Online Higher Education Institution Prepares for Growth

Apollo Group, Inc. created highly scalable and available data center switching architecture with Nexus platform.

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EXECUTIVE SUMMARY

Apollo Group, Inc.
- Higher Education
- Phoenix, Arizona
- 21,777 Employees

Business Impact:
- Delivered excellent student experience even during peak times
- Doubled network size without increasing staff
- Lowered per-port switch costs while increasing ports
- Freed up several rows in the data center

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Business Challenge

Founded in 1973, Apollo Group, Inc., is a leading provider of higher education programs for working adults. University of Phoenix, Apollo Group's flagship university, has more than 400,000 students, 24,000 faculty members, and 200 campuses and learning centers nationwide.

Apollo Group's learning and business applications reside on approximately 7500 servers in three data centers in the Phoenix metropolitan area. The IT team wanted to upgrade the data center network, for two reasons. First, the existing switches had begun to falter during peak traffic times, affecting students' experience. "Online education is a competitive market, and a student who can't access our servers or experiences slow performance might choose another educational provider," says Dennis Crowe, director of network engineering for Apollo Group.

In addition, Apollo requires a modular and scalable switch architecture in order to address future student demand. "If we need to add tens of thousands of servers to support growth, we want our IT infrastructure to be ready," Crowe says.

Solution and Results

Apollo built its next-generation data center infrastructure using the Cisco Nexus family of switches. "The Cisco Nexus platform provides the 10 Gigabit Ethernet connectivity we need as we continue to virtualize," Crowe says. "It also has capabilities that will make it easier to scale the network as we offer IaaS, like Virtual Device Contexts on the core, virtual PortChannel (vPC) to double server bandwidth, and Cisco Nexus 2000 Series Fabric Extenders to minimize management points."

The new modular architecture consists of blocks, each containing a pair of Cisco Nexus 7010 Switches at the core. These connect to Cisco Nexus 5010 or 5020 Switches at the end of each server row over two 10 Gigabit Ethernet links. The Cisco Nexus 5000 Series Switches, in turn, connect to Cisco Nexus 2248 Fabric Extenders at the top of rack, also over two 10 Gigabit Ethernet links. As Apollo continues virtualizing applications, the IT team will begin using 10Gbps servers and connect them directly to the Cisco Nexus 5000 Series Switches.

Currently, the Apollo data centers have about a half dozen blocks comprising more than 40 Cisco Nexus 7010 Switches, hundreds of Cisco Nexus 5000 Series Switches, and nearly 1000 Cisco Nexus 2248 Fabric Extenders. The three data centers connect over dense wavelength division multiplexing (DWDM) using the Cisco ONS 15454 Multiservice Transport Platform.

> "Ordinarily, doubling the IT infrastructure requires a 20 to 30 percent headcount increase. Having a single point of management for Cisco Nexus 2000 Fabric Extenders through the Cisco Nexus 5000 enabled us to manage twice the number of devices with the same size team."
> — **Dennis Crowe, Director of Network Engineering, Apollo Group, Inc.**

Main benefits of the Cisco Nexus architecture for Apollo Group include:

- **Scalability to support business growth:** With the modular data center switching architecture, Apollo can add as much bandwidth as needed to support more students and any future schools. "We'll add Cisco Nexus 7000 Series Switches to create new blocks, leaving the rest of the switching architecture intact," Crowe says. "The high port density of the Cisco Nexus 7000 Switch gives us an abundance of capacity."

- **Lower port costs:** Cisco Nexus 7000 Series Switches provide ten times as many ports as other options, reducing the number of switches that Apollo needs to purchase, manage, power, and cool. Switch consolidation immediately freed up several rows in the data center.

- **Reduced management overhead:** Instead of individually managing thousands of Cisco Nexus 2248 Fabric Extenders, the IT team manages the Cisco Nexus 5000 Series Switches to which they connect. "Ordinarily, doubling the IT infrastructure requires a 20 to 30 percent headcount increase," says Crowe. Having a single point of management for Cisco Nexus 2000 Series Fabric Extenders through the Cisco Nexus 5000 enabled us to manage twice the number of devices with the same size team." Apollo expects to further simplify management by using Cisco Data Center Network Manager to automate provisioning and actively monitor network performance.

- **Excellent user experience and enhanced resiliency:** Business users and students immediately noticed faster database access times. Availability also improved, for several reasons. For example, Apollo takes advantage of the vPC feature of Cisco Nexus switches to eliminate the need for unreliable Spanning Tree. "With vPC, we can give servers double the bandwidth, helping to ensure high performance even during peak traffic times," Crowe says. In addition, the In-Service Software Upgrade (ISSU) feature enables the IT team to upgrade switch firmware while students and employees continue to access the network.

- **Scalable campus connectivity:** Apollo also uses Cisco networking solutions for campus connectivity. To meet increasing demand for high-definition video as part of the curriculum, Apollo is deploying an 802.11 Cisco Unified Wireless Network to provide the needed bandwidth.

Apollo's future plans include using the Cisco Nexus 7000 Overlay Transport Virtualization (OTV) feature to move virtual machines between data centers, for disaster recovery.

For More Information

To find out more about the Cisco Nexus family of switches, visit: http://www.cisco.com/go/nexus

To find out more about Cisco Data Center Business Advantage solutions, visit: http://www.cisco.com/go/dc

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