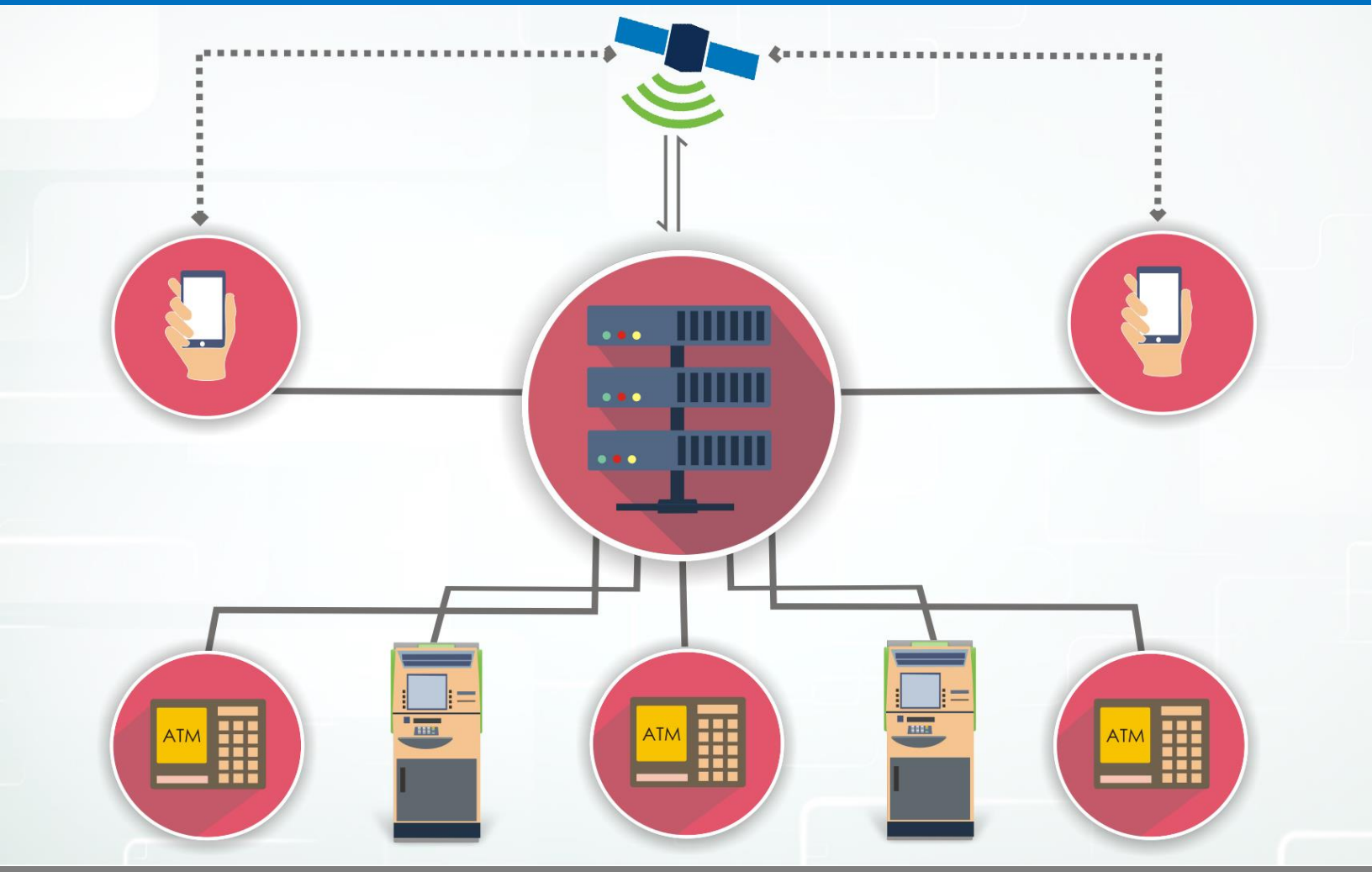
WHITEPAPER

A Secure & Effective System for Remote Monitoring of Large Network of Heterogeneous ATMs



Remote monitoring and management of ATMs is a critical aspect for banks from a business perspective. Deploying a centrally located 'ATM Management System' will help provide a secure, optimized, and low-cost monitoring solution, for effective management of a huge ATM network.

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CONTENTS

INTRODUCTION

ATMs have changed the way banks interact with their customers. Since, ATMs provide services beyond cash dispensing, strategic innovation for effective ATM deployment is required. Availability of machines for performing various tasks such as dispensing cash with receipts, deposit-taking and many such services, thus becomes inevitable. A stable and uninterrupted availability of all ATM services is the key to maintaining customer satisfaction. With banks further expanding their ATM networks, problems regarding their effective control & monitoring are sure to surge. A rigid control needs to be exercised, to prevent security issues pertaining to the individual terminal and network. Additionally, it should improve operating efficiency of the bank and the entire system. Banks should be able to use their ATM network to differentiate services, increase revenue and provide value added services to their customers. Failure to respond to fresh challenges would result in lost revenues, while providing a competitive edge to more incisive ATM deployers. Further, clients of the payment industry are extremely concerned about self-intelligence of the ATM network.

Intelligence and learning capability of the network can only improve through transactional and faulty data analysis of the specific network/terminal. It is self-explanatory that analysis of the transactional data of individual ATMs would be quite cumbersome as compared to a managed network. This is particularly true on an ad-hoc network.

This demands a central system, which can provide a fast, optimized and cost-effective solution to manage ATM networks. This Whitepaper proposes

an efficient ATM network management solution (ATM management system) that would provide financial institutions with comprehensive management and operations support to keep their machines up and running round the clock.

CHALLENGES IN MANAGING LARGE ATM NETWORKS

Financial institutions find it cumbersome to monitor and manage a large group of ATM terminals deployed at diverse locations. Moreover, frequent issues on an ATM terminal resulting from a dysfunctional device or faulty software modules, makes it all the more challenging for banks to resolve such issues within the committed time. Therefore, managing the ATMs independently across different regions raises several serious questions. The management of large ATM networks involves the following challenges:

- **Security Concerns and Operating Efficiency:** In the absence of a centralized management system, it is difficult for the banks to control ATMs individually, which in turn affects operating efficiency while raising security concerns. For example, if card-reader status is not monitored continuously then the chances are that banks might overlook tempering related attacks.
- **Increased Response Time:** Managing ATMs independently in an ad-hoc manner raises yet another problem of increased response time. For example, if a service-engineer receives an uncategorized problem, there is probability that the engineer might not have required equipment or skill set to resolve the targeted ATM's specific issue. Hence, the service engineer might need to make multiple visits to the site, in order to fix the faulty unit/device.
- **Data Collection and Analysis is Difficult:** Collection of transactional and faulty data is a strenuous process with the legacy management system. There is a critical need for an improvised system that facilitates easy data analysis to manage the generation of overall revenue.
- **Loose Control and Monitoring:** In the absence of a robust monitoring system, ATM terminals might remain out of service more often due to paper outs, software problems, or other unidentified problems.

WHY THE NEED FOR A ROBUST ATM MANAGEMENT SYSTEM?

Banks and other financial institutions are facing innumerable challenges in managing and monitoring a large group of ATM terminals. Thus, a central system that can allow these organizations to get complete control over managing a large group of diversified ATM networks is strongly felt. With a robust ATM management system in place, banks can realize greater efficiency, through reduced operating cost and increased revenue generation. An ATM management system is a central system, which is planned and implemented to manage, monitor and register messages from different ATM machines. The management system is also responsible for surveillance of the machine placed at a remote location, detecting and resolving ATM errors within a short span of time, at a low operational cost. With this system in place, banks can utilize their resources (ATM machines) more efficiently while remaining active/In-service round-the-clock with minimum downtime.

This System is based on the principle of listening to the messages/events sent by ATM machine and sending pre-defined requests.

The messages/events sent by the ATM is converted into an understandable format, for example, “receipt printer paper out”, “cash dispenser – cash out” etc. These will be saved for further action.

ARCHITECTURE OF THE PROPOSED ATM MANAGEMENT SYSTEM

The ATM Management System is based on the Client/Server architecture. The important components of this system include The Client, Communication Channel, Management Server, and Mobile Application. The Client is responsible for notifying the Server (regarding events which occur on an ATM) and processing the requests received from the Server. The Client exchanges messages with the Server using standard networking protocols. The Server is responsible for remotely managing one or more Clients connected within a network. A Mobile Application is responsible for synchronizing the geo-location of service-engineers with the Management Server (Figure 1).

Figure 1: ATM Management System

• Communication Channel

Communication channel plays a significant role in exchanging messages between ATMs and 'Management Server'. For exchanging the messages between Client and Server, **SNMP protocol** is considered the most accepted protocol. This protocol manages entities remotely over a network having unique IP Address. SNMP is poised to deliver end-to-end management for all areas of the growing inter-networking industry. A key reason for its widespread acceptance is its relative simplicity. There are different versions of SNMP, such as SNMP V1, SNMP V2, and SNMP V3. However, earlier versions of SNMP (Version1 and Version2) had few problems related with security and delivery confirmation, which indeed has been resolved in SNMP V3. Though, Microsoft's SNMP service currently supports only SNMP version 1 and 2, SNMP version 3 offers a more effective and secured solution.

SNMP V3:

- This protocol has added cryptographic security (encryption) and remote configuration enhancements.
- It has new textual conventions, concepts, and terminology.
- It addresses issues related to the large-scale deployment of SNMP, accounting, and fault management.

Client:

ATM acts as a client within 'ATM Management System'. Whenever there is any fault in the ATM, (Hardware or software), communication to the bank is made via an SNMP (Simple Network Management Protocol) service, which runs on an ATM. It helps in taking timely action on the targeted ATM.

Agent:

Implementation of SNMP Agent application is done using master-sub agent architecture. Master-agent is a component of Windows's SNMP service. Sub-agent is a module which plugs into the Master-agent.

XFS layer on the ATM plays a significant role in providing device's events to sub-agent. Sub-agent converts these events into a meaningful SNMP message and passes it to master-agent. Master-agent forwards this message to Management Server (Figure 2).

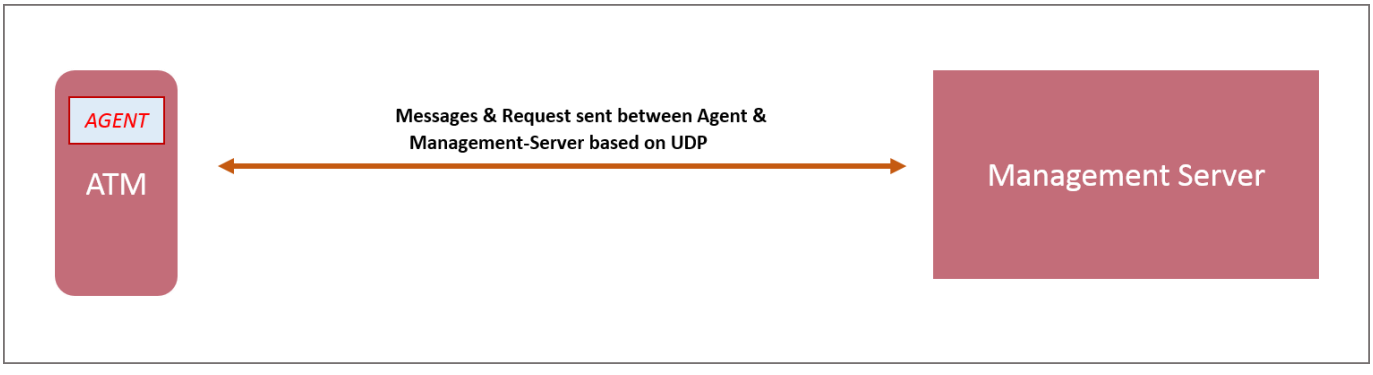

Figure 2: Communication between ATM and Management Server

- ## Management Server

Management Server is the core of the ATM Management System. It is responsible for interpreting the messages sent by Client (ATM), and converting them to a readable format for the service-engineers.

It includes rich features that help banks and financial institutes to resolve and analyze ATM related problems. These include informing service-engineers about the issues and generating reports related to hardware problems. Following are the components of Management Server and the functionality provided by each one of them (Figure 3):

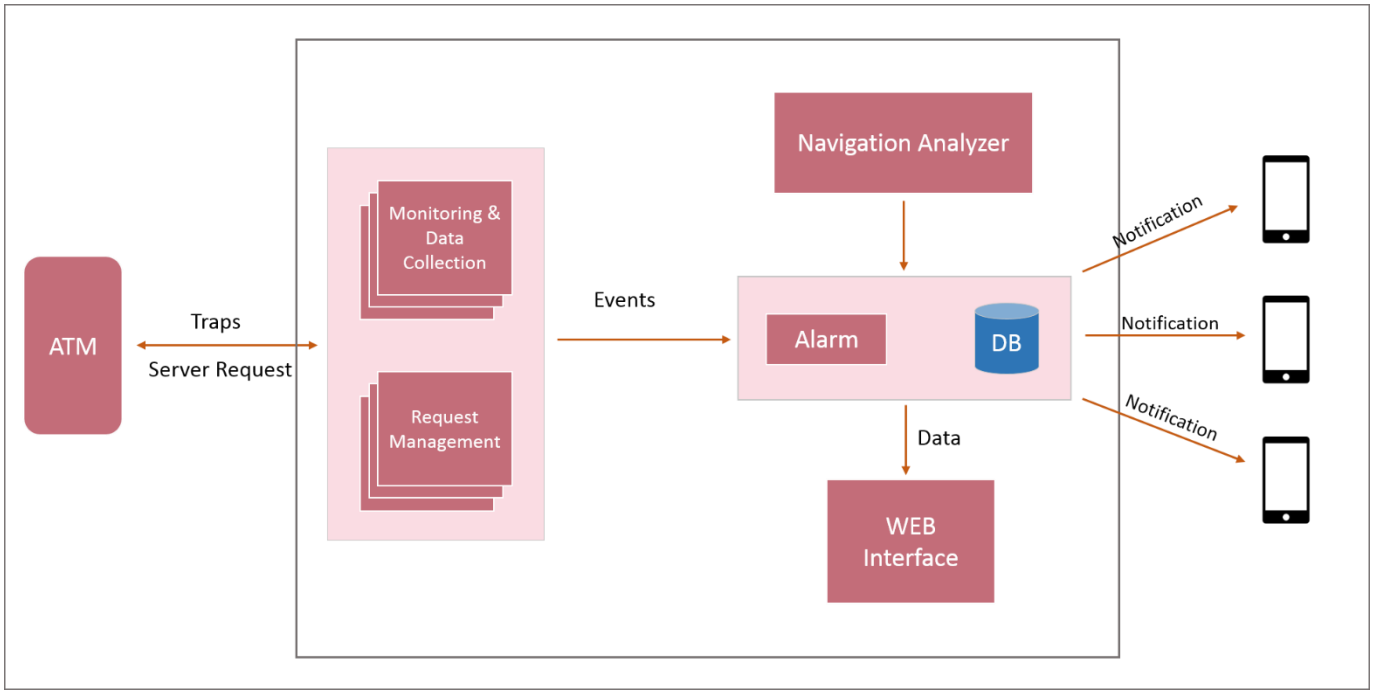

Figure 3: Components of Management-Server

- **Monitoring:** The monitoring module is responsible for receiving and registering any message/trap sent from an ATM. It stores them in a database and generates the ticket for the problem. The Operator can see the ticket and its description through a 'Web-App'.
- **Alarm:** After generating the ticket, monitoring module raises an event to notify the alarm-module. The Alarm module is responsible for intimating the problem to service-engineer in the form of messages, and email.
- **Request Management:** This module sends pre-defined commands to ATMs in the form of well-defined syntax. At times, few tasks such as resetting the device, require an engineer to visit an ATM, which instead can be managed remotely with the help of the new module.
- **File Management:** This module is responsible for exchanging files with the Client. The exchanged files could be of any type, in a compressed format. It also facilitates two different tasks including broadcasting the file

to selected ATMs, and a collection of logs from targeted ATMs.

- **Report Generator:** This module is responsible for generating different kind of reports required by banks to improve their services. It has complete access to the system database and can produce a variety of reports, as and when required.

- **Navigation Data Analyzer:** This module is responsible for identifying the appropriate service-engineer for resolving the issues that occur in ATMs. This is achievable, through periodically retrieving the geo-location data of service-engineers belonging to specific ATM-workgroups and assigning the ticket to the service-engineer nearest to the targeted ATM.

• Mobile Application

Mobile-application will provide added value to the complete ATM Management solution. Once the '**ATM Management System**' has processed the message received from **ATM (Client)**, and has categorized it in to a specific problem, an SMS with a problem description and other necessary information will be sent to the mobile application of the nearest service-engineer within corresponding ATM-workgroups. In this process, a GPS enabled mobile running a lite Mobile application will send geo-location data periodically to the Management Server. The Management Server will store this geo-location data and use this information to send messages to the nearest service-engineer's mobile, within the ATM workgroup. The illustration below highlights the flow of events (Figure 4):

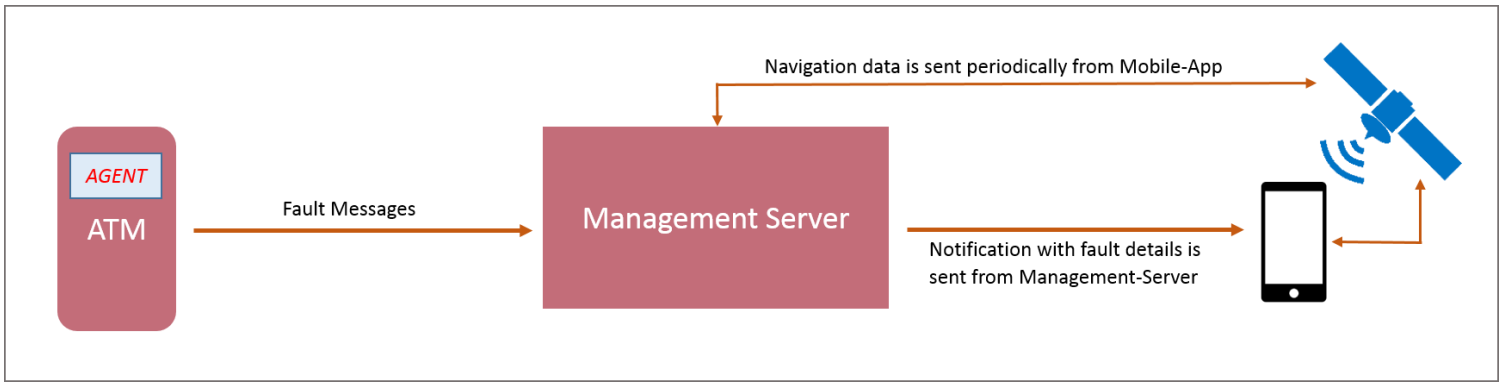

Figure 4: Communication between Mobile-App and Management-Server

- The moment service-engineer receives a ticket with necessary information related to an ATM problem, engineer will either accept or reject the assigned ticket based on his availability. If service-engineer accepts the ticket, he will be able to resolve the problem in a much easy and quicker way, as the ticket description provided will be concise and clear.

- If service-engineer rejects the assigned ticket then 'Management Server' will take further action on this ticket. The ticket will either be assigned to the next nearest service-engineer or the state of the ticket will be updated.

BENEFITS OF THE PROPOSED ATM MANAGEMENT SYSTEM

Following are the benefits of the proposed ATM management system over the current legacy management systems.

- The proposed system offers a secure and acknowledged solution, as it utilizes SNMP version 3 protocol. The messages exchanged over the network using SNMP v3 protocol are encrypted and cannot be morphed. The acknowledgement of messages is provided by this system. With this system in place, the overall response and resolution time required for servicing the ATMs is reduced considerably.
- Mobile-App helps in quickly identifying the geo-location of nearest service-engineer within an ATM-workgroup and instantly assigns the problem ticket.
- It leverages banks with flexible and comprehensive reporting tools for generating reports, which in turn could be helpful in identifying future-trends, and making prudent business decisions accordingly.

CONCLUSION

Myriad challenges continue to plague banks and other financial institutions in managing and monitoring a large group of ATM terminals. For independent monitoring of ATMs, banks need a robust enterprise-wide solution. Such a system would provide value beyond management, as well as, real-time monitoring of terminals, even over the multivendor platform. With a robust central ATM management system in place, banks would realize business value in terms of improved operational efficiency and augmented ROI.

Additionally, problems regarding ATM maintenance could be predicted well in advance so that regular tasks could be scheduled in a timely fashion. This, in turn, improves ATM uptime while reducing engineer visits.

Controlling the entire network of ATM terminals from a centralized location, can help banks to realize better operational efficiency through reduced cost and enhanced security. This would help banks maintain a powerful and consistent presence, throughout their operations.

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