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Business Solutions based on Internet of Things (IoT)

May 2025

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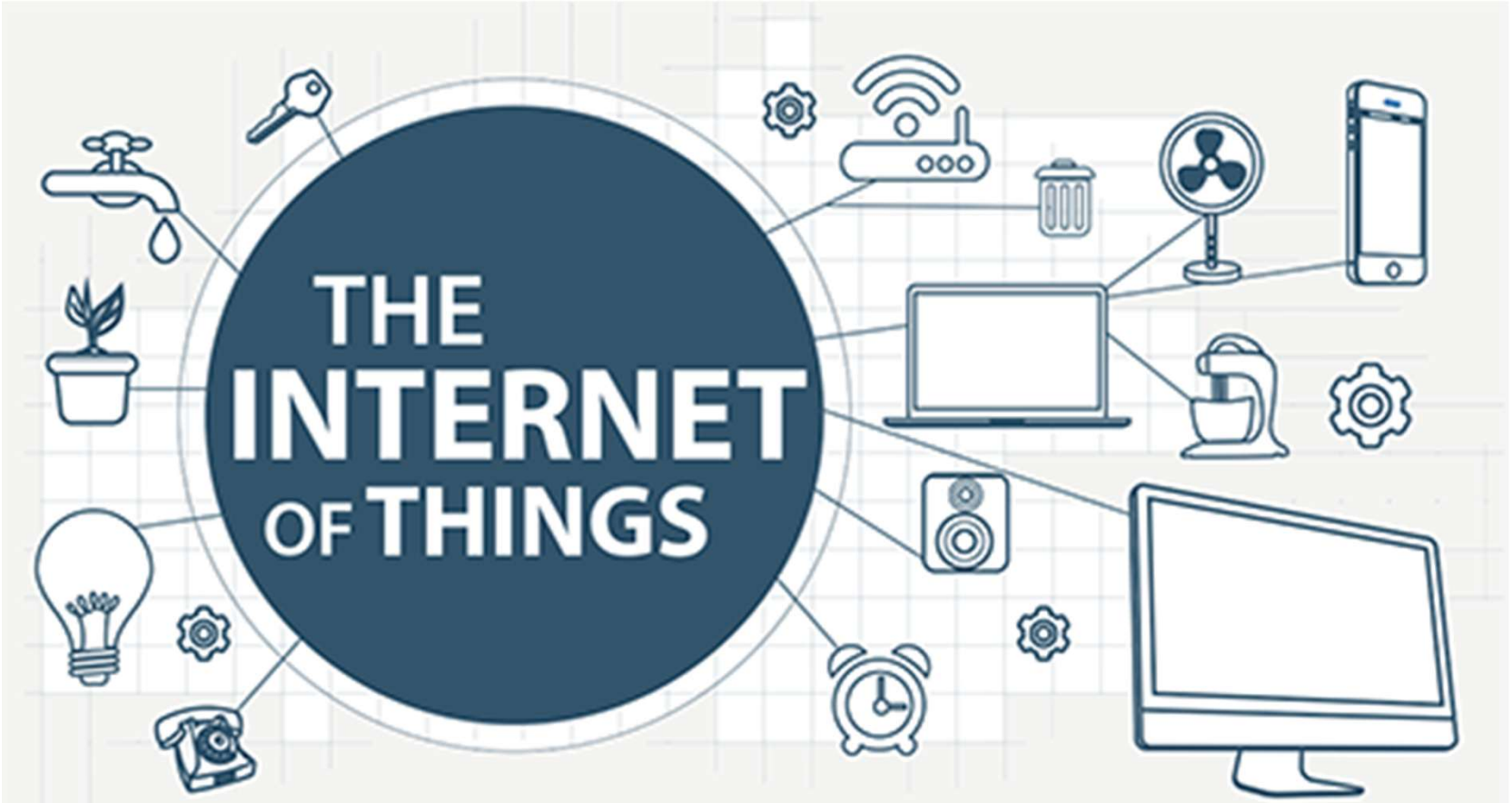
1. What is IoT?

IoT is a technical term that refers to ***Internet of Things***.



Interconnected

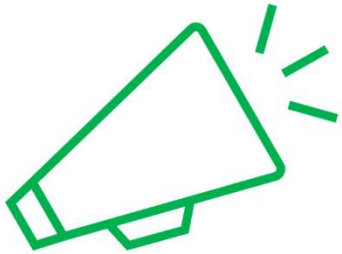
Devices

One of the main objectives of IoT is having sensor devices that **report information on real time**. With that, system and facilities performance is far more efficient, as you can now learn about their status immediately, act accordingly, and avoid a personal or reactive supervision.

2. What advantages does an IoT service / solution provide?

AUTOMATED PROCESSES: Having a system that automatically notifies maintenance personnel of infrastructure problems (breakdowns, lighting failures, etc.) results in **proactivity and better use of resources and subcontractor**

ENERGY EFFICIENCY: A company that proactively monitors and manages the temperature and the switching on and off of lighting in its facilities will optimize its **energy consumption**.



MEASURABLE SAVINGS: A company that implements automation via IoT saves on electricity consumption, improves response times, and provides better service to its internal and external customers.

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2. What advantages does an IoT service / solution provide?

The most frequently used IoT sensors monitor:

- Temperature
- Humidity
- Toxic gases, including CO2
- Presence (people, or vehicles in a parking lot)
- Electricity consumption
- Faulty or broken lighting fixtures
- Device disconnection

In an office, a shop, a workshop, or a warehouse, we can control devices, their proper functioning, or environmental and working conditions.

Automatically, we can turn lighting, air conditioning or heating equipment on or off, monitor storage levels of solids, liquids or gases, or the number of people in a room, to name just a few examples.

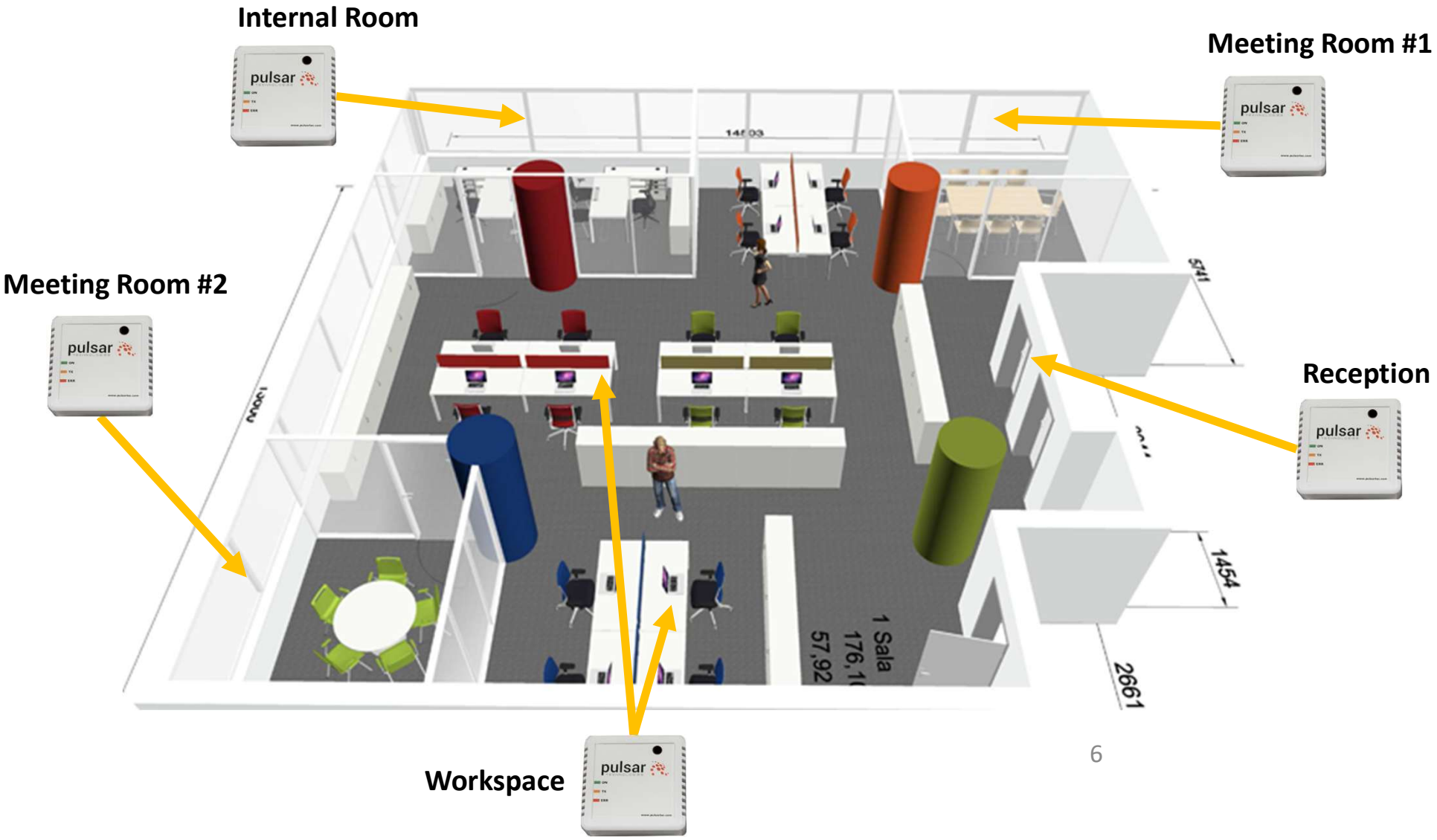
3. Components of an IoT solution

An IoT solution is **modular** and consists of at least:

- *Probes* that continuously capture physical data from the environment in which they are installed (readings).
- *Gateways* or Communication Servers.
- *Web application* that displays the data from the readings, historical records and reports, and where alerts can be programmed for different levels.

3. Components of an IoT solution

Example of monitoring common areas in a company



3. Components of an IoT solution: PROBES

Probe

Monitor

REAL-TIME DATA MONITORING – Our probes accurately and in real time monitor CO_2 concentration, air quality, ambient humidity, and temperature. The product comes equipped with a high-performance chip using sophisticated infrared sensors.

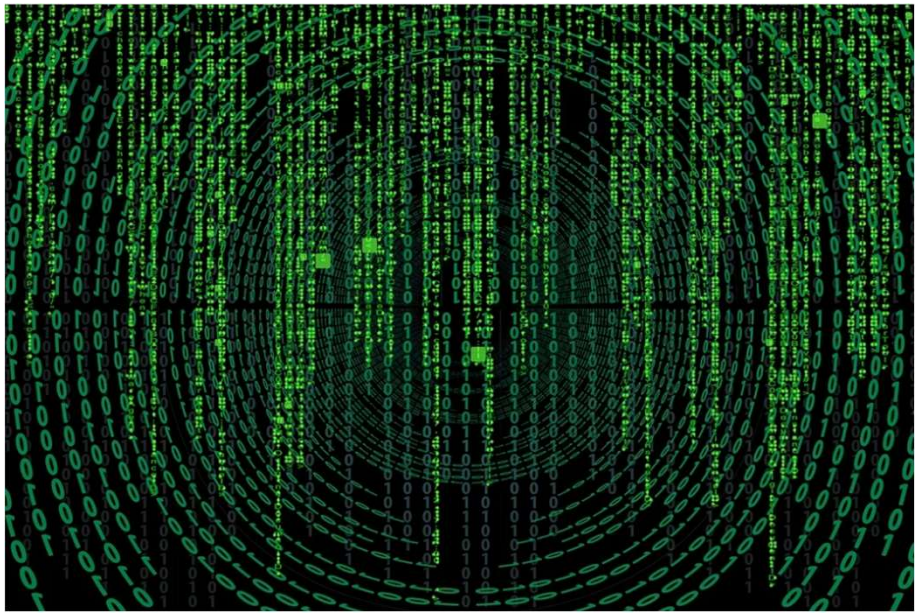
ELECTRICAL CONSUMPTION MONITORING – We offer specialized probes for measuring electrical consumption and its variations.

COMPREHENSIVE AND UNIFIED DISPLAY – Optionally includes a large digital screen with unified data logging on a common display. It features a concise, intuitive interface with a clear area division and excellent readability.

PORTABLE AND VERSATILE – This measuring device has a lightweight design that makes it easily portable due to its small size. It is easy to install in terraces, bars, bedrooms, living rooms, kitchens, offices, cars, schools, hotels, and campsites. Ideal for shared spaces.

CE CERTIFICATION / QUALITY – The probes are certified by EU bodies and come with CE certification, ensuring product quality and safe usage. For example, the Pulsar CO_2 and air quality meter is certified to meet the high standards of the EU.

3. Components of an IoT solution : COMMUNICATION SOFTWARE



NETWORK AVAILABILITY – Our probes communicate via Wi-Fi or Ethernet, and alternatively use LoRa to reach greater distances and coverage areas.

SECURE COMMUNICATION – In addition to using standard security protocols (SSL/TLS, HTTPS), Pulsar has developed its own protection system against intrusions in P2P transmissions over LoRa.

AUTO-RESTART AND POWER OUTAGE PROTECTION – The probes we use are capable of recovering from any power failure.

RELIABILITY – Pulsar's IoT ecosystem is built on absolute reliability in the face of unexpected communication issues.

READING FREQUENCY – Our software supports a very high frequency of readings to ensure uninterrupted service.

3. Web Application(SCILA)

Main Characteristics:

CLOUD-BASED ACCESS – From anywhere and on any device—mobile, tablet, or PC—you can view the reading data. Information is presented through simple and intuitive graphs. Your installation data is fully protected, as it is hosted in a secure Microsoft Azure environment with daily backups.

MULTIPLE PROBES – The web portal allows you to view readings from all your probes (if you have several) on a single screen, providing an easy overview.

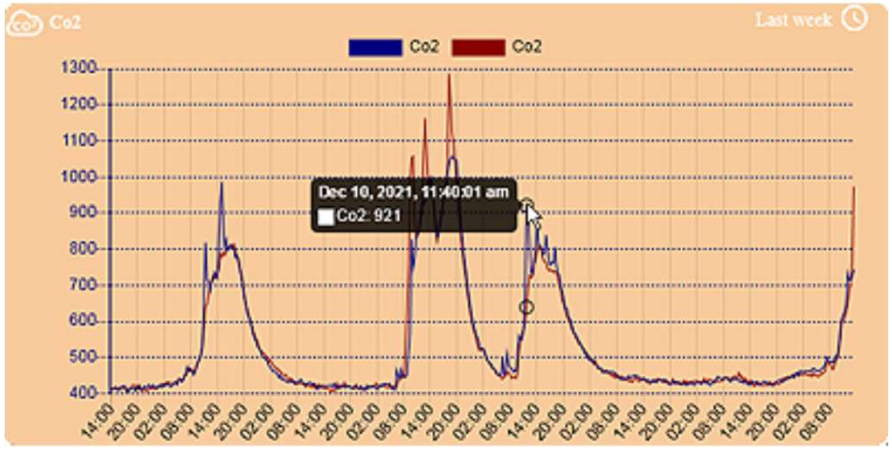
CONFIGURABLE – You can choose what information to display, in what format, compare graphs, and easily set thresholds that will trigger alerts. You can also review past alerts, whether for CO_2 levels, temperature, humidity, electrical consumption, presence, etc.

ALERTS – A single-screen alert and threshold configurator is available for each monitored parameter: CO_2, temperature, humidity, electrical consumption variations, etc. You can choose whether alerts are sent to you or a designated person, and whether to receive them via email.

HISTORICAL DATA – Real-time monitoring 24/7 to protect your shared spaces. Reading data is stored in the web application with the highest security standards.

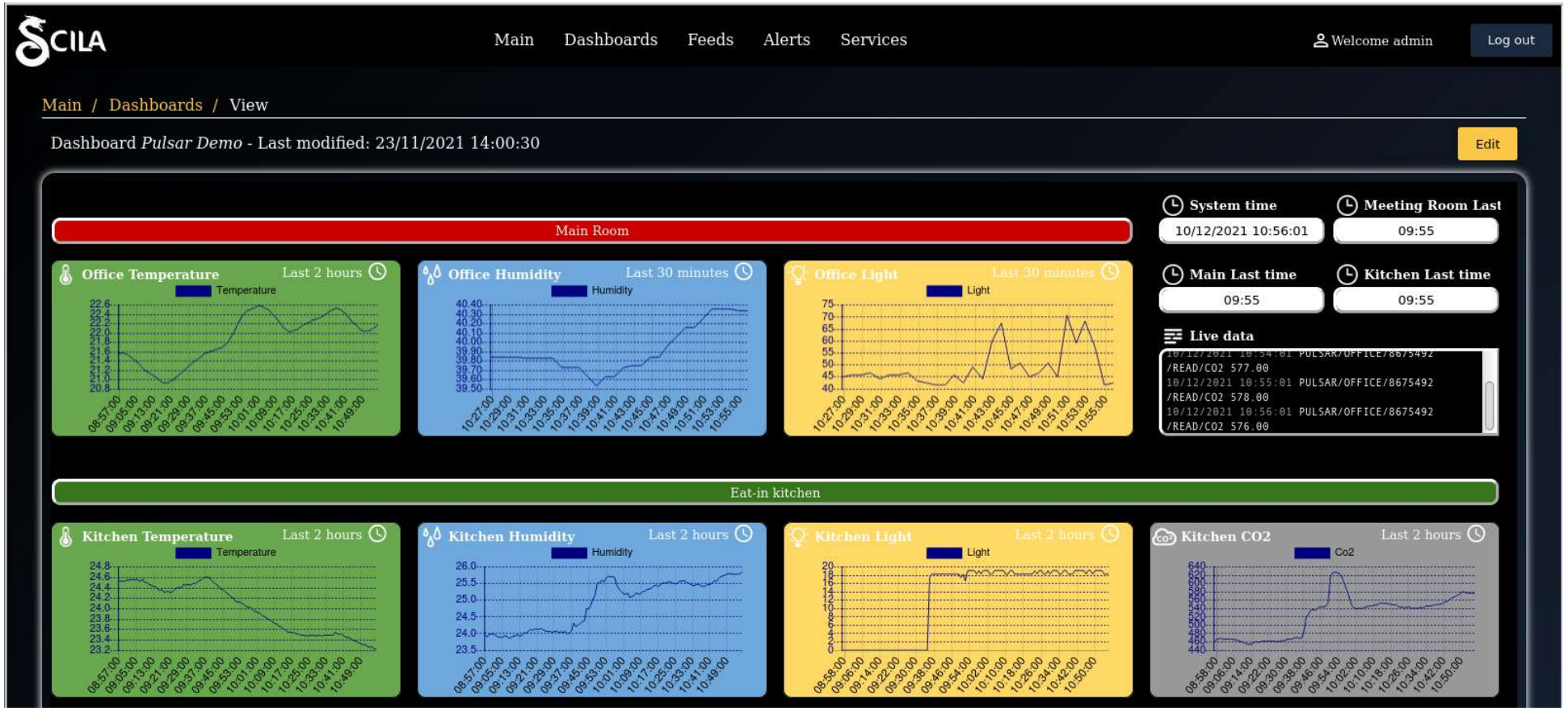
REPORTS – You can easily generate reports on the various parameters measured by the probes, as well as on all generated alerts.

CO2 Level

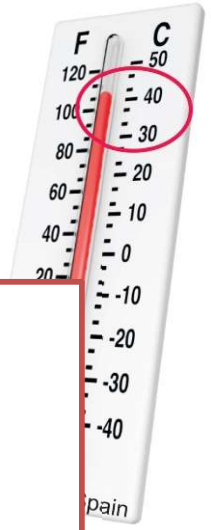


3. Web Application(SCILA)

Detailed view



4. References and Examples:



CiH Bank (Morocco):

Installed and Operating Continuously Since 2020
Monitoring of temperature, humidity, light levels, and electrical consumption.

Initial Deployment
Installed in 50 of the bank's more than 300 branches.

Automated Climate Control
Air conditioning is activated based on the branch's internal temperature.

Automated Lighting Control
External lighting is activated/deactivated based on ambient light levels and calendar schedules.

Centralized Control
Centralized activation/deactivation of lighting and air conditioning systems.

Maintenance Alerts
Alerts and notifications are sent to maintenance teams for malfunctioning lights.

Detailed Reporting
Comprehensive usage reports and statistics.

4. References and Examples:

SELAE – National Lottery (Spain):

Installed and Operating Since January 2025
Monitoring of temperature, humidity, light levels, UPS performance, and electrical consumption.

Initial Deployment
Installed in their Datacenter main center in Madrid.

Automated Climate Reporting

Automated Lighting Reporting

Centralized Control

Maintenance Alerts
Alerts and notifications are sent to the IT and Infrastructure department.

Detailed Reporting
Comprehensive usage reports and statistics.

Thank you!

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