

Introducing the
SMART CAMPUS



TABLE OF CONTENTS

| | |
|---|----|
| CHAPTER 1 Building the Smart Campus of the Future | 3 |
| CHAPTER 2 Introducing the Smart Campus | 4 |
| CHAPTER 3 The Internet of (Campus) Things | 6 |
| CHAPTER 4 Smart Campus Living | 7 |
| CHAPTER 5 Smart Campus Living Applications | 10 |
| CHAPTER 6 Smart Campus Security and Safety | 13 |
| CHAPTER 7 Smart Campus Learning | 16 |
| CHAPTER 8 Unleash Innovation with Open APIs | 19 |
| CHAPTER 9 Trust Ruckus on Your Smart Campus Journey | 20 |
| CHAPTER 10 Start Your Smart Campus Journey | 21 |



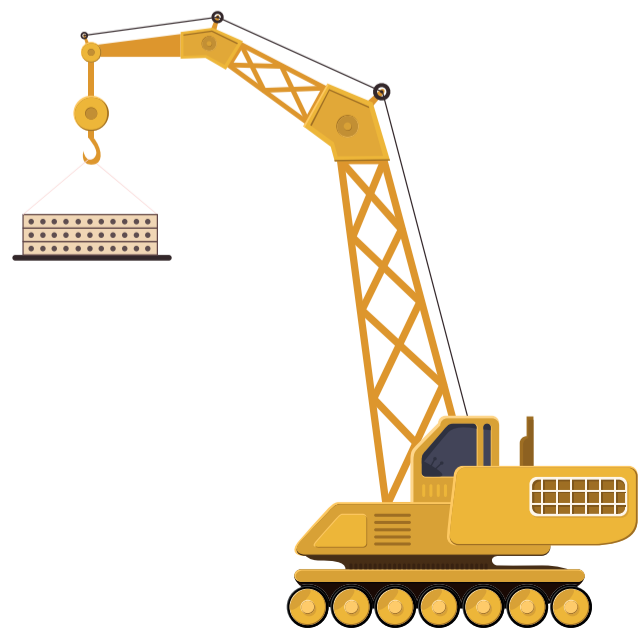
BUILDING THE SMART CAMPUS OF THE FUTURE

ATTRACTION AND RETENTION

How are you helping students to engage more deeply with campus life? What have you put in place to help your institution stand out—among faculty, researchers and organizations awarding grants—as a leader and innovator?

Leaders of every college and university ask themselves some variation of these questions. And a growing number are putting technology front and center in their answers. The most innovative institutions no longer view campus connectivity as merely a utility to be managed like electricity or water. They recognize their wired and wireless technology infrastructure as a platform for new applications and experiences that transform life on campus in powerful, positive ways.

It's called the Smart Campus. And it's coming to colleges and universities around the world.





SMART SECURITY & SAFETY

- Video surveillance
- Asset tracking
- Smart locks/physical access
- Access control

SMART CAMPUS ID

- Universal payment card
- Bus token
- Smart locks/access control

SMART SERVICES

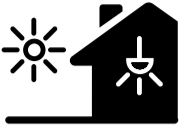
- Find parking
- Real-time bus, bike share transit info
- Interactive digital kiosks
- Wayfinding applications

INTRODUCING THE SMART CAMPUS

WHAT, EXACTLY, MAKES A CAMPUS “SMART”?

At the highest level, a Smart Campus links devices, applications, and people to deliver two key value propositions: enabling new experiences and improving operational efficiency.

A Smart Campus starts with ubiquitous, reliable wired and wireless connectivity, indoors and out. However, while that kind of connectivity may once have been a goal in itself for many colleges, it's just the beginning of a Smart Campus. When all of the people, devices and applications on campus share a common technology infrastructure, they can interact with each other to enable experiences and efficiencies that weren't possible before.



CONNECTED INDOOR/OUTDOOR LIGHTING

- Drive down power costs



SMART ENVIRONMENTAL CONTROLS

- Reduce carbon footprint



SMART WATER AND POWER MANAGEMENT

- Create a greener campus



FIVE BARS OF INDOOR CELLULAR SERVICE WITH OPEN G

- Save millions vs. DAS solutions

New experiences like these engage students more deeply in campus life. They position your institution as a state-of-the-art environment—the kind that students, faculty, and researchers want to be part of. But that's just one side of the equation. As you link more devices to your connectivity infrastructure—sensors, cameras, lighting, vehicles, ID cards—you can begin to manage campus services much more efficiently, in an automated way. You can collect analytics to identify previously unseen trends. And you can use that visibility to realize substantial operational savings. Those savings can then be redirected to hire more faculty, launch new research programs and expand campus facilities and services.

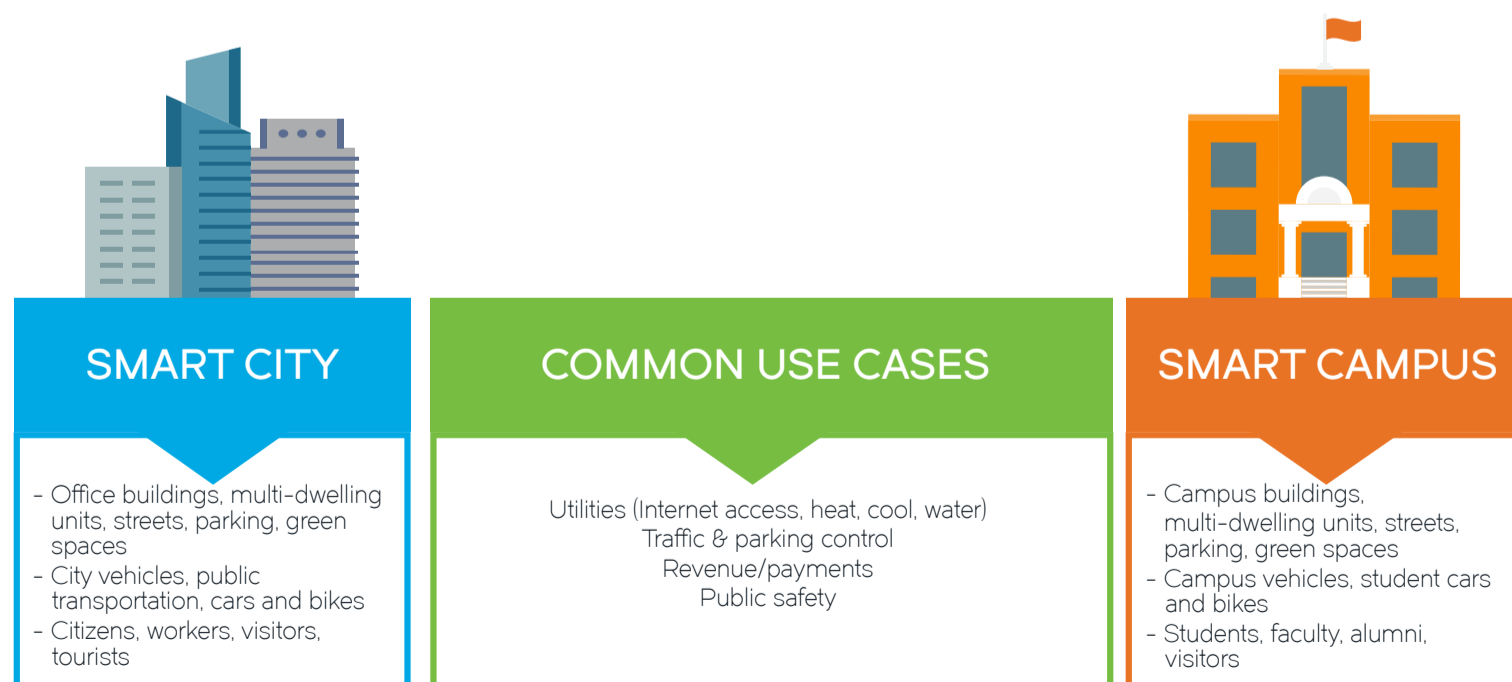
THE INTERNET OF (CAMPUS) THINGS

If you've been following the buzz around the Internet of Things (IoT), many of these concepts should sound familiar. They're all part of one of the highest-profile implementations of the IoT: the Smart City. And what is a university campus, after all, if not a city unto itself, albeit a specialized one?

In fact, cities and campuses share many of the same goals. They're both looking to attract people and investment in their communities. They're seeking to create services and applications that improve the lives of citizens/students and keep them safer. And, they're looking to stand out from the crowd by demonstrating innovation and leadership. "Smart" IoT technology can provide a versatile foundation to further all of these goals.

By integrating cutting-edge technology into the way people live, work and learn on campus—and simply by having a technology platform that facilitates innovation—you raise your profile for prospective students and research programs. And, because all of those sensors and devices share a common technology infrastructure, you can take advantage of new efficiencies fueled by big data and analytics, green technology and IoT automation as they continue to emerge.

Let's take a closer look at some of the areas where Smart Campus innovations can transform the campus experience for students, faculty, staff and visitors.





SMART CAMPUS LIVING

The first facet of a Smart Campus lifestyle—and the most important prerequisite—is providing students with a true home-away-from-home connectivity experience. What should that look like?

CONNECTIVITY EVERYWHERE AND ANYWHERE



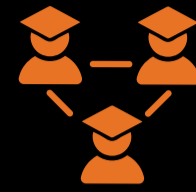
If the campus Wi-Fi isn't fast and reliable, nothing else matters. Institutions building Smart Campuses are using 802.11ac Wave 2 Wi-Fi technology to make it happen. State-of-the-art technologies in AP antenna design, channel selection, and band steering mitigate the challenges of crowded campus airspace and deliver strong, reliable connections to every user and device. In residence halls, wall-mounted AP and switch platforms combine great Wi-Fi with wired connections for all the devices that students now bring to campus. Outdoors, wireless meshing simplifies deployments and extends network connectivity to remote areas where it never reached before.

HASSLE-FREE ACCESS



Secure, simple network access starts with certificate-based Wi-Fi in the form of WPA2-Enterprise with EAP-TLS. Certificate-based access combines the gold standard in encryption with scalability to support massive numbers of devices, and flexible policy-based control. It allows for simple, self-service onboarding, with the ability to register devices once—even from home, before students ever show up on campus. Once registered, students won't be constantly prompted for logon credentials while roaming campus. The thousands of hours that IT spends dealing with password and onboarding issues disappear. And students get connectivity that just works, everywhere, every time.

PERSONAL STUDENT NETWORKS



In residence halls, students expect to live the way they do at home—using AirPlay to stream video from their iPad over Wi-Fi, playing video games with friends down the hall, connecting to a personal printer without scrolling through dozens of networks and devices. Making large-scale campus networks operate that way, however, is a huge challenge. Certificate-based onboarding platforms provide a policy framework to correlate multiple devices with one user. Multiple users can share the same SSID, while each student's devices—and only their devices—show up in their personal virtual LAN, securely separated from other users.

FIVE BARS OF CELLULAR COVERAGE INDOORS



Even when the Wi-Fi is excellent, students still struggle with spotty cellular network access. Newer LEED-certified construction is among the biggest culprits, preventing cell signals from penetrating residence hall walls—and keeping students from calling mom, texting with SMS or receiving emergency notifications. The only viable answer has been expensive cellular digital antenna systems (DAS). But now, universities can bypass the problem with [OpenG](#). By simply snapping a new LTE module into existing Wi-Fi APs, they can deliver five bars of cell coverage anywhere—and save millions in the process.

SMART CAMPUS LIVING APPLICATIONS

Once you have ubiquitous, hassle-free campus connectivity, life becomes a lot simpler for students and IT. Just as important, you now have a framework to deliver new services and experiences that engage students more deeply with campus life.



SMART ID CARDS/ SMART PAYMENTS



Open up closed-loop student ID payment systems to integrate with credit and debit cards, and mobile payments. Integrate Smart ID cards with student information systems to automate and digitize attendance, voting, bursary distributions and even access to residence halls and school facilities.

BUILDING AUTOMATION



Connect heating, air conditioning, ventilation and safety equipment. Reduce power consumption while making buildings more responsive to the people living, working and learning in them. Link building control sensors with analytics and location-based services to capture new insights about how people use the space—and make better investment and renovation decisions.

SMART LIGHTING



Monitor and collect information on parameters such as motion and lumens. Use this information in real time to turn on or off, dim or brighten, or even adjust color of indoor and outdoor lighting to reduce energy consumption and improve safety.

SMART TRANSIT AND PARKING

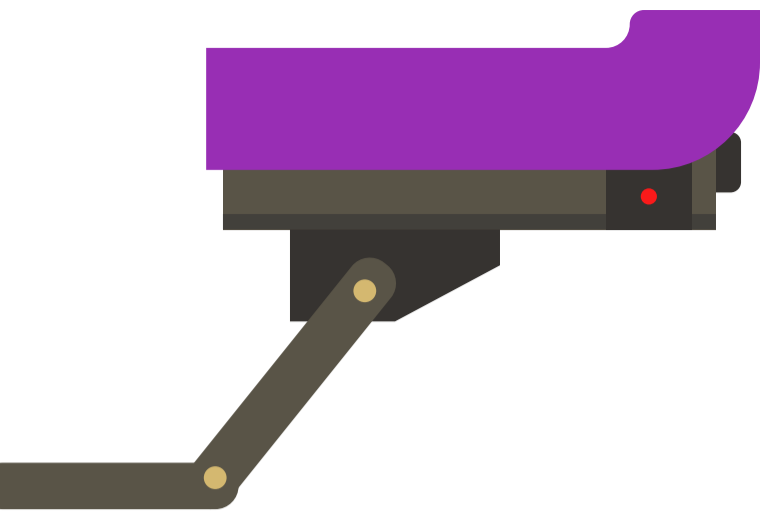


Connect campus buses, bike shares and vehicles to provide real-time location and arrival information to students' smartphones. Reduce traffic congestion by making it easy for people to find, reserve and wirelessly pay for parking.

LOCATION BASED SERVICES



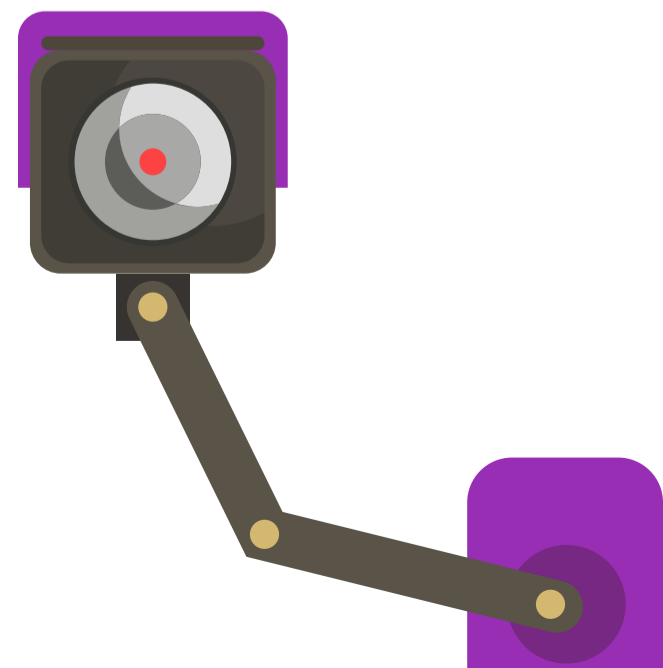
Use real-time location services to make it easy to navigate and take advantage of campus life. Offer smartphone apps that trace the path a student or visitor should follow to reach their destination. Deliver messages and promotions—"20 percent off today in the student union bookstore"—triggered by a user's proximity to a specific space.



SMART CAMPUS SECURITY AND SAFETY

To parents, their sons and daughters are their most precious asset. When they send them off to college, they want to know they will be safe. On a Smart Campus, you can build a compelling story around using technology to protect the safety and security of students everywhere on campus, 24/7.

Traditional campus security systems include access control systems, intrusion alarms, panic buttons, video surveillance and more. In most cases, however, these systems are technology silos, isolated from each other as well as other campus systems like building automation and lighting control. By integrating disparate security technologies within a unified system, you can create safety and security services that are much more than the sum of their parts. Lighting, surveillance cameras, alarms and smart ID cards can now all work together to make automated real-time decisions that keep everyone on campus safer.



VIDEO SURVEILLANCE



Traditional closed-circuit security cameras require physical connections to a switch—making deployments expensive and, in some outdoor areas, almost impossible. On a Smart Campus, anywhere you have a power source, you can deploy a smart IP video camera and use wireless meshing to connect it. Using smart lighting? Use the same poles and power for cameras. Extend video surveillance to places you could never reach before, including outdoor areas hundreds of meters from the core network.

SMART LOCKS AND ACCESS CONTROL



Connected locks make it easy to control who has access to hundreds of buildings on campus. Combine them with other Smart Campus systems—smart ID card readers, video surveillance, perimeter controls—and you can now closely monitor every individual coming and going at all times. Use behavior-based alarms to alert campus security if someone tries to enter a building during off hours or even if a door has been left open. In residence halls, verify that everyone entering the building at night is actually a resident.

ASSET TRACKING



Combine ubiquitous wireless coverage with location-based services to track anything moving across campus. Attach Bluetooth beacons to projectors, TV screens, lab equipment and vehicles, and pinpoint their precise location on campus. Use geofencing to receive alerts if an asset moves outside a given area. You can even apply asset tracking concepts to human beings. Use smart campus ID cards to track the location of students in a building during an emergency evacuation. Or, use connected medical alert wristbands that alert emergency responders to the precise location of a student having a seizure.



SMART CAMPUS LEARNING

Colleges and universities may take great pride in their longstanding traditions, but the last decade has brought sweeping changes to campus learning. A Smart Campus embraces these changes—building on one-to-one and now many-to-one computing devices per student to implement new teaching and learning models. With students, devices and applications all connecting over the same ubiquitous technology infrastructure, a Smart Campus can redefine lecture halls, collaborative workspaces and even learning itself.

FLEXIBLE LEARNING SPACES



On a Smart Campus, mobile technologies and applications free educators to rethink how they deliver learning. Why invest in an expensive dedicated computer lab when you can create a “virtual” lab in the cloud, accessible from a web browser anywhere? Why stick to traditional lecture hall configurations—a speaker up front talking to a sea of fixed seats—when you can reconfigure any room on the fly, without losing connectivity to digital tools and curricula? Why stay inside at all when you can move the lecture outdoors?

COLLABORTIVE LEARNING



Use videoconferencing and digital collaboration tools to create ad hoc work sessions, and bring in experts from across campus or around the world.

DISTANCE LEARNING



On a Smart Campus, students, faculty and administrators no longer need to worry about space constraints, location or weather. Use video and collaboration tools to open up classes and lectures to students anywhere, without having to squeeze them into a single lecture hall. When students are ill, when bad weather makes it difficult to get to campus, class can still go on. Students can log into live lectures from their PCs, participate in discussions, download course materials and submit assignments without missing a beat.

LECTURE CAPTURE



In the same way that Smart Campus technologies free students and faculty from the constraints of physical space, they also afford more flexibility and freedom in time. By recording and archiving all lectures, when an ill student misses class—or just wants to review before a test—every second of every lecture can be streamed with a click of a mouse.

UNLEASH INNOVATION WITH OPEN APIs

Many of the technologies involved in Smart Campus applications are not necessarily new—they're just used in new ways. But one thing that is relatively new—and that's essential for a versatile Smart Campus platform—is open APIs.

Open APIs are the “glue” that connects different devices and systems, even when using different access methods, to communicate and interact with each other in real time. But open APIs also allow you to harness the creativity of faculty, staff and even students to develop innovative new applications that improve campus life. The next wave of Smart Campus applications doesn't have to come from your IT department. On a Smart Campus, students and faculty have the framework and the freedom to identify problems they want to solve and create their own groundbreaking new connected campus experiences.









TRUST RUCKUS ON YOUR SMART CAMPUS JOURNEY

Ruckus has been a leader in connecting higher education institutions for many years. Around the globe, college and university IT departments trust Ruckus to help them deliver lightning-fast, reliable wireless and wired connectivity everywhere on campus. Now, we're helping higher education leaders build new smart solutions and experiences to create the campus of the future.

We combine industry-leading Wi-Fi innovations with state-of-the-art wired infrastructure and cloud management solutions, advanced network intelligence with machine learning, and location-based analytics that use the campus network to bring information and decision-making closer to users and devices.

All of these Ruckus solutions use open APIs, allowing you to easily integrate with devices, applications and management solutions from multiple vendors—or even new solutions created on your own campus. And they're backed by a broad ecosystem of industry-leading IoT partners that deliver ready-to-deploy solutions for advanced analytics, smart lighting, video surveillance, building automation and many other Smart Campus use cases.

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|  Cloudpath <ul style="list-style-type: none">— Hassle-free, self service on-boarding & pre-boarding— Personal networks— Manage policy for all devices |  SmartZone <ul style="list-style-type: none">— Easily set up, manage, and troubleshoot the network— Campus-level view of the entire infrastructure |  SCI <ul style="list-style-type: none">— Glean actionable insights from thousands of devices— Machine learning network intelligence |
|  Access Points <ul style="list-style-type: none">— Wall-mount AP/switch for residence halls & IPTV— Industry's best outdoor APs— The best connection to every device |  ICX Switches <ul style="list-style-type: none">— Industry's best performance/value— Easy-to-manage campus fabric |  SPoT <ul style="list-style-type: none">— Track assets— Target services & information |

START YOUR SMART CAMPUS JOURNEY

What will your campus look like five years from now? Will students and faculty be clamoring to get in? Will researchers be involved in exciting grant programs to explore new green initiatives, machine intelligence and big data analytics?

By embracing the vision of a Smart Campus—by creating a single technology infrastructure to connect devices, applications and people—forward-looking colleges and universities are building a foundation for the future. They're putting in place a platform to deliver campus services more efficiently and intelligently. They're collecting information from more places, in more ways, to uncover new insights and improve decision-making. And they're creating a more dynamic and engaging campus that affords better experiences to everyone using it.

Ready to start your Smart Campus journey? Contact your local Ruckus account representative, or visit ruckuswireless.com/contact

See our Smart Campus solution briefs:

ruck.it/smartcampus-living

ruck.it/smartcampus-learning

ruck.it/smartcampus-security

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