Cisco MDS 9000 Family Statement of Direction

Storage Challenges and Trends

Companies today are facing a more competitive environment where speed of innovation is critical for their success. Ability to do more with less – and faster – is becoming increasingly important. As our customers continue to look for points of differentiation in their markets, the Storage Area Network (SAN) continues to play a vital role in enabling businesses to adopt new technologies and applications to help them grow. For many businesses, increased user expectations along with government regulations for data recovery make it imperative for 24-hour access to critical information. Storage costs continue to grow faster than server costs, resulting in the need for more efficient and cost-effective storage and lifecycle management. The creation of Data Center infrastructure that is flexible, intelligent, and able to rapidly evolve with the growing demands and applications of today and tomorrow, while protecting customer investments, is essential.

Cisco Storage Networking Vision and Strategy

Multiprotocol storage networking is central to the Cisco® Unified Fabric, providing a networking platform for IT departments to achieve lower total cost of ownership (TCO), enhanced resilience, and greater agility through Cisco MDS 9000 and Nexus Family products and services. Multiprotocol storage networks start with the reliable performance and rich, mature functionality of Fibre Channel SANs and extend them seamlessly into the Ethernet realm, resulting in a single network with the flexibility to deploy both protocols at any point in the path between server and storage. It's one elegantly simple network that can be 100% Fibre Channel, 100% FCoE, or any mix of the two, adding FICON, iSCSI, and FCIP when needed.

Cisco Services Oriented SAN applications enable centralized, storage-vendor-neutral solutions to customer needs including data encryption, data migration, and acceleration of backup and replication performance between distant data centers. The storage team can manage all of these products, protocols and features with a single operating system, NX-OS, and a single GUI, Data Center Network Manager (DCNM).

Market Acceptance

The Cisco MDS 9000 Family has been deployed by thousands of customers worldwide in networks of varying sizes, supporting many of the most demanding application environments in the world.

Cisco Storage Networking Portfolio

Figure 1. Cisco MDS 9000 Family Key Attributes

Cisco MDS 9500 Series Multilayer Directors share a common architecture (see Figure 1) and line-rate 8-Gbps switching and services modules that are backward and forward compatible across the entire Cisco MDS 9500 Series. The same Cisco NX-OS data center operating system powers the Cisco MDS 9000 Family and the entire Cisco Nexus® Family of Ethernet switches, as well as the UCS® Fabric Interconnects. The MDS 9500 Series can bridge the Ethernet and Fibre Channel portions of a Cisco multiprotocol storage network, providing full access to all devices on the SAN regardless of how they are attached.

The Cisco MDS 9200 Series Multilayer Switches deliver state-of-the-art multiprotocol and distributed multiservice convergence, offering high-performance SAN extension and disaster-recovery solutions, intelligent fabric services, and cost-effective multiprotocol connectivity.

The Cisco MDS 9100 Series Multilayer Fabric Switches are cost effective, scalable, easy to install, and highly configurable Fibre Channel switches that are ideal for small to medium-sized businesses. The Cisco MDS 9148 Multilayer Fabric Switch offers the most line-rate 8-Gbps ports in a one-rack-unit (1RU) form factor and includes a full set of enterprise features. Cisco MDS 9000 Family fabric switches are also available in blade switch form factors for popular blade server chassis from IBM and HP.

A complete portfolio of optics is supported. The Cisco MDS 9000 Family supports a variety of transport layer technologies and distances, including integrated coarse and dense wavelength-division multiplexing (CWDM and DWDM) optics that eliminate the need for optical transponder equipment.

Cisco MDS 9000 Family Innovation

Innovative leadership with Multiprotocol storage networking and Fibre Channel over Ethernet: Cisco Unified Fabrics consolidate separate LAN, SAN, and server cluster network environments into a single unified network. Multihop FCoE support in Cisco storage networks lets you mix and match Fibre Channel and FCoE anywhere in a SAN, with the same scale and management tools regardless of the protocol mix. This allows customers to morph their SANs over time as they refresh old servers and storage and add new ones, all the while enjoying the robust reliability for which MDS has been known for its ten years in the market.

Comprehensive end-to-end virtualization: Expanded virtualization solutions at the network, server, and storage levels improve utilization and performance with unique features such as VSANs, built-in Inter-VSAN Routing (IVR), FlexAttach, N-Port ID Virtualization (NPIV), and F-port trunking that support end-to-end virtualized environments. The VMpath feature of Data Center Network Manager (DCNM) provides path visualization, troubleshooting, and performance monitoring from the VM all the way to the storage port.

UCS Integration: The MDS family offers superior integration with Cisco's Unified Computing System (UCS). F-Port PortChannels increase availability and provide load balancing across physical uplinks, and F-Port Trunking allows traffic from multiple VSANs to coexist on a single uplink or PortChannel. DCNM can discover service profiles and map them to UCS blades.

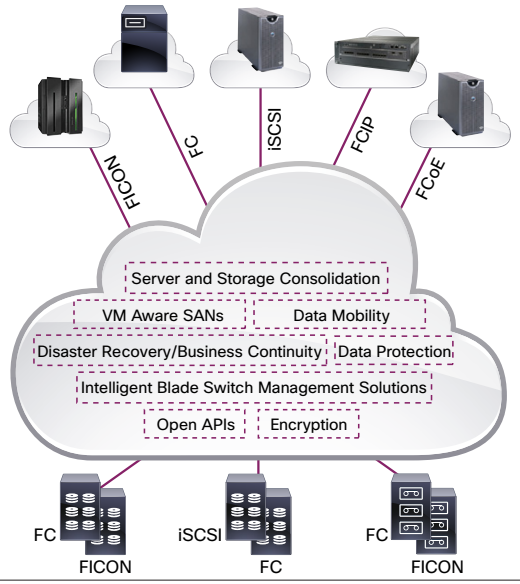
Services-oriented SANs: The Cisco MDS 9500 and 9200 Series support network-hosted storage services that can be extended to any SAN-connected host or storage device. This approach enables centralized, scalable performance of agile, reliable services to support changing customer needs in the virtualized data center. Key capabilities such as Cisco Data Mobility Manager (DMM), I/O Accelerator (IOA), Storage Media Encryption (SME), and Continuous Data Replication, address important customer needs related to data migration, data security, and backup and replication. The recent extension of Cisco Storage Media Encryption to support disk arrays is the latest application evidence of Cisco's continued investment in the Cisco MDS 9000 Family.

Investment protection: The Cisco MDS 9000 Family continues Cisco's tradition of delivering platforms with outstanding longevity due to forward-looking, state-of-the-art architectures, thus lowering operating expenses (OpEx) and capital expenditures (CapEx). A Cisco MDS 9500 Family chassis shipped in 2002 can be field-upgraded to support FCoE and Cisco's newest 8-Gbps Fibre Channel modules, whereas other vendors' directors have required complete replacement every time Fibre Channel speeds increased.

The next stage in the evolution of the Fibre Channel SAN is its extension to Ethernet. FCoE is an extension of the Fibre Channel SAN to devices that connect to it over Ethernet. As such, it takes full advantage of the rich capabilities and customer administrative knowledge of Cisco multiprotocol storage networks built up over the years. FC or FCoE – It's ONE network!

Operational efficiency: By implementing rich instrumentation, building advanced management applications, and exposing the network through standards-based interfaces, Cisco offers the most manageable storage networking platforms in the industry today (Figure 2). Cisco Data Center Network Manager (DCNM) provides converged, role-based management of LAN and SAN that supports multiple organizational models, including separate SAN/LAN teams or a single converged group.

Figure 2. Cisco MDS 9000 Architecture



Cisco Storage Networking Solutions

Storage Consolidation and Migration: The Cisco MDS 9000 Family's industry-leading SAN features facilitate a smooth migration and consolidation of multiple SAN islands into a centralized scalable SAN. The Cisco MDS 9000 Family interoperates with existing solutions, thus enabling transparent migration to a consolidated SAN.

Automation: Cisco MDS 9000 Family fabrics can be managed by leading industry storage management solutions through the industry-standard Storage Management Initiative-Specification (SMI-S) and Simple Network Management Protocol (SNMP). In addition, every feature of DCNM is exposed via a Web Services API.

Disaster recovery and business continuance: Cisco multiprotocol storage networking solutions support Fibre Channel and Fibre Channel over IP (FCIP) SAN Extension, hardware-based compression and encryption, and Cisco IOA. Integrated DWDM 32-wavelength optics dramatically reduce transport cost. Continuous Remote Replication and Continuous Data Protection solutions help provide immediate data recovery and reduced WAN costs. PortChannels between sites can include links of widely varying lengths, enabling logical connections to withstand the loss of an entire data path from a redundant set of connections.

Data-at-rest encryption: Cisco SME offers data-at-rest encryption as a transparent fabric service for disk storage arrays, tapes and virtual tape libraries (VTLs), including robust key management. SME has been audited successfully for PCI DSS 2.0 compliance.

Data migration: Cisco DMM transparently enables online data migration within the data center or between storage arrays in geographically disparate locations.

IBM Fibre Connection (FICON) I/O infrastructure: A reliable and highly available FICON infrastructure facilitates consolidation and scaling and provides disaster-recovery solutions. Advanced FICON services include FICON Tape Acceleration of read and write operations, XRC (z/OS Global Mirror) Acceleration, cascaded FICON fabrics, VSAN-enabled intermix of mainframe and open systems environments, Geographically Dispersed Parallel Sysplex (GDPS) support, and N-Port ID virtualization for mainframe Linux partitions and virtualized zBX systems.

Cisco MDS 9000 Family: Looking Forward

Cisco is committed to delivering innovative new capabilities to the Cisco MDS 9000 Family. Primary areas of focus for ongoing development efforts include:

- **16-Gbps Fibre Channel:** 16-Gbps technology for the Cisco MDS 9000 Family is already under development.
- **Services-oriented SANs:** Support of the Cisco MDS 9000 16-Port Storage Services Node (SSN-16) will be augmented, and additional features will be added to Cisco SME, DMM, and IOA. New transports, such as FCoE, will be supported.
- **FCoE:** FCoE support for intelligent SAN services will be enhanced. FCoE hardware support will be added to the MDS fabric switch portfolio, and higher density FCoE modules will be developed for MDS directors.
- **Virtual machine-aware SANs:** SAN management will become more highly automated, and more integrated with management of virtualized servers. In addition, increased integration with the Cisco Unified Computing System will integrate SAN and server provisioning, allowing faster, more accurate provisioning within established data center roles.

For More Information

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