

OTM-Evolver

An Evolution-Aware Semantic Framework Enhancing Operational Technology Monitoring in Critical Infrastructures

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Projektbeschreibung

Efficient and safe operation of critical infrastructures has significant impact on the life of citizens and economies. A wide range of technologies, aka. "Operational Technologies (OT)", are employed for monitoring and controlling the operation of critical infrastructures, being, due to the convergence with Information Technology (IT), more and more based on the Internet-of-Things (IoT) paradigm. Monitoring the service quality of OT (e.g., sensors, actuators or network routers), i.e., "Operational Technology Monitoring (OTM)", is a crucial prerequisite for ensuring efficient and safe operation. Currently, OTM of critical infrastructures often faces three main deficiencies namely (1) an insufficient conceptual representation of OT, unable to provide interoperability of existing OT, (2) limited service quality monitoring preventing an integrative service-oriented perspective as needed for OTM, and (3) missing system evolution support, disregarding the dynamic nature of OT in large-scale critical infrastructures.

To address these deficiencies, OTM-Evolver proposes an evolution-aware semantic framework enhancing OTM by providing a threefold contribution: Firstly, to achieve an interoperable IoT-based OT representation, semantic technologies, ontologies respectively, are elaborated addressing the structural dimension of OT. Secondly, to provide a service-oriented quality monitoring in terms of an integrated assessment of OT service quality, formalisms for defining appropriate quality metrics and rules are elaborated on top of the interoperable ontology-based OT representation, addressing the behavioral dimension of OT. Thirdly, to cope with the evolution of OT in critical infrastructures, a hybrid evolution impact detection approach, covering both, intended as well as unintended evolution, is elaborated. Along these contributions the expected outcome of OTM-Evolver is to establish a lean proof-of-concept prototype demonstrating the feasibility of the proposed solutions on the one hand side and acting as a showcase for a succeeding industrial exploitation on the other hand side.

Projektpartner

- team Technology Management GmbH