iStorage Server: High Availability iSCSI SAN for Windows Server 2012 Cluster

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Overview

KernSafe iStorage Server is an advanced and powerful, full-featured software-only iSCSI Target which is fully compatible with the newest Windows Server 2012. iStorage Server can deliver immediate benefits for the new server environment which is implemented with Window Server 2012 as it is allowed to centralized manage and consolidate storage. iStorage Server provides a lot of features, such as RAID, VHD, CDP, Snapshot and Failover etc. These features are very popular and important in Storage Industry and make iStorage Server suitable for any size of business.

Microsoft 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. 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 system may need to be imported and mounted, network hardware may have to be

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configured and some supporting applications may need to be running as well.



After iStorage Server 3.0, it allows to create High Availability iSCSI SAN

with multiple NICs to	improve performance	and prevent Split-Brain.
-----------------------	---------------------	--------------------------

Name	IP Address	Detail
12DC	192.168.1.2	Domain Controller
12node1	Heart-beat: 192.168.1.103	Cluster Node 1
	DATA: 192.168.0.103	
12node2	Heart-beat: 192.168.1.104	Cluster Node 2
	DATA: 192.168.0.104	
iStorage Server1	DATA: 192.168.0.105	iStorage Server 1
	SYNC: 192.168.2.105	
iStorage Server2	DATA: 192.168.0.106	iStorage Server 2
	SYNC: 192.168.2.106	

Configure Domain Controller

Install Active Directory and DNS roles

Because of working as Domain Controller, the network adapter should be assigned a **static** IP Address. As it is also the DNS Server, We need to configure the DNS as itself.

Internet Protocol Version 4 (TC	P/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:	192.168.1.1			
○ O <u>b</u> tain DNS server address auton	\bigcirc O <u>b</u> tain DNS server address automatically			
Use the following DNS server add	resses:			
Preferred DNS server:	192.168.1.2			
Alternate DNS server:	· · ·			
Ualidate settings upon exit	Ad <u>v</u> anced			
	OK Cancel			

After the Network Adapter is configured successfully, we then can add the roles.

Launch the Server Manager and click the Manage on the top right corner,

then select Add Roles and Features. The Wizard will be shown as below.

B	Add Roles and Features Wizard	_ D X
E Select server roles Before You Begin Installation Type Server Selection Server Roles Features AD DS DNS Server Confirmation Results	Add Roles and Features Wizard Select one or more roles to install on the selected server. Roles Active Directory Certificate Services Active Directory Domain Services Active Directory Federation Services Active Directory Rederation Services Active Directory Rights Management Services Application Server DHCP Server Fax Server File And Storage Services (Installed) Hyper-V	DESTINATION SERVER WIN-SJTUU94N3NO
	Network Policy and Access Services Print and Document Services Remote Access Remote Desktop Services < Previous	t > <u>I</u> nstall Cancel

Select Roles: "Active Directory Domain Services" and "DNS Server".

Press **Next** to continue.

b	Add Roles and Features Wizard	– – X
Confirm installati	on selections	DESTINATION SERVER WIN-SJTUU94N3NO
Before You Begin	To install the following roles, role services, or features on selected server, click In	nstall.
Installation Type	Restart the destination server automatically if required	
Server Selection	Optional features (such as administration tools) might be displayed on this page	e because they have
Server Roles	been selected automatically. If you do not want to install these optional features their check hoves	s, click Previous to clear
Features		
AD DS	Active Directory Domain Services	^
DNS Server	DNS Server	
Confirmation	Group Policy Management	
Results	Remote Server Administration Tools	
	Role Administration Tools	=
	AD DS and AD LDS Tools	
	AD DS Tools	
	Active Directory Administrative Center	
	AD DS Snap-Ins and Command-Line Tools	
		~
	Export configuration settings Specify an alternate source path	
	< <u>P</u> revious <u>N</u> ext > <u>I</u> r	nstall Cancel

Check "Restart the destination server automatically if required".

Then press Install.



Press **Close** to complete the installation.

Configure Active Directory Role

After the roles are successfully installed, press the Notifications.

B	Server Manager	_ D X
Server Ma	nager 🔸 Local Server 💿 🗸 🛚 🖌	Manage Tools View Help
 Dashboard Local Server All Servers AD DS DNS File and Storage Services ▷ 	P Post-deployment Configura TASKS Fc Configuration required for Active Directory Domain Services at WIN-SJTUU94N3NO Workgt Promote this server to a domain controller Image: Provide the server to a domain controller Image: Provide the server to a domain controller Image: Window Remote Configuration required. Installation succeeded on WIN-SJTUU94N3NO. Remote Add Roles and Features NIC Teal Task Details	TASKS Last installed updates Windows Update Last checked for updates Windows Error Reporting Customer Experience Improv IE Enhanced Security Configu Time zone Product ID
	Operating system version Microsoft Windows Server 2012 Datacente Hardware information Xen HVM domU	r Processors Installed memory (RAM) Total disk space
	EVENTS	×

Click "Promote this server to a domain controller".

The configuration wizard will be shown as below.

	Active Directory Domain Services Configuration Wizard	_ D X
Deployment Configuration Domain Controller Options Additional Options Paths Beview Options	iguration Select the deployment operation Add a <u>d</u> omain controller to an existing domain Add a new domain to an <u>existing</u> forest Add a new <u>fo</u> rest	TARGET SERVER WIN-SJTUU94N3NO
Review Options Prerequisites Check Installation Results	Specify the domain information for this operation <u>R</u> oot domain name: <u>KernSafe.Loca</u>	
	More about deployment configurations	
	< <u>P</u> revious <u>N</u> ext > <u>1</u>	nstall Cancel

Select "Add a new forest" and then enter the Root domain name.

a	Active Directory Domain Services	Configuration Wizard	_ D X
Domain Controlle	r Options		TARGET SERVER WIN-SJTUU94N3NO
Deployment Configuration	Select functional level of the new forest	and root domain	
Domain Controller Options	Forest functional level:	Windows Server 2012	•
Additional Options	Domain functional level:	Windows Server 2012	•
Paths Review Options Prerequisites Check Installation Results	Specify domain controller capabilities Domain Name System (DNS) server Global Catalog (GC) Read only domain controller (RODC) Type the Directory Services Restore Mod Passwor <u>d</u> : Confirm password:	de (DSRM) password	
	More about domain controller options		
< Previous Next > Install Cancel			

Configure the Forest functional level and Domain functional level.

Type the DSRM password.

a	Active Directory Domain Services Configuration Wizard	x
DNS Options	TARGET SE WIN-SJTUU94N	RVER I3NO
A delegation for this DNS	server cannot be created because the authoritative parent zone cannot be found Show more	×
Deployment Configuration Domain Controller Options DNS Options Additional Options Paths Review Options Prerequisites Check Installation Results	Specify DNS delegation options	
	More about DNS delegation	
	< <u>P</u> revious <u>N</u> ext > <u>Install</u> Cance	el

Leave it default and press Next to continue.

Ē	Active Directory Domain Service	s Configuration Wizard	_ D ×
Additional Option	IS		TARGET SERVER WIN-SJTUU94N3NO
Deployment Configuration Domain Controller Options DNS Options Additional Options	Verify the NetBIOS name assigned to The NetBIOS domain name:	the domain and change it if necessary KERNSAFE	
Paths Review Options Prerequisites Check			
Results			
	More about additional options		
		<u>Previous</u> <u>N</u> ext > <u>Ins</u>	tall Cancel

The NetBIOS domain name will be "KERNSAFE" and press Next to

continue.



Customize the database, log file and SYSVOL directories.



Check if all the parameters are correct, press Next to continue.



Press Install to run the installation.

After it finishes installing, the server will reboot automatically to take effect.

Configure DNS Server Role

Log on the server with domain controller administrator, and then launch

the DNS Manager.



Right click the "Reverse Lookup Zones" and then press New Zone.



Press Next to continue.

New Zone Wizard	x
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.	
⊖ St <u>u</u> b 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.	
✓ Store the zone in <u>A</u> ctive Directory (available only if DNS server is a writeable domain controller)	
< <u>B</u> ack <u>N</u> ext > Cancel	

Select Primary zone.

Press **Next** to continue.

New Zone Wizard	x
Active Directory Zone Replication Scope You can select how you want DNS data replicated throughout your network.	
Select how you want zone data replicated: 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	
\bigcirc To all domain <u>c</u> ontrollers specified in the scope of this directory partition:	
	~
< <u>B</u> ack <u>N</u> ext > Ca	ancel

Keep default and press **Next** to continue.

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 IPv4 addresses or IPv6 addresses.			
IPv4 Reverse Lookup Zone			
○ IPv <u>6</u> Reverse Lookup Zone			
< <u>D</u> ack <u>IV</u> ext > Cancel			

Select IPv4 Reverse Lookup Zone.

Press **Next** to continue.

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. Enter the network ID in its normal (not reversed) order. If you use a zero in the network ID, it will appear in the zone name. For example, network ID 10 would create zone 10.in-addr.arpa, and network ID 10.0 would create zone 0.10.in-addr.arpa. Reverse lookup zone name:
<pre> Reverse Howap zone Hame: 1.168.192.in-addr.arpa </pre> <pre> <pre> </pre> <pre></pre></pre>
< <u>B</u> ack <u>N</u> ext > Cancel

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

New Zone Wizard
Dynamic Update 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 their resource records with a DNS server whenever changes occur. Select the type of dynamic updates you want to allow:
 Allow only secure dynamic updates (recommended for Active Directory) This option is available only for Active Directory-integrated zones. Allow both nonsecure and secure dynamic updates Dynamic updates of resource records are accepted from any client. This option is a significant security vulnerability because updates can be accepted from untrusted sources. Do not allow dynamic updates Dynamic updates of resource records are not accepted by this zone. You must update these records manually.
< <u>B</u> ack <u>N</u> ext > Cancel

Specify dynamic update option.

New Zone Wizard
Completing the New Zone Wizard You have successfully completed the New Zone Wizard. You specified the following settings: Name: 1.168.192.in-addr.arpa
Type: Active Directory-Integrated Primary Lookup type: Reverse V Note: You should now add records to the zone or ensure that records are updated dynamically. You can then verify name resolution using pshockup
To dose this wizard and create the new zone, dick Finish.

Check if all the parameters are correct, and press **Finish**.

After the Reverse Lookup zone is successfully configured, then right click on the **KerSafe.Local** in the left tree view of **DNS Manager**, then select **New Host(A or AAA)...** menu item.

The **New Host** dialogue is shown as below.

New Host X		
Name (uses parent domain name if blank):		
12node 1		
Fully qualified domain name (FQDN):		
12node 1.KernSafe.Local.		
I <u>P</u> address:		
192.168.1.103		
✓ Create associated pointer (PTR) record		
Allow any authenticated user to update DNS records with the same owner name		
Add <u>H</u> ost Cancel		

Type the **Name** and **IP address** for the cluter node – 12node1.

Check Create associated pointer (PTR) Record.

Press **Add Host** button to add 12node1 recoed. Then add the 12node2.

New Host X			
Name (uses parent domain name if blank): 12node2			
Fully qualified domain name (FQDN):			
12node2.KernSate.Local.			
192.168.1.104			
Allow any authenticated user to update DNS records with the same owner name			
Add <u>H</u> ost Done			

Type the **Name** and **IP address** for the cluter node – 12node2.

Check Create associated pointer (PTR) Record.

Press Add Host button to add 12node2 recoed.

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

Å	DNS Ma	anager	_	D X
<u>F</u> ile <u>A</u> ction <u>V</u> iew <u>H</u> elp				
🗢 🏟 🙇 🖬 🗐 🙆 😽	? 🖬 🗄 🗐 🛱			
 DNS WIN-SJTUU94N3NO Global Logs Forward Lookup Zones msdcs.KernSafe.Local KernSafe.Local Reverse Lookup Zones 1.168.192.in-addr.arpa Trust Points Conditional Forwarders 	Name msdcs sites tcp DomainDnsZones ForestDnsZones (same as parent folder) (same as parent folder) (same as parent folder) (same as parent folder) 12node1 12node2	Type Start of Authority (SOA) Name Server (NS) Host (A) Host (A) Host (A) Host (A)	Data [19], win-sjtuu94n3no.ker win-sjtuu94n3no.kernsafe 192.168.1.2 192.168.1.2 192.168.1.103 192.168.1.104	Timestam static static 12/24/201 static
	<	Ш		>
Ŷ	DNCM			
Eile Action View Hele	DNS Ma	anager	_	- x
Lile Action View Help	DNS Ma	anager		- X
 File Action View Help → → → → → → → → → → → → → → → → → → →	DNS Ma Name (same as parent folder) (same as parent folder) (192.168.1.103) (192.168.1.104)	Type Start of Authority (SOA) Name Server (NS) Pointer (PTR) Pointer (PTR)	Data [3], win-sjtuu94n3no.kernsafe vin-sjtuu94n3no.kernsafe.local. 12node1.kernsafe.local. 12node2.kernsafe.local.	Timestam static static static static
File Action Yiew Help Image: Second state of the second	DNS Ma	Type Start of Authority (SOA) Name Server (NS) Pointer (PTR) Pointer (PTR)	Data [3], win-sjtuu94n3no.kern win-sjtuu94n3no.kernsafe 12node1.kernsafe.local. 12node2.kernsafe.local.	Timestam static static static static

Configure iStorage Server1

Prepare Quorum volume

For working in clustering environment, the network adapter must be assigned a static IP Address.

Internet Protocol Version 4 (TC	P/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	y		
• Use the following IP address:			
IP address:	192 . 168 . 0 . 105		
S <u>u</u> bnet mask:	255.255.255.0		
Default gateway:	192.168.0.1		
○ O <u>b</u> tain DNS server address automatically			
• Us <u>e</u> the following DNS server add	resses:		
Preferred DNS server:	192.168.0.1		
<u>A</u> lternate DNS server:	· · ·		
Validate settings upon exit	Ad <u>v</u> anced		
	OK Cancel		

Launch the **iStorage Server Management Console**, press the Create button on the toolbar of iStorage Server Management Console, the **Create iSCSI Target Wizard** will be shown as below.

Create iSCSI Target Wizard	×
iSCSI Device Type Select which device type of the iSCSI target you want to create.	
 Hard Disk Create iSCSI target by using physical disk, partition, standard image file or VHD. Optical Device Create iSCSI target by using physical optical drive or CD / DVD image file. Generic SCSI Create iSCSI target by using generic SCSI device, such as disk, CD-ROM, tape, printer. 	
Advanced Device Create advanced iSCSI target such as CDP device and snapshot linked device.	
< <u>Back</u> <u>N</u> ext > Cancel	

Select an iSCSI Device Type.

Choose Hard Disk.

Create iSCSI Target Wizard	x
iSCSI Medium Type Select medium of the iSCSI disk you want to create.	•
 Image File Create iSCSI disk by using standard image file or Virtual Hard Disk (.VHD). RAM Space 	
Create iSCSI disk by using memory space. Security Images	
Disk Partition Create ISCSI target by using a disk partition.	
Physical Disk Create iSCSI target by using physical disk.	
< <u>B</u> ack <u>N</u> ext > Cancel	

Choose Image File in iSCSI Medium Type.

Create iSCSI Target Wizard	x
iSCSI Image Type Select image type of the iSCSI disk you want to create.	<u></u>
 Standard Image File Create iSCSI disk by using a standard disk image file. Virtual Hard Disk (VHD) Create iSCSI disk by using a Virtual Hard Disk image file. 	
< <u>B</u> ack <u>N</u> ext >	Cancel

We choose Standard Image File and press Next to continue.

Create iSCSI Target Wizard
Virtual Image Disk Configuration Specify a image file full path and parameters.
Image file parameters
Full path and name of the image file: C:\Users\Administrator\Documents\1.img Device Size in MRe: 1024
Fill with zeros
File system options
Sparse file (Recommended for image files smaller then 1TB) Compressed (Enable file system compress feature) Encrypted (Enable NTFS encryption feature)
< <u>B</u> ack <u>N</u> ext > Cancel

Select Create a new image file or Use existing image file if you already

have one.

Specify the **file path** and **device capacity**.

Press **Next** to continue.

Create iSCSI Target Wizard		
Authorization 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. 		
< <u>B</u> ack <u>N</u> ext > Cancel		

Specify authorization method as you require. We take **Anonymous** as example.

Create iSCSI Target Wizard			
Completing the Create iSCSI Wizard You can specify a target name and other options to complete iSCSI target creating.	<u></u>		
Basic Target Information Target Name: □6-03.com.kemsafe:KemSafe.Quorum ✓ 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. < <u>Back</u> Finish	ancel		

Type the **Target Name** as you like or use the default.

Check "Enable multiple initiators with full access connected (sharing and clustering)".

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

Prepare Generic Volume

Launch the **iStorage Server Management Console**, press the Create button on the toolbar of iStorage Server Management Console, the **Create iSCSI Target Wizard** will be shown as below.

Create iSCSI Target Wizard
iSCSI Device Type Select which device type of the iSCSI target you want to create.
 Hard Disk Create iSCSI target by using physical disk, partition, standard image file or VHD. Optical Device Create iSCSI target by using physical optical drive or CD / DVD image file. Generic SCSI Create iSCSI target by using generic SCSI device, such as disk. CD-ROM tape, printer.
 Advanced Device Create advanced iSCSI target such as CDP device and snapshot linked device.
< <u>Back</u> <u>N</u> ext > Cancel

Select an iSCSI Device Type.

Choose Hard Disk.

Create iSCSI Target Wizard	x
iSCSI Medium Type Select medium of the iSCSI disk you want to create.	•
 Image File Create iSCSI disk by using standard image file or Virtual Hard Disk (.VHD). RAM Space 	
Create iSCSI disk by using memory space. Security Images	
Disk Partition Create ISCSI target by using a disk partition.	
Physical Disk Create iSCSI target by using physical disk.	
< <u>B</u> ack <u>N</u> ext > Cancel	

Choose Image File in iSCSI Medium Type.

Create iSCSI Target Wizard	x
iSCSI Image Type Select image type of the iSCSI disk you want to create.	<u></u>
 Standard Image File Create iSCSI disk by using a standard disk image file. Virtual Hard Disk (VHD) Create iSCSI disk by using a Virtual Hard Disk image file. 	
< <u>B</u> ack <u>N</u> ext >	Cancel

We choose Standard Image File and press Next to continue.

Create iSCSI Target Wizard	x
Virtual Image Disk Configuration Specify a image file full path and parameters.	2
Image file parameters	
C:\Users\Administrator\Documents\2 img Device Size in MBs: 4096	vse
File system options Sparse file (Recommended for image files smaller then 1TB) Compressed (Enable file system compress feature) Encrypted (Enable NTFS encryption feature)	
< <u>B</u> ack <u>N</u> ext > C	ancel

Select Create a new image file or Use existing image file if you already

have one.

Specify the **file path** and **device capacity**.

Press **Next** to continue.

Create iSCSI Target Wizard		
Authorization 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. 		
< <u>B</u> ack <u>N</u> ext > Cancel		

Specify authorization method as you require. We take **Anonymous** as example.

Create iSCSI Target Wizard			
Completing the Create iSCSI Wizard You can specify a target name and other options to complete iSCSI target creating.	<u>.</u>		
Basic Target Information Target Name: □6-03.com.kemsafe:KemSafe.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. Put this actions in writell for electronic disk sharing and NAS			
 <u>Back</u> Finish Can 	cel		

Type the **Target Name** as you like or use the default.

Check "Enable multiple initiators with full access connected (sharing and clustering)".

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

Now the sample images are shown as below in management console if

successful.

3	iStorage Server Ma	inagement (Console			- 🗆 X
File Server Storage Clients Vi	File Server Storage Clients View Tools Help					
Create Delete Start Stop	Create Delete Start Stop Refresh Add Remove View Access Settings Print About					
Servers Tree ×	iStorage Server: LocalHost					
E-@ KernSafe Servers E-@ WIN-DUA795G5UMO (127.0.0.1	General Targets Applications IPFilters Liser	s Groups I	005			
E- Targets	Target Name	Device Type	Source	Capacity	Authentication	Status
KernSafe.Generic	👒 iqn. 2006-03. com. kernsafe: Kern Safe. Quorum	Disk Drive	C:\iStorage\newimage.img	1.00G	Anonymous	Enabled
Applications	👒 iqn.2006-03.com.kernsafe:KernSafe.Generic	Disk Drive	C:\iStorage\2.img	4.00G	Anonymous	Enabled
- 🧱 Groups						
Logs						
				Co 🥨	nnected: LocalHost (20-Days Trial) .::

Configure iStorage Server2

Prepare volumes

Firstly for working in clustering environment, the Network Adapter must

be assigned a static IP.

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 automatically			
• Use the following IP address:			
IP address:	192.168.0.106		
Subnet mask:	255 . 255 . 255 . 0		
Default gateway:	192.168.0.1		
○ O <u>b</u> tain DNS server address autom	atically		
• Use the following DNS server add	resses:		
Preferred DNS server:	192.168.0.1		
<u>A</u> lternate DNS server:			
Validate settings upon exit	Ad <u>v</u> anced		
	OK Cancel		

Set the IP address as we planned, press **OK** to finish.

We also need two volumes on iStorage Server2, we name them **KernSafe.Quorumpartner** and **KernSafe.Genericpartner** which have same capacity as on iStorage Sevrer1. We create them as we do on iStorage Server1.

3	iStorage Server Ma	nagement (Console			– – X		
File Server Storage Clients View Tools Help								
Create Delete Start Stop	Refresh Add Remove View Acce	ss Setting	js Print About					
Servers Tree × 😝 iStorage Server: LocalHost								
KernSafe Servers WIN-DI (27565/1MD (127.0.0.1:3261)								
E- Targets	General Targets Applications IPFilters User	Groups I	.ogs Sauras		A set succession	Charles		
 KernSafe.Quorumpartner KernSafe.Genericpartner Applications 	Target Name	Device Type Disk Drive	Source Chistorage) newimage img	1 00G	Authentication	Enabled		
	ign.2006-03.com.kernsafe:KernSafe.Genericpar	Disk Drive	C:\iStorage\2.img	4.00G	Anonymous	Enabled		
			5 5		5			
Logs								
				<i></i>				
				© Co	nnected: LocalHost	(20-Days Trial) 🔡		

Create Application

Create Application with Quorum volumes

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 will be shown as below.

Create Application Wizard				
Application Type Select which type application that you want to create.				
 Synchronous Replication Create real-time remote synchronous replication to iSCSI target or image file. Asynchronous Replication Create real-time remote asynchronous replication to iSCSI target or image file. High Availability Node Create a high-availability iSCSI SAN node or synchronizing with other iSCSI targets. Automatic Snapshots Create automatical snapshots and replications to other iSCSI targets. 				
< <u>Back</u> <u>N</u> ext > Cancel				

Select High Availability Node and press Next to continue.
You can specify two servers to fail over each other. se Target		
Target Name	Device Type	
iqn.2006-03.com.kemsafe:KemSafe.Quorum	Disk	
iqn.2006-03.com.kemsafe:KemSafe.Generic	Disk	
artner Tamet		
	S	etting

Check the **Quorum** target and press **Setting** to configure the partner target.

Select iSCSI Target
iSCSI Source
Host Name: 192.168.2.106 Port: 3260
CHAP
Use CHAP to logon
User Name:
Secret:
Target
Target: iqn.2006-03.com.kemsafe:KemSafe.Quorumpartner 🗸
Discovery OK Cancel
Discovery OK Cancel

Input the **IP Address** which is used for SYNC of iStorage Server2 in iSCSI Source.

Press Discovery to find the mirror target and choose the Quorumpartner

in the drop-down list. Then press **OK** to continue.

Note: If the mirror target needs CHAP authorization, you need to provide

User Name and Secret.

Failover Configuration You can specify two servers to fail over each other. Base Target Target Name Device Type Image: I	
Base Target Target Name Device Type ✓ iqn.2006-03.com.kemsafe:KemSafe.Quorum Disk ☐ iqn.2006-03.com.kemsafe:KemSafe.Generic Disk Base Target Pathoer Target	
Target Name Device Type ✓ iqn.2006-03.com.kemsafe:KemSafe.Quorum Disk ☐ iqn.2006-03.com.kemsafe:KemSafe.Generic Disk	
Image: Partner Tarret	
Pattner Tarraet	
Partner Tarmet	
Partner Tarret	
Pather Tarret	
Pather Tamet	
Pather Tamet	
Partner Tarnet	
ign.2006-03.com.kemsafe:KemSafe.Quorumpartner Setting	
< <u>B</u> ack <u>N</u> ext > Canc	al

The partner target will be added to the windows, press **Next** to continue.

	Create Appli	cation Wizar	ď	
Synchronizatio You can specify	n Settings Parameters for synchroniz	ation.		2
Sync				
Local Address:	Any	v L	ocal Port:	Any 🗸
Remote Address:	192.168.2.106	~ R	lemote Port:	3260
Alternative Sync 1				
Local Address:	Any	v L	ocal Port:	Any 🗸
Remote Address:	192.168.0.106	~ R	lemote Port:	3260
Alternative Sync 2				
Specify a folder to	save temporary data dump	folder must exis	t):	
C:\Temp\				Browse
		< <u>B</u> ack	Next >	Cancel

Specify the Synchronization Channel. To prevent Split-Brain, after iStorage Server 3.0, HA feature allows to as much as 4 channels for SYNC. **Note**: User must specify parameters for Sync Channel and can scroll up the window and specify more channels for alternatives, these alternatives work as heart-beat and can be used when Sync channel got broken, these alternatives will prevent split-brain.

Press **Next** to continue.

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

Now, the base target should be synchronized to partner target. If the two targets are both new and not initialized, we 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.

	Create Application Wizard
5	Completing the Create Applicatio Wizard
	Application name: SAN Cluster
	Cluster type: iSCSI
	Local node: ign.2006-03.com.kemsafe:KemSafe.Quorum
	Local portal: Any:Auto
	Remote node: iqn.2006-03.com.kemsafe:KemSafe.Quorumparti
	Remote portal: 192.168.2.106:3260
	Work path: C:\Temp\
	To close this wizard, click Finish.
	< <u>B</u> ack Finish Cancel

Press **Finish** to complete the creation.

Create Application with Generic volumes

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** will be shown as below.

Application Type Select which type application that you want to create. Select which type application that you want to create. Synchronous Replication Create real-time remote synchronous replication to iSCSI target or image file. Asynchronous Replication Create real-time remote asynchronous replication to iSCSI target or image file. High Availability Node Create a high-availability iSCSI SAN node or synchronizing with other iSCSI targets. Atomatic Snapshots Create a utomatical snapshots and replications to other iSCSI targets. Description	Create Appl	ication Wizard	X
 Synchronous Replication Create real-time remote synchronous replication to iSCSI target or image file. Asynchronous Replication Create real-time remote asynchronous replication to iSCSI target or image file. High Availability Node Create a high-availability iSCSI SAN node or synchronizing with other iSCSI targets. Automatic Snapshots Create automatical snapshots and replications to other iSCSI targets. 	Application Type Select which type application that you war	nt to create.	
 Create real-time remote synchronous replication to iSCSI target or image file. Asynchronous Replication Create real-time remote asynchronous replication to iSCSI target or image file. High Availability Node Create a high-availability iSCSI SAN node or synchronizing with other iSCSI targets. Automatic Snapshots Create automatical snapshots and replications to other iSCSI targets. 	O Synchronous Replication		
 Asynchronous Replication Create real-time remote asynchronous replication to iSCSI target or image file. High Availability Node Create a high-availability iSCSI SAN node or synchronizing with other iSCSI targets. Automatic Snapshots Create automatical snapshots and replications to other iSCSI targets. 	Create real-time remote synchronous rep	lication to iSCSI target or image file.	
 Create real-time remote asynchronous replication to iSCSI target or image file. High Availability Node Create a high-availability iSCSI SAN node or synchronizing with other iSCSI targets. Automatic Snapshots Create automatical snapshots and replications to other iSCSI targets. 	Asynchronous Replication		
 High Availability Node Create a high-availability iSCSI SAN node or synchronizing with other iSCSI targets. Automatic Snapshots Create automatical snapshots and replications to other iSCSI targets. 	Create real-time remote asynchronous re	plication to iSCSI target or image file.	
Create automatical snapshots and replications to other iSCSI targets.	High Availability Node Create a high-availability iSCSI SAN nod Automatic Spapebote	le or synchronizing with other iSCSI targets.	
	Create automatical snapshots and replic	ations to other iSCSI targets.	
< <u>Back</u> <u>N</u> ext > Cancel		< Back Next > Cano	el

Select High Availability Node and press Next to continue.

Create Application V	Vizard
Failover Configuration You can specify two servers to fail over each other.	<u></u>
Base Target	
Target Name	Device Type
iqn.2006-03.com.kemsafe:KemSafe.Quorum	Disk
✓ iqn.2006-03.com.kemsafe:KemSafe.Generic	Disk
Partner Tarnet	
	Setting
< Ba	ck Next > Cancel

Check the **Generic** target and press **Setting** to configure partner target.

Select iSCSI Target	x
iSCSI Source	
Host Name: 192.168.2.106 Port: 3260	
CHAP	
Use CHAP to logon	
User Name:	
Secret:	1
Target	
Target: iqn.2006-03.com.kemsafe:KemSafe.Genericpartner 😒	
Discovery OK Cancel	

Input the IP Address which is user for SYNC of iStorage Server2, then press **Discovery** to find the mirror target **Genericpartner**.

Note: If the mirror target needs CHAP authorization, you need to provide

User Name and Secret.

Press **OK** to continue.

Create Application Wiz	zard
Failover Configuration You can specify two servers to fail over each other.	2
Base Target	
Target Name	Device Type
iqn.2006-03.com.kemsafe:KemSafe.Quorum	Disk
✓ iqn.2006-03.com.kemsafe:KemSafe.Generic	Disk
Partner Tarnet	
ign.2006-03.com.kemsafe:KemSafe.Genericpartner	Setting
C DI	Next > Correct
< <u>B</u> ack	<u>IN</u> ext > Cancel

Press **Next** to continue.

	Create Applic	ation Wiz	ard	
Synchronizatio You can specify	n Settings parameters for synchronizat	ion.		4
Sync				
Local Address:	Any	~	Local Port: Any	~
Remote Address:	192.168.2.106	~	Remote Port: 3260	
Alternative Sync 1				
Local Address:	Any	~	Local Port: Any	~
Remote Address:	192.168.0.106	~	Remote Port: 3260	
Alternative Sync 2				
Specify a folder to	save temporary data dump (folder must e	xist):	
C:\Temp\				Browse
		< <u>B</u> ack	Next >	Cancel

Specify the Synchronization Channel. To prevent Split-Brain, after iStorage Server 3.0, HA feature allows to as much as 4 channels for SYNC. **Note**: User must specify parameters for Sync Channel and can scroll up the window and specify more channels for alternatives, these alternatives work as heart-beat and can be used when Sync channel got broken, these alternatives will prevent split-brain.

Press **Next** to continue.

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

Now, the base target should be synchronized to partner target. If the two targets are both new and not initialized, we 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.

	Create Application Wizard	
5	Completing the Create Applicatio Wizard	
	Application name: SAN Cluster	
	Cluster type: iSCSI	
	Local node: iqn.2006-03.com.kemsafe:KemSafe.Generic	
	Local portal: Any:Auto	
	Remote node: ign.2006-03.com.kemsafe:KemSafe.Genericparti	
	Remote portal: 192.168.2.106:3260	
	Work path: C:\Temp\	
	To close this wizard, click Finish.	
	< <u>B</u> ack Finish Cancel	

Press **Finish** to complete the creation.

Now, the two applications should be shown as below if successful.

3 iStorage Server Management Console					
<u>F</u> ile <u>S</u> erver Stora <u>g</u> e <u>C</u> lients	Eile Server Storage Slients View Iools Help				
Create Delete Start Sto	Refresh Add Remove View	Access Settings	Print About		
Servers Tree ×	Carlor Convert LocalHeat				
E-00 KernSafe Servers	Taturage acreet. Lucarrost				
E-W 2012-01 (127.0.0.1:3261)	General Targets Applications IPFilters Use	ers Groups Logs			
KernSafe.Quorum	Target Name	Application Type	Partner Device	Status	
KernSafe.Generic	🗿 iqn.2006-03.com.kernsafe:KernSafe.Quorum	High Availability	iSCSI: 192.168.2.106:3260:iqn.2006-03.com.kernsafe:KernSafe.Quorumpartner	Running	
Applications	iqn.2006-03.com.kernsafe:KernSafe.Generic	High Availability	iSCSI: 192.168.2.106:3260:iqn.2006-03.com.kernsafe:KernSafe.Genericpartner	Running	
IPHilters					
Groups					
Jugs					
	<		III	>	
			🚿 Connected: LocalHost (Ultimate	e License) 🔐	

The configuration on iStorage Server 1 is completed.

We do the same operations on iStorage Server 2 to create applications;

the main interface will be shown as below.

3	iStorage Se	rver Management Console	_ 🗆 🗙		
Elle Server Storage Clients View Jools Help					
Create Delete Start Stop R	reate Delete Start Stop Refeeth Add Remove View Access Settings Print About				
Servers Tree ×	iStorage Server: LocalHost				
🚊 🎯 Targets	Target Name	Application Type Partner Device	Statur		
KernSafe.Quorumpartner	anget wante	High Availability ISCSI: 192.168.2.105:3260:jon.2006-03.com kernsafe/KernSafe Quoru	m Running		
Applications	iqn.2006-03.com.kernsafe:KernSafe.Gene	High Availability iSCSI: 192.168.2.105:3260:ign.2006-03.com.kernsafe:KernSafe.Generi	c Running		
Groups Logs					
		🚿 Connected: Log	alHost (Ultimate License) 💥		

Configure Cluster Node 1

Join to the Domain

For working in the clustering environment, the Network Adapter must

be assigned a static IP Address.

Internet Protocol Version 4 (TCP/IPv4) Properties ? ×				
General	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	у			
• Use the following IP address:				
IP address:	192 . 168 . 1 . 103			
S <u>u</u> bnet mask:	255.255.255.0			
Default gateway:	192.168.1.1			
○ O <u>b</u> tain DNS server address automatically				
• Use the following DNS server add	resses:			
Preferred DNS server:	192.168.1.2			
<u>A</u> lternate DNS server:				
Validate settings upon exit Advanced				
	OK Cancel			

Type the IP Address, subnet, gateway and DNS. The DNS should point to Domain Controller.

After the Network Adapter is successfully configured, we can join the domain.

Right click **Computer** and then open **Properities**.



Click Change settings and then we can configure the System properties.

System Properties			
Computer Name Hardwa	re Advanced Remote		
Windows uses on the network	the following information to identify your computer		
Computer description:			
	For example: "IIS Production Server" or "Accounting Server".		
Full computer name:	WIN-SJTUU94N3NO		
Workgroup:	WORKGROUP		
Workgroup: WORKGROUP To rename this computer or change its domain or workgroup, click Change. Qhange			
	OK Cancel Apply		

Press **Change** to rename computer and change its domain.

Computer Name/Domain Changes		
You can change the name and the membership of this computer. Changes might affect access to network resources.		
Computer name:		
12node1		
Full computer name: 12node1		
<u>M</u> ore		
Member of		
KemSafe.Local		
O Workgroup:		
WORKGROUP		
OK Cancel		

Type Computer name **12node1**.

Select Domain in **Member of** and type Domain name **KernSafe.Local** we

have set.

Press **OK** to continue.

	Windows Security	×
Computer I Enter the name domain.	Name/Domain Changes e and password of an account with permission to join the	
	administrator ••••••• Domain: KernSafe.Local	
	OK Cancel]

Domain Controller account is required to join the domain.

Type user name and password.

Press **OK** to continue.

If successful, a notification window as below will be shown.



Press **OK** to continue.

But reboot is required.



Press **Restart Now** to finish joining.

Install MPIO

Launch the Server Manager in Windows Server 2012 and then click

Manage on the top right corner, select Add Roles and Features.

Then the wizard will be shown as below.

B	Add Roles and Features Wizard	_ D X		
ES Select features Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Add Roles and Features Wizard Select one or more features to install on the selected server. Features Data Center Bridging Enhanced Storage Failover Clustering Group Policy Management Ink and Handwriting Services Internet Printing Client IP Address Management (IPAM) Server ISNS Server service LPR Port Monitor Management OData IIS Extension Media Foundation Message Queuing	Description Multipath I/O, 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.		
	Multipath I/O Network Load Balancing <			
< Previous Next > Install Cancel				

Select **Multipath I/O** and install it following the wizard.

Connect to iSCSI Target

Launch the Administrator tools-> Microsoft iSCSI initiator.

Turn to **Discovery** tab.

iSCSI Initiator Properties				×
argets Discovery F	avorite Targets	Volumes and Devices	RADIUS Configuration	
Target portals			Pefrech	
The system will look	for <u>T</u> argets on f	ollowing portals:	Keirean	
Address	Port	Adapter	IP address	
192.168.0.105	3260	Default	Default	
192.168.0.106	3260	Default	Default	
To add a target port	al, click Discover	^r Portal.	Discover Portal	
To remove a target then click Remove.	oortal, select the	e address above and	<u>R</u> emove	
Name				
To add an iSNS serve	er, click Add Ser	ver.	A <u>d</u> d Server	
To remove an iSNS s then dick Remove.	erver, select the	e server above and	Re <u>m</u> ove	
More about Discove	ry and iSNS			

Press **Discover Portal** button and then input each IP of iStorage Server.

Then turn to Targets tab.

iSCSI Initiator Prope	rties
Targets Discovery Favorite Targets Volumes and De	vices RADIUS Configuration
To discover and log on to a target using a basic connect DNS name of the target and then click Quick Connect.	tion, type the IP address or
Target:	Quick Connect
Discovered targets	
	<u>R</u> efresh
Name	Status
iqn.2006-03.com.kernsafe:KernSafe.Generic	Inactive
iqn.2006-03.com.kernsafe:KernSafe.Genericpartner	Inactive
iqn.2006-03.com.kernsafe:KernSafe.Quorum	Inactive
To connect using advanced options, select a target and dick Connect.	then Co <u>n</u> nect
To completely disconnect a target, select the target and then click Disconnect.	<u>D</u> isconnect
For target properties, including configuration of session select the target and click Properties.	s, <u>P</u> roperties
For configuration of devices associated with a target, so the target and then click Devices.	elect De <u>v</u> ices
More about basic iSCSI connections and targets	
OK	Cancel Apply

On the Discovered targets list, you will see all four targets we have

created on iStorage Server.

Select first one and press Connect.

Connect To Target	x
Target name: iqn.2006-03.com.kernsafe:KernSafe.Generic	
Add this connection to the list of Favorite Targets. This will make the system automatically attempt to restore the connection every time this computer restarts.	
Enable multi-path	
Advanced OK C	ancel

Keep default and press **OK** to connect.

Connect other three targets in the same way.

iSCSI Initiator Properties				
Targets Discovery Favorite Targets Volumes and Devices	RADIUS Configuration			
To discover and log on to a target using a basic connection, to DNS name of the target and then click Quick Connect.	ype the IP address or			
Target:	Quick Connect			
Discovered targets	<u>R</u> efresh			
Name	Status			
ign.2006-03.com.kernsafe:KernSafe.Generic	Connected			
ign.2006-03.com.kernsafe:KernSafe.Genericpartner	Connected			
iqn.2006-03.com.kernsafe:KernSafe.Quorum	Connected			
ign.2006-03.com.kernsafe:KernSafe.Quorumpartner	Connected			
To connect using advanced options, select a target and then	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.	De <u>v</u> ices			
More about basic iSCSI connections and targets				
ОК	Cancel Apply			

Enable MPIO

MPIO Properties X
MPIO Devices Discover Multi-Paths DSM Install Configuration Snapshot
SPC-3 compliant
Device Hardware Id
Add support for ISCSI devices
Add support for SAS devices
Add
Others
Device Hardware Id
Add
Mare information on discovery of multipathed devices
OK Cancel

Launch Administrative Tools-> MPIO.

Turn to **Discover Multi-Paths** tab.

Check Add support for iSCSI devices and then press Add.

Press **OK** to continue.



Reboot is required to enable MPIO.

Press Yes to restart.

After the node is successfully restarted, launch Administrative Tools->

Computer Management.

An Initialize Disk dialog is shown.

Initialize Disk
You must initialize a disk before Logical Disk Manager can access it. Select disks: ☑ Disk 1 ☑ Disk 2
Use the following partition style for the selected disks:
OK Cancel

Press **OK** to initialize disk.

#		Compute	r Management				x
<u>File Action View Help</u>							
(= =) 🖄 🖬 🛛 🖬 🖓 🗙 📽	P 🖻 🔍 📓						
Computer Management (Local Volu	ume	Layout Type File System	Status		Actions		
A System Lools A A A System Lools A	(C:) Vstem Reserved	Simple Basic NTFS Simple Basic NTFS	Healthy (Boot, Page File, Cras Healthy (System, Active, Prim	h Dump, Primary Partition) arv Partition)	Disk Manage	ment	•
b L Event Viewer	,		,		More Action	ns	•
Shared Folders							
Performance							
📇 Device Manager							
Storage Windows Server Backur							
📄 Disk Management							
Services and Applications							
<		ш		>			
	Disk 0			<u> </u>			
Basi	ic Sy	stem Reserved	(C:)				
Onli	line He	ealthy (System, Active, Prim	Healthy (Boot, Page File, Crash	Dump, Primary Partitic			
				=			
	Disk 1						
Basi 1023	ic 3 MB 10	23 MB					
Onli	line Ur	nallocated					
	Disk 2						
4.00	0 GB 4.0	00 GB					
Onli	line Ur Inallocated Prin	nallocated		·			
	rianocated 🔤 Plin	nary partition			1		

Right click on the disk and then select New Simple Volume, partition and

format the disks by following wizard.

If successfully, the new volumes created are shown as below.

File Action Yes Help Image: Status Image: Status <tdi< th=""><th>2</th><th></th><th>Compute</th><th>er Management</th><th>_ 🗆 X</th></tdi<>	2		Compute	er Management	_ 🗆 X
A Computer Management (Local Volume (E) Simple Basic NTFS Healthy (Boot, Page File, Crash Dump, Primary Partition) A Ctions Computer Management (Local Volume (F) Simple Basic NTFS Healthy (Primary Partition) A Ctions Actions Disk Management A Ctions Actions Actions Actions Actions Actions Actions Disk Management A Ctions Actions	<u>File Action View H</u> elp				
Computer Management (Local Volume Layout Type File System Status Actions IV System Tools Simple Basic NTFS Healthy (Doct, Page File, Crash Dump, Primary Partition) Disk Management Image: Crash Dump, Primary Partition) Image: Disk Obstance System Reserved Simple Basic NTFS Healthy (System, Active, Primary Partition) More Actions Image: Disk Obstance System Reserved Simple Basic NTFS Healthy (System, Active, Primary Partition) More Actions Image: Disk Obstance System Reserved Simple Simple Simple More Actions Image: Disk Obstance System Reserved Signem Reserved	🗢 🔿 🙍 🖬 👔 🔅 ;	X 📽 🖻 🔍 📓			
4 System Tools C: Simple Basic NTFS Healthy (Boot, Page File, Crash Dump, Primary Partition) b C Task Scheduler New Volume (E) Simple Basic NTFS Healthy (Primary Partition) b Event Viewer System Reserved Simple Basic NTFS Healthy (Primary Partition) b Event Viewer System Reserved Simple Basic NTFS Healthy (Primary Partition) b Sorage System Reserved Simple Basic NTFS Healthy (System, Active, Primary Partition) b Windows Server Backup System Reserved Simple Basic NTFS Healthy (System, Active, Primary Partition) b Windows Server Backup System Reserved Simple Reserved (C.) b Sorage System Reserved (C.) 24.00 GB System Reserved Simple Basic NTFS b Disk 0 Basic System Reserved (C.) 24.00 GB Simple Reserved Simple Basic NTFS c III More Active, Prim Primary Partition IIII More Active, Prim IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	🜆 Computer Management (Local	Volume	Layout Type File Syster	n Status	Actions
Image: Scheduler Image: Scheduler New Volume (E) Simple Basic NTFS Healthy (Primary Partition) Image: Scheduler New Volume (E) Simple Basic NTFS Healthy (Primary Partition) Image: Scheduler System Reserved Simple Basic NTFS Healthy (Primary Partition) Image: Scheduler System Reserved Simple Basic NTFS Healthy (System, Active, Primary Partition) Image: Scheduler System Reserved Simple Basic NTFS Healthy (System, Active, Primary Partition) Image: Scheduler System Reserved Simple Basic NTFS Healthy (System, Active, Primary Partition) Image: Scheduler System Reserved Simple Basic NTFS Healthy (System, Active, Primary Partition) Image: Scheduler System Reserved Simple Basic NTFS Healthy (System, Active, Prime) Image: Scheduler System Reserved Simple Basic NTFS Scheduler Image: Scheduler System Reserved Scheduler Scheduler Image		(C:)	Simple Basic NTFS	Healthy (Boot, Page File, Crash Dump, Primary Partition)	Disk Management 🔺
Starter Folders > @ Share Folders > @ Share Folders > @ Cotal Users and Groups > @ Storage > Windows Server Backur > @ Disk Management > @ Storage > @ Disk Management > @ Storage > @ Disk 0 System Reserved 2 Storage > @ Disk 0 System Reserved 2 Storage > @ Disk 0 Basic 2 Storage Online Basic 2 Storage Online Healthy (System, Active, Prim Healthy (Boot, Page File, Crash Dump, Primary Partition) Pilsk 2 Basic Quo GB New Volume (E) 1021 MB NTFS Online Healthy (Primary Partition) Unallocated Primary Partition	I ask Scheduler Event Viewer	New Volume (E	:) Simple Basic NTES :) Simple Basic NTES	Healthy (Primary Partition) Healthy (Primary Partition)	More Actions
Cocal Users and Groups Orice Manager Storage Windows Server Backup Orice Manager Services and Applications Services and Appl	Shared Folders	System Reserve	d Simple Basic NTFS	Healthy (System, Active, Primary Partition)	
No Performance	Local Users and Groups				
Bevice Manager Disk Omino Disk 0 Basic 24.00 GB Online Disk 1 Basic 1023 MB Online Disk 2 Basic Online Disk 2 Basic Online Disk 2 Basic Online Disk 2 Basic Online Point Primary Partition V	Performance				
▶ Windows Server Backup ■ Disk Management ▶ ■ Services and Applications ■ Disk 0 Basic 24.00 GB Online ■ Disk 1 Basic 1023 MB 1021 MB NTFS Healthy (System, Active, Prim Healthy (Boot, Page File, Crash Dump, Primary Partitic) ■ Disk 1 Basic 1023 MB 1021 MB NTFS Healthy (Primary Partition) ■ Disk 2 Basic 1021 MB NTFS Healthy (Primary Partition) ■ Disk 2 Basic 1021 MB NTFS Healthy (Primary Partition) ■ Disk 2 Basic You GB	Device Manager A Storage				
Disk Management > Services and Applications <	Windows Server Backup				
Services and Applications Services and Applications Image: Construction Image: Construction <td>📄 Disk Management</td> <td></td> <td></td> <td></td> <td></td>	📄 Disk Management				
Image: Construction of the second state of the se	Services and Applications				
Image: Construct of the second state of the second stat					
Image: Construct of the second state of the second stat					
Image: Construction of the second state of the second s				>	
Image: Construct of the second state of the second stat					
Basic 2 A.00 GB Online System Reserved 350 MB NTFS Healthy (System, Active, Prim (C3) 22.66 GB NTFS Healthy (Boot, Page File, Crash Dump, Primary Partitic) Basic 1023 MB Online New Volume (E:) 1021 MB NTFS Healthy (Primary Partition) Image: Calify the color of the color		Disk 0			
Online Healthy (System, Active, Prim Healthy (Boot, Page File, Crash Dump, Primary Partitic) Basic Disk 1 Basic New Volume (E:) 1021 MB NTFS Online Healthy (Primary Partition)		Basic 24.00 GB	System Reserved 350 MB NTES	(C:) 23.66 GB NTES	
Image: Construction Image: Construction		Online	Healthy (System, Active, Prim	Healthy (Boot, Page File, Crash Dump, Primary Partitic	
Image: Construction Image: Construction				=	
Basic New Volume (E:) 1021 MB NTFS Online Healthy (Primary Partition) Image: Constraint of the straint of th		Disk 1			
1023 MB 1021 MB NTFS Online Healthy (Primary Partition) ■ Disk 2 Basic 4.00 GB 4.00 GB NTFS Online Healthy (Primary Partition) ✓ III > Unallocated Primary Partition		Basic	New Volume (E:)		
Image: Second and Second a		1023 MB Online	1021 MB NTFS Healthy (Primary Partition)		
Comparison Comparison			including (initially including)		
Image: Specific spectrum Image: Specific spectrum Basic New Volume (F:) 4.00 GB 4.00 GB NTFS Online Healthy (Primary Partition) ✓ Image: Specific spectrum ✓ Image: Specific spectrum					
4.00 GB 4.00 GB NTS Online Healthy (Primary Partition) ✓ III ✓ Unallocated		Basic	New Volume (F:)		
Online Healthy (Primary Partition) ▼ ■ Unallocated ■ Primary partition		4.00 GB	4.00 GB NTFS		
		Online Unallocated	Healthy (Primary Partition)	×	
			rinner person		

Install Failover Clustering

Launch Server Manager Management Console and click the Manage on the top right corner, then select Add Roles and Features. The Wizard will be shown as below.

a	Add Roles and Features Wizard	_ 🗆 X
E Select features Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Add Roles and Features Wizard Select one or more features to install on the selected server. Features .NET Framework 3.5 Features .NET Framework 4.5 Features (Installed) Background Intelligent Transfer Service (BITS) BitLocker Drive Encryption BitLocker Network Unlock BranchCache Client for NFS Data Center Bridging Enhanced Storage Failover Clustering Group Policy Management Ink and Handwriting Services Internet Printing Client IP Address Management (IPAM) Server 	DESTINATION SERVER 12node1.KemSafe.Local
	< III (Previous Next >	Install Cancel

Select Feature Failover Clustering.

Press **Next** to continue.

a	Add Roles and Features Wizard	_ D X
Confirm installation Before You Begin Installation Type Server Selection	ON selections To install the following roles, role services, or features on selected server, Restart the destination server automatically if required Optional features (such as administration tools) might be displayed on th	DESTINATION SERVER 12node1.KernSafe.Local click Install.
Server Roles Features	been selected automatically. If you do not want to install these optional t their check boxes.	eatures, click Previous to clear
Confirmation Results	Failover Clustering Remote Server Administration Tools Feature Administration Tools Failover Clustering Tools Failover Cluster Management Tools Failover Cluster Module for Windows PowerShell	
	Export configuration settings Specify an alternate source path	
	< <u>P</u> revious <u>N</u> ext >	Install Cancel

Press Install to add Failover Clustering feature.



Note: You can close the windows to make it work in the background.



After the feature installation succeeds, you can press **Close** button.

Configure Cluster Node 2

Join to the Domain

For working in the clustering environment, the Network Adapter must

be assigned a static IP Address.

Internet Protocol Version 4 (TC	P/IPv4) Properties ? X
General	
You can get IP settings assigned auton this capability. Otherwise, you need to for the appropriate IP settings.	natically if your network supports ask your network administrator
O Obtain an IP address automatical	у
• Use the following IP address:	
IP address:	192.168.1.104
S <u>u</u> bnet mask:	255 . 255 . 255 . 0
Default gateway:	192.168.1.1
○ O <u>b</u> tain DNS server address autom	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, subnet, gateway and DNS. The DNS should point to Domain Controller.

After the Network Adapter is successfully configured, we can join the domain.

Right click **Computer** and then open **Properties**.



Click Change settings and then we can configure the System properties.

	System Properties
Computer Name Hardwa	re Advanced Remote
Windows uses on the network	the following information to identify your computer
Computer <u>d</u> escription:	
	For example: "IIS Production Server" or "Accounting Server".
Full computer name:	WIN-SJTUU94N3NO
Workgroup:	WORKGROUP
To rename this computer workgroup, click Change	or change its domain or <u>C</u> hange
	OK Cancel Apply

Press **Change** to rename computer and change its domain.

Computer Name/Domain Changes
You can change the name and the membership of this computer. Changes might affect access to network resources.
Computer name: 12node2
Full computer name: 12node2.KemSafe.Local
Member of
O Workgroup:
OK Cancel

Type Computer name **12node2**.

Select Domain in Member of and type Domain name KernSafe.Local we

have set.

Press **OK** to continue.

	Windows Security	x
Computer Enter the nam domain.	Name/Domain Changes te and password of an account with permission to join the	
	administrator •••••••• Domain: KernSafe.Local	
	OK Cancel	

Domain Controller account is required to join the domain.

Type user name and password.

Press **OK** to continue.

If successful, a notification window as below will be shown.



Press **OK** to continue.

But reboot is required.



Press **Restart Now** to finish joining.

Install MPIO

Launch the Server Manager in Windows Server 2012 and then click

Manage on the top right corner, select Add Roles and Features.

Then the wizard will be shown as below.

L	Add Roles and Features Wizard	
Confirmation Results	Add Roles and Features Wizard Select one or more features to install on the selected server. Features Data Center Bridging Enhanced Storage Failover Clustering Group Policy Management Ink and Handwriting Services Internet Printing Client InP Address Management (IPAM) Server SiSN Server service LPR Port Monitor Management OData IIS Extension Media Foundation Media Foundation Message Queuing Multipath I/O	DESTINATION SERVER WIN-SJTUU94N3NO Description Multipath I/O, 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.
	< <tr> Network Load Balancing <</tr>	
	< <u>P</u> revious <u>N</u> ext >	Install Cancel

Select **Multipath I/O** and install it following the wizard.

Connect to iSCSI Target

Launch the Administrator tools-> Microsoft iSCSI initiator.

Turn to **Discovery** tab.

		iSCSI	Initiator Properties	;	X
rgets D	iscovery Fa	avorite Targe	ts Volumes and Devices	RADIUS Configuration	1
Target p	ortals				1
The sys	tem will look f	or <u>T</u> argets or	n following portals:	R <u>e</u> fresh	
Addres	S	Port	Adapter	IP address	
192.16	8.0.105	3260	Default	Default	
192.16	8.0.106	3260	Default	Default	
To add	a target porta	al, click Discov	ver Portal.	Discover Portal	
To remo	ove a target p	ortal, select i	the address above and	<u>R</u> emove	
iSNS serv The sys Name	vers tem is registe	red on the fo	llowing įSNS servers:	Re <u>f</u> resh	
iSNS serv The sys Name	vers tem is registe	red on the fo	llowing <u>i</u> SNS servers:	Refresh	
iSNS serv The sys Name	vers tem is registe an iSNS serve	red on the fo	llowing įSNS servers:	Re <u>f</u> resh A <u>d</u> d Server	
iSNS serv The sys Name To add a To remo	an iSNS serve	red on the fo er, click Add S erver, select t	llowing įSNS servers: erver. the server above and	Refresh Add Server Remove	
iSNS serv The sys Name To add a To remo then did	an iSNS serve vers an iSNS serve ve an iSNS serve k Remove.	red on the fo er, click Add S erver, select t ry and iSNS	llowing <u>i</u> SNS servers: erver. the server above and	Refresh Add Server Remove	
iSNS serv The sys Name To add a To remo then clic	an iSNS serve by an iSNS serve we an iSNS serve by an iSNS serve	red on the fo er, click Add S erver, select t	llowing iSNS servers:	Refresh Add Server Remove	

Press **Discover Portal** button and then input each IP of iStorage Server.

Then turn to Targets tab.

iSCSI Initiator Prope	erties 🗙							
Targets Discovery Favorite Targets Volumes and De	vices RADIUS Configuration							
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.								
Target:	Quick Connect							
Discovered targets								
	<u>R</u> efresh							
Name	Status							
iqn.2006-03.com.kernsafe:KernSafe.Generic	Inactive							
iqn.2006-03.com.kernsafe:KernSafe.Genericpartner	Inactive							
iqn.2006-03.com.kernsafe:KernSafe.Quorum	Inactive							
To connect using advanced options, select a target and click Connect.	then Co <u>n</u> nect							
To completely disconnect a target, select the target an then click Disconnect.	d <u>D</u> isconnect							
For target properties, including configuration of session select the target and click Properties.	s, <u>P</u> roperties							
For configuration of devices associated with a target, s the target and then click Devices.	elect De <u>v</u> ices							
More about basic iSCSI connections and targets								
ОК	Cancel Apply							

On the Discovered targets list, you will see all four targets we have

created on iStorage Server.

Select first one and press Connect.

Connect To Target	x				
Target name: iqn.2006-03.com.kernsafe:KernSafe.Generic					
Add this connection to the list of Favorite Targets. This will make the system automatically attempt to restore the connection every time this computer restarts.					
Enable multi-path					
Advanced OK	Cancel				

Keep default and press **OK** to connect.

Connect other three targets in the same way.

iSCSI Initiator Properties	s X						
Targets 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.							
Target:	Quick Connect						
Discovered targets	<u>R</u> efresh						
Name	Status						
ign, 2006-03.com, kernsafe:KernSafe.Generic	Connected						
ign, 2006-03.com, kernsafe:KernSafe, Genericpartner	Connected						
ign. 2006-03.com.kernsafe:KernSafe.Ouorum	Connected						
ign. 2006-03.com.kernsafe:KernSafe.Ouorumpartner	Connected						
To connect using advanced options, select a target and then click 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.	De <u>v</u> ices						
More about basic iSCSI connections and targets							
ОК	Cancel Apply						

Enable MPIO

MPIO Properties X							
MPIO Devices Discover Multi-Paths DSM Install Configuration Snapshot							
SPC-3 compliant							
Device Hardware Id							
Add support for iSCSI devices							
Add support for SAS devices							
Add							
Others							
Device Hardware Id							
Add							
OK Cancel							

Launch Administrative Tools-> MPIO.

Turn to **Discover Multi-Paths** tab.

Check Add support for iSCSI devices and then press Add.

Press **OK** to continue.



Reboot is required to enable MPIO.

Press Yes to restart.

After the node is successfully restarted, launch Administrative Tools->

Computer Management.

2				Comput	er Management		_ D X		
<u>File Action View H</u> elp									
E Computer Management (Local	Volume	Layout	Туре	File System	Status	С	Actions		
▲ System Tools Task Scheduler	C:)	Simple	Basic	NTFS	Healthy (Boot, Page File, Crash Dump, Primary Partition)	23	Disk Management 🔷		
Fask Scheduler I ask Scheduler I ask Scheduler	System Reserved	Simple	Dasic	NIFS	Healthy (System, Active, Filmary Fartition)	э.	More Actions		
Shared Folders									
Local Users and Groups									
Performance Device Manager									
∠ Storage									
Windows Server Backup									
🔤 Disk Management									
Services and Applications									
	<			ш		>			
						^			
	Basic								
	1023 MB	1021 MB							
	Help								
	Cisk 2					_			
	4.00 GB	4.00 GB				=			
	Offline (
	CD-ROM 0								
	CD-ROM (D:)								
	No Media					~			
< III >	Unallocated F	rimary par	tition						

Disk 1 and Disk 2 are offline.

Note: We should not bring them online.

Install Failover Clustering

Launch Server Manager Management Console and click the Manage on the top right corner, then select Add Roles and Features. The Wizard will be shown as below.
a	Add Roles and Features Wizard	_ D X
ES Select features Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Add Koles and Features Wizard Select one or more features to install on the selected server. Features Image: Install on the selected server. Select one or more features to install on the selected server. Features Image: Install on the selected server. Select one or more features to install on the selected server. Features Image: Install on the selected server. Image: Ima	DESTINATION SERVER 12node1.KernSafe.Local Description Failover Clustering allows multiple servers to work together to provide high availability of server roles. Failover Clustering is often used for File Services, virtual machines, database applications, and mail applications.
	< <u>P</u> revious <u>N</u> ext >	. Install Cancel

Select Feature Failover Clustering.

Press **Next** to continue.

a	Add Roles and Features Wizard	_ D X
Confirm installation Before You Begin Installation Type Server Selection	ON selections To install the following roles, role services, or features on selected server, Restart the destination server automatically if required Optional features (such as administration tools) might be displayed on th	DESTINATION SERVER 12node1.KernSafe.Local click Install.
Server Roles Features	been selected automatically. If you do not want to install these optional t their check boxes.	eatures, click Previous to clear
Confirmation Results	Failover Clustering Remote Server Administration Tools Feature Administration Tools Failover Clustering Tools Failover Cluster Management Tools Failover Cluster Module for Windows PowerShell	
	Export configuration settings Specify an alternate source path	
	< <u>P</u> revious <u>N</u> ext >	Install Cancel

Press Install to add Failover Clustering feature.



Note: You can close the windows to make it work in the background.



After the feature installation succeeds, you can press **Close** button.

Configure Failover Clustering

Validate a Configuration

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

Launch the Failover Cluster Manager in node1 or node2.



Click Validate Configuration... on the right tree view.

The Validate a Configuration Wizard will be shown as below.

N	Validate a Configuration Wizard	x			
Before Y	Before You Begin				
Before You Begin Select Servers or a Cluster Testing Options Confirmation Validating Summary	This wizard runs validation tests to determine whether this configuration of servers and attached storage is set up correctly to support failover. A cluster solution is supported by Microsoft only if the complete configuration (servers, network, and storage) passes all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2012." 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 that 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				

Press Next to continue.

N	Validate a Configuration Wizard				
Select Servers or a Cluster					
Before You Begin Select Servers or a Cluster	To validate a set of server To test an existing cluster,	s, 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:	Browse Add Remove			
		< <u>P</u> revious Next > Cancel			

Press Browse...

Select Co	omputers	? X
Select this object type:		
Computers		Object Types
From this location:		
KemSafe.Local		Locations
Enter the object names to select (<u>examples</u>):		
		Check Names
<u>A</u> dvanced	ОК	Cancel

Click **Advanced** to find the nodes.

Select Computers	? X
Select this object type:	
Computers Qb	ject Types
From this location:	
KemSafe.Local	ocations
Common Queries	
Name: Starts with V	<u>C</u> olumns
Description: Starts with V	Find <u>N</u> ow
Disa <u>b</u> led accounts	Stop
Non expiring password	
Days since last logon: 🗸	7
ОК	Cancel
Search results:	

Click Find Now.

Select Computers ? ×
<u>S</u> elect this object type:
Computers Qbject Types
From this location:
KemSafe.Local
Common Queries
Name: Starts with ✓
Description: Starts with ✓ Find Now
Disabled accounts Stop
Non expiring password
Days since last logon: 🗸
Search results: OK Cancel
Name In Folder
12NODE1 KemSafe.Local/
INVESTICATION INTERNATION INTERNATI INTERNATIA INTERNATIA INTERNA

Select **12NODE1** and press **OK**.

Then add **12NODE2** and press **OK**.

Select this object type: Computers <u>D</u> bject Type <u>From this location:</u>	¥S
Computers <u>Object Type</u> <u>From this location:</u>	es
From this location:	
KemSafe.Local Locations.	
Enter the object names to select (<u>examples</u>):	
12NODE1: 12NODE2 Check Nam	ies
Advanced OK Cance	si li

Press **OK** to continue.

Validate a Configuration Wizard					
Select Servers 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:	12node1.KemSafe.Local 12node2.KemSafe.Local	<u>A</u> dd <u>R</u> emove		
		< <u>P</u> revious <u>N</u> ext >	Cancel		

Press Next to continue.

N	Validate a Configuration Wizard				
Testing C	Testing Options				
Before You Begin Select Servers or a Cluster Testing Options Confirmation Validating	Choose between running all tests or running selected tests. The tests examine the Cluster Configuration, Hyper-V Configuration, Inventory, Network, Storage, and System Configuration. Microsoft supports a cluster solution only if the complete configuration (servers, network, and storage) can pass all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2012."				
Summary	 Run <u>all tests (recommended)</u> Run only tests I <u>s</u>elect 				
	More about cluster validation tests < Previous				

Keep default and press **Next** to continue.

- M	Validate a Configuration Wizard		
Confirma	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	12node1.KernSafe.Local		\sim
Velidetiee	12node2.KernSafe.Local		
Validating			
Summary	Tests Selected by the User	Category	
	List Fibre Channel Host Bus Adapters	Inventory	
	List iSCSI Host Bus Adapters	Inventory	
	List SAS Host Bus Adapters	Inventory	
	List BIOS Information	Inventory	~
	List Environment Variables	Inventory	
	To continue, click Next. More about cluster validation tests		
		< <u>P</u> revious <u>N</u> ext > (Cancel

Press **Next** to run tests.

N		Validate a Configuration Wizard		×
Validatin	g			
Before You Begin Select Servers or a	The following amount of time	validation tests are running. Depending on the test se	election, this may take a si	gnificant
Cluster	Progress	Test	Result	~
Testing Options		List System Information	Pending	
Confirmation		List Unsigned Drivers	Pending	
Commission		List Network Binding Order	Pending	=
Validating		Validate Cluster Network Configuration	Pending	
Summary		Validate IP Configuration	Pending	
		Validate Network Communication	Pending	
		Validate Windows Firewall Configuration	Pending	
	0%	List Disks	Test is current	ly runnii
	1	List Ratantial Cluster Diaka	Ponding	<u> </u>
	Test is current	v nuoping		
	reacta currenti	y ranning.		
			Γ	Canaal
				Cancel

If the configuration passes the tests, you will see a dialog as below.



Keep default and press Finish to start to create a cluster.

Create Cluster

*	Create Cluster Wizard	x
Before Yo	ou Begin	
Before You Begin Access Point for Administering the Cluster Confirmation Creating New Cluster Summary	This wizard creates a cluster, which is a set of servers that work together to increase the availability of clustered roles. If one of the servers fails, another server begins hosting the clustered roles (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 2012." You must be a local administrator on each of the servers that you want to include in the cluster. To continue, click Next. More about Microsoft support of cluster solutions that have passed validation tests D on ot show this page again	
	Next > Cancel	

Press Next to continue.

*	Create Cluster Wizard				
Access Point for Administering the Cluster					
Before You Begin Select Servers Access Point for Administering the Cluster Confirmation	Type the name you v Cluster N <u>a</u> me: () The NetBIOS nam	want to KemS me is lin	use when administering the cl afeCluster nited to 15 characters. All ne	uster. tworks were configured automatically.]
Creating New Cluster			Networks	Address	
Summary		✓	192.168.1.0/24	192.168.1.3	
			192.168.0.0/24	Click here to type an address	
			[< <u>P</u> revious <u>N</u> ext > Cancel]

Type a **Cluster Name** and configure the IP Address of the cluster.

a		Create Cluster Wizard	X
Confirma	tion		
Before You Begin Select Servers	You are ready to creat The wizard will create	e a cluster. your cluster with the following settings:	
Access Point for Administering the Cluster	Cluster: Node:	KernSafeCluster 12node2.KernSafe.Local	^
Contirmation Creating New Cluster	IP Address:	12node1.KernSare.Local 192.168.1.3	
Summary			
			~
	I ✓ <u>A</u> dd all eligible stora	ige to the cluster.	
	To continue, click Next		
		< <u>P</u> revious <u>N</u> ext > Ca	ancel

Keep default and press **Next** to continue.

- a	Create Cluster Wizard	x		
Creating New Cluster				
Before You Begin Select Servers Access Point for Administering the Cluster Confirmation Creating New Cluster	Please wait while the cluster is configured.			
Summary	Configuring Cluster Service on node 12node1.KemSafe.Local.			
	Cancel			

You can press **Cancel** button to stop the creation.



Check the configuration of the cluster and press **Finish** to complete.

After the Cluster is successfully created, you can connect the cluster

through Failover Cluster Manager.

Note: You must log on the cluster node with domain administrator account.

巷		Failo	over Cluster Manager				_ 🗆 X
<u>File Action View H</u> elp							
🗢 🔿 🙎 🖬 👔							
📲 Failover Cluster Manager	Disks (2)					Actions	
▲ WernSafeCluster.KernSafe.Lo ■ Roles	Search P Queries V 🔒 V 😒						Disks 🔺
⊿ 🏺 Nodes	Name	Status	Assigned To	Owner Node	Disk Num_ Capacit	y Infor	🛃 Add Disk
12node1	📇 Cluster Disk 1	Online	Available Storage	12node1	1	4 GB	🍰 Move A 🕨
12node2	Eluster Disk 2	Online	Disk Witness in Quorum	12node1	2	1 GB	View 🕨
🔠 Disks							Refresh
Pools							🛛 Help
Cluster Events							
	<		1			>	
	×						
< III >							
Disks: Cluster Disk 1	1						

Contact

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