Industrie 4.0: The Industrie 4.0 Component

The Industrie 4.0 component describes principles of Industrie 4.0. It supports enterprises and developers who aim to implement hardware or software for Industrie 4.0. It is the first model based on the Reference Architectural Model RAMI 4.0.

The Industrie 4.0 Component

The Industrie 4.0 component is a model for describing in more detail the properties of cyber-physical systems – real objects in a production environment networked with virtual objects and processes. Hardware and software components in production environments, from production systems and machines to the modules within machines, become Industrie 4.0-capable by satisfying such properties.

One property is the ability of real objects to communicate and the associated data and functions. Thus, the model describes prerequisites for Industrie 4.0-compliant communication between distinct hardware and software components in production environments. For an example see the adjacent figure.

An important prerequisite is that an Industrie 4.0 component collects all relevant data throughout its entire life cycle in an electronic and secure container carried by the component and that it provides these data to enterprises participating in the value-adding process. In the model such a container is referred to as an “administration shell”.

The Administration Shell

All relevant data of a hardware or software component in a production environment, e.g. a machine, comprise the component’s virtual mapping, which is stored in the administration shell. This allows completely new possibilities for networked manufacturing.

The Industrie 4.0 Component

Contact:
Gunther Koschnick
Managing Director
Automation Division
Phone: +49 69 6302-318
E-mail: koschnick@zvei.org
Version: 1.0
April 2015
Author:
Dr. Michael Hoffmeister
Festo AG & Co. KG

Source: Plattform Industrie 4.0

* = Interface/ data format Industrie 4.0-compliant designed
Consequently this creates benefits for all enterprises participating in the value-adding process. These benefits can be described as follows:

**Data**
An Industrie 4.0 component’s administration shell contains a vast amount of data and information provided by manufacturers such as CAD data, connection diagrams, manuals, etc. System integrators and operators of factories and facilities can add important information concerning maintenance or connection to other hardware or software components. Platform Industrie 4.0 defines data security measures and ensures that data availability, confidentiality and integrity are safeguarded.

**Functions**
The administration shell also provides certain functions. These comprise e.g. (project) planning, configuration, operation, maintenance and complex functions of business logic.

**Services**
Data and functions are available within the component itself, within an enterprise network or even in the cloud. The benefit is that information has to be stored only once and can be provided transparently via IT services to any user or in any use case.

**Integration**
Horizontal and vertical integration is facilitated by combining Industrie 4.0-compliant communication protocols and the administration shell concept.

**Seamless Information Flow**
Ultimately, all information is seamlessly available for engineering as well as operation and maintenance.

**Modularity**
In order for Industrie 4.0 to be successful, it is crucial that information not only on whole machines, but also on the specific parts and components, be stored in the administration shell. For example, the quality of certain machine functions is determined by properties of electrical axes. Therefore, these properties are also to be recorded by central maintenance systems. In automation the same is true when it comes to product components that do not possess a data interface of their own. A terminal block, for example, carries information in its administration shell about what was connected to it, when and why. Every part thus becomes a smart part within networked production.

**Benefit for Enterprises**

- Data stored in the administration shell can be expanded as desired. Vendors and system integrators can implement smart services by creating new information, information models and technical functions. In this way information can be provided to many users within an information network like the Internet. This will make the smart factory a reality.

- Enterprises use the Industrie 4.0 component to develop hardware and software components ready for Industrie 4.0.

Further Information:
For more details on Industrie 4.0 please visit our website www.zvei.org/industrie40
VDI-Statusreport Industrie 4.0 is available online at http://www.vdi.de