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Business Resource & Workflow Management System

Kumaraguru College of Technology
Coimbatore – 641006.

Department of Computer Applications

By

M.Sathyaseelan
Reg. No. 71204621041

Of

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P-1917

BONAFIDE CERTIFICATE

Certified that this project report titled **Business Resource & Workflow Management System** is the bonafide work of **Mr. M.Sathyaseelan** who carried out the research under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Head of Department

Project Guide

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Internal Examiner

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iii

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Kumaraguru College of Technology
Coimbatore

This is to certify that **Sathyaseelan. M** has completed an internship with Accenture Services Pvt. Ltd. The period of internship is from December 15, 2006 to June 01, 2007.

During this period, the intern has been working on a project entitled as Business Resource and Work Flow Management System.

We found the intern's conduct good.

Yours Sincerely

Shailendra K Dasika
India HR Services Centre
Accenture Services Pvt. Ltd

ABSTRACT

The Business Resource & Workflow Management System enables employees to raise their request for facilities in the project and also enables the team lead and manager to generate report on particular issue and so on. The system also transforms the results into useful information based on the reports that aids managers and team leads in the decision making process.

Business Resource and Workflow Management retains the manual methodology followed by the team leads and managers in facilitating the employees. The manual systems consume much time and resources and are prone to errors in the calculation while charging the clients. Hence, the reliability of the information being submitted to the top management could be much distorted if not properly scrutinized by the concerned team leads and managers. Erroneous data could lead to erroneous decision making whose aftermath could only be known in the long run.

The Business Resource & workflow Management system takes care of such potential threats and provides reliable services to the employees and team leads and manager concerned, on demand.

The system also provides for maintenance of employee biodata. Employee an update their information as and when they achieve level grades professional merits and this is available to the managers at the time of performance appraisals.

The Business Resource & Workflow Management system thus provides a comprehensive coverage of the functional requirements with regard to employee and project management of NOKIA team in ACCENTURE.

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TABLE OF CONTENTS

Topic	Page No.
Abstract	iii
List of Tables	vii
List of Figures	viii
1. Introduction	1
1.1 System Overview	1
1.2 Company Profile	3
2. System Study and Analysis	4
2.1 Problem Statement	4
2.2 Existing System	5
2.2.1 Drawbacks of the Existing System	6
2.3 Proposed System	6
2.3.1 Advantages of the Proposed System	6
2.4 Feasibility Analysis	7
2.4.1 Technical Feasibility	7
2.4.2 Operational Feasibility	7
2.4.3 Economic Feasibility	8
2.5 Users of the System	9
3. Development Environment	10
3.1 Hardware Requirements	10
3.2 Software Requirements	10
3.3 Programming Environment	11
3.3.1 C#.Net 2005	11
3.3.2 SQL SERVER 2005	12

4. System Design and Development	14
4.1 Elements of Design	14
4.1.1 Modular Design	15
4.1.2 Input Design	19
4.1.3 Output Design	21
4.1.4 Database Design	23
4.2 Table Structure	23
4.3 Data Flow Diagram	29
4.4 Use Case Diagram	36
5. Implementation	37
5.1 System Verification	37
5.2 System Validation	37
5.3 Testing	38
5.3.1 Unit Testing	38
5.3.2 Integration Testing	39
5.3.3 System Testing	39
6. Conclusion and Future Enhancement	41
6.1 Conclusion	41
6.2 Future Enhancement	42
Appendices	43
Reference	50

LIST OF TABLES

Table Description	Page No
Table 4.2.1 EmployeeMaster	24
Table 4.2.2 VacationPlanner	25
Table 4.2.3 CabRequest	25
Table 4.2.4 TimeTracking	26
Table 4.2.5 NewIssues	26
Table 4.2.6 SolvedIssues	27
Table 4.2.7 ResourceManagement	27
Table 4.2.8 Chargeability	28

LIST OF FIGURES

Figure Description	Page No	
Figure 4.3.1	Context Diagram	29
Figure 4.3.2	Login DFD	30
Figure 4.3.3	Employee Master DFD	30
Figure 4.3.4	Vacation Planner DFD	31
Figure 4.3.5	CabRequest DFD	32
Figure 4.3.6	TimeTracker DFD	33
Figure 4.3.7	IssuesTracker DFD	34
Figure 4.3.8	Chargeability DFD	34
Figure 4.3.9	Resource Management DFD	35
Figure 4.4.1	Use case diagram	36

CHAPTER 1

INTRODUCTION

1.1 SYSTEM OVERVIEW

The project titled "**Business Resource & Workflow Management System**" offers total solution to the various project related requirements of the team leads and project managers.

The need for the Business Resource & workflow Management system was felt due to the nature of the work required, which involved a lot of information such as granting leave for employees, tracking working hours of employees, handling issues raised and calculation on which to charge the clients. Moreover the process involved was quite a repetitive one and was prone to numerous errors which could result in inappropriate data being presented to the top management.

Automation is the key to increase efficiency, performance and reliability in any system and is being rapidly followed in all walks of life. The problem with the traditional approach of Business Resource & Workflow Management System is that due to the manual nature of the work involved with lot of excel sheets , there is always the possibility of wastage of time and very hard to remain various information in mind and also leads to error in calculation. Automation helps eradicate the root cause of the error and time wastage by completely automizing the system of granting facilities such as leave, cab to employees', resource requirements, Issues tracking and also calculation of chargeability for client.

The Business Resource & Workflow Management System integrates all the sub modules such as **Employee Master, Chargeability, Vacation Planner, Cab planner, Time Tracking, Issues Tracking, and Resource Requirement**.

2

The Employee master serves as the foundation for Business Resource & Workflow Management System. It contains all the details of each employee who are working in the project. It has various details such as Employee Name, Date of Birth, Sex, Marital Status, Educational Qualification, Enterprise Id, Employee Id, Date of joining, Position, Project Enrolled, Mobile number, Extension Number etc...

Another very important module which powers the Business Resource & Workflow Management system is Chargeability. It involves the calculation of charge for the client based on the time worked by the employees.

The Vacation planner performs the functionality that the employee can request for vacation on a date to team lead. It records the granted and denied requests and a report generated by the date.

The Cab planner performs the cab booking functionality for the employees who goes in late night after completing the work. This module has also enabled the team leads to enter the requirement of cab with date and time.

The Time tracking module performs main functionality of the Business resource & Workflow Management System .It tracks each employee activities as worked hours, idle hours , Training hours etc...Based on the date it can generate the report on which how the employee have worked .Also, it aids in bringing out performance of various employees to the top management .

The Issues tracking module records the Issues raised by employee and the details of team lead or manager who classify and rectify those Issue. The issues raised are generated as reports and been bringing out to the scene of manager.

Resource Requirement Module in this system performs the functionality of resources that are required in the project. The required resource report is generated and sent to HR team to select employee based on skill set needed.

3

1.2 COMPANY PROFILE

Accenture is a global management consulting, technology services and outsourcing company, with net revenues of US\$16.65 billion for the fiscal year ended Aug. 31, 2006. Committed to delivering innovation, Accenture collaborates with its clients to help them become high-performance businesses and governments.

The company's "**high performance business**" strategy builds on its expertise in consulting, technology and outsourcing to help clients perform at the highest levels so they can create sustainable value for their customers and shareholders. Using its industry knowledge, service-offering expertise and technology capabilities, it identifies new business and technology trends and develops solutions to help clients around the world:

- Enter new markets.
- Increase revenues in existing markets.
- Improve operational performance.
- Deliver their products and services more effectively and efficiently.

The company's extensive relationships with the world's leading companies and governments and work with organizations of all sizes—including 91 of the Fortune Global 100 and two-thirds of the Fortune Global 500. The company's commitment to client satisfaction strengthens and extends its relationships. For example, 97 of its top 100 clients in fiscal year 2006, based on revenue, have been clients for at least five years, and 77 have been clients for at least 10 years.

CHAPTER 2

SYSTEM STUDY AND ANALYSIS

2.1 PROBLEM STATEMENT

The team leads and managers has to manually work with lot of work sheets in-order to perform various operations related to project and to generate reports to the top management. The tasks involved in the generation of these reports are repetitive. Often, due to the repetitive nature of the work and the tedious process involved, errors creep into these reports which lead to inconsistent information being submitted to the top management.

Handling the details of employees who are gone under vacation and leave on dates is very hectic for the team leads to remain and work with excel sheets for a very large team of employees. Due to repetitive work with a lot of excel sheets may lead to error prone. This could affect the total number of working days of the employees.

Time tracking is one of very important problem in the project, the amount of time spent for particular country site should be noted by team leads for each employee this is not possible to do for a large team. Working with excel sheets may lead to wrong entry for employee. This could affect the employees concerned during the appraisal periods.

Also, chargeability report needs to be obtained from time worked for each country's site. The information is quite difficult to obtain in case these data are placed in excel sheets this leads to very tedious calculation.

Tracking of issues that are raised in project is not easy one and also to maintain the resources that are required for project on a specific stream in excel sheets is also overhead for team leads and managers. The project requires a system which could help ease out the problems faced in each of the scenarios mentioned above.

6

2.2.1 Drawbacks of the Existing System

The drawbacks of the existing systems can be summarized as below:

- Time Consuming.
- Team leads are questioned for delays.
- Wastage of Human resources.
- Lot of work to do with excels.
- Over head in managing both employees and excel sheets.
- Generation of reports is difficult, since various excel sheets are to be verified.

2.3 PROPOSED SYSTEM

The proposed system would automate all of the manual processes described which would help reduce the overhead incurred by the team leads and managers and make the whole process simple and efficient. The proposed system will have computerized data entry screens and processes can be carried out based on inputs from those screens. A set of reports would be provided to ease out the end users task of having to consolidate data to be sent across to the top management.

2.3.1 Advantages of the Proposed System

The expected benefits of the Proposed System are as follows:

- Easy to use and simple.
- New modules can be added with ease without many modifications to the existing system.
- Flexible and Scalable.
- Data available on demand.
- Retrieval of data and reports will be much simpler.
- Automatic conversion of data from time tracking database to chargeability calculation with excel sheets and reducing data entry.

2.2 EXISTING SYSTEM

The details of vacation and leave of employees are logged into excel sheets manually. These are then consolidated into various reports which are sent to the top management for review.

Time tracking for various employees who are working for various country sites are also maintained in different excel sheets manually. The working time in minutes are concerned as inputs to worked hours calculation. These are then aggregated with inputs such as idle hours, training hours, down hours to calculate the total working hours of an employee. All the calculations are made manually and are available to the accounts team for salary calculation.

Chargeability is done manually over a tedious calculation by team leads and manager. This incorporates various things such as number of resources, available effort, total project hours, training hours project related, training hours others, leave details, idle hours etc. Each details are maintained in separate excel sheet and finally total productive effort and utilization hours are calculated manually and are generated as reports and send to clients to charge for resources used in the project.

Cab request details are also maintained in excel sheets are used when budgeting the project. The issues that are occurred in different classification are made available in various excel sheets that are needed during review of project.

Resources that required for project in a specific stream are maintained in different excel sheets that are raised by date. When this requirement is given to HR team it will be hectic work for both the team project and HR recruitment team.

7

2.4 FEASIBILITY ANALYSIS

Feasibility analysis is the measure of how beneficial or practical the development of the System will be to the project. Once the problem is explained information is gathered about the system to test whether the system is viable Technically, Financially and Operationally. Thus, feasibility study is carried out in three phases as follows:

2.4.1 Technical Feasibility

Technical Feasibility is the measure of practicality of a specific technical solution and the availability of technical resources and expertise. It centers on the existing computer system (hardware, software, etc.) and to what extent it can support the new addition.

The proposed system is to be developed using C#.net 2005 and SQL SERVER 2005 which are some of the leading technologies in the market. These technological resources are easily available and the company/project does not need to acquire any development licenses. Visual studio .NET 2005 and SQL SERVER 2005 are already available with the company. These technologies work well on Microsoft platforms.

2.4.2 Operational Feasibility

Operational Feasibility asks if the system will work when it is developed and installed. It checks for the support of the management, the current business methods, user's involvement and their attitude towards the proposed system, etc.

The proposed system has found encouraging support from the employees, team leads, managers and the top management as it will be of great use to them. The

team leads and managers of the project are also committed to have the system operational as it will save time and reduce their workload. Also since the team leads and managers can have easy access to employee's information, calculate and summarize time tracked details, vacation details, cab requested details, resource requirement details, chargeability details, issues tracked details they are very much in favor of implementing the system. The current processes followed in the project would be depicted in the system as it is.

2.4.3 Economic Feasibility

Economic Feasibility is the measure of the cost-effectiveness of the proposed system. The investment to be made in the proposed system must prove a good investment to the project by returning benefits equal to or exceeding the costs incurred in developing the system.

The proposed benefits of the system will outweigh the costs to be incurred during system developed since the system does not require procurement of additional hardware facilities it is economically feasible. In addition capability of the system to incorporate future enhancement will improve the performance to suit the future need of the company/project.

2.5 USERS OF THE SYSTEM

The users of the proposed Business Resource & Workflow Management System have been categorized as below and each of the user categories will have a set of rights which manage their use of the proposed system.

- Employees
- Team Leads
- Managers

Employees are authorized to make data entry in the system. Employee can log on into the application and make entry on the time tracking screen, for which country site he/she is working on with the status details and time details. Employees can also raise a request to the team leads for vacation and leave, and also they can raise a request about issues that are occurred in the project in which they are working on.

Team leads can access all data available in the system. Team leads are concerned about the day to day activities like ensuring data entered by employees are right or wrong. Team leads also has provision to enter details in the screen if the employees are unable to make entry or forget to make entry. Team leads would be allowed access to all reports generated by the system and can update the details of employees into the system in the Employee master section.

The manager is also authorized to view details and reports and is provided access to the major part of the system without any constraints. He is responsible for making updates to employee bio data. Manager can generate any of the report from the system such as chargeability reports, Time tracking reports, issues reports etc.

CHAPTER 3

DEVELOPMENT ENVIRONMENT

3.1 HARDWARE REQUIREMENTS

The hardware support required for deploying the application

Server Configuration

Processor: Pentium 3/4 Processor or above/Athlon Processor
RAM: Minimum 512 MB
Hard Disk: 20GB or more

Client Configuration

Processor: Pentium 3/4 Processor/Athlon Processor
RAM: Minimum 128 MB

3.2 SOFTWARE REQUIREMENTS

The software support required for deployment is:-

Operating System : Windows XP
Web Server : Microsoft IIS
Database : SQL SERVER 2005
Software for Development : C#.Net 2005
Web browser : IE 5.0

3.3 PROGRAMMING ENVIRONMENT

3.3.1 C#.Net

Visual C# is a simple, type-safe, object-oriented, general-purpose programming language. It provides code-focused developers with powerful tools and language support to build rich, connected Web and client applications on the .NET Framework.

3.3.1.1 C#.net overview

- Visual C# 2005 is the modern, innovative programming language and tool for building .NET-connected software for Microsoft Windows, the Web, and a wide range of devices.
- With syntax that resembles C++, a flexible integrated development environment (IDE), and the capability to build solutions across a variety of platforms and devices, Visual C# 2005 significantly eases the development of .NET-connected software.

3.3.1.2 Features of C#.net

- Visual C# 2005 builds on a strong C++ heritage.
- Immediately familiar to C++ and Java developers, C# is a modern and intuitive object-oriented programming language that offers significant improvements, including a unified type system, "unsafe" code for maximum developer control, and powerful new language constructs easily understood by most developers.
- An advanced inheritance model enables developers to reuse their code from within any programming language that supports .NET.



- .NET Framework class library to gain powerful built-in functionality, including a rich set of collection classes, networking support, multithreading support, string and regular expression classes, and broad support for XML, XML schemas, XML namespaces, XSLT, XPath, and SOAP.
- Using Visual C# 2005, developers can construct powerful Web services that encapsulate business processes and make them available to applications running on any platform.
- Visual C# 2005 also enables developers to build the next generation of Windows-based applications. With visual inheritance, developers can greatly simplify the creation of Windows-based applications by centralizing in parent forms the common logic and user interface for their entire solution.
- With native support for the .NET Compact Framework, mobile Web devices, and embedded applications available as part of Visual Studio 2005 Professional Edition, C# developers can now target a wide variety of mobile devices, including Pocket PCs, mobile phones, and devices powered by the Windows CE operating system. Programmers can become immediately productive by using the same programming model and tools for creating powerful device-based software as they use for building robust Windows- and Web-based solutions.

3.3.2 Sql Server 2005

Microsoft SQL Server 2005 provides a new Management Studio, integration with Visual Studio 2005, and the Microsoft .NET common language runtime - all of which help you build, debug, and operate applications faster and more efficiently. SQL Server 2005 Management Studio Express, for easily managing your database. Best of all, as your needs grow, your applications will seamlessly work with the rest of the SQL Server product family.

CHAPTER 4

SYSTEM DESIGN AND DEVELOPMENT

4.1 ELEMENTS OF DESIGN

System Design is the most creative and challenging phase in the development of a software system. Design implies to a description of the final system and the process by which it is developed. The first step is to determine what input data is needed for the system and then to design a database that will meet the requirements of the proposed system. The next step is to determine what outputs are needed from the system and the format of the output to be produced.

During the design of the proposed system some areas where attention is required are:

- What are the inputs required and the outputs produced?
- How should the data be organized?
- What will be the processes involved in the system?
- How should the screen look?

The steps carried out in the design phase are as follows:

- Modular Design
- Input Design
- Output Design
- Database Design

3.3.2.1 Overview of Sql Server 2005

Extending the strengths of SQL Server 2000, SQL Server 2005 provides an integrated database management and analysis solution that can help developers to do the following

- Build, deploy, and manage enterprise applications that are more secure, scalable, and reliable.
- Maximize IT productivity by reducing the complexity of developing and supporting database applications.
- Share data across multiple platforms, applications, and devices to make it easier to connect internal and external systems.
- Control costs without sacrificing performance, availability, scalability, or security.

3.3.2.2 Features of Sql Server 2005

SQL SERVER 2005 provides statements for a variety of tasks, including

- Querying data
- Inserting, updating, and deleting rows in a table
- Creating, replacing, altering, and dropping objects
- Controlling access to the database and its objects
- Guaranteeing database consistency and integrity
- Supports PL/SQL

4.1.1 Modular design

It is always difficult for any System Development team to grasp a system without breaking it into several subsystems/modules. These subsystems/modules will be a part of the original system yet they will be independent in the sense that they will incorporate within them the major functionalities of the proposed system.

A software system is always divided into several subsystems/modules which make it easier to develop and perform tests on the whole system. The subsystems are also known as the modules and the process of dividing an entire system into subsystems/modules is known as Decomposition.

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4.1.1.2 Vacation Planner

- The Employee has to log on into the Business Resource & workflow Management system, it verifies from the database and allows the user only if the employee username and password is valid.
- The concerned Employee has to enter details of the vacation such as from date, to date, type of vacation.
- The details of employee along with the details of leave request is sent to the concerned team lead, he/she then log on into the system and can approve the leave or deny the leave on the date what employee have requested.
- The details of approved and denied vacation request can be viewed in grids as reports.

4.1.1.3 Cab Request

- The Employee has to log on into the Business Resource & workflow Management system, it verifies from the database and allows the user only if the employee username and password is valid.
- The Employee has to raise a request in the cab request screen.
- The details of employee along with the details of cab request is sent the concerned team lead, he/she then log on into the system and can look after the number of request arrived.
- Then the team lead organizes all the requests and sent those cab requests to transport desk.
- Then transport desk group similar requests and arranges the cab based on their time requisition.

4.1.1.6 Chargeability

- Chargeability module calculates the charge for client based in the work done by the employees.
- Chargeability is calculated by considering Number of resources, available effort(hrs), actual project hours, training hours-project related, training hours-others, leave/vacation, idle hours, IDC activities.
- The productivity is calculated by adding actual project hours with training hours-project related and subtracting from available effort(hrs) and leave/vacation.
- The utilization is calculated by adding actual project hours with training hours-project related and subtracting it from number of resources, training hours-others, leave/vacation, IDC activities.
- The over time for each country site are calculated separately and the total over time is counted to client.

4.1.1.7 Resource Requirement

- Resource requirement module deals with the resources that are deficit in the project.
- The team leads and managers have authorization to enter into this and they can enter the resources needed in it.
- Resource requirement module contains fields such as enterpriseld which is retrieved from the session when team lead or manager logs in, date of entry which will be get from system's current date, project, number of resources required and skill.
- The report on grid will be generated based on date and later on it will be given to recruitment team to hire or select employees from bench who matches the skill required for the project.

4.1.1.4 Time Tracking

- Employee has to log on into the system by entering username and password; it is verified from the employee database.
- The Employee has to enter the following details in the screen such as date of entry, entered by, worktype, site, page, from status, to status, worked hours and comments.
- If the worked hours are more 480 minutes in a day then the remaining time will be added in the overtime column.
- Based on the details entered by employee it is easy to track the total amount of hours spent for a site in day and reports are generated as required.
- Each employee details of time tracking is stored in time tracking database

4.1.1.5 Issues Tracking

- The employee has to log on into the system if he/she has any issues regarding the project or specific country site.
- The new log issue contains the following information Issue number which is automatically generated, Entered by which will be retrieved from session when user logs on into the system, Date of entry that is also retrieved from system's current date, Brief description and comments.
- The logged new issues are then classified by team leads under various classifications.
- The classified issues can then be viewed in grids as reports.
- If the issues are cleared then it can be moved to trash.

4.1.2 Input Design

The input design is the process of converting the user-oriented inputs into computer-based format. The goal of designing input data is to make sure that the automation is easy, logical and free from errors.

The input design requirements such as user friendliness, consistent format and interactive dialogue which provide users with timely help and correct messages are given high priority.

The input screens of the **Employee master** module are as below:

- Employee Registration
- Edit profile

Employee Registration screen allows the employee to enter the details about employee which contains both personal and employee information.

Edit profile screen displays the details of an employee in the grid view, if any information has to be changed only the team leads or managers are allowed to change information in that.

The input screen of **Vacation Planner** module is as below:

- Vacation Request

Vacation Request screen allows the employee to enter the details about of type of leave and leave dates as from date and to date.

The input screen of **Cab Request** module is as follows:

- Cab Request

Cab Request screen allows employee to enter the details of time, start place and place where he/she should be dropped out and the project belongs to.

The input screen of **Time Tracking** module is as below:

- Time Tracking-Site Specific

Time Tracking-Site specific screen allows employee to enter the details about the date of entry, entered by, worktype, site, page, from status, to Status, worked duration, overtime and comments.

The input screen of **Issues Tracking** module is as below:

- Log new issue
- Classify New Log issue

The *Log new issue* screen is for employee he/she enters the details about the issues which occurred such as entered by, date of entry, brief description and comments.

The *Classify new log issue* is only for team leads and manager where they classify the issue type and the person of person who classifies the occurrence of issue related to the project and if the issue is cleared then it will be moved to trash.

The input screen of **Resource Requirement** is:

- Resource Requirement

The *Resource Requirement* screen contains the details about date of entry, project, number of resources and skills required for hiring the resources.

Vacation Approved list grid view lists the requests which are approved for vacation and leave for the mentioned as dates. This grid contains only the approved list.

Vacation rejected list grid view lists the requests which are rejected due to some reasons such as work specific and others details. This contains only the rejected list of requests send for approval.

Chargeability report contains the cumulative details of all employees who worked for the project such as number of resources involved and their work details; this also contains the total productivity, effort utilization and over time details. This chargeability results is sent to the client for charging the employees.

Resource Requirement report contains the list of resources needed for the project such as date of entry, number of resources required, project related with and skill of resources. This contains the list of resources required for project and displayed based on date.

Cab request report the details of employee who booked the cab it also contains the details of date of booking and time of cab requested.

General Master Report is the one which contains the details about codes that are used in the project and its explanation.

4.1.3 Output Design

Reports are generated as output for the users to view and take print-outs. Different reports are generated for different criteria. The reports present in the system are:

- Employee Profile.
- Classified Issues.
- Classify new log issues.
- Vacation approved List.
- Vacation Rejected List.
- Chargeability report.
- Resource Requirement report.
- General Master.
- Cab request list.

Employee profile report displays the details of the employee who are in the project. It will be listed as the date of entry into the system.

Classified Issues grid contains the details of issues those are classified with respect to the notice of team lead or manager. This grid contains only the issues which are classified.

Classify new log issue contains the details of the issues which are raised by the employee which contains the whole details of issue along with date of issue raised and so. This grid displays only the issues which are not classified and rectified yet.

4.1.4 Database Design

A database is a collection of inter-related data stored with minimum redundancy to serve many users quickly and efficiently. The general objective of database design is to make the data access easy, inexpensive and flexible to the user. An elegantly designed database can play a strong foundation for the whole system.

The details about the relevant data for the system are first identified. According to their relationship, tables are designed through the following method.

- The data type for each data item in the table is decided.
- The tables are then normalized.

The tables are normalized so that they can provide better response time, have data integrity, avoid redundancy and be secure.

4.2 TABLE STRUCTURE

Design Conventions Used

1. Appropriate words that describe the table should be used.
2. Words used to describe the table should be separated with an Underscore '_ '.
3. No special character other than an underscore is used in formulating a table name.
4. No number should be used anywhere in the table name string.

Table 4.2.1 **Table Name: EmployeeMaster**

Field	Type	Key	Null
EmployeeName	varchar(50)		No
FatherName	varchar(50)		No
Dob	datetime		No
Sex	nchar(10)		No
MaritalStatus	nchar(10)		No
Address	nvarchar(max)		No
Educational Qualification	nvarchar(15)		No
EnterpriseId	nvarchar(50)	Primary	No
Password	nvarchar(30)		No
EmployeeNo	int		
Doj	int		No
Position	nchar(5)		No
ProjectEnrolled	varchar(20)		
AccessCardno	int		No
Mobile	int		
Extension	int		

This table deals with the employee details. This table maintains all the details about employee who are working in the project an also it incorporates some of the personal details too.

Table 4.2.2 **VacationPlanner**

Field	Type	Key	Null
EnterpriseId	nvarchar(50)	Primary	No
FromDate	datetime	Primary	No
EndDate	datetime	Primary	No
Type	nchar(20)		No
ChargeCode	nvarchar(15)		No
Approve	nchar(10)		No

Vacationplanner deals with the employee who is taking leave and vacation for specific dates. The details of that leave/vacation are stored in this table.

Table 4.2.3 **CabRequest**

Field	Type	Key	Null
EnterpriseID	nvarchar(50)	Primary	No
DateofEntry	datetime		No
Project	nvarchar(50)		No
Time	shortdatetime		No
Startplace	nvarchar(50)		No
Endplace	nvarchar(50)		No

CabRequest deals with the requests that are raised for requisition for cab during late nights where company shuttles are not available

Table 4.2.4 **TimeTracking**

Field	Type	Key	Null
TransactionId	varchar(10)	Primary	No
DateofEntry	Datetime		No
EnteredBy(enterpriseid)	nvarchar(50)	Foreign	No
WorkType	varchar(15)		No
Site	varchar(15)		No
FromStatus	varchar(15)		No
ToStatus	varchar(15)		No
WorkedHours	Int		No
Overtime	Int		
TotalHours	int		No
Comments	nvarchar(max)		

The details of employees who are working for specific country site and their duration and status are maintained in this TimeTracking table.

Table 4.2.5 **Issues Tracking – New Issues**

Field	Type	Key	Null
Issued	varchar(10)	Primary	No
EnterpriseId	nvarchar(50)	Foreign	No
DateofEntry	datetime		No
IssueType	varchar(20)		No
Detail	varchar(50)		

The new issues that are raised by employee in the project are stored in this NewIssues table.

Table 4.2.6 **Issues Tracking - Solved Issues**

Field	Type	Key	Null
SolIssued	varchar(10)	Primary	No
EnterpriseId	varchar(50)	Foreign	No
DateofEntry	datetime		No
Issued	varchar(10)	Foreign	No
IssueType	varchar(20)		No
Details	varchar(max)		
SolDatetime	datetime		No
Solution	varchar(max)		

This table maintains the details about the issues which are solved. Solved Issues are those that are cleared or rectified by team leads or technical people who are assisting the project.

Table 4.2.7 **Resource Management**

Field	Type	Key	Null
EnterpriseId	nvarchar(50)	Primary	No
Date	Datetime		No
Project	nvarchar(50)		No
Resources	nvarchar(50)		No
Skill	nvarchar(50)		No

This table maintains the details about the requests that are raised for resource requirement in the project. It contains the details of requested resources along with date and skill required.

Table 4.2.8 Chargeability

Field	Type	Key	Null
TransactionId	nvarchar(10)	Primary	No
ApplicationModule	nvarchar(50)		No
Resources	int		
AvailableEffort	int		
ActualProjectHours	int		
TrainingHoursProject	int		
TrainingHoursOthers	int		
Leave	int		
IdleTime	int		
IDCActivities	int		
ProductiveEffort	int		
UtilizationEffort	int		
OverTime	int		

The Chargeability table deals with the data that are needed to charge the client for work done by the resources. The charges for resources are calculated by taking the time spent by employee for specific country's site and the status done.

4.3 DATA FLOW DIAGRAMS

Data flow diagrams are graphical representation depicting information regarding the flow of control and the transformation of data from input to output. The DFD may be used to represent the system or software at any level of abstraction. In fact, DFD can be partitioned into levels. A Level 0 DFD called Context Level Diagram represents the entire software system as a single bubble with its interactions. The **Context** diagram shows the overall system with the users who will be interacting with it.

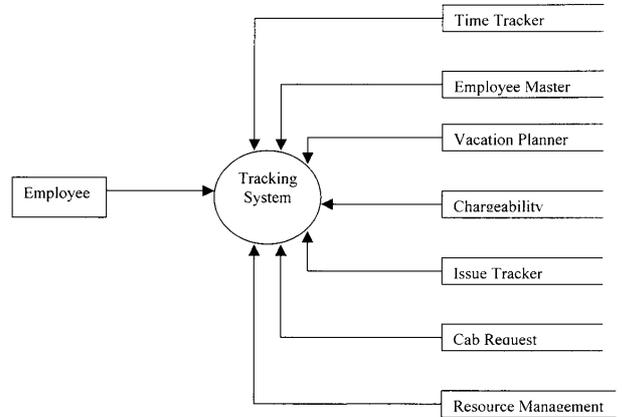


Figure 4.3.1 Context Diagram

The Level 1 DFD will explain the major modules in the whole system, i.e., how the data flow between each of these modules. The flow from once a user logs in to entering measurement criteria, entering data, etc., is shown in level 1 of the data flow diagram. The processes of each module are shown below.

Login

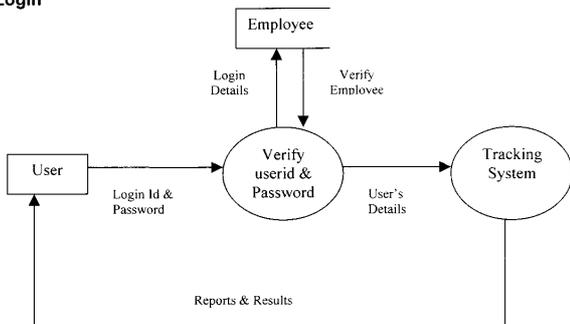


Figure 4.3.2 Login

Login DFD explains the process that will take place when the user/employee logs on into the system. Only authorized users are allowed to enter into system by ensuring username and password.

Employee Master

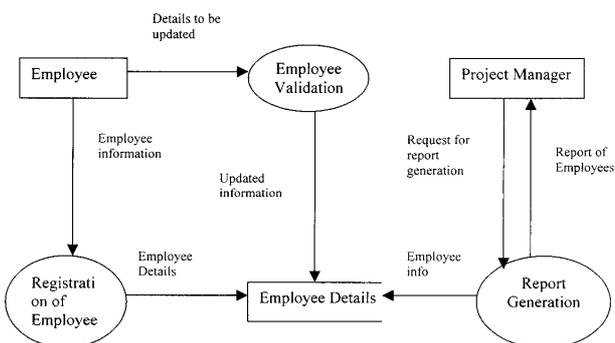


Figure 4.3.3 Employee Master

Employee Master DFD explains about the employee registration and validation process. When new employee is allotted to this project the authorization should done by either team lead or manager to add into this system and also if manager wants any report about employee he/she can retrieve from the employee database.

Vacation Planner

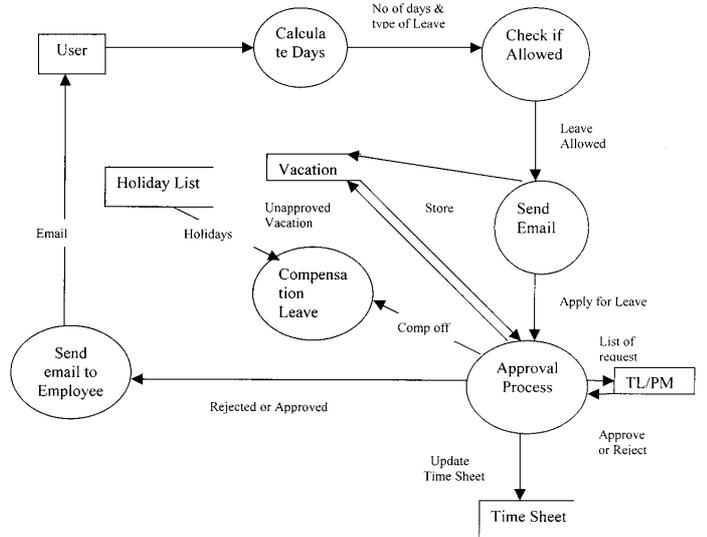


Figure 4.3.4 Vacation Planner

Vacation Planner DFD explains about the process of taking leave or vacation the leave/vacation is granted for employee based on the remaining leave available, if the employee is allowed and it has to be approved by team lead or manager. If the request is approved it has to be stored in the vacation database meanwhile an email should be generated for employee informing that the vacation is granted.

Cab Request

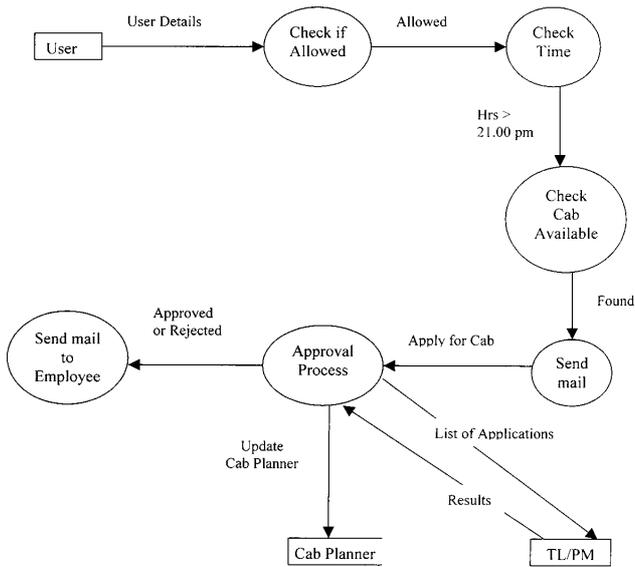


Figure 4.3.5 Cab Request

Cab Request DFD explains the process that is taking place during the employee who request for a cab when he lost the last shuttle or he goes home by late night by completing his/her work. When an employee requests for cab the system checks whether he/she is allowed to take cab and time is checked out for availing the cab then request is approved by team lead or manager then it is sent to transport desk for arranging the cab. If cab is arranged then an email is sent to employee stated cab is arranged.

Time Tracker

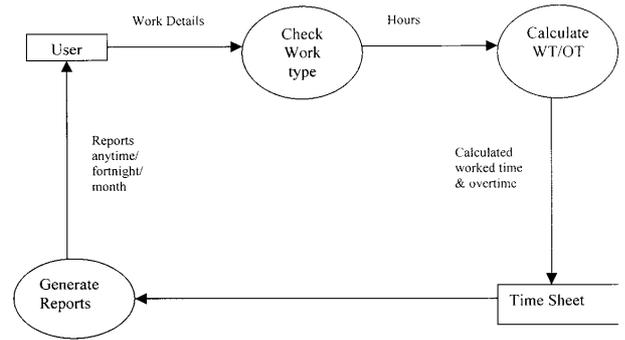


Figure 4.3.6 Time Tracker

Time Tracker DFD shows how the working time of employee is tracked and calculated by the system developed. Work details of each employee is entered into the system along with the time spent for each work type, based on that the worked hours and overtime hours is calculated and stored in the timesheet database. The reports are generated for every fortnight/month or anytime as per requirement.

Issues Tracker

The following DFD is Issues Tracker it explains about how the issues that are raised in the project are cleared and rectified. The Issues that are raised and logged into the system by the employee, and then these issues are classified and solved by team lead or technical leads. Solved issues are stored in database and if any unsolved issues are no more needed they are deleted by team lead or manager.

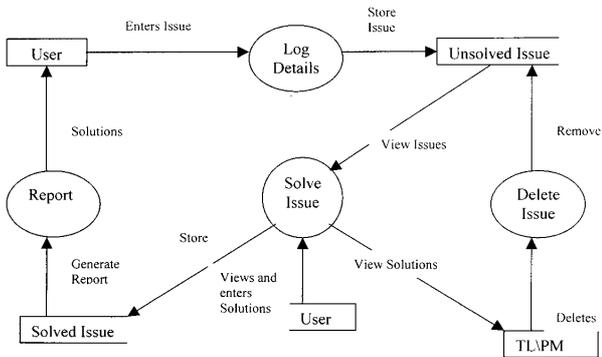


Figure 4.3.7 Issues Tracker

Chargeability

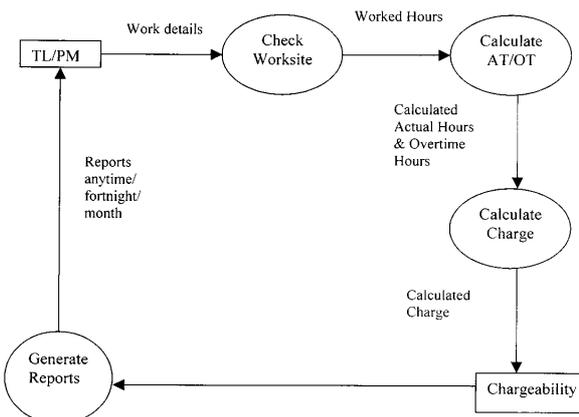


Figure 4.3.8 Chargeability

Chargeability DFD explains how the charge for the client is calculated based on the work done by the resources. The work done by resources for each country are calculated based on their worked hours and overtime hours spent for each specific site. Based on that the charge for resources is calculated and sent to client as report which contains all details of work done and status of work and so on.

Resource Management

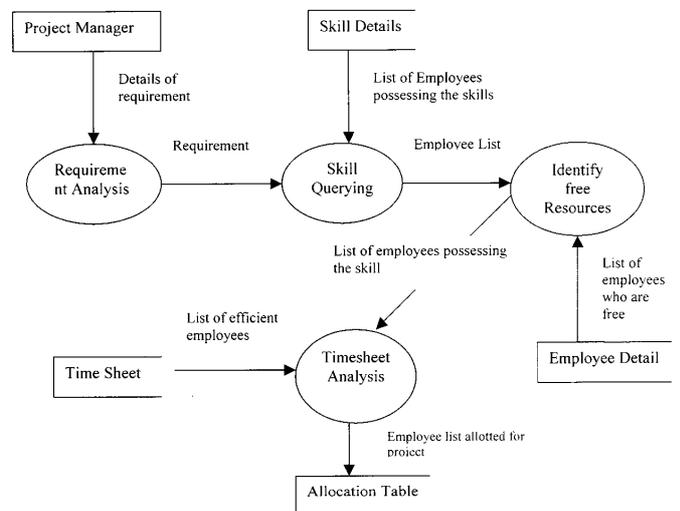


Figure 7.3.9 Resource Requirement

Resource Requirement module explains how the required resources for project task are hired. When there is deficit of resources in the project then team lead or manager logs on into the system and makes an entry about how many resources are required along with that the skill required details are also mentioned.

4.4 USE CASE DIAGRAMS

Use case diagrams give a picture of the different scenarios wherein users interact with the different components of the system. It gives a general idea on the requirements to be addressed by the system and the sequence of operations happening.

The diagram below gives the overall context of the Business Resource & Workflow Management System. The users of the system are depicted below.

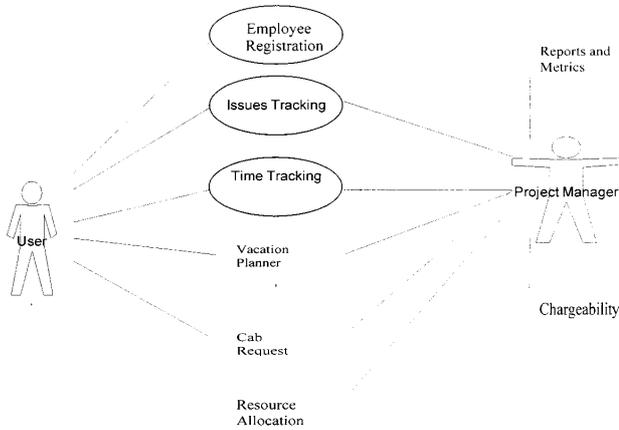


Figure 4.4.1 Use Case diagram

CHAPTER 5

IMPLEMENTATION

System Implementation is the part of the software engineering life cycle, where, the design artifacts are converted to a working application. Coding is done in this stage using an apt framework and programming language, which would solve the specific problem the best way. Once the design is coded into a working application, it has to be verified, validated and tested in detail. The tested product if successful is deployed in the user environment.

5.1 SYSTEM VERIFICATION

System Verification answers the question "Am I building the product right?" It includes the review of interim work steps and interim deliverables during a project to ensure they are acceptable. Verification also determines if the system is consistent, adheres to standards, uses reliable techniques and prudent practices, and performs the selected functions in the correct manner. In data access, it verifies whether the right data is being accessed, in terms of the right place and in the right way.

5.2 SYSTEM VALIDATION

Validation answers the question "Am I building the right product?" This checks whether the developer is moving towards the right product, whether the development is moving towards the actual intended product that was agreed upon in the beginning. Validation also determines if the system complies with the requirements and performs functions for which it is intended and meets the organization's goals and user needs. It is traditional and is performed at the end of the project. In data access, it checks whether we are accessing the right data, in terms of data required to satisfy the requirement.

5.3 TESTING

Testing is a critical element of software quality and assurance and represents the ultimate review of specification design and coding. It is a vital activity that has to be enforced in the development of any system. This could be done in parallel during all the phases of system development. The feedback received from these tests can be used for further enhancement of the system under consideration. The testing phase conducts test using the Software Requirement Specification as a reference and with the goal to see whether the system satisfies the specified requirements.

The main types of tests carried out on Business Resource & Workflow Management System are:

- Unit Test
- Integration Test
- System Test

5.3.1 Unit Testing

Module or Unit Testing is the process of testing all the program units that make up a system. Unit testing focuses on an individual module thus allowing one to uncover all the errors made logically and while coding in the module.

In Business Resource & Workflow Management System each page is tested separately as a unit. Initially the flow of control and data through that page is checked. When considering a module as a unit, the flow of data and control through the whole module is tested. The result is stored in the test plan. In a page, each control is further tested in unit testing. The process is done in all the pages of the system. Once the errors are rectified, the testing procedure is repeated with same test cases to ensure this hasn't produced new errors. Hence this is a continuous process.

5.3.2 Integration Testing

Integration testing tests the process of integrating the various modules to form the completed system. Integration starts with a set of units each individually tested in isolation and ends when the entire application has been built. Integration testing verifies that the combined units function together correctly. It facilitates in finding problem that occur at interface or communication between the individual parts.

Business Resource & Workflow Management System followed top-down integration testing. Modules were linked to the main menu in a sequence as required in the real time operating mode of the system. Menu items were created as and when required for the integration. This process is continued from the page level to module level, finally to the system level. In the final stage, the whole system is taken together and tested for integration. A change in one place should be reflected through out the system. Regression testing is done after each change made into the software. This tests if the change has affected any part of Business Resource & Workflow Management system negatively after the change was made. The whole set of test cases need to be run again to do the regression testing.

5.3.3 System Testing

System testing is actually a serious of different tests, whose primary purpose is to fully exercise the computer-based system. This helps in verifying that all the system elements have been properly integrated and perform the allocated functions. It verifies the entire product after having integrated all software and hardware components, and validates it according to the original project requirement. The system testing takes into consideration the hardware, and the software.

5.3.3.1 Security Testing

Security testing is important in system testing. The system in no way shall be accessible to unauthorized users. Testing is done to ensure that a user with respective rights can only view the various forms and reports presented by Business Resource & Workflow Management System. If users try to perform something beyond his assigned rights corresponding messages should be displayed. The Business Resource & Workflow Management System in such cases displays a error message.

Another security issue involves the sensitive data in the system. The system is highly secure with authentication fixed at various levels of the hierarchy.

One more level of security is concerned with user rights. Each user is applied rights module wise. The menus can be configured to roles. Users can also be configured to roles. Menu items are assigned to users dynamically based on the roles assigned to menu items as well as users. A match is done before displaying the menu to the user. Different Menu items are displayed for user and tam lead or manager.

5.3.3.2 Stress Testing

Stress Testing executes a system in a manner that demands resources in abnormal quantity, frequency or volume. Business Resource & Workflow Management System was stress tested by all employees in the project and accessing simultaneously to various modules in the system.

Thus the Business Resource & Workflow Management System increases the efficiency, performance of the team leads and managers by enabling them to spend more time on concentrating on employees who work under them. The reports provided to the top management are error free and leads to improved decision making.

6.2 FUTURE ENHANCEMENT

The following features listed below if introduced could benefit the users of the system.

- The work allotment for each employee can also be computerized so that the work for the day can be in their inbox when employee logs on his computer to day-to-work.
- Based on the work done by employee and their skill the performance of employee can be generated by the system so it could reduce the misunderstanding and incorporation between team work
- If any new modules want to be added into the system can be added easily.

CHAPTER 6

CONCLUSION AND FUTURE ENHANCEMENT

6.1 CONCLUSION

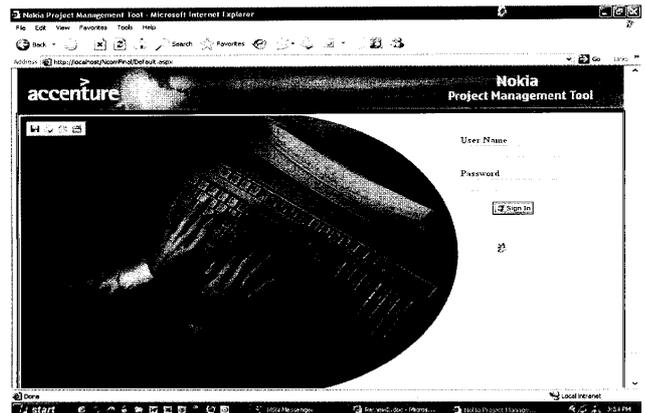
The Business Resource & Workflow Management System enables the project team to get rid of a very tedious and time consuming process which has been followed so far. By automating the entire Vacation planner, cab request, Issues Tracker, Time Tracking, Resource requirement and chargeability I and report generation process the team lead and managers are spared of a cumbersome and repetitive task. It also eliminates the possibility of any error in manual calculation of the Time Tracking or Chargeability calculation.

When fully deployed, the Business Resource & Workflow Management System will transform the entire working of the team leads and managers that deals with calculation and other things that have to remind are converted into computerized professionally operated process. It makes the entire procedure faster, error free, simple, and efficient and more performance enhancing one. Business Resource & Workflow Management System provides a uniform interface for conducting queries and generating reports on demand.

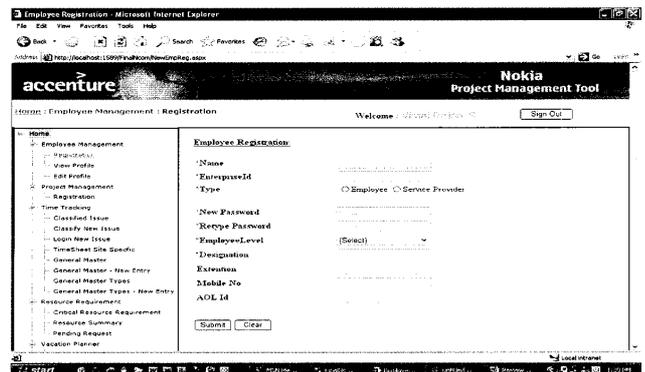
The information in the system should be maintained upto date with periodic updates. The security feature of the system allows only team leads and managers to make updates to important and sensitive data. It prevents unauthorized access to important data.

APPENDICE

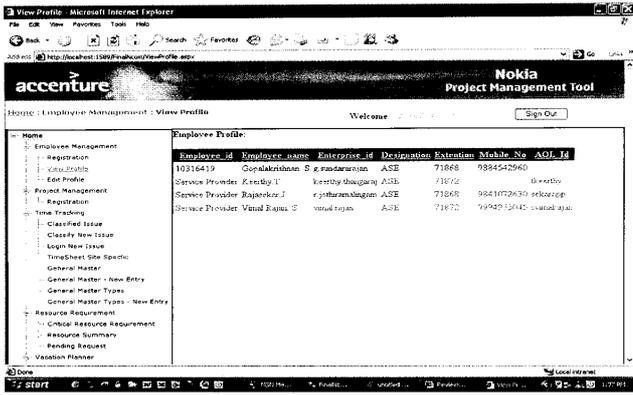
LOGIN



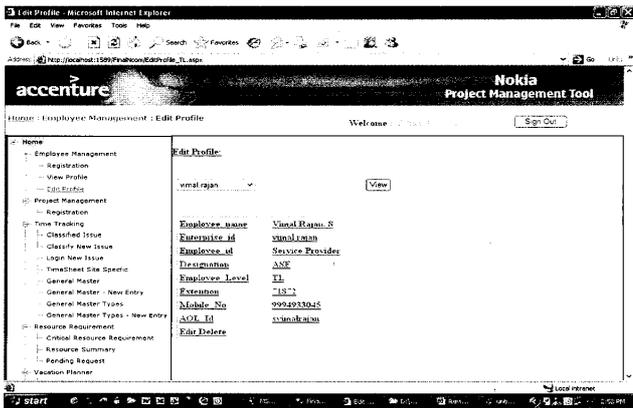
EMPLOYEE MASTER - REGISTRATION



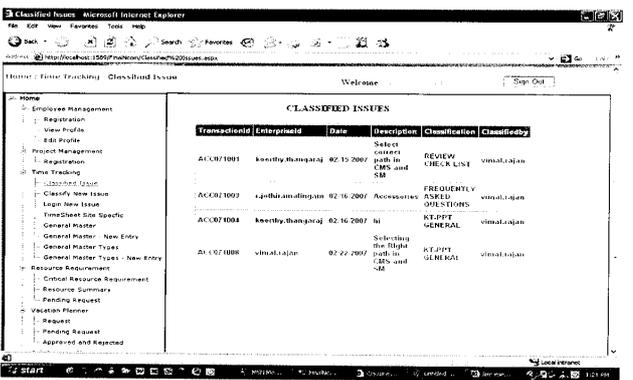
EMPLOYEE MASTER - VIEW PROFILE



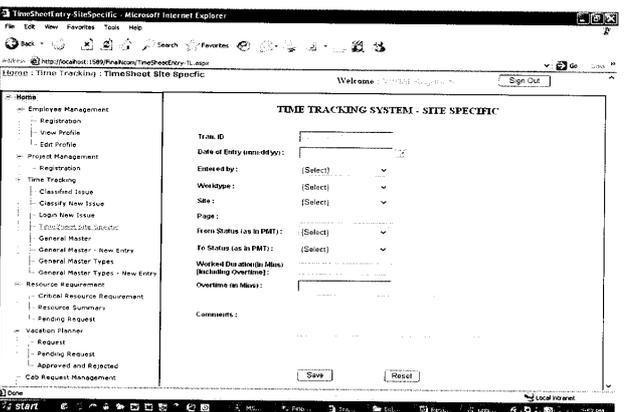
EMPLOYEE MASTER - EDIT PROFILE



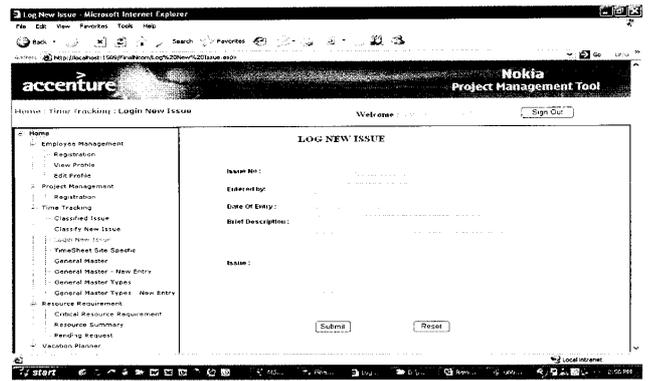
ISSUES TRACKING - CLASSIFIED ISSUES



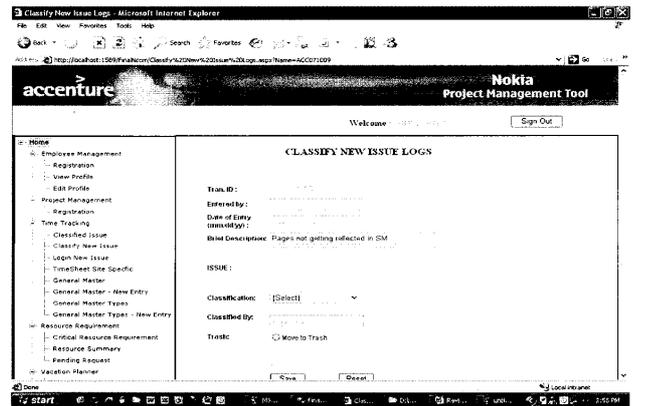
TIME TRACKING SYSTEM - SITE SPECIFIC



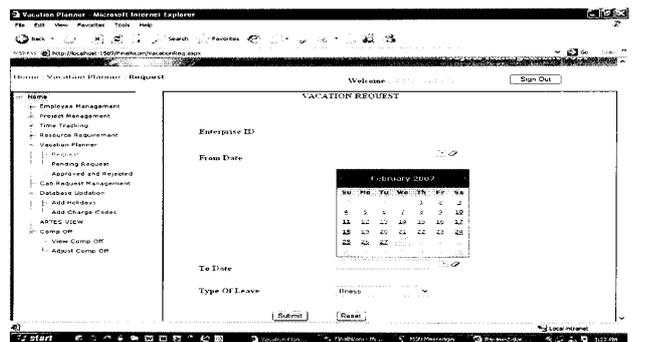
ISSUES TRACKING - LOG NEW ISSUE



ISSUES TRACKING - CLASSIFY NEW LOG ISSUE



VACATION PLANNER - REQUEST



VACATION PLANNER - APPROVE OR REJECT

