



Full to Capacity: Implementing WLAN at Seijo University

Japanese universities are at the forefront of developing and maintaining their society's technological edge. Part of this process is to ensure that graduating students have a thorough understanding of the IT tools they will need as they enter the 21st Century workforce. To achieve this goal, both students and faculty need to seamlessly access networks anywhere on campus; wireless LAN (WLAN) is a key technology for cost-effectively achieving this.



As Seijo University in Tokyo, Japan, discovered however, deploying WLAN in the demanding environment of a campus can be a difficult proposition. User density is a critical issue: many students on the same network in the same place will mean poor or non-existent service for some, while increasing infrastructure density will lead to equally great problems due to co-channel interference. To solve this dilemma, Seijo looked to an Extricom WLAN system.

The New Wireless Paradigm

Technological literacy is a fundamental aspect of modern university life. Using computers to conduct research, collaborate with fellow students, or participate in online classes would have been unthinkable a decade ago, but it is now an integral part of the learning experience.

With this new educational paradigm comes a new problem: how do you ensure that all students can always access the network and the resources they need? Deploying a wired LAN to provide complete access everywhere on campus is cost-prohibitive, so the wireless LAN (WLAN) is the quickly becoming the communications medium of choice for universities.

But WLAN can create its own set of challenges. Use patterns vary tremendously across offices, classrooms and dorms, and the schedule of classes can create high-capacity "flashpoints" that are hard to predict. At the same time, universities want to create a cutting-edge technological environment, which means users will expect to access bandwidth-hungry applications with conflicting data requirements. All of this adds up to very crowded airspace.

Bringing the Enterprise to the Campus

Seijo University's objective was clear: enable wireless connectivity everywhere in their "Third Building". This new facility was intended to help realize a strategic goal of

equipping all university graduates with a solid background in technology.

The challenge: how to ensure that any user out of the 5,500 students and 200 teachers would always achieve the required network performance in this facility. Seijo's new multi-story building was densely constructed and would house large numbers of simultaneous users in multiple classrooms. In the past, Seijo had taken a traditional approach of using standalone access points (APs) in "hotspots", but the sheer number of wireless clients, from PCs to PDAs to iPods, in this new high-capacity environment made this approach unfeasible.

Kazuhiro Igarashi, Seijo's Head of IT Infrastructure, summarized the university's challenge, "We wanted to enable a 'free office'-type environment where students could move from classroom to classroom with their laptops, just like in a commercial organization. But unless multiple users could connect anywhere with high throughput, our goal was not achievable."

The Cell-Planning Problem

Compounding the user performance challenges, Seijo faced deployment constraints and a difficult building design. The Seijo IT team needed to have the system implemented before the end of the summer vacation, but could only work from blueprints while the building was under construction. The Third Building's structural layout was also problematic: constructed in a square shape with a large open space in

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Kazuhiro Igarashi
Head of IT infrastructure
Seijo University

Project Scope

Deploy WLAN to provide complete coverage for both students and teachers in new 9-story, 22,500 square-meter teaching facility

Solution

- Extricom EXSW-2400 24-port switch every three floors with full complement of EXRP-40 access points
- TrueReuse activated to meet throughput requirements of up to 5,500 students and eliminate congestion at wireless “flashpoints”

Results

- Project completed on schedule in spite of limited physical access to building and challenging structural layout
- TrueReuse achieves up to 3X throughput under real-world conditions
- “Free Office” style approach to mobile learning enabled

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the middle, radio signals could potentially be heard on the other side of the building and between floors.

Under the circumstances, deploying a WLAN based on a traditional cell-based layout was a non-starter. Without building access, the IT team could not perform the labor-intensive RF cell-planning needed to determine AP locations. Furthermore, the physical design would make it virtually impossible to prevent co-channel interference between APs.

A More Competitive Solution

Faced with the limitations of the major wireless vendors, Seijo looked for an innovative alternative. Research drew them to the Extricom WLAN, based on its combination of deployment simplicity and operational versatility.

The Extricom Channel Blanket™ architecture, in which all APs broadcast on the same channel, would allow Seijo to design their WLAN without any RF cell-planning. The Channel Blanket also eliminates co-channel interference between APs, so structural layout became a non-issue.

Once implemented, the Extricom WLAN offers straightforward configuration of its UltraThin™ APs via an intuitive Web GUI, and maintenance is easily accomplished at the switch rather than the individual AP. As Igarashi explained it, “From an ROI perspective, Extricom offers an extremely reasonable price at project initiation and minimal support costs down the road. It was simply more competitive than the other WLAN products on the market.”

Going Beyond the Limits

The ultimate selling point for Extricom, however, was the ability to increase capacity without compromising coverage. In an Extricom system, users associate with the WLAN switch, not an individual AP, and the switch decides on a packet-by-packet basis which AP can best serve which user. This innovative approach allows APs to be deployed in any density to support the maximum number of users, without the channelization issues faced by other vendors.

That’s just the beginning though: an Extricom system can expand user capacity well beyond the normal limits of conventional WLAN through TrueReuse™. A technology unique to Extricom, TrueReuse dynamically optimizes the reuse of a standard 802.11 channel, allowing multiple, closely spaced APs to transmit on the same channel at the same time without interference.

Performance gains from TrueReuse are impressive; the Seijo IT team was able to improve per-channel throughput by up to three times. Add to this the ability of an Extricom WLAN to support multiple channel blankets on the same physical WLAN infrastructure, and the result is a system highly suited for user-dense “flashpoints” such as lecture halls crowded with students.

Expanding Achievement

An in-house IT team at Seijo rapidly deployed the Extricom WLAN and immediately rolled it into production just in time to support incoming students as the new term began. The system also offers considerable advantages from a “green computing” perspective due to the minimal power requirements of the UltraThin APs, and Seijo leveraged Extricom PoE Range Extenders to ensure APs could be placed in any part of the building.

Seijo has met all its goals for this phase of the deployment and is now moving to expand the system to all campus buildings and complete the conversion over to the “all wireless campus.” As they do so, the IT team will take confidence from the fact that the Extricom WLAN has easily passed every test it’s been given so far.

Igarashi summarized the project’s success in basic terms, “Extricom products are fundamentally easy to use, which leads to important cost-savings over the entire product life cycle. And ultimately, the WLAN’s flexibility translates into flexibility throughout our whole IT environment: whatever we need to support, we can adjust the system to accommodate it.”