Cisco Unified Fabric Convergence

Overview

The challenges faced by managers in the data center are not simply the old problems of reliability and capacity planning, but the challenges brought about by complexity. The root cause of complexity is the proliferation of systems, all tied together with virtualization in the data center. The individual systems are not a challenge to manage, but virtualization and cloud technologies bring all these technologies together, and the complexity becomes compounded at both the physical level and the management level. This complexity leads to longer lead times for projects. Even worse, it leads to administrators who must spend a preponderance of time attending to mundane administrative tasks rather than working on projects that can be of direct benefit to the business.

The reduction of complexity can lead to direct business benefits. Significantly lowering lead times to implement projects that are important to the business or to IT brings a new level of value to the data center. One way in which customers can reduce complexity is by converging the LAN and SAN infrastructure with Cisco® Unified Fabric.
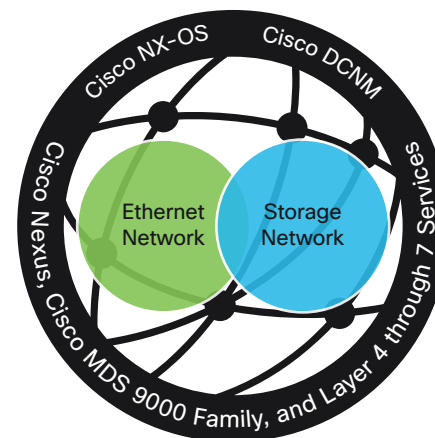
What Is Cisco Unified Fabric?

An important building block for general-purpose, virtualized, and cloud-based data centers, Cisco Unified Fabric provides the foundational connectivity and unifies storage, data networking, and network services to deliver architectural flexibility and consistent networking across physical, virtual, and cloud environments. Cisco Unified Fabric is the networking technology that provides a foundation for automation and control that is so necessary in the virtual and private cloud data center. Cisco Unified Fabric provides the architectural flexibility that allows companies to meet their networking needs and the scalability necessary for organizations to grow in multiple dimensions, including toward private and public clouds and outward and upward with bandwidth and ports. Cisco Unified Fabric allows companies to reduce costs and increase performance by simplifying and automating IT operations while protecting the customer's investment in technology. It addresses continued data center consolidation, server virtualization scalability limited by I/O bottlenecks and integration complexity in network infrastructure, increasingly bandwidth-intensive multimedia applications, rapid storage growth, and rising energy costs.

Products in the Cisco Unified Fabric family include the Cisco Nexus® 7000, 5000, and 3000 Series Switches and 2000 Series Fabric Extenders; the Cisco MDS 9500 Series Multilayer Directors and 9200 and 9100 Series Multilayer Fabric Switches; and Layers 4 through 7 product lines such as Cisco Wide Area Application Services (WAAS) and Cisco Application Control Engine (ACE). All these products are tied together with Cisco NX-OS Software, networking software run on the switches that provides continuity of management, predictable responses, and exceptional compatibility across the data center network. Cisco Data Center Network Manager (DCNM) is the single-pane management tool that ties Cisco Unified Fabric together, providing management and monitoring for LAN, SAN, and converged unified fabric networks.

Cisco Unified Fabric forms a data center network that can handle traditional LAN and SAN multiprotocol traffic as well as new protocols and technologies such as Fibre Channel over Ethernet that converge LAN and SAN traffic onto a single network. Convergence of two separate networks can bring much efficiency in the physical, virtual, and management environments (Figure 1).

Figure 1. Unified Fabric Ecosystem

Enabling LAN and SAN Convergence with Cisco Unified Fabric

In many data centers, the storage network is a separate entity running Fibre Channel, using Fibre Channel host bus adapters (HBAs), switches, and directors. In this scenario, storage traffic has both its own protocol and its own physical network. This successful configuration for the data center has remained prevalent for years and still is widely adopted by customers. With the rise of server virtualization, however, the complexity created by separate storage and data networks has begun to be a hindrance to greater efficiency in the data center. With this complexity coupled with rising energy costs and decreasing data center space, converging the LAN and SAN networks into a single physical network makes increasing sense in the data center. FCoE provides Fibre Channel transport over the data center Ethernet network. New standards for Ethernet in the data center help ensure in-order and on-time packet delivery with the same reliability as Fibre Channel.

Capital expenditures (CapEx) are the first and most easily recognizable aspect of data center networks that can be reduced by converging the network with Cisco Unified Fabric. By converging the network on a single physical infrastructure, the number of upstream switches, ports, and cabling are greatly reduced. Cabling is usually reduced by a minimum 2:1 factor. Convergence saves not only CapEx but also time, reducing the number of interfaces and making it much easier to diagnose problems, provision cabling, and trace cabling problems. Standard Fibre Channel HBAs are replaced by converged network adapters (CNAs), which function as part of the FCoE and Ethernet network. Operating expenses (OpEx) are saved through the reduced use of heating, ventilation, and air conditioning (HVAC); energy; and space and simplified, consolidated management.

Cisco Unified Fabric brings a number of benefits that make the transition to a converged network easy. The human factor is normally the most difficult one to overcome, but with Cisco Unified Fabric, it becomes much more manageable. Storage administrators can use their familiar tools; to them, the FCoE network looks and functions like a pure Fibre Channel environment. Ethernet administrators can leave the FCoE configuration and management to the storage administrators and concentrate on the underlying Ethernet network.

Cisco DCNM supports role-based administration, allowing tasks and areas of responsibility to be securely divided. Fibre Channel administrators and Ethernet administrators can use Cisco DCNM to fully manage the fabric. Cisco DCNM provides automation for common administrative tasks. Cisco DCNM also provides extensive monitoring capabilities that help administrators identify exactly where a network problem may be and to correct it.

The transition to a converged network can occur gradually. With the Cisco MDS 9000 Family and Cisco Nexus Family switch portfolios, the investment in current Fibre Channel equipment, including switching and storage, can be maintained. Features such as unified ports on certain Cisco Nexus 5000 Series models make the transition easy, with the capability to transform a port from Ethernet to Fibre Channel with a license change. Customer investments are protected throughout their service and financial life; transitions are gradual and managed. Cisco is committed to helping ensure not only customer investment protection but also manageable technological change that keeps the risks to customer data and the business low.

Why Cisco?

Cisco has decades of experience in the data center, and our continued investment in research and development helps ensure that we continue to bring our customers solutions that solve business and technology problems while making the most of customers' investments. Our data center products are designed from the foundation to work in virtualized and cloud environments, and Cisco has been a leader in the LAN and SAN convergence standards bodies. Cisco is the only vendor with a common operating system across data center LAN SAN product lines. Cisco has one of the largest data center switching, computing, and management product portfolios, collected in the Cisco Unified Data Center architecture.

For More Information

Detailed case studies are available at http://www.cisco.com/en/US/products/ps9670/prod_case_studies_list.html, with Cisco's partner ecosystem developing end-to-end FCoE-enabled products for increased customer benefits.

Learn more at http://www.cisco.com/go/unifiedfabric.