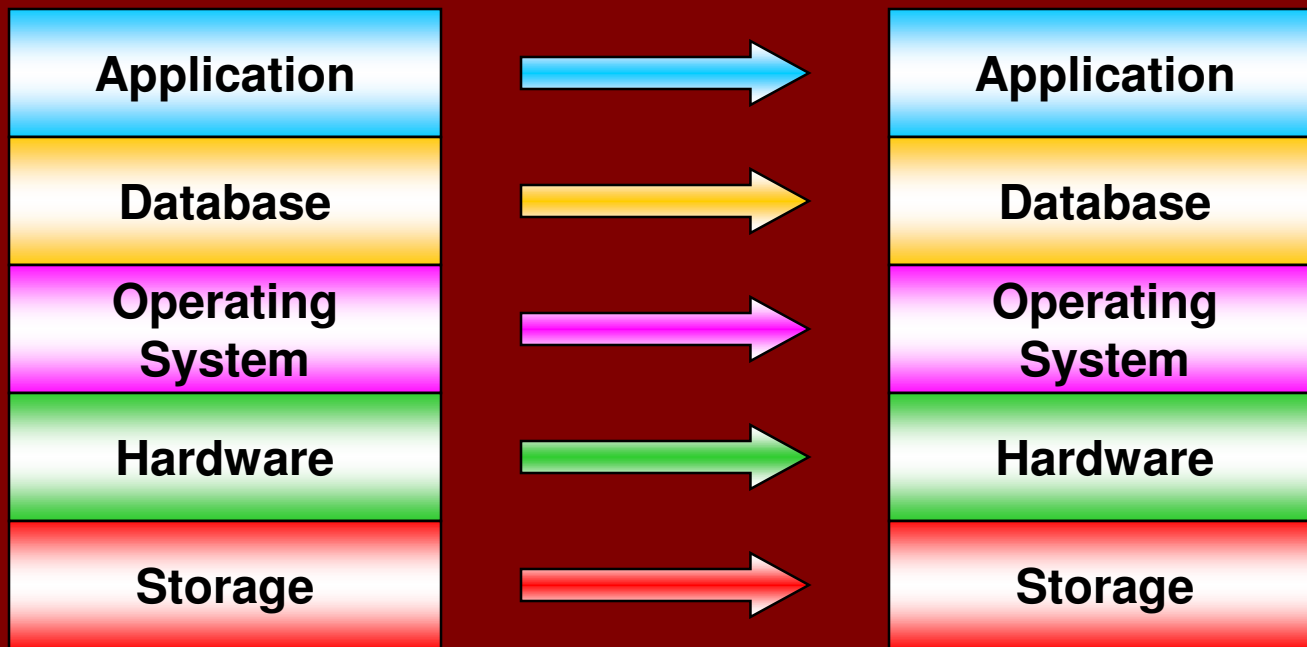


Data Replication

➤ Replication can be done
at many levels

➤ Replication can be done
at many levels



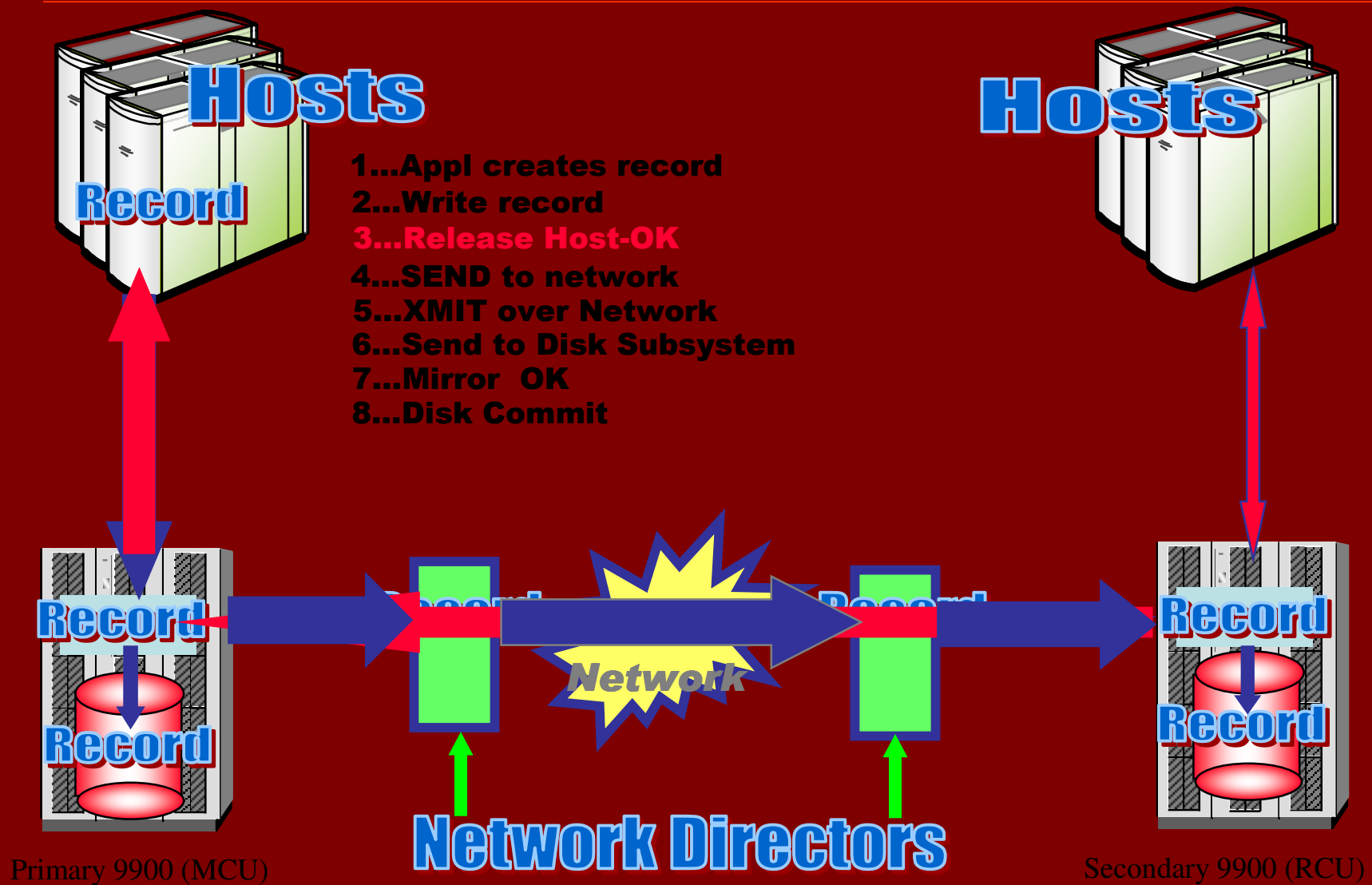
•Real Time COPY

- Provide Disaster Recovery
- **NOT to maintain two identical copies**
- Provide I/O consistent copy of data

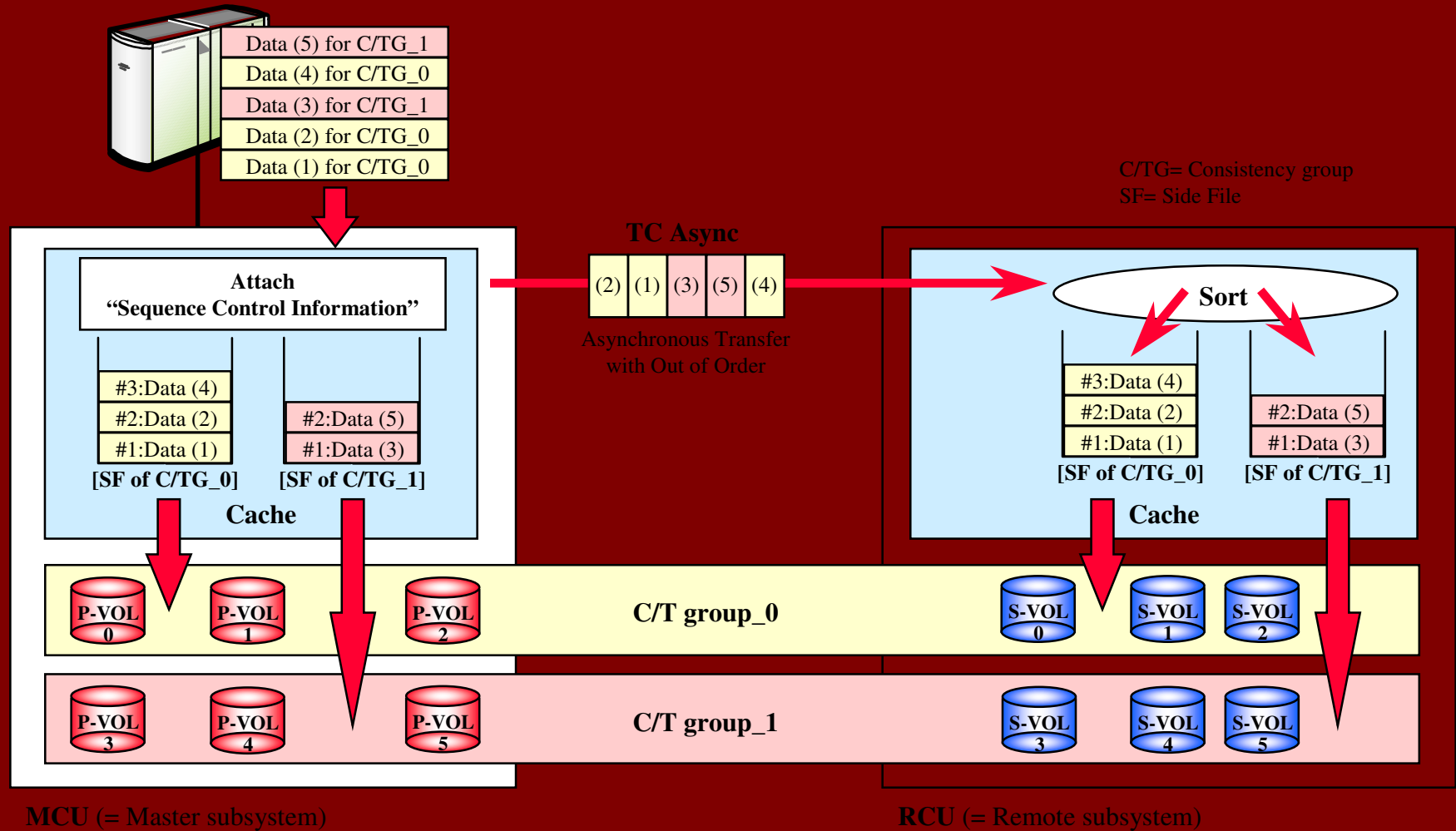
Synchronous Or Asynchronous

- If Within **Supported** Distance Use Synchronous Because:
 - Data is more secure
 - Best overall performance
- Asynchronous is supported
 - Cases w/low I/O rates and some potentially lost data is acceptable if links are broken

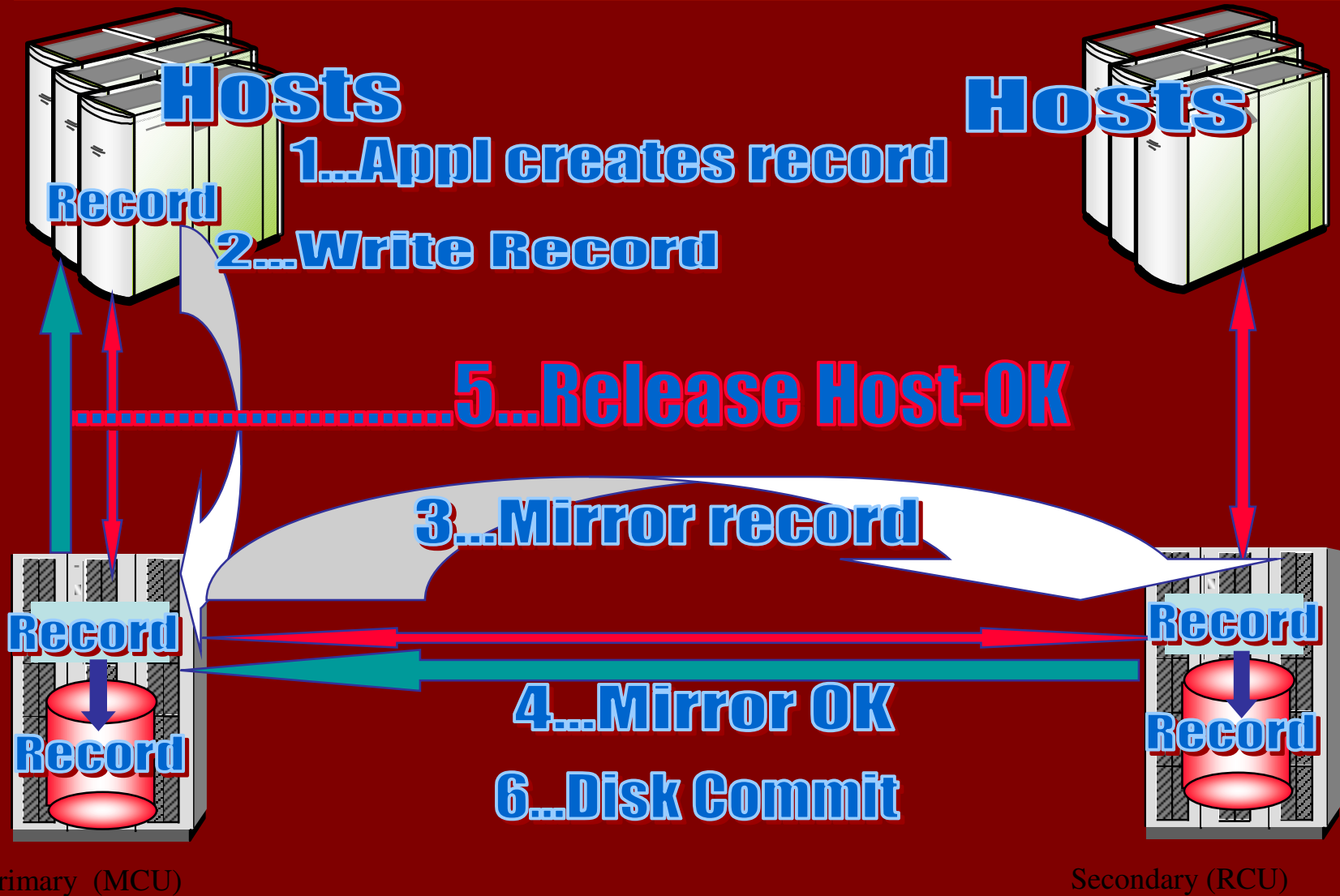
Asynchronous Operations



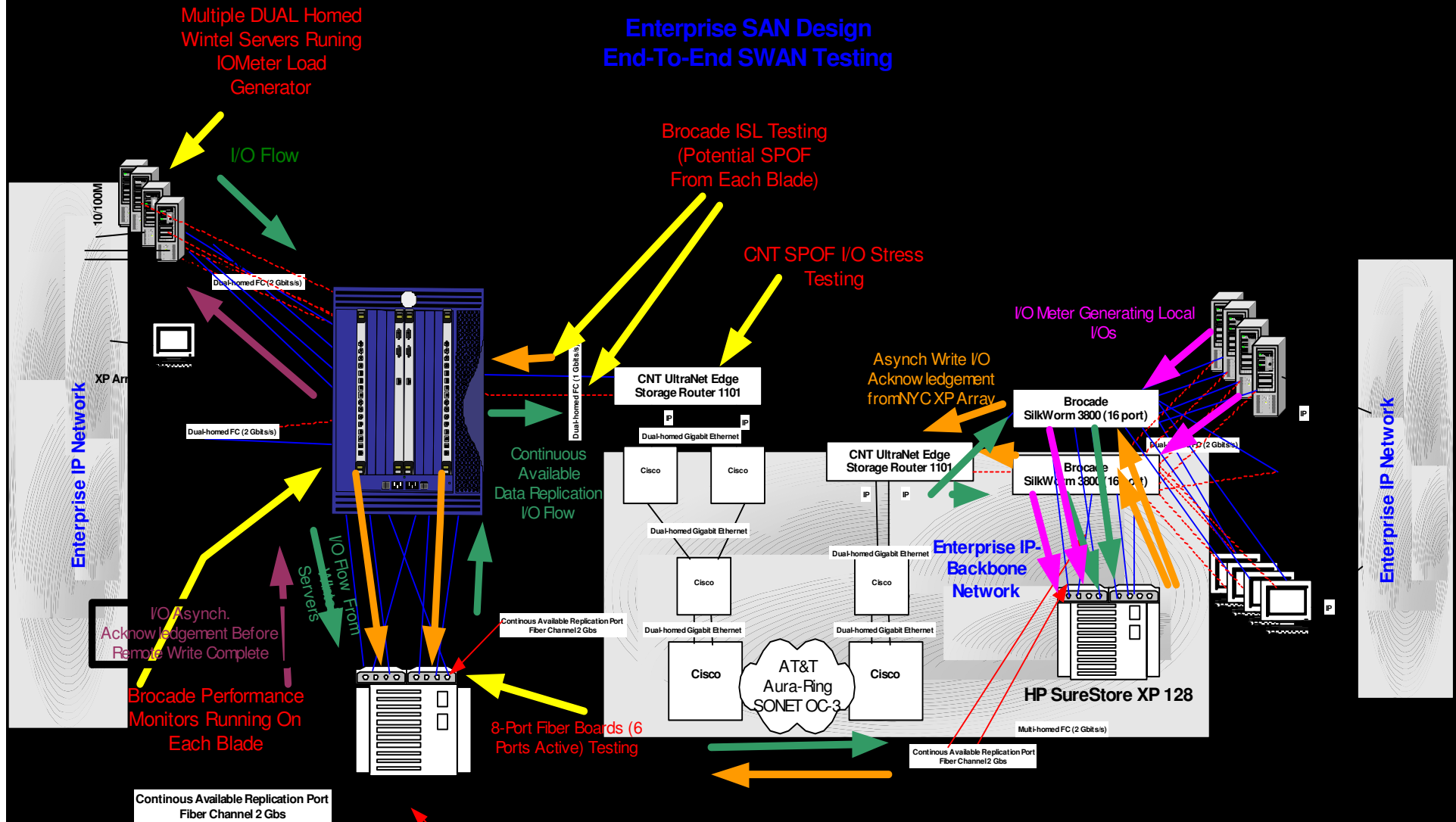
Asynchronous Update Sequence



Synchronous Operations



Enterprise SAN Design End-To-End SWAN Testing



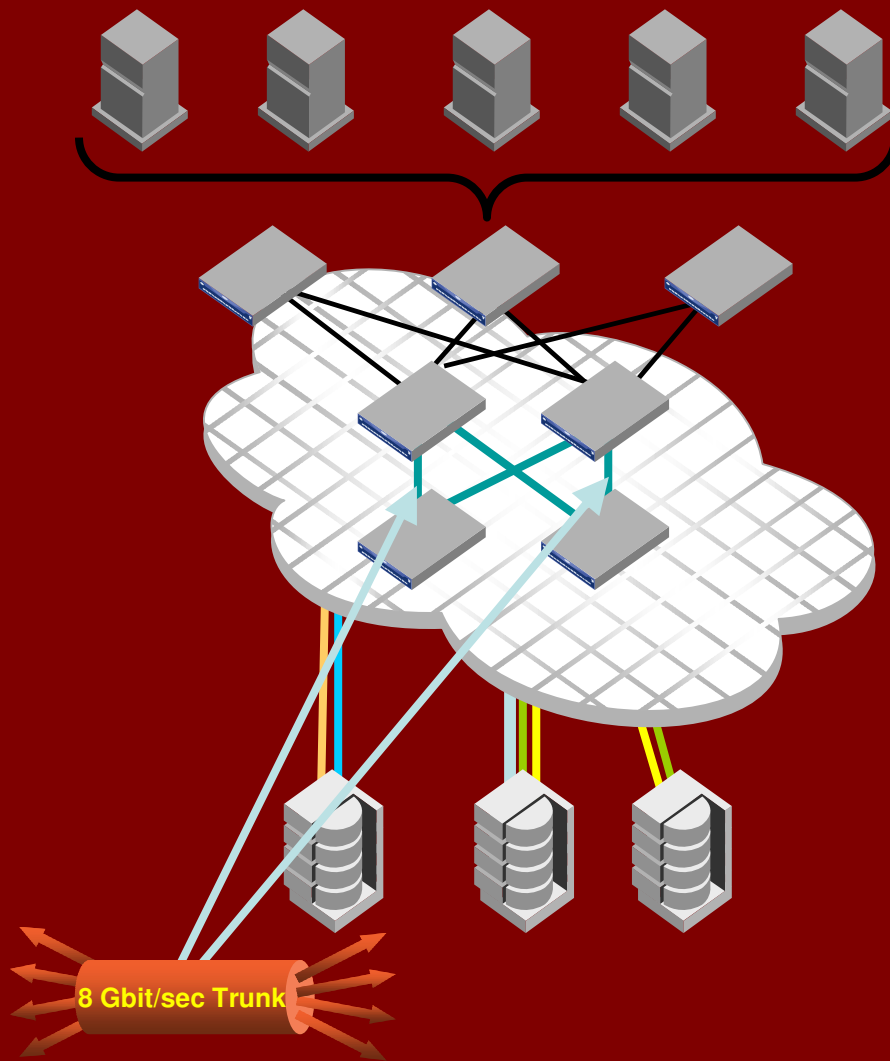
NOTES

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 XP 128 SAN's.
3. Based on the design and the backbone bandwidth limitation, only Asynchronous communication between the XP 128 SAN's was recommended.
5. The design will work (in Async. mode) with existing Cisco's Enterprise IP-backbone without using QoS, Packet Prioritization, Traffic Shaping, or Layer 3 switching technology.

Brocade Silkworm 12000

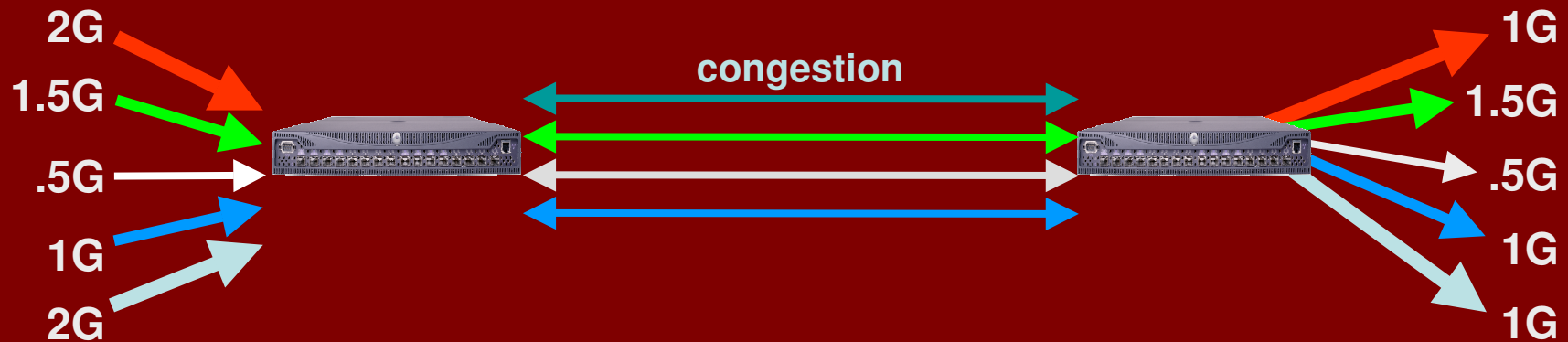
- Verify Hardware Components MTBF
 - Switch backplane 43,328,000 hours
 - Power backplane 10,722,000 hours
 - Control processor 177,000 hours
 - 16 port FC blade 153,000 hours
 - Power supply 500,000 hours
 - Blower FRU 473,000 hours
 - WWN card 2,153,000 hours

New Advanced Fabric Services: Inter-Switch Link Trunking



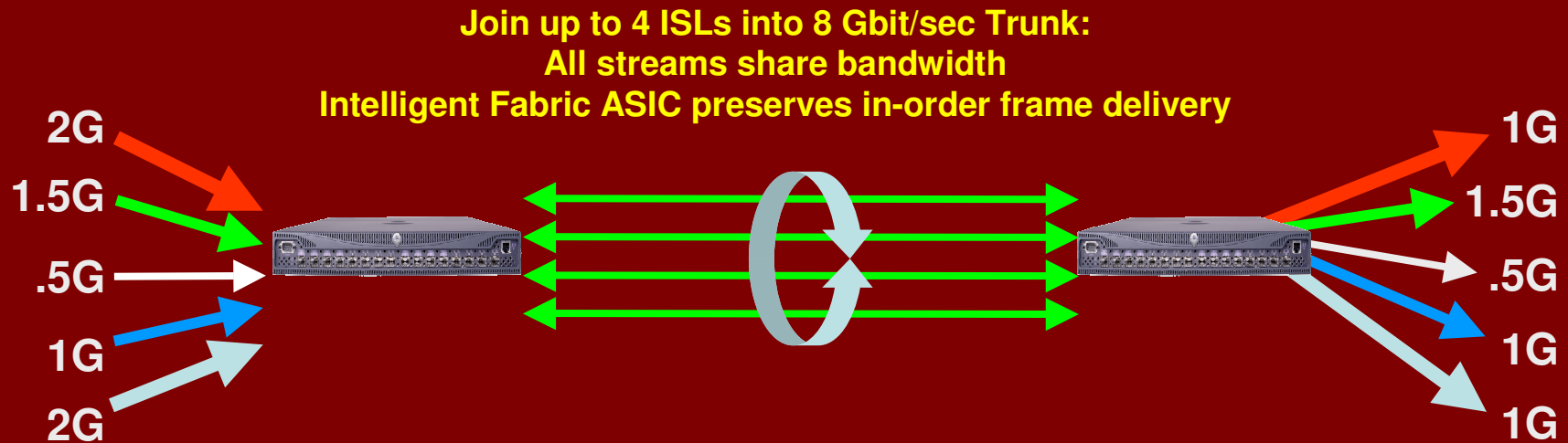
- ISL Trunking
 - 8 Gbit/sec logical links
 - Aggregate edge traffic
 - Zero management
- Simplify network design and management
- Simplifies ongoing administration (manage one link versus four links)
- Maximizes fabric performance
- Provides increased high availability in case of link failures

Intelligent Bandwidth Utilization: Dynamic Load Sharing



- Load sharing across multiple ISL links
- Round robin assignment
- Can get “unlucky” with multiple high utilization traffic assigned to same link
- In our example, theoretical maximum is 8 Gbit/sec, but effective throughput is 5 Gbit/sec

Intelligent Bandwidth Utilization: Inter-switch Link Trunking



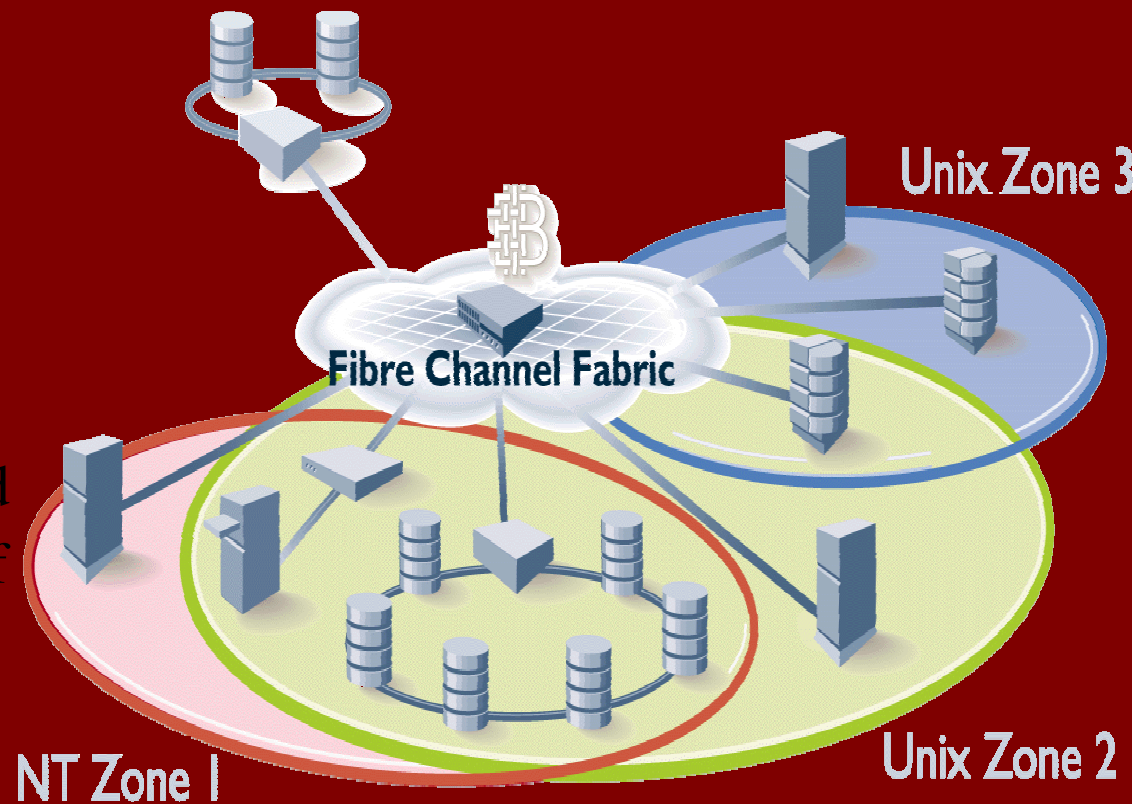
- Aggregate traffic onto fewer logical links
- Automatically created when switches are connected
- Managed as a single logical 8 Gbit/sec ISL
- Fault-tolerant – will withstand failure of individual links
- Supports redundant trunks between switches

Zoning Concepts

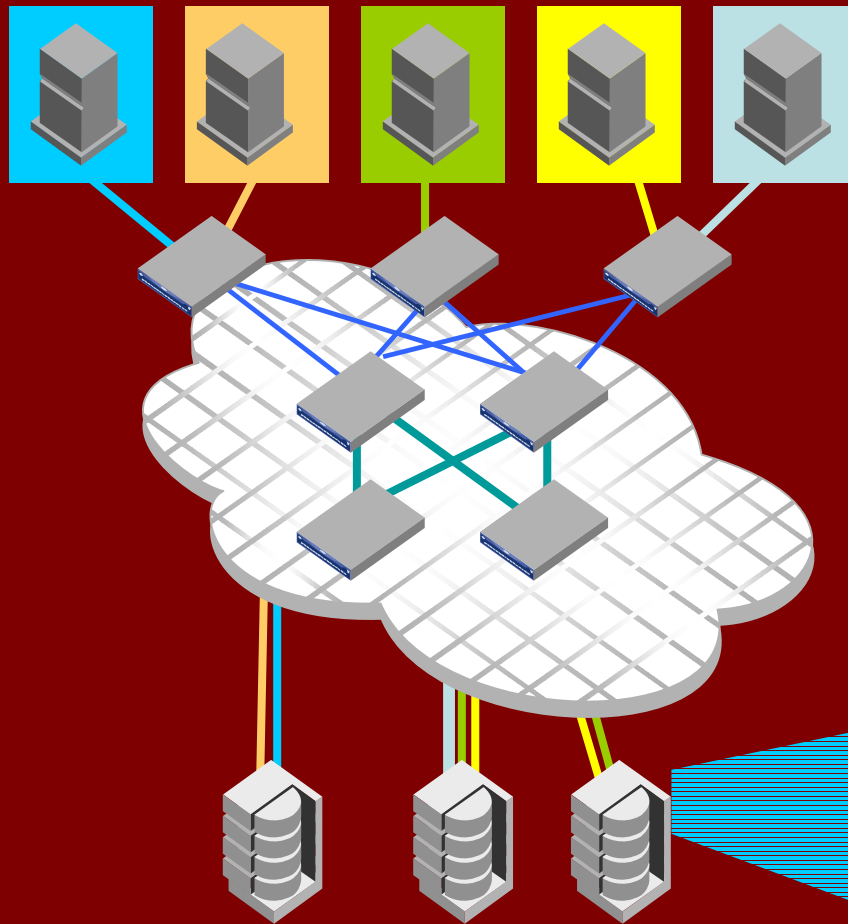
- Controls host access to logical devices connected to a fibre channel port via World Wide Name assignment.
- Ideal for multi-NT servers and SAN customers
 - Data protection in a multi-host environment
 - Prevent unauthorized access to LUN

Zoning

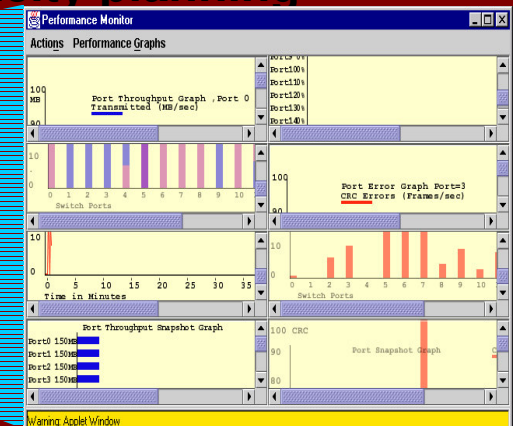
- Provides OS & storage isolation
- Store multiple zone configurations
- Zones based on port # or device WWN
- Updates distributed dynamically across the fabric
- Overlapping zones allowed
- No logical limit on the # of zones



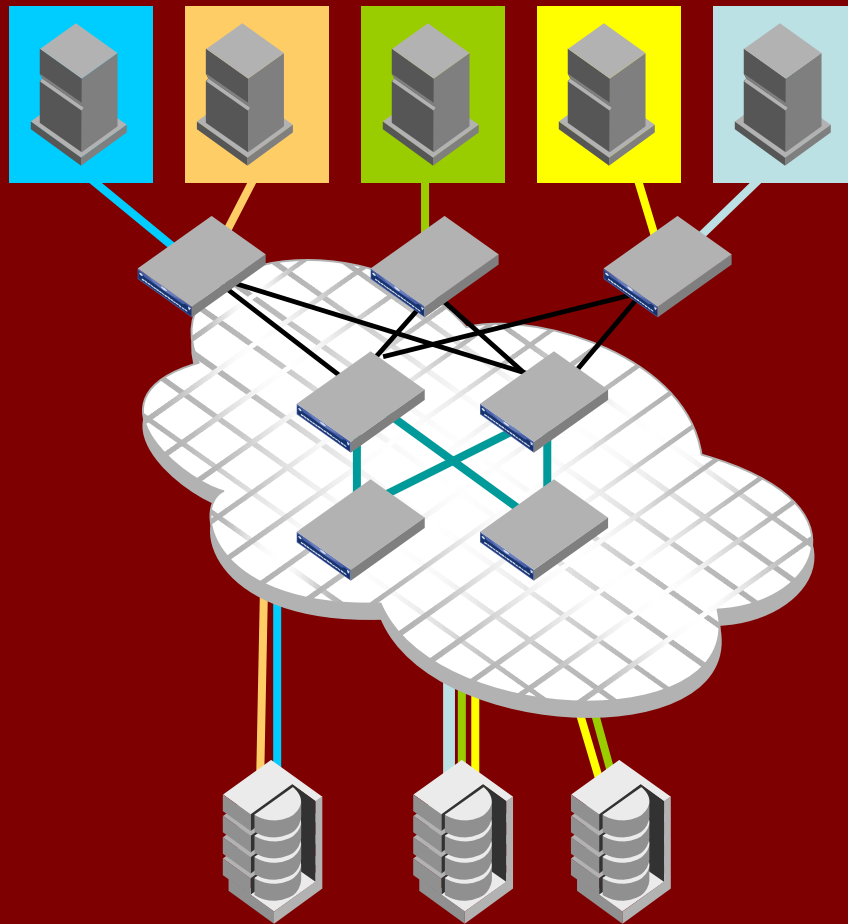
Advanced Fabric Services: New Global Performance Analysis



- Performance analysis
- Proactive SAN management
- Provides end-to-end performance measurement from the source to the destination target
- Optimize fabric resource allocation
- Maximizing performance tuning
- Reducing trouble-shooting time
- Improve capacity planning

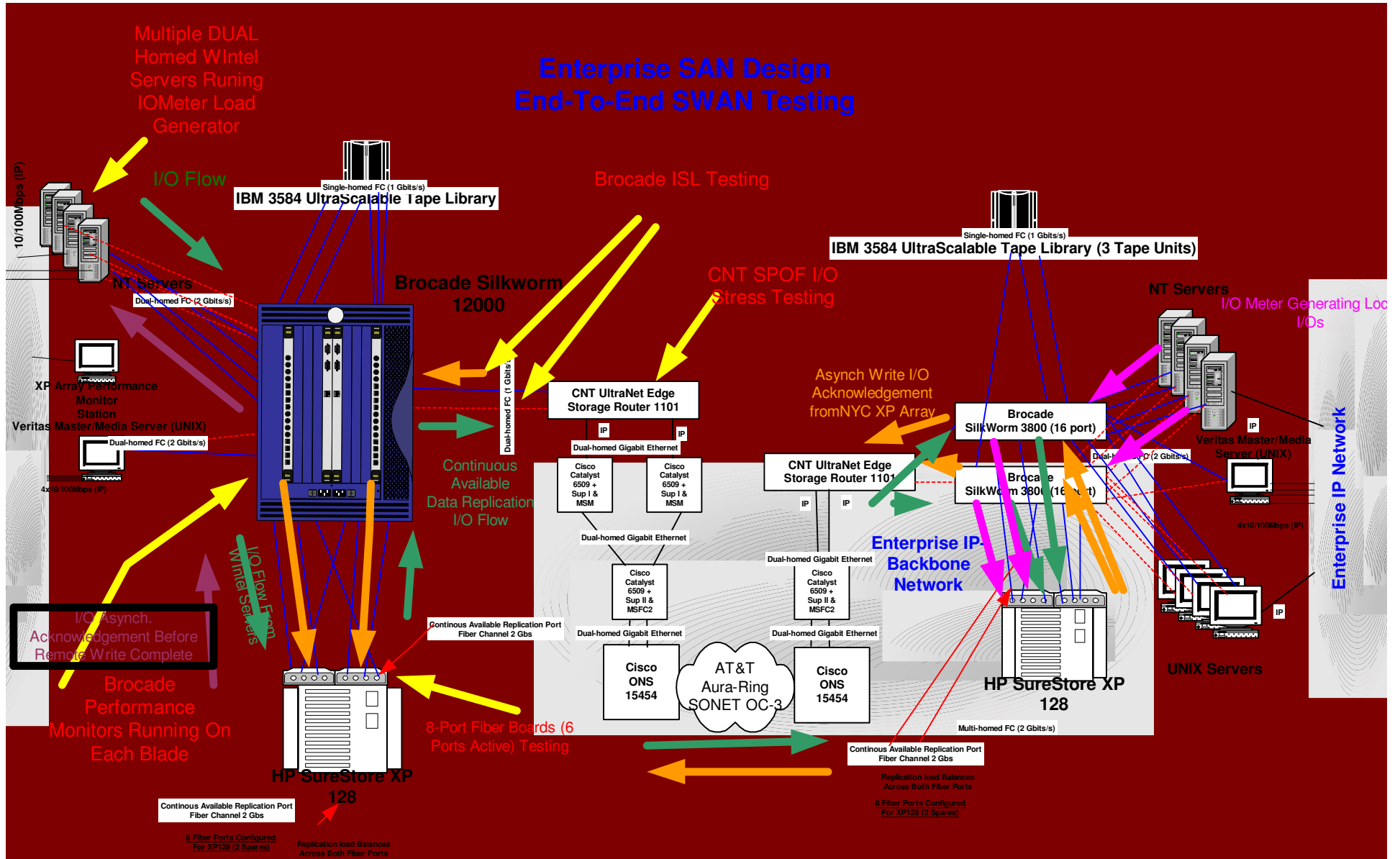


New Advanced Fabric Services: Advanced Zoning



- WWN Zoning
 - Hardware enforced
 - Simple administration
 - Secure access control
- Provides a safer, more secure SAN network
- Hardware enforced access control
- Administrators can organize physical fabric into logical groups and prevent unauthorized access by devices outside of the zone

Enterprise SAN Design End-To-End SWAN Testing



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.