



Die MDS Familie - Eine Säule der Cisco Data Center 3.0 Strategie



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Topics

- Cisco MDS 9000 Family
- Managing SAN Fabrics
- Consolidating SANs
- Accelerating Server Virtualisation
- Securing and Extending SANs
- Deploying Services Oriented SANs

Nach diesem Webinar kennen Sie

- MDS9000 Hardware Platform und die wichtigen Funktionen des NX-OS Betriebssystems
- Virtual SANs (VSANs) zur Konsolidierung und Optimierung der SAN Infrastruktur
- Wie virtuelle Server optimal in ein SAN eingebunden werden können
- Wie Services in ein SAN integriert werden können

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MDS 9000 Multilayer Directors and Switches

Small/Medium Business

Enterprise and Service Provider

- Performance and density leadership
- Scalable from 8- to 528-ports
- Single code stream across MDS and Nexus families
- Director investment protection
- Integrated Multiprotocol and Multi-services



MDS 9134



MDS 9124



MDS 9222i



HP/IBM FC Blade Switch



MDS 9506, 9509, 9513

Management

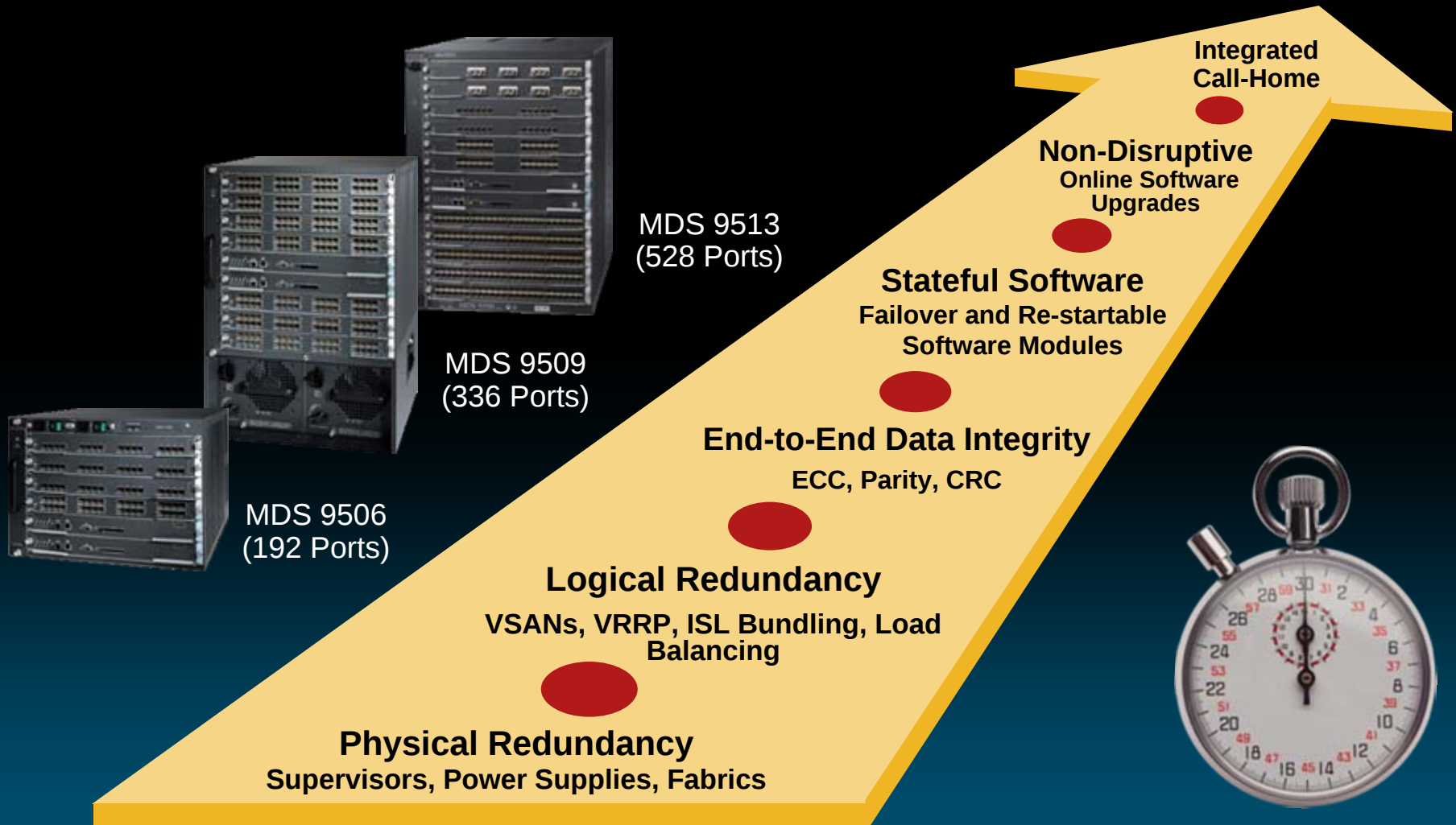
Cisco Fabric Manager

O/S

Cisco MDS 9000 Family NX-OS

Ultra-High Availability SAN Directors

Reducing down-time through HW and SW resiliency



Cisco MDS 9500 Series – Directors

- Industry-leading **528 8-Gbps port density**
- **Twice the bandwidth** of earlier-generation Cisco MDS Fibre Channel switching modules
- Consolidate large-scale SANs with fewer chassis:
 - Reduces space, power, and cooling
 - Lowers your total cost of ownership (TCO)
- **Tiered connectivity** to address diverse SAN performance requirements:
 - Storage subsystems and ISLs
 - High-performance virtualized servers
 - Standard servers

Achieve High-End
Storage Connectivity



MDS 9222i Multiservice Fabric Switch

- **Fibre Channel, FCIP and iSCSI**

- 18 4-Gbps Fibre Channel ports

- 4 1-Gbps Ethernet port for FCIP and iSCSI

- Expansion slot

- Fibre Channel switching (up to 66 ports)

- Service modules



- **Optimized for SAN extension**

- FCIP over WAN

- FC over DWDM/CWDM/SONET/SDH

- HW-based encryption—IPSec

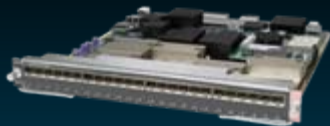
- **Flexible integrated service engine supports**

- Storage media encryption (SME)

- Data mobility manager (DMM)

Secure 8-Gbps Fibre Channel Modules

- **Tiered connectivity:** optimize cost, performance and density
- **Investment Protection:** compatibility with all MDS 9500 Series ever shipped
- **Reduced TCO:** simplified infrastructure reduces space, power, and cooling requirements
- **Fibre Channel Link Encryption:** Cisco TrustSec



24-Port 8-Gbps Module

High end storage subsystems and Inter-Switch Links (ISLs).



48-Port 8-Gbps Module

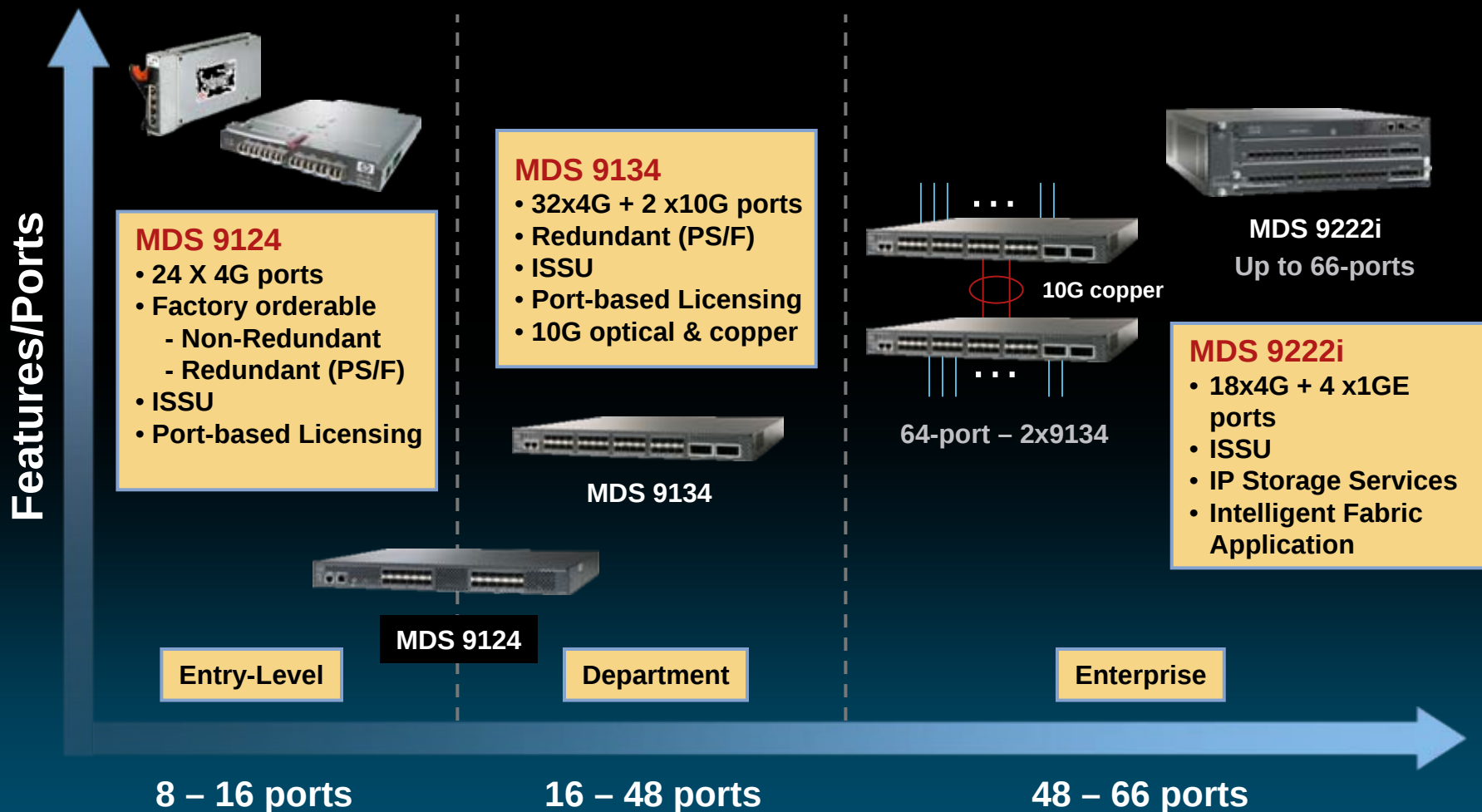
Optimal performance and density for virtualized servers.



4/44-Port 8-Gbps Host-Optimized Module

Cost-effective solution for standard servers

Cisco MDS 9100 Series – Fabric Switches



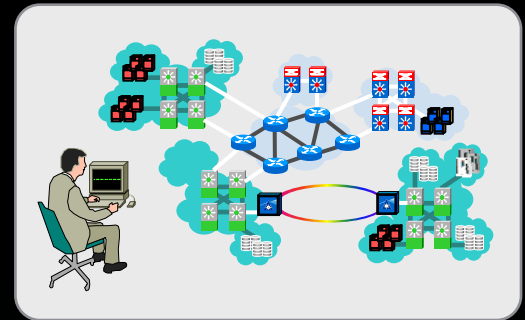
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MDS Management Overview

Complete, Open Standards Based Management

- Comprehensive embedded management capabilities
 - CLI with syntax like Cisco IOS® CLI
 - Cisco Fabric Manager
- Integrates with industry leading management applications
 - IBM Tivoli, EMC ControlCenter, HP OpenView, Symantec ...
 - CiscoWorks
- Open standard interfaces: SNMP, XML CIM (SMI-S), FC-GS



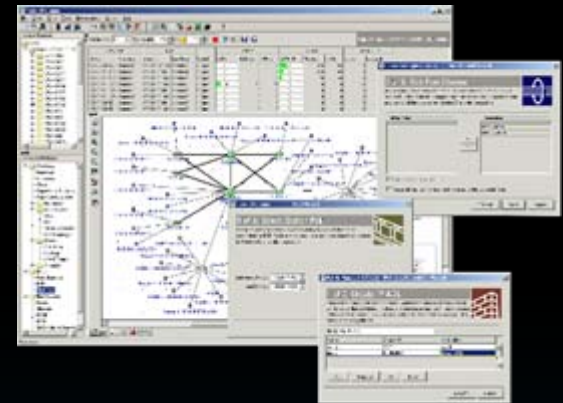
Cisco Fabric Manager

1 of 2

Secure Multiprotocol SAN Management

- Secure management with role-based access control and SNMPv3
- Discovers entire multiprotocol fabrics
- Visualises complete storage network topology, VSANs and Zones
- Configures all key MDS features
 - Rapid device configuration
 - Wizards to simplify multi-step tasks
- Device View provides status at a glance
 - Fans, power, supervisors,
 - Switching modules and port status

Fabric View



Device View



Cisco Fabric Manager

2 of 2

Efficient Configuration and Troubleshooting

- Summary view provides **real-time statistics monitoring**

In-line bar charting, sorting, drill-down capabilities

Chart, print, or save to file

- Fabric troubleshooting tools**

Switch health analysis

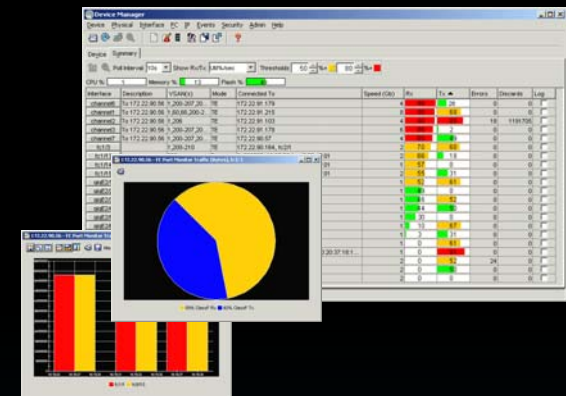
End-to-End connectivity analysis

Fabric configuration analysis

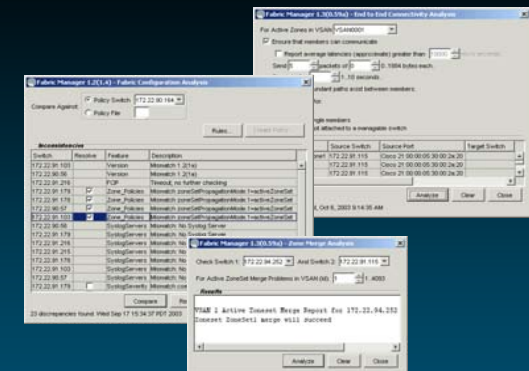
Zone merge analysis

FC Traceroute

Summary View



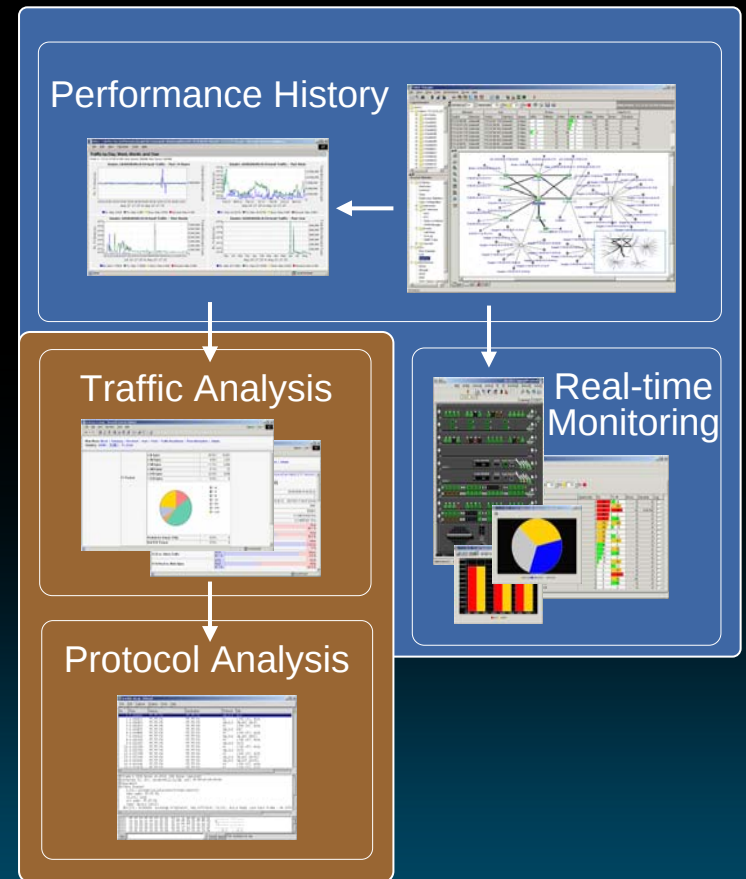
In-depth Troubleshooting



Multi-level SAN Performance Analysis

Detect Hot-spots and Determine Root Causes

- Historical Performance (FMS)
Network-wide, long-term historical performance monitoring and analysis
- Real-time Monitoring (DM)
Real-time performance monitoring of MDS ports and interfaces
- SCSI I/O Traffic Analysis (TA)
I/O throughput, response times, and traffic distribution statistics
- Fibre Channel Protocol Analysis
Frame level viewing and analysis of Fibre Channel traffic



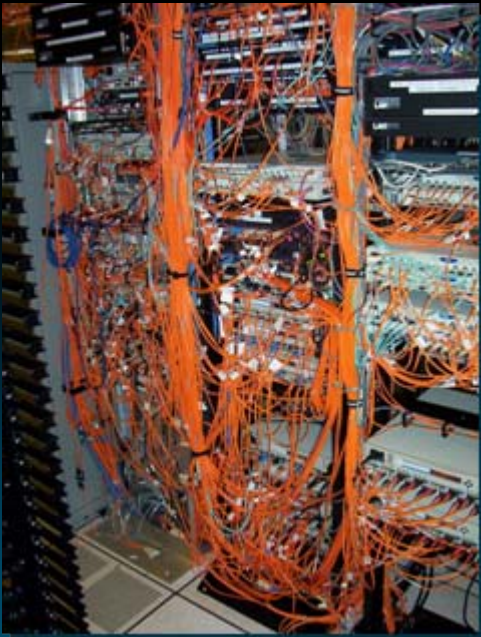
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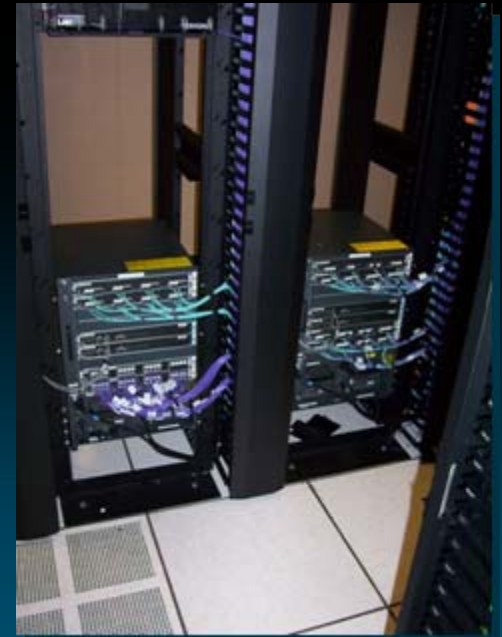
Why Consolidate SANs?

Customer Reference

- One of the largest insurance and financial services companies in the world
- Migrated storage infrastructure which includes several hundred Terabytes from several SAN islands to a consolidated MDS 9000-based SAN designed for availability, recoverability, and growth

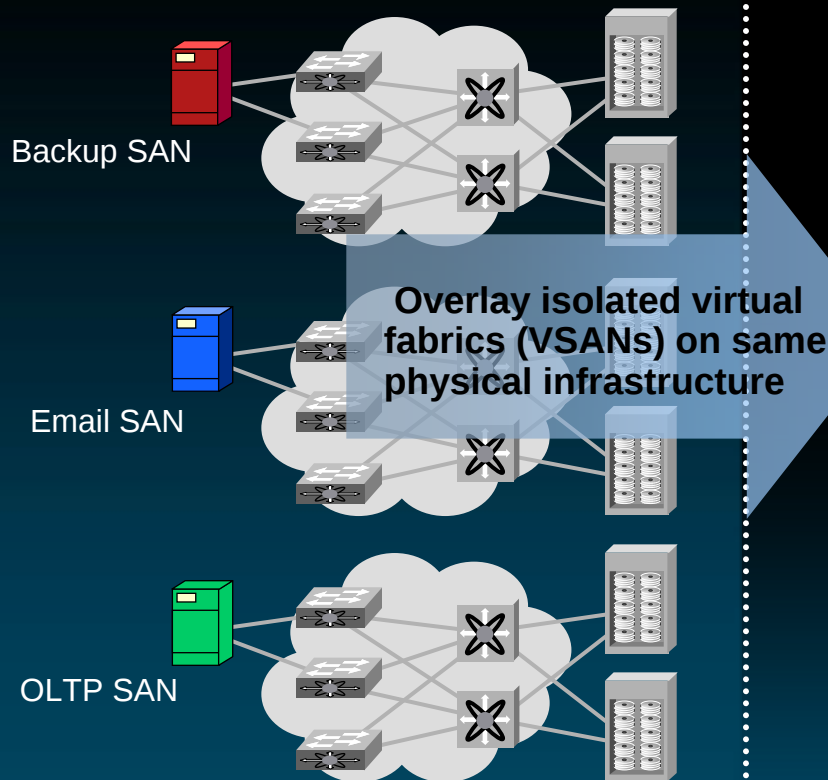


- Converted 24 fabrics to 4 fabrics over two production Data Centres
- Consolidated 102 legacy switches to 20 MDS directors
- Completed project in 90 days

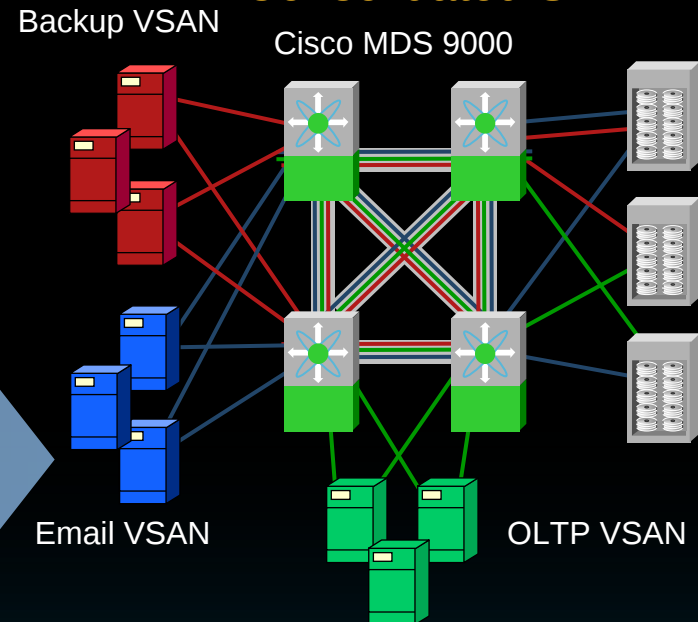


VSANs – Essential for SAN Consolidation

Application/Department-Based SAN Islands



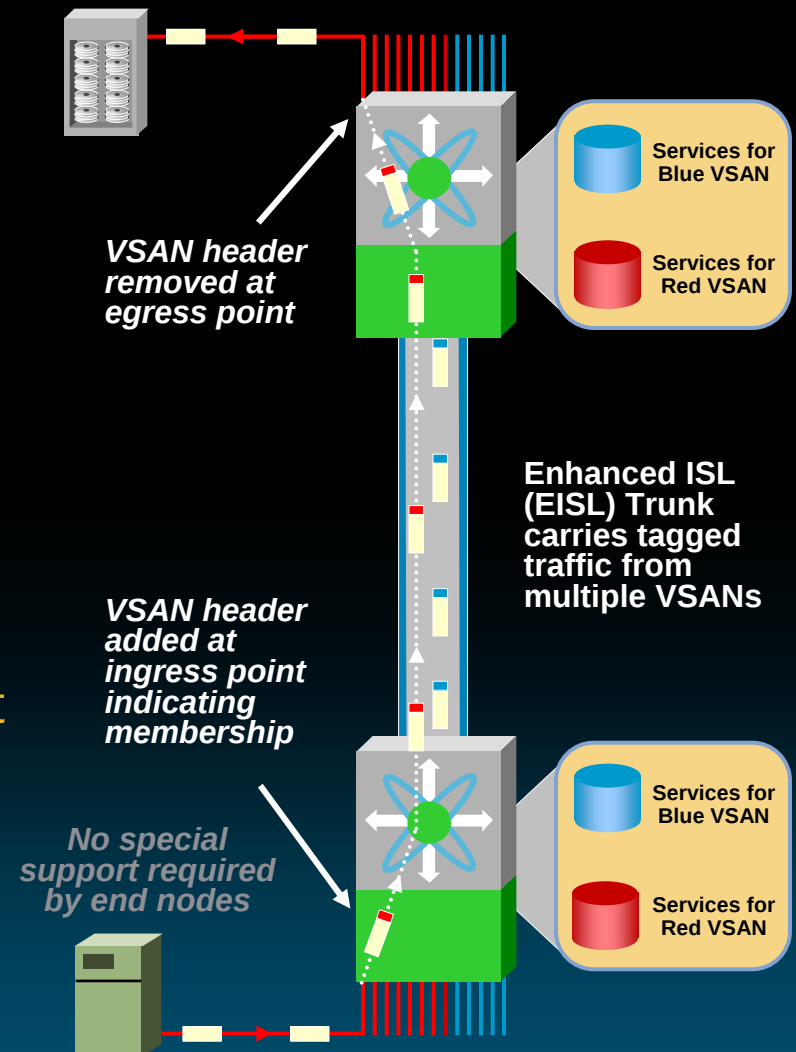
Consolidated SAN



With VSANs	
Number of Switches	Fewer
Switch Utilization	Optimal
Simplified Management	Yes
On-demand Flexibility	Yes
Overall TCO	Low

SAN Consolidation – Benefits of VSANs

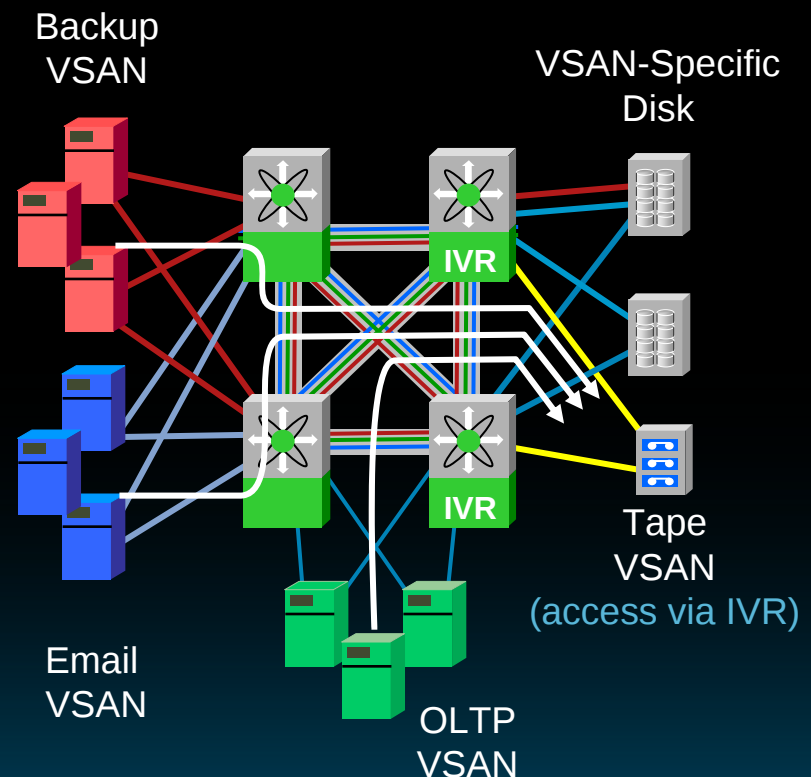
- Provides **independent services** for each Fibre Channel VSAN
 - Name server, management server, FSPF, Zoning, etc.
- **Localizes fault-isolation** per VSAN
 - Misbehaving HBA or controller
 - Fabric rebuild event
 - Zone set change
- Enables **effective traffic management**
 - Limit VSAN traffic to specific ISLs
- **Secures management** with role-based access control at VSAN level



Inter-VSAN Routing (IVR)

- Routes data traffic between VSANs for **any-to-any connectivity**
- Integrated in standard hardware, separate **SAN routers not required**
- Enhances utilization of assets (e.g. tape drives)
- Provides **on-demand flexibility**
- Allows communication while keeping environments separated

Control traffic not routed across VSANs



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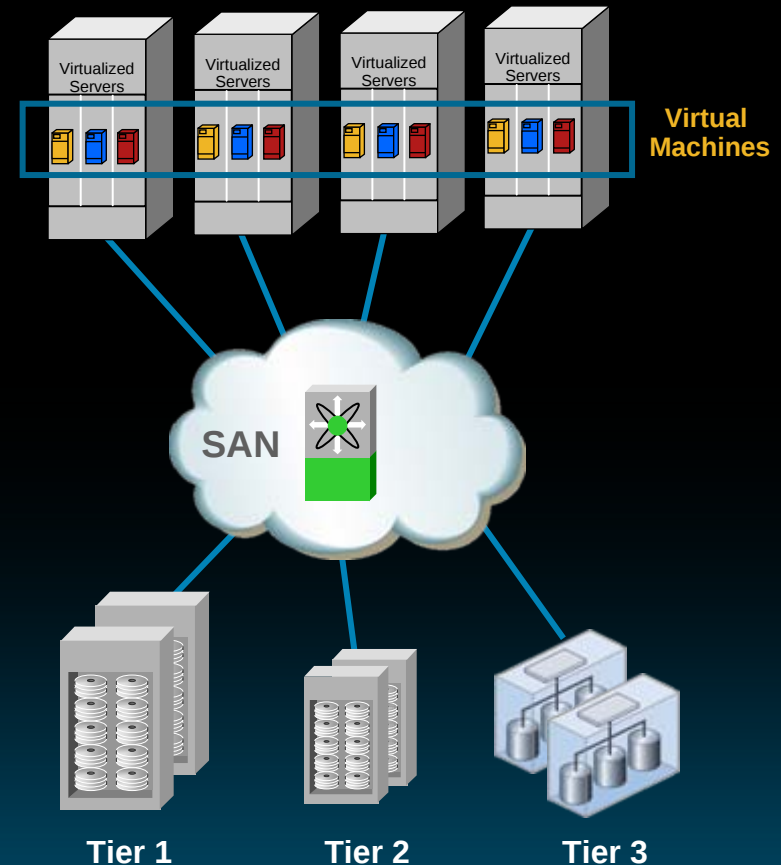
Virtual Machine Requirements

Predictable Switching Performance

- Support complex, unpredictable, dynamically changing traffic patterns
- Provide fabric scalability for higher workload
- Differentiate Quality of Service per VM

Secure, Flexible Management

- Create isolated SANs with independent management access control
- Support performance monitoring, trending, and capacity planning for each VM
- Allow VM mobility without compromising security



VM Transparent SANs – Cisco MDS 9000



- Accommodates growing VM Bandwidth

Flexibility, performance, density and security

8 Gbps Fibre Channel

Investment protection



- Provides VN-Link storage services per VM

SAN fabric and device access control (NPIV)

Quality-of-Service and traffic management

Security, performance monitoring, and management



- Optimizes SANs for Blade Servers

Network Port Virtualizer (NPV)

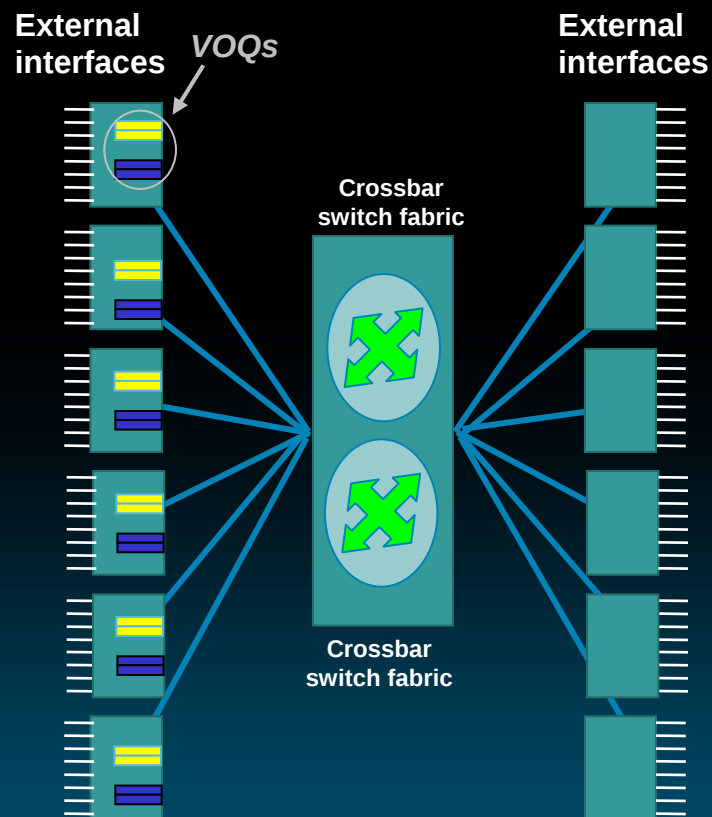
FlexAttach

F-port Port Channels and F-Port Trunking

High-Performance MDS 9000 Architecture

- Crossbar and arbiter architecture enables **optimal performance** under difficult traffic conditions
- Virtual Output Queues (VOQs) **eliminate head-of-line blocking**
- Delivers **even, predictable throughput** and latency for many-to-one and many-to-few traffic conditions
- Offers **100% wirespeed** for both large and small frames
- Provides **fair load-balancing** for both large and small frames

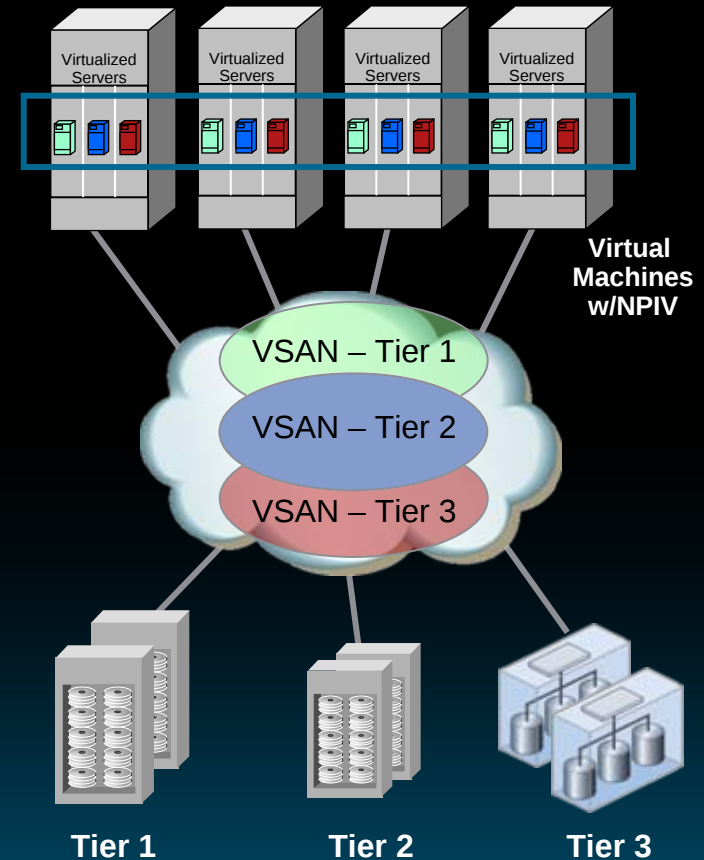
Centralized crossbar switch architecture



VN-Link for Storage Networks

MDS 9000 Delivers Virtual Machine Aware SANs

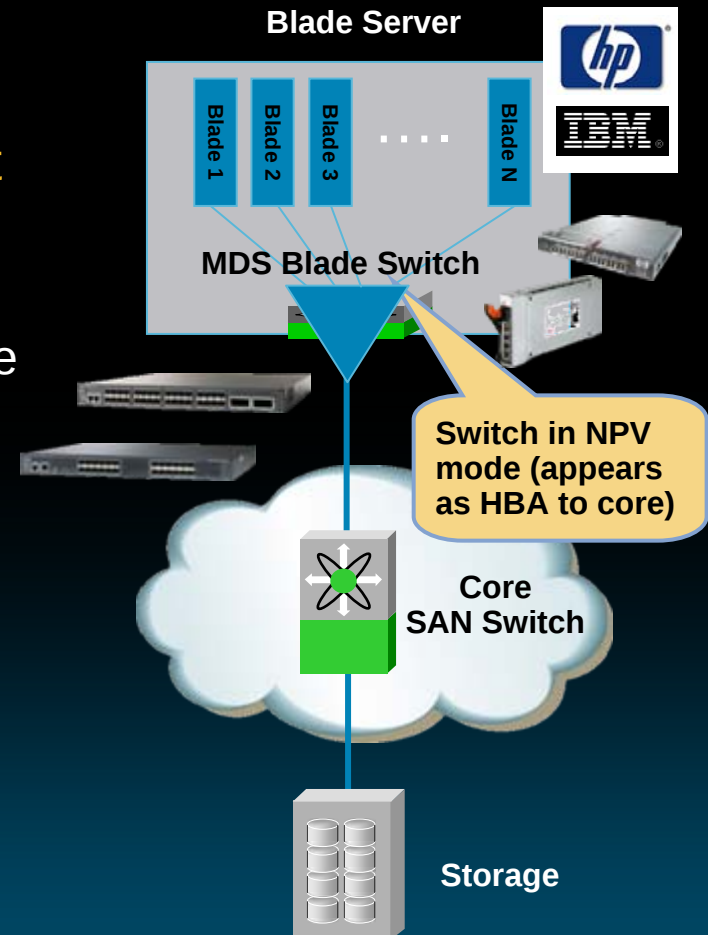
- Mobility with security
VM fabric access, **VM-granular zoning**, and VSAN level RBAC
- Fabric scalability and performance
Resilient, high performance fabric to support large, dense VM environments
- Performance monitoring and trending
- Advanced traffic engineering
VM-granular QoS and ISL traffic management based on VSANs
- SAN-base storage services
Virtualisation for **VM-granular Storage Tiers**, Continuous Data Protection (CDP), and Continuous Remote Replication



N-Port Virtualizer (NPV)

Enabling Large-Scale Blade Server Deployments

- NPV converts Fibre Channel switches to HBAs from connectivity perspective
- **Simplifies deployment and management** of large scale SANs
 - Reduces number of Domain IDs
 - Minimizes interoperability issues with core SAN switches
 - Minimizes coordination between server and SAN administrators
- NPV **available on MDS 9100 series** switches
 - IBM and HP Blade Switches
 - MDS 9124 and 9134 Fabric Switches



Virtualized Configuration – FlexAttach

- **FlexAttach** based on WWN NAT of Blade Server's WWN

Locks identity to port

Identity follows physical pWWN

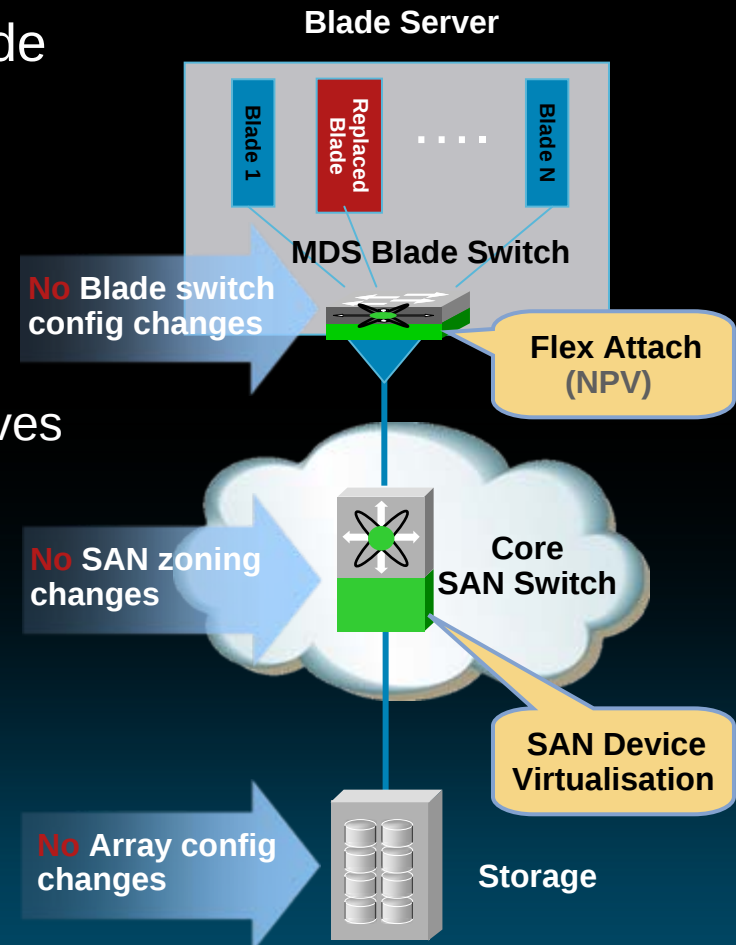
- **FlexAttach benefits**

Flexibility for Server Mobility - Adds, moves and changes

Eliminates need for SAN and server team to coordinate changes

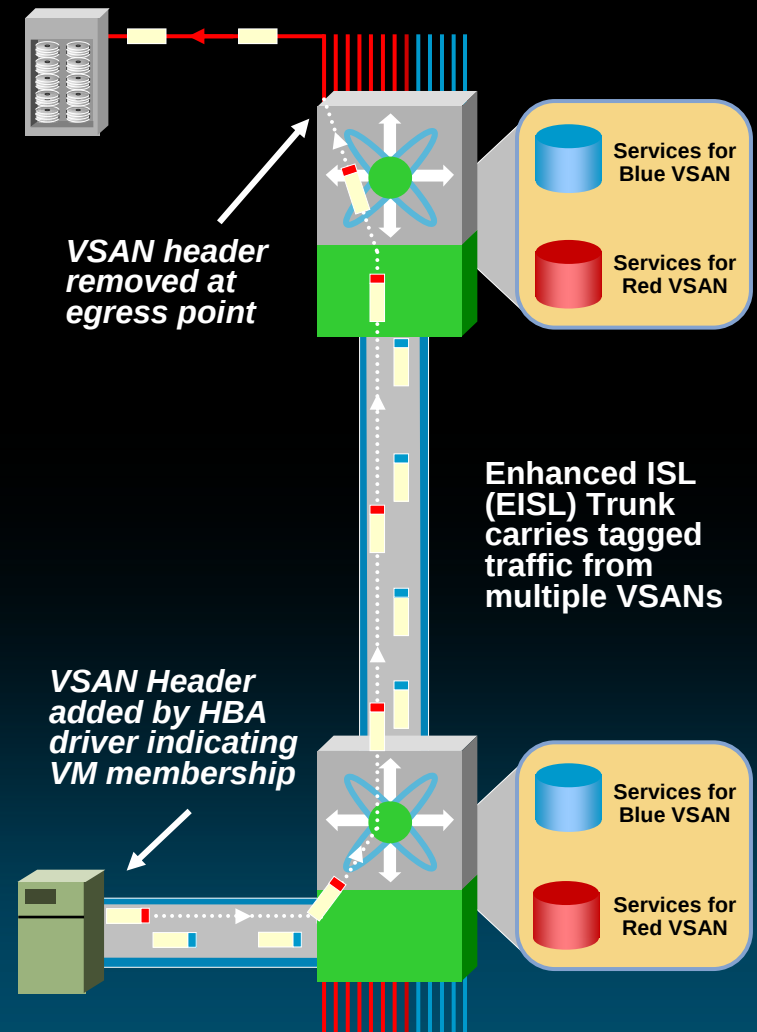
- **SAN device Virtualisation (SDV)**

Virtualizes management of devices (storage) attached to core switches



Extend VSANs to VMs – F-Port Trunking

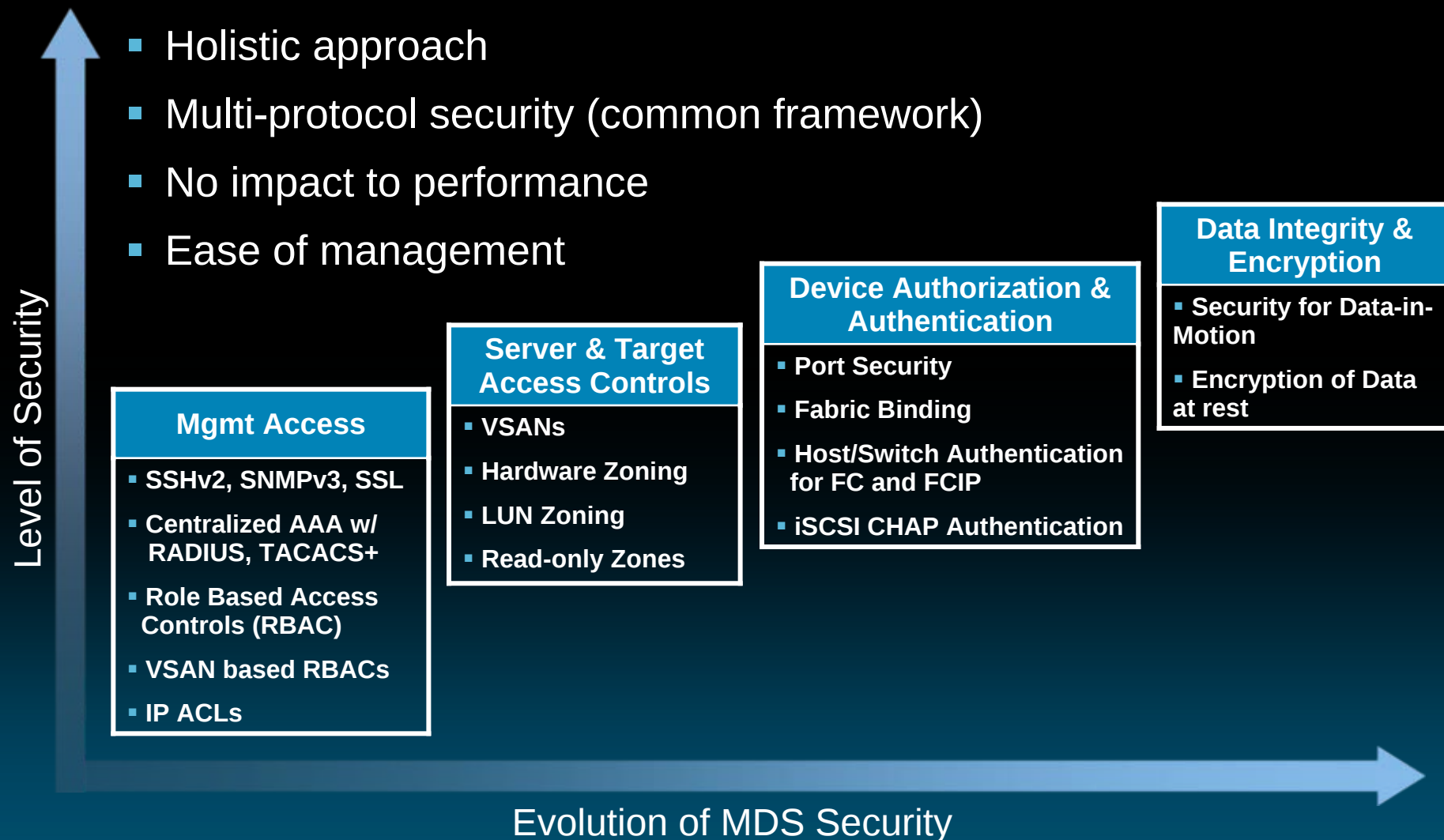
- Extends VSANs “the last mile” to server VMs
 - Traffic tagged by HBA depending on VM
- Offers VMs full benefits of directly attached servers
 - Enhanced ISL traffic engineering
 - Improved fault-isolation and resilience (per VSAN)
 - Secure management with per VSAN RBAC



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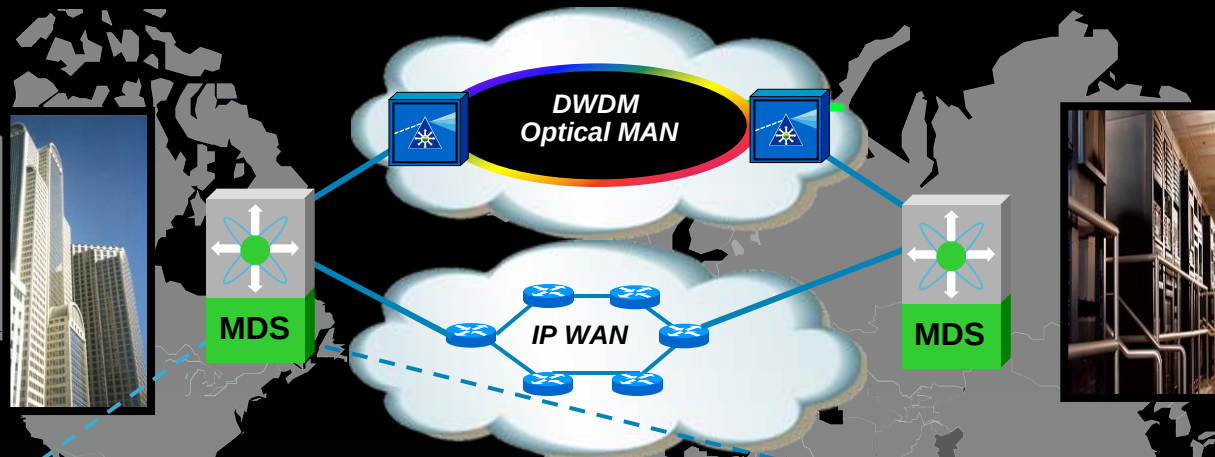
Cisco MDS 9000 Secures SANs



Secure SAN Extension with MDS 9000

Primary Data Centre

Secondary Data Centre



Comprehensive SAN Extension Capabilities

Application
Acceleration

Disk and Tape
I/O Acceleration

WAN Bandwidth
Utilization

Hardware
Compression

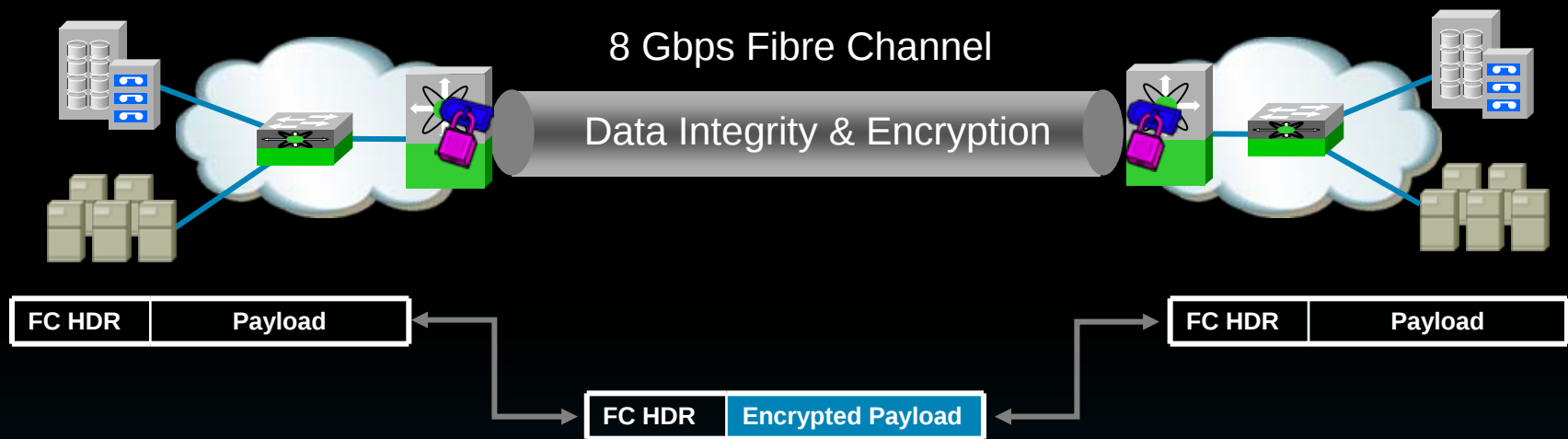
Security

IPSec Encryption

Traffic
Management

QoS and SAN
Routing

Cisco Fibre Channel TrustSec



- Preserve integrity and confidentiality of FC traffic over MAN
- Integrated, high performance functionality
- No change to existing SAN, enable functionality only on edge switches

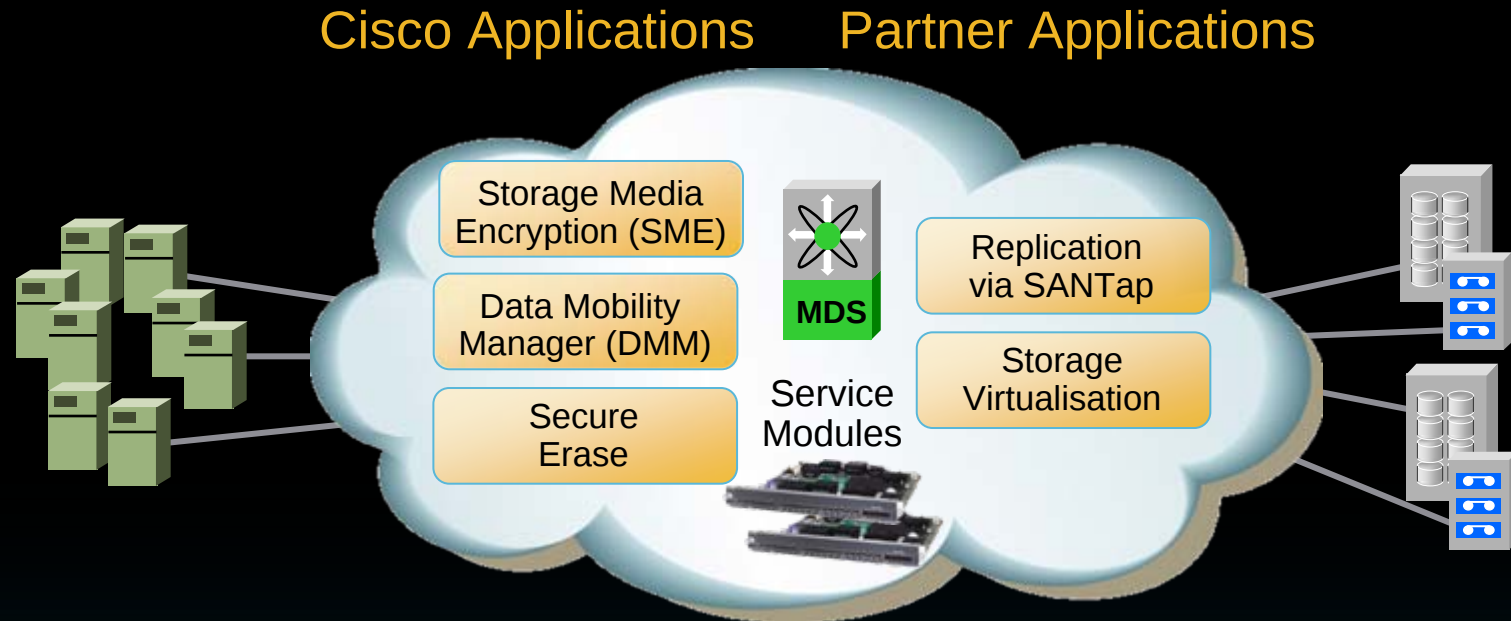
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Why Deploy Services in SANs?

- Storage traffic flows through SANs, making them a natural location to centralise services
- Centralising services dramatically reduces points of management
 - Eliminates server updates for similar applications
- Offers heterogeneous device support
 - Common tool across many server operating systems
 - Consistent functionality across diverse storage devices
- Provides investment protection by extending utility of devices attached to SANs

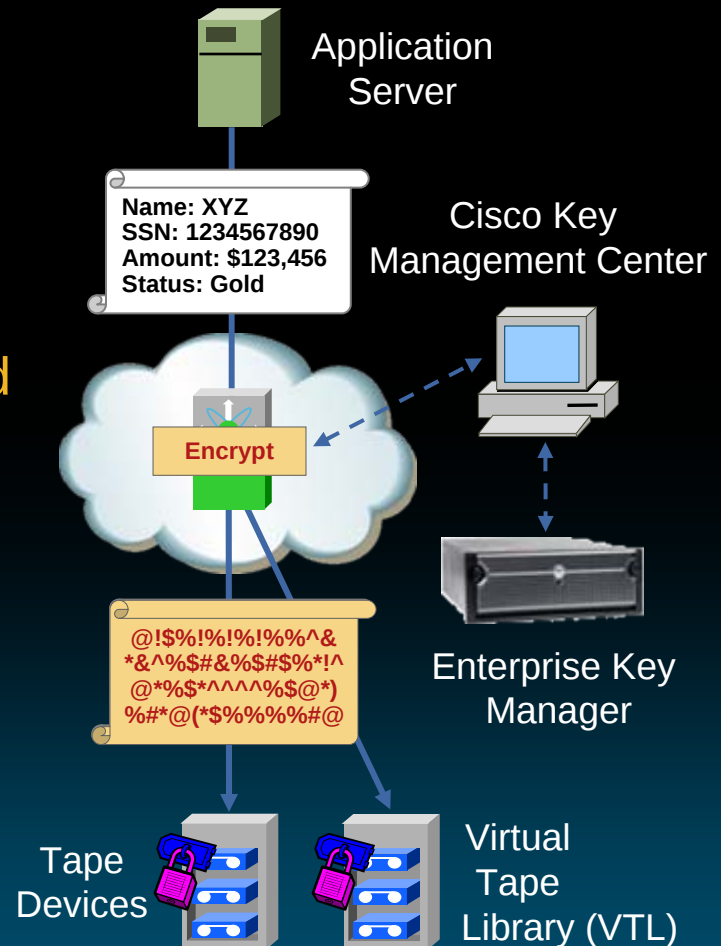
Service Oriented SANs



- Integrated, high performance services – no appliances, no host agents
- Heterogeneous solutions for storage arrays and servers
- Flexibility to extend applications to any SAN device
- Open platform for enabling partner applications

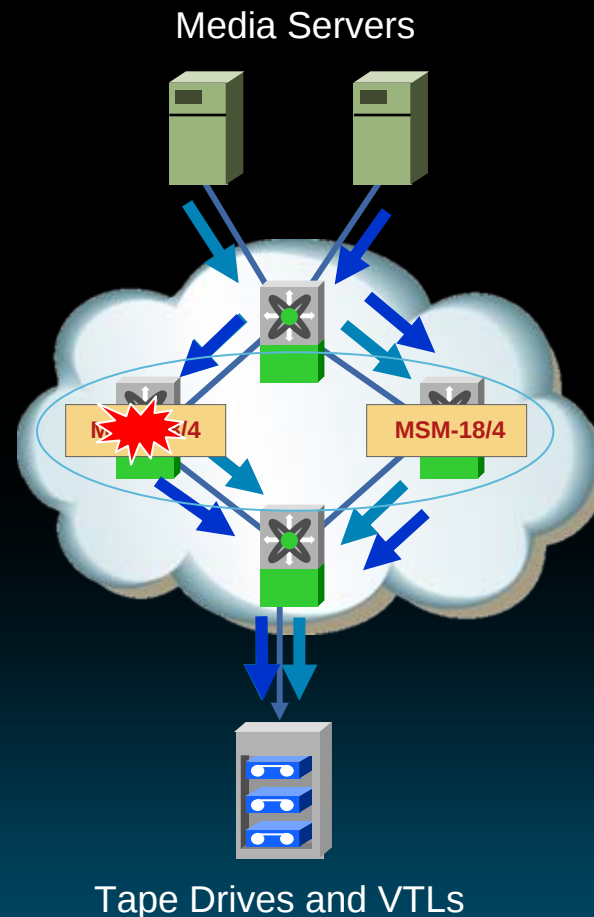
Cisco Storage Media Encryption

- **Encrypts storage media (data at rest)**
 - Strong, Std. IEEE AES-256 encryption
 - Integrates as transparent fabric service
 - Handles traffic from any virtual SAN (VSAN) in fabric
- Supports **heterogeneous, SAN attached tape devices** and virtual tape libraries
- Includes **secure key management**
 - Integrates with enterprise key managers for enterprisewide, lifecycle key mgmt
- Compresses tape data
- Allows offline, software only media recovery



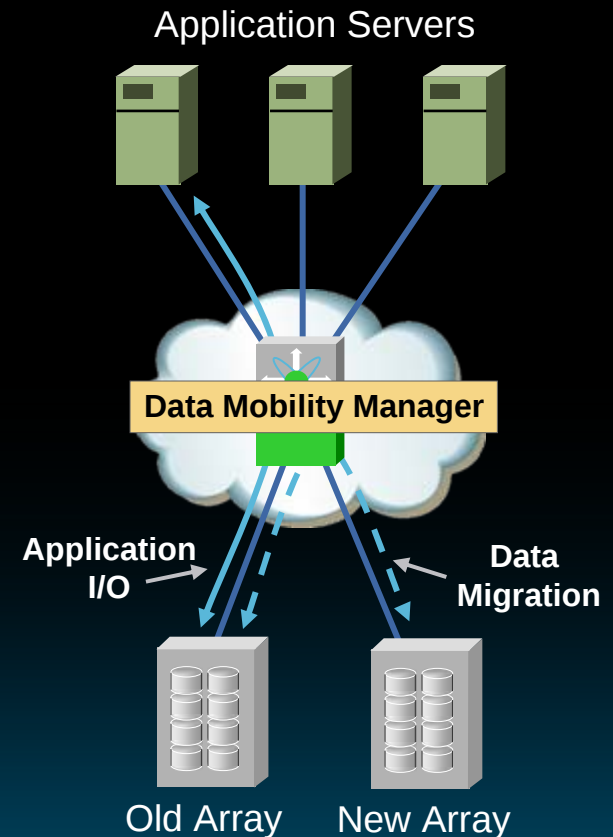
Cisco SME – Scaleable, Highly Available

- **Integrates transparently** in MDS fabrics
- Dramatically reduces deployment time
 - No SAN re-configuration or re-wiring to insert appliances
 - Provisioning becomes a simple, logical process of selecting what to encrypt
- **Modular, clustered solution** offers highly scaleable and reliable performance
- Load balances automatically
- Redirects traffic if a failure occurs
- **Provisions quickly** with Cisco Fabric Manager wizards



Cisco Data Mobility Manager

- Provides **on-line data migration** between storage arrays for
 - Technology refreshes, workload balancing and storage consolidation
- DMM Benefits
 - Requires **no SAN re-configuration or rewiring**
 - Flexible to deploy without full Virtualisation solution
 - Minimizes Server downtime** and I/O degradation during migration
 - Simple configuration**
 - Enable/disable feature via software



Cisco DMM Features

- Online Sync Data Migration
- Heterogeneous Array Migration
- Unequal LUN Migration
- Rate Adjusted Migration
- Verification of migrated data
- Dual Fabric/Multipath Support
- Configuration using Wizard based GUI and CLI

Cisco MDS 9000 Differentiators

#1

Industry-leading platform for SAN consolidation w/ proven investment protection

#2

Flexibility, scalability and intelligence to enable VM-aware SANs

#3

Comprehensive Tiered Data Protection for Disaster Recovery & Business Continuity

#4

End-to-End SAN Virtualisation for flexibility, improved utilization, and lower TCO

#5

Services-Oriented SANs for fabric-based heterogeneous storage applications

