REDCELL TECHNOLOGIES

MEDICINE ON THE MOVE

How hospitals can reduce costs, increase revenue and improve efficiency, accuracy and security by re-engineering the wireless LAN infrastructure.

A RedCell Technologies Whitepaper

EXECUTIVE SUMMARY

Quality patient care is the goal of every healthcare provider, but the reality is that many highly trained and specialized caregivers are spending up to 60 percent of their time doing administrative tasks. Doctors, nurses and administrators are all experiencing a time crunch as legal, billing and regulatory requirements steadily generate an increasing number of documents per patient.

A transition to electronic medical records (EMRs) can do much to improve healthcare document management. However, hospitals continue to suffer from chronic inefficiencies despite the transition to EMRs. Combining EMRs with wireless connectivity and mobile technology solutions could reshape the healthcare landscape.

From remote monitoring and access of critical health information to improving communication and collaboration among healthcare providers, mobility shows great promise for streamlining administrative tasks while simultaneously improving quality of care, staff efficiency and hospital revenues. In fact, a new study by the Ponemon Institute found that the average U.S. hospital could boost the bottom line by more than $1.5 million per year through improvements in wireless connectivity and communications technologies.

This whitepaper will examine the role of Wi-Fi in healthcare and how U.S. hospitals in particular stand to gain from pervasive wireless connectivity. It will then analyze the difficulties hospitals face in deploying wireless LANs and highlight vendor-agnostic strategies for re-engineering the WLAN infrastructure to support today's mobile devices. Of critical importance is selecting an engineering and implementation partner with in-depth knowledge of radio frequency (RF) issues and proven expertise in the latest Wi-Fi technologies.

BENEFITS OF MOBILITY IN HEALTHCARE

The benefits of mobile wireless technology in healthcare have been illustrated in a number of different applications. Wireless technology is used to monitor heart rate, blood pressure, blood oximetry and other physiological signals without the need for a bedside Ethernet connection. It can also be used in fall detection, location tracking and other physical activities.

Mobile point-of-care (MPOC) solutions that combine mobile devices, mobilized applications and wireless infrastructure can improve patient care by enabling clinicians to communicate and collaborate with colleagues, ancillary workers and patients regardless of their physical location. Mobility solutions also enhance access to patient history, laboratory results, pharmaceutical data, insurance information and other resources, thus improving the quality of patient care. Smart card technology and thin-client computing enable staff members to instantly access personalized desktops with all of the applications and data that are necessary for their jobs while protecting patient information from unauthorized access.

This also helps caregivers capture and record critical patient information, such as vital signs and medications given, right from the bedside. Mobility thus eliminates the error-prone manual process of transferring information from a clipboard or notepad to the computer and improves the accuracy of the patient information.

In a 2003 NOP World Technology study sponsored by Cisco, 70 percent of medical staff said they felt that the use of wireless devices increased accuracy of patient information, helping to ensure patient health and safety. A 2009 study by Motorola found that the use of key mobility applications contributed to a 31 percent reduction in manual errors, saving billions of dollars annually. Other commonly cited mobility benefits include increased employee productivity, increased compliance accuracy for quality reporting and increased order fulfillment accuracy.

EXTENDING THE WLAN

Access to clinical information, EMRs and communications systems improves productivity, accuracy and collaboration regardless of the size or location of the healthcare facility. Campus wireless technology can extend hospital-grade Wi-Fi connectivity to local staff and devices in physicians' offices and other affiliated sites. Clinics and surgical centers can gain hospital-like efficiency through access to centralized scheduling, billing, administration, order entry and healthcare information systems.

HOSPITALS LAG BEHIND IN MOBILITY ADOPTION

Despite these well-documented benefits, hospitals lag behind other industries in mobility adoption. The Ponemon study found that hospitals continue to utilize outmoded communications technologies such as pagers, decreasing clinician productivity and increasing patient discharge times. The Ponemon Institute estimates that these inefficiencies translate into an industry-wide loss of more than $8.3 billion annually.

Clinicians estimate that only 45 percent of their time — about 27 minutes out of every hour — is spent with patients. The remaining 55 percent is spent communicating and collaborating with other clinicians, or using electronic medical records and other clinical IT systems. As a result, inefficiencies in communication and information access have a big impact on overall clinician productivity.

The survey of 577 healthcare professionals, sponsored by tech security firm Imprivata, found that clinicians waste more than 45 minutes each day on average due to the use of outdated communication technologies. Pagers are the leading pain point, cited by 52 percent of survey respondents. But even if they had smartphones and tablets, many clinicians couldn't connect — 39 percent of respondents cited the lack of Wi-Fi availability as the primary cause of inefficiency in the hospital environment.

The Ponemon Institute estimates that this waste of clinicians' time costs each U.S. hospital more than $900,000 per year. Based on the number of registered hospitals in the U.S., this translates to an industry-wide loss of more than $5.1 billion annually.

Similar deficiencies in communications lengthen patient discharge time, which currently averages about 101 minutes. Sixty-five percent of survey respondents believe that secure text messaging can cut discharge time by 50 minutes, which the Ponemon Institute estimates could generate more than $3.1 billion in revenue per year across the healthcare industry.

ENSURING HIPAA COMPLIANCE

Fifty-one percent of respondents to the Ponemon Institute survey say HIPAA compliance requirements can be a barrier to mobility. Specifically, HIPAA makes access to electronic patient information difficult (according to 79 percent of respondents), restricts the use of electronic communications (56 percent) and restricts the use of personal mobile devices (54 percent). Enterprise-class WLAN security, combined with data encryption and integrated policy enforcement, can minimize security risks and ensure HIPAA compliance.

WI-FI CHALLENGES IN THE HOSPITAL ENVIRONMENT

Achieving those benefits is a formidable challenge. In a hospital environment, the wireless LAN must meet exacting standards for performance, reliability and security. Healthcare networks must support latency-sensitive applications such as IP telephony, videoconferencing and high-resolution image transfer, and devices such as telemetry alarms and medical monitors that cannot tolerate even low levels of packet loss. Clinicians also need 24x7 access to EMRs and other mission-critical applications, each with its own service-level requirement. In this life-or-death environment, such requirements are demanding.

Yet many experts agree that healthcare represents the most difficult environment for Wi-Fi. Hospitals are filled with RF-blocking obstacles, including masonry and concrete walls, shielded X-ray and cancer treatment rooms, and highly mobile metal objects such as medical equipment, beds and carts. There is also RF interference from microwaves, monitoring equipment and medical devices that share the same 2.4GHz spectrum as Wi-Fi. In fact, most of the reliability issues with hospital WLANs can be traced to the RF layer due to the inherently challenging and dynamic nature of the wireless environment.

Users are highly mobile as well, so the wireless infrastructure must have the coverage and capacity to support changing concentrations of smartphones, tablets and other client devices. The network must also provide connectivity for purpose-built medical devices that do not support Wi-Fi or provide suboptimal RF performance. These devices are selected by clinicians and administrators with little to no input from IT.

But it isn't enough to engineer a wireless network that overcomes these difficulties — access restrictions also come into play. The need for cleanliness and patient privacy limits the placement and methods for mounting access points, while regulations such as HIPAA and PCI add stringent security and monitoring requirements.

ENGINEERING THE HOSPITAL WLAN

Most hospitals have one or more existing WLANs that were typically implemented several years ago for a single application in a small area of the facility. Generally, these WLANs are not capable of supporting pervasive wireless connectivity in the hospital environment.

Today, the 802.11n standard delivers Wi-Fi performance that is on par with wired Ethernet connections, and a number of vendors offer 802.11n solutions that can work well in a hospital setting. However, engineering a "medical-grade" WLAN capable of supporting mission-critical applications and sensitive devices requires significant expertise.

There are a number of "rules of thumb" in the WLAN industry regarding access point density and placement in an office building, but these best practices are of little value in a hospital. Hospital WLANs must be carefully engineered to account for stationary and mobile obstacles, RF interference, floor-to-floor signal bleed, and other environmental issues that impact network performance.

State-of-the-art tools can help with site surveys, coverage tests, and noise and interference detection. If an existing WLAN is in place, these tools can also identify areas of poor signal strength and quality, and help determine whether the existing infrastructure can be modified to improve coverage. Still, multiple site visits may be required for an engineer to document the many obstacles, points of interference and areas in which access point placement may be restricted. It is critical to partner with a solution provider with a proven track record of success deploying Wi-Fi in tough environments.

In addition to overcoming environmental challenges, hospital WLANs must be able to support the user densities, escalating bandwidth requirements and seamless roaming associated with pervasive wireless. The WLAN must also be reliable enough for mission-critical applications, secure enough to meet industry and regulatory requirements, and scalable to support growing numbers of users and ever-expanding facilities. Hospitals should look for a solution provider with end-to-end expertise in pervasive wireless solutions capable of carrying all types of voice, video and data traffic simultaneously with high quality of service.

Manageability is also important. In many hospitals, small IT staffs are already spread thin managing existing IT operations. They often lack expertise in RF or WLAN solutions. It is important to integrate management tools that enable non-specialists to support wired and wireless LANs and mobile devices from a "single pane of glass." These tools can help ensure high availability by speeding the discovery, diagnosis and troubleshooting of problems that surface in the highly dynamic hospital environment.

CONCLUSION

The healthcare industry is experiencing increased pressures from greater numbers of patients and the need to become more efficient while still providing exceptional patient care. In an environment where anytime, anyplace communications is critical, wireless and mobility solutions allow healthcare providers to dramatically improve decision-making processes and bring more resources directly to the patient. However, WLAN challenges, along with security and regulatory requirements, have kept hospitals behind the curve.

Engineering a WLAN for the hospital environment is far from simple. It requires the expertise of experienced Wi-Fi engineers armed with state-of-the-art tools and an in-depth understanding of the physics of RF. Hospitals should carefully vet not only the Wi-Fi equipment to be purchased but the knowledge of the engineering and implementation team.

Despite the potential pitfalls, Wi-Fi connectivity promises to build upon the benefits of EMRs and provide the healthcare industry with unprecedented levels of efficiency and information access. Given that the average hospital can net $1.5 million annually with up-to-date wireless communications, there is a huge potential upside to overcoming WLAN challenges in the healthcare environment.

ABOUT REDCELL TECHNOLOGIES

RedCell Technologies is a highly focused professional services firm specializing in the integration of enterprise mobility solutions. The company offers a broad portfolio of services based upon an unparalleled combination of experience and extensive research data on the industry's most effective solutions for mobility. The ability to analyze and interpret each business' unique needs and deliver cost-effective and efficient technology solutions to meet those needs makes RedCell Technologies the clear choice for enterprise mobility.

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