802.11ac

Q. How will 802.11ac benefit users?
A. 802.11ac offers greater speed for environments dealing with the proliferation of mobile devices and mobile applications, such as HD video and cloud storage. The increased bandwidth will also benefit BYOD (bring your own device) and high user-density scenarios as more Wi-Fi clients begin to support the standard. Laptops and higher-end wireless devices that can incorporate more antennas into their physical design will be able to take full advantage of the new standard.

Q. Why should customers buy Meru's 802.11ac solution?
A. The primary reason for upgrading to 802.11ac is increased capacity and speed. Meru is delivering the world's fastest 802.11ac AP, providing up to 2.6 Gbps data rates through two 5 GHz 802.11ac radios. Meru's solution has two 802.11ac radios (versus the single radio provided by most vendors), and because of its unique single-channel, Virtual Cell architecture, Meru recommends using 80 MHz channels, while the competition recommends using 40 MHz channels, as required by their multi-channel implementation: this allows Meru to provide an AP that operates twice as fast. Meru also has a comprehensive set of software and management tools, including centralized network management, identity management, WIPS and PCI compliance, and cloud controller support.

Q. When will Meru start shipping 802.11ac products?
A. The AP832 was made commercially available as of October 1, 2013.

Q. How do I buy Meru's 802.11ac access point?
A. To locate a Meru reseller near you, contact (toll free) 877.952.6725 or, outside the U.S., +1 408.215.5300. Ask for the product by name: AP832.

Q. What is the upgrade path for current customers who have 802.11n access points and controllers?
A. Existing Meru controllers can be upgraded to support 802.11ac using the latest firmware, SD 6.0, which will be available for download. To take advantage of 802.11ac, customers need to buy the new 802.11ac AP832 access point. As customers replace their existing APs with 802.11ac APs and deploy them in highly trafficked environments, such as convention halls, meeting rooms, and auditoriums, their existing Meru controllers will be able to manage and support the new APs.
Q. How many 802.11ac APs are supported by each controller model?
A. The same number of 802.11ac APs will be supported as the current models:

- MC1550 : 50 APs
- MC3200 : 200 APs
- MC4200 : 500 APs
- MC6000 : 5,000 APs

Q. Will 802.11ac create bottlenecks for controller-based technologies?
A. No, it shouldn't. Meru offers WLAN controllers that support multiple 10 Gbps interfaces and high availability for massive, scalable 802.11ac wireless LAN networks. Meru also supports Bridge-mode, which decouples the data plane from the control plane, so that data does not need to flow through the controller. During 802.11n's ratification period, similar concerns were raised about the centralized architecture, but fears about the lack of bandwidth through a controller proved unjustified. Meru's architecture is designed to allow you to continue using your existing infrastructure and migrate to larger controllers, or a distributed data plane, when the need dictates.

Q. Will I need to run an extra 1 Gbps Ethernet drop to the access point?
A. This is not mandatory, but should be considered. While the 802.11ac AP offered by most vendors will typically support only one 802.11ac radio with data rates approaching 1 Gbps, Meru's AP832 will be able to support data rates up to 2.6 Gbps, which exceeds the capacity of a 1 Gbps Ethernet connection. For the majority of deployments, however, the single, 1 Gbps Ethernet is sufficient to support one 802.11ac 80 MHz configuration and one 2.4 GHz 40 MHz configuration.

Q. How do I use the second Ethernet port on the AP832?
A. In a nominal usage model, one radio will be used to support 2.4 GHz b/g/n devices, and the other to support 5 GHz a/n/ac devices. In this configuration, a maximum aggregate backhaul data rate will be well below the 1 Gbps rate and easily handled by a single, 1 Gbps Ethernet link. The theoretical 1.75 Gbps data rate is not achievable because of protocol overhead and retransmissions. Use of the second Ethernet port for backhaul services will be supported in a future System Director release.

Q. Should customers start planning for 802.11ac today?
A. Yes. Any new network put in place today should last four to six years. With 802.11ac products starting to ship, it makes sense to consider how your network will incorporate this new standard. When selecting your network, you should consider high-density environments such as convention halls, meeting rooms, and auditoriums, or spaces that routinely utilize HD video or cloud storage services. In addition, BYOD clients such as smartphones and tablets are already coming to market with 802.11ac built in (e.g., the latest Samsung Galaxy phones).

Q. What is Meru's Investment Protection Plan?
A. Meru offers an Investment Protection Plan to make the transition from 802.11n to 802.11ac easier. Subject to the terms and conditions of the Program, customers who have purchased an eligible Meru 802.11n access point between November 1, 2012 and December 31, 2013 may trade-in their eligible 802.11n access point in exchange for the purchase of a new 802.11ac AP832 access point for only $499.
Q. How do I get support for Meru’s 802.11ac AP?
A. All Meru products are sold with 12 months of support, with continued support contracts available in 12-month increments. In addition, through our MeruAssure Support program, our customers can obtain additional support services for our access points, controllers, and software. Please visit http://www.merunetworks.com/support/index.html for more information.

802.11ac Technology Primer

Q. What is 802.11ac?
A. 802.11ac is the next generation of Wi-Fi technology being standardized by the IEEE, following the existing 802.11n standard. It is intended to support networks that run faster and more efficiently.

Q. How is 802.11ac different from 802.11n?
A. 802.11ac provides greater performance than 802.11n with first-generation products operating at up to 1.3 Gbps maximum data rates, or about three times faster than the maximum 450 Mbps data rates of today’s 802.11n products. 802.11ac operates only in the 5 GHz unlicensed spectrum, whereas 802.11n operates in both the 2.4 GHz and 5 GHz spectrums.

Q. Is 802.11ac backward compatible with 802.11n and older Wi-Fi standards?
A. Yes, depending on the type of client and network. Existing 802.11n 5 GHz and 802.11a clients will be able to connect to 802.11ac networks. These types of clients are typically labeled 802.11a or 802.11an. Similarly, new 802.11ac clients will be able to connect to 802.11an 5 GHz networks.

802.11n 2.4 GHz and 802.11bg clients will still require an 802.11bgn network that supports 2.4 GHz, but it is expected that most AP products will support both bands. These types of clients are typically labeled 802.11bgn or 802.11bg.

Q. When will the 802.11ac standard be ratified?
A. The final certification of the 802.11ac standard by the IEEE is expected to be completed by late Q4-2013 or early Q1-2014. Products will show up in the market in advance of the final standard, but it is anticipated that there will be no substantive changes to the standard between first product availability and the final certification.

Q. What is Multi-User MIMO?
A. Multi-User MIMO (MU-MIMO) is a part of the 802.11ac standard that defines how an access point can communicate to up to four clients simultaneously. Leveraging the capability of beamforming, this feature incrementally increases the total active client capacity for the network. This feature is not supported in the first generation of 802.11ac silicon, but should be available in the second-generation product in late 2015.

Q. What is the difference between 802.11ac and 802.11ad?
A. 802.11ac and 802.11ad are two different wireless standards in development by the IEEE. 802.11ad works in the 60 GHz frequency band, as opposed to Wi-Fi, which operates in the 2.4 GHz and 5 GHz frequency bands. The 802.11ad standard is expected to be used more as a wireless replacement for short wired connections such as HDMI, USB, and laptop docking stations.
Q. **How do you upgrade an existing LAN with 802.11ac?**

A. There are two basic approaches for deploying an 802.11ac solution in an existing network: overlay or replace. The first approach may be appropriate for a staged integration, where selected areas of the network require the higher bandwidth provided by the “ac” access point. However, to receive the full advantage of the standard, a replacement strategy is the way to go. Although support for 802.11ac requires new hardware for the access points, typically all the controller element requires is an update to the firmware. Meru’s System Director 6.0 supports 802.11ac.

Q. **How many devices can be connected simultaneously, downloading multimedia rich content, to one 801.11ac access point?**

A. The number of devices that can associate with an 802.11ac access point is 128, but the number of active devices supported is directly dependent upon the aggregate bandwidth demand on the access point. This aspect is determined by the mobile client application mix and the efficiency of the access point hardware. Typically, this will be 10 to 20 devices, but your “mileage” may vary.

Q. **Has Apple confirmed it will release 802.11ac-compatible devices? Same question for Android and Microsoft 8 platform manufacturers.**

A. Apple and Samsung have made commitments to 802.11ac with their MacBook Air and Galaxy 4S devices. It is expected that future devices from these companies will also support 802.11ac. With 802.11ac chip sets commercially available, it makes little sense to develop new products based on 802.11n. With the Apple MacBook Air and Samsung Galaxy 4S supporting 802.11ac, other vendors will quickly follow.

Q. **Does 802.11ac promise fewer interference problems with other wireless?**

A. Because 802.11ac only supports the 5 GHz band, it will be more stable than the crowded 2.4 GHz band. More channels means less potential for interference. However, since the standard mandates support for the 80 MHz channel, the previous statement appears to be somewhat contradictory. While the 5 GHz band is wider, there are restrictions on access to certain channels based on national or international RF regulations. Without the restrictions, there are plenty of 80 MHz channels (a maximum of five) with which to deploy a network. With the restrictions, the number of available channels drops to a maximum of two, making traditional multiple-channel planning almost impossible.

The short answer to the question is “somewhat.” With Meru’s single-channel approach, the level of interference is the same it has always been – no changes.

Q. **Can 802.11ac coexist with n, or will ac overpower and interfere with n devices and access points?**

A. 802.11ac coexists nicely with 5 GHz devices running 802.11a or 802.11n. No need to change devices.

Q. **What is the maximum bandwidth of the access point in the “first wave”?**

A. Wave-1 design supports 3x3:3 streams, which can generate a raw 1.3 Gbps per radio.
Q. Would you please comment on Wave-1 and Wave-2 implementation of 802.11ac?

A. Wave-1 will have the bulk of the “ac” benefits, including beamforming, 80 MHz wide channels, and 256-QAM. This is a major step above 802.11n in addressing the growing bandwidth demand. Wave-2, which may be available sometime in 2015, will support Multi-User MIMO (MU-MIMO) and 160 MHz or (80+80) MHz wide channels. The biggest benefit for enterprise will come with WAVE-1. WAVE-2 will increase client capacity and double the data rate, but the availability of 160 MHz channels may be a problem both in the U.S. and Europe.

Q. Without many 11ac clients available, is 11ac even useful?

A. Adoption of 802.11ac will be driven by availability of clients. Analysts suggest that the adoption curve for the migration to 802.11ac will happen faster than the transition to 802.11n. Networks being deployed today are expected to last up to five years, which means it makes sense to consider purchasing 802.11ac now, especially given the small differences in price. So, going forward, expect to see every new device “ac” ready!