

StarWind iSCSI SAN Software: ESX Storage Migration

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Guide

Introduction

This technical paper describes how to provide Virtual Machine migration from existing storage to the StarWind Datastore.

This process requires a customized network infrastructure, where DNS service is running, as well as a computer with the already installed vCenter.



Configuring StarWind Server

This section describes StarWind configuration in details. Before you start, please ensure that the StarWind software is installed on the host that provides storage services to VMware ESX Server.



Storage Information

Image File device

The **Image File** device creates a virtual iSCSI disk using the space of a physical hard disk on the machine where it is created. The resulting iSCSI storage will have the same structure as a physical hard disk.

When the **Image File** device is mounted (using an iSCSI Initiator), it appears as standard hard disk to the computer on which it is mounted. All standard disk operations such as formatting using a custom file system, copying data to/ from it and installation of applications, etc. are fully supported.

There are some limitations for the Image File device usage:

As a virtual hard disk uses the space of your physical hard disk, the available volume is limited by the free space on that hard drive. If the size of an image file is close to the remaining free space of the hard disk on which it is stored, you will not be able to store additional files on that disk.

You cannot change the volume of the image file while it is online and users are connected to it. However, you can extend the volume.



Preparing Storage

1. Launch the StarWind console by clicking **Start -> All Programs -> StarWind Software -> StarWind -> StarWind**. Whenever the **StarWind Console** is running, its icon appears in the system tray.

2. Access the **StarWind Console** by either double-clicking the icon using the left mouse button or single-click with the right mouse button and selecting the **Start Management** menu item from the pop-up menu.

3. From the **Connections** tree select the server you want to provision the iSCSI target device on.

4. Click the **Connect** button to continue. You will be prompted to enter the login and password. Use the default login and password - "**root**" and "**starwind**" respectively. You can always change them later.

5. Click the **Add Target** button to continue.

6. In the **Add Target Wizard** that appears, specify a unique target name. By this name the device will be declared to the iSCSI initiators connecting to StarWind over an IP network.

Add Target Wizard				×
Common target parameters Specify target alias and target na	ime,			0
Target Alias:				
sharedstorage				
Target Name:				
iqn.2008-08.com.starwindsoftw	are:192.168.	1.216-shareds	torage	
	< <u>B</u> ack	<u>N</u> ext >	Cancel	Help



7. Click the **Next** button to continue.

8. Under Device Type, click the **Basic Virtual option** button.

Add Target Wizard	×
Device type Select device type.	0
Physical Select this option to export any physical hard disk (SATA, PATA, RAID, SCSI)
 Basic Virtual Select this option to create and export a virtual hard disk. 	
Advanced Virtual Select this option to create and export a virtual hard disk with advanced fund	ctionalities.
Items marked as are not licensed. Please contact support http://www.starwindsoftware.com/support	
< <u>B</u> ack <u>N</u> ext > Cancel	Help



10. Click Image File device.

Add Targe	et Wizard 🛛 🗙
Device Sel	e type lect device type.
۰	Image File device Allows creating a virtual hard disk that uses a disk file as its storage medium. The file is a RAW set of all sectors that the virtual hard drive contains.
C	RAM disk device Allows creating extremely fast virtual disks that reside entirely in random access memory.
	< <u>B</u> ack <u>N</u> ext > Cancel Help



12. Use one of the options: **Create new virtual disk** creates a new hard disk image, while **Mount existing virtual disk** mounts an existing image that you created before.

Add Targe	t Wizard 🗙
Device Sele	creation method ect device creation method.
o	Mount existing virtual disk Choose an existing virtual disk and export it as an iSCSI target.
۰	Create new virtual disk Create a new virtual hard disk and export it as an iSCSI target.
C	Create new virtual disk based on Snapshot and CDP disk Choose an existing Snapshot and CDP virtual disk to create a new Image File virtual disk based on it and export it as an iSCSI target.
	< <u>B</u> ack <u>N</u> ext > Cancel Help



14. If you decided to create a new virtual disk, specify its location and name.

15. Define the virtual disk size in megabytes.

Refer to the StarWind Online Help for details regarding additional parameters (Fill with zeroes, Compressed and Encrypted).

Add Target Wizard		×
Virtual disk paramet Specify virtual disk	ers parameters.	0
New virtual disk locati	on and name:	
My Computer\D\stor	age.img	▼
Size:	75 GB 💌	
Compressed		
Encrypted		
User account that w Name;	vill have access to this image	
Password:		
Fill with zeroes	< <u>B</u> ack <u>N</u> ext >	Cancel Help

16. Click the **Next** button to continue.

17. Specify Image File device parameters. Refer to the StarWind Online Help for details regarding the following parameters: Asynchronous mode, Allow multiple connections (clustering), Read-only mode, and Specify advanced options).



Add Target Wizard	×
Image File device parameters Specify Image File device parameters.	0
Select the virtual disk you want to make accessible via iSCSI:	
My Computer\D\storage.img	<u> </u>
Asynchronous mode	
Allow multiple concurrent iSCSI connections (clustering)	
Header size in bytes:	
< <u>B</u> ack <u>N</u> ext > Cance	I Help



19. From the **Cache mode** list choose the necessary option.

Add Target Wizard				×
Image File device cache paramel Specify Image File device cache p	t ers arameters.			0
Cache mode Normal (no caching)				
Cache size in MB;		64 🖂		
Note: cache size is subject to : machine memory.	shrink w/o no	otice if specified v	alue is too large f	for destination
Cache block expiry period in ms:		5000 🖂		
	< <u>B</u> ack	<u>N</u> ext >	Cancel	Help



21. Make sure you have specified correct device parameters. Click the **Back** button should any changes be required.

Add Target Wizard		×
SAN	Add Target Wizard	
· · · · · · / / /	The following device will be added:	
iscs	ImageFile1	
	You specified the following settings:	
	File : My Computer\D\storage.img Asynchronous : Yes Clustering : No Cache mode: : Normal (no caching)	×
≈ Şţạr ₩ınd	Click Next to add new device.	
	< Back Next > Cancel	Help



A summary of the created device is displayed on the last wizard page.



23. Click the **Finish** button to close the wizard.



Configuring ESX Server

This section gives the detailed description of the ESX configuration.

Configuring the iSCSI Software Initiator

1. Click the **Configuration** tab.

2. In the Hardware section, click Storage Adapters. The list of available storage adapters appears. Select iSCSI Software Adapter.



3. In the **Details** section below, click **Properties**. **iSCSI Initiator Properties** dialog appears.



🛃 iSCSI Initiator (vmhba34) Pi	iSCSI Initiator (vmhba34) Properties				
General Dynamic Discovery Static Discovery					
-iSCSI Properties					
Name:	iqn.1998-01.com.vmware:s2n4				
Alias:					
Target discovery methods:	Send Targets, Static Target				
– Software Initiator Properties –					
Status:	Enabled				
CHAP Advanced]		Configure		
	_				
		Close	Help		

4. Click the **Dynamic Discovery** tab.



🕑 iSCSI Initiator (vmhba34) Properties	
General Dynamic Discovery Static Discovery	
Send Targets	
Discover iSCSI targets dynamically from the following locations (IPv4, host name):	
iSCSI Server Location	
192.168.1.215:3260	
<u>A</u> dd <u>R</u> emove <u>S</u> et	tings
Close	
	11

5. Click the **Add...** button.



6. In the **Add Send Targets Server** dialog, specify the IP address of the StarWind iSCSI target server.

æ	Add Send Target S	jerver	×	
			1	
	iSCSI Server:	192.168.1.216		
	Port:	3260		
	Parent:			
	Authentication may need to be configured before a session can be established with any discovered targets.			
		<u>CHAP</u> <u>A</u> dvanced		
		OK Cancel <u>H</u> elp		

7. Click **OK**. You will be returned to the **iSCSI Initiator** properties dialog.



🕑 iSCSI Initiator (vmhba34) Properties	
General Dynamic Discovery Static Discovery	
Send Targets	
Discover iSCSI targets dynamically from the following locations (IPv4, host nam	ne):
ISCST Server Location	
192 168 1 215:3260	
192.168.1.216:3260	
Add Remove	Settings
Close	Help
	1

8. Click the **Close** button.



vSphere client will prompt you to rescan the host bus adapter for New Storage Devices and New VMFS volumes.

Rescan		×
1	A rescan of the host bus adapter is recommended for this configuration change. Rescan the adapter?	
	<u>Y</u> es <u>N</u> o	

9. Click **Yes** to rescan the host bus adapter.



After the iSCSI software initiator has been successfully configured, the **vSphere Client** window should look like the sample picture below.

😢 vcenter.sws.com - vSphere Clier	۱ t						
Eile Edit View Inventory Administr	ration <u>P</u> lug-ins <u>H</u> elp						
🚺 🛃 🏠 Home 🕨 🛃 In	ventory 🕨 🗊 Hosts and Clusters				😴 🗸 Search Inven	tory	0
तो हो आई							
Construction of the second secon	192.168.1.222 VMware ESX, 4.1.0, 2602 Getting Stated Summary Vistual Mark Processors Memory Storage Networking Storage Adapters Network Adapters Advanced Settings Power Management Software Licensed Features Time Configuration DNS and Routing Authentication Services Power Management Visual Machine Startup/Shutdown Visual Machine Startup/Shutdown Visual Machine Startup/Shutdown Visual Machine Startup/Shutdown	Performance Configuration Tasks 8 Events Aler Storage Adapters Type ISCSI Software Adapter Type ISCSI Software Adapter Immunolity Immunolity Immunolity Immunolity Intex Peak 2 port SATA IDE Controller Immunolity Immunolity Immunolity Immunolity Immunolity	me Permissions Maps WWN ign.1998-01.com.vmware Paths: 2 Paths: 2 Runtime Name LU vmhba34:C0:T0:L0 0	Storage Views ::s2n4: 	Transport SCSI SCSI	Refresh Capacity 76,25 GB 75,00 GB	Rescan All



Setting Up the Datastore

- 1. Switch to the **Configuration** tab.
- 2. In the Hardware section, click Storage.



3. Click the Add Storage... link on the right. Add Storage dialog appears.



4. In the **Storage Type** section, click the **Disk/LUN** storage type.

🚱 Add Storage	
Select Storage Type Specify if you want to form	at a new volume or use a shared folder over the network.
Disk/LUN Select Disk/LUN Current Disk Layout Properties Formatting Ready to Complete	Storage Type • Disk/LUN Create a datastore on a Fibre Channel, iSCSI, or local SCSI disk, or mount an existing VMFS volume. • Network File System Choose this option if you want to create a Network File System. • Adding a datastore on Fibre Channel or iSCSI will add this datastore to all hosts that have access to the storage media.
Help	Back Next ≥ Cancel



6. Select the device in the section to the right.

🛃 Add Storage					
Select Disk/LUN					
Select a LUN to create a dat	astore or expand the current one				
	1				
Select Disk/LUN	Name, Identifier, Path ID, LUN, Capacity	y, Expandable or VMFS	Label c	•	Clear
Current Disk Layout	Name	Path ID		Capacity VMFS Lab	el Harc
Formatting	ROCKET iSCSI Disk (eui.946600f41d	iqn.2008-08.com.s	. 0	75,00 GB	Unkr
Ready to Complete					
	•				F
Help		4	<u>< Back</u>	Next > Ca	ancel

7. Click **Next** to continue.



8. Review the current disk layout.

🚱 Add Storage				-D×
Current Disk Layout You can partition and formal	t the entire device, all free space, or a single block of f	free space.		
Disk/LUN	Review the current disk layout:			
Current Disk Layout Properties Formatting Ready to Complete	Device ROCKET iSCSI Disk (eui.946600f41db577 Location /vmfs/devices/disks/eui.946600f41db5776b The hard dis	Capacity 75,00 GB k is blank.	Available 75,00 GB	LUN O
	There is only one layout configuration available. Us pages. A partition will be created and used	e the Next button I	to proceed with the	other wizard
			1	1
		<u> </u>	Next >	Cancel



10. Specify the datastore name in the corresponding text field.

🚱 Add Storage		
Properties Specify the properties for th	ne datatore	
Disk/LUN Select Disk/LUN Current Disk Layout Properties Formatting Ready to Complete	Enter a datastore name StarWind Storage	
Help	≤ Back Next ≥ Cancel	



12. Specify the **Disk/LUN formatting** options.

🛃 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 Ready to Complete	Maximum file size Large files require large block size. The n block size. 256 GB , Block size: 1 MB Capacity Maximize capacity	ninimum disk space used by any file is equal to the file system Image: space system <td< td=""></td<>
Help		<u>≤ Back</u> Next ≥ Cancel



14. Make sure that the device parameters are correct. Click **Back** should any changes be required.

🛃 Add Storage		_0>
Ready to Complete Review the disk layout an	nd click Finish to add storage	
Disk/LUN	Disk layout:	
Ready to Complete	Device ROCKET ISCSI Disk (eui.946600f41db577 Location /vmfs/devices/disks/eui.946600f41db5776b	Capacity LUN 75,00 GB 0
	Primary Partitions VMFS (ROCKET ISCSI Disk (eui.946600f41db	Capacity 75,00 GB
	File system:	
	Datastore name: StarWind Storage	
	Formatting File system: VMF5-3 Block size: 1 MB Maximum file size: 256 GB	
Help		< Back Finish Cancel

15. Click the **Finish** button to close the wizard.



After the datastore has been setup, the **vSphere Client** window should look like the sample picture below.

🛃 vcenter.sws.com - vSphere Clie	nt							
Eile Edit View Inventory Administ	ration Plug-ins Help							
🖸 🖸 🔥 Home 🕨 🚓 Ir	nventory 🕨 🎁 Hosts and Clusters					Se Se	arch Inventory	Q
5 6 8								
vcenter.sws.com	192.168.1.222 VMware E5X, 4.1.0, 2602 Getting Started Summary Virtual Mac	147 nines Performance Configural	tion Tasks & Event	s Alarms Permission	ns Maps 5	torage Views		
Clust#2 SWSCluster 192.168.1.222	Hardware	View: Datastores Device	s					
	Processors	Datastores				Refresh	Delete Add Storage	Rescan All
vm1	Memory	Identification	Status	Device	Capacity	Free Type	Last Update	Alarm Actions
	 Storage 	datastore	🥏 Normal	Local ATA Disk (t	231,50 GB	123,52 GB vmfs3	08.06.2011 16:52:26	Enabled
	Networking	esx datastore	Normal	MSFT ISCSI Disk	76,00 GB	35,45 GB vmfs3	08.06.2011 16:52:26	Enabled
	Storage Adapters	Starwind Storage	🦁 Normai	ROCKET ISCSI DI	74,75 GB	74,20 GB VMFS3	08.06.2011 16:51:22	Enabled
	Advanced Settings							
	Power Management							
		•						Þ
	Software	Datastore Details						Properties
	Licensed Features		and the second second		daga sa		and the second	
	Time Configuration							
	DNS and Routing							
	Authentication Services							
	Power Management							
	Virtual Machine Startup/Shutdown							
	Virtual Machine Swapfile Location							
	Security Profile							
	System Resource Allocation							
	Mavariceu securiys							



Migrating Virtual Machine from MS iSCSI target Datastore to the StarWind Datastore

1. To migrate virtual machine, right-click on it and click "Migrate...".

nt							<u>×</u>
tration Plug-ins Help							
nventory 🕨 🎁 Hosts and Clusters					<mark>6</mark> € - Se	arch Inventory	Q
192.168.1.222 VMware E5X, 4.1.0, 26 Getting Started Summary Virtual M	50247 1achines Performance <mark>Configurat</mark> i	on Tasks & Events	Alarms Permission	s Maps 5	torage Views		
Hardware	View: Datastores Devices	1					
Processors	Datastores				Refresh	Delete Add Storage	Rescan All
sole	Identification Identification	 Status Normal Normal Normal 	Device Local ATA Disk (t MSFT ISCSI Disk ROCKET ISCSI Di	Capacity 231,50 GB 76,00 GB 74,75 GB	Free Type 123,52 GB vmfs3 35,45 GB vmfs3 74,20 GB vmfs3	Last Update 08.06.2011 16:52:50 08.06.2011 16:52:50 08.06.2011 16:52:50	Alarm Actions Enabled Enabled Enabled
ance storn Ctrl+P formance formance sw Window Ctrl+Alt+N on m Inventory bla	Datastore Details						Properties
	nt ration Plug-ins Help ventory Plug-ins Help 192.168.1.222 VMware E5X, 4.1.0, 2(Geting Started Summary Venual N Hardware Processors sole gs ance k ance k formance Shutdown cocation w Window Ctrl+At+N on Dekk	nt ration Plugins Help ventory P Hots and Clusters 192.168.1.222 VMware ESX, 4.1.0, 260247 Getting Started Summary Vetual Machines Performance Configuration Hardware Processors Processors Configuration Processors Configuration Processors Configuration Configuratio	nt ration Plug-ins Help Iventory b Total And Clusters 192.168.1.222 YMware ESX, 41.0, 260247 Getting Started Summary Virtual Machines Performance Configuration Tasks & Evento Hardware Devices Processors Mormal gs ance , ison, Ctrl+AP, on Isok buildown or book	nt ration Plug-ins Help Vertory b Hots and Clusters 192.168.1.222 VMware ESX, 4.1.0, 260247 Getting Started Summary Vertual Machines Performance Configuration Tasks & Events Alarma Permission Hardware Processors Processors Status Device Datastores Datastores Device Normal MSFT (SCSI Disk B scale Status Device Normal ROCKET (SCSI Disk Status Device Datastore Normal ROCKET (SCSI Disk Status Device Datastore Normal ROCKET (SCSI Disk Status Device Datastore Normal ROCKET (SCSI Disk Datastore Details formance Posk	nt ration Plug-ins Help Ventory P Hots and Clusters 192.168.1.222 VMware ESX, 41.10, 260247 Getting Started Summary Vetual Machines Performance Configuration Tasks & Events Alarm Permission Map S Hardware Processors Processors Datastores Devices Processors Status Device Capacky Batastore Normal Local ATA Disk (t 231,50 GB escidatastore Normal MSFT ISCSI Disk 76,00 GB Statwind Storage Normal ROCKET ISCSI Disk 74,75 GB ance Potastore Details formance Potastore Details	nt ration Plugins Help Ventory D T Hots and Clusters	nt ration Plugins Help ventory ♪ ♪ Hots and Clusters 192.168.1.222 VMware ESX, 4.1.0, 260247 Getting Started Summary Vetual Machines: Performance Configuration Tasks & Events Alamis Permissions Maps Zonage Views View: Datastores Devices Processors Datastores Devices Processors Configuration Tasks & Events Alamis Permissions Maps Zonage Views View: Datastores Devices Datastores Devices Datastores Processors Configuration Tasks & Events Alamis Permissions Maps Zonage Views View: Datastores Devices Datastores Processors Datastore ● Normal Local ATA Disk (t, 231,50 GB 123,52 GB vinfs3 08.06.2011 16:52:50 gs Datastore ● Normal ROCKET BCSI Disk 76,00 GB 35,45 GB vinfs3 08.06.2011 16:52:50



2. In the Migrate Virtual Machine wizard that appears, click Select Migration Type.3. Click the Change datastore option button to move the desired virtual machine storage to StarWind Datastore.

🚱 Migrate Virtual Machine		
Select Migration Type Change the virtual machine	e's host, datastore or both.	
Select Migration Type Select Datastore Disk Format Ready to Complete	 Change host Move the virtual machine to another host. Change datastore Move the virtual machine's storage to another datastore. Change both host and datastore Move the virtual machine to another host and move its storage to another datastore. Move the virtual machine must be powered off to change the VM's host and datastore. 	
Help	<u>≤</u> Back Next ≥	Cancel



5. In the **Select Datastore** section, click **StarWind Storage** to define it as the destination datastore for this virtual machine migration. If it is possible to migrate, the message "Validation succeeded" will appear in the **Compatibility** section.

Select Migration Type	The following datastores are ac	cessible by the destinati all of the virtual disks.	ion you've select	ted. Select the	e destinati	on datastore for the v	irtual
Disk Format	Name	Capacity	Provisioned	Free	Туре	Thin Provisioning	Access
Ready to Complete	[datastore]	231,50 GB	107.98 GB	123,52 GB	VMFS	Supported	Sinale H
	[esx datastore]	76,00 GB	42,55 GB	35,45 GB	VMFS	Supported	Single h
	[StarWind Storage]	74,75 GB	561,00 MB	74,20 GB	VMFS	Supported	Single I
	•						
	Compatibility: Validation succeeded						



7. In the **Disk Format** section, click one of the option buttons to define the format in which the virtual machine's virtual disks will be stored.

🛃 Migrate Virtual Machine		_ 🗆 X
Disk Format In which format do you wa	ant to store the virtual disks?	
Select Migration Type Select Datastore Disk Format Ready to Complete	Select a format in which to store the virtual machine's virtual disks Same format as source Use the same format as the original disks. Thin provisioned format Allocate full size now and commit on demand. This is only supported on VMFS-3 and newer datastores. Othe types of datastores may create thick disks. Thick format Allocate and commit the full size now. Compatibility: Validation succeeded	r
Help	<u>≤ Back</u> Next ≥	Cancel //

9. Review the summary before finishing the wizard. Click the **Back** button should any changes be required

🕑 Migrate Virtual Machine		
Ready to Complete		
Click Finish to start migratio	n	
Select Migration Type Select Datastore	Review this summary before finishing the wizard.	
Disk Format Ready to Complete	Host: Current Location Datastore: StarWind Storage vMotion Priority: Default Priority Disk Storage: Same format as source	
Help	<u>≤</u> Back <u>E</u> inish	Cancel

10. Click the **Finish** button to close wizard and to start migration.



11. Switch to the Task & Events tab to monitor the migration process.

🛃 vcenter.sws.com - vSphere Clie	int				
Eile Edit View Inventory Adminis	tration <u>P</u> lug-ins <u>H</u> elp				
C 🖸 🛃 🏠 Home 🕨 🛃 I	inventory 🕨 🛐 Hosts and Clusters			Search Inventory	Q
vcenter.sws.com New QA Datacenter Cust#1 Ust#2	vm1 Getting Started Summary Resource A View: Tasks Events	Illocation Performance Tasks & Eve	ents Alarms Console Permissions	Maps Storage Views	Scheduled Tasks
92.168.1.222			Name, Ta	irget or Status contains: 👻	Clear
vm1	Name	Target	Status	Details	
	🐔 Relocate virtual machine	🔂 vm1	94% (Copying Virtual Ma	chine files
	▲ Task Detais				Þ



The status **Completed** shows that the migration has been successful.

🚱 vcenter.sws.com - vSphere Clie	ent				
Eile Edit View Inventory Adminis	stration Plug-ins Help				
C 🖸 🙆 🔥 Home 🕨 🚮 🗄	Inventory 🕨 🛐 Hosts and Clusters			🚮 🗸 Search Inventory	Q
🔳 II 🕨 🧐 🙆 🧕	à 🔯 😫 🥪 🧇				
vcenter.sws.com	vm1 Getting Started Summary Resource View: Tasks Events	Allocation Performance Tasks & Ev	ents Alarms Console Permissions M	laps Storage Views	Scheduled Tasks
SwScluster 192.168.1.222			Name, Targ	et or Status contains: 👻	Clear
vm1	Name	Target	Status	Details	
	Relocate virtual machine	🔂 vm1	Completed		
	<mark>.▲]</mark> Task Details)



12. To make sure that the migration has been successfully completed, open the Virtual Machine Properties dialog. To do so, choose the virtual machine you need, rightclick on it, click Edit settings, and choose Hard disk 1. If migration has been successful, the Virtual Machine Properties window should look like the sample picture below.

🛃 vm1 - Virtual Machine Propert	ies	
Hardware Options Resources		Virtual Machine Version: 7
	Add Re	move Disk File
Hardware Memory CPUs Video card VMCI device SCSI controller 0 Hard disk 1 CD/DVD Drive 1 Network adapter 1 Floppy drive 1	Summary 1024 MB 1 Video card Restricted LSI Logic SAS Virtual Disk Client Device VM Network Client Device	Disk Provisioning Type: Thick Provisioned Size: 20 • GB • Maximum Size (GB): 74,20 Virtual Device Node SCSI (0:0) Hard disk 1 Mode Independent Independent Independent disks are not affected by snapshots. Persistent Changes are immediately and permanently written to the disk. Nonpersistent Changes to this disk are discarded when you power off or revert to the snapshot.
Help		OK Cancel



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