Ensuring Life-Critical Communications at Madera Community Hospital

"Using WaveDeploy we were able to pinpoint the network limitations and determine the needed upgrades within less than one day. None of the previous site surveys we conducted were able to provide such decisive results within such a short time."

- Wallace Jester, Network Systems Analyst

"WaveDeploy gave us a detailed view of our network and helped us formulate a growth and upgrade plan to move us towards an all-wireless Meditech Health Care Information System."

- Arthur Haggerty, CIO

Madera Community Hospital's wireless LAN supports hundreds of doctors, nurses, clinicians and other staff members, as well as patients and guests. The network utilizes Cisco AP1131AG access points positioned across the hospital's two floors and eight main wings. To ensure delivery of critical services the network was designed with numerous SSIDs serving a variety of devices such as laptops, tablet PCs and VoIP over WLAN handsets.

Since deployment in 2008, wireless network utilization continued to grow steadily, prompting Network Systems Analyst Wallace Jester and CIO Arthur Haggerty to embark on an aggressive expansion adding new services and support for high-speed mobile tablets and Workstations on Wheels (WOWS) for use by doctors and nurses. At the same time, the Madera team sought to address persistent performance challenges such as ensuring reliable VoIP. Initial issues causing some nurses to lose faith in the system based on Cisco 7925 handsets had been largely resolved through software upgrades, but some areas still suffered low voice quality with certain handsets draining batteries at alarming rates.

Faced with the daunting job of expanding and improving service at the same time, Jester's plan included optimizing existing AP locations, evaluating upgrades to 802.11n, and assessing the network's readiness for additional clients and services. The MCH team determined that VeriWave's WaveDeploy is the only solution suitable for assessing the state of the current network, troubleshooting remaining VoIP issues and planning for upcoming upgrades.

"With WaveDeploy, we were able to accomplish three distinct goals," Jester says. "Optimize our existing configuration, find and fix problems that have eluded us since deployment, and determine our needs and investment strategy for the next few years."

The team began by evaluating the viability of connecting a multitude of additional clients to the current network. A WaveDeploy site assessment was conducted in the hospital's Intensive Care Unit (ICU) using a Lenovo T510 laptop, an IBM X201 tablet-PC, an AT&T iPhone 3GS, an AT&T iPad, and a Verizon HTC Incredible (Android). The results revealed lower-than-expected data rates of less than 3.5 Mbps for the iPad, laptop and tablet. The smart-phones fared slightly better with data rates below 5 Mbps. The assessment also discovered high co-channel inference from adjacent channels and excessive overlap between APs.

At a Glance

MCH
Madera Community Hospital
Bringing today's medicine close to home

Since 1971, Madera Community Hospital has been serving California's Central valley with a state-of-the-art facility offering both inpatient and outpatient services. Having begun as a modest 88-bed acute care facility, MCH has become a full-service facility offering emergency and intensive care to more than 3,000 patients a month.

Requirements:

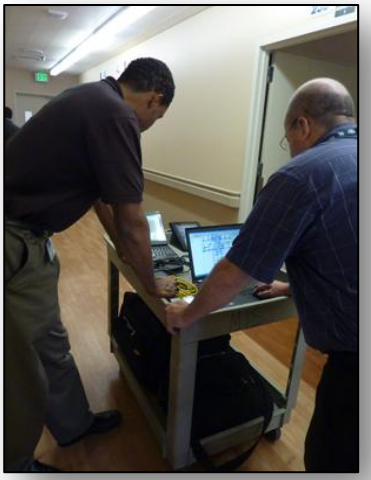
- Determine if hospital can provide high-bandwidth wireless connectivity in all areas supporting laptops, tablets and VoIP phones
- Measure individual WiFi client-device performance and behavior as seen by the end-user
- Evaluate required upgrades to support the hospital's $4M investment in Meditech Health Care Information System for bedside patient care and CPOE
- Resolve rapid battery-drain problems with Cisco 7925 phones
- Assess voice quality at nurse's stations where VoIP handsets are concentrated

Solution:

- WaveDeploy Expert

Results

Assessed current network capacity, determined expected individual client performance, resolved 7925 phone battery-drain issue, determined needed network upgrades, outlined best practices for network and client deployment.



Armed with these results, the team was able to determine the needed repositioning of APs and re-configuration of power needed to maximize capacity. They also concluded that an upgrade to 802.11n would be needed to support the required 10+ simultaneous user devices.

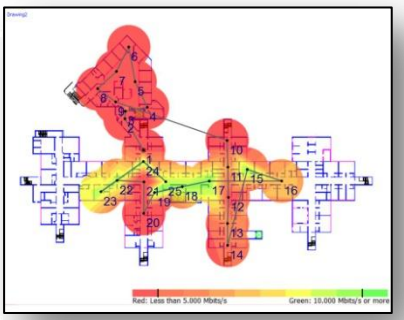
These results, taken on the 2.4 GHz band, were then compared to another assessment taken in the west wing of the hospital in which the 5 GHz band is utilized. Using the less congested band, the iPad throughput showed more than 100% improvement from an average of 3.17 Mbps to 7 Mbps, while the Lenovo laptop showed a more moderate improvement from 3.5 Mbps to 4.8 Mbps. This proved the benefits of utilizing the 802.11a band for high-capacity, bandwidth-hungry devices such as iPads and other tablet-PCs.

Next the team set out to identify and remediate a consistent battery-drain problem two chief nurses were experiencing with their Cisco handsets losing battery power within 4-6 hours, while other handsets averaged 24 hours. Prior attempts to simply replace the handsets didn't solve the problem. The WF1101 WiFi Traffic Generator / Analyzer (part of the WaveDeploy Expert system) was used to capture and analyze traffic between the two handsets and the call manager. Analysis revealed that the two affected phones initiated a 3-second TCP session to the call manager every minute that other phones did not, indicating a unique configuration issue. Once the configuration was changed, the phones stopped draining the batteries.

Finally, the team turned its attention towards capacity planning for future growth. A nurse's station currently under construction was chosen to validate the network's ability to handle high client loads. The WF1101 WiFi Traffic Generator was again used to populate the network with 5 laptops, 5 smart-phones, and 20 Cisco 7925 handsets. Nearly 5Mbps of traffic was generated, including a high percentage of voice, a top priority at nurses' stations. An assessment was conducted using the Lenovo T510 laptop and iPad. The laptop achieved a throughout of only 3Mbps while the iPad fared better achieving 8 -17 Mbps at varying locations. It was determined that the current infrastructure could not support the needed client load, reliable VoIP communication and growing laptop / tablet usage, and an upgrade to 802.11n will be required.

Summary

"Within a 6 hour span, we conducted four separate network assessments and troubleshooting events," said Wallace Jester. "We were able to gain deep insight into our current network capabilities, troubleshoot and remediate a battery-drain problem that has been plaguing our network for months, and assess network readiness for the expected future growth as we bring the CPOE systems online. And although we spent less than a day conducting these tests, we gained knowledge that we were never able to obtain even when we spent weeks testing and troubleshooting."



The WaveDeploy Advantage

WaveDeploy is a strategic site assessment solution for analyzing WiFi networks before, during and after deployments. Optimized for 802.11n, WaveDeploy is the only solution that generates and analyzes application traffic using the exact same clients as end-users, allows users to test capacity with hundreds of client at scale, and presents results in a heat map to convey how performance varies by location. It measures true network readiness and lets wireless professionals gauge the impact of ongoing changes. Eclipsing typical "survey" tools, WaveDeploy measures real QoE for all mobile applications – voice, video, web, data—with a single sweep through a facility. WaveDeploy equips IT managers and Solution Providers with a lifecycle solution for tuning networks, verifying compliance and managing vendors, SLAs and return on investment.