OPC UA: New communication and information platform covering all levels from production to ERP

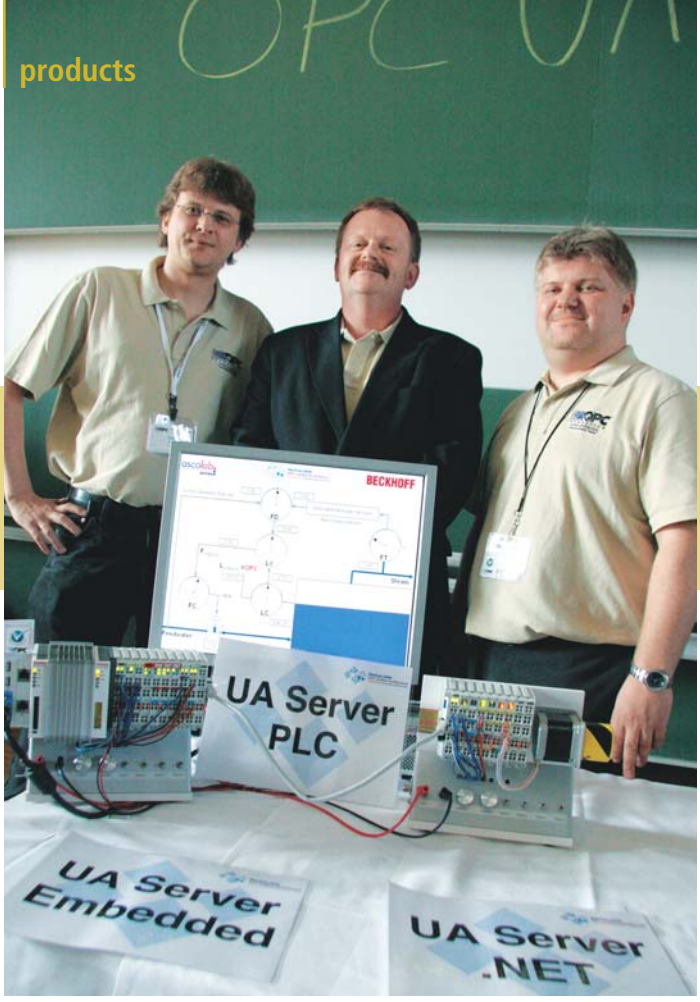
OPC Unified Architecture

OPC is an established and recognized standard for data exchange in manufacturing and process automation. A total of 400 companies and organizations have come together in the OPC Foundation with the aim of maintaining this standard and developing it further.

In time for the 10th anniversary of the OPC Foundation, the new "Unified Architecture" specification is creating the basis for a new communication and information platform. Tom Burke, president of the OPC Foundation, commented on the background of the new standard: "The further development of the specification was driven by new requirements and was the logical step for solving future challenges." Originally, the focus of OPC was more on data exchange between visualization and control applications. Meanwhile OPC is used at all levels from production to ERP. This resulted in additional challenges relating to scalability, network capability, platform independence and access security. Further requirements include an integrated data model for the "DA/AE/HDA" and "Command" OPC specifications and a consistent mechanism for access to structures and elements within this information model.

Towards the end of 2003, a team was formed and tasked with accommodating these new requirements and developing a modern specification. The result is the lean "OPC UA Base Service" transport layer offering access to higher-level "OPC devices" based on a small number of basic services. In addition to two transport routes, "WebService for HTTP" or "UA-TCP" (port 4840), a distinction is made between two types of data coding ("XML" or "binary data"). Higher-level information layers describe the type of information that can be transported. Examples are OPC information models such as DataAccess, Alarm&Event, HistoricalData and Command. Other organizations such as PLCopen, MIMOSA and OMAC can contribute their own extensions or information models to the UA while using accepted OPC communication technology as a basis. The EDDL and ISA95 organizations have actively contributed to the development of the OPC UA, specifically regarding the definition of online information exchange.

The current state of UA activities was illustrated at the European OPC-DevCon conference held between 10 and 12 October 2006 in Munich/Germany. In front of an audience of 250 international delegates, the UA team presented the technical details and introduced migration paths for previously COM-based OPC interfaces. The first UA server implementations on non-Windows systems were demonstrated. In a live demonstration Beckhoff presented a first prototype of an UA server integrated in the CX1020 Embedded PC under Windows XP Embedded with access to the TwinCAT PLC.



In a live presentation at OPC-DevCon, Stefan Hoppe (Program Manager for HMI and System Connectivity at Beckhoff and member of the OPC European Steering Committee), Tom Burke (president of the OPC) and Matthias Damm (AscoLab) demonstrated the functionality of OPC UA on different hardware and software platforms. Several OPC UA clients were already able to access the CX1020 from Beckhoff with UA server integration.

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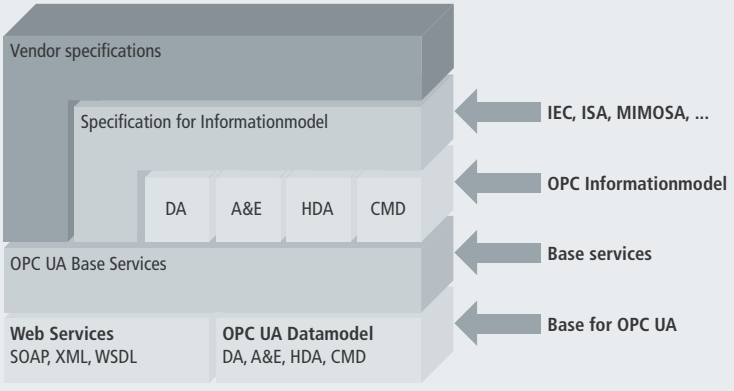
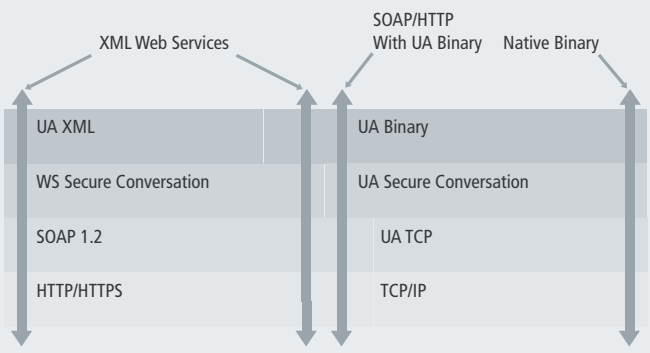


Certain basic UA services enable access to the OPC information models.



The TCP and HTTP transport layers are used for platform-independent data exchange.
The UA design enables secure data communication via a security layer.