OPTIMIZED 802.11AC WAVE 2 NETWORKS
The Perfect Union for Multi-Gigabit Applications:
Ruckus 2.5GbE Wireless and Wired

Ruckus™

APPLICATION NOTE

With the advent of high-bandwidth, media-rich applications, the bring-your-own-device (BYOD) trend and the Internet of Things (IoT), businesses are rapidly migrating to 802.11ac Wave 2 Wi-Fi. This offers many advantages—speed that matches or exceeds wired networks, greater bandwidth, flexibility and the ability for one access point (AP) to transmit multiple data streams to multiple connected devices simultaneously via MU-MIMO. It's becoming apparent that gigabit Ethernet may not be sufficient to deliver optimal 802.11ac Wave 2 performance and capabilities, particularly in high-traffic or high-density environments in sprawling spaces. In response to this, network vendors have recently rolled out various multi-gigabit Ethernet (GbE) switching options for the network edge—including 5GbE and 10GbE options. The question that arises is: How much do you really need?

Ruckus has the answer. To take full advantage of 802.11ac Wave 2, Ruckus 2.5GbE wireless APs and the network switch work together to deliver optimized performance at an affordable price.

WHAT YOU NEED TO SUPPORT 802.11AC WAVE 2

In most scenarios, 1GbE to 2.5GbE solutions are more than sufficient to fulfill most networking requirements. In fact, there are few, if any, scenarios that justify higher capacity at this point in time or in the near future. Anything more exceeds the capacity of 802.11ac Wave 2 and requires a big financial outlay—without a justifiable return on investment.

Client   Old Bottleneck   Pre-802.11ac   AP   New Bottleneck   With 802.11ac Wave 2   Switch

Network performance is only as good as the weakest link. Historically, 1GbE has been more than adequate to backhaul Wi-Fi APs because the Wi-Fi interface was the throughput bottleneck. Nowadays, fully featured 802.11ac Wave 2 has shifted the bottleneck from the Wi-Fi interface to the Ethernet interface. In cases where the access point's Wi-Fi interfaces are maximally utilized—with clients on both 2.4GHz and 5GHz radios with maximum channel widths and highest possible physical layer rates—a 1GbE backhaul would be overtaxed. In the most extreme cases, today's state-of-the-art 802.11ac Wave 2 APs may achieve upwards of 1.5Gbps total TCP throughput—so 2.5GbE at the AP and switch port fits the bill with some capacity to spare. Even with new evolving Wi-Fi standards, it will likely be many years before clients which can drive APs to greater than 2.5Gbps exist in high enough numbers. Connecting current APs to 5GbE and 10GbE switches won't result in faster speeds, as the maximum realistic throughputs for APs are based on current standards. 2.5GbE is ideal for 802.11ac Wave 2 APs, laptop and desktop computers, Voice-over-IP (VoIP) phones, video cameras, printers and other device connections.

The argument of high-priced solutions that go beyond 2.5GbE as a way to future proof your network does not hold up in today's world. While the next-generation 802.11ax standard does promise higher total throughput, its true objective is to improve wireless efficiency and allow more clients to better share available bandwidth.

NETWORK CAPACITY WITHOUT THE HIGH PRICE TAG

For enterprises that have embraced 802.11ac Wave 2 and need to support high-density environments where thousands of users attempt to connect simultaneously, there's an affordable and flexible alternative. Ruckus delivers optimized multi-gigabit performance with paired multi-gigabit wireless/wired APs and switches—without the need to replace your existing cabling infrastructure. Our 2.5GbE AP/switch support open industry standards, offering unconstrained 802.11ac Wave 2 performance without the heavy price premium associated with competitive solutions.

Our solution includes two components that were developed within the same timeframe and were built with an eye toward full integration:

The Ruckus R720 Indoor AP: This AP, with its 2.5GbE port, is purpose-built to support 802.11ac Wave 2. Each AP supports up to 512 clients and provides reliable connectivity and extensive coverage for high-density Wi-Fi environments, such as corporate campuses, convention centers and large lecture halls or classrooms. Patented Ruckus technologies set the Ruckus R720 AP apart from the rest. These technologies work together to help maximize the rate at which we can deliver throughput to client devices.

Our adaptive, smart antenna systems, powered by BeamFlex®+ technology, directs radio signals to clients on a per-packet basis, which enables mobile devices to receive signals with a high signal-to-noise (SNR) ratio so that they get the highest possible throughput from the AP. Antennas on traditional APs transmit in all directions, in circular fashion, much like a light blub. In Ruckus APs, the algorithm driving the antenna sends transmissions in specific directions towards client devices wherever they are located. It quickly adapts to environmental conditions, is resilient to interference and changes in client device location and orientation.

Ruckus ICX® 7150 Z-Series Switch: This 48-port switch has 16 2.5GbE ports and integrates seamlessly with Ruckus wireless APs, delivering unified wireless and wired network access. The combination of our innovative Ruckus R720 indoor AP with its 2.5GbE port combined with the Ruckus ICX 7150 Z-Series switch eliminates Ethernet bottlenecks in this segment of the connectivity chain. Our 2.5GbE wireless capacity is now completely unencumbered and able to function at full capacity when paired with this multi-gigabit switch for a fully interoperable and scalable solution.

With the average number of APs per switch estimated at 12 or 13, the Ruckus ICX 7150 Z-Series switch can easily accommodate your wireless number of APs and scale up as needed. With dual redundant, best-in-class 1480W load-sharing power supplies, the Ruckus ICX 7150 Z-Series switch has enough power budget to support any number of APs that you choose to connect. As a critical link in your network connection, the dual hot-swap power supplies and fans also provide resiliency, so you can replace a power supply without taking the switch down.

In addition, when stacked with other members of the ICX 7150 family, the Z-Series switch doubles the bandwidth of the entire stack.

Advantages of the Ruckus 2.5GbE Wireless and Wired Solution

- **Full-performance 802.11ac Wave 2:** Optimizes the latest, fastest Wi-Fi technology, which addresses latency-sensitive, throughput-hungry applications and increasing device densities.
- **Retain existing cabling:** Support for 2.5GBASE-T on both the AP and the switch means you don't have to replace your existing CAT 5e cabling configurations, resulting in substantial cost savings—up to $150 per pulled cable port.
- **Optimized cost/performance:** Delivers multi-gigabit performance at a significantly lower cost than 5GbE or 10GbE technology—switches that support 5GbE or 10GbE can run up to four times the cost of a 1GbE solution.*

* Source: June 6, 2017. Retrieved from http://itprice.com.

Prices For 48-Port PoE Switch
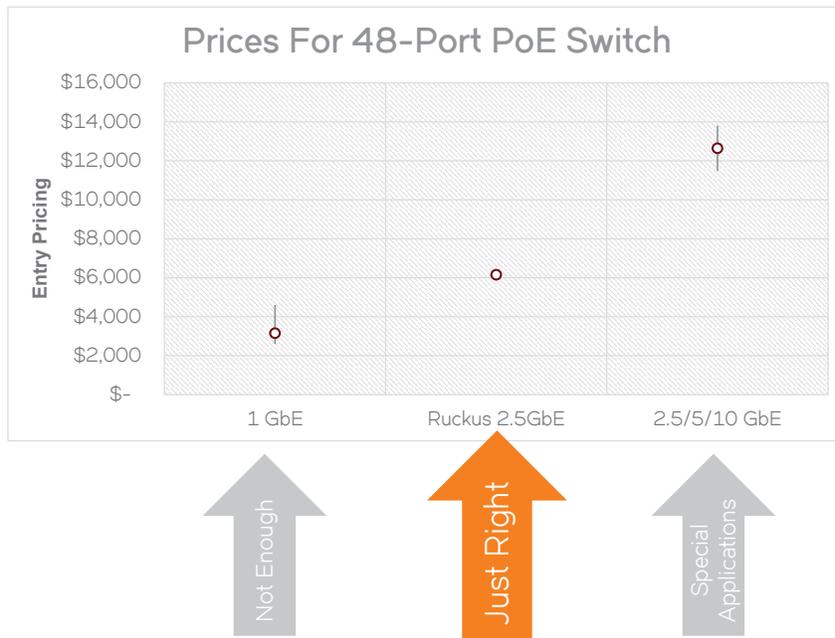
THE PERFECT UNION: GET MORE OUT OF YOUR NETWORK

Developed in parallel, the Ruckus R720 and the Ruckus ICX 7150 Z-Series are a well-matched pair that delivers an optimized network edge solution and goes beyond performance. Features unique to Ruckus take advantage of all the capabilities of multi-gigabit at a value price. This single-vendor solution offers the ability to customize and scale as your network needs change and new Wi-Fi standards emerge. Looking forward, as we continue to develop complementary products, we see the potential for further integrations, such as shared management platforms and joint features that leverage both the APs and switches. Ruckus helps you get more out of your network.

FOR MORE INFORMATION

- Ruckus R720
- Ruckus ICX 7150 Z-Series