



The Connected Heritage Building

How to Easily Retrofit Your Building Management



Introduction and Challenge

How can we manage different parameters such as temperature, humidity and luminosity to live more efficiently? These questions, as well as many others are currently being asked by facility managers. Kornelius Nägele, Technical Innovation Evangelist for IoT at Bosch Connected Devices and Solutions, accepts this challenge by oneself. Collaborating with CISCO, he has been searching for an easy and wireless solution to make the historical "CISCO openBerlin Innovation Center" in Berlin even brighter. Some existing solutions are mostly cable-based and difficult to install. To solve this problem, the Cross Domain Development Kit (XDK) provides the matching hardware and software. This notable wireless sensor device containing eight built-in sensors, is easy to retrofit and can be used as a fully connected sensor node.

Approach

Built in the early 20th century, the typical industrial brick building with its vintage look appears warm and welcoming.

Kornelius is standing in the middle of a big office room in the venerable Innovation Center in Berlin. He looks back a year and recalls: "The building is awesome, but when I was working here for the first few weeks, I asked myself: how can we enhance the efficiency of winter heating and summertime cooling?"

It was not long before he found a potential solution of how to measure these different parameters: the XDK. The XDK is a wireless sensor device that enables rapid prototyping of sensor-based products and applications for the Internet of Things (IoT).

Inclusive of multiple microelectromechanical Systems (MEMS) sensors from Bosch

Sensortec and Akustica, both fully owned subsidiaries of Robert Bosch GmbH specializing in MEMS sensors and microphone solutions bringing digital awareness to new customer products. This enables time and cost effective realization of IoT applications while offering users the freedom of programming from a basic to an advanced level.

"But, you can also use it as a sensor node to validate and analyze data from machines, for example. In the case at hand, most of the XDK's were acting as an ambient sensor ceiling-mounted and on the power-rail," Kornelius says. The 850-square-meter Innovation Center for the Internet of Everything has three floors and 17 rooms sized from 10 to 200 square meters. In the following success story, you get to know how the heritage building transforms into a "fully connected heritage building".

Use Case

To measure the relevant parameters, 100 XDK's have been installed in the building. The XDK comes with 8 built-in sensors:



Accelerometer



Acoustic sensor



Digital light sensor



Gyroscope



Humidity sensor



Magnetometer



Pressure sensor



Temperature sensor

The digital light sensor, humidity sensor and temperature sensor are the ones used in this specific case. Due to its housing with an included battery with a small form factor of only 60 x 40 x 22 mm³, it can be retrofitted to objects of any size! The power supply runs via USB on the cable trays on the ceiling and every sensor is connected via Wi-Fi and Message Queue Telemetry Transport (MQTT) to the local gateway and remote cloud. The XDK is able to update the sensor data once in a minute. From every smartphone or tablet, the user can regulate light intensity or light color individually for his cubicle.

Especially if you think about all the wiring that you would have had to do to connect it to the power-line communication, let alone buying this type of building management from notorious building providers. If you use KNX, where every data cable has to be separated from power cable, it will be even more expensive to retrofit.



"The combination of wireless sensors, fog architecture for the building controller, a cloud backend and BACnet (Building Automation and Control Networks) controlled devices for heating, air conditioning, fresh air intake and lights was never tried before. The certified XDK is the right tool for this kind of project, because of its compact packaging and nice housing. Also the new extension packs allow the building to get smarter over the time."

Kornelius Nägele,

*Technical Innovation Evangelist for IoT
Bosch Connected Devices and Solutions*

Select Room:

1. Open Office

Temperature

Area: 1

Current Temperature: 21.9 °

21.9

Set Temperature

The values are aggregated on the room level by a local fog gateway, where a smart rules engine controls all of the lights, A/C, fresh air intake and heating for the whole building, except those needed for emergency.

If you think a classic, wired temperature-sensor costs 140€, the sensor box was a bargain.

Bosch Connected Devices and Solutions role

As an innovative company, Bosch Connected Devices and Solutions can draw on extensive sensors and software solutions experience. By combining our expertise with partners from different business entities, for example, from Bosch Sortotec and Akustica, we enable new value propositions and new ways of value creation.

The XDK gives you the power to monitor and control your product remotely over Bluetooth or a wireless network. In this way you have a 24/7 access to your data. For this sort of usage, we offer you the reliable XDK hardware including a software stability resolution. Not only can you control your building management, it is also possible to use XDK for predictive maintenance in the industry area. Finally, you can enhance security, reduce energy and increase comfort in your daily business.

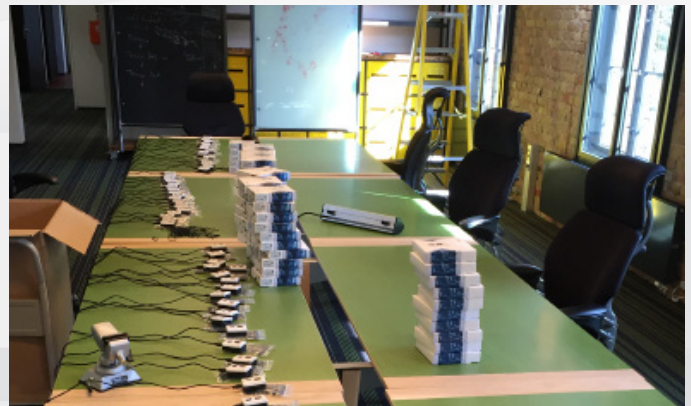
Solutions and Benefits

With the help of the XDK, you can easily build your own building management. Questions like: “Is it too humid”, “Is it too dark”, or “Is it too cold?” Belong to the past. At a glance, all the relevant data can be checked in a dashboard. The text at hand is an outstanding example of how to make life easier and more comfortable with the help of XDK. “After running this project, the heat- and light management was improving from time to time. Energy savings of about 60 % due to adequate temperature- and light control were achieved”, Kornelius proudly reports.

This use case is only one example of how to use XDK as a sensor node: machine operators certainly ask themselves if their devices need to be maintained or not. Operators can also benefit from reducing down-time and operating costs due to changed settings on the sensitive machines. Here, small changes concerning vibration result in significant changes.

Conclusion

In the future, some more activities to improve the building management are planned: an occupancy sensor will show which areas in the building are taken and not, and an indoor air quality sensor will ensure good ventilation. Thus, mold risk can be reduced. Such kind of examples show the far-reaching areas of application of the XDK. Smart Home use cases can be transferred to Industry use cases and vice-versa. If you have similar use cases and need a tailored software package in quantity, along with the XDK comes the right partner. We offer individual options for the mass production and series engineering of your product.



About Bosch Connected Devices and Solutions

Bosch Connected Devices and Solutions GmbH is based in Reutlingen, Germany and is a 100% owned subsidiary of Robert Bosch GmbH. As an innovative company, it serves the new market for the Internet of Things. We offer compact electronic devices, comprehensive software and end-to-end solutions in many fields of application. Our main businesses are in the areas of Connected Mobility and Industry 4.0 & Logistics! We improve everyday life, increase comfort, security and productivity.

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