ARC VIEW

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Kepware Communication Solutions Help Optimize OPC Connectivity

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Overview

Attaining connectivity and communications between products and solutions at all levels of the organization remains a challenge for all manufacturers and other industrial enterprises. Given an appropriate business case, most enterprises today are not averse to replacing existing legacy products, systems, and software with new state-of-the art solutions. However, in many cases, rather than wholesale technology replacement, these enterprises will opt to simply add incremental technology, creating the need to connect and establish appropriate communications between the new products, systems, or software and the legacy technology from multiple vendors that was installed in the 1990s, 1980s, or earlier.

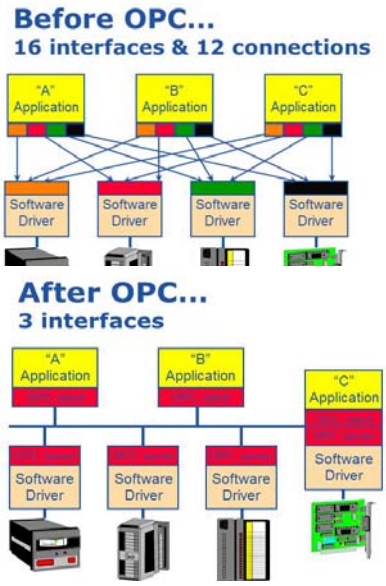
In the 17 years since it was formed, the OPC Foundation has been developing standards and components that promote interoperability between multiple technology providers. Kepware Technologies offers a variety of OPC-based products that provide connectivity and communications solutions within and between all levels of a manufacturing enterprise.

Thus, the manufacturers must find a way to not only establish interoperability between the plant floor and enterprise, but also to link multiple variations and generations of enterprise and automation products. To address these issues, the OPC Foundation has developed standards and components that promote interoperability between multiple technology providers.

Kepware Technologies recently updated ARC Advisory Group on the current status of OPC within the industry and the company's various OPC-based products designed to provide connectivity and communications solutions within and between all levels of a manufacturing enterprise.

The OPC Foundation and How It Began with OPC-DA

The OPC Foundation is the community for interoperability solutions based on OPC communication specifications that deliver near-universal, open product connectivity. The Foundation's mission is to advance the development, adoption and certification of OPC products. Initially, it focused on developing a standard interface for data and information acquisition between software applications in plant floor systems and the multitude of devices on the plant floor. This benefited automation suppliers and end users alike who no longer had to contend with a myriad of troublesome, hard to maintain custom interfaces or drivers.



OPC-DA Benefits

In 1996, the Foundation released its first specification, OPC Data Access (DA), for data exchange between devices, PLCs, and Windows applications. All "classic" OPC specifications were based on Microsoft's client/server technology of the day, Object Linking and Embedding (OLE), which was used to share information between applications using vendor-specified interfaces and rules. Microsoft rebranded OLE as Component Object Model (COM), which is the core of DCOM (Distributed COM) and the basis for the OPC standardized communication interfaces. With strong support from Microsoft, the OPC Foundation created an industrial equivalent of Microsoft's printer-driver architecture. This design allows an OPC device driver in a PC host to communicate with a variety of industrial devices. The resulting OPC-DA specification is still widely deployed today in a large number of Microsoft-based PC server and client applications from a broad base of HMI and automation suppliers.

OPC Foundation Addresses Alarms and Events (A&E)

Users in industrial plants also need to generalize the management, collection and acknowledgement of alarm and event sources. In an automated environment, certain characteristics of a process need to be monitored for abnormal conditions. When an abnormal condition occurs, the appropriate personnel or systems must be notified so that the proper corrective measures can be taken. The OPC Alarms and Events (A&E) specification is similar to the original OPC-DA specification, except that the A&E specification addresses real-time alarm and event data as opposed to real-time process control data. Released in 1999, the OPC A&E specification provides

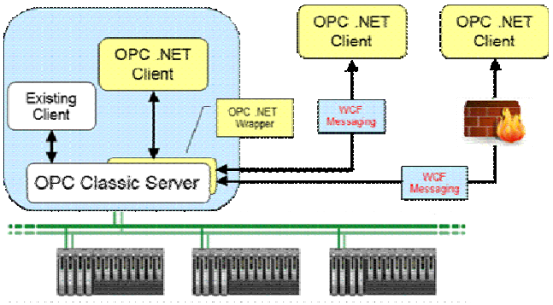
a common communication interface for transferring real-time alarm and event data in the process control environment.

OPC Foundation's Solution to Historical Data Access (HDA)

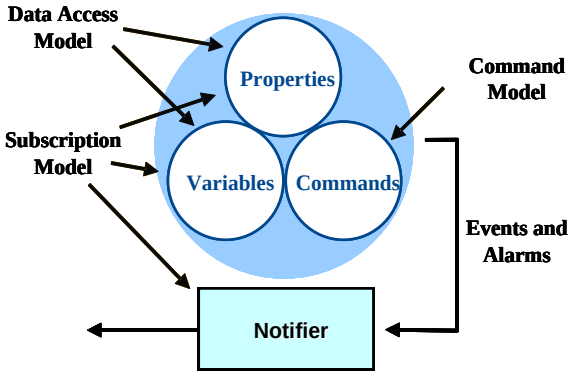
Users in industrial environments also need to generalize the collection and management of historical data. OPC Historical Data Access (HDA), introduced in 2001, provides an interoperable platform to store and exchange historical process data. OPC-HDA historians range from simple trend data servers, to more complex data compression, analysis, and storage servers. The OPC-HDA specification is widely deployed today.

OPC.Net Evolves from OPC-Xi

The Foundation just introduced OPC.NET 4.0 (formerly known as OPC Express Interface, or Xi, which was originally introduced in 2009) to bridge the gap between Microsoft.NET and the Microsoft-focused OPC Classic products (OPC-DA, OPC-A&E, and OPC-HDA). OPC.NET 4.0 is the result of collaboration among several OPC vendor companies to provide a simple .NET interface and to allow client applications to use the .NET features to access existing OPC Classic servers. OPC.NET 4.0 provides a secure, firewall-friendly connection to applications, giving users more flexibility to access plant data remotely from smart phones or handheld computers. OPC.NET is backwards compatible with OPC servers and may be used in the same system as OPC DCOM-based clients and servers. OPC.NET clients and servers offer basic platform-independent SOAP/XML Web Service interfaces. OPC.NET clients and servers could be written for non-Microsoft platforms using these Web Service interfaces.



OPC.NET Configuration



OPC-UA's Object Model

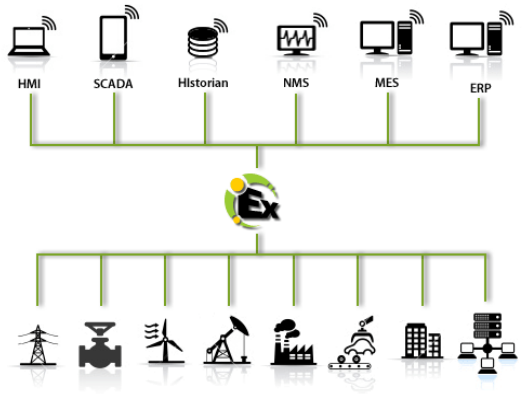
OPC-UA Connects the Rest of the Enterprise

The OPC Foundation's next phase was to expand its reach beyond data access, defining additional standards that can help convert data into information and connect plant devices and systems that may or not be outside a firewall with the enterprise. OPC Unified Architecture (UA), initially introduced in 2006, is the series of specifications

that embodies the OPC Foundation's vision of providing secure, reliable interoperability for moving data and information from the plant floor to the enterprise. OPC-UA is intended to leverage Web Services to integrate the existing OPC specifications with current automation and IT technology and applications, whether based on Microsoft or other platforms.

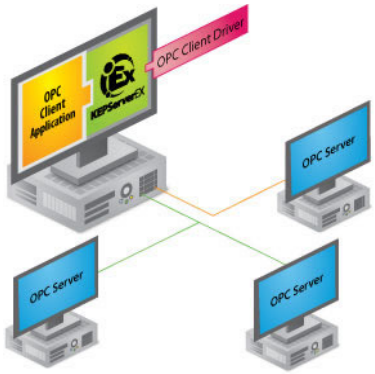
Kepware Technologies Helps Deploy OPC Solutions

Kepware Technologies was established in 1995, the same year as the OPC Foundation. The company offers a wide range of communication and interoperability software solutions for the automation industry, including many solutions that leverage OPC technology. These are based on its KEPServerEX Communications Platform. KEPServerEX is a flexible and scalable solution for connecting, managing, monitoring, and controlling diverse automation devices and software applications. Communications is managed through a platform that supports an array of open standards, including (but not limited to) OPC.



KEPServerEX Communications Platform

KEPServerEX provides connectivity and supports many OPC client server technologies. The OPC-DA Client Driver and OPC Server KEPServerEX connect disparate third-party OPC-DA servers to client applications, including HMI/SCADA, historian, MES, ERP, and custom applications. As a result, users can manage their operations through a single OPC Server. The product is used to move real-time data from PLCs, DCSs, and other control devices to HMIs and other display clients.



KEPServerEX OPC Client Driver

OPC-A&E provides alarm and event notifications on demand. Kepware's Alarms and Events plug-in for KEPServerEX enables OPC-A&E clients to receive and monitor process alarms, operator actions, informational messages and tracking/auditing messages. Users can monitor areas of a process that require operator attention when defined thresholds are met, such as event detection, abnormal situations, and equipment safety limits. The Alarms and Events plug-in can also be used to identify faulty equipment, create maintenance work orders, improve operators' effectiveness, collect and record alarm and event information for audits to use with other historical data.

For OPC-UA, KEPServerEX is itself an OPC-UA server. KEPServerEX also supports a UA Client driver which allows the product to aggregate data from other OPC-UA servers. Kepware's OPC Client Driver allows data aggregation from third-party OPC-UA servers and any other data that KEPServerEX may be monitoring. KEPServerEX can also act as a gateway by converting existing OPC-DA servers to OPC-UA servers, or enabling OPC-DA clients to connect to OPC-UA data sources.

The KEPServerEX OPC-UA Client Driver and OPC-UA Server provide an OPC tunneling solution for remote connectivity to OPC applications. Here, the OPC-UA Client Driver provides a communications tunnel between two or more computers. This eliminates reliance on Microsoft COM and DCOM technology and provides higher performance and deterministic failure modes. Kepware's OPC Tunneler uses client/server architecture to transfer data over an intranet, the Internet, or a WAN. It also creates a secure OPC tunnel through firewalls and complements existing OPC-DA applications.

Conclusion

Collaborative manufacturing environments require that manufacturers connect plant floor production systems with multiple enterprise domains. As manufacturers develop factory architectures that define the interfaces of the manufacturing domains, they should include standard communication specifications, such as OPC, as an integral component of their architecture to help ensure interoperability. ARC believes that Kepware's KEPServerEX Communications Platform is well-suited to provide manufacturers with OPC data connectivity and communications solutions within and between all levels of a manufacturing enterprise.

Challenges for OPC and Kepware Technologies include placing a strong focus on expanding the awareness of the use of OPC's Unified Architecture and Web Services as a secure, reliable method to increase manufacturing visibility and connectivity of disparate devices across the enterprise. This can be achieved through documenting case studies which demonstrate metrics-based success stories.

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