The Demand for Smart Buildings

Breaking down the 'who, what and how' of smart buildings

AXONIZE

2019

The pressure to invest in intelligent facilities and leverage the latest IoT technologies is a key driver in pushing for a greater number of smart buildings. Add to that the scope of collecting real-time data, efficiency, cost savings and facility management and it's clear to see why smart buildings are in such demand.

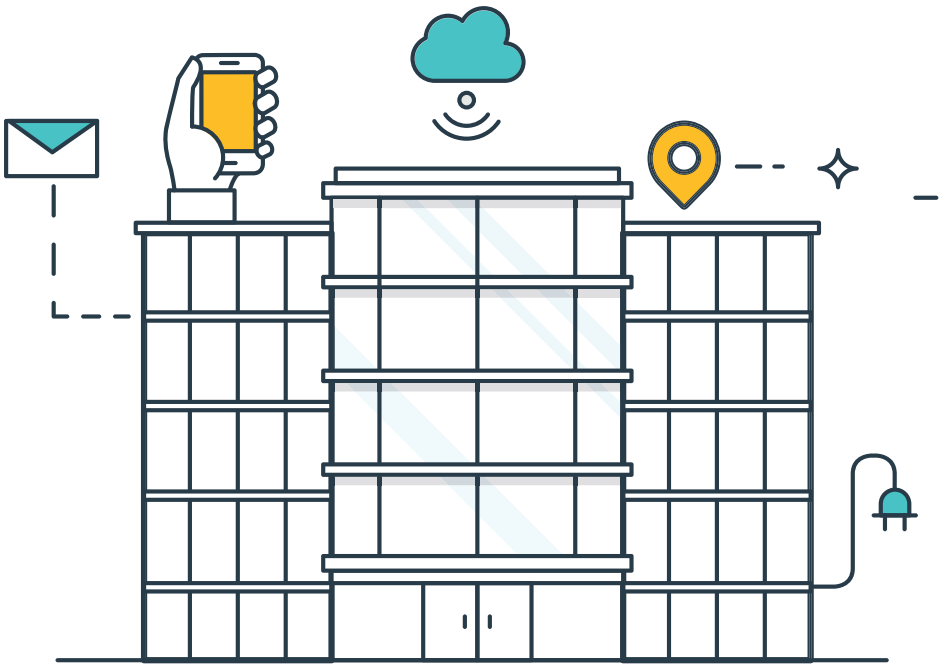
And as the demand grows, so do the questions. So we're breaking down the 'who, what, where, why and how' of smart buildings.

What is a Smart Building?

A smart building can be defined as any building or structure that uses automated processes to connect and control the building's facility operations and systems. It is a dynamic entity consisting of many devices, sensors and IoT technologies used to communicate with a centralized insights/decision-making portal, with each other and with external systems. In turn, they share data, depend on each other and respond to various needs within the building.

The success of a smart building can be measured by how well the systems communicate with each other and the external world by exposing their measurements, readings and events. It is also evaluated on how well their readings and usage data are aggregated, analyzed and applied to building performance and profitability.

Smart buildings are not only dependent upon the new sensors that are installed and the legacy in-place systems. An essential component for smart building success is the IoT platform that turns these systems into an environment of shared information, which can lead to real-time notification, insights and enhanced decision-making capabilities. This centralized portal enables the full integration of all the building's systems into the same network, such as fire alarms, access control units, HVAC, elevators and more.



Why Do We Need Smart Buildings?

Workplace space and building operating costs (energy, service and maintenance) represent a considerable cost to any organization, and there is significant potential for companies to save huge amounts of money in this arena.

In order to make use of this potential cost savings, it is necessary to record space use, energy use, service needs and maintenance requirements by measuring them and by collecting, correlating, analyzing and understanding these measurements. This will make it possible to develop and implement viable optimization concepts.

How often do lights stay on in a room when no one is using them? Are the doors and windows shut at the end of the day? These are questions facility managers should be able to answer at any given time, with stats to back it up.

With smart building capabilities, all of these functions can be monitored and analyzed from one centralized location with all customer requirements being handled on one platform. **Smart buildings have the ability to capture data, improve service quality, reduce overhead costs and increase ROI within months.** Recording, analyzing and evaluating elements of a smart building helps control and monitor the quality of the building's parameters at all times.

Who Benefits from a Smart Building?

Transforming a building into a smart building has many benefits for all parties involved – the owner, facility manager or management team, organizations working together within, employees and customers/clients.

In such a connected environment, there are major gains to be achieved for everyone, ranging from **increasing productivity and cost savings to reducing energy costs:**

- **Capital Savings** - Specific capital savings of heating, ventilation, air-conditioning, lighting and more.
- **Predictive Maintenance** - Smart buildings enable simpler predictive maintenance intervention by enabling automatic alarms and notifications.
- **Optimize Facility Productivity** - Building staff are able to act quicker and more responsibly with their increased knowledge of activity in the building.
- **Increase ROI** - Increasing ROI is a direct correlation between lowering costs and saving money.
- **Optimized Comfort Parameters** - Full integration of a centralized monitoring and control portal enables the automated adjustment of air quality, humidity and temperature, as well as awareness of other comfort parameters, such as CO2 recordings, overcrowding, noise, state and movements of doors and windows and lighting.

How are Smart Buildings Created?

The key to creating a smart building lies within the connectivity and measuring of sensors. There is no set of rules when it comes to the particular sensors used in connecting a smart building, but the element that all smart buildings have in common is integration.

Some sensors measure and provide a single type of reading, such as temperature or humidity while others provide multiple types of measurements. The following describes various types of sensors suited to the smart building industry.

PIR Sensors

Heat Passive Infrared (PIR) sensors measure heat and are used as motion detectors to detect intrusion and the presence of people in a room or building. It is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. Infrared sensors are typically quite low cost, thus enabling you to deploy multiple sensors without significant expense.

Room Sensors

ERS and ERS-lite are LoRaWAN™ room sensors measure and indoor environment. ERS contains five internal sensors – temperature, humidity, light, and a motion (PIR). For ERS-CO2 there is an additional CO2 sensor, and for the ERS-sound there is an additional sound sensor for peak and average dBa level. The sensor also provides a magnetic switch sensor for door and windows, regarding open/close state.

All-in-One Home Sensor

The sensor packs a huge amount of functionality into a small form factor. It is an ideal tool for measuring and reporting temperature, humidity and light intensity, detecting motion, shock and water leaks. Available in three different packaging options that include either an external contact for pulse reading or a PIR lens for motion detection.

An IoT platform that supports a wide range of out-of-the-box LoRaWAN sensors covering motion, temperature, humidity, luminosity, sound, CO2, presence and door/windows opening and closure, as well as allowing for new sensor types to be added with configuration, is exactly what is needed for transforming any facility into a smart building.

Where is Additional Value Gained from Smart Buildings?

Implementing a smart building strategy, including sensors, connection with an IoT platform and analyzing data will enable it to perform more efficiently in a short amount of time. Other important benefits include:

- **Enhanced Efficiency** - Manage buildings with greater efficiency by optimally aligning areas to their actual need. This may lead to additional profit by re-renting unused spaces. Making sure that areas are not too crowded and ensuring optimal balance between people and space.

- **Increased Service Quality** - Total usage transparency enables you to monitor effectively by aligning services and avoiding unnecessary use of resources.
- **Lower Costs** - Total visibility enables you to avoid unnecessary heating, open windows, lighting of unused spaces and to reduce energy costs.
- **Secured and Fast Reactions** - Automated alerts and indicators are enabled by the limits and thresholds that you set. This enables prompt intervention.
- **Realtime Data Assessment** - Receive notifications and alerts in real time.
- **End-to-End Product -** One-stop-shop for the entire solution ensures easy and total solution integration.
- **Encrypted and Secure** – End to end encryption according to the latest data protection guidelines. Remain safe and secure with cloud-based software, such as Microsoft Azure.
- **Actionable Intelligence** – Provides in-depth statistics and understanding of people and systems behaviors.

When a Smart Building Comes Together

Until now, the various systems in buildings each existed as their own separate closed blocks. But with smart buildings, targeted and timely intervention and the recognition of under-utilized space enables companies to create new levels of added value and services throughout the building. What does this look like?

Rooms

- Monitor and analyze the presence and quantity of people in a meeting room.
- Monitor comfort parameters, such as CO2, temperature, humidity, light of meeting rooms.
- Define rules that trigger alarms and notifications for conditions, such as "Room Not In Use", "CO2 to High", etc.
- Define rules that control room devices, such as rules controlling PIR sensors that switch lights, heating and/or air conditioning on and off after no one has been detected in a room for 60 minutes.

Doors/Windows

- State indicator of door/window/gate – open or closed.
- Analyze door/window/gate openings and closings – quantities and times.
- Define rules that trigger alarms and notifications, such as "Door/Window/Gate Open More Than 20 Minutes," which is particularly important for security and fire doors.

Desks

- Monitor and analyze office desk occupation.
- Define rules to trigger alarms and notifications, such as "Empty Desk For An Entire Day," and so on.

People Flow

- Monitor and report flow of people in/out of rooms, along corridors, in elevators and in various areas, such as reception.
- Detect unwanted conditions such as crowds or obstructions and create notifications to trigger processes to resolve such conditions.
- Analyze people flow measurements in order to optimize services, such as in a cafeteria, bathroom or reception. For example, for cleaning purposes or for adding additional service personnel.

Predictive Maintenance

- Monitor and report the health and operational status of various facilities by measuring vibrations, temperature and power consumption.
- Detect unwanted operational states, such as outages or wear, and create notifications to trigger processes that resolve such conditions. For example, an emergency repair or a scheduled maintenance service.
- Analyze conditions and optimize related processes, such as maintenance, purchasing and so on.

Consumables

- Monitor and report fill quantity of consumable, such as in bathrooms or dustbins.
- Detect whether consumable stock is nearly empty or whether a dustbin nearly full and create notifications to trigger processes to handle these conditions by an immediate or a scheduled service response.
- Analyze data to optimize service processes and work plans.

Smart Building Case Study

ISS is a leading global provider of facility management services, based in Germany, who offers services on an international scale with leveraged knowledge and experience. With more than 530,000 employees and local operations managing 35,000 buildings worldwide, they provide solutions that address the specific needs of their customers, providing them with extensive added value. **They are aiming to increase their growth, asset optimisation, market differentiation, service efficiency and user experience by implementing innovative, smart building solutions to their provided services.**

The Challenges

ISS Group's customers' demands, expectations and behaviors are constantly changing. Therefore, they must enable innovative, reliable and best-practice services across all customer sites with the intention of saving money and reducing operational costs as well as engaging, inspiring and improving the overall user experiences, people behavior and site improvements.

They needed out-of-the-box, IoT functions, including monitoring individual's activity in rooms, usage of work desks, opening and closing of doors and windows and the measuring of comfort parameters, i.e. humidity, temperature, CO2-concentration, loudness and luminosity to transform their facilities into smart buildings.

The Solution

Revolutionizing the 35,000 buildings they manage into smart buildings was the out-of-the-box solution ISS was looking for. **Managing, analyzing, and storing the data in one, centralized location with the ability to present reports to users on a customized dashboard reduced operational costs, improved efficiency and will increase ROI in the long run.**

Their smart building solution also provided them benefits such as:

- Improving the way sites are managed, the user experience and meeting the needs of their customers with the customized dashboard.

- Providing a deeper understanding of people behaviour through reports and analytics.
- Predicting certain building maintenance areas using charts and widgets.
- A shared IoT platform that the ISS Group can deploy as a service to selected countries, while offering IoT services to identified customers and commercial bids.
- Help consolidate or decommission existing shadow IoT services into the new shared IoT platform.
- A framework within the shared platform that governs how IoT and digital solutions are delivered across ISS Global.
- Cloud-to-cloud integration
- Support of an extensive number of sensors and gateways

Incorporating smart building technologies, ISS was able to engage, inspire and innovate user experiences across all customer sites, using out-of-the-box IoT smart business services.

About Axonize

Axonize is an IoT orchestration platform, purpose-built to provide speed and scale for service providers and their end customers, developing and managing IoT applications. Based on a unique multi-application architecture that requires configuration rather than development, launching a full-fledged IoT project on Axonize requires mere days, rather than months, and yields a high ROI. Axonize is used by leading companies, including ISS, Deutsche Telekom, DHL, Optus and others.

Some of our customers

Contact us to schedule a walk-through at any time: **hello@axonize.com**