ProSAFE® WAC720 and WAC730 and everything 802.11ac

Frequently Asked Questions

1. What is 802.11ac?

802.11ac is the newest generation of the WiFi standard. Sometimes referred to as the 5th generation (after 802.11b, 802.11a, 802.11g, and 802.11n). Within the 802.11ac standard, there are 2 waves (or stages) of implementation. Wave 1 is generally available today, and Wave 2 products are slowly coming to the market. Wave 2 builds on wave 1 and includes MU-MIMO and support for 4 streams (over 3 in wave 1) as well as higher throughput. NETGEAR WAC720 and WAC730 products are Wave 1 products. WAC740 (planned to launch by Q2 2016) is a Wave 2 product.

2. What trends are driving adoption of 802.11ac?

Proliferation of video, increases in the number of WiFi devices, and cloud enabled applications are three key factors in driving the adoption of the 802.11ac.

More than 50% of Internet traffic in 2016 will be video, and that will increase to more than 80% by 2019. Video demands higher throughput and 802.11ac delivers the transmission pipeline to support higher service expectations.

Adoption of BYOD (Bring Your Own Device) across enterprise and now extending to K-12 education, along with the proliferation of WiFi enabled smartphones and tablets demands a solution that requires support of higher client capacity per radio at the specific rate. 802.11ac can support higher density of clients at a given rate.

With cloud hosted applications, the traffic profile of clients have changed. More applications are now hosted on the cloud, resulting an increase of traffic over the network (and wireless access) as compared to the traditional model, where the applications are hosted directly on the client device. This increase of traffic over the network mandates an increasing size of pipe (wired and wireless) for network connectivity.

3. What is the frequency that 802.11ac operates?

802.11ac operates on the 5 GHz frequency band. Most of the 802.11ac Access Points are dual band with concurrent operation at 2.4 and 5 GHz. Wireless-ac devices use 802.11n standards on the 2.4 GHz band (and therefore, generally at lower throughput, around 300 Mbps to 450 Mbps of theoretical PHY rate). Furthermore, the 5 GHz frequency band is a much quieter, less noisy environment, and therefore, client devices that operate at 5 GHz using 802.11ac are expected to have both higher throughput and a better user experience. WAC720 and WAC730 are both dual band concurrent access points.

4. Is 802.11ac backward compatible with 802.11n/a?

Yes, 802.11ac standard is backward compatible with 802.11n and 802.11a operating at 5 GHz. The legacy user experience will be transparent when the infrastructure is migrated from 802.11n/a to 802.11ac.

5. What are the key differences between 802.11ac Wave 1 and 802.11n?

There are 4 key technical advancements that are achieved by 802.11ac that enables higher throughput and better user experience:

- Stronger encoding with 256 QAM to enable more robust transmission of data
- Wider channel bandwidth (up to 80 MHz for enterprise use) to enable higher throughput
- More spatial streams (up to 4) to maximize throughput and probability of successful delivery
- Operates on less crowded, less noisy 5 GHz frequency band

6. What is the benefit of stronger encoding with 256 QAM?

Stronger encoding gives each transmitted bit of data more granular specification or representation, such that if one bit of data is corrupted, it is easier to correct the data without retransmission. Take the easiest example, if you are sending one byte of data and you can only represent that byte of data as True or False, if this data is corrupted, you don't know if the original data is true or false. If you represent the one byte of data as 10 Trues or 10 Falses, and if the data is partially corrupted, for example, you receive 9 True and 1 False, you can reliably guess that the originally transmitted data really is true.

7. What is the benefit of wider channel bandwidth?

To squeeze the data through the medium to the destination, it is analogous of a car driving on a highway. If the highway has only one lane, you may get stuck behind someone slow. If the highway now doubles to two lanes, you have a better probability to go faster. This is analogous to 802.11ac standard of increasing the channel bandwidth from 40 MHz to 80 MHz. But keep in mind that the medium (or in our real world example, highway) is not an infinite resource, so wider bandwidth has some trade-offs such as frequency reuse that will need to be handled with more intelligent controller-based algorithms for frequency re-use assignment (which NETGEAR will implement on our controller code).

8. What are the key differences between Wave 1 and Wave 2 802.11ac?

Wave 2 introduced the concept of Multi-User MIMO (MU-MIMO). MU-MIMO allows the simultaneous transmission of data to multiple clients. This is analogous to Hub (802.11ac Wave 1) and Switch (802.11ac Wave 2) in the wired world. For example, MU-MIMO will allow the AP to transmit one stream to a WiFi phone and simultaneously, transmit two streams to a laptop. Wave 1 utilizes Single User-MIMO (SU-MIMO) – the ability for an AP to send multiple streams to one device at a time (requiring the device to have more than 1 antenna).

NETGEAR WAC740 (planned to be released by summer 2016) will be based on the Wave 2 standard.

9. What is Ensemble Mode management?

Ensemble Mode Management allows centralized configuration and management of up to 10 like APs as a single group, without the need for an on-premise controller. With Ensemble, all management is performed remotely through a single secure management IP address to the master Access Point's web browser. As the management function is hosted on the AP, operational administrative tasks that are relevant to traditional controller architectures are eliminated — the purchase, update, support renewal, and HW maintenance of a separate controller is not required . This is perfect for small and medium enterprises that do not have the in-house IT resource to support. Ensemble Mode Management is offered at zero cost allowing SMBs the opportunity to step up from standalone Access Point deployments into a transparent and self-organized Wi-Fi network.

10. Can I mix WAC720 and WAC730 in the same Ensemble group?

No. Ensemble management manages like models of Access Points in the same group. Users can configure two separate ensemble groups in the same subnet by defining distinct Ensemble names. WAC720 and WAC730 need to be defined in separate Ensemble groups.

11. Should I wait for 802.11ac Wave 2 or should I implement Wave 1 today?

Wave 1 solutions today, such as WAC720 and WAC730 come with significant performance and reliability improvements over 802.11n products at a nominal price premium (typically less than 10%). As traffic requirements increase in enterprises, many deployments today will benefit immediately from the upgrade to 802.11ac Wave 1. Most of the client devices today are based on Wave 1, and an upgraded infrastructure can benefit fully without waiting for Wave 2. Note that Wave 1 APs won't support Wave 2 clients in MU-MIMO mode.

### 12. Should I buy NETGEAR 802.11n or ac product?

NETGEAR continues to offer customers cost effective 802.11n solutions. For many customers, 802.11n is considered 'good enough' where dual band APs can be bonded to support 900Mbps throughput. Consider that the analyst group, IHS Infonetics, pointed to 802.11n still commanding a clear presence with 1/3 of sales in 2016 in their Q414 WLAN equipment market share report, with 11ac forming the remaining lion's share. At the same time, both WAC720 and WAC730 offer an affordable 'step up' in WiFi performance for more demanding environments. Both operate in either standalone or Ensemble mode for centralized group management of up to 10 like AP's without additional hardware, licenses or support fees. If a customer wants immediate controller or cloud based deployments, then existing NETGEAR 802.11n AP managed solutions should be positioned. Customer's happy to use WAC720 or WAC730 in standalone or Ensemble mode will benefit from both being WC7600/WC9500 and Business Central Wireless Manager ready. Controller support is planned for Q1 '16 with Cloud support to follow shortly afterwards.

13. Is 802.11ac going to deliver significant larger area coverage than 802.11n?

Not necessarily. The advent of 802.11ac with the many technical advances as described above, are mainly intended to deliver higher throughput and more reliability. Users may see better throughput at the edge of coverage, but the 802.11ac standard was not defined to specifically improve the coverage area of Access Points. 802.11ac delivers higher throughput at a given distance compared to 802.11n, and this can benefit users at the edge of the coverage. For example, in a 802.11n network, a user may be able to transmit only 500Kbps at the edge of the network, but at the same location in a 802.11ac deployment, this user may now be able to transmit at 2Mbps (assuming all other variables are constant). And in this specific scenario, a user may now be able to sustain a throughput high enough for video with 802.11ac, whereas with 802.11n infrastructure, it could only sustain web browsing. Below is an illustration showing the effect of 802.11ac vs. 802.11n in a graph of speed (throughput) vs. coverage.
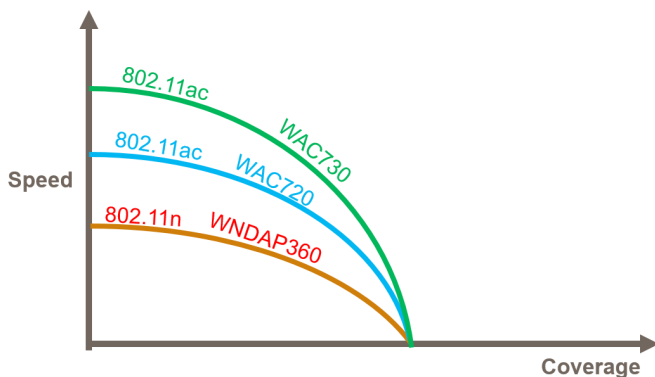
14. Is 802.11ac going to support higher client density than 802.11n?

Yes, for capacity limited deployment. 802.11ac is able to deliver higher aggregate throughput than 802.11n (by a factor of 2x to 3x). Assuming that the deployment is limited by the number of clients in a coverage area (as opposed to a coverage limited deployment), having a higher ceiling automatically translates to a higher total number of clients supported by the access point (assuming all variables, such as types of applications supported, stay constant). The following illustration shows the potential additional capacity achieved by 802.11ac at any given speed.
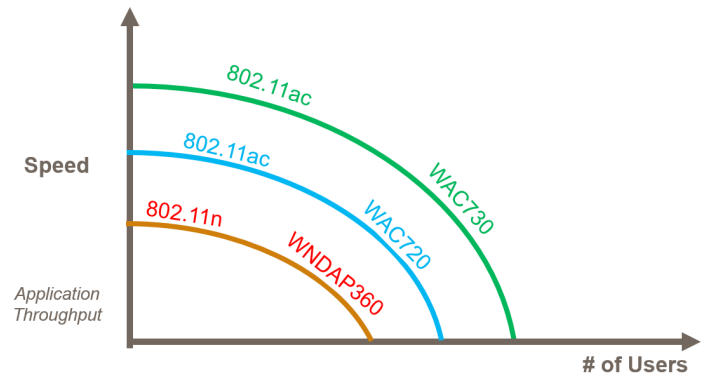
15. Do I need PoE+ for operation of WAC720 and WAC730?

No. Full throughput of WAC720 and WAC730 can be achieved with one single PoE port. Most of the products today were rushed to market, and power budget was traded off to time to market, and therefore, require higher priced 802.3at to achieve full throughput. NETGEAR WAC720 and WAC730 were designed with power consumption in mind, and can support full functionality with a single power efficient PoE (802.3af) port. The benefit to the user is a lower Total Cost of Ownership for deployment of NETGEAR 802.11ac solution.

16. Do the WAC720 and WAC730 come with an AC/DC power adapter?

No. AC/DC power adapter can be purchased as accessory.

17. Do WAC720 and WAC730 support lifetime warranty?

Yes. All ProSAFE Wireless Access Points, including WAC720 and WAC730 support lifetime warranty, lifetime online chat support and 90 days phone support as standard.

18. How many Wave 2 clients are available today?

Client devices with Wave 1 802.11ac chipsets are already on sale. New smartphones are arriving with 2 x 2 streams, whilst laptops with 3 x 3 are available. Wave 2 clients are not currently available at the time of writing and are expected to appear from mid to late 2016 onwards.