RTS Technology Overview

Introduction

The Remote Transactions System (RTS) was developed by a consortium of public and private organizations[1] convened by the Hewlett-Packard Company in August 2003. The team, which joined forces to catalyze a breakthrough in the scale of microfinance, envisioned an end-to-end data processing backbone that would link microfinance clients to the formal financial sector. A financial transaction system would provide timely and accurate data for microfinance institutions. It would also allow microfinance transactions to be captured anywhere and transmitted to back-end systems, such as accounting systems, central switches, credit reference bureaus, and other financial services.

The RTS solution was built specifically for microfinance institutions and was optimized for reduced cost, reliability, and simple technical requirements, uniquely positioning the technology relative to other PoS solutions in the marketplace today. Many applications that were developed for, and used in more sophisticated financial markets, are optimized for increased functionality and flexibility and rely on infrastructure heavy environments, which results in higher costs and the need for more advanced technical support. The low entry point to take up this solution enables all institutions interested in providing microfinance services a viable and sustainable means to gain a return on investment while expanding customer services.

From January 2004 through March 2005, the RTS was piloted in three microfinance institutions in Uganda. Each institution used the solution according to a different business model. Two of the models demonstrated that they could return positive value to the microfinance institutions and their clients. One of the models is relevant to microfinance institutions that provide loans through traditional group lending methodologies. The second model empowers institutions that offer individual loans.[2]

RTS Architecture & Components

The RTS is composed of a hardware device, known as a point-of-sale (PoS) terminal, a specialized software application, smart cards, and a RTS back-end system. All transactions that are captured on the PoS terminal are uploaded to an RTS server (simple PC). The data then moves through a connector to the accounting systems of the appropriate microfinance institution.

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[1] The Microdevelopment Finance Team (MFT) includes individuals from Accion International, Bizcredit, FINCA International, Grameen Technology Center, Freedom from Hunger, Global eChange, PRIDE AFRICA, and Hewlett-Packard Company.
[2] Details about the pilot, the financial models for each participating microfinance institution, and the lessons for achieving scale will be published and available publicly in Summer 2005.

The RTS solution consists of the following components:

- Smart cards distributed to clients and agents
- Wireless point-of-service (PoS) Terminal running the RTS client software
- Centralized server running RTS server software and an MFI connector interface
- MFI accounting system to which transactions are reconciled

The following diagram shows how the main components of the RTS fit together:
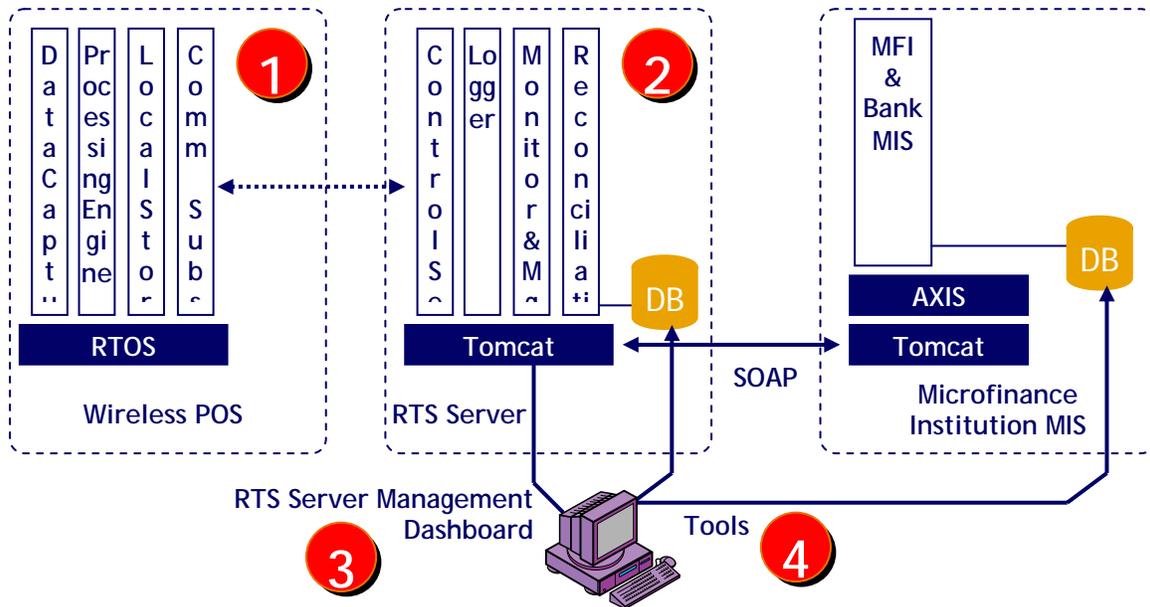
The PoS terminals are equipped to communicate with the RTS Server via GSM, landline, or serial cable. The RTS functions either as an online, real-time system or as an offline system. When connecting to the RTS Server through either GSM or a landline, the PoS terminal is making either a cellular or regular phone call. Both of these approaches are used when the PoS terminal is not in the same location as the RTS Server. If the PoS terminal is in the same location as the RTS Server, then the PoS terminal can be connected directly to the RTS Server through a serial cable.

Transaction Process

- A client arrives at authorized PoS terminal with their authorized smart card
- The agent initiates a transaction through the PoS by inserting a smart card into the terminal thus authenticating the terminal and its association with that agent.
- The client inserts their smart card into the PoS terminal.
- The type of transaction – savings deposit, loan payment, withdrawal, funds transfer – is selected.
- The amount of payment is entered into the PoS

- A screen appears requiring both the agent and the client to confirm the transaction type, account number, and amount.
- Upon acceptance of the transaction, the PoS device prints two receipts – one for the client and another for the agent.
- To ensure that the time required to connect to, and communicate with, the RTS Server is minimized, the POS "packetizes" the data it is sending by compressing and encoding the data.[3] The data is also encrypted[4] for security purposes.
- Transactions flow from the RTS server through the connector to the appropriate microfinance accounting system
- Accounting staff at the microfinance institution perform a set of end-of-day reconciliation procedures

Lipman Nurit 8000

The Lipman Nurit 8000 was chosen because it met the following requirements:

- Rugged design and battery power
- Programming interface that could use Java runtime builds
- Support and distribution available globally for future usage scenarios
- Built-in GSM capabilities
- Built-in Smart Card reading/writing capabilities
- Built-in Printer

PoS Software

The Lipman Nurit 8000 is shipped with a default interface that allows the purchaser to load customer-specific applications developed in Java to the terminal. Before a PoS terminal goes into the field, it must be loaded with the RTS PoS software that converts the terminal into an RTS terminal for a specific microfinance institution.

Smart Cards

There are two types of smart cards used in the RTS solution, a 2KB memory card that is used by clients and a 32KB card that is used for agents. Client cards can hold approximately 6-7 transactions and the high volume cards can hold up to 300 transactions. As a result, the high volume cards can be used as floppies or as a backup transaction log.

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[3] Compression is via built-in "code books" that are shared with RTS server.
[4] The encryption information is hard-coded for added security. It also uses standard encryption techniques for https but no public keys.

RTS Software

<u>RTS Management Console</u> The RTS Management Console (Console) is an Internet web site consisting of an Apache Web Server and a MySql database. For the pilot project, each microfinance institution has a dedicated Pentium PC running Windows 2000, which contains both the RTS Server and Console. The Console provides the following capabilities to microfinance institution users and administrators:

- Login screen requiring password
- Multiple levels of user access (general user, accountant, and administrator)
- Card credentials input and control (enable, disable, add, remove)
- Terminal credentials input and control (enable, disable, add, remove)
- Credentials reports for cards and terminals
- Detailed transaction reports through the report generation tool
- Manual transaction entry
- Commission and fees setup

<u>The Connector</u>   The connector consists of a TCP server on the RTS side of the solution and a Listener on the MFI accounting application side. The TCP Server manages the sending and receiving of data between the RTS Web Server and the Listener. The Listener manages the sending and receiving of data between the TCP Server and the MFI MIS software. The MFI MIS side of the connector has to be built by the MFI MIS vendor.

The connectors between the RTS were constructed to work with existing MIS systems for microfinance, such as Banker's Realm, SIEM and Loan Performer. A minimal level of development effort is required for any MIS vendor to build the code required for their software to accept transactions from the RTS server. This approach will allow all MIS vendors to quickly adapt their solutions to work with the RTS, building interoperability between the applications.

Sevak Solutions and Open Source

The Consortium that developed and piloted the RTS came together to dramatically increase the scale in microfinance. As they worked together toward that common vision, they sought to accomplish what no institution could accomplish alone. The team also agreed on the following set of guiding principles.

- Foster collaboration on central issues while allowing innovation and competition at the local level
- Support the development of standards and procedural protocols to aggregate client data and increase information flow
- Empower service providers at all levels of the global financial system

- Foster and enable innovative solutions that will reduce the cost of transactions, increase the points of access and broaden the range of financial products and services for the world's poor.

These principles led the Consortium throughout its work together. When the pilot ended with the creation of the first elements of a working solution, the team decided to make the code available to any microfinance institution, developer, or implementation team that could take the work to the next level. As a result, they decided to transfer all their rights in the Intellectual Property (IP) to a new non-profit organization, Sevak Solutions, that will have the authority and capacity to provide executable and source code licenses to all interested parties.

Having fulfilled their initial mission, the original consortium disbanded in May 2005. Before disbanding, they transitioned their ownership and mission to Sevak Solutions. The RTS software is now available to interested parties through an open source licensing agreement with Sevak Solutions.

To learn more, go to:
www.sevaksolutions.org

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