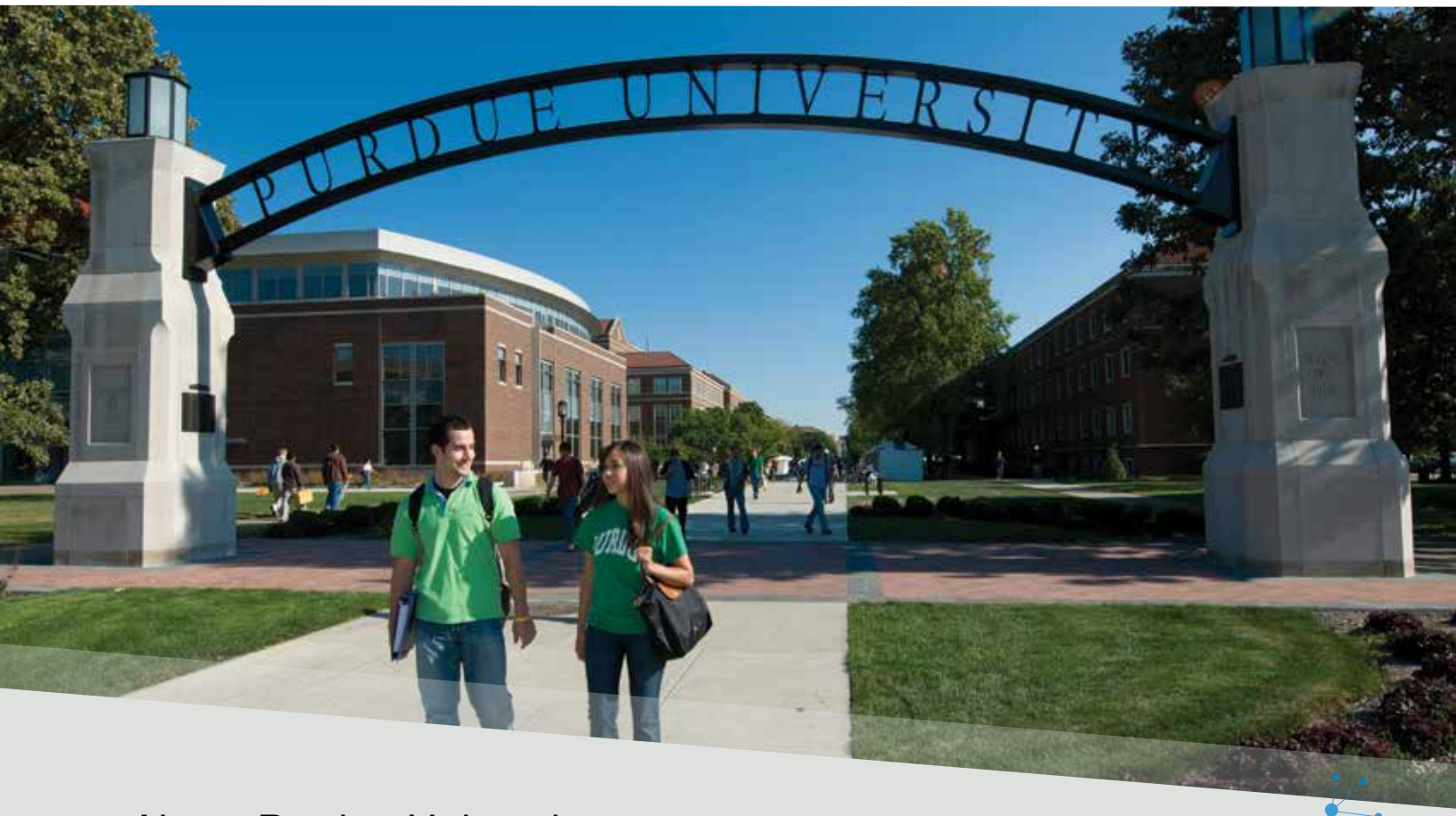
Purdue University Case Study



About Purdue University

Purdue University is a land-grant university in West Lafayette, Indiana, founded in 1869. Today, the university boasts an enrollment of 40,451 students and 16,466 staff. The technology needs of the students and faculty are served from two data centers and two data pods that house super computers, plus 700 telecommunication rooms. More than 500 miles of copper cabling and almost 600 miles of fiber-optic cabling deliver IP-based services, in support of the university's mission of teaching, learning, research, and outreach.

PANDUIT®

infrastructure for a connected world

COMPANY
Purdue University

COUNTRY
West Lafayette, Indiana, USA

INDUSTRY
Education

BUSINESS CHALLENGES

To provide a reliable, highly available, wireless infrastructure to support the university's mission of teaching, learning, research, and outreach.

PANDUIT SOLUTION

Panduit enterprise solution that consists of the structured cabling system, a highly reliable, scalable infrastructure solution to increase network performance, availability and productivity, providing a more dynamic educational experience for students; surface raceway to secure and route the structured cabling system throughout campus buildings.

BUSINESS BENEFITS

A network infrastructure that effectively facilitates the agility to adopt wireless technologies campus wide.

Delivering Wireless to Support the University Mission

Tried and true Panduit solutions become an innovative solution to deliver wireless connectivity for students

BUSINESS CHALLENGES

Understanding that the demand for wireless connectivity wasn't going to diminish, Purdue University embarked on an extensive project in the early 2000s to make wireless access readily accessible for students and staff. They began investing in a wireless infrastructure, with a project that included deployment of 1,200 wireless access points, with that number continuing to increase year after year. The initial project targeted areas where students congregate: the Purdue Memorial Union, common rooms in residence halls, and public areas in academic buildings. As the use of wireless devices grew in recent years, the university found it needed to expand its wireless service. This initiative took two paths: one to provide full wireless coverage to students living in residence halls; and a second to expand coverage in common areas to accommodate the growing number of devices that students and staff are connecting to the wireless network.

- In 2010, Purdue installed approximately 6,000 APs for 100% wireless coverage in academic buildings (excluding stairwells, mechanical rooms, and restrooms).
- In 2014-2015, Information Technology at Purdue (ITaP) began a major project to upgrade the wireless system in residence halls and academic buildings. In residence halls, the university had a goal of 100% coverage, meaning that every student would be able to connect wireless devices in their residence hall room. In academic buildings, the goal was to move beyond 100% coverage to capacity, so that students and faculty would be able to connect multiple devices and have the desired performance. An additional 1,300 APs were installed as part of that project to support wireless demands throughout the residence halls, bringing the total number of APs on campus to nearly 8,600.

Residence Halls: Reaching 100% Coverage

Several of the 18 residence halls on Purdue's campus were built several decades ago … long before wired or wireless technology needed to be considered. Academic buildings and residence halls were all re-cabled in the mid-1990s to adhere to TIA standards for all wired Ethernet ports. Panduit's T70 surface raceway was used as a pathway to deliver wired connections to student rooms.

Fast forward to 2015, when wireless access isn't a luxury for the student population – it's an expectation. Students bring as many as eight wireless devices to campus (beyond the basic computer, phone and tablet, wireless printers, smart watches, and gaming systems are commonly found in residential rooms). And, students were finding ways to deploy their own wireless in the residence halls. Rogue routers and access points were creating other problems on the university's network. ITaP's wireless project sought to provide a better wireless experience for students, while also eliminating those issues created by student-supplied routers and access points.

SOLUTION

To reach its goal of 100% wireless coverage in all residence halls, ITaP faced a significant challenge: buildings constructed in the 1950s and 1960s aren't conducive to common in-ceiling deployment of wireless access points. ITaP tested two options and had the most success with a solution that used the same T70 surface raceway already being used in the dorms, paired with an outlet box. The faceplate on the outlet box was replaced with a Cisco 702 wireless access point. Using raceway to locate WAPs meant ITaP could position the access points where they were most beneficial, rather than locating them where the existing infrastructure dictated. Using predictive site survey software, ITaP determined one wireless faceplate in every other room achieved their goal of 100% coverage. Access points are connected by TX6-28™ Category 6 28 AWG UTP patch cords. The cabling delivers data and Power over Ethernet to the access points.

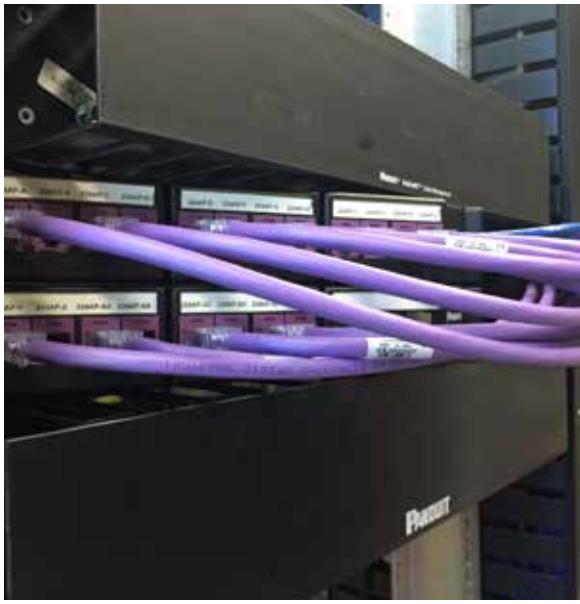
The use of the smaller 28 AWG patch cords allowed ITaP to use existing surface raceway in the residence hall rooms. Daniel Pierce, telecommunications design engineer with ITaP, said that the 28 AWG cabling was a critical piece of the solution, as the small size allowed them to run all the cables they needed to connect the access points, without replacing the existing raceway. (At a 40% fill rate, the T70 raceway can hold 116 of the 28 AWG Category 6 cables. This compares to only 47 of the 24 AWG cables in the same raceway.) This provided the throughput desired, while preventing the expense of replacing or adding raceway. Along with cost savings, it also allowed the university to maintain the aesthetics, which was important to them.

Along with the wireless access in each room, the university still provides one wired connection per student in each residence hall room, delivered via the same raceway.

100%

coverage

To reach its goal of wireless coverage in all residence halls, ITaP faced a significant challenge.



Academic Buildings: From Coverage to Capacity

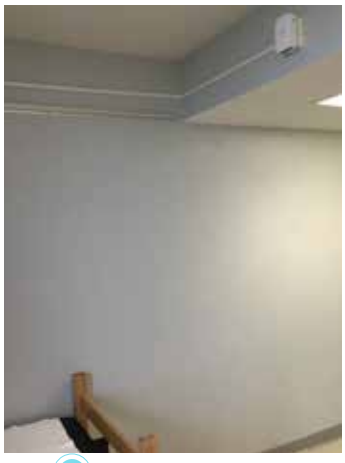
Students and faculty have had wireless access in academic buildings since the early 2000s. In recent years, however, the university found that 100% coverage simply wasn't enough. As wireless use became more common, students began bringing multiple devices to classrooms, lecture halls and laboratories. Purdue found it needed to expand wireless capacity to accommodate an average of 2.5 devices per student. In a lecture hall with 100 students, this translates to 250 or more devices all trying to connect wirelessly within a limited space.

THE SOLUTION

Purdue has embarked on a program to regularly assess and update wireless access points to deliver the needed capacity in academic buildings, adjusting WAP locations and adding access points for higher density as needs arise.

As updates are made, ITaP has opted for the robustness of a Category 6A infrastructure to support wireless access in academic buildings. Cisco 3702 access points are the current standard for academic buildings, and ITaP will begin moving to Cisco 3800s as their standard. Access points are connected with two Category 6A horizontal cables, running as a permanent link from the telecommunications room, providing both a data connection and Power over Ethernet. ITaP is a strong proponent of adhering to standards, which means they follow cabling recommendations that call for running two cables to each wireless access point.

Purdue has set Category 6A as the standard for all new buildings and major renovations, with wireless speeds driving that decision. The Category 6A infrastructure also makes them more agile as they respond to classroom modification requests from faculty. If a professor wants to deploy a new technology in a classroom, ITaP can usually adapt and provide what they're requesting, Pierce said.



It is also giving them the bandwidth to support IP-based television services, IP cameras, metering devices, safety and security systems, and building automation systems.

SUCCESS

Surveys have indicated that students are very happy with the 100% coverage, and ITaP has found the upgrade has reduced the number of rogue access points that students had been using in the residence halls. This protects the integrity and performance of the network.

ITaP is pleased with the residence hall solution, as it met their objectives of 100% coverage, while the 28 AWG solution provided the space savings and performance that allowed them to reuse existing infrastructure. "We've been really pleased," Daniel Pierce said. "We know exactly what we're getting when we use Panduit and it frequently outperforms what it was designed to do."

The wireless expansion in academic buildings is also meeting expectations, and will continue to be monitored, refined, and expanded, as part of the ongoing effort. ITaP views the wireless deployment as a work in progress, continually being monitored and tweaked to provide the wireless experience that makes the grade with students and staff.

PANDUIT®

Panduit Corp.
World Headquarters
Tinley Park, IL 60487

cs@panduit.com
US and Canada: 800.777.3300
Europe, Middle East, and Africa: 44.20.8601.7200
Latin America: 52.33.3777.6000
Asia Pacific: 65.6305.7575

www.panduit.com