Storage Wide Area Network Design, Implementation and Performance Analysis

HP World 2004 Symposium
Session # 3150 August, 2004

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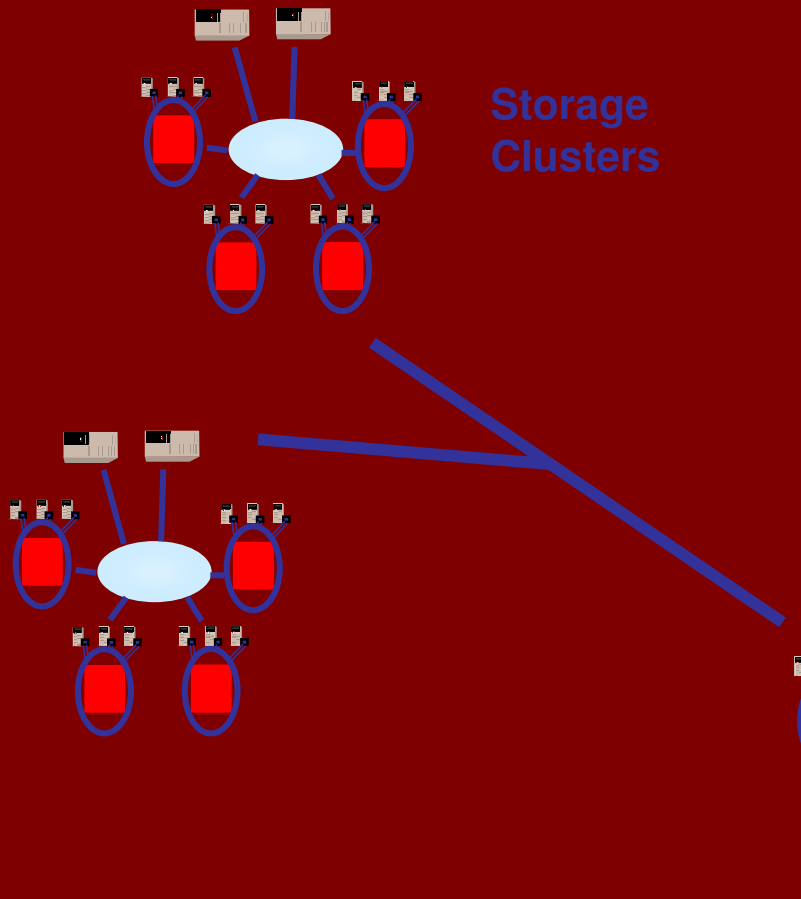
Storage WAN (SWAN)



- Features
  - Manage the WORLD as a single Entity
  - Wide area data sharing/migration
  - Storage Management/Reporting
  - Shadow/Remote Backup
  - Wide area DT
  - Connectivity within standard infrastructure (Network)
  - Span: The World

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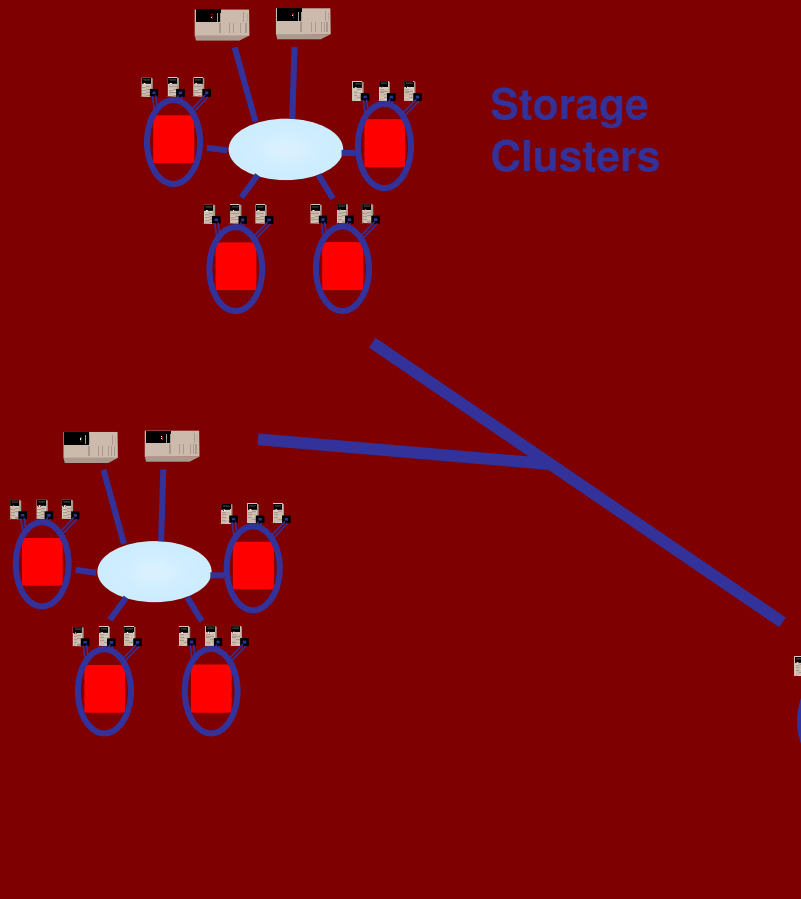

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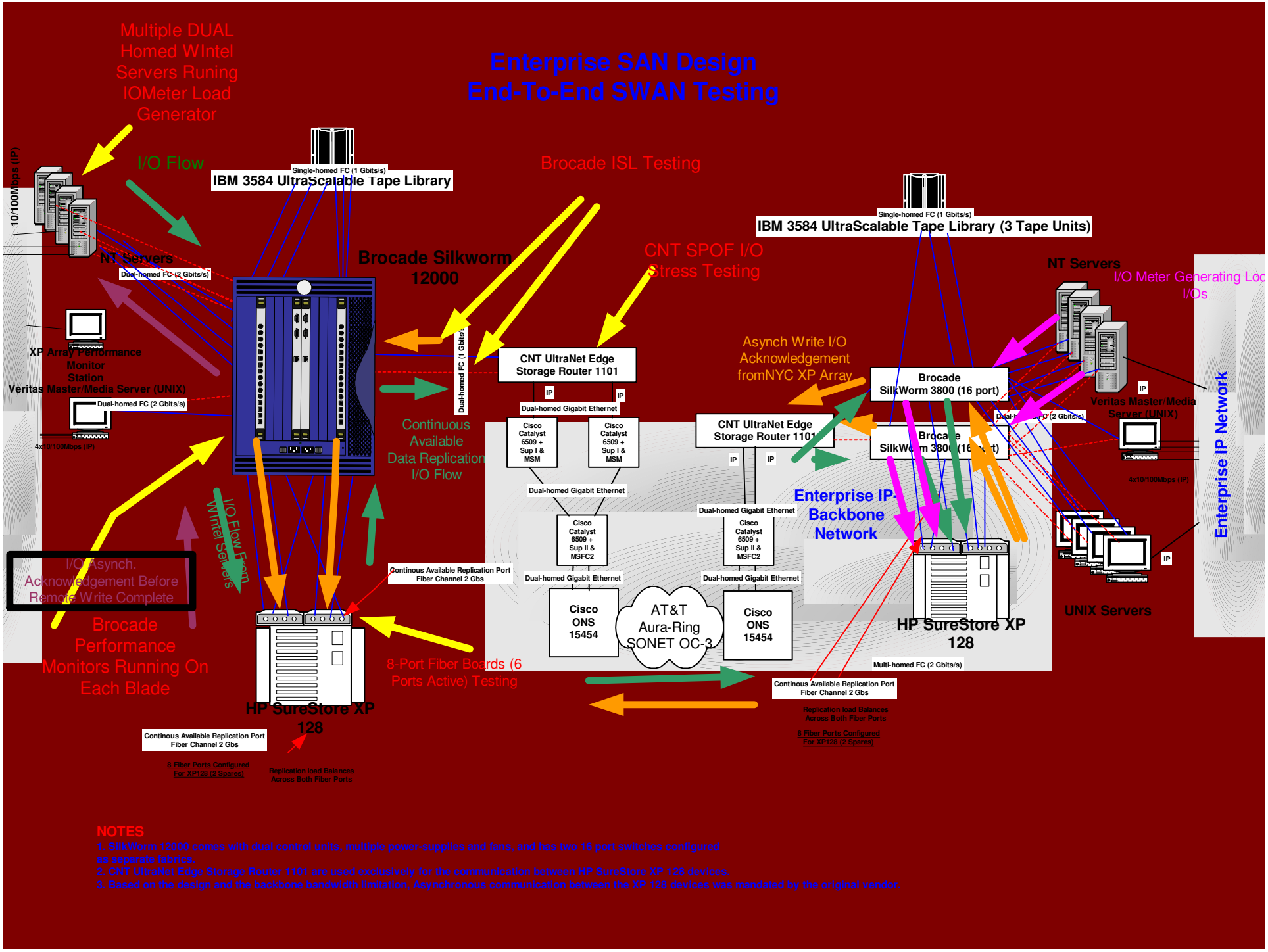


NOTES

1. SilkWorm 12000 comes with dual control units, multiple power-supplies and fans, and has two 16 port switches configured as separate fabrics.
2. CNT UltraNet Edge Storage Router 1101 are used exclusively for the communication between HP SureStore XP 128 devices.
3. Based on the design and the backbone bandwidth limitation, Asynchronous communication between the XP 128 devices was mandated by the original vendor.

Host Bus Adapters

- Individual Component Utilization Is A Necessary Part SAN Architecture and Implementation.
- Selecting the Right Will Lower Overall SAN Costs.

Host Bus Adapters

- Connect the Server to the SAN.
- Alleviate the Server From Some I/O Processing.
- Typically, Assist in the Execution of Parts of Communications Protocol.
- Compatibility Across HBA's.

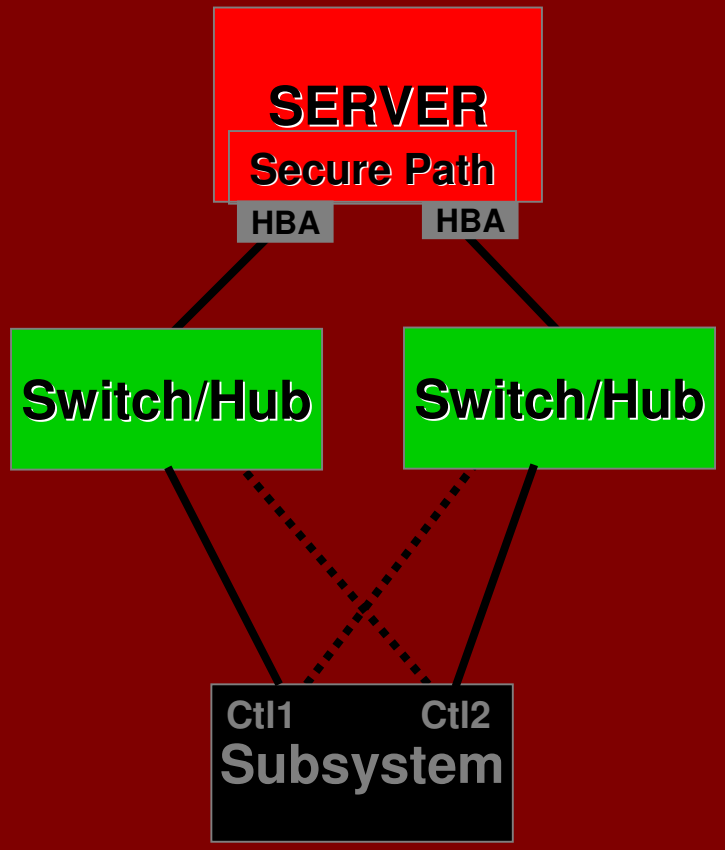
Emulex HBA's

- Dual Channel (LP9402DC)
  - ❖ High performance through the use of two Emulex Centaur ASICs,
  - ❖ Two 266MIPS onboard processors,high speed buffer memory.
  - ❖ Automatic speed negotiation capability which allows complete compatibility between 1GBS and 2 GBS.
  - ❖ switched fabric support,full-duplex data transfers.
  - ❖ high data integrity features,support for all Fibre Channel topologies
  - ❖ dual channel HBA. Channels deliver up to 800MB/s link bandwidth

EMULEX HBA's

- Single Channel (LP9802)
  - full duplex 2Gb/s Fibre Channel delivering up to 400MB/s
  - automatic speed negotiation
  - automatic topology detection
  - onboard hardware context cache for superior fabric performance
  - support for use of multiple concurrent protocols (SCSI and IP)
  - support for FC-Tape (FCP-2)devices
  - 66/100/133 MHz PCI-X 1.0a and PCI 2.2 compatibility
  - Buffered data architecture to support over 50km cabling at full 2Gb/s bandwidth
  - Windows 2000,Windows NT,HP-UX,Linux,NetWare,Solaris and AIX

HP *StorageWorks*™ Secure Path



Secure Path is Multi-path software

Benefits:

- Eliminates path as single point of failure
- Higher performance
- Static or dynamic I/O balancing
- Path failure detection

When Used:

- When highest availability needed
- When highest performance needed

Brocade SilkWorm® Product Family

- Based on a common, intelligent technology
- Entry-level to enterprise solutions
- Fully compatible building blocks
- Advanced software services and management

NEW

SilkWorm 24000

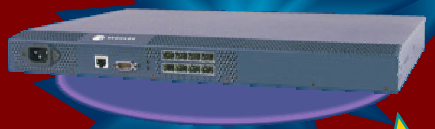
SilkWorm 12000

SilkWorm 3900

SilkWorm 3800

SilkWorm 3850

SilkWorm 3250



NEW

NEW

8 - 128-port switches

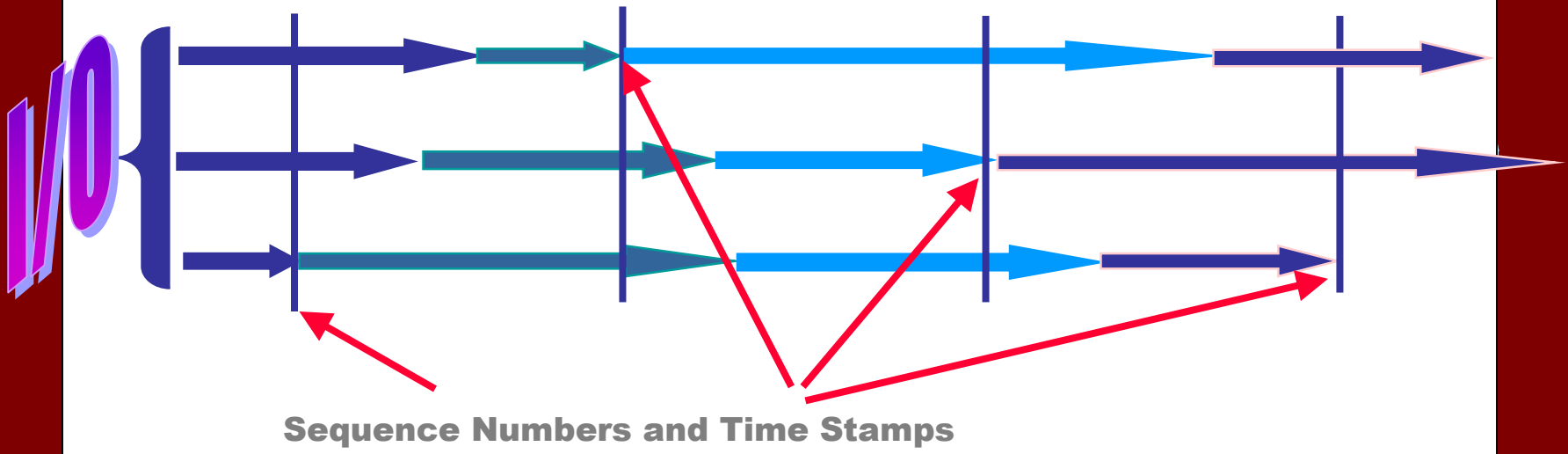
- Hot Code Activation across the product line
- Auto-sensing 1 and 2 Gbit/sec
- Higher port density
- ISL Trunking and Frame Filtering
- Brocade Advanced Fabric Services

SilkWorm 12000 Core Fabric Switch

- Flexible, modular architecture
  - Scalable 64/128 port design
  - 2 Gbit/sec ports; Autosensing
  - 3rd generation Brocade ASIC
- 99.999% availability
  - Redundant, hot-swap elements
  - Non-disruptive software updates
  - Redundant 64 port switch config
- Intelligent fabric services
  - Interswitch link trunking
  - Frame filtering
  - Global performance analysis
- Multi-protocol architecture
  - 10 Gbit/sec fibre channel
  - IP storage interconnect
  - InfiniBand

I/O Consistent

Non-Synchronous & Synchronous DB I/O



What's Wrong with Routed IP in the WAN?

- Routed IP is designed for scalability and connectivity
- Routed IP is NOT designed for performance
- TCP algorithms are designed to make the end user back-off quickly at the first sign of congestion
- Throughput is controlled by latency (geographical distance) and packet loss rate
- IP Carriers will always have packet loss
  - Sell service by peak capacity
  - Allocate equipment based on average capacity