HP e3000 High Availability
Solutions

Agenda

- Intro

- Nov 14th Announcement

- HA Investment Strategies

- Your HA Goals

- Storage Components

- HA Components

- SAN Components

- Lets Build a Cluster with SAN

Intro

ZZZZzzzzzzzzzzzzzzz

Announcement

- HP stops selling the HP e3000 Nov 2003

- HP will support the HP e3000 through its 5 year support life

  (which ends Nov 2006)

HA Investment Strategy

- Goal: Give the best, reasonable, chance to our HP e3000 users so that they migrate to another HP platform, when it and they are ready.

- Invest in HA solutions that solve real customer problems and that can be realistically supported.

- Invest in hardware (storage) that gives the best chance of being there through the support life of the HP e3000.
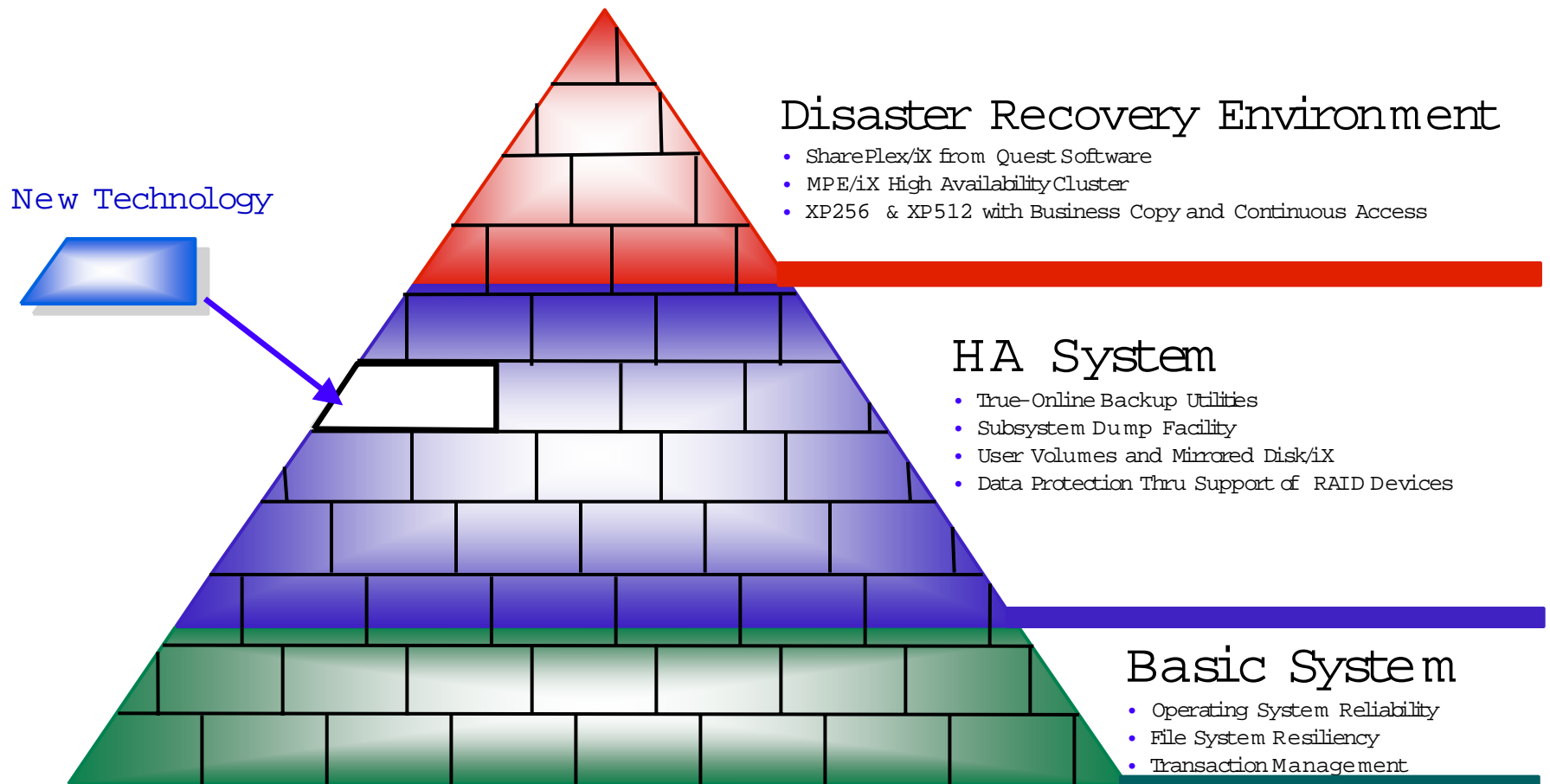
Your HA Goals

- Remove points of failure

- Reduce complexity

- Increase or maintain availability

- Make sure outages are not catastrophic to the life of the business (or your career)

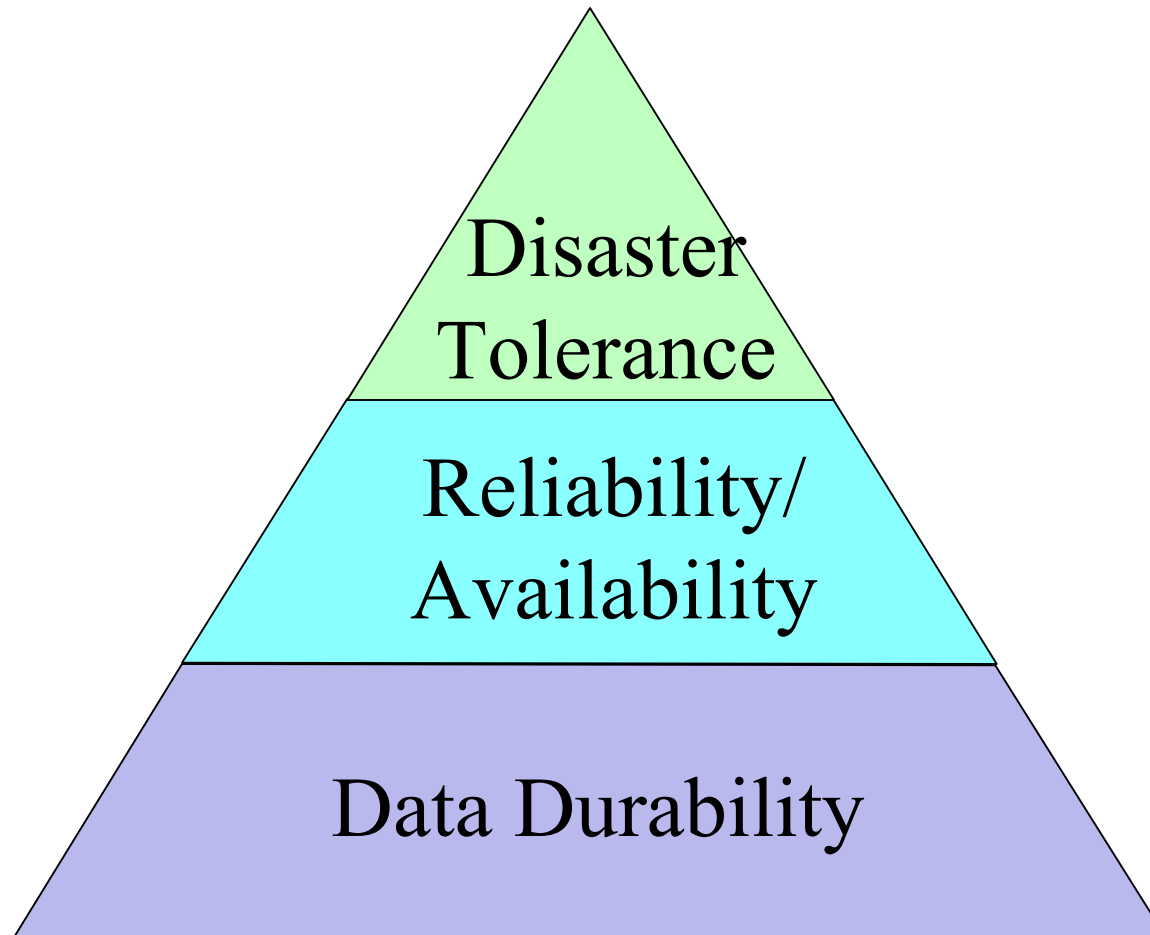- Invest in real solutions that reduce unplanned downtime (not perceived problems)

Garlic rope
against Vampires
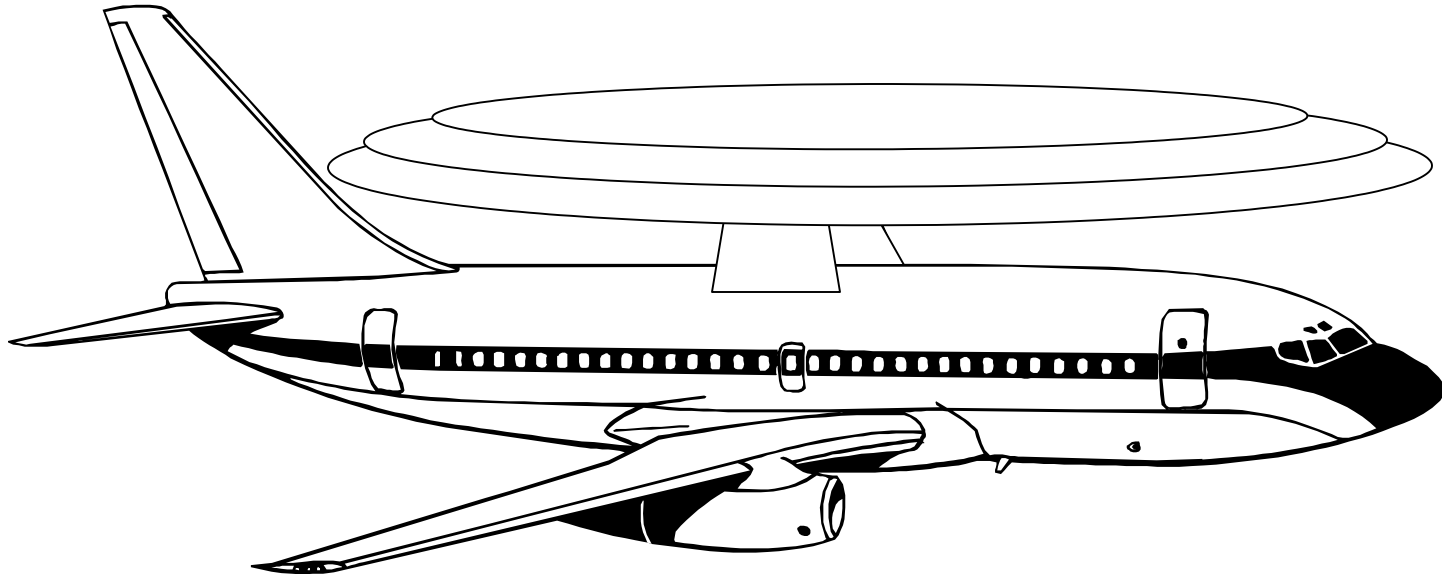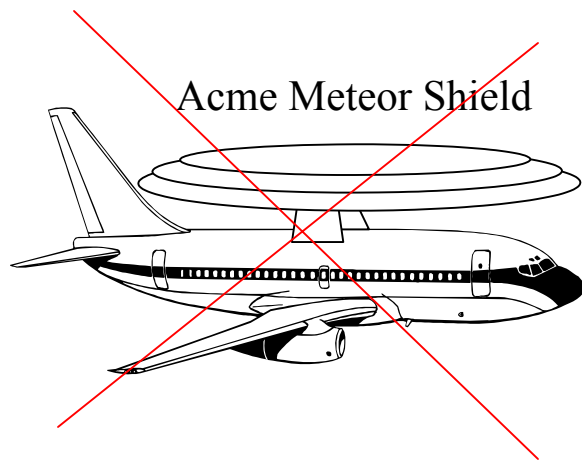
High Availability Pyramid

Disaster Recovery Environment
- SharePlex/iX from Quest Software
- MPE/iX High Availability Cluster
- XP256 & XP512 with Business Copy and Continuous Access

New Technology

HA System
- True-Online Backup Utilities
- Subsystem Dump Facility
- User Volumes and Mirrored Disk/iX
- Data Protection Thru Support of RAID Devices

Basic System
- Operating System Reliability
- File System Resiliency
- Transaction Management

Modified High Availability Pyramid

Acme Meteor Shield

Acme Meteor Shield

Selection Criteria

- Evaluate cost of solution vs risk of the event

- Impact to business if you do nothing

- Collect outage data

- Select solution that reduces the risk

- Select solution that reduces impact

- Training

Bad Choices

- Malicious compliance

- Perceived vs Real Risk

- Invalid outage data

Storage Component

SureStore Virtual Array 7100

Fibre Channel Port

Array Controller LEDs

RS-232 Serial Port

Array Controller

AC Power Connection

Power Supply

Power Supply LEDs
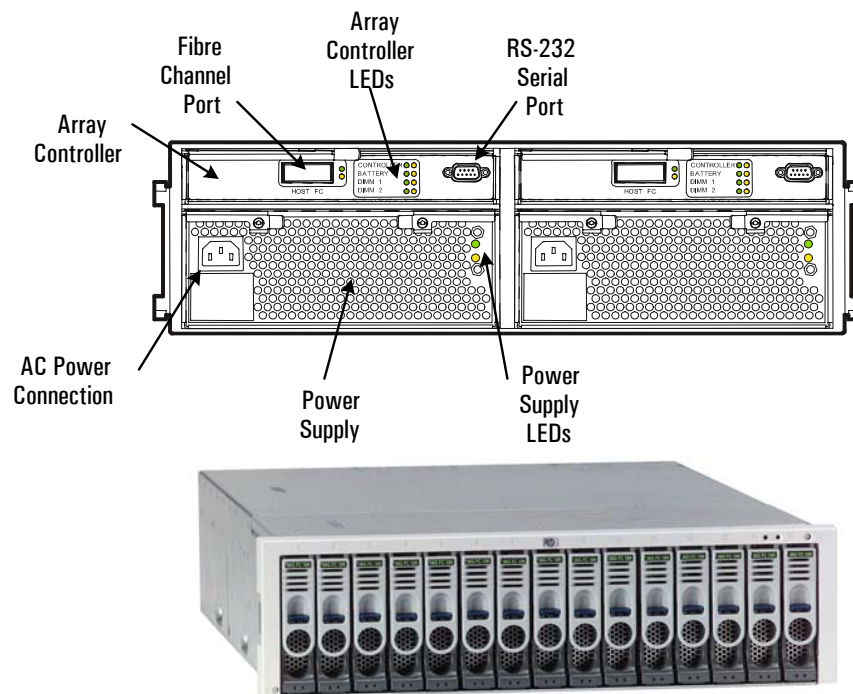
VA7100

- Replacement for 12H AutoRAID

- FC only

- Has one redundancy group that can be configured in either RAID0-1 or AutoRAID (RAID0-5)

- Capacity up to 1TB raw

- Currently for 7.1 and beyond

- SCSI connectivity requires A5814A-003 Fabric Router

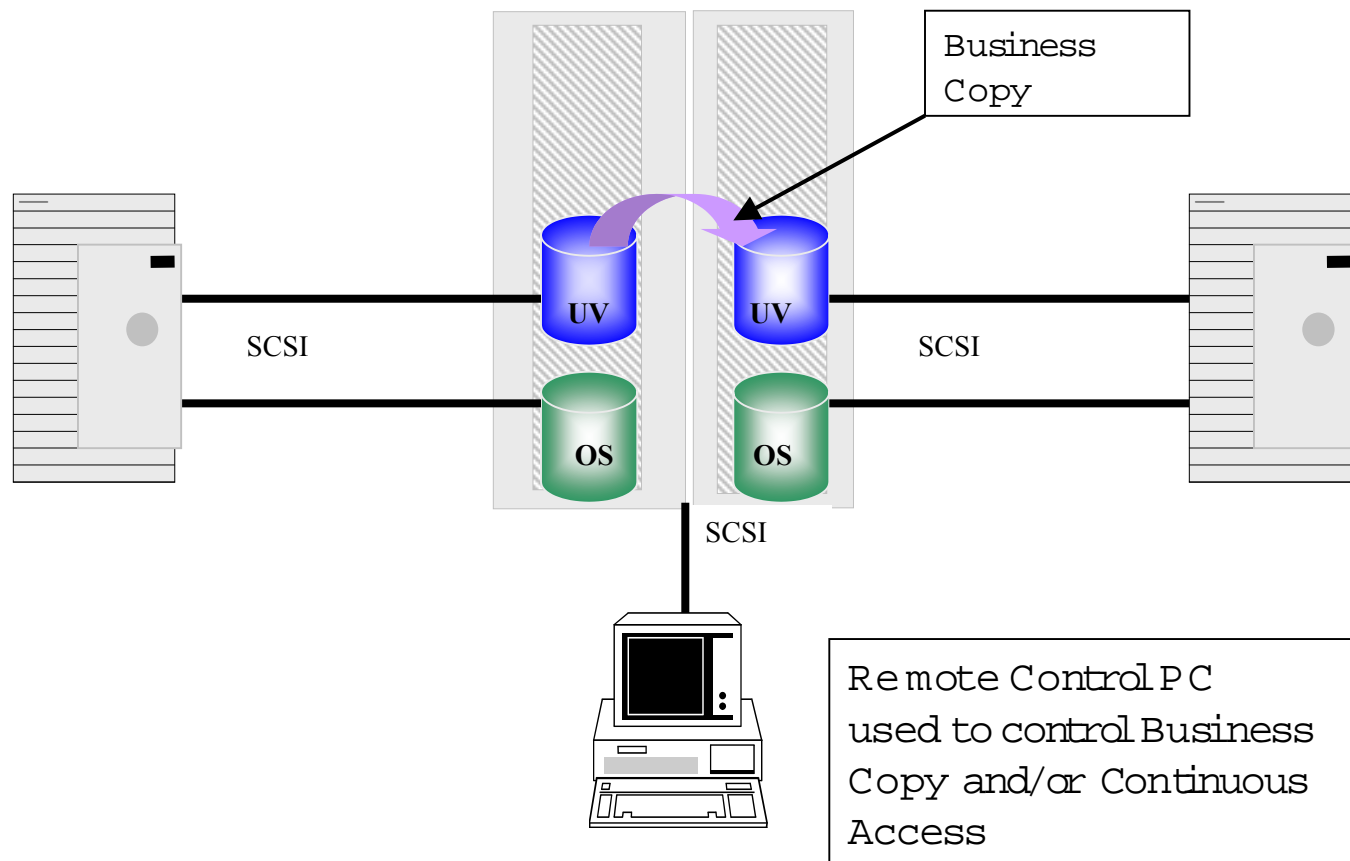- Implementation requires PC running CV SDM

Storage Components

SureStore Disk Array XP512

DKU Disk Frames

Control Frame DKC

DKU Disk Frames

Disks

DKU L2

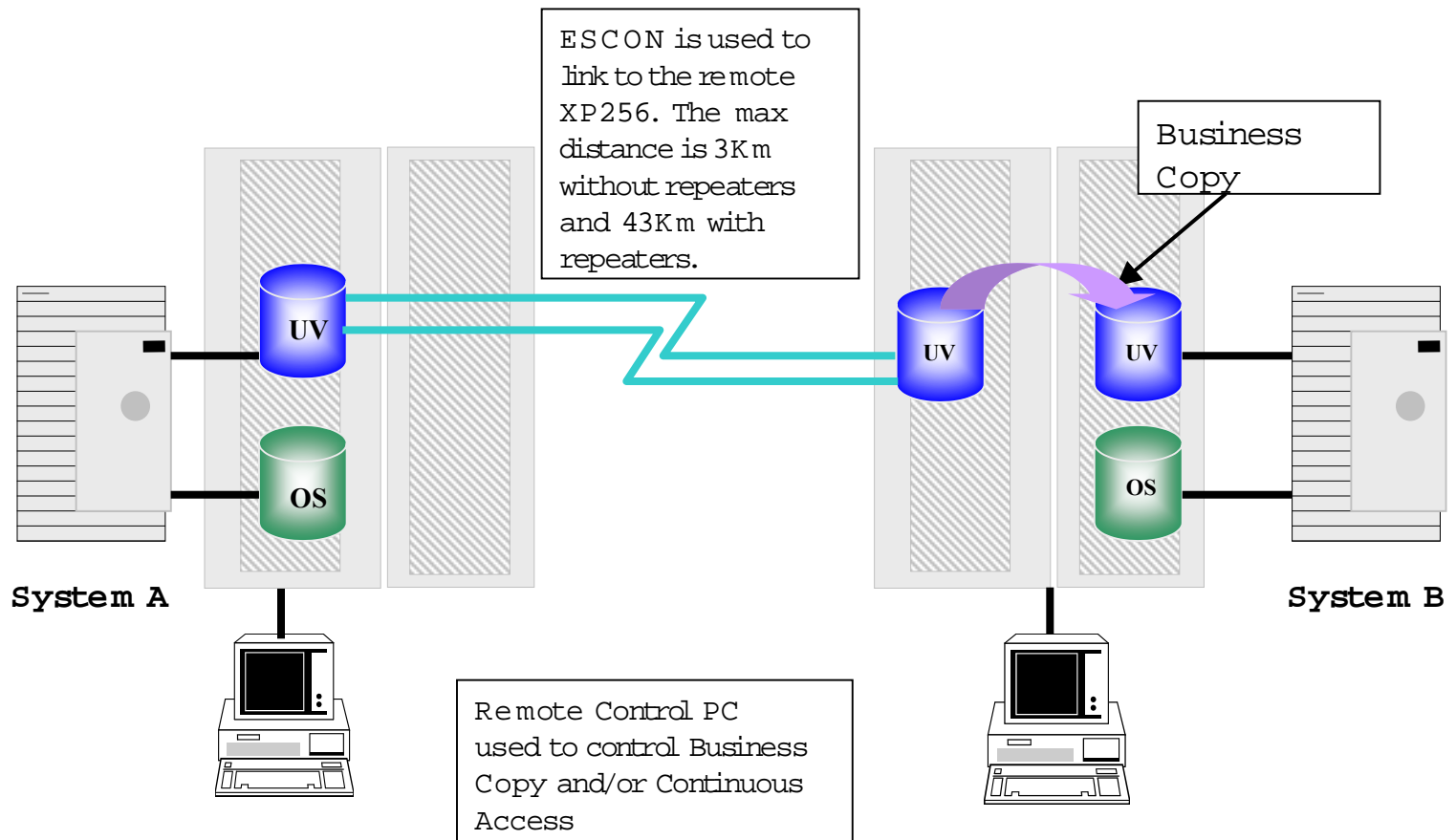**DKU L1**

DKC

DKU R1

DKU R2
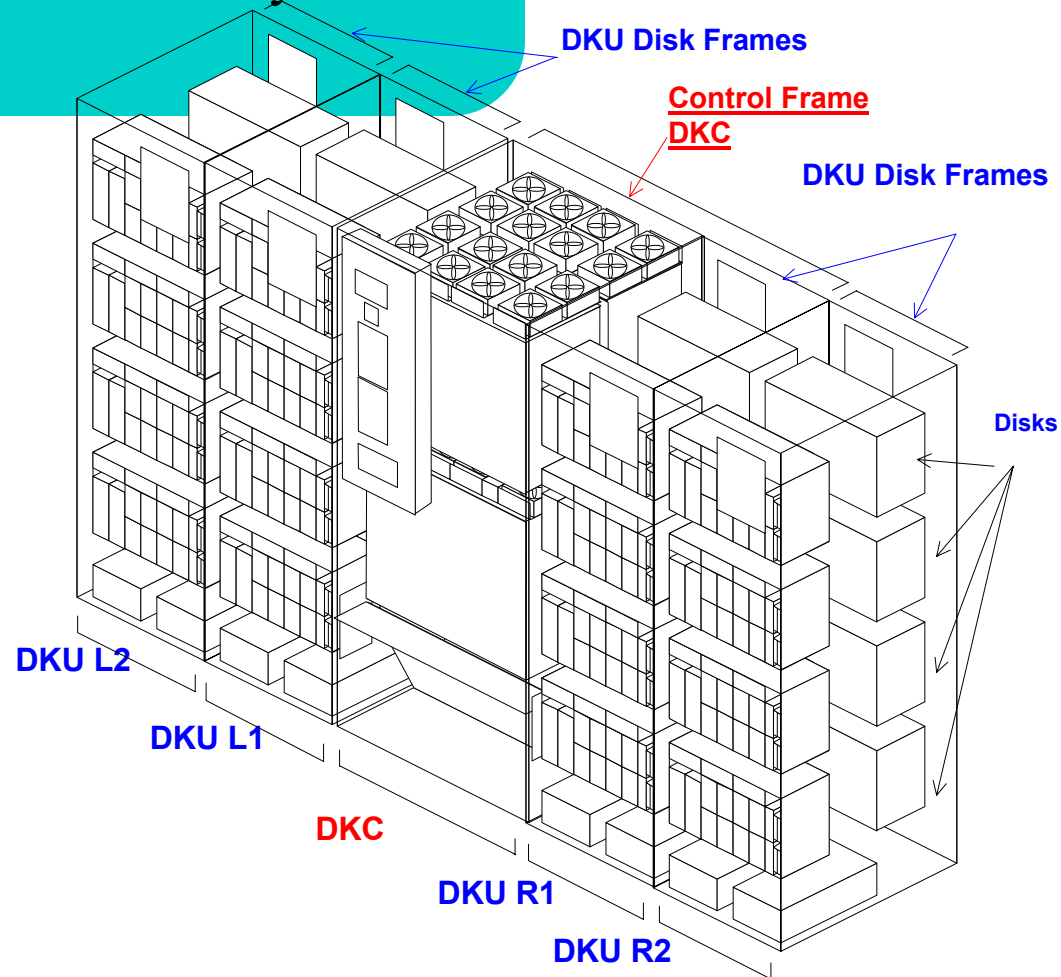
XP512 Specs

- **Environmental**
  Small footprint and disk capacity at 93Terabytes

- **Heterogeneous Hardware Support**
  The cabinet can be shared among multiple machines running MPE/iX or HP-UX or any other operating system. *(Shared hardware not shared data)*

- **High Availability Features**
  Protection of data thru RAID algorithms
  Ability to hotswap components
  Support of Business Copy and Continuous Access
  Host based control thru XP RAID Mgr

- **Support**
  The XP cabinet is configured to "phone home" when errors are detected. HP will then contact the customer, fix the problem online or dispatch a CE.

MPE/iX with Business Copy XP

Business
Copy

UV   UV

SCSI   SCSI

OS   OS

SCSI

Remote Control PC
used to control Business
Copy and/or Continuous
Access

14

MPE/iX Continuous Access XP

ESCON is used to link to the remote XP256. The max distance is 3Km without repeaters and 43Km with repeaters.

Business Copy

UV

OS

System A

UV

UV

OS

System B

Remote Control PC used to control Business Copy and/or Continuous Access

HA Components Mirrored Disk/iX

- Works on JBOD

- Inexpensive

- Low overhead

Downside

- Not recommended with capacities over 50GB

- No protection for Ldev 1
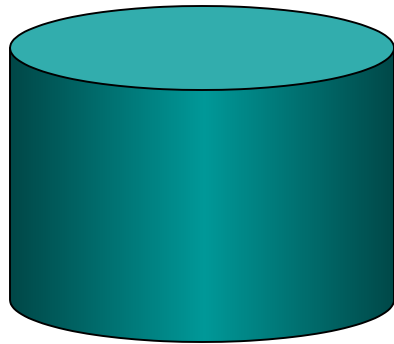
- More complex that hardware protection
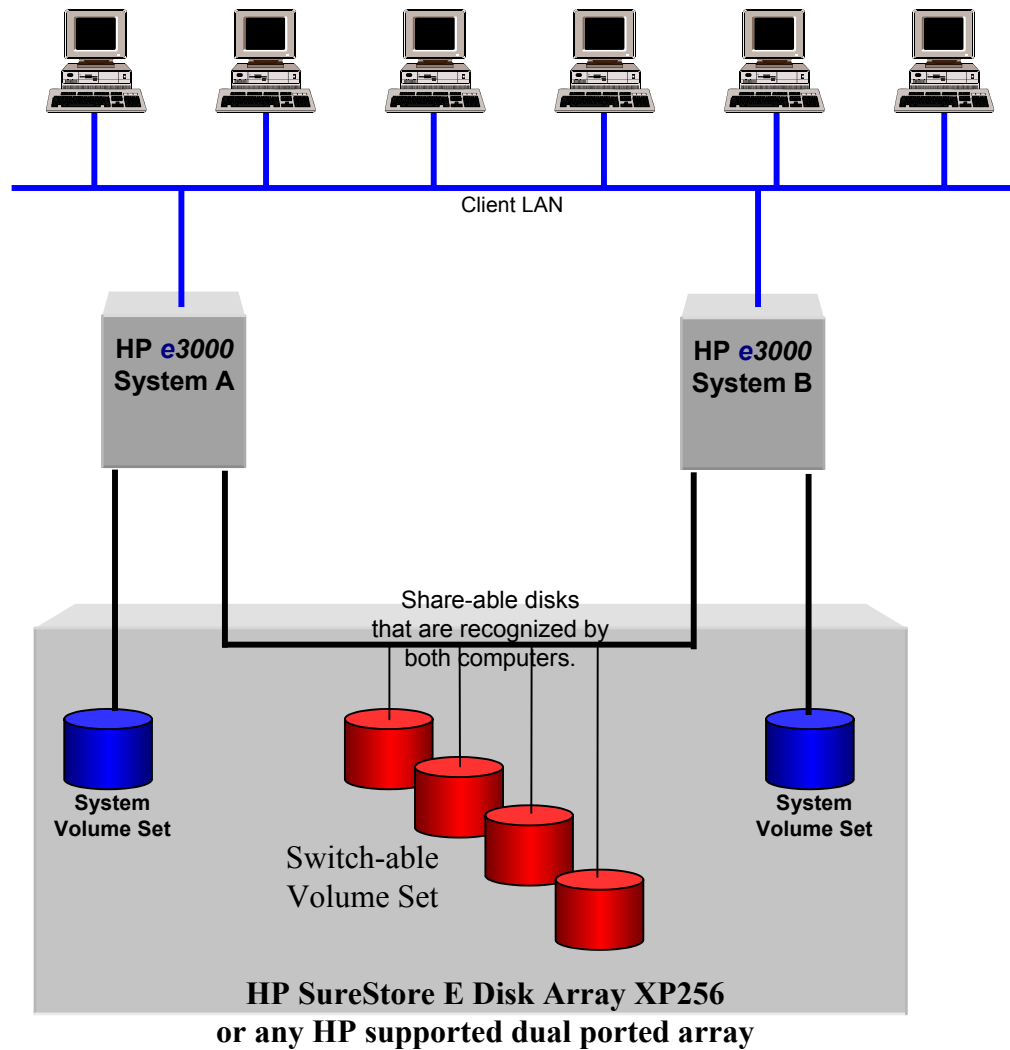
Mirrored Disk/iX

Memory Manager

- Start two asynchronous write

- Wait for first return

- Start timer (~130 seconds)
  If second write fails disable mirroring
  Notify operator

Toggle Select for Read

- Read disk

- Wait for this return of ~130 sec

- If read timeout disable mirroring
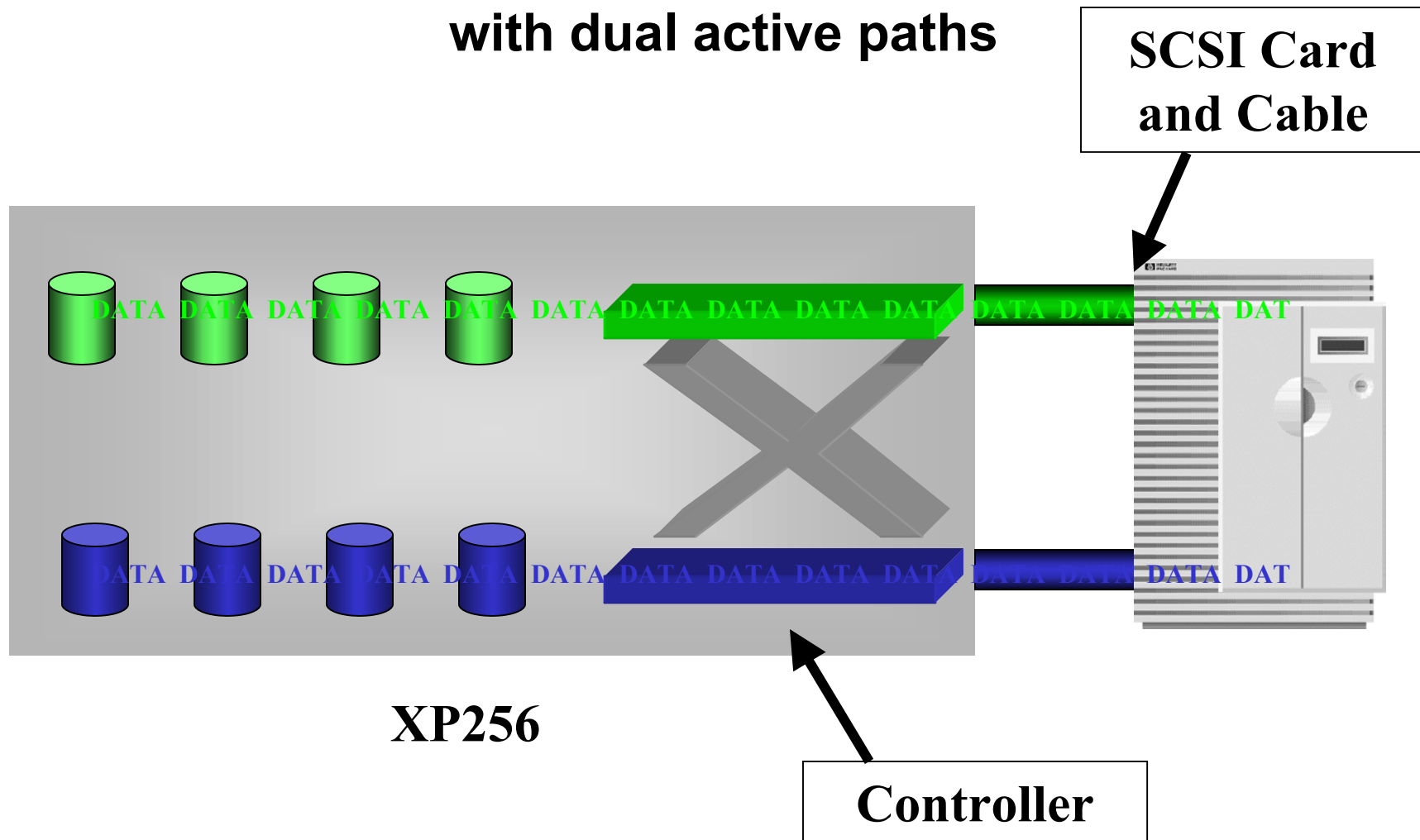
Cluster/iX

Cluster/iX Features

- Easy management

- Inexpensive cluster solution

- Totally customer customizable job scripts

- New heartbeat feature in 7.5 release

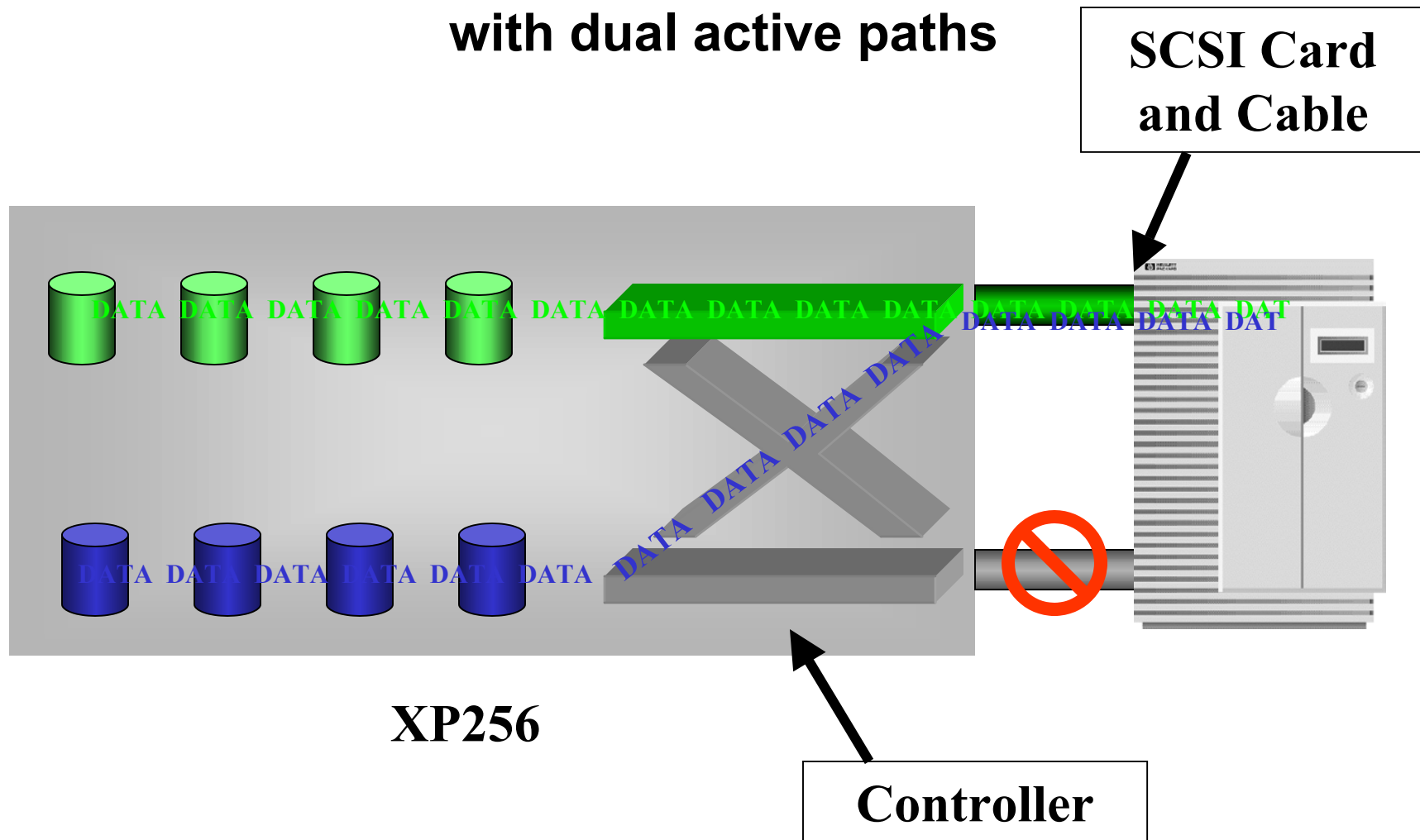- Works with any HP supported dual ported array

Downside

- User is responsible for user/account structure migration issues*

- User is responsible for third party application copies

- User is responsible for IP address migration*

- Doesn't play well with Failover/iX

*HP consulting solves these in its implementation service

high availability failover with dual active paths

SCSI Card and Cable

DATA DATA DATA DATA DATA DATA DATA DATA DATA DATA DATA DAT

DATA DATA DATA DATA DATA DATA DATA DATA DATA DATA DATA DAT

XP256

Controller

high availability failover
with dual active paths

SCSI Card and Cable

Controller

XP256

DATA DATA DATA DATA DATA DATA DATA DATA DATA DATA DATA DATA DATA DAT

DATA DATA DATA DATA DATA DATA DATA DATA DATA

Fabric Router

- allows legacy systems connectivity to FC storage

- supports the VA7100, XP48 and XP512

- can be deployed in a SAN topology

- supports the 2400 and 2800 Brocade Silkworm Fibre Switches

- is independent of any switch zoning configuration

- currently for 6.5 and beyond

- does not support distancing solution (SCSI-FC-SCSI)
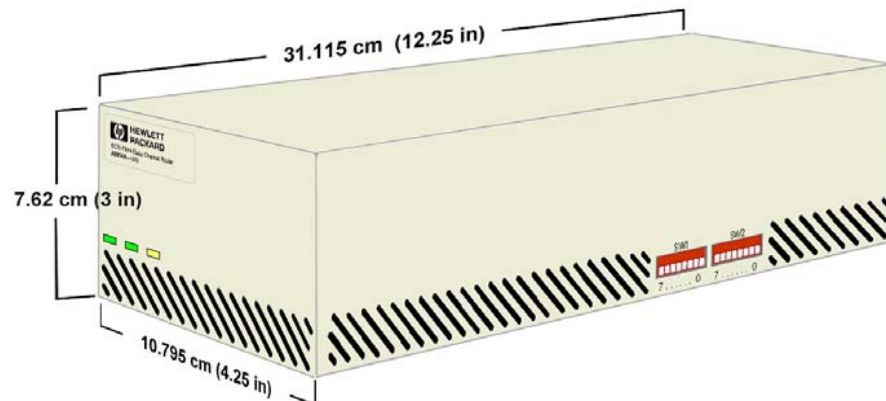
Brocade Switch
2400 Silkworm 8 port
2800 Silkworm 16 port
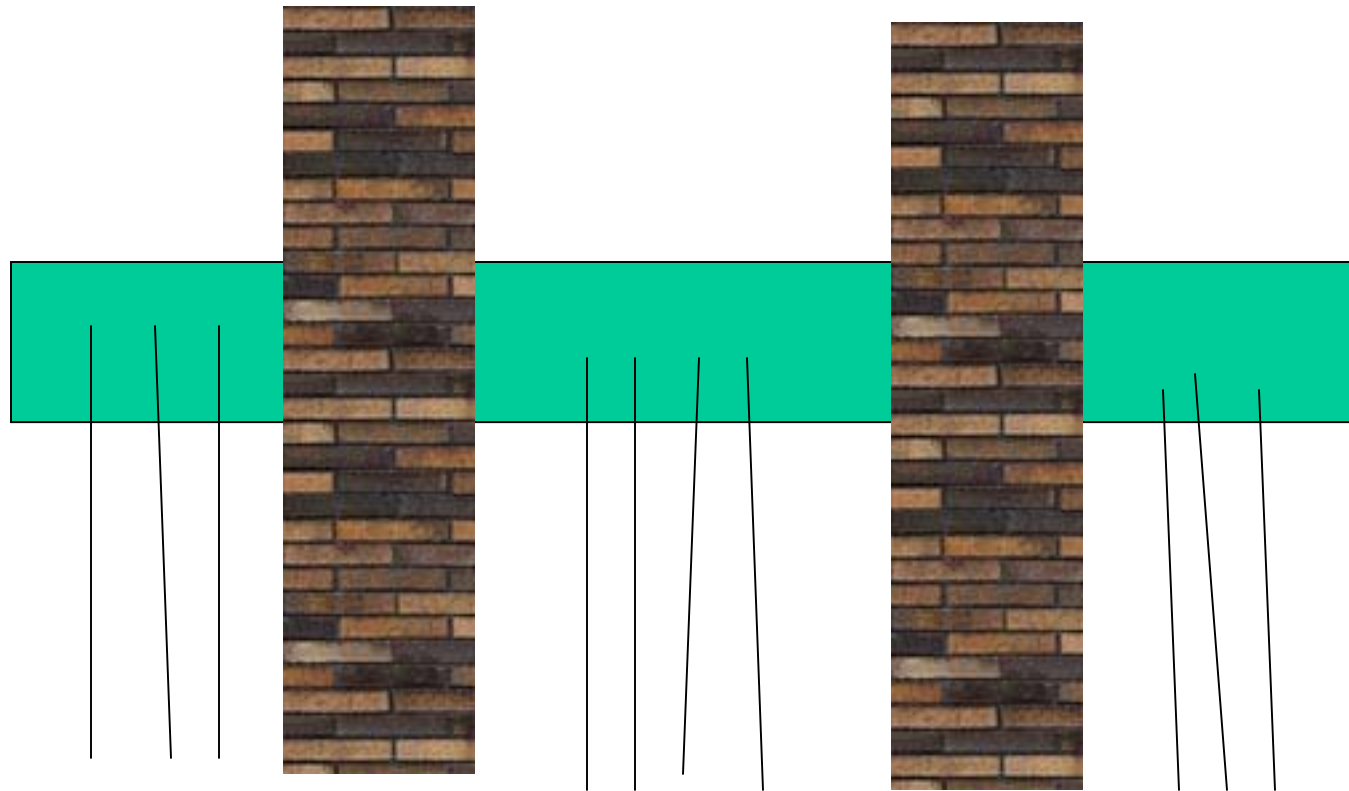
Lets Build a SAN Cluster

Problem: Airline and shipping

- Reservation system almost 24x7

- Sales and accounting

- Development machine

- No disaster tolerance yet.

Criteria

- Res system is critical to business
  loss of machine is $100,000 per hour

- Can live with Sales out for 1
  whole day with little impact

- Can live with Dev out for 3 days
  with no impact

Relative performance:

Res system	1.0
Sales system	0.75
Dev system	0.30

Reservation System

8 System volumes

16 User Volumes
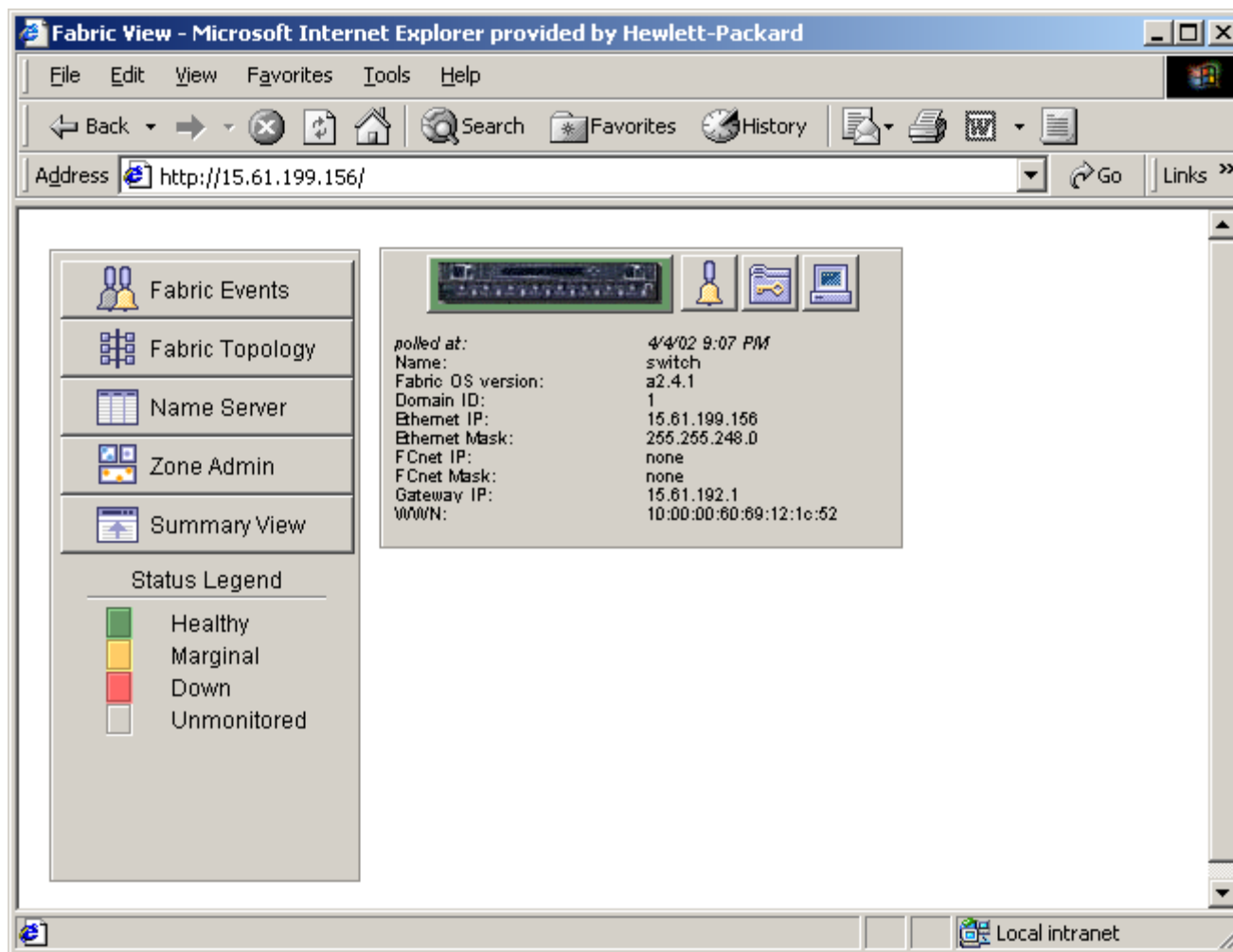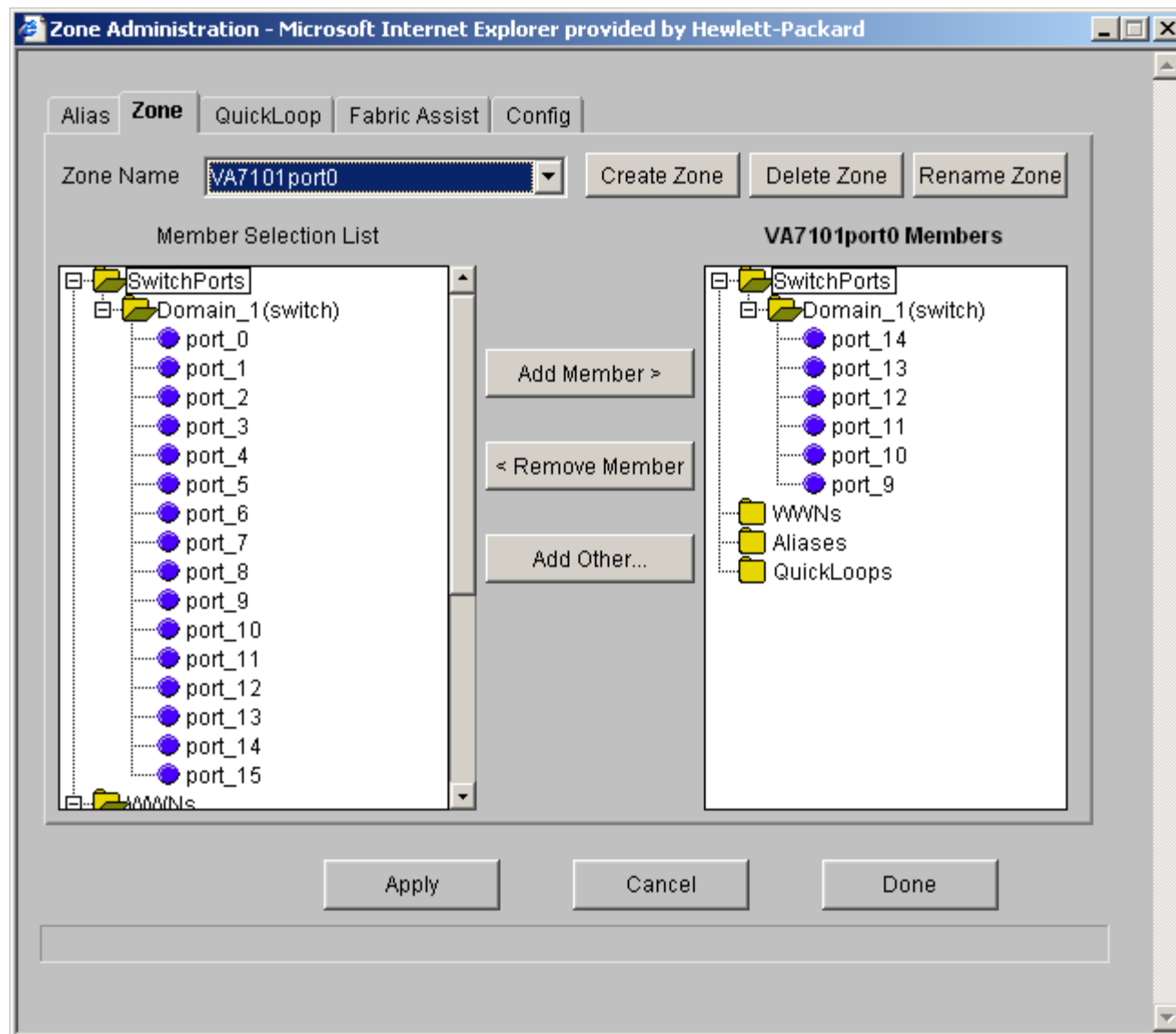
24 Luns
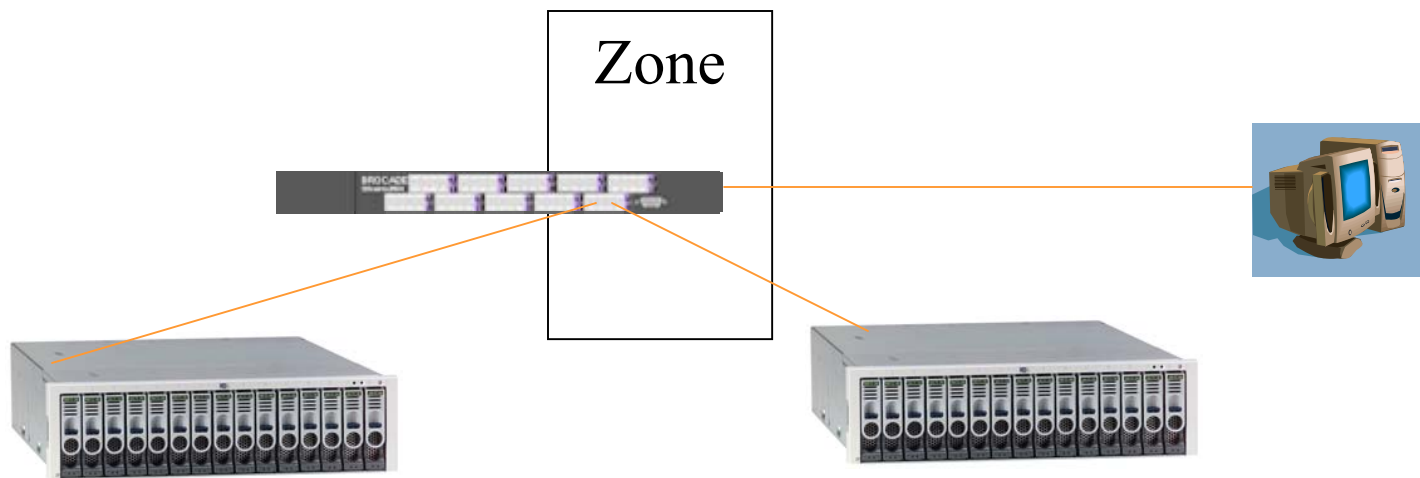
Sales System

4 Systems volumes

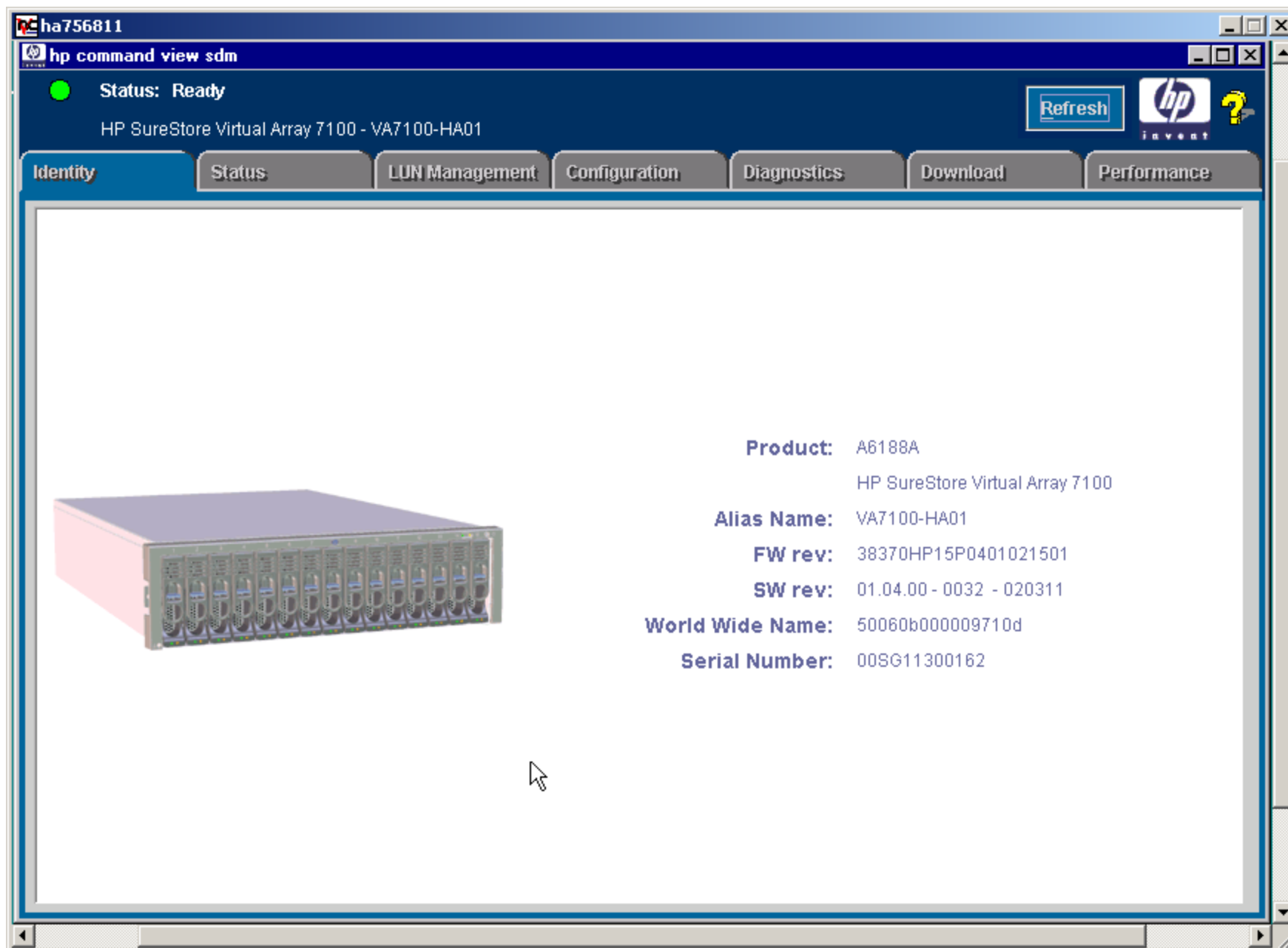8 User volumes

12 Luns

Development System

4 System volumes

8 User volumes

12 Luns

Zone

hp command view sdm

● **Status: Ready**

HP SureStore Virtual Array 7100 - VA7100-HA01

Refresh

| Identity | Status | LUN Management | Configuration | Diagnostics | Download | Performance |

Product: A6188A

HP SureStore Virtual Array 7100

Alias Name: VA7100-HA01

FW rev: 38370HP15P0401021501

SW rev: 01.04.00 - 0032 - 020311

World Wide Name: 50060b000009710d

Serial Number: 00SG11300162

ha756811

hp command view sdm

● **Status: Ready**

HP SureStore Virtual Array 7100 - VA7100-HA01

Refresh

| Identity | Status | LUN Management | Configuration | Diagnostics | Download | Performance |

General Settings | Rebuild

Array Settings...

Controller Settings...

Configuration : Edit Array Settings

Alias Name: VA7100-HA01

Queue Full Threshold (between 0-4096): 750

Data Resiliency: Normal ▼

- High Performance
- Restricted Normal
- **Normal**
- Secure
- Single Controller

Subsystem Level RAID Control:

Hot Spare Mode:

Automatic Include: ● Enable ○ Disable

Auto Format Drive: ● Enable ○ Disable

OK **Cancel**

Controller	Port ID
Controller M/C1	95
Controller M/C2	1

hp command view sdm

● **Status: Ready**

HP SureStore Virtual Array 7100 - VA7100-HA01

Refresh

| Identity | Status | LUN Management | Configuration | Diagnostics | Download | Performance |

General Settings | **Rebuild**

Array Settings...

Controller Settings...

Alias Name: VA7100-HA01

Configuration : Edit Controller Settings

Select Controller: | **Controller M/C1** ▼

Port ID: | 95

Port Behavior: | **HPUX** ▼

Port Topology: | **Private Loop** ▼

OK | **Cancel**

Controller	Port ID	Port Behavior	Port Topology
Controller M/C1	95	HPUX	Private Loop
Controller M/C2	1	HPUX	Private Loop

hp command view sdm

● **Status: Ready**

HP SureStore Virtual Array 7100 - VA7100-HA01

Refresh

| Identity | Status | LUN Management | Configuration | Diagnostics | Download | Performance |

General Settings **Rebuild**

Array Settings...

Controller Settings...

Alias Name: VA7100-HA01

Subsyst

Maximum

Port Topology:

Configuration : Edit Controller Settings

Select Controller: **Controller M/C1** ▼

Port ID: 95

Port Behavior: HPUX ▼

| Windows NT |
| Windows 2000 |
| Linux |
| Solaris |
| AIX |
| NetWare |
| MPE |
| Tru64 |

Controller	Port ID	Port Behavior	ogy
Controller M/C1	95	HPUX	
Controller M/C2	1	HPUX	

ha756811

hp command view sdm

Status: Ready

HP SureStore Virtual Array 7100 - VA7100-HA01

Refresh

Identity	Status	LUN Management	Configuration	Diagnostics	Download	Performance

Logical LUNs	Business Copy	Secure Manager

LUN ID	Redundancy Group	Capacity	Size
0	1		5 GB
1	1		5 GB
2	1		5 GB
3	1		5 GB
4	1		5 GB
5	1		GB
6	1		GB
7	1		GB
8	1		GB
9	1		GB
10	1		GB
11	1		GB
12	1		GB
13	1		GB
14	1		GB
15	1		GB

Create LUN...

Delete

Create Copy...

LUN Management : Create LUN

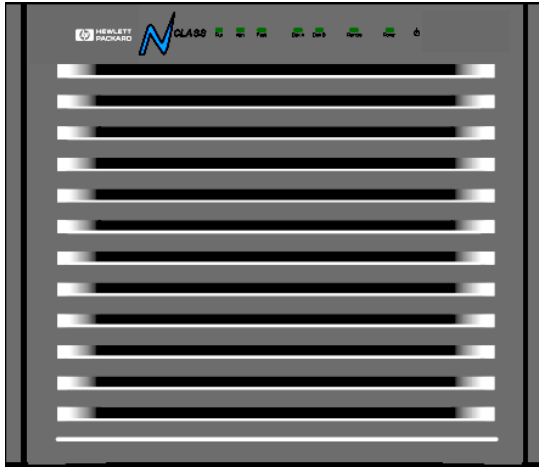LUN number (between 0-127): `16`

Redundancy Group: `1 ▼`

Redundancy Group 1 Available Storage: 23.634 GB

LUN Size in GB: _____

OK   **Cancel**

Redundancy Group 1 Available Storage: `23.634 GB`

Clear Router Map Table

SCSI

Normal Operation

Fibre
Channel

Cluster/iX Setup

SXOutil

:SXOMAKELABEL RES_DBSET 100
:exit

<< Then boot Sales and/or Dev system >>

Cluster Heartbeat

```
!job beat,manager.sys
!SXOutil
Verify off
Sxobeat RES_DBSET 50 2
Exit
!comment      If beat terminates Emergency close volumes because
!comment       the other machine accidentally took over
!VSCLOSE RES_DBSET;now
!TELLOP        Help me mister wizard
```

Cluster Listen

```
!job listen,manager.sys
!SXOutil
Verify off
SXOListen RES_DBSET 50 120 2
Exit
!comment      Heartbeat stopped
!comment      Take over volume set
!SXOutil
verify off
SXOsetlabel RES_DBSET 50
Exit
!VSOPEN RES_DBSET
!Stream IPMigrat.Job.Sys
!Stream Launch.App.Sys
!TELLOP        Ready to go
!stream Jbeat.job.sys
!Eoj
```