

November 2022

# Smart Buildings

## Context Aware Physical Spaces

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Smart Spaces & IoT EMEA

# Agenda

- Aruba Overview
- Business Challenges
- Experience
- Asset tracking and localization
- Location Based Analytics
- Zebra integration
- IoT and Sustainability
- Demos
- Summary
- Geneva CIC and Next Steps
- Q&A



# THE ROLE OF THE EDGE

- The edge is where telemetry data are generated by IoT & OT devices
- The edge is where contextual data is created by intelligent networks
- The edge is where the majority of cyber breaches start
- The edge is where process failures bring companies to their knees
- The edge is the launch point for **sustainability programmes.**





# ECONOMIC DRIVERS OF IOT

- Total economic impact of IoT in 2025 is \$70-140B
- Top areas include:
  - Human productivity monitoring \$48-115B
  - Energy monitoring & **Sustainability** \$12-21B
  - Building security \$3-6B
  - Asset tracking \$40-50B

# THE OVERALL CHALLENGES

“Instantaneous  
expectation of  
experience

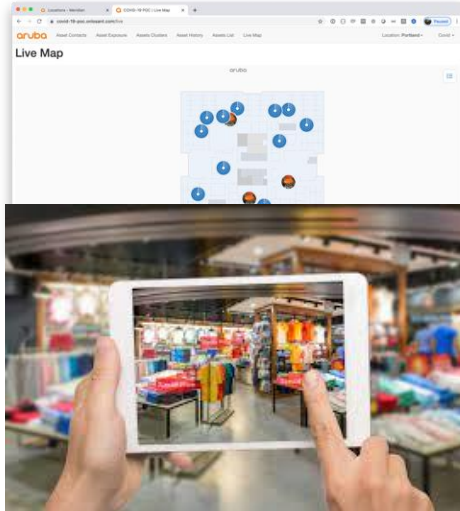
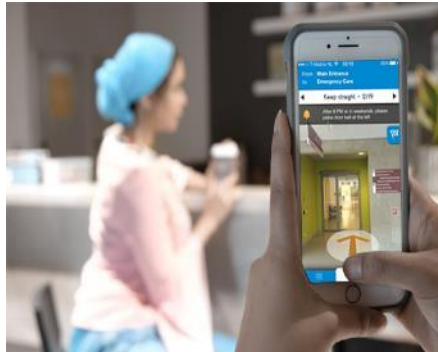
Exponential  
growth at the  
edge in terms  
of connectivity,  
security and  
management

Extremely  
stretched IT  
resources

New  
paradigm for  
space  
utilization  
and patient  
interactions

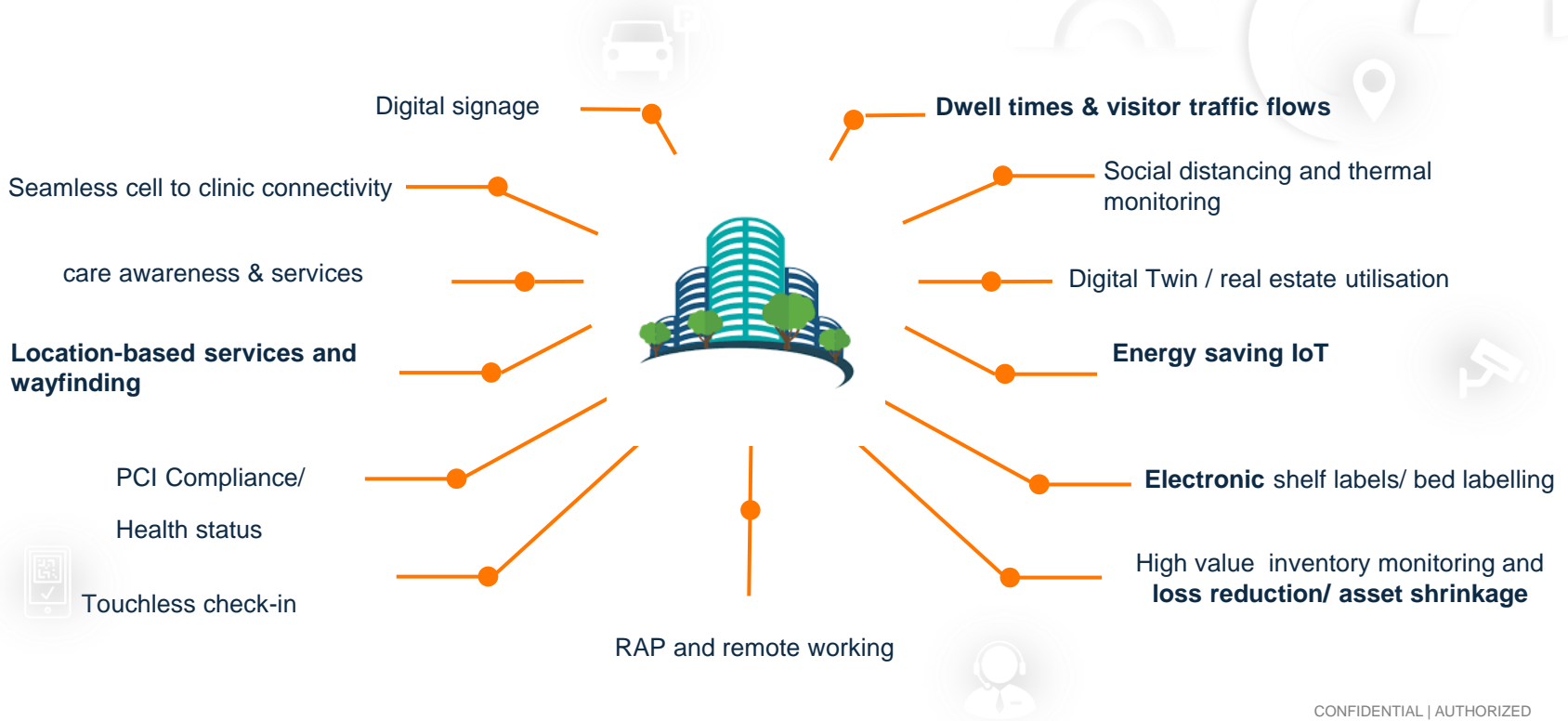
Concern for  
safety and  
privacy

Economic  
pressures  
(def in UK!)



# Business Challenges

Leverage Aruba ESP to solve multiple areas:



# ACCESS POINT AS THE IOT GATEWAY

## 802.11AX (Wi-Fi 6) RADIO



CERTIFIED Wi-Fi 6  
SOLUTION



Wi-Fi ENABLED  
EMPLOYEE  
BADGES



SMART WRIST BANDS  
TELEMETRY SENSORS



WiFi BASED  
ANALYTICS



DENSE ENVIROMENT  
AND ROAMING



CONNECT FROM  
ANYWHERE RAPS

## BLUETOOTH 5 RADIO



WAY  
FINDING



TEMPERATURE  
CONTROL



AUTOMATED  
NOTIFICATION  
SERVICES



ENERGY / HEATING,  
AIR QUALITY SENSORS

## 802.15.4 ZIGBEE RADIO



SMART ROOM  
MANAGEMENT



DOOR LOCK  
MANAGEMENT



FOOD SAFETY  
SENSORS



SAFE  
SENSORS



TEMPERATURE  
SENSORS



## USB PORT



DIGITAL  
SHELF LABEL



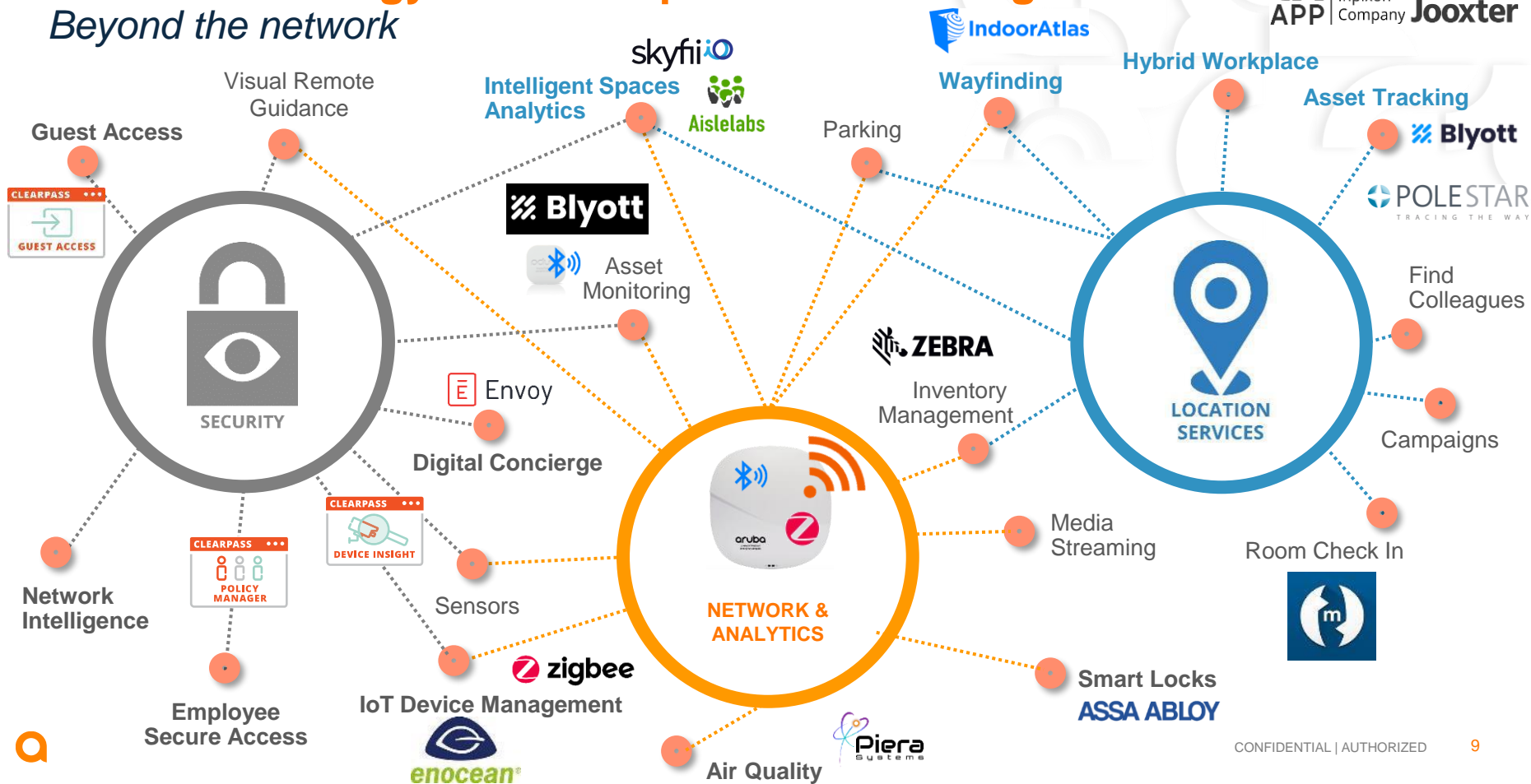
SMART LIGHTING &  
METERING



CELLULAR INTERFACES

# Aruba Technology Partnerships Solve Challenges

## Beyond the network





# Experience





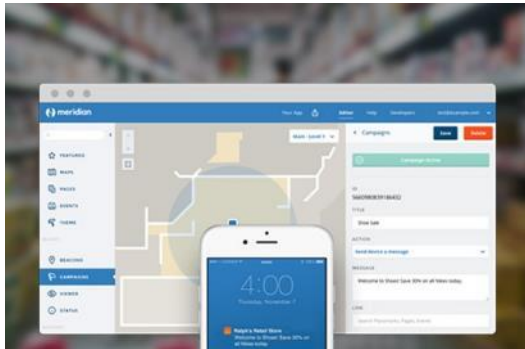
**NO  
MORE  
MANUAL  
EFFORTS**

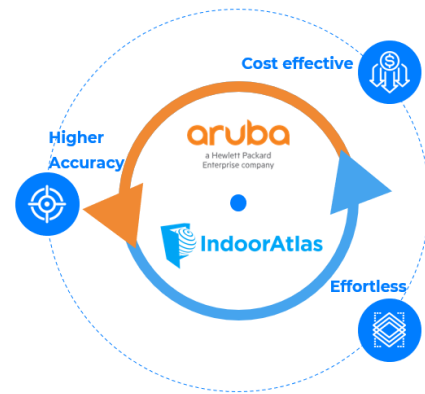
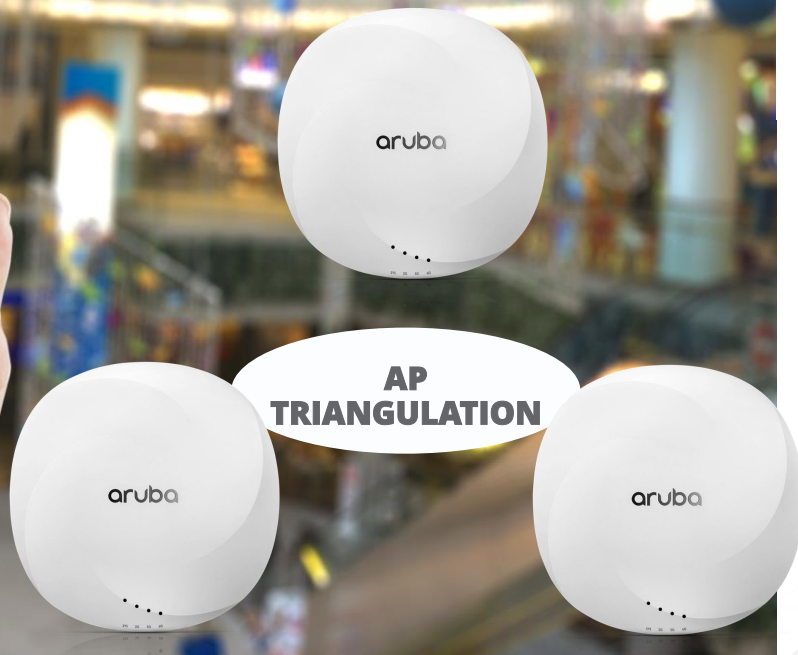
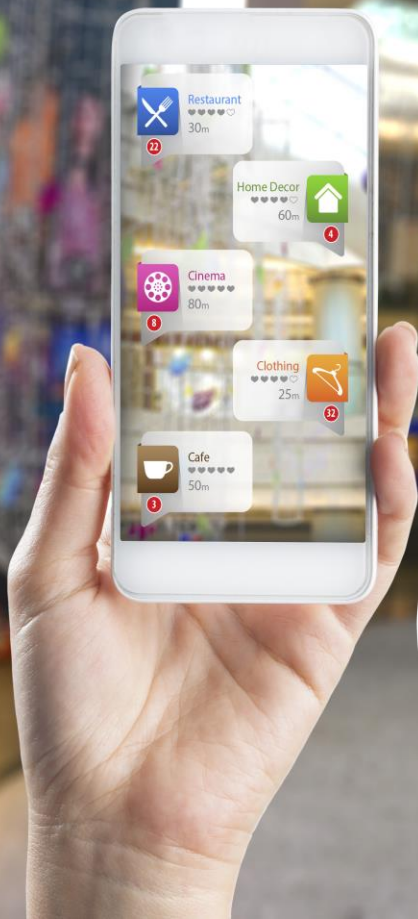


**ALWAYS STAY  
CONNECTED**

# Use Aruba Beacons to enhance 2D Experience

Leverage your Aruba infrastructure to improve visitor satisfaction & guidance to hospital areas with indoor location services (Meridian)

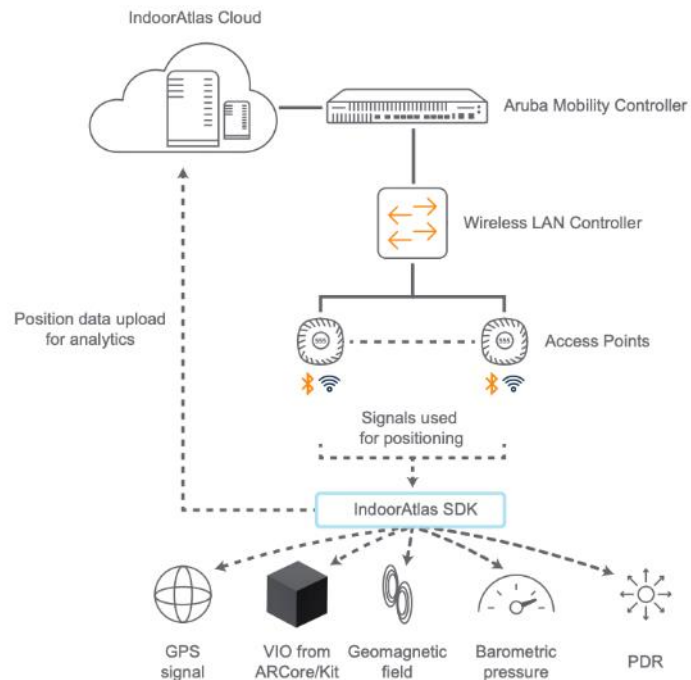




# Indoor Atlas - AR Navigation & Notices

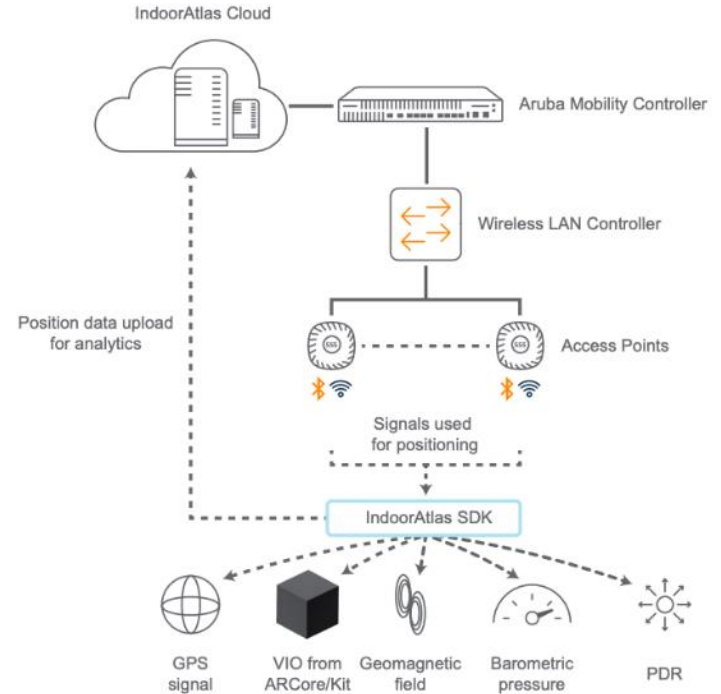


# Indoor Atlas Aruba Integrated AR SDK





# Sensor fusion technology enhanced by Aruba ESP



# INTRODUCING **OPEN LOCATE**

## WORLD'S FIRST SELF-LOCATING WIRELESS NETWORK



# COLLABORATING WITH MOBILE OS VENDORS TO ENSURE INDOOR LOCATION AVAILABILITY

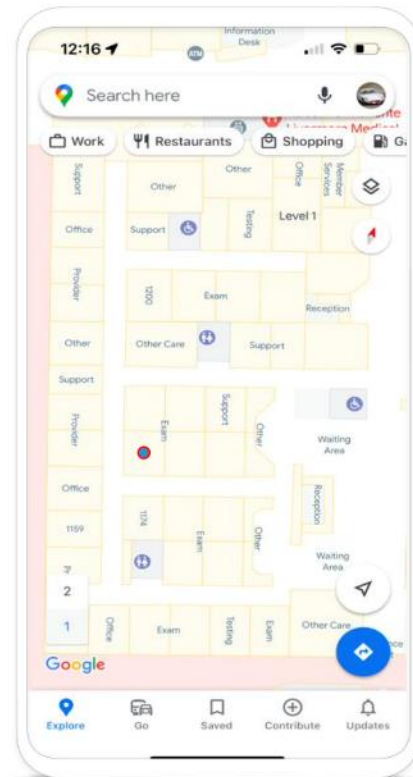
## Open Locate within the Android Ecosystem

### Android Wi-Fi RTT API

- Returns FTM ranges and AP location, where available
- Developers must integrate measurements with their own location engine
- Currently delivers best results with accuracy of 1-2m

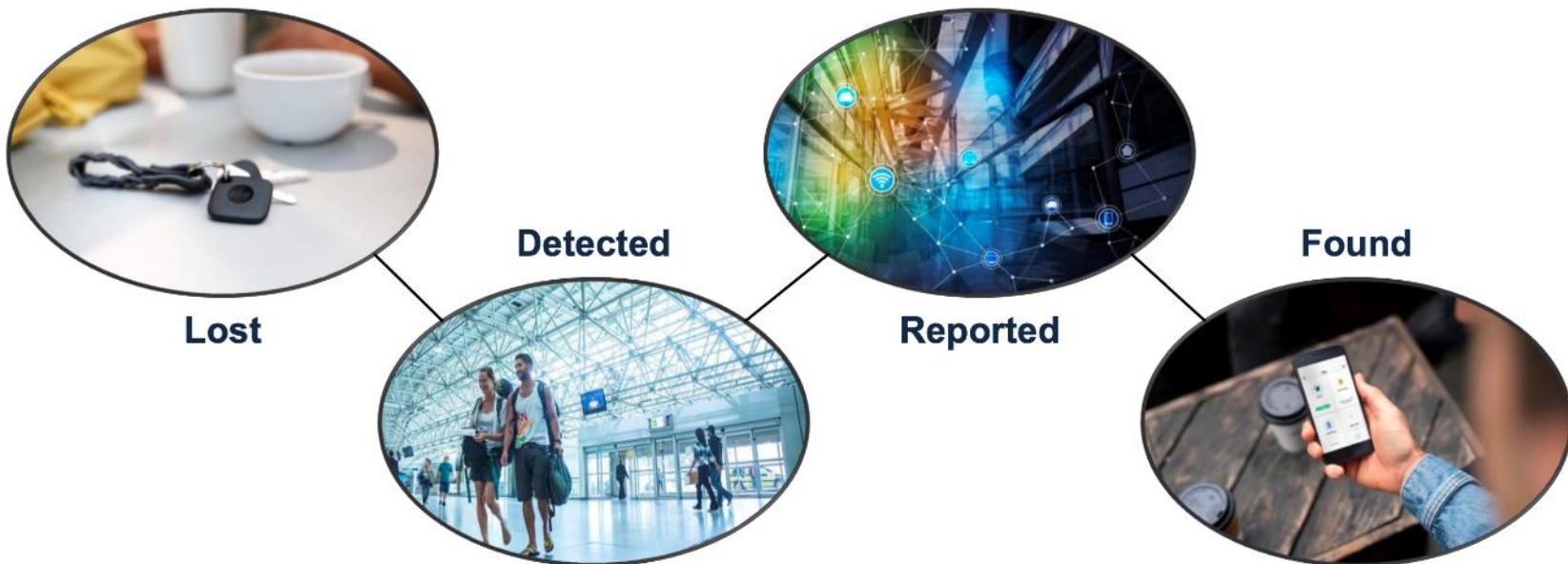
### Fused Location Provider

- Location API within Google Play Services
- Standard method for accessing location information
- Integration of FTM underway
- AP locations currently estimated from crowd-sourced sightings
- Existing FTM standards allow incorporation of Aruba self-locating AP data as these become available
- Seamless support in existing applications





# OPEN LOCATE INFRASTRUCTURE JOINS THE TILE NETWORK OF SECURE COMMUNITY FINDING



# Asset Tracking & Localisation



# Business Outcome – Asset Tracking – BIG SAVINGS 😊

01

Tracking expensive or shared equipment, such as ICU ventilators, hospital beds and intravenous pumps, can save time and money, and prevent equipment from becoming accidentally lost or stolen.

02

A typical 500-bed hospital has an average potential to track and trace 5.000 assets such as blood pressure monitors, refrigerator temperature monitors.

03

On average assets cost EUR 4.000. Based on 10% less purchase this leads to initial capital savings of EUR 2.000.000.



## ROI CHART

On average assets cost EUR 4.000. Based on 10% less purchase this leads to initial capital savings of EUR 2.000.000. The initial investment in is around EUR 50.000, and the annual fee is EUR 60.000 (Blyott example).

The final savings after 5 years will be EUR 1.650.000 (over 400% Return On Investment) with immediate payback time!

**Hospital (without RTLS)** 5.000 assets

Initial investment = EUR 20.000.000

**Hospital (with RTLS)** 4.500 assets ( as less needed )

RTLS installation Initial investment

**Immediate savings**

RTLS annual fee RTLS 5 years fee Capital savings

EUR 18.000.000 EUR 50.000

EUR 18.050.000

EUR 1.950.000

EUR 60.000 EUR 300.000 EUR 1.650.000

# Business Outcome – Asset Tracking – HAPPY STAFF 😊

01

Medical personnel spend less of their working time searching for equipment, thus increases their efficiency and productivity, as well as their (and patients') satisfaction.

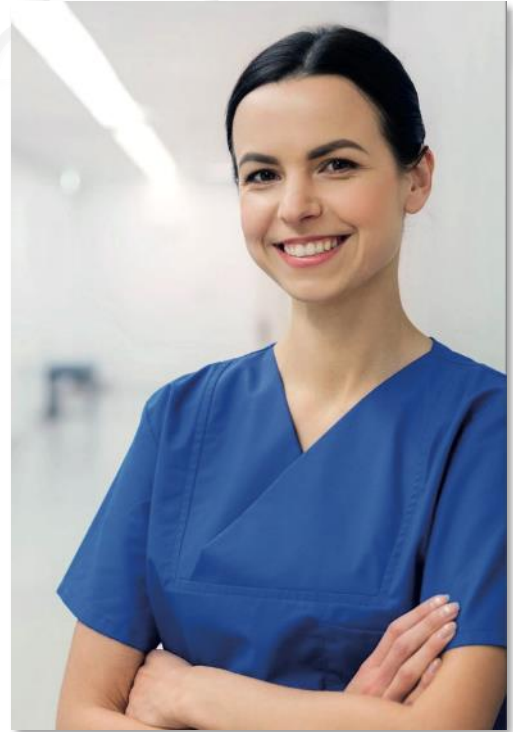
02

**Hospital** (with RTLS, 1.000 nursing staff) Average search time yearly 40.000 hours  
Based on 1 hours per week, 40 weeks per year, per staff member  
Extra quality hours 40.000 Reduced frustration.

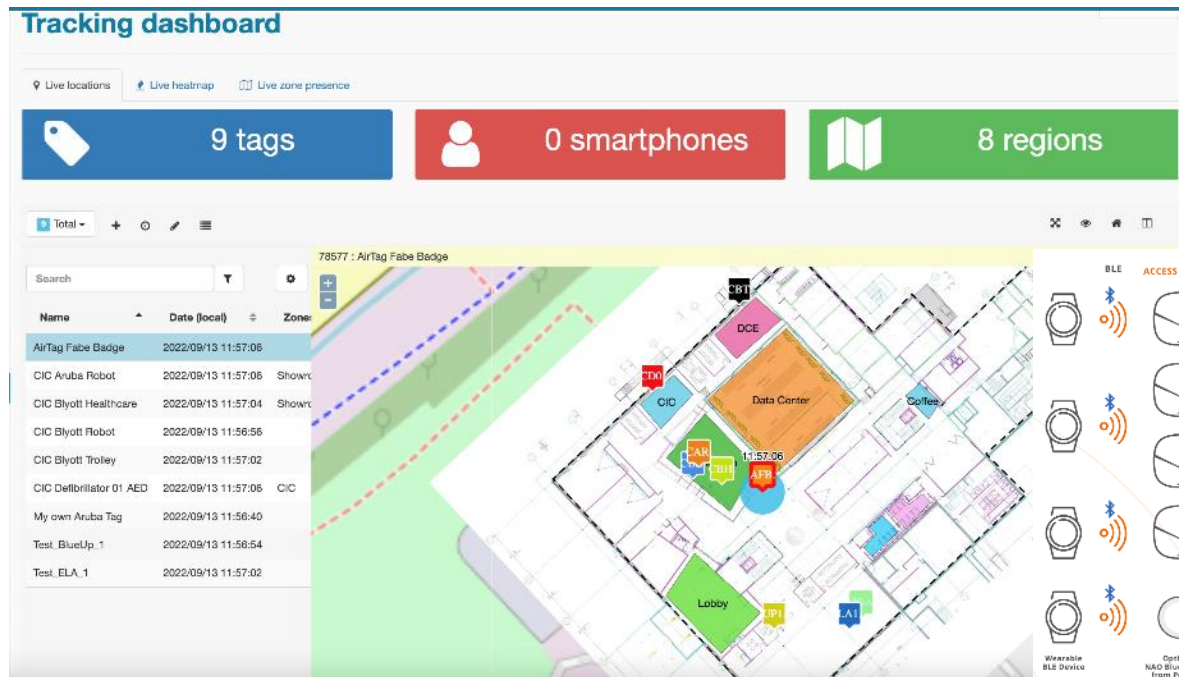
03

**Hospital** (without RTLS, 1.000 nursing staff) Average search time yearly 80.000 hours  
Based on 2 hours per week, 40 weeks per year, per staff member

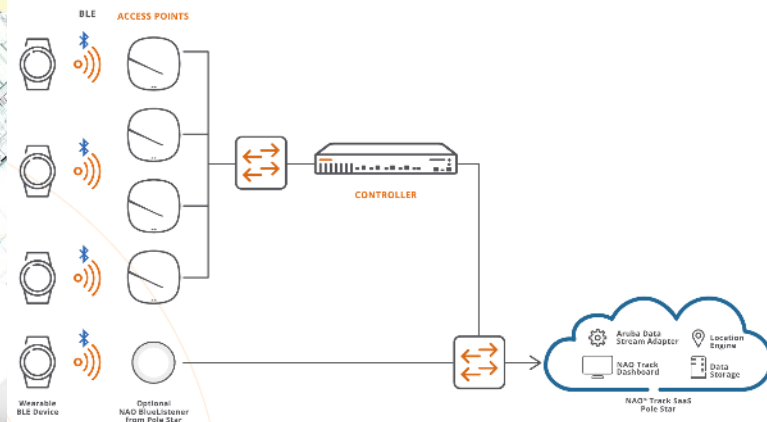
**Double Efficiency**



# Polestar Integration Example:



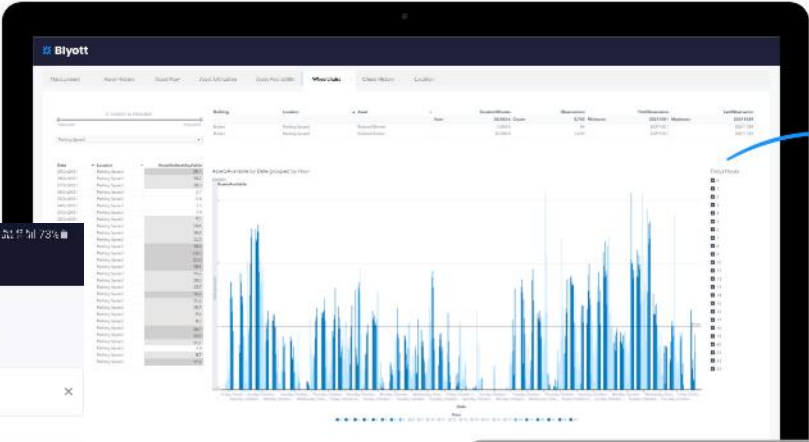
The tags communicate with Aruba Wi-Fi 5 and Wi-Fi 6 Access Points via their built-in Bluetooth radios which forward unique tag identification data to Pole Star's NAO® Cloud service



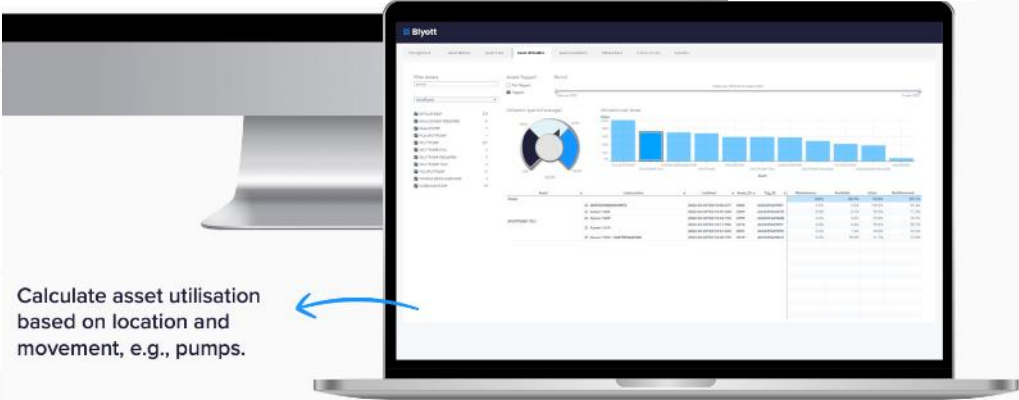
# Blyott Integration Example:

Simple Aruba  
Based Data  
Visualization

Wiliot integration –  
Medicine Lockers



Insights into wheelchair  
parking occupancy.



Calculate asset utilisation  
based on location and  
movement, e.g., pumps.



# Real Examples

## **BE hospital:** 5.250 Tags

- **Director Nursing asked the Financial Director to buy 10 new Bladder scanners**
- All scanners in the hospital have a tag.
- Financial Director uses Reporting tool to track usage.
- He sees departments where the scanners are used and how often, also where the bladder scanners aren't used , (nurses have placed them in a cabinet)
- He made the decision not to order new bladder scanners but move bladder scanners from departments where they're not utilised

Asset value: between 5.000 & 10.000 €

***There was a demand for 10 bladder scanners , not a single one was purchased.***

**Savings: between 50.000 & 100.000 €**





# Spatial Analytics



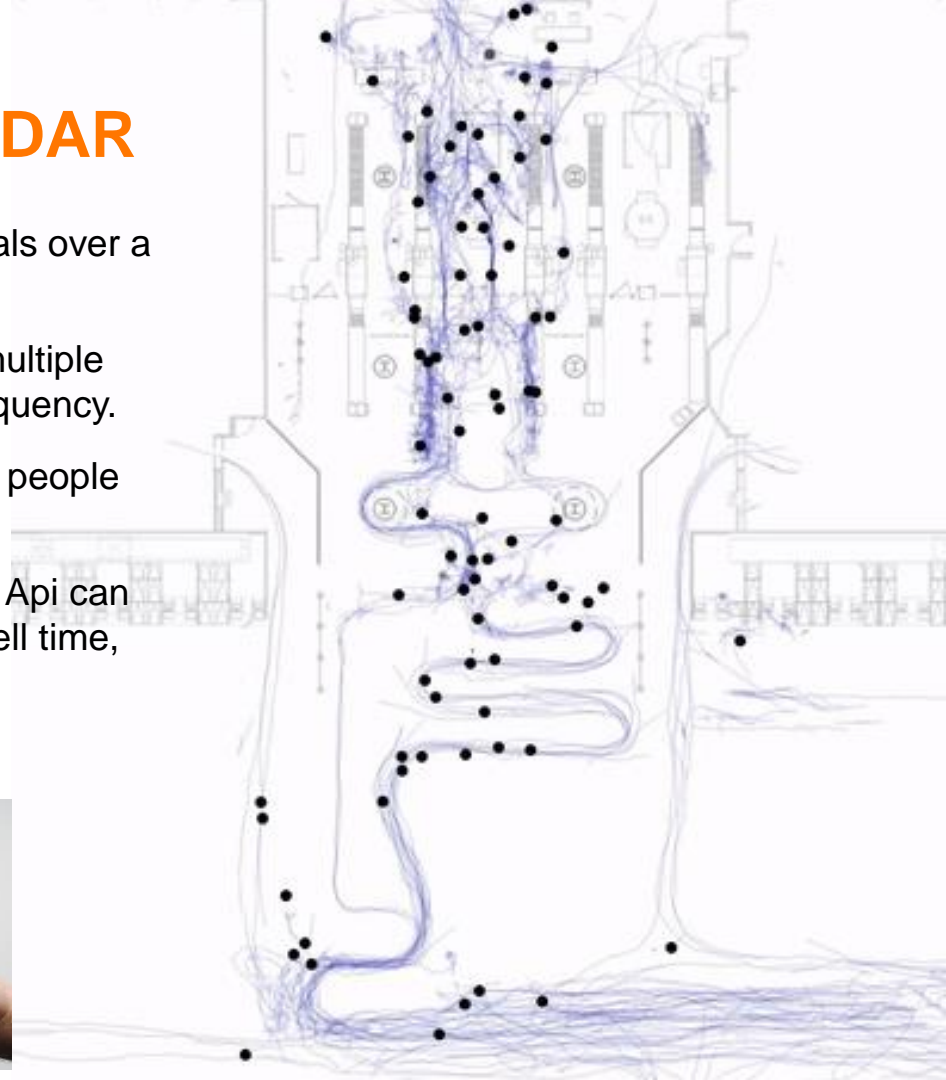
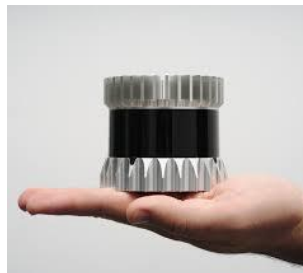
# Aruba Wi-Fi location services, supplemented by video and other sensors



- Optimize facility flow, site upgrades, and visitor experiences based on footfall data and dwell times
- Real-time analysis of parking dissects the flow of on-site visitor traffic and identify infrastructure improvements
- Measures footfall across the site to inform staffing, security, and infrastructure decisions

## Example: Aruba WLAN with LiDAR

- Skyfii's LiDAR system can follow the path of individuals over a long period of time and space.
- Multiple sensors work together to follow users over multiple touchpoints, like check in, room occupancy & aisle frequency.
- Live maps enable staff to Live View insights into how people are using the space.
- Blending this with the Aruba Central Location Engine Api can enhance the data by including historic information: dwell time, loyalty & site to site comparison



# Zebra Integration



# Zebra & Aruba – Empower the Edge



Joint roadmap and managed integrations (Indoor Atlas example)



Teams and Voice Integration and prioritisation



Joint account support and to the end user



Location Based Services integration – Open Locate and 802.11mc



Uxi Zebra Agent – turns the device into a sensor. SaaS





# Zebra Device Tracking with Indoor Atlas

- Uses Wifi6 Aruba APs to triangulate and track Zebra devices.
- Find lost customer Scan & Shop devices, back end operational TC52 or logistic devices.
- See Wifi, BLE, GPS and user input tracing.
- Playback the entire weeks device routing on a map.



## Summary

Start time	10/06/2021, 14:58:52 BST	Bundle ID	com.indooratlas.androidagent 1.0
Session duration	1 h 22 min 54 sec 839 ms	Operating system	ANDROID 10
IndoorAtlas SDK version	3.4.6		

## Identified issues

No issues detected!

## Timeline



Floorplan  
Location



# Aruba UXI + Zebra

## Overview

- The Aruba User Experience Insight Agent for Zebra enables IT administrators and network operations to measure and troubleshoot the end-user experience from Zebra handsets.
- The UXI agent performs synthetic tests and collects passive application analysis beginning with real voice calls and roaming analysis including successes and failures made available via the Zebra Worry-Free Wi-Fi API.





EnOcean

Self-powered IoT

aruba

a Hewlett Packard  
Enterprise company

# Sustainability of Self-powered IoT

# Why Now?

## Climate Emergency:

Nearly 40% of global carbon dioxide emissions come from the real estate sector. Of these emissions, approximately 70% are produced by building operations

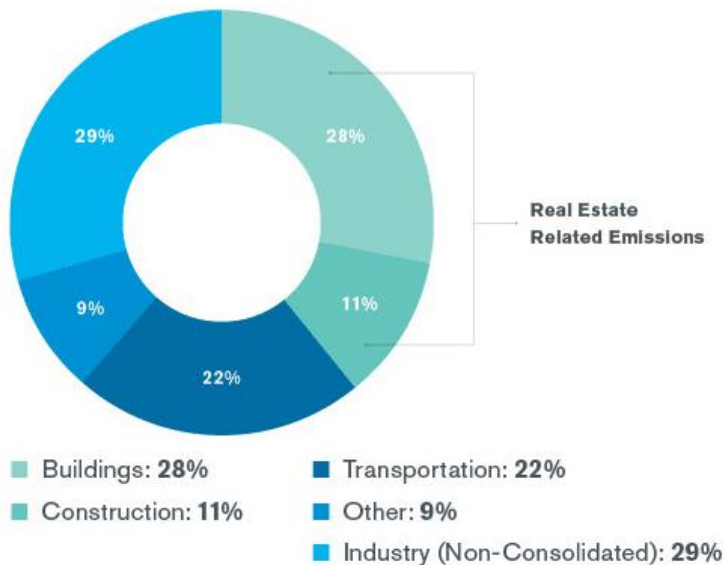
## Energy Crisis (EU)

During the first two weeks of the war, Brent prices – the European oil benchmark – increased by more than 25%. By the end of March, European gas prices were around 580% higher than a year earlier

## Government Taxation (EU)

Green Deal (Green Tax) Reduce EU-based GHG emissions by 55% by 2030. It is the first step towards carbon neutrality in 2050. Pushing customers to reduce energy consumption and real estate emissions. DACH Energy 19.

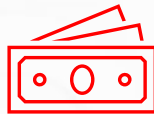
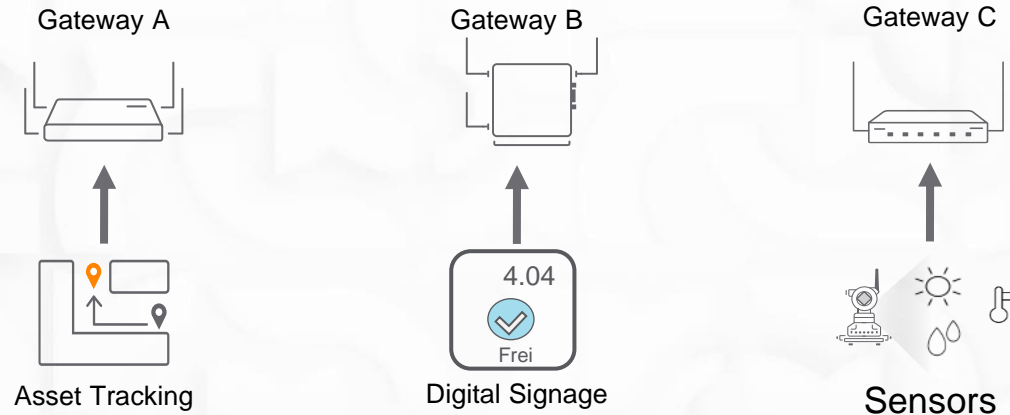
FIGURE 2: SHARE OF GLOBAL EMISSIONS BY SECTOR



Source: New Buildings: Embodied Carbon—Architecture 2030.

# Challenges of IoT connectivity

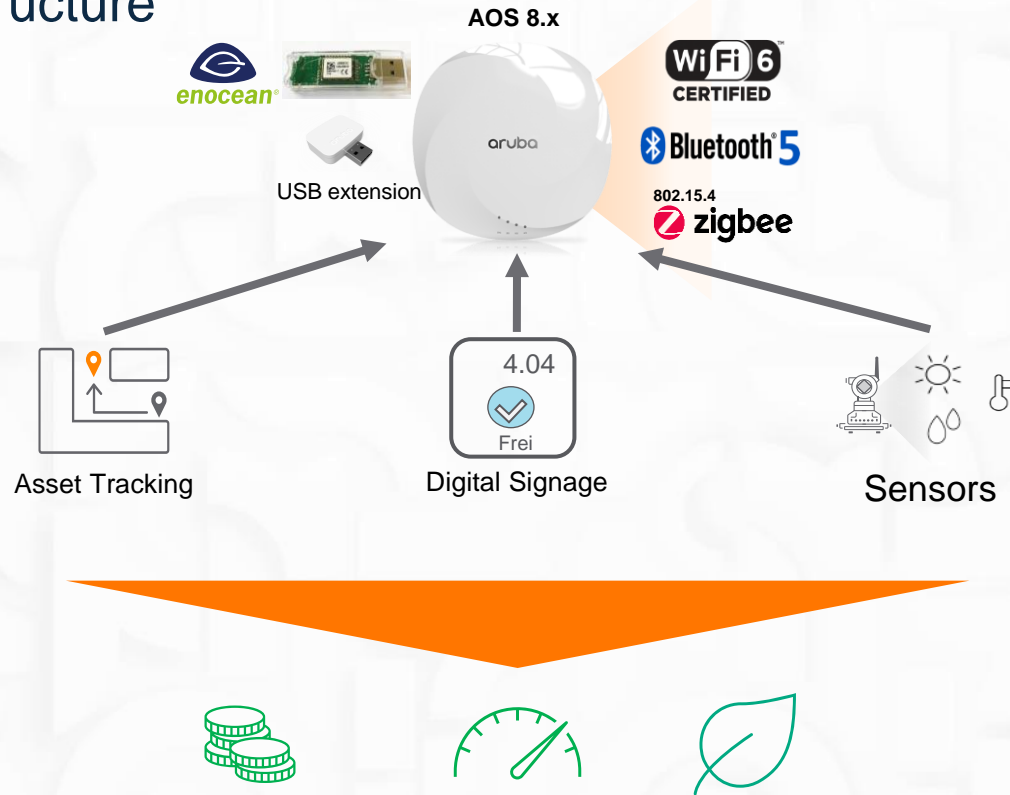
## Parallel infrastructures





# Aruba Access Point as the connectivity platform

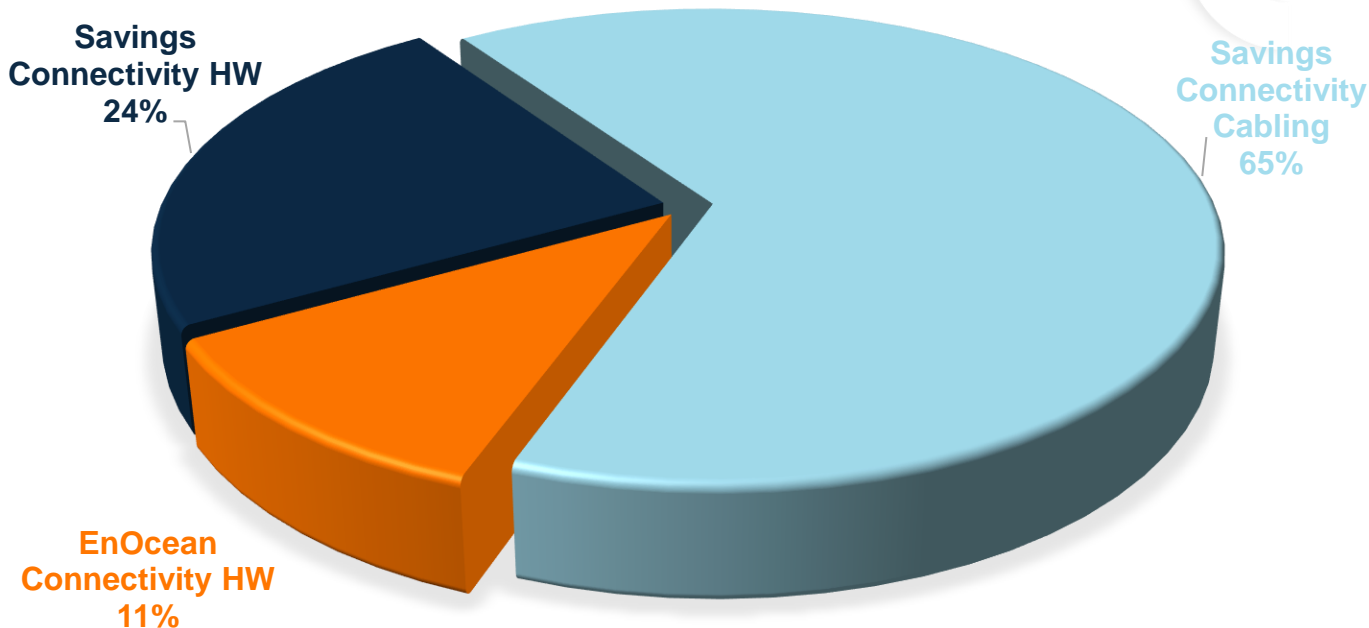
## Unified Infrastructure



# Cost of infrastructure

## Integrated solution with access points

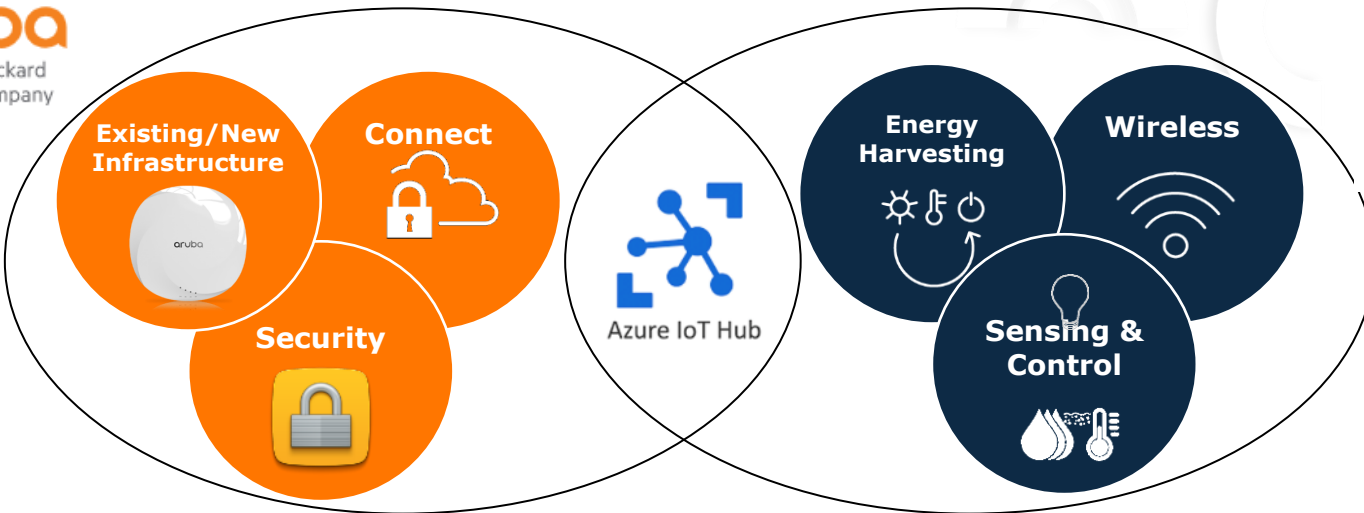
About 89% of connectivity cost (29% of total hardware cost) can be saved



# Aruba, Microsoft & EnOcean – A strategic partnership

Combining core technologies for easy to deploy IoT projects

Ecosystem Partner:



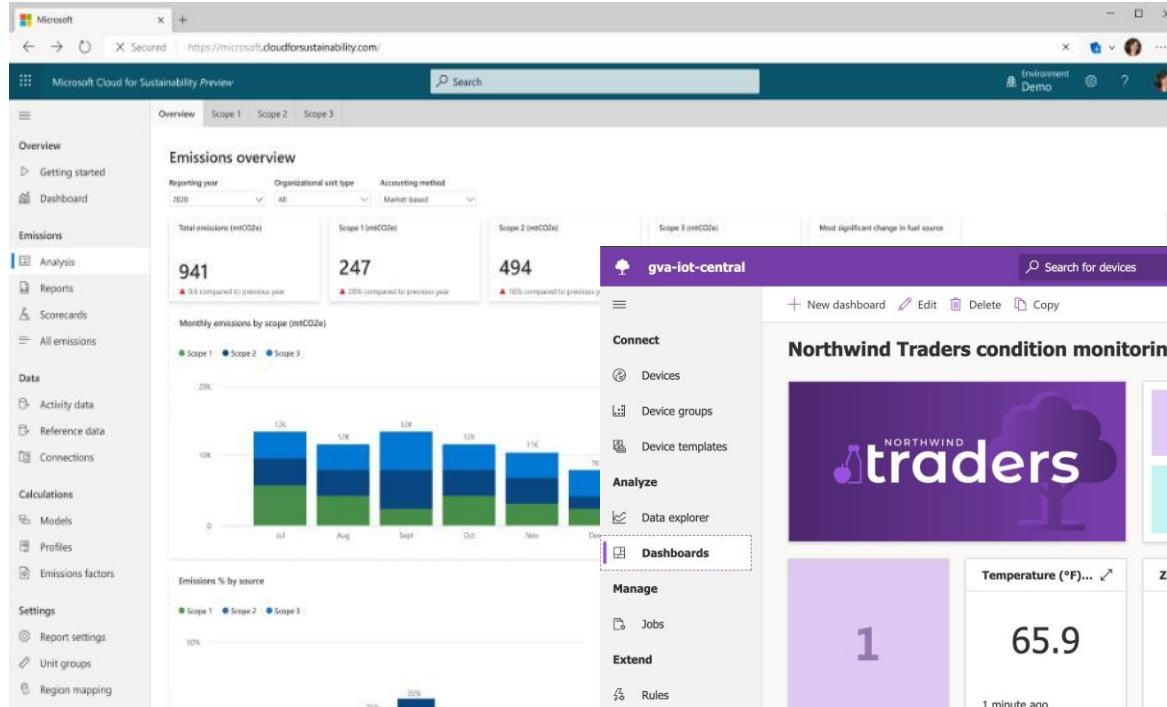
- Energy harvesting sensors do the work without batteries
- EnOcean Sensors provide data that cloud services demand
- Aruba access points eliminate the challenge of installing separate gateways
- MSFT Azure Cloud services analyze and react to the data creating a Hyper-Aware building



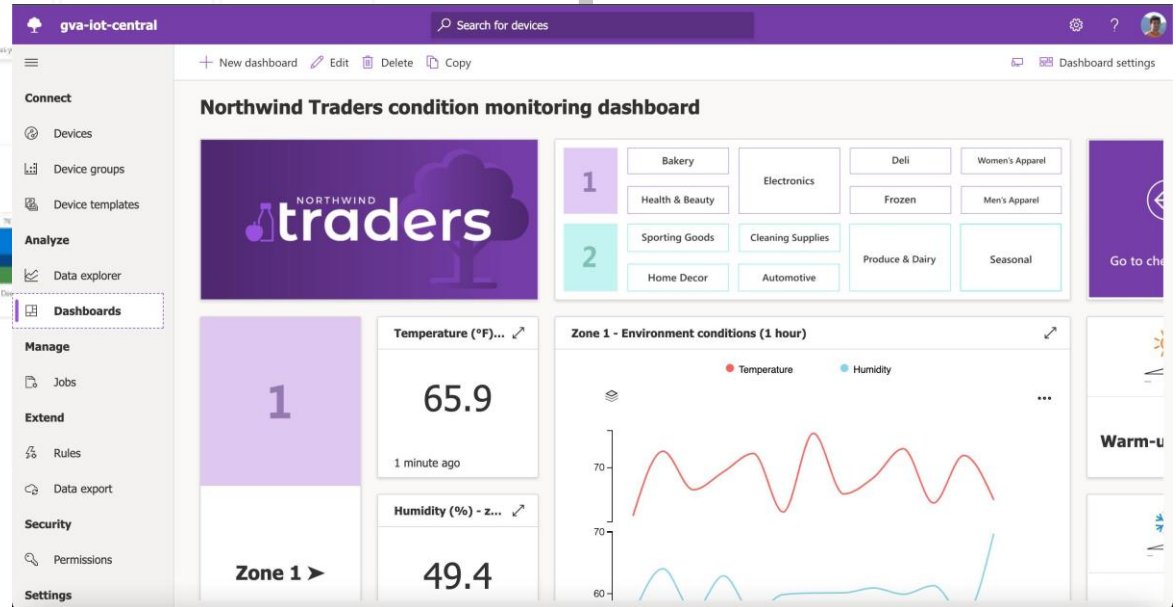
Microsoft Azure  
IoT Platform



# Microsoft Global Sustainability Cloud & IoT Hub/ Central




- Optimize the way buildings, campuses, and cities consume and deliver resources.



# IoT Use Cases





{ 24°C }

{ 19°C }

# PEOPLE COUNTING

## Benefit & Devices

No cables needed (ideal for retrofit, no cabling cost),  
No issues regarding the European GDPR (no camera used)



**Bed Utilization**



Multisensor  
(Vibration / T / rH / Lux)



**Activity Sensor**  
(ceiling mounted)



# of movements per  
time  
(passive infrared)



**People Counting**  
(door mounted)



# of door activations  
(contact switch)



**People Counting**  
(entrance)



# of people passing  
(in and out)

# SMART CLEANING

## Benefit & Devices

Service Transparency, **20%** cost savings (demand oriented cleaning)

Source: Thing-It

### Private Rooms / Lounges



People activity



Table / device  
utilization

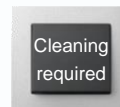


Door status /  
people count



People count

### Restrooms / Washrooms

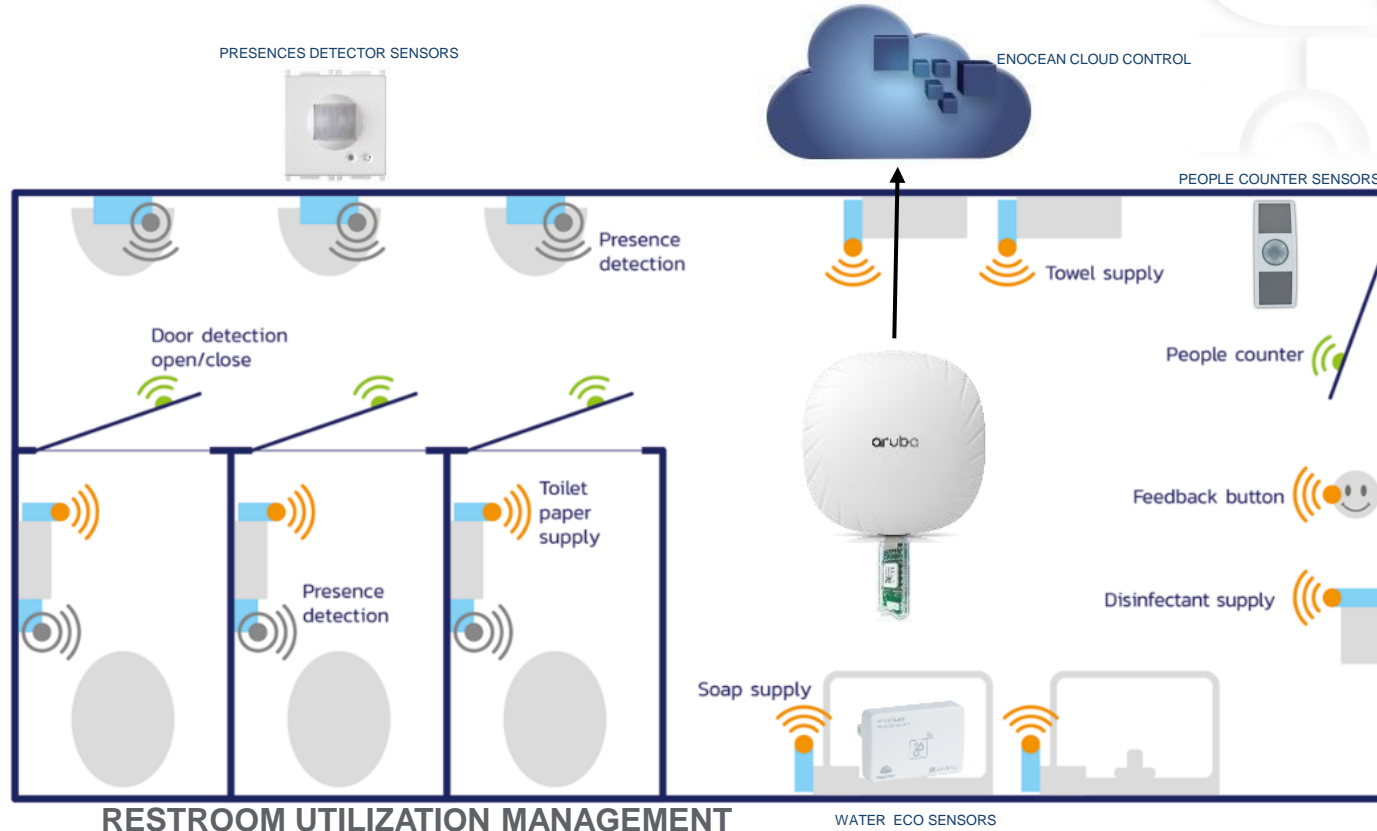


Service  
button



Status sign  
(cleaning  
needed)

# SMART CLEANING : BATHROOM EXAMPLE



**AOS 8.8/9 AZURE IOT HUB INTEGRATION.**

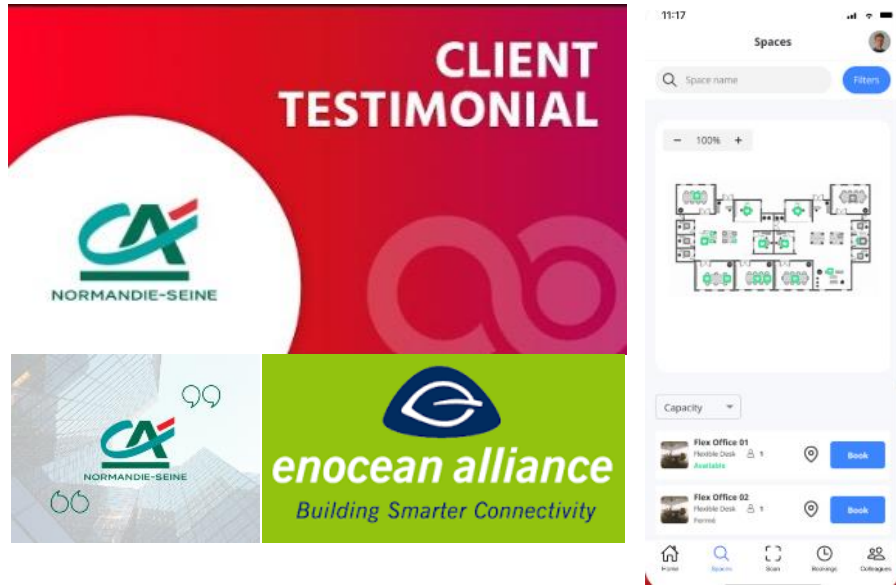
SENSORS COLLECT DATA AND SEND THEM TO THE ENOCEAN USB STICK

ENOCEAN USB STICK THE NETWORKED ACCESS POINT RECEIVES THE SENSOR DATA VIA ENOCEAN RADIO.

THE ARUBA ACCESS POINT SENDS THE COLLECTED DATA TO THE CLOUD.



# Enocean IoT Example – Credit Agricole - Jooxter



*“Our need was a bit specific: we know that we have a lot of workspaces that can be shared on our territory, while mobility needs are developing (decompartmentalization of headquarters/network, remote work, etc.), recognizes Guillaume Lambour - Organization and Technologies Manager at [Crédit Agricole](#)*

## ARUBA WLAN 5 SERIES INTEGRATIONS:

- Enocean IoT for desk and room booking sensors
- Enocean Sensors for humidity, movement and occupancy
- Clearpass with Access Control integration
- Office 365 integration.
- Aruba WLAN – Enocean USB Dongle.

## VALUE ADD:

- Reduction in ghost meetings
- Book from home via app – train and travel savings
- Enocean integration enables live check in & occupancy
- 140k sq ft, over 6 floors, 3k active daily users.



# Applications/ Visualisation



# Sustainability package. Energy only when it's needed



40 Watts in stand-by mode



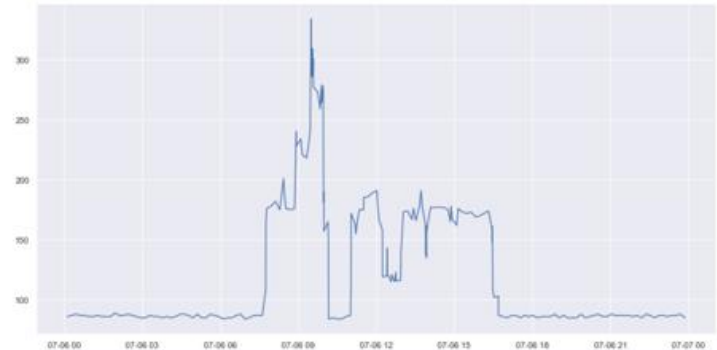
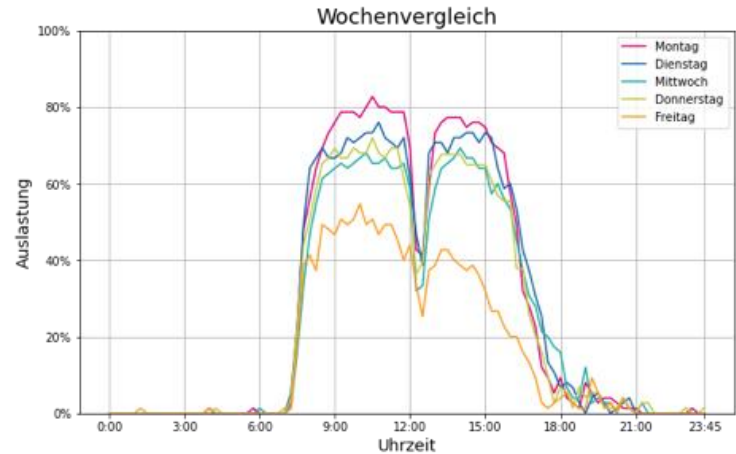
23% heating energy wasted



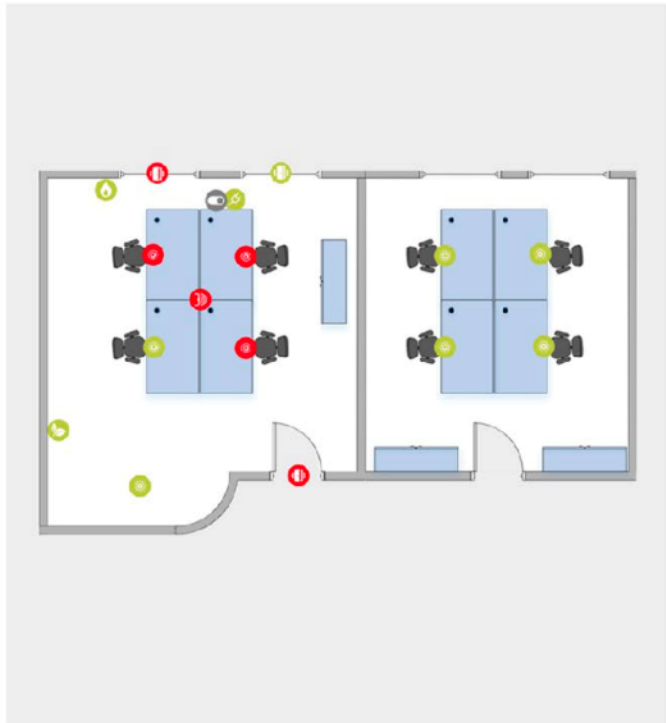
504kg CO2e per office / year



About 260€ per office / year savings  
only for energy



# Smart Spaces with EnOcean Alliance.



Cable & battery-free  
retrofit sensors



Use of existing  
infrastructure



Scaleable Azure Cloud



Digital Twin & spatial  
analyses

# Demos & Summary





# **CUSTOMER INNOVATION CENTER GENEVE**

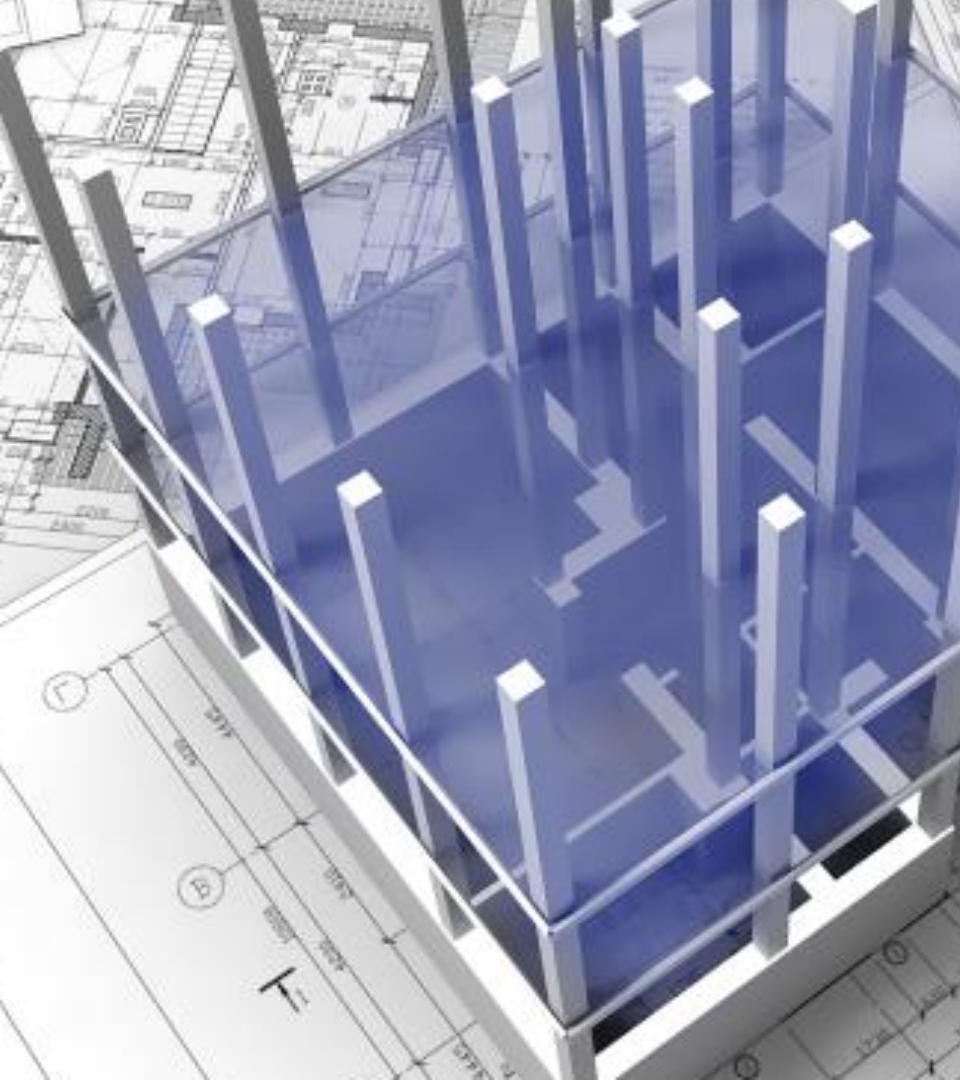


# What can you see in the CIC?

## Customer experience driven demos

- Zebra printer and scanners using Uxi Agents, Indoor Atlas Tracker and locationing. Reporting medicine errors
- Stanley Healthcare asset tags
- Blyott Asset tags
- Polestar multiple asset tracking
- Skyfii based healthcare occupancy analytics (with LiDar coming In Dec 22)
- AR based navigation
- EnOcean sensors with Azure IoT Central
- Aruba CX & WLAN IoT Ops with AOS10.





# ARUBA: THE PLATFORM OF CHOICE FOR SMART BUILDINGS

- Unified infrastructure connects everything and everyone
- Zero trust security from I/O to CEO
- Location services for contextual meta data- sustainability
- Compute at the edge and the cloud
- AIOps for visibility
- Open APIs at all layers
- Partner ecosystem second to none



# Thank you

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