Fast semantics – Secure Manufacturing Real Time Semantics

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Prof. Dr.-Ing. Dr. h.c. G. Fettweis
Vodafone Chair
01062 Dresden, Germany
Tel.: +49 351 463 41000
Fax: +49 351 463 41099
www.vodafone-chair.com

Vodafone Chair contact:

Dipl.-Ing. Robert Wittig

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Project Partners:

ABB
Systemintegration, Sensorik, Aktorik, Prozessleitsysteme

bürkert FLUID CONTROL SYSTEMS
Anwendungsspezifische fluidische Systeme

KORAMIS
Industrial IT Security und integrierte Automatisierungssysteme

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Mobile Nachrichten Systeme (MNS):
Multiprozesssysteme und Transceiver für mobile 5G Echtzeitkommunikation

Hochparallele VLSI-Systeme und Neuromikroelektronik (HPSN):
System on Chip Integration, Deep-submicron Schaltungsentwurf

Prozessleittechnik (PLT):
Informationsmodellierung, Middleware, Prozessautomatisierung

fast semantics

Motivation:

In todays industrial processes the use of analogue measurement components is still predominant, resulting in the use of analogue signals (4-20mA) for transmitting and receiving information.

In the scenario of industry 4.0 the consistent integration of all devices (sensors, actuators etc.) is required. This means, that not only measured values but semantic information needs to be transmitted. To achieve this, the OPC-UA stack can be a key technology. It enables devices in industrial environments to transmit information within a semantic context. Thus enabling plug and produce scenarios and the integration of IoT devices within industrial processes.

Objective:

The goal of ***fast semantics*** is the integration of a real-time OPC-UA server on a on-chip platform. In comparison to a software integration this also enables low power/energy devices to be integrated within industrial processes. The semantic context of information is also key for building a real-time communication network for maintenance and controlling purposes.

Approach:

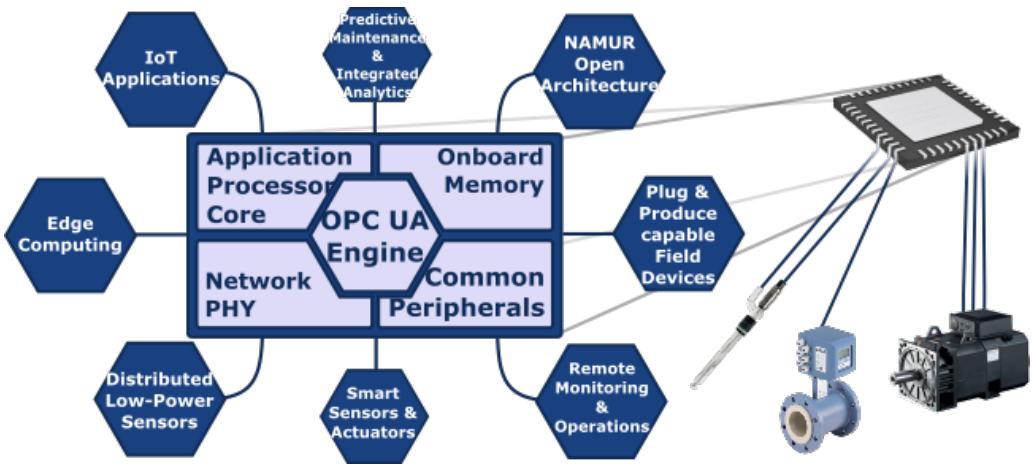
In order to facilitate the advantages of semantic communication for a wide range of low budget, low energy devices the ***fast semantic*** team will design a reusable IP core for the OPC-UA functionalities. Furthermore, the core will be integrated into a System-on-Chip platform which in turn serves as a center piece in a full industry ready demonstrator.

Vodafone Chair Contribution:

The researchers at the Vodafone Chair will develop scenarios to integrate the OPC-UA platform within a 5G communication network. In this context the Tomahawk chip will be used to offload computational/communicational task from the OPC-UA chip to an MPSoC. The Tomahawk platform will enable the computation of massive parallel workloads, including but not limited to 5G communication and security tasks.

To achieve this, a communication channel between the Tomahawk and the OPC-UA chip will be established.

On the Tomahawk side a new distributed task management engine will be deployed and tested.



C. P. Iatrou, L. Urbas; "fast semantics: OPC-UA-on-a-chip for deeply embedded semantic real-time communications", GMA Fachausschuss 1.50 "Grundlagen vernetzter Systeme", 2018, Reisensburg, (Vortrag)

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