



Europe's Big Banks' Search for High Performance Switching Solutions

Most of us do not like to think we are using out-of-date technology. Most of us would also feel uncomfortable driving a new 2002 registered high performance car powered by an inefficient engine designed in the late 70s.

To some extent Europe's largest bankers are in this position with the components they use to drive their retail POS and ATM switching applications. To put it bluntly, very old technology supports the bodywork of many of Europe's card schemes, ATM switches, authorisers and POS processors. If bankers lifted the bonnet of their switching vehicles many would be very distressed to realise that most of their engines are over 15 years' old.

Why are transaction switches so important to Europe's banking business? Well, they support over 4.6m POS devices and 275,000 ATMs. They move over 60m on-line transactions per day and settle €3.5bn overnight. Failures in these components can cause major outages and reduced services to consumers and merchants. So systems have to be 99.9% reliable, almost totally failsafe and be capable of handling peaks of 500 transactions per second (tps) for the largest operators. However, whilst reliability is vital it's the cost of maintaining high availability that is now focusing the attention of many within the payments' industry. The business and IT units in the largest banks face a technical conundrum, namely, how to modernise and radically reduce switching costs whilst minimising the risks of change.

"So why change?", the pragmatist may say. "If current systems work, don't touch them", and there is some sense in this approach. However, a hands-off philosophy carries some risks.

An old design often means an old programming language (Tandem TAL is an example) which is low level and requires specialist staff to write and maintain. Data structures are complex and files are often flat. Geriatric design also means software is inflexible and cannot be easily modified to keep pace with market changes. Costs can be high. For example, in the UK the annual costs of maintaining ATM and EftPos switching infrastructure is estimated at between €100m - €120m per annum. For the whole of the EU the total cost may exceed €600m-€750m pa. At many banks and interbank companies software development and maintenance teams of 40/75 staff are relatively commonplace.

Modern transaction switching software products, on the other hand have set out to eliminate most of the failings of the traditional switches. Architectures are based on Unix or NT, and use a modular design. Modern relational database structures and object orientated application development tools such as Java, C++

have been used in their construction so modification and change is relatively easy. These products have maintenance costs that can be 20% of their traditional equivalents.

The consequences of a failure to upgrade and modernise can be far reaching and can have business, not just technical and operational impacts. For example, Switch Card Services (SCSL), who support the UK Switch domestic debit card (1.5bn transactions per annum), recently announced a move to the Mastercard/EPI infrastructure after a lengthy and exhaustive search for a new central switching hub. Switch has operated an old style peer-to-peer network designed in 1988/89 which linked each bank to each other. After 10 years it became apparent that this structure could no longer support the 11 Switch member banks. Orchestrating upgrades and changes for chip and the UK's new PIN/CVM environment had become increasingly complex and costly. Eventually Switch members realised that lack of flexibility was disadvantaging them in the marketplace and that they could no longer easily support their domestic product. Switch examined several alternatives including the use of interbank and Third Party Processors (TPPs), however none were able to offer a modern, flexible, well-designed switching solution at very low cost. An in-house switch was also evaluated but Switch's need to support very high volumes was a major constraint. Lack of available solutions forced Switch to rethink its core functions. The result was a decision to migrate to Mastercard processing and the Maestro brand as the only logical basis on which new technology, lower costs and long term continuity could be provided.

Switch's network is only 12 years' old. There are many examples of older switches operating within the UK and mainland Europe. Some predict that Switch's analysis and rationale may be adopted by other European domestic card schemes.

The general perception is that the design base of the average European bank or interbank switch is some 15-20 years. Over 85% of the current platforms used in the UK were installed between 10-15 years ago (see Table 1 below). A high proportion of installations use proprietary switching packages from ACI, S2 and e-Funds. However, several interbank organisations use almost bespoke solutions developed over the past 20 years.

| | ATM | POS | Product | Approx Date Implemented |
|--------------------------------|-----|-----|----------------------------|-------------------------|
| A & L | ✓ | EDS | ACI BASE 24 EDS Bespoke | |
| AIB | ✓ | ✓ | ACI BASE 24 | 1989/90 |
| Abbey National | ✓ | ✓ | S2/ON2 | 1990 |
| TNS | ✓ | | ON2/Postillion | 1990/2002 |
| Barclays/BMS | ✓ | ✓ | ACI BASE 24 | 1987/88 |
| BOI | ✓ | | ACI BASE 24 | 1989/90 |
| BoS | ✓ | | Connex | 1989/90 |
| Euroconex | | ✓ | Compass | 2001 |
| FDR | | ✓ | S2/ON2 FDR Bespoke | Early 90's |
| HSBC | ✓ | ✓ | ACI BASE 24 | 1987/88 |
| Link | ✓ | | e-funds | 1999/90 |
| LTSB | ✓ | | ACI BASE 24 | 1987/88 |
| National Australia Bank | ✓ | | ACI BASE 24 | Mid 90s |
| Nationwide | ✓ | | ACI BASE 24 | 1989/89 |
| RBS/NWB | ✓ | ✓ | Connex | 2002 |
| Ulster Bank | ✓ | ✓ | ACI BASE 24 | 1989/90 |

Table 1 Analysis of Major Bank British Isles Switching Components

It is important to place the current situation in context. The major traditional switch vendors (and several others) were highly innovative when their Tandem and Stratus hardware based products were first launched in the early 80s and mid 80s. Their solutions totally transformed Europe's ATM and POS networks and delivered a technical sophistication never achieved before. More significantly, these founder switches have subsequently proved themselves capable of handling very high processing volumes. Similarly, organisations such as Banksys, developed their own interbank switch platform in the early 80s which was subsequently implemented in Portugal and at other European interbank processors. All these switching platforms have been extensively modified and performance improved despite the age of the core software design.

For example, ACI's core middleware was redesigned and rewritten in the early 1990s and is now part of a new common platform renamed BASE24-es. Their recently announced new "**superscripting**" component is totally modern, is based on open systems architecture and enables users to rapidly change authorisation rules and logic at a much lower cost. BASE24-es is also now offered on IBM z Series, Sun Solaris and HP-NonStop systems reducing the risk and cost associated with hardware platform migration.

However, many will ask why banks and interbank organisations have delayed migrating to new software platforms. Several factors have created this inertia. First, there are few tested modern replacement packages with very high volume processing capability. The switch vendor market divides into two primary groups (see Table 2 below).

| Type | Product | Year Originally Designed | Approx No. EU Users |
|--------------------------------|--------------------------|--------------------------|---------------------|
| Group 1 Traditional | ACI BASE 24 | Early 80s | 50-60 |
| | e-Funds Connex | Mid 80s | 4 – 5 |
| | S2/ON2 | Mid 80s | 16 – 20 |
| Group 2 Modern | Mosaic Postilion | Mid 90s | 15-18 |
| | Oasis IST | Mid 90s | 5 – 6 |
| | Alaric | Late 2000 | Not known |
| | Steria | Early 90s | 15-25 |
| | Iliad/EPS | Late 90s | 4-5 |
| | Nomad Software Cortex | Early 90s | 12 - 15 |

Table 2 Analysis of Major Switch Software Vendor Products

Group 1 are those supplying the traditional monolithic and highly expensive products with a large established base of major banks and interbank companies. Group 2 are the smaller software companies who have developed modern, flexible products that sell at lower prices. This group initially targeted the smaller banks and are now penetrating medium sized institutions. However, as yet no very large European bank or interbank player has implemented a Group 2 switching software platform (to a degree Switch and Mastercard/EPI may be pioneering a concept.) Clearly many banks perceive the risk and costs associated with changing platforms cannot yet be offset by the high costs of continuing with current solutions.

Second, a high proportion of the old technology switches have been extensively modified either by the switch vendors for their customers or by in-house developers at banks and interbank organisations. The result is that the cost of changing platforms will be very complex if the current level of functionality is to continue to be delivered.

The third reason is vendor inertia. The major vendors of traditional software have been slow to develop new products simply because new modern packages sell at prices that are 30% - 40% of the old platforms. More significantly they generate much lower maintenance and support revenues.

Fourth, there are no credible TPPs offering a large bank switching service based on modern flexible software. TPPs are caught in the same technology trap as banks. So far only TNS (UK) and Euroconex offer services based on Group 2 platforms (or the equivalent) and both organisations have (as yet) little experience of handling very high volumes.

However, there is one significant group that has invested heavily in modern systems' technology, namely Mastercard/EPI and Visa. EPI implemented a distributed version of Oasis IST switch in the late 90s to replace its ageing Series 1 solution. Mastercard are now expected to implement a European version of their USA switching hub. Visa have also invested heavily in new infrastructures and are using modern solutions to replace Visanet.

So where do the largest banks and interbank companies go from here? What are the strategic options that can be followed by those with (say) more than 3000 ATMs and/or 50k POS devices? The following paragraphs review five possible routes banks can consider.

First, **Option 1 is Wait and See**, essentially continue as now, make no major change and allow others to test out new concepts.

A summary of the advantages and disadvantages of this approach is as follows:

| Advantages | Disadvantages |
|--|---|
| <ul style="list-style-type: none"> • Low risk • Known suppliers • Maintaining high volume processing capacity • Allow others to pioneer • Many efficiency enhancing add-on products available | <ul style="list-style-type: none"> • Continuing high cost of change • Continuing high support costs • Continued low flexibility • Continued technical complexity • Lack of skilled resources • Slow to market |

Table 3 Advantages and Disadvantages of Option 1 - Wait and See

This is the option chosen by many major banks and interbank companies. Risks are low, cosy supplier relationships continue and transaction growth is met. In addition, there are many low cost add-on products that can enhance traditional switch platforms (Turnstones flat transaction file converter to SQL reporting and Level 4's prototyping and testing tools are good examples) which deliver modern solutions.

However, the downsides are substantial. Very high costs of development and support continue, users protest over long delivery times and slowness to market. Programmers with Tandem language skills are few and technical complexity makes training difficult.

But most major banks are on hold. Better to allow competitors to pioneer concepts and learn from their mistakes. The problem with this strategy is that everyone waits and watches and no decisions are made.

Option 2 is to replace the ageing software with a **modern package**. The advantages and disadvantages of this approach are as follows:

| Advantages | Disadvantages |
|---|---|
| <ul style="list-style-type: none"> • Simple logical approach • Much lower support costs • Flexible software enables change | <ul style="list-style-type: none"> • Untested capacity • Untested products • Relatively high risk project • Major bespoke development |

Table 4 Advantages and Disadvantages of Option 2 – Modern Package Implementation

This option is the most logical solution and in theory should deliver a new modern solution. However, the downside is that (as Switch found) a credible high performance package is not readily available. Many large banks believe that implementation of a Group 2 switching (S2) package is high risk and possibly career threatening. New products are in development and alpha testing by ACI

and S2 expect that by mid 2004 a major banking client will have implemented a substantial ATM and POS population on their new platform.

Large banks thus have a real problem. However, small and medium sized banks are not constrained. Many could gain cost and competitive advantage over the large by moving now to modern platforms.

Option 3 would be to outsource all ATM and POS switching to a Third Party Processor or interbank organisation. This could include organisations such as FDMS, Euroconex, Tsys and several of Europe’s interbank processors. This option offers the following advantages and disadvantages:

| Advantages | Disadvantages |
|---|---|
| <ul style="list-style-type: none"> • Lower operational costs • Lower development costs • Lower management effort | <ul style="list-style-type: none"> • Few credible suppliers yet • Few with both ATM and POS capability • TPP software also old/inflexible • Complexity of migration and bespoke changes |

Table 5 Advantages and Disadvantages of Option 3 – Outsource all ATM and POS Switching

The advantages of this approach are that development and operational costs should fall as a result of sharing a common platform. However, it’s very difficult to identify a credible TPP supplier that can support both ATM and POS and also handle high transaction volumes. Very few offer a modern platform. Migration of a large base of ATM and POS devices would be high risk. So the conclusion is that until a TPP makes a commitment to large bank switching service provision, there are few solutions for major banks in this sector.

Option 4 would involve the sharing of the costs of an existing old generation switch with another bank in a similar manner to that recently proposed by the Bank of Ireland and Allied Irish Banks, or an equivalent concept to the shared paper clearing company formed by LTSB and Barclays Bank. An example at an interbank level is the growing co-operation between Interpay of the Netherlands and Banksys of Belgium which may lead both parties to use Interpay’s recently developed and modern switching platform on a shared basis. The advantages and disadvantages of this approach are as follows:

| Advantages | Disadvantages |
|---|--|
| <ul style="list-style-type: none"> • Substantially lower development and support cost • Substantially lower operational and networking costs • Shared risks and costs • Potential to pool ATM devices | <ul style="list-style-type: none"> • Continuation of use of old technology • High cost of migration • Regulatory approval needed • Potential conflicts with partners |

Table 6 Advantages and Disadvantages of Option 4 – Pooled/Shared Processing

Potentially sharing a switch with another party is a very attractive solution, particularly if three banks co-operate. Both development and operational costs should fall substantially, as well as ATM servicing and support. Banks would also be able to pool their ATMs making major reductions in capital and cash provision

costs. The downsides are the high costs of migration for the bank that closes down its in-house operations. Also there is always the potential for conflict and for very large banks the regulators may not be comfortable with the concept.

Overall this is a very credible option which would be even more attractive if the partners planned to move to a modern platform as a second stage of co-operation.

Option 5 is the final option which would also rely upon a co-operative approach. The proposal would be that the largest banks and interbank bodies would hold a public competition requesting switch vendors to bid to develop a new or upgraded software product that will support very high volume processing. Ideally banks would seek at least two credible suppliers. It can be argued that it would be in banks' interests to part fund the development, given the importance to their businesses of the solution developed.

The advantages and disadvantages of this approach are summarised below:

| Advantages | Disadvantages |
|--|---|
| <ul style="list-style-type: none"> • Clear statement of needs • Shared seedcorn costs • Shared risks of development • Significant market-attractive to vendors • Bespoke solution for largest banks | <ul style="list-style-type: none"> • No focal point for initiative • Wide definitions of requirements • Potential of cost overruns |

Table 7 Advantages and Disadvantages of Option 5 – Interbank Competition

At face value this is an attractive solution. Banks flag clearly that they need a bespoke solution and costs and risks are shared. The market for a very high performance switches is between 20/30 within Europe, more than sufficient to be attractive to the supplier sector. The disadvantages mainly relate to planning and managing such an initiative. There is no European wide co-ordinating body able to take on such a role. Larger banks would again be fearful of regulatory intervention if they co-operate too closely.

On balance this is a workable solution. Group 2 vendors have the most to gain in that they could receive much needed capital to move their product into the big league. Similarly, traditional Group 1 suppliers would be keen to participate and consequently compete because of their need to retain large legacy customer base.

So what do we conclude from this analysis. Europe's largest banks and interbank processors face a real dilemma. The market, members and shareholders are seeking radical reductions in operational costs and want large and costly maintenance and support units to be substantially reduced. To a degree, banks have been badly served by suppliers of high volume switches who have lacked innovation because they perceive that modern technology would damage their businesses.

However, large banks have no clear solutions that are totally without risk. Wait and see means current high costs continue. Implementing a modern switch carries high risk and potential failure to perform. The TPP sector is in a similar situation and few can offer a credible high volume switching platform. Shared processing with a partner has many attractions. Already initiatives are taking

place. Large banks must carefully consider this option (the FM and TPP markets could take the initiative and offer to facilitate such deals.) Finally, a bank competition for vendors to develop high performance solutions is also a feasible, but the concept requires a European focal point.

Clearly Europe's major banks have to orchestrate change. Change will not happen without initiative and investment by the sector. Europe's payment business has to take action soon if the benefits and efficiencies of modern technology are to be realised.

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