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HP e3000

**Achieving High Availability
on the HP e3000**

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High Availability Architect
Commercial Systems Division

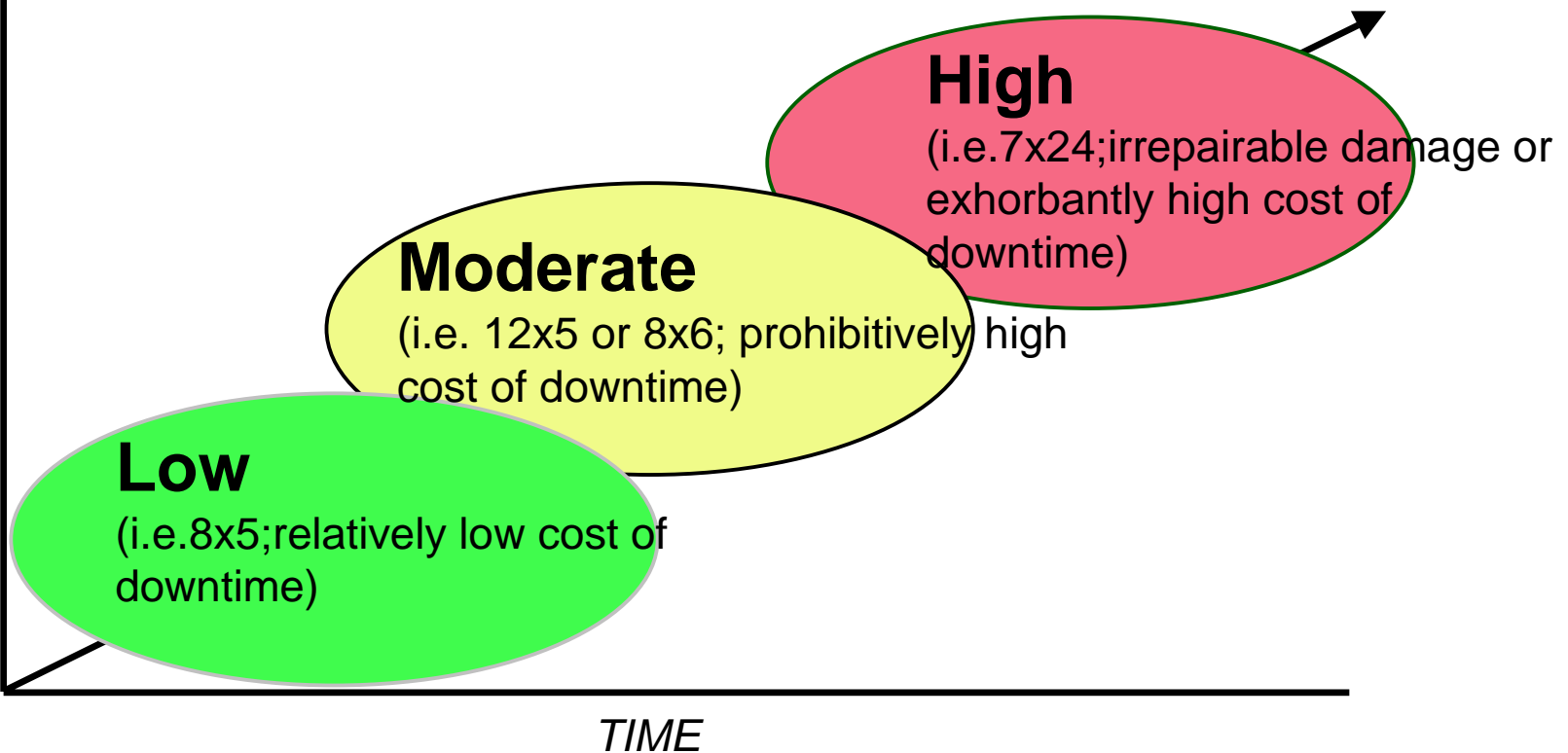


Goals

- When you need to improve what you have
- Show the available facilities
- Consider backup and storage

Industry Trend of Availability Requirements

AVAILABILITY REQUIREMENTS



Did You Know ?

More than 90 % of the 911 systems in the U.S. are running on the *HP e3000**

Solutions on the *HP e3000* are the market leader in the mail order, credit union, California K-12 industries

Over half of the Top 25 Fortune 500 companies use the *HP e3000*

*Populations > 100,000

C S Y H i g h A v a i l a b i l i t y S t r a t e g y

Technology

- **Investigating New Technologies to Increase Data Availability**

Process and Procedures

- **Standard Solutions for Common Business Requirements**

Service and Support

- **Renewed emphasis on processes, support & service**

HP Critical Systems Support

Build it Right

- Operations Checkup
- Software update assistance

Keep it Running

- Proactive systems monitoring
- Proactive, preventive assistance
- Assigned team of mission critical experts
- Specialized technical consulting
- Quarterly patch analysis
- Change management planning

Fix it Fast

- Automated configuration tracking
- Remote diagnostics
- Immediate access to system recovery specialist
- Immediate dispatch of hardware specialist
- 6-hour hardware call-to-repair commitment
- Parts logistics and processes

HP Business Continuity Support

Build it Right

- Operational assessment
- Operating system update planning

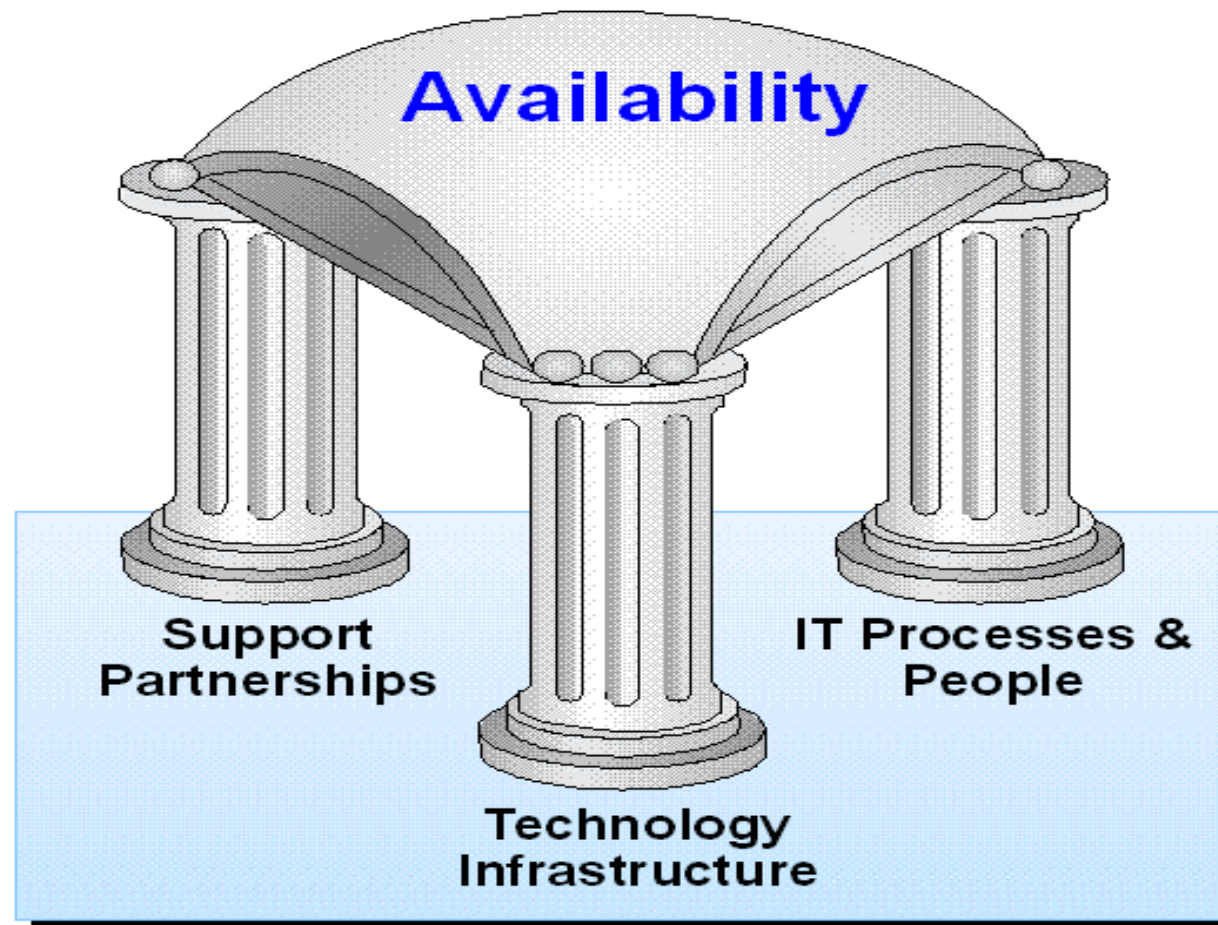
Keep it Running

- Proactive system monitoring
- Proactive consulting from trained experts
- On-site availability technical review
- Assigned team of mission critical experts
- Close monitoring of system abnormalities
- Monthly patch analysis
- Daily notification of critical patch/problems
- Change management planning

Fix it Fast

- Automated configuration tracking
- Remote diagnostics
- Immediate access to system recovery specialist
- Immediate dispatch of hardware specialist
- 4-hour hardware and software call-to-restoration commitment
- Permanent solution within 14 days
- Accelerated, customized escalation process
- R & D mobilization
- Dedicated, actively managed inventory

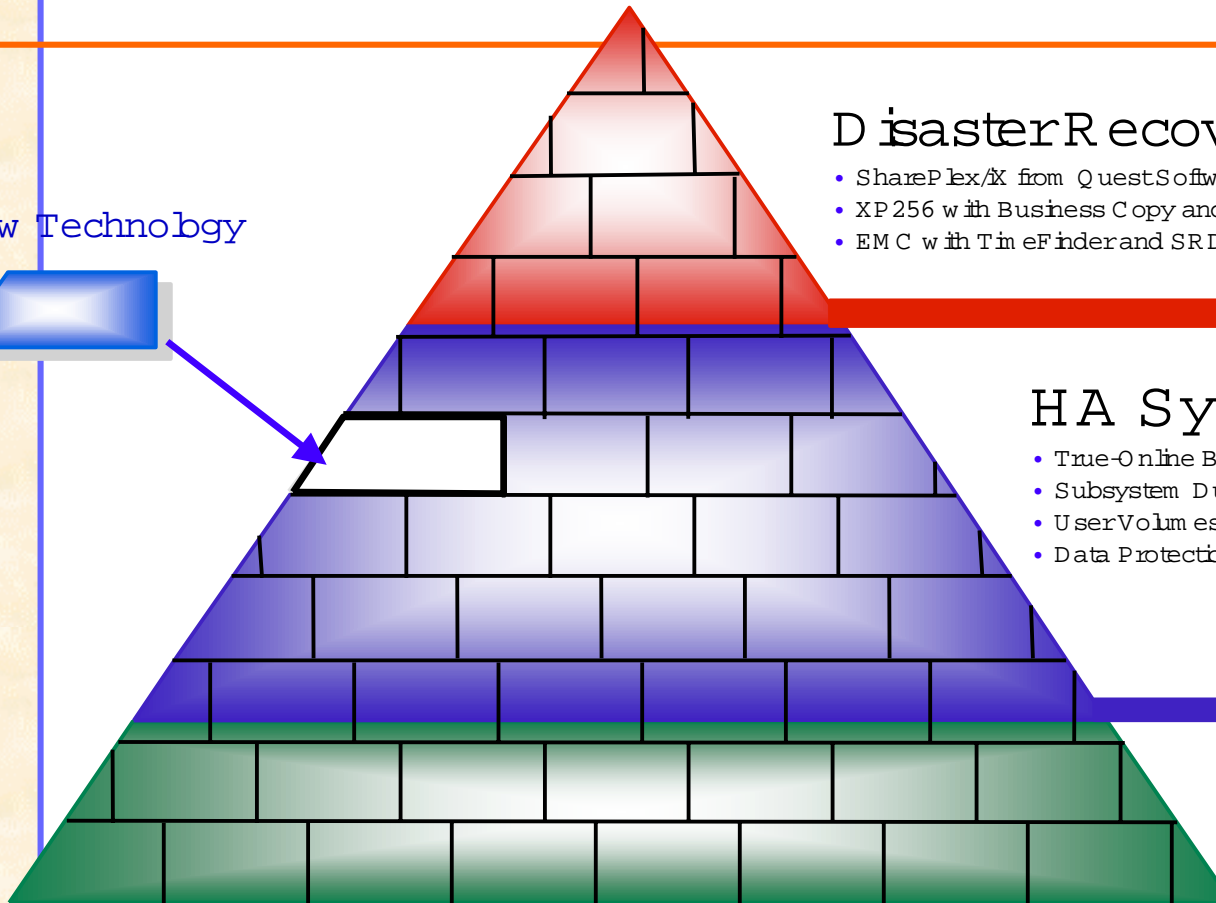
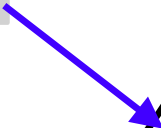
Availability Investments



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HP e3000 High Availability Pyramid

New Technology



Disaster Recovery Environment

- SharePlex/iX from Quest Software
- XP256 with Business Copy and Continuous Access
- EMC with TimeFinder and SRDF

HA System

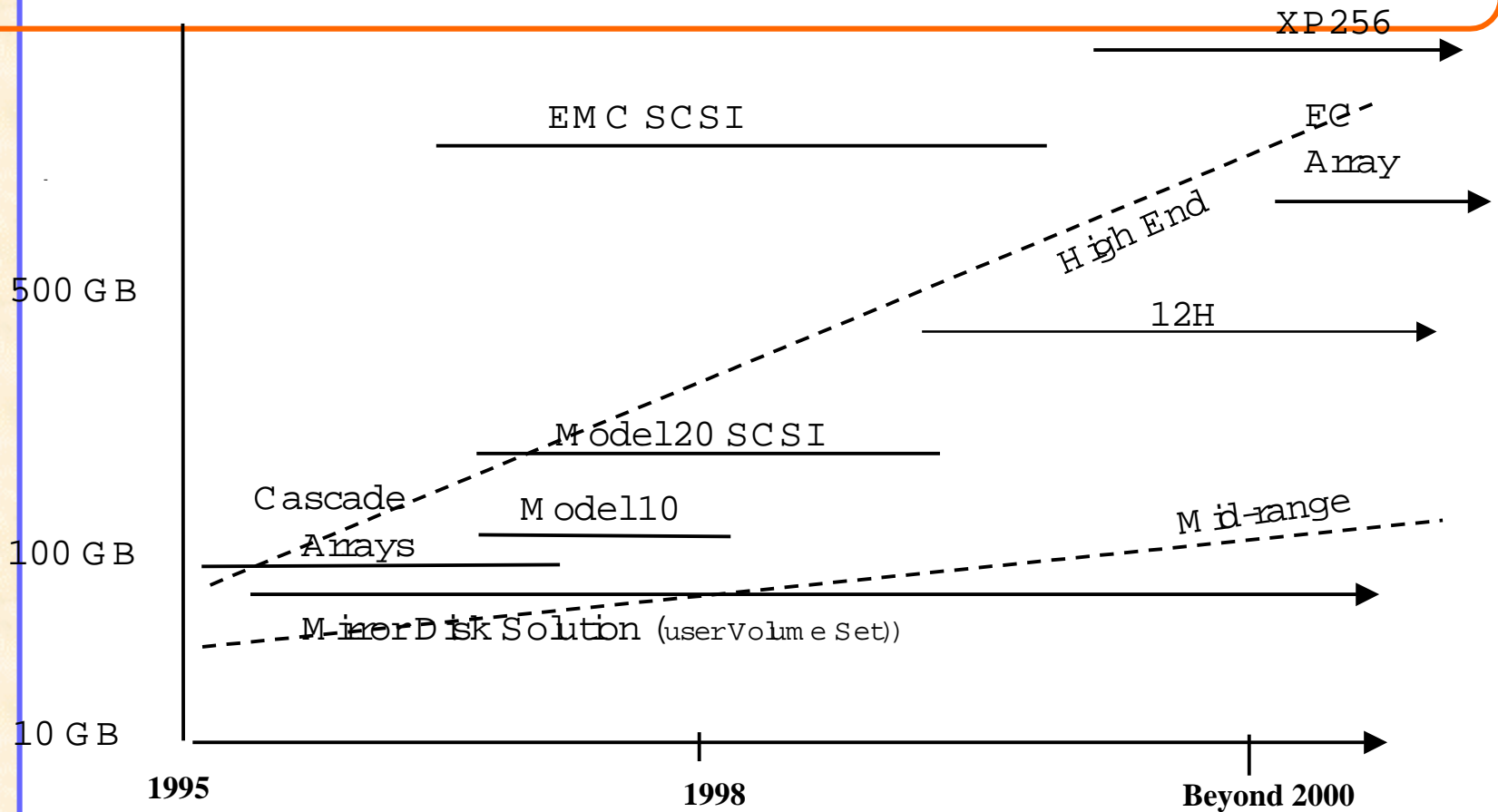
- True-Online Backup Utilities
- Subsystem Dump Facility
- User Volumes and Mirrored Disk/iX
- Data Protection Thru Support of RAID Devices

Basic System

- Operating System Reliability
- File System Resiliency
- Transaction Management

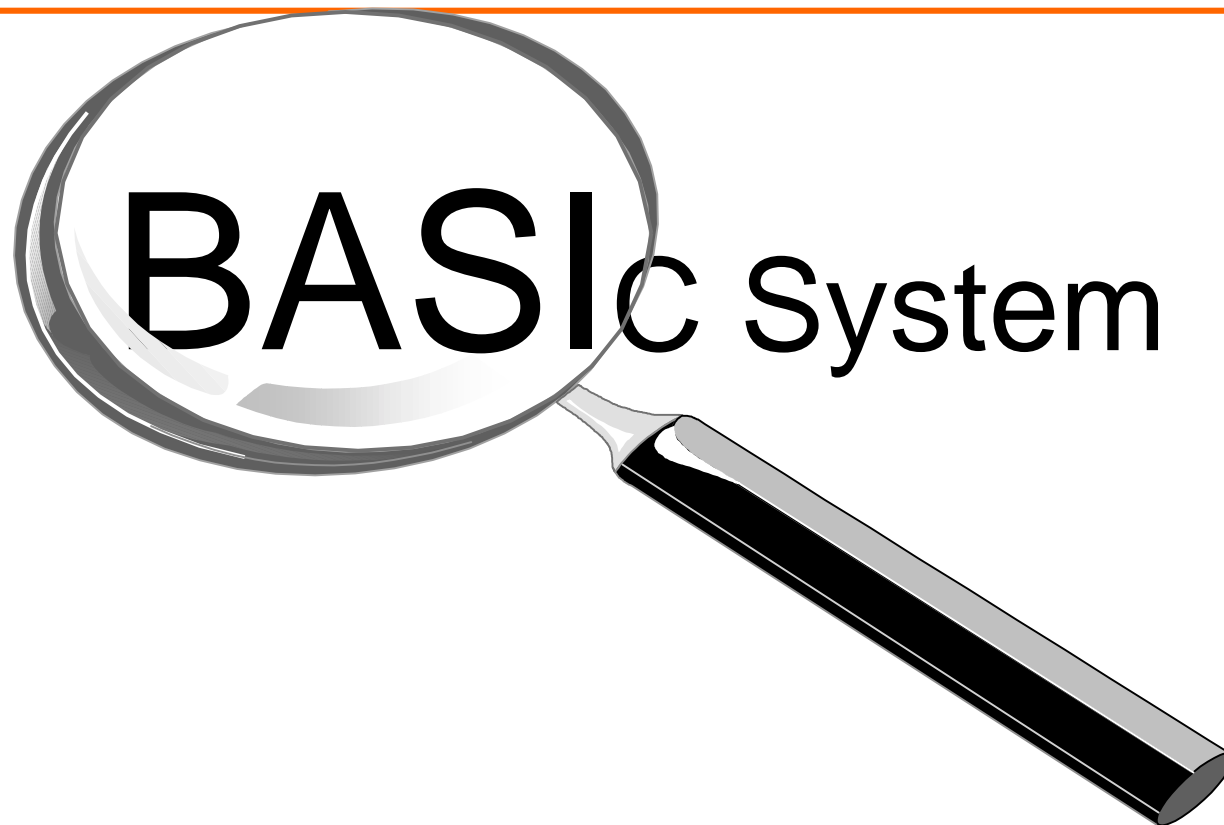
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High Availability Continuity Roadmap



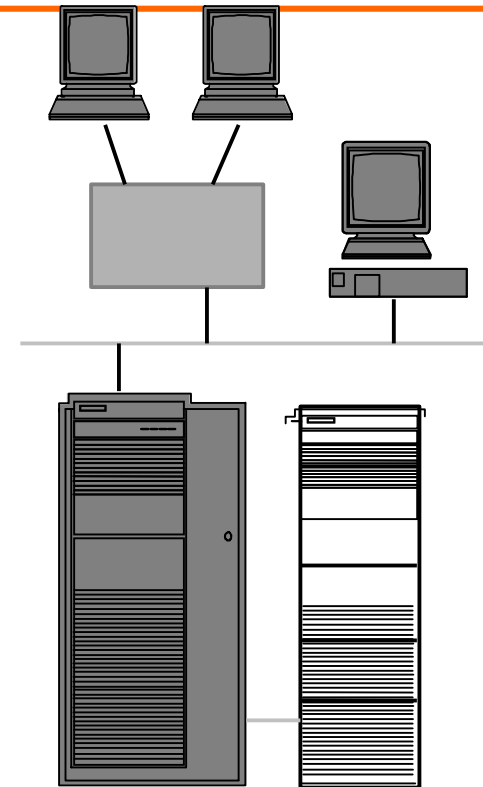
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Taking a Closer Look at the ...



Basic System

- One of the Best Single System Availability
- Standard with every HP 3000
- Low cost, high performance solution
- Strong system availability without the need for add-on products



Basic System Features

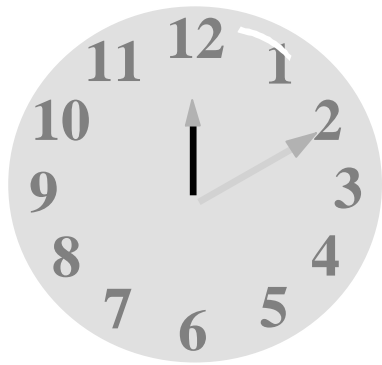
MPE/iX Operating System

- MPE/iX Threshold Manager
- File System Resiliency (KSAM, UserVolumes, I/O subsystem, Image/SQL)
- MPE/iX Transaction Manager (XM)
- UserVolumes
- Image/SQL dynamic detail expansion
- Utilities (setcbck, contig vol.)
- Faster Boot Time (Dump, spoolfile parallel recovery)

HP PA-RISC Hardware

- PA-RISC based architecture
- Error correcting hardware (cache, bus, etc)
- Disk drive reliability (sector atomicity)

Do I need the next level?



- Is availability necessary for meeting your operational requirements?
- Is your cost of downtime prohibitively expensive?
- Are your availability goals higher than what you are actually achieving?

If you answered **yes** to any of these questions, consider upgrading to the High Availability System.



Annualized System Availability Unplanned Events

Unplanned Event	Frequency of events experienced per year	# HRS down per event	Recovery time to “:” per year	Recovery time to application prompt
O/S Failures or Hangs				
SPU Hardware				
Networking				
Operator Error				
Total Unplanned Downtime				

Annualized System Availability Planned Events

Planned Event	Frequency of events experienced per year	# HRS down per event	Recovery time to “:” per year	Recovery time to application prompt
Configuration Changes				
Partial Backup				
OS Install or Update				
OS Patch				
Total Planned Downtime				

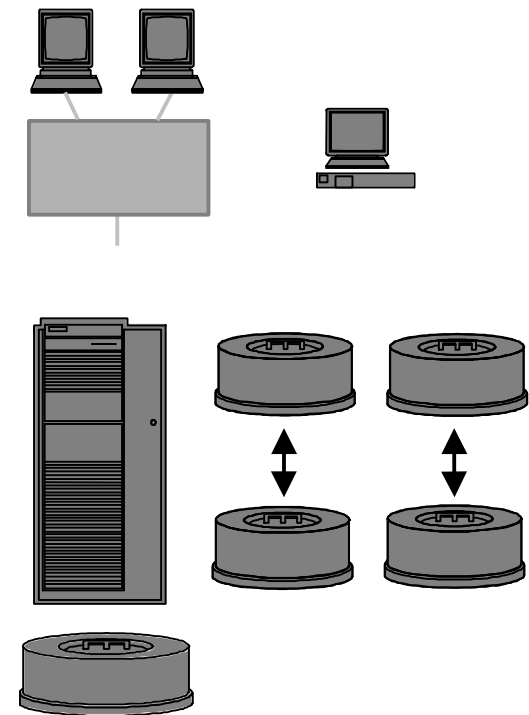
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Taking a Closer Look at the ...



High Availability System

- Expedient recovery from disk failures
- Fast recovery from system failure
- Continuous access to data
- Online backup

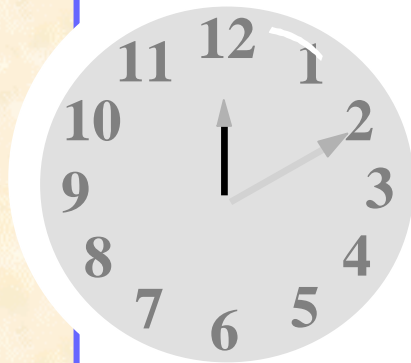


High Availability Features

Add-On Products for High Availability

- TurboSTORE /X IIOnline Backup
- Mirrored Disk /X
- High Availability disk arrays
- AutoRestart /X

Moving to the next level



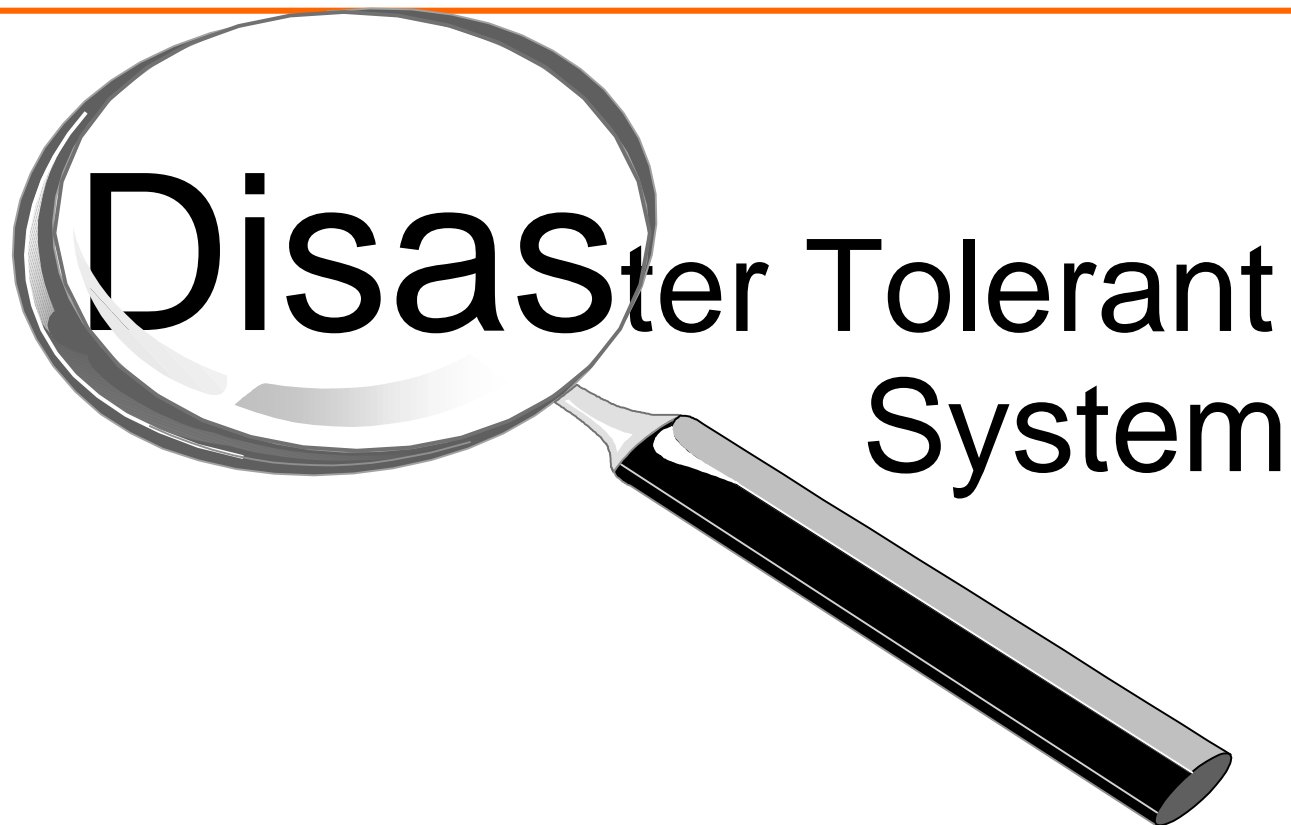
- Do your availability goals align with a 24x7 operation?
- Do you find you are not achieving that level of availability?
- Would you suffer irreparable damage if a disaster hit?

If you answered **YES** to any of these questions, consider upgrading to the SharePlex/iX-NetBase System and/or XP256.



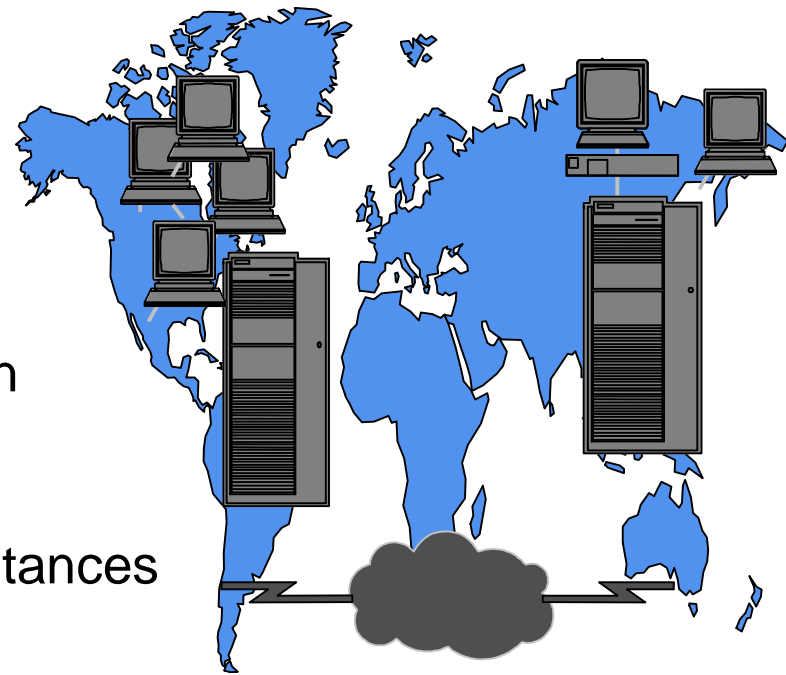
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Taking a Closer Look at the ...



Disaster Tolerant System

- Disaster recovery
- Load balancing
- Horizontal growth path
- Full system and application redundancy
- Unlimited geographical distances
- Maximized efficiency of system capacity and availability



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HP SureStore E Disk Array XP 256



XP 256 Feature Set

- **Environmental**

Small footprint and disk capacity at 9 Terabytes

- **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

- **Support**

The XP 256 cabinet is configured to "phone home" when errors are detected. HP will then contact the customer, fix the problem online or dispatch a CE.

Disaster Tolerant System Features (Software)

Disaster Tolerance, 7x24

- Shareplex/IX-NetBase Bundle
 - Shadowing (IMAGE/SQL, ALLBASE/SQL*, flat file, KSAM)
 - Network File Access (NFA)
 - NB Spool
 - AutoRPM
 - Statistics
- Shareplex/IX-NetBase Shadowing
 - Shadowing (IMAGE/SQL, flat file, and KSAM)

Summary: **Current Products and Solutions**

Products for HA

- AutoRestart/iX
- High Availability peripheral cabinets
- 12H Disk Arrays (AutoRAID)
- XP256 Disk Arrays

- Mirrored Disk/iX
- SharePlex/iX-NetBase Shadowing
- TurboSTORE/iX II Online Backup
- Image/SQL dynamic detail expansion

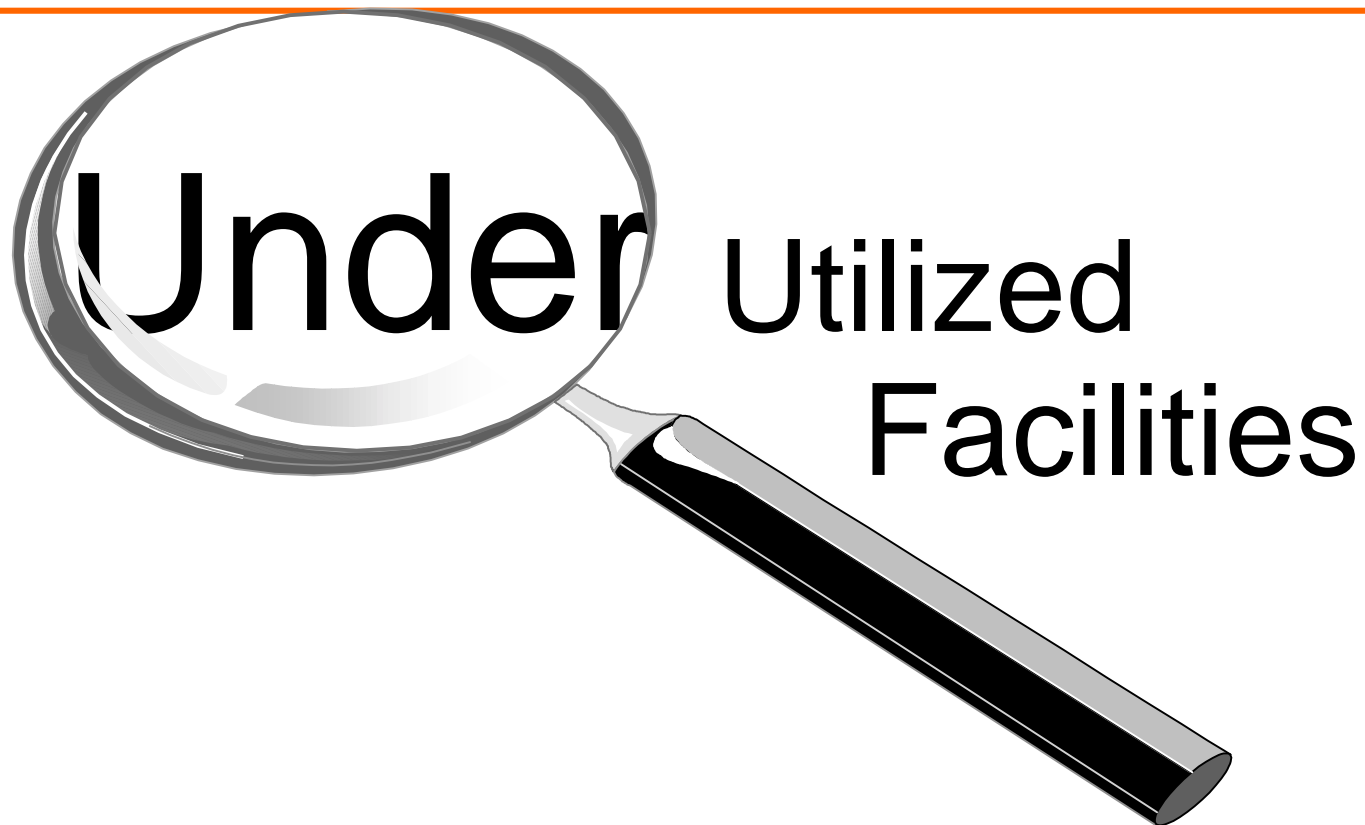
- PSO/SSO (Disaster Planning/Recovery services)
- Business Continuity Support

Incorporated in MPE/iX

- MPE/iX Threshold Manager
- Software Resiliency (KSAM, user volumes, I/O subsystems, Image/SQL DB)
- Utilities (set clock, contig vol, set counter, etc.)
- MPE/iX Transaction Manager (XM)
- Disk drive certification (sector atomicity)
- PA-RISC based architecture
- Error correcting hardware (cache, bus, etc)
- Faster Boot Time (Dump, spoolfile, parallel recovery)
- User Volumes
- Memory Page Deallocation

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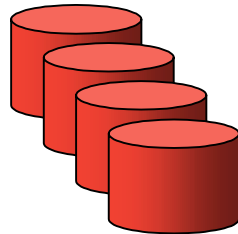
Taking a Closer Look at ...



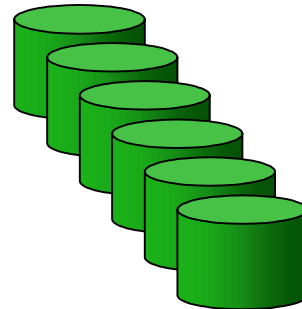
MPE /X Volume Management

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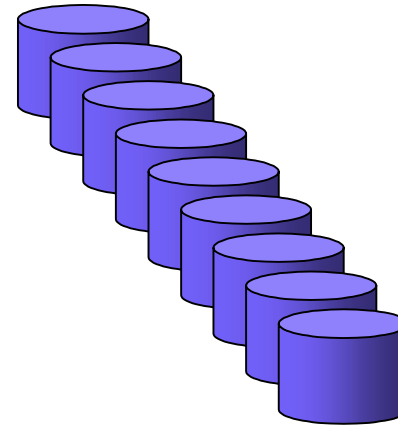
System
Volume Set



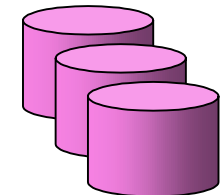
Finance



Production

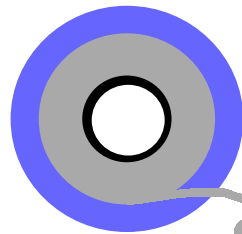
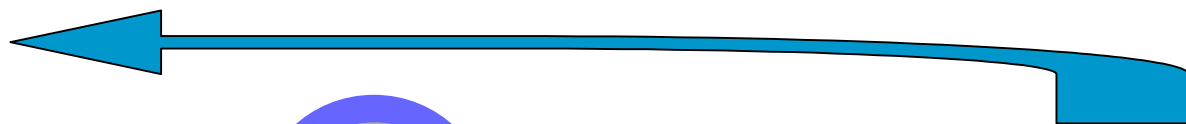
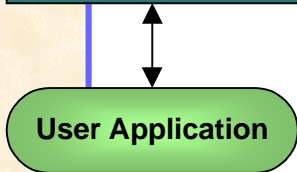
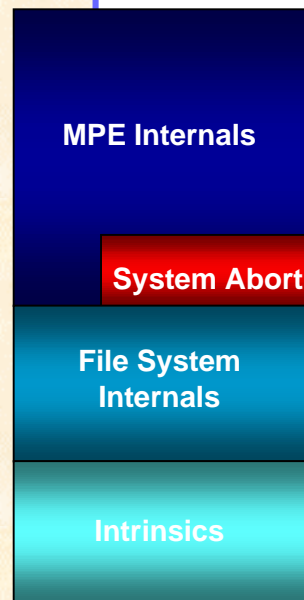


Development



SUBSYSTEM Dump

System Abort Strategy

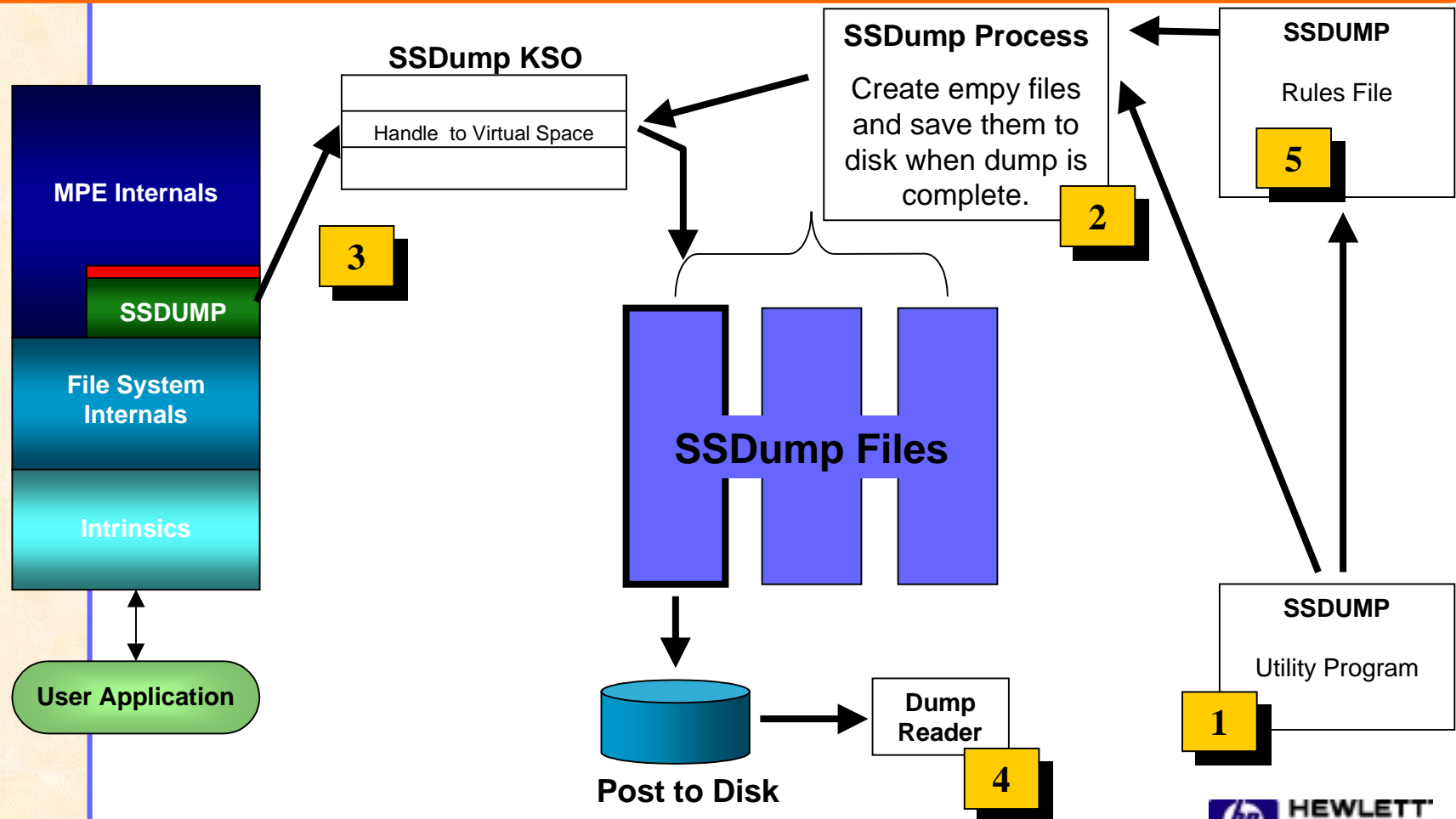


Reboot the System

H H P hp 1 2 hp H P ab



SUBSYSTEM Dump Design



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Taking a Closer Look at the ...



Hierarchy

**Storage Systems Cost
Data Availability**

**Additional
Fault Tolerant
Features**

Redundant Disks

Disk Arrays

**Disk Storage Systems
JBOD**

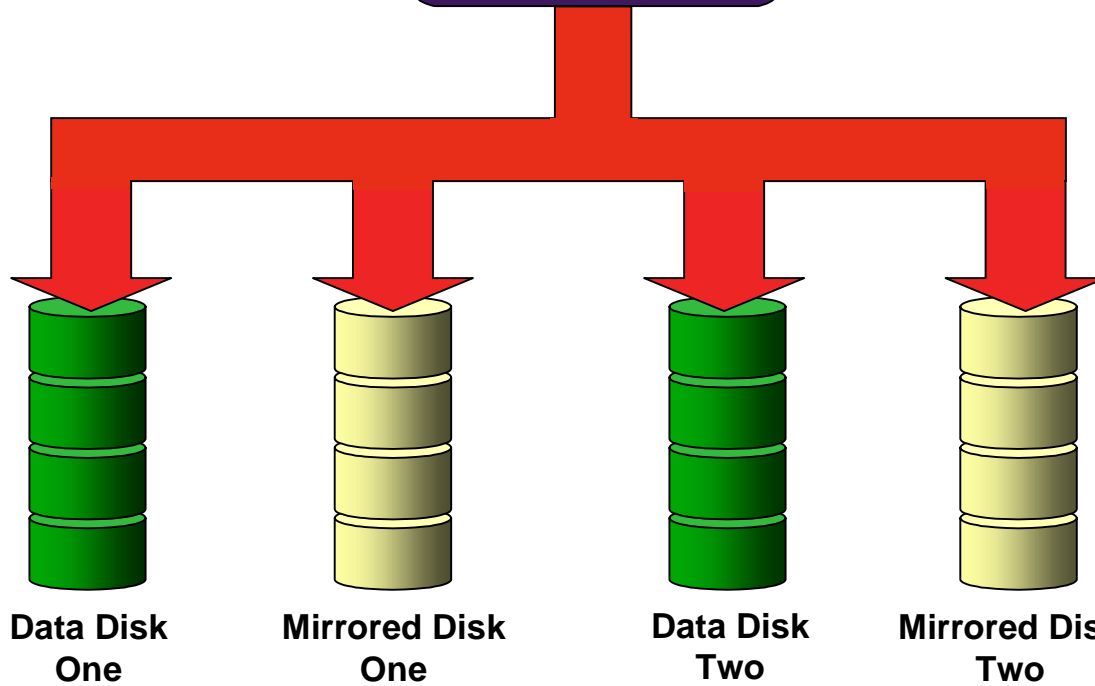


Mirrored Disk/IX

Host System

Pros: Fast

Cons: 50% disk capacity



Raid Level 0

Host System

Pros: Fast

Cons: No data protection

Disk Array Controller

16K Write

Four 4K Writes

Data Disk

Data Disk

Data Disk

Data Disk



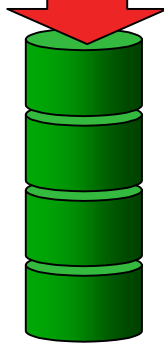
Raid Level 1

Host System

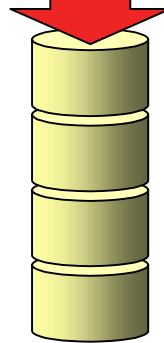
Pros: Fast

Cons: 50% disk capacity

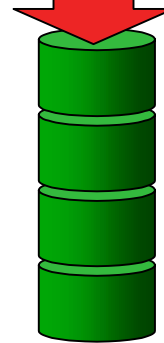
Disk Array Controller



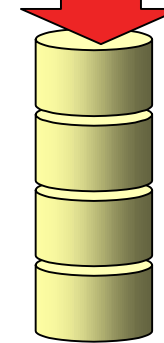
Data Disk One



Mirrored Disk One

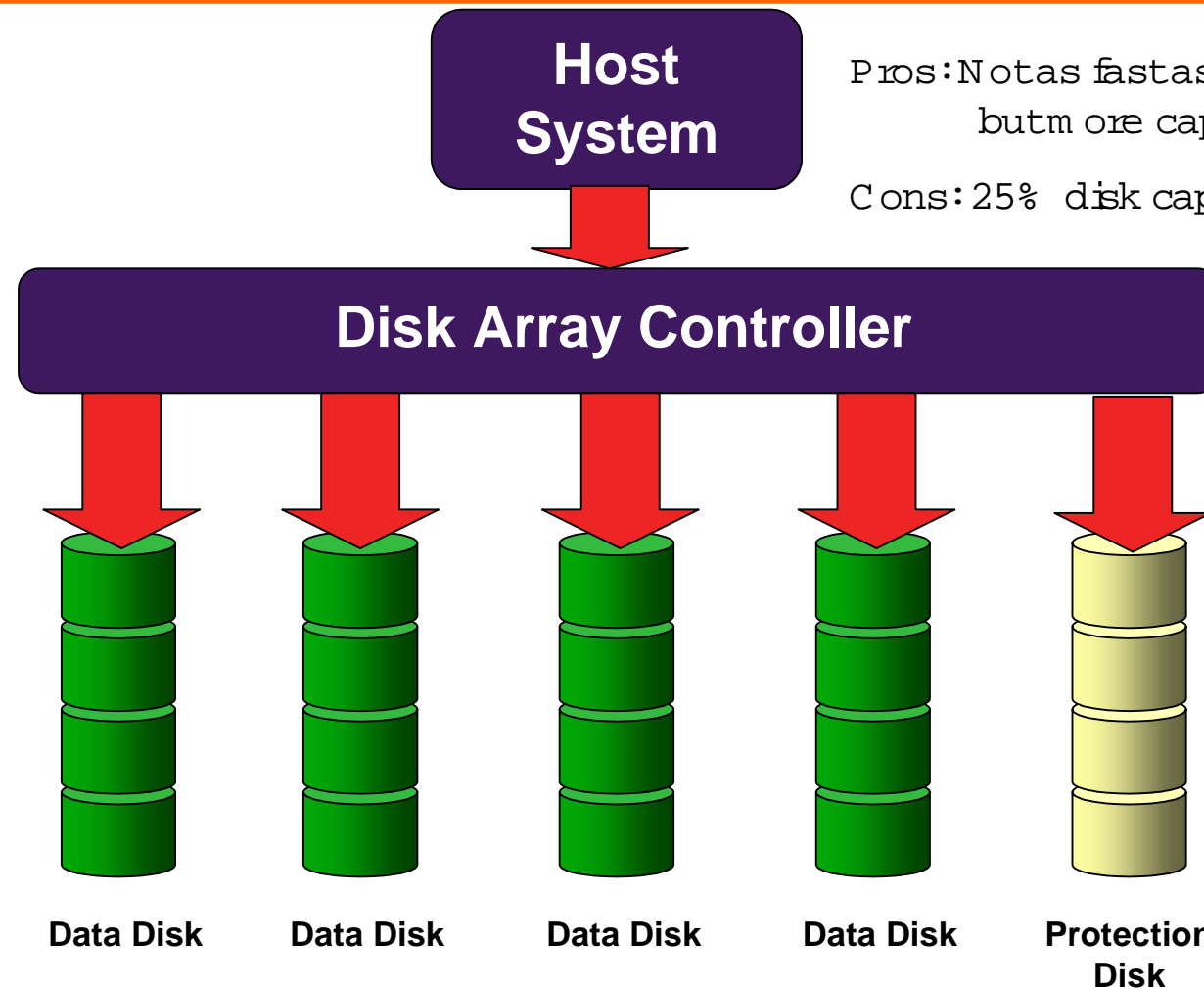


Data Disk Two



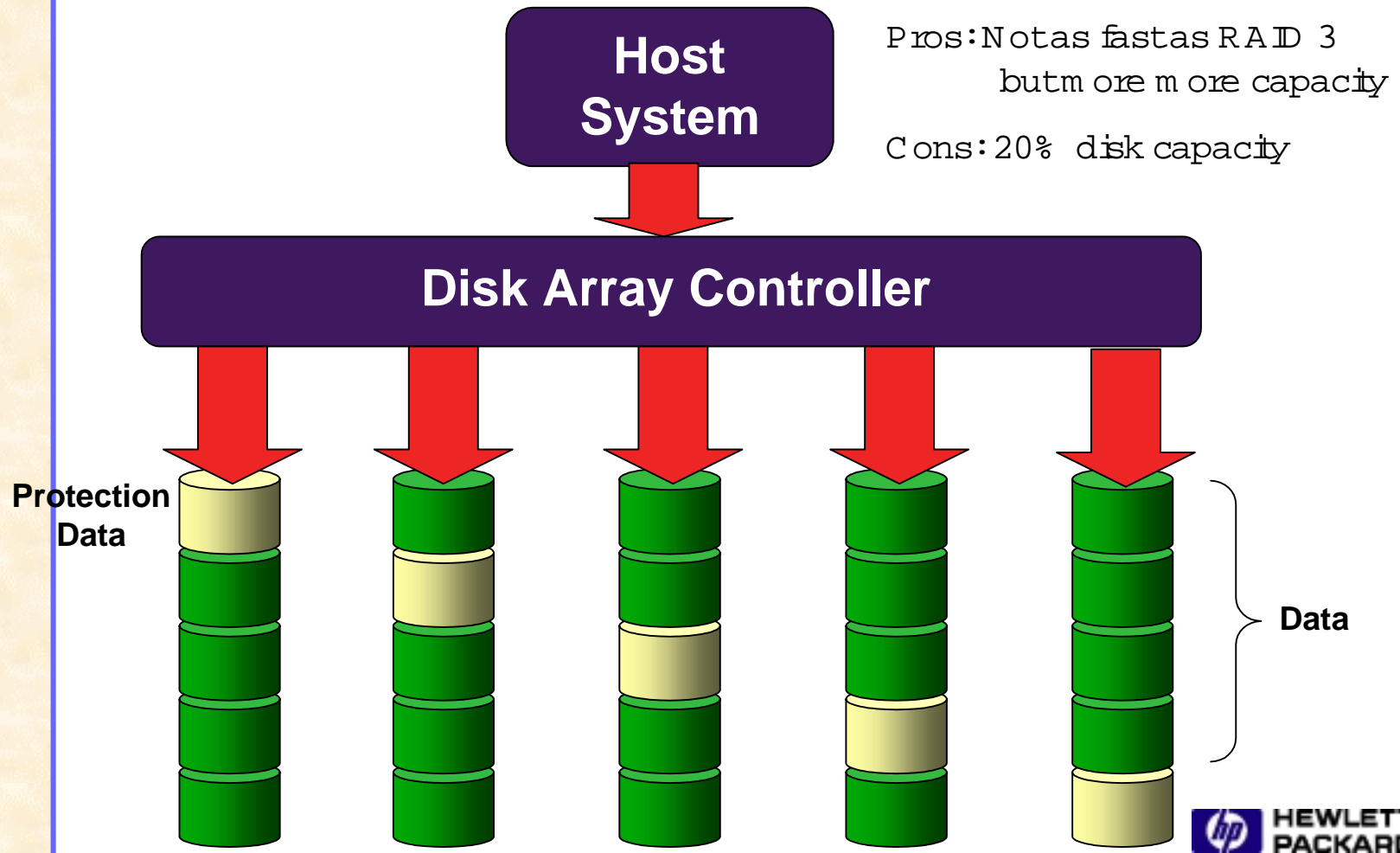
Mirrored Disk Two

Raid Level 13



Pros: Notas fastas RAID 1
but more capacity
Cons: 25% disk capacity

Raid Level 5

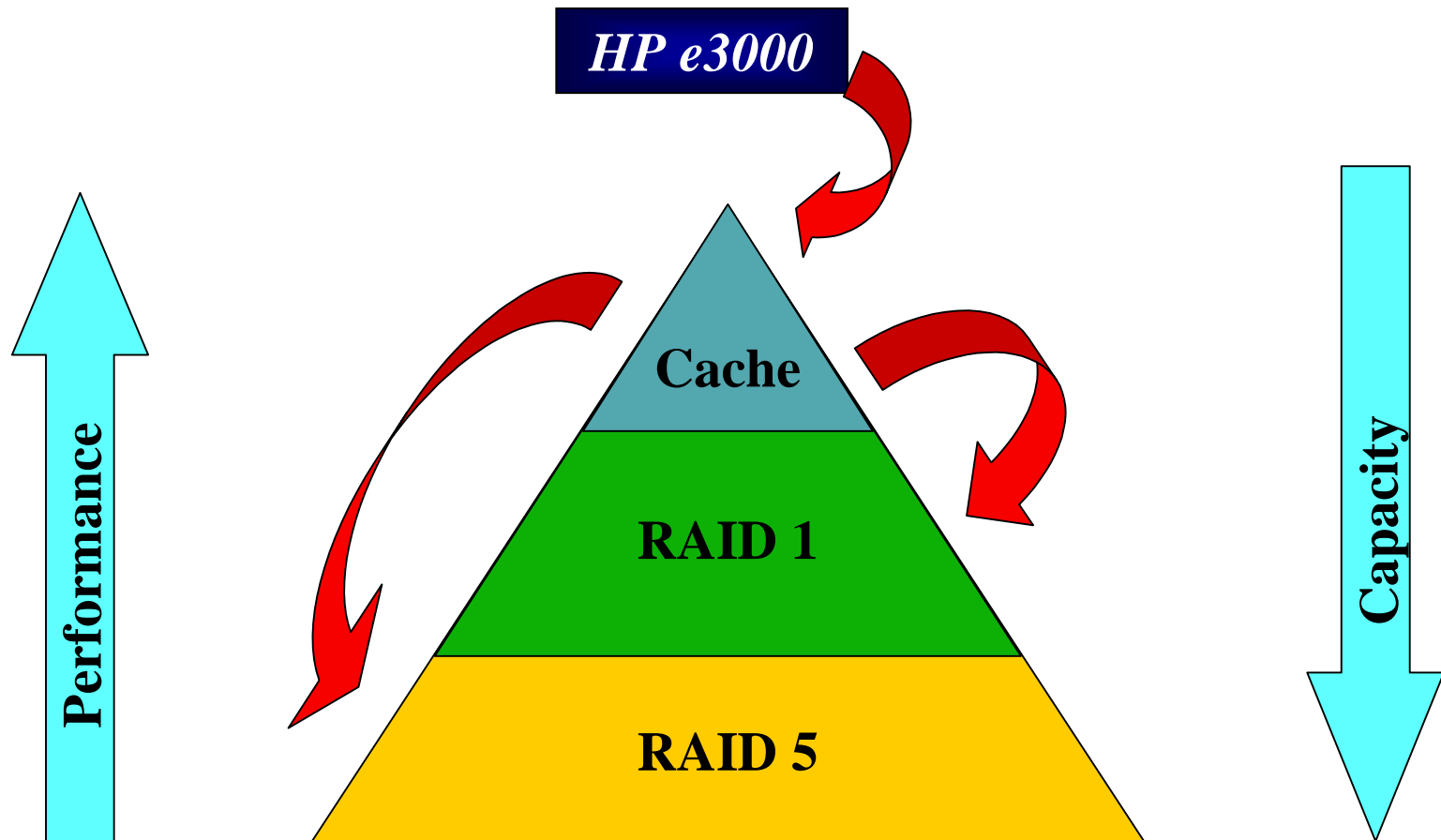


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HP SureStore E Disk Array 12H

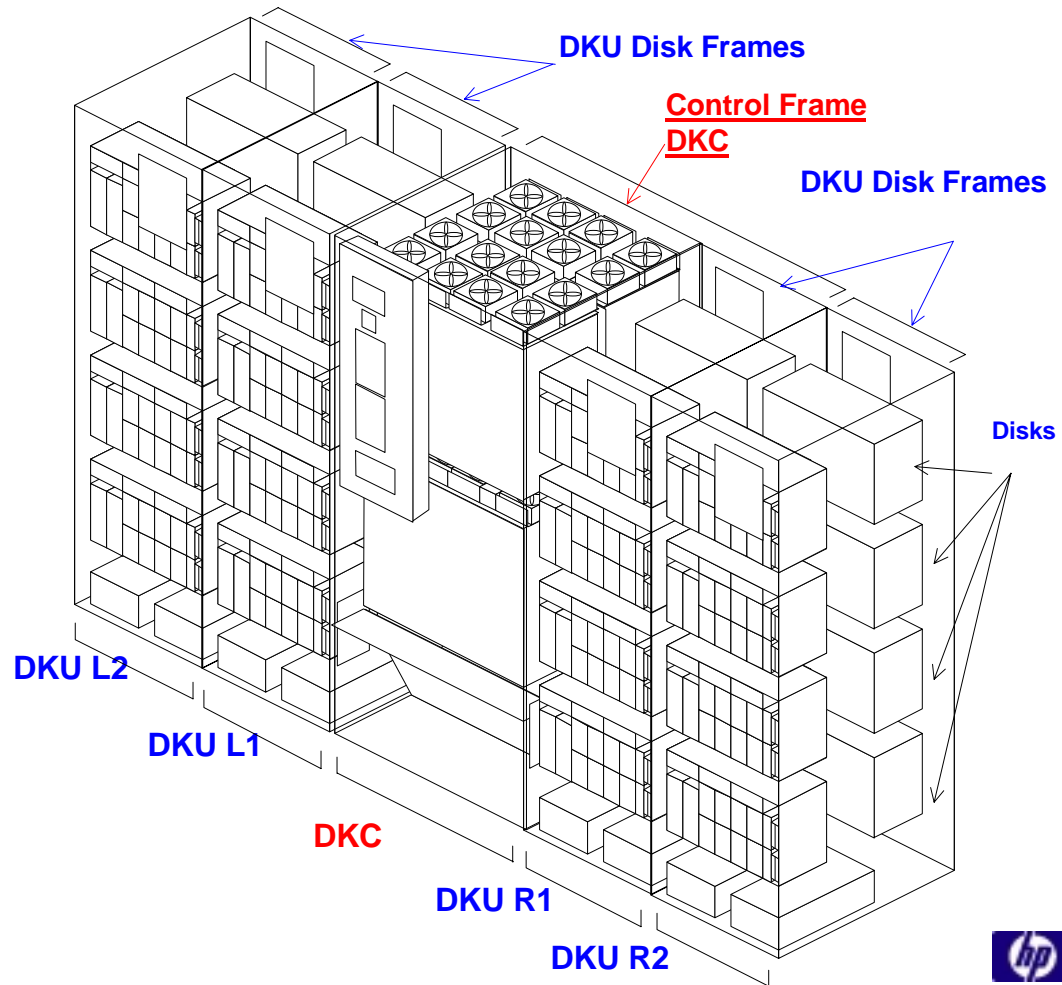


Performance Hierarchy

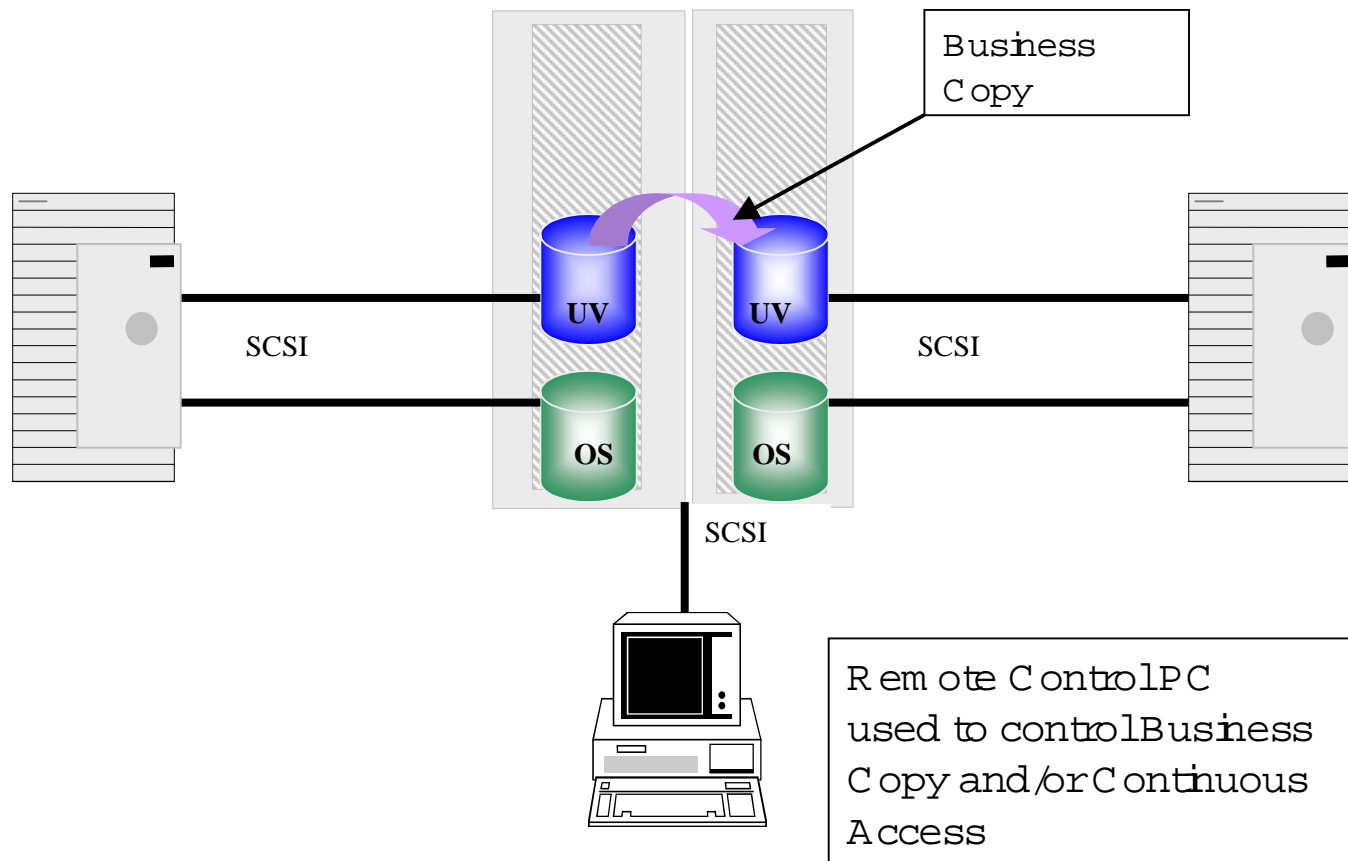


http://enterprisestorage.hp.com/products/disk_array/autoraaid/810163.pdf

XP 256 WireFrame



MPE/iX Business Copy XP



MPE/IX Continuous Access XP

