White Paper

Web-enabled ATMs and Postilion

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Postilion \Pos*til"ion\, n. [F. postillon, It. postiglione, fr. posta post. See *Post*, a postman.] One who rides and guides the first pair of horses of a coach or post chaise; also, one who rides one of the horses when one pair only is used.
Webster's Revised Unabridged Dictionary (1913)

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Introduction

Overview

This document is targeted at anyone interested in learning more about Web-enabled ATMs and Postilion's support for them. Specifically, it covers the following aspects:

- What Web-enabled ATMs are
- Why the time is right for Web-enabled ATMs
- Where they fit in the history of ATM development
- The benefits and challenges of Web-enabled ATMs

After laying this introductory groundwork, the paper explains how Postilion helps meet the challenges of Web-enabled ATMs through:

- Integration to multiple back-end service providers
- Transaction integrity, regardless of point of failure
- Multi-party reconciliation and financial settlement
- Full ATM state-of-health monitoring and notification

This paper should give the reader a good understanding of what makes Web-enabled ATMs different from their predecessors, as well as what challenges they pose to ATM processors. It will also discuss how Postilion meets these challenges by going beyond the traditional roles expected of an ATM host to fulfil new responsibilities unique to driving Web-enabled ATMs.

Preface

At a time when technological progress in most fields takes place at an incredible pace, when the concept of "Internet time" is used to refer to the increasingly rapid rate of adoption for new technologies, progress in the deployment of advanced ATMs seems sluggish by comparison. When it comes to personal computers, mobile phones, and stereo systems, consumers have come to expect that next year's models will be more powerful and convenient than what they have today.

The average ATM, on the other hand, has changed little from the consumer's perspective over the last couple of decades. There have been some changes, most notably in the more interesting graphical colour displays and smaller, more stylish ATMs that can be installed almost anywhere. For the most part, though, the consumer experience has been limited to the same ATM functions that have been available since the Seventies: withdrawal, transfer, deposit, and inquiry.

There are many reasons to explain this slow progress. Most industry insiders cite factors such as the large investments in existing ATM networks, the banking industry's historically conservative approach to new technology, or the fuzzy business propositions behind some of the initial efforts to use advanced ATM technology. There were also some early false starts and pilots that never materialised into widespread deployment. Recent developments suggest, however, that there has been a dramatic shift in thinking since those early days. High-profile rollouts by influential groups, like American Express and Wells Fargo in the US, are evidence that something has indeed changed in the ATM landscape.

One explanation is that many ATMs in the current population might be reaching the end of their useful service life, or at the very least have been amortised over enough years of productive service that the cost of their replacement is no longer prohibitive. Another explanation is that the technology payoffs in other areas of banking, including the widespread adoption of PCs and Web technologies, have now demonstrated the rewards of prudent use of new technologies.

Perhaps the best explanation, though, is that there is now a better understanding of the business case behind Web-enabled ATMs. Today's banks are under increasing pressure to provide improved customer service and lower costs, while at the same time trying to tame the growing complexities of multiple delivery channels. Many banks and third-party deployers are realising that the rich customer experience, simplified delivery strategy, and vendor independence that Web-enabled ATMs provide will be key to keeping them on top in this challenging environment. With interest in Web-ATMs running at an all-time high, there is no better time to learn more about what these advanced ATMs can do for your organisation and how Mosaic Software can help you take advantage of them quickly.

Web-enabled ATMs

In order to appreciate the enormous opportunities that Web-enabled ATMs offer, it is important to clearly understand what they are and how they differ from previous generations of ATM technology. To be precise, Web-enabled ATMs are next-generation ATMs that are distinguished from their predecessors in two key areas: how the ATMs communicate with their host or hosts and how the ATMs are programmed.

Unlike previous generations of ATMs, Web-enabled ATMs make use of advanced, Internet-based communications standards. As compared with legacy communications protocols, these newer standards provide much more flexibility in the types of transaction messages and data that can be exchanged with the ATM. Not only does this translate into a richer customer experience, but when coupled with a next-generation hosting platform such as Postilion it allows for innovative new transactions that increase overall revenue.

The second point of differentiation is that, unlike previous ATMs, Web-enabled ATMs are programmed using an open, standards-based environment that is *vendor independent*. Some of these standards come from the Internet world, hence the term "Web-enabled"; others are specific to the world of ATM software. Regardless of their origin, though, the goal of these standards is the same – to create an easy-to-program, vendor independent environment for ATM software.

The historical perspective

Since their introduction in 1967, ATMs have continuously evolved along two lines: connectivity and openness. Since Web-enabled ATMs represent a dramatic advance in both areas, tracing ATM evolution along these lines is the clearest way of illustrating how different they are from their predecessors.

Trends in connectivity

Early ATMs were not connected to any other system at all – they used strictly off-line methods of dispensing and accounting for cash. For example, some used a magnetic stripe reader/writer to record available balances and allowable withdrawal frequencies on the ATM card itself. Later ATMs were connected to the bank's host systems so that customers could access their accounts online. This gave customers new features such as access to multiple accounts as well more current balance information. It also gave banks real-time information about ATM usage.

As ATMs began to be used more as a matter of course and less as an emergency cash dispenser, it was logical to extend connectivity in order to provide as many customer access points as possible. The advent of shared networks, wherein several banks in a region would form a network that allowed their customers to use each other's ATMs, was therefore the next step in ATM connectivity. This was followed by the worldwide connectivity that we enjoy

today, in which cardholders can access their accounts online at almost any ATM in the world.

A new level of flexible communications

Web-enabled ATMs go well beyond the global online bank account access we have today and represent a new era in ATM connectivity. Rather than an evolutionary step, the flexibility and power of the connectivity they offer is nothing less than revolutionary. No longer do the ATMs sit behind their driving host, isolated from the rest of an organisation's infrastructure by virtue of legacy point-to-point communications protocols. A new world of possibilities now exists, including everything from allowing customers to review hometown news headlines while performing a transaction halfway around the world to advertising a local theater event and providing the capability to purchase tickets immediately. This new openness in communications also allows customers to access not only the services their own bank provides but those of outside service providers as well. These outside services may include stock brokerage, cheque cashing, money transfer, bill payment or any number of high-value services.

From a technical perspective, all of these scenarios are made possible by the inherent flexibility and robustness of the Internet communications protocol called TCP/IP and the various applications protocols that are built on top of it. Unlike earlier communications protocols used by ATMs, TCP/IP allows multiple "channels" of rich information to be communicated across the same physical communication line. Internet-based application protocols build on this channel concept to provide high-level standards for communicating user interface screens, data files, multimedia streams, and email, among others. For example, a dynamic, web-server-based ATM user interface can be accomplished by using the Internet standard called Hypertext Transport Protocol, or HTTP. This allows the ATM host to dynamically generate the look and feel of the ATM user interface based on the customer profile, advertising campaigns, or other factors. Other channels could be used for the large multimedia file transfers or streaming media to support more attractive advertising.

The most important feature of this new level of communications robustness is that, when coupled with a flexible, next-generation hosting solution like Postilion, more than the simply traditional EFT transactions can be communicated between the ATM and host system. Whole new categories of transactions, such as event ticketing or e-commerce purchasing, can be rapidly added as new business opportunities and service partners are identified. This flexibility is a radical departure from previous generations of ATMs and presents both significant opportunities and challenges. The ways in which Postilion can help capitalise on these opportunities and meet these challenges will be discussed later in this document.

Note: A common misconception is that Web-enabled ATMs either use the Internet for communication or allow customers to browse the Web. In fact, due to security and performance concerns, Web-enabled ATMs are likely to be driven across dedicated communications networks. In the interest of

maintaining key business relationships, not to mention facilitating timely transactions, most Web-enabled ATMs do not allow unrestricted Web browsing.

Trends in openness

Like the significant advances made in connectivity, the openness provided by Web-enabled ATMs represents a tremendous leap of progress. The very first ATMs were, out of necessity, completely closed and proprietary machines. Later ATMs made use of minicomputers and software to control their various functions. However, the computer's operating system, the ATM software program that ran on it, and the way this program interacted with the ATM's devices were still completely proprietary. To make changes in the way the ATM interacted with customers, to add new transactions or support new languages, involved working with the manufacturer to create the necessary software and hardware changes and then have a technician physically visit and modify each ATM.

A next-generation shift to microcomputers introduced the "states and screens" method of programming and helped standardise things somewhat. Different models of ATMs from the same manufacturer (sometimes even from different manufacturers) could be centrally controlled in a similar fashion. Off-the-shelf ATM driving software from ACI and Deluxe, typically run on a special class of mainframe computer, could be used to monitor and control these ATMs, and the look of the screens and basic program flow could be changed centrally.

The introduction of PC-based ATMs continued this trend of increasing openness through the use of a standard hardware platform and operating system. The PC platform, coupled with widely used operating systems such as OS/2, made some software development tasks a bit easier. The type of software developed, however, did not advance much beyond the already established "states and screens" methodology. Adding whole new classes of transactions, like ticketing or banker's draft, was still overly cumbersome and often involved writing software specific to a particular ATM manufacturer and/or model. In fact, beyond slightly lower prices, it is questionable whether or not ATM deployers realised much benefit from this generation (though there were some isolated attempts in new areas such as ATM advertising).

A new era in openness and ease of programming

Web-enabled ATMs represent a complete departure from the merely incremental steps towards openness made in previous generations. They go well beyond being non-proprietary at the hardware platform or operating system level to provide a completely open and standardised programming environment. All aspects of the ATM, including interaction with low-level devices such as cash dispensers or card readers, have been simplified and standardised. Not only does this standardisation give ATM software developers an easier way to program and interact with these devices, it frees them from writing software that is specific to a particular ATM manufacturer. Just as software written for Microsoft Windows can run on any type of Windows PC,

for the first time ATM software can be written that works on almost any type of Web-enabled ATM, regardless of manufacturer.

At a technical level, there are certain standards that ATM manufacturers must adhere to in order to make all of this possible. They must support the component-based software standard known as Windows Open Services Architecture Extension for Financial Services (WOSA/XFS), initiated by Microsoft but now under control of CEN/ISSS (the European Committee for Standardization/Information Society Standardization System).

In addition, in order to allow for easier control from browser-based interfaces, a Web-enabled ATM should support the newer ActiveXFS standard. This standard builds on the WOSA/XFS foundation by providing an even simpler programming interface. ActiveXFS gives access to ATM devices from simple scripting languages like VB Script or JavaScript, allowing programmers to develop complete ATM programs using standard web pages and scripting techniques. Changes in look and feel or branding, advertising graphics, or even the addition of whole new transactions can be performed quickly using tools and skills that are readily available today. When compared with the proprietary programming methods of the past, it is clear that Web-enabled ATMs provide a level of openness unmatched by any previous generation of ATMs.

To summarise, Web-enabled ATMs represent a logical extension, though a radical one, of the historical trends of increased connectivity and openness of ATMs. The flexibility of the TCP/IP communications protocol and the power of increased bandwidth provide a whole new degree of connectivity. Standards-based software components that control the ATM's devices, coupled with common Web development techniques and tools, provide a powerful new environment. Taken together, it's easy to see why Web-enabled ATMs are poised to radically change the way we think about and use ATMs.

Benefits of Web-enabled ATMs

Given the impressive almost flashy capabilities of Web-enabled ATMs, it might be tempting to write them off as a "gee-whiz" technology that offers no real bottom-line benefit. Recent white papers and research notes on the topic, however, suggest that this would be a mistake. Reports such as TowerGroup's "Open Web-enabled ATMs" argue that the technological advantages of Web-enabled ATMs can directly translate into tangible business benefits for most organisations. There are several ways in which these advanced ATMs can either drive down costs or increase revenues.

Consolidated delivery platform

One of the more attractive features of Web-enabled ATMs is the cost savings that can be achieved through having a single technology platform for all delivery channels. No longer does the ATM environment have to be isolated as its own specialised area, consisting of specialised minicomputers, proprietary operating systems, and legacy communications protocols. The use of standard Internet technologies allows Web-enabled ATM functionality to be delivered and managed by the very same platforms that provide functionality to other

consumer channels such as online and mobile banking. In addition, the advent of browser-based user interfaces for call center and teller platforms means that some internal needs can also be served by a Web-based platform. For the first time, organisations have the ability to standardise on a single technology platform for both internal and external banking functions. The reduced operational costs that this translates into may even be compelling enough to warrant the use of Web-enabled ATMs even if there are no plans to take advantage of their advanced transaction capabilities.

Rich and responsive customer relationship management

The ability to operate consistently across all customer touch-points brings tremendous opportunity to improve customer relationship management (CRM). The relationship strategy of an organisation can now be executed across all channels of delivery, reinforcing the relationship with every interaction. As customers continue to rely on self-service channels, the enrichment of CRM in those channels will become increasingly important. For more customers every day, the ATM *is* the bank, and ATMs thus present the only real opportunity for banks to execute their strategies for retention, cross-sell, and overall satisfaction.

Web-enabled ATMs not only allow for ATMs to participate in enterprise-wide CRM, their inherent flexibility makes them an ideal platform on which to dynamically interact with a customer based on a relationship strategy. The entire look and feel of an ATM can change in response to a targeted customer profile. No longer is an organisation limited to the coarse-grained segregation of “on-us” versus “not-on-us”. The overall value of each customer and their unique banking needs can now be reflected through a set of service offerings, features, and interactions that are tailored to the individual customer.

Vendor independence

Vendor independence is another important tangible business benefit of Web-enabled ATMs. As discussed previously, the WOSA/XFS and ActiveXFS standards, coupled with common operating systems and the use of the PC platform, provide a consistent run-time environment among all compliant Web-enabled ATMs. This means that ATM applications can be written in such a way as to run on any compliant ATM regardless of manufacturer. This gives organisations a freedom that translates into increased bargaining power and lower supplier risk, while at the same time helping to “future proof” development investment.

Increased transaction volume and revenue

There is little doubt that the ATM’s role as a dispenser of cash has been somewhat diminished in recent years. An increase in the total number of ATMs available, the advent of cashback transactions, and the increased use of debit cards and other cash sources and equivalents have all acted to drive down per-ATM transaction volumes. Web-enabled ATMs, however, are uniquely suited to offer a broad range of new transactions. The ability to accept things of value, dispense things of value, print arbitrary documents, and securely participate in

a financial network makes them an ideal platform to offer transactional services that cannot be fulfilled in other ways.

The unique characteristics of Web-enabled ATMs offer several ways to increase volume and overall revenue. To begin with, new transactions such as wire transfer, banker's draft, and cheque cashing can be offered. Many of these transactions are considered "high value" and can thus attract a higher service fee than basic banking functions. While customers have historically resisted the idea of paying a convenience fee for transactions they feel should be a part of their regular banking services, these new transactions are likely to be perceived as a premium service and customers are therefore willing to pay higher service fees for them.

For card issuing institutions, some of these new transactions are likely to attract more "not-on-us" customers, thereby increasing overall transaction volume. Other transactions, like cheque cashing, may even draw a demographic that wasn't previously served by the organisation. The "un-banked" consumer, for example, is not only a demographic that many organisations do not effectively serve today, this is also a group willing to trade higher service fees for the ability to transact without an account. In the end, though, whether through un-banked customers or foreign account holders, increasing the amount of not-on-us traffic not only increases overall revenue but also provides greater opportunity to target promotions and advertisements designed to attract new customers.

When it comes to certain transactions, such as event ticketing, many consumers already expect to pay a handling or service fee. This model might be applied to prepay phone card top-up or other purchases. The emerging business of e-commerce transactions at the ATM opens up unique business models of splitting revenue with merchants in the form of either discounted product or a referral fee. Without a doubt, the opportunities for revenue generation at Web-enabled ATMs are really just beginning to be explored. It is highly likely that many more innovative service offerings will be thought of in the future. Fortunately, the inherent flexibility of the Web-enabled ATM platform means that these new types of transactions can more easily be rolled out in pilots and later widely adopted if they prove successful.

Postilion and Web-enabled ATMs

An introduction to Postilion

Postilion is a comprehensive electronic commerce and funds transfer system that runs on Windows NT. It is designed to deliver consumer transactions at every level of an EFT network. The Postilion family of products provides for custom-made electronic commerce solutions over a wide range of environments. The Postilion product may be enhanced to offer specific feature sets by adding software components. This modularity allows end-users to select the configuration to meet their specific needs.

In addition to providing features specifically related to Web-enabled ATM driving, Postilion's Java origin, native support for TCP/IP, and modular architecture make it a natural fit in the Web-enabled ATM environment. Postilion is a comprehensive EFT solution, able to drive a variety of device types, including both traditional and Web-enabled ATMs as well as retail POS terminals. However, with advanced features such as home banking and bill payment, Postilion goes well beyond the functions normally associated with a device-driving host and is in fact a full-fledged transaction platform. Postilion's interfaces for advanced forms of payment acquiring, including m-commerce via mobile phones and e-commerce over the Internet, help round out the solution to provide a flexible EFT platform capable of meeting almost any need. Finally, support for switching between numerous EFT networks, both debit and credit, regional or international, means that Postilion can be easily adapted to a wide variety of EFT environments.

The eSocket.ATM advantage

Not all Web-enabled ATM driving scenarios are the same. In some cases the ATM application may be designed to use web pages and resources that reside solely on the ATM itself. Such an architecture may be useful if off-line service is required. In other cases a centralised web server may be used in order to provide more dynamic and responsive control over application content. In either case, Mosaic's eSocket.ATM component can be used to provide quick and easy integration of Web-enabled ATMs to Postilion.

eSocket.ATM is a 100% pure Java compliant component that provides an easy-to-use COM interface. This design yields two benefits. First, it offers complete cross-platform compatibility so that it can be integrated to almost any web server. For the Web-enabled architectures that rely on a central web server, this platform flexibility can be crucial. Second, because eSocket.ATM allows for simple, COM-based programming from common web scripting languages such as JavaScript and VB Script, it can be integrated directly to each individual Web-enabled ATM. This option supports the local content model for Web-enabled ATMs. In either case, the object-oriented nature and overall design goals of eSocket.ATM yield an easy and natural way to integrate to Postilion.

The transaction set supported by eSocket.ATM reflects the unique requirement for rich functionality on Web-enabled ATMs. This means that eSocket.ATM caters not only for all of the traditional ATM transactions but also the advanced transactions such as cheque cashing, wire transfer, and e-commerce purchasing. Since Web-enabled ATMs will likely support transactions not yet imagined, one of the key design goals of eSocket.ATM was how easy it was to extend, while maintaining backwards compatibility. This ensures that any development investments in eSocket.ATM will be protected no matter what the future brings.

Deploying Web-enabled ATMs and Postilion

In Web-enabled ATM driving, the modular nature of Postilion is used to provide solutions that are tailored to the particular EFT environment. For example, a typical Web-enabled solution may involve the introduction of Web-enabled ATMs into an already established ATM driving environment. In this case, a legacy ATM driving host may continue to handle traditional ATMs while Postilion is used to drive the newer Web-enabled ATMs. Such a deployment may also involve new types of transactions that are not catered for by the existing ATM host. Postilion can handle these transactions as well. Such a configuration is shown in the following diagram:

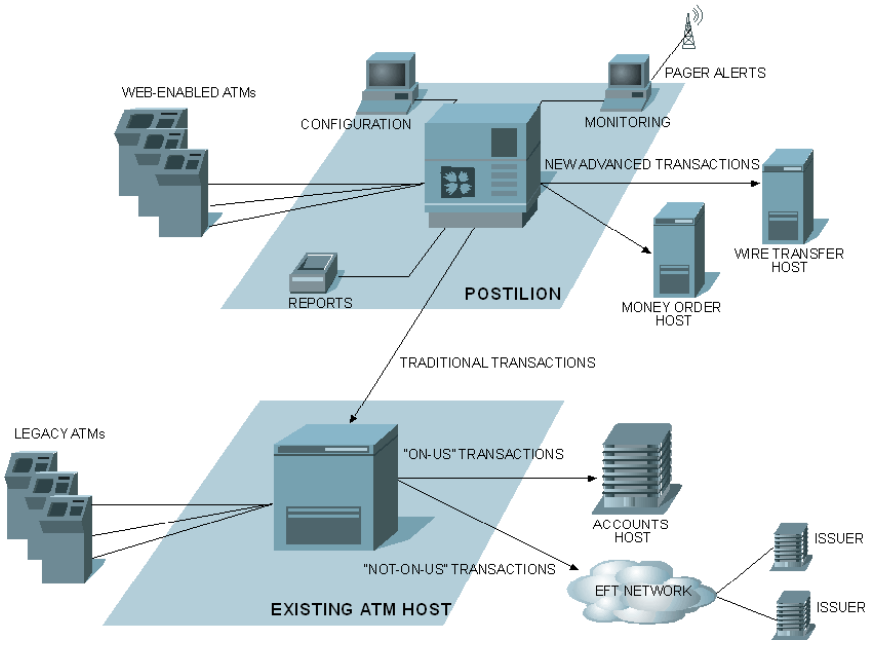

Figure 1: Bank integration of Web-enabled ATMs into existing deployment with Postilion

In this scenario, a financial institution has decided to deploy Web-enabled ATMs but has found their legacy host cannot drive the new ATMs nor can it integrate to a couple of outside services they would like to offer. Postilion has been brought in to drive the Web-enabled ATMs and to make two new types of transaction services available on them: banker's draft and wire transfer. Since

time to market was extremely important, it was considered a key requirement that the solution could be deployed with little or no impact on existing systems.

When deploying Postilion in a co-hosting scenario such as this, Postilion's support for commonly found host interfaces such as Connex or Base 24 is crucial. Postilion's ability to integrate seamlessly to existing ATM hosts means that no changes are required on either the accounts host or the EFT network interface. All traditional transactions are sent to the existing host and are processed as though they originated at the legacy ATMs. The newer transactions are handled directly by Postilion via its integration to the outside service providers. In many cases, interfaces to such services are available as existing product from Mosaic Software. The combination of drop-in integration to common ATM hosts and the off-the-shelf availability of service provider interfaces means that solutions like this can be deployed very rapidly.

Another common scenario for Web-enabled ATM deployment is where an independent sales organisation (ISO) wishes to maximise revenue from its ATM placements by providing new premium services. Many ISOs currently outsource their ATM driving to third-party processors that may not be capable of driving Web-enabled ATMs. Beyond providing a solution to this problem, Postilion's advanced real-time monitoring and rich Web-based reporting capabilities can help lower costs for an ISO while giving better service to their ATM owners. For these reasons, the ISO may decide to take direct control of their ATM population by moving processing in-house. Such a scenario is shown below:

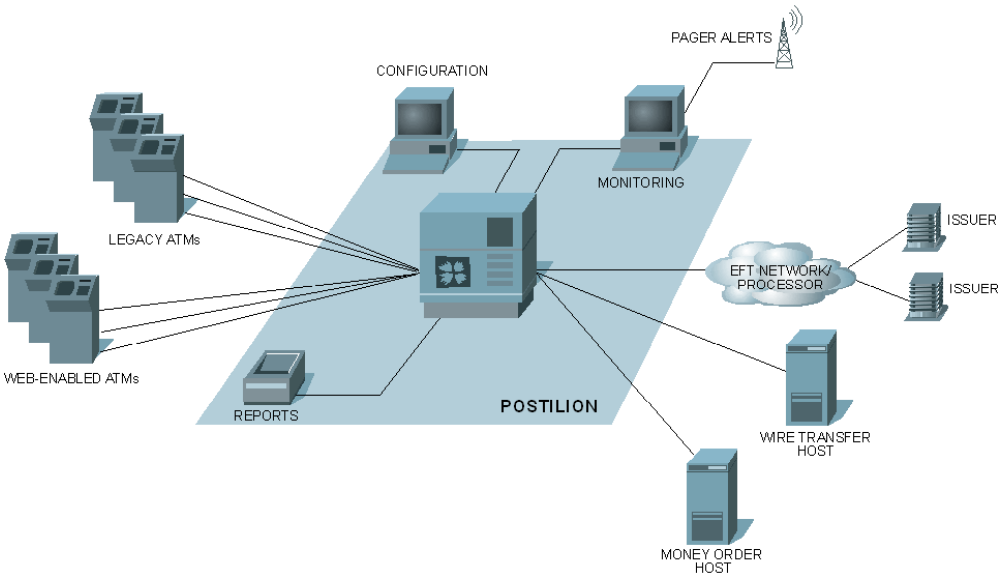

Figure 2: ISO brings processing in-house with Postilion and adds Web-enabled ATMs

In this scenario, Postilion's off-the-shelf interfaces to the major EFT processors and networks come into play. An ISO can negotiate a reduced processing cost with their existing processor and then use one of Postilion's certified interfaces to quickly integrate with the processor on a host-to-host level. Equally important is Postilion's support for the most common dial-up and legacy ATMs. This allows an ISO to keep their ATM driving consolidated on a single

platform. The combination gives independent deployers a comprehensive solution that empowers them to take control of their own ATMs.

Postilion's role in Web-enabled ATM driving

The role of any ATM host is fundamentally altered when Web-enabled ATMs are involved. Given that Web-enabled ATMs are intelligent devices and that interaction with them is conducted via high-level messaging protocols, it is tempting to believe that the ATM host must have a reduced role to play. In fact, in order to realise the full potential of Web-ATMs, especially in the area of new types of rich transaction functionality, the ATM host must take on an even more prominent and complex role than it does today. Some of the functions that Postilion provides as a Web-enabled ATM host are common to all ATM driving scenarios; others are completely new and reflect the challenges that Web-enabled ATMs present.

Service provider integration

Just as web sites are often stitched together from information and services provided by various content providers, it is likely that the services offered at a Web-enabled ATM will be fulfilled by multiple back-end transaction providers. For example, traditional ATM functions might be handled by a bank host or existing EFT network while new transactions like cheque cashing or wire transfer are fulfilled by a new outside service provider. In some cases, there may even be interactions among these systems. When the purchase of mobile prepay top-ups are made at a Web-enabled ATM, for example, interactions with both the phone company's billing system and either a bank host or payment network must take place.

In order to support these complex interactions and provide rapid service rollouts, a flexible and powerful point of integration is required. This means that things like integration libraries and toolkits and the programming tools and skills needed to use them must be readily available. The ability to add new functionality with minimal impact on the existing system is also of utmost importance.

This is where the power and flexibility of Postilion's modular architecture and Java-based Software Development Kit (SDK) really shine. To begin with, programmers can work within a modern Java environment, which means they spend less time dealing with arcane platform issues and more time coding valuable new interfaces. It also means they can increase their overall productivity by taking advantage of common Java programming tools and environments.

Beyond the productivity advantages of the Java programming environment itself, the richness of Postilion's SDK gives an enormous head start to any new development project. The SDK provides a multi-threaded, event driven development framework that has been optimised for the development of EFT interfaces. With built-in support for all of the most common message formats and encoding schemes, including advanced support for XML, the SDK allows programmers to quickly develop the interfaces required to support new

transactions and service providers. In fact, it is the very same development kit that is used internally by Mosaic Software to rapidly respond to new product development needs.

Transaction integrity

There are standard EFT principles that are required for any system to be able to operate satisfactorily in a financial network. These are rules related to properly handling duplicate requests, lost requests, and lost responses, among others. A Web-enabled solution based on Postilion benefits from Postilion's existing compliance with these principles. In addition, Postilion provides a unique and powerful feature that is essential for multi-party financial transactions.

Many of the new services that are likely to be provided at Web-enabled ATMs will involve unique combinations of business partners. As a result, some of the transactions initiated at an ATM will involve multiple back-end interactions. E-commerce shopping, for example, may involve several steps, such as checking for product availability from a merchant host, debiting an account on a financial institution host, and then notifying the merchant host that the funds were cleared. Failure in any one of these steps must be accounted for and properly handled.

For example, one typical service that may be offered at Web-enabled ATMs is the purchasing of mobile prepay top-ups. Such a service will require both funds reservation from an EFT system as well as purchase notifications to a mobile phone billing system. In such a scenario it is vital that the two messages sent outbound to the EFT system and prepay system are made dependent on each other in order to:

- avoid topping up the prepay account if authorisation fails; and
- avoid debiting the customer's payment card if the prepay account is closed or does not exist.

Postilion handles this by monitoring all outbound messages and applying appropriate reversal procedures when needed. If one transaction fails, Postilion will automatically take corrective action to reverse the effect of the other transaction – the top-up or the payment card debit – to ensure overall financial integrity.

Settlement, reconciliation, and Electronic Journaling

Despite whatever other drastic changes the newer ATMs might cause, one constant will remain – there must always be a way to account for all cash or items dispensed at the ATM or any cash or cheques that are deposited. In fact, as the number of potential service offerings increases, settlement and reconciliation take on an even more vital role in the world of Web-enabled ATMs. In this new environment where the ATM may require the e-commerce, wire transfer, or other advanced transaction functionality of outside service providers, the settlement and reconciliation role is both complex and indispensable. Postilion's fully-relational, multi-batch transaction database, coupled with the advanced Postilion Office settlement and reporting facilities,

allows these complex new interactions to be safely reconciled and fully accounted for.

Postilion Office offloads the settlement and reconciliation functions from an online transaction processing Postilion system onto a framework that is optimised for robust multi-party settlement. Business relationships that split product purchase revenue, network interchange, or services can be expressed as percentages or specified values. Multiple business entities can have an interest in any one aspect of a Web-enabled ATM, allowing creative new models to be supported. In addition, the modular nature of the Postilion Office system allows custom extract modules to be added in order to support reconciliation with business partners.

In addition to back-office functions, Postilion also provides advanced Electronic Journal, or E-Journal, features that help facilitate better customer service at the front end. Mosaic Software has worked with ATM manufacturers to define an advanced XML journaling format that can fully capture the state of the ATM as various complex transactions are performed. Unlike older E-Journal schemes, which treated the journal as a single file and therefore required massive uploads, Postilion's Web-enabled ATM journaling feature continuously uploads transaction details in the background. Instead of waiting for lengthy end-of-day transmissions, customer service personnel have the information they need to quickly resolve customer disputes.

Device monitoring

It is important to note that while the ATMs are Web enabled and can be treated as a generic web device in some respects, in actuality they are a complex financial delivery platform that bears little resemblance to the typical web device. Web-enabled ATMs often support multiple internal devices such as cash dispensers, presenters, depositories, cheque imagers, etc., all of which must be monitored to ensure optimal service to customers. Postilion provides a rich monitoring platform that includes support team scheduling, notification, and service logs.

When a device fault is reported, it is categorised by severity. If the ATM can still provide service, but perhaps with reduced functionality, it is considered to be "suspect". If the ATM can no longer provide service, it is considered to be "critical". In either case, Postilion's support management system can be used to automatically look up the service team assigned to that particular region or type of ATM, determine which team member is on duty (based on scheduling information), and automatically dispatch a notification to the proper member. Once the problem is resolved, notes to indicate services performed can be added to the support log and then the issue can be closed.

Reports that detail mean time to event response and closure, ATM uptimes, and support event frequency provide a complete picture of support trends and common issues so they can be proactively addressed. This type of robust device monitoring is critical to any successful ATM network; and any Web-enabled ATM host that does not provide it makes the mistake of treating Web-enabled ATMs as simple web devices – a disaster waiting to happen.

Conclusion

There is little doubt that Web-enabled ATMs hold tremendous opportunity, both in cutting costs and increasing revenues. There is also little doubt that there are significant challenges to be met before their full potential is realised. Postilion helps meet these challenges in a number of ways:

- Provides many off-the-shelf interfaces to host systems and EFT networks
- Allows rapid integration to new business partners using a Java-based SDK
- Provides easy integration to almost any Web-enabled ATM using eSocket.ATM
- Maintains transaction integrity regardless of point of failure
- Coordinates multi-part transactions involving more than one authorising system
- Includes advanced settlement, reconciliation, and E-Journal capabilities
- Offers a complete device monitoring and support event system, including automatic notification

These features are central to providing a complete Web-enabled ATM solution. They allow an organisation to concentrate on innovating new uses for Web-enabled ATMs and leave the complex ATM management issues to Postilion. In addition, Postilion's modular architecture and multi-channel acquiring capabilities means that when your organisation grows, Postilion can grow with it. In an industry that is changing almost daily, knowing that your ATM driving solution has the flexibility and robustness to change with it is more than just a comforting thought – it's a business necessity.

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