Automatic Demand Draft Generation using the Automated Teller Machine

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Abstract — **Automation of any processes in an efficient way that affect the mankind is an increasing demand of recent times. This includes the automation process that aims at instant generation of demand draft using the automated teller machine assigning a unique number for each demand draft generated coupled with availability of information for the same on the mobile. It also includes minimizing the transactions with respect to the financial institution for demand draft generation. Hence, the aim of this paper is to provide an efficient and convenient mechanism for the generation of demand draft using Automated Teller Machine. It also takes care of security issues to prevent its forceful generation by any means. There is a need to automate this process by making an instant debit on the user account from which demand draft generation is requested and credit to the account after producing the same to any respective financial institution or through the ATM itself. Also, the technical and the financial complexity of automated process are reduced by installing module within the automated teller machine which is globally accessible. This has been automated using RESTful web services which reduces the burden on the financial server.**

Key Words: Automated Teller Machine, Demand Draft Generation, Financial Servers, Pass Code.

I INTRODUCTION

Automated Teller Machines (ATM) have become the need of the day for any type of financial transactions. The Automated Teller Machines [1] [2] which performs the financial activities with ease are installed in all the locations around the globe. The increased connectivity, increasing demand for instant availability of the financial services has increased the need for Automated Teller Machine (ATM). The birth of Automated Teller Machine field changes the view on financial services domain and turns the instant availability of financial services into reality. In our daily life the best example is the instant cash withdrawal. The aim of this paper is to concentrate on the generation of demand draft using the already existing ATM terminals. In the current scenario, use of ATM terminals for the demand draft generation has the following benefits,
1. One can access the ATM terminal applications at any instant of time framework. The 24x7 facility is one of main benefit of integrating the service with the Automated Teller Machines.

2. Providing higher efficiencies with greater utilization is one of important goal. This enables the generation of the demand draft with no extra need for human and financial resources.
3. Generate the Demand Draft whenever and wherever needed provides flexibility and allows the users to access the ATM Terminal even at remote hours to generate the demand draft.
4. The resources required for the financial activities thus could be properly tuned down according to the requirement. It provides scaled up and down feature of the resources as per the changing needs of the business.
5. It helps in quick automatic updates to the user mobile about the transactions that happened in the automated process of generation of demand draft in a timely manner.
The motivation for proposing such type of automated system is as follows,
1. There was deployment of human force in each financial institution for the generation of demand draft. This solution is to avoid additional wastage of human resources and subsequently additional financial burden on the financial institution.
2. Also the main issue of the customers or the end users approaching the financial institution is thus avoided. The need of the customer or the end user to stay in the long queues at the financial institution is also avoided.
3. Achieving a complete automated process for dispense of the demand draft. The fact is that the automated teller machine are underutilized, it is programmed to work for other financial services to improve the utilization rate thereby providing an efficient and automated process for the demand draft generation. 4. Making the entire process of demand draft generation available instantly and available throughout the day even if the financial institution is not working.

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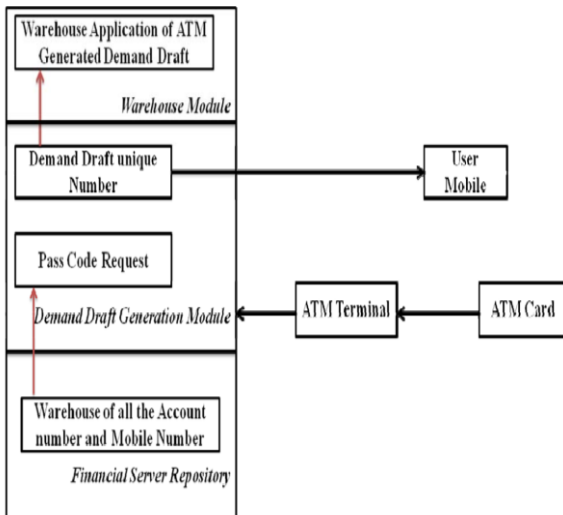**ISSN: 2278-0181**
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Figure. 1. High Level Architecture of Proposed Automated Demand Draft Generation Model.

The Section II describes the high level architecture of the proposed system. Section III deals with how the failures in the existing demand draft generation methods are addressed. Section III describes the various phases associated with the proposed system along with the complete functional flow. Section V deals with the implementation issues of the proposed model using the RESTful web services.

II. PROPOSED ARCHITECTURE

The architecture proposed is interrelated and interdependent architecture that could possibly be divided into three separate modules - one the Demand Draft Generation Module, one the repositories associated with these transactions followed by the pre-existing ATM Terminal and the financial server with the National Financial Switch. Module I - Demand Draft Generation Module contains the date base of the ATM Card Number, the account number and the branch code number of the end user, to which bank the card is associated and a random number generator. It also contains the field of the unique demand draft number generated pointing to the account number of the user for which the demand draft has been generated. It also has the data associated with the generated demand draft such as the date of activation data of expiry. This also prevents the module from assigning the same demand draft number to two different demand draft generated using the ATM. Module II - repositories include the Warehouse Application of ATM Generated Demand Draft. Also it maintains the separate repository to which the details of the account number and the user mobile number are stored and updated by the financial institution. The Module III - existing Automated Teller Machine terminal, National Financial Switch (NFS) and the financial server is upgraded suitably to interface with the newly developed demand draft generation module and for proper session maintenance and coordination amongst the same. The architecture extends to the fact that the entire process is controlled and coordinated by a single centralized system. The coordination among the modules could be split into three major activities as follows,

1. The user swipes in the ATM card and the respective financial institution validates the same. Once the validation is completed, the financial institution server list out the available financial services with respect to the corresponding bank of the ATM Card. The user selects the services (in case of this paper – demand draft generation services) and the financial server now communicates to the corresponding demand draft generation module for further communication with the ATM Terminal. This happens only after a secure communication is established between financial institution server and the ATM terminal routed via the National Financial Switch after the validation of the Personal Identification Number (PIN) of ATM Card holder.

2. The user is validated by the demand draft generation server with the help of the pass code. The pass code is the unique code in which the financial institution server demands an additional level of authentication from the end user. This code usually contains the random security questions that the user previously would have entered in the online banking session and the general personal information of the end user like the year of birth, last four digits of the officially registered mobile number. The pass code is generated at random, in combination of the any two above mentioned data (not palindromic – for security purpose) and requested to the user at the ATM Terminal. Once the validation is complete, the amount for which the demand draft has to be taken and the beneficiary account number are requested from the end user. On entering the unique account number of the beneficiary, the name of the beneficiary is displayed to the end user at the ATM Terminal. Once user finds a match, the payment towards the demand draft is made. A Demand Draft with a unique number on it is generated. Simultaneous debit is made to the user's account.

3. One level of additional comfort could be given to the beneficiary after the receipt of the demand draft. Either the beneficiary could personally deposit the demand draft to any of the nearest financial institution or could possibly approach the ATM Terminal, enter the unique Demand draft number and make a credit to the account after the swipe of their ATM card. To achieve additional level of security, the demand draft generated will be realized for credit to the beneficiary only after a day of generation of the demand draft. Also to prevent some other person to force the end user from generating a demand draft in their name inside the ATM Terminal, entering the reverse of the pass code would generate a demand draft but will not make a debit in the end user account and also will not subject that particular demand draft for realization. The person who forced would come to know that this demand draft number is not valid only after one day of generation of the demand draft. This acts as a additional level of security.

There is a possibility of the end user who generated the demand drat to cancel the same using the ATM. On entering the unique demand draft number on the ATM, the user will be prompted again with the pass code and then confirmed for the cancellation transaction. Once

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user confirms, the warehouse of the demand draft generated deletes the entry paving way for the unique number to be used for other demand drat and makes a simultaneous credit to the end user account provided the demand draft has not expired.

III. BENEFITS OVER THE EXISTING SYSTEM

There is one such existing system deployed using the Automated Teller Machine with the use of a trusted third party application [3]. There comes a system which routes all the information through the trusted third party application server. So there is an additional Third Party Application Server. The main drawbacks that are associated with the former that are addressed in the current are as follows,

1. All the transactions happen through a trusted third party application. Though the application is hosted on a trusted authority third party server, there is no particular security mechanism in place to discuss the maintenance of integrity in case of any compromise. There is no security mechanism in place to address such compromises. But in the current system discussed, there is no third party interference. Also there is no question on compromise on secure communication as the entire communication happens through existing secure network with no additional interfaces.

2. Also in the main cause of concern in the existing system is the complexity of the financial transactions. There is a need for the trusted third party server to route all the transactions from and to the financial institutions i.e., if the end user account is with one financial institutions and the remitter account is in another financial institution, there is a need to have a simultaneous debit and credit on both of the servers of financial institutions. In this proposed system, there is no need of such complex transactions. Once the secure session between the respective financial institution and the ATM Terminal is established, there is a debit happening for the amount of requested on the beneficiary account number and name from the account holder of the end user who requested a demand draft. The simultaneous credit will happen only when the beneficiary submits the printed Demand Draft generated by the Automated Teller Machine to any financial institution or approaches the ATM for its realization.

3. Avoiding complexity in the transactions and allowing no compromise in the security and integrity of the user's personal data compromises are major achievements of the proposed system. Also there is instant availability of the demand draft and there is no changes in the existing infrastructure of the ATM network set up are also achieved in the proposed design.

4. Some other system which proposed the new paper stack for printing [4] the demand draft requires a change in the design of the ATM Terminal. The proposed model does not require change in any design and from entering the end user account number, the name is retrieved, makes the life even easier as there is necessity for changing the keypad also does not arise. The provision for the beneficiary to swipe the ATM Card and enter the unique number

associated with the demand draft, makes a credit automatically to the beneficiary account number reduces the complexity with respect to the beneficiary in approaching the financial institution.

5. Also the credit in the beneficiary account subject to the realization of the demand draft would happen only by approaching the financial institution. In the proposed model realization of the demand draft and the credit on the beneficiary account is automated using the ATM itself. The realization of the demand draft is only after a day of its generation, which adds a additional level of security as no person could force the end user to generate Demand Draft for their account number in the ATM Terminal.

6. The new feature of pass code if entered in reverse would generate a demand draft but would never subject to realization, add as an additional tier of security. Thecancellation of the demand draft generated is possible by the end user using the option of cancellation of demand draft provided in the ATM terminal services itself. This increases the convenience of the proposed model, thereby by making instantaneous credit into the user account once the demand draft gets cancelled.

IV. FUNCTIONAL FLOW

To discuss the entire functional flow of the automated demand draft generation process, it is necessary to split the same into three different phases. These three different phases are Pass code Generation and Validation Phase, Demand Draft Number generation phase and the demand draft issue phase. Pass Code Generation Phase. This phase is the primary phase that happens as soon as the secure session between the ATM Terminal and the financial institution server is established after being routed by the National Financial Switch (NFS). The NFS routes the session in accordance to the guidelines prescribed by the particular governing bank of that country.

1. The ATM Card is inserted into the ATM Terminal, the National Financial Switch routes to the particular financial institution. Then the ATM card is validated and the PIN number (Personal Identification Number) is requested from the end user. Once the PIN is validated a secure session is said to have established between the ATM and the financial institution server. Then the available list of services is displayed to the end user using the ATM Terminal.

2. Once the end user selects the Demand Draft generation services, the financial institution server requests an additional authentication in form of a pass code. This pass code is a combination of personal information of the end user and the random security question that is prompted to the end user at the time of online banking. One such sample pass code is asking user to enter the last four digit of the registered mobile number in combination with the year of the birth in reverse order. It is taken care that the generated pass code is not palindrome – for security purpose.

3. For retrieving such information, financial server repository which holds the warehouse of all the account number is contacted. The pass code if entered in reverse

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would lead to generation of the demand draft but will not be subjected to the realization. This acts as an additional tier of security.

4. Once the validation of the pass code is made the user is allowed for the process of generation of the demand draft, thus making the entire process to be authenticated providing an additional tier of security. This completes the pass code request and validation phase.
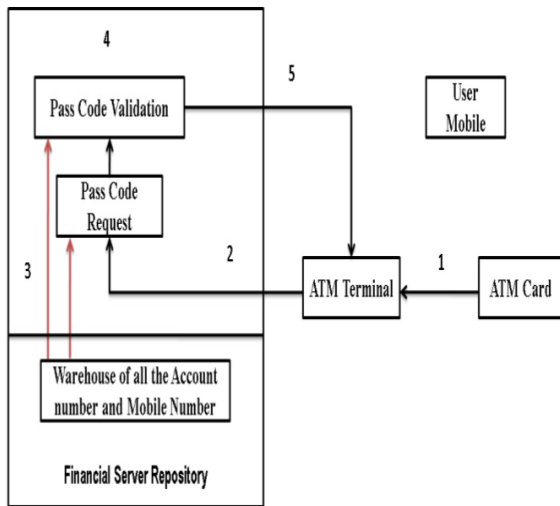
Figure. 2. Pass code Request and Validation Module

Demand Draft Number Generation Phase. There is a unique demand draft number generated in each case of the generation of same. The demand draft generation process begins after the validation of the Pass Code generated. Once the user enters the pass code from the ATM terminal, the same is validated at the financial institution server and the demand draft generation phase comes into existence.
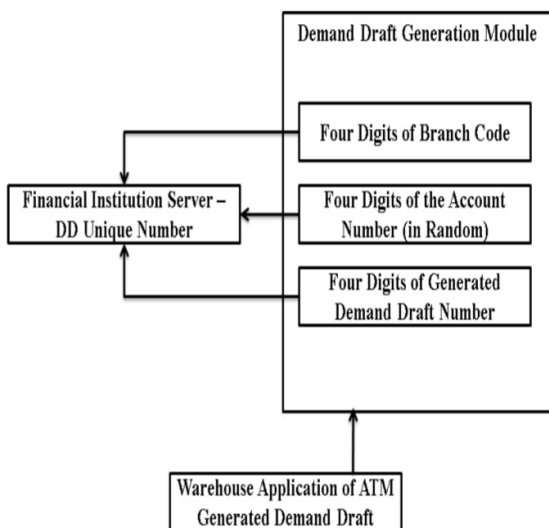

Figure. 3. Demand Draft unique Number Generation Module

This unique demand draft is generated with the help of the warehouse application of the ATM generated Demand Draft which is then updated on the issue of the same. Until the credit is made to the beneficiary account or the demand draft gets expired, the same number is not reused. This

repository is common and accessible to all the financial institution through the national financial switch. This repository is maintained by the single governing bank of the particular country (in case of India Reserve Bank of India). This is made accessible only through National Financial Switch, thus making the entire truncation between it and the financial institution server secure.

The generation of the unique number associated with the demand draft is using three important components from the warehouse. These are the branch code of the respective financial institution to which the ATM card belongs, account number of the ATM Card and the Random Number Generator. Last Four Digits of the account number in random and the four digits of the branch code of the respective financial institution to which the ATM card belong to is taken. Along with it a randomly generated number is appended. This is shifted and rotated and verified, validated to find if it match with existing active demand draft number. If match is found again the process of shifting of digits is carried out else, the same is updated on the warehouse of the active demand draft generated using the ATM.
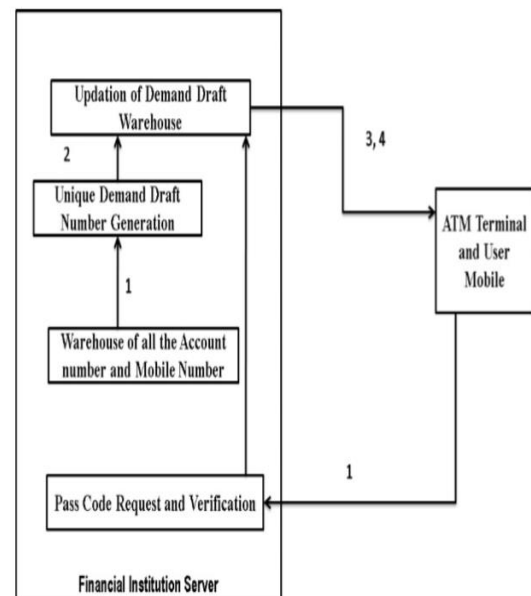

Figure. 4. Demand Draft Issue Phase.

Demand Draft Issue Phase: This phase does not wait until the generation of unique demand draft number generation process. The entire phase and its transactions is as follows,

1. This demand draft issue phase starts once the pass code request is made to the end user and the pass code is validated. This indicated by simultaneous transaction of pass code verification and validation and the unique demand draft number generation process with the help of the warehouse application of all the account number and the mobile number.

2. Once the unique demand draft number is generated, the demand draft repository is updated with the unique demand draft number against the respective account number of the end user, date of the demand draft drawn, the beneficiary account number and the name, amount for

which the demand draft is drawn, the active date for the demand draft (one day after the issue of demand draft), date of expiry. If the pass code entered is in the reverse order nothing is stored except a demand draft for some randomly assigned number is said to have issued and intimated to the ATM terminal. These fields are not updated and so the demand draft will never become active.

3. Once the details are updated in the warehouse of the demand draft generated using ATM, the barcode corresponding to the unique number is generated, stored in the warehouse and the same is sent across the secure channel to the ATM Terminal. A barcode is printed on the sheet of paper issued as demand draft. So there is only one need to introduce high resolution printer to print the bar code by recognizing it. At the same time, the mobile number of the registered user gets a message of generation of the demand draft for specified amount. Even if pass code is reversed and entered, the message is delivered, but the updating does not happen in the warehouse related to demand draft generated using ATM. Beneficiary after one day of issue of demand draft would enter the unique Demand draft number and make credit to their account the respective amount as specified in the demand draft. This makes the unique demand draft number reusable by making the same information about the realized demand draft to enter into their transaction history statement (financial service available in online banking). This makes the demand draft number reusable as the entry associated with it is deleted from the warehouse of generated demand draft. Demand Draft Realization. The demand draft need to be realized by the beneficiary for the credit in his account. This could be done by the beneficiary by approaching the financial institution or using the ATM itself. Once the beneficiary approaches the ATM terminal, beneficiary enters the PIN and establishment of the secure session happens. Once it is completed, the beneficiary selects, the demand draft realization option, which then requests the pass code. Once pass code is validated, the beneficiary is asked to enter the unique demand draft number. Once the number is entered, the warehouse of the demand draft generated using ATM is verified. Verification is to make sure that the demand draft is issued on the account number of that particular individual. Once the verification and the validation of the beneficiary using pass code are completed, the credit is made to the beneficiary account.

Also the message about the credit is sent to the mobile number of the beneficiary and the mobile number of the end user who generated the demand draft. The entire process in end user perspective is that the end user swipes the ATM Card and the PIN is asked to be entered. Also the pass code is requested, followed by the entry of account number of beneficiary to which the demand draft is generated. Once the account number is entered (assuming each account number to be unique), name of beneficiary is displayed to the end user for the validation. Then the amount to be transferred is also requested, followed by the issue of demand draft and a mobile update. When beneficiary receives, one day after the issue, they could enter the unique number and (if barcode reader is made available in the ATM terminal could be swiped too) get the respective amount as credit.

V. IMPLEMENTATION ISSUES

The entire process is implemented in RESTful web services. The need for the same arises as it would reduce the load on the server as the client itself could maintain the session and there is safe encapsulation of the legacy system. Also it supports all security mechanism too. The screen shot of the request for generation of Demand draft through ATM would look like would look like as in figure 5. The beneficiary account number is only entered, which then contacts the financial institution server to retrieve the account holder's name.

Figure. 5. Request for the Issue of Demand Draft using ATM.

The RESTful web service reduces the load on server as the session is maintained by client itself. Since there could be only one transaction on the ATM terminal at a particular instance of time period, there is no question of load. The demand draft issued would look alike the figure 6.

Figure. 6. Demand Draft issued using ATM.

VI. CONCLUSION

The main benefit of this implemented framework for the demand draft generation coupled with Automated Teller Machine lies in the fact of the instant availability of the generation process and integration of the financial

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transactions with that of the demand draft issue coupled with the easy realization process. The session establishment and validation can also be reviewed and new secure methods could be proposed as a future scope. The main process of the establishment of the session and its transfer between the servers involve the major achievement of the proposed framework. The newer [5] system with finger print based ATM can also provide much security and authenticated transaction which lies as future scope.

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