

## Dutch University Takes Wireless Lead in Europe

University of Twente grows one of the first and largest wireless networks in Europe with Cisco's 802.11n access points.

### EXECUTIVE SUMMARY

#### University of Twente University of Twente

- Higher education
- Enschede, The Netherlands
- 2000 employees; 8000 students

#### CHALLENGE

- Facilitate research and education processes by providing mobile network and Internet access
- Increase capacity of existing wireless network to support the growing number of users, devices, and high-bandwidth applications

#### SOLUTION

- 800 wireless access points provide campus-wide wireless connectivity, enhancing student collaboration and enabling interactive teaching methods
- Security and guest access features provide separate VLANs for students, faculty, research groups, and guests and support eduroam system
- 802.11n access points deployed in high-traffic study hall provided test pilot for the university's migration path

#### BUSINESS RESULTS

- Wireless network helped reinforce university's leadership position
- Mobility enables university to attract more students and continue to improve the quality of education
- 802.11n access points provide five to six times faster speeds with greater reliability than university's existing a/b/g network

### Challenge

Founded in 1961, the University of Twente (UT) is an entrepreneurial research university offering a broad educational curriculum and world-class research programs. Degree programs at the university range from business studies and applied physics to biomedical technology and psychology. Research in the applied sciences includes nanotechnology, engineering, and biomedical sciences. With a large international student body, UT teaches its postgraduate programs in English and is the only university in the country with a residential campus. The university has also created 600 spin-off companies, more than any other higher-education institution in The Netherlands.

"Providing a strong and flexible technology infrastructure is crucial to supporting the leading work of our students, employees, and researchers," says Jan Markslag, the network team leader at the university.

In 2003, the University of Twente decided to improve its network services by providing mobile access. "We wanted to facilitate the educational and research processes for students and faculty by giving them access to server-based applications, as well as the Internet, from wherever they were on campus," says Markslag. A long-time Cisco® customer, the university chose to deploy Cisco wireless access points to provide campus-wide wireless connectivity throughout its 60 educational and research facilities. With the easy and constant availability of the network, the number of educational applications and mobile users grew rapidly, increasing the demand for more bandwidth.

"It became clear that we needed a way to increase the capacity of the wireless network to support the growing number of users, devices, and high-bandwidth applications," says Jan Freerk Popma, network manager at the University of Twente.

### Solution

Before the initial deployment of the wireless network in 2003, the University of Twente evaluated ten different providers. Once the evaluation process was complete, the university deployed 800 Cisco Aironet® access points to provide indoor and outdoor coverage across its campus. "We chose Cisco because it was the only vendor to support multiple VLANs and IEEE 802.1x security," says Markslag.

As a result of the wireless network deployment, the university developed several laptop-based study programs for courses such as industrial design. Mobile access to the academic network and the Internet enables students to participate in interactive meetings and collaborate by sharing documents and applications while the students are in motion on campus. Professors use the wireless network for calculation and simulation environments, team teaching,

and in-class polling. “Now students can connect to the academic network and download material and data needed for in-classroom examples and assignments,” says Markslog.

The security features and guest access capabilities of the Cisco wireless network provide the University of Twente with maximum flexibility. The wireless network enables the easy creation of secure VLANs for special closed research groups and facilitates the formation of registered user accounts. Guest access capabilities provide secure Internet access to visiting faculty and students. The Cisco access points also support eduroam (Education Roaming), the roaming infrastructure used by the international research and education community. Eduroam enables users to access a wireless network at another institution using the same credentials as they use at their own university. “The Cisco wireless network interoperates smoothly with the eduroam technology. Protected by the 802.1X IEEE protocol, our eduroam VLAN is our production network,” says Markslog.

In 2008, the University of Twente began considering using 802.11n technology to address its growing bandwidth requirements and evaluated two wireless providers. Once again, Cisco was the clear winner. “The Cisco 802.11n access points are completely interoperable with our current a/b/g network and provide maximum scalability,” says Popma. Using five Cisco Aironet 1250 access points and a Cisco 4400 Wireless LAN Controller, the university created a test pilot to determine the capabilities of the 802.11n technology and the ease with which it could be integrated into the current infrastructure. “We wanted to make sure that it could support all of the different users and devices that we have at the university without complicating our network management,” he says. Four 802.11n access points were deployed in the busiest study hall on campus, and one access point was provided to network experts in the Computer Sciences school for in-depth study.

“With our wireless network, professors can be more innovative in their teaching methods, increasing learning retention and improving the quality of education that we provide.”

—Gert Meijerink, ICT/CIO, the University of Twente

## Results

In deploying the Cisco wireless network, the University of Twente reinforced its leadership position among higher education institutions in Europe. “We were the first university in the country to deploy a wireless network,” says Gert Meijerink, the university’s ICT/CIO. “Today, we host 1600 concurrent users per day, making us one of the largest WLAN deployments in Europe.”

Mobility enables the university to attract more students and continue to improve the quality of education. “Whether they’re using a smartphone, an iPhone, or a laptop, students can connect and download films, games, and educational material from wherever they are,” says Meijerink. Wireless access is also driving more interactivity in the classroom. “With our wireless network, professors can be more innovative in their teaching methods, increasing learning retention and improving the quality of education that we provide.”

The results of the pilot proved that the Cisco 802.11n network can provide the bandwidth capacity and interoperability required by the University of Twente today and in the future. “Our results show that the 802.11n access points are five to six times faster than our current a/b/g network, provide increased speed to older clients, and are fully backwards compatible,” says A. B. Tibben, the 802.11n project leader. Increased bandwidth helps to manage user density. “Sometimes we have 100 or 200 students watching a video or presentation in a busy lecture hall, which slows our current network down,” says Tibben. “We are counting on 802.11n to provide continuous connectivity to an increasing number of different clients accessing bandwidth-intensive applications at the same time.”

## Next Steps

As a result of its positive test pilot, the University of Twente plans to expand the deployment of 802.11n access points. "We intend to upgrade our existing access points to 802.11n in high client-density environments that require increased bandwidth," says Tibben. "Auditoriums and libraries, for instance, typically have a large number of people working within small spaces and could benefit from the high speeds and greater reliability that 802.11n provides." For new buildings and locations, the university plans to deploy 802.11n access points right from the start. "As our campus grows in numbers of users, new devices, and applications, 802.11n provides the right migration path to the future," says Meijerink.

### PRODUCT LIST

#### Wireless

- Cisco Aironet 1250 Series Access Points
- Cisco Aironet 1130AG Series Access Points
- Cisco Aironet 1200 Series Access Points
- Cisco 4400 Series Wireless LAN Controller
- Cisco Wireless Control System (WCS)

#### Routing and Switching

- Cisco Catalyst® 6500 Series Switches
- Cisco Catalyst 3570 Series Switches
- Cisco Catalyst Blade Switches 3020
- Cisco 7200 Series Routers

## 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 University of Twente, visit: <http://www.utwente.nl/en/>.

To view University of Twente's video on its 802.11n deployment, visit: <http://www.surfmedia.nl/Mediatheek/Pages/MediaFragment.aspx?videoId=135624>

To find out more about eduroam, visit: <http://www.eduroam.org/>



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