Application Note

Meru Networks

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Deploying a Secure Wireless VoIP Solution in Healthcare

Situation

Healthcare is a natural environment for wireless LAN solutions. With a large mobile population of doctors, nurses, physician's assistants and other caregivers, wireless LANs bring the ability to access the latest patient charts, medical records and clinical decision support data at all times, anywhere in the healthcare organization. And as caregivers travel among different facilities, wireless allows for easy connectivity at each site.

Real Patient and Economic Benefits through Wireless LAN Deployment

This trend was given further momentum with the release of a 1999 report on Adverse Drug Effects (ADEs) which recognized that upwards of 100,000 deaths per year were related to preventable medical errors. Following in 2000, a Presidential mandate was issued requiring healthcare providers to reduce data errors by 50% in 5 years. The proven ability of wireless to allow for immediate availability of treatment records at the point of care along with clinical decision support through instant access of medical reference databases has saved many healthcare facilities millions of dollars.

A Trend towards Wireless VoIP

Historically, healthcare institutions used wireless LANs for data applications, but increasingly want to support wireless VoIP as well. Healthcare organizations have a constant need for timely communication among caregivers; nurses contacting physicians, physicians contacting pharmacists or other specialists, unit staff contacting support staff such as transportation, housekeeping or dietary. All of this has traditionally been accomplished through wired phones and pages. However, significant inefficiencies result as nurses and other staff wait for calls or pages to be returned, causing delays and interruption of patient care. As IT administrators gain confidence and experience with Wi-Fi deployments for data, they are now looking at wireless VoIP as an increasingly desirable technology for clinicians. With wireless VoIP phones that can be worn by all caregiving staff, the incidence of missed calls is significantly lowered, resulting in better patient care.

Security Needs Distinct to Healthcare

Security is a front and center concern for healthcare IT administrators, especially due to the Healthcare Information Portability and Accountability Act (HIPAA). While security vulnerabilities endanger the integrity of any corporate network, the risks are magnified in healthcare due to HIPAA legislative requirements. HIPPA is a law passed in 1996 by the US government that covers many

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areas, but impacts IT administrators specifically as it mandates that patient data that is stored, transmitted or accessed across networks must be protected.

Because of the security risk an open wireless LAN network presents, leaving a wireless VoIP implementation unsecured is not an option. However, most wireless LAN systems will not ensure high quality calls while simultaneously supporting industry-standard security measures. Ensuring secure, reliable wireless VoIP communications demands that businesses choose a wireless LAN infrastructure that is purpose-built to meet the demands of voice applications as well as put appropriate policies in place to mitigate those risks.

Secure Remote Access Required

In addition, healthcare organizations face the challenge of providing remote access to patient data and clinical applications to hundreds – potentially thousands - of doctors, physician's assistants and other care givers. These users may be in regional offices, remote sites or their home. Balancing the security necessary for the sensitive nature of healthcare data, as well as providing the flexibility and ease of administration necessary for managing a diverse network is a key challenge.

Solution

Meru Networks and Juniper Networks, Inc. have developed a secure wireless VoIP solution for healthcare organizations. Many healthcare organizations have deployed the Meru Networks and Juniper solution resulting In a complete, end-to-end wireless VoIP system that meets HIPAA security requirements without sacrificing call density and voice quality.

The First WLAN System Designed for Converged Voice and Data Applications

Meru and Juniper overcome the critical challenges involved in implementing and managing a converged, scalable wireless local area network (WLAN) infrastructure for voice and data applications at healthcare institutions of all sizes. Specifically, the Meru Wireless LAN System automatically recognizes voice flows including H.323, SIP, Vocera and Spectralink ensuring high priority for these protocols. Prioritization is passed down from the wireline side or up to the wireline network through support of 802.1e via 802.1p and Diffserv. Meru's Air Traffic Control^{TM}

Juniper Networks Firewall / IPSec VPNs (NS 5GT, NS 208)

IPSec VPNs provide complete LAN access and are an excellent solution for remote or branch offices, fixed telecommuters and partner sites when the user has a managed corporate device and is coming from a trusted network.

Juniper Networks SSL VPNs

SSL VPNs operate at the application layer and provide selected access to specific resources. They are an excellent solution for mobile employees, consultants as well as business partners where the user is accessing the network via a non-corporate device from an untrusted network

Juniper Networks Intrusion Detection and Prevention Products (ISG/IDP)

Juniper Networks IDP provides comprehensive and easy to use protection against current and emerging threats at both the application and network layer. Using industry recognized stateful detection and prevention techniques, Juniper Networks IDP provides zero day protection against worms, Trojans, spyware, keyloggers, and other malware.

Meru Access Points

Meru Access Points provide leading Wi-Fi performance for 802.11b, 802.11g and 802.11a clients. Deployed wherever Wi-Fi coverage is required, they work in conjunction with Meru Controllers to deliver the highest toll quality voice over Wi-Fi service, excellent data client performance, self-healing and rogue AP detection.

(ATC) technology manages client access to the wireless medium to reserve bandwidth over the air, ensuring the same high performance for voice calls over the wireless LAN as over the wireline network. ATC also enables inter-cell coordination, a cellular coordination algorithm between APs analogous to the cellular telephone network's operation, to mitigate interference from clients in neighboring cells and co-channel interference.

Proven Security Solutions Extended to the WLAN

Juniper's "security zones" are seamlessly extended to the wireless domain over Meru WLAN infrastructure, enabling end-to-end media-independent security. Juniper Application Layer Gateways (ALGs) work with voice protocols to dynamically open and close firewall ports as needed, providing robust security for wireless VoIP. For enterprises, this joint solution provides significant benefits, including:

- Significant cost savings – A single network infrastructure, both wired and wireless, can be utilized for both voice and data communications; Moves, Adds and Change costs are dramatically lowered.
- Increased productivity – Users can securely connect to voice and data applications no matter where they are within the hospital.
- HIPAA compliance – A multi-layered security approach including protection at layer 2 and layer 3, as well as proactive wireless threat prevention help ensure patient record confidentiality.
- Deployment simplicity – Complex channel planning is eliminated for the WLAN; a single set of network security products are purchased for both the wired and wireless networks.
- Better user experience – Users have the same access and policies that apply regardless of how they connect.
- Improved control over remote access – Secure connectivity solutions are rapidly deployed for remote users by using SSL VPNS, decreasing frustration for both administrators and end users.

Meru Wireless LAN Controllers (MC500, MC1000, MC3000)

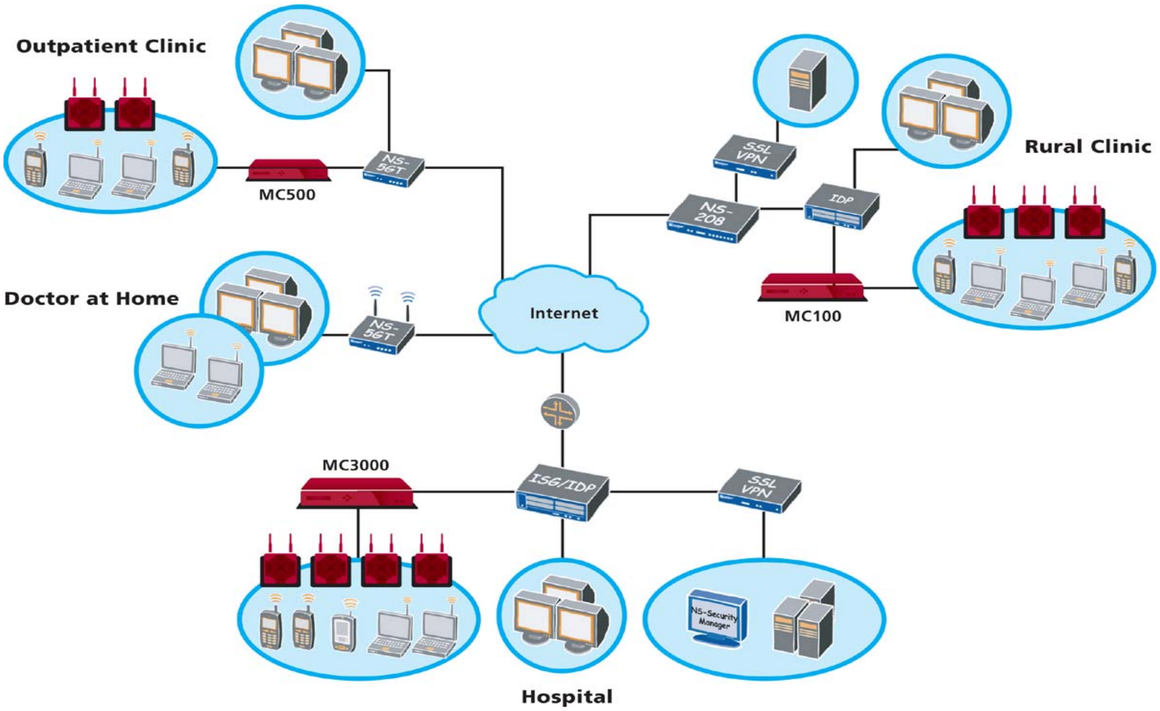
Meru Controllers provide centralized management and control of Meru APs. Meru Controllers intelligently manage the RF air space to deliver a WLAN that is as reliable as the wired network. Intelligent management of client access ensures the highest performance for dense voice and data applications, delivering a true converged voice and data WLAN.

Benefits of the Combined Meru/Juniper Solution

A multi-layered security approach enabling HIPAA compliance

Meru and Juniper offer a multi-layered security approach that helps ensure compliance with HIPAA. At Layer 2, Meru wireless LANs feature the industry's most robust security capabilities, including IEEE 802.1X and WPA. Unlike other wireless LANs, voice clients may use WPA and roam among access points without dropping the connection due to long latencies. Meru's Virtual Cell feature enables this by allowing all APs to be on the same channel thus guaranteeing zero handoff. With guaranteed zero handoff, voice clients will maintain toll quality while roaming among access points, including those that are on different IP subnets. Zero handoff is independent of security context, so even phones that use IEEE 802.1X or WPA will roam seamlessly without any call interruption.

Layer 3 and above security is provided via Juniper Networks firewalls. The Juniper Networks security operating system, ScreenOS, includes Application Layer Gateways (ALGs) that work with voice protocols. The ALG dynamically opens and closes firewall ports to allow both incoming and outgoing calls to enter and leave the network. The firewall ports dynamically open and establish call connection and then automatically close upon completion of the call. Other solutions do not have the capability to dynamically open and close firewall ports, requiring a range of firewall ports to be opened and remain open indefinitely – even when there are no calls being received. These open ports are commonly used by malicious hackers to gain entry or perform attacks on the network.



The Meru/Juniper solution delivers HIPAA compliance for wireless access while providing a single user experience and security policies for both wired and wireless access.

High availability features to ensure reliable wireless VoIP communications

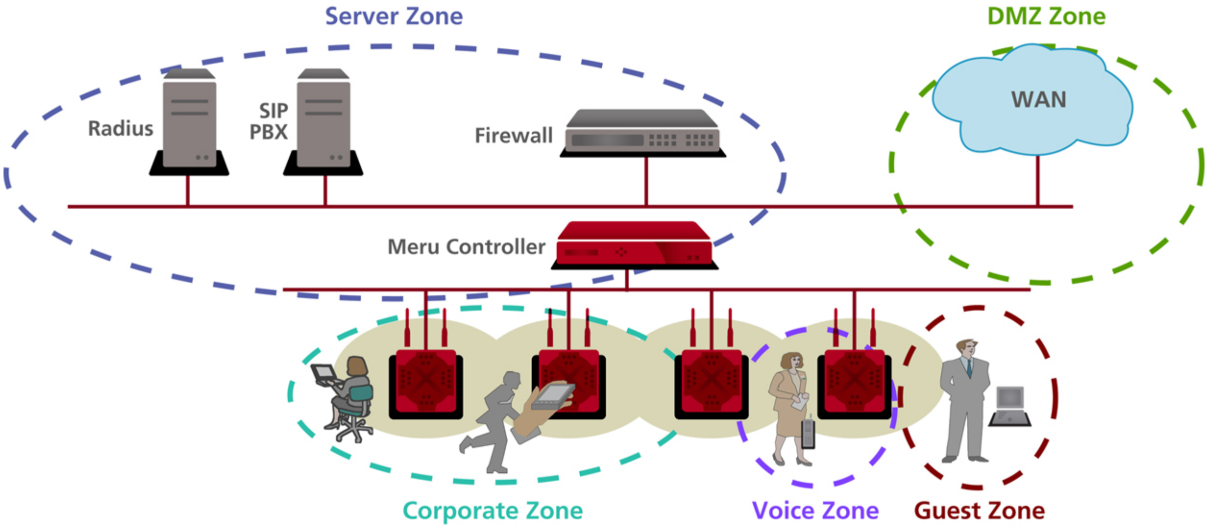
In a hospital, it can be critical to reach the right person immediately in a life-threatening situation demanding the highest reliability in the communication system. Voice applications are expected to be available 24 x 7. The joint Meru/Juniper solution ensures the highest availability of the wireless VoIP network. The Meru Wireless LAN System supports Call Admission Control. This means that if the network resources upper limit has been reached, new calls are rejected with a busy tone instead of allowing the call to enter and reduce quality for all the voice users. This is a unique Meru Wireless LAN feature, and provides a similar user experience to wired telephony networks.

The Juniper Networks security solution also incorporates high availability mechanisms. These mechanisms ensure voice communications are available, even when unexpected network events occur, including:

- Dynamic VPN tunnel failover increases network reliability by allowing a backup VPN tunnel to automatically take over when the primary VPN tunnel fails. The VPN failover occurs without dropping any calls.
- Dynamic route-based VPNs that auto-discover the network and reroute traffic around congested or failed links.
- Dual firewall configuration with sub-second, stateful failover in case the primary firewall fails.
- Multi-homing or support for dual network providers so voice communications are available even if connection to the primary network provider fails.

Identity-driven access extended to the wireless LAN

Juniper's Netscreen VPN Appliances provide advanced identity-driven access allowing administrators to easily deploy a network that securely supports the varied employees within a healthcare institution. As an example, a physician may be able to access a set of clinical applications, while employees in accounting are only able to access billing systems. Meru extends this identity-based access to the WLAN using VLANs to support up to 16 separate networks on a single Meru AP. User traffic can be directed to separate VLAN or Ethernet ports on the Netscreen appliance based on the network name (SSID) or authentication method, including: 802.1x WLAN, VPN login or captive web portal.



Identity zones are extended from the wireline network to the wireless network using separate SSIDs and VLAN segmentation on the wireless network.

Easy WLAN deployment in challenging hospital building environments

A hospital's high density of clients, unique building topology and construction create a challenging environment for wireless LAN deployment. The multi-floor configuration and need for highly directional antennas to efficiently cover the long narrow corridors create an environment where co-channel interference is impossible to avoid. Other wireless LAN solutions require complex channel planning to try and mitigate co-channel interference, which can add significantly to installation time and cost. Meru greatly simplifies this process with Virtual Cell technology which eliminates co- and cross-channel interference. With the worry of co-channel interference removed, Meru access points are simply placed in the best positions to ensure complete coverage. Complex 3-dimensional site plans to ensure that access points on the floor above or below are on different channels are a thing of the past and the network is up and operating cleaner and smoother in less time.

About Meru Networks

Meru Networks is a global leader in Wireless Voice over IP (VoIP) infrastructure solutions. With its innovative, award-winning Air Traffic Control technology that brings the benefits of the cellular world to the wireless LAN environment, Meru's WLAN System is the only solution on the market that offers the reliability, scalability, and security necessary to deliver converged voice and data services over a single WLAN infrastructure.

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