

Implementing HP Enterprise Virtual Array Solutions

ESG9710LG0306

lab guide



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ESG9710LG0306



training

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Implementing HP Enterprise Virtual Array Solutions

Lab Guide

June 2003

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locating storage hardware

module 1 lab

Overview

This lab is intended to familiarize you with the hardware components of the Enterprise Virtual Array. The hardware components involved in this lab are:

- 41U or 42U rack
- Fibre Channel disk drive enclosure (including the disks drives and drive blanks)
- HSV controller and enclosure
- FC loop switches (present on switched hardware)
- Storage Management Appliance (SMA)
- Fibre Channel switches

In the first part of the lab, you locate the key hardware components. In the following two labs (Module 2 and Module 3), you perform tasks using the controls and displays of some of the key components to become familiar with their functions. This lab does not include removal and replacement procedures for FRUs or CRUs. Those are covered later in the course.

Objectives

After completing this lab, you should be able to:

- Locate the major components and connections contained within an Enterprise Virtual Array 41U or 42U rack.
- Locate the disk drive enclosure, components, and LEDs.
- Locate the HSV controllers, components, and LEDs.
- Locate the FC loop switches (present on switched hardware), connections, and LEDs.
- Locate the storage management appliance and connections.
- Locate the SAN switches, connections, and LEDs.

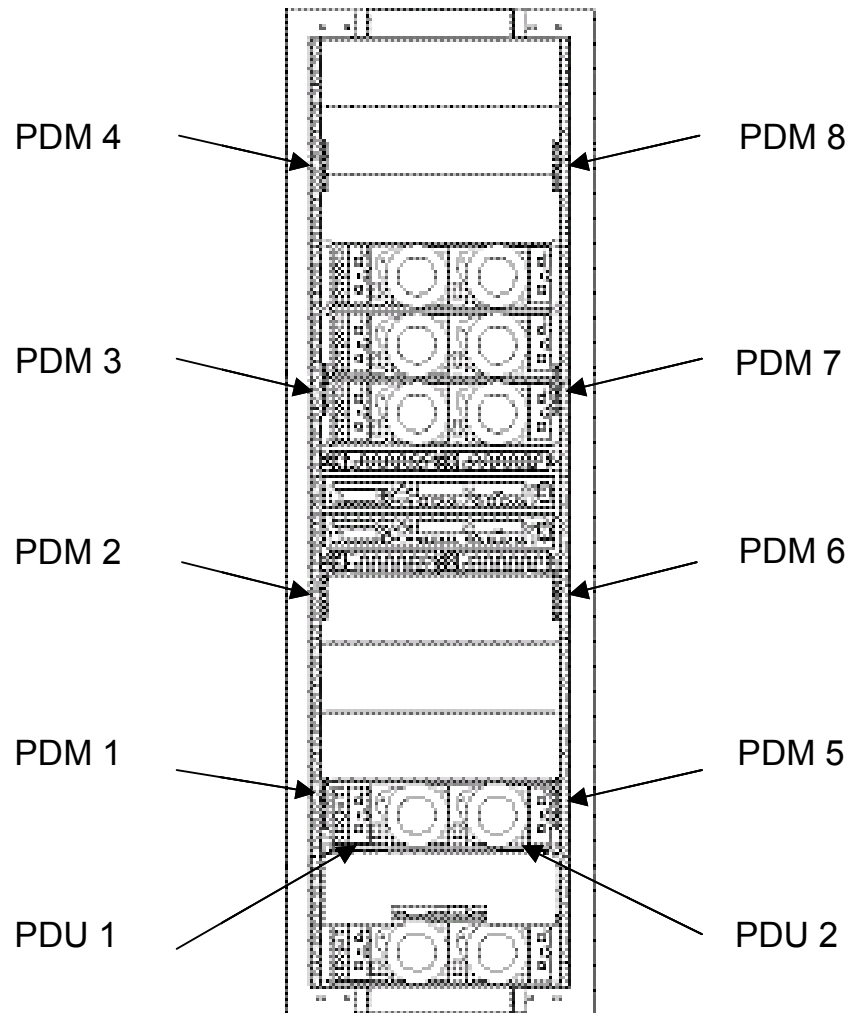
Locating the Major Components

Rack

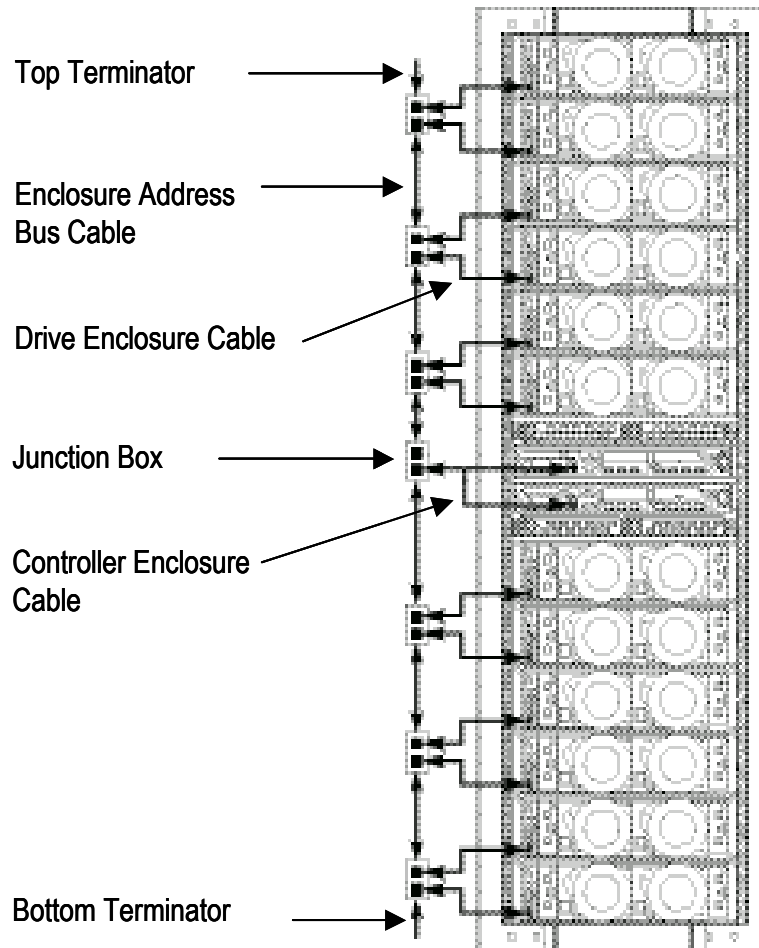
Beginning with the rack, follow the steps described below to locate the hardware component of a rack.

On a 41U or 42U rack, locate the following components:

- The **power distribution unit (PDU)** assembly — Each rack has a 50Hz or 60Hz, dual PDU mounted on the bottom rear of the rack.
- The **power distribution module (PDM)** — The power modules on the right in the rack connect to the right PDU, and the PDMs on the left in the rack connect to the left PDU. Individual power cords connect the controller and drive enclosure power supplies to these modules.



- **Enclosure address bus (EAB)**
 - Junction box (JB) — Seven per rack at 6U intervals.
 - Enclosure address bus cable — Six connecting the JBs.
 - Drive enclosure cable — Six or 12, depending on the configuration; for this lab, there are probably only six.
 - Controller enclosure cable — One cable (the Y cable) shared by two controllers.
- Top and bottom **terminators** of the EAB. You can feel these above the highest and below the lowest JBs. Also, read the top and bottom labels on the terminators (bottom terminator is difficult to reach).



Disk Drive Enclosure

Follow the steps below to locate and check the status of the disk drive enclosure elements.

1. Set the power switches on both HSV controllers to off. Apply power to the rack using the breaker on each PDU.
2. On the rear of the drive enclosure, locate the following components:

- **EMU (Environmental Monitoring Unit)**

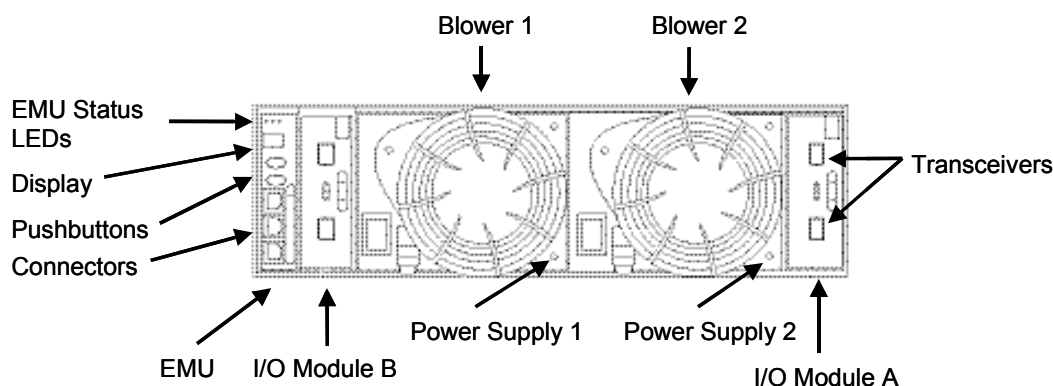
Once you locate the EMU, locate the following on the EMU:

- ♦ EMU status LEDs — Three visual indicators of the EMU and enclosure status. These are the same as the LEDs on the front.
- ♦ Alphanumeric display — Two 7-segment alphanumeric character displays of enclosure status
- ♦ Function Select “Group Selector” (top) pushbutton — Used to select a display group level or to modify the value flashing. The LED in this button is **on** when there are multiple errors.
- ♦ Display Group Select (bottom) pushbutton — Used to select a display group level or move between display groups. The secondary function of the button is to control the audible alarm. The LED in this pushbutton is **on** when the audible alarm is muted or disabled.
- ♦ Serial line RS232-only connector
- ♦ LCD only (unused RJ45 connector)
- ♦ Cab only (RJ45 connector) — Used for the EAB
- Two **power supplies** and **blowers**
 - ♦ Locate and check the status LED on the blower.
- Two **I/O modules** (A and B)

On the I/O modules, locate the following:

- ♦ Loop A input and output, and loop B input and output ports on I/O modules
- ♦ I/O status LEDs

- Fiber optic **transceivers** — Loop switch configurations use only one transceiver per I/O module. New I/O modules contain only one transceiver per I/O module.



3. On the front of the drive enclosure, locate the following components:

- **Enclosure status icons.** These are the same as on the rear of the enclosure.

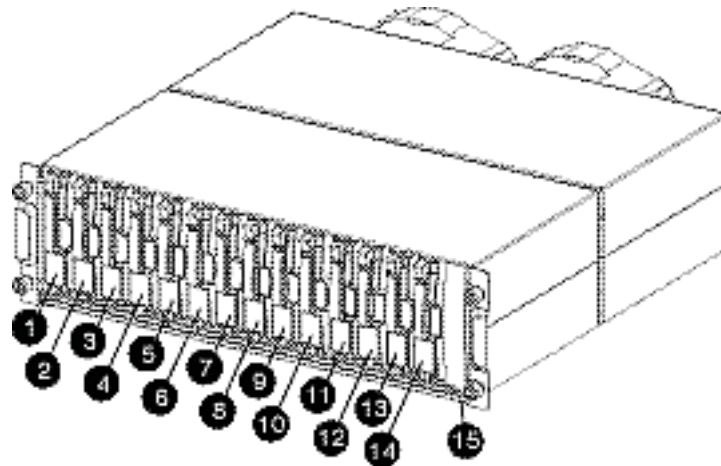
Enclosure LED Icon	LED Icon Location	LED Color
EMU heartbeat	Left	Green
Power	Middle	Green
Enclosure status	Right	Amber

- **Drive and drive bay.** Also, locate and check the following drive status icons on a disk drive:

Drive LED Icon	LED Icon Location	LED Color
Drive activity	Top	Green
Drive online	Middle	Green
Drive failure	Bottom	Amber

- ♦ Drive activity icon (top green LED). This LED is **on** when there is no bus activity or **flashing** if the drive is active or a drive locate is being performed.
- ♦ Drive online icon (middle green LED). This LED is **on** when the hard drive is online, power is supplied, or if the drive is a member of a disk group. This LED is **flashing** if a locate is being done. This LED is **off** if there is no controller on the bus, power is not available, or the drive is not properly installed.

- ◆ Drive failure icon (bottom amber LED). This LED is **off** if the hard drive is functioning properly, **flashing** if there is a drive error, or **on** during a drive locate or is nonoperational.



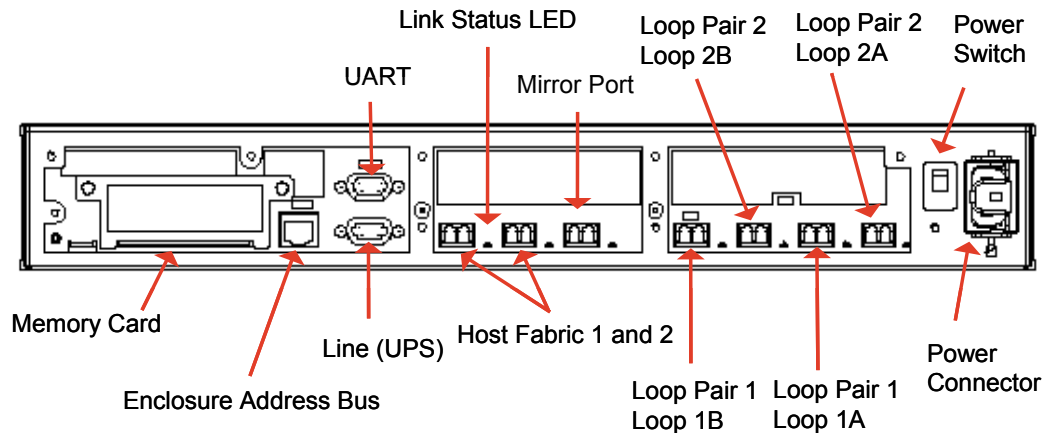
1 to 14 Drive Bays

15 Enclosure Status Icons

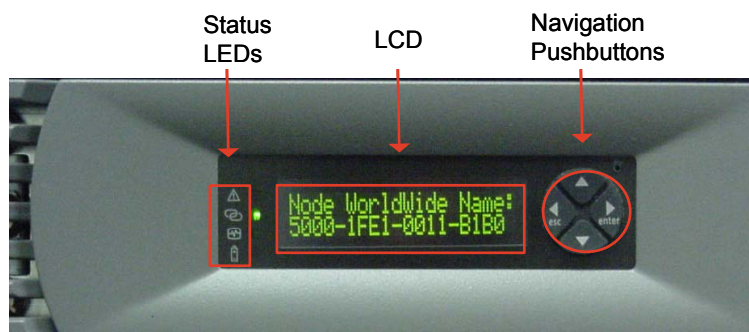
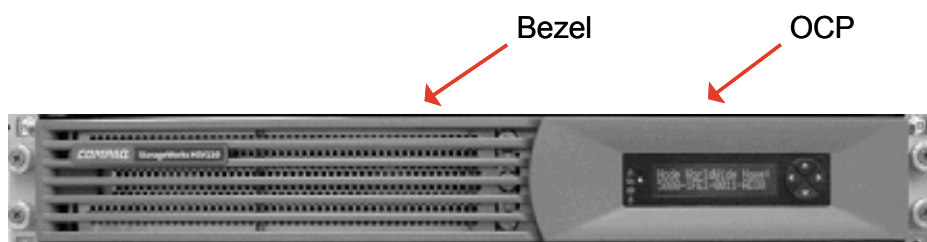
HSV Controllers and Enclosures

Follow the steps below to locate and check the status of the HSV controller enclosures and the controllers.

1. Locate the controller enclosures within the rack.
2. Set the power switches to both of the controllers to the ON position.
3. On the rear of the HSV controller enclosure, locate the following:
 - Interface to the enclosure address bus (EAB). Note that this is labeled as CAB.
 - Interface to the power distribution module (PDM). There may be two connections if you have dual power supply controllers.
 - Data and fabric connections, including connections to the following:
 - ◆ Device-side loops 1A, 1B, 2A, and 2B. There may be connections to either FC loop switches (if present) or directly to drive enclosure I/O modules A and B.
 - ◆ Mirror port and host ports FP1 and FP2
 - ◆ UART and UPS ports
 - ◆ Link status LEDs
 - Power connections, noting if it is a single or dual power supply.



4. On the front of the HSV controller, locate the following:
 - Removable **bezel** — Provides access to the blower compartment and the cache battery compartment
 - **Blower** compartment — Contains the two blowers that cool the controller
 - **Operator Control Panel (OCP)**, including the following:
 - ♦ Controller status LEDs (Fault, Host Link, Controller Heartbeat, Cache Battery Assembly)
 - ♦ 40-character alphanumeric display
 - ♦ Navigation pushbuttons
 - Node **World Wide Name (WWN)** and checksum label. Find these on each side of the HSV controllers.



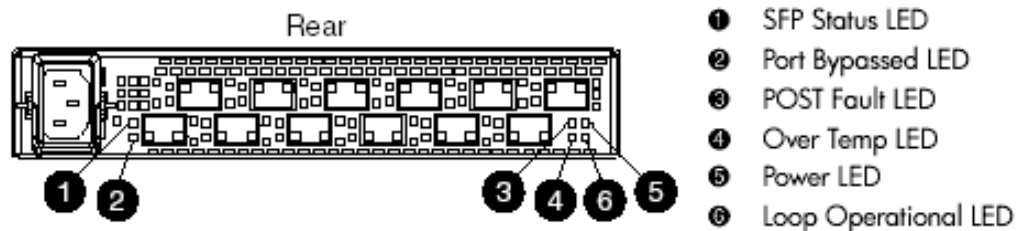
Note

The cache battery compartment that houses two lead-acid batteries is located behind the OCP.

FC Loop Switches

If you are using a switched hardware configuration, follow the steps below to locate and check the status of the FC arbitrated loop switches:

1. Locate the FC loop switches within the rack.
2. On the rear of the switch, locate the following:
 - Ports
 - System and port status LED indicators
 - Universal power supply
3. Within the LEDs, locate the following:
 - System LEDs (status of the switch)
 - ♦ Power — Green LED should be **ON**
 - ♦ Loop operational — Green LED should be **ON**
 - ♦ POST fault — Amber LED should be **OFF**
 - ♦ Over temp — Amber LED should be **OFF**
 - Port LEDs (status of the port)
 - ♦ SFP status
 - ♦ Port bypassed

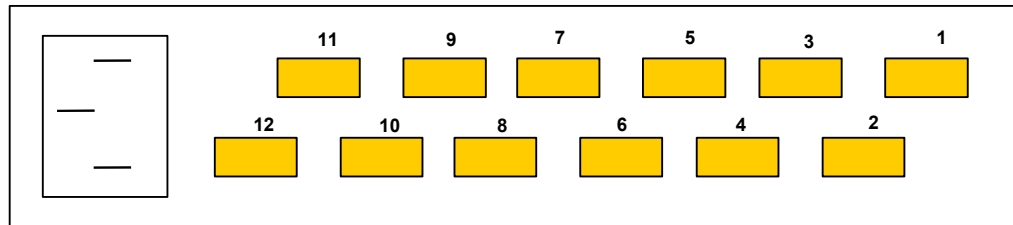


Note

Both LEDs **OFF** — Normal status of operation for ports in which SFPs are not installed.

SFP status **ON** and port bypassed **OFF** — Normal operation. Port and device are fully operational.

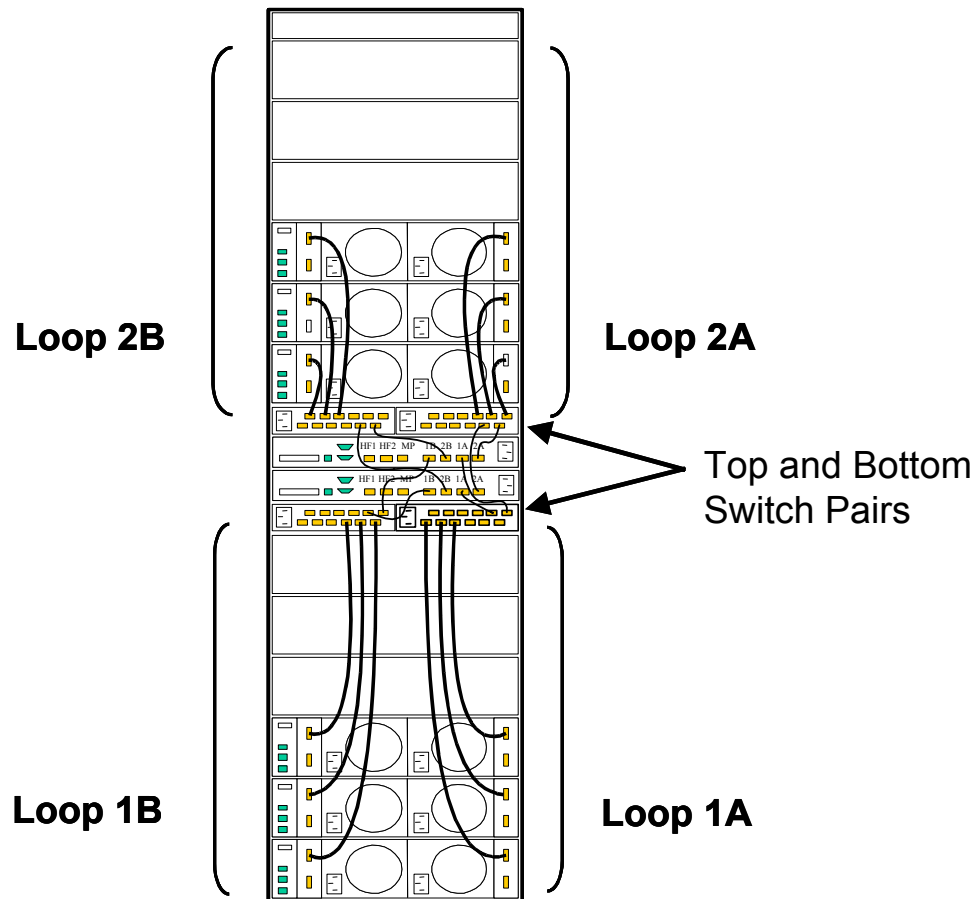
When referring to loop switch ports, refer to the switch port numbering in the following diagram.



4. Locate Fiber Channel cable connections from the Enterprise components to the FC loop switches. The following diagram shows the standard connections for a 2C6D configuration.

Note

The placement of the FC loop switches depends on your lab setup. The switches may be located at the top of the rack if you upgraded from a nonswitched hardware configuration. Otherwise, the switches should be as indicated in the diagram.



Storage Management Appliance

Locate the Storage Management Appliance and do the following:

- Verify the connection between the SMA FC host bus adapter and the fabric switch.
- Verify the Ethernet connection to the LAN.

Fabric Switches

Locate the switches and verify that the cables have been connected between each HSV controller and the two switches. Each HSV controller is connected to both switches.

Verify that the controllers are connected in either of two ways:

1. Top and bottom controller port 1 to one SAN switch
Top and bottom controller port 2 connected to the other SAN switch
2. Top controller port 1 and bottom controller port 2 to one SAN switch
Top controller port 2 and bottom controller port 1 to the other SAN switch

If using the SAN Switch 2/16, you should see two LEDs above each port:

1. Port status LED on the left
2. Port speed LED on the right

The following table describes the various indicators and conditions for each of the ports.

Port LED Location	Port LED Indicator	LED Indicator Description
Left	Black	No SFP installed, no cable, or power off
Left	Steady yellow	Receiving light, not online
Left	Slow yellow	Disabled (portDisable)
Left	Fast yellow	Faulty port
Left	Steady green	Online
Left	Slow green	Segmented
Left	Fast green	Internal, external, or cabled loopback
Left	Flickering green	Normal — Frames being transferred
Right	Dark (no light)	1Gb/s
Right	Steady green	2Gb/s

Removing Power



Important

Implementing this procedure removes power from the controller pair only. It does not remove power from the disk drive enclosures.

You should always perform a graceful shutdown when powering down the Enterprise Virtual Array.

Performing a graceful shutdown removes power from the controller pair, saves the data, and removes the storage system from Command View EVA. To remove power, you will need to use the operator control panel (OCP) to set up the controller by entering a 16-character WorldWide Name (WWN) and two-character checksum. You will also do this in the Module 2 lab.

Entering the World Wide Name

Enter the WWN by performing the following steps:

1. Note the display of the WWN entry; each of the 16 character positions should read **0**.
2. Using the WWN label found on either side of the HSV controller, press the UP or DOWN arrow pushbuttons until the correct first character is displayed. Then, press the RIGHT arrow pushbutton to accept the character and move to the next position.
3. Repeat the step above until all of the remaining WWN characters have been entered.
4. Press the LEFT arrow pushbutton to accept the WWN. You will be in the checksum entry mode.

Entering the Checksum

Enter the two-character checksum by performing the following steps:

1. The initial WWN checksum entry display is **00**, so press the UP or DOWN arrow pushbuttons until the first character display reads the correct first character. Press the RIGHT arrow pushbutton to accept the character.
2. Repeat the step above until the second character display is also correct and then press the LEFT arrow pushbutton to accept the entry.

Note

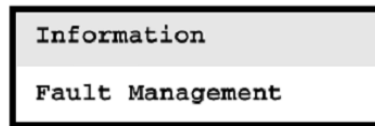
A valid checksum entry automatically selects the default display.

Powering Off the Controllers

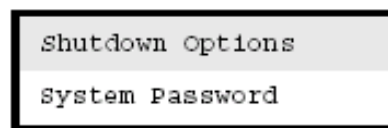
Power off the controllers by performing the following:

1. From the default display on the OCP, press the RIGHT arrow pushbutton.

The Information display appears.



2. Press the DOWN arrow pushbutton twice, then select *Shutdown Options*.



3. Once you have selected *Shutdown Options* from the above display, use the UP or DOWN arrow pushbuttons to select the shutdown method, in this case, Power Off.
4. When the Power Off system function is active, press the RIGHT arrow pushbutton to display the NO option.
5. To remove power from the controller, press the DOWN arrow pushbutton to select the YES option.
6. Press the LEFT arrow pushbutton to accept the YES option.
7. Power down both HSV controllers from the OCP, then turn off both breakers on the PDU to power down the rack.

You have completed this lab.

setting up and using the HSV controller

module 2 lab

Overview

You should perform this lab after you become familiar with the hardware components in the Module 1 lab. The only hardware component involved in this lab is the HSV controller and enclosure.

This lab does not include removal and replacement procedures of FRUs or CRUs. Those are covered later in the course.

Objectives

After completing this lab, you should be able to:

- Set up an HSV controller pair for use with the Enterprise Virtual Array.
- Locate and use the Operator Control Panel (OCP) on the HSV controller.
- Display, navigate through, and use the Storage System Menu Tree to perform all required functions on the HSV controller.

Setting up an HSV Controller

Set up the controllers by performing the following:

- Entering the 16-character node World Wide Name (WWN).
- Entering the two-character checksum.

A password will not be set up here. That will be covered in a later section of the lab.

Entering the World Wide Name

Enter the WWN by performing the following steps:

1. Set the power switches on both HSV controllers to off. Apply power to the rack using the breaker on each PDU.



Caution

Applying power to the rack when the controller power switches are ON can prevent proper controller initialization.

2. Set the power switches to both of the controllers to the ON position.

Note

Please be patient while the controllers start up.

3. Ensure **no** storage system name is assigned. If a storage system name is displayed on the operator control panel, skip to the Uninitializing the System page of this lab and uninitialize the system. Then return to step 1.
4. Note the display of the WWN entry; each of the 16 character positions should read **0**.
5. Using the WWN label found on either side of the HSV controller, press the UP or DOWN arrow pushbuttons until the correct first character is displayed. Then, press the RIGHT arrow pushbutton to accept the character and move to the next position.
6. Repeat the step above until all of the remaining WWN characters have been entered.
7. Press the LEFT arrow pushbutton to accept the WWN. You will be in the checksum entry mode.

Entering the Checksum

Enter the two-character checksum by performing the following steps:

1. The initial WWN checksum entry display is **00**, so press the UP or DOWN arrow pushbuttons until the first character display reads the correct first character. Press the RIGHT arrow pushbutton to accept the character.
2. Repeat the step above until the second character display is also correct and then press the LEFT arrow pushbutton to accept the entry.

Note

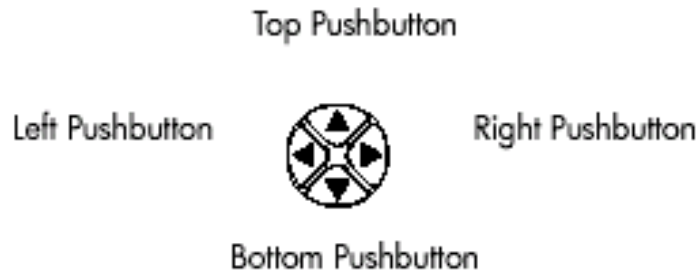
A valid checksum entry automatically selects the default display.

Displaying the Storage System Menu Tree

The storage system menu tree (shown below) allows you to select information to display or select procedures to implement.

1. Press the UP, DOWN, RIGHT, or LEFT arrow pushbuttons when either of the default displays is active (see diagram below).
2. Choose among the following to view the options:
 - Information or Fault Management — Allows you to display but not change product information.
 - Shutdown Options — Allows you to shut down the system in a logical and sequential manner that maintains data integrity and avoids the possibility of losing or corrupting data.
 - System Password — Allows you to create a system password to ensure that only authorized personnel can modify system operation and functions from Command View EVA.

The navigation buttons are *left (escape)*, *right (enter)*, *top*, and *bottom*.



The menu tree is given by the following:

- **Information**
 - *Port Config*
 - *Versions*
 - *Debug Flags*
- **Fault Management**
 - *Last Fault*
 - ◆ *Term Code*
TC: 04240960 IDX: 04
 - ◆ *LTEA[0]*
 - ◆ *Done*
 - *Detail View*
 - ◆ *Done*
 - ◆ *LTEA[0]*
- **Shutdown Options**
 - *Restart*
 - ◆ *Restart System (single HSV only)*
Yes/No
 - *Power Off*
 - ◆ *Power Off System (single HSV only)*
Yes/No
 - *Uninitialize System*
 - ◆ *Really Uninit System (all data will be destroyed)*
Yes/No
- **System Password**
 - *Change Password*
 - *Clear Password*
 - *Current Password*

Viewing System Software and Firmware Versions

Information shows the system configuration that includes: the Virtualization Controller software (VCS) version, OCP firmware and application programming interface (API) versions, and the EAB programmable integrated circuit (PIC) configuration.

1. From an active default display (Storage System Name or Node WWN), perform the following:
 - a. Press the RIGHT arrow pushbutton to display the flashing Information.
 - b. Press the RIGHT arrow pushbutton again to display Version Menu, then press the right arrow pushbutton again to select versions.
 - c. Use the arrow pushbuttons to move through and display the following information. List the versions for the following elements:
 - ♦ VCS:
 - ♦ OCP:
 - ♦ Address Bus PIC:
 - ♦ Battery PIC:
 - ♦ PowerPC Processor:
 - ♦ Quasar:
 - ♦ Glue FPGA:
 - ♦ Surge:

Uninitializing the System

This part of the Shutdown Options menu is covered first, the other parts are covered at the end of the lab. This method causes the loss of all storage system data. Because Command View EVA cannot communicate with the disk drive enclosures, the stored data cannot be accessed.



Caution

Implementing the uninitialize system function effectively destroys the storage system by removing metadata on the drives.

1. Navigate to Shutdown Options, then to the Uninitialize System menu.
2. To uninitialize the system, press the DOWN arrow pushbutton to select “YES, Really Uninitialize System?”
Press the LEFT arrow pushbutton to accept.
3. To complete the uninitialization sequence, press the DOWN arrow pushbutton to display the YES prompt (“Data will be lost! Proceed?”).
4. Press the DOWN arrow pushbutton to display the YES prompt.
5. Press the LEFT arrow pushbutton to start the uninitialization process.

Password Options

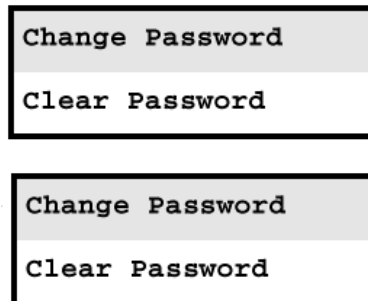
The password entry options are:

- Change a password.
- Clear a password.
- Current password.

Changing a Password

For security reasons, you may need to change a storage system password. Complete the following procedure to **set** the password.

1. Determine a new, unique, eight-character password, using the letters A through Z (uppercase and lowercase).
2. While in the main menu, press the DOWN arrow pushbutton, then select the flashing *System Password*. Press the RIGHT arrow pushbutton to display the *Change Password* option, then select *YES*.



3. Use the pushbutton to display the first alphanumeric character “A”. Press the UP or DOWN arrow pushbuttons to display the first password character.
4. Press the RIGHT arrow pushbutton to accept this character and select the second character.
5. Repeat the above procedure to select and enter characters 2, 3, 4, 5, 6, 7, and 8.
6. When all eight characters are entered, press the LEFT arrow pushbutton twice to return to the menu tree.

Clearing a Password

Complete the following procedure to remove storage system password protection:

1. While in the main menu, press the DOWN arrow pushbutton to select the flashing *System Password*, then select *Clear Password*.
2. Press the UP arrow pushbutton to select yes, then the RIGHT arrow pushbutton.

Fault Management Displays

When you do not have access to the GUI, you can display and analyze termination codes (TCs) on the OCP display. When the Fault Management display is active (flashing) you can display the last fault or display detailed information about the last 32 faults reported.

Displaying Last Fault Information

Complete the following procedure to display Last Fault information:

1. When the Fault Management display is active (flashing), press the RIGHT arrow pushbutton to select the *Last Fault* menu. Press the RIGHT arrow pushbutton to select *Term Code*.



Note

The first line of the TC display contains the eight-character TC error code and the two-character IDX (index) code. The IDX is a reference to the location in the TC array that contains this error.

The second line of the TC display identifies the affected parameter with a two-character parameter number (0-30), the eight-character parameter code affected, and the parameter code number.

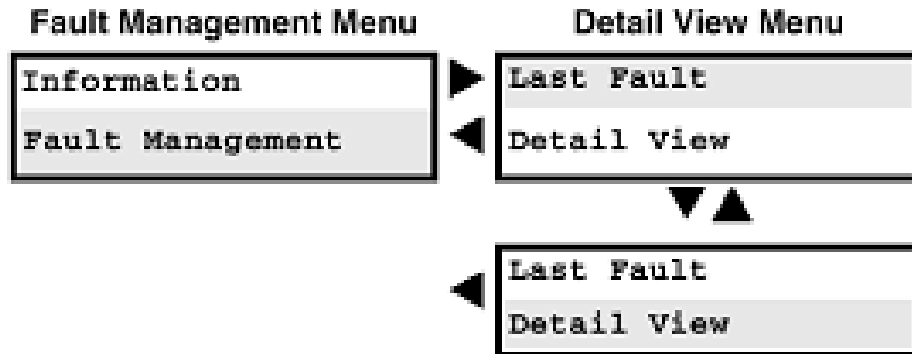
2. Press the LEFT arrow pushbutton to return to the *Done* menu, then press the right arrow pushbutton to return.

Displaying Detailed Information

The *Detail View* menu lets you examine detailed fault information stored in the Last Termination Event Array (LTEA). This array stores information for the last 32 termination events.

Complete the following procedure to display the LTEA information about any of the last 32 termination events:

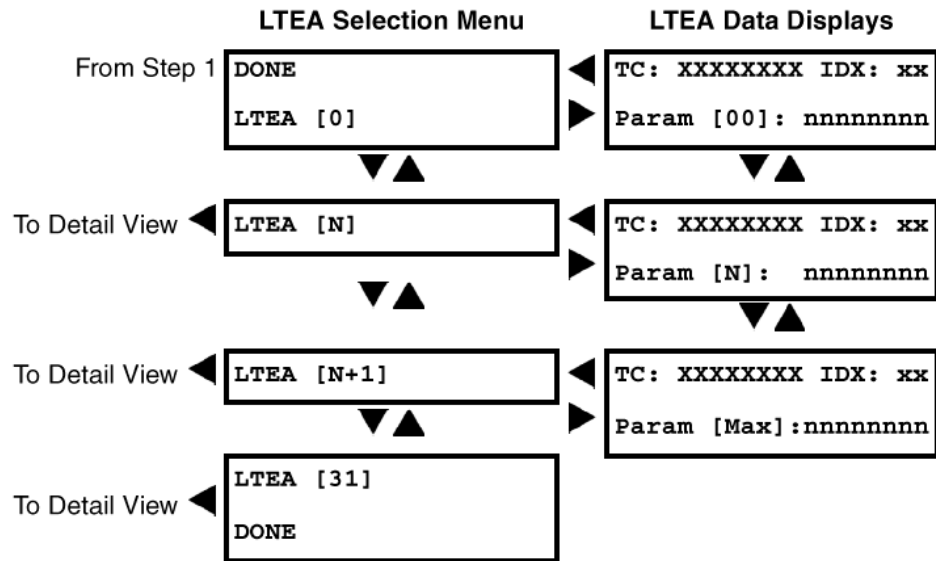
1. When the Fault Management display is active (flashing), press the RIGHT arrow pushbutton to select, then select *Detail View*.



2. When the LTEA selection menu is active (*LTEA 0* displayed), press the DOWN arrow pushbutton or the UP arrow pushbutton to increment to a specific error.

To display information about a specific LTEA, in this case *LTEA N*, press the RIGHT arrow pushbutton to observe the current data.

- Use the UP arrow pushbutton and the DOWN arrow pushbutton to move through the *LTEA N* data displays.
- Press the LEFT arrow pushbutton to escape from the *LTEA* selection menu to the previous menu.



Shutting Down the System

To ensure that you do not inadvertently activate one of the shutdown procedures, the default state is always *do not implement this procedure* (“No”).

The following are shutdown methods:

- Restart
- Power Off
- Uninitialize (this was covered in a previous section)



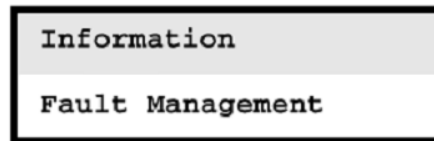
Important

If storing a system for more than 96 hours, power off the controller pair by using the OCP or Command View EVA. The HSV power off code will flush the cache and disable the batteries. Do not simply turn off the switch.

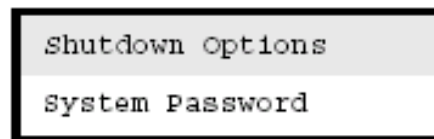
Initiate a shutdown procedure by performing the following:

1. From the default display, press the RIGHT arrow pushbutton.

The Information display appears.



2. Press the DOWN arrow pushbutton twice, then select *Shutdown Options*.



3. Once you have selected *Shutdown Options* from the above display, use the UP or DOWN arrow pushbuttons to select the shutdown method (Restart, Power Off, or Uninitializing System).

Restarting the System

Complete the following procedure to restart the system:

1. When the restart system function is active, press the RIGHT arrow pushbutton to display the restart NO option.
2. To restart the system, press the DOWN arrow pushbutton to select the YES option.
3. Press the LEFT arrow pushbutton to accept the YES option.

Removing Power



Important

Implementing this procedure removes power from the controller pair only. It does not remove power from the disk drive enclosures.

Removing power from the controller pair saves the data and removes the storage system from Command View EVA.

1. When the power off system function is active, press the RIGHT arrow pushbutton to display the *NO* option.
2. To remove power from the controller, press the DOWN arrow pushbutton to select the *YES* option.
3. Press the LEFT arrow pushbutton to accept the *YES* option.
4. Power down both HSV controllers from the OCP, then turn off both breakers on the PDU to power down the rack.

You have completed this lab.

using the EMU controls and displays

module 3 lab

Overview

You should perform this lab after you perform the Module 1 and Module 2 labs. In this lab, you perform tasks using the EMU controls and displays to become familiar with their functions. This lab does not include removal and replacement procedures of FRUs or CRUs. Those are covered later in the course.

Objectives

After completing this lab, you should be able to:

- Analyze drive enclosure status monitoring features.
- Use the controls/displays on the EMU.

Alphanumeric Display

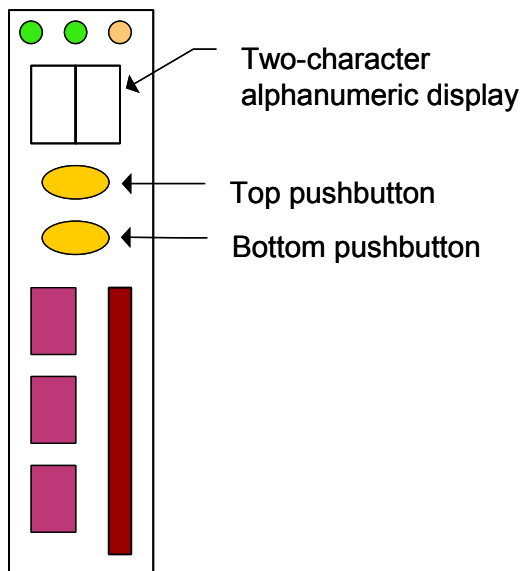
Use the alphanumeric display and pushbutton controls on the EMU. The pushbuttons control the data displayed or entered.

Note

Push and hold means push the button and hold it depressed until the operator interface changes (about two seconds). Then release the button.

Push and release means push the button and release it immediately.

Press and release the bottom pushbutton to sequentially move between and select a display group. The alphanumeric display shows a different display group.



Using the Enclosure Number Feature



Important

This material is included to show you how this feature is used. For this class, you **may not** be able to change the addresses. **Please check with your instructor before performing these procedures.**

1. Press the bottom pushbutton to change the display to **En**, the enclosure number display mode.
2. When the mode is **En**, press and release the top pushbutton to display the enclosure number.

A display of 00 indicates that the enclosure is not connected to the enclosure address bus (EAB). When this condition exists, there is no EMU-to-EMU communication over the EAB.

3. Determine the status if the display is an enclosure number in the range of 01 through 24.

Note

A display of 01 through 14 indicates that the enclosure is physically connected to the EAB and can exchange information with other enclosures on the EAB.

Enabling the Audible Alarm

To enable the audible alarm:

1. Press and release the bottom pushbutton until the alphanumeric display is **Au**.
2. Press and hold the top pushbutton to change the display to a flashing **oF** (audible alarm OFF).
3. Press and release the top pushbutton until the alphanumeric display reads a flashing **on** (audible alarm ON).
4. Press and release the bottom pushbutton to accept the change and display **Au**. The bottom pushbutton LED is now OFF (not lit).

Using the Condition Reporting Feature

The EMU reports errors to the user by changing the alphanumeric display to **Er** and sounding an audible alarm. This condition report takes precedence over all other displays.

After checking with your instructor, pull (remove) any of the following components from the Enterprise Virtual Array storage system:

- FC disk
- Disk enclosure power supply power cable

Note

The occurrence of a more severe error takes precedence and the display changes to the most severe error. The most severe error in the queue always has precedence, no matter how long less severe errors have been in the queue.

If an error condition exists, the alphanumeric display is **Er**, the top pushbutton LED is lit (ON), and the audible alarm beeps three times per cycle.

You need to know how to do the following:

- Move around the error display.
 - Move between element types.
1. Press and hold the top pushbutton to move from:
 - The element type display, then press and release the top button to display.
 - The element number display, then press and release the top button to display.
 - The error code display.
 2. Analyze the error code by referring to the Student Guide, Appendix A.
 3. Press and release the bottom pushbutton to return to the **Er** menu if there are no additional errors.

Muting, Unmuting, and Disabling the Audible Alarm

To mute or unmute the audible alarm:

1. Mute — Press and hold the bottom pushbutton until the LED is lit solid (ON).
2. Unmute — Press and hold the bottom pushbutton until the LED is no longer lit (OFF).

To disable the audible alarm:

1. Press and release the bottom pushbutton until the alphanumeric display is **Au**.
2. Press and hold the top pushbutton until the alphanumeric display is flashing **on** (audible alarm ON).
3. Press and release the top pushbutton to change the display to a flashing **oF** (audible alarm OFF).
4. Press and release the bottom pushbutton to accept the change and display **Au**. The bottom pushbutton LED is now OFF.

Note

Disabling the audible alarm only affects a single enclosure. This action does not affect condition report displays on the EMU alphanumeric display or Command View EVA.

To complete this lab, please disable all EMU audible alarms, then shut down the HSV controllers and the rack.

You have completed this lab.

setting up and using the storage management appliance

module 6 lab

Overview

This lab steps you through the processes for restoring the SMA to factory settings, powering up the SMA, establishing communication, and connecting to the SMA using a browser. After the communication is established, this lab steps you through the processes of updating software (if needed), configuring static IP addresses, and changing the name of the SMA.

Objectives

After completing this lab, you should be able to:

- Restore the storage management appliance operating system to the original default state.
- Communicate with the SMA using the Fully Qualified Domain Name (FQDN) and Remote Insight Board (RIB) ethernet name.
- Connect to the SMA using a browser.
- Log in to the SMA.
- Install the current versions of storage management appliance software.
- Configure the SMA to use static IP addresses.
- Start and restart the Command View EVA Service using the storage management appliance software and RIB.

Restoring the Storage Management Appliance

This procedure describes how to restore the storage management appliance operating system and patch to the December 2002 update by using the SANworks Management Appliance Restore CD and other service packs.

You should be aware that there are two hardware versions of the appliance, the SANworks Management Appliance and the HP OpenView Storage Management Appliance II (previously SANworks Management Appliance II). The SANworks Management Appliance uses a V1 Restore CD or a V2 Restore CD, while the HP OpenView Storage Management Appliance II uses its own Restore CD (Management Appliance II V2.0 Restore CD). You cannot use the HP OpenView Storage Management Appliance II Restore CD on a SANworks Management Appliance.

Restore Options

To support and use VCS V3.0, HP recommends that you be at the following software levels:

- HP OpenView Storage Management Appliance Software V2.0, SP3
- Command View EVA V3.0

These software levels are implemented through the following options:

1. For the SANworks Management Appliance, using the version 2.0 Quick Restore CD (patched to January 2002 update) **and**
 - Applying Storage Management Appliance Software V2.0
 - Applying any patches and service packs
2. For the HP OpenView Storage Management Appliance II, using the Management Appliance II Quick Restore V2.0 CD **and**
 - Applying Storage Management Appliance Software V2.0
 - Applying any patches and service packs

After loading the software, you should be at the required Enterprise VCS V3.0 level, that is, using the following:

- HP OpenView Storage Management Appliance Software V2.0, SP3
- Command View EVA V3.0
- VCS V3.0 (using Storage System Software V3.000)

Restore CD Availability

For the SANworks Management Appliance:

- Customers order a V2 Restore CD from hp.com as follows:
<http://h18007.www1.hp.com/products/sanworks/softwaredrivers/management/appliance/qrv20.html>
- Internal orders can be placed from ASM as follows:
<http://asmorder.nqo.cpqcorp.net/default.htm> (part number 260427-B22)

For HP OpenView Storage Management Appliance II:

- Included with the appliance hardware
- Internal orders can be placed from ASM as follows:
<http://asmorder.nqo.cpqcorp.net/default.htm> (part number 260427-B23)

The process for migrating from a SANworks Management Appliance to a HP OpenView Storage Management Appliance II does not currently give a complete update; that is, you cannot duplicate your SANworks Management Appliance image by backing up the SANworks Management Appliance configuration and restoring it to the HP OpenView Storage Management Appliance II.

Note

HP recommends using the SANworks Management Appliance Restore CD only after all other attempts to restore the operating system and storage management software applications have failed.

Restoring the Appliance

For the SANworks Management Appliance restore, use the Management Appliance Quick Restore CD (not for use with the Management Appliance II).

For Management Appliance II (HP OpenView Storage Management Appliance II) restores, use the Management Appliance II Quick Restore V2.0 CD and follow these steps:

1. Power the Management Appliance II on.
2. Insert the SANworks Management Appliance II Quick Restore CD V2.0 into the CD-ROM drive.
3. From the Quick Restore Main Menu, press the **F** key to begin a full restore. This step initiates the Quick Restore process.

Note the following additional menu options:

- Press the **E** key from the Main Menu to exit restore.
 - Press the **H** key from the Main Menu for help on the Management Appliance II build specification.
4. Press the **Y** key to confirm the deletion of all data and restore to factory default settings. This will begin the restore process.

Note the following additional menu option:

- Press the **N** key if you want to return to the Main Menu.



Caution

Once you press **Y** from the SANworks Management Appliance Main Menu, the process of restoring your Management Appliance begins. All data on the Management Appliance will be erased.

5. When instructed, power the Management Appliance II off and then on with the CD-ROM still in the drive.
6. When prompted, set the Management Appliance II date to the Current Date (for example, 04-22-2002), and press the Enter key.
7. Press the **Y** key to confirm the new date.
8. When prompted, set the Management Appliance II time to the current time in 24-hour format (for example, 13:30 for 1:30 p.m.), and press the Enter key.
9. Press the **Y** key to confirm the new time.
10. The Management Appliance II automatically begins hardware configurations. **During this process, the appliance reboots three times.** Approximately six minutes elapses before the automated configuration displays the subsequent Quick Restore SANworks Management Appliance Status Indicator screen.

11. When the hardware configuration is complete, the Management Appliance II image automatically downloads after the Status Indicator screen displays. **Approximate time for the image download is 12 minutes.**
12. After the image download is complete, the Management Appliance II begins operating system and software configurations automatically. **During this process, the appliance reboots four times.**
13. When the configuration process completes, the Management Appliance II is restored to its factory default state. The Quick Restore CD will automatically eject.



Important

You cannot browse to the appliance until you set up the network configuration (covered later in this lab).

Logging in to the Storage Management Appliance

Use the following procedures to log in to the storage management appliance:

1. Log in to the Storage Management Appliance **console** as **administrator**. The password is **adminxxxxxx**, for example, if the serial number is SMAD240FK34K111, the password is admin111K43.
2. Open Internet Explorer. If prompted, select *try again* in the no connection pop-up. If not already defaulting to the local loopback TCP/IP address (for example, **http://localhost:2301**), then browse to it.
3. Click on the splash screen.
4. Log on using **administrator**, **administrator**.

Setting the NIC IP Address

To view the static NIC IP address, perform these steps:

1. From the side navigation frame of the Open SAN Manager window, select *Applications* → *Configuration Services* → *Appliance Manager*.

2. Click *Launch*.

The software prompts you for a user name and password of the SMA operating system to access the configuration section.

3. Enter user name and password as follows:

User Name: *administrator*

Password: adminxxxxxx

Where xxxxxx = the last six digits of the SMA serial number, reversed with the alpha character capitalized.

Example

If the serial number is SMAD140FK34K111, the password is admin111K43.

A successful logon to the configuration section of the SMA displays the Appliance Manager Properties page, which provides the status of the SMA and any message that might be waiting.

4. Select *Network Setup* in the Navigation pane.

5. Select *Local Area Connection*, the network adapter.

The Adapter Properties page displays, where you can define a static IP address.

The screenshot shows the 'Compaq SANworks Appliance Manager' interface. The top bar includes 'Home', 'Help', and 'Exit' buttons. The left sidebar lists 'Appliance Manager', 'Network Setup', 'Compaq NC3163', 'Services', 'System Name', 'Date and Time', 'Time Zone', and 'Administrator Password'. The main content area is titled 'Adapter Properties' and contains the following configuration sections:

- IP Configuration**
 - Network Adapter: Compaq NC3163 Fast Ethernet NIC
 - MAC Address: 00:02:A5:74:85:DD
- Internet Address Configuration**
 - IP Settings:
 - ☐ Obtain IP configuration from DHCP server
 - ☒ Use local TCP/IP Address Configuration
- Local TCP/IP Address Configuration**
 - IP Address: 192.168.0.60
 - Subnet Mask: 255.255.0.0
 - Gateway Address: 192.168.0.10
- Internet Address Configuration**
 - DNS Settings:
 - ☐ Obtain DNS configuration from DHCP server
 - ☒ Use local DNS Configuration
- Domain Name Server Configuration**
 - Primary DNS Server Address: 192.168.0.10
 - Alternate DNS Server Address: (empty field)

At the top of the main content area, there are buttons for 'Save Changes', 'Cancel', and 'Page Help'.

6. Enter the following settings:
 - IP Settings — *Use local TCP/IP Address Configuration* is selected.
 - Local TCP/IP addresses configuration—from your lab station information sheet, enter the appropriate IP address and subnet mask.
 - A Gateway is not needed
7. Select *Save Changes* at the top of the content pane.

! **Important**
Verify all fields before saving the changes.

8. Before closing the browser window on the appliance console, use the workstation to ping the new IP address of the appliance (below).

Establishing Communication

Note

Your classroom does not include a DHCP server. The following information may be used in the lab. If needed, refer also to the HP White Paper, *SANworks Management Appliance: Configuration in a Non-DHCP Environment*, for specific instructions.

The software for the SMA is preloaded at the factory to provide plug-and-play connectivity. When the SMA initially starts, it uses Dynamic Host Configuration Protocol (DHCP) to establish an IP address; therefore, ensure that DHCP and Domain Name Service (DNS) are working in the network.

If DNS is functioning, you should be able to communicate with the SMA using the Fully Qualified Domain Name (FQDN).

Follow these steps to determine if you can communicate with the SMA using its FQDN:

1. On the **workstation**, select *Start → Programs → Accessories → MSDOS or Command prompt* (Windows 2000 and Windows NT).

On the PC, the DOS prompt may be located in a different place in the start menu.

2. Ping the SMA using the FQDN as follows:

```
c:\> ping [FQDN]
```

Example

```
c:\>ping smad140fk34k111
```

The SMA responds with a message similar to the following:

```
Pinging smad140k34k111 [10.10.10.10] with 32

Reply from 10.10.10.10: bytes=32 time<10ms TTL=128
Reply from 10.10.10.10: bytes=32 time<10ms TTL=128
Reply from 10.10.10.10: bytes=32 time<10ms TTL=128
Reply from 10.10.10.10: bytes=32 time<10ms TTL=128
```

If DNS is not functioning, you may get the following response:

```
Unknown host smad140fk34k111
```

If so, check the hosts file per the following instruction:

If the host replies with a ping, close the Appliance Manager screen on the storage management appliance console.

Adding an IP Address to the Hosts File

Follow these steps to add the SMA IP address to the host's file to perform local name resolution.

1. From the desktop, select *Start → Search → For Files or Folders*.
2. Type *hosts*, and press *Enter*.
3. Double click on the **hosts** file located in the `c:\windows\system32\drivers\etc` directory.

Open the file with Notepad.

4. Edit the file by adding an entry similar to the following at the end of the file:
`10.10.10.14 smad140fk34k111`
5. Save your changes and close the file.

Applying the Storage Management Appliance Software V2.0 Update (December 2002)

Use this procedure to update from Open SAN Manager (OSM) V1.0C to Storage Management Appliance Software V2.0 when you are logging on to the storage management appliance remotely through a web browser.

1. Log on to your storage management appliance.
2. Choose *Applications* → *Installation Services* → *Install Products*.
3. Choose the CDROM method to install the update.
4. Insert the update CD-ROM into the CDROM drive of the storage management appliance.
5. Click *Next Step*.
6. Choose *Storage Management Appliance V2.0* from the drop-down list.
7. Click the *Install* button at the top of the page.

An informational dialog box appears asking you to confirm the software installation.

8. Click *OK*.

An installation progress page displays.

During this phase of the installation process, another page displays explaining that a system reboot is required. A timer is displayed that counts down the time until the process is complete. Be sure to wait until the system has rebooted and logged you back in before using the new version of storage management appliance software.

This process takes approximately 45 minutes.

9. Once the installation has finished, the Storage Management Appliance Software V2.0 starts up automatically.

Applying the Storage Management Appliance Software V2.0 Service Pack 3 (May 2003)

After you upgrade to Storage Management Appliance Software v2.0, you must use the HP OpenView Storage Management Appliance Software v2.0 Service Pack 3 Install CD to install the following service packs and patches:

- HP OpenView Storage Management Appliance Software v2.0 Service Pack 1a
- Microsoft SQL Server Virus (W32.SQLExp) Security Patch
- Microsoft Windows 2000 Security Patch–DisableWebDAVPatch.SWP
- HP StorageWorks Command View EVA v3.0
- Fibre Channel HBA Performance Optimization patch

To apply Storage Management Appliance Software V2.0 Service Pack 3, use the CD supplied by your instructor and follow directions. Refer to the following topics for more detail on installing SP1a, the Microsoft SQL Server Security Patch, and Command View EVA V3.0.

Applying the Storage Management Appliance Software V2.0 Service Pack 1a

Service Pack 1a addresses a communication problem between Network View V2.0B and the Enterprise Virtual Array. To apply the Storage Management Appliance Software V2.0 Service Pack 1a, use the CD supplied by your instructor and follow directions.

INTERNET

You can also download Service Pack 1a by going to the following website:

<http://h18000.www1.hp.com/products/sanworks/softwaredrivers/managementappliance/v20-sp1.html>

Applying the Microsoft SQL Server Security Patch

A Microsoft SQL Server virus named **W32.SQLExp** (also known as **W32.Slammer**) exploits a security hole in SQL Server, resulting in high-level Internet traffic. Because the storage management appliance is vulnerable to the **W32.SQLExp** virus, you must apply a security patch.

To apply the security patch for **W32.SQLExp**, perform the following:

1. Reboot the storage management appliance.
2. Open a Terminal Services session or attach a keyboard, monitor, and mouse to the storage management appliance and log on to the storage management appliance.
3. Stop all services by running the **StopAllApps** batch file found in the following directory on the storage management appliance:
C:\Program Files\Compaq\SANworks\OSM
4. Install the SQL Server 2000 patch (8.00.0686) from the following website or from a CD supplied by your instructor:
<http://support.microsoft.com/default.aspx?scid=kb;en-us;Q316333&sd=tech>
5. Reboot the storage management appliance.

Upgrading to Command View EVA V3.0

This section describes how to install HP storage management applications on the SMA. This material is taken from the *HP StorageWorks Command View EVA Version 3.0 Installation Instructions* and does not contain procedures for downloading from an FTP server. Refer to the document for complete instructions.

Installing Command View EVA on the SMA

One or more of the following may be required to complete this procedure:

- Product name — Command View EVA
- Product CD-ROM, if using the CD-ROM installation method
- Network package file name (SWP) — **Command_View_EVA_V3_0.swp**

Install the Command View EVA software using the following procedure:

1. Close all browser windows, Microsoft Management Console (MMC) sessions, Terminal Services sessions, and Java applets that are open to and on the SMA.
2. From a client computer, launch a Web browser and browse to the SMA, using the following format:
`http://<appliance_name>`
3. Log in to the SMA using a valid username and password.
4. Click *Settings*.
5. Click *Maintenance*.
6. Click the *Install Software* option.

An Installation Wizard page displays.

Note

If reinstalling or updating the Command View EVA application, make sure the application is not running before proceeding. Click the *Manage Tools* link and stop the application service, if required.

7. Click *Next* at the bottom of the page.
8. Determine the installation method to use from the following list and continue in the appropriate section below:
 - CD-ROM Drive on the storage management appliance
Use this option only for HP storage management products that are shipped on a CD-ROM.
 - Local Disk on the storage management appliance
Use this option to install an SWP file from the SMA hard disk installation kits directory.

Using the CD-ROM Drive on the Storage Management Appliance

Use the following procedure if the installation method is the CD-ROM drive:

1. Choose *CD-ROM Drive on the Storage Management Appliance*.
2. Click *Next* at the bottom of the page.
3. When prompted, insert the Command View EVA CD-ROM in the SMA CD drive, if not previously positioned.
4. If necessary, choose *command view eva* from the drop-down list.
5. Click *Next* at the bottom of the page.
6. Click *Next* to initiate the installation.

For example, the display states:

Installation is in progress.

Time to completion depends on the size of the application and the network connection speed. After approximately 5 minutes, the display states:

Installation is complete.

Command View EVA - Installation Complete.

Note

In some cases, the display may indicate **Rebooting this Appliance**.

If an installation fails for any reason, the SMA does not permit a subsequent installation attempt for 1 hour following the failed attempt. Beginning an installation attempt during this one-hour period displays an error message.

7. Click *Finish*.
8. Verify that a *command_view_eva* entry exists on the Devices page.
 - If yes, stop, the installation is complete.
 - If no, return to step 4 under the topic **Installing Command View EVA on the SMA** to repeat the installation.

Using the Local Disk on the Storage Management Appliance

Use the following procedure if the installation method is the local disk on the SMA:

1. Choose *Local Disk on the Storage Management Appliance*.
2. Click *Next* at the bottom of the page.
3. Choose *SMA2SP1a.swp* from the drop-down list.
4. Click *Next* at the bottom of the page.
5. The screen will return with the file display name
Storage Management Appliance V2.0 SP1a.
6. Click *Next*.
7. Click *Finish*. The management appliance will return to the Maintenance page.
8. Click *Install Software*.
9. Click *Next*.
10. Select the location of the file — *Local Disk on the Storage Management Appliance*.
11. Repeat the above process (step 3 - step 10) for each of the files shown in the following table in sequence.

File Name File	Display Name
DisableWebDAVPatch.swp	Disable Web Authoring Patch
Command_View_EVA_V3_0.swp	Command View EVA V3 0
FCHBAPerfEnhancements.swp	FibreChannel HBA performance optimization

Continue with step 12.

Note

If the file names do not display in the drop-down list, verify that the swp files are located in the **C:\Compaq\SWPInstallKits** directory.

12. Verify that a *command_view_eva* entry exists on the Devices page.
 - If yes, stop, the installation is complete.
 - If no, return to step 4 under the topic **Installing Command View EVA on the SMA** to repeat the installation.

Starting and Restarting the Command View EVA Service

Follow these steps to start and restart the Command View EVA service:

1. From the session pane, select *Settings*.
2. Click *Manage tools* in the Content pane.

A list of relevant services displays with **running** or **stopped** status. A Start or Stop button for each service is provided, depending on the present state.

3. If not already started, click *Start* next to the Command View EVA service.

Starting and Restarting the Command View EVA Service Using the RIB

Follow these steps to start and stop the Command View EVA service using the Remote Insight Board:

1. On the workstation, point the web browser to **http://<RIB-IP-address>**.
2. Log in to the RIB board as *Administrator*.
See SMA attached tag for password.
3. Select *Remote Console (Full)* or *Remote Console (Frame)*.
4. Log in to Windows as administrator, adminxxxxxx.
5. From the remote console view, select *Start* → *Programs* → *Administrative Tools* → *Services*.
6. Select service NSA Server to restart Command View EVA.
7. Select *Stop* or *Start* (or *Restart*) for this service as required.

You have completed this lab.

configuring storage and hosts

module 8 lab

Overview

After the hardware is set up and associated firmware is loaded, you configure the storage system to be used by hosts using Command View EVA. This lab steps you through the processes of initializing the storage system for a first-time configuration, adding hosts to the storage system configuration, creating and deleting disk groups and virtual disks, and presenting and unpresenting virtual disks to a host. It also steps you through the processes of creating fully-allocated (Traditional) snapshots and demand-allocated (Virtually Capacity-Free) snapshots and snapclones.

Objectives

After completing this lab, you should be able to:

- Launch Command View EVA on the SMA.
- Perform a code load.
- Initialize an Enterprise Virtual Array storage system.
- Uninitialize an Enterprise Virtual Array storage system.
- Identify the Command View EVA window panes.
- Request main system, page, and field online help.
- Create, modify, and delete disk groups.
- Create folders.
- Add a host to the storage system.
- Remove a host from the storage system.
- Remove a host Fibre Channel adaptor (FCA).
- Add ports to a host.
- Create, modify, and delete virtual disks.
- Present virtual disks to a host.
- Unpresent virtual disks to a host.
- Create and delete fully-allocated and demand-allocated snapshots.
- Create and delete snapclones.

Launching Command View EVA

You launch the Command View EVA software through Storage Management Appliance software. Follow these steps to launch the Command View EVA software.

1. Connect to the SMA through a browser by entering the fully qualified domain name (FQDN) of the appliance in the address box.
For example, if the name of the appliance is smad140fk34k111, enter the URL as:
http://smad140fk34k111:2301.
2. On the Device Home Page, click on the button for the HP OpenView Storage Management Appliance.
3. Log in to the Storage Management Appliance software as follows:
User name: **administrator**
Password: **adminxxxxxx** (see Note)
Click *OK*.

Note

Your instructor will either have the password posted or will give it to you.

4. In the Storage Management Appliance home page, select *Devices* → *Command View EVA* to start Command View EVA.

Performing a Code Load

Note

A valid Basic license must be registered on the SMA for the Enterprise Virtual Array before you are allowed to perform a code load or initialization. A floppy disk may be provided by the instructor for the licenses.

A code load allows you to load superimage files (files with **.sss** extensions) to the SMA from a CD, and then download them to the Enterprise Virtual Array. You can perform a code load on an initialized or uninitialized storage system.

Follow these steps to perform a code load on an uninitialized storage system:

1. Select *HSV Storage Network* → *Uninitialized Storage System* in the left pane.
The Uninitialized HSV Storage System Properties page displays.
2. Click the *Code load* button to initiate the Code Load wizard.
3. After clicking *OK* at the prompt, enter the path to your controller firmware image file, or browse to select one.
4. Click *Next step* to upload the controller firmware image to the SMA.
The Code Load Storage System page displays.
5. Read the information presented on this page, and click *Next step* to download the firmware file to the Enterprise Virtual Array.
6. Click *OK* at the prompt and wait for the process to complete and for the controllers to restart.

Initializing the Enterprise Virtual Array

You must initialize the storage system before you can use the storage system. This initialization process creates the default disk group. You can add other disk groups after the initialization process. Command View EVA provides a wizard to step you through this process.

Follow these steps to initialize the Enterprise Virtual Array storage system:

1. Select *Uninitialized Storage System* from the HSV Storage Network folder in the left pane.
2. Click *Initialize* on the Uninitialized HSV Storage System Properties page.

This initiates the Initialize an HSV Storage System wizard.

Note

If the SMA does not have a license loaded for the specific Enterprise Virtual Array you are managing, you are prompted to enter a license key.

Enter the license key if required.

3. Enter a name in the text box to identify your storage system controller. Names can be up to 20 characters in length.
4. Enter the number of disks (a value between eight and the number of disks on your system) to include in the Default Disk Group. The maximum number is 240. More disks can be added later as required.
5. Click *Advanced options*.

Note

You have the option to click *Finish* to initialize the system with default values (eight disks and data protection level of None).

6. Enter the Console LUN ID if the host machine requires it. Operating systems that require a unique ID for their devices must set this ID by entering a number between 1 and 32767. The default setting is 0 (disabled).
7. Click *Next step*.

8. Select the disk group protection level.

This identifies the method by which a controller pair sets aside reserve capacity within the disk group to take over the functionality of a failed or failing physical disk drive. The options and descriptions include the following:

- None (default)
- Single — Capacity of two physical disks is reserved.
- Double — Capacity of four physical disks is reserved.

9. Click *Next step*.

10. Optionally enter comments in the comment box.

11. Click *Finish* to initialize your Enterprise Virtual Array.

12. In the Navigation pane, select *Disk Groups* from the initialized storage system folder.

The Disk Group Folder Properties page displays in the right pane.

13. In the Navigation pane, select *Default Disk Group* from the initialized storage system folder.

The disks that comprise the Default Disk Group are listed in the Navigation pane. The Disk Group Properties page displays in the Content pane.

Note the occupancy alarm-level entry. The default value is 95%, the percentage of total disk capacity. When the amount of data in the disk group reaches this level, an event code is generated on the SMA. For example, if the capacity of a disk group is 5GB, and the occupancy alarm level is 80%, the event code is generated when the amount of data in the disk group reaches 4GB.

Getting Familiar with the GUI and Online Help

The Command View EVA interface is divided into a Session pane, Navigation pane, and Content pane. From the Session and Content panes you can request online help. Refer to the Student Guide for details.

Follow these steps to explore each of the window panes and request online help:

1. With the HSV Storage Network Properties page displayed, locate the following:
 - Session pane
 - Navigation pane
 - Content pane
2. In the Navigation pane, select an initialized storage system, then select *Virtual Disks*.

The *Vdisk Folder Properties* page displays in the Content pane of the Command View EVA window.

3. Click *Create Vdisk*.
4. Request online help by performing each of the following:
 - a. Click *Help* on the Session pane to start the main help system. You can select a Command View EVA version number. Once you do, you can select options for a table of contents, index, or keyword search.
Close the main help system window.
 - b. Click the question mark (?) at the top right of the Content pane to view help on the specifics of the page.
Close the page help window.
 - c. Click the question mark (?) located next to a text box to view field help.
Close the field help window.
5. Click *Cancel* at the top of the Content pane to exit from the Create Vdisk page.

Creating a Disk Group After Initialization

Once you initialize the storage system, you can create additional disk groups. Command View EVA provides a wizard to step you through this process. The only required step is to provide a disk group name. If only this information is supplied, the disk group is created with the following default values: eight disks and a disk protection level of None. Optional steps enable you to specify the number of disks to include in your disk group, as well as other details.

Follow these steps to create an additional disk group:

1. In the Navigation pane, select the initialized storage system.
2. Select *Disk Groups*.

The Disk Group Folder Properties page displays in the Content pane.

3. At the top of the Content pane, click *Create disk group*.

This initiates the Create a Disk Group wizard.

4. Enter a disk group name.
5. Click *Advanced options*.

Note

You have the option to click *Finish* to create a disk group without further definitions.

6. Enter the number of disks (between eight and the maximum number of ungrouped disk drives available on your system) to include in the disk group.
7. From the drop-down list, select the disk group protection level.
8. Click *Next step*.
9. Enter the occupancy alarm level (minimally should be 90%).
10. Enter comments in the comment box.
11. Click *Finish* to create your disk group.
12. In the Navigation pane, select the disk group you just created and view the disk group properties.

Adding a Host

A host is a collection of Fibre Channel adapters (FCAs) that belong to the same virtual server. Before a host can use the storage system's virtual disks, you must make the host known to the storage system by adding a host entry using Command View EVA. Adding a host creates a path from the storage system to one FCA. You can also add a second FCA port. A host can be added any time after you initialize the storage system. The procedure to add a host creates a list of hosts that can potentially use the storage system.



Important

You may need to load the platform kits that apply to the host types for your lab configuration. Your instructor will supply you with any of the required kits.

Before you can add a host, you need to know the following (these will be supplied on a sheet of paper in the lab):

- LAN name
- IP address (optional)
- World Wide ID (WWID) of one FCA
- Operating system

Adding a host to a storage system involves the following processes:

1. Collect the host information listed above.
2. Create a host folder.
3. Add a host.
4. Verify that the host has been added.

For this section of the lab, add two hosts to the Enterprise Virtual Array. You will delete one later during the lab. Your instructor will provide server names for you. Command View EVA provides a wizard to step you through the process of adding a host.

Follow these steps to create a host folder and add a host to the storage system:

1. In the Navigation pane, select the initialized storage system.
2. Select *Hosts* in the Navigation pane.
The *Host Folder Properties* page displays in the Content pane.
3. At the top of the Content pane, click *Create folder* to initiate the Create a Folder page.
4. Enter the name of the folder. For example, if the folder is for an HP server, enter *HP Servers*.
5. Optionally, enter any comments. For example, "This folder contains all HP host definitions."

6. Click *Finish* to create your folder.

View the folder name in the Navigation pane.

7. At the top of the Content pane on the Host Folder Properties page, click *Add host*.

This initiates the Add a Host wizard. The wizard requires the following information:

- LAN node name of the host machine
- IP address
- FCA WWID
- Host operating system
- Custom mode number, if applicable
- Direct eventing option

Note

The process will use a wizard if the option has been selected in the user interface options under Agent Options.

8. Enter the node name of the host.
9. Enter the IP address if your host uses a static LAN IP address. Skip this step if your host uses a dynamic IP address.
10. Click *Next step*.
11. Select an FCA from the drop-down list or enter the FCA WWID in the text box.
12. From the drop-down list, select the operating system.
13. Click *Next step*.
14. Optionally enter any comments in the comment box.
15. Click *Finish* to add your host.
16. Verify that your host has been added.
 - a. In the Navigation pane, select the initialized storage system.
 - b. Select the *Hosts* folder in the Navigation pane.
 - c. Select the host folder name you created.

The Host Properties page displays in the Content pane.

Adding a Port to the Host

Multipathing requires that the host have at least two paths to the host. You already created one path when you added a host to the storage system by specifying the WWID of one FCA port. Now you must create a second path by adding a port to the host you just added.

Follow these steps to add a port to the host you just added:

1. From the Host Properties page, select the *Ports* tab.
2. Click *Add port* to initiate the Add a Host Port wizard.
3. Select a FCA port WWID from the drop-down list or enter the WWID in the text box.
4. Click *Add port*.
5. View the Host Properties, Ports page, to verify that two FCA ports are defined for the host.

Removing a Host Port

If a server FCA needs to be replaced, you must remove the port from the host through Command View EVA.

Follow these steps to remove an FCA port from a host:

1. From the Navigation pane, select the host.
The Host Properties page displays in the Content pane.
2. Select the port that you want to delete.
3. Select *Delete port*.

Removing a Host

You cannot remove a host that has actively presented units. For this section of the lab, delete one host that you previously added.

1. In the Navigation pane, select the host you want to remove.
2. Click *Delete host*.
3. Click *OK* in the confirmation dialog box.

The host is removed from the system.

Creating a Virtual Disk and Presenting It to a Host

A virtual disk is created from a disk group. To create a virtual disk, you must assign a name to it, define its attributes (size and redundancy level), and specify a preferred controller path and controller mode. A virtual disk can be presented to a host during virtual disk creation or at a later time. To present the virtual disk to a host, you must select a LUN ID. For this lab, you present the virtual disk to a host during creation because you have already added the host.

HP recommends that you create a folder for the virtual disks. Once the folder is created, you can create a virtual disk for the folder. Command View EVA refers to a virtual disk as a virtual disk family.

Creating a Folder

Follow these steps to create a virtual disk folder and a virtual disk family, then present the virtual disk to a host:

1. In the Navigation pane, select the initialized storage system.
2. Select *Virtual Disks*.
The Vdisk Folder Properties page displays in the Content pane.
3. At the top of the Content pane, click *Create folder* to display the Create a Folder page.
4. Enter a folder name. For example, if this folder will contain virtual disks related to Oracle, name the folder *Oracle Disks*.
5. Optionally enter comments in the comment box.
6. Click *Finish*.

A folder is created.

Creating and Presenting a Virtual Disk

1. In the Navigation pan, select the folder you just created.
2. In the top of the Content pane on the Vdisk Folder Properties page, click *Create Vdisk*.

This initiates the Create a Virtual Disk Family wizard. Here, you name the virtual disk and optionally make choices regarding size, redundancy level, cache policy, and host to present to.

Note

The process will use a wizard if the option has been selected in the user interface options under Agent Options.

3. Enter the virtual disk name.
4. From the **Disk group name** drop-down list, select the appropriate disk group.
5. Select the virtual disk redundancy level.
6. Enter the virtual disk size in gigabytes (GB). This must be a whole number.

The maximum size of a virtual disk depends on the unused capacity of the disk group in which it is created and the selected redundancy (data protection) level. For example, a disk group with 120GB available capacity can produce a 120GB virtual disk with no data protection (VRAID0), or a 60GB virtual disk with the highest level of data protection (VRAID1).
7. From the **Select a host** drop-down list, select *None*.

This lists hosts that have already been added to the Enterprise Virtual Array storage system.
8. Click *Advanced options*.
9. Select a LUN address.

This defines the LUN at which the virtual disk is presented to the host. This is a host property. For example, if the virtual disk name is *Transaction Log* and the LUN entry is 3, the virtual disk *Transaction Log* is presented to the host at LUN3.
10. From the **Preferred path/mode** drop-down list, select the preferred controller path and controller mode.

11. In the OS Unit ID text box, enter the operating system LUN identifier if required.

**Important**

OpenVMS requires that each virtual disk be assigned an OS Unit ID. If a virtual disk is not assigned an OS Unit ID, OpenVMS cannot see it. In addition, OpenVMS requires that OS Unit IDs be unique across the entire SAN.

For example, if you accidentally give two virtual disks the same OS Unit ID (either within a single storage system or within multiple storage systems), OpenVMS cannot see both of those virtual disks. Therefore, when using OpenVMS, you must ensure that each virtual disk within a SAN is assigned a unique OS Unit ID.

For Tru64 UNIX, the use of OS Unit IDs is optional, but helpful. This value shows up in certain Tru64 UNIX `show` commands, making virtual disk to host file system mapping easier.

12. Click *Next step*.
13. Select a write cache policy and a read cache policy.
14. Click *Next step*.
15. Select the write protection and the WWN if necessary.
16. Click *Next step*.
17. Enter comments.
18. Click *Finish* to create the virtual disk.
19. In the Navigation pane, select the virtual disk folder you created and view the Vdisk Active Member Properties page.

Select the *Presentation* tab. This indicates whether the virtual disk has been presented to a host and the LUN at which it is presented.

Unpresenting a Virtual Disk

In the last procedure, you created a virtual disk and presented it to a host. Now, using the same virtual disk, unpresent it to the host.

Follow these steps to unpresent the virtual disk and verify that it is unpresented:

1. In the Navigation pane, select the virtual disk you want to unpresent.
2. From the Vdisk Active Member Properties, and the Presentation page, click *Unpresent*.
3. Select one or more hosts to be unpresented. Only those hosts with existing presentations to your virtual disk are shown.
4. Click *Unpresent host(s)*.
5. On the Vdisk Active Member Properties, and the Presentation page, verify that the virtual disk no longer is presented to a host.

Presenting a Virtual Disk to a Host After Creation

You can present the virtual disk after virtual disk creation. Using the same virtual disk from the previous lab section, modify the virtual disk properties to present it to the same host as before.

Follow these steps to present a virtual disk to a host after the virtual disk has been created:

1. In the Navigation pane, select the virtual disk you want to present.
2. From the Vdisk Active Member Properties, and the Presentation page, click *Present*.
3. Select the host or hosts.
4. Select the LUN (optional) at which the virtual disk will be presented to the host.
5. Click *Present Vdisk*.

Creating a Snapshot

A snapshot is created from an active virtual disk family. You can create a fully-allocated or demand-allocated (Vsnap) snapshot. For this lab section, create a snapshot for the virtual disk you just created and presented to a host.

Follow these steps to create a snapshot:

1. In the Navigation pane, select the active virtual disk family.
The Vdisk Active Member Properties page displays in the Content pane.
2. At the top of the Content pane, click *Create snapshot* to initiate the Create a Vdisk Snapshot wizard.
3. Enter a snapshot name.
4. Select a host from the drop-down list.
5. Click *Advanced options*.

Note

You have the option to click *Finish* to create a snapshot without further definitions.

6. Select a LUN address from the drop-down list.
7. Select an allocation policy to specify a fully-allocated or demand-allocated snapshot.
You have two choices for allocation policy:
 - Fully-allocated (Traditional Snapshot) — The space a virtual disk requires on the physical disks is reserved, even if the virtual disk is not currently using the space.
 - Demand-allocated (Virtually Capacity-Free Snapshot) — The space a virtual disk requires on the physical disks is not reserved until needed.
8. Enter the OS Unit ID if required.
This allows you to select the identifiers for OpenVMS and Tru64 UNIX operating systems.
9. Click *Next step*.
10. Select a read-cache policy from the drop-down list.
11. Click *Next step*.
12. Set the write protection.
13. Enter the World Wide LUN Name (optional).
14. Click *Next step*.

15. Optionally enter comments in the comment box.
16. Click *Finish* to create your virtual disk snapshot.
17. In the Navigation pan, select your snapshot to view the properties of the snapped virtual disks.

Note the following on the Vdisk Snapshot Properties page:

- At the top of the pane, there are no longer any snapshot or copy buttons.
 - The Family Name is the name of the original virtual disk, not the snapshot name.
 - Capacity used and allocation field entries — The same number in both fields reflects a space-efficient snapshot.
18. If possible, from the host, follow normal procedures to work with the newly presented disk and confirm you can access it.

Deleting a Snapshot

Follow these steps to delete the snapshot you just created:

1. In the Navigation pane, select the snapshot you want to delete.
2. In the Content pane, click *Delete*.
3. Click *OK* in the confirmation dialog box.

The snapshot is deleted.

Creating a Snapclone

A Virtually Instantaneous Snapclone is created from an active virtual disk family. You cannot snapclone a virtual disk unless it has been presented to a host. For this lab section, create a snapclone for the virtual disk you created and presented to a host.

Follow these steps to create a Virtually Instantaneous Snapclone:

1. In the Navigation pane, select the active virtual disk.
The Vdisk Active Member Properties page displays in the Content pane.
2. At the top of the Content pane, click *Create Snapclone* to initiate the Create a Snapclone wizard.
3. Enter a snapclone name.
4. Select a host from the drop-down list.
5. Click *Advanced Options*.
6. Select a LUN address identifier from the drop-down list.
7. In the OS unit ID text box, enter the LUN identifier as required for OpenVMS and Tru64 UNIX.
8. Click *Next step*.
9. Select a disk group from the drop-down list.
10. Select a read-cache policy from the drop-down list.
11. Click *Next step*.
12. Set the write protection to *Read/write* or *Read only*.
13. Enter the World Wide LUN Name (optional).
14. Click *Next Step*.
15. Optionally enter comments.
16. Click *Finish*.

The snapclone is created.

Note

Notice that during the background process, the capacity required and the capacity used are different.

17. View the Navigation pane to find the location of your snapshot and the snapclone you just created.
18. If possible, from the host, follow normal procedures to work with the newly presented disk and confirm you can access it.

Deleting a Snapclone

Follow these steps to delete the Virtually Instantaneous Snapclone you just created:

1. In the Navigation pan, select the snapclone you want to delete.
2. In the Content pane, click *Delete*.
3. Click *OK* in the confirmation dialog box.

The snapclone is deleted.

Deleting a Virtual Disk

Before you can delete a virtual disk, you should unpresent the virtual disk to a host. In this lab section, delete the virtual disk you created.

Follow these steps to delete a virtual disk:

1. In the Navigation pane, select the virtual disk you want to delete.

The Vdisk Active Member Properties page displays.

2. In the Content pane, click *Delete*.

3. Click *OK* in the confirmation dialog box.

The virtual disk is removed from the system.

Modifying a Disk Group

The only properties of a disk group that you can modify are disk group name, disk failure protection level, occupancy alarm level, and comments. For this lab section, modify the disk group name and verify the name change.

Follow these steps to modify a disk group and verify the change:

1. In the Navigation pane, select the disk group that you created.
The Disk Group Properties page displays in the Content pane.
2. Change the disk group name.
3. Click *Save changes*.
4. Verify your change on the Disk Group Properties page.

Deleting a Disk Group

Before you delete a disk group, all the virtual disks contained in the disk group must be deleted.

You cannot delete the Default Disk Group. The only way to delete this is to uninitialize the Enterprise Virtual Array Storage System.

Follow these steps to delete a disk group:

1. In the Navigation pane, select the disk group that you created.
The Disk Group Properties page displays in the Content pane.
2. In the Content pan, click *Delete*.
3. Click *OK* in the confirmation dialog box.

The disk group is removed from the system.

Uninitializing the Enterprise Virtual Array (Optional)

Uninitializing the Enterprise Virtual Array storage system deletes all information previously defined through Command View EVA. Make sure this is what you really want to do because all data for that storage system is deleted.

Follow these steps to uninitialize the Enterprise Virtual Array:

1. In the Navigation pane, select the storage system.
2. In the Content pane, click *Uninitialize*.
A warning displays.
3. Click *OK*.

The system is uninitialized and all data is deleted.

You have completed this lab.

monitoring the storage system

module 9 lab

Overview

This lab steps you through the process of using the Command View EVA GUI to monitor the Enterprise Virtual Array. You will be able to display management agent options as well as information about the Enterprise Virtual Array hardware components.

Objectives

After completing this lab, you should be able to use Command View EVA to do the following:

- View and change management agent options.
- View the Enterprise Virtual Array rack properties.
- View the Enterprise Virtual Array controller properties.
- View the Enterprise Virtual Array drive enclosure properties.

Viewing Management Agent Options

To view the Management Agent options, you must be logged in to Command View EVA running on the SMA. Select the *Agent Options* button in the Session pane to see the management agent options.

Perform the following in any order:

- Click the button next to **Storage system password access** to see the various options. Select the Add, Change, and Delete options to view those screens.
- Click the button next to **Licensing Options** to see the options. View all current licenses.
- Click the button next to **User interface options** to see the options. Change settings for wizards, number of tree objects displayed, and default operating system for new hosts, and test if your selections are implemented in the GUI.
- Click the button next to **Page footer message options** and set a new message to display in the Content pane.

Viewing Hardware Properties

Using Command View EVA, view the hardware properties for your Enterprise Virtual Array storage system. The storage systems are listed by name in the *HSV Storage Network* folder. You must select a storage system, then select a storage system rack, to view properties for the rack, controller, drive enclosures, and disk drive.

The specific identifiers may vary for each hardware configuration. Substitute the correct name where you see [].

Viewing Rack Properties

To view the rack properties:

1. In the Navigation pane, select a storage system.
2. Click *Hardware* → *Rack [#]*.

Note

An Unmappable Hardware folder in the Navigation pane means that the management agent cannot determine the device's position within a rack (because of a hardware failure or the removal of required hardware), and therefore cannot show its location.

The Rack Properties page displays in the Content pane.

Viewing Controller, Drive Enclosure, and Disk Drive Properties

Continue viewing properties for the same storage system and rack you selected in the previous procedure. Notice that the Controller Enclosure folder contains two controllers. The controller enclosures are wired together to the EAB and share one address.

Follow these steps to view the controller, disk enclosure, and disk properties:

1. In the Rack [#] folder, select Controller Enclosure [ID] → Controller [ID].

The Controller Properties page displays in the Content pane.

Note the last digit of the World Wide Node Name entry. The storage system controller or base address ends in 0. Note the fields displayed on this page, such as the VCS version, controller serial number, and operational state of the controller.

2. Click the *Host Ports* tab.

Note the last digit of the World Wide Name entry. This identifies the host port. On the HSV controllers, controller A host ports end with **8** and **9**, and controller B host ports end with **C** and **D**.

3. Click the *Device Ports* tab.

This page displays the WWN of the controller device ports on each loop and its AL_PA.

4. Click the *Enclosure* tab.

This page displays the blower speed, power, temperature sensor, and cache battery status.

5. Select the other controller in the Controller Enclosure folder and review the General, Host Ports, Device Ports, and Enclosure properties.

6. Note the disk enclosure folders listed in the Navigation pane.

7. In the Navigation pane, select *Disk Enclosure* [#].

The Disk Enclosure Properties page displays. Note the EMU firmware version.

8. Click the *Power* tab.

View Power Supply 1 and Power Supply 2 properties.

9. Click the *Cooling* tab.

View the Sensor-General, Sensor-Thresholds, Blower 1, and Blower 2 properties.

10. Click the *IO-Comm* tab.

View the I/O Ports and Communication Buses properties. Note that the ports displayed by Command View EVA are the opposite of their physical configuration.

11. In the Navigation pane, select *Bay [#] → Disk Bay tab*.

The Disk Enclosure Bay Properties page displays in the Content pane.

12. Click the *Disk Drive* tab.

Note the physical drive type, firmware revision, formatted capacity, and RSS ID and index.

You have completed this lab.

Troubleshooting the Disk Enclosures

Lab 7

Objective

After completing this lab, you should be able to:

- EE* Utilize the LEDs on the disk drive enclosure to identify problems.
- EE* Utilize the EMU to identify problems with the disk drive enclosure.
- EE* Utilize the HSV Element Manager Graphical User Interface to identify problems with the disk drive enclosures.

Requirements

To perform this lab exercise, you will need:

- EE* SANworks Management Appliance with HSV Element Manager loaded
- EE* E1 storage system
- EE* Fibre Channel SAN switches
- EE* Copy of Appendix A from *E1 System Disk Enclosure EMU User Guide*.

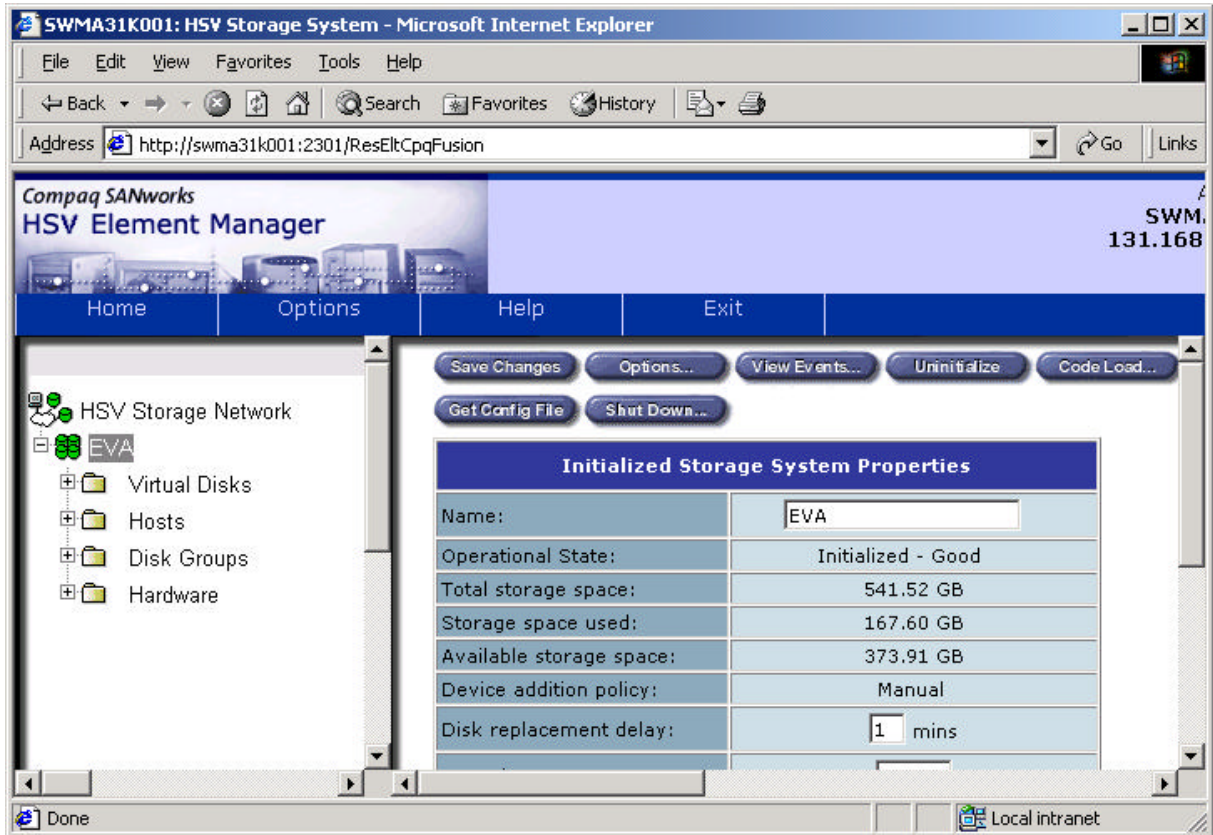
Utilizing Disk Enclosure LEDs and the EMU to Identify Problems with a Disk Enclosure

1. While the E1 system is running, unplug a power cable which leads to one of the power supplies of the disk enclosure.
.....
.....
2. What happens to the LEDs on the EMU?
.....
.....
3. Push and hold the top button of the EMU until the word *Er* changes into decimal numbers. Record the decimal numbers. This represents the element type.
.....
4. Push the top button of the EMU again. Record the next decimal numbers. This represents the element number.
.....
5. Push the top button of the EMU again. Record the next decimal numbers. This represents the probable cause.
.....
6. You should now have an error code in the format of *##.##.##.##*. The error codes can be interpreted by referencing Appendix A of the *E1 System Disk Drive Enclosure EMU User Guide*. Go to the section titled *Element Types*. What is the element corresponding to the error code you have recorded?
.....
7. Go to the section titled *Power Supply Errors*. Which GBIC does the element number correspond to?
.....
8. Next, look up the probable cause from the last decimals of your error code. What is the probable cause listed as?
.....
9. Go the front of the disk drive enclosure. What is happening to the Status LEDs near the bottom right corner?
.....
10. Reinsert the power cable.

Utilizing the HSV Element Manager GUI to Identify Problems with the Disk Drive Enclosure

This section will use the HSV Element Manager GUI to view error logs from the errors caused by the previous section.

1. Using a web browser, open the HSV Element Manager page.



11. Click on *View Events*.
12. Click on *View* next to *Management Agent Event Log*.
13. If indicators of a fault are listed in the log, record the time of the event.
.....
The event description may not be very specific. We will see more detail in the other event logs.
14. Click on *OK* to exit the page.
15. Click on *View* next to *Disk Shelf Event Log*. Look for errors corresponding to the time when the cable was disconnected. You may see several errors.
16. If indicators of a fault are listed in the log, briefly record the description.
.....
- 17.

18. Click on *View* next to *Controller Event Log*. Look for errors corresponding to the time when the cable was disconnected. You may see several errors.
19. If indicators of a fault are listed in the log, briefly record the description.

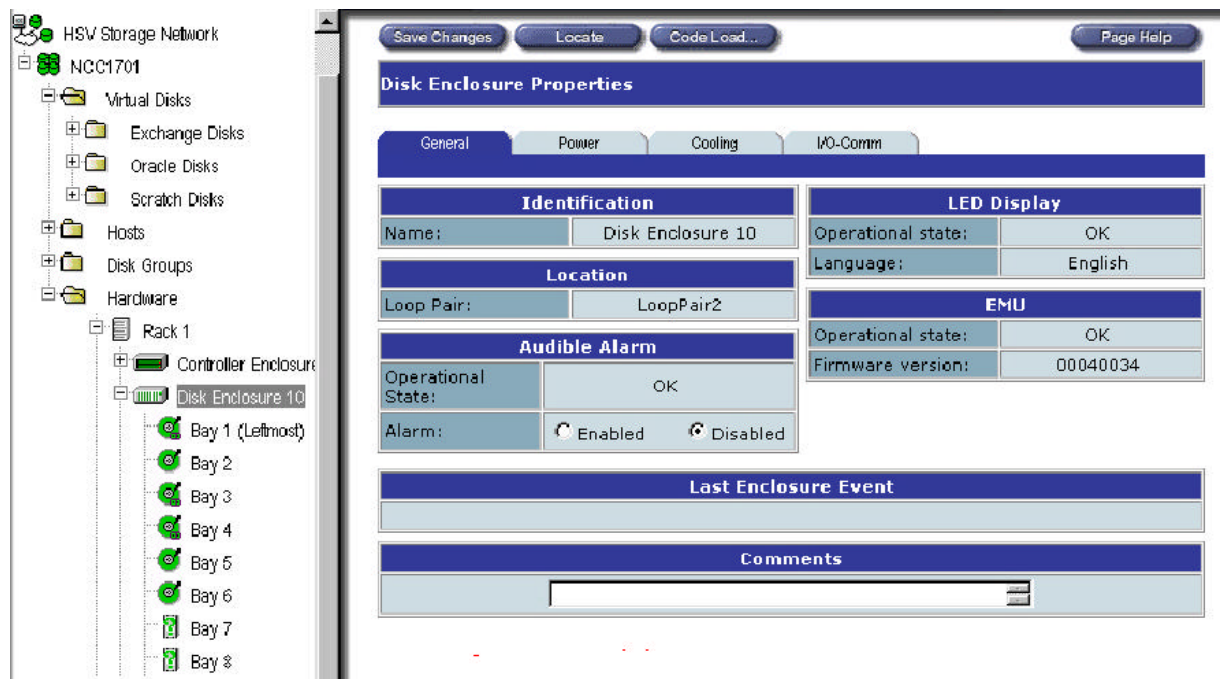
.....

.....

20. Click *OK* to exit the page
21. Click on *View* next to *Controller Termination Event Log*. Look for errors corresponding to the time when the cable was disconnected. You may see several errors.
22. If indicators of a fault are listed in the log, briefly record the description.

.....

23. In the left frame, expand *Hardware* and then *Rack 1*.
24. Expand one of the disk enclosures.



25. Click on the *General* tab. What is the Operational state of the EMU?

.....

26. Is the Alarm *Enabled* or *Disabled*?

.....

27. Click on the *Power* tab. What is the output voltage of 5VDC?

.....

28. Click on the *Cooling* tab. What is the temperature of the EMU?

-
29. Click on the *I/O-Comm* tab. What is the operational state of port A1?
-

30. Click on *Bay5* in the left frame. Then click on the *Disk Drive* tab.

Group... **Locate** **Code Load...** **Remove** **Page Help**

Disk Enclosure Bay Properties

Disk Bay **Disk Drive**

Identification	
Name:	Disk 008
Loop Pair:	LoopPair2
Node World Wide Name:	
Loop A:	
Assigned LUN:	0
Loop ID:	4
Loop B:	
Assigned LUN:	0
Loop ID:	16

System	
Requested Usage:	Unused
Actual Usage:	Unused
Disk Group:	Scratch Disks
Occupancy:	0.00 GB

Condition/State	
Operational State:	Normal
Migration State:	Not Applicable
Failure Prediction:	No
Media Accessible:	Yes
Loop A State:	Normal
Loop B State:	Normal

Physical	
Type:	Fibre Channel Disk
Manufacturer:	COMPAQ
Model Number:	BD01853526
Firmware Revision:	FACF
Formatted capacity:	16.96

Location	
Enclosure ID:	0
Bay ID:	5
<div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> <div>6</div> <div>7</div> <div>8</div> <div>9</div> <div>10</div> <div>11</div> <div>12</div> <div>13</div> <div>14</div> </div>	

Comments

31. What is the name of this disk drive?

.....

32. In Loop B, what is the Assigned LUN and Loop ID of the disk drive?

.....

33. Which disk group is this disk drive assigned to?

.....

34. What is the firmware revision of this disk drive?

.....

35. Has the drive been predicted to fail?

.....

Troubleshooting the HSV Controller

Lab 8

Objective

After completing this lab, you should be able to:

- EE* Utilize the HSV Element Manager Graphical User Interface to identify problems with the HSV controller.
- EE* Utilize the HSV controller Operator Control Panel to access the Fault Management menu.
- EE* Utilize the HSV controller Operator Control Panel to activate one of the shutdown procedures for the controller.

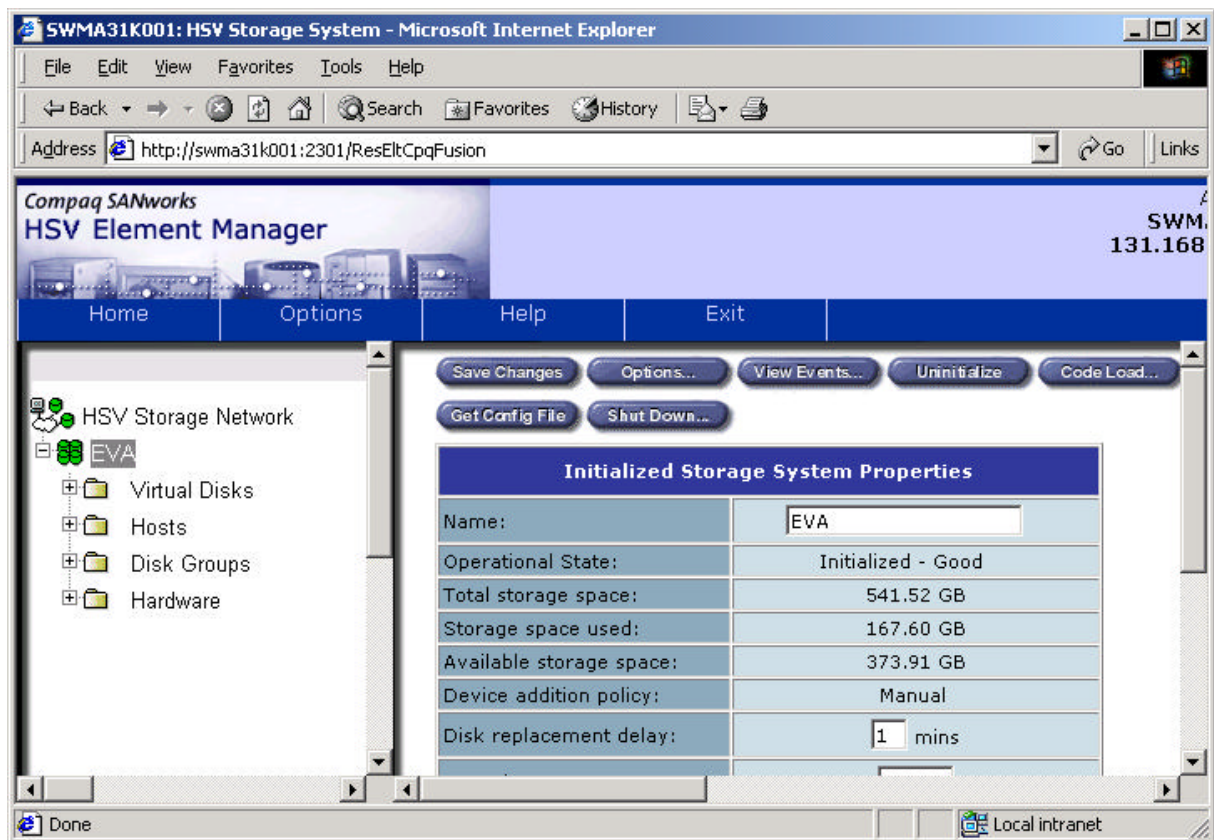
Requirements

To perform this lab exercise, you will need:

- EE* SANworks Management Appliance with HSV Element Manager loaded
- EE* E1 storage system
- EE* Fibre Channel SAN switches
- EE* Copy of Appendix A from E1 System Disk Enclosure EMU User Guide.

Utilizing the HSV Element Manager GUI to Identify Problems with the HSV Controller

1. Remove a cable from the Fibre Channel SAN Switch that leads to the top controller.
2. What happens to the LED on the controller corresponding to the cable?
.....
3. Do not insert the fibre cable back into the port. Using a web browser, open the HSV Element Manager page.

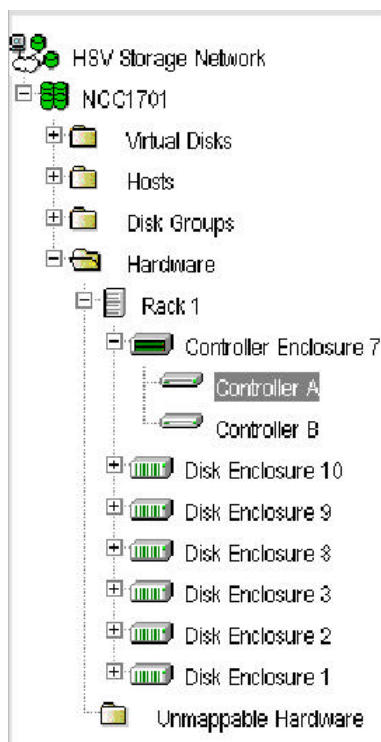


1. Click on *View Events*.
2. Click on *View* next to *Management Agent Event Log*.
3. If indicators of a fault are listed in the log, record the time of the event.
.....

The event description may not be very specific. We will see more detail in the other event logs.

4. Click on *View* next to *Controller Event Log*.
5. If indicators of a fault are listed in the log, briefly record the description.

6. Click *OK* to exit the page
7. In the left frame, expand *Hardware* and then *Rack 1*.
8. Expand the controller enclosure. Then click on *Controller A*.



9. Click on the *Host Ports* tab. What is the operational state of the port 2?
10. Insert the Fibre cable back into port FP1 in the rear of the upper HSV controller.
11. After the LED next to the cable turns green, return to the Web browser.
12. Click on the *General* tab. Then click on the *Host Ports* tab again.
13. What is the operational state of port 2? You may need to repeat step 15.

14. Click on the *Device Ports* tab. This tab shows the status of ports that communicate with the drive enclosures.
15. What is the operational status of Loop Pair 2 Loop A?
16. Click on the *Enclosure* tab. This tab shows the status of the HSV controller enclosure.

17. What is the operational status of cache battery system?

.....

18. What is the temperature of I2C Sensor 1?

.....

19. Click on the General tab.

20. What is the operational status of the cache memory?

.....

Utilizing the Operator Control Panel (OCP) to Identify Problems with the Controller

1. Press the *Enter* button on the Operator Control Panel of the upper HSV controller.
2. Press the bottom button to select Fault Management.
3. Press the *Enter* button to confirm Fault Management.
4. Press the *Enter* button to confirm Last Fault.
5. Press the *Enter* button to confirm Term Code.
6. Record the Termination Code.

.....

Utilizing the Operator Control Panel to Shut Down the HSV Controller

1. Press the *Enter* button.
2. Press the bottom button twice to highlight Shutdown System.
3. Press *Enter* to select Shutdown System.
4. You should now see a Restart as well as a Power Off. Do not select either unless your instructor permits.

