

## Industrie 4.0

### INTEGRATED FUTURE OF INDUSTRY



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**Uniform interfaces are an important prerequisite on the way to Industrie 4.0. VDMA is currently focusing on the interface standard OPC UA. This standard should make Industrie 4.0 viable in a few defined steps. A review.**

By Dr. Christian Mosch

Mechanical engineering is at the core of Industrie 4.0 since it is both the provider and the user. A clear and above all company-individual understanding of Industrie 4.0 is therefore important for the industry. This makes it all the more important that mechanical engineering meets the challenges of technological development.

For mechanical engineering, there are two driving incentives behind Industrie 4.0: The first is the increase in productivity through the technological merging of the information and communication technology with production. Customers have access to machine data, machines communicate with machines, work pieces and machines control production independently - and all this in a flexible and efficient manner whilst saving resources.

The second incentive is that mechanical engineering will soon stand on two pillars. In addition to selling physical products, mechanical engineering will rely on data and information as a product of the future.

The definition of uniform interfaces in production is a prerequisite on the way to Industrie 4.0. Interfaces define the mechanisms of cooperation based on information about products, production processes and their resources. The exchange of this information, which has to be manufacturer-neutral, leads to cross-company interoperability. This interoperability enables companies to be more flexible. Components, machines and systems are not configured and programmed for a specific production task. Their skills are portrayed as services within the added value network.

#### **OPC UA: The open Industrie 4.0 interface standard**

VDMA's strategy is to enable member companies to engage with Industrie 4.0 in defined steps. A crucial step is the focus on the interface standard OPC UA. OPC UA is an open interface standard specified in the IEC 62541 set of standards, which stands for Open Platform Communications Unified Architecture.

OPC UA is increasingly becoming established for Industrie 4.0 communication among small and medium-sized enterprises (SMEs) in mechanical and plant engineering. Companies are able to use OPC UA to map both the device and the skill descriptions of their products. Device and skill descriptions are described in defined specifications, the OPC UA Companion Specifications.

An OPC UA Companion Specification is an information model suitable for all manufacturers which represents the real interfaces between components, machines and systems. With a specific OPC UA Companion Specification, a new machine can be easily integrated into a system because standardized device and skill information are described by all manufacturers in the same way. The standardized device and skill information includes the name of the manufacturer, the device type, and process data such as temperatures, pressures, feed speeds and cycle times.

The principle is similar to the well-known USB standard. Smartphones, printers and peripheral devices can be easily connected to the computer through the USB standard. Basis of the USB standard is also the standardized device and skill information. Smartphones, printers and peripheral devices independently provide details on their manufacturer's name, the device type and their capabilities.

### **Manuals and information sheets will be replaced in the future**

OPC UA Companion Specifications will replace manuals and information sheets in the future. To date, manuals and information sheets have been the basis for manually adapting the control programs during the commissioning and conversion of machines and systems. In addition to the manual adaptation, the information contained in manuals and information sheets differs from manufacturer to manufacturer. Both of these reasons hinder the cross-company interoperability and hamper the successful implementation of Industrie 4.0.

The mechanical and plant engineering companies are pursuing the clear objectives with the development of OPC UA Companion Specifications: Once the components, machines and systems will be able to provide independent information regarding their own device and skill information, regardless of the manufacturer, application scenarios such as Plug & Work in production will be conceivable. In addition to Plug & Work, fieldbus-independent condition monitoring of the components and machines and predictive maintenance can be derived as direct benefits for the industry.

### **VDMA implements OPC UA**

VDMA's main strength is the development of safety standards and mechanical standardization for components, machines and systems. A further field of standardization is added with the interface standardization in OPC UA Companion Specifications.

The focus on the OPC UA interface standard also provides new challenges for VDMA's standardization activities. The biggest challenge is to ensure the coherence of the OPC UA Companion Specifications. Only with coherent interface standards can the interoperability of the components, machines and systems in production ultimately be assured. Here, VDMA is acting on behalf of the entire mechanical and plant engineering industry. Seven of the 52 sectors represented within VDMA are in the process of describing specific interfaces in OPC UA Companion Specifications in a way that is independent of the manufacturer. And at least six further sectors will follow - with even more yet to come. OPC UA has also become a strategically important topic in many other management and working groups within VDMA. ■

### **Further Information**

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