StarWind iSCSI SAN & NAS:

Multipathing October 2012



STORAGE 🗯 HYPERVISOR







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STORAGE your HYPERVISOR



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INTRODUCTION

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



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CONFIGURING STARWIND SERVER

1. Open a StarWind configuration file.

Note: The default path is C:\Program Files\StarWind Software\StarWind\StarWind.cfg

2. Find the string "<!--<iScsiDiscoveryListInterfaces value="1"/>-->" and uncomment it (should look as follows: <iScsiDiscoveryListInterfaces value="1"/>).

3. Restart StarWind Service.

4. Launch StarWind Management Console: Start -> All Programs -> StarWind Software -> StarWind.

Note: The StarWind Console icon appears in the system tray when the **Console** is running. To open **StarWind Management Console**, double-click the icon or right-click it and then select **Start Management Console** from the shortcut menu.

5. Select the server you want to provide with the iSCSI target device from the **Console tree**. Double-click the host to connect.

Note: If you are prompted to enter login and password, specify "root" and "starwind", relatively. These are the default login and password, but you can always change them later.

6. After connecting to **StarWind Service**, you can create devices and targets on the server. Open **Add Device Wizard** by one of the following ways:

- Select Add Device from the Target menu.
- Select Add Device from the Devices shortcut menu (right-click to open it).

7. Add Device Wizard appears. Please, follow the wizard's steps to complete creation of a new image file device.



8. Select Virtual Hard Disk -> Image File device.



9. Click Next to continue.

10. Select the Create new virtual disk option.

Add Devic	e Wizard	1
Select	device creation method.	
0	Mount existing virtual disk	
-	Choose an existing virtual disk and export it as an iSCSI target.	
۲	Create new virtual disk Create a new virtual hard disk and export it as an iSCSI target	
0	Create new virtual disk based on Snanshot 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	

11. Click Next to continue.



12. Specify required virtual disk parameters.

Device Wizard	×
Virtual disk parameters Specify virtual disk parameters.	
New virtual disk location and name:	
My Computer \D\srvdsk.img	
Encrypted	
User account that will have access to this image	
Password:	
Fill with zeroes	
< <u>B</u> ack <u>N</u> ext > Cancel Help	

13. Click Next to continue.

14. Select a virtual disk that will be made accessible via iSCSI.

nage File device parameters Select the virtual disk you want to make accessible via iSCSI: My Computer\D\srvdsk.img ✓ Asynchronous mode Header size in bytes: 0	e Wizard						
Select the virtual disk you want to make accessible via iSCSI: My Computer\D\srvdsk.img Asynchronous mode Header size in bytes:	File device parameters cify Image File device param	eters.					
My Computer\p\srvdsk.ing	the virtual disk you want to	nake accessible via iS	CSI:				
Asynchronous mode	omputer\D\srvdsk.img					▼	
Header size in bytes:	nchronous mode						
	ader size in bytes:	0 =					
< Back Next > Cancel Help			< Back	Next >	Cancel	Help	

15. Click Next to continue.



16. Specify cache parameters of an image file device.

Add Device	Wizard	×
Image F Speci	le device cache parameters fy Image File device cache parameters.	
⊢ Cache	mode	
۲	Write-back caching Data write is done to the memory, then dient request is completed. Modified memory blocks are stored on disk later. Each result of read request is cached in memory too.	
0	Write-through caching Data write is done synchronously to the memory and to the disk. Each result of read request is cached in memory too.	
0	No caching Read and write requests are processed by the disk storage without caching.	
Cache s	naximum available cache size ize (MB) 128	
	< <u>Back</u> Cancel Help	

17. Click Next to continue.

18. Specify target parameters. Select Allow multiple concurrent iSCSI connections (clustering) checkbox.

et parameters pecify the target parameters for the device. hoose a target attachment method: Treate a new target arget Alias: arget Alias: stor1 Target Name: iqn.2008-08.com.starwindsoftware:172.16.1.48-stor1 Allow multiple concurrent iSCSI connections (clustering)	evice Wizard			
pecify the target parameters for the device. hoose a target attachment method: Treate a new target arget Alias: stor1 Target Name: ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Z Allow multiple concurrent iSCSI connections (clustering)	get parameters			
hoose a target attachment method: Treate a new target arget Alias: stor1 Target Name: ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Allow multiple concurrent iSCSI connections (clustering)	Specify the target parameters for the devi	ce.		
hoose a target attachment method:				
Treate a new target arget Alias: stor1 Target Name: Ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Allow multiple concurrent iSCSI connections (dustering)	Choose a target attachment method:			
arget Alias: stor1 Target Name: ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Allow multiple concurrent ISCSI connections (clustering)	Create a new target			•
arget Allas: stor1 Target Name: iqn.2008-08.com.starwindsoftware:172.16.1.48-stor1 Allow multiple concurrent iSCSI connections (clustering)	Torrest altern			
Target Name: iqn.2008-08.com.starwindsoftware:172.16.1.48-stor1 Allow multiple concurrent iSCSI connections (clustering)	Target Allas:			
Target Name: ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Allow multiple concurrent iSCSI connections (clustering)	JSCOLI			
iqn.2008-08.com.starwindsoftware:172.16.1.48-stor1 Allow multiple concurrent ISCSI connections (clustering)	Target Name:		 	
Allow multiple concurrent iSCSI connections (dustering)	iqn.2008-08.com.starwindsoftware:172.1	.6.1.48-stor1		
	Allow multiple concurrent iSCSI connect	ions (clustering)		
Z Pody Move N Consol				

19. Click Next to continue.

20. Check whether device parameters are correct. Click **Back** to make any changes. Click **Next** to continue.

21. Click **Finish** to close the wizard.



CONFIGURING ISCSI CLIENTS

Windows Server 2008

1. Launch **Server Manager**, select the **Features** item and click **Add Features**. Select **Multipath I/O** from the features list. Follow the wizard's instructions to install it.

Add Features Wizard		×
Select Features		
Features Confirmation Progress Results	Select one or more features to install on this server. Eatures: NET 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 LPR Port Monitor Message Queuing Multipath I/O Quality Windows Audio Video Experience Remote Assistance Remote Differential Compression Remote Server Administration Tools Remote Server CMITD Server More about features	Description: <u>Multipath I/O</u> , along with the Microsoft DeviceSpecific Module (DSM) or a third-party DSM, provides support for using multiple data paths to a storage device on Windows.
	< Brevious Next	> Install Cancel

2. Launch **Microsoft iSCSI Initiator: Start > Administrative Tools > iSCSI Initiator.** Navigate to the **Discovery** tab.

3. Click **Discover Portal**. In the **Discover Target Portal** dialog enter the first IP address of the StarWind Server. Click **OK**.



4. Click **Discover Portal** again. Enter the second IP address of the StarWind Server. Click **OK**.

ties		
Favorite Targe	ts Volumes and Devices	RADIUS Configuration
for Targets of		Refresh
Port	Adapter	IP address
3260	Default	Default
3260	Default	Default
tal, click Disco	ver Portal.	Discover <u>P</u> ortal
portal, select	the address above and	<u>R</u> emove
	ties =avorite Targe : for <u>T</u> argets or Port 3260 3260 :tal, click Disco : portal, select	ties avorite Targets Volumes and Devices for Targets on following portals: Port Adapter 3260 Default 3260 Default tal, click Discover Portal. portal, select the address above and

5. Navigate to the **Targets** tab. The previously created target is listed in the **Discovered Targets** section.

Note: If the created target is not listed, check the firewall settings on the StarWind Server as well as a list of networks served by the StarWind Server (go to **StarWind Management Console** -> **Configuration** - > **Network**).

6. Select the target and click **Connect**.

SI Initiator F	Properties		
Targets Disco	very Favorite Targets Volumes and Dev	ices RAE	DIUS Configuration
Quick Connect	t		
To discover a DNS name of	nd log on to a target using a basic connection the target and then click Quick Connect.	on, type t	ne IP address or
<u>T</u> arget:			Quick Connect,
Discovered ta	rgets		<u>R</u> efresh
Name		Status	
ign.2008-08	.com.starwindsoftware:172.16.1.48-stor1	Inactiv	e
To connect us click Connect.	sing advanced options, select a target and	then	Connect



7. In the **Connect to Target** dialog select **Add this connection to the list of Favorite Targets** and **Enable multi-path** checkboxes. Click **Advanced**.

Connect To Target		×
Target name:		
iqn.2008-08.com.starwindsoftware: 172.16.1.4	8-stor 1	
✓ Add this connection to the list of Favorite Tar This will make the system automatically attem connection every time this computer restarts.	gets. pt to restore the	
Enable multi-path		
Advanced	ОК	Cancel

8. Select **Microsoft iSCSI Initiator** in the **Local adapter** text field. In the **Target portal IP** select the first IP address of the StarWind Server.

inced Sectings	
neral IPsec	
Connect using	
Local adapter:	Microsoft iSCSI Initiator
Initiator <u>I</u> P:	172.16.1.47
Target portal IP:	172.16.1.48 / 3260
CRC / Checksum	
Data digest	🔲 <u>H</u> eader digest
Enable CHAP log or CHAP Log on informa CHAP helps ensure cor an initiator.	n Ition Innection security by providing authentication between a target and
Enable CHAP log or CHAP Log on informa CHAP helps ensure cor an initiator. To use, specify the sar initiator. The name wil specified.	n ation anection security by providing authentication between a target and me name and CHAP secret that was configured on the target for this Il default to the Initiator Name of the system unless another name is
Enable CHAP log or CHAP Log on informa CHAP helps ensure cor an initiator. To use, specify the sar initiator. The name wil specified.	n ation nnection security by providing authentication between a target and me name and CHAP secret that was configured on the target for this Il default to the Initiator Name of the system unless another name is I default to the Initiator Name of the system unless another name is
Enable CHAP log or CHAP Log on informa CHAP helps ensure cor an initiator. To use, specify the sar initiator. The name wil specified. <u>Name:</u> Target secret:	n ation anection security by providing authentication between a target and me name and CHAP secret that was configured on the target for this II default to the Initiator Name of the system unless another name is iqn.1991-05.com.microsoft:win-1j84kjv9pan
Enable CHAP log or CHAP Log on informa CHAP helps ensure cor an initiator. To use, specify the sar initiator. The name wil specified. Name: Target secret: Eerform mutual aut To use mutual CHAP, e RADIUS.	n ation Inection security by providing authentication between a target and me name and CHAP secret that was configured on the target for this Il default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-1j84kjv9pan iqn. 1991-05.com.microsoft:win-1j84kjv9pan thentication ather specify an initiator secret on the Configuration page or use
Enable CHAP log or CHAP Log on informa CHAP helps ensure cor an initiator. To use, specify the sar initiator. The name will specified. Name: Target secret: Berform mutual aut To use mutual CHAP, e RADIUS. Use RADIUS to ger	n nection security by providing authentication between a target and me name and CHAP secret that was configured on the target for this I default to the Initiator Name of the system unless another name is iqn.1991-05.com.microsoft:win-1j84kjv9pan thentication either specify an initiator secret on the Configuration page or use rerate user authentication credentials
Enable CHAP log or CHAP Log on informa CHAP helps ensure cor an initiator. To use, specify the sai initiator. The name wil specified. Mame: Target gecret: Eerform mutual aut ro use mutual (CHAP, e RADIUS. Use RADIUS to ger Use RADIUS to aut	n ation Interview of the system unless another name is I default to the Initiator Name of the system unless another name is I default to the Initiator Name of the system unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator Name of the System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator System unless another name is I default to the Initiator Syste

9. Click OK. As you return to the previous dialog, click OK to go back to iSCSI Initiator Properties.



10. Select the same target and again click **Connect**.

argets Discovery Favorite Targets Volumes and Devices RADIUS C Quick Connect To discover and log on to a target using a basic connection, type the IP add DNS name of the target and then click Quick Connect. Iarget: Quick Discovered targets R Name Status Ign.2008-08.com.starwindsoftware:172.15.1.48-stor1 Connected	nfiguration ress or Connect
Quick Connect To discover and log on to a target using a basic connection, type the IP add DNS name of the target and then click Quick Connect. Target: Quick Discovered targets Name Status Ign.2008-08.com.starwindsoftware: 172, 16, 1.48-stor 1 Connected	iess or
To discover and log on to a target using a basic connection, type the IP add DNS name of the target and then click Quick Connect. Iarget: Quick Discovered targets R Name Status Ign. 2008-08.com.starwindsoftware: 172. 16. 1. 48-stor 1 Connected	ess or
Iarget: Quick Discovered targets R Name Status ign.2008-08.com.starwindsoftware: 172. 16. 1. 48-stor 1 Connected	Ionnect
Discovered targets B Name Status ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Connected	
Name Status ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Connected	
Name Status ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Connected	fresh
ign.2008-08.com.starwindsoftware:172.16.1.48-stor1 Connected	

11. Perform the same actions as described above; this time specify another IP address as a target portal IP. Click **OK**.

eral IPsec	
Connect using	
ocal adapter:	Microsoft iSCSI Initiator
Initiator <u>I</u> P:	172.16.2.47
Target portal IP:	172.16.2.48 / 3260
CRC / Checksum	_
<u>D</u> ata digest	Header digest
CHAP Log on inform	nation
CHAP Log on inform CHAP helps ensure of an initiator.	nation connection security by providing authentication between a target and
CHAP Log on inform CHAP helps ensure of an initiator.	nation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this
CHAP Log on inform CHAP helps ensure of an initiator. Fo use, specify the s nitiator. The name v specified.	nation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is
CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s nitiator. The name v specified.	mation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s nitiator. The name w specified.	nation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn.1991-05.com.microsoft:win-1j84kjv9pan
CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s initiator. The name s specified. Name: Target secret:	mation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-1j84kjv9pan
CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s initiator. The name v specified. Name: Target secret:	mation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn.1991-05.com.microsoft:win-1j84kjv9pan
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s initiator. The name of specified. Name: Target secret: Eerform mutual a To use mutual CHAP.	mation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn.1991-05.com.microsoft:win-1j84kjv9pan authentication , either specify an initiator secret on the Configuration page or use
CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Eerform mutual a To use mutual CHAP, RADIUS.	mation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-1j84kjv9pan authentication , either specify an initiator secret on the Configuration page or use
CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Eerform mutual a To use mutual CHAP, RADIUS.	mation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-1j84kjv9pan authentication , either specify an initiator secret on the Configuration page or use generate user authentication credentials
CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Eerform mutual a To use mutual CHAP, RADIUS.	mation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn.1991-05.com.microsoft:win-1j84kjv9pan cuthentication , either specify an initiator secret on the Configuration page or use generate user authentication credentials authenticate target credentials
CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s initiator. The name v specified. Yame: Target secret: Berform mutual a To use mutual CHAP, RADIUS. Que RADIUS to a Use RADIUS to a	nation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn.1991-05.com.microsoft:win-1j84kjv9pan authentication , either specify an initiator secret on the Configuration page or use generate user authentication credentials authenticate target credentials
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s initiator. The name of specified. Mame: Target secret: Eerform mutual a To use mutual CHAP, RADIUS.	nation connection security by providing authentication between a target and same name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn. 1991-05.com.microsoft:win-1j84kjv9pan authentication , either specify an initiator secret on the Configuration page or use generate user authentication credentials authenticate target credentials

12. Connect the second path of the target and close the MS Initiator.



13. Open the MPIO manager: Start -> Administrative Tools -> MPIO.

14. Go to the **Discover Multi-Paths** tab. Select the **Add support for iSCSI devices** checkbox and click **Add**.

IO-ed Devices	Discover Multi-Paths	DSM Install		
SPC-3 complian	t			
Device Hardw	are Id			
Add suppor	t for <u>i</u> SCSI devices	_		
			Add	
Others				
Others Device Hardw	are Id	<u>i</u>		
Others Device Hardw	are Id	<u>i</u>		
Others	are Id			
Others	are Id			
Others	are Id		Add	
Others	are Id		Add	

15. When prompted to restart the server, click **Yes** to proceed.

Reboo	ot Required	×
	A reboot is required to complete the operation. Reboot Now?	
_		
	[
		-



16. After the system reboot open the MPIO Manager again to ensure that the multipathed device has been recognized and added. A new device has to be displayed in the **Devices** list of the **MPIO-ed Devices** tab.

MPIO Properties	×
MPIO Devices Discover Multi-Paths DSM Install Configuration Snapshot	I,
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 Vendor 8Product 16	
Add Remove	
OK Cancel	



17. Open the iSCSI Initiator and view the target properties. Select the target and click **Properties**.

argets	Discov	ery	Favorit	e Target:	s Volu	imes and	Devices) RAD	JUS	Conf	figuration	۱ĺ
Ouick C	Ionnect :				<u> </u>			<u> </u>		<u> </u>	-	
To disc DNS na	over an ame of ti	d log he ta	on to a rget an	target u: d then cli	sing a b ck Quicł	asic conr k Connec	nection, I t.	:ype tł	ne IP	addre	ess or	
<u>T</u> arget	. [_							Q	uick Co	onnect,,,	,
Discove	ered targ	gets										
										Ref	resh	
Name								State	JS			
ign.20	008-08.c	:om.s	tarwind	software	:172.1	6.1.48-st	or1	Conr	necte	d		
To con	pect usi	ng ad	vanced	options	celect	a target .	and ther			_		
To con click Co	nect usir onnect.	ng ad	vanced	options,	select	a target -	and ther			Con	nect	
To con click Co To corr then cl	nect usir onnect. opletely (ick Disco	ng ad discor onnec	vanced nnect a t.	options, target, s	select t	a target . ne target	and ther and			Co <u>n</u> Disco	nect	
To con click Co To corr then cl For tar select	nect usin onnect, npletely (ick Disco rget prop the targ	ng ad discor onnec pertie et an	vanced nnect a t. s, inclu d click F	options, target, s ding confi roperties	select : elect th iguratic	a target . ne target nn of sess	and ther and ions,			Co <u>n</u> Disco Proper	nect nnect	
To con click Co To corr then cl For tar select For co the tar	nect usin prinect, ippletely of ick Disco get prop the targ infigurati get and	ng ad discor nnec oertia oet an on of then	vanced nnect a t. s, inclu d click F device: click De	options, target, s ding confi roperties s associal vices.	select : elect th iguratio	a target o ne target on of sess n a targel	and ther and sions, t, select			Co <u>n</u> Disco Proper De <u>v</u> io	nect onnect rties	
To con click Cr To com then cl For tar select For con the tar	nect usin onnect. opletely of ick Disco oget prop the targ of get and oout bas	ng ad discou nnec bertie et an on of then <u>ic iSC</u>	vanced nnect a t. s, inclu d click R device click De <u>SI conn</u>	options, target, s ding confi roperties s associal vices. <u>ections a</u>	select the select select the select s	a target . ne target on of sess n a target <u>jets</u>	and ther and sions, t, select			Con Disco Proper De <u>vi</u> o	nect nnect rties	



18. The **Sessions** tab contains two sessions that represent both network paths that you have set.

perties		
essions Portal Groups		
	Pofrech	
	K <u>e</u> iresii	
	2001	
ffffa8004b2b428-40000137000	0001c	
To add a session, click Add session.	<u>A</u> dd sessio	n
To disconnect one or more sessions, si session and then click Disconnect.	elect each <u>D</u> isconner	t
To view devices associated with a sess a session and then click Devices.	ion, select De <u>v</u> ices	
Session Information		
Target portal group tag:	1	
Status:	Connected	
Connection count:	1	
Maximum Allowed Connections:	1	
Authentication:	None Specified	
<u>H</u> eader Digest:	None Specified	
Data Digest:	None Specified	
Configure Multiple Connected Sessio To add additional connections to a se configure the MCS policy for a select click MCS.	n (MCS) ission or ed session, <u>M</u> CS	
More Information on iSCSI Sessions		
	ок (с	ancel



19. Click **Devices**. This window displays general information about devices.

De	evices		X	1
ļ	Name	Address		
	Disk 1	Port 3: Bus	0: Target 2: LUN 0	
	Volume path	names:		
	Legacy devic	e name:	\\.\PhysicalDrive1	
	Device interf	ace name:	\\?\mpio#disk&ven_rocket∏_imagefile&rev_0001	
Γ	Configure Mu	ultipath IO (M	IPIO)	
	To configure selected dev	the MPIO po vice, click MP	olicy for a MPIO	
1	Information C	n iSCSI Devi	<u>ce Details</u>	
			QK	

20. Click **MPIO**. Select a load balance policy of your connections. A brief description of the selected policy is provided beneath the **Load balance policy** box.

ice Decails	1			
PIO				
1				
oad balance	e policy:			
Round Robi	n			•
Fail Over Or	nlv			
Round Robi	n,			
Round Robi	n With Subs	et		
Least Queu	e Depth			
weighted Pa Least Blocks	acns			
	,			
This de <u>v</u> ice h	has the follo	wing paths:	:	
⊓his de <u>v</u> ice h Path Id	as the follo Status	wing paths Type	: Weight	Session ID
This de <u>v</u> ice h Path Id 0x7707	as the follo Status Conne	wing paths Type Active	: Weight n/a	Session ID fffffa8004b2b428-40
This de <u>v</u> ice h Path Id 0x7707 0x7707	as the follo Status Conne Conne	wing paths Type Active Active	: Weight n/a n/a	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40
[his de <u>v</u> ice Path Id 0x7707 0x7707	as the follo Status Conne Conne	wing paths Type Active Active	: Weight n/a n/a	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40
Fhis de <u>v</u> ice f Path Id 0x7707 0x7707	aas the follo Status Conne Conne	wing paths Type Active Active	Weight n/a n/a	Session ID fffffa8004b2b428-40 ffffffa8004b2b428-40
This de <u>v</u> ice f Path Id 0x7707 0x7707	as the follo Status Conne Conne	wing paths Type Active Active	Weight n/a n/a	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40
This de <u>v</u> ice f Path Id 0x7707 0x7707	as the follo Status Conne Conne	wing paths Type Active Active	: Weight n/a n/a	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40
This de <u>v</u> ice h Path Id 0x7707 0x7707	as the follo Status Conne Conne	wing paths Type Active Active	: n/a n/a	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40
This de <u>v</u> ice h Path Id 0x7707 0x7707	as the follo Status Conne Conne	wing paths Type Active Active	: n/a n/a	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40
This de <u>v</u> ice h Path Id 0x7707 0x7707	as the follo Status Conne Conne	wing paths Type Active Active	: Weight n/a n/a	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40
This device P Path Id 0×7707 0×7707	as the follo Status Conne Conne	wing paths Type Active Active	: N/a n/a <u>D</u> e	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40 tails <u>E</u> dit
his de <u>vi</u> ce l Path Id 0×7707 0×7707	as the follow Status Conne Conne	wing paths Type Active Active	: //Weight n/a n/a De	Session ID fffffa8004b2b428-40 fffffa8004b2b428-40 tails Edit



Windows Server 2012

1. Launch **Server Manager**, select the **Manage** item and click the **Add Roles and Features** option. Install the **Multipath I/O** feature by following the wizard's steps.

a	Add Roles and Features Wizard
Before you begin	DESTINATION SERVER WIN-2H56E0226L3
Before You Begin Installation Type Server Selection	This wizard helps you install roles, role services, or features. You determine which roles, role services, or features to install based on the computing needs of your organization, such as sharing documents, or hosting a website. To remove roles, role services, or features:
Server Roles Features Confirmation Results	Start the Remove Roles and Features Wizard Before you continue, verify that the following tasks have been completed: • The Administrator account has a strong password • Network settings, such as static IP addresses, are configured • The most current security updates from Windows Update are installed If you must verify that any of the preceding prerequisites have been completed, close the wizard, complete the steps, and then run the wizard again.
	To continue, click Next.
	< <u>Previous</u> <u>Next ></u> <u>Install</u> Cancel

2. Click Next.



3. Select Role-based or feature-based installation as an installation type and click Next to continue.

B	Add Roles and Features Wizard
Select installation	type Destination server WIN-2H56E0226L3
Before You Begin	Select the installation type. You can install roles and features on a running physical computer or virtual machine, or on an offline virtual hard disk (VHD).
Installation Type Server Selection	 Role-based or feature-based installation Configure a single server by adding roles, role services, and features.
Server Roles Features	Remote Desktop Services installation Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual machine-based
Confirmation Results	or session-based desktop deployment.
	< <u>P</u> revious <u>Next</u> > <u>Install</u> Cancel

4. Select the **Select a server from the server poll** option and select the appropriate server.

2	Add Role	s and Features	Wizard
Select destinati	on server		DESTINATION SERVER WindowsServer
Before You Begin	Select a server or a virtual	hard disk on which	to install roles and features.
Installation Type	Select a server from the se	e server pool	
Server Selection	 Select a virtual hard di 	sk	
Server Roles	Server Pool		
Features			
Confirmation	Filter:		
Results	Name	IP Address	Operating System
	WindowsServer		Microsoft Windows Server 2012 Datacenter Evaluation
	1 Computer(s) found This page shows servers th Add Servers command in collection is still incomplet	hat are running Wi Server Manager. O te are not shown.	ndows Server 2012, and that have been added by using the ffline servers and newly-added servers from which data
		< <u>P</u> r	evious <u>N</u> ext > <u>I</u> nstall Cancel

STORAGE for HYPERVISOR



5. Click Next.

6. In the features list select Multipath I/O feature and install it.

B	Add Roles and Features Wizard	_ D X
E Select features Before You Begin Installation Type Server Selection Server Roles Features Confirmation Results	Add Roles and Features Wizard Select one or more features to install on the selected server. Features	DESTINATION SERVER WindowsServer 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.
	Network Load Balancing Peer Name Resolution Protocol Quality Windows Audio Video Experience <	• <u>I</u> nstall Cancel

7. Launch Microsoft iSCSI Initiator: Start > Administrative Tools > iSCSI Initiator. The iSCSI Initiator Properties window appears.

8. Navigate to the **Discovery** tab.

9. Click **Discover Portal.** Enter the first IP address of the StarWind Server in the appropriate field of the **Discover Target Portal** dialog. Click **OK**.

10. Again click **Discover Portal** to add the second IP address of the StarWind Server.

	iSCSI In	itiator Properties		
gets Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration
arget portals —				
The system will lo	ok for <u>T</u> argets on fo	llowing portals:		R <u>e</u> fresh
Address	Port	Adapter	I	P address
172.16.1.48	3260	Default	0	Default
172.16.2.48	3260	Default	[Default
Fo add a target p	ortal, click Discover	Portal.	Disco	over <u>P</u> ortal
lo remove a targ	et portal, select the	address above and		<u>R</u> emove



11. Click the **Targets** tab. The previously created targets are listed in the **Discovered Targets** section.

Note: If created targets are not listed, check the firewall settings of the StarWind Server as well as the list of networks served by the StarWind Server (go to **StarWind Management Console** -> **Configuration** - > **Network**).

12. Select the targets and click **Connect** to add it.

iSCSI Initiator Properties	x
Targets Discovery Favorite Targets Volumes and Devices RADIUS Configuration Quick Connect	
Image: Quick Connect Discovered targets Refresh Name Status iqn.2008-08.com.starwindsoftware:172.16.1.48-stor1 Inactive	
To connect using advanced options, select a target and then Connect click Connect. To completely disconnect a target, select the target and Disconnect	
then click Disconnect.	
More about basic iSCSI connections and targets	
OK Cancel Apply	

13. Select Add this connection to the list of Favorite Targets and Enable multi-path checkboxes in the Connect to Target dialog. Click Advanced.

Connect To Target	
Target name: iqn.2008-08.com.starwindsoftware:172.16.1.48-stor1	
Add this connection to the list of Favorite Targets. This will make the system automatically attempt to restore the connection every time this computer restarts.	
Advanced OK Cancel	

STORAGE your HYPERVISOR



14. Select **Microsoft iSCSI Initiator** in the **Local adapter** text field. In the **Target portal IP** select the first IP address of the StarWind Server. Click **OK**.

	Advanced Settings	?	x
General IPsec			
Connect using			
Local adapter:	Microsoft iSCSI Initiator	¥	
Initiator <u>I</u> P:	172.16.1.49	~	
Target portal IP:	172.16.1.48 / 3260	~	
Data digest	Header digest		
Enable CHAP log on			
CHAP Log on informat	ion		
CHAP helps ensure conr an initiator.	nection security by providing authentication between a target and	1	
To use, specify the sam	e name and CHAP secret that was configured on the target for the	nis ic	
specified.	der dale to the Initiation Manie of the system diffess another Hame	13	
Name:	iqn.1991-05.com.microsoft:windowsserver		
Target <u>s</u> ecret:			
Perform mutual auth	entication		
To use mutual CHAP, eil RADIUS.	ther specify an initiator secret on the Configuration page or use		
Use RADIUS to gene	rate user authentication credentials		
Use <u>R</u> ADIUS to auth	enticate target credentials		
	OK Cancel	AP	ply

15. Click **OK** to return to MS Initiator main window.



16. Select the same target and again click **Connect**. Perform the same actions as described above; this time specify another IP address as a target portal IP. Click **OK**.

rgets Discovery F	avorite Targets Volumes and Devices RADIUS Co	onfiguration
Quick Connect		
To discover and log or DNS name of the targ	n to a target using a basic connection, type the IP add et and then click Quick Connect.	dress or
Target:	Quick	Connect
Discovered targets —		
	E	efresh
Name	Status	
To connect using adv. Llick Connect.	anced options, select a target and then	o <u>n</u> nect
	Advanced Settings	2
neral IPsec		
Connect using		
Local adaptory	Microsoft iSCSI Initiator	
Local adapter:	Microsoft iSCSI Initiator	~
Local adapter: Initiator IP:	Microsoft iSCSI Initiator	~
Local adapter: Initiator IP: Target portal IP:	Microsoft iSCSI Initiator 172.16.2.49 172.16.2.48 / 3260	* *
Local adapter: Initiator IP: Target portal IP:	Microsoft iSCSI Initiator 172.16.2.49 172.16.2.48 / 3260	~
Local adapter: Initiator IP: Target portal IP: CRC / Checksum	Microsoft iSCSI Initiator 172.16.2.49 172.16.2.48 / 3260 <u>H</u> eader digest	~
Local adapter: Initiator IP: Iarget portal IP: CRC / Checksum Data digest	Microsoft iSCSI Initiator 172.16.2.49 172.16.2.48 / 3260 Header digest	~
Local adapter: Initiator IP: Iarget portal IP: CRC / Checksum Data digest	Microsoft iSCSI Initiator 172.16.2.49 172.16.2.48 / 3260	~
Local adapter: Initiator IP: Iarget portal IP: CRC / Checksum Data digest Langle CHAP log of CHAP Log on inform CHAP helps ensure c an initiator.	Microsoft iSCSI Initiator	♥ ♥ en a target and
Local adapter: Initiator IP: Iarget portal IP: CRC / Checksum Data digest CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s initiator. The name v specified.	Microsoft iSCSI Initiator	en a target and ne target for this another name is
Local adapter: Initiator IP: Iarget portal IP: CRC / Checksum Data digest CHAP Log on inform CHAP Legs ensure c an initiator. To use, specify the s initiator. The name v specified. Name:	Microsoft iSCSI Initiator	en a target and ne target for this another name is
Local adapter: Initiator IP: Iarget portal IP: CRC / Checksum Data digest CHAP Log on inform CHAP helps ensure c an initiator. To use, specify the s initiator. The name w specified. Name: Target secret:	Microsoft iSCSI Initiator	v

17. Connect the second path of the target and close the MS Initiator.

ОК

Cancel

Use <u>R</u>ADIUS to authenticate target credentials

Apply



- 18. Open the MPIO manager: Start -> Administrative Tools -> MPIO.
- 19. Go to the Discover Multi-Paths tab. Select the Add support for iSCSI devices checkbox and click Add.

MPIO Properties	x
MPIO Devices Discover Multi-Paths DSM Install Configuration Snapsh	iot
_ <u>S</u> PC-3 compliant	
Device Hardware Id	
Add support for iSCSI devices	
Add support for SAS devices	
Add	
Qthers	ור
Device Hardware Id	
Add	
More information on discovery of multipathed devices	
OK Cance	1

20. When prompted to restart the server, click **Yes** to proceed.



STORAGE for HYPERVISOR



21. After the system reboot open the MPIO Manager once again to check whether the multipathed device has been recognized and added. A new device should be displayed in the **Devices** list of the **MPIO-ed devices** tab.

	MPIO P	roperties		x			
MPIO Devices	Discover Multi-Paths	DSM Install	Configuration Snaps	hot			
To add suppo Product Ids a Devices can b To remove su then click Ren	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.						
<u>D</u> evices:							
Device Hard MSFT2005iS	ware Id CSIBusType 0x9						
Vendor 8Pro	Vendor 8Product 16						
More about a	dding and removing MP	<u>A</u> dd IO support	<u>R</u> emove				
	OK Cancel						

22. Open the iSCSI Initiator to check the target properties. Select the target and click Properties.



23. The **Sessions** tab contains two sessions that represent both network paths that you have set.

Prope	rties
Sessions Portal Groups	
	Defrech
Telephifica	<u>Konosi</u>
fffffa8000dee310-400001370000	0001
ffffa8000dee310-400001370000	0002
To add a session, click Add session.	<u>A</u> dd session
To disconnect one or more sessions, se session and then click Disconnect.	lect each <u>D</u> isconnect
To view devices associated with a sessi a session and then click Devices.	ion, select De <u>v</u> ices
Session Information	
Target portal group tag:	1
<u>S</u> tatus:	Connected
Connection count:	1
Maximum Allowed Connections:	1
Authentication:	None Specified
Header Digest:	None Specified
Data Digest:	None Specified
Configure Multiple Connected Sessior To add additional connections to a se configure the MCS policy for a selecte click MCS.	n (MCS) ssion or ed session, <u>M</u> CS
More Information on iSCSI Sessions	
	OK Cancel



24. Click **Devices**. This window displays general information about devices.

	Devices X
Name Address	
Disk 1 Port 3: Bus	0: Target 0: LUN 0
Volume path names:	
Legacy device name:	\\.\PhysicalDrive1
	\\?\mpio#disk&ven_rocket∏_imagefile&rev_0001-
Device incerrace name:	
Canfin we Multimath TO /A	
Conrigure Multipath IO (N	imit()
selected device, click MP	olicy for a MPIO
Information On iSCSI Dev	ice Details
	<u></u> K

25. Click **MPIO**. Select a load balance policy of your connections. A brief description of the selected policy is provided beneath the **Load balance policy** box.

		Devio	e Details		x
MPIO					
Load balance	e policy:				
Round Robi	n			×	
Fail Over Or	ıly				
Round Robin	n'				
Least Queue Weighted Pa Least Blocks	e Depth aths				
This de <u>v</u> ice h	as the follo	wing paths:	Waiahk	Session ID	
Path Id	Status	Type	weight		
UX77U3	Conne	Active	n/a	rrrra8000dee310-4	/000
Ux7703	Conne	Active	n/a	rrrra8000dee310-4	
			Del	tails <u>E</u> dit	
		C	ж	Cancel Ap	ply



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