aruba
a Hewlett Packard
Enterprise company

SOLUTION OVERVIEW

Self-locating Wireless Access Points

ENABLING INDOOR LOCATION SERVICES – EVERYWHERE

GROWTH IN LOCATION-AWARE SERVICES

Digital modernization is accelerating, driving the creation and expansion of location-aware services like turn-by-turn wayfinding, high-value asset tracking, retail customer engagement, and smart office initiatives. Yet, despite the importance of location context, organizations are unable to deploy indoor location as widely as they would like or provide seamless user experiences across indoor and outdoor environments due to the complexity, cost, and level of effort existing solutions require.

TODAY'S INDOOR LOCATION SERVICES LIMIT WIDESPREAD ADOPTION

Today's traditional Wi-Fi and Bluetooth ranging technologies are reliant on manually mapped reference points and relative distance measurements. To map reference points, IT must conduct site surveys and hand place reference points on site-specific maps. This requires costly professional services efforts and results in maps that are error-prone and difficult to use.

Because of the manual effort involved, only 25% of organizations map AP location and even fewer update it.

This limits the impact of innovations such as virtual Bluetooth because their accuracy is based on manually mapped reference points.

Newer solutions such as ultra-wide band (UWB) two-way ranging methods have the ability to measure relative distance down to the centimeter level; however, they are too costly and complex and are reserved for niche uses. Like traditional Wi-Fi and Bluetooth approaches, UWB is also reliant on manually mapped reference points that limit the accuracy of device measurements.

KEY BENEFITS

- Reduce IT burden by automating AP positioning thereby eliminating error-prone manual surveys and mapping.
- Leverage APs as a foundation for accurate indoor measurements to widely deploy new location-aware services and enhance existing applications.
- Scale indoor location across the organization using Open Locate to broadcast measurements over air to any mobile device.
- Create seamless user experiences across indoor and outdoor environments.

Incorporating indoor location measurements is also a challenge. Indoor measurements are typically locked in local x-y coordinates, making them incompatible with Google Maps, Apple Maps, and other off-the-shelf applications. Applications that use local coordinates require additional development effort, delaying the rollout of new services and increasing the cost.

To improve the accuracy and access to indoor location services, what is needed is an automated method to map the absolute reference measurements using universal latitude and longitude coordinates.

Wayfinding/ Navigation	Asset Management	Network Management	Safety/ Geofencing	Hyperlocal Marketing	Smart Cities

Figure 1: Location aware services common use cases

ARUBA'S APPROACH

To address these challenges and make indoor location services more widely available, Aruba has introduced the first self-locating access points which creates a foundation for accurate indoor location. Our goal is to bring the ease and widespread adoption of outdoor GPS to indoor environments.

Our APs use built-in GPS receivers, fine time measurements, and intelligent software to establish their locations accurately and automatically using universal latitude and longitude coordinates. Unlike today's manual approaches, which use site surveys and local map coordinates, Aruba Wi-Fi 6 and Wi-Fi 6E APs automatically locate themselves, refine their measurements over time, self-heal when APs are moved or replaced, and serve as absolute reference points for accurate client location.

Through our Open Locate initiative, Aruba is committed to establishing industry standards for sharing AP reference locations with client devices and network-based services. In coordination with mobile OS vendors, Aruba ensures that any application will have access to accurate and reliable indoor location.

COMPONENTS OF LOCATION SERVICES

Self-locating APs

Using embedded GPS receivers, Aruba Wi-Fi 6E APs are able to self-locate and work with Wi-Fi 6 APs to establish reference points that can be used to accurately determine indoor client location.

Intelligent software

Improves accuracy by refining multi-dimensional measurements over time and by constantly updating absolute reference points and relative distance to reflect changes. Includes management and orchestration of APs to allow location communication without impacting performance.

Open Locate

Open Locate aims to standardize the way APs advertise their location over the air and through cloud-based APIs, enabling mobile devices to locate themselves and applications to support network analytics.

Partner ecosystem

Major OS vendors and device manufacturers like Google, Zebra, Tile and Samsung are partnering with Aruba on Open Locate and leveraging Aruba for new and enhanced location services.
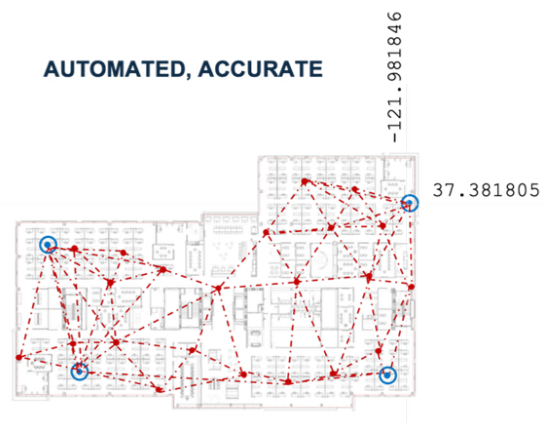

Figure 2: Manual mapping approaches with site surveys and proprietary maps do not offer the same level of accuracy or usability as self-locating APs.
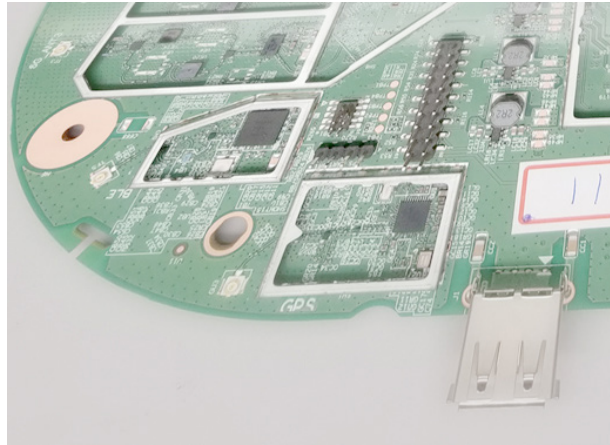
Figure 3: GPS receivers are embedded in Aruba's self-locating Wi-Fi 6E access points.

APS AS A FOUNDATION FOR INDOOR LOCATION

Aruba APs act as a foundation for accurate indoor location so that location-aware services can be deployed at scale. Our Wi-Fi 6/6E APs determine and transmit universal latitude and longitude coordinates over air so that they can be consumed by any mobile OS. There is no need for custom map development or to create separate applications for indoor and outdoor environments.

How it works

1. Location-aware Wi-Fi 6/6E APs automatically determine relative indoor location using ranging techniques known as fine time measurement.

2. Wi-Fi 6E APs with built in GPS anchor these relative location using the universal coordinates of latitude and longitude.

3. Intelligent orchestration and management software continuously refine AP location measurements and self-heal when APs are moved or replaced.

4. APs broadcast their location over the air to clients that support the Open Locate protocol and publish it over the cloud API.

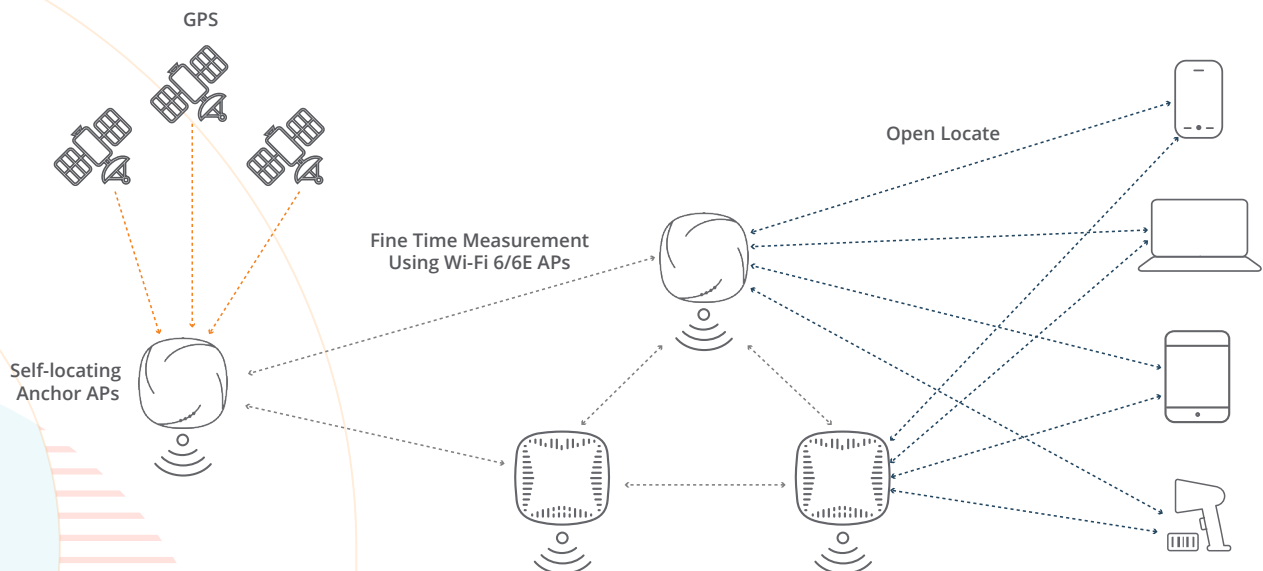5. Clients can use APs as reference points to determine their own location.

Figure 4: Aruba Wi-Fi 6/6E APs act as a foundation for indoor location using built in GPS, fine time measurement ranging techniques, and intelligent orchestration and management software.

AP portfolio support

Wi-Fi 6E APs are self-locating with built-in GPS receivers and fine time measurement technology that act as absolute reference points and can anchor relative indoor location. These APs are also referred to as the Aruba 6xx Series Campus Access Points.

Wi-Fi 6 APs have embedded fine time measurement technology to determine relative location and act as absolute reference points to determine client location. These APs are also referred to as the Aruba 5xx Series Campus Access Points.

OPEN INTEROPERABLE FRAMEWORK

As part of our efforts, Aruba is collaborating with IEEE and Wi-Fi Alliance to leverage and extend the 802.11 fine time measurement (FTM) standard with Open Locate. Our goal is to expand the methods for collecting, storing, and sharing indoor location information and to provide greater interoperability.

Aruba self-locating access points can also be used as absolute reference points for Wi-Fi, Bluetooth, or UWB technologies to drive greater accuracy.

SUMMARY

With Aruba's self-locating indoor APs, enterprises and service providers will be able to deliver location-aware applications more quickly, accurately, and at scale. IT teams eliminate manual surveys and site-specific floorplans by automatically locating reference points. Indoor location — whether it uses Wi-Fi, beacons, UWB, or other methods — is highly accurate because it is based on absolute reference points.

In the future, indoor location services will be applied in a variety of new ways to extract value. Location-enabled workflows and analytics have the potential to dramatically improve network operations. For example, location-aware machine learning can be used to optimize AP placement and to identify and replace failing APs before users experience issues. Lines of business can roll out and enhance applications without customization, and users benefit from seamless indoor and outdoor experiences.

For more information, visit arubanetworks.com/locationservices.

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