



Is a new business and
technology model
required for the ATM
channel?

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Contents

3	Introduction
4	How ATM architecture has stagnated
5	Current business and technology drivers
7	A new model based on open standards
9	A vision of the future
11	Conclusion
11	About Level Four

The automated teller machine (ATM) is a familiar and enduring sight to bank customers looking to access their cash 24 hours per day, seven days a week. In fact for the banks themselves, the business and technology model behind the automated teller machine (ATM) network has remained virtually unchanged for the last 25 years. Ever since 1967, when the very first ATM was installed by Barclays Bank, the ATM's role has indeed primarily been to dispense cash. Of course, today's ATMs can offer various other services such as balance checks and statement requests, but these are little more than peripheral value-adds, exploiting, rather than advancing, the technology that has driven these machines for so long.

It can be argued that the reason that the functionality of the ATM has barely evolved over all this time is actually that the structure of the software which powers it has been allowed to stagnate.

Today's ATM systems are universally architected using a simplistic 'two box' model in which the ATM operates either as a dumb terminal connected to an intelligent host banking application, or as an intelligent client machine connected to a slave host server. Either way, inherent design inflexibilities in the implementation of these two box architectural approaches have come to define the manner in which the ATM and bank communicate.

This makes any customisation of the ATM - be it aesthetically as regards the display, or more fundamentally, the services it provides - an extremely complex, time consuming and expensive proposition. The current two box architectures mean that each unit has to be updated individually and in synchronization to change the service.

Due to the timing and slow evolution of the ATM software market, it is today still clearly dominated by a small number of incumbent suppliers - the ATM manufacturers - who typically supply both the hardware of the ATM and the software that controls it. These closed, proprietary legacy systems are now proving to be a major hurdle to the expansion of ATM usage.

A new wave of services and marketing opportunities

However, as banks focus on extracting revenue from untapped resources, the humble ATM is about to enter a new era of fundamental change. Recently introduced open standards are creating opportunities for banks to seek alternative suppliers for their ATM software. New applications are becoming available at the same time as new distributed processing architectures are unlocking the potential of the networks and increasing the opportunity to interact with other bank systems and third parties.

In this exciting new environment, customers can anticipate a wave of new opportunities when they insert their card into the 'hole in the wall'. Because applications can be created and controlled in network servers rather than individual ATMs, new content can be integrated into the network quickly and inexpensively. New services can be developed and deployed without the need for specialist staff and, because each machine can be configured dynamically, third party processing networks can present different screens and functions to the customer depending on which bank issued their card.

For banks and third party vendors alike, this equates to a huge chunk of as yet untapped marketing opportunity, while for the customer, everything from car hire to last minute travel insurance could be arranged via an ATM.

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How ATM architecture has stagnated

The business and technology model for ATM networks has remained virtually unchanged since these devices were first installed

Proprietary software solutions in the ATM have been provided almost exclusively by the ATM manufacturers

ATMs have connected to banks' central host systems either as dumb terminals or as intelligent client machines

Both approaches adopt a dated and inflexible 'two box' architecture

Where intelligence has been deployed in the ATM, new application software needs to be downloaded to each machine to update the service

1. How ATM architecture has stagnated

It is only recently that the perception of the ATM has started to change. For decades it has been viewed as little more than a practical solution to the problem of providing an essential service outside banking hours and reducing queues at the counter during banking hours. The ATM existed to support and relieve the burden placed on the human teller. It was not considered an important channel in its own right. This simple business logic was representative of banks' strategic thinking at the time, which was dominated by the high street branch as the main channel to customers.

Development was also hindered by the fact that many banks' central accounting systems could not support 24/7 online services. These host mainframes supported online services for the branch teller network during the day and then ran batch accounting updates overnight. High availability front-end processing systems were introduced to overcome this problem and some banks outsourced the support of their ATMs to third party processing networks. Complex proprietary operating systems in these machines encouraged the use of third party supplied switch software (for example ACI's BASE24, Shared Financial's ON/2).

As a result of this reliance on a handful of software suppliers, the only real differentiator between different banks' ATMs came in the shape of the customer interface. Changing the presentation of the interface was in itself a difficult task, and one that was compounded by complex ATM manufacturer-specific codes and logic.

No opportunity or inclination to differentiate

Most early ATMs then were little more than dumb terminals, controlled by non-standardised networks and manufacturers. This meant the banks had little scope to expand the services provided by their ATMs and little inclination to do so either, given the cost involved and their focus on the branch channel.

A minority of more technically advanced banks built their own ATM applications using the ATM manufacturer's software toolkits. In these installations, ATMs were connected directly to the banks' online accounting systems and the service was controlled by a bespoke application within the ATM.

To make the smallest of changes to the way the service was presented required either the modification and distribution of complex data files to ATMs acting as dumb terminals, or the time-consuming updating of software in every ATM. Such procedures are hardly in line with today's banks ambition for rapid response to competition and customer demand. Furthermore, the testing required of any updates to these complex systems has deterred many banks from making major updates to their services.

Reliable is no longer enough

Whatever the approach, banks have become locked into inflexible 'two box' architectures, where the ATM acts as either a 'dumb' device controlled by the central switch or an 'intelligent' client, making requests to a slave host server. These architectures were designed in response to a simple business model using technology and networks available at the time. While they have proven reliable over the years, they are no longer suitable to today's fast changing business climate where flexibility and a rapid response to market demands is a critical factor to continued success.

2. Current business and technology drivers

Despite its limited service offering, the ATM is now the banks' most commonly used customer touch-point (over 1.5 million machines are in operation worldwide) and is a trusted and familiar device on which many people depend. In fact, if a marketing guru were to devise the ideal marketing device, they would probably come up with something that closely resembled the ATM. And yet this vast potential has been virtually untapped to date. Now, the advent of powerful new networks and machines is driving a profound transformation in the role of the ATM and self-service terminals.

New network and operating system technology

As high bandwidth networks become commonplace, allowing huge quantities of data to be relayed in real time, the reliance on outdated software architecture stands as the final hurdle to the development of new ATM functionality.

The withdrawal of support for OS/2 by IBM has recently prompted the adoption of the Microsoft Windows operating system as the corner stone for most ATM software environments. ATM providers such as NCR and Diebold have invested in Microsoft-based solutions, while Wincor Nixdorf also now offers Java based solutions to allow other operating systems to be adopted in future. Interestingly however, these solutions, although implemented using up-to-date technology, still perpetuate the original architectural approach.

Microsoft Windows has introduced new open software standards (XFS) in the ATM allowing more radical software solutions to be provided by third party software specialists. This shift, coupled with the availability of powerful, high bandwidth networks, means that the infrastructure is now in place for banks to implement a fully distributed software architecture in their ATM network.

The IFX message standard

The emergence of the IFX message standard encompasses communications within a wide range of delivery systems (for example, branch terminals, home banking or ATMs) and the support for IFX removes the need for multiple proprietary ATM communication standards - which has acted as an obstacle for too long.

The IFX message protocol - already supported in most of the leading third party switches - assumes intelligence in the network and removes control of the ATMs from the central switch. Banks that have historically built their own ATM applications could migrate their systems to this communications standard, enabling them to use generic tools as part of their solution.

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Current business and technology drivers

The branch is enjoying a resurgence with new self-service machines playing an important role

New card technology

In addition, new card technologies, driven largely by chip-card payment technology mandated by EMV (Europay, MasterCard, Visa) mean that the ATM could provide an array of bespoke services. Indeed, the opportunity for the individual to actually tailor the services on offer when they insert their card into the ATM is well within the bounds of current technology. Using their online banking portal, the customer could highlight which key services they require when they use an ATM.

Marketing and customer service drivers

The current mindset of today's banks is a far cry from the branch-focussed strategy that dominated twenty years ago. Today, internet and telephone banking are considered cheaper, more efficient alternatives to the branch network.

However, the branch is also enjoying a resurgence with new self-service machines playing an important role. And as ATMs have become more widespread - moving beyond the wall outside the branch and into bars, restaurants and convenience stores - the scope for self-service delivery that empowers the customer has increased. But to achieve the delivery of next generation services via the ATM, banks require a more flexible model that allows:

- Personalised ATM services to be dynamically created each time a machine is used
- The provision of individual customer preferences (e.g. service selection options, language, customised dashboard)
- Service presentation to be controlled by non-technical staff
- New content to be created and introduced into the network without the need for data or software updates at the ATM and complex retesting

Moving away from the two box approach

At present, the main obstacle preventing such services is the two box architecture that banks use in their ATM environments. Until recently, banks' ATM environments were still reliant on legacy network technology, operating systems and hardware that had changed little in the past decade. However, the uptake of Windows XP and XP Embedded as support for IBM's legacy OS/2 is withdrawn has been accompanied by more powerful processors within ATMs and more widespread adoption of high-bandwidth IP networks.

According to Retail Banking Research, the share of Windows ATM operating systems in Western Europe grew from 13.5 per cent in 2000 to 46.5 per cent in 2004. With the spread of more functional, enabling technology in their ATM environments, a tipping point has been reached. As the remaining pool of legacy technology shrinks, there is momentum for change. Banks are now at a point where they must seriously consider upgrading their software architecture, as well as their hardware and operating systems, to take full advantage of the service transformation opportunities available to them.

3. A new model based on open standards

To meet the multiple business drivers outlined in section two, banks require an ATM model vastly more flexible than the existing restricted 'two box' architecture. In addition to changes in operating systems, hardware and networks, the development of open standards over the last few years provides further opportunities. Open standards mean banks and third party networks can now seek alternative suppliers for their ATM software, allowing a single software solution to be deployed on any manufacturer's hardware.

Distributed architecture provides a model for the future

Modern tools and high bandwidth networks have transformed the distributed architectural approach from pipe dream to reality. With such a model in place, processing and control can be located within the network where it is required. This solution goes far beyond previously proposed simplistic web based ATMs and self-service terminals.

The IFX messaging standard is critical to this model. The existing ATM transaction authorisation protocols are no longer capable of handling today's functionality. IFX allows the bank or ATM deployer to use the same software applications and supporting infrastructure across several channels. This reduces software development cost, while enabling advanced ATM functions such as personalisation and additional services to be supported and separated from the core transaction logic.

With the IFX definition providing the communication between host and ATM, an encapsulated IFX 'kernel' could reside in each ATM to provide a secure interface to these services. This would allow application services to be contained in network servers rather than in each ATM. These services can execute either within the ATM or the application server, as they are location independent. Customer applications can interact with external customer relationship management (CRM) systems, home banking systems, and external third party systems if necessary to create and deliver a customised service. Within the ATM, requests are made to the IFX 'kernel' to initiate financial transactions with the central switch or host. This approach creates greater flexibility in service presentation to the customer, whilst maintaining a totally secure interface to financial transactions.

Rick DuVall, senior product manager at ACI, explains that the transition to the Microsoft Windows operating system means banks are more likely to employ IFX to take advantage of the new opportunities on offer: "With many ATMs migrating to the Windows platform, the existing two box message architecture was simply not flexible enough. IFX is much more robust in allowing Windows-based ATMs to fully utilise the power that is available to them."

DuVall cites the importance of consumer preference - allowing the customer to establish their own default ATM settings via their online banking service - as a case in point. "Using either Internet banking or via the ATM itself, customers set up preferences regarding the amount of a standard transaction or which account the money is to come from for example." DuVall believes that such a system could cut slash standard ATM transaction times from 30 seconds to about 10.

Implementing a distributed architecture for ATM networks could provide banks and customers with a number of benefits, depending on which distributed elements are connected to the network.

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A new model based on open standards

Focused promotions and services

Promotions and presentations can be customised for the individual user at the ATM rather than employing the one-size fits all approach of the past. By linking the ATM to the bank's CRM systems, banks can offer a personalised service, creating a much higher level of customer satisfaction and loyalty. Furthermore, promotional campaigns can be focused and timed to maximise sales.

In a similar manner, campaigns could also be focused on specific locations and on particular groups of customers, just as advertisers do with bill posters. Promotions could be activated only at specific times of the day, for example, evenings at supermarkets where promotions might be aimed at the busy professional who is late night shopping.

Flexible advertising boosts brand loyalty

By improving the graphical presentation of their service, banks are better able to reinforce their brand image and exploit the potential of this frequent interaction with their customers. Banks could display promotions and adverts at the ATM without affecting the simplicity and speed of service of a basic cash withdrawal. In addition, real-time messages, such as urgent charitable appeals or seasonal offers could attract new customers to the bank's machines and create a more responsive image.

Third party integration supports cross-selling opportunities

When operating across a distributed network, third party network providers can grow revenue from their machines by allowing them to be shared by a number of banks. Rather than each ATM presenting a generic interface, the machine would be dynamically reconfigured so that when a customer inserts their card, their particular bank's screen is displayed (possibly customised to the customer's requirements). With a modern software architecture in place, each bank could have direct control over their own service, delivering it from their own server on the network, rather than relying on an image installed on the ATM.

Quick and easy customisation of service offering

A network of servers using a distributed computing model enables a complete service to be created, maintained and delivered to customers at ATMs and self-service devices in a flexible manner. Appropriate departments can control the service in a dynamic and integrated fashion. Furthermore, a simple, user-friendly interface would allow non-technical staff to easily change and update the presentation layer, thus accelerating the process and removing complex and costly technical hurdles that hamper customer service.

Cross channel integration benefits customer and bank

Ultimately, banks could integrate the ATM with other banking delivery channels and provide a flexible, customer orientated service. Furthermore, third party networks will be able to offer their banking customers the same level of control and customer focus as an in-house network, whilst sharing the physical infrastructure of devices.

4. A vision of the future

For too long the potential of the ATM has gone overlooked and unexploited, largely because most banks have relied too heavily on their ATM suppliers for software. By adopting a distributed software architecture, the many benefits highlighted in this whitepaper can be easily and inexpensively implemented across the board. Furthermore, the huge opportunities offered by the new wave of chip cards could also be seized upon.

Multi-application chip cards

Combating fraud is generally cited as the main benefit behind EMV cards, yet the functionality and applications that could be stored on them substantially increase their value. For example, new products could be delivered to the card on request from the customer at the ATM, and then used immediately in the ATM and at other delivery channels. In addition, customer information could be held on the card to create portable profiles used in all delivery channels.

Because banks can write new applications to cards that are already in circulation, it becomes relatively easy to deliver new applications and promotions linked to a particular location or timeframe. The cost of doing so is becoming cheaper all the time and the scope of usage extends to areas banks have previously struggled to gain access to, for example, mobile phone top-up services or supermarket incentive schemes.

Banks could also use this technology to boost their existing services. For example, a bank selling travel insurance could provide promotional offers at ATMs located near ports or airports. The scope is virtually limitless.

New products could be delivered to the card on request from the ATM

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A vision of the future

Let's recap on the potential a distributed software architecture has to offer an ATM network:

The bank

- The service at each machine can be created dynamically allowing the network to be fully exploited at anytime
- New content can be created and introduced into the network without the need for data or software updates at the ATM and complex retesting
- Promotions and presentations can be customised for the individual user at the ATM rather than employing the "one-size fits all" approach
- Promotions can be activated at specific times of the day or at certain ATMs to target particular audiences
- Real-time messages can be broadcast to improve customer loyalty, for example an immediate 'congratulations' message could be sent to ATMs near a winning football team stadium
- Network performance data can be extracted at all levels to improve management information
- Applications can be created and controlled in network servers rather than in each ATM

The customer

- ATM link to CRM data allows for personalised promotions
- Personalised services can replace standard ATM displays, welcoming the customer by name for example
- New card technologies allow the ATM to recognise individual customers and update them as to relevant new products and services
- Customers can tailor the services on offer using their Internet banking service

Third party partners

- Each machine can be configured for a bank dynamically when it is used rather than always presenting just one bank's branded screen or a generic interface and service
- New technologies enable third party processing networks to 'share' their ATMs with multiple banks
- Third party networks can offer their banking customers the same level of control and customer focus as an in-house network

Conclusion

With the infrastructure now in place to kick-start a new era of ATM usage, high street banks now need only to provide the impetus to drive this change through. A distributed hardware and software architecture, delivering a fully customisable service, linked through a bank's CRM system and providing detailed managerial reports, sounds too good to be true. And yet it can be made available, right now, and is ready to be implemented with minimal expense or disruption.

As we have already seen, the benefits of this new approach can be many, ranging from a simple personalised greeting to instantaneous service downloads and online deployment of applications. Coupled with the recent technology advances made in the payment card industry, a network of dynamically configured ATMs will allow both banks and their customers to enjoy an unprecedented array of new ATM services.

About Level Four

Level Four is the leading global provider of test and development tools for the ATM channel, enabling banks and processors to maximise their existing investments in ATM and self-service technology. Level Four's key offering is the ATM Channel Development Suite, an integrated suite of software products that enable its customers to unlock the profit potential of their ATM networks. Support for the move to open standards within the ATM and self-service world is core to the company's strategy as is support for industry initiatives such as EMV and Triple DES. Level Four provide software solutions with measurable economic benefit and have built an impressive customer base of banks and payments processors across the globe including Royal Bank of Scotland, Lloyds TSB, National Bank of Dubai, Rabobank, LINK and Standard Bank of South Africa. Level Four partners with key players in the ATM payments arena including ACI Worldwide, Diebold, NCR and Wincor-Nixdorf. Level Four has offices in Dunfermline, Maidenhead, Dubai and Miami.

Visit Level Four on the web at www.levelfour.com

A network of dynamically configured ATMs will allow both banks and their customers to enjoy an unprecedented array of new ATM services

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