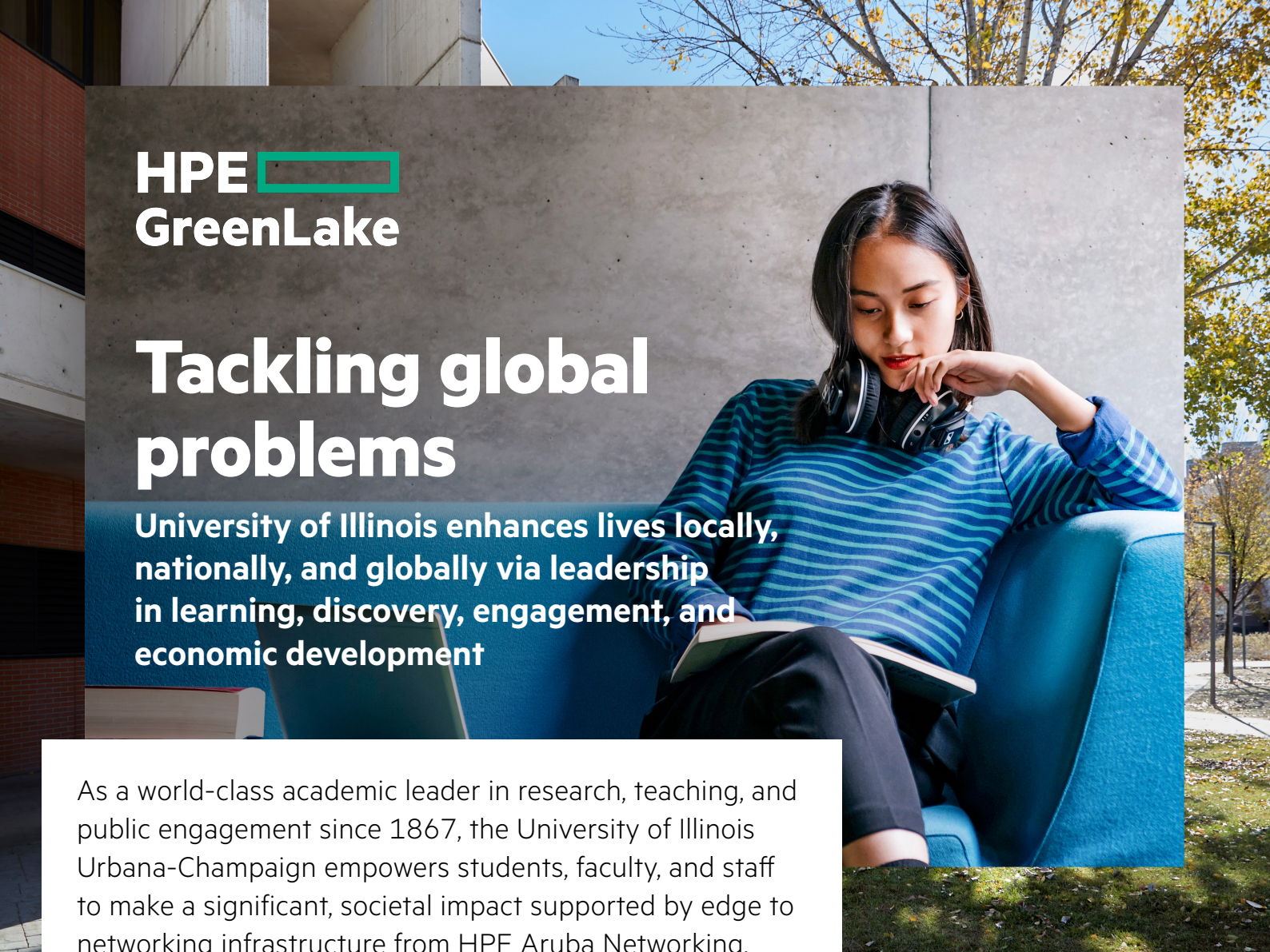




HPE GreenLake

Tackling global problems

University of Illinois enhances lives locally, nationally, and globally via leadership in learning, discovery, engagement, and economic development

As a world-class academic leader in research, teaching, and public engagement since 1867, the University of Illinois Urbana-Champaign empowers students, faculty, and staff to make a significant, societal impact supported by edge to networking infrastructure from HPE Aruba Networking.

Keeping pace with mobility, IoT, and academic computing needs

By combining its land-grant heritage with a fundamental mission to foster discovery and innovation, the University of Illinois Urbana-Champaign has earned a reputation as a world-class leader in research, teaching, and public engagement for over 150 years.

Dedicated to providing transformative learning experiences, the University's 13,000+ faculty and staff members serve over 56,000 students on its 6,370-acre (9.9 sq. mi.) campus using the latest in academic teaching techniques and technologies.

"We've a rich history of pioneering new approaches to solving some of the world's most difficult problems," explains Bradley McDuffie, a Lead Network Engineer for the University of Illinois Urbana-Champaign. "As the mobility, IoT, and other computing needs of our students, faculty, and staff continue to require faster, more secure connectivity in support of achieving academic, research, and operational goals, it's critical that our IT systems keep pace."

Data center networking modernization for a new era

When the University's data center networking solution began struggling to meet new academic connectivity demands, its IT staff collaborated with trusted partner PIER Group to evaluate the options. Already partnered with HPE Aruba Networking for wired and wireless edge networking, Illinois determined that adopting an HPE Aruba Networking Data Center solution was the best choice.



Industry: Higher education

Region: United States

Vision

Provide transformative academic experiences and support pioneering research that enables students, faculty, and staff to make a significant societal impact.

Strategy

Modernize edge and data center networks to deliver ultra-high performance, secure connectivity.

Outcomes

- Delivers 100GbE that enables attracting research grants
- Achieves \$200K savings by reducing data center complexity
- Streamlines management and troubleshooting significantly

“The HPE Aruba Networking DCN (data center networking) offering provided us with the most innovative and all-inclusive modernization option,” McDuffie says. “With advanced data security capabilities built into the solution, it eliminated the need to purchase separate hardware appliances, software, and licenses to provide the cybersecurity capabilities we required.”

Combining HPE Aruba Networking DCN with the University’s existing edge-to-core security-first networking infrastructure creates a complete, unified networking and security solution.

Overall, the deployment includes CX Core and Data Center Switching, along with Wi-Fi 6E access points (APs), for wireless indoor connectivity, CX Access Switching, for wired edge infrastructure, and EdgeConnect SD-Branch (software-defined branch networking), for securely connecting remote facilities.

Delivering 100GbE while saving \$200K

Using its new DCN solution, anchored by the HPE Aruba Networking CX 10000 distributed services switch, Illinois gains an always-on, robust, flexible backbone

for delivering secure connectivity for servers, storage, and edge networking. “Resiliency is critical, as our network can never be down,” says McDuffie. “Our new DCN solution provides us with the reliability we can depend on.”

From an academic perspective, the benefits include fulfilling faculty and researcher requests for the 100 Gigabit Ethernet (GbE) speeds required for attracting grants and completing projects. “Leveraging our higher-performing 100GbE fabric gives our researchers a competitive edge,” McDuffie says. “When researchers include 100GbE connectivity in their proposals, it improves their chances of winning grant funds nationally and worldwide.”

In addition, the CX10000’s built-in stateful firewall helps the University improve data security while also streamlining infrastructure and operations.

“Having the stateful network and security services embedded into the CX 10000 enables us to fulfill requests from our security team for optimized, secure DCN connectivity,” says McDuffie. “In addition, we can eliminate discrete security appliances for firewalling and load balancing, with an expected savings of over \$200,000 on hardware along

with considerable further savings on management, space, power, and cooling.”

Empowering departmental IT organizations

Other benefits of Illinois’ new DCN solution include an intuitive management interface and the ability to efficiently support the University’s distributed IT services.

“As the CX switching solution’s interface is easy to use, everyone on our team can perform provisioning, updating, troubleshooting, and other management tasks quickly and efficiently,” notes Benjamin Barkin-Williams, a Lead Network Engineer at Illinois.

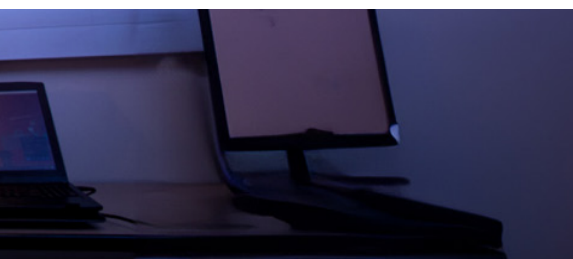
The DCN deployment also enhances productivity, efficiency, and security for departmental IT organizations. “Our DCN deployment empowers departments to connect their compute and storage environments quickly and safely without requiring assistance from our enterprise staff,” says Barkin-Williams.

“Whether it’s a temporary environment for a student in a specific class, a research server farm, or a high-performance storage system, we can now enable our departmental IT staff to focus on their core responsibilities rather than the network,” he adds.



We’re very excited about the many ways that our edge and data center networking platform benefits our students, faculty, staff, and community.”

– **Bradley McDuffie**, Lead Network Engineer, University of Illinois Urbana-Champaign



IoT-enabled technologies support inclusive learning

Illinois also appreciates the many advantages of its edge networking solutions, such as solving the perennial higher education challenge of providing inclusive learning in large lecture halls. This involves using its modern Wi-Fi and wired edge networks to support a Listen Technologies app that delivers a lecture's audio stream to a student's personal smartphone.

The University is also leading the way with adopting complex IoT-enabled solutions, such as life-sized wireless teaching manikins for providing fully-interactive healthcare learning and research. These game-changing devices can be programmed to supply realistic experiences, including the patient speaking, bleeding, or undergoing an event, such as a heart attack or birth and require low-latency, reliable connectivity to support interactive learning experiences.

In addition, the University is addressing data security using its policy-based network access control solution, HPE Aruba Networking ClearPass. It enables securely connecting any type of device that constituents bring on campus, which also addresses the escalating

demand for securely connecting IoT and OT technologies.

For Illinois, it ranges from providing connectivity for IoT sensors at the University's RiverLab field station to supporting a smart home research facility that is studying methods for integrating and streamlining the many residential IoT-enabled apps that operate separately today.

Location awareness boosts e911 security

The various location data and analytics capabilities provided by Illinois' Wi-Fi edge networks are also improving campus life, such as boosting physical safety. With the location awareness built-into the University's Wi-Fi 6E APs, the resulting data streams are supplying accurate proximity data to the campus e911 system.

"As we've migrated to Microsoft Teams as our primary communications and collaborations, it's critical to have appropriate e911 data," says Uros Marjanovic, a Lead Network Engineer at Illinois. "The accuracy provided by our Wi-Fi's location awareness data for our e911 system enables us to respond rapidly and effectively in case of an emergency."

Another benefit from location awareness is granular insights into space utilization. Using this data will enable Illinois to optimize facilities in numerous ways, such as improving sustainability and reducing cost by adjusting HVAC systems to align with actual utilization.

Proactive optimization enhances user experiences

Improved user experiences are another edge networking plus, as IT teams can proactively optimize networking infrastructure and speed troubleshooting.

This is accomplished using two AI-enabled solutions. HPE Aruba Networking Central On-Premises unifies and simplifies wired and wireless administration, while HPE Aruba Networking User Experience Insight (UXI) supplies real-time network health and performance monitoring from the perspective of users and devices.

"Campus needs can change quickly," says Marjanovic. "With Central, we have the visibility and analytics insights we need to pivot rapidly. Central also enables us to provide other University teams with the detailed, customized reports they require for responding to new demands."



Our DCN deployment empowers departments to connect their compute and storage environments quickly and safely without requiring assistance from our enterprise staff."

– **Benjamin Barkin-Williams**, Lead Network Engineer, University of Illinois Urbana-Champaign



It's a similar story for troubleshooting user and device issues. "We've quickly resolved a number of perplexing challenges with the visibility and AI-powered insights supplied by UXI," says Chuck Hayes, a Lead Network Engineer at Illinois.

"For instance, we had an intermittent performance lag affecting Microsoft Outlook in a certain building," he recalls. "UXI uncovered the source of the problem, which enabled us to fix it."

SD-Branch delivers valued shuttle service connectivity

The University's modern SD-Branch networking capabilities also power institutional innovations, such as providing free, secure Wi-Fi on the intercampus shuttle service UI Ride. This enables students, faculty, and researchers to travel between the three University of Illinois System campuses without losing productivity.

"Having Wi-Fi, which is comprised of an AP and a gateway, on every UI Ride charter bus enables users to complete projects individually, or take advantage of the available collaboration spaces, during the approximately four hour round-trip from our main campus to Chicago or Springfield," says Hayes.

More advances in the pipeline

Moving ahead, the University plans to leverage more advanced features provided by its HPE Aruba Networking edge-to-core deployment. These include continuing to enhance cybersecurity for edge and data center networking, using the HPE Aruba Networking Dynamic Segmentation capabilities, and further fine-tuning data center network performance with insights from the telemetry data generated by the CX switches.

The University is also considering the adoption of HPE Aruba Networking Fabric Composer. It provides software-defined data center network orchestration that simplifies and accelerates IT operations, while increasing visibility and control, such as automating micro segmentation for advancing data security.

In addition, Illinois is evaluating Private 5G and deploying HPE Aruba Networking Air Pass. With Air Pass, the

University could unify wireless and cellular network experiences by enabling mobile users, along with certain types of intelligent IoT devices, to roam securely and seamlessly between cellular and Wi-Fi.

Trusted innovation for today and tomorrow

No matter how Illinois decides to build out its network, the institution has acquired the ultra-high performance, future-proof infrastructure that will support evolving higher education needs.

"The dependability, reliability, and innovation we've long trusted at Illinois for our edge networking is now being brought into our data center, where we're only scratching the surface of what our new DCN infrastructure can do," says McDuffie.

This is also true of the University's edge network, he adds, due to gaining a wealth of new capabilities with Wi-Fi 6E.

"Overall, we're very excited about the many ways that our edge and data center networking platform benefits our students, faculty, staff, and community."



As campus needs can change quickly, Central provides the visibility and analytics insights we need to pivot rapidly."

– **Uros Marjanovic**, Lead Network Engineer, University of Illinois Urbana-Champaign

About University of Illinois

Founded in 1867, the University of Illinois Urbana-Champaign is one of the nation's premier public research universities. It's 13,500 faculty and staff members serve 56,000 students. Consistently ranked as a top university, the Illinois faculty have been awarded Nobel Prizes, Pulitzer Prizes, and the Fields Medal in Mathematics.



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– **Chuck Hayes**, Lead Network Engineer, University of Illinois Urbana-Champaign

"We're only scratching the surface of what our new DCN infrastructure can do."

– **Bradley McDuffie**, Lead Network Engineer, University of Illinois Urbana-Champaign



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Solution

Hardware

- HPE Aruba Networking Wi-Fi 6E Access Points
- HPE Aruba Networking CX Access Switches
- HPE Aruba Networking CX Core and Data Center Switches
- HPE Cray Supercomputing

Software

- HPE Aruba Networking Central On-Premises
- HPE Aruba Networking ClearPass Policy Manager
- HPE Aruba Networking SD-Branch
- HPE Aruba Networking User Experience Insights (UXI)



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