VirtualSAN: HA and Hyper-Converged iSCSI SAN for Citrix XenServer

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KernSafe Technologies, Inc.

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Overview

The Virtual SAN is native version of KernSafe iSCSI SAN cross-platform which can work in the VMWare cSphere (ESX, ESXi) and Citrix XenServer host machine. It quickly brings the benefits are:

1. Build Hyper-Converged Infrastructure or high availability visualization server with only two servers (two nodes high availability).

2. Convert VMWare vSphere and Citrix XenServer into hyper converged servers, allows it can provide both compute and storage service.

Citrix Xen Server™ is the only enterprise-class, cloud-proven virtualization platform that delivers the critical features of live migration and centralized multi-server management at no cost. Xen Server is an open and powerful server virtualization solution that radically reduces datacenter costs by transforming static and complex datacenter environments into more dynamic, easy to manage IT service delivery centers.

High availability is the implementation of technology so that if a component fails, another can take over for it. By using highly available platforms, the downtime for a system can be reduced, and, in many cases, it can be reduced to a short enough time that the users of the system do not see the failure.

Now, assume you have two servers want to run XenServer, have IP address as follows:

Name	IP Address	OS	Usage
Manage Node	Any	Windows	Management
Node1	192.168.0.231	Bare or Linux	Compute and storage
Node2	192.168.0.232	Bare or Linux	Compute and storage

Install XenServer

You need two servers which running XenServer. XenServer must first be installed on to a suitable machine that will be used to create the virtual environment. For how to obtain or install Citrix Xen Server, please contact the Citrix supplier.

Install Virtual Native SAN

Logon to XenServer nodes to console by local server machine or ssh:

#ssh root@192.168.0.231

Download KernSafe Virtual Native SAN:

#wget http://www.kernsafe.com/download/virtual-native-san.5.30.tar.gz

Note the version number can be changed if new version available.

#tar -zxvf virtual-native-san.5.30.tar.gz

Enter the VirtualSAN directory:

```
[root@localhost package]# ls
asyncplugin.so      install.sh         partitionplugin.so  target_common.so
autosnapplugin.so   iscsisvc.so        smtpplugin.so       userplugin.so
cdpplugin.so        logplugin.so       snapshot.so         Users.db
failoverplugin.so   memdiskplugin.so   supersan            vhdplugin.so
imageplugin.so      mirrorplugin.so    supersand           ximageplugin.so
[root@localhost package]# _
```

Install it

#./install

```
[root@localhost package]# ./install.sh
Stoping KernSafe SuperSAN OK
Starting KernSafe SuperSAN OK
[root@localhost package]# _
```

Now the VirtualSAN has been installed to XenServer host machine, redo the work on another node.

Configure firewall

You need add TCP port 3260 and 3261 to be opened in firewall, or just disable if you are running in testing mode:

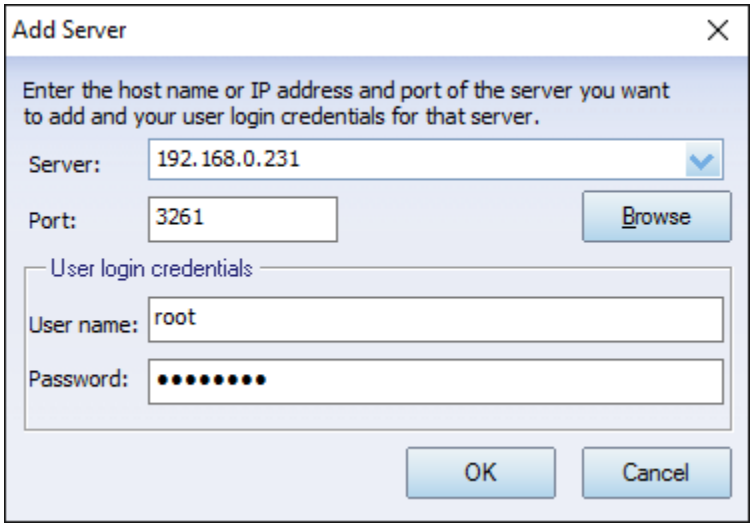
#service iptables stop

Configuring on Management Node

The same as XenServer, VirtualSAN does also need Windows based machine as management node, in Windows:

Launch **KernSafe iSCSI SAN Management Console.**

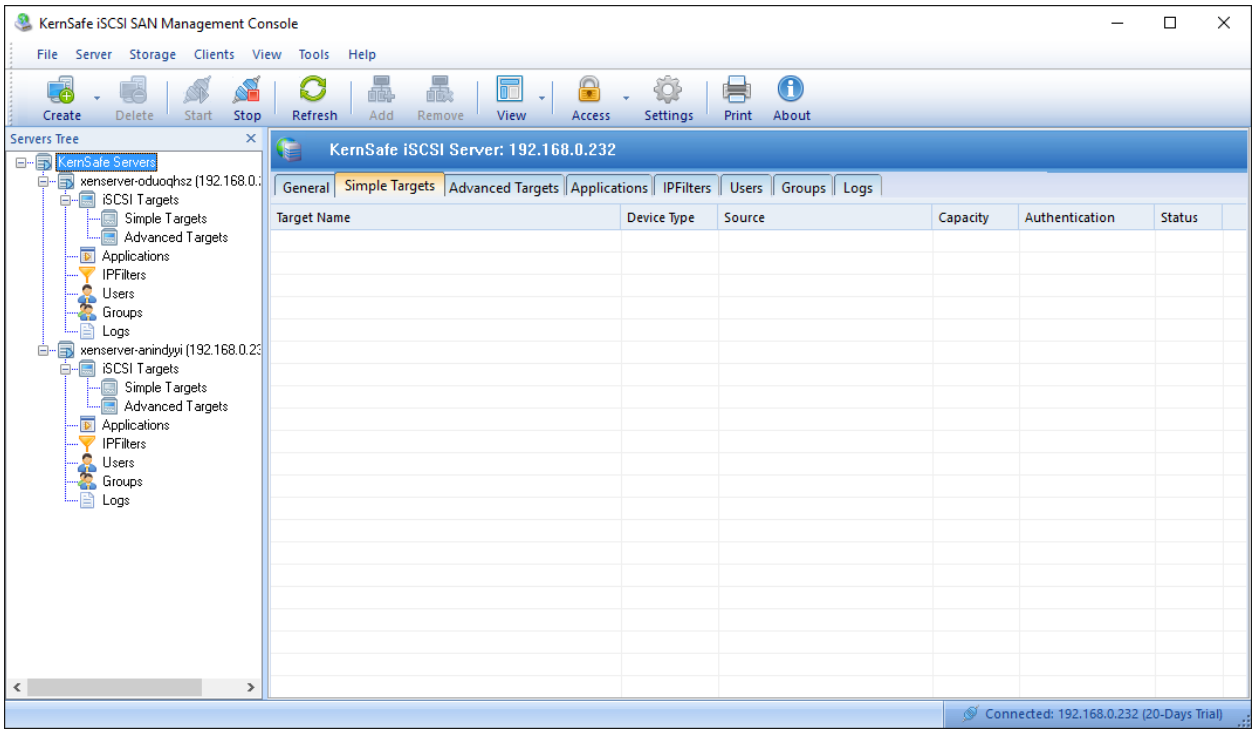
Click Server->Add another server menu item, the Add Server dialog shows.



Fulfill the dialog with the credential of remote KernSafe VirtualSAN server, then click the OK button to add.

Do the same way with the second server.

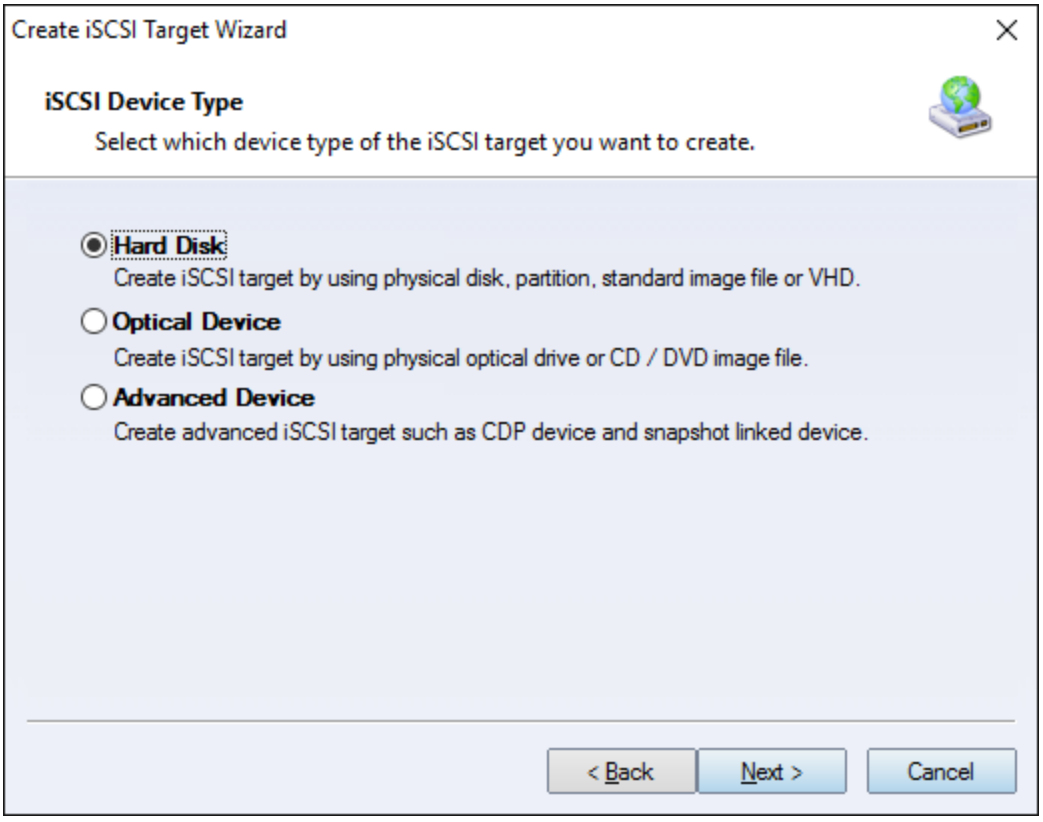
Note: if you are running **trial** mode, you need click the “Start” button to manually start iSCSI service.



Create Target on Node1

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

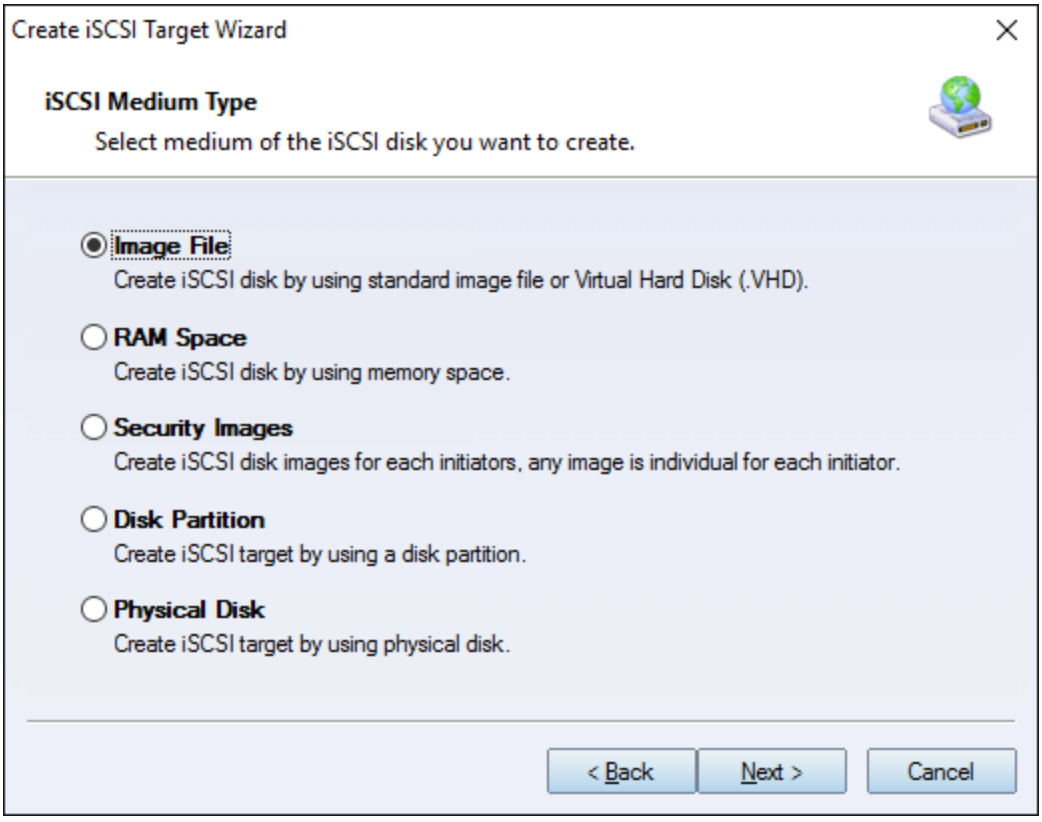
Select a device type



Choose **Hard Disk**.

Press the **Next** button to continue.

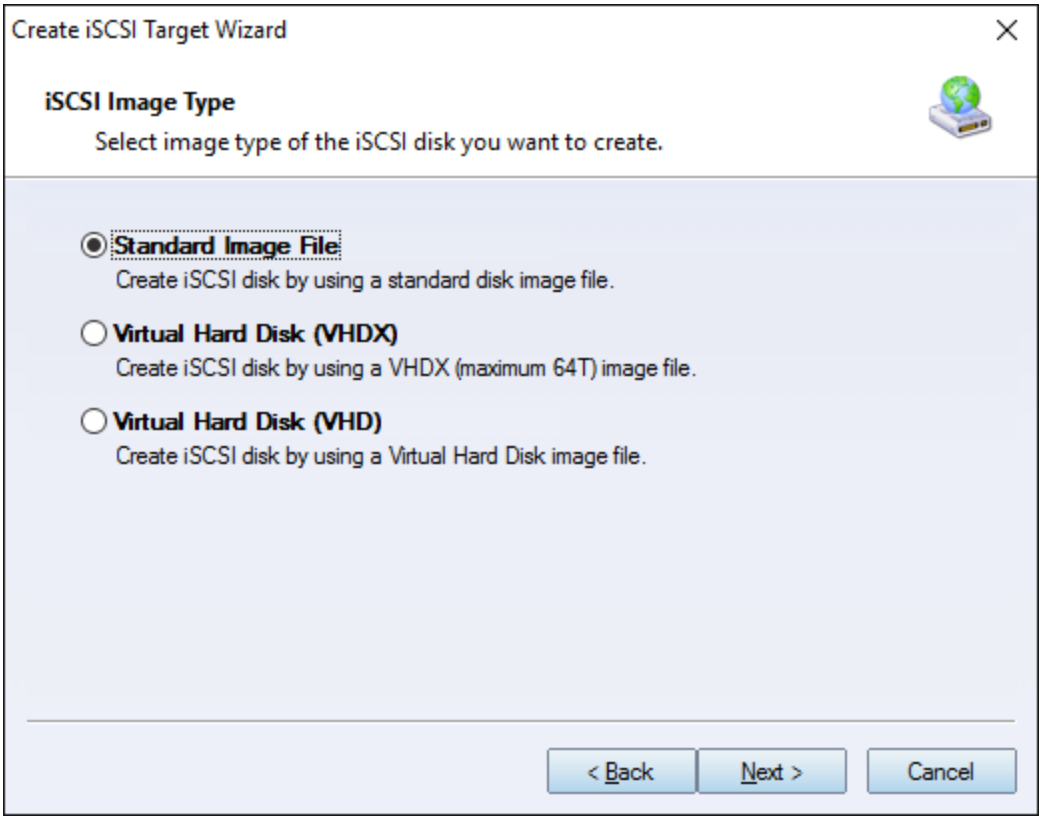
Select a medium type.



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

Then press **Next** button to continue.

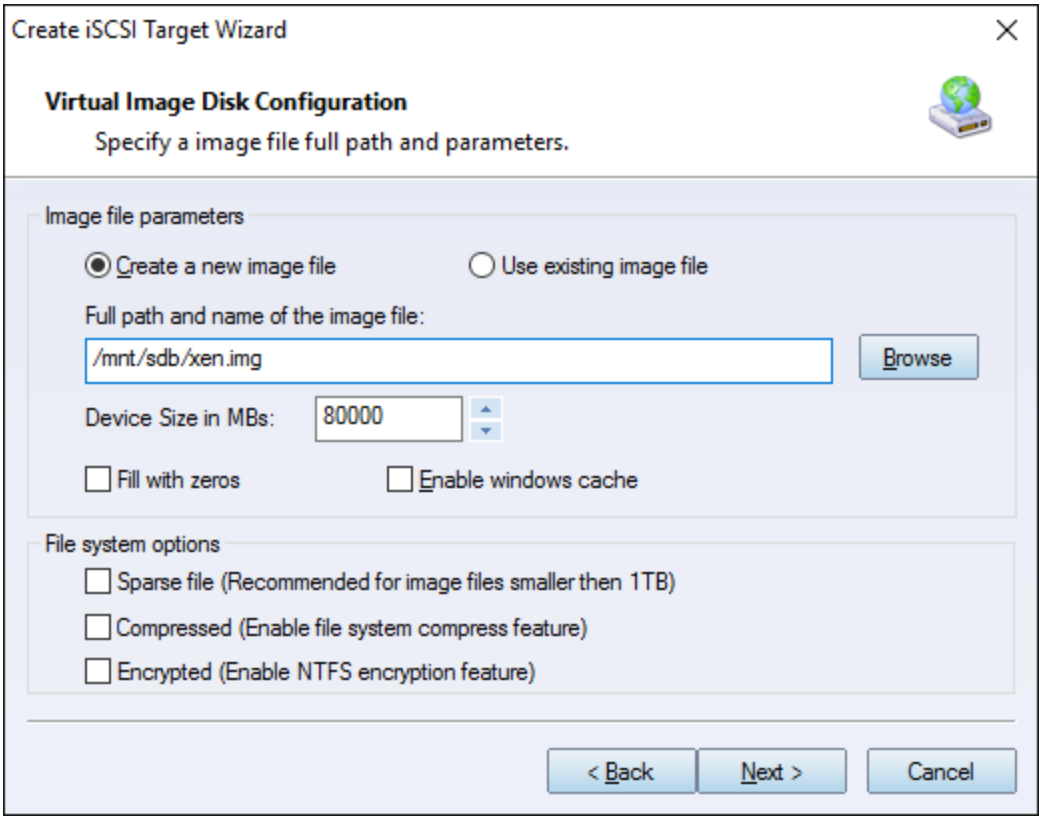
Select an Image type.



Choose **Standard Image File.**

Press the **Next** button to continue.

Specify image file path and size.

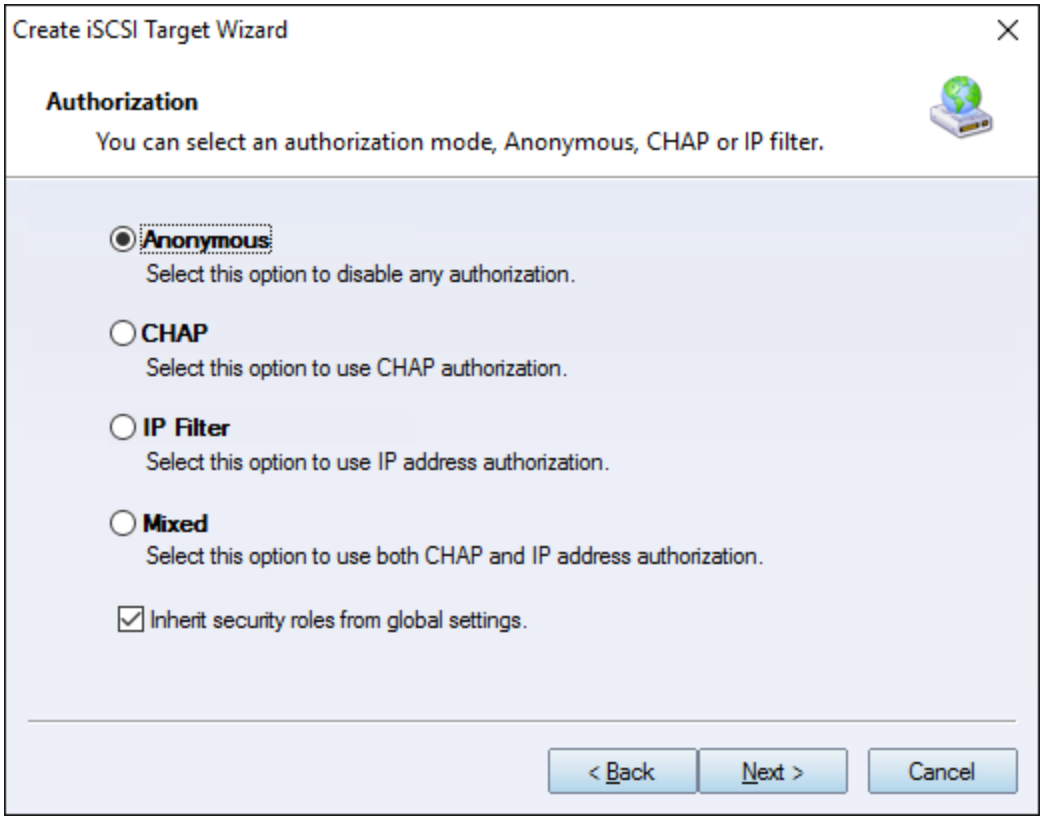


Specify the image file.

Specify the device size.

Press the **Next** button to continue.

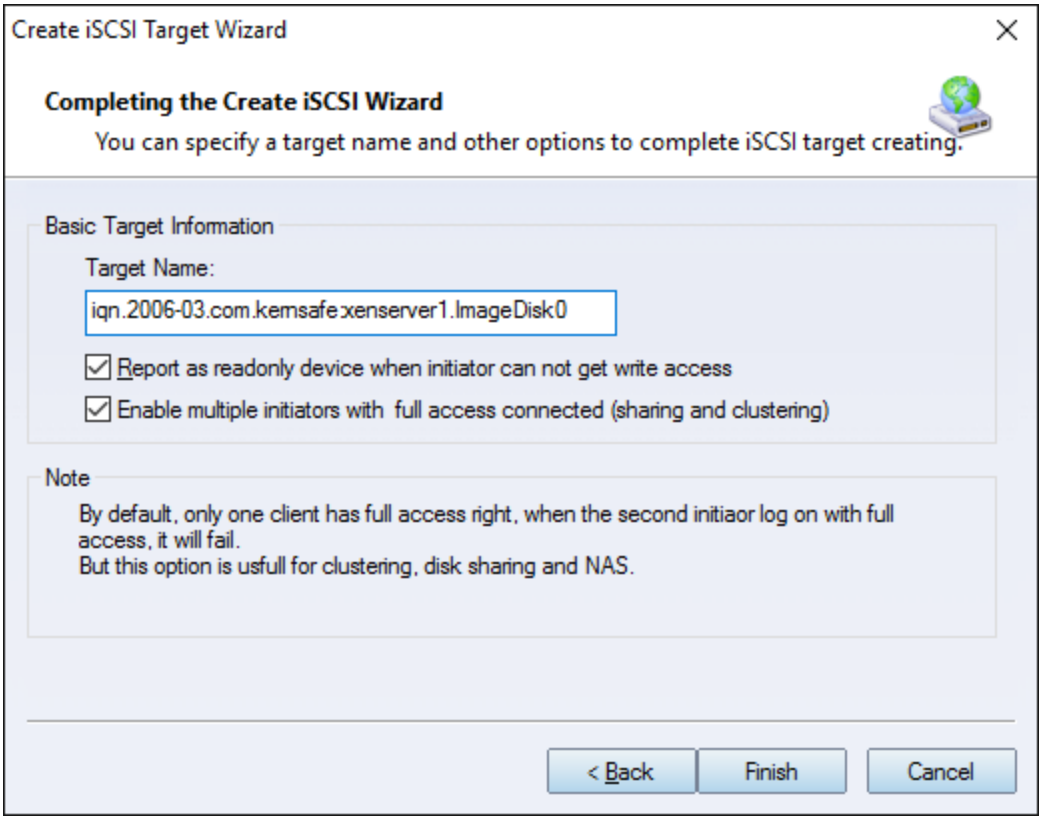
Set authorization mode.



Choose **Anonymous** authorization.

Press the **Next** button to continue.

Finish creating iSCSI Target



Type a target name in the Target Name field, we use **iqn.2006-03.com.kernsafe:xenserver1.ImageDisk0** as an example.

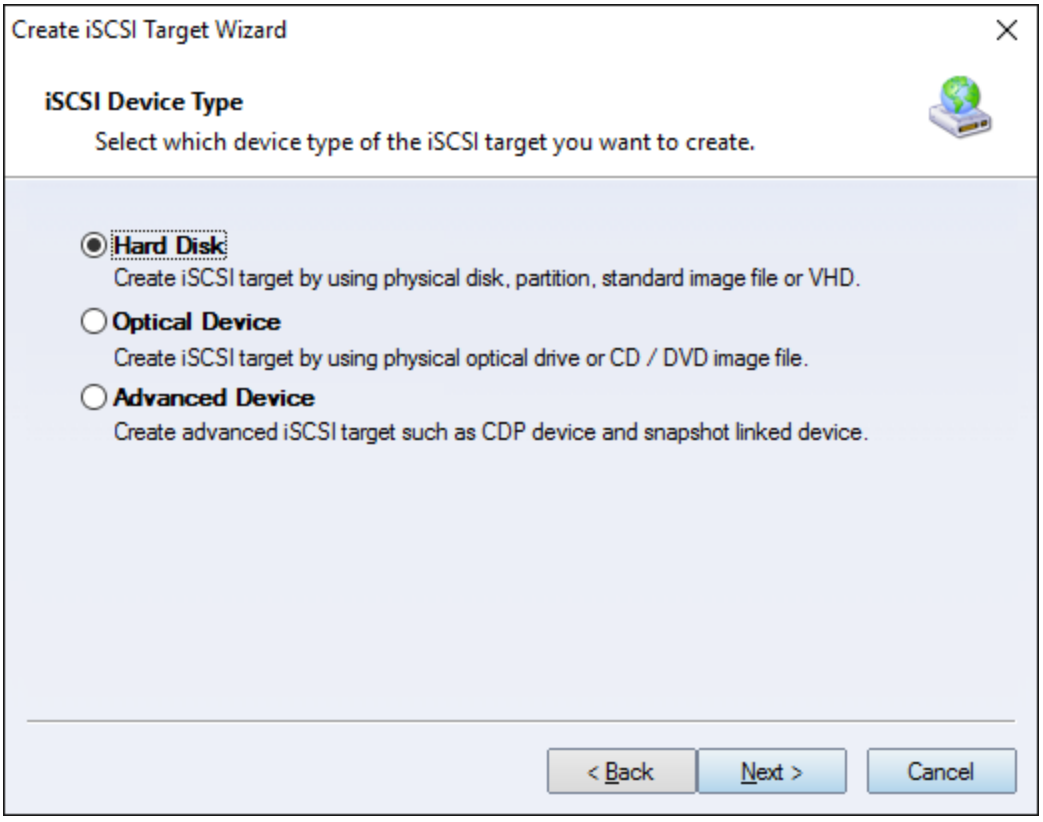
Check the **Enable multiple initiators with full access connected (sharing and clustering)** check box.

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

Create Target on Node2

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

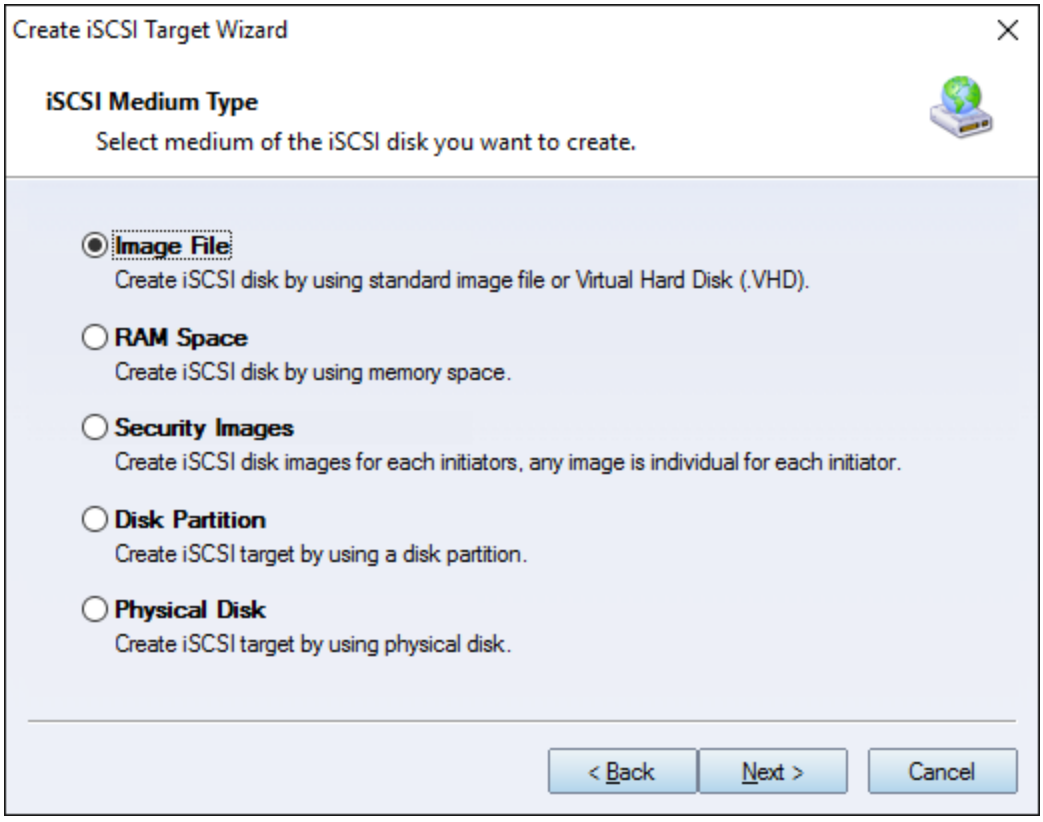
Select a device type



Choose **Hard Disk**.

Press the **Next** button to continue.

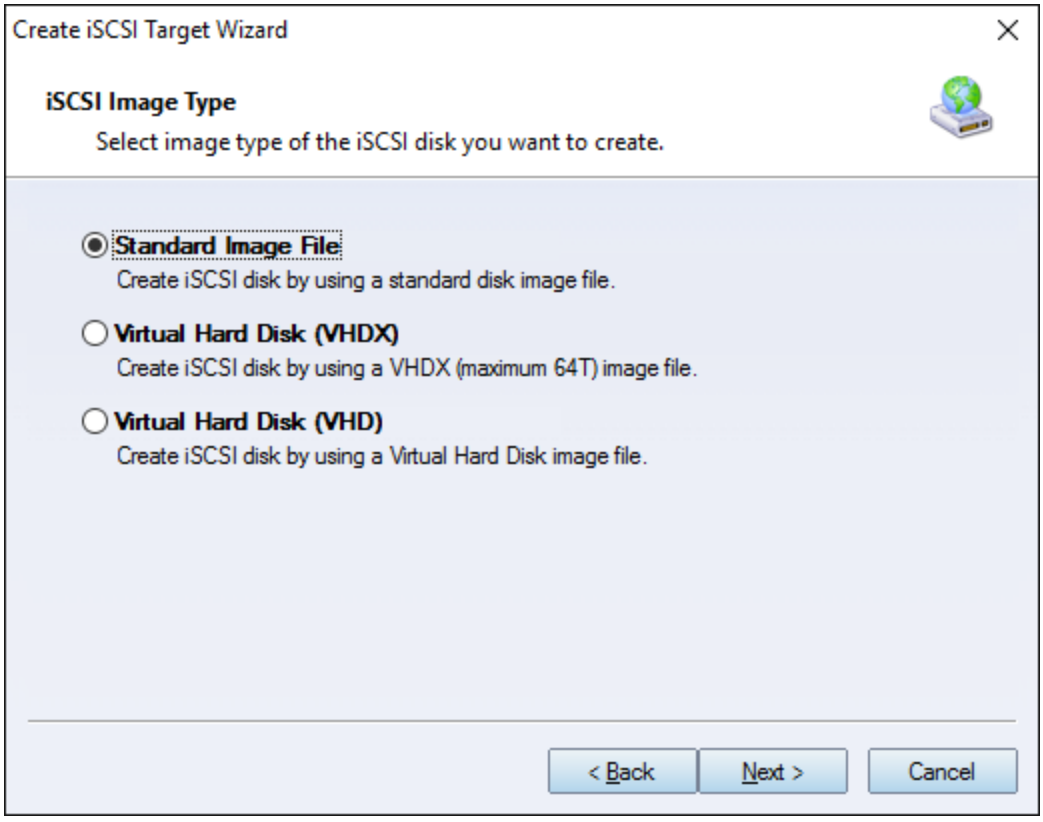
Select a medium type.



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

Then press **Next** button to continue.

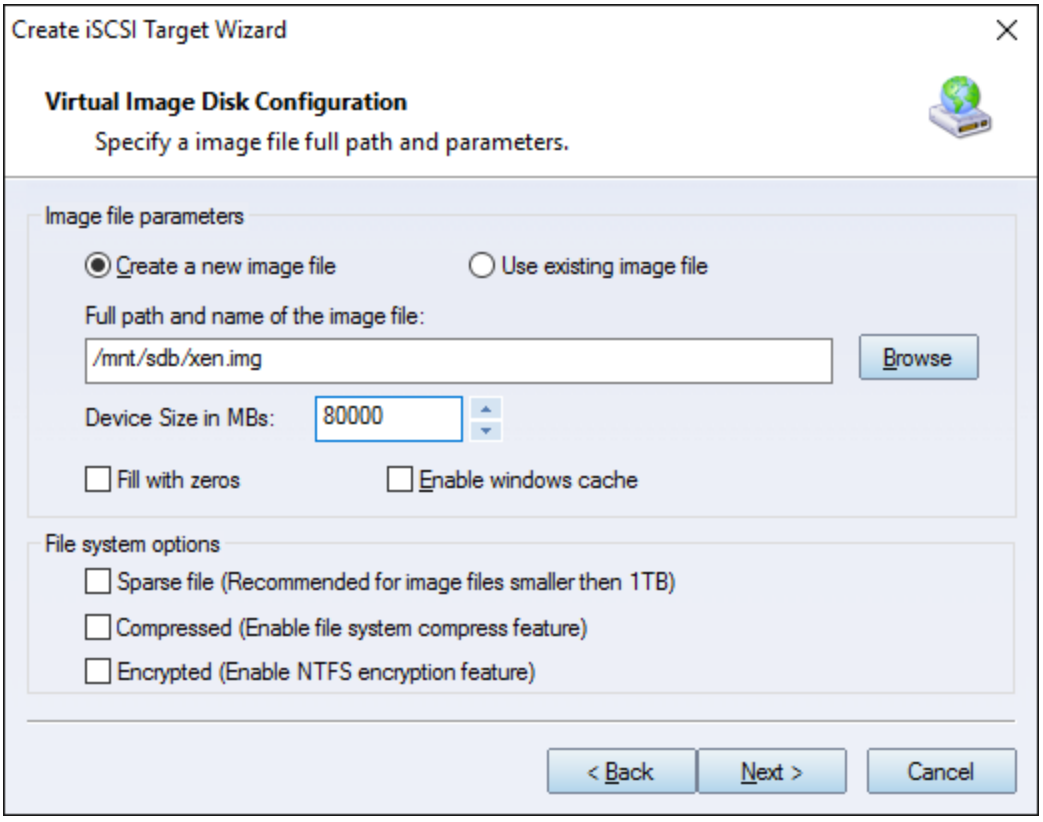
Select an Image type.



Choose **Standard Image File.**

Press the **Next** button to continue.

Specify image file path and size.

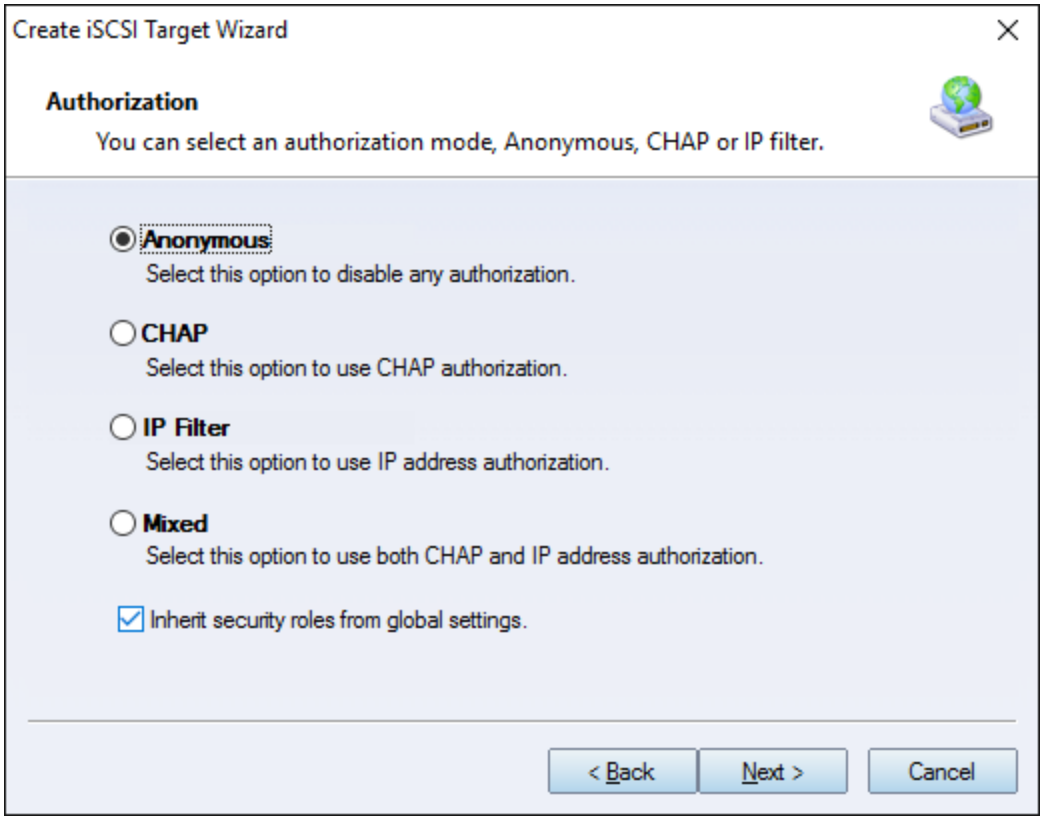


Specify the image file.

Specify the device size.

Press the **Next** button to continue.

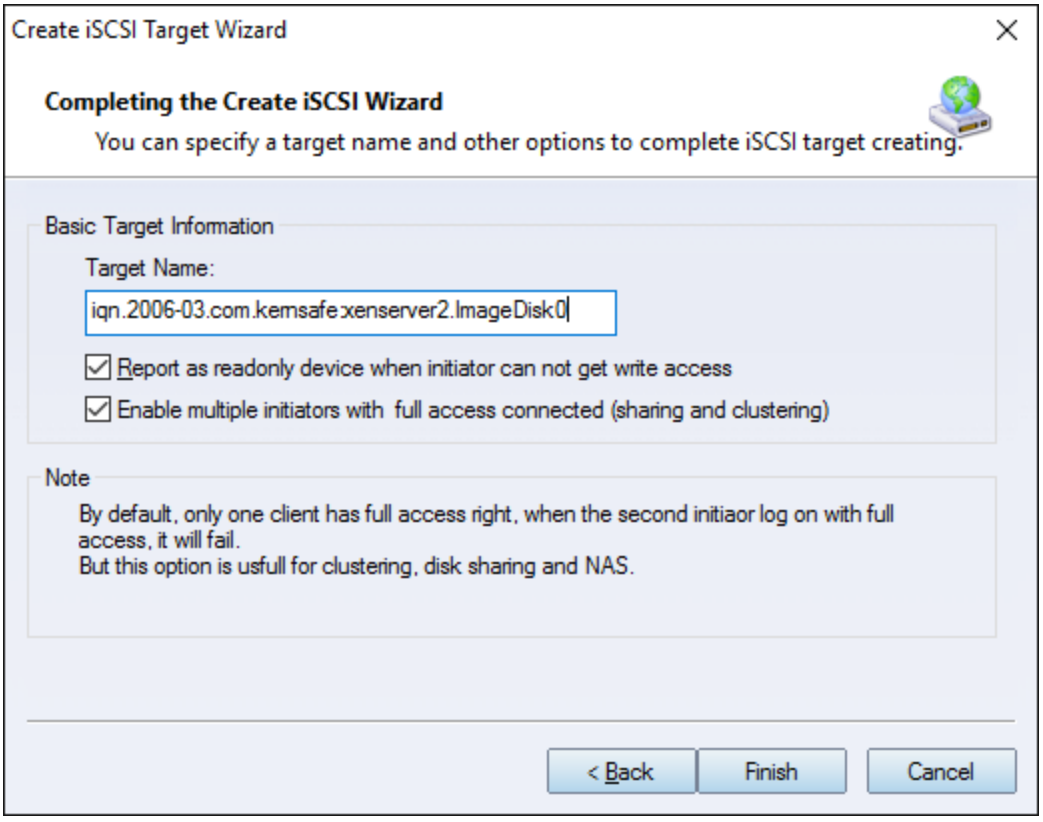
Set authorization mode.



Choose **Anonymous** Authorization.

Press the **Next** button to continue.

Finish creating iSCSI Target



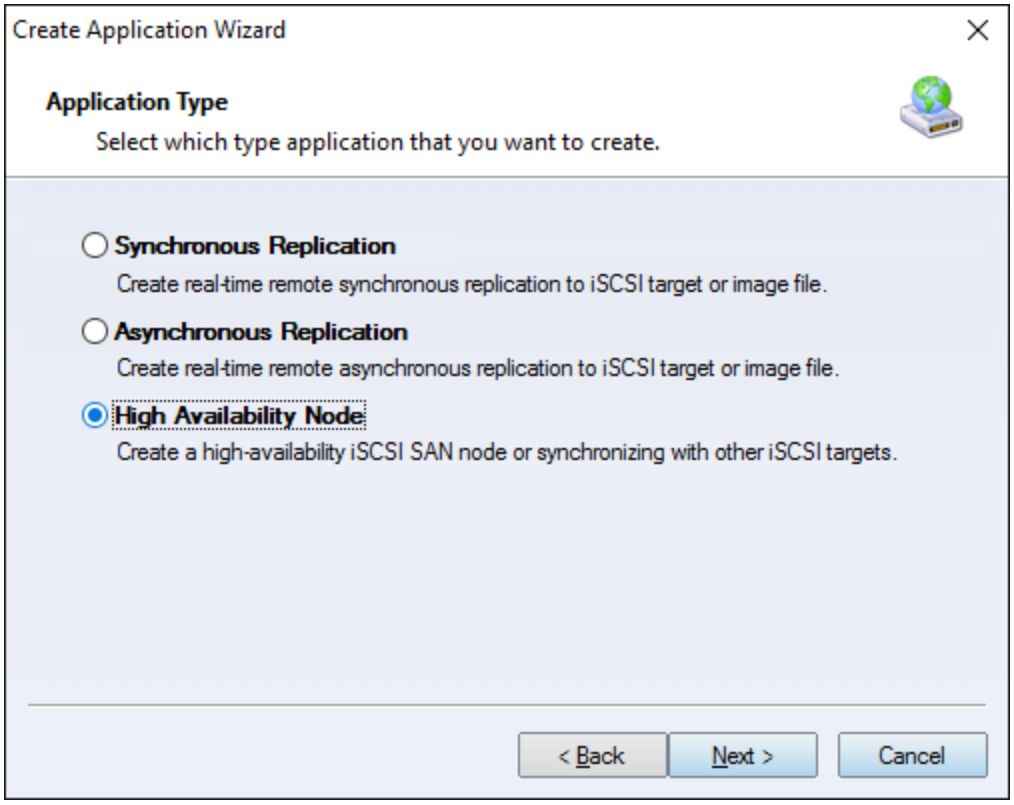
Type a target name in the Target Name field.

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

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

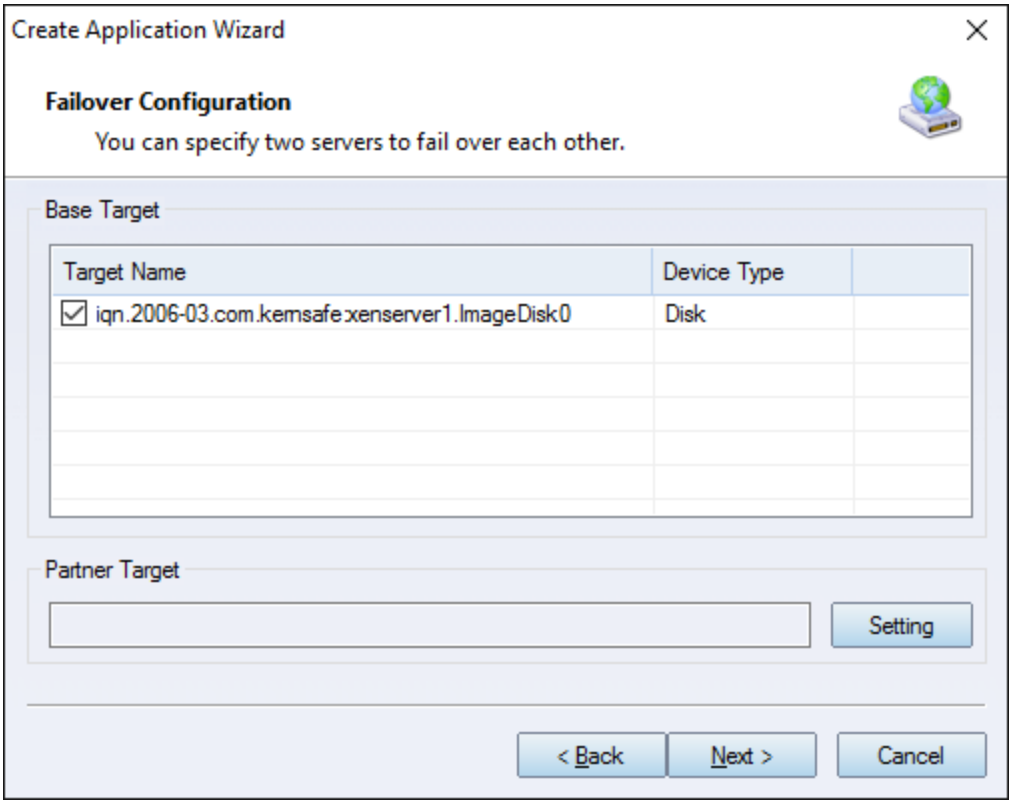
Creating Application on Node1

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

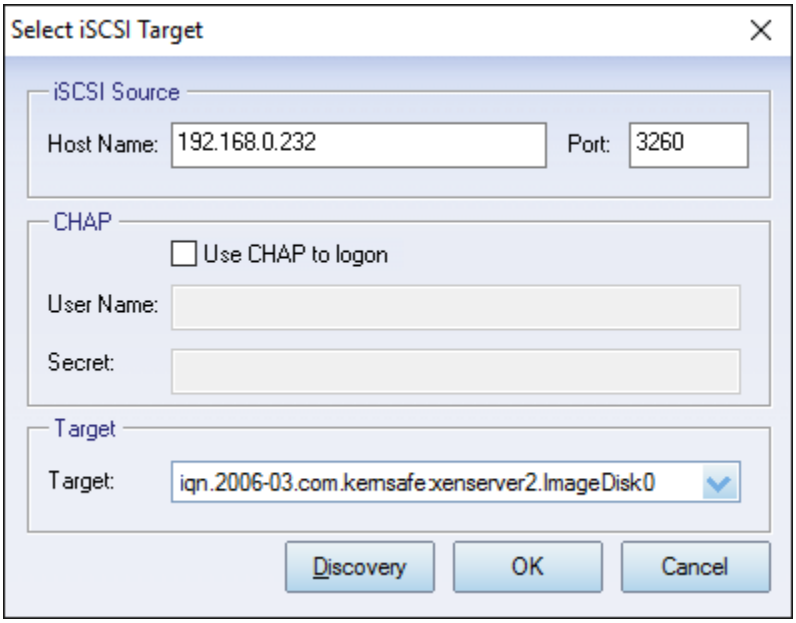


Choose **High Availability Node**.

Then press **Next** to continue.



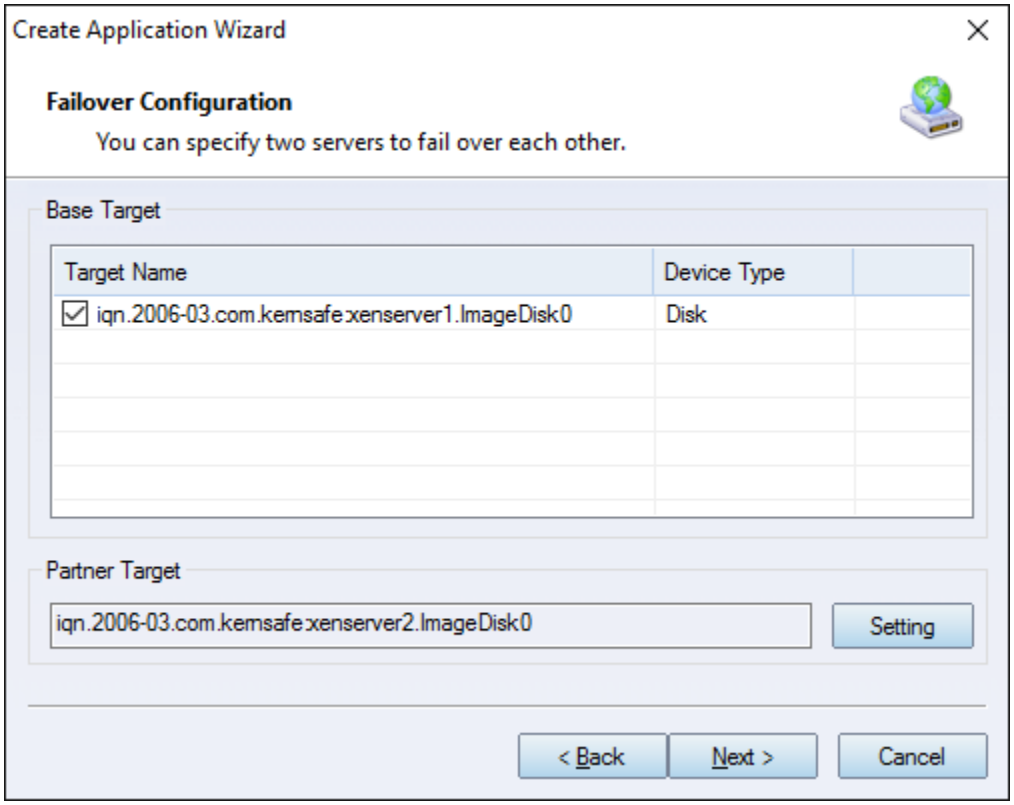
Check the **iqn…xenserver1.ImageDisk0** storage and click **Edit** to find the mirror target.



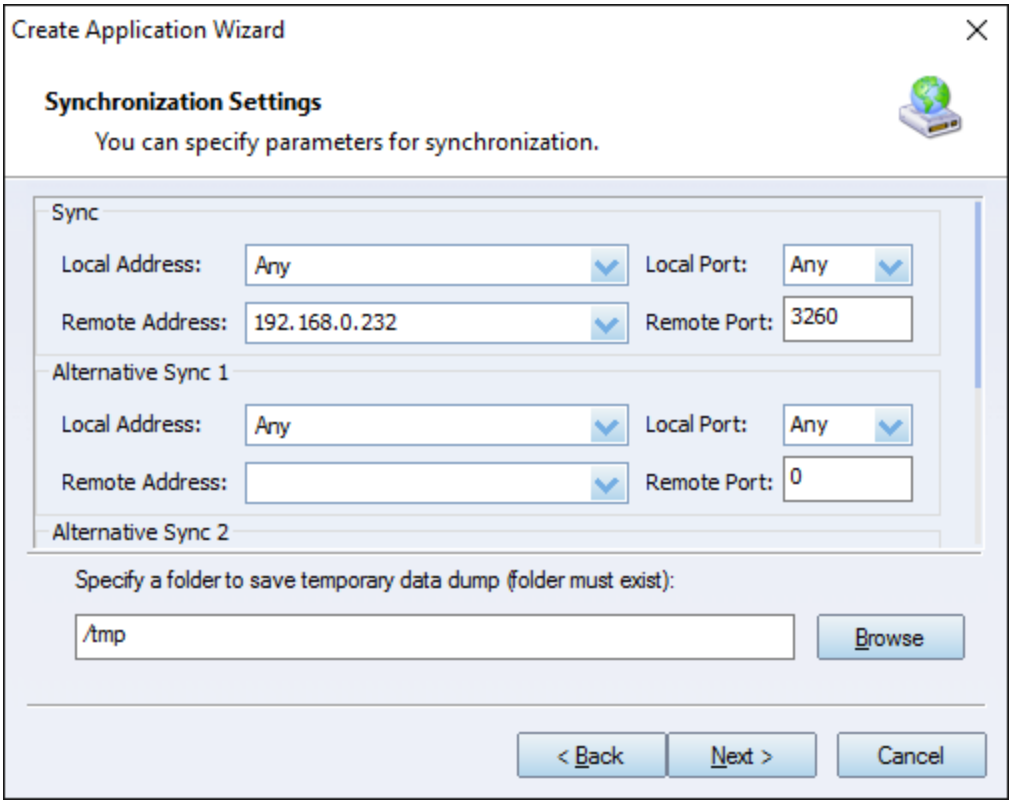
Input the IP and port of server2 in **iSCSI Source** tab, and then click **Discovery** on the bottom of the window to find the mirror target, choose the **iqn…xenserver2.ImageDisk0** in the down-list.

Press **OK** button to continue.

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



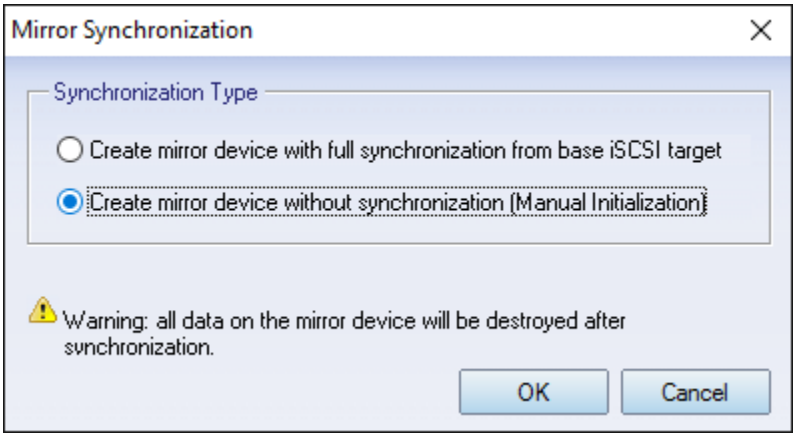
The mirror target will be added to the window, then click **Next** button to continue.



Specify local interface, port for Sybc interface and Heartbeat interface, if you have two NIC for each server ,you can sepcify different address-pair for Sync interface and Heartbeat interface, if you have only one NIC for synchronous, you can use same address for Sync and Heartbeat.

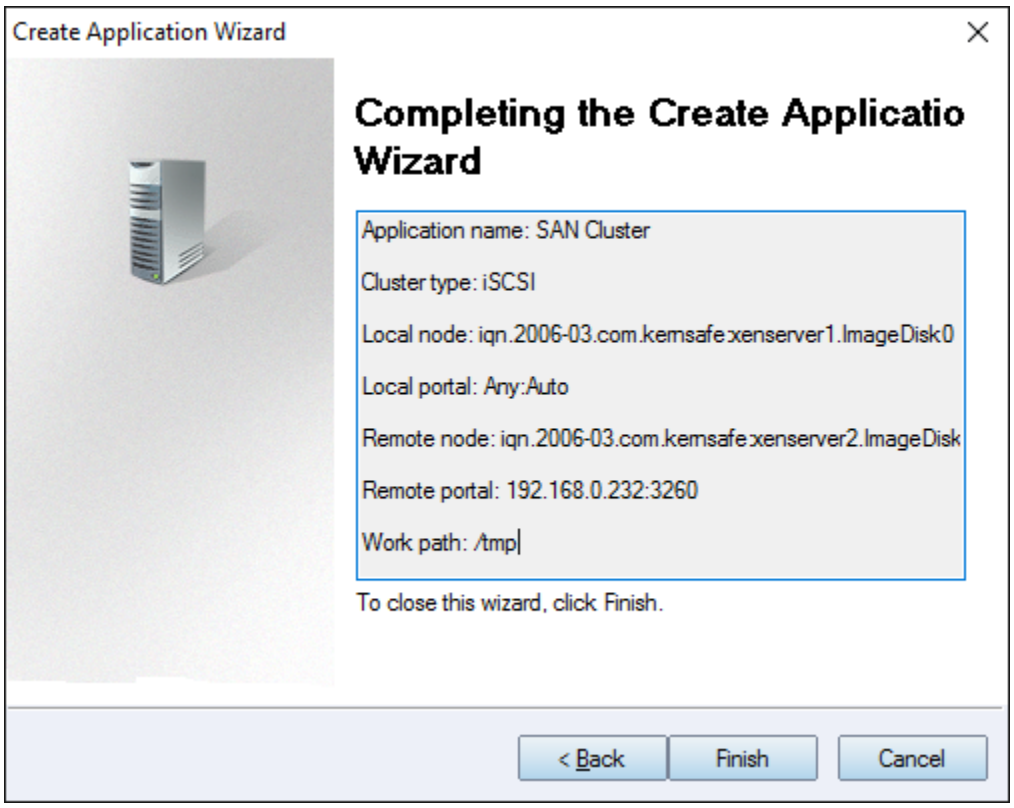
Specify the portal and port.

Press **Next** 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**.

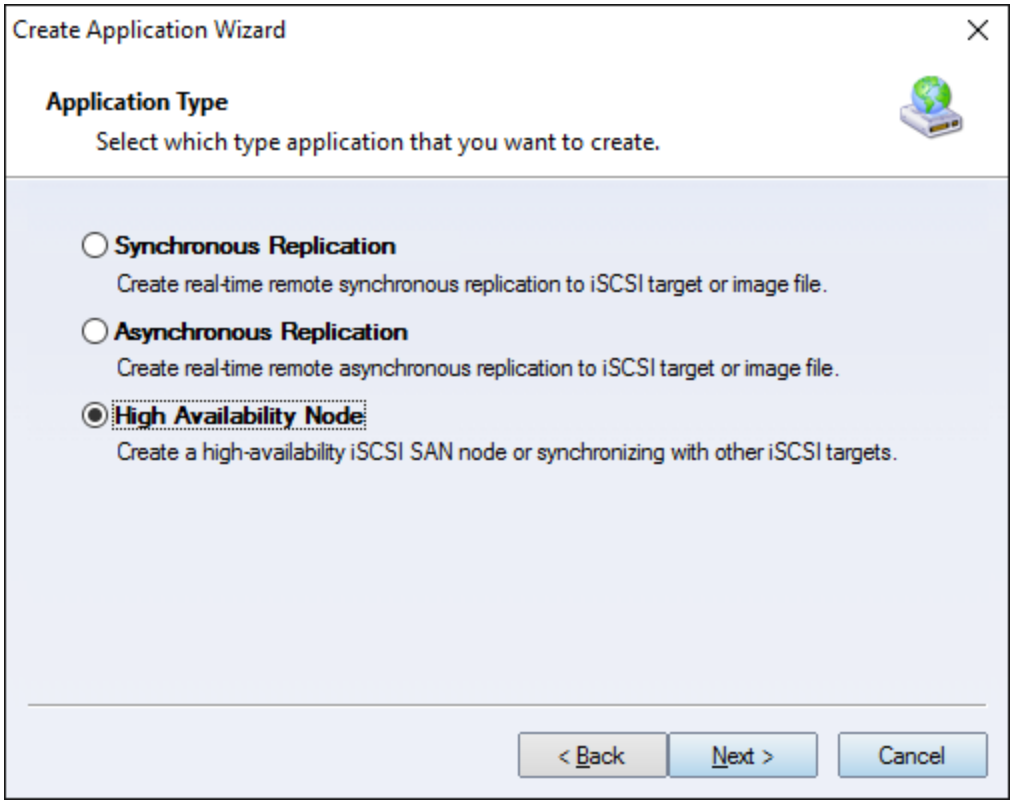
Press **OK** button to continue.



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

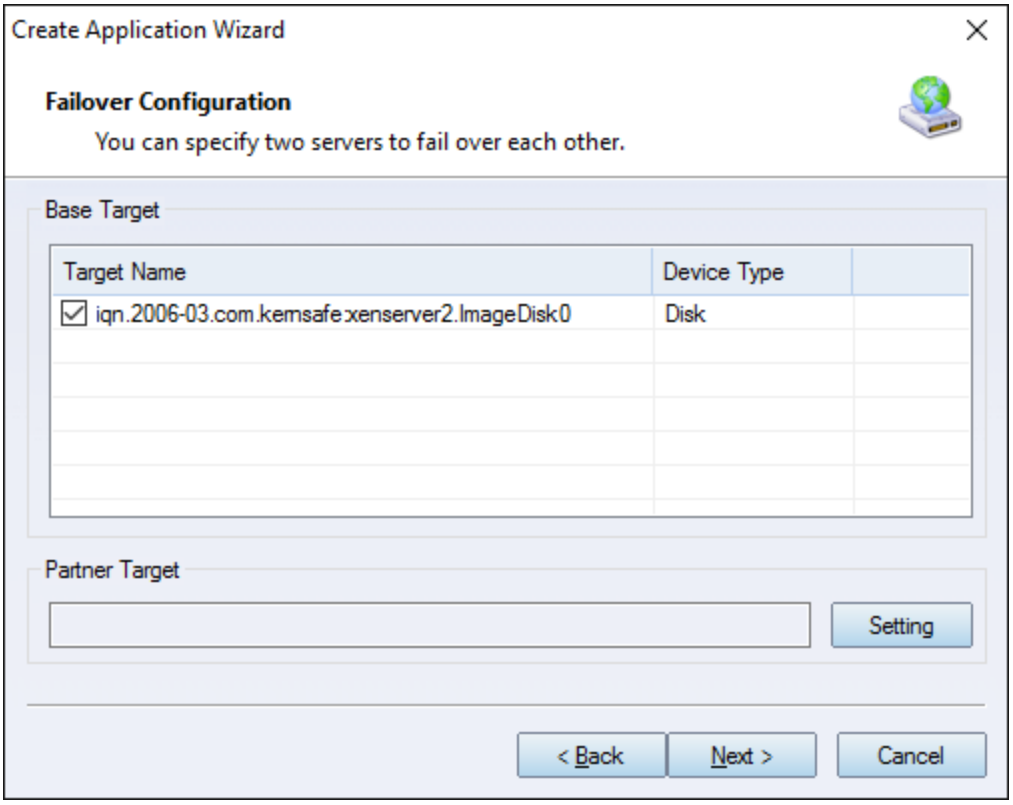
Creating Application on Node2

On server node2, right click **Applications** on the left tree of the main interface, choose **Create Application** on the pop-up menu, the **Create Application Wizard** widow will be shown.

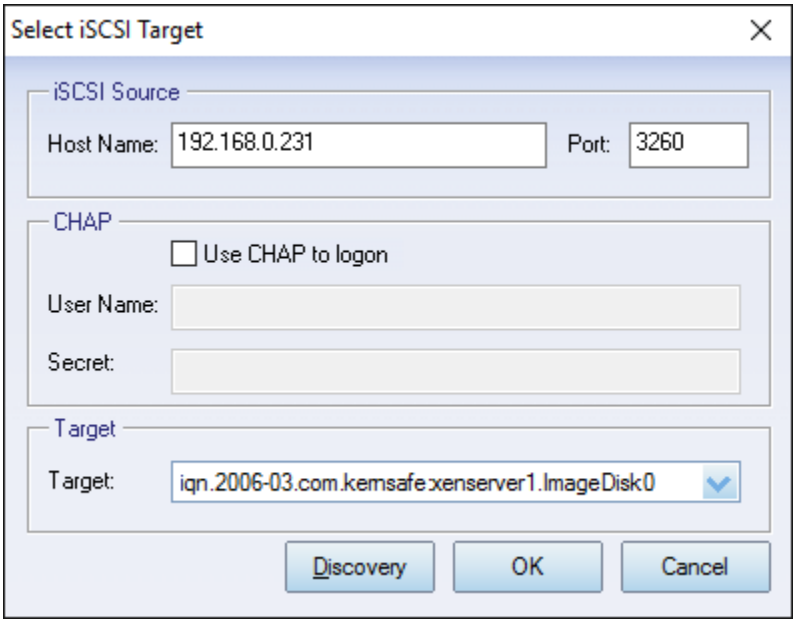


Choose **High Availability Node**.

Then press **Next** to continue.



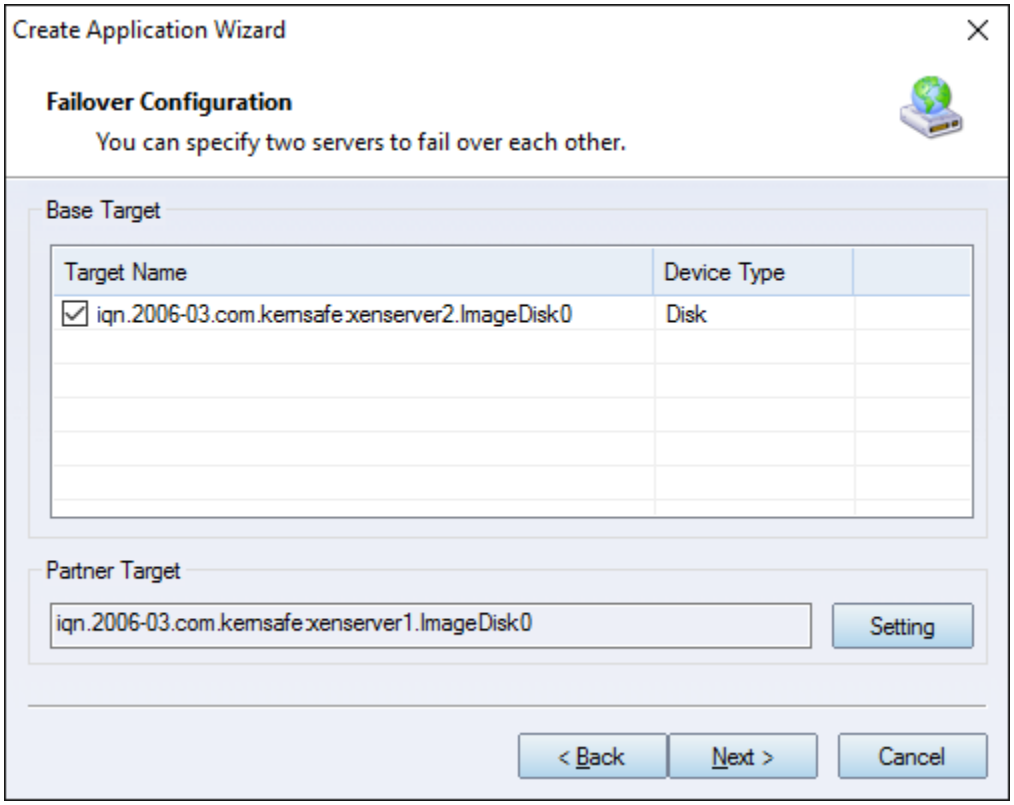
Check the **iqn…xenserver2.ImageDisk0** storage and click **Setting** to find the partner target.



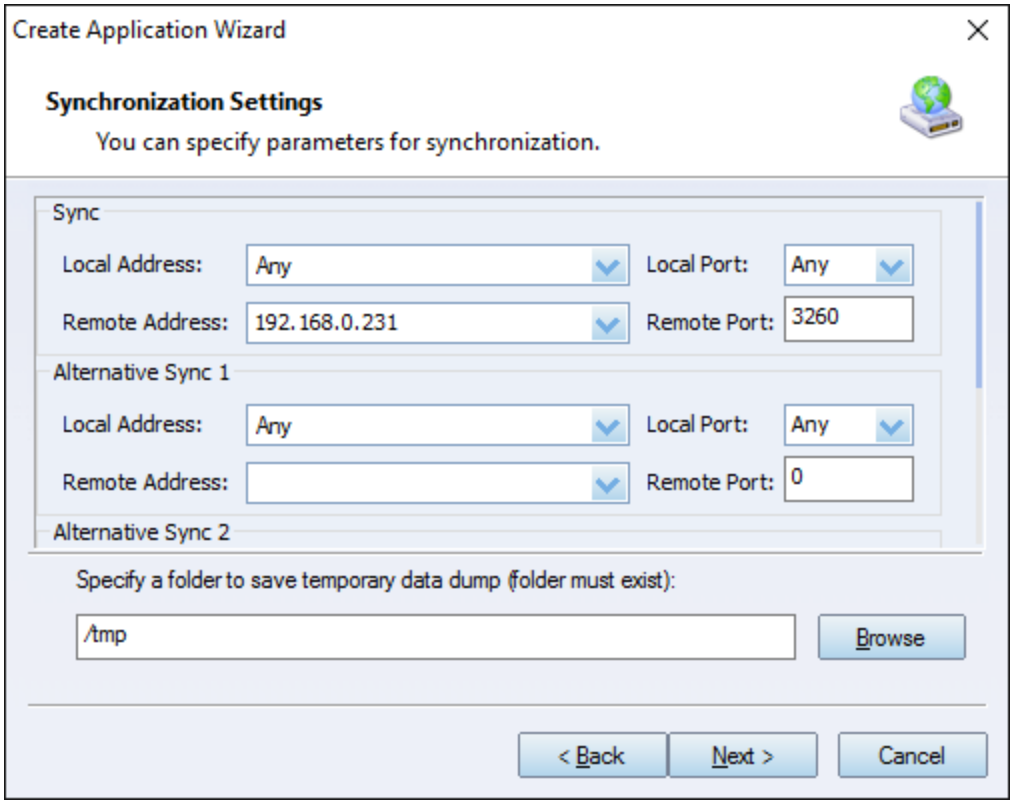
Input the IP and port of server1 in **iSCSI Source** tab, and then click **Discovery** on the bottom of the window to find the mirror target, choose the **iqn…xenserver2.ImageDisk0** in the down-list.

Press **OK** button to continue.

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

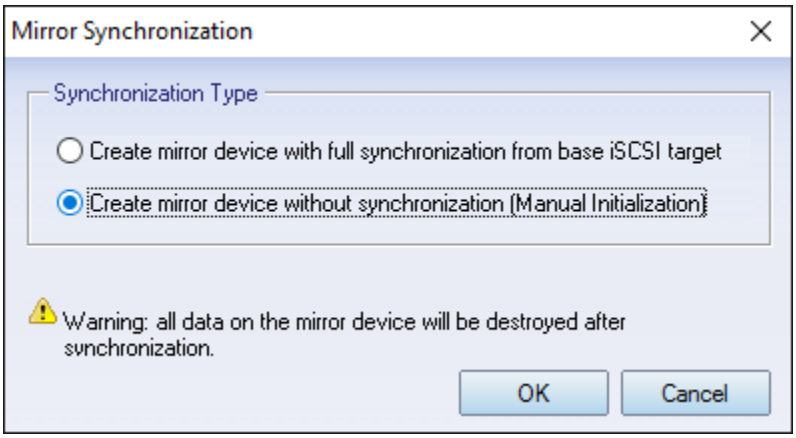


The mirror target will be added to the window, then click **Next** button to continue.



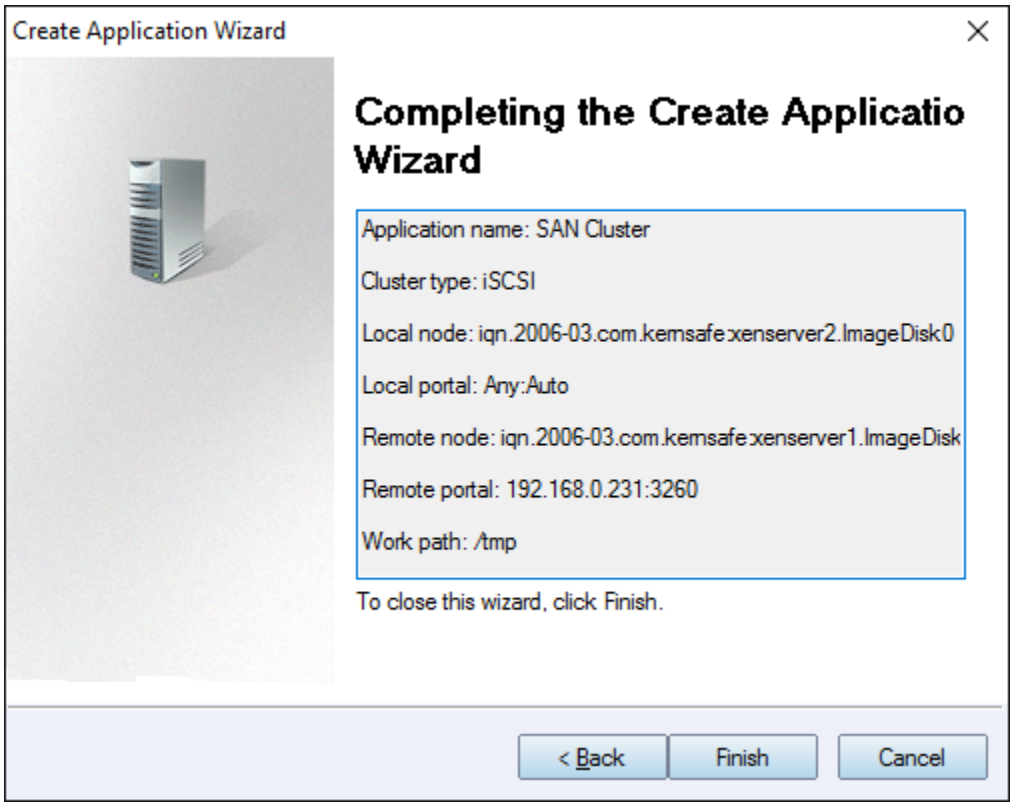
Specify Sync and Heartbeat interface.

Press the 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.

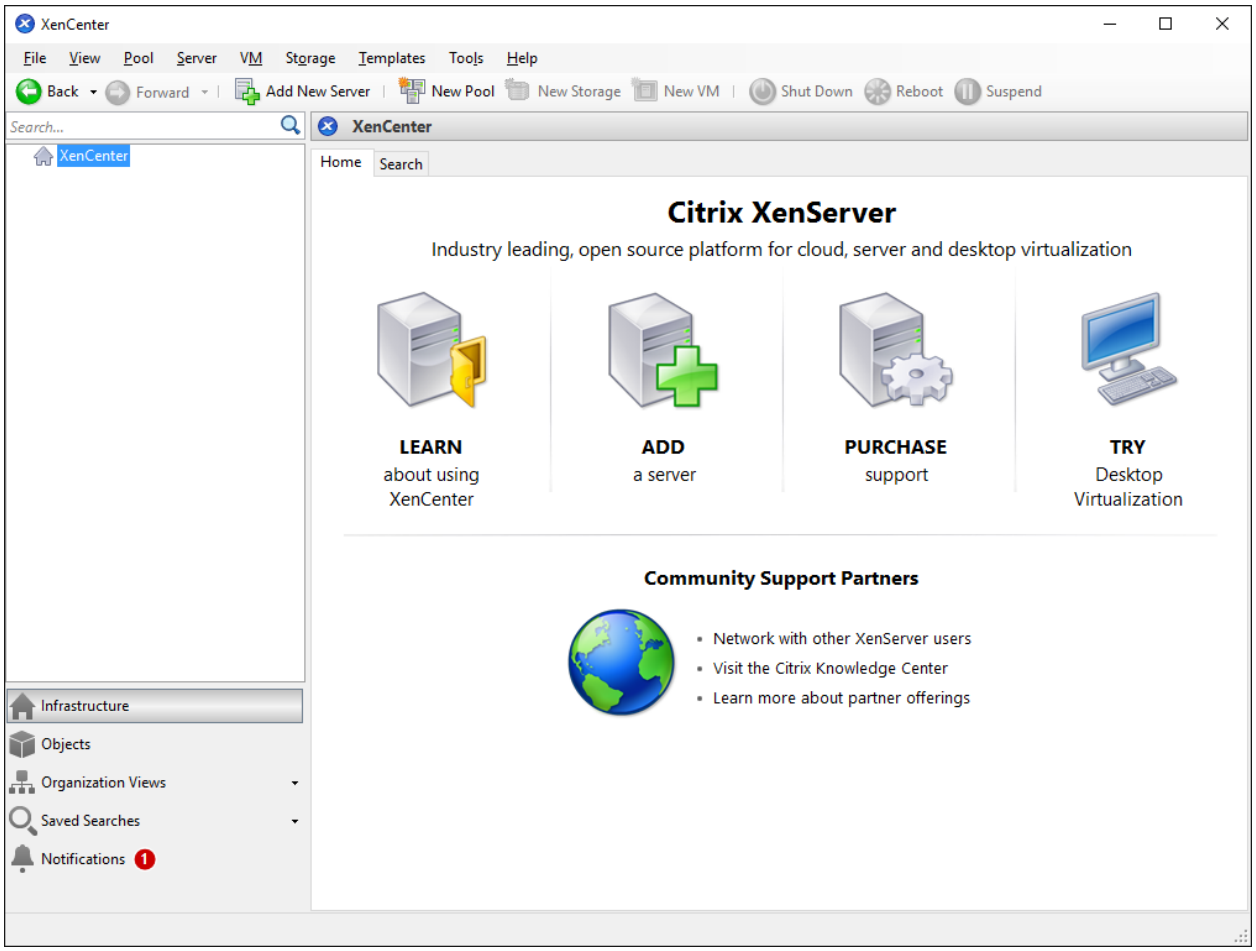


Click **Finish** button to complete the application creation.

Configuring XenServer

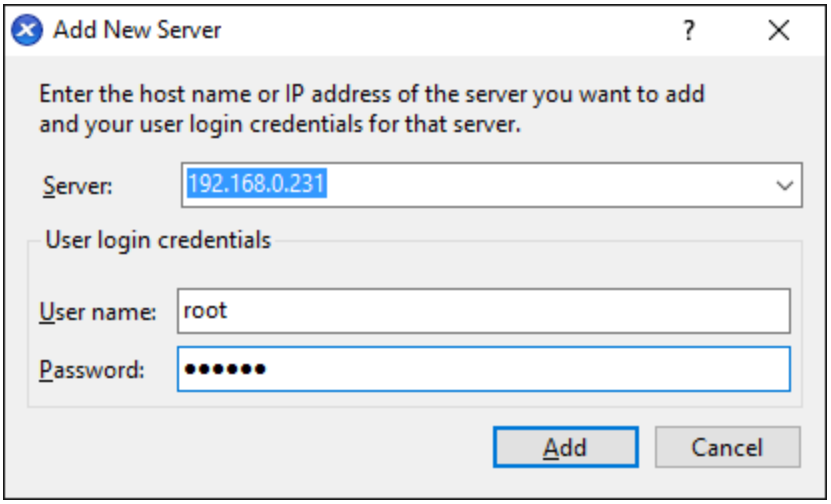
Log On to XenServer

Open XenCenter.



Click **Add New Server** in the tool bar.

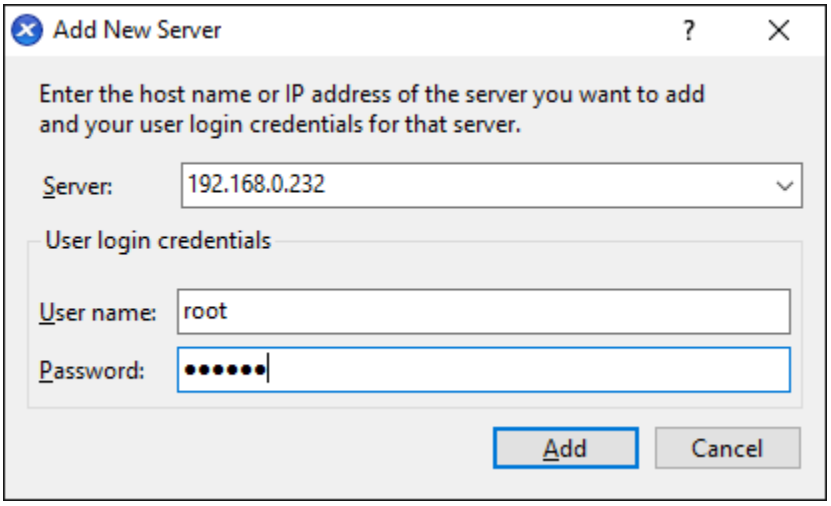
Add New Server dialog is shown.



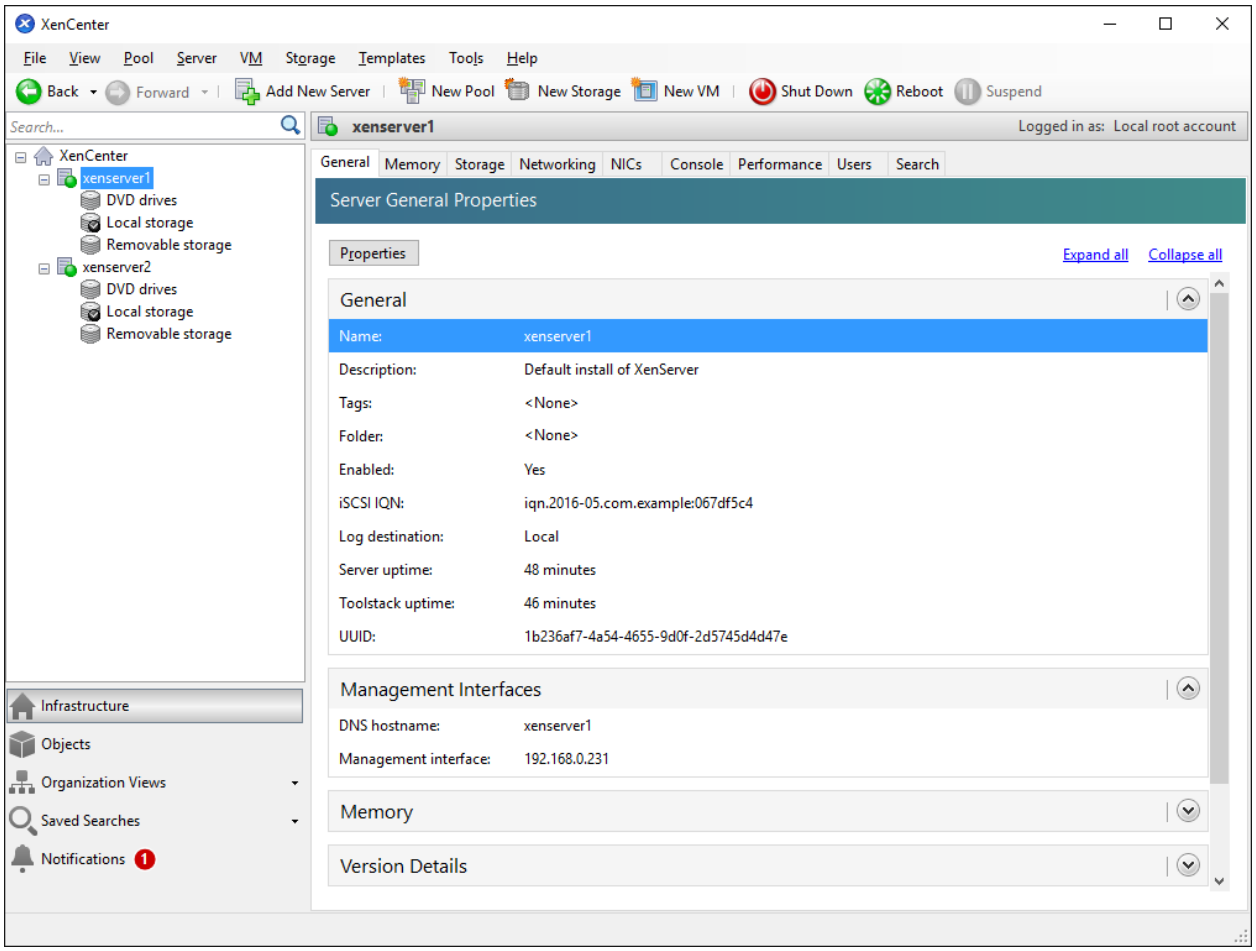
Input IP address / Name with which running Xen Server, User name and password.

Press the **Add** button to continue.

Repeat the steps to add another server.

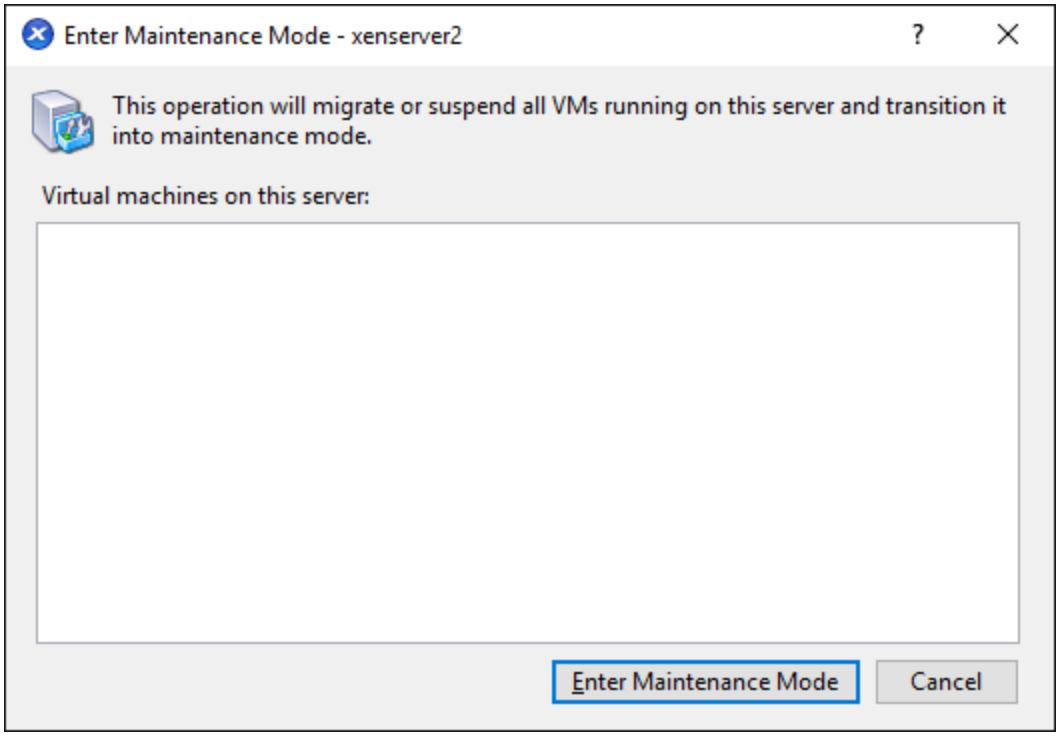


The XenCenter which is connected by XenServers is shown as follows.



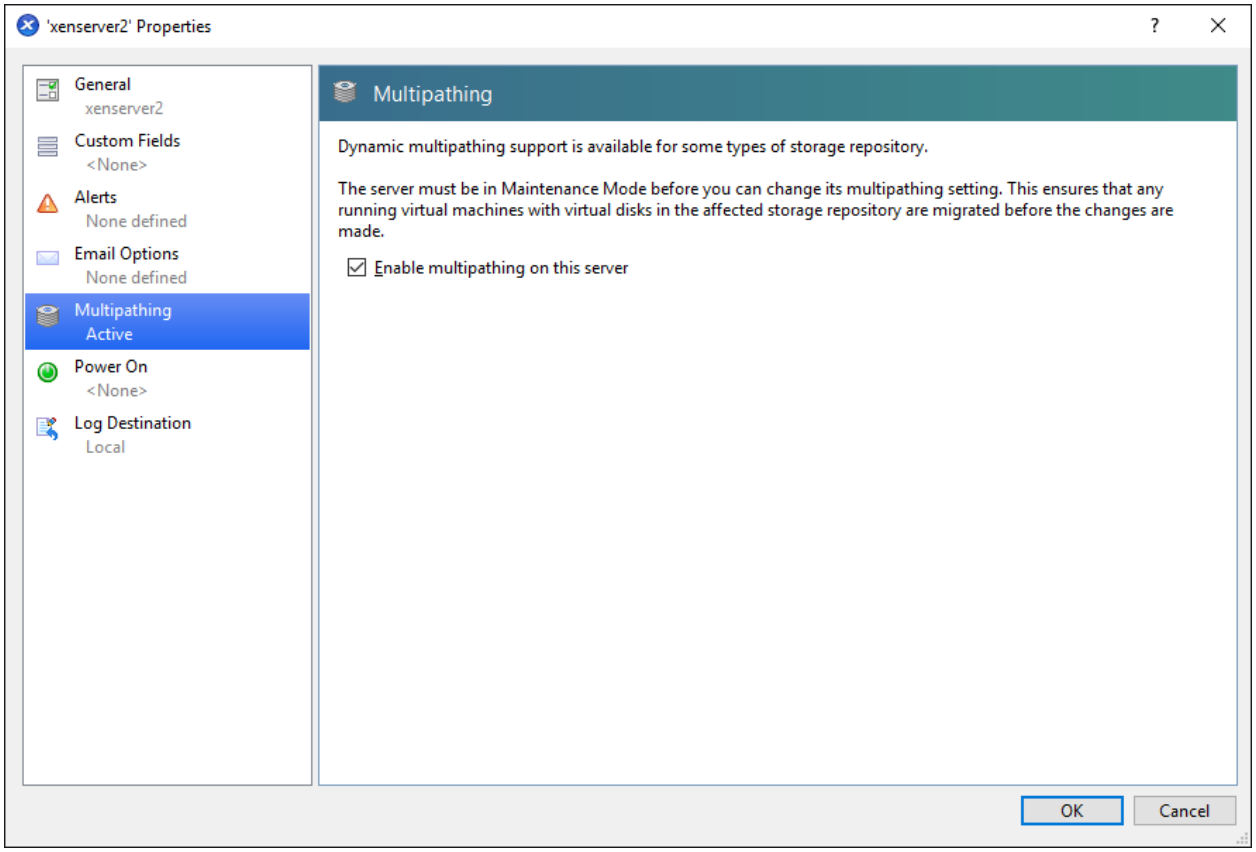
Enable Multipathing

Before to add storage, we must ensure that the Xen Server have enabled multipathing, we should to this by entering maintenance mode and change this property, click **Server->Enter Maintenance mode**, the following window is shown.



Click **Enter Maintenance** button, the server will enter maintenance mode.

Click **Server->properties**, click **Multipathing** on the left panel of the pop-up window, the following window is shown.

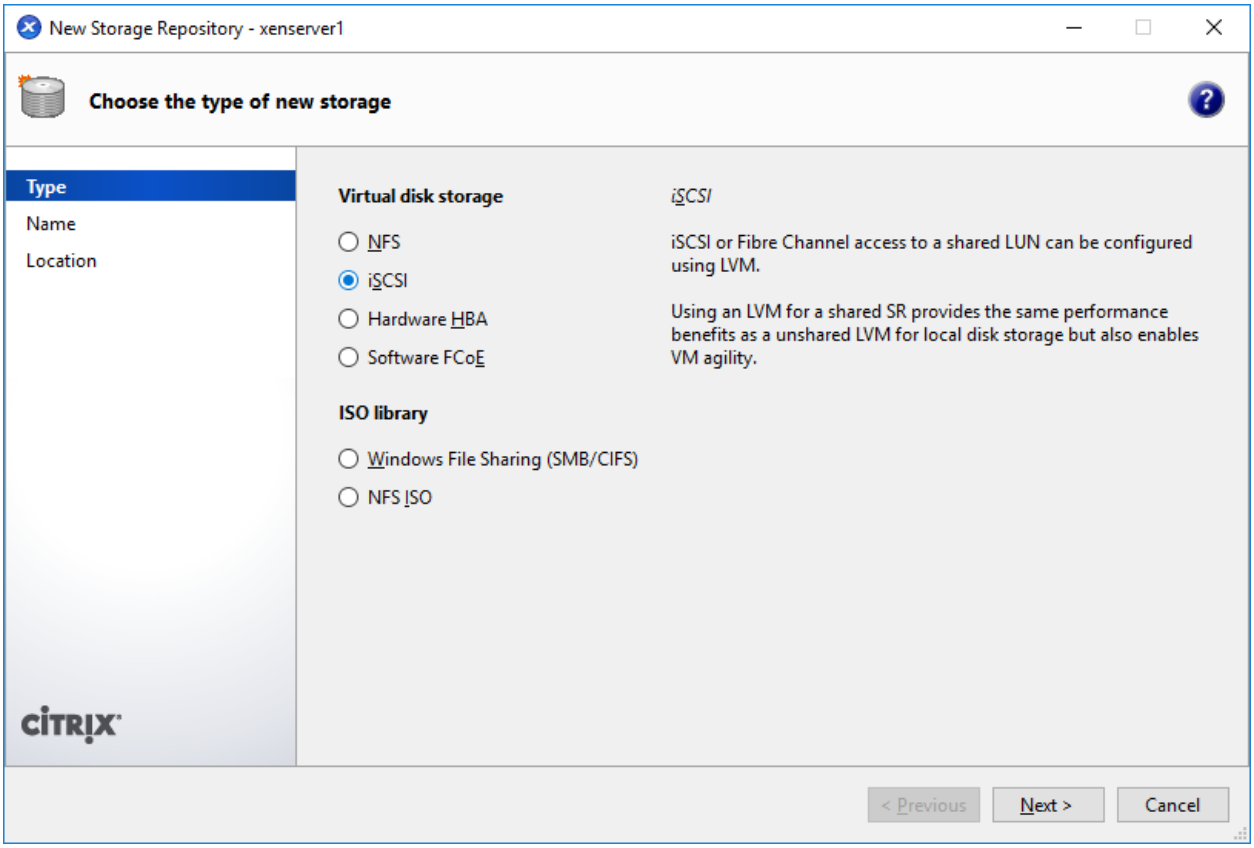


Check **Enable multipathing on this server** and press **OK** button to exit, this server has now enabled multipathing.

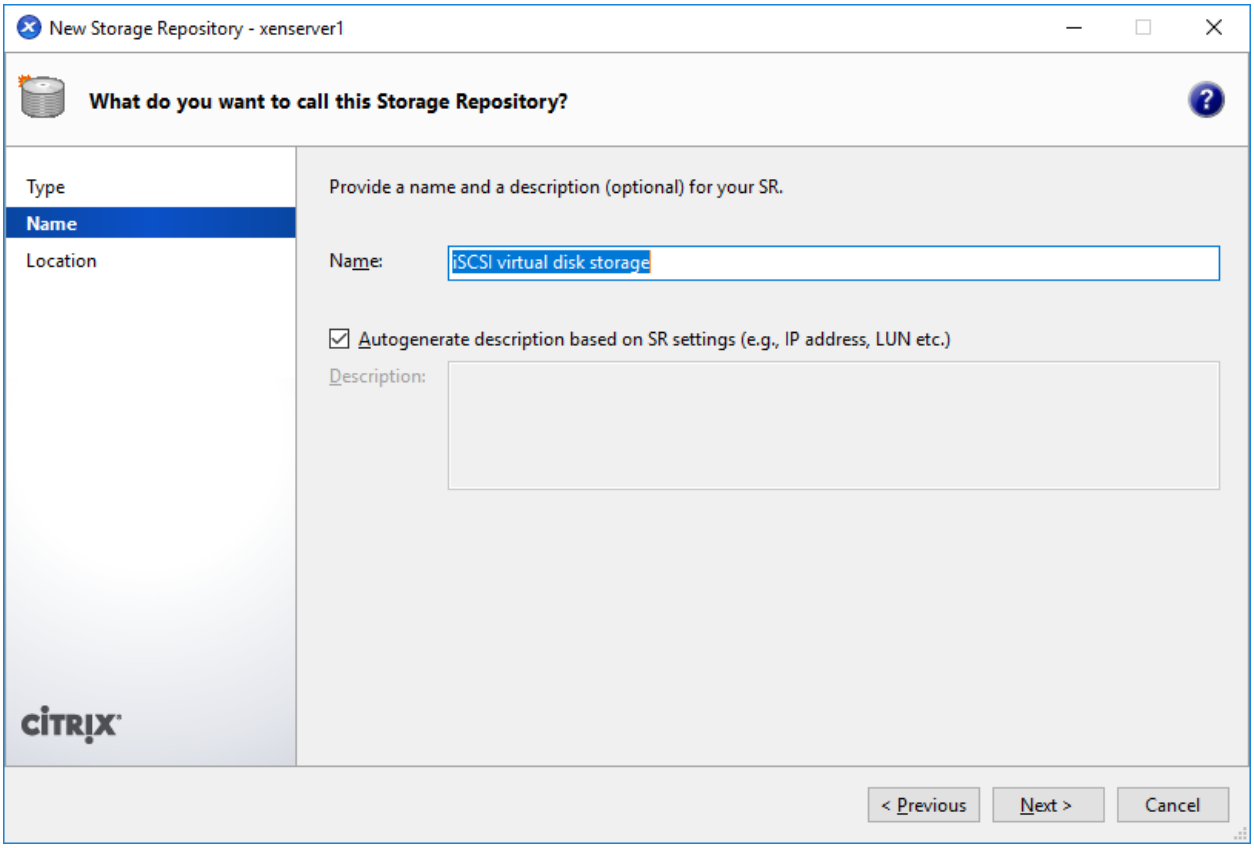
Repeat the same setups on another xenserver node.

Add iSCSI storage device into XenServer

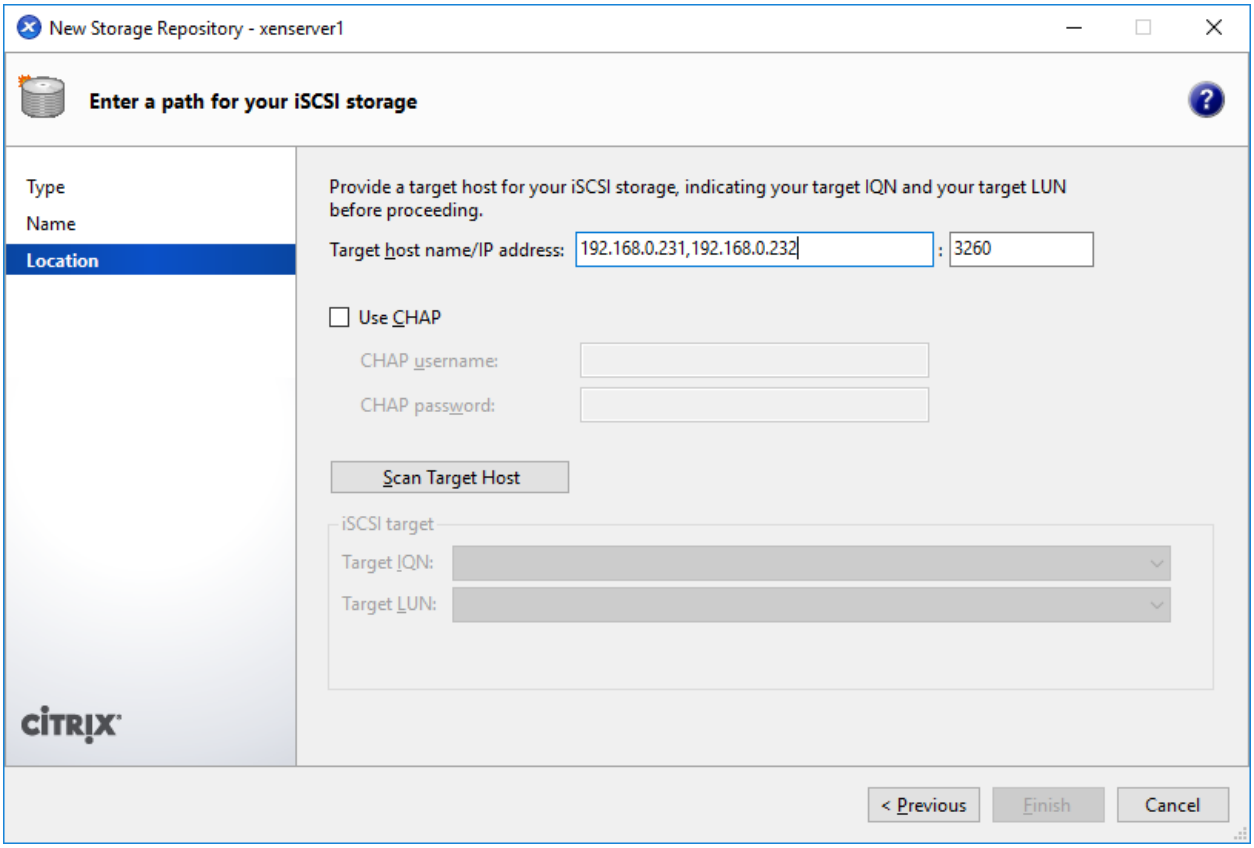
Click **New Storage**, **New Storage Repository** dialog is shown.



Select **iSCSI**, press the **Next** button to continue.

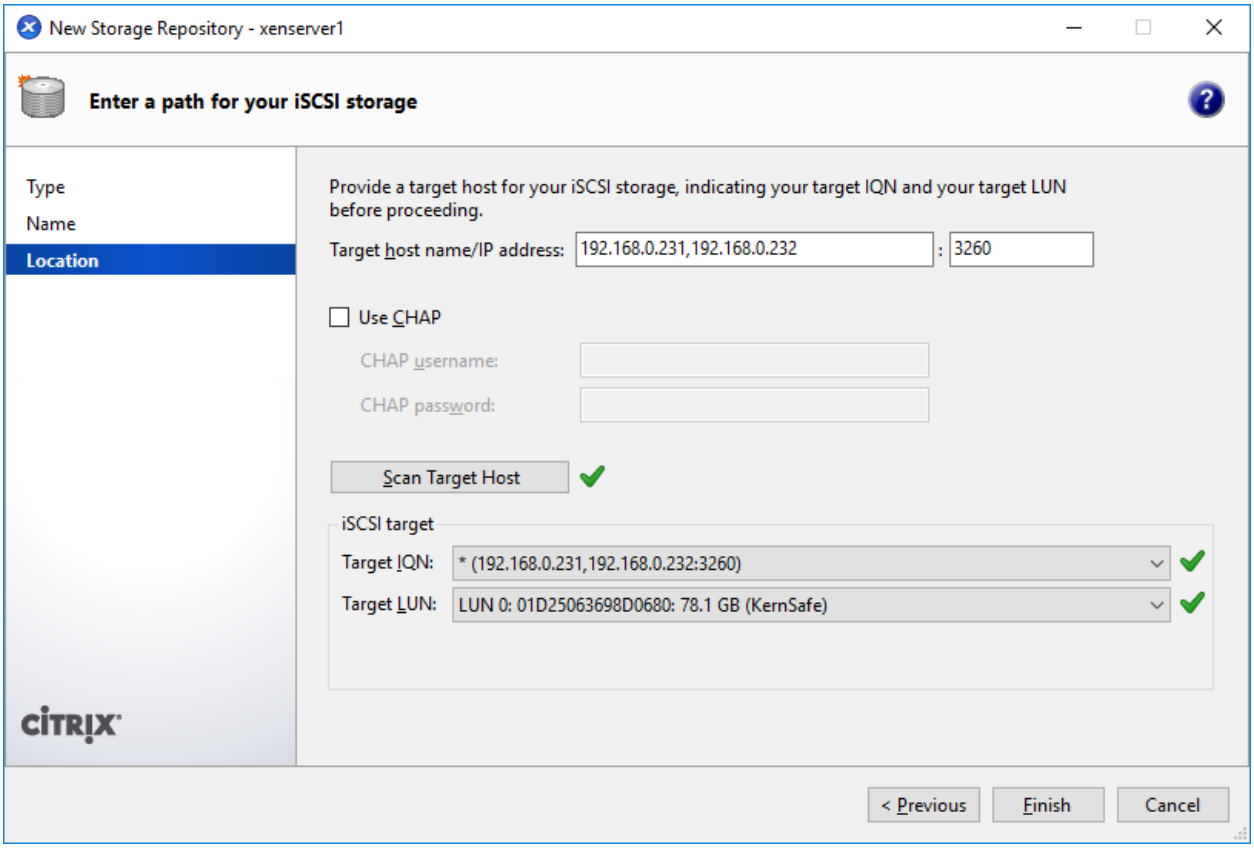


Type storage **Name** and press the **Next** button to continue.



Input IP address and port (if not 3260) of the two servers, If the target you want to connect to has CHAP Authentication, check **Use CHAP** and input user name and secret.

Press the **Scan Target Hosts** button, a list of Targets in drop-down control is shown.

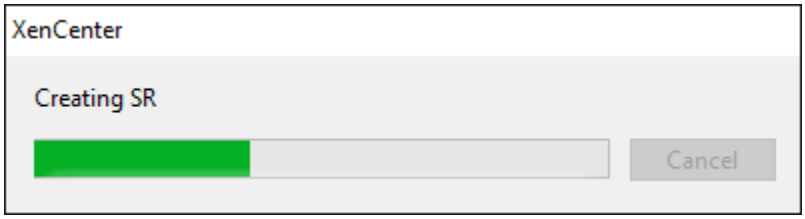


Select *(192.168.0.231, 192.168.0.232:3260) and LUN 0: … **Target LUN** in the list.

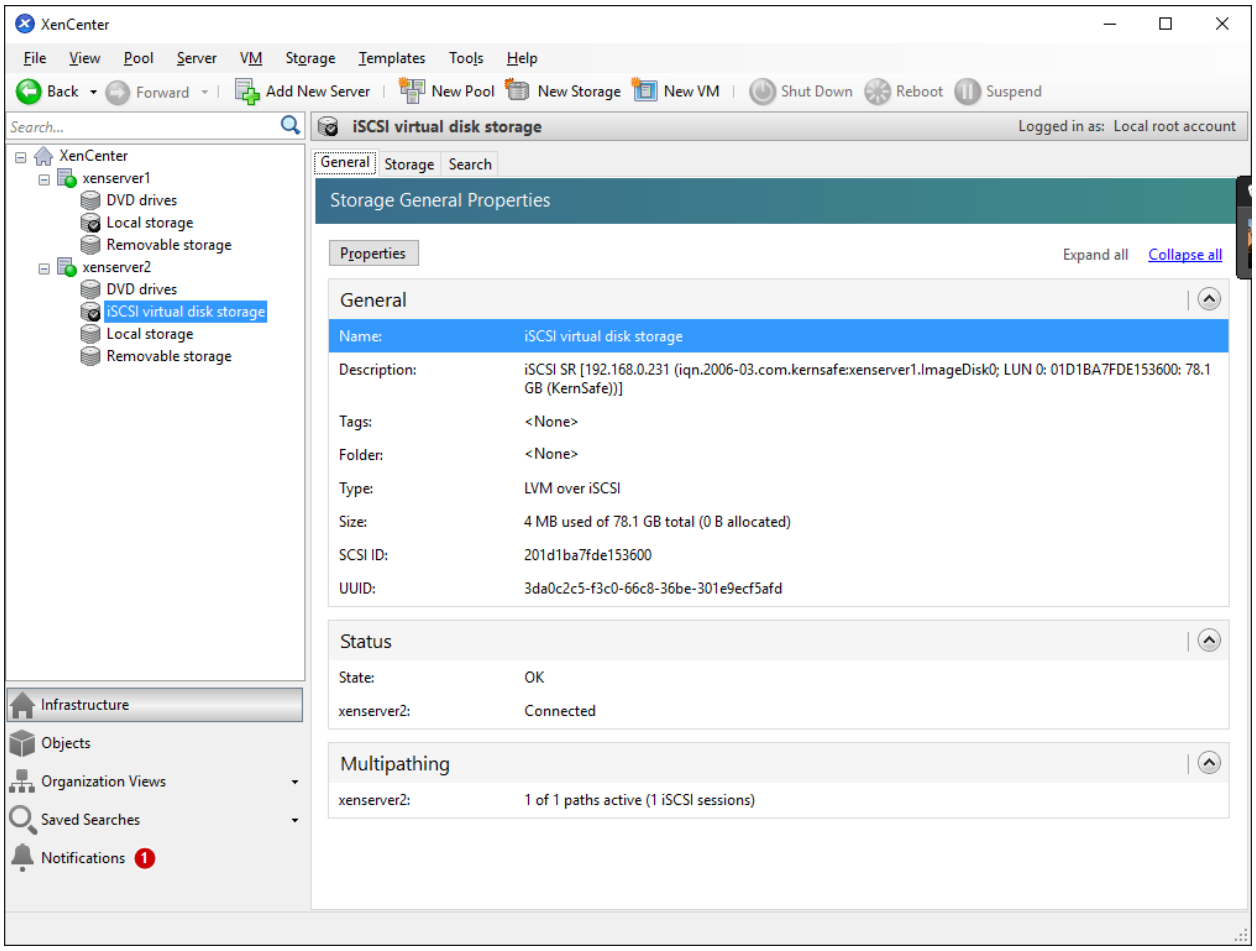
Press the **Finish** button to continue.

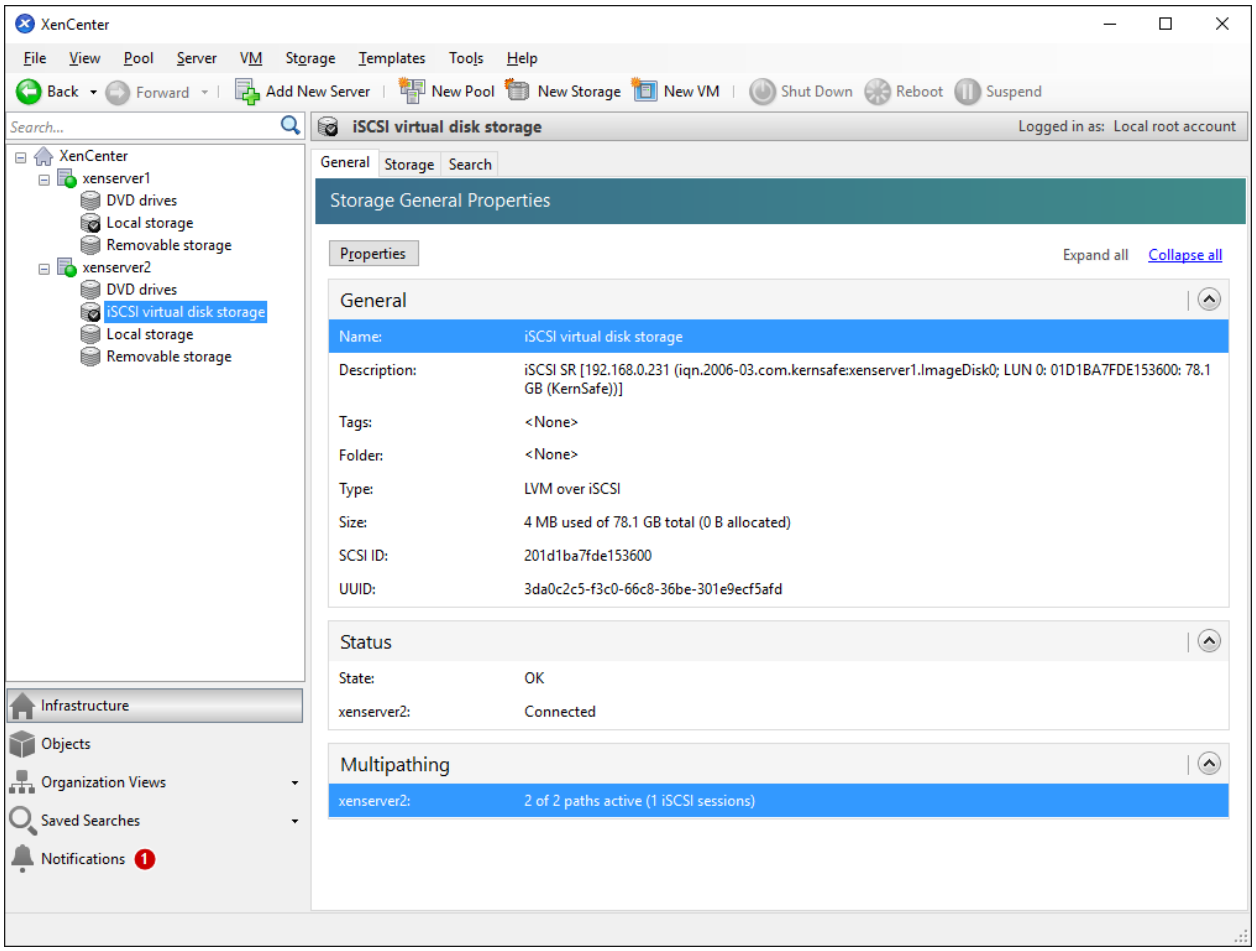
The following dialog is shown, press the **Yes** button to proceed.

Now Xen Server is carrying on a series of operations, such as **Creating SR**, to create data structures required by data repositories.



Sorted! You now see an iSCSI storage device successfully added into Xen Server.





At the bottom of this interface you can see there are 2 of 2 paths active.

If by some reasons you will see only 1 path active, go back to your server console and type:

 # /opt/xensource/sm/mpathcount.py

This causes to refresh multipath status in virtual storage.

```
[root@localhost etc]# /opt/xensource/sm/mpathcount.py
[root@localhost etc]#
```

After you will do it, you should be able to see proper 2 out of 2 paths active.

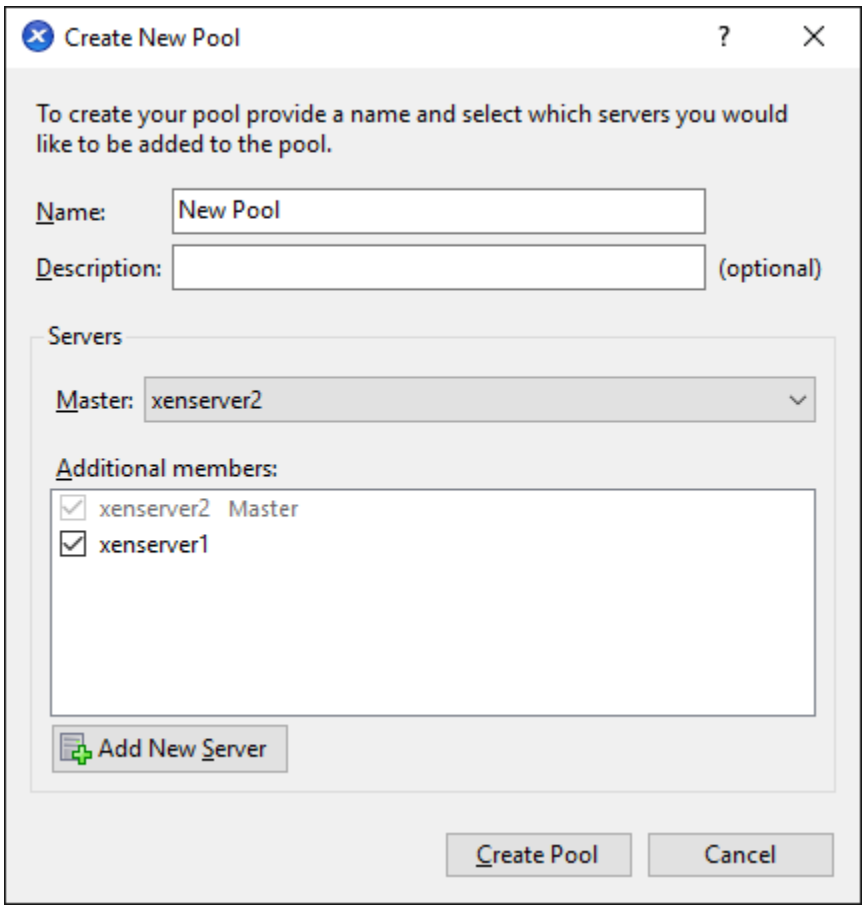
You can type:

#multipath –ll

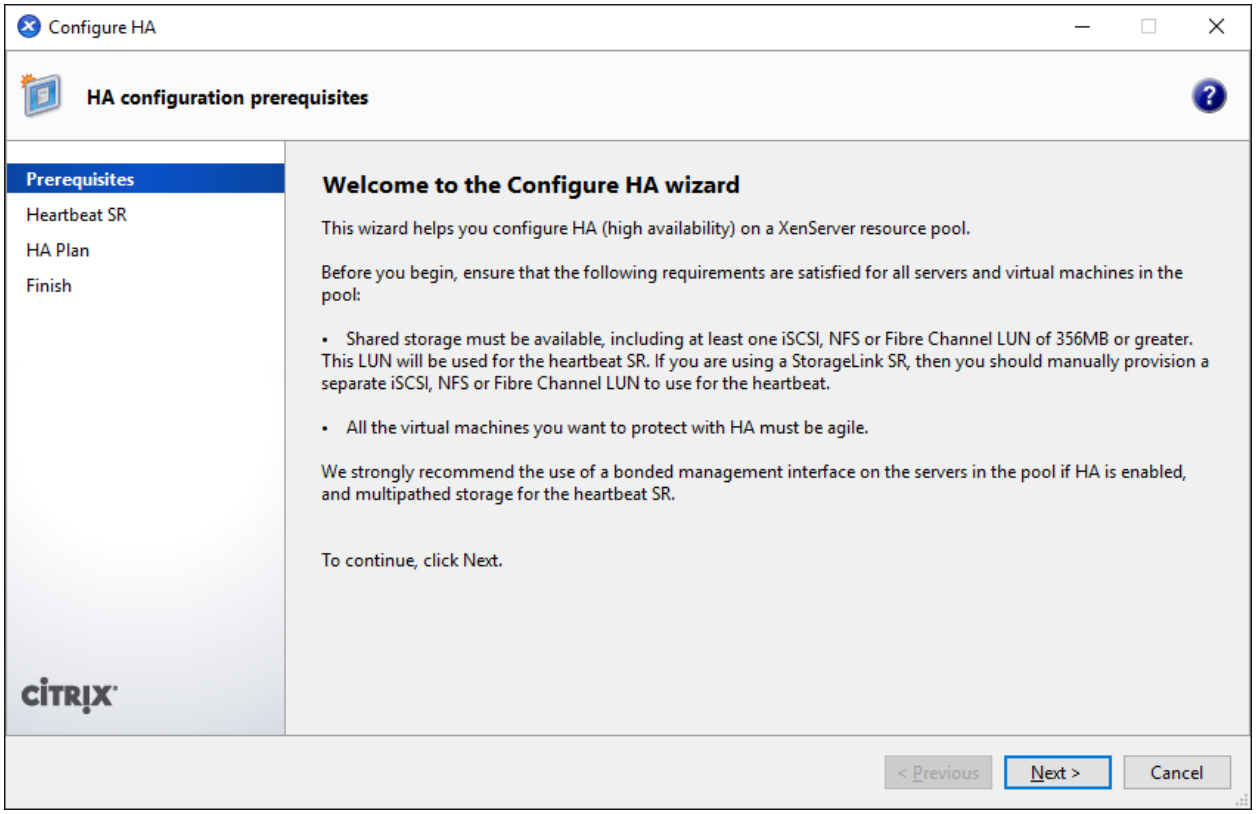
```
[root@xenserver2 ~]# multipath -ll
May 31 13:36:25 | multipath.conf line 12, invalid keyword: polling_interval_10
201d1ba7fde153600 dm-1 KernSafe,iSCSI Adapter
size=78G features='0' hwhandler='0' wp=rw
|-+- policy='round-robin 0' prio=1 status=enabled
| `- 12:0:0:0 sdc 8:32 active ready running
`-+- policy='round-robin 0' prio=1 status=enabled
  `- 13:0:0:0 sdd 8:48 active ready running
[root@xenserver2 ~]#
```

Create Pool in XenServers

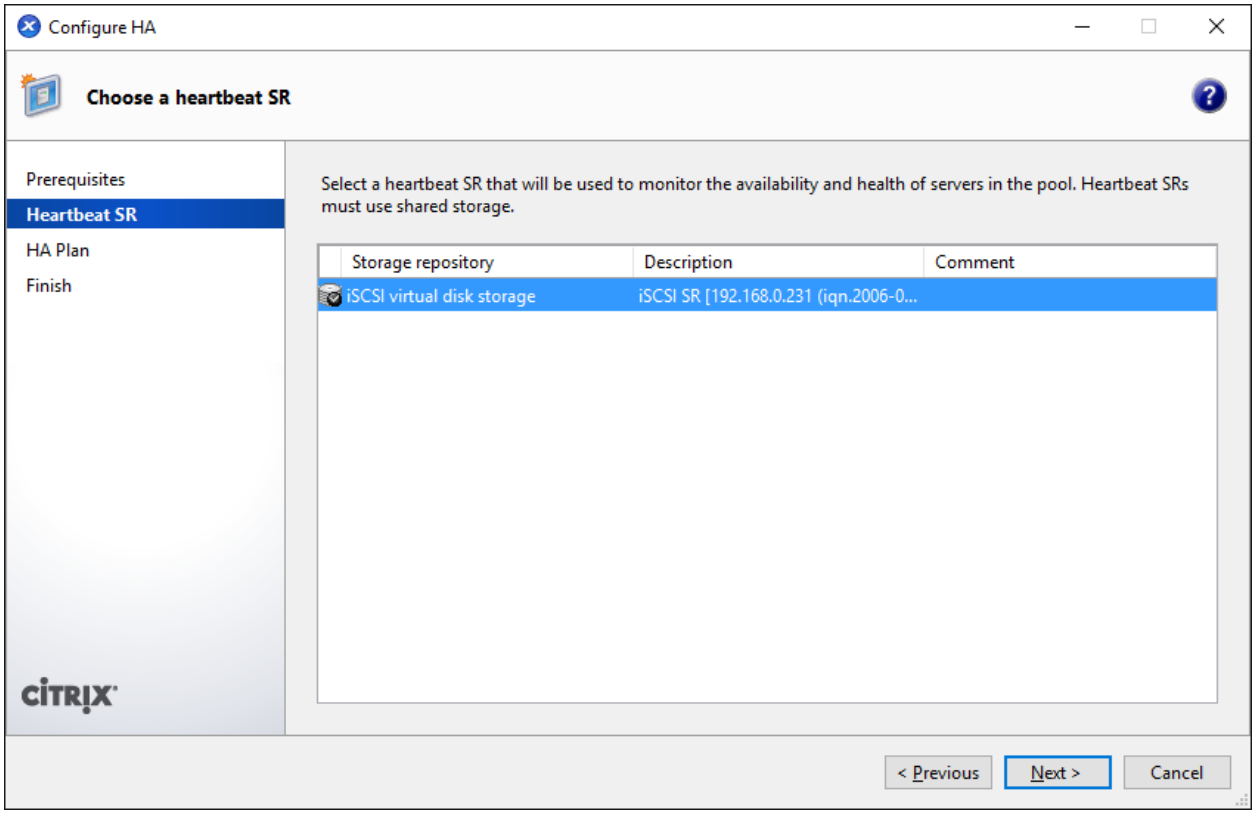
Click on the Pool->New Pool… menu item then Create New Pool dialog shows.



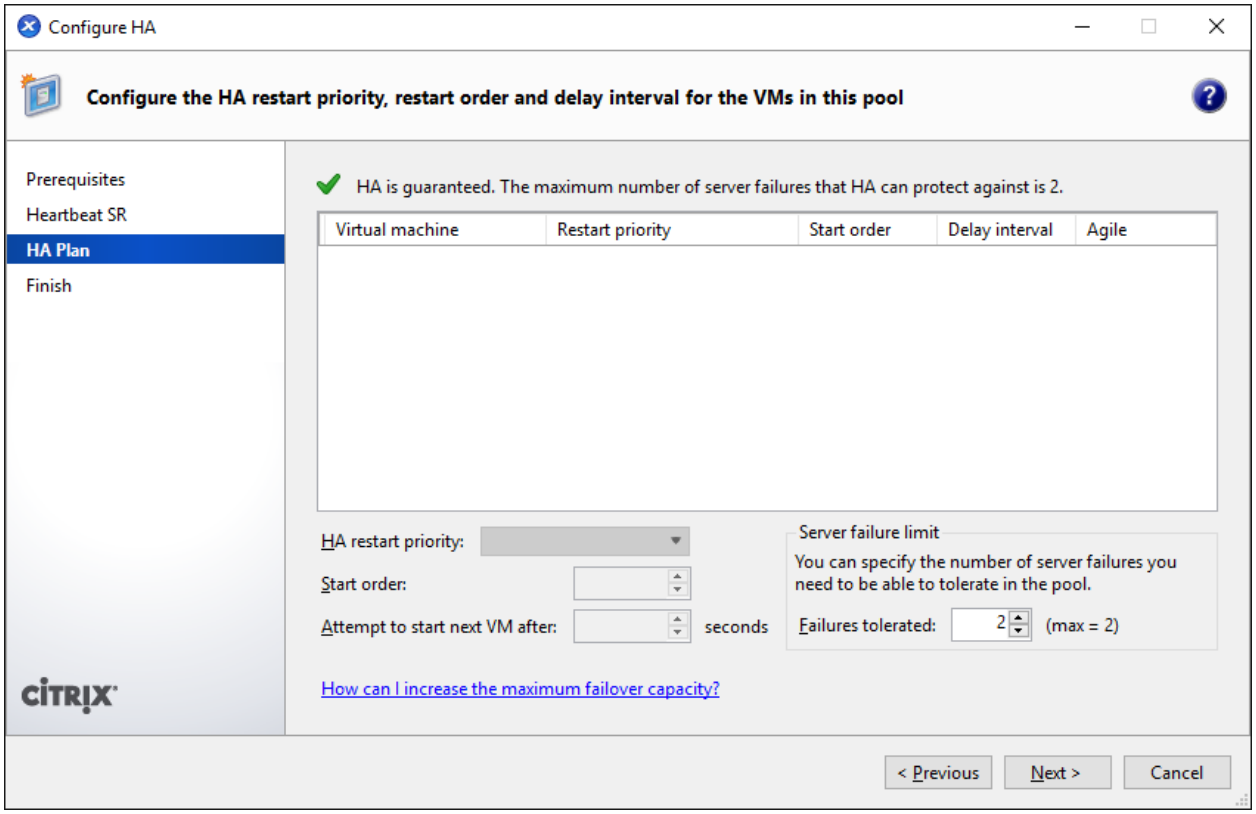
Type Name and Description and select the both server, then click the Create Pool button to create pool.



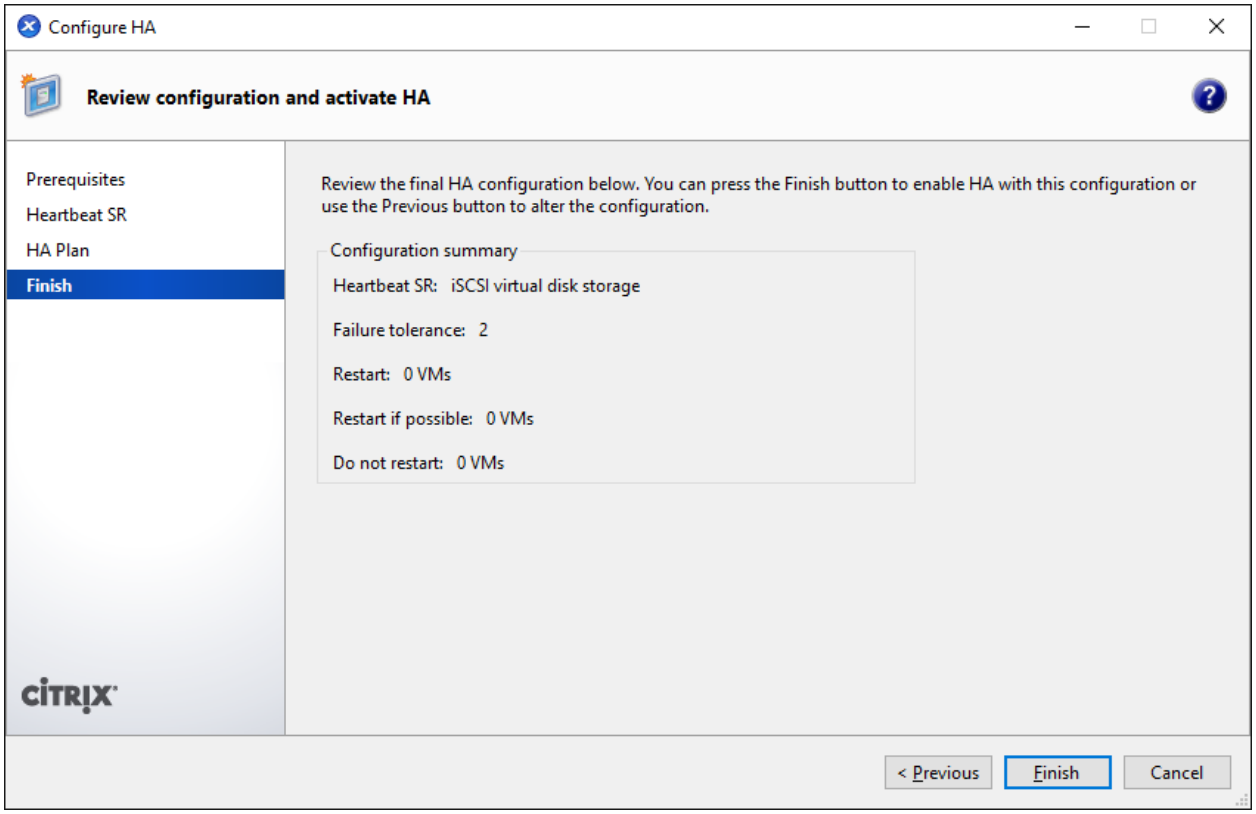
Press the **Next** button to continue.



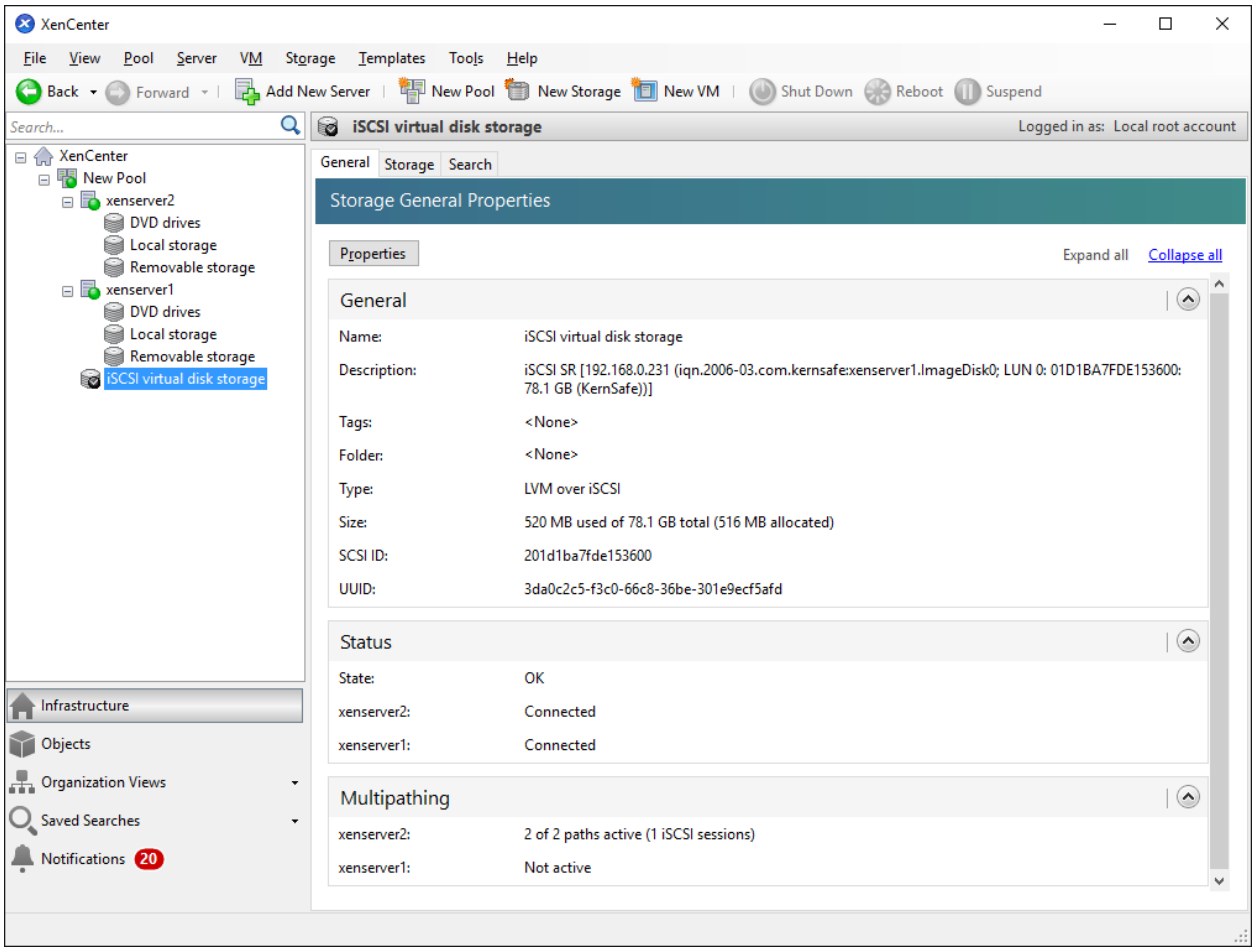
Select the iSCSI storage as hartbeat SR and press the **Next** button to continue.



Specify HA settings, and press the **Next** button to continue.



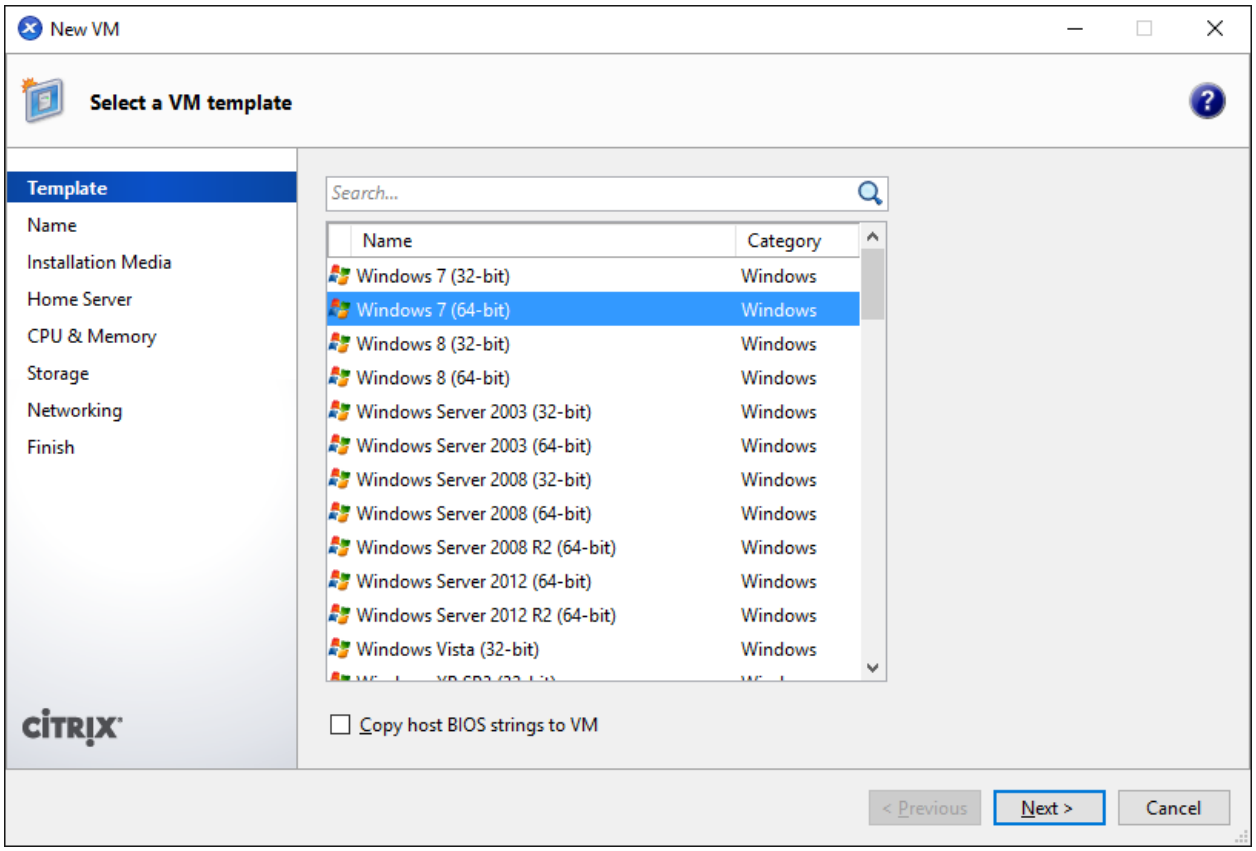
Press the **Finish** button to finish creating pool.



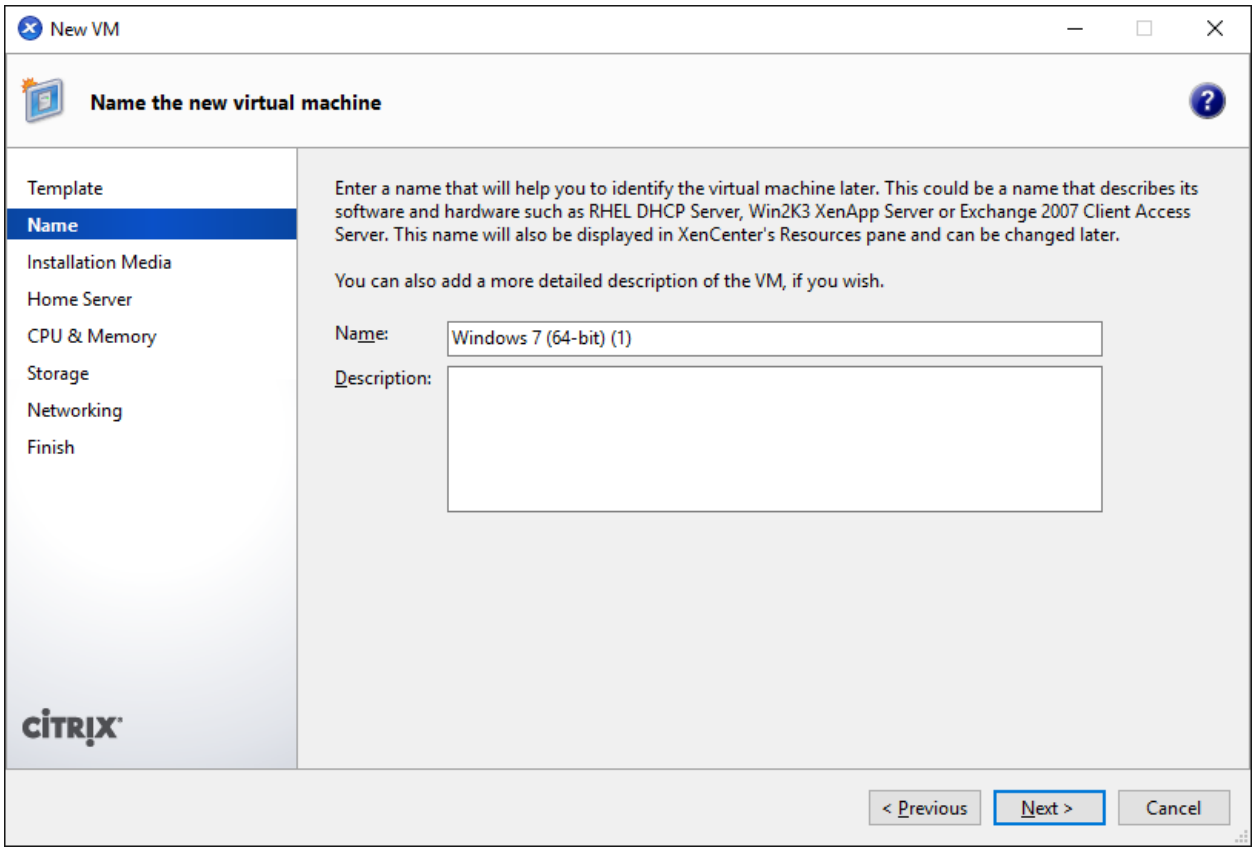
Create a virtual machine

Click **New VM** on Xen Server console.

Select **Windows 7 x64** in the following wizard.

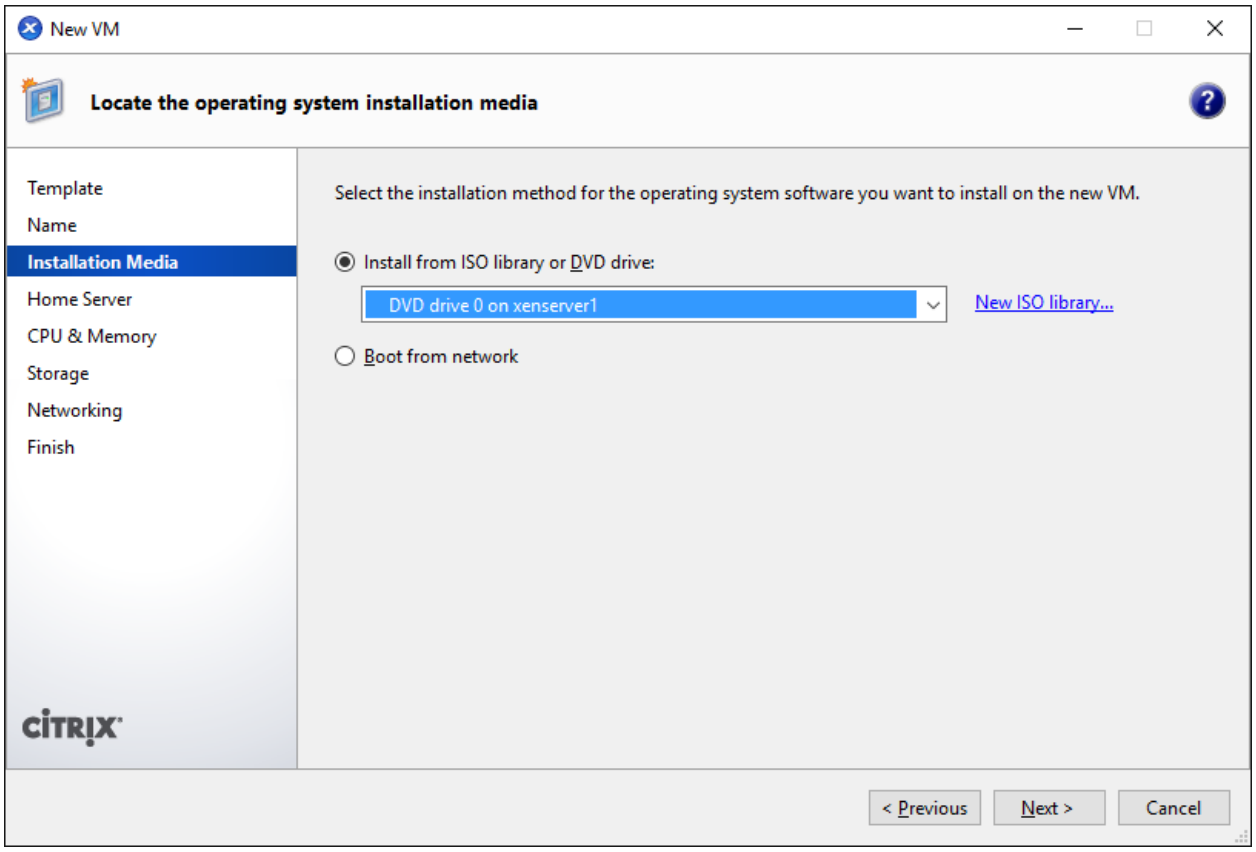


Input the desired name and description.



Press the **Next** to continue.

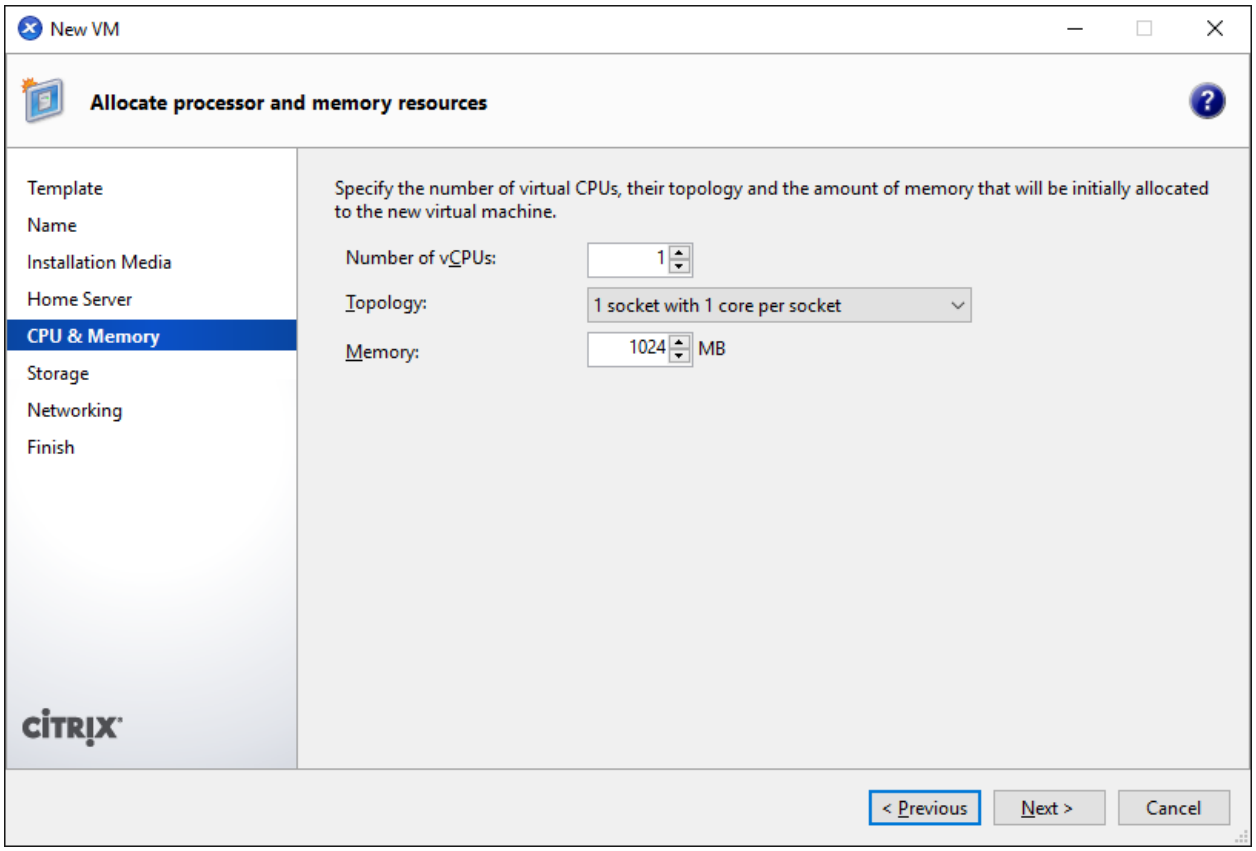
Select installation media for operating system.



Choose **physical DVD Drive** on XenServer.

Press the **Next** button to continue.

Specify the number of CPUs and memory size.

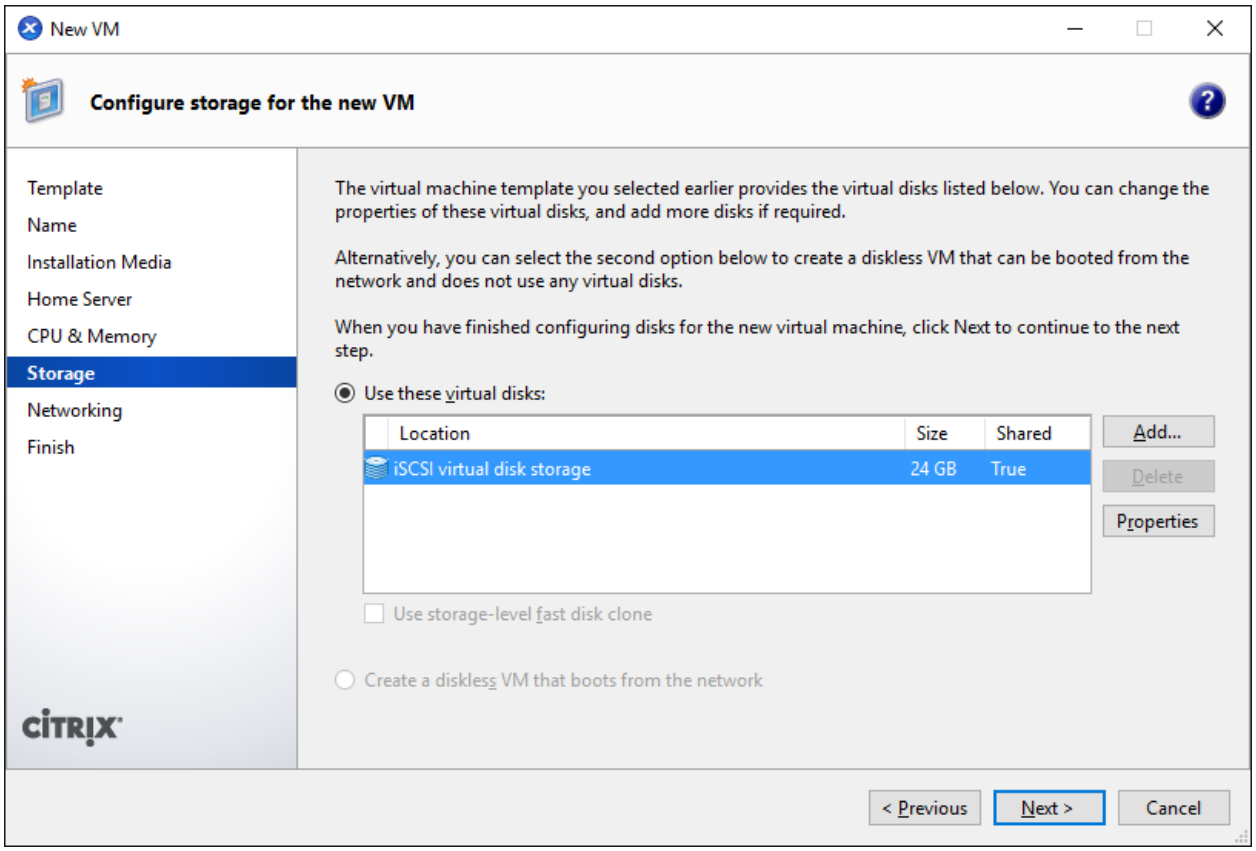


Select number of vCPUs.

Specify initial memory size.

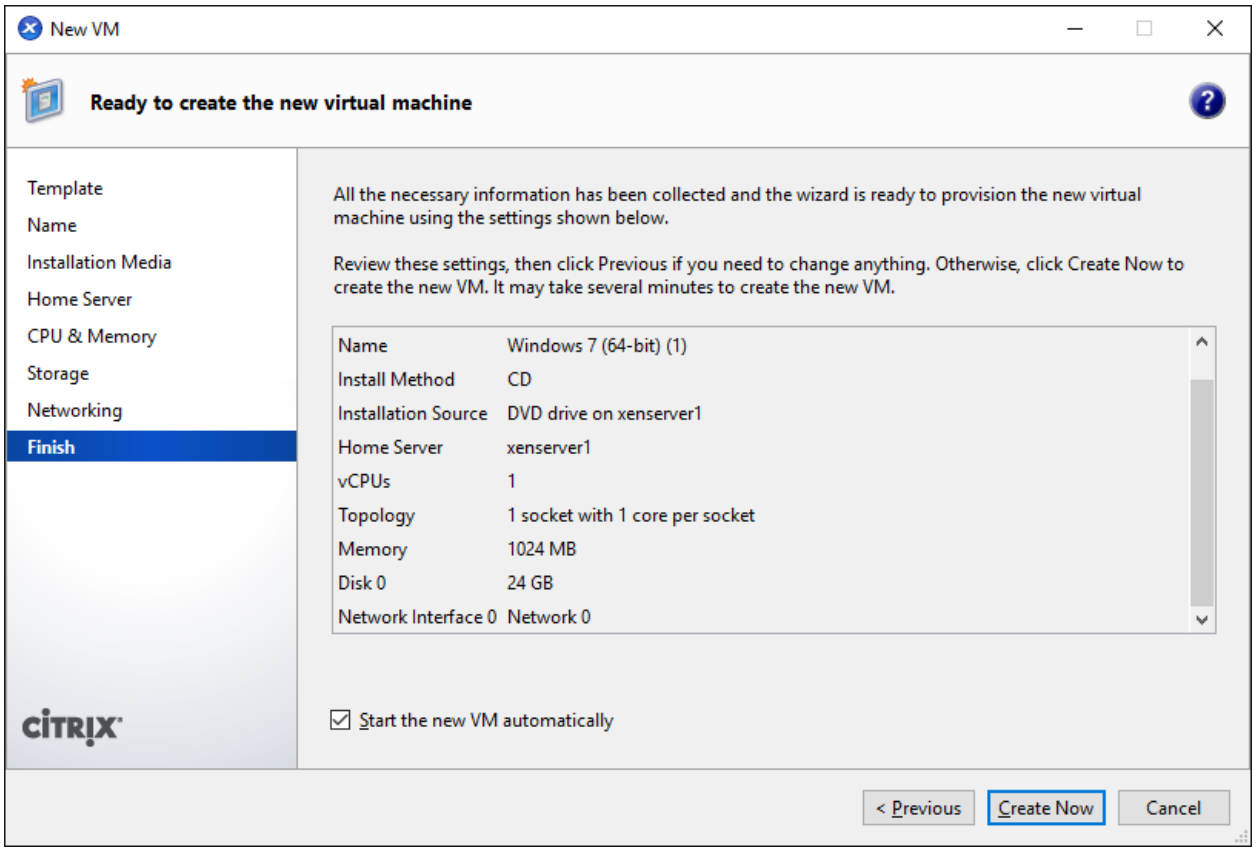
Press the **Next** button to continue.

Select storage device.



First you see an **iSCSI Virtual disk storage** device, which is previously create. It is Xen Server's default storage device. If you want to add other virtual disk, press the **Add** button.

Select **iSCSI virtual disk storage…** and then press the **Next** button, the **Disk Settings dialog** is shown.



Specify the size of the new virtual disk.

Press the **OK** button to finish the wizard.

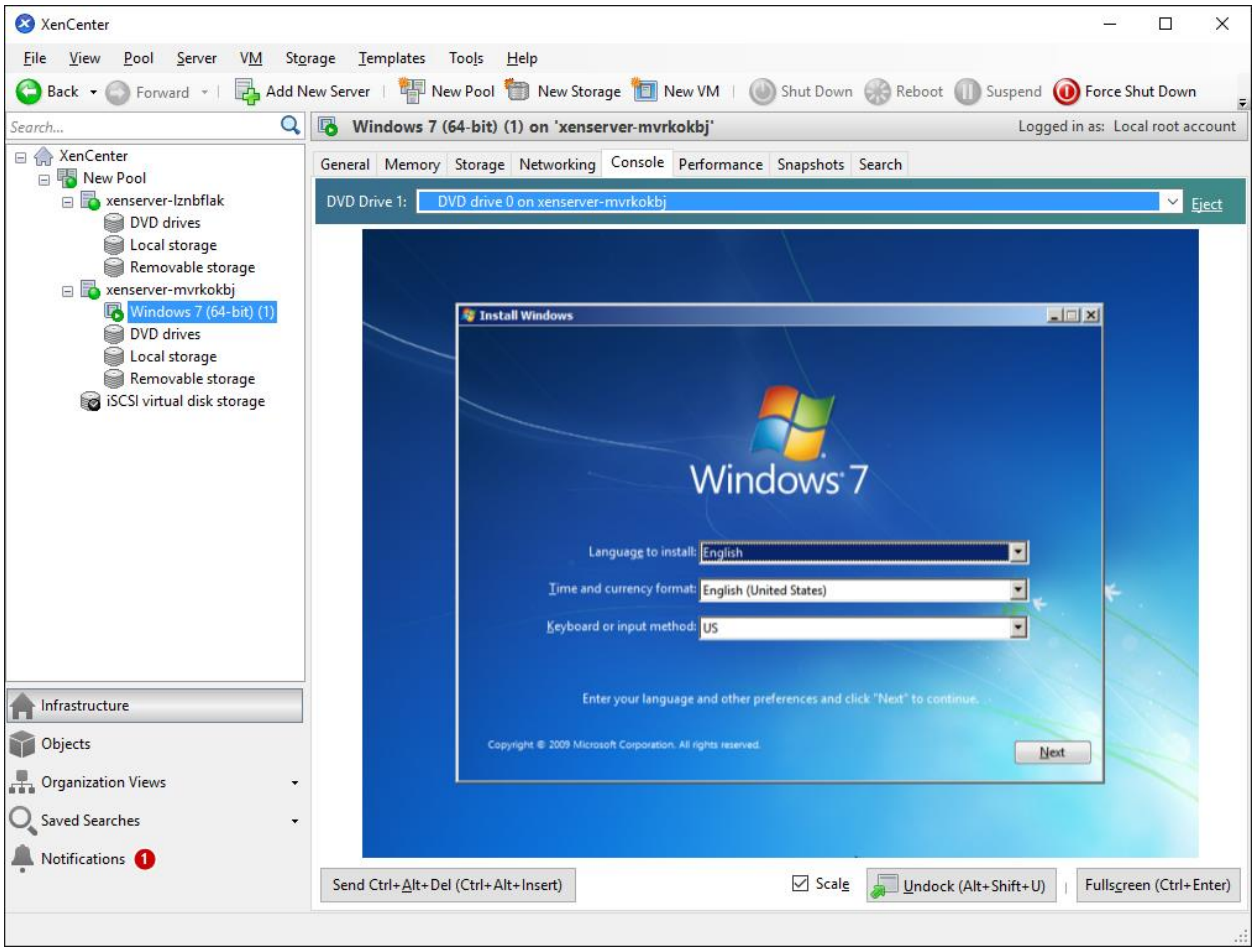
A virtual machine is built.

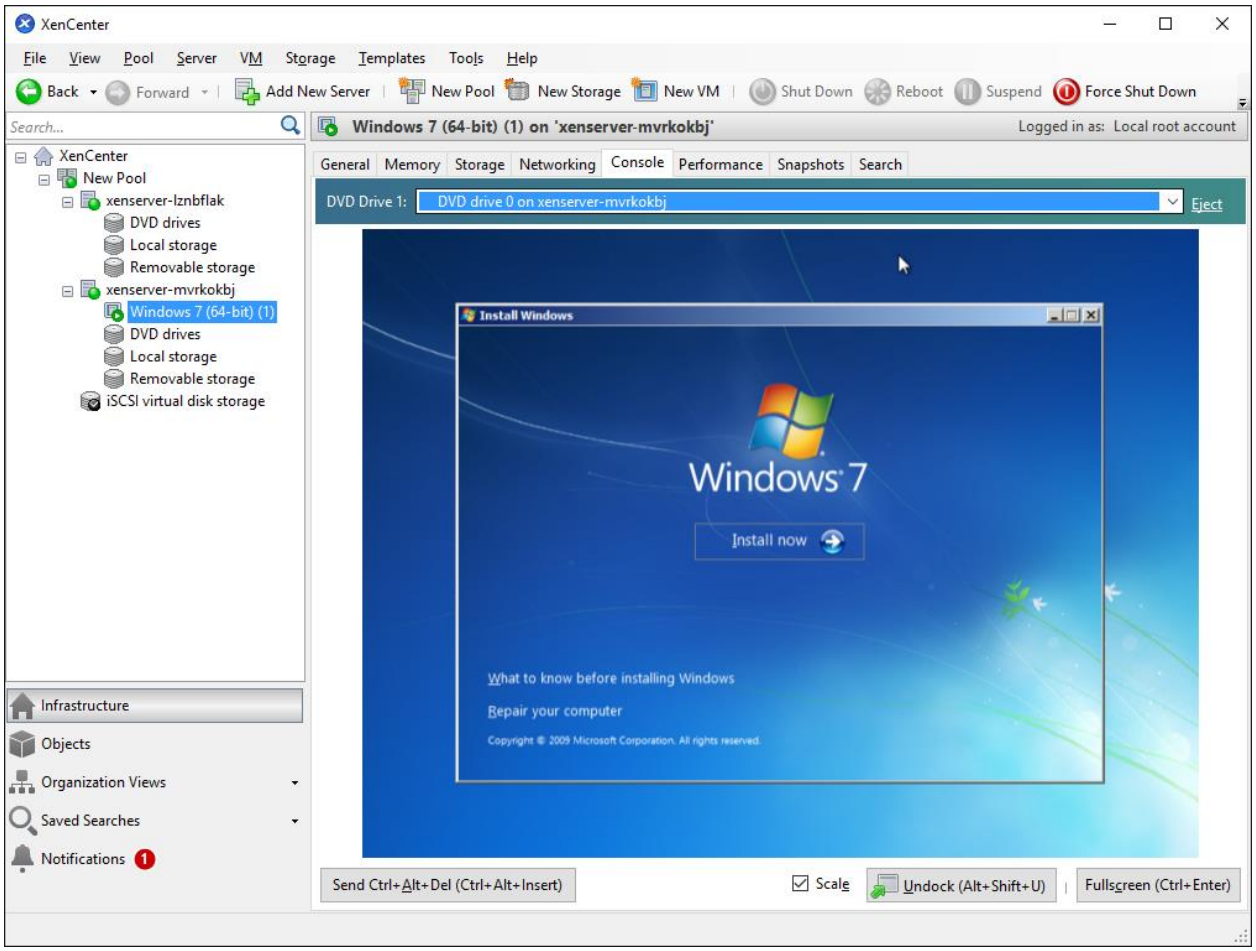
Note that before Version6.5 in the Storage labels of your virtual machine, you need to exchange the position of iSCSI Virtual Storage and Local Storage (make sure iSCSI Virtual Storage at position 0) so that the operating system can be installed on this iSCSI device.

Install Operating system

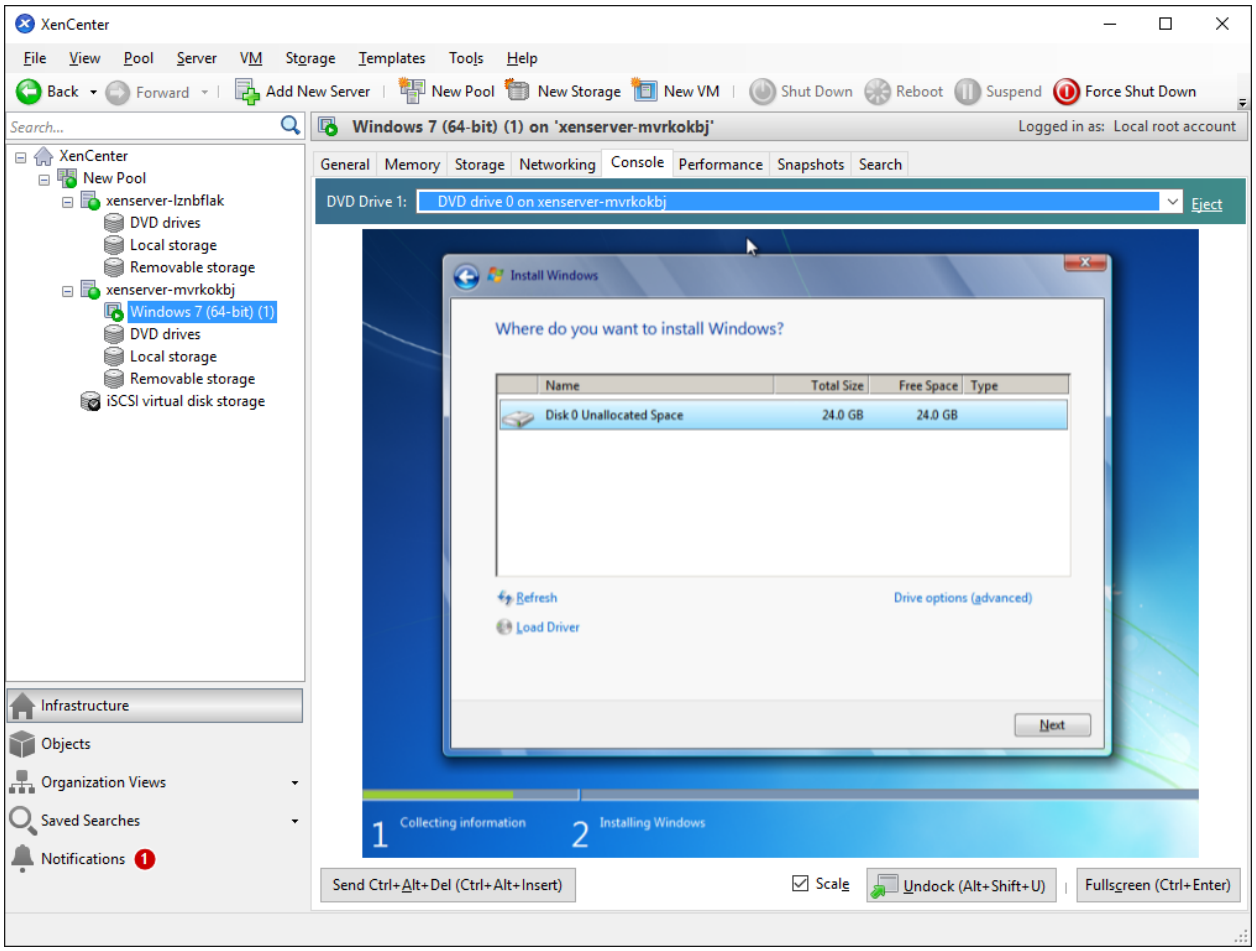
Run the virtual machine and set up the operating system.

The process is just like that on real machine.


XenCenter
File View Pool Server VM Storage Templates Tools Help
Back Forward Add New Server New Pool New Storage New VM Shut Down Reboot Suspend Force Shut Down
Search...
Windows 7 (64-bit) (1) on 'xenserver-mvrkokbj'
Logged in as: Local root account
XenCenter
New Pool
xenserver-lznbflak
DVD drives
Local storage
Removable storage
xenserver-mvrkokbj
Windows 7 (64-bit) (1)
DVD drives
Local storage
Removable storage
iSCSI virtual disk storage
Infrastructure
Objects
Organization Views
Saved Searches
Notifications 1
General Memory Storage Networking Console Performance Snapshots Search
DVD Drive 1: DVD drive 0 on xenserver-mvrkokbj
Eject
Install Windows
Windows 7
Language to install: English
Time and currency format: English (United States)
Keyboard or input method: US
Enter your language and other preferences and click "Next" to continue.
Copyright © 2009 Microsoft Corporation. All rights reserved.
Next
Send Ctrl+Alt+Del (Ctrl+Alt+Insert)
Scale
Undock (Alt+Shift+U)
Fullscreen (Ctrl+Enter)

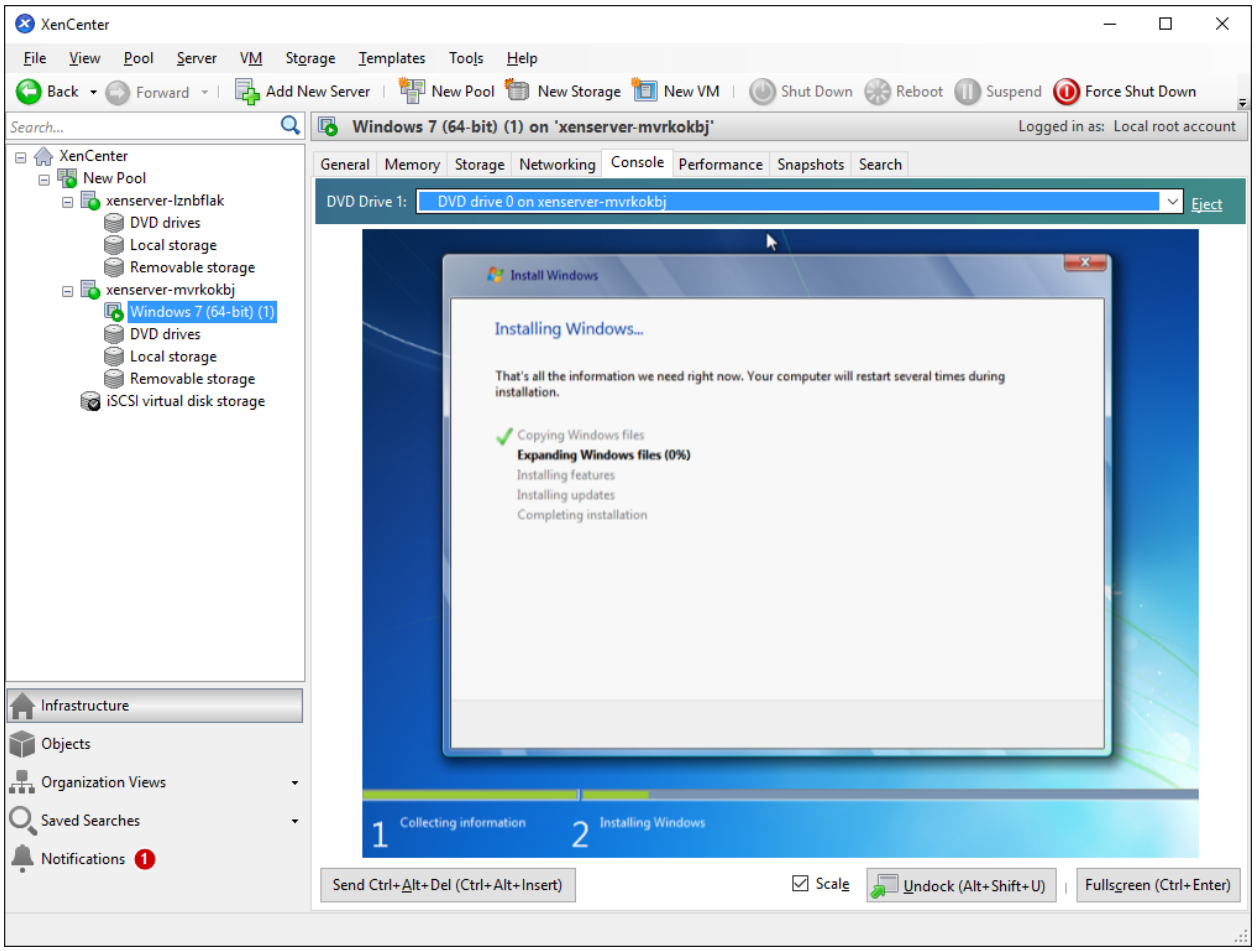


Press the **Install Now** button to install OS.

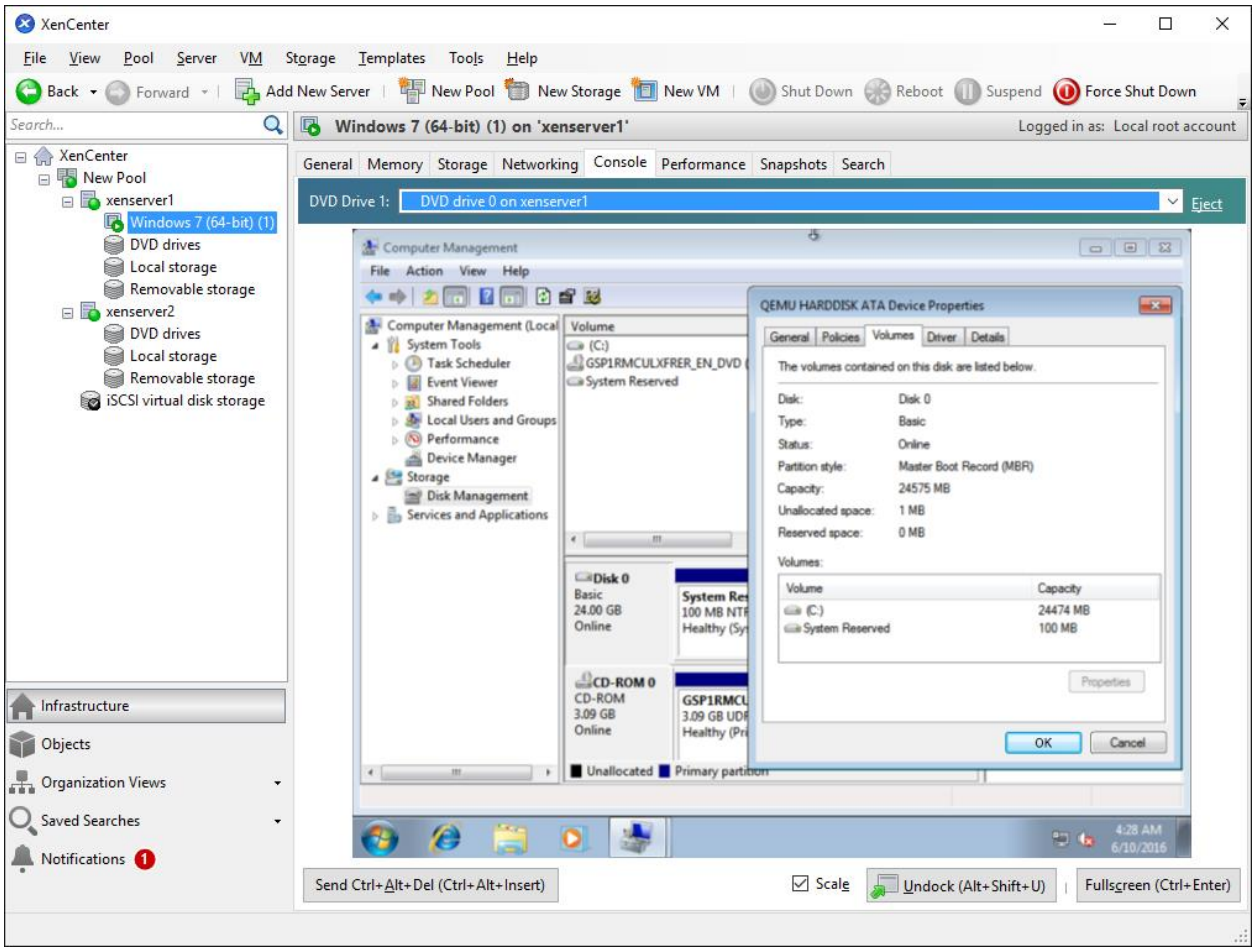


Select the 24G disk. Just like that on a real hard disk.

Setup starts copying files



Last, with all work done, we'll see iSCSI virtual storage device in the virtual operating system.



Likewise, you may install Windows Server 2008, Windows10 and Windows Server 2012, or even any version of Linux as you need.

By the same way, you can create more targets and create HA application to link them together so that you can create 3 or more nodes hyper- converged solutions.

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