Consolidating I/O in the Data Center

Cisco Nexus 7000 and 5000 Series Switches consolidate I/O, reducing cabling requirements and increasing application performance.

Cisco IT is transforming its data centers with solutions that help to realize the company's Data Center 3.0 vision. In the Data Center 3.0 environment, a unified fabric connects servers and storage devices in a way that is resilient, scalable, and easy to manage.

Until now, Cisco has used a traditional Cisco Ethernet switching infrastructure and Fibre Channel switches at the distribution layer. Cisco IT is currently consolidating data center I/O from multiple 1 Gbps Ethernet connections and 4 Gbps Fibre Channel connections to a pair of 10 Gbps Ethernet connections through a lossless, high-performance, low-latency switching fabric.

In September 2008, Cisco IT deployed the Nexus 7000 and 5000 Switches along with Cisco Catalyst 6500 Series Switches in a controlled production environment at its data center in Mountain View, California. The test environment includes the following components:

- Nexus 7000 Series Switches are deployed at the Layer 2/3 distribution boundary to consolidate existing Cisco Catalyst 6500 Series Switches.
- Nexus 5000 Series Switches are deployed at the server-access layer to provide a low-latency, lossless fabric.
- Catalyst 6500 Series Switches are still used at the network edge to provide rich network services, such as load balancing and Secure Sockets Layer (SSL) acceleration services provided by the Cisco ACE Application Control Engine.

The Nexus 7000 and 5000 Series Switches meet Cisco IT's criteria for a unified I/O platform. The Nexus 7000 Series meets Cisco's needs for the distribution layer because of its scalability, up to 512 Gigabit Ethernet ports and up to 15 Tbps backplane capacity. A standards-based switch, the Cisco Nexus 7000 is built to support future 40 Gbps and 100 Gbps Ethernet. The Cisco Nexus 5000 Series meets Cisco's needs for a top-of-rack access switch because of its unified I/O support, high port density, and low-latency (less than 3 milliseconds) lossless fabric, which will improve application performance.

Cisco IT is deploying the Cisco Nexus 7000 and 5000 Switches in four steps:

- **Step 1.** Deploy unified I/O pods in the Mountain View data center. Pods incorporate the network access layer and distribution layer, which connect to a common LAN and SAN core layers shared by all pods.
- **Step 2.** Measure application performance within the pods to determine which applications experience the greatest throughput improvements from Fibre Channel over Ethernet (FCoE).
- **Step 3.** Connect the pod to a production Oracle database in the Mountain View data center and repeat the performance testing.

- **Step 4.** Use FCoE within the rack. The converged network adapters will connect to the top-of-rack Nexus 5000 Switch.

To learn more about the Nexus pod test environment, and the business drivers behind the Nexus deployment and results to date, see the Deployment in Progress: How Cisco IT Consolidates I/O in the Data Center.