



CASE STUDY Education

West Chester University to Save \$1M in Budget, and cut 100 Metric Tons of Carbon Emissions, by going All-Wireless in New Dorms

West Chester University (WCU), one of the largest institutions in the Pennsylvania State System of Higher Education, recently faced a unique opportunity. In the course of designing five new state-of-the-art student living facilities, it became apparent that the high-speed 802.11n Wi-Fi network intended to provide connectivity for resident students could be used for all network access in lieu of the planned wired Ethernet access network. Doing so would significantly reduce build-out costs and, by reducing electricity consumption and wired switch cooling expenses, minimize the environmental impact of the new facilities.

Such a break from standard IT infrastructure design required thoughtful analysis. Once removed from the building plans, Ethernet cabling would be very expensive to retrofit into the finished buildings. WCU had traditionally provided multiple Ethernet ports to every student living space in its dormitory buildings, and Aruba Networks' wireless LANs in the common spaces. While this design provided fixed connectivity to students, it was rigidly inflexible:

- The many new technology savvy students were bringing notebook computers, media players, and Wi-Fi enabled phones into the dorms that could not be easily accommodated by the wired infrastructure;
- Mobile network access was limited to the common spaces; and
- It was expensive to install and operate.

On the last point, the “per-port, per-pillow” cost of the traditional solution was not only high per port, but also when the total cost of ownership was considered. Installing cables accounted for only part of the expense. Maintaining the data center Ethernet switches, powering and cooling the equipment, the yearly maintenance contracts, and on-site support services were significant burdens to the IT budget.

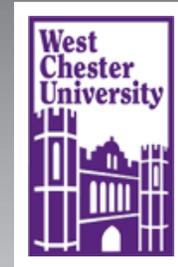
And then there was the issue of sustainability. Dr. Greg Weisenstein,

WCU's President, was driving a comprehensive sustainability and green campus initiative across the university. His mandate to WCU staff members was to look everywhere for opportunities to significantly reduce the university's carbon footprint. The high energy consumption of traditional wired LANs, and the toxicity and landfill issues associated with data cabling, provided just such an opportunity.

The Right Infrastructure for Network Rightsizing

During the initial planning for the five new student housing facilities, WCU's IT staff determined that they could address the limitations of the wired Ethernet infrastructure, and reduce the university's carbon footprint, by expanding the 802.11n network throughout the buildings instead of just the common rooms. “Our objective across the campus was/is to use wireless wherever we can, and deploy Ethernet only where we absolutely must,” says Adel Barimani, WCU's CIO. “The residence halls presented a unique opportunity to go all-wireless and completely avoid Ethernet infrastructure at the access layer.”

Significant effort was devoted to qualifying the right 802.11n for the task. WCU's IT staff rigorously tested 802.11n solutions from multiple vendors. Based on performance, security, and scalability a clear choice emerged - Aruba's



Requirements:

- Reduce construction costs and ongoing IT expenses for new dormitory buildings
- Lower the environmental impact of student housing
- Provide high-reliability 802.11n Wi-Fi connectivity in each building and to outdoor common areas
- Centrally manage the campus and dormitory network from a single location
- Layer-3 roaming to support potential deployment of voice over Wi-Fi

Solution:

- Aruba 6000 Controller
- Aruba AP 125 802.11n Access Points

Benefits:

- \$1M in savings by reducing cost of construction and network operating expenses
- Reduce the university's carbon footprint by 100 Metric tons
- Provide high performance wireless connectivity for students living in dormitories
- Support new mobile devices such as media players, netbooks and phones that support Wi-Fi

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adaptive 802.11n Wi-Fi solution. Aruba was the only vendor to offer a Wi-Fi network that not only adapted to its environment but caused client devices to do so as well. Aruba's Adaptive Radio Management (ARM) technology uses infrastructure-based controls to optimize the performance of Wi-Fi clients in real-time. Acting on their own, Wi-Fi clients do not always work cooperatively with one another, nor do they select the optimal band, channel, or access point. These issues are exacerbated in settings with densely packed users such as university dormitories and lecture halls. ARM controls how Wi-Fi clients interact to ensure that data, voice, and video applications have sufficient network resources, including airtime, to operate properly.

"Using Aruba's wireless networks in the new seven-story student residences will eliminate roughly 1,050 Ethernet ports and fourteen 80-port switches per building, saving roughly \$250,000 per building and 25 metric tons of carbon emissions per year," says Richard Chan, WCU's Assistant Director of Networking and Telecommunications. Across all the new dormitories, this will save over \$1,000,000 and reduce carbon emissions by over 100 metric tons.

The process of downsizing wired Ethernet infrastructure to address shrinking demand, and expanding 802.11n wireless networks to satisfy growing usage, is called "network rightsizing." Typically network rightsizing is a three step process:

- Step 1: assess the actual and projected utilization of wired Ethernet ports and closet switches. It is not unusual to find that that 40% of wired ports are underutilized or not used at all;
- Step 2: consolidate required ports into fewer switches to lower deployment and maintenance costs, and reduce electricity and HVAC usage;
- Step 3: deploy adaptive 802.11n Wi-Fi to enhance the mobility and productivity of all users who don't need a wired connection.

To date WCU has deployed the Aruba M3 Controller Module in a redundant configuration for resiliency, and deployed 126 AP-125 802.11n Access Points in two dormitories under construction. Wireless coverage extends to the basements of both buildings where multiple classrooms are situated. Aruba AP-124 Access Points installed in weatherproof enclosures equipped with high-gain outdoor antennas service the common areas outside the new dormitories.

WCU deployed Aruba's AirWave management system to manage both the new wireless LAN and the existing Wi-Fi system on campus. This allowed WCU to easily scale wireless to these new facilities without adding complexity or requiring additional IT resources. Having a more comprehensive operations management system provided additional benefits such as enhanced network visibility and reporting and offering

Company Overview:

West Chester University is one of the top regional comprehensive public universities in the country. It is the fourth largest university in the Philadelphia region with approximately 13,621 students: 2,137 graduate and 11,484 undergraduate. The University offers more than 80 undergraduate and 70 master's degree programs taught by 568 full-time and 149 part-time faculty. It is one of 14 universities that comprise Pennsylvania's State System of Higher Education.

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Richard Chan
Assistant Director of Networking
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West Chester University



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better integration with helpdesk and troubleshooting functions.

But it was the size and scope of another IT project, happening during the same timeframe, which demonstrated just how smooth the transition can be to 802.11n. WCU was in the process of relocating the University data center, a significant project with many moving parts and based on months of planning. The wireless LAN project ran in parallel to the data center move, seamlessly overlaying the network architecture.

Summary

After an extensive planning, testing and implementation process, West Chester University's IT staff has significantly reduced the cost and carbon footprint of the networking infrastructure at its new

housing/learning facilities. The savings will continue to grow as the network is expanded to cover existing facilities which will be "rightsized" in the coming months. "This initial deployment of 802.11n infrastructure has clearly shown us the future of WCU's IT strategy," said Mr. Barimani, WCU's CIO. "As new facilities come on-line, we will leverage the many benefits of Aruba's adaptive 802.11n solution to reduce costs, minimize our environmental impact, and deliver to our students and faculty the highest possible level of service."



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