Pioneering University Deploys Canada's First 802.11n Wireless Network

Concordia University adopts 802.11n to expand unique mobility infrastructure.

EXECUTIVE SUMMARY

Concordia University

- Higher Education
- Montreal, Quebec, Canada
- 40,000+ students
- 1,900+ faculty
- 4,500+ employees

BUSINESS CHALLENGE

- Keep up with a young, technology-savvy user base
- Continue to use the wireless network to add innovative applications and services both on and off campus
- "Future-proof" the wireless infrastructure to accommodate more users accessing the network simultaneously
- Improve WLAN predictability and performance to provide productivity gains for faculty, staff and students

NETWORK SOLUTION

- The Cisco Unified Wireless Network provides centralized management and troubleshooting
- Cisco Aironet 1250 Series Access Points deliver predictable, high-speed access for multimedia and high-bandwidth applications using 802.11n MIMO technology
- Cisco Aironet 1500 Series Outdoor Wireless Mesh Access Points extend wireless access off-campus in the downtown Montreal area.

BUSINESS RESULTS

- Improved network reliability and performance when large number of users in the same location are simultaneously accessing the network
- Increased productivity for staff and students who can now access important data and applications from anywhere on campus, as well as from off-campus locations

Business Challenge

Concordia University has a reputation for being a vanguard when it comes to technology. The university prides itself on a series of "firsts," including the first in Canada to deploy Wi-Fi to students across campus and the first to deliver voice over IP (VoIP) across that network. Given its history of innovation, it is no surprise that Concordia has now become the first university in Canada to use 802.11n technology as part of a larger effort to improve its mobility infrastructure and offer students and staff a broader array of mobility services.

Concordia's initial wireless network, built in 2001, was ahead of its time and proved to be a valuable recruiting tool for the college. The university was also the first in its country to deploy voice over its wireless network in 2003. Today, wireless networking is a baseline service that new, more technology-savvy students expect to be available on campus. Furthermore, as Concordia's associate vice president of instructional and information technology services, Andrew McAusland, acknowledges, these technology-savvy students are driving the university's commitment to constant innovation.

"Today's students have grown up with the Internet and for them, full access is a given," says McAusland. "Our demographic is huge. With 90 percent of these students bringing laptops with them their first year, and a significant increase in the amount and type of new mobile devices they are using, it's imperative that we stay ahead of demand."

Indeed, McAusland cites a 200 percent growth in the use of Concordia's wireless network each year since it was installed. The university also discovered that faculty and students tend to congregate in specific areas such as lounges, cafeterias, classrooms, and libraries when they use the network, rather than being equally distributed throughout the campus. This means that the university was seeing up to 3000 simultaneous users in some instances, often resulting in fragmented or dropped connections, despite the fact that the wireless network covered about 90

percent of the campus. Concordia found that providing consistent, reliable access was challenging because of the way the wireless network was being used.

In addition, the University wanted to expand the kinds of applications and services that it could offer over the wireless network, adding significant amounts of video in the form of lectures, guest speaker sessions and podcasts, and distance learning courses through its eConcordia online service. In the competitive Canadian higher education environment, Concordia recognized that investing in its mobility infrastructure to both enable these new applications and services, as well as address the growing student population and simultaneous access issues, was vital to its continued success.

Network Solution

Concordia's original wireless network was built almost exclusively on Cisco® products. Today, the network includes more than 300 Cisco Aironet® 350, 1130 and 1240 Access Points, Cisco 4400 Wireless LAN Controllers, and the Cisco Wireless Control System (WCS) to provide management. When it came time to consider a solution that would address its growing user base and could accommodate both new and future applications and services, Concordia considered only Cisco. McAusland says, "When you are delivering services, you have to be certain that the infrastructure you put in place for delivery is reliable and can provide the throughput required. We use Cisco because what they install works."

Concordia considered simply adding more 802.11g access points to the network, but concluded that moving to 802.11n was the right choice for addressing their current needs and "future-proofing" the network. The university purchased 60 Cisco Aironet 1250 Access Points, which it is currently installing with assistance from integrator, Bell Canada. To date, Concordia has put in 45 of the new 802.11n access points, replacing their existing access points in some of the university's more popular indoor congregating areas, and thereby allowing the university to deliver more throughput and reliability to users in those areas. McAusland expects to continue upgrading the network, and over time, convert about 80 percent of it to 802.11n. "802.11n enhances our coverage to enable more simultaneous connections, significantly improves the performance of our network, and is backward-compatible, which means that all of our students can benefit immediately, whether they are using new, 802.11n laptops or older 802.11g models," he says.

Concordia's deployment is also unique in that it merges its indoor wireless network with a services-oriented outdoor wireless mesh network that extends beyond the university's campus into downtown Montreal. The university acts as a service provider to students, staff and faculty; it uses 50 Cisco Aironet 1500 Series Outdoor Mesh Access Points to deliver the same wireless connectivity available already on campus to neighboring apartment buildings, restaurants, and other downtown gathering centers, covering approximately two square miles. Although accessing the indoor 802.11n network is free, the university charges subscribers (the Concordia community) a monthly rate of CAN $8.99 for outdoor connections. Subscribers receive not only basic Internet access, but data storage and virtual desktop services, as well, which minimize software and hardware replacement costs and keep security risks to a minimum. "We're offering advanced services at an extremely competitive rate," says McAusland. "The merging of the indoor and outdoor networks is a core part of our commitment to Concordia's students, staff and faculty."

Business Results

Concordia is aggressively pursuing its reputation as a technology vanguard, partially because of the significant benefits that its users have reaped from the university's innovative approach to wireless networking. "Without the wireless network, we could never accommodate our user base," says McAusland.

Although the upgrade to 802.11n is still in process, users are already benefiting from the increases in reliability and performance of MIMO technology available with the Cisco Aironet 1250 Series Access Points that have been deployed. For voice and video services, in particular, students are finding that speeds are substantially faster over the new 802.11n connections. Most importantly, the move to 802.11n has eliminated lags in connectivity, and the IT department is seeing consistent service regardless of the number of users simultaneously connecting. Over time, Concordia expects that these improvements in predictability and performance will result in real productivity gains for faculty, staff, and students alike, as they access the data and applications that they need, when and where they need them.

However, beyond the added efficiencies, one of Concordia's most impressive results has been its ability to combine the indoor and outdoor wireless networks to give the university community access both on and off campus. "With the advanced mobility infrastructure we are putting in place, we are really changing the way we deliver services to our community," says McAusland. "The added benefit to Concordia is that we can use these new services to offset our IT costs and really transform the business model."

PRODUCT LIST

Wireless

- Cisco Aironet 1240 AG, 1130 AG, and 1250 Series Access Points
- Cisco Aironet 1500 Series Outdoor Wireless Mesh Access Points
- Cisco 4400 Series Wireless LAN Controllers
- Cisco Wireless Control System (WCS)

Voice over Wi-Fi

- Cisco Unity
- Cisco IVR
- Cisco IPCC Express for IP Telephony
- Cisco IP Communicator Softphones
- Cisco Wireless IP Phones 7920 and 7921
- Cisco IP Desk Phones 7911,7940 and 7960

Routing and Switching

- Cisco Catalyst 3500 XL Switches
- Cisco Catalyst 3750 XL Switches
- Cisco Catalyst 6500 Switches
- Cisco 11500 Appliance

Security

- Cisco Secure ACS

Network Management

- Cisco LMS

Next Steps

As one would expect from such a progressive institution, Concordia has a number of planned technology roll-outs that will continue to sharpen its competitive edge. Notably, Concordia is working on a plan that will allow students located on campus to transparently offload calls from their mobile provider's network, to avoid using minutes from their mobile phone plans. Using this Seamless Mobile Collaboration (SMC) approach to transition between the campus and mobile carriers' networks, various mobile applications, and mobile devices, the university can support a wealth of new applications including click-to-talk instant voice assistance for students, SMS emergency notification, and general student communications and campus operations services.

Currently, Concordia offers students a monthly telecom service for CAN $18 per month for which they receive a SIP phone number with unlimited calls over the IP and wireless network, and they can connect using their laptops with a Cisco IP Softphone. This is particularly advantageous for foreign students who can use the service before they have even arrived on campus, and is convenient for faculty when they work from home. Concordia plans to take its voice services a step further, however, by eventually equipping faculty with dual-mode cell phones and Wi-Fi enabled phones to further cut telephony costs.

In addition, Concordia is already expanding its outdoor wireless mesh network, hoping to offer connectivity and services to the larger Concordia community. Concordia is using Cisco WCS now to manage its outdoor wireless network, but expects to use Cisco WCS to manage both its indoor and outdoor network in the future, since the Cisco indoor and outdoor access points can use the same controllers.

For Concordia, innovation is now a habit and novel approaches are the norm. McAusland says, “The majority of our users are young, savvy, and heterogeneous, in nature, and we know that every year, there will be a new population more advanced than the next. They expect to use cutting-edge technology wherever they go and we always have to be ready to provide it.”

For More Information

To find out more about the Cisco Unified Wireless Network and 802.11n technology, visit: http://www.cisco.com/go/nextgen-wireless

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

To find out more about Concordia University, visit: http//www.concordia.ca

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