

The Evolution of Edgeware

“**Edgeware**” is the next evolutionary step in Information and Communications Technology (ICT) that brings businesses closer to ubiquitous computing and real time visibility of logistics.



To explain this, we need to take a brief look at the evolutionary nature of computers, particularly from a Business application or *Enterprise Software* perspective.

Business (and many other) applications of computers rely on synchronising computer processes and databases with actual events and transactions generated within the Enterprise, such as: data entry of customer details, sales order placement, accounts queries, stock movements and receipt of payments, etc.

There is a delay between when these business events actually occurred (eg. sales order placement) and when the data is entered into the system and resulting actions required (eg. generation of purchase orders, shipping, etc). This delay causes many of the supply chain issues we encounter today.

Networks have extended the reach of computers to enable operators to interact with the computer system within the office complex.

The **Internet** allows Enterprise Software to be connected to computer systems anywhere in the world and provides the foundation for which collaboration within the supply chain can be achieved.

With the advent of **wireless** and **mobile** computers, the reach of the Enterprise Software continue to be extended, and with these technologies, beyond the wall of the Enterprise to the point where the data is generated or captured (eg. mobile computer for remote order entry).

Considerable investment has gone into the development and operation of such Business systems, especially in software. In many cases it is easier to extend the core system with the addition of application specific software, typically called “**middleware**”, to enhance functionality.

Middleware provides a way of increasing the functionality of Business Systems while still keeping the core investment; noting that it is not practical to rewrite software every time new functionality is required. In many Enterprise Software systems, provisions are made for the interchange of data between it and other applications (including middleware) via Application Program Interfaces (API's).

Middleware typically synchronises other business applications automatically which would have normally been done via data entry. For example Electronic Data Interchange (EDI) enables disparate computers between different Enterprises to electronically transfer business transactions eg. purchase orders and shipment details.

With the growing complexities, sophistication and volume of Business Systems and transactions, evolution continued with the introduction of **Automatic Identification** devices like barcoding and optical character recognition Systems. Such devices helped improve the efficiency and effectiveness of data entry.

Edgeware is the next evolutionary growth of computer applications in extending the reach of the Enterprise system. Edgeware represents the hardware and middleware that extends the Enterprise System to the physical world at the "edge" of enterprise where logistical and environmental monitoring and control occurs. Here data capture devices like Radio Frequency Identifications (RFID) readers and tags, barcode readers, sensors (eg. temperature, proximity etc) and actuators (ie. for control) are used.

Similar in concept to a Supervisory Control and Data Acquisition (SCADA) system, which provides real world monitoring and control of production processes, Edgeware provides real time automatic data acquisition of logistical data to Enterprises Software. For example, a SCADA system would control and monitor the manufacturing process of a product, while Edgeware would monitor and control the logistics.

In many cases, the Enterprise Software will not have the necessary capability to communicate with, or control, the data capture devices. In these cases, middleware, as part of an Edgeware solution, will generally be added to the Enterprise Software to provide the necessary interface.

Middleware may also provide additional business logic functions which the Enterprise Software may not be able to perform. A good example of this is an RFID System in a warehousing environment. Here a fixed RFID reader may be placed over a door to read all pallets passing through it. RFID readers constantly poll the antenna, resulting in multiple readings of the same RFID tag. Middleware would filter this data to generate a list of single valid RFID tag numbers before it is presented to the Enterprise System.

Edgeware will play an important role in the future of ubiquitous systems as it enables Enterprise Software to sense and interact with the real world. Especially with the introduction of RFID and wireless sensors, the challenge is going to be how to manage these devices to collect and process data and collaborate with other systems.

This will lead to the next evolutionary phase: **intelligence**. Once Edgeware systems are in place to provide logistics monitoring and control, Intelligent Software will evolve to sense our movements and demands, anticipate our needs and adjust our supply and communicate our instructions automatically. But this story is for another time.