Cisco Unified Fabric

What Is Cisco Unified Fabric?

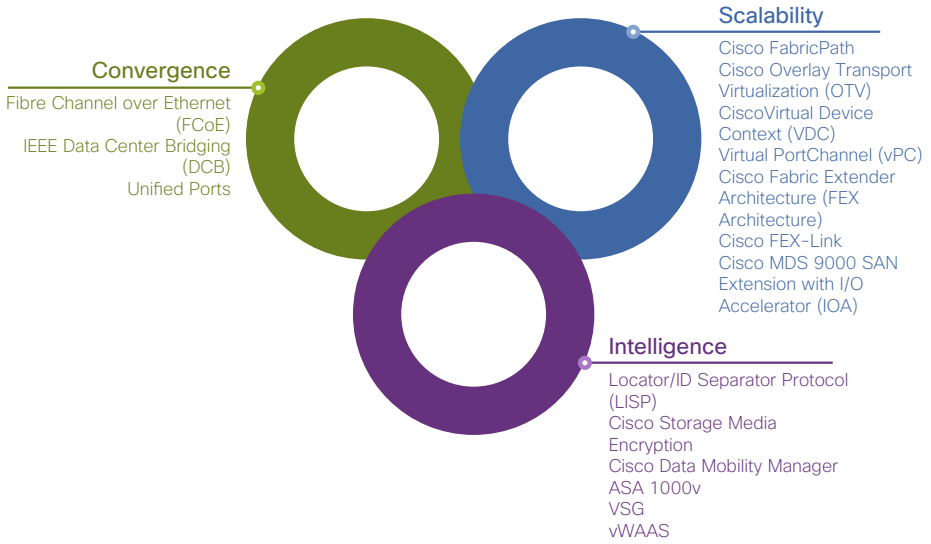
Chief information officers (CIOs) and IT managers spend a lot of time considering standard data center metrics such as uptime and application response time. However, with budgets for IT stagnant or even shrinking, CIOs need to consider not only traditional metrics but also such factors as data center consolidation; power; heating, ventilation, and air conditioning (HVAC); and the management of ongoing complexity. Market trends such as the growing deluge of data, the need for workload mobility, cloud computing, and the growing importance of video all are important elements in data center planning. Beyond all these is the basic goal of data center productivity. Business opportunities can be lost if IT cannot implement business initiatives quickly and efficiently. By reducing operational complexity, data center managers can shift IT staff resources from maintenance to deployment. New deployments that provide business opportunities that normally would be lost or delayed can be implemented and business impact can be increased.

Cisco® Unified Fabric is one of the pillars of the Cisco Unified Data Center, which unifies computing, storage, networking, and management resources to simplify IT operations, reduce costs, and increase performance. Products in the Cisco Unified Fabric portfolio include the Cisco Nexus® 7000, 5000, and 3000 Series Switches and 2000 Series Fabric Extenders; and the Cisco MDS 9500 Series Directors, 9200 Series Multilayer Switches, and 9100 Series Multilayer Fabric Switches. Cisco Unified Fabric provides a basis for the automation required to deliver the private cloud or public cloud data center. Cisco Unified Fabric delivers architectural flexibility, transparent convergence, scalability and intelligence with reduced total cost of ownership (TCO), quicker application deployment, and faster return on investment (ROI).

Specifically, a Cisco Unified Fabric is a data center network that supports both traditional LAN traffic and all types of storage traffic, including traditional non-IP-based protocols such as Fibre Channel and IBM Fibre Connection (FICON), tying everything together with a single OS (Cisco NX-OS Software), a single management GUI, and full interoperability between the Ethernet and non-Ethernet portions of the network (Figure 1).

Overall, the data center journey is from point virtualization to more strategic server and storage virtualization projects, evolving to private cloud initiatives. Cisco Unified Fabric supports this journey and provides investment protection throughout.

Figure 1. Cisco Unified Fabric



Convergence

Cisco Unified Fabric creates high-performance, low-latency, and highly available networks. These networks serve diverse data center needs, including the lossless requirements for block-level storage traffic. A Cisco Unified Fabric network carries multiprotocol traffic to connect storage (Fibre Channel, FCoE, Small Computer System Interface over IP [iSCSI], and network-attached storage [NAS]) as well as general data traffic. Fibre Channel traffic can be on its own fabric or part of a converged fabric with FCoE. Offering the best of both LAN and SAN environments, Cisco Unified Fabric enables storage network users to take advantage of the economy of scale, robust vendor community, and aggressive performance roadmap of Ethernet while providing the high-performance, lossless characteristics of a Fibre Channel network.

Convergence reduces TCO through both reduced capital expenditures (CapEx; host interfaces, cables, and upstream switch ports) and operating expenses (OpEx; management, power, cooling, rack space, and floor space) and is designed for incremental adoption without major system upgrades and without disruption of existing LAN and SAN management and operation procedures.

Scalability

Cisco uniquely offers multidimensional scalability for the data center network: switch size and performance, system scale, and geographic span. Cisco Unified Fabric scalability enables businesses to scale simultaneously in multiple areas to support changing traffic patterns in the data center, including the larger, more complex workloads brought about by virtualization, the proliferation of virtual machines, and the challenges of cloud computing. Cisco Unified Fabric transparently extends the network to encompass all locations in a single extended environment or spanning data centers, allowing resources to be efficiently accessed and effectively used regardless of size or scope.

Intelligence

Cisco Unified Fabric continues and extends Cisco's strategy of embedding policy-based, intelligent services directly in the network fabric to create a service platform. On the LAN side, these services include Layer 4 through 7 acceleration and load balancing throughout the data center in a consistent and uniform manner. For SAN traffic, services include acceleration of I/O over metropolitan area network (MAN) and WAN links, data migration across storage arrays, and encryption of data being written to tape and disk. Benefits from this approach include:

- Ubiquity: All services, whether physical applications, virtual workloads, network services, or other infrastructure elements, are available to all elements of the data center.
- Scalability: Service delivery capability automatically scales with changes in the size of the network.
- Agility: Applications can be deployed more quickly with policy-based compliance instead of physical infrastructure changes.

The intelligence in Cisco Unified Fabric is powered by Cisco NX-OS, the common operating system across the Cisco Nexus and Cisco MDS 9000 Families. Cisco NX-OS is a modern, modular, Linux-based operating system that provides consistent management and predictable response for the data center. Cisco NX-OS is managed by Cisco Data Center Network Manager (DCNM), which provides single pane of glass management across the Cisco Nexus and Cisco MDS 9000 Families. Cisco DCNM simplifies operations and can manage, monitor, and automate the data center network.

Why Is Cisco Unified Fabric Needed?

Cisco Unified Fabric supports the data center evolution to virtualization and cloud architectures; enables improved deployment, operation, and end-user experience of virtualized resources; and meets growing bandwidth and computing requirements. Cross-data center processes, such as rapid backup and recovery and workload mobility, require this type of data center transformation.

Cisco Unified Fabric addresses these trends:

- Data center consolidation
- Limitations on server virtualization scale caused by I/O bottlenecks and the complexity of integration with network infrastructure
- Increasingly bandwidth-intensive multimedia applications
- Rapid storage growth
- Rising energy costs

Cisco Unified Fabric enables solutions such as private cloud computing, public cloud computing, workload consolidation, desktop virtualization and virtual desktop infrastructure, Web 2.0, backup and recovery, business continuity, and pre-integrated data center pods.

Cisco Unified Fabric consolidates and standardizes the way that servers and storage resources are connected, application delivery and core data center services are provisioned, servers and data center resources are interconnected to scale, and server and network virtualization is orchestrated.

Products Included in Cisco Unified Fabric

Cisco Unified Fabric includes:

- Cisco Nexus Family of data center switches
- Cisco MDS 9000 Family of storage network switches
- Cisco DCNM
- Cisco NX-OS
- Cisco Application Control Engine (ACE)
- Cisco Wide Area Application Services (WAAS)

Main Benefits of Cisco Unified Fabric

Cisco Unified Fabric delivers reliable, scalable, agile, and cost-effective network services to servers, storage, and applications while improving the user experience. It facilitates better support of virtualization and cloud services with improved staff utilization, more efficient resource utilization (more load on servers and storage), low-latency options, lower TCO, and better resiliency and uptime. Your data center can do more with less.

Cisco is the only vendor with server and switch platforms natively designed for integrated virtualized services. Cisco is a leader in LAN and SAN convergence standards bodies and is the first to bring intelligent virtualization to the network, enabling service and resource access anytime and anywhere. Cisco is the only vendor with a common operating system across data center LAN and SAN product lines.

Cisco Unified Fabric is the networking pillar of Cisco Unified Data Center, bringing unified storage and data networking and supporting application performance, application delivery, automation, and services delivery. This approach enables overall solutions such as business continuity, virtualization, and low-latency, high-performance computing while providing energy-efficient, resilient, and secure data centers.

For More Information

Hundreds of IT departments, such as Qualcomm MEMS Technologies (QMT), University of Arizona, Salem Hospital, Epiq Systems, Coca Cola, and NetApp, are already experiencing the benefits of an incremental approach to unified fabric deployment by starting at the server access layer. Case studies and other detailed information are available at http://www.cisco.com/en/US/netsol/ns945/networking_solutions_presentations_list.html, with Cisco's partner ecosystem developing end-to-end FCoE-enabled products for increased customer benefit.

For more information about Cisco Unified Fabric, see http://www.cisco.com/go/unifiedfabric.

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