



Cisco Helps University of British Columbia Build WLAN for 35,000-student Campus

As part of its comprehensive e-Strategy initiative to enhance its academic and research environment, the University of British Columbia is deploying Cisco Aironet® 1200 Series access points in a campus-wide wireless network.

University of British Columbia

- Incorporated by the provincial government in 1908
- One of the largest universities in Canada and the oldest in the province
- Over 38,500 students (undergraduate and graduate) from 115 countries
- 2,302 international students
- 1,000-acre campus
- More than 400 buildings owned by UBC
- More than 100 spin-off companies through technology transfer

For more information on:

- UBC, go to: www.UBC.ca
- UBC's e-Strategy initiative, go to: www.e-strategy.ubc.ca
- UBC's UNP, go to: www.UNP.ubc.ca
- UBC's wireless technology installation, go to: www.wireless.ubc.ca

Background

The University of British Columbia (UBC) in Vancouver, B.C. is one of the largest universities in Canada and the oldest in the province. UBC is a global center of research and academia, and offers a wide range of professional programs at its state-of-the-art facilities. Currently, some 38,500 students are enrolled at the university, a quarter of whom reside on the campus, including more than 2,300 international students. The campus covers approximately 1,000 acres and has more than 400 buildings.

Challenge

UBC is engaged in a major capital initiative, called the University Networking Program (UNP), whose purpose is to enhance the environment in which students learn and faculty conduct research. The goal is to upgrade or provide connectivity across the campus (which has approximately 20,000 connection points), and to research hospitals affiliated with the university. A major phase of the UNP is the addition of a sophisticated campus-wide wireless local area network (WLAN).

“Wireless is but one technology among several for providing, as part of the UNP mandate, optimal network connectivity at UBC,” explains UNP Program Director Susan Mair. “But wireless by its very nature offers extra benefits that wired networks can’t.

“Wireless frees us from wires and encourages people to think creatively about how to do their teaching, learning, and research,” Mair continues. “It opens up a new universe of networking possibilities.”



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The initial objective of the UPN has been to rebuild existing—or create new—networking infrastructure across the university’s approximately 1,000-acre campus and 400-plus buildings, many of which have very thick walls, embedded asbestos, or both. “There also are aesthetic concerns, making it difficult or unsightly to lay cable along ceilings or walls,” Mair says. “All of this speaks to the attraction of wireless.”

Wireless also is uniquely cost-efficient, she adds. “We needed to be able to provide a cost-effective way of future-proofing the buildings so that we won’t have to do cabling again, and wireless gives us that capability.” Wireless technology allows the university “to address a real operational requirement—future-proofing—while enjoying great mobility advantages incumbent with the wireless platform,” Mair explains. “This is how we are able to justify the costs associated with wireless.”

Another criterion that made wireless an attractive solution was its ability to provide blanket coverage to the large campus. “We want a system that quite simply allows students, who take courses from different disciplines and often at widely disparate parts of the campus, to have a seamless network with no blank spots. There should be no difference in logging on whether you are at the Botany Annex, the Sedgewick/Koerner Library or the Poultry Sciences Buildings on South Campus,” says Ted Dodds, associate vice president of the university’s Information Technology department.

Solution

In selecting its WLAN partner, UBC evaluated 12 providers. According to John Martell, wireless services manager for UBC, the evaluation process was rigorous. “We looked carefully at the technology as well as price points, and, in the end, Cisco Aironet won hands down. Their access points had greater range, which means we need fewer of them, and they have better mountings, so less custom work is required. We also like their upgradability, which gives us flexibility for the future. In addition, he says, “Cisco is not likely to go out of business, so this is a partner we can depend on for the long term. As to price, they did a very good job of addressing that.”

The evaluation was conducted with the assistance of Dave Michelson, a professor of Electrical and Computer Engineering. Michelson, who specializes in wireless networks, is an active member of several Institute of Electrical and Electronics Engineers (IEEE) boards.

UBC selected the Cisco Aironet 1200 Series access point (AP) for their WLAN and plans to have 1,200 APs installed by late 2003. The Cisco Aironet 1200 Series provides simultaneous support for both 2.4 GHz and 5 GHz radios, thus preserving the university’s existing IEEE 802.11b investments and providing a migration path to future IEEE 802.11a and IEEE 802.11g technologies. This ability to upgrade to more advanced WLAN standards was a critical selection factor for UBC.



“We support Ethernet wireless, the high-speed wireless specifications by the IEEE,” Martell explains. “The widely adopted standard currently is the 11 Mbps 802.11b,” but Martell says the university “also plans to support 802.11a when it becomes deployable and, eventually, 802.11g, which is expected to replace 802.11b.” The 802.11g standard “is backward-compatible with 802.11b, and the Cisco Aironet 1200 AP has the necessary upgradability,” Martell adds.

For the security of wireless users, UBC’s WLAN is protected by a secure authentication system. Users must log in to access most resources on campus and on the Internet. UBC will augment this system with advanced security architecture from Cisco.

The Cisco Aironet 1200 Series supports both wired equivalent privacy (WEP) keys for encrypting data before it is transmitted and a centralized security architecture based on the IEEE 802.11b standard for WLANs. This standard includes centralized, mutual authentication and ensures that every client uses a unique, dynamic WEP key. Cisco supports an 802.11b authentication type called Extensible Authentication Protocol (EAP), or Cisco EAP (LEAP).

“There has been a lot of industry and IEEE work done in the past year to address the authentication and security issues with wireless,” Dodds says.

“Cisco has been leading a lot of these initiatives and we expect them to be at the forefront of standards-based security, whether it be Wi-Fi Protected Access (WPA) or 802.11i. They can fortunately leverage from their existing experience with LEAP,” adds Martell.

The modular design of the Cisco Aironet 1200 Series AP supports single- and dual-band configuration. Investment protection is further provided by large storage capacity and support for Cisco management tools. As a result, Cisco Aironet is able to deliver both the capacity and means to upgrade firmware and support new features as they become available.

The Cisco Aironet 1200 Series features an integrated mounting system for wall and ceiling mounting, is compatible with most of the broad line of Cisco antennas, and delivers an extended operating temperature range.

It also supports both inline power over Ethernet and local power—a feature that was particularly influential in the university’s decision to turn to Cisco, Martell says. “We didn’t consider any product that doesn’t support inline power.” Ninety-five percent of the APs at UBC operate through the inline power function, which provides electricity to ceilings and other areas where cabling would be prohibitively costly or visually unacceptable.

Results

The factor in determining the success of wireless at UBC will be its adoption, according to Dodds. “If the adoption rate of the new wireless system by students and faculty is high, then we can consider this project a success. The current term has just started, and our rollout is still progressing, but the adoption has been quite impressive, so far.”

Logins jumped from a constant 50 per day to 450 during September, Martell notes. “The system has been very reliable, although we need to manage interference at some locations,” he says.

To encourage adoption, UBC has not mandated any specific client adapter card. Any 802.11b Wi-Fi-certified cards will enable notebooks, PDAs or other devices to interface with the new wireless system. “With more than 35,000 students, we don’t think it feasible to insist that everyone use a single brand of card. We have many international students, for example, and it would be unreasonable to expect all of them to be compliant. For that matter, I wouldn’t relish forcing a Nobel laureate to switch systems just to accommodate us,” Mair says, referencing the late Nobel laureate Michael Smith, who was among UBC’s researchers.

Next Steps

Cisco Aironet 1200 APs are being installed in phases across the entire campus. The goal is to achieve the widest possible coverage, from labs and classrooms to libraries, residence halls, cafeterias, and outdoor gathering spots. "As fall changes to winter, we will continue to identify the most popular congregating spots and add APs where density requires," Dodds says. "We want lots of [coverage]. Thus far, we are getting much more of it from the internally mounted Cisco Aironet 1200s than we anticipated."

For management of the WLAN, UBC is presently evaluating the CiscoWorks Wireless LAN Solution Engine (WLSE). A specialized turnkey daily operational solution for customers to manage the entire Cisco Aironet wireless LAN infrastructure, the WLSE provides centralized, template-based configuration with user-defined groups to effectively manage a large number of access points and bridges. It monitors the LEAP authentication server and further enhances security management by detecting misconfigurations on access points and bridges.

"While we are looking carefully at the WLSE, I should note that Cisco APs themselves provide good management and view of other APs on the network, and we are incorporating management in our existing management tools," Martell explains. "Many third-party products have specific support for Cisco wireless equipment, which is a very good sign. We expect to make a decision on the WLSE when we see the next version."

"We already have compiled, and will continue to compile, a substantial database of material that we can share with Cisco. Given the size of our wireless network and the extensive user base, this will inevitably become more than simply a customer-supplier relationship," Dodds adds.



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