



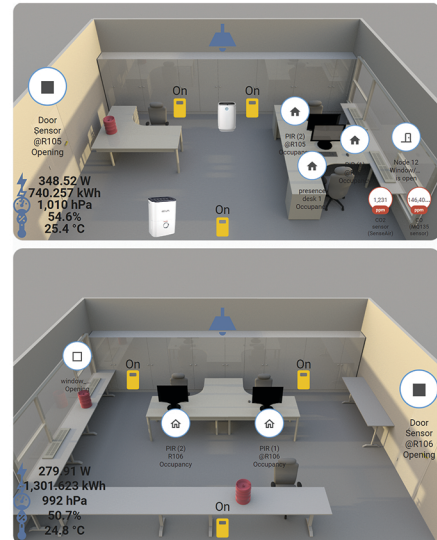
PILOT 5: Energy Efficient, Health Safe & Sustainable Smart Buildings

OTE, NCSR Demokritos, Fogus Innovations & Services, Infolysis, Polytechnic University of Valencia

Pilot & Scenario Overview

Enterprise buildings can save energy by using advanced sensors and automated controls in HVAC (Heating, Ventilation and Air Conditioning) taking advantage of building automation with data analytics. At the same time in the last years, the Coronavirus pandemic disruptively affected the traditional work norms, stranding previously crowded office buildings and embracing flexible working and mobile workspaces. Evidently, the post-pandemic workplaces have become open spaces with proper employees' placement, energy efficiency, business and personal preferences becoming a complex and dynamic task. In this transformation towards flexible, safe, and sustainable workplaces, IoT technology and Analytics through the aerOS capabilities can offer a unique, autonomous solution towards safe and sustainable workplaces. That solution, can be deployed in a diverse set of buildings, employing plethora of IoT solutions aligned to the IoT sourcing strategy of each enterprise.

This use case, implemented in an office building of OTE (Athens, Greece) and driven by partners OTE, NCSR, FOGUS, INF and UPV, aims to demonstrate gains of the aerOS architecture in an edge deployment for energy efficient, sustainable, flexible, and health-safe smart buildings. A wide number of IoT devices furnished with the aerOS capabilities are deployed to meter energy, luminosity, CO₂, humidity, temperature, motion detection, and desk occupancy. The data collected in conjunction with the AI-generated recommendations towards minimizing energy consumption and maximizing health measures are used to determine the appropriate clustering of employees in the offices and deduce the recommended employees seating, while exploited to actuate appropriately the ventilation, heating and air-condition systems and control luminosity.



Infrastructure & Technology

The pilot consists of the following systems:

- An end-to-end IoT application, already developed by OTE and adapted following the aerOS Domain and Infrastructure Element concepts and re-architected to incorporate the aerOS high-level and low-level automation, that includes:
 - Front-end, incorporating a variety of sensors, orchestrated by IoT Gateways
 - Back-end applications, including InfluxDB, MQTT, Grafana, Prometheus, HomeAssistant
- Health & Energy Optimization AI System
- Seat Recommendation System
- End-user application



All the pilot components have been designed to support the semantics interoperability developments of the project, using the FIWARE context broker.

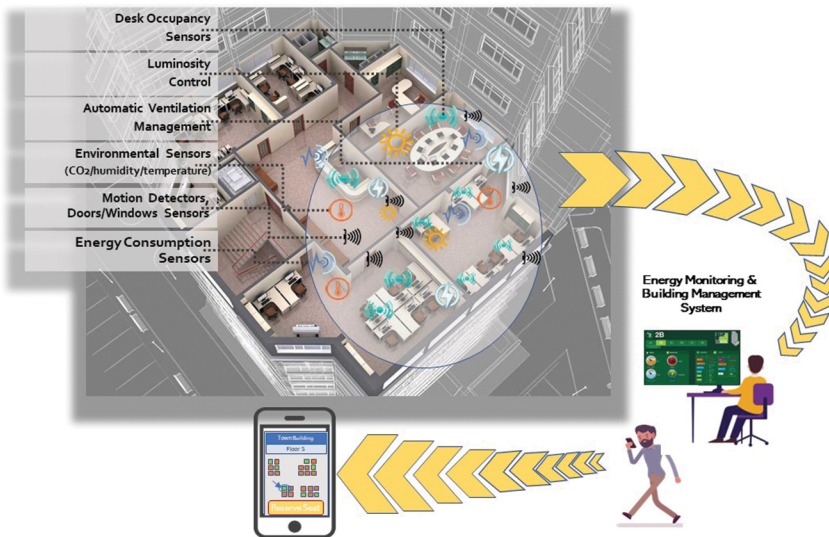
Objectives & Benefits

Energy Efficient, Health Safe & Sustainable Smart Buildings Use Case aims to exhibit how the aerOS platform agnostic meta-operating system for the IoT-cloud-edge continuum can be applied in the Smart Buildings applications domain. Key objectives include:

1. Implement the aerOS architecture in Smart Buildings market to optimize the efficiency and safety of enterprises based on process and data autonomy and self-orchestrated IoT ecosystems.
2. Demonstrate energy efficiency of the large buildings using real-time processing and (frugal) AI.

With multiple IoT vendors and solutions, tech integration, so that sensors, systems, analytics work in sync, becomes a considerable obstacle. Through the application of the aerOS architecture the customer and end-users will enjoy the following benefits:

- Smart building technologies can provide facilities' operators with the tools to anticipate and proactively respond to maintenance, comfort, and energy performance issues, resulting in better equipment maintenance, higher occupant satisfaction, and reduced energy consumption and costs.
- The pilot proposes a unique combination of energy-efficient and health-safe buildings by utilizing a distributed AI approach for proper employees' placement, addressing social distancing and energy efficiency, along with business and personal preferences and work habits.
- The pilot is IoT-technology agnostic and can dynamically adopt and adapt to changes in infrastructures using automated orchestration solutions.
- The pilot deployment can dynamically scale-in and out (e.g. add/remove rooms, floors and buildings) and integrate in a bigger ecosystem by leveraging the distributed autonomy, federated architecture and interoperability assured by aerOS node principles providing flexibility to support customers' target infrastructures and business plans.
- The pilot is exploiting to the maximum open-source, community best-practices and as such is a state-of-the-art cost-effective, future proof solution.



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