University of Petroleum & Energy Studies, Dehradun

SUMMER INTERNSHIP PROJECT REPORT

On

Re-engineering the SAP Customer master record creation process using Business Process Framework

At

WIPRO Consumer Care & Lighting Group, Bangalore

WIPRO
Applying Thought

Submitted by

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MBA-ISM (2011-13)

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CERTIFICATE

WIPRO
Applying Thought

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Arpit Mittal** student of **MBA-Information Systems Management, University of Petroleum & Energy Studies** has done project **Re-engineer the SAP Customer Master Creation using BPM** in his summer internship at **Wipro Consumer Care and Lighting Group** from **1st June 2012** to **4th Aug 2012.**

During the above period, we found him to be very sincere and hardworking. He displayed a lot of initiative to learn, improvise and improve upon the service standard of organization. He was always willing to accept additional responsibilities and showed a lot of interest in his work.

We do not hesitate to recommend **Arpit Mittal** to any organization who may want to employ him.

Wishing him all the success in the future.

WIPRO LIMITED
Consumer Care & Lighting Divisio
Doddakannahalli Village

(Arindam Sengupta)
Head –IT (Wipro CCLG)

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Finally I thank my HOD, **Dr. Devendra Kumar Punia** for his guidance throughout.

Arpit Mittal

University of Petroleum and Energy Studies

Dehradun

Re-engineer the SAP customer master creation process using business Process framework

Executive Summary

The project was to re-engineer the SAP customer master and material master record creation process using Business Process Framework which consist of radically redesigning the current process and convert into automated to-be process that should be very much efficient and effective for the customer and organizational point of view .

The Project objective was to provide a web service based solution using business process framework (cordys) to design the process and implement it with the current SAP based process so as to combine the Internal SAP based environment with the External customer end environment.

The current process which was going on consist of creating the customer master record in SAP was the manual process which involves entering data using excel template which was

- Difficult to understand by the new customer/vendor and also by the authorities approving that template.
- Moreover, to create that template was an cumbersome job for the SAP master controller and again verifying through e-mails with customers and approving authorities was also very much time consuming.
- Also this process was delaying the goods dispatching time because the time for creating the customer was more, thus order processing time was more.

The solution provided consist of a **web service based workflow** which gathers the customer data from the form based interface which was entered by the customer/sales person on the sales portal. The form filled with data will go to the authorities for verification and approval which is done in a single step and finally to the master controller who will call an RFC (remote function call) from SAP and create a customer code in SAP.

The platform used is CORDYS which is **Business Process Management Suite based on SOA and business modeling notation 3.0 for designing the workflow.**

1. Introduction

In the year of 1945, in pre–independent India, a vision was born, which would eventually stand out as a brand name synonymous with innovation and integrity. Starting off with consumer products business, Wipro then diversified into newer areas including IT hardware and IT services. Such has been the dynamic power of the organization that over the past 50 years, Wipro has evolved into a leading global IT company, a company which has pioneered many an innovation in the IT services, BPO and R&D services space.

Headquartered at Bangalore, India, we at Wipro implement the philosophy of 'Applying Thought', thereby helping clients to "Do Business Better". Our path breaking innovations and ideas have culminated into the `Wipro Way' – a process which directly impacts customer benefits by improving time-to-market, enhancing predictability and reliability, and cutting costs. Wipro's Global IT business caters to more than 150 global Fortune 500 clients across financial services, retail, transportation, manufacturing, healthcare services, energy and utilities, technology, telecom and media. We employ over 120,000 people from over 70 nationalities and 72 plus global delivery centres across 5 continents. Wipro, one of the world's most trusted brands, is a name with a long history that powers itself into new ventures. This trust extends to a series of products, services and solutions that cover diverse businesses - from consumer care to cutting-edge information technology. Over the years, our identity has evolved with our business, adapting to changing global dynamics.

Wipro Ltd. is today among the top business conglomerates in the world. With a $ 5 Billion turnover, it has diverse interests ranging from Information Technology to Infrastructure Engineering and Consumer Care. Wipro has a presence across 50 countries and employee strength of over 94000 employees worldwide from over 50 nationalities. Wipro Consumer Care and Lighting is today among the top 10 FMCG companies and amongst the Fastest Growing FMCG companies in India. It has a presence in over 40 countries with over 6500 employees worldwide. Wipro has 8 production plants in India and 5 overseas. The business segments within WCCLG include Consumer Care, Trade Lighting, Commercial and Institutional Lighting, Furniture, North West Switch Gear and with the acquisition of Unza in 2007, company has now acquired a global footprint. Wipro's organic growth has been led by growth in toilet soaps, domestic and institutional lighting and office furniture.

Wipro has also gained from new launches **Wipro Safe wash, Santoor hand wash, Santoor Face wash, Wipro Sanjeevini honey, Wipro Sweet N Healthy**. Amongst the acquired brands, **Glucovita and Chandrika**, **Yardley** have shown excellent growth with new variants, brand extensions and brand enhancements. Acquisition in the institutional business segment includes North West Switches. Focus on customer needs with distinctive offerings, supported by an able distribution system has contributed to the growth of Wipro. Project on network Management was done as a part of summer internship in Wipro Consumer Care and Lightning.

Wipro Consumer Care and Lighting is one of the strategic business unit of Wipro limited headed by **Mr.Vineeth Aggarwal.** Wipro Consumer Care and Lightning focus on Fast Moving Consumer Care goods.

Wipro CCLG comprises of 3 lines of business:

- Personal care products,
- Retail lighting and
- Institutional lighting & furniture business.

Products include soaps like **Santoor , Chandrika ,sugar free**, lightning include **office lightings**. Wipro CCLG also acquired various brands outside India like Yardley and Romanov. Wipro CCLG provides

maximum profit (29% in 2011-12financial years) as a strategic business unit. Wipro CCLG has **60 offices across India** with **Sarjapura (Bangalore)** office being the head office. Wipro CCLG has its own IT division headed by **Mr. Arindam Sen Gupta (Information Systems Head)**. Entire business is managed by SAP system which is out sourced and ERP system (built in). All offices are connected via Wide Area Network. **Sify and Bharti provides 4MB leased line to the hub,** which is the head office located at Sarjapura, Bangalore. There are 60 offices (58 offices at spoke location and 2 offices at hub location). All spoke locations are connected to the hub location via Sify and Bharathi with capacity ranging from 256kbps to 1mbps. All offices are last mile connection.

2. Project Background

The objective of project has been achieved in various different phases. Wipro implemented SAP in 2005 to improvise its business processes, since then the customer master record is created manually and through an excel data documents in SAP.

Master data is data that remains unchanged over a long period of time. Master data contains information that is needed again and again in the same way. Characteristics can bear master data in BI. Master data can be attributes, texts, or hierarchies.

If characteristics have attributes, texts, or hierarchies, they are referred to as characteristics that bear master data.

- The master data of a cost center contains the name, the person responsible, the relevant hierarchy area, and so on.
- The master data of a supplier contains the supplier's name, address, and bank details.
- The master data of a user in the SAP system contains his/her access authorizations to the system, standard printer, start transaction, and so on.

Customer master data is the data you require to conduct business relationships with your customers. It includes address data and terms of payment, for example. It also controls how business transactions are

posted to a customer account and how the posted data is processed. Master data, such as whether complete delivery is required and the default delivery plant, is stored in master records.

Customer master record includes 3 types of data:

- General data
- Company code Data
- Sales Organization data

1. General Data
    a. Name & Address
    b. Search Term
2. Sales Data
    a. Sales Tab
        i. Sales Office
        ii. Sales Group
        iii. Customer Group
    b. Shipping Tab
        i. Shipping Conditions
        ii. Delivering Plant
        iii. Order Combination
        iv. Partial Delivery Allowed
    c. Billing Tab
        i. Invoice Dates
        ii. Inco Terms
        iii. Payment Terms
        iv. Account Assignment Group
        v. Tax Classification
    d. Partners Tab
3. Company Code Data

a. Reconciliation account (Customer control account)
b. Payment terms.

so that each company code and each sales organization can store its own information for doing business with customers.

The creation process in SAP manually ,includes 3 transaction codes to create/change/display Customer Master .

- VD01/02/03
- FD01/02/03
- XD01/02/03

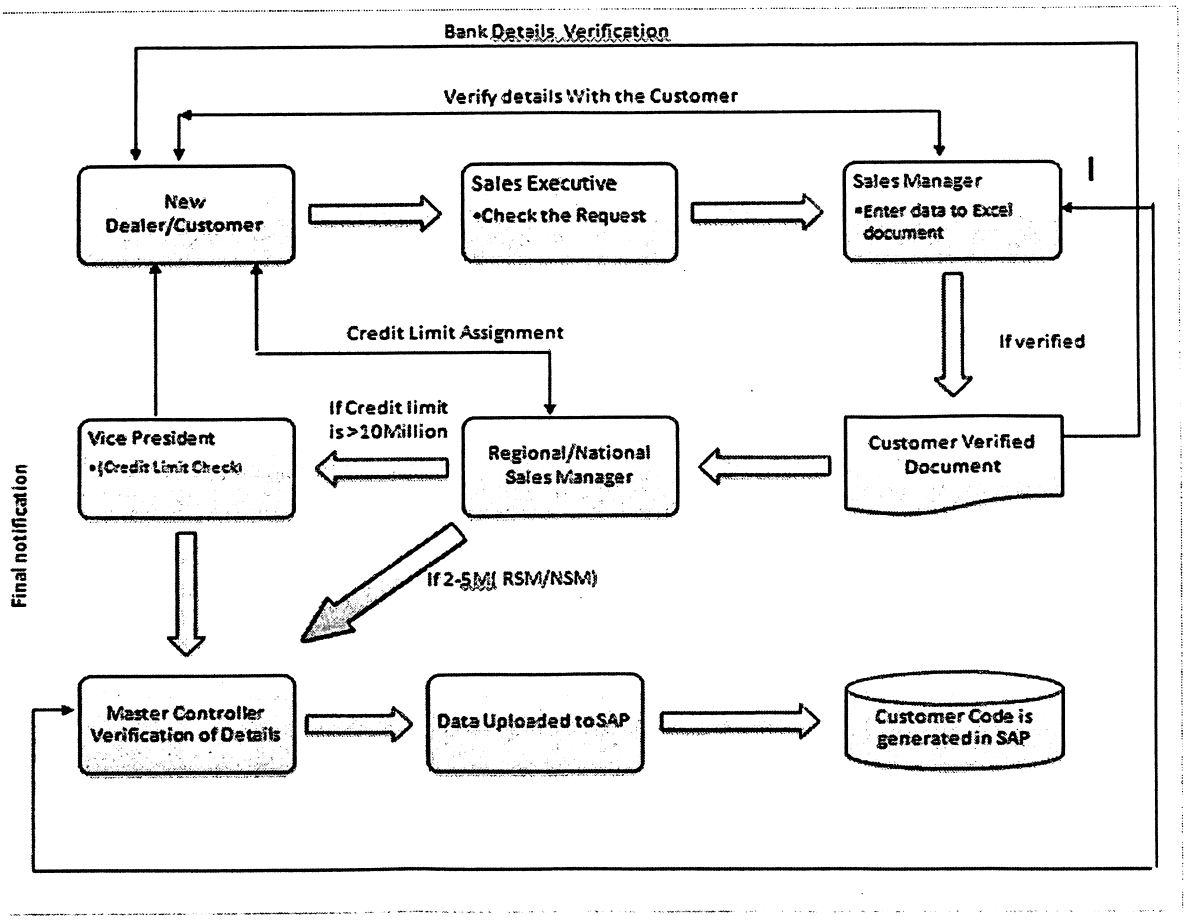
The menu path for the corresponding Transaction codes above are

- [Logistics -> Sales and Distribution -> Master Data -> Business Partner -> Customer -> Create -> VD01]
- [Accounting -> Financial Accounting -> Accounts Receivable -> Master Records -> FD01]
- [Logistics -> Sales and Distribution -> Master Data -> Business Partner -> Customer -> Create -> XD01]

The above process is used only with few records to be created in SAP ,that too is very much time consuming.

Wipro receives around 100 orders from different customers for which various customer masters are needed to be created for which they used a excel template for to upload data to SAP database.

2.1 Customer master consist of documented fields that are needed to be filled by the customer/sales person and has to be approved by various authorities like Sales Manager(SM), Regional Sales Manager (RSM), Vice President (VP), SAP master controller for final entry in the SAP database and further to approve the order.



The **As-Is process** is as follows:-

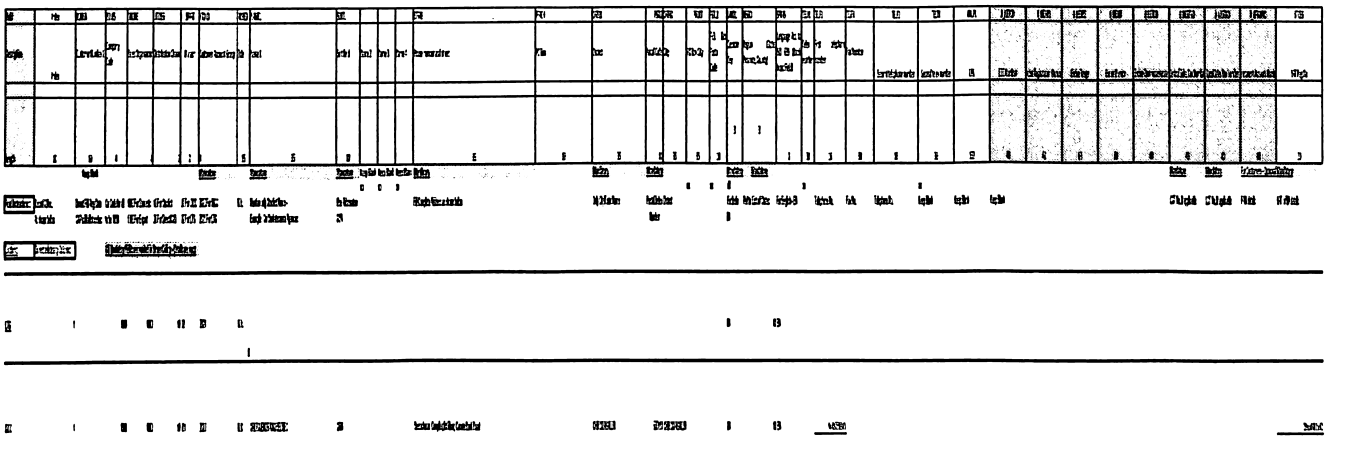
- Firstly, the dealer/customer places requests for the products through e-mail.
- For which the dealer is asked for the required details as per the new customer.
- After receiving the specification, the data regarding the details of Customer is entered into the excel template and verified it with the dealer/customer, if any modification needed ,the excel document is again modified and verified.
- The excel template was created by the master controller of Sales & distribution department manually.
- After verifying it from customer end, the document is mailed to Sales Manager (Regional/National) for the approval (depending upon the credit limit).
- After sales manager approval it will go to the finance department and then specific authorities as per the template data fields.
- At every step the customer is notified through e-mails for modification required.

The above process is totally based on the correctness of the excel template data, but problem is with that template only because:

- It is difficult to create the template by the master controller.
- And to understand by the customer and the authorities approving it.

The customer master template has various fields which were to be filled according to the structure and instructions of the template and also in a corrective way.

The **customer master** template is as follows:



2.2 Characteristics of customer master template

- Cover all details as per SAP database requirements
- Different for different regions
- Forwarded through e-mails for verifying with customer and various management levels.
- Uploaded through Remote function call (RFC) in SAP.

3. Business Problem

As per the increasing customers the above process was taking time to fulfill the orders and thus increasing the delivery time because of increasing in customer record creation time in SAP.

The major problems which Wipro CCLG was facing and which became the objective of the project was:

- Firstly, the major problem is the excel template which is manually created by the master controller is to be differentiated according to various regions i.e. North, South, East, West and North-east
- Understanding the template is very much cumbersome at various organizational levels and for the customers also.
- Secondly, Data uploading to SAP, through excel document, is sometimes not in the specified format of SAP database due to data inconsistency in the template by the customer because the customer has to fill the document according to template fields not according to the SAP structure.
- Thirdly, customer is acknowledged through e-mails only, there is no process for real-time monitoring of the process which makes a 2-3 days job for creating a single master data in SAP an accordingly the processing time and delivery time is reduced.
- Lastly, the escalation process is to be tracked through mails and approvals has to managed separately with respect to each record.

These were the very major issues which was to be resolved as it was affecting the entire FMCG business of Wipro CCLG.

A better synchronized environment would not only provide and optimized customer master creation process with visibility into supplier and customer, It will also provide the information like:

- Real-time information about the ongoing process.
- The process is in which stage.
- Completion time and output as a structured record.
- Reducing overhead for the management as well as for the customer.
- Instantaneous results.

The problem is not only for the single business process, but for all related processes which depend upon the customer master data. Moreover, the processes like claim management were also need to be synchronized on the basis of above data.

So the business issue was critical and I with the kind support of process management team, master data managers and SAP functional team decided that we would go for **an in-house solution** rather than a vendor specific solution. As the data and information involved is critical for the business and also dynamic in nature integrity was a mandatory part for the solution and it has to be taken care of.

4. Literature review

Now a days organization are moving towards Business process management for providing governance to their business's process environment to improve agility and operational performance.

Business process management (BPM) is a systematic approach to making an organization's workflow more effective, more efficient and more capable of adapting to an ever-changing environment.

Gartner research focuses on a structured BPM approach employing methods, policies, metrics, and software tools to continuously optimize an organization's activities and processes.

The goal of BPM is to reduce human error and miscommunication and focus stakeholders on the requirements of their roles. BPM is a subset of infrastructure management, an administrative area concerned with maintaining and optimizing an organization's equipment and core operations.

BPM is often a point of connection within a company between the line-of-business (LOB) and the IT department. Business Process Execution Language (BPEL) and Business Process Management Notation (BPMN) were both created to facilitate communication between IT and the LOB. Both languages are easy to read and learn, so that business people can quickly learn to use them and design processes. Both BPEL and BPMN adhere to the basic rules of programming, so that processes designed in either language are easy for developers to translate into hard code.

There are three different kinds of BPM frameworks available in the market today. Horizontal frameworks deal with design and development of business processes and are generally focused on technology and reuse. Vertical BPM frameworks focus on a specific set of coordinated tasks and have pre-built templates that can be readily configured and deployed. Full-service BPM suites have five basic components:

- Process discovery and project scoping
- Process modeling and design
- Business rules engine
- Workflow engine
- Simulation and testing

While on-premise business process management (BPM) has been the norm for most enterprises, advances in cloud computing have lead to increased interest in on-demand, software as a service (SaaS) offerings.

The most critical disciplines for BPM success are related to nontechnical issues, such as changing people's attitudes and assumptions based on building a new frame of reference or perspective (that is, the process perspective) for evaluating business performance of government agencies. These essential elements consist of:

- Comprehending processes through business process modeling for visualization
- Evaluating process performance through attention to the right process metrics
- Generating options for performance improvements through process analysis
- Gaining the willingness to change the processes from the stakeholders involved

Together, these disciplines provide a fresh approach to improving the performance of business processes.

According to Gartner, the BPMS (business process management suite) market size in 2010 was valued at $1.9 billion growing to $5.4 billion by 2016, a compound annual growth rate of 12.2%. Certainly the BPM market is not the size of CRM, ERP or pure Enterprise Content Management, but it is still a good size.

And the point about BPM is that it tends to blur the lines with the other markets that surround it. As a result, my estimate is that the BPM industry is quite a bit larger depending on how you look at it.

It is probably for this reason that so many complementary technologies are feeling compelled to move into the BPM space either through acquisitions or organic initiatives. Without a doubt the industry will continue to heat up in 2013.

4.1 BPM Market in 2012-13

There will be more acquisitions in 2012. This seems like an obvious prediction, but I think there is more of interest here than simple M&A activity. In 2012 and beyond, we will see two types of acquisitions:

1) Acquisitions by BI, CRM, ERP, ECM, and related solutions in order to acquire process functionality,

2) Consolidation strategies centered around industry specific verticals.

The trend in the BPM acquisitions in 2011 was acquisition for the sake of acquiring technical functionality to add to a complementary product/technology offering. This was clearly the case for Open Text, Lexmark, and Kofax in each of their respective acquisitions. Of course, this brings revenue and expanded sales channels, etc, but this is much different than an acquisition for the sake of purely growing customers and revenue. I believe that this trend will continue in 2013.

Also we will see more vertical, industry specific acquisition strategies as BPM players look to consolidate offerings in a particular industry. In this case, the acquisition will have the purpose of adding customers and revenues, but it will be very industry specific. Of the 70 or so BPM/Workflow companies in the market today, how many are doing more than $10 million a year in annual revenue? Certainly it is less than 10 and maybe it is less than 5, right? Singularity was only doing $16.1 million in revenue when it was acquired (and with a very unimpressive 6.2% net profit margin).

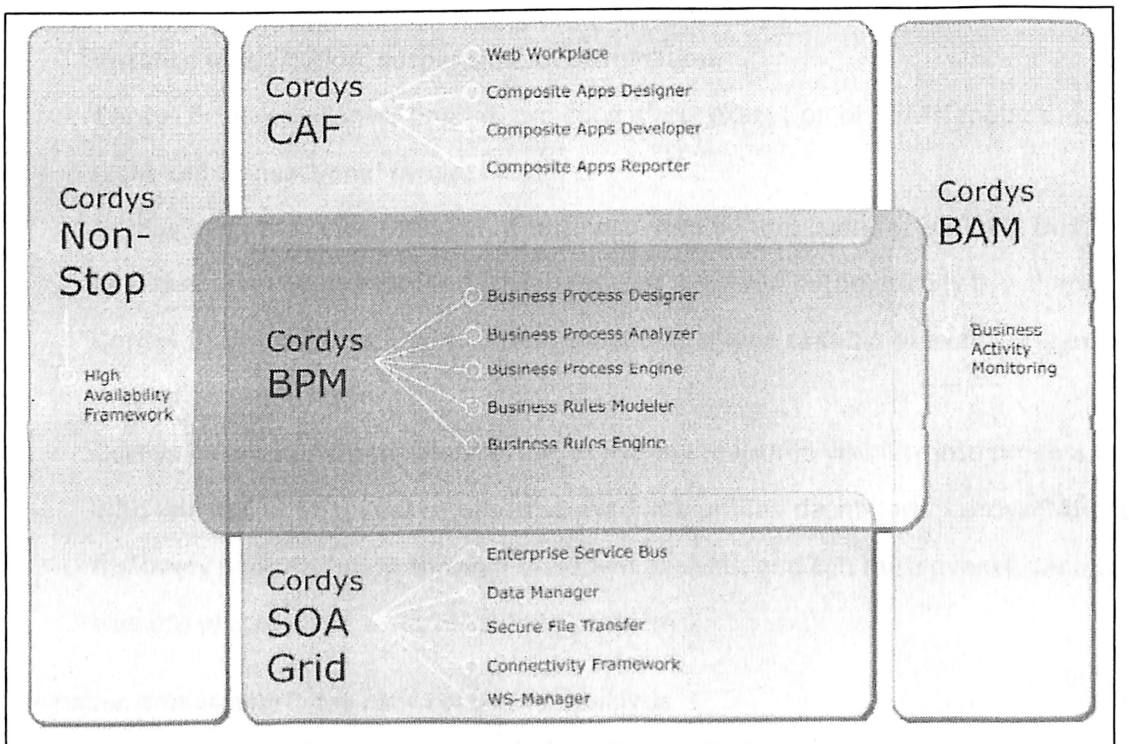
4.2 Gap analysis and Platform Selection

After the reviewing the process structure and problems in the processes, there is need for a business intelligence solution that should provide:

- Real-time business activity monitoring.
- GUI based application forms that should provide customers to fill correct information.
- Web service oriented platform for real-time updation of data in SAP.

So, after considering all these specifications we decided to go for a BPM suite called CORDYS for re-engineering this process. As wipro has already implemented this platform for structuring their claim management and supply chain management processes.

Cordys platform provides a suite of tools used for both creating services and orchestrating them in business process solutions, as well as the ESB infrastructure or making those solutions agile, loosely coupled, and scalable to high transaction volumes.



Functional architecture of Cordys platform. Source: Cordys

4.2.1 Cordys BPM

Cordys BPM helps companies increase efficiency by integrating IT systems with business processes through Web services. Cordys' event-driven Enterprise Service Bus (ESB) provides a common, integrated platform to which new and existing systems can be added affordably, at a company's own pace. With Cordys, IT systems can be made to respond easily and rapidly to business changes, insuring those systems are "future-proof."

- **Cordys Business Process Designer,** a BPMN-based process modeling and design tool shared by business analyst and developers supporting both human-centric and integration-centric processes.
- **Cordys business process analyzer,** a process monitoring and administration tool,which can query runtime data in realtime for process, activity, or user based monitoring, supporting in-flight instance modification, suspension, ot termination.
- **Cordys business process engine,** provifing direct execution of BPMN models including both human tasks and transactional services.
- **Cordys business rules modeler,** a business-friendly tool used for defining business rules that can be either invoked as process decision tasks or triggered automatically byy changing process data.
- **Cordys Business Rules Engine,** a rule execution engine capable of evaluating over 10,000 rules per second on single server.
- **Cordys Business Activity Monitoring,** delivering real-time visibility into process performance along with analysis of historical trends, displayed in a unified dashboard. Cordys BAM supports problem discovery and resolution through drilldown analysis, and can raise events, send alerts, and directly execute processes or tasks remediate problems.

Integration productivity in the hands of business analysts

To enable accurate modeling of real-life process scenarios, the Cordys BPM graphical model editor provides powerful process mode ling features—including decision branching, conditional looping, parallel processing of activities, time-out handling, event triggers, and compensation modeling for exception handling. Business analysts can utilize we b services through simple drag-and-drop operations, and build composite integration solutions based on business process logic instead of program code.

Hybrid modeling with a single engine

Cordys BPM is uniquely designed to provide hybrid modeling capabilities. It incorporates both human activities and web services–based data transactions in a single process flow, accurately reflecting the actual operation of a business process. Besides supporting so-called "macro-flows", which are typically longer-running processes involving both human activities and system transactions, Cordys BPM provides specialized support for modeling and execution of "micro-flows", which are high-speed, high-volume transaction models that do not involve human interaction.

Process simulation for optimal design

Along with the ability to illustrate a process model in "debug" mode for step-by-step analysis of the technical execution of the process, Cordys BPM offers extensive process simulation capabilities. Through simulation, business analysts can identify potential process bot tlenecks, allowing them to make improvements to the process design before deployment in a live environment. As an extra measure, simulation can also be applied to historical process data after deployment, to verify whether the process design indeed performs as intended.

Cordys BPM Features

- Single engine for design and execution
- Adheres to Business Process Modeling
- Notation (BPMN) standard
- Hybrid modeling of human activities and
- data transactions
- Support for micro-flows and macro-flows
- Supports Business Process Execution
- Language (BPEL) standard
- Drag-and-drop modeling
- Seamless use of web services in process
- activities
- Detailed process debugging features
- Process simulation for improved design

Cordys BPM Advantages

- Avoids complexity of traditional coding
- Exploits detailed process knowledge of
- business analysts
- Shorter time-to-market for new solutions
- Increased business agility when responding
- to change
- Extends ROI of existing systems
- Lowers TCO of integration fabric
- Based on industry standards for future proof solution deployment.

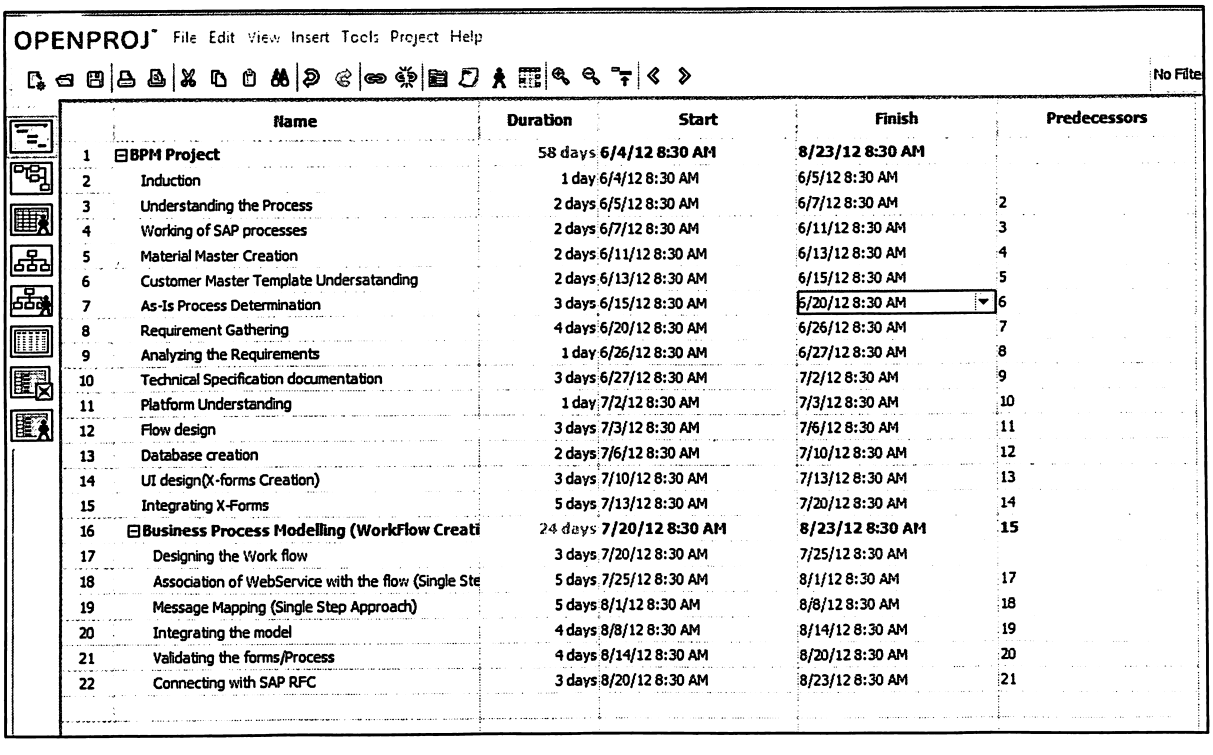
5. Process Methodology

The methodology we followed for solution designing was based on creating a form based interface which was based on SOA, and using that forms we designed the work flow according approval at various levels of management.

The methodology includes:

- Determining the requirements at various management levels.
- Determining problems of customer while filling details in customer master template.
- Approving process criteria according to credit limit.
- Task Clarification structure for the request.
- Real-time tracking and monitoring of process.
- Combining the internal SAP based environment with external customer environment.

The Project Plan we followed was somewhat like this:



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	Name	Duration	Start	Finish	Predecessors
1	⊟**BPM Project**	58 days	**6/4/12 8:30 AM**	**8/23/12 8:30 AM**	
2	Induction	1 day	6/4/12 8:30 AM	6/5/12 8:30 AM	
3	Understanding the Process	2 days	6/5/12 8:30 AM	6/7/12 8:30 AM	2
4	Working of SAP processes	2 days	6/7/12 8:30 AM	6/11/12 8:30 AM	3
5	Material Master Creation	2 days	6/11/12 8:30 AM	6/13/12 8:30 AM	4
6	Customer Master Template Undersatanding	2 days	6/13/12 8:30 AM	6/15/12 8:30 AM	5
7	As-Is Process Determination	3 days	6/15/12 8:30 AM	6/20/12 8:30 AM	6
8	Requirement Gathering	4 days	6/20/12 8:30 AM	6/26/12 8:30 AM	7
9	Analyzing the Requirements	1 day	6/26/12 8:30 AM	6/27/12 8:30 AM	8
10	Technical Specification documentation	3 days	6/27/12 8:30 AM	7/2/12 8:30 AM	9
11	Platform Understanding	1 day	7/2/12 8:30 AM	7/3/12 8:30 AM	10
12	Flow design	3 days	7/3/12 8:30 AM	7/6/12 8:30 AM	11
13	Database creation	2 days	7/6/12 8:30 AM	7/10/12 8:30 AM	12
14	UI design(X-forms Creation)	3 days	7/10/12 8:30 AM	7/13/12 8:30 AM	13
15	Integrating X-Forms	5 days	7/13/12 8:30 AM	7/20/12 8:30 AM	14
16	⊟**Business Process Modelling (WorkFlow Creati**	24 days	**7/20/12 8:30 AM**	**8/23/12 8:30 AM**	15
17	Designing the Work flow	3 days	7/20/12 8:30 AM	7/25/12 8:30 AM	
18	Association of WebService with the flow (Single Ste	5 days	7/25/12 8:30 AM	8/1/12 8:30 AM	17
19	Message Mapping (Single Step Approach)	5 days	8/1/12 8:30 AM	8/8/12 8:30 AM	18
20	Integrating the model	4 days	8/8/12 8:30 AM	8/14/12 8:30 AM	19
21	Validating the forms/Process	4 days	8/14/12 8:30 AM	8/20/12 8:30 AM	20
22	Connecting with SAP RFC	3 days	8/20/12 8:30 AM	8/23/12 8:30 AM	21

Customer Requirements

For the customer ease, a XML based form was created which will contain all the fields required to be filled by the customer and submit that form for approval.

The form interface will be available for the customers on the **wipro leap** sales portal for which they have to log in for placing their orders. Also they can track their status on the same.

Management Requirements

There are 3 authorities at management level for the approval of the master creation of master record. These are:

- **Sales Manager(SM)/Regional Sales Manager(RSM) :** for Customer details and Credit limit
- **Vice President :** Credit limit approval
- **Master Controller:** Uploading data in SAP.

For these requirements, the work flow is created by Business process modeling tool that will define the whole process and forms are mapped into the workflow to implement the process.

System Requirements

The system should have an interactive interface and should be accessible to the customer as well as the various management levels. Moreover, the system should have the utility to integrate data with SAP by calling an RFC/BAPI.

5.1 BAPI's

BAPI (Business Application Programming Interface) is a set of interfaces to object-oriented programming methods that enable a programmer to integrate third-party software into the proprietary R/3 product from SAP. For specific business tasks such as uploading transactional data, BAPIs are implemented and stored in the R/3 system as remote function call (RFC) modules.

A Business Application Programming Interface (BAPI) is a precisely defined interface providing access to processes and data in business application systems such as R/3.

BAPIs of SAP Business Object Types

BAPIs are defined as API methods of SAP business object types. These business object types and their BAPIs are described and stored in the Business Object Repository (BOR). A BAPI is implemented as a function module, that is stored and described in the Function Builder.

BAPIs of SAP Interface Types

A BAPIs can also describe interfaces, implemented outside the R/3 System that can be called in external systems by R/3 Systems. These BAPIs are known as BAPIs used for outbound processing. The target system is determined for the BAPI call in the distribution model of Application Link Enabling (ALE).

BAPIs used for outbound processing are defined in the Business Object Repository (BOR) as API methods of SAP Interface Types. Functions implemented outside the R/3 System can be standardized and made available as BAPIs.

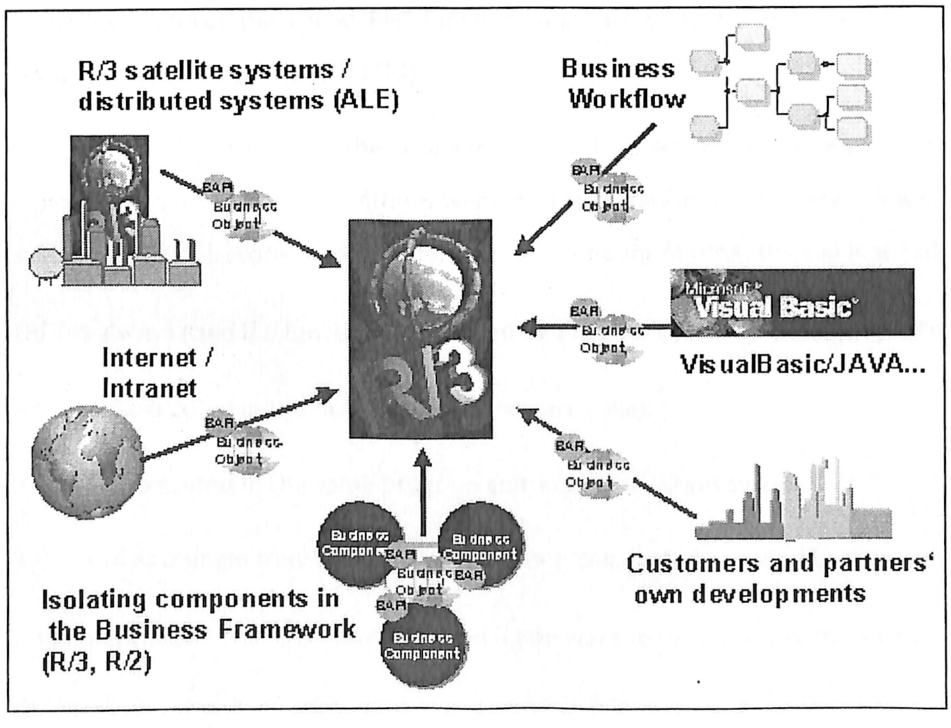
Integration

BAPIs can be called within the R/3 System from external application systems and other programs. BAPIs are the communication standard for business applications. BAPI interface technology forms the basis for the following developments:

- Connecting:
- New R/3 components, for example, Advanced Planner and Optimizer (APO) and Business Information Warehouse (BW).
- Non-SAP software
- Legacy systems
- Isolating components within the R/3 System in the context of Business Framework
- Distributed R/3 scenarios with asynchronous connections using Application Link Enabling (ALE)
- Connecting R/3 Systems to the Internet using Internet Application Components (IACs)
- PC programs as frontends to the R/3 System, for example, Visual Basic (Microsoft) or Visual Age for Java (IBM).
- Workflow applications that extend beyond system boundaries
- Customers' and partners' own developments

The graphic below shows how BAPI interfaces enable different types of applications to be linked together.

BAPIs - Interfaces to the R/3 System



5.2 Remote Function Call (RFC)

Communication between applications in different systems in the SAP environment includes connections between SAP systems as well as between SAP systems and non-SAP systems. Remote Function Call (RFC) is the standard SAP interface for communication between SAP systems. RFC calls a function to be executed in a remote system.

- **Synchronous RFC(sRFC)**

  The first version of RFC is synchronous RFC (sRFC). This type of RFC executes the function call based on synchronous communication, meaning that the systems involved must both be available at the time the call is made.

- **Transactional RFC (tRFC)**

  Transactional RFC(tRFC, previously known as asynchronous RFC) is an asynchronous communication method that executes the called function module just once in the RFC server. The remote system need not be available at the time when the RFC client program is executing a tRFC. The tRFC component stores the called RFC function, together with the corresponding data, in the SAP database under a unique transaction ID (TID).

  If a call is sent, and the receiving system is down, the call remains in the local queue. The calling dialog program can proceed without waiting to see whether the remote call was successful. If the receiving system does not become active within a certain amount of time, the call is scheduled to run in batch.

  tRFC is always used if a function is executed as a Logical Unit of Work (LUW). Within a LUW, all calls

  - are executed in the order in which they are called
  - are executed in the same program context in the target system
  - run as a single transaction: they are either committed or rolled back as a unit.

  Implementation of tRFC is recommended if you want to maintain the transactional sequence of the calls.

- **Queued RFC (qRFC)**

  To guarantee that multiple LUWs are processed in the order specified by the application, tRFC can be serialized using queues (inbound and outbound queues). This type of RFC is called queued RFC (qRFC).

  qRFC is therefore an extension of tRFC. It transfers an LUW (transaction) only if it has no predecessors (based on the sequence defined in different application programs) in the participating queues.

  Implementation of qRFC is recommended if you want to guarantee that several transactions are processed in a predefined order.

Data transfer

All RFC types are transferred by means of CPI-C or TCP/IP. They represent a kind of Gateway Communication.

5.3 Development Process

Now ,for developing the system the coordination with both CORDYS and SAP team was needed.

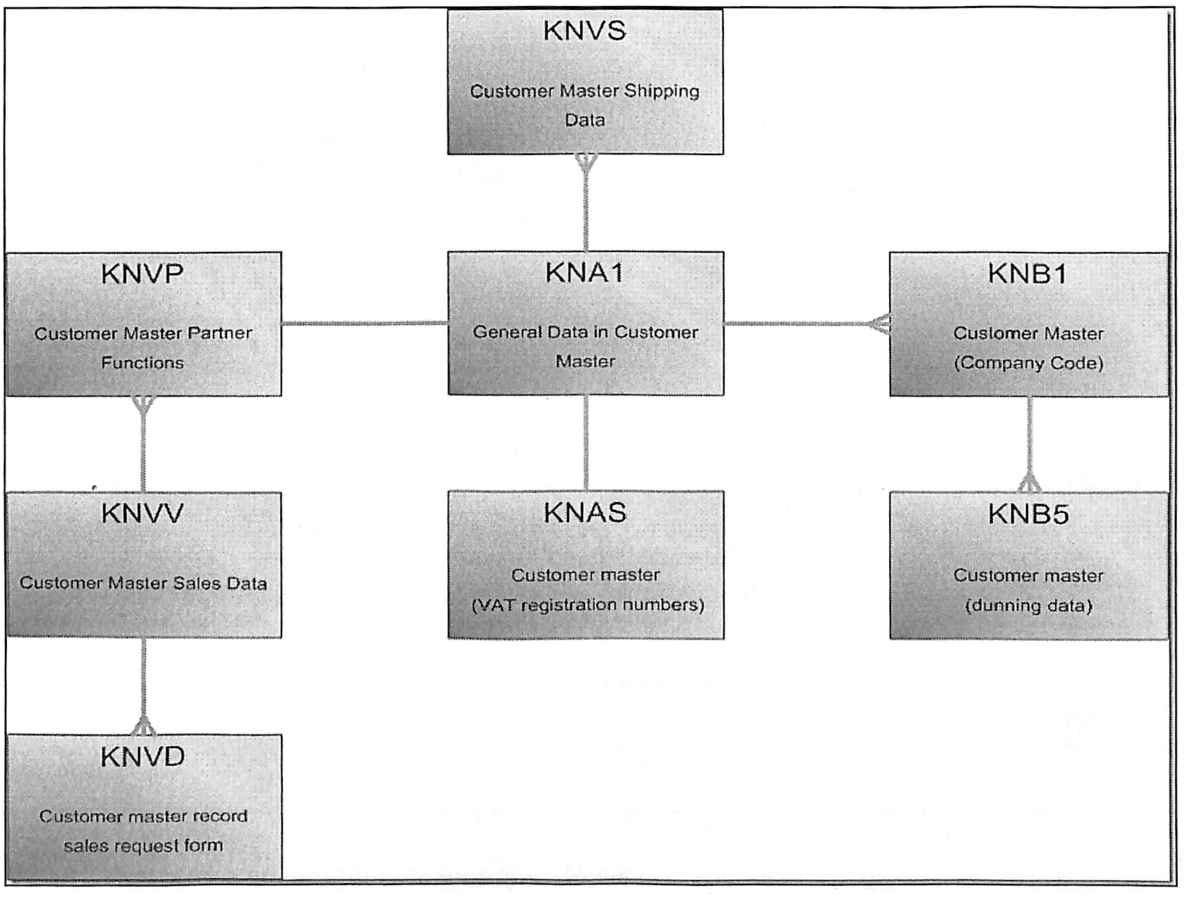
- Firstly ,we got the data fields requirements and the database related information from the SAP team as well as the dummy template.
- Now we have to determine the database logic, and the customer code logic before creating the workflow.
- The logic is as follows:

Customer master Tables

Customer Master	Tables
General Data in Customer Master	KNA1
Customer Master (Company Code)	KNB1
Assign customer credit card	VCKUN
Customer Master Contact Partner	MASSKNVK
Customer master record sales request form	MASSKNVD
Customer Master Sales Data	KNVV
Customer Master Partner Functions	KNVP
Customer Master Licenses	KNVL
Customer Master Tax Indicator	KNVI

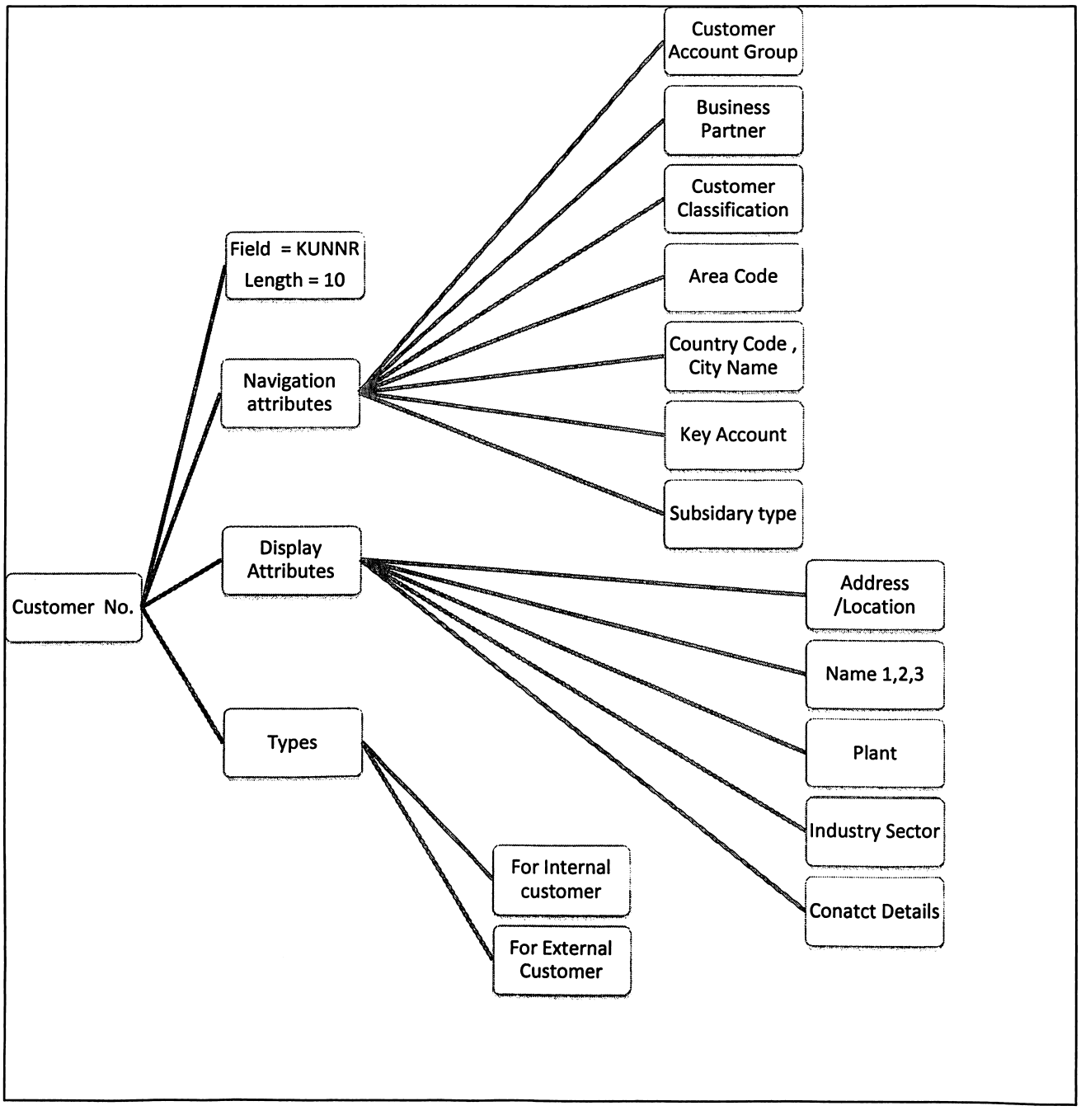
Customer Master Unloading Points	KNVA
Customer master credit management: Control area data	KNKK
Customer master credit management: Central data	KNKA
Customer Master: Legal Control Sanctioned Party List	KNEX
Customer Master (Bank Details)	KNBK
Customer master (dunning data)	KNB5
Customer master (VAT registration numbers general section)	KNAS

Table Relations



5.3.1 Customer Code Logic

- A customer is an automatic generated code by the SAP system. It is a unique identification number for the customer.



- Customer Code is different for the type of customer :
  - For internal customer it is different
  - For External customer it is different
  - Customer code is different on division basis also .(E.g. For Customer 'X' , the customer code would be different for **Santoor** and it would be different for **Yardley**)

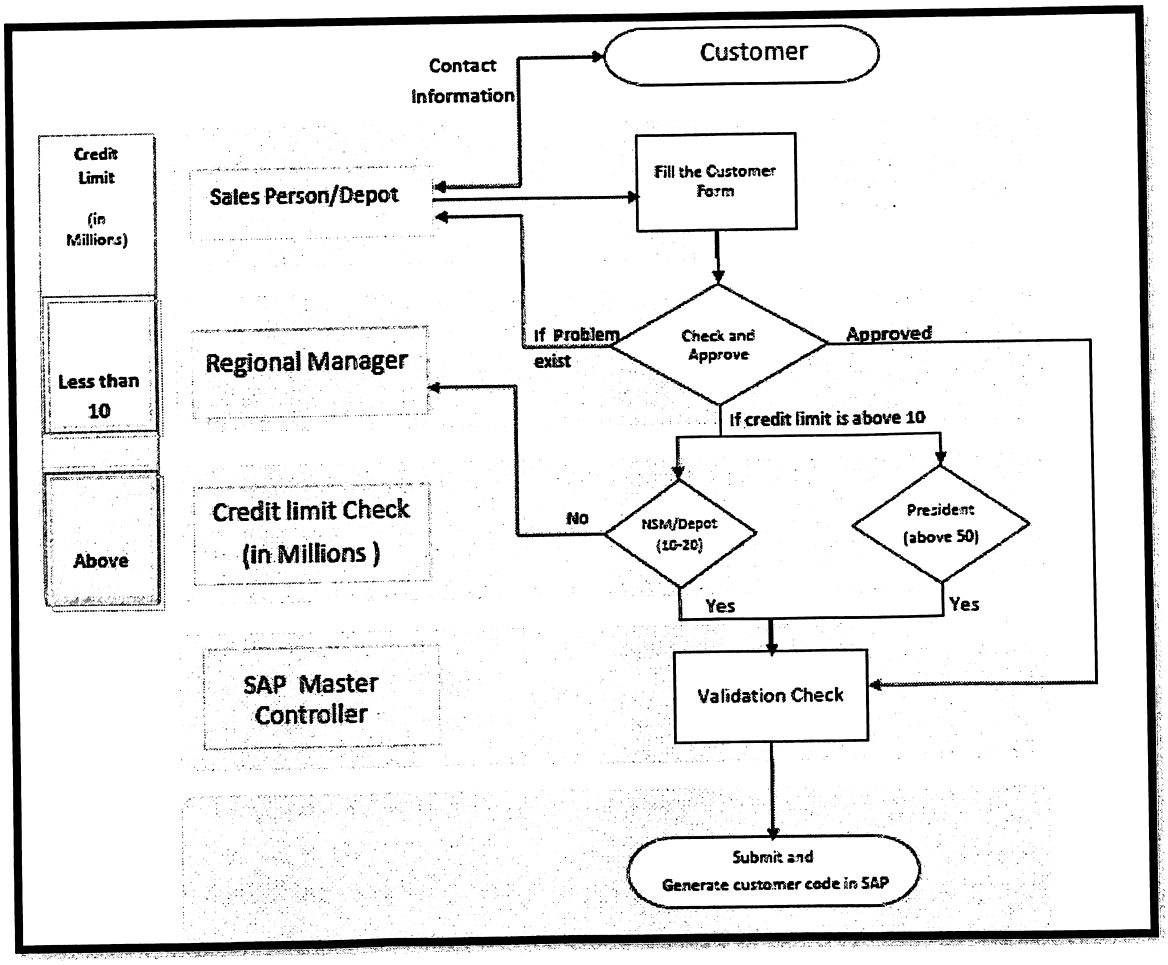
- There is GL account associated with each customer and according to that account the differentiation is done between internal and external customer.

- After determining the table relation we have to design the process which will be the To-Be process on which the workflow has to be designed.
- The process flow would be created by keeping in mind all the approvals at various levels and that should be a single step approval.
- And constantly acknowledging the customer at every step of problem. This could only be done by providing customer with an interface that could connect him with the internal environment.
- Also, the process was to be automated in such a way that it should not disturb the current structure of the process flow.

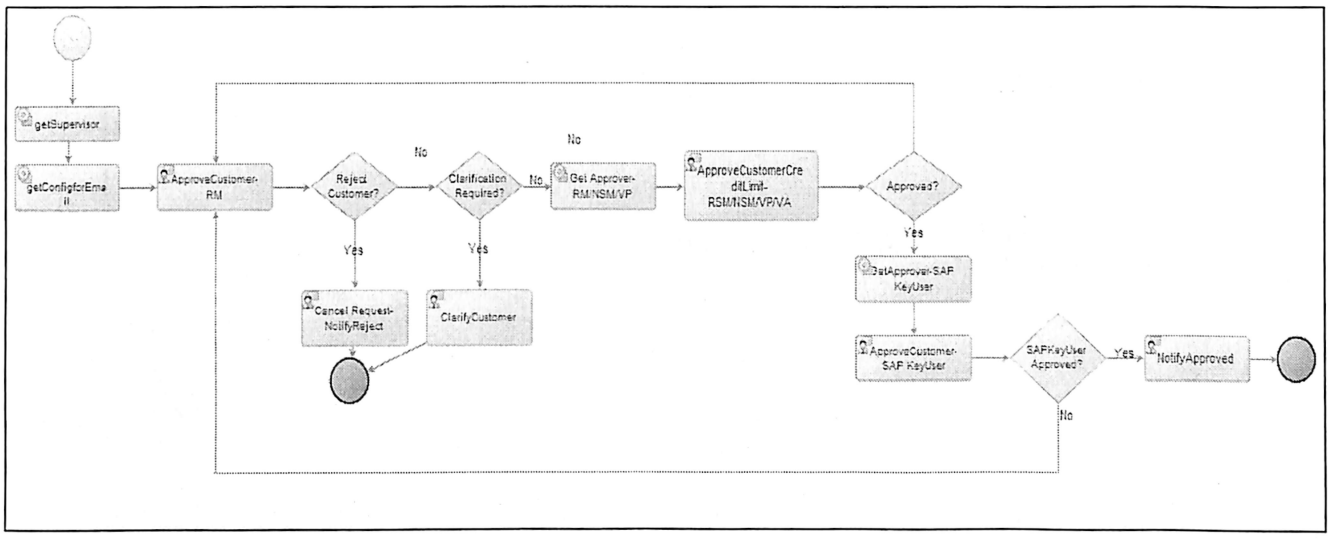
5.3.2 To-Be Process:

The Program will provide the customers with the interface by which they can palce their orders through a Sales portal directly.

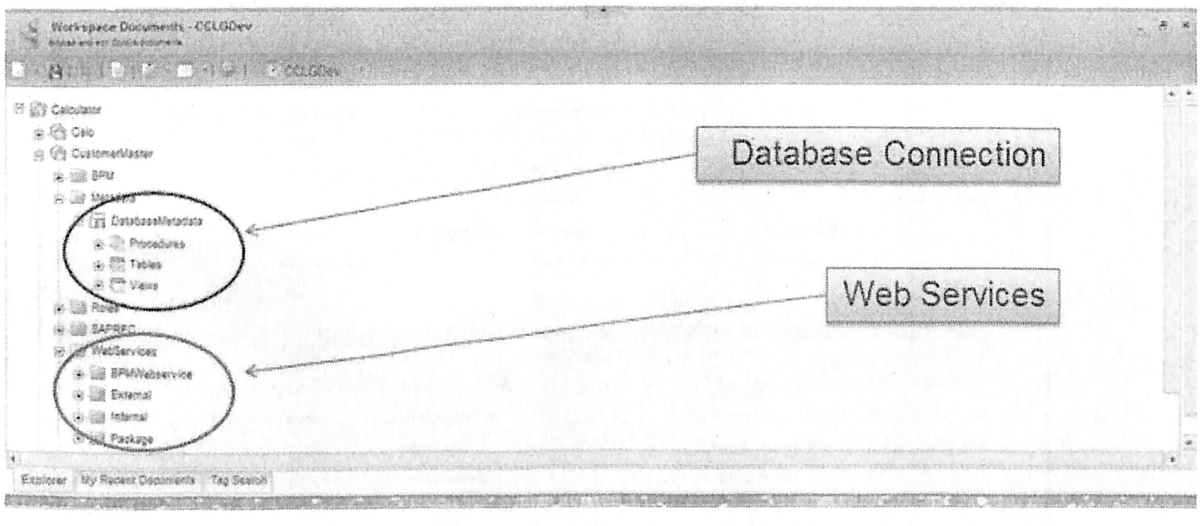
- A form generated interface is filled by the dealers for placing their orders , after loging into the **wipro leap** portal.
- On submitting that form, the process is started for approving/Disapproving respectively, but in an automated way.
- The authorities at various steps in the process have to just click for approving/disapproving the customer details data form and also for clarification ,they have to just enter the comment and send back.
- The last step is to send data to sap through RFC which is done by integrating the workflow with business process rule engine which will call an RFC/BAPI from the SAP which will fetch the data from cordys database and generate the Customer code in SAP.
- The To-Be process flow:-



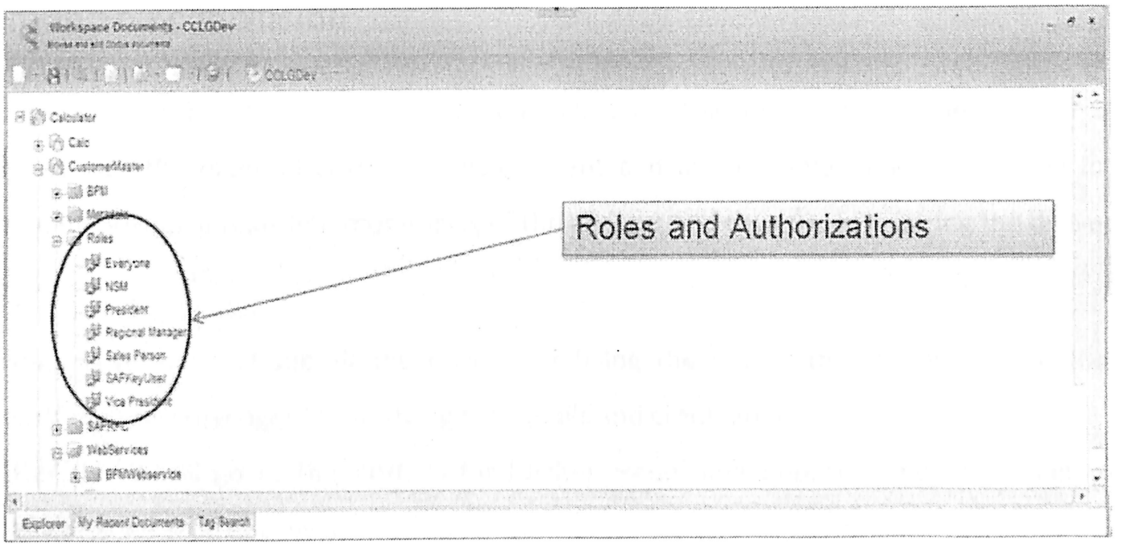
- On the basis of this process flow we designed over workflow and XML forms are based on the customer master template fields.
- All the fields are incorporated in single form and only the selected fields are visible to the various authorities at various levels to maintain the privacy of information.
- The process workflow is as follows.



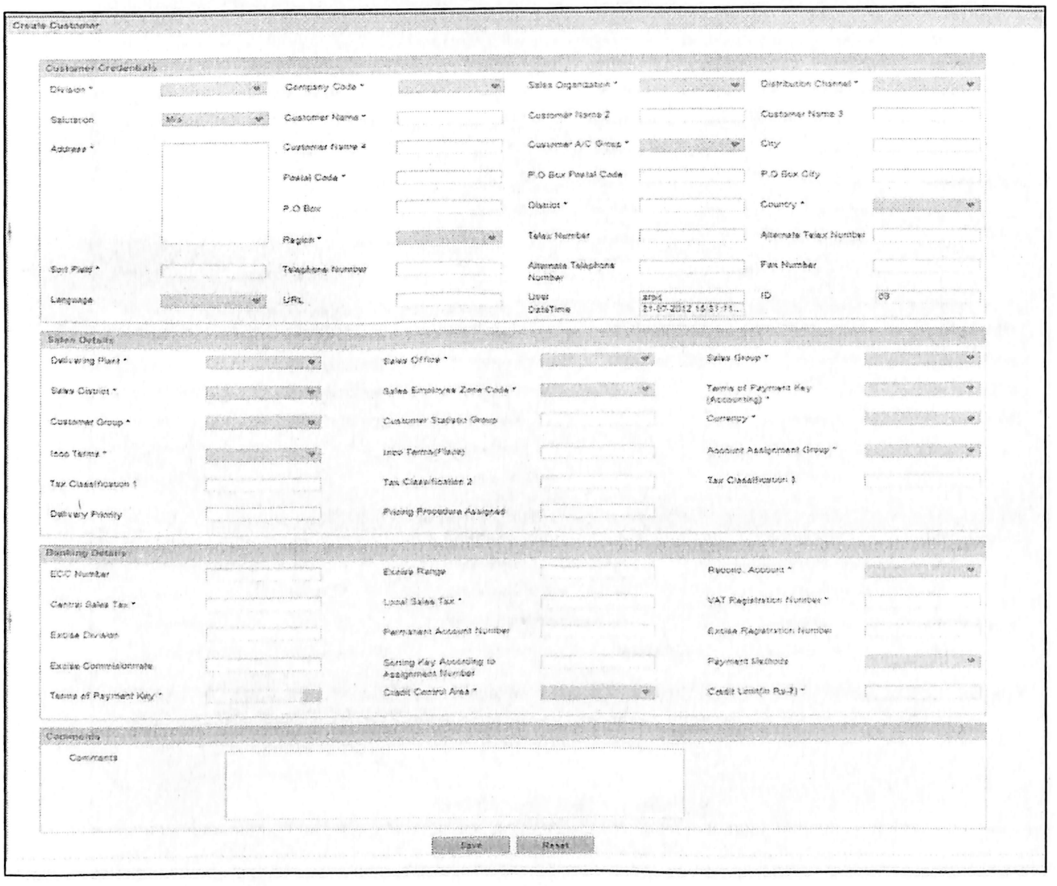
- The BPM notation used to create this flow is version 3.0.
- The blue instances are the web services created from the database and XML forms ,created separately for the customer levels.



- According to various management levels **ROLES** are assigned to each one so that form will show the respective data to a particular authority.



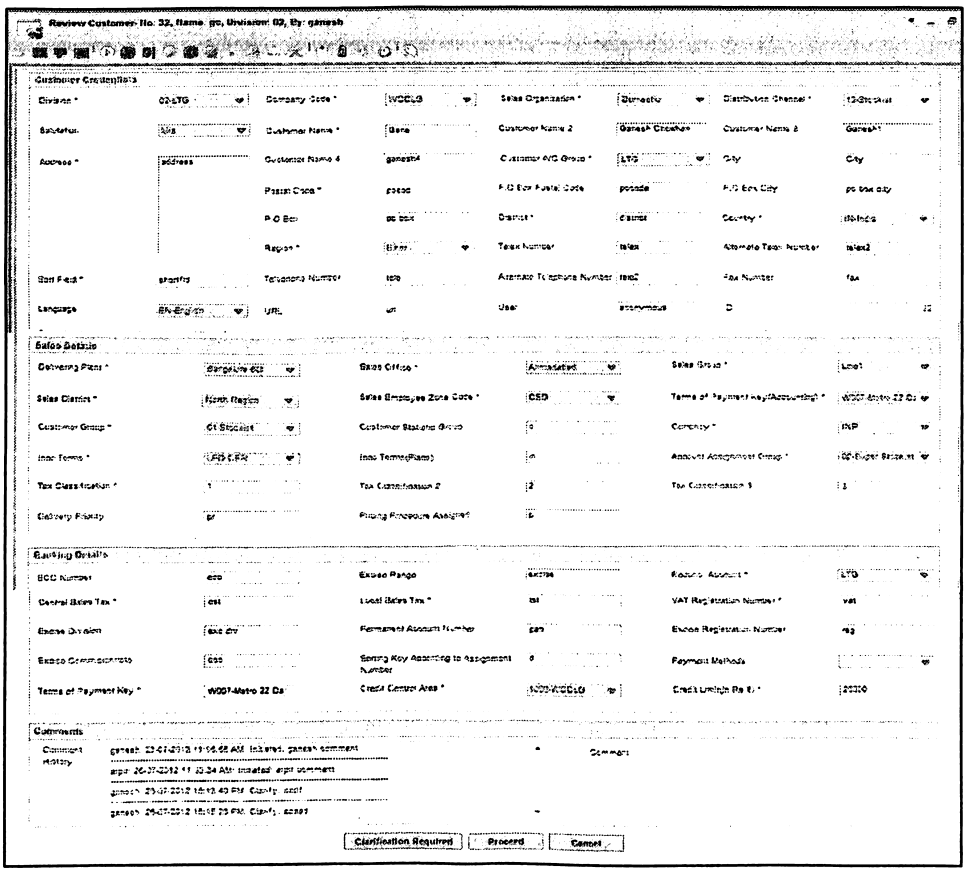
- There is one MASTER role which is modified according to the administrator privileges called EVERYONE.
- The form which is merged with the workflow contains all the fields and is as follows:



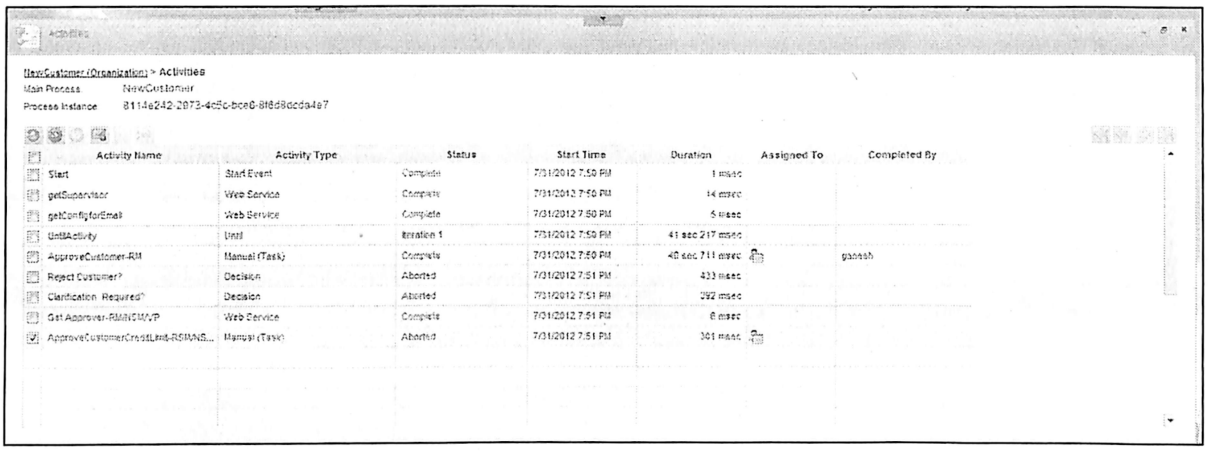
6. Solution and conclusion

The solution deviced at last was a system which is capable of combining the internal SAP based environment with the external customer environment and at the same time provides an intelligence information by providing real-time monitoring of the process and thus finaly reducing the delivery time of the product.

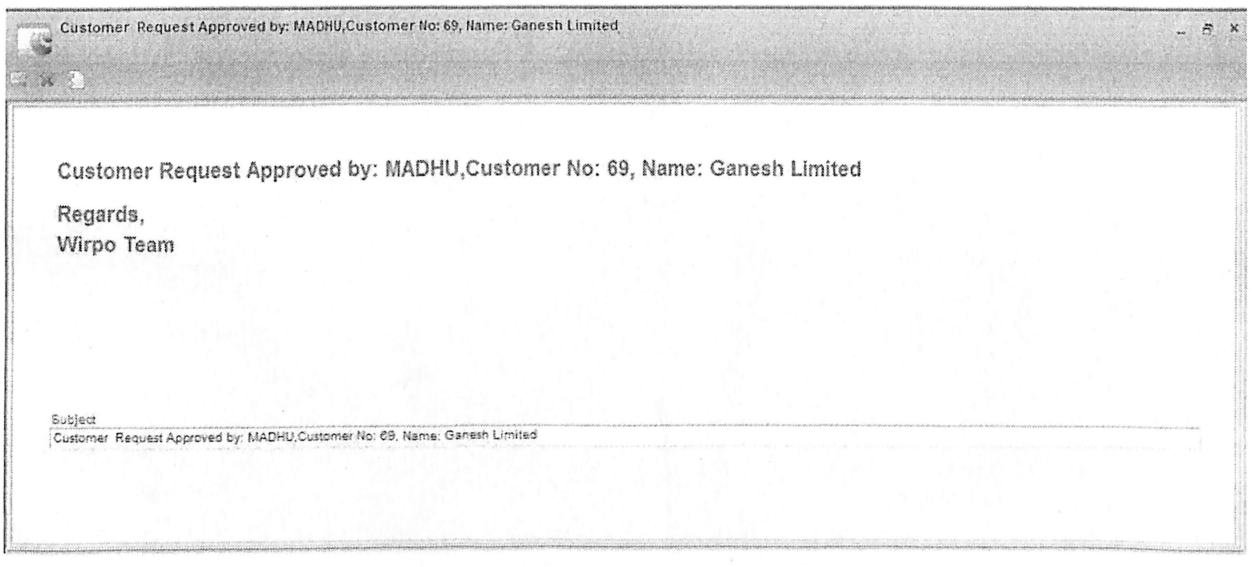
- When customer will submit the form after filling the details the task will go to the regional manager/sales manager for verifying the details and credit limit.
- After this it will go to the VP/CFO for further credit limit approval and thus finally to master controller for final approval.
- After this step the RFC will automatically fetch data from the form and create a customer code in SAP.
- The customer task received is as follows:



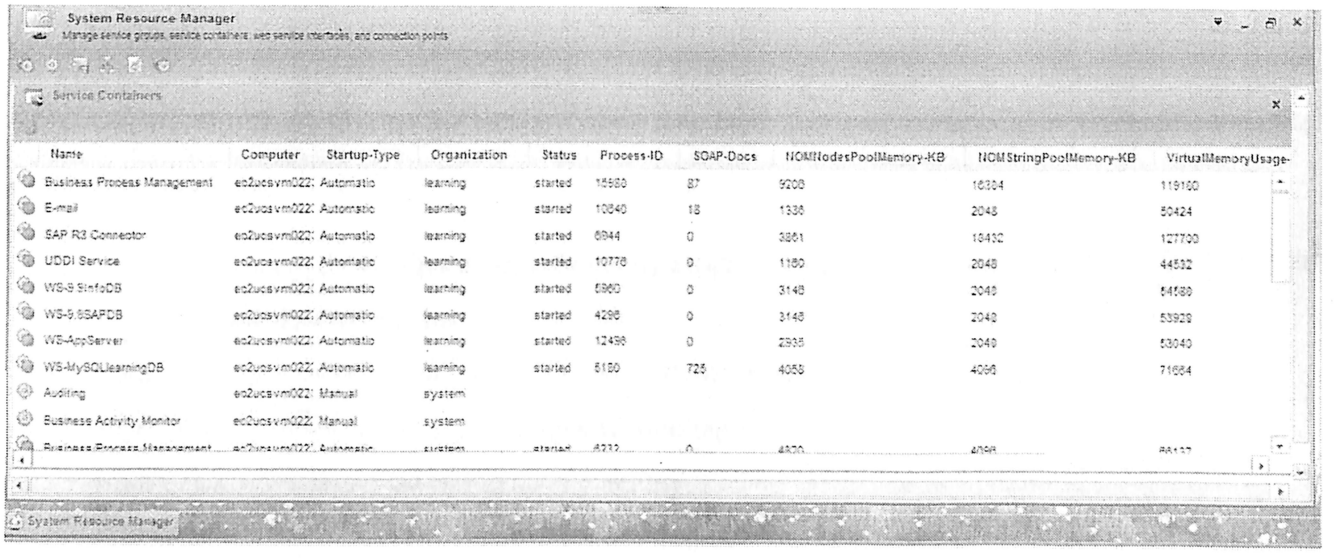
- The customer can also track the task, at what level it is and what approvals are pending and correspondingly the notifications are provided at every approval.



- Notification



- The system resource manager will automatically call an RFC which will generate customer code in SAP.


System Resource Manager
Manage service groups, service containers, web service interfaces, and connection points
Service Containers
Name
Computer
Startup-Type
Organization
Status
Process-ID
SOAP-Docs
NOMNodesPoolMemory-KB
NOMStringPoolMemory-KB
VirtualMemoryUsage-
Business Process Management
E-mail
SAP R3 Connector
UDDI Service
WS-9 SInfoDB
WS-9.6SAPDB
WS-AppServer
WS-MySQLearningDB
Auditing
Business Activity Monitor
System Resource Manager

7. Learnings

The are several situations that let me to learn some new facts and gave knowledge in terms of handelling a particular situations.

- Proper Documentation plays a key role in any project, without documentation no project will able to provide the desired results.
- Behavior of one self in an organization also with in a team.
- Knowledge in terms of dealing with new technology.
- Data gathering techniques and project planning.
- And atlast ,how to adapt the organizational culture.

8. References

Pirmary data

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- Cordys BPM Suite docs
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- Wipro Cordys development team
- Wipro IT-Head (Mr. Arindam Sengupta)

Secondary Data

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