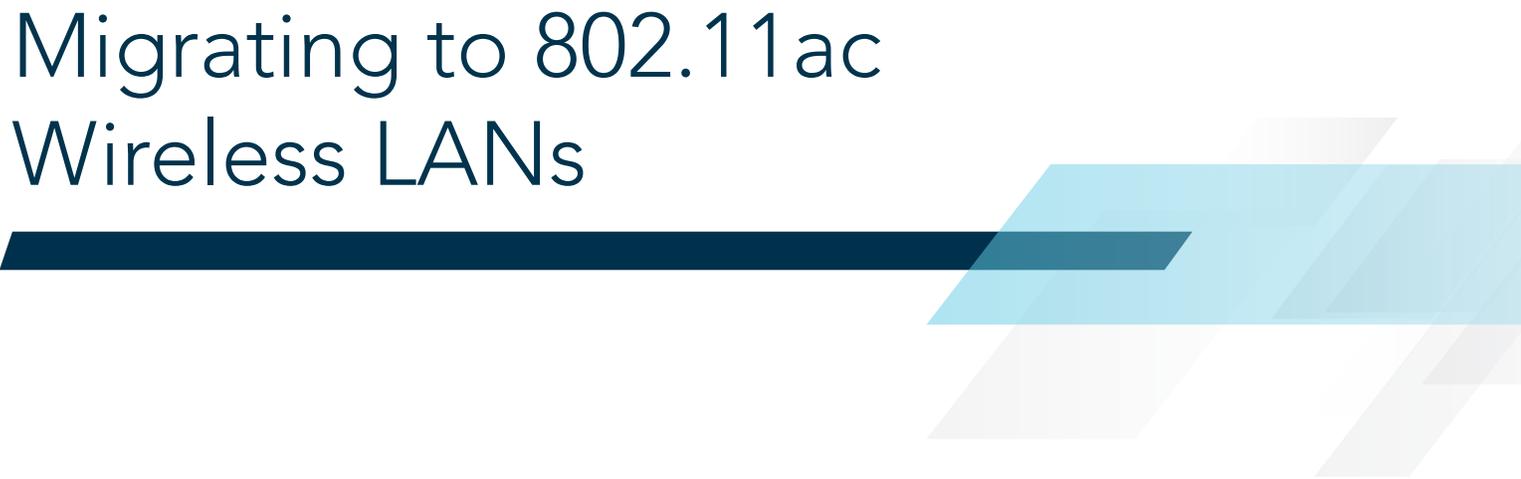


SOLUTIONS BRIEF

Migrating to 802.11ac Wireless LANs



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With an average number of 2.8 wireless devices per person, business users are increasingly dependent on Wi-Fi for their everyday needs. Modern enterprises depend on wireless access for communications and business applications including ERP, CRM, business analytics and collaboration. At the same time, bring-your-own-device (BYOD) brings an array of recreational and personal applications to these same wireless networks.

Now the latest Wi-Fi technology—802.11ac—is ramping quickly in the enterprise and promises to further progress wireless as the primary means for network access. 802.11ac is the first wireless standard to break the Gigabit per second speed barrier through the use of faster modulation, wider bandwidth channels, up to 8 antennas, and multi-user MIMO (MU-MIMO). 802.11ac operates exclusively in 5GHz frequency band.

Xirrus delivers a broad range of high performance, low cost 802.11ac solutions for the enterprise. Xirrus' unique innovations get the most out of 802.11ac's advances while maintaining excellent performance for legacy Wi-Fi technologies. With software programmable radios, a distributed architecture, ACEXpress™, and a modular, future-proof platform, Xirrus simplifies migrating to 802.11ac and enables customers to optimize their deployment of the technology.

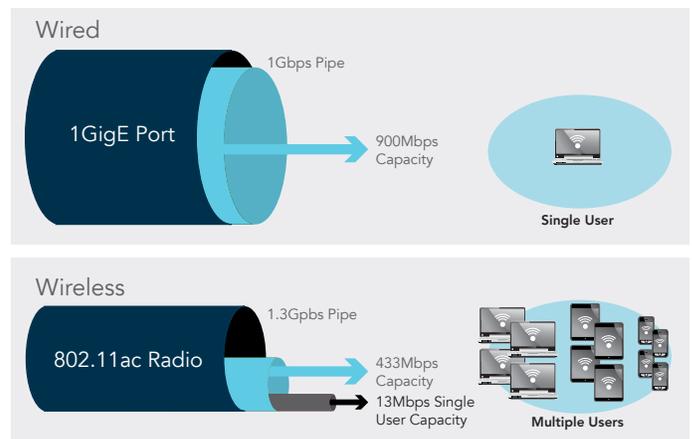
Deployment Challenges

Even as 802.11ac takes hold, IT departments must continue to support legacy 802.11 technologies that operate from low Mbps to hundreds of Mbps, including 802.11a, b, g, and n operating in the 2.4GHz and 5GHz bands.

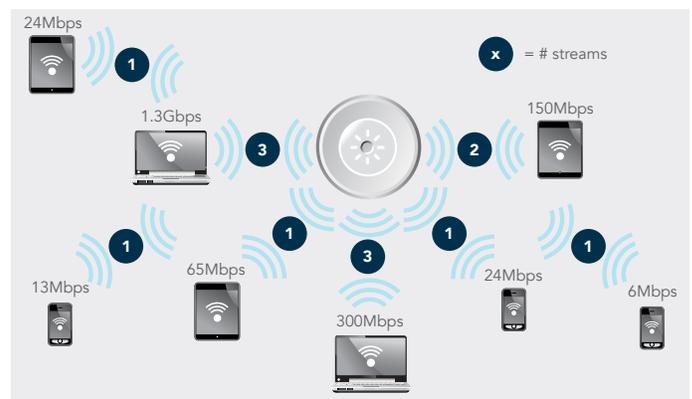
Implementing 802.11ac presents several challenges:

- **Changing Landscape** – Wireless technology and devices continue to evolve at a rapid pace (e.g. Wave 1 and Wave 2 802.11ac) in tandem with the rapid growth in wireless network usage over time. With new Wi-Fi technologies emerging every few years, keeping the wireless infrastructure up to date is an ongoing challenge.

- **Application Performance** – Wireless is shared medium and even with 1.3Gbps (Wave 1) 802.11ac speeds, each user typically will see only a small fraction of this bandwidth given protocol overhead and sharing access between multiple users. Optimizing available bandwidth is critical in any wireless technology to be able to deliver the performance needed for business applications with priority over recreational usage.



- **Mixed Clients** – Slower 802.11a/n devices have a dramatic negative effect on overall throughput when sharing the medium with the faster 802.11ac clients. Faster devices must wait for slower devices to complete their packet transfers before communicating.
- **BYOD Clients** – Most BYOD clients—tablets and smartphones—are small form factor devices with either one or two antennas due to size and power considerations. The restricted capabilities of these devices must be considered in the design of wireless infrastructure that should be right-sized to match the client devices it will support without paying a premium.



DEVICES	2.4GHZ	5GHZ	ANTENNAS
Media Players (iPod Touch)	X	Some	1x1
Smartphones – low end	X		1x1
Smartphones – high end	X	X	1x1
Tablets – low end	X		1x1
Tablets – high end	X	X	2x2
Laptops – low end	X	Most	2x2
Laptops – high end	X	X	3x3

The Xirrus Solution— Maximizing performance and capacity at a lower cost

Xirrus access points and Arrays optimize overall wireless network performance. An integrated controller, application-level intelligence, and automated provisioning, enable the Xirrus APs/Arrays to deliver a robust 802.11ac solution with lower total cost of ownership.

Unique benefits of Xirrus 802.11ac solutions

Scalability and High Resiliency – The conventional method of deploying thin access points tied to central controllers is increasingly challenged with the explosion of devices, applications and the faster speeds of 802.11ac. Xirrus APs/Arrays are based on distributed architecture with an integrated controller in each AP. In centralized architectures, APs are reliant on a central controller that exposes performance and resiliency issues.

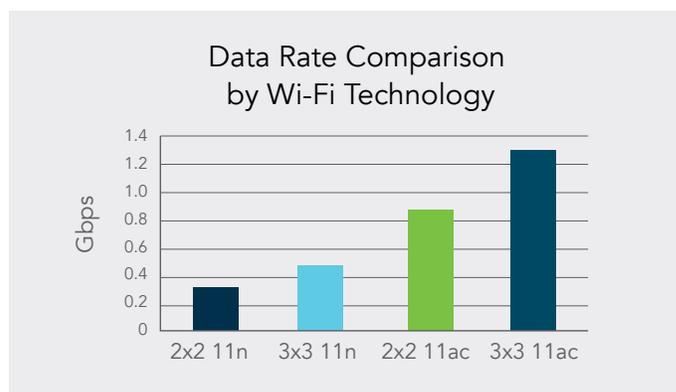
Xirrus distributed architecture delivers:

- **Linear Scalability** – Capacity is incrementally added to the network as every AP is added.
- **Efficient Policy Enforcement** – Policies are applied with greater efficiency directly where users connect at the network edge.
- **High Resiliency** – Each AP operates as a standalone device with no central controller and hence no single point of failure.
- **Superior Network Performance** – By processing control and data traffic at the network edge, performance is improved with fewer network hops and reduced latency.

High Performance

Xirrus APs/Arrays are built on a high performance platform that utilizes 2 to 6-core processors (depending on model) to handle the high packet rates of 802.11ac. Xirrus networks support:

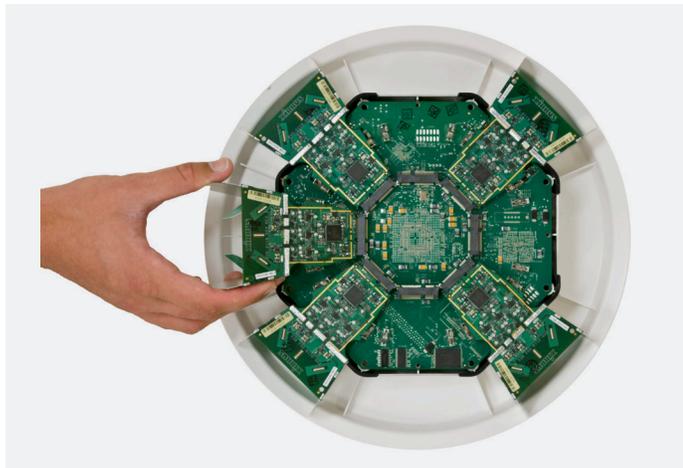
- **Increased uplink speeds** – The AP/Array support from 2–4 Gigabit Ethernet (plus optional 10GigE fiber uplink) to provide bandwidth necessary for congestion free 802.11ac connectivity.
- **ACEExpress™** – Xirrus APs/Arrays automatically segregate faster and slower wireless devices on different radios allowing every client device to perform at its maximum capacity.
- **Band Steering** – The AP/Arrays can recognize the client capability and steer the appropriate clients to the less congested 5GHz band.
- **Application Control** – Using deep packet inspection (DPI) technology, Xirrus APs/Arrays can identify over 1300+ applications to prioritize business usage and deliver predictable performance even under heavy load.
- **Enabling BYOD** – Xirrus 2x2 MIMO 802.11ac radios deliver up to 867Mbps of bandwidth, this is 2-3 times the performance compared to the 802.11n standards. A low cost 2x2 solution is ideal for smartphones (1x1) and tablets (2x2) that have 1 or 2 antennas.



Future-proofed with Simple Upgradeability

Every 2-3 years, some new variant of wireless standard comes to the market. Future-proofed solutions help lower the total cost of ownership as new wireless standards are rolled out. Xirrus simplifies and reduces the costs of migrating to 802.11ac with a number of flexible options.

- **100% 802.11ac** – Xirrus AP/Arrays can support 802.11ac standards on all the radios simultaneously, unlike other competitive 802.11ac products that typically support 802.11ac on only one radio.
- **Software Programmable Radios** – Xirrus radios can be programmed to operate in either the 2.4GHz or 5GHz bands. As more clients start supporting 5GHz, Xirrus APs/Arrays can be re-programmed with a click of the button to adapt to this changing client mix without adding more APs.
- **Software upgradeability** – Most of the client devices support only 802.11n standards today. Xirrus XR 11ac APs can be purchased as lower cost 802.11n or as full performance 802.11ac devices. The APs can be upgraded from 802.11n to 802.11ac with a software license to avoid ripping and replacing the access point.
- **Hardware upgradeability** – Xirrus multi-radio Arrays utilize a modular chassis that can accommodate different radio types. As Wi-Fi usage increases and migrates from 802.11n to 802.11ac, radios can be added or upgraded to meet this demand. This results in fewer devices and less infrastructure, lowering the TCO.



Optimized 802.11ac Connectivity

Tuning the RF to meet the different density and capacity requirements is critical in maximizing the performance of the wireless network. Xirrus automates this process to optimize the wireless network for delivering the best user experience.

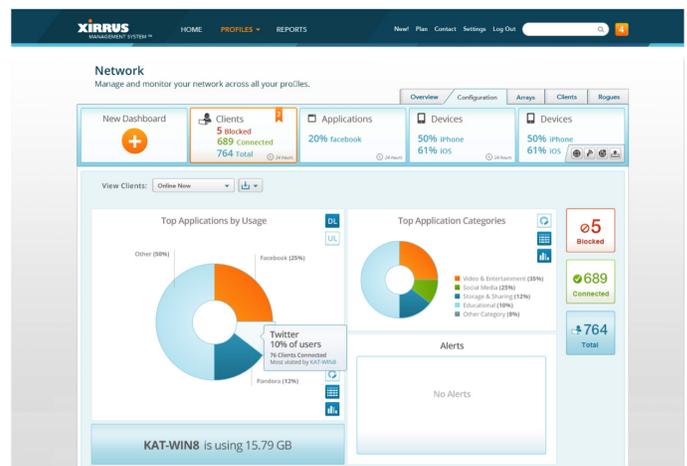
- **Auto Channel** – Channel planning is a critical to mitigate RF interference and maximize performance. It is essential in open spaces like large office areas, auditoriums, and gyms where multiple access points can see each other. Xirrus Auto Channel reduces the burden on IT by automatically selecting the most optimal channel to deliver the best performance.

- **Auto Cell** – Auto Cell is an automatic, self-tuning mechanism that adjusts cell size between Xirrus APs/Arrays to guarantee coverage. In case of a device failure, neighboring APs/Arrays automatically adjust radio power to compensate for the down AP/Array. Cell coverage overlap is retained to support seamless roaming.
- **Seamless Roaming** – Roaming within a wireless network can be compromised with smartphones and tablets due to their smaller size, reduced power, and other design constraints. With Roaming Assist, Xirrus can gracefully hand off devices from one AP/Array to the other. Fast roaming eliminates long delays for re-authentication, thus supporting time-sensitive applications such as Voice over Wi-Fi.

Easy to manage

Xirrus 802.11ac wireless networks are manageable with a single centralized platform with extensive ability to deploy monitor and manage the entire network.

- **Choice of deployment** – The Xirrus Management System (XMS) can be deployed on-premise or in the cloud, giving organizations flexibility and choice of platform. This also provides the financial flexibility to deploy the solution as a CAPEX or an OPEX model.
- **Zero-touch configuration** – The Xirrus APs/Arrays support zero touch configuration that reduces the burden on IT. The deployment and turn up of new equipment is greatly simplified and expedited without involving IT, and makes deploying Xirrus network as easy as plugging the new Xirrus AP/Array into the IP network.
- **Network profiles** – Xirrus simplifies the configuration management of the WLAN with network profiles (network templates with services) instead of device-centric configuration. The XMS converts these network profile into device level configurations abstracting the wireless complexities, and simplifying configurations for IT.



Xirrus Differentiators

Only Xirrus delivers a wireless solution that is truly 802.11ac-ready:

- **100% 802.11ac** network with every radio concurrently supporting 11ac.
- **Software programmable** radios can be set to operate on either the 2.4GHz or 5GHz bands.
- **Distributed architecture** with integrated controller delivers high performance with no single point of failure.
- The industry's **broadest portfolio** with 2x2 MIMO and 3x3 MIMO options across a family of both fixed radio APs and multi-radio modular Arrays.
- DPI-based **Application Control** that can identify over 1300+ applications and deliver predictable performance.
- **Software upgradeable** from 802.11n to 802.11ac as business demand grows without a need to rip and replace APs.
- Xirrus' **modular, multi-radio architecture** provides investment protection and a smooth migration path to 802.11ac.
- **ACExpress™** segregates client devices on different radios to allow each client to operate at its maximum capacity.



Multi-Radio Arrays – The 2, 4, 8, and 16 radio Xirrus Array platforms provide the ultimate in wireless performance to meet the demands of medium to high-density wireless environments. With more radios per platform, the Arrays can service more wireless devices. This approach provides significant TCO savings by reducing the amount of equipment, cable drops, switch ports, and installation labor costs required in the network.

Xirrus Management System (XMS) – The XMS is a wireless network management platform that provides full monitoring and management of Xirrus wireless networks. XMS scales from small single site to large multi-site enterprises. The XMS provides IT the flexibility to pick the right deployment model—on premise with VMWare or Hyper V, or as a private or public cloud.

Conclusion

IEEE 802.11ac is an exciting new evolution of Wi-Fi technology, but careful AP selection and site planning are needed to get the most from it. Xirrus distributed architecture with ACExpress™ and innovations like software programmable radios enable you to easily migrate from legacy network to the latest 802.11ac technology. Xirrus' low cost XR-600 series combined with high performance multi-radio modular XR Arrays provide a complete suite of solutions to meet today's and tomorrow's wireless networking needs. For more information visit <http://www.xirrus.com/11ac>.

Xirrus 802.11ac Solutions Components

XR-600 series APs – The XR-600 is a low cost, cloud provisioned and manageable access point with uncompromised performance. This product series utilizes a unique radio design and built-in software programmability to allow organizations to run 802.11ac, the latest wireless standard, on both radios concurrently to provide a cumulative bandwidth of up to 2.6Gbps per AP.

About Xirrus, Inc.

Xirrus is the leading provider of high-performance wireless networks. Xirrus' Array-based solutions perform under the most demanding circumstances with wired-like reliability and superior security. The Xirrus wireless solutions provide a vital strategic business and IT infrastructure advantage to the education, healthcare, government and enterprise industries that depend on wireless to operate business-critical applications. Headquartered in Thousand Oaks, CA, Xirrus is a privately held company that designs and manufactures its products and solutions in the USA. For more information please visit: www.xirrus.com and follow us on Twitter: @Xirrus.



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