intel®

Empowering building management with intelligent systems

Intel works with BSC Computer and EnOcean to bring powerful and efficient solutions to Eltako Electronics' home automation business

As part of the drive to reduce energy consumption, costs and carbon, demand for building management and home automation is increasing rapidly. Working with Intel, BSC and EnOcean, Eltako Electronics is developing innovative, intelligent solutions that inspire smart, energy-efficient buildings throughout Europe.

Challenges

- **Manage tiny form factors.** Deliver powerful data analytics that provide real insight into energy consumption and critical building functions without compromising on size and aesthetics of devices.
- **Minimize power consumption.** Make sure energy savings from greater insight and control are not lost to power-hungry computing and analytics.
- **Facilitate installation.** Maximize potential customer base with systems suitable for deployment in new builds as well as retrofitting.
- **Manage multiple communication protocols.** Ensure that internal short-range and external long-range wireless networks work together without interference.
- **Secure data.** Maximize uptake from potential user base by securing sensitive data.
- **Increase user acceptance.** Offer easy operation and high comfort and reduce long-term maintenance effort.
- **Future proof.** Avoid future retrofits and upgrades with sustainable, long-lasting solutions.

Solutions

- **Develop end-to-end solution.** Bring together Wi-Fi, GSM/UMTS and EnOcean communication standards, hardware, analytics and applications for HVAC, electricity, and building security into a single device.
- **Standardize on Intel® technology.** Create a standardized environment built on Intel® Atom™ processor, developed specifically for low-power, high-performance embedded and mobile environments.
- **Create the dream team.** Work closely with specialists in individual fields to deliver complete solutions, share expertise and prompt innovation.

Impact

- **Grow customer base.** Eltako has expanded its customer base within Europe and continues to deliver solutions to new customers every month.
- **Develop leadership position.** Long regarded as a leader in building control devices, Eltako is establishing a similar position for wireless controls and building automation.
- **Change the domestic experience.** Eltako is delivering greater comfort, control and cost reduction to individual families as well as commercial and industrial organizations.
- **Educate the marketplace.** Public awareness of the benefits of battery-free, energy harvesting wireless sensors and devices can increase, giving greater impetus to the smart-home market segment.

"The high performance-per-watt capability of the Intel® Atom™ processor is vital to the successful development of our building automation solution. It supports our always-on, always-connected needs while giving us high levels of performance, data integrity, and security."

Jörg Hofmann,
Managing Director,
BSC Computer GmbH

The arrival of the smart building

At first glance, the Egyptian Embassy in Berlin has little in common with the city's ABBA Hotel. But behind the scenes, both buildings have deployed energy harvesting wireless smart building solutions from Eltako Electronics, a marketplace leader in building automation.

Eltako has been synonymous with high-quality functionality and imaginative product design in the development and manufacture of control technologies, switches and meters for more than 60 years. However, over the last five years, the company has turned to home automation and building management solutions to meet rapidly growing demand.

As a result, the embassy and the hotel are just two of a growing list of residential buildings, universities, medical practices, conference centers, office blocks, churches and warehouses that depend on Eltako's technology. The company's clients can be found throughout Germany, Austria, Switzerland, Sweden, Italy and New Zealand.

An early adopter of the Internet of Things

Building automation is a rapidly growing sector, as developers, facilities managers and owners look to central control of critical building functions to reduce energy consumption and carbon emissions while increasing comfort and security. But the smart building is also an example of the Internet of Things in action.

Intelligent systems with tiny form factors combine high-performance, Internet-connected processors with a series of sensors and actuators that detect pressure, temperature or movement. These sensors are embedded into equipment such as programmable communicating thermostats, controls for lighting, air conditioning and ventilation, or even window-locking mechanisms. The intelligent system is linked together to communicate, disseminate and analyze the data gathered by the sensors, and then distribute that data in the form of actionable insight, to both individual building managers and other devices over the cloud.

Always-on, always-connected intelligence in the service of building management and a lower carbon environment

Building managers and occupiers can access and respond to the data through the local mobile phone network: separate control devices can be built, or control applications installed on standard tablets and smartphones.

Power and performance for intelligent systems

Developing an effective home automation solution presents three key challenges. As Anja Krombholz, technical sales assistant at Eltako, explains, "The first challenge is internally networking a large number of individual sensors so they can also communicate with long-range, external wireless networks. The second is minimizing power consumption of the sensors – especially when the end goal is reduced energy consumption. And the third is to reduce cables and batteries for easier installation and long-term maintenance."

The company turned to BSC Computer GmbH to provide the solution. A long-term specialist in developing customized, secure solutions to the IT sector, BSC had been collaborating with Intel to develop a cost-effective and powerful network gateway that incorporated the latest control and visualization software and machine-to-machine (M2M) communication techniques. Importantly, the gateway also introduced the idea of managing all building control elements – such as heating, electricity, water and security – through a single solution.

The gateway offered a complete, end-to-end solution from hardware and communications to smart phone apps and analytics, and was developed on Intel® architecture to ensure the highest levels of performance.

At the heart of the gateway design is the Intel Atom processor. Small and power-efficient, the Intel Atom processor features 22nm technology and integrates energy-efficient CPUs and built-in security onto a chip that draws less than 10 watts of power. Designed to offer low power consumption while delivering dual-core performance, the high performance-per-watt capability of Intel Atom processors supports the always-on, always-connected needs of the BSC gateway. It also uses Intel® Smart Connect Technology to interact with the communications channel and update data while it is in sleep mode.

Jörg Hofmann, managing director of BSC Computer, says: "When we first came to Intel with the idea of the gateway, we knew we would get a reliable, high performing architecture that still offered very low power consumption and at a size that would work within the

constraints of building automation technology. Performance is important because it enables us to consolidate more building-management functions onto a single device, and empowers both the local data analytics and visualization, which is a key element of the smart-building concept."

BSC was also attracted by the Intel Atom processor's ability to maintain high levels of data integrity, reliability, and system uptime as well as its ability to secure endpoints and protect data. Security features include data encryption from Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI) for safe data transfer and McAfee security solutions to protect the entire solution stack. Hofmann points out, "Data security is vital when it comes to building automation. The gateway transmits highly sensitive personal information that people are understandably cautious about sharing. Deploying it over Intel architecture enables us to reassure customers and provide an essential level of trust that is so important for high levels of user acceptance."

Collaborations and alliances

The other key factor in Intel architecture was its ability to seamlessly interact with the communication channel. The BSC gateway has to handle three key wireless communication technologies: Wi-Fi for transferring large amounts of data to the external WAN; GSM/UMTS to enable remote access and control from any device in any location; and, finally, a communication protocol for transferring control and measurement data from the sensors (in this case, the EnOcean energy harvesting wireless protocol).

The EnOcean Alliance plays a crucial role in the success of the BSC Gateway. It standardizes application profiles based on the open wireless standard ISO/IEC 14543-3-10, using sub 1 GHz frequency bands. This not only ensures the interoperability of all EnOcean-based devices in a single system, it also enables them to network with other wireless protocols via the Intel® technology-powered BSC gateway. As a result, any EnOcean-based sensors can be easily added following the initial installation of the gateway. It also provides a safeguard against other wireless transmitters and offers fast system response and elimination of data collisions.

Equally importantly, the EnOcean protocol optimizes energy harvesting wireless technology for ultra-low-power data transfers. Instead of using batteries, or mains power, devices have access to ever-present power sources in the form of motion, light or temperature differences gained by miniature solar cells, a mechanical motion converter and thermal converters.

When combined with the low-power performance of the underlying Intel architecture, it allows BSC to deliver an energy-efficient network gateway that opens up new opportunities for battery-free applications for intelligent networks and M2M communications.
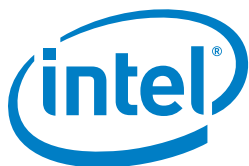
Automation in action

For Eltako, the collaboration among Intel, BSC and EnOcean has enabled it to deliver an extensive range of building automation services to a wide variety of clients. In addition to its energy-autonomous applications – such as battery-free switches, intelligent window handles, temperature, moisture and light sensors, relay receivers and control centers – the company sells complete smart-home systems.

The company has seen sales increase by 30 percent and now sells more than 20,000 individual components into approximately 1,000 buildings per month.

Hofmann adds, "Because we built the Gateway on Intel architecture, we can reassure our customers that our solution is open, scalable and easy to upgrade. With the next generation of Intel processors set to enable even better performance, greater reduction in power consumption and further scalability from quad-core functionality, we have a clear roadmap for the future that we can implement with minimal disruption. When working with people's houses and workplaces, that's a very important factor."

Krombholz at Eltako says, "The low-power, battery-free design means that the BSC Gateway is suitable for new developments, as well as retrofitting in existing buildings, greatly extending our potential customer base. It also allows us to develop highly flexible solutions that we can tailor with ease to meet the needs of our individual clients. And because it is highly scalable, we can install it in a single-switch environment, knowing we can increase the devices covered as our customers demand."

Find the solution that's right for your organization. Contact your Intel representative, visit Intel's Business Success Stories for IT Managers (**www.intel.co.uk/Itcasestudies**) or explore the Intel.co.uk IT Center (**www.intel.co.uk/itcenter**).