Cisco Unified Wireless for Healthcare Organizations

Healthcare organizations run what can be considered the pinnacle of mission critical applications. Simply put, reliable IT infrastructure in a healthcare organization can help save lives. Just the ability to provide on the spot access to patient data to medical practitioners at the point of care can alone increase treatment accuracy, while new wireless voice and location applications can improve the timeliness of treatment. With a large population of mobile users, wireless LANs (WLANs) conveniently enable access to the latest patient records and clinical decision-support information anytime and anywhere in the facility. And as caregivers travel among different facilities, WLANs allow for easy connectivity at every site. As part of the Cisco Medical Grade Network, the Cisco Unified Wireless Network can enable healthcare organizations to reduce costs and improve patient care. The Unified Network uniquely addresses mobility needs by providing the security, ease of deployment, manageability, and control for healthcare organizations that require a pervasive WLAN deployment.

HEALTHCARE TRENDS
Prompted by escalating costs and expanding regulations, healthcare organizations are seeking every advantage that new information technology can offer. As early as the mid 1990s when the first WLAN solutions emerged, healthcare organizations recognized the benefits of mobile applications and became early adopters. Using the proven ability of wireless enabled applications to improve treatment at the point of care and to support clinical decisions by providing instant access to medical records, healthcare organizations have been able to improve treatment accuracy and to save millions of dollars. In addition, recent improvements in wireless infrastructure security and mobility services such as location-based tracking and voice over WLAN, have provided further gains in productivity and patient care while simultaneously addressing government privacy regulations.

IMPROVING PATIENT CARE AND MEDICAL STAFF PRODUCTIVITY WITH WLANS
As the adoption of WLANs in healthcare organizations has grown, so has the number of ways in which WLAN applications are used. Healthcare providers currently use or plan to use wireless for:

- **Patient registration**: Simplification of patient registration through self-administered check-in.
- **Patient medical records**: Input clinical data at the point of care, which reduces transcription errors while allowing other healthcare providers instant access to the most current patient medical history.
- **Prescription automation**: Immediate look-up of adverse drug interactions, patient allergy information, patient-specific dose checking, coupled with accurate information from the latest medical reference guides.
- **Treatment verification**: Simple verification of patient identity using barcodes providing more accurate treatment, medicine delivery, and the additional benefit of streamlined insurance billing.
- **Real-time, mobile voice communication**: Improved access to the closest and most appropriate caregiver using wireless IP communications.
- **Materials management**: Ordering, distribution, and safe dosage monitoring of patient prescriptions through barcode scanning of new supplies to departments, minimizing errors, overstocking, or out-of-stock situations.
- **Hospital equipment tracking**: Active radio frequency ID (RFID) tags provide real-time location tracking of critical medical equipment to gain better asset utilization.
- **IP Video Surveillance**: Access to IP video surveillance images from mobile or portable devices to enhance physical security services.
WLANs and mobility services combined with the appropriate clinical information systems, staff support, and mobile computing devices, have the ability to significantly improve the accuracy and efficiency of medical treatment at healthcare organizations. Wireless technology that provides the proper security, manageability, and support for advanced applications can help achieve productivity gains throughout the organization.

**BENEFITS OF THE CISCO UNIFIED WIRELESS NETWORK FOR HEALTHCARE APPLICATIONS**

The Cisco Unified Wireless Network meets the needs of healthcare organizations for network security and privacy and efficient network management, which has the effect of lowering the total cost of ownership (TCO). A single unified wired and wireless network enables healthcare organizations to meet their requirements for a wide range of billing, clinical, prescription, imaging, telephony, video and audio conferencing applications without the need for multiple single-use application networks.

**Figure 1.** The Cisco Unified Wireless Network

### Security and Privacy

With any network, security and privacy are top priorities. No where is this more true than in healthcare organizations where the federal government has set regulations for security and privacy of medical information. The Health Insurance Portability and Privacy Act (HIPPA) legislates that healthcare institutions protect patient data that is stored, transmitted, or accessed by any medical personnel. As a transport and access mechanism, WLANs must provide security and privacy measures that can be audited and certified as HIPPA-compliant. Security technology must include authentication and encryption, and provide an audit trail and event reporting.
Cisco Unified Wireless Networks Ensures Privacy and Security for Healthcare

The Cisco Unified Wireless Network provides a comprehensive solution for both protecting the wired network from wireless threats and for ensuring secure, private communications over an authorized wireless LAN. Every device in the network—from clients to access points (APs) to wireless controllers and the management system—plays a part in securing the wireless network environment through a distributed defense.

The Cisco Unified Wireless Network includes the following security features:

- Support for the IEEE 802.11i standard
- Support for the Wi-Fi Alliance security certifications Wi-Fi Protected Access 2 (WPA2)
- Strong, mutual authentication and dynamic encryption key management via support for IEEE 802.1X
- Data encryption using Advanced Encryption Standard (AES) or Temporal Key Integrity Protocol (TKIP)
- Support for the broadest range of 802.1X authentication types, client devices, and client operating systems on the market
- Mitigation of active and passive network attacks
- Integration with the Cisco Self-Defending Network and Network Admission Control (NAC)
- Intrusion Prevention System (IPS) capabilities and advanced location services with real-time network visibility
- Cisco Centralize Key Management (CCKM) for ensuring optimal security and voice performance while roaming

Cisco, the network leader and a driving force behind wireless networking, has made it possible for network managers to give users the tools they need to be productive without sacrificing the network security they demand.

The Cisco Unified Wireless Network supports a HIPAA-compliant, standards-based, wireless security solution that gives hospital administrators confidence that data will remain private and secure. This security solution supports robust wireless LAN security services that closely parallel the security available in a wired LAN. It fulfills the need for consistent, reliable, and secure mobile networking by delivering industry-leading WLAN security services. It mitigates sophisticated passive and active WLAN attacks, interoperates with a range of client devices and provides reliable, scalable, centralized security management. The Cisco Unified Wireless Network allows network administrators to deploy large-scale WLANs with scalable, security administration that does not increase the burden on the IT staff.

Network Management and Operation

Healthcare IT managers deploying the latest technology have to be aware of the implications of deploying and managing that technology so that it doesn’t result in a net increase in cost of owning the network. A low total cost of ownership (TCO) allows organizations to deploy solutions without adding additional staff, ultimately leading to a reduced burden of deploying and maintaining the network. This improves the bottom line for an organization.

Following the path of cellular networks, Cisco pioneered WLAN centralization and delivered the industry’s first unified platform for advanced mobility services. The Cisco Unified Wireless Network is the industry’s only unified wired and wireless solution to cost-effectively address the WLAN security, deployment, management, and control issues facing healthcare facilities. The Cisco Unified Wireless Network is an integrated end-to-end solution that addresses all elements of the WLAN, from Cisco Compatible client devices and access points, to the network infrastructure, to centralized network management, to the delivery of mobility services.

The key to Cisco Unified Wireless Network is the intelligence and centralized security and QoS policies in the wireless LAN controller. With this solution, access points can be easily managed by the controllers which in turn are managed by the industry-leading Cisco Wireless Control System (WCS). With an easy to navigate centralized web interface, the WCS easily manages multiple controllers. Since there are many fewer controllers in the network than AP’s this approach delivers a scalable lower total cost of ownership than a traditional WLAN architecture. Cisco WCS supports wireless LAN planning and design, RF management, location tracking, intrusion protection system, and WLAN systems configuration, monitoring, and management.
Zero Touch Deployment

The Cisco Unified Wireless Network minimizes the effort required to deploy the network. When installed, an AP automatically seeks out a controller. After the AP joins a controller, the controller can update AP images or configurations as needed. Because all traffic from the APs are securely tunneled back to the wireless LAN controller over a Layer 2 or Layer 3 network there is no need to extend or configure special VLANs to individual APs. With zero touch deployment hundreds and even thousands of APs can be deployed without IT staff direct involvement.

Ease of Upgrades

With the Cisco Unified Wireless Network, all AP images are stored centrally in controllers. When an image or configuration upgrade for APs is required, the new image or configuration is loaded onto a controller, and it, in turn, upgrades all of the APs that are associated with it. There is no need to deploy a specialized script or to create a special job on a centralized management station.

Ease of Operation

Wireless networks are traditionally deployed using a static RF plan, where each AP has its channel and power statically set. In the Cisco Unified Wireless Network, the controllers have Radio Resource management software that enables them to understand the signal strength that exists between APs within the same network. The controllers aggregate and hand off the RF information to the WCS which creates a dynamic optimal RF topology for the network. The WCS provides the ability to deliver detailed RF utilization and reports on network performance, including clients, and it supports ongoing network operations. With Cisco WCS, network administrators have a single solution for RF prediction and monitoring that demystifies RF and removes the complexity of managing the RF environment.

SUPPORT FOR MOBILITY SERVICES

In order to realize cost savings, process improvements, and productivity increases, the WLAN must have some key capabilities. Specifically, it must have reliable voice communication while simultaneously running data applications and location based services for improved asset location.

Voice over WLAN (VoWLAN)

To improve communication among medical staff and hospital operation, IT administrators are increasingly looking to leverage their WLAN for voice applications. The Cisco Unified Wireless Network is a voice ready network that can enhance the efficiency, responsiveness, and collaborative capabilities of healthcare providers—and ultimately helps provide better care for patients. It creates opportunities for real-time on-campus and global collaboration, and lets caregivers and administrators access information anytime, at the point of care.

To support voice, the Cisco Unified Wireless Networks delivers unique enhancements for demanding real-time communications capabilities, including the following:

- Industry-leading quality of service (QoS) and Call Admission Control (CAC) on the wireless network, enabling deploy converged voice and data services on the WLAN.
- Power saving features for extended handset battery talk life
- Real-time RF scanning and monitoring of the RF environment, delivering a self-configuring, self-optimizing, and self-healing wireless network to ensure the quality and availability of voice services.
- Fast secure roaming across the campus while maintaining WPA2 security
- Access points with MAC layer enhancements to intelligently handle voice and reduce voice packet delays caused by retries.

The Cisco Unified Wireless Network supports a wide variety of clients. The Cisco Unified Wireless IP Phone 7920 is an easy-to-use IEEE 802.11b wireless IP phone that provides comprehensive voice communications in conjunction with Cisco Unified CallManager and Cisco Unified Wireless Network. In addition, the Cisco Compatible Extensions program gives voice client manufacturers the ability to design current and future voice wireless innovations into a wide variety of devices.
The Cisco Unified Communications system provides a full-featured, scalable, distributable, and highly available IP telephony call-processing solution. The Unified Communications system, application partners, and Cisco’s voice-ready wireless infrastructure together enable healthcare workers to move freely within their campuses without loosing connectivity and access to IP communications applications. For example, Cisco streamlines communication and workflow when using the Cisco 7920 phones by providing nurse call alerts and allowing for a 1-touch call back to a patient room directly from the phone saving nurses time and improving patient care by providing direct communication between patients and nurses. In addition, IP phones can be configured to connect to specialized medical devices, like Patient Monitors to send secondary alerts across the wireless network to Cisco phones—shortening response times.

**Location Based Services**

Tracking an expensive, mobile asset like a wheelchair typifies the kind of big asset management issue the healthcare industry faces. A variety of assets are deployed throughout a hospital, including gurneys, intravenous (IV) pumps, dialysis equipment, and neonatal and adult infusion pumps for administering medications. These must be tracked and managed by the care providers who use them to treat patients, by the administrators who handle inventory accounting and purchase forecasting, and by maintenance technicians who have to calibrate, repair, and upgrade each piece of equipment. Theft prevention and analyzing usage for optimal deployment also requires the ability to locate and account for assets.

**Cisco Unified Wireless Networks Provide Location Based Services for Improved Asset Visibility and Productivity**

The Cisco Wireless Location Appliance is an innovative, easy-to-deploy solution that uses advanced RF fingerprinting technology to simultaneously track thousands of 802.11 wireless devices from directly within a WLAN infrastructure, increasing asset visibility and control of the air space. Additionally, the appliance provides location-based alerts for business policy enforcement, and it records rich historical location information that can be used for location trending, rapid problem resolution, and RF capacity management. By enabling the deployment of powerful location-based applications such as Enhanced 911 (E911) services, asset management, and workflow automation through integration with the Cisco Wireless Location Appliance API, the appliance becomes a critical solution for healthcare organizations looking to optimize operations and improve the delivery of healthcare services.

By design, the Cisco Wireless Location Appliance is directly integrated into the Cisco Unified WLAN infrastructure to lower the customer’s total cost of ownership and extend the value and security of the existing WLAN infrastructure by making it “location-aware.” As a component of the Cisco Unified Wireless Network, the Cisco Wireless Location Appliance uses Cisco wireless LAN controllers and Cisco Aironet lightweight access points to track the physical location of wireless devices to within a few meters. Moreover, the centralized WLAN management capabilities and intuitive GUI of the Cisco WCS are extended for managing and configuring the Cisco Wireless Location Appliance, making setup fast and intuitive.

With the Cisco Unified Wireless Network and location tags, the hours spent on searching for and collecting assets in a hospital and the need to set a policy of nightly collection of assets both become a thing of the past. The Cisco Wireless Control System solution enables a simple, visual interface for employees: a quick glance at the screen shows exactly where the tagged assets are located on a map of the site.
GUEST NETWORKING

A “guest” to the enterprise network is essentially any user that isn’t a full-time employee such as a medical supplier or a visiting physician as well as patients and their families. It’s important for patient comfort as well as hospital operations that these guests have access to the hospital network but providing guest services over a wireline network can pose significant challenges and can turn into a major sink of resources and time to isolate the traffic and insure privacy as required by HIPAA.

Guest networking is the ability of the network to assign special access rights based on the profile of the user. The system can customize the privileges granted based on the external employee’s role. Consider the drug supplier delivering the latest shipment. These suppliers and vendors are not permitted to have access to patient information that is on the network however allowing these suppliers and vendors to automatically update inventory positions or place refill orders while on the premises minimizes short stock situations and improves patient care. Using guest networking of the Cisco Unified Wireless Network allows hospitals to safely provide network access to various types of users, streamline operations, and improve overall patient care.

CONCLUSION

The Cisco Unified Wireless Network is the industry’s only unified wired and wireless solution to cost-effectively address the WLAN security, deployment, management, and control issues facing healthcare organizations. This powerful solution combines the best elements of wireless and wired networking to deliver scalable, manageable, and secure WLANs with a low total cost of ownership. It includes innovative RF capabilities that enable real-time access to core applications and provides highly secure connectivity. The Cisco Unified Wireless Network is an integrated end-to-end solution that addresses all the needs of HIPAA-compliant networks, from client devices and APs, to the network infrastructure, to network management, to the delivery of advanced wireless services integration and award-winning, worldwide, 24-hour product support.