

# Data Governance Tool for Business Administration: BUDGET EDITOR

Submitted By

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**INSTITUTE OF TECHNOLOGY**

**NIRMA UNIVERSITY**

**AHMEDABAD-382481**

**May 2015**

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# Data Governance Tool for Business Administration: BUDGET EDITOR

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## Major Project

Submitted in partial fulfillment of the requirements

for the degree of

Master of Technology in Computer Science and Engineering (Networking Technologies)

Submitted By

**Pranjali Agrawal**

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Guided By

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May 2015

## Certificate

This is to certify that the major project entitled ” **Data Governance Tool for Business Administration: BUDGET EDITOR** ” submitted by **Pranjali Agrawal (Roll No: 13MCEN11)**, towards the partial fulfillment of the requirements for the award of degree of Master of Technology in Computer Science and Engineering (Networking Technologies) of Institute of Technology, Nirma University, Ahmedabad, is the record of 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, to the best of my knowledge, haven’t been submitted to any other university or institution for award of any degree or diploma.

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## Certificate

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I hereby declare that the work which is being presented in the Major Project titled **”Data Governance Tool for Business Administration: BUDGET EDITOR”** in partial fulfillment of the requirement for the award of degree of Master of Technology in Information and Network Security (CSE) of Institute of Technology, Nirma University, Ahmedabad is an authentic record of my own work carried out under the supervision of Mrs. Archana Thakur, External Guide and Mr. Sanjeev Bansal, Manager. The matter presented in this thesis has not been submitted in any other University/Institute for the award of my degree.

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It is certified that the above statement made by the student is correct to the best of my knowledge and belief.

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## Statement of Originality

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I, **Pranjali Agrawal**, Roll. No. **13MCEN11**, give undertaking that the Major Project entitled ” **Data Governance Tool for Business Administration: BUDGET EDITOR** ” submitted by me, towards the partial fulfillment of the requirements for the degree of Master of Technology in **Computer Science & Engineering (Networking Technologies)** of Institute of Technology, Nirma University, Ahmedabad, contains no material that has been awarded for any degree or diploma in any university or school in any territory to the best of my knowledge. It is the original work carried out by me and I give assurance that no attempt of plagiarism has been made. It contains no material that is previously published or written, except where reference has been made. I understand that in the event of any similarity found subsequently with any published work or any dissertation work elsewhere; it will result in severe disciplinary action.

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- **Pranjali Agrawal**

**13MCEN11**

## Abstract

In today's reality the innovation is developing quick and there are an enormous measure of specialized information, it gets to be troublesome for an association to keep up all the information needed by the association in a sorted out way which can prompt the distinguishing proof of the right asset for the right occupation. The thought behind a computerized apparatus is to help the supervisors to deal with the assets at their expertise level and help the individuals add to their abilities by legitimately adjusting them to the undertaking demands. The association can get much out from that point representative by thusly and which may prompt make the association to lead more result.

By this way the organization can take the best out from people which can help to develop a skillful organization.

The basic objective of the document is the description of detailed working of an automated tool with important objective of handling the task with a great ease also to maintain and show the roles and responsibilities of all people under the organization. It likewise compresses the necessities, limitations and the other administration situated reports bolstered by the outline.

This record consider the extent of portraying the working of the device that perform extraction of the information and perform its examination. This task is done all in back-end. It also tell about the details of certain concepts, some technological requirements, the flow of the data and certain level of designing. There are some confidentiality and security rights issue of the organization due to which every small details can not be disclosed.

# Abbreviations

<b>IFRS</b>	International Financial Reporting Standards.
<b>TLS</b>	Time Logging System.
<b>SDB</b>	Scheduled Database.
<b>DEV</b>	Development.
<b>QA</b>	Quality Analysis.
<b>PROD</b>	Production.
<b>SoC</b>	System on a Chip or System on Chip .

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# Chapter 1

## Introduction : Budget Editor

### 1.1 Introduction to Tool

Budget Editor is a Data Governance tool that is been used as an automated tool for the organization. This tool is been used by the managers and the supervisors to maintain the data so that they can differentiate about there plannings and the particualr out come. In technical terms there are two types of data forecast data and the capacity. And the ansalysis of this is been done bt the report generation technique by which one can come to know about the utilized resources.

This tool basically brings the data based on the users right type.It brings the organizations based on the users right. And after these selections the required and personalized data as per the users need come as an outcome.

### 1.2 Tool Description

Budget Editor consider some concept like :

1. Retrival of the records from a team or organization
2. Changes are reflected by highlighting the changes
3. Changes are then published i.e. Storing the change in database.
4. Database : MySQL Workbench.
5. Web service in Java that helps in the connection of database with tool.

6. Web service data is been serialized in the xml form and is deserialized when user retrieve it in front end .
7. The tool uses Visual Basic as its programming language.
8. Macro is been initialized to every buttons.
9. A Macro is a series of command and function that are programming code module that can be executed when user need to perform some functionality.
10. Comparing two snapshots and highlighting those records.
11. Adding new records
12. Inactivating records
13. Hiding/Unhiding the effort comment window
14. Changing the view on the button click

### 1.3 Guidelines

1. Budget Filling guideline:
  - (a) **Frequency of update** : once in a week
  - (b) Complete data needs to be filled for next one quarter
  - (c) For Further quarter, data needs to be filled as per visibility
2. **Accuracy:** Initially data needs to be filled as available without fearing about accuracy, data will be fine tuned later as accuracy build up
3. Program needs to be selected from pre-defined list. In case any program is missing, please contact Support.
4. SOC or Product needs to be selected from pre-defined list as follows:
  - (a) In-case of missing SOC please contact support
  - (b) In-case of generic project, please mark one the followings:
    - i. Roadmap

- ii. Service
  - iii. RnD
  - iv. Others
5. For transversal activities, like PM, QM, Management etc. role, we can define under shared category (program), and allocate the shared activity through Allocations  $i$  Techno option. Same can be defied in TLS to match the effort distribution in both the tool
  6. Non-project activity, like leave, public holiday and part time etc., guideline mentioned below:
    - (a) Long leave ( $i$  one month): Defined in Shared program and distribute the effort in main 3 programs using Allocation $i$  Techno option
    - (b) For others, declared in the forecast itself.
  7. Defined the QLIB name in Activity field, if any IP is being developed for QLIB.

**Note:** in TLS, we normalize non-project activity data on the program, based on the team

## 1.4 AGILE : Software Development Methodology

Agile is an approach for an optional and conventional way to manage project, commonly used in the development programs. It allow the teams to tell about the various unpredictability via incremental iterative working rhythms, which is also referred as sprints. The Agile approach is the possibility of a waterfall, or the usual sequence[1].

Agile development process helps in the evaluation of the heading to undertake all around the development life-cycle[2]. By focusing on the way it work and the repeatations and the process cycle and in also the functional item they produce, agile system can be defined as *iterative* and *incremental*.

It can be contrasted with waterfall the advancement gatherings have just single open door for having every step right. Yet, in dexterous perfect model there is an essentials of every part and one need to arrange, this is dependably returned to all around the

# Budget DB

2

1. Online Command: Allow user to when connected to the DB, user can retrieve, highlight the changes and publish the data
2. Offline command: user can work without connecting to the net
3. Utilities:
  1. Report: generated predefined pivot based report
  2. Snap shot, delete snap: allow user the take snapshot of the sheet and delete them
  3. Edit Program: Available to selected user (PMO) to set the program list for the year
  4. Baseline: Allow user the take baseline of data. One budget is freed for next year, the baseline is taken.

The screenshot shows the 'Budget Editor' interface. At the top, it displays 'Quarter-Year : Q1-2015' and 'Organization: No Access Rights'. The interface is divided into several sections:

- Offline Commands:** Includes buttons for 'Add Project', 'Mark Delete', 'Mark Undelete', 'Check Data', 'Deselect All Sites', and 'DeselectAllResource'. A 'View Year' dropdown is also present.
- Online Commands:** Includes 'Check Connection', 'Initialize', 'Retrieve', 'Highlight Changes', and 'Publish'.
- Utilities:** Includes 'Report', 'Snapshot', 'Del Snap', 'Comp Snap', 'Mark Modified', 'Freeze Month', and 'Export to xl'. A 'Detail View' button is also visible.
- Allocation:** A section with 'Division' and 'Techno' options.
- Summary Table:** A table with columns 'Emp', 'Subco', and 'F'. It includes rows for 'Total Available', 'Total Estimated', and 'Total Free / Missing'. A 'Filtered Data' section below it shows 'Total Estimated'.
- Legend:** Lists site codes: CS - Castelletto, C2 - Croilles 300, C3 - Croilles 300, GR - Grenoble, OTI - Others Ital.
- Data Table:** A table with columns: Team, Program Name, Project Description, MPT Code, Charge - PLine, Group, Product, Em, Subi, F.

Callouts and annotations include:

- 'Year and Quarter option - enable user to work on 4 rolling quarter' pointing to the 'Quarter-Year' field.
- 'Set the view based on the selection of sites and resources' pointing to the 'View Year' dropdown.
- 'Allocation of shared program and group' pointing to the 'Allocation' section.
- 'Total Available: indicated the total available resource of the team' and 'Total Estimated: indicated the total resource declared in the budget' pointing to the summary table.
- 'Important Note: Copy & Paste must be done with all columns visible' pointing to the data table header.
- 'Data area: to enter the program, Project, Product and division information etc' pointing to the data table.
- 'Resource allocated based data area' pointing to the data table.

Figure 1.1: Budget Description.



life-cycle. Precisely when a social event stops and re-assesses the taking of a stretch off at standard break, there's dependably time to control it in a substitute bearing.

Therefore in an organization it is recommended that this thing is to be used. For achieving the above discussed benefits.

## 1.5 Block Diagram of Budget Editor Tool

This block diagram gives a feel how tool works like:

1. **Database** : There are several type of database one is the shared or common database and other is the tool individual database every tool user its respective database and needs permission to use others database if required.
2. **Functionality of the tool** : The below figure describe the functionality. The next chapter contains more detail about the functionality of the tool.



Figure 1.2: AGILE :Development Methodology.

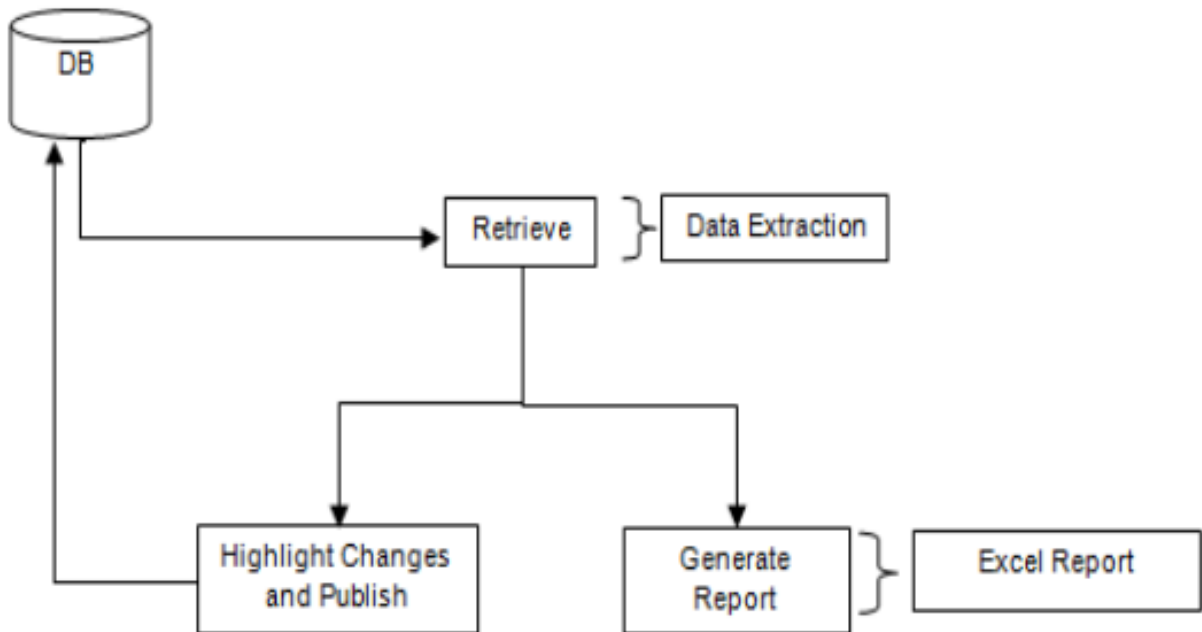


Figure 1.3: : Automated Tool's Block Diagram.

# Chapter 2

## Description of Tools Functionality

Each and every tool has certain functionality and is used for certain task these are defined individually below:

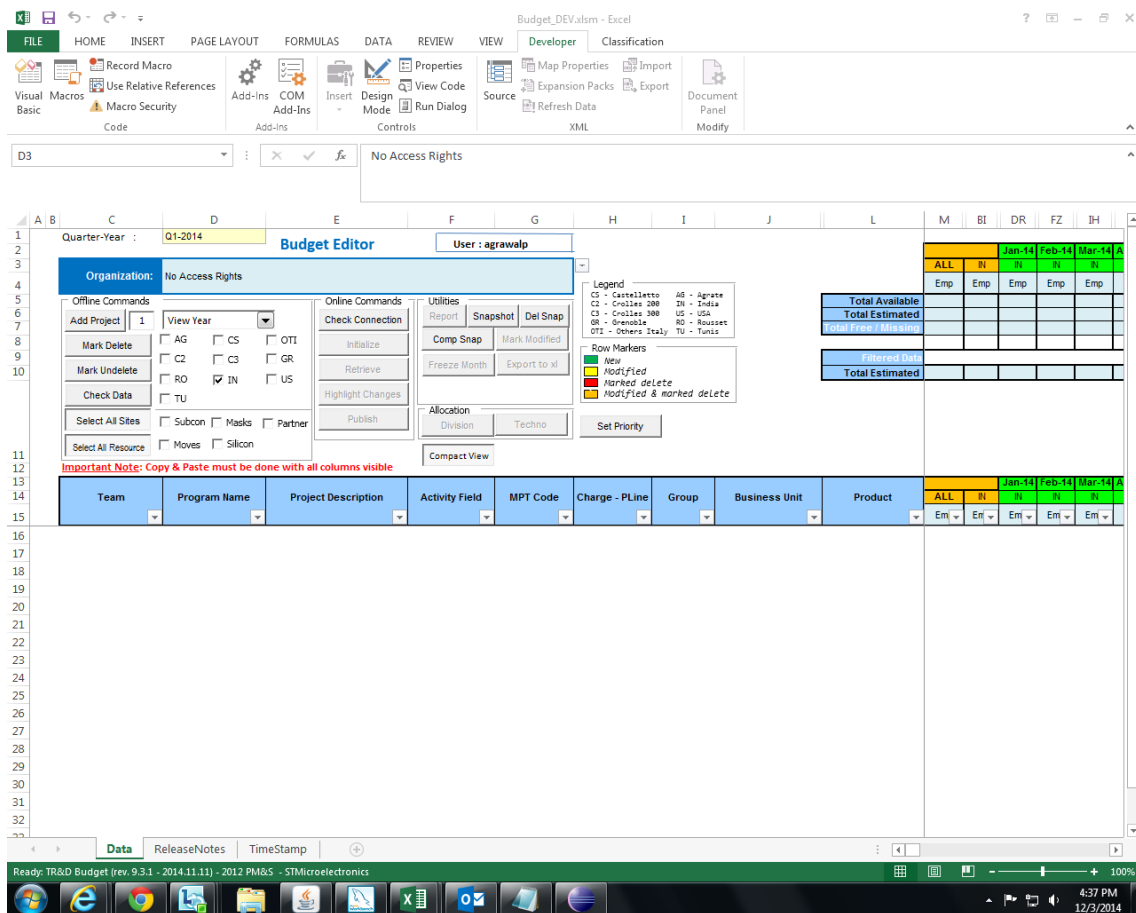


Figure 2.1: Budget's Main Sheet.

## **2.1 Online Commands**

This are the commands require the connection to the server and can only be executed only if the connection to server is there.

### **2.1.1 Check Connection:**

This commands checks weather you are using the latest tool or not. As tool maintain the version of each release and one can only use the latest tool for performing the task. If the user is having the older version of the tool then the tool wont allow the user to execute further process.

### **2.1.2 Initialize:**

This brings all the mandatory fields that are according to user requirements. It brings the permission for the user what the user is allowed to access, which team is defined for the user. The windows login id is used to detect the users permission.

### **2.1.3 Retrieve:**

This command is enabled only after you have initialize command. By default the value of the quarter year and the organization is set to the top member of the drop-down menu. If user want to access data according tho the initialized field then user retrieves the data and it will bring the data according to that team and selected quarter year. This brings the forecast and the retrieve data.

### **2.1.4 Highlight Changes:**

Any changes that are been done recently and not published would be marked with the yellow color. So that the user can check whether he really want to change the things before user publish.

### **2.1.5 Publish:**

Any changes in the sheet whether it has been modified, added and deleted needs to be sent to the database to maintain the records for future reference. By publish this functionality is achieved.

## **2.2 Offline Commands**

Even if the server is down or any maintenance purpose is going on in server side this commands can be executed.

### **2.2.1 Add Project:**

This is used when user wants to add the records in the existing template. There is an option of entering the no by which user can add multiple records eg: 10 records.

### **2.2.2 Mark Delete:**

to delete rows from the database the marked delete is used select a cell and click on the mark delete button one or many rows can be selected in one go. Marked delete don't delete the data it just mark it and after the publish button is used then only the data would be deleted.

### **2.2.3 Mark Undeleted:**

The marked data can be retrieved and if user don't want to delete the data then select the cell and press this button now the data would be unmarked. And thus would not be deleted.

### **2.2.4 Check Data:**

Some time user fails to fill some of the important fields that are necessary and required for further processing. then this button searches for that field. And mark that particular cells.

### **2.2.5 Select all Sites:**

A command that selects all the available sites in one go. So that the user need not to select individual sites.

### **2.2.6 Select all Resource:**

Same as the select all sites. This command that selects all the available resources in one go. So that the user need not to select individual resource.

### **2.2.7 View Year:**

This is a combo box will allow user to view the templet either with a year wise summary or without the summary.

### **2.2.8 Compact View / Detailed View:**

Some fields are not important for some users and some field can not be deleted as per there request as others may use those fields so its a mid path for making happy both the user by creating this button. So user may use the field they need.

### **2.2.9 Hide/Unhide Effort Window:**

This is basically for hiding or unhiding the comment window that pop up each time to help user to fill the field with correct value but some time it became irritation for the user. As user knew that user don't want this comments as user has knowledge of filling so by using this user can disable the comments window.

## **2.3 Utilities**

### **2.3.1 Report:**

Report is a summary kind of thing that is generated after so much analysis of the forecasted and the capacity data. The calculation is shown by the pivot table. With each and every aspects clear. For better understating for the utilized resource.

### **2.3.2 Snapshot:**

The snapshot is a feature of taking the data as it is in the current sheet and displaying it in other sheet wit a time-stamp an the sheet of name. It is used for several purpose such as the storage for future reference and for the comparison purpose.

### **2.3.3 Delete Snapshot:**

The snapshot taken can also be deleted after its not in use. This feature is provided to delete all those snapshots that are not in use and are just occupying the work-space.

### **2.3.4 Compare Snapshot:**

This is used to compare two snapshots whats the difference this there in the data. Used by user for reference purpose.

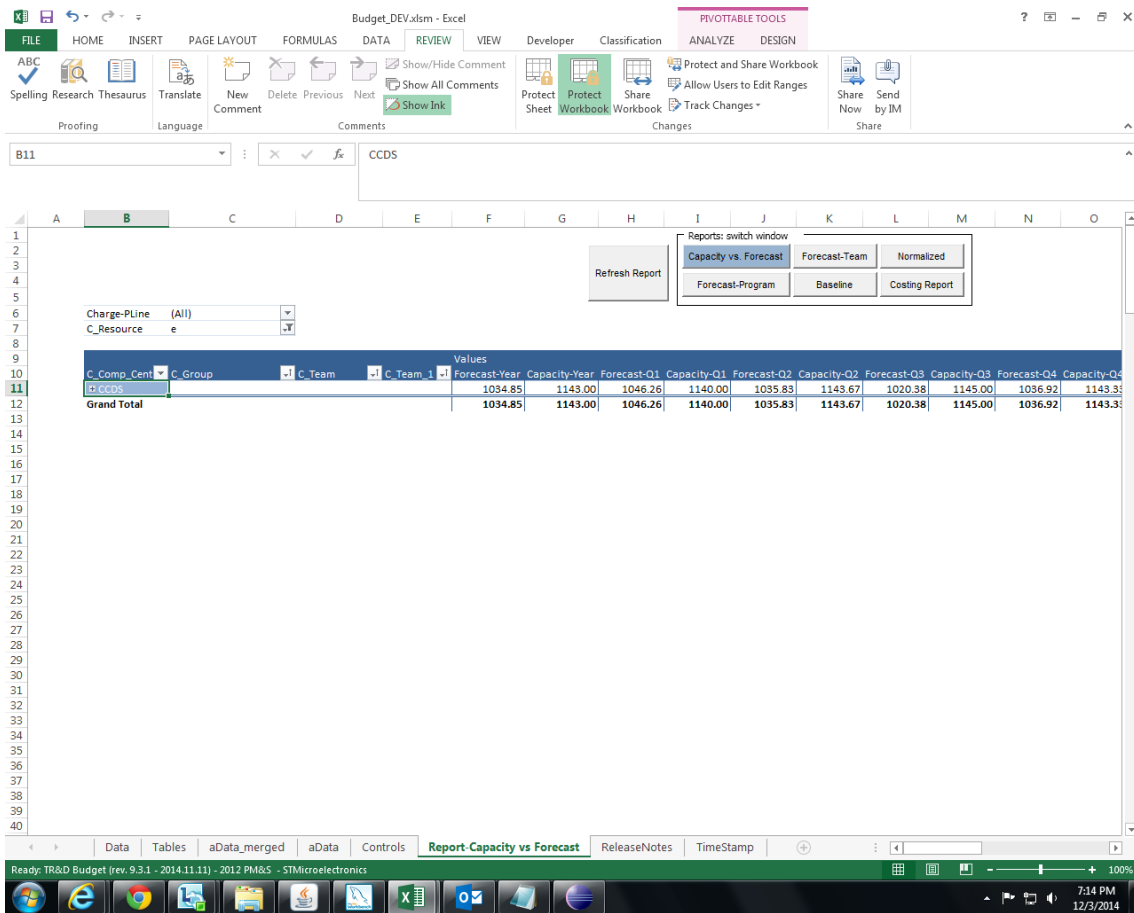


Figure 2.2: Report's View.

### 2.3.5 Mark Modified:

Changes recently made by the user is marked by it. It's the wish of user from when he wants to see the data. Hence there is a field to enter the date and then after that date modified records are highlighted.

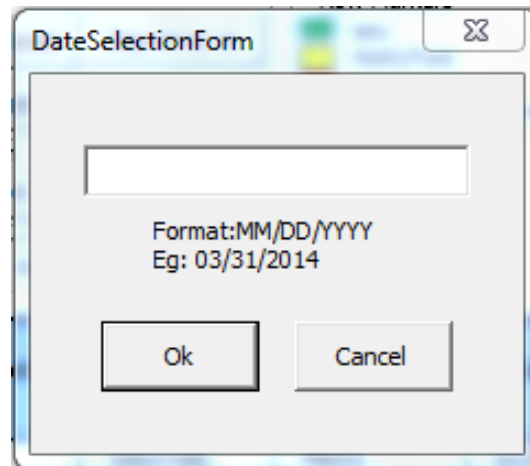


Figure 2.3: Marked Modified window.

### 2.3.6 Freeze Month:

Used for fixing the month pane.

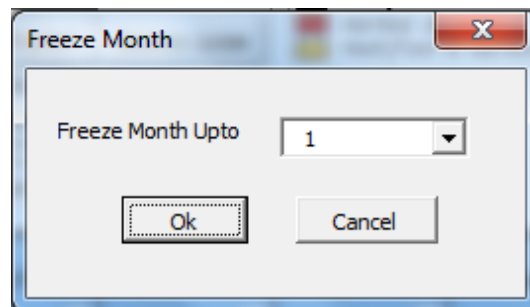


Figure 2.4: Marked Modified window.

### 2.3.7 Edit Program:

An admin functionality used for adding or changing the program. Not every user has the permission to do so. Hence a permission is maintained. User having admin permission can only see this button else this is disabled for other user.



## 2.4 Allocation

Allocation gives a detail about where the total resource would be distributed in which way. Basically it give a detail about the resource allocation.

### 2.4.1 Division:

When user wants to share the group means under that team there are several group then in the group field the user can select field as shared and can use this division button to fill the data for each group individually.

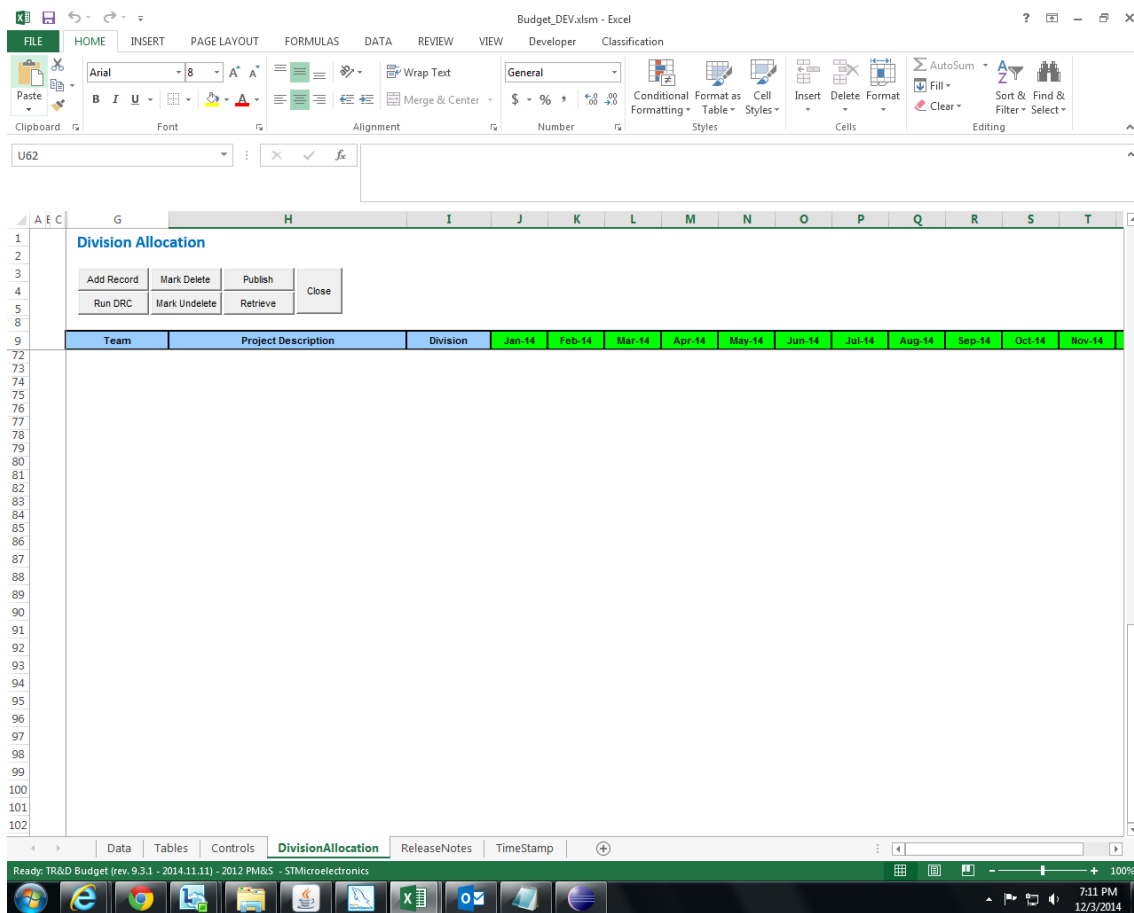


Figure 2.5: Division Allocation View.

### 2.4.2 Techno:

This has also the same feature as the division but on an average perform same task. When a team has several program running on then the user select the program name as shared and after that going to techno to define each individual program running in the team and how much resources does the team need can be filled in the techno allocation.



## **2.5 View Change**

By the toggle button user can change the view according to him. this is fulfilled by the use of these two buttons.

### **2.5.1 Set Priority:**

A toggle button used for hiding or unhiding the priority column.

As by default the value of priority is set to 100 user can change it according to their choice where they want to see their data.

### **2.5.2 Detail View/Compact View:**

This is for changing the view according to the user. As half part of the screen is been fixed and only other half part can be rolled or slide by the user . according to their choice the fixed screen can be set.

# Chapter 3

## Literature Survey

### 3.1 About the Technology

- Java Web Services (JAX-RS) : Restful Web Service
- MS-Excel 2010/2013[3]
- Visual Basics Application (VBA)[4]
- Rest Console (Crome Plug-in)
- WorkBench MySQL (For Database)
- Design Sync : for Synchronization
- Sun Java System Application Server

### 3.2 Web Service as a middleware

- The main task of the Web service is being used to connect to the databases. We Retrieve the data from the databases using this web service and manipulate the data as per the requirement .To connect the two i.e MySQL database and the tool we use the web service as an interface between them [5][6].
- The database has information from a number resources, organization, teams. And various information about the users. And all the detail about the forecast and the planned capacity.

A Web service is used to combine the database to the internet. Web services uses XML for coding and for translating information. Web service is being used to connect to the databases. We Retrieve the data from the databases using this web service and manipulate the data as per the requirement . The web service is used as an interface between the MySQL database and the tools[7].

### **3.2.1 RESTful Web Service as a new technology**

REST portrays a design standards by which information can be transmitted over a interface like as HTTP. RESTful administration not contain some extra informing layer and accordingly concentrate on the planning tenets for making stateless administration.

RESTful web-administration portray the compositional guideline which can be transmitted over an institutionalized interface. RESTful web-administration not hold the additional data layer and just focus on arrangement rules for having an exile organizations[8]. A client can have the advantage make use of the striking and a depiction state for the focal point is repeated. With each new resource representation, the client is said to trade state. While getting to Restful resources with HTTP custom, the URL of the advantage display as the point of interest identifier and Head,get, Head, pu, DELETE and POST are the standard HTTP operations to be executed on that preference[9].

RESTful applications are simple, lightweight and fast due to the following principles to encourage :

- Resource identification : A RESTful web administration gives an arrangement of assets that take care of the reason for the utilization with its customers. Assets are looked by the URIs,and a worldwide tending to space for asset and administration revelation which will gave [10].

### **3.3 JAVA JAXB Parser**

JAXB parser is used by the java developer which is used to process the XML information that is been generated while the database is queried. There is no need to know the XML in the depth basic knowledge is enough to work. This automatically creates the java class by the given outlined XML records. It basically focus on the representation of the XML data.

Still Java architecture JAXB XML binding and had been reached since the days Java 1.5 however got that some pieces of language with Java 7.0. In the framework of the heavily relies on the inclusion of the definition data (Annotations) in source code, of course, Java class from the XML.

Which prepare operating with XML a great deal more straightforward, the code more productive and less blame tolerant frequently delicate nature of XML information sources with the missing segments and the modify part ask.

XML has several level of informational groups. that are been encoded by a tree type structure. Similarly the java class can also be organized so that it seems to be tree structured order. JAXB utilizes this thing and also handles all type of the transformations to inherent all the primitive type of information and the classes. After completion this makes a information ally populated tree. This therefore helps to populate the data easily in a sorted manner and the easy separation of the individual sort.

### **3.4 Visual Basic For Application**

Visual basic is the backed program that allow to modified and personalize the Windows excel as per the use. Also it is a subset of the Visual Basics. By the help of this one can easily [11]. Visual Basics application allow a lot for a windows excel user to automate the things as per the users wish. The developer can fully utilize the excel formulas and all the features by shifting it to back end. All these feature are present in the Microsoft excels developer tab that makes one to use the visual basics application.

In the developer tab there is an option of visual basics that open an editor where we can write code. According to developer what he wants to develop it gave a great platform to code. Not only the coding is easy here even the debugging and breakpoints give a great feature.

There is also a great feature called macro recorder. This feature records the mouse and the movement of the console and whatever one is done is recorded in the form of code that can be further manipulated , add some code and can be reused in as per desierd way.

VBA Code combines with spreadsheets through Object Model, a vocabulary, which is typical of spreadsheets article and a kit is supplied capacity or strategies, which allows corneas and To keep in touch with spreadsheets, and association with its clients did VBA

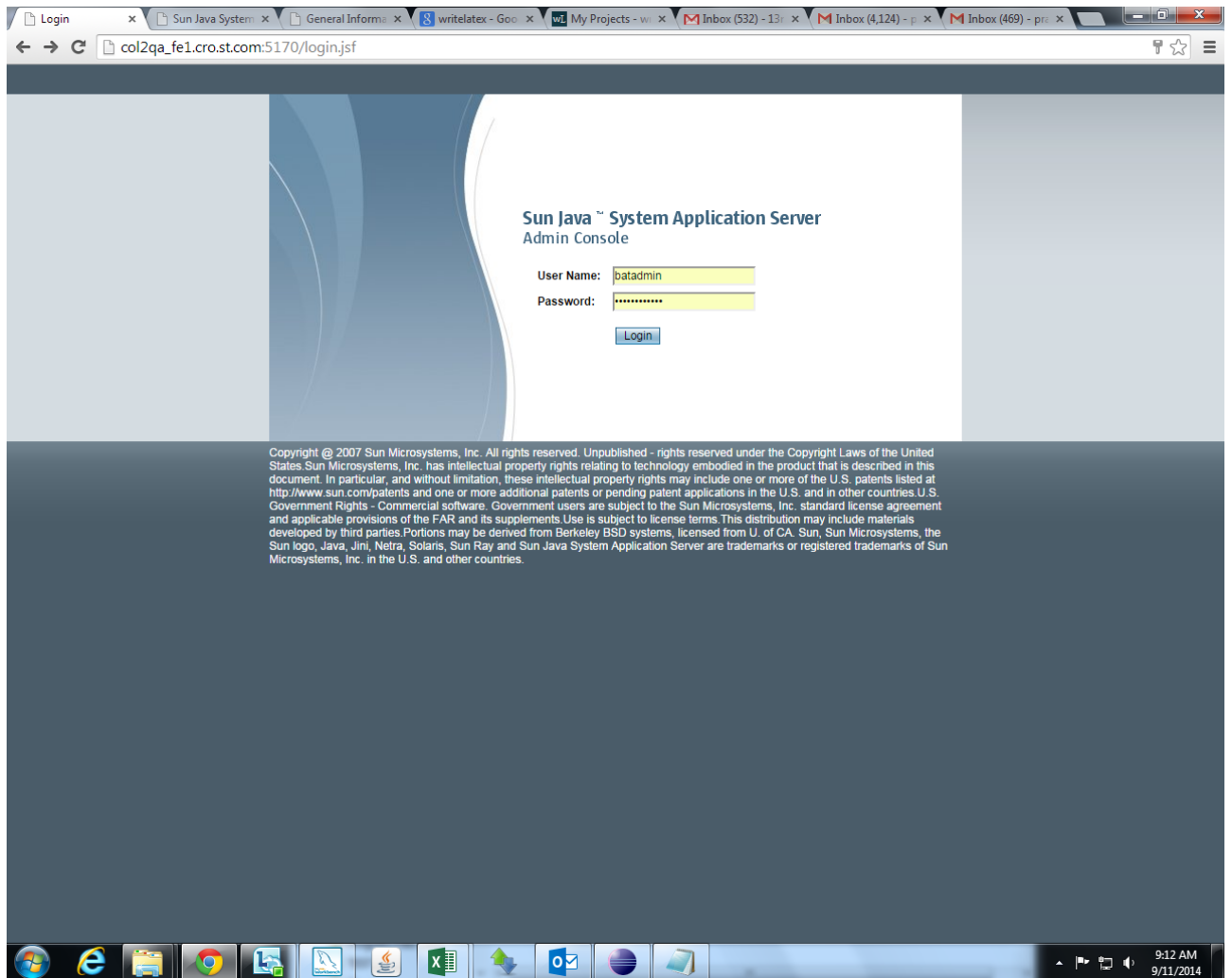


Figure 3.1: Login to Server

sub-routines perform these activities and functions as macros produced with the help of macro recorder, but is more flexible and productive.

### 3.5 Sun Java System Application Server

The .war file is created from the web service by the ant build. It create a XML type document that is to be uploaded to the server .

### 3.6 MySQL Workbench used for Database

- MySQL Workbench is a database tool that helps to design and create the database visually.
- The tool combines the database design, maintenance, administration, creation and administration by only one environment for development that combines all to form

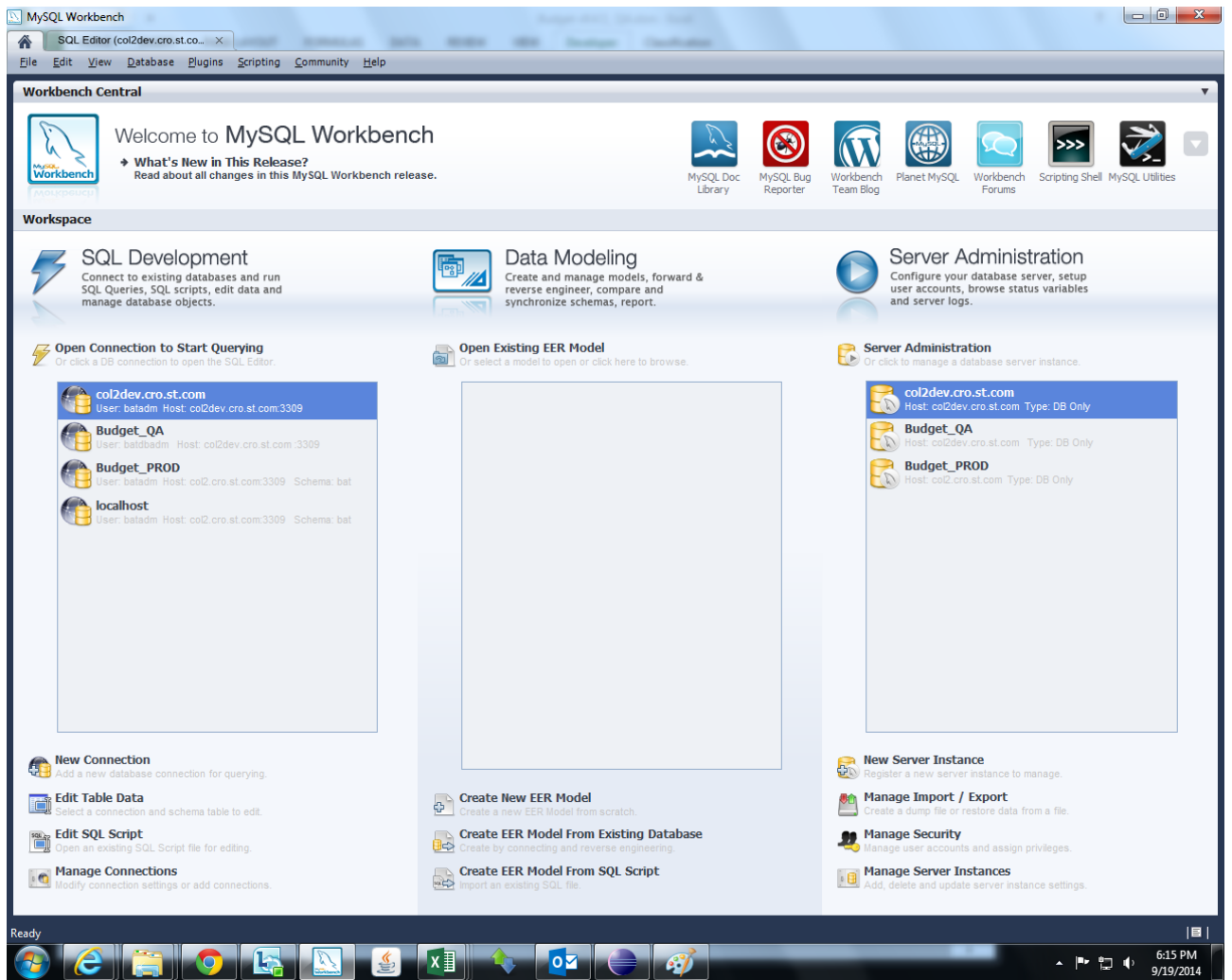


Figure 3.2: Database Managed by workBench

the MySQL database system[12].

- There are several other products and tool but this one is the base for all. some examples DBDesigner 4 from fabFORCE.net, MySQL GUI Tools Bundle.



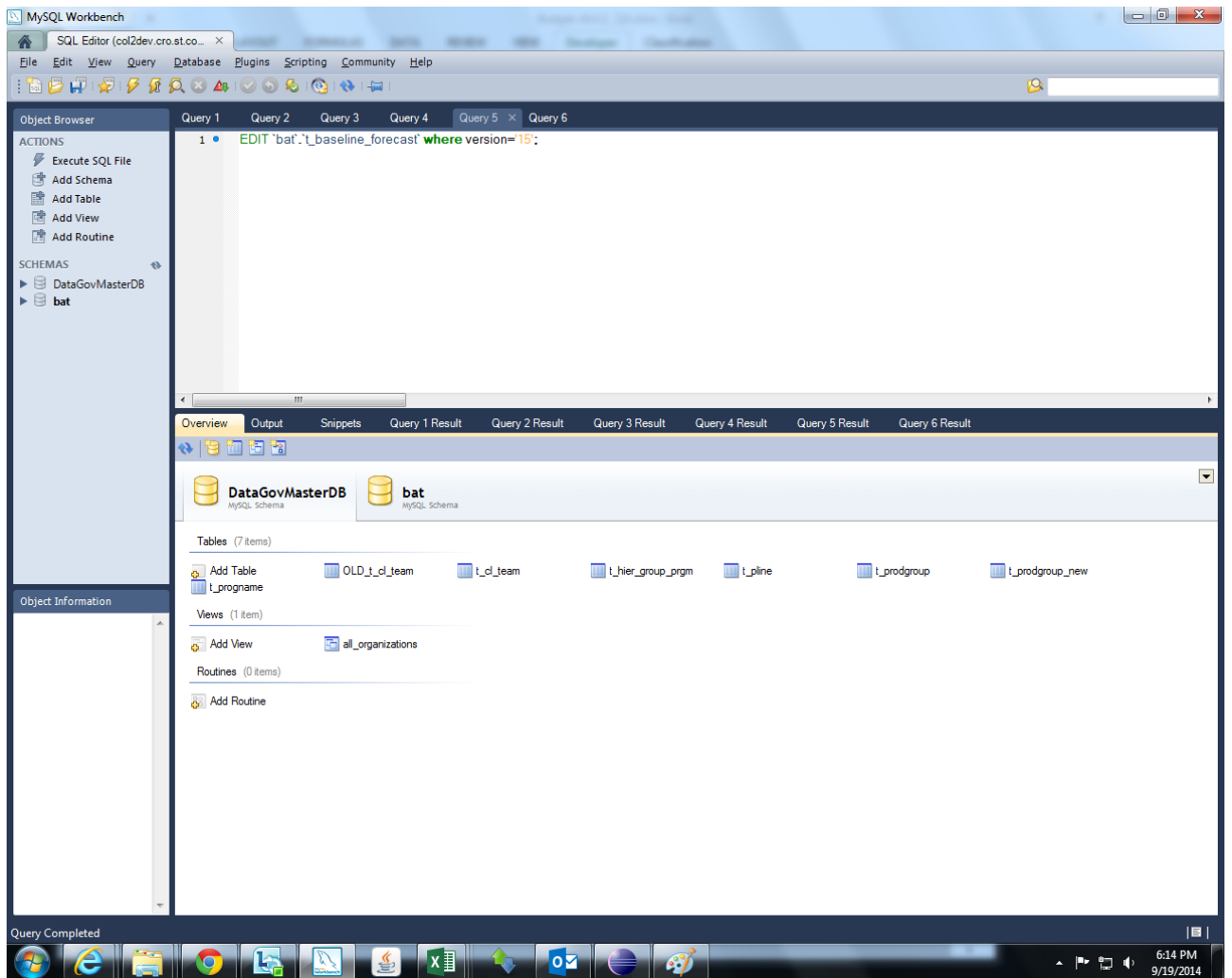


Figure 3.3: Various Database in the Server is maintained.

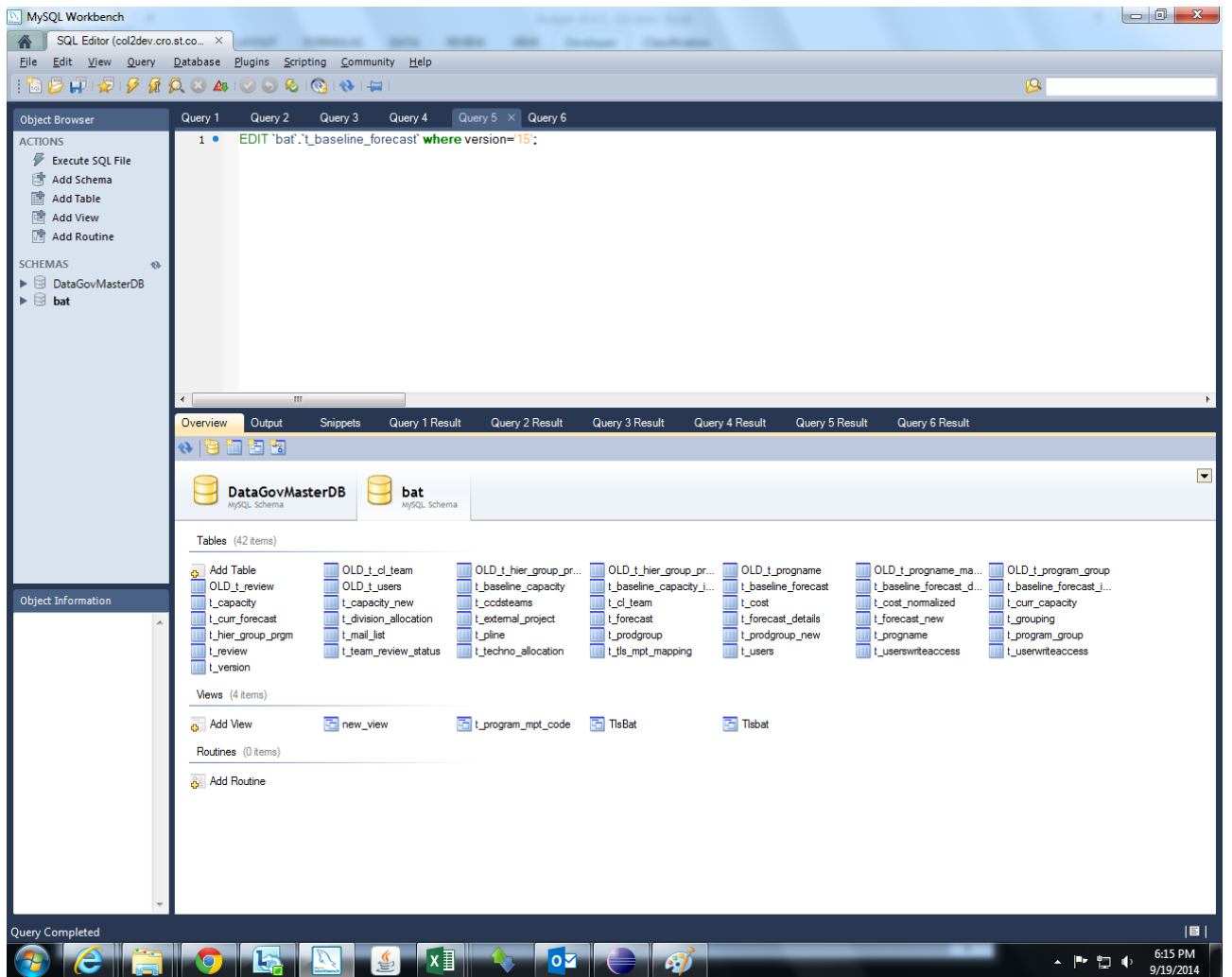


Figure 3.4: Various Database in the Server is maintained.

# Chapter 4

## Architectural Changes

As there was a requirement for the architecture to change due to several reasons there for some requirement, certain issues and some problems. Therefore the budget editor was architecturally modified. And there was certain things that come in between the path of the change.

Every point is discussed in brief here:

### 4.1 Problem Definition

As while defining the architecture every one faces certain issues same came around while discussing and some come while implementation is half way done. These are the issues that came in the mean time of implementation.

- Two tables some common data : there were 2 tables and they had some columns identical which consist of the same data.
- Cost of Joining tables : Each and every time the table is been referred
- Data Inconsistency
- Inconvenience to handle parent-child relationship
- Time Consuming
- Data Duplicate (reason)

Above points are discussed in detail in the next chapter named Degrading the normalization.

## 4.2 Requirement

For the architectural changes there was certain requirement that was been thought in a way to implement. The requirement is described below :

- To convert year wise storage to start date and end date format
- Combining two tables
- To set ifrs-code as primary key for maintaining uniqueness
- New column owner to know which tool has created which program

## 4.3 Previous Connection

There were two tables one programe and hier-group there representation is in the below figure. Figure 4.1: Parent Child node link.

## 4.4 Problem Faced

There were some cases were program was not used in some particular year then we came with two proposals:

- Either create one more table for holding exception
- Or to create a columns called on-hold year that will consist of the exception year.

Query had been modified and new checks have been applied.

### 4.4.1 Retrieval Feature

For the retrieval query we have thought of the following modifications. Following points defines about the way we thought of our retrieval query would be. Below is some important points:

- Select record where year is between the start date and the end date.
- Year should not be present in onhold years.
- Check weather program belongs to Budget tool.

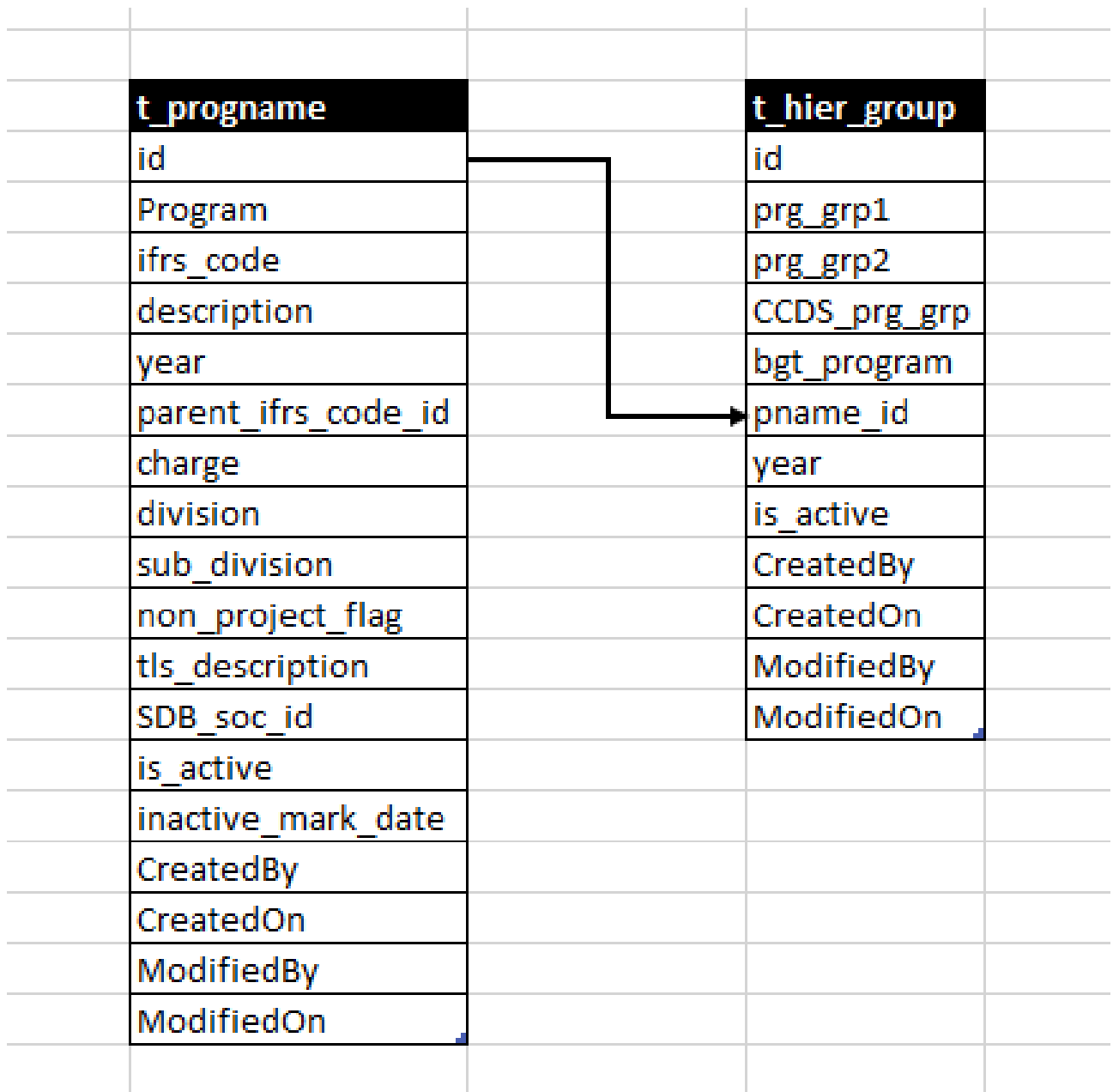


Figure 4.1: Parent Child node link

	IFRS_Code (Primary Key)	ProgramName	StartDate	EndDate	OnHoldYears
Example Record	11111111	Trial1	2012-01-01	2015-12-31	2013 , 2015
	11111112	Trial2	2012-01-01	2015-12-31	2014
	11111113	Trial3	2012-01-01	2015-12-31	
	11111114	Trial4	2012-01-01	2013-12-31	
	11111115	Trial5	2012-01-01	2013-12-31	

Figure 4.2: Example Table for onhold column

#### 4.4.2 Add Existing Feature

Add existing feature can be best understood with the help of the example. For example: Add existing record for 11111111 in 2015 given in the below Figure 4.3: Add existing Parent Child node link.

#### 4.4.3 Effect on deletion process

Delete record can also be understood with the help of the example. For example: Delete record form 11111112 in year 2013 given in the below Figure 4.4: Deleting Parent Child node link

### 4.5 Story of Owner Column

A need was there for introducing the new field in the database as to define the owner of the program. So that its defined which user has created what. For more owner detail one can refer Chapter 6 : Budget Dependent tools

- Previously before merging two table relationship was handled by the way of joining
- Now it became mandatory to define the name of the tool creating the program
- This Column best define the parent child relationship
- Parent program was created by Budget Editor and child program was created by IFRS.

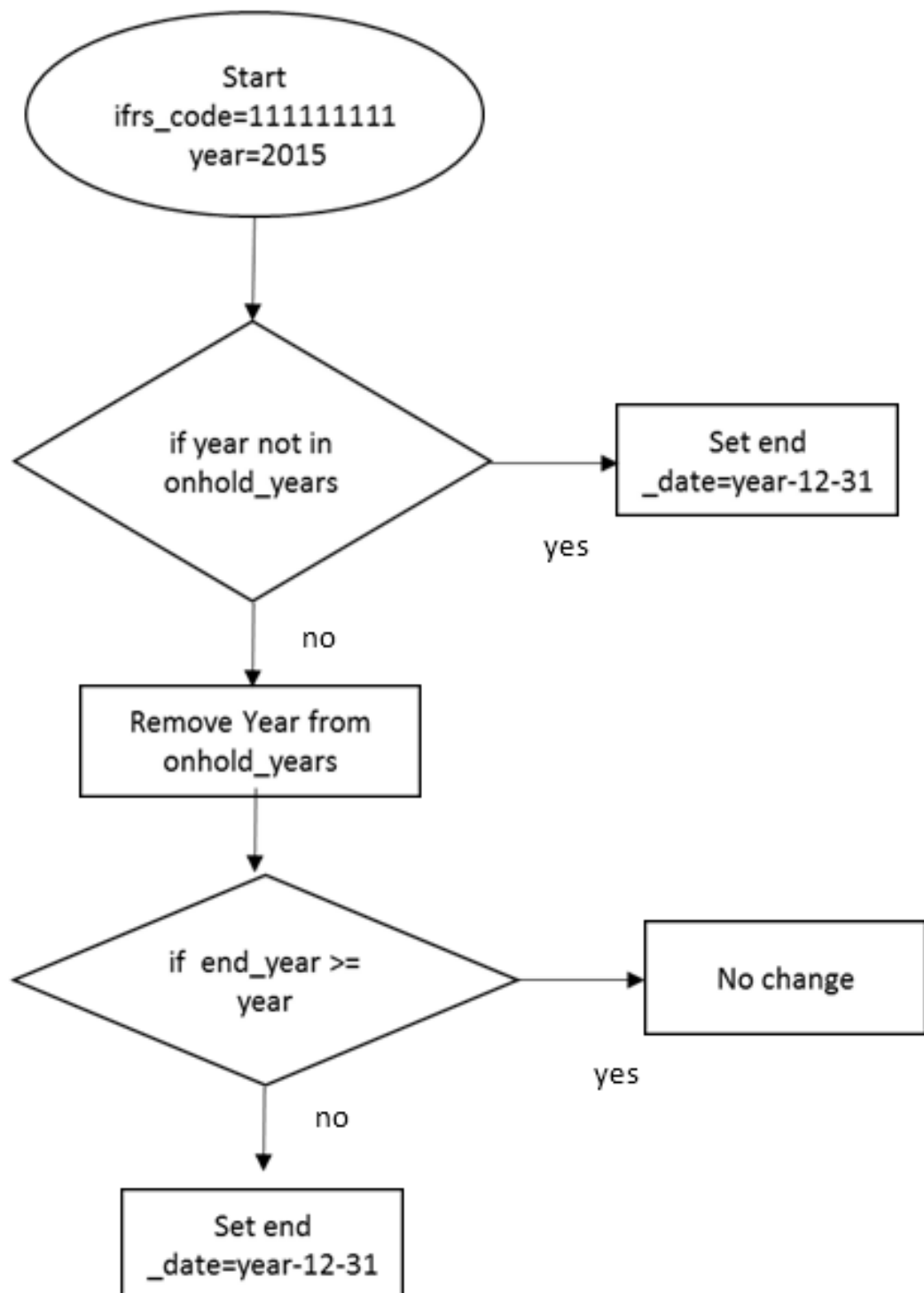


Figure 4.3: Add existing Parent Child node link

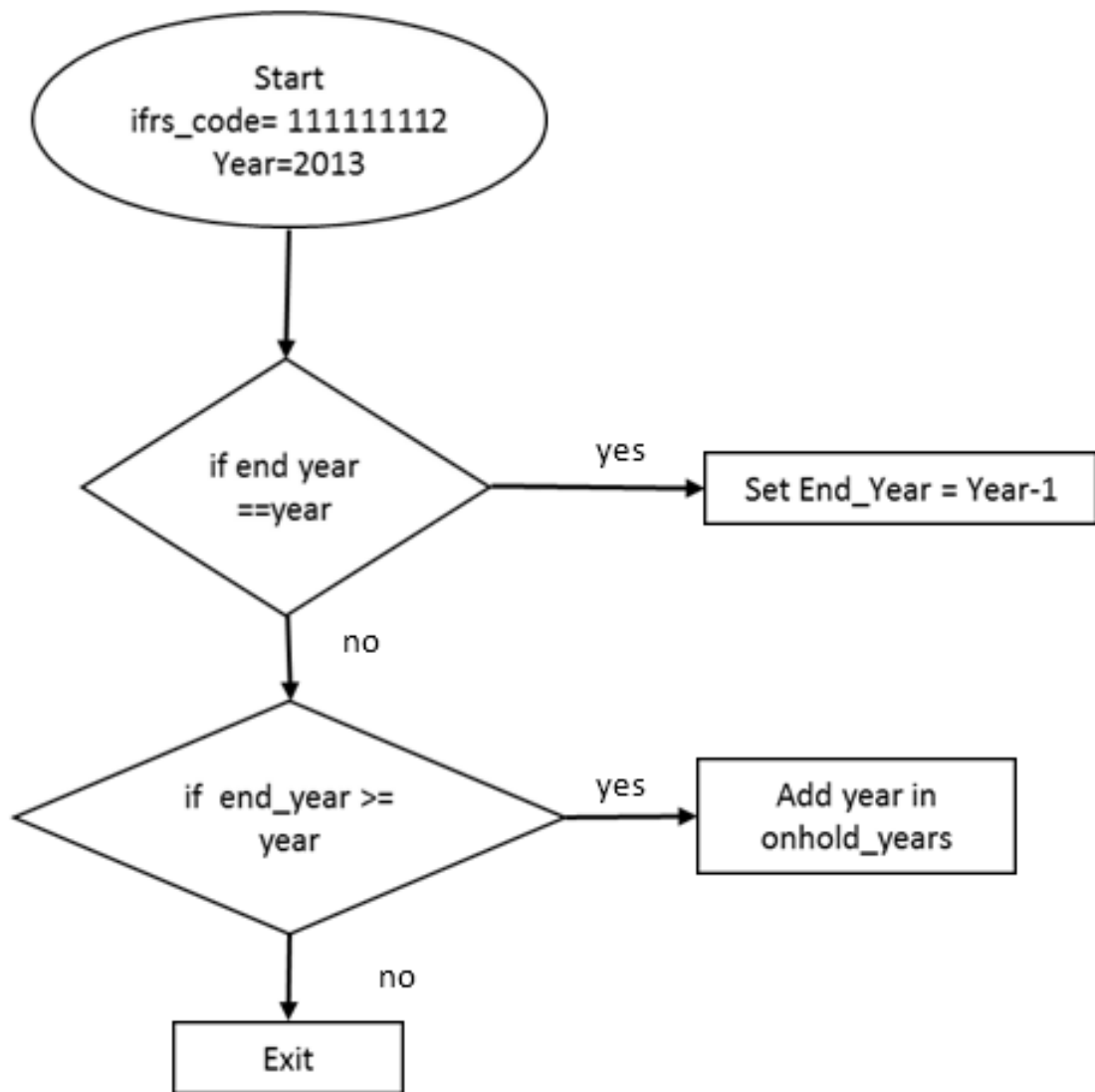


Figure 4.4: Deleting Parent Child node link



# Chapter 5

## Degrading the Normalization

### 5.1 Database Normalization

To minimize the redundancy we use the data normalization. The data normalization basically is the process for organizing all the tables and the attributes in the relational database. Normalization is a process that re-factors a table in a several small sub tables but still it don't loose any data or information. Also makes sure that the primary key which was present in the old big table will remain present in the small sub table as a primary key. Thus not losing the primary key. And same is the case with the foreign key that was previously referring to old table will now refer to the new tables primary key. The need and requirement is to separate data so that additions, modifications, and deletions of an attribute can be made in only a table and then moved via the rest of the database by using the foreign key[13].

### 5.2 Why Degrading the normalization was a requirement

Sometime we have a common record with a same code but just have a single difference of the field here it is Year then we can surely degrade the the normalization used from 3NF to 2NF. By doing this we saved a lot of time, space and effort.

how each and every thing is been saved will be deal in following points below:

1. Time: The querying time was very high due to some complicated joins between the 2 tables. The join operation was done almost every time we have to use the data so each and every time the data is used the time complexity increases in all the

operation, Every time we refer to the table. So to cut down the cost we decided to join the table.

2. Space: Out of the 2 table there were one table which was having the redundant data except one field(year) changed so another change came to the picture. The change was to store the common data and the year field was broken to two fields representing the start date and the end date. This made the query complex but was comparative faster to the previous one.
3. Effort: Buy doing this we also reduced our effort of redoing each and every time the join operation.

# Chapter 6

## Budget Dependent tools

### 6.1 Introduction

Dependency of one tool to other is common in organizations. Certain tools are dependent to each other either via direct , indirect, one way or may be in bi-directional way. So here are certain tools that are dependent to the budget. and there is one tool that provide web service to the Budget Editor.

There are certain tool that access the comman data base that tool is not mentioned here. The major tools that uses or is dependent to the other one is generally referred here. Some of them are :

#### 6.1.1 International Financial Reporting Standards (IFRS)

IFRS is a tool that depends on the budget for its data. Basically it is an approval system that allow user to create any program they want but they wont get a ifrs code until its not approved. This maintains all the status like pending, approved and all.

#### 6.1.2 Time Logging System (TLS)

The report of the budget editor is used by this tool, as the TLS analyses weather the prediction done by budget editor was accurate or not and if its not accurate then how much of the prediction gone wrong and all such prediction is done by the TLS. Thus budget provide certain web-service to the TLS for all such analysis to be done.

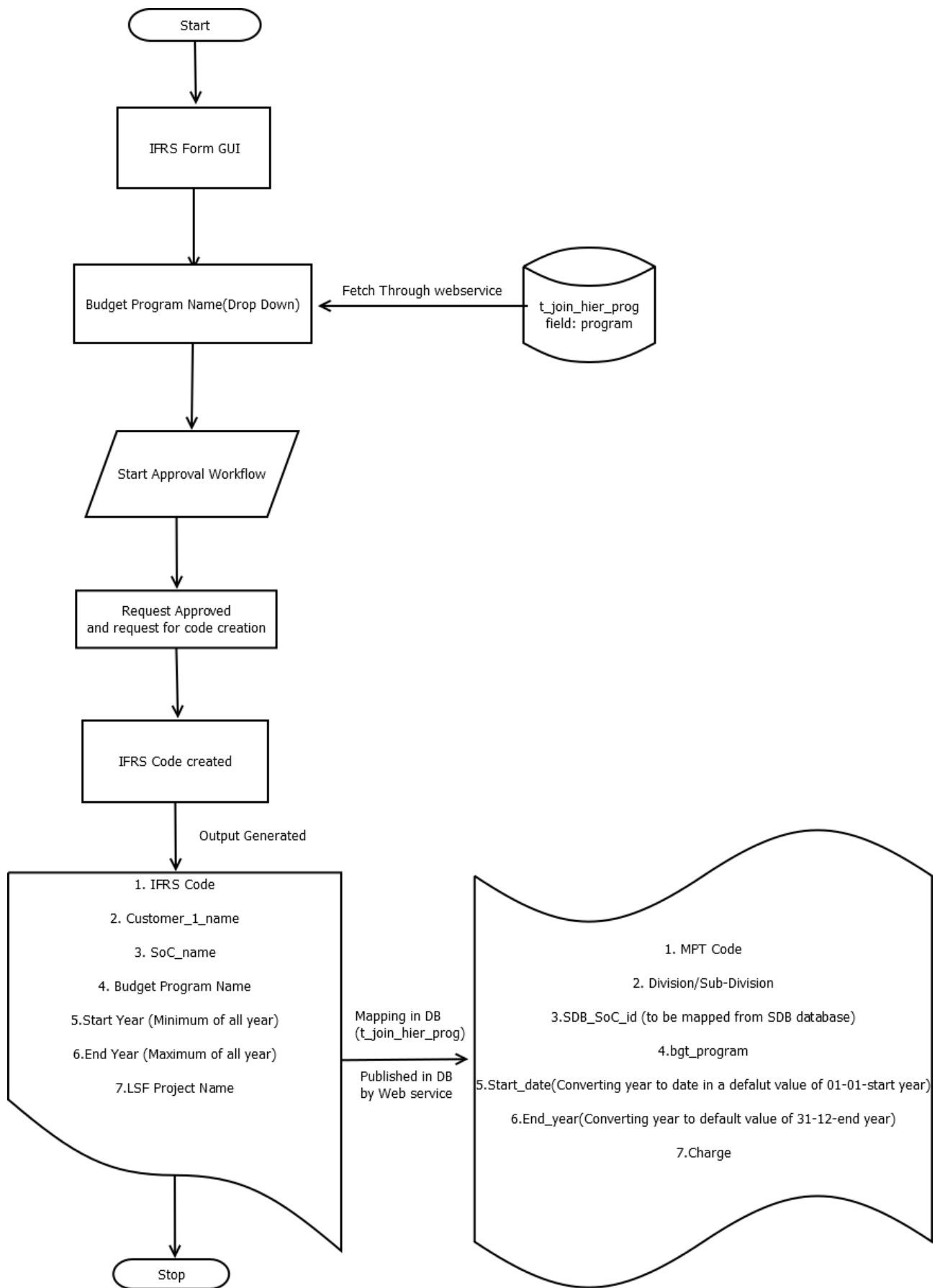


Figure 6.1: Flow of IFRS with help of Budget

### **6.1.3 Scheduled Database (SDB)**

This tool is not dependent on budget in-fact the Budget editor is dependent on the SDB for the soc list. This is to be used for the products column drop-down so that it can define the full data.

Also budget creates certain required soc list that is been the new requirement for the present year. Then budget can use the data whenever needed. The budget

# Chapter 7

## SoC by SDB

### 7.1 Introduction

SoC are the the SDB's product that are been used by the Budget to fill the Product list of the budget so that data is maintained that how many products have been used and how many are a in a void condition.

The SoC has a version no defined. SoC can have same names but would surely have a different version no. So to make it unique both SoC and the version are append. And this value is made visible to the user so that user have a clear idea about which version the user is using. This reduce the chance of any complications.

### 7.2 Fetching SoC

The drop down list that came in the product column have a long story.Thus fetching require certain steps, they are:

1. SDB provide the webservice provide all the valid SoCs with there version number.
2. The Budget tool when get the records then parse these record for further processing.
3. Budget tool links the version number with the SoC name so to avoid the void entries.
4. Now once all things are done it would be visible in the dropdown list.
5. User can select one or more SoCs from the dropdown as per there requirement.

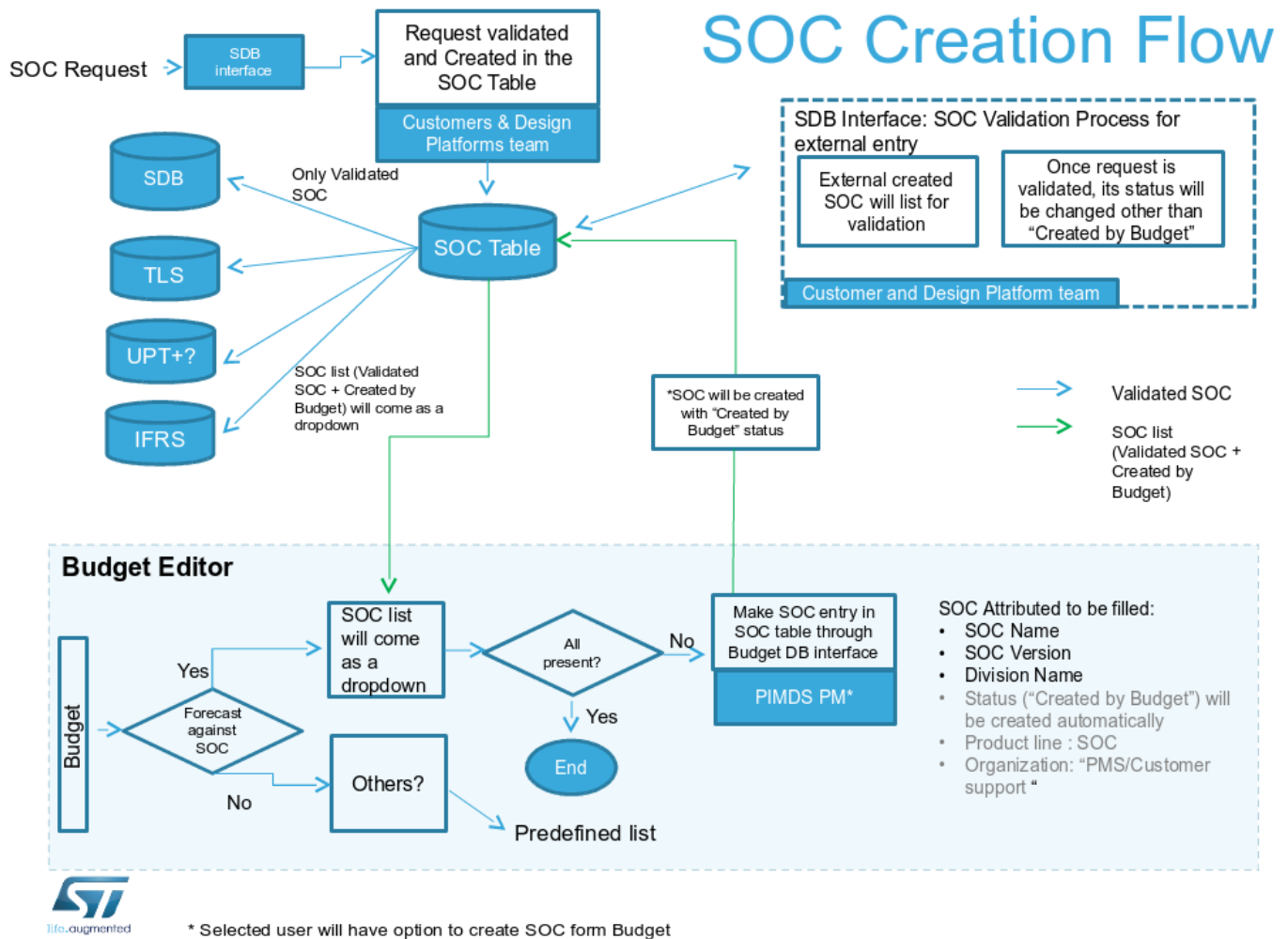


Figure 7.1: SoC creation Flow.

### 7.3 Using the SoC

When user wants to upload/publish the data all SoC name would convert into there id's and in reference with the forecast tables id they would be stored in the new forecast-SoC table. this table consist of both soc and the forecast id which links one forecast with multiple of the SoCs id.

### 7.4 Storing in SDB

If user has a requirement of creating the new SoCs then the system allow to do such changes for user. The system allow user to create but would be approved and finalize only after the heads allow to do so. Till then the status would be pending.

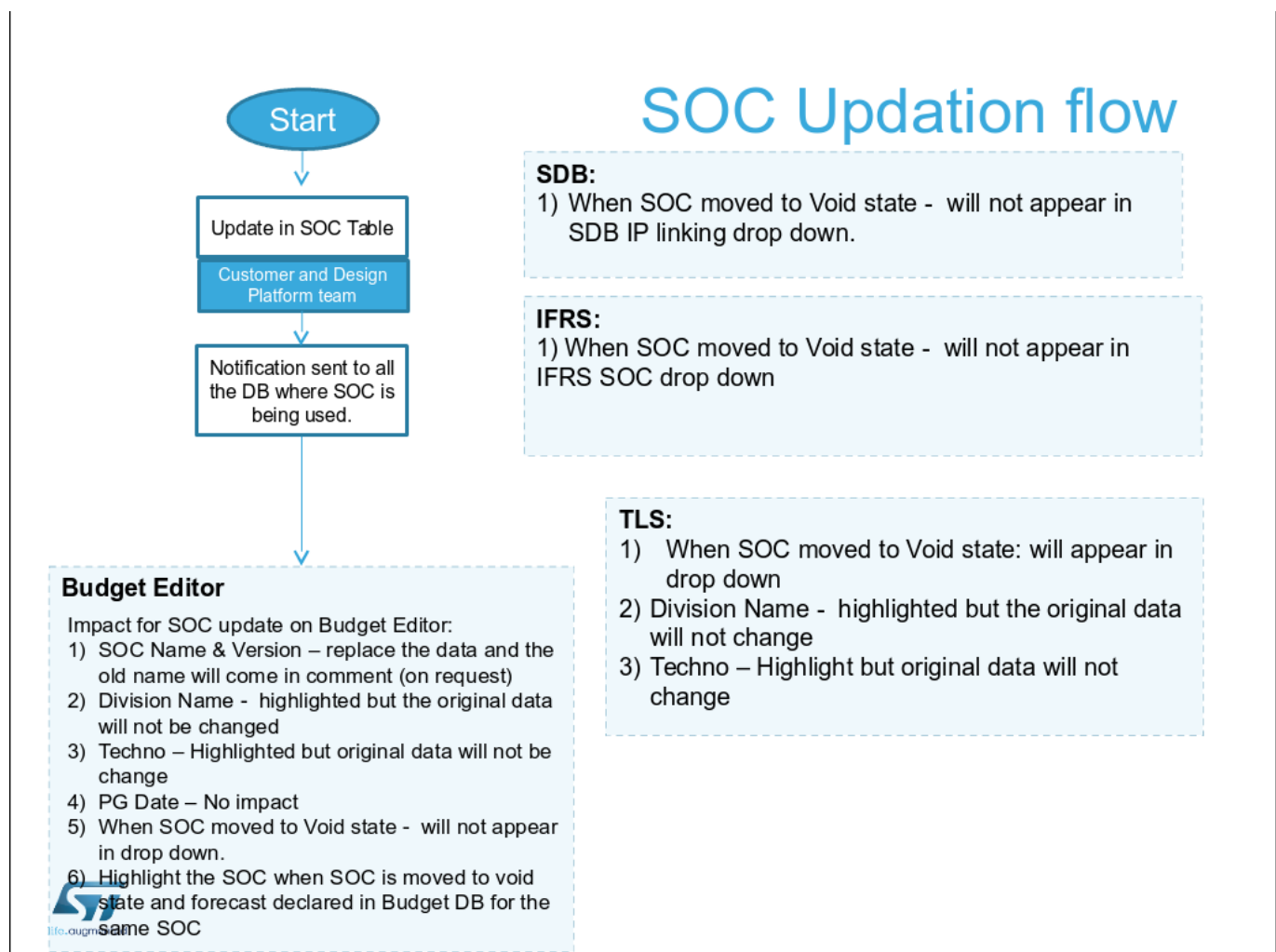


Figure 7.2: SoC Updation Flow.



# Chapter 8

## Conclusion and Future Scope

### 8.1 Conclusion

This report contains details and analysis of Data Governance Automation Tool and its background process and also technical knowledge of RESTful Web Service and Java Persistence API as a part of the technological exploration.

Organization require automation and automation is a tedious and manual work like maintaining the records, budgets, and many more these tasks are the basic need of every organization. Implementing these type of automation tool for every projects by every teams within an organization become transparent and easy to manage. Hence making the database easier to maintain. After the use of this automation tool the efforts and time can be reduced to a greater extent. Also it provides a combined platform for various people in the organization. That track there record and help to utilize there skill in more efficient way.

Its required for every organization to maintain such tool for the easy handling of the task. So without going to the lengthy process of the manual calculation hence not wasting time. Therefore an organization need to automate these thing. The tool help to automate these things and handle the things in a much easier way.

The report created by this tool is used to showcase as presentation by various ST teams (Inside/Outside India).

## 8.2 Future Scope

Tool like this is been used in the ST from many year hence each and every time there is enhancement as per the clients requirement.

Many teams are dependent on this tool hence many a times new requirement comes from the client and hence taking the tool par beyond the perfection.

Even the development teams every time try to see the scope of the improvement and the optimization and making the tool more efficient to work with.

As the tool is used by thousands of the ST employees from India and the Outside India therefore the tool has to maintain some standards. And thus every time there is a scope of improvement.

# References

- [1] T. Lehman and A. Sharma, “Software development as a service: Agile experiences,” in *SRII Global Conference (SRII), 2011 Annual*, March 2011.
- [2] S. Suzuki, R. Shiohama, M. Kadoya, K. Sakamoto, H. Washizaki, and Y. Fukazawa, “Analyzing effectiveness of workshops for learning agile development principles,” in *Agile Conference (AGILE), 2013*, Aug 2013.
- [3] “<http://excelvbatutor.com/vba-tutorial.html>,”
- [4] “Excel vba programming for dummies, 2nd edition,published by wiley publishing inc.,indianapolis, indiana,”
- [5] “Haas. reconciling web services and rest services. in 3rd iee european conference on web services (),,” ECOWS 2005, Nov. 2005.
- [6] “St sources,” July 2014.
- [7] “<http://searchsoa.techtarget.com/tip/rest-vs-soap-how-to-choose-the-best-web-service>,”
- [8] H. Li, “Restful web service frameworks in java,” in *Signal Processing, Communications and Computing (ICSPCC), 2011 IEEE International Conference on*, Sept 2011.
- [9] E. Varga, I. Lendak, M. Gavric, and A. Erdeljan, “Applicability of restful web services in control center software integrations,” in *Innovations in Information Technology (IIT), 2011 International Conference on*, April 2011.
- [10] “<http://docs.oracle.com/cd/e19159-01/819-3193/819-3193.pdf>,”

- [11] M. Seppanen, “Developing industrial strength simulation models using visual basic for applications (vba),” in *Simulation Conference, 2000. Proceedings. Winter, 2000*.
- [12] “<http://docs.oracle.com/javaee/6/tutorial/doc/gijqy.html>,”
- [13] Wikipedia Database normalization — Wikipedia The Free Encyclopedia, 2015.