

DataCore[™] SANsymphony[™] and InfiniFlash[™] IF150 Platform Configuration Guide for iSCSI



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Introduction

This document provides a reference guide for configuring and tuning DataCore SANsymphony and the InfiniFlash IF150 platform for an iSCSI deployment. The guidance contained in this document is subject to change as SANsymphony and/or InfiniFlash firmware and drivers may be updated periodically. This is not a performance guide; rather it provides the general configuration and tuning options to deploy DataCore SANsymphony on the InfiniFlash IF150.

SANsymphony software, powered by DataCore Parallel I/O technology, provides a flexible platform for enterprise environments. From its inception, SANsymphony has been designed as a parallel storage software solution; it is uniquely able to scale due to its underlying hardware environment and to do so in both conventional storage topologies and in converged environments. By employing parallel processing, the software balances the load and better utilizes memory, compute, and storage resources to accelerate the I/O between the external workload and the storage subsystem. This parallel I/O architecture further enhances the system's ability to process intensive and mixed workloads typical of database and other transactional-oriented applications.

The InfiniFlash IF150 all-flash storage platform empowers medium and large-scale infrastructure and data centers to deliver massive capacity and throughput to address the demands of capacity workloads at scale without compromise. The IF150 enables the use of flash memory for primary and secondary storage with low total acquisition costs and extremely compelling total cost of ownership (TCO). InfiniFlash can be configured with up to 64 hot-swappable cards (devices), each providing 8TB of capacity in the current release. Together, the cards deliver up to half a petabyte (512TB) of raw flash storage in a 3U enclosure. InfiniFlash delivers a high performance, petabyte scale solution for virtualization, databases, or Big Data.

This guide is not an endorsement of DataCore SANsymphony by Western Digital Corporation, and no warranty of the product is either expressed or implied.

Reference Configuration

The reference configuration for this deployment is an iSCSI implementation with DataCore SANsymphony 10.0 PSP5 Update 1 and the InfiniFlash IF150. The DataCore SANsymphony controller hosts are configured in a high-availability (HA) configuration. The data pools are configured in a RAID 1 mirror across the two SANsymphony controllers with a dedicated 40Gbps Ethernet connection. Each data pool can contain one or more 8TB flash drives.

SANsymphony can be deployed on many commodity x86-64 server architectures and supports Fibre Channel (FC) and iSCSI, as well as NAS protocols such as NFS and SMB through Windows[®] File Services. The screenshots and configuration options in this guide are specific to the Dell[™] PowerEdge[™] R730 servers; other server installations may vary.

For more information about the hardware supported by DataCore SANsymphony, visit the <u>DataCore</u> <u>Support</u> website.

Deployment Topology

Figure 1) Deployment topology



Note: This paper is not a performance guide and no effort has been made to tune the configuration for optimal performance results.

Bill of Materials

Server Hardware

- 2 x Dell PowerEdge R730 client systems
- 2 x Dell PowerEdge R730 host servers
- Dell R730 PowerEdge server specifications:
 - 2 x Intel[®] Xeon[®] E5-2680 v3 CPUs
 - o 128GB DRAM

- 1 x Avago SAS 9300-8e 12G 2-port HBA
- 1 x Mellanox[®] ConnectX[®] -3 40GbE adapter
- o 1 x 1GbE NIC (management)
- Chipset driver 8H5MF_WN64 10.1.2.19 A05

Ethernet Network Switches

- 1 x 1GbE network management switch
- 1 x Brocade[®] VDX[®] 6940 40GbE network switch

InfiniFlash IF150 Configuration

- 1 x InfiniFlash IF150
- 64 x 8TB flash cards
- 4 x 12Gbps MiniSAS cables
- Z2 zoning configuration
- IF150 installer version 2.1.2.0.0.RC
- IF150 ifcli tool version 2.2.12

SANsymphony Host System

- Microsoft[®] Windows[®] 2012 R2
 - Microsoft Windows 2012 R2
 - o Microsoft recommended updates
 - DataCore recommended updates
 - https://support.microsoft.com/en-us/kb/3102997
 - http://support.microsoft.com/kb/2990170
 - http://support.microsoft.com/kb/2869606
 - https://support.microsoft.com/en-us/kb/3000850
 - Microsoft .NET Framework Version 4.6.1 Redistributable Package
 - Microsoft Visual C++ 2015 Redistributable Packages
- SANsymphony 10.0 PSP5, Update 1
 - DataCore Tuning Power Shell script
 - iSCSI-Settings_Helper_v1.3.ps1



BIOS Settings

Configure Dell iDRAC Network

Set the remote IP, gateway, and subnet mask in iDRAC to enable access to the remote console and click the **Apply** button.

Figure 2) iDRAC configuration

iDRAC Settings	IPv4 Settings	
	Attribute	Value
Update and Rollback	Enable IPv4	
Server Profile	DHCP Enable	
Sessions Hardware	Static IP Address	10.60.95.121
Storage	Static Gateway	10.60.94.1
ost OS	Static Subnet Mask	255.255.254.0
	Use DHCP to obtain DNS server addresses	
	Static Preferred DNS Server	8.8.8
	Static Alternate DNS Server	0.0.0

Memory Settings

The following memory settings provide tuning for performance and power efficiency. These can have a major impact on overall system performance, and are not generally considered power efficiency options. However, these selections can impact system performance and power.

Configure the following settings in the System BIOS:

Select System BIOS | Memory Settings and configure these options:

Memory Operating Mode \rightarrow Optimizer Mode

Node Interleaving \rightarrow Disabled

Figure 3) Memory configuration

System Setup	
System BIOS	
System BIOS Settings • Memory Settings	
System Memory Size	128 GB
System Memory Type	ECC DDR4
System Memory Speed	2133 Mhz
System Memory Voltage	1.20 V
Video Memory	16 MB
System Memory Testing	○ Enabled
Memory Operating Mode	Optimizer Mode
Node Interleaving	○ Enabled
Snoop Mode	● Early Snoop O Home Snoop

Processor Settings

Disable the following settings in the System BIOS:

• Select System BIOS | Processor Settings and set the following options:

Logical Processor \rightarrow Enabled

Virtualization Technology \rightarrow Enabled

Dell Contolled Turbo \rightarrow Disabled

Figure 4) Hyper-threading and virtualization configuration

System Setup		
System BIOS		
System BIOS Settings • Processor Settings		
Logical Processor	Enabled	O Disabled
QPI Speed	Maximum da	ta rate
Alternate RTID (Requestor Transaction ID) Setting	O Enabled	Disabled
Virtualization Technology	Enabled	O Disabled
Address Translation Services (ATS)	Enabled	

Figure 5) Disable Dell Controlled Turbo

System BIOS		
System BIOS Settings • Processor Settings		
Configurable TDP	Nominal	O Level 1
X2Apic Mode	O Enabled	Disabled
Dell Controlled Turbo	Disabled	
Number of Cores per Processor	All	
Processor 64-bit Support	Yes	

System Profile Settings

Select the following option in the System BIOS:

• Select System BIOS | System Profile Settings and set the following option:

System Profile \rightarrow Performance

C States \rightarrow Disabled (automatically disabled when Performance is selected)



Figure 6) CPU power management configuration

System Setup	
System BIOS	
System BIOS Settings . System Profile Settings	
System blob bettings - System Frome bettings	•
System Profile	Performance
System Profile CPU Power Management	Performance Maximum Performance

SATA Settings

Select the following option in the System BIOS:

Select System BIOS | SATA Settings and set the following option:
 Embedded SATA → AHCI Mode

Figure 7) SATA settings

System Setup
System BIOS
System BIOS Settings • SATA Settings
Embedded SATA

Operating System Configuration

The clients and DataCore servers are running Windows Server 2012 R2 with all recommended Windows Server 2012 R2 updates, as of the date of publishing.

The following hotfixes have been installed as recommended by DataCore:

- https://support.microsoft.com/en-us/kb/3102997
- <u>http://support.microsoft.com/kb/2990170</u>
- <u>http://support.microsoft.com/kb/2869606</u>
- https://support.microsoft.com/en-us/kb/3000850

The following packages have been installed as required by DataCore:

- <u>Microsoft .NET Framework Version 4.6.1 Redistributable Package</u>
- Microsoft Visual C++ 2015 Redistributable Packages

Windows Power Plan

To ensure the Windows Server is providing the maximum performance, set the Windows Power Plan to High Performance.

Figure	8)	Windows	power	plan
--------	----	---------	-------	------

\$		Control Panel\System and Security\Power Options	_ D X
¢	🕑 💿 🔹 🕇 🝃 🕨 Control Pan	el 🕨 System and Security 🕨 Power Options 🛛 🗸 🖒	Search Control Panel 🔎
	Control Panel Home	Choose or customize a power plan	Ø
	Choose what the power button does	A power plan is a collection of hardware and system settings (like disp manages how your computer uses power. <u>Tell me more about power</u>	lay brightness, sleep, etc.) that <u>plans</u>
	Create a power plan	Preferred plans	
P	Choose when to turn off the display	 Balanced (recommended) Automatically balances performance with energy consumption 	Change plan settings on capable hardware.
		Itigh performance Favors performance, but may use more energy.	Change plan settings
	See also User Accounts	Show additional plans	

Chipset Firmware

Verify the Chipset firmware is functioning correctly in the Windows Device Manager. This deployment uses the Dell Chipset driver from the Dell Support site at http://www.dell.com/support/home/us/en/04/Drivers/DriversDetails?driverId=6DK2N.



Networking Configuration

Time Server

Configuring Network Time Protocol (NTP) is recommended for all hosts to ensure the system clocks are synchronized. System clocks which are not synchronized may cause debugging and authentication issues. In Windows Server 2012 R2, NTP can be configured in the Windows PowerShell[™] using the w32tm command. After configuring the NTP servers, restart the w32time service.

```
PS C:\DataCore> w32tm /config /manualpeerlist:"0.pool.ntp.org 1.pool.ntp.org"
/syncfromflags:MANUAL
The command completed successfully.
PS C:\DataCore> stop-service w32time
PS C:\DataCore> start-service w32time
```

IP Addressing

For this deployment, management and data network IP addresses, netmask, and routing are set using a DHCP server. Configuration of DHCP is outside the scope of this document. Note: Management and data network addresses should be on different network IP ranges.

DNS/Hostname

Hostnames are configured during system installation and must be DNS resolvable.

NIC Bonding

NIC bonding is not configured in this deployment.

iSCSI Port Naming

To allow easy identification of the iSCSI ports, a recommended best practice is to rename the ports for each connection. The name should include the hostname and function. For example:

- DataCore 1 Management: tme-sj-s21-mgmt
- DataCore 2 Management: tme-sj-22-mgmt
- Client 1 iSCSI Initiator: tme-sj-23-initiator
- Client 2 iSCSI Initiator: tme-sj-24-initiator
- DataCore 1 iSCSI Target: tme-sj-s21-target
- DataCore 2 iSCSI Target: tme-sj-s22-target
- DataCore 1 iSCSI Mirror: tme-sj-s21-mirror
- DataCore 2 iSCSI Mirror: tme-sj-s22-mirror

SanDisk*

HBA Configuration

The Avago 9300-8e HBA firmware and BIOS versions are configured as follows:

Туре	Title	Version
BIOS	SAS3_UEFI_BSD_P12	13.0
Driver	LSI_SAS3.SYS	2.50.65.01
Firmware	Installer_P12_for_MSDOS_and_Windows	13.0
Management Tools	SAS3IRCU for SAS3 Controller	13.0

To download the Avago 9300-8e HBA firmware, BIOS, and drivers:

- Firmware and BIOS downloads: Avago Support website
- Driver download: Avago Support website

Note: Occasionally, the latest Avago 9300-8e HBA drivers do not install correctly on Windows Server 2012 R2. If this happens, use an earlier version of the driver (i.e. 2.50.65.01).

Upgrading the BIOS

The command-line instruction to flash the IT UEFI SAS3 BSD HII driver is:

sas3flash -c <n> -b mpt3x64.rom

where <n> is the controller number (starting with zero (0)).

```
C:\DataCore> sas3flash.exe -c 0 -b mpt3x64.rom
Avago Technologies SAS3 Flash Utility
Version 13.00.00.00 (2016.03.07)
Copyright 2008-2016 Avago Technologies. All rights reserved.
        Adapter Selected is a Avago SAS: SAS3008(CO)
        Executing Operation: Flash BIOS Image
                Validating BIOS Image...
                BIOS Header Signature is Valid
                BIOS Image has a Valid Checksum.
                BIOS PCI Structure Signature Valid.
                BIOS Image Compatible with the SAS Controller.
                Attempting to Flash BIOS Image...
                Verifying Download...
                Flash BIOS Image Successful.
        Finished Processing Commands Successfully.
        Exiting SAS3Flash.
```



Upgrading the Driver

This procedure installs or upgrades the lsi_sas3.sys driver for the Windows Server 2012 R2 system.

Note: When an Avago SAS Gen3 adapter is added to an existing system installation, the new adapter is automatically detected at the next reboot. When the **Update Driver Software Wizard** appears at boot, continue from step 8 below.

- 1. Boot Windows 2012R2 and logon as a user that has Administrator privileges.
- 2. Start the Device Manager.
- 3. Click the **arrow** to the left of the Storage Controllers line. Find the adapter desired for the driver upgrade and **double-click the entry**. Click on the **Driver** tab.
- 4. Click on the **Update Driver** button to update existing driver. The Update Driver Software wizard begins.
- 5. Click on the Browse my computer for driver software selection.
- 6. Click on the Let me pick... selection at the bottom of the window.
- 7. Click on the **Have Disk** button and type the path to the driver, or click on the **Browse** button. Select the location for the driver package which matches the processor architecture of the system (x86). After the path to the driver has been established, click the **OK** button.
- 8. Select the driver from the list and click on the **Next** button.
- 9. The system will load the driver from the driver package media.
- 10. Click **Yes** to continue the installation.
 - The system copies the driver to the system disk. For any adapter other than the boot adapter, the updated driver will become active immediately. For the boot adapter, a message displays indicating that you must reboot your system for the new driver to take effect.
- 11. Click on the **Close** button to complete the driver upgrade.

HBA BIOS Settings

The following settings are configured on the Avago 9300-8e SAS HBA.

BIOS Interrupt 13 Configuration

Set the Interrupt value for each HBA BIOS adapter either to 0 or 1. If this is not done, the host may hang when rebooted.

To set the Interrupt value perform the following steps:

At boot time, press **Ctrl+C** to run the SAS Configuration Utility and press Enter.

Select the SAS8300-16e HBA card and press Enter.

SanDisk*

Note: Each SAS HBA card must be configured separately.

Figure 9) SAS configuration utility

Avago Technologies Adapter List Globa	Config 1 Prope	Utilit erties	:y	∨8.2	29.00.00	(2016.	03.08)		
Adapter SAS9300-16e SAS9300-16e	PCI P Bus D 06 C	CI PO lev Fi 90 00	I PC IC S1 FF FF	I FW ot 12	J Revisi	01 00-IT 00-IT	Status Enabled	Boot Order 0	
3133300-100	00 0	0 00		14		00-11	LIADICU	1	
Esc = Exit Menu	F1/S	Shift+1	L = He	10					
Alt+N = Global Prop	erties	-/+ =	Alte	r Boot	Order	Ins/De	l = Alter	Boot	List

Select Advanced Adapter Properties and press Enter.

Figure 10) Advanced adapter properties

Avago Technologies Config Uti Adapter Properties SAS3008	lity v8.29.00.00 (2016.03.08)
Adapter PCI Slot MPT Firmware Revisio Package Version SAS Address NVDATA Version Status Boot Order Boot Support SAS Topology Advanced Adapter Pre	SAS9300-16e FF 0.00.00.00 500605B0:0B0CED90 0B.02.00.08 Enabled 0 IEnabled BIOS & OSI
Esc = Exit Menu F1/Shift Enter = Select Item -/+/Ente	t+1 = Help er = Change Item

Select Advanced Device Properties and press Enter.



Figure 11) Advanced device properties

Avago Technologies Config Utility Advanced Adapter Properties SAS3008	v8.29.00.00 (2016.03.08)
IRQ NVM IO Port Address Chip Revision ID Advanced Device Properties Adapter Timing Properties Advanced Port Properties	0F Yes 3000 02
Esc = Exit Menu F1/Shift+1 = Hel Enter = Select Item -/+/Enter = Chan	p ge Item

Set the Maximum INT 13 Devices for this Adapter to either **0** or **1**.

Figure 12) Setting Maximum INT 13

Avago Technologies Config Utility v8.29.00.00 (Advanced Device Properties SAS3008	2016.03.08)
Maximum INT 13 Devices for this Adapter	1
IO Timeout for Block Devices IO Timeout for Block Devices(Removable) IO Timeout for Sequential Devices IO Timeout for Other Devices Start Stop Unit Timeout	10 10 10 10
LUNs to Scan for Block Devices LUNs to Scan for Block Devices(Removable) LUNs to Scan for Sequential Devices LUNs to Scan for Other Devices	[A11] [A11] [A11] [A11] [A11]
Removable Media Support	[None]
Restore Defaults	
Esc = Exit Menu F1/Shift+1 = Help Enter = Select Item -/+/Enter = Change Item	

Return to the first screen of the SAS Configuration Utility and select **Save changes then exit this menu** and press **Enter**.

SanDisk*

Figure 13) Saving adapter changes

Avago	Technologies	Config Utility	v8.29.00.00 (2016.03.08)
		Adapter and/or	• device property changes have been made.
		Cancel Exit Save changes Discard chang	then exit this menu les then exit this menu
		Exit the Conf	iguration utility and keboot
Esc =	Exit Menu	F1/Shift+1 =	Help



Set the Maximum Queue Depth

For this deployment, the maximum queue depth has been set to 64. This value works well for a wide variety of workloads. The queue depth for this deployment has been configured using the Windows Driver Configuration Utility (WDCFG) for the Avago 9300-8e HBA.

To set the maximum queue depth with the WDCFG utility, run the wdcfg -s MaxSASQueueDepth command.

```
C:\DataCore> wdcfg -s MaxSASQueueDepth=64
LSI Windows Host Driver Configuration Utility (wdcfg)
Version 2.00.17.01, Built Jun 26 2013 11:43:02
Snapshot Before Changes:
MaxSASQueueDepth = 254
Snapshot After Changes:
MaxSASQueueDepth = 64
Config Params in Snapshot Updated to specified values
```

After setting the MaxSASQueueDepth parameter value, the new driver configuration must be activated with the wdcfg -a command.

```
C:\DataCore> wdcfg -a
LSI Windows Host Driver Configuration Utility (wdcfg)
Version 2.00.17.01, Built Jun 26 2013 11:43:02
DRIVER HAS NOT BEEN RESTARTED. RESTART DRIVER TO MAKE CHANGES ACTIVE.
Current snapshot activated to driver LSI_SAS3
```

Finally, the HBA driver must be disabled and re-enabled to load the new configuration. From the Device Manager, **select** the LSI Adapter in Storage Controllers. **Right-click** the LSI Adapter and select **Disable**. After disabling the LSI adapter, **right-click** the LSI adapter and select **Enable**.

Figure 14) HBA driver restart

Bevice Manager
File Action View Help
⊿ 📇 TME-SJ-S21
Description of the second s
DataCore Fibre-Channel Adapters
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Ports (COM & LPT)
Print queues
Processors
⊿
LSI Adapter, SAS3 3008 Fury -StorPort
LSI Adapter, SAS3 3008 Fury -StorPort
Microsoft iSCSI Initiator

To view the current configuration, enter the wdcfg -q h command.



History Stack Index: 2 PlaceHolder = 0

For more information about the Windows Driver Configuration Utility, review the Windows Driver Configuration Utility (WDCFG) User Guide included with the installation driver.

Multipathing

Client Multipathing

Multipathing I/O (MPIO) for the client initiator hosts is configured using DataCore's Windows Integration Kit. The kit provides an improved MPIO driver that enables advanced updates to the SANsymphony user interface. The Windows Integration Kit is available on the <u>DataCore Support</u> website.

DataCore Multipathing

Multipath I/O (MPIO) for the SANsymphony hosts is configured in the Windows Server Manager. After starting the Server Manager, select the **Manage** menu and choose **Add Roles and Features**. Click **Next** until reaching the Select Features window. Scroll down the list of features and **select Multipath I/O**.



Figure 15) Client multipathing

InfiniFlash IF150 Configuration

InfiniFlash Cabling

This deployment uses an A2 cabling configuration:

Figure 16) InfiniFlash cabling configuration



IFCLI Installation

For this configuration, the system has been installed with the IF150 Windows 2.1.2.0.0-IF-150-rc software binaries. Download the IF150 ifcli.exe, firmware binary, and the zone package file from the InfiniFlash support webpage at <u>https://link.sandisk.com</u>:

- Ifcli.exe
- 2.1.2.0.0.RC.bin
- InfiniFlashZoneCnf_01.11.zpkg

Download all three files and transfer them to the DataCore server.

Note: The hash after 'SanDisk-bundle-' is unique for each download.

InfiniFlash Firmware Level

Below are the firmware versions for the IF150 2.1.2.0.0 RC release:

Element	Firmware	BootCode	PCU Boot	PCU FW	ISTR
HSE	A01A	BC04	NA	NA	1008
DSE	A01A	BC04	NA	NA	1008
FPGA	1.00.023D	NA	NA	NA	NA
Drive	62EL	NA	FD4E	FD4E	NA

To validate the IF150 firmware version, run the ifcli encl0 version command. If necessary, update the firmware of the InfiniFlash to the appropriate version.

C:\DataCore> ifcli SanDisk ifcli versi Copyright (C) 2016 08/23/2016 17:19:1	encl0 version on 2.2.12 SanDisk 8				
Enclosure : encl0					
Element	Firmware Version	BootCode Version	PCU Boot Version	PCU FW Version	ISTRVersion
encl0/hse0	A01A	BC04	NA	NA	1008
encl0/hse1	A01A	BC04	NA	NA	I008
encl0/hse0/d1	A01A	BC04	NA	NA	1008
encl0/hse0/d3	A01A	BC04	NA	NA	I008
encl0/hse1/d0	A01A	BC04	NA	NA	1008
encl0/hse1/d2	A01A	BC04	NA	NA	1008
FPGA 0	1.00.023D	NA	NA	NA	NA
FPGA 1	1.00.023D	NA	NA	NA	NA
encl0/slot0/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot1/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot4/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot5/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot8/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot9/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot12/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot13/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot16/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot17/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot20/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot21/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot24/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot25/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot28/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot29/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot33/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot34/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot35/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot38/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot39/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot42/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot43/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot46/drive	62EL	NA	FD4E	FD4E	NA
encl0/slot4//drive	62EL	NA	FD4E	FD4E	NA
encl0/slot50/drive	62EL	NA	FD4E	FD4E	NA
enclU/slot51/drive	62EL	NA	FD4E	FD4E	NA
enclU/slot53/drive	62EL	NA	FD4E	FD4 E	NA
enclU/slot56/drive	62EL	NA	FD4E	FD4E	NA
enclU/slot5//drive	62EL	NA	FD4E	FD4E	NA
enclu/slot60/drive	62EL CORI	NA	FD4E	FD4E PD4E	NA
enciu/siotoi/drive	02EL	NA	FD4E	FD4E	NA
Warning: Unable to device(s) Command Executed Su	access one or more	drives because of	zoning or drive r	eservation or of	fline/blocked

Note: If the IF150 enclosure was previously assigned a zone configuration, the firmware version of the drives must be checked for each host.

SanDisk*

Updating the IF150 firmware is performed with the ifcli encl0 update command. This command must be completed on each server host connected to the IF150. After executing the firmware update on all hosts, reboot the InfiniFlash IF150.

C:\DataCore> ifcli SanDisk ifcli versi Copyright (C) 2016 08/23/2016 17:39:1	encl0 version on 2.2.12 SanDisk 8					
Enclosure Enclosure Logical Compatible Enclosure Power C Update needed from Enclosure State	: end : 500 : Yes : Yes : Yes : OK					
Element Power Cycle?	Туре	Upgradable	Current Ver	New Ver	OS Device Name	IO Suspend?
encl0/hse0	ISTR	Updateable	1006	I007	/dev/sg2	No
encl0/hse0	BootCode	NotRequired	BC04	BC04	/dev/sg2	No
encl0/hse0	Firmware	Updateable	A017	A018	/dev/sg2	No
encl0/hsel	ISTR	Unreachable	I006	1007	NA	No
encl0/hse1	BootCode	NotRequired	BC04	BC04	NA	No
encl0/hse1	Firmware	Unreachable	A017	A018	NA	No
encl0/hse0/d1	ISTR	Updateable	1006	I007	/dev/sg3	No
encl0/hse0/d1	BootCode	NotRequired	BC04	BC04	/dev/sg3	No
encl0/hse0/d1	Firmware	Updateable	A017	A018	/dev/sg3	No
encl0/hse0/d3	ISTR	Updateable	1006	I007	/dev/sg10	No
encl0/hse0/d3	BootCode	NotRequired	BC04	BC04	/dev/sg10	No
encl0/hse0/d3	Firmware	Updateable	A017	A018	/dev/sg10	No
encl0/hse1/d0	ISTR	Unreachable	1006	I007	NA	No
encl0/hse1/d0	BootCode	NotRequired	BC04	BC04	NA	No
encl0/hse1/d0	Firmware	Unreachable	A017	A018	NA	No
encl0/hse1/d2	ISTR	Unreachable	1006	1007	NA	No
encl0/hse1/d2	BootCode	NotRequired	BC04	BC04	NA	No
encl0/hse1/d2	Firmware	Unreachable	A017	A018	NA	No
encl0	FPGA	NotRequired	1.00.023D	1.00.023D	NA	No
encl0/slot36/drive	PCUBootCode	Updateable	6AC0	7EC0	/dev/sdf	Yes
encl0/slot36/drive	PCUFirmware	Updateable	6AC0	7EC0	/dev/sdf	Yes
encl0/slot36/drive No	Firmware	NotRequired	62EL	62EL	/dev/sdf	No



encl0/slot37/drive	PCUBootCode	Updateable	6AC0	7EC0	/dev/sdh	Yes
Yes	DCIIFirmuaro	Undatable	610	750	/dour/adh	Yog
Yes	rcorilliwale	opuaceabie	OACO	/ECU	/dev/sui	162
encl0/slot37/drive No	Firmware	NotRequired	62EL	62EL	/dev/sdh	No
encl0/slot54/drive Yes	PCUBootCode	Updateable	6AC0	7EC0	/dev/sdg	Yes
encl0/slot54/drive	PCUFirmware	Updateable	6AC0	7EC0	/dev/sdg	Yes
encl0/slot54/drive	Firmware	NotRequired	62EL	62EL	/dev/sdg	No
encl0/slot58/drive	PCUBootCode	Updateable	6AC0	7EC0	/dev/sde	Yes
encl0/slot58/drive	PCUFirmware	Updateable	6AC0	7EC0	/dev/sde	Yes
encl0/slot58/drive	Firmware	NotRequired	62EL	62EL	/dev/sde	No
encl0/slot59/drive	PCUBootCode	Updateable	6AC0	7EC0	/dev/sdc	Yes
encl0/slot59/drive	PCUFirmware	Updateable	6AC0	7EC0	/dev/sdc	Yes
encl0/slot59/drive	Firmware	NotRequired	62EL	62EL	/dev/sdc	No
encl0/slot62/drive	PCUBootCode	Updateable	6AC0	7EC0	/dev/sdb	Yes
encl0/slot62/drive	PCUFirmware	Updateable	6AC0	7EC0	/dev/sdb	Yes
encl0/slot62/drive	Firmware	NotRequired	62EL	62EL	/dev/sdb	No
encl0/slot63/drive	PCUBootCode	Updateable	6AC0	7EC0	/dev/sdd	Yes
encl0/slot63/drive	PCUFirmware	Updateable	6AC0	7EC0	/dev/sdd	Yes
encl0/slot63/drive No	Firmware	NotRequired	62EL	62EL	/dev/sdd	No
Warning:						
One or more element Enclosure may move until those element	s are not con into reduced s are updated	nected to thi functionality through ifcl	s host mode after u i from remote	pdate host		
Warning: Unable to access one or more drives because of zoning or drive reservation or offline/blocked device(s)						
CAUTION: After update operation enclosure needs to be power cycled.						
Do you want to continue?(Y/N): ${f y}$						
Update for encl0						
encl0 : Update succ encl0 : Update : Dr	essfully init	iated. Code Update s	tarted			
encl0 : Update : 0%	completed	code opdace o	carcea			
encl0 : Update : Dr	ive PCU Boot	Code Update f	inished			
encl0 : Update : Dr encl0 : Update : 11	% completed	poate started				
encl0 : Update : Dr	ive PCU F/W U	pdate finishe	d			
encl0 : Update : 22	% completed	Undated				
encl0 : Update : 33	<pre>% completed</pre>	opualeu				
encl0 : Update : en	cl0/hse0/d3:I	STR Updated				
<pre>encl0 : Update : 44 encl0 : Update : en</pre>	% completed cl0/hse0/d1:⊺	STR Updated				
1		- · · · · · · ·				



enc10	:	Update	:	55% completed
encl0	:	Update	:	encl0/hse0/d3:Firmware Updated
encl0	:	Update	:	66% completed
encl0	:	Update	:	encl0/hse0/d1:Firmware Updated
encl0	:	Update	:	77% completed
encl0	:	Update	:	encl0/hse0:Firmware Updated
encl0	:	Update	:	88% completed
encl0	:	Update	:	Reset done for updated SEB(s)
encl0	:	Update	:	Update completed
encl0	:	Update	:	100% completed
encl0	:	Update	С	ompleted successfully.
Power	C	ycle for	<u> </u>	encl0 to complete update.
Commar	nd	Execute	ed	Successfully.

To reboot the IF150, enter the ifcli encl reboot command. Enter y to confirm and initiate the reboot process.

InfiniFlash Zone Configuration

This deployment uses a Z2 zoning configuration for the A2 cabling. Use the *ifcli* zone command to set the zoning. Reboot the IF150 after configuring the zone.

```
C:\DataCore> ifcli zone -e encl0 -o update -p InfiniFlashZoneCnf_01.11.zpkg -n Z2
SanDisk ifcli version 2.2.12
Copyright (C) 2016 SanDisk
08/23/2016 17:57:34
Zone configuration updated.
NOTE:Enclosure power cycle is required for the change to take effect.
Command Executed Successfully.
```

After rebooting the IF150, verify the zoning configuration using the ifcli encl0 show command.

```
C:\DataCore> ifcli encl0 show
SanDisk ifcli version 2.2.12
Copyright (C) 2016 SanDisk
08/23/2016 18:02:08
DeviceName State Identify Vendor ProductID ZoneName
```



encl0 OK OFF SANDISK SDIFHS02 Z2 Command Executed Successfully.

Create Support Bundle

In order to expedite troubleshooting of any issues that may occur after deployment of the IF150, it is recommended to create a baseline support bundle. For easier reading, the baseline support bundle should be renamed to a user-friendly name. To create a support bundle, enter the following command: ifcli encl0 createSub.

```
C:\DataCore> ifcli encl0 createSub -p .
SanDisk ifcli version 2.2.12
Copyright (C) 2016 SanDisk
08/23/2016 18:25:16
Creating support bundle for encl0 (for all accessible SEBs, drives from present host)
                                        _____
encl0 : createSUB started successfully.
encl0 : createSUB : Opening all SES targets
encl0 : createSUB : 16% completed
encl0 : createSUB : 41% completed
encl0 : createSUB : 50% completed
encl0 : createSUB : Completed reading SES Pages, opening drives
encl0 : createSUB : 60% completed
encl0 : createSUB : Collected information from all attached drives
encl0 : createSUB : 80% completed
encl0 : createSUB : Archiving completed
encl0 : createSUB : 100% completed
encl0 : createSUB completed successfully.
Support Archive File Name : .\TME-SJ-S22 5001E82000071540 08232016 182545.zip
Command Executed Successfully
```

DataCore Configuration

Pre-Installation Guidance

DataCore provides an easy-to-use installation wizard for SANsymphony. Prior to running the tool, disable the following Microsoft Windows features. These adversely affect the fundamental storage operations in SANsymphony's software:

- Storage spaces pools with virtual volumes
- iSCSI target volumes

A DataCore recommended best practice is to run the following command on the SANsymphony host systems. This allows faster formatting of large drives and the setting is persistent.

fsutil behavior set DisableDeleteNotify 1



Installing DataCore SANsymphony

The DataCore Deployment Wizard can be requested for download from the DataCore website at <u>https://www.datacore.com/products/SANsymphony.aspx</u>.

For an iSCSI deployment, ensure the Microsoft iSCSI Initiator feature is enabled in the Windows operating system.

The DataCore Deployment Wizard must be run on each host and performs the following actions:

- 1. Validates the host system meets the prerequisites
 - a. Windows Power Shell version 2.0 or higher
 - b. .NET Framework
 - c. Windows Server version
 - d. Hardware configuration
- 2. Installation of the SANsymphony software

Figure 17) DataCore SANsymphony Deployment Wizard

%				10.60.94.120 -	. <u> </u>	_ = ×
D	ataCore™ Data			ant Wirard		About Release Notes
V so	JFTWARE Data	TOLE DE	pioyine	ant wizaru		Getting Started
Start Server (Che Inst Complet	One ok Prerequisites tallation te	Check prereq	uisites for i	installation reck on this server. his server meets the mphony software.	1 23 4	
					Ne	ext > Exit
Installation Ste	2p		Status	Details	Step Started	Step Completed
Serv	√er One					
-	Prerequisites					
	Get Server Configuration		Passed	Server: TME-SJ-S21	8/15/2016 2:04:49 PM	8/15/2016 2:04:49 PM
-	Software					
	Windows PowerShell version 2.	2.0 or higher	Passed	Found: 2.0, 4.0	8/15/2016 2:04:49 PM	8/15/2016 2:04:49 PM
	.NET Framework		Passed		8/15/2016 2:04:49 PM	8/15/2016 2:04:49 PM
	Windows Server 2008 K2 SP1 6	or higher	Passed	Found: Windows Server 2012 R2, StandardEVaiua	8/15/2016 2:04:49 PM	8/15/2016 2:04:49 PM
	Hardware					
	2 CPUs		Passed	- 1 to could h	8/15/2016 2:04:49 PM	S / F / SS F S S A 40 DM
	* C C C C AM			Found: 48 CPU(s)	- 11- 100 4 C 0-0 4- 40 DM	8/15/2016 2:04:49 PM
	8 GB RAM		Passed	Found: 48 CPU(s) Required: 8.0 GB. Found: 128.0 GB	8/15/2016 2:04:49 PM	8/15/2016 2:04:49 PM 8/15/2016 2:04:49 PM
	 ✓ 8 GB RAM ✓ 20 GB available on C:\ 		Passed Passed	Found: 48 CPU(s) Required: 8.0 GB. Found: 128.0 GB Found: 201.1 GB	8/15/2016 2:04:49 PM 8/15/2016 2:04:49 PM	8/15/2016 2:04:49 PM 8/15/2016 2:04:49 PM 8/15/2016 2:04:49 PM
•	8 GB RAM 20 GB available on C:\ Setup		Passed Passed	Found: 48 CPU(s) Required: 8.0 GB. Found: 128.0 GB Found: 201.1 GB	8/15/2016 2:04:49 PM 8/15/2016 2:04:49 PM	8/15/2016 2:04:49 PM 8/15/2016 2:04:49 PM 8/15/2016 2:04:49 PM



Licensing SANsymphony

Licenses can be added during installation from the deployment wizard, or after installation from the SANsymphony user interface. To add a license, click **Server Group | License | Activate Product Keys**. Enter the license keys and click **Next**.

- :	101	A	CAN		In	1:	1
Figure	18)	Activate	SAINS	утр	nony i	license	кеуѕ

Alerts Users Rol	les Log Messages -H Server Group	×		×
	Server Group Server Group			Edit
Settinos DataCore	Servers License Performance Eve	nts		
Activate Produc	t Kevs			
Choose the appropriat used for future commu	te activation method and enter the purchase unications.	d product keys one	by one. Additional fields may appear depending on the type of product key provided. The contact information will be	
Contact Information	1			•
Contact name:		Email address:		
Phone number:		Company name:		
License Product Key	/S			
	XXXXX-XXXXX-XXXXX-XXXXX-CO27C	1	TMF-S1-S21	
			TME-51-522	
	XXXXX-XXXXX-XXXXX-D00O8	,	136 [^] TBs	
	XXXXX-XXXXX-XXXXX-LJSH0	,	3 ^ TBs	
				_
			< Back Next >	Cancel

For more detailed installation instructions, see the <u>Getting Started with SANsymphony</u> support webpage on DataCore Support.

SANsymphony iSCSI Settings

DataCore provides a Windows Power Shell script to assist with tuning SANsymphony and the iSCSI configuration settings. The script performs the following actions:

- Disables scheduled disk defragmentation
- Sets the Windows Power Plan to High Performance
- Creates the iSCSI Net Transport Filter
- Disables the power saving functionality on each NIC
- Disables all protocols other than IPv4 on adaptor(s)
- Disables NAGLE and DELAYED ACK on adaptor(s)
- Disables WINS lookup on adaptor(s)
- Disables DNS Registration on adaptor(s)
- Disables SR-IOV on adaptor(s)
- Sets the following NETSH parameter options

SanDisk

- Enables Receive-Side Scaling State
- Disables Chimney Offload State
- Disables NetDMA State
- Disables Direct Cache Access
- o Sets the Receive Window Auto-Tuning Level to NORMAL
- Disables ECN Capability
- o Disables RFC 1323 Timestamps
- Sets the Initial RTO to 3000ms
- o Enables Receive Segment Coalescing State
- Disables Non-Sack RTT Resiliency
- Sets the Max SYN Retransmissions to 2
- Sets the Custom TCP/IP Template Settings
- o Sets the Optimal I/O Cache Queue Parameters

SANsymphony iSCSI Power Shell Script

To execute the iSCSI Settings Helper 1.3 PowerShell script, run the iSCSI-Settings_Helper_v1.3.ps1 script at the Power Shell prompt:

```
PS C:\DataCore\iSCSI-Settings Helper v1.3> .\iSCSI-Settings Helper v1.3.ps1
>>>>>----- SCRIPT START -----<
Setting Windows Global Settings
         Disabling Scheduled Defrag Task
TaskPath
                                              TaskName
                                                                               State
_____
                                              _____
\Microsoft\Windows\Defrag\
                                              ScheduledDefrag
                                                                               Disabled
Setting Windows Power Plan to >High performance<
    success
Creating iSCSI Net Transport Filter
Caption
                       :
Description
                       :
ElementName
                       :
InstanceID
CommunicationStatus
                       :
DetailedStatus
                       :
HealthState
InstallDate
                      :
Name
                       : Nk~kmox~o|55@55=<@:55=<@:55:55@??=?554
OperatingStatus
OperationalStatus
                       :
PrimaryStatus
                       :
Status
StatusDescriptions
                       :
CreationClassName
IsNegated
SystemCreationClassName :
SystemName
DestinationPrefix
```



: 3260 LocalPortEnd LocalPortStart : 3260 Protocol : TCP : 65535 RemotePortEnd RemotePortStart : 0 : Datacenter SettingName PSComputerName : success Disable powersaving functionality on each NIC success Setting individual adapters settings Disabling protocols other than IPv4 on adapter(s) Disabling NAGLE and DELAYED ACK on adapter(s) Disabling WINS lookup on adapter(s) Disabling DNS Registration on adapter(s) Disabling SR-IOV on adapter(s) Setting NETSH Parameters Enabling Receive-Side Scaling State: Ok. Disabling Chimney Offload State: Ok. Disabling NetDMA State: Ok. Disabling Direct Cache Access: Ok. Setting Receive Window Auto-Tuning Level to NORMAL: Ok. Disabling ECN Capability: Ok. Disabling RFC 1323 Timestamps: Ok. Setting Initial RTO to 3000ms: Ok. Enabling Receive Segment Coalescing State: Ok. Disabling Non-Sack RTT Resiliency: Ok. Setting Max SYN Retransmissions to 2: Ok. Setting Custom TCP/IP Template Settings: Ok. Setting Optimal IO Cache Queue Parameters: Ok. Ok. False Ok. NO SCRIPT ERRORS DETECTED >>>>----- SCRIPT END -----<<<<< Press Enter to Finish:



Configuring DataCore SANsymphony

Join the DataCore Servers

After installing and licensing the SANsymphony hosts, the next step is to add the DataCore Servers to the Server Group. Select the Server Group menu item and click **Add DataCore Server**. Enter the IP address of each SANsymphony host and then click **Add** to join the DataCore server.

Configure the iSCSI Port Rules

Each iSCSI connection must be configured as a front-end data connection, a mirror connection, or both. To set the iSCSI port rules, select **iSCSI connection** in the Server Ports menu item, and then click the **Settings** tab.

Figure 19) Configure iSCSI port rules

	DataCore™ Management Console Not-for-resale license (348 days remaining)
Hame Common Actions iS	CST Back Actions
Virtual Disk Pools Hosts Storage Vir	hual Disk. System Live Performance Recorded Tasks Reports Event Alerts Repet Lisers Roles Help
Disks Profiles Te	mplates Health Performance - Log Layout
Lists	Diagnostics Layout Security Help
Server Group Connections 🗖 🕂 🗙	Getting Started 🛛 System Health 🗋 Log Messages 🗍 Alerts 🗍 Roles 🗍 Virtual Disks 🗋 Disk Pools 🔤 🚧 X3 Mirror - S21 on TME-SJ-S21 💌
Server Group - (localhost)	SCSI Port X3 Mirror - 521
Connect to Server Group	
DataCore Servers 🖽 4 🗙	IQN: ign.2000-08.com.datacore:tme-sj-s21-1
Physical Disks	IP address: 172.16.1.121
A DataCore Disks	DataCore Server: TME-SJ-S21
🕀 🚍 Virtual Disks	Role: Mirror
🕀 🍰 Disk Pools	Description:
🖃 🥔 Server Ports	Info Settings Authentication Remote Ports Virtual Disks Performance Events
A Loopback Port 1	General Settings
Loopback Port 2	
Loopback Port 3	Role: Front-end Mirror
Loopback Port 5	TCP port: 3260
S Loopback Port 6	Max outstanding target commands: 256
👻 management	
Microsoft iSCSI Ini	Advanced Options
X3 Mirror - S21 [MR]	
X3 target - S21 [FE]	Apply Cancel
🗄 🚺 TME-5J-522	
Hosts 🗂 🛱 🗙	
😑 🙀 tme-sj-s23	
🕀 🔁 Virtual Disks	
🕀 🛷 Server Ports	
🖃 🎆 tme-sj-s24	
The Virtual Disks A Server Ports	Operations
Coopback Port 5 Loopback Port 6 management Microsoft ISCSI Ini X3 Mircor • S21 [MR] X3 target • S21 [FE] THE-SJ-S22 Hosts Microsoft ISCS Microsoft ISCS Withal Disks Server Ports Virtual Disks Virtual Disks Server Ports Virtual Disks Server Ports	Apply Cancel Operations Operations

Configuring iSCSI Storage Connection

Create the iSCSI connection between the client hosts and the DataCore SANsymphony hosts. Configuring the iSCSI path is beyond the scope of this document.

For more information, see the Microsoft iSCSI Initiator Step-by-Step Guide on TechNet.



For more information on the SANsymphony iSCSI Best Practices, visit the DataCore support website at <u>http://datacore.custhelp.com/app/answers/detail/a_id/1626</u>.

Create the iSCSI Mirror Connection

Configure the iSCSI mirror connection between the two DataCore hosts. The mirror connection is a bidirectional path:

- DataCore (1) iSCSI initiator to DataCore (2) iSCSI target
- DataCore (2) iSCSI initiator to DataCore (1) iSCSI target

For more information, see the Microsoft iSCSI Initiator Step-by-Step Guide on TechNet.

For more information on the SANsymphony iSCSI Best Practices, visit the DataCore support website at <u>http://datacore.custhelp.com/app/answers/detail/a_id/1626</u>.

Create Disk Pools

Each SANsymphony host must have a disk pool which contains the disks to mirror with the HA partner.

The disk pools in this example are configured as follows:

- Disk Pool 1
 - o 32 x 8TB flash drives
 - o 4,096B block size
- Disk Pool 2
 - o 32 x 8TB flash drives
 - o 4,096B block size

To create a disk pool, select **Disk Pool** and click the **Create Disk Pool** tab. Enter the name of the Disk Pool, the SANsymphony server, allocation size, and the sector size (4 KB), and then click **Create**.

A DataCore recommended best practice is to set the allocation size to 128MB. The only exception is when using snapshots; in this case, DataCore recommends setting the allocation size to 4MB.

Figure 20) Create a disk pool

Alerts Users Roles Log	Messages 🛛 🛏 TME-SJ-S21 in S	erver Group Create Disk Pool	×				×
Create Disk Pool							
The size of the Storage Allocation Unit (SAU) determines the maximum possible pool size and cannot be changed after the pool is created. The maximum number of tiers is a setting used with automated storage terring and storage profiles to indicate different levels of data priority. Default values are optimal for most applications.							
Name:	Disk pool 1				🔲 Bulk storag	e	
Description:							
DataCore Server:	TME-SJ-S21 ·	Storage allocation unit siz	e (MB): 128	▼ Sector :	size: 4KB 🔻		
Maximum number of tiers:	3 ‡	Space preserved for new allo	ations: 0 🗘 % per tier	Maximum	possible pool size:	1 PB	
Name	Index	▲ Disk Size	Disk Sector Size	Port.Bus.Target.LU	N	Status	
0 items							
						Create	Cancel

Once the disk pool is created, add the physical disks to the disk pool. Select the disk pool name and click the **Physical Disk** tab. Then click the **Add Physical Disks** link. Select the physical disk to be added to the pool and click **Add**.

Figure 21) Add physical disks to the disk pool

Alerts Users Roles Log Messages Add Physical Disks to Disk pool 1 🔀 🛏 Disk pool 1 on TME-SJ-S21								
Add Physical Disks to Disk pool 1								
Select the physical disks to add to the pool. The physical disks will be added to the pool using the selected tier. Choose the appropriate tier based on the performances of the disks.								
Tier for added disks:	2 ‡							
Name	Disk Size	Disk Sector Size	Port.Bus.Target.LUN	Status				
SANDISK SDIFC 10-072080 1	6.99 TB	4 KB	2.1.118.0	On-line				
1 item (1 selected)								
					Add Cancel			
					Aud			

Once a disk is added to the disk pool, SANsymphony begins a reclamation process to prepare the disks. Full reclamation may take longer than eight hours for a fully populated InfiniFlash IF150 with 64 x 8TB SSDs. Fortunately, the disks are available during reclamation.

Note: Performance testing should not be initiated until reclamation has completed.

Note: Some disks may require running the Windows disk partitioning utility (diskpart.exe) to clean the drive prior to adding it to the SANsymphony disk pool. If necessary, each storage disk must be cleaned individually. Be careful not the clean your boot drive or local devices.

C:\DataCore> diskpart Microsoft DiskPart version 6.3.9600 Copvright (C) 1999-2013 Microsoft Corporation. On computer: TME-SJ-S21 DISKPART> list disk
 Disk ###
 Status
 Size
 Free

 Disk 0
 Online
 7153 GB
 7153 GB

 Disk 1
 Online
 7153 GB
 7153 GB

 Disk 2
 Online
 7153 GB
 7153 GB

 Disk 2
 Online
 7153 GB
 7153 GB

 Disk 3
 Online
 7153 GB
 7153 GB

 Disk 4
 Online
 7153 GB
 7153 GB

 Disk 5
 Online
 7153 GB
 7153 GB

 Disk 6
 Online
 7153 GB
 7153 GB

 Disk 7
 Online
 7153 GB
 7153 GB

 Disk 7
 Online
 7153 GB
 7153 GB

 Disk 10
 Online
 7153 GB
 7153 GB

 Disk 10
 Online
 7153 GB
 7153 GB

 Disk 11
 Online
 7153 GB
 7153 GB

 Disk 12
 Online
 7153 GB
 7153 GB

 Disk 13
 Online
 7153 GB
 7153 GB

 Disk 14
 Online
 7153 GB
 7153 GB

 Disk 15
 Online< Disk ### Status Size Free Dyn Gpt _____ _____ _____ DISKPART> select disk 0 Disk 0 is now the selected disk. DISKPART> clean



Note: Once a disk is added to the SANsymphony Disk Pool it cannot be managed by the Windows Disk Management interface. Actions to the disk can only be completed from SANsymphony. A disk can be removed from the disk pool, and then released back to the Windows operating system.

Auto-Tiering

Auto-tiering is a feature of DataCore that allows different workloads to utilize different storage types. For high-demand workloads, the InfiniFlash IF150 functions as the Tier-1 storage device. Existing DataCore customers can add the IF150 storage platform for Tier-1 and keep their existing Tier-2 or Tier-3 storage, all under the control of SANsymphony.

- Tier 1: Highest performance-class disk device (i.e. Flash, SSD)
- Tier 2: High performance-class disk device (i.e. 15k SAS)
- Tier 3: Moderate performance-class disk device (i.e. NL-SAS)
- Tier 4: Slow performance-class disk device (i.e. Internal or external SATA)

For more information, see the <u>Automated Storage Tiering – How it Works FAQ</u> on the DataCore Support website.

Create a Virtual Disk

A DataCore virtual disk is created by selecting **Virtual Disk** from the menu, selecting the Virtual Disk tab, and then clicking **Create Virtual Disk**. Enter the name, virtual disk size, reserved space, and sector (block) size. Click the **Next** button to move to the next step.

Note: By default, all virtual disks are thin provisioned. Virtual disks can be thick provisioned, up to the size of the virtual disk, with the Reserved Space parameter.

Figure 22) Create a virtual disk

Alerts Users	Roles Log Messages Create Virtual Disk 🗶 🕶 TME-SJ-S21 in Server Group	×
Step 1 of 3	: Set Virtual Disk Properties	8
Configure one o is free space res	r more virtual disks with the same characteristics. Mirrored virtual disks require two storage servers in the server group. Dual virtual disks require a shared pool or pass-through disk. Reserved size are in the pool for exclusive use by the virtual disk.	
Name:	Virtual disk 1	
Description:		
Type:	© Single One DataCore Server with a single storage source.	
	Dual Two DataCore Servers with a shared storage source. Provides fault tolerance at the server level.	
	Immored Two DataCore Servers with two mirrored storage sources. Provides fault tolerance at the server and storage level.	
Size:	32 🛟 TB 👻 Reserved space: 0 🗘 GB 👻 🖾 Assign ownership to me	
Quantity:	1 \$ Sector size: 4KB -	
	< Back Next > Cancel	



This deployment uses a RAID 1 configuration with a mirrored data pool on each HA host. Select **Disk Pool 1 and Disk Pool 2** on the SANsymphony hosts and then click **Next**.

Figure 23) Select storage source

Alerts	Alerts Users Roles Log Messages 🕶 TME-SJ-S21 in Server Group Create Virtual Disk 🗙									×				
Step	Step 2 of 3: Set Storage Source									-3				
Choos	e the server,	source	e type, and storage sour	ce to use for	each side of	the mirrore	d virtual dis	sk. Source type can	be disk pool or pass-th	rough disk (a ph	ysical disk that is	not in a pool).		Contraction of the local division of the loc
	D-1-00		THE 01 004			di se sal								
	DataCore Ser	ver:	IME-5J-521 ¥	Sour	ce type: Dis	sk pool	•							
P	ool Name		DataCore Server(s)	Size	Status	SAU Size	Sector	Available Stor	Single Virtual Disk	Mirrored Vir	Dual Virtual	Oversubscription	Usage	
🍰 Di	isk pool 1		TME-SJ-S21	223.55 TB	Running	128 MB	4 KB	203.58 TB	1	14	0	08		2%
								Create Disk P	ool					
1 item														
	DataCore Ser	ver:	TME-SJ-S22 ·	Sour	ce type: Di	sk pool	*							
P	ool Name		DataCore Server(s)	Size	Status	SAU Size	Sector	Available Stor	Single Virtual Disk	Mirrored Vir	Dual Virtual	Oversubscription	Usage	
🔏 Di	isk pool 2		TME-SJ-S22	223.55 TB	Running	128 MB	4 KB	220.02 TB	0	14	0	08		2%
								Create Disk P	ool					
1 item														
											(< Back Nex	t >	Cancel

The final step to create virtual disks is to review the Storage Profile and Mirror Paths, then click **Finish**.

Figure 24) Setting virtual disk advanced options

Alerts Users Roles	Log Messages 📗 🍽 TME-SJ-S21 in Se	ver Group Create Virtual Disk 🗙	×
Step 3 of 3: Set Adv Under Advanced Options, min	vanced Options ror path settings and continuous data p	itection can be customized.	
Storage profile	Normal		Î
🔲 Continuous Data P	otection Enabled		
DataCore Server Disk pool Mirror Paths	- Select a server -	 Maximum history log size: 1 [•] TB [•] • 	
Path mode	Single path Redundant	yath	=
DataCore Server	TME-SJ-S21	DataCore Server: TME-SJ-S22	
Initiator port	Auto select	Target port: Auto select	
Target port	Auto select -	Initiator port: Auto select -	
			< Back Finish Cancel

After creating the virtual disk, verify the virtual disk is available by selecting Virtual Disks in the menu.

Figure 25) Displaying the virtual disks

Alerts	lsers R	oles 🛛 Log Messages 🛛 🛶	TME-SJ-S21 in Serve	er Group 💌						×
	Da	taCore Server TME-SJ	I-S21							Edit
	3	Computer name: TME-SJ-S	21							
Running		Product type: SANsymp	hony							
Kurining	•	Description:								
Info Se	ttings	Physical Disks 🚺 DataCore Di	sks Disk Pools	Virtual Disks Ports Pe	erformance Events					
Name		▲ Size	Sector Size	Allocated Space	DataCore Server(s)	Туре	Storage Profile	Replication Status	Status	
🔍 💐 Virtu	al disk 2	50 GB	4 KB	768 MB	TME-SJ-S21	Single	Normal		Up to date	
🛒 Virtu	al disk 3	200 GB	4 KB	48.63 GB	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🛒 Virtu	al disk 4	200 GB	4 KB	48.63 GB	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🛒 Virtu	al disk 5	200 GB	4 KB	48.63 GB	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🛒 Virtu	al disk 6	200 GB	4 KB	48.63 GB	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🛒 Virtu	al disk 7	200 GB	4 KB	48.50 GB	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🗐 Virtu	al disk 8	200 GB	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🔄 🔄 Virtu	al disk 9	200 GB	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🗐 Virtu	al disk 10	200 GB	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🔄 🔄 Virtu	al disk 11	200 GB	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🗐 Virtu	al disk 12	200 GB	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🔄 🔄 Virtu	al disk 13	200 GB	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🗐 Virtu	al disk 14	200 GB	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🔄 🔄 Virtu	al disk 15	1.17 TB (1200 GB)	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
🔄 🔄 Virtu	al disk 16	32 TB	4 KB	0 B	TME-SJ-S21 TME-SJ-S22	Mirrored	Normal		Up to date	
					Create Virtual Disks					
16 items (1 s	selected)									

The new virtual disk must be served to the SANsymphony hosts so they can be used by an application. To serve the virtual disk to the hosts, select the virtual disk from the Virtual Disk menu and select the **Serve Virtual** Disk to Hosts tab. Select the hosts to serve the virtual disks to. Click **Next** to go to the next step.

```
Figure 26) Serve virtual disks to hosts
```

Alerts Users Roles	Log Messages Serve Virtual disk 16 to H	osts 🗙 🛏 Virtual disk 16		×
Step 1 of 2: Select	Hosts			P
Select one or more hosts to	o serve the virtual disks to.			
			-	
Name	Description	State	Туре	Multipath
tme-sj-s23		Connected	Microsoft Windows Server 2012	Yes
tme-sj-s24		Connected	Microsoft Windows Server 2012	Yes
TME-SJ-S21		Running	DataCore Server	Yes
TME-SJ-S22		Running	DataCore Server	Yes
		Register Host	<u>L</u>	
4 items (4 selected)				
				< Back Next > Cancel

The final step is to select the paths for the hosts. Use the Initiator and Target Port dropdown menus to choose the paths. For this deployment, Auto select automatically chose the iSCSI path. Click Finish to complete serving the virtual disk to the hosts.

Figure 27) Select paths

Alerts Users Roles Log Messages Serve Virtual disk 16 to Hosts 🗵 🛏 Virtual disk 16
Step 2 of 2: Select Paths Select the path mode to use. Redundant paths for hosts with multipathing, creates two paths from the host to each DataCore Server and the ports are automatically selected. Single paths can be customized.
Path mode:
DataCore Server Host DataCore Server
TME-SJ-S22 to TME-SJ-S21
Initiator port: Auto select Target port: Auto select UNI: Auto select ILUN:
TME-SJ-S22 to TME-SJ-S22
Initiator port: Auto select
< Back Finish Cancel

After serving the virtual disks and adding the iSCSI path details, the iSCSI paths are displayed in SANsymphony.

Figure 28) Verify the virtual disk paths

Alerts Users	Roles Log Messages	s 🖓 Virtual disk 16 💌						×
	Virtual Disk V	irtual disk 16					Ed	it
	Description:							
	Size: 32	2 TB						
On-line	Sector size: 4	KB						
	Type: M	irrored						
	Storage profile: No	ormal						
Info Settings	Paths Snapshots	Rollbacks Replication	Owned By Performance Even	ts				
Preferred	State	Initiator Machine	Initiator	Target Machine	Target	LUN Access	Enabled	
Initiator: tm	e-sj-s23							▲
	😪 Connected	tme-sj-s23	iSCSI Port 1	 TME-SJ-S21 	X3 target - S21	✓ 2 ⁺ Read/Write	 Yes 	
	😪 Connected	tme-sj-s23	iSCSI Port 1	 TME-SJ-S22 	x3 target - s22	✓ 2 ⁺ Read/Write	 Yes 	
😑 Initiator: tm	e-sj-s24							
	👻 Connected	tme-sj-s24	iSCSI Port 1	 TME-SJ-S21 	X3 target - S21	✓ 0 ⁺ Read/Write	 Yes 	-
	😪 Connected	tme-sj-s24	iSCSI Port 1	 TME-SJ-S22 	x3 target - s22	✓ 0 ⁺ Read/Write	 Yes 	
😑 Initiator: TM	E-5J-521							
	Active	TME-SJ-S21	Microsoft iSCSI Initiator	 TME-SJ-S22 	x3 Mirror-s22	✓ 14 ⁺ Read/Write	 Yes 	
😑 Initiator: TM	E-SJ-S22							
	Active	TME-SJ-S22	Microsoft iSCSI Initiator	 TME-SJ-S21 	X3 Mirror - S21	✓ 14 ⁺ Read/Write	* Yes	-
			Add	Path				
4 items (2 selected	i)							
Show only co	nnected ports						Apply	

The virtual disk is now available on the host initiator system.

Logging and Monitoring

SANsymphony has several methods for observing the status and events of the DataCore system.

Live Performance Monitoring

DataCore's Live Performance monitoring utility provides a configurable interface to choose and graph live performance.



DataCore [™] Management Console Not-for-resale license (348 days remaining)						_ _ X				
Home Common Actions Live Performance Actions										
Update time: 2 seconds Update										
Server Group Connections 🗆 4 🛪 Getting Statted System Health Log Messages Alerts Roles Virtual Dids Diak Pools Live Performance 💌 🕶 TME-53-521 in Server Group 🗙										
Server Group - (localhost)	Category	/:		Instances: (1 / 2)			Counters: (1 / 51)			
Connect to Server Group	DataCo	re Servers		TME-SJ-S21 in Server Gro	up		Support Bundle Remaini	ng Bytes to Send	1	
	Disk poo	ols		TME-SJ-S22 in Server Gro	up		Target Bytes Read / see			
DataCore Servers 🗖 🕂 🗙	Host groups Host SCSI ports						Target Bytes Transferred / sec			
😑 🚺 Server Group 🔺	Hosts			=			Target Operations / sec			
🕀 🚺 TME-SJ-S21	Pass-th	rough virtu	al disk sources				Target Reads / sec			
🕀 <table-cell-columns> Physical Disks</table-cell-columns>	Physical Pool phy	i disks vsical disks						Total Bytes Migrated / sec		
🕀 🔁 DataCore Disks	Pool virt	tual disk so	urces					Total Bytes Read / sec		
Ze Virtual Disks	Rollback	Rolback groups Total Bytes Transferred / sec								
B Sequer Parts	Server 9	groups SCSI ports					Total Dytes written / sec			
A Loopback Port 1	Shared	Shared dik nols.								
Soppade Port 2	Show counter description 1 counter selected of 42 remaining Add						aining Add Done			
🖋 Loopback Port 3										
A Loopback Port 4	Grou	ip by Categ	ory 🗹 Order values by dat	a type first						
M Loopback Port 5	Show	Color	Counter	Instance	Category	Last	Average	Min	Max Recording	
management			Cache Write Hits / sec	TME-SJ-S21 In Server Group	DataCore Servers		0			
Microsoft iSCSI Ini			Cache Write Misses / sec	TME-SJ-S21 in Server Group	DataCore Servers		0 1) U	0	
🤏 X3 Mirror - S21 [MR] 🚽			Poller Dedicated CPUs	TME-SJ-S21 in Server Group	DataCore Servers		2 .	2	2	
Hacta D R X	i 💌		Folier Lodu / Thread	TME-SJ-S21 in Server Group	DataCore Servers		76 07	, U%	0 %	
	E7		Tatget Operations / sec	TME 53 521 in Server Group	DataCore Servers	_				
E Virtual Disks			rotarbytes mansferred / sec	The as a server group	Datacure Servers		0	, 08		
Server Ports										
🖻 🙀 tme-sj-s24	Add Counters									
🗉 🚘 Virtual Disks	Derative									
🗉 🛷 Server Ports	Operatio									

Server Group Alerts

Figure 30) Server group alerts

Alerts 🗵 Users Roles Log Messages 🛏 Server G	iroup - (localhost) ×
Active Alerts	
An alert is an urgent notification of an event that Alerts must be advrowledged by clicking the "Adv	t requires immediate attention. nowledge All" button in order to reset the status bar alert flag. Admowledged alerts can be found in the Event Log.
TimeStamp	Message
A 8/24/2016 11:22:11.299 AM	The logstore disk is currently failed. If the server restarts, those virtual disks that require log recoveries will undergo full recoveries.
A 8/24/2016 11:22:31.300 AM	Connection to server TME-57-522 has been lost.
A 8/24/2016 12:07:34.077 PM	Connection to server TME-5J-522 has been lost.
A 8/24/2016 12:20:58.702 PM	Connection to server TME-5J-522 has been lost.
A 8/24/2016 2:40:11.289 PM	Connection to server TME-5J-522 has been lost.
A 8/24/2016 2:59:21.671 PM	Connection to server TME-57-522 has been lost.
A 8/24/2016 4:46:48.396 PM	Server TME-5J-522 did not start as the last shutdown was unexpected. Start the server manually.
A 8/24/2016 6:22:29.391 PM	The logstore disk is currently failed. If the server restarts, those virtual disks that require log recoveries will undergo full recoveries.
A 8/24/2016 8:02:49.058 PM	The logstore disk is currently failed. If the server restarts, those virtual disks that require log recoveries will undergo full recoveries.
A 8/25/2016 1:45:45.588 AM	The logstore disk is currently failed. If the server restarts, those virtual disks that require log recoveries will undergo full recoveries.
▲ 8/25/2016 5:49:49.295 AM	The logstore disk is currently failed. If the server restarts, those virtual disks that require log recoveries will undergo full recoveries.
Level: Warning Source type: Virtual disk source	Source: Logstore for TME-SJ-S22 on TME-SJ-S22
Message: The logstore disk is currently failed. If the serv	er restarts, those virtual disks that require log recoveries will undergo full recoveries.
	Adknowledge All



Operations Event Log

Figure 31) Operations event log

Oper	Operations				
	8/25/2016 1:07:42.831 PM	Add physical disk(s) to pool	Done		
	8/25/2016 1:07:43.550 PM	Add physical disk 'SANDISK SDIFC 10-0720801' to pool 'Disk pool 1'	Done		
_	8/25/2016 1:08:01.347 PM	Add physical disk(s) to pool	Done		
- V	8/25/2016 1:08:01.628 PM	Add physical disk 'SANDISK SDIFC10-0720801' to pool 'Disk pool 1'	Done		
U 🗸	8/25/2016 1:57:12.594 PM	Add physical disk(s) to pool	Done		
- V	8/25/2016 1:57:12.782 PM	Add physical disk 'SANDISK SDIFC 10-0720801' to pool 'Disk pool 1'	Done		
- V	8/25/2016 2:23:28.078 PM	Create virtual disk - Virtual disk 16	Done		
- V	8/25/2016 2:23:28.812 PM	Rescanning port Microsoft iSCSI Initiator on TME-SJ-S21.	Done		
↓ ✓	8/25/2016 2:23:29.281 PM	Rescanning port Microsoft iSCSI Initiator on TME-SJ-S21.	Done		
- V	8/25/2016 2:23:33.781 PM	Rescanning port Microsoft iSCSI Initiator on TME-SJ-S22.	Done		
↓ ✓	8/25/2016 2:23:58.781 PM	Rescanning port Microsoft iSCSI Initiator on TME-SJ-S21.	Done		
↓ ✓	8/25/2016 2:24:08.781 PM	Rescanning port Microsoft iSCSI Initiator on TME-SJ-S22.	Done		
↓ ✓	8/25/2016 3:10:10.935 PM	Serve virtual disk	Done		
↓ ✓	8/25/2016 3:10:11.325 PM	Rescanning port Loopback Port 1 on TME-SJ-S22.	Done		
↓	8/25/2016 3:12:15.700 PM	Remove path - Loopback Port 1 on TME-SJ-S22 Loopback Port 1 on TME-SJ-S22 LUN 0	Done		
	0/15/1016 2.11.16 560 DM	Recenting out Loophad Dart 1 on TME 61 677	Depo		

Host Log Messages

Figure 32) Host log messages

Alerts Users Roles Log Messages 💌 Create Disk Pool 🕶 TME-SJ-S21 in Server Group					
	Search:				
_					
	TimeStamp	Message			
0	8/24/2016 4:50:31.802 PM	Virtual disk <i>Virtual disk 15</i> is up-to-date.			
0	8/24/2016 4:50:31.802 PM	Virtual disk Virtual disk 15 is currently Redundancy failed.			
0	8/24/2016 4:50:32.099 PM	Client access to Virtual disk 9 on TME-5J-522 changed to ReadWrite.			
0	8/24/2016 4:50:32.099 PM	Virtual disk Virtual disk 9 is currently On-line.			
0	8/24/2016 4:50:32.099 PM	Client access to Virtual disk 10 on TME-5J-522 changed to ReadWrite.			
0	8/24/2016 4:50:32.099 PM	Virtual disk Virtual disk 10 is currently On-line.			
0	8/24/2016 4:50:32.099 PM	Client access to Virtual disk 11 on TME-5J-522 changed to ReadWrite.			
0	8/24/2016 4:50:32.099 PM	Virtual disk Virtual disk 11 is currently On-line.			
0	8/24/2016 4:50:32.099 PM	Client access to Virtual disk 12 on TME-5J-522 changed to ReadWrite.			
0	8/24/2016 4:50:32.099 PM	Virtual disk Virtual disk 12 is currently On-line.			
0	8/24/2016 4:50:32.099 PM	Client access to Virtual disk 13 on TME-5J-522 changed to ReadWrite.			
0	8/24/2016 4:50:32.099 PM	Virtual disk Virtual disk 13 is currently On-line.			
0	8/24/2016 4:50:32.099 PM	Client access to Virtual disk 14 on TME-5J-522 changed to ReadWrite.			
0	8/24/2016 4:50:32.099 PM	Virtual disk Virtual disk 14 is currently On-line.			
0	8/24/2016 4:50:32.099 PM	Client access to Virtual disk 15 on TME-5J-522 changed to ReadWrite.			

Task Manager

The Windows Task Manager also provides monitoring of the CPU, memory, processes, and network traffic.





References

- DataCore Support website
 <u>https://datacore.custhelp.com/app/home</u>
- Getting Started with SANsymphony
 <u>https://www.datacore.com/SSV-Webhelp/getting_started_with_SANsymphony.htm</u>
- SANsymphony iSCSI Best Practices
 <u>http://datacore.custhelp.com/app/answers/detail/a_id/1626</u>
- DataCore Parallel Server SPC-1 Benchmark Report
 <u>http://link.sandisk.com</u>
- InfiniFlash IF150 Best Practices Guide <u>http://link.sandisk.com</u>
- InfiniFlash IF150 Software Installation Guide <u>http://link.sandisk.com</u>
- InfiniFlash IF150 Troubleshooting Guide
 <u>http://link.sandisk.com</u>
- Avago Support website
 - http://www.avagotech.com/support
- Microsoft TechNet iSCSI Initiator Step-by-Step Guide <u>https://technet.microsoft.com/en-us/library/ee338476(v=ws.10).aspx</u>
- DataCore The Host Server Qualified Software Components
 <u>http://datacore.custhelp.com/ci/fattach/get/287852/1463581756/redirect/1/filename/Qualified%20Sof</u>

 <u>tware%20Components.pdf</u>
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 <u>20Known%20Issues.pdf</u>

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