SOFTWAR PROJECT MANAGEMENT AUTOMATION FOR OFFSHORE DEVELOPMENT (NERVE)

By

M Usman Piracha

(2000-NUST-BIT-827)

A project report submitted for the fulfillment of the requirements for the degree of Bachelors in Information Technology

In

NUST Institute of Information Technology
National University of Sciences and Technology
Rawalpindi, Pakistan

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CERTIFICATE

Certified that contents and form of the documentation entitled **NERVE- A Software Project Management Tool** submitted by Mr. M. Usman Piracha has been found satisfactory for requirement of the Bachelors in Information Technology at NUST Institute of Information Technology.

Advisor: _____

Lecturer Mr. Atif Kamal

Co-Advisor: _____

Assistant Professor Dr. Sharifullah Khan

Committee Member: _____

Lecturer Mr. Rizwan Ahmed

Committee Member: _____

Lecturer Ms. Ramla Ahmed

DEDICATION

In the name of Allah, the Most Gracious, the Most Merciful

To my dear Family especially to my Parents.

ABSTRACT

Today, the world is spending close to a $10.5 trillion on projects. Amongst the different types of projects lies a category that deals with software products. This industry has taken the world by storm particularly in the last fifteen years. *{ courtesey of the bbc}* This is why there are no mature procedures in place that can guarantee the effectiveness of the software project management techniques that are used today. The flexibility and change of needs / requirements bring greater difficulty in the success of a particular methodology to follow for effective software project management.

A renowned group of study "CHAOS" concluded that only 16.2% of IT projects are successful. The Project Management Institute (PMI) describes 9 knowledge areas destined to successfully manage a project. Needless to say, these knowledge areas are meant to overcome the discrepancies that were faced.

Where Does Project NERVE help?

Project NERVE works to assess the findings (knowledge areas) and provides a platform that shall be tailored specifically to the needs of the software industry of Pakistan; in particular the companies involved in the off shore development area. The solution proposed by NERVE aids companies to work towards achieving certifications that are a sign of quality assurance for e.g. the CMM and ISO certifications. This happens when NERVE provides the flexibility and the needed "paperless" environment that would work as a catalyst to encourage companies achieve harmony and consistency in their processes and thus a seal of quality procedures.

TABLE OF CONTENTS

List Of Figures

ACKNOWLEDGEMENTS

First of all I am extremely thankful to Almighty Allah for giving me the will power, courage and sprit to complete my Final Year Project. I am also really grateful to my family, especially my parents who have encouraged me through their devotion towards me and my studies and for their prayers.

I am most thankful to Mr. Aatif Kamal for his encouragement and excellent supervision. I thank him for his patience with my probing questions during meetings and for allowing me to encroach into his busy schedules. I gratefully acknowledge his support in providing me all the guidance and support throughout my project. I am highly obliged to Dr. Sharifullah Khan for providing his technical advices and guidance. Working with Mr. Aatif Kamal and Dr. Sharif has taught me many things, which will be more helpful for me in my practical life. I am full of gratitude for each of my friends namely Adeel Zafar, Afnan Ullah Khan, Ali Khan, Fahim Qureshi and Mati ur Rehman for boosting my morale and providing me assistance wherever I needed it.

Chapter 1

INTRODUCTION

Project NERVE is about building a reliable, online web based system that shall provide means to monitor as well as manage all activities relating to software project management at various levels.

An important aspect of this project deals with understanding the kind of interaction that takes place with the off shore clients. An ideal implementation would mean eliminating all paper based systems. The users of this system shall be project managers, product managers, business analysts, clients, developers and other stake holders related to the project under construction.

1.1 MOTIVATION

Promoting the use of CMM and ISO within the software industries through NERVE and providing a project management solution without the need of purchasing expensive (licensed) project management products; designed exclusively for software projects having off shore clients.

High quality software products cannot be guaranteed unless the processes used in their construction, monitoring and overall management are matured and streamlined. Attaining CMM and ISO levels amongst software industries shall help Pakistan become quality oriented.

However, the high cost attributed in maintaining an "environment" that would promote CMM and ISO compliant processes is the biggest hurdle. Essentially, the paperwork involved as well as the lack of flexibility or adaptation for real life software project scenarios are not contemplated by using ordinary project management tools.

NERVE focuses to provide a platform that would focus on the management and monitoring of software projects particularly for Pakistani based off shore development companies as well as to encourage the implementation of the CMM and ISO levels thus keeping in mind the particular needs of the software industry in Pakistan. It caters the discrepancies in the current project management products available in the market by providing a web based solution in a client server architecture so that licensed software may not be needed by both sides (client and developers) to communicate. This project also provides its developers useful knowledge into the working environment of a software house-a potential workplace for the future.

1.2 PROBLEM STATEMENT

Software Project Management Techniques result in procedures involving a lot of paperwork. Time is wasted in maintaining and updating the documentations and controlling duplications / discrepancies within copies.

Pakistan based Software companies lack the tools to manage their processes, such that over time they may become eligible for CMM or ISO certifications. This results in poor quality products and loss of valuable foreign clients. Projects are not

monitored or controlled properly resulting in serious deficiencies and loss. Secondly, there are no tools available that are designed specifically to manage software projects not to mention off shore development projects.

The idea is to introduce techniques that are based on using an efficient methodology and approach towards software development.

1.3 CMM AND ISO IMPLEMENTATIONS IN PAKISTAN

With the recent recession in American economy in general and IT sector in particular, some Pakistani software companies are badly hit. Before the recession, some well-known Pakistani companies had ambitions to achieve CMM Level-3 and ISO certifications by the year 2002. *{3 spider magazine issue july 2003}* The recession has made them reconsider their priorities. In some cases this has pushed the targeted certification time to year 2004-05; while in other cases the certifications have been dropped off from the priority list all together. Given this bleak picture, the future of CMM and ISO does not look very bright.

1.4 EXISTING SOLUTIONS: THE MS PROJECT

Microsoft (MS) Project is a popular tool that is widely used in the industry for project management. The main problems that are associated with this tool are as follows.

MS Project is not open source.

The pirated versions available in the market are not good quality.

MS project would have to be purchased by both client and developer parties to communicate which is not a cheap solution.

MS project is not particularly for the software industry projects.

The need for an application is felt that caters to the software industry needs

1.5 SCOPE AND DELIVERABLES (PROPOSED SOLUTION)

Using NERVE's managers will be able to introduce and implement effective managerial techniques eliminating use of paperwork at the same time.

NERVE helps by managing and monitoring projects from inception till rollout, easy and effective. The effective communication between managers and off shore clients (by using discussion boards) improves interaction and promotes quality engineering.

The following functionalities are provided to fulfill the important requirements for a useful software project management tool.

- A web based application that would not need to be installed on the client's machine and would require only a web browser for accessibility.
- An application that works on the client server architecture, centralizing information.
- Open source code.
- Introducing effective communication between client and developers providers.
- Eliminating silos of information.
- Progress monitoring and controlling.

- Platform independence.
- Bidding and archiving for tenders.

1.6 TYPE OF DEVELOPMENT MODEL CHOSEN

We shall use the waterfall model to construct our project as we have a sufficient idea about the requirements needed to construct a project management tool. Secondly, we have divided our project into distinctive phases due to which we can be certain about the development to occur in modules.

1.7 CONCLUSION

The project shall have some preliminary information provided to it such as the project charter, the scope and the SRS document before the utility of this tool can be realized.

Chapter 2

LITERATURE REVIEW

2.1 CHOICE OF PLATFORM FOR IMPLEMENTING NERVE

There are primarily two options for the development of NERVE; either using the .NET technology or J2EE. To better, understand the reason for choosing .NET as the tool to implement NERVE we shall study the technologies and draw a comparison between the two.

2.1.1 Differences b/w .NET and J2EE

There are some very core differences between the two technologies. The following topics discuss some of the main aspects regarding this issue.

2.1.1.2 Interoperability and Web Services

The .NET platform eCollaboration model is based on the UDDI and SOAP standards. These standards are widely supported by more than 100 companies. Microsoft, along with IBM and Ariba, are the leaders in this area.

2.1.1.3 Framework Support

When building a large, eCommerce solution, one wants to build on top of a well-defined and tested eCommerce framework. The use of such a framework can dramatically reduce development costs, probably by a factor of at least 10.

The .NET platform includes such an eCommerce framework called Commerce Server. At this point, there is no equivalent vendor-neutral framework in the J2EE space.

2.1.1.4 Portability

The .NET/Windows platform can scale from 16,000 transactions per minute to over 500,000 transactions per minute. The J2EE/Unix technology, conducts around 17,000 to 110,000 range of transactions per minute, at a much higher cost per transaction.

2.1.1.5 Client device independence

The .NET Framework approach is to write device independent code that interacts with visual controls. It is the control, not the programmer, that is responsible for determining what HTML to deliver, based on the capabilities of the client device.. In the .NET Framework model, one can forget that such a thing as HTML even exists.

In Java, it is the presentation tier programmer that determines the ultimate HTML that will be delivered to the client, and with .NET, it is a Visual Studio.NET control.

2.1.1.6 Standardized configuration

Java configuration is for the most part, oriented around property files, which are simple name-value pairs separated by equal signs in a text file. Property parsers are included as part of Java, and the java runtime executable (java.exe on Windows) accepts named properties on the command line that are included with System properties (which are a centralized repository for global properties).

Though XML parsers certainly exist for Java, Java components don't tend to be configured by XML files.

In contrast, XML permeates every corner of .Net. XML is infinitely more flexible than property files, and that makes it a better standard configuration technology than property files. Lists of values are easier to represent in XML, the range of parsing technologies is larger, and the format is familiar to anyone accustomed to HTML.

2.1.1.7 Conclusion

The above discussion is a clear indicator to the superiority of using .NET in place of J2EE.

2.2 PROJECT MANAGEMENT

According to PMI PMBOK project management is defined as "The application of knowledge, skills, tools and techniques to project activities in order meet project requirements".

2.3 PMBOK

PMBOK is defined as a virtual collection of processes and knowledge areas generally accepted as best practices within Project Management. It is an internationally recognized standard (IEEE Std1490-1998) and provides the fundamentals of project management, irrespective of the type of project (software, construction, environmental, aerospace, etc.). It recognizes 5 basic process groups

and 9 knowledge areas typical of almost all projects. These basic concepts are applicable to all projects and programs (and operations).

2.4 PM PROCESS GROUPS

The Processes overlap and interact throughout a project or phase. They are described in terms of:

Inputs (documentation, plans, designs, etc)

Tools & Techniques (mechanisms applied to inputs)

Outputs (documentations, products, etc.)

2.5 PM KNOWLEDGE AREAS

- **Project Integration & Management**

Describes the processes required to ensure that various elements of the project are properly coordinated. It consists of project plan development project plan execution and integrated change control.

- **Project scope management**

Describes the processes required to ensure that project includes all the work required and integrated change control.

- **Project time management**

Describes the processes required to ensure the timely completion of the project. It consists of initiation scope planning scope definition scope verification and scope change control.

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Describes the processes required to ensure the timely completion of the project. It consists of initiation scope planning scope definition scope verification and scope change control.

- **Project Cost Management**

Describes the processes required to ensure that the project is completed within the approved budget. It consists of resource planning, cost estimating, schedule development and schedule control.

- **Project Quality Management**

Describes the processes required to ensure that the project will satisfy the needs for which it was undertaken. It consists of quality planning, quality assurance and quality control.

- **Project Human Resource Management**

Describes the processes required to make the most effective use of the people involved with the project. It consists of organizational planning, staff acquisition, and team development.

- **Project Communication Management**

Describes the processes required to ensure timely and appropriate generation, collection, dissemination, storage and ultimate disposition of project information. It consists of communication planning, information distribution, performance reporting and administrative closure.

- **Project Risk Management**

Describes the processes concerned with identifying, analyzing and responding to project risk events. It consists of risk management planning, risk

identification, qualitative risk analysis, quantitative risk analysis, risk response planning, risk-monitoring and risk control.

- **Project Procurement Management**

Describes the processes required to acquire goods and services from outside the performing organization. It consists of procurement planning, solicitation planning, solicitation, source selection and contract administration.

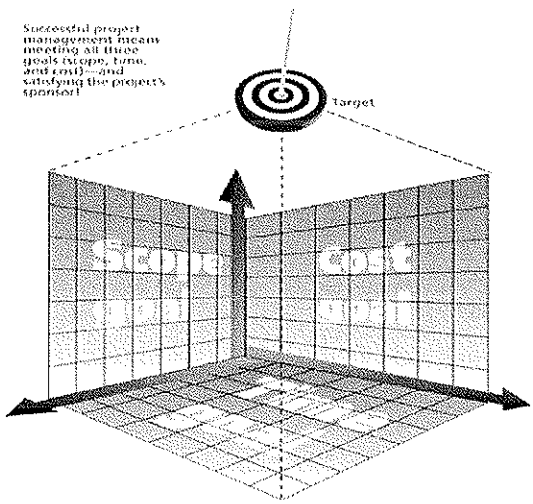

Figure 2.1: The Triple Constraints

2.6 CMM

The Capability Maturity Model-Software (CMM-SW) is a model developed by the Software Engineering Institute (SEI) of Carnegie Mellon University (USA) that helps companies manage risk and plan to run the business in an effective manner. Since its establishment in 1987, the model has gained popularity

throughout the world and become the de facto international standard for software process improvement and software capability evaluation.

The **Capability Maturity Model for Software (CMM)** is a framework that describes the key elements of an effective software process. CMM describes an evolutionary improvement path from an ad hoc, immature process to a mature, disciplined process. The CMM covers practices for planning, engineering, and managing software development and maintenance. When followed, these key practices improve the ability of organizations to meet goals for cost, schedule, functionality, and product quality.

2.7 ISO

ISO is a network of the national standards institutes of 151 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

ISO is a non-governmental organization. It occupies a special position between the public and private sectors. This is because, on the one hand, many of its member institutes are part of the governmental structure of their countries, or are mandated by their government. On the other hand, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations.

ISO 9000 family is primarily concerned with" Quality Management". ISO 9001 contains requirements for inspection and testing, inspection, measuring and test equipment and for inspection and test status.

2.8 ISO v/s CMM

CMM and the ISO 9000 series of standards share common concerns with quality and process management. However, CMM emphasizes continuous improvement, whereas ISO deals with minimum criteria of quality systems.

An ISO 9001-compliant organization would not necessarily satisfy all of the CMM level 2 key process areas (it would satisfy most of the level 2 goals and many level 3 goals. Also some key practices in CMM that are not addressed in ISO 9000, it is possible for a level 1 organization to receive 9001 registration; similarly, there are areas addressed by ISO 9001 that are not addressed in the CMM. Also a level 3 organization would have little difficulty in obtaining ISO 9001 certification

2.9 CONCLUSION

CMM is without doubt an effective framework for modeling, defining, and assessing the maturity of the software processes used within projects, programs and operations (business unit or enterprise). It also helps in identifying the key practices that are required to increase the maturity of these processes. ISO 9000 is an effective framework for assessing the minimum requirements and processes for a quality management system Lastly; PMBOK is an effective framework for modeling, and defining the performance of processes used for projects.

Thus, CMM and PMBOK complement each other whereas CMM and ISO differ in their emphasis on quality improvement.

Chapter 3

SYSTEM ARCHITECTURE AND DETAILS

3.1 OVERVIEW

The detail that follows underlies two major sections:-

- **Description**
- **Specific requirements**

3.2 DESCRIPTION

Project NERVE is about building a reliable, online web based system that shall provide means to monitor as well as manage all activities relating to software project management at various levels. An important aspect of this project deals with understanding the kind of interaction that takes place with the off shore clients. An ideal implementation would mean eliminating all paper based systems. The users of this system shall be project managers, product managers, business analysts, clients, developers and other stake holders related to the project under construction.

3.3 DATA BASE REQUIREMENTS

MS SQL server works well for large databases. That is why this is the preferred tool to use for handling the data with a .NET application on the front end. The Microsoft Access DBMS shall fail for large size databases and thus is not the tool of choice.

3.4 OPERATING SITE ADAPTATIONS

3.4.1 User Characteristics

The intended users for NERVE would be;

3.4.1.1 Project Managers

Project Managers use NERVE for:

- The management of the teams in completion of the projects within time and budget constraints
- The management of the overall procedure of Project Management.
- Specification of the project requirements, products, deliverables, scope etc
- Manage interactions with the team members, resolve conflicts and maintaining communication with the various offshore members.
- Ensure quality adherence during all the stages of the project life cycle.
- Making use of the flexibility incorporated in structuring the WBS.

3.4.1.2 Project Managers / Program Managers

Project Managers use NERVE for:

- The management of the team.
- The management of the overall procedure of Project Management.
- Specification of the project requirements, products, deliverables, scope etc.
- Manage interactions with the team members, and maintaining communication with the various offshore members.

- Making use of the flexibility incorporated in structuring the WBS .
- Analyzing the existing processes and recommending and implementing new ones.

3.4.1.3 WBS Owners, Team Members, Business Analysts and Developers

These individuals shall use NERVE for:

- Participating in discussions.
- Keeping informed on issues of importance.
- Providing details for tenders of off shore clients.
- Deliberating and proposing bids.

3.4.1.4 Clients

- Tracking projects direction of progress
- Providing project requirements and expectations.
- Participating in discussions.

3.4.1.5 Constraints

- Technical Limitations
- Interfaces to other applications
- Safety and Security Considerations
- Criticality of the application

3.5 ASSUMPTIONS AND DEPENDENCIES

We assume that the systems that would be using our application shall have internet connectivity and a browser to support web pages.

3.6 APPORTIONING OF REQUIREMENTS

We shall make this application workable on hand held devices for the next phase of project NERVE.

3.6.1 Specific Requirements

3.6.1.1 Main Deliverables

The following are the major deliverables that shall comprise of project NERVE

Software Requirement Specification (SRS)

Project creation and management module

- CVS file management system for project documents
- Uploading project documents e.g. project charter, SRS etc.
- Creating project detail
- Project task breakdown: WBS management (creation and modification)
- WBS representation in parent child relationship
- Client information
- Modifying project/ client information
- Assigning of project managers, developers, and WBS owners

Discussion Board module

- Add/create topics to specified projects
- Post messages

Bidding for tenders process automation modue

- Upload documents
- Search Archives

- Maintain feedback

Resource Pool Management Module

- Listing of all the resources that are assigned to the WBS / subtasks of project.
- Information such as allocated time, cost of resource allocated etc.
- An automated Gantt Charts module
- Change Request Forms module
- Tested and running web based application
- Test documentations and reports
- Documentations
    - i) Design documentation
    - ii) User Manuals

Coding Modules that shall be developed by M. Usman Piracha are

- Project creation, management and monitoring module
- Discussion Board module
- Bidding process automation module

The coding modules to be prepared my Ms. Akefa Zaidi are the following:

- An automated Gantt Charts module
- Change Request Forms module
- Resource pool management module

We shall provide a prototype of our application and its complete documentation as the final deliverable

3.7 DESCRIPTION TO M. USMAN PIRACHA'S MODULES

3.7.1 Module 1: The Project Module

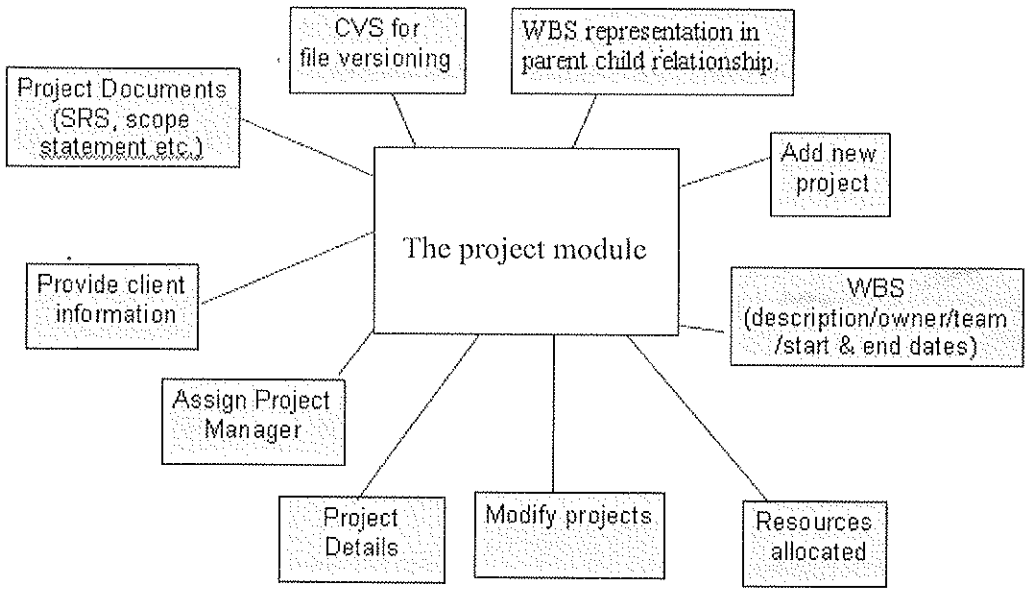

Figure 3.1: The Project Module

3.7.1.2 Introduction

This module is perhaps one of the most critical and important. The reason being that the important modules of change request, resources and Gantt Charts are all off shoots from this project module. The project manger shall handle the creation of the project the modification of its detail, the WBS allocation, its modification and

its representation as essential functionalities. Client information shall also be maintained here.

3.7.1.3 Description of Functionalities

3.7.1.4 Adding a project

The project has to be provided a specific id and name with which it would be identified. Other that this details such as project start date, predicted end date, client name and other important information is provided.

3.7.1.5 WBS development

3.7.1.5.1 Introduction

The work breakdown structure divides the overall project into modules to have a greater control over the system. This is done for the sole purpose to identify the total resources required for the project and to classify the amount of time to be spent on each module/task.

3.7.1.5.2 Associated Functional Requirements

- **Approach**

The WBS is developed in either of the two modes by phase or by product. According to which the WBS is formulated. It follows a predefined but customizable template/form according to which the WBS is elaborated and further detailed into sub tasks. The template is then filled in by the Project Manager depending on a particular approach.

- **Objective**

Before initiating any project the methodology is improved upon by the Project Manager, whether basing their decision on the some similar projects employed in the past or on as figured necessary by the Program Manager.

- **Team Lead**

A team lead is assigned for each sub task or module and the various team members are then assigned depending on their particular level of expertise and skill set in the particular situation.

- **Start end date**

Since the WBS has been assigned a certain task force therefore keeping in mind their skills and expertise the start and end date of the WBS according to the availability of the resource is assigned.

- **Deliverables**

The specific deliverables to be produced at the end of each module to be submitted as an input to the next activity are also to be catered for.

- **WBS completion**

A WBS completion form is then filled automatically with some comments by the Project Manager and is reviewed at the completion of each module.

- **Status Check**

The current status of the WBS as to the partially completed activities and the status verification of the remaining/pending activities can be reviewed by the authorized personnel any time with the help of the Gantt Charts.

- **Representation**

The WBS shall be represented in the intended structure that depicts the parent child relationships between the WBS. The user may select a WBS and view its details. He/ she may also modify them when he pleases.

3.7.1.5.3 Project Modification / View Functionality

This functionality aims to provide the user the ability to handle the flexibility in making relevant changes and updations. The Structure, task division or any other related project information can be updated as needed.

3.7.1.5.4 Client Information

The client information is essential to record when a project is initiated. This information can be searched and extracted for viewing or modification

3.7.1.5.5 The CVS

The CVS is a file and document management system. This is the core idea around which the paperless environment can be ensured. All files are maintained in a uniform fashion and redundancy and duplication within documents is eliminated.

3.7.2 Module 2: Discussion Board

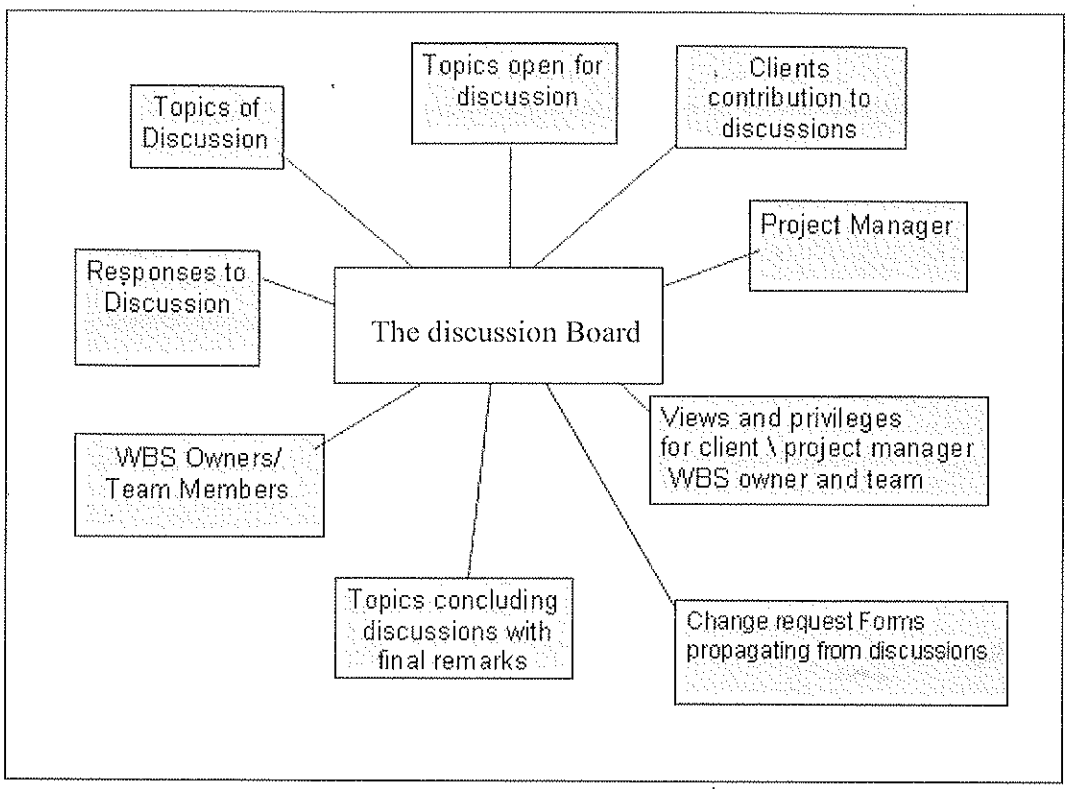

Figure 3.2: Discussion Board

3.7.3 Introduction

The discussion board is an essential part of NERVE. This is the central area from where the useful interactions between the client and the development team propagates. These discussions are useful from the point of better understanding the clients requirements, propagating new ideas/changes and keeping the project in track and on focus.

3.7.4 Description of Functionalities

3.7.4.1 Management of Discussion Board Modules

The discussion boards shall be managed by the project manger / or any moderator and shall be launched at the start of every project and shall continue till

the end of it. This provides a platform for important idea sharing and brain storming. The conclusions of different discussions can be propagated to all concerned parties. All discussions shall take place within the topics of a project.

- **Topics**

Topics can be related to risks, the WBS or any other material and important information can be propagated effectively and efficiently.People who can introduce topics on the discussion boards are the clients, the project manager or the WBS owner (moderators). Other than these any other concerned individual may be assigned the "moderator" status as well.

- **Status management of potential contributors**

The status of a user can be changed from "ordinary" to discussion board's "moderator" if his participation requires a more active role in the discussions.

- **Participation of the Off-shore client**

The off shore client participates with the development team and gets a complete picture of the project. Therefore the participation of this off shore client helps to bridge the communication gap and thus the off shore client stays interactive. Some discussions shall end with the need of a change request form. Thus the change shall be notified to the project manager by the WBS owner and the impact of the change is sent to all the WBS owners affected.

3.7.5 Module 3: Bidding

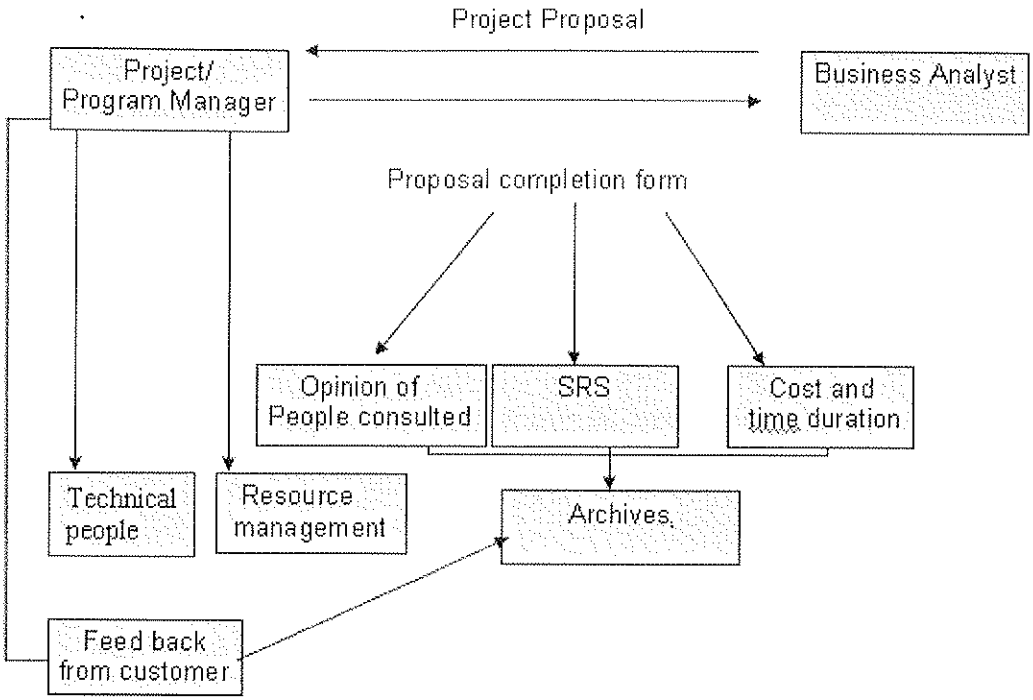

Figure 3.3: Bidding

3.7.5.1 Introduction

The Bidding for Tenders module is an effective way to maintain the trends of the market and to analyze the position of the software company with respect to its competitors. The business analyst, who is a representative of the software company in an off shore base presents the home staff with details of potential projects that need to be developed for clients and are open for bidding. Documents provided are uploaded and pondered upon by the management team and other experienced individuals of the software company. Eventually an amount shall be set as the bid on which the project may be created. This information is saved in forms and by uploading the respective documents.

Whether or not the bid is successful, all information is archived and including that of the successful bidder. This archived data helps to better understand the market trends for future bids.

3.7.5.2 Description of Functionalities

3.7.5.2.1 Saving bid detail

The Business Analyst informs of a potential bid. This information is stored in forms and necessary documents such as the project charter are uploaded. The project manager interacts with the people of importance such as the technical staff and the management to gauge the level of the project and to generate a reasonable bid.

3.7.5.2.2 Feedback Forms and Archives

The proposal completion document is sent out to the Business Analyst (by uploading it) who interacts with the off shore client on its basis. The program manager takes and records the feed back of the customer even if the bidding is not successful so that an archive can be created to learn from experience and shortcomings.

3.8 CONCLUSION

It is observed that the modules that need to be developed are extremely essential foundation of the project NERVE. This is because the complete management and archiving is being done here.

Chapter 4

ARCHITECTURE AND SYSTEM DESIGN

4.1 DFD's OF NERVE (DFD 0)

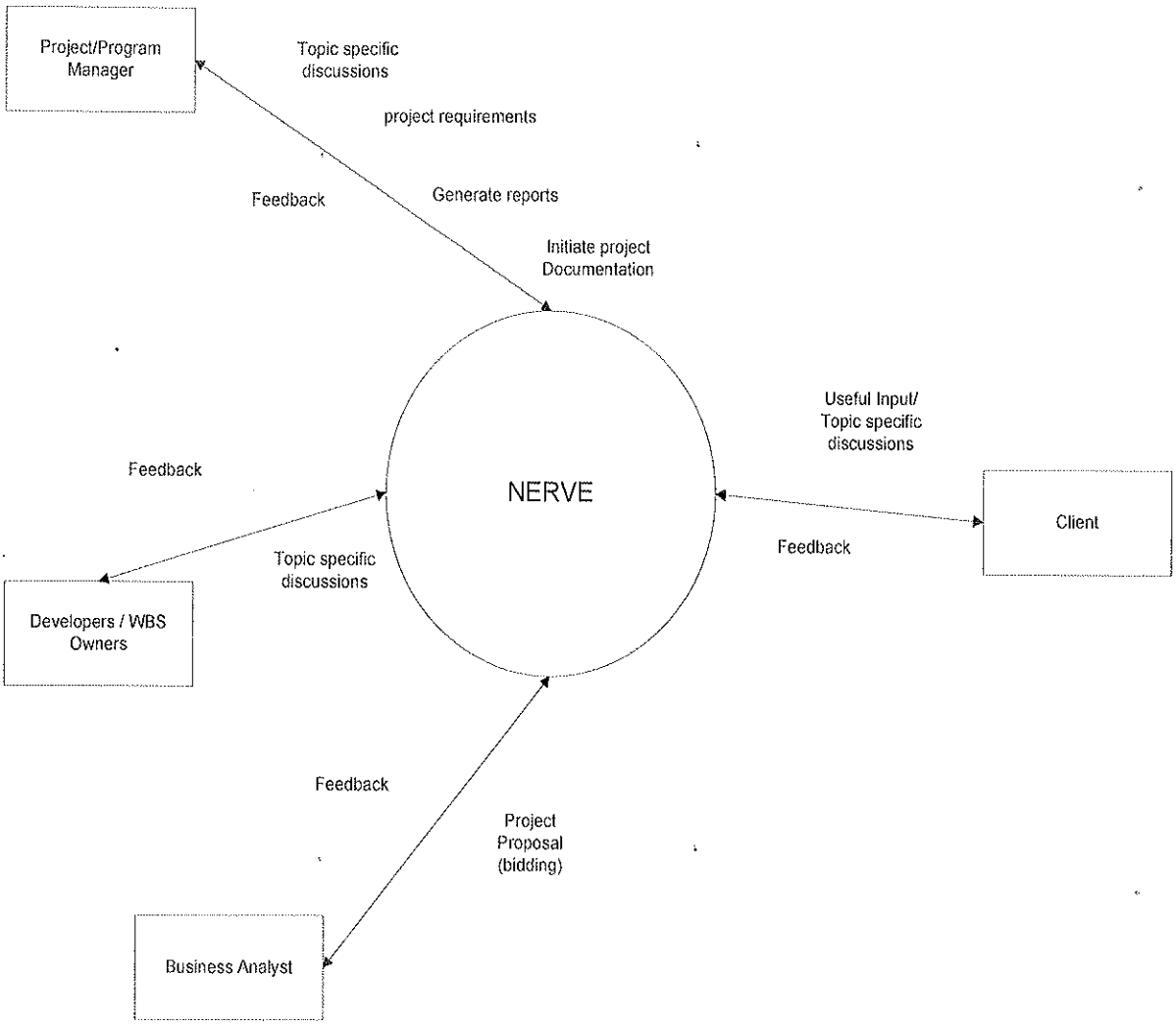

Figure 4.1: DFD 0 of NERVE

4.1.1 Description

The figure above describes the project NERVE and the external entities that interact with it. These include entities from both within as well as outside the organization

4.1.2 DFD 1 Nerve

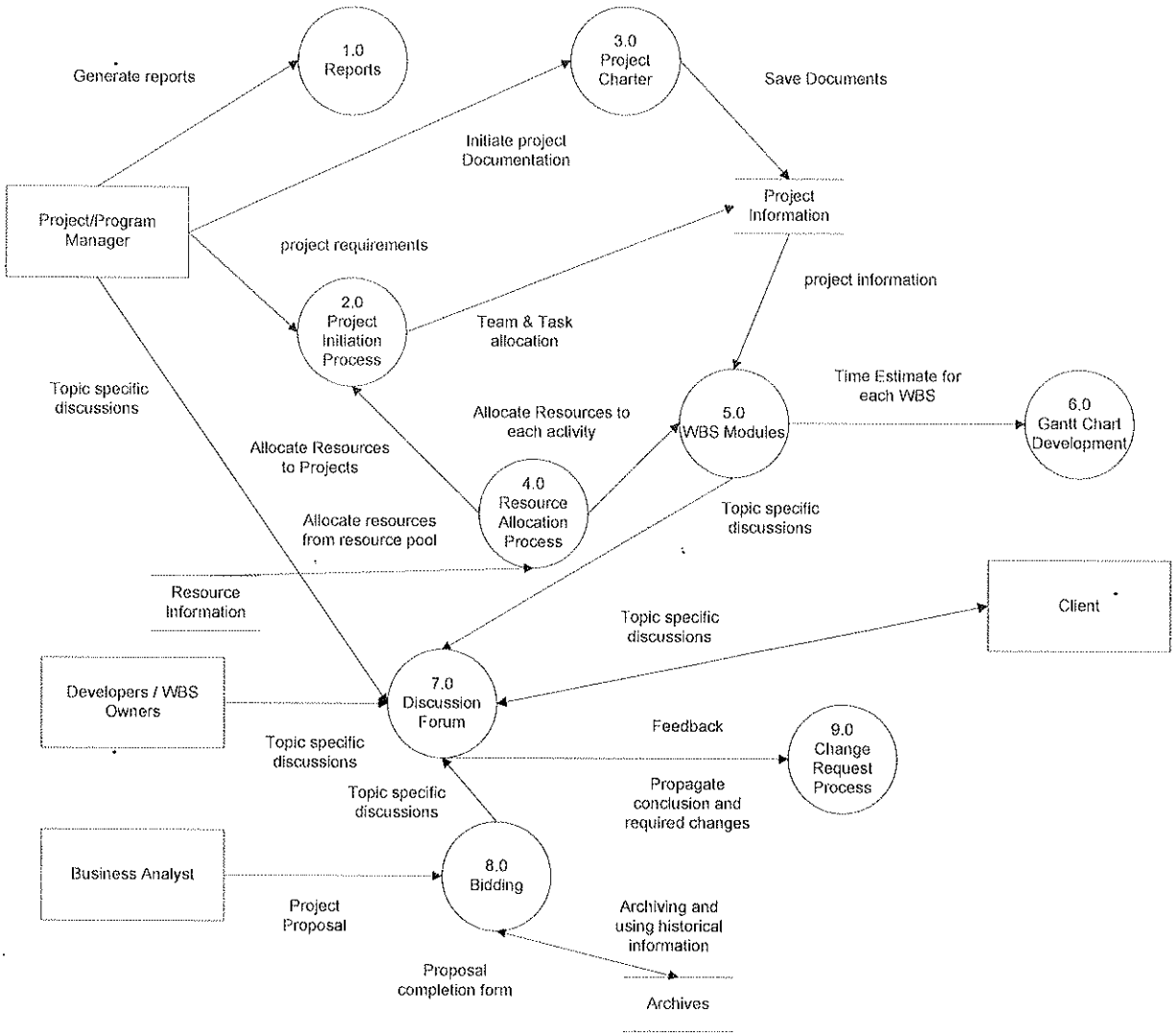

Figure 4.2: DFD 1 of NERVE

4.1.3 Description

The figure above i.e. the DFD 1 of NERVE is a complete explanation of the major processes that are possessed by the tool. As you will see these processes have been further defined below.

4.1.4 DFD 2 Project Development Process

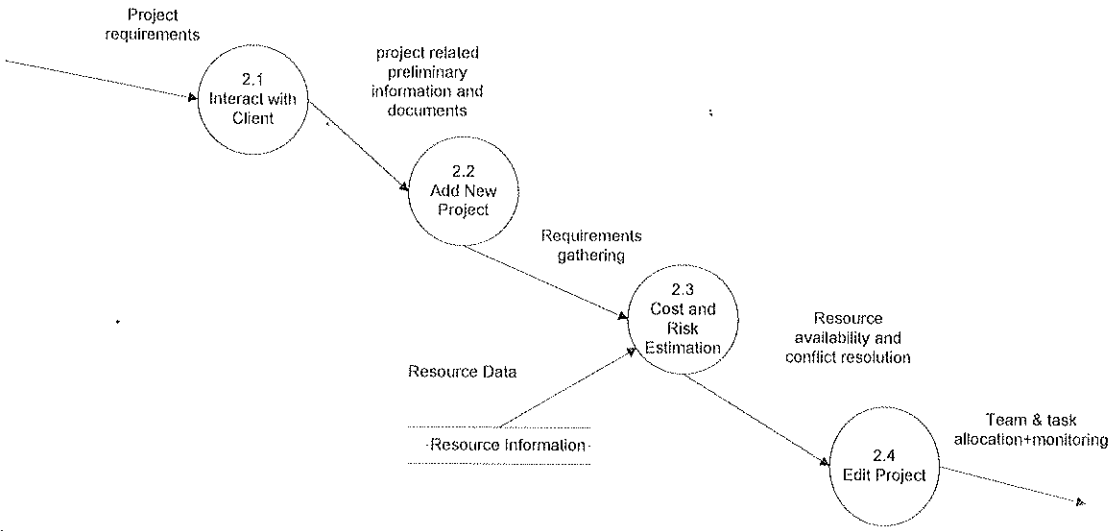

Figure 4.3: DFD 2 – Project Development Process

4.1.5 Description

The project development process has been defined completely from the start until the end. The interaction with client is essential for making the right kind of judgments. The tasks that are finally broken down are allocated to the development team. This module is very important in itself as it bears the responsibility of the complete project management. However the automation of the module can be furthered.

4.1.6 DFD 2 Discussion Forum

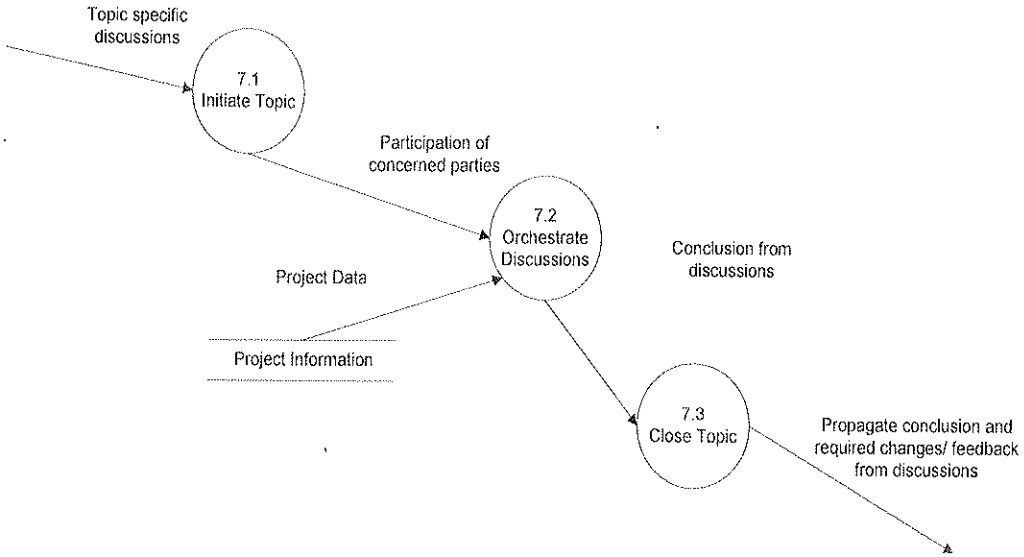

Figure 4.4: DFD 2 – Discussion Forum

4.1.7 Description

The discussion forum starts from the initiation of a topic and ends with the conclusion of the topic. The conclusion could result in the triggering of further changes that may be needed as well as any other notifications to the team or members associated.

4.1.8 DFD 2 Bidding (Tenders and Proposals)

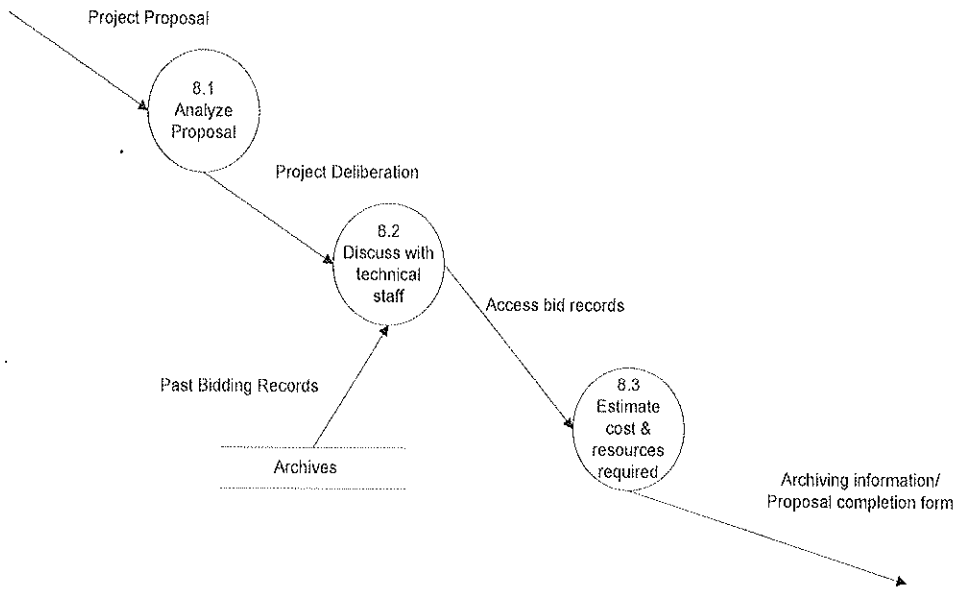

Figure 4.5: DFD 2 – Bidding (Tenders and proposals)

4.1.9 Description

The bidding module aids in contesting for tenders maturely with time. Thus effective record keeping and archiving are extremely essential.

4.2 CONCLUSION

We could implement NERVE as a desktop application to run on the systems of the associated users of NERVE. However, communication and information sharing (in the forms of views available and discussion boards) would not be possible to share and achieve.

Secondly, this way we would fail to centralize the information.The solution NERVE represents is a tool that should have a client server approach to enable effective communication, information flow and authentication mechanisms.

Chapter 5

IMPLENMENTATION AND TESTING

5.1 INTRODUCTION

This part of the report covers the implementation details of NERVE. It defines the various views according to which the software would be used. It follows a step by step procedure as to the working of the entire project and would define how to navigate through the project. NERVE is developed on the .NET Framework on a Windows Operating System with a backend SQL Server 2000 Database.

5.2 SYSTEM REQUIREMENTS

In order to run the project NERVE, we need to install and run the IIS (Internet Information Service) before installing the Microsoft .NET Compact Framework. Then the Database Server in this case being SQL Server 2000 is installed. The project need only run on Microsoft Windows as is the basis of any Compact Framework application.

5.3 GRAPHICAL USER INTERFACE

5.3.1 GUI Properties

The GUI developed for NERVE has been made as user friendly as possible. The properties of the interface are as follows

- Intuitive
- Responsive
- Simplicity
- Consistency

5.3.2 User Control

Users are given maximum control over the entire project. Through configuration the users can exercise the flexibility in the project.

5.4 MAIN INTERFACE

There are different views defined in the project thereby NERVE starts with a login page. Access Privileges have been set and depending on the login the view of particular user is defined.

5.5 LOGIN PAGE

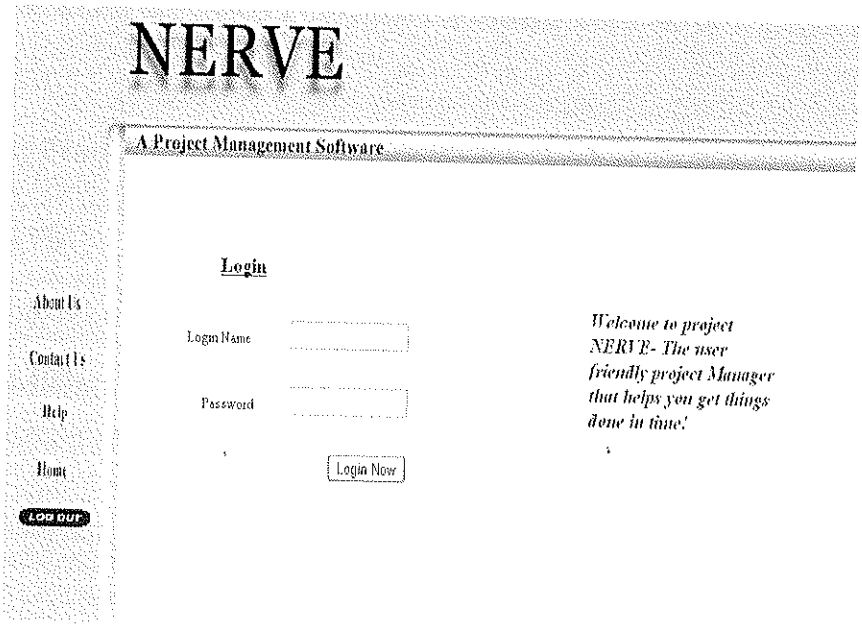

Figure 5.1: The Login Page

The login page provides authorized access into the system. The user enters its login name and password, depending upon which the appropriate view is generated. Thereby providing controlled access into the system. There are two primary views into the system. One of the "moderator" and the other of the "ordinary" user. If the login is successful, the user is taken to the main page.

5.6 THE PROJECT MANAGEMENT MODULE

The Project Management page provides links to the following essential utilities:

- Add new Project
- Modify Existing Project
- Add new Client
- Update Client Information
- This is where the project information is entered when the new project has to be initiated.

5.6.1 Key Features from this Module

5.6.1.1 DVS

The DVS (also referred to as the CVS), the Document version management system shall be needed when adding, or modifying project details.

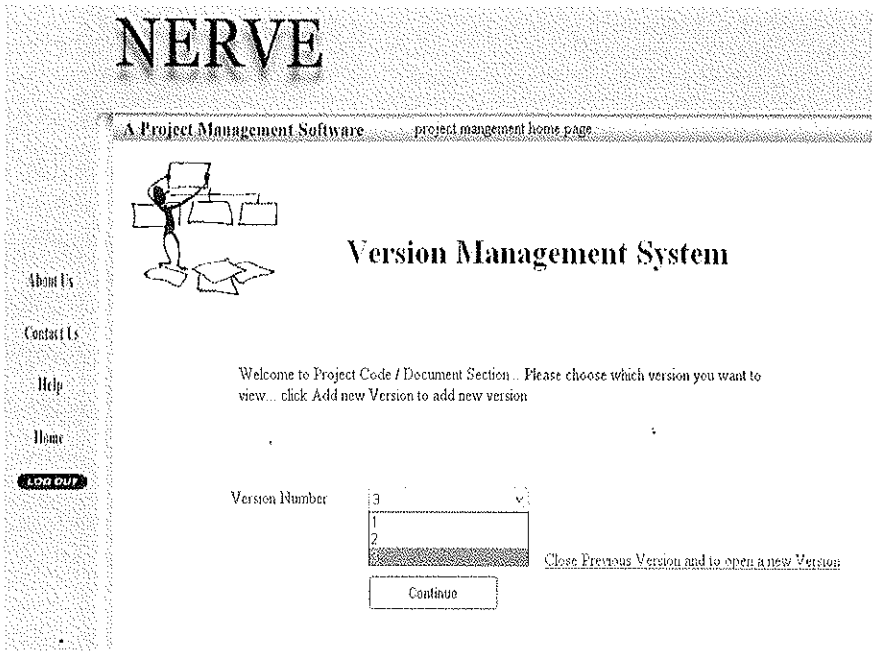

Figure 5.2: The DVS

The Version Management System helps to maintain files in a uniform manner. It works on the principle of CVS. The main attributes of this functionality are:

- **Documentation Management**

Create updated versions with previous versions as well and cater for duplication of documents in new versions

Keep new version most updated by storing unchanged documents from previous *versions* as well as replacing old ones and / or adding new *documents.*

- **Downloading Files**

DVS provides the functionality to download files for future reference and the save them if needed.

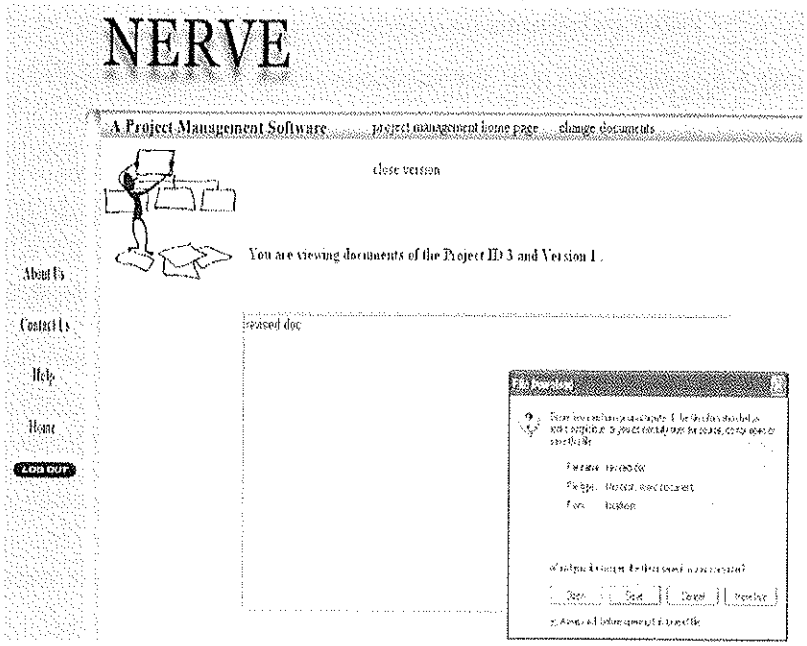

Figure 5.3: View & download files using DVS

5.6.1.2 WBS views

The WBS views are an essential part of the view / modify project details functionality.

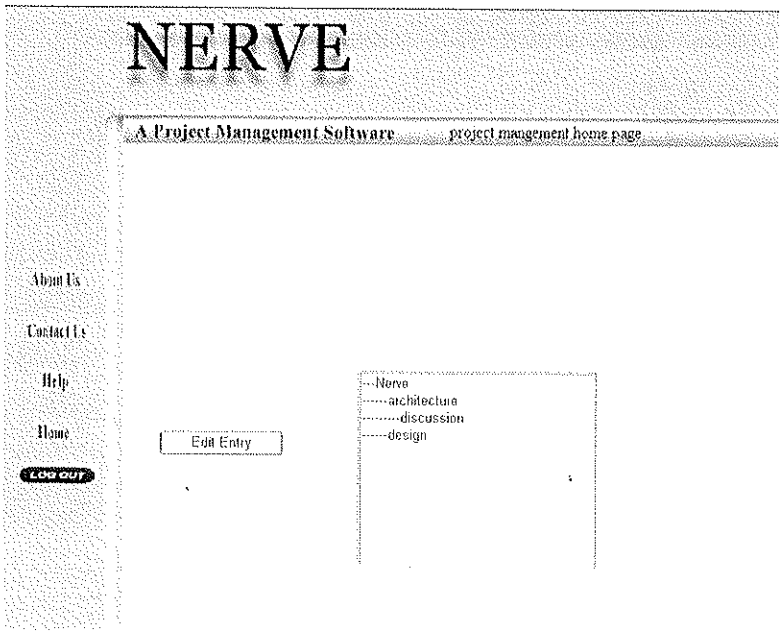

Figure 5.4: Viewing and modifying WBS

The WBS are created as the modules and sub modules of the entire project. These WBS are created by specifying their particular information such as the tasks included, the WBS owner, etc.

These WBS can be accessed and modified as the project progresses. To provide ease of use and a user friendly view, the WBS shall be listed in a graphical format so that their place in the project development and their sub/parent modules are visible.

5.6.1.3 Storing and Retrieving Client Information

The client information is essential and shall be provided every time a new project is initiated. Thus the client information may be stored, retrieved or modified when ever needed.

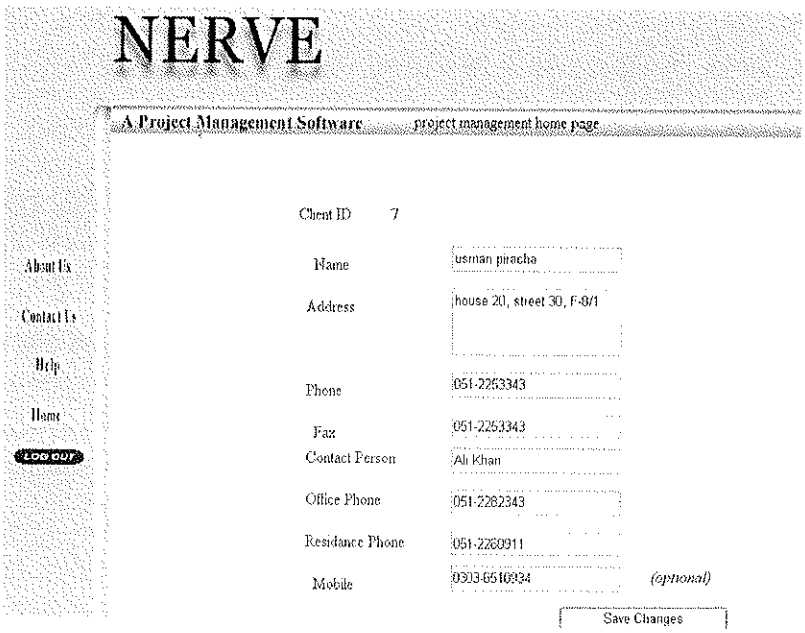

Figure 5.5: Storing and retrieving client information

5.7 THE DISCUSSION BOARD MODULE

- This discussion board has the following essential utilities:
- Add topic
- Add user
- Change User Privileges
- Post messages
- View Discussions on topics
- Prompts on new topic added.

5.7.1 Key Feature of this Module

5.7.1.2 Project Discussion Board Management

The project discussion board management lists the projects that have been initiated. Maintains their respective topics and details / updates the messages posted for each topic. Prompts are initiated whenever a new topic is added so that the concerned parties of a project may view it.

Every individual with respect to his or her privileges can contribute to the project. This is very essential as we know that software projects require explicit interaction and communication needs to be shared and disseminated effectively.

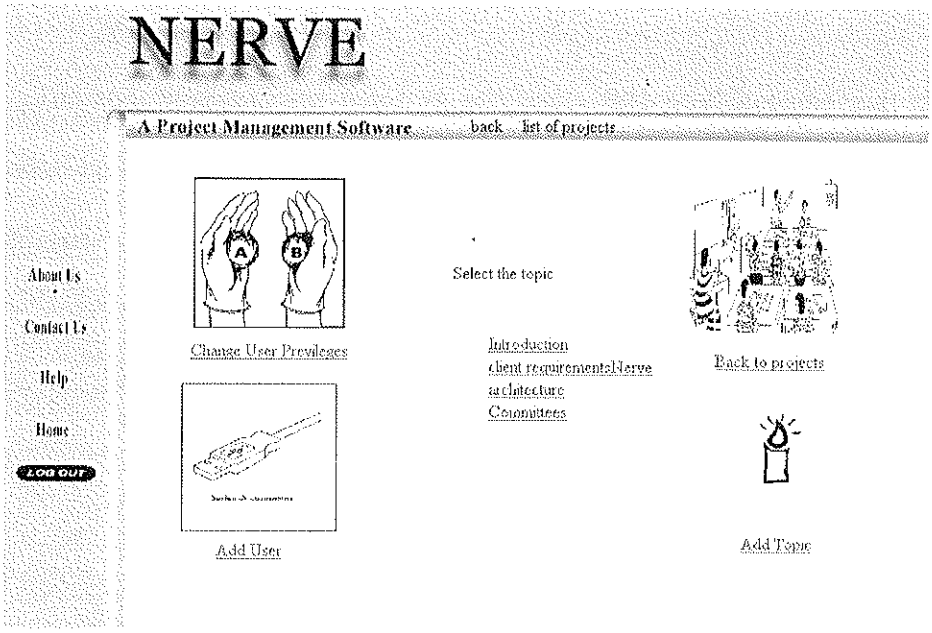

Figure 5.6: View of Discussion Board module

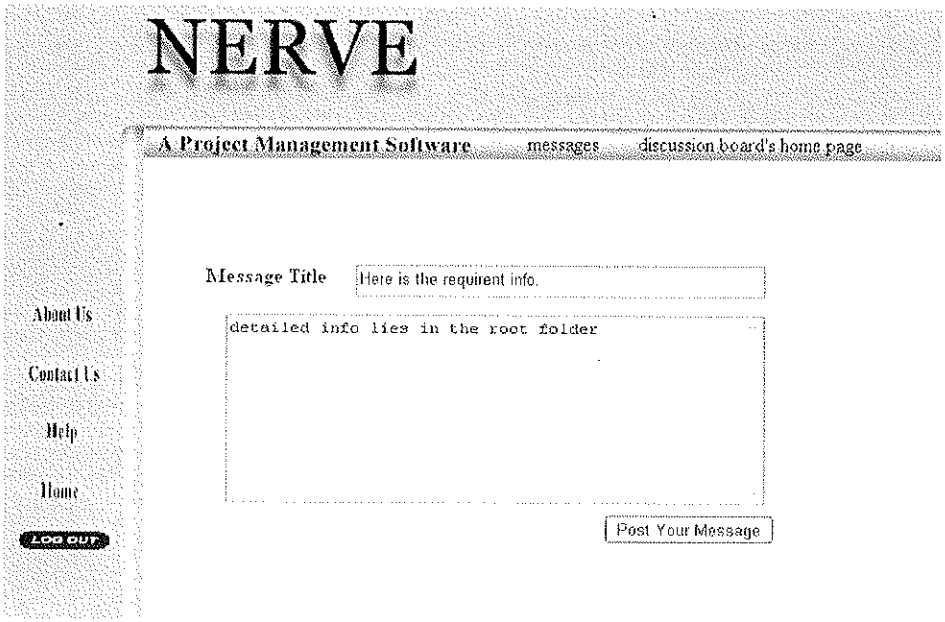

Figure 5.7: Message posting

5.7.1.3 User Management

The user management helps to add users that shall become part of the discussion board and/or the users of the complete project NERVE tool. There are two categories of users. i.e. the moderators or the ordinary users. The moderators have a broader and extended view of the complete project as well as the rights to use the utilities provided by this tool. Secondly, the privileges of the users may be changed from ordinary to moderator.

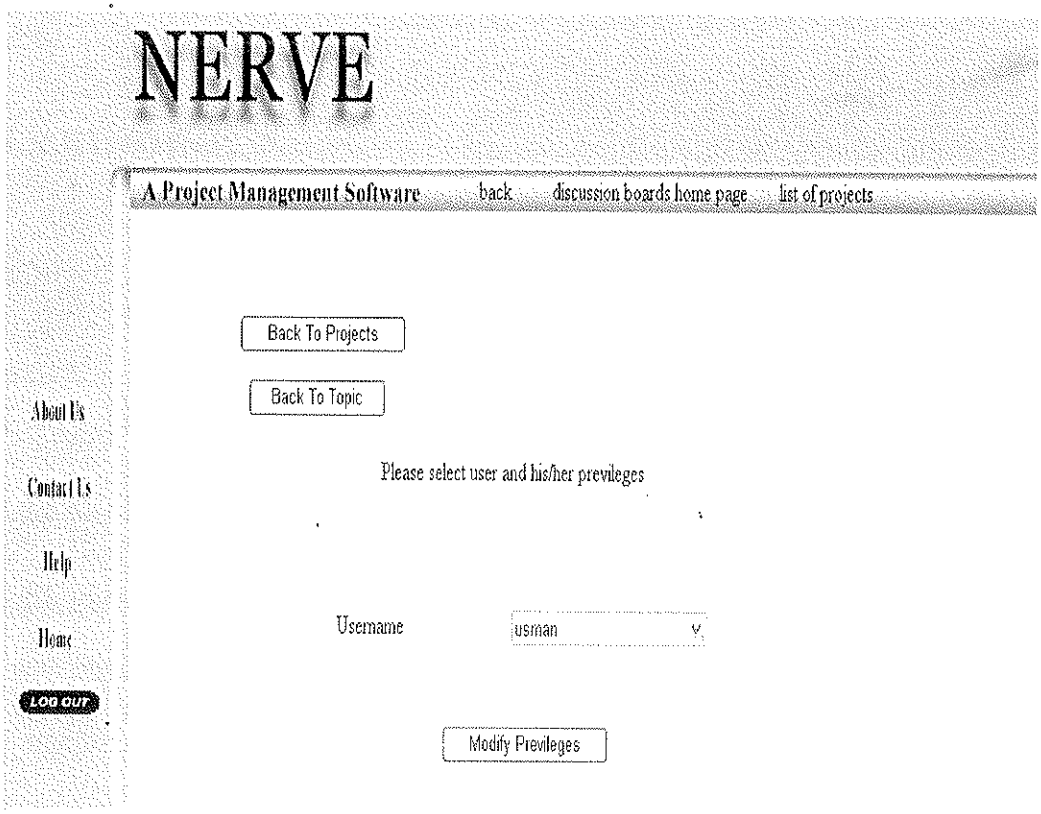

Figure 5.8: Modifying user privileges

- **The Moderator**

The moderator has access to the complete project module. He can view different projects, take part in discussions and search archives for past records. This view shall be exclusive for top level management.

- **The Ordinary User**

This view is reserved for clients and team members. They can take part in discussions via the discussion board. The ordinary user can be upgraded to the level of the moderator if the need be.

5.8 BIDDING

This module has the following functionalities.

- Bid detail
- Search Archives
- Feed Back form

5.8.1 Key features of this module

5.8.1.1 Maintaining Archival data

This aspect is very essential for the company that bids for tenders and needs to mature with time. All documents as well as other critical information is stored so that future bids are more successful keeping in mind the trends from the current and past experiences. Bids can be searched according to their category or name.

Whether or not a bid is successful, the feedback from the client is maintained so that the area may be identified where the company may lack. Similarly, the successful bidders detail is also saved.

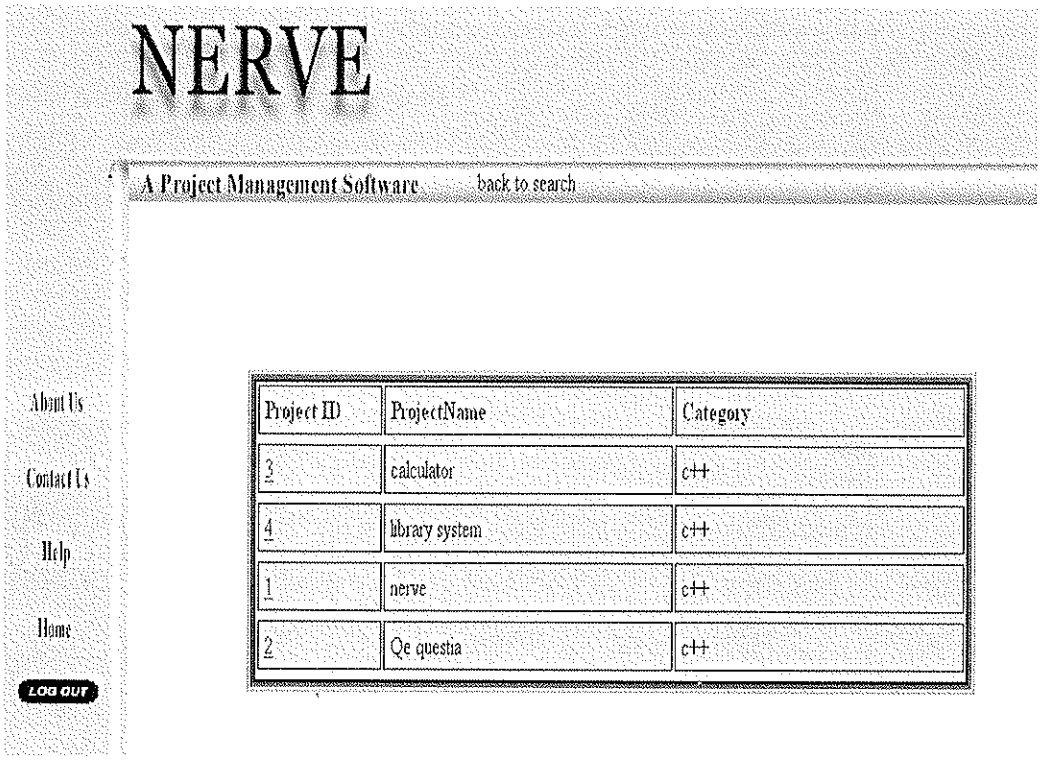

Figure 5.9: Accessing archived data

5.8.1.2 Uploading needed documents

Relevant documents such as project proposals etc. shall be uploaded for deliberation as well as future reference.

5.9 TEST CASES

5.9.1 General Tests

Test Case 01

PROJECT: NERVE

MODULE: Authenticated Login

FORM REF: Authentication

FUNCTIONAL SPECIFICATION: User Authentication

TEST OBJECTIVE: To check whether the user entered correct login and password.

PREPARED BY:M. Usman Piracha

Table 5.1: Tests and their respective outcomes

STEPS	Enter username and press login button	Enter password and press login button	Enter correct username and password and press login button	Enter correct username and password and press login button
DATA / ACTION	Username= usman	Password= usman	Username= usman Password= usman	Username= afnan Password= afnan
EXPECTED RESULTS	Should display warning message "please enter login name"	Should display warning message "incorrect password "	Should navigate to the "main.aspx" page	Should navigate to the "main.aspx" page
ACTUAL RESULTS	Displays warning message "Please enter login name"	Displays warning message "incorrect password"	Navigates to the "main.aspx" page	Navigates to the "main.aspx" page

5.9.2 Tests of the Discussion Board Module

Test Case 02

PROJECT: NERVE

MODULE: Discussion Board.

FORM REF: Accessing a topic & posting a message Test.

FUNCTIONAL SPECIFICATION: Posting a new message on a topic.

TEST OBJECTIVE: To check whether a topic is accessible

TEST DATA: Message text and title about a topic.

Table 5.2: Tests for the Discussion Board Module

STEPS	Select a project from the list of projects.	Select a topic from the list of topics	Provide no message title	Provide message title and message text
DATA / ACTION	Username= usman	Password= usman	Username= usman Password= usman	Username= afnan Password= afnan
EXPECTED RESULTS	Should navigate to the "select_topic. aspx" page.	Should navigate to the "discussion.as px" page.	Should display error message "enter message title"	Should display message "message posted"
ACTUAL RESULTS	Navigates to the "select_topic. aspx" page.	Navigates to the "discussion.as px" page.	Displays error message "enter message title"	displays message "message posted"

5.9.3 Test Case 03

PROJECT: NERVE

MODULE: Discussion Board.

FORM REF: Posting new topic test.

FUNCTIONAL SPECIFICATION: Posting a new message on a topic.

TEST OBJECTIVE: To check whether a topic is added to the discussion board of the project.

PREPARED BY: M. Usman Piracha

TEST DATA: Topic name

Table 5.3: Tests for checking the behavior of add topic

STEPS	Select a project from the list of projects.	Adding a new topic	Provide no topic name	Provide topic name
DATA / ACTION	Project Name= nerve	Click Link="new topic"	Topic Name=N/A	Topic Name=latest details
EXPECTED RESULTS	Should navigate to the "select_topic.aspx" page.	Should navigate to the "discussion.aspx" page.	Should display error message "enter message title"	Should display message "new topic has been added"
ACTUAL RESULTS	Navigates to the "select_topic.aspx" page.	Navigates to the "discussion.aspx" page.	Displays error message "enter message title"	Displays message "new topic has been added"

5.9.3 Tests of the Bidding for Tenders Module

Test Case 04

PROJECT: NERVE

MODULE: Bidding for Tenders

FORM REF: Test for archives functionality.

FUNCTIONAL SPECIFICATION: Search and open archived bid's detail.

TEST OBJECTIVE: To validate the archive mechanism by retrieving historical records of previous bids.

TEST DATA: Bid's data

Table 5.4: Bidding module: behavior and outcomes

STEPS	Select a bid from the search archives	Select the project	Download document
DATA / ACTION	Project Name= nerve Category=C++ Project ID=1	Click project ID	Click the link for downloading the document
EXPECTED RESULTS	Should show the results of the query	Should show details of the bid including the documents uploaded.	Should display the contents of the document
ACTUAL RESULTS	Results of the query are shown.	Shows details of the bid with a link to download the related documents.	Contents of the document are shown

5.10 CONCLUSION

It is observed that the modules that need to be developed are extremely essential foundation of the project NERVE. This is because the complete management and archiving is being done here. The test results complement their working.

Chapter 6

CONCLUSION

6.1 CONCLUSION

IT projects have poor track records. Each year a considerable number of projects are abandoned, proving unsuccessful. CHAOS a Standish Group cited that only 16.2% of IT projects are successful. In spite of the terrible record however the world as a whole spends nearly $10 trillion of its $40.7 trillion gross product on projects of all kinds. The percentage ratio of software project failures has been found to decrease steadily as a result of the wide spread use of an emerging profession termed as software project management.

Therefore NERVE has been implemented for streamlining the otherwise chaotic project management techniques. The 9 knowledge areas defined by PMBOK a widely renowned industry standard are automated to some extent in NERVE. It aims to assist Project and Program Managers in their quest to successfully and effectively manage a project, in doing so increasing the products chance to be a ground breaking success.

Also being the first of its kind to promote offshore development. It's not focused solely on the local market but has worked to the advantage of the various constraints faced in the process of communication and synchronization of the project management procedures followed in offshore developments. It builds up on the discrepancies in the current products deployed in the market.

The intent is the result of a paperless environment so that managing and maintaining records and logs of the current workings in any local or international software developments could be established.

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