

Belimo: intelligent and decentralised control – drives with integrated logic

With Belimo sharedlogic Belimo, the global market leader for HVAC actuators and governors, has come up with an innovative and ground-breaking development platform for intelligent solutions in the field of heating, ventilation and air conditioning. It is the result of five years of close cooperation with Ergon. Based on embedded systems, smart components can now be easily developed for decentralised applications used to automate building services.

An increasing number of devices, which in principle have nothing to do with information technology, are being controlled by processors in conjunction with special software. Embedded systems is the name of these integrated solutions which are permanently installed in the relevant device. When sensors as well as an Internet connection are involved, the computer industry talks about the "Internet of Things". The aim here is to simplify processes, cut costs and become more sparing with our scarce resources. Instead of a computer being the user's focus of attention as is currently the case, the "Internet of Things" is supposed to help us with our activities through increasing miniaturisation of PCs without us even noticing. Localisation, analysis and modelling of context information are currently still at an experimental stage. Top computer scientists throughout the world are busy developing new ways of thinking and tools to at last make this reality.

Getting ahead through innovation

To open up new applications and with them new business sectors, successful industrial firms such as Belimo, a technology company quoted on the stock market, constantly come up with fresh products. Its innovations have allowed this firm from Hinwil to become the global market leader with its electric HVAC drive solutions. When Belimo's developers hit upon the idea of upgrading electric actuators with a web server and decentralised logic five years ago, they started to look out for an innovative IT partner. This firm should not just stand out with its sophisticated software engineering, but also with its R&D skills. The project vision was to assemble a development kit for embedded systems which would allow HVAC application programmers at Belimo's partner firms to link up control systems to create a "network of smart things" for their own products. According to Daniel Roner, head of System Innovation at Belimo, they had found the perfect project partner in Ergon: offering the engineering expertise for the solution they had in mind.

Development of Belimo sharedlogic

The starting point for cooperation was to create a platform that provided the basic functions to develop decentralised control systems for building services components and supported open Internet communication protocols. The aim was to equip drives with the required innovative technology and logic so that the built-in miniature computers firstly ensure flexible control for the individual motors, and secondly, allow themselves to be controlled by a central master system.

Before developing the software for communication and control a suitable processor had to be found, offering a good balance between performance and waste heat. Matters were made more complicated by the plan to house it in a welded and sealed enclosure, where it was to ensure maintenance-free functioning (unlike conventional IT products) as the systems are designed for a service life of up to 20 years. Today, after detailed feasibility studies and development cycles, the solution going by the name of Belimo sharedlogic is based on an ARM processor built into the drive running under Linux. The platform has also been extended to include a graphical development environment, which can be used to program the control systems and associated web interfaces for operational manipulation, in addition to a special tool for configuring the network and bus addresses for starting up the network.

When developing the software, Ergon's engineers relied on modern agile methods, which help shorten run times and offer operational software releases more frequently as well as resulting in a more focused work approach.

Great comfort combined with lower energy consumption

Belimo's drives can now be easily networked with the new system and controlled from a central location. This has been demonstrated by a model installation at the recently completed Rosengarten old people's home in the town of Stäfa (near Zurich). Here Belimo sharedlogic is responsible for operation, maintenance and diagnostics of the entire energy system including heating and ventilation. It ensures convenient handling with optimised energy consumption at all times. Simple individual adjustment is possible for both the floor heating and ventilation system as well as timer programming, whether using control knobs in the rooms or remotely via an iPhone. The controllers are built into the various heating and ventilation components, providing for centralised control and adjustment from the basement via an iPad. The Rosengarten pilot project has ushered in tomorrow's "network of smart things": With Belimo sharedlogic heating and ventilation can be adjusted to maximise economic efficiency and home comfort.

"Cooperation between Ergon and Belimo makes a valuable contribution that goes beyond building services engineering", commented Daniel Roner. He went on to say, "Thanks to the development of innovative high-quality solutions using Belimo sharedlogic it is possible to reduce energy consumption while improving reliability, safety and well-being inside buildings."