Canadian University Deploys Cisco Unified Wireless Network

Laval University deploys a Unified Wireless Network to serve its students, faculty, and security staff.

EXECUTIVE SUMMARY

LAVAL UNIVERSITY

- Education
- Quebec City
- 5657 employees
- 38,219 students

BUSINESS CHALLENGE

- Provide ubiquitous wireless network access to students and faculty
- Find a reliable, cost-effective replacement for an aging walkie talkie-based security system

SOLUTION

- Installed a campus-wide Cisco Unified Wireless Network
- Uses Cognio Spectrum Expert to detect and eliminate RF interference in the wireless network
- Replaced obsolete campus security system with wireless IP telephony

BUSINESS RESULTS

- Remote management of the wireless network saves maintenance time for the IT staff
- Supporting both Internet access and IP phones with one wireless network results in significant cost savings
- University receives revenue from nominal student network access fees
- Security staff has a reliable means of communication

Business Challenge

As the oldest educational facility in Canada and the first institution in North America to offer a higher education entirely in French, Université Laval is one of Canada's leading universities. In addition to a comprehensive liberal arts undergraduate program, the university offers postgraduate programs in professional areas including medicine, dentistry, and actuarial studies.

Laval's main campus in Quebec City covers 1.2 square kilometers (0.76 square miles). There are 30 buildings on the campus, all linked by 10 kilometers (6.2 miles) of heated underground tunnels—a welcome feature during Quebec's frigid winters.

A few years ago, Laval started seeing a growing number of notebook computers on campus, among both faculty members and students. This led to a demand for wireless Internet access. Late in 2003, the university deployed a small wireless LAN in two engineering and science buildings—a logical location for a technology pilot—in order to determine whether such a network would be utilized. The small network proved to be so popular that "the university decided to deploy wireless all over the campus," says Mario Bruneau, associate director of infrastructure at Laval.

Meanwhile, the university was looking to replace the antiquated walkie talkie system that the campus security staff used as its main means of communication. That system was neither secure nor reliable. Outsiders could intercept walkie talkie messages simply by tuning into the right radio frequency, and the radios did not always work inside the underground tunnels.

The campus IT staff knew that an ideal solution would address the Internet access needs of the students and faculty as well as the wireless voice communication needs of the mobile security staff.

"We wanted to converge these two needs into one network," says Bruneau. To that end, the university decided to replace the walkie talkie system with a wireless IP telephony system that could run over a wireless LAN.

Network Solution

Knowing that it would have to deploy hundreds of access points all over campus, the university's IT team knew its needs would be best met by a centralized WLAN, in which the access points were managed remotely by a series of controllers.

Laval chose a unified wireless network from Cisco®, which already had proven itself as a trusted provider of the university's wired IP telephony and Ethernet equipment. The team decided to deploy a unified WLAN made up of several hundred Cisco Aironet® access points and four Cisco Catalyst® 6500 Series Wireless Services Modules (WiSMs)—a solution that protected Laval's existing investment in Cisco Catalyst 6500 Series Ethernet Switches. The team also installed Cisco Wireless Control System (WCS) software to manage all four controllers—and the entire WLAN—from a single interface. In addition to centralized supervision of the network, the controllers also provide the Layer 3 roaming that allows for uninterrupted connections as mobile devices travel around the network. This was a necessity for the security staff.

With the help of Virtual Routing and Forwarding (VRF) technology, the unified network will allow for separate Service Set Identifiers (SSIDs) within the WLAN. Bruneau and his staff could assign students to one subnet, administrative staff to another, and the faculty to another. A virtual LAN (VLAN) would split the security staff's voice traffic from the rest of the network.

In 2005 and 2006, Laval deployed 850 access points across the campus—in academic buildings, in the tunnels, and on the outside of buildings and other campus structures. Each WiSM blade can support up to 300 access points, but by deploying four WiSMs, the IT staff helped ensure operational redundancy.

Cisco Aironet 1100 and 1200 Series Access Points were deployed indoors and in the tunnels. Cisco Aironet 1300 Series Access Points were used for the outdoor connections. Aware that the campus faced interference issues ranging from Bluetooth devices to dorm-room microwave ovens, the team also deployed the Spectrum Expert solution from Cisco partner Cognio. While the Cisco WCS software detects and thwarts rogue access points, the Cognio solution goes a step further to detect any device that can interfere on the same frequency as the WLAN.

Initially the network supported 802.11g and 802.11b, but eventually the IT team decided to add support for 802.11a as well. This provided additional bandwidth in classrooms and study areas, where hundreds of students might be using the network at the same time. "And almost all new laptops support 802.11a, b, and g," Bruneau says.

Laval purchased more than 100 wireless IP to replace walkie talkies and cellular phones. The Cisco Unified Wireless IP Phone 7920 provides Laval reliable, secure voice communication as well as voicemail and caller ID.

The team eventually plans to obtain the Cisco Unified Wireless 7921 Series IP phones to replace the security staff's walkie talkies, which feature larger screens and push-to-talk functionality. This will let a staff member relay a message to multiple recipients at the touch of a button.

"The push-to-talk function lets the security staff use the phone like a walkie talkie—but with more advanced features and better security," Bruneau says. "This is important because their job duties require them to be reached quickly and easily."

Business Results

The unified wireless network has improved business operations for Laval in several ways.

Centralized management has proven to be a boon for a widespread WLAN in which access points are deployed inside, outside, and even underground over a large coverage area. Ease of management is especially convenient when the staff adds wireless network connectivity to its satellite campuses in Montreal and downtown Quebec.

“We do not have to go to remote areas to manage the configuration of new access points,” Bruneau says.

The university is now supporting two systems—Internet access and wireless IP telephony—on a single network. This has yielded significant cost savings in terms of deployment; rather than install a whole new radio network for the security staff, Laval was able to utilize the WLAN. The combined system continues to save the university money on network maintenance.

The university charges its students a nominal fee of $10 per four month session ($30 per year) to use the wireless network.

“It is almost free, but it does provide revenue,” Bruneau says. “Today we have more than 5000 students who use the Wi-Fi network, and that number will grow. More and more students are buying laptops and bringing them to the campus each year, and as they do, we may add more access points. The students are participating in the development of the infrastructure.”

The wireless network enables faculty to integrate network access into their teaching. Web access is a necessary part of many lesson plans, and some departments now require students to have laptops in class, Bruneau says.

PRODUCT LIST

- Cisco 4400 Series Wireless LAN Controllers
- Cisco Aironet 1100 Series, 1200 Series, and 1300 Series Access Points
- Cisco Wireless Control System
- Cisco Catalyst 6500 Series Wireless Services Module
- Cisco 7920 Series Wireless IP Phones
- Cisco 7921 Series Wireless IP Phones
- Cisco 3200 Series Mobile Access Routers
- Cognio Spectrum Expert for Wi-Fi

The network is also making the campus a safer place to live and work. The wireless IP telephony system is far more reliable than the walkie talkie system that preceded it; it is more secure, and it works in the underground tunnels. In addition to the security staff, the school’s maintenance staff also uses the wireless IP phones.

“They can roam without losing their connection, all over the campus,” Bruneau says.

Next Steps

Although the wireless LAN covers all of the buildings and most of the areas in between, there are still small, rural pockets on the outskirts of campus where Wi-Fi signals are sometimes weak. This is an issue of concern for the campus security staff, who sometimes drive through these weak coverage areas on their daily rounds. To resolve the problem, Laval recently began testing the Cisco 3200 Series Mobile Access Router for its police cars. Optimized for in-vehicle use, the router is able to communicate over multiple wireless networks—both Wi-Fi and cellular.

“If the car is in a shadow area where Wi-Fi is not working, the routers will use the cell phone network to make the call,” Bruneau says. “If our tests continue to go well, we expect to install those in all the security vehicles.”

For More Information

To find out more about the Cisco Unified Wireless Network, visit: http://www.cisco.com/go/wireless

To find out more about Cisco Solutions and Services, visit: http://www.cisco.com

To find out more about Cisco Education Solutions, visit: http://www.cisco.com/go/education

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