Wi-Fi for Higher Education

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Every Campus Needs Reliable, Fast Wi-Fi

OVERVIEW

Just how much do today’s college students use Wi-Fi? In a single day in April 2015, Indiana University’s wireless LAN handled 34,444 registrations to the network—and those were just in its dorms.

Another stat highlights a major reason why college and university WLANs are so busy: The WLAN in Indiana’s dorms was supporting 541 different types of devices running 32 unique operating systems. Laptops, tablets, streaming media players and smart TVs are just a few examples of the Wi-Fi enabled devices that students now bring to school and expect to be able to connect to the WLAN.

Their expectation continues in classrooms, where faculty also want to use their personal devices. Often that’s because they’ve had a great, convenient experience at home and want that in the classroom, such as easily calling up a streaming video to share with everyone else.

Whatever their reason and device of choice, one aspect always applies: The school’s WLAN must be able to accommodate nearly any Wi-Fi device that students and faculty bring—including ones that weren’t conceived when the WLAN was spec’d and installed. That’s one example of why colleges and universities need to focus on Wi-Fi infrastructure that’s as future-proof as possible, which means from a vendor that is major player in a lot of other markets, from consumer electronics to enterprise IT.

High-quality Wi-Fi also helps colleges and universities save money. For example, Wi-Fi is an ideal way to connect smart building devices that maximize energy efficiency, such as motorized window shades and HVAC controls.

Read on to learn:
• Which applications, trends, devices and challenges to consider when choosing a wireless LAN.
• How Wi-Fi lays the foundation for highly secure, energy-efficient buildings.
• Which features make a WLAN capable of meeting the unique requirements of colleges and universities.
• Why Samsung is the ideal partner for schools that need a comprehensive selection of Wi-Fi infrastructure and digital devices such as projectors and digital signage.
College students don’t believe campus Wi-Fi is a nice-to-have, like a state-of-the-art rec center. They believe it’s a must-have: as fundamental to their education as classrooms and computers.

This preference has broad implications. For one, it highlights how Wi-Fi is now their network of choice. That means the WLAN has to be reliable and fast because the old help desk advice of “Plug into the Ethernet wall jack for now” no longer is viable. Most of them probably couldn’t find an Ethernet cable anyway.

Another implication is that the WLAN has to be able to accommodate everything they do: No recommending that bandwidth-intensive traffic go over a wired connection. HD video is a prime example: Eighty-four percent of colleges and universities now use videoconferencing for instruction.

Classrooms, auditoriums and libraries are obvious places to make sure Wi-Fi service is fast and seamless, but don’t overlook dorms. One reason is because residence halls compete with private apartment complexes. So if a school’s dorms develop a reputation for slow, unreliable Wi-Fi, they’ll struggle to attract and retain tenants, meaning a big revenue hit for those schools.

Skeptical that Wi-Fi really has that much influence over where they live? Consider that as far back as five years ago, 60 percent of students said they wouldn’t attend a college or university that didn’t have extensive Wi-Fi. Their dependence on Wi-Fi has grown even more since then. So if it’s enough to sway their decision about where to go to school, then it can be a make-or-break factor for where they live, especially at colleges and universities that don’t require freshmen to live on campus.

But dorms are notoriously challenging when it comes to providing fast, reliable Wi-Fi. For example, they’re often subject to higher levels of interference than learning spaces: On top of all the tablets, laptops and other Wi-Fi devices that students bring to classrooms, dorms also are home to myriad fixed devices that use Wi-Fi, such as smart TVs and streaming media players. Add in microwave ovens and other non-communications devices that use the same unlicensed spectrum as Wi-Fi, and it’s no wonder that schools often struggle to deliver the Wi-Fi experience that residents say they want.

To tackle those challenges, look for Wi-Fi infrastructure that can make decisions on its own, in real time, about how best to serve each connected device. For example, the best WLANs include sophisticated traffic scheduling technology to ensure that each device gets the right amount of access to network resources. This approach can more than double an access point’s (AP) throughput.

Scalability is another key capability to look for when comparing WLAN solutions because the amount of Wi-Fi devices that each student brings keeps growing exponentially. For example, the University of Tennessee at Chattanooga had 3,833 student-owned Wi-Fi devices in spring 2011. Four years later, it had 18,995. This trend will only increase as new device types emerge, such as wearables and virtual reality headsets.
Colleges and universities also will continue to add to their WLAN’s workload. A prime example is the Internet of Things (IoT), a sprawling category of devices and applications. Most higher ed IoT applications are internal rather than faculty- or student-facing services. One example is smart buildings, where IoT is used to control HVAC, lighting and other systems to reduce energy use—and achieve LEED certifications in the process. These solutions lose their effectiveness if the WLAN’s vulnerability to interference means those IoT devices connect too late to make a difference.

Some smart building systems are linked to audio-video (AV) systems, such as to automatically close the shades and throttle down the HVAC blower when the projector starts a presentation. Many AV systems use Wi-Fi to connect the classroom’s or auditorium’s touchpanels to the main controller. If that venue’s WLAN struggles to accommodate all of the students’ laptops and tablets, which also are competing for the same finite amount of spectrum, then the presenter could be frustrated by a touchpanel that takes several seconds or longer to respond to each change.

Yet another IoT example is security applications, such as using Wi-Fi to backhaul surveillance cameras, feed digital signage or connect electronic door locks. Copper and fiber are obvious alternatives, but they often aren’t practical for architectural or installation-cost reasons, such as when they involve trenching a marble floor or putting a cable chase on walnut paneling.

**Gaining Operational Efficiency with Connected Beacons**

- Energy savings through controlled use of lighting and HVAC
- Auto-shutdown of networked devices that are idle
- Tracking campus shuttles
- Tracking campus inventory
- Tracking facility and equipment usage
- Enabling smart doors, locks and security cameras
- Auto-lock access points in case of emergency
- Tracking student attendance

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Key Samsung Differences

Architectural challenges highlight another feature to look for when comparing WLAN products: self-organizing networks (SON). This technology automatically configures the APs, including in ways that maximize their ability to work around walls and physical features that block or absorb signals. SON also reduces installation time and thus cost, which is a major plus for schools struggling to compete with enterprises and other employers for scarce IT talent.

SON is one of eight ways Samsung Wi-Fi solutions enable colleges and universities to provide the fast, reliable and seamless WLANs that students, faculty and IoT applications require. In independent tests, Samsung’s 802.11ac solution provided 30 percent better coverage and 40 percent more data throughput than competing systems. Here are seven more ways Samsung delivers a superior experience and more:

1. **Available with access points deployments with controller only**
2. **Availability depends on smartphone model**

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**Decades of cellular experience.** Unlike most Wi-Fi vendors, Samsung also provides mobile network infrastructure and smartphones. In fact, mobile operators worldwide use Samsung solutions to launch complex, industry-first services such as Voice over LTE (VoLTE). This experience directly benefits Samsung WLAN customers by, for example, ensuring that Wi-Fi calls can seamlessly hand off from one AP to another as staff walk around a facility.

**Intelligent Beam Selectable Antenna (IBSA).** Like SON, IBSA neutralizes concrete walls, steel beams and other common architectural features that undermine coverage. IBSA uses 15 antennas in each AP to minimize dead zones, extend service coverage and achieve a receiving sensitivity 2 dB higher than competing APs.

**Voice Aware Traffic Scheduling (VaTS).** This patented technology efficiently sends voice frames to multiple devices using traffic scheduling techniques that Samsung perfected over decades of serving mobile operators. As a result, VaTS ensures that voice quality never degrades as the number of concurrent calls increases.

**AirMove.** In traditional Wi-Fi handoffs, the user’s device scans for APs and connects to the appropriate AP when the signal drops below a certain threshold. This approach requires a long scan time and degrades service quality. AirMove uses LTE cellular handover techniques, enabling the AP controller to determine the ideal time to hand off and the right AP to use. As a result, Samsung users enjoy seamless service during voice calls and video, and twice the throughput that competing WLAN solutions can provide during handoffs.

**AirEqualizer.** This traffic scheduling technology optimizes Wi-Fi service by allocating equal airtime to multiple devices, so all simultaneously connected users get the resources they need. AirEqualizer also can maximize the AP’s total cell throughput by more than 50 percent compared to competitors’ products by adapting to the Wi-Fi standard (a/b/g/n/ac) in use and by the signal intensity characteristics.

**Built-in security.** Samsung APs feature a dedicated security RF monitoring chip embedded independently of the RF service chip for continuous realtime monitoring. This approach reduces the amount of standalone security equipment, helping keep the total WLAN system cost within budget.

**Forward-thinking architecture.** Samsung Wi-Fi solutions such as the Series 400 APs are designed to accommodate emerging applications and requirements, including IoT. This flexibility extends the WLAN’s service life and enables schools to take advantage of new applications and devices to further increase learning, faculty and staff productivity, energy efficiency and safety.

Samsung’s relationships with mobile operators, as well as its work with cellular and Wi-Fi standards bodies, gives it unique insights into how wireless technologies, devices and applications will evolve over the next decade. This vision enables Samsung to design its Wi-Fi solutions to accommodate many of those changes. That flexible, forward-thinking architecture helps schools extend the life of their WLAN investment and quickly, cost-effectively capitalize on emerging trends.

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1. Available with access points deployments with controller only
2. Availability depends on smartphone model
Many vendors offer WLAN products. Only Samsung can provide best-in-class Wi-Fi infrastructure and an extensive portfolio of other devices—including tablets Chromebooks, smartphones, interactive whiteboards, digital signage, and security/surveillance equipment—designed to meet the unique needs of higher education. Some examples:

- **Document management solutions.** Samsung's printers, copiers and multifunction devices are designed for all of the ways that students, faculty and staff exchange documents, including PDFs and JPG. Simplified workflows and other features enable Samsung document solutions to typically have a total cost of ownership that's 10 to 30 percent lower than alternatives.

- **Digital signage.** Although most colleges and universities now have smartphone apps, text messaging and other mobile services to update faculty, staff and students, digital signage remains an equally effective way to reach them—especially when a tornado or other major event has overloaded or disabled cellular networks. Samsung’s portfolio of digital signage includes models with resolutions up to 4K, touch screens, embedded media players and built-in Wi-Fi.

- **Wired and mobile phone systems.** Samsung offers a broad, deep selection of desk phones, smartphones, switches and other telephony products. The Samsung OfficeServ 7400, for example, makes it easy for staff to move calls between desk phones and smartphones, so they're always reachable throughout the campus.

- **Video surveillance.** Samsung's surveillance portfolio includes pan-tilt-zoom (PTZ) and fixed cameras for indoor and outdoor use, as well as controllers and support infrastructure such as switched and PoE injectors. A high-quality WLAN provides the flexibility to relocate cameras, such as when a large event requires augmenting a venue's existing surveillance system.

Wi-Fi is now the primary network for students and faculty. That means WLANs must have not only maximum uptime, but quality uptime, meaning ample bandwidth for all concurrent users, even in high interference environments. That reliability and quality also are must-haves for internal applications, such as smart buildings and security. Samsung delivers that—and more. Only Samsung provides a total solution that includes best-in-class Wi-Fi infrastructure and an extensive portfolio of other devices including interactive whiteboards, digital signage and video surveillance equipment. No wonder so many colleges and universities turn to Samsung when they need to upgrade their WLAN.