CHANGE TO OPEN

As open systems begin to move from dream to reality, Jackie Roskilly looks at their benefits for industry and explains the essentials of the architecture.

There seems to be no formal definition for open systems, but the objective is clear—freedom and choice. Freedom and choice for the user, the manufacturing enterprise which wants and needs what open systems promise to deliver: one standard easy-to-use interface across all applications; one common set of data for all to share and access as necessary; the most appropriate hardware platform for each site or subsidiary; a cohesive system which meets the local needs within a global architecture. The list of benefits goes on—security of data, vast cost-savings, flexibility to meet changing needs into the future. While the benefits seem clear, few manufacturers today have implemented such a system and there still seems to be a significant number who are not yet convinced.

Certainly, implementing an open systems strategy is not simple; like everything facing manufacturing industry today the process of change is not an easy one.

All manufacturers know about the pressures facing the industry—global competition, an uncertain economy and more discerning customers. These pressures demand shorter time to market for our products together with higher quality and even better value for money. However, actually achieving these more quickly and cost-effectively than our competitors is not easy, it requires radical change and a certain amount of pain.

The one constant facing all manufacturing industry in the next decade is change—continual change. Change in infrastructures, change in business processes and change in the business systems that underpin them. Flexibility is the key to all of these. If organisational structures keep changing and business processes are continually re-engineered then the systems supporting these will need to be adaptable as well. Only open systems can provide this flexibility.

Essentials

What, then, are the essential elements in pursuing an open systems strategy?

First, it is important to realise that all aspects of computing are involved—hardware, operating systems, networks, application software and communications. If the goals of freedom and choice are to be achieved, then all elements of the architecture must be interchangeable. Certain fundamentals are:

- portability—the same software, both database and application software, must run, without change, on different machines, from different vendors;
- interoperability—any machine should connect to any other machine and provide integration across the enterprise;
- scalability—this will allow you to run the same software on the most appropriate size and power of machine across different operations.

Relational technology is vital to achieving these. Relational databases (RDBMS) provide a common set of data which is easily accessible within a standard software environment. More than that, they allow an organisation to integrate a wide variety of hardware, even from different vendors, into one heterogeneous system. This means that the application software can run in exactly the same way on a personal computer (PC) as it does on a large Unix machine, so that the smallest subsidiary in a far flung corner of the world can operate to the same standards as the head office in Europe, the USA or even Asia!

Clearly, this has benefits in sharing data, operating to common practices and the consolidation of financial information. As the software is no longer intrinsically linked to the hardware, when a faster, cheaper machine becomes available, the software will run in just the same way on the new machine as on the old one. In the not too distant
future, the same applications will run on a massively parallel processing computer with the ability to deliver mainframe level power at the cost of PC power.

The flexibility of new applications built with open systems technology gives an organisation the ability to change, adapt and reconfigure the software as necessary, build new functionality and easily integrate it with the existing applications. Another key aspect which gives the necessary flexibility of software is fourth generation tools which use the widely accepted industry standard SQL to allow for easy modifications and additions to applications. Increasingly, computer aided software engineering (CASE) is becoming an important element of any new system build. New functionality and easily integrate it with the existing applications. Another key aspect which gives the necessary flexibility of software is fourth generation tools which use the widely accepted industry standard SQL to allow for easy modifications and additions to applications. Increasingly, computer aided software engineering (CASE) is becoming an important element of any new system build. New functionality and easily integrate it with the existing applications.

Also, in integrating with existing application packages, open interfaces are an important element of any new system strategy.

Client/server

Open systems bring together the benefits of both the centralised and decentralised approach. The power of a centralised system with all the additional advantages of the desk-top environment. The key to this is that data is held in a relational database and so is accessible much more easily than in a hierarchical database. The user can find, manipulate and report on information within a simple to use graphical user interface (GUI). The move from host-based, centralised systems to client/server technology provides the basis for this.

There are three key parts to client/server:

- the presentation layer, or user interface, which resides on the client which is usually a PC or workstation;
- the application layer, such as inventory control, manufacturing management and so on, where part of the application may reside on the client and the rest on the server;
- the database, which is the repository for all the data. Currently, the database is likely to be centralised on the server, but over the next few years it will become totally distributed across different servers and clients.

Client/server technology provides a standard user interface across all applications and simple to use systems where accessing data is fast and easy.

Business

Protection of investment is a major benefit of open systems. The biggest investment in any system is the expensive brainpower which goes into building and configuring the applications and it is important to protect this investment. However desirable it may be to throw everything away and start again, it is not always practical. Very often, for a period at least, the old must be able to co-exist with the new. It may well be imperative that new, usually Unix-based systems can interoperate with existing mainframe or proprietary systems. However, the emphasis should always be on developing the new systems and not bolstering the old ones.

Open systems are a vital component in the business systems of the future and fundamental to enterprise resource planning (ERP) which is fast becoming recognised as the next generation business system from MRP II. ERP is a system architecture which encompasses not only the internal, but also the external, requirements. Although it is a relatively new concept, in fact it is an extension of the same principles which lie behind concurrent engineering. This concept brought together prototypers and designers, marketing and sales, and production all working together to shrink the time-to-market on a product. ERP will work in the same way.

To support the new business processes which are inherent in ERP requires a new generation of application software; just putting old systems on new technology will not solve the business problem. If the core code is ten or 20 years old then the software, although it is functionally rich, has met the end of its life and will be unable to take advantage of the full benefits of the new technology both today and over the next decade.

Way forward

The Gartner Group advises on a number of items which need to be considered when identifying vendors that can help you achieve your open systems strategy. Among them are key technology pre-requisites for the package software: GUI, SQL calls to a relational database, 4GL and/or CASE, built on a client/server architecture, integrated software and database.

Functionally, support for hybrid manufacturing (both process and discrete) is key, as is the ability to stimulate the effect of an order throughout the enterprise. Internal integration between all areas is fundamental, but external integration to customers and suppliers via electronic data interchange (EDI) is also critical. Is the vendor investing significantly in the development of its applications, is it core to its business? Will it be around in five or ten years' time and does it have global support of a global product?

Certainly, the change is not easy. It will take some time for the new technology-based systems to catch up with the functionality of the more mature systems, although a number of leading manufacturers are already realising major benefits from the open systems approach. One thing is certain, the change will have to happen and how long can you really afford to wait?

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