



Challenge

- Implement a secure wireless LAN system that reliably meets the needs of a 300+ bed full service teaching hospital
- Overcome the performance, mobility, deployment and quality-of-service issues experienced in the hospital's 2nd generation WLAN system

Solution

- Meru's Air Traffic Control Technology coordinates all traffic on the network and eliminates co-channel interference by placing all APs on a single channel to deliver predictable performance – even in dense voice and data networks
- Over-the-air Quality of Service (QoS) for both downstream and upstream traffic ensures high quality voice and data service to all Wi-Fi clients on the same infrastructure
- Virtual Cell Technology eliminates handoff delays and creates seamless access for roaming voice and data clients
- Multi-layered security eliminates the need for a 3rd party gateway

Benefits

- Better patient care and significant time savings as a result of improved communications for doctors, nurses, and healthcare staff
- Supplement existing APs to preserve investment while migrating to Meru System
- Derive significant ROI by eliminating costs associated with site surveys or RF planning

St. Agnes Hospital Puts the Patient First by Combining the Most Advanced Medicine with the Most Advanced Wireless LAN

St. Agnes Hospital was built by the Daughters of Charity and began serving the health needs of the poor in 1823. With a staff of 3000, this 308-bed community hospital is now the fifth-largest in Baltimore, and 10th-largest in Maryland. A full-service teaching hospital, they are a leader in implementing advanced technology and medicine to deliver the best possible patient care. Today, the hospital is a clinical leader in Bariatric Surgery, Cancer, Orthopedics, Pediatrics, and Women's Health.



In 2004, St. Agnes was recognized as one of the "Most Wireless Hospitals" by U.S. News and World Report. In 2005, the Cleverly & Associates Community Value Index named them a Top 100 Hospital.

The St. Agnes mission is to provide the finest care for all patients who enter their doors. One way they accomplish this is by enabling their staff of top-notch doctors, nurses and health care professionals with the best technology – be it medicine, communications, or computing.

A Vanguard in Wireless Deployment

St. Agnes has a long history of leadership in wireless network deployment to improve patient care. Even before the availability of Wi-Fi and the ratification of the IEEE 802.11 standard, they were one of the first hospitals to implement a wireless LAN. The vision for the St. Agnes IT and networking infrastructure has been driven by William Greskovich, VP and CIO. "It began almost 9 years ago when we decided to move to a Microsoft Windows based client server architecture. What was really driving that decision was the value of the internet and a ubiquitous approach to computing."

The hospital deployed their first generation WLAN in 1999 – a proprietary 2.4GHz Frequency Hopping system from BreezeCom. This wireless network served them well, and as standards developed several years later they transitioned to a Cisco Systems 802.11 Aironet solution.

The hospital IT team doesn't shy away from using new technology with the potential to improve patient care. Through pilot installations, they can prove the technology works in their environment with minimal disruption, and determine the value that the solution brings to the hospital. "Our goal has always been to enable clinicians and physicians to have access to data anytime, anywhere. The closer we can put them to the patient data the happier they'll be in terms of efficiency and better informed about patient care." stresses Greskovich.

Bringing About a Wireless Network to Support Staff Productivity

Today, St. Agnes has wireless coverage for three interconnected buildings, supporting close to 800 wireless clients. To improve nursing productivity and patient care St. Agnes uses 500 Vocera Communications Badges. Consistent with their mission of providing the best possible patient care, the Vocera badges enable direct patient-nurse communications. For example, when a patient pushes the nurse-call button, instead of being connected to a central operator the patient speaks directly to his or her assigned nurse. This means the patient gets an immediate response and the nurse saves time by determining the patient's needs without having to walk back to the room. While nurses use Vocera badges, Emergency Room doctors and roving pharmacists use SpectraLink phones for immediate communication and response.

In addition to the wide use of voice, data applications include medical administration, nursing documentation, a point-of-care system, pharmacy, and Meditech for clinical information. Wirelessly enabled laptops on mobile carts have access to the above systems.

Wireless connectivity is also available to all visitors and patients via the St. Agnes "We Care Network". Via a secure VLAN, free Internet access is available to all visitors, anywhere in the hospital.

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The WLAN Suffers Growing Pains

While their existing wireless LAN initially served St. Agnes well, the hospital started to experience significant performance problems as network density increased. As they moved more data devices onto their production wireless network, the response time was getting unacceptably slower, and as a result their VoIP devices were often not getting the best possible signal. This was quite frustrating for the doctors, nurses and other staff who depended on the network. Users of 802.11g data devices also suffered performance headaches often seen in mixed .11b/g networks, where data transmission is rated to accommodate the slower .11b clients.

In addition, they experienced challenges that are typical in older hospital buildings which have topologies and are built of materials not conducive to wireless LAN propagation. Complex and time consuming site surveys for the hospital had been a critical element of deploying and growing their wireless network. They had difficulties coordinating access point locations with the building structure limitations, and were not able to achieve the total coverage required to serve the hospital's voice and data communication needs.

A third challenge for the hospital had been implementing the wireless network security required to meet HIPAA compliance. With their previous Cisco wireless system they were using a 3rd party vendor solution to achieve the required security levels. While this system worked well, they preferred a single vendor solution.

Meru Shines in Meeting the Challenges of St. Agnes' Applications

Larry Lawson, Director of Technical Services was looking for a solution to overcome the problems the hospital was experiencing with their existing wireless LAN. His three primary technical objectives were to overcome their client density performance problem, address AP location challenges, and to improve security – preferably with a single vendor. "We try to keep our eyes and ears open to the latest and greatest technology. We learned about the Meru system in a trade publication and thought it would be worthwhile to learn more about their product and technology," said Larry.

The hospital conducted a pilot with a Meru Networks Wireless LAN System comprised of a Controller and 10 Access Points. Installed in the hospital's Intensive Care Unit, the pilot ran flawlessly, supporting Vocera Badges, SpectraLink phones, and .11g data clients. This convinced Larry and his team that the Meru System would work continuously in their environment day after day. The hospital is now rolling out 140 Meru Access Points in three buildings on the campus. This approach integrates the Meru system with their Cisco APs, preserving their investment in the existing WLAN system.

The Meru WLAN System overcame all the key issues St. Agnes was experiencing with their existing wireless system.

- Pervasive Wireless with Dependable Performance:** The density issues were resolved with Meru's Air Traffic Control Technology which provides contention management that enables predictable performance even in crowded voice and data environments. The mixed .11b/g problem is uniquely solved by Meru's dual speed mode which is based on fair time on the channel, not fair access for 802.11b and 802.11g clients. In this mode, 802.11g clients perform up to five times faster than in standard wireless LAN systems.
- Toll Quality Voice:** Air Traffic Control Technology delivers Quality of Service for the 500+ Vocera badges and Spectralink phones. ATC deterministically schedules voice traffic to avoid contention. The Meru WLAN System automatically recognizes voice flows for Vocera, SpectraLink, SIP, and H.323 protocols and reserves bandwidth to ensure toll quality voice. In addition, Meru AP coordination by the Controller allows for zero-loss handoff enabling toll-quality voice for hospital staff, even while on-the-move.
- Full Hospital Coverage without an Extensive Site Survey:** Meru's E(z)RF simplified AP installation and configuration by eliminating the need for channel planning or extensive site surveys. E(z)RF completely avoids co-channel interference caused by overlapping channels enabling "RF Everywhere", the hospital's initiative to provide wireless services anywhere in the hospital.
- Centralized Management:** Deployment and management of the Meru WLAN system is greatly simplified via centralized intelligence which enables AP management, auto-discovery and configuration. This means that the hospital IT staff doesn't have to visit every AP anytime an upgrade or change needs to be implemented.
- Multi-Layered Security:** The hospital configured the Meru APs to support WPA, negating the need for a 3rd party gateway to provide authentication and encryption. In addition, the Meru system supports VPNs. WPA and VPN combined provide the requisite user authentication to satisfy WLAN HIPAA requirements.

An Efficient Healthcare Staff Means Better Patient Care

For St. Agnes Hospital, deploying a technology-leading Meru WLAN System is all about fulfilling their vision of providing the best possible patient care. Via the wireless LAN, electronic medical records can be securely accessed in real time, from anywhere in the hospital. Nurses can now be reliably reached on their Vocera Communications Badge reducing the number of trips necessary to check in at the nurses' station or collect supplies. Doctors can safely update patient notes, write prescriptions, and even electronically sign documents, from their office or from a patient's bedside. This hassle-free productivity makes for a more satisfied, efficient hospital staff. This means better care for patients and a worthy mission well met.



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