

# StarWind iSCSI SAN Software: Using DataPlow SFS to Share iSCSI Volumes

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### **Table of Contents**

Introduction	4
Configuring StarWind Server	5
Connecting the Target to the Client Machines	13
Installing Dataplow SFS	18
Formatting and Sharing Disk on Metadata Server	27
Mounting Shared Disk to Clients	32
Setting Access Rights to Shared Disk	35
Conclusion	44



# Guide

### Introduction

Today more and more customers are willing to use a SAN for concurrent multiinitiator access to the same disk volume and the same set of files. Movie rendering farms, huge distributed databases, clusters all benefit from the performance of an IP SAN compared to NAS utilizing the same hardware. However iSCSI alone own does not solve the task of maintaining distributed write locks and keeping file caches coherent. NTFS cannot be used as a SAN file system alone so here some SAN File System (SFS) from DataPlow. This document describes how to use the StarWind iSCSI Target for Microsoft Windows together with DataPlow SFS. The Microsoft iSCSI Initiator is used for this example, however any Windows software iSCSI initiator or iSCSI HBA (Host Bus Adapter) will work.



### **Configuring StarWind Server**

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

From the **StarWind Servers** tree please select the server you want to connect to. Press the right mouse button over the desired host and select the **Connect** popup menu item. You will be prompted to enter the login and password. Default ones are: root, starwind. You can always change them later.

Press Add Target button to continue.

In the Wizard that appears, specify 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.

dd Target Wizard
Common target parameters Specify target alias and target name.
Target Alias:
sfstarget
Target Name:
iqn.2008-08.com.starwindsoftware:eva-sfstarget
< <u>B</u> ack <u>N</u> ext > Cancel Help



#### Select Image File device.





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





If you have decided to create a new virtual disk, specify the location and the name of the virtual disk you want to be created. The virtual disk size is specified in megabytes. Refer to the online help for details regarding additional parameters (Fill with zeroes, Compressed and Encrypted).

Add Target Wizard	
Virtual disk para Specify virtual	meters disk parameters.
New virtual disk k	ocation and name:
My Computer \C	sfs.ing
Size in MBs:	2048
Compressed	at will have access to this image
Password:	
Fill with zeroes	< <u>B</u> ack <u>Next</u> > Cancel Help



An Image File device can have additional parameters. Refer to the online help for details regarding the additional parameters (Asynchronous mode, Allow multiple connections (clustering), Read-only mode and Specify advanced options).

Add Target Wizard	×
Image File device parameters Specify Image File device parameters.	$\approx$
Select virtual disk you want to make accessible via iSCSI:	
My Computer\C\sfs.img	▼
Asynchronous mode	
Read-Only mode	
Allow multiple concurrent iSCSI connections (dustering)	
Advanced options	
File system buffering	
Header size in sectors: 0	
< <u>B</u> ack <u>N</u> ext > Cancel	Help



An Image File device can have additional parameters. Refer to the online help for details regarding the additional parameters (**Cache mode, Cache size in MBs** and **Cache block expiry period in ms**).

Add Target Wizard	
Image File device cache paramete Specify Image File device cache para	rs ameters.
Cache Normal (no caching)	▼
Cache size in MBs:	64 🛋
Note: cache size is subject to sh memory.	rink w/o notice if specified too large for destination machine
Cache block expiry period in ms:	5000
	< Back Next > Cancel Help



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





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



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



### **Connecting the Target to the Client Machines**

We use Microsoft iSCSI Initiator to connect to the recently created and preconfigured iSCSI target. Choose the machine that will act as a metadata server. Launch MS iSCSI Initiator. Switch to the **Discovery** tab and specify the computer with **StarWind** installed or **iSNS** server (if there is one configured over your network).

iSCSI Initi	iator Prope	rties				x
General	Discovery	Targets P	ersistent Tar	gets Bound	Volumes/Devic	es
<u>I</u> arge	et Portals —					
Add	dress	Port	Adapter		IP Address	
	<u>A</u> dd		<u>R</u> emove	R	l <u>e</u> fresh	
jSNS	Servers —					
Na	me					
	A <u>d</u> d		Remove	B	le <u>f</u> resh	
						1
			OK	Cancel	Apply	

Press the **Add** button to continue.



In the dialog that appears type in the **IP address** of the computer with the **StarWind** installed and **Port** of that machine.

Add Target Portal		×
Type the IP address or DNS name a want to add. Click Advanced to sele session to the portal.	nd socket number o ct specific settings	of the portal you for the discovery
IP address or DNS name: 192.168.1.224	<u>P</u> ort: 3260	<u>A</u> dvanced
	ОК	Cancel

Then press **OK** button to continue.



The Target Portal is added now. Switch to the **Targets** tab. Select the target name from the list and press **Log On**.

iSCSI Initiator Properti	es	×
General Discovery T	argets Persistent Targets	Bound Volumes/Devices
Select a target and clic target. Click details to s devices for that target.	k Log On to access the sto see information about the se	prage devices for that essions, connections and
Targets:		
Name		Status
sistarget		Inacuve
1		
	<u>D</u> etails <u>L</u> og L	Jn <u>He</u> tresh
	ОК	Cancel Apply



In the Logon to Target dialog box check **Automatically restore this connection** when the system boots.

Log On to Target 🛛 🗙
Target name:
sfstarget
$\overline{ullet}$ Automatically restore this connection when the system boots
Enable multi-path
Only select this option if iSCSI multi-path software is already installed on your computer.
Advanced OK Cancel

Press **OK** button to logon to the **StarWind** iSCSI Target.



After the **Image File** iSCSI target is connected you need to initialize it. Launch the Computer Management console, expand the Storage node and select the Disk Management menu item. The Initialize and Convert Disk Wizard appears. Follow the instructions of the wizard to initialize a new iSCSI disk device. When the initialization is complete, you have to create a new partition on the device by right clicking on the unallocated space and selecting the New Partition... menu item from the pop-up context menu. Follow the instructions to create a new primary partition. The **Wizard** will offer to specify formatting options. Select **Do not format this partition**.

New Partition Wizard	×
Format Partition To store data on this partition, yo	ou must format it first.
Choose whether you want to for	nat this partition, and if so, what settings you want to use.
Do not format this partition	3
C Format this partition with the second s	he following settings:
<u>File</u> system:	NTFS
<u>A</u> llocation unit size:	Default
⊻olume label:	New Volume
Eerform a quick for	nat
🔲 Enable file and fold	er compression
	< <u>B</u> ack <u>N</u> ext > Cancel

Press the **Next** button to continue. On the next page press the **Finish** to complete the wizard.

As a result of these actions a new drive with the **unformatted** volume appears on the client machine. At this step you need to connect to this target the other client machines that will use SAN volume. Perform described above steps on each machine. Those machines will discover new unformatted disk. **You do not need to format it**. Drive letter would be signed to it automatically.



## Installing Dataplow SFS

Install **DataPlow SFS** on each machine that will use SAN volume. Run the DataPlow SFS installer.

PataPlow SFS
Welcome to the DataPlow SFS Setup Wizard
DataPlow SAN File System (SFS)
Copyright (C) 1997-2006 DataPlow, Inc. All Rights Reserved. DataPlow and the DataPlow logo are registered trademarks of DataPlow, Inc.
Cancel < Back Next >



Accept the license agreement.

🚏 DataPlow SFS	
License Agreement	
Please take a moment to read the licens Agree", then "Next". Otherwise click "C	se agreement now. If you accept the terms below, click "I Cancel".
DeteDiau CAN File Quet	am (CEC)
Copyright (C) 1997-2006	S DataPlow, Inc.
This copy of the DataPlov	w SAN File System software is the
DataPlow, Incorporated, I	protected under the copyright, trade
secret and confidentiality laws of the la	United States, and is further subject to
◯ I <u>D</u> o Not Agree	
	Cancel < <u>B</u> ack <u>N</u> ext >



SFS **BootMount Services Account** dialog appears. Provide username and password of user with administrative privileges.

SFS BootMount Serv	rices Account
<b>F</b>	GET
Enter an account with BootMount service.	Administrator privileges for the SFS
<u>U</u> ser name:	😰 WISHMASTER\root 💽 🗾
Password:	••••••
	OK Cancel



The installation procedure of **DataPlow SFS** is completed.

🔂 DataPlow SFS	_ 🗆 🗙
Installation Complete	
DataPlow SFS has been successfully installed.	
Click "Close" to exit.	
Please use Windows Update to check for any critical updates to the .NET Framework.	
Cancel < <u>B</u> ack	ose

Press the **Close** button.



Run **DataPlow SFSTools** using shortcut from your desktop. You need to provide registration key.

SFS Licens	se Activation	×
Invalid Ac	tivation Key - Enter valid Activation Key or press Cancel.	
HostID	E909E2A4 No Expiration.	
Кеу	0000 - 0000 - 0000 - 0000 - 0000 - 0000	
	OK Cancel Apply	

Dataplow SFSTools main window appears.



Choose Load Driver at Boot option from Actions menu.



### SFSTools confirmation dialog appears.

SFSTools			×
?	Set SFS drive	er to load during	) boot?
	OK )	Cancel	



Choose **Load Driver** option from **Actions** menu. DataPlow SFSTools main window should change.





Choose **Mount at Boot** option from **Actions** menu. **SFSTools** confirmation dialog appears. Perform described above steps on all the machines that will use SAN target.

SFSTools			×
?	Set SFS to mo	unt volumes during b	oot?
	ОК	Cancel	



### Formatting and Sharing Disk on Metadata Server

Open DataPlow **SFSTools**. Right click over the sfsdrive (J: in our case) and select **Format**.

SFS	SEEDataPlow SFSTools - Full Control, Driver Loaded 3.98								_ 🗆 ×	1	
Eile	<u>A</u> ctions	<u>M</u> anagement <u>H</u>	<u>t</u> elp								
	Volume		Mount	Environment	Capacity	Free Space	% Free	Т	Mode	Volume ID	[]
E:			RAW		10.33 GB	10.33 GB	100.0	Α			
3:			RAW		1.99 GB	1.99 GB	100.0	i			
L											l
ш										<u>`</u>	1
For H	Help, press	F1								NUM /	1



#### Format Volume dialog appears.

Format Volume on J:	×
🔽 Format Volume	
Block Size	8 KB
Number of Segments	4
Number of Pre-Allocated Journals	24
Store All Bitmaps in Segment 0	
Volume Label (Optional)	Sanvolume
	Format Cancel

Check **Format Volume** parameter and optionally provide Volume Label (for example sanvolume). Press the **Format** button to continue.



Select **Refresh** option from **Actions** menu. Now disk becomes in RO (read-only) mode.





Right-click over the Sanvolume and choose the **Mount** option. Check **Mount at Boot** option. Select **Server** option in **Mount Type** group. Check **Automatically Share Volume with Full Access** option and provide share name.

Mount Volume for Sanvolume on :	): <u>×</u>					
Mount at Boot	Read Only					
Mount Type	Environment					
Server	<ul> <li>Default</li> </ul>					
C Client	C Small File (<128KB)					
C Serverless Client	C Large File (>16MB)					
	C Huge File (>1GB)					
Access Threshold (ms) 4000	C Custom					
Server Share						
Block Pre-Allocation Low (MB) 32						
Block Pre-Allocation High (MB)	8					
Allocation Length 32	Allocation Stride 32					
Automatically Share Volume with Full Access	Share SFS					
Mount Save	Cancel Advanced					

Press the **Mount** button to continue.



Now disk become in RW (read-write) mode and mounted as "Server". Now you have shared volume and it could be accessed by other network machines. Later on you need to set access rights to the shared volume. Now you need to mount it to other clients.

SFS	🗺 DataPlow SFSTools - Full Control, Driver Loaded 3.98							_ 🗆 🗵	
Eile	File <u>A</u> ctions <u>M</u> anagement <u>H</u> elp								
	Volume	Mount	Environment	Capacity	Free Space	% Free	Т	Mode	Volume ID
E:		RAW		10.33 GB	10.33 GB	100.0	Α		
J:	Sanvolume	Server	Default	1.99 GB	1.99 GB	100.0		RW	0x45b9cda6
•									Þ
For H	Help, press F1								NUM //



### **Mounting Shared Disk to Clients**

Open SFSTools. Right-click over the "Sanvolume" disk.





Mount Volume for Sanvolume dialog appears. Check **Mount at Boot** option. Select **Client** option in **Mount Type** group. Provide IP address of the metadata server and share name of the disk.

Mount Volume for Sanvolume on	E: 🔀						
Mount at Boot	🔲 Read Only						
Mount Type	Environment						
C Server	Oefault						
<ul> <li>Client</li> </ul>	🔘 Small File (<128KB)						
C Serverless Client	C Large File (>16MB)						
	C Huge File (>1GB)						
Access Threshold (ms) 4000	C Custom						
Server 192.168.1.234	Share SFS						
Block Pre-Allocation Low (MB) 3	2						
Block Pre-Allocation High (MB)	28						
Allocation Length 32	Allocation Length 32  Allocation Stride 32						
Automatically Share Volume with Full Access	Share						
Mount Save	Cancel Advanced						

Press the **Mount** button to continue.



Now the disk is mounted to client and it can be accessed via Explorer. Perform described above steps on each client.





### **Setting Access Rights to Shared Disk**

To prevent access to the shared SFS volume from the machines that do not have **SFSTools** installed you need to set access rights. First of all you need to create on metadata server user accounts for all machines that will use SFS volume(s). Right-click on **My Computer** and select **Manage** tree item. **Computer management** console appears.

📮 Computer Management			
🖳 Eile Action View Window H	elp		_8×
Computer Management (Local)	Name	Full Name vmware_user ASP.NET Machine Account Remote Desktop Help Assi CN=Microsoft Corporation	Description VMware User Account used for running the ASP.I Built-in account for guest access to Account for Providing Remote Assis Built-in account for administering th This is a vendor's account for the H
	•		
	, <b>.</b>		

#### Select Local Users and Groups tool. Left mouse click on the "Users" node.



Select **New User...** from the **Action** menu. New User dialog appears. Provide **User name**, **Password**, and **Confirm password** for new user. "User name" and "Password" must be the same as on the machine that would have access to "Sanvolume". Uncheck **User must change password at next login**. Check **User cannot change password** and **Password never expires**. Repeat this step for all users you wish to have access to SFS volume.

New User		<u>?</u> ×
<u>U</u> ser name:	van	
<u>F</u> ull name:		
Description:		
<u>P</u> assword:	•••••	
<u>C</u> onfirm password	t	
User <u>m</u> ust ch	ange password at next logon	
🔽 U <u>s</u> er cannot d	change password	
Pass <u>w</u> ord nev	ver expires	
🔲 Account is dis	sa <u>b</u> led	
	Create Clos	;e

Press the **Create** button to continue. Click **Close** button. Exit the **Computer Management** console.



Now you need to assign access rights to shared volume. Open **My Computer**. Double-click the "Sanvolume". Select **Folder Options** from **Tools** menu. Switch to the **View** tab. **Uncheck Use simple file sharing (Recommended)** option.

Folder Options
General View File Types Offline Files
Folder views You can apply the view (such as Details or Tiles) that you are using for this folder to all folders. Apply to All Folders <u>R</u> eset All Folders
Advanced settings:
<ul> <li>Launch folder windows in a separate process</li> <li>Managing pairs of Web pages and folders</li> <li>Show and manage the pair as a single file</li> <li>Show both parts and manage them individually</li> <li>Show both parts but manage as a single file</li> <li>Remember each folder's view settings</li> <li>Restore previous folder windows at logon</li> <li>Show Control Panel in My Computer</li> <li>Show encrypted or compressed NTFS files in color</li> <li>Show pop-up description for folder and desktop items</li> <li>Use simple file sharing (Recommended)</li> </ul>
Restore <u>D</u> efaults
OK Cancel Apply



Go back to **My Computer** and right-click on "Sanvolume". Select **Properties**. Switch to the **Sharing** tab.

Sanvolume (J:) Properties
General Tools Hardware Sharing
You can share this folder with other users on your network. To enable sharing for this folder, click Share this folder.
C Do not share this folder
Share this folder
Share name: SFS
Comment: SFS Volume Sanvolume
User limit:
C Allow this number of users:
To set permissions for users who access this folder over the network, click Permissions.
To configure settings for offline access, click Caching Caching
N <u>e</u> w Share
OK Cancel Apply

Press the **Permissions** button.



Permissions for SFS window appears. Select **Everyone** and click **Remove**.

	<u>?</u> ×
A <u>d</u> d	<u>R</u> emove
Allow	Deny
	Add Allow V V

Press the **Add** button.



Select Users or Groups dialog appears.

Select Users or Groups	? ×
Select this object type:	
Users, Groups, or Built-in security principals	Object Types
From this location:	
WISHMASTER	Locations
Enter the object names to select ( <u>examples</u> ):	
	Check Names
Advanced OK	Cancel

Click the **Advanced...** button to continue.



Click **Find Now**. Press **Ctrl** button on your keyboard and click on all users you wish to have access to SFS volume.

Select Users or G	oups			? ×
Select this object ty	/pe:			
Users, Groups, or I	Built-in security princi	pals		Dbject Types
From this location:				
WISHMASTER				Locations
Common Queries	]			
N <u>a</u> me: s	Starts with 🔽			<u>Columns</u> Find <u>N</u> ow
Disabled ac	counts			Stop
	j password			
Days since last	logon:			
			OK	Cancel
Nexe (DDN)	la Caldar			
Name (RDN)				
Power Users	WISHMASTER			
Remote Desk	WISHMASTER			
Replicator	WISHMASTER			
🔮 root	WISHMASTER			
SERVICE				
🔊 SUPPORT_3	WISHMASTER			
🕵 SYSTEM				
🕵 TERMINAL S				
🕵 Users	WISHMASTER			
🛒 van	WISHMASTER			<b>.</b>



You return to the Select Users or Groups dialog.

Select Users or Groups	? ×
Select this object type:	
Users, Groups, or Built-in security principals	Object Types
Erom this location:	
WISHMASTER	Locations
Enter the object names to select ( <u>examples</u> ):	
WISHMASTER\root; WISHMASTER\van	<u>C</u> heck Names
Advanced OK	Cancel



For each user you can specify access type (Full control, Change, Read).

ermissions for SFS		?
Share Permissions		
<u>G</u> roup or user names:		
😰 root (WISHMASTER\root)		
🛛 🧕 🖸 van (WISHMASTER\van)		
1	[	1
	<u>Ad</u> d	<u>R</u> emove
Permissions for van	Allow	Deny
Full Control		
Change		
Change Read	2	
Change Read	N	
Change Read		
Change Read	N	
Change Read		
Change Read		

Press the **OK** button to continue.

Now you have shared volume that everyone can see in your network, but only SFS members have access to it.



### Conclusion

StarWind iSCSI Target and the DataPlow SFS allow you to have distributed SAN volume access. In this example two machines use SFSTools working thru the established iSCSI connection for concurrent access arbitration. You can easily expand this example by adding additional shared SAN volumes to one or more iSCSI targets and increase number of the client machines.



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