

Enterprise Integration: Connecting the Control Center to the Enterprise

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In any organization the key to being competitive is good information - accurate, complete, on time, interpretable. This is especially true in the process industries, where companies have seen the value of extending critical, real-time data beyond the engineers in the control center or factory floor to other departments in the enterprise. A purchasing manager, for example, may want to monitor inventory levels of process resources from the same real-time database and graphics used by batch mixers. Or, the accounting department may want to run certain plant data through a third party application that specializes in "what-if?" scenarios. The question is not whether to make a plant's operational data accessible to the enterprise, but which technologies to use.

Historically, software development companies who provide off-the-shelf or turnkey solutions for managing real-time command and control applications have not taken into account the needs of the enterprise away from the operator stations. For example, many applications are built around a two-tier client/server technology consisting of a client application for handling both the logic and the graphical user interface, and a server application for delivering data to and from a database. With limitations, this architecture can be extended to the enterprise by installing the client software on the appropriate desktops throughout the organization and using the local area network to connect to the back end application. Unfortunately, the clients in this case are typically very heavy weight applications that require high-end hardware and, therefore, this approach is typically not cost effective. Yet, today it does provide many managers with tremendous insight into their factories that would not otherwise be available.

Some organizations with big budgets opt to completely replace their existing applications with new software designed for enterprise use, or else to extend an existing application by adding more components. For many process control companies, however, the big price tags and lost productivity associated with these approaches make them unfeasible. As a result, many software development companies have created software packages that extend the existing client/server applications to the Internet/intranet to provide enterprise data access. In some cases, these are specific tools that only work with the software vendors' traditional client/server architecture, and in other cases the tools can be used to augment almost any database-driven application.

With access to the corporate intranet now commonplace, many software companies are providing tools that tap into the database of the control room application and extract data for delivery over an intranet. While this is usually a very cost-effective method for putting raw data on desktops throughout the enterprise, the data is typically displayed

only in textual format, such as in a spreadsheet, and the luxury of a dynamic graphical user interface does not exist. Additionally, this type of data bridge usually bypasses most of the features of the original command and control application and presents a “view only” screen.

In many cases, companies can extend the functionality of their systems by using add-on components supplied by the original software development company. For instance, some components leverage existing client/server architectures by providing access to the logic within the system, and not just the data. In these applications, an Internet is still the medium for delivering the data, but either Java or ActiveX is used to provide a solid graphical user interface for interaction. The resulting client applications have much of the same appearance and functionality of the operator consoles.

For those who are not tied to an existing application, there are more complete solutions that address the needs of distributing information throughout the enterprise. In general, having access to data solves only a part of the problem -- being able to integrate that data with other applications is a vital piece of the total solution. Other business units must not only be able to access data from the control room, but see that it is easily processed by other third party applications specific to the needs of that particular user or department. This describes a truly open system based on standard protocols. With the introduction of Enterprise Java Beans (EJB), this type of application is suddenly a viable alternative and, for this reason, most software development companies are adopting this new technology.

A framework built around EJB technology solves many of the problems inherent in distributing useful information throughout the enterprise. An N-tier architecture can be easily developed which would allow for the use of a “thin client”. This thin client application would support all the functionality of the control room application but would not require high performance hardware on the desktop. The middle tiers of the application would support business logic and act as a layer between the thin client and the back end servers. With the middle tiers built around EJB, connectivity to many other applications would be possible. Indeed, as long as the other applications support common protocols such as CORBA or RMI, communication with other applications will be standard.

In the past, these technologies were either too immature or too expensive to provide real-time, dynamic data to each desktop in the company. With the recent advancements in Internet/intranet access and the Java programming language, many of the barriers to enterprise information access have been removed. Using these newer technologies, software development companies can now provide tools that allow virtually any organization to get the most out of their real-time data.

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