

PRESS RELEASE

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Intelligent data for the digital factory

Standardized interfaces ensure efficient communication between the machines

Frankfurt am Main, 31. January 2025 – The more intelligently a company uses data, the greater the profit. It is not only international software companies such as Google, Meta and Microsoft that know this, but also companies in the manufacturing industry. Smart data networking creates the greatest added value. For this reason, interface standards that ensure cross-manufacturer communication between machines and the smooth exchange of measurement results in the factory are increasingly coming into focus. How do you get the most out of the data? The answers to this key question will be provided at the EMO Hannover 2025 from September 22 to 26. At the world's leading trade fair for production technology, visitors can familiarize themselves with the latest trends in industrial production under the motto "Innovate Manufacturing".

Each machine generates huge amounts of data. It used to be considered a by-product, but today it is an indispensable raw material that can be used to

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make production more efficient. In this way, manufacturing companies can secure a decisive competitive advantage even in times of a shortage of skilled labor and high international competitive pressure. Smart data utilization may also reduce emissions and increase the sustainability of production in order to meet increasing regulatory challenges.

The global language of production

However, data can only be utilized optimally if there is barrier-free communication between the machines. Such a "global language of production" in a networked factory is made possible by the open interface standard OPC UA (Open Platform Communications Unified Architecture). OPC UA, on which the universal interface *umati* (Universal Machine Technology Interface) is based, guarantees the interoperability of machines and systems that can be linked and reconfigured as required using Plug & Work – regardless of platform and manufacturer.

"OPC UA allows for the interoperability between a wide range of machines and systems, regardless of the manufacturer," confirms Heiko Wenzel-Schinzer, Chief Digital Officer (CDO) of the measurement technology specialists Wenzel Group, based in the Franconian town of Wiesthal. "This creates the basis for fully networked production, in which measurement results can flow directly into the process control. The advantage: Reduced sources of error, faster reaction times in the event of deviations and increased efficiency in production."

Recognizing trends and patterns

Smooth data exchange makes statistical analyses possible in order to identify trends or patterns in the data and derive insights for the optimization of production processes. One specific application for this is the monitoring of tool

wear in production. Continuous measurement and data analysis mean that deviations in product quality can be detected at an early stage. "This data flows directly into statistical models that provide precise predictions about the optimum time to replace a tool – reducing downtime and material waste," explains Wenzel-Schinzer, who, in addition to his position as CDO of the Wenzel Group also holds a professorship in BWL, Business Consulting and Process Management at the Department of Economics and Information Sciences at Merseburg University of Applied Sciences.

However, there are a few hurdles to overcome in order for the work with the machine data to deliver targeted results. "A key challenge is the harmonization of data formats and protocols to ensure cross-manufacturer interoperability," says Wenzel-Schinzer. Added to this is the secure handling of sensitive data in a networked environment, particularly with regard to cyber security. In addition, the integration of standards such as OPC UA requires close cooperation between various industry players. "This is where the associations come into play," according to the Chief Digital Officer of the Wenzel Group, which is exhibiting coordinate measuring machines and gear measuring machines, among others, at the EMO.

Another specific application example is the closed loop between measuring machines and systems at the gear specialist Klingelberg, which is based in Hückeswagen in the Bergisches Land region of Germany. Alexander Troska, Head of Software Development at Klingelberg, describes the process as follows: "The grinding machine produces gears of the desired quality. Results gradually start to deviate from parameters due to tool wear. Our precision measuring machines are used to carry out regular measurements on workpieces that have just been manufactured, to identify trends and initiate countermeasures."

Low- and high-frequency

"On the Klingelberg gear grinding machines, a large amount of data is recorded, low-frequency status data, high-frequency control data and process settings. "We combine this machine-related data with measurement and test results from the gears in the GearEngine, Klingelberg's own platform," adds Daniel Meuris, Head of Digitalization and Visualization at Klingelberg. This data integration could then provide extensive knowledge on cause-and-effect relationships when analyzing quality problems.

In order to achieve optimum results, extensive knowledge of the entire manufacturing and measuring process is required, explains Jan Häger, Head of Software Development for Precision Measuring Centers at Klingelberg. "Each workpiece has its own requirements in terms of quality, cycle and set-up time. Experience and knowledge of the different manufacturing processes help when analyzing the data," says Häger. However, artificial intelligence, such as machine learning, is also already being used.

Standardization guarantees compatibility

Here too, the focus is on smooth data exchange between production machines and measurement technology. In the past, Klingelberg mainly used proprietary formats, some of which have become established as industry standards. Today, Klingelberg, which will be showing visitors to EMO cylindrical gear grinding machines, cylindrical gear rolling testing machines for determining the causes of gear noise and precision measuring centers with hybrid measuring technology, is consistently switching to standard interfaces such as OPC UAati. "These help us and the customer to keep the interfaces compatible in the long term," says Häger.

Artificial intelligence or the digital twin are set to make great leaps forward in this context. "Artificial intelligence and digital twins will make production in digital factories much more efficient in the future," Troska is convinced. By creating virtual images of real systems, processes can be optimized and potential problems can be identified at an early stage. "AI-supported systems allow for precise quality control and autonomous production. This results in more efficient, more flexible and more intelligent factories that can adapt quickly to changing market conditions," says Troska.

A head start thanks to OPC UA

Do cross-manufacturer data exchange and analysis in the factory offer a competitive advantage, especially when comparing European with North American and Asian suppliers? Daniel Meuris, the digitalization expert at Klingelberg, says that there is a strong focus on MQTT, an open network protocol for machine-to-machine communication, especially for comprehensive data exchange in the North American region. "OPC UA is more in demand in other parts of the world. With OPC UA, we can better serve the various requirements in the world from Europe," says Meuris.

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Background

EMO Hannover 2025 – the world's leading trade fair for production technology

Under the motto *Innovate Manufacturing*, EMO will showcase the entire metalworking value chain from September 22 to 26, 2025. These are cutting and forming machine tools, manufacturing systems, precision tools, automated material flow, computer technology, industrial electronics and accessories. EMO takes place in a sequence of "Hanover – Hanover – Milan" every two years and will celebrate its 50th anniversary in 2025. Most recently in 2023, more than 1800 exhibitors attracted a good 92,000 visitors from all over the world to Hanover. As the most important platform for metalworking worldwide, the event stands for **innovation**; EMO is a source of inspiration and a global leader when it comes to new products, manufacturing solutions and services. **Internationality**: International market leaders from 45 countries exhibit at EMO. The trade visitors come from all major customer industries such as mechanical and plant engineering, the automotive industry and its suppliers, aerospace technology, precision mechanics and optics, shipbuilding, medical technology, tool and mold making, steel and lightweight construction, and from around 140 countries. **Inspiration**: No other trade fair presents the full breadth and depth of international manufacturing technology like EMO. Exhibitors and visitors with a high level of expertise discuss the megatrends in manufacturing, exchange ideas with representatives of international production research and develop solutions to existing challenges. **The future of metalworking**: *Innovate Manufacturing* remains a constant challenge for the industry. EMO points the way to the limitless possibilities of industrial manufacturing.

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