

# **HP StorageWorks Disk Array XP1024 Heterogeneous SAN Solution**

**Edwin Alabastro**

Systems / Software Engineer  
Hewlett-Packard Company



# Agenda

- Introduction
- Part 1: The StorageWorks Disk Array XP1024
- Part 2: Storage Area Network (SAN) Essentials
- Part 3: SAN Heterogeneous Essentials
- Part 4: Backup and Recovery
- Part 5: High Availability Solutions
- Part 6: SAN Maintenance
- Part 7: Question and Answer Session

# Introduction

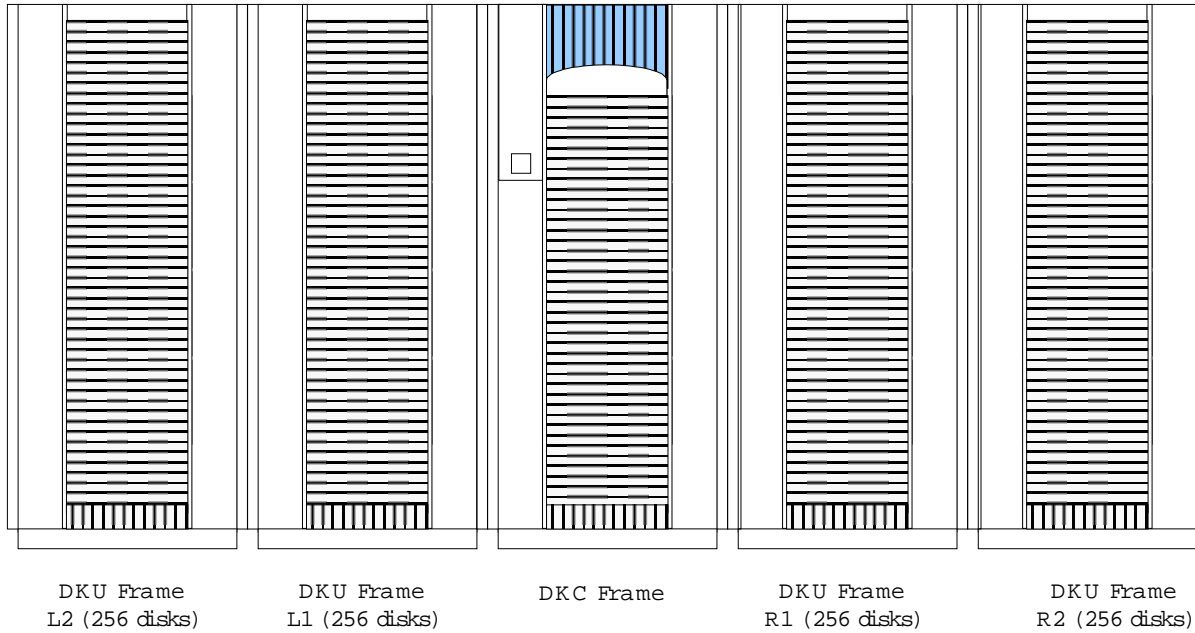
- Industry work experience
- Reasons for presentation
- Audience expectations

# Part 1: The storageworks disk array xp1024



- XP1024 Array
- Specifications
- Features
- CHIP (Client Host Interface Processor) Cards

# XP1024 array



# Specifications

Maximum number of disk drives	1,024
Maximum capacity	129 TB
Maximum cache memory	64 GB
Maximum shared memory	3 GB
Maximum host connectivity ports	64
Maximum number of Array Control Processor (ACP) pairs	4 (8 total)
Host interface cards	Maximum of 32 per subsystem: 32 ESCON cards or 32 FICON cards or 64 Fibre Channel cards
ESCON data transfer rate	17 MB/s
FICON data transfer rate	2 GB/s
Fibre Channel data transfer rate	2 GB/s
Sustained maximum sequential data transfer rate	2 GB/s
Peak cache maximum sequential data transfer rate	3.2 GB/s
Maximum random IO per sec	500 K
Supported disk drives	36 Gb 15K rpm, 73 Gb 10K rpm
RAID Level	RAID 5 / RAID 1
Cache memory battery backup time	48 hours
Shared memory battery backup time	7 days
Supported operating systems	HP-UX, Solaris, AIX, Linux, Win NT/2000, Tru64, etc.

# Features

- Fully redundant components, no single point of failure
  
- Large cache and shared memory
  - 64 GB mirrored cache memory (minimum 4 Gb)
  - Dynamically duplexed cache with battery backup
  - 3 GB shared memory
  
- Crossbar switch architecture
  - Fast, efficient with point-to-point connections

# Features continued

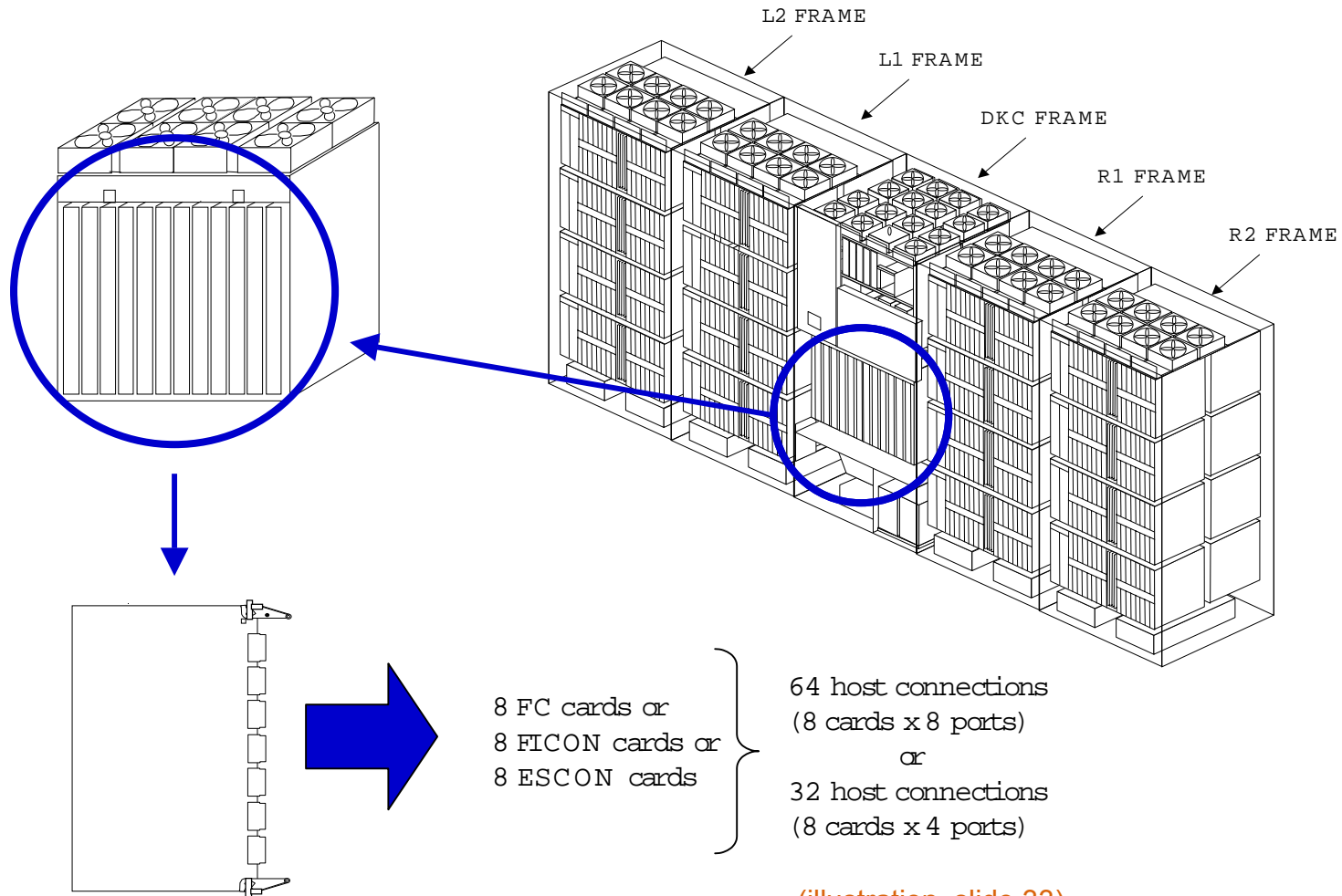
- Disk Capacity and Support
  - From 144 GB to 129 TB capacity
  - 1024 drives supported
  - Disk drives are dual ported native FC-AL
  - 64 FC-AL loops (2 GB/s)
  - Denser disk drive packaging - 256 disk drive packaging per DKU
  - Denser data center packaging – 1024 disk drives in a four DKU package



# Features continued

- New RAID Support
  - RAID 1 (4D + 4D)
  - RAID 5 (7D + 1P)

# Client host interface processor cards



(illustration, slide 33)

# Part 2: Storage area network essentials



- Must be robust and reliable
- Must be able to support different types of operating systems (OS), i.e., heterogeneous hosts
- Must be secure
- Must guarantee data protection
- Must be scaleable

# Robustness and reliability

- Use H/W and S/W components from vendors that formed partnerships or worked together to qualify the products
- The SAN infrastructure must be able to withstand localized server H/W or S/W anomalies ([illustration, slide 33](#))
- Pay close attention to ASCII standards that are vendor unique because it might cause inter-operability issues, e.g., inter-switch communication problem
- Must be able to reliably backup the data from different operating system
- Continuous data availability - 7x24x365

# Heterogeneous environment

- Supports different operating systems:
  - AIX
  - HP-UX
  - Solaris
  - Tru64
  - Windows NT / 2000
  - etc.
  
- Supports different protocols:
  - Fibre Channel
  - ESCON
  - FICON

# Security and data protection

- Must be able to secure data within the SAN (using World Wide Name LUN security)
- Must be able to ensure different hosts do not have access to Logical Units (LUN) belonging to other operating system on the same SAN topology
- Must be able to backup and restore the data reliably

# Scalability

Initial SAN topology design should take into account future growth in:

- Number of servers
- Number of switches
- Number extenders/converters
- Number of storage devices
- Change in protocols and topologies: from ESCON to FICON, direct connect to fabric switch connect

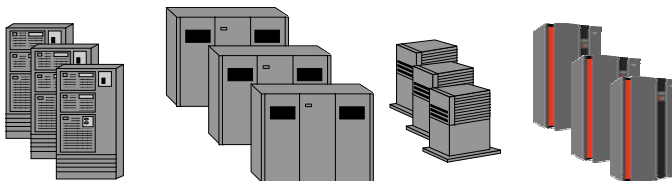
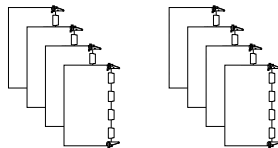
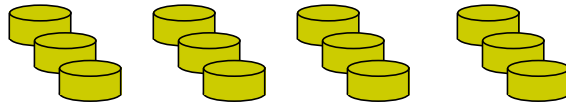
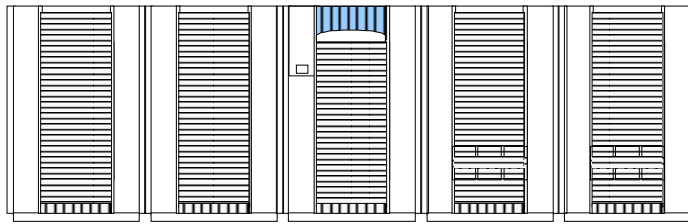
# Part 3: SAN heterogeneous essentials



- Storage array connectivity supporting different OS connectivity
- Enough host port connectivity
- Sufficient storage devices
- Correct fabric controller for the environment
- SAN Topology



# SAN heterogeneous essentials



## Multiple OS Support

XP array supports different OS via Host Mode setting

## Storage Scalability

XP array can scale up to 129 TB

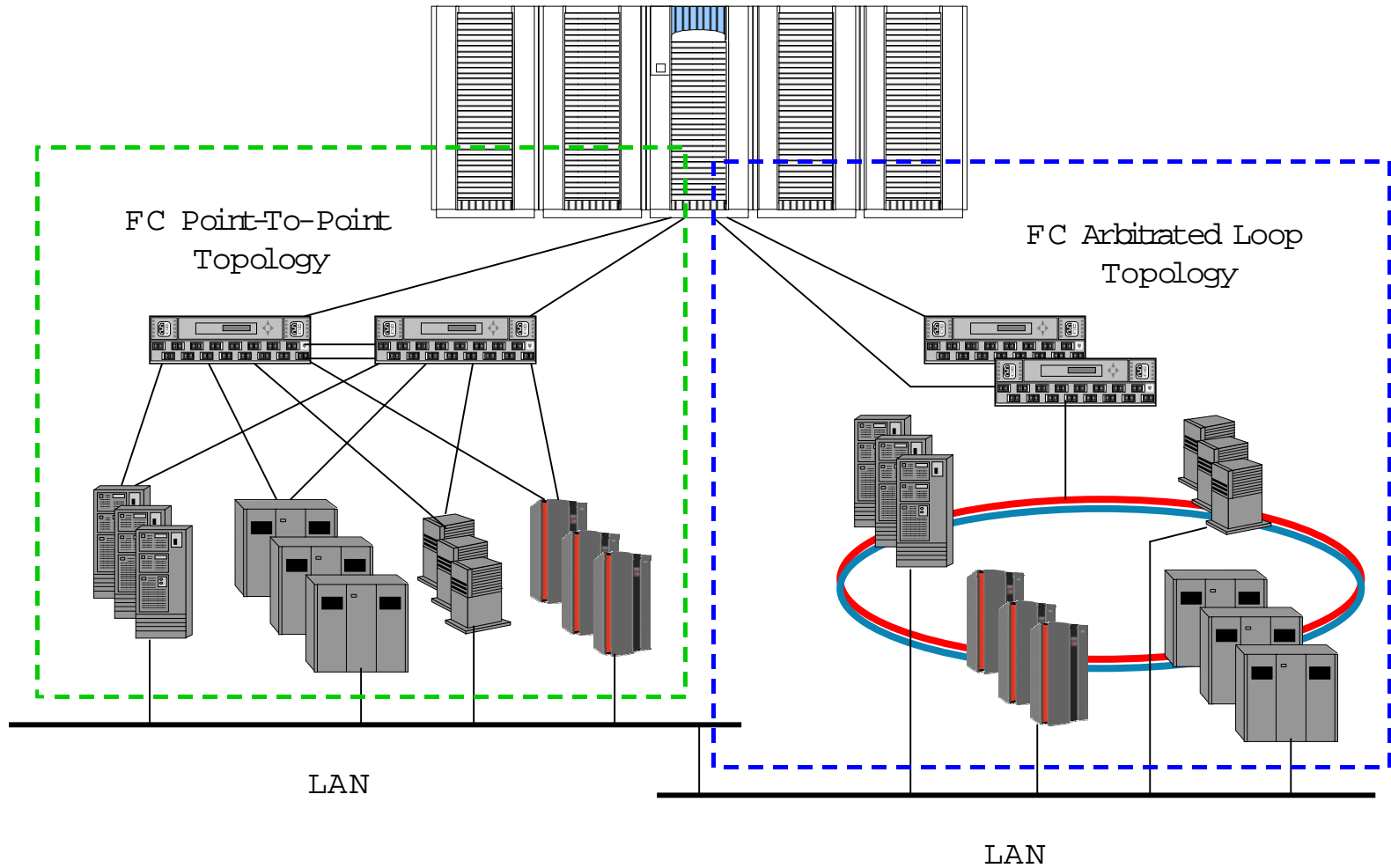
## Multiple Host Interface

XP CHIP cards support 32 or 64 host connections

## Heterogeneous Connections

Hosts with different OS. LUNs are secured using WWN of the host bus adapter (HBA)

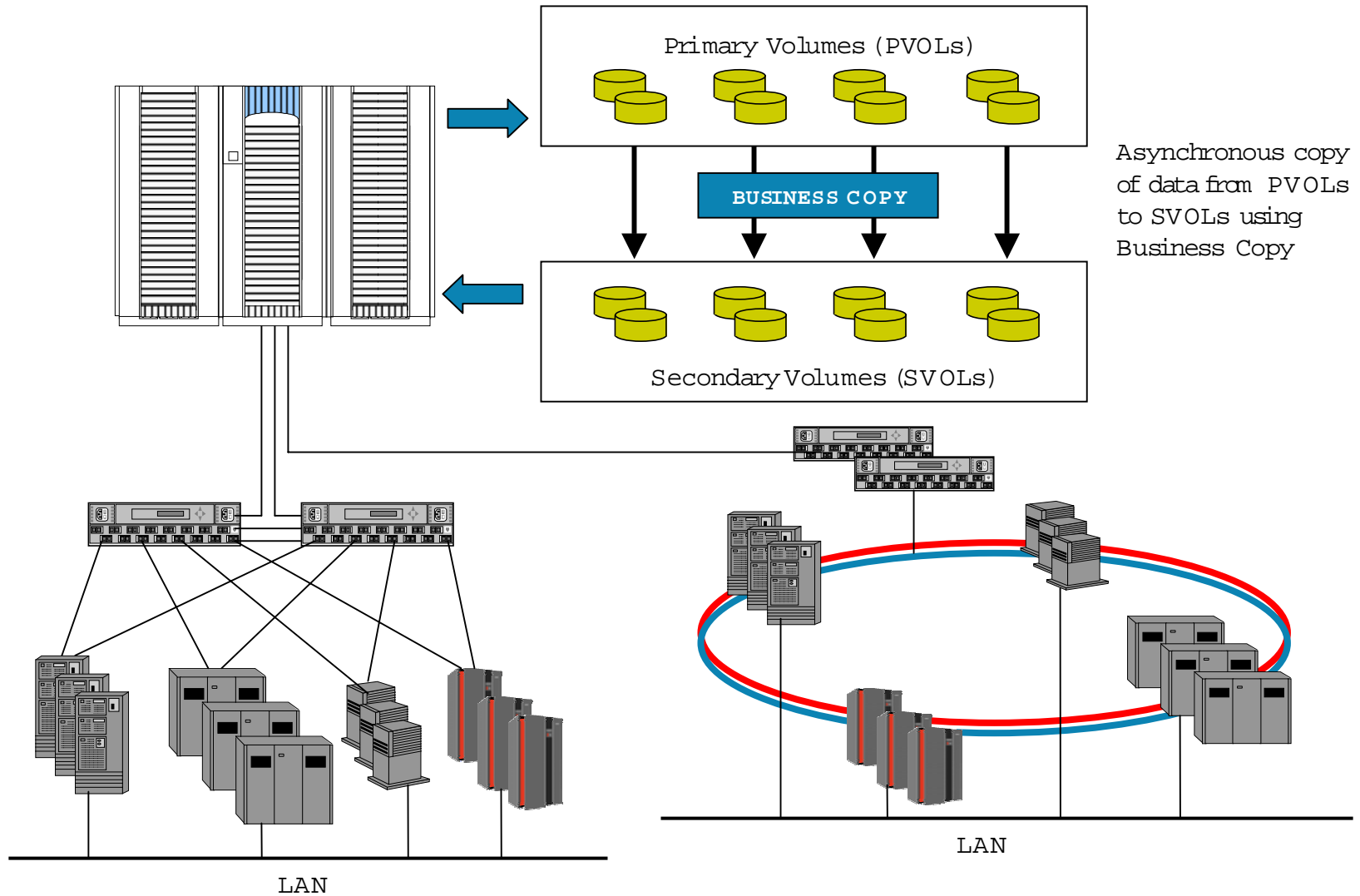
# SAN topology



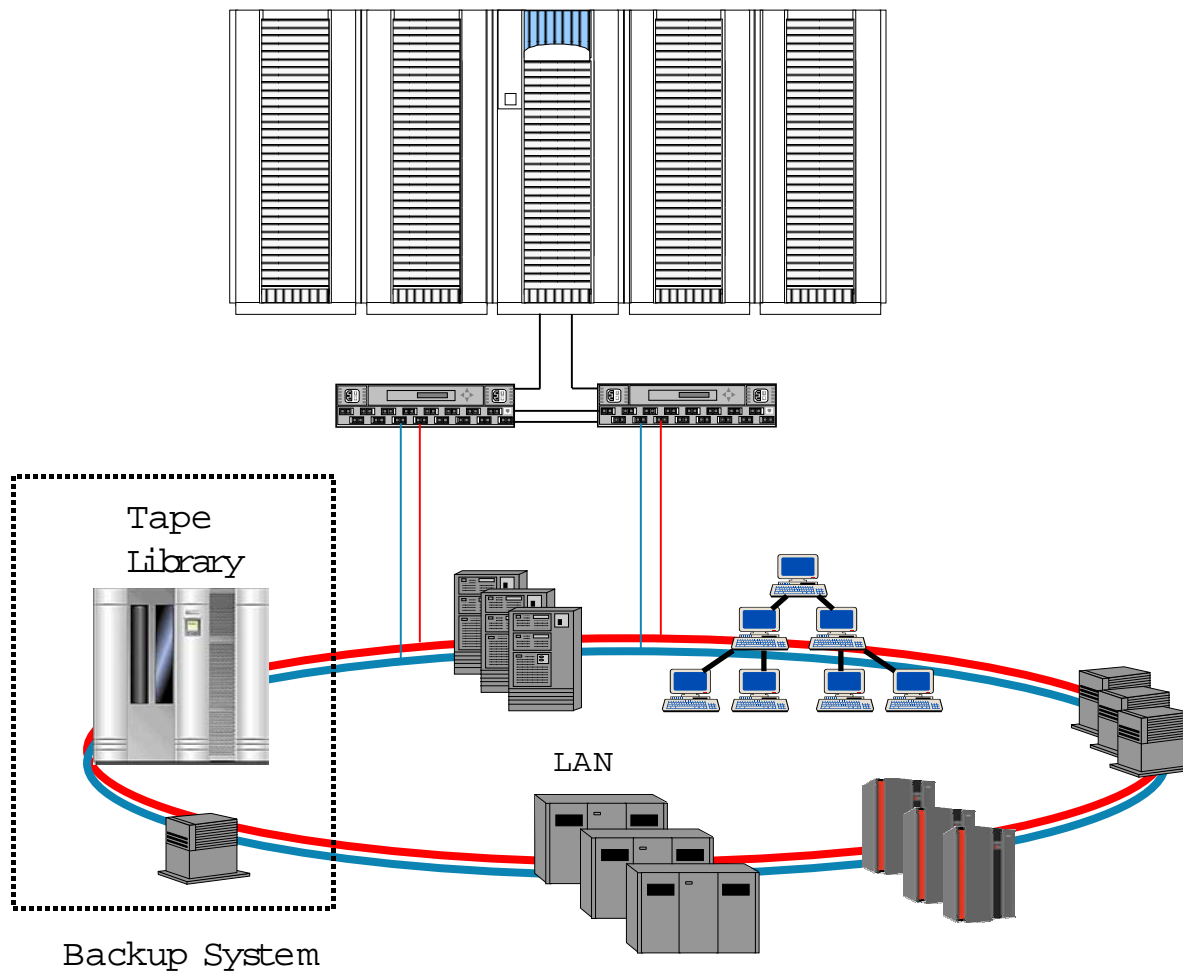
# Part 4: Backup and recovery

- Disk-to-disk copy
- Tape library backup
- Remote copy

# Disk-to-disk copy

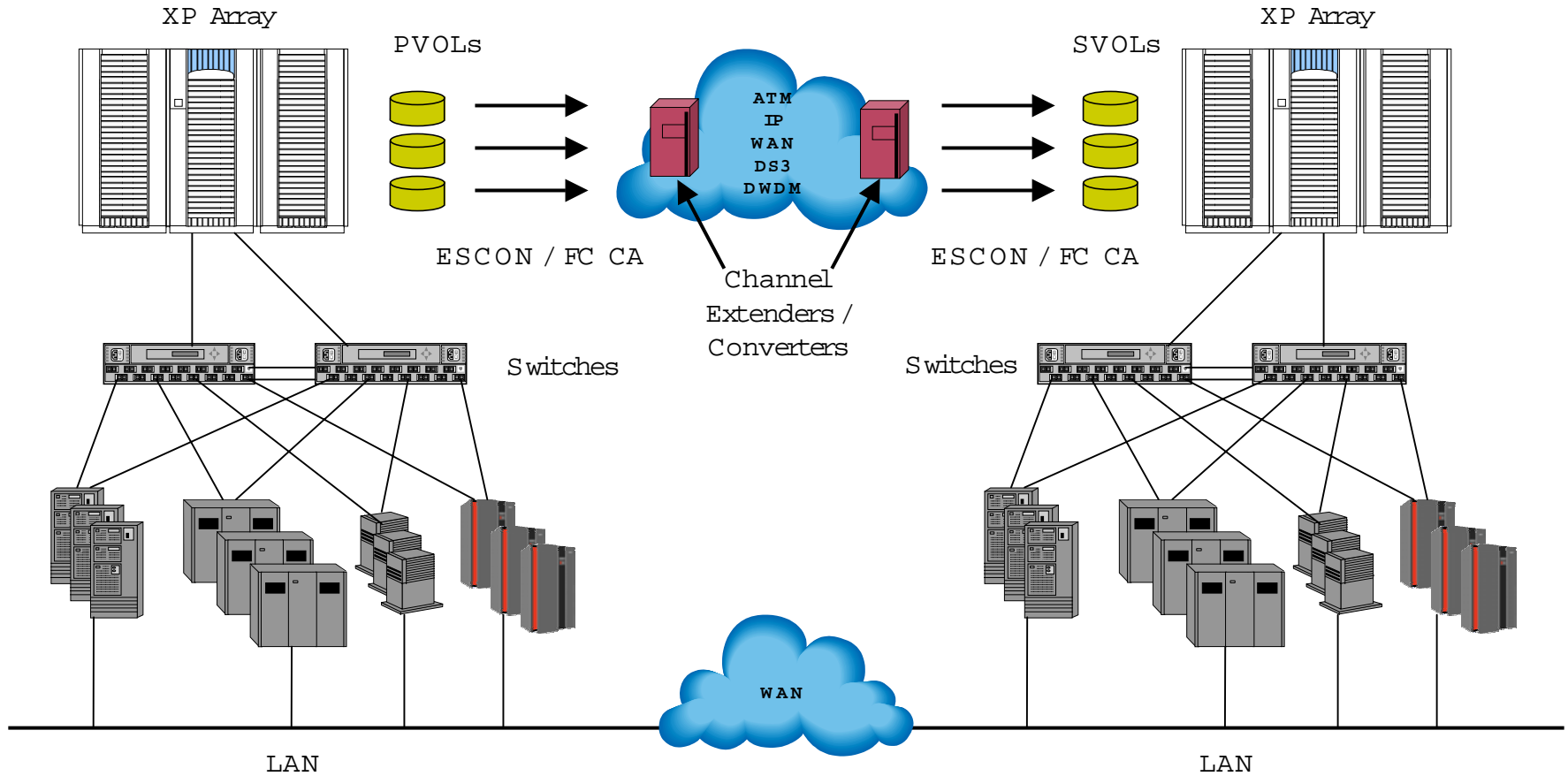


# Tape library backup



# Remote copy

Asynchronous or synchronous remote copy of PVOLs to SVOLs data using Continuous Access XP

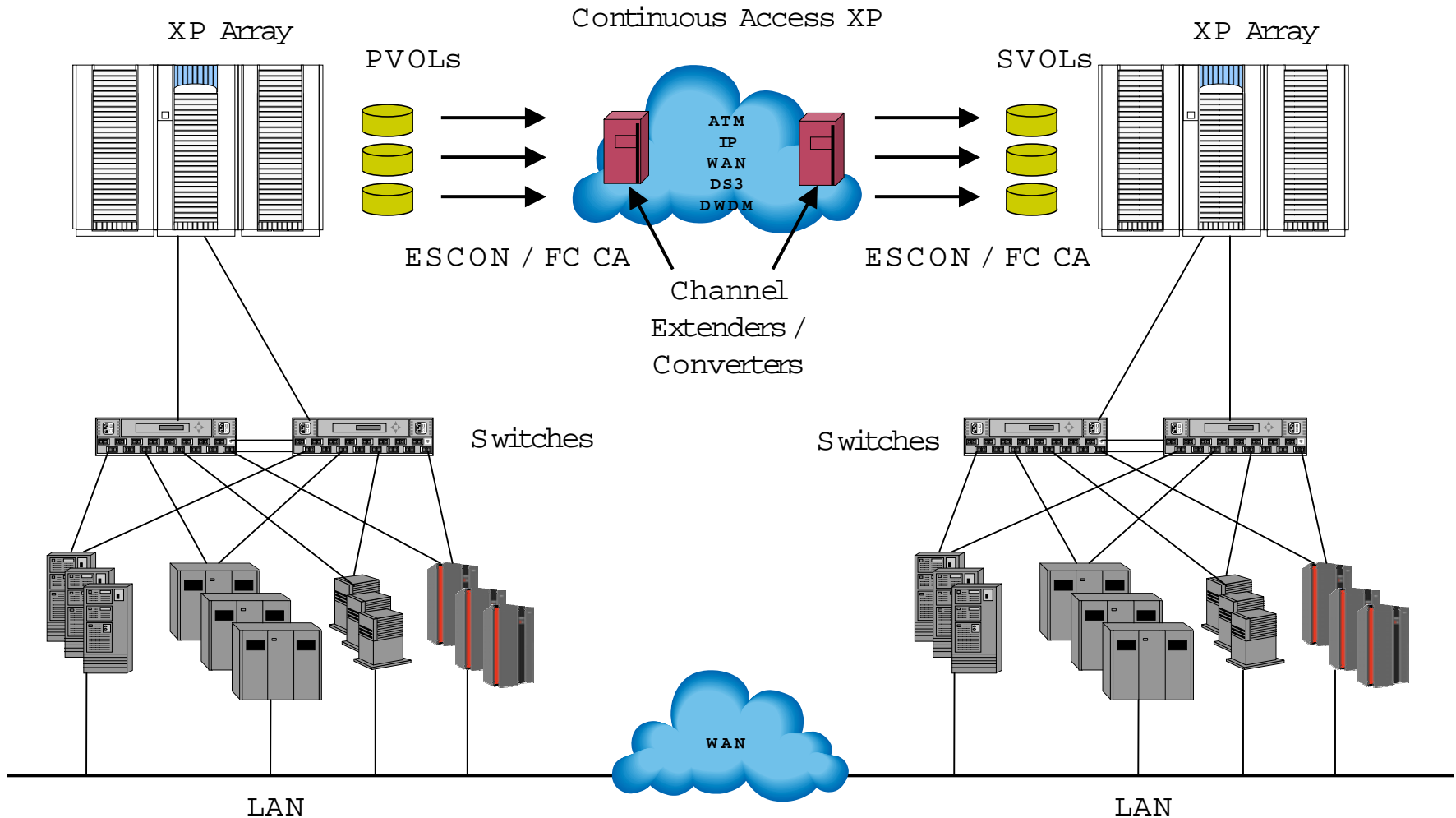


# Part 5: High availability solutions



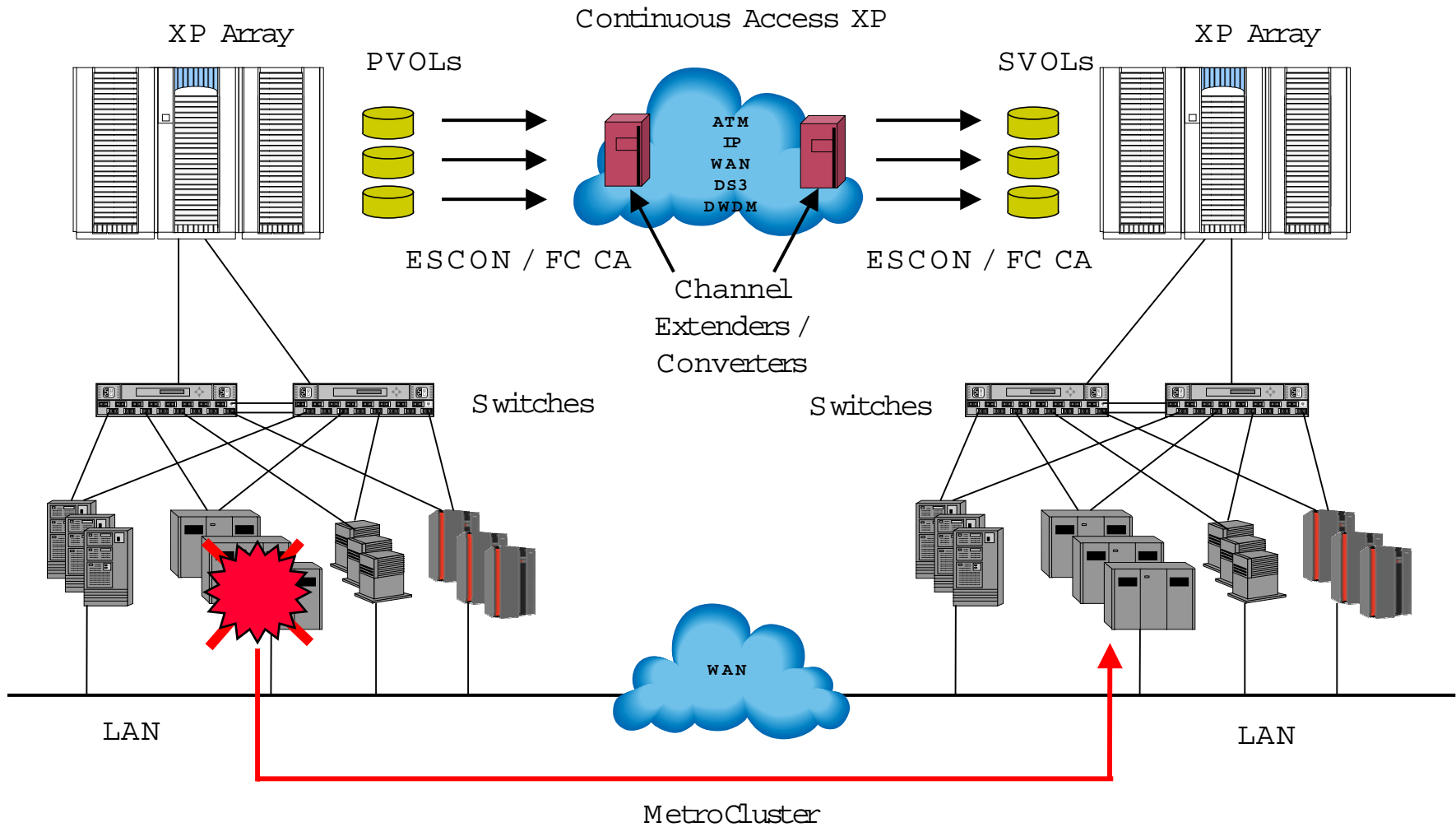
- Synchronous / asynchronous data replication
- Protection from hardware failures
  - Single failure
  - Multiple failures
  - Data center failure

# Synchronous / asynchronous data replication

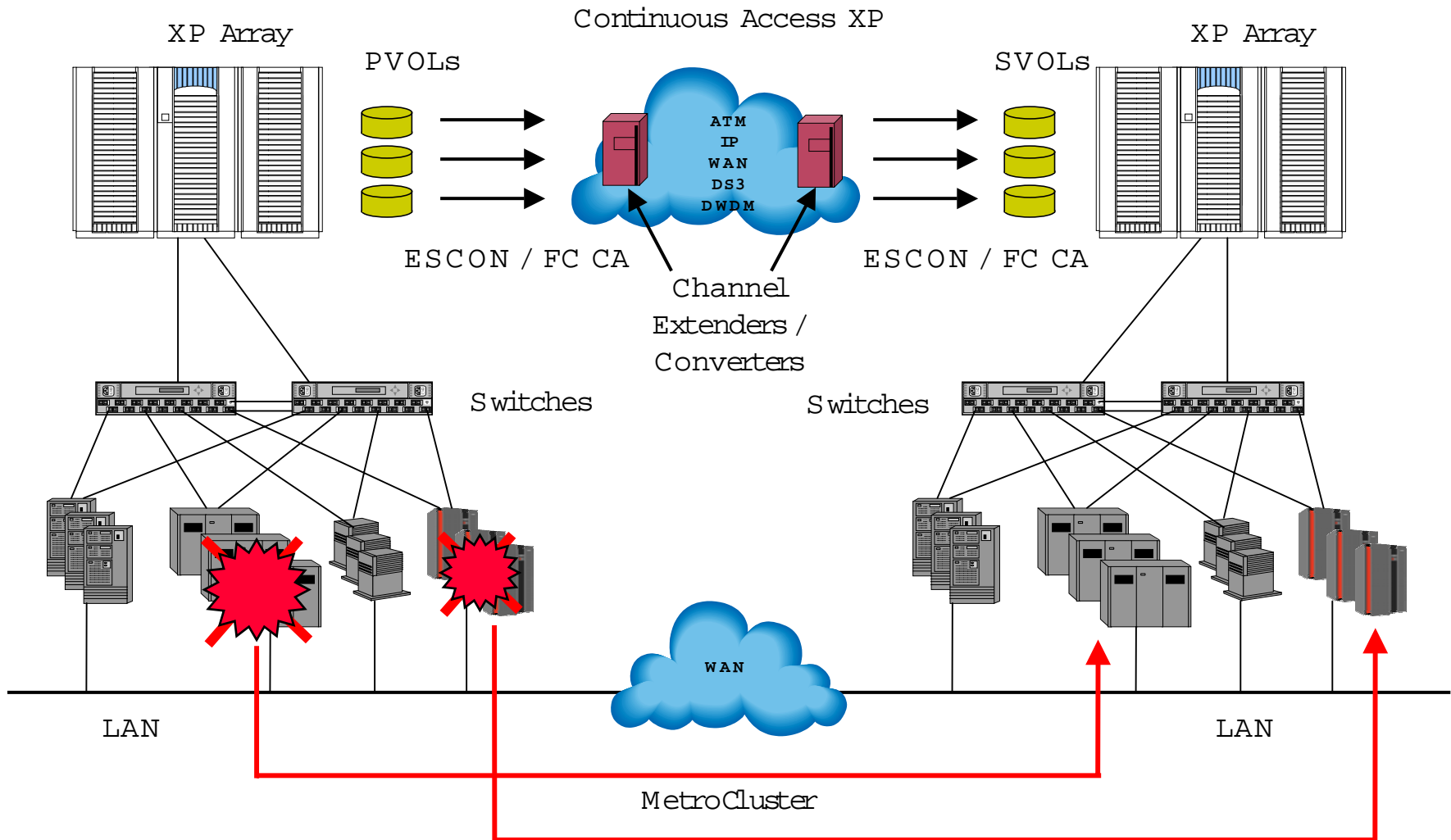




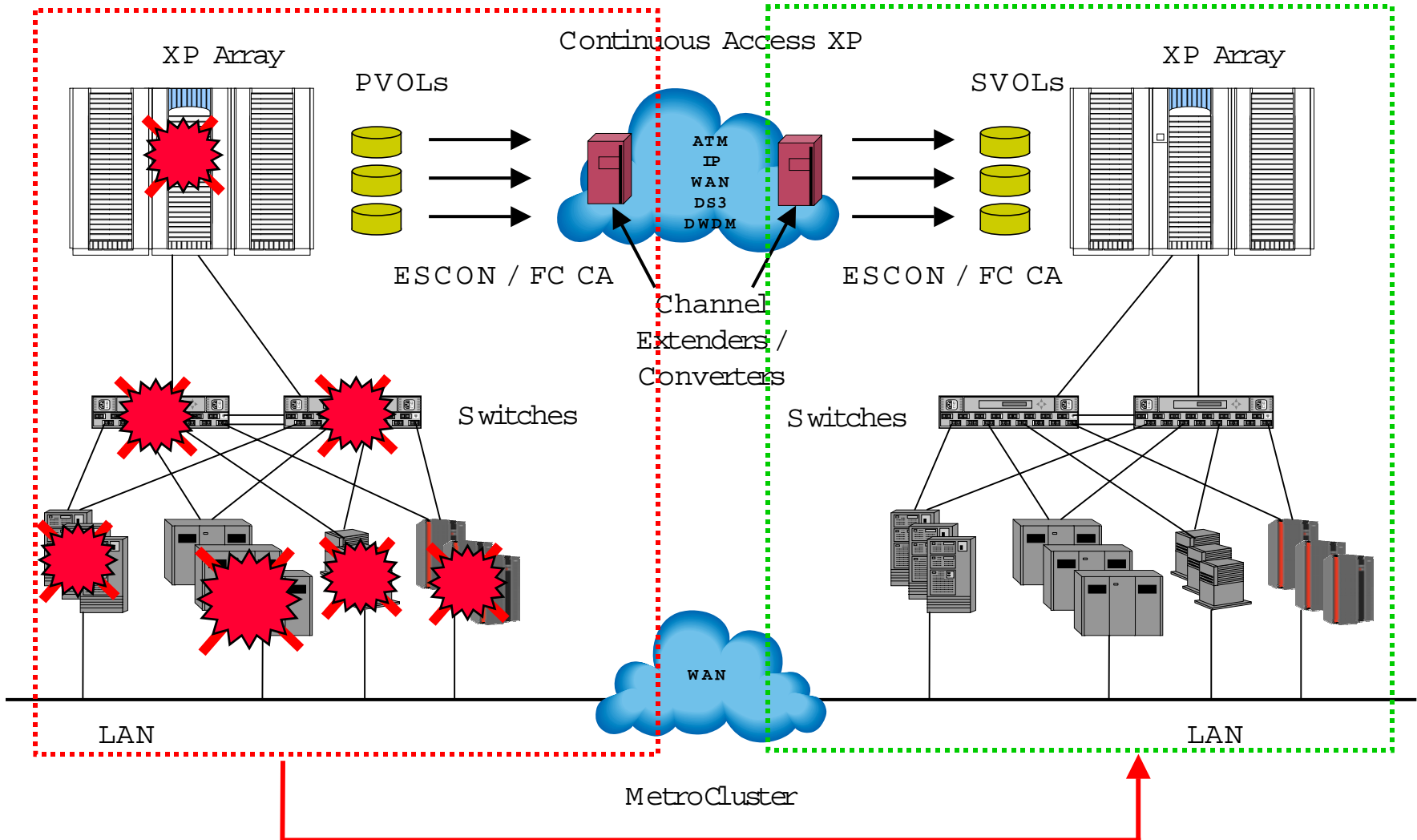
# Single failure



# Multiple failures



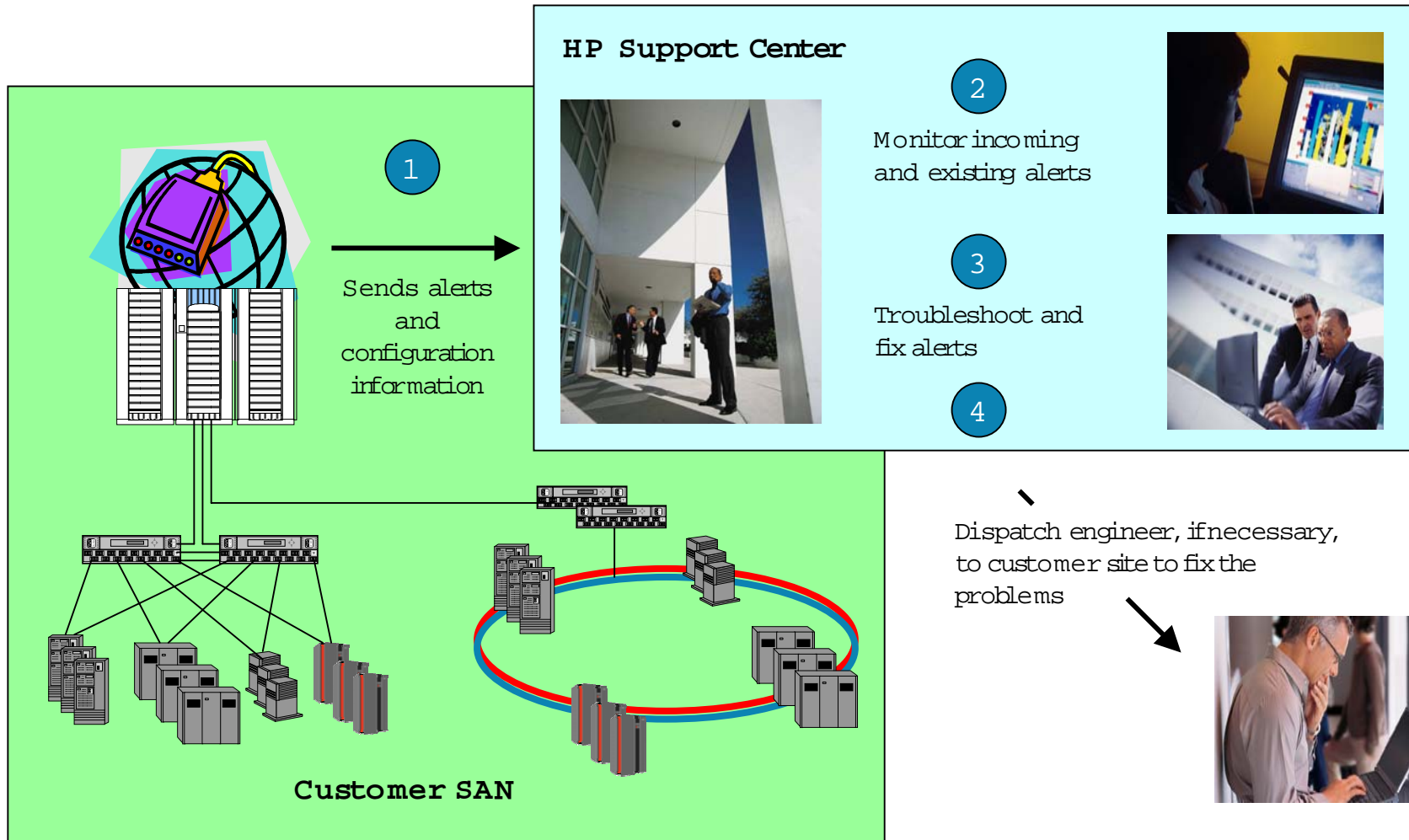
# Data center failure



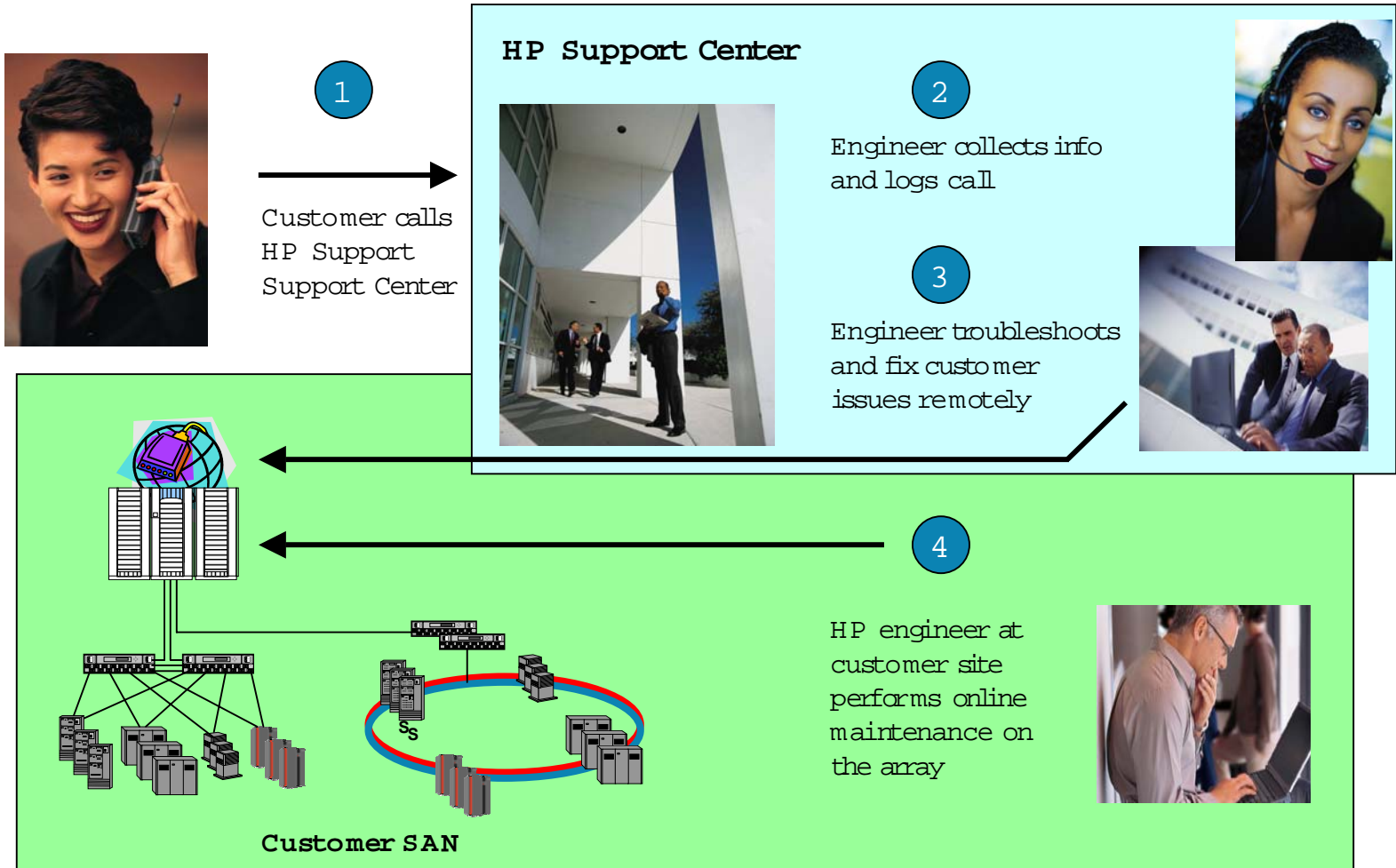
## Part 6: SAN maintenance

- Automatically sends alerts to HP Support Centers
- Automatically sends system configuration to HP Support Centers
- Remote troubleshooting and maintenance
- Online maintenance

# Automatically sends alerts to hp support centers



# Online maintenance



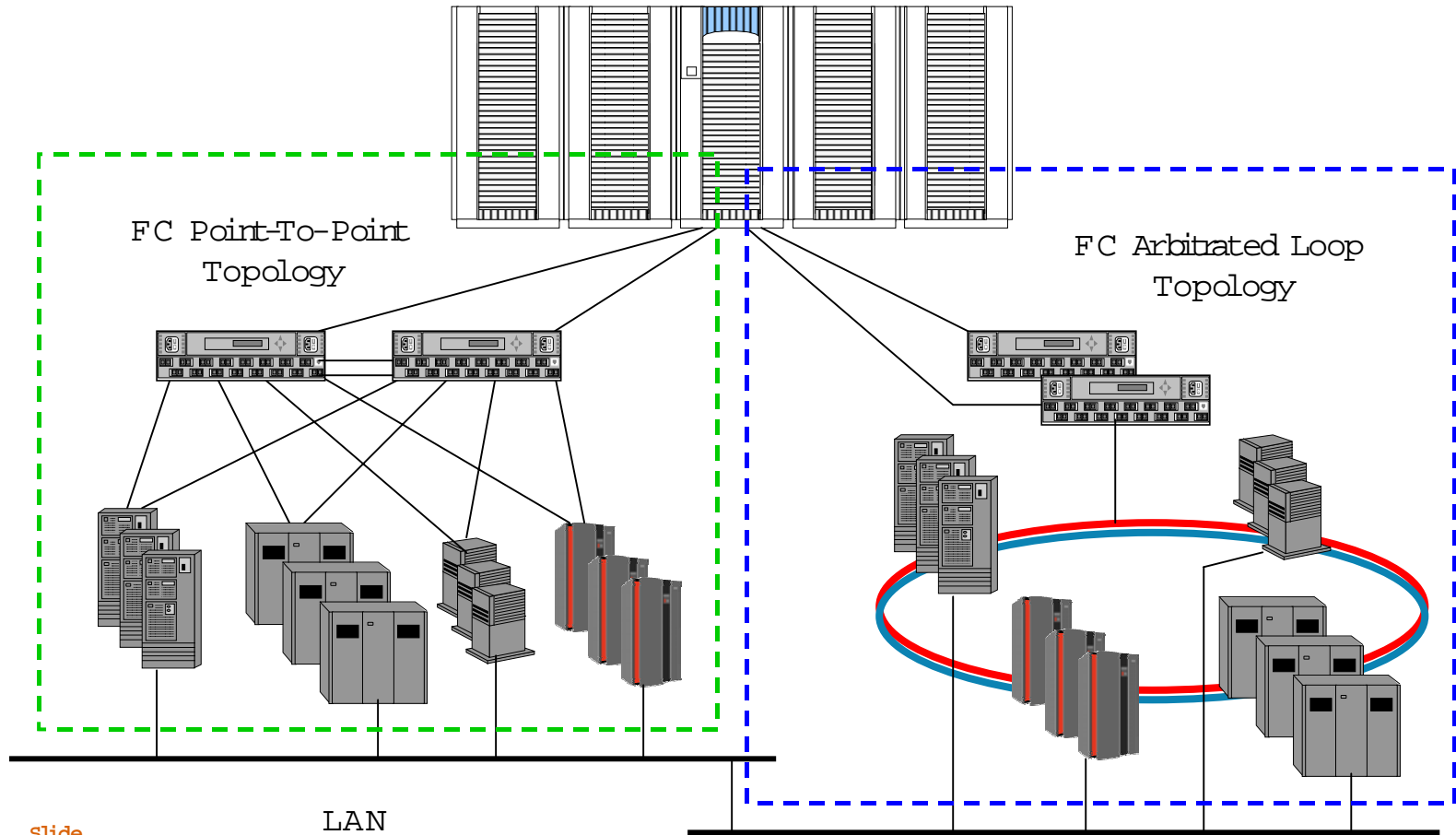
# Part 7: Question & answer session



# Backup Slides



# SAN topology



[Slide 10](#)  
[Slide 12](#)

LAN

LAN



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