



EVA Setup and Configuration



Agenda

- Licensing
- Initializing the EVA
- Troubleshooting



General HSV Licensing

- ↓ License keys are stored on Management Server hard drive and on each Management Logical Disk (MLD)
 - Keep Record
- ↓ Loss of Management Server does not lose licensing state
- ↓ VCS software on controller is full featured
- ↓ Basic license required to initialize storage cell
- ↓ Feature licenses are tied to a specific subsystem (WWN) and cannot be moved
- ↓ Feature License validated whenever a feature is requested :
 - By Command View EVA
- ↓ Basic license is never revalidated on an initialized storage cell
- ↓ Command View EVA blocks access to VCS features which do not have a corresponding license
- ↓ FLEXlm 7.0 is underlying product managing and creating licenses

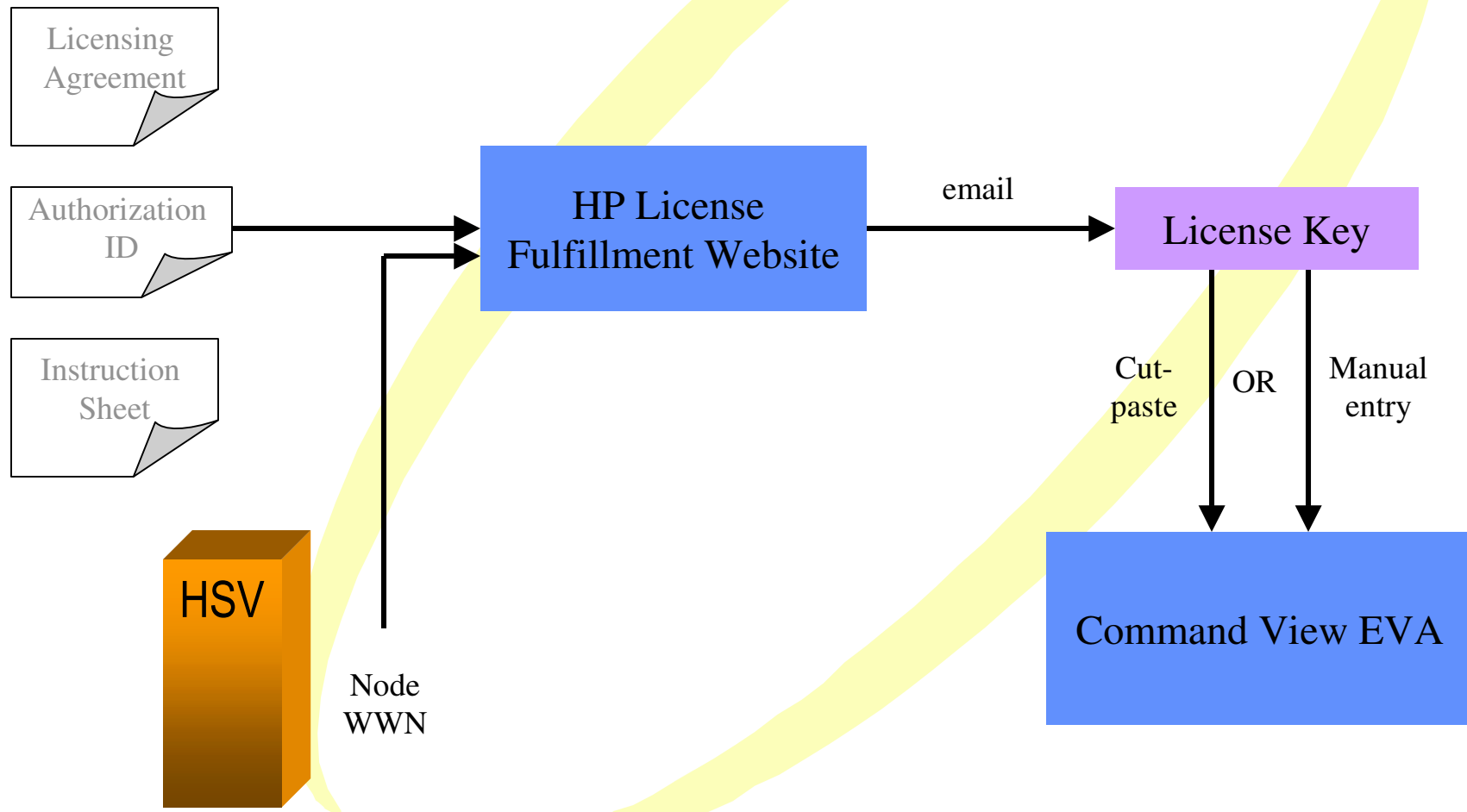


General HSV Licensing

- ↓ License enforcement is based on VCS version number
- ↓ VCS versions are changed with a SuperImage firmware load
- ↓ 1.xy to 1.xz change does not require any new license keys
- ↓ 1.x to 1.y change requires new license keys
- ↓ SuperImage update which contains a VCS level which is not licensed will require a license in order to complete



HSV Licensing Flow





Obtaining Licenses

- Go to <http://h18000.www1.hp.com/products/software/softwarekeys/index.html>
- Enter authorization ID and WWN

The screenshot shows the HP License Key Renewal web form. On the left is a navigation menu with the HP logo and 'invent' tagline, and a 'software' section containing links for 'Fortran', 'INT', 'TeMIP', and 'Storage'. The main content area is titled 'License Key Renewal' and contains instructions: 'To obtain a License Key(s), fill out the form below and then click the SUBMIT button.' and 'Your License Key(s) will be generated and sent back to you via email within 1 - 48 hours.' It also provides contact information for trouble. The form includes input fields for 'Company Name', 'Country' (with a dropdown arrow), 'E-mail Address', 'First Name/Last Name' (split into two fields), and 'Phone number'. Below these is a note: 'You may submit up to 10 Authorization IDs on this page. Refresh this page to submit additional Authorization IDs.' A red note states: 'FOR HSWXXX PRODUCTS ONLY! Include WWN Number. Please use the following format: HSWWWN=xxxx-xxxx-xxxx-xxxx, where the x's are the WWN number provided with the product.' At the bottom, there are two rows of input fields: 'License 1' with 'Authorization ID' and 'WWN Number' fields.

hp
invent

software

- > Fortran
- > INT
- > TeMIP
- > Storage

License Key Renewal

To obtain a License Key(s), fill out the form below and then click the SUBMIT button.

Your License Key(s) will be generated and sent back to you via email within 1 - 48 hours.

If you have trouble obtaining a License Key, please contact us at the phone or e-mail address listed on the License Key Retrieval Instruction Sheet which you have received with your License Agreement. This Instruction Sheet also contains the Authorization ID that you must enter in the space(s) provided below.

Company Name

Country

E-mail Address

First Name/Last Name

Phone number

You may submit up to 10 Authorization IDs on this page. Refresh this page to submit additional Authorization IDs.

FOR HSWXXX PRODUCTS ONLY! Include WWN Number. Please use the following format: HSWWWN=xxxx-xxxx-xxxx-xxxx, where the x's are the WWN number provided with the product.

License 1	Authorization ID	<input type="text"/>
	WWN Number	<input type="text"/>



Sample License—Base License

➤ Compaq Computer Corporation

➤ Version 3.5b GTLicensing Fulfillment System.

➤ The lines of software instructions denoted below are your LICENSE KEY.

➤ To avoid typographical errors, COPY the License Key from this message

➤ using a text editor and PASTE into your license file. Refer to your FLEXlm

➤ End User's Manual for more information on license files.

➤>>> LICENSE KEY begins AFTER THIS LINE <<< Start your copy there.

```
➤ INCREMENT HSV110-BASIC Compaq 1.0 permanent uncounted 92ACB0BDABC7 \  
➤      HOSTID=HSVWWN=5000-1FE1-0011-0000 NOTICE="Authorization \  
➤      =xxxxxxxxxxxxxxxxxxxxxx, Qty 1, QM-6RNAA-AA1.0, VCS PKG V1.0 \  
➤      DUAL HSV CNTLR" ck=100
```

➤>>> LICENSE KEY ends BEFORE THIS LINE <<< End your selection on the PREVIOUS line

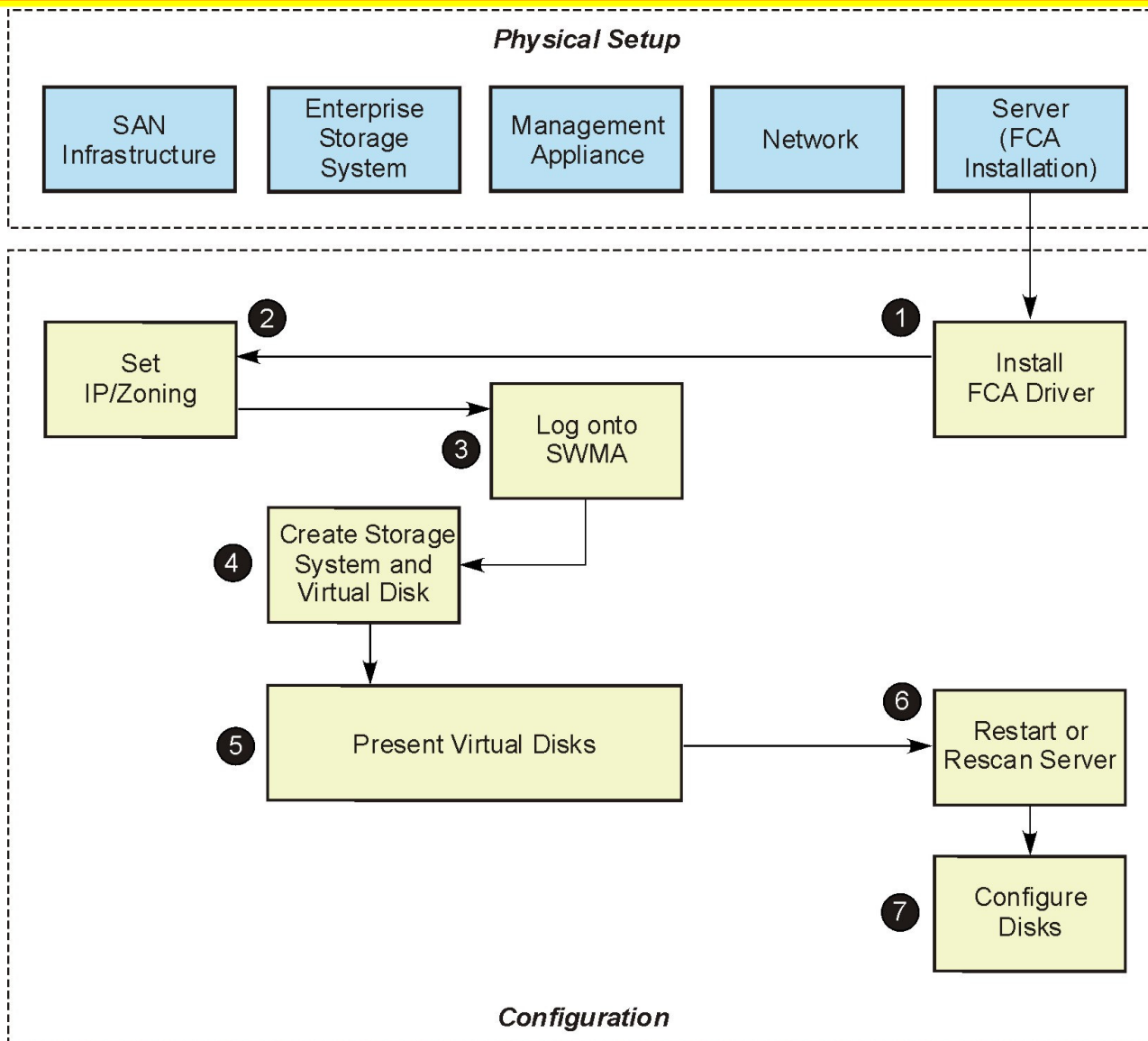
➤ to complete your COPY.

➤ If you have any problems installing this license key, contact the parties listed on the

➤ associated license documentation or web site.

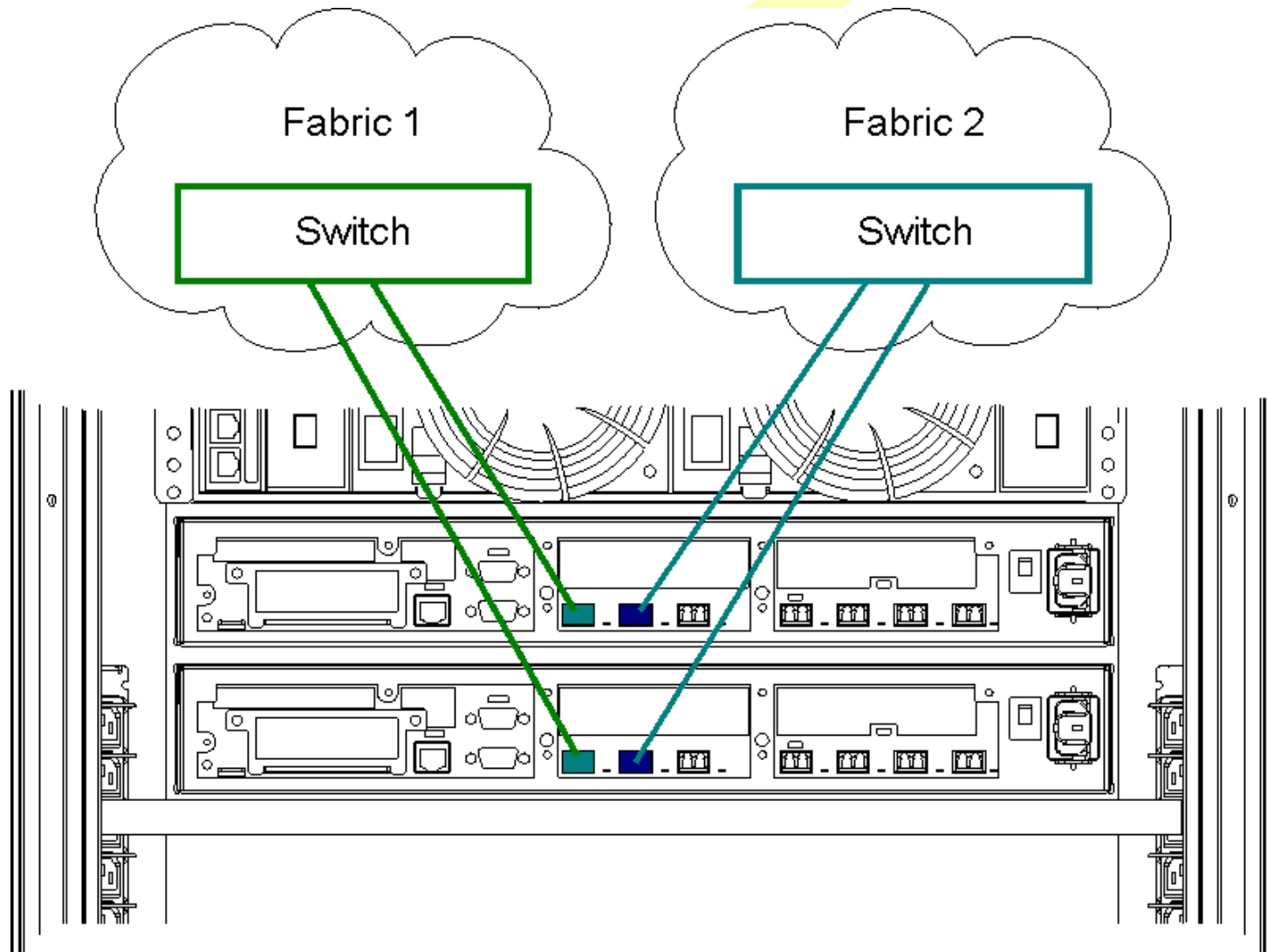


Configuring the Enterprise Virtual Array





HSV110 Fabric Cabling





Step 1—Before Launching the Command View EVA

- ↓ Fabric ports (FP1, FP2) remain disabled until WWN is configured
- ↓ Use the Operator Control Panel (OCP) to enter in WWN and Checksum
 - Located on front of rack adjacent to HSV110 controllers
 - Successful configuration displays the WWN on LCD of both controllers
- ↓ Verify FP1 and FP2 have a link into the fabric, LED adjacent to each port
 - Green LED indicates link is up
 - Amber LED indicates link is down



LCD WWN Programming

- At the "Enter Node" display
 - ▼ Up-Down keys select hexadecimal number
 - ▶ Right key moves position to right
 - ◀ Left key enters the number and moves to checksum step
- At the "Enter Checksum" display
 - ↓ Up-Down keys select Letter/Number
 - Full alphabet
 - ↓ Right key moves to the right
 - ↓ **Left key completes operation**





LCD Front Panel Display Messages

Initialization Confirmation

REALLY INIT SYSTEM?
NO



DATA WILL BE LOST!
NO

Password Confirmation

CHANGE PASSWORD?
NO

OR

CLEAR PASSWORD?
NO

Shutdown Confirmation

POWER OFF SYSTEM?
NO

OR

RESTART SYSTEM?
NO

OR

IDLE SYSTEM?
NO

WWID Entry

Enter World Wide ID:
0000-0000-0000-0000



Enter WWID Checksum:
00



The Very First Time - Uninitialized Storage System

Compaq SANworks
HSV Element Manager

Appliance:
SWMAN1K215
172.16.120.100

Home Options Help Exit

View Events... Rediscover Page Help

HSV Storage Network
+ Uninitialized Storage System

HSV Storage System Network Properties	
Name:	HSV Storage System Network
Total HSV systems:	1
Total storage space:	0.00 GB
Storage space used:	0.00 GB
Available storage space:	0.00 GB

Compaq Confidential



Uninitialized Storage Cell

Compaq SANworks
HSV Element Manager

Appliance:
SWMAN1K215
172.16.120.100

Home Options Help Exit

Initialize... Set Time... View Events... Code Load... Page Help

HSV Storage Network
Uninitialized Storage System
Hardware

Uninitialized HSV Storage System Properties	
Name:	Uninitialized Storage System
Operational State:	Uninitialized - Good
Total storage space:	0.00 GB
Controller time:	05 Jul 2001 16:18:38

***** THIS SYSTEM IS UNINITIALIZED *****
Click the Initialize button to prepare the system for data storage.

Compaq Confidential



Storage Cell Initialization

(Page 1 of 4) (8 disks min)

Enter the name of
the Storage Cell

Enter Number of
disk drives in Disk
Group **MIN 8 disks**

Finish Adv Options... Cancel Page Help

Initialize an HSV Storage System

Page 1 Page 2 Page 3 Page 4

Complete this step and click **Finish** to initialize your HSV storage system in the simplest way possible. If you'd like more control over the initialization of your HSV storage system, complete the step and click **Adv Options** instead.

STEP 1: Enter a Name
Enter a name for your HSV storage system.

→ NCC1701 ?

STEP 2: Enter the number of disks
Enter a number of disks between 4 and 40. (You can add more disks later, if you wish.)

→ 8 ?

Finish Adv Options... Cancel

Compaq Confidential



Storage Cell Initialization (Page 2 of 4)

Use the Management
Server time

Enter the Identifier
of LUN 0 (SACD)

Previous Step Next Step Cancel Page Help

Initialize an Enterprise System Page 1 Page 2 Page 3 Page 4

Continue with this step to initialize your Enterprise system using advanced options. Click the **Next Step** button to move to the next page.

STEP 3: Set the system date/time

☐ Use Compaq SAN management date/time: 28 Jan 1900 00:01:17 GMT ?

☒ Use local date/time and convert to GMT: 29 Mar 2001 21:17:41 GMT

☐ Use existing controller date/time setting: 29 Mar 2001 21:17:29

☐ Use a custom date/time setting:

01 - Jan - 2000 00 : 00 : 00

STEP 4: Enter the VMS Console LUN ID

100 ?

Previous Step Next Step Cancel

Compaq Confidential



Storage Cell Initialization (Page 3 of 4)

Select Disk Group
protection level

Previous Step Next Step Cancel Page Help

Initialize an Enterprise System Page 1 Page 2 Page 3 Page 4

When you initialize your Enterprise system, a default disk group is created. Continue with these steps to specify the attributes of the default disk group. Click the **Next Step** button to move to the next pages.

STEP 5: Select the disk failure protection level

Single ?

Single
Double
None

Previous Step Next Step

Compaq Confidential



Storage Cell Initialization (Page 4 of 4)

You may want to
enter some
comment in here.

Previous Step Finish Cancel Page Help

Initialize an HSV Storage System Page 1 Page 2 Page 3 Page 4

Continue with these steps to create the default disk group and initialize your HSV storage system using advanced options.

STEP 6: Enter your comments

STEP 8: Initialize your HSV storage system
Click the **Finish** button to initialize your HSV storage system.

Previous Step Finish Cancel

Compaq Confidential



Storage Cell Initialized

HSV Storage Network
NCC1701

Save Changes Options... View Events... Uninitialize Code Load... Page Help
Get Config File

Initialized Storage System Properties	
Name:	NCC1701
Operational State:	Initialized - Good
Total storage space:	50.48 GB
Storage space used:	0.00 GB
Available storage space:	50.48 GB
Device addition policy:	Manual
Disk replacement delay:	1 mins
Console LUN ID:	100
Controller time:	30 Jan 1900 00:35:19
Comments:	
<input type="text"/>	

Compaq Confidential



Multiple Virtual Disks created

Save Changes Delete Page Help

Virtual Disk Family Properties

Name:	Message Store
Date/Time Created:	30-Jan-1900 23:30:25
Operational state:	Operating normally
Disk Group:	Default Disk Group
Snapshots:	0
Preferred Presentation Path:	Path A-Failover only
Comments:	

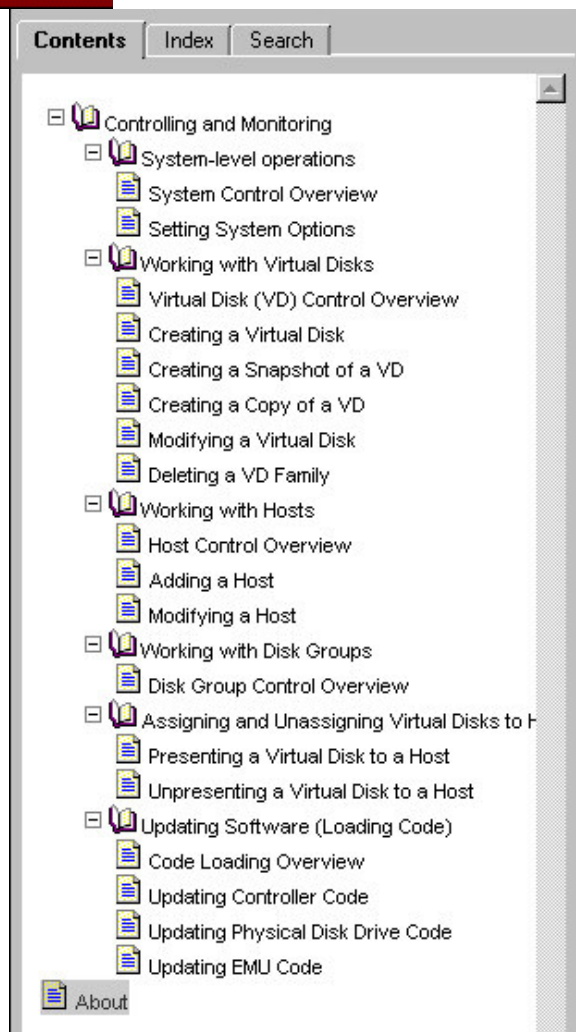
HSV Storage Network

NCC1701

- Virtual Disks
 - Exchange Disks
 - Log Disk
 - ACTIVE
 - Message Store
 - Oracle Disks
 - Data Disk1
 - ACTIVE
 - Data Disk2
 - ACTIVE
 - TransactionLog
 - ACTIVE
 - Scratch Disks
 - Temp1
 - ACTIVE
 - Temp2
 - ACTIVE
- Hosts



Enterprise Online Help



SyncToC

About HSV Element Manager Software

HSV element manager offers a graphical user interface for configuration, management, and monitoring of StorageWorks HSV-series storage systems.

[Version and build information.](#)

©2001 Compaq Computer Corporation
COMPAQ Registered in U.S. Patent and Trademark Office. All other product names mentioned herein may be trademarks or registered trademarks of their respective companies.
Confidential computer software. Valid license from Compaq required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Compaq shall not be liable for the technical or editorial errors or omissions contained herein. The information in this document is subject to change without notice.

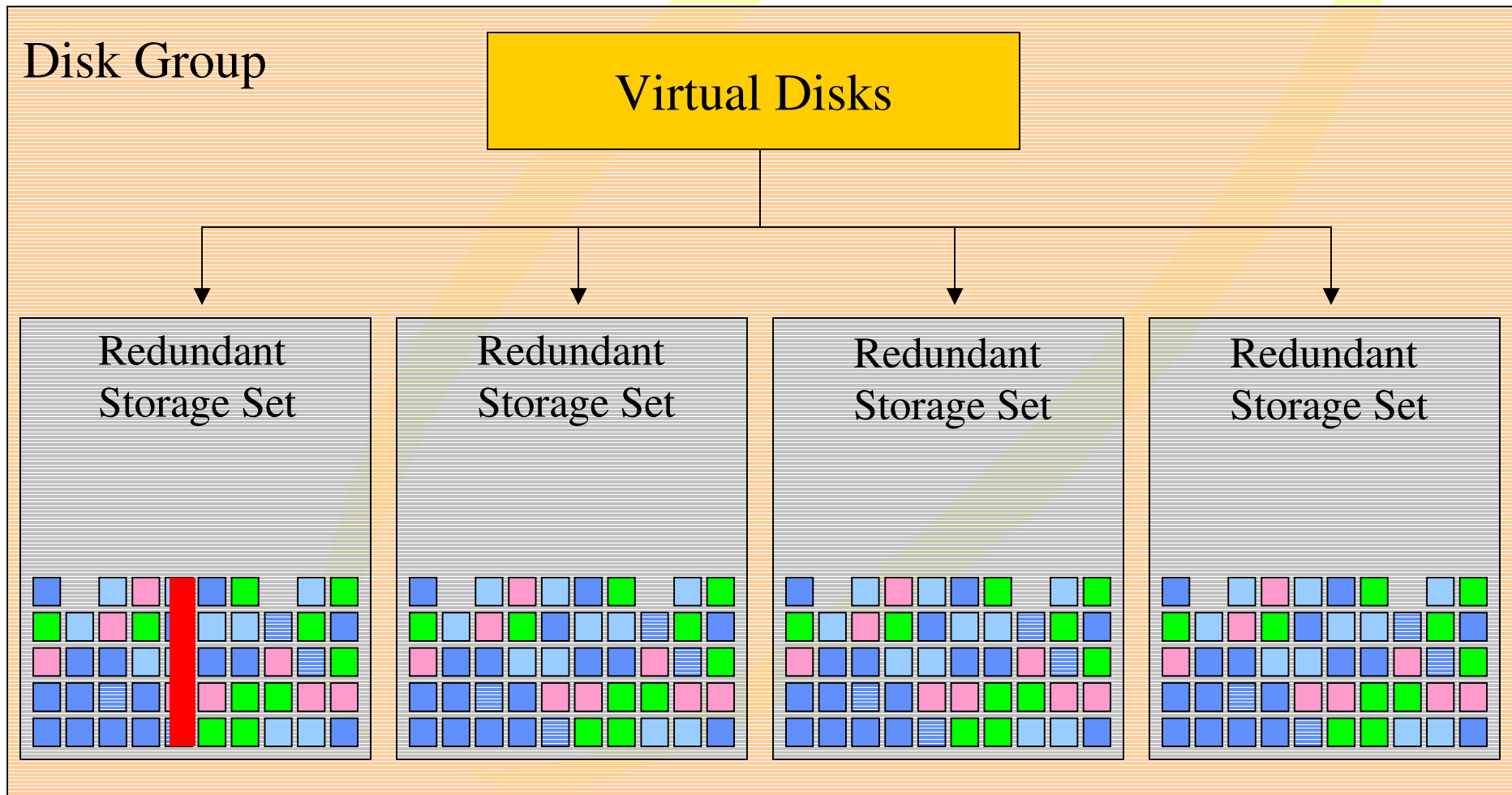


Redundant Storage Sets (RSS)

- ↓ Reduces chance of data loss in large (> 12 physical disks) disk groups
- ↓ Not visible to user through Interface
- ↓ Complete managed by the HSV controllers
- ↓ Typical size for disk group: 8 - 12 physical disks
- ↓ If RSS equals 12 physical disks, it splits into 2 RSS of 6 disks each
- ↓ Failed disk drive recovery restricted to affected RSS only
 - Reduces access to number of disks, more efficient
- Example: Disk Group with 28 disks
 - ↓ # of disks - 6, repeat until the remainder is 12 or less
 - $28 - 6 = 22$, $22 - 6 = 16$, $16 - 6 = 10$ stop
 - RSS configured as $6 + 6 + 6 + 10$



HSV110 Virtualization : Redundant Storage Sets





Sizing HSV Disk Groups — Considerations

➤ Considerations:

- ↓ Hardware versus software capacities
- ↓ System metadata overhead
- ↓ Vraid overhead
- ↓ Snapshot working space
- ↓ Spare capacity
- ↓ Room for growth



Sizing HSV Disk Groups — Considerations

- ↓ Hardware versus software capacities
 - Physical 1000 000 000Bytes = 1GB
 - Software 1073 741 824Bytes = 1.07GB Physical (2^{30})
 - ~ 7% Variance → 1GB Physical = 0.93GB Software
- ↓ System metadata overhead — 0.2%
 - System metadata
 - MLD—Command View EVA metadata
 - Virtual Disk metadata
- ↓ Vraid overhead
 - Vraid0 — 0% (1 block for every 1 block usable)
 - Vraid1 — 50% (2 blocks for every 1 block usable)
 - Vraid5 — 20% (1.25 blocks for every 1 block usable)
- ↓ Snapshot working space
 - Snap — depends on rate of change of original data
 - Snapclone — same physical capacity as virtual disk
- ↓ Spare capacity
 - 2 X physical capacity of the largest physical disk X protection selected



Sizing HSV Disk Groups—Formula

$$\text{Disk Count} \approx \frac{((\text{UsableV0} * 538) + (\text{UsableV5} * 673) + (\text{UsableV1} * 1076))}{(\text{DiskCap} * 476)} + (\text{ProtLevel} * 2)$$

- ◆ DiskCap: Disk drive capacity in hardware GB
- ◆ DiskCount: Integer number of disk drives
- ◆ ProtLevel: 0 for None, 1 for Single, 2 for Double
- ◆ UsableV0 Desired usable Vraid0 capacity in software GB
- ◆ UsableV1 Desired usable Vraid1 capacity in software GB
- ◆ UsableV5 Desired usable Vraid5 capacity in software GB
- ◆ VFactorx: 538 for Vraid0, 673 for Vraid5, 1076 for Vraid1



Sizing HSV Disk Groups—Summary of Steps

1. Determine:
 - a. physical disk capacity
 - b. disk failure protection level required for the disk group
2. Determine:
 - a. number of virtual disks in the disk group
 - b. usable capacity required for each virtual disk
 - c. Vraid type for each virtual disk
3. Determine:
 - a. amount usable capacity for snapshot working space for each virtual disk that will have snapshots
 - b. Vraid type of the snapshots will match the original
4. Sum the total usable capacity required for each Vraid type
5. Solve for the number of disks using Formula

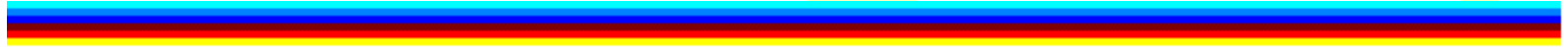


Sizing HSV Disk Groups—Example

$$\text{Disk Count} \approx \frac{((\text{UsableV0} * 538) + (\text{UsableV5} * 673) + (\text{UsableV1} * 1076))}{(\text{DiskCap} * 476)} + (\text{ProtLevel} * 2)$$

$$26.78 \approx \frac{((0 * 538) + (500 * 673) + (50 * 1076))}{(36 * 476)} + (2 * 2)$$

- ◆ DiskCap: 36GB
- ◆ DiskCount: Integer number of disk drives
- ◆ ProtLevel: 2 for Double
- ◆ UsableV0 0GB
- ◆ UsableV1 50GB
- ◆ UsableV5 500GB
- ◆ VFactorx: 538 for Vraid0, 673 for Vraid5, 1076 for Vraid1



Trouble Shooting



Best Practices

- ↓ Synchronize HSV110 system date / time to same as Management Server
- ↓ Helps correlate events when trouble shooting

HSV Storage Network
Uninitialized Storage System
Hardware

Previous Step Next Step Cancel Page Help

Initialize an HSV Storage System

Page 1 Page 2 Page 3 Page 4

Continue with this step to initialize your HSV storage system using advanced options. Click the **Next Step** button to move to the next page.

STEP 3: Set the system date/time

☒ Use Compaq SAN management date/time: 19 Jul 2001 08:42:22 GMT ?

☐ Use local date/time and convert to GMT: 19 Jul 2001 20:42:56 GMT

☐ Use existing controller date/time setting: 19 Jul 2001 08:42:22

☐ Use a custom date/time setting:

01 - Jan - 2001 00 : 00 : 00

STEP 4: Enter the Console LUN ID

?

Previous Step Next Step Cancel



Configuration Remarks

➤ Disk Groups can be created in 2 ways:

↓ Vertically, so one disk drive per shelf

▣ Pro:

- ◆ 100% guarantee that it will survive a shelf meltdown failure

▣ Con:

- ◆ Limited number of disk drives per Disk Group
- ◆ Performance (less spindles)
- ◆ Cannot use full capacity due to loss in space reservation for (space efficient) snapshots



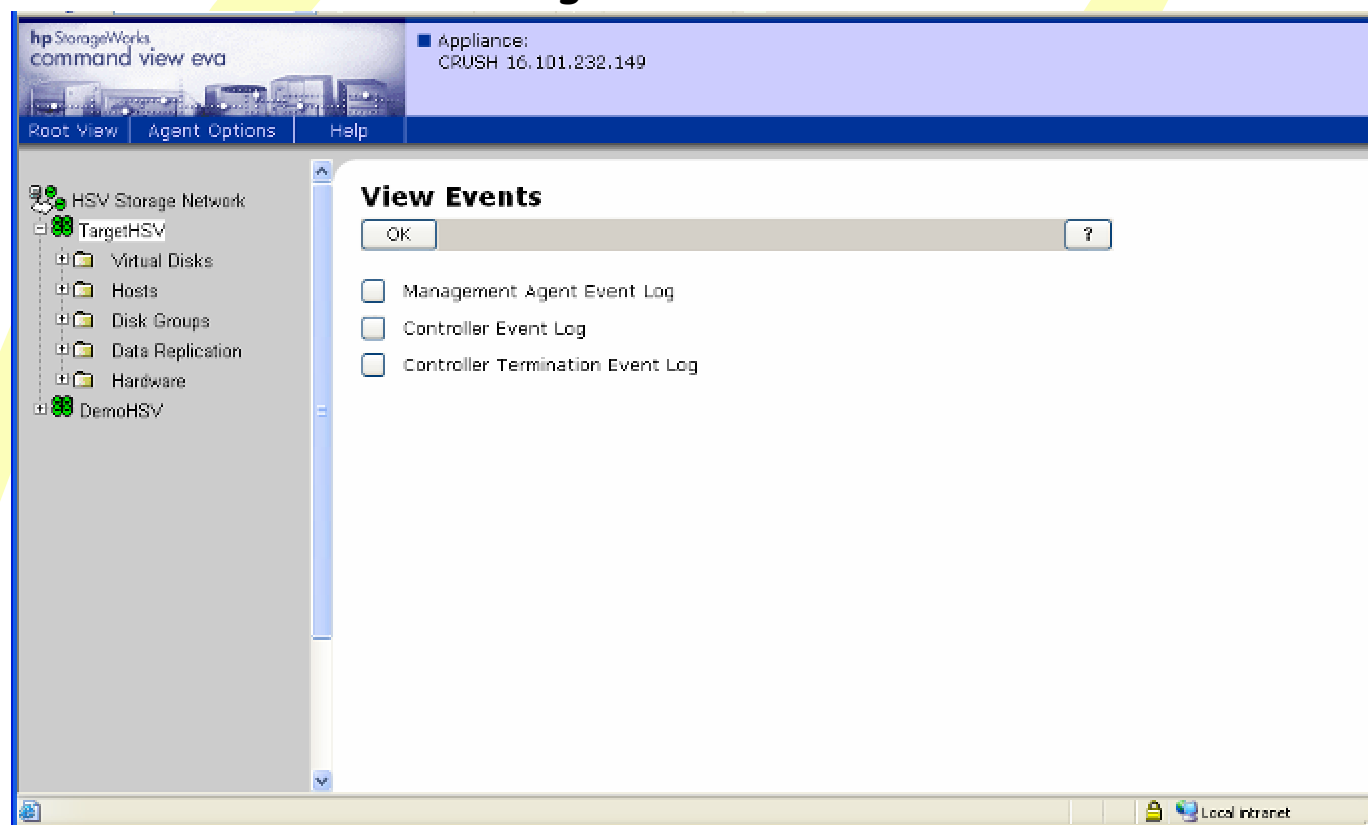
Configuration Remarks

- Disk Groups can be created in 2 ways (continued):
 - ↓ Multiple disk drives per shelf
 - Pro:
 - ◆ Unlimited performance due to large number of disk drives in disk group
 - ◆ No loss in space reservation for snapshots or snapclones
 - Con:
 - ◆ Isn't guaranteed to survive a shelf meltdown failure



Troubleshooting Tools—Events

- Management Agent Event Log
- Controller Event Log
- Controller Termination Event Log





Log Files

↓ Management Agent Event Log

Management Agent Event Log - Microsoft Internet Explorer provided by Compaq Computer Corporation

OK Filter Events... Get Log File Clear Log Page Help

Management Agent Events						
	Date	Time	Appliance	Code	Alarm	Description
✓	13-Nov-2001	10:49:44	SWMA31K001	1014	No	The state of an object in the system has changed. View adjacent events for more detail.
✓	13-Nov-2001	10:49:24	SWMA31K001	2048	No	Virtual Disk Family: Copy of vdisk-vraid1-01 - deleted successfully
✓	13-Nov-2001	10:47:02	SWMA31K001	2042	No	Virtual Disk Copy of VD vdisk-vraid1-01/ACTIVE - Completed
✓	13-Nov-2001	10:45:50	SWMA31K001	1014	No	The state of an object in the system has changed. View adjacent events for more detail.
✓	13-Nov-2001	10:45:16	SWMA31K001	2048	No	Snapshot Virtual Disk: Allocate Completely Snapshot - deleted successfully
✓	13-Nov-2001	10:43:38	SWMA31K001	2041	No	Virtual Disk Snapshot of VD - Completed
✓	13-Nov-2001	10:42:44	SWMA31K001	1014	No	The state of an object in the system has changed. View adjacent events for more detail.
✓	13-Nov-2001	10:42:08	SWMA31K001	2048	No	Snapshot Virtual Disk: Allocate on Demand Snapshot - deleted successfully



Audit / Event Logs

➤ Management Event Log:

- ↓ Contains events created by Command View EVA
- ↓ Used to report configuration changes
- ↓ Filterable based on category for viewing, SNMP forwarding and posting to NT event log of SAN Appliance
- ↓ Round robin buffer
 - 1000 entries per Storage Cell
 - Entry size: 512 bytes
- ↓ Timestamps based on SAN Appliance time
- ↓ Sometimes referred to as "Audit Log"



Log Files

↓ Controller Event Log

Controller Event Log - Microsoft Internet Explorer

Controller Events (Initialized system)

OK Get log file Get parse file Send parse file ?

Display Range: 1 - 400 Previous group Next group

Controllers: Controller B: 5005-08b4-0001-4909-0000-0000-0000
Controller A: 5005-08b4-0001-48c8-0000-0000-0000

Date/Time Controller	Severity	Event Code	Sequence #
12:57:17:000 25-Jun-2004 Controller B	✓	0101000d	#60
The system time value was set to the value contained in the time field by a call to the EXEC\$SET_TIME service. ✗Corrective action code: 00 More details			
12:54:45:429 25-Jun-2004 Controller B	✓	42030007	#59
An excessive number of link errors were detected on a HSV110 controller's Fibre Channel port. ✗Corrective action code: 00 More details			
12:54:45:429 25-Jun-2004 Controller B	✓	42030007	#58
An excessive number of link errors were detected on a HSV110 controller's Fibre Channel port. ✗Corrective action code: 00 More details			
12:54:39:354 25-Jun-2004 Controller B	✓	09070005	#57
The state of the Fibre Channel port identified in the attribute.value.str field and located on the rear panel of the HSV110 controller identified in the handle field has transitioned to the NORMAL state. ✗Corrective action code: 00 More details			



Audit / Event Logs

➤ System Event Log

- ↓ Contains events created by HSV controllers
- ↓ Used to report Storage Cell state changes
 - Configuration changes
 - Storage Cell state changes
 - Software detected Inconsistencies
- ↓ Round robin buffer of 2MB
 - No fixed entry size, so variable number of event
- ↓ Filterable on importance level and category for forwarding to SNMP and posting in NT event log of SAN Appliance
- ↓ Timestamps based on HSV controller time



Log Files

↓ Controller Termination Event Log

Controller Termination Event Log - Microsoft Internet Explorer

Controller Termination Events (Initialized system)

OK Get log file Get parse file Send parse file ?

Controllers: Controller B: 5005-08b4-0001-4909-0000-0000-0000-0000
Controller A: 5005-08b4-0001-48c8-0000-0000-0000-0000

Date/Time Controller	Severity	Event Code	Sequence #
12:48:39:200 25-Jun-2004 Controller A	✓	03660060	#54
This HSV110 controller was requested to terminate operation and then power off. ✗ Corrective actions code: 00 More details			
23:44:40:373 27-Jan-2004 Controller A	⚠	04240960	#53
Power failed. ✗ Corrective actions code: 09 More details			
09:07:36:896 22-Jan-2004 Controller A	✓	03640020	#52
This HSV110 controller was requested to terminate operation and then restart. ✗ Corrective actions code: 00 More details			
16:08:39:824 16-Jan-2004 Controller A	✓	03640020	#51
This HSV110 controller was requested to terminate operation and then restart. ✗ Corrective actions code: 00 More details			
16:59:25:610 3-Dec-2003 Controller A	✓	03640020	#50
This HSV110 controller was requested to terminate operation and then restart. ✗ Corrective actions code: 00 More details			



Audit / Event Logs

➤ Termination Event Log

- ↓ Used to record HSV shutdown messages
 - Fatal errors (so firmware problems)
 - Graceful shutdowns
- ↓ Controlled by the HSV controllers
- ↓ Controller crash event logs
- ↓ No crash dump (separate file)
- ↓ Timestamps based on HSV controller time.
- ↓ No forwarding capability to SNMP or posting into NT event log of SAN Appliance
- ↓ Round robin buffer
 - 32 entries
 - Entry size: 10KB



Enterprise System Behavior

- ↓ Unconfigured HSV110 will not enable Host Ports until the WWN is configured with the OCP
 - LEDs adjacent to FP1 and FP2 are initially off
 - ◆ Green when enabled
 - ◆ Link symbol LED on HSV110 front panel
- ↓ Check port LEDs on:
 - FC-Switches → Green
 - Rear of HSV110 → Green
- ↓ If Host Ports (FP1, FP2) are off, no communication path





EMU error code

➤ Current Errors

- ↓ Audible—beeping
- ↓ Code available on EMU display
- ↓ 3 part error code xx-xx-xx
- ↓ May have multiple errors available

➤ Error log

- ↓ Available through Command View EVA event page
- ↓ 62 entries per EMU (enclosure)



Audible Alarm Sound Patterns

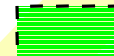
- ↓ Most severe alarm controls the alarm pattern
- ↓ Sounds until errors are cleared

Condition Type	Cycle:1						Cycle:2					
Unrecoverable	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Critical	Red	Green	Red	Green	Red	Green	Red	Green	Red	Green	Red	Green
Non critical	Red	Green	Red	Green	Green	Green	Red	Green	Red	Green	Green	Green
Information	Red	Green	Green	Green	Green	Green	Red	Green	Green	Green	Green	Green

Legend



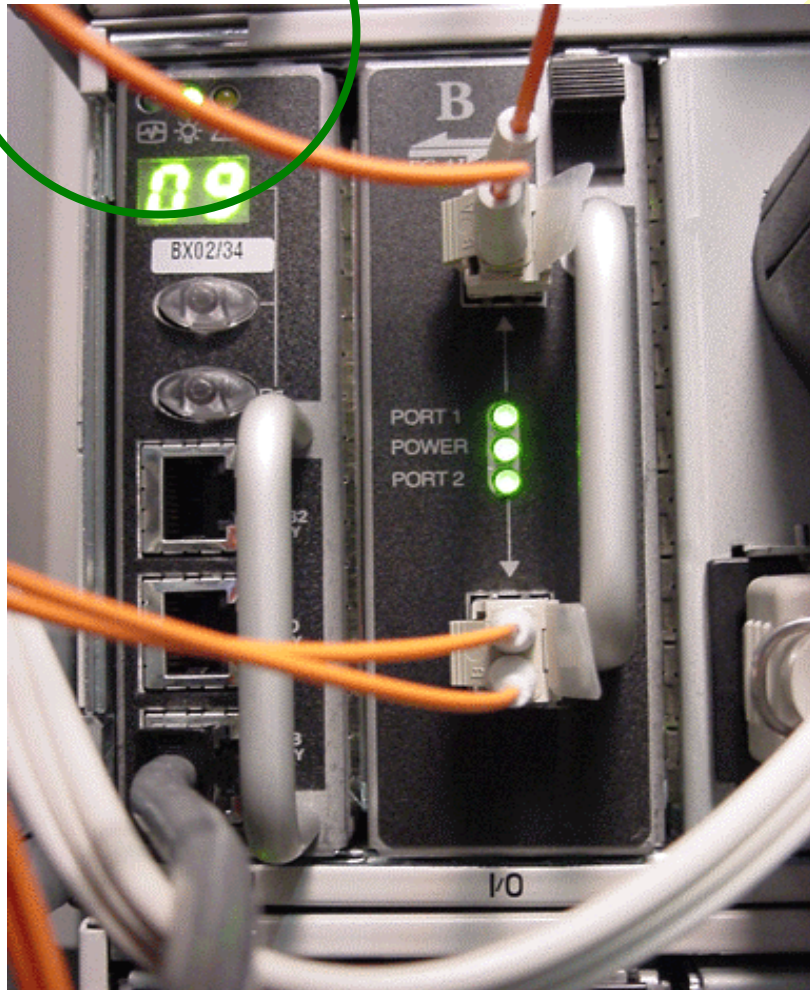
Alarm On



Alarm Off



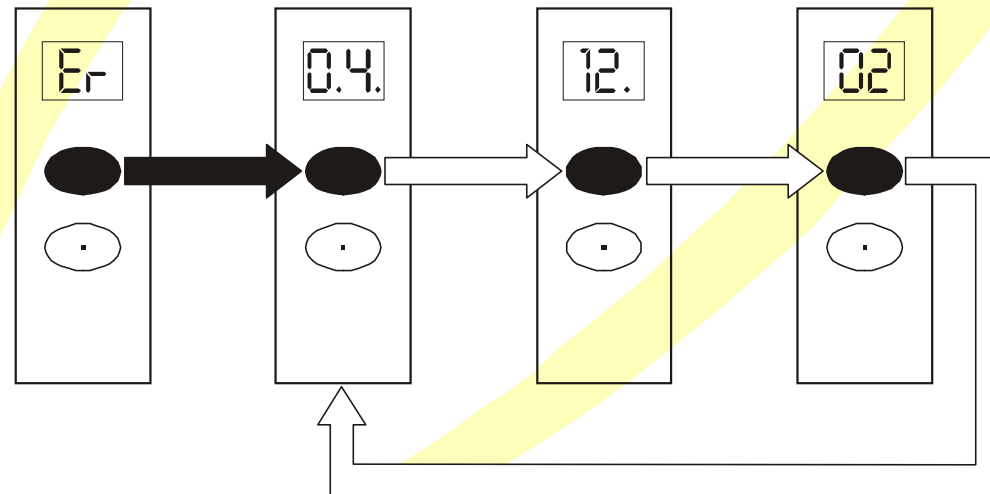
EMU error code





EMU error code

- Current error code collection
 1. Press and hold top button (~2 seconds)
 2. Record 2 digit number
 3. Press and release top button
 4. Record second 2 digit number
 5. Press and release top button
 6. Record third 2 digit number
- Repeat if error light still lit—Multiple errors





View Events

HSV Storage Network
NCC1701

- Virtual Disks
- Hosts
- Disk Groups
- Hardware

Buttons: Save Changes, Options..., **View Events...**, Uninitialize, Code Load..., Page Help, Get Config File

Initialized Storage System Properties

Name:	NCC1701
Operational State:	Initialized - Good
Total storage space:	364.75 GB
Storage space used:	255.34 GB
Available storage space:	109.41 GB
Device addition policy:	Manual
Disk replacement delay:	1 mins
Console LUN ID:	100
Controller time:	02 Feb 1900 17:31:57
Comments:	

OK Page Help

View Events

- View Management Agent Event Log
- View Disk Shelf Event Log
- View Controller Event Log
- View Controller Termination Event Log

Compaq Confidential



Event Data and Collection

- The HSV controllers have 2 Event Logs:
 - ↓ Termination events
 - ↓ Spontaneous events (all controller events that are not termination events) that occur within the Storage Cell
- The termination events are stored in NVRAM in each controller AND on a logical disk in the storage cell



Event Data and Collection

- Be careful on time stamps
 - ↓ HSV controller time may be different than server time, which may be different than SAN Appliance time
 - ↓ More difficult to correlate different product timestamps
- Disk shelf logs do not contain timestamps, but "elapsed time as of last [EMU !!] reboot"



Command View EVA Events

- The Parse file is released with VCS build
 - ↓ Contains bit-to-text translation of VCS codes
 - ↓ HSV110_event_nxxxxxxxxx_xxxxxx.txt



Command View EVA Events

- Click on cell, select options in title bar
 - ↓ Event notification: System options
 - Select which events are sent as traps
 - ↓ Event notification: Host options
 - Add the host to receive the SNMP trap of events
 - Need MIB to decode

OK Modify List... Get List File Page Help

Set Event Host Options

The Host Notification List displays the hosts you have configured to receive event notifications directly via the network. You can modify the list directly by clicking the **Modify List** button. You can also get a file representing the list by clicking the **Get List File** button. After editing the file, you can replace the list by sending it back to the server, as described below.

Host Notification List	
Host Name	Notify Port
128.100.100.86:2301	SNMP

To replace the host notification list:
You can replace the host notification list above by sending a properly formatted host notification file to the server. Enter the complete file path or browse to the host notification file of your choice and click the **Send List File** button to send the file.

Browse... Send List File



HSV—Errors



- ↓ Hardware failures
- ↓ Cable connectivity
- ↓ Versions of software/firmware
- ↓ Topology
- ↓ Cabling

- ↓ Intermittent
 - Drive connectivity
 - FC-AL LIPs
- ↓ Software incompatibility
- ↓ Zoning



HSV—Error Indication



- ↓ LEDs
- ↓ Error Codes
- ↓ Audible
- ↓ Event logs

- ↓ None
- ↓ Management Server hangs
- ↓ No communication between Management Server and EVA
- ↓ Intermittent devices errors



Best Practices

- ↓ Ensure drives are properly seated
 - Gently apply pressure with thumb
- ↓ Check all cabling
 - Fibre Channel
 - Power—PDUs, PDMs
 - CAN Bus
- ↓ Use dust covers on cables and transceivers
- ↓ Don't touch end of cables
- ↓ Use care when removing Fibre Channel Cables—fragile



Symptom—No Enterprise in Command View EVA

- ↓ Installation check list
- ↓ Fabric connectivity
 - Check Fabric Name Server table
 - Are devices logged in?
 - ◆ Check cabling
 - ◆ Check HSV110 LCD—alternating System Name and WWN
 - Did you activate the HSV110 Controller password?
 - ◆ Does the password match with Command View EVA?
 - ◆ Default system password: **AAAAAAAAA**
- ↓ Command View EVA (EM) is installed but not visible
 - HSV EM has stopped
 - ◆ Check Appliance Manager → Services
 - Check required software and firmware
 - ◆ For example, SAN switch firmware v2.1.9m



Symptom—No Enterprise in Command View EVA

- ↓ Device port (1A, 1B, 2A, 2B) Loop errors
 - ▣ Unstable system
 - ▣ Intermittent to no communication
 - ▣ Troubleshooting is challenging
- ↓ Need to reduce the bus configuration to isolate the failing component
 - ▣ Requires re-cabling/bus isolation
 - ◆ Risk to customer data—backup
 - ◆ Understanding flow of data
 - ◆ Disk Enclosure (5214)
 - ❖ Data **IN** → I/O module **top** (or **bottom**) port → bay 1 → bay 2..→ bay 14 → **OUT** I/O module **bottom** (or **top**) port
 - ◆ Bypass circuit:
 - ❖ Drive present—signal connected to drive
 - ❖ Empty bay—into bypass circuit to next bay
 - ◆ Disk errors logged in the Controller Event Log

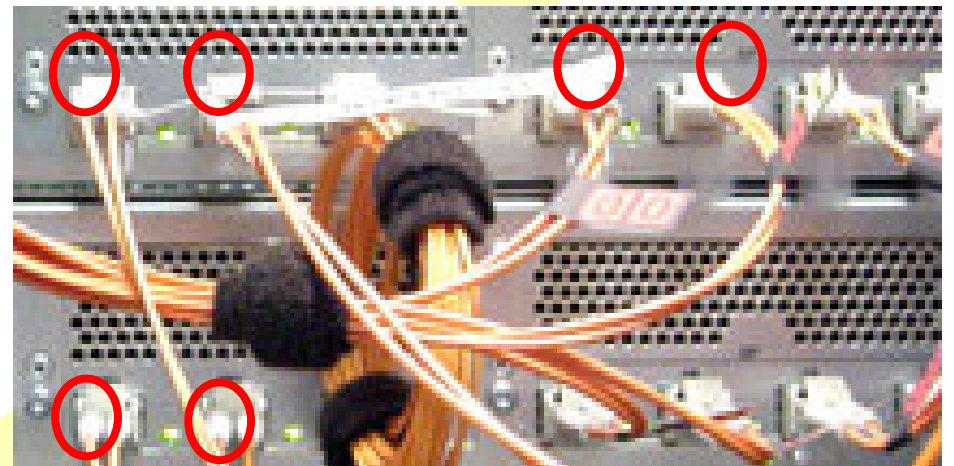


Error Indication—Controller LEDs

- ↘ Fault
- ↘ Host Link
- ↘ Controller Heartbeat
- ↘ Cache Battery Assembly



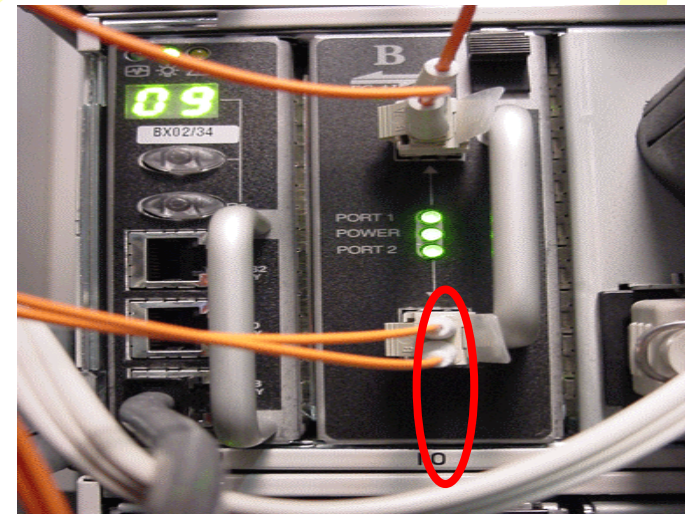
- ↘ Fabric Ports
- ↘ Mirror Port
- ↘ Device Ports





Error Indication—Enclosure I/O Module LEDs

- ↓ Top port status
- ↓ I/O Module power
- ↓ Bottom port status
- ↓ **Flashing Port** → data transfer
- ↓ Port Status → **Off** when:
 - Bad frames detected
 - Bad connection/cabling
 - No light from I/O module "upstream"
 - HSV110 Controller disabled device port as a result of too many errors
 - ◆ 10 minute timer before re-enabling
 - ◆ Wait for at least 11minutes to diagnose
 - Cable may be lit from both controllers
 - Remove cable from top controller → check ports → re-install and wait 10 minutes → remove cable from bottom controller → check ports

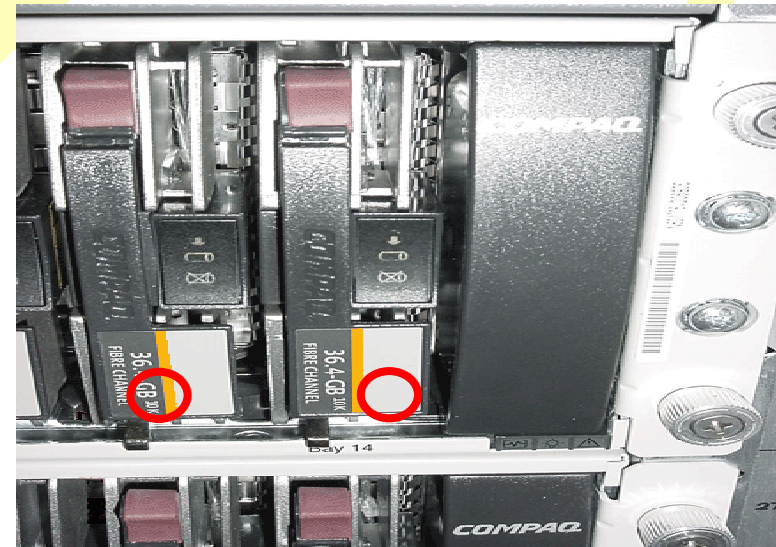




Error Indication—Drive LEDs

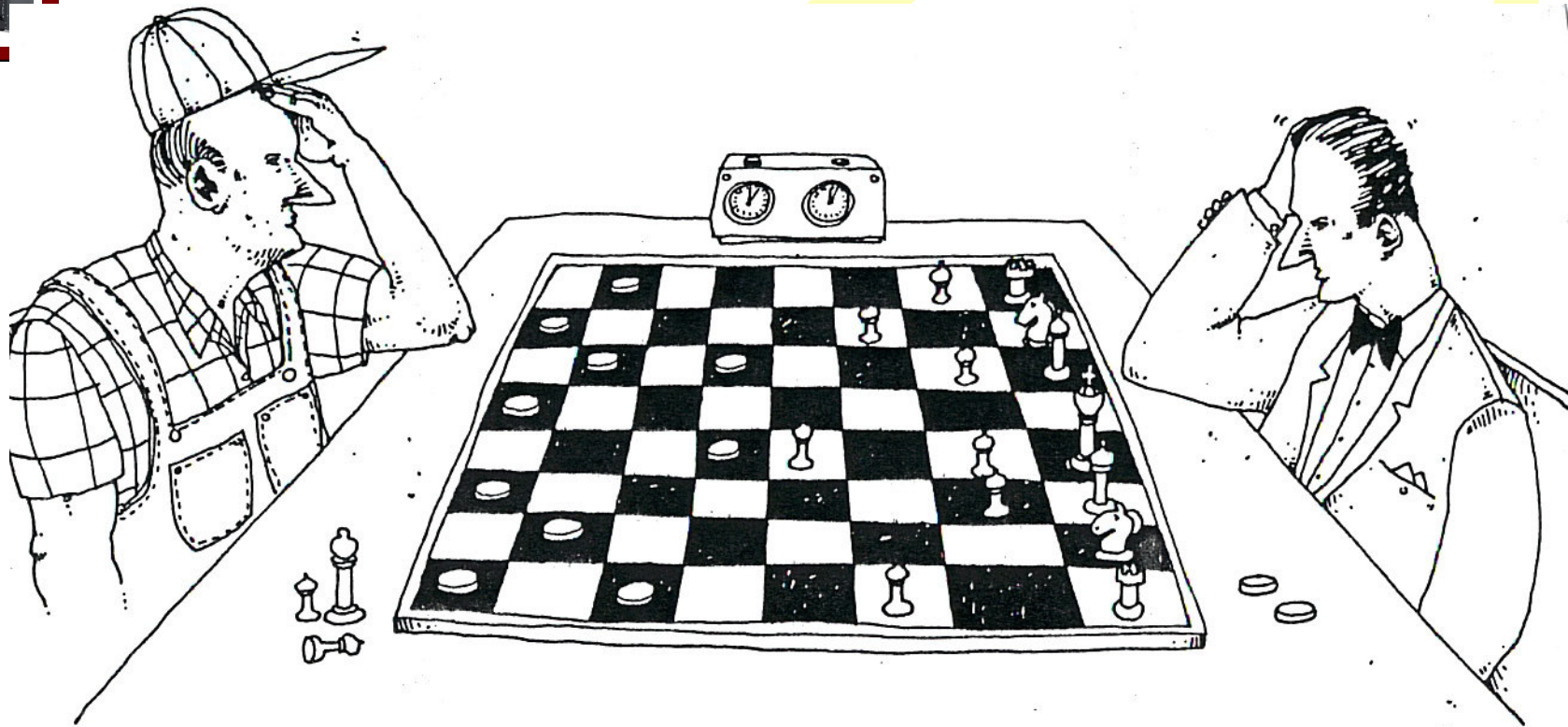


- ↓ Lit (Activity LED) indicates drive idle
- ↓ Flashing indicates activity
- ↓ When a drive is inserted:
 - Spin up and enable ports
 - LIP will occur (FC-AL)
- ↓ LIP will cause all drives on loop pair to flash the Activity LED
- ↓ All drives flashing Activity LED ~every 30 seconds may indicate system has detected problem
- ↓ LIPs to establish loop stability





Any Questions?



ATToE.