

BaaS

Blueprint for Building automation and Management ecosystems

Impact highlights

- In Materna, IoT has recently been elected as one of the company's key innovation areas. The results from the BaaS project can be considered as preparatory activities to this, and the knowledge part gained in BaaS will definitely be a basis for Materna's future activities.
- Materna's Open Source JMEDS platform, which was further developed in BaaS, has been downloaded more than 31,000 times all over the world (87 countries) since its publication.
- BOR Software started the project as the smallest SME participant (2 people) and now has 15 people working in BaaS-based IoT products and services. The income resulting from the project is estimated at around 1.5 million euros for the period 2017-2020. Spin-off companies IOTIQ GmbH and ERSTE Software Ltd were recently founded under the guidance of BOR, inspired by the gained BaaS knowledge and its IoT focus.

Smart buildings of the future need comprehensive and extendible cross-domain management and control functionality that today's building automation and management systems (BAS) do not adequately provide. These buildings should not only create an environment that optimises the conditions in which people can work and live in comfort and with security but should also ensure that management and maintenance are performed effectively and efficiently. The BaaS (Building as a Service) project set out to tackle these challenges by introducing a novel semantic IoT service framework for commercial buildings along with a reference architecture and corresponding software platform as a basis for current and future commercial building automation and management technologies.

Project results

The BaaS Reference Architecture provides common concepts and guidance for the development of concrete BaaS platforms. In particular, the BaaS Information Model facilitates the semantic modelling of devices, functions and data and thus provides a blueprint for the specification and generation of BaaS services. The establishment of a BaaS system follows a service lifecycle model that covers the phases of Design, Development, Engineering, Commissioning, Operation and Optimisation. The BaaS platform provides a number of tools and methodologies supporting the first phases of this lifecycle while the BaaS runtime facilitates the capabilities needed to operate a system of BaaS services. A technical management system monitors the services and ensures their proper operation.

The benefits of the BaaS platform and runtime have been shown in various application demos, including an Emergency Evacuation demonstrator and a Smart Workplace demonstrator. Building automation engineers benefit from BaaS tools that facilitate easy and flexible modelling, development, engineering and commissioning

of services while tenants benefit from enhanced comfort, better customisation of services and energy savings through presence detection and environment awareness. Essentially, the BaaS approach can serve as a blueprint for stakeholders in future BAS ecosystems and provides for promising exploitation options.

Exploitation

Project leader Materna continued to develop its Open Source JMEDS (Java Multi Edition Device Stack) framework based on DPWS (Devices Profile for Web Services) in BaaS. The foundations for JMEDS were laid in the ITEA projects SIRENA and OSAmI. JMEDS implements an abstraction layer for the integration of diverse device technologies as used and found in BAS.

BOR Software generated a commercial product from the BaaS results: BEY, a Building Inventory Management tool for commissioning, operating and monitoring BAS. After BaaS, BOR has established a new division for Smart Environment Engineering releasing commercial products and professional services. In 2013, BOR was not familiar

with smart environments, but now the company has a strong business in this field. BaaS gave BOR a fast learning curve to convert knowledge into commercial exploitation and new opportunities.

Prodevelop provided the prototype 3D Web Visualisation for Real-Time Maintenance of Smart Buildings in BaaS. The company has used BAS added-value services to enhance its POSIDONIA Space © (Smart maintenance of harbour infrastructures) and POSIDONIA Safety © (Emergency plan specification and execution based on outdoor and indoor location systems) solutions.

Siemens has taken advantage of the results of the BaaS project for supporting the development of new BACnet standards (a data communication protocol for Building Automation and Control networks) together with Siemens Building Technologies. Ideas from the BaaS project have contributed to the Technical Working Group of the Fairhair Alliance, launched in 2015, to adopt and develop IoT technologies for Building Automation Systems, with Siemens, Philips and NXP as members.

12011 BaaS		PARTNERS <i>Czech Republic</i>		TU Dortmund TWT GmbH Science & Innovation University of Rostock University of Technology in Munich		○ Gerade Software ● Kartek Kart ve Bilisim Teknolojileri Tic. A.S. ○ SmartSoft ○ KoçSistem Information Communications Services ●	
PROJECT LEADER Franz-Josef Stewing, Materna & Christoph Niedermeier, Siemens		Masaryk University Institute of Computer Science MDS Computer s.r.o. X-COM BASE Praha		○ ○ ○		○	
PROJECT START November 2013		PROJECT END October 2016		<i>Germany</i> Fraunhofer Gesellschaft E.V. Kieback&Peter GmbH & Co KG Materna GmbH Siemens AG TU Dortmund		○ ● ● ● ○	
PROJECT WEBSITE https://itea3.org/project/baas.html				<i>Turkey</i> Defne Bilgi Islem Ürünleri San. ve Tic. Ltd. S		○ ○	