

Enterprise



**Aruba Delivers the Optimal  
Wireless LAN Infrastructure  
for High-Quality Enterprise  
Voice Services**

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# Aruba Delivers the Optimal Wireless LAN Infrastructure for High-Quality Enterprise Voice Services

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## Introduction

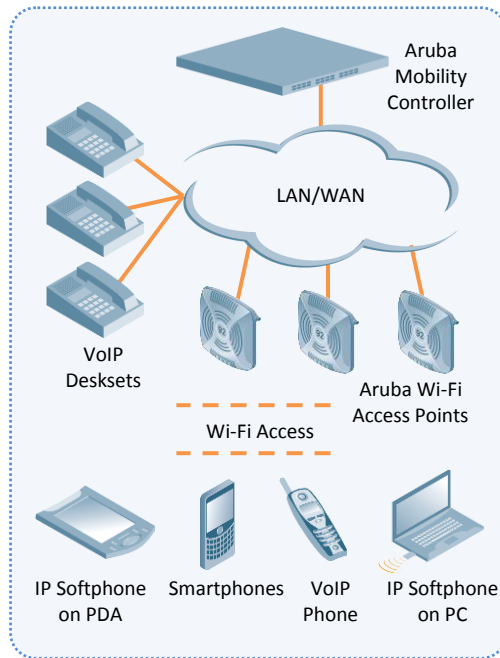
Voice over wireless LANs (VoWLANs) are becoming increasingly important to organizations, and network managers are phasing it into their next round of technology implementation plans. In the past, many have called VoWLANs the *killer app* for wireless, while others have referred to WLANs as the *app killer* for voice over IP (VoIP) due to concerns about bandwidth scarcity and quality of service (QoS).

However, significant evolutionary strides in VoWLAN technology over the past few years have made it viable for deployment in today's enterprise networks. Specifically, these VoWLAN technology advancements have occurred in three key areas – *networks*, *clients* and *applications*.

- *Networks* – Although 802.11n offers significantly greater bandwidth than its technology predecessors, it requires a higher level of radio resiliency and power consumption than earlier generations.
- *Clients* – Smartphones, soft phones and smart pads have the ability to pull down and process multiple parallel streams of data to support converged voice, video and data for a complete collaboration experience.
- *Applications* – The Research In Motion (RIM) BlackBerry Mobile Voice System (MVS) and Apple FaceTime video calling software demonstrate that real-time applications are no longer tied to dedicated hardware but are just one of many applications running on standard computing devices. This presents a unique challenge to the network infrastructure which must discern real-time traffic for bandwidth reservation and prioritization.

Network managers have clearly indicated their desire to future-proof their wireless LAN (WLAN) systems to support current and future requirements of voice and real-time technologies. The evolution of the mobile edge demands wire-line quality for voice across multiple wireless platforms and multiple applications with seamless integration into the existing voice back-end systems. More importantly, the user experience must be consistent, irrespective of how and where they require access.

Aruba Networks strives to meet these fast-growing demands through the most comprehensive set of VoWLAN features available with industry-leading performance independently verified by leading test labs. Using the Aruba WLAN infrastructure, enterprise networks can support today's wireless voice technology and be prepared for future standards, applications, protocols and developments.



*Aruba has the ideal WLAN infrastructure to support a wide range of enterprise wireless devices.*

## Aruba Technology

The following sections discuss the various requirements for quality VoWLAN services and how different components of Aruba technology address these needs.

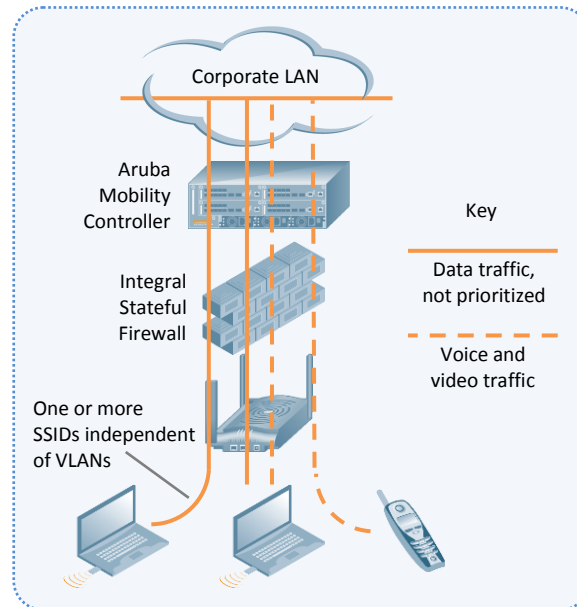
### Requirements for VoWLAN quality

#### ***Assured bandwidth***

- Role-based access minimizes service set identifiers (SSIDs) that can reduce airtime availability and adversely impact air quality.
- Aruba's market-leading line of single- and dual-band 802.11n access points (APs), coupled with the industry's fastest, most scalable Mobility Controllers, offer the maximum possible bandwidth for voice applications with minimum processing delays.
- Aruba Adaptive Radio Management (ARM) ensures WLAN coverage across the carpeted space using the entire available 802.11 spectrum. ARM provides additional self-healing infrastructure-based controls in the event of an AP failure, band-steering for interference avoidance, spectrum load balancing, and application-aware radio-frequency (RF) scanning in real-time without user intervention.
- An integrated firewall, which also allows distributed enforcement on Aruba Remote APs (RAPs), ensures that bandwidth can be reserved for every voice call in upstream and downstream directions.

## Assured QoS

- Aruba application layer gateways (ALGs) – Aruba integrates a stateful application-aware firewall in the WLAN infrastructure. This firewall detects the most common VoIP protocols including the session initiation protocol (SIP), H.323, Alcatel-Lucent New Office Equipment (NOE) voice protocol, signaling connection control part (SCCP) and Vocera for bandwidth reservation as well as QoS prioritization.



*Aruba Mobility Controllers integrate a stateful application-aware firewall in the WLAN infrastructure that detects most common VoIP protocols to make bandwidth reservations and QoS prioritizations as required.*

- Application fingerprinting – Traditional implementations of deep-packet analysis for voice protocols fail with newer applications designed to work across WANs. Applications like RIM BlackBerry MVS use encrypted SIP for call signaling, which cannot be identified by traditional firewalls. Aruba uniquely offers the capability to perform fingerprint analysis of the real-time traffic flows associated with such calls and perform required QoS enforcement.
- Wired and wireless QoS mapping – An important aspect of WLAN integration into a wired infrastructure is the flexibility to map wired with wireless QoS and guarantee it from end to end. Aruba's integrated firewall allows differentiated services code point (DSCP) tag-mapping from wired traffic to be translated to Wi-Fi Multimedia (WMM) tags on wireless traffic and vice-versa. Aruba also allows over-writing of DSCP tags if required for this matching.

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### ***Timing***

- Certain voice applications, such as Polycom SpectraLink Voice Priority (SVP), have specific packet spacing and intervals to guarantee voice quality. Aruba Mobility Controllers allow high-speed packet processing to eliminate voice traffic delays. Also, split-tunneling on Aruba RAPs increases packet-routing efficiency in order to minimize voice traffic delays. Over-the-air features like strict prioritization for SVP ensure that timing requirements for different voice protocols and implementations are met.

### ***Cross-layer optimization***

- Within the five Layers of the TCP/IP networking stack, it is important for network devices that operate across multiple layers to use intelligence gathered in one layer to implement network decisions at another layer.
- The unique integration of WLAN services and application-level firewall on a common platform allows information from one layer to be used for decisions at a different layer. This improves RF optimization, QoS and wireless security for better overall services. For example, knowledge of a voice call at the application layer enforces voice-aware scanning and spectrum load balancing at the Wi-Fi layer.
- Awareness of SIP at the upper layers also allows the enforcement of standards-based methods of WMM call admission control.

### ***Seamless mobility***

- Session awareness for Layer 3 roaming – It is important that the WLAN infrastructure be cognizant of any active data sessions as a client roams between APs across a Layer 3 boundary. Aruba's recognition of such active sessions enables IP mobility, by which the client retains its IP address during roaming and consequently retains an active session.
- Support for 802.11 provisions for fast roaming – Aruba supports standards-based implementations like opportunistic key caching (OKC) and pairwise master key (PMK) caching to promote faster roams between APs. Aruba is also an active and ongoing contributor to the Wi-Fi Alliance in standards development efforts such as the IEEE 802.11k and 802.11r, which enable seamless basic service set (BSS) transitions for WLANs.

## **Requirements for ease of deployment**

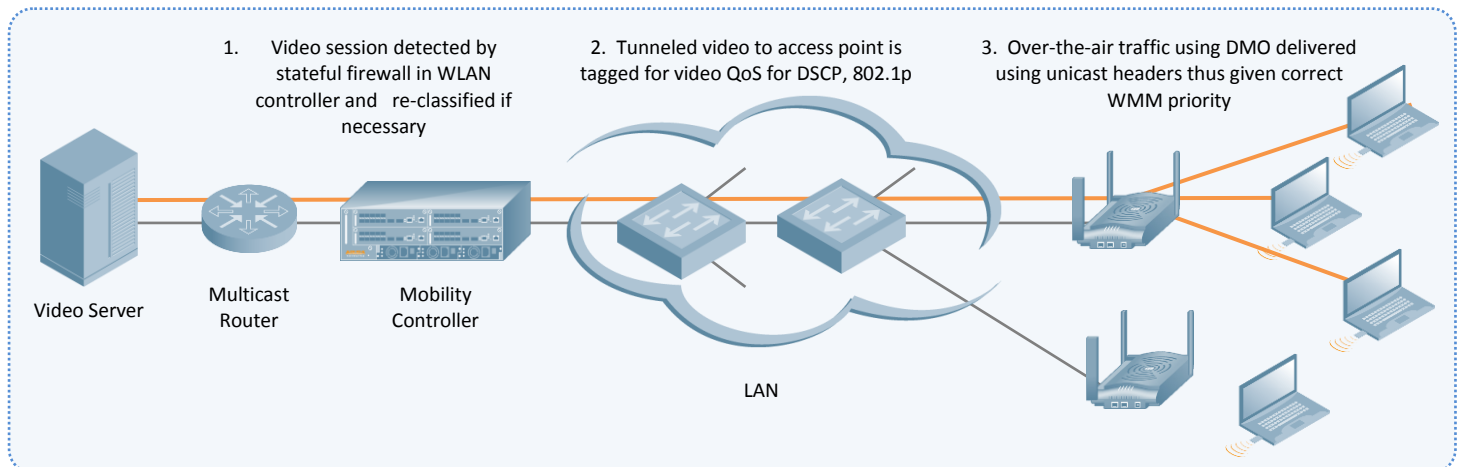
Provisioning a WLAN for voice services should require minimal incremental changes to the existing network, including RF planning, VLAN planning, firewall configuration and network security.

### ***Auto-optimized coverage***

- Aruba APs do not require pre-provisioning. Once deployed, they connect to the Mobility Controller across a Layer 3 network and download code and configurations. The Mobility Controller also co-ordinates the channel and power settings of the AP across the entire network to ensure appropriate coverage and capacity.

## Multicast optimization

- The wireless medium is limited in bandwidth. To keep the medium clear, Aruba offers features to eliminate unnecessary multicast traffic. Aruba also offers dynamic multicast optimization (DMO), which consumes less bandwidth by converting multicast video traffic to unicast and ensures higher priority treatment for reliable over-the-air delivery.



*Dynamic Multicast Optimization (DMO) converts multicast frames to unicast and ensures higher priority treatment of video traffic for reliable delivery over the air.*

## Same services regardless of operating mode

- Aruba RAPs allow firewall rules and RF optimization to be enforced at the AP level. This means that the RAP can offer location-agnostic voice services to users in terms of authentication, RF optimization, application awareness and QoS prioritization.

## Converged client and application management

- Aruba allows application-based QoS enforcement instead of employing traditional VLAN-based, user-based or access control list (ACL)-based QoS mechanisms. This means that different application types from the same client or different clients can be serviced differently without requiring separate SSIDs for each type of service.

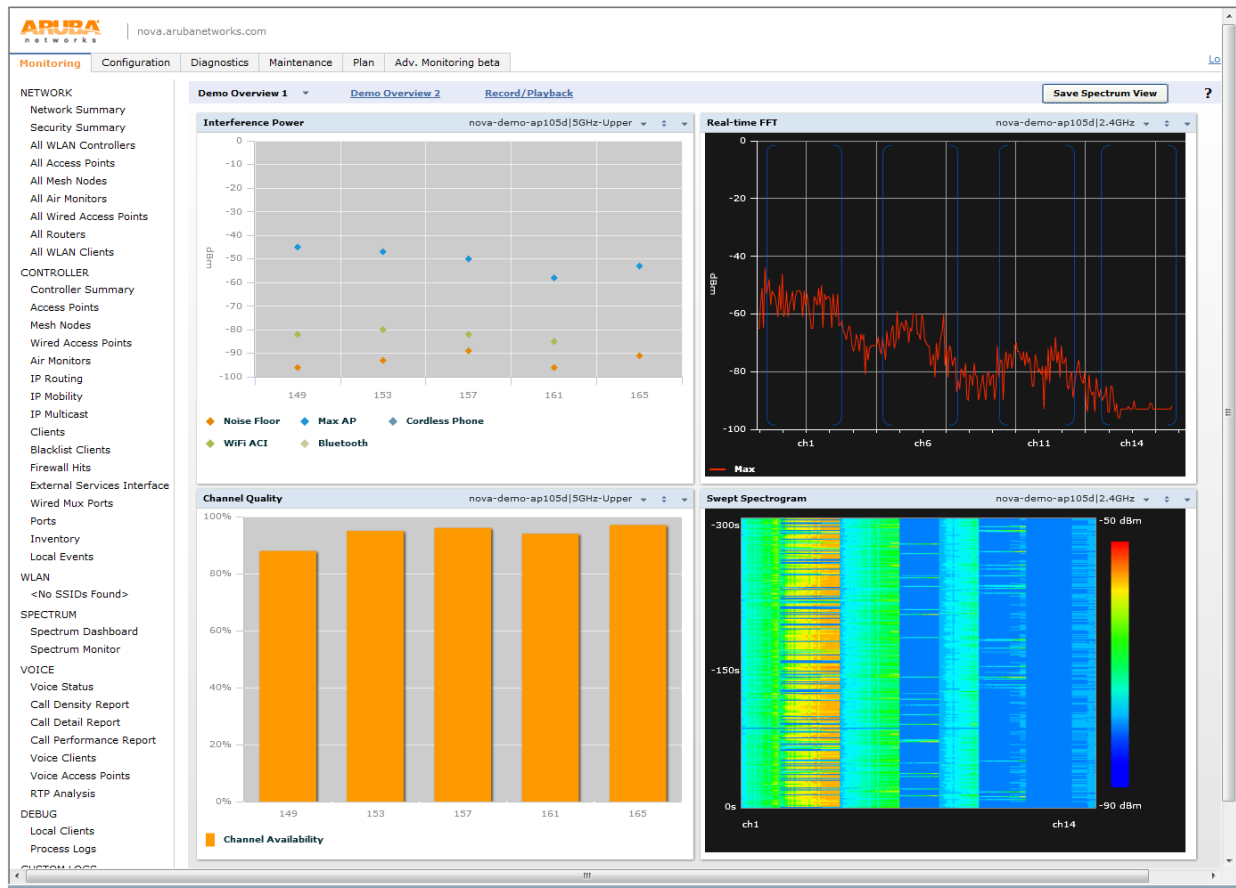
## Requirements for effective troubleshooting

### Visibility into RF quality

- Aruba's integrated RFProtect™ Spectrum Analyzer provides visibility into Wi-Fi and non-Wi-Fi sources of RF interference and their effects on WLAN performance, without requiring additional network components, devices or configurations.

Using Aruba 802.11n APs to scan the spectral composition of 2.4-GHz and 5-GHz radio bands, the RFProtect Spectrum Analyzer remotely identifies RF interference, classifies its source and provides real-time analysis at the point of the problem.

Data collected by the RFProtect Spectrum Analyzer is used to quickly isolate packet transmission problems, over-the-air QoS and traffic congestion caused by RF contention with other devices operating in the same band or channel. Appropriate remediation measures can then be put in place to optimize network performance.



*The RFProtect Spectrum Analyzer provides graphical charts that show channel health, the strength of interfering devices, and other interference characterization graphs – all in real time.*

### **Visibility into authentication exchanges**

- Detailed frame exchanges are captured for all authentications between the client and AP in order to debug Wi-Fi authentication failures.

### **Visibility into call messaging**

- The Aruba Mobility Controller monitors all call signaling and can provide debugging information on signaling exchanges.

### **Call quality monitoring**

- The Aruba Mobility Controller computes call-quality statistics based on real-time transport control protocol (RTCP) and other metrics to provide a summary of the average quality of voice calls.

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### **Remote packet capture**

- To troubleshoot Wi-Fi issues, any AP radio can be converted into a wireless sniffer to obtain remote packet traces from the affected client or AP.

### **Aruba Technology Partners**

- Agito Networks – Aruba has verified interoperability with the Agito Networks enterprise Fixed Mobile Convergence (eFMC) solution for seamless in-call handoffs between Wi-Fi and cellular, presence and other features.
- Alcatel-Lucent – Aruba is a technology partner with Alcatel-Lucent and supports the company's NOE voice protocol over 802.11. Aruba and Alcatel-Lucent are also OEM partners.
- Apple -- Aruba has certified Apple's iPhone as interoperable with its wireless LANs and has issued the device a Compatible Partner rating. Aruba's unique stateful firewall detects and prevents Layer 2-7 attacks, offers stateful deep packet inspection, and provides policy-based security that follows iPhone users wherever they roam.
- Ascom -- The combination of the Ascom Wireless Solutions Voice-over-WiFi (VoWiFi) system and Aruba Networks secure wireless LAN (WLAN) infrastructure provides a high-end mobility solution for enterprise environments. The solution delivers wireless VoIP, professional messaging and personal alarm functionality, as well as wireless data capabilities, over a single wireless network.
- Avaya DevConnect – Aruba is member of the Avaya DevConnect program. Aruba's remote access solution has been certified to interoperate with Avaya's wired and wireless telephony infrastructure.
- Polycom VIEW – Aruba is member of the VIEW program and Aruba's equipment has been certified to interoperate with Polycom SVP and SIP-based telephony systems.
- RedSky – Aruba and RedSky team up to offer e911 location services over WLAN.
- RIM BlackBerry MVS – Aruba works with RIM on an ongoing basis to ensure interoperability and seamless Wi-Fi-cellular handoffs on RIM BlackBerry MVS.
- Vocera – Aruba and Vocera deliver leading-edge VoWLAN solutions for healthcare and other industries where hands-free mobile communications are considered mission critical. Vocera and Aruba Networks support WPA2 for secure wireless communications, while Aruba's fast roaming and Vocera-aware admission control and scanning enable top performance.

### **Handset Interoperability**

Aruba verifies interoperability of most commonly deployed voice over Wi-Fi clients with every software release. A current list of devices can be found at:

<http://www.arubanetworks.com/support/interoperability.php#Voice>

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## About Aruba Networks, Inc.

Aruba is the global leader in distributed enterprise networks. Its award-winning portfolio of campus, branch/teleworker, and mobile solutions simplify operations and secure access to all corporate applications and services - regardless of the user's device, location, or network. This dramatically improves productivity and lowers capital and operational costs.

Listed on the NASDAQ and Russell 2000® Index, Aruba is based in Sunnyvale, California, and has operations throughout the Americas, Europe, Middle East, and Asia Pacific regions. To learn more, visit Aruba at <http://www.arubanetworks.com>. For real-time news updates follow Aruba on [Twitter](#), [Facebook](#), or the [Green Island News Blog](#).

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