ARUBA AIRGROUP™:
GET YOUR WI-FI READY
FOR AIRPRINT AND AIRPLAY
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Introduction

Aruba AirGroup™ is a unique enterprise-class capability that leverages zero-configuration networking (zeroconf) to enable services like AirPrint and AirPlay from mobile devices.

What sets Aruba AirGroup apart from other mDNS approaches is its ability to distinguish between shared devices and personal devices. AirGroup goes a step further by employing location relevance, which only shows shared devices in close proximity to the user. This is achieved through Aruba context-aware technology, which identifies user roles, their devices and their locations.

With Aruba AirGroup, the network traffic generated by these services is greatly minimized and the user experience is far more intuitive, taking into account contextual information to define what can be seen and accessed.

Aruba AirGroup is available for all customers who use Aruba Mobility Controllers and the Aruba ClearPass™ Policy Manager in their network. It is primarily designed for:

1. IT organizations in the general enterprise that want to make zeroconf available to end users at work. Use cases may include context-based access to shared network resources such as an Apple TV in a conference room for projecting a mobile device screen or printers in common areas.
2. IT organizations in education institutions that want to enable zeroconf in classrooms and dormitories. Use cases may include personal access to one’s own Apple TV in a dorm room or faculty-only access to an Apple TV in the classroom.

What is Zero Configuration Networking (zeroconf)?

Zeroconf is a set of protocols that enable service discovery, address assignment and name resolution for desktop computers, mobile devices and network services. It is designed for flat, single subnet IP networks such as wireless networking at home.

Bonjour, Apple’s trade name for its zeroconf implementation, is the most common example. It is supported by most of the Apple product line including the Mac OS X operating system, iPhone, iPod Touch, iPad, Apple TV and AirPort Express.

Bonjour can be installed on computers running Microsoft Windows and is supported by most new network-capable printers. Bonjour is also included within popular software programs such as Apple iTunes, Safari and iPhoto.

Bonjour uses multicast DNS (mDNS) to locate devices and the services that those devices offer. Since the addresses used by the protocol are link-local multicast addresses each query or advertisement can only be forwarded on its respective VLAN, but not across different VLANs.

Several new wireless advancements make Aruba the clear choice, including device-aware and device-specific policies, application performance, broadcast video, over-the-air performance, RF resiliency, flexible deployment, and simplified management.
WLANs and Bonjour

In large universities and enterprise networks, it is common for Bonjour-capable devices to connect to the network across VLANs. As a result, user devices such as an iPad on VLAN 30 will not be able to discover the Apple TV that resides on another VLAN.

When a router is enabled to propagate all the mDNS traffic between VLANs across wired and wireless networks, the network is flooded with mDNS traffic that consumes valuable wireless airtime.

Network administrators are faced with a difficult choice between either propagating mDNS traffic across VLANs and risk significant reduction in wireless performance or block mDNS traffic to prevent connectivity for Bonjour-capable devices and services.

The Solution: Aruba AirGroup

Aruba addresses this challenge with the introduction of patent-pending AirGroup technology. AirGroup leverages key elements of Aruba’s solution portfolio including ArubaOS operating system software for Aruba Mobility Controllers and the Aruba ClearPass Policy Manager.

With AirGroup, seamless connectivity of clients and services is maintained across VLANs and SSIDs. The mDNS traffic across the wired and wireless network is minimized, thereby preserving valuable wired network bandwidth and WLAN airtime.

Aruba AirGroup also enables context awareness for services across the network.

1. AirGroup is aware of shared resources. This might be an Apple TV in a meeting room or a printer in a supply room that’s available to certain users, such as the marketing department. Or, in a classroom, teachers can use AirPlay to wirelessly project a laptop screen onto an HDTV monitor using an Apple TV.

2. AirGroup is aware of personal devices. For instance, Apple TV in a dorm room that belongs to a specific student.

3. AirGroup is aware of the location of services. For instance, depending on proximity, an iPad would be presented to AirPrint using the closest printer instead of all printers in the building. Another example is a user in a conference room who wants to use AirPlay to project a MacBook screen on an HDTV monitor using an Apple TV receiver. When that user queries the network for a list of available Apple TVs, the location-aware Mobility Controller only shows the Apple TV closest to the user.

How does Aruba AirGroup work?
Here are the steps to enable AirGroup functionality within an Aruba WLAN, powered by Aruba Mobility Controllers and the ClearPass Policy Manager.

1. An end user is authorized by the network administrator to register a service – such as AirPlay to Apple TV – using the Aruba ClearPass device registration interface. The end user logs into ClearPass using corporate network credentials and gets access to a web registration portal. After registration, this restricts the use of this service to mobile devices logged onto the network under that user’s identity.

2. Aruba Mobility Controllers continuously maintain state information for all mDNS services by running service discovery in Layer 2. Aruba Mobility Controllers query Aruba ClearPass to map access privileges of a particular mobile device to available services.

3. Aruba Mobility Controllers respond back to the query listing made by a mobile device based on contextual data – user role, device type and location.

**Discovering Services with Aruba Mobility Access Switch**

If a shared wired service, such as a printer, is connected to an Aruba S2500 or S3500 Mobility Access Switch, a centralized Aruba Mobility Controller automatically correlates the APs connected to that switch with shared mDNS services. In this case, there will be no need to make the service VLANs visible to the Aruba Mobility Controller in Layer 2.

When a Mobility Access Switch is being managed by an Aruba Mobility Controller, it will act as a collector of discovery information for all devices downstream from it. This allows a Mobility Controller to discover devices on VLANs that appear at the switch but not at the Mobility Controller.

Furthermore, Aruba Mobility Controller can estimate the physical location for wireless devices that are associated with an AP under its control and the Mobility Access Switch can provide an estimate for a wired device directly connected to it. This could eliminate the need for an administrator to place the wired device delivering the services (eg. AppleTV) on a floor plan.

When a Mobility Access Switch is deployed standalone and not managed by an Aruba Mobility Controller, it will then perform the Aruba Group service discovery tasks.

**Example: Higher Education Wireless LAN**

The example below shows a higher education environment with shared, local and personal services that are available to mobile devices. With Aruba AirGroup, context-based policies determine which services are visible to end user mobile devices.
Figure 1: Aruba AirGroup in a higher-education environment
### Table 1: Sample policies for Aruba AirGroup in a higher education environment

<table>
<thead>
<tr>
<th></th>
<th>Faculty</th>
<th>Student</th>
<th>Visitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>mDNS Services</td>
<td>User X’s iPad</td>
<td>User B’s MacBook</td>
<td>Windows Laptop</td>
</tr>
<tr>
<td>Apple TV in the lab, registered to user role “Faculty”</td>
<td>✔️</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Apple TV in the dorm room, registered to User B</td>
<td>✗</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Apple TV in a lecture hall accessible to Faculty</td>
<td>✔️</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Printer located in a lab accessible to faculty and students</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
</tbody>
</table>

### Deploying Aruba AirGroup

Aruba AirGroup can be deployed with Aruba ClearPass (recommended for large WLANs) or optionally without ClearPass in smaller networks. The network administrator and end user experience in each case is outlined in the following sections.

1. **Small network deployment**
   a. < five user VLANs
   b. Dozens of mDNS-capable devices
   c. Hundreds of Bonjour-capable clients
   d. Aruba Mobility Controller

   **Network administrator experience**
   - Deploy ArubaOS software with Aruba AirGroup feature.
   - Administrator defines network access policies and user roles.

   **End user experience**
   - User connects to the WLAN. User is automatically assigned a role based on authentication credentials.
   - Bonjour-capable devices and services allowed for that role are accessible by the user.

2. **Large university or enterprise network**
   a. Dozens of user VLANs
b. Hundreds of mDNS-capable devices
c. Thousands of Bonjour-capable clients
d. Aruba Mobility Controller
e. Aruba ClearPass Policy Manager
f. Aruba S2500 or S3500 Mobility Access Switch (optional)

Network administrator experience

- Deploy ArubaOS software with Aruba AirGroup feature.
- Administrator defines network access policies and user roles.
- Administrator can use the ClearPass registration page to identify shared services and map them to physical location based on AP name or AP group name.

End user experience

- User connects to the WLAN using a mobile device. User is automatically assigned an administrator-defined role based on authentication credentials.
- Users, such as students in dorm rooms, are asked to register personal devices like Apple TVs and gaming consoles.

Why Aruba AirGroup?

Aruba WLANs with AirGroup technology enable secure context-aware access to Apple Bonjour and other zeroconf-enabled devices without generating mDNS traffic that can constrain Wi-Fi performance. Only AirGroup delivers:

1. Context-aware access control using Aruba Mobility Controllers. A user’s role in an organization (e.g. marketing), the user’s devices (e.g. iPad) and the user’s location (e.g. conference room) are taken into account before zeroconf services are made available.

2. Self-registration of services using the Aruba ClearPass Policy Manager. Users and IT administrators can register devices that support zeroconf while policies define user- and location-based access privileges.

3. Zero-touch installation of services. AirGroup requires no wired or wireless network configuration changes. No additional SSIDs, VLANs, IP subnets, IP routing and configuration MAC filters are required.