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NETWORK-CENTRIC IT ARCHITECTURES

A NEW IT MODEL FOR BANKS - OBJECTS, THIN CLIENTS, AND MIDDLEWARE

Managing IT is a severe challenge for most financial institutions, especially large, well established groups which have invested substantially in old fashioned, so-called "legacy" systems. Three problems are particularly vexing:

- ❖ Systems maintenance. Big legacy systems contain tens of millions of lines of computer code written in old computer languages such as Cobol. Maintaining these systems – simply keeping them going – consumes vast resources, leaving little effort free to develop new systems to support new business opportunities. The huge investment currently devoted to fixing the "Year 2,000 problem" is a case in point.
- ❖ Interoperability. Most users are locked in to proprietary products from IT suppliers which do not easily work with different products from other suppliers. There is a need for more "open" standards.
- ❖ Flexible integration. As IT becomes more pervasive, there is an increasing need to integrate systems serving different functions. But large, highly integrated systems tend to be difficult to change and expand. There is a need for a new, flexible type of systems architecture which can grow with the business and allow components to be swapped in and out as circumstances change.

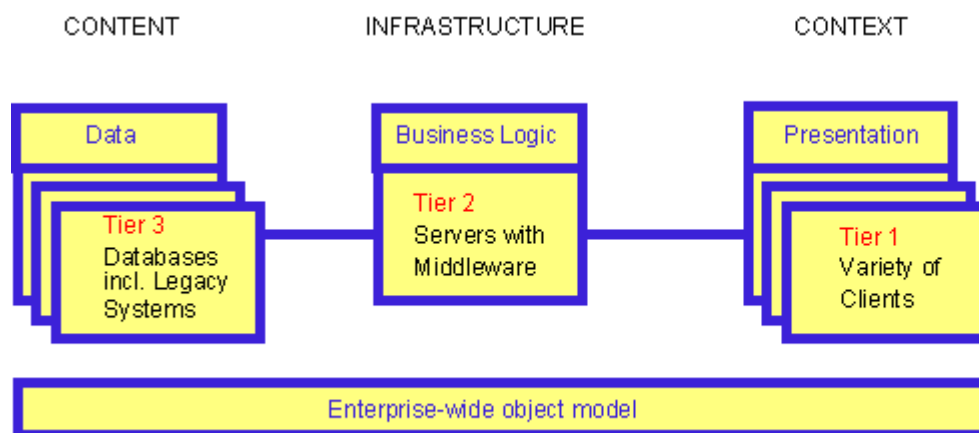
Over the last few years, a several exciting developments in IT have converged to provide potential solutions to these problems:

- ❖ A new type of software based on "objects" promises to solve the systems maintenance problem. Objects are essentially packages of program and data which mirror real objects in the real world. For example we might have an object representing a generic customer and another object representing a balance enquiry transaction. The idea is that a company creates an enterprise-wide "object model" of its business and can then create new systems or modify old ones as the business changes by simply selecting the appropriate objects from a library and bolting them together using standard interfaces.
- ❖ Systems are becoming increasingly "open" through the adoption of standards which allow products from different suppliers to work with each other and to communicate across networks using standard protocols. The Internet and the World Wide Web are the most triumphant examples of this principle. Another example is the "thin client". "Client" is jargon for a PC or terminal used to access a computer system. A "thin client" is a simple, standard client, which downloads appropriate standard software and data from a larger computer known as a "server", only when it needs to do a particular task. Another term for this is "network-centric computing". Considering a typical bank with, say, 100,000 clients in the form of branch terminals and ATMs, the benefits of this approach are substantial. It is no longer necessary to physically visit each device every time the software needs to be updated, the devices themselves are cheaper, and hardware and software can be replaced with standard products from other suppliers without having to change the whole system.
- ❖ "Three-tier client server" architectures build on the simple client/server model by using a middle tier of servers to integrate very large, industry-strength transactional systems into a flexible, easily modifiable whole. At the heart of such systems is a new breed of software called "middleware" which glues the whole architecture together securely, reliably and efficiently, allowing objects to talk to objects and clients to talk to servers in the most appropriate way to serve the business.

Delivery of financial services can be usefully thought of in terms of a "virtual value chain" comprising Content (the product itself, which in banking is largely an information-based resource), Infrastructure (the systems, processes, people and other resources for connecting the content with the customer), and Context (the total customer experience in a particular circumstance). It is interesting to consider how the IT model above supports a financial services value chain. Every component of the value chain is very much dependent on IT:

- ⋮ Content is almost entirely in digital form – managing accounts and customer records would be unthinkable without vast computer systems.
- ⋮ Computer systems and networks form by far the most important part of an institution's Infrastructure , especially delivery systems.
- ⋮ And the Context within which the customer interacts with an institution is increasingly mediated by technology - this is obviously the case with newer delivery channels such as ATMs, call centres and PCs, but even branch transactions are now dependent on sophisticated terminal systems to support tellers, linked to central computer systems by high speed networks.

The new technology model maps remarkably well on to the value chain model, as illustrated below:



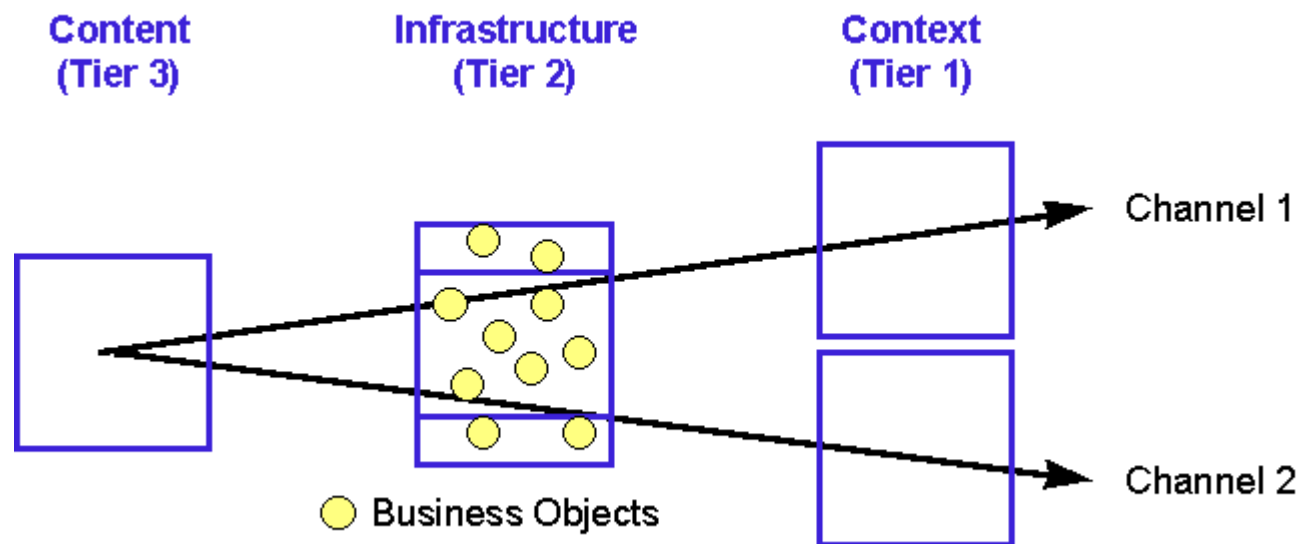
An institution's Content, mainly data, is held on large, mainframe computers at a data centre. For many years to come, these will be old fashioned, legacy systems, but using object technology it is possible to hide the complexity and proprietary nature of these systems by encapsulating them within an "object wrapper" which presents a standard interface to the rest of the architecture.

Each Context – which might be based around a branch terminal, ATM, call centre terminal, kiosk, or PC – is supported by a client, probably a thin client, which is responsible for presenting an easy to use, intuitive interface to the user (either a customer or an agent such as a teller or call centre operator).

The institution's Infrastructure is supported by the whole architecture and by an enterprise-wide object model. By using objects to represent common modules of business logic, and by using middleware to allow all parts of the system to communicate with each other, it is possible to build a highly integrated yet highly flexible system.

Integration of delivery channels is currently a major preoccupation for retail financial institutions, as the number and nature of different delivery channels increases, especially those based on new technologies (eg Internet banking) or new uses of mature technologies (eg telephone banking). The combination of a network-centric IT architecture with a business organised in terms of value chains promises to help us tackle delivery integration in a more logical, cost-effective fashion,

ultimately translating into better customer service, driven by the needs of particular segments of the customer base. Each delivery channel has a distinct Context (Tier 1), but shares common business processes and data with other channels. The sensible approach is therefore to create in the middle tier a generic set of standard objects for the common business processes, of which each distinct type of client uses a sub-set. The data in Tier 3 is even more integrated – a customer will need to access the same personal details and account data irrespective of which channel is used. Thus there is a gradation of integration across the value chain, with high integration of Content, loose integration of Context, and sharing of common elements of infrastructure, thus:



Let's say I use an ATM to transfer funds from my current to my savings account. The system accomplishes this transaction using common objects representing the two types of account and the processes of crediting and debiting those accounts. If I now enter the branch and ask the teller for the balance on my account, he/she uses another type of terminal to access the same shared objects, which interrogate the Tier 3 server database to find out my balance which has been updated in real time as part of the ATM transaction. Now imagine that in the future a new type of delivery channel emerges, say banking via TV. No problem - we simply create a new type of client which uses the same business logic and the same data as other delivery channels.

Of course we have presented a highly simplified account of a very complex subject and glossed over the many technical and management challenges which actually implementing such an architecture will involve. Nevertheless, this type of architecture really does work (at least on a small scale) and several major institutions such as Wells Fargo and Nomura are building just such a system. Over the next few years we are confident that more and more institutions will adopt this approach at that it will become the technology model of choice to support the value chain business model described earlier.

Interested? Please contact Nick Collin on nick@ncollin.demon.co.uk or +44 (0)207 833 8765 with comments or questions.

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