A NOVEL APPROACH TO RESOLVE CHALLENGES IN REQUIREMENT ENGINEERING FOR GLOBAL SOFTWARE DEVELOPMENT

[1]InduRawat, [2]VaibhavSharma

[1,2] *CSE,Teerthanker Mahaveer University, Moradabad UP (India)*

ABSTRACT

The analysis of the Combined results from three independent industry focused case studies ,undertaken in the area of distributed software development over a period of eight years,has resulted in the identification of ten key factors. These ten factors have been utilized as the basis for the development of the GSD implementation Model.The objective of the creation and presentation of this model is to provide a practical and systematic approach to address the key activities ,infrastructure and support which are required to facilitate effective distributed software development .This approach is inspired by the IDEAL Model and divided into five specific phases which are classified as Initiating, Provisioning, Establishing, Managing and Levaraging. The goal of the Initiating phase is to clearly determine Why, if and how the distributed development strategy is to be selected and undertaken. The implementation of the provisioning phase is to ensure that the required infrastructure ,processes and support to facilitate successful distributed software development are ide notified and put in place.The focus of the establishing phase is to ensure that the development teams are effectively established .The Managing phase addresses the day to day requirements of operating efficiently in a distributed environment .The Levaraging phase concentrates on the need to ensure that the structures and procedures are in place so that lessons learned can be documented in existing and future projects

KEYWORDS- Architectural Description Languages – ADL, Business process global software development – BPO,Global Software Development - GSD,Information technology global software development - ITO,Requirement Engineering -RE

I. INTRODUCTION

Global Software development means that the software is developed globally. All the members who are involved in this development belong to different Countries and Continents .Global Software Development can include different countries or only a single company can work globally. Any Company that have centres in different locations around the world can also work in a Global Environment.

1.1 PROBLEM OF GLOBAL SOFTWARE DEVELOPMENT

The impact of problem in Global Software Management, on development processes and software usability is often underestimated. As we refer to in the Background chapter and Established approaches there is a need for creating new ways of developing global software applications. The traditional models do not consider global software development and cultural or myths aspects.

There are many research papers which shows the problem in Global Software Development .

According to S.Chinbat [1], Some of the problems are:

- Knowledge transfer (specially tacit knowledge) becomes difficult
- Remote communication problems: ambiguity in communication, less communication richness
- Difficulties coordination of team members efforts
- Cultural issues (language barrier)
- Reduced opportunity for building personal relationships
- Low level of team spirit
- Low level of trust between team members
- Big, complex projects may require physical collocation of project managers, team leaders and core members which increases development cost
- Lack of common standard for process, activities and terms (software configuration, difficulties in establishing shared understanding)
- Technical issues (difficulties in configuring and installing technology remotely, complicated

Researcher Hansich says in [2] other problems of Global Software Development are :

1. Communication and Distribution of the Development Team.

2. Communication and Distribution of the Clients and the Development Team.

3. Communication and Cultural Differences between Client and Developments Team.

4. Communication and Cultural Differences Among the Development Team.

According to Yuan Tianin [3],the most critical issue are Communication and Coordination

Decreased Frequency of Communication: Instead of immediate face-to-face communication in a co-located project, people in a GSD project have to rely on communication media that are not always dependable. People are more reluctant to initiate the communication. According to a study by Tom Allen [4], people 30 meters away do not communicate more often than those are miles away.

Difficult to Initiate Communication. When communication is infrequent, team members often lose the vision of the project. The situation is worsened when more than one development site or organization is involved. "Who to contact about what" is the common question among GSD projects.
Miscommunication. Although miscommunication results from communication media itself, the primary cause of miscommunication in a GSD project is cultural differences. When team members do not share a common native language, miscommunication happens much more frequently. Cultures differ on many critical dimensions, namely the need for structure, attitudes toward hierarchy, sense of time, and communication styles.

Increased Communication Cost- Time, Money, and Staff. Communication among remote sites incurs a cost not only in financial terms, but also in human terms. This needs to be considered in project budgets. Even

though telecommunication is cheap, time to initiate the communication should also be considered. Sometimes each project site needs a special person in charge of coordinating with other sites.

1.2. PREVIOUS WORK

The findings of the problem and the Solutions in this Thesis Work are based on different Research papers.

To solve the Problems of Global software development, Researchers us Extreme Programming with GSD[3] .Extreme programming is a set of twelve independent software development practices, which include: Planning game, Small release, Metaphor, Simple design, Tests, Refactoring, Pair programming, Continuous integration, Collective ownership, On-site customer, 40-hours weeks, and Open workspace.

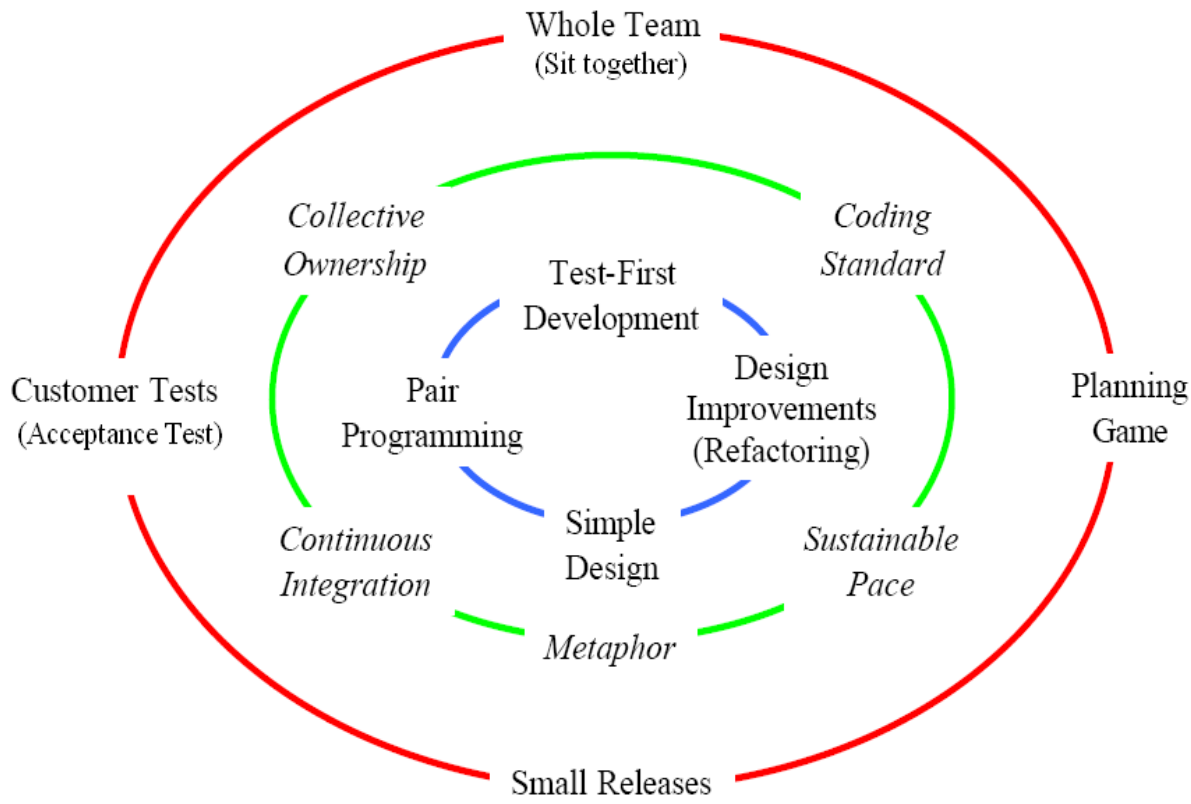

Fig1: XP practices in GSD

Results of Extreme Programming : To validate the approach two department manager and six software engineers were invited .After the conduction of experiment 100% users aggried that this approach solve the problem of Awareness and Miscommuniaction problem ,92% of users says that it decrease communication ,cost,timeand staff,35% think that it solve the problem of time difference.In the end 35% users suggest to improvement of Release Plan Management

Sapphire's Software House Case Study [2]: This case study covers the development

and implementation of an object–oriented system between Sapphire Software House, (an international software company based in New Zealand), the users from a large rail company located in the UK and the users' IT groupwhich was also situated in the UK. Hence, the project team for a significant part of the project lifecycle were working in a virtual domain.

The system architects in NZ commenced communication with the users in the UK once the contract negotiation between the two companies was complete. The users' Senior Management assigned two users to the project and they visited the site in NZ during initial stages of the project. Once the two users returned to the UK, communication between Sapphire and the two users occurred using email and the telephone. Sapphire decided to relocate the three system architects to the UK, as they

were concerned that progress in the project was being hampered by communication constraints with all of the users located the UK, and all of the development project team located in NZ. Sapphire's project manager and the two junior developers remained in NZ. Hence the development team was divided between the two continents for the majority of the project.

RESULTS OF SAPPHIRE SOFTWARE HOUSE :

1. The majority of Sapphire's experienced skill sets were located at one site, hence miscommunication and misinterpretation of requirements occurred at the location where team members were less experienced.
2. Communication overheads were exacerbated by the short development time frame over such a large timezone difference.
3. The hidden meanings of cultural differences within the development team.
4. Sapphire considered that communication was the most difficult issue overall for the project.It may be categorized in four categories:

- Communication and Distribution of development team
- Distribution of the Client and Development team
- Cultural differences between the Client and development team
- Cultural differences among the development team

1.3 PURPOSE PF MY PAPER

The Purpose of this paper is to sort out the problems of Devolping the Software Globally,As all the problems are mentioned earlier .This work gives the solution of four problems and these are

- Time Zone Problem
- Coordination Problem
- Problem Of Knowledge Transfer
- Technical Issue

II. PROPOSED WORK

In my work, I have resolved the four problems of global software development.These are :

Problem of Time Zone

Coordination Problem

Technical Problem

Problem of Knowledge Transfer

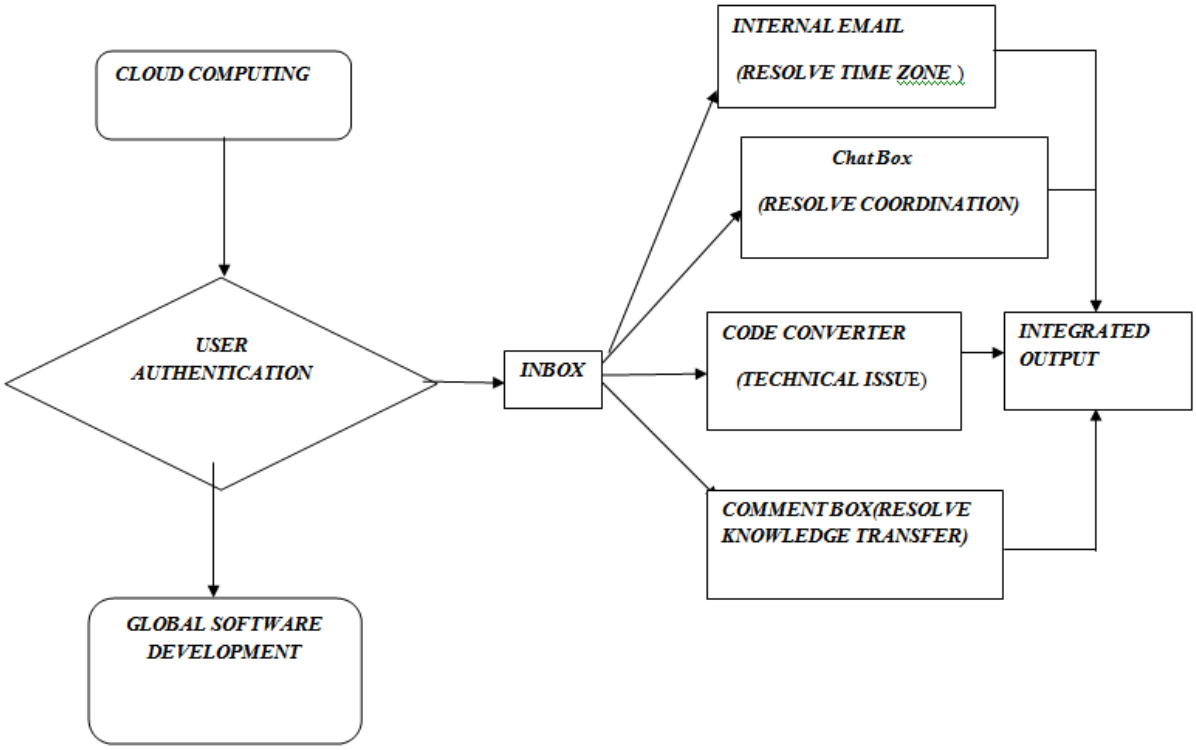

Fig 2 :Problem With their Respected Solutions

INTERNAL EMAIL: In GSD ,Parties are in different counteries or different location.When party is in one location do some work in their working hours then they will save their work in a common space so that the party on the other side having different working hours can see it and continue the work .This will also provide the last time of the team member so that all other member can see the time of last message.It will also include a Chat Box by which all the team members can chat with each other .This will resolve the problem of Time Zone.

CHAT BOX: When any member of development team is not able to give the logic of his task then this work will be shown to other members of team and other members can comment on his work to help him.

LANGUAGE CONVERTER: If any member of development team want the logic in JAVA but the developer is

able to give it in C or C++ for this problem we will provide a Language Converter which will convert the code in one language into another. It will resolve the technical issue.

COMMENT BOX : All the member of team can see the work of any project and can comment on it .By this he or she can share his/her knowledge to other members of the team

2.1 WORKING OF THE PROJECT :

It will show how the project will continue to work**.**

2.1.1 INDEX PAGE

2.1.1.1 Company Registration: When any new company want to work in Global Mode then it will first registered itself by filling Compnay Registration form .This Form will demand for some general information about the Company like:Name of the company ,Address of the company ,Contact number, Email id, Category to which the company belong like IT ,User name and Password to create an account .This registration will be done by the Administrator of company who have command on different employees.

2.1.1.2 Company Login : When company get registered on the site then it can enter into the working of the development of software globally by using authorized user name and password. when the Company login with the correct user name and password it will enter to the company panel. Company Panel has three options

2.1.1.2.1 Create New Project: If the registered company want to create a new project then it have to fill a form regarding that project like the customer name who want that software, developer name,start date ,end date and other information.

2.1.1.2.2 Display Project Details: Company can see all the details of the project on which it is working but the restricted details of the other projects.

2.1.1.2.3 Status of the Project: Company can see the status of the project either the project is Completed or Underprocess. Only the Administrator of the company can change the status of the Project

2.1.1.3 Employee Registration: Now the Company will assign its employees to the project by filling up the employee registration form. The employee can not register himself because of the purpose of authorization.

2.1.1.4.Employee Login: when company provided the user name and password to the authorized employee he/ she can login any time and can work on his /her project . When employee will enter into employee pamel he will get the solution of all problems.

2.1.1.4.1 Internal Email :In this any one employee can mail any matter to the other employee working on the same project through the mailing system it will resolve the problem of Time Zone because whatever the difference in time zone parties can get the information with specifying the time and date of receiving.

2.1.1.4.2 Chat Box: To resolve the problem of Coordination ,there is a chating option in which all the members working on the same project can share their views and ideas.

To maintain the synchronization among the working of all employees,colour are assigned to every employee so that the work of every employee can easily distinguish.

2.1.1.4.3 Code Converter :To solve the Technical issue there will be a online code converter which convert the coding in one language to any other programming language

2.1.1.4.4 Comment Box: To Solve the problem of Knowledge Transfer there will be a comment box in which employee of any other project can suggest the solution of any problem by providing the logic in the theoretical form.

III. SCREEN SHOTS

Fig 3:Index Page

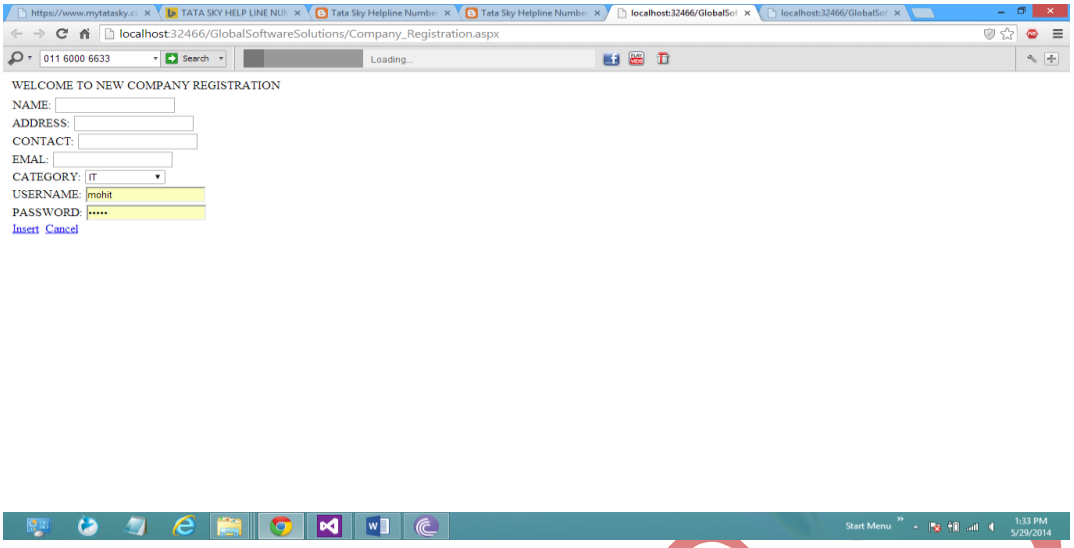

Fig 4: New Company Registration

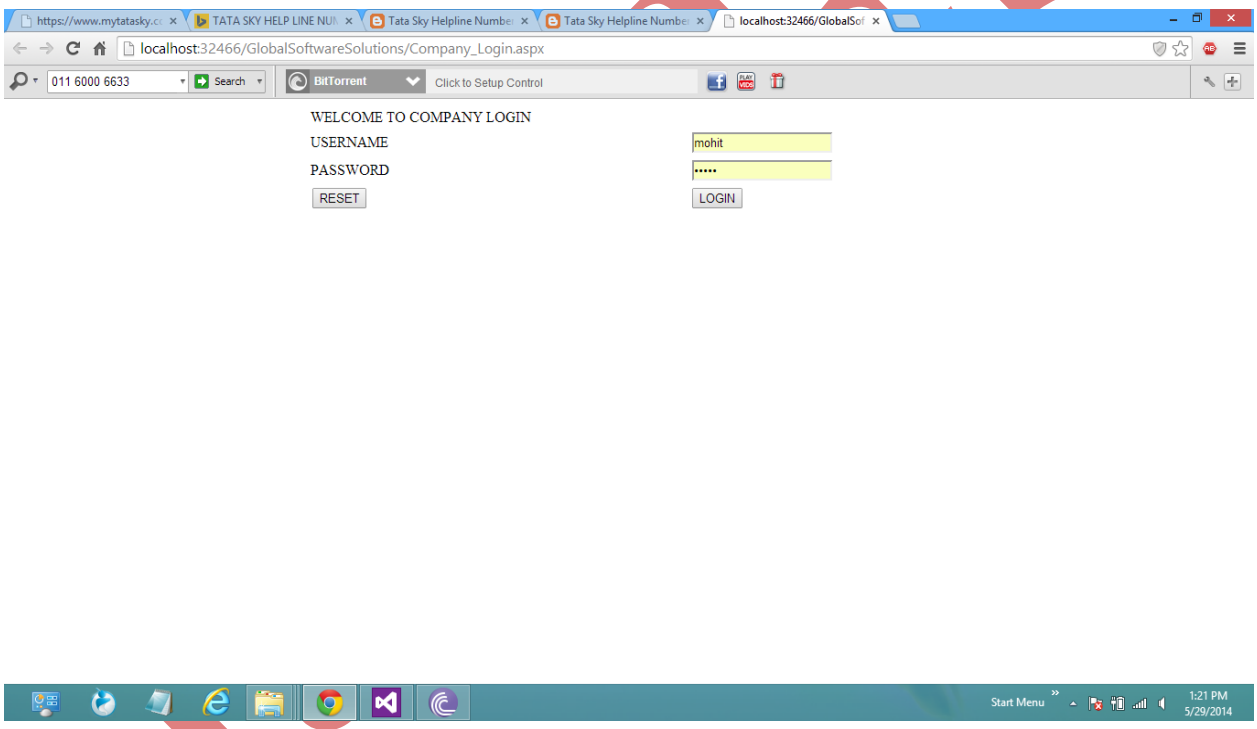

Fig 5: Company Login

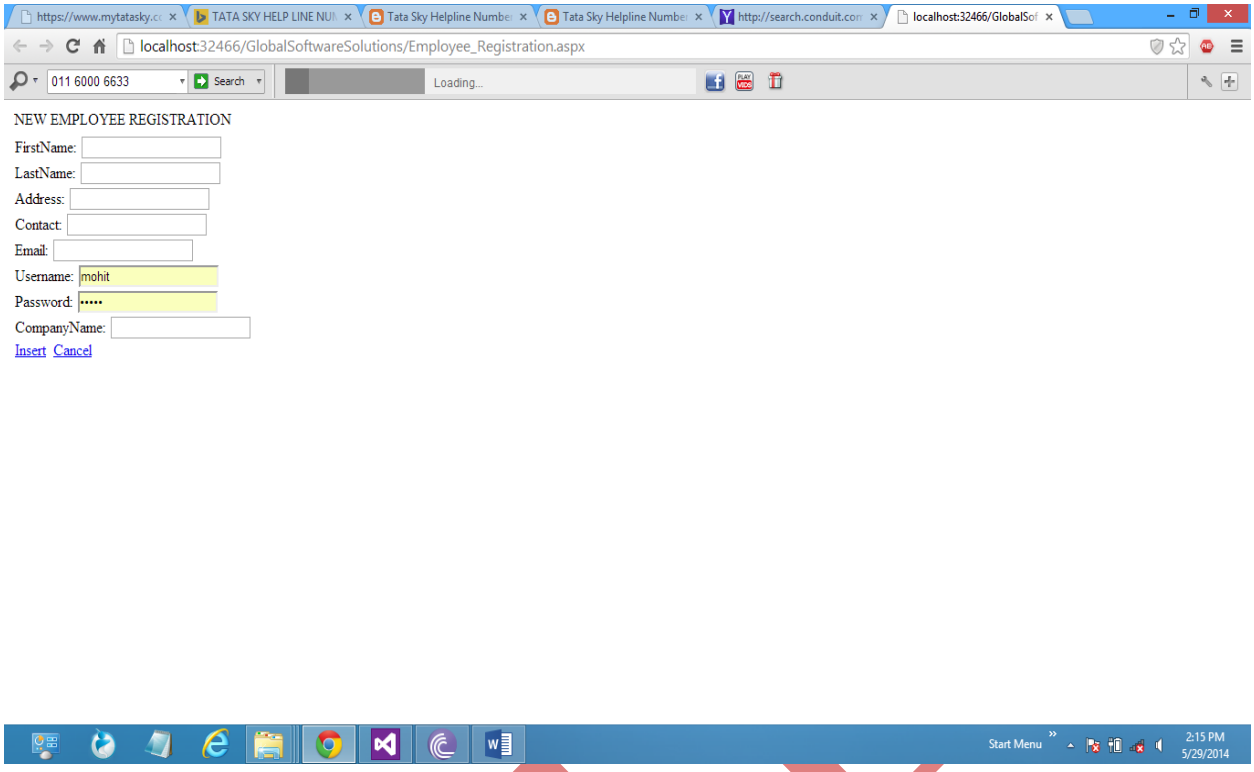

Fig 6:Registration of New Employee

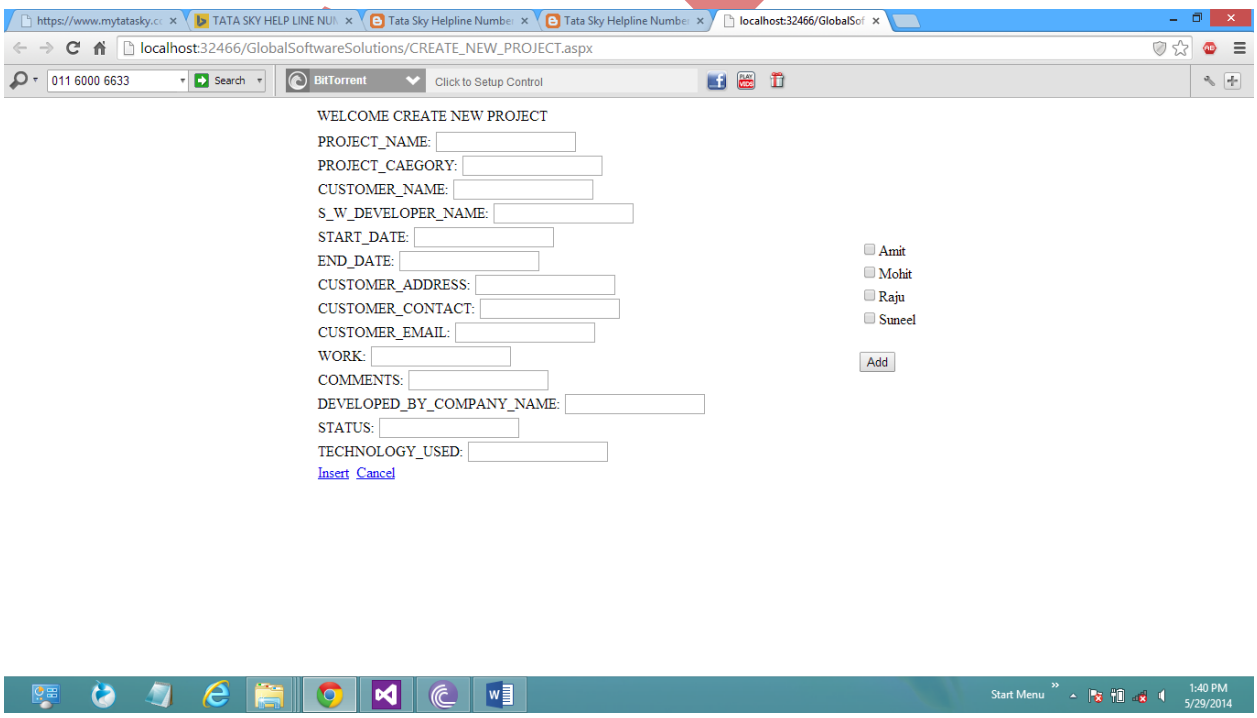

Fig 7 :Creating New Project

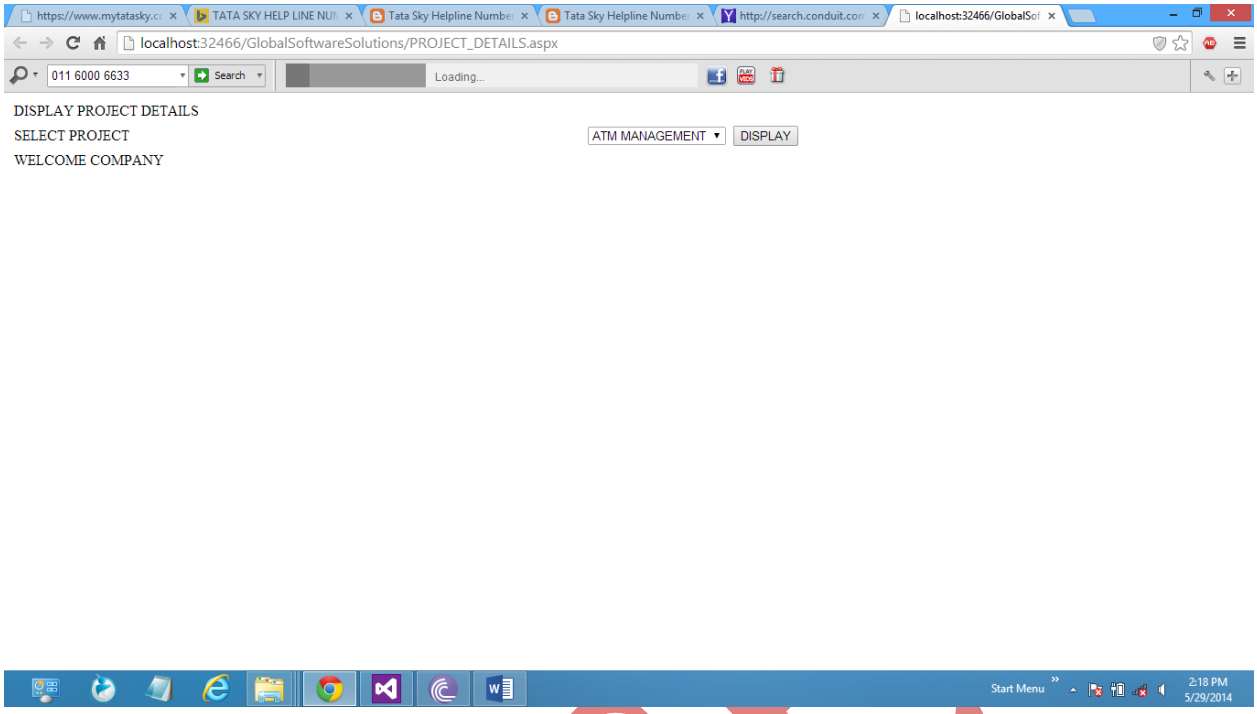

Fig 8:Details of Project

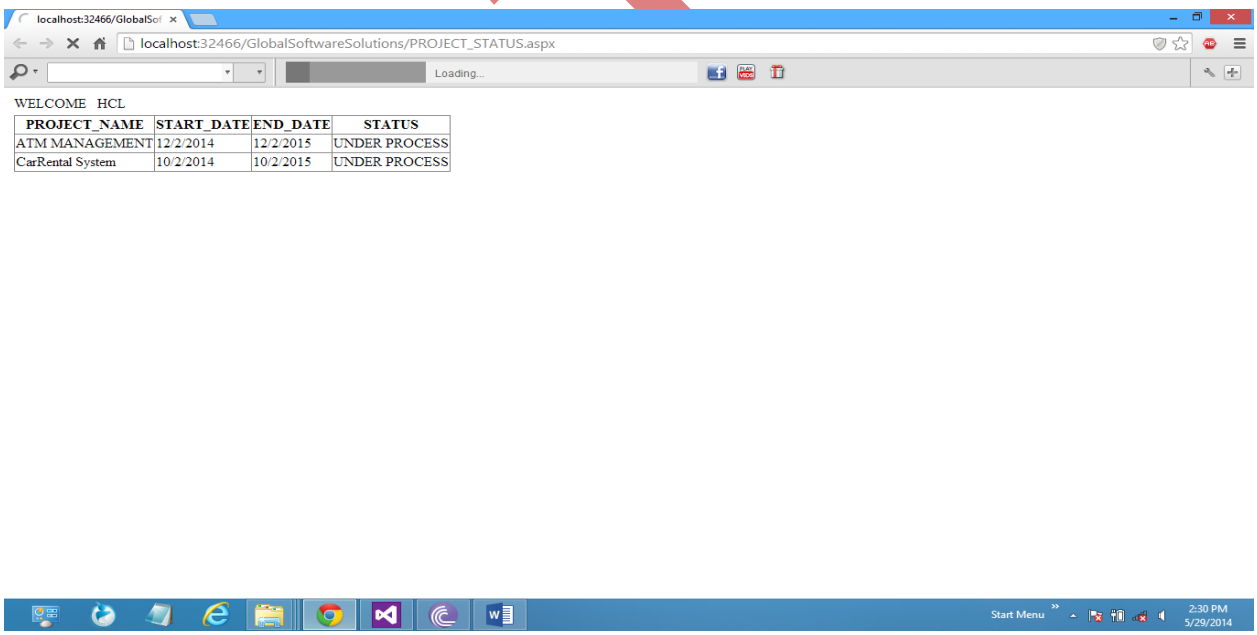

Fig 9 :Project Status

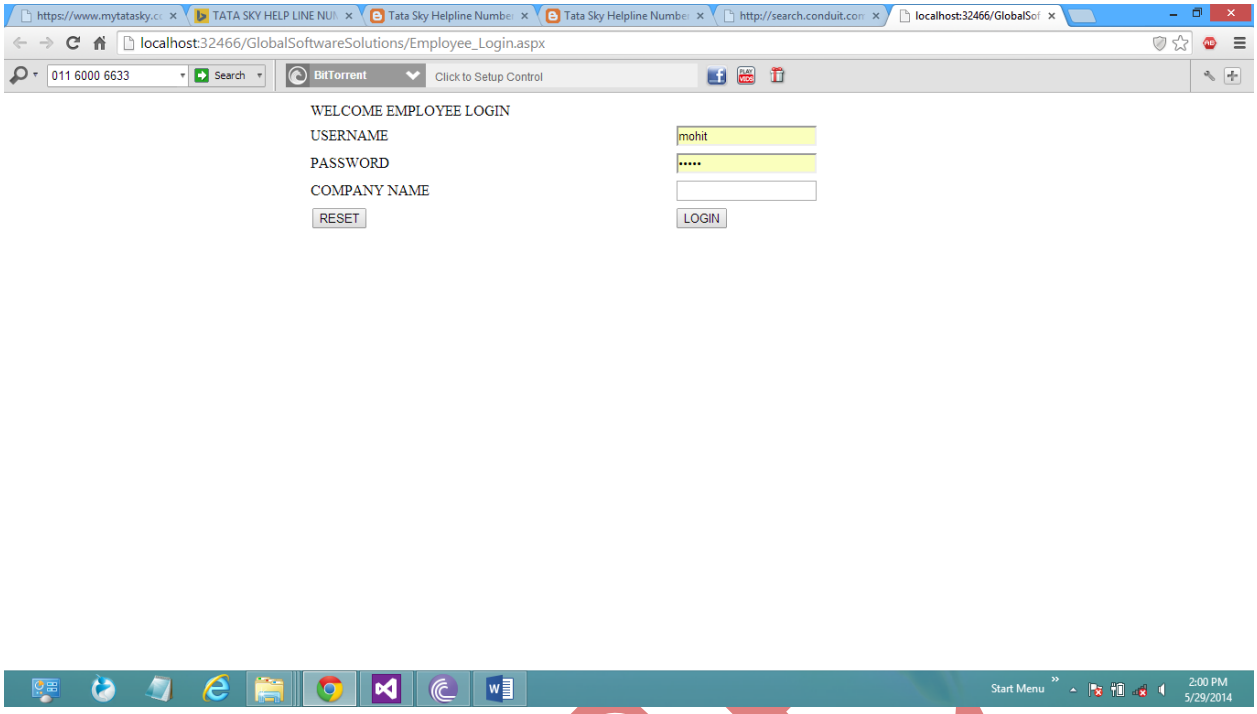

Fig 10:Employee Login

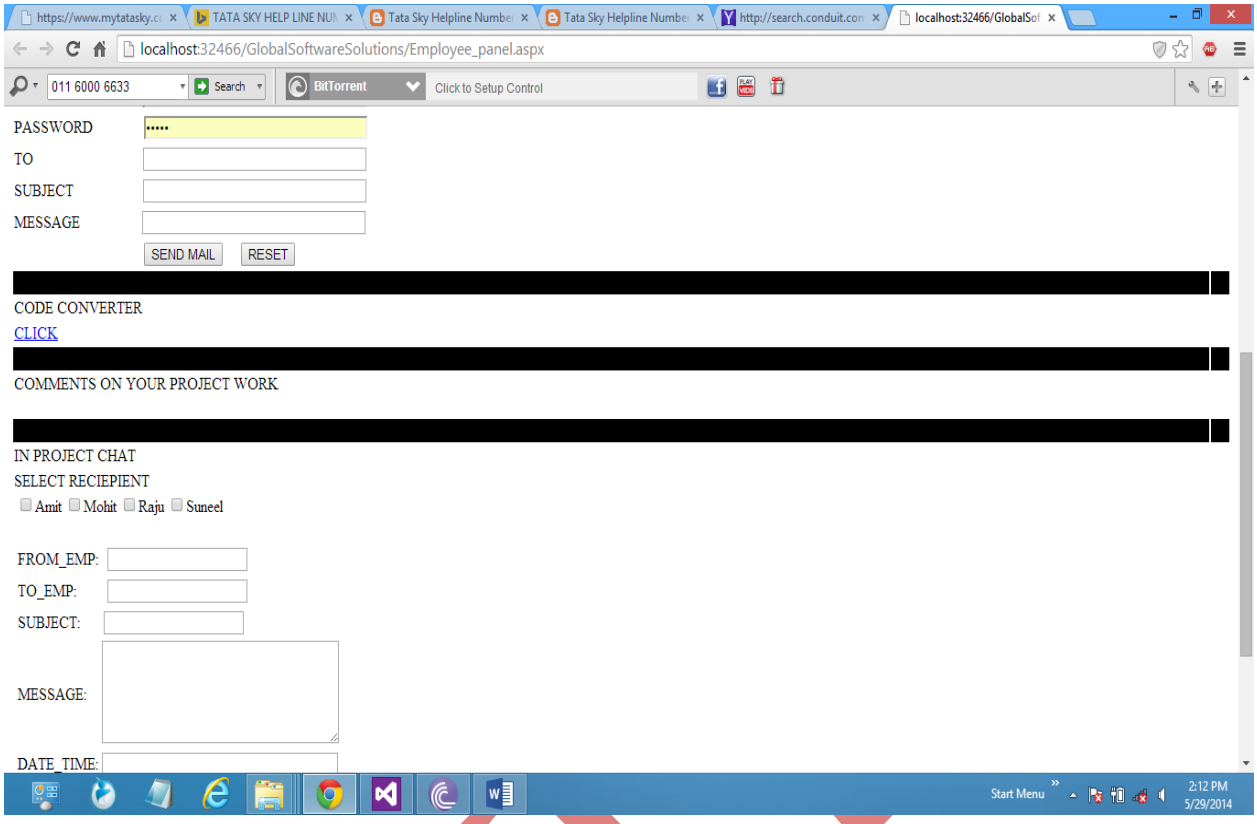

Fig 11:Employee Panel

IV. CONCLUSION

After working on the problems of Global Software Development, it is concluded that these four problems (Time Zone, Coordination problem, Technical Problem and Problem of knowledge Transfer)can be sorted after applying the given solution provided by this paper .

It will enhance the speed and smoothness in the development of software globally.

Like other project this project also have some restrictions .These are :

- Only a single projecct is assigned to an employee
- Not more than five employee can work on the project
- The code converter is not working on all Prograamming languages.

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