

Major University Meets Students' Expectations for Wireless

The University of Arizona deploys a Cisco Unified Wireless Network across its campus to provide ubiquitous network access.

EXECUTIVE SUMMARY

UNIVERSITY OF ARIZONA

- Higher Education
- Tucson, Arizona
- 14,466 employees
- 36,805 students

BUSINESS CHALLENGE

- Attract new students and engage existing ones by addressing their expectation for ubiquitous wireless network access
- Help ensure that the network can support future plans, such as wireless voice and public safety applications
- Lay the foundation for the growth of mobile computing
- Mitigate network security risks

SOLUTION

- A Unified Wireless Network from Cisco provides remote management of several thousand access points
- Separate Service Set Identifiers (SSIDs) help ensure secure network access for students interacting with personal information
- Cisco wireless VoIP phones replace or supplement traditional wired phones.

BUSINESS RESULTS

- Students can remotely access course related information from anywhere on campus, including classrooms, study areas and the student union
- Providing ubiquitous wireless access enhances the university's reputation as a leading educational institution
- A future public safety network will let campus police spend more time patrolling the campus and less time filing reports at their desks
- Student technology fees pay for most of the network.
- The wireless network provides secure network access and enables new applications, such as tracking university buses

Business Challenge

Established in 1885, the University of Arizona is among the top public educational and research institutions in the United States. Its main campus, located a mile northeast of downtown Tucson, spans 380 acres, with 182 buildings and a renowned arboretum.

The university offers 334 fields of study at the bachelor's, masters, doctoral, and first professional levels, including top-rated programs in astrophysics, hydrology, engineering, and astronomy. In fact, the National Aeronautics and Space Administration (NASA) gives more space exploration research grants to the University of Arizona than to any other university in the nation.

A couple of years ago, university officials began to realize that a school known for such outstanding research needed to offer its students and faculty an outstanding wireless network. For many young people, ever-present Wi-Fi access is not just a convenience or a privilege; it is an expectation.

"There were complaints that the University of Arizona was behind the times because we did not have a campus-wide wireless network," says Michele Norin, executive director of central IT at the University of Arizona. Although various staff members had scattered some individual wireless LANs around the campus throughout the years, students were frustrated by the lack of ubiquity,

Norin says. The multiple WLANS also posed a security risk, because the IT staff had no control over access and authentication for each network.

"A student could log into a wireless network in one building, but as soon as they got to another part of campus, they would either have to log into a different wireless network or there was no wireless network at all," Norin says. "We decided that we needed to have a single system for wireless."

In fact, students were so excited about the prospect of ubiquitous Wi-Fi that they were willing to pay a premium for it. "Because we received so much interest from students, we decided to negotiate the institution of a student technology fee to fund what became known as The Wireless Project," Norin says.

Network Solution

Late in 2005, the IT team began planning a wireless network that would cover the majority of the campus, including both indoor and outdoor spaces. The team knew that the entire network would require thousands of access points, so ease of management was important.

"We wanted a network in which we could control access points centrally, because of the size of the campus" Norin says.

Because Cisco® had been the university's trusted networking provider for years, and because Cisco offered superior wireless hardware and software tools, the school chose a Cisco Unified Wireless Network, featuring centralized access point management and control.

The university hired NEC, a popular systems integrator, to install the network, which includes Cisco Wireless Control System (WCS) management software, Cisco Catalyst® 6500 Series Wireless Services Modules (WiSMs), Cisco Aironet® 1200 Series access points and Cisco Aironet® 1100 Series access points. Designed to integrate into networks that utilize Cisco Catalyst 6500 Series Ethernet switches, WiSM controllers provide real-time communication among lightweight access points and other controllers.

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—Michele Norin, Executive Director of Central IT at the University of Arizona

Initially, the NEC team conducted a comprehensive site survey, determining the optimal locations to install the lightweight access points and tracking down any unauthorized access points. Then, working with Cisco and the university, the NEC team divided the wireless deployment into several phases.

The first phase involved covering the main campus student center and several high traffic areas in time for the Fall 2006 semester, when the first student technology fees were due. "We wanted to make sure that as soon as they paid the US\$50 fee, they would have something to show for it," says Bob Lancaster, director for the networking solutions group at the university.

The next phase, completed in December of 2006, covered about 50 percent of the campus with some 3000 access points. Again, the team prioritized areas of high student traffic, such as student unions and libraries. The Wireless Project is due for completion by the end of 2007. With 6800 to 7000 access points, it will cover 85 percent of the main campus, as well as a branch campus in Sierra Vista, Arizona and the medical college in Phoenix.

The NEC team also took advantage of the WiSMs' ability to support multiple Service Set Identifiers (SSIDs), creating three for the campus Wi-Fi network. UAWiFi, available for students, faculty, and staff, requires registration and an ID. It provides users with full network bandwidth and full access to the campus network. In addition to data services, there is support for wireless IP based voice services; several faculty members now use Cisco 7921 series wireless VoIP phones in lieu of tethered desktop phones. This lets them roam around their academic buildings, among labs, offices and classrooms.

UAPublic, meant for short-term visitors, provides less bandwidth than UAWiFi, helping ensure that paying members of the UA community receive bandwidth priority. Finally, UAGuest is an SSID meant for vendors, prospective employees, and other professional guests of the university. UAGuest users are assigned a temporary login code that routes them off the campus network for security reasons, but still gives them Internet access with full bandwidth capabilities. The guest SSID is supported by the Cisco NAC Appliance (also known as Cisco Clean Access), a network admission control product that uses the network infrastructure to enforce security policies.

Business Results

Financially, the wireless network has provided a best-case scenario for the university. Not only are the student fees funding most of the project, but the students seem genuinely happy to pay that fee, because of the constant connectivity that they receive. The fee was raised from US\$50 in 2006 to US\$85 in 2007. Although this is a nominal amount of money, more than 33,000 students are paying it, so the revenue is significant. And not only does the network appease current students, but it helps to ensure future students that the university can meet their technology expectations.

"They really wanted wireless, and wanted to be part of the planning process," Norin says.

"The student government candidates included the promise of wireless as part of their election campaigns. The ability for students to move around and still get the information that they need, electronically, is very important. And the unified network addresses the earlier complaints about having too many systems but not enough coverage."

"The simplicity is a big benefit for the students," Lancaster says. "Once they're configured, they can travel anywhere on campus to use the network. It saves time and helps the education process. We anticipate more and more classroom use of wireless."

"We had about 18,000 people register to use the wireless network right away, and we often see over 1800 simultaneous connections," Lancaster says, adding that the management tools in the network have helped determine the best locations for new access points as the network expands.

"The WCS has helped us identify hot spots," Lancaster says. "We have learned, for example, that the College of Law classrooms are the heaviest users, so we have added more access points there. In the meantime, though, the access points have the ability to compensate for the load, automatically. So while we are able to identify potential load balance problems on the WCS, the user community usually sees no problem at all."

As with the students, for those staff and faculty who require mobility, the wireless network has enabled them to roam about their buildings and still maintain a connection to the voice network, thanks to the addition of wireless IP phones. Even for those employees who would not ordinarily need network mobility, the Wi-Fi network has proven to be invaluable at times when the wired network is unavailable.

"While we still view wireless as a supplemental option rather than a replacement for the main wired network, it does provide a quick connectivity for new staff while they are waiting to be connected to the wired network," Lancaster says. "And recently, we experienced a security incident in which a few of our servers were compromised. To react, we had to turn off the wired network in one building, but we were able to do the evaluation and recovery fairly quickly, because we still had access to the wireless network."

Next Steps

Although student Wi-Fi access was the main goal of The Wireless Project, the University of Arizona officials say that the university chose the Cisco network knowing that it could support multiple applications, data, voice, and RFID. "From the beginning of our network assessment, we have been evaluating the possible use of RFID technology to track expensive equipment," Norin says. The school has no definite plans for RFID yet, but "If we do that, we know the network is ready for it," Norin says. U of A is considering using the network to track university buses, she adds.

PRODUCT LIST

- Cisco Catalyst 6500 Series Wireless Services Module
- Cisco Catalyst 6500 Firewall Services Module
- Cisco Wireless Control System
- Cisco Aironet 1200 Series access points
- Cisco Aironet 1100 Series Access Points
- Cisco 2700 Series Location Appliance
- Cisco Unified Wireless IP Phones 7921
- Cisco NAC Appliance

The school also is planning to take further advantage of the network's ability to support multiple SSIDs. "We are working with our campus police to create a secure public safety network just for them," Lancaster says. "Right now they take their reports back to headquarters in order to file them. We are showing them the possibility of filing their reports from the field, so that they can spend more time patrolling the campus and less time at headquarters."

For More Information

- For more information on Cisco wireless solutions, visit: <http://www.cisco.com/go/wireless>
- For more information on Cisco Unified Wireless Network Solution, visit: <http://www.cisco.com/go/unifiedwireless>
- For more information on Cisco SMARTnet, visit: <http://www.cisco.com/go/smartnet>
- For more information on the University of Arizona, visit: <http://www.arizona.edu/>



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