Fabric Scaling

Overview

The volume of data flowing through today's data centers and across data centers is growing exponentially. This growth is placing a burden on today's networks, with the volume of data growing faster than IT departments are able to scale their networks, resulting in congestion and slow response times.

Cisco® Unified Fabric addresses the challenge of scalability in the data center. Cisco Unified Fabric offers multidimensional scalability, encompassing device scale, fabric and system scalability, and geographic span, which enables the Cisco Unified Fabric to scale within the data center and also across data centers, creating a true unified network.

Device Scalability

At the device level, the Cisco Unified Fabric portfolio offers the broadest switch portfolio and the highest-performance switches in the industry, both in terms of switching capacity and port density. The Cisco Nexus® 7000 Series Switches, Cisco's flagship data center flagship switch, delivers up to 17 terabits per second (Tbps) of switching capacity and a density of up to 768 10 Gigabit Ethernet ports, the highest in the industry. For faster port speeds, the Cisco Nexus family also offers high-density 40- and 100-Gbps connectivity.

Fabric Scalability within the Data Center

In addition to switch density, the capability to deliver high density at the system level is a crucial aspect of scalability. Scaling in the past has meant simply adding bandwidth and ports to accommodate the client-to-server traffic. Today, scaling has to take into consideration virtualized servers, workload mobility, and increased East-to-West server-to-server traffic.

Cisco Fabric Extender Technology (FEX Technology): To scale the access layer, Cisco Unified Fabric supports FEX Technology, based on the emerging IEEE 802.1BR standard.

Cisco FEX Technology delivers three main solutions to help scale the access layer, Cisco Nexus 2000 Series Fabric Extenders, Cisco Adapter Fabric Extender (Adapter FEX) and Cisco Virtual Machine Fabric Extender (VM-FEX). All three solutions are managed from the parent Cisco Nexus 7000 or 5000 Series Switch, simplify operations.

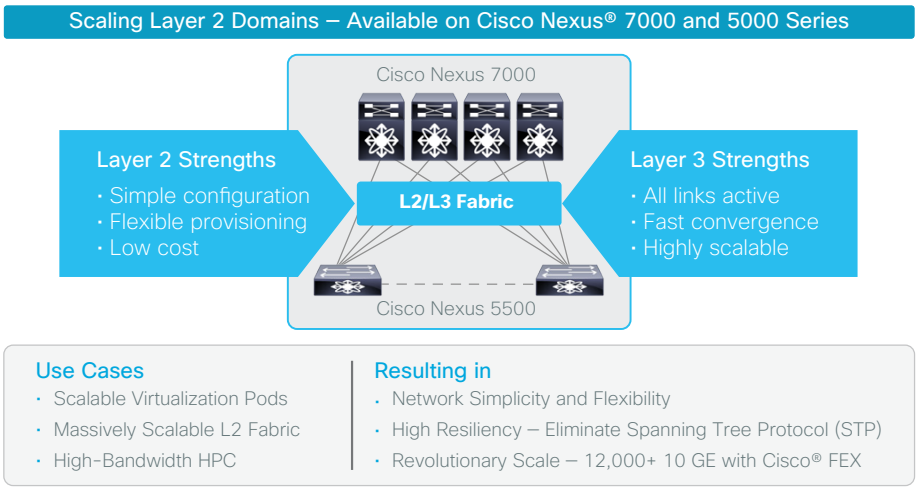
For scaling top-of-rack (ToR) deployments, the Cisco Nexus 2000 Series ToR switch acts as a remote line card. Today, more than 1500 ports (1 or 10 Gigabit Ethernet) can be deployed and managed from a single parent switch.

Cisco Adapter-FEX and Data Center VM-FEX allow network scalability to extend to the server. Cisco Adapter-FEX logically partitions the network adapter into many virtual ports, allowing each virtual port to be assigned to individual applications or workloads. This feature provides the capability to set network service-level agreements (SLAs) for each application over a 10 Gigabit Ethernet port for better bandwidth efficiency and scalability.

Similarly, Cisco VM-FEX partitions the server adapter port into multiple virtual ports, assigning each virtual port to an individual virtual machine, extending network control and visibility to the virtual machine level. Up to 2000 virtual machine network interfaces can be deployed from a single Cisco Nexus 5000 Series Switch.

Cisco FabricPath: To scale the fabric between the access and aggregation or core layer, Cisco FabricPath delivers a highly scalable Layer 2 solution. Cisco FabricPath combines the simplicity of Layer 2 with the scalability of Layer 3. Cisco FabricPath eliminates the need for spanning tree and its limitations. It enables load balancing and multipathing for Layer 2 deployment, significantly increasing scalability and resiliency. With Cisco FabricPath, you can deploy highly scalable Layer 2 domains with 100 Tbps or more of cross-sectional bandwidth for up to 12,000 10 Gigabit Ethernet server connections, enabling data center–wide workload mobility.

Figure 1. Cisco FabricPath: Revolutionary Fabric Scale



Virtual extensible LAN (VXLAN): enables Layer 2 networking over Layer 3, allowing Layer 2 domains to scale across Layer 3 boundaries in the data center. This capability enables large scale virtualized server deployments with workload mobility across the data center over layer 3 networks.

Fabric Scalability Across Data Centers

Cisco Unified Fabric also addresses cross-data center scalability for workload mobility.

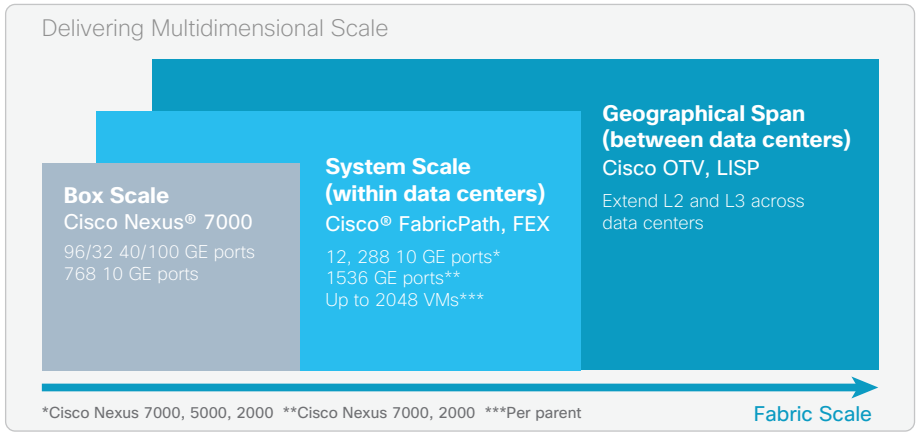
Cisco Overlay Transport Virtualization (OTV): extends Layer 2 Ethernet networks between data centers over any network that supports IP. It allows you to extend VLAN domains between geographically distant data centers, providing Layer 2 adjacency for workload mobility and distributed clustering beyond the data center walls. OTV was designed to be an overlay technology over existing networks, making it easy to deploy without requiring a network redesign.

Cisco Locator/ID Separation Protocol (LISP): is an emerging inter-data center scaling technology that enables IP address portability. LISP is a new IP routing architecture, developed by Cisco and IETF, that splits the device identity and its location into two different numbering spaces. This separation enables global IP address portability. For workload mobility, it means that a virtual machine can to be moved across data centers or across the country while preserving its IP address. By eliminating the need to renumber IP addresses, LISP allows customers to move entire workloads across Layer 3 boundaries to different IP subnets and still maintain connectivity. With the deployment of the LISP routing architecture, IT will truly have a network that can deliver any application to any location at any time and at any scale.

Cisco MDS 9000 I/O Accelerator (IOA): provides storage network connectivity across data centers. IOAreduces the effect of distance-induced latency, enabling reduced backup and replication windows and making optimal use of expensive long-haul bandwidth.

The following figure provides a high level summary of the multi-dimensional scale the Cisco Unified Fabric offers.

Figure 2. Revolutionary Scale



Why Cisco?

Cisco Unified Fabric offers the industry's broadest product portfolio and the industry's most innovative features for scaling data centers today and in the future. Cisco's innovative products and solutions together with a broad range of services programs to accelerate customer success, delivered through a combination of people, processes, tools, and partners, result in high levels of customer satisfaction. Cisco continues to lead the industry with innovative new solutions and technologies that are the product of years of networking experience.

For More Information

http://www.cisco.com/en/US/solutions/ns340/ns517/ns224/ns945/unified_fabric.html

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