Extricom

Case Study

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> Director of IT and
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Wireless On the Move

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Deventer Hospital: Paperless Means Wireless

Deventer Hospital is a large healthcare facility in the east of The Netherlands, serving the inhabitants of the town of Deventer and the surrounding region. It is a recently formed institution, having been created in 1985 by the merger of two hospitals, St. Geertruiden Hospital and the St. Jozef Hospital. The facility serves as a central coordinating entity for a local network of physicians and has a vital role in patient care throughout the region, so IT infrastructure plays an important part with respect to the hospital's core mission.

Deventer is in the forefront of technological trends that are shaping the future of European medicine. Its progressive vision has resulted in the hospital being acknowledged as one of the country's top clinical teaching hospitals as well as a first place ranking among large general hospitals in the Netherlands.

Perhaps the strongest evidence of its bold aspirations is Deventer's aim to transform itself into a paperless environment by the end of 2007; and since hospital personnel and services are, by their very nature, highly mobile, the move to an all-electronic operation means one thing: the creation of the paperless hospital is critically dependent on wireless.

Wireless LAN Technology Revolutionizes Healthcare

The evolution of wireless technology has created the prospect of major new efficiencies and improved productivity for many industries. Perhaps nowhere is this more true than in the field of healthcare, where WLANs promise to revolutionize the doctor-patient relationship through benefits such as real-time caregiver access to patient data, the ability to stream MRI images to a physician's laptop, and wireless-enabled alerting mechanisms, to name a few. Ultimately, WLANs provide the opportunity for doctors to spend more time treating patients and less time on administrative tasks. In the end, quality of care and efficiency of hospital operations both increase.

While the benefits of WLAN in healthcare are self-evident, the hospital setting is arguably the most challenging environment for deploying Wi-Fi. Clinical staff are highly mobile, require time-sensitive access to information, and work in buildings whose sprawling layout and concrete construction create physical hurdles to conventional WLAN implementations, creating basic coverage issues in a place where maximum coverage is essential.

Deventer Hospital Defines Its Requirements

The IT team at Deventer Hospital was well aware of both the promise and challenge of Wi-Fi when they considered implementing a WLAN. The process naturally started with defining the strict requirements for the wireless infrastructure: mobility; security; support for real-time, connected data applications; ease of deployment and maintenance; inherent scalability and readiness for future applications such as voice over Wi-Fi and Wi-Fi RFID. "We regard the wireless system as a fundamental enabler of hospital operations today and far into the future, so the solution we selected must be ready for any eventuality," observed Ko Takema, Director of IT and Technical Services at Deventer, "This means that the key elements of the wireless network – coverage, mobility, security, multi-application/multi-tenant support, and capacity – must all be maximized. In the long run, it would not serve us well to procure a network that could only be optimized for one or the other of these."

A Conventional Solution Fails to Do the Job

Deventer had accomplished an important preliminary step in its WLAN deployment: clearly articulating the business requirements. Unfortunately, the next steps did not prove so successful. Deventer's technology supplier initially recommended and deployed a switched WLAN system based on conventional cell-planning topology, in which each Wi-Fi access point (AP) is configured to a separate channel.

Deventer soon experienced the classic constraints

Project Scope

Deploy WLAN to ensure secure connectivity to mobile clinical workstations, throughout a 5,000 square meter, five-story building. System must also be ready to support a multi-application environment, including voice and Wi-Fi RFID locationing service, with guaranteed quality of service.

Solution

- Extricom WLAN System, consisting of EXSW-800/EXSW-2400 WLAN switches and over 110 UltraThin Dual Radio a/b/g Access Points.
- Ready for support for voice and data applications, with guaranteed quality of service, through multi-channel blankets in 2.4GHz band.

Results

- Secure and reliable connectivity in a mobile environment, hospital-wide.
- Rapid deployment without RF cell planning, yielding continuous coverage without co-channel interference between APs.

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of such an architecture, A fundamental issue with cell topology is the inefficiency and unpredictability of the "handoff" that a wireless client experiences every time it moves from one AP to another. When the initial system was deployed, the highly mobile Deventer staff found that handoff times were too long, causing users' VPN security sessions to drop, and forcing them to re-authenticate every time they changed location. This violated Deventer's primary requirement for mobility throughout the facility. An additional headache was RF interference. In spite of spending weeks of effort in repeatedly fine-tuning AP positioning, transmission power, and a myriad of other variables, Deventer was inevitably forced into making trade-offs between coverage, capacity, mobility, and the effects of co-channel interference between APs.

The bottom line was clear: users experienced frequent disconnections, inconvenience, and frustrations – and the paper-based "back-up" system for managing patient information and medication would reappear!

The Channel Blanket

Clearly another approach was needed. Deventer found it in the Extricom channel blanket topology, an innovative alternative to cell-planning that eliminates the performance hurdles and complexities that plague conventional enterprise Wi-Fi solutions. The Extricom WLAN System consists of a constellation of APs that are connected to and fully controlled by a wireless switch. This solution allows each available Wi-Fi channel to be used everywhere, on every AP, to create blankets of coverage for each channel. Within the channel blanket the wireless client experiences seamless mobility with no AP-to-AP handoff, no co-channel interference, robust connections, and a steady and predictable grade of service. "One of the most notable Extricom traits is the way in which true mobility simply exists in the system, without requiring any special measures, either in the clients or the infrastructure," commented Henk Timmerman, IT Manager at Deventer. "With the handoff eliminated entirely, the client's VPN sessions never disconnected as the mobile workstations rolled throughout the hospital wards."

In the end, Extricom's patented Interference-Free™ WLAN deployed dramatically faster and more easily than the previous experience, while delivering on Deventer's criteria.

Next Steps: Voice, Location, and Beyond

The deployment has shown the Extricom platform to be ready for Deventer's future. Toward the end of 2007, the hospital will expand into a new facility that is over three times the size of the current one. This will trigger the introduction of voice over WLAN, Wi-Fi RFID for asset location tracking, and the need to support 200 to 300 concurrent users on the system.

"We see voice over WLAN as a service that will be available to all functions in our operation," predicts Timmerman. "And asset tracking, given the larger facility, will be also play an important role. The key for us is to deploy a platform that provides the mobility, scale, simplicity, and security that we have seen in the Extricom implementation."

Both voice and RFID location services hold exciting prospects for Deventer. But, together with mobile data and guest services, the resulting multi-application environment creates a new requirement: to ensure that grade of service is maximal for all applications, and in particular to avoid the performance loss caused by contention between data and voice traffic.

In this respect, the Extricom system provides another market-unique value: the ability to allocate Wi-Fi bandwidth to different client groups, thereby ensuring predictable and guaranteed quality of service. The system does this via multiple, full-bandwidth channel blankets, set to any combination of 802.11a/b/g channels, from the same bank of APs. This, for example, enables one group of clients, such as phones, to be set to work on one channel, while another group, such as clinical workstations, is set to work on another channel – conflict between voice and data is not just mitigated, it is eliminated.

The value of this is magnified in the case of Deventer, since 5 GHz channels (i.e. 802.11a) are not permitted in Dutch hospitals, leaving only three channels in the 2.4 GHz frequency band available for use. While all other solutions would force all traffic, of all types, to compete for the same three channels, the Extricom system enables Deventer to dictate which clients will use one channel instead of another. This gives the IT team the unprecedented ability to eliminate traffic contention and pre-determine grade of service for each group.

The Future of Medical Care

Deventer is steadily moving toward the 21st century future of healthcare: the "intelligent" and paperless hospital, in which the WLAN is used to extend the physician's reach and revolutionize hospital operations. The Extricom system fulfills the promise of WLAN like never before, yielding the productivity, cost-savings, and operational flexibility that will enable Deventer to reach its ambitious goals.