

Contribution to the AML User Conference 2018

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AutomationML as single source of truth in a smart factory

In the IIC Testbed Smart Factory Web the Korean Institute KETI and Fraunhofer IOSB aim to form a network of smart factories with flexible adaptation of production capabilities and sharing of resources and assets to improve order fulfilment. The testbed implements the usage scenario “Order driven adaptive production” that combines the Industrie 4.0 application scenarios “order controlled production” and “adaptable factory”.

In the web portal (www.smartfactoryweb.de), you can register factories, search for and locate factories with desired capabilities. Plug&Work functionality allows new components or even complete machines to be “plugged” into the factory with automatic recognition of the equipment and software reconfiguration with minimal manual interaction. The factory owner and authorised users can use a cockpit application for plant monitoring, as well as material and information logistics. An OPC UA aggregation server with Pub/Sub functionality is used to separate the shop floor network from the network of the portal. Two different systems are used for the visualization: Microsoft Azure IoT Connected Factory for shop floor data from the OPC UA aggregation server and a FROST Server (Fraunhofer Open Source SensorThings API Server) for higher-level factory data (e.g. derived through complex event processing) and optional additional sensor data. The testbed also deals with the advanced goal of achieving collaborative engineering across factories.

The various engineering tools and systems need a consistent knowledge base of factory information. This is especially important for the Plug&Work scenario. Metadata about all process variables is included in the AutomationML file describing the factory assets. This AutomationML file is used to automatically generate the OPC UA aggregation server and to configure the visualization both in Azure as well as on the FROST server and on the Smart Factory Web portal.

An AutomationML description of the factory constitutes the foundation for all needed information. The AutomationML model include the factory hierarchy information according to IEC 62264 and connections to the process data (DataVariables). In addition, the AutomationML model stores specific information for the target engineering tools such as the location of the factory (web portal and Azure) or KPI-relevance (Azure). This factory description is uploaded to the portal during the registration and converted into several configuration files for the different tools (in JSON format).

Results of testbed experimentation indicate that this is a successful approach to collecting all relevant factory information into a single AutomationML file.