The bridge to possible

Leading Research University Increases Data Center Performance, Resiliency with Cisco VXLAN EVPN

Size: 27,202 faculty and staff · Industry: Higher education · Location: Minneapolis, Minnesota

The University of Minnesota (UMN) is a highly-ranked public research university offering a wide range of undergraduate and graduate programs. Its Twin Cities campus is organized into 19 colleges, schools, and other major academic units. For more information, visit umn.edu.

Challenges

- Reduce data center network bottlenecks
- Increase technology standardization and scalability
- Improve operational efficiency

Solutions

- Cisco® VXLAN EVPN
- Cisco Nexus® 9000 Series switches

Results

- Dramatically improved data center network performance
- Accelerated data center infrastructure deployments from weeks to hours
- Improved network segmentation and resiliency

For more information

- Cisco VXLAN EVPN
- Cisco Nexus 9000

The bridge to possible

Challenge: Eliminate network bottlenecks

UMN has five campuses, several outreach offices, and a number of research facilities spread across the state of Minnesota. It is one of only five universities in the nation with an engineering school, medical school, law school, veterinary medical school, and agricultural school all on one campus. And with academic programs in 70 countries, UMN's teaching, research, and outreach extend well beyond state and national borders.

"We contribute to a lot of projects and initiatives," says Rich Ingram, network engineer at UMN, citing the University's international presence and participation in global research initiatives. "From a technology standpoint, we don't just try to keep up. We try to lead the way."

To provide a state-of-the-art network infrastructure that connects and empowers tens of thousands of students, faculty, and research partners around the world, UMN recently deployed a Virtual Extensible LAN (VXLAN) Ethernet Virtual Private Network (EVPN) in its data centers using Cisco Nexus 9000 switches. An open network fabric, VXLAN offers elastic workload placement, higher scalability of Layer 2 (L2) segmentation, and connectivity across the Layer 3 (L3) network boundary.

"We had a massive L2 network spanning multiple locations, and it was causing a lot of east/west bottlenecks," Ingram explains. "After a rigorous RFP process, we chose Cisco VXLAN EVPN on the Nexus platform."

Using a Border Gateway Protocol (BGP) control plane, the solution is optimized for multi-site connectivity and large-scale routing and switching.

"Using a small routed backbone in each data center and connecting everything with Cisco VXLAN EVPN has improved performance and simplified network administration," Ingram says.

The spine-and-leaf data center network topology has eliminated east/west bottlenecks. A 400 Gigabit uplink has significantly increased network bandwidth at a lower cost per port. And the multi-site design simultaneously connects and isolates the University's two main data centers.

"It's a strong resiliency model," Ingram says. "The data centers are completely isolated, but they talk to each other via BGP."

> "Using a small routed backbone in each data center and connecting everything with Cisco VXLAN EVPN has improved performance and simplified network administration."
>
> **Rich Ingram**
> Network Engineer, UMN

The bridge to possible

> "With the multi-site design, BGP control plane, and automation scripts, extending the network and deploying new data centers is simplified and repeatable."

Colin Murphy
Network Engineer, UMN

Script-based automation

In addition to increasing infrastructure performance and resiliency, Cisco VXLAN EVPN has helped standardize and streamline network administration. UMN's IT staff is developing scripts that automate data center infrastructure provisioning and routine maintenance tasks.

"The Nexus API is flexible and customizable, and it has simplified VXLAN administration," says Colin Murphy, network engineer at UMN.

Software updates that were previously avoided because they frequently caused outages are now fast and painless, he adds. And the manual provisioning processes of the past have been largely automated, with switch deployments now taking hours instead of weeks.

"One of the biggest benefits of the new network is the time we're saving," says Murphy.

Looking ahead

As UMN's technology needs grow, its data center network with Cisco VXLAN EVPN can be easily scaled.

"With the multi-site design, BGP control plane, and automation scripts, extending the network and deploying new data centers is simplified and repeatable," Murphy says. "And for our satellite locations, we can deploy a couple of switches, connect them via fiber, and add them to our data center fabric. It's easy. All we need is an IP address."

While those satellite locations will share a pool of VLAN, L2, and disaster recovery resources, they will be fully isolated from other UMN tenants via microsegmentation.

"This has been a significant change for us," says Murphy. "Speeding up our data center systems and processes has had a positive impact on our academics, research, collaboration, and data processing."