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 DataCore Support 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
  - 128GB DRAM
DataCore SANsymphony and InfiniFlash IF150 Platform Configuration Guide for iSCSI

- 1 x Avago SAS 9300-8e 12G 2-port HBA
- 1 x Mellanox® ConnectX®-3 40GbE adapter
- 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
  - Microsoft recommended updates
  - DataCore recommended updates
    - [https://support.microsoft.com/en-us/kb/3102997](https://support.microsoft.com/en-us/kb/3102997)
    - [http://support.microsoft.com/kb/2990170](http://support.microsoft.com/kb/2990170)
    - [http://support.microsoft.com/kb/2869606](http://support.microsoft.com/kb/2869606)
    - [https://support.microsoft.com/en-us/kb/3000850](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

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 → Optimizer Mode
  - Node Interleaving → Disabled
Processor Settings

Disable the following settings in the System BIOS:

- Select **System BIOS | Processor Settings** and set the following options:
  - Logical Processor → Enabled
  - Virtualization Technology → Enabled
  - Dell Contolled Turbo → Disabled
Figure 4) Hyper-threading and virtualization configuration

Figure 5) Disable Dell Controlled Turbo

System Profile Settings

Select the following option in the System BIOS:

- Select System BIOS | System Profile Settings and set the following option:
  - System Profile → Performance
  - C States → Disabled (automatically disabled when Performance is selected)
**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 6) CPU power management configuration*

*Figure 7) SATA settings*
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](https://support.microsoft.com/en-us/kb/3102997)
- [http://support.microsoft.com/kb/2990170](http://support.microsoft.com/kb/2990170)
- [http://support.microsoft.com/kb/2869606](http://support.microsoft.com/kb/2869606)
- [https://support.microsoft.com/en-us/kb/3000850](https://support.microsoft.com/en-us/kb/3000850)

The following packages have been installed as required by DataCore:

- [Microsoft .NET Framework Version 4.6.1 Redistributable Package](#)
- [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*

Chipset Firmware

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.

```powershell
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
HBA Configuration

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Title</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS</td>
<td>SAS3_UEFI_BSD_P12</td>
<td>13.0</td>
</tr>
<tr>
<td>Driver</td>
<td>LSI_SAS3.SYS</td>
<td>2.50.65.01</td>
</tr>
<tr>
<td>Firmware</td>
<td>Installer_P12_for_MSDOS_and_Windows</td>
<td>13.0</td>
</tr>
<tr>
<td>Management Tools</td>
<td>SAS3IRCU for SAS3 Controller</td>
<td>13.0</td>
</tr>
</tbody>
</table>

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(C0)
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**.
**Note:** Each SAS HBA card must be configured separately.

*Figure 9*) SAS configuration utility

Select **Advanced Adapter Properties** and press **Enter**.

*Figure 10*) Advanced adapter properties

Select **Advanced Device Properties** and press **Enter**.
Set the Maximum INT 13 Devices for this Adapter to either 0 or 1.

Return to the first screen of the SAS Configuration Utility and select Save changes then exit this menu and press Enter.
Figure 13) Saving adapter changes
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 \texttt{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 \texttt{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*

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

```
C:\DataCore> wdcfg.exe -q h
LSI Windows Host Driver Configuration Utility (wdcfg)
Version 2.00.17.01, Built Jun 26 2013 11:43:02

=====================================================  
History Stack Contents
Target Driver = LSI_SAS3
=====================================================  

History Stack Index: 0
MaxSASQueueDepth = 64

History Stack Index: 1
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 [DataCore Support](#) 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 https://link.sandisk.com:

- 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:

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<thead>
<tr>
<th>Element</th>
<th>Firmware</th>
<th>BootCode</th>
<th>PCU Boot</th>
<th>PCU FW</th>
<th>ISTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSE</td>
<td>A01A</td>
<td>BC04</td>
<td>NA</td>
<td>NA</td>
<td>I008</td>
</tr>
<tr>
<td>DSE</td>
<td>A01A</td>
<td>BC04</td>
<td>NA</td>
<td>NA</td>
<td>I008</td>
</tr>
<tr>
<td>FPGA</td>
<td>1.00.023D</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
</tbody>
</table>
To validate the IF150 firmware version, run the `ifcli encl0 version` command. If necessary, update the firmware of the InfiniFlash to the appropriate version.

```plaintext
C:\DataCore> ifcli encl0 version
SanDisk ifcli version 2.2.12
Copyright (C) 2016 SanDisk
08/23/2016  17:19:18

Enclosure : encl0

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
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<td>encl0/hse0</td>
<td>A01A</td>
<td>BC04</td>
<td>NA</td>
<td>NA</td>
<td>I008</td>
</tr>
<tr>
<td>encl0/hse1</td>
<td>A01A</td>
<td>BC04</td>
<td>NA</td>
<td>NA</td>
<td>I008</td>
</tr>
<tr>
<td>encl0/hse0/d1</td>
<td>A01A</td>
<td>BC04</td>
<td>NA</td>
<td>NA</td>
<td>I008</td>
</tr>
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<td>encl0/hse0/d3</td>
<td>A01A</td>
<td>BC04</td>
<td>NA</td>
<td>NA</td>
<td>I008</td>
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<td>A01A</td>
<td>BC04</td>
<td>NA</td>
<td>NA</td>
<td>I008</td>
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<td>FD4E</td>
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<td>NA</td>
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<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
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<td>NA</td>
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<td>encl0/slot4/drive</td>
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<td>NA</td>
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<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot8/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
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<td>encl0/slot9/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
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<td>encl0/slot12/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
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<td>encl0/slot13/drive</td>
<td>62EL</td>
<td>NA</td>
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<td>NA</td>
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<td>NA</td>
<td>FD4E</td>
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<td>NA</td>
</tr>
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<td>encl0/slot17/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot20/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot21/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot24/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
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<td>encl0/slot25/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot28/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
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<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
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<td>encl0/slot33/drive</td>
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<td>NA</td>
<td>FD4E</td>
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<td>NA</td>
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<tr>
<td>encl0/slot34/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot35/drive</td>
<td>62EL</td>
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<td>FD4E</td>
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<td>encl0/slot38/drive</td>
<td>62EL</td>
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<tr>
<td>encl0/slot39/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
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<tr>
<td>encl0/slot42/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot43/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
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<td>NA</td>
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<tr>
<td>encl0/slot46/drive</td>
<td>62EL</td>
<td>NA</td>
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<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot47/drive</td>
<td>62EL</td>
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<td>NA</td>
</tr>
<tr>
<td>encl0/slot50/drive</td>
<td>62EL</td>
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<td>NA</td>
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<tr>
<td>encl0/slot51/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot53/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot56/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot57/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
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<tr>
<td>encl0/slot60/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
<tr>
<td>encl0/slot61/drive</td>
<td>62EL</td>
<td>NA</td>
<td>FD4E</td>
<td>FD4E</td>
<td>NA</td>
</tr>
</tbody>
</table>

Warning: Unable to access one or more drives because of zoning or drive reservation or offline/blocked device(s)

Command Executed Successfully.

Note: If the IF150 enclosure was previously assigned a zone configuration, the firmware version of the drives must be checked for each host.
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 encl0 version
SanDisk ifcli version 2.2.12
Copyright (C) 2016 SanDisk
08/23/2016 17:39:18

Enclosure : encl0
Enclosure Logical Id : 5001E8200006B0C0
Compatible : Yes
Enclosure Power Cycle Required? : Yes
Update needed from secondary host? : Yes
Enclosure State : OK

<table>
<thead>
<tr>
<th>Element</th>
<th>Type</th>
<th>Upgradable</th>
<th>Current Ver</th>
<th>New Ver</th>
<th>OS Device Name</th>
<th>IO Suspend?</th>
</tr>
</thead>
<tbody>
<tr>
<td>encl0/hse0</td>
<td>ISTR</td>
<td>Updateable</td>
<td>I006</td>
<td>I007</td>
<td>/dev/sg2</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse0</td>
<td>BootCode</td>
<td>NotRequired</td>
<td>BC04</td>
<td>BC04</td>
<td>/dev/sg2</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse0</td>
<td>Firmware</td>
<td>Updateable</td>
<td>A017</td>
<td>A018</td>
<td>/dev/sg2</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse1</td>
<td>ISTR</td>
<td>Unreachable</td>
<td>I006</td>
<td>I007</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse1</td>
<td>BootCode</td>
<td>NotRequired</td>
<td>BC04</td>
<td>BC04</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse1</td>
<td>Firmware</td>
<td>Unreachable</td>
<td>A017</td>
<td>A018</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse0/d1</td>
<td>ISTR</td>
<td>Updateable</td>
<td>I006</td>
<td>I007</td>
<td>/dev/sg3</td>
<td>No</td>
</tr>
<tr>
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<td>NotRequired</td>
<td>BC04</td>
<td>BC04</td>
<td>/dev/sg3</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse0/d3</td>
<td>ISTR</td>
<td>Updateable</td>
<td>I006</td>
<td>I007</td>
<td>/dev/sg10</td>
<td>No</td>
</tr>
<tr>
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<td>NotRequired</td>
<td>BC04</td>
<td>BC04</td>
<td>/dev/sg10</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse0/d3</td>
<td>Firmware</td>
<td>Updateable</td>
<td>A017</td>
<td>A018</td>
<td>/dev/sg10</td>
<td>No</td>
</tr>
<tr>
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<td>I006</td>
<td>I007</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
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<td>NotRequired</td>
<td>BC04</td>
<td>BC04</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse1/d0</td>
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<td>Unreachable</td>
<td>A017</td>
<td>A018</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse1/d2</td>
<td>ISTR</td>
<td>Unreachable</td>
<td>I006</td>
<td>I007</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse1/d2</td>
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<td>BC04</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0/hse1/d2</td>
<td>Firmware</td>
<td>Unreachable</td>
<td>A017</td>
<td>A018</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0</td>
<td>FPGA</td>
<td>NotRequired</td>
<td>1.00.023D</td>
<td>1.00.023D</td>
<td>NA</td>
<td>No</td>
</tr>
<tr>
<td>encl0/slot36/drive</td>
<td>PCUBootCode</td>
<td>Updateable</td>
<td>6AC0</td>
<td>7EC0</td>
<td>/dev/sdf</td>
<td>Yes</td>
</tr>
<tr>
<td>encl0/slot36/drive</td>
<td>PCUFirmware</td>
<td>Updateable</td>
<td>6AC0</td>
<td>7EC0</td>
<td>/dev/sdf</td>
<td>Yes</td>
</tr>
<tr>
<td>encl0/slot36/drive</td>
<td>Firmware</td>
<td>NotRequired</td>
<td>62EL</td>
<td>62EL</td>
<td>/dev/sdf</td>
<td>No</td>
</tr>
</tbody>
</table>
encl0/slot37/drive  PCUBootCode  Updateable   6AC0         7EC0       /dev/sdh        Yes
encl0/slot37/drive  PCUFirmware  Updateable   6AC0         7EC0       /dev/sdh        Yes
encl0/slot37/drive  Firmware     NotRequired  62EL         62EL       /dev/sdh        No
encl0/slot54/drive  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  Firmware     NotRequired  62EL         62EL       /dev/sdd        No

Warning:
One or more elements are not connected to this host
Enclosure may move into reduced functionality mode after update until those elements are updated through ifcli from remote 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): y

Update for encl0
---------------------
encl0 : Update successfully initiated.
encl0 : Update : Drive PCU Boot Code Update started
encl0 : Update : 0% completed
encl0 : Update : Drive PCU Boot Code Update finished
encl0 : Update : Drive PCU F/W Update started
encl0 : Update : 11% completed
encl0 : Update : Drive PCU F/W Update finished
encl0 : Update : 22% completed
encl0 : Update : encl0/hse0:ISTR Updated
encl0 : Update : 33% completed
encl0 : Update : encl0/hse0/d3:ISTR Updated
encl0 : Update : 44% completed
encl0 : Update : encl0/hse0/d1:ISTR Updated
To reboot the IF150, enter the `ifcli encl reboot` command. Enter `y` to confirm and initiate the reboot process.

```
C:\DataCore> ifcli encl reboot
SanDisk ifcli version 2.2.12
Copyright (C) 2016 SanDisk
08/23/2016  17:47:25

This operation will reboot the enclosure(s). Do you want to continue?(Y/N): y
DeviceName  Status
----------  -------------------------------
encl0       Reboot request sent successfully

Command Executed Successfully.
```

**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
----------  --------  ---------  -------  ----------  ----------
```
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 https://www.datacore.com/products/SANsymphony.aspx.

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
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**.

*Figure 18) Activate SANsymphony license keys*

![Activate SANsymphony license keys](image)

For more detailed installation instructions, see the web page 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
- Enables Receive-Side Scaling State
- Enables Chimney Offload State
- Enables NetDMA State
- Enables Direct Cache Access
- Sets the Receive Window Auto-Tuning Level to NORMAL
- Enables ECN Capability
- Enables RFC 1323 Timestamps
- Sets the Initial RTO to 3000ms
- Enables Receive Segment Coalescing State
- Enables Non-Sack RTT Resiliency
- Sets the Max SYN Retransmissions to 2
- Sets the Custom TCP/IP Template Settings
- 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:

```powershell
PS C:\DataCore\iSCSI-Settings_Helper_v1.3> .\iSCSI-Settings_Helper_v1.3.ps1

Setting Windows Global Settings
Disabling Scheduled Defrag Task

Setting Windows Power Plan to >High performance<
success

Creating iSCSI Net Transport Filter

Caption :
Description :
ElementName :
InstanceID :
CommunicationStatus :
DetailedStatus :
HealthState :
InstallDate :
Name :
OperatingStatus :
OperationalStatus :
PrimaryStatus :
Status :
StatusDescriptions :
CreationClassName :
IsNegated :
SystemCreationClassName :
SystemName :
DestinationPrefix :
```

*SanDisk*
LocalPortEnd : 3260
LocalPortStart : 3260
Protocol : TCP
RemotePortEnd : 65535
RemotePortStart : 0
SettingName : Datacenter
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.

![Configure iSCSI port rules](image)

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 http://datacore.custhelp.com/app/answers/detail/a_id/1626.

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 http://datacore.custhelp.com/app/answers/detail/a_id/1626.

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

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
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.

```plaintext
C:\DataCore> diskpart
Microsoft DiskPart version 6.3.9600
Copyright (C) 1999-2013 Microsoft Corporation.
On computer: TME-SJ-S21
DISKPART> list disk

<table>
<thead>
<tr>
<th>Disk #</th>
<th>Status</th>
<th>Size</th>
<th>Free</th>
<th>Dyn</th>
<th>Gpt</th>
</tr>
</thead>
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<tr>
<td>Disk 0</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk 1</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk 2</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk 3</td>
<td>Online</td>
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</tr>
<tr>
<td>Disk 4</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk 5</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk 6</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disk 7</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
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<tr>
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<td>Online</td>
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<td>7153 GB</td>
<td></td>
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<tr>
<td>Disk 10</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
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<td>Disk 11</td>
<td>Online</td>
<td>7153 GB</td>
<td>7153 GB</td>
<td></td>
<td></td>
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<tr>
<td>Disk 12</td>
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<td>7153 GB</td>
<td></td>
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<tr>
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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 [Automated Storage Tiering – How it Works FAQ](#) 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*
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*

![Selecting storage sources](image)

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*

![Advanced options](image)

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

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

![Select paths diagram]

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

![Verify virtual disk paths]

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.

*Figure 29) Monitoring live performance*

Server Group Alerts

*Figure 30) Server group alerts*
Operations Event Log

Figure 31) Operations event log

![Operations Event Log](image1)

Host Log Messages

Figure 32) Host log messages

![Host Log Messages](image2)
Task Manager

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

Figure 33) Task manager
References

- DataCore Support website
  https://datacore.custhelp.com/app/home
- Getting Started with SANsymphony
  https://www.datacore.com/SSV-Webhelp/gettingStarted_with_SANsymphony.htm
- SANsymphony iSCSI Best Practices
  http://datacore.custhelp.com/app/answers/detail/a_id/1626
- DataCore Parallel Server SPC-1 Benchmark Report
  http://link.sandisk.com
- InfiniFlash IF150 Best Practices Guide
  http://link.sandisk.com
- InfiniFlash IF150 Software Installation Guide
  http://link.sandisk.com
- InfiniFlash IF150 Troubleshooting Guide
  http://link.sandisk.com
- Avago Support website
  http://www.avagotech.com/support
- Microsoft TechNet iSCSI Initiator Step-by-Step Guide
- DataCore – The Host Server – Qualified Software Components
- DataCore – Known Issues – Third Party Hardware and Software

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