COMPACT

Platform for Building Rapid IoT Solutions

The ITEA project COMPACT aims to provide novel solutions for the application-specific and customer-oriented realisation of ultra-small IoT nodes. With a focus on software generation for IoT nodes with ultra-small memory footprints and ultra-low power consumption, the development of IoT software, and thus IoT devices, will become much shorter and more efficient.

ADDRESSING THE CHALLENGE

The tremendous impact of Internet-of-Things (IoT) on every aspect of our lives – from industry automation, smarter homes and energy efficiency to better healthcare and more flexible working provides strong motivation to incorporate IoT research and developments in Industry 4.0 strategies. IoT devices with sensors and actuators need electronics to connect that world of ‘things’ with the digital world of the Internet, and software to run the IoT electronic hardware. Since IoT devices need to be smart, cheap, and must consume as little power as possible, developing IoT software is challenged by these constraints. Therefore, an industry-wide effort is required to facilitate fast and efficient software development.

PROPOSED SOLUTIONS

COMPACT (Cost-Efficient Smart System Software Synthesis) will create significant technological innovations to automate the software development process and the configuration flow for ultra-constrained IoT nodes by introducing scalable approaches based on purposefully designed meta-models and generators. The key concept is a model driven architecture (MDA) - for configuration flow and tool chain generation - enabled by the new IoT Platform Modelling Language (IoT-PML). The PML models the IoT node hardware- and software-stack, functional and non-functional requirements as well as node configurations and IoT scenarios. The primary focus of the PML is to drive generators for ultra-thin, smart-functionality IoT software where all redundancy and overhead is prevented. Novel optimization approaches will allow for collateral efficiency increases of the generated code. Standardization of the IoT-PML shall pave the way for early and wide acceptance by suggesting quick and smooth adoption into industrial practice. Highly efficient analysis methods support the evaluation of the generated code and its non-functional properties such as memory footprint, safety, security, timing, and power. A reference IoT tooling framework - including advanced features such as requirement management and human readable interfaces - to the IoT-PML will be developed and the application of the COMPACT methodology will be demonstrated by various use cases from the IoT domain.

PROJECTED RESULTS AND IMPACT

The results of the COMPACT project will make the development of IoT software, and thus of IoT devices, not only much shorter and more efficient but will also support competitively priced, just-in-time production while increasing reliability and stability. The competitiveness of European industries impacted by IoT will be strengthened while further benefits will become evident due to greater IoT product variability as well as due to improved safety and security enabled by continuously updated software.
ITEA is a transnational and industry-driven R&D&I programme in the domain of software innovation. ITEA is a EUREKA Cluster programme, enabling a global and knowledgeable community of large industry, SMEs, start-ups, academia and customer organisations, to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society.

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