Reference: OPC-Client

Topic: Web Client for an OPC UA server

Lecture-Type: Practical course, Seminar, Bachelor thesis

Start: As soon as possible

End: To be defined

Contact: Felix Rinker (felix.rinker@tuwien.ac.at)
Stefan Biffl (stefan.biffl@tuwien.ac.at)

Background

In automation systems flexible configuration of components and subsystems is of high interest by industry, such as required by Industrie 4.0 initiatives. Components that support these requirements include self-aware and self-adaptable production system components for enabling intelligent networking and cooperative decision-making. With focus on practical applications, a migration path from existing production system architecture to flexible components is required.

AutomationML [1] provides a standardized XML-based data structure for storing and exchanging engineering data of automation systems, such as a production system. AutomationML includes the plant topology, geometric data, kinematics, and control logic. Beyond the specification of automation systems additional methods and tools are needed to support efficient data exchange based on semantic meanings of exchanged data.

OPC UA [2][3] is a machine-to-machine (M2M) communication protocol that support data description and propagation based on a semantic technologies, i.e., the meaning of available data is available and can be used in application. Note that OPC UA is also capable of handling runtime data.

The main goal of this topic is to design and develop a web frontend prototype to efficiently browse through engineering data based on AutomationML and OPC UA data based on an industry prototype. Figure 1 presents an overview on the architecture.

![Figure 1: Web client to browse a production system structure in an OPC UA server.](image-url)
Tasks
Based on the overall goal, two specific tasks include:

- Design, develop, and evaluate a web interface to browse the structure and run-time data of a technical system provided by an OPC UA server interface in AutomationML format.
- Design, implement, and evaluate a web interface to set control parameters of a technical system via the same OPC UA server interface.

Expertise and Skills Needed
Based on different tasks, required expertise and skills may vary. For this project, the following skill set is recommended:

- Web User Interface design
- Software Engineering Skills
- Java and the standard technology stack (e.g., Build Tools, Issue tracker, SCM)
- Interest in test automation
- Nice to have: interest in OPC UA and/or AutomationML modeling

You will learn

- Automation systems engineering basics
- AutomationML and OPC UA in practice

References
