Cisco Delivers Wireless Access at University of Louisville

Cisco Unified Wireless Network provides powerful, cohesive support for BYOD trend.

EXECUTIVE SUMMARY

Customer Name: University of Louisville

Industry: Education

Location: Louisville, Kentucky

Number of Employees: 22,250 students and 6,400 faculty and staff

BUSINESS CHALLENGE

- Upgrade wireless networking to attract students and meet requirements of today's university communities
- Help enable students and faculty to connect to wireless network on mobile devices in all buildings and classrooms
- Improve student technology services and support
- Support high-density wireless coverage
- Implement a wireless management strategy to facilitate deployment and network administration
- Track rogue devices, sources of WiFi interference, and client devices

NETWORK SOLUTION

- Cisco Unified Wireless Network delivers high-performance 802.11n wireless for campuswide BYOD support

BUSINESS RESULTS

- Delivers high-performance 802.11n wireless network in all buildings and common areas including the Student Activities Center (SAC), library, and green spaces
- Supports any mobile device
- Provides high-density coverage for high-traffic areas such as library
- Simplifies troubleshooting & provides better quality of experience for students & faculty
- Positions university to support wirelessly connected multi-media devices and other future needs

Business Challenge

IT organizations across the world are scrambling to deal with the Bring Your Own Device (BYOD) trend. In large businesses, senior executives usually push the trend from above, but within education, students are demanding support for their own technology: the latest smartphones, tablets, and other devices.

The University of Louisville has long had a robust network infrastructure based on Cisco technology, but had outgrown its system of wireless service modules and several hundred access points (APs). Increasingly, administrators became aware that pervasive wireless had become essential to attracting students and meeting expectations of all community members and guests. They realized that they needed to commit to, and fund, the establishment and maintenance of a pervasive, secure, and technologically adept wireless environment for the university community and guests. Users need to be able to connect effectively to all university network resources in a fully mobile fashion, using any device, from any location, at any time.

The university's network team set about designing a network that could provide cohesive coverage to the university's 22,250 students and 6400 faculty and staff across 8.5 million square feet and 114 buildings on the University of Louisville's three campuses: the central 287-acre Belknap Campus, the Health Sciences Center, and the Shelby Campus in eastern Jefferson County.

Their goal was to create a wireless infrastructure that would enable students and faculty to connect using their mobile devices from anywhere on campus. For parts of campus where students congregate, such as the Student Activities Center, library, and outdoor spaces between academic buildings and the stadium, the network had to provide high-density wireless coverage. Plus, to deliver consistent performance, the team needed the ability to track rogue devices, Wi-Fi interference, and client devices that threatened the quality of network service.

The university decided to migrate to the Cisco® Unified Wireless Network, which can deliver 802.11n wireless service with high throughput, unprecedented reliability, and connectivity even in hard-to-wire locations. It also offered ease of management, which would make it simpler for the university's IT Communication Team to control network performance and save on total cost of ownership.

To prepare for the 802.11n-capable wireless infrastructure, Kevin Condit, the network facilities manager, Trenton Hurt, the wireless network administrator, and the Network Management Team did a major overhaul both of the wireless network and also of the access layer network, rebuilding the core and replacing the LAN switches throughout the network. Working closely together, the team coordinated activities and shared expertise to help ensure optimal design and deployment of the technical aspects of the project. Condit mapped out an extensive project plan for the pervasive wireless project (PWP), which included mapping, surveying, and designing of the buildings and facilities including conduits, cabling, and equipment, both for access switches and access point installations, and communications planning. Condit also planned and tracked inventory and labor resources.

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>
> **— Priscilla Hancock, Vice President of Information Technology, University of Louisville**

Network Solution

Today, most of the university campus has high-performance 802.11n wireless network available, and within a few months will be able to provide wireless access from any building or select high-traffic outdoor space on campus. The network now comprises eight Cisco Catalyst® 6509 chassis with a Catalyst 3750 Series distribution layer and an access platform based on Cisco Catalyst 3560 switches. A private fiber ring connects all three campuses. For the wireless network, the team deployed Cisco Aironet®1142 Series Access Points for wireless coverage in and around campus, and Cisco Aironet 3500 Series Access Points with CleanAir™ technology, for high-density stadium and outdoor use. The team also deployed the new 3600 Series access points, the industry's first 4x4 multiple-input multiple-output (MIMO) three-spatial-stream AP in two of the campus buildings. These APs sustain reliable connections at higher speeds further from the AP than competing solutions for three times more availability of 450 Mbps rates for tablets, smartphones, and high-performance laptops. The Cisco Aironet 3600 Series APs include Cisco ClientLink 2.0 to boost performance and Cisco CleanAir spectrum intelligence for a self-healing, self-optimizing network.

To capture the full benefits of CleanAir, the university deployed the Cisco 3350 Mobility Services Engine (MSE), which provided full visibility of all the interferers, interferer zone of impact, and rogues. The Cisco Mobility Services Engine also provided systemwide interferer and rogue correlation with advanced forensics capability, which helped improve the quality of experience of the users of the campus Wi-Fi network.

As part of this new deployment, the university migrated from the Cisco Wireless Control System to Cisco Prime Network Control System (NCS), a first-of-its-kind platform offering converged wired, wireless, and security policy management in a single solution for faster troubleshooting of multiple client devices and more efficient network operations.

“When my team compared the WCS solid database to the NCS Oracle database, the difference in speed of searching and access was like night and day,” says Hurt. “For example, while WCS only has predictive heat maps, NCS has real-time heat maps, so we can look at what’s actually happening on the floors. Plus, it scales better, so we can support more access points.”

Cisco 5508 controllers enable the university to manage more access points, delivering reliable performance, enhanced flexibility, and minimizing service loss for mission-critical wireless.

Business Results

High-Performance Wireless for BYOD

Even interactive multimedia applications perform flawlessly over the wireless network, and students and faculty can use any kind of mobile device anywhere on campus. As an instructor moves around the classroom with a laptop, students can use Tegrity classroom capture software to write notes live on the presentation. They can also use the wireless network to access applications such as Blackboard for their class notes and schedules.

BYOD means the university still has to support some older 802.11a/g clients, which can delay communications for 802.11n clients and reduce system performance. The network leverages Cisco ClientLink technology to “learn” the best way to communicate with the client. This technique, also referred to as MIMO beamforming, helps improve performance for all clients on the network.

Coverage in High-Density Environments

Previously, high-density areas, such as the school library, where 3000 to 4000 students go every day, or the dental school, which treats 100 patients a day, and some of the larger classrooms with 150 seats or more, did not have strong enough network connections. Some auditorium-style classrooms only had 1 access point, but needed at least 10 to get good performance. Now, just two Cisco Aironet 3500 Series APs are enough to deliver higher throughput for those classrooms; the library has 93 Aironet 3600 Series APs, and the dental school has 95.

More Consistent Performance

Previously, the network included several hundred APs, but no controller. Hurt would simply turn each one up to full power, set the channels, and respond if he received any problem reports. Now, the network’s controller-based infrastructure provides dynamic, centralized management for a self-healing wireless network. If one AP malfunctions, the others automatically fill in the gaps without IT having to do anything. “Now we can manage more than 2200 access points while eliminating capacity and availability issues,” says Hurt. “We couldn’t do it without the controllers.”

Reduced Interference

Interference used to be a significant problem, because the university is in the flight path of an airport. However, Hurt says Cisco CleanAir "works like magic" to mitigate interference from airport radar and transmissions. The IT team also used to get complaints from the residence halls, but now the team can resolve those issues more easily as well. CleanAir with Cisco MSE can classify, locate, and provide zone of impact of more than 20 types of interference, from PS3 stations to Bluetooth headsets and microwave ovens, within seconds and take automatic remedial action.

Even if a problem persists, IT technicians no longer need to cross campus or drive to one of the other campuses and walk around with a spectrum analyzer to find the problem. Instead, they can remotely check CleanAir and tell the caller what type of appliance is the source of the interference. This capability reduces the time required to troubleshoot network issues, and helps the small four-person team respond more quickly to issues wherever they arise.

More Satisfied Students and Faculty

"For years, we worked to ensure that we had good wired connections for students," says Priscilla Hancock, vice president of information technology for the university. "But now most college students prefer to use laptops and mobile phones. In order to attract and retain students, the University of Louisville committed to this project and built a cutting-edge Cisco wireless network to support their device preferences with a robust wireless network that is available across the university."

Wherever they go, the IT team hears praise for the network. Researchers like that they can move freely around their labs, and students and faculty appreciate being able to work in hallways or on the lawns. "It's a good feeling to know that this solution is part of a larger Unified Wireless Network, designed to scale and grow as we do, without any limits," says Condit. "I know that with the Cisco expertise that we've developed, we'll be able to take advantage of the latest advances to support whatever devices students start bringing in. This is a solid foundation for our future growth, as well as a comprehensive solution for our current needs."

PRODUCT LIST

Unified Access

- Cisco Unified Computing System™
- Cisco Unified IP Phone 7942G

Routing and Switching

- Cisco Catalyst 3560 Series Switches
- Cisco Catalyst 6500 Series Switches
- Cisco Catalyst 3750 Series Switches

Wireless

- Cisco Aironet 1142 Series Access Points
- Cisco Aironet 3500 Access Points with CleanAir
- Cisco Aironet 3600 Series Access Points
- Cisco 2504 and 5500 Wireless Controllers
- Cisco 3350 Mobility Services Engine (MSE)

Network Management

- Cisco Prime Network Control System

For More Information

To find out more about the Cisco 3600 Access Points, go to: http://www.cisco.com/en/US/products/ps11983/index.html.

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