

OPC UA UMATI: MORE THAN JUST ANOTHER DATA INTERFACE

Integrated communication is the linchpin of Industry 4.0 processes. And it can only be achieved if all the systems and machines involved speak the same language everywhere in the world. OPC Unified Architecture (OPC UA) is just such a standard and is now integrated into Klingelberg machine tools.

Compact

OPC UA Key Technology

The OPC UA platform-independent communication standard provides solutions for core challenges of Industry 4.0, including top priorities such as data security and standardized information exchange. The OPC UA is a standard promoted worldwide by the OPC Foundation, which boast over 470 members.

For more information, visit:
<https://opcfoundation.org/about/opc-technologies/opc-ua/>



One of the key promises of Industry 4.0 is integrated communication – from the individual sensor, to the machine level, all the way to data integration in the ERP (Enterprise-Resource-Planning) system at the corporate level. Given the wide array of protocols and interface descriptions, however, it has been difficult to achieve this level of integration until now. This presents considerable challenges for operators and production machine suppliers.

Each player must grapple with a veritable “species-rich zoo” of existing and new IT technologies and protocols, and this jeopardizes the sustainability of these approaches in an Industry 4.0 future. The effort required for service and maintenance will increase – and it will become more and more difficult in the future to adapt these technologies and protocols to suit current information and communication technology requirements, such as data throughput, data security and open data readiness. Commissioning new systems and integrating them into existing

IT systems is also becoming an increasingly complex undertaking. To ensure that the exciting future of Industry 4.0 can be fully developed, machine manufacturers and operators should set a common objective: take control of the IT interfaces in their machines.

The OPC UA Standard: a Beacon of Hope

A look at available IT technologies quickly reveals the international manufacturer- and platform-independent OPC Unified Architecture (OPC UA) communication standard. In the morass of conflicting interests outlined above, OPC UA is a beacon of hope, in that it provides a valuable framework for industrial interoperability, from the individual sensor to the entire plant. OPC UA serves as a standardized software solution across all levels of the automation pyramid, without neglecting the specific characteristics of any one supplier or system. As such, this standard fits in perfectly with the philosophy behind Klingelberg’s Closed Loop and GearEngine®.

Probably the most exciting feature of OPC UA is its ability to offer extensible information models that do more than just provide simple bits and bytes. Instead, they include a complete description (semantics) of the totality of features and characteristics and the significance of data. Thus machines in the new cyber-physical OPC UA world can understand quickly and easily, without requiring a discussion about memory area in dedicated control units. There is no longer a need to adapt data interfaces for specific machines. The machine is more quickly integrated into its IT environment.

Of course, to ensure the easiest possible integration into production for specific industries, a common information model is desirable for a specific class of machines. This type of OPC UA standard, known as a companion specification, has recently become available for machine tools.

umati: the Machine Tools Standard

Spearheaded by VDW (the German Machine Tool Builders' Association), umati (universal machine tool interface) was established as an OPC UA information model for all types of machine tools. Because umati is guaranteed to be capable of integrating into every IT landscape, it makes a valuable contribution to the success of each individual Industry 4.0 strategy.

The key feature of umati is its standardized semantics for machine status data. This includes:

- A quick overview of ongoing production
- Current production orders and job data
- An overview of errors, alarms, faults
- Machine status, operating states
- Identification of machines
- Statistical evaluations
- Evaluations of total plant effectiveness
- Tool management

OPC UA is steadily gaining in importance and is considered a key technology for tomorrow's production. For this reason,

Klingelberg has gradually been implementing this interface on its machines (see figure 1). An OPC UA server makes data from the numerical control unit and Klingelberg's operator software available on the machine. This is done through two information models. General status information flows through the first of these using the umati specification. The second one, a Klingelberg information model, is just as easily queried and carries Klingelberg-specific information to SmartTooling or Closed Loop.

Helping to Shape the Future

With a view to the GearEngine® initiative, integration of OPC UA is the next logical step toward achieving total data integration within the Klingelberg production system. That is why Klingelberg is involved in defining the future evolution of this interface as a member of a VDW working group. The aim is to provide a sustainable, modern Industry 4.0 solution from Klingelberg that customers can continue to rely on. Customers will fully benefit from the advantages of an open standard as soon as the machine tools are upgraded to include this interface. umati makes it easy to link Klingelberg machines to the customers' IT landscape. As a result, Industry 4.0 projects can be executed faster and more efficiently. ◆

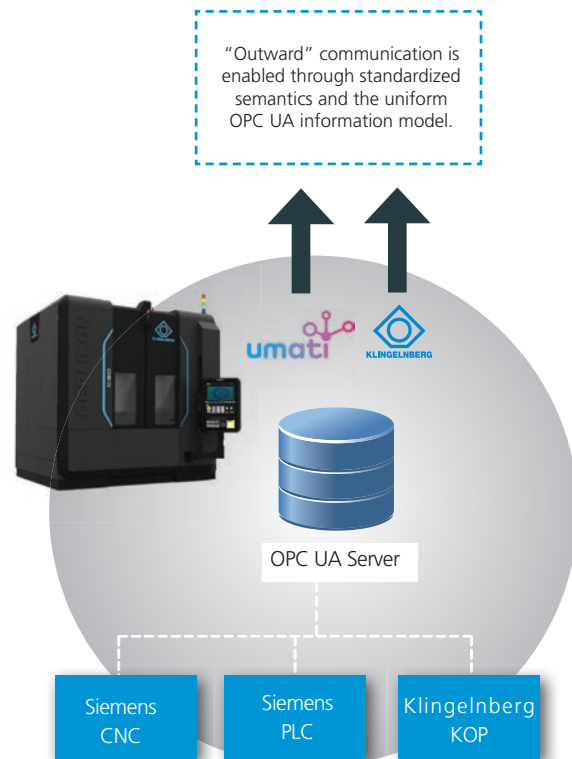


Fig. 1: Principle architecture of the Klingelberg OPC UA umati interface

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