SAN Switch Interoperability in Migration

How Cisco Multilayer Director Switch Operates with Other SAN Switches During SAN Migration

A Cisco on Cisco Case Study: Inside Cisco IT

Overview

- Challenge

  Migrate from McDATA - based storage area network (SAN) to a Cisco® MDS-based SAN.

- Solution

  Staged migration with the Cisco MDS 9000 Series Multilayer Switch interoperating with McDATA Director and edge switches.

- Results

  Cisco MDS 9000 interoperates with McDATA switches; basic SAN features work well, though a few management features, VSAN do not. Eventually migrated to full Cisco MDS SAN.

- Next Steps

  Expand storage SANs throughout Cisco data centers.

Challenge - Migrate to Cisco MDS SAN

- Migration from direct attached storage (DAS) to SAN had begun.

  At the time, Cisco® IT had standardized on McDATA SAN switches in both the core and edge.

- Migrating an entire SAN to the new Cisco MDS 9500 Series Multilayer Director would provide additional needed features (better management, VSANs).
- A flash-cut migration would be expensive and difficult.
- Gradual migration would require interoperating Cisco MDS with McDATA SAN switches for months.
- McDATA and Cisco switches were not certified as working together; feature compatibility was unknown.

Solution - Interoperability Test

- Cisco® wanted to test operability on a SAN that supports a mission-critical application with high performance demands.
- IBM Rational Clear Case was chosen for the test. Cisco developers rely on Clear Case as their source-code library to develop Cisco IOS® Software.

  Clear Case is a demanding application with thousands of transactions per second, low latency requirements, and critical availability requirements.
- Cisco IT ran the Cisco engineering SAN in interoperability mode for several months to learn its features and functions for customers who would be making the same migration.

Solution - Cutover Process

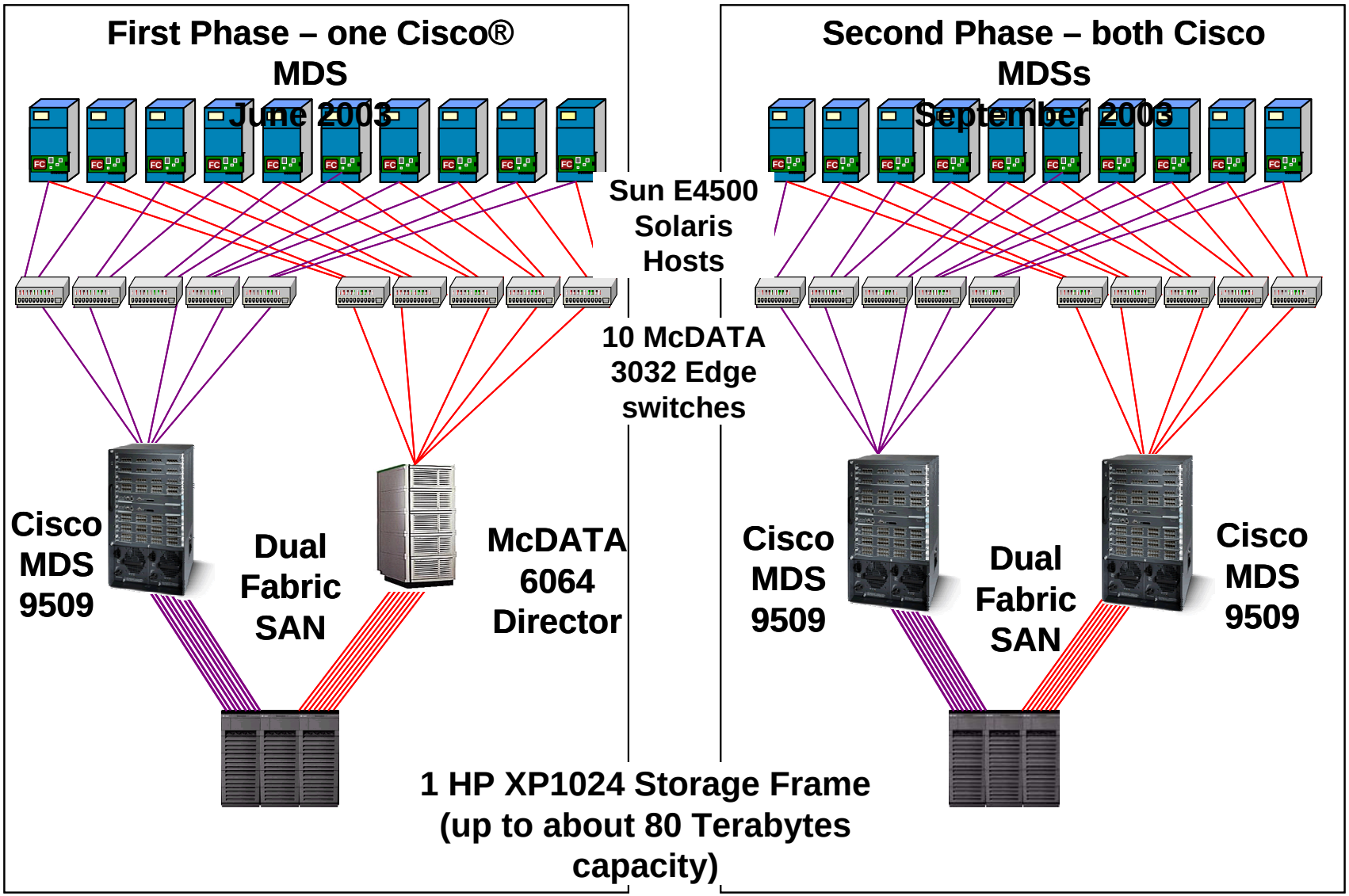
- SAN designed with complete redundancy
- Cutover requirements
  - Configuring the Cisco MDS 9509 multilayer director switches
  - Disconnecting the McDATA 6064 core switches from the storage array and McDATA edge switches
  - Reconnecting the storage array and edge switches to the new core Cisco MDS switches
- Two-phase transition: One Cisco MDS 9509 Multilayer Director Switch at a time
  - Phased migration ensured that the host continued operating without interruption during the transition

Solution - Connecting McDATA and Cisco Switches

- First, one McDATA 6064 switch replaced by Cisco Cisco® MDS 9509 multilayer director switch
- Three months later, second Cisco® MDS 9509 multilayer director switch replaced all McDATA at the core, connected to the existing McDATA 3032 edge switches and storage arrays
- McDATA edge switches connected to the Cisco MDS switch one at a time, using Inter-Switch Links (ISLs)
- Transition to a mixed Cisco MDS and McDATA SAN achieved without service interruption

  "When we took out one core switch, the host didn't blink and the clients didn't even notice." – David Angulo, Program Manager, Cisco Systems

Solution - Two-Phase Plan Migration



Results - High Availability Operation

- Cisco® engineering SAN ran without failure in interoperability mode from June 2003 to January 2004.
- ClearCase host experienced no service interruption during migration, and no application outages since then have been attributable to the Cisco MDS 9000 Series multilayer switches.
- Cisco declared the interoperability demonstration a success after 6 months and replaced its McDATA 3032 edge switches with Cisco MDS 9120 multilayer fabric edge switches to gain the benefits of a SAN based exclusively on Cisco MDS switches.

Results - Improved Utilization

- During the interoperability phase, Cisco® improved scalability and utilization and achieved its availability goals.

  The higher port density of the Cisco MDS 9509 Multilayer Director Switch—32 ports per blade and up to 224 Fibre Channel—is reducing costs, improving utilization, and freeing data center floor space.

- The high availability is a result of redundant supervisor engines, fully stateful supervisor engine failover, redundant crossbars, hitless software upgrades, individual process restart ability, and process isolation within VSANs.

Next Steps - SAN Expansion

- SAN expansion in Building 5 in San Jose

  Continue expanding the SAN in the engineering data center in San Jose building 5, adding additional hosts and storage frames as needed

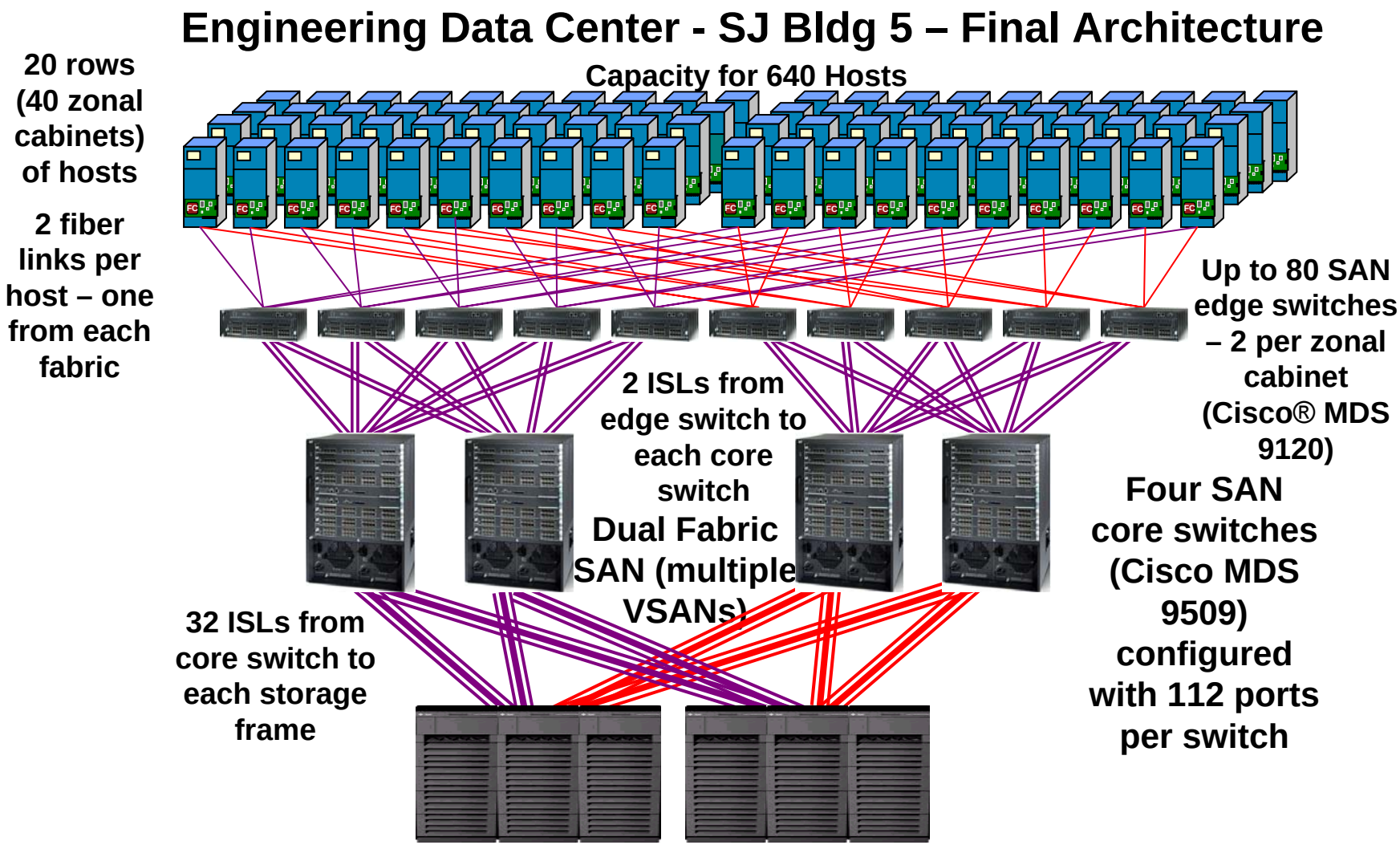
- Storage frames

  Each storage frame can house 80 terabytes, and with two storage frames the SAN can serve 180 terabytes, or more than 10 percent of all Cisco storage

- Data centers

  Install Cisco MDS-based SANs in engineering data centers in Bangalore, India; South Netanya, Israel; Research Triangle Park, North Carolina, USA; and Boxborough, Massachusetts, USA

Next Steps Engineering Data Center: Capacity for 640 Hosts



Cisco MDS 9000 Series Multilayer Switch

- Cisco® MDS 9000 Series is an example of Cisco using Cisco products to help save, time, space, and money

Cisco MDS Family: 9506, 9513, 9509 multilayer directors and 9216 Multilayer Fabric Switch

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