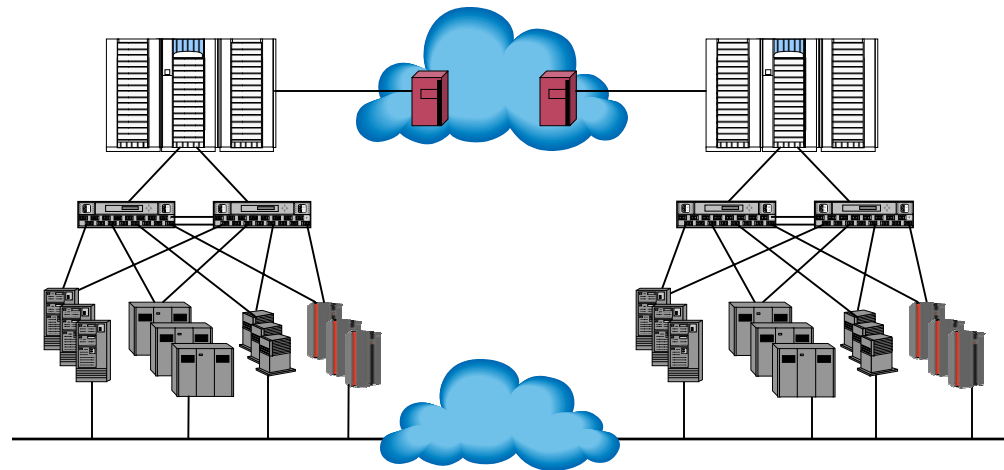


# HP SureStore Heterogeneous SAN Solution

Name: Edwin Alabastro

Company: Hewlett-Packard Company

Presenter: edwin\_alabastro@hp.com



# Agenda

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

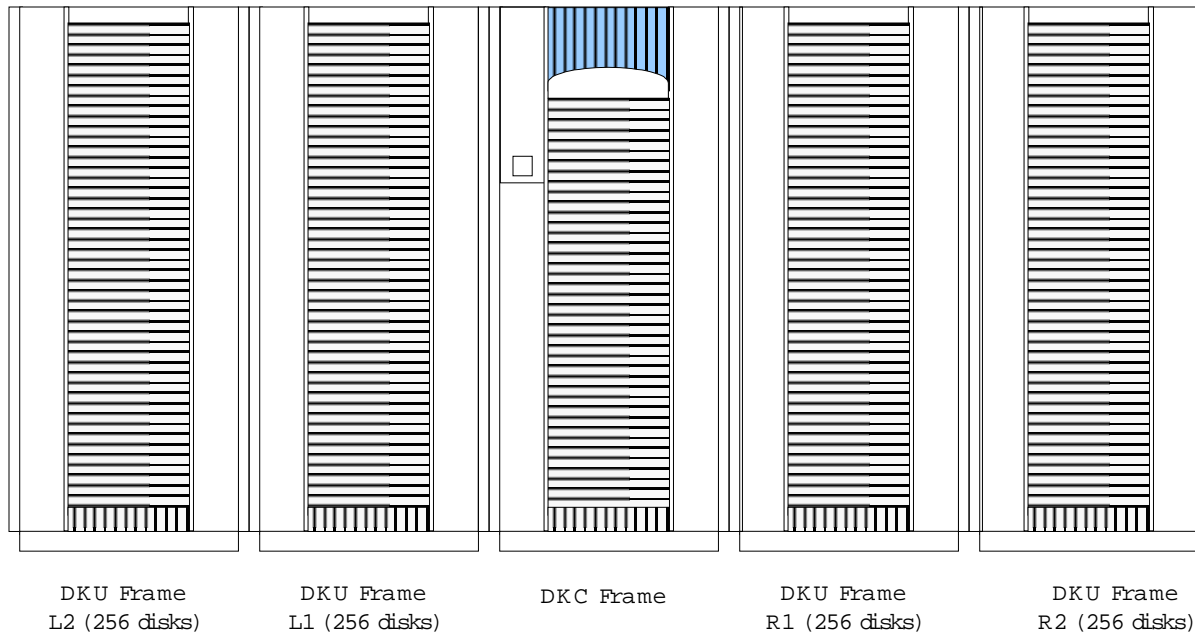
# Introduction

- Industry work experience
- Reasons for presentation
- Audience expectations

## Part 1: The XP SureStore Disk Array

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

# XP1024 Disk Array



# Specifications

Maximum number of disk drives	1,024
Maximum capacity	74 Tb
Maximum cache memory	64 Gb
Maximum shared memory	3 Gb
Maximum host connectivity ports	32
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 32 Fibre Channel cards
ESCON data transfer rate	17 MB per sec
FICON data transfer rate	100 MB per sec
Fibre Channel data transfer rate	200 MB per sec
Sustained maximum sequential data transfer rate	2 Gb per sec
Peak cache maximum sequential data transfer rate	3.2 Gb per sec
Maximum random I/O 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, Windows NT / 2000 , etc .

# Features

1. Fully redundant components, no single point of failure
2. Large cache and shared memory
  - 64 Gb mirrored cache memory (minimum 4 Gb)
  - Dynamically duplexed cached with battery backup
  - 3 Gb shared memory
3. Crossbar switch architecture
  - Fast, efficient with point-to-point connections
4. Disk Capacity and Support
  - From 144 Gb to 74 Tb capacity
  - 1024 drives supported
  - Disk drives are dual ported native FC-AL
  - 32 FC-AL loops (100 Mb/sec)
  - Denser disk drive packaging – 256 disk drive packaging per DKU
  - Denser data center packaging – 1024 disk drives in a four DKU package

## Features continued

### 5. New RAID Support

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

### 6. Host Connectivity

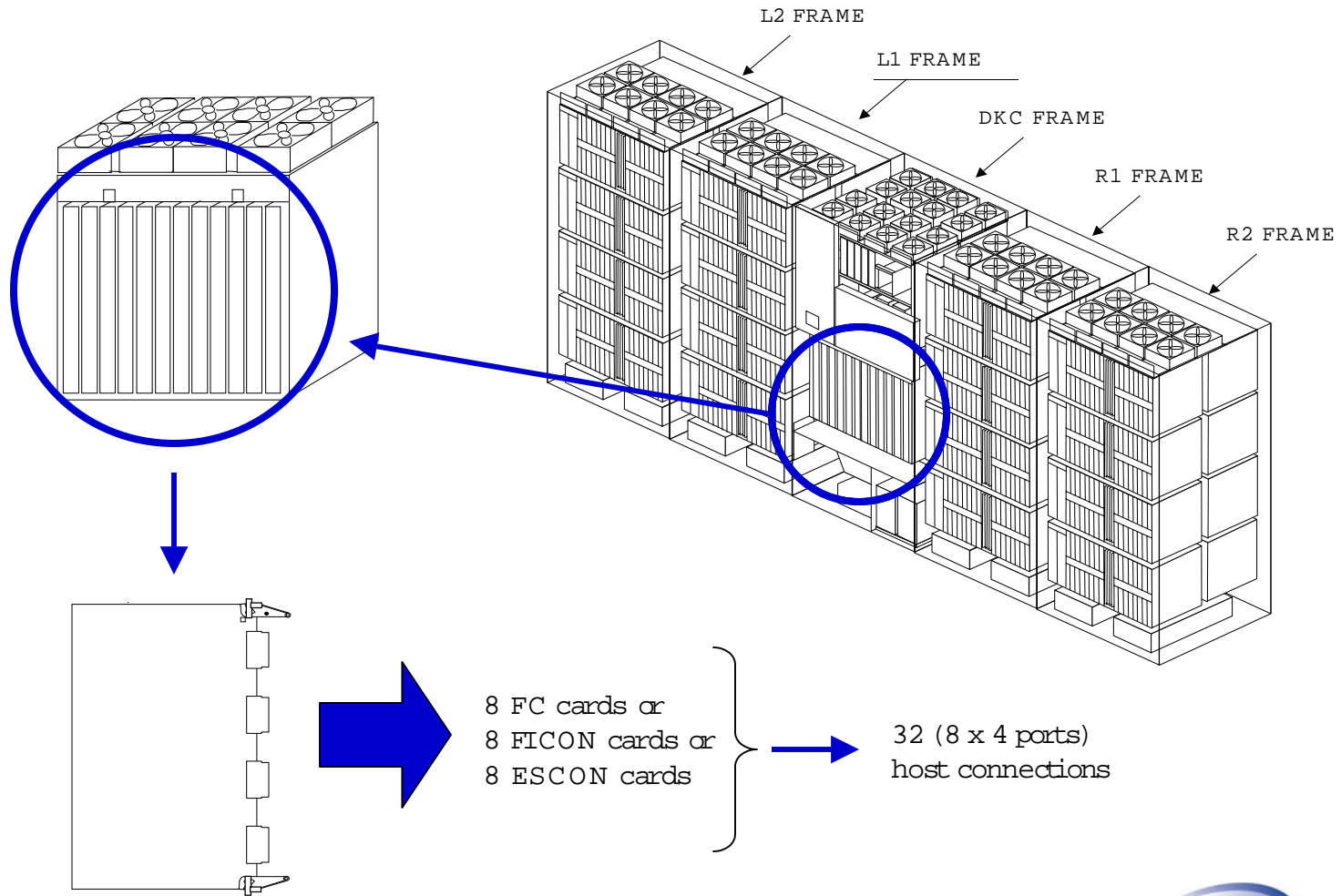
- 32 host connect ports
- Dual and concurrently active paths
- Maximum of 512 LUNs per FC port

### 7. Battery Backup Cache and Shared Memory

- 48 hours for cache
- 7 days for shared memory



# Client Host Interface Processor Cards



## 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
- 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

- Support different operating systems: AIX, HP-UX, Solaris, True64, Windows NT / 2000, etc.
- Support different protocols: FC, ESCON, FICON and SCSI.

## Security and Data Protection

- Must be able to secure data within the SAN (using WWN 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

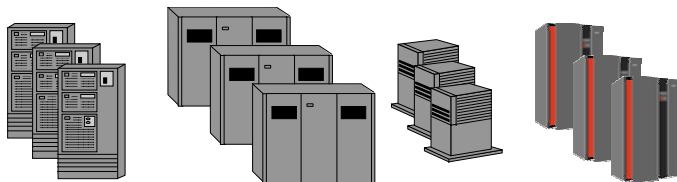
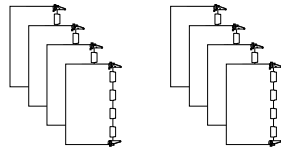
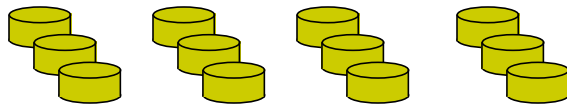
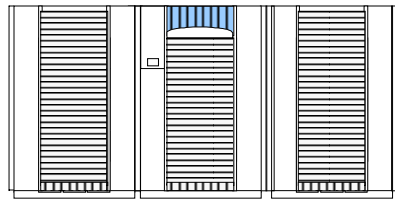
Initial SAN topology design should take into account future growth in:

- a. Number of servers
- b. Number of switches
- c. Number extenders/converters
- d. Number of storage devices
- e. Change in protocols and topologies: from ESCON to FICON, SCSI to FC, 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 Operating Systems via Host Mode setting

## Storage Scalability

XP array can scale up to 74 TB

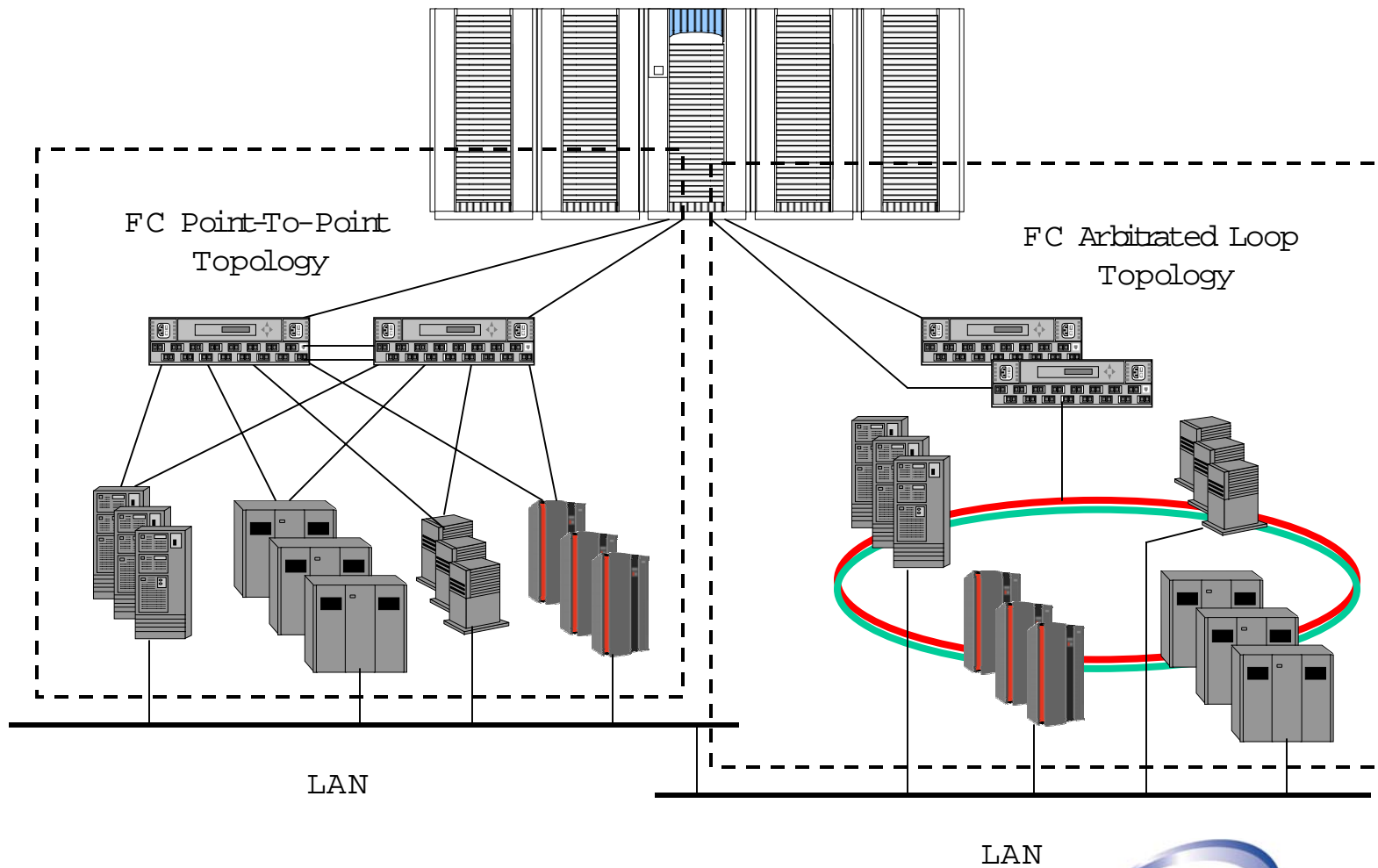
## Multiple Host Interface

XP CHIP cards support 32 host connections.  
LUNs are secured using W W N of the HBAs on the hosts.

## Heterogeneous Connections

Hosts with different OS

# Fibre Channel SAN Topology

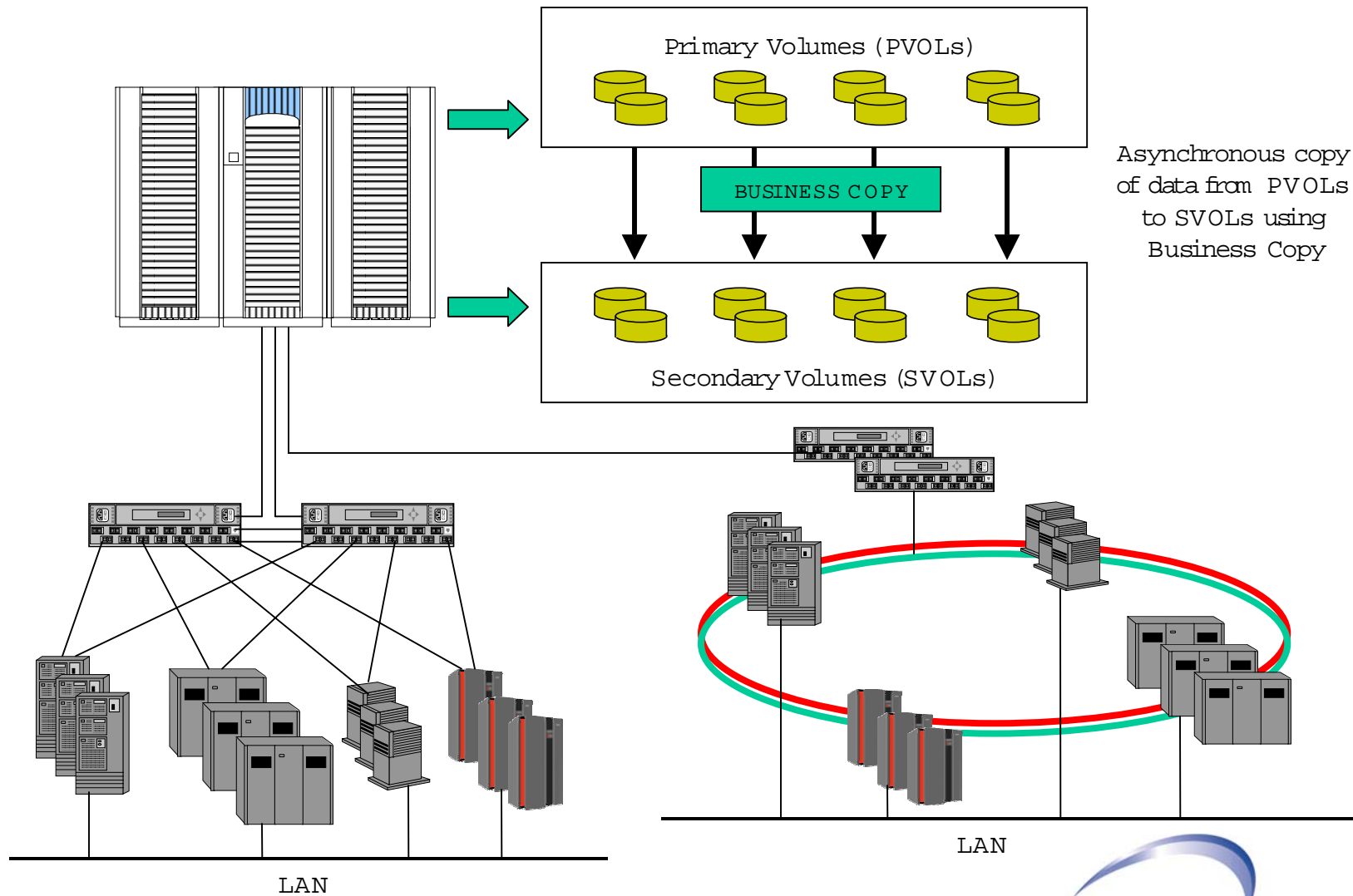




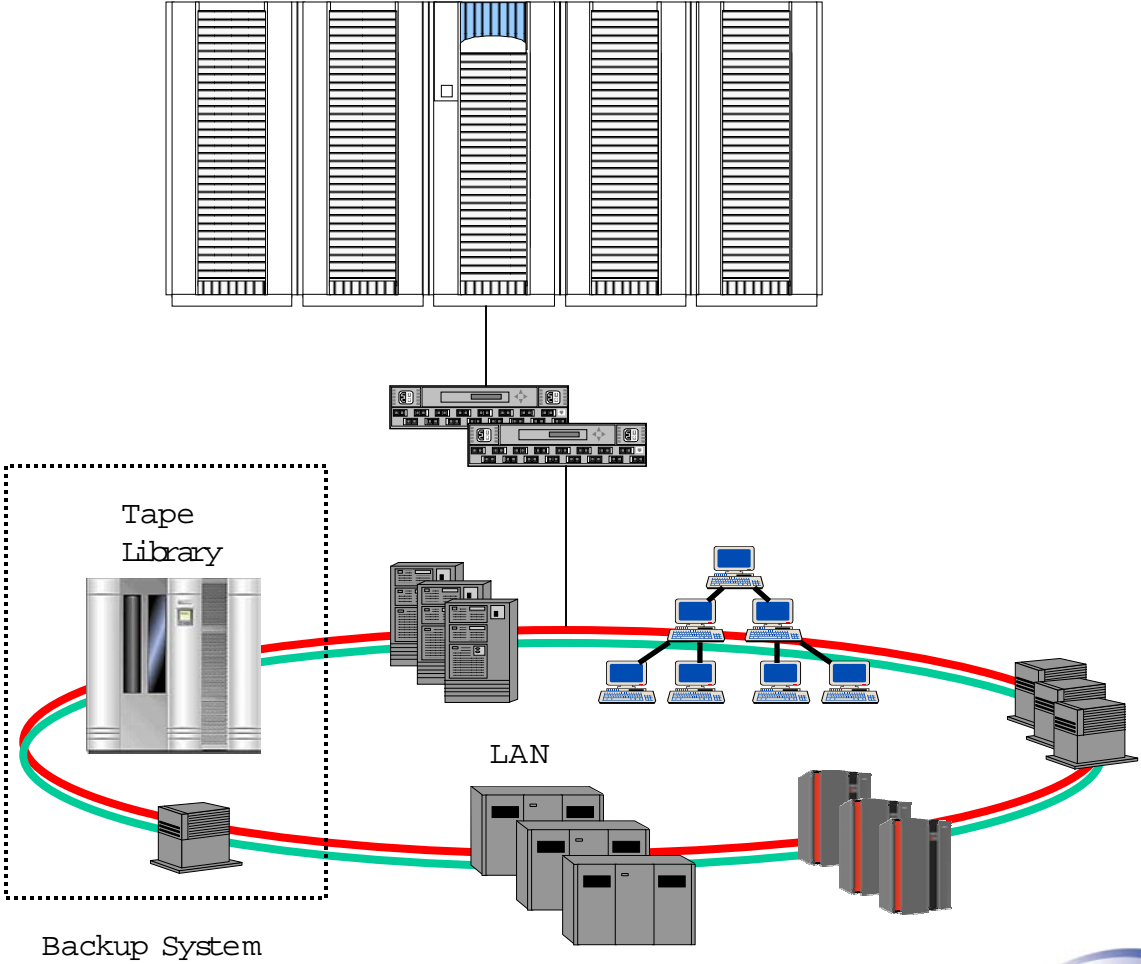
## Part 4: Backup and Recovery

- Disk-to-disk copy
- Tape libraries
- Remote copy

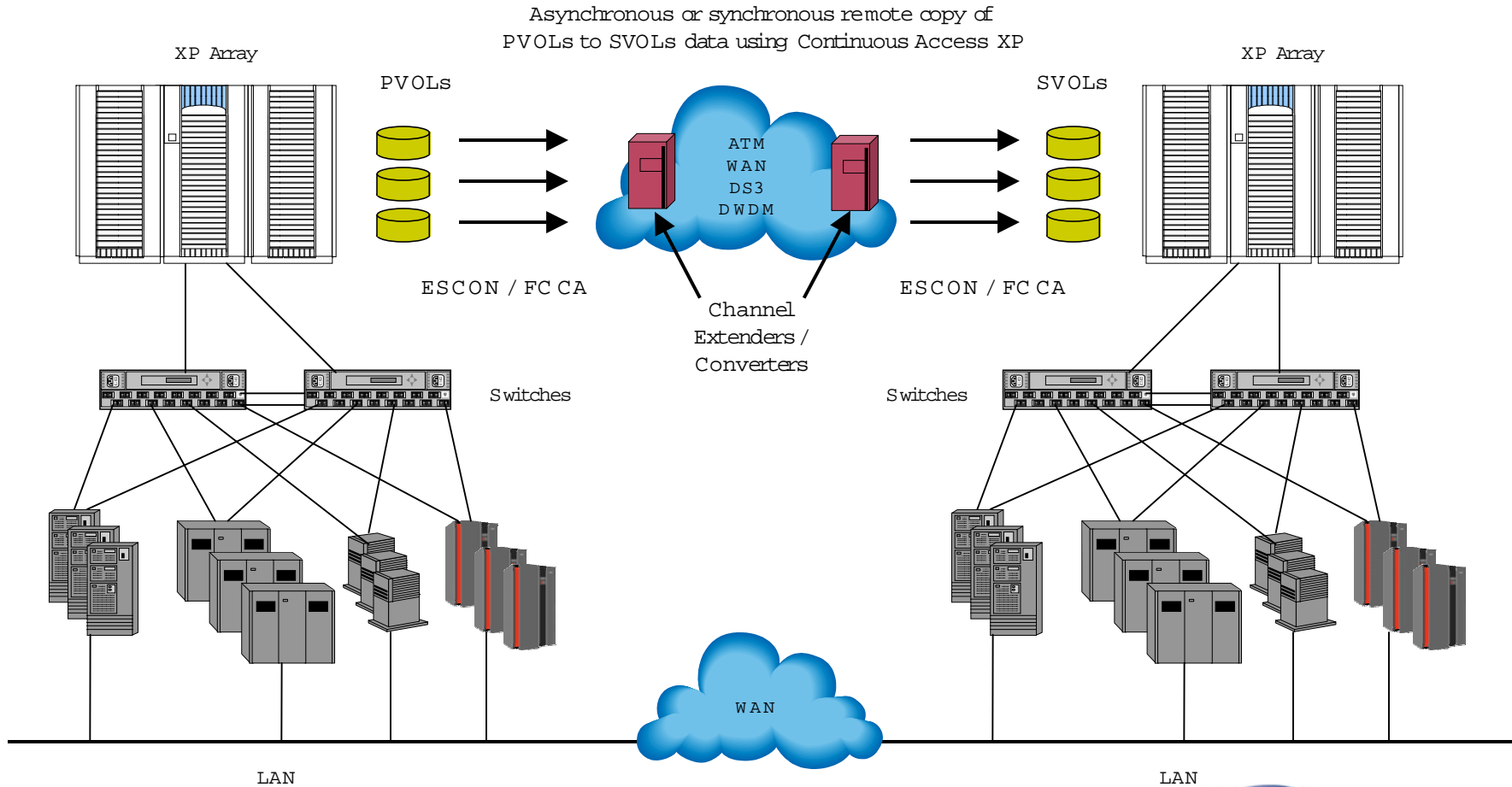
# Disk-to-disk Copy



# Tape Library Backup



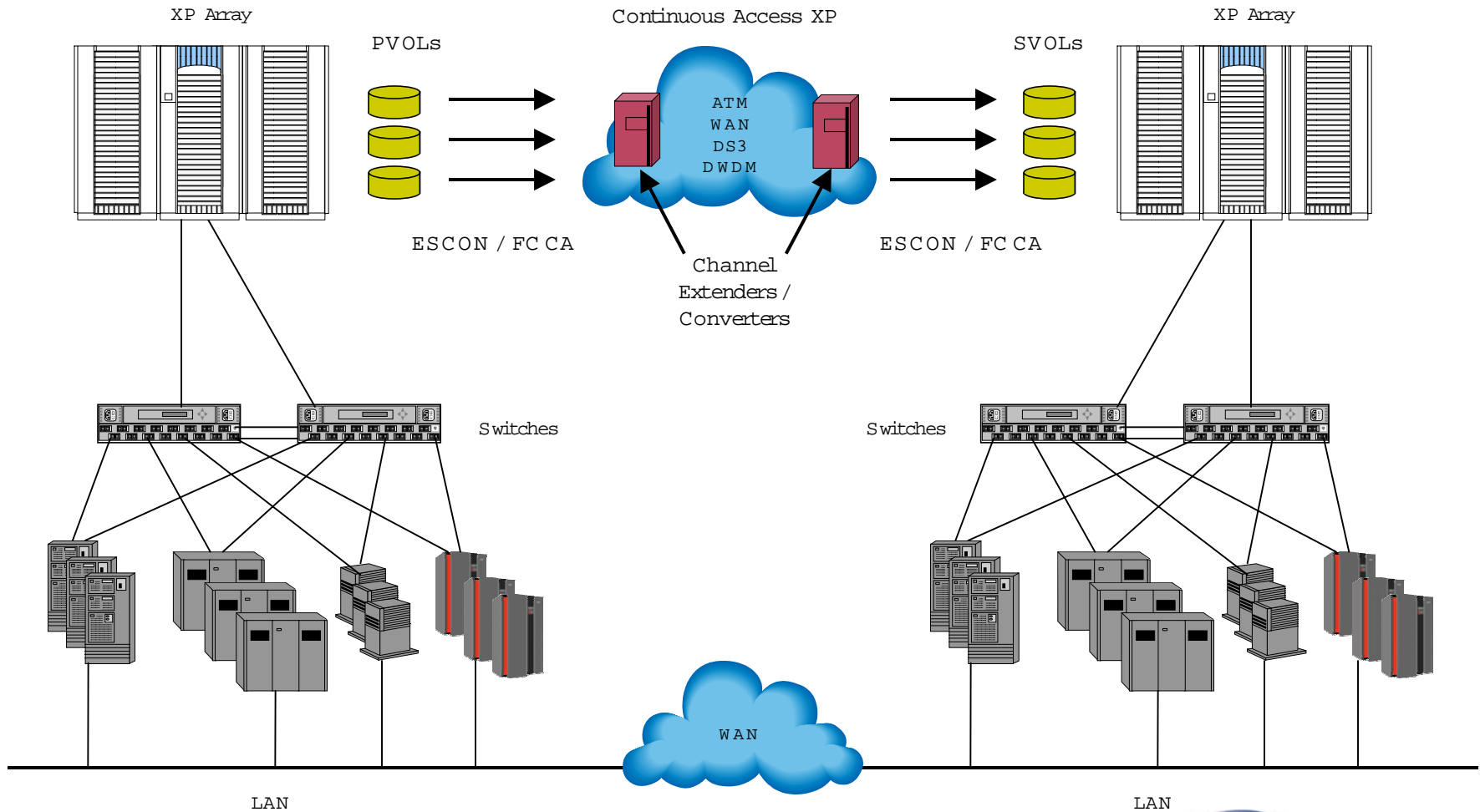
# Remote Copy



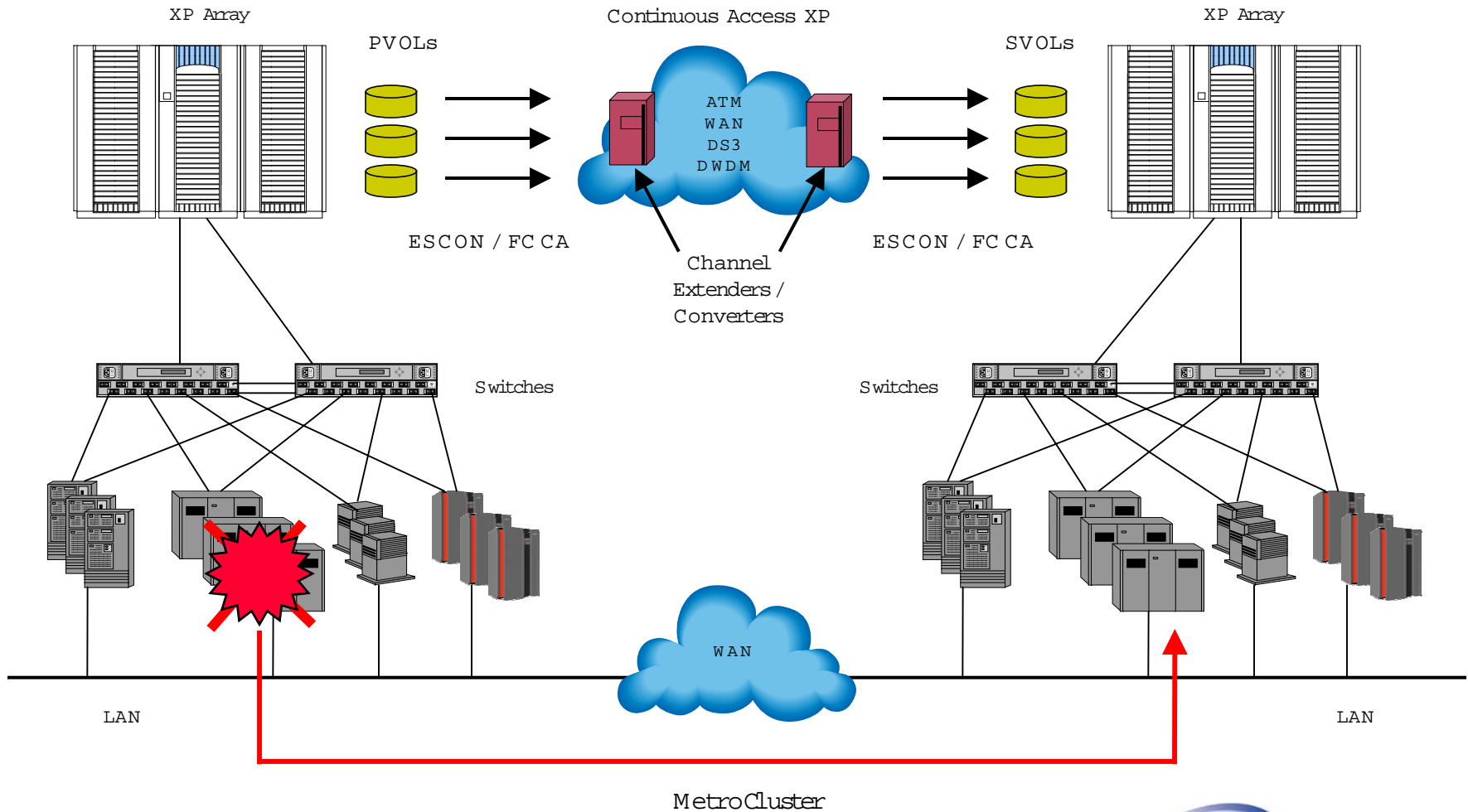
## Part 5: High Availability Solutions

- Synchronous / asynchronous data replication
- Protection from hardware failures

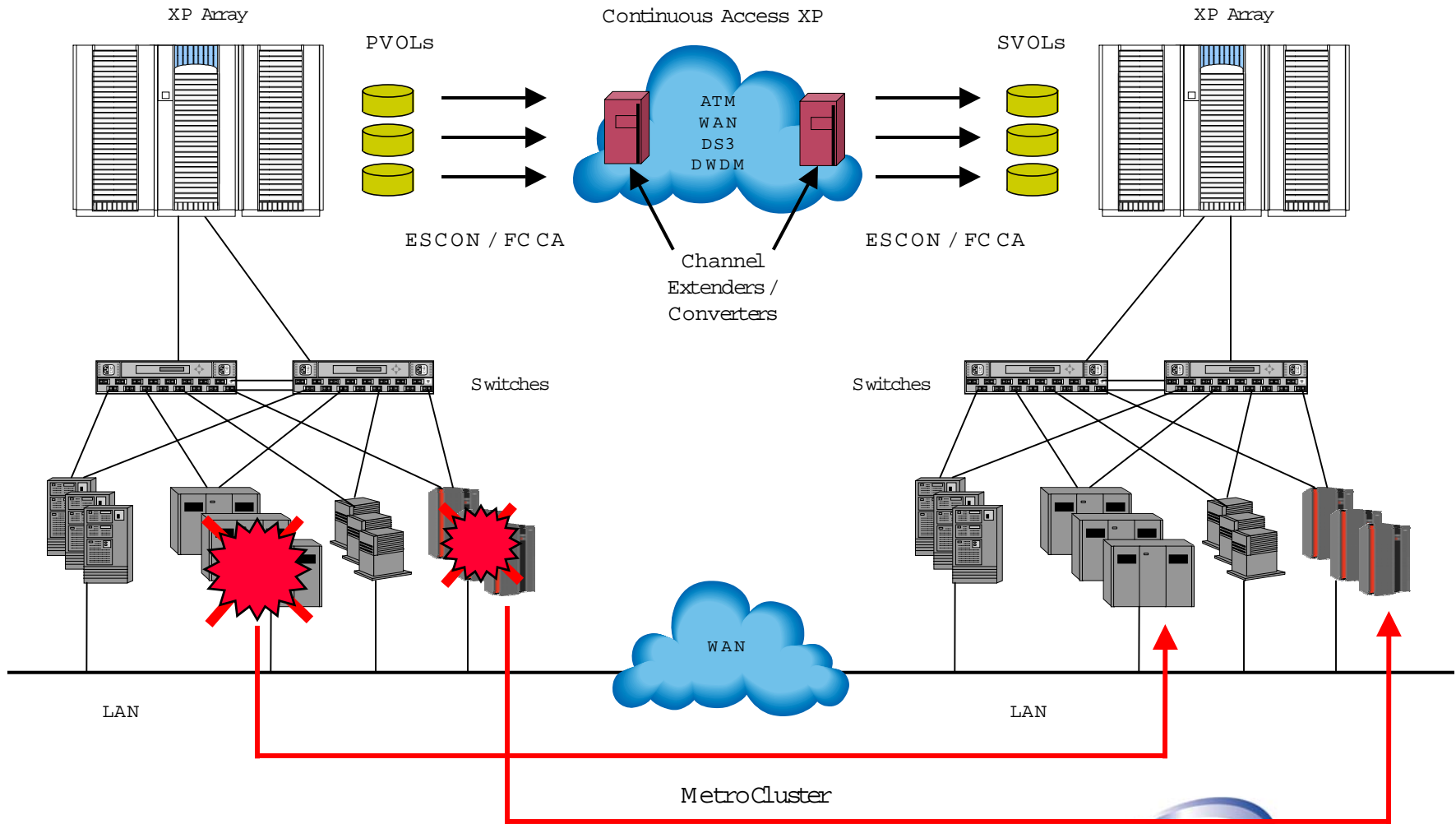
# Synchronous / Asynchronous Data Replication



# Single Failure

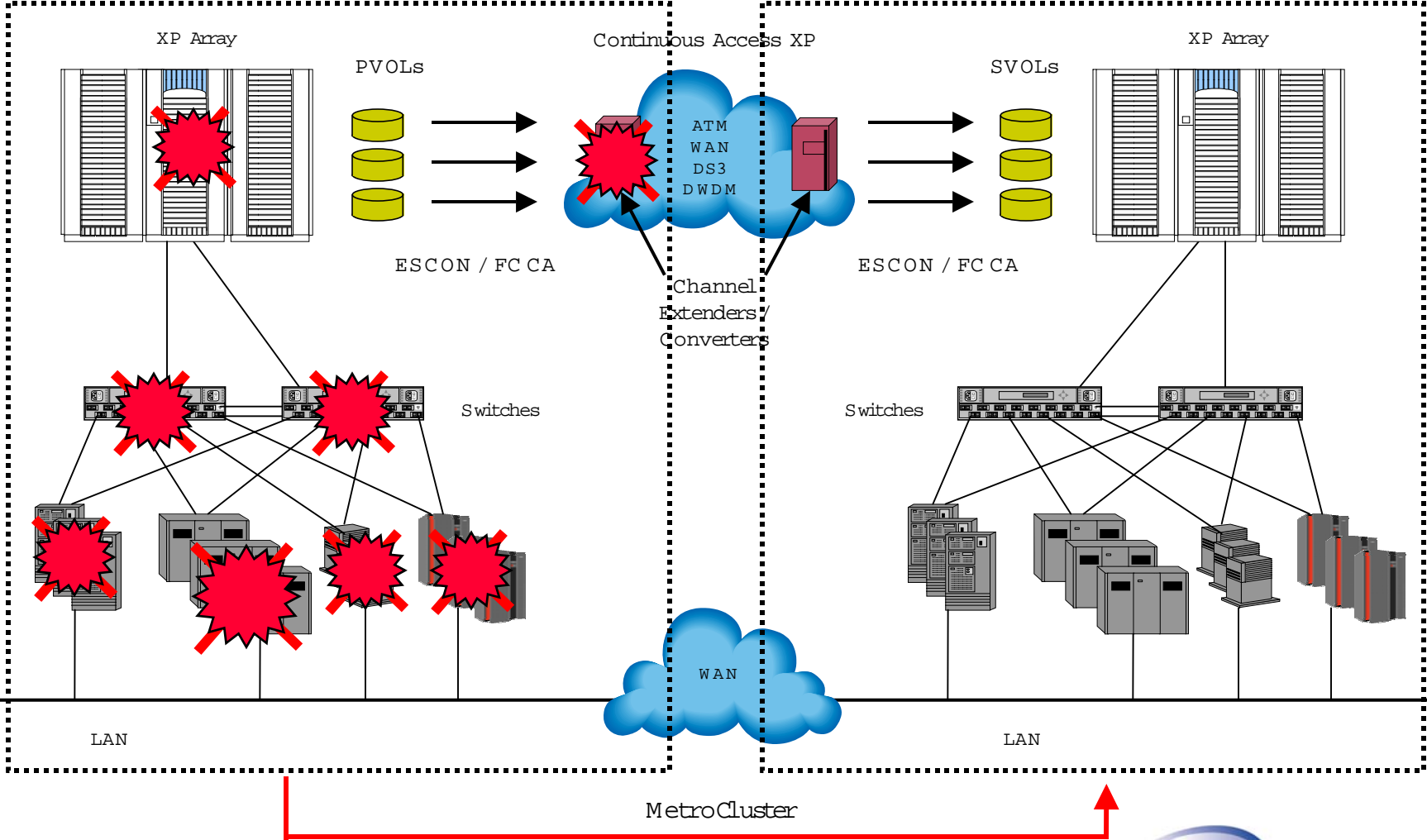


# Multiple Failures





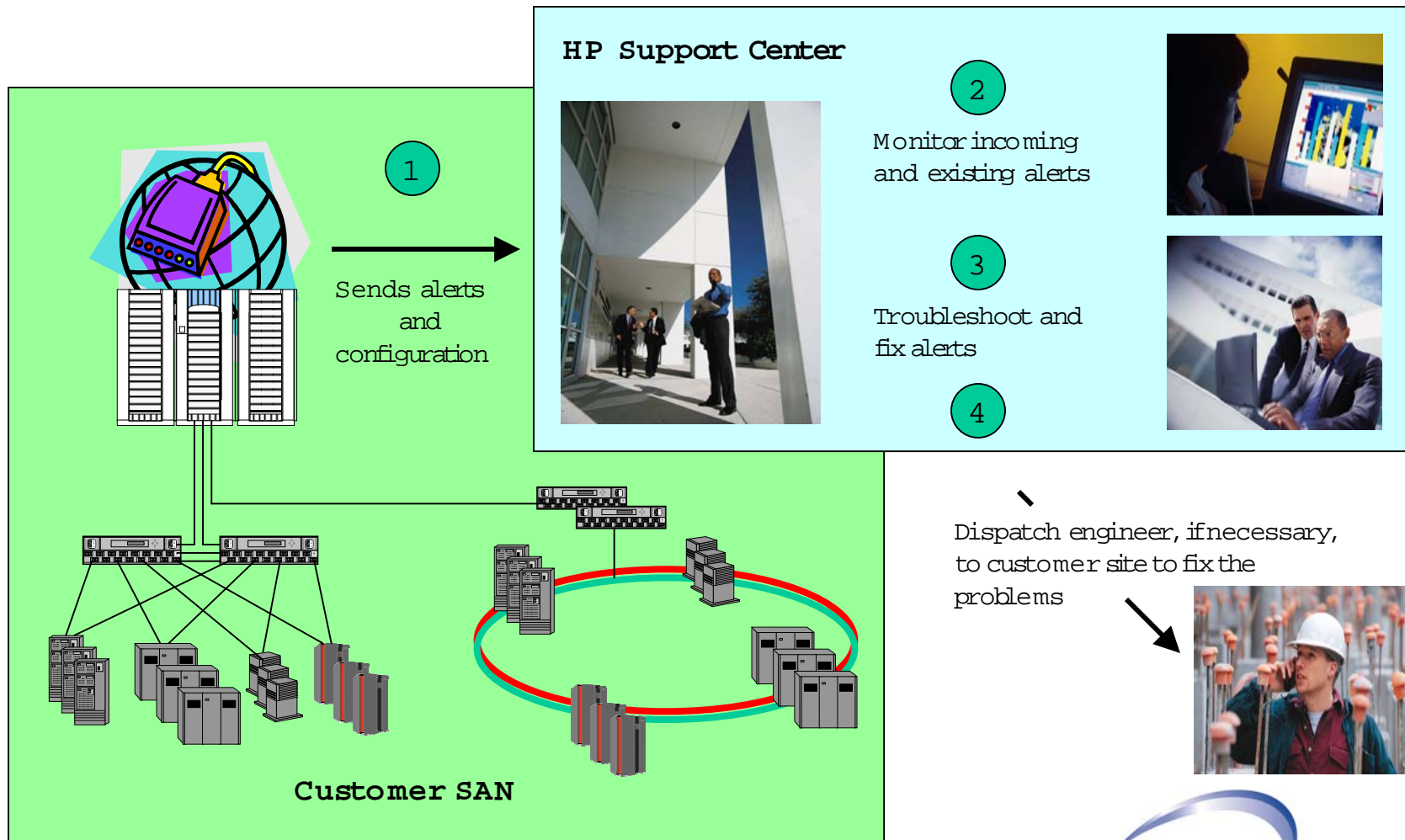
# Data Center Failure



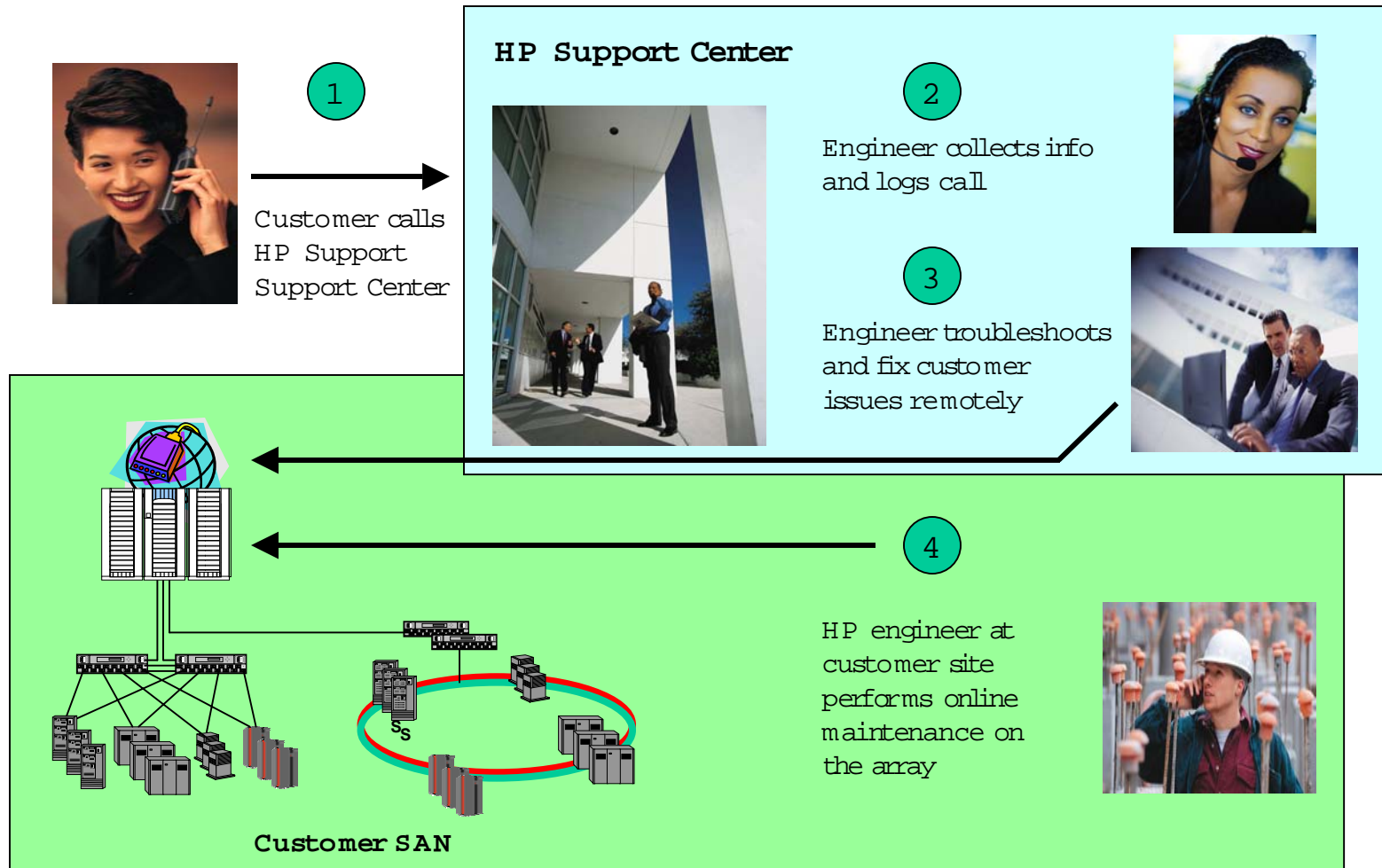
## Part 6: SAN Maintenance

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

# Automatically sends alert notifications and system configurations to HP Support Centers



# Online Maintenance



## Question and Answer Session