How AI-Driven Solutions Support Unique Higher Ed Networking Needs

On university campuses nationwide, students move about the grounds at all hours of the day and night, attending class and socializing with friends. Campus researchers pursue scientific breakthroughs, generating and analyzing large volumes of data. Colleges also host thousands of visitors — and their devices — during athletic events and concerts. To function smoothly, universities need networking solutions with the speed and capacity necessary to support academic, social and safety needs that are constantly fluctuating.

In many ways, supporting the needs of a university is similar to serving a small, self-contained city. University leaders must plan for the present and future needs of their communities. Cutting-edge solutions driven by artificial intelligence (AI), machine learning and data science techniques can help IT leaders modernize network operations in support of a secure, scalable network architecture, designed to serve the computing needs of students, staff, researchers, visitors and more.

Institutions of higher education are using cutting-edge solutions to address key technology concerns, including major network overhauls. As university leaders plan for the present and future networking needs of their communities, they must account for a unique environment. Life on campus encompasses much more than education.

A Network That Supports a Campus in Motion

As community members move about campus, devices move with them. The ever-expanding Internet of Things is resulting in more connected devices than ever. Fifteen years ago, a student might carry a laptop to class. Today, they're connecting to the campus network with laptops, smartphones, tablets, smart watches and more. A robust university networking solution must be prepared to scale to meet this demand and handle multiple devices per person at all times.

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Now add to these personal devices all university-supported devices, from smart boards in classrooms to connected instruments in research labs — even heart rate monitors and other sensors in athletic facilities. Each of these devices creates, stores and sends data. Most people experience this constant flow of information without a second thought, as long as it's moving smoothly. But a network interruption could stall activity on campus almost immediately. Maintaining fast, reliable connections within the campus and with external partners is vital to daily life and learning.

"You have this constant state of flux. Unencumbered mobility is really key, because students are on campus 24/7," says Kurt Steege, chief technology officer at ThunderCat Technology. "They're living on campus, they're moving to breakfast in the dining halls, and then moving to classes and between buildings, and later to sporting events. A networking solution needs to learn and adapt to these types of migration."

How to Achieve Network Success FASTER

Data mobility is the cornerstone of a connected world. The ability to generate, analyze and transmit data as quickly as possible can help a university campus raise its profile in terms of both research and standard of living.

"We're at this really cool inflection point where the technology, from a pure horsepower perspective, is able to meet data generation and usage needs," Steege says. "Data is being generated to generate more data, and all of that is constantly being used as a feedback loop to learn more about what's going on."

As university leaders look to design a modern network that can support their campus' current and future needs, Steege recommends they remember the acronym FASTER:

The network is the frame that supports computing power. Without a strong and resilient network, "it doesn't matter how much computing power you have if no one can get to it," Steege says. "You've got all of these pieces and parts, and all of them require connectivity across the entire environment. That all plays into the idea of using AI to drive a network."

F	The network needs to be **flexible**, able to keep pace with movement on campus, as well as fluctuating numbers of people and devices.
A	It has to be **available.** Downtime must be reduced to avoid lapses in critical research and other tasks.
S	It must be **secure** without being slowed down by security measures.
T	A new network should be **transformative**. While upgrading, look for opportunities to transform the learning environment.
E	Look for an **enterprise-grade** solution rather than taking a piecemeal approach.
R	Finally, it must be **resilient**. Issues will arise — network solutions should be designed with resiliency in mind.

Leveraging AI for FASTER Results

Though campus life can seem chaotic, there are patterns to the movement of people, devices and data. An AI-driven solution uses machine learning to identify those patterns at a level of sophistication and speed that would be difficult for humans to match. Campus technology leaders can then use those patterns to optimize connectivity.

"You can use machine learning to take a look at the movement of devices around your campus and decide, 'OK, maybe this is somewhere in the future where I need to add additional connectivity,' or 'maybe this is where the amount of bandwidth needs to increase,'" Steege says. "The AI-driven campus architecture allows you to do that."

The question is, which solutions lead to FASTER, smarter connectivity? Modernizing a university technology portfolio requires an ideal mix of solutions to complement vibrant campus life. ThunderCat, a service-disabled veteran-owned small business (SDVOSB), partners with universities from strategy

development through solution deployment. As the former chief enterprise architect for the FBI, Steege is familiar with the complex needs of a large campus comprising many different departments. His vast networking expertise has led him to connect higher ed leaders to Juniper Mist AI, largely because of the company's dedication to the higher ed space.

"The key for me is that Juniper has specifically designed reference architectures for education — higher education as well as K-12," Steege says. "They provide a predictable, reliable and measurable networking infrastructure."

Across wired access, wireless access or wide area network (WAN) domains, Mist AI offers end-to-end visibility and analytics, and uses machine learning techniques to automate previously manual functions. This gives network managers more time for complex analysis rather than repetitive tasks.

"You get this really holistic view of your network, because of the visibility that's there, from access points to switches, routers and firewalls," Steege says. "That allows you to have near-real-time interaction with the network."

AI Humanizes the Network

One form of interaction involves Marvis, the industry's first AI-driven virtual network assistant. Marvis is a conversational interface, and thanks to natural language processing, a network manager can speak to the network as if conversing with a colleague. Marvis can provide actionable recommendations for troubleshooting and real-time insights into network operations.
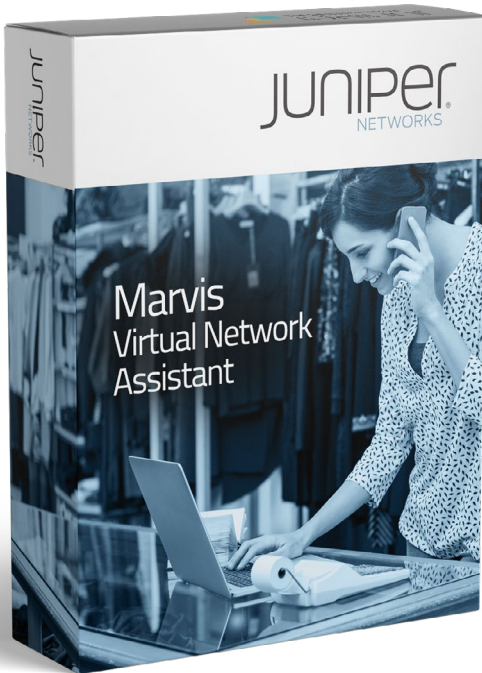
"It's the ability to find the root cause of anomalies and then correlate that information. It'll speak back to you across the scope of issues in disparate network areas, from WiFi to WAN to wired infrastructure," Steege says. "Not only are you managing it and using this tool to understand the network, but it's also giving you feedback and saying, 'Hey, you need to look at this,' or, 'All of these things are happening.' That interaction is really great."

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As Mist AI continually gathers information and ingests more data, it provides increasingly sophisticated insights. Technology leaders, in turn, gain a detailed, high-level understanding of how all points of the network are interconnected and impact one another. With AI-driven technology, network managers can use the tools to learn about the network while the very same solutions are also learning.

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Though most people on a university campus won't spend much time contemplating network architecture, it's still the glue that holds campus operations together. And the moment the network is no longer fast or available, connectivity — or lack thereof — will be on everyone's minds.

"There's so much competition these days, so how do you make your institution better?" Steege says. "You not only want to draw students, but you want to draw your faculty and say, 'Hey, we have a plan, we have an architecture that will meet your needs, not only now but in the future.'"

Learn more about how ThunderCat helps higher education and government organizations identify and deploy the right suite of technology tools to support their missions.