Capgemini Delivers Smart Building Transformation

With around 400 buildings in every corner of the planet, world-leading technology services provider Capgemini knew the only way to ensure maximum efficiency for staff in many of its offices, while meeting its stringent corporate sustainability goals, was to implement smart building systems based on proven Internet of Things (IoT) technology, Semtech's LoRa® devices and the LoRaWAN® open protocol. With an initial investment of two percent of Capgemini's total facilities budget, the company expects an annual savings of more than 10 percent by increasing the occupancy to more than 75 percent in many of its offices. The project proved so successful that Capgemini is now offering its own LoRa-based solution, SmartOffice, to their external clients. Companies with a facilities budget of 300M€ have a potential yearly saving of 45M€ after a onetime investment of 6M€ in this SmartOffice solution.

THE EXPANDING SMART BUILDINGS AND COMMERCIAL REAL ESTATE MARKET

Increasingly sophisticated smart cities are being developed by nations around the world to improve efficiencies, reduce costs and generally make life easier for residents and business owners. A key element in the development of any smart city is the ability to infuse a high degree of intelligence into its buildings, particularly in commercial real estate. According to Navigant Research, the global market for IoT technology in smart buildings is forecast to grow from a value of $8.5B in 2020 to more than $22B in just six years.

For Capgemini, it became clear that any company supplying solutions for implementation within the smart buildings market has to collaborate not only with software specialists, but also with property managers or facility management operators, who have very different concepts and expectations of smart buildings. Rather than operating in an IT-driven world where participants are paid by bytes per hour or gigabytes in a data center, Capgemini found that an IoT infrastructure had its own idiosyncrasies and the cost units in smart buildings were significantly different, with real estate customers being driven by price per square meter. To this end, sustainability was recognized as an important factor because a reduction in the number of square meters automatically leads to a smaller carbon footprint.

In its research, Capgemini found that many companies active in the smart buildings market would claim to sell solutions when they were in fact selling a product, or set of products, that could conceivably combine to make up an end-to-end solution. In a total IoT landscape, sensors have to be part of a complete data management environment. The task involves not only transferring sensor data to a back-end in a smart building, it also involves maintaining and monitoring the sensor network and its physical assets, as well as keeping track of changes in the office environment, interpreting trend analysis, taking appropriate action, and using data to fine-tune the building's management system. It was clear to Capgemini that for a company working on the deployment of IoT in the smart buildings sector, there was more involved than simply choosing a technology off the shelf.

THE BENEFITS OF CREATING A SMART BUILDING

Driving cost down is not necessarily the primary benefit of creating a smart building. Capgemini renews its real estate contracts every five years, and contract negotiations take place on a regular basis across the globe. Based on the insights that its SmartOffice solution is able to provide, the company now has tangible and reliable data that make such negotiations much easier.

For Capgemini, there was also a strong business case for maximizing office occupancy. With an initial investment of two percent of its total office/facilities budget, the company expects annual savings of more than 10 percent of its real estate costs by increasing the occupancy to more than 75 percent in many of its offices.

Additionally, the company wanted to solve the problem of 30 percent 'no shows' in meeting rooms, which occur when people schedule a meeting and book a room, but then fail to use the space though the room reservation remains.

At the same time, Capgemini had an average occupation of 65 percent in its offices – i.e., 65 desks/seats occupied per 100 available. The goal was to increase this to at least 75 percent, but to achieve this target required access to extremely accurate data. Accuracy was vital because local managers tend to decide on occupancy at peak moments and need to be convinced by real data.

Another key benefit is the ability to check the availability of meeting rooms, which is part of the larger goal of better utilization of buildings that Capgemini is continually striving to meet. It is important for employees to be able to find available meeting rooms, so they are able to plan their networking and daily schedule more efficiently and accurately, which in turn helps minimize travel costs. Obtaining accurate, real-time data and passing it on to employees throughout a building is of primary importance to Capgemini.

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With these factors in mind, Capgemini developed a sensor solution based on Semtech's LoRa devices consisting of:

- **Presence sensors** – used in meeting rooms to get real-time usage, which is shown on a floor plan in a mobile app
- **Desk sensors** – used for desks and meeting room tables to measure actual usage. This information is used for right-sizing, but also to show in real time where seats are available
- **Comfort sensors** – used to measure CO2, noise, temperature, humidity, and light to bring this information to the users of the office (and also to signal extremes)

Capgemini's Corporate Real Estate Services (CRES) has deployed sensors (based on Semtech's SX1276 long-range, low-power transceiver) in its smart buildings in approximately 25 locations around the world – including the Netherlands, Sweden, the U.K., U.S.A., France, India, Italy, and Spain. The truly global reach of LoRaWAN will enable Capgemini to deploy around 5,000 meeting room sensors in the first phase of its smart building development, to be followed by more than 75,000 meeting room and desk sensors in phase two. Although the business operates in 40 countries, sensors will only be deployed in buildings where it makes sense to do so, depending on the size of the building and the number of staff working there. At the end of 2020, the global rollout will cover approximately 85,000 sensors (including meeting, comfort, and desk sensors).

Companies like Capgemini spend hundreds of millions on office space and facilities costs. Increasing the occupancy in offices from 65 to 75 percent brings a potential saving of 15 percent. For a company that spends 400M€ annually, that means with a onetime investment of 8M€ the potential yearly saving of 60M€.

Capgemini has been able to demonstrate the main benefits that Semtech's radio frequency-based technology can provide, including monitoring employee comfort issues as well as cost savings. With data being shared by LoRa devices, facility managers have access to the most accurate and timely data on such subjects as the cleaning of washrooms, temperature, humidity, CO2, and noise levels in meeting rooms.

"When engaging with IoT, the emphasis must be about people and not about technology. You have to engage with everyone who is on board. It's very different to working in a pure IT environment because in order to be successful with IoT you have to work extremely closely together. This is one of the key lessons we have learned through working with Semtech."

Hans Scholten,
Vice President of Corporate Real Estate at
Capgemini and product owner of the SmartOffice solution

DEPLOYING SMARTOFFICE IN CAPGEMINI

For Capgemini, it was important that its smart building transformation was based on a solution that is truly scalable across offices, meaning wired sensors were dismissed because installing and maintaining them would be hugely labor-intensive. Without the flexibility offered by Semtech's LoRa devices, Capgemini would have struggled to roll out its global transformation across its various offices so rapidly and so effectively. In addition, it would have been far more difficult for Capgemini to offer other multinational companies the level of experience and consultation required for the successful implementation of smart buildings.

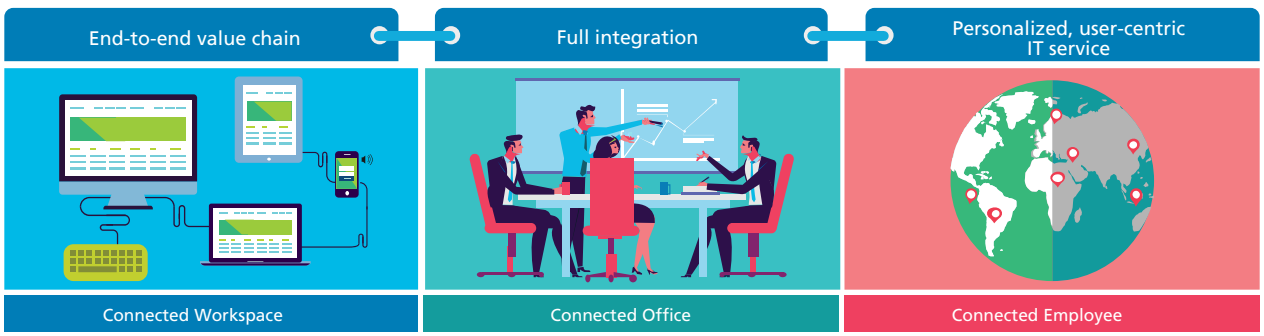
Initially, Capgemini did not select the LoRa devices or develop the sensor solution with the intention of making its own commercial offering – developing hardware-based sensors and selling products was exceptional because this was not the core business of the software developer. However, once it had acquired the experience and taken on board the success that the LoRa platorm was able to deliver, the company realized that there was a major opportunity to provide the market with a better solution than anything that was currently available. With Capgemini able to offer a commercially available product, the company's customers would be able to improve their decision-making competencies through better access to data. At the same time, the development would enable Capgemini to sell its other core services, such as solving IT problems at the customer's location and creating applications that deliver businesses the insights that they need.

Capgemini found that Semtech's radio frequency technology was the obvious choice in the development of its line of IoT solutions, including its intelligent SmartOffice sensor devices, not least because the technology enabled the battery life of sensors to be extended significantly (up to 10 years) while delivering on key requirements of range, sensitivity, reliability, and ease of installation.

LoRaWAN was chosen as the networking standard for Capgemini's SmartOffice solution for various reasons, not the least of which its ease of installation. This was essential with 400 offices in more than 40 countries because a local non-skilled person would be able to install the gateways and sensors, and only LoRaWAN made this possible. Another reason for choosing LoRaWAN was the extensive long-range coverage. The gateways Capgemini uses can reach sensors at more than 50 meters, which means that one gateway can cover more than 10,000 square meters, and by using LoRaWAN, Capgemini was able to minimize the number of gateways in its offices, saving significantly on installation costs. Finally, LoRaWAN offered excellent price/performance ratios. The company was able to develop a highly affordable solution that is much more affordable than anything of its type available on the market today.

It soon became clear when deploying some sensors that users would struggle with the IT tools they were given. For example, some users were not familiar with handling laptops or even using a mouse. Capgemini realized that using a laptop for deployment was not the ideal way forward when developing a sensor solution and the end user was much more comfortable using a smartphone. This led the company to develop the concept of scanning QR codes on a sensor's label in a room.

Today, Capgemini offers an off-the-shelf version of its SmartOffice solution that consists of asset management applications combined with the LoRa-based sensor network and LoRaWAN protocol. The products are designed to meet the differing requirements of many types of business, from small start-ups to large corporations.



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CONCLUSION

As a concept, smart buildings are not new, but the technology is continually evolving and what Capgemini has discovered through working closely with Semtech is that LoRa-based devices and the LoRaWAN protocol represent the way forward. They deliver low-power, low-maintenance, long-range, and high-capacity networking and data management solutions. This technology puts powerful data in the hands of property owners and facilities managers and enables designers of smart buildings to create cost-effective, easy to install and scalable IoT systems that the market demands.

ABOUT SEMTECH

Semtech Corporation is a leading supplier of high performance analog and mixed-signal semiconductors and advanced algorithms for high-end consumer, enterprise computing, communications, and industrial equipment. Products are designed to benefit the engineering community as well as the global community. The Company is dedicated to reducing the impact it – and its products – have on the environment. Internal green programs seek to reduce waste through material and manufacturing control, use of green technology and designing for resource reduction. Publicly traded since 1967, Semtech is listed on the Nasdaq Global Select Market under the symbol SMTC. For more information on Semtech's LoRa devices and the LoRaWAN protocol, visit **www.semtech.com/lora**.

ABOUT CAPGEMINI

A global leader in consulting, technology services and digital transformation, Capgemini is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50 years of heritage and deep industry specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of 200,000 team members in over 60 countries. The Group reported 2018 global revenues of EUR 13.2 billion. For more information, visit **www.capgemini.com**.

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