

Frequently Asked Questions

Who are we?

- High Performance Wi-Fi – Guaranteed!

What is our vision?

- Wi-Fi as the primary network connection in the Enterprise

What is our mission?

- To unwire the Enterprise with High Performance Wi-Fi Arrays

How are we different?

- Distributed intelligence – our data and control planes are fully distributed to the edge, delivering intelligent wired-like performance = guaranteed performance
- Dense radios – our dense radio architecture operates across more channels simultaneously delivering unmatched user and device capacity = guaranteed connectivity
- Reliability – our architecture provides unmatched survivability at the access point, controller, wireless backhaul, wired uplink, and power supply levels backed by a 5 year warranty = utility-grade Wi-Fi

Why do we win?

- Performance – we deliver unmatched coverage, bandwidth, and capacity per access point = the most powerful Wi-Fi in the industry
- Fewer devices – our implementations require 4X fewer access points, switch ports, and cabling = less time and effort to install and maintain
- Time-To-Value – our implementation guarantee assures no cost or time overruns = guaranteed success in 1/3rd the time

What is a Wi-Fi Array®?

- The Wi-Fi Array consists of 4, 8, 12, or 16 802.11abgn access points coupled to a high-gain, directional antenna system, integrated together with a multi-gigabit switch, controller, firewall, threat sensor, and spectrum analyzer into a single, easy-to-install device.
- The integrated design of the Wi-Fi Array provides unprecedented user density, Wi-Fi capacity, and coverage, while at the same time requiring fewer devices to deploy. The embedded Wi-Fi Controller is the heart of the Wi-Fi Array providing distributed processing and intelligence in the form of forwarding, security, QoS, and management directly at the edge of the network similar to a wired switch.
- The integrated access points (IAPs) within the Array function as “thin APs” directly controlled by the Wi-Fi controller in the same device. Each IAP is coupled to a high-gain, directional antenna system. This high gain antenna array is

arranged in sectors in a circular fashion to provide 360 degrees of coverage with extended transmit and receive gain in all directions.

Why is it difficult for other vendors to add capacity to a Wi-Fi network?

- Wi-Fi bandwidth is shared across all users associated to a given access point (radio). The protocols that govern data transmission and contention in Wi-Fi across such a shared medium limit the network's capacity for supporting bandwidth intensive applications. Clients must wait for a channel to be clear to avoid collisions before transmitting their own packets, causing wait times to rise and overall network performance to decrease as more users join the network.
- Deploying more traditional 1 or 2 radio access points in a given area in an attempt to increase capacity will typically produce only incremental improvements due to the fact channels must be reused and interference problems that arise from placing multiple access points in close proximity to each other. Traditional Wi-Fi products use omnidirectional antennas which limit their effectiveness in isolating RF bleed of transmissions between cells on the same channel.
- The best way to effectively increase capacity in a Wi-Fi network is to use as many non-overlapping channels as possible, thereby eliminating channel reuse and co-channel interference issues. By deploying up to 16 radios on separate channels and strongly leveraging the 5GHz band (with 24 channels), the Xirrus Wi-Fi Array offers the only true high density, high performance Wi-Fi solution.

What is Xirrus' long term sustainable differentiation?

- Xirrus' long term sustainable differentiation is based upon RF innovation. This focus on RF innovation (specifically RF isolation, management, and shaping) has enabled the Wi-Fi Array to deliver more coverage, bandwidth, throughput, and user density per device and per system - far and above any other offering. The Wi-Fi Array platform (Hardware and Software) and the patents that protect it have successfully positioned Xirrus as the only viable replacement for wired Ethernet or Fast Ethernet to the desktop for the Enterprise.

How does the Wi-Fi Array Architecture compare to solutions on the market today?

- Traditional Wi-Fi architectures use de-featured "thin" access points that are connected (physically or logically) to a centralized controller. The main purpose of the controller is to centralize the management and provisioning of the access points. Such solutions do not scale well as in order to increase the scale of the WLAN, larger and/or additional controllers must be purchased at a high expense. In addition, redundant controllers must be purchased to achieve high resiliency, otherwise the controller creates a single point of failure. In contrast, each Xirrus Wi-Fi Array integrates the controller together with the access points in one device, in addition to a switch, firewall, threat sensor, and spectrum analyzer. The scale of the network grows linearly as more Arrays are added and no single point of failure exists that could wipe out large portions or the entire network. The dense radio architecture of the Array together with its large coverage area requires fewer devices than traditional APs, resulting in fewer cable runs and switch ports to support the wireless network.

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How much capacity (RF bandwidth) does the Wi-Fi Array deliver?

- The Wi-Fi Array supports up to 4.8 Gbps of Wi-Fi bandwidth (XN16 model) by simultaneously supporting up to 16 802.11n radios on non-overlapping channels (up to 300Mbps per radio).

What are the key features of the Wi-Fi Array?

- The key integrated features and capabilities in the Array include:
 - High-gain, directional antennas for greater range and a larger coverage area per device
 - Dense radio architecture for high user density and throughput capacity per device
 - Automatic channel planning per device and per system
 - Automatic cell sizing per device and per system
 - Automatic Station Load Balancing (including Band & Mode Steering)
 - Fixed Wi-Fi mode (802.11a/b/g/n) assignment per radio
 - Integrated web-based authentication (Captive Portal)
 - Integrated DHCP server
 - Integrated RADIUS server
 - Fast Roaming at Layer 2 and Layer 3
 - Wire-rate encryption capability
 - Integrated Wi-Fi Threat Sensor
 - Integrated Wi-Fi Spectrum Analyzer
 - Integrated Station Locationing
 - Wireless Quality of Service (802.11e, WMM)
 - 802.1Q and 802.1p VLAN tagging and prioritization
 - Modular design capable of supporting future updates to the 802.11 standards

How does the Wi-Fi Array deliver 4X the coverage area of traditional APs?

- The larger RF coverage of the Wi-Fi Array is accomplished through the use of a multi-sector, directional antenna system. The increased directional transmit and receive gain in every RF sector greatly increases rate and range in all directions. The resulting coverage pattern has 2X the range of a traditional AP and correspondingly 4X the coverage area.

How does the embedded Array controller compare to a centralized controller?

- The Array’s integrated controller far surpasses the functionality found in today’s Wi-Fi controllers by providing complete control and coordination of the Array’s integrated access points (IAPs) resident in the same device. Competitive solutions cannot deliver the same level of coordination because each access point is a disparate device separated by one or more cable runs and switch hops. Since the Array controller is built into the Wi-Fi Array, there is no need to install a separate controller appliance in the IDF closet. The Array integrates directly into the existing Ethernet infrastructure just like a wired switch. The Array’s design supports a multi-gigabit switching fabric allowing traffic from one IAP to flow unrestricted to another IAP or to the wired uplink interface. This architecture allows for maximum performance by

eliminating the tromboning of traffic back to the controller deep within the network, then back to its destination. The net effect is one-half the traffic impact on the network backbone from the Array as compared with a centralized controller.

How are Xirrus Wi-Fi Arrays managed?

- Xirrus Wi-Fi Arrays can be managed in one of 3 ways: Command line Interface (CLI), Web Management Interface (WMI) or via SNMP with the Xirrus Management System (XMS). The XMS is designed to centrally manage a Xirrus Wi-Fi Array network from anywhere via a Layer 3 connection. The XMS does not sit in the Wi-Fi traffic data path, but can discover, authenticate and automatically configure Wi-Fi Arrays to make large scale deployments a snap. The XMS is offered as a software application or Linux-based appliance.

Note: In all cases, the XMS is optional

What are multi-state Integrated Access Points (IAPs)?

- Multi-state integrated access points (IAPs) are Wi-Fi radios that allow complete configuration flexibly, allowing them to be configured to operate in any Wi-Fi required. This includes both the 2.4GHz and 5GHz spectrums, specifically 802.11a, 802.11b, 802.11g, 802.11n 2.4G, and 802.11n 5G. This is in contrast to traditional 2 radio APs that have 1 radio fixed in the 2.4G band (802.11b/g/n) and 1 radio fixed in the 5G band (802.11a/n). With the Wi-Fi Array, transmit power can be configured on a per radio, per RF sector basis to create a “perfect fit” customized coverage pattern.

How does the Xirrus Wi-Fi Array differ from a typical access point?

- The Xirrus Wi-Fi Array utilizes a dense radio architecture of 4, 8, 12 or 16 integrated access points (radios) per device capable of operating in either the 2.4G and 5G. The 5G band has 8X the bandwidth compared with the 2.4G band, so providing the flexibility to deploy more 5G radios in the Array enables maximum overall Wi-Fi network performance. Traditional access points have just 2 radios, 1 fixed to 2.4G and 1 to 5G, and are therefore very limited in bandwidth and spectrum utilization individually and across the entire network. To put in another way traditional APs require 50% of all radios to operate in the 2.4GHz spectrum when in fact that band only comprises about 10% of the available channels .

What is the difference between Xirrus’ distributed architecture and other vendor’s centralized architectures?

- Xirrus’ distributed architecture places the network intelligence and traffic processing at the edge of the network in each Array as opposed to performing these functions in a separate centralized controller. This distributed approach eliminates the potential for a single point of failure (unless expensive redundant controllers are purchased) as well as eliminating a single choke point for traffic due to the backhauling of traffic to a central point. Placing the power and intelligence at the edge of the network increases performance and reliability and is a well-known and proven best practice in wired switching.

What are the Wi-Fi Array resiliency capabilities?

- Each Wi-Fi Array features overlapping coverage between its integrated access points (IAPs), redundant wired uplinks, redundant wireless backhaul links, and optional redundant power. In a network of Wi-Fi Arrays, automatic cell sizing will expand RF coverage to fill gaps if an adjacent Array has been detected to fail. These capabilities work together to eliminate the vast majority of potential Wi-Fi failure modes. Additionally, complete Wi-Fi Array failover is possible through a hot standby failover feature.

Is the encryption key information stored on the Wi-Fi Array?

- Encryption keys and other security-related information are maintained in encrypted format (MD5 Hash) on the Wi-Fi Array to prevent unauthorized access.

Can the Xirrus Array be used to construct a wireless mesh network?

- Yes, the Xirrus Wi-Fi Array supports Wireless Distribution System (WDS) links between Arrays. With up to 4 bridged point-to-point link per Array and each bridging service supporting up to up to 3 radios per link, a very high performance wireless mesh network can be created.

Can the Wi-Fi Array support future 802.11 technologies?

- Yes, the Wi-Fi Array utilizes a modular and programmable architecture designed for upgradeability. The integrated access points (IAPs) are contained on removable radio boards enabling hardware upgrades (Antennas & Radios). Software programmable FPGAs provide field upgradeability for MAC and encryption functions that are otherwise instantiated in hardware on traditional APs. These capabilities enable upgrades and technology changes without obsoleting the Array hardware itself.

What type of beamforming does the Wi-Fi Array support?

- Beamforming is a technique used to improve RF signal transmission and/or reception. This is achieved by using fixed or adaptive transmit/receive beam patterns to directionally focus RF energy. The improvement compared with omnidirectional transmission/reception is referred to as the transmit/receive gain.
- There are 3 primary types of beamforming used in Wi-Fi devices: fixed (directional antennas), electronic (via phase manipulation), and switched (via multiple antenna elements). Xirrus Wi-Fi Arrays support fixed beamforming using multiple radios, each with a high-gain directional antenna system to provide improved coverage and performance in all directions.

Why isn't anyone else making a product like the Array?

- First, it is very difficult to integrate more than 3 or 4 radio devices into a single product without significant RF engineering effort to prevent intra-radio interference. Xirrus as an RF innovator performs all of its own antenna and radio board engineering in house to create the high radio density Array. Several other vendors have tried to create 8 and 12 radio devices, but efforts failed to produce a released product
- Second, Xirrus has over 20 patents granted and pending to protect its RF innovation and Array design.

Does the Array support Ethernet Switch based PoE (802.3af or 802.3at)?

- No, The Wi-Fi Array does not support the PoE services currently available Ethernet switches. This is due to the Wi-Fi Arrays power requirements of up to 16 integrated radios in a one Array exceed the current PoE power levels. However Xirrus provides high power Power over Ethernet injectors capable of powering all models of Wi-Fi Arrays over standard Cat5e/Cat 6 cabling.

Will the Xirrus Arrays automatically adjust coverage if a radio fails?

- Yes, the Wi-Fi Array supports an Auto Cell feature that allows the Arrays to automatically determine and adjust radio power levels between adjacent Arrays for optimal coverage. This feature is useful to preventing interference between Arrays and to cover for a failed device.

Why is an Array more expensive than other Access Points?

- The Wi-Fi Array is not the equivalent to a traditional Access Point and so the cost cannot be directly compared. The Array integrates the access points, controller, switch, and threat sensor into in every device instead of requiring multiple devices as with a traditional AP + controller solution. The true price comparison is between the Array and these other components

taken together. In addition, the reduction in the number of devices to deploy in the case of the Wi-Fi Array (typically 75% fewer than the number of APs) reduces the amount of cabling and switch ports required, significantly adding to the cost savings.

What Security features does the Wi-Fi Array utilize?

- All industry standard wireless encryption and authentication methods, including hardware-based AES encryption and IEEE 802.1X authentication
- Integrated wireless RF threat monitoring including Rogue AP detection and mitigation
- Mechanical security through a lockable mounting bracket and a Kensington lock feature
- Administrator account privileges
- Secure network management via SSHv2 and SNMPv3

Does the Wi-Fi Array support RF monitoring?

- Yes, the Wi-Fi Array supports a dedicated threat sensor connected to an omni-directional antenna. This dedicated RF “sniffer” continually scans for Rogue APs and other security threats. Unlike other vendor’s products where the RF monitor must multi-task between RF scanning and servicing wireless clients, the Array’s built-in RF monitor is dedicated to its function. This results in much greater RF spectrum coverage and more accurate scanning results.

How do I keep someone from stealing the Array?

- The Wi-Fi Array can be locked to the mounting bracket preventing theft of the device. A Kensington lock slot is also available to secure the Wi-Fi Array in any type of environment. In addition, an optional door alarm can be purchased for the drop ceiling indoor enclosure that will generate an alert when opened.

How do you configure the Wi-Fi Array?

- Via the Xirrus Management System (XMS) that uses SNMPv2/v3
- Via a secure HTTPs Web Management Interface
- Via a Command Line Interface (CLI) over the serial port, SSH, or Telnet

What benefits does the XMS management platform provide?

- The Xirrus Management System (XMS) is not required for operation of a Xirrus Wi-Fi network. It provides centralized configuration, monitoring and security management for a Xirrus Array deployment. The XMS operates outside of the data path and provides a consolidated view of the status and performance of the network. It provides all of the features of an enterprise-class management console, including:
 - Automatic device discovery
 - Authentication and configuration of Wi-Fi Arrays
 - Security policy management
 - Software upgrades
 - Dashboard status and performance summary
 - Alarm and Event notification
 - Rogue AP detection and mitigation
 - User management and monitoring
 - Floor map import and device placement
 - RF coverage heat maps
 - Station location identification

- Performance reporting

Is a professional site survey required to deploy the Wi-Fi Array?

While an active site survey is always recommended, less complex areas may be deployed with a predictive only survey using simple rules for placement. Xirrus will provide an implementation guarantee for coverage only if an active site survey is performed. In all cases, verification of coverage is always recommended following deployment.

How is a site survey conducted for the Wi-Fi Array?

- A site survey for Wi-Fi Array coverage is done at the deployment site by a Xirrus certified engineer. This survey is conducted with the actual product to be deployed and in such a manner as to meet customer requirements and is guaranteed.

How is the Wi-Fi Array installed?

- A complete line of interior and exterior mounting options are available for installing the Wi-Fi Array on ceilings, walls, or i-beams of different types. A drop-in enclosure is available for drop-down (T-bar) ceilings. Refer to the Xirrus web site for details about mounting options: www.xirrus.com.

How close can Xirrus Wi-Fi Arrays be placed together?

- A minimum of 50 feet is recommended between Wi-Fi Arrays, however actual placement is dependent on the environment and obstructions between Arrays.

Can the Wi-Fi Array be placed in a vertical orientation?

- Yes, vertical orientation is possible however greatest coverage is provided by an Array in the horizontal direction.

Can the Wi-Fi Array be used outdoors?

- Yes. While the physical Wi-Fi Array unit is designed for indoor use, an environmentally controlled outdoor enclosure is available for outdoor deployments. Refer to the Xirrus web site for details about the Xirrus Outdoor Enclosure (ODE): www.xirrus.com.

Can external antennas be used with the Wi-Fi Array?

- Yes, the Wi-Fi Array allows up to three external antennas to be connected via RP-TNC connectors. While the internal high gain antennas of the Array are sufficient for the vast majority of installations, external antennas can be used for point-to-point WDS links and coverage extension.

What does Xirrus mean when they say installs are guaranteed?

- When Xirrus or our representatives perform a guaranteed active survey, Xirrus will guarantee the signal level of the implementation. This means that after the install is completed, if the network does not meet the previously agreed upon signal level in the required areas, Xirrus will provide any additional Arrays at no cost.

What is the Warranty on the Wi-Fi Array?

- Xirrus offers a comprehensive warranty that covers Array hardware for 5 years and Array software for 90 days from the date of purchase. Hardware warranty covers repair and return of defective Array hardware. Software warranty covers

software bug fixes. Extended warranty and premium support options are available to increase support levels and extend coverage time.

What support is provided with the purchase of the Wi-Fi Array?

- Xirrus provides a comprehensive offering of direct and online technical support to Xirrus Array customers. Warranty coverage provides access to technical support personnel via phone, email, or chat as well as a wide variety of technical information via support.xirrus.com.

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