

CIMug Call for Presentations

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Abstract

Today's power grid is experiencing a major transformation into a complex cyber-physical system, the so-called Smart Grid. One hallmark of this process is a fast growth of the amassed data – not only in terms of volume, but also in terms of variety and interconnectedness. Integrating this increasingly complex information domain into a unified landscape of – presumably "big" – interoperable data is a major challenge. The IEC Common Information Model (CIM) is widely agreed upon as a promising candidate to address this challenge.

However, despite being widely considered a semantic data model, the potential of CIM from the perspective of semantic computing remains largely untapped. Therefore, this talk will present recent research results that demonstrate how to exploit CIM semantics:

Firstly, we present an approach to ontology-based integration of a CIM master data layer with large quantities of measurement time series data. Secondly, we showcase a system that performs semantic reasoning over the CIM ontology and network instance models in order to improve frequently reoccurring tasks, such as network topology processing.

The presented work is conducted in the scope of Energy Lab 2.0, a large-scale technology research platform developed by a consortium of several scientific institutions in Germany. Among the main research goals, the project aims to investigate strategies for renewables integration, novel control methods and the dynamics of microgrids at very small time scales. The overall infrastructure comprises a power-hardware-in-the-loop experimental field, an energy grid simulation and analysis laboratory, and a control, monitoring, and visualization center. A project of this complexity poses significant challenges to the underlying data management system, which this work aims to contribute to.

About the Author

Artem Schumilin is a PhD candidate in computer science at the Karlsruhe Institute of Technology (KIT) focusing on semantic computing and its application to the domain of smart electricity grids.

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