

Top Six Considerations for Upgrading to 802.11ac

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Section I: Introduction – Understanding 802.11ac

The concept of BYOD is now a freight train that cannot be stopped. IT departments are faced with supporting an order-of-magnitude more devices than just a few years ago, with the majority of these being wireless-only devices. This has put a tremendous strain on corporate Wi-Fi networks, which needs to be faster and more reliable than ever before.

Today's current Wi-Fi standard, 802.11n, is sufficient for creating pervasive wireless networks that can handle a moderate number of devices, but something better is required to handle the needs of tomorrow. The next standard in Wi-Fi is 802.11ac, which promises to be a significant improvement over what is available today. The key feature benefits of 802.11ac are as follows:

- **Gigabit speeds.** The most obvious benefit of 802.11ac is more speed. The current standard allows the 802.11ac version to reach gigabit speeds, compared with the 450Mbps that 802.11n allows. Reaching these speeds requires a number of different factors to come into alignment, but there's no question that 802.11ac is substantially faster than 802.11n. Some may question whether the extra speed is really necessary on a wireless network, but the majority of today's tablets and smart phones are capable of doing real-time video and streaming media, and, as proven in the wired world, users will consume as much bandwidth as possible.
- **Operates at 5 GHz.** The 2.4GHz band that Wi-Fi currently operates on is known by many to be the "junk" band. This is because 2.4GHz is now overcrowded with consumer devices causing contention with corporate devices. Operating at 5 GHz means the wireless infrastructure is broadcasting in a far less crowded spectrum, ultimately providing a better, more consistent overall user experience, with lost connections.
- **Eight spatial streams.** One of the primary benefits of 802.11n was the implementation of spatial multiplexing of streams

using multiple input, multiple output (MIMO), which is the use of multiple antennas at both the receiver and transmitter to improve data throughput. MIMO operates by spreading the total transmit power over multiple antennas to push more bits per second at the same power level. 802.11ac increases the number of spatial streams from four to eight.

- **Multi-user MIMO.** Another interesting feature of 802.11ac is multi-user MIMO, or MU-MIMO. With the 802.11n standard, MIMO can only be used for a single client at any moment in time. MU-MIMO enables support for multiple clients, which would allow an 802.11ac AP to transmit two or more spatial streams to two or more clients. This could be a big improvement, but it's expected that it won't be available until the later 802.11ac chip sets.
- **256 Quadrature Amplitude Modulation (QAM).** QAM enables modulating radio waves to transmit bit-dense data packets. The maximum capacity of 802.11n is 64-QAM, so the implementation of 256-QAM in 802.11ac should allow for a significant increase in throughput.

Section II: Uses Cases for 802.11ac

The release of corporate-grade 802.11ac infrastructure will allow enterprises to create a wireless edge that can be as robust, reliable, secure and resilient as a wired edge. However, IT leaders need to understand how to best utilize this next-generation wireless network. The following are some of the technology use cases that can best leverage the increased speed and throughput of the Wi-Fi network.

Voice over WLAN

Voice has been slowly transitioning to IP over the past decade. The majority of VoIP, though, has connected dedicated IP phones over wired connections. Now that smart phones have become more widely used in the corporate workplace, the VoIP vendors have been very active in

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developing clients for Wi-Fi-enabled smart phones. This will drive rapid adoption of voice over WLAN much faster than voice dedicated Wi-Fi handsets. VoIP creates new requirements for the wireless network, as latency and jitter must be minimized while service quality must be consistent.

Videoconferencing

Enterprise video has been a market in the making for the better part of two decades. Today, though, a combination of smart phones and tablets that are video-capable and easy to use and a younger workforce that has a thirst for visual connections has created an unprecedented demand for videoconferencing, particularly over mobile devices.

Videoconferencing is a powerful collaboration tool that can improve negotiations and shorten decision-making time. However, video drives bandwidth more than almost any other business application. A bad video experience can waste valuable meeting time and create high levels of user frustration. It's imperative that wireless networks that are being deployed today can support video as a mainstream corporate application.

BYOD initiatives

CIO support for the bring-your-own-device trend has never been stronger. A recent ZK Research study shows that 82% of companies now support BYOD, albeit with varying levels of IT involvement. However, allowing consumer devices in the enterprise can have a profound impact on the wireless network. First, implementing BYOD results in significantly more devices on the network. And in just a few years, the number of wireless-only devices could more than triple. This creates density and capacity requirements that are far beyond where today's networks are. Also, many of the consumer-grade devices have weak radios in them, so the wireless infrastructure needs to provide stronger radio signals than with legacy commercial wireless devices.

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Streaming media

Much of the focus of enterprise video has been on real-time conferencing. However, many organizations are using recorded media for initiatives such as digital signage, company meetings, training sessions and customer support. More and more companies want to deliver streaming media over the WLAN for laptops, smart phones and tablets.

Remote expert services

This is another excellent use case of a video-enabled business process. Remote expert services enable customers or field service people to interact with centralized experts no matter where they are. Conversations can be conducted over wireless devices for customer service, field service and technical repairs.

Section III: Top 6 considerations for 802.11ac

Although not commercially available yet, now is the right time to start thinking about 802.11ac deployments. The first corporate products are likely to be available in the middle of 2013, with rapid uptake expected in 2014. Organizations that are ready for 802.11ac will get a jump on their competition. Those that are not ready will be playing catch-up and could miss out on business opportunities. The following are the key factors IT leaders should consider in preparing for an 802.11ac deployment:

- **Understand not only today's enterprise application strategy, but also tomorrow's.** This includes having a good understanding of the types of applications that are being run today. IT needs to determine bandwidth requirements, how latency-sensitive their applications are and what types of devices are the preferred form factors, and then be able to project this out over five years to correctly build a network with the necessary capacity.
- **Consider the company's BYOD strategy.** It's critically important to determine how aggressively the company will be implementing a BYOD plan. This will help IT managers understand the number of

wireless devices being brought on the network so the wireless network can be built to not only handle the number of devices today, but also continue support once BYOD is fully implemented.

- **Identify any areas of congestion or high density.** The traffic across a wireless network is not always uniform, and the areas of high congestion should be identified and planned for accordingly. This will have a positive impact on end-user satisfaction, as workers will have a consistent experience across the network.
- **Explore channel planning options.** Upgrading to 802.11ac involves more than just removing the old access points and replacing them with new ones. What should be considered is how to maximize the benefits of 802.11ac with regard to channel planning options and data rate. Current 802.11 standards require at least three noninterfering channels to complete a successful multichannel deployment. In a best-case scenario, there are four 80MHz channels and one 160MHz channel. Accounting for dynamic frequency selection restrictions, there are only two 80MHz channels available and no 160MHz channel. Such a reduction in channels is a significant challenge to traditional deployment. Meru is a vendor that has solved this problem. Its unique, single-channel technology permits the company to deploy without the need for channel planning while using all of the full speed of 802.11ac with 80MHz channels anywhere within a facility - something that can be supported only by Meru.
- **Plan for continued 2.4GHz device support.** 2.4GHz devices will continue to be used by individuals for some time, so any 802.11ac plan must also include an 802.11n strategy to support these devices. BYOD will have its impact on this class of device, and the demand for more 2.4GHz bandwidth will also increase. With Meru, such a solution involves its existing 802.11n products coupled with deployment of channel layering to maximize available services in the 2.4GHz band.
- **Consider other services that need to be deployed.** The proliferation of mobile applications will mandate that the wireless network support application-level functions like Apple's Bonjour protocol and Microsoft Lync requirements. A real network-level requirement exists to provide gateway capabilities for Bonjour access and wireless unified communications services.

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Section IV: Conclusion

The era of BYOD is here, which means IT leaders need to deploy a network infrastructure that is capable of ushering in this new computing paradigm. While 802.11n is sufficient for now, companies will need to consider moving to 802.11ac shortly after it is available. If the proper steps are taken, organizations can realize a rapid, risk-free migration to 802.11ac that provides a high-quality, consistent and secure user experience that enables workers to be more productive while mobile. To make this transition easier, Meru Networks is offering a unique 802.11ac investment protection plan so enterprises purchasing qualifying three stream 802.11n access points today will be able to trade them in for new 802.11ac access points later for a nominal price*.

While Meru offers highly competitive 802.11n solutions today, it is aggressively leading the market to provide 802.11ac solutions that make the most of the promise of greater throughput and capacity.

Meru and 802.11ac

The exploding demand for wireless throughput will be best met by deploying 802.11ac solutions. Meru's unique differentiators will allow a business to reap the maximum benefit from this new technology: speed, capacity, and application assurance. Our single-channel architecture allows us to deploy pervasive coverage throughout a facility using only a single 80 MHz channel, a feat that conventional Wi-Fi vendors cannot equal. Doubling of client capacity and bandwidth can be accomplished through exploiting another unique feature of Meru's architecture, channel layering.

Planning for 802.11ac is a great investment, and Meru solutions can help ensure success by providing a network that will meet the demands of the new wireless world.

*Conditions apply. See more [here](#)