



ATMIA Next-Generation ATM Networks Committee
Deployer Subcommittee for an Industry RFI

Industry Request for Information

Draft: January 20, 2017

Sponsored by:

- Rich Barron, Bank of America
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This document summarizes the most important “problem statements” which the ATM Deployers on this subcommittee have identified to be addressed in Next-Generation ATM Networks.

Vendors receiving this document should respond only to the sections relevant to their products and services. Please email responses to Mike Lee, CEO ATMIA, by 31 March 2017 (mike@atmia.com).

Thanks to the following Industry Thought Leaders who have provided input to and support for this RFI: Chase Adkins, PNC Bank, Billy Arnold, Iberia Bank, Ryan Campbell, Prosperity Bank, Eric de Putter, Payments Redesign, Paul Gooch, Elan, David Gwynne, Capital One, Kathy La Fleur, US Bank, Rob Myhre, US Bank, Brenda Pino, Bank of Montreal and Rensche Van Der Merwe, FNB South Africa.

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Introduction

Summary: *Simplify. Rationalize and Standardize.*

ATM Deployers believe that a new, App-Model-based network architecture for ATMs will create a flexible, secure infrastructure for ATMs seamlessly integrated with both traditional transaction processing systems as well as emerging and future payments systems through APIs and web services interfaces.

Further, deployers believe that use of modern technologies hold promise to simplify and standardize many operational practices and procedures, thereby reducing the cost of operating and maintaining an ATM network.

In addition, similar to Mobile and Internet banking channels, deployers believe that leveraging modern technologies will enable them to:

- Maintain a consistent user experience across all ATM endpoints as new services and capabilities are added at ATMs
- More nimbly deploy and redeploy ATMs, quickly and efficiently
- Enable “continuous delivery” by simplifying software distribution logistics
- Improve security of the end-to-end ATM ecosystem

The biggest problems to be solved in a Next-Generation ATM Network are summarized as follows:

1. Inter-Operability
2. Creating an App Model for ATMs
3. Operating System
4. Monitoring and Management
5. Standards
6. Security

Next-Gen ATM Network Ecosystem

- I. Describe your proposed contribution to the Next-Generation ATM Network, including all components in the ecosystem.
 - a. Which components in the Next-Generation ATM Network will be provided by your company? Which will be provided by other vendors?
 - b. What are the key technology enablers in your proposed Next-Generation ATM Network? Which of these key technology enablers are available today, and which are still under development?
 - c. How does your proposed Next-Generation ATM Network encourage innovation and introduction of new technologies such as blockchain, biometrics, headless ATMs, etc.?
 - d. What is your proposed approach to security of the Next-Generation ATM ecosystem, including accommodations for new technologies
 - e. How will your proposed Next-Generation ATM Network deliver the benefits described in the introduction? Describe in detail.

Inter-operability

- II. Describe how your proposed contribution to the next-generation ATM Network will:
 - a. Enable a deployer's User Experience to appear and to operate consistently on all ATM hardware models
 - b. Enable a deployer's User Experience to appear and to operate consistently on ATM hardware from different vendors
 - c. Integrate software components from the deployer and from other vendors as part of the User Experience

- III. Describe how your next-generation ATM software will allow customization of the user experience by ATM deployers without affecting interoperability as described in (I).
 - a. What aspects of the user experience will be customizable by deployers? And which will not be customizable?

Verbatims from ATM Deployers:

- "Since 1988 we have used the vendor solution for software. We currently have a mixed fleet and are running both the Diebold (Agilis) and NCR (Apra) products. I have done my best to make them appear as similar as possible to my end user, however that is not always possible. Also the providers have still not grasped the intricacies of their own product and typically make changes that are not fully tested and end up causing unnecessary downtime and problems for my users.
- "A day does NOT go by when I am not playing arbitrator between vendors trying to get them to "play nice" in the sand box to resolve issues for Cross Vendor implementations or for that matter their own application running on their own hardware. For sure we need to council the vendors and bring them all to the table being willing to participate in our effort here. As I stated, my fear is they shy away from this idea of the industry getting together to solve these issues we are defining. As you know if we do not get participation from the vendors, I'm not sure we have any options other than a few of us Big Banks getting together and developing our own solution that may eventually be used in the industry.
- "Vendors need to provide a more flexible ATM application that can be easily customized by an FI (or Processor) to meet their functionality needs without the need for vendor dependencies that are needed today when an FI (or Processor) wants to launch a new transaction option as an example.
- "As mobile technologies pervade our culture, we need to be support for cross-endpoint interoperability and new customer experiences at ATMs. Phone apps are interoperable today on iOS/Android devices; ATM apps need to be interoperable as well to efficiently enable this integration.

App Model for ATMs

In the Next-Generation ATM Network, ATM Deployers desire an “App Model for ATMs” in which the same app can run on multiple vendors ATMs without dependencies on other parts of the software stack. This requirement is modeled after the Internet and Mobile models, in which the same internet App will run in a browser independent of operating system and provide a consistent user experience, and the same mobile App will run on mobile phones from multiple different vendors while offering a consistent user experience.

- IV. For your proposed contribution to the Next-Gen ATM ecosystem, describe how it enables deployers to implement the desired App Model
- a. What standard apps will be offered by your company? How deployer’s custom apps to enhance the user experience coexist with standard apps?
 - b. What is the software stack which will need to run in each component of this future ecosystem to enable the App Model?
 - c. Under this App Model, outline your and deployers’ roles and responsibilities in deploying and supporting ATM Apps in production?
 - d. For other vendors’ products in the ecosystem, what will be the roles and responsibilities of these vendors in deploying and supporting ATM Apps in production?
 - e. What will be the programming environment for deployer’s custom apps? What technologies will programmers need to understand to create apps in this environment?

Verbatims from ATM Deployers:

- “I look forward to a day that the ATM itself has minimal levels of software on them and can operate in a “Thin” or App” type environment to help maintain software image integrity across a fleet and a manageable common image on my terminals. I feel this would aid everyone in the value chain for the ATM from the Manufacturer, to the software developer, to the EFT /processing network, to the terminal deployer (FI or ISO), to the service/software technician and finally and most importantly to the cardholder.
- “We need ATM OEMs to start to think about Cloud based architecture and the current stack and reliance on XFS and Windows does not enable this. ATM architecture needs to evolve to allow Banks the freedom to change fast and deploy fast without being stifled by thick client architecture.
- “Stability of our ATM fleet needs to improve. Various factors contribute this including a large and complex software stack. The bank also is limited in the number of production releases it can do as a result, which removes the ability to quickly react to production issues and deploy fixes to the fleet. What is needed is a simpler and more modular architecture. This will provide targeted testing and certification of components and drive up confidence of more frequent and reliable deployments.
- “Modern technologies offer the promise to dramatically simplify ATM infrastructure and operations with commensurate cost savings – while offering improved security and interoperability at lower cost than the thick client technology from the ‘90s and still in use today in our ATMs.
- The lines are getting blurred between the R&R for these entities (deployers and vendors). Traditionally only banks would deploy and manage ATMs but increased competition from retailers, Fintechs and entrepreneurs are putting us at risk of becoming irrelevant. We need to come up with smart architecture and simplified technology to remain relevant and necessary

Operating System

ATM deployers require that no hardware investment be required for patches and new versions of OS and system-level (i.e. non-App) software components. OS upgrades and patches should maintain backward compatibility with all ATM hardware in production.

ATM deployers desire the next-generation ATM ecosystem to be OS Agnostic, and to choose best-in-class systems independent of OS without impacting services offered or the customer experience.

- V. For the Operating System(s) in your proposed Next-Gen ATM network:
- a. What operating system(s) will your products and services devices use?
 - b. What operating systems will be supported in your proposed Next-Gen ATM network?
 - c. How will your Next-Gen ATM network enable apps to interoperate across different operating systems?
 - d. How often will the primary OS in your Next-Gen ATM network be patched or updated? How will this patch or update be completed?
 - e. How will you ensure that no hardware updates are required to run an OS update?

Verbatims from ATM Deployers:

- “Upgrading a Windows operating systems is a considerable effort, analysing system requirements, upgrading hardware and sending an engineer for installing a new OS. If there is a real security issue with Windows 7, an upgrade to Windows 10 within a short period of time is simply not an option.
- “The Industry needs an operating system including an XFS type layer that is common for all vendors so we do not see differences in the XFS layer as we see today between vendors. The common operating system may result in a "thin client" or "thick client" type of architecture however I also feel we need to move away from the Microsoft dependency that exists today and need a fresh approach.
- “Windows 7 migration (and the looming Windows 10 migration) has been a huge dis-service to our ATM industry. As a deployer we’d rather invest in ATM user experience and cross-platform integration than operating systems. ATMs need to become OS agnostic leveraging modern thin-client technologies so that ATM deployers can re-focus on serving our customers.
- Our reliance on Microsoft O/S and XFS is stifling any thin client/virtualization initiatives that we want to put in place.

Monitoring & Management

- VI. For ATMs In your proposed Next-Gen ATM Network:
- a. What Monitoring & Management tool or tools will be supported?
 - b. Which devices in the network will be monitored by this tool or tools? Which will not be monitored?
 - c. How will software updates be distributed to ATMs? How will content updates be distributed?
 - d. How will operational tasks for Next-Gen ATMs be accomplished, such as remote reboot of ATMs, remote diagnosis of hardware issues, predictive modeling for preventative maintenance, etc.
 - e. How will cash levels in ATMs be monitored and optimized?
 - f. How will dispatch of service techs and ticket management be handled?
 - g. Describe the proposed balancing and reconciliation process for ATMs?
 - h. Where will journals be housed? How will customer research be completed against journal data?
 - i. What diagnostic data will be maintained? How will this data be retrieved and interrogated to diagnose hardware and software issues?
- VII. For servers and other devices in your proposed Next-Gen ATM Network – App Servers, Routers, Monitoring Systems, etc:
- a. How will these devices be monitored for performance and operational health?
 - b. How will software updates be distributed to appropriate devices?
 - c. How will content be distributed to appropriate devices?
 - d. What diagnostic data will be maintained for these devices? How will this data be retrieved and interrogated to diagnose hardware and software issues?
 - e. How will operational tasks such as performance optimization be completed?
- VIII. What will be the minimum telecom requirements for operation, monitoring, and management of your proposed Next-Gen ATM Network?

Verbatims from ATM Deployers:

- “We still have to rely on agent based monitoring and XFS events, as SNMP is just not possible on networks with 3G type connectivity. The ‘thinner’ the solution is and the less complicated the hardware is to monitor the more efficient we can be with monitoring and managing our network. There is a lot that can go wrong on an ATM – the more moving parts it has the more complicated our monitoring is. ATMs need to become less complex and the stack has to become less cumbersome to manage.
- “ATM diagnostic data, information, and logs are stored in unique ways per vendor. Items such as tallies, faults, threshold information, and sensor data are critical information and worth retrieving and/or having visibility into. In addition, ATM support & management has been geared towards local administration (Back panel, TTU, VDM). ATM deployers require standard and consistent remote management controls for devices on ATMs. In general we would like to see more ‘operational’ input into how ATMs are designed and implemented, and not be as driven from a unique hardware perspective.
- “ATM deployers require the ability to monitor every ATM device component in a standard way across manufacturers.
- “As a developing country we still rely on communication protocols such as 3G, 4G and VSAT. At some sites we even have an Edge connection. This is the case for most of Africa. Thick client architecture makes this an operational nightmare. Stacks need to become thinner and less cumbersome to make deployments.

Standards

Previous standards in the ATM industry – XFS and IFX – do not provide the level of abstraction required for the App Model. Modern standards for HTML5 and Mobile Operating Systems such as Android and iOS are rapidly evolving but allow the same app to be used on a wide variety of devices.

Financial Institutions and non-FI ATM deployers will support and propagate standards that enable the App Model for ATMs.

- IX. For your proposed contribution to the Next-Gen ATM Network:
 - a. What new ATM standards will be required to enable the App Model for ATMs?
 - b. What existing Internet and/or Mobile technology standards will be the basis for these new ATM standards?
 - c. How will these proposed standards ensure interoperability of Apps across a wide variety of ATM devices?
 - d. Which providers of hardware and software will need to agree on these standards?

Verbatims from ATM Deployers:

- “Similar to the age old IFX solution that really did not seem to gain traction, I do think it's time the industry does settle on a common message format that for sure reduces costs especially for processors like Elan where we can now truly go to a Single Device Handler to develop and maintain vs. multiple we support today for all the different message formats & emulation's.
- “Especially when dealing with the CEN XFS solution from a hardware vendors, ATM deployers may be dragged into refereeing between arch rivals. Additionally, there are little signs that the various Android implementations rely on a common layer, setting the ATM industry 25 years back.
- “Device-level standards such as XFS are irrelevant in a modern cloud-based architecture. The ATM industry needs to re-think standards at a network level to enable interaction by design across ATM platforms and integration with other banking channel endpoints.

Security

The proposed Next-Gen ATM Network could offer a smaller and more secure attack surface on ATM devices themselves. However, backend infrastructure including servers and other devices could offer new potential points of compromise. End-to-end security of the network is paramount.

- X. For ATM devices – i.e. endpoint devices with direct customer interfaces - in your proposed Next-Gen ATM network:
 - a. How will next-gen ATMs be physically secured?
 - b. How will communication between devices within the ATM be secured? I.e. between dispenser and processor board, etc.
 - c. How will the software components on the Next-Gen ATM be secured from hacking?
 - d. How will communication between components on the Next-Gen ATM network be secured from eavesdrop and modification?
 - e. How will communication between Next-Gen ATMs and servers/front-end processors be secured?
 - f. How will security alerts be generated? What types of security alerts will be supported (anti-shimmer, dispense velocity, comms tampering, etc.)?
 - g. How will proposed security measures provide greater hardware, communications, and cyber security than for current ATMs?

- XI. For servers and other devices in your proposed Next-Gen ATM Network – App Servers, Routers, Monitoring Systems, etc.:
 - a. How will these devices be secured?
 - b. How will communication between these devices and ATMs be secured?
 - c. How will communication between these devices and back-end systems be secured?
 - d. How will security alerts be generated for these devices? What types of security alerts will be supported?

- XII. Describe end-to-end security features of your proposed next-Gen ATM network.
 - e. What preventative measures will be supported to guard against attacks on central infrastructure?
 - f. How will anomalous behavior be detected across the network?
 - g. Considering all devices in the Next-Gen ATM network, describe how security measures can be extended as criminals develop new forms of attack.

Verbatims from ATM Deployers:

- “End-to-End Security – This is an increasing threat. Certainly in South Africa syndicates are moving away from physical attacks (bombings, torching and grinding) to more sophisticated attacks such as malware, skimming and social engineering. The vulnerabilities in our existing architecture (Windows, XFS and thick client applications) makes it virtually impossible to secure our channel. If it’s in the Cloud it is harder to compromise.
- “ATM Industry lacks a standard on how to lock-down an ATM from a PCI perspective. It is possible that PCI new requirements will naturally address this, but today there is wide variability.
- “Information security for cloud-based systems is mature, proven, and continues to evolve. Endpoint-based security approaches have proven expensive, inconsistent, and ineffective for other channels – ATMs need a cloud-based architecture for improved security at lower cost.
- “Big data techniques – predictive modeling to detect attacks earlier.

Additional Input

Verbatims from ATM Deployers:

- “Require the ability to have an ATM serviced without taking the entire ATM out of service.
- User Experience
 - a. “Hardware User Experience – Devices are becoming more complex for customers. Especially in developing countries (such as South Africa), customer migration to self-service is affected by device complexity and literacy issues. Devices need to be simpler and more user friendly
 - b. “Software User Experience – What is intuitive to ATM savvy developers is not intuitive to our end users. The complexity of the software stack spills over to the user experience. The simpler we can make the interface the more success we will have with uptake and customer migration. On the other side of the spectrum customers have become accustomed to the BYOD experience. ATMs need to evolve to cater for this trend accommodate the smart phone (even feature phone) as the initiation point for transactions. We need to eliminate the need for the card and move authentication over to the smart phone. The ATM then just becomes a physical point of presence to dispense cash.
- “Gateway Systems – Interoperability is becoming more and more important in order to be able to adopt new technologies. As technology like biometrics and NFC is introduced banks need to come together to make this architecture possible instead of relying on proprietary and closed gateway systems.
- “Operational Considerations
To keep an ATM channel operational and profitable takes an army of people, which injects cost and complexity. ATMs are now commodities that should be simplified both from a hardware and software management point of view. ATM vendors need to take cognizance of the fact that Fintecs and Retailers are disintermediating Banks with simple technology and smart business models. If we do not evolve our archaic architecture we will make ourselves irrelevant for the changing consumer
- “Lifecycle Management – The lifecycle of an ATM is complex from leaving the plant to becoming operational to de-commissioning and responsible destruction. It again takes an army of people to provision an ATM, keep it alive and profitable until its expiry date. The more complexity we can remove out of the cycle the better for deployers, Banks and ultimately ATM vendors.