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

Wednesday, Mar 30, 2011

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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 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 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.

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.			
O Obtain an IP address automatical	ly		
🕞 Use the following IP address:			
IP address:	192.168.1.2		
Subnet mask:	255.255.255.0		
Default gateway:	192.168.1.2		
C Obtain DNS server address autor	natically		
└ Use the following DNS server add	resses:		
Preferred DNS server:	192.168.1.2		
Alternate DNS server:	· · ·		
Validate settings upon exit	Ad <u>v</u> anced		
	OK Cancel		

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.

🖅 Run		×
	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.	
Open:	dcpromo 💌	
His task will be created with administrative privileges.		
	OK Cancel <u>B</u> rowse	

Press the **OK** button to continue.

The Active Directory Domain Services Installation Wizard is shown.



The Active Directory Domain Services Installation Wizard is shown, before clicking on Next button,

please read the introducing instructions carefully.

Active Directory Domain Services Installation Wizard	×
Operating System Compatibility Improved security settings in Windows Server 2008 and Windows Server 2008 R2 affect older versions of Windows	
<ul> <li>Windows Server 2008 and "Windows Server 2008 R2" domain controllers have a new more secure default for the security setting named "Allow cryptography algorithms compatible with Windows NT 4.0." This setting prevents Microsoft Windows and non-Microsoft SMB "clients" from using weaker NT 4.0 style cryptography algorithms when establishing security channel sessions against Windows Server 2008 or "Windows Server 2008 R2" domain controllers. As a result of this new default, operations or applications that require a security channel serviced by Windows Server 2008 or "Windows Server 2008 R2" domain controllers might fail.</li> <li>Platforms impacted by this change include Windows NT 4.0, as well as non-Microsoft SMB "clients" and network-attached storage (NAS) devices that do not support stronger cryptography algorithms. Some operations on clients running versions of Windows earlier than Windows Vista with Service Pack 1 are also impacted, including domain join operations performed by the Active Directory Migration Tool or Windows Deployment Services.</li> <li>For more information about this setting, see Knowledge Base article 942564 (http://go.microsoft.com/fwlink/?LinkId=104751).</li> </ul>	s
< <u>B</u> ack <u>N</u> ext > Cano	xel

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

Active Directory Domain Services Installation Wizard	×
Choose a Deployment Configuration You can create a domain controller for an existing forest or for a new forest.	
C Existing forest	
C Add a domain controller to an existing domain	
C <u>C</u> reate a new domain in an existing forest This server will become the first domain controller in the new domain.	
• Create a new domain in a new forest	
More about possible deployment configurations	
< <u>B</u> ack <u>N</u> ext >	Cancel

Specify the name of Forest Root Domain.

a 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.	
EQDN of the forest root domain: KemSafe.Local	_
Example: corp.contoso.com	
< <u>B</u> ack <u>N</u> ext > Ca	ancel

Select the Forest functional level.

Active Directory Domain Services Installation Wizard	×
Set Forest Functional Level Select the forest functional level.	
Forest functional level:	
Windows Server 2008 R2	•
Details:	
<ul> <li>The Windows Server 2008 R2 forest functional level provides all the features that are available in the Windows Server 2008 forest functional level, plus the following additional feature:         <ul> <li>Recycle Bin, which, when it is enabled, provides the ability to restore deleted objects in their entirety while Active Directory Domain Services is running.</li> </ul> </li> <li>Any new domains that are created in this forest will operate by default at the Windows Server 2008 R2 domain functional level.</li> </ul>	A 7
You will be able to add only domain controllers that are running Windows Server 2008 R2 or later to this forest.	
More about domain and forest functional levels	
< <u>B</u> ack <u>N</u> ext > C	ancel

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.

tive Directory Domain Services Installation Wizard	
lditional Domain Controller Options	
Select additional options for this domain controller.	
DNS server	
🔽 <u>G</u> lobal catalog	
<u>R</u> ead-only domain controller (RODC)	
Additional information:	
cannot be an RODC. We recommend that you install the DNS Server service on the first domain	
cannot be an RODC. We recommend that you install the DNS Server service on the first domain controller.	V
cannot be an RODC. We recommend that you install the DNS Server service on the first domain controller. More about <u>additional domain controller options</u>	<b>Y</b>
cannot be an RODC. We recommend that you install the DNS Server service on the first domain controller. More about <u>additional domain controller options</u>	V
cannot be an RODC. We recommend that you install the DNS Server service on the first domain controller. More about <u>additional domain controller options</u>	- -

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

Press the **Next** button to continue.

The Active Directory Domain Services Installation Wizard is shown.

active	Directory Domain Services Installation Wizard	×
<u>^</u>	A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found or it does not run Windows DNS server. If you are integrating with an existing DNS infrastructure, you should manually create a delegation to this DNS server in the parent zone to ensure reliable name resolution from outside the domain "KernSafe.Local". Otherwise, no action is required. Do you want to continue?	
	<u>Y</u> es	)

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

Active Directory Domain Services Installation Wizard	×
Location for Database, Log Files, and SYSVOL Specify the folders that will contain the Active Directory domain controlle database, log files, and SYSVOL.	er
For better performance and recoverability, store the database and log fil volumes.	es on separate
Database folder:	
C:\Windows\NTDS	B <u>r</u> owse
Log files folder:	
C:\Windows\NTDS	Br <u>o</u> wse
SYSVOL folder:	
C:\Windows\SYSVOL	Bro <u>w</u> se
More about <u>placing Active Directory Domain Services files</u>	
< <u>B</u> ack <u>N</u> ext >	Cancel

Press the **Next** button to continue.

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

Active Directory Domain Services Installation Wizard	×
Directory Services Restore Mode Administrator Password	
The Directory Services Restore Mode Administrator account is different from the dom 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.	nain
Password:	
Confirm password:	
More about <u>Directory Services Restore Mode password</u>	
< <u>B</u> ack <u>N</u> ext > C	ancel

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

Province and active				
Poviou vour coloctione:				
neview your selections:				
Configure this server as the	first Active Directory	y domain controll	er in a new fores	t. 🔺
The new domain name is "H	KemSafe.Local''. Th	iis is also the nan	ne of the new for	rest.
The NetBIOS name of the d	domain is "KERNSA	FE".		
Forest Functional Level: Wir	ndows Server 2008	R2		
Domain Functional Level: V	Vindows Server 200	8 R2		
Site: Default-First-Site-Name	•			
Additional Options:				-
To change an option, click	Back. To begin the	operation, click	Next.	
These settings can be expo other unattended operations More about <u>using an answe</u>	rted to an answerfil s. <u>r file</u>	e for use with	Export settin	gs

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.



Select zone type.

New Zone Wizard	×
Zone Type The DNS server supports various types of zones and storage.	
Select the type of zone you want to create:	
Primary zone Creates a copy of a zone that can be updated directly on this server.	
Secondary zone Creates a copy of a zone that exists on another server. This option helps balance the processing load of primary servers and provides fault tolerance.	e
Stub zone Creates a copy of a zone containing only Name Server (NS), Start of Authority (SOA), and possibly glue Host (A) records. A server containing a stub zone is not authoritative for that zone.	t
Store the zone in Active Directory (available only if DNS server is a writeable don controller)	nain
< Back Next > Car	ncel

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.

New Zone Wizard	×
Active Directory Zone Replication Scope You can select how you want DNS data replicated throughout your network.	-
Select how you want zone data replicated:	
O To all DNS servers running on domain controllers in this forest: KernSafe.Local	
• To all DNS servers running on domain controllers in this domain: KernSafe.Local	
O To all domain controllers in this domain (for Windows 2000 compatibility): KernSafe.Local	
igodot To all domain controllers specified in the scope of this directory partition:	
	<b>Y</b>
< Back Next > Ca	ncel

Keep the default selection.

Press the **Next** button to continue.

Choose Reverse Lookup Zone Name.

New Zone Wizard	×
Reverse Lookup Zone Name A reverse lookup zone translates IP addresses into DNS names.	
Choose whether you want to create a reverse lookup zone for $\ensuremath{\text{IPv4}}\xspace$ addresses.	
IPv4 Reverse Lookup Zone	
O IPv6 Reverse Lookup Zone	
< Back Next > Cance	s

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: 192 .168 .1 The network ID is the portion of the IP addresses that belongs to this zone. En 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 zone 0.10.in-addr.arpa.	nter the ple, I create
Reverse lookup zone name: 1.168.192.in-addr.arpa	
< 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.

New Zone Wizard	×
<b>Dynamic Update</b> You can specify that this DNS zone accepts secure, nonsecure, or no dynamic updates.	
Dynamic updates enable DNS client computers to register and dynamically update the resource records with a DNS server whenever changes occur. Select the type of dynamic updates you want to allow:	eir
Allow only secure dynamic updates (recommended for Active Directory) This option is available only for Active Directory-integrated zones.	
<ul> <li>Allow both nonsecure and secure dynamic updates</li> <li>Dynamic updates of resource records are accepted from any client.</li> <li>This option is a significant security vulnerability because updates can be accepted from untrusted sources.</li> </ul>	
O not allow dynamic updates Dynamic updates of resource records are not accepted by this zone. You must up these records manually.	odate
< Back Next > Car	ncel

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.

File     Action     View     Help       Image: State of the state of	🚊 DNS Manager			
Image: Second	File Action View Help			
DNS     Name     Type     Data     Timestamp       Image: Im	(= =) 🖄 🖬 💥 🖬 Q 🔒 🛛 🖬 📑 🗐 📬			
<ul> <li></li></ul>	Image: Second state second	Type Start of Authority (SOA) Name Server (NS) Host (A) Host (A) Host (A)	[47], 08dc.kernsafe.local., 08dc.kernsafe.local. 192.168.0.197 192.168.0.197 192.168.0.197	Timestamp static static 1/12/2010 9: static static
Create a new host resource record.	Create a new host resource record.			Þ

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.

New Host	×
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	2
Add Host Done	

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				
🗢 🔿 🖄 📅 🔀 🖬 🧟 🗟	2 🖬 🗄 🗐 🖬			
DNS 08DC Global Logs Forward Lookup Zones CernSafe.Local Reverse Lookup Zones Conditional Forwarders	Name 	Type Start of Authority (SOA) Name Server (NS) Host (A) Host (A) Host (A) Host (A) Host (A)	[47], 08dc.kernsafe.local., 08dc.kernsafe.local. 192.168.0.197 192.168.0.197 192.168.0.197 192.168.1.101 192.168.1.102	Timestamp static static 1/12/2010 9: static static
	<u>  •  </u>			<u> </u>

🛔 DNS Manager				
<u>File Action View H</u> elp				
🗢 🔿 🖄 🖬 😫 🗟				
DNS OBDC Global Logs Forward Lookup Zones Construction KernSafe.Local Reverse Lookup Zones Conditional Forwarders Conditional Forwarders	Name (same as parent folder) (same as parent folder) 192.168.1.101 192.168.1.102	Type Start of Authority (SOA) Name Server (NS) Pointer (PTR) Pointer (PTR)	Data [3], 08dc.kernsafe.local., h 08dc.kernsafe.local. 08node1.kernsafe.local. 08node2.kernsafe.local.	Timestamp static static static static
I Description of the second	•			F
	,			

# **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.

You can get IP settings assign his capability. Otherwise, you for the appropriate IP settings	ed automatically if your network supports need to ask your network administrator s.
Obtain an IP address aut	omatically
Output Description Use the following IP addr	ess:
IP address:	192.168.0.2
Subnet mask:	255.255.255.0
Default gateway:	192.168.0.1
Obtain DNS server addre	ss automatically
() Use the following DNS se	rver addresses:
Preferred DNS server:	192.168.0.1
Alternate DNS server:	K 20 X
🔲 Validate settings upon e	xit Advanced

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 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.

Create iSCSI Target Wizard	×
<b>iSCSI Medium Type</b> Select medium of the iSCSI disk you want to create.	<b>\$</b>
<ul> <li>Image File Create iSCSI disk by using standard image file or Virtual Hard Disk (.VHD).</li> <li>RAM Space Create iSCSI disk by using memory space.</li> </ul>	
<ul> <li>Security Images         Create iSCSI disk images for each initiators, any image is individual for each initiator.     </li> <li>Disk Partition         Create iSCSI target by using a disk partition.     </li> </ul>	
Physical Disk Create iSCSI target by using physical disk.	
< Back Next > C	ancel

Choose Image File in iSCSI Medium Type page.

Then press **Next** button to continue.

Create iSCSI Target Wizard	×
<b>iSCSI Image Type</b> Select image type of the iSCSI disk you want to create.	
<ul> <li>Standard Image File Create iSCSI disk by using a standard disk image file.</li> <li>Virtual Hard Disk (VHD) Create iSCSI disk by using a Virtual Hard Disk image file.</li> </ul>	
<pre></pre>	ancel

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

Specify image file path and size.

Create iSCSI Target Wizard	x
Image Disk Configuration You can specify a image file as an iSCSI device.	
Device Parameters	
Use existing image file Oreate a new image file	
H:\Quorum.img Browse	
Device Size in MBs: 1024	
Optiona	
Use sparse file on NTFS file system	
Note: Using sparse file can save your harddisk space, the size of disk image file only depend on its content used. But we recommentd that using this feature when image file size is less than 1T bytes	
< Back Next > Can	cel

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.

Create iSCSI Target Wizard	X
<b>Authorization</b> You can select an authorization mode, Anonymous, CHAP or IP filter.	
Anonymous Select this option to disable any authorization.	
CHAP Select this option to use CHAP authorization.	
IP Filter Select this option to use IP address authorization.	
Mixed Select this option to use both CHAP and IP address authorization.	
☑ Inherit security roles from global settings.	
< Back Next > Ca	incel

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

Press the **Next** button to continue.

Finish creating iSCSI Target

Create iSCSI Target Wizard	×
Completing the Create iSCSI Wizard You can specify a target name and other options to complete iSCSI target creating.	
Basic Target Information Enter Target Name: iqn.2006-03.com.kemsafe:KemStorage.Quorum I Report as readonly device when initiator can not get write access I Enable multiple initiators with full access connected (sharing and clustering)	
Note By default, only one client has full access right, when the second initiaor log on with full access, it will fail. But this option is usfull for clustering, disk sharing and NAS.	
< Back Finish C	ancel

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.

Create iSCSI Target Wizard	×			
<b>iSCSI Medium Type</b> Select medium of the iSCSI disk you want to create.				
<ul> <li>Image File Create iSCSI disk by using standard image file or Virtual Hard Disk (.VHD).</li> <li>RAM Space Create iSCSI disk by using memory space.</li> </ul>				
<ul> <li>Security Images Create iSCSI disk images for each initiators, any image is individual for each initiator.</li> <li>Disk Partition Create iSCSI target by using a disk partition.</li> <li>Physical Disk Create iSCSI target by using physical disk.</li> </ul>				
< Back Next >	Cancel			

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.

Create iSCSI Target Wizard
Image Disk Configuration You can specify a image file as an iSCSI device.
Device Parameters
Use existing image file Oreate a new image file
H:\Generic.img Browse
Device Size in MBs: 4096
Options
Use sparse file on NTFS file system
Note: Using sparse file can save your harddisk space, the size of disk image file only depend on its content used. But we recommentd that using this feature when image file size is less than 1T bytes
< Back Next > Cancel

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.

Create iSCSI Target Wizard	X
Authorization You can select an authorization mode, Anonymous, CHAP or IP filter.	
<ul> <li>Anonymous</li> <li>Select this option to disable any authorization.</li> <li>CHAP</li> </ul>	
Select this option to use CHAP authorization.	
IP Filter Select this option to use IP address authorization.	
Mixed Select this option to use both CHAP and IP address authorization.	
☑ Inherit security roles from global settings.	
< Back Next > Ca	ncel

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

Press the **Next** button to continue.

Finish creating iSCSI Target

Create iSCSI Target Wizard	×
Completing the Create iSCSI Wizard You can specify a target name and other options to complete iSCSI target creating.	
Basic Target Information Enter Target Name: iqn.2006-03.com.kemsafe:KemStorage.Generic ✓ Report as readonly device when initiator can not get write access ✓ Enable multiple initiators with full access connected (sharing and clustering)	
Note By default, only one client has full access right, when the second initiaor log on with full access, it will fail. But this option is usfull for clustering, disk sharing and NAS.	
< Back Finish Ca	ancel

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.

iStorage Server Management Co	onsole					_ <b>D</b> X
<u>S</u> torage <u>C</u> lients <u>V</u> iew <u>T</u> ool	<u>S</u> torage <u>C</u> lients <u>V</u> iew <u>T</u> ools <u>H</u> elp					
Create Delete Sta	rt Stop Refresh Add	Remove	View A	cess 🗸	Settings P	rint About
E@ kernsafe-PC E@ Targets ≫ KernStorage.Quorum	iStorage Server: kernsafe-P	C	uns[] Logs]			
🧼 📚 KernStorage.Generic	Target Name	Device	Source	Canaci	Authenticati	Status
Applications     IPFilters	ign.2006-03.com.kernsafe:KernStora	Disk Dri	H:\Ouorum.ima	1.00G	Anonymous	Enab
	iqn.2006-03.com.kernsafe:KernStora	Disk Dri	H:\Generic.img	4.00G	Anonymous	Enab
See Groups 						
Done 😚 Connected: kernsafe-PC (Ultimate License)				imate License)		

## **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.

eneral	
You can get IP settings assign this capability. Otherwise, you for the appropriate IP settings	ed automatically if your network supports need to ask your network administrator .
🔘 Obtain an IP address aut	omatically
• Use the following IP addr	ess:
IP address:	192.168.0.5
Subnet mask:	255.255.255.0
Default gateway:	192.168.0.1
Obtain DNS server addre	ss automatically
Ose the following DNS ser	rver addresses:
Preferred DNS server:	192 . 168 . 0 . 1
Alternate DNS server:	10 NO 11
Validate settings upon es	xit Advanced

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.

iStorage Server Management Console				- <b>-</b> X	
<u>Storage</u> <u>Clients</u> <u>V</u> iew <u>T</u> ools <u>H</u> e	<u>S</u> torage <u>C</u> lients <u>V</u> iew <u>T</u> ools <u>H</u> elp				
Create Delete Start	Stop Refresh Add Remove View	Access	<ul> <li>Settings</li> </ul>	Print Abou	
e kernsafe-PC ⊨ International Targets	🥞 iStorage Server: kernsafe-PC				
KernStorage.Quorumpartner	General Targets Applications IP Filters Users Groups	Logs			
	Target Name	Device T	S Capacity	Authentication	
IPFilters	👒 iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner	Disk Drive	H 1.00G	Anonymous	
	👒 iqn.2006-03.com.kernsafe:KernStorage.Genericpartner	Disk Drive	H 4.00G	Anonymous	
	<	-		•	
Done S Connected: kernsafe-PC (Ultimate License)					

# **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.		4
Base Target		
Target Name	Device Type	
🕼 iqn.2006-03.com.kemsafe:KemStorage.Quorum	Disk	
iqn.2006-03.com.kemsafe:KemStorage.Generic	Disk	
Mirror Target	Ec	dit
< B	ack Next >	Cancel

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

Select iSCSI Tar	get	<b>— X</b>
- iSCSI Sourc	e	
Host Name:	192.168.0.5	Port: 3260
CHAP	Use CHAP to logon	
User Name:		
Secret:		
- Target		
Target:	iqn.2006-03.com.kernsafe:KernStorage	.Quorumpartner 💌
	Discovery	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.

te Application Wizard		
Fail Over Configuration You can specify two servers to fail over each other.		Ş
Base Target		
Target Name	Device Type	
iqn.2006-03.com.kemsafe:KemStorage.Quorum	Disk	
iqn.2006-03.com.kemsafe:KemStorage.Generic	Disk	
Mirror Target		
iqn.2006-03.com.kemsafe:KemStorage.Quorumpartner	E	dit
<	Back Next >	Cancel

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

Mirror Synchronization		
Synchronization Type		
Create mirror device with full synchronization from base iSCSI target		
<ul> <li>Create mirror device without synchronization (Manual Initialization)</li> </ul>		
Synchronization Progress		
Warning: all data on the mirror device will be destroyed after synchronization.  OK Cancel		

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.	2
Base Target	
Target Name	Device Type
iqn.2006-03.com.kemsafe:KemStorage.Quorum	Disk
iqn.2006-03.com.kemsafe:KemStorage.Generic	Disk
Mirror Larget	
	Edit
< B	ack Next > Cancel

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

Select iSCSI Tar	get			x
- iSCSI Source	e			
Host Name:	192.168.0.5	Port:	3260	
CHAP	Use CHAP to logon			
User Name:				
Secret:				
Target —				
Target:	iqn.2006-03.com.kernsafe:KernStorage	Generi	partner	•
	Discovery		Car	ncel

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.

reate Application Wizard		×
Fail Over Configuration You can specify two servers to fail over each other.		2
Base Target		
Target Name	Device Type	
iqn.2006-03.com.kemsafe:KemStorage.Quorum	Disk	
Iqn.2006-03.com.kemsafe:KemStorage.Generic	Disk	
Mirror Tarnet		
ign.2006-03.com.kemsafe:KemStorage.Genericpartner	F	dit
	Back Next >	Cancel
	NCAL 2	Cancel

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

Mirror Synchronization
Synchronization Type
Create mirror device with full synchronization from base iSCSI target
Create mirror device without synchronization (Manual Initialization)
Synchronization Progress
Warning: all data on the mirror device will be destroyed after synchronization.  OK Cancel

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.

iStorage Server Management Co	nsole			
<u>S</u> torage <u>C</u> lients <u>V</u> iew <u>T</u> ool	s <u>H</u> elp			
Create Delete Sta	rt Stop Refresh Add Remove	View	Access Settings	Print A
E	iStorage Server: kernsafe-PC General Targets Applications IP Filters Users Gr	roups Log	5	
	Target Name	Applic	Mirror Device	Status
IPFilters	🔊 iqn.2006-03.com.kernsafe:KernStorage.Quorum	Cluster	iSCSI: 192.168.0.5:3260:iqn.2006	Running
Users	🔊 iqn.2006-03.com.kernsafe:KernStorage.Generic	Cluster	iSCSI: 192.168.0.5:3260:iqn.2006	Running
		U.		
Done		3	Connected: kernsafe-PC (Ultimate	License)

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:

🍓 iStorage Server Management Console				_ <b>D</b> _ X
<u>S</u> torage <u>C</u> lients <u>V</u> iew <u>T</u> ools <u>H</u> e	łp			
Create Delete Start	Stop Refresh Add Remove	View	Access S	ettings Prin
⊟@ kernsafe-PC Ė@ Targets	iStorage Server: kernsafe-PC			
KernStorage.Quorumpartner	General Targets Applications IP Filters Users	Groups	.ogs	
Applications	Target Name	Applic	Mirror Device	Status
IPFilters	iqn.2006-03.com.kernsafe:KernStorage.Quo	Cluster	iSCSI: 192.168.0	Running
Groups	iqn.2006-03.com.kernsafe:KernStorage.Gen	Cluster	iSCSI: 192.168.0	Running
Logs				
Done		Connected	: kernsafe-PC (Ultim	ate License)

# **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.

Internet Protocol Version 4 (TCP/IP	v4) 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.				
O Obtain an IP address automatica	lly			
□ Use the following IP address:				
IP address:	192.168.1.101			
Subnet mask:	255.255.255.0			
Default gateway:	192.168.1.2			
C Obtain DNS server address auto	matically			
• Use the following DNS server add	dresses:			
Preferred DNS server:	192.168.1.2			
<u>A</u> lternate DNS server:	· · ·			
Validate settings upon exit	Ad <u>v</u> anced			
	OK Cancel			

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

Set the second network adapter of 08Node.

Internet Protocol Version 4 (TCP/IPv	(4) Properties	? ×
General		
You can get IP settings assigned autom this capability. Otherwise, you need to for the appropriate IP settings.	natically if your network suppor ask your network administrato	ts r
C Obtain an IP address automatical	ly	
Use the following IP address:		_
IP address:	192.168.2.101	
Subnet mask:	255 . 255 . 255 . 0	
Default gateway:		
C Obtain DN5 server address auton	natically	
ho Use the following DNS server add	resses:	_
Preferred DNS server:		
Alternate DNS server:		
Validate settings upon exit	Advanced.	
	OK Can	icel

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.

System Properties		X
Computer Name Hardwa	re Advanced Remote	
Windows uses on the network	the following information to identify your computer c.	
Computer description:		
	For example: "IIS Production Server" or "Accounting Server".	
Full computer name:	WIN-761UGR36DM5	
Workgroup:	WORKGROUP	
To rename this computer workgroup, click Change	or change its domain or <u>C</u> hange	
	OK Cancel Apply	

Press the Change ... button.

Computer Name/Domain Changes	×
You can change the name and the membership of this computer. Changes might affect access to network resources. <u>More information</u>	
Computer name:	
08Node1	-
Full computer name: 08Node1	
<u>M</u> ore	
Member of	1
• Domain:	
kemsafe.local	
O Workgroup:	
WORKGROUP	
OK Cancel	

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.

Vindows Securi	ty	×
Computer Nar Enter the name	<b>me/Domain Changes</b> and password of an account with permission to join the domain.	
	User name Password Domain: kernsafe	
	OK Cancel	

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.

Microsoft Windows	×
You must restart your compute	r to apply these changes
Before restarting, save any open file	s and close all programs.
Rest	art Now Restart Later

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.

Add Features Wizard			×
Select Features			
Features Confirmation Progress Results	Select one or more features to install on this server. Eeatures:	Description: <u>Multipath I/O</u> , along with the Microsoft Device Specific Module (DSM) or a third-party DSM, provides support for using multiple data paths to a storage device on Windows.	
	< <u>P</u> revious	> Install Cancel	

# Log in to iSCSI disks

Launch the Administrative Tools -> Microsoft iSCSI initiator.

<u>T</u> arget:		Q	uick Connect
Discovered ta	argets		Refresh
Name		Status	
To connect u click Connect	using advanced options, select a targe	et and then	Cognect
To connect u click Connect To completel then click Dis	using advanced options, select a targe t. ly disconnect a target, select the targ sconnect.	et and then	Cognect Disconnect
To connect u dick Connect To completel then dick Dis For target pr select the ta	using advanced options, select a targe t. ly disconnect a target, select the targ sconnect. roperties, including configuration of se irget and click Properties.	et and then	Cognect Disconnect Properties
To connect u click Connect to completel then click Dis For target pr select the ta For configura the target ar	using advanced options, select a targe t. ly disconnect a target, select the targ connect. roperties, including configuration of se irget and click Properties. ation of devices associated with a targ nd then click Devices.	et and then	Cognect Disconnect Properties Deyjces
To connect u click Connect To completel then click Dis For target pr select the ta For configura the target ar	using advanced options, select a targe t. ly disconnect a target, select the targ sconnect. roperties, including configuration of se irget and click Properties. ation of devices associated with a targ nd then click Devices.	et and then	Cognect Disconnect Properties Deyjces

Select the **Discovery** page.

SCSI Ini	tiator Prope	erties			2
Targets	Discovery	Favorite Targets	Volumes and Devices	RADIUS Configuration	
-					
Targ	et portais			Refresh	
Add	system will lo fress	ok for <u>T</u> argets on f	Adapter	IP address	
		, ore	ridupter	1 000/000	
Tor	udd a taraat o	ortal dick Discove	r Portal	Discover Portal	
- 10 2	uu a taiget p				
ther	emove a targ n click Remove	et portal, select th 2.	e address above and	Remove	
<b>_</b> iSNS	servers				
The	system is reg	istered on the follo	owing <u>i</u> SNS servers:	Refresh	
Nar	ne				
To a	add an iSNS se	erver, click Add Ser	ver.	A <u>d</u> d Server	
To r	emove an iSN dick Remove	S server, select th	e server above and	Remove	
uici	r dick remove				
Mo	re about Disc	overy and iSNS			
			OK	Cancel Apply	

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

Discover Target Portal	×
Enter the IP address or DNS name and p want to add.	ort number of the portal you
To change the default settings of the dis the Advanced button.	covery of the target portal, dick
IP address or DNS name:	Port: (Default is 3260.)
192.168.0.2	3260
<u>A</u> dvanced	<u>O</u> K <u>C</u> ancel

Discover Target Portal	×
Enter the IP address or DNS name and p want to add.	ort number of the portal you
To change the default settings of the dist the Advanced button.	covery of the target portal, click
IP address or DNS name:	Port: (Default is 3260.)
192.168.0.5	3260
<u>A</u> dvanced	<u>O</u> K <u>C</u> ancel

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.

CSI Initiator Properties	
Targets Discovery Equation Targets Velymon and David	
Pargets   Discovery   Pavorite Targets   Volumes and Devic	
Quick Connect	a true the TD eddeese as
DNS name of the target and then click Ouick Connect.	on, type the IP address or
Target:	Quick Connect
Discovered targets	
	Refresh
[	
Name	Status
ign. 2006-03.com.kernsafe:KernStorage.Generic	Inactive
ign 2006-03 com kernsaferKernStorage.Genericpartner	Inactive
ign 2006-03 com kernsafe KernStorage Quorum	Inactive
ight 2000-03.com.kernsbreikernsbordget.gubrumparater	Indeave
To connect using advanced options, select a target and th	hen - I
dick Connect.	Connect
To completely disconnect a target releat the target and	
then dick Disconnect.	Disconnect
For target properties, including configuration of sessions,	Properties
select the target and click Properties.	
For configuration of devices associated with a target, sele	ect Devices
the target and then click Devices.	
More about basic iSCSI connections and targets	
OK	

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

Connect To Target	×
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 restor connection every time this computer restarts.	ire the
Enable multi-path	
<u>A</u> dvanced OK	Cancel





Connect To Target	×
Target name:	
iqn.2006-03.com.kernsafe:KernStorage.Genericpartner	
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.

argets       Discovery       Favorite Targets       Volumes and Devices       RADIUS       Configuration         Quick Connect       To discover and log on to a target using a basic connection, type the IP address or DNS name of the target and then dick Quick Connect.       IP address or DNS name of the target and then dick Quick Connect.         Target:       Quick Connect.       Quick Connect.         Discovered targets       Refresh         Name       Status       Iqn. 2006-03.com.kernsafe:KernStorage.Generic         Iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         Iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         Iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         Iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         Iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         Iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         Iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then dick Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and dick Properties.       Properties         For configuration of devices associated with a target, select the target and then dick Devices.       Devices         More about basic ISCSI connections and targets	argets Disco				
Quick Connect       To discover and log on to a target using a basic connection, type the IP address or DNS name of the target and then click Quick Connect.         Target:       Quick Connect         Discovered targets       Refresh         Name       Status         iqn. 2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Genericpartner       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then click Connect.       Disconnect         To completely disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select       Devices       More about basic ISCSI connections and targets         More about basic ISCSI connections and targets       OK       Connel       Confu		overy Favorite Targets Volumes and Dev	vices   RAI	DIUS Configuration	
To connect using advanced options, select a target and then click Quiry Connected lign. 2006-03.com.kernsafe:KernStorage.Quorumpartner Connected lign. 2006-03.com.kernsafe:KernStorage.Quorum Connected Sconected lign. 2006-03.com.kernsafe:KernStorage.Quorum Connected lign. 2006-03.com.kernsafe:KernStorage.Quorum Connected Sconected lign. 2006-03.com.kernsafe:KernStorage.Quorum Connected Sconected Lign. 2006-03.com.kernsafe:KernStorage.Quorum Connected Lign. 2006-03.com.kernsafe:KernStorage.Quorumpartner Connected Sconected Lign. 2006-03.com.kernsafe:KernStorage.Quorum Connected Lign. 2006-03.com.kernsafe:KernStorage.Quorumpartner Connected Lign. 2006-03.com.kernsafe:KernStorage.Qu	Ouick Connec	+			_
Target:       Quick Connect         Discovered targets       Refresh         Name       Status         Iqn.2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connect         To connect using advanced options, select a target and then click Connect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and target	To discover a	and log on to a target using a basic connect	ion, type t	he IP address or	
Target:       Quick Connect         Discovered targets       Refresh         Name       Status         iqn. 2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         ign. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and dick Properties       Properties         For configuration of devices associated with a target, select       Devices         More about basic iSCSI connections and targets       More about	Divo name or	na le target and then tick guick connect.			
Discovered targets           Refresh           Name         Status           iqn.2006-03.com.kernsafe:KernStorage.Generic         Connected           iqn.2006-03.com.kernsafe:KernStorage.Genericpartner         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorum         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorum         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorum         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner         Connected           To connect         Disconnect.         Disconnect           To completely disconnect.         Disconnect         Disconnect           For target properties, including configuration of sessions, select the target and then click Devices.         Devices         Devices           More about basic iSCSI connections and targets         Devices         Devices         Devices	Target:			Quick Connect	
Name       Status         iqn. 2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then click Connect.       Connect         To completely disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets	Discovered ta	argets			
Name       Status         iqn.2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then click Connect.       Connect         To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets				Refresh	
iqn. 2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then click Connect.       Connect         To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select       Devices         More about basic iSCSI connections and targets	Name		Stat	us	
iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then click Connect.       Connect         To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       OK       Cancel       Only	iqn.2006-03	3.com.kernsafe:KernStorage.Generic	Con	nected	
iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then click Connect.       Connect         To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       OK       Cancel       Apply	iqn.2006-03	3.com.kernsafe:KernStorage.Genericpartne	r Con	nected	
iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then dick Connect.       Connect         To completely disconnect a target, select the target and then dick Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and dick Properties.       Properties         For configuration of devices associated with a target, select the target and then dick Devices.       Devices         More about basic iSCSI connections and targets       OK       Cancel       Apply	ign.2006-03	3.com.kernsafe:KernStorage.Quorum	Con	nected	
To connect using advanced options, select a target and then click Connect. To completely disconnect a target, select the target and then click Disconnect. For target properties, including configuration of sessions, select the target and click Properties. For configuration of devices associated with a target, select the target and then click Devices. More about basic iSCSI connections and targets OK Cancel (moly)	ign.2006-03	3.com.kernsafe:KernStorage.Quorumpartne	r Con	nected	
Click Connect.       Disconnect         To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       OK       Cancel       Apply					
To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       OK       Cancel       Apply	To connect u	using advanced options, select a target and	then	Connect	
For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       OK       Cancel       Apply	To connect u click Connect	using advanced options, select a target and t.	then	Connect	
For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets         OK       Cancel	To connect u dick Connect To completel then dick Dis	using advanced options, select a target and t. y disconnect a target, select the target and connect.	then I	Connect Disconnect	
More about basic iSCSI connections and targets OK Cancel Apply	To connect u dick Connect To completed then dick Dis For target pr select the tar	using advanced options, select a target and t. y disconnect a target, select the target and connect. roperties, including configuration of sessions rget and click Properties.	then I	Connect Disconnect Properties	
More about basic iSCSI connections and targets OK Cancel Apply	To connect u dick Connect To completel then dick Dis For target pr select the tar For configura the target ar	using advanced options, select a target and t. y disconnect a target, select the target and connect. roperties, including configuration of sessions rget and click Properties. ation of devices associated with a target, se nd then click Devices.	then 1 5, elect	Connect Disconnect Properties Devices	
OK Cancel Apply	To connect u click Connect To completel then click Dis For target pr select the tar For configura the target ar	using advanced options, select a target and t. y disconnect a target, select the target and connect. roperties, including configuration of sessions rget and click Properties. ation of devices associated with a target, se nd then click Devices.	then J S,	Connect Disconnect Properties Devices	
OK Cancel Apply	To connect u click Connect To completel then click Dis For target pr select the tar For configura the target ar	using advanced options, select a target and t. y disconnect a target, select the target and connect. roperties, including configuration of sessions rget and click Properties. ation of devices associated with a target, se nd then click Devices.	then J s,	Connect Disconnect Properties Devices	
OK Cancel Apply	To connect u dick Connect To completel then dick Dis For target pr select the tar For configura the target ar	using advanced options, select a target and t. y disconnect a target, select the target and connect. roperties, including configuration of sessions rget and click Properties. ation of devices associated with a target, se nd then click Devices.	then 5, elect	Connect Disconnect Properties Devices	
	To connect u dick Connect To completel then dick Dis For target pr select the tar For configura the target ar	using advanced options, select a target and t. y disconnect a target, select the target and connect. roperties, including configuration of sessions rget and click Properties. ation of devices associated with a target, se nd then click Devices.	then I s,	Connect Disconnect Properties Devices	

# **Enable Multipath Support**

Launch MPIO manager by clicking Start->Administrative Tools->MPIO. Go to Discover Multi-Paths tab,

check Add support for iSCSI devices.

esi
Add

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.

Server Manager					_ 🗆 X
File Action View Help					
🗢 🔿 🔰 🖬 😰 🗰 🗙	é 🖆 🚔 😼				
Server Manager (08NODE1)	Disk Managemen	t Volume List + Graphical View		Actions	
E P Roles	Volume	Layout Type File System Status		Disk Management	-
Configuration	画 (C:) System Reserved	Simple Basic NTFS Healthy (E Simple Basic NTFS Healthy (S	Boot, I Syster	More Actions	•
E Storage					
Windows Server Backup	•				
Disk Management	Disk 0 Basic 40.00 GB Online	System I 100 MB NT Healthy (S Healthy (Boot, Page File, Cr			
	Disk 1 Basic 4.00 GB Online	4.00 GB Unallocated			
	Disk 2 Basic 1023 MB Online	1023 MB Unallocated	•		
	Unallocated	Primary partition		<u> </u>	

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.

Ele Action View Help         Image: (08NODE1)         Server Manager (08NODE1)         Image: Roles	
Construction     C	
Server Manager (08NODE1)    Server Manager (08NODE1)   Server Manager (08NODE1)   Server Manager (08NODE1)  Get an overview of the status of this server, perform top management tasks, and add or remove server roles and features.	
Configuration     Storage	
Server Summary	
Image: Computer Information       Image: Computer Name:       08Node 1.KernSafe.Local       Image: Change System Properties       Image: Change: Change System Properties       Image: Change: Change System Properties       Image: Change: Change: Change: Change: Change: Change: Change: Change: Change: System Properties       Image: Change:	iote
Security Information	ard
Last Kerresn: Today at 10:37 PM Configure refresn	

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



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

Add Features Wizard		X
Select Features		
Features Confirmation Progress Results	Select one or more features to install on this server.         Eeatures: <ul> <li>NET Framework 3.5.1 Features</li> <li>Background Intelligent Transfer Service (BITS)</li> <li>BitLocker Drive Encryption</li> <li>BranchCache</li> <li>Connection Manager Administration Kit</li> <li>Desktop Experience</li> <li>DirectAccess Management Console</li> <li>Falover Clustering</li> <li>Group Policy Management</li> <li>Internet Printing Client</li> <li>Internet Storage Name Server</li> <li>LPR Port Monitor</li> <li>Multipath I/O</li> <li>Network Load Balancing</li> <li>Peer Name Resolution Protocol</li> <li>Quality Windows Audio Video Experience</li> <li>Remote Differential Compression</li> </ul> More about features	Description:          Failover Clustering allows multiple servers to work together to provide high availability of services and applications. Failover Clustering is often used for file and print services, database and mail applications.         Image: The service of

#### Select the Failover Clustering.

Press the **Next** button to continue.

Confirm Installation Selections
Features       To install the following roles, role services, or features, dick Install.         Progress       1 informational message below         Image: The server might need to be restarted after the installation completes.         Failover Clustering         Image: The server might need to be restarted after the installation completes.         Failover Clustering         Image: The server might need to be restarted after the installation completes.         Failover Clustering         Image: The server might need to be restarted after the installation completes.         Failover Clustering         Image: The server might need to be restarted after the installation completes.         Failover Clustering         Image: The server might need to be restarted after the installation completes.         Failover Clustering         Print, e-mail, or save this information         Image: Print, e-mail, or save this information

Press the Install button to install the Failover Clustering feature.

The installation of the Failover Clustering is going on.

Add Features Wizard	
Installation Prog	ress
Features	The following roles, role services, or features are being installed:
Confirmation	Eailover Clustering
Progress	
Results	
	Installing
	< <u>Previous</u> <u>Next</u> > <u>Install</u> Cancel

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.

Internet Protocol Version 4 (TCP/IP	v4) 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.			
O Obtain an IP address automatica	lly		
<ul> <li>Use the following IP address:</li> </ul>			
IP address:	192 . 168 . 1 . 102		
Subnet mask:	255.255.255.0		
Default gateway:	192.168.1.2		
C Obtain DNS server address auto	matically		
□ Use the following DNS server add	dresses:		
Preferred DNS server:	192.168.1.2		
<u>A</u> lternate DNS server:			
🕅 Vaļidate settings upon exit	Ad <u>v</u> anced		
	OK Cancel		

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

Set the second network adapter of 08Node.

Internet Protocol Version 4 (TCP/IPv	4) Properties	? ×
General		
You can get IP settings assigned autom this capability. Otherwise, you need to for the appropriate IP settings.	natically if your network suppor ask your network administrato	ts r
O Obtain an IP address automatical	ly	
• Use the following IP address:		
IP address:	192 . 168 . 2 . 102	
Subnet mask:	255 . 255 . 255 . 0	
Default gateway:		
C Obtain DN5 server address auton	natically	
Use the following DNS server add	resses:	_
Preferred DNS server:		
Alternate DNS server:		
Validate settings upon exit	Ad <u>v</u> anced.	
	OK Car	ncel

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.

System Properties		x
Computer Name Hardwa	re Advanced Remote	
Windows uses on the network	the following information to identify your computer c.	
Computer description:	1	
	For example: "IIS Production Server" or "Accounting Server".	
Full computer name:	WIN-1SKQN4PN90I	
Workgroup:	WORKGROUP	
To rename this computer workgroup, click Change	or change its domain or <u>C</u> hange	
	OK Cancel Apply	

Press the Change ... button.

Computer Name/Domain Changes	×
You can change the name and the membership of this computer. Changes might affect access to network resources. <u>More information</u>	
Computer name:	
08Node2	-
Full computer name: 08Node2	
<u>M</u> ore	
Member of	1
• Domain:	
KemSafe	
○ <u>W</u> orkgroup:	
WORKGROUP	
OK Cancel	

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.

Vindows Securi	ty	×
Computer Nar Enter the name	me/Domain Changes and password of an account with permission to join the domain.	
	User name Password Domain: kernsafe	
	OK Cancel	

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.

Microsoft Windows	×
You must restart your compute	r to apply these changes
Before restarting, save any open file	s and close all programs.
Rest	art Now Restart Later

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.

Add Features Wizard			×
Select Features			
Features Confirmation Progress Results	Select one or more features to install on this server. Eeatures:	Description: <u>Multipath I/O</u> , along with the Microsoft Device Specific Module (DSM) or a third-party DSM, provides support for using multiple data paths to a storage device on Windows.	
	< <u>P</u> revious	> Install Cancel	

# Log in to iSCSI disks

Launch the Administrative Tools -> Microsoft iSCSI initiator.

Target:		2	uick Connect
Discovered ta	argets		Refresh
Name		Status	
To connect u click Connect	using advanced options, select a targe t.	t and then	Connect
To connect u click Connect To completel then click Dis	using advanced options, select a targe t. y disconnect a target, select the targe connect.	t and then	Co <u>n</u> nect Disconnect
To connect u dick Connect To completel then dick Dis For target pr select the ta	using advanced options, select a targe t. ly disconnect a target, select the targe connect. roperties, including configuration of se rget and click Properties.	t and then	Cognect Disconnect Properties
To connect u dick Connect To completel then dick Dis For target pr select the ta For configura the target ar	using advanced options, select a targe t. ly disconnect a target, select the targe sconnect. roperties, including configuration of se rget and click Properties. ation of devices associated with a targ nd then click Devices.	t and then	Cognect Disconnect Properties Degices
To connect u dick Connect To completel then click Dis For target pr select the ta For configura the target ar	using advanced options, select a targe t. ly disconnect a target, select the targe sconnect. roperties, including configuration of se irget and click Properties. ation of devices associated with a targ nd then click Devices.	t and then	Connect

Select the **Discovery** page.

SCSI Init	iator Prope	erties			×
Targets	Discovery	Favorite Targets	Volumes and Devices	RADIUS Configuration	
Taraa	t portala				
The	t portais	ak far Taraata op fa	llowing portals:	R <u>e</u> fresh	
Addr	ess	Port	Adapter	IP address	
To ad	ld a target p	ortal, click Discover	Portal.	Discover Portal	
To re	move a targ	et portal, select the	address above and	Remove	
then	click Remove	2.		170110110	
iSNS s	ervers	interned on the fallow	ving iSNS converge	Refresh	
Name	e	Istered on the follow	ving joino servers.		
To ad	ld an iSNS se	erver, click Add Serv	er.	Add Server	
To re	move an iSN	S server, select the	server above and	Remove	
then	click Remove	2.			
More	e about Disco	overy and iSNS			
			OK	Cancel <u>Apply</u>	

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

Discover Target Portal				
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, dick the Advanced button.				
IP address or DNS name:	Port: (Default is 3260.)			
192.168.0.2	3260			
<u>A</u> dvanced	OK Cancel			

Discover Target Portal	×
Enter the IP address or DNS name want to add.	and port number of the portal you
To change the default settings of the Advanced button.	ne discovery of the target portal, dick
IP address or DNS name:	Port: (Default is 3260.)
<u>A</u> dvanced	<u>O</u> K <u>C</u> ancel

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.

CSI Initiat	tor P	roperties						
Targets In		and Fauntin T		man and Davies	- Loss	TUE L Com	6 Ì	
	JISCOV	ery   Favorite i	argets   volu	imes and Device	S		nguration	
Quick Con	nnect		ant using a la					
DNS name	/eran e of t	he target and th	get using a b nen click Ouick	connection	, type u	he ip addre	ess or	
		Ĩ						
<u>T</u> arget:						Quick C	onnect,,,	
Discovere	ed tar	nets						
5.5607676		<u>d</u> em				Ref	fresh	ı
					[			
Name					Stati	JS		
ign. 2006	5-03.	com.kernsate:Ke	ernstorage.Ge	eneric	Inac	tive		
ign 2004	5-03.	com kernsaferKe	anstorage.Ge	uorum	Inac	uve tive		
ign 2006	5-03. 5-03.	com kernsafe Ke	ernStorage O	uorumpartner	Inac	uve tive		
1911.2000	0.00.	commernative	anotorage.q	aoramparater	Inde	uve		
-								
To conne click Conr	ect usi	ng advanced op	tions, select a	a target and the	en	Con	inect	
CICK COTI	iccu.							
To comple	etely	disconnect a tar	get, select th	e target and		Disco	onnect	
then click	DISC	onnect.						1
For targe	et pro	perties, including	g configuratio	n of sessions,		Prope	rtiec	t
select the	e targ	et and click Prop	perties.			Eiobe	rucom	1
For confid	ourat	ion of devices as	sociated with	a target, selec	t			
the targe	et and	then click Devic	es.	ra targety selec		Devi	ces	
More abou	ut bas	ic iSCSI connect	ions and targ	<u>ets</u>				
					-			_
				ОК	C	ancel	Apply	
								-

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

Connect To Target	×			
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				
<u>A</u> dvanced OK	Cancel			





Connect To Target	×			
Target name:				
iqn.2006-03.com.kernsafe:KernStorage.Genericpartner				
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.

argets       Discovery       Favorite Targets       Volumes and Devices       RADIUS       Configuration         Quick Connect       To discover and log on to a target using a basic connection, type the IP address or DNS name of the target and then click Quick Connect.       Quick Connect.         Target:       Quick Connect.       Quick Connect         Discovered targets       Refresh         Name       Status       Ign. 2006-03.com.kernsafe:KernStorage.Generic         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         ick Connect.       Disconnect       E         To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and then click Devices.		Properties				
Quick Connect         To discover and log on to a target using a basic connection, type the IP address or DNS name of the target and then click Quick Connect.         Target:       Quick Connect         Discovered targets       Refresh         Name       Status         iqn. 2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         To connect using advanced options, select a target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Prope	argets Disco	very Favorite Targets	Volumes and Devices	s   RAE	DIUS Configuration	n İ
To connect using advanced options, select a target and then dick Disconnect. To completely disconnect a target, select the target and dick Properties. For configuration of devices associated with a target, select More about basic ISCSI connections and targets	Ouick Connec	t		· ·		<u> </u>
Target:       Quick Connect         Discovered targets       Refresh         Name       Status         iqn.2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn.2006-03.com.kernsafe:KernStorage.Genericpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then click Connect.       Disconnect         To completely disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets <td colspan="4">To discover and log on to a target using a basic connection, type the IP address or</td>	To discover and log on to a target using a basic connection, type the IP address or					
Target:       Quick Connect         Discovered targets       Refresh         Name       Status         iqn. 2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then dick Disconnect.       Disconnect         To completely disconnect.       Disconnect       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets	bito fiance of		- Quick connecti			
Discovered targets           Refresh           Name         Status           iqn.2006-03.com.kernsafe:KernStorage.Generic         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorum         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorum         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorum         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorum         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner         Connected           iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner         Connected           To completely disconnect a target, select the target and then click Disconnect.         Disconnect           For target properties, including configuration of sessions, select the target and click Properties.         Properties           For configuration of devices associated with a target, select the target and then click Devices.         Devices           More about basic iSCSI connections and targets         More about basic iSCSI connections and targets	Target:				Quick Connect, ,	·
Refresh         Name       Status         iqn.2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect       Disconnect       Disconnect         To completely disconnect.       Disconnect       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       More about basic iSCSI conne	Discovered ta	rgets				
Name       Status         iqn.2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn.2006-03.com.kernsafe:KernStorage.Genericpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         iqn.2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then dick Connect.       Connect         To completely disconnect a target, select the target and then dick Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and dick Properties.       Properties         For configuration of devices associated with a target, select       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets					Refresh	
iqn. 2006-03.com.kernsafe:KernStorage.Generic       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect       Image: Connect of Connected       Image: Connected         To completely disconnect.       Disconnect       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties       Devices         For configuration of devices associated with a target, select       Devices       Devices       More about basic iSCSI connections and targets </td <td>Name</td> <td></td> <td></td> <td>Stat</td> <td>us</td> <td></td>	Name			Stat	us	
iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then dick Connect.       Connect         To completely disconnect a target, select the target and then dick Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and dick Properties.       Properties         For configuration of devices associated with a target, select the target and then dick Devices.       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets	iqn.2006-03	.com.kernsafe:KernStora	ge.Generic	Conr	nected	
iqn. 2006-03.com.kernsafe:KernStorage.Quorum       Connected         iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then dick Connect.       Connect         To completely disconnect a target, select the target and then dick Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets	iqn.2006-03	.com.kernsafe:KernStora	ge.Genericpartner	Conr	nected	
iqn. 2006-03.com.kernsafe:KernStorage.Quorumpartner       Connected         To connect using advanced options, select a target and then dick Connect.       Connect         To completely disconnect a target, select the target and then dick Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and dick Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets	ign.2006-03	.com.kernsafe:KernStora	ige.Quorum	Conr	nected	
To connect using advanced options, select a target and then dick Connect.       Connect         To completely disconnect a target, select the target and then dick Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and dick Properties.       Properties         For configuration of devices associated with a target, select the target and then dick Devices.       Devices         More about basic iSCSI connections and targets       More about basic iSCSI connections and targets	ign.2006-03	.com.kernsafe:KernStora	ge.Quorumpartner	Conr	nected	
Click Connect.       Disconnect.         To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       Output	To connect u	sing advanced options, s	elect a target and the	n	Connect	٦
To completely disconnect a target, select the target and then click Disconnect.       Disconnect         For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       Output	CIICK Connect	•				
For target properties, including configuration of sessions, select the target and click Properties.       Properties         For configuration of devices associated with a target, select the target and then click Devices.       Devices         More about basic iSCSI connections and targets       Output	To completely then click Dis	/ disconnect a target, sel connect.	ect the target and		Disconnect	
For configuration of devices associated with a target, select Devices  Devices  More about basic iSCSI connections and targets	For target pr select the tar	operties, including config get and click Properties.	uration of sessions,		Properties	
More about basic iSCSI connections and targets	For configura the target an	tion of devices associate d then click Devices.	d with a target, select	t	Devices	
More about basic iSCSI connections and targets						
		-1-1000T	La			
	More about ba	ISIC ISESE connections and	d targets			
	More about ba	ISIC ISCS1 connections and	<u>a targets</u>			
OK Cancel Apply	More about ba	ISIC ISCS1 connections and	<u>a targets</u>			

## **Enable Multipath Support**

Launch MPIO manager by clicking Start->Administrative Tools->MPIO. Go to Discover Multi-Paths tab,

check Add support for iSCSI devices.

Device Horaw	vare Id	
Add suppor	t for iSCSI devices	
i na sacesi		Add
<u>O</u> thers		
Device Hardw	vare Id	

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.

Server Manager			
File Action View Help			
🗇 🔿 🔰 💽 🛐 📓			
Server Manager (08NODE1)	Disk Managemer	t Volume List + Graphical View	Actions
🕀 📄 Roles	Volume	Layout Type File System Status	Disk Management 🔺
E Features	(C:)	Simple Basic NTFS Healthy (Boot, Page File, Crash Dump, Pri	Mara Actions
	System Reserve	Simple Basic NTFS Healthy (System, Active, Primary Partition	Hore Actions
E Storage			
Windows Server Backup			
Disk Management			
	•	<u> </u>	
	Basic	Surtan Bacan	
	40.00 GB	100 MB NTFS /39.90 GB NTFS	
	Online	Healthy (System, Arealthy (Boot, Page File, Crash Dump, Primary	
	🐨 Disk 1		
	Basic 4 00 CB	4.00.00	
	Offline (1)	4.00 GB	
	Help		
	Gibick 2		
	Basic		
	1023 MB	1021 MB	
	Help		
	<u> </u>	<u>P</u>	
	CD-ROM 0		
<u> </u>	Unallocated	Primary partition	

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

## **Installing Failover Clustering Service**

Launch the Windows Server manager Console.

Ele Action View Help         Image: (08NODE1)         Server Manager (08NODE1)         Image: Roles	
Construction     C	
Server Manager (08NODE1)    Server Manager (08NODE1)   Server Manager (08NODE1)   Server Manager (08NODE1)  Get an overview of the status of this server, perform top management tasks, and add or remove server roles and features.	
Configuration     Storage	
Server Summary	
Image: Computer Information       Image: Computer Name:       08Node 1.KernSafe.Local       Image: Change System Properties       Image: Change: Change System Properties       Image: Change: Change System Properties       Image: Change: Change: Change: Change: Change: Change: Change: Change: Change: System Properties       Image: Change:	iote
Security Information	ard
Last Kerresn: Today at 10:37 PM Configure refresn	

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



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

Add Features Wizard		X
Select Features		
Features Confirmation Progress Results	Select one or more features to install on this server.         Eeatures: <ul> <li>NET Framework 3.5.1 Features</li> <li>Background Intelligent Transfer Service (BITS)</li> <li>BitLocker Drive Encryption</li> <li>BranchCache</li> <li>Connection Manager Administration Kit</li> <li>Desktop Experience</li> <li>DirectAccess Management Console</li> <li>Falover Clustering</li> <li>Group Policy Management</li> <li>Internet Printing Client</li> <li>Internet Storage Name Server</li> <li>LPR Port Monitor</li> <li>Multipath I/O</li> <li>Network Load Balancing</li> <li>Peer Name Resolution Protocol</li> <li>Quality Windows Audio Video Experience</li> <li>Remote Differential Compression</li> </ul> More about features	Description:         Failover Clustering allows multiple servers to work together to provide high availability of services and applications. Failover Clustering is often used for file and print services, database and mail applications.         ▼         ▼         Texts         Image: Next >         Image: Next >

#### Select the Failover Clustering.

Press the **Next** button to continue.

Add Features Wizard	
Confirm Installation Selections	
Features       To install the following roles, role services, or features, dick Install.         Progress       Informational message below         Image: The server might need to be restarted after the installation completes.         Failover Clustering         Print, e-mail, or save this information         Print, e-mail, or save this information         Image: Print, e-mail, or save this information	

Press the Install button to install the Failover Clustering feature.

The installation of the Failover Clustering is going on.

Add Features Wizard	
Installation Prog	ress
Features	The following roles, role services, or features are being installed:
Progress	Failover Clustering
Results	
	دم المعالي الم المعالي المعالي
	< Previous Next > Install Cancel

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

Add Features Wizard	×
Installation Res	sults
Features Confirmation Progress Results	The following roles, role services, or features were installed successfully:         ①       1 warning message below         ①       1 windows automatic updating is not enabled. To ensure that your newly-installed role or feature is automatically updated, turn on Windows Update in Control Panel.         Failover Clustering       ② Installation succeeded
	Print, e-mail, or save the installation report
	< <u>Previous</u> <u>N</u> ext > <b>Close</b> Cancel

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 Y	ou 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.

👹 Validate a Configu	ration Wizard		×
Select Se	ervers or a Cluster		
Before You Begin Select Servers or a Cluster	To validate a set of server To test an existing cluster,	rs, add the names of all the servers. , add the name of the cluster or one of its nodes.	
Testing Options Confirmation Validating Summary	<u>E</u> nter name: <u>S</u> elected servers:		<u>B</u> rowse Add <u>R</u> emove
		< Previous Next >	Cancel

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

Select Computers	?×
Select this object type:	
Computers	Object Types
From this location:	
KemSafe.Local	Locations
Enter the object names to select ( <u>examples</u> ):	
	<u>C</u> heck Names
Advanced OK	Cancel

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

Select Computers	<u>?</u> ×
Select this object type:	
Computers	Object Types
From this location:	
KemSafe.Local	Locations
Common Queries	
Name: Starts with 💌	<u>C</u> olumns
Description: Starts with	Find <u>N</u> ow
Disabled accounts	Stop
Non expring password	
Days since last logon:	
Search results:	OK Cancel
Name (RDN) In Folder	
NemSafe.Local/	
RemSafe.Local/	
Non Safe.Local/	
l	

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

Select Computers	? ×
Select this object type:	
Computers	Object Types
From this location:	
KemSafe.Local	Locations
Enter the object names to select (examples):	
08NODE1	Check Names
Advanced OK	Cancel

Press the **OK** button.

👹 Validate a Configu	uration Wizard	×
Select Se	ervers or a Cluster	
Before You Begin Select Servers or a Cluster	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.	
Testing Options Confirmation Validating Summary	Enter name:       Browse         Selected servers:       O8node 1.kemsafe.local       Add         Remove       Remove <t< th=""><th></th></t<>	

Press the **Browse...** button and add **08NODE2** by through the same way.
👹 Validate a Configu	ıration Wizard	×
Select Se	ervers or a Cluster	
Before You Begin Select Servers or a Cluster	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.	
Testing Options Confirmation Validating Summary	Enter name: Selected servers: 08node 1 kemsafe local 08node 2 kemsafe local	<u>A</u> dd <u>R</u> emove
	< <u>P</u> revious <u>N</u> ext >	Cancel

👹 Validate a Configu	ration Wizard	×
Testing C	Options	
Before You Begin	Choose between running all tests or running selected tests.	
Select Servers or a Cluster	The tests include Inventory tasks, Network tests, Storage tests, and System Configuration tests.	
Testing Options	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	
Confirmation	for Windows Server 2008 R2".	
Validating		
Summary		
	Run <u>all</u> tests (recommended)	
	C Run only tests I select	
	More about cluster validation tests	
	< <u>P</u> revious <u>N</u> ext > Cancel	]

## Select Run all tests (recommended).

🐯 Validate a	Configuration	Wizard
- Wandaree a	configuration	WILLOUT G

Confirmat	tion	
Before You Begin Select Servers or a Cluster	You are ready to start validation. Please confirm that the following settings are correct:	
Testing Options	Servers to Test	▲
Confirmation	08node1.kernsafe.local	
Validating	08node2.kernsafe.local	
Summary		
	Tests Selected by the User	Category
	List BIOS Information	Inventory
	List Environment Variables	Inventory
	List Fibre Channel Host Bus Adapters	Inventory
	To continue, click Next. More about cluster validation tests	
		< Previous Next > Cancel

X

Press the **Next** button to continue.

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

👹 Validate a Configu	ration Wizard	×
Summary		
Before You Begin	Testing has completed successfully and the configurat	tion is suitable for clustering.
Select Servers or a Cluster		
Testing Options	Validate Microsoft MPTO Dased disks	Juccess
Confirmation	Validate Multiple Arbitration	Success
Validating		
Summary	Validate SCSI device Vital Product Data (VPD)	Success
	Validate SCSI-3 Persistent Reservation	Success
	Validate Simultaneous Failover	Success v
	To view the report created by the wizard, click View Report. To close this wizard, click Finish.	<u>V</u> iew Report
	Create	the cluster now using the validated nodes
	More about cluster validation tests	
		<u> </u>

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.

## 罉 Create Cluster Wizard

Before Y	ou Begin
Before You Begin Select Servers Validation Warning Access Point for Administering the Cluster Corfirmation Creating New Cluster Summary	This wizard creates a cluster, which is a set of servers that work together to increase the availability of clustered services and applications. If one of the servers fails, another server begins hosting the clustered services and applications (a process known as failover).     Before you run this wizard, we strongly recommend that you run the Validate a Configuration wizard to ensure that your hardware and hardware settings are compatible with failover clustering.     Microsoft supports a cluster solution only if the complete configuration (servers, network, and storage) can pass all tests in the Validate a Configuration wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2008 R2".     You must be a local administrator on each of the servers you want to include in the cluster.     To continue, click Next.     More about Microsoft support of cluster solutions that have passed validation tests More about the name and IP address information needed for a new cluster     Image: Do not show this page again

×

🚏 Create Cluster Wiz	zard		×
Select Se	ervers		
Before You Begin Select Servers	Add the names of all the s	ervers that you want to have in the cluster. You must add at least one server.	
Validation Warning			
Access Point for Administering the	Enter server name:	Browse	
Cluster	Selected servers:	Add	
Confirmation		Permate	
Creating New Cluster			
Summary			
		< Previous Next > Cancel	

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

🊏 Create Cluster Wiz	zard		×
Select Se	ervers		
Before You Begin Select Servers Access Point for Administering the	Add the names of all the	e servers that you want to have in the cluster. You must add at I	east one server.
Cluster Confirmation Creating New Cluster Summary	<u>E</u> nter server name: <u>S</u> elected servers:	08node 1.kemsafe.local 08node 2.kemsafe.local	<u>A</u> dd <u>R</u> emove
		< <u>P</u> revious <u>N</u> ext >	Cancel

Press the **Next** button to continue.

Specify IP address for the cluster.

zard			×
oint for Ac	Iministering the	Cluster	
Type the na Cluster N <u>a</u> n One or more be configure type an add	ame you want to use who ne: KemSafeC e DHCP IPv4 addresses ed automatically. For eac ress.	en administering the cluster. luster were configured automatically. One or more IPv4 addresses could not ch network to be used, make sure the network is selected, and then	
Γ	Networks	Address	
-	192.168.1.0	/24 192.168.1.20	
More about	t the administrative Acc	ess Point for a cluster	
	oint for Ac Type the na Cluster Nan One or more be configure type an add	card     oint for Administering the     Type the name you want to use whe     Cluster Name:   KemSafeC     One or more DHCP IPv4 addresses to be configured automatically. For each type an address.     Networks     192.168.1.0/     More about the administrative Acc	coint for Administering the Cluster     Type the name you want to use when administering the cluster.     Cluster Name:   KemSafeCluster     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.     Image:   Networks     Address     Image:   192.168.1.0/24     192.168.1.0/24   192.168.1.20     More about the administrative Access Point for a cluster     Image:   Image:     Image:   Image:

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

Create Cluster Wi	zard			×
Confirma	tion			
Before You Begin Select Servers	You are ready to create a The wizard will create you	cluster. Ir cluster with the following settings:		
Select Servers Access Point for Administering the Cluster Confirmation Creating New Cluster Summary	Cluster: Node: Node: IP Address: IP Address: To continue, click Next.	KernSafeCluster 08node1.kernsafe.local 08node2.kernsafe.local DHCP address on 192.168.0.0/24 192.168.1.20		×
		< <u>P</u> revious	<u>N</u> ext >	Cancel

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.

🍟 Create Cluster Wiz	zard		×
Summary	,		
Before You Begin Select Servers	You have such	cessfully completed the Create Cluster Wizard.	
Access Point for Administering the Cluster Confirmation		Create Cluster	<u> </u>
Creating New Cluster Summary	Cluster: Node: Node: Quorum:	KernSafeCluster 08node1.kernsafe.local 08node2.kernsafe.local Node and Disk Majority ( Cluster Disk 2 )	•
	To view the report crea To close this wizard, cli	ated by the wizard, click View Report. ick Finish.	<u>Vi</u> ew Report
			<u>F</u> inish

Press the **Finish** button to continue.

Server Manager					
File Action View Help					
🗢 🔿 🖄 📊 🚺 🖬					
Server Manager (08NODE1)	Storage			Actions	
🕀 🔂 Roles	Storago	Pagant Cluster Fu	anto: 🍐 Critical 4 Error: 70 Marsing:	Storage	-
Image: Teatures I	Storage	neceni cluster Ev	antes. 🐴 childar.4, Elfor. 70, Walthing.	dd a disk	
E KernSafeCluster.KernS	Summary of St	torage		View	
	<i>s</i>				
E Podes	Storage:	Total Capacity:	Available Capacity:	Q Refresh	
Iteration	2 Total Disks - 2 online	Total: 4.99 GB	Total: 4 GB	👔 Help	
Cluster Events	1 Available Disks - 1 online	Free Space: 4.9 GB	Free Space: 3.95 GB		
Diagnostics	I In Use Disks - I online	Percent Free: 98.2%	Percent Free: 98.8%		
E Storage					
Windows Server Backup					
📄 Disk Management	Disk	Status	Current Owner		
	Disk Witness in Quorun	n			
	🗆 📼 Cluster Disk 1	Online	08Node1		
	Volume: (F)	File System: NTFS	1,021 MB (95.7% free )		
	Available Storage				
	E Cluster Disk 2	( Online	08Node1		
	Volume: (E)	File System: NTFS	4 GB (98.8% free )		
		-			
	,				

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

Support:	<u>support@kernsafe.com</u>
Sales:	sales@kernsafe.com
Home Page:	http://www.kernsafe.com/
Product Page:	http://www.kernsafe.com/product/istorage-server.aspx
Licensing	http://www.kernsafe.com/product/istorage-server/license-
	<u>compares.aspx</u>
Forum:	http://www.kernsafe.com/forum/

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