CASE STUDY: EL CENTRO REGIONAL MEDICAL CENTER

Acute-Care Facility Brings Cutting-Edge Healthcare Excellence to the Imperial Valley with Aerohive Cooperative Control Wireless LAN

EL CENTRO REGIONAL MEDICAL CENTER (ECRMC) is a 165-bed rural acute-care facility located in the Southeastern California desert. Along with Pioneer Memorial Healthcare District, the facility serves the 150,000 people who reside in California's Imperial Valley. ECRMC consists of a central hospital and four remote clinics, each requiring wireless network access.

Like many U.S. community hospitals, ECRMC has limited financial resources and IT staff. These constraints are challenging, because community hospitals generally have most of the same IT needs as larger, well-staffed facilities.

Nevertheless, ECRMC is dedicated to providing healthcare excellence to the Imperial Valley using cutting-edge information technology. For example, the hospital is moving toward a complete Electronic Health Record (EHR). ECRMC recognized that a next-generation wireless LAN would be a key component of its IT infrastructure and critical for realizing the full value of its other technology initiatives.

Wireless LAN Requirements

ECRMC desired a wireless LAN that would meet its current needs and would also flexibly accommodate future requirements, particularly the migration to higher-bandwidth 802.11n equipment. ECRMC anticipates that 802.11n's increased bandwidth will benefit busy physicians by speeding application performance and by increasing the coverage and reach of the network.

"WE FOUND AEROHIVE'S UNIQUE COOPERATIVE CONTROL WIRELESS LAN EQUIPMENT COMPELLING ENOUGH TO SELECT THEM OVER VENDORS WITH LONGER HISTORIES IN THE HEALTHCARE ARENA. OUR DEPLOYMENT SUCCESS HAS PROVEN THE WISDOM OF OUR DECISION. AEROHIVE'S PIONEERING TECHNOLOGY AND OUTSTANDING CUSTOMER SUPPORT HAVE OUR HIGHEST RECOMMENDATION."

John Gaede
Director, information Systems
El Centro Regional Medical Center

ECRMC's nurses and physicians were seeking to access the network from patients' bedsides, and the hospital also wanted to deploy voice over wireless LAN (VoWLAN). Both of these applications require secure fast roaming, the ability to remain connected to the wireless LAN when moving between wireless LAN access points. Roam times must be kept under 50 milliseconds, even across subnet boundaries. Additionally, because the hospital's wireless LAN supports mission-critical applications, network reliability and resiliency were key considerations.

The hospital is required to secure its network to protect its patients' confidentiality in order to comply with HIPAA regulations, which address the security and privacy of health data. As a result, any wireless LAN solution would require strong security features.

Given ECRMC's limited resources, it also hoped to find a wireless LAN solution that offered easy deployment, monitoring, and maintenance. Hiring another employee to manage the wireless LAN was simply not an option.

Because parts of ECRMC's facility consist of older buildings with large concrete walls and without false ceilings, wiring new access points could be difficult and expensive. As a result, the ability to augment wired access points with mesh access points was a highly desirable feature. Finally, ECRMC's electronic and medical imaging equipment, cement-wall construction, and other environmental factors

created a challenging RF environment that would need to be gracefully handled by any new wireless LAN.

Evaluating the Alternatives

Previously, ECRMC had deployed a wireless LAN comprised of Proxim Orinoco access points. These autonomous, or "fat", access points were unsuitable for ECRMC, because they did not support secure fast roaming. They were also cumbersome to manage, as each access point required manual monitoring and maintenance through a command-line interface. The coverage density of these first-generation access points was also a concern. Finally, the access points did not support mesh capability, reducing the network's resiliency and connectivity in ECRMC's hard-to-wire environments.

ECRMC evaluated several wireless LAN solutions that use centralized network controllers to provide the roaming, management ease, and security missing from its existing access points. The cost of the network controllers, especially with the extra capacity needed to support 802.11n bandwidth and to provide resiliency, made the controller-based solutions unattractive. One of the most expensive controller-based networks was quickly eliminated as a choice on that basis.

Other wireless LAN equipment providers with previous customer wins in the healthcare industry were also considered. Single-channel products from two of these vendors simply did not work without interference in ECRMC's challenging RF environment, failing ECRMC's "bake-off" tests for network usability and resiliency. Medical imaging equipment, cordless telephones, and even wireless networks in nearby houses appeared to interfere with these products. A multi-channel offering from another vendor performed somewhat better, but ECRMC found that network to be more difficult to manage than Aerohive's network.

KEY FACTS:

- ECRMC IS A 165-BED ACUTE-CARE FACILITY LOCATED IN THE SOUTHEASTERN CALIFORNIA DESERT.
- ECRMC FOUND THAT ITS EXISTING AUTONOMOUS-AP WIRELESS LAN COULD NOT MEET ITS REQUIREMENTS FOR BEDSIDE CONNECTIVITY, WHOLE-FACILITY COVERAGE, AND NETWORK SECURITY, RESILIENCY, AND RELIABILITY.
- ECRMC DESIRED AN EASY UPGRADE PATH TO 802.11N TECHNOLOGY.
- AFTER AN IN-DEPTH STUDY, AEROHIVE'S UNIQUE COOPERATIVE CONTROL WIRELESS LAN EQUIPMENT WAS SELECTED FOR ITS EXCEPTIONAL VALUE AND TECHNICAL SUPERIORITY.

Cooperative Control Wireless LAN Equipment from Aerohive

Ultimately, ECRMC selected cooperative control wireless LAN equipment from Aerohive. The technical superiority of Aerohive's architecture was the main reason for the hospital's choice. Aerohive's wireless LAN technology is unique: Aerohive cooperative control access points ("HiveAPs") provide secure fast roaming, ease of management, and state-of-the-art security without network controllers or overlay networks. Instead, software in the HiveAPs enables them to self-organize into groups called "hives", to share network control information, and to deliver QoS, identity-based policy enforcement and other advanced functionality.

Eliminating controllers from the network substantially reduces the cost of Aerohive solutions. Aerohive's cooperative control networks are also more reliable than controller-based networks, because controllers' "single points of failure" are eliminated. Removing controllers from the network also eliminates the bandwidth bottlenecks, latency, and jitter that result from backhauling traffic through a controller, creating an ideal platform for demanding applications, such as VoWLAN.

ECRMC also found that the RF performance of the Aerohive equipment was superior to the other vendors' RF performance. Even in the hospital's concrete-walled laboratory, connecting to the network was easy, and the HiveAPs' cooperative control functionality performed flawlessly.

The Aerohive cooperative control architecture also makes it easy for ECRMC to upgrade its wireless LAN access points to 802.11n on an as-needed basis. Aerohive 802.11n HiveAPs can be seamlessly deployed along with 802.11a/b/g HiveAPs. Finally, the second-generation 802.11n chipset in the Aerohive equipment was also a factor in ECRMC's choice.

Wide Array of Healthcare Applications

ECRMC runs a wide array of applications on its Aerohive wireless LAN. In the emergency room, full physician order entry, clinical documentation, and billing are supported. In the operating room, ECRMC uses the mission-critical Aerohive wireless LAN to support full nurse documentation

across the entire spectrum of care. The core Hospital Information System (HIS) assists nurses with charting in the hospital's medical/surgical, pediatric, and ICU departments. Finally, ECRMC depends on Aerohive to provide hospital-wide wireless LAN access for its quality review management software.

HIPAA Compliance for Secure Healthcare Environments

Sensitive healthcare information is continuously handled by ECRMC's wireless LAN, so security of the wireless LAN is critical. Aerohive's cooperative control architecture and the HiveAPs provide the HIPAA-grade security ECRMC requires, with features including 802.11i (WPA2), 802.1X authentication, rogue detection, and guest access control. Third-party solutions, such as Microsoft NAP- and TNC-based systems, that enforce endpoint compliance checking, are easily integrated with HiveAPs.

Each HiveAP also features an integrated stateful inspection firewall, providing edge-based access control, segmentation, and policy control. In addition, multi-layer, in-line denial-of-service protection is provided, preventing wireless clients from consuming too much wireless bandwidth or overloading buffers.

Mesh Networking for Connectivity and Resiliency

HiveAPs can connect with one another wirelessly using mesh networking. This has allowed ECRMC to connect HiveAPs on different floors of its information services building without running wires, saving effort and expense. ECRMC's older clinics also have no network drops, so mesh networking is also used there.

In addition to providing deployment flexibility, the mesh networking capability increases the resiliency of Aerohive networks. Aerohive wireless LANs can be configured for dynamic mesh failover, enabling network traffic to be routed around failures in the wired network by dynamically and gracefully establishing a wireless mesh connection between neighboring HiveAPs. As a result, ECRMC can confidently deploy an Aerohive wireless LAN for mission-critical applications.

Ease of Implementation

Because Aerohive wireless LANs require no controllers or overlay networks, ECRMC's upgrade to the Aerohive

network has been simple and fast, requiring only minimal resources. ECRMC's in-house team has deployed the network itself, without installation assistance.

ECRMC plans to deploy 75 HiveAPs, and, as of August 2008, 45 HiveAPs have been deployed. In ECRMC's emergency room and operating room, 15 HiveAPs have been deployed. 20 wireless workstations access the network in the operating room, and nine wireless devices connect to the network in the emergency room. All clinical documentation, including pre-op, intra-op, and post-op documentation, is prepared using the Aerohive wireless LAN.

Centralized Network Management

Aerohive's HiveManager Network Management System (NMS) appliance manages the entire wireless network. A HiveManager is not a network controller and is not required to operate a hive of HiveAPs. The HiveManager simplifies provisioning for global policy management and provides centralized configuration and monitoring. The HiveAPs in ECRMC's entire hospital and all remote clinics are managed from a single HiveManager, a valuable convenience to the organization's lean IT staff.

ECRMC was especially pleased with the HiveManager's user-friendly graphical interface, which delivers advanced functionality without unnecessary complexity. ECRMC estimated that other vendors' NMS offerings would have required another person on the IT staff to manage the network. No additional headcount is required to manage the Aerohive network using the HiveManager.

The HiveManager also makes deploying HiveAPs extremely simple. First, un-configured HiveAPs are connected to the network and allowed to discover the HiveManager. Then, configuration data is pushed from the HiveManager to the newly installed HiveAPs, for true plug-and-play installation.

Praise for Aerohive Documentation and Tech Support

Although ECRMC's selection of Aerohive was made primarily on the basis of the equipment's technical superiority, the hospital's IT staff was also impressed with Aerohive's high-quality documentation, which is thorough and useful even to IT staff who are not wireless LAN experts. ECRMC has also had an excellent experience with Aerohive's responsive and knowledgeable technical support team.

What's Next for El Centro Regional Medical Center and Aerohive?

In the future, the Aerohive wireless LAN will support many more wireless devices and applications. Physicians and clinicians will be issued handheld Symbol devices and tablet PCs for bedside use; VoWLAN will be deployed; RFID tracking will be implemented; and new bedside devices, including a bar code printing system for the hospital's phlebotomists and network-connected I.V. pumps, will be put into service. Secure and convenient guest access to the wireless network will also be provided using Aerohive's GuestManager, which would enable any authorized ECRMC employee to create guest network accounts via an intuitive Web interface.

Later in 2008, ECRMC also plans to deploy the Vocera Communications System to provide hands-free voice communication throughout the ECRMC facility using the Aerohive wireless LAN. The sophisticated quality of service (QoS) capabilities of Aerohive's access points will ensure optimal system performance.

Contact Aerohive today to learn how your organization can benefit from a cooperative control wireless LAN architecture. Informative whitepapers, product datasheets, and other materials are also available at **www.aerohive.com**.

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