A Basic Prototype for Enterprise Level Project Management

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Abstract— **Project management system which we have proposed is a network based Enterprise Project Management (EPM) system, it can be configured and customized for the organization, unlike a web-based application which would have to have a generalized scheme with minimum customization. Being a network application we will still be able to use the network based software technologies which are used in web based applications and which help make web applications faster and better like XML, AJAX, JavaScript, etc. While using J2EE to make the connected components communicate faster (response time is reduced), make the system scalable allowing multiple simultaneous access. It involves features such as requirement analysis, allocation of the resources, project designing and its planning followed by scheduling and also responsible for managing the cost and the system administration which can handle complex projects. The system was implemented on an enterprise scale where many users simultaneously access the system and also insert and retrieve information; security is also provided so that misuse does not occur. Enterprise Project Management (EPM) is responsible for developing an organization that processes the integral management and adapting to the changes of a transformation.**

*Index Terms—***content management, project management, J2EE, web programming**

I. INTRODUCTION

Project management has been practiced since early civilization. Previously creative architects, engineers or builders were used to managing the civil engineering projects. Project Management has been developed from various fields of applications such as defense, construction, civil engineering projects. The Henry Gantt called the father of planning and control techniques. He used the Gantt chart as a project management tool; and Henri Fayol has created the 5 management functions which have formed the base of project and program management. His work is the foundation for modern project management tools including work breakdown structure (WBS) and resource allocation. There are various approaches to successfully complete a project.

Some of the highlights of the requirement gathering phase included:

- Collecting project management ideas.
- Analyzing the requirements of customers.
- proposed solutions for project and justify it.

- Submitting the proposal request of the project.
- Forming the team for Project management.
- Preparing the document for requirements.

. In "Enterprise Project Management System", all the information (functionalities) regarding

- Project Details
- Project List
- Archived Project
- Resource Management
- Scheduling
- Deadlines
- Memo
- Estimation Calculations
- User Communications

is accounted for and implemented.

II. EXISTING TECHNOLOGY

There are many project management tools like Microsoft Project [2] (MSP, MSOP or WinProj). After having analyzed and tested them over a period of time there were some key points noted about them

Drawbacks:

1. MS Project is incapable to solve the production related problems in available material. Additional software is required to manage a complex activity that produces physical goods.

2. It is also in most cases individual system software. It works on the individual system and later the data can be consolidated onto a server and database (using MS Office Project Server).

3. It does not have a message passing system for the members of a project to communicate with each-other.

4. It is propriety software and a license is needed to be procured for its usage

5. No archives of project is available, it only handles current projects.

So considering the above points we added more features in designing and developing our framework.

III. DESIGN

The idea of our project is to implement a management system framework [1] on the enterprise level for managing all

the projects which are being done by the organization. The system constitutes of a relational database for storage of the data. A relational database has been chosen on the basis of the fact that it is easier to insert, update and manage a relational database especially when it comes to data which has relevance to its different sub-parts and it also provides us a lot of functionalities like joins, foreign key and surrogate key. The RDBMS manages the relational database. The system is implemented over a network name as it is for a particular organization. We created a web server (web server provides service by sending the requested pages over the network to the requesting client) for servicing the requests of the clients over the networks. The idea behind using a web browser is that we would also be using web technology like HTML, AJAX, etc, for the various dynamic needs like session tracking, dynamic redirection   etc. There are two users participating in the system:- Employees & Managers

The employee uses actions to interact with the system, some of the important actions are
- View Project List
- View Project
- View Schedule
- View Deadline
- View Sent/Received Memos
- Perform communication (chat, forum or e- mail)

The manager uses actions to interact with the system, some of the important actions are
- Add/Update/View Project List
- Add/Update/Delete/View Project
- Add/Update/Delete/View Schedules
- Resource Management
- Create Memos
- View Sent/Received Memos
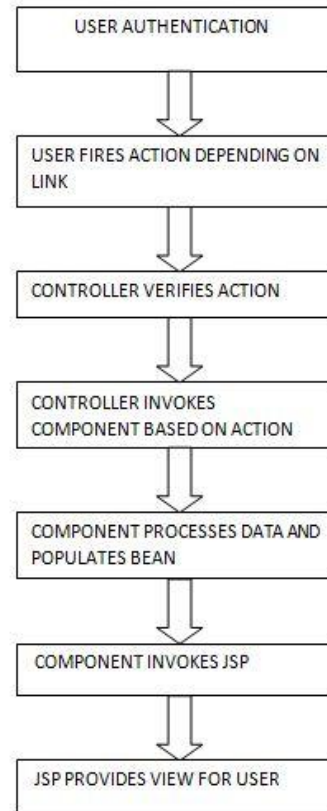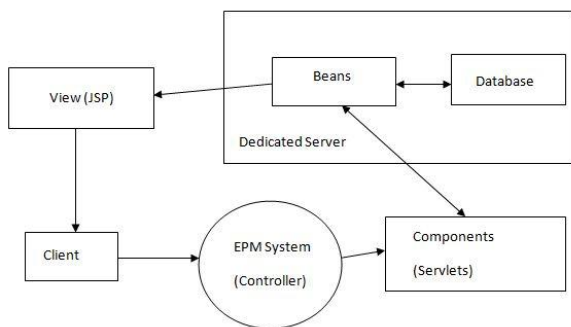- Perform communication (chat, forum or e- mail)

Fig 1. System Framework

Because the efficient design the system is highly flexible in terms of addition or updating of functionalities and security aspects.
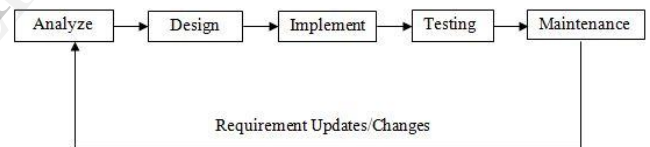

Fig 2. General Workflow

Fig 3. Application Life Cycle

The application design is such that it is able to facilitate the changes and updates as the requirements keep on changing over the period of time. The key aspect is the framework that allows this provision.

IV. IMPLEMENTATION

The entire system was developed on Java technology [3] [5] which is platform independent and very economic hence suitable for all kinds of enterprises.

Ajax [4] is a web development tool used on the client-side to create web applications asynchronously. With Ajax, without interfering with the display and behavior of the existing page web applications can send data to and retrieve data from a server asynchronously.The object XMLHttpRequest is used to send and receive data.

AJAX is based on internet standards, and uses a combination of:
- The object XMLHttpRequest is used to exchange data asynchronously with a server.
- JavaScript/DOM object is used to display/interact with the information.
- CSS is used to style the data.

• XML is often used for transferring data among Incorporated Technologies.

• HTML (or XHTML) and CSS for presentation.

• The Document Object Model (DOM) for dynamic display of and interaction with data

• XML for the interchange of data and XSLT for its manipulation.

• The XMLHttpResponse object for asynchronous communication

• JavaScript is used to bring these technologies together.

A servlet is a Java programming language class used to enhance the functionalities of servers that accesses the application via a request-response programming model. Servlets can commonly respond to applications hosted by Web servers. Java Applet that runs on a server instead of a browser. MySQL [6] is the Relational database management system (RDBMS) that provides multi-user access to a number of databases runs as a server.

JavaServer Pages (JSP) is a technology that helps to generate web pages dynamically based on HTML, XML, or other document types. A web server compatible with servlet container is required to deploy and run the program. The servlet container must support JavaServer Pages (JSP) specifications and the JCP (Java Community Process) and Servlet. Apache Tomcat is a widely used servlet container/web server.

Testing is an application which is very important for success of application. Testing focuses on testing fundamentals including test plans, test procedure. Developers & users should participate in testing.

In early development of life cycle of project we start partial testing procedure in which we analyze for various datatypes & their capabilities. Then during system design we check response of different form with each other & their compatibility with advanced datatypes & query processing. Then in early development of source code, we keep on checking how the database is behaving with jsp forms. We check all the fields for proper & expected value where there was bug we make changes in coding & perform cycle procedure during system testing like we follow in development of project.

TABLE I. TEST CASES

No.	Test Case	Input	Expected Result	Actual Result	Pass or Fail
1.	User Login	Employee Number, Employee Name, Password	User relevant URL should be displayed	Relevant URL's displayed	✓
2.	User Clicks a link and initiates action	Link click with or without input	Session should be verified. Relevant servlet should be invoked and jsp should generate user relevant view	Session is verified. Relevant servlet is invoked and view is generated	✓
3.	User input is required	User preference Input	If input is not there then user is prompted to give an input, process waits till input is given	Input is prompted, process is stopped till input is received	✓
4.	Database Update and Insert	User data Input	All fields are filled verification All discrepancies with database records are to be checked and proper prompts given to user	All fields are verified, User is given proper prompts	✓
5.	Date entries	User Input	Date discrepancies are checked and user should be prompted to rectify them	Discrepancies are checked and user is properly prompted	✓
6.	User Queries for project informat	User input	User access rights should be checked, Project number	User access rights are verified, project existence is	✓

	ion		exists in database should be checked, else user is prompted	verified, prompts are given for relevant actions	
7.	User sends memo	User input	Verification of relevant values like project number, sender number as filled	Verification is done and prompts r given if otherwise	✓
8.	User accesses a component	Action	User session should be verified, Action should be verified, Component should be verified and invoked	Session verification is done, Action verification is done, Component verification and invocation is done	✓
9.	User inactive for more than 3 minutes	N/A	User session should be terminated, user should be prompted about the termination, user is redirected to login page	Session is terminated, User is prompted about termination, User is redirected	✓
10.	User wishes to upload and download files	File or link	File is uploaded and properly placed, File is downloaded to user	File Transfer is successful, acknowledgment of file is given	✓
11.	User wants to communicate with members or managers	Chat, Forum or E-Mail	Selection of option to enable a mode of communication	Message is successfully posted through mail or chat or forum	✓

After carrying out successful testing at the local server (localhost), the entire system was deployed on a dedicated server having then following configuration:

Dual Xeon Processor 2.4 GHz
8GB DDR3 RAM
4TB HDD

Client Machines had the following configurations:
Dual Core Processor 1.8GHz
2GB DDR3 RAM
160 GB HDD
Web Browsers used: Internet Explorer, Mozilla Firefox & Google Chrome

The results were upto the standards as the system was successfully deployed and could handle more than 1000 users simultaneously at single instance of time without any of delays.

V. RESULTS

The following as some output screens of operations of the user.

Fig 4. Basic entry of project details

Each project details are to be entered and indexed accordingly which can then be accessed or viewed in project archives.

Fig 5. Setting up schedules

All the previously entered project details along with their information related to the resource allocation, deadlines, memos and tasks could be retrieved and updated.

Fig 6. Project details

VI. CONCLUSION

We were successful in creating a common framework(prototype phase) for project management scenarios; the system follows the object oriented programming methodology hence it is easy to customize in terms of updating or adding new functionalities to it. Since it is based on a platform independent technology it is highly portable and available to all types of users. It is very lightweight and portable in nature. Clients only require a web browser to enter and access the system to perform the operations.

VII. FURTHER WORK

As the enterprise requirements keep on changing over the period of time it is necessary to facilitate the updates accordingly as the system framework is highly customizable in nature.

As the data grows the system can be hosted on a cloud service that will make it more reliable in terms of performance and availability.

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