



## SOLUTION OVERVIEW

# Wireless Mesh Routers

## Deploying Wireless Mesh Routers for Indoor and Outdoor Wi-Fi Access and Mesh Backhaul

With always-on connectivity an expectation across enterprise networks, it's easy to overlook how challenging it can be to provide wireless coverage to environments beyond the traditional office.

But bringing the benefits of mobility to indoor and outdoor environments just got simpler. With advances in technology, wireless mesh routers can be used to deliver cost-effective, reliable, secure connectivity in both indoor and outdoor environments.

### Use Cases for Wireless Mesh

Wireless mesh networks are suitable for any enterprise or service provider deployment, but wireless mesh has most compelling advantages for industrial enterprise settings where network connectivity is often regarded as costly and difficult.

Ideal uses cases for wireless mesh include:

- **Public safety and emergency response** demand wireless connectivity that supports coverage of large geographic areas, high-speed mobility and high-quality video surveillance. Wireless mesh routers are ideal to deliver high throughput, highly reliable wireless connectivity

in a variety of public safety applications, including first responders and physical security for public events, parking garages and other outdoor facilities.

- **Extended campuses and business parks** require both indoor and outdoor connectivity, but delivering that connectivity with a consistent wireless solution can be challenging. With wireless mesh, educational institutions and business parks can provide wireless coverage both inside and outside, and even for non-line-of-site applications. Using a wireless mesh avoids the high cost of trenching and pulling fiber between buildings on a large campus.

### Aruba Solution Advantages

- HD-quality video surveillance for public safety and security at events, parking garages, retail malls and large outdoor facilities
- Eliminate the cost and complexity of trenching and installing fiber between buildings in campuses and business parks
- Provide public and departmental Wi-Fi services throughout extended metropolitan areas
- Secure, cost-effective enterprise Wi-Fi access and HD-quality video surveillance at construction sites
- Reliable delivery of cinema-quality video at 30 frames per second for transit and port authority surveillance and monitoring
- Ruggedized and hardened to withstand extreme environmental conditions at manufacturing plants, warehouses and outdoor industrial facilities



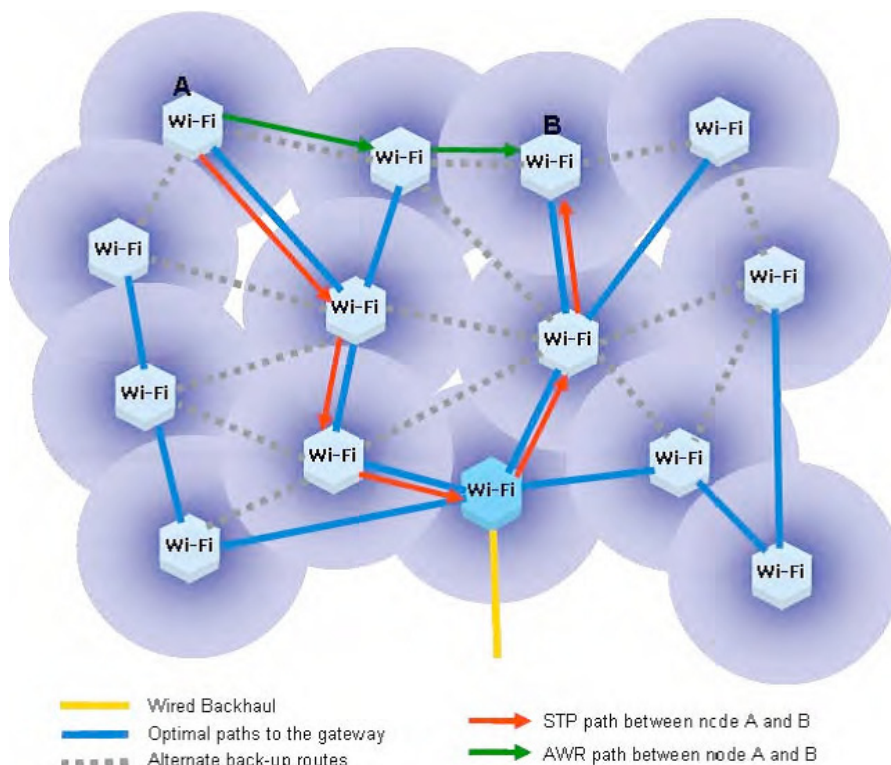
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- **Municipalities** can build out a high-quality network service over a large geographic area for their departments and constituents without sacrificing quality or control, even in areas that would otherwise require costly wired backhaul.
- **Construction sites** can use a wireless mesh to provide workers and inspectors with access to information resources during the day and to provide video surveillance at night. Wireless mesh routers can be used to deliver wireless connectivity over broad area without the need to pull wires.
- **Transportation agencies and port authorities** can support real-time applications and video surveillance over large physical area using a wireless mesh without the hassle of pulling fiber for a wired network or leasing expensive bandwidth from a service provider.
- **Manufacturing plants, warehouses and outdoor industrial facilities** can ensure the productivity and safety of their workers with an industrial-strength, wireless mesh network that is easy to deploy and operate. Support for high-speed mobility and video surveillance makes the workers more productive and the site safer.

### How Wireless Mesh Routers Work

Wireless mesh networks are easily adaptable and expandable, making it easy and effective to provide connectivity over large and often challenging geographic areas. In a wireless mesh, the network connection is spread out over dozens or hundreds of wireless routers that communicate with each other.

A wireless mesh is truly wireless. It does not rely on a wired network for backhaul. The absence of fiber or cable runs significantly reduces network installation costs and



*Aruba makes wireless mesh networks more scalable, resilient and flexible to the business needs for mobile connectivity and real-time applications.*

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requires fewer Ethernet switch ports, which simplifies deployment and lowers operations costs.

A modern-day wireless mesh network is comprised of routers that contain multiple radios that can be individually configured for different purposes. This gives organizations the flexibility to choose the wireless mesh architecture that best fits their use case. In a multi-radio architecture, each radio in a mesh router can be configured to operate as an access point (AP) for secure Wi-Fi client access, or as a point-to-point, point-to-multipoint, or full mesh backhaul.

A multi-radio architecture also improves the throughput and scalability of the mesh, which makes it possible to ensure high performance for applications. Having multiple radios makes it possible to separate access and mesh backhaul data while optimizing radio resources for both traffic types to ensure fast throughput and low latency.

Today's wireless mesh networks are resilient and reliable. Like the Internet, which is the ultimate mesh network, a wireless mesh is self-healing. Wireless mesh routers that support true network-layer routing can find the fastest and most reliable paths through the mesh.

### The Technology Advantages of Aruba Wireless Mesh Routers

Aruba Networks overcomes the challenges of traditional wireless mesh networks. Aruba's investments in several areas of wireless mesh technology resolve the difficulties associated with building and operating a high-performance, highly resilient infrastructure suitable for use in industrial-grade settings and to support real-time and mobile applications.

**Resiliency with true network-layer routing.** Aruba's mesh network solution is resilient and reliable. Aruba developed Adaptive Wireless Routing™ (AWR), a distance vector routing protocol that brings the resiliency and reliability of network-layer routing to wireless mesh.

Routing at Layer 3 eliminates the performance delays and scalability issues that occur with wireless mesh products that use the spanning tree protocol at Layer 2 to communicate. Awareness of the quality of the wireless-link state, together with AWR, allows Aruba to deliver a highly scalable wireless mesh network.

With true network-layer routing, Aruba wireless mesh networks deliver the necessary scalability, throughput and low latency even over multiple mesh hops in large geographic areas

### Aruba Technology Advantages

- Ideal where wired connectivity is impractical or unavailable
- Multi-radio, multi-frequency mesh architecture delivers unmatched speed and reliability over long distances
- High-performance adaptive routing automatically optimizes traffic routes between wireless mesh routers
- Supports Wi-Fi access as well as point-to-point, point-to-multipoint and full mesh backhaul
- High-speed roaming for latency-sensitive voice and video traffic with 50 millisecond session handoff between wireless mesh routers
- Delivers enhanced video at up to 30 frames per second across the distributed wireless mesh infrastructure

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to meet the requirements of delay-sensitive applications such as IP voice and video. AWR is a fast and efficient routing protocol that incurs a per-hop latency of less than two milliseconds.

Aruba's wireless routers use a multi-radio architecture, which allows organizations to use the same gear to deploy a variety of topologies to meet different application requirements, including full and partial mesh, point-to-multipoint and hierarchical hub and spoke.

**High-speed mobility.** Information workers expect their Wi-Fi laptops, smartphones and tablets to connect, regardless of how far they roam – or

while maintaining session persistence and their IP addresses. Such speed makes the Aruba mesh ideal to support mobility in vehicles that move at high speeds, such as for first responders and patrol cars.

MobileMatrix roaming technology supports ordinary Wi-Fi clients. It does not require any special software on servers, clients or other networking devices to support seamless roaming with session persistence.

**High-quality voice and video.** With an Aruba wireless mesh, real-time applications such as IP voice and video surveillance are not only possible, but practical. Cinema-



how quickly. With Aruba, the same can be true for workers in outdoor and industrial settings.

Aruba's MobileMatrix™ roaming technology makes it possible for Wi-Fi clients to roam at high speeds, both within a single IP domain as well as across IP domains. With Aruba's seamless roaming, users can maintain a continuous connection to their applications, even with latency-sensitive applications like IP voice and video.

In an Aruba mesh, Wi-Fi clients can move from wireless router to wireless router in less than 50 milliseconds

quality video can be delivered over the mesh.

Aruba's Active Video Transport™ (AVT) traffic-shaping technology ensures the delivery of high-definition video and high-quality voice by employing quality of service (QoS) and bandwidth management.

AVT makes intelligent tradeoffs between latency and impairments to video quality. The end result is that users perceive a significant improvement in video quality – and the video is delivered at 30 frames percent.

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Aruba supports multiple methods of enforcing QoS, including DiffServ, IEEE 802.11e and VLANs, which give network operators full control over service quality for converged wireless networks carrying voice, video and data traffic while maintaining session persistence and their IP addresses.

### Inside the Aruba Wireless Mesh Solution

The Aruba solution leverages Adaptive Wireless Routing, MobileMatrix roaming and Active Video Transport technologies to deliver unparalleled speed, scale and reliability as well as low latency and seamless hand-offs for voice, video and other real-time applications across the outdoor wireless mesh network.

Organizations can be confident of Aruba's strong security. Rigorous authentication, strong encryption and other security provisions ensure network integrity and user privacy from end to end.

The Aruba family of wireless mesh routers includes:

- **MSR2000 Outdoor Wireless Mesh Router** – Wireless mesh

router with two 802.11a/b/g/n radios for high-density outdoor mesh deployments using the 2.4-GHz, 5-GHz and 4.9-GHz U.S. public safety band.

- **MSR1200 Indoor Wireless Mesh Router** – Wireless mesh router with two 802.11a/b/g/n radios for medium-density indoor mesh deployments using the 2.4-GHz, 5-GHz and 4.9-GHz U.S. public safety band.

With Aruba wireless mesh routers, organizations can unleash the power of mobility even in challenging outdoor environments. Aruba's technology advance the state of the art, making the Aruba wireless mesh high throughput, highly resilient, secure and able to support in-demand applications like voice and video surveillance. And with a remarkably low total cost of ownership, organizations can get back to business, instead of focusing on technology.



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