI Target creation.

Come back to iStorage Server Console.

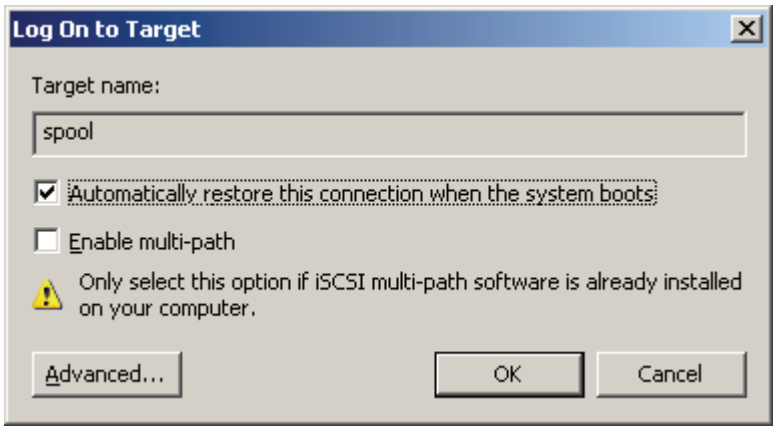


After the successful creation, the status is shown as in the figure.

Open iSCSI Initiator on node1, and then press the **Refresh** button on the **Targets** page.



Press the **Log On** button.



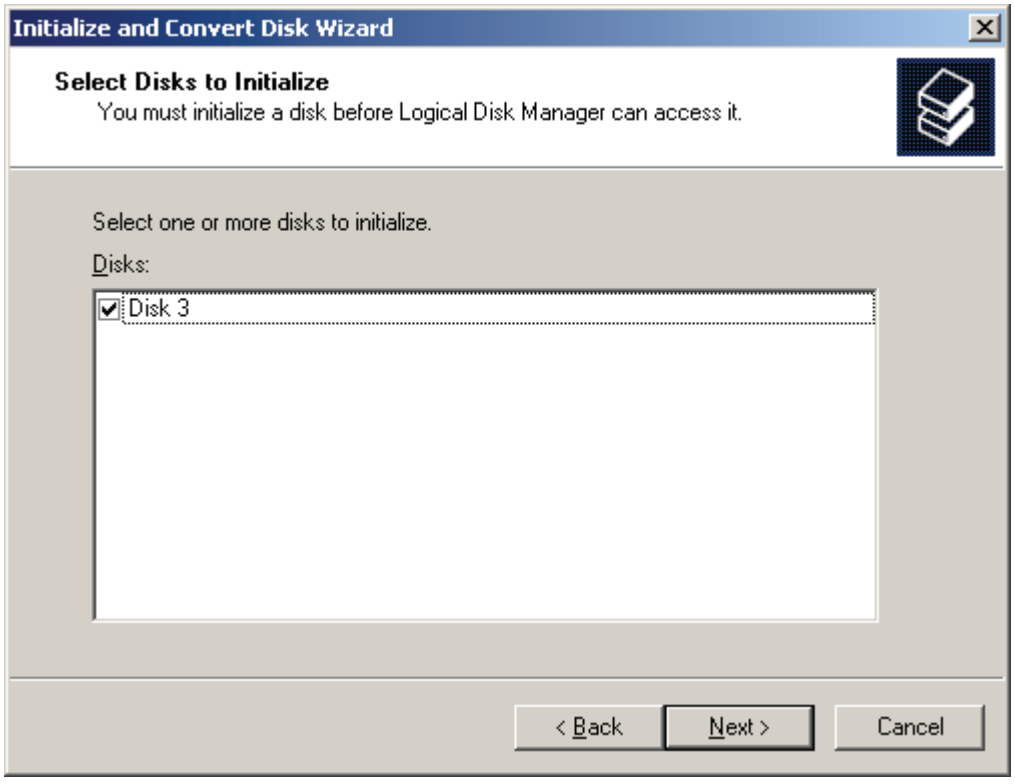
Select spool and click the **Log On** button. Check **Automatically restore this connection when the system boots**

Open Computer Management, select Disk Management and then the **Initialize and Convert Disk**

Wizard is shown.

Press the **Next** button to continue.

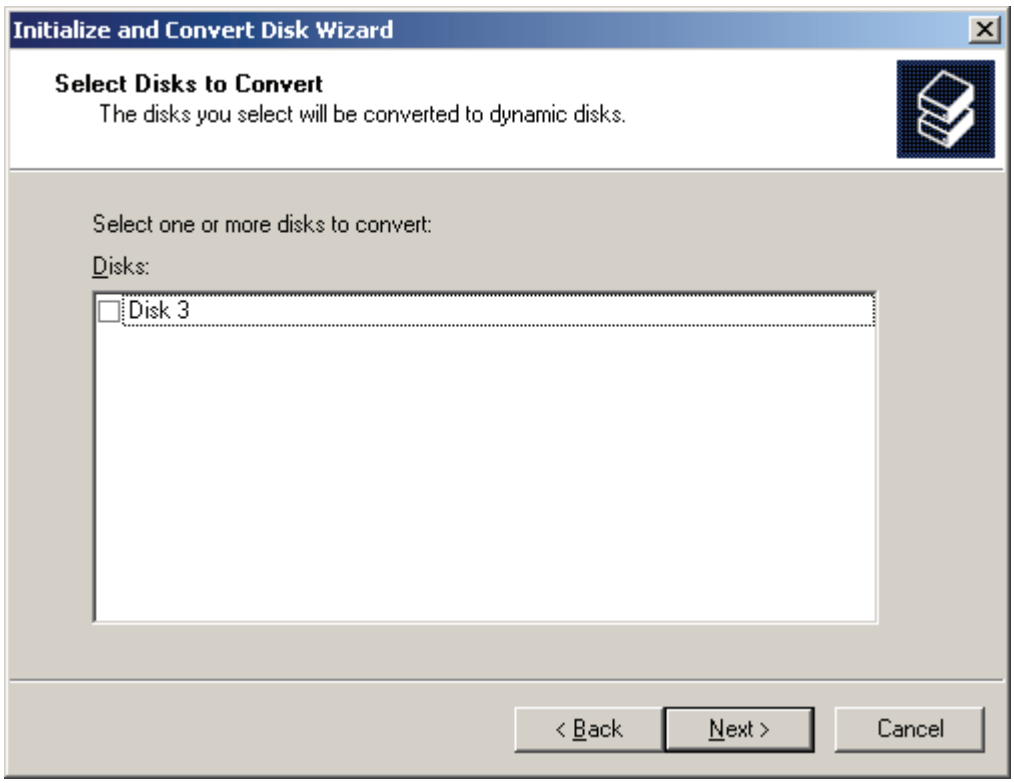
Select disks to be initialized.



Select Disk3.

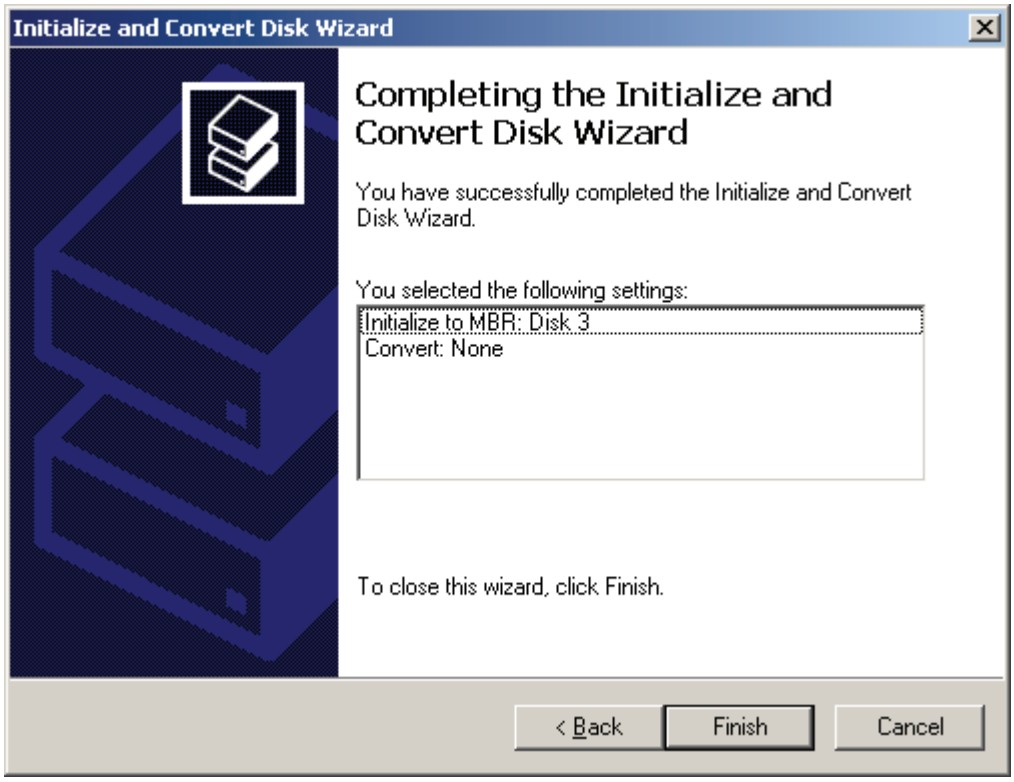
Press the **Next** button to continue.

Select disks to be converted.



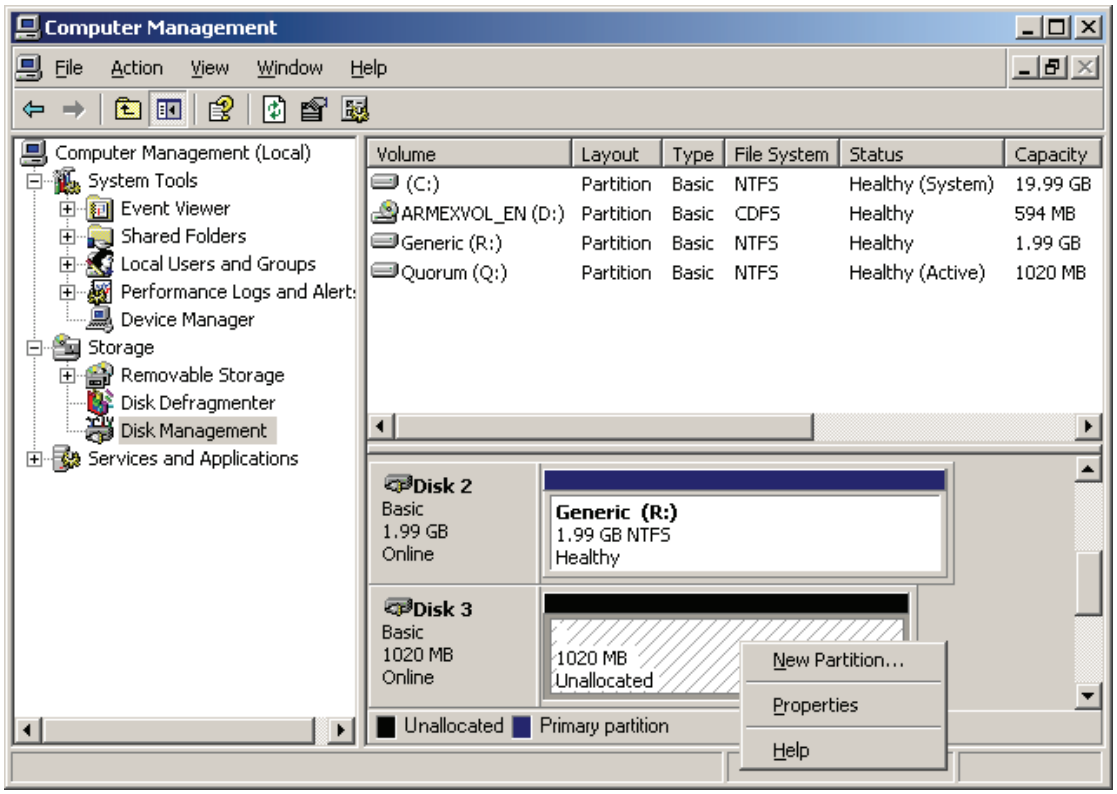
Press the **Next** button to continue.

Finish initializing disk.

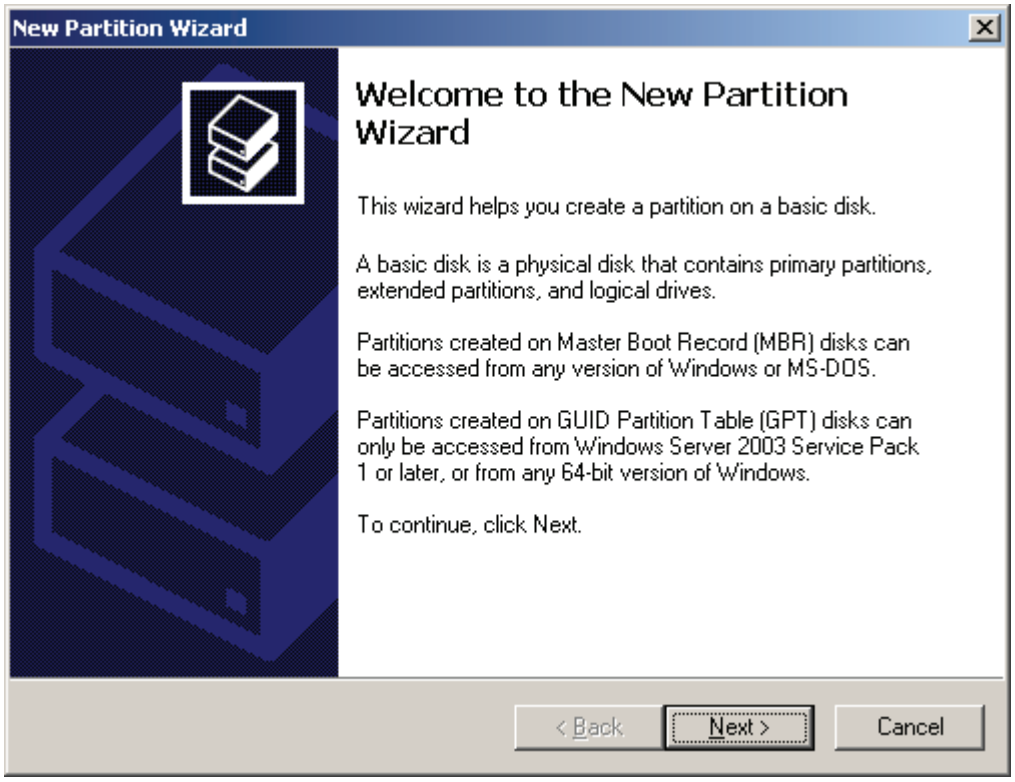


Press the **Finish** button.

Come back to the Computer Management Console.

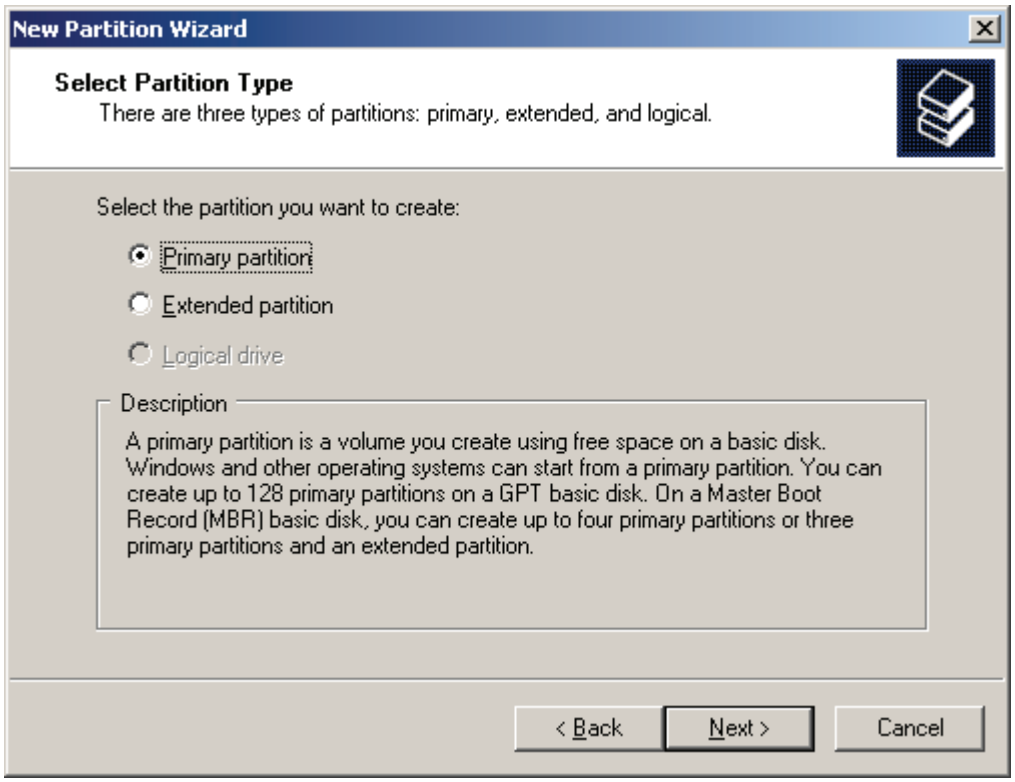


Right click on the disk3 and then select **New Partition**, the **New Partition Wizard** is shown.



Press the **Next** button to continue.

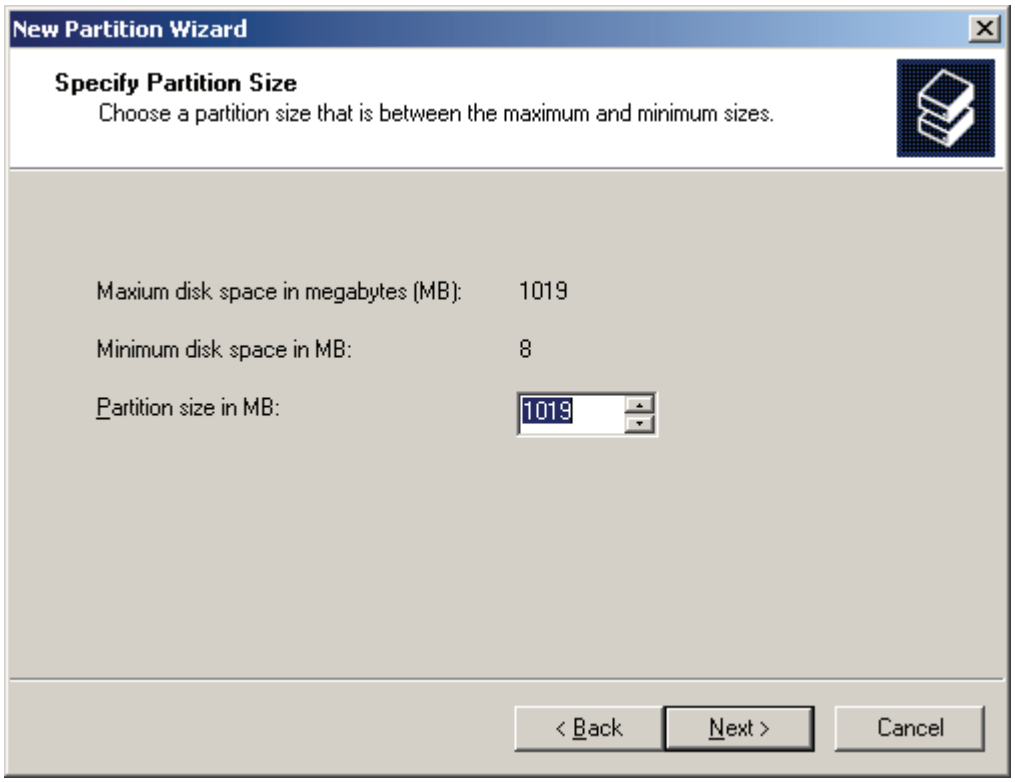
Select partition type.



Select Primary partition

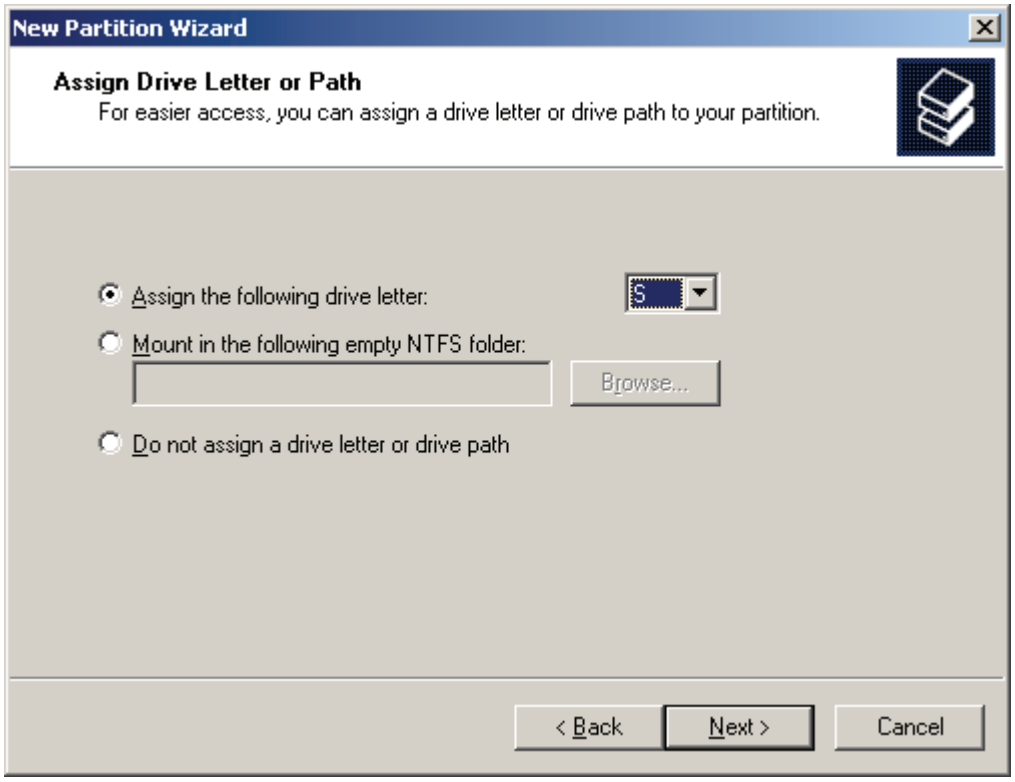
Press the **Next** button to continue.

Specify partition size



Press the **Next** button to continue.

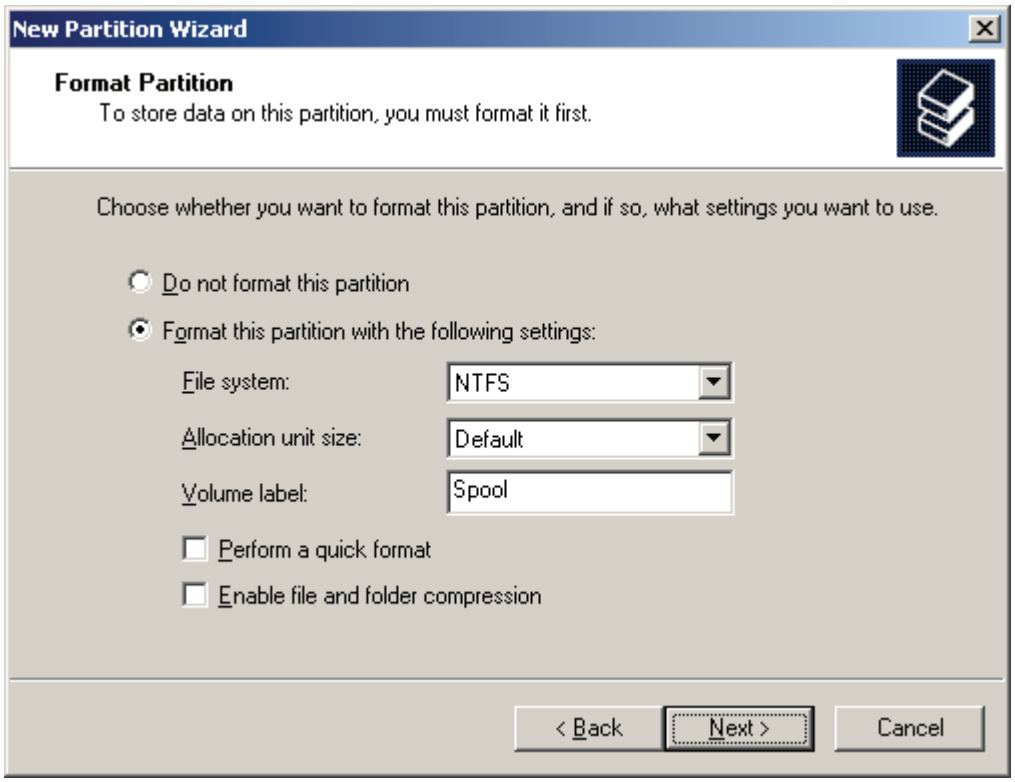
Assign drive letter



Assign S as drive letter.

Press the **Next** button to continue.

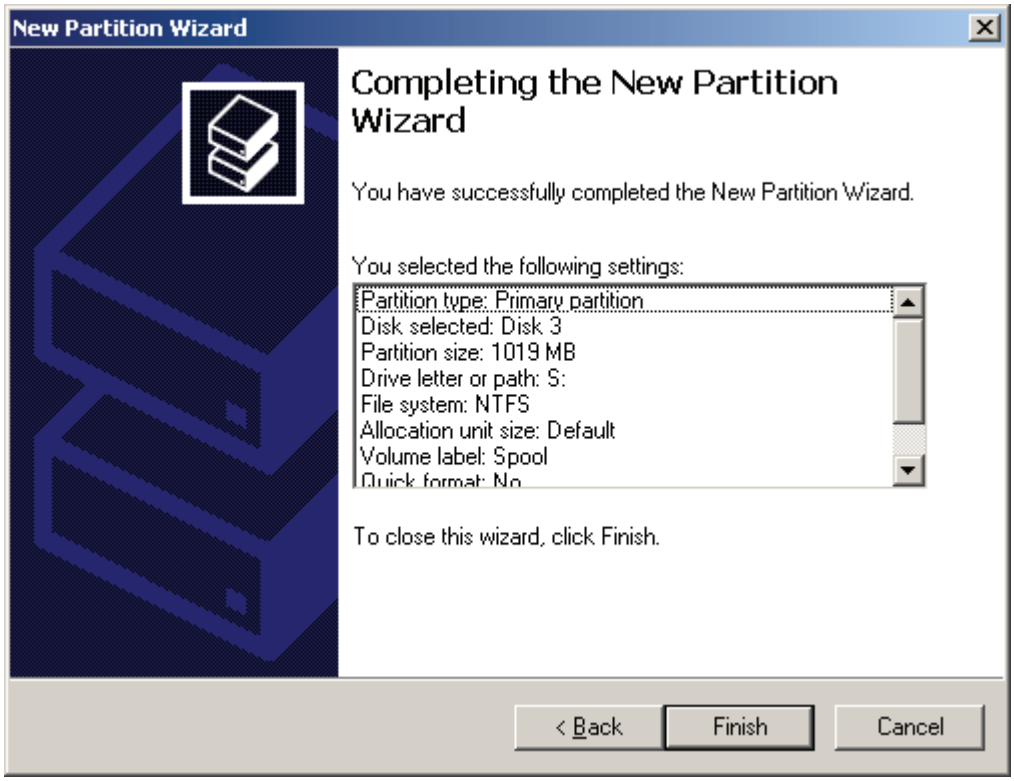
Format partition



Enter Spool as Volume label.

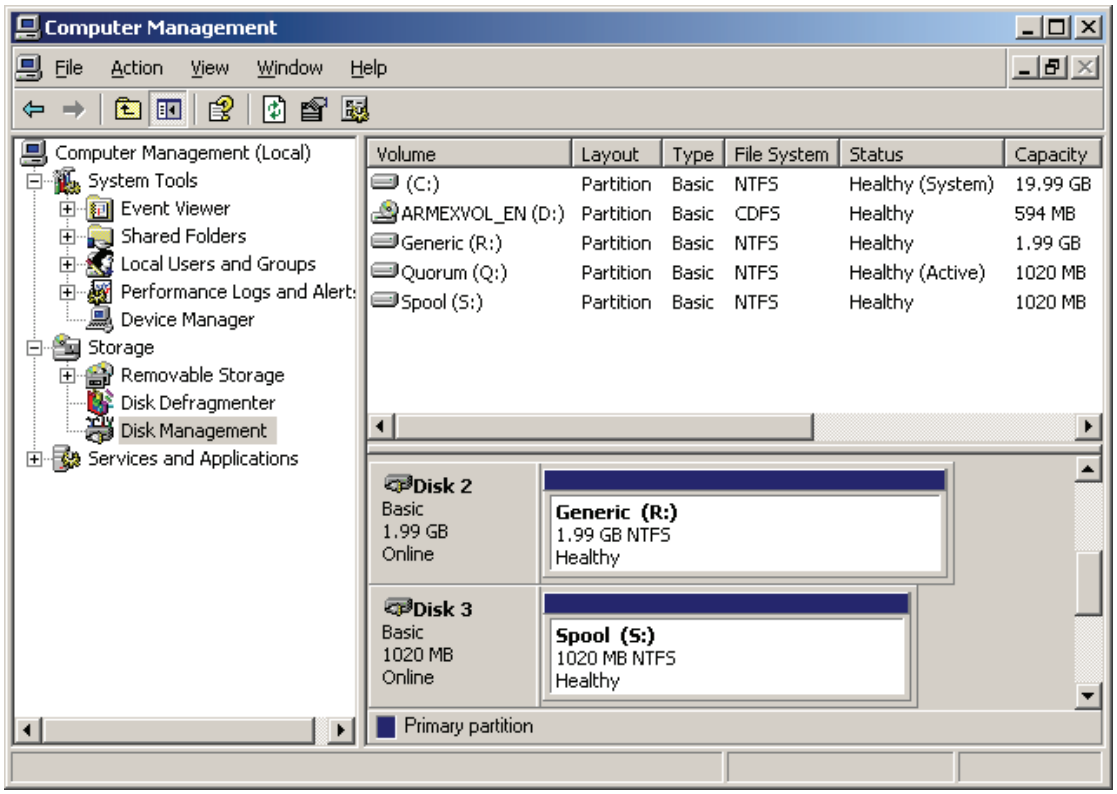
Press the **Next** button to continue.

Finish disk formatting



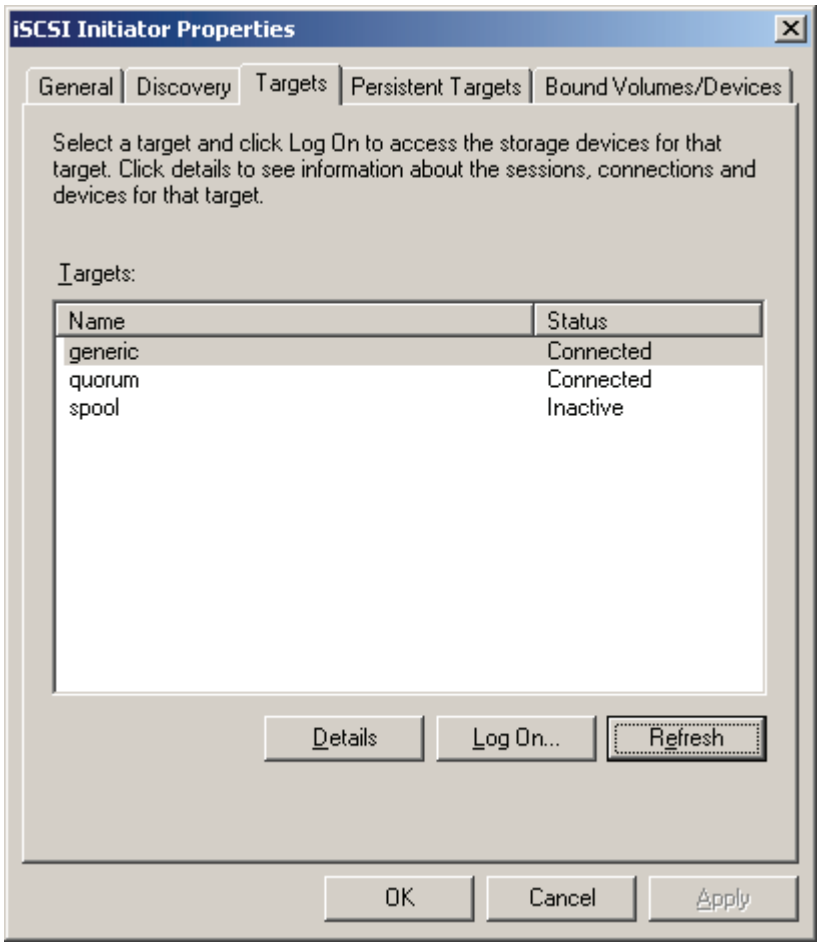
Press the **Finish** button.

Come back to the Computer Management Console.

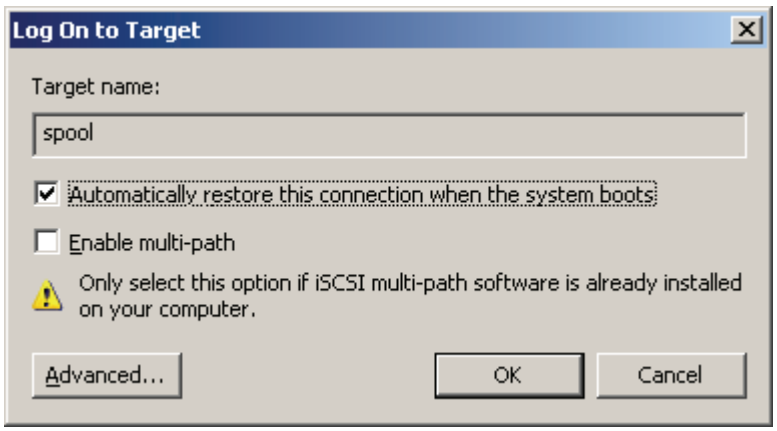


After the successful operation, the status is shown as in the figure.

Open iSCSI Imitator on node2, client the **Refresh** button on the **Targets** page.

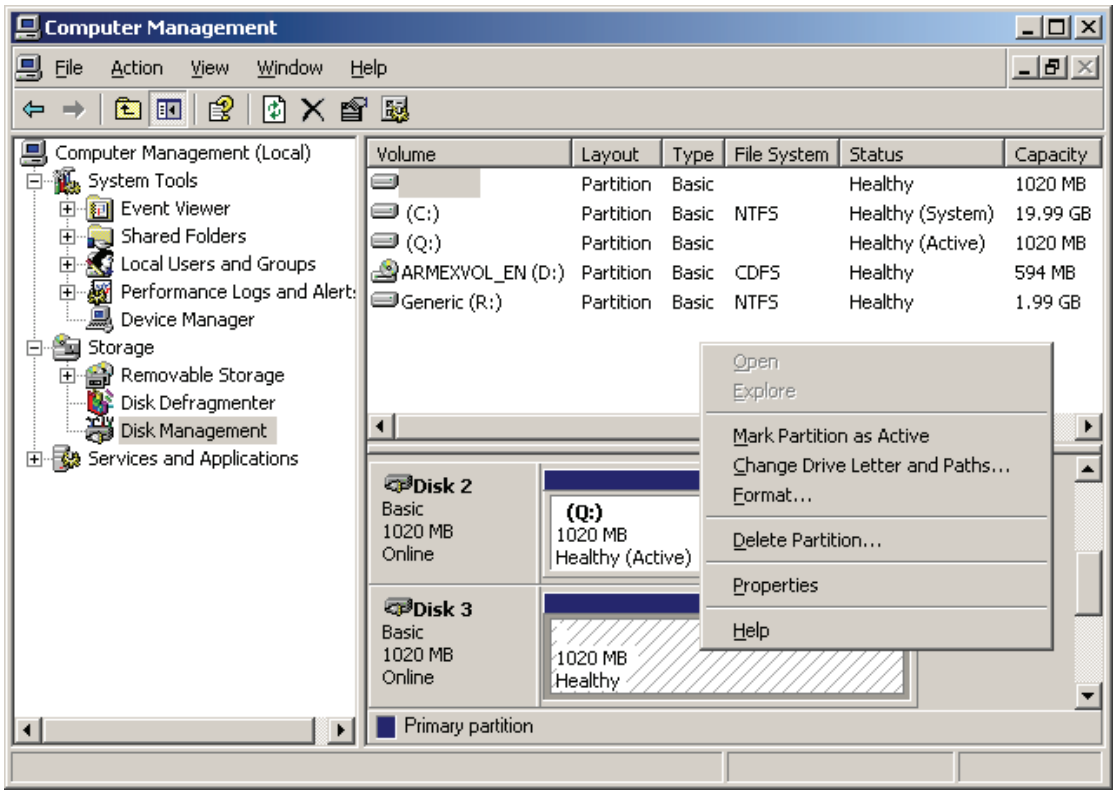


Select spool and then press the **Log On** button, the **Log On to Target dialog** is shown.

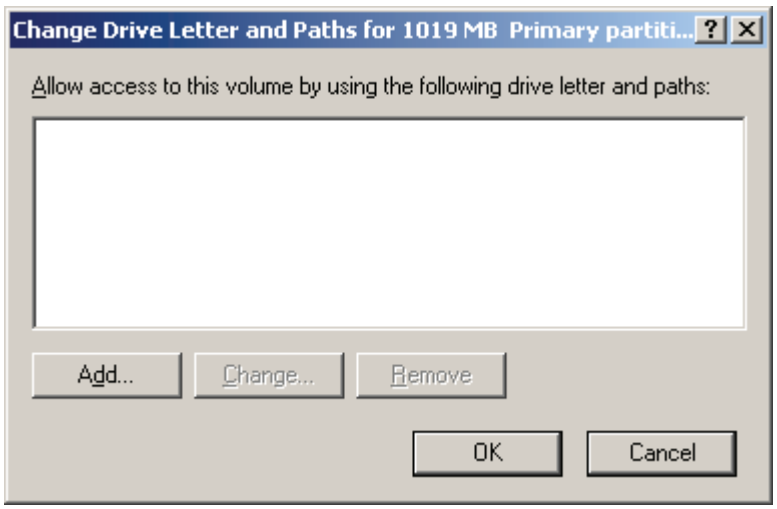


Select spool and click the **Log On** button. Check **Automatically restore this connection when the system boots**.

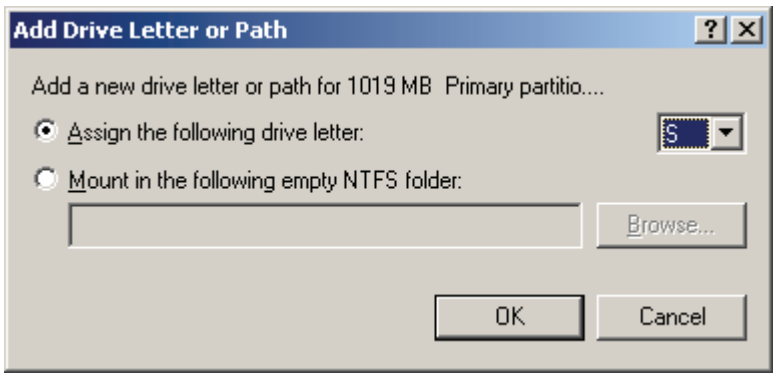
Open Computer Management and select Disk Management.



Right click on spool disk and select **Change Drive Letter and Paths**.

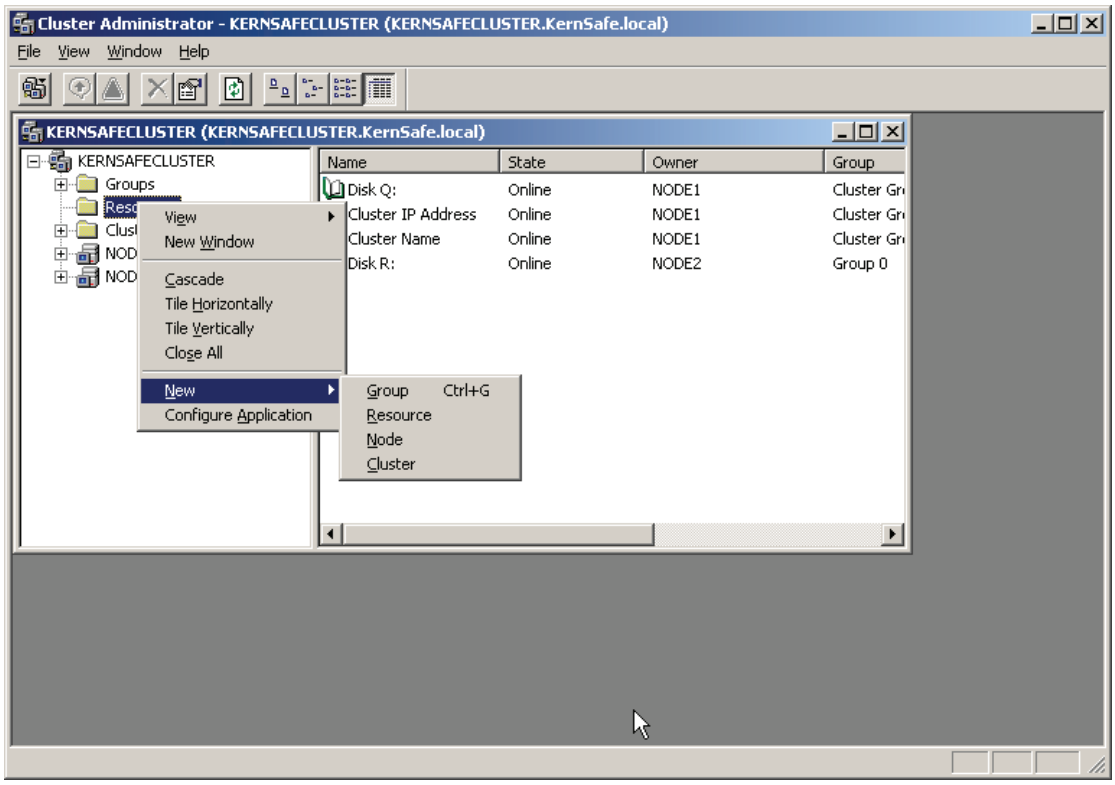


Click the **Add** button.

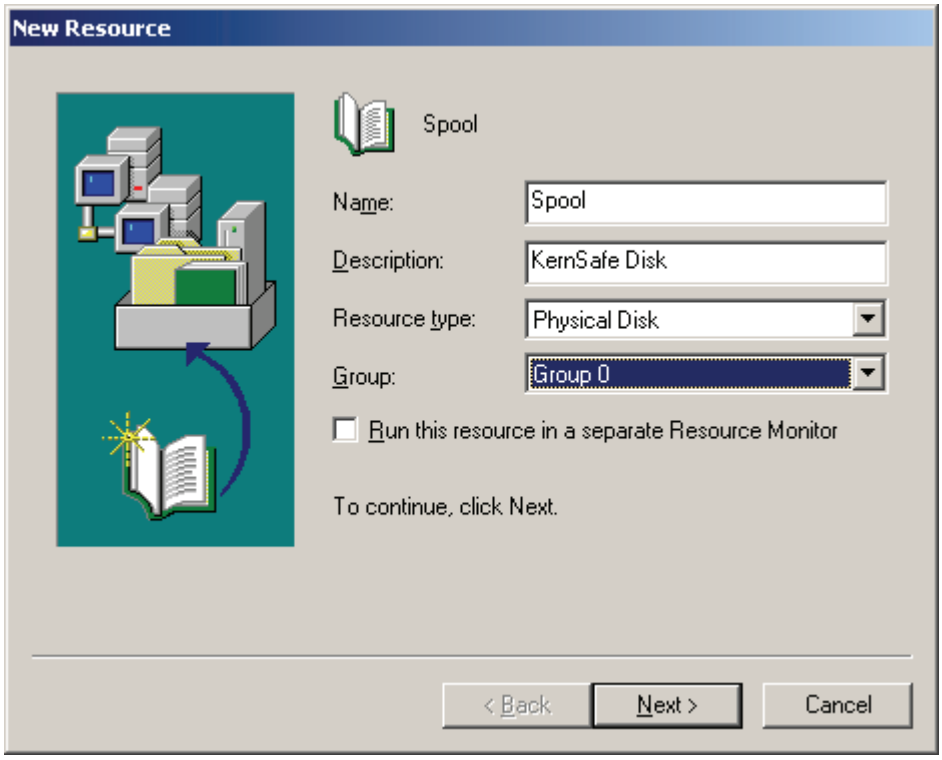


Assign S as drive letter and press the **OK** button.

Open Cluster Administrator



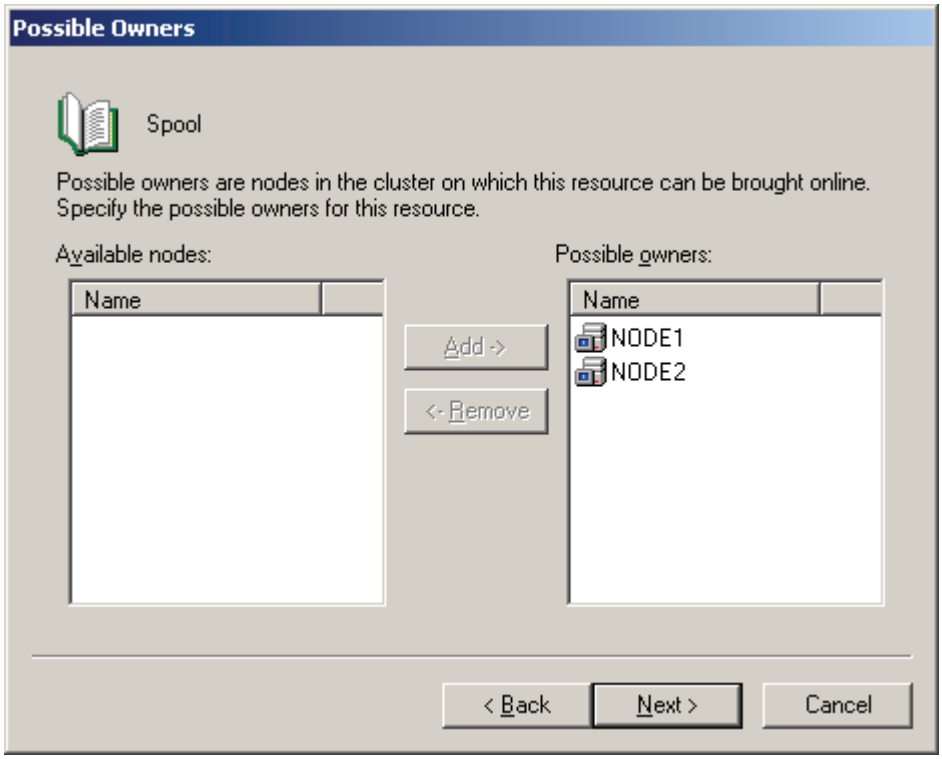
Right click on Resources, then select New - > Resource, the **New Resource dialog** is shown



Enter contents for each item.

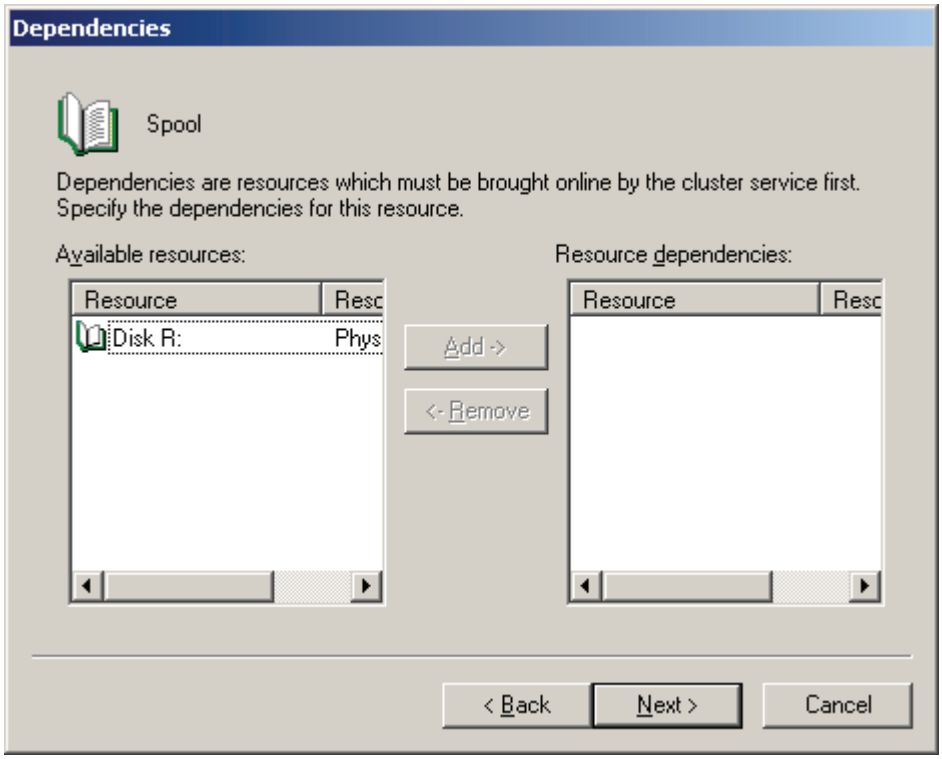
Enter Spool as Name, KernSafe Disk as Description, Physical Disk as Resource type and Group 0 as Group.

Press the **Next** button to continue.

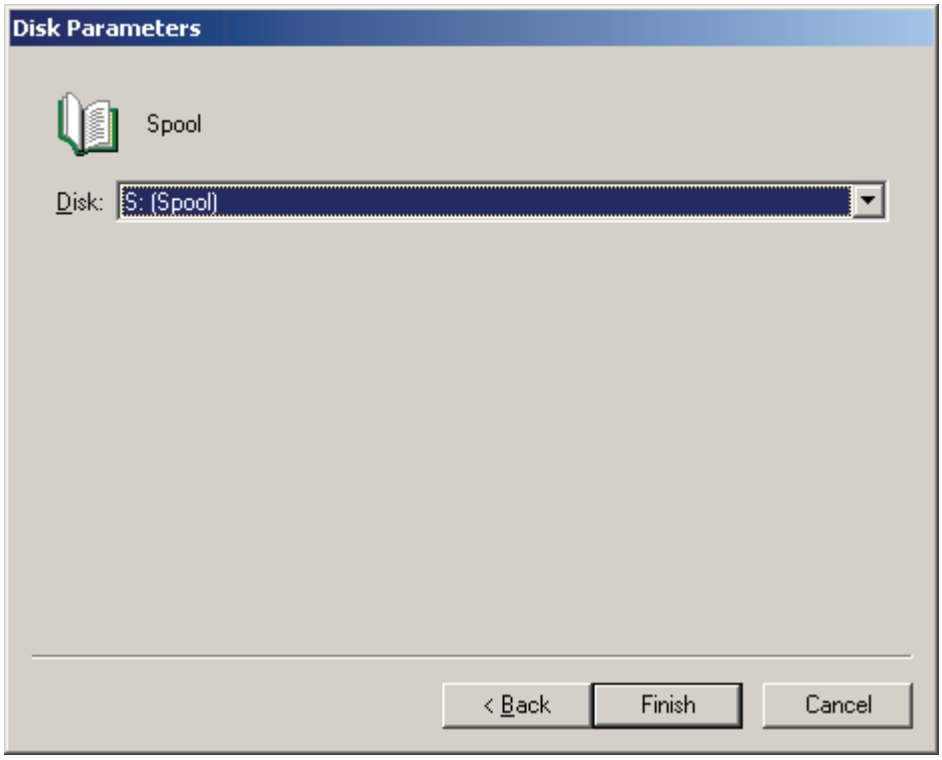


Add node1 and node2 to **Possible owners**.

Press the **Next** button to continue.



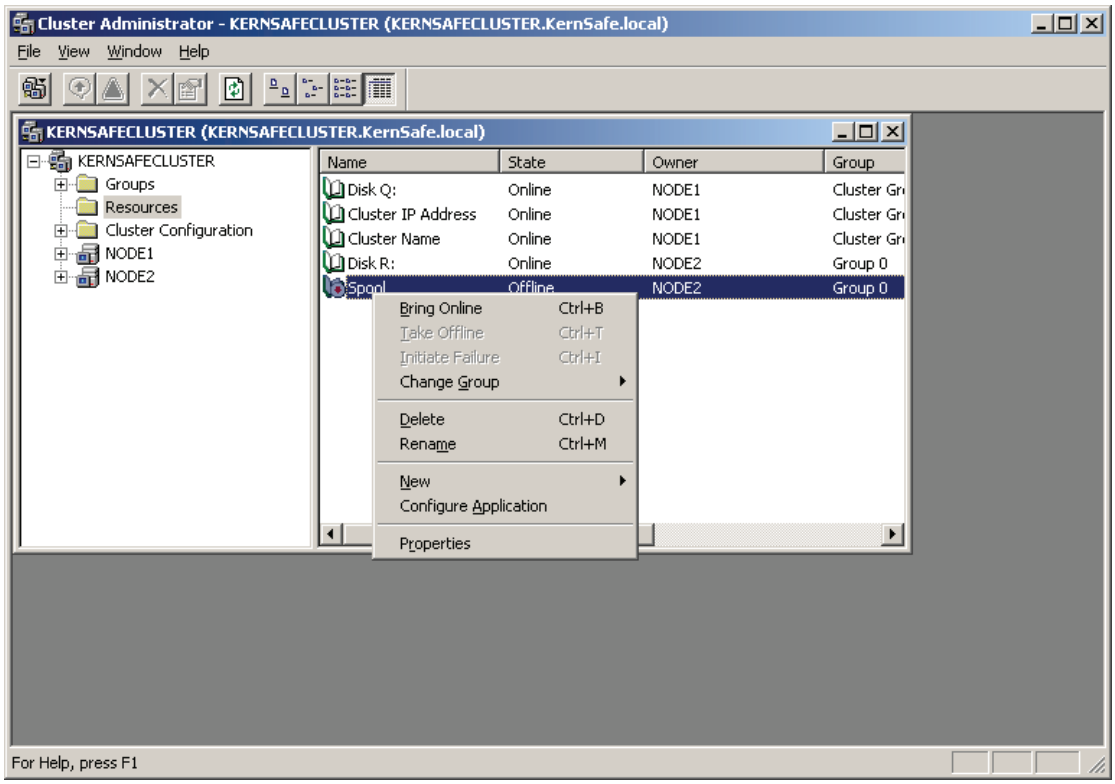
Press the **Next** button to continue.



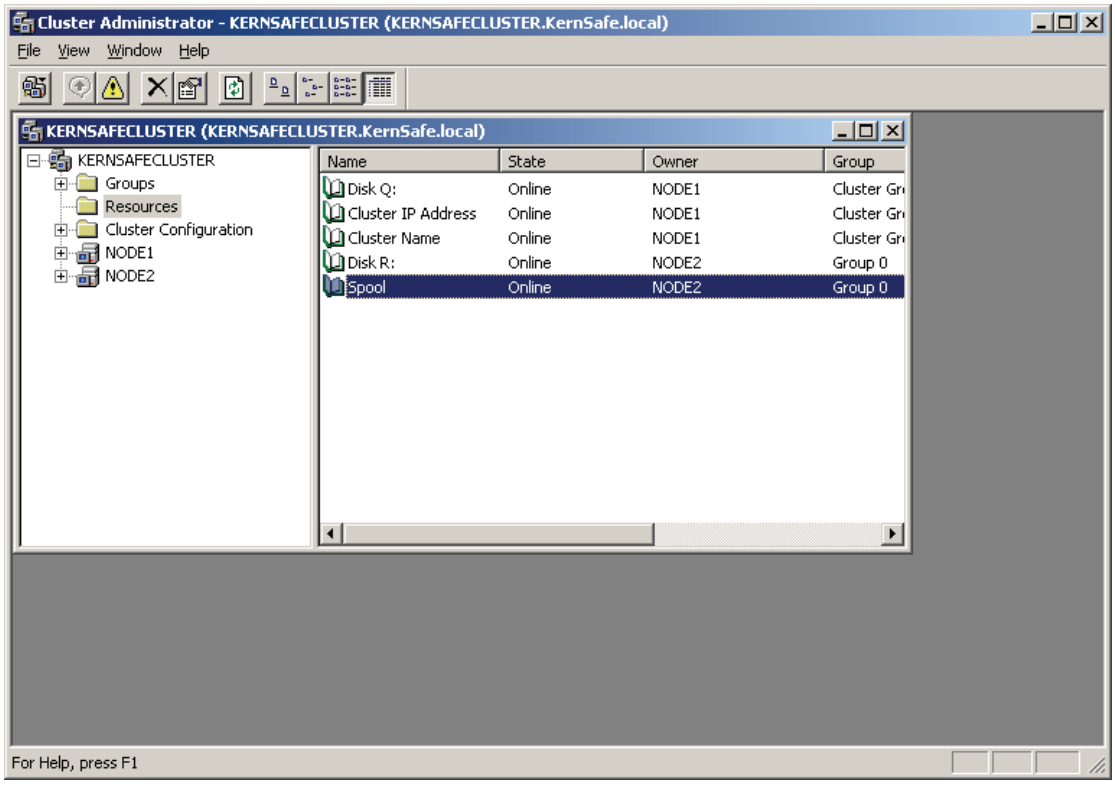
Select **S:(Spool)** and press the **Finish** button.

Press the **OK** button.

Come back to the Cluster Administrator Console



Right click on **Spool** and select **Bring Online**.



After the successful operation, the status is shown as in the figure.

Now, the cluster has been created successfully and can increase nodes and resources.