HAReplicator: High Available replication for Windows Server 2008 clustering

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Overview

High-availability replication is the main function of HAReplicator which allows user to create **Microsoft Windows Cluster Server (MSCS)** without ISCSI SAN, instead of using SAN for shared volume. HAReplicator can create replication between local storages in two or more servers. Since there is no SAN node, user can create active-active high availability server by using only two servers.

This document gives you detailed step-by-step instructions to create high available replication on HAReplicator. Before to do so, you should prepare following three computers or virtual machine.

Name	IP address	detail
08DC	192.168.1.2	Domain controller
ServerNode1	192.168.1.101	FailoverNode1
	192.168.0.101	
ServerNode2	192.168.1.102	FailoverNode2
	192.168.0.102	

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/IP4) and then press the Properties button, the Internet Protocol Version 4(TCP/IP4) 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 the installation of Active Directory.

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 supports ask your network administrator
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 auton	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

Fill in the IP address and the DNS server must point at itself address. Press the **OK** button.

Install Active Directory

Select start \rightarrow run and type dcpromo in the open input box.



Press the **OK** button to continue.

The Active Directory Services Installation Wizard is shown.

\overline Active Directory Domain	Services Installation Wizard	×
	Welcome to the Active Directory Domain Services Installation Wizard	
	This wizard helps you install Active Directory Domain Services (AD DS) on this server, making the server an Active Directory domain controller. To continue, click Next.	
	Use <u>advanced mode installation</u> Learn more about the additional options that are available in <u>advanced mode installation</u> .	
	More about Active Directory Domain Services	
	< <u>B</u> ack <u>N</u> ext > Cancel	

Press the **Next** button to continue.

Before click the **Next** button, please read the introducing instructions carefully.

Operating System Compatibility Improved security settings in Windows Serve affect older versions of Windows	er 2008 and Windows Server 2008 R2	
Windows Server 2008 and "Windows Server new more secure default for the security secompatible with Windows NT 4.0." This senon-Microsoft SMB "clients" from using we when establishing security channel session "Windows Server 2008 R2" domain control operations or applications that require a se 2008 or "Windows Server 2008 R2" domain control operations or applications that require a se 2008 or "Windows Server 2008 R2" domain control operations or applications that require a se 2008 or "Windows Server 2008 R2" domain control operations or applications that require a server 2008 or "Windows Server 2008 R2" domain stronger cryptography algorithms. Some op Windows earlier than Windows Vista with domain join operations performed by the AD Deployment Services. For more information about this setting, see (http://go.microsoft.com/fwlink/?LinkId=1)	ver 2008 R2" domain controllers have a etting named "Allow cryptography algorithms etting prevents Microsoft Windows and eaker NT 4.0 style cryptography algorithms ns against Windows Server 2008 or ollers. As a result of this new default, ecurity channel serviced by Windows Server ain controllers might fail. e Windows NT 4.0, as well as non-Microsoft age (NAS) devices that do not support berations on clients running versions of Service Pack 1 are also impacted, including ictive Directory Migration Tool or Windows e Knowledge Base article 942564 104751).	
	< Back Next > Cancel	

Press the **Next** button to continue.

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.	
◯ <u>E</u> xisting forest	
${f C}$ $ m {\it A}$ dd a domain controller to an existing domain	
C Greate 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

Select Create a new domain in a new forest, then press the Next button.

ive Directory Domain Services Installation Wizard	
me 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:	
kernsafe.cluster	

Specify the name of Forest Root Domain.

Press the **Next** button to continue.

active Directory Domain Services Installation Wizard	×
Set Forest Functional Level Select the forest functional level.	
Forest functional level:	
Windows Server 2008 R2	•
Details:	
 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: Recycle Bin, which, when it is enabled, provides the ability to restore deleted objects in their entirety while Active Directory Domain Services is running. Any new domains that are created in this forest will operate by default at the Windows Server 2008 R2 domain functional level. 	4
You will be able to add only domain controllers that are running Windows Server 2008 R2 or later to this forest.	
More about <u>domain and forest functional levels</u>	
< <u>B</u> ack <u>N</u> ext >	Cancel

Select windows server 2008 or windows server 2008 r2 if building windows server 2008 r2 cluster.

Press the **Next** button to continue.

ditional Domain Controllor Options	ſ
Select additional options for this domain controller.	
DNS server	
☑ <u>G</u> lobal catalog	
<u>R</u> ead-only domain controller (RODC)	
Additional information:	
We recommend that you install the DNC Conversion on the first domain	
controller.	Ţ
Controller.	Y
Controller.	V
More about additional domain controller options	Y
More about additional domain controller options	V

Keep the selection of the **DNS server.**

Press the **Next** button to continue.



Press the Yes button to continue.

🔄 Active Directory Domain Services Installation Wizard	×
Location for Database, Log Files, and SYSVOL Specify the folders that will contain the Active Directory domain contro database, log files, and SYSVOL.	ler
For better performance and recoverability, store the database and log f volumes.	iles on separate
Database folder:	
C:\Windows\NTDS	Browse
_ Log files folder:	
C:\Windows\NTDS	Br <u>o</u> wse
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

Specify the location for Database, Log files, and SYSVOL.

Press the **Next** button to continue.

Active Directory Domain Services Installation Wizard	×
Directory Services Restore Mode Administrator Password	
The Directory Services Restore Mode Administrator account is different from the d Administrator account.	lomain
Assign a password for the Administrator account that will be used when this domai controller is started in Directory Services Restore Mode. We recommend that you choose a strong password.	in
Password:	
Confirm password:	
More about Directory Services Restore Mode password	
< <u>B</u> ack <u>N</u> ext >	Cancel

Specify the Directory Services Restore Mode Administrator Password.

Press the **Next** button to continue.

	stallation Wizard	
nmary		
Review your selections:		
Configure this server as the first Active	Directory domain contro	oller in a new forest. 🛛 🔺
The new domain name is "kernsafe.clu forest.	uster". This is also the n	ame of the new
The NetBIOS name of the domain is "K	KERNSAFE''.	
Forest Functional Level: Windows Serv	ver 2008 R2	
Domain Functional Level: Windows Se	erver 2008 R2	
Site: Default-First-Site-Name		
To change an option, click Back. To b	egin the operation, click	 ≪Next.
These settings can be exported to an a other unattended operations.	answer file for use with	Export settings

Specify the information and press the Next button to continue.



Press the Finish button to close the wizard.

a Active Directory Domain Services Installation Wizard	×
You must restart your computer before the changes made by the Active Directory Domain Services Installation wizard take effect.	
<u>Restart Now</u> <u>D</u> o not Restart Now	

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

Install DNS

Use the administrator role to log on to the domain controller machine and launch **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

New Zone Wizard		×
	Welcome to the New Zone Wizard	
This wizard helps you create a new zone for your DNS server. A zone translates DNS names to related data, such as addresses or network services.		
	To continue, dick Next.	
	< Back Next > Cance	

Press the **Next** button to continue

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.	
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.	
Store the zone in Active Directory (available only if DNS server is a writeable doma controller)	in
< Back Next > Cano	el

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

Select how you want	zone data replicated:
C To <u>a</u> ll DNS server	s running on domain controllers in this forest: kernsafe.cluster
• To all <u>D</u> NS server	s running on domain controllers in this domain: kernsafe.cluster
O To all domain con kernsafe.cluster	trollers in this domain (for Windows 2000 compatibility):
C To all domain gon	trollers specified in the scope of this directory partition:
I.	

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



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

New Zone Wizard	×			
Reverse Lookup Zone Name A reverse lookup zone translates IP addresses int	o 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 				
C Reverse lookup zone name: 1.168.192.in-addr.arpa				
<	Back Next > Cancel			

Select the **Network ID** and then type the IP address in the **Network ID Note**, It depends on the private address.

Press the **Next** button to continue.

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 updates records manually. 	ate
< Back Next > Cance	el

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



Check all of the parameters are correct, and press **Finish** to create the new zone.

Right click on the **kernsafe.cluster** in the left tree view of DNS manager, the select **new host(A or AAA)...** menu item.

🛓 DNS Manager				
File Action View Help				
🗢 🔿 🗡 📷 💥 🖼 🍳 😹 🛛 🖬 🗎 🗐				
Image: Second state of the second s	Type Type s t folder) Start of Authority (SOA) t folder) Name Server (NS) t folder) Host (A) Host (A) 0 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.				

The New Host dialog is shown

New Host 🗙				
Name (uses parent domain name if blank):				
ServerNode1				
Fully qualified domain name (FQDN):				
ServerNode1.kernsafe.cluster.				
I <u>P</u> address:				
192.168.1.101				
☑ _reate associated pointer (PTR) record				
Allow any authenticated user to update DNS records with the same owner name				
Add <u>H</u> ost Cancel				

Type Host name and IP address and check the **Create associated pointer (PTR) record** checkbox, then press Add Host to add **ServerNode1**.

New Host 🛛 🗙
Name (uses parent domain name if blank):
ServerNode2
Fully qualified domain name (FQDN):
ServerNode2.kernsafe.cluster.
IP_address:
192.168.1.102
☑ _reate associated pointer (PTR) record
Allow any authenticated user to update DNS records with the same owner name
Add <u>H</u> ost Done

Add ServerNode2 in the same way.

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

🛔 DNS Manager 📃 🗌 🗙					
Eile Action View Help					
⇔ ⇒ 2 📷 💥 🗒 @ 💩 12 🖬 1 🗄 🗑					
 DNS WIN-1FF8PP2A1HK Min Global Logs Forward Lookup Zones Forward Lookup Zones Forsafe.cluster Reverse Lookup Zones Conditional Forwarders 	Name msdcs sites Ltp DomainDnsZones ForestDnsZones (same as parent folder) (same as parent folder) win-1ff8pp2a1hk win-1ff8pp2a1hk ServerNode1 ServerNode2	Type Start of Authority (SOA) Name Server (NS) Host (A) Host (A)	Data [25], win-1ff8pp2a1hk.kern win-1ff8pp2a1hk.kernsafe.c 192.168.1.2 192.168.0.22 192.168.0.22 192.168.0.22 192.168.0.22 192.168.1.2 192.168.0.22 192.168.1.2 192.168.1.2 192.168.1.2 192.168.1.2 192.168.1.101 192.168.1.102	Static static 1/13/2013 1/13/2013 static static static	
	•			Þ	
1			1		

🛔 DNS Manager					
Eile Action View Help					
🗢 🔿 📶 🖾 😖 🔽 🖬 🗄 🗑					
 DNS WIN-1FF8PP2A1HK Global Logs Forward Lookup Zones Forward Lookup Zones Kernsafe.cluste Reverse Lookup Zones Reverse Lookup Zones 1.168.192.in-addr.arpit 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], win-1ff8pp2a1hk.kerns win-1ff8pp2a1hk.kernsafe.c servernode1.kernsafe.cluster. servernode2.kernsafe.cluster.	Timestamp static static static static	
	4				

Configuring on ServerNode1

Network Adapter

For working in clustering environment, the network adapter must be assigned a static IP address. Select the **Internet Protocol Version 4(TCP/IP4)** and then press the **Properties** button, the **Internet Protocol Version 4(TCP/IP4)** dialog is shown.

Set the first Network Adapter of ServerNode1

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:	192.168.1.101			
Sybnet mask:	255 . 255 . 255 . 0			
Default gateway:	192.168.1.1			
C Obtain DNS server address autor	natically			
□ —	resses:			
Preferred DNS server:	192.168.1.2			
<u>A</u> lternate DNS server:	<u> </u>			
Validate settings upon exit	Advanced			
	OK Cancel			

Type the IP address , Subnet mask, Gateway and DNS server .

Press the **OK** button to save change.

Set the second Network Adapter of ServerNode1

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:	192.168.0.101		
Sybnet mask:	255 . 255 . 255 . 0		
Default gateway:	192.168.0.1		
C O <u>b</u> tain DNS server address auton	natically		
└ Us <u>e</u> the following DNS server add	resses:		
Preferred DNS server:	192.168.0.1		
Alternate DNS server:	· · ·		
Validate settings upon exit	Ad <u>v</u> anced		
	OK Cancel		

Type the IP address, Subnet mask, Gateway and DNS server.

Press the **OK** button to save change.

Join to the domain

Open the System Properties page.



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

System Properties		×
Computer Name Hardw	vare Advanced Remote	
Windows use on the netwo	es the following information to identify your compute rk.	,
Computer <u>d</u> escription:	[
	For example: "IIS Production Server" or "Accounting Server".	
Full computer name:	ServerNode1	
Workgroup:	111	
To rename this compute workgroup, click Chang	er or change its domain or <u>C</u> hange je.	
	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:
ServerNode1
Full computer name: ServerNode1
<u>M</u> ore
Member of
• Domain:
kernsafe.cluster
O Workgroup:
111
OK Cancel

Type ServerNode1 in the Computer name and kernsafe.cluster in the Domain.

Press **OK** to save the changes

Windows Securit	¥	X
Computer Nan Enter the name	ne/Domain Changes and password of an account with permission to join the domain.	
	User name Password Domain: kernsafe.cluster	
	OK Cancel	

Domain controller account is required to join the domain.

Type User name and Password , then press the **OK** button to continue.

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



Press **OK** to continue.

P	Microsoft Windows	×
	You must restart your computer to apply these changes	
	Before restarting, save any open files and close all programs.	
	Restart Now Restart Later	

Restart is required, press the **Restart Now** button to restart computer.

Installing Failover Cluster Service

Launch the windows server manager Console



Select the Feature from the left tree view.

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



Select the Failover Clustering.

Press the Next button to continue.

Add Features Wiz	ard		×
Cor	nfirm Installation	Selections	
Features Confirmation Progress Results		To install the following roles, role services, or features, click Install. 1 informational message below To This server might need to be restarted after the installation completes. Failover Clustering Print, e-mail, or save this information < Previous Next > Install Cancel	

Press Install to continue the installation of Failover Clustering.

Add Features Wizard	
Installation Progra	ess
Features	The following roles, role services, or features are being installed:
Confirmation	Failover Clustering
Progress	
Results	
	Installing
	< Previous Next > Install Cancel

The installation is going on.

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

Add Features Wizard			×
Installation Results	i		
Features Confirmation Progress Results	The following roles, role services, 1 warning message below Mundows automatic updating automatically updated, tur	or features were installed successfully: ng is not enabled. To ensure that your newly-installed role or fea n on Windows Undate in Control Panel.	ature is
	Failover Clustering	Installation succeeded	
	Print, e-mail, or save the installati	ion report	
		< <u>Previous</u> <u>N</u> ext > Close	Iancel

Press the Close button.

Configuring on ServerNode2

Network Adapters

For working in clustering environment, the network adapter must be assigned a static IP address. Select the Internet Protocol Version 4(TCP/IP4) and then press the Properties button, the Internet Protocol Version 4(TCP/IP4) dialog is shown. Set the first Network Adapter of ServerNode2

Internet Protocol Version 4 (TCP/IPv	14) 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:	192.168.1.102			
Subnet mask:	255.255.255.0			
Default gateway:	192.168.1.1			
C Obtain DNS server address autor	natically			
└ Us <u>e</u> the following DNS server add	Iresses:			
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 the IP address ,Subnet mask, Gateway and DNS server .

Press **OK** to save change.

Set the second Network Adapter of ServerNode2

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.				
C Obtain an IP address automatical	ly			
Use the following IP address:				
IP address:	192.168.0.102			
Sybnet mask:	255 . 255 . 255 . 0			
Default gateway:	192.168.0.1			
C Obtain DNS server address auton	natically			
└	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			

Type the IP address, Subnet mask, Gateway and DNS server.

Press the **OK** button to save change.

Join to the domain

Open the System Properties page.



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

System Properties		×
Computer Name Hardw	vare Advanced Remote	
Windows use on the netwo	es the following information to identify your compute ork.	:1
Computer <u>d</u> escription:	[
	For example: "IIS Production Server" or "Accounting Server".	
Full computer name:	ServerNode2	
Workgroup:	123	
To rename this comput workgroup, click Chang	er or change its domain or <u>C</u> hange ge.	
	OK Cancel Appl	y

Press the Change... Button

Computer Name/Domain	Changes	5	×
You can change the name a computer. Changes might af <u>More information</u>	and the me fect acce:	embership ss to netv	o of this vork resources.
Computer name:			
ServerNode2			
Full computer name: ServerNode2			More
- Momber of			
Domain:			
kernsafe.cluster			
C Workgroup:			
1234			
	0	эк	Cancel

Type ServerNode1 in the Computer name and kernsafe.cluster in the Domain.

Press the **OK** button to save the changes

Windows Securit	Y	×
Computer Nar Enter the name	ne/Domain Changes and password of an account with permission to join the domain.	_
	User name Password Domain: kernsafe	
	OK Cancel	

Domain controller account is required to join the domain.

Type User name and Password , then press **OK** to continue.

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



Press OK to continue.



Restart is required, press the **Restart Now button** to restart computer.

Installing Failover Cluster Service

Launch the windows server manager Console



Select the **Feature** from the left tree view.

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

Add Features Wizard	×
Select Features	
Features Confirmation Progress Results	Select one or more features to install on this server. Eachards Instance Instance Connection Manager Administration Kit Description DirectAcces DirectAccess Management Consection Manager Administration Kit Description DirectAccess Management Consection Manager Administration Kit Description DirectAccess Management Consection Manager Administration Kit Description DirectAccess Management Consection Manager Administration Kit Description DirectAccess Management Consection Manager Administration Kit Description DirectAccess Management Consection Manager Administration Kit Description DirectAccess Management Internet Printing Client Internet Storage Name Server LPR Port Monitor Multipath I/O (Installed) Peer Name Resolution Protocol Quality Windows Audio Video Experience Remote Differential Compression Multipath I/O (Installed) Multipath I/O (Installed) Multipath I/O (Installed) Multipath I/O (Installed) Multipath I/O (Installed) Multipath I/O (Installed)
	< Brevious Next > Install Cancel

Select the Failover Clustering.

Press the **Next** button to continue.

Add Features Wiz	ard		×
Cor	nfirm Installation	Selections	
Features Confirmation Progress Results		To install the following roles, role services, or features, click Install. 1 informational message below To This server might need to be restarted after the installation completes. Failover Clustering Print, e-mail, or save this information < Previous Next > Install Cancel	

Press Install to continue the installation of Failover Clustering.

Add Features Wizard	
Installation Prog	ress
Features Confirmation Progress Results	Failover Clustering Installing
	< <u>Previous</u> <u>N</u> ext > <u>I</u> nstall Cancel

The installation is going on.

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

Add Features Wizard	X
Installation Resul	ts
Features Confirmation Progress Results	The following roles, role services, or features were installed successfully: 1 warning message below Mundows 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 Installation succeeded
	Print, e-mail, or save the installation report
	< Previous Next > Close Cancel

Press the **Close** button.

Configuring on HAReplicator

Launch the **HAReplicator management console**, press the add button on the toolbar of management console, the **add server** dialog is shown.

Fill in the ServerNode1 IP address, and leave other default.

Add Server				
Enter the host name or IP address and port of the server you want to add and your user login credentials for that server.				
Server:	192.168.0.101 🔹			
Port:	63261 <u>B</u> rowse			
User login	predentials	1		
User name:	root			
Password:	•••••			
	OK Cancel			

After pressing **OK** button to save setting and connect to the server, HAReplicator Management Console will be shown as below.

HarnSafe HAReplicator			
<u>File Servers Replication View Tools H</u>	lp		
		1	D
Add Remove Create Delete Ref	esh Settings Tools	About Hide	Exit
Servers and Replications	Status	Interface	Partner Device
Servers			
SERVERNODE1	Connected	192.168.0.101:63261	
	Copyright (C) www.kernsafe.cor	m all right reserved.	
💋 Connected: 192.168.0.101 (Enterprise License)			H

Add ServerNode2

×
st name or IP address and port of the server you want to r user login credentials for that server.
192.168.0.102
63261 <u>B</u> rowse
credentials
root
•••••
OK

After pressing **OK** button to save setting and connect to the server, HAReplicator Management Console will be shown as below

🚠 KernSafe HAReplicator				- • ×
<u>File Servers Replication View Tools H</u> elp				
Add Remove Create Delete Refresh Settings	s Tools	€ About Hide	Exit	
Servers and Replications	Status	Interface	Partner Device	
Servers				
SERVERNODE1	Connected	192.168.0.101:632	61	
SERVERNODE2	Connected	192.168.0.102:632	61	
Copyright (C) www.	kernsafe.com all rigi	ht reserved.		
💋 Connected: 192.168.0.101 (51 days-trial)				h.

Then press the **Create** button on the toolbar of management consolle.

Create Replication Wizard	X
Replication Type Select which type of the replication service you want to create.	
High Availability Storage Create high availability storage for windows cluster and hyper-v.	
Remote Replication Create disk/volume real-time replication to remote iSCSI SAN	
Image File Mirror Create mirror to local image file.	
Harddisk Mirror Create mirror (RAID-1) between two hard disks or volumes.	
Volume Mirror Create mirror (RAID-1) between two hard disks or volumes.	
< <u>B</u> ack Next >	Cancel

Choose High Availability Storage in Replication Type page.

Then press the **Next** to continue.

Create Replication Wiza	rd	— X —
Add Nodes Select two server	s to build HA replication.	
Enter name: Selected server:	SERVERNODE1(192.168.0.101)	<u>R</u> efresh <u>A</u> dd <u>R</u> emove
	< <u>B</u> ack Next >	Cancel

Choose servers from **Enter name** combo box. Press the **Add** button to add two servers to the **Selected server** list box.

Create Replication Wizar	d	X
Add Nodes Select two server:	s to build HA replication.	
Enter name: Selected server:	SERVERNODE1(192.168.0.101)	<u>R</u> efresh Add
	SERVERNODE2(132.106.0.102)	<u>R</u> emove
	< <u>B</u> ack <u>N</u> ext >	Cancel

Press the **Next** button to continue

Create Replication Wizard			×
Choose Storage Select two disks from separated nodes to build HA r	eplication.		
Choose storage medium to build high availability replication:			
Device Tree	Size	Signature	
ERVERNODE1			
	298	D056C686	
	59	ED6A45E9	
HD2: ST500DM0 02-1BD142	465	FA0D3688	
SERVERNODE2			
	465	7E4C095D	
	59	ED6A45E9	
HD2: ST325082 0SV	232	9212B412	
	< <u>B</u> ack	Next >	Cancel

Choose two disks with the same capacity from separated servers. Then press **Next** button.

Create Replication Wizard				X
Set Network Portal Set network portal	configuration for HA storage.			
SERVERNODE1				
Remote Interface:	192.168.0.102	•	Remote Port:	63261
Local Interface:	Any	•	Local Port:	Any 👻
SERVERNODE2				
Remote Interface:	192.168.0.101	•	Remote Port:	63261
Local Interface:	Any	•	Local Port:	Any 👻
Options				
Initilize Type:	Full Synchronize			
		< <u>B</u> ack	Next >	Cancel

Specify local interface, port, remote interface and port for transmitting data traffic for the both nodes.

NOTE, choose **Full Synchronize** as Initialize Type, if you reach to the following conditions, you can select **Don't Synchronize** to save your time:

1. Source storage is a completely empty hard disk (even not initialized in windows disk management console).

2. The source storage and target storage was synchronized before, they are consistent already.

Except the above two conditions, you much select Full Synchronize

Then click **Next** button.



Check the information.

Click **Finish** to close the wizard. The main interface of HAReplicator will be shown as below:

🚠 KernSafe HAReplicator			
<u>File S</u> ervers <u>R</u> eplication <u>V</u> iew <u>T</u> ools <u>H</u> elp			
Add Remove Create Delete Refresh Settings	O - Tools	(i) ★ About Hide	Exit
Servers and Replications	Status	Interface	Partner Device
Servers			
SERVERNODE1	Connected	192.168.0.101:63261	
HA: HD1: M4-CT064 M4SSD2 (59.63G)	Synchronizing 0	8 192.168.0.102:63261	HD1: M4-CT064 M4SSD2 (59.63G)
	Connected	192.168.0.102:63261	
HA: HD1: M4-CT064 M4SSD2 (59.63G)	Running	192.168.0.101:63261	HD1: M4-CT064 M4SSD2 (59.63G)
Copyright (C) www.kr	ernsate.com all rig	ht reserved.	
P Connected: 192.168.0.101 (51 days-trial) R: 0.00K/s \	N: 0.00K/s A	Avg. R: 0.00K/s W: 0.00	K/s

Create the second High Availability Storage in the same way.

RemSafe HAReplicator			
<u>File Servers Replication View Tools H</u> elp			
Add Remove Create Delete Refresh Settings	O - Tools	Image: AboutImage: About	Exit
Servers and Replications	Status	Interface	Partner Device
Servers SERVERNODE1	Connected	192.168.0.101:63261	
	Synchronizing 0%	192.168.0.102:63261	HD0: ST500DM0 02-1BD142 (465.76G)
HA: HD1: M4-CT064 M4SSD2 (59.63G)	Synchronizing 1%	192.168.0.102:63261	HD1: M4-CT064 M4SSD2 (59.63G)
SERVERNODE2	Connected	192.168.0.102:63261	
	Running	192.168.0.101:63261	HD2: ST350041 8AS (465.76G)
	Running	192.168.0.101:63261	HD1: M4-CT064 M4SSD2 (59.63G)
			1999) 1999)
Connected: 192.168.0.101 (51 days-trial) R: 0.00K/s	W: 0.00K/s Av	g. R: 0.00K/s W: 0.00	K/s

After synchronization completes, you can put the disks into MSCS.

Configuring on Failover Clustering

Validate a Configuration

Note that this step is not necessary for creating a cluster, but it tells that whether the configuration is suitable for creating cluster or not.

Launch to the Windows Failover Cluster Manager console in ServerNode1 or ServerNode2.



Click on the Validate a Configuration...link

The Validate a Configuration Wizard is shown.

👹 ¥alidate a Configu	Jration 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	

Press the **Next** button to continue.

👹 ¥alidate a Configu	iration Wizard		×
Select Se	ervers or a Cluster		
Before You Begin Select Servers or a Cluster	To validate a set of serve To test an existing cluster	ers, add the names of all the servers. r, 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 <u>R</u> emove
		< <u>Previous</u> <u>N</u> ext >	Cancel

Add ServerNode1 and ServerNode2 to cluster.

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

Select Computers			? ×
Select this object type:			
Computers			Object Types
From this location:			
kernsafe.cluster			Locations
Common Queries			
N <u>a</u> me: Starts w	ith 💌		<u>C</u> olumns
Description: Starts w	ith 💌		Find <u>N</u> ow
Disa <u>b</u> led accounts			Stop
Non expiring passw	vord		
Days since last logon:	-		9 7
Search results:		0	K Cancel
Name (BDN)	In Folder		
12-01	kernsafe cluster		
1012-02	1001110010.0100001		
	kernsafe.cluster		
🝋 CLUSTERN1	kernsafe.cluster kernsafe.cluster		
NUSTERN1	kernsafe.cluster kernsafe.cluster kernsafe.cluster		
NDDE	kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster		
I CLUSTERN1 I CLUSTERN3 I NODE I REPLICATOR	kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster		
I CLUSTERN1 CLUSTERN3 RODE REPLICATOR SERVERNODE1	kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster		
CLUSTERN1 CLUSTERN3 CLUSTERN3 REPLICATOR SERVERNODE1 ESERVERNODE2	kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster	I	
CLUSTERN1 CLUSTERN3 E CLUSTERN3 E REPLICATOR SERVERNODE1 SERVERNODE2 C VCENTERSERVER	kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster		
CLUSTERN1 CLUSTERN3 E NODE REPLICATOR SERVERNODE1 SERVERNODE2 VCENTERSERVER VEWCONNECTION	kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster kernsafe.cluster		

Press **Advanced...**and select ServerNode1 to add.

elect Computers		? ×
Select this object type:		
Computers		Object Types
Erom this location:		
kernsafe.cluster		Locations
Enter the object names to select (<u>examples</u>):		
SERVERNODE1		<u>C</u> heck Names
1		
Advanced	OK	Cancel

Add ServerNode2 in the same way. Press the **OK** button to continue.

👹 Validate a Configu	ıration Wizard		×
Select Se	ervers or a Cluster		
Before You Begin Select Servers or a Cluster	To validate a set of serve To test an existing cluste	ers, add the names of all the servers. r, 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:	servernode1.kernsafe.cluster servernode2.kernsafe.cluster	Browse
		< <u>P</u> revious <u>N</u> ext >	Cancel

Press the **Next** button to continue.

👹 ¥alidate a Configu	ration Wizard	×
Testing C	Options	
Before You Begin Select Servers or a Cluster Testing Options Confirmation Validating	Choose between running all tests or running selected tests. The tests include Inventory tasks, Network tests, Storage tests, and System Configuration tests. Microsoft supports a cluster solution only if the complete configuration (servers, network, and storage) can pass all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2008 R2".	
Summary	 Run <u>a</u>ll tests (recommended) Run only tests I <u>s</u>elect <u>More about cluster validation tests</u> 	
	< <u>P</u> revious <u>N</u> ext > Cancel	1

Select Run all tests (recommended) and Press the Next button to continue.

👹 Validate a Configu	uration Wizard		X
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	servernode1.kernsafe.cluster		
Validating	servernode2.kernsafe.cluster		
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. <u>More about cluster validation tests</u>		
		< Previous Next >	Cancel

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			x
Summary	,			
Before You Begin	Testing has completed successfully and the config	uration is suitable fo	or clustering.	
Select Servers or a Cluster				
Testing Options	Validate Microsoft MPTO Dased disks		Juccess	
Confirmation	Validate Multiple Arbitration	1	Success	
Validating			Julius	
Summary	Validate SCSI device Vital Product Data (VPD)	1	Success	
	Validate SCSI-3 Persistent Reservation		Success	
	Validate Simultaneous Failover		Success	
	To view the report created by the wizard, click View Report To close this wizard, click Finish.	ate the cluster now	<u>Vi</u> ew Report using the validated nodes	
	More about cluster validation tests			
			<u>F</u> inish	

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

Create a Failover Cluster

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

闂Failover Cluster Manager		
<u>File Action View Help</u>		
Failover Cluster Manager	Failover Cluster Manager	Actions
	Create failover clusters, validate hardware for potential failover clusters, configuration changes to your failover clusters.	Failover Cluster Manager Validate a Configuration Create a Cluster
	* Overview	Manage a Cluster
	A failover cluster is a set of independent computers that work together to inc	View
	availability of services and applications. The clustered servers (called nodes) physical cables and by software. If one of the nodes fails, another node begi	r Properties
	services (a process known as failover).	Help
	* Clusters	
	t Management	
	To begin to use failover clustering, first validate your hardware configuration, cluster. After these steps are complete, you can manage the cluster. Manag include migrating services and applications to it from a cluster running Windo Windows Server 2008, or Windows Server 2008 R2.	3
	Validate a Configuration Image: Second	
	Create a Cluster Create a Cluster Create a Cluster node	
	Manage a Cluster 👔 Managing a failov	<u></u>
	Minratino services	

The **Create Cluster Wizard** is shown.

🚏 Create Cluster Wizard				
Before Yo	bu Begin			
Before You Begin Select Servers Validation Warning 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 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 Do not show this page again			
	Next > Cancel			

Press the **Next** button to continue.

🍄 Create Cluster Wiz	zard			×
Select Se	ervers			
Before You Begin Select Servers Validation Warning	Add the names of all the s	ervers that you want to have ir	n the cluster. You must add al	t least one server.
Access Point for Administering the Cluster Confirmation Creating New Cluster Summary	Enter server name: <u>S</u> elected servers:			<u>B</u> rowse Add <u>R</u> emove
			< 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 Validation Warning	Add the names of all t	he servers that you want to have in the cluster. You must add at least one server.	
Access Point for Administering the Cluster Confirmation Creating New Cluster Summary	<u>E</u> nter server name: <u>S</u> elected servers:	Browse servernode1.kernsafe.cluster Add Bemove	
		< <u>P</u> revious <u>N</u> ext > Cancel	

Press the **Next** button to continue.

Before You Begin Select Servers	Type the name	you want to use when adm	inistering the cluster.	_
Addation Warning Access Point for Administering the Cluster	One or more IP sure the networ	4 addresses could not be c k is selected, and then type	onfigured automatically. For each network to be us an address.	ed, make
Confirmation		Networks	Address	
Creating New Cluster	5	192.168.1.0/24	192.168.1.109	
ummary	N	192.168.0.0/24	192 . 168 . 0 . 109	

Specify IP address for this cluster.

Press the **Next** button to continue.

Confirmat Before You Begin Select Servers	tion You are ready to create The wizard will create yo	a cluster. ur cluster with the following settings:	
Access Point for Administering the Cluster Confirmation Creating New Cluster Summary	Cluster: Node: Node: IP Address: IP Address: To continue, click Next.	kernsafecluster servernode1.kernsafe.cluster servernode2.kernsafe.cluster 192.168.1.109 192.168.0.109	*

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

If successful, the Create Failover Wizard will complete and is shown as the figure below.

🚏 Create Cluster Wiz	ard		X
Summary			
Before You Begin Select Servers	You have suc	ccessfully completed the Create Cluster Wizard.	
Access Point for Administering the Cluster		Create Cluster	_
Confirmation Creating New Cluster Summary	Cluster: Node: Node: Quorum:	kernsafecluster servernode1.kernsafe.cluster servernode2.kernsafe.cluster Node and Disk Majority (Cluster Disk 2)	
To view the report created by To close this wizard, click Fini		ated by the wizard, click View Report. lick Finish.	View Report
			<u> </u>

Press Finish to continue.

Now the creation of a cluster is completed, expand the cluster node and select the Storage node, it will show as the figure below. The disk is shown online.



Contact

- Support: <u>support@kernsafe.com</u>
- Sales: <u>sales@kernsafe.com</u>
- Marketing: <u>marketing@kernsafe.com</u>
- Home Page: <u>http://www.kernsafe.com</u>
- Product Page: <u>http://www.kernsafe.com/product/hareplicator.aspx</u>
- Licenses <u>http://www.kernsafe.com/product/ hareplicator/license-compares.aspx</u>
- Forum: <u>http://www.kernsafe.com/forum</u>



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