high availability

achieving high availability on the *hp e3000*

Walter McCullough
High Availability Architect
Commercial Systems Division

high availability

agenda

- did you know?
- what is the cost of downtime
- what is the cost of availability
- how to calculate risks
- Improving your availability
- enabling MPE/iX for SAN
- ClusterArX templates
- ClusterArX roadmap

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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 mailorder, credit union, California K-12 industries

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

*Populations > 100,000

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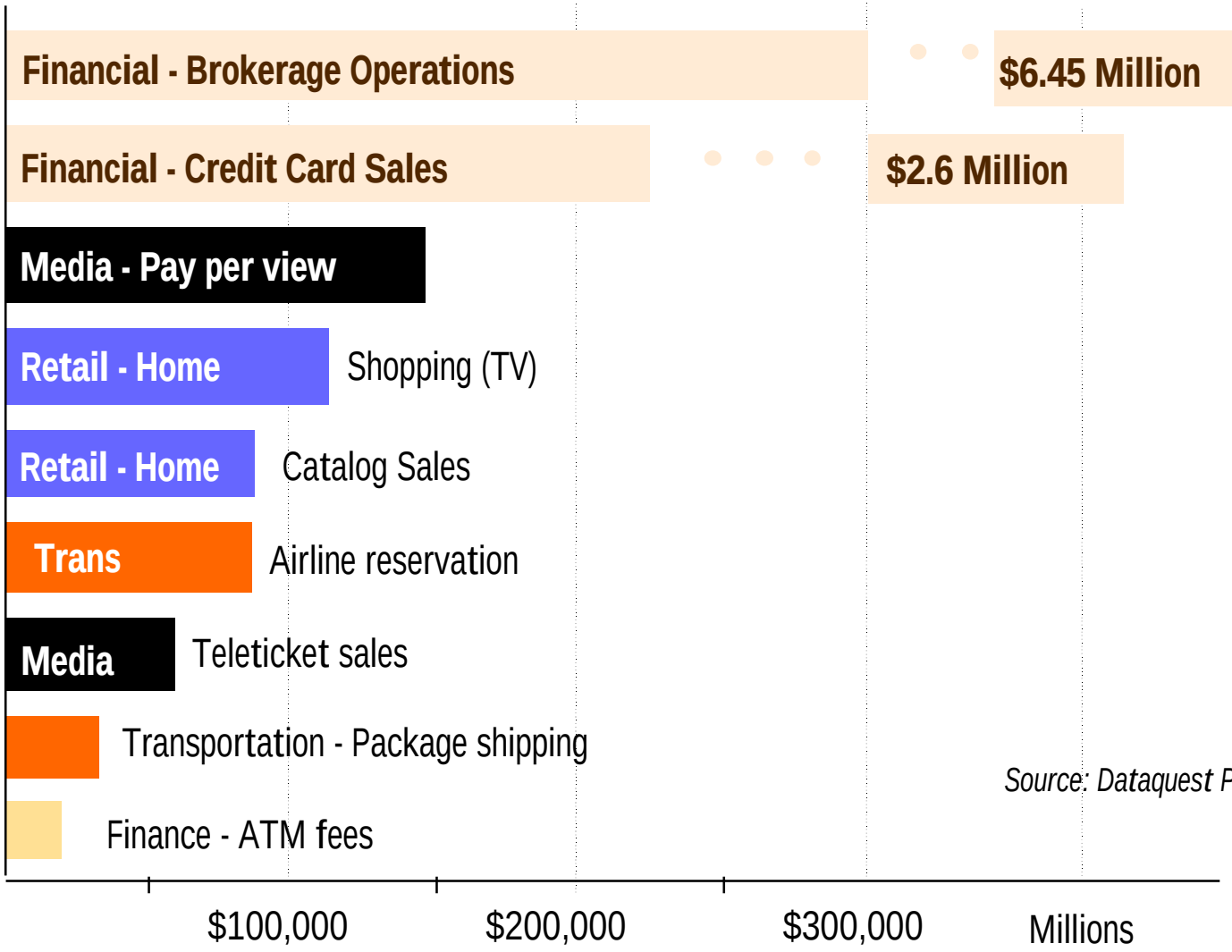
average cost per hour of downtime



Source: Dataquest Perspective, Sept. 1996

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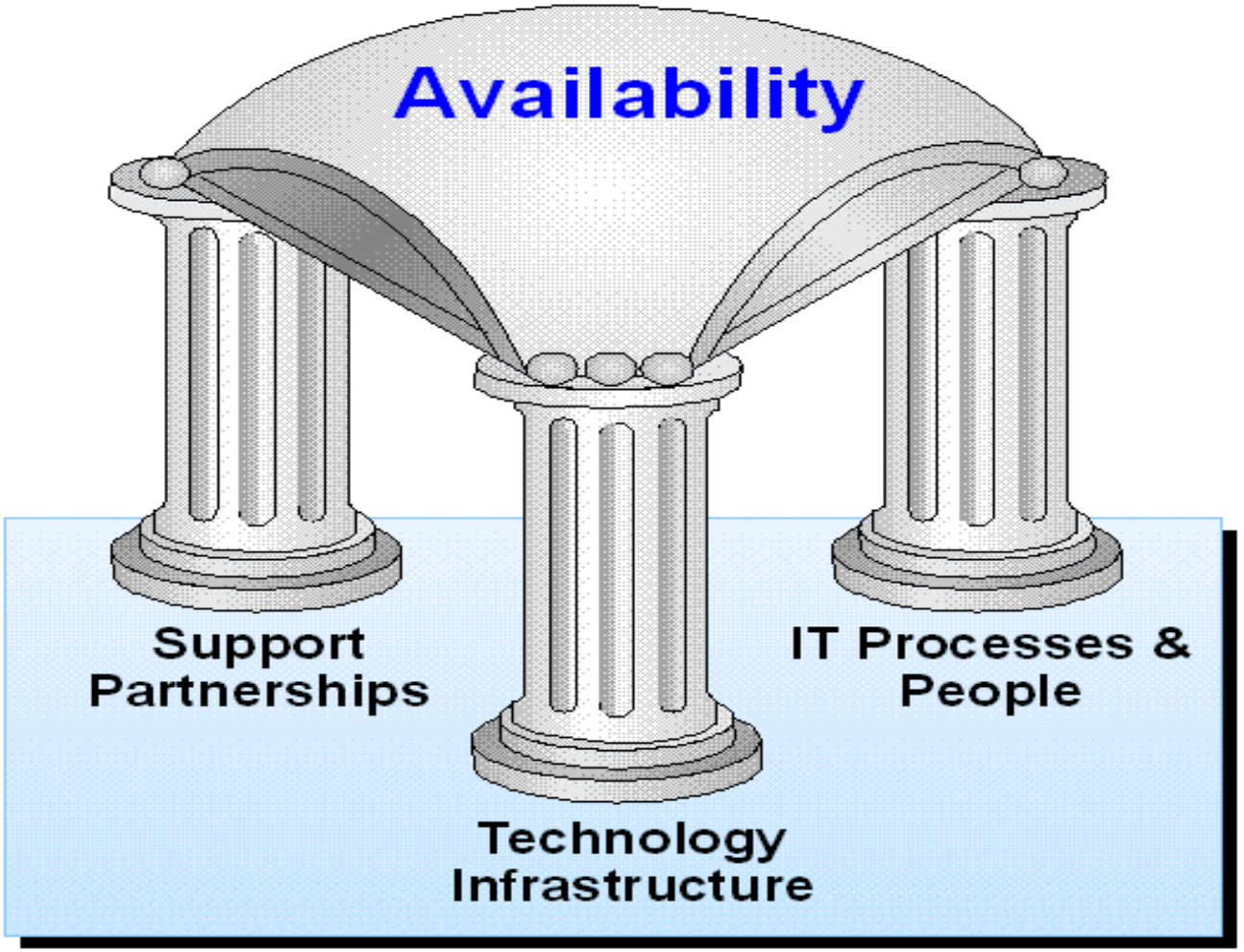
Availability Investments



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high availability strategy

Technology

- Understanding the problem and investing in the correct technology to address it

Process and Procedures

- Taking ownership of correct processes, procedures and training

Service and Support

- Make sure your business has the right level of support

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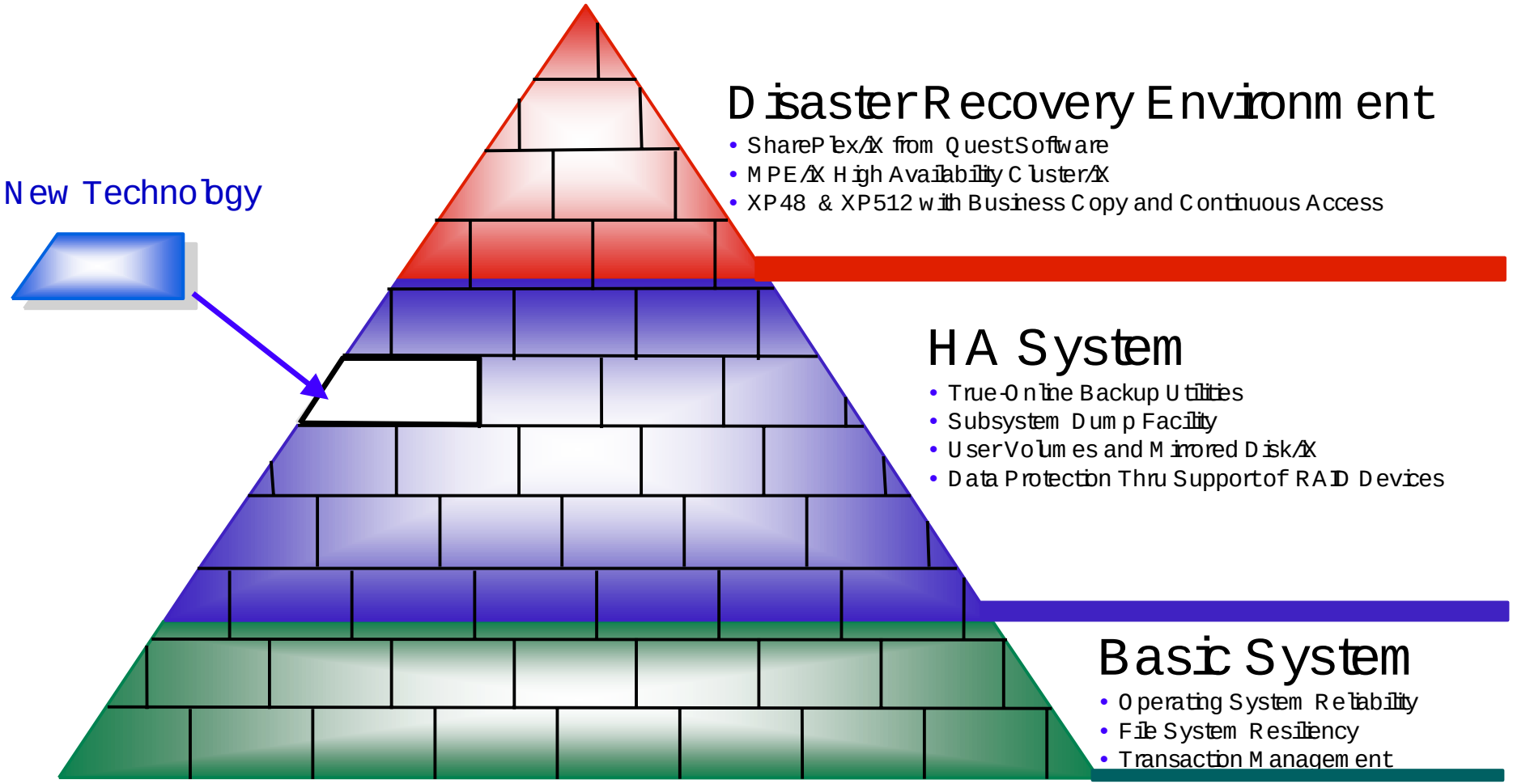
hp e3000 high availability pyramid



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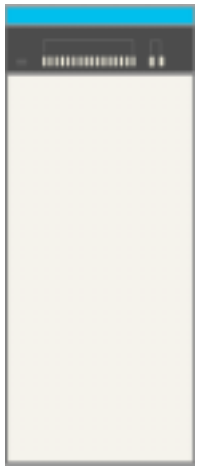
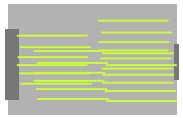
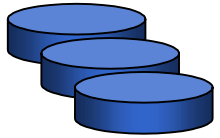
yesterday





JBOD



MTBF

1 per 5yrs

1 per 10yrs

3x (1 per 10yrs)

Impact: 20 users

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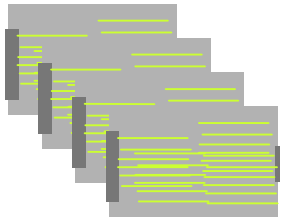
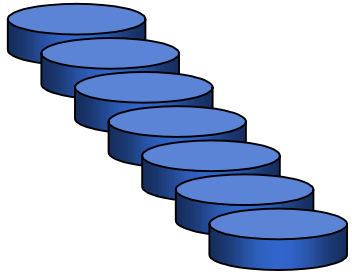
today

Calculate failure events





MTBF

1 per 10yrs

1 per 10yrs

50x (1 per 10yrs)

Impact: 200-500 users

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the numbers game

(events per year ^ redundancy) x number disks

= number of events likely to happen that year

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the numbers game

(events per year ^ redundancy) x number disks

= number of events likely to happen that year

(1/10)^1 no redundancy X 20 drives = 2 per year

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the numbers game

Each event is ½ day to get the CE out to replace the unit

Plus ½ to 1 day to rebad data

(1/10)^1 no redundancy X 20 drives = 2 per year

(1/10)^2 RAID 1 X 20 pair of drives = 1/5 per year

Or 1 event every 5 years

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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				

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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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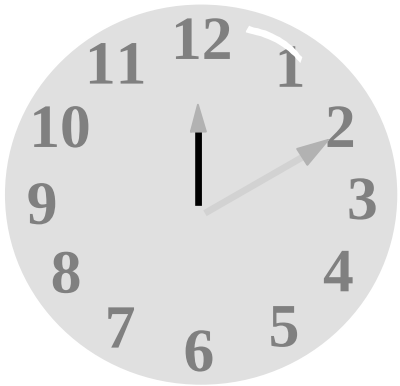
Do I need the next level?



- 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 next layer of availability.

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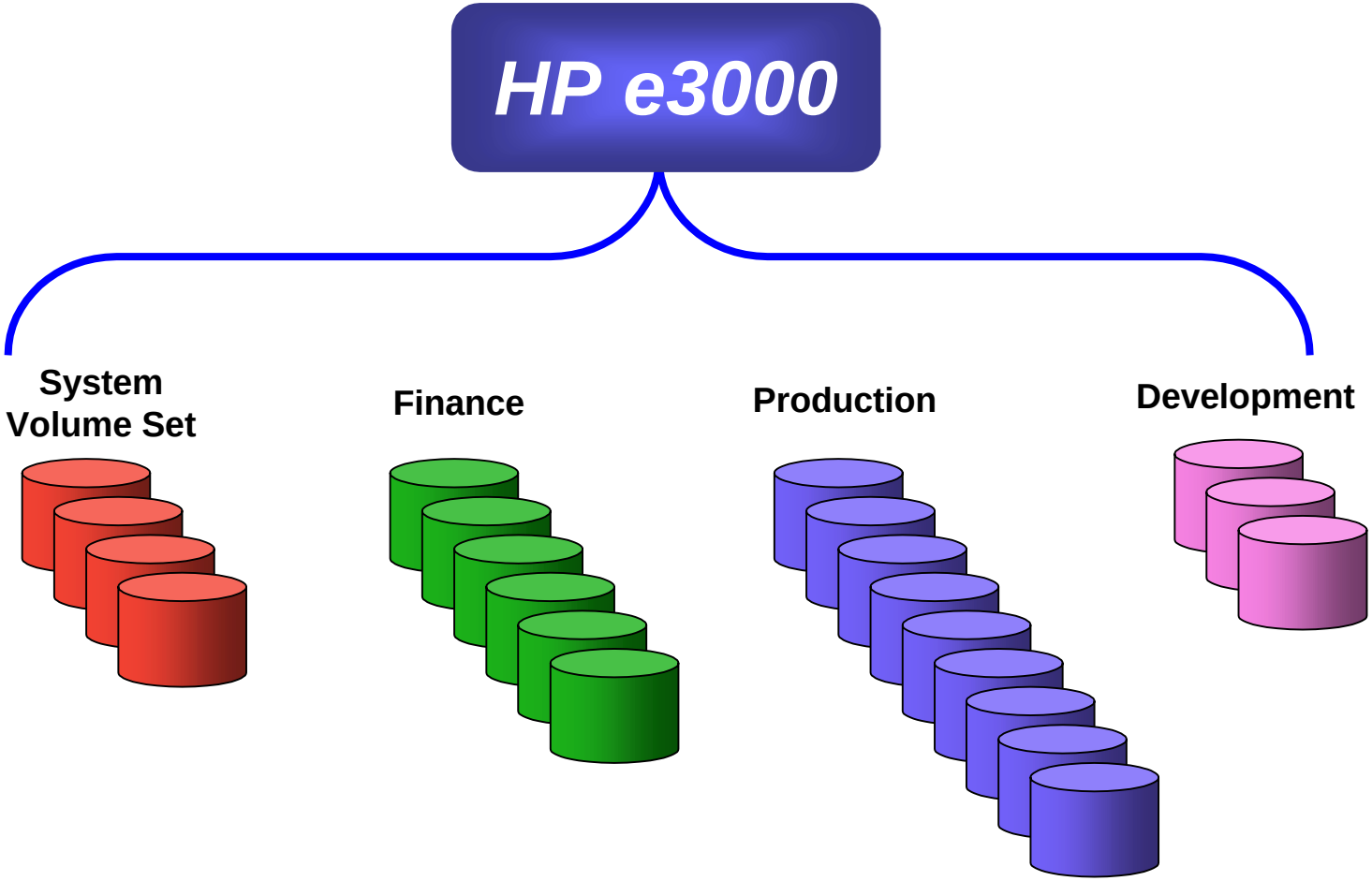
MPE/iX Volume Management



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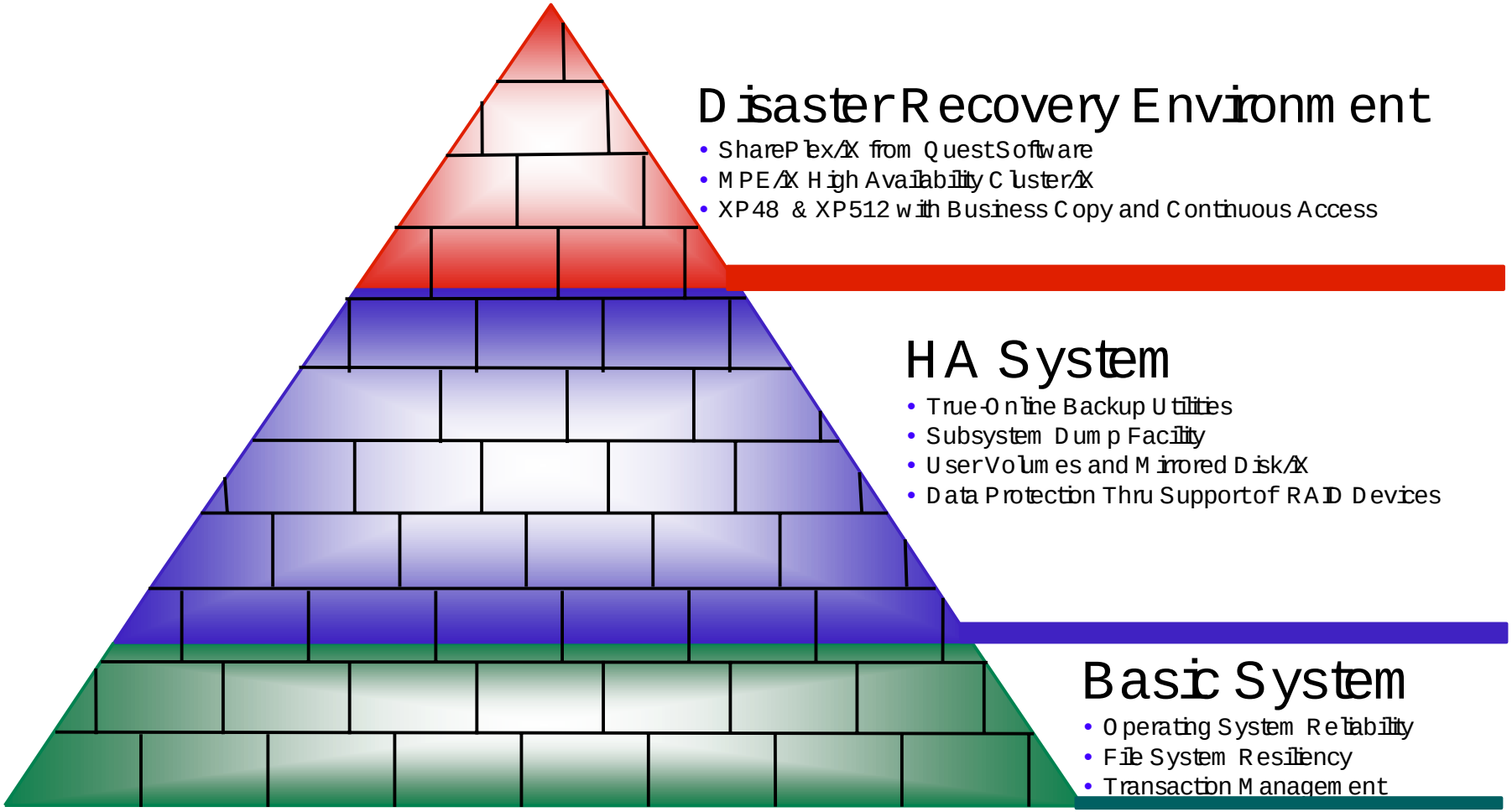
hp e3000 high availability pyramid



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Taking a Closer Look at the …

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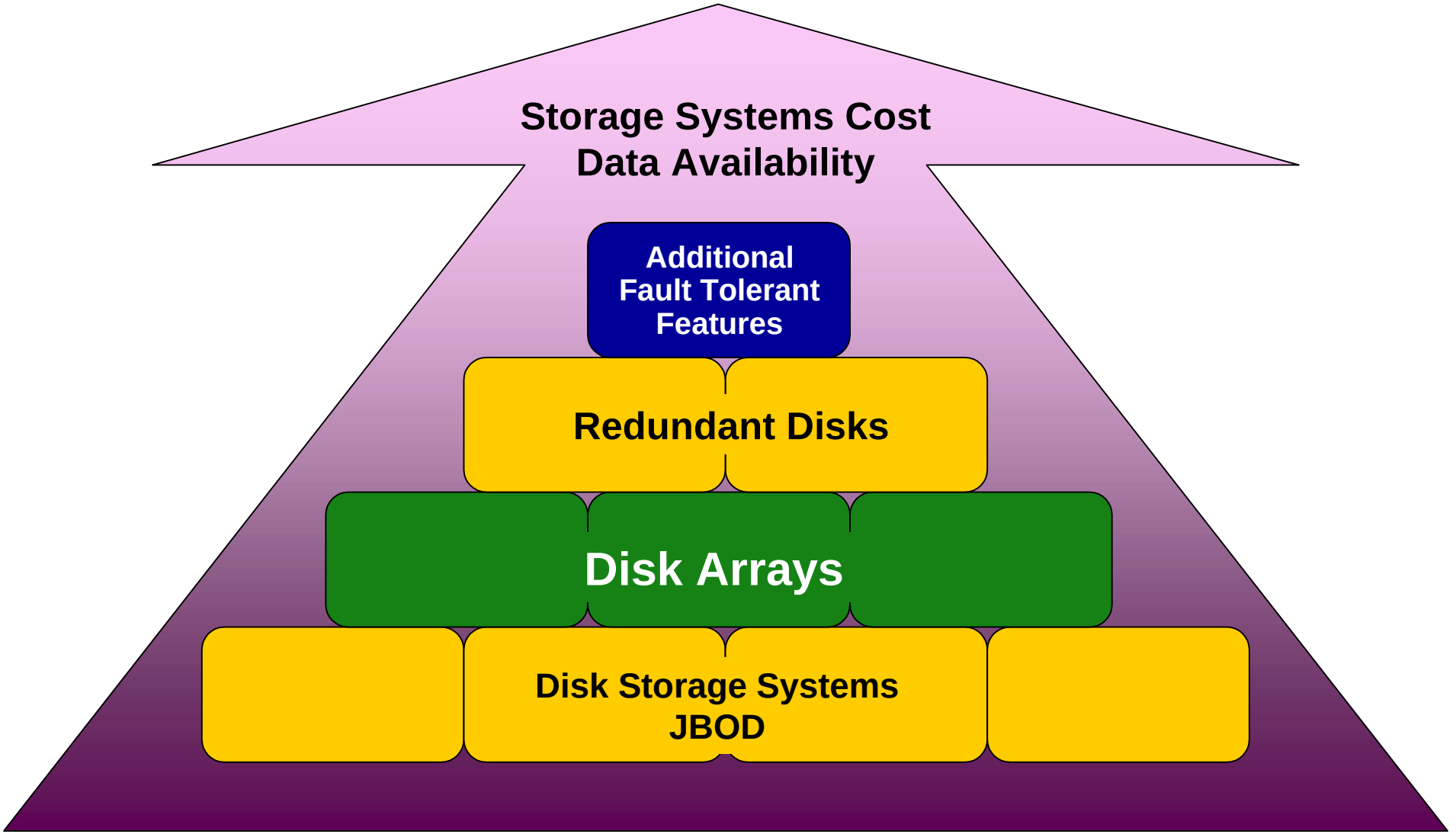
Hierarchy



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AutoRAID Replacement

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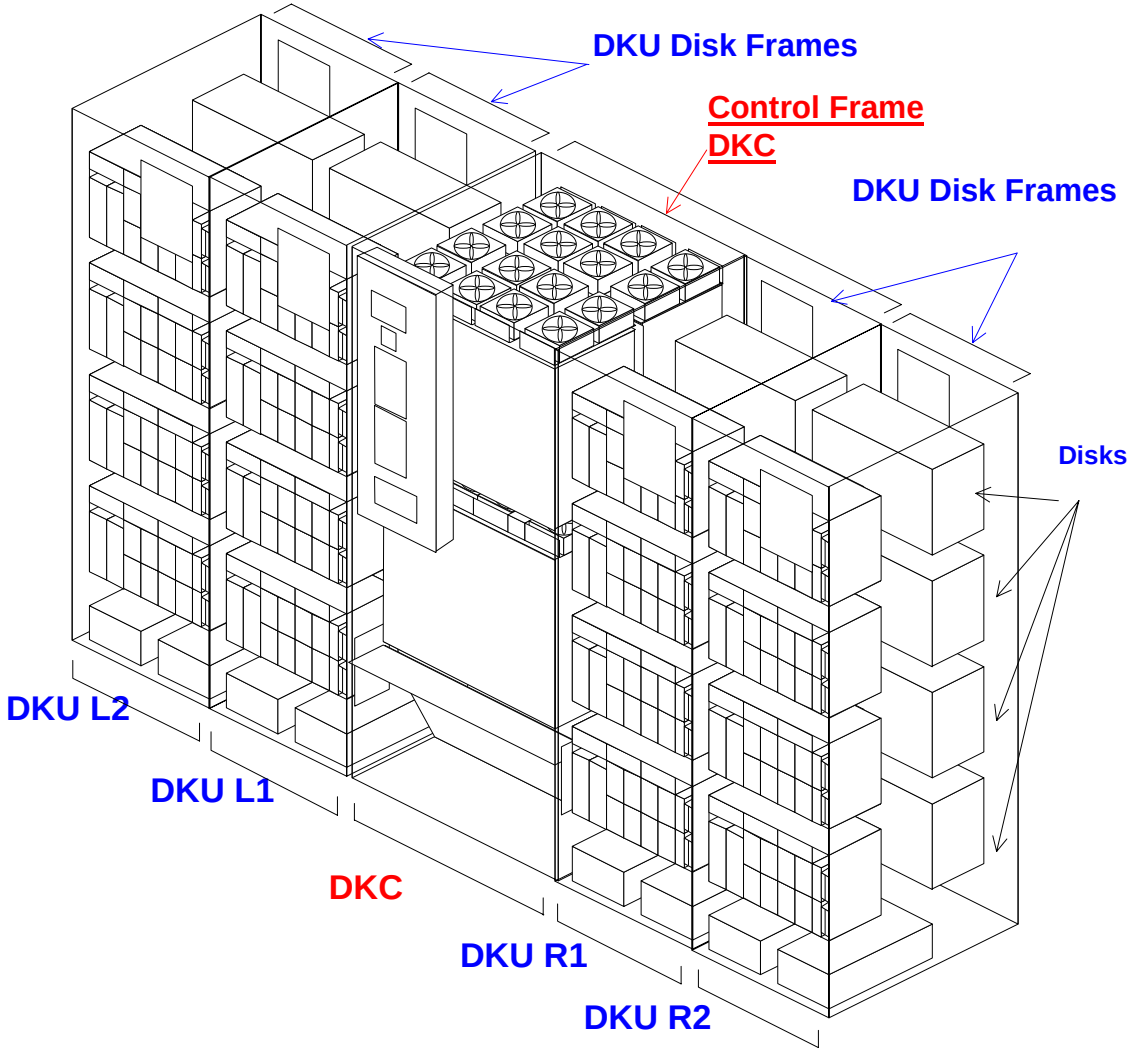
XP256 and XP512 WireFrame



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XP48 and XP512 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
  Host based control thru XP RAID Mgr
- **Support**
  The XP256 cabinet is configured to "phone home" when errors are detected. HP will then contact the customer, fix the problem online or dispatch a CE.

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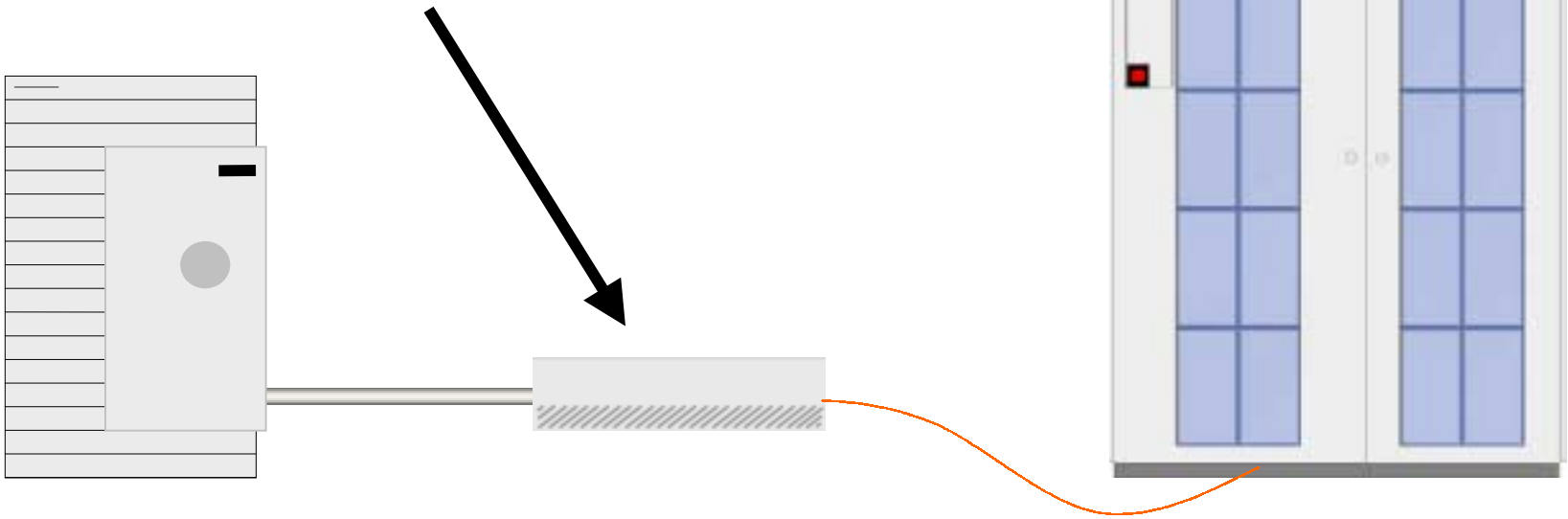
FC Connectivity Strategy Uses SCSI-FC Router



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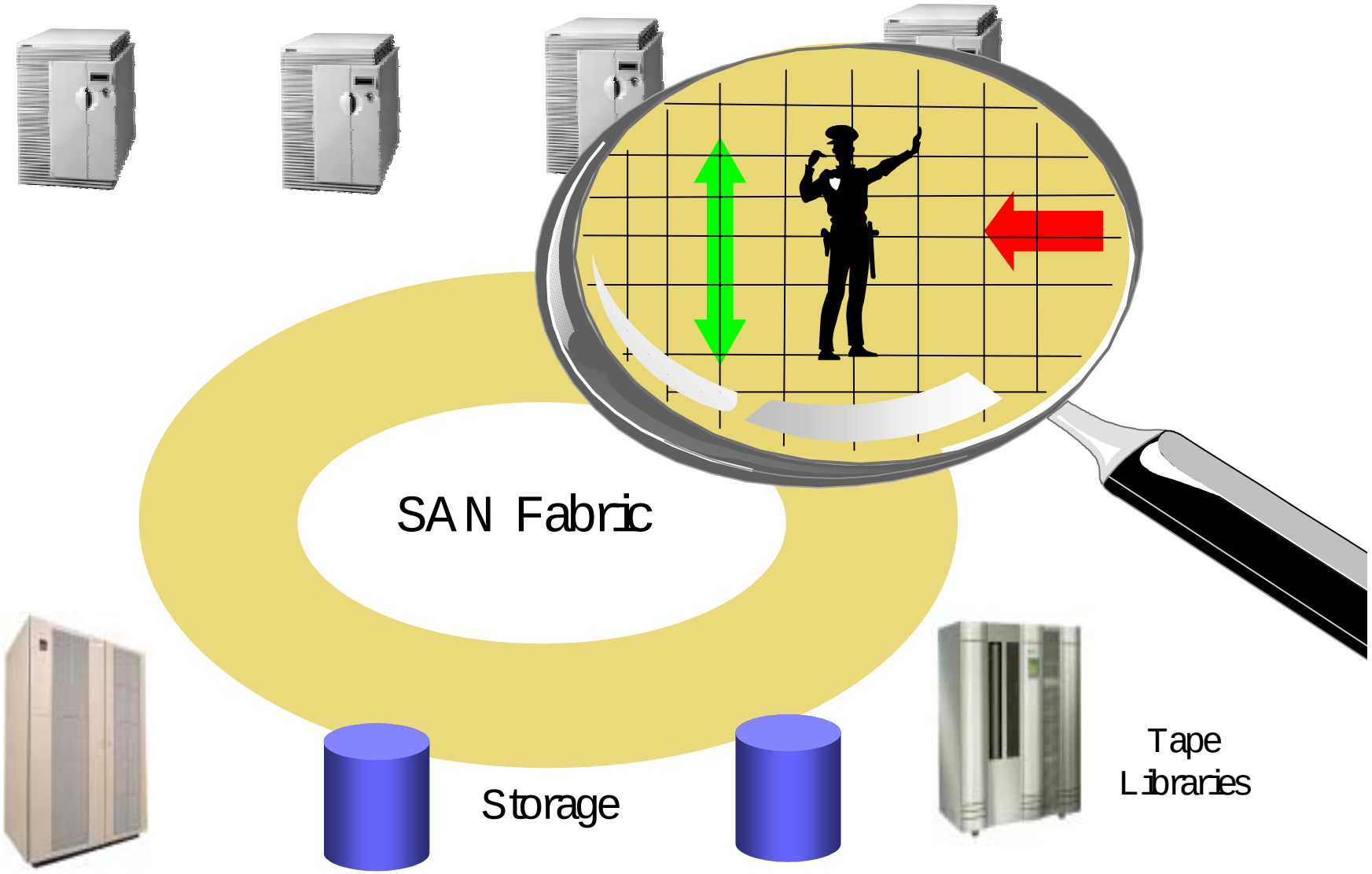
FC SAN Fabric



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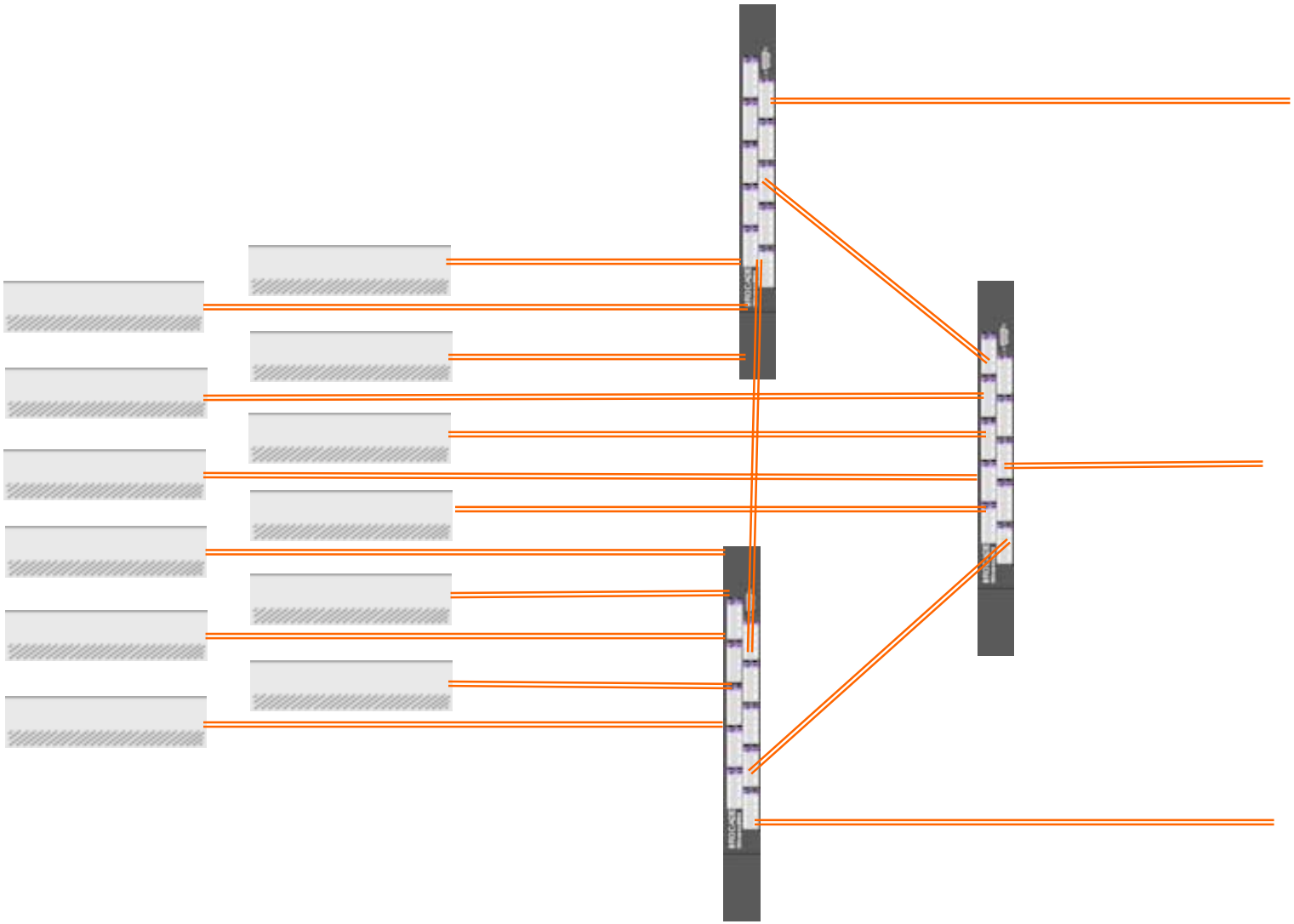
Another View of a fabric using Routers and Switches



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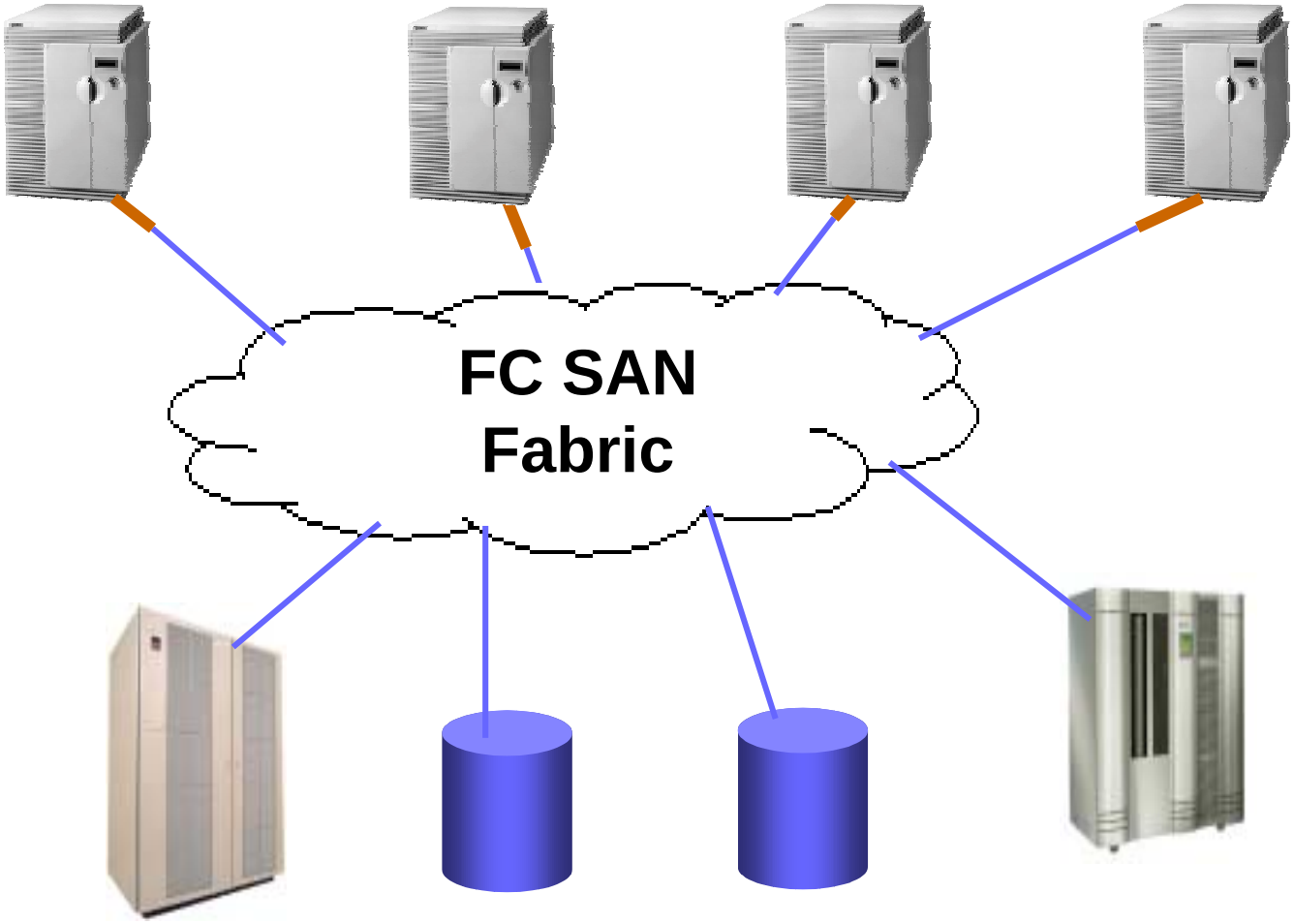
Cloud Concept



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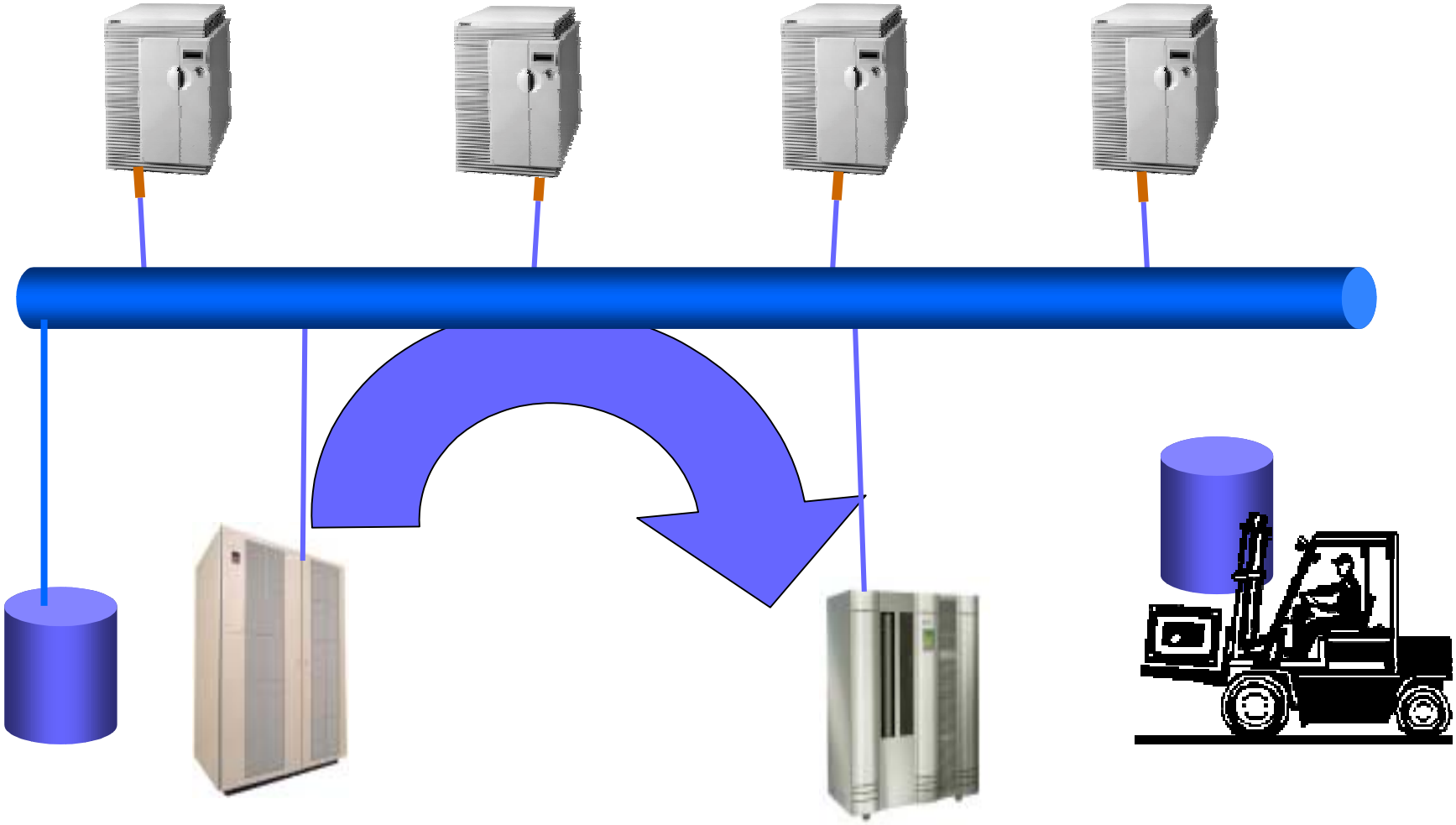
Fatpipe concept



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Taking a Closer Look at the …

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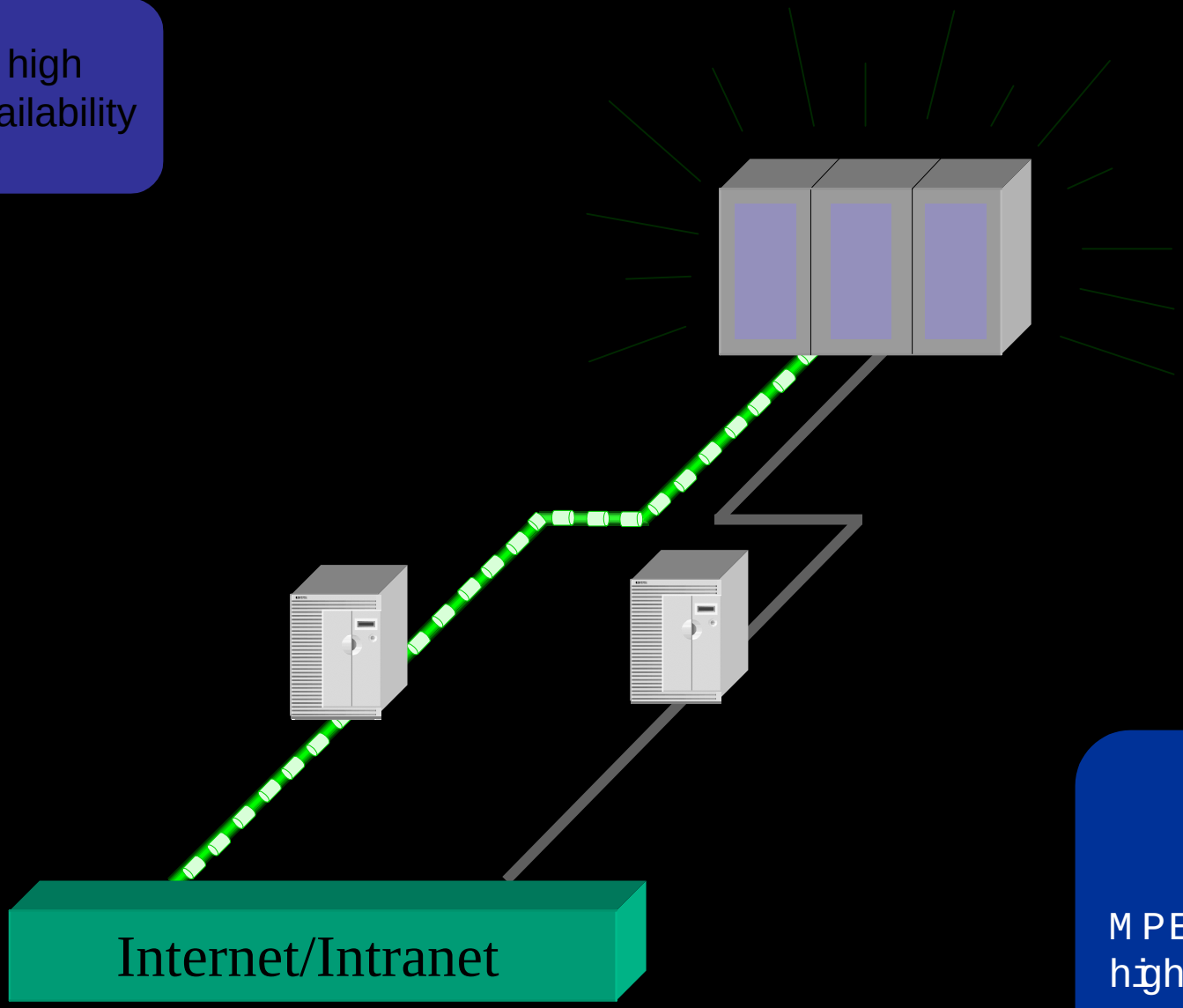
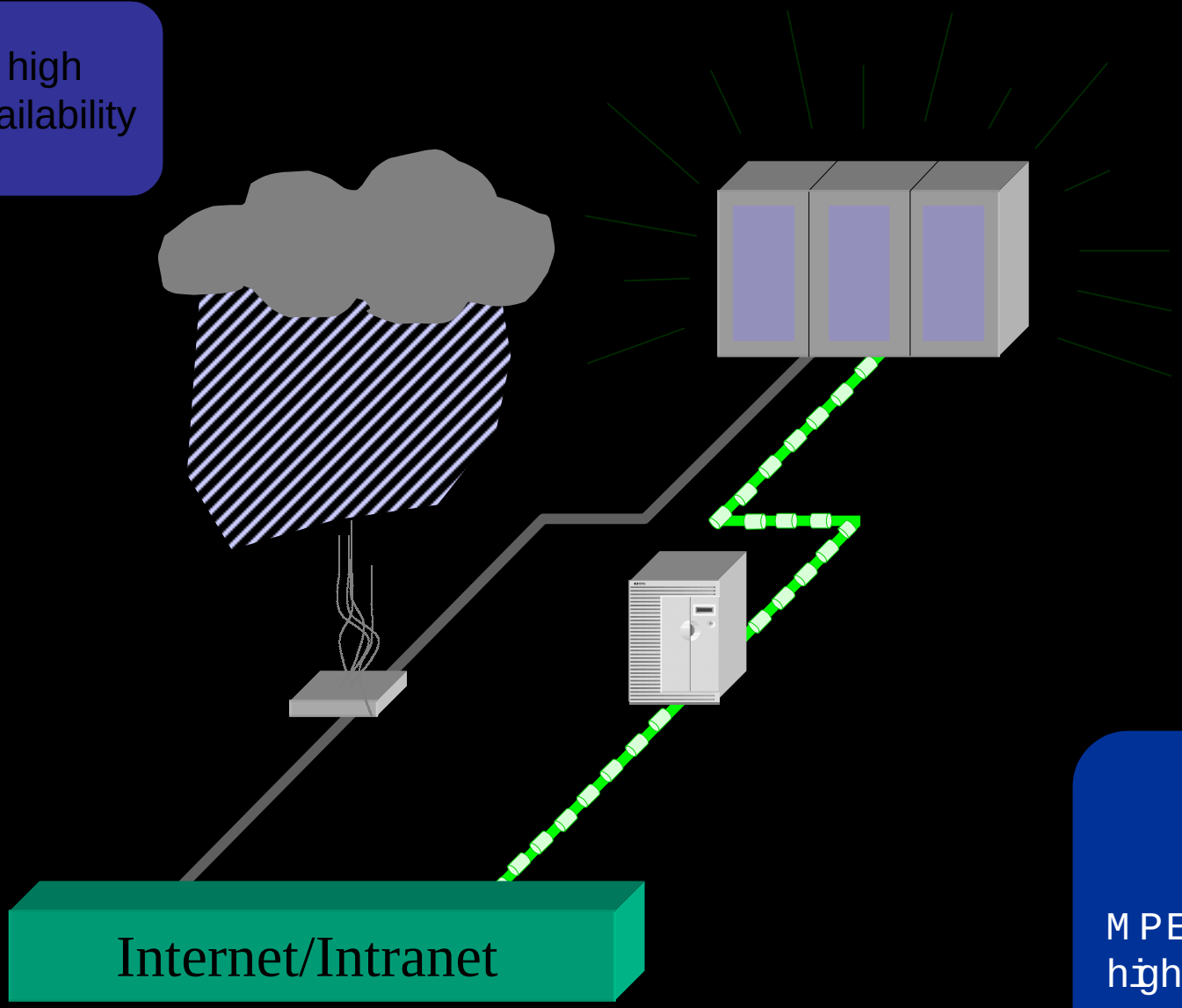


MPE/iX
high availability cluster

high availability



MPE/iX high availability cluster

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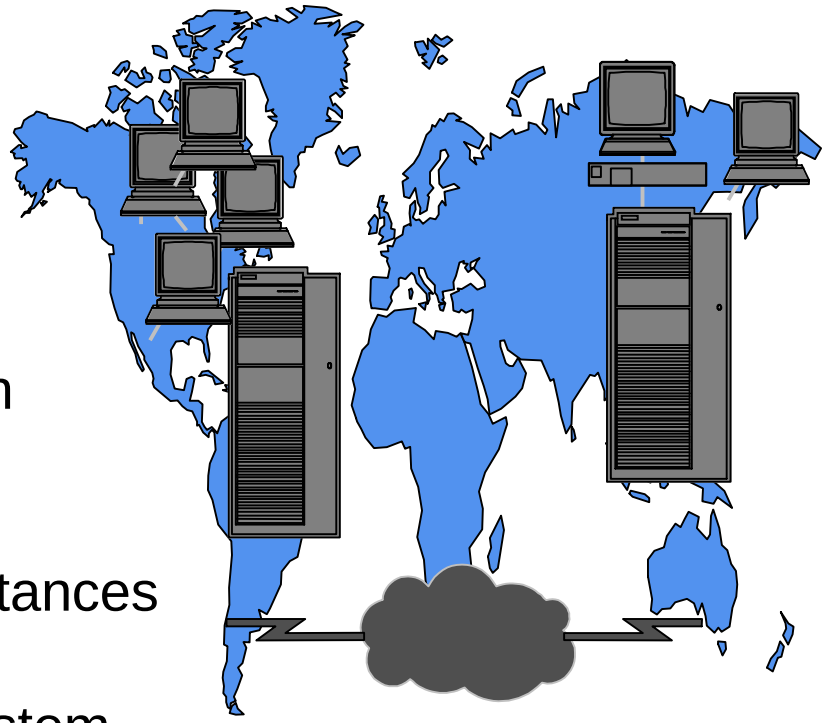
Disaster Tolerant System

- 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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Disaster Tolerant System Features (Software)

Disaster Tolerance, 7x24

- SharePlex/X-NetBase Bundle

  Shadowing (IMAGE/SQL, ALLBASE/SQL*, flatfile, KSAM)
  Network File Access (NFA)
  NB Spool
  AutoRPM
  Statistics

- SharePlex/X-NetBase Shadowing

  Shadowing (IMAGE/SQL, flatfile, and KSAM)

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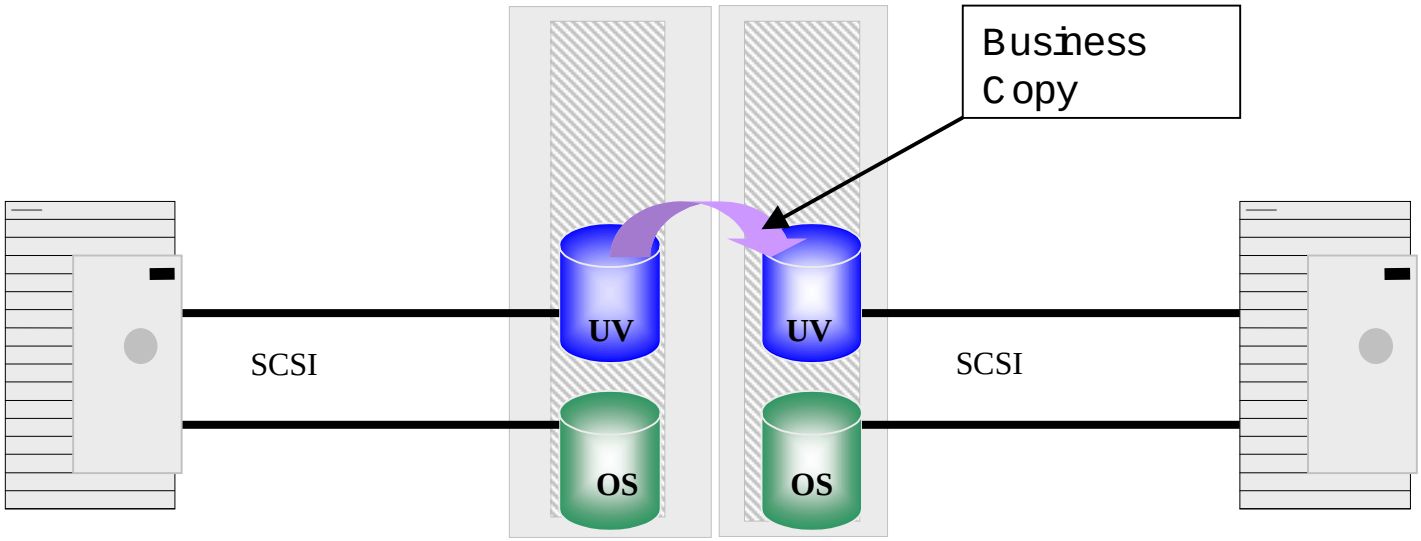
MPE/iX Business Copy XP



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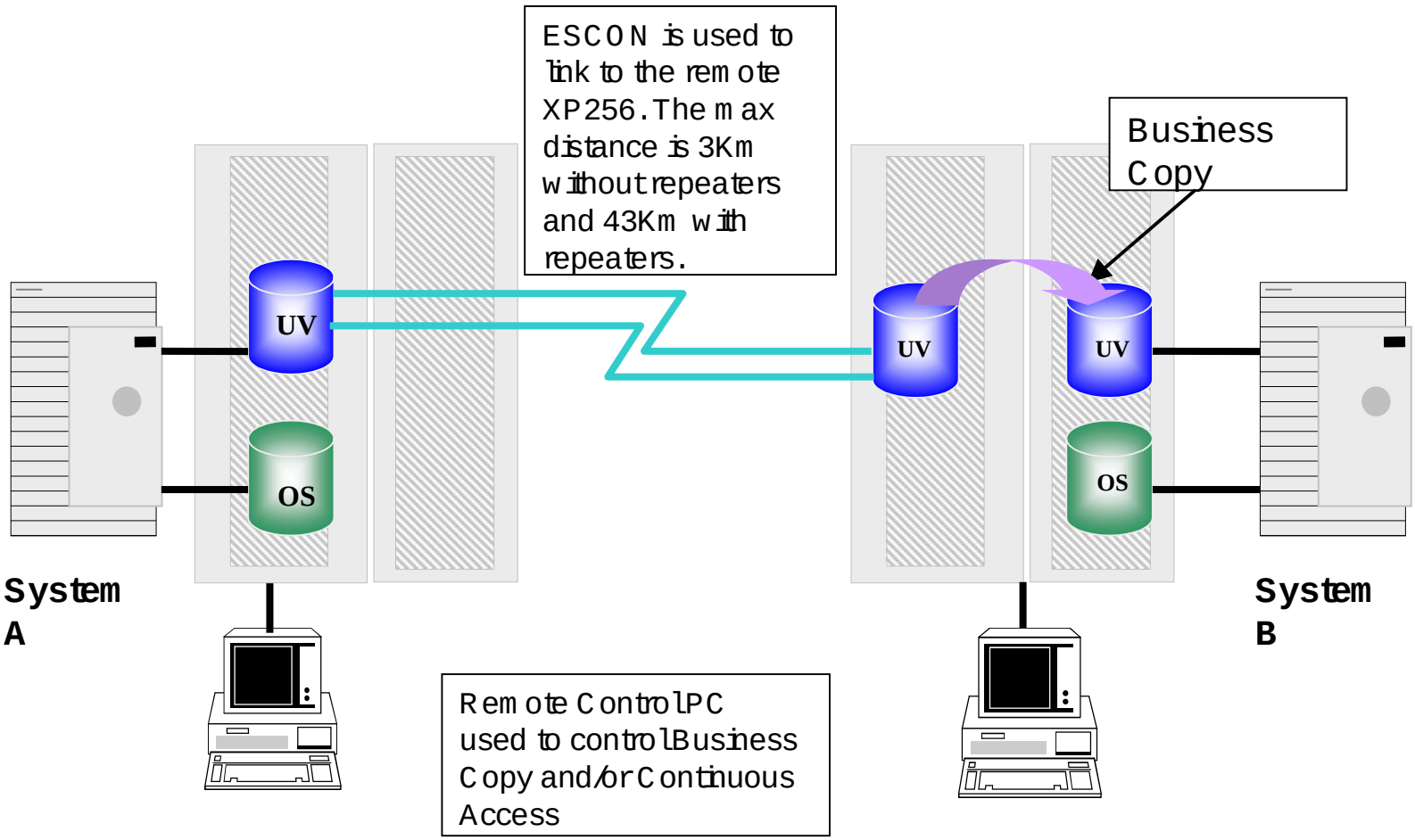
MPE/iX Continuous Access XP



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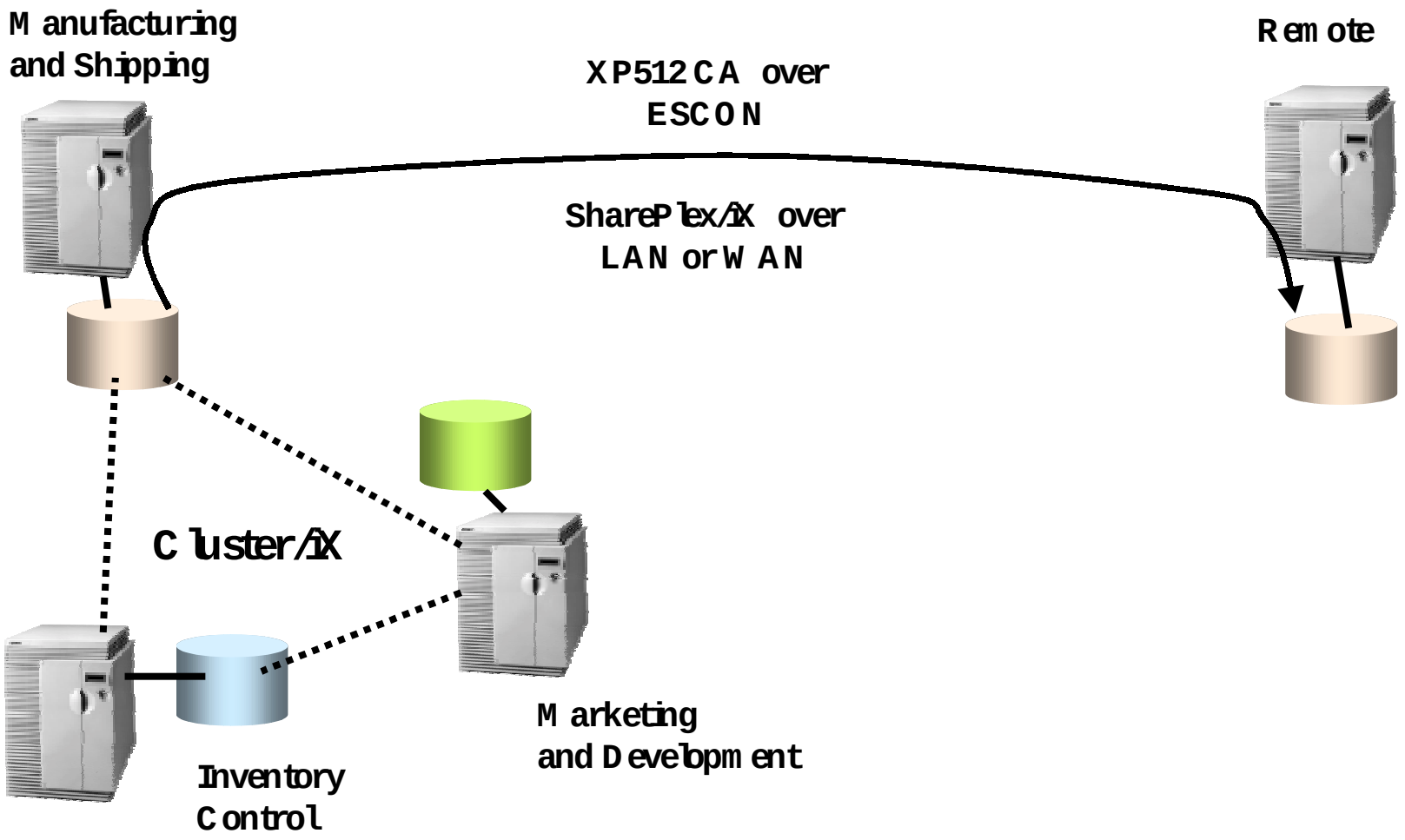
ClusterXL Templates



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