Compaq StorageWorks

Release Notes

MA6000 HSG60 Controller ACS Version 8.5c Solution Software for Sun Solaris

This document summarizes features and characteristics of the HSG60 Array Controller (Array Controller Software Version 8.5) for Sun Solaris systems that are supported in the 8.5c release of the HSG60 Solution Software for the Sun Solaris platform kit.

These *Release Notes* provide information not covered elsewhere in the documentation. This document should be used by individuals responsible for configuring, installing, and using the HSG60 Array controller.

NOTE

This update (Version 8.5c) is software only. No documentation updates were done for this release (except for these *Release Notes).* The Installation Reference Guide will still refer to Version 8.5; this is incorrect. All references to Version 8.5 in the Installation Reference Guide should be replaced with 8.5c.

Read this entire document before installing or upgrading the software.

These release notes include the following sections:

1.0 Identifying Your ACS Software Revision Level

2.0 Hardware and Software Support

NOTE

Refer to this section for updates to SWCC
Software revision levels.

3.0 Key Features

4.0 Configuration Rules

5.0 Operating Constraints

6.0 Saving Your Configuration

7.0 Host Operating System Notes

8.0 Avoiding Problem Situations

9.0 StorageWorks Command Console (SWCC)

Intended Audience

This document has been prepared for customers who have purchased the MA6000 Fibre Channel system with an HSG60 controller, and for Compaq Customer Services personnel responsible for installing and maintaining systems that include the HSG60 array controller.

Visit our Web Site for the Latest Information

Check our web for the latest drivers, technical tips and documentation for the HSG60 Array Controller. We can be found in the technical area of our web page:

http://www.compaq.com/support

Release Package Contents

The Solution Software consists of:

- The HSG60 Solutions documentation set:

    -- *Modular Array Cabinet Restrictions EK-MACON-CA. B01*

    -- *Compaq StorageWorks Command Console V2.3 for MA6000 User Guide
        AA-RMBDA-TE*

    -- *MA6000 HSG60 Array Controller Solution Software Kit Overview
        AA-RMBCA-TE*

    -- *HSG60/HSG80 Array Controller ACS Version 8.5 CLI Reference Guide
        EK-HSG85-RG. B01*

    -- *HSG60/HSG80 Array Controller ACS Version 8.5 Maintenance and
        Service Guide EK-HSG84-SV. D01*

    -- *Registration
        MA6000, RA7000/8000, ESA10000/12000 and MA8000/EMA12000
        EK-RAESA-RC. E01*

    -- *StorageWorks Warranty Package
        Warranty Terms and Conditions   EK-HSXSW-WC. C01
        Warranty Terms and Conditions Addendum 3R-Q178A-3V. B01
        158199-021*

    -- *MA6000 HSG60 Array Controller ACS Version 8.5 Solution Software for
        Sun Solaris Installation and Configuration Guide AA-RMBNA-TE*

- CD-ROM: MA6000 Fibre Channel Solution Software V8.5c for Sun Solaris
  AG-RMBPA-BE

1.0 IDENTIFYING YOUR ACS SOFTWARE REVISION LEVEL

You can identify ACS Software Version 8.5 by entering the following command at the CLI prompt:

```
SHOW THIS_CONTROLLER
```

The resulting display lists the software revision level as the following:

```
V8.5L
```

2.0 HARDWARE AND SOFTWARE SUPPORT

This section lists the hardware and software supported by HSG60 Solution Software V8.5c.

2.1 Operating System Support

Table 1 Minimum System Requirements

Host Feature	Requirement
Platform	SPARC, Ultra SPARC
Architectures	Sun4m (SPARC 20 only), sun4d, sun4u
Operating System	Solaris 2.6, 2.7, 2.8 (32-bit mode), 2.7, 2.8 (64-bit mode)
Free Disk	500KB, before any log files
Fibre Channel Adapter	Compaq/JNI FC-1063 (SWSA4-SB) or Compaq/JNI FC64-1063 (DS-SWSA4-SC) or Compaq/JNI FCI-1063 (SWSA4-PC)
SCSI Adapters (optional)	Compaq/PTI SBS450, Sun X1065A, Sun X6541A
Controller	HSG60 Array Controller Software (ACS) Version 8.5L

NOTE: THE FOLLOWING PATCHES ARE REQUIRED FOR PROPER OPERATION:

Version	Patch Number	Patch Description
2.6	106226-01	Format
	105600-10	Isp
	105181-19	Kernel
	106125-08	Patchadd
	105375-18	Dynamic Reconfiguration
	105356-10	Dynamic Reconfiguration
	106357-04	Dynamic Reconfiguration
2.7	106541-08	Kernel
	107544-03	Fsck
2.8	N/A	N/A

2.2 Device Support

ACS Software Version 8.5 supports the devices listed in the Table 2 below at the indicated hardware levels.

Table 2 Supported Disk Drives

Device		Capacity in Gigabytes	Spindle Speed (RPM)	Minimum Microcode Version	Minimum Hardware Version
328939-B22	BD009122BA	9.1	10,000	3B07	A01
142671-B22	BD00962373 BD00962A66	9.1	10,000	BCJE B007	A01 A01
128418-B22	BD018122C9	18.2	10,000	B016	A01
142673-B22	BD01862376 BD01862A67	18.2	10,000	BCJE B007	A01 A01
188120-B22	BF00963643	18.2	15000	3B01	A01
188122-B22	BF01863644	18.2	15000	3B01	A01
176496-B22	BD03663622 BD0366349C	36.4	10,000	BDC4 3B01	A01 A01
176494-B21	BC072638A2	72.8	10,000	BDC4/BDC7	A01

2.3 StorageWorks Command Console

The StorageWorks Command Console (SWCC) version 2.3 is included in this release. SWCC provides a graphical user interface that can be used to configure and monitor your storage subsystem. Use of SWCC is highly recommended, but not required. The SWCC Agent is installed as part of the CPQfcraid package. Refer to the *MA6000 HSG60 Array Controller ACS Version 8.5 Solution Software for Sun Solaris Installation and Configuration Guide* for information about installing the solution software packages.

SWCC contains an on-line manual, which can be accessed in the on-line Help. For the latest information about SWCC refer to the product links available on the Compaq web site at:

http://www.compaq.com/products/storageworks/

2.3.1 Identifying Your SWCC Software Revision Level

The StorageWorks Command Console Client software suite for the HSG60 V8.5 consists of various components. The following SWCC components are included in this release of the Solution Software kit:

SWCC Command Console (storage window manager)	**V 2.2.0.213**
SWCC CLI Window	**V 2.0.0.33**
HSG80 ACS85 StorageWindow	**V 2.3.0.13**
HSG80 StorageWindow	**V 2.1.0.28**
HSG60 StorageWindow	**V 2.3.0.4**
HSZ StorageWindow	**V 2.3.0.47**
HSZ80 StorageWindow	**V 2.3.0.15**
HSD StorageWindow	**V 2.0.0.5**
HSJ StorageWindow	**V 2.0.0.5**

Verification of the individual components can be done with Explorer by right clicking on the particular executable program in its folder and selecting the Properties option. In the resulting Properties window, click on the Version tab and select the Product Version to display the version of the program.

2.3.2 Compaq Insight Manager Integration

This release of the SWCC Client kit is not integrated with Compaq Insight Manager (CIM). For updates on CIM integration, please check Compaq's StorageWorks Storage Management Software website:

www.compaq.com/products/storageworks/storage-management-software/swccdownload.html

3.0   KEY FEATURES

This section briefly describes features that are supported by the HSG60 controller. For more information on these features, see *MA6000 HSG60 Array Controller ACS Version 8.5 Solution Software for Sun Solaris Installation and Configuration Guide* and *HSG60/HSG80 Array Controller ACS Version 8.5 CLI Reference Guide.*

3.1 External Cache Battery

Compaq recommends that you replace the ECB every two years to prevent battery failure.

If you are shutting down your controller for longer than one day, complete the additional steps in "Shutting Down the Subsystem" in the *HSG60/HSG80 Array Controller ACS Version 8.5 Maintenance and Service Guide*. This will prevent the ECB from discharging during planned power outages.

3.2 Host Ports

The HSG60 controller has two host ports. You can specify a maximum of 64 units per port, for a total of 128 LUNs total (127 if the Command Console LUN [CCL] is enabled). The StorageWorks solution software enables 16 LUNs per port by default. However, if you need to support more than 32 LUNs, refer to Section 7.18 of these notes.

4.0   CONFIGURATION RULES

The following list outlines the configuration rules for the controller:

- Maximum 127 visible LUNs and one Command Console LUN (CCL)
- Maximum 512-GB LUN capacity
- Maximum 24 physical devices
- Maximum 8 RAID-5 storagesets
- Maximum 8 partitions of a storageset or individual disk
- Maximum 6 physical devices per RAID 1 (mirrorset)
- Maximum 14 physical devices per RAID-5 storageset
- Maximum 24 physical devices per RAID 0 (stripeset)
- Maximum 24 physical devices per striped mirrorset

5.0   OPERATING CONSTRAINTS

This section describes the operating constraints for ACS Software Version 8.5. An operating constraint is a limitation placed on the operation of the controller. Other constraints on host adapters or other system components may also apply (these are described in Section 7, host operating system notes). Keep these constraints in mind to avoid problems and to help achieve maximum performance.

5.1 Using FRUTIL to Insert a New Controller

When using FRUTIL to insert a new controller in a dual-redundant controller configuration, the user will see a new set of instructions after the new controller has been inserted:

If the other controller did not restart, follow these steps:

1. Press and hold the other controller's reset button.

2. Insert the other controller's program card.

3. Release the reset button.

NOTE

Be aware that running FRUTIL will quiesce all I/O. Consequently, never run this program when under heavy load.

5.2   Dual External Cache Battery Failures

The HSG60 Array Controller cache policy provides for proper handling of a single ECB failure as described in Table 2-8 of the *MA6000 HSG60 Array Controller ACS Version 8.5 Solution Software for Sun Solaris Installation and Configuration Guide* and *HSG60/HSG80 Array Controller ACS Version 8.5 CLI Reference Guide.* For dual ECB failures, Table 2-8 states that no failover occurs. For this release, if a dual ECB failure is detected both controllers are restarted.

6.0   SAVING YOUR CONFIGURATION

Saving a Configuration to Previously Initialized Storagesets

When enabled, the SAVE_CONFIGURATION switch allows you to do the following on single-controller configurations only:

- Save a configuration to a disk or storageset. The configuration may be retrieved later and downloaded onto a replacement controller.
- Retain code patches to the operating software.

If any storageset within your configuration was previously initialized with the INITIALIZE container-name SAVE_CONFIGURATION command to save your configuration to disk, it will not be necessary to reconfigure your devices with a new controller. SAVE_CONFIGURATION also retains code patch information to the software. This option is supported on single controller configurations only.

ACS Software Version 8.5 saves any installed software patches on disks initialized with the SAVE_CONFIGURATION option. Should you need to replace a controller and restore the configuration from a disk, you will not have to reinstall any software patches.

NOTE

> You must use the same software version when replacing the controller. You can also hold in port button 6 on the operator control panel, and press the reset button to restore the configuration.

Configuration information cannot be retrieved from storagesets created on other HSx controllers (for example, HSD, HSJ, or HSZ controllers). You can only restore a configuration from a configuration saved on this or another HSG60 array controller.

7.0   HOST OPERATING SYSTEM NOTES

7.1 Connection Table Changes

This release of Solution Software includes updated Fibre Channel (FC) adapter drivers (version 2.5.9). These drivers are included in the CPQfca, CPQfcaw, and CPQfcaPCI packages. This driver version assigns World Wide Node Names (WWNNs) differently from previous versions. This change will be evident in servers that have more than one FC Host Bus Adapter (HBA) installed. In systems with multiple FC HBAs installed, these changes will cause new connections to be created on the HSG controller when the driver is upgraded from a previous driver version.

Previous versions of the adapter drivers gave every adapter in a system a unique WWNN based on the World Wide Port Name (WWPN) of the specific adapter. The new driver (v2.5.9) assigns one WWNN per system based on the WWPN of the first adapter found. Subsequent adapters will be given this common WWNN and the unique WWPN of the individual HBA as they are initialized.

After the driver upgrade, a new connection will be generated for the second and subsequent HBA connections. The connection formerly associated with the FC HBA will be offline. The WWNN of the new connection(s) will be different but the WWPN will be the same as the offline connection. The new connection will have the same WWPN, but the WWNN will be the new common one. To restore availability of the storage volumes it is necessary to delete the old offline connection (be sure to retain the name), and rename the new connection to the old name. Follow this procedure for every connection that has changed.

Refer to Chapter 7, "Configuration Example Using CLI" of the Installation and Configuration Guide, as well as the DELETE *connections*, RENAME and SET *connection-name* commands in the CLI Reference Guide for more information on managing connections.

In installations where Selective Storage Presentation (SSP) is employed, your storage may be unavailable until you update the connection names on your controller. You will need to do the following:

- Show units full and write down SSP connections
- Disable access to SSP LUNs
- Record the connection name and unit offset
- Delete the old connection from the connection table
- Rename the new connection

- Set the unit offset for the new connection

- Enable access to SSP LUNs for the new connection name

7.2 SWCC Agent Incompatibilities

The SWCC Agent included in the 8.5 Solution Software kit is not capable of sharing a storage system with any other management application. This makes it incompatible with the SAN Appliance, for example.

If you must use the 8.5 Solution Software kit for compatibility with other software products (see interoperability document), we recommend that you update your SWCC Agent to version 3.2.1, build 79. This version Agent is included as part of the 8.5c Solution Software kit. Use the following steps to upgrade your SWCC Agent:

- After the 8.5 kit installation is complete, mount the 8.5c CD

- Stop the agent (if it is running)

- Change to the /$BASE_DIR$/steam/bin (i.e., /opt/steam/bin) directory

- Move steamd to steamd.old

- Copy the steamd file from the /cdrom/hsg80_v85c_sun/CPQfcraid/reloc/steam/bin directory to the /$BASE_DIR$/steam/bin (i.e. /opt/steam/bin) directory

- Restart the agent

7.3 SMCgawk v3.0.4 is Now Required.

We now require GNU awk (SMCgawk package) for proper operation of the RAID Manager software. You will be prompted to install the package if the installation script does not find gawk in your search path. The source code for SMCgawk is also provided in a tar file (gawk-3.0.4.tar.gz) in the root directory of the installation CD.

7.4 Multiple Agents Are Now Supported.

This release of the RAID manager software contains an updated SWCC agent, build 79 which supports locking, so multiple agents can be supported. This feature is required to use the SAN Appliance in addition to the host based agent.

7.5 Dynamic Reconfiguration is Now Supported.

The included FC Adapter drivers (fca, fcaw, fca-PCI Version 2.5.9) now support Dynamic Reconfiguration.

7.6 A Subsystem Name Cannot Use a Pipe Character.

When adding a storage subsystem, do not use the pipe character (|) in the name.

7.7 The Installation Script May Not Correctly Modify The /etc/nsswitch.conf File In NIS Configurations.

If you are using NIS, make sure that your services entry in */etc/nsswitch.conf* looks like this:

```
services: files nis
```

This will ensure the edits made to the */etc/services* file will be used.

7.8 Maximum Supported Storageset Size

With this release, Solaris can support storagesets up to 512 GB with the following limitations:

- You cannot enter the LUN logical geometry manually, it must be sensed by format automatically. LUNs configured manually are still limited to 256 GB.
- You must limit the number of sectors/track to 255 and the number of heads to 128 when the LUN is initialized. This means that you will have to use the CLI to create and initialize LUNS to ensure that these limits are observed. Use the command:

```
initialize <container> heads = 128
sectors_per_track = 255
```

- If you are using Solaris 2.6, you must have patch # 106226-01 loaded, or format will dump core.

7.9 Solaris 2.7 and 2.8 Support

Solaris 2.7 and 2.8 are supported in both 32-bit and 64-bit modes with this release.

7.10 Per-instance Device Configuration

By default, all instances of a driver for a particular adapter type are configured in the same mode (FC-SW or FC-AL) depending on the mode selected during driver installation.

If you must configure different adapter instances in different modes, you may use Option 20 of *config.sh* to change the mode for a specific adapter instance.

Note that mixed FC-SW and FC-AL mode functionality has not been extensively tested and is not supported at this time.

7.11 Limitation on Supported sun4m Systems

The only sun4m architecture machine that is supported with this release is the SPARC 20. No other sun4m machines are supported.

7.12 Installation Problems on SPARC 20 Systems

While attempting to load the CPQfcaw driver on a SPARC 20 system, the driver may fail to attach, and the following error message will appear on the console:

```
WARNING: fca0: fca_alloc_host_data: fca_dma_zalloc
failed (IMQ_queue)
```

If this happens, you must reboot your server before attempting to load the CPQfcraid package. After your server has rebooted, and the fcaw driver has successfully loaded, you may continue with the CPQfcraid installation.

7.13 Messages on Console After Driver Initializes

You may see messages similar to the following on the console after the driver initializes:

```
/kernel/drv/fca symbol ddi_model_convert_from
multiply defined
```
```
NOTICE: fca_transparent: utsname.release: 5.6
```

These messages can be safely ignored. They will be removed in a future release.

7.14 Required Patches

Do not omit the required patches (they are listed in Section 2.0 of these release notes). These patches are required for proper operation of your RAID system.

The installation program (install_stgwks) will check that you have the required patches loaded, and notify you if any are missing. Note that if any patches are missing, the installation will list all required patches, not just the missing ones.

Use the following command to list the patches already installed on your system:

```
showrev -p
```

7.15 Minimum System Memory Requirements

Due to the increased functionality and performance of the version 2.5.9 FC Adapter drivers, the Sun server memory requirements have increased. A minimum of 256 MB of memory is required in the Sun server before loading the FC adapter drivers.

7.16 Maximum Supported HBAs per System Board

For Sun mid-range servers (Enterprise X500 machines), the maximum number of adapters that may be installed in any sbus I/O tray is two. The maximum number of I/O trays is only limited by the system expandability.

7.17 64-Bit Sbus Mode

By default, the 64-bit sbus adapter is configured to operate in 32-bit mode on 4m architecture machines. This ensures a trouble-free installation on all machines. If your system has 64-bit sbus slots, you can enable 64-bit sbus operation with the following steps:

1. Open the file */etc/system* with a text editor.

2. Find the StorageWorks edits marked by, *Start of CPQfcaw edits*

3. Comment out the line that reads *set fcaw:force32=1* NOTE: In this file use the "*" character for the comment.

4. Check your edit, and save the */etc/system* file when you are finished.

5. Shut down and reboot your system. NOTE: Your system must be shut down and rebooted for the changes to take effect.

7.18 Number of Supported LUNs

This release of StorageWorks solution software adds support for 16 LUNs per port/Target. This should be adequate for most installations.

However, the HSG60 controller, and Solaris, can support up to 64 LUNs per port/Target. If your environment requires more than 16 LUNS/Target, you may perform the following work-around, keeping the following notes in mind:

NOTE

- You should have all the required patches installed.

- You may need to adjust the `sd_max_throttle` setting in /etc/system (see Section 7.19 below)

- SWCC has not been tested, and is not supported with more than 32 LUNs.

- Refer to the *driver.conf* (4) and *sd* (7D) man pages for more information.

1. Run *config.sh* and choose Option 20; Add/change adapters.

2. Chose Option 4; Modify and adapter.

3. Select the adapter that you want to modify.

4. Follow the instructions to modify the number of LUNs/Target. NOTE: Do not enter more than 64.

5. Create your LUNs on the HSG60 controller.

6. Shut down and do a reconfigure boot (boot -r), and your new units should be ready for formatting.

7.19 sd_max_throttle setting in /etc/system

Solaris defaults to a queue depth of 256 tagged commands per LUN, but it only recognizes LUN 0 on each target. The StorageWorks RAID Manager software adds support for 16 LUNs per target, but Solaris will still allow 256 queued commands per lun. With 32 luns mounted, you can have over 8000 outstanding queued requests, but the controller will only support 256 queued commands per port.

The solution is to restrict the maximum queue depth by setting `sd_max_throttle` in the `/etc/system` file. The StorageWorks Solution software has already throttled the queue depth back to 32 during the installation. This will work fine for most environments. If you will be doing heavy I/O to 16 or more luns, you will need to set `sd_max_throttle` even lower. Edit your `/etc/system` file, and change the `sd_max_throttle` entry in the CPQfcraid section. You must shut down and reboot for the changes to take effect.

Set `sd_max_throttle` so that the number of active LUNs on the port times `sd_max_throttle` is less than or equal to 256 (the maximum number of queued requests for the port). For example, 16 busy LUNs on a port will require a sd_max_throttle setting of 16 (256/16 = 16).

For more information, refer to the *system* (4) and *sd* (7D) man pages.

7.20 Manually Specifying Logical Geometry for a Large Storageset

There are two ways to configure a LUN's logical geometry:
- Automatic Mode: This is the preferred method. Storagesets up to 512 GB can be configured this way.
- Manual Mode: Manual configuration is described in this step. Note that the maximum values are smaller when using manual mode. This reduces the maximum LUN size to 256 GB when using manual mode. If you prefer to use this mode, it is documented below.

The Solaris format command is used to label and partition a storageset before a filesystem can be created on it. For large storagesets with a high number of large disks the controller may specify a geometry that exceeds the parameters supported by the format command. The maximum values supported by Solaris (when manually configuring geometry) are:
- 32767 cylinders (including 2 alternate cylinders)
- 64 heads
- 256 sectors per track

The symptoms of exceeding these maximums will vary.

Exceeding 64 heads will cause **newfs** to abort with the following error message:

```
There is no block size that can support this disk
```
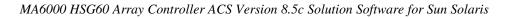
Exceeding 32767 cylinders will cause format to report an incorrect size (much higher or lower than the actual size of the storageset).

To properly configure a storageset whose logical geometry exceeds these values, follow these steps:

1. Get the size of the storageset by performing a show on the unit from the CLI on the HSG60 controller (e.g. SHOW D100). This will include a line with the following format:

```
LUN                                              Uses
-------------------------------------------------

  D100                                             S0

      LUN ID:6000-1FE1-0000-13E0-0009-8090-0624-0147

      NOIDENTIFIER
      Switches:

        RUN         NOWRITE_PROTECT          READ_CACHE
         READAHEAD_CACHE           WRITEBACK_CACHE
         MAXIMUM_CACHED_TRANSFER_SIZE = 2048
       Access:
              ALL


      State:
        ONLINE to this controller
        Not reserved
      Size: 248768478 blocks
      Geometry (C/H/S): ( 73601 / 20 / 169 )
```

2. Your actual numbers will vary depending on the exact size of your storageset. The values given represent the number of data cylinders (cyl), the number of heads (hd) and the number of sectors per track (sec). Write these numbers down.

Note that in the above example, the Solaris format command will report the cylinder count (cyl + alt) as 8065, giving a much smaller total block count for the above storageset.

3. The goal of the calculation process is to ensure that all parameters end up in the valid ranges specified earlier in this section. Throughout the calculation, the total number of blocks should remain constant or as close to the original value without exceeding it. This is achieved by dividing one value (e.g., cylinders) by the same amount as one of the other values (e.g., heads) is multiplied. In this example, we will divide the number of cylinders and multiply the number of heads by the same value: 3. This results in the following values:

   - 24533 cylinders
   - 60 heads
   - 169 sectors per track.

4. At this point, allocate the alternate cylinders (2) from the total number of cylinders to get the following values:

   - 24531 data cylinders
   - 2 alternate cylinders
   - 60 heads
   - 169 sectors per track

Write down the above data and proceed with the next step.

5. Using the **format** utility, reconfigure your storageset's logical geometry.

   - From the **main** menu, select the storageset

   - From the **type** menu, select other

   - Enter the new number of data cylinders, heads and sectors when prompted. Hit return, to take the default, for **all** other questions.

   - Use the partition command to create the desired partition table layout.

   - Use the label command to write the new geometry to the storageset.

Upon completing the above process, you will now be able to use the **newfs** command to create filesystems on the partitions you have created.

7.21 Using the "fsck" Utility on Large Storagesets

When attempting to fsck a large storageset, you may get the following error:

```
Cannot alloc 115667202 bytes for aclinop
```

The actual number is irrelevant. This error means that your system does not have enough virtual memory to fsck a large device. This is a known problem with fsck.

The solution is to add swap space with the swap -a command. Our testing has shown that up to 500 MB of free memory is required to run fsck on a 120 GB storageset.

7.22 Solaris Bootability

Using the HSG60 array controller, Solaris bootability has not been tested and is not supported.

7.23 Command Console LUN (CCL)

The HSG60 can provide a dedicated communications LUN (CCL). This can simplify the installation and operation of SWCC, but it can cause some issues under Solaris. During booting, you will get an error, "corrupt label - bad magic number". This is due to the fact that Solaris "sees" the CCL as a 320 MB read-only disk. This is just a warning, and it can be ignored. You may disable the CCL if desired, but remember that it may be used by the SWCC Agent for communications with the controller. Make sure that you have configured another LUN for communication before deleting the CCL.

7.24 Setting maxcontig and rotdelay for Filesystems

The overall performance of your configuration can be affected by your choice of maxcontig and rotdelay values. Maxcontig specifies the maximum number of contiguous blocks that will be written before inserting a rotational delay. Rotdelay specifies the time (in milliseconds) of the rotational delay.

Our testing has show that for optimal performance with the rotdelay should always be set to 0.

The maxcontig value is somewhat dependent on the number of units that are active in your HSG60 configuration. In our testing, values of 128 and 256 blocks have worked very well. Your exact value will depend on the number of storagesets in use. If your system is reporting excessive numbers of warnings (ddi_iopb_alloc failed or fca_dma_zalloc failed) your value may be too high.

Both the maxcontig and rotdelay values can be set at the time of filesystem creation with newfs flags or they can be modified at a later time using *tunefs*. When using *tunefs* the filesystem must be unmounted. See the *newfs*(1M) and *tunefs*(1M) man pages for further details.

7.25 Driver Messages

The driver initialization message may reference Solaris 2.5 and 2.6. This message is incorrect and should be ignored.

The actual supported O/S levels are listed in Section 2.0 of this document.

8.0   AVOIDING PROBLEM SITUATIONS

Under certain conditions, you may experience unusual controller behavior. This section presents information to help you avoid such situations and to recover from them if they occur.

8.1 Adding, Moving, and Changing Devices

The controller maintains a configuration map of a device's type and location. This map is used to communicate with devices. If you add, move, or change a device while the controller is powered off without first changing the controller configuration, the controller is not able to communicate with the changed device when it returns to service.

If a device is removed by mistake while the controller is off, delete all containers associated with the removed device after power has been restored to the controller.

If a device is replaced while the controller is off, remove the device before restoring power to the controller. Correctly remove the current device and add the new device after restoring power to the controller.

See the *HSG60/HSG80 Array Controller ACS Version 8.5 Maintenance and Service Guide* for correct device removal and addition procedures.

8.2 Moving Storagesets

Move only normal storagesets. Do not move storagesets that are reconstructing or reduced, or data corruption will result.

8.3 Adding, Moving, and Changing Controllers, Cache Modules, or External Cache Batteries

It is permissible to replace the controller, cache module, or external cache battery while the subsystem is shut down. However, you must enter the SHUTDOWN THIS_CONTROLLER command before shutting the subsystem down to make configuration changes. If two controllers are configured in a dual-redundant configuration, you must first enter the SHUTDOWN OTHER_CONTROLLER command.

These commands instruct the controllers to flush all unwritten data from the cache modules and discontinue all I/O activity. For more information regarding the SET controller command or maintenance and replacement of the controller, cache module, and external cache battery, see *MA6000 HSG60 Array Controller ACS Version 8.5 Solution Software for Sun Solaris Installation and Configuration Guide.*

9.0   STORAGEWORKS COMMAND CONSOLE (SWCC)

This portion of the release notes provides application information on Version 2.3 of the Command Console HSG60 Client software suite. Command Console Client, HSG60 Storage Window 2.3 is a feature-rich graphical user interface (GUI) for StorageWorks HSG60, Fibre Channel controllers.

SWCC HSG60 Storage Windows Restrictions

When installing the SWCC HSG60 Storage Window component, you must also install the HSG80 and HSG80ACS V8.5 Storage Windows components. This assures that the proper library elements are available for all of the components.

If you cannot install the HSG80 and HSG80ACS V8.5 Storage Windows or if you remove these later, you will need to execute the following command from a command line to register the required OCX component:

```
REGSVR32 C:\Progra~1\Compaq\SWCC\HSG60\PhysView.ocx
```

This path is the default path for the file *physview.ocx*.

Logical View and Physical View Note

Note that Logical View is an accurate representation of your subsystem; however, the physical view may not be an accurate representation of your subsystem.

This section of the release notes covers the Command Console Storage Manager and HS Window modules. These modules are referred to within as *"Client"*.

SWCC Manual Refresh Rate

We recommend that you do not refresh SWCC windows more often than once every 30 seconds.

Storage Area Network (SAN) Configuration

In a SAN configuration, we recommend that only one SWCC Agent be active at one time.

Document Issues

The term "Command Console" can refer to the Storage Window Manager. It can also refer to the entire Command Console product suite and all of its components, or simply as "the software".

In this section, Storage Window Manager, paging, and automatic event notification issues are presented to cover situations that Command Console Clients have been installed under an installation that includes a Storage Window Manager.

Client and Agent are intimately connected in their operation. Although these release notes are meant to cover Client issues, some Agent-specific issues are included for completeness.

More Information

For complete product information on Command Console, see the product's on-line Help. Also, for details on the features of the controller software, see the controller documentation.

9.1 Installation Notes

Be careful about the order in which you install certain SWCC products. If you install SWCC from a Fibre-Channel Switch CD-ROM kit, it may overwrite newer SWCC components that have been installed with the CD-ROM that ships with this kit. You should reinstall using the CD-ROM in this kit to ensure that you have the latest client versions.

Stand-Alone Installations

After doing a stand-alone install of a device-specific Client, exit Command Console before adding or accessing a system with that type of device. Command Console will then recognize the installation.

SWCC 1.1B Client Will Not Work if Version 2.x Client Was Already Installed

SWCC 1.1b will malfunction if you already have SWCC 2.x on a Windows NT/Windows 2000 operating system. The Asynchronous Event Service that comes with SWCC 2.x uses the same port as SWCC 1.1b. SWCC 1.1b can be removed without impacting SWCC or ServerWORKS.

Perform the following to solve this:

1. Uninstall SWCC 1.1b. Ignore the error box that appears.

2. Reboot the computer. The integration for SWCC 1.1b will have been removed.

3. Integrate SWCC 2.x with ServerWORKS.

"There is no disk in the drive" Message

When you install the Command Console Client, the software checks the shortcuts on the desktop and in the Start menu. If you have Windows NT or Windows 2000, the installation will check the shortcuts of all users for that computer, even if they are not currently logged on. You may receive an error message if any of these shortcuts point to empty floppy drives, empty CD-ROM drives, or removable disks that are no longer present. Do the following:

- Ignore the error message by clicking Ignore.

- Replace the removable disks, and place a disk in the floppy drive and a CD-ROM in the CD-ROM drive. Then, click Retry.

9.2 Clarifications

This section presents clarifications on the behavior of the software in certain situations.

SWCC Agent Uninstall

The Windows NT or Windows 2000 SWCC Agent may not be completely uninstalled (that is, the service is not removed) until a system reboots.

Operating System Considerations

Client provides a graphical interface that replaces your controller's CLI interface. It cannot, however, perform all operating system configuration necessary to make your subsystem's virtual disks visible to the user in the operating system.

When you create or delete virtual disks using either the CLI or Client, you are adding or removing "disks" in the subsystem in a manner similar to plugging or unplugging physical disk drives on the host bus. In either case, there are certain operating system configuration actions you must perform to make these "disks" visible or invisible to the operating system's file system.

Windows NT/Windows 2000 Configuration

On a Windows NT/Windows 2000 host, after you create or delete a virtual disk using Client (or the CLI), you must perform the following steps to properly configure the file system to recognize your changes.

1. Boot the host system. This action has the effect of forcing the Disk Administrator to recognize added virtual disks as raw disks, available for use. It also notes that deleted virtual disks are no longer present.

2. Create file system partitions on your disks. When you create a virtual disk in the controller, you have the option to partition it *at the controller level* in any way you wish, as long as you create at least one partition per disk. Each of the *controller-level* partitions you create becomes a virtual disk, visible to the host. In Disk Administrator, you must partition these newly added virtual disks at NT's file system (NTFS) level.

3. Once you have partitioned your drives in Windows NT/Windows 2000, the file system assigns each drive a unique drive letter. Make a note of the drive letters assigned.

4. Format your disks—You must format each newly added disk.

5. Start the Agent Configurator by double clicking its icon in the Command Console Start Menu group.

6. Navigate through the menus until a popup appears, prompting you to rescan your subsystems. Click Yes to perform the rescan and display a list of subsystems.

7. Make sure that the access device you've been using for your subsystem still exists. If you inadvertently deleted it, you must assign another device in its place. If no access device exists, Client cannot communicate with your subsystem unless the CCL is used.

8. Click the Next button until you can exit the configurator.

9. Select the Services option in the Windows Control Panel.

10. Scroll down to highlight the Steam entry.

11. Click the Stop button and wait for a prompt indicating that the service is halted.

12. Click the Start button and wait for a prompt indicating that the service is started.

13. Exit Control Panel.

14. Windows NT/Windows 2000 now recognizes any changes you may have made in your virtual disk configuration.

UNIX-Based Configuration

On a UNIX-based host and after you create or delete a virtual disk using Client (or the CLI), you must perform the following steps to properly configure the UNIX file system to recognize your changes.

1. Reboot the host system—This action has the effect of forcing the file system to recognize added virtual disks as raw disks, available for use. It also notes that deleted virtual disks are no longer present.

2. (Optional) Create file system partitions on your disks—When you create a virtual disk in the controller, you have the option to partition it *at the controller level* in any way you wish. Each of the *controller-level* partitions you create becomes a virtual disk, visible to the host.

3. Afterward, if you desire, you can partition these newly added virtual disks at UNIX's file system level. Use the appropriate commands for your operating system version to perform this task. Once you have partitioned your drives in UNIX, the file system assigns each drive a unique drive identifier.

4. Stop and Restart the Agent—Using the Agent configuration script, you must stop and restart the Agent running on your UNIX host, using the configuration program. In the program, you must choose the option to create a new *storage.ini* file. This action updates the Agent to recognize any virtual disk changes you have made.

Display in VGA Mode

There are numerous issues involving the use of Client on a system with standard, VGA resolution. The Storage window requires a minimum amount of screen space to properly display its contents. When you use VGA display resolution, screen space becomes more limited. It is highly recommended that you use Client with a minimum of SVGA (800x600) display resolution.

If you must use VGA resolution, consider the following suggestions:

*   You may not be able to see the scroll bars on the bottom of the display. You can use the Storage window's menu settings to remove the toolbar from the display to make room for the bottom scroll bars.

*   If you are using Client with a 24-device, high-availability enclosure, it may be easier to configure the subsystem if you set the system type to *Generic* for configuration purposes. Return the setting to *High-Availability 24-Device Pedestal* for monitoring and viewing.

9.3 Operating Constraints

This section describes the operating constraints for the software. An operating constraint is a limitation placed on the operation of the controller by the nature of its design. Keep these constraints in mind, to avoid problems and to help you to get the maximum performance from your controller.

Failover Mode Set in CLI

Client is intended to be used to configure and monitor your storage only, and there are some functions available in the CLI that are not available in graphic form in the GUI. If you wish to use your controller's multiple-bus failover mode, you must enable and control that function via the CLI.

Also, if you wish to use virtual disk preferencing in multiple-bus failover mode, you must set your virtual disk preferences via the CLI when you set the failover mode.

Connection Limitations

Local SCSI or serial connections are only available with standalone Storage Windows.

Some Features Dependent Upon Connection Type

Because of the nature of the connections you can use between Client and your subsystems, the features available with each connection type vary slightly. Some connection types impose limitations on Client's features, as noted in Table 5.

Table 3 Feature Limitations

Feature Connection Type	Create virtual disk	Delete virtual disk	Fault Events: Client Visual Notification	Fault Events: Paging Notification	Windows NT and Windows 2000 Fault Events: Event Logging	Email Notification (UNIX/VMS only)
Local Serial Connection (Storage Window Manager and Agent not used)	**Supported**	**Supported**	**Supported**	**Not Supported**	**Not Supported**	**Not Supported**
Local SCSI Bus Connection (Storage Window Manager and Agent not used)	**Supported**	**Supported**	**Supported**	**Not Supported**	**Not Supported**	**Not Supported**
Local Network Connection (Client and Agent running on the same host)	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
Remote Network Connection (Client running on a PC remote from Agent on a host)	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
RAS Connection (Client running on a remote PC with a dialup network connection)	**Supported but not recommended. Followup operating system configuration cannot be performed remotely**	**Supported but not recommended. Followup operating system configuration cannot be performed remotely**	**Supported reliably only while RAS intact. Some events may be missed while dialup connection is broken.**	**Supported reliably only while RAS intact. Some events may be missed while dialup connection is broken.**	**Supported reliably at host end only. Some events may be missed at Client end while dialup connection is broken.**	**Supported**

Delayed Event Notification on RAS Connections

Visual fault notification, paging, and event logging may be delayed significantly in situations where RAS connections are used for multiple Clients. An Agent with multiple Clients in its *client.ini* file must poll each Client whenever a fault occurs. Any Clients not currently network-connected significantly delay this process, because Agent must wait for their connections to time out before moving on to the other Clients.

To avoid this situation, set the *notification_method* parameter for each Client in the *client.ini* file to "0" to delete event fault notification.

CLI RUN Commands

Do not issue RUN commands in the CLI Window. Use only a maintenance terminal connection to issue RUN commands.

Creating Partition Units Across Targets or Ports

Be aware that the name you pick for a unit assigns it to a particular host bus target. If you create a unit from free space on a device, the program forces you use a unit name that puts the unit on the same host target as the other partitions on the device.

On dual-port controllers, partitions on the same device that are assigned to different host ports are not supported.

Maximum Number of Active Connections Limited

The controller maintains a table of host port connections that can contain up to 64 named connections. Only 8 of those connections can be active (that is, "on line") at any time, however. Client shows only those connections that the controller recognizes as "on line".

Avoiding Problem Situations

In certain situations and under specific conditions, you may experience unusual behavior with the software. This section presents information to help you avoid such situations and to recover from them if they occur.

Enable Read-ahead Cache Before Enabling Write-back Cache

The controller requires that read-ahead cache mode is enabled before you can enable write-back cache mode.

Incomplete Scans Cause Connection Loss

For proper display of subsystem status, Client performs a "scan" to collect information about your storage subsystems. The program displays scan progress screens while the process occurs. In some, rare situations, you may experience incomplete scans or scans that appear to hang. In these cases, the likely cause is that Client has lost its connection with the virtual disk it was using for communication with your subsystem.

This problem may show up with either local SCSI or network connections.

To remedy this situation, you must first restart both of your controllers, followed by restarting Client and Agent. If the system still does not operate properly, you must reboot your host system. If your host is running Windows NT or Windows 2000, you must ensure that the special device driver, HSZDISK.SYS or HSXDISK.SYS is installed and running properly after it is booted.

Mirrored Cache Mode Not Retained After Configuration Restore

If you restore your controller configuration from a configuration file, the mirrored cache setting may not be properly enabled. You must restore the mirrored cache setting manually, using a CLI Window.

Error Message on Exiting Storage Window

Under certain conditions, when you exit a Storage Window, you may experience an "Illegal Operation Error" message. You may ignore this message.

Inappropriate Error Message on Device Delete

If you select a disk, then chose Device/Delete, a dialog box may appear, asking "Are you sure?". If you choose the "NO" option, the message "Nothing selected to delete!" is displayed. You may ignore this message.

Storage Window Corruption After Making/Removing Spare Device

If you select a disk and make it a spare (using either menu or context menu options), then remove the device as a spare, some information in the Storage Window may be left corrupted. To reconstruct the window, you must exit the window and open a new one.

Cache Policy Not Shown in Controller Properties Sheet

The controller cache policy may not be properly shown in the controller properties sheet. The field may be blank. You must use a CLI Window to obtain the cache policy setting.

Incorrect Capacity Shown in Add Virtual Disk Wizard

In some circumstances, in Step 3 of the Add Virtual Disk Wizard, if you specify a capacity greater than the available disk capacity, an error message results. If you back up to Step 2 of the Wizard and return to Step 3, the correct capacity is then displayed. An attempt to move to Step 4 of the Wizard at this point, however, results in the same error message, even though the correct capacity is shown.

To complete your virtual disk, you must exit the Wizard and recreate the virtual disk.

Storage Window Corruption While Deleting a Virtual Disk

In some circumstances, if you delete and confirm deletion of a RAID-based virtual disk, a "Subsystem Connection Status" window may be displayed, and the Storage Window goes blank. The Storage Window may remain blank for several seconds until the "Subsystem Connection Status" window disappears.

Application Errors When Restarting Agent

You may experience an "application error" error when attempting to restart Agent after manually changing the Agent configuration files. Either of the following issues may be the cause:

- The *client.ini* file must end with a carriage return. If any other character terminates the file, it may cause an application error.

- The *storage.ini* file must not end with a carriage return. If a carriage return terminates the file, it may cause an application error.

False Restart Message on Agent Installation

When you first install a Windows NT/Windows 2000 Agent, and you modify more than one configuration parameter, the installation program may prompt you with a message indicating the Agent must be "restarted", even though it has not yet been completely installed. You may ignore this message, and you must respond to the subsequent prompt, "Would you like to start the Agent service now?" by answering "Yes".

Client Access Changes Not in Effect

After manually editing or changing the Agent *client.ini* file with a configurator program, you may notice that your Clients' access has not changed. To place your changes in effect, you must restart Agent after editing any of the Agent configuration files.

Reconfiguration After Controller Replacement

If you replace either of the controllers in your subsystem, you must reconfigure your Agent *storage.ini* file to match the serial numbers of the new hardware. See your Agent documentation for details on reconfiguring your *storage.ini* file.

Storage Window Won't Open

If you cannot open a Storage Window from the Storage Window Manager or in standalone mode, the *client.ini* ACCESS_ALLOWED parameter for your Client is probably set to "0", disabling Storage Window access. Use the Agent configuration script or edit the *client.ini* file to enable access to the subsystem.

Invalid Network Port Numbers During Installation

During Client or Agent installation, you may experience an error if the installation program cannot find an acceptable pair of network port numbers.

Your Client uses Windows sockets (sometimes called "network ports") to communicate with its Agents. The socket numbers at the Client and Agent ends must match for network communication to occur.

In Windows NT/Windows 2000, the socket numbers are assigned in the *services* file in the *winnt\system32\drivers\etc* subdirectory. In UNIX-based systems, the socket numbers are assigned in the *services* file in the */etc* subdirectory. In the unlikely event that you experience a conflict with the socket numbers, you may edit the file manually.

There are two default socket numbers, one for Command Console (4998) and the other for the HS series Client and Agent (4999). If you are installing either Client or Agent and these numbers are already taken by another application, the installation program prompts to warn you that you must choose another pair.

To select another pair for Client, open the file containing the sockets in an ASCII editor, after you have installed Client. Pick two numbers above 1023 that are not already used in the file, and add the following two lines:

```
spgui              number1/tcp # StorageWorks® Command
Console
spagent            number2/tcp # StorageWorks® Command
Console
```

Note that the port numbers that you select must match the port numbers used by all of the Clients to which you wish to connect your Agent.

Network Port Assignments for UNIX-Client/Server Systems

A UNIX host may use Network Information Services (NIS) to serve the *services* file containing its network port assignments.

Agent must use the *services* file to determine which network ports to use. Because of this requirement, you may need to configure your system so that Agent can access the proper *services* file.

You have two options to prevent a conflict between the two possible locations of the *services* file. See the Agent user guide for your particular Agent for more information.

Error on First Attempt to Make Connection
You may experience a system error such as a "Command Execution Error" on your first attempt to make a network connection using the Storage Window. If this happens, try the connection again, and it will succeed.

Client Hangs If Virtual Disk Deleted

If Client is monitoring a particular subsystem, and you delete the virtual disk being used to communicate with that subsystem, the program may hang. To delete the virtual disk Client is using for communications with an Agent, you must first reassign another virtual disk as the communications LUN, using the Agent configurator.

If you are using the CCL as your communications LUN, and you disable it, Client may lose its connection with your subsystem. If you wish to disable the communication LUN, you must first reassign another virtual disk as the communications LUN.

Invalid Cache Errors

Your controller module, cache module, and subsystem devices all contain configuration information used to keep their activity synchronized. This data is called *metadata.* The controller software reports an invalid cache error on the affected controller in situations where there is a mismatch between the metadata in the controller module and a cache module containing unwritten data. This mismatch can result in loss of the unwritten cache data if the error is not cleared properly.

CAUTION

Use extreme care in responding to the Command Console invalid cache error prompt. If you inappropriately instruct the program to delete unwritten cache data, you may lose valid user data.

Client displays a message and prompt box when an invalid cache error occurs. You must tell the program whether or not to delete unwritten cache data as the error is cleared. If you are not familiar with the proper treatment of unwritten cache data, see the information in the on-line Help documentation under the topic "Invalid Cache Errors."

Connecting Via the Host SCSI Port

Client may indicate that it cannot find your subsystem if you attempt to connect via the host SCSI port by using Windows NT/Windows 2000 in either of the following situations:

- A StorageWorks controller subsystem is connected to the host, but the subsystem has no virtual disks configured on it in SCSI-2 mode with CCL disabled.

- A StorageWorks controller subsystem is not connected to the host.
  If you are using SCSI-2 mode and Windows NT/Windows 2000, you must disable the Command Console LUN and create a virtual disk by using a serial connection. For more information on the Command Console LUN, refer to the *Compaq StorageWorks Command Console V2.3 User Guide*.

Note that because Agent uses a SCSI host bus connection to its subsystems, the same rules mentioned above also apply.

Communications Failure on Power Up with Low Batteries

If the battery in your cache is discharged when you power up the controller, the controller may produce an invalid cache error. If you are using Client as your controller interface at that time, the error may prevent communication with the controller. In this case, the controller status bar in Client changes to yellow, and the program displays a window containing error information.

To clear the error, you must exit Client and use a normal controller maintenance terminal to issue the CLEAR ERRORS INVALID_CACHE command before you can use the controller. See your controller documentation for instructions on use of the CLEAR ERRORS INVALID_CACHE command.

If the battery remains low, the invalid cache error may reappear. In this case, you can operate your controller with reduced capability, or you can change its cache policy to get around its built-in battery protection, although at some risk to your data. Refer to your controller documentation for details on its cache policy controls.

After you have cleared the invalid cache error, you can use either a normal maintenance terminal or Client as your controller interface.

Lost Connections Cause Invalid or Missing Fault Displays and Event Logging

Client receives notification for most types of changing subsystem fault conditions on the next monitor interval after they occur. You may experience invalid or lost notifications in situations in which Client's connection with its subsystems is broken. Any Windows NT/Windows 2000 event logs that might have occurred while the connection was broken are also lost.

If the connection between Client and its subsystems is broken for any reason, Client may continue to display faults that are cleared while the connection is broken. Similarly, faults that occur while the connection is broken are not displayed at all.

To avoid lost fault indications, make sure that Client's connections with its subsystems are monitored and maintained. To reestablish a connection with a storage subsystem, you must exit and restart Client.

Broken connections can occur for a variety of reasons:

- For RAS connections—It is the nature of a RAS connection that it is not a full-time connection. Events that occur during a period when the RAS connection is not made are not logged to Windows NT's/Windows 2000's event logging facility.

- For serial controller connections—Bad or missing serial cable. To repair this situation, plug in or replace the cable.

- For host port SCSI connections—Bad or missing SCSI host cable, no LUNs configured on controller on Client startup.

- For network connections—Agent missing or not running, network discontinuity, Agent not properly configured for your Clients.

- THIS controller halted, reset or hung—To repair this situation, restart or replace THIS controller.

- The virtual disk being used for communications with the storage subsystem is no longer available.

No Agent Notification Causes Invalid or Missing Fault Displays

For some types of faults, Agent does not send Client notification of changes in status as they occur. Client displays whatever fault information it last received. Following are three situations in which a fault can occur without immediate display in Client:

- The OTHER controller fails or is shut down.
- A cache battery on either controller fails or goes low.
- A cache module fails.
- A fan fails.
- A power supply fails.

In all of these cases, you can get current status by viewing the subsystem in question using the REFRESH option in the View menu.

Manual Restart Required in Some Situations

In some situations in multiple-bus mode, both controllers must be restarted to properly continue subsystem operation. Usually, this function is automatically performed by the software. If only one controller in a dual-redundant pair restarts, however, you must manually restart the other controller.

CCL Recognition

The Windows NT/Windows 2000 Agents will now recognize a CCL. The CCL cannot be assigned a drive letter because it is a logical device and must be recognized by its physical drive number. The Windows NT/Windows 2000 x86 Agents will recognize both device names (a-z) and physical drive numbers. The disk administrator can be used to find the associated drive number for any of the recognized devices.

Reservation Error Message

The Agent application, and other applications which access RAID storage through SCSI, will get a reservation error if a device is reserved by one host and another host attempts to access the same device. When this occurs, a generic I/O error will be logged.

Reservation Conflict

Agent will discard reserved LUNs from its list of devices to be statused. The reservation conflict will be recorded for each reserved LUN in the system error log. A notification will appear in the log for each LUN reserved. In addition to the system's binary error log (Tru64 UNIX), an error message will also be recorded in the *daemon.log* file. An example of the error message is "Device *lunName* is reserved and cannot be statused by steamd." This only applies to Agent during its current run. If Agent is restarted without either a) releasing the reservation or b) rescanning the bus, the reservation conflict will be recorded again each time Agent is restarted.

For **prior Agent releases**, to avoid filling the binary error log, Agent must be stopped and restarted with bus scan enabled. Agent will not record the reserved LUN in the storage.ini file, and will not status the reserved LUN.

Switching SCSI Modes

When switching HSG60 controllers from SCSI-3 to SCSI-2 mode, the host system should be rebooted after the change is made. This will clear any unclaimed SCSI-3 CCL devices from the system. Failure to clear devices can cause erratic Agent behavior or crash the NT system (BSOD). It is also recommended that you reboot when changing from SCSI-2 to SCSI-3 mode.

Add Virtual Disk Wizard Cache Functionality

The Add Virtual Disk Wizard allows you to try to add a unit that has readahead cache enabled while read cache is disabled. This is an invalid action. The controller will not allow the "add unit" to execute. The result is a storageset without an attached unit. This "orphaned" storageset may be used to create a new unit by returning to the Add Virtual Disk Wizard and adding a unit of the same redundancy level as the failed unit.

Ensure that you do not check Enable readahead cache if Enable read cache is unchecked. Refer to Step four of the Add Virtual Disk Wizard.

Add Virtual Disk Wizard – Partitioned Units and Ports Functionality

The Add Virtual Disk Wizard allows you to choose a port when adding a unit based upon a partitioned set that is different from the port of a current unit that is using the same partition.

Ensure that you use a LUN ID that corresponds to units that have already been used for a partitioned storageset. For example, if a unit using a partitioned set has a LUN ID below 100 (e.g., D55), then the subsequent units should also be below 100. Likewise, if a LUN ID is 100 or above, subsequent LUN IDs should also be above 100.

LUN ID is set on Step 4 of the Add Virtual Disk Wizard.

NT Agent CCL Access Device Recognition

For ACS 8.5 in SCSI-3, it is possible to have multiple CCLs based on the unit offsets. Agent picks the last of the set as the access device. The CCLs will not appear in the disk administrator, but are visible in the registry with their port, target, and LUN. The CCL will show as CCLp:b:t:I, each with a different target number (port bus target LUN, e.g., CCL2:1:1:0) in the storage.ini file.

In SCSI-2, you will only get one CCL, which is presented as an offline device in disk administrator. This CCL will show as "PhysicalDrive#" in the storage.ini file.

Host Non-descriptive Error Message

If the host machine running the Storage Window is not in the client.ini file of an Agent and attempts to access that Agent, a non-descriptive error message is returned. For example, "Cannot establish communication with '77FORD' ". [Socket message is incorrect type.]

Multiple Connections in Controller Properties Connections Tab

When paging through more than 8 connections in the Controller Properties window Connections tab and then pressing the Previous button to return to previous pages, some of the host id and adapter id labels may disappear. This will not affect functionality.

Selecting Disk Drives When Creating Snapshots

When creating a snapshot, if you select disk drives of different sizes, Storage Windows reports the size erroneously. Storage Window adds all selected devices together for selected capacity. The selected capacity is actually the smallest drive multiplied by the quantity of drives selected. Storage Windows will allow you to proceed when you have inadequate storage selected. When you select drives of different sizes, you should calculate the selected storage by multiplying the smallest drive by the quantity of drives selected. If you select drives of the same size, this feature functions properly.

Client Domain Network Server (DNS) Setup Application Error

You must ensure that your client DNS is set up correctly. In some situations, Storage Window will get an application error if the Host of the Agent exists but cannot be reached directly by the Client machine.

Expand Option Not Implemented

The Expand Unit option is not implemented in ACS version 8.5.

Agent Failure using Multiple Storage Windows

If the Agent fails while you have multiple Storage Windows connected to different subsystems, you may not be able to close the Storage Window. When this occurs, close the Storage Window by using Windows Task Manager.