



HP StorageWorks Disk Array XP1024 Heterogeneous SAN Solution



Edwin Alabastro
Senior Systems/Software Engineer
Hewlett-Packard Company

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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

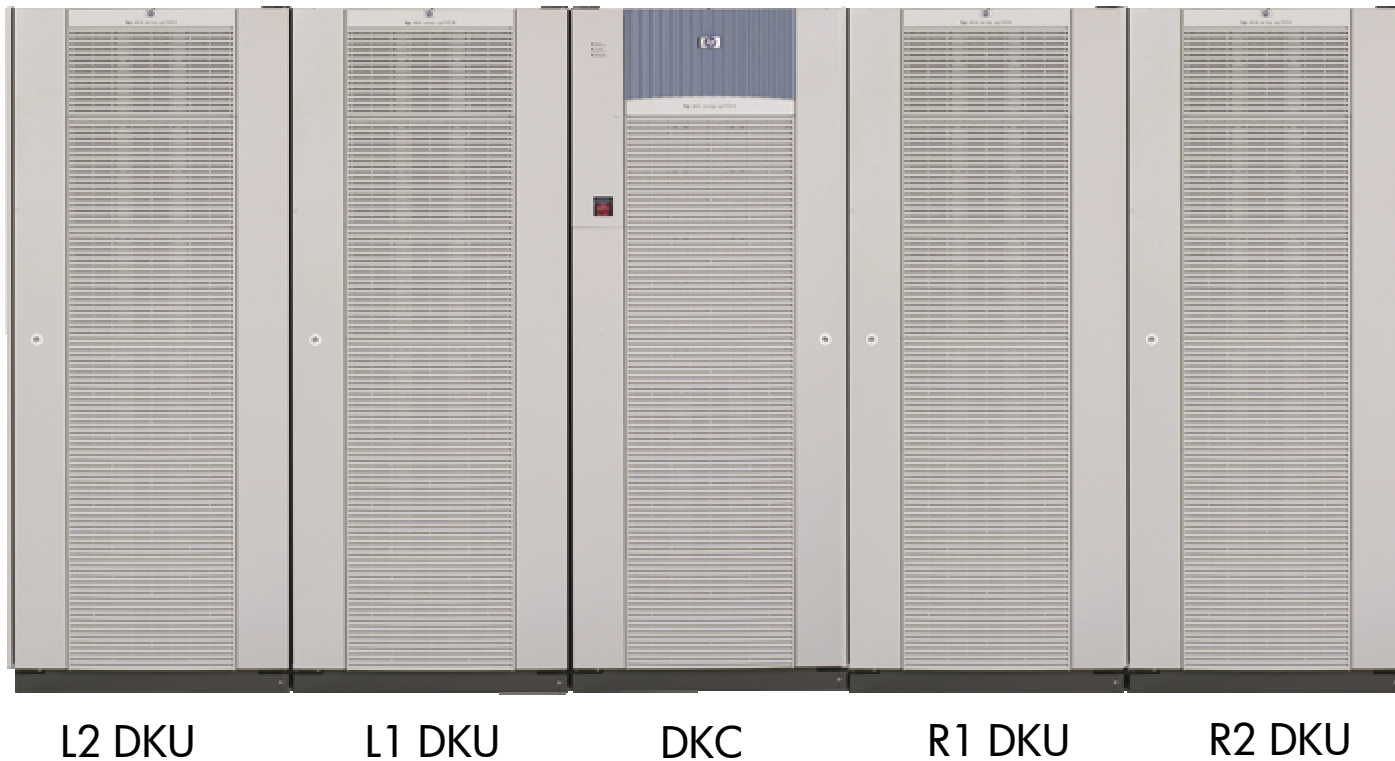
- Industry work experience
- Reasons for presenting
- Audience expectations



Part 1: The StorageWorks Disk Array XP1024

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

XP1024 array



Legends:

DKU – Disk Unit (max 256 disks)

DKC – Disk Controller

Specifications

TEM			SPECIFICATION
Subsystem	Maximum number of disk drives		1024
	RAID Level		RAID 5 / RAID 1
	RAID Group Configuration	RAID 5	3D+1P / 7D+1P
		RAID 1	2D+2D / 4D+4D
	Maximum number of RAID Groups	3D+1P / 2D+2D	254 (Spare Disk = 8) 252 (Spare Disk = 16)
		7D+1P / 4D+4D	126 (Spare Disk = 16)
	Maximum number of spare drives		16
Memory	Maximum number of volumes		8192
	Cache memory	Memory capacity	2GB – 64GB
		Battery backup time	48 hours
	Shared memory	Memory capacity	512MB – 3GB
		Battery backup time	7 days

Specifications

ITEM			SPECIFICATION
Device I/F	DKC - DKU Interface		Fibre Channel AL / Dual Port
	Data transfer rate (MB/s)		Maximum of 100
	Maximum number of Disk Adapters		8
Channel I/F	Supported channel option	Mainframe	ESCON (Serial channel) = 8 ports (SW) 1Gbps Fibre Channel (SW)
		Open systems	1-2Gbps Fibre Channel (SW)
			1-2Gbps Fibre Channel (LW)
			1.25Gbps NAS (SW)
	Data transfer rate (MB/s)	ESCON	17
		Mainframe FC	100 / 200
		Open systems FC	100 / 200
		NAS channel	100
	Maximum number of Channel Adapters options		4

Features

- Scalable
 - Scales from 9 drives to 1024 or over 129 TB of usable storage capacity, 4 drives at a time, and up to 128 GB of cache, online with no interruptions to applications or hosts, to accommodate growing storage needs
- Redundant
 - All critical components are redundant and hot-replaceable to provide extreme reliability and availability, including: processors, cache, shared memory, I/O interfaces, power supplies, batteries and control processors

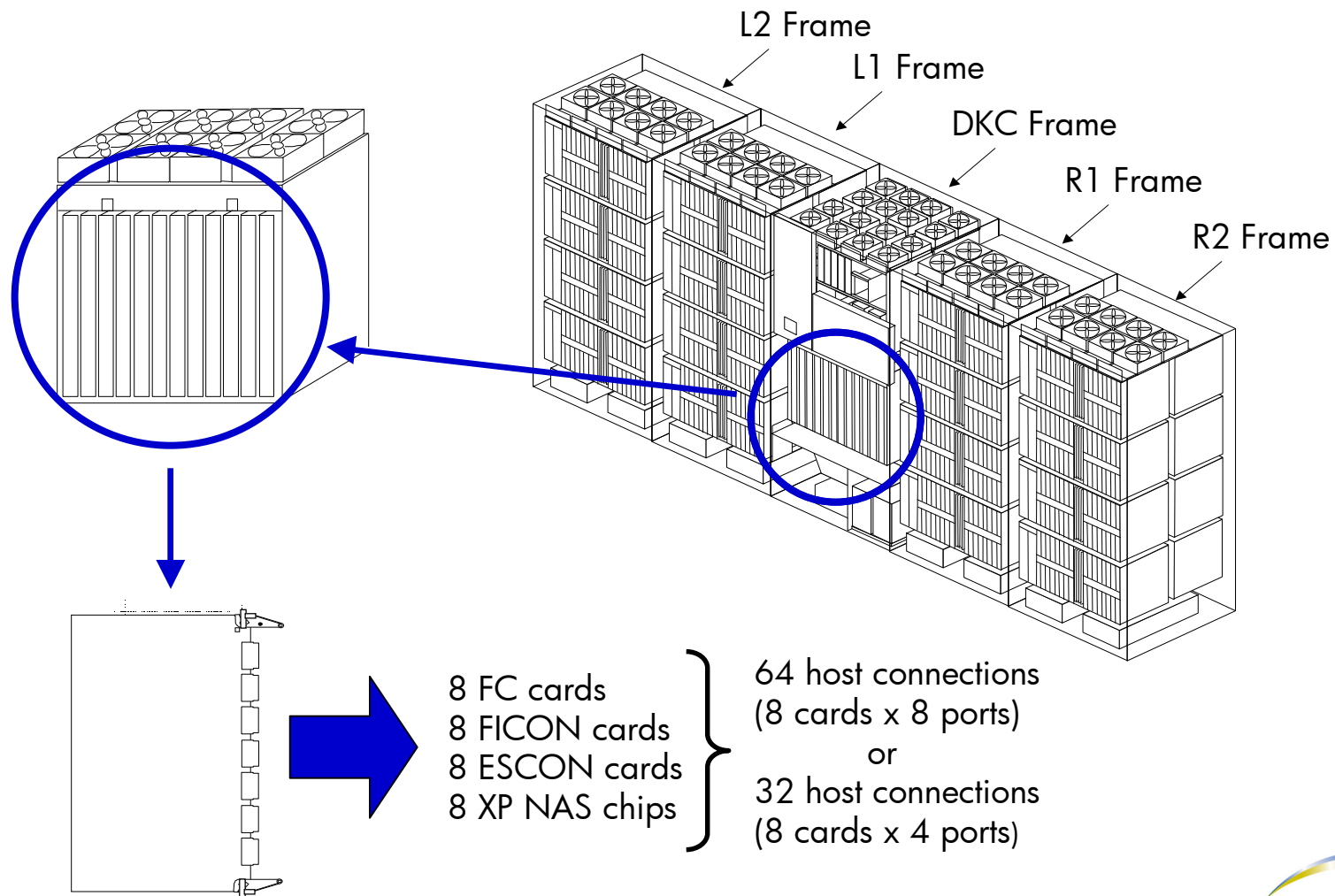
Features continued

- Performance
 - Uses an advanced crossbar fault tolerant architecture resulting in outstanding levels of random and sequential I/O operations for database, OLTP, SAP, Oracle, and messaging workloads
- Heterogeneous
 - Supports multiple operating systems, including HP-UX, Windows, Linux, OpenVMS, Mainframe, Tru64, Netware, Solaris, and AIX
- Open Connectivity
 - Fibre Channel, FICON, ESCON and XP NAS CHIP connectivity

Features continued

- Flexible
 - Supports a mixture of disk drives configured as RAID 1 (2D+2D and 4D+4D) and RAID 5 (3D+1P and 7D+1P).
- Manageable
 - Multiple arrays and hundreds of terabytes can be managed from a single station, by existing staff, with no increase in staffing
- Low Cost of Ownership
 - Great price/performance ratio, increased productivity via higher throughput speeds and zero downtime, compact footprint to conserve floor space, and ease of management

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 scalable

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 failures/anomalies
- Pay close attention to ASCII standards that are vendor unique because it might cause interoperability 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:
 - HP-UX
 - AIX
 - Solaris
 - Windows
 - Linux
 - Tru64
 - OpenVMS
- Supports different protocols:
 - Fibre Channel
 - ESCON
 - FICON
 - Ethernet

Security and data protection

- Must be able to restrict disk access to specific hosts within the SAN, e.g., using World Wide Name LUN security
- Must ensure different hosts do not have access to disks (Logical Units) belonging to other OS on the same SAN topology
- Must be able to detect data inconsistency
- Must be able to backup and restore data reliably

Scalability

- Initial SAN topology design should include scalability:
 - Number of servers
 - Number of switches
 - Number extenders / converters
 - Number of storage devices
- Initial SAN topology design should include flexibility:
 - Change in protocol, e.g., from ESCON to FICON
 - Change in topology, e.g., from direct connect to fabric switch connect

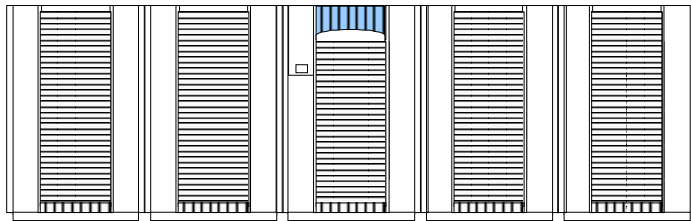
Part 3:

SAN heterogeneous essentials



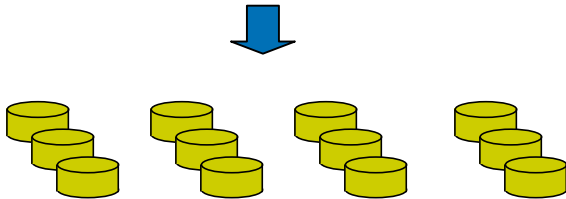
- Storage array supporting different operating systems
- Enough host port connectivity
- Sufficient storage devices
- Correct fabric controller for the environment
- SAN Topology

SAN heterogeneous essentials



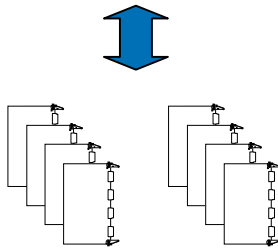
Multiple OS Support

XP array supports different OS via Host Mode setting



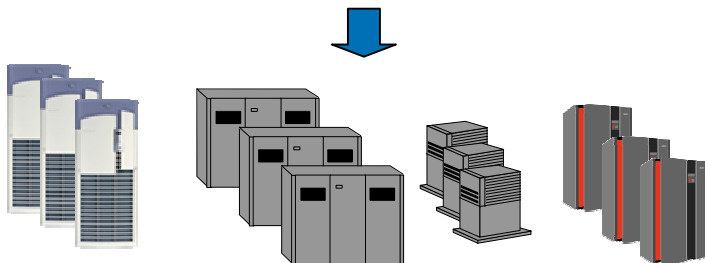
Storage Scalability

XP array can scale up to 129 TB



Multiple Host Interface

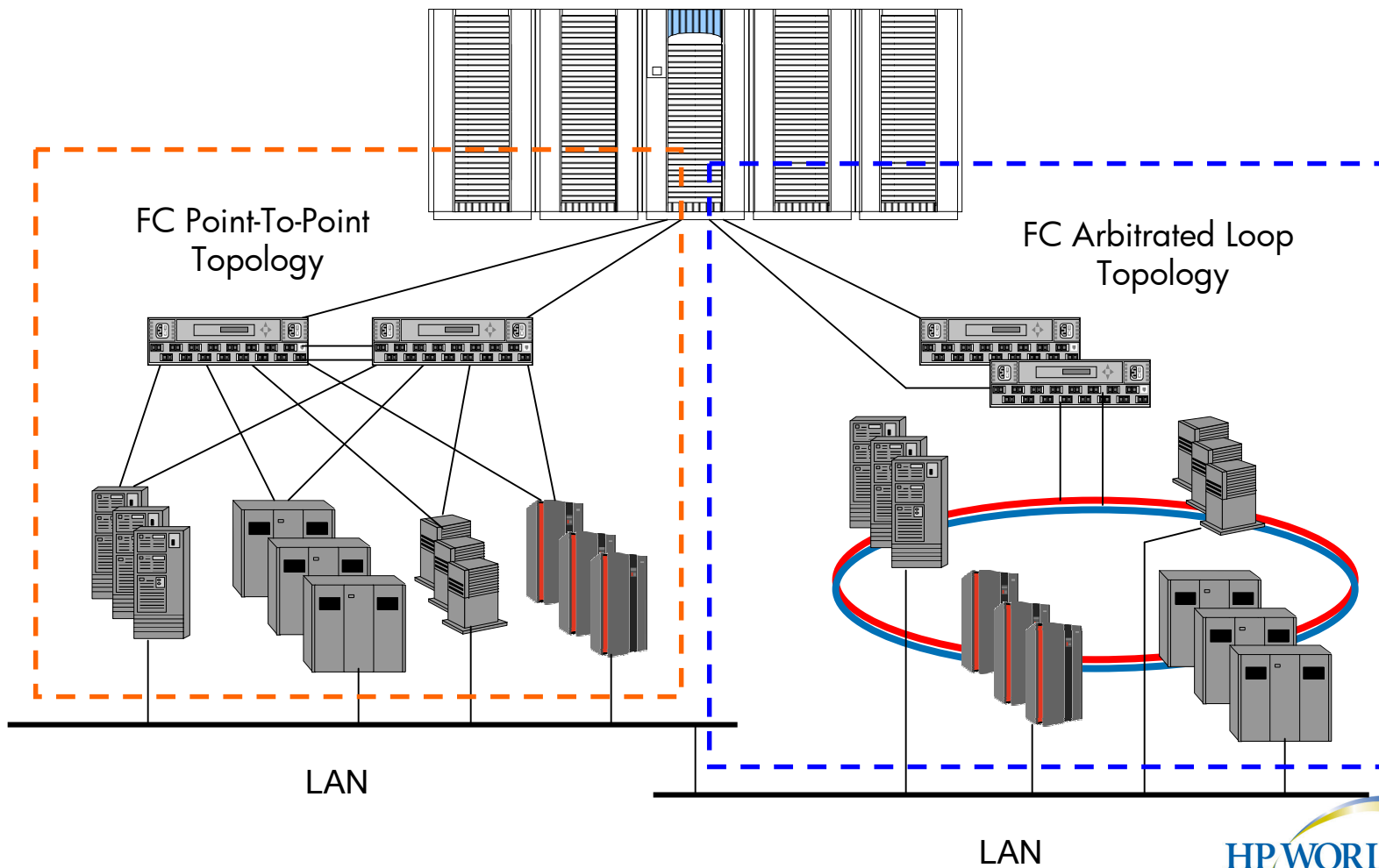
XP CHIP cards support 32 or 64 host connections



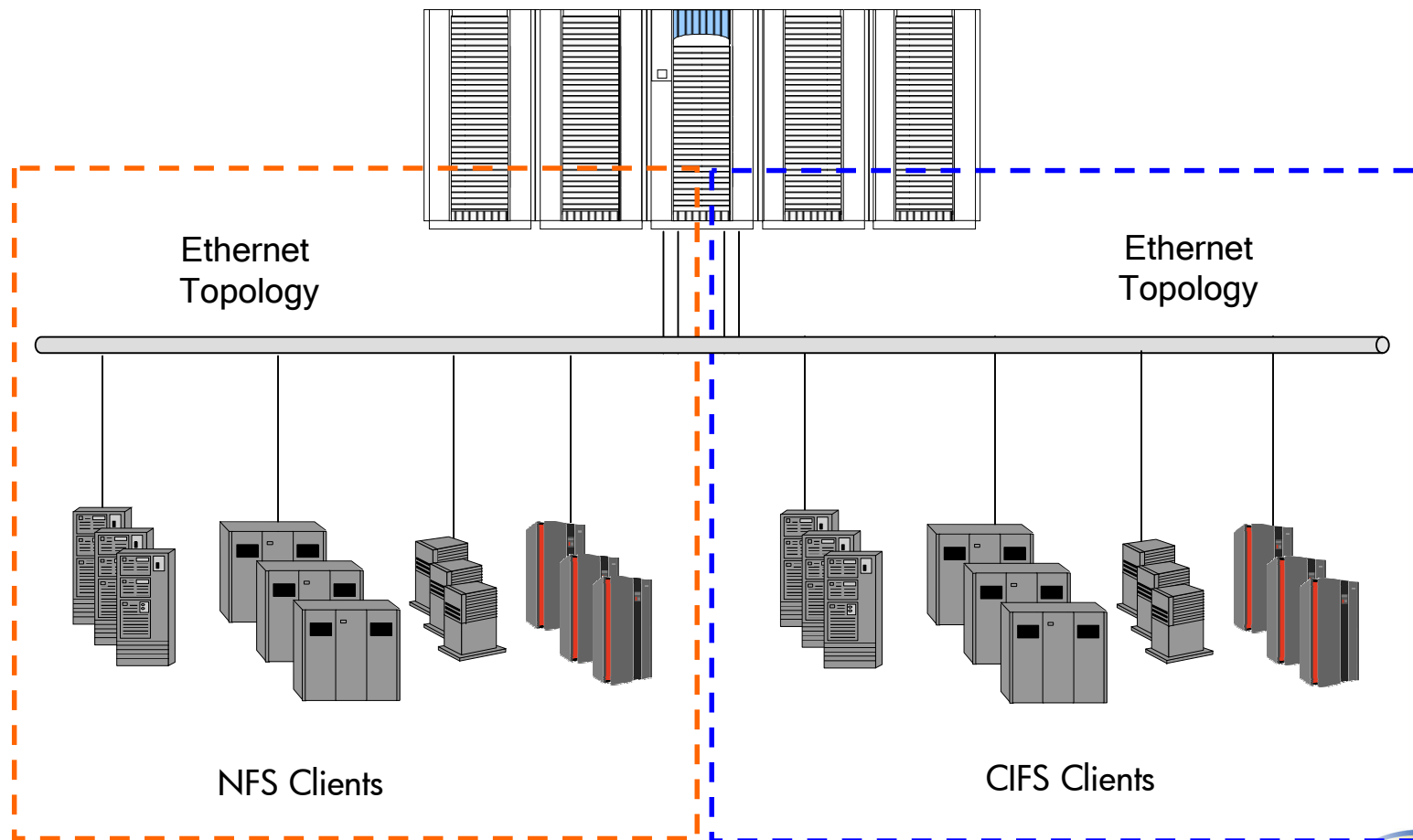
Heterogeneous Connections

LUNs from heterogeneous hosts are secured using the WWN of the host bus adapter (HBA)

Fibre channel SAN topology



network attached storage SAN topology



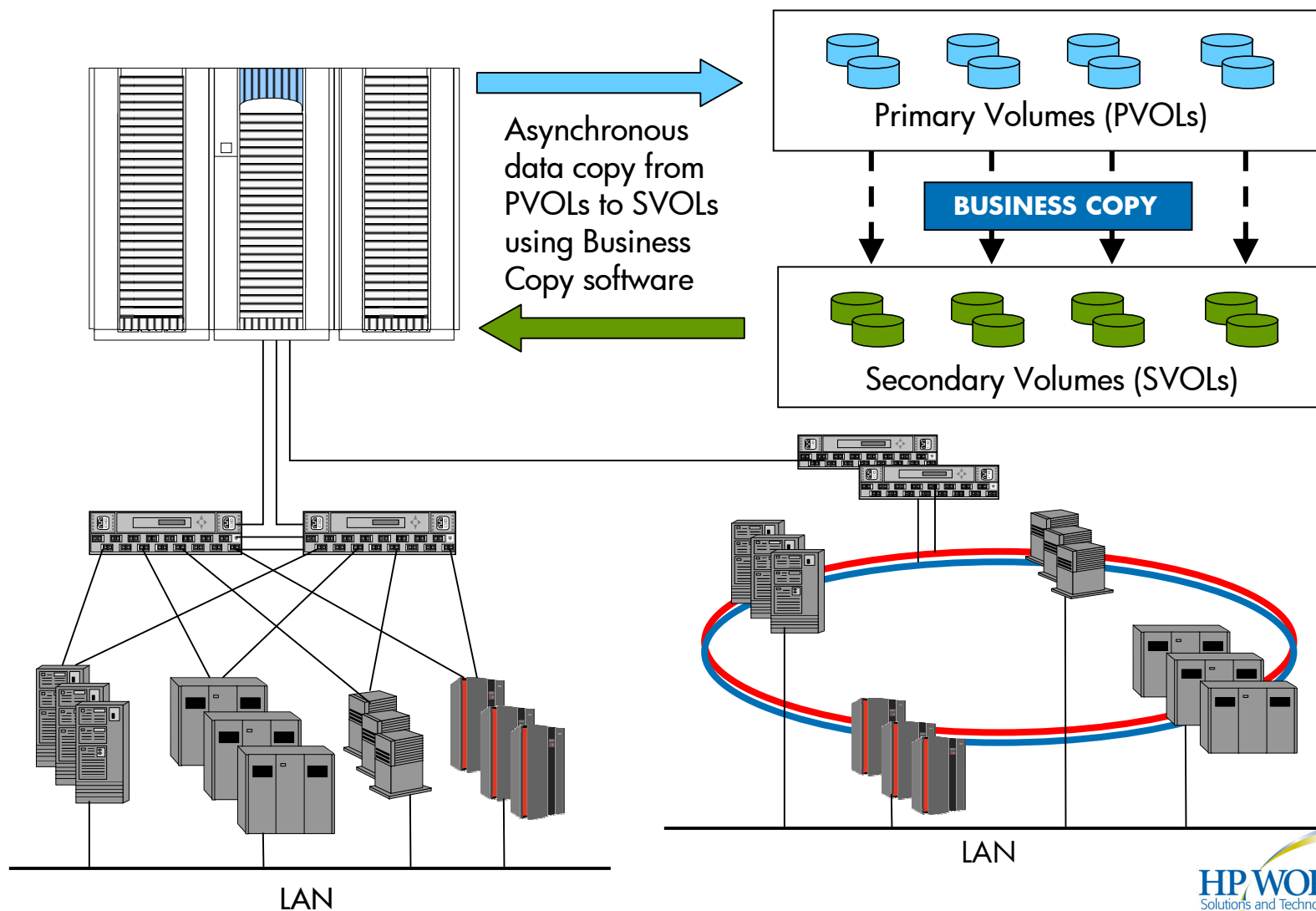
Part 4:

Backup and recovery

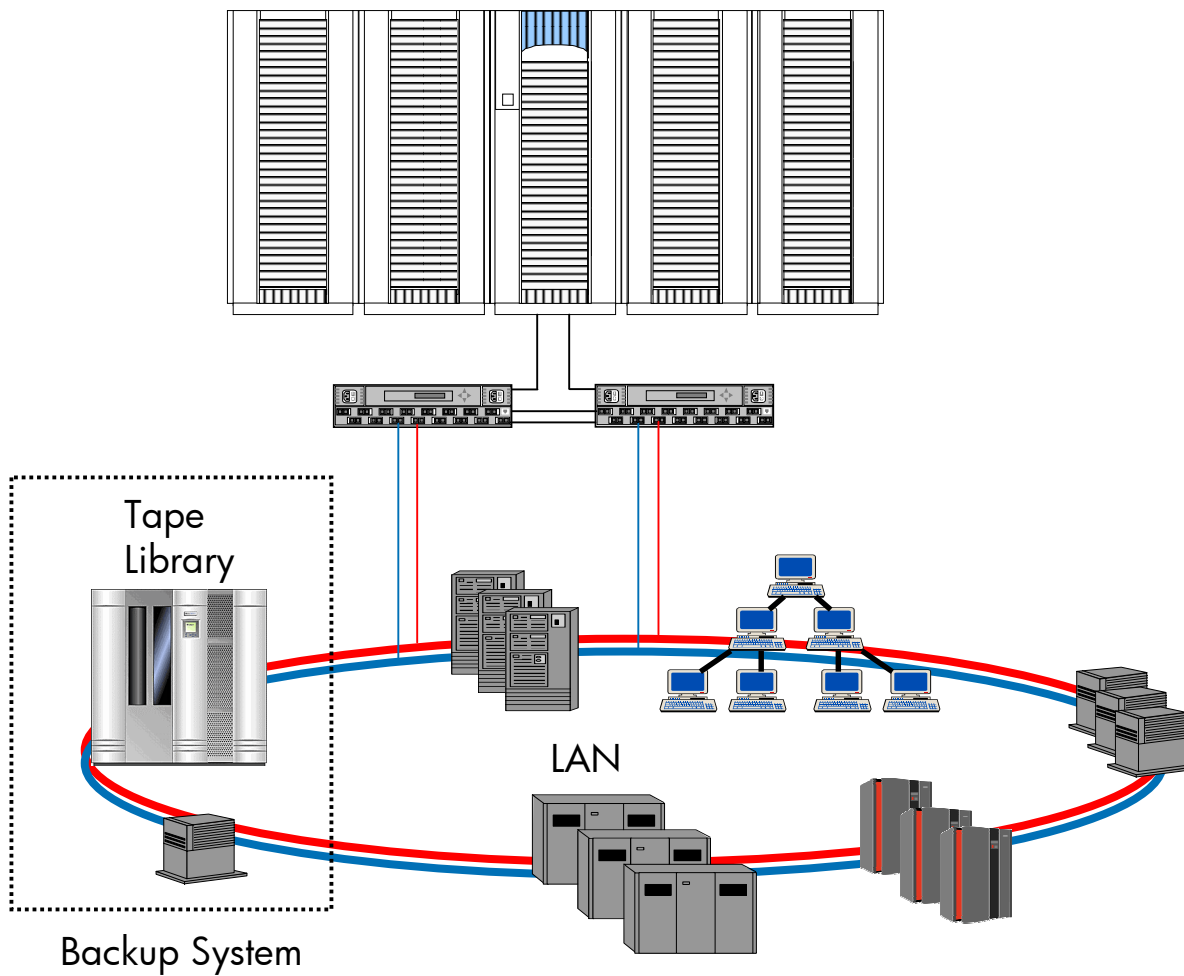


- Disk-to-disk copy
- Tape library backup
- Remote copy

Disk-to-disk copy

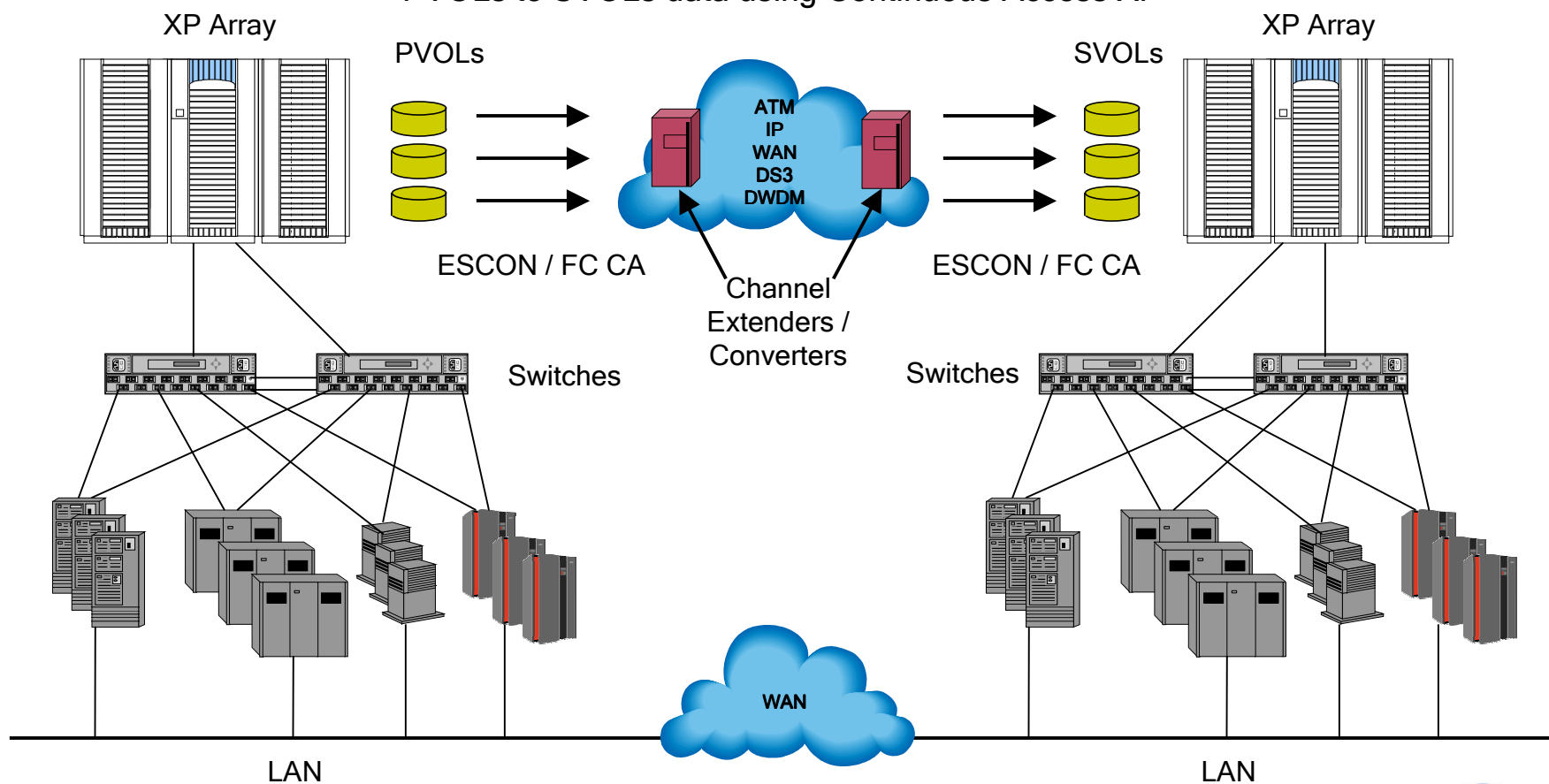


Tape library backup



Remote copy

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



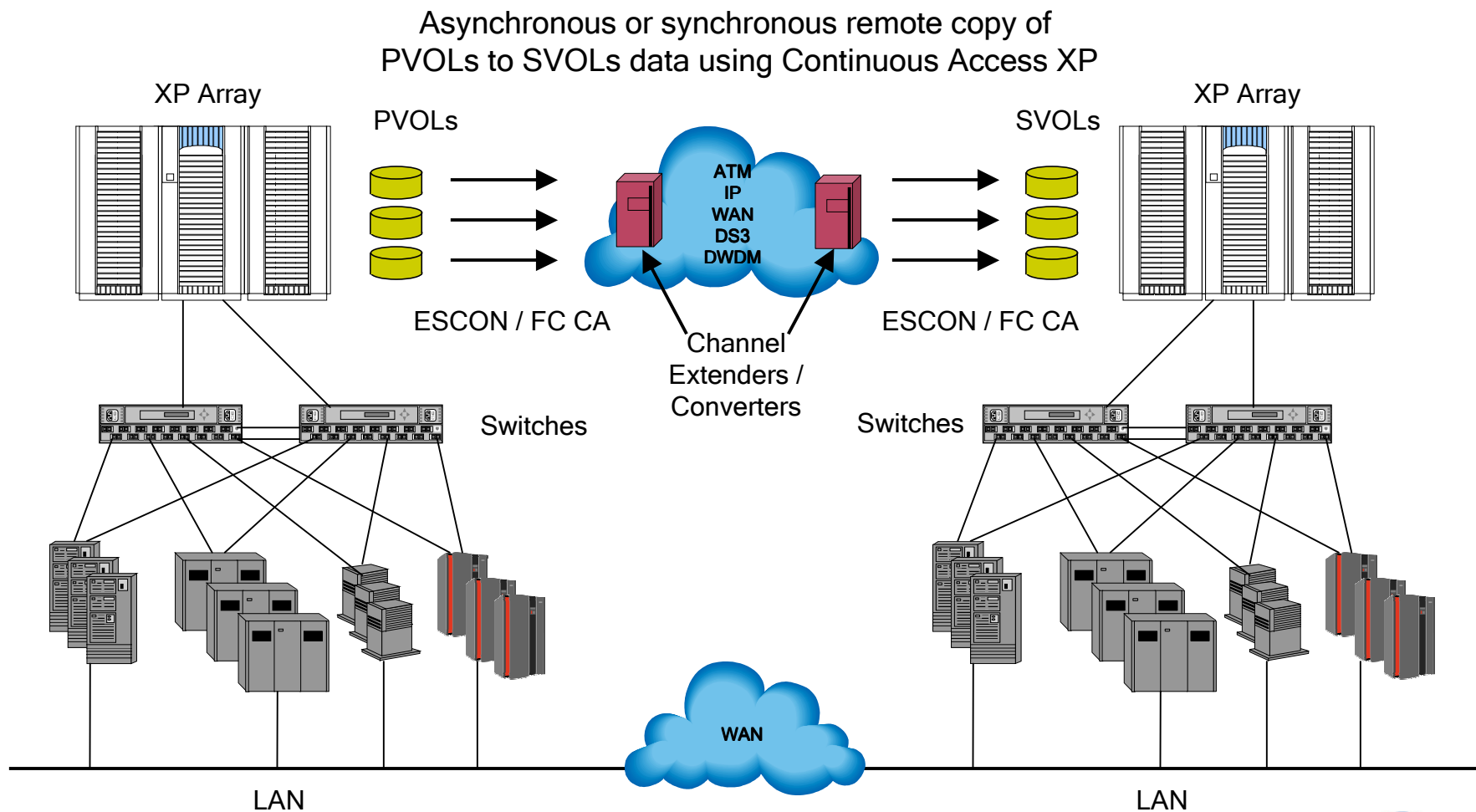
Part 5:

High availability solutions

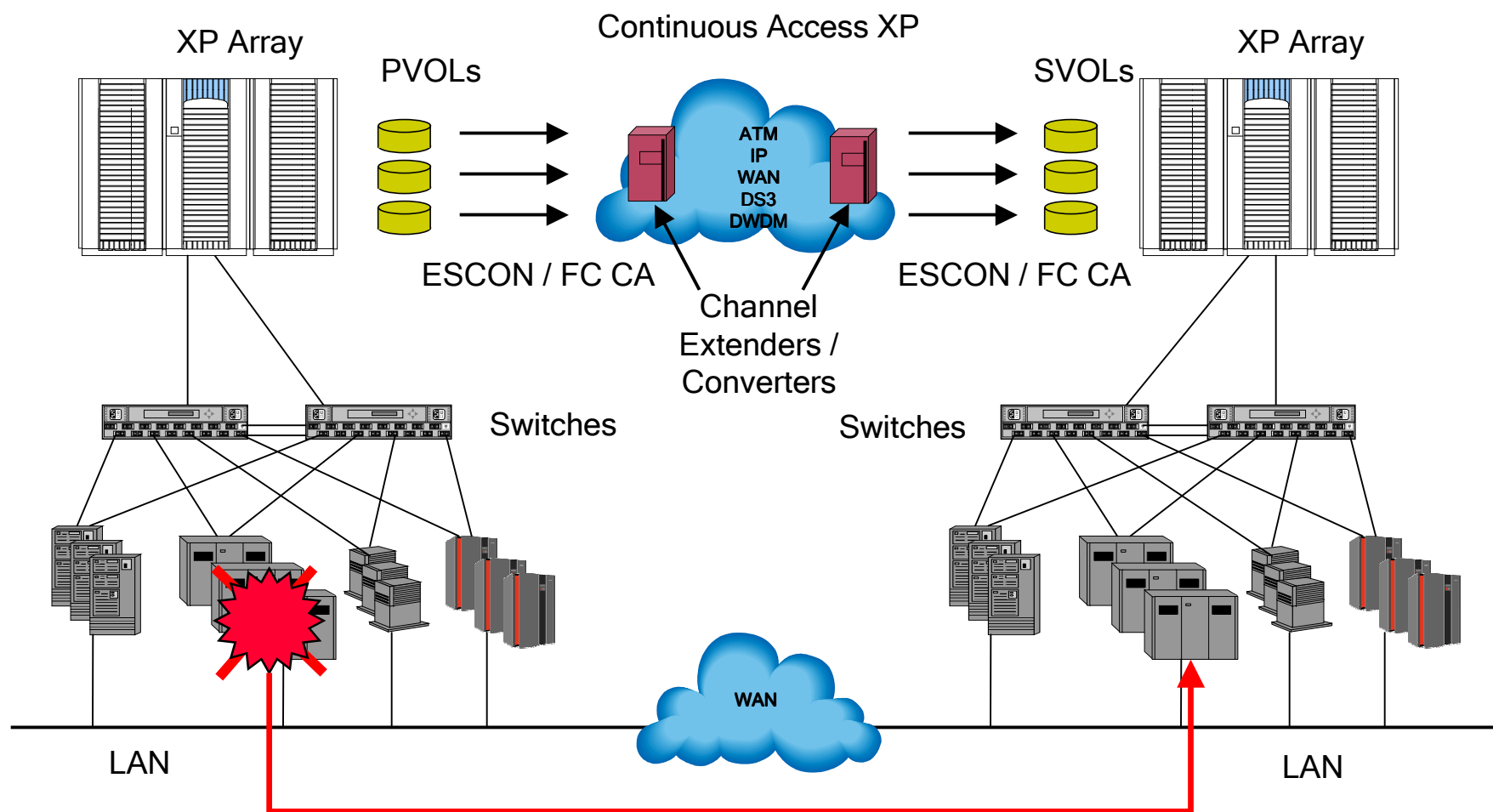


- Synchronous / asynchronous data replication
- Protection from hardware failures
 - Single failure
 - Multiple failures
 - Data center failure

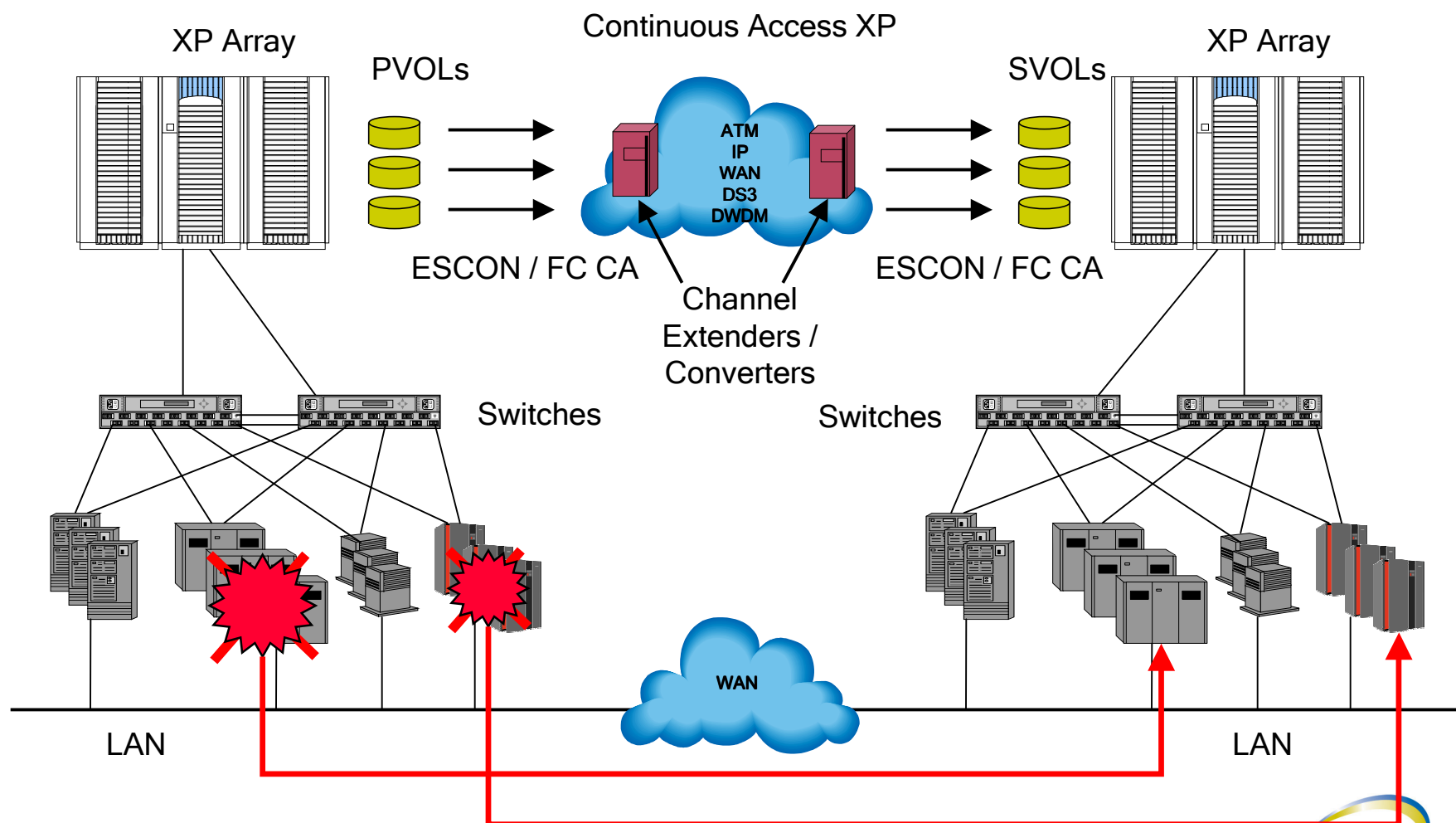
Synchronous / asynchronous data replication



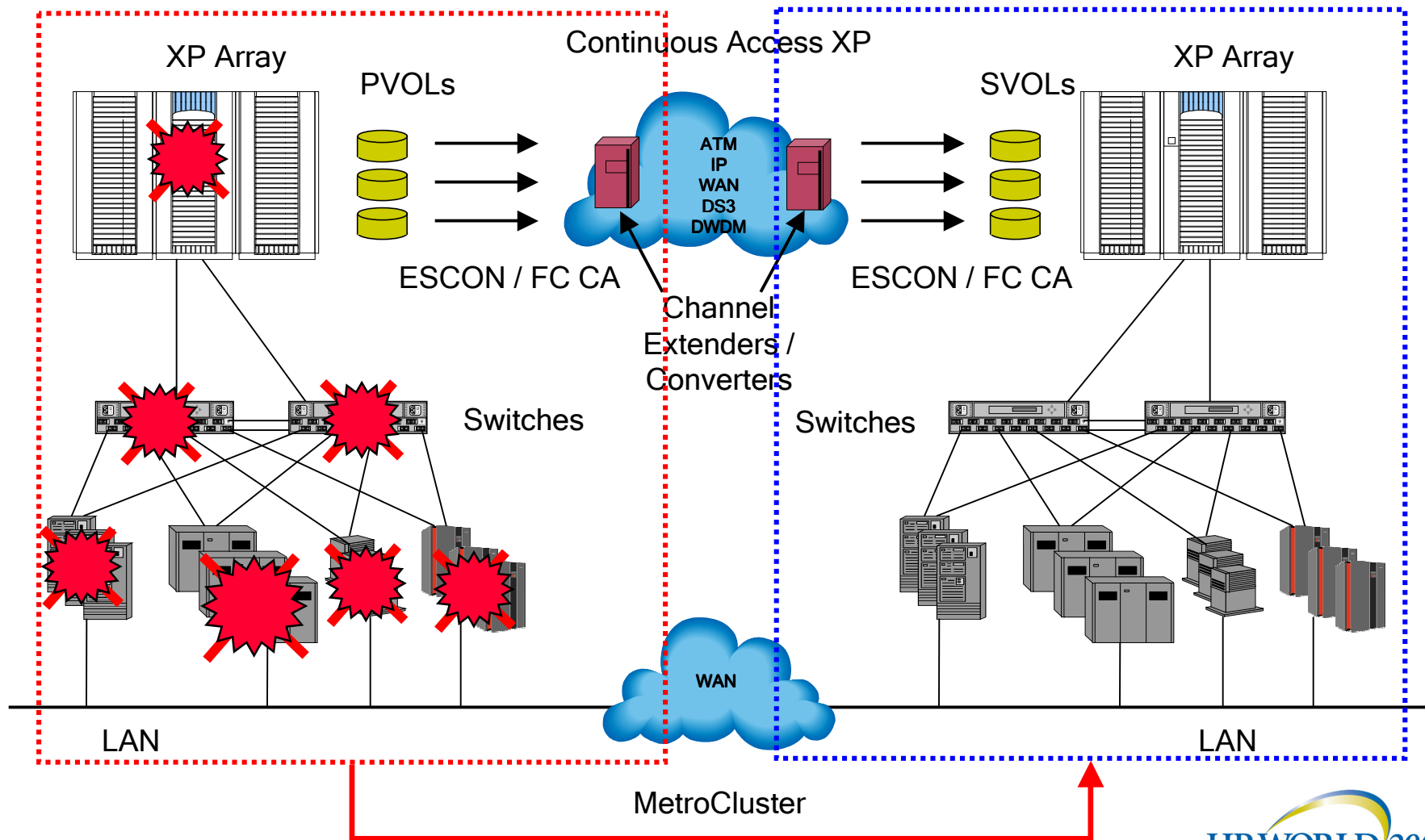
Single failure



Multiple failures



Data center failure

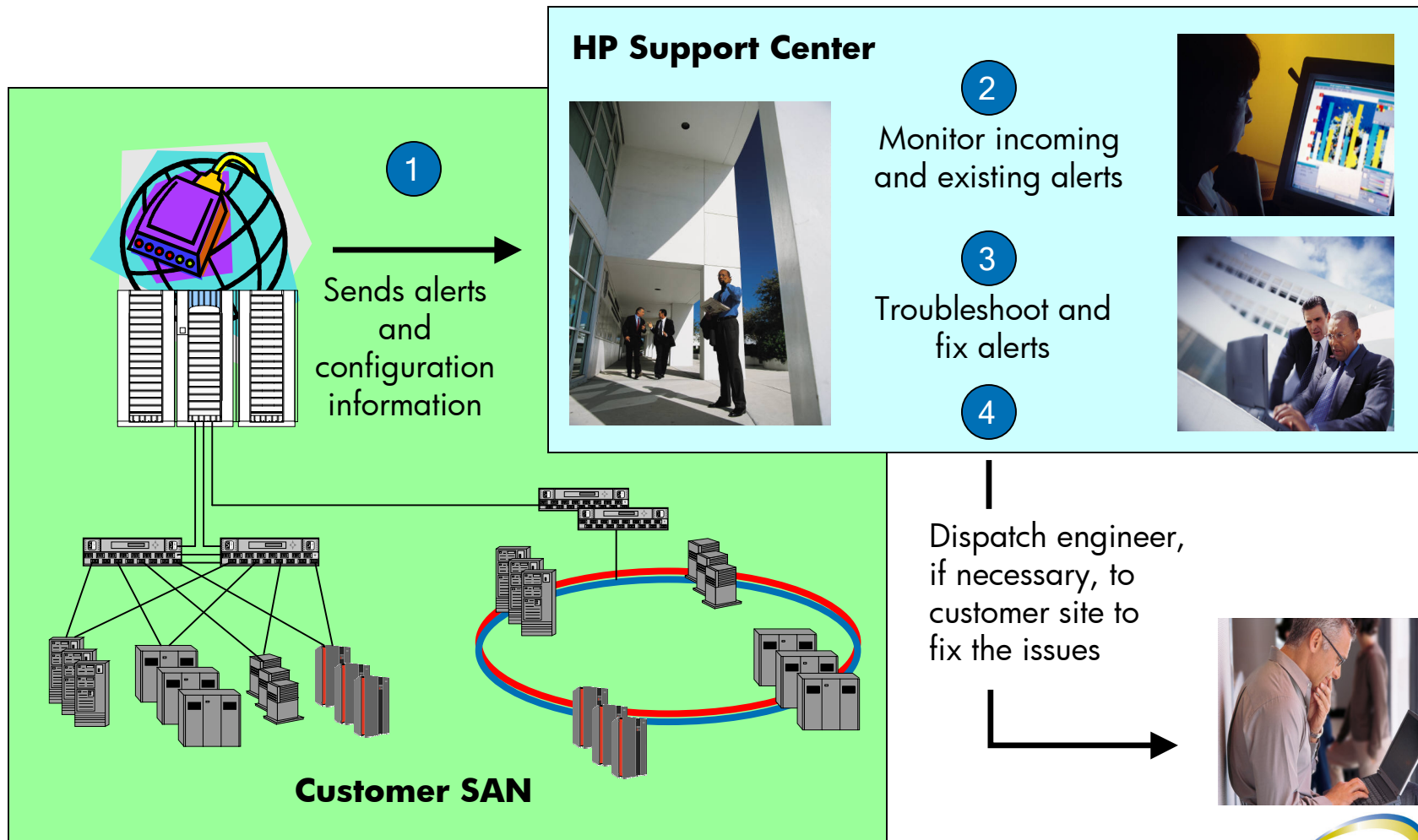


Part 6: SAN maintenance

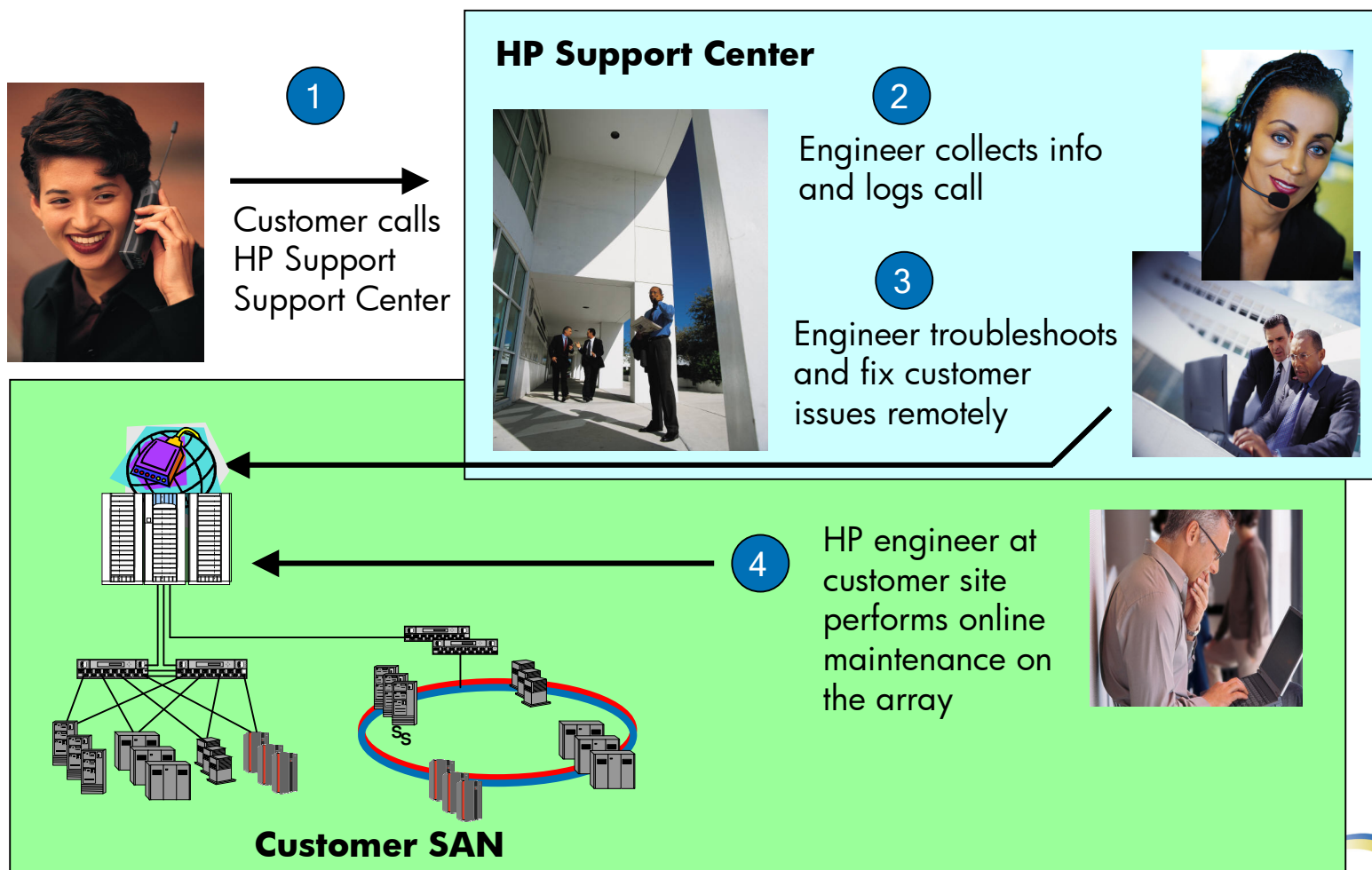


- Automatically sends alerts to HP Support Centers
- Automatically sends system configuration to HP Support Centers
- Remote troubleshooting and maintenance
- Online maintenance

Automatically sends alerts to hp support centers



Online maintenance



Part 7: Question & Answer Session





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