

# Cisco IT Consolidates I/O in the Data Center



The networking industry has been working to consolidate I/O to creating a cost effective, resilient, scalable and easy-to-manage data center. Cisco IT has been creating a data center using their Nexus 7000 and 5000 series switches to consolidate I/O, reduce cabling requirements and increase application performance.

Cisco IT is transforming its data center in order to realize the company's Data Center 3.0 vision, which employs a unified fabric to connect servers and storage devices. This transformation occurs in three stages:

- Consolidating I/O and increasing throughput running on 10GE Ethernet

- Increasing the power available to compute resources by reducing the power consumed by the network
- Making applications location-independent

Until now, Cisco has used a traditional Cisco Ethernet Switching infrastructure and Fiber channel switches at the distribution layer. This is soon changing with multiple 1Gbps and 4Gbps Fiber Channel connections being replaced by 10Gbps Ethernet connections through a lossless, high-performance and low latency switching fabric.

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Cisco Engineering Manager

Some of the drivers for this change include meeting increased bandwidth demand while improving application performance, reducing hardware and operational costs, and adopting Fiber Channel over Ethernet (FCoE) which can require greater throughput.

"Cisco's servers require 4Gbps of Fibre Channel capacity for storage access, so we need a 10Gbps connection to accommodate storage plus data," says Kumar Ramachandra-Rao, technical staff member, IT Network and Data Center Services Engineering.

To meet these requirements, Cisco IT needed a new data center architecture that would consolidate I/O at the access layer and increase bandwidth in the core. When planning in 2004, Cisco IT only had the option of Infiniband, a layer 2 proprietary method of connecting hosts with storage, SAN switches and networking devices. But they wanted to improve operational efficiency by standardizing on Ethernet and IP standards-based technologies whenever available, which made FCoE the preferred choice.

## IT Project

In September 2008, Cisco IT deployed the Nexus 7000 and 5000 Switches



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Cisco IT anticipates that Nexus-based pods can reduce in the number of access and distribution switches by up to 80%.

along with Cisco Catalyst 6500 Switches in a controlled production environment in Mountain View, California:

- Nexus 7000 Series Switches deployed at the Layer 2/3 distribution boundary to consolidate existing Cisco Catalyst 6500 Series Switches
- Nexus 5000 Series Switches deployed at the server-access layer to provide a low-latency, lossless fabric
- Catalyst 6500 Series Switches used at the network edge

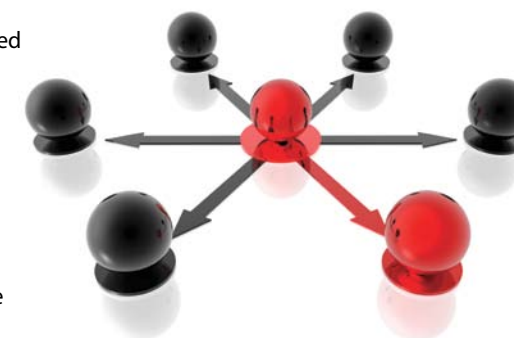
## Nexus Pod Deployment

Cisco IT deployed the Nexus 7000 and 5000 switches in four steps. The initial step included the deployment of unified I/O pods, self-contained and standardized modular computing blocks. Application performance is measured within the pod to determine which applications experience the greatest improvements throughout with FCoE. The pod is then connected to a production Oracle database in the Mountain View data center and sub-

jected to a similar performance testing. FCoE is used within the rack where the converged network adapters connect to the top-of-rack Nexus 500 switches.

## Management

Nexus 7000 and Nexus 5000 Series Switches use the NX-OS operating system, which closely resembles Cisco IOS software, so Cisco IT staff can configure and implement NX-OS using their existing skills. The plan is to integrate



management of the Cisco Nexus 7000 and 5000 Switches into existing system management environments using Cisco Data Center Network Manager.

## Anticipated Results

Cisco IT anticipates that the initial deployment will result in a low-risk experience since it is only being used as an access technology and not across the whole data center. Increased port density among the Nexus switches will provide for increased scalability in the data center. Operational costs will be reduced both at the system and the data center level. Lower cabling costs, faster provision, improved SAN performance and a much more efficient IT organization are among the various other benefits that Cisco foresees.



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