Gearing up for rapid application development using OPC UA

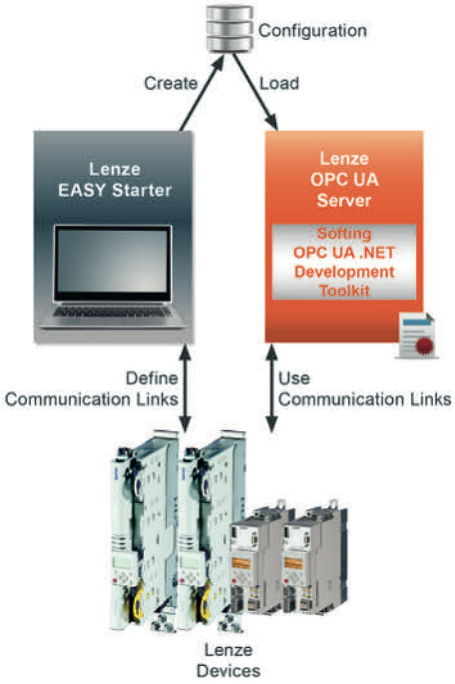
Instead of developing an OPC UA Server as an all-proprietary solution, new development toolkit technology provides generic data exchange using encapsulated libraries which can be integrated into the application through a standard programming interface, reducing complexity and dramatically reducing time-to-market.

THE OPC CLASSIC STANDARD has been used, in the past, to effectively enable access to device data for external applications. However, as this standard no longer covers advanced requirements, companies such as Lenze are now opting for the development of an OPC UA server.

Lenze is one of the global specialists for drive and automation solutions in mechanical engineering. Its comprehensive portfolio of drive solutions, complete automation systems, engineering tools, modular software, and one-stop services forms the basis, making the implementation, production, and application of technical equipment as easy as possible for the customer. This is greatly aided by the use of open standards and interfaces.

The EASY Starter development tool from Lenze combines the functionalities for quick and easy device commissioning and for device maintenance by service technicians.

A GUI with a restricted number of buttons enables easy parameterization, commissioning, and online diagnosis of all Lenze devices, including control systems. What is more, EASY Starter allows loading of entire applications onto a device. The EASY Starter enables integration of various communication links via Ethernet, fieldbus systems, and the USB interface. This tool further comprises the logic used for the detection of Lenze devices and for the selection of an appropriate device description as well as specific methods for accessing device features.



SOURCE: SOFTING/LENZE

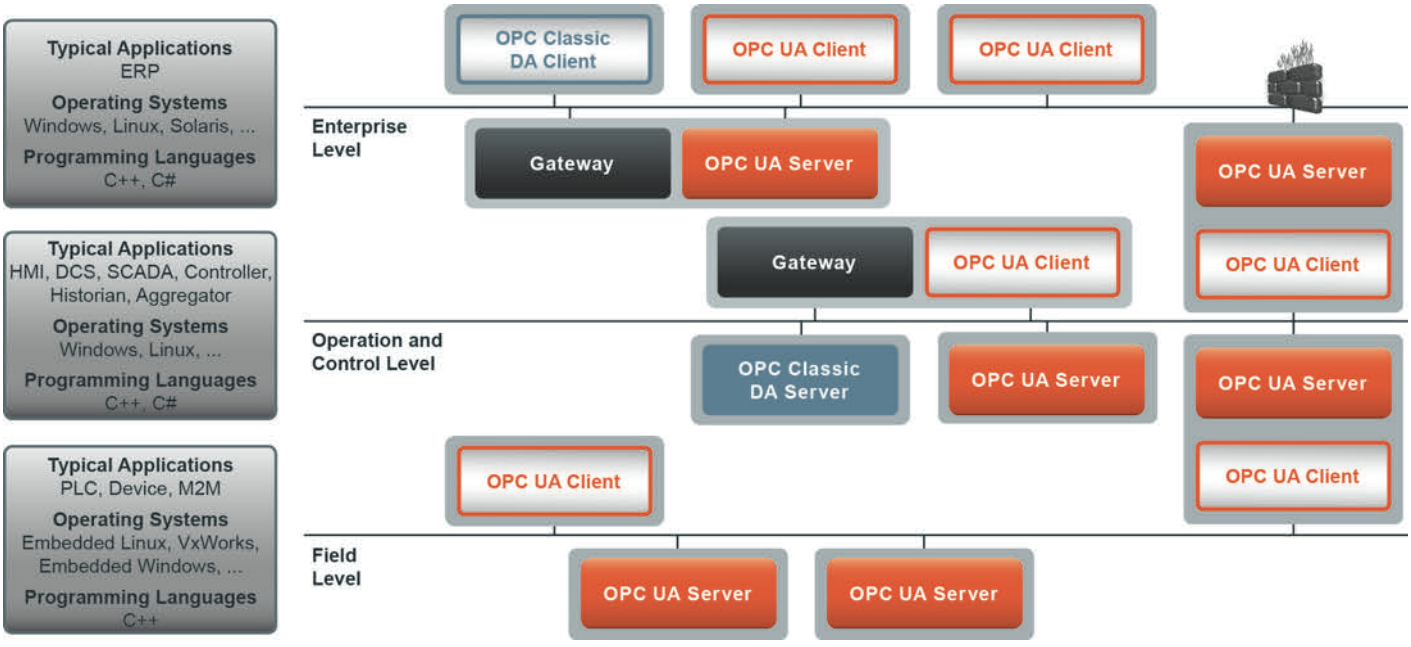
OPC UA Server integrates with the "EASY Starter" tool.

Migrating to OPC UA

In line with the basic Lenze principle, users access the Lenze device parameters using third-party software. For this purpose, a standardized, secure, and future-oriented interface is used which is not bound to particular fieldbuses and platforms. In the past, this was the job of the Lenze drive server operating on the basis of the OPC Classic standard.

This server, which uses Microsoft's COM technology, encapsulates the communication protocols used and provides the device parameters to other automation applications such as visualization systems. However, the COM technology is aging and its maintenance is a tedious task. In addition, this standard no longer covers modern requirements, such as the implementation of security features.

In their quest for a future-proof solution approach that replaces OPC Classic, Lenze investigated the OPC UA (Unified Architecture) standard. Besides the supported functionality, the evaluation focused on performance aspects, as it was important that especially the time-critical requirements could be



SOURCE: SOFTING/LENZE

OPC UA supports a consistent data exchange between the field and enterprise levels.

covered. But also the comprehensive security concept, the Internet-based communication, the potential use on embedded platforms, and the fact that the Industrie 4.0 requirements are covered spoke in favor of the OPC UA standard. After careful consideration, Lenze opted for the development of an OPC UA Server.

Choosing the appropriate toolkit

As an alternative to developing the OPC UA Server as an all-proprietary solution, an OPC development toolkit lends itself to this task. The toolkit provides the generic data exchange functionality in the form of encapsulated libraries which can be integrated into the application through a programming interface.

Using this approach, it is possible to save one man-year of software development effort or more which, in turn, allows for a dramatically reduced time-to-market. To benefit from these advantages, Lenze opted for the UPC UA .NET development toolkit from Softing Industrial Automation.

Two more criteria contributed to the decision. Softing's toolkit supports the .NET environment as used by Lenze in their EASY Starter tool, which simplifies the development process. Softing also offered a workshop aimed at giving the Lenze employees extensive training on how to use the OPC UA development toolkit for their server development.

Softing's OPC UA .NET Development Toolkit provided Lenze with a comfortable and properly documented programming interface for the application. The libraries it contains are state-of-the-art with respect to the OPC specifications and fully conform with the standards to provide optimum interoperability with other OPC UA components. The OPC UA profiles supported by the toolkit include UA Extended Security, Data Access, Complex Data, Eventing, and UA Historical Access. Currently, Lenze only uses Data Access.

This profile also provides for the realization of integrated security systems that enable secure data transmission to remote locations and reliable protection from modern threats. The toolkit comes with complex test and simulation clients and servers for fast development.

Access devices using OPC UA

When developing the OPC UA Server, Lenze relied on the sample applications and tutorials delivered with the toolkit, in combination with the hands-on practice gained from the Softing training course. This way, the EASY Starter interfaces could be linked quickly with the toolkit interfaces.

When the integration into the EASY Starter is complete, the users benefit from functionality for using the device information in other applications. The first step is to configure the OPC UA Server within the existing, basic user interface. For this purpose, an online connection is established to all devices which should be accessible through the OPC UA Server.

This involves selecting the communication paths used and searching for the connected devices or addressing them manually. After saving the configuration and launching the OPC UA Server, a connection to the configured devices is established, identifying each station, and assigning the associated device description.

The result is that the object directory or the parameter list of a connected device is known and available to other devices throughout the system. The configured system is available in a tree structure on the OPC UA Server, enabling access to each parameter from an OPC UA Client via a unique path.

Convincing application results

The implementation of the OPC UA Server and the release for series production could be accommodated within the usual bi-annual release planning. An additional benefit for Lenze in this process was Softing's short response times for questions. During the implementation, the OPC UA test clients that came with the toolkit were available for functionality and performance testing.

Today, Lenze operates the OPC UA Server as a future-proof interface for the access to the Lenze devices for parameterization tasks. The fact that it supports the OPC UA standard allows the platform-independent and secure use of remote maintenance and visualization applications. Several customers relate this option to Lenze's innovative potential and future-orientation, leading to a positive perception of the company. This spawned several inquiries that already resulted in new customer contacts.

Off-the-shelf or proprietary?

For many standard platforms, turnkey OPC servers available on the market are intended for large-scale use and usually only cover common requirements. With the use of an OPC toolkit, on the other hand, fast implementation of customized OPC solutions is possible without being compelled to delve too deep into the OPC technology.

This way, specific requirements can be met and individual communication protocols can be integrated. Other advantages of this function library are related to its versatile application. They include benefits such as increased quality and robustness as well as improved efficiency and performance resulting from ongoing product maintenance. The certification by OPC Foundation test labs and the participation in annual interoperability tests with other products also add to these advantages.

*Technology report by **Softing.***