Enabler for Industry 4.0 concepts

Data-based services such as predictive maintenance will become increasingly important in the future. But many processes based on data are still pure theory. Aucotec recently showed, together with the University of Magdeburg, how a plant can communicate with its digital twin. Prerequisites are a cross-disciplinary data model and a universal language standard.

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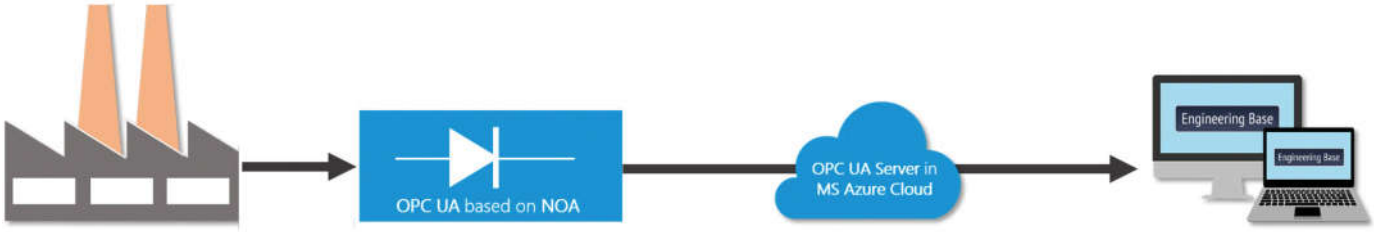
Technology-based business models are still state-of-the-art. In the future, however, they will decline and be replaced by digital services. Today, digital platforms are finding their way into business processes and enable comprehensive management from development and design to ordering, manufacturing and logistics. The digital transformation and thus the networking of processes and objects can become a decisive competitive advantage for industrial companies.

Up-to-date plant data are essential

In order to further expand and use data-based platforms in engineering, up-to-date plant data and real-time communication are essential. Let's take a look at services such as predictive maintenance or full-service business models in which the product is no longer the compressor, but the available compressed air, keyword energy efficiency. Web services of this kind are only possible with reliable data and their accessibility and analysis. Most of the plants currently in operation, however, still date from the 20th century and have since been converted and expanded many times. Accordingly, many documentations look outdated. But where does the current plant data that makes such services possible come from?

The Namur principle NOA in engineering creates the conditions for digitalized processes



Digitally is not enough

The prerequisite for IoT-compliant use of the current engineering data is always that they are available "24/7" in a central data model. Not in containers of data management systems, not in files of different, discipline-specific engineering tools nor in PDF, let alone paper plans. Just as a navigation device does not know what to do with a PDFed city map because it cannot extract one-way street or traffic jam information from it, engineering data must also be separately "get-at-able" and interpretable, across disciplines. This is because the representation of a pump in a P&ID (Piping & Instrumentation Diagram) is not a digital twin without associated loops and without navigability up to its last terminal in the cabinet, but only a small part of it – and in the event of a malfunction, where seconds can be important, not worth much.

After the update is before the update

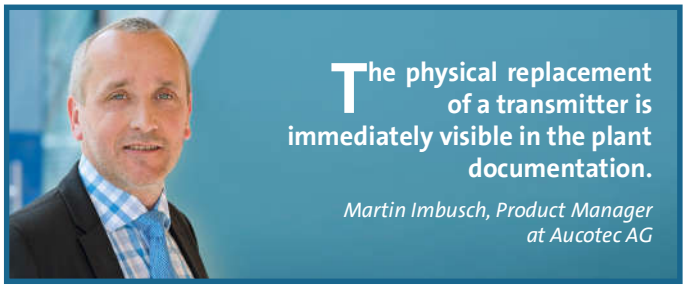
The platform Engineering Base (EB) of the system developer Aucotec is based on such a comprehensive data model as single source of truth for all disciplines of plant design. It thus represents the highest level of digitization and is an enabler for Industry 4.0 concepts for all aspects of the operation of machines, plants and mobile systems, in short for everything that can be configured with EB. Aucotec has also developed a solution for the digitization of older systems that transfers, enriches and updates existing data to EB via mapping and configuration. But as soon as the documentation of a plant is up to date, it runs the risk of becoming out of date again, because change is a sure constant in the course of a plant's life. So Aucotec focuses on maintenance support. Service specialists can now use mobile devices on site to transfer their changes directly to EB via an app. But in cooperation with the Institute for Automation and Communication (ifak) at Otto-von-Guericke University in Magdeburg, Aucotec went one step further: in a user case presented for the first time at the Namur Annual General Meeting at the end of 2018, the plant itself "spoke" to the documentation and informed EB directly about the physical changes made by a service professional.

Leave it to the plant

"Automated updating of plant documentation" was the name given to one of four use cases presented at the Namur Annual General Meeting in a workshop on the practical use of Namur Open Architecture (NOA). It illustrated how engineering benefits from the neutral OPC-UA format (Open Platform Communications/Unified Architecture) based on NOA. In a live demonstration with video switching into the plant, the initiator of the use case, Prof. Dr. Christian Diedrich from ifak, together with Aucotec product manager Martin Imbusch, demonstrated how the physical replacement of a transmitter is directly reflected in the plant documentation. The practical example was based on the test facility of the Interessengemeinschaft Regelwerke Technik (IGR) in the Industriepark Höchst. Ifak, Aucotec AG and IGR had jointly developed the example for the presentation.

Web connection and continuous change documentation

"The EB cooperative platform is predestined to communicate with a plant not only because of its understanding of OPC-UA and its web connection," explains Martin Imbusch. "The versatile data model also automatically displays the modification of a real object in the plant in all its documented representations, such as P&ID, circuit diagram, bill of materials, etc." In addition, EB makes it possible to track who changed what and when via the data tracking function and history display.



The plant informs, EB documents

For the live demonstration, the IGR plant was connected to Aucotec's cloud via its OPC-UA server. EB received the live data of the plant at definable intervals via the so-called data diode, which only has read access to the plant and only communicates in one direction. In EB's data model, after the replacement, at each location displaying the sensor in some form, the information on the change appeared. So every processor in every discipline knows immediately whether and what consequences need to be drawn: for example, adapting wiring, updating specification sheets or creating new revision statuses.

"This is a dream come true for operators," says the product manager. The plant automatically reports changes to its as-built status and the documentation always, i.e. 24/7, shows the latest status – without redlining, without paper, without manual transmissions. This makes maintenance and conversion work considerably easier and clearer. "The digital twin does not remain a snapshot. EB is the first system that can permanently maintain twin status," stresses Imbusch.

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