IBM System Storage SAN Volume Controller

Host Attachment Guide - Errata

Version 4.3.X

December 16th, 2008

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Contents

Introduction

This guide provides update information for chapter 2 in the SVC 4.3.*x* *IBM System Storage SAN Volume Host Attachment Guide* and describes
How to attach HP-UX 11iv3, running on HP 9000 and Integrity Servers to an SVC cluster
Guidance on the attachment of the IBM System Storage™ TS7650G ProtecTIER De-duplication Gateway to SVC.
Guidance on the attachment of Citrix Xen Server to SVC
Guidance on the attachment of Windows 2008 Hyper-V
Guidance on the attachment of IBM I i5OS through VIOS
Guidance on the attachment of IBM JS12 Blades running SLES10 SP2
. The material in this guide should be read in conjunction with the existing material in the Host Attachment Guide available at: http://www.ibm.com/storage/support/2145.

Who should use this guide

This errata should be used by anyone using *the IBM System Storage SAN Volume Controller Host Attachment Guide* that wishes to attach HP-UX 11iv3, running on HP 9000 or Integrity Servers to their SAN Volume Controller ,wishes to attach IBM System Storage™ TS7650G ProtecTIER De-duplication Gateway to SAN Volume Controller, attachment of Citrix Xen Server, Attachment of Windows 2008 Hyper-V or attachment of IBM i i5OS through VIOS & JS12 Blades running SLES10 SP2.

Last update

This document was last updated: 16 Dec 2008

Change History

The following revisions have been made to this document:

Date	Sections Modified
21 May 2008	New Document
10 Oct 2008	Additional information on IBM System Storage™ TS7650G ProtecTIER De-duplication Gateway
10 Oct 2008	Guidance on the attachment of Citrix Xen Server
20 Nov 2008	Attachment to Windows 2008 Hyper-V Attachment to IBM I i5OS Through VIOS
16 Dec 2008	Attachment of JS12 Blades running SLES10 SP2

Chapter 2. Attaching a host running HPUX 11iV3

Note this section is now in the 4.3.1 SAN Volume Controller host attachment guide

System Prerequisite

SVC 4.2.1.4 and SVC 4.3.0 can support HP-UX 11.31 September 2007 (and later 0803) releases. The following patches must be applied to all the hosts with 0709 Patches attaching to SVC:
PHKL_37453 (esdisk),
PHKL_37454 (esctl),
PHCO_37483 (scsimgr)

0803 Bundle contains the above listed patches.

Note: RPQ required for support of earlier than HP-UX 11.31 September 2007 release.

The following IBM Web site provides current interoperability information about supported device driver and firmware levels:
http://www.ibm.com/storage/support/2145

New Mass Storage Stack and Native Multi-pathing on HP-UX 11.31

A new mass storage stack was introduced by HP-UX 11.31. The new features include a new agile naming method and native multi-pathing solution. For more detail information, refer to related HP publications.

To support the new mass storage stack and native multi-pathing of HP-UX 11.31, the type attribute of related host objects must be specified as ***hpux***.

IBM no longer supports SDD on HP-UX 11.31. Although legacy DSF naming and PVLinks are still supported by HP-UX 11.31 for backward compatibility, IBM recommends using the new agile naming and native multi-pathing with SVC.

HP-UX 11.31 command ***ioscan –fnNC disk*** can discover and show all hardware paths and persistent DSFs of the attached disks. SVC vdisks are discovered as IBM 2145 disks.

Command ***scsimgr get_info all_lpt*** can determine the open close state of paths to a SVC vdisk. The value of WWID in the output of ***scsimgr*** matches vdisk_UID of the corresponding vdisk on SVC. Also HP-UX 11.31 September 2007 release and later implement the T10 ALUA support. Implicit ALUA support has been integrated to hpux host type of SVC 4.2.1.4 and SVC 4.3. Asymmetric state of paths to preferred SVC node of the LUN is shown as ACTIVE/OPTIMIZED by command ***scsimgr***. This value of paths to non-preferred is shown as ACTIVE/NON-OPTIMIZED. Following is an example of using ***scsimgr*** command:

scsimgr get_info all_lpt -D /dev/rdisk/disk1484

STATUS INFORMATION FOR LUN PATH : lunpath993

Generic Status Information

SCSI services internal state	= STANDBY
Open close state	= STANDBY
Protocol	= fibre_channel
EVPD page 0x83 description code	= 1
EVPD page 0x83 description association	= 0
EVPD page 0x83 description type	= 3
World Wide Identifier (WWID)	= 0x600507680184000060000000000005d4
Total number of Outstanding I/Os	= 0
Maximum I/O timeout in seconds	= 30
Maximum I/O size allowed	= 2097152
Maximum number of active I/Os allowed	= 8
Maximum queue depth	= 8
Queue full delay count	= 0
Asymmetric state	= ACTIVE/NON-OPTIMIZED
Device preferred path	= No
Relative target port identifier	= 256
Target port group identifier	= 1

STATUS INFORMATION FOR LUN PATH : lunpath990

Generic Status Information

SCSI services internal state	= ACTIVE
Open close state	= ACTIVE
Protocol	= fibre_channel
EVPD page 0x83 description code	= 1
EVPD page 0x83 description association	= 0
EVPD page 0x83 description type	= 3
World Wide Identifier (WWID)	= 0x600507680184000060000000000005d4

Total number of Outstanding I/Os	= 0
Maximum I/O timeout in seconds	= 30
Maximum I/O size allowed	= 2097152
Maximum number of active I/Os allowed	= 8
Maximum queue depth	= 8
Queue full delay count	= 0
Asymmetric state	= ACTIVE/OPTIMIZED
Device preferred path	= No
Relative target port identifier	= 0
Target port group identifier	= 0

Dynamic LUN expansion

Dynamic LUN expansion feature, added in HP-UX 11.31, now supports SVC vdisk expansion (using the command ***svctask expandvdisksize)***. Refer to HP publication HP-UX System Administrator's Guide: Logical Volume Management: HP-UX 11i Version 3 for more information of a host-side operation.

Clustering Support

ServiceGuard 11.18 provides a new cluster lock mechanism called cluster lock LUN. SVC can support this new feature by specifying the block device name of a vdisk for CLUSTER_LOCK_LUN variable in the cluster configuration ASCII file. The lock LUN among all cluster nodes must point to the same SVC vdisk. This consistency can be guaranteed by determining the WWID of the vdisk. The lock LUN can not be used for multiple cluster lock, and can not be used as a member of a LVM volume group or VxVM disk group.

SAN Boot Support

SAN Boot is supported for all HP-UX 11iv3 releases on both HP 9000 PA-RISC and Integrity (IA64 Itanium) Servers.. Please refer to HP publication HP-UX System Administrator's Guide for details.
HP 9000 Servers have been in use for a long time and have been covered extensively in Host Attachment Guide.
HP Integrity Servers are relatively new, but have been taking more and more of a market share.
So, we'll focus on here on **SAN Boot on Integrity (IA64 Itanium) Servers:**

After OS Installation on SVC vdisk, HP-UX creates Primary Boot partition, which is set as the default choice.
The Primary Boot is the upper line of the setboot menu at the MP Server console and the boot starts in 10 seconds unless interrupted - just like normal boot.

A change to the Alternative boot partition, adding a boot disk and a boot order can be configured within the console boot menu.

There is also ***setboot*** command to list, add or modify Primary Boot, HA Alternative boot and Alternative boot from already booted OS.

To upgrade Host's or HBAs Firmware or check for the connected SAN disks can be done using EFI shell.

Known Limitations

HP-UX 11.31 0703 and 0803 hosts require that a vdisk with SCSI LUN id 0 be defined in each iogroup for the remaining disks to be recognized.

By default, the lowest available SCSI LUN id is allocated when a VDisk is mapped to a host, so 0 for the first host mapping.

But it can also be created manually, like in the following example of defining a virtual disk to host mapping with SCSI LUN id 0:
svctask mkvdiskhostmap -host <host_name | host-id> -scsi 0 <vdisk_name | vdisk_id>

Chapter 3. IBM System Storage™ TS7650G ProtecTIER De-duplication Gateway

IBM System Storage™ TS7650G ProtecTIER De-duplication Gateway Software can generate a substantial volume of write I/O during backup. SVC is more than capable of sustaining the I/O workload generated by the TS7650G ProtecTIER SW, however when used in conjunction with the SVC global mirror feature there is an additional requirement that the long distance link must be capable of sustaining the peak write workload generated during the backup. Customers who want to replicate their data de-duplication repository for disaster recovery purposes at global distances should ensure that they are using high bandwidth long distance links.

Chapter 4. Citrix Xen Server

Guest Operating support

For Guest Operating support please visit the SAN Volume Controller Supported Hardware at

http://www-01.ibm.com/support/docview.wss?rs=591&uid=ssg1S1003277
Only operating systems listed on this support matrix are supported at this time

Clustering support

Clustering Guest Operating Systems either within or across Citrix XEN servers or clustering of XEN servers is not supported.

Configuration Guidelines

Linux

Under Citrix Linux VMs are always supported in paravirtualized mode. Please use Linux based VMs in paravirtual mode only as directed by CITRIX XEN support documentation.

Windows

Under Citrix Windows VMs are always supported as HVM with paravirtualized drivers (PV) for storage and network, which should be installed from CITRIX XenServer installation CD(s). Please use Windows based VMs in HVM with PV drivers only as directed by CITRIX XEN support documentation.

Support for Windows VMs also mandates hardware virtualization support, such as Intel-VT or AMD-V based processor(s), which is a requirement for support from CITRIX. If you plan to use Windows VMs under CITRIX XEN, then make sure that the server processors have hardware virtualization support, such as Intel-VT or AMD-V based processor(s).

Chapter 5. Microsoft Hyper-V operating system

This information explains the requirements and other information for attaching the SAN Volume Controller to a variety of guest operating systems running on the Microsoft Hyper-V operating system. With Microsoft Hyper-V, you can run multiple guest operating systems on one server.

Attachment requirements for hosts running Microsoft Hyper-V operating systems

This section provides an overview of the requirements for attaching the SAN Volume Controller to a host running the Microsoft Hyper-V operating system.

- Ensure that there are enough fibre-channel adapters installed in the server to handle the

total logical unit numbers (LUNs) that you want to attach.

- Ensure that you have the documentation for the Microsoft Hyper-V operating system, the guest host operating system, and the IBM System Storage SAN Volume Controller Hardware Installation Guide. All SAN Volume Controller publications are available from the following Web site: www.ibm.com/storage/support/2145
- Ensure that you have installed the correct operating systems and version levels on your host. Be sure to review the device driver installation documents and configuration utility documents for any additional Microsoft Hyper-V or guest operating system patches that you might need.

Environments for host running Microsoft Hyper-V operating systems

Ensure that each host running the Microsoft Hyper-V operating system uses a supported level of Microsoft Hyper-V and a supported guest operating system. The following IBM Web site provides current interoperability information about supported host operating systems: www.ibm.com/storage/support/2145

Host bus adapters for hosts running Microsoft Hyper-V operating systems

Ensure that your hosts running the Microsoft Hyper-V operating system use the correct host bus adapters (HBAs). The following Web site provides current interoperability information about HBA and platform levels: www.ibm.com/storage/support/2145

Drivers and firmware for hosts running Microsoft Hyper-V operating systems

Be sure that you use the correct host bus adapter device driver and firmware levels for hosts running the Microsoft Hyper-V operating systems. The following IBM Web site provides current interoperability information about device driver and firmware levels: www.ibm.com/storage/support/2145

Installing the HBA on a host running a Microsoft Hyper-V operating system

Before you can attach the host running the Microsoft Hyper-V operating system, you must install the host bus adapter (HBA).

Before you begin

Before you install the HBA, ensure that it is supported by the SAN Volume Controller. See the supported hardware list at the following IBM Web site if you need to verify that the HBA is supported: www.ibm.com/storage/support/2145

About this task

To install the HBA, use the following general steps:

1. Shut down your host and its attached peripherals, following the manufacturer's recommendations.
2. Install the HBA, using the adapter manufacturer's installation instructions.

Installing the HBA drivers for hosts running the Microsoft Hyper-V operating systems

Follow the instructions provided by Microsoft Hyper-V to install the HBA drivers and firmware. Installing these components should be part of the Microsoft Hyper-V installation and setup process.

Configuring the QLogic HBA for host running Microsoft Hyper-V operating system

After you have installed the QLogic host bus adapter (HBA) and the device driver on hosts that are running the Microsoft Hyper-V operating system, you must configure the HBA.

About this task

To configure the HBA BIOS, either use the QLogic HBA manager software or reboot into the Fast!UTIL tool. Configure the following settings:

- Host Adapter BIOS: Disabled (unless the machine is configured for SAN Boot)
- Adapter Hard Loop ID: Disabled
- Connection Options: 1 - point to point only
- LUNs Per Target: 0
- Port Down Retry Count: 15

Set the execution throttle to a suitable queue depth for your environment. A recommended value is 100. If you are using subsystem device driver (SDD) 1.6 or higher, set Enable Target Reset to No.
See Table 14 to include the required parameters for the registry key.

Table 14. Registry key parameters for QLogic models

Key	Required parameters
HKEY_LOCAL_MACHINE>SYSTEM >CurrentControlSet>Services>ql2xxx> Parameters>Device>DriverParameters	Buschange=0;FixupInquiry=1 Note: If you are using QLogic driver version 9.1.2.11 or higher, Buschange cannot be set to zero. Refer to your device driver documentation for details.

For more information on supported QLogic models, see the following IBM Web site: www.ibm.com/storage/support/2145

Configuring the Emulex HBA for hosts running the Windows Hyper-V operating system

This section applies to hosts that are running the Windows Hyper-V operating system.
After you install the Emulex host bus adapter (HBA) and the driver, you must configure the HBA.

Before you begin

For the Emulex HBA StorPort driver, accept the default settings and set topology to 1 (1=F_Port Fabric).

Configuring the Microsoft Hyper-V operating system

You must configure the Microsoft Hyper-V operating system and the guest operating system before you can use hosts running the Microsoft Hyper-V operating system with the SAN Volume Controller.

Before you begin

Before you configure the host operating systems, the following tasks must be completed:

- The IBM service representative must have installed the SAN Volume Controller.
- You must have installed the appropriate host bus adapters.

About this task

After the prerequisite tasks are complete, use the following general steps to configure your host system. Chapter 15. Attaching to a host running Microsoft Hyper-V operating system

1. Define the host system with the worldwide port name identifiers. You will have to locate the list of worldwide port names.
2. Define the fibre-channel port configuration if it was not done during the installation of the SAN Volume Controller or fibre-channel adapters.
3. Configure the host system for the SAN Volume Controller by using the instructions in your Microsoft Hyper-V and guest operating system publications.

Multipath support for hosts running the Microsoft Hyper-V operating system

You must install multipathing software on all attached hosts that run the Microsoft Hyper-V operating system.

The following Web site provides current interoperability information: www.ibm.com/storage/support/2145

The subsystem device driver (SDD) for Windows supports dynamic pathing for hosts running Windows Hyper-V operating system.

SDD dynamic pathing on hosts running the Windows Hyper-V operating systems

The subsystem device driver (SDD) for Windows supports dynamic pathing for hosts running Windows Hyper-V operating system.

Note:

1. SDD is not supported on all operating systems. See the following Web site for the latest support information: www.ibm.com/storage/support/2145

2. When you use SDD for multipathing, you must use the FC Port driver for Emulex HBAs and SCSI Miniport driver for QLogic HBAs.
3. The SDD driver can coexist on a host running the Windows 2000 Server operating system with the IBM DS4000 (FAStT) Redundant Dual Active Controller (RDAC) or IBM DS5000 drivers. Coexistence is not supported on hosts that run the Windows Server 2003 or Windows Server 2008 operating systems.

SDD supports dynamic pathing when you add more paths to an existing VDisk and when you present a new VDisk to the host. No user intervention is required, other than is normal for a new device discovery under the Windows operating system.

SDD uses a load-balancing policy and tries to equalize the load across all preferred paths. If preferred paths are available, SDD uses the path that has the least I/O at the time. If SDD finds no available preferred paths, it tries to balance the load across all the paths it does find and uses the least active non-preferred path.

Multipathing configuration maximums for hosts running Microsoft Hyper-V operating systems

When you configure multipathing on your hosts, you must consider the maximum supported configuration limits. Table 15 provides the configuration maximums for hosts running Microsoft Hyper-V operating system. 112 SAN Volume Controller Host Attachment User's Guide
Note: Check your operating system and HBA documentation for limitations that may be imposed by other driver software.

Table 15. Configuration maximums for hosts running Microsoft Hyper-V operating system

Object	Maximum	Description
VDisk	512 (See Note 1.)	The maximum number of VDisks that can be supported by the SAN Volume Controller for a host running Microsoft Hyper-V operating system (per host object).
Paths per VDisk (See Note 2.)	8	The maximum number of paths to each VDisk. The recommended number of paths is 4.
Notes: 1. SDDDSM for Windows supports 16 paths per VDisk, but the SAN Volume Controller supports only a maximum of eight paths, to support a reasonable path-failover time.		

Clustering support for hosts running Microsoft Hyper-V operating system

The SAN Volume Controller provides clustering support for guest operating systems that support Microsoft Cluster Services (MSCS) in the Windows Hyper-V operating systems. See the following Web site for supported cluster software and other information:

www.ibm.com/storage/support/2145

SAN boot support for hosts running Microsoft Hyper-V operating systems

The SAN Volume Controller does not provide SAN boot support for guest operating systems or the base Microsoft Hyper-V operating system.

Chapter 6. IBM i Server

Introduction

The IBM Virtual I/O Server appliance version 1.5.2.1 or later is used for hosting IBM SAN Volume Controller virtualized storage to an IBM i virtual I/O client running IBM i 6.1 or later.

Attaching the San Volume Controller to an IBM i OS client and a VIOS host

This information explains the requirements and other information for attaching theSAN Volume Controller to a host running the IBM i operating systems. See the following Web site for a list of the supported operating systems and current interoperability information: http://www-01.ibm.com/support/docview.wss?rs=591&uid=ssg1S1003277

Attachment requirements for hosts running the IBM i operating systems

This section provides an overview of the requirements for attaching the SAN Volume Controller to a Virtual I/O Server with an IBM i virtual I/O client.The following list provides the requirements for attaching the SAN Volume Controller to your host.

- Check the LUN limitations for your host system. Ensure that there are enough fibre-channel adapters installed in the server to handle the total LUNs that you want to attach.
- Ensure that you have the documentation for your IBM i operating system and the IBM System Storage SAN Volume Controller: Hardware Installation Guide. All SAN Volume Controller publications are available from the following Web site:http://www.ibm.com/storage/support/2145
- Ensure that you have installed the supported hardware and software on your host,

including the following:

- Virtual I/O Server partition with VIOS 1.5 fixpack 11.1 (1.5.2.1) or later
- Supported Fibre Channel Host Bus Adapters (HBAs) -- see http://www14.software.ibm.com/webapp/set2/sas/f/vios/documentation/datasheet.html
- HBA device drivers
- SVC SDDPCM multipathing drivers
- IBM i virtual I/O client partition with IBM i 6.1 or later

The following Web site provides current interoperability information about HBA and platform levels: http://www.ibm.com/storage/support/2145

Drivers and firmware for VIOS hosts with IBM i clients

Ensure that you use the correct host bus adapter device driver and firmware levels for your hosts. The following Web site provides current interoperability information about supported device driver and firmware levels: http://www.ibm.com/storage/support/2145 .
Specific VIOS host and client information is at:
http://www-01.ibm.com/support/docview.wss?rs=591&uid=ssg1S1003278#VirtualIOServer .

Installing and Configuring the HBA driver for VIOS hosts with IBM i clients

After you install the host bus adapter (HBA) into the host machine, you must download and install the appropriate HBA driver. Follow the manufacturer's instructions to upgrade the BIOS levels for each type of HBA and follow the VIOS installation instructions for installing HBAs in VIOS.

Configuring the IBM i operating systems for use with the San Volume Controller

You must configure VIOS and the IBM i client operating system before you can use IBM i as a host with the SAN Volume Controller. Before you configure the host operating systems, the following tasks must be completed:

- The IBM service representative must have installed the SAN Volume Controller.
- You must have installed the appropriate host bus adapter and driver on your host system.After the prerequisite tasks are complete, use the following general steps to configure your operating system:
    1. Zone the Virtual I/O Server to the SAN Volume Controller on the Fibre Channel SAN.
    2. Install SVC SDDPCM on the Virtual I/O Server to enable the management of multiple paths to SAN Volume Controller virtual disks (VDisks).
    3. Create the host system on the SAN Volume Controller, using the worldwide port names(WWPNs). Map the VDisks to the host as required. Note: The IBM i

virtual I/O client supports boot from SAN with a virtual disk for the load source of 20 GB or larger.

4. Run cfgdev command on the Virtual I/O Server to configure the new disks. Use the lspath command to ensure disks are enlisted via all paths to the SVC.
5. Map the SVC LUNs (hdisks on the Virtual I/O Server) uniquely to the IBM i virtual SCSI client adapters using the mkvdev command. Note: IBM i multipathing for virtual SCSI disks is not supported. should be moved to the last section
6. Ensure on the HMC the I/O tagging for the IBM i virtual I/O client partition is correctly set for the load source and the alternate restart device.
7. Start installing IBM i 6.1 or later referring to the IBM Systems Information Center at: http://publib.boulder.ibm.com/infocenter/systems/scope/i5os/index.jsp

Multipath support for VIOS with IBM i clients

You must install SDDPCM multipathing software in the VIOS partition. The following Web site provides current interoperability information:
http://www-01.ibm.com/support/docview.wss?rs=540&uid=ssg1S7001350#AIXSDDPCM

Multipathing configuration maximums

When you configure, keep in mind the maximum configurations for hosts. The following table provides the configuration maximums for VIOS supporting an IBM i client attached to SVC:

Object	Maximum	Description
Vdisk	512	The maximum number of VDisks that can be supported by the SAN Volume Controller for a host running a IBM i operating system (per host object).
Paths per VDisk	8	The maximum number of paths to each VDisk. The recommended number of paths is 4. (See Note 1)

Notes:

1. SDDPCM for AIX actually support 16 paths per VDisk, but the SANVolume Controller supports only a maximum of 8 paths to support a reasonable path-failover time.

Important Considerations for hosts running IBM i operating systems

The following are important considerations when attaching to a host that runs the IBM i operating systems.

1. When there are 2 disks in a remote copy relationship, do not access the read-only secondary Vdisk from the IBM i host.
2. A maximum of 16 disk virtual LUNs and 16 optical virtual LUNs is supported for each IBM i virtual I/O client SCSI adapter.

3. IBM i multipathing for virtual SCSI disks is not supported.

4. SVC FlashCopy, MetroMirror and GlobalMirror is supported for IBM i full-system replication only
5. SVC Space Efficient Vdisks (SEV) are supported for IBM i for use as FlashCopy targets only

Chapter 7. SLES 10 SP2 on JS12 blades

It has been observed that if one of the HBA WWPNs is deleted from the SVC (say using SVC CLI: svctask rmhostport -hbawwpn <HOST_HBA_WWPN> <HOST_NAME>), then I/O on the SVC disks would abend on the host.

If a need arises to delete the host HBA WWPN from SVC, then for the interim solution, following steps will be useful:

1. Gracefully stop the I/O,
2. Unmount the volumes,
3. Delete the WWPN from the SVC,
4. Run multipath for host to recognize new multipath configuration
5. Re-mount the volumes.

If the above procedure does not help, then please reboot the host after deleting the WWPN and run fsck on all the volumes before remounting.

