iStorage Server: High-Availability iSCSI SAN for VMWare ESX / ESXi Server

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KernSafe Technologies, Inc.

www.kernsafe.com

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Overview

iStorage Server is a network based storage virtualization software powered by KernSafe Technologies, Inc. Being a powerful, full-featured and software-only iSCSI Target SAN solution, that can quickly convert existing Windows computer into IP SAN. Storage media of iSCSI Target can include existing storage devices such as the entire hard disks or partitions, CD-RWs, tapes and USB storage devices, as well as disk image file or CD image files including ISO9660(,iso), .bin, .mdf, .cdi, .b5i, .nrg, .ccd, .sub, .img, .raw and other image file formats. Furthermore, iStorage Server also supports a lot of features such as: VHD (Virtual Hard Disk) target, snapshots, STPI, RAID-1 and failover, these features are very important and poplar in storage industry world and make iStorage Server is suitable for any size of business.

VMware ESX and VMware ESXi are "bare-metal" hypervisors, meaning they install directly on top of the physical server and partition it into multiple virtual machines that can run simultaneously, sharing the physical resources of the underlying server. Each virtual machine represents a complete system, with processors, memory, networking, storage and BIOS, and can run an unmodified operating system and applications.

The functionality and performance of VMware ESX and ESXi are the same; the difference between the two hypervisors resides in their architecture and operational management. VMware ESXi is the latest hypervisor architecture from VMware. It has an ultra thin footprint with no reliance on a general-purpose OS, setting a new bar for security and reliability. The small footprint and hardware-like reliability of VMware ESXi enable it to also be available preinstalled on industry standard x86 servers.

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

After iStorage Server 2.0, it supports server side mirroring, synchronous replication and failover which allows user to create a high-availability iSCSI SAN for ESX Server. This article demonstrates how High availability works under VMware ESX Server. We need two targets which has the same size on two servers, in this document, we used server1 192.168.0.195 and server2 192.168.0.111.

Install ESX Server

You need a server running ESX Server. ESX Server must first be installed on to a suitable machine that will be used to create the virtual environment. For learning how to obtain or install VMware ESX Server, please contact the VMware supplier.

Configuring on iStorage Server1

Choose the Authentication Mechanism

Decide which authentication mechanisms you would want to use: **Anonymous, CHAP, IP address** or **Mixed** authentication.

1) Anonymous:

All initiators will get full access permission without any authorization required.

2) CHAP (Challenge-handshake authentication protocol)

All initiators need to specify a CHAP user and secret to connect to the target. iStorage Server has a built-in user called "Guest", which is used for initiators without CHAP secret specified.

3) IP Filters

All initiators will be authorized by the incoming IP address defined by IP Filter roles.

4) Mixed

Security policy is determined by both CHAP and IP Filters.

Create Target

Open iStorage Server Management Console.

🍓 iStorage Server Managem	ent Console	
<u>S</u> torage <u>C</u> lients <u>V</u> iew	<u>T</u> ools <u>H</u> elp	
Create Delete	Start Stop Refresh	Add Remove View Access Settings Print
E server1	iStorage Server:se	rver1
	General Targets Applications	IP Filters Users Groups Logs
Users Groups Logs	Storage General	Properties
	General	
	Hostname:	server1 ≡
	Bind Address:	All Address
	Port:	3260
	Management Metho	d: Active Directory
	State:	ОК
	Status	
	Status:	Started
	License:	Ultimate License
	•	
<u> </u>		S Connected:server1(Ultimate License)

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

Select device type



Choose Hard Disk.

Press the Next button to continue.

Select a medium type.

Create iSCSI Target Wizard	×
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 Create iSCSI disk images for each initiators, any image is individual for each initiator. Disk Partition 	
Create iSCSI target by using a disk partition. Physical Disk Create iSCSI target by using physical disk.	
< Back Next > Car	ncel

Choose Image File in iSCSI Medium Type window.

Then press **Next** button to continue.

Select an Image type.



Choose Standard Image File.

Press the **Next** button to continue.

Specify image file path and size.

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

Choose **Create a new image file** to create a new image file or choose **Use existing image file** if you have one.

Specify image file full name path.

Specify the device size.

If you check **Use sparse file on NTFS file system**, the size of disk image file only depend on its content used, it can save your hard disk space.

Press the **Next** button to continue.

Set authorization mode.

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.	
< Back Next > Ca	incel

Choose Anonymous Authorization.

Press the **Next** button to continue.

Finish creating iSCSI Target.

Create iSCSI Target Wizard	×
Completing the Create iSCSI Wizard You can specify a target name and other options to complete iSCSI target creating.	1
Basic Target Information Enter Target Name: iqn.2006-03.com.kemsafe:KemSafe.ESXTarget	
 Report as readonly device when initiator can not get write access Enable multiple initiators with full access connected (sharing and clustering) 	
Note By default, only one client has full access right, when the second initiaor log on with full access, it will fail. But this option is usfull for clustering, disk sharing and NAS.	
< Back Finish C	Cancel

Type a target name in the **Target Name** field.

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

Press the **Finish** button to continue.

Configuring on iStorage Server2

Create Target

Open iStorage Server Management Console.

🍓 iStorage Server Managem	ent Console	
<u>S</u> torage <u>C</u> lients <u>V</u> iew	<u>T</u> ools <u>H</u> elp	
Create Delete	Start Stop Refresh	Add Remove View Access Settings
E@ server2	iStorage Server:serve	ir2
Applications	General Targets Applications IP Fi	ilters Users Groups Logs
Groups	Storage General Pr	roperties
	General	
	Hostname:	server2
	Bind Address:	All Address
	Port:	3260
	Management Method:	Active Directory
	State:	ОК
	Status	
	Status:	Started
	License:	Ultimate License
	•	
		SSI Connected:server2(Ultimate License)

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

Select device type



Choose Hard Disk.

Press the Next button to continue.

Select a medium type.

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 Create iSCSI disk images for each initiators, any image is individual for each initiator. Disk Partition 	
Create iSCSI target by using a disk partition. Physical Disk Create iSCSI target by using physical disk.	
< Back Next > Car	ncel

Choose Image File in iSCSI Medium Type window.

Then press **Next** button to continue.

Select an Image type.



Choose Standard Image File.

Press the **Next** button to continue.

Specify image file path and size.

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

Choose **Create a new image file** to create a new image file or choose **Use existing image file** if you have a one.

Specify image file full name path.

Specify the device size.

If you check **Use sparse file on NTFS file system**, the size of disk image file only depend on its content used, it can save your hard disk space.

Press the **Next** button to continue.

Set authorization mode.

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.	
< Back Next > Ca	ancel

Choose Anonymous Authorization.

Press the **Next** button to continue.

Finish creating iSCSI Target.

Create iSCSI Target Wizard	x
Completing the Create iSCSI Wizard You can specify a target name and other options to complete iSCSI target creating.	\$
Basic Target Information Enter Target Name: iqn.2006-03.com.kemsafe:KemSafe.ESXTargetPartner	
Enable multiple initiators with full access connected (sharing and clustering) Note By default, only one client has full access right, when the second initiaor log on with full	
access, it will fail. But this option is usfull for clustering, disk sharing and NAS.	
< Back Finish (Cancel

Type a target name in the Target Name field.

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

Press the Finish button to continue.

Creating Application on server1

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



Choose Failover iSCSI SAN Node.

Then press **Next** to continue.

Create Application Wizard	— ×-
Fail Over Configuration You can specify two servers to fail over each other.	4
Base Target	
Target Name	Device Type
Iqn.2006-03.com.kemsafe:KemSafe.ESXTarget	Disk
Mirror Target	
	Edit
	Back Next > Cancel

Check the KernSafe.ESXTarget storage and click Edit to find the mirror target.

Select iSCSI Tar	get		x
- iSCSI Source	:e		
Host Name:	192.168.0.111	Port: 3260	
	Use CHAP to logon		
User Name:			
Secret:			
Target			
Target:	[ign.2006-03.com.kernsafe:KernSafe.ESX	Targetpartner	•
	Discussion OK		
	Discovery		ncel

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

Press **OK** button to continue.

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

reate Application Wizard		×
Fail Over Configuration You can specify two servers to fail over each other.		4
Base Target		
Target Name	Device Type	
Iqn.2006-03.com.kemsafe:KemSafe.ESXTarget	Disk	
Mirror Target iqn.2006-03.com.kemsafe:KemSafe.ESXTargetpartner	Edit	
	< Back Next > C	Cancel

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

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

Now, the mirror target should be synchronized to the base target, if the two targets are both the new one and do not be initialized, we can choose **Create mirror device without synchronization (Manual Initialization),** otherwise, we must choose **Create mirror device with full synchronization from base isCSI target**.

Press **OK** button to continue.

Create Application Wizard	
	Completing the Create Application Wizard
	Application Name: Cluster
	Cluster Type: iSCSI
	First Node: iqn.2006-03.com.kemsafe:KemSafe.ESXTarget
	Second Node: iqn.2006-03.com.kemsafe:KemSafe.ESXTargetpart
	To close this wizard, click Finish.
	< Back Finish Cancel

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

Creating Application on server2

On Server2, right click **Applications** on the left tree of the main interface, choose **Create Application** on the pop-up menu, the **Create Application Wizard** window will be shown.



Choose Failover iSCSI SAN Node.

Then press **Next** to continue.

Create	Application Wizard		x
Fai	I Over Configuration You can specify two servers to fail over each other.		2
Ba	ase Target		
	Target Name	Device Type	
	Iqn.2006-03.com.kemsafe:KemSafe.ESXTargetpartner	Disk	
- M	irror Target		
		Edit	
	< Ba	ck Next > (Cancel

Check the KernSafe.ESXTargetpartner storage and click Edit to find the mirror target.

Select iSCSI Target	×
iSCSI Source	
Host Name: 192.168.0.195 Port: 3260	
CHAP	
User Name:	
Secret:	
Target	
Target: iqn.2006-03.com.kernsafe:KernSafe.ESXTarget	•
Discovery OK Can	cel

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

Press **OK** button to continue.

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

Create Application Wizard		X
Fail Over Configuration You can specify two servers to fail over each other.	¢	<u>s</u>
Base Target		
Target Name	Device Type	
Iqn.2006-03.com.kemsafe:KemSafe.ESXTargetpartner	Disk	
Mirror Target		
iqn.2006-03.com.kemsafe:KemSafe.ESXTarget	Edit	
< Ba	ck Next > Ca	ncel

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

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

Now, the mirror target should be synchronized to the base target, if the two targets are both the new one and do not be initialized, we can choose **Create mirror device without synchronization (Manual Initialization),** otherwise, we must choose **Create mirror device with full synchronization from base isCSI target**.

Press **OK** button to continue.



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

Configure VMware ESX Server

Install VMware Infrastructure Client 4.0

Run VMware Infrastructure Client installation, the following interface is shown.



Press the **Next** button to continue.

Install VMware Infrastructure Client.

🛃 VMware	vSphere Client 4.0
Installing The prog	VMware vSphere Client 4.0 gram features you selected are being installed.
17	Please wait while the installation wizard installs VMware vSphere Client 4.0. This may take several minutes.
	Status:
	Copying new files
InstallShield	
	Cancel

After coping files is completed, press the **Finish** button to complete VMware Infrastructure Client installation.

Log on to ESX Server

Run VMware Infrastructure Client, VMware Infrastructure Client Log on dialog is shown.

🚱 VMware vSphere Client	
vmware ™ware vSphere Client	R
To directly manage a sing To manage multiple hosts, vCenter Server.	le host, enter the IP address or host name. , enter the IP address or name of a
IP address / Name:	192.168.0.109
User name:	root
Password:	*****
	Use Windows session credentials
	Login Close Help

Type IP address / Name with which running ESX Server.

Type user name and password.

Press the Login button to continue.

Configure ESX Server's networking

Open VMware Infrastructure Client.



Click **Networking** link in the **Hardware** group, the built-in Virtual Switch is shown.

🔗 192.168.0.109 - vSphere Client			
File Edit View Inventory Administration Plug-ins Help			
🖸 🔯 Home 🕨 🛃 Inventory 🕨 🗊 Inventory			
	localhost VMware ESX, 4.0.0, 208167 E	valuation (59 days remaining)	
	Getting Started Summary Virtual Machi	nes Resource Allocation Perform	mance Configuration Users & Groups Events Permissions
	Hardware	View: Virtual Switch	
	Health Status	Networking	Refresh Add Networking Properties
	Processors		
	Memory	Virtual Switch: vSwitch0	Remove Properties
	Storage	- Virtual Machine Port Group	Physical Adapters
	Storage Adapters	Sanira Carela Bart	
	Network Adapters	Service Console	
	Advanced Settings	vswif0:192.168.0.109	
	Software		
	Licensed Features		
	Time Configuration		
	DNS and Routing		
	Virtual Machine Startup/Shutdown		
	Virtual Machine Swapfile Location		
	System Resource Allocation		
	Advanced Settings		
Recent Tasks			×
Name	Target Status	Details Initiated by	Requested Start Ti Start Time Completed Time
Remove port group	192.168.0.109 📀 Completed	root	5/25/2010 6:37:41 PM 5/25/2010 6:37:41 PM 5/25/2010 6:37:41
Remove virtual NIC	192.168.0.109 Scompleted	root	5/25/2010 6:37:41 PM 5/25/2010 6:37:41 PM 5/25/2010 6:37:41 I
<	172.100.0.109 V Completed		3/23/2010 0.37.30 PM 3/23/2010 0.37.30 PM 3/23/2010 0.37.30 PM
Tasks			Evaluation Mode: 59 days remaining root

For using iSCSI, we need to create a new Network, click **Add Networking** link, an **Add Network Wizard** is shown.

🛃 Add Network Wizard	
Connection Type Networking hardware can	be partitioned to accommodate each service that requires connectivity.
Connection Type Network Access Connection Settings Summary	Connection Types C Virtual Machine Add a labeled network to handle virtual machine network traffic. C VMkernel The VMkernel TCP/IP stack handles traffic for the following ESX services: VMware VMotion, iSCSI, and NFS. C Service Console Add support for host management traffic.
Help	< Back Next > Cancel

On the first page of this wizard, select **VmKernel** which allows your virtual machines can use the iSCSI.

Press the **Next** button to continue.

Select which virtual switch will handle the network traffic.

😰 Add Network Wizard				
VMkernel - Network Acce The VMkernel reaches n	ess etworks through uplink adapters atta	ched to virtual s	witches.	
Connection Type Network Access	Select which virtual switch will han using the unclaimed network adap	dle the network ters listed belov	traffic for this connection. You may also create a n v.	ew virtual switch
 Connection Settings Summary 	Create a virtual switch	Speed	Networks	
	• Use vSwitch0	Speed	Networks	
	Vmnic0	1000 Full	192.168.0.6-192.168.0.6	
	Preview:	P	hvsical Adapters	
	VMkernel Virtual Machine Port Group VM Network Service Console Port Service Console vswif0 : 192.168.0.109	<u>0</u>	⊷ 🗃 vmnic0	
Help			< Back Next >	Cancel

Select User vSwitch0 option.

Press the **Next** button to continue.

Type the identification of the network adapters.

🛃 Add Network Wizard			
VMkernel - Connection Se Use network labels to iden	ttings ntify VMkernel connections while mar	naging your hosts and datacenters.	
Connection Type Network Access Connection Settings IP Settings Summary	Port Group Properties Network Label: VLAN ID (Optional):	VMkernel Use this port group for VMotion Use this port group for Fault Tolerance logging	
	Preview: VMkernel Port VMkernel Virtual Machine Port Group VM Network Service Console Port Service Console vswif0 : 192.168.0.109	Physical Adapters vmnic0 2 2 4 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5	
Help		< Back Next >	Cancel

Give the name of the new network.

Press the **Next** button to continue.

IP Settings

🕝 Add Network Wizard				x
VMkernel - IP Connectio Specify VMkernel IP set	n Settings tings			
Connection Type Network Access Connection Settings IP Settings Summary	C Obtain IP settings automatically Use the following IP settings: IP Address: Subnet Mask: VMkernel Default Gateway:	192 168 0 . 102 255 . 255 . 2 	Edit	
	-Wikernel Image: Construction of the second sec	Physical Adapters		
Help		< Back	Next > Cancel	

Input IP Address and Subnet mask, we take **192.168.0.102** and **255.255.255.0** as an example. Press the **Next** button to continue.

Complete add networking

💋 Add Network Wizard	
Ready to Complete Verify that all new and mo	odified virtual switches are configured appropriately.
Connection Type Network Access Connection Settings Summary	Host networking will include the following new and modified vSwitches: Preview: VMkernel Port Physical Adapters VMkernel 192.168.0.102 Virtual Machine Port Group VM Network Service Console Port Service Console Vswif0 : 192.168.0.109
Help	< Back Finish Cancel

Check the parameters are correct and press the **Back** button if any changes are required.

Press the **Finish** button to complete creating adding network.

Configure iSCSI Storage

Click Storage Adapters link in the Hardware group.

Click Properties link.

The iSCSI Initiator (vmmhba34) Properties Dialog is shown.

Now we need to disable **Delayed Ack**. Having Delayed Ack enabled can sometimes result in slow read performance that can interfere with High Availability between servers and SAN itself.

To read more about it, please visit:

http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId= 1002598

😰 iSCSI Initiator (vmhba34) Prop	perties	_ D X
General Dynamic Discovery St	atic Discovery	1
Name: Alias:	iqn.1998-01.com.vmware:localhost-5e10)cd34
Target discovery methods:	Send Targets, Static Target	
Software Initiator Properties – Status:	Enabled	
CHAP Advanced		Configure
	_	
	Clos	e Help

To disable delayed Ack, please click on Advanced... button.

Then please scroll down and uncheck **Delayed Ack**.

Advanced Settings					×
Min: 10	Max: 30				*
NoopInterval				60	
iSCSI option : No-Op Inte	rval				
Min: 1	Max: 60				
InitR2T					
iSCSI option : Init R2T					
ImmediateData			\checkmark		
iSCSI option : Immediate	Data				
DelayedAck					L
iSCSI option : Delayed Ac	k				4 III
		ОК	Cancel	Help	

Press **OK** button to continue.

😰 iSCSI Initiator (vmhba34) Prop	perties	_ 🗆 X
General Dynamic Discovery St	atic Discovery	1
Name:	iqn.1998-01.com.vmware:localhost-5e10	cd34
Target discovery methods:	Send Targets, Static Target	
Software Initiator Properties - Status:	Enabled	
CHAP Advanced		Configure
	_	
	Close	e Help

In the General page, press the Configure... button.

The General Properties dialog is shown.

Select **Enabled** check box in the **Status** group.

Press the **OK** button to continue.

😰 General Properties	x
iSCSI Properties iSCSI Name: qn. 1998-01.com.vmware:localhost-5e10cd3 iSCSI Alias:	4
Status	
OK Cancel Help	

Add iSCSI Target discovery.

😰 iSCSI Initiator (vmhba34) Properties	
General Dynamic Discovery Static Discovery	
Send Targets	
Discover iSCSI targets dynamically from the following IP addresses:	
iSCSI Server Address	
Add Remove	Settings
Clos	e Help

In Dynamic Discovery page, press the Add button, the Add Send Targets Server dialog is shown.

🛃 Add Send Target Se	erver	×
iSCSI Server:	192.168.0.195	
Port:	3260	
Inheritance:		
Authentication	n may need to be d with any discove	configured before a session can ered targets.
		CHAP Advanced
	ОК	Cancel Help

😰 Add Send Target Se	rver
iSCSI Server: Port: Inheritance: Authentication be established	192. 168.0. 111 3260 n may need to be configured before a session can with any discovered targets.
	CHAP Advanced
	OK Cancel Help

Input iSCSI Server address and port with which is running the iStorage Server.

Press the **OK** button to proceed.

Specify CHAP authentication information.

🕖 iSCSI Initiator (vmhba34) Prop	erties			×
General Dynamic Discovery Sta	tic Discovery			
Name: Alias:	iqn.1998-01.com.vmware:localhost-5e10	cd34		
Target discovery methods:	Send Targets, Static Target			
Software Initiator Properties				
Status:	Enabled			
CHAP Advanced		Con	figure	
	Close	e	н	elp
			_	/

If you choose CHAP user authorization mode in target of iStorage Server, this step cannot be skipped. Press the **CHAP** button, the **CHAP Credentials** dialog is shown.

🕖 CHAP Credent	ials	×
All iSCSI targets otherwise specifi The CHAP s CHAP (target a	are authenticated using these credentials unle ed in the target's CHAP settings. secret and Mutual CHAP secret must be differ uthenticates host)	ess ent.
Select option:	Use CHAP	-
	Use initiator name	
Name:		
Secret:		
	nost authenticates target)	
Select option:	Do not use CHAP	-
	Use initiator name	
Name:		
Secret:		
	OK Cancel He	elp

Type CHAP user name and secret in the CHAP (target authenticates host) group.

If you do not choose CHAP authentication, you should select **Do not Use CHAP**.

Press the **OK** button in this dialog.

Press the **Close** button in the **iSCSI Initiator (vmmhba34) Properties** dialog to finish iSCSI Target configuration.

A prompt dialog is shown.



Press the **Yes** button to continue.

Please wait for a while, you will found an iSCSI device appears in the following interface:

💋 192.168.0.109 - vSphere C	lient	
File Edit View Inventory	Administration Plug-ins Help	
🔄 💽 🏡 Home 👂	🔉 🚮 Inventory 🔉 🛐 Inventory	
田 田 192.168.0.109 Io	calhost VMware ESX, 4.0.0, 2081	67 Evaluation (58 days remaining)
G	Getting Started Summary Virtual	Machines Resource Allocation Performance Configuration Users & Groups Events Permissions
Pro	DCESSOFS	vmhba34 iSCSI iqn.1998-01.com.vmware:localhost-5e10cd34:
Str	entor y	82801H (ICH8 Family) 2 port SATA IDE Controller
Ne	tworking	S vmhba1 Block SCSI
str	prage Adapters	vmhba33 Block SCSI
Ne	twork Adapters	82801H (ICH8 Family) 4 port SATA IDE Controller
Ad	Ivanced Settings	Details
	~	
ftw	are	vmba34 Properties
Lio	ensed Features	Model: ISSI SOLIVATE Adaptet ISCSI Name: Inn. 1998-01.com. vmware:localhost-5e10cd34
Tin	ne Configuration	iSCSI Allas:
DN	IS and Routing	Connected Targets: 2 Devices: 1 Paths: 2
Vir	tual Machine Startup/Shutdown	View: Devices Paths
Vir	tual Machine Swapfile Location	
Se	curity Profile	Name Runtime Name LUN Type Transport Capacity Owner
Sy	stem Resource Allocation	KemsafeisCsi Disk (euluitosaba Vmnbas4:Cu:12:LU u disk ISCSI 4.00 GB NMP
Ad	Ivanced Settings	
		-
.		m b
Recent Tasks		· · · · · · · · · · · · · · · · · · ·
Name	Target Status	Details Initiated by Requested Start Ti V Start Time Completed Time
🐔 Rescan HBA	📔 192.168.0.109 🥥 Comp	leted root 8/15/2010 8:11:57 PM 8/15/2010 8:11:57 PM 8/15/2010 8:12:20 PM
Add Internet SCSI send	. 📋 192.168.0.109 🔮 Compl	leted root 8/15/2010 8:11:49 PM 8/15/2010 8:11:49 PM 8/15/2010 8:11:49 PM
Remove Internet SCSI	192.168.0.109 OCompl	leted root 8/15/2010 8:11:41 PM 8/15/2010 8:11:41 PM 8/15/2010 8:11:41 PM
Refresh host storage s	192.168.0.109 💟 Comp	leted root 8/15/2010 8:11:15 PM 8/15/2010 8:11:15 PM 8/15/2010 8:11:15 PM
2 lasks		Evaluation Mode: 58 days remaining root

Now, the iSCSI configuration is completed.

You will see there are two targets are connected but one device is shown in the table.

Click **Paths** label in the **View** panel, you will see two paths which are connected to the device and the status is active.



Configure Storage device

Click **Storage** link in the **Hardware** group.



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

Select Disk/LUN

😰 Add Storage						×
Select Disk/LUN Select a LUN to create a data	istore or expand the current one					
Disk/LUN Select Disk/LUN	Name, Identifier, Path ID, LUN, Capacit	y, Expandable or VM	FS Label c -			Clear
Current Disk Layout	Name	Path ID	LUN	Capacity	VMFS Label	
Properties	KernSafe iSCSIDisk (eui.00000000	iqn.2006-03.com	0	4.00 GB		
Help			Back	Next >	Cance	

Select KernSafe iSCSI Disk device with the Identifier of iqn.2006-03.com.kernsafe....

Press the **Next** button to continue.

Partition and format the entire device.

🕢 Add Storage				_ D X
Current Disk Layout You can partition and forma	at the entire device, all free space, or a single block of fr	ree space.		
	Review the current disk layout:			
Current Disk Layout Properties Formatting Ready to Complete	Device KernSafe iSCSI Disk (eui.000000000000 Location /vmfs/devices/disks/eui.000000000000000000000000000000000000	Capacity 4.00 GB	Available 4.00 GB	LUN O
	There is only one layout configuration available. Use pages.	the Next button	to proceed with the	e other wizard
	A partition will be created and used			
Help		< Back	Next >	Cancel

Just use the default.

Press the **Next** button to continue.

Type the data store name.

🕢 Add Storage			
Properties Specify the properties for the	datatore		
Disk/LUN Select Disk/LUN Current Disk Layout Properties Formatting Ready to Complete	Enter a datastore name		
Help		< Back Next >	Cancel

Type iStorage Server in the Enter a datastore name.

Press the **Next** button to continue.

Format entire device

🕢 Add Storage		
Disk/LUN - Formatting Specify the maximum file siz	e and capacity of the datastore	
Disk/LUN Select Disk/LUN Current Disk Layout Properties Formatting	Maximum file size — Large files require large block size. The minimum disk space used by any file is equipoon block size.	ual to the file system
Ready to Complete	Capacity	
	Maximize capacity	4.00 <u></u> GB
Help	< Back Nex	ct > Cancel

Leave the default recommend settings.

Press the **Next** button to continue.

Complete data store creating

💋 Add Storage				
Ready to Complete Review the disk layout and	d dick Finish to add storage			
Disk/LUN	Disk layout:			
Ready to Complete	Device KernSafe iSCSI Disk (eui.00000000000000 Location /vmfs/devices/disks/eui.000000000000000000	Capacity 4.00 GB	Available 4.00 GB	LUN O
	Primary Partitions VMFS (KernSafe iSCSI Disk (eui.0000000000	Capacity 4.00 GB		
	File system:			
	Datastore name: iStorage Server			
	Formatting File system: VMFS-3 Block size: 1 MB Maximum file size: 256 GB			
Help		< Back	Finish	Cancel

OK, now, the storage is going to be created, press the **Finish** button to finish the wizard.

Press the Yes button in the following prompt dialog, so that the ESX Server formats the storage.

After this, you can see the storage device in the following interface.



Now, we have the storage to store virtual machines, so next we will install virtual machine on it.

Manage and Install virtual machine

🛃 192.168.0.109 - vSpher	e Client					_ 🗆 X
File Edit View Invent	ory Administration Pl	ug-ins Help				
🕞 💽 🏡 Home	▶ Inventory ▶	Inventory				
		N 112 🗳 🗠	%			
192.168.0.109	localhost VMware ES	X, 4.0.0, 208167 E	valuation (59 days rem	aining)		
	Getting Started Sum	mary Virtual Machin	es Resource Allocation	Performance Configuration	n Users & Groups Eve	nts Permissions
				Name, State	or Guest OS contains: +	Clear
	Name	State	e Provis	ioned Space Used Space	Host CPU - MHz Host	t Mem - MB Guest Mem - %
	↓ • • 					•
Recent Tasks						×
Name	Target	Status	Details Initiated	by 🔰 Requested Start Ti 🗢	Start Time	Completed Time
🛛 🖄 Unregister virtual mac	h 🚹 Unknown	Completed	root	5/25/2010 7:26:09 PM	5/25/2010 7:26:09 PM	5/25/2010 7:26:09 PM
🛛 🖄 Unregister virtual mac	h 👜 Unknown 1	Completed	root	5/25/2010 7:26:09 PM	5/25/2010 7:26:09 PM	5/25/2010 7:26:09 PM
Refresh host storage	s 192.168.0.109	Completed	root	5/25/2010 7:23:19 PM	5/25/2010 7:23:19 PM	5/25/2010 7:24:41 PM
Create VMFS dataston	e 192.168.0.109	Completed	root	5/25/2010 7:23:06 PM	5/25/2010 7:23:06 PM	5/25/2010 7:24:28 PM 🔻
🖉 Tasks					Evaluation Mo	de: 59 days remaining root //

In the Virtual Machine tab page of VMware Infrastructure Client, right click on the black page, and then select New Virtual Machine..., the New Virtual Machine Wizard is shown.

Select the appropriate configuration.

😰 Create New Virtual Machine	
Configuration Select the configuration for	Virtual Machine Version: 7
Configuration Name and Location Datastore Guest Operating System Create a Disk Ready to Complete	Configuration Typical Create a new virtual machine with the most common devices and configuration options. Custom Create a virtual machine with additional devices or specific configuration options.
Help	< Back Next > Cancel

Select Typical option.

Press the **Next** button to continue.

Type the virtual machine name.

😰 Create New Virtual Machine	
Name and Location Specify a name and location	Virtual Machine Version: 7 On for this virtual machine
Configuration	Name:
Name and Location	windows xp
Guest Operating System	Virtual machine (VM) names may contain up to 80 characters and they must be unique within each vCenter Server VM folder.
Ready to Complete	VM folders are not viewable when connected directly to a host. To view VM folders and specify a location for this VM, connect to the vCenter Server.
Help	< Back Next > Cancel
	< back Cancel

Type in the virtual machine name, we take **windows xp** as an example.

Press the **Next** button to continue.

Choose a data store for storing files of the virtual machine.

Create New Virtual Machin Datastore Select a datastore in white	ne ch to store the virtual mad	thine files				Virtual	Machine Version:
Configuration Name and Location	Select a datastore in	which to store	the virtual mach	ine files:			
Datastore	Name	Capacity	Provisioned	Free	Туре	Thin Provisioning	Access
Guest Operating System	[Storage1]	147.75 GB	7.97 GB	139.78 GB	VMFS	Supported	Single host
Create a Disk Deady to Complete	[iStorage Serve	3.75 GB	301.00 MB	3.46 GB	VMFS	Supported	Single host
	Compatibility: Validation not applica	able this time.					
Help					< Bac	k Next >	Cancel

Specify a data store to store the virtual machine, select iStorage Server.

Press the **Next** button to continue.

Choose the guest operation system.

😰 Create New Virtual Machine	
Guest Operating System Specify the guest operatin	g system to use with this virtual machine
Configuration Name and Location Datastore Guest Operating System Create a Disk Ready to Complete	Guest Operating System: Microsoft Windows Linux Novell NetWare Solaris Other Version: Microsoft Windows XP Professional (64-bit) Identifying the guest operating system here allows the wizard to provide the appropriate defaults for the operating system installation.
Help	< Back Next > Cancel

Select operation system, we select **Microsoft Windows XP Professional (64-bit**) as an example. Press the **Next** button to continue.

Specify the size of virtual disk that will be used by the guest machine.

🕖 Create New Virtual Machine			
Create a Disk Specify the virtual disk size	e and provisioning policy		Virtual Machine Version: 7
Configuration Name and Location Datastore Guest Operating System Create a Disk Ready to Complete	Datastore: Available space (GB): Virtual disk size: Allocate and commit sp The virtual disk file star Support dustering feat Selecting this option wil	Storage Server 3.5 B → GB ▼ ace on demand (Thin Provisioning) ts small and grows as more virtual disk space is us ures such as Fault Tolerance I increase the time it takes to create the virtual me	ed. achine.
Help		< Back	Next > Cancel

Press the **Next** button to continue.

Check if the parameters are correct and press the **Back** button if any changes are required.

😰 Create New Virtual Machine		
Ready to Complete Click Finish to start a task th	Virtual Mach	ine Version: 7
Configuration	Settings for the new virtual machine:	
<u>Datastore</u> <u>Guest Operating System</u> <u>Create a Disk</u> Ready to Complete	Name: windows xp Host/Cluster: localhost Datastore: iStorage Server Guest OS: Microsoft Windows XP Professional (32-bit) Virtual Disk Size: 3 GB	
	Edit the virtual machine settings before completion	
	Creation of the virtual machine (VM) does not include automatic installation of the guest of system. Install a guest OS on the VM after creating the VM.	perating
Help	< Back Finish	Cancel

Right click on the **Windows XP**, select **Edit Settings...** on the pop-up menu, the **Virtual Machine Properties** widow is shown. In this window, we click **CD/DVD Drive1 (edited)** link in the **Hardware** group and then select **Host Device** we will install OS form client computer.

🔗 windows xp - Virtual Machine Properties				
Hardware Options Resources		Virtual Machine Version: 7		
Show All Devices	Add Remove	Device Status		
Hardware	Summary	Connect at power on		
Memory CPUs Video card VMCI device Floppy drive 1 Hard disk 1 CD/DVD Drive 1 (edited) Network adapter 1	256 MB 1 Video card Restricted Client Device Virtual Disk /dev/scd0 VM Network	Device Type Client Device Note: To connect this device, you must power on the virtual machine and then click the Connect CD/DVD button in the toolbar. Host Device /dev/scd0 Datastore ISO File Browse Mode Passthrough IDE (recommended) Emulate IDE Virtual Device Node Virtual Device Node IDE (1:0) CD/DVD Drive 1		
I I I I I I I I I I	•			
Help		OK Cancel		

CD device should be set to connect at power on.

Click the **Finish** button to complete virtual machine creating.

Insert windows XP installation CD, and then power on the virtual machine just created, you will see the windows XP imitation interface:



Formats the partition C:



Copy files



Continue windows install



Likewise, you may install Windows Server 2003, Vista, Windows Server 2008 and Windows 7 or even any version of Linux as you wish.

Contact

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