# JUNIPER NETWORKS | Engineering Simplicity

# UNIVERSITY OF SOUTH CAROLINA DEPLOYS 100-GBPS NETWORK TO ADVANCE RESEARCH AGENDA

## Summary

**Company:**
University of South Carolina

**Industry:**
Education

**Business Challenges:**
Build a flexible network to support expanding research, academic, and administrative needs.

**Technology Solution:**
- MX480 and MX10003 5G Universal Routing Platforms
- EX9208, EX4600, and EX4300 Ethernet Switches

**Business Results:**
- Built a high-performance, reliable, secure network designed for today's hybrid IT world
- Offer a choice of cloud services, including Amazon Web Services, Microsoft Azure, and Google Cloud
- Easily move massive data sets to support data-driven research without impacting other users

Long known for affordable quality academics and strong athletics, University of South Carolina (USC) has become a research powerhouse in recent years. USC has attracted $258 million in external funding for research in health sciences, advanced materials, energy, and environment and sustainability.

USC researchers investigate the everyday causes and prevention of chronic diseases like diabetes and heart disease. They are revealing the genetics of breast cancer and exploring how behavior interventions could prevent cancer. They are developing algorithms for predictive maintenance to keep the U.S. Army's helicopters flying. Researchers are developing fuel cells and creating more options for clean energy. And they're investigating climate change and weather, especially hurricanes.

## Academic Excellence and Innovative Research

As important as laboratories and state-of-the-art equipment are, a world-class network is necessary to support researchers' data-intensive work. At the same time, USC's network infrastructure must support the academic and administrative needs of nearly 35,000 students.

"We have been pushing forward with two directives," says Ron Scherba, executive director of infrastructure services at USC. "We needed a more flexible and reliable infrastructure, and our research footprint is expanding."

"To do world-class research, we needed to augment the network itself," says Scherba. "That led to a conversation: How do we build on-premises and cloud-ready networks?" To build a foundation to support today's hybrid, multicloud world, the network needed to be faster, support advanced capabilities, and be more secure.

The USC infrastructure team delivered a tenfold increase in network capacity, upgrading both its core network and Internet2 connection to 100 Gbps. "We built the core network so that it's future-proofed and scalable to any needs we have in the future," says Jessie O'Connor, systems architect.

*"As IT professionals, we can't cure cancer. But if we can provide infrastructure that allows our researchers to do that, then we've done our job. With Juniper, we can do that."*

- Ron Scherba, Executive Director of Infrastructure Services, University of South Carolina

Researchers and academics have a broad choice of cloud services, with direct connections to Microsoft Azure, Amazon Web Services (AWS), and Google Cloud. "Dedicated connections with each cloud provider streamline the connectivity between their infrastructure and ours," says Jason Boryk, systems architect.

The MPLS network connects 250 buildings on the flagship Columbia campus. It also connects to seven other campuses in the university system, including Aiken, Beaufort, and Spartanburg, which consume a variety of IT services delivered from the Columbia campus data center.

*"Juniper saw our vision and helped us turn it into something tangible that we can actually accomplish. The relationship we've had with Juniper is the tipping factor for me."*

- Don Perry, Systems Architect, University of South Carolina

The university deployed the Juniper Networks® EX9208 Ethernet Switch for a programmable, flexible, and scalable campus core and to simplify the deployment of cloud applications, virtualized workloads, and academic and administrative applications. It also uses the Juniper Networks EX4600 and EX4300 Ethernet Switches for scalable 10GbE aggregation.

The university uses the Juniper Networks MX10003 5G Universal Routing Platform for its backbone network. The agile and modular MX480 delivers highly scalable routing, switching, security, and service features, while the ultra-compact MX10003 5G Universal Routing Platform provides best-in-class density and performance.

"The network is designed as a service-provider environment," says O'Connor. "With Juniper, we can maintain as much redundancy as possible while keeping the design simple and scalable." Layer 3 VPNs securely segment the network to support different departments and applications.

## Benefits

A 100-Gbps network drives many advantages for the university. Data center workloads move faster. Researchers can move data to compute nodes and out to the cloud in a fraction of the time previously required. And with a highly segmented network, heavy-duty research traffic doesn't impact the quality of the network experience for the rest of the university's users.

The network supports academics, administrative needs, residence life, athletics, law enforcement, third-party access for automated building management systems, and more. Wi-Fi blankets the campus, residence halls, stadiums, and fields—and all that traffic from students, faculty, and enthusiastic Gamecock fans is backhauled over the wired network.

But 100 Gbps means much more than moving packets. "As IT professionals, we can't cure cancer," says Scherba. "But if we can provide infrastructure that allows our researchers to do that, then we've done our job. With Juniper, we can do that."

"We don't want our users to worry about speed and security," says Scherba. "Those things we can do very well. We want them to trust the services we provide, and that's built on a solid infrastructure."

## Simplify Operations

A network designed for the rigors of today's mixed on-premises and public cloud world enables new levels of flexibility and agility for the IT team. "If we can move 80 percent of our workloads to the cloud, that would be great," says Scherba. "And we want the flexibility to move those workloads back if we need to. The only way we can do that is to build the right infrastructure here."

The operations team quickly adjusted to Juniper Networks Junos® operating system, which is defined by simplicity and innovation. The strength of having a single network operating system—Junos OS, which runs across Juniper routing, switching, and security—is clear. "There's an absolute advantage to having one platform like Junos OS to work with," says O'Connor.



*"With Juniper, we can maintain as much redundancy as possible while keeping the design simple and scalable."*

- Jessie O'Connor, System Architect, University of South Carolina

## A Strong Partnership

Beyond speed, reliability, and advanced capabilities, a key selection criteria was partnership. "Juniper stepped up and really involved themselves in this project," says Don Perry, systems architect. "Juniper saw our vision and helped us turn it into something tangible that we can actually accomplish."

"The relationship we've had with Juniper is the tipping factor for me," says Perry.

## Next steps

Automation is next on the agenda. "Like many other institutions and corporations, a lot of teams are understaffed and overutilized," says Scherba. "Automation can support troubleshooting and keep our network reliable so we don't require manual intervention every time something fails or we need to push a security patch."

## For More Information

To find out more about Juniper Networks products and solutions, please visit www.juniper.net.

## About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

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