

Using the Meru Radio Switch to Quickly Enable Wireless in Branch Offices

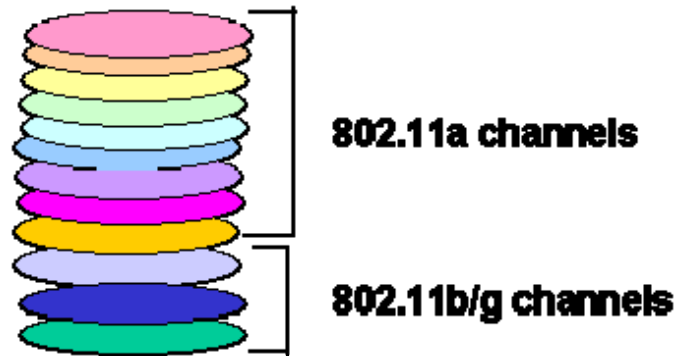
Many corporations have multiple remote or branch offices for local sales, marketing and development teams. Typically, these offices are physically small with no onsite IT support. Deploying 802.11 as the primary network is increasingly a viable option as newer standards such as 802.11g has increased speeds to 54 Mbps. Because many small offices do not support structured cabling, a wireless network gives the enterprise the ability to quickly get to work without hiring contractors or tearing into the walls. The flexibility of wireless also means that as new employees are hired, or the office is reconfigured, that expensive moves and changes are not necessary. In addition, In-Stat reports that in a survey of more than 300 mid-size businesses, 23% of enterprises have deployed wireless voice over IP and another 30% are considering implementing it in the next 6 to 12 months.¹ As voice over Wi-Fi becomes an increasingly viable option with the influx of new Wi-Fi enabled phones, including dual mode cellular/Wi-Fi phones, wireless as the primary network looks even more promising.

Despite the attractions of 802.11 as the primary network for small and branch offices, many corporate IT administrators stop short due to several concerns including:

- Wireless won't provide equivalent bandwidth as a wired network without deploying multiple APs
- Need to perform a site survey to ascertain complete RF coverage at the appropriate bandwidth for the user density and applications
- Determination of correct RF settings for the access points
- Correct configuration of Quality of Service policies, especially Voice over Wi-Fi

The new Meru Radio Switch solves these issues allowing local personnel to quickly deploy a wireless network without wireless knowledge, a site survey or complicated configuration. The Meru Radio Switch provides eight or twelve simultaneous AP channels from a single device. Based on multiple high performance 802.11a/b/g radios with omni directional antennas, a single Radio Switch *simultaneously* delivers up to three 802.11b/g channels and nine 802.11a channels over the entire coverage area, with omni directional antennas.

¹ "Demand for Wireless VoIP Services and Applications in the Business Environment", February 2005, In-Stat



The Meru Radio Switch provides up to 12 overlapping access point channels in an omni directional coverage area from a single device.

Simultaneous multiple AP channels from a single device significantly reduces deployment time and cost. Centralized management allows corporate IT administrators to remotely monitor and manage the wireless network.



A Return to Simplicity - Eliminate Multi-AP Deployments and RF Channel Planning

For larger branch offices with tens of employees, having sufficient bandwidth for each user is a concern. Denser offices, even though they may be physically small, may require multiple APs to ensure adequate throughput for each user. When multiple APs are deployed, RF channel planning and a site survey is needed to ensure proper placement and avoid self-interference. Not only must self-interference within the office be considered, but as many remote offices are in business parks, the impact of wireless LAN networks from neighboring offices must also be considered.

For a remote IT administrator with many tens if not hundreds of branch offices, this is a significant roadblock. Now, not only must the administrator be familiar with the IP networking principles, but he must also have knowledge of RF propagation and 802.11 channel plans. The Meru Radio Switch eliminates these two issues. First, it provides up to 3 channels of 802.11b/g and 9 channels of 802.11a from a single device so the need to deploy multiple APs for the branch office is eliminated.

Secondly, Meru removes the need to become RF knowledgeable. Current WLAN architectures require this expertise because of their inability to properly manage contention for the 802.11 spectrum in a dense environment. Contention occurs due to clients within the office as well as APs and clients in neighboring buildings or floors.

To mitigate contention, all other WLAN systems require proper 802.11 channel planning to make the network perform well. With the Meru Radio Switch, Air Traffic Control technology manages contention created from 802.11 devices both inside the office and from neighboring deployments.

One aspect of contention that cannot be planned around is hidden node. Hidden node occurs when two clients can each reach the access point, but cannot talk directly to each other. In this situation, contention is increased as the two clients try to access the medium simultaneously, causing further reduction in throughput. If multiple cells are needed to physically cover the office space, Meru Virtual Cell technology coordinates contention and manages co-channel interference among multiple APs, further simplifying the wireless LAN deployment. This intelligence makes the fact that the network is based on RF transparent to the administrator. Administrators can deploy confidently, needing only the same knowledge they would deploying a standard Ethernet switch.

Closing the Gap on Wired Network Capacity

One key concern of wireless as the primary network is fear of insufficient capacity. Unlike traditional 802.11 wireless LANs which are similar to Ethernet hubs in that each Access Point provides only a single 54 Mbps channel which is shared, the Meru Radio Switch is more akin to an Ethernet switch. With configurations supporting up to 12 individual 802.11 channels, the Meru Radio Switch provides the equivalent of twelve access points all in a single device. Similar to how a 12-port switch delivers dedicated bandwidth to the users on each port, the Meru Radio Switch provides high bandwidth to each group of users on each 802.11 channel. Twelve simultaneous channels delivers 648 Mbps of capacity, closing in on wired Ethernet switches. Even with 30 people all actively using the network, the Meru Radio Switch will be able to deliver an actual throughput of over 10 Mbps per person!

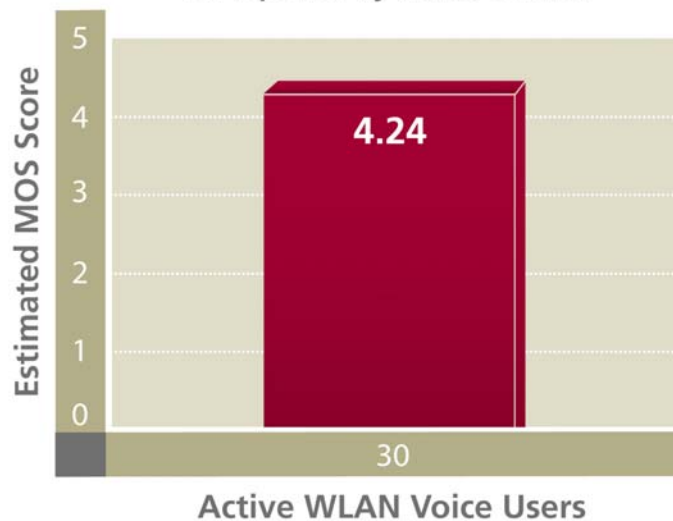
Future Proof Your Office for Voice over Wi-Fi

Whether now or next year, the Meru Radio Switch makes it easy to roll out voice over Wi-Fi. Voice over Wi-Fi is an excellent way to increase the ROI on your wireless LAN investment, and at the same time save costs on phone usage. Voice over Wi-Fi uses voice over IP technology, but instead of a hardwired desk set, allows the use of phones with an embedded Wi-Fi radio, or a laptop or PDA with Wi-Fi running a soft phone application. Because contention is not managed by today's wireless LAN solutions (whether 'heavy' or 'light' architectures), they can only support 6 to 7 simultaneous voice over Wi-Fi calls. In the not so distant future, your employees will be able to purchase cell phones that include Wi-Fi. These phones are designed to find the best network and will switch to Wi-Fi if it is available. Even ten employees walking into an office with these types of phones will bring the network to a halt because of the sudden increased density of Wi-Fi clients. One alternative is to

plan the network now for this application, but doing so increases access points needed and results in the complications of channel planning discussed earlier.

Instead of this complex planning and deployment, use the Meru Radio Switch, which is designed for converged voice and data networks. Meru's patented Air Traffic Control technology ensures that voice applications are scheduled, prioritized, and have bandwidth reserved dynamically over the air to avoid contention with other data applications. Using Air Traffic Control, Meru is able to support 30 simultaneous voice over Wi-Fi calls AND a heavy data traffic load on a single access point. As the Meru Radio Switch really encompasses up to 12 APs, the scalability is enormous!

**Call Quality of 30 Simultaneous Voice Calls
from 30 Standard Wi-Fi Clients over a Single 802.11b AP
As reported by Net IQ Chariot**



Automatic Voice Call Identification Eliminates Complicated Quality of Service Set Ups

Only Meru identifies voice calls and automatically prioritizes voice traffic over data streams such as web or email traffic. Even if the voice call is coming from a softphone on a laptop that is also running data applications! All other solutions only provide user-based Quality of Service (QoS), require separate SSIDs for data and voice traffic or entail complex configuration to ensure QoS on voice calls from data traffic. In the first situation, if the wireless LAN uses user-based QoS, then data traffic from a laptop will have the same priority as voice calls, which will actually result in a negative impact on voice quality.

Using separate SSIDs to provide QoS for voice versus data traffic is also self-defeating. One, it puts the burden on the user to determine which SSID he should be configuring his client for, and two, once the user community realizes that better performance can be had on the voice SSID, the system will break down.

Complex configuration is possible with some solutions to solve the problem of providing high priority voice and lower priority data from the same device, but this then places a large administrative burden on the administrator. The complexities can extend to such esoteric parameters as the desired back off time for voice clients necessitating almost a PhD in the 802.11 protocol.

With Meru, no such configuration is needed. Whether it is a SIP call, H.323, Vocera, Spectralink or other voice over Wi-Fi phone, the Meru Radio Switch automatically recognizes voice traffic and schedules it to ensure the highest voice quality. Contention does not interfere with voice performance as the Meru Radio Switch intelligently schedules client traffic both within the cell and among neighboring cells in multi-AP deployments. No special configuration or knowledge on the part of the user is required to achieve the toll quality voice connections needed in today's business environment.

Manage Personnel Turnover and Location Changes with Ease

Wireless LANs as the primary network for branch offices brings about a much-needed simplification of adds, moves and changes. Personnel rotate rapidly through branch offices, and location may change frequently as well as the company grows. With WLANs, the network is everywhere, so new personnel can walk in, sit anywhere and within minutes are on the network. Partners, customers and guest Internet access is also easily accommodated due to this flexibility. And, if the office moves locations, resuming network connectivity is as simple as ensuring a WAN connection and plugging in the Radio Switch.

Summary

The Meru Radio Switch significantly advances the ability for IT professionals to deploy Wi-Fi as the primary wireless network for branch and remote offices, even those that may have many tens of users. With up to 12 simultaneous AP channels, the Meru Radio Switch provides an astounding 684 Mbps of network capacity. Using Air Traffic Control technology, the Meru Radio Switch eliminates the current complexities of channel planning and RF site surveys inherent in all other solutions that try to support high density users in a small physical space. Intelligent contention management delivers the ability to support high densities of voice over Wi-Fi users on the same infrastructure without a detrimental effect on data traffic. And, unique voice call identification means that when voice over Wi-Fi is ready to be deployed, no special configuration will be required. Clearly the Meru Radio Switch is the solution that can take enterprise wireless networking from an extension of the wired LAN network to the primary network infrastructure.