

ICT in Micro finance

Datanet Systems Ltd

1.0 Introduction

Micro finance is becoming a major segment of financial operations under the inclusive finance policy and is considered to be a key approach to poverty alleviation. Several models of micro financing have emerged. Primarily, they are: SHG model, Individual Member model, Members in an SHG model, MFI Funding model, SHG-Bank Linkage model, etc. While each of these models has certain distinct characteristics, they also have several commonalities. Deployment of ICT is considered in all of these models essentially for achieving low cost of transaction and for managing scalability efficiently.

This paper describes an architecture developed and implemented for an efficient and cost-effective solution by Datanet Systems Ltd and Encore Software Ltd.

2.0 Business processes

The key business processes that can be considered to be common to all models are:

- (i) Collection of facts about the prospects with a view to assessing their credit needs and eligibilities – *a field level activity*
- (ii) Assessing the creditworthiness and deciding the quantum and nature of credit – *a centralized back-office activity*
- (iii) Selecting a loan product to offer -- *a centralized back-office activity*
- (iv) Preparing the requisite documentation and financing instruments -- *a centralized back-office activity*
- (v) Preparing the loan related data needed for the disbursement -- *a centralized back-office activity*
- (vi) Disbursing the loan – *typically a field-level activity*
- (vii) Preparing the repayment related schedules -- *a centralized back office activity*
- (viii) Collecting the repayments -- *typically a field-level activity*
- (ix) Maintaining an accounting system and integrating the disbursement and repayment data with a back-end accounting system -- *a centralized back-office activity*
- (x) Generating the required MIS or business intelligence for guiding and assessing the progress and performance of the scheme and the borrowers -- *a centralized back-office activity*
- (xi) Communicating progress and performance metrics to the borrowers -- *typically a field-level activity.*



The system is typically hierarchic and consists, from the bottom layer, of the borrowers, the field officers, branch offices, and central office with one or more corresponding levels of accounting systems. The entities may interact directly with the relevant layer or through intermediaries such as NGOs for some of the functions.

3.0 ICT deployment points

It would be seen that the business processes are all highly amenable to the usage of ICT. All entities participate in one or more of the following activities -- data generation, data capture, data processing, and data dissemination. Hence the two essential attributes of ICT, viz. data capture and processing, and data communication play a vital role, particularly because of the hierarchical set up. The challenge is in selecting and deploying the right technology and system suited to the needs and capabilities of the respective entities and their interaction medium, with the cost of transaction and adequate scalability as the prime factors for consideration. This is also an important consideration in view of the geographies in which the entities operate. As many transactions involve financial data, many a time through intermediaries, it is additionally felt that security features such as authentication, non-repudiation, and encryption would be welcome and comforting features.

The accounting systems are fairly well understood in terms of functionality, platform, manageability etc., and traditional PC/server-based solutions developed by many are available. In this paper, we will focus on the solution for field-level activities and their interaction with the other entities.

4.0 Need and characteristics of the field-level IT solution

A study of the business processes clearly brings out the fact that the source and destination of all data is actually at the field level. Hence an effective device to capture and disseminate data becomes very important to achieve the efficiencies of ICT – data capture at source, avoidance of repetitive entry of the same data, selection and display of only relevant data, making available accurate and current data with least delay, etc.

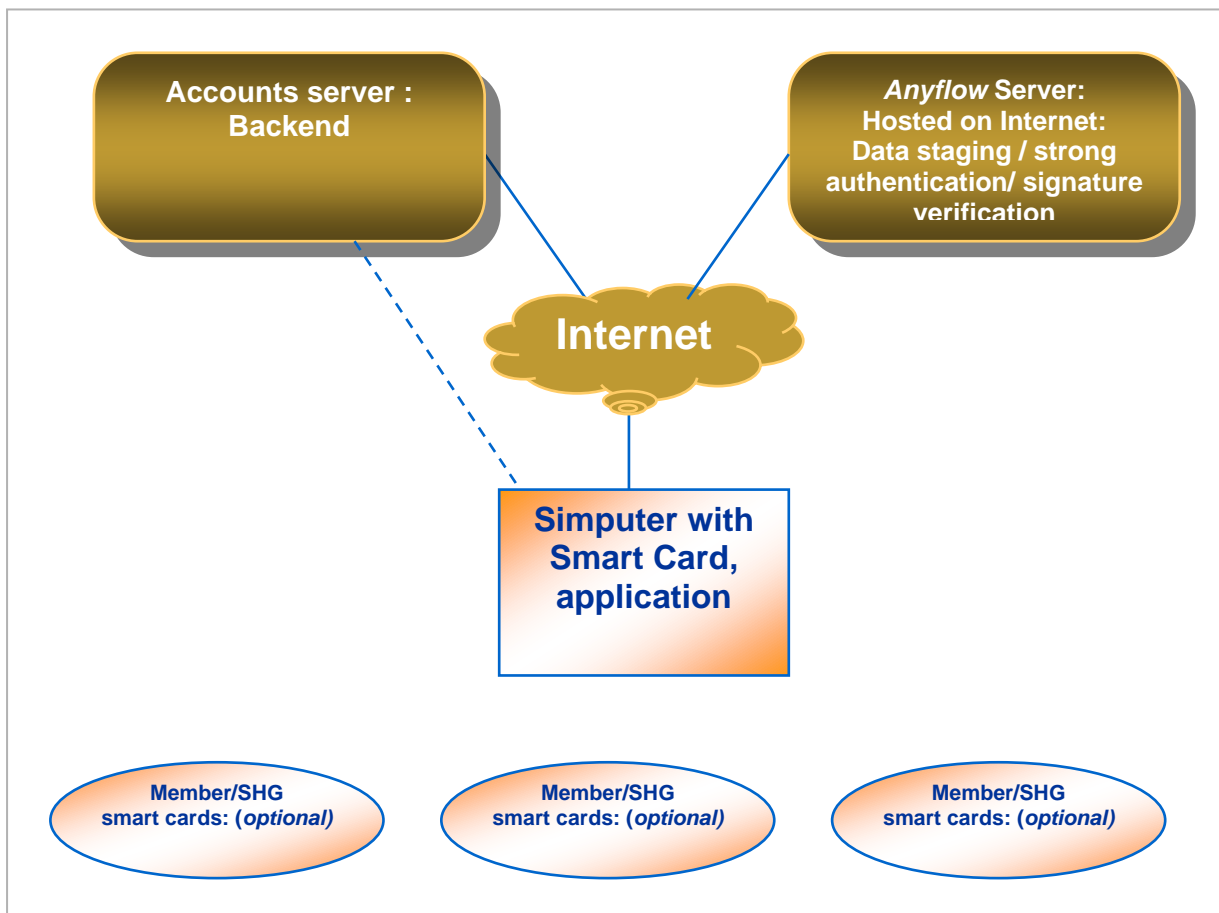
The field-level activity in most of the cases is in rural/semi-urban geographies. Further, the field officer covers a reasonably large geographical area by actual travel. This imposes the following requirements on the ICT solution: (i) the device should be truly portable (ii) should work on battery for sufficiently long periods (iii) should have support for local languages (iv) should be very easy to learn and use (v) should be efficient for limited data capture of all types – alpha, numeric, photo, biometric (vi) should have no maintenance hassles (vii) should have a range of connectivity options (viii) should work in a wide range of environments (ix) should have adequate data storage and processing capability (x) should have a mini printer option (xi) should have assured support and continuity (xii) should be relatively low cost (xiii) should have the



ability to load custom-developed applications and to field-upgrade them, and (xiv) should have a way of implementing “security”.

5.0 Architecture of the solution

A solution with the following architecture has been developed which can meet almost all the requirements of the various models of microfinance.



Components of the architecture:

Accounts Server: This could be any existing software being used for the accounting of the loan accounts. It would typically have all the functionality to handle backend business processes and computing loan-related details such as interest, penalty, and savings related details etc. It could be a single server or a set of regional servers connected for data aggregation & processing to a central server.

Anyflow server: This is a hosted-managed service offered by Datanet. It is a 24x7 service, with an unattended-mode server hosted on the Internet. Its primary function is strong authentication of transaction data by digital signature verification of the cardholders. Optionally, it can be used for intermediate data



staging, both ways -- between the accounts server and *Anyflow* server and between the *Simputer* and *Anyflow* server.

Simputer with Smart card and application software: The *Simputer* has been chosen as a device that meets all the requirements stated in section 4 above. It is typically used by field officers. The application software to enable this functionality is loaded in this device. A small-footprint RDBMS has also been integrated for providing a powerful local data access capability. The smart card with a PIN and unique key per card is used for authentication & non-repudiation of the Field Officer, and for detecting data transmission errors. It also acts as a hardware lock for the application, and prevents unauthorized use. The built-in smart card reader in the *Simputer* makes its implementation very easy and elegant. The multiple built-in communication options of the *Simputer*, such as IR port, dial-up, Ethernet, CDMA/GSM option, etc., make the architecture easy to realize. Thus the data from/to *Simputer* can be exchanged over Internet with a central server directly or thro *Anyflow* server or over IR/LAN with a regional server.

Borrower Smart card: This is optional, but recommended. It can be issued one per SHG or one per member, depending on the scheme. It is used for storing the bio-data of the borrower entity, for authentication/ID of the borrower, storing a record of all financial transactions on the loan accounts, optionally finger print minutiae and to generate a digital signature of disbursal and repayment/deposit transactions. The card can be reused after a loan account is closed.

Internet connectivity: This is considered a ubiquitous facility and is continuing to spread its coverage steadily and rapidly.

6.0 Typical Functionality and Operation

The *Simputer* software can have primarily two modes of operation: Online and Offline. In the online mode, it connects to the *Anyflow* server and performs the transactions with the data available on the server or uploads and downloads data to/from the server. In the offline mode, the data already downloaded to the *Simputer* is used to perform transactions without any connectivity.

In a situation where there is a smaller local-accounts server, the *Simputer* data can be uploaded/downloaded with the server using IR or Ethernet connection.

Wherever needed, the data has to be sent to the *Anyflow* Server for strong authentication or digital signature verification.. It could of course be sent post-facto as batch data, too.

Customer authentication can be simple, by Smart card or by fingerprint verification.



The set of financial transactions supported are: loan sanction details, loan disbursement details, loan repayment schedule, loan repayment details and loan closure. Efficiency and convenience are achieved by providing several parameters-based sorted views of data from the local RDBMS.

A generic user-customizable forms-definition module is also available for any other data capture. Of course, custom-built data capture forms can also be provided.

7.0 Field Trial and its lessons

The application was initially developed and field tried with the MFI Sanghamithra. It was tried in semi-urban and rural areas for a specific SHG interaction model they were experimenting with. The application stabilized after a few iterations, and performed all transactions comfortably with dial-up connectivity to the Internet. However, Sanghamithra wanted to change the interaction model and the ICT solution to a field-officer-based model, and the application was modified suitably to support both the earlier version as well as the offline field-officer version.

Subsequently, with our interactions with other micro finance agencies, the application has been more generalized to meet almost all models. Some customisation may of course be needed in specific cases.

8.0 Issues to be considered by MFIs

In selecting a technology solution, apart from the initial cost of hardware/software, the MFIs should give due consideration to the following aspects:

- (i) What is the growth foreseen in operations size in the next 3-5 years?
- (ii) Will the schemes/business processes undergo modifications/enhancements with time due to feedback, changing market scenario etc.? Examples are from pure micro credit to savings cum credit, from loans only to insurance with loans, gathering survey data in addition to payment related records etc.
- (iii) Would it empower the Field Officers to become 'smarter' as they mature in the operations?
- (iv) Would the same device & architecture be usable if new services are added by MFI thro its network of Field Officers such as becoming 'delivery channels' for agro products, other products or services?
- (v) Will the solution purchased become a waste/limitation due to the above factors? Or does the hardware/software have the intrinsic capability to adapt to such changes?



- (vi) Can the solution save costs elsewhere such as in number of local offices with computing & connectivity infrastructure to be opened & maintained, number of field officers to be deployed, number of functions field officers can perform, etc?
- (vii) Does it have provision for adequate security to deter/detect/prevent frauds that may start occurring as operations grow?
- (viii) Would a relatively higher initial cost be justifiable in view of above issues?

9.0 Conclusions

The architecture proposed is capable of meeting all the needs of the 'last mile' computerized interaction needs of the MF sector. The *Simputer* with its many hardware features specially designed keeping in mind the needs of semi-urban and rural regions, along with its system software capabilities, is a perfect fit for the problem. The variety of communication options possible makes a powerful architecture feasible. The smart card brings in the additional factors of authentication, non-repudiation and local data storage. As the cost of all components is the lowest possible, for a computerized operation, the cost of transaction will be lowest with this solution. For more demanding needs, it is possible to deploy the next generation device *Mobilis*, with the same architecture and software functionality.

For details contact:

Datanet Systems Limited

#90, G R S Complex, 2nd Floor, 2nd Cross, 8th Main
J P Nagar, 3rd Phase, Bangalore - 560078

Tel: 91-80-66648200, Fax: 91-80-66648203

E-mail: vish@datanetsystemsLtd.com

