

# Western Michigan University Going Completely Wireless



Western Michigan University (WMU) is on track to become the first major public research university in the nation to create a totally wireless and ubiquitous computing campus environment using Cisco Aironet® 350 Series Access Points and PC adapter cards.

“We’ve learned that wireless computing, in particular, is one of the most exciting and important new developments in many years for our University,” said WMU President Elson S. Floyd. “With this technology, we can transform buildings that are 20 or 30 years old into state-of-the-art information portals. This will, in turn, lead to exciting new opportunities in teaching, research, communication, and a host of scholarly activities some as yet unimagined.”

Viji Murali, WMU vice president for information technology and chief information officer, agrees. “This initiative allows access to information at any time from any place on campus. Thanks to President Floyd for his vision and support in putting WMU on the leading edge. We will indeed be a wireless campus by January 2002.”

Based on direct sequence spread spectrum technology and operating in the 2.4 GHz band, the Cisco Aironet 350 Series provides an Ethernet-like data rate of up to 11 megabits per second (Mbps), comparable to that of fiber-optic cable. Access points and client adapters are IEEE

802.11b compliant and Wi-Fi® certified by the Wireless Ethernet Compatibility Alliance for interoperability.

Located in Kalamazoo, Michigan, WMU plans to become completely wireless by January 2002. “Completely wireless” means that students, faculty and staff eventually will be able to connect to the WMU network and to the Internet from laptop computers anywhere on campus. The wireless initiative will not replace existing wired connections but will supplement them with indoor and outdoor wireless connections for the University’s 28,657 students and 3,485 faculty and staff.

## Survey Guiding Access Point Installation

Installation of the first 400 Cisco Aironet access points began in June 2001. Additional access points will be installed following completion of a campus-wide survey. More than 80 of the University’s 125 buildings have been evaluated, and many of the “green” areas, such as lawns, parks, and commons, have been surveyed as well.

“We are looking first at the public areas where students congregate, such as the library, Bernhard Center, common meeting rooms, and residence hall lounges,” said George Kohrman, project lead for Wireless Western from the Office of Information Technology (OIT). “Those places,



along with classrooms, are our priority. Beyond that, we'll know more when the survey is complete. But our ultimate goal is to provide universal access on this campus, whether wired or wireless. WMU users won't have to find an active jack, and OIT doesn't have to guess where they want to use the system."

A key goal of the project is to create wireless access in every classroom on campus. This includes the creation of several "laptop intensive" rooms where all students in the class will have wireless access. A pilot project implemented in WMU's Haworth College of Business in the fall of 2000 provided a model for that development.

### Successful Pilot in Business School

For the pilot, every freshmen business student was strongly encouraged to purchase a laptop. Approximately 250 of more than 800 enrolling freshmen bought new laptop computers, and the University estimates that several hundred more used PCs or laptops were purchased elsewhere. To access the wireless network, students were provided with Cisco Aironet 340 Series Client Adapter cards.

The laptops were used in computing sections of three entry-level business courses. Three classrooms in the Haworth College of Business' Schneider Hall were configured as wireless hubs with two others serving as wired portals. Business students also were able to access wired or wireless connections in the computer lab, the student café, study areas, the University's main Library, the student center, and residence hall rooms, which already were wired for Internet access.

Freshman business student, Mark Fruehauf, said wireless changed the way he handles homework and research projects "for the better, mainly because I'm not confined to the labs and wired Internet access stations anymore. Instead of waiting in line at the computer lab, I worked on

my research paper while eating lunch at the Bernhard Center. When I was ready to hand in my homework, I printed it out using the infrared port at the Haworth College of Business Lab, Bernhard or the University Computing Center."

The wireless Internet access was ideal for group meetings, he added. "We could sit almost anywhere in the College of Business lower level or study lounge to work on our project comfortably at any of the tables instead of the main lab."

### Faculty Gearing up for Wireless

WMU's subsequent decision to deliver wireless technology campus wide has faculty support. Professor Dean Johnson is preparing to use wireless in his large lecture course in electrical and computer engineering. Students will be strongly encouraged to attend with a notebook equipped with the Cisco Aironet 350 Series Client Adapter card; those who choose to do so will be in special wireless lab sections.

Johnson is considering several ways to integrate wireless technology into his lectures. "My first idea is to continue demonstrating the weekly quizzes and sample pre-lab computer simulations. Those students who don't have a machine will still get to view this process on the big screen. However, students armed with a wireless notebook will be able to go beyond the demonstration and participate with the instructor in these activities. In fact, I will encourage them to do so," he said.

His second idea is to pose a logic design problem, with some starting point simulation code that could be downloaded from the Web site. "I will then ask students to extend the example to another level of thinking and compare their results to that which I will present. Students not empowered with notebooks can still watch this event

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and perhaps look on with other students whose machines are involved in the interaction. A third idea would be to create more conceptual paths and links between lecture and laboratory by allowing students to readily move design environments between the lecture and the laboratory," he said.

### Choosing Cisco Aironet

The OIT Wireless Project Team evaluated a number of product lines before settling on Cisco Aironet 350 Series Access Points and PC adapter cards as the core of its wireless system. The University's backbone already employs Cisco routers and switches so compatibility issues were nonexistent.

Security was also a factor in the team's decision to use Cisco products. The use of static wired equivalent privacy (WEP) keys has become insufficient for most organizations, and attention is being directed toward 802.1x for 802.11, the standard for wireless LAN (WLAN) security. 802.1x for 802.11 requires an authentication type that operates over Extensible Authentication Protocol (EAP); only two such types are presently available, one of which is EAP-Cisco Wireless (also known as LEAP). The Project Team is evaluating LEAP as a means for protecting the sensitive information that is transmitted throughout the campus.

Another factor in the decision was the inline power capability of the Cisco Aironet 350 Series. The Cisco 350 Series Access Points can be powered remotely across the same cable that is used for Ethernet, and a Cisco technology-powered switch, a powered patch panel or a small, in-line device called a power injector can provide this power. The ability to remotely power the access points means that only one Category 5 copper cable needs to be run to the Cisco 350 Series Access Points.

For WMU, which was founded in 1903 and still has many older buildings in which it is difficult and expensive to install additional electrical outlets, wireless provides a cost-saving, convenient solution.



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