



Direct Path Forwarding

Enterprise Wireless Without Limits

RoamAbout[®] Wireless: Enabling a New Generation of Wireless Networking

There is nothing more important than our customers.

Break the Limits of Enterprise Wireless

Current-generation enterprise wireless local area networks (WLANs) are significantly limited in performance and scalability, preventing enterprises from reaping the full cost and productivity benefits of wireless. It's time for a better approach that breaks those limits, while preserving existing investments.

Centralized Architectures Limit Current-generation Enterprise WLANs

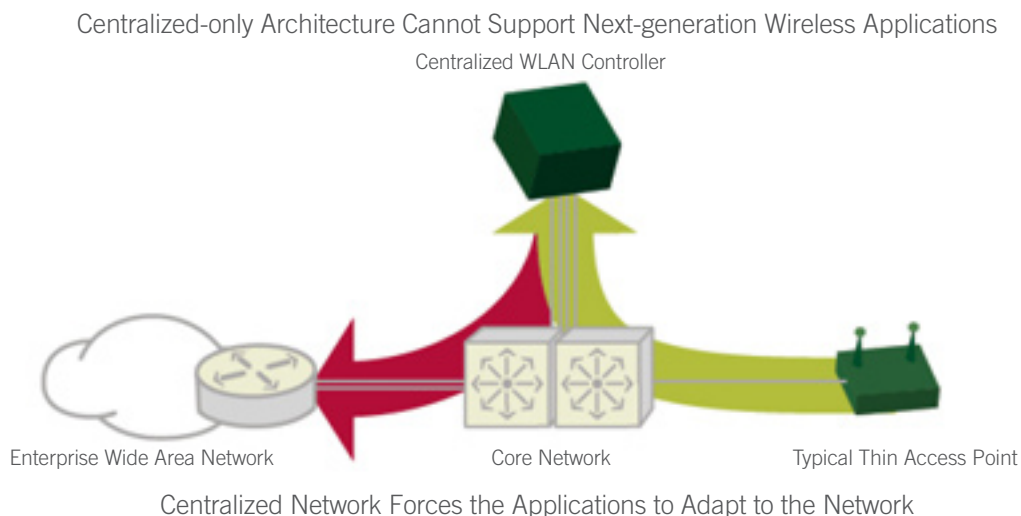
Many of today's enterprise WLANs are built on architectures that centralize intelligence in the WLAN controller, requiring all traffic to pass through the controller. This type of WLAN Architecture is commonly referred to as "Centralized" or "Collective Mode" Wireless. While this approach delivers the benefit of centralized management, it results in inefficient traffic flow and high levels of latency. This limits network scalability, particularly for latency-sensitive applications such as voice over WLAN (VoWLAN). And due to that inefficiency, today's collective-mode WLANs cannot support large-scale outdoor deployments providing enterprise-class services, where scarce over-the-air bandwidth must be shared for both backhaul and client services.

Centralized architectures also mean that as WLAN coverage is extended, and as more users and applications are added to the network, enterprises must continually upgrade their controllers in order to support the increased throughput—a potentially prohibitive expense. For this same reason, WLANs with centralized architectures will require massive and costly controller upgrades to support high-speed networks based on the coming IEEE 802.11n standard.

It's Time for a Smarter Approach

Today's enterprises want the productivity benefits of increased worker mobility that WLANs deliver. They want the cost benefits of not having to run Ethernet cable to every office and cubicle. And they want to leverage wireless for further cost savings, such as cutting cellular phone bills by extending VoWLAN service. But enterprises have been forced to limit their WLAN deployments, in both the number of users and applications supported, due to the limitations of centralized architectures.

It's time for a smarter approach to WLAN architecture. What is required is an architecture that delivers the benefits of centralized WLAN management and control, without the inefficiencies of centralizing all traffic. This new architecture needs to support 802.11n-based networks without costly controller upgrades and it needs to enable toll-quality voice over WLAN, not just for a few users but for hundreds or thousands of users. The answer is Direct Path Forwarding (DPF).



Direct Path Forwarding: The First and Only WLAN with Intelligent Switching

Direct Path Forwarding overcomes all the limitations of current-generation WLANs with breakthrough technology called "intelligent switching"—a significant evolution and advance over today's limited WLAN architectures. DPF's intelligent switching combines both centralized and direct path data forwarding based on the requirements of the underlying application, resulting in optimized traffic flow, radically reduced latency, and ultra high performance—all without the high cost of upgrading the network controller infrastructure. Direct Path Forwarding enables organizations, for the first time, to cost-effectively deploy secure, massively scalable enterprise WLANs that support the most demanding data and voice applications, while providing unlimited reach both indoors and outdoors.

Direct Path Forwarding without Limits

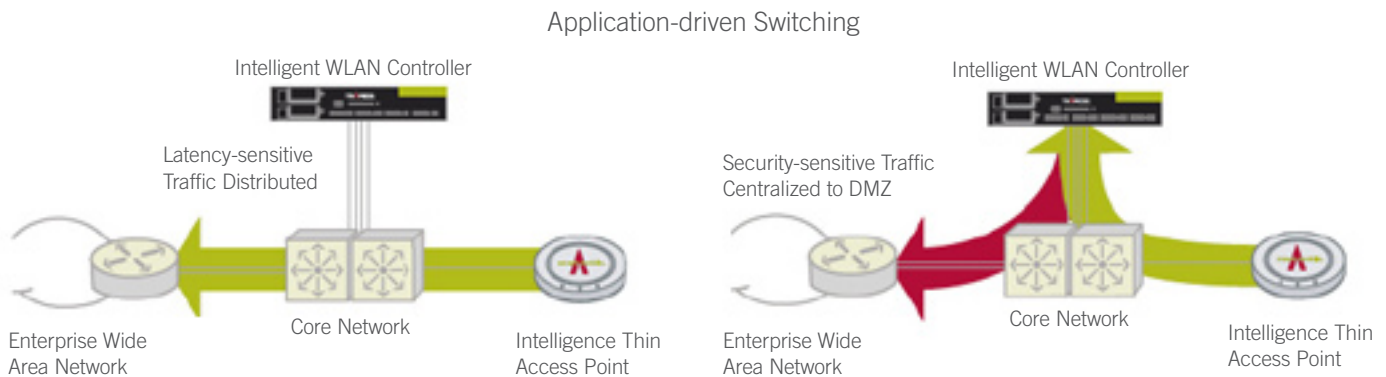
Direct Path Forwarding breaks through the limitations of today's WLANs, enabling customers to deploy scalable WLANs that support demanding data and voice applications, while providing unlimited reach indoors and outdoors.

Ubiquitous Voice-over-WLAN Deployments Now Possible

By eliminating the continuous round-trips between the controller and the voice handset—thereby minimizing network latency—DPF's intelligent switching makes large-scale voice-over-WLAN deployments possible. Now for the first time, enterprises can deploy WiFi phones and toll-quality VoWLAN service to large numbers of users—tens of thousands—and reap substantial savings in their cellular phone bills, just as VoIP desk phones have helped slash landline phone bills.

Highest Network Performance, Efficiency, and Scalability

The ability to forward data either centrally or in direct-path fashion also leads to an enormous increase in network performance, efficiency, and scalability. Direct Path Forwarding WLANs can support far more users, devices, and applications with substantially less controller capacity than WLANs from other vendors, resulting in significantly lower cost and better value for customers. Because Direct Path Forwarding WLANs are 802.11n ready, customers can move to the new high-speed 802.11n standard when it is finalized, without having to rip out and replace their switching infrastructure with expensive new boxes.



Direct Path Forwarding Adapts to the Needs of the Application

Unlimited Reach: Bringing the Enterprise WLAN Outdoors

Centralized WLANs have failed to deliver scalable outdoor service, because they require centralized policy enforcement, resulting in inefficient use of scarce over-the-air bandwidth. Direct Path Forwarding overcomes this limitation through intelligent switching, which distributes policy enforcement throughout the network to optimize bandwidth usage. As a result, Direct Path Forwarding delivers the industry's most scalable enterprise WLANs indoors and outdoors.

Fully Centralized Lifecycle Management and Control

The huge benefit of centralized WLAN architectures is centralized network management and control—and Direct Path Forwarding gives up none of that benefit. While Direct Path Forwarding enables direct-path forwarding, encryption, and policy management, it retains fully centralized lifecycle management and control. Network administrators can plan, deploy, and manage the entire WLAN—both indoors and outdoors—from a single, integrated management console. In fact, as with previous generations of RoamAbout WLAN solutions, Direct Path Forwarding continues to deliver the industry's most advanced and easiest to use WLAN management solution.

Future-proofing Your WLAN Investment: No Forklift Upgrades Required

Direct Path Forwarding enables customers to future-proof their WLANs and protect their investments for the long haul. For CIOs and network managers who are wondering how to cost-effectively scale their WLANs to deliver enterprise-wide mobility, support rapidly increasing numbers of users, and provide mobile applications such as voice and video, Direct Path Forwarding provides a complete solution that does not require expensive forklift upgrades.

Highest Performance without Limits

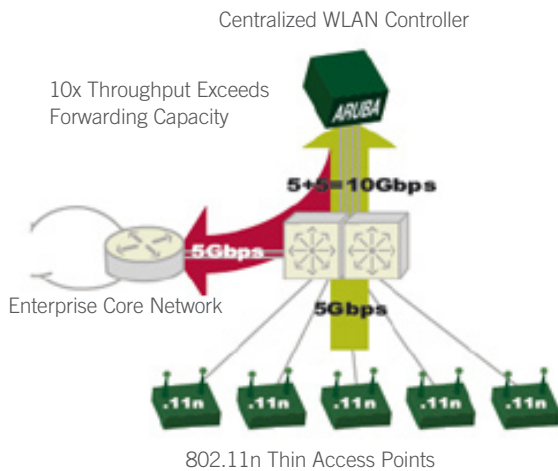
Combining centralized WLAN management with optimized traffic flow, Direct Path Forwarding provides the highest performance WLANs today—802.11n ready without costly upgrades.

Optimized Traffic through Intelligent Switching

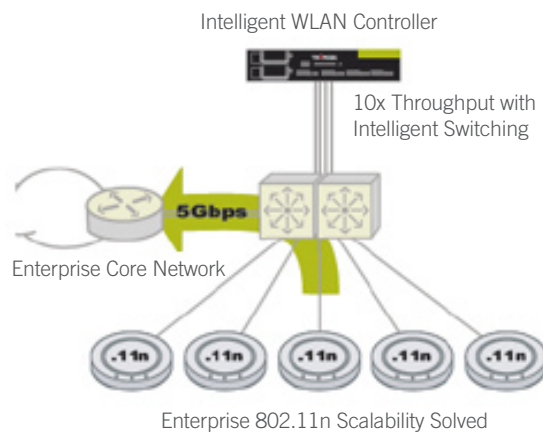
DPF's intelligent switching is the first and only WLAN architecture that allows data to be forwarded centrally or in direct-path fashion, depending on the underlying application. For example, voice over WLAN requires extremely low latency. DPF's patent-pending intelligent switching technology forwards voice traffic in direct-path mode—directly from access point to access point, rather than having to go through the central controller each time—minimizing latency and enabling highly scalable VoWLAN deployments.

802.11n Will Break Current-generation WLANs

DPR Supports 802.11n without a Problem



Limited Enterprise 802.11n Scalability



Enterprise 802.11n Scalability Solved

Application Driven

While Direct-Path Forwarding delivers efficiency gains, some applications require centralized forwarding. Guest traffic, for example, needs to remain outside the firewall. Direct Path Forwarding allows customers to centrally forward all guest traffic through a designated controller, ensuring strict separation from the internal network. Direct Path Forwarding is the only enterprise WLAN solution that delivers this flexibility.

802.11n Support Out of the Box

The IEEE 802.11n standard will bring about a new generation of ultra-high-speed wireless technology. The new standard—expected to be finalized by late 2007 or early 2008, with commercial availability of 802.11n radios coming soon after—specifies data transfer rates up to 700 Mbps, compared to today's peak rate of 54 Mbps. Unfortunately, current-generation WLAN controllers, operating in a centralized-forwarding mode, cannot handle the 12x increase in network load that 802.11n will bring. As a result, some WLAN vendors are recommending that customers buy expensive new controllers to support 802.11n. By contrast, RoamAbout's Direct Path Forwarding architecture with intelligent switching can scale to support the 12x increase in network load without requiring customers to upgrade their entire switch infrastructure.

Highest Scalability at Lowest Cost

Through intelligent switching, Direct Path Forwarding offloads an enormous amount of processing—including data forwarding, encryption, and policy enforcement—from the controller to the access points. By dramatically reducing the load on the controller, Direct Path Forwarding has no problem with the 12x increase in throughput that 802.11n will bring. Direct Path Forwarding scales with exceptional efficiency, because each access point adds more processing capability to the network. This is far more efficient and less costly than WLANs with centralized architectures—such as those from Cisco and Aruba—where each access point adds significantly to the controller load, requiring more and/or bigger controllers as the number of access points increases.

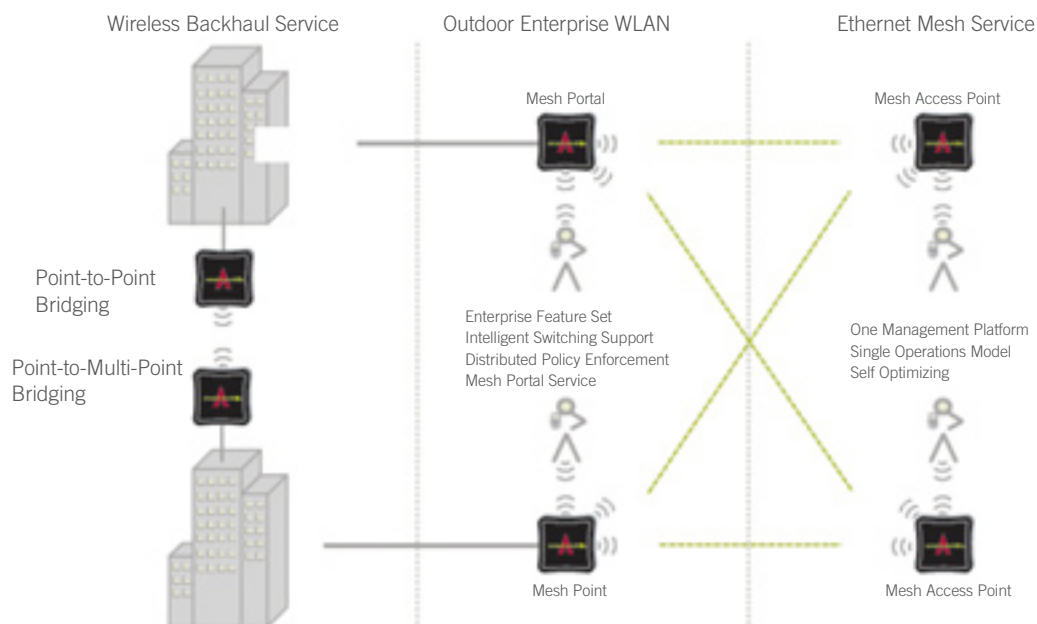
Outdoor Enterprise WLANs without Limits

Through bandwidth-optimized intelligent switching, Direct Path Forwarding delivers the most scalable enterprise WLAN solution for outdoor and uncarpeted areas, providing enterprise services such as WiFi Multimedia (WMM) and WPA2 security.

Limited Bandwidth Creates Significant Challenges for Outdoor Deployments

Deploying enterprise WLANs to outdoor or uncarpeted locations, such as warehouses and factory floors, poses significant challenges. Due to the unavailability of Ethernet wiring in these areas, over-the-air bandwidth—which is very limited—must be shared for backhaul and bridging service, as well as for service to client devices. Bandwidth usage, therefore, must be very efficient. Yet current generation WLANs with centralized architectures are highly inefficient, as they require centralized policy enforcement at the controller.

Eliminating the Boundaries: Outdoor WLANs with Indoor Sophistication



Direct Path Forwarding Is Bandwidth Optimized for Maximum Efficiency and Scalability

Direct Path Forwarding overcomes the limitations of current-generation WLANs by optimizing usage of scarce over-the-air bandwidth. Unlike WLANs with centralized architectures and centralized policy enforcement, Direct Path Forwarding WLANs enforce policy in a direct-path fashion, at the wired-wireless edge, rather than at the central controller. By optimizing bandwidth, Direct Path Forwarding outdoor WLANs can provide highly scalable backhaul, bridging, and client service with significantly less infrastructure than WLANs from other vendors, resulting in lower capital and operating costs, and better value.

Complete Enterprise-class Services

Direct Path Forwarding delivers a complete enterprise feature set for outdoor deployments—the same enterprise features available in indoor WLANs—including the highest security standards (802.1X, WPA2, AES CCMP encryption, etc.) and toll-quality voice support (WMM, PMK cached fast roam, etc.).

Single Integrated WLAN, Indoors and Outdoors

As enterprises extend their WLANs to outdoor and uncarpeted locations, they do not want to manage these extensions as separate networks requiring yet another set of management tools. Direct Path Forwarding outdoor WLANs are fully integrated with Direct Path Forwarding indoor WLANs, and can be managed as one system from a single console. Direct Path Forwarding gives network administrators a single consolidated view of the entire network, indoors and out, and centralized lifecycle control over planning, configuration, deployment, and ongoing optimization of the network.

Toll-quality Voice over WLAN without Limits

Leveraging IEEE industry standards, Direct Path Forwarding delivers the highest-quality voice-over-WLAN solution for thousands of users. Users can connect once to the WLAN, authenticate and roam, and enjoy strong, clear voice quality without disruption throughout the enterprise.

Voice-optimized Traffic Enables Massive Scalability


The centralized architectures of current-generation WLANs result in excessive latency in the network, making large-scale deployment of latency-sensitive voice over WLAN virtually impossible. DPF's intelligent switching overcomes this limitation by forwarding voice traffic in direct-path fashion along the shortest path—i.e., from access point to access point—rather than through the central controller. As a result, network latency is no longer an issue, enabling VoWLAN deployments for hundreds—even thousands—of users.

Standards-based Toll-quality Voice

RoamAbout is the only WLAN system shipping today with an IEEE standards-based VoWLAN solution that delivers true toll-quality voice.

Highest Level of Security

The enterprise-class security mechanisms implemented for WLAN access are also applied for VoWLAN service, including:

Industry Standard		Cisco	Aruba
Prioritize & Queue Traffic (WMM)	Delivered	Proprietary	Delivered
Preserve Voice Priority (802.11e,WMM)	Delivered	Proprietary	Press Release
Control Bandwidth for Voice (TSPEC)	Delivered	Proprietary—Future Release	Press Release
Maximize Handset Battery Life (U-APSD)	Delivered	Proprietary—Future Release	Press Release
Regulate Call Load (802.11v)	Delivered	No Support Announced	No Support Announced
Roam Efficiently (802.11k)	Delivered	No Support Announced	No Support Announced

- Full support of 802.11i standards—highest level of enterprise-class authentication and encryption
- Seamless session mobility through fast, secure roaming
- Voice-aware personal firewalls for added security
- Highest level of intrusion protection through integration with AirDefense IPS capability

Fully Managed Service

RoamAbout Switch Manager enables pre- and post-deployment planning, configuration, and management of voice over WLAN. Key capabilities include:

- Lifecycle management—single point of control
- User-level voice service management
- Network-wide service deployment
- Performance monitoring—track detailed performance statistics
- High scalability and easy integration

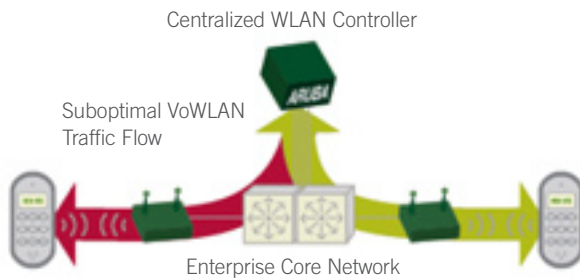
Making the Promise of Fixed Mobile Convergence a Reality

In partnership with several pioneers of fixed mobile convergence (FMC), RoamAbout has demonstrated interoperability with dual-mode phones and leading cellular network carriers. Benefits of FMC include:

Secure Wireless without Limits

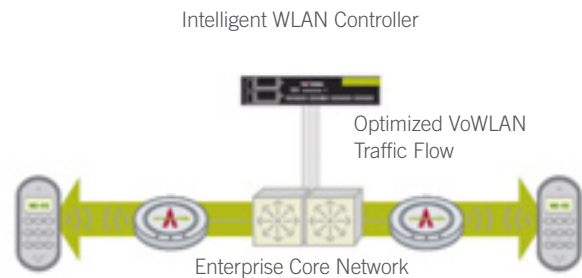
Direct Path Forwarding combines the highest security standards for authentication and encryption with industry-leading detection and prevention, delivering the most secure wireless solution on the market.

Current-generation WLANs: Not Optimized for Voice



Limited Enterprise VoWLAN Scalability

DPF: Voice-optimized Traffic Flow



Enterprise VoWLAN Scalability Solved

- Seamless voice mobility across WLAN and cellular networks
- Shift of control—from the cellular provider to the enterprise—over coverage, capacity, and other factors impacting call volume and quality
- Reduced infrastructure and management costs by providing single handset, phone number, and voice mailbox for employees

Most Secure Authentication and Encryption

Using strong authentication and encryption, Direct Path Forwarding networks protect against misuse and eavesdroppers, and isolate traffic between multiple private groups. Direct-path cryptography implemented in RoamAbout access points ensures scalability of security policies.

- 802.1X-based authentication—the most secure enterprise-level authentication scheme
- AES CCMP encryption—the most robust encryption algorithm in the industry
- WiFi Alliance WPA2—the highest level of wireless security certification
- Comprehensive guest-access control measures to secure the corporate network and resources

Protection from Untrusted and Unhealthy Client Devices

Direct Path Forwarding networks prevent misconfigured or infected devices from accessing the network by checking for the latest security patches and service packs, firewalls, antivirus software, and anti-spyware. Endpoint assurance features include:


- Trusted Network Connect support—As an active participant in the Trusted Computing Group (TCG), RoamAbout supports TCG's Trusted Network Connect (TNC), an industry-standard approach to secure access control and endpoint integrity.
- Symantec On-Demand Endpoint Protection—RoamAbout has integrated the Symantec On-Demand Protection agent into the RoamAbout Wireless Controller Switch. The security agent checks if the endpoint complies with corporate security policies before giving it access to the network.
- Microsoft Network Access Protection (NAP) support—RoamAbout is a NAP solutions partner. The RoamAbout Mobility System works with Microsoft NAP infrastructures to ensure endpoint integrity.
- Support for endpoint remedial services—including quarantine and redirection to remedial servers

Fully Integrated Intrusion Protection

RoamAbout has partnered with AirDefense, the pioneer and leader in wireless intrusion prevention systems (IPS), to deliver the industry's only fully integrated IPS at the lowest cost of ownership.

Real-time Location Services without Limits

Tracking and locating high-value assets in real time is a critical requirement in industries such as healthcare, manufacturing, logistics, and distribution where delays can be costly or even life-threatening. Partnering with industry leaders in WiFi-based location systems, RoamAbout Direct Path Forwarding delivers the most scalable, real-time, integrated WLAN-based location solution at the lowest cost of ownership.

	 Integrated AirDefense	Cisco	Aruba
Number of Attack Types Defended Against	230+	24	40
NIAP Common Criteria Certification (DoD)	✓	—	—
Integrated Management & Configuration	✓	—	—
Auto Alarm Correlation & Roll-up in Single Console	✓	—	—
Common Hardware for NIAP-certified Sensor & AP	✓	—	—

- Integrated configuration and management—reduces configuration effort up to 50% compared with deploying a separate IPS overlay, by dramatically simplifying tasks such as adds, moves, and changes. Network administrators can monitor WLAN operation and alarms in a single console.
- NIAP Common Criteria Certification—AirDefense is the only wireless IPS vendor that is NIAP CC certified, a U.S. Department of Defense requirement.
- 360° protection from 230+ threats—The RoamAbout/AirDefense solution defends against rogue devices, denial of service attacks, “Evil Twins” that spoof legitimate hotspots, misconfigured machines, and many other threats.
- 24/7 continuous monitoring—Unlike time-slice monitoring approaches that leave networks vulnerable to threats, the RoamAbout/AirDefense solution continuously monitors the airwaves for potential threats.
- Comprehensive forensic analysis—An extensive historical forensic database provides deep understanding of attempted attacks, aiding investigations, security planning, and prevention against future attacks.
- Common hardware—RoamAbout access points and AirDefense sensors leverage identical hardware—one part to install, stock, maintain, and operate—thereby reducing the IT burden and cost.
- Dynamic threat response—Access points can be easily converted into sensors for rapid counter-attack, then converted back to access point service, reducing the required number of dedicated sensors by up to 50%.

Longest Battery Life

Network-based tags utilized in Direct Path Forwarding inherently consume much less battery power than client-based tags. Their extended battery life results in lower operational costs and higher reliability. Tag battery life can extend over years.

Highest Scalability

Network-based tags do not associate with WLANs as a client, which reduces the network load. This enables deployment of thousands of tags in the network without impacting the network load for voice and data services.

Asset Tracking and Alerts Extend Location Applications

With installation of tracking detectors at entry or exit points in a facility, security and operational personnel can be alerted when a tagged asset crosses that boundary. This capability can support key applications such as theft prevention, inventory management, and personnel/patient safety.

Real-time Location Accuracy


The RoamAbout solution provides nearly instantaneous updates on location, thus ensuring reliable information to track an asset or a person fast.

WLAN Lifecycle Management without Limits

RoamAbout Switch Manager enables IT managers to perform pre- and post-deployment planning, configuration, monitoring, and optimization of the WLAN. With RoamAbout's client-server architecture, customers can easily deploy multi-site networks. A single server scales to support 500 switches, thousands of radios, and tens of thousands of clients.

Out-of-the-box, User-developed, and Third-party Applications Can Utilize Location Data

Organizations have both ready-made end user applications for asset tracking and process improvement, as well as an open interface to utilize location

		Cisco	Aruba
Tag Battery Life	Years	Years	Months
Asset Tracking Alerts	Yes	Yes	No
Scalability/Number of Tags	10,000+ Tags	1,500+ Tags	Max 25 Tags per AP
Real-time Location Capability & Accuracy	Real-time (Updated in Seconds)	Delayed (Updated in Minutes)	Delayed (Updated in Minutes)
Application Support	Full	Full	Limited
Total Cost of Ownership	Lowest	High	Highest

data within existing asset and inventory management systems.

Lowest Total Cost of Ownership

By using existing WLAN infrastructures to support location services, customers realize significantly lower costs compared to deploying standalone location systems. With the demonstrated lowest cost of ownership afforded by Direct Path Forwarding over other WLAN offerings, customers can easily leverage their WLAN infrastructure to achieve the most cost-effective location solution available.

Easy and Powerful 3D Wireless Planning

Wizard-based Virtual Site Survey and capacity planning tools simplify network planning.

- Integrated 3D planner—enables IT to plan an entire building versus just a floor
- Auto computes signal losses via a library of common building obstacles
- Auto-generated wireless coverage map and work order—provides configuration data for each switch, the optimal power levels for each AP, the number of APs, and their placement
- Auto optimization—performance data feeds continuous WLAN improvement

Fast and Easy Network-wide Deployment

RoamAbout Switch Manager leverages the network plan for easy two-click configuration of services and security policy. Powerful task wizards guide the configuration process.

- Network-wide voice service wizard—two-click setup
- Network-wide security profile wizard—two-click setup
- Multi-switch deployment wizard—push configuration data to all switches in a single click
- Network-wide change management—ensures network changes are stable

Easy Real-time Monitoring


RoamAbout Switch Manager provides complete, effortless visibility into any layer on the network and any device or client.

- Dashboard view—offers unprecedented visibility into network activity
- Network-wide fault correlation and location—dramatically speeds and simplifies network troubleshooting
- Drill down to details of a fault or event
- 30-day trend monitoring

Comprehensive Reporting

RoamAbout Switch Manager includes comprehensive reporting tools that enable the IT staff to baseline network performance and track usage trends, which are essential for planning enhancements and extensions.

- Comprehensive 1-hour to 30-day reporting
- End user customizable reports
- Trend reporting
- Historical data on network activity

		Cisco	Aruba
Management Interface	Single Console	Multiple Components	Multiple Components
Software Generation	5th Generation	Many Generations, Many Products	1st Generation
Outdoor/Indoor Operation Model	Single Integrated Model	Different for Indoor and Outdoor	Outdoor Not Integrated
Controllers/Switches per Server	500	25	125
Integrated 3D Planner	✓	—	—
Network-wide Service Deployment & Change Management	✓	Limited	—
Network-wide Fault Correlation & Location	✓	Limited	✓
Drill Down to Real-time & Historical Data	✓	—	—
Comprehensive 1-hour to 30-day Reporting	✓	—	—

Contact Us

For more information, call Enterasys Networks toll free at **1-877-801-7082**, or **+1-978-684-1000** and visit us on the Web at enterasys.com



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