Mobile Wallet Financial Product Report Module Enhancements

By

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Mobile Wallet Financial Product Report Module Enhancements

Major Project

Submitted in partial fulfillment of the requirements

For the degree of

Bachelors of Technology in Computer Science &Engineering

By

12bce081 (Sanket Jain)

12bce098 (Snehal Parmar)

Guide

Prof. Vijay Ukani

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Ahmadabad 382481

MAY 2016

CERTIFICATE

This is to certify that the project entitled “Mobile Wallet Financial Product Report Module Enhancements” submitted by Sanket Jain (12BCE081) towards the partial fulfilment of the requirements for the degree of Bachelor of Technology in Computer Science and Engineering of Nirma University, Ahmadabad is the record of the work carried out by him under my supervision and guidance. In my opinion, the submitted work has reached a level required for being accepted for examination. The results embodied in this Project report are true to the best of my knowledge and have not been submitted to any other university or institution for the award of any degree or diploma.

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CERTIFICATE

This is to certify that the project entitled “Mobile Wallet Financial Product Report Module Enhancements” submitted by Snehal Parmar (12BCE098) towards the partial fulfilment of the requirements for the degree of Bachelor of Technology in Computer Science and Engineering of Nirma University, Ahmadabad is the record of the work carried out by her under my supervision and guidance. In my opinion, the submitted work has reached a level required for being accepted for examination. The results embodied in this Project report are true to the best of my knowledge and have not been submitted to any other university or institution for the award of any degree or diploma.

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At last, we must express our sincere heartfelt gratitude to all the staff members of Computer Engineering Department who helped me directly or indirectly during this course of work.

ABSTRACT

Mobile Wallet Financial Product is a mobile application used for various money transactions. Every transaction will be stored in the database on daily basis. The transactional data is very important for the business analysis purpose for that company. Report Portal team deals with those data and generates the report for the customer or company as per their demands.

We had worked in Report Portal wherein we worked mainly on JAVA,DBMS, and PLSQL. Every report will be generated using unique query. Some queries are complex. Queries run on large data so query optimization is very important for the complex queries. We had learned optimization of queries.

Reports are generated automatically by the help of schedulers. But a user can generate the report manually which are known as online reports. They are stored on the local server. The user will get those report offline on search.
Customer may demand new changes in the existing report or they might want the new report to be generated. Report portal team understands their demands and requirements and accordingly changes the existing system.

Keywords: Financial Product, Money Transaction, Module Enhancement.

Contents

Chapter 1

Introduction

1.1) About the company

1.1.1) Introduction to the Company:

It is an IT services, counseling, and business arrangements association that conveys genuine results to worldwide organizations, guaranteeing a level of assurance. TCS is part of the Tata group, one of India's biggest industrial conglomerates and most regarded brands. TCS offers a counseling drove coordinated arrangement of IT and IT-empowered administrations conveyed through it's one of a kind Global Network Delivery Model™ (GNDM™), perceived as the benchmark of greatness in programming improvement. TCS was set up in 1968 as a division of Tata Sons Limited. TCS Ltd. got joined as a separate entity on January 19, 1995.

1.1.2) Quality Policy:

TCS is committed to providing superior quality products and services that meet applicable regulatory, statutory, and customer requirements by adhering to a quality management system that benefits our customers, employees, and shareholders. To meet its commitment it:

1) Values its customers through open communication, timely response and continual improvement.

2) Appreciate and foster an environment of trust, integrity, challenge and reward.

3) Leverage efficient technology applied across all business processes.

4) Understand that its ultimate aim is customer satisfaction.

5) Ensure that its QMS (Quality Management System) serves its customer needs.

1.1.3) Communication:

Tata Consultancy Services Limited
PLOT NO.41,
PHASE-1, IT/ITES-SEZ
GARIMA PARK,
Gandhinagar - 382009, Gujrat

1.1.4) Resources:

TCS provides all the resourced required by the project such as unlimited internet access, personal computers for each employee, video tutorials, all the software resources required and an excellent guidance of the mentor required for developing the application and learning technologies used in the project.

1.2) Project profile

1.2.1) Project title:

Mobile Wallet Financial Product Report Module Enhancements.

1.2.2) Scope of project:

1. Reports shall be generated for functions
    - Anti-Money Laundering (AML)
    - Customer Service (CS)
    - Marketing
    - Finance (MIS & Operations)
    - Sales & Distribution (S&D)
2. Each Report shall be grouped under the above functions
3. Reporting Portal shall be accessed by Circle User (all functions), Corporate User (all functions) & Bank User for specific Bank Instance Reports i.e. Demographic Reports
4. All Reports shall be for a T-1 day.
5. Reports can be classified into Online, Offline Reports
6. Offline Reports shall be generated on previous day and made available to Users (Shared path, through Email or Browse)
7. Online Reports shall be generated real time based on the report specific search filter.

1.2.3) Scope of works as per definition:

1. Understanding Java programming concepts with JSF, spring, PL- SQL (in depth), deployments (WebLogic/wildfly).

2. Conceptual understanding of Mobile wallet product constructs and reports - Admin - SR portals.

3. Online report creator information embedded into all online pages.

4. Migration of Financial reports from Admin portal reports to Report portal.
5. Utility to update report email notifications configuration via a user interface.
6. Query performance enhancement.
7. Functionality to view all reports generated from the current date and download list as .xls.
8. Feasibility study for Android application development for SR portal.
9. Report portal new feature demands (user stories) understanding, design and development.

1.2.4) Project title:

1. Sanket Jain (12bce081)
2. Snehal Parmar (12bce098)

1.2.5) Software testing /Quality assurance arrangements:

Sr.No	Software/Hardware	Version
1	Eclipse Java EE IDE for Web Developers.	Version: Juno Service Release 2 Build id: 20130225-0426
2	Oracle SQL Developer	Version 2.1.1.64
3	Notepad++	V5.9.6.2
4	Shrew Soft VPN ACESS Manager	Ver2.1.7
5	Cisco AnyConnect Secure Mobility Client	Version 3.1.03103
6	Chrome	Version 48.0.2564.97 m
7	IP Messenger	Beta
8	Android Studio	

1.2.4) Software testing /Quality assurance arrangements:

Internal Quality Audit and Assurance is to be conducted by existing project guide during the tenure. Functional / User Interface design – Code implementation – Database design are to be reviewed and sign off is to be received by existing project guide.

Chapter 2

System analysis:

2.1) Feasibility Study:

A feasibility study is an evaluation and analysis of the potential of the proposed project which is based on extensive investigation and research to give full comfort to the decisions makers. It helps in deciding whether it is viable to go through the project or not. Feasibility study studies the system and tells the system whether to develop the system or not.

2.1.1) Operational feasibility:

Operational Feasibility is a measure of how well a proposed system solves the problems, and how it satisfies the requirements of users. The operational feasibility assessment focuses on the degree to which the proposed development projects fits in with the existing business environment and objectives with regard to development schedule, delivery date, corporate culture, and existing business processes.

Mobile Wallet Financial Product application is LIVE application hence it is a feasible application. But Report portal deals with the new demands of a customer so it is important to understand the operation feasibility of new requirement with the existing project.

2.1.2) Technical feasibility:

The technical feasibility assessment is focused on gaining an understanding of the present technical resources of the organization and their applicability to the expected needs of the proposed system. It is an evaluation of the hardware and software and how it meets the need of the proposed system.

The first deliverable of the project is in the form of a library as Report portal uses java as the programming language and spring as a framework, considering the feasibility java would be a better choice for the library.

2.2) Detail specification of the project:

2.2.1) Reports Portal:

The reports portal web application will be installed on the WebLogic server at the platform. The application will have the following components:

2.2.2) JSF View Layer:

The UI of the application will be built using Prime faces/JSF components in XHTML files. The JSF managed beans will interact with the spring service layer for generation of online reports as the will to display the reports which are already generated by the scheduler.

2.2.3) Spring Service Layer:

Spring framework is going to be used at the service layer. The spring services will also be injected into the JSF managed beans and the scheduler jobs. The various property files / XML files for the configuration will be loaded by spring utile.

2.2.4) Quartz Scheduler:

Quartz scheduler will be used for scheduling the report creation jobs.

2.2.5) Database Persistence Layer:

The SQL queries will be optimized for use with Oracle 11g database server, leveraging its new features (Egg pivot function).JDBC will be used to execute these queries from the application.C3p0 will be used for pooling the database connections needed by the application.

2.2.6) Summary Jobs:

To improve the performance of report generation, the database data has to be processed first. Merge SQL statement denoted in summary jobs will be designed for this processing which will store the summary data in the database.

2.2.7) Integration Layer:

JMS queues will be used for sending SMS and Emails. Apache Commons Net API will be used to upload files to the FTP server.

2.2.8) Logger:

Log4j will be used to create the application logs to monitor the health of the application.

2.3) Solution Architecture and Integration Design:

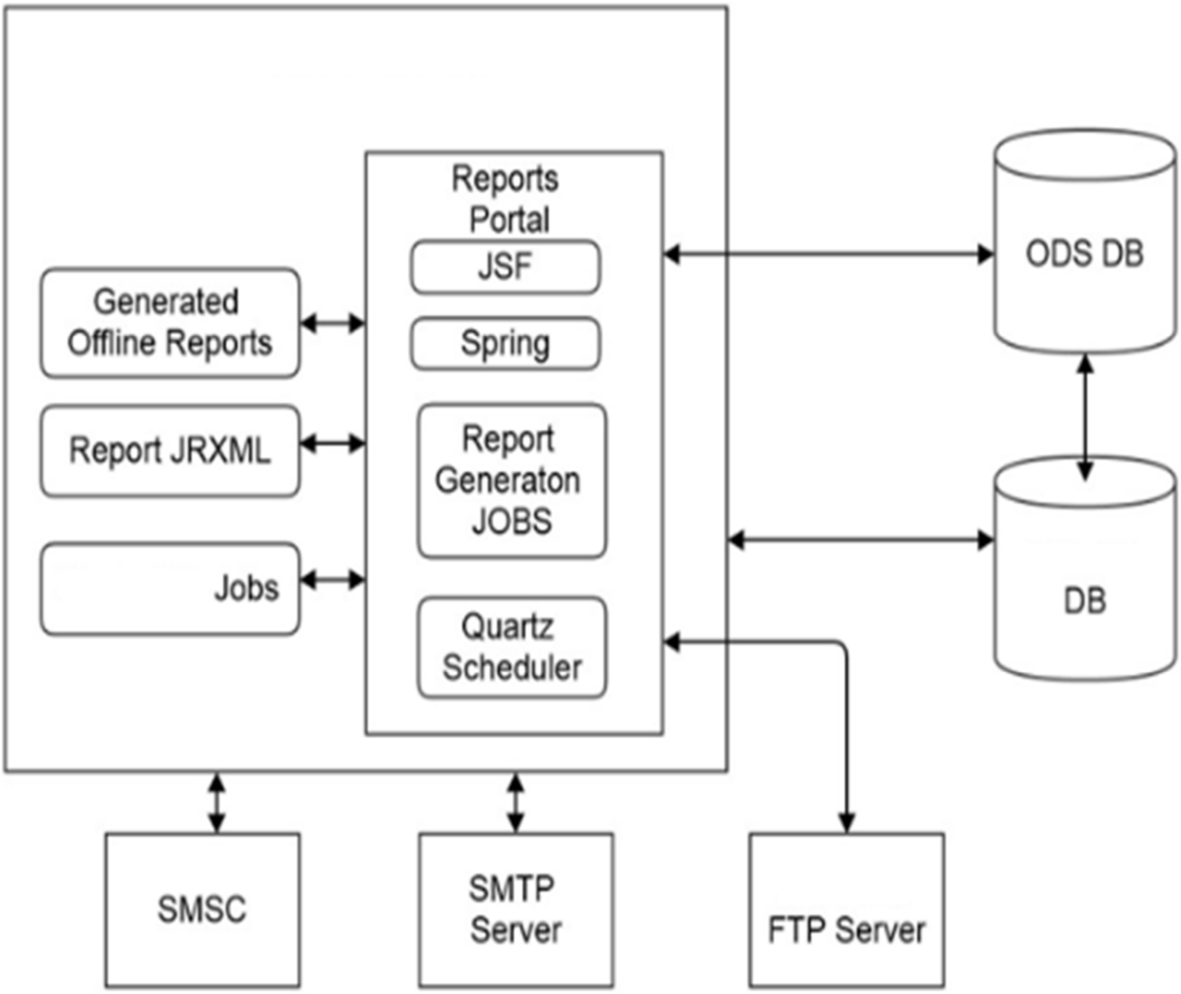


Fig.2.1 Architecture of System.

2.3.1) Admin Portal

Authentication management for the reports portal will be done from the admin portal. These two applications will communicate with each other through the database tables. The database tables in the database, which are needed by the reports portal will be synchronized in the ODS using Oracle golden gate.

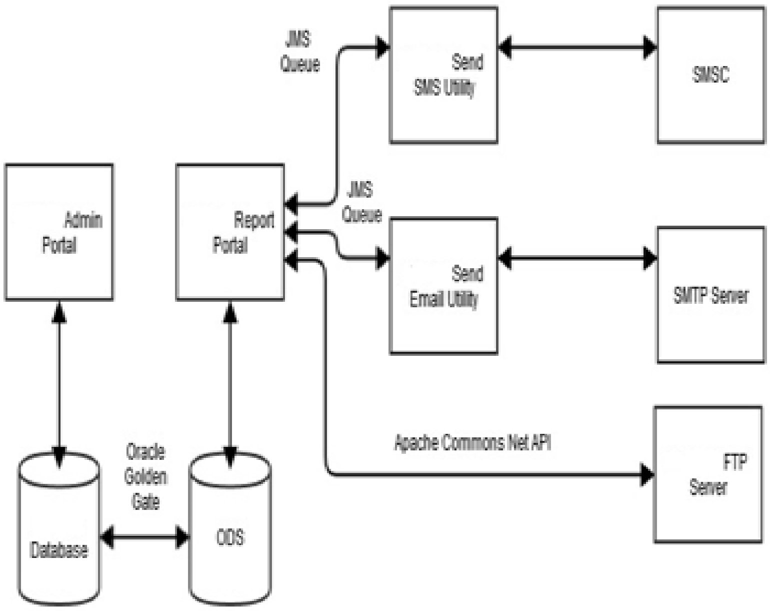


Fig.2.2 Integration Design

2.3.2) Send Email Utility

The report portal application will utilize the send Email utility to asynchronously send Emails with or without attachments. The Send Email Utility will consume JMS messages from a JMS queue created at the WebLogic server. The reporting portal will write the messages to this queue whenever it needs to send an Email. The template of the email and the recipient email addresses will be configured in the database.

2.3.3) Send SMS Utility

The report portal application will utilize the send SMS utility to asynchronously send SMS notifications. The Send SMS Utility will consume JMS messages from a JMS queue created at the WebLogic server. The reporting portal will write the messages to this queue whenever it needs to send an SMS. The template of the SMS and the recipient MSISDNs will be configured in the database.

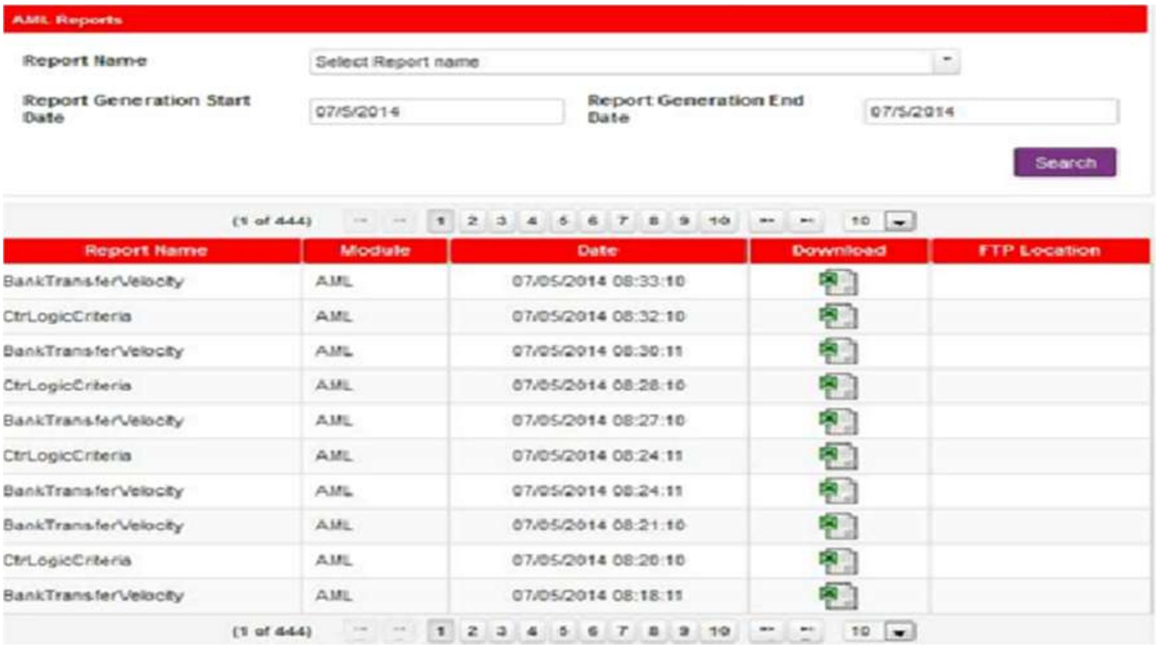
2.3.4) FTP location

Some offline reports (28 in release 1) will be uploaded to an FTP location once they get generated. The report generation will be asynchronous with these file transfers. The Apache Commons Net API will be used to upload the files to the FTP server.

2.4) User Interface:

The users will first have to log into the reports portal application. Based on their role and the type of report, they can browse the existing offline reports or generate online reports by giving some parameters.

2.4.1) Mockup of Browsing Offline Report:



AML Reports

Report Name: Select Report name ▾

Report Generation Start Date: 07/5/2014

Report Generation End Date: 07/5/2014

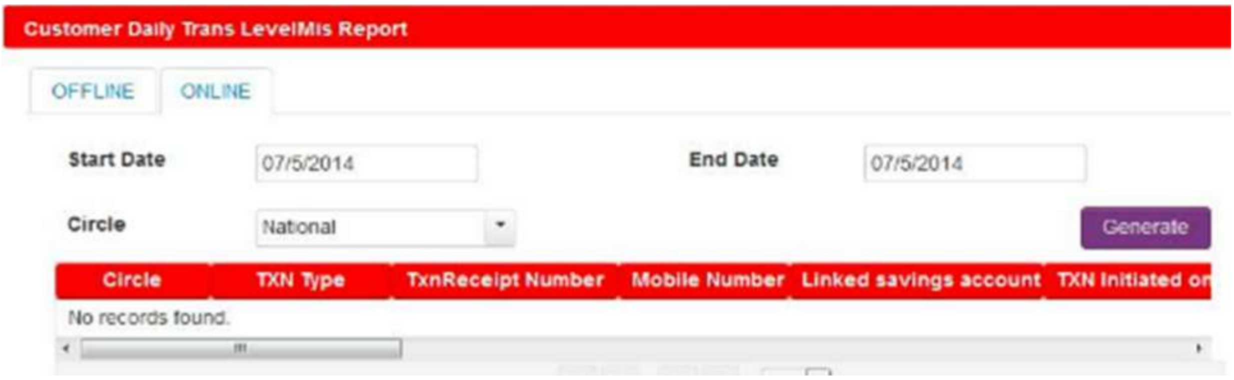
Report Name	Module	Date	Download	FTP Location
BankTransferVelocity	AML	07/05/2014 08:33:10	📄	
CtrLogicCriteria	AML	07/05/2014 08:32:10	📄	
BankTransferVelocity	AML	07/05/2014 08:30:11	📄	
CtrLogicCriteria	AML	07/05/2014 08:28:10	📄	
BankTransferVelocity	AML	07/05/2014 08:27:10	📄	
CtrLogicCriteria	AML	07/05/2014 08:24:11	📄	
BankTransferVelocity	AML	07/05/2014 08:24:11	📄	
BankTransferVelocity	AML	07/05/2014 08:21:10	📄	
CtrLogicCriteria	AML	07/05/2014 08:20:10	📄	
BankTransferVelocity	AML	07/05/2014 08:18:11	📄	

Fig 2.3 Offline report generation

The report can be search offline in which user can search previously generated report for any date. If the report has been generated for that particular date then it will show the all the report generated online for that day as a result. A user can download those reports clicking on download. In above figure, it is shown the list of and already generated report and download option to download that report.

2.4.2) Mock-up of Generating Online Report:

Reports are generated automatically on a daily basis by using Quartz Scheduler. The user can generate those reports manually and they all are called to online reports. Online generated reports were stored at a local server and whenever user will search those report offline he will get the list these online generated reports from the server. Next figure will show the generation of an online report.



Customer Daily Trans LevelMis Report

Start Date 07/5/2014

End Date 07/5/2014

Circle National

Circle	TXN Type	TxnReceipt Number	Mobile Number	Linked savings account	TXN Initiated on
No records found.					

Fig 2.4 Online Report Generation.

2.5) User Management:

The users and their access will be maintained from the admin portal.

Based on their roles and access information, the screens, as well as the functionalities on the screens, will be verified for the logged in user.

2.6) Flow of Report Generation:

2.6.1) Online Report Generation:

Process Flow:

Step 1) User logs into the system.

Step 2) User goes to the report page.

Step 3) User chooses the type of report and the various filters applicable to a JSF page.

Step 4) The JSF managed bean passing on the selection parameters to the spring service layer.

Step 5) The report SQL query is fetched from the query bank and the user selected parameters are set for the query.

Step 6) The query is then executed at the ODS.

Step 7) The service layer then sends a collection of report specific java beans.

Step 8) These report java beans are then displayed on the JSF page in the form of a table.

Step 9) The user is provided links to download the report and to email the report to their email account.

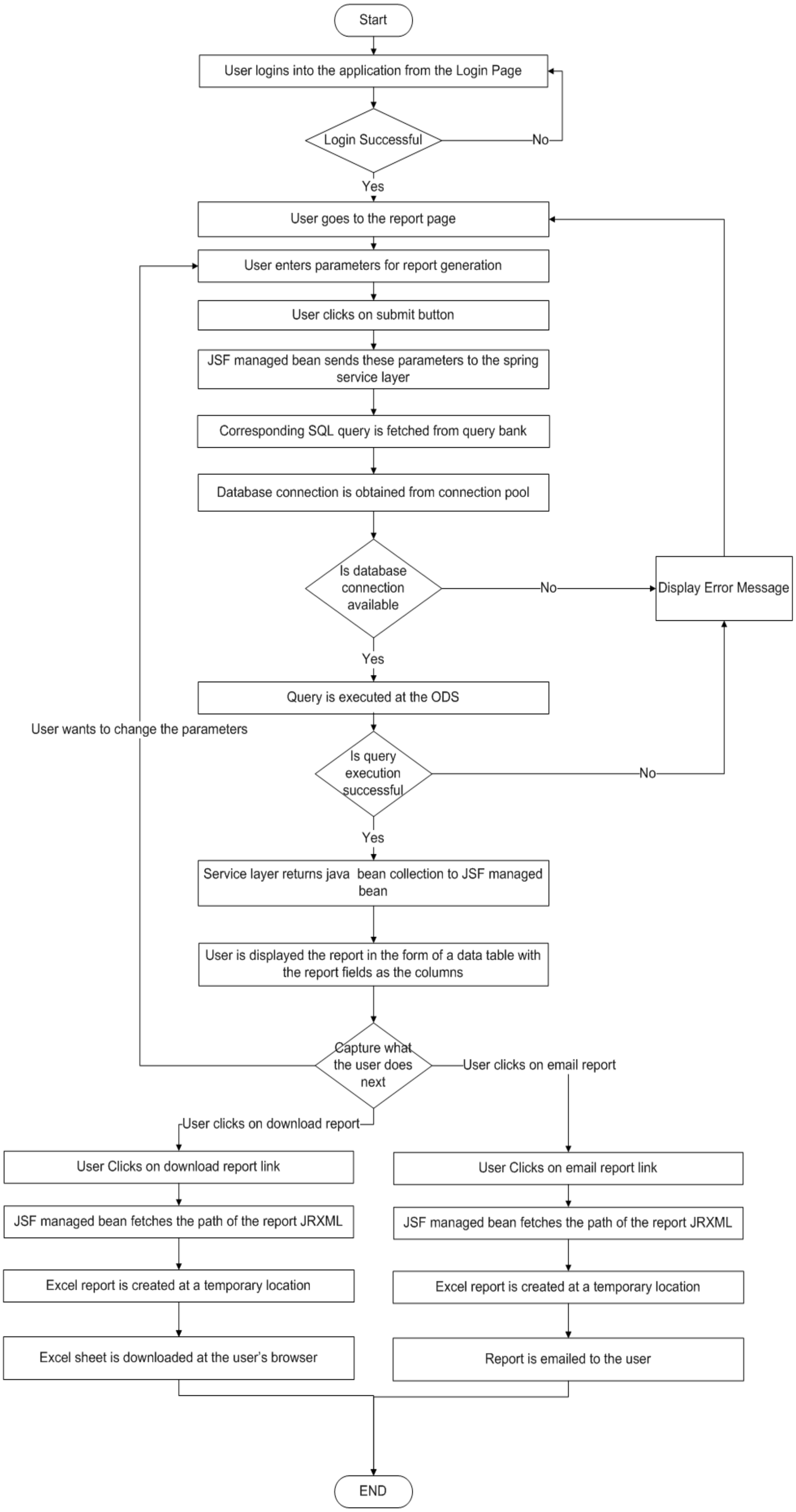

Start
User logins into the application from the Login Page
Login Successful
No
Yes
User goes to the report page
User enters parameters for report generation
User clicks on submit button
JSF managed bean sends these parameters to the spring service layer
Corresponding SQL query is fetched from query bank
Database connection is obtained from connection pool
Is database connection available
No
Display Error Message
Yes
Query is executed at the ODS
User wants to change the parameters
Is query execution successful
No
Yes
Service layer returns java bean collection to JSF managed bean
User is displayed the report in the form of a data table with the report fields as the columns
Capture what the user does next
User clicks on email report
User clicks on download report
User Clicks on download report link
JSF managed bean fetches the path of the report JRXML
Excel report is created at a temporary location
Excel sheet is downloaded at the user's browser
User Clicks on email report link
JSF managed bean fetches the path of the report JRXML
Excel report is created at a temporary location
Report is emailed to the user
END

Fig. 2.5 Flow for Online Report Generation

Step 11) If the user is satisfied with the report data, the user can then download the report/ email it to their account by clicking on the link.

Step 12) When the user clicks on download report, the report jr XML is fetched and a temporary file is created at a preconfigured temporary folder.

E.g. the temporary folder is configured as D:\reportportal\temp now, if the user "admin" is generating an online report for Customer Daily Transaction Level MIS, and clicking the download link at 08:56:34 hours on 06 May 2014, a file 20140506085634_Customer_Daily_Transaction_Level_MIS_admin.xls will be created in the above folder.

This file is then sent to the user's browser. When the user clicks on email report, the report jr XML is fetched and a temporary file is created. This file is then sent to the user's email address as an attachment.

2.6.2) Offline Report Generation:

Process flow:

Step 1) Quartz scheduler jobs triggered by CRON expressions will generate a batch of reports at specific intervals. These jobs can be scheduled daily, weekly, monthly or at multiple times during the day.

Step 2) when such a job is triggered, the report generation will follow a sequence. The first report to be generated will be picked up.

Step 3) the parameters for generating that report will be configured in the job.

Step 4) these parameters will be sent to the service layer.

Step 5) the report SQL query is fetched from the query bank and the user selected parameters are set for the query.

Step 6) the query is then executed at the staging database.

Step 7) the service layer then sends a collection of report specific java beans.

Step 8) the job then fetches the location of the report jr XML and creates the report at a configured location using the java beans it received from the service layer as a data source.

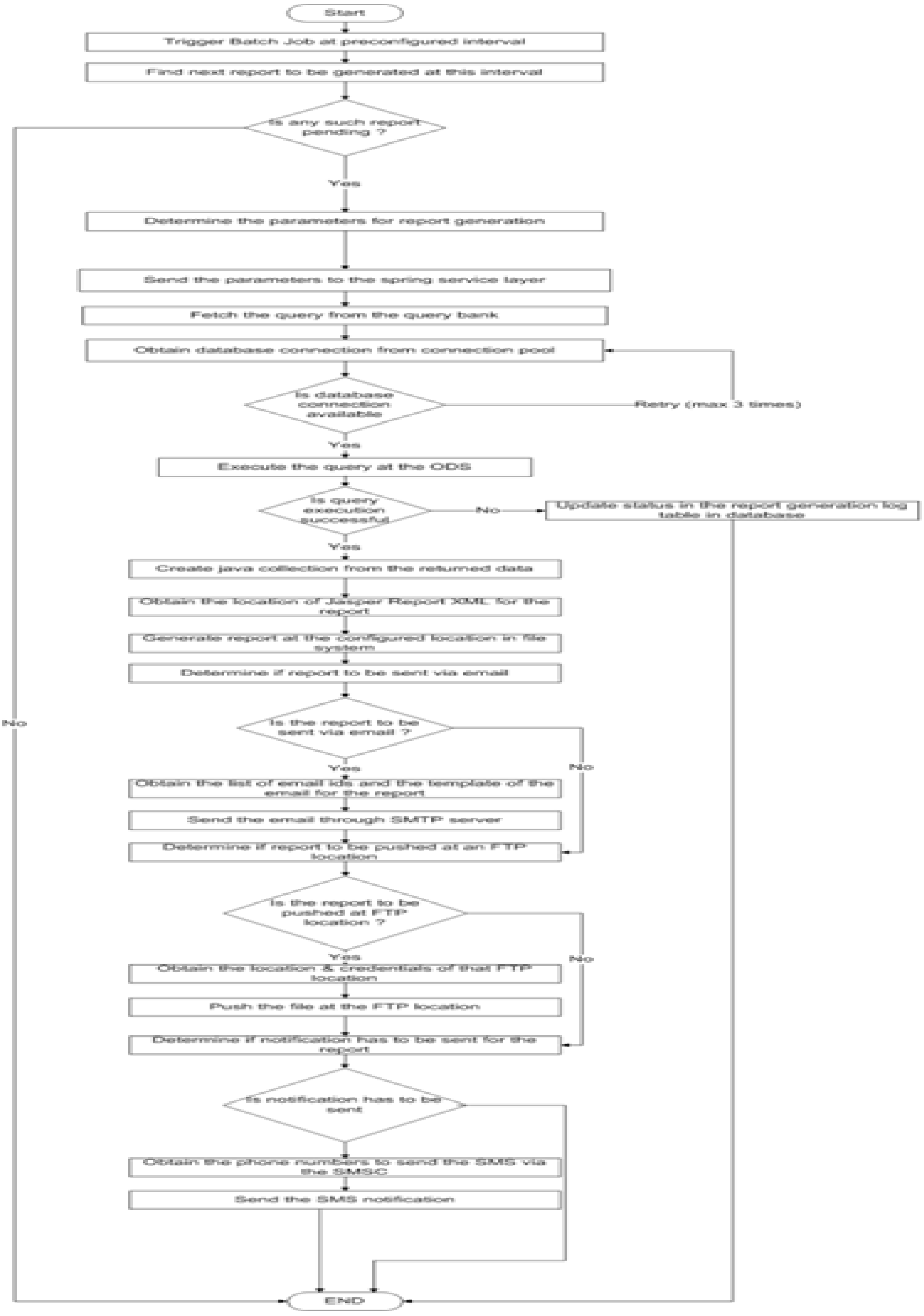

Start
Trigger Batch Job at preconfigured interval
Find next report to be generated at this interval
Is any such report pending ?
Yes
No
Determine the parameters for report generation
Send the parameters to the spring service layer
Fetch the query from the query bank
Obtain database connection from connection pool
Is database connection available
Retry (max 3 times)
Yes
Execute the query at the ODS
Is query execution successful
No
Update status in the report generation log table in database
Yes
Create java collection from the returned data
Obtain the location of Jasper Report XML for the report
Generate report at the configured location in file system
Determine if report to be sent via email
Is the report to be sent via email ?
No
Yes
Obtain the list of email ids and the template of the email for the report
Send the email through SMTP server
Determine if report to be pushed at an FTP location
Is the report to be pushed at FTP location ?
Yes
No
Obtain the location & credentials of that FTP location
Push the file at the FTP location
Determine if notification has to be sent for the report
Is notification has to be sent
Obtain the phone numbers to send the SMS via the SMSC
Send the SMS notification
END

Fig 2.6 Flow for Offline Report Generation

Step 9) this location is configured as the following:
PATH-TO-BASE-FOLDER\DD-MM-YYYY\MODULE\CIRCLE (OPTIONAL)\REPORT-NAME.xlsWhere,
PATH-TO-BASE-FOLDER – absolute path of base folder configured in the properties file.
DD-MM-YYYY – Date for which the report is being generated.
CIRCLE – Circle for which the report is being generated (only used in some modules)
REPORT-NAME – Name of the file that will be generated for this report, configured in the properties file.

Step 10) It is then determined whether the report has to be emailed to someone or not. If yes, the list of receiver email ids is fetched along with the template for the email. The email is then created and sent to a JMS queue for sending emails.

Step 11) It is then determined whether the report has to be pushed to an FTP location. If yes, then the location of the FTP server and the credentials are fetched and the report is copied to that location.

Step 12) It is then determined whether an SMS notification has to be created for the report. If yes, then the phone numbers to whom the SMS has to be sent are retrieved along with the template of the SMS. This is then sent to JMS queue to send SMS.

2.7) Quartz Scheduler Jobs

The report generation jobs are going to be scheduled using the quartz scheduler. Each Job will first check if their corresponding flag has been set by the summary job indicating successful loading of its summary data. If not it will sleep for 5 minutes and check again. In case this doesn’t happen, after 3 retries, it will send a notification to the operations team.

Chapter 3

Work was done as per definition:

3.1) Understanding the system and technical concept:

First, two-week they have given us the task to brush up the basic concept of DBMS and in-depth study of PL-SQL. The system is based on JAVA platform so we have studied the basic concept of JAVA Programming. They are using spring framework so we had understood the application of java in spring framework.

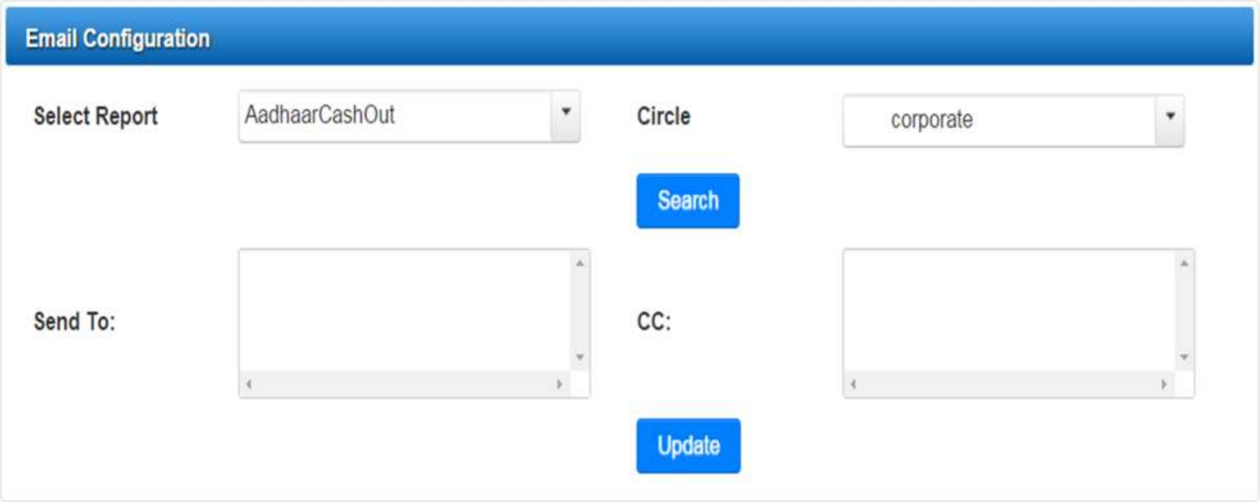
After basic studies, we have to understand the main structure of Mobile wallet product constructs and Reports - Admin - SR portals. Understand the integration of Java Framework with the database, How to integrate the queries and run it on the Report Portal. After that, we have learned about WebLogic and Wildfly application which are mainly used for deployment of the project.

3.2) Query modification and integration:

To understand the query integration practical they had given us some queries. We had to modify it according to their need and check it by integration. We had modified the given queries and after integration, we checked the output with the output of original queries. This task helps us to get more familiar with the system Mobile Wallet Financial Product Report Module. We got the knowledge about the Tables which are used at the backend and the Reports which are generated at Report portal.

3.3) Email Configuration Page:

Previously there was no direct page for email configuration. The Mail IDs for to and cc were used to added manually into the Database. We designed a page which is directly connected to the database. It helps to make a new entry in the database for each new mail. This page gives the utility to update report email notifications configuration via a user interface.


Email Configuration

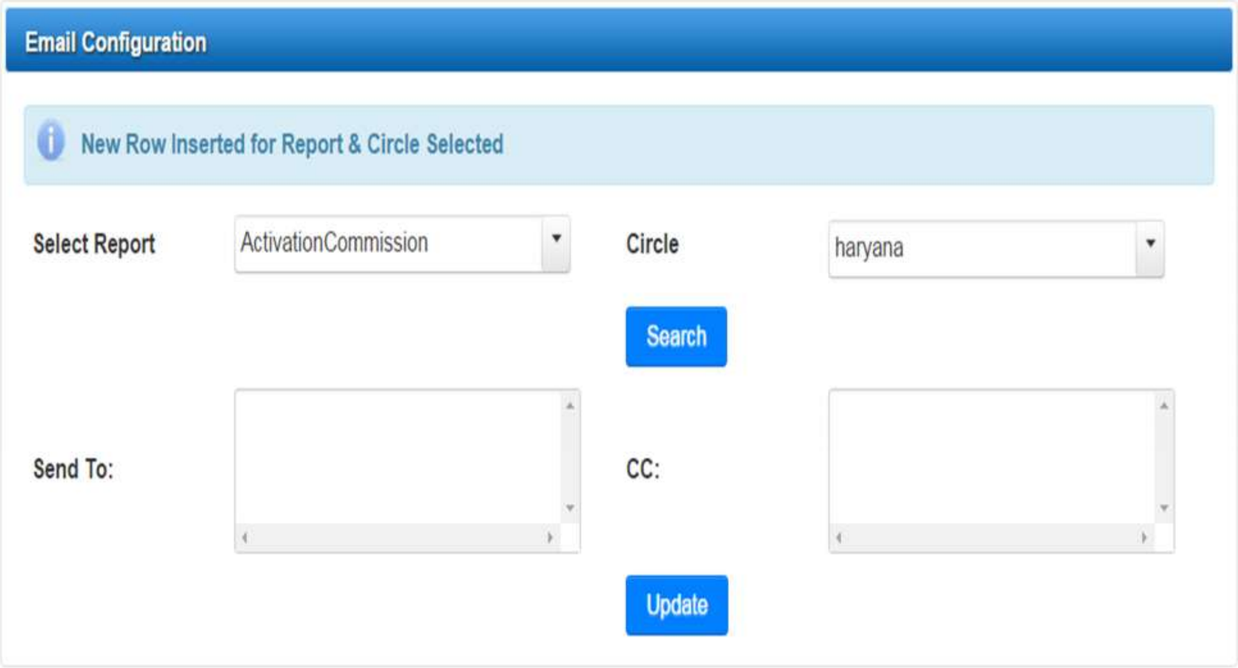
Select Report: AadhaarCashOut

Circle: corporate

Fig 3.1 Email Configuration page.

Functionalities of Email Configuration Page:

3.3.1) Insert a new row if that entry does not exist in the database.


Email Configuration

New Row Inserted for Report & Circle Selected

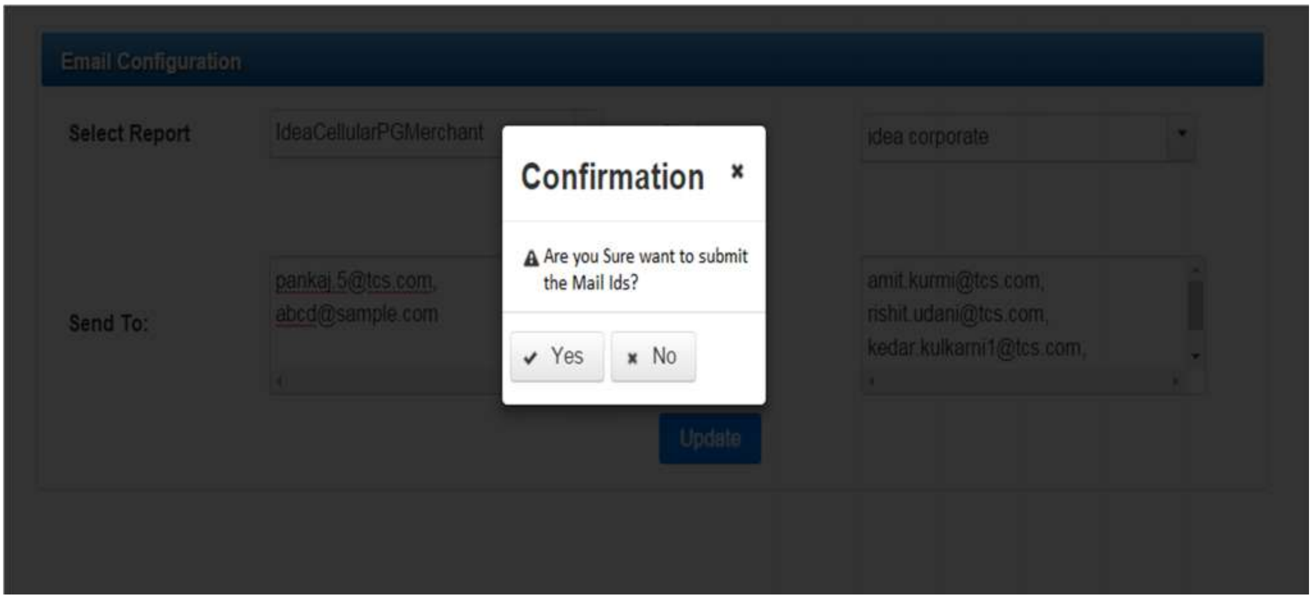
Select Report: ActivationCommission

Circle: haryana

Fig 3.2 insertion of a new row.

3.3.2) Popup of confirmation bar after every update:

It asks the user for final confirmation of update in the database.



Select Report: IdeaCellularPGMerchant

idea corporate

Send To: pankaj.5@tcs.com, abcd@sample.com

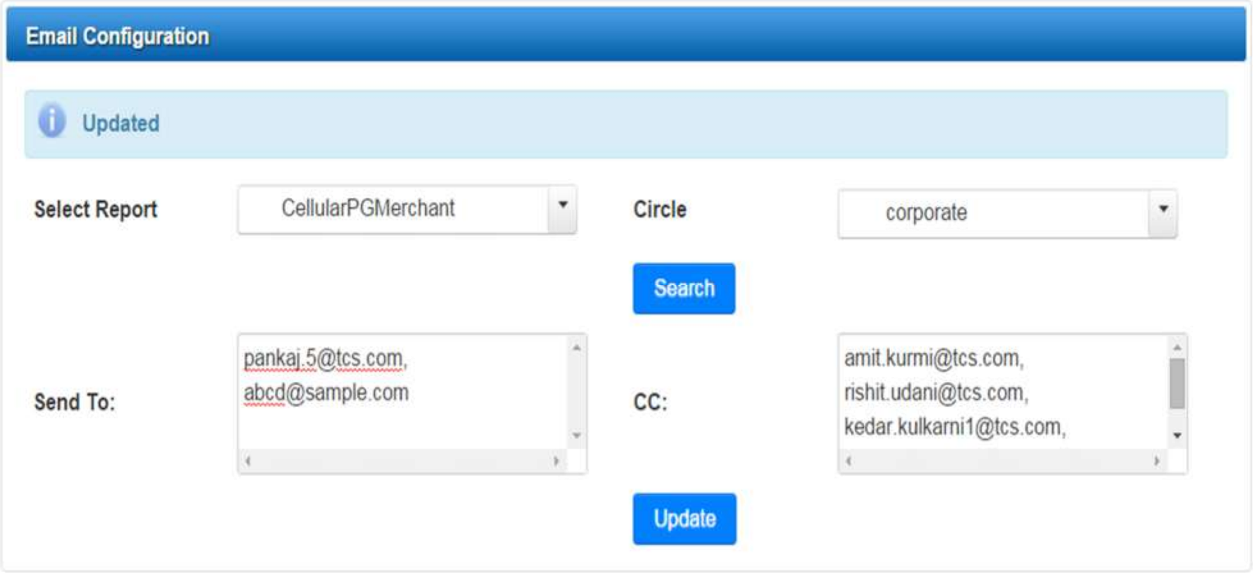
amit.kurmi@tcs.com, rishit.udani@tcs.com, kedar.kulkarni1@tcs.com,

Are you Sure want to submit the Mail Ids?

Fig 3.3 Confirmation for a final update.

3.3.3) Update the database on every change.

After confirmation of user, it updates the table in the database. It updates the entry in the column of to and Cc of the table.



Updated

Select Report: CellularPGMerchant

Circle: corporate

Send To: pankaj.5@tcs.com, abcd@sample.com

CC: amit.kurmi@tcs.com, rishit.udani@tcs.com, kedar.kulkarni1@tcs.com,

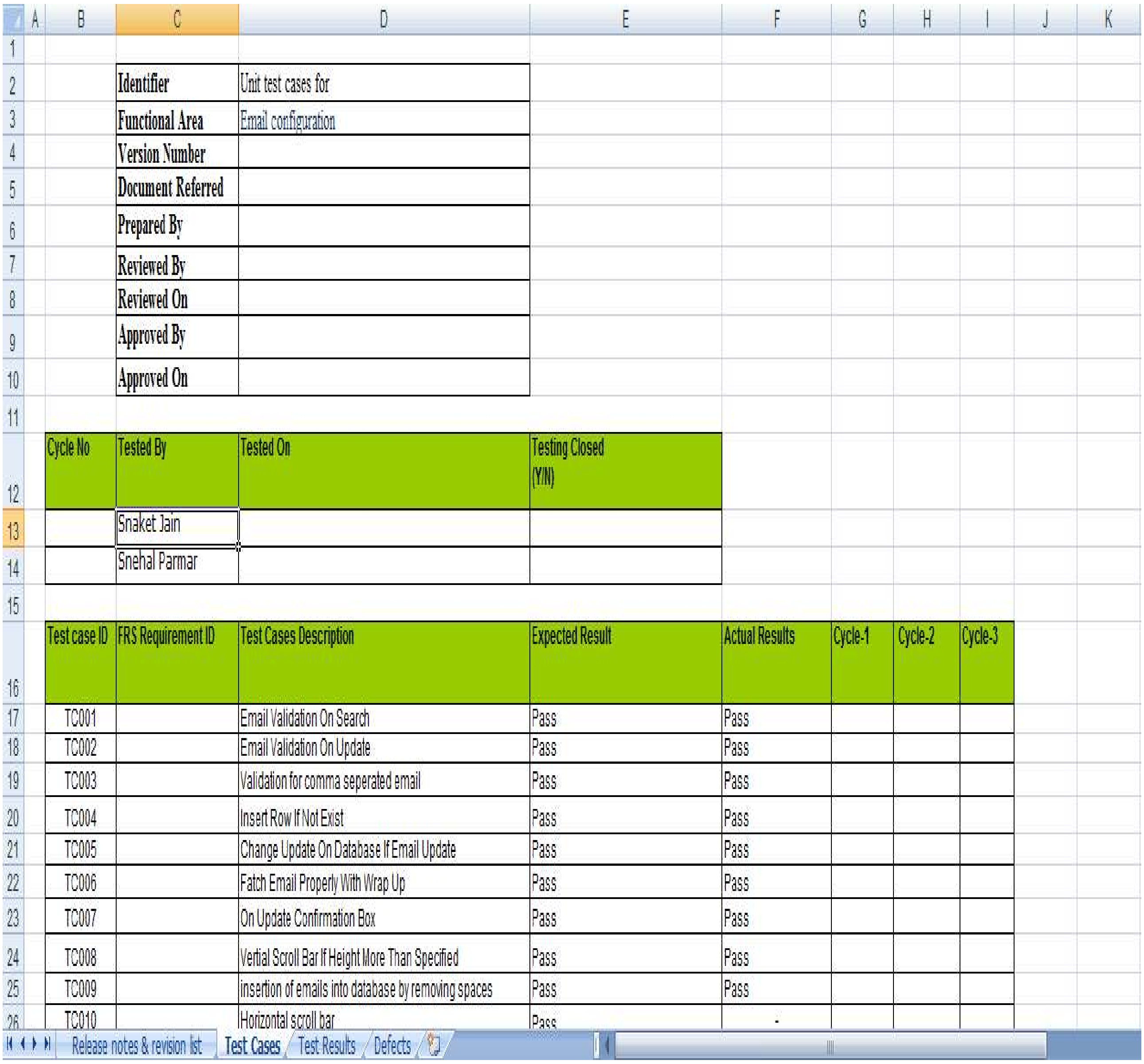
Fig 3.4 updating the database.

3.3.4) Other Functionalities:

1. Email validation on search.
2. Email validation on the update.
3. Validation for comma separated emails.
4. Fetch email on search.

3.3.5) Test cases:

After page development, we are given to make a document for the test cases. In which we have included every test case which we had run and checked with the actual and expected result.



Identifier	Unit test cases for
Functional Area	Email configuration
Version Number	
Document Referred	
Prepared By	
Reviewed By	
Reviewed On	
Approved By	
Approved On	

Cycle No	Tested By	Tested On	Testing Closed (Y/N)
	Snaket Jain		
	Snehal Parmar		

Test case ID	FRS Requirement ID	Test Cases Description	Expected Result	Actual Results	Cycle-1	Cycle-2	Cycle-3
TC001		Email Validation On Search	Pass	Pass			
TC002		Email Validation On Update	Pass	Pass			
TC003		Validation for comma seperated email	Pass	Pass			
TC004		Insert Row If Not Exist	Pass	Pass			
TC005		Change Update On Database If Email Update	Pass	Pass			
TC006		Fatch Email Properly With Wrap Up	Pass	Pass			
TC007		On Update Confirmation Box	Pass	Pass			
TC008		Vertial Scroll Bar If Height More Than Specified	Pass	Pass			
TC009		insertion of emails into database by removing spaces	Pass	Pass			
TC010		Horizontal scroll bar	Pass	-			

Fig 3.5 test case document for email configuration

3.4) Migration of Financial reports from Admin portal reports to Report portal.

Previously some reports were generated only from Admin View Portal. For some reports, it was taking more to download and hence it was time-consuming. It takes less time for download on report portal so we have added those reports in Report portal View. So one can download those report from Report Portal.

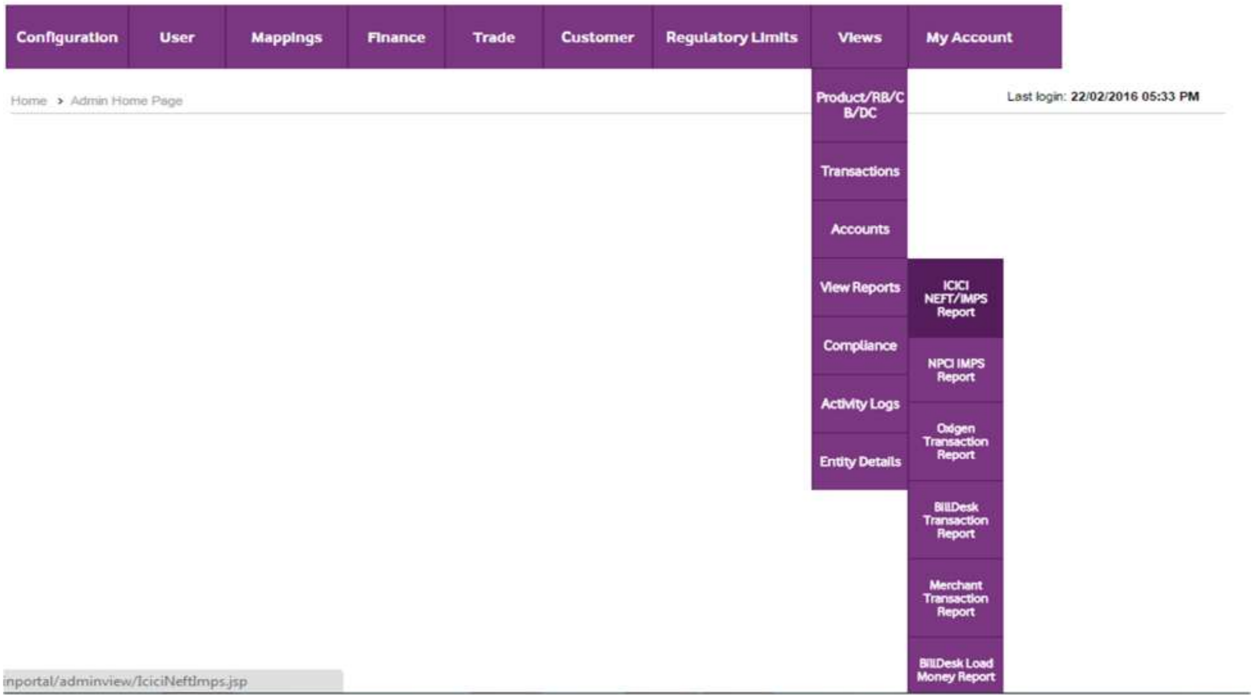


Fig 3.6 admin portal

Above figure is of Admin portal. We had migrated the reports from it to the Report portal which is shown below.

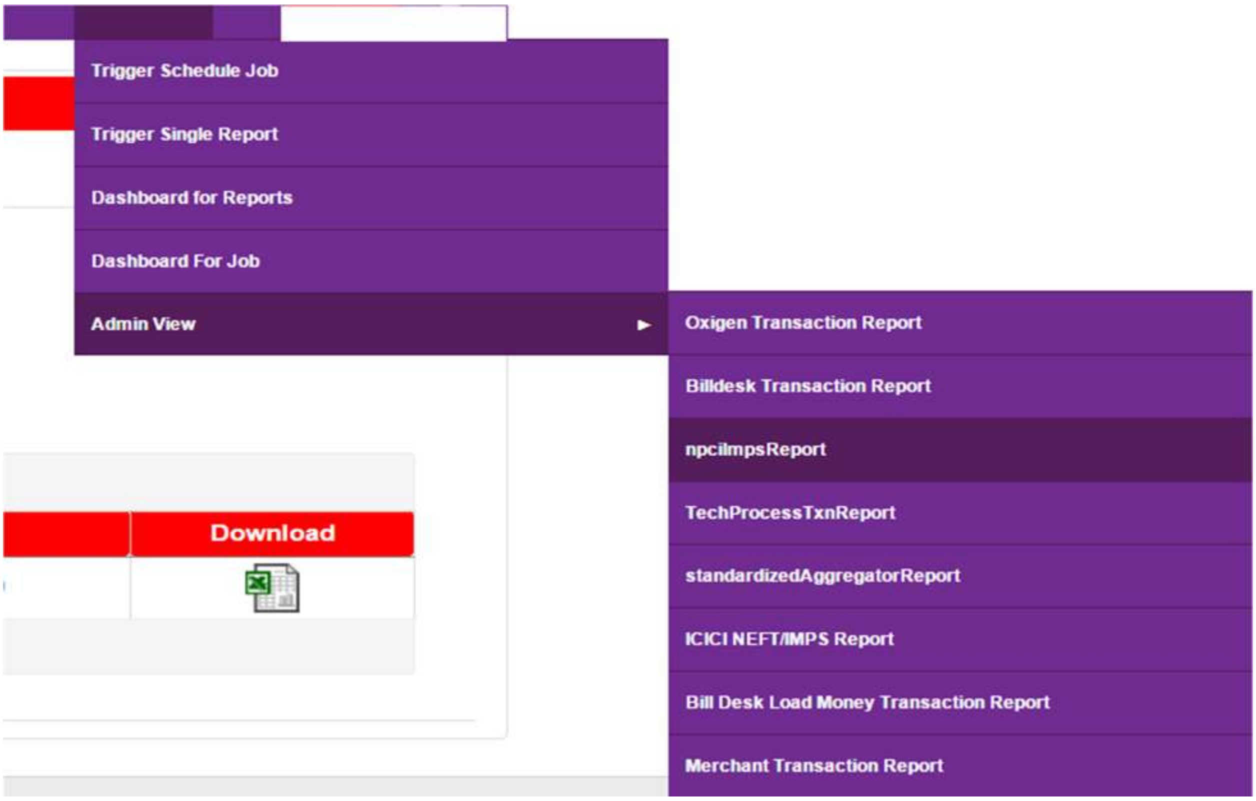
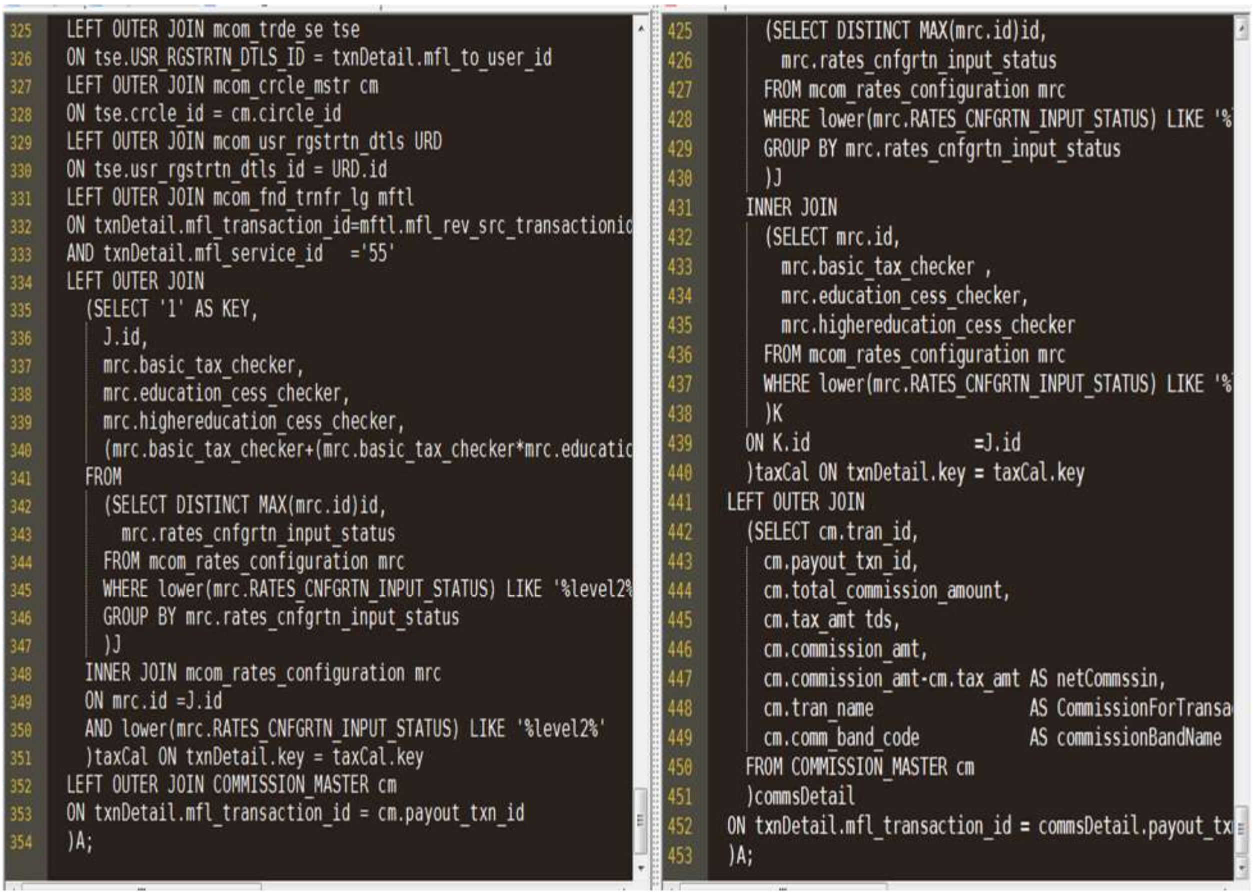


Fig 3.7 Report portal

3.5) Query performance enhancement:

For each report, there is a unique query. That query runs at the time of report generation. Some of them are very complex queries which include many joins and condition. Sometimes single query takes too much time for execution which is not preferable for the report generation. We had given the task to optimize those complex queries. We had optimized query on removing unnecessary join, by replacing the natural join with left join. We had learned how to check the explain plan for any query. It is very important to check the explain plan for query optimization. It gives the information about execution time, how many tables are fully scanned etc.

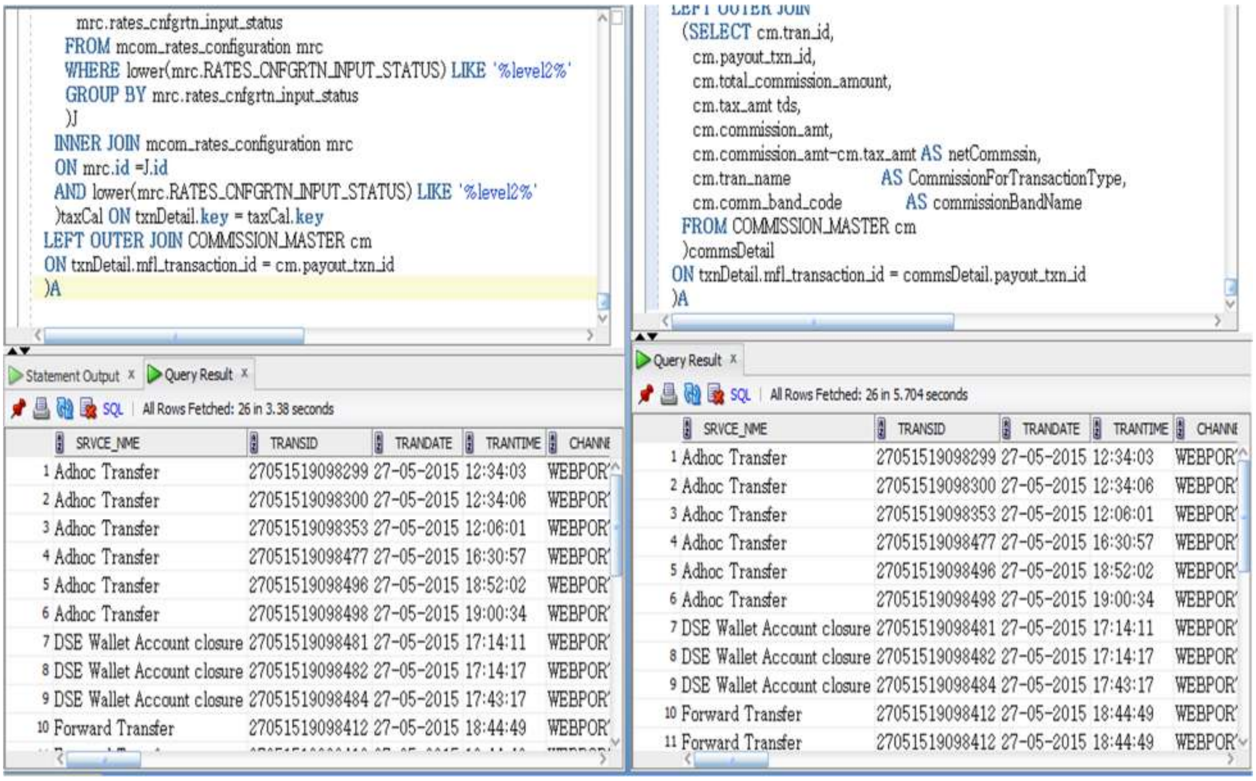


```
LEFT OUTER JOIN mcom_trde_se tse
ON tse.USR_RGSTRTN_DTLS_ID = txnDetail.mfl_to_user_id
LEFT OUTER JOIN mcom_crcle_mstr cm
ON tse.crcle_id = cm.circle_id
LEFT OUTER JOIN mcom_usr_rgstrtn_dtls URD
ON tse.usr_rgstrtn_dtls_id = URD.id
LEFT OUTER JOIN mcom_fnd_trnfr_lg mftl
ON txnDetail.mfl_transaction_id=mftl.mfl_rev_src_transactionic
AND txnDetail.mfl_service_id   ='55'
LEFT OUTER JOIN
  (SELECT '1' AS KEY,
    J.id,
    mrc.basic_tax_checker,
    mrc.education_cess_checker,
    mrc.highereducation_cess_checker,
    (mrc.basic_tax_checker+(mrc.basic_tax_checker*mrc.educatic
  FROM
    (SELECT DISTINCT MAX(mrc.id)id,
      mrc.rates_cnfgrtn_input_status
    FROM mcom_rates_configuration mrc
    WHERE lower(mrc.RATES_CNFGRTN_INPUT_STATUS) LIKE '%level2%
    GROUP BY mrc.rates_cnfgrtn_input_status
    )J
  INNER JOIN mcom_rates_configuration mrc
  ON mrc.id =J.id
  AND lower(mrc.RATES_CNFGRTN_INPUT_STATUS) LIKE '%level2%'
  )taxCal ON txnDetail.key = taxCal.key
LEFT OUTER JOIN COMMISSION_MASTER cm
ON txnDetail.mfl_transaction_id = cm.payout_txn_id
)A;
```

```
      (SELECT DISTINCT MAX(mrc.id)id,
        mrc.rates_cnfgrtn_input_status
      FROM mcom_rates_configuration mrc
      WHERE lower(mrc.RATES_CNFGRTN_INPUT_STATUS) LIKE '%
      GROUP BY mrc.rates_cnfgrtn_input_status
      )J
    INNER JOIN
      (SELECT mrc.id,
        mrc.basic_tax_checker ,
        mrc.education_cess_checker,
        mrc.highereducation_cess_checker
      FROM mcom_rates_configuration mrc
      WHERE lower(mrc.RATES_CNFGRTN_INPUT_STATUS) LIKE '%
      )K
    ON K.id                    =J.id
    )taxCal ON txnDetail.key = taxCal.key
  LEFT OUTER JOIN
    (SELECT cm.tran_id,
      cm.payout_txn_id,
      cm.total_commission_amount,
      cm.tax_amt tds,
      cm.commission_amt,
      cm.commission_amt-cm.tax_amt AS netCommssin,
      cm.tran_name                 AS CommissionForTransa
      cm.comm_band_code            AS commissionBandName
    FROM COMMISSION_MASTER cm
    )commsDetail
  ON txnDetail.mfl_transaction_id = commsDetail.payout_tx
  )A;
```

Fig 3.8 Query optimization.

We can optimize the query by removing the unnecessary join, avoiding the use of natural join instead of that use the left join. In figure 3.7 we have compared the optimized and query before optimized the queries accordingly. The execution time for the query before and after modification is shown in figure 3.7 where the data after execution is some but the execution time varies in both the case.



```
    mrc.rates_cnfgrtn_input_status
   FROM mcom_rates_configuration mrc
   WHERE lower(mrc.RATES_CNFGRTN_INPUT_STATUS) LIKE '%level2%'
   GROUP BY mrc.rates_cnfgrtn_input_status
   )J
  INNER JOIN mcom_rates_configuration mrc
  ON mrc.id =J.id
  AND lower(mrc.RATES_CNFGRTN_INPUT_STATUS) LIKE '%level2%'
  )taxCal ON txnDetail.key = taxCal.key
 LEFT OUTER JOIN COMMISSION_MASTER cm
 ON txnDetail.mfl_transaction_id = cm.payout_txn_id
 )A
```

All Rows Fetched: 26 in 3.38 seconds

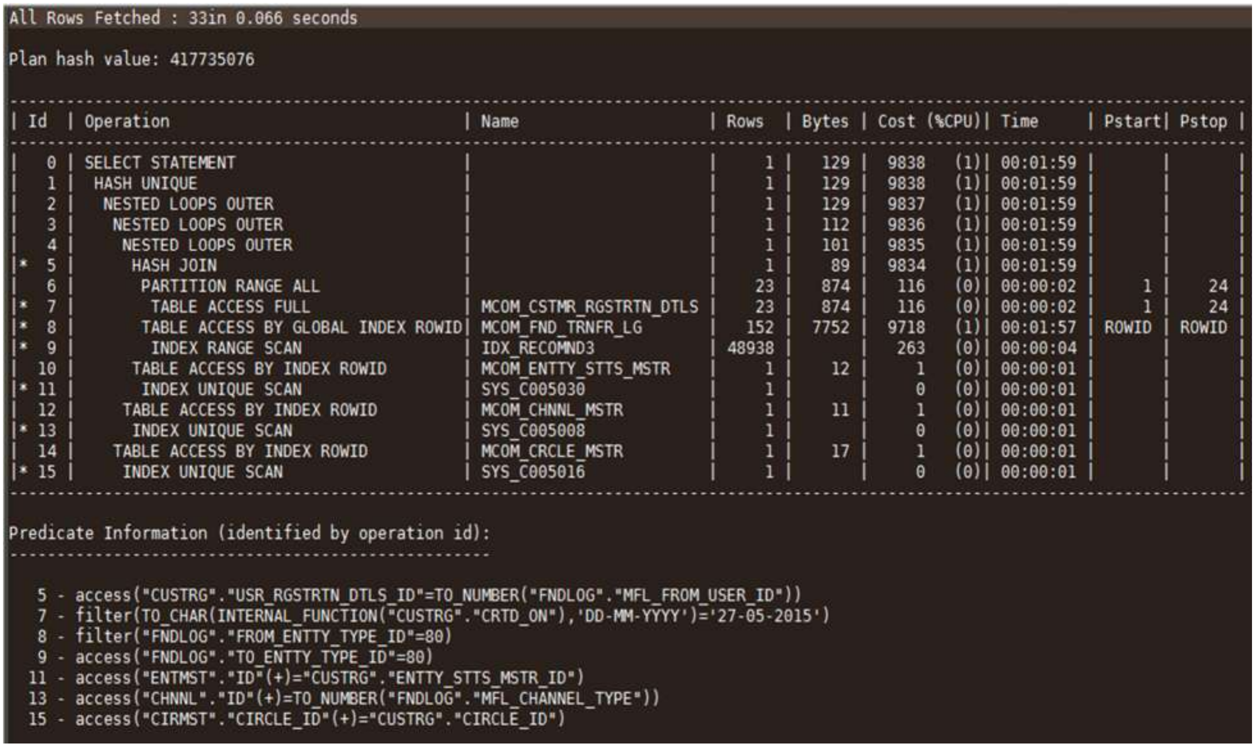
	SRVCE_NME	TRANSID	TRANDATE	TRANTIME	CHANNE
1	Adhoc Transfer	27051519098299	27-05-2015	12:34:03	WEBPOR'
2	Adhoc Transfer	27051519098300	27-05-2015	12:34:06	WEBPOR'
3	Adhoc Transfer	27051519098353	27-05-2015	12:06:01	WEBPOR'
4	Adhoc Transfer	27051519098477	27-05-2015	16:30:57	WEBPOR'
5	Adhoc Transfer	27051519098496	27-05-2015	18:52:02	WEBPOR'
6	Adhoc Transfer	27051519098498	27-05-2015	19:00:34	WEBPOR'
7	DSE Wallet Account closure	27051519098481	27-05-2015	17:14:11	WEBPOR'
8	DSE Wallet Account closure	27051519098482	27-05-2015	17:14:17	WEBPOR'
9	DSE Wallet Account closure	27051519098484	27-05-2015	17:43:17	WEBPOR'
10	Forward Transfer	27051519098412	27-05-2015	18:44:49	WEBPOR'

```
 LEFT OUTER JOIN
  (SELECT cm.tran_id,
    cm.payout_txn_id,
    cm.total_commission_amount,
    cm.tax_amt tds,
    cm.commission_amt,
    cm.commission_amt-cm.tax_amt AS netCommssin,
    cm.tran_name                AS CommissionForTransactionType,
    cm.comm_band_code             AS commissionBandName
  FROM COMMISSION_MASTER cm
  )commsDetail
 ON txnDetail.mfl_transaction_id = commsDetail.payout_txn_id
 )A
```

All Rows Fetched: 26 in 5.704 seconds

	SRVCE_NME	TRANSID	TRANDATE	TRANTIME	CHANNE
1	Adhoc Transfer	27051519098299	27-05-2015	12:34:03	WEBPOR'
2	Adhoc Transfer	27051519098300	27-05-2015	12:34:06	WEBPOR'
3	Adhoc Transfer	27051519098353	27-05-2015	12:06:01	WEBPOR'
4	Adhoc Transfer	27051519098477	27-05-2015	16:30:57	WEBPOR'
5	Adhoc Transfer	27051519098496	27-05-2015	18:52:02	WEBPOR'
6	Adhoc Transfer	27051519098498	27-05-2015	19:00:34	WEBPOR'
7	DSE Wallet Account closure	27051519098481	27-05-2015	17:14:11	WEBPOR'
8	DSE Wallet Account closure	27051519098482	27-05-2015	17:14:17	WEBPOR'
9	DSE Wallet Account closure	27051519098484	27-05-2015	17:43:17	WEBPOR'
10	Forward Transfer	27051519098412	27-05-2015	18:44:49	WEBPOR'
11	Forward Transfer	27051519098412	27-05-2015	18:44:49	WEBPOR'

Fig.3.9 Query Optimization and comparison



```
All Rows Fetched : 33in 0.066 seconds

Plan hash value: 417735076

-----------------------------------------------------------------------------------------------------------------------------
| Id  | Operation                          | Name                      | Rows  | Bytes | Cost (%CPU)| Time     | Pstart| Pstop |
-----------------------------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT                   |                           |     1 |   129 |  9838   (1)| 00:01:59 |       |       |
|   1 |  HASH UNIQUE                       |                           |     1 |   129 |  9838   (1)| 00:01:59 |       |       |
|   2 |   NESTED LOOPS OUTER               |                           |     1 |   129 |  9837   (1)| 00:01:59 |       |       |
|   3 |    NESTED LOOPS OUTER              |                           |     1 |   112 |  9836   (1)| 00:01:59 |       |       |
|   4 |     NESTED LOOPS OUTER             |                           |     1 |   101 |  9835   (1)| 00:01:59 |       |       |
|*  5 |      HASH JOIN                     |                           |     1 |    89 |  9834   (1)| 00:01:59 |       |       |
|   6 |       PARTITION RANGE ALL          |                           |    23 |   874 |   116   (0)| 00:00:02 |     1 |    24 |
|*  7 |        TABLE ACCESS FULL           | MCOM_CSTMR_RGSTRTN_DTLS   |    23 |   874 |   116   (0)| 00:00:02 |     1 |    24 |
|*  8 |       TABLE ACCESS BY GLOBAL INDEX ROWID| MCOM_FND_TRNFR_LG    |   152 |  7752 |  9718   (1)| 00:01:57 | ROWID | ROWID |
|*  9 |        INDEX RANGE SCAN            | IDX_RECOMND3              | 48938 |       |   263   (0)| 00:00:04 |       |       |
|  10 |      TABLE ACCESS BY INDEX ROWID   | MCOM_ENTTY_STTS_MSTR      |     1 |    12 |     1   (0)| 00:00:01 |       |       |
|* 11 |       INDEX UNIQUE SCAN            | SYS_C005030               |     1 |       |     0   (0)| 00:00:01 |       |       |
|  12 |     TABLE ACCESS BY INDEX ROWID    | MCOM_CHNNL_MSTR           |     1 |    11 |     1   (0)| 00:00:01 |       |       |
|* 13 |      INDEX UNIQUE SCAN             | SYS_C005008               |     1 |       |     0   (0)| 00:00:01 |       |       |
|  14 |    TABLE ACCESS BY INDEX ROWID     | MCOM_CRCLE_MSTR           |     1 |    17 |     1   (0)| 00:00:01 |       |       |
|* 15 |     INDEX UNIQUE SCAN              | SYS_C005016               |     1 |       |     0   (0)| 00:00:01 |       |       |
-----------------------------------------------------------------------------------------------------------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   5 - access("CUSTRG"."USR_RGSTRTN_DTLS_ID"=TO_NUMBER("FNDLOG"."MFL_FROM_USER_ID"))
   7 - filter(TO_CHAR(INTERNAL_FUNCTION("CUSTRG"."CRTD_ON"),'DD-MM-YYYY')='27-05-2015')
   8 - filter("FNDLOG"."FROM_ENTTY_TYPE_ID"=80)
   9 - access("FNDLOG"."TO_ENTTY_TYPE_ID"=80)
  11 - access("ENTMST"."ID"(+)="CUSTRG"."ENTTY_STTS_MSTR_ID")
  13 - access("CHNNL"."ID"(+)=TO_NUMBER("FNDLOG"."MFL_CHANNEL_TYPE"))
  15 - access("CIRMST"."CIRCLE_ID"(+)="CUSTRG"."CIRCLE_ID")
```

Fig 3.10 Explain plan

Explain plan gives the detailed information about the query execution. It includes Loops in the query, table access, cost of each loop, execution time for each loop etc. Sometimes we try to access the table without using an index. It will increase the execution time because it will scan the whole table. We can reduce the execution time of a query by creating the index. Explain plan gives the information about the fully scan table so we can create the index for that particular table and decrease the execution time.

The purpose of the Oracle Optimizer is to work out the foremost economical execution set up for your queries. It makes these choices supported the applied math info it's regarding your knowledge and by investing Oracle info options like hash joins, parallel question, partitioning, etc. Still it's expected that the optimizer can generate sub-optimal plans for a few SQL statements currently then. In cases wherever there's another setup, that performed higher than the set up generated by the optimizer, the primary step in designation why the Optimizer picked the sub-optimal setup is to visually examine each of the execution plans.

Examining the various aspects of AN execution set up, from property to parallel execution and understanding what info you ought to be gleaming from the set up may be overwhelming even for the foremost toughened DBA. This paper offers an in-depth clarification of every side of the execution set up and an insight into what caused the CBO to form the choice it did.

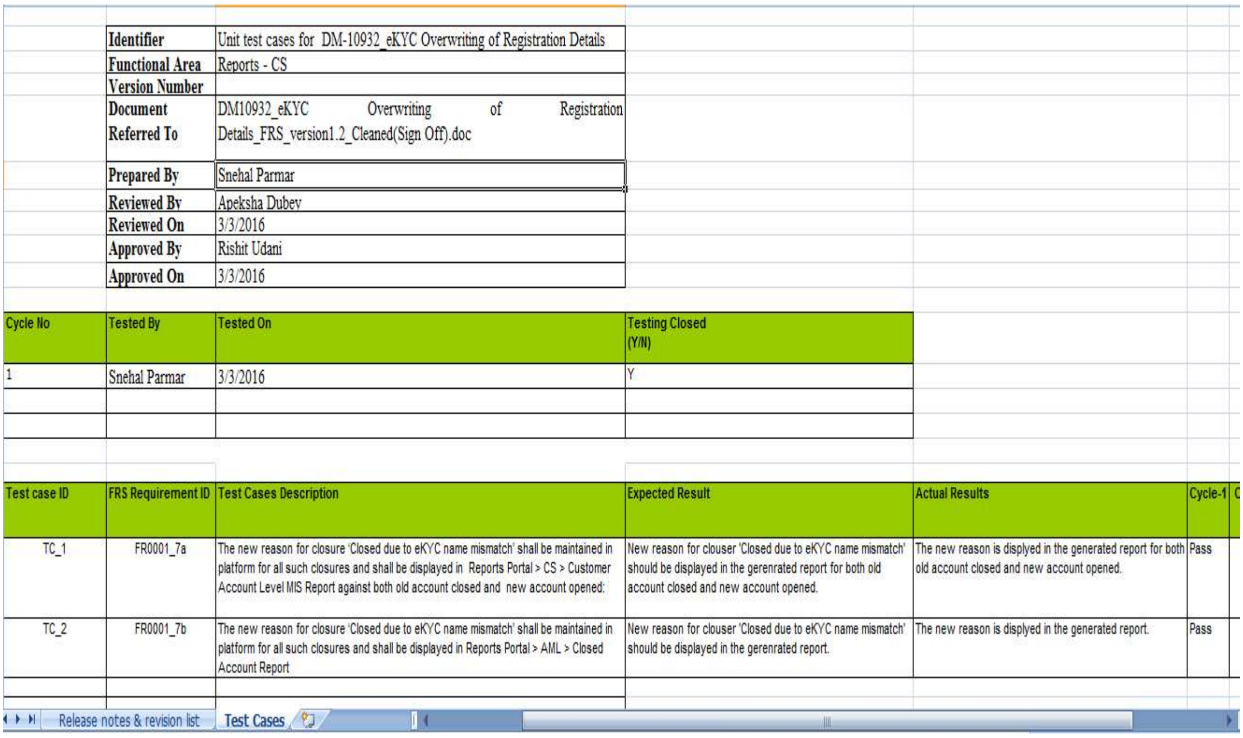
3.6) Customer Demand Analysis:

Next task was to analyze the demand of customer and made the changes according to the demand. We have studied 4 to 5 demands and help them to complete those demands. In figure 3.10 we have shown the document of test cases for the demand which we had studied.

3.6.1) Functional Requirements:

1) A new reason for closure ‘closed due to eKYC mismatch ’ shall be maintained in the platform for all such closer and shall be displayed in Report Portal>CS>Customer Account Level MIS Report against both old accounts closed and a new account opened.

2) A new reason for closure ‘closed due to eKYC mismatch ’ shall be maintained in the platform for all such closer and shall be displayed in Report Portal>AML>Closed Account Report against both old accounts closed and a new account opened.



Identifier	Unit test cases for DM-10932_eKYC Overwriting of Registration Details
Functional Area	Reports - CS
Version Number	
Document Referred To	DM10932_eKYC Overwriting of Registration Details_FRS_version1.2_Cleaned(Sign Off).doc
Prepared By	Snehal Parmar
Reviewed By	Apeksha Dubey
Reviewed On	3/3/2016
Approved By	Rishit Udani
Approved On	3/3/2016

Cycle No	Tested By	Tested On	Testing Closed (Y/N)
1	Snehal Parmar	3/3/2016	Y

Test case ID	FRS Requirement ID	Test Cases Description	Expected Result	Actual Results	Cycle-1	C
TC_1	FR0001_7a	The new reason for closure 'Closed due to eKYC name mismatch' shall be maintained in platform for all such closures and shall be displayed in Reports Portal > CS > Customer Account Level MIS Report against both old account closed and new account opened:	New reason for clouser 'Closed due to eKYC name mismatch' should be displayed in the gerenrated report for both old account closed and new account opened.	The new reason is displyed in the generated report for both old account closed and new account opened.	Pass	
TC_2	FR0001_7b	The new reason for closure 'Closed due to eKYC name mismatch' shall be maintained in platform for all such closures and shall be displayed in Reports Portal > AML > Closed Account Report	New reason for clouser 'Closed due to eKYC name mismatch' should be displayed in the gerenrated report.	The new reason is displyed in the generated report.	Pass	

Fig 3.11 Demand analysis and test cases.

3.7) Report Generation According to new demand:

In some demands, customer needs new reports to be generated. For the reports, the new queries had to be developed. We had worked on the demandDM11227_Refer and Earn in which customer wanted two new report Referral Code generation Report and Referral code redemption.

We had created new UI for these two new report and developed new queries for them.

3.7.1) Referral Code Generation Report:

Referral code has been generated for every new registration. This code will be added to the database corresponding to the entry of that customer. This report contains the information about the customer and his referral code which has been generated at the time of registration. In the figure, the new entry for new report is shown.

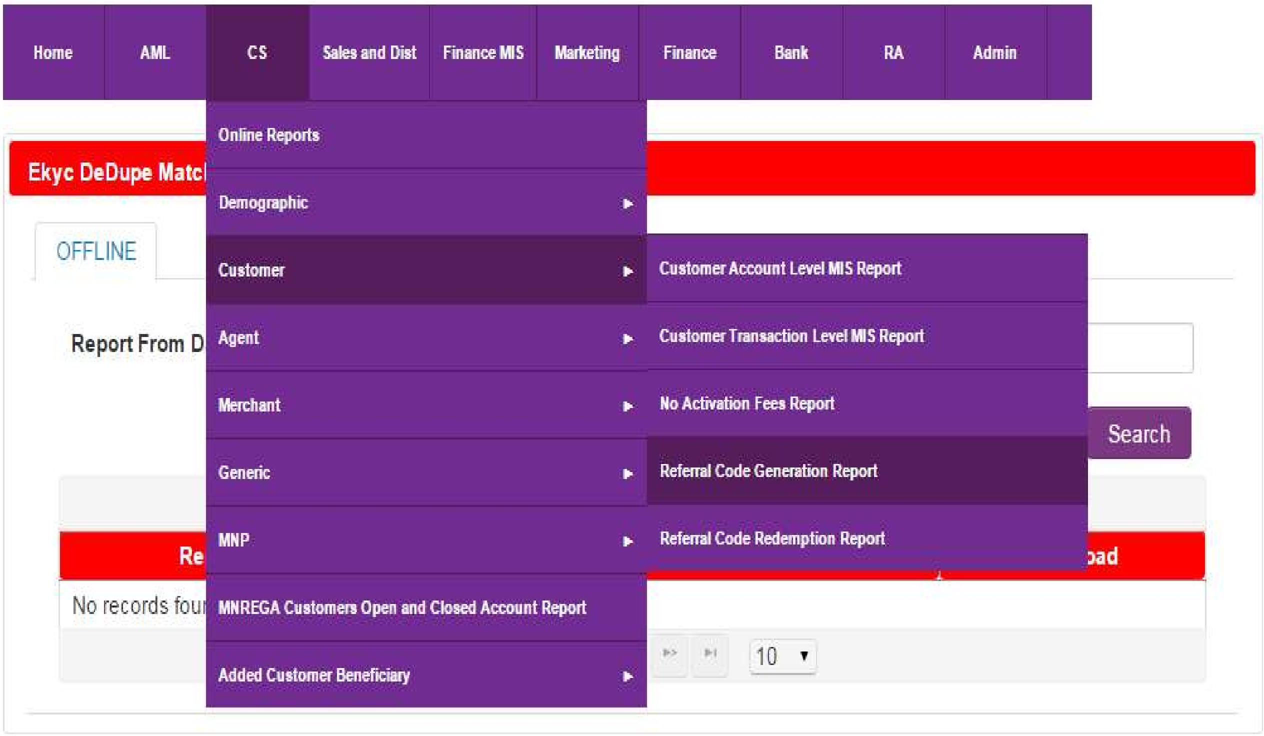

Home
AML
CS
Sales and Dist
Finance MIS
Marketing
Finance
Bank
RA
Admin
Ekyc DeDupe Matcl
OFFLINE
Report From D
Search
Re
No records foul
Online Reports
Demographic
Customer
Agent
Merchant
Generic
MNP
MNREGA Customers Open and Closed Account Report
Added Customer Beneficiary
Customer Account Level MIS Report
Customer Transaction Level MIS Report
No Activation Fees Report
Referral Code Generation Report
Referral Code Redemption Report
10

Fig.3.12 New demand for Referral Code generation Report and Referral code redemption.

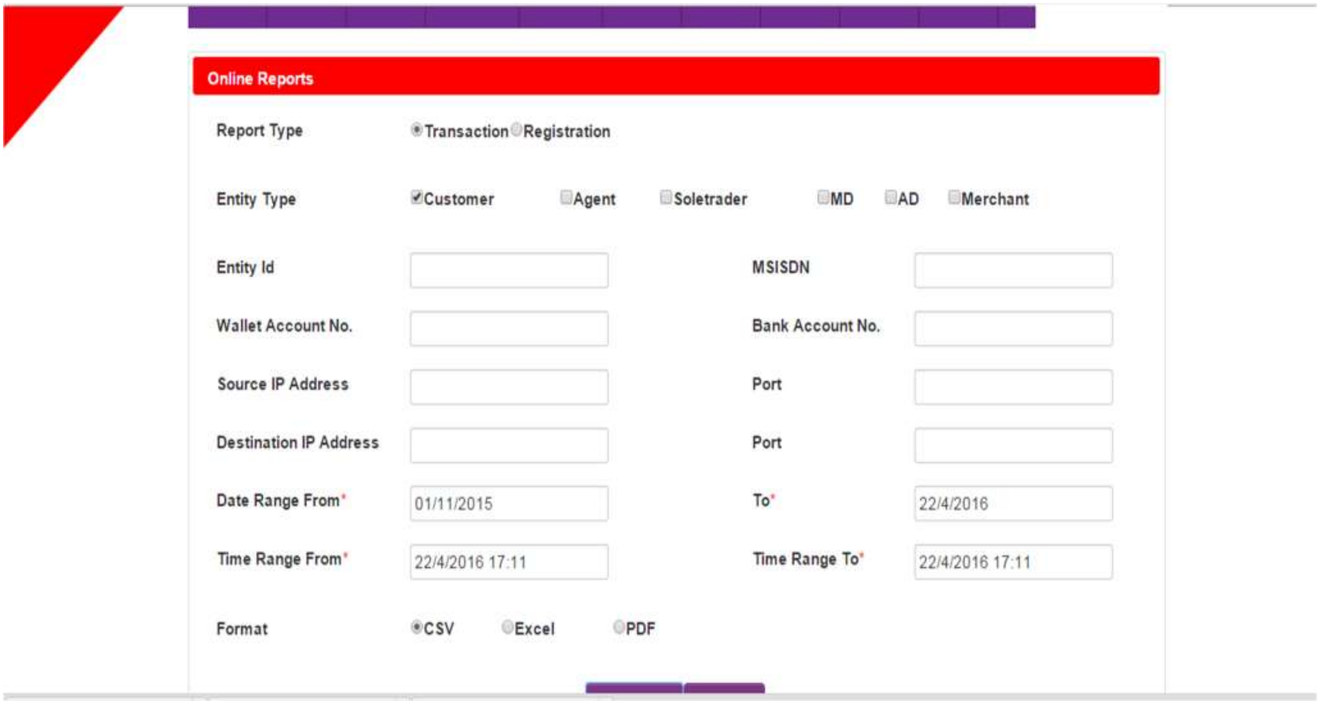
3.7.2) Referral Code Generation Report:

The customer which is already registered and having the referral code will suggest another person to register in this application by using his referral code. If that new person registers in this application using referral code of that already registered person that registered person will get the benefit of some virtual money. That virtual money will be transferred to his account. Whole data of transaction will be added to the database. This report will have the information about the new customer and the already registered customer, benefited amount etc.

3.8) PDF generation in java as a part of demand:

Usually, reports are generated in the format of Excel or CSV but in demand DM11915 - Fraud CR to capture additional information in Transaction & Registration Logs customer had demanded to generate the report in PDF format. We helped them in the generation of PDF.

Using text library we can generate PDF in Java. In given figure 3.13 we have shown the UI for the new reports of this demand.



Online Reports

Report Type	● Transaction ○ Registration		
Entity Type	☑ Customer □ Agent □ Soletrader □ MD □ AD □ Merchant		
Entity Id		MSISDN	
Wallet Account No.		Bank Account No.	
Source IP Address		Port	
Destination IP Address		Port	
Date Range From*	01/11/2015	To*	22/4/2016
Time Range From*	22/4/2016 17:11	Time Range To*	22/4/2016 17:11
Format	● CSV ○ Excel ○ PDF		

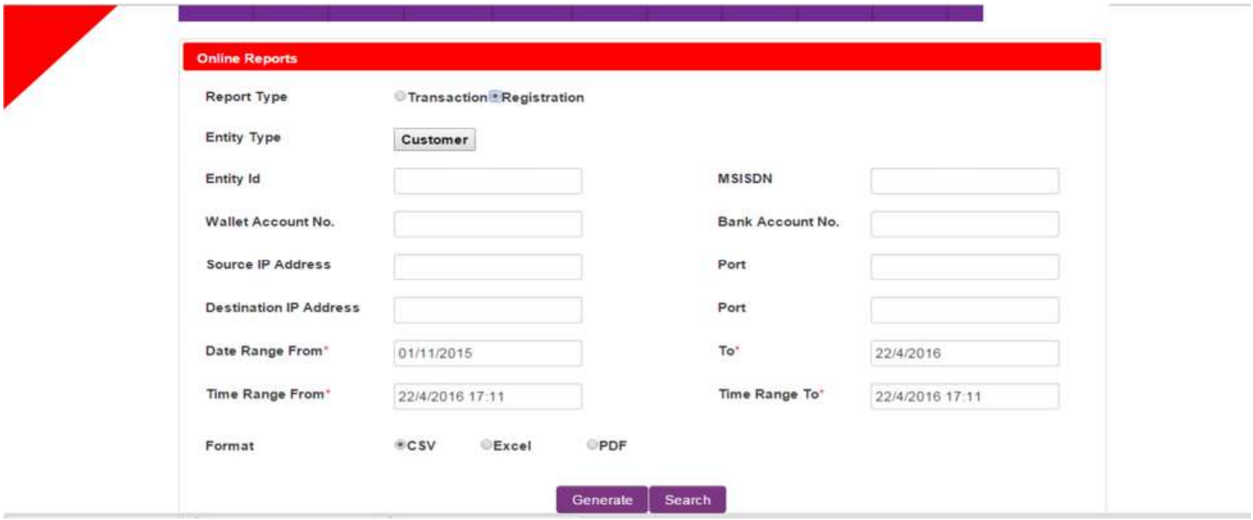
Fig 3.13 UI for new report: Fraud Transaction report

3.8.1) Fraud Transaction report:

This report will give the information about the transaction of particular entity type it can be Customer, Agent, and Merchant etc. according to the filter selected by the user. We had included the option for PDF generation which will generate PDF for that report.

3.8.2) Fraud registration report:

This report will give the information about the registration of customer with given filters.



Online Reports

Report Type	○ Transaction ● Registration		
Entity Type	Customer		
Entity Id		MSISDN	
Wallet Account No.		Bank Account No.	
Source IP Address		Port	
Destination IP Address		Port	
Date Range From*	01/11/2015	To*	22/4/2016
Time Range From*	22/4/2016 17:11	Time Range To*	22/4/2016 17:11
Format	● CSV ○ Excel ○ PDF		

Fig 3.14 Fraud Registration report.

3.9) Report For Today:

We have to create UI page into Admin Page which displays all current transaction of the current date. We have to display the result of SQL Query of the current transaction into a data table in JSF with java as a backend. Also in UI Display the color of row differently according to Status of Report so they can detect easily for any ambiguity. There are so many Records so we have to apply Pagination.

3.10) Functional Requirements (DMR):

New Customer can register through DMR menu Beneficiary addition through DMR service and DMR transaction.

3.11) Some Queries:

1) Name, Registration Date, channel name where "Registration date" = Day and "channel name" = "Agent Assisted" and "Source" = "USSD"

2) Fetch all Transactions in which Customer is included for T-1 Day and send a query. The following information should be cover in a query. Transaction Type, Transaction ID, Transaction Date, Transaction time, Channel, Customer, Mobile number, Customer First Name, Customer Last Name, Customer Circle, Date of, Registration, Time of Registration, Customer KYC Status, Entity ID, Customer Account Number, Charges, Service Tax.

3) Name, Registration Date, channel name where "Registration date" = Day and "channel name" = "Agent Assisted" and "Source" = "WEBPORTAL" or "Agent Portal"

4) Name, Registration Date, channel name where "Entity Status" not equal to "Closed".

3.12) Some solved issues:

1) Trigger Schedule Auto Refresh Issue: There is an issue of Auto Refresh in Trigger Schedule Reports after every 30 sec that is to be solved.

2) Cs Online Status Refresh Issue: In this Status Refresh Issues where the report is generated but Status do not change.

3) Solve Bug in Dashboard for Report: In this there is Bug in the list where duplicate entry is there that is to be solved.

Chapter 4

Study of Tools:

4.1) Programming Mistake Tool (PMD) Tool:

It is a tool which helps to find a mistake in programming code. It analysis the code and finds the mistake from the given code. Some common mistakes are unused variable, empty catch box, unnecessary object etc. It is also used as Copy paste detector (CPD). It supports many language i.e. Java, JavaScript, SQL, Apache Velocity, XML, XSL.

Fig 4.1 PMD tool

4.1.1) Step for installation of PMD plug-in:

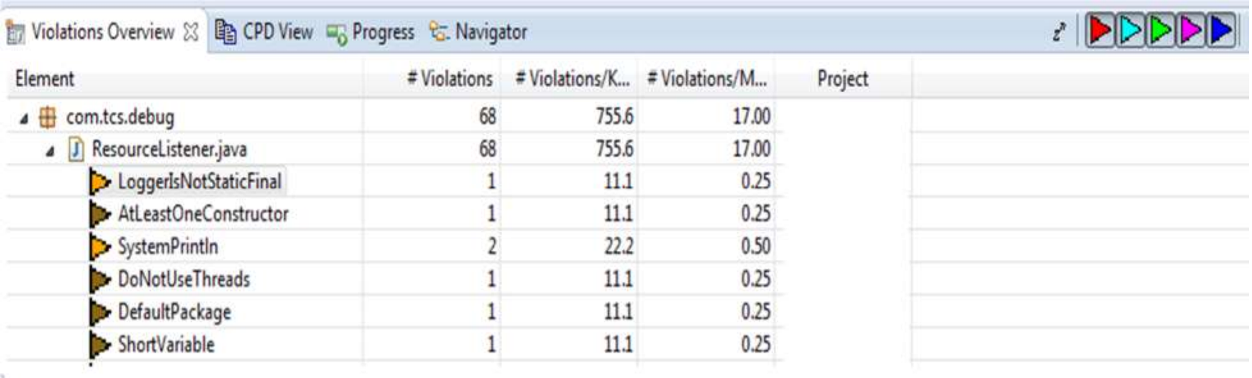
Step 1) In Eclipse, go to Help -> Install New Software

Step 2) then add Name: PMD for Eclipse Update Site and URL:

Step 3) http://sourceforge.net/projects/pmd/files/pmdeclipse/updat site/

Step 4) Select checkbox and Next.

Step 5) Accept the license and confirm And Then Restart eclipse and it will install.



Element	# Violations	# Violations/K...	# Violations/M...	Project
com.tcs.debug	68	755.6	17.00	
ResourceListener.java	68	755.6	17.00	
LoggerIsNotStaticFinal	1	11.1	0.25	
AtLeastOneConstructor	1	11.1	0.25	
SystemPrintln	2	22.2	0.50	
DoNotUseThreads	1	11.1	0.25	
DefaultPackage	1	11.1	0.25	
ShortVariable	1	11.1	0.25	

Fig 4.2 Error Detection in Eclipse

4.2) War file deployment:

4.2.1) Creation of War File:

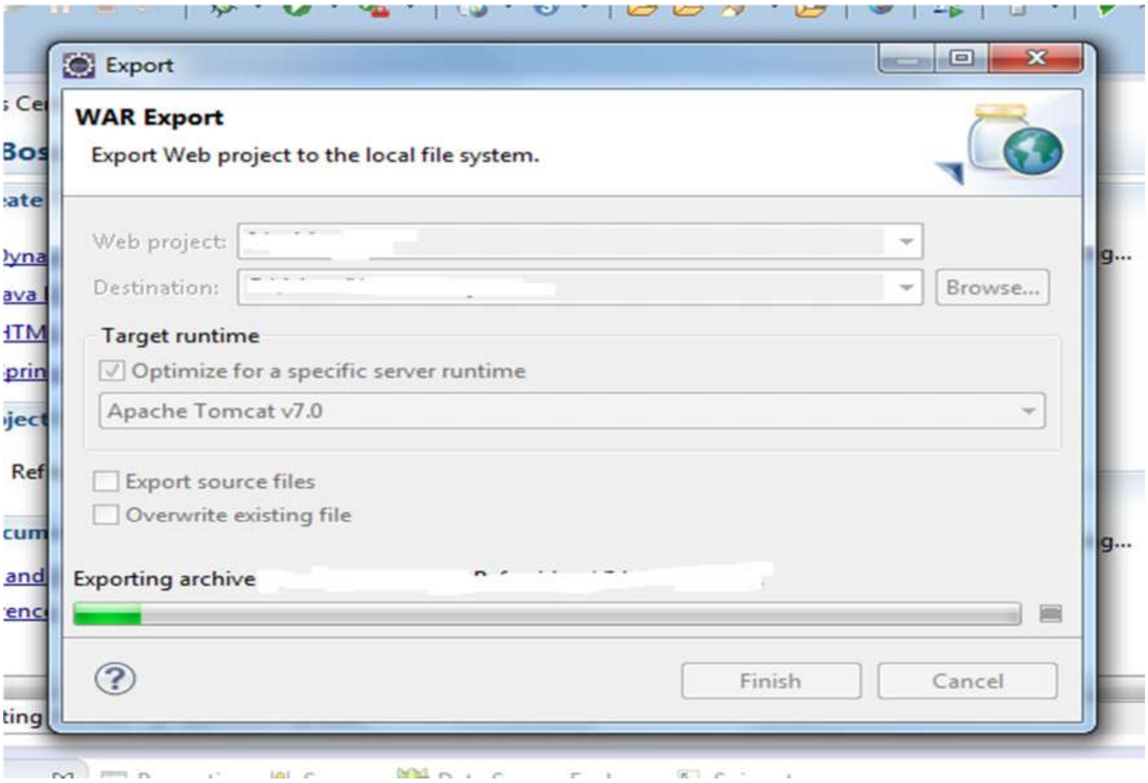
Step 1) Export war file from Eclipse.

Step 2) Create war file And Put in Deployment

Step 3) Replace File in War File

Step 4) WEB-INF\classes\com\tcs\anyfloder\service\generic\querybank\

Step 5) WEB-INF\classes\



WAR Export

Export Web project to the local file system.

Web project:

Destination:

Target runtime

☑ Optimize for a specific server runtime

Apache Tomcat v7.0

□ Export source files

□ Overwrite existing file

Exporting archive

Fig 4.3 War export.

Step 6) WEB-INF\config\

Step 7) copy in temp FROM FILEZILLA

Step 8) Move Deploy from top to deployment via putty cp command

Step 9) putty cp command(/opt/wildfly/standalone/deployments).

4.2) JBossWildFly:

JBoss is an Open-source Java EE-based application server runtime platform used for building, deploying, and hosting Java applications and services. It is authored by JBoss and developed by Red Hat. WildFly is implemented on Java platform. On 20 November 2014, JBoss Application Server was renamed WildFly.

The JBoss Platform is open-source Java EE-based application server runtime platform used for building, deploying, and hosting Java applications and services.

Load balancing distributes workloads across multiple computing resources, computers, cluster, network links, CPUs or disk drive. Load balancing aims to optimize resource use, maximize throughput, minimize response time, and avoid overload of any single resource.

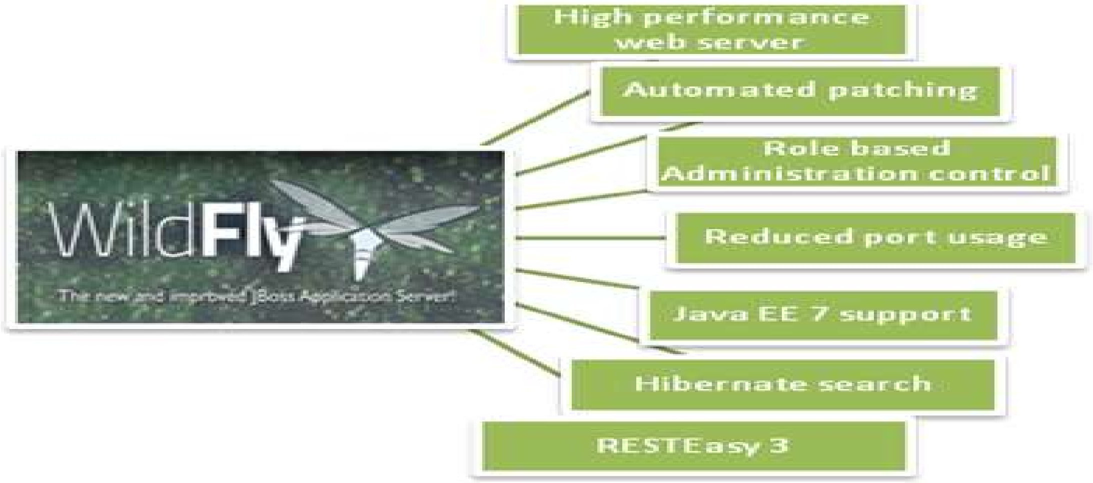

WildFly
The new and improved JBoss Application Server!
High performance web server
Automated patching
Role based Administration control
Reduced port usage
Java EE 7 support
Hibernate search
RESTEasy 3

Fig 4.3 Functionality of wildfly.

On the web, corporations whose internet sites get a good deal of traffic sometimes use load equalization. For load balancing net traffic, there square measure many approaches. For net serving, one approach is to route every request in turn to a distinct server host address during a naming system (DNS) table, round-robin fashion.

Usually, if two servers square measure won’t balance a piece load, a 3rd server is required to see that server to assign the work to. Since load equalization needs multiple servers, it's sometimes combined with failover and backup services. In some approaches, the server’s square measure distributed over completely different geographic locations.

4.2.1) Product features:

1. Clustering
2. Deployment API
3. Distributed caching
4. Distributed deployment
5. Hibernate integration
6. Java Authentication and Authorization Service
7. Java EE Connector Architecture
8. Java Message Service
9. Java Naming and Directory Interface
10. Java Mail
11. Java Server Faces
12. JSP/ Java Servlet 2.1/2.5 (Tomcat)
13. JDBC
14. Load balancing
15. Management API

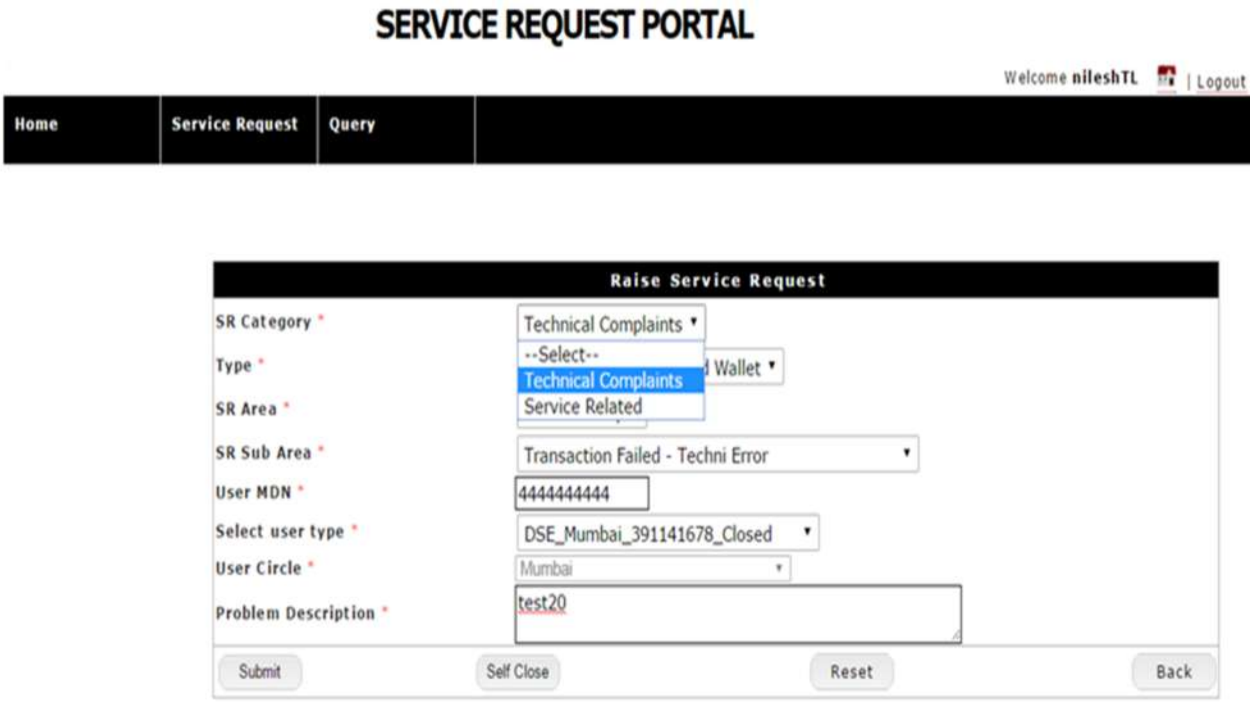
Chapter 5

Feasibility study for Android application development for SR PORTAL:

5.1) SR portal:

SR portal is a service portal which works as Customer care service. Customer service is the act of taking care of the customer's needs by providing and delivering professional, helpful, high-quality service and assistance before, during, and after the customer's requirements are met[].Customer care service is a very important part of any business. It helps to develop a good relationship with customers.

SR Portal is also customer care service that helps customers for their queries. The customer can raise their queries and complaints such as technical and services related complaints.SR Portal team will solve those queries.



SR Category * Technical Complaints

Type * Wallet

SR Area *

SR Sub Area * Transaction Failed - Techni Error

User MDN * 4444444444

Select user type * DSE_Mumbai_391141678_Closed

User Circle * Mumbai

Problem Description * test20

Fig. 5.1 SR Portal

Currently, SR Portal is a Desktop application. We had given the task of a feasibility study of SR Portal for android app.

5.1.1) Column Specification:

SR Number : It is a number given to SR queries.

SR Area : It specifies the type of queries.

SR Type : It specifies status Closed or Semi-Closed

SR subtype : It gives the information about SR subtype 1 and 2.

User circle : It specifies the Circle of User.

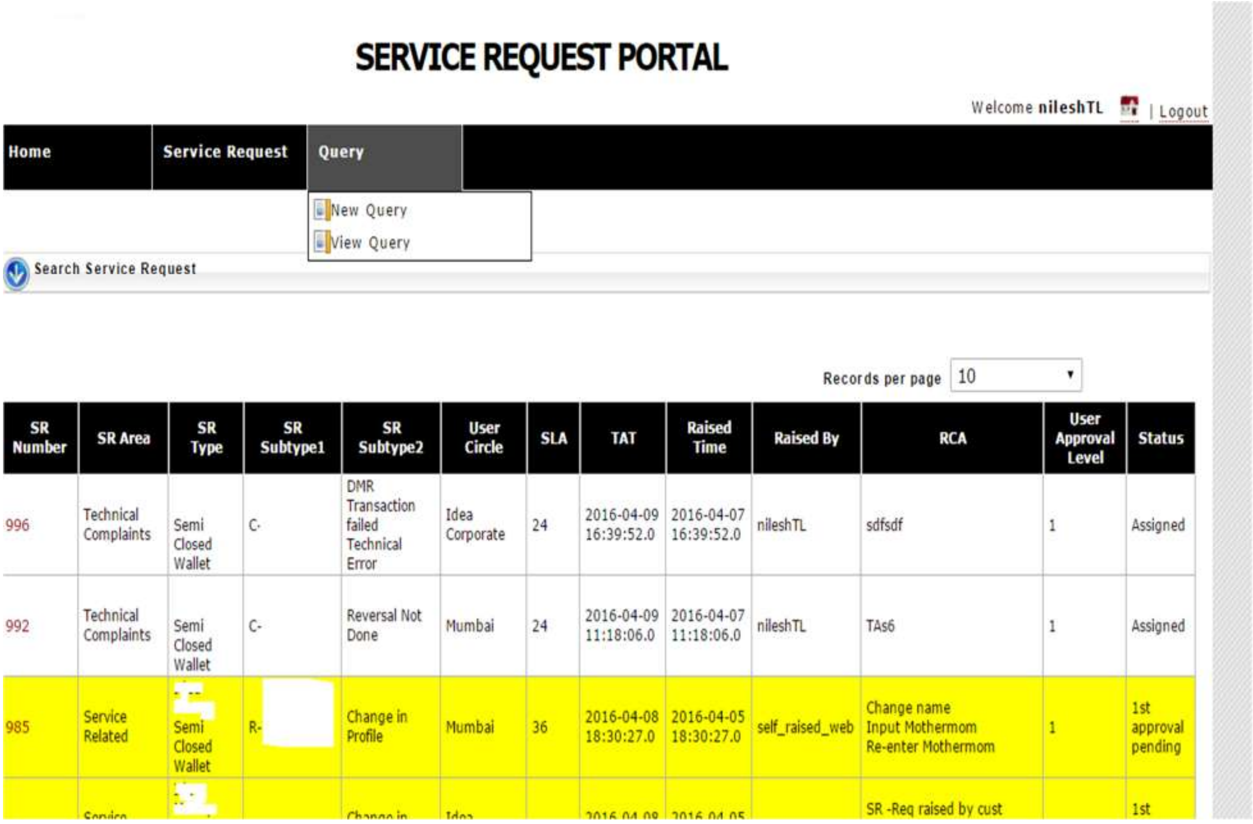
SLA : It shows the time limit of the completion of that query.

TAT : It species deadline excluding holiday according to circle.

Raised time : It shows the time when the query was raised.

Raised By : It specifies the name of User who raised that query.

Level : It gives the level of execution.



SR Number	SR Area	SR Type	SR Subtype1	SR Subtype2	User Circle	SLA	TAT	Raised Time	Raised By	RCA	User Approval Level	Status
996	Technical Complaints	Semi Closed Wallet	C-	DMR Transaction failed Technical Error	Idea Corporate	24	2016-04-09 16:39:52.0	2016-04-07 16:39:52.0	nileshTL	sdfsdf	1	Assigned
992	Technical Complaints	Semi Closed Wallet	C-	Reversal Not Done	Mumbai	24	2016-04-09 11:18:06.0	2016-04-07 11:18:06.0	nileshTL	TAs6	1	Assigned
985	Service Related	[redacted] Semi Closed Wallet	R- [redacted]	Change in Profile	Mumbai	36	2016-04-08 18:30:27.0	2016-04-05 18:30:27.0	self_raised_web	Change name Input Mothermom Re-enter Mothermom	1	1st approval pending
	Service	[redacted]		Change in	Idea		2016-04-08	2016-04-05		SR -Req raised by cust		1st

Fig 5.2 queries raised by customer

5.1.2) Admin team:

1) Team Leader: He is a person who has the right to see all the queries.

2) Tec hops : He is a person who has a limited right to see the queries. He can see the queries which are assigned to him.

3) Implementers: He implements the solution for given queries.

5.2) Objective and Scope of an Android Application:

The objective is to make an android application that will help the customer to raise their complaint with the help of mobile. Currently, the SR Portal is desktop application so to raise complaints customer must use desktops, but an android application will give them the flexibility that they can raise their queries from anywhere using mobile.

5.3) Functional and Non-functional Requirements:

5.3.1) Functional Requirements:

A functional requirement defines a function of a system or its component. A function is described as a set of inputs, the behavior, and outputs [13]. Functional Requirements for this application is given below.

1) Create Account: Customer can create an account.

2) Log in : Registered customer can log in into their account.

3) Add Queries : Registered customer can raise their complaints on Adding their queries.

4) Update Queries: Registered customer can update or delete their Complaints on adding their queries.

5) Check Status : Registered customer can check his status. Possible status is Approved, Assigned, Completed.

5.3.2) Non-Functional Requirements:

A non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors [14].Functional Requirements for this application is given below.

1) Performance : The application must be interactive and there Must be less delay in action-response of the Application.

2) Safety and security: Information of customer is very important so it should be safe and secured and transferred Securely transfer to the server.

3) Reliability : Application should be reliable such that it Should deliver the result in the given time.

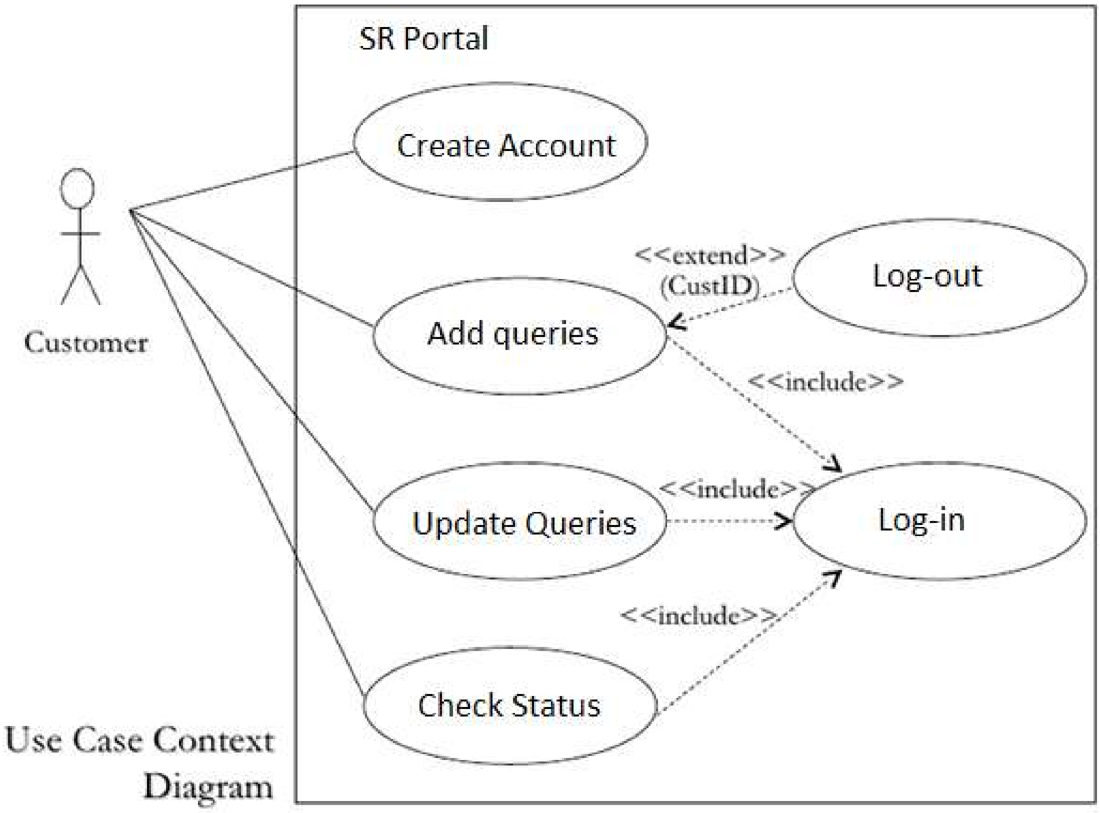


Fig 5.3 use case diagram for Customer log-in

Chapter 6

Conclusion

Report Portal is a platform which deals with database and the real-time requirements of the customers. According to demands, it changes the UI for the report generation and also develops new queries for news reports. New demands also include query performance which is the basic part for fetching the data from the large database. It also includes the study of new tools and application which can be helpful for the code enhancement.

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