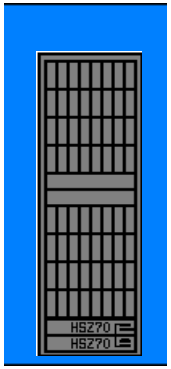
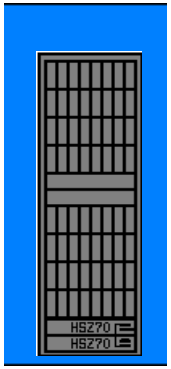
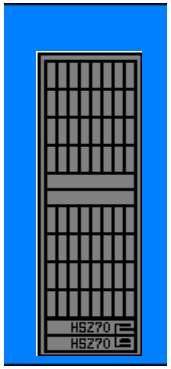



# EVA Setup and Configuration




# General HSV Licensing

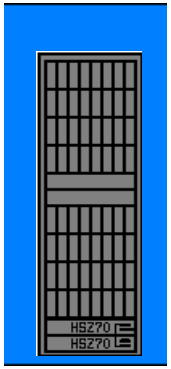
- License keys are stored on SWMA hard drive and on each Management Logical Disk (MLD)
  - Keep Record
- Loss of appliance does not lose licensing state
- VCS software on controller is full featured
- Basic license required to initialize storage cell
- Feature licenses are tied to a specific subsystem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

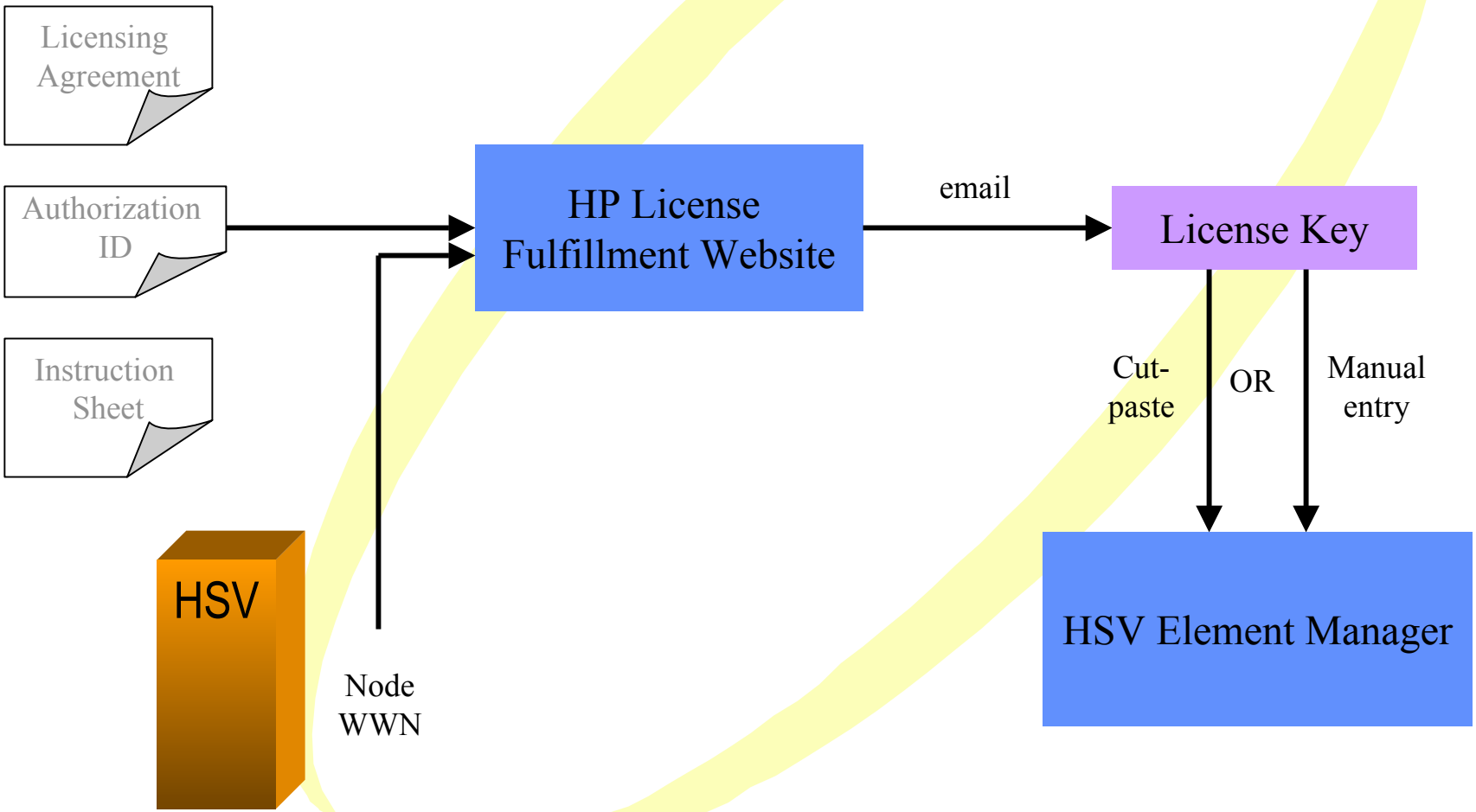



# General HSV Licensing

- License enforcement is based on VCS version number
- VCS versions are changed with a SuperImage 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


## License Fulfillment

### Order Information

| | | | | |
|---|---|---|---|---|
| Order No: | OW6 | | Version: | 1.0 |
| Product Name: | QM-6RNAA-AA1.0 | | Type: | prod |
| Option: | VCS PKG V1.0 DUAL HSV CNTLR | | | |
| Quantity Ordered: | 1 | | Quantity Created: | 0 |

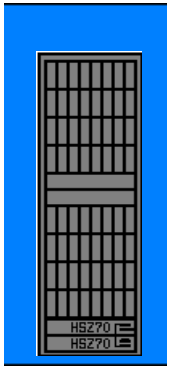
Enter the information below, then press the 'Generate License' button

There are 1 items remaining of the original 1

Quantity: 1

Host ID of the machine where you will run the application: HSVWWN=5000-1

Generate_License



# 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 \
        =xxxxxxxxxxxxxxxxxxxx, Qty 1, QM-6RNAA-AA1.0, VCS PKG V1.0 \
        DUAL HSV CNTLR" ck=100
```

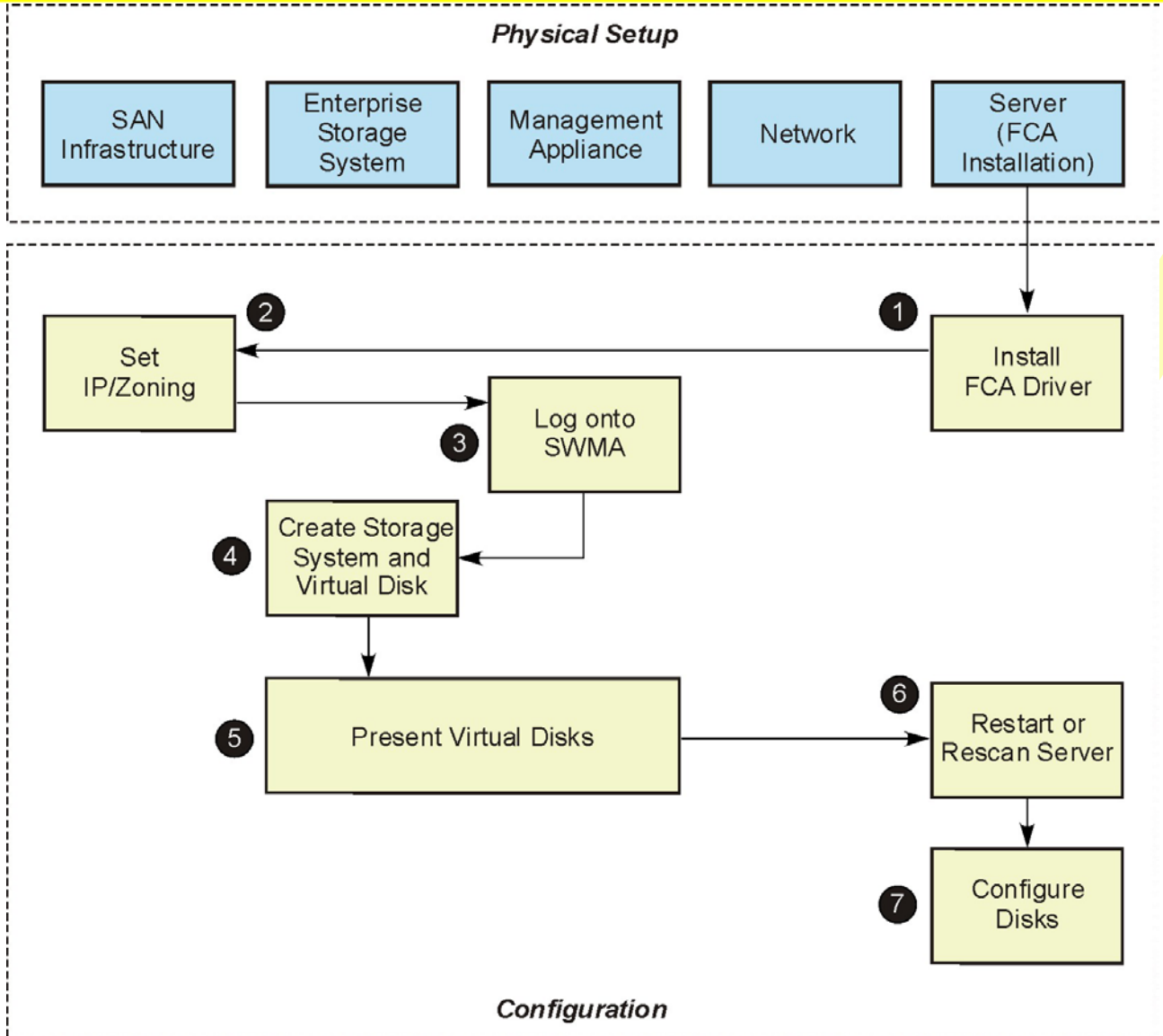
>>> LICENSE KEY ends BEFORE THIS LINE <<< End your selection on the PREVIOUS line

to complete your COPY.

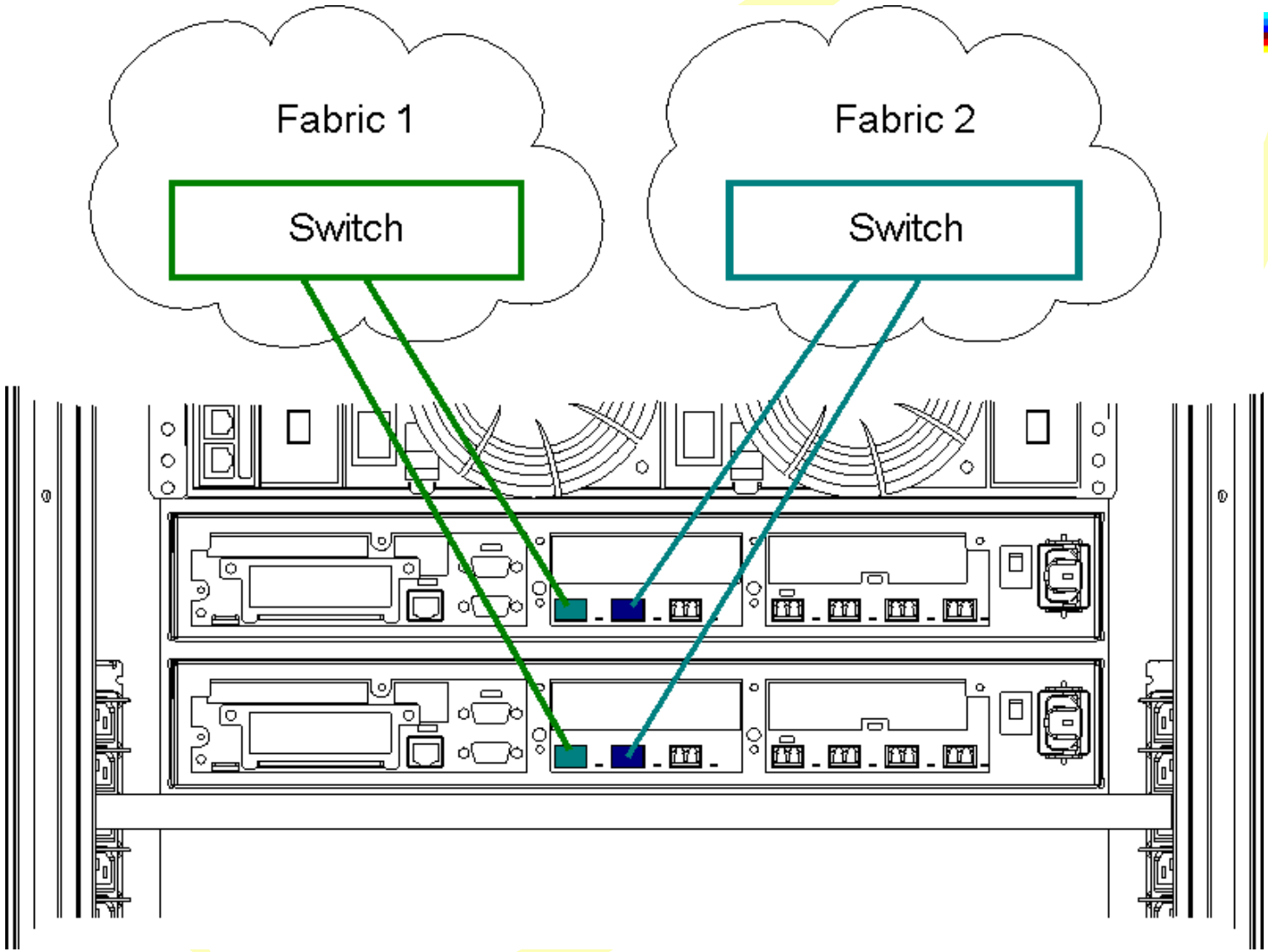
If you have any problems installing this license key, contact the parties listed on the

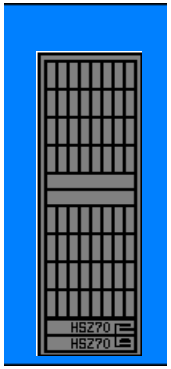
associated license documentation or web site.

# Configuring the Enterprise Virtual Array



# HSV110 Fabric Cabling

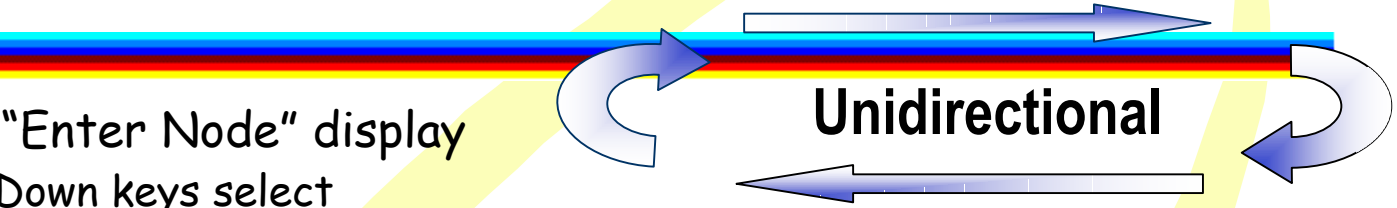




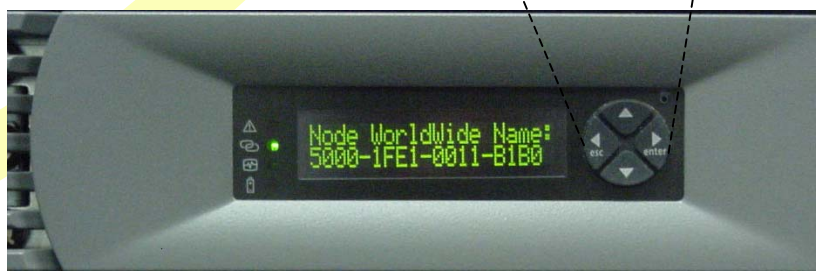

# Step 1—Before Launching the HSV Element Manager

- 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

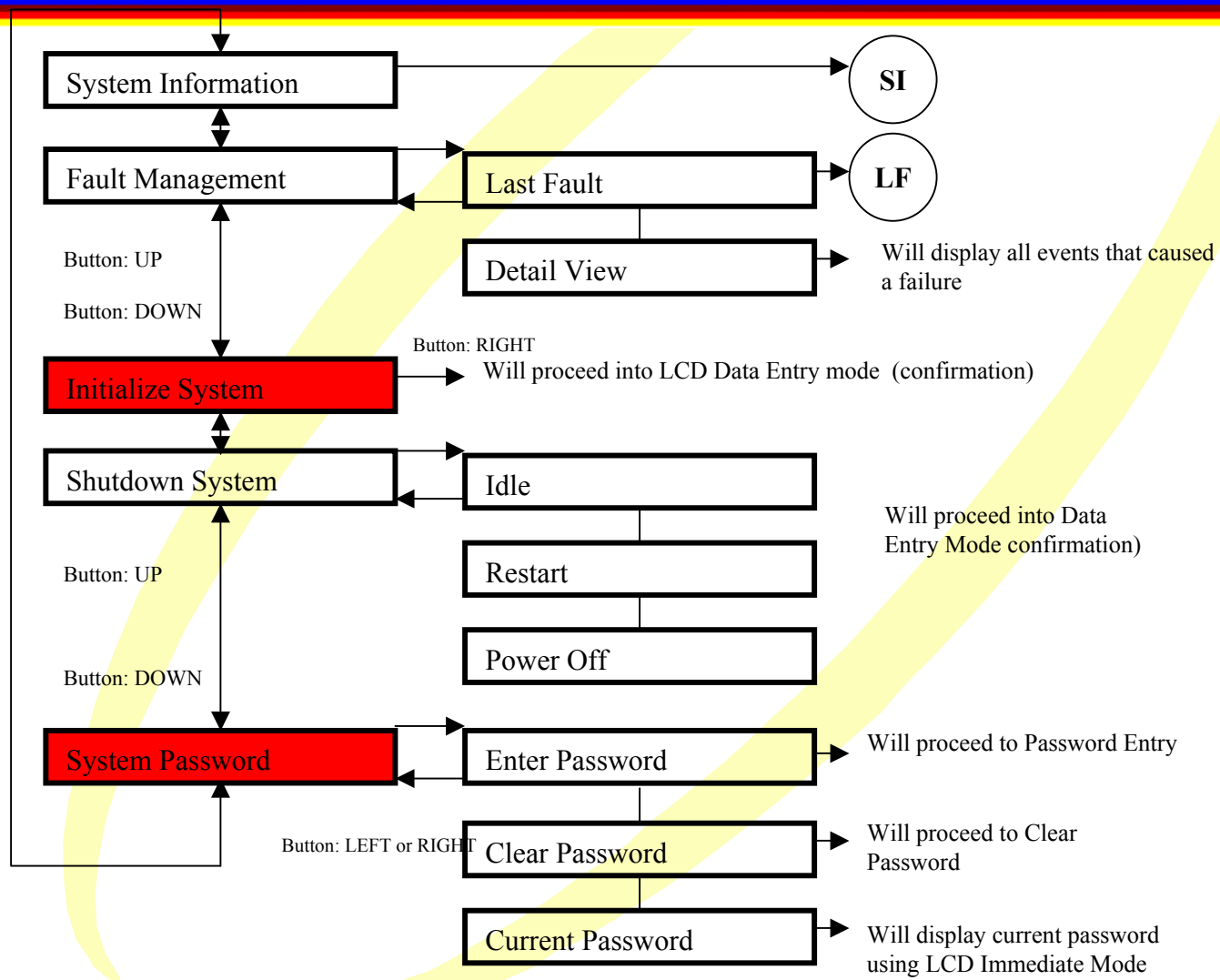
# LCD WWN Programming



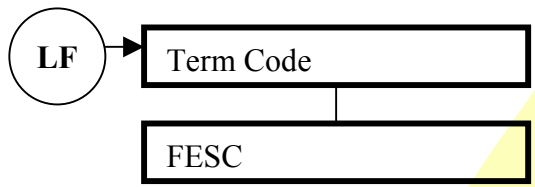

- At the "Enter Node" display
  - Up-Down keys select hexadecimal number
  - Right key moves position to right
  - Left key enters the number and moves to checksum step
- At the "Enter Checksum" display
  - Up-Down keys select Letter/Number
    - Full alphabet
  - Right key moves to the right
  - Left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

# LCD Front Panel Menu Structure



# LCD Front Panel Menu structure (continued)

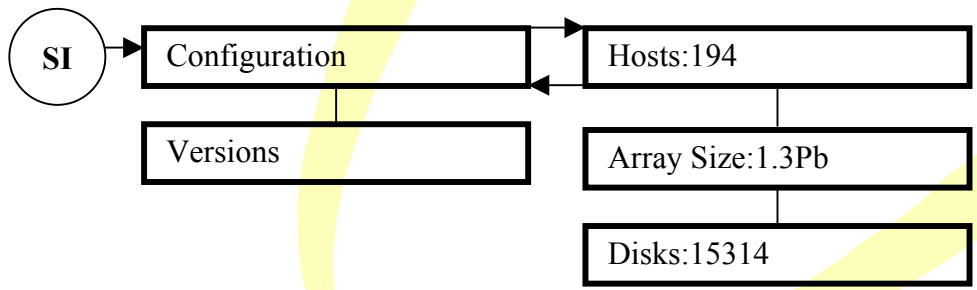



Will display the last event that caused a failure using "termination code" format

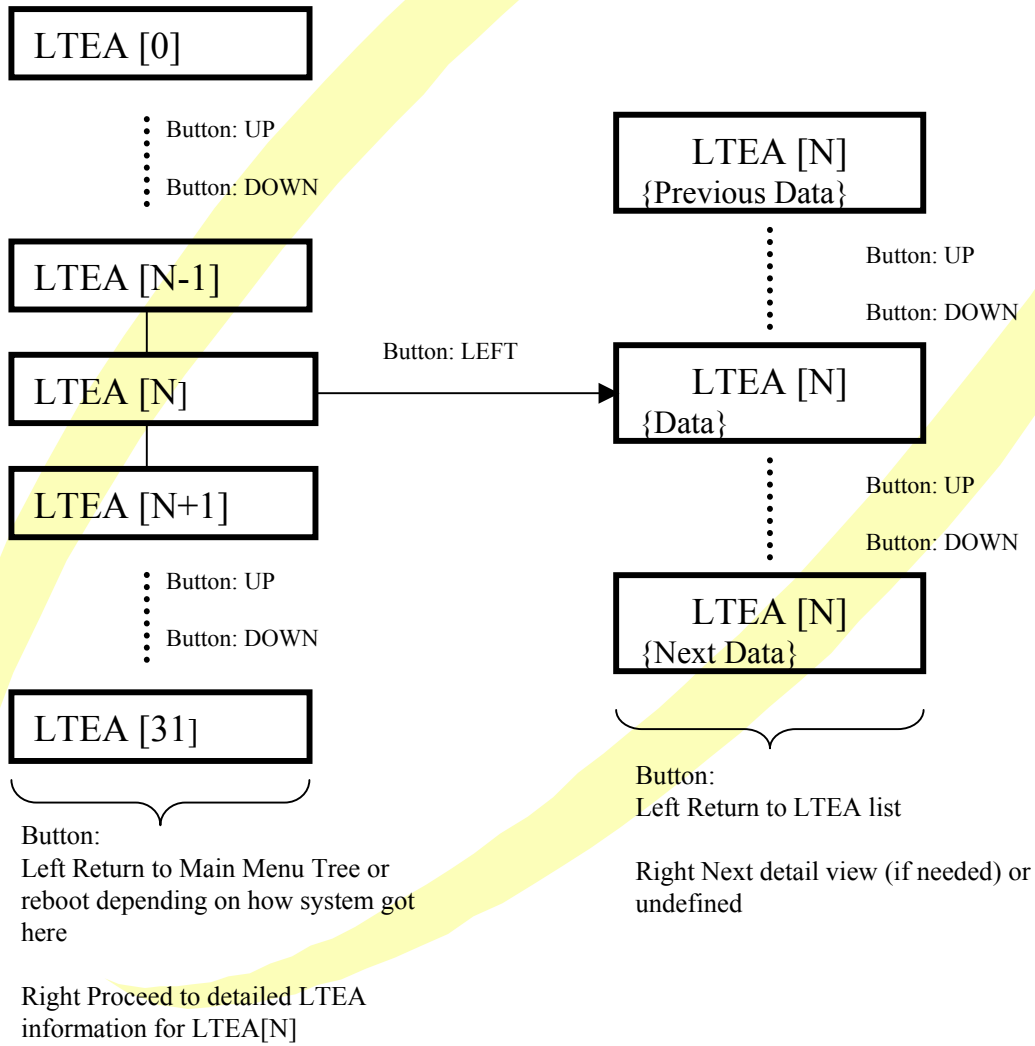
Will display the last event that caused a failure using "fatal error state code" format

TC: 0412001F
LTEA [5]

FESC: 82010000



# LCD Front Panel Fault Menu Tree



# 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

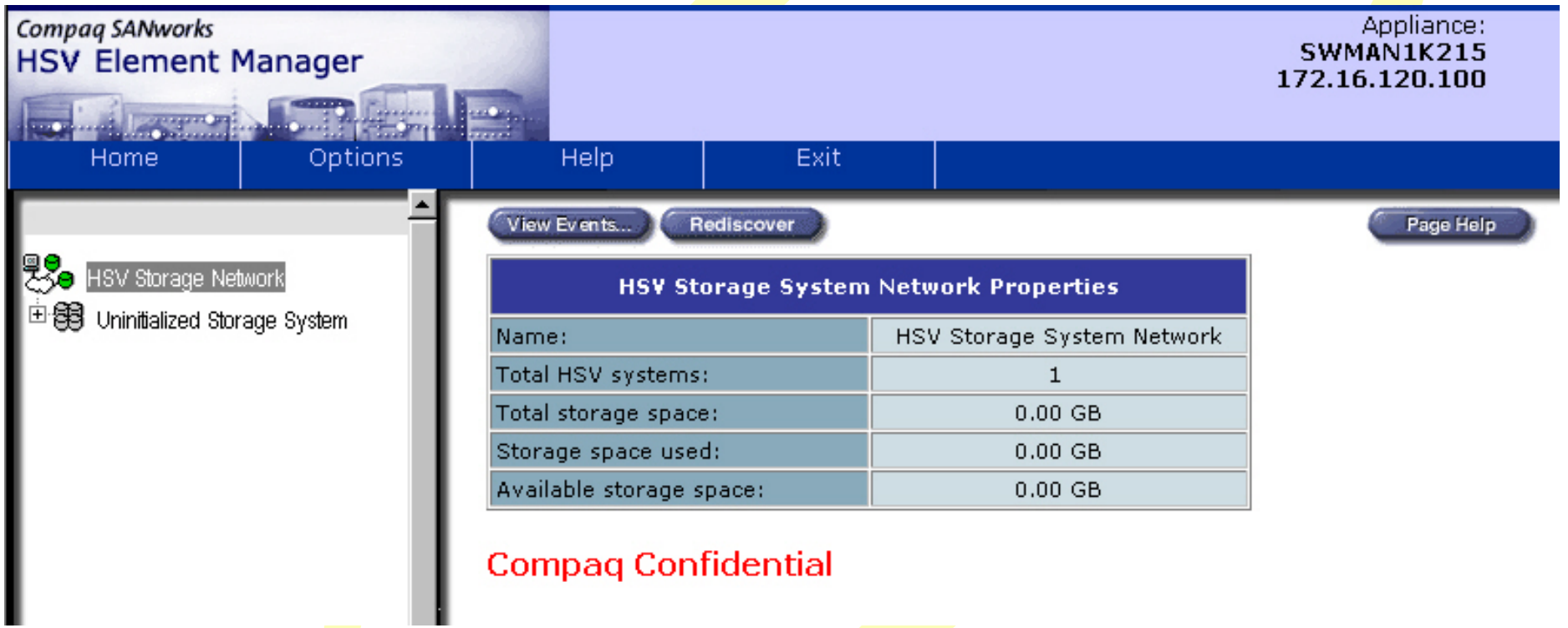
## WWID Entry

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

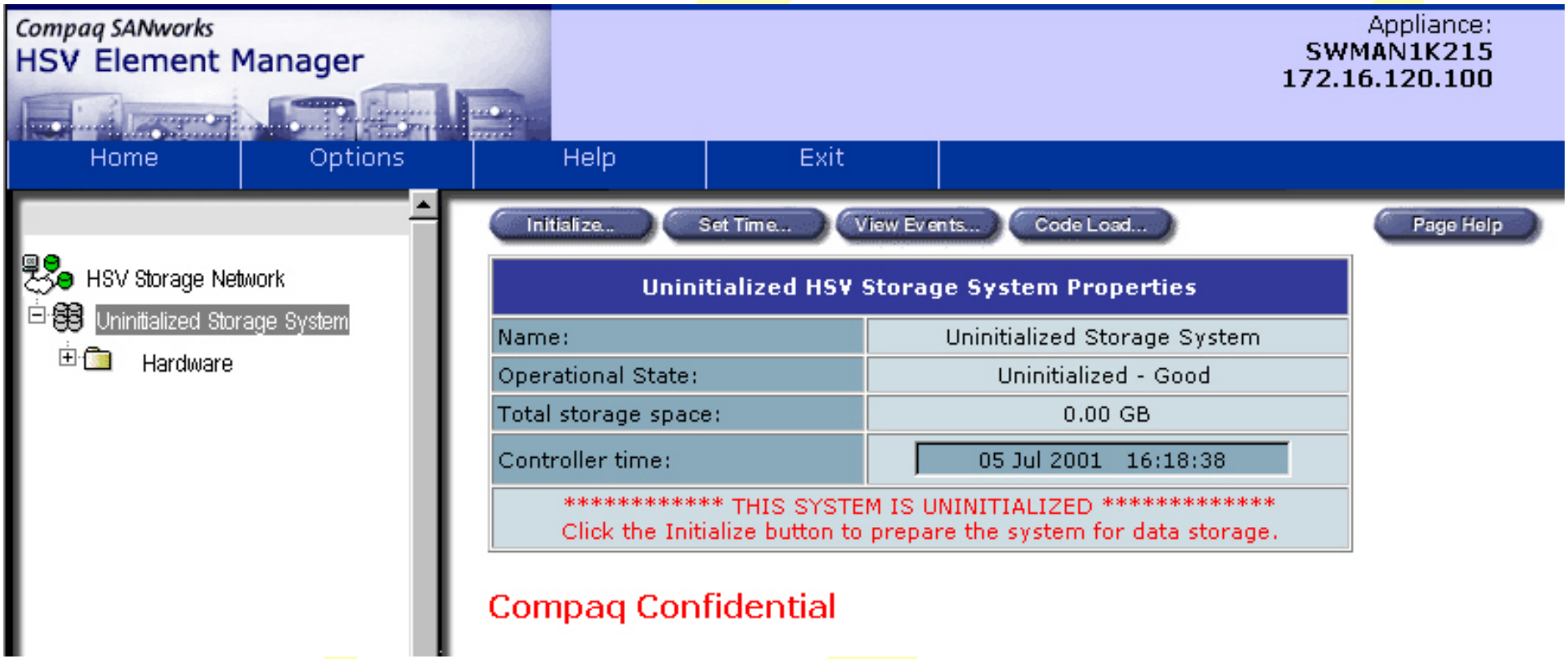
↓

Enter WWID Checksum:
00

# The Very First Time – Uninitialized Storage System

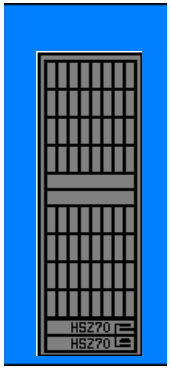


# Uninitialized Storage Cell



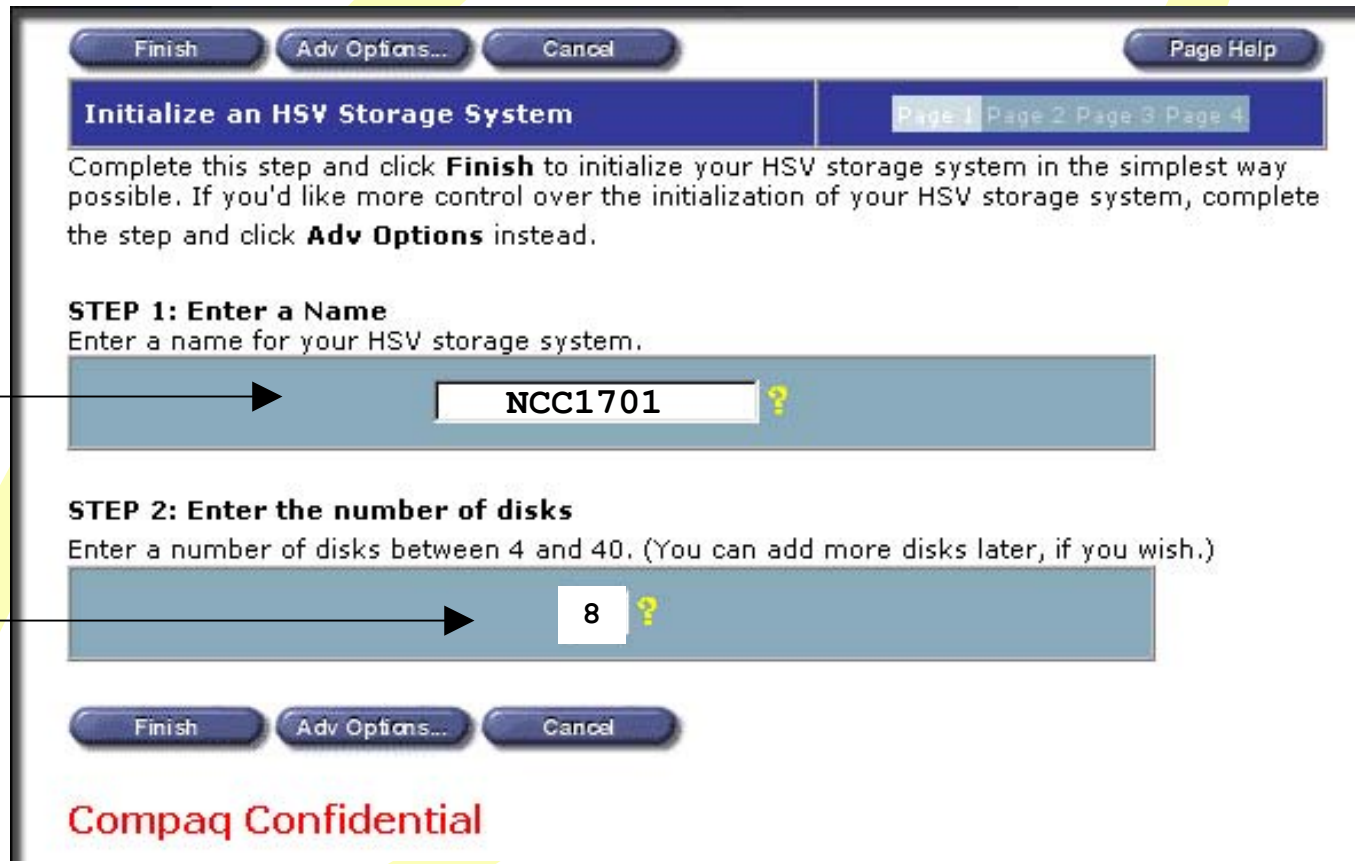

Compaq Confidential

# Storage Cell Initialization (Page 1 of 4) (8 disks min)



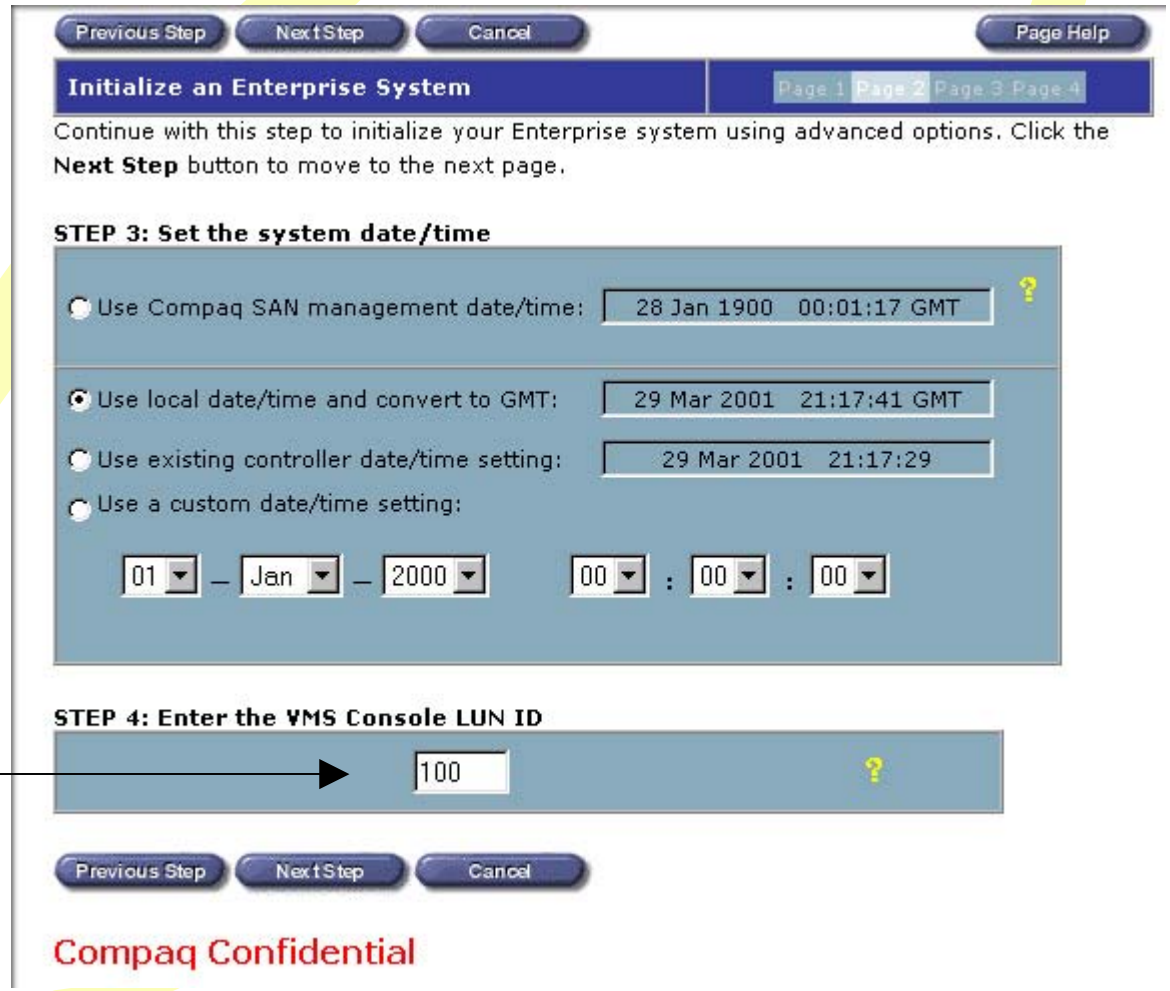

**Enter the name of the Storage Cell**

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



# Storage Cell Initialization (Page 2 of 4)

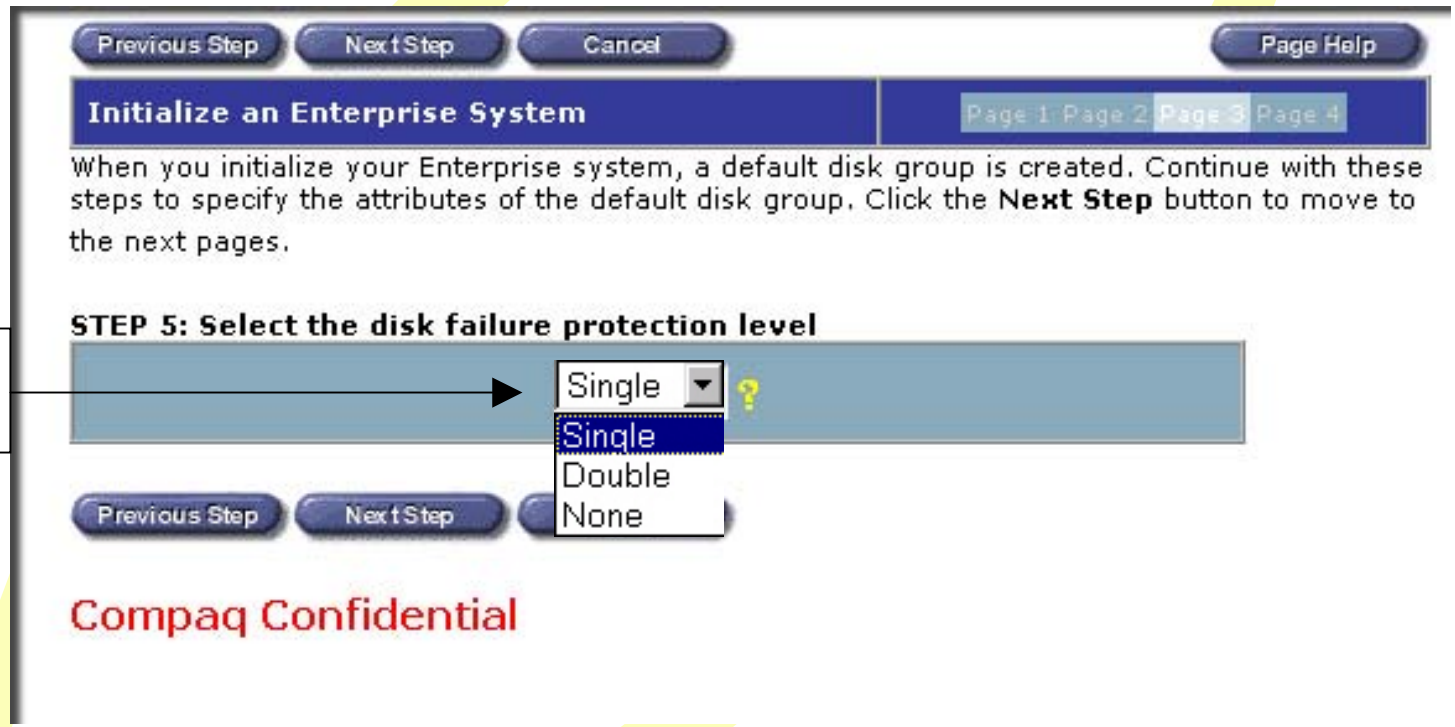
Use the SWMA time



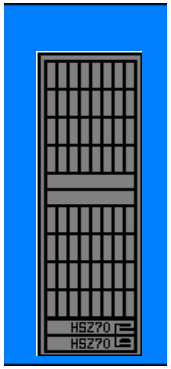

**Enter the Identifier of LUN 0 (SACD)**

# Storage Cell Initialization (Page 3 of 4)

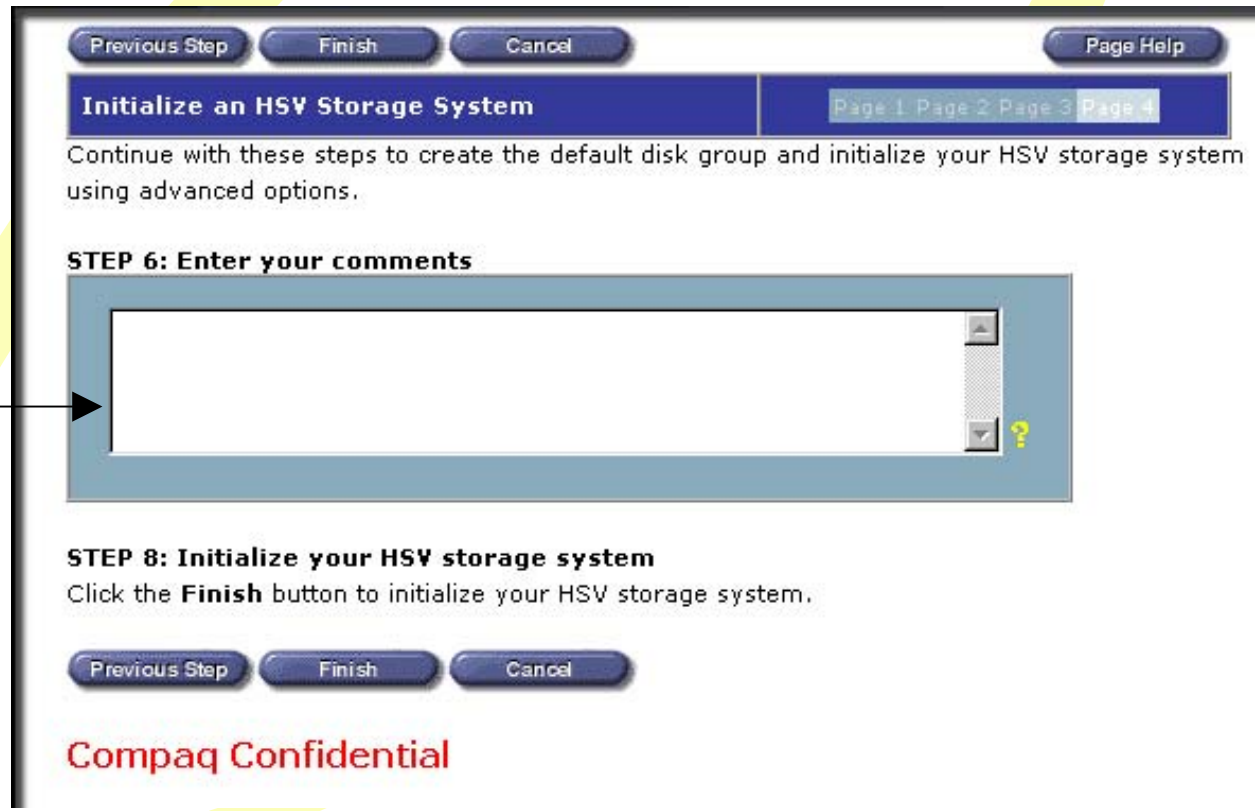
**Select Disk Group protection level**



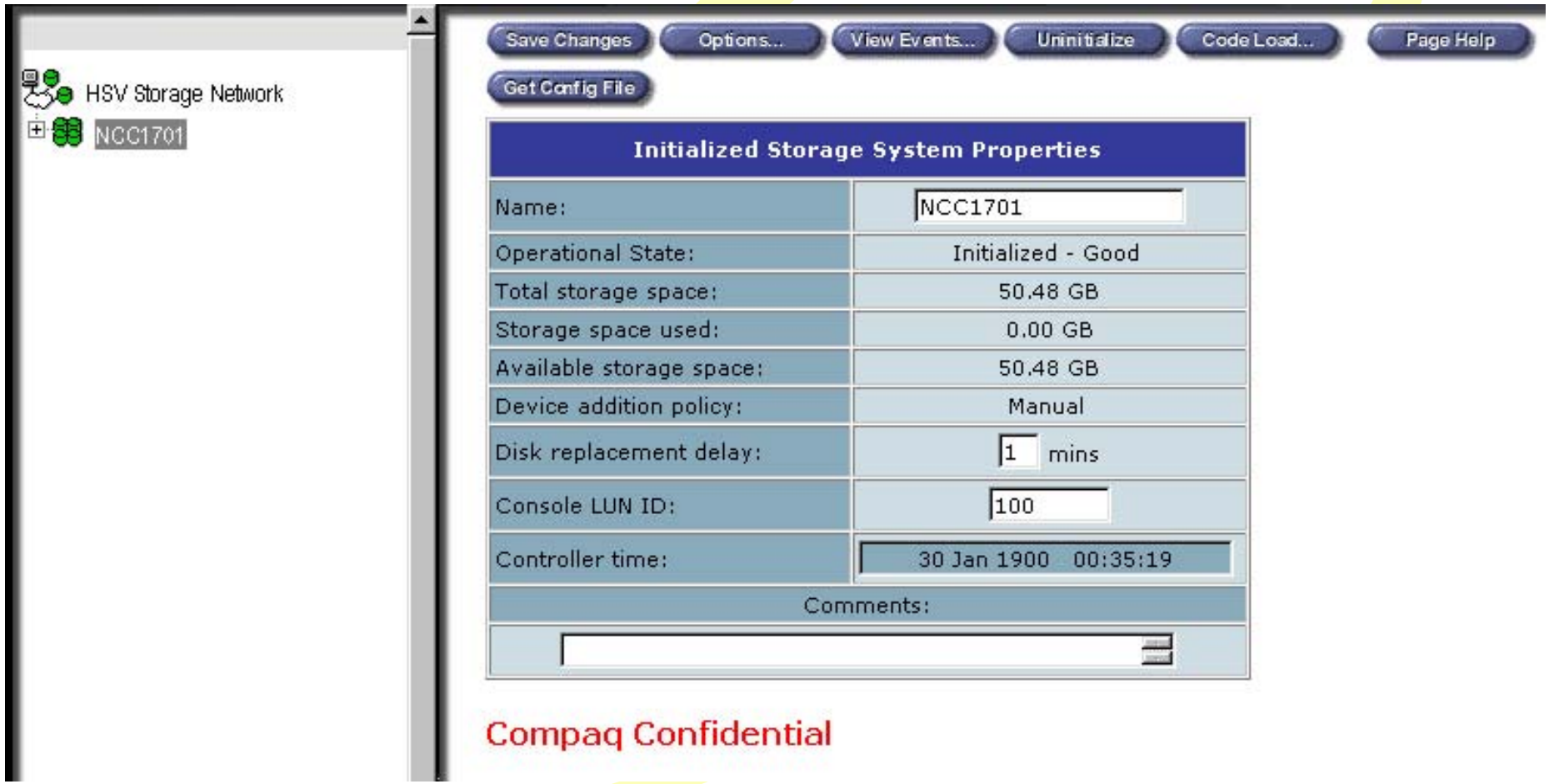
# Storage Cell Initialization (Page 4 of 4)

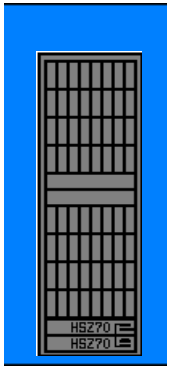



**You may want to enter some comment in here.**



# Storage Cell Initialized

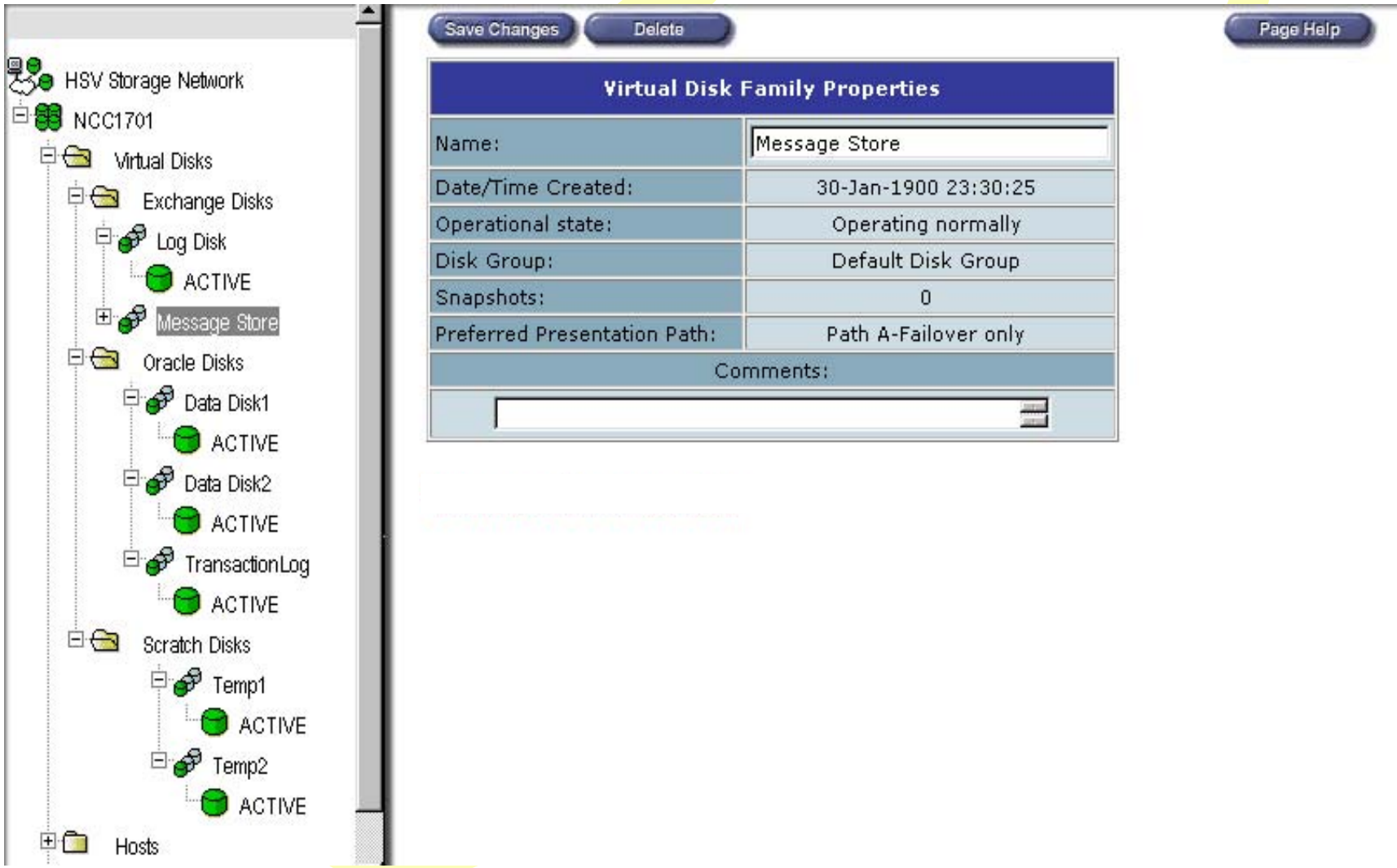




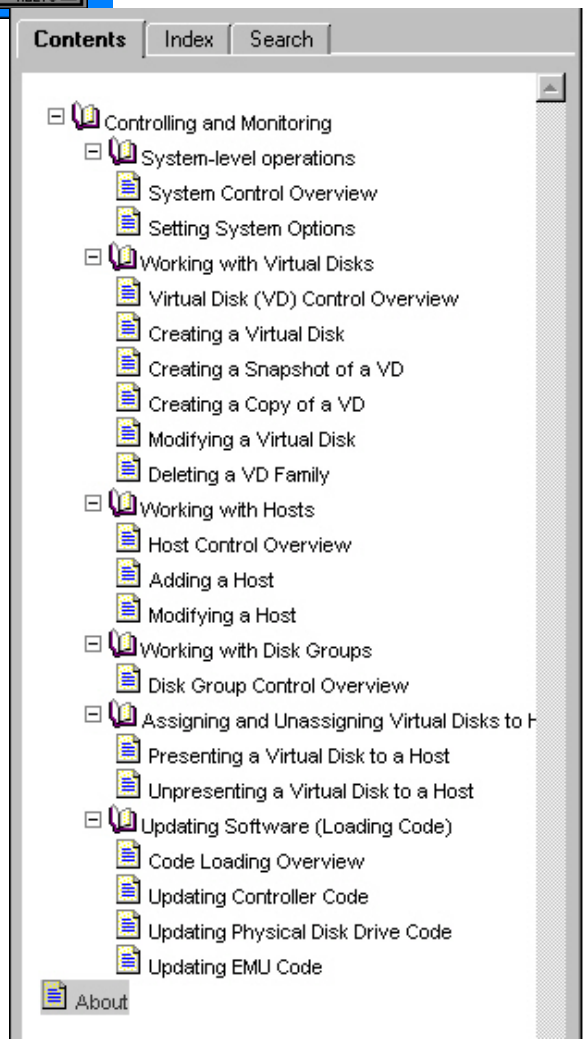
# Initialize Storage Cell via SANscript

```
select manager <ApplianceName> user=administrator -
                                    pass=administrator
show cell
select cell UninitializedStoragePool1
add cell <StorageCellName> device_count=<8..240> -
                                vms_console_id=<1..(32K-1)> -
                                spare_policy=[None|Single|Double]
select cell <StorageCellName>
show cell full
show group full
```

# Multiple Virtual Disks created



# Enterprise Online Help

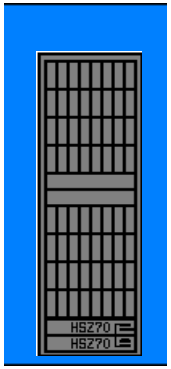



SyncToc

## About HSV Element Manager Software

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

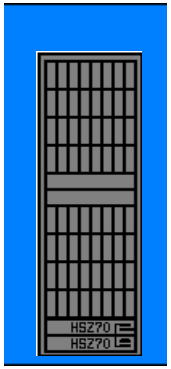
Version and build information.



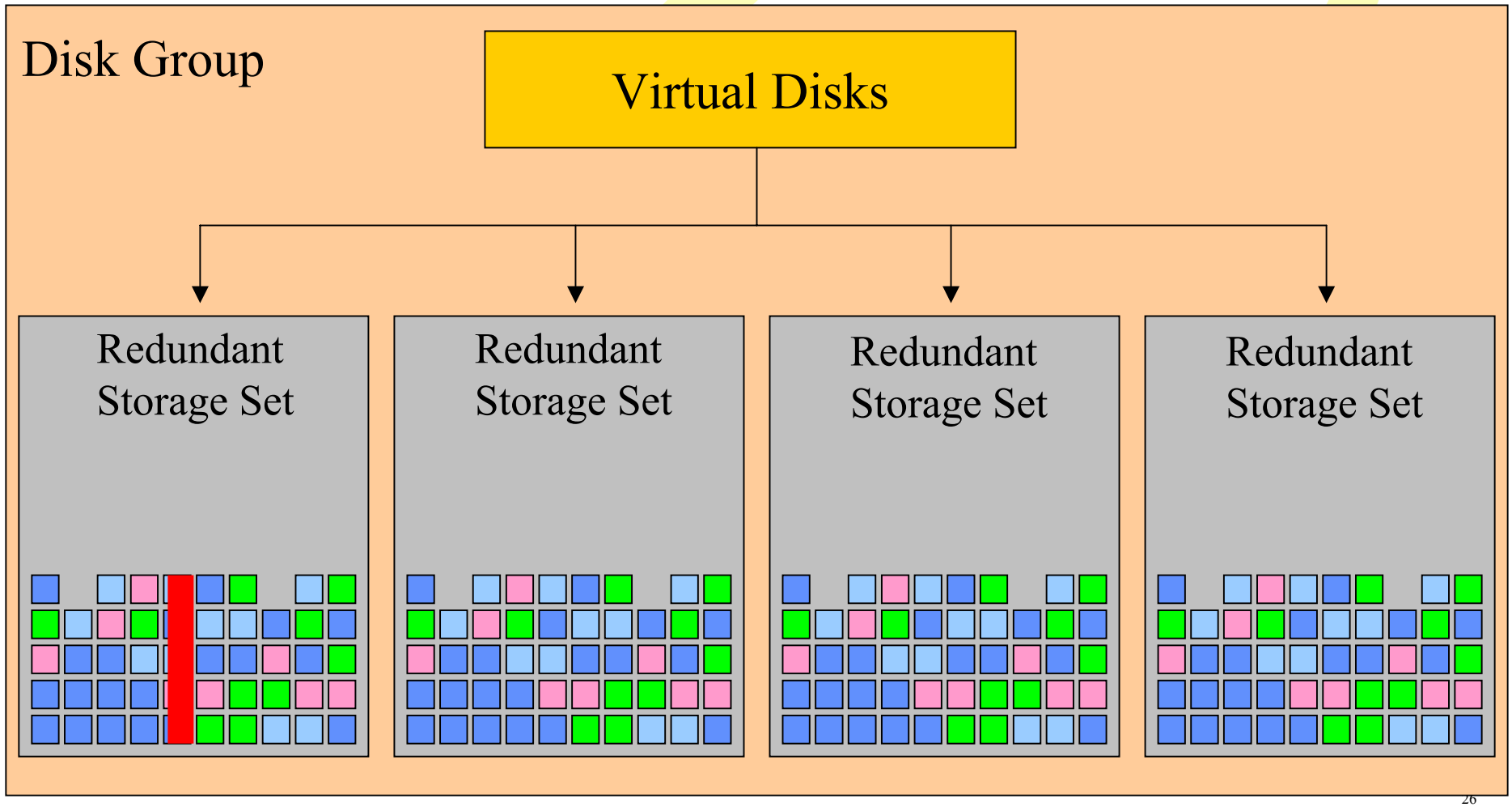

# Redundant Storage Sets (RSS)

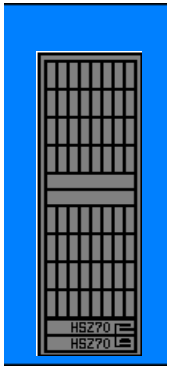
- Reduces chance of data loss in large (> 12 physical disks) disk groups
- Not visible to user through Interface
- Complete managed by the HSV controllers
- Typical size for disk group: 8 - 12 physical disks
- If RSS equals 12 physical disks, it splits into 2 RSS of 6 disks each
- Failed disk drive recovery 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



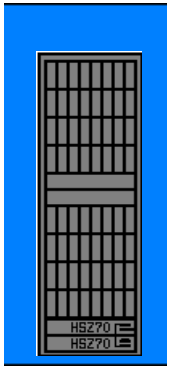
# HSV110 Virtualization : Redundant Storage Sets





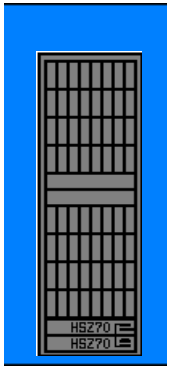

# Sizing HSV Disk Groups — Considerations

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




# Sizing HSV Disk Groups — Considerations

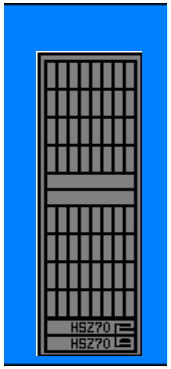
- Hardware versus software capacities
  - Physical 1000 000 000Bytes = 1GB
  - Software 1073 741 824Bytes = 1.07GB Physical ($2^{30}$)
  - ~ 7% Variance → 1GB Physical = 0.93GB Software
- System metadata overhead — 0.2%
  - System metadata
  - MLD—HSV Element Manager metadata
  - Virtual Disk metadata
- 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

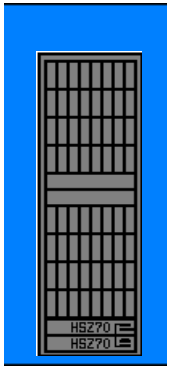
$$\text{Disk Count} \simeq \frac{((\text{UsableV0} * 538) + (\text{UsableV5} * 673) + (\text{UsableV1} * 1076))}{(\text{DiskCap} * 476)} + (\text{ProtLevel} * 2)$$

- 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

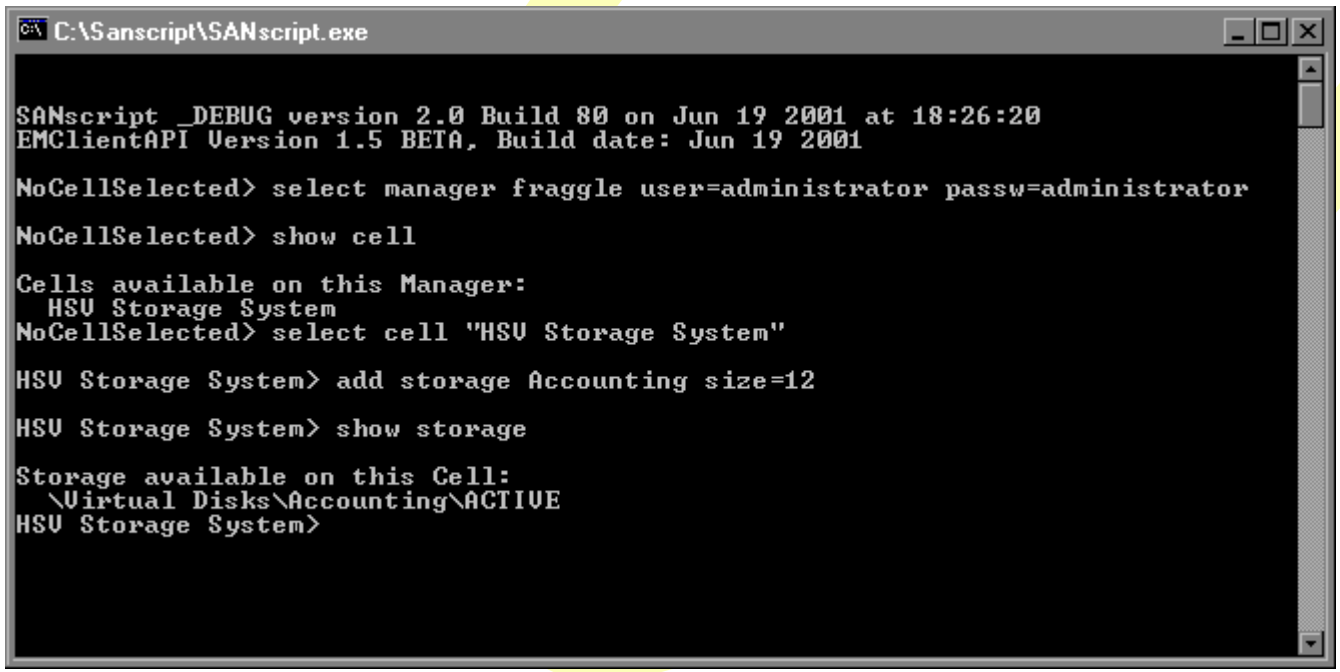
$$\text{Disk Count} \simeq \frac{((\text{UsableV0} * 538) + (\text{UsableV5} * 673) + (\text{UsableV1} * 1076))}{(\text{DiskCap} * 476)} + (\text{ProtLevel} * 2)$$

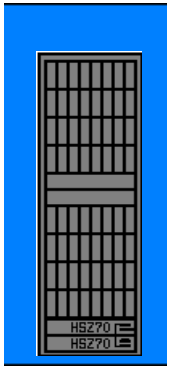
$$26.78 \simeq \frac{((0 * 538) + (500 * 673) + (50 * 1076))}{(36 * 476)} + (2 * 2)$$

- 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

# Storage System Scripting Utility (SSSU)

- Commonly referred to as SANscript
  - Tool to issue commands through a shell UI and execute scripts
  - Scripts to create/modify a configuration
  - Interactive mode as a command prompt
  - Configuration commands to add, set, and delete
  - Capture of a configuration into a script file
  - Show command to display configuration

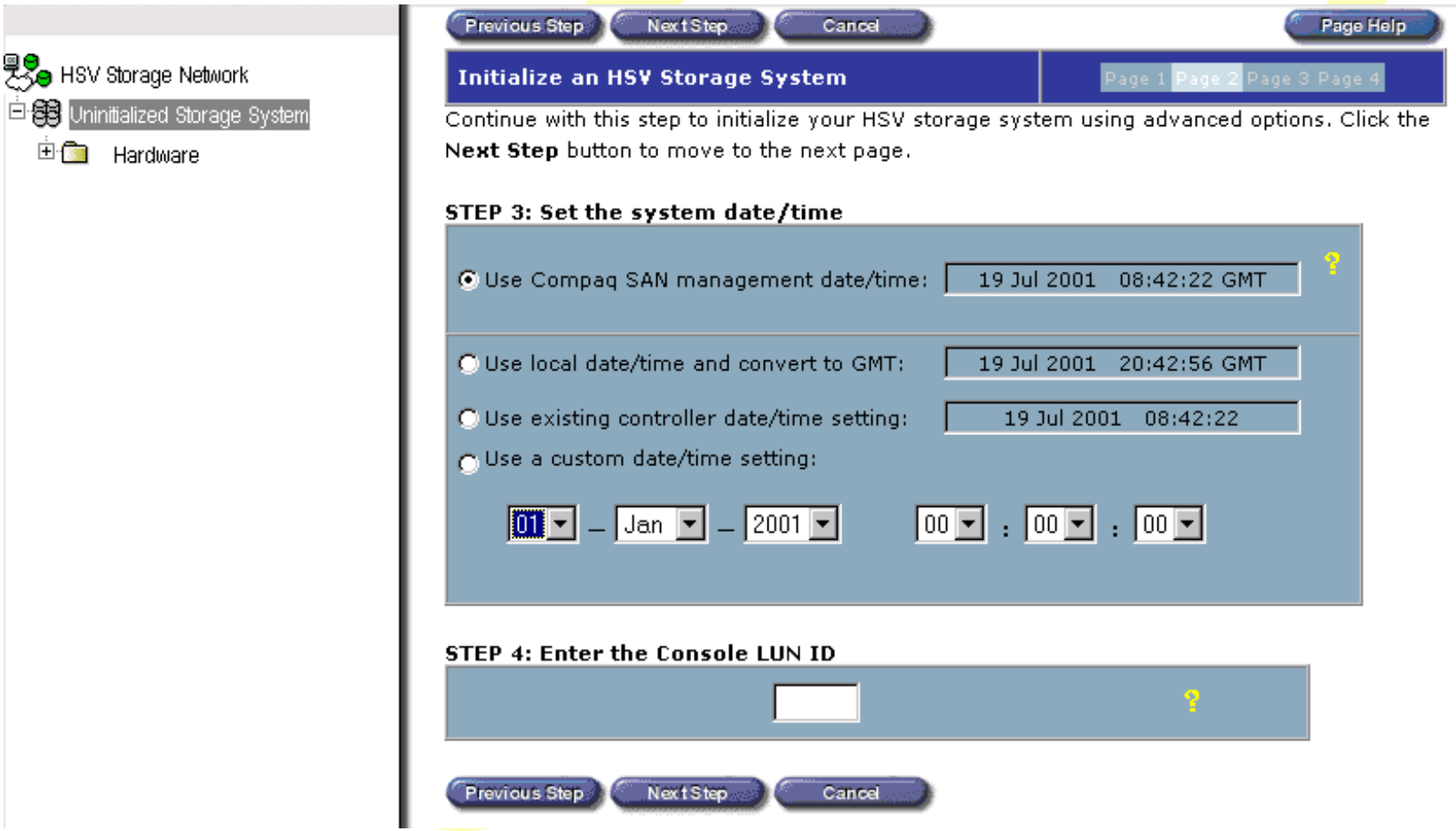


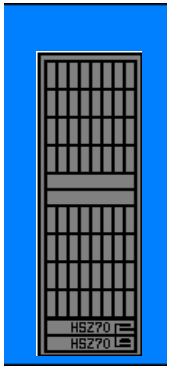



# Trouble Shooting

# Best Practices

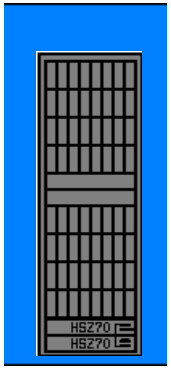
- Synchronize HSV110 system date / time to same as SWMA
- Helps correlate events when trouble shooting






# 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

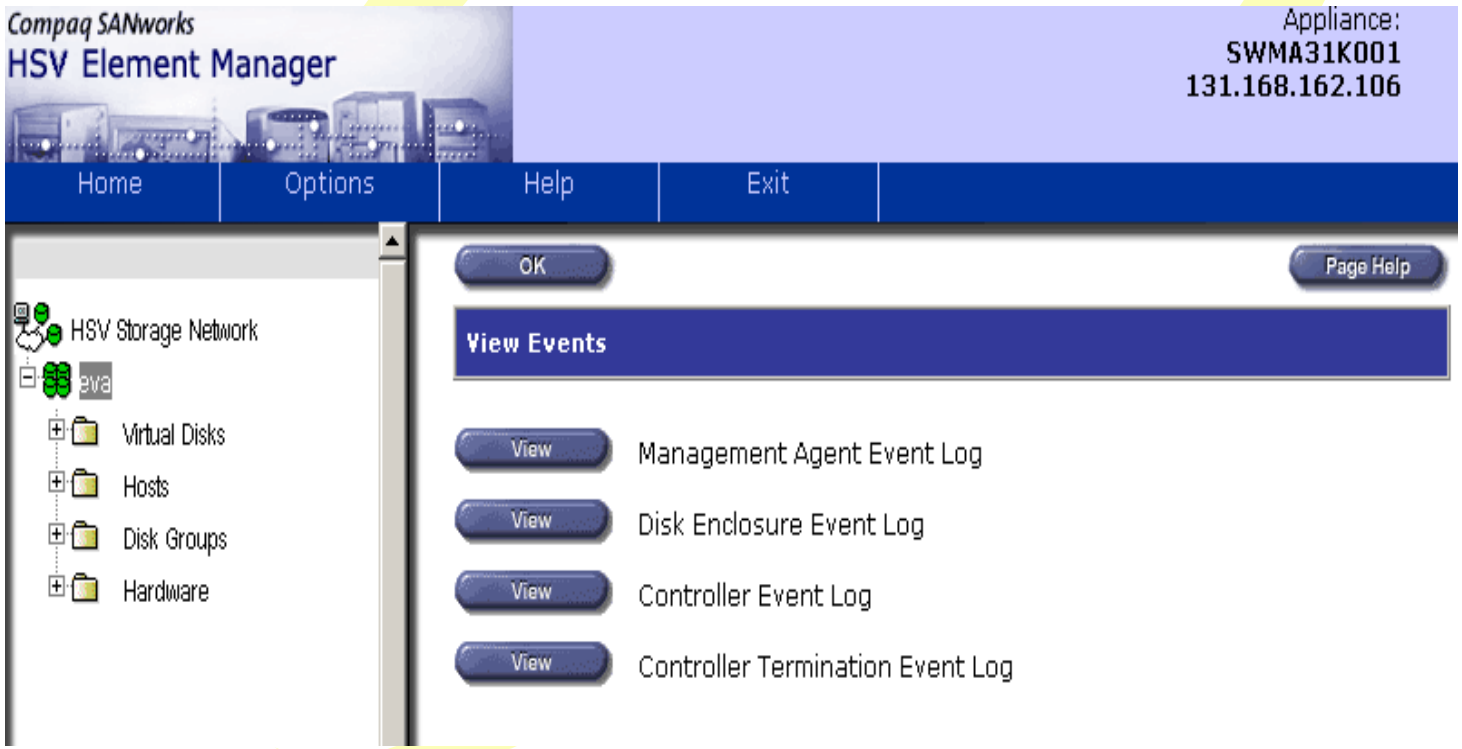



# Configuration Remarks

- 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

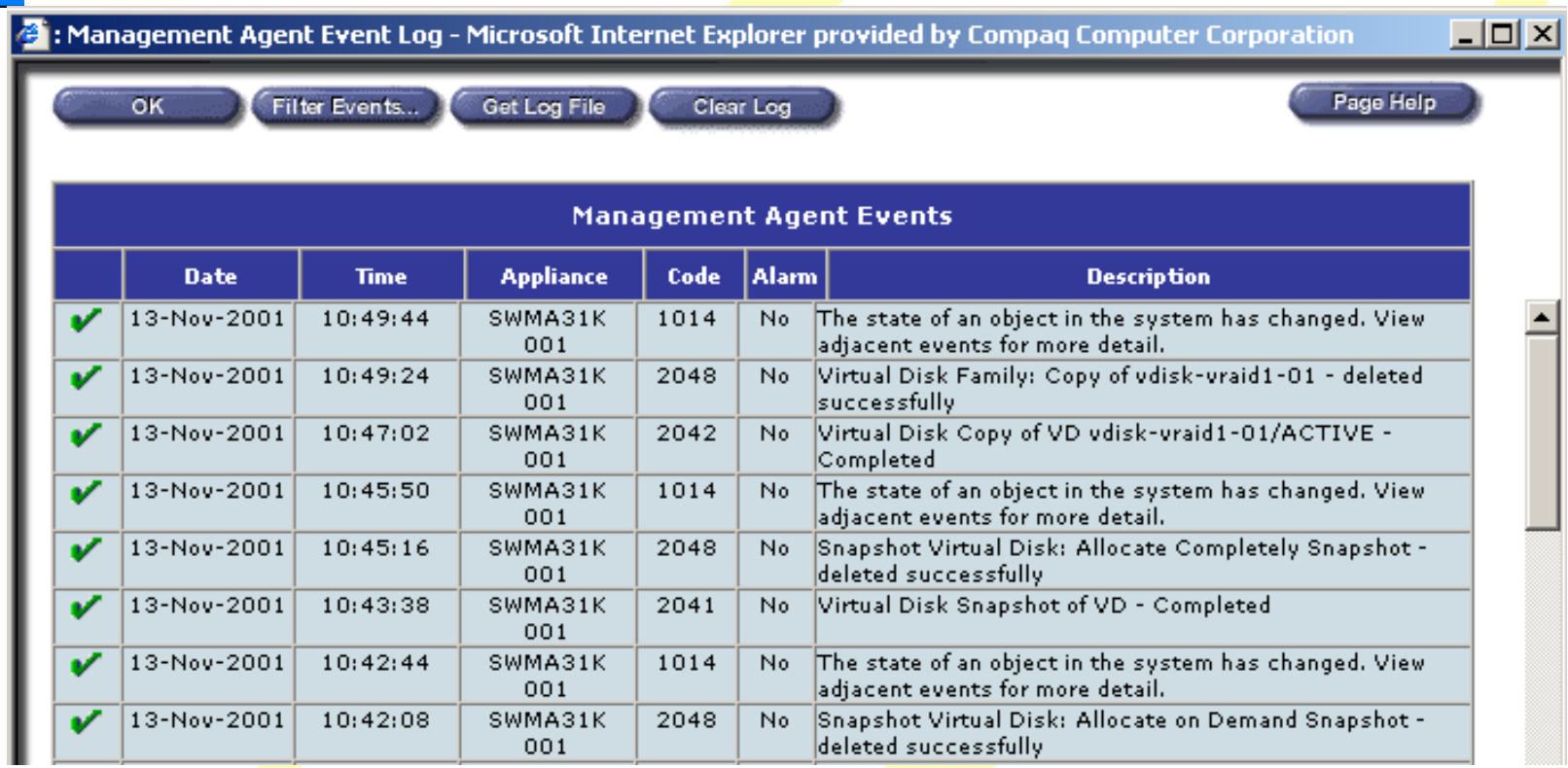
# Troubleshooting Tools—Log Files

- Management Agent Event Log
- Disk Shelf Event Log
- Controller Event Log
- Controller Termination Event Log
- Error Log(s) in Operating System



# Log Files

- Management Agent Event Log




**Management Agent Events**

| | Date | Time | Appliance | Code | Alarm | Description |
|---|---|---|---|---|---|---|
| ✔ | 13-Nov-2001 | 10:49:44 | SWMA31K 001 | 1014 | No | The state of an object in the system has changed. View adjacent events for more detail. |
| ✔ | 13-Nov-2001 | 10:49:24 | SWMA31K 001 | 2048 | No | Virtual Disk Family: Copy of vdisk-vraid1-01 - deleted successfully |
| ✔ | 13-Nov-2001 | 10:47:02 | SWMA31K 001 | 2042 | No | Virtual Disk Copy of VD vdisk-vraid1-01/ACTIVE - Completed |
| ✔ | 13-Nov-2001 | 10:45:50 | SWMA31K 001 | 1014 | No | The state of an object in the system has changed. View adjacent events for more detail. |
| ✔ | 13-Nov-2001 | 10:45:16 | SWMA31K 001 | 2048 | No | Snapshot Virtual Disk: Allocate Completely Snapshot - deleted successfully |
| ✔ | 13-Nov-2001 | 10:43:38 | SWMA31K 001 | 2041 | No | Virtual Disk Snapshot of VD - Completed |
| ✔ | 13-Nov-2001 | 10:42:44 | SWMA31K 001 | 1014 | No | The state of an object in the system has changed. View adjacent events for more detail. |
| ✔ | 13-Nov-2001 | 10:42:08 | SWMA31K 001 | 2048 | No | Snapshot Virtual Disk: Allocate on Demand Snapshot - deleted successfully |

# Log Files

- Disk Shelf Event Log

Disk Enclosure Event Log - Microsoft Internet Explorer provided by Compaq Computer Corporation

OK | Get Log File | Page Help

**Disk Enclosure Events**

| Encl ID | Date Time | Elmnt Type | Elmnt No | Error Code | Severity | Description |
|---|---|---|---|---|---|---|
| 10 | 7-Nov-2001 14:51:37 | Amp Sensor | 4 | 2 | C | Current sensor 4 high current error; replace supply now. |
| 10 | 7-Nov-2001 14:51:31 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 7-Nov-2001 14:51:25 | Pwr Supply | 2 | 1 | N | Power supply 2 no AC input; check AC power to the supply. |
| 10 | 6-Nov-2001 13:37:00 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 6-Nov-2001 13:37:00 | GBIC | 3 | 2 | C | Transceiver 3 lost signal; check cabling. |
| 10 | 6-Nov-2001 13:37:00 | GBIC | 2 | 2 | C | Transceiver 2 lost signal; check cabling. |
| 10 | 6-Nov-2001 13:37:00 | GBIC | 1 | 2 | C | Transceiver 1 lost signal; check cabling. |
| 10 | 6-Nov-2001 13:31:26 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 6-Nov-2001 13:31:26 | GBIC | 3 | 2 | C | Transceiver 3 lost signal; check cabling. |

# Log Files

- Controller Event Log

Controller Event Log - Microsoft Internet Explorer provided by Compaq Computer Corporation

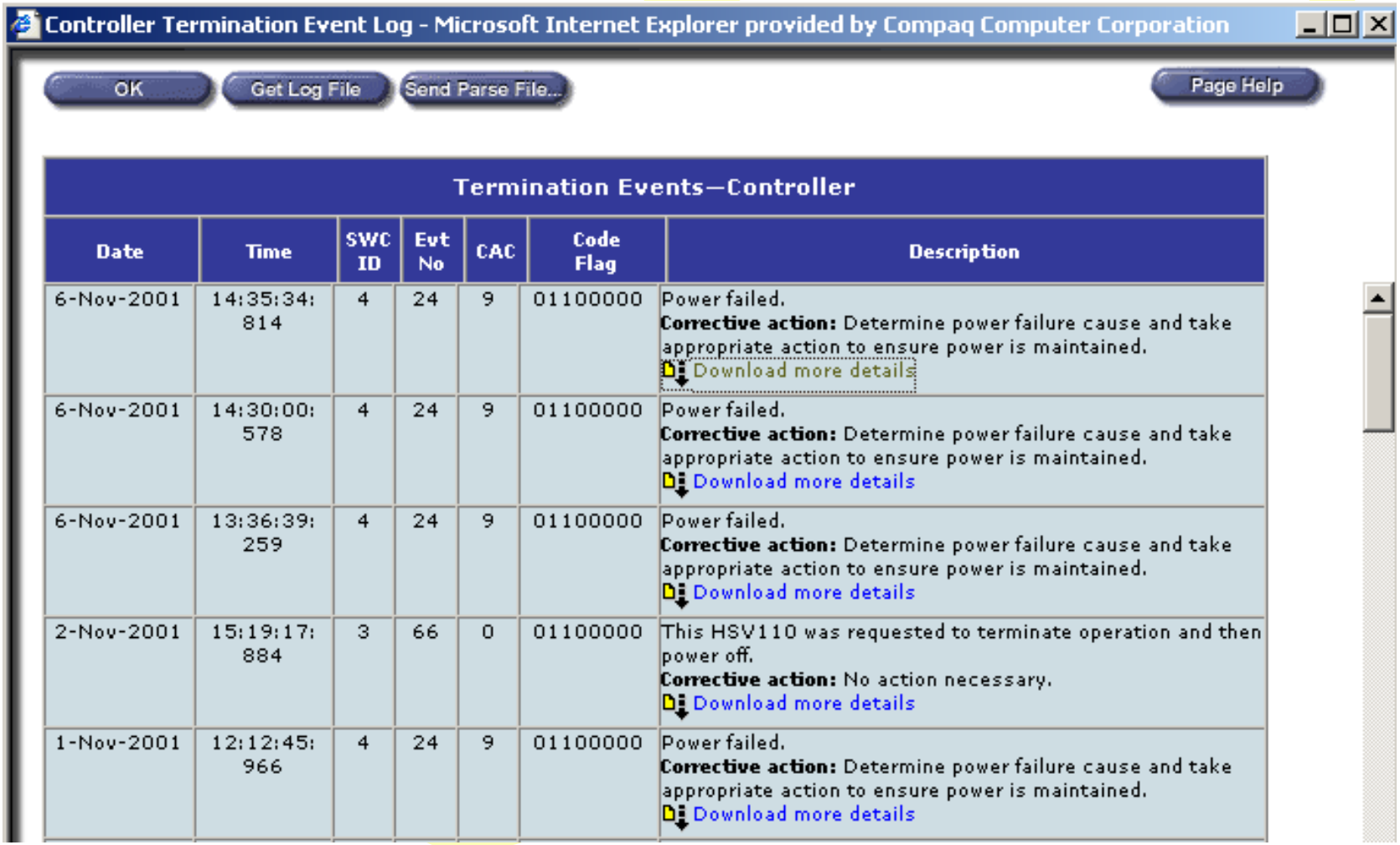
OK | Get Log File | Send Parse File... | Page Help

**Controller Events**

| Date | Time | SWC ID | Evt No | CAC | EIP Type | Description |
|---|---|---|---|---|---|---|
| 13-Nov-2001 | 10:49:26: 335 | 9 | 3c | 0 | e | The Logical Disk identified in the handle field was deleted. **Corrective action:** No action necessary. Download more details |
| 13-Nov-2001 | 10:49:24: 595 | 9 | 40 | 0 | e | The Storage System Host path identified in the handle field was deleted. **Corrective action:** No action necessary. Download more details |
| 13-Nov-2001 | 10:49:24: 487 | 9 | 3b | 0 | e | The Derived Unit identified in the handle field was deleted. **Corrective action:** No action necessary. Download more details |
| 13-Nov-2001 | 10:49:24: 428 | 9 | 3f | 0 | e | The Presented Unit identified in the handle field was deleted. **Corrective action:** No action necessary. Download more details |
| 13-Nov-2001 | 10:47:57: 584 | 9 | c | 0 | 5 | The Snapclone Logical Disk identified in the handle field has completed the unsharing operation. **Corrective action:** No action necessary. Download more details |

# Log Files

- Controller Termination Event Log

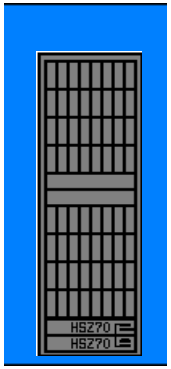



**Termination Events—Controller**

| Date | Time | SWC ID | Evt No | CAC | Code Flag | Description |
|---|---|---|---|---|---|---|
| 6-Nov-2001 | 14:35:34:814 | 4 | 24 | 9 | 01100000 | Power failed. **Corrective action:** Determine power failure cause and take appropriate action to ensure power is maintained. Download more details |
| 6-Nov-2001 | 14:30:00:578 | 4 | 24 | 9 | 01100000 | Power failed. **Corrective action:** Determine power failure cause and take appropriate action to ensure power is maintained. Download more details |
| 6-Nov-2001 | 13:36:39:259 | 4 | 24 | 9 | 01100000 | Power failed. **Corrective action:** Determine power failure cause and take appropriate action to ensure power is maintained. Download more details |
| 2-Nov-2001 | 15:19:17:884 | 3 | 66 | 0 | 01100000 | This HSV110 was requested to terminate operation and then power off. **Corrective action:** No action necessary. Download more details |
| 1-Nov-2001 | 12:12:45:966 | 4 | 24 | 9 | 01100000 | Power failed. **Corrective action:** Determine power failure cause and take appropriate action to ensure power is maintained. Download more details |

# Enterprise System Behavior

- Unconfigured (un-initialized) 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

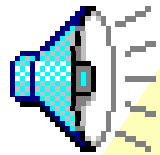


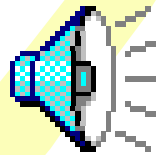
# EMU error code

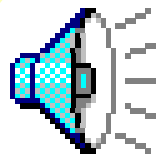
- Current Errors
  - Audible—beeping
  - Code available on EMU display
  - 3 part error code xx-xx-xx
  - May have multiple errors available
- Error log
  - Available through HSV Element Manager event page
  - 62 entries per EMU (enclosure)

# Error Codes—Audible Beeps

- Loss of power to HSV110 controller ----
  --
  - EMU code
- Loss of power to one side of the PDU--
  --
  - EMU code
- Unplugged hard drive----------
  ------
  - EMU code

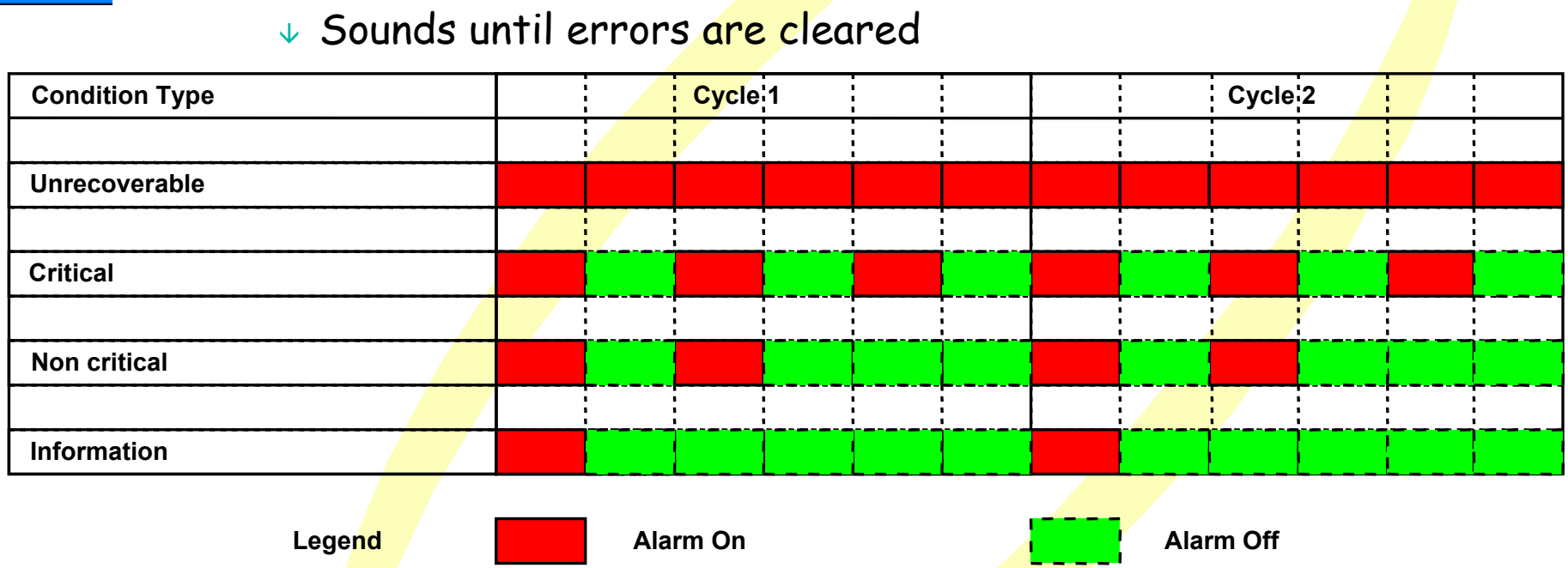




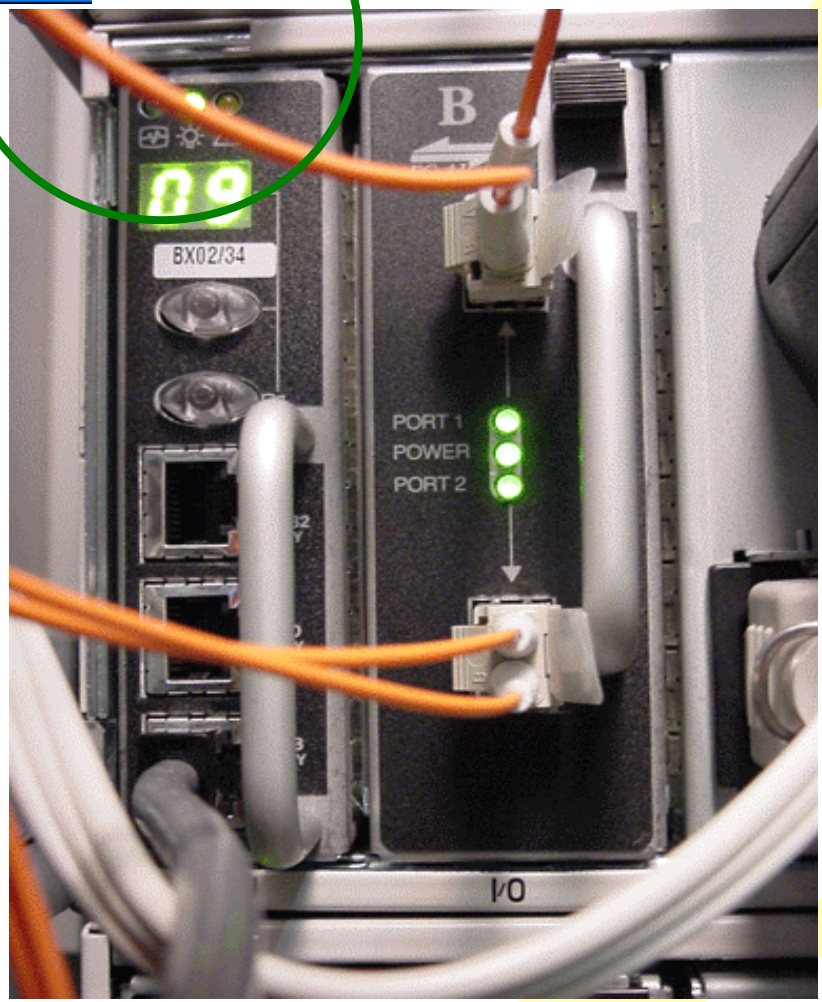


# Audible Alarm Sound Patterns

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

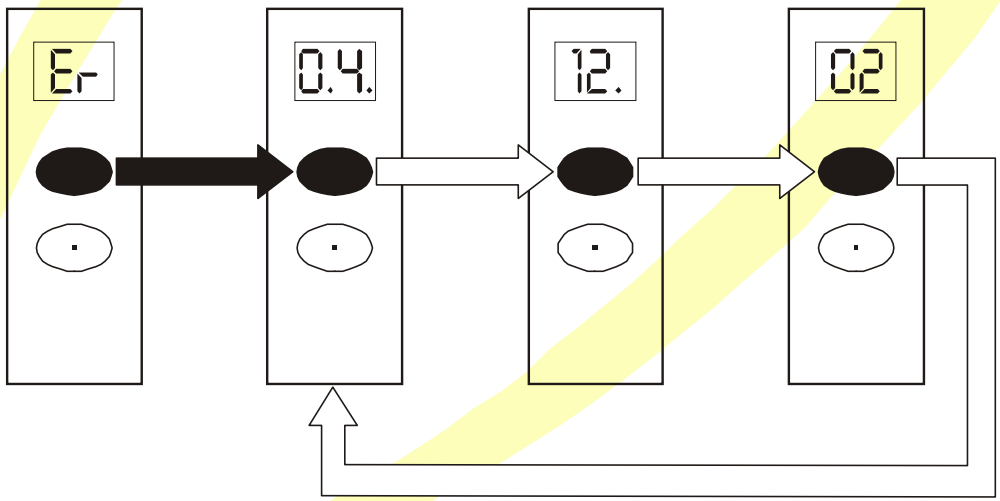


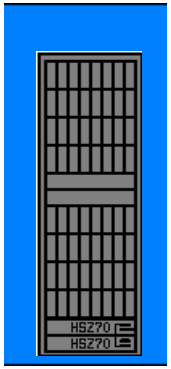
# EMU error code




# EMU error code

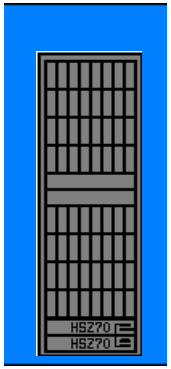
- Current error code collection
  1. Press and hold top button (~2 seconds)
  2. Record 2 digit number
  3. Press and release top button
  4. Record second 2 digit number
  5. Press and release top button
  6. Record third 2 digit number
- Repeat if error light still lit—Multiple errors





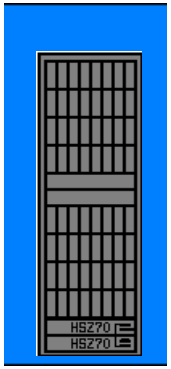
# Audit / Event Logs

- Management Event Log:
  - Contains events created by HSV Element Manager
  - 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"



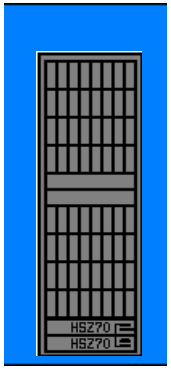
# Audit / Event Logs

- Disk Shelf Event Log
  - Contains events created by the EMUs
  - Used to report disk drive, EMU, power, and cooling problems
  - Round robin mechanism per EMU
    - 62 entries per EMU
    - Entry size: 512 bytes
  - No filtering capability for SNMP forwarding or posting in NT event log of SAN Appliance
  - SMART advisories (drives which are about to fail)
  - Timestamps on events are elapsed since EMU startup



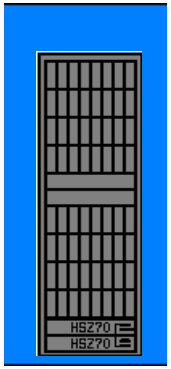

# Audit / Event Logs

- 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




# Audit / Event Logs

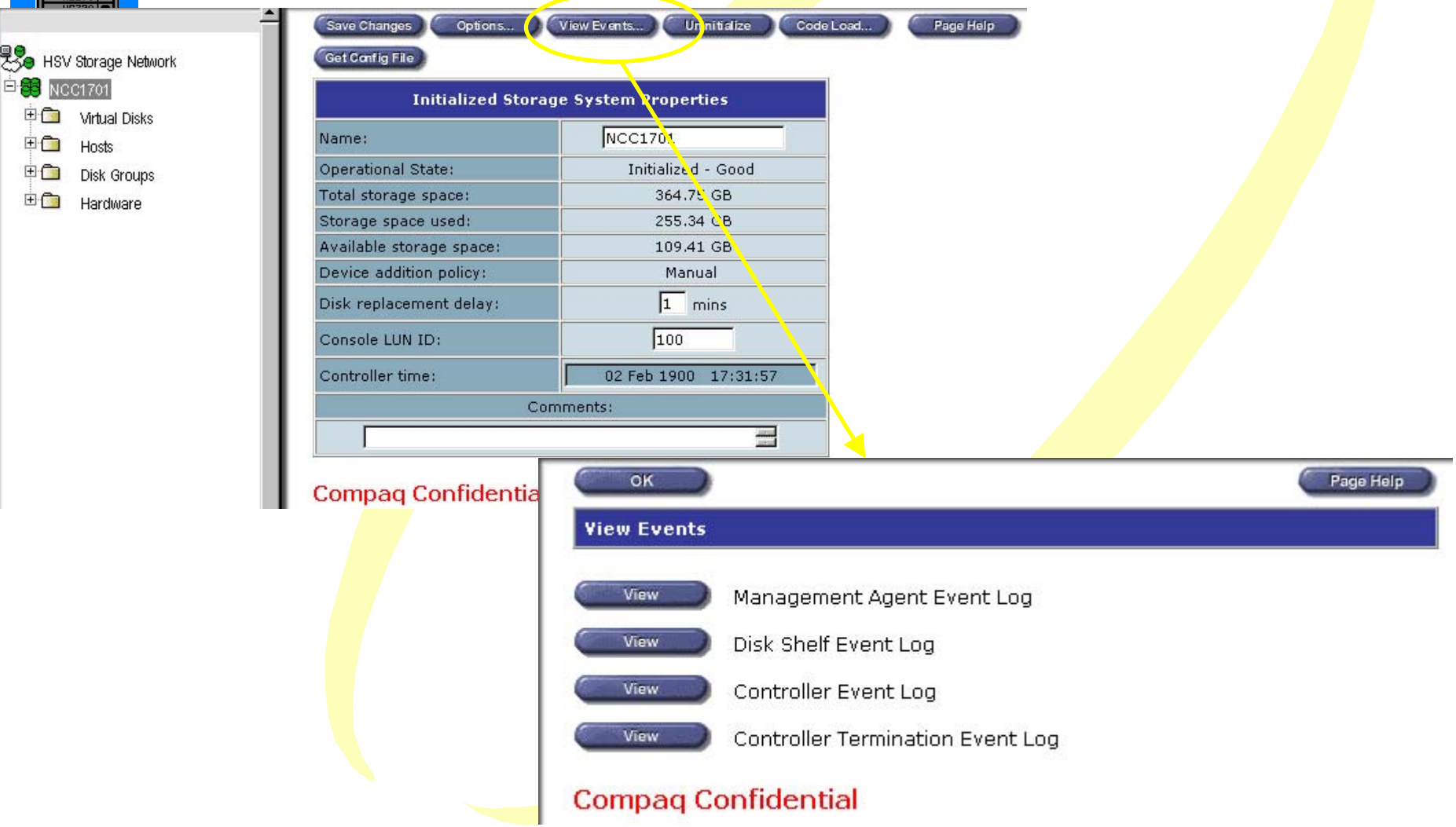
- Termination Event Log
  - Used to record HSV shutdown messages
    - Fatal errors (so firmware problems)
    - Graceful shutdowns
  - Controlled by the HSV controllers
  - Controller crash event logs
  - No crash dump (separate file)
  - Timestamps based on HSV controller time.
  - No forwarding capability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

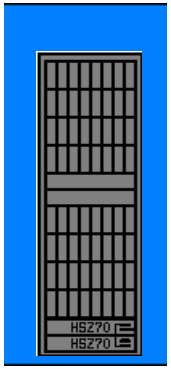


# Audit / Event Logs

- Management Logical Disk (MLD)
  - Acts as database for HSV Element Manager
  - Created on Storage Cell to save controller state
  - Includes any Storage Cell centric data from HSV Element Manager
  - File is always current, and mirrored
  - MLD is striped across the metadata part of all Disk Groups
  - Logs are read at the moment this is requested via the Web browser

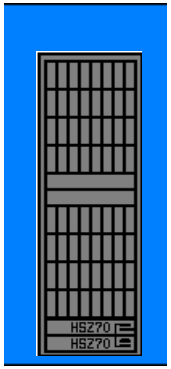
# View Events


HSV Storage Network
NCC1701
Virtual Disks
Hosts
Disk Groups
Hardware
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:
Compaq Confidentia
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

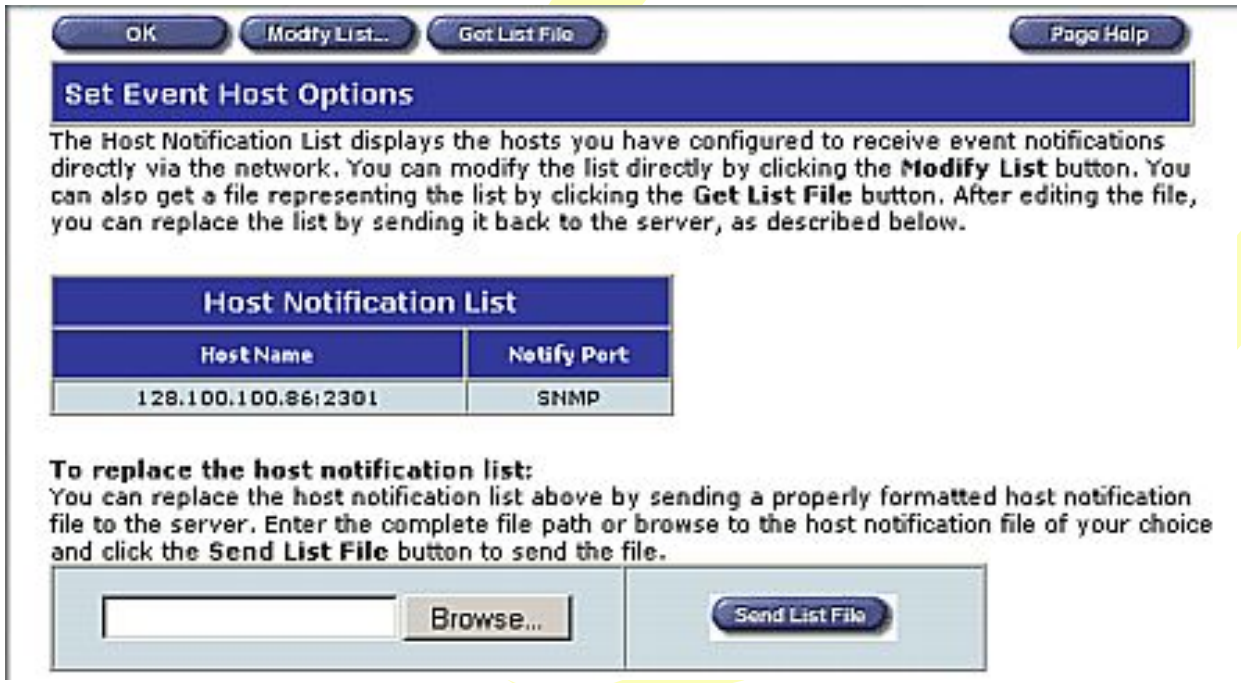
- Be careful on time stamps
  - HSV controller time may be different than server time, which may be different than SAN Appliance time
  - More difficult to correlate different product timestamps
- Disk shelf logs do not contain timestamps, but "elapsed time as of last [EMU !!] reboot"

# HSV Element Manager Events

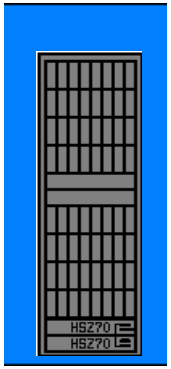
- The Parse file is released with VCS build
  - Contains bit-to-text translation of VCS codes
  - HSV110_event_nxxxxxxxx_xxxxx.txt

# HSV Element Manager 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



# Management Event Log




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

**Management Agent Events**

| | Date | Time | Server | Code | Alarm | Description |
|---|---|---|---|---|---|---|
| ✔ | 9-Jul-2001 | 16:41:06 | SWMAN1K 215 | 2052 | No | Object modification for Disk Shelf - Complete |
| ✔ | 9-Jul-2001 | 16:40:49 | SWMAN1K 215 | 2052 | No | Object modification for Disk Shelf - Complete |
| ✔ | 7-Jul-2001 | 00:24:14 | SWMAN1K 215 | 1014 | No | The state of an object in the system has changed. View adjacent events for more detail. |
| ✔ | 7-Jul-2001 | 00:22:31 | SWMAN1K 215 | 2042 | No | Virtual Disk Copy of VD Data Disk1/ACTIVE - Completed |
| ✔ | 6-Jul-2001 | 23:46:34 | SWMAN1K 215 | 2041 | No | Virtual Disk Snapshot of VD - Completed |
| ✔ | 6-Jul-2001 | 23:13:58 | SWMAN1K 215 | 1014 | No | The state of an object in the system has changed. View adjacent events for more detail. |
| ✔ | 6-Jul-2001 | 23:13:58 | SWMAN1K 215 | 1014 | No | The state of an object in the system has changed. View adjacent events for more detail. |
| ✔ | 6-Jul-2001 | 23:13:43 | SWMAN1K 215 | 2023 | No | Virtual Disk: Temp2 - Created |
| ✔ | 6-Jul-2001 | 23:11:08 | SWMAN1K 215 | 2023 | No | Virtual Disk: Temp1 - Created |
| ✔ | 6-Jul-2001 | 23:10:07 | SWMAN1K 215 | 1014 | No | The state of an object in the system has changed. View adjacent events for more detail. |
| ✔ | 6-Jul-2001 | 23:09:35 | SWMAN1K 215 | 2023 | No | Virtual Disk: Log Disk - Created |
| ✔ | 6-Jul-2001 | 23:08:21 | SWMAN1K 215 | 1014 | No | The state of an object in the system has changed. View adjacent events for more detail. |
| ✔ | 6-Jul-2001 | 23:08:19 | SWMAN1K 215 | 2023 | No | Virtual Disk: Message Store - Created |
| ✔ | 6-Jul-2001 | 23:06:01 | SWMAN1K 215 | 2026 | No | 8.7.16.1610942644.65713.77824.65536E~n~d17090 7102000002085d4653700000000000000000E~n~d |
| ✔ | 6-Jul-2001 | 23:06:01 | SWMAN1K 215 | 2034 | No | Change Device Usage Complete |
| ✔ | 6-Jul-2001 | 23:05:56 | SWMAN1K 215 | 2034 | No | Change Device Usage Complete |
| ✔ | 6-Jul-2001 | 23:05:54 | SWMAN1K 215 | 2034 | No | Change Device Usage Complete |
| ✔ | 6-Jul-2001 | 23:05:51 | SWMAN1K 215 | 2034 | No | Change Device Usage Complete |
| ✔ | 6-Jul-2001 | 23:05:49 | SWMAN1K 215 | 2034 | No | Change Device Usage Complete |

OK

**View Events**

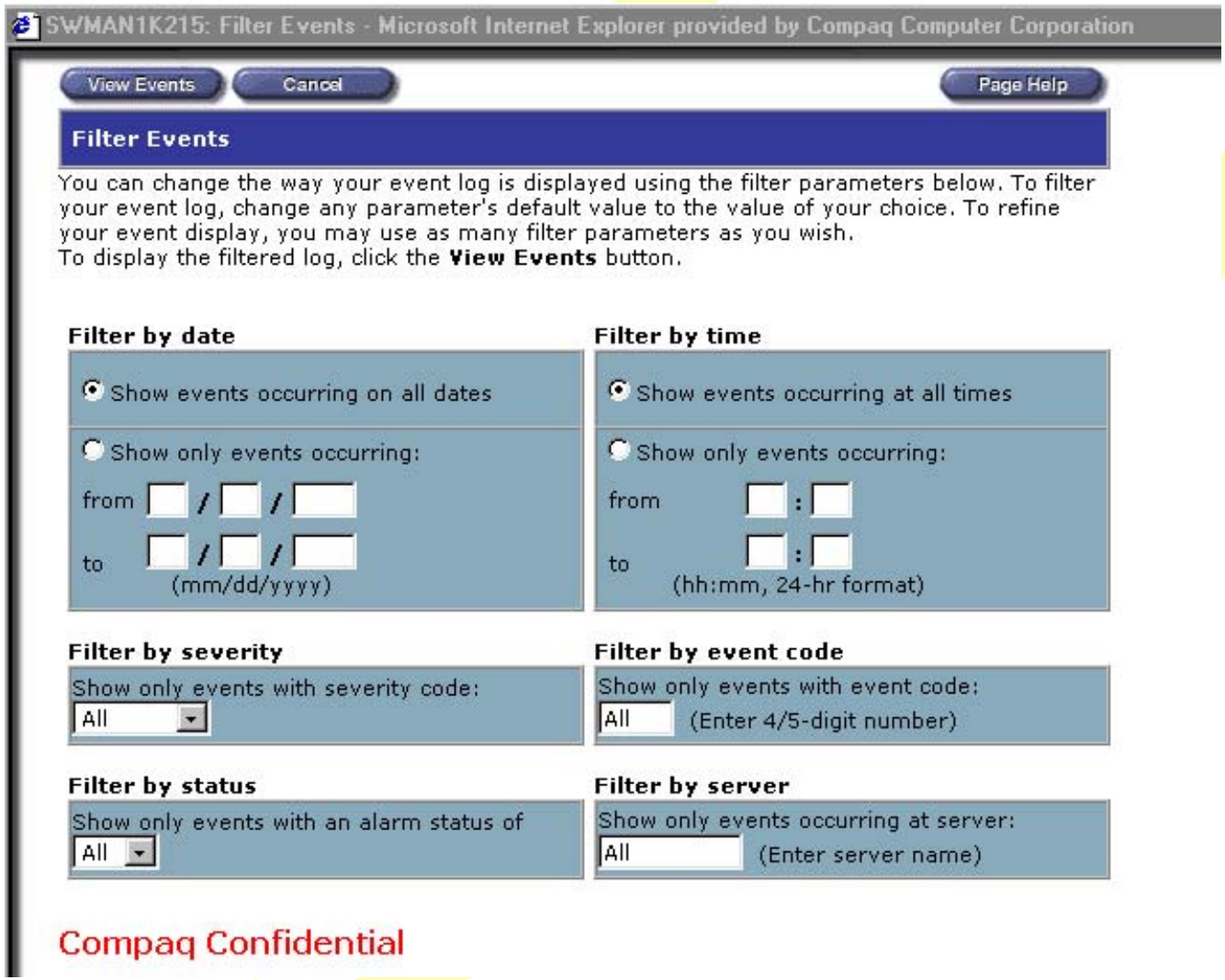
View Management Agent Event Log

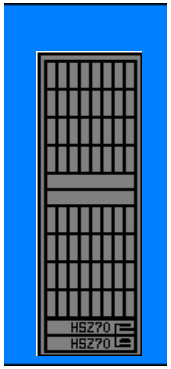
View Disk Shelf Event Log

View Controller Event Log

View Controller Termination Event Log

# Filtering Management Events






# Disk Shelf Event Log

OK

View Events

View Management Agent Event Log

View Disk Shelf Event Log

View Controller Event Log

View Controller Termination Event Log

Compaq Confidential

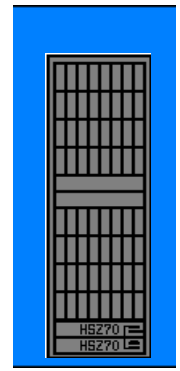
- In sequence within the shelf
- Shelves are in random order

OK | Get Log File | Page Help

**Disk Enclosure Events**

| Encl ID | Elapsed Time | Elmnt Type | Elmnt No | Error Code | Severity | Description |
|---|---|---|---|---|---|---|
| 10 | 15d 08:10:21 | Pwr Supply | 1 | 1 | N | Power supply 1 no AC input; check AC power to the supply. |
| 10 | 7d 03:25:18 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 7d 03:25:04 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 7d 03:24:31 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 7d 03:24:15 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 7d 03:23:18 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 7d 03:23:10 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 7d 03:20:12 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 7d 03:20:07 | Pwr Supply | 2 | 1 | N | Power supply 2 no AC input; check AC power to the supply. |
| 10 | 3d 00:24:20 | GBIC | 3 | 2 | C | Transceiver 3 lost signal; check cabling. |
| 10 | 3d 00:24:20 | GBIC | 1 | 2 | C | Transceiver 1 lost signal; check cabling. |
| 10 | 3d 00:24:18 | GBIC | 4 | 2 | C | Transceiver 4 lost signal; check cabling. |
| 10 | 2d 22:15:53 | GBIC | 3 | 2 | C | Transceiver 3 lost signal; check cabling. |
| 10 | 2d 22:15:53 | GBIC | 1 | 2 | C | Transceiver 1 lost signal; check cabling. |
| 10 | 2d 22:09:39 | GBIC | 2 | 2 | C | Transceiver 2 lost signal; check cabling. |
| 10 | 2d 21:37:33 | GBIC | 2 | 2 | C | Transceiver 2 lost signal; check cabling. |
| 10 | 2d 21:34:54 | GBIC | 2 | 2 | C | Transceiver 2 lost signal; check cabling. |
| 10 | 2d 18:16:37 | Pwr Supply | 2 | 1 | N | Power supply 2 no AC input; check AC power to the supply. |
| 10 | 2d 16:40:15 | Temp Sensor | 2 | 1 | N | Temperature sensor 2 high temp alert; check for empty bay or air temperature. |
| 10 | 2d 15:10:03 | Temp Sensor | 3 | 1 | N | Temperature sensor 3 high temp alert; check for empty bay or air temperature. |
| 10 | 2d 13:54:10 | Blower | 1 | 3 | U | Fan 1 failure; replace fan now. |
| 10 | 2d 13:52:17 | Blower | 1 | 3 | U | Fan 1 failure; replace fan now. |
| 10 | 2d 13:47:55 | Blower | 1 | 3 | U | Fan 1 failure; replace fan now. |
| 10 | 2d 13:47:40 | Blower | 1 | 3 | U | Fan 1 failure; replace fan now. |
| 10 | 2d 13:44:04 | Blower | 1 | 3 | U | Fan 1 failure; replace fan now. |
| 10 | 2d 13:42:34 | Blower | 1 | 3 | U | Fan 1 failure; replace fan now. |

# Controller Event Log




OK | Get Log File | Send Parse File... | Page Help

OK

View Events

View Management Agent Event Log

View Disk Shelf Event Log

View Controller Event Log

View Controller Termination Event Log

Compaq Confidential

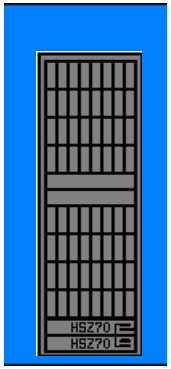
090C0005:
The Snapclone logical disk is done with the unsharing operation. The handle field contains the associated Logical Disk handle.

0937000E:
The Presented Unit object was created. The handle field contains the created Presented Unit handle. The add_handle field contains the associated DU handle.

**System Events—**

| Date | Time | SWC ID | Evt No | CAC | EIP Type | Description |
|---|---|---|---|---|---|---|
| 30-Mar-2001 | 2:20:59:605 | 9 | c | 0 | 5 | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 30-Mar-2001 | 2:10:49:813 | 9 | 37 | 0 | e | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 30-Mar-2001 | 2:10:49:295 | 9 | 6e | 0 | f | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 30-Mar-2001 | 2:10:49:247 | 9 | 33 | 0 | e | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 30-Mar-2001 | 2:10:49:106 | 9 | 6a | 0 | f | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 30-Mar-2001 | 2:10:49:33 | 9 | 6b | 0 | f | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 30-Mar-2001 | 1:51:30:376 | 9 | 37 | 0 | e | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 30-Mar-2001 | 1:51:29:620 | 9 | 6e | 0 | f | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 30-Mar-2001 | 1:51:29:572 | 9 | 33 | 0 | e | Description Unavailable - need file: HSV100_event_D010317_0001.txt Download more details |

# Controller Termination Event Log




OK | Get Log File | Send Parse File... | Page Help

OK

**View Events**

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

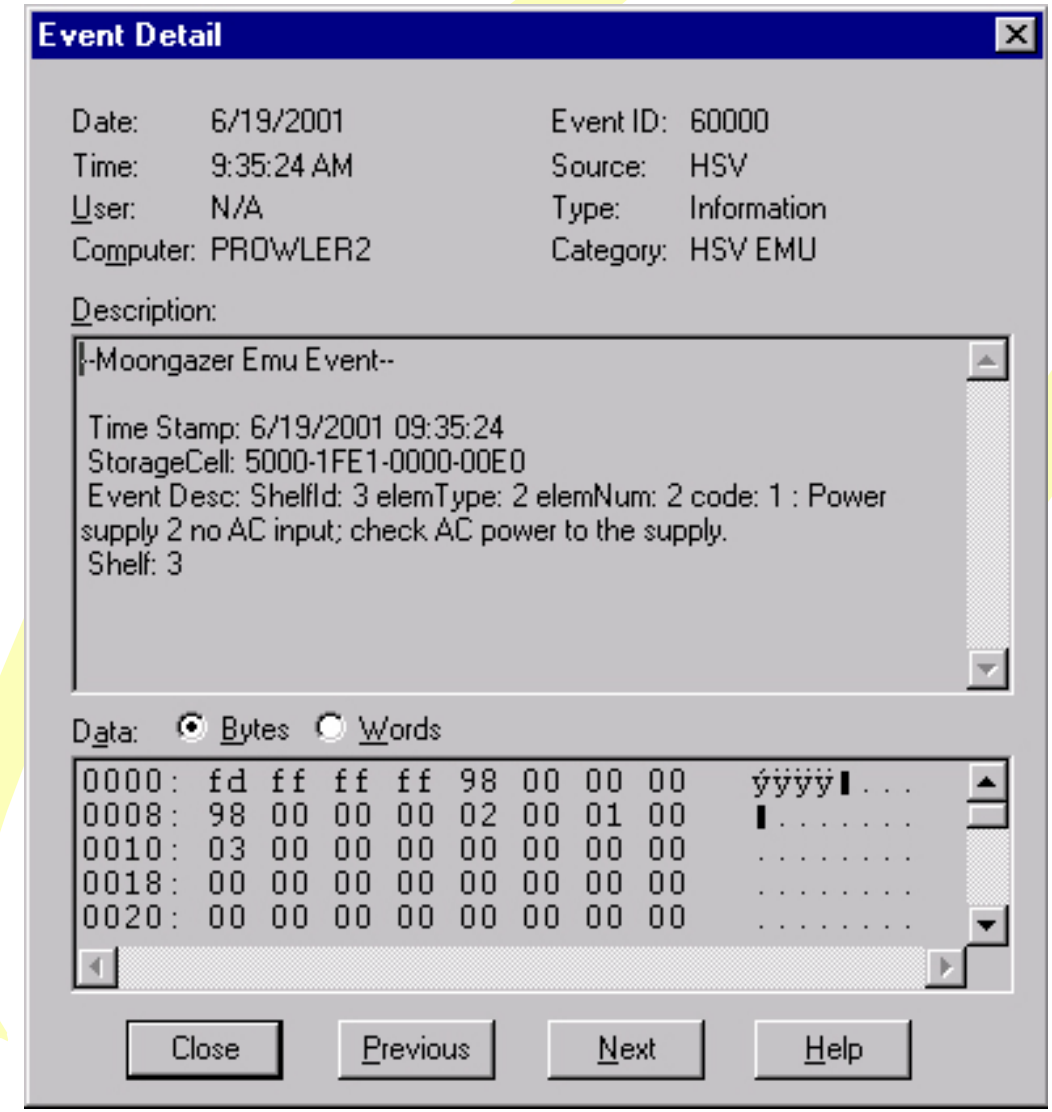
Compaq Confidential

**Termination Events—Controller**

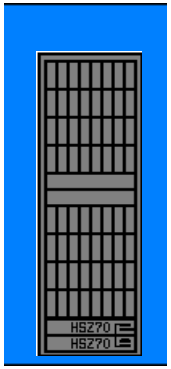
| Date | Time | SWC ID | Evt No | CAC | Code Flag | Description |
|---|---|---|---|---|---|---|
| 29-Mar-2001 | 18:36:43:913 | 4 | 24 | 9 | 01100000 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 29-Mar-2001 | 17:38:42:361 | 4 | 24 | 9 | 01100000 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 28-Mar-2001 | 18:26:3:171 | 1 | 1f | 1 | 10100000 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 27-Mar-2001 | 20:32:42:461 | 4 | 24 | 9 | 01100000 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 27-Mar-2001 | 18:41:35:704 | 4 | 24 | 9 | 01100000 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 27-Mar-2001 | 18:37:46:919 | 4 | 24 | 9 | 01100000 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 26-Mar-2001 | 23:8:45:428 | 3 | 1 | 1 | 00000100 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 23-Mar-2001 | 17:33:42:376 | 4 | 24 | 9 | 01100000 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |
| 22-Mar-2001 | 0:50:0:682 | 4 | 8 | 3 | 10011111 | Description Unvailable - need file: HSV100_event_D010317_0001.txt Download more details |

**04240960:**
**Power failure**
**011F01A0:**
**Console requested restart without dump (coupled).**
**03010104:**
**Logic inconsistency detected; one controller is suspect**
**0408039F:**
**A last gasp message was received from the other NSC with the coupled crash flag set.**

# NT Event Log—HSV Element Manager Detail



# NT Event Log—Controller Detail



**Event Detail**

| | | | |
|---|---|---|---|
| Date: | 6/19/2001 | Event ID: | 50000 |
| Time: | 9:33:50 AM | Source: | HSV |
| User: | N/A | Type: | Warning |
| Computer: | PROWLER2 | Category: | HSV Controller |

Description:

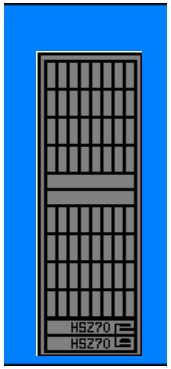
```
--HSV Controller Event--

 Time Stamp: 19-Jun-2001/09:33:19
 StorageCell: 5000-1FE1-0000-00E0
 Event Type: HSV Controller Event
 Event Code: 9 6e 0 f
```

Data: (•) Bytes ( ) Words

```
0000: fd ff ff ff 98 00 00 00    ýÿÿÿÿ▌...
0008: 80 06 00 00 02 00 01 00    ▌.......
0010: 03 00 00 00 00 00 00 00    ........
0018: 00 00 00 00 00 00 00 00    ........
0020: 00 00 00 00 00 00 00 00    ........
```

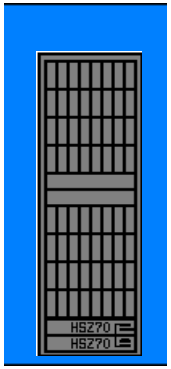
Close | Previous | Next | Help




# HSV—Errors


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

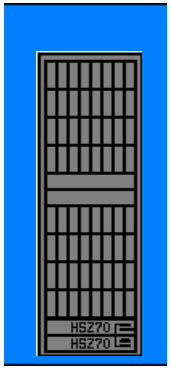
- Intermittent
  - Drive connectivity
  - FC-AL LIPs
- Software incompatibility
- Zoning



# HSV—Error Indication

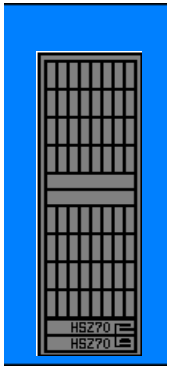

- LEDs
- Error Codes
- Audible
- Event logs

- None
- SWMA hangs
- No communication between SWMA and EVA
- Intermittent devices errors



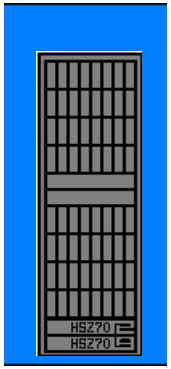
# Best Practices

- 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 HSV Element Manager

- 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 HSV Element Manager?
    - Default system password: ***AAAAAAAA***
- HSV Element Manager (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



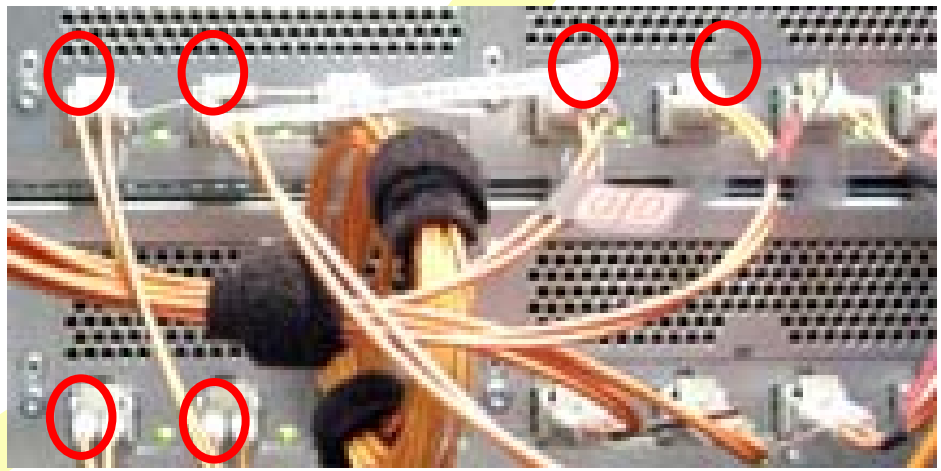
# Symptom—No Enterprise in HSV Element Manager

- 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

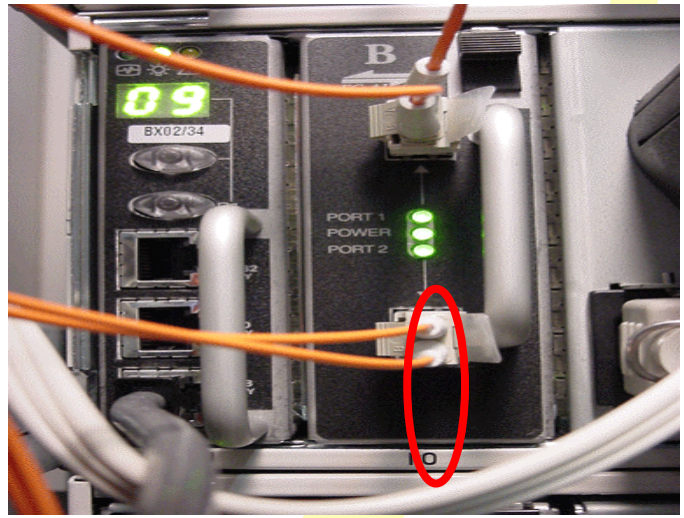
- Fault
- Host Link
- Controller Heartbeat
- Cache Battery Assembly


- 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