ECCS MENU: A Novel Implementation of Electronic Clearance Scheme

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Abstract— **Electronic Clearing Service was introduced by Reserve Bank of India which handles bulk payments and receipt of transactions that are repetitive in nature. Objective of ECS is to provide unconventional way for effecting aforementioned payments different from the manual one thus eliminating the need for paperwork and improve efficiency through automation. ECCS Menu or Electronic Credit Control System Menu is a software implementation of ECS. ECCS Menu can be used by small banks to receive the ECS file sent by RBI on a daily basis. ECCS Menu can further process this file efficiently for all the branches of the bank and help in filing returns.**

Keywords: ECS, Credit, Debit, Electronic Credit, Electronic Debit

I. INTRODUCTION

A. What is Electronic Clearing Service?

Electronic Clearing Service or ECS is one of the payment systems introduced by the Reserve Bank of India. It was introduced in 1990s to ease load on the existing paper payment system which uses paper instruments such as cheque, demand draft, etc. ECS scheme is available in two flavors:

- ECS Credit: ECS Credit is used by an institution for affording credit to a large number of beneficiaries having accounts with bank branches at various locations within the jurisdiction of an ECS Centre by raising a single debit to the bank account of the user institution. ECS Credit enables payment of amounts towards distribution of dividend, interest, salary, pension, etc., of the user institution.[1]

- ECS Debit: ECS Debit is used by an institution for raising debits to a large number of accounts (for instance, consumers of utility services, borrowers, investors in mutual funds etc.) maintained with bank branches at various locations within the jurisdiction of a ECS Centre for single credit to the bank account of the user institution. ECS Debit is useful for payment of telephone / electricity / water bills, cess / tax collections, loan instalment repayments, periodic investments in mutual funds, insurance premium etc., that are periodic or repetitive in nature and payable to the user institution by large number of customers etc.[2]

B. Parties Involved

Following are the entities which are in play whenever transfer of electronic cash takes place.

1) *User*: Users are institutions which effect bulk payment to a large number of beneficiaries (credit) or Users are institutions receiving/collecting payments from a large number of subscribers (debit).

2) *Sponsor Bank:* Refers to the bank which acts as the agent of the User to submit the input data containing payment instructions prepared by the User to the National Clearing Cell (NCC) / NPCI/ Clearing House (CH) /Clearing Agency and gives a mandate to RBI / NPCI/ Clearing House / Clearing Agency designated by RBI to debit its account on behalf of the User OR Refers to the bank which has agreed to act as the agent of the User company and will submit the data on electronic media or on the network, containing debit instructions prepared by the User to the National Clearing Cell (NCC) / NPCI / Clearing House(CH) /Clearing Agency (CA) along with an undertaking / mandate to the effect that the standing instruction mandates of the concerned customers / subscribers mentioned in the data have already been collected from the end users (consumers, etc.) and have been forwarded to the respective destination bank branches enabling them to debit the accounts of those customers for collecting and to credit the account of the sponsor bank with the sum mentioned therein. The mandate will also authorise RBI / Clearing Agency to debit sponsor bank

3) *Reserve Bank of India (RBI):* Reserve Bank of India established under Reserve Bank of India Act in 1934.

4) *National Clearing Cell (NCC)/Clearing House (CH)/Clearing Agency (CA):* An agency authorized by RBI to process credit/debit instructions and generate relevant reports.

5) *National Payments Corporation of India (NPCI):* Organization authorized by RBI to operate National Automated Clearing House (NACH) in 2007.

6) *Destination Accounts holder:* Refers to beneficiaries under the Scheme who opt for receiving payments from the User by way of direct credit to their bank accounts[5] OR Refers to the utility consumers / end users such as telephone and electricity users, insurance

policy holders, debtors, etc., under the Scheme who/which opt for making payments to the User company directly by way of debit to their bank accounts as indicated by them in the individual/respective mandate/s submitted by them to the utility company and also to their bank / branch.[6]

7) *Destination Bank Branches:* Banks where Destination Account Holders maintain their account and from where ECS payments are credited / debited.

8) *Electronic Media:* Is any electronic media / tool / arrangement provided by NCC / Clearing House / NPCI / Clearing Agency which carries data.

9) *NACH:* Refers to form of ECS (Credit/Debit) being operated upon by NPCI.

C. How ECS works

User intending to effect payments through ECS Credit has to submit details of beneficiaries, date on which credit is to be afforded, etc in a RBI defined format. This is submitted to one of the ECS Centers through its sponsor bank where user is registered. The bank which operates the ECS Center will now debit the account of Sponsor Bank on the date which was specified by the user. This will be credited to destination bank for onward credit to ultimate beneficiary.

A user who intends to effect payments through ECS Debit has to submit details of the customer in a predefined RBI format to ECS Center via its Sponsor Bank. The bank which operates the ECS Center carries debits on to destination banks so that customer's account is debited. Destination banks treat Debit instructions received from ECS Center similar to physical money and accordingly debit the account. All unsuccessful debits are returned through ECS Center.

D. ECCS Menu

ECCS Menu is a web application designed to process the credit/debit information which is received from the ECS Centers. This information is received by destination bank and is in the form of a text file of RBI defined format. ECCS Menu segregates this information and loads it on to a database. It then presents this information to employees of the destination in a browser based interface using which employee can easily mark a particular debit or not. After the employees review all the transactions received for that particular day, ECCS Menu will automatically generate a file of failed transactions which is to be returned to ECS Center. This file known as return file also has an RBI defined format. Also data related to a particular day is backed up on a database server controlled by ECCS Menu.

II. ARCHITECTURE

ECCS Menu is an application developed using server-driven development model. Thus ECCS Menu was developed only on server side and an AJAX based client side engine renders the application on a browser [7]. ECCS Menu is a 3 tiered application and consists of following three tiers:
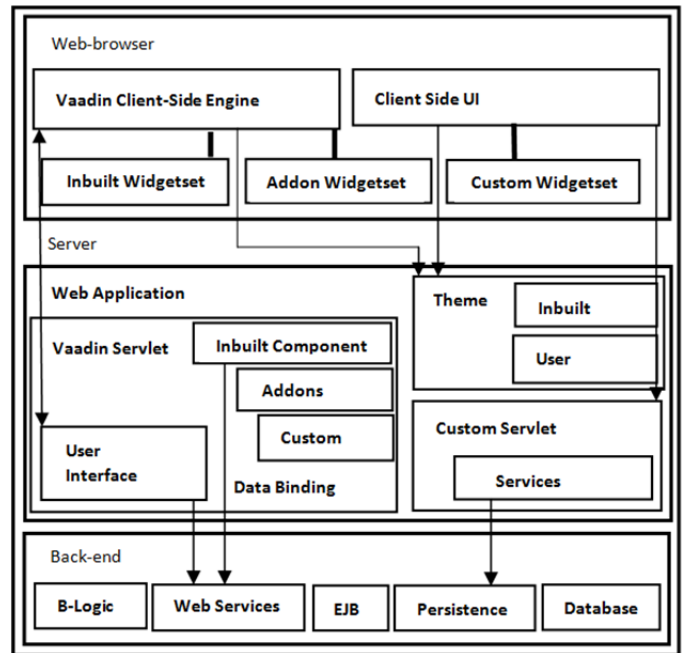
- Web Browser.
- Web Server.
- Backend.

Fig 1 ECCS Menu Architecture.

ECCS Menu also uses a database server. We have used Oracle 10 g Express Edition.

III. METHODOLOGY

ECCS Menu being a web application runs on a server. ECCS Menu was developed using Vaadin framework and runs on a HTTP Server. Users will be able to access ECCS Menu via a web browser.

A. Extraction of data from the file

Every day at a fixed time, destination bank will receive a text file sent from the sponsor bank via ECS Center. This file contains information for those transactions which are to be completed on that day. ECCS Menu will receive this file and extract the information from this text file. ECCS Menu extracts following information from the file.

- ECS Number.
- Amount to be debited.
- Account Number from which amount is to be debited.
- Bank Code of Sponsor Bank.
- User Number
- User Name
- Branch Code of Destination Bank.

Each row in the file represents a single transaction. ECCS Menu thus literally extracts the transactions to be processed from the file sent by ECS Center.

B. Data Cleansing and Insertion

After the aforementioned data has been extracted, ECCS Menu will not directly insert the values in the database. Some of the values can be unacceptable. For example Account Numbers received in ECS must only be of length 4 bits but sometimes received values may be lengthier. In such a case ECCS Menu will remove the excess bits and required 'clean' bits will be stored. Also redundant data bits such as extra zeroes in Amount will also be removed.

After cleansing of data, data will be moved to tables in ECS database. For doing extraction, cleansing and insertion, Import module of ECCS Menu will be used.

C. Processing of Data

Now that data is stored away in tables, using Mark Return module of ECCS Menu clerks at the Destination bank will see the list of all transactions in GUI of ECCS Menu. Employees will now proceed to review each and every transaction present. A transaction can be marked as clear, or it can be marked with reason why it was not cleared, for example Insufficient Account Balance could be one such reason. A transaction being marked clear implies that it can occur and the amount mentioned can be debited from the customer's account.

Simultaneously as the statuses of transactions are being marked, ECCS Menu will monitor the number of transactions not being cleared.

D. Generation of Return File

As now all the Transactions have been marked, those not clear will now be compiled into a text file and sent back to the ECS Center which in turn forwards it to respective sponsor bank. Return File is generated using the Export module of ECCS Menu.

IV. FEATURES

A. Import

This module of ECCS Menu extracts information from the ECS file, cleanses and loads it in a database.

B. Export

This module generates the return file after all the transactions have been reviewed and marked.

C. Mark Return

This module presents the information from ECS Database to the clerk in a table form thus allowing him to review and mark transactions. It will also record the response marked by a clerk for every transaction and store the response in ECS database.

D. Backup

This module allows user to backup the history of marked transactions in database. This save is different from Mark ECS Return module as these transactions will be saved in a permanent long term database for historical purposes.

E. Post Dated ECS

This module allows the clerk to process the ECS file for the next day. If ECS Center by mistake sends file for current day and also for next day, then ECCS Menu allows user to process the current day file in regular manner. But it also allows user to process the ECS file for next day by using a separate table in the ECS Database.

F. User Management and Authentication

ECCS Menu allows more than one user with different privilege levels to be active. Administrator privilege user can create more normal users. Password authentication is used. Password are protected using SHA 2 512 algorithm.

G. Summary

This module continuously monitors the transactions being cleared and not cleared. ECCS Menu creates dynamic graphs which changes for each transaction marked. ECCS Menu also displays warning if number of transactions marked with a particular reason crosses a pre defined threshold.

V CONCLUSION

This paper discusses ECCS Menu which is a web application that helps in implementation of ECS Scheme at Destination Bank. This approach increases the working efficiency at Destination Bank by automation. This system is ideal for small banks which cannot afford their own custom tailored solution for handling ECS transactions. Currently we have developed the system and are in deployment phase.

REFERENCES

[1] ECS FAQS. [Online]. Available: https://rbi.org.in/Scripts/FAQ
[2] ECS FAQS. [Online]. Available: https://rbi.org.in/Scripts/FAQ
[3] ECS Credit – Procedural Overview [Online] Available: https://rbi.org.in/Scripts/ECSUserView.aspx?Id=1#b7
[4] ECS Debit – Procedural Overview [Online] Available: https://rbi.org.in/Scripts/ECSUserView.aspx?Id=25
[5] ECS Credit – Procedural Overview [Online] Available: https://rbi.org.in/Scripts/ECSUserView.aspx?Id=1#b7
[6] ECS Debit – Procedural Overview [Online] Available: https://rbi.org.in/Scripts/ECSUserView.aspx?Id=25
[7] Vaadin Blog [Online] Available: https://vaadin.com/blog/-/blogs/vaadin-7-application-architecture