

University Deploys Unified Fabric in Data Center

University of Arizona used the Nexus family to converge its data and storage networks, reducing projected infrastructure costs by 50 percent.

EXECUTIVE SUMMARY

UNIVERSITY OF ARIZONA

- Higher Education
- Tucson, Arizona
- 38,000 students; 14,600 faculty

BUSINESS RESULTS

- Will save a projected US\$1.2 million over two years
- Reduced average in-rack cable count from 80 to 2
- Enabled latency-sensitive applications

Business Challenge

Located in Tucson, the University of Arizona is one of the leading public research universities in the U.S. The university wanted to modernize its data center to support new initiatives to increase administrative efficiency and reduce costs, such as replacing all enterprise applications and accelerating the adoption of virtualization. The new network infrastructure would need to support server virtualization and latency-sensitive applications. "We operate an average of 20 virtual machines per host," says Derek Masseth,

senior director for infrastructure services, University of Arizona. "The complexity and costs of maintaining six or more Ethernet cables and two or more SAN [storage area network] cables for each host were becoming unreasonable, and we needed a more sustainable solution." Therefore, the IT department decided to build a 10 Gigabit Ethernet environment with a unified fabric for the LAN and storage area network (SAN).

Solution and Benefits

The University of Arizona is using the Cisco[®] Nexus family as the platform for its next-generation data center network. Each server rack connects over lossless 10 Gigabit Ethernet to redundant Cisco Nexus 5010 Switches that support Fibre Channel over Ethernet (FCoE). These top-of-rack switches connect to the IP network through the Cisco Nexus 7010 Switch, and to the SAN through a Cisco MDS 9509 Multilayer Director that the university already owned.

The enterprise application replacement project required low-latency, high-bandwidth interconnects between the university's primary and disaster recovery data centers. In the primary data center, dual Cisco Nexus 7010 Switches, linked with Cisco's virtual PortChannel (vPC) technology, connect to a single Cisco Nexus 7010 Switch in the disaster recovery location over dual 10 Gigabit Ethernet long-range fiber. The interconnects also enable the university to move virtual machines between the two data centers to balance application workloads for better performance.

University of Arizona is experiencing the following benefits from the Cisco Nexus family:

- **Capital cost savings:** "The converged Ethernet and SAN networks reduced our upfront capital outlay by 50 percent, or \$600,000, when compared to our previous architecture," Masseth says. Factors in the savings include switch port consolidation, using converged network adapters (CNAs) instead of separate network interface cards (NICs) and host bus adapters (HBAs), and reduced cabling.
- **Simplified cable management:** "Deploying the Cisco Nexus 5010 Switch top of rack reduced the homerun cable count from an average of 80 per rack to two, and intra-rack cable count from an average of four per server to two," says Masseth. Not having to deal with that tangled web of cabling is dramatically reducing manpower requirements."
- **Reduced power consumption and cooling efficiency:** Consolidation has reduced power consumption per port by 30 percent, supporting the university's commitment to environmental sustainability. The reduction in

cabling bulk has improved airflow, reducing server temperatures and the load on cooling systems. “In addition, front-to-back airflow in Cisco Nexus 5010 Switches enables proper hot aisle/cold aisle layout,” Masseth says.

- **Support for high-bandwidth and latency-sensitive applications:** The lossless design of the Cisco Nexus family conserves bandwidth by eliminating data retransmissions. This provides higher sustained bandwidth for storage and rich-media applications, improving the user experience. It also decreases the latency of cluster communication and replication processes.
- **More convenient maintenance:** Nearly all university departments depend on network access, which previously made it difficult to schedule maintenance to the fabrics. “The ISSU [in-service software upgrade] feature of Cisco Nexus 7010 Switches enables us to perform maintenance that we would otherwise have to postpone for months, helping us provide reliable services to students and faculty,” says Masseth.
- **Investment protection:** The university will be able to adopt 40 or 100 Gigabit Ethernet in the future, without replacing the switch chassis.

The university is currently exploring options to extend the value of its Cisco Nexus investment. One plan is using Cisco Nexus 2000 Fabric Extenders to connect existing Gigabit Ethernet servers. Another is implementing Cisco Nexus 1000V, a software switch that resides on servers. “The Cisco Nexus 1000V will allow us to virtualize applications that were previously infeasible,” says Masseth. “It has the potential to revolutionize the way we provide secure and stable compute resources to various campus departments.”

Masseth concludes, “Our old data center fabric architecture was a shortcoming that we repeatedly had to design around. With users as tech-savvy as ours, the demands on our data center constantly grow and shift. The Cisco Nexus architecture is an enabler, empowering our department to focus on our primary mission, which is to provide the richest user experience possible.”

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— Derek Masseth, Senior Director for Infrastructure Services, University of Arizona

For more information about the Cisco Nexus Switch Family, visit: <http://www.cisco.com/go/nexus>



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