

StarWind iSCSI SAN Software: Multipathing



www.starwindsoftware.com

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Guide

Introduction

The diagram below illustrates the network architecture used throughout this document.

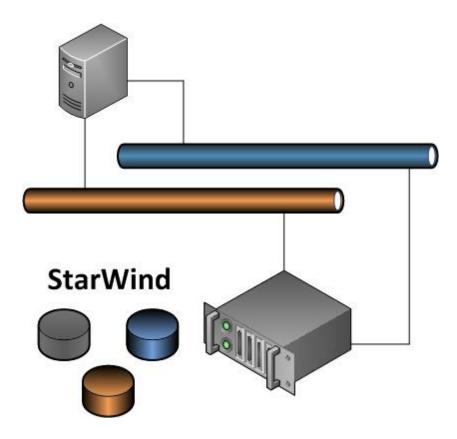


Figure 1. Using StarWind to provide iSCSI storage



Configuring StarWind Server

Network Adapters

Both network adapters must have a static IP address assigned. Select **Use the following IP address** option and enter the IP adress you wish to use, also provide a subnet mask. The Gateway and DNS are not necessary to provide. Do so for both adapters which participate in MPIO storage configuration.

Internet Protocol (TCP/IP) Propertie	-s ? X					
General						
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.						
O Obtain an IP address automatica	ly					
🕞 Use the following IP address:						
IP address:	192.168.1.1					
S <u>u</u> bnet mask:	255.255.255.0					
Default gateway:	· · ·					
C Obtain DNS server address autor	natically					
□ —	dresses:					
Preferred DNS server:	· · ·					
<u>A</u> lternate DNS server:						
	Ad <u>v</u> anced					
	OK Cancel					

Press the **OK** button.



Open TCP/IP properties of the second network adapter, enter the IP address with a different subnet, the Subnet mask should remain the same.

Internet Protocol (TCP/IP) Propertie	s <u>?x</u>					
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 . 68 . 2 . 1					
Subnet mask:	255 . 255 . 255 . 0					
Default gateway:						
C Obtain DNS server address autor	natically					
└ ─ O Use the following DNS server add	resses:					
Preferred DNS server:	· · ·					
<u>A</u> lternate DNS server:	· · ·					
	Ad <u>v</u> anced					
	OK Cancel					

Press the **OK** button.



Preparing Storage Volume

Launch the **StarWind** console selecting **Start** -> **All Programs** -> **StarWind Software** -> **StarWind** -> **StarWind**. After the console is launched its icon appears in the system tray. Double click the icon with the left mouse button or single click it with the right and select **Start Management** pop-up menu item. StarWind management console will appear.

From the **Connections** tree please select the computer you wish to connect to. By default, there is a single item in the tree (localhost) which represents a loopback connection. Double click on the host to connect to it.

Default login and password are: root, starwind. You can always change them later.

After you have successfully connected to the **StarWind Service**, Press the

🛋 button to launch Add Target wizard.



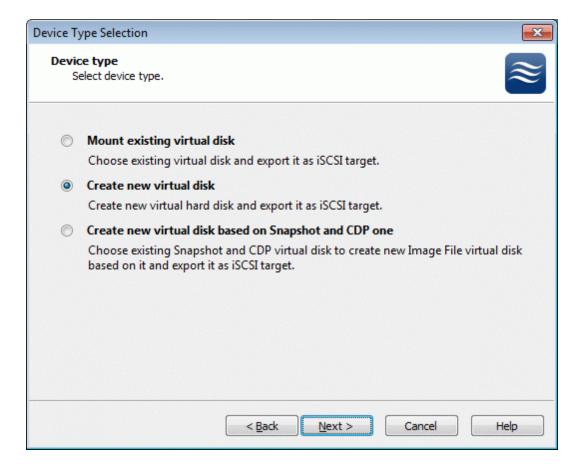
Add Target wizard window will appear. Specify the target name for your virtual disk.

arget Wizard						
mmon target pa Specify target ali		t name.				
Target Alias:						
multipath						
Target Name:						
ign.2008-08.com	m.starwindsof	ftware:localho	st-multipath			
		< <u>B</u> adk	<u>N</u> ext >	Canc	:el	Hel



Select Image File device type by going Hard Disk->Basic Virtual->Image File device.

Select Create new virtual disk option.





Specify the path where the disk image file should be created and it's size in Megabytes.

Check any additional parameters of the virtual disk you wish to create. Please refer to the online help to learn about additional parameters (**Compressed**, **Encrypted** and **Fill with zeroes**).

Device Type Selection	
Virtual disk parar Specify virtual o	neters lisk parameters.
New virtual disk lo	cation and name:
My Computer \C\	/irtual Disks/multipath_storage_01.img
Size in MBs:	10240
Compressed	
Encrypted	
User account the	at will have access to this image
Name:	
Password;	
Fill with zeroes	
	< Back Next > Cancel Help



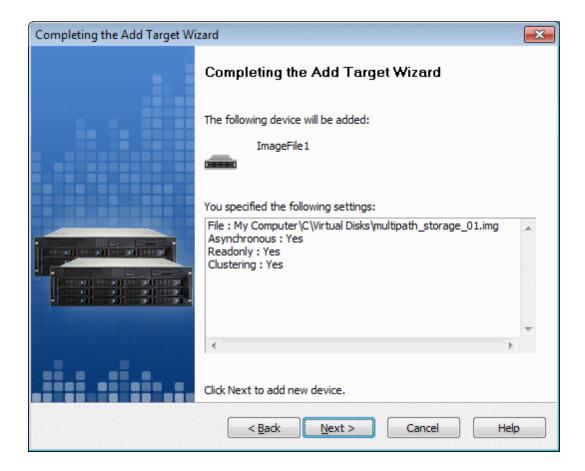
Set Image File device parameters. Check **Allow multiple concurrent iSCSI** connections (clustering) checkbox.

To learn more about additional parameters (Asynchronous mode, Allow multiple connections (clustering), Read-only mode and Specify advanced options) please refer to the online help.

Device Type Selection	×
Image File device parameters Specify Image File device parameters.	\approx
Select virtual disk you want to make accessible via iSCSI:	
My Computer\C\Virtual Disks\multipath_storage_01.img	·
Asynchronous mode	
Read-Only mode	
Allow multiple concurrent iSCSI connections (clustering)	
Advanced options	
File system buffering	
Header size in sectors: 0	
< <u>B</u> ack <u>N</u> ext > Cancel	Help



Check the device parameters you have set are correct. Press the **Back** button should any changes be required.





Wizard will inform you that the target has been successfully created.

Completing the Add Target W	izard	×
	The new target was successfully added	
	The following device was created:	
	ImageFile 1	
	Target name:	
	iqn.2008-08.com.starwindsoftware:localhost-multipath	*
		-
	To close this wizard click Finish.	
	< Back Finish Cancel H	elp

Press the **Finish** button to close the wizard.



The **StarWind Console** now displays the device you have created. If needed you can configure access rights and CHAP permissions to the device you have created.

File Host Target Options Help					×
🔘 🔁 🖃 😫 🕑 🛛	P 🚅 🙎				
StarWind Servers	Target List CHAP Permission	ns Access Rights			
Targets	Target Alias	Target IQN		Clustered	
multipath		iqn.2008-08.co	om.starwindsoftware:localh	Yes	
1	multipath Devices SCSI Sessions CF Device Name	HAP Permissions	Device Type	State	
		0x00A1FD68	Image File	Active	
T W A R	Device Properties				
	Device:	ImageFile 1	Mintered Distriction data attacks on a	1 in	
0 F T 0 F T	Virtual Disk: Persistent Reservation:	My Computer (C Yes	\Virtual Disks\multipath_storage_0	1.img	
	File System Buffering:	No			III
	Size in MBs:	10240			
	Read-Only Mode:	Yes			
111	Header Size in Sectors:	0			-



Configuring Client Server

Windows 2003 Server

Configuring network adapters

Both network adapters must have a static IP address assigned. Select **Use the following IP address** option and enter the IP address you wish to use, also provide a subnet mask. The Gateway and DNS are not necessary to provide. Do so for both adapters which participate in MPIO storage configuration.

Internet Protocol (TCP/IP) Propertie	-s ? X				
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.					
🔘 Obtain an IP address automatica	lly				
☐ Use the following IP address: —					
IP address:	192.168.1.2				
S <u>u</u> bnet mask:	255.255.255.0				
Default gateway:	· · ·				
O Obtain DNS server address auto	matically				
□ — • Use the following DNS server add	dresses:				
Preferred DNS server:	· · ·				
<u>A</u> lternate DNS server:	· · ·				
	Ad <u>v</u> anced				
	OK Cancel				



Open TCP/IP properties of the second network adapter, enter the IP address with a different subnet, the Subnet mask should remain the same.

ternet Protocol (TCP/IP) Properti	es ?>
General	
You can get IP settings assigned auto this capability. Otherwise, you need t for the appropriate IP settings.	
🔘 Obtain an IP address automatic	ally
☐ Use the following IP address:—	
IP address:	192.168.2.2
Sybnet mask:	255 . 255 . 255 . 0
Default gateway:	· · ·
C Obtain DNS server address auto	
 Use the following DNS server address addr	
Preferred DNS server:	
Alternate DNS server:	
Hitemate Divid Server.	
	Ad <u>v</u> anced
	OK Cancel

Press the **OK** button.



Configuring Microsoft iSCSI Initiator

Download Microsoft iSCSI Initiator from here. Install it with the Microsoft MPIOMultipathing Support for iSCSI option enabled.

Microsof	t iSCSI Initiator will be installed
- Installati	ion Options
V	Virtual Port Driver
	Initiator Service
	Software Initiator
V	Microsoft MPID Multipathing Support for iSCSI

You will need to restart the computer, before continuing.



Launch the MS iSCSI Initiator by selecting Start->All Programs->Microsoft iSCSI Initiator-> Microsoft iSCSI Initiator.

Switch to the Discovery tab. Here you can locate and specify the computer with StarWindinstalled or iSNS server.

iSCSI Initia	tor Prope	rties				X
General	Discovery	Targets F	^p ersistent Tar <u>c</u>	jets Bound	Volumes/Devic	es
_ <u>I</u> arget	Portals —					
Addre	ess	Port	Adapter		IP Address	
	Add		<u>R</u> emove	R	<u>e</u> fresh	
jSNS S	ervers					
Name	e					
	A <u>d</u> d		Re <u>m</u> ove	R	e <u>f</u> resh	
			ОК	Cancel	Apply	

Press the **Add** button.



Type in StarWind servers first IP address.

Add Target Portal Type the IP address or DNS name a want to add. Click Advanced to sel session to the portal.		
IP address or DNS name: 192.168.1.1	Port: 3260	<u>A</u> dvanced
	ОК	Cancel

Press the **OK** button.

In the MS Initiator window click Add once again, Type in StarWind servers second IP address.

Add Target Portal		×
Type the IP address or DNS name a want to add. Click Advanced to sele session to the portal.		
IP address or DNS name: 192.168.2.1	<u>P</u> ort: 3260	<u>A</u> dvanced
	ОК	Cancel

Press the **OK** button.



Switch to the Targets tab

iSCSI Initiator Properties	×
General Discovery Targets Persistent Targets Bound Vo	olumes/Devices
Select a target and click Log On to access the storage device target. Click details to see information about the sessions, con devices for that target.	
Name	Status
ign.2008-08.com.starwindsoftware:localhost-multipath	Inactive
<u>D</u> etails <u>Log On</u>	R <u>e</u> fresh
OK Cancel	Apply

Select a target from the list and press the Log On... button.



A 'Log On to Target' dialog will now appear.

Log On to Target		×
Target name:		
iqn.2008-08.com.starwindsoftware:local	host-multipath	
Automatically restore this connection w	when the system	boots
🔽 Enable multi-path		
Only select this option if iSCSI multi-p on your computer.	ath software is al	ready installed
[Advanced]	ок	Cancel

Enable restore and multi-path options and click the **Advanced** button.



The Advanced Settings dialog appears. For the Target Portal select StarWind servers first IP address.

Advanced Settings
General IPSec
Connect by using
Local <u>a</u> dapter: Default
Source IP: Default
<u>I</u> arget Portal: 192.168.1.1 / 3260 ▼
CRC / Checksum
□ Data digest □ Header digest
CHAP logon information CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.
User name: iqn. 1991-05. com. microsoft: max-a64ae55b996
Target <u>s</u> ecret:
Perform mutual authentication
To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.
OK Cancel Apply

Press the **OK** button to continue.

You will be returned to Previous dialog window. Press the **OK** button to return to MS Initiator main window



Select the target you have just connected.

iSCSI Initiator Properties	×
General Discovery Targets Persistent Targets Bound	Volumes/Devices
Select a target and click Log On to access the storage dev target. Click details to see information about the sessions, o devices for that target.	
Targets:	
Name ign.2008-08.com.starwindsoftware:localhost-multipath	Status Connected
<u>D</u> etails <u>Log On</u>	R <u>e</u> fresh
OK Cancel	Apply

Press **Log On...** once again and perform the same steps as described above, but in the target portal selection window select StarWind servers **second** IP address. Return to MS Initiator main window and view the detailed target info by pressing the **Advanced** button.



If you have done everything correct on the Sessions tab you will see two sessions representing both network paths that you have set. Switch to the Devices tab. You can see that the connected device is Multi-Path capable.

Target Prop	erties			×
Sessions I	Devices Prope	rties		
	to view informa	oosed by iSCSI session ation about the device		
Device N	lame		MPIO Capable	ו ר
	IMAGEFILE IMAGEFILE	SCSI Disk Device SCSI Disk Device	Multi-Path Support Multi-Path Support	
			<u>A</u> dvanced	
		ок	Cancel Apply	

Press the **Advanced** button.



In the dialog window appeared you can view general information about the device.

Go to MPIO tab. Here you can configure load balance policy for your connections.

A brief description of the selected policy type can be found beneath Load Balance Policy selection box.

Device Details	;				×
General MP	:o				
Load Balance	e Policy :				
Fail Over O	nly			•	
Fail Over O Round Robi Round Robi Least Queu Weighted P Least Blocks	n n With Subse e Depth aths ;	•			
Path Id	Status	Туре	Weight	Session ID	
	Conne Conne		n/a n/a	fffffff8839c8fc-4 ffffffff8839c8fc-4	
•					•
			Deta	ails <u>E</u> dit	
		0	<	Cancel	1. pply



Windows 2008 Server

Configuring network adapters

Both network adapters must have a static **IPv4** address assigned. It is recommended to switch off the IPv6 option. Select Use the following IP address option and enter the IP address you wish to use, also provide a subnet mask.Gateway and DNS are not necessary to provide. Do so for both adapters which participate in MPIO storage configuration.

Internet Protocol Version 4 (TCP/IPv	/4) Properties
General	
You can get IP settings assigned auton this capability. Otherwise, you need to for the appropriate IP settings.	ask your network administrator
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:	
C Obtain DNS server address auton	natically
Use the following DNS server add	Iresses:
Preferred DNS server:	
<u>A</u> lternate DNS server:	
	Ad <u>v</u> anced
	OK Cancel



Open **TCP/IPv4** properties of the second network adapter, enter the IP address with a different subnet, leave the Subnet mask the same as in the first connection.

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.	ask your network administra	Contraction of the second s
Obtain an IP address automatical	ly	
Use the following IP address:	102 169 2 2	
IP address:	192.168.2.2	
S <u>u</u> bnet mask:	255.255.255.0	
Default gateway:		
C Obtain DNS server address auton	natically	
Use the following DNS server add	resses:	
Preferred DNS server:		
<u>A</u> lternate DNS server:		
	Advance	d
	ОК С	ancel

Press the **OK** button.



Adding multipath I/O feature

Open **Server Manager** (Start->Administrative Tools->Sever Manager). Go to **Features** item. Click **Add Features**.

An **Add Features Wizard** will appear. In the features list select **Multipath I/O** feature and install it.

Add Features Wizard		×
Select Features		
Features Confirmation Progress Results	Select one or more features to install on this server. Eatures: INET Framework 3.0 Features BitLocker Drive Encryption BITS Server Extensions Connection Manager Administration Kit Desktop Experience Failover Clustering Group Policy Management Internet Printing Client Internet Storage Name Server DR Port Monitor Message Queuing Multipath I/O Network Load Balancing Peer Name Resolution Protocol Quality Windows Audio Video Experience Remote Differential Compression Remote Differential Compression Removable Storage Manager RPC over HTTP Proxy Simple TCP/IP Services Meth Secure More about features	Description: Multipath I/O, along with the Microsoft Device Specific Module (DSM) or a third-party DSM, provides support for using multiple data paths to a storage device on Windows.

After the installation completes restart your server.



Configuring Microsoft iSCSI Initiator

Open the Microsoft iSCSI Initiator (Start -> Administrative Tools -> iSCSI Initiator).

Now the Microsoft iSCSI Initiator window will open. Go to Discovery tab. Press the **Add Portal** ... button.

In the window appeared enter StarWind servers first IP address.

Add Target Portal Type the IP address or DNS nam to add. To select settings for the Advanced.		
IP address or DNS name:	Port:	
ir address or DNS hame;	Ford	

Press **OK** button to continue.

In the initiator window press Add Portal... button once again to add the second StarWind server IP address.

Add Target Portal		×
Type the IP address or DNS name ar want to add. Click Advanced to selec session to the portal.		
IP address or DNS name:	Port:	<u>A</u> dvanced
	ОК	Cancel

Press **OK** button to continue and switch to Targets tab.



Select the desired target.

51 Initiator Properties		
Favorite Targets	Volumes and Devices Discovery	RADIUS Targets
To access storage devices Log on.	for a target, select the tar	get and then dick
To see information about s dick Details.	essions, connections, and	devices for a target,
Targets:		
Name		Status
and the second se	software:localhost-multipath	the second s
Deba		Defect.
Details	Log on	R <u>e</u> fresh

press the Log On... button.



Log On to Target		×
Target name:		
iqn. 2008-08. com. starwindsoftware: localho	st-multipath	
Automatically restore this connection	when the compu	ter starts
🔽 Enable multi-path		
Only select this option if iSCSI multi-p on your computer.	ath software is a	already installed
<u>A</u> dvanced	ОК	Cancel

Enable restore and multi-path options and press the **Advanced...** button.



In the Target Portal field select StarWind servers first IP address.

nced Settings		ſ
neral IPsec		
Connect by using		
Local adapter:	Default	
Source IP:	Default	
Target portal:	192, 168, 1, 1 / 3260	Control of the second s
CRC / Checksum		
Data digest	🔲 Header digest	
2		
CHAP logon infor		
	data security by providing authentication between a target and an pecify the same target CHAP secret that was configured on the target	
for any madory		
User name; iq	n. 1991-05.com.microsoft:win-eejju862fty	
Target secret:		
	generate user authentication credentials	
Perform mutual a		
To use mutual CHAP	either specify an initiator secret on the Initiator Settings page or use	
To use mutual CHAP	either specify an initiator secret on the Initiator Settings page or use secret must be configured on the target.	
To use mutual CHAP RADIUS. The same		
To use mutual CHAP RADIUS. The same	secret must be configured on the target.	

Press the **OK** button to continue.

You will be returned to Previous dialog window.

Press the **OK** button to return to MS Initiator main window



Select the target again.

5I Initiator Properties		
Favorite Targets General	Volumes and Devices Discovery	RADIUS Targets
To access storage device: Log on.	s for a target, select the ta	rget and then dick
To see information about dick Details.	sessions, connections, and	devices for a target
Targets:		
Name		Status
14.12000 00.0011.3011WI	ndsoftware:localhost-multipa	th Connected
<u>D</u> etails	Log on	R <u>e</u> fresh

Press **Log On...** once again and perform the same steps as described above, but in the target portal selection window select StarWind servers **second** IP address. Connect the target's second path and close the MS Initiator.



Now open the MPIO manager(Start->Administrative Tools->MPIO) and go to **Discover Multi-Paths** tab.

Enable the Add support for iSCSI devices checkbox.

IPIO-ed Devices	Discover N	Multi-Paths	DSM Inst	tall		
SPC-3 complia	nt —					
Device Hard	ware Id					
Add suppo	ort for ISCSI	devices				
	ALL IN POST	ue vices		ſ	Add	
				L		
Oll						
Others						
Device Hard	ware Id					
	ware Id					
	ware Id					
	ware Id					
	ware Id				Add	
	ware Id				Add	

Press **Add** button.

You will be prompted to reboot, press the **Yes** button.



After the reboot open the MPIO manager once again to ensure that the multipathed device has been successfully recognized and added. In case of success you will see a new device in the Devices list on the MPIO-ed devices tab.

MPIO Properties	×
MPIO-ed Devices Discover Multi-Paths DSM Install	
To add support for a new device, click Add and enter the Vendor and Product Ids as a string of 8 characters followed by 16 characters. Multiple Devices can be specified using semi-colon as the delimiter. To remove support for currently MPIO'd devices, select the devices and then click Remove.	
Devices:	
Device Hardware Id	
MSFT2005iSCSIBusType_0x9	
<u>A</u> dd <u>R</u> emove	
OK Cancel Apply	



Open the iSCSI initiator and view your target properties by selecting the target and pressing Details button.

On the Sessions tab you will see two sessions representing both network paths that you have set.

Switch to the Devices tab. You can see that the connected device is Multi-Path capable.

rget Properties	2
Sessions Devices Properties	
These are the devices exposed by iSCSI sess Advanced to view information about the devi- multipath policy.	
Devices:	
Device Name	MPIO Capable
ROCKET IMAGEFILE SCSI Disk Device	Disk drive
ROCKET IMAGEFILE SCSI Disk Device	Disk drive
	Advanced
OK	Cancel Apply

Press the **Advanced** button.



Here you can view general information about the device. Go to MPIO tab. Here you can specify the load balance policy for your connections. A brief description of the selected policy type can be found beneath Load Balance Policy selection box.

vice Details	;				>
eneral MPI	0				
Load balance	e policy :				
Fail Over O	nly				-
Fail Over Or Round Robin Round Robin Least Queue Weighted Pa Least Blocks	n n With Subse e Depth aths	et			
This device h	use the follow	wing nather			
This de <u>v</u> ice h Path Id	nas the follow Status	wing paths: Type	Weight	Session ID	
Path Id 0x7702	and the second second	Type Active	Weight n/a n/a	Session ID fffffff872cf8d4 fffffff872cf8d4	
Path Id 0x7702	Status Conne	Type Active	n/a	fffffff872cf8d4 ffffffff872cf8d4	

Conclusion



Contacts

Support:	www.starwindsoftware.com/support
Support Forum:	www.starwindsoftware.com/forums
Sales E-mail:	sales@starwindsoftware.com
US Headquarters	
Phone:	617-449-7717
Fax:	617-505-5845
EMEA:	1-888-532-2203

StarWind Software Inc.

40 Mall Rd., Burlington MA 01803, USA www.starwindsoftware.com