

StarWind iSCSI SAN Software: Using StarWind with MS Cluster on Windows Server 2008

www.starwindsoftware.com Copyright © StarWind Software 2008-2012. All rights reserved.

COPYRIGHT

Copyright © StarWind Software 2008-2012. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written consent of StarWind Software.

TRADEMARKS

"StarWind", "StarWind Software" and the StarWind and the StarWind Software logos are trademarks of StarWind Software which may be registered in some jurisdictions. All other trademarks are owned by their respective owners.

CHANGES

The material in this document is for information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, StarWind Software assumes no liability resulting from errors or omissions in this document, or from the use of the information contained herein. StarWind Software reserves the right to make changes in the product design without reservation and without notification to its users.

TECHNICAL SUPPORT AND SERVICES

If you have questions about installing or using this software, check this and other documents first - you will find answers to most of your questions here or there. If you need further assistance, please contact us.



Table of Contents

Configuring StarWind Server.6Preparing Quorum Volume6Preparing Generic Volume13Preparing Cluster Nodes21Node 121Node 250Configuring Microsoft Cluster Service.68Validate a Configuration68Create a Cluster75Adding New Shared Disk Resource.82StarWind Target82Node 189Node 2101	Introduction	
Preparing Generic Volume13Preparing Cluster Nodes21Node 121Node 250Configuring Microsoft Cluster Service68Validate a Configuration68Create a Cluster75Adding New Shared Disk Resource82StarWind Target82Node 189	Configuring StarWind Server	
Preparing Cluster Nodes21Node 121Node 250Configuring Microsoft Cluster Service68Validate a Configuration68Create a Cluster75Adding New Shared Disk Resource82StarWind Target82Node 189	Preparing Quorum Volume	6
Node 121Node 250Configuring Microsoft Cluster Service68Validate a Configuration68Create a Cluster75Adding New Shared Disk Resource82StarWind Target82Node 189	Preparing Generic Volume	
Node 250Configuring Microsoft Cluster Service68Validate a Configuration68Create a Cluster75Adding New Shared Disk Resource82StarWind Target82Node 189	Preparing Cluster Nodes	21
Configuring Microsoft Cluster Service.68Validate a Configuration68Create a Cluster75Adding New Shared Disk Resource.82StarWind Target82Node 189	Node 1	
Validate a Configuration	Node 2	
Create a Cluster	Configuring Microsoft Cluster Service	68
Adding New Shared Disk Resource	Validate a Configuration	
Adding New Shared Disk Resource	Create a Cluster	
Node 1		
Node 1	StarWind Target	
	•	
	Node 2	



Guide

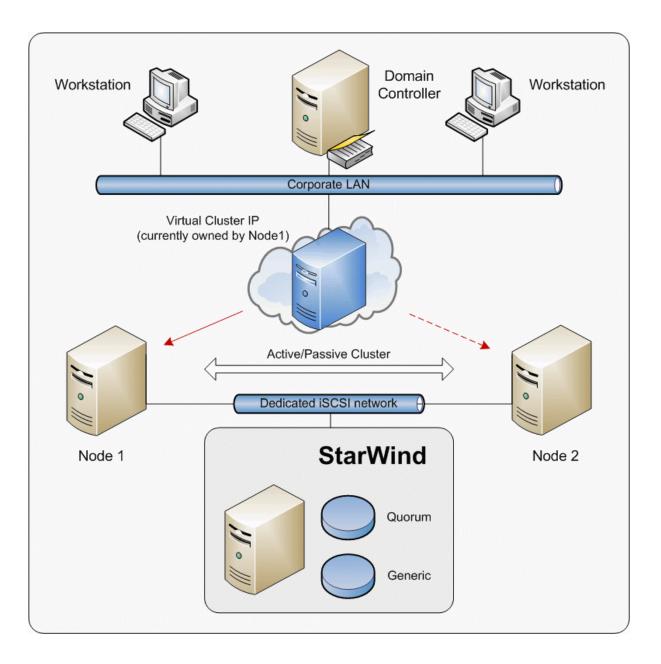
Introduction

Software clustering technology enables you to make several servers to work as a unit. Various cluster configurations can be implemented. One of the most frequently used configurations is the failover cluster. This configuration assumes that if one of the cluster nodes fails, the reserved node automatically brings online, serving the applications. With that the workflow remains uninterrupted and secured.

Failover cluster configuration includes two (or more) server nodes that share an external storage. Based on the iSCSI technology, **StarWind Softwafe Inc. StarWind** enables to create an external storage in Windows environment without implementation of expensive FC or external SCSI solutions. With **StarWind** you can create a shared disk array on a host running Microsoft Windows.



This document gives you detailed step-by-step instructions on **StarWind** configuring for failover clusters.





Configuring StarWind Server

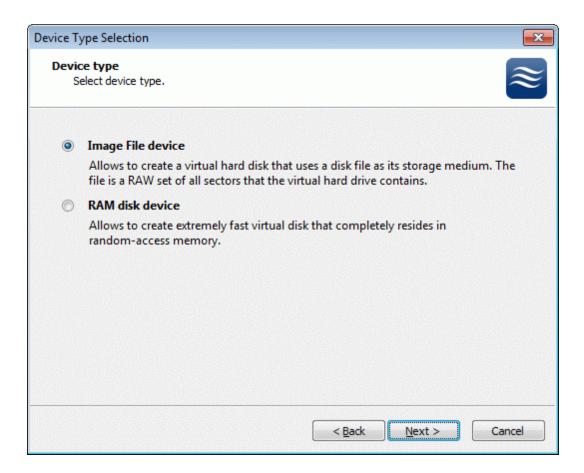
Preparing Quorum Volume

Launch the StarWind Management 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. From the StarWind Servers tree please select the computer you wish to connect to. Press the right mouse button over the desired host (computer) and select the Connect menu item. You will be prompted to enter the login and password. Default ones are: root, starwind. You can always change them later. After you have successfully connected to the StarWind Service, please click the right mouse button over the desired host (computer) and select Add Target pop-up menu item. In the wizard that appears, select a target name. The name must be a unique name by which the device will be declared to the iSCSI initiators connecting to StarWind over an IP network.

Add Target Wizard				x
Common target pa Specify target alia	rameters as and target name.			\approx
Target Alias:				
quorum				
Target Name:				
iqn.2003-09.com	n.starwindsoftware:wishmas	ter-quorum		
		< <u>B</u> ack	Next >	Cancel

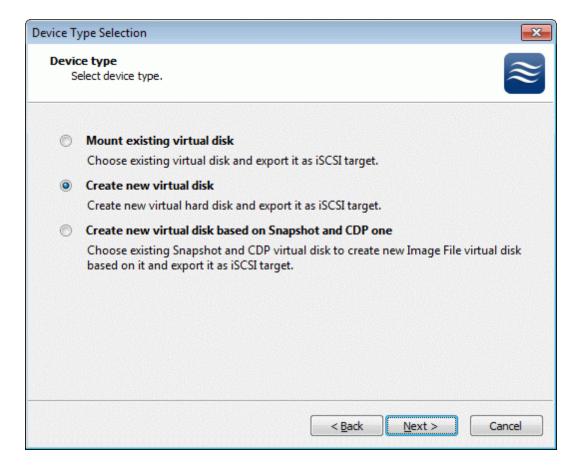


Select Image File device.





Select **Create new virtual disk** to create a new virtual hard disk or **Mount existing virtual disk** to mount an existing virtual disk that you've prepared before.





If you have decided to create a new virtual disk please specify the location and the name of the virtual disk you wish to be created. Also you have to provide the virtual disk size in megabytes. Check any additional parameters of the virtual disk you wish to create. Please refer to the online help for details regarding those additional parameters (**Compressed** and **Encrypted**).

Device Type Selection	
Virtual disk parameters Specify virtual disk parameters.	\approx
New virtual disk location and name:	
My Computer \C \images \quorum.img	•
Size in MBs: 1024	
Compressed	
Encrypted	
User account that will have access to this image	
Name:	
Password:	
Fill with zeroes	
	< <u>B</u> ack <u>N</u> ext > Cancel



Image File device has some extra parameters. Check Allow multiple concurrent iSCSI connections (clustering) checkbox. Please refer to the online help for details regarding those additional parameters (Asynchronous mode, Allow multiple connections (clustering), Read-only mode and Specify advanced options).

Device Type Selection
Image File device parameters Specify Image File device parameters.
Select virtual disk you want to make accessible via iSCSI:
My Computer\C\images\quorum.img
✓ Asynchronous mode
Read-Only mode
Allow multiple concurrent iSCSI connections (dustering)
Advanced options
Use file system buffering
Header size in sectors: 0
< <u>B</u> ack <u>N</u> ext > Cancel

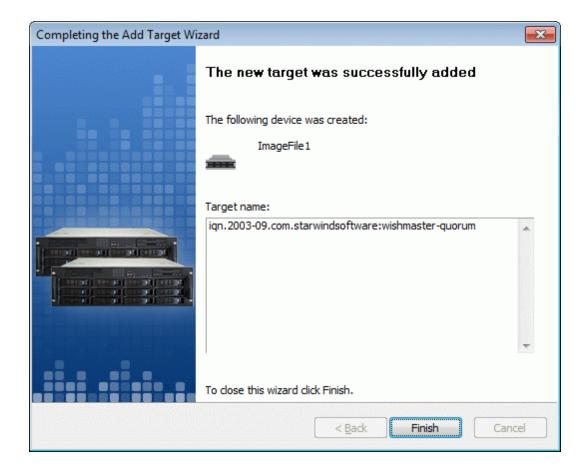


Check the device parameters are correct. Press the **Back** button should any changes be required.

Completing the Add Target Wi	izard	×
	Completing the Add Target Wizard	
	The following device will be added:	
	ImageFile 1	
	You specified the following settings:	
	File : My Computer\C\images\quorum.img Asynchronous : Yes Readonly : No Clustering : Yes	*
		-
	Click Next to add new device.	-el



A summary of the created device is displayed on the last wizard page (see image below).



Press the Finish button to close the wizard.

Preparing Generic Volume

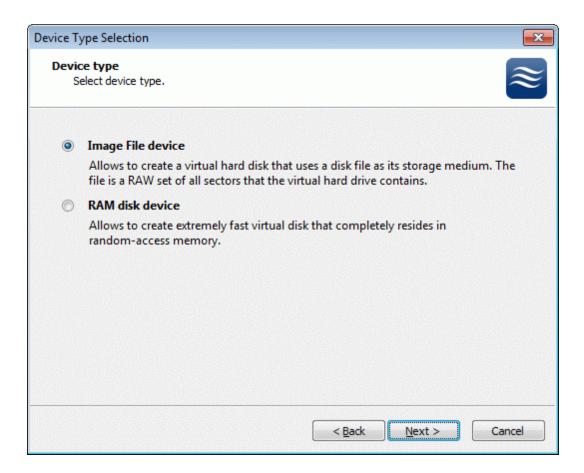
Click the right mouse button over the host and select **Add Target** pop-up menu item.

In the wizard that appears, select a target name. The name must be a unique name by which 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 name.	\approx
Target Alias:	
generic	
Target Name:	
iqn.2003-09.com.starwindsoftware:wishmaster-generic	
< <u>B</u> ack <u>Next</u> >	Cancel

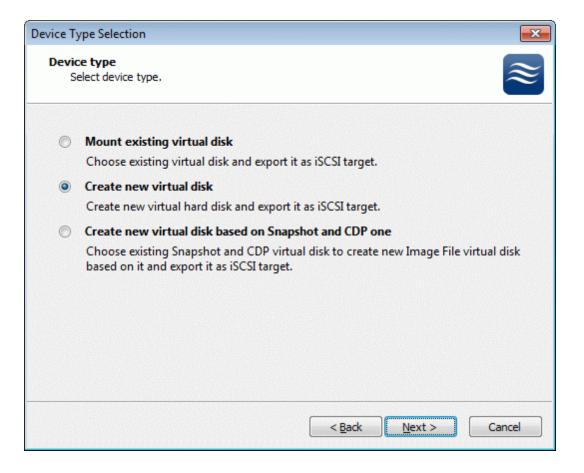


Select Image File device.





Select **Create new virtual disk** to create a new virtual hard disk or **Mount existing virtual disk** to mount an existing virtual disk that you've prepared before.





If you have decided to create a new virtual disk please specify the location and the name of the virtual disk you wish to be created. Also you have to provide the virtual disk size in megabytes. Check any additional parameters of the virtual disk you wish to create. Please refer to the online help for details regarding those additional parameters (**Compressed** and **Encrypted**).

Device Type Selection
Virtual disk parameters Specify virtual disk parameters.
New virtual disk location and name:
My Computer \C \images \generic.img
Size in MBs: 2048
Compressed
Encrypted
User account that will have access to this image
Name:
Password:
Fill with zeroes
< <u>B</u> ack <u>N</u> ext > Cancel



Image File device has some extra parameters. Check Allow multiple concurrent iSCSI connections (clustering) checkbox. Please refer to the online help for details regarding those additional parameters (Asynchronous mode, Allow multiple connections (clustering), Read-only mode and Specify advanced options).

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

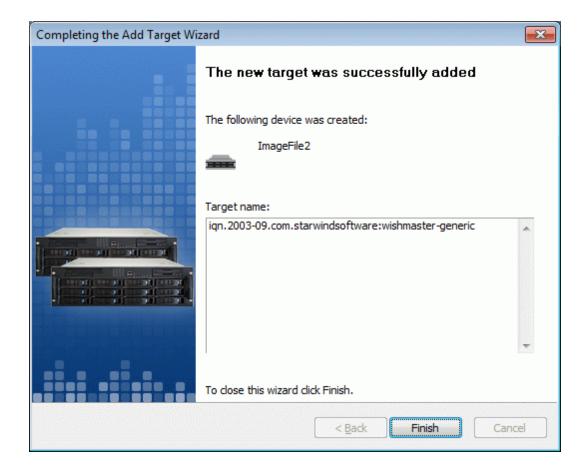


Check the device parameters are correct. Press the **Back** button should any changes be required.

Completing the Add Target Wi	izard	X
	Completing the Add Target Wizard	
	The following device will be added:	
	ImageFile2	
	You specified the following settings:	
	File : My Computer\C\images\generic.img Asynchronous : Yes Readonly : No Clustering : Yes	*
		-
	٠	
	Click Next to add new device.	
	< <u>B</u> ack Next > Can	:el



A summary of the created device is displayed on the last wizard page (see image below).



Press the Finish button to close the wizard.



If successful, the **StarWind Console** should look like the sample image provided below.

StarWind Management Console					
File Options Help					
🍅 🔁 🚔 🚅 📲 🛃					
	Target List Authentication Access	s Rights		≈şţą	
- C Targets	Target Alias	Target IQN		Clustered	
quorum	🚗 quorum		ndsoftware:wishmaster-quorum	Yes	
generic	👝 generic	iqn.2003-09.com.starwir	ndsoftware:wishmaster-generic	Yes	
	eneric	ution \	m		•
	Device Name	Device ID	Device Type	State	
	ImageFile2	0x002185E0	Image File	Active	
StarWind s o f T W A R E	Device properties				
	Device: Virtual Disk:	ImageFile2 My Computer\C\images\generic.img			
	Persistent Reservation:	Yes			
	Use File System Buffering:	No			
	Size in MBs:	2048			
that a	Read-Only Mode:	No			
(A)	Header Size in Sectors:	0			
	Asynchronous Mode:	Yes			
					-
StarWind Software Ready					



Preparing Cluster Nodes

Node 1

Configuring iSCSI initiator

Launch the Microsoft iSCSI Software Initiator application Administrative Tools -> iSCSI Initiator

iSCSI Initiator Propertie	5	×			
Favorite Targets General	Volumes and Devices Discovery	RADIUS Targets			
iSCSI devices are disk, tapes, CDs, and other storage devices on another computer on your network that you can connect to. Your computer is called an initiator because it initiates the connection to the iSCSI device, which is called a target.					
Initiator Name	iqn.1991-05.com.microsoft:r	node1.rds.local			
To rename the initiator, click Change.					
To use mutual CHAP authentication for verifying <u>S</u> ecret <u>S</u> ecret					
To set up IPsec tunnel mode addresses, <u>Set</u> up					
What is iSCSI ?					
		e Apply			

Select the **Discovery** Tab.



In the Target Portals group, click the Add Portal... button.

SCSI Initiator Prope	rties			X
Favorite Targets General		Volumes and Devices Discovery	RADIUS Targets	
Target portals				1
Address	Port	Adapter	IP address	
Add Portal		Remove	Refresh	
Name				
A <u>d</u> d	1	Remove	Refresh	
A00		Kellinas	Keiresii	
		OK Car	ncel <u>A</u> pply	

Press the **Add Portal...** button.



In the Add Target Portal dialog enter IP address or DNS name of the StarWind target server.

Add Target Portal		×
Type the IP address or DNS name to add. To select settings for the d Advanced.		
IP address or DNS name:	Port:	
192.168.2.1	3260	<u>A</u> dvanced
	ОК	Cancel



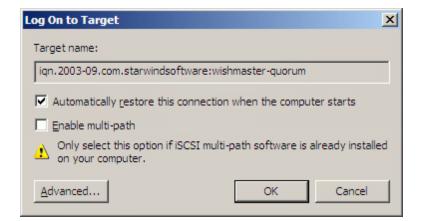
Click on the Targets tab. Select the IQN of the target just added.

5I Initia	tor Proper	ties					
	te Targets neral		Volumes an Discovery		1	RADIUS Targets	
To access Log on.	storage de	vices for	a target, se	lect the ta	rget an	id then click	
To see inf click Deta		out sess	ions, connec	tions, and	device	s for a targe	et,
Targets:							
a second and a second							
Name						Status	
ign. 200			ftware:wish ftware:wish			Status Inactive Inactive	
ign. 200						Inactive	
ign. 200				master-qu	orum	Inactive Inactive	•

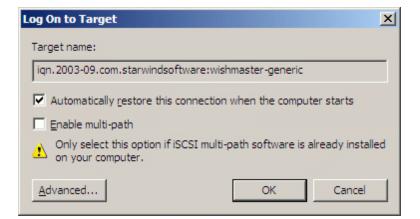
Press the Log On... button.



The **Log On to Target** dialog now appears. In this dialog click on the checkbox **Automatically restore this connection when the system boots** to make this connection persistent.



Press the **OK** button to continue.





If successful, the initiator is now logged on to **StarWind**.

neg beren sjok de eren standelet. Ne <u>r</u> en sjok en <u>er</u> en opgesteret in de		
Favorite Targets	Volumes and Devices	RADIUS
General	Discovery	Targets
o access storage devices og on.	for a target, select the targe	t and then click
o see information about s lick Details.	essions, connections, and de	vices for a target,
iick Details.		
argets:		
Name		Status
	1.0	a second second second second
•	dsoftware:wishmaster-gener	
ign.2003-09.com.starwin	dsoftware:wishmaster-quoru	m Connected
-1		-
•		Þ
4		
▲ Details		R <u>e</u> fresh



Initializing, formatting and creating partitions

When the **StarWind** Disks are connected, they show up on the initiator machine as new disk devices. Before these devices can be used as cluster disks, they have to be initialized and formatted. Launch the **Computer Management** console.

Server Manager		
Eile Action Yiew Help		
🗢 🔿 🖄 🖬 🛿 🖬 🖄 🗡	. 🗳 🖻 🖉	
Server Manager (NODE1)	Disk Management Volume List + Graphical View	Actions
	Volume Layout Type File System Status	Disk Management
Roles Features Features Gonfiguration Storage Windows Server Backup Disk Management	C Simple Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	More Actions
	Disk 0 Basic (C)	
	16.00 GB Online 16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	
	Unknown 1.00 GB Unallocated Unallocated	
	Otsk 2 Image: Constraint of the second	
	No Media 🗸	
	Unallocated Primary partition	

Select Disk Management.



Bring disks online. Press the right mouse button over the disk and select **Online**.

File Action View Help			
🗢 🔿 🙍 📅 🚺 🖬	8 5		
Server Manager (NODE1)	Disk Management Volume List + Graphical View	Actions	antina.
± ♪ Roles + ∰ Features	Volume Layout Type File System Status	Disk Management	
Configuration Storage Windows Server Backup Disk Management	(C:) Simple Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	More Actions	
	C:) Is.00 GB Online Disk 0 Is.00 GB NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)		
	O class O commentation Unknown Properties Offline Help Unknown 2.00 GB Offline 2.00 GB Unallocated Unallocated		
	CD-ROM 0 CD-ROM (D:) No Media		



🔚 Server Manager	
File Action View Help	
Server Manager (NODE1) Disk Management Volume List + Graphical View	Actions
Roles Volume Layout Type File System Status	Disk Management
Roles Peatures Pologrootics Configuration Storage Windows Server Backup Disk Management Image: Configuration Disk Management Image: Configuration Image: Configuration Disk Management Image: Configuration Image: Configuration	Disk Management
Unallocated Primary partition	



Initialize the Disks. Press the right mouse button over the Disk and select **Initialize Disk**. Follow the wizard to initialize the new disks.

🖥 Roles	Disk Management Volume List + Graphical View	Actions
Roles	Volume Layout Type File System Status	Disk Management
Diagnostics Configuration Storage Disk Management	(C:) Simple Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	More Actions
	1.00 GB Offline Not Initializ Properties	



Initialize Disk
You must initialize a disk before Logical Disk Manager can access it.
Select disks:
✓ Disk 1
☑ Disk 2
Use the following partition style for the selected disks:
MBR (Master Boot Record)
C GPT (GUID Partition Table)
Note: The GPT partition style is not recognized by all previous versions of Windows. It is recommended for disks larger than 2TB, or disks used on Itanium-based computers.
OK Cancel



Both disks have now been initialized.

📕 Server Manager			<u>-0×</u>
Eile Action View Help			
🗢 🔿 🖄 📅 🚺 🖬 🚺	e 😼		
E Server Manager (NODE1)	Disk Manageme	nt Volume List + Graphical View Actions	
 € ■ Roles ● ■ Features 	Volume Layout	Type File System Status Disk Mana	agement 🔺
🛨 📷 Diagnostics	🗀 (C:) Simple	Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) More A	ictions •
 			
👘 🐪 Windows Server Backup			
📄 Disk Management			
	4	B	
	Basic	(C:)	
	16.00 GB Online	16.00 GB NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	
	Disk 1 Basic		
	1023 MB Online	1023 MB Unallocated	
	Basic		
	2.00 GB Online	2.00 GB Unallocated	
	CD-ROM 0	<u></u>	
	CD-ROM (D:)		
	No Media	-	
	Unallocated		
		,	



Right-click over the unallocated space and select **New Simple Volume**. Follow the instructions in the wizard to create an NTFS partition for use as the quorum disk.

Server Manager				
File Action View Help				
🗢 🔿 🖄 📅 🛛 🖬 🔯 🖷	s 😼			
Server Manager (NODE1)	Disk Manageme	nt Volume List + •	Graphical View	Actions
 	Volume Layout	Type File System	Status	Disk Management
Teacures Teacures Teacures Teacures	📾 (C:) Simple	Basic NTFS	Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) More Actions
🗉 🁬 Configuration				
Storage Windows Server Backup				
Disk Management				
	•			
	Disk 0	1		
	Basic	(C:)		
	16.00 GB Online	16.00 GB NTFS Healthy (System)	, Boot, Page File, Active, Crash Dump, Primary Partition)	
		Tribulariy (Syscolli)	secces rage ries ricertes crash bainps rinnally randomy	
	Disk 1 Basic		New Simple Volume	
	1023 MB Online	1023 MB	New Spanned Volume	
	Ormine	Unallocated	New Striped Volume	
	Disk 2 Basic		New Mirrored Volume New RAID-5 Volume	
	2.00 GB	2.00 GB		
	Online	Unallocated	Properties	
	CD-ROM 0		Help	
	CD-ROM (D:)			
	No Media			
	Unallocated	Primary partition		



New Simple Volume Wizard appears.

New Simple Volume Wizard				
	Welcome to the New Simple Volume Wizard			
	This wizard helps you create a simple volume on a disk.			
	A simple volume can only be on a single disk.			
	To continue, click Next.			
	< <u>B</u> ack <u>Next</u> > Cancel			



Specify new volume size in megabytes.

New Simple Volume Wizard	×
Specify Volume Size Choose a volume size that is betwe	en the maximum and minimum sizes.
Maximum disk space in MB:	1021
Minimum disk space in MB:	8
<u>S</u> imple volume size in MB:	
	< <u>B</u> ack <u>N</u> ext > Cancel



Choose the Drive Letter to assign.

New Simple Volume Wizard			×
Assign Drive Letter or Path For easier access, you can assign a drive letter or drive path to your partition.			
 Assign the following drive letter: Mount in the following empty NTFS folder: Do not assign a drive letter or drive path 	B Iows		
	< <u>B</u> ack	Next >	Cancel

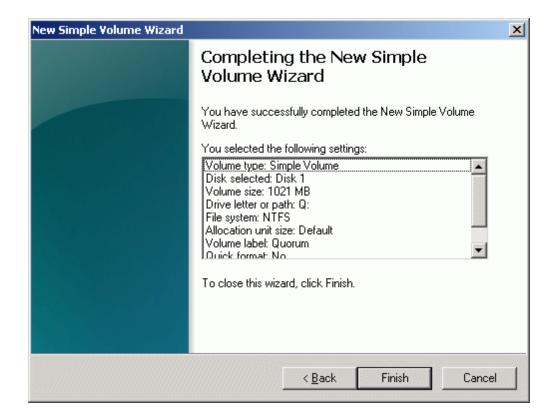


Specify format options. Provide the Volume Label.

New Simple Volume Wizard	×			
Format Partition To store data on this partition, you must format it first.				
Choose whether you want to format this volume, and if so, what settings you want to use.				
O Do not format this volume				
• Format this volume with the following settings:				
File system: NTFS				
Allocation unit size:				
Volume label: Quorum				
Perform a quick format				
Enable file and folder compression				
< <u>B</u> ack <u>N</u> ext > Cancel				



Check the settings are correct. Press the **Back** button should any changes be required.



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



If successful, a new volume will be created as shown in the example image below. Repeat the same steps to create the second volume.

File Action View Help				
Þ 🔿 🙋 📅 🔽 🖬	e i			
Server Manager (NODE1)	Disk Management Volu	Disk Management Volume List + Graphical View		
3 🚏 Roles 3 🚮 Features	Volume Layout Type File	a System Status	Disk Management	
Diagnostics Configuration Storage Disk Management	→ (C:) Simple Basic NT → Q Simple Basic NT		ition) More Actions	
	Disk 0 Basic 16.00 GB 16.00 C			
	Disk 0 Basic 16.00 GB 16.00 G Online Disk 1 Basic 1021 MB 1021 MB	(System, Boot, Page File, Active, Crash Dump, Primary Partition)		
	Disk 0 Basic 16.00 GB Online Disk 1 Basic Disk 2 Basic Disk 2 Basic 2.00 GB Online Disk 2 Disk 3 Disk 3 Dis	(System, Boot, Page File, Active, Crash Dump, Primary Partition)		
	Disk 0 C:3 Basic (C:3) 16.00 GB 16.00 G Orline Healthy Disk 1 Busic Basic 1021 M Orline Healthy Disk 2 Basic 2.00 GB 2.00 GB	(System, Boot, Page File, Active, Crash Dump, Primary Partition) n (Q:) NTFS (Primary Partition) New Small Volume New Spanned Volume		
	Disk 0 C:> Basic 16:00 GB 16:00 G Online Healthy Disk 1 Basic Quorun 1023 MB 1021 MI 1021 MI Online Healthy Easic 2.00 GB 2.00 GB 2.00 GB Online Linallocc	(System, Boot, Page File, Active, Crash Dump, Primary Partition)		

Right-click over the unallocated space and select **New Simple Volume**. Follow the instructions in the wizard to create an NTFS partition for use as the generic disk.



New Partition Wizard appears.

New Simple Volume Wizard		×
	Welcome to the New Simple Volume Wizard	
	This wizard helps you create a simple volume on a disk.	
	A simple volume can only be on a single disk.	
	To continue, click Next.	
	< <u>B</u> ack <u>Next</u> > Cancel	



Specify new volume size in megabytes.

New Simple Volume Wizard	×
Specify Volume Size Choose a volume size that is betwe	en the maximum and minimum sizes.
Maximum disk space in MB:	2045
Minimum disk space in MB:	8
<u>S</u> imple volume size in MB:	2045
	< <u>B</u> ack <u>N</u> ext > Cancel



Choose the Drive Letter to assign.

New Simple Volume Wizard			×
Assign Drive Letter or Path For easier access, you can assign a drive letter	or drive pat	h to your partition	
 Assign the following drive letter: Mount in the following empty NTFS folder: Do not assign a drive letter or drive path 	Biows	;e	
	< <u>B</u> ack	Next >	Cancel

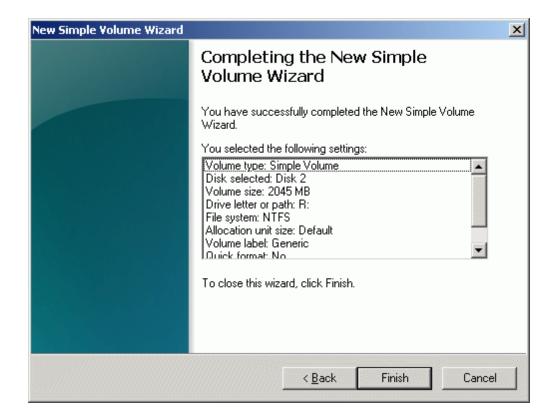


Specify format options. Provide the Volume Label.

New Simple Volume Wizard	×			
Format Partition To store data on this partition, you must format it first.				
Choose whether you want to format this volume, and if so, what settings you want to use.				
O Do not format this volume				
• Format this volume with the following settings:				
<u>File system:</u>				
Allocation unit size:				
Volume label: Generic				
Perform a quick format				
Enable file and folder compression				
< <u>B</u> ack <u>N</u> ext > Cancel				



Check the settings are correct. Press the **Back** button should any changes be required.



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



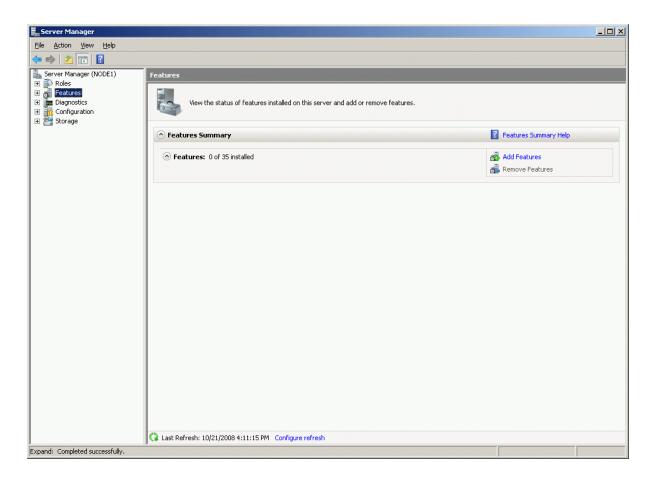
If successful, both of the disks are now formatted as shown in the example image below.

	Disk Management Volume List + Graphical View	Actions
 B Roles Features B Dignostics Configuration Configuration Storage Windows Server Backup Disk Management 	Volume Layout Type File System Status (C:)	
	C: C: I6.00 GB NTFS Healthy (System, Boot, Page File, Active, Cr Disk 1 Constant (C)	rash Dump, Primary Partition)
	Basic Quorum (Q:) 1023 MB 1021 MB NTF5	



Installing Failover Clustering Feature

Launch the **Computer Management** console. Select **Features** node from the list.



Click the Add Features to continue.



Add Features Wizard appears. Check the Failover Clustering feature.

Add Features Wizard		X
Select Features		
Features Confirmation Progress Results	Select one or more features to install on this server. Eeatures:	Description: Failover Clustering allows multiple servers to work together to provide high availability of services and applications. Failover Clustering is often used for file and print services, database and mail applications.
	< <u>P</u> revious	> Install Cancel



Check that the parameters are correct. Press the **Previous** button should any changes be required.

Add Features Wizard	×
Confirm Installation Selections	
Features To install the following roles, role services, or features, click Install. Progress Informational message below Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following roles, role services, or features, click Install. Image: Install the following role, role services, or features, click Install. Image: Install the following role, role services, or features, click Install. Image: Install the following role, role services, role services, or features, click Install. Image: Install the following role services, or features, click Install. Image: Install the following role services, r	-

Complete the installation of the Failover Clustering Feature by pressing the **Install** button.



If the feature is successfully installed, the wizard should look similar to the example image below.

Add Features \	Wizard		×
I.	nstallation Results		
Features Confirmation Progress Results	T	The following roles, role services, or features were installed successfully: 1 warning message below Image: Windows automatic updating is not enabled. To install the latest updates, use Windows Update in Control Panel to check for updates.	
		Failover Clustering 🛛 🕢 Installation succeeded	
	E	rint, e-mail, or save the installation report	
		< Previous Next > Close Cancel	

Press the **Close** button.

Shut down the server.

Node 2

Configuring iSCSI initiator

Launch the Microsoft iSCSI Software Initiator application Administrative Tools -> iSCSI Initiator

iSCSI Initiator Propertie	25	×	
Favorite Targets General	Volumes and Devices Discovery	RADIUS Targets	
iSCSI devices are disk, tapes, CDs, and other storage devices on another computer on your network that you can connect to. Your computer is called an initiator because it initiates the connection to the iSCSI device, which is called a target.			
Initiator Name	iqn.1991-05.com.microsoft:n	ode2.rds.local	
To rename the initiator	hange		
To use mutual CHAP authentication for verifying <u>S</u> ecret <u>S</u> ecret			
To set up IPsec tunnel mode addresses, <u>Set up</u>			
What is iSCSI ?			
	OK Cance	Apply	

Select the **Discovery** Tab.



In the Target Portals group, click the Add Portal... button.

iSCSI Initiator Prope	rties			×
Favorite Targets General		Volumes and Dev Discovery	vices RADIUS	
Target portals				
Address	Port	Adapter	IP address	
Add Portal	1	Remove	R <u>e</u> fresh	
		Touro		
iSNS servers				1
Name				
A <u>d</u> d		Remove	Re <u>f</u> resh	
		ок	Cancel Apply	

Press the **Add Portal...** button.



In the Add Target Portal dialog enter IP address or DNS name of the StarWind target server.

Add Target Portal		×
Type the IP address or DNS name to add. To select settings for the d Advanced.		
IP address or DNS name:	Port:	
192.168.2.1	3260	<u>A</u> dvanced
	ОК	Cancel



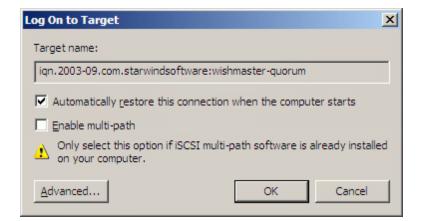
Click on the Targets tab. Select the IQN of the target just added.

51 Initia	tor Proper	ties					
	ite Targets neral	1	Volumes an Discovery	d Devices	1	RADIUS Targets	
To acces Log on.	s storage de	vices for a	a target, se	ect the tar	get an	id then click	
To see in click Deta	formation ab ails.	out sessi	ons, connec	tions, and	device	s for a targ	et,
Targets:							
alaine et the et t Tel tale an et tale					100000000		
Name					00000	Status	
ign.200)3-09.com.st)3-09.com.st					Status Inactive Inactive	
ign.200						Inactive	
ign.200				naster-quo	brum	Inactive Inactive	

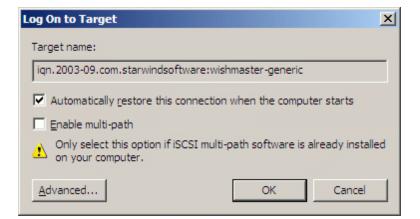
Press the Log On... button.



The **Log On to Target** dialog now appears. In this dialog click on the checkbox **Automatically restore this connection when the system boots** to make this connection persistent.



Press the **OK** button to continue.





If successful, the initiator is now logged on to **StarWind**.

Face in Treasts	Values and Decision	1
Favorite Targets	Volumes and Devices	RADIUS
General	Discovery	Targets
og on.	s for a target, select the target sessions, connections, and dev	
argets: Name		Status
ign.2003-09.com.starwir	adsoftware wishmaster-generic	c Connected
•	-	
•	ndsoftware:wishmaster-quorur	

Assigning drive letters

When the StarWind Disks are connected, they show up on the initiator machine as new disk devices. Before these devices can be used as cluster disks, they have to be mounted. Launch the **Computer Management** console.

Server Manager			<u>-0×</u>
Eile Action View Help			
🗢 🔿 🖄 📅 🚺 🖬 🖄	K 📽 🚅 🔍 🔣		
E Server Manager (NODE2)	Disk Manageme	nt Volume List + Graphical View	Actions
	Volume Layout	Type File System Status	Disk Management
 € and the set of the set of	C:) Simple	Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	More Actions
🕀 🎆 Configuration			
E 🔄 Storage			
Disk Management			
	•		
	Basic	(c)	
	16.00 GB Online	16.00 GB NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	
		readity (system, boot, rage rile, Active, crash build), Frinary Farduon)	
	Disk 1 Basic		
	1023 MB Offline	1021 MB	
	Gisk 2 Basic		
	2.00 GB Offline	2.00 GB	
	DVD (D:)		
	No Media	-	
	Unallocated		
	,		,

Select Disk Management.



Bring disks online. Press the right mouse button over the disk and select **Online**.

E Server Manager		<u>_</u> _×
File Action View Help		
(= =) 2 📅 🛛 🖬	g 💀	
Server Manager (NODE2)	Disk Management Volume List + Graphical View	Actions
🛨 🟐 Roles	Volume Layout Type File System Status	Disk Management
 €	(C:) Simple Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	More Actions
🛨 🁬 Configuration		
E 🔄 Storage		
Disk Management		
	Basic (C:)	
	16.00 GB 16.00 GB NTF5	
	Online Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	
	CeDisk 1 Online	
	Basic 1023 MB Properties	
	Offline	
	Help	
	Basic	
	2.00 GB 2.00 GB 0ffline	
	CD-ROM 0	
	DVD (D:)	
	No Media	
	Unallocated 📕 Primary partition	
🎝 Start 🛛 🏭 📰 🖉 💽	Pictures - ACDSee Photo	📳 🍺 🅼 4:04 PM



Server Manager		
File Action View Help		
🗢 🔿 🔰 🖬 🚺 🖬	9 B	
Server Manager (NODE2)	Disk Management Volume List + Graphical View	Actions
E P Roles	Volume Layout Type File System Status	Disk Management
 € and the second se	👄 (C:) Simple Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	More Actions
🗉 🕂 Configuration	Q Simple Basic NTFS Healthy (Primary Partition)	
E Storage		
Disk Management		
	Disk 0	
	Basic (C:) 16.00 GB 16.00 GB NTFS	
	Online Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	
	Disk 1	
	Basic Ouorum (E:)	
	1023 MB 1021 MB NTF5 Online Healthy (Primary Partition)	
	Theadriv (Phillip Parddon)	
	CoDisk 2 Basic Online	
	2.00 GB	
	Offline Properties	
	CD-ROM 0 Help	
	DVD (D:)	
	No Media 🔹	
	Unallocated Primary partition	
2 Start 🛛 🚠 📰 🔰 💽	Pictures - ACDSee Photo 🔜 Server Manager	🗐 🍺 🕼 4:05 PM
		📴 📑 🖓 T.00 PM



The picture below shows that Windows has automatically assigned Drive Letters to the mounted volumes. As these are local drive letters they may not be the same as we have assigned to these volumes on the first node. However, as all volumes of a cluster must be assigned the same drive letters, any differences must be manually changed. Press the right mouse button over the Quorum volume.

• 🔿 🙍 📅 🚺 🔂 🕻	X 📽 🖻 🔍 😼				
Server Manager (NODE2)		nt Volume List + Graphical V	iew	Actions	
🗉 🖥 Roles 🗄 🚮 Features	Volume Layout	Type File System Status		Disk Management	
Bing Diagnostics Configuration Storage Windows Server Backup Disk Management	G Simple	Basic NTFS Healthy ((System, Boot, Page File, Active, Crash Dump, Primary Partition) Primary Partition) (Primary Partition)	More Actions	
			Open Explore		
			Mark Partition as Active		
			Format		
	Disk 0 Basic 16.00 GB Online	(C:) 16.00 GB NTFS Healthy (System, Boot, Pag	Extend Volume Shrink Volume Add Mirror Delete Volume n)		
		Theateny (System, Boot, Fag	Properties		
	Disk 1 Basic 1023 MB Online	Quorum (E:) 1021 MB NTF5 Healthy (Primary Partition)	Help		
	Disk 2 Basic 2.00 GB Online	Generic (F:) 2.00 GB NTFS Healthy (Primary Partition)			
	CD-ROM 0 DVD (D:)				
	Unallocated	Primary partition			

Select Change Drive Letter and Paths...



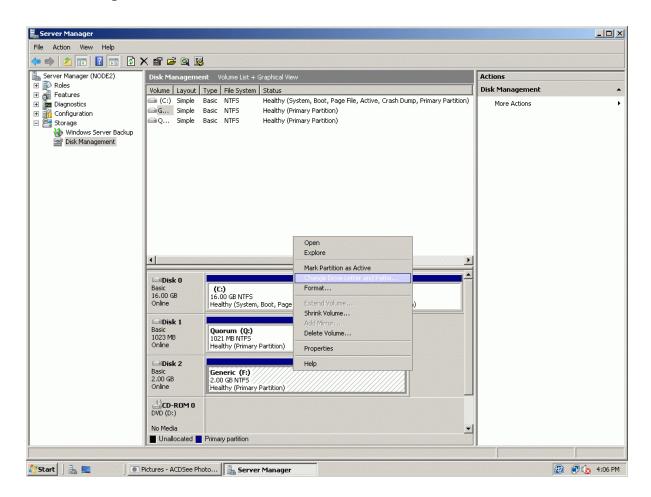
Change the Drive Latter for the Quorum to Q.

Allow access to this volume by using the following drive letter and paths:
Allow access to this volume by using the following unvertexel and paths.
Add Change <u>R</u> emove
OK Cancel

Change Drive Letter or Path	×
Enter a new drive letter or path for E: (Quorum).	
 Assign the following drive letter: 	Q 💌
$m{O}$ Mount in the following empty NTFS folder:	
	Browse
ОК	Cancel



Press the right mouse button over the Generic volume.



Select Change Drive Letter and Paths...



Change the Drive Latter for the Generic to R.

Change Drive Letter and Paths for F: (Generic)	×
Allow access to this volume by using the following drive letter and paths:	
	-
Add <u>C</u> hange <u>R</u> emove	
OK Cancel	1
Cancer	1

×
R
<u>B</u> rowse
Cancel



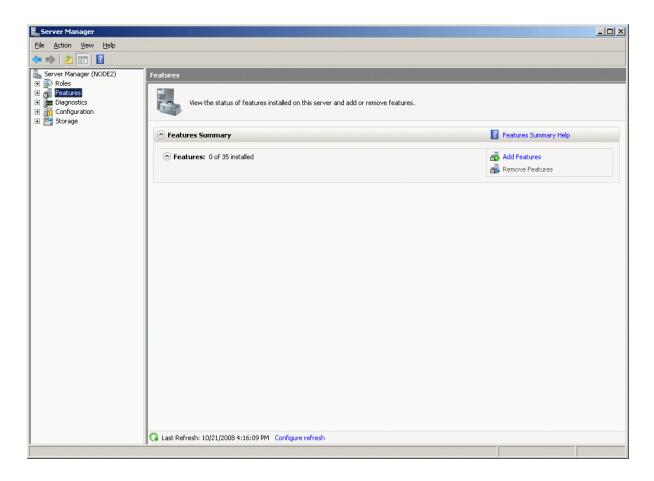
If successful, the **Computer Management** console should look like the sample image provided below.

server Manager (NODE2) ∃ ≩ Roles	Party and a second s	nt Volume List + Graphical View	Actions	
🗄 🚮 Features		Type File System Status	Disk Management	
🛯 🚋 Diagnostics		Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) Basic NTFS Healthy (Primary Partition)	More Actions	
Configuration		Basic NTFS Healthy (Primary Partition)		
🦳 🍓 Windows Server Backup				
📄 Disk Management				
	•			
	Disk 0			
	Disk 0 Basic 16.00 GB	(C:) 16.00 GB NTF5		
	Disk 0 Basic			
	Basic 16.00 GB Online	16.00 GB NTFS		
	Basic 16.00 GB Online	16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)		
	Basic 16.00 GB Online	16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)		
	Disk 0 Basic 16.00 GB Online Disk 1 Basic 1023 MB Online	16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) Quorum (Q:) 1021 MB NTF5		
	Disk 0 Basic 16.00 GB Online	16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) Quorum (Q:) 1021 MB NTF5 Healthy (Primary Partition)		
	Disk 0 Basic 16.00 GB Online Disk 1 Basic 1023 MB Online Disk 2 Basic 2.00 GB	16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) Quorum (Q:) 1021 MB NTF5 Healthy (Primary Partition) Generic (R:) 2.00 GB NTF5		
	Basic 16.00 GB Online Disk 1 Basic 1023 MB Online Disk 2 Basic	16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) Quorum (Q:) 1021 MB NTF5 Healthy (Primary Partition) Generic (R:)		
	Disk 0 Basic 16.00 GB Online Disk 1 Basic 1023 MB Online Disk 2 Basic 2.00 GB Online CD-R0M 0	16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) Quorum (Q:) 1021 MB NTF5 Healthy (Primary Partition) Generic (R:) 2.00 GB NTF5		
	Disk 0 Basic 16.00 GB Online Disk 1 Basic 1023 MB Online Disk 2 Basic 2.00 GB Online	16.00 GB NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition) Quorum (Q:) 1021 MB NTF5 Healthy (Primary Partition) Generic (R:) 2.00 GB NTF5		



Installing Failover Clustering Feature

Launch the **Computer Management** console. Select **Features** node from the list.



Click the Add Features to continue.



Add Features Wizard appears. Check the Failover Clustering feature.

Add Features Wizard		×
Select Features		
Features Confirmation Progress Results	Select one or more features to install on this server. Features: 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 LPR Port Monitor Multipath I/O Network Load Balancing Peer Name Resolution Protocol Quality Windows Audio Video Experience Remote Assistance Remote Assistance Remote Server Administration Tools Removable Storage Manager RPC over HTTP Proxy Simple TCP/IP Services MULTGenuer More about features	Description: Failover Clustering allows multiple servers to work together to provide high availability of services and applications. Failover Clustering is often used for file and print services, database and mail applications.
	< Previous Next	: > Install Cancel



Check that the parameters are correct. Press the **Previous** button should any changes be required.

Add Features Wizard		×
Confirm Installat	tion Selections	
Features Confirmation Progress Results	To install the following roles, role services, or features, click Install. Informational message below This server might need to be restarted after the installation completes. Failover Clustering Failover Clustering Print, e-mail, or save this information Previous Mext > Install Cancel	

Complete the installation of the Failover Clustering Feature by pressing the **Install** button.



If the feature is successfully installed, the wizard should look similar to the example image below.

Add Features \	Wizard		×
I.	nstallation Results		
Features Confirmation Progress Results	T	The following roles, role services, or features were installed successfully: 1 warning message below Image: Windows automatic updating is not enabled. To install the latest updates, use Windows Update in Control Panel to check for updates.	
		Failover Clustering 🛛 🕢 Installation succeeded	
	E	rint, e-mail, or save the installation report	
		< Previous Next > Close Cancel	

Press the **Close** button.

Shut down the server.



Configuring Microsoft Cluster Service

Validate a Configuration

Start both Cluster Node 1 Server and Cluster Node 2 Server. Launch the Failover Cluster Management console selecting Administrative Tools->Failover Cluster Management.

矔 Failover Cluster Management			
<u>File Action View H</u> elp			
Railover Cluster Management	Failover Cluster Managemer	nt	Actions
	Create failover clusters, validate han failover clusters.	dware for potential failover clusters, and perform configuration changes to your	Failover Cluster Managem Validate a Configuration Create a Cluster
	* Overview		Manage a Cluster
		computers that work together to increase the availability of services and d nodes) are connected by physical cables and by software. If one of the nodes	View View
	Clusters	rces (a process known as railover).	
	* Management		
	complete, you can manage the cluster. M Windows Server 2003.	alidate your hardware configuration, then create a cluster. After these steps are Managing a cluster can include migrating settings to it from a cluster running	
	Validate a Configuration	Understanding cluster validation tests	
	Create a Cluster	Creating a failover cluster or adding a cluster node	
	Manage a Cluster	Managing a failover cluster	
		Migrating settings from a cluster running Windows Server 2003	
	More Information		
	Failover cluster topics on the Web		
	Failover cluster communities on the	Web	
	Microsoft support page on the Web		
		20 July	
]			

After the management console is launched please click **Validate a Configuration...** item to ensure that the configuration is suitable for failover clustering.



Validate a Configuration Wizard appears.

👹 ¥alidate a Configu	ration Wizard	×
Before Yo	ou Begin	
Before You Begin Select Servers or a Cluster Testing Options Confirmation Validating Summary	This wizard runs validation tests to determine whether this configuration of servers and attached storage is set up correctly to support failover. A cluster solution is supported by Microsoft only if the complete configuration (servers, network, and storage) passes all tests in this wizard. In addition, all hardware components in the cluster solution must be "Certified for Windows Server 2008". If you want to validate a set of unclustered servers, you need to know the names of the servers. Important: the storage connected to the selected servers will be unavailable during validation tests. If you want to validate an existing failover cluster, you need to know the name of the cluster or one of its nodes. You must be a local administrator on each of the servers you want to validate. To continue, click Next. More about preparing your hardware for validation More about cluster validation tests If <u>p</u> o not show this page again	
	Next > Cancel]



Add the names of servers you wish to use as cluster nodes.

👹 ¥alidate a Configu	uration Wizard		×
Select Se	ervers or a Cluster		
Before You Begin Select Servers or a Cluster		ers, add the names of all the servers. r, add the name of the cluster or one of its nodes.	
Testing Options Confirmation Validating Summary	<u>E</u> nter name: <u>S</u> elected servers:	NODE2.rds.local	<u>B</u> rowse Add <u>B</u> emove
		< <u>P</u> revious <u>N</u> ext >	Cancel



Select Run all tests (recommended) for testing the complete configuration.

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



Check the parameters are correct. Press the **Previous** button should any changes be required.

efore You Begin elect Servers or a luster	You are ready to start validation. Please confirm that the following settings are correct:		
esting Options	Servers to Test		•
	node1.rds.local		
onfirmation	NODE2.rds.local		
ilidating			
mmary	Tests Selected by the User	Category	
	List BIOS Information	Inventory	
	List Environment Variables	Inventory	
	List Fibre Channel Host Bus Adapters	Inventory	
	List iSCSI Host Bus Adapters	Inventory	
	List Memory Information	Inventory	
	List Operating System Information	Inventory	-

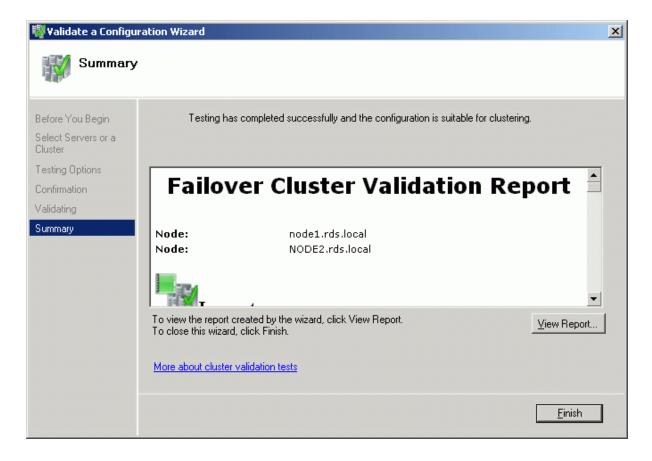


If all of the tests are successful, the wizard should look similar to the example image below.

Progress Test sting Options 100 % Validate Disk Arbitration nfirmation 100 % Validate Disk Failover 100 % Validate File System 100 % idating 100 % Validate Microsoft MPID-base	Result The test passed. The test passed.
Sting Options 100 % Validate Disk Arbitration nfirmation 100 % Validate Disk Failover 100 % Validate File System	
firmation 100 % Validate Disk Failover 100 % Validate File System	The test passed.
100 % Validate File System	
dating 100 % VITLANC ANDIOL	The test passed.
dating 100 % Validate Microsoft MPIO-base	d disks The test passed.
nmary 100 % Validate Multiple Arbitration	The test passed.
100 % Validate SCSI device Vital Pro	duct Data (VPD) The test passed.
100 % Validate SCSI-3 Persistent Re	servation The test passed.
100 % Validate Simultaneous Failove	The test passed.
100 % Validate Active Directory Conl	iguration The test passed. 🖕
	- -



If successful, the wizard should look like the example picture provided below.



Press the Finish button.



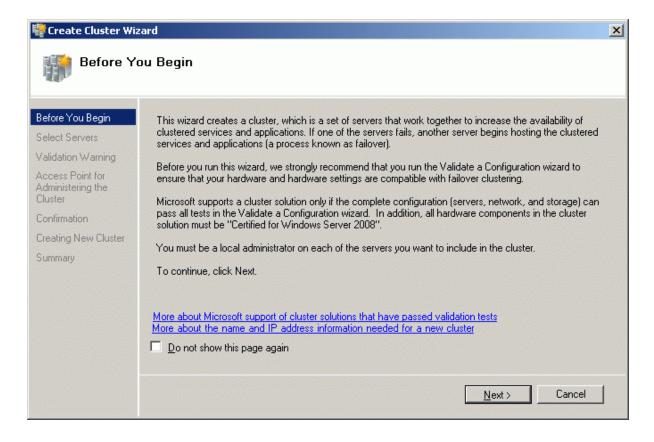
Create a Cluster

It is now time to create the cluster. Click **Create a Cluster** item from the Actions panel shown on the right.

👹 Failover Cluster Management		
Eile Action Yiew Help		
📲 Failover Cluster Management	Failover Cluster Management	Actions
	Create failover clusters, validate hardware for potential failover clusters, and perform configuration changes to your failover clusters.	Failover Cluster Managem Validate a Configuration Create a Cluster
	* Overview	Manage a Cluster
	A failover cluster is a set of independent computers that work together to increase the availability of services and applications. The clustered servers (called nodes) are connected by physical cables and by software. If one of the nodes fails, another node begins to provide services (a process known as failover).	View View View
	Clusters	
	Management To begin to use failover clustering, first validate your hardware configuration, then create a cluster. After these steps are complete, you can manage the cluster. Managing a cluster can include migrating settings to it from a cluster running Windows Server 2003. Validate a Configuration Validate a Configuration Create a Cluster Create a Cluster Managing a failover cluster or adding a cluster node Managing a failover cluster Migrating settings from a cluster running Windows Server 2003	
	More Information Ealover cluster topics on the Web Ealover cluster communities on the Web Ealover cluster communities on the Web Microsoft support page on the Web	



Create a Cluster Wizard appears.





Add the names of servers you wish to use as cluster nodes.

Before You Begin	Add the names of all t	he servers that you want to have in the cluster.	You must add at least one server.
elect Servers			
Access Point for Administering the Cluster	Enter server name:		<u>B</u> rowse
Confirmation	Selected servers:	node1.rds.local	Add
Creating New Cluster		NODE2.rds.local	<u>R</u> emove
ummary			<u> </u>



Specify Cluster Name and Cluster IP address.

Before You Begin	Type the name	you want to use when admi	nistering the clu:	ster.				
Select Servers	Cluster Name:	rdscluster					_	
Access Point for Administering the Cluster	One or more IP	v4 addresses could not be c k is selected, and then type		atically. For	each netw	ork to be use	ed, make	
Confirmation								
Creating New Cluster		Networks	Address					
Summary	•	192.168.1.0/24	192 .	168 .	1.	33		

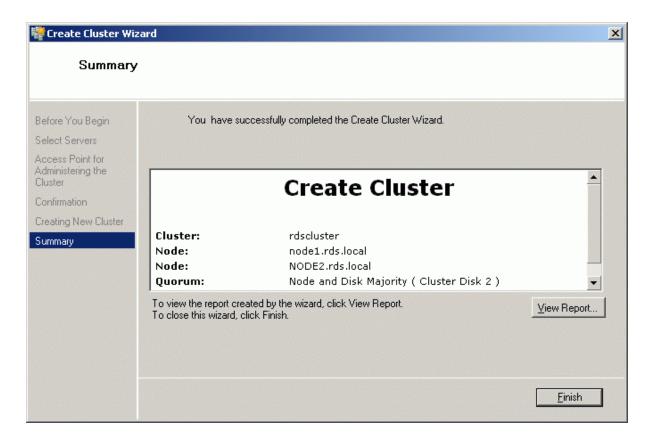


Check the parameters are correct. Press the **Previous** button should any changes be required.

Create Cluster W				X
Before You Begin Select Servers Access Point for Administering the Cluster	Cluster:	ur cluster with the following setti rdscluster	ngs:	<u></u>
Confirmation Creating New Cluster Summary	Node: Node: IP Address:	node1.rds.local NODE2.rds.local 192.168.1.33		
	To continue, click Next.			
			< <u>P</u> revious <u>N</u> ext >	Cancel



If successful, the wizard should look like the example picture provided below.



Press the Finish button.



Now that the creation of the cluster is complete it will be shown in the panel on the left.

Expand the cluster by clicking on the '+' symbol next to the cluster, then click on **Storage**. The **Failover Cluster Management** console should look like the example picture provided below. Both cluster disk resources will be shown as online.

👹 Failover Cluster Management				_D×
<u>File Action View H</u> elp				
🗢 🔿 🖄 📅 🚺 🖬				
Railover Cluster Management	Storage			Actions
 Image: Image: Ima				Storage 🔺
🖃 🍯 Nodes	Summary of Stor	age		📫 Add a disk
node1				View +
Storage	Storage: 2 Total Disks - 2 online	Total Capacity: Total: 2.99 GB	Available Capacity: Total: 2 GB	Q Refresh
Networks Gluster Events	1 Available Disks - 1 online	Free Space: 2.91 GB	Free Space: 1.96 GB	Help
	1 In Use Disks - 1 online	Percent Free: 97.3%	Percent Free: 98.1%	Cluster Disk 2
				Bring this resource online
	Disk	Status	Node	Take this resource offline
	Witness Disk in Quorum			Change drive letter
	🗉 🚥 Cluster Disk 2	🕥 Online	node1	Show the critical events f
	Volume: (Q)	File System: NTFS	1,021 MB (95.7% free)	
	Available Storage			Show Dependency Report
	🖃 🚥 Cluster Disk 1	🕥 Online	node1	More Actions
	Volume: (R)	File System: NTFS	2 GB (98.1% free)	Properties
				Help



Adding New Shared Disk Resource

StarWind Target

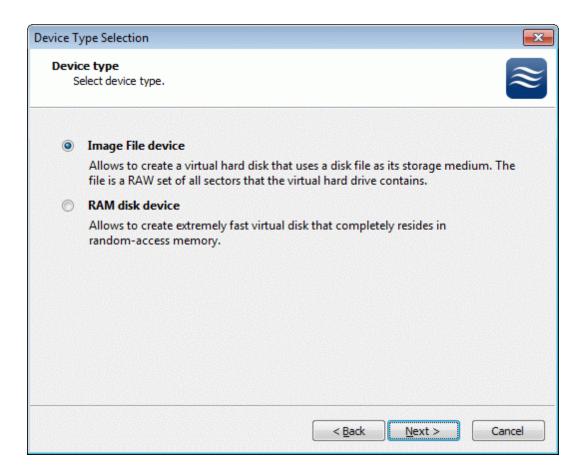
Click the right mouse button over the host and select **Add Target** pop-up menu item.

In the wizard that appears, select a target name. The name must be a unique name by which the device will be declared to the iSCSI initiators connecting to **StarWind** over an IP network.

rget Wizard		
mmon target parameters Specify target alias and target name.		
Target Alias:		
spool		
Target Name:		
ign.2003-09.com.starwindsoftware:v	vishmaster-spool	

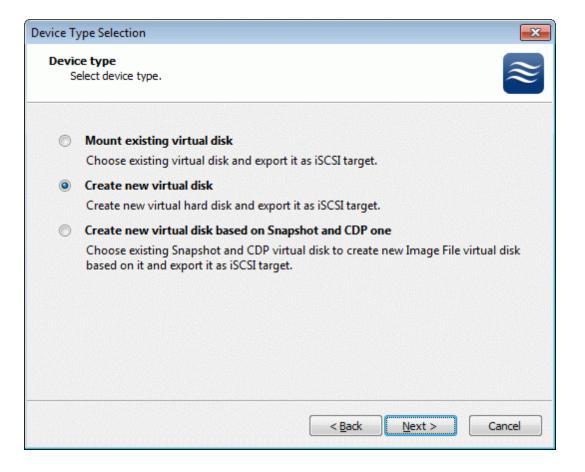


Select Image File device.





Select **Create new virtual disk** to create a new virtual hard disk or **Mount existing virtual disk** to mount an existing virtual disk that you've prepared before.





If you have decided to create a new virtual disk please specify the location and the name of the virtual disk you wish to be created. Also you have to provide the virtual disk size in megabytes. Check any additional parameters of the virtual dsik you wish to create. Please refer to the online help for details regarding those additional parameters (**Compressed** and **Encrypted**).

Device Type Selection	×
Virtual disk parameters Specify virtual disk parameters.	\approx
New virtual disk location and name:	
My Computer \C \images \spool.img	•
Size in MBs: 1024	
Compressed	
Encrypted	
User account that will have access to this image	
Name:	
Password:	
Fill with zeroes	
< <u>B</u> ack <u>N</u> ext >	Cancel



Image File device has some extra parameters. Check Allow multiple concurrent iSCSI connections (clustering) checkbox. Please refer to the online help for details regarding those additional parameters (Asynchronous mode, Allow multiple connections (clustering), Read-only mode and Specify advanced options).

Device Type Selection	x
Image File device parameters Specify Image File device parameters.	≋
Select virtual disk you want to make accessible via iSCSI:	
My Computer \C \images \spool.img	▼
Asynchronous mode	
Read-Only mode	
Allow multiple concurrent iSCSI connections (clustering)	
Advanced options	
Use file system buffering	
Header size in sectors: 0	
< Back Next >	Cancel

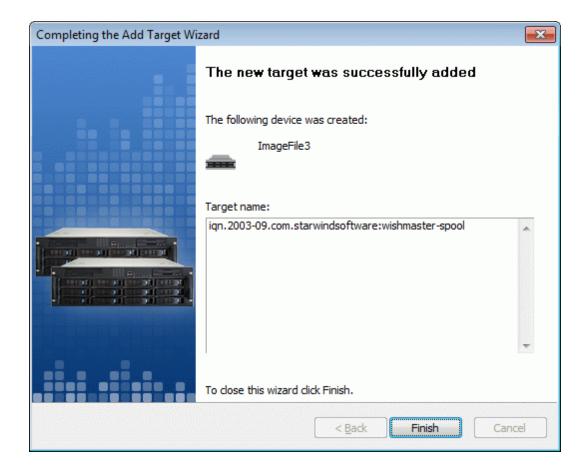


Check the device parameters are correct. Press the **Back** button should any changes be required.

Completing the Add Target Wi	izard	×
	Completing the Add Target Wizard	
	The following device will be added:	
	ImageFile3	
	You specified the following settings:	
	File : My Computer\C\images\spool.img Asynchronous : Yes Readonly : No Clustering : Yes	*
		-
	< >	
	Click Next to add new device.	
	< <u>B</u> ack <u>N</u> ext > Can	cel



A summary of the created device is displayed on the last wizard page (see image below).



Press the Finish button to close the wizard.

Node 1

Launch the Microsoft iSCSI Software Initiator application **Administrative Tools** -> **iSCSI Initiator**. Click on the **Targets** tab. Select the IQN of the target just added.

I Initiator Properties	
Favorite Targets Volumes and Devices	RADIUS
General Discovery	Targets
o access storage devices for a target, select the target ar og on.	nd then click
o see information about sessions, connections, and device ick Details.	es for a target,
ick Details.	
argets:	
Name	Status
iqn.2003-09.com.starwindsoftware:wishmaster-generic	Connected
iqn.2003-09.com.starwindsoftware:wishmaster-quorum	Connected
ign.2003-09.com.starwindsoftware:wishmaster-spool	Inactive
<	
Details Log on	R <u>e</u> fresh

Press the Log On... button.



The **Log On to Target** dialog now appears. In this dialog click on the checkbox **Automatically restore this connection when the system boots** to make this connection persistent.





When the **StarWind** Disks are connected, they show up on the initiator machine as new disk devices. Before these devices can be used as cluster disks, they have to be initialized and formatted. Launch the **Computer Management** console. Select **Disk Management**.

Server Manager (NCOE.1) Disk Management. Value List & Graphical Yew Actions Probarts Volume Layout. Type File System Status Disk Management. Dis	🔿 🖄 💽 🔽 📷 🕃	😰 😼 Disk Manageme	ent Volume List + Graph	ical View	Actions	
Configuration C	💫 Roles	and the second state of th				
Disk 1 Basic 2.00 GB 2.00 GB NTF5 Reserved Healthy (Primary Partition) Disk 2 Basic 1023 MB 1021 MB NTF5 Healthy (Primary Partition) Disk 3 Unknown 1.00 GB Offline Properties	Diagnostics Configuration Storage Windows Server Backup	C:) Generic (R:)	Simple Basic NTFS Simple Basic NTFS	Healthy (System, Boot, Page File, Active, Crash Dump, Primary F Healthy (Primary Partition)	a More Actions	
Basic 1023 MB Reserved Unknown 1.00 GB Offline Properties						
Unknown 1.00 GB Offline Properties		Disk 1 Basic 2.00 GB	2.00 GB NTFS		31	
		Disk 1 Basic 2.00 GB Reserved Basic Disk 2 Basic 1023 MB	2.00 GB NTFS Healthy (Primary Partit Quorum (Q:) 1021 MB NTFS	ion)	31	

Bring disk online. Press the right mouse button over the disk and select Online



Initialize the Disk. Press the right mouse button over the Disk and select **Initialize Disk**. Follow the wizard to initialize the new disk.

Server Manager (NODE1)	Disk Management Volume List + Graphical View	Actions	
Roles Features Diagnostics Configuration Configuration Configuration Disk Management Disk Management	Volume Layout Type File System Status Image: C(:) Simple Basic NTF5 Healthy (System, Boot, Page File, Active, Crash Dump, Primary Page File, Active, Crash Dump, Page File, Active, Active, Crash Dump, Page Fil	Disk Management More Actions	
	Disk 1 Basic 2.00 GB 2.00 GB NTF5 Reserved Healthy (Primary Partition) Disk 2 Basic 1021 MB NTF5 Reserved Healthy (Primary Partition)		



Initialize Disk
You must initialize a disk before Logical Disk Manager can access it.
<u>S</u> elect disks:
Disk 3
Use the following partition style for the selected disks:
MBR (Master Boot Record)
C GPT (GUID Partition Table)
Note: The GPT partition style is not recognized by all previous versions of Windows. It is recommended for disks larger than 2TB, or disks used on Itanium-based computers.
OK Cancel



The disk has now been initialized. Right-click over the unallocated space and select **New Simple Volume**. Follow the instructions in the wizard to create an NTFS partition for use as the spool disk.

File Action View Help						
⊨ 🧼 🖄 📰 🚺 🚺 🚺	ef 😼					
Server Manager (NODE1)	Disk Manageme	ent Volume List + Gr	iraphical View		Actions	
± ♪ Roles + ∰ Features	Volume L	Layout Type File S	System Status		Disk Management	
🗄 📷 Diagnostics		Simple Basic NTFS	Healthy (System, Boot, Page File, A	Active, Crash Dump, Primary Pa	More Actions	
Configuration		Simple Basic NTFS				
🦳 🐞 Windows Server Backup						
📄 Disk Management						
	•			F		
	Disk 1 Basic	Generic (R:)				
	Disk 1	2.00 GB NTFS	Partition)			
	Disk 1 Basic 2.00 GB Reserved	Generic (R:) 2.00 GB NTF5 Healthy (Primary P	Partition)			
	Disk 1 Basic 2,00 GB Reserved	2.00 GB NTF5 Healthy (Primary P	Partition)			
	Disk 1 Basic 2.00 GB Reserved Disk 2 Basic 1023 MB	2.00 GB NTFS Healthy (Primary P Quorum (Q:) 1021 MB NTF5				
	Disk 1 Basic 2.00 GB Reserved	2.00 GB NTFS Healthy (Primary P Quorum (Q:)				
	Disk 1 Basic 2.00 GB Reserved Disk 2 Basic 1023 MB Reserved Disk 3	2.00 GB NTFS Healthy (Primary P Quorum (Q:) 1021 MB NTF5				
	Disk 1 Basic 2.00 GB Reserved Disk 2 Basic 1023 MB Reserved	2.00 GB NTF5 Healthy (Primary P Quorum (Q:) 1021 MB NTF5 Healthy (Primary P	Partition)			
	Disk 1 Basic 2.00 GB Reserved Disk 2 Basic 1023 MB Reserved Disk 3 Basic	2.00 GB NTFS Healthy (Primary P Quorum (Q:) 1021 MB NTFS	Partition) Partition New Small Volume. New Spanned Volume			
	Disk 1 Basic 2.00 GB Reserved Disk 2 Basic 1023 MB Reserved Disk 3 Basic 1023 MB Online	2.00 GB NTFS Healthy (Primary P Quorum (Q:) 1021 MB NTFS Healthy (Primary P	Partition) Rev Simple Volume New Spanned Volume New Striped Volume			
	Disk 1 Basic 2.00 GB Reserved Disk 2 Basic 1023 MB Reserved Disk 3 Basic 1023 MB	2.00 GB NTFS Healthy (Primary P Quorum (Q:) 1021 MB NTFS Healthy (Primary P	Partition) Partition New Small Volume. New Spanned Volume			
	Disk 1 Basic 2.00 GB Reserved Disk 2 Basic 1023 MB Reserved Disk 3 Basic 1023 MB Online	2.00 GB NTFS Healthy (Primary P Quorum (Q:) 1021 MB NTFS Healthy (Primary P	Partition) New Simple Volume New Spanned Volume New Mirrored Volume			



New Simple Volume Wizard appears.

New Simple Volume Wizard		×
	Welcome to the New Simple Volume Wizard	
	This wizard helps you create a simple volume on a disk.	
	A simple volume can only be on a single disk.	
	To continue, click Next.	
	< <u>B</u> ack <u>Next</u> Cancel	



Specify new volume size in megabytes.

New Simple Volume Wizard	×
Specify Volume Size Choose a volume size that is betwee	en the maximum and minimum sizes.
	1021
Maximum disk space in MB:	1021
Minimum disk space in MB:	8
<u>S</u> imple volume size in MB:	1021
	< <u>B</u> ack <u>N</u> ext > Cancel



Choose the Drive Letter to assign.

New Simple Volume Wizard			×
Assign Drive Letter or Path For easier access, you can assign a drive letter	or drive pati	h to your partition	
 Assign the following drive letter: Mount in the following empty NTFS folder: Do not assign a drive letter or drive path 	S Brows	e	
	< <u>B</u> ack	<u>N</u> ext ≻	Cancel

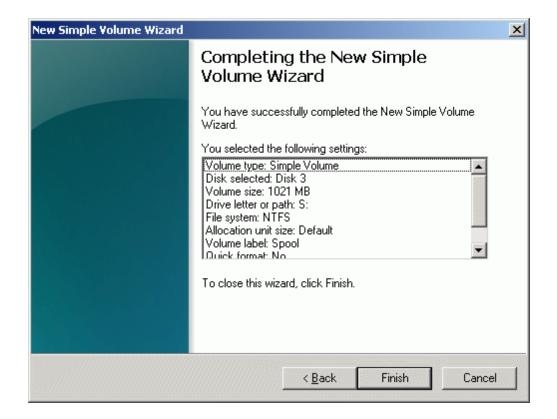


Specify format options. Provide the Volume Label.

New Simple Volume Wizard	×
Format Partition To store data on this partition, you must format it first.	
Choose whether you want to format this volume, and if so, what settings you want to use.	
O Do not format this volume	
• Format this volume with the following settings:	
File system: NTFS	
Allocation unit size:	
Volume label: Spool	
Perform a quick format	
Enable file and folder compression	
< <u>B</u> ack <u>N</u> ext > Cancel	



Check the settings are correct. Press the **Back** button should any changes be required.



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



If successful, the disk is now formatted as shown in the example image below.

L Server Manager (NODE1)	Disk Management Volume List + Graphical View	Actions
 Particle Particle	Volume Layout Type File System Status Image: C::) Simple Basic NTFS Healthy (System, Boot, Page File, Active, Crash Dump Image: Ceneric (R:) Simple Basic NTFS Healthy (Primary Partition) Image: Ceneric (R:) Simple Basic NTFS Healthy (Primary Partition) Image: Ceneric (R:) Simple Basic NTFS Healthy (Primary Partition) Image: Ceneric (S:) Simple Basic NTFS Healthy (Primary Partition)	Disk Management Disk Management More Actions
		<u>></u>
	2:00 db 2:00 db 17:5 Reserved Healthy (Primary Partition) Disk 2 Basic Basic Quorum (Q:) 1023 MB 1021 MB NTF5 Reserved Healthy (Primary Partition)	

Shut down the node.

Node 2

Launch the Microsoft iSCSI Software Initiator application **Administrative Tools** -> **iSCSI Initiator**. Click on the **Targets** tab. Select the IQN of the target just added.

I Initiator Properties		
Favorite Targets General	Volumes and Devices Discovery	RADIUS Targets
o access storage devices og on.	for a target, select the targ	jet and then click
o see information about s lick Details.	sessions, connections, and d	evices for a target,
jargets:		
Name		Status
iqn.2003-09.com.starwin	ndsoftware:wishmaster-gene	eric Connected
iqn.2003-09.com.starwin	ndsoftware:wishmaster-quor	um Connected
iqn.2003-09.com.starwir	ndsoftware:wishmaster-spoo	l Inactive
•		
Details	Log on	R <u>e</u> fresh

Press the Log On... button.



The **Log On to Target** dialog now appears. In this dialog click on the checkbox **Automatically restore this connection when the system boots** to make this connection persistent.





When the StarWind Disks are connected, they show up on the initiator machine as new disk devices. Before these devices can be used as cluster disks, they have to be mounted. Launch the **Computer Management** console. Select **Disk Management**.

Roles Features	Disk Managemen Volume La				and a second	
Features			File System	Status	Disk Management	
Diagnostics Configuration Storage Windows Server Backup Disk Management	(C:) Si Generic (R:) Si Quorum (Q:) Si		NTFS	Healthy (System, Boot, Page File, Active, Crash Dump, Primary Pa Healthy (Primary Paritiion) Healthy (Primary Paritiion)	More Actions	
	Disk 1 Basic 2.00 GB Reserved	Generic (f 2.00 GB NTF Healthy (Pri				
	Disk 2 Basic 1023 MB Reserved					
	1023 MB Offline	Online Properties Help				

Bring disks online. Press the right mouse button over the disk and select **Online**.



The picture below shows that Windows has automatically assigned Drive Letters to the mounted volumes. As these are local drive letters they may not be the same as we have assigned to these volumes on the first node. However, as all volumes of a cluster must be assigned the same drive letters, any differences must be manually changed. Press the right mouse button over the **Spool** volume.

Server Manager (NODE2)	Disk Manageme	nt Volume List + Graphical Viev	V	Actions
Roles	Volume I	ayout Type File System Sta	tus	Disk Management
 	Generic (R:)	5imple Basic NTFS Hea 5imple Basic NTFS Hea	althy (System, Boot, Page File, Active, Crash Dump, Primary Pa althy (Primary Partition) althy (Primary Partition) althy (Primary Partition)	More Actions
	Disk 1 Basic 2.00 GB	Generic (R:)	Open Explore Mark Partition as Active Chance Drive Letter and Estimate Format	
	Reserved	2.00 GB NTF5 Healthy (Primary Partition) Quorum (Q:) 1021 MB NTF5 Healthy (Primary Partition)	Extend Volume Shrink Volume Add Mirror Delete Volume Properties	
	Disk 3 Basic 1023 MB Online	Spool (E:) 1021 MB NTF5 Healthy (Primary Partition)	Help	
	CD-ROM 0 DVD (D:)			

Select Change Drive Letter and Paths...



Change the Drive Latter for the Spool to S.

Change Drive Letter and Paths for E: (Spool)	×
Allow access to this volume by using the following drive letter and paths:	
	- 1
	- 1
Add Change <u>R</u> emove	
OK Cancel	ו

×
S 💌
Browse
Cancel



If successful, the **Computer Management** console should look like the sample image provided below.

• 🔿 🙋 🖬 🚺 🖬 😫	X 📽 🖻 🍳 😼		
 Server Manager (NODE2) 	Disk Managemer		Actions
Roles	Volume La	ayout Type File System Status	Disk Management
Diagnostics Configuration Storage Windows Server Backup Disk Management	Generic (R:) Si Quorum (Q:) Si	Imple Basic NTFS Healthy (System, Book, Page File, Active, Crash Dump, Primary Parition) Imple Basic NTFS Healthy (Primary Partition) Imple Basic NTFS Healthy (Primary Partition) Imple Basic NTFS Healthy (Primary Partition) Imple Basic NTFS Healthy (Primary Partition)	More Actions
	4	F	
	Disk 1 Basic 2.00 GB Reserved	Generic (R:) 2.00 GB NTF5 Healthy (Primary Partition)	
	Disk 2 Basic 1023 MB Reserved	Quorum (Q:) 1021 MB NTFS Healthy (Primary Partition)	
	Reserved		
	Disk 3 Basic 1023 MB Online	Spool (S:) 1021 MB NTF5 Healthy (Primary Partition)	



Launch the Failover Cluster Management console. Click on Storage node.

👹 Failover Cluster Management				_ _ _ _ _ _
Eile Action View Help				
Eailover Cluster Management	Storage			Actions
Tasciuster.rds.iocal The services and Applications		800		Storage 🔺
🗉 🍯 Nodes		uge		📫 Add a disk
node1	Storage:	Total Capacity:	Available Capacity:	View 🕨
📇 Storage	2 Total Disks - 2 online	Total: 2.99 GB	Total: 2 GB	Refresh
Networks Guster Events	1 Available Disks - 1 online 1 In Use Disks - 1 online	Free Space: 2.91 GB Percent Free: 97.3%	Free Space: 1.96 GB Percent Free: 98.1%	🛛 Help
	T IN USE DISKS - T ONIINE	Percent Free: 37.3%	Percent Free: 38.1%	Cluster Disk 1
				Bring this resource online
	Disk	Status	Node	Take this resource offline
	Witness Disk in Quorum			Change drive letter
	🖃 🚥 Cluster Disk 2	🕥 Online	node2	Show the critical events f
	Volume: (Q)	File System: NTFS	1,021 MB (95.7% free)	Show Dependency Report
	Available Storage			More Actions
	🖂 📼 Cluster Disk 1	🕥 Online	node2	X Delete
	Volume: (R)	File System: NTFS	2 GB (98.1% free)	
				Help
This action enables you to add a disk to I	the cluster.			

Click Add a Disk item from the Actions panel shown on the right.



Add Disks to a Cluster dialog appears. Select the disk to add.

Ad	ld Disks to a Cluster				×
Select the disk or disks that you want to add.					
	Avalilable disks:				
	Resource Name	Disk Info	Capacity	Signature/GUID	
	☑ Cluster Disk 3	Disk 3 on node node2	1 GB	1620362949	
1			04	Cancel	



When completed, the disk is now a cluster disk.

Failover Cluster Management	Storage			Actions
🙀 rdscluster.rds.local				Storage
	Summary of Store	age		🛋 Add a disk
anode1	~			View
node2	Storage: 3 Total Disks - 3 online	Total Capacity: Total: 3.99 GB	Available Capacity: Total: 2.99 GB	Q Refresh
🛨 🍈 Networks	2 Available Disks - 2 online	Free Space: 3.88 GB	Free Space: 2.93 GB	Help
🔢 Cluster Events	1 In Use Disks - 1 online	Percent Free: 97.2%	Percent Free: 97.7%	Cluster Disk 3
	Disk	Status	Node	Bring this resource online
	Witness Disk in Quorum	Jidius	Node	Take this resource offline
	🗆 🖙 Cluster Disk 2	🕥 Online	node2	Change drive letter
	Volume: (Q)	File System: NTFS	1,021 MB (95.7% free)	Show the critical events
	Available Storage			Show Dependency Repo
		0		More Actions
	E Cluster Disk 1 Volume: (R)	() Online File System: NTFS	node2 2 GB (98.1% free)	🗙 Delete
	E Cluster Disk 3	Online	node2	Properties
	Volume: (S)	File System: NTFS	1,021 MB (96.8% free)	Help



Start the other servers in the cluster.

闂Failover Cluster Management					
<u>File Action View H</u> elp					
🗢 🔿 🙋 🖬 🚺 🖬					
Failover Cluster Management	Storage			Actions	
In the second sec				Storage	•
🖃 🍯 Nodes		age		💣 Add a disk	
node1				View	•
📇 Storage	Storage: 3 Total Disks - 3 online	Total Capacity: Total: 3.99 GB	Available Capacity: Total: 2.99 GB	Q Refresh	
	2 Available Disks - 2 online	Free Space: 3.88 GB	Free Space: 2.93 GB	P Help	
Endster Events	1 In Use Disks - 1 online	Percent Free: 97.2%	Percent Free: 97.7%		
	Disk	Status	Node		
	Witness Disk in Quorum				
	🖂 📼 Cluster Disk 2	💿 Online	node2		
	Volume: (Q)	File System: NTFS	1,021 MB (95.7% free)		
	Available Storage				
	🖯 📼 Cluster Disk 1	🕥 Online	node2		
	Volume: (R)	File System: NTFS	2 GB (98.1% free)		
	Cluster Disk 3 Volume: (S)	Inline € 000 €	node2 1,021 MB (96.8% free)		
	Volume: (5)	File System: NTFS	1,021 MB (36.8% free)		
This action enables you to add a disk to) the cluster.				



Contacts

Support:	www.starwindsoftware.com/support
Support Forum:	www.starwindsoftware.com/forums
Sales E-mail:	sales@starwindsoftware.com

US Headquarters

Direct phone number:	1-617-449-7717
Fax:	1-617-507-5845

EMEA, APAC

Direct phone numbers:	+44-0-2071936727
	+44-0-2071936350
Voice Mail:	1-866-790-2646

StarWind Software Inc. 40 Mall Rd., Burlington MA 01803, USA

www.starwindsoftware.com