

OLE for Process Control

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This article describes aspects of a process control system for both continuous and batch applications that bridges the application gap between programmable controllers (PLCs) and small distributed control systems (DCSs). However, unlike PLC/PC systems, which have multiple databases that must be married, this system uses a single global database and a "cutting edge" data integration that includes the first released product based on the OPC (OLE for Process Control) specification.

OPC makes "plug and play" software a reality - allowing different applications written in different languages running on different platforms to share information among field, plant, and business applications such as, for example, Microsoft Excel.

Object linking and embedding

Many users of Microsoft's Office package are familiar with the benefits of OLE without necessarily being aware of the terminology.

In the past, most integrated office suites only offered simple copy and paste - allowing users to copy information from one document or application and paste the information, at the appropriate point. In a second document, the major draw-back of the procedure was that if the original information changed, the procedure had to be continually repeated in order to keep the second documents current. The second drawback was the need to remember the application that created the information and where the files had been put.

One option that overcomes these drawbacks is to create a link between the two files. Now, whenever the data in the source file changes, this change is immediately reflected in all other applications using that data. This is termed dynamic data exchange (DDE).

Another option is to embed the information into the destination document and use the source application's tools to update the information. The source application can either be launched from within the destination document - with a separate window appearing with the source application showing the information to edit - or the application tools can be embedded.

In this latter option, when a user selects the object to edit, the menu and toolbar change to the source application but the user remains within the document and can see the surrounding text or data. This kind of sharing is termed Object Linking and Embedding (OLE) in which an 'object' can be text, a chart, table, picture, equation, or any other form of information that is created and edited - usually within an application other than the source application.

The major difference between linking and embedding is that linked (DDE) information is stored in the source document. Thus, the destination contains only a code that supplies the name and location of the source application, document and the portion of the document. Embedded (OLE) information, on the other hand, is stored in the destination document and the code associated with OLE points to a source application rather than a file.

OLE for Process Control

OLE is a communication standard based on Microsoft's OLE technology that fosters greater interoperability between automation/control applications, field systems/devices, and business/office applications- OPC defines standard objects, methods, and properties built on OLE technologies for servers of real-time information like DCS, PLCs, historian, and other software applications, and communicates the information they contain to standard OLE-enabled clients.

OPC is based on Microsoft's OLE environment and thus requires the OLE 'COM' technology to be present in the operating system. The OLE 'COM' technology is currently available on Microsoft's NT operating system, and Windows 95 operating system.

However, in order to fully leverage the advantages of OLE for process control and automation applications, extensions are needed in order to provide users of automation and control equipment with better assurance of interoperability. For example, it is quite likely that two applications, both claiming OLE/COM-awareness, might actually support very different OLE aspects and, therefore, not be interoperable.

OLE for Process Control (OPC) defines standard objects, methods, and properties for meeting the interoperability requirements of real time process automation applications. These requirements include a standard technique for addressing information contained in process control devices/systems, efficient transfer of data from a process device to an application, the ability for a client to use several servers simultaneously, and server-specific configuration support.

OPC and fieldbus standards

While most fieldbus efforts focus on providing secure communications among field devices, the focus of OPC is on providing communications between applications, and between field devices and applications. In this regard, therefore, OPC compliments fieldbus standardisation efforts.

The Fieldbus Foundation, for example, is focused primarily on providing a standard that provides secure communications among field devices. In addition, the Fieldbus Foundation is providing Fieldbus Messaging Services (FMS), that are used to integrate field devices to three device-support applications: System Management, Device Definition and Function Block Service applications. These three fieldbus applications use FMS to communicate up and down the H1 or H2 fieldbus network. However, there is currently no standardised Application Programming Interface (API) above the Function Block Services defined by the Fieldbus Foundation.

Here, the OPC Task Force uses OLE/COM technology to fill in this void by specifying objects, methods, and properties - allowing the integration of many applications to each other as well as integrating many applications to field devices.

DDE vs OPC

<i>DDE</i>	<i>OPC</i>
Passes one value per request	Can pass multiple values per request
No time stamp	Time stamp standard part of response
No 'quality' flag or indication of data	Quality indication standard part of response
No underlying structure similar to OLE	Based on OLE/COM structure
Does not support OLE Automation	Supports OLE Automation

Table 1 helps to clarify the differences between DDE and OPC.

An open standard

The OPC standard is in the public domain and available to anyone who wishes to use it, A copy of the standard is posted on the Microsoft FTP server so that it is readily accessible to the user/vendor community.

References

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Resume

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