



SANsymphony™ V

SANsymphony™-V 8.0 Software Storage Virtualization Software Reviewers Guide

This guide is intended for confidential review of the SANsymphony-V Release 8.0 product prior to public announcement and general availability.

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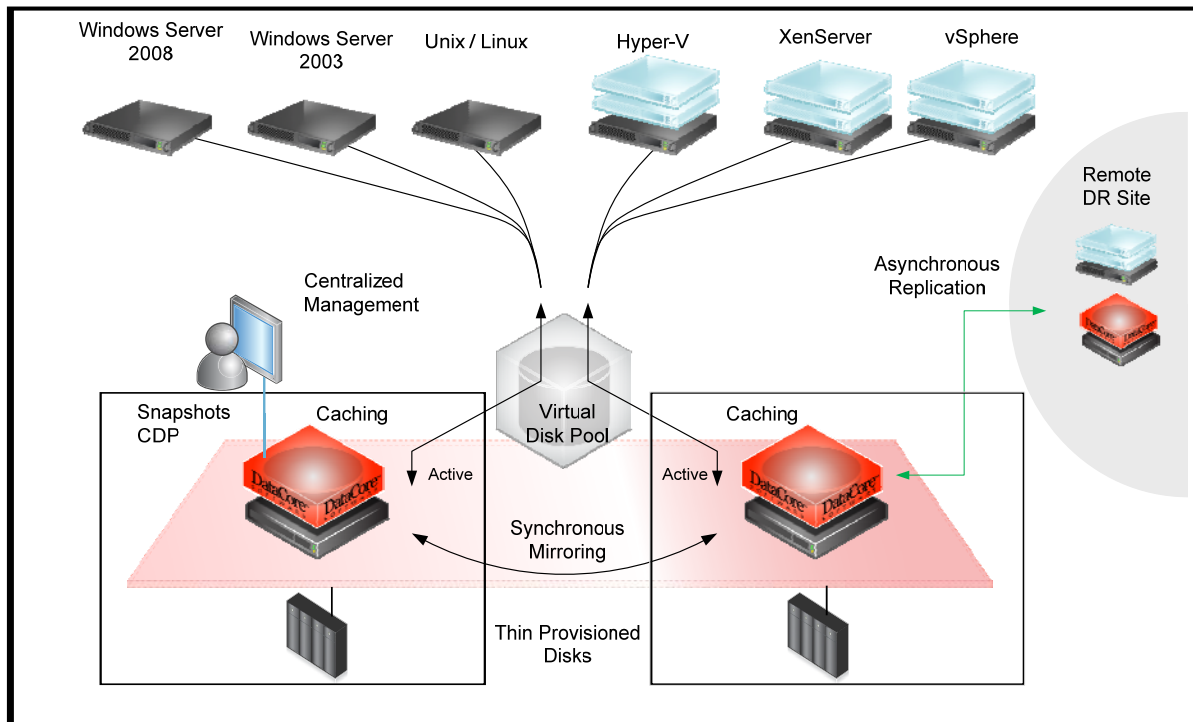
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Guidelines for Reviewers

Typical SANsymphony Configuration

In this guide we will discuss how to set up a configuration similar to the one below. It is representative of the most common use case for achieving business continuity and disaster recovery.



Training and Certification

As you get ready for your test drive, please keep in mind that SANsymphony-V software is installed and configured in IT organizations by solution providers who specialize in storage, server and desktop virtualization. These value added resellers and system integrators undergo DataCore training and certification programs to prepare for field implementations in a wide variety of scenarios. Once in place, a system administrator familiar with the configuration will take responsibility for general management and provisioning of the virtualized storage infrastructure. Major expansions and upgrades requiring broader systems expertise will be also performed by DataCore-certified solution providers.

If you would prefer to access an environment that is already pre-configured, please contact the DataCore representative with whom you are coordinating the product review.

Product Overview

SANsymphony-V software solves difficult storage-related challenges introduced by server and desktop virtualization, cloud computing and more general expansion, business continuity, and disaster recovery initiatives. It forms an active, transparent virtualization layer across disk storage devices to maximize the availability, performance and utilization of datacenters large and small.

The integrated set of centrally-managed data protection, provisioning, caching, replication and migration functions operates uniformly over different models and brands, assimilating current and future equipment non-disruptively. You'll find that SANsymphony-V cost-effectively speeds up applications, delivers uninterrupted data access and extends the life of tiered storage investments, while giving you peace of mind.

Key Features to Review

The review procedure suggested below will help you evaluate the following features:

- Virtual Disk Pooling and Thin Provisioning
- Synchronous Mirroring between two DataCore servers for High Availability
- Remote Replication between two DataCore servers for Disaster Recovery
- Snapshots for Backup and Restores
- CDP for Continuous Data Protection and Recovery
- Centralized Management for the virtual storage infrastructure

Please refer to the Addendum for more detailed descriptions of these and other features.

System Requirements

You'll need the following components to set up a simplistic test environment:

- 2 - Windows Server 2008 R2 computers to run the DataCore Software each equipped with some disks
- 1 - Windows Server 2008 computer to act as a host
- LAN connection between them (used for iSCSI connection)

A more comprehensive configuration would include:

- 1 additional Windows Server 2008 R2 computer to run the DataCore Software at a disaster recovery site connected via an IP WAN to the local DataCore Servers
- Additional hosts at each site
- Mix of storage devices from different manufacturers split between the locations

The software and **minimum** hardware requirements for SANsymphony-V 8.0 software installation are defined below.

Note: SANsymphony-V software may also run in virtualized servers alongside virtual machines, but we won't cover that here.


Software Requirements

The SANsymphony-V software package consists of two components: Server and SANsymphony-V Management Console (user interface).^{*} Complete installations will install both components. Custom installations will install either component.

Component	Software Requirements
Complete (Server and SANsymphony-V Management Console)	Microsoft Windows 2008 Server R2 operating system: Standard, Enterprise, or Datacenter editions Full installation ¹
Server only	Microsoft Windows 2008 Server R2 operating system: Standard, Enterprise, or Datacenter editions Full installation or Core installation ¹
SANsymphony-V Management Console only	Microsoft Windows 2008 Server R2 operating system (Full installation), Windows XP operating system, Windows Vista operating system, Windows 7 operating system

^{*}Required Microsoft Windows Server 2008 R2 hotfix 979711 (<http://support.microsoft.com/kb/979711> for iSCSI)

- TCP/IP installed and configured. (IPV4 addressing is supported.)

 Servers must be restarted after installing any software, service packs, or hotfixes before installing SANsymphony-V software.

Minimum Hardware Requirements

For complete installations or custom Server-only installations:

Component	Minimum Hardware Requirements [*]
Processors	2 single core CPUs or 1 dual core CPU with 2.0 GHz, x64 processors only (Itanium processors are not supported)
Memory	4 GB RAM
Disk Space	20 GB available hard disk space
Display	XGA (1024 × 768) or higher resolution monitor
Input devices	Keyboard and mouse (or compatible pointing device)
Network interface	1 Gb/s (or faster) Ethernet port
Storage interfaces	2 Fibre Channel HBAs or 2 Ethernet network cards (iSCSI)

 Actual requirements will vary based on system configuration and workload.

Storage Devices

Any storage device that is qualified to work with Microsoft Windows 2008 R2 can be managed by SANsymphony-V software; from JBOD (just a bunch of disks) enclosures to intelligent storage arrays. Devices can connect through Fibre Channel or iSCSI switches or directly to a DataCore Server. Basic vendor-specific configuration and installation of these storage devices should be performed as per manufacturer instructions.

Windows Security Settings Disclosure

In order to allow DataCore Servers to communicate with each other and SANsymphony-V software to function properly, certain Windows operating system settings are automatically changed during the SANsymphony-V software installation. The installation only makes the minimum Windows security changes required. Although security settings are changed, they are never disabled.

Below are the specific changes performed to the Windows security settings during installation:

- The **File and Print Share Service** is turned on.
- Allow the **DataCore Executive Service** and the **SANsymphony-V Management Console** to run under the firewall. Firewall exceptions are enabled for iSNS communication.
- Open the following TCP ports:
 - **Port 3793** is used by the **DataCore Executive Service** to communicate between DataCore Servers and for **Remote Replication**.
 - **Port 3260** used for **iSCSI communications**.
- A local administrator account **DataCore Executive Service** with logon as service privileges (user name **DcsAdmin**) will be created exclusively for SANsymphony-V services. Do not delete the account.


Pre-Installation Steps

To ensure a smooth installation, please take a few moments to prepare the DataCore Servers that will run the SANsymphony™-V storage virtualization software and the hosts that will utilize the virtual storage resources.

Important Notes:


- SANsymphony-V software (complete installations or server only component) should be installed on dedicated servers. Do not install the Server component on Domain Controllers.
- DataCore Server computer names cannot be changed after SANsymphony-V software has been installed. Do not change the host or domain membership of the DataCore Server after installing the software.
- The software must be installed using an account with installation and administrator privileges.
- Read the **Release Notes** provided with our software for important information.

Prepare DataCore Servers

- DataCore Servers "broker" all storage resource allocations and paths from hosts (application servers utilizing virtual storage) to physical disks. Connect the DataCore Servers to hosts and physical storage to the network via Fibre Channel (FC) HBAs, NICs for iSCSI, or a hybrid of both. Internet Protocol Version 4 (IPv4) is supported for iSCSI. IP to FC routers that enable IP/iSCSI connectivity to the Fibre Channel and iSCSI storage resources are supported. Ensure all DataCore Servers, hosts and storage is accessible.
 - In order to achieve high availability, two DataCore Servers with two FC HBAs or NICs are required. This will achieve automatic failover if I/O directed to one path fails to a virtual disk served to a host with multipathing capabilities.
 - Storage devices must be qualified to work with the Windows operating system; from JBOD enclosures to intelligent storage arrays. Basic vendor-specific configuration and installation of these storage devices should be performed according to manufacturer instructions. After the physical devices are discovered by SANSymphony-V software, no further device-specific configuration is necessary, other than for hardware maintenance or failure correction.
 - SANSymphony-V software will manage any disks that are unpartitioned. To use partitioned disks with obsolete information, remove the drive letters and partitions from them in Windows Disk Management.
 - Physical disks with existing file systems and disk formats (such as Windows, Unix, AIX, Linux, Solaris) can be migrated into the SANSymphony-V environment without modifying the structure. Access to current disk contents can be maintained during the migration process. Do not alter these disks in any manner. See Pass-through Disks in the product Help after installation.
 - If using **iSCSI**:
 - For Windows Server 2008, Microsoft iSCSI Initiator is included with the operating system and is automatically enabled during installation.
-  In Microsoft iSCSI Initiator software, do **not** enable the Microsoft MPIO Multipathing Support for iSCSI option. This option will interfere with the operation of SANSymphony-V software.
- If using an iSNS server, attach the iSNS server to the iSCSI SAN and install the iSNS software. Microsoft iSNS Server software can be downloaded from the Download Center on the Microsoft Web site.
 - If planning to replicate virtual disks to a remote location, TCP/IP connections (using IPv4) are required between local and remote servers.
 - All DataCore Servers and hosts should be time-synchronized. We recommend configuring the built-in Windows Internet Time Settings (NTP) to synchronize the time.

Prepare Hosts

- Hosts should be connected to DataCore Servers as noted in the previous section.
- If using iSCSI, install an iSCSI initiator on hosts. Add the DataCore Servers as targets and logon.

 In Microsoft iSCSI Initiator software, do **not** enable the Microsoft MPIO Multipathing Support for iSCSI option— even if intending to use MPIO. This option will interfere with the operation of SANsymphony-V software.

- Install qualified multipathing drivers for high availability (HA) access to mirrored virtual disk resources being provided by DataCore Servers. Multi-path drivers can be DataCore MPIO or other qualified HA drivers. Perform any configuration necessary for the specific operating system and the multipathing software installed.
- All DataCore Servers and hosts should be time-synchronized. We recommend configuring the built-in Windows Internet Time Settings (NTP) to synchronize the time. Installing SANsymphony-V Software

The SANsymphony-V software package consists of two components: **Server** and **SANsymphony-V Management Console**.

- The **Server** component consists of the program files used to run the SANsymphony-V virtualization functions. This component is required to be installed on the computers chose to be DataCore Servers.
- The **SANsymphony-V Management Console** component consists of the program files used to run the user interface. The SANsymphony-V Management Console is used to configure, control, and monitor DataCore Servers. This component can be installed on any Windows computer (including the DataCore Servers) running a supported version of the operating system.
- **Complete** installations will install both components on a DataCore Server.

Custom installations can also be performed in which either component is installed. In this manner, the management console component can be installed on a seperate computer and be used to remotely configure, manage, and monitor DataCore Servers that have the server component installed. Also, the server component can be installed on a DataCore Server without installing the management console component. (Network connections are required between DataCore Servers and computers running the SANsymphony-V Management Console components.)

To install:

- 1 Log on to Windows using a local system account with administrator privileges.
- 2 Save and close all files, programs, and windows. At the end of the installation, it will be necessary to restart the server to finalize the installation process.
- 3 Run the **SANsymphonyV.exe** file that was downloaded. The installation wizard should start automatically.
- 4 The License Agreement will appear. To proceed with the installation, choose the option to accept the terms of the license agreement and click **Next**.
- 5 On the **Setup Type** dialog box, choose **“Complete”** to install Server and Management Console components or **Custom** to install one component and click **Next**.
- 6 On the **Ready to Install the Program** window, click **Install** to start installing the program files.
- 7 The installation begins. When you receive the Windows Security Alerts to install DataCore device drivers; select the **Always trust software from DataCore Software Corporation** check box to install the remaining drivers without the prompts and click **Install** to continue.

- 8 When the installation of files completes, the **Set DcsAdmin Password** dialog box will appear. A local administrator account **DataCore Executive Service** with logon as service privileges (Service name **DcsAdmin**) will be created exclusively for SANSymphony-V services. Do not delete the account.
 - a Enter the desired password and confirm it.

◆ Remember the password, it must be used to install the software on each DataCore Server in your SANSymphony-V configuration.
 - b Click **Next** to continue.
- 9 To complete the installation, choose to restart the system and click **Finish**.
- 10 When the DataCore Server restarts, log on to the DataCore Server using a local administrator account. Please be patient, as it may take some time for your system settings to update with the new information.
- 11 Repeat steps 1-10 to configure your second DataCore server for a high-availability configuration

Managing the DataCore Server Group

The SANSymphony-V Management Console allows users to connect to any DataCore Server running the SANSymphony-V Management Console component.

- ◆ Windows credentials are used to connect to DataCore Servers. Credentials can be domain-wide or local (workgroup). If all DataCore Servers are part of the domain, credentials will be automatically authenticated; otherwise, credentials that are used to connect to a DataCore Server must match Windows user accounts and passwords created on all DataCore Servers accessed in the local server group and in the remote server group if replicating virtual disks. Users must also be registered in the SANSymphony-V Management Console, see **Registering Users and Assigning Roles** in the Help.

To connect the console to a server group:

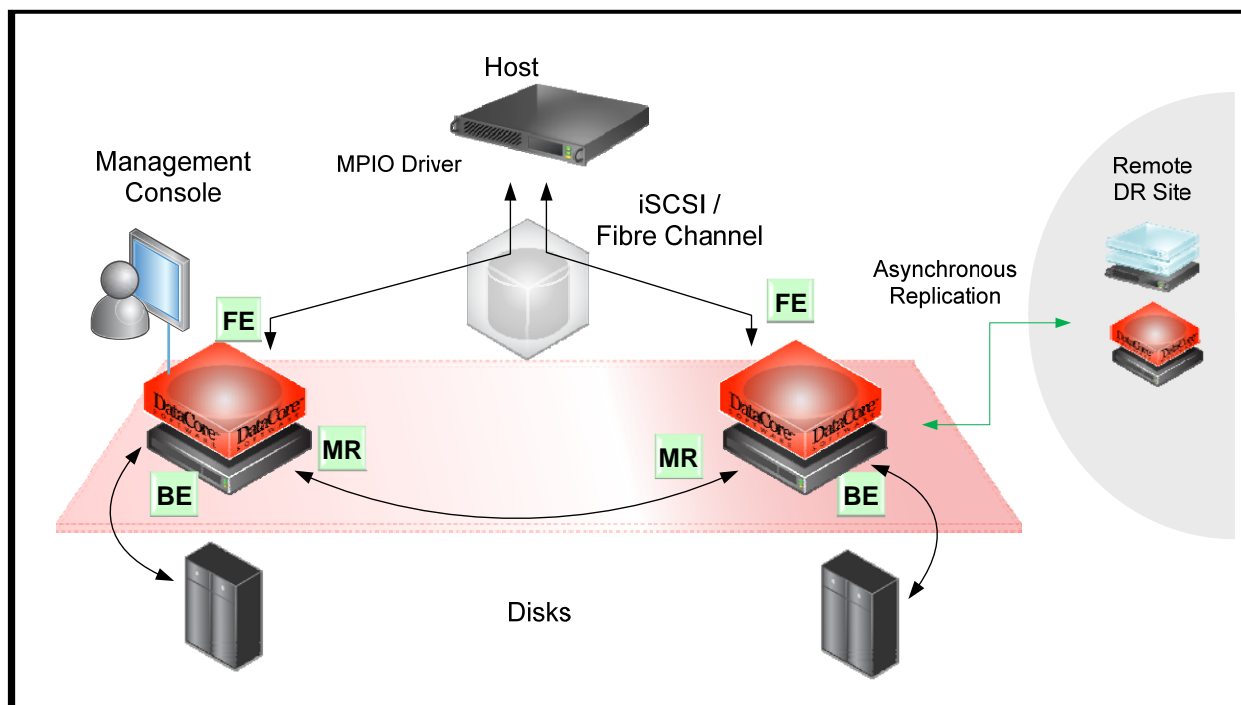
- 1 Click the **SANSymphony-V desktop shortcut** to open the SANSymphony-V user interface.
- 2 When the SANSymphony-V Management Console is opened, the **Connect to Server Group** dialog box opens.
- 3 In the dialog box, enter the name or IP address of the DataCore Server to connect to. When connected, all DataCore Servers in the group can be accessed from the same console. If the DataCore Server name or IP is not provided, a local connection is presumed.
- 4 To login to the DataCore Server using the same credentials that were used when logging into Windows, select the **Use default credentials** check box. Otherwise, clear the check box and enter the required authorized credentials.

- ◆ The first time that you login to SANSymphony-V you must use the local administrator credentials of your machine to login to the SANSymphony-V Management Console. After logging in, you can add users that correspond with Windows local and/or domain users that should be granted access to the interface.

- 5 Click **Connect**. A message will appear on the dialog box that the management console is attempting to connect to the DataCore Server. When the connection has been successfully completed the dialog box will close.

Getting Started with a Sample High Availability (HA) Configuration

In this guide we will discuss how to set up a configuration similar to the one below. Storage hardware, hosts, and procedures may slightly vary depending on your configuration.



- 1 Open the **SANsymphony-V Management Console**, and login to your first DataCore Server.
- 2 Click **Getting Started** in the ribbon.
- 3 On the **Getting Started** page, select **Register a user**, to register and assign roles for the administrators of the SANsymphony-V software. The role assigned to the user determines the privilege level.

◆ Windows operating system credentials are used to authenticate registered users; user names must match Windows user accounts. Credentials can be domain-wide or local (workgroup). Credentials that are used to connect to a server must match Windows user accounts and passwords created on all servers accessed in the local server group.

- 4 On the **Getting Started** page, select **Add a DataCore Server**, then on the dialog box, enter the name or IP address of the second server. Both servers should now appear in the **DataCore Servers Panel**.

◆ Grouping DataCore Servers in a server group should be performed **before** other configuration steps! After the DataCore Servers are "grouped," the following steps and any configuration changes can be performed from either DataCore Server.

- 5 On the **Getting Started** page, select **Assign port rules**. Ensure each server has one port designated for **Front-end** use only, and one port designated for both **Back-end** and **Mirror**. Below is an example of this configuration.

◆ In this configuration, we are assuming you have 2 dedicated iSCSI or FC connections.

- 6 If using iSCSI network connections, on the hosts, use the iSCSI Initiator to log in to the DataCore Servers.

◆ In this configuration, we require the DataCore MPIO driver to be installed on each of the Microsoft Windows hosts.

- 7 On the **Getting Started** page, select **Register a host**, and fill in the name of the host that you plan to allocate storage to, then select the proper iSCSI connection from the list that corresponds with your host. If you are using Fibre Channel select the World Wide Name (WWN) of your host from the list.
- 8 On the **Getting Started** page, choose **Create a disk pool for DataCoreServerName**, give your disk pool a name. Select the disks that you plan to use for this pool, click **Create** to create the disk pool. Repeat this step for each DataCore Server.
- 9 On the **Getting Started** page, select **Create virtual disks**. Give the virtual disk a name, and determine the size of the disk. Check to make sure the mirrored option is selected so the virtual disk is highly available, click **Next**. Now select the disk pool to use on each server and click **Next**. Verify all the information is correct and click **Finish**.
- 10 On the **Getting Started** page, choose **Serve virtual disks to hosts**, select the host that you wish to serve the virtual disk to, and choose **Next**. Select the virtual disk that you wish to serve to the host, and click **Next**. Choose redundant path and click **Finish**.
- 11 Your basic highly available configuration is now complete. It automatically synchronously mirrors updates between the DataCore Servers and thin provisions virtual disks from the centrally managed pool.

Asynchronously Replicating Virtual Disks to Remote Locations

Replication is the process of copying the data from a "source" virtual disk on one DataCore Server to a "destination" virtual disk on another DataCore Server. Remote replication to a distant disaster recovery site is the most usual application of this feature; meaning that the source is on a server in the local server group and the destination is on a server in a remote replication group that is "partnered" with the local group. Virtual disks can also be replicated locally from one server to another in the same local server group.

- 1 On the DataCore Server that you plan to replicate from, create a replication buffer location. In the **DataCore Servers Panel**, right click on the DataCore Server under your local server group, and select **View Details**, then click the **Properties** tab. Set a replication buffer location (do not use the boot disk as the buffer location) and click **Apply**.
- 2 Rename the local server group. In the **DataCore Servers Panel**, right click on the server group and select **Rename**. Enter a meaningful name.
- 3 When replicating virtual disks, a virtual disk from the local server is replicated to a virtual disk on the remote server. Virtual disks should be the same size. Ensure that virtual disks exist to use in replication. (See step 9 above.)
- 4 If performing a remote replication, install and configure the remote DataCore Server.
 - a. Start with the **Installing SANsymphony-V Software** section in this document on the server you plan on using for replication.
 - b. Open the **SANsymphony-V Management Console**, and log in as the local administrative account.
 - c. Rename the remote server group. In the **DataCore Servers Panel**, right click on the server group and select **Rename**. Enter a meaningful name.
 - d. In the ribbon, click **Getting Started**.
 - e. Select **Register User**, register and assign roles for SANsymphony-V users.
 - f. Choose **Create a disk pool for DataCoreServerName**, give your disk pool a name. Select the disks to use for this pool and click **Create**.
 - g. Select **Create Virtual Disks** and create the same number and size of virtual disks for the remote server.
- 5 On the **local DataCore Server** that you want to replicate from, partner with the remote replication group. In the **DataCore Servers Panel**, right click on the local server group and choose **Partner with Replication Group**. Enter your remote replication server IP address and the credentials to login to the server. Enter the credentials for the local replication server and click **Partner**.
- 6 On the **local DataCore Server**, select the first virtual disk to replicate in the **DataCore Servers Panel**. The **virtual disks details page** opens, select the **Replication** tab and choose **Create Replication**. In **Local Virtual Disk**, select the local server used to replicate from. In **Partner Virtual Disk**, select the remote replication server group, remote server and virtual disk to replicate to. Click **"Create"**. This begins the process of replicating to the destination.
- 7 Repeat steps 6 to replicate additional virtual disks.

Taking Snapshots

Snapshot is a feature used to create a logical usable image and/or an independent fully usable copy of the data residing on a virtual disk at a specific point in time (snapshot point). Snapshots can then be served to hosts for backups, testing, and other purposes.

- 1 In the **DataCore Servers Panel**, select the source virtual disk that you would like to create a snapshot of. The **virtual disks detail page** opens, select the **Snapshots** tab, and click **Create Snapshot**.
- 2 In the wizard:
 - a. Enter a name for the snapshot, or leave the default name.
 - b. If the source virtual disk is mirrored, choose the DataCore Server where the snapshot will be located.
 - c. Select the snapshot type.
 - d. Select the disk pool used to create the snapshot.
 - e. Click **Next**.
 - f. Select the disk pool used to create the mapstore.

◆ The mapstore is a dedicated storage location within a disk pool that is used internally for the specific purpose of holding state and delta map information for all snapshots on the source DataCore Server. The first time a snapshot is created, a disk pool will be selected.
 - g. Click **Finish**.
- 3 You may also create automated snapshots under the **Tasks** feature. You may find more information about this in the product Help.

Enabling Continuous Data Protection (CDP) and Creating Rollbacks

When data protection is enabled for a virtual disk, an internal history log is created on a DataCore Server that the virtual disk is created from. All data changes occurring on the protected virtual disk are time-stamped and saved in the history log. The history log is used to create rollbacks—logical copies of the data-protected virtual disk at a prior point-in-time saved in the history log.

- 1 In the **DataCore Servers Panel**, select the virtual disk that you would like to enable data protection.
- 2 The **virtual disk details page** opens. Click the **Properties** tab and then click **Advanced Options**.
- 3 Select the **Enable Data Protection** check box.
- 4 Select the DataCore Server and disk pool where the history log will reside. Set the maximum size of the history log.
- 5 Click **Apply**.
- 6 In order to create rollbacks in the following section, this virtual disk should be served to a host and the host should write or copy data to the virtual disk. This starts the logging of changed blocks.

Creating Rollbacks

- 1 In the **DataCore Servers Panel**, select the data-protected virtual disk.
- 2 The **virtual disk details page** opens. Click the **Rollbacks** tab and then click **Create rollback**.
- 3 Enter a name for the rollback or keep the default.
- 4 Move the **Restore point** slider to the point in time to restore to. As the slider moves, the time stamp will update.
- 5 In **Rollback type**, choose **Expire rollback** or **Persistent rollback**.
- 6 Select the disk pool used to create the rollbacks.
- 7 Click **Create**.

◆ If unsure of the accurate point-in-time to select, create several rollbacks with various restore points. Then serve the rollbacks to the host and determine the best rollback to use to either revert the data to an acceptable state or split the rollback to a fully usable virtual disk.

Additional information is provided via the SANsymphony-V Help commands.

What's New in SANsymphony-V Release 8.0

Management Console

- The user interface, called the Management Console, allows users to manage the SANsymphony-V storage virtualization software by connecting to any of the DataCore Servers
- The Management Console has a new and improved look and feel.
- All configuration and management activities are performed from the same interface, which is streamlined, simplified, and flexible.
- Extensive use of context-sensitive menus through the console and drag-and-drop functions exist. Operations can be initiated from most areas in the console.
- See the SANsymphony-V Help topic ***SANsymphony-V Management Console*** for details.

Basic Configuration

- When configuration changes are made, in most cases the configuration no longer needs to be applied. Most configuration changes are made as they are performed. When an apply is needed, an **Apply** button will be provided on the dialog box or wizard used to perform the configuration change.

Authentication and User Access

- Windows® operating system credentials are used to connect to DataCore Servers. If all DataCore Servers are part of the domain, credentials will be automatically authenticated; otherwise, credentials that are used to connect to a server must match Windows user accounts and passwords created on all DataCore Servers accessed in the local server group and in the remote server group if replicating virtual disks.
- Users must also be registered to gain access to the SANsymphony-V Management Console. See the SANsymphony-V Help topic ***Registering Users and Assigning Roles*** for details.

Licensing

- After installation, the software will run in trial mode for 30 days. ***After 30 days, SANsymphony-V software will stop functioning unless a license is activated. The license must be activated within 30 days*** from the date the software was installed.
- The activation process is simplified for DataCore Servers with Internet access.
- See the SANsymphony-V Help topic ***Activating the License*** for details.

Disk Pools (formerly NMV Pools)

- Disk space in pools is always dynamically allocated (thin provisioned).
- Space may be "reserved" in a pool for exclusive use by a particular virtual disk.
- Networked Managed Volumes (NMVs), in SANmelody software and earlier versions of SANsymphony software do not exist in SANsymphony-V software. Virtual disks (formerly known as virtual volumes) are created directly from pools.
- Enhanced monitoring of available pool space and I/O latency is provided. When thresholds are reached, alerts and email notifications can be provided by configuring an automated task.
- See the SANsymphony-V Help topic ***Disk Pools*** for details.

Virtual Disks (formerly Virtual Volumes)

- Virtual disks are created from two types of storage sources: disk pools or pass-through disks (formerly proxy volumes).
- Two types: mirrored (synchronously across DataCore Servers) and non-mirrored. Types such as 3PAP (MPIO or AP) and CP no longer exist.
- There is no concept of standard versus multipath mirrors. Multipathing is an attribute of the host. When the host is enabled for multipathing and mirrored virtual disks are served (formerly mapped) to the host, a path is automatically created between the host and both DataCore Servers.
- Also, the number of available paths used for virtual disk I/O are only limited by the number of ports available and can be customized for each virtual disk. See the SANsymphony-V Help topic **Modifying Virtual Disk Paths** for details.
- Virtual disk space (SAUs) can be reclaimed from virtual disks that have been served to hosts after files have been deleted.
- See the SANsymphony-V Help topic **Virtual Disks** for details.

Pass-through Disks (formerly Protected File System Volumes in SANmelody software and Proxy Volumes in SANsymphony software)

- Pass-through disks can be any physical disk previously formatted that has not been added to a pool, and is simply used as a storage source when virtual disks are created.
- Pass-through disks can be used temporarily to migrate existing data into the SANsymphony-V environment.
- Pass-through disks can also exist permanently as storage sources for virtual disks.
- See the SANsymphony-V Help topic **Pass-through Disks** for details.

Server Groups (formerly Partners or Regions)

- The concept of partners in SANmelody software and regions and domains in earlier versions of SANsymphony software has been replaced by server groups. See the SANsymphony-V Help topic **Establishing Server Groups** for details.
- One server group can "partner" with another server group when replicating virtual disks. (Replication was formerly known as AIM). See the SANsymphony-V Help topic **Configuring Server Groups for Replication** for details.

Port Connections and Paths (formerly Mappings)

- Port roles is a new feature. DataCore Server ports are assigned roles (front-end, mirror, or back-end) to regulate which ports can be used when paths are created. Ports can have one or more roles assigned. Limiting the roles that a port supports can regulate paths and avoid automatic selection of an undesirable port thus simplifying the zoning in the SAN.
- The number of available paths used for virtual disk I/O are only limited by the number of ports available and can be customized for each virtual disk. See the SANsymphony-V Help topic **Modifying Virtual Disk Paths** for details.
- Hosts can be enabled for multipathing and when mirrored virtual disks are served (formerly mapped) to the host, a path is automatically created between the host and both DataCore Servers.
- Redundant paths to hosts and redundant mirror paths are created automatically if redundant connections exist.

- The concept of a preferred server is now designated by host instead of by virtual disk.
- See the SANsymphony-V Help topic **Port Connections and Paths** for details.

Snapshot

- Snapshot is a feature used to create a logical usable image and/or an independent fully usable copy of the data residing on a virtual disk at a specific point in time (snapshot point).
- Snapshots have no relationship number; they are identified by name and appear in the SANsymphony-V Management Console under the source virtual disk.
- Snapshots can be created in two types: full (formerly a complete image) or differential (formerly a snapshot enable).
- A mapstore is automatically created when the first snapshot is created. The mapstore is hidden and cannot be deleted by the user.
- The names of the snapshot operations have changed.
- See the SANsymphony-V Help topic **Snapshot** for details.

Replication (formerly AIM)

- Virtual disk replication (formerly known as AIM) is the process of asynchronously copying the data from a "source" virtual disk on one DataCore Server to a "destination" virtual disk on another DataCore Server. The destination virtual disk becomes a usable copy of the source virtual disk. Replication is most often used to provide off-site copies of critical virtual disks following a controlled or emergency site-failover.
- A remote replication is the most usual application of this feature, but virtual disks can also be replicated locally from one DataCore Server to another in the same local server group.
- Replication occurs over TCP/IP Internet connection via an improved proprietary transfer protocol designed by DataCore Software. (Replication does not use File Transfer Protocol (FTP) or Server Message Block (SMB) as with the earlier AIM feature.)
- Data compression is used to speed up data transfers by lowering the amount of data transmitted over the network.
- The transfer mode can be unidirectional or bidirectional (license-dependent). The direction of replication can be reversed.
- Checkpoint markers (formerly known as AIM markers) can be sent in the replication source data transfer to initiate actions on the destination.
- See the SANsymphony-V Help topic **Replication** for details.

Continuous Data Protection

- The Continuous Data Protection (CDP) feature (license-dependent) saves data changes for a virtual disk in a history log for a period of time. Rollbacks—read/writable logical copies of the data-protected virtual disk—can be created at *any* point in time during the valid time period. Depending on license parameters and available capacity, data can be stored in a history log for up to 48 hours.
- This feature can be used as a temporary backup vehicle in place of creating explicit snapshots, for example, to protect and recover from errors.
- See the SANsymphony-V Help topic **Continuous Data Protection (CDP)** for details.

Performance Tool

- The SANsymphony-V Performance Tool gathers specific performance-related measurements, known as counters, in real-time for resources managed or reported by SANsymphony-V software. Counters are no longer available in the Windows Performance (Perfmon) tool.
- The counters are logically grouped by object category, which makes finding all device-related counters much easier and eliminates overlooking counters for users not familiar with the drivers.
- Counter data can be provided globally for all objects in the same window or for a specific object.
- See the SANsymphony-V Help topic **Performance Tool** for details.

System Health

- System Health tool provides a quick visual summary of the overall health of resources managed by SANsymphony-V software.
- Messages are classified by severity, time-stamped and reported in the tool.
- At a glance, any object requiring attention can be identified in the tool.
- See the SANsymphony-V Help topic **System Health Tool** for details.

Event Logs

- SANsymphony-V software timestamps and records informational, warning and error events as they occur in an Event Log in the SANsymphony-V Management Console. (DataCore driver events are still recorded in Windows Event Log.)
- Messages are categorized by level: Info, Warning, Error, or Trace. The message scope can be narrowed by selecting the specific DataCore Server and message levels.
- The event log can provide a global view of all events in one window or can be viewed for a specific object.
- A simple text search can be performed on the log.
- Alerts are generated for events requiring immediate attention. Alerts must be acknowledged. (Similar to the Alarms feature in SANcentral in earlier SANsymphony software versions.)
- See the SANsymphony-V Help topic **Event Log** for details.

Automated Tasks

- The Task tool assists in the administration of SANsymphony-V. A task is an action that is performed when a trigger occurs.
- Possible triggers include a scheduled date/time, receipt of checkpoint markers in replication, a change of state in System Health, or the posting of event log messages.
- Possible actions include snapshot operations, posting an event log message, running a command or Windows PowerShell™ script file, sending an email notification or reclaiming unused virtual disk space.
- See the SANsymphony-V Help topic **Automated Tasks** for details.

Support Bundles

- Support bundles can be automatically uploaded from the customer site to DataCore Customer Support for analysis or created from a command line and manually sent to DataCore Customer Support.
- See the SANsymphony-V Help topic **Support Bundles** for details.

UPS Support

- Support is provided for Uninterruptible Power Supplies (UPS) attached to DataCore Servers and recognized by the Windows® operating system. Write caching is automatically disabled when the DataCore Server is running on UPS battery backup. When power is restored write caching is enabled again. See the SANsymphony-V Help topic **UPS Support** for details.

Addendum

SANsymphony-V Features at-a-glance