CHAPTER-3

SOFTWARE REQUIREMENT SPECIFICATION

3.1 Introduction

3.1.1 Purpose

This document identifies the requirements of SOAPMS that would have to be carried out as the part of the project. Once approved, this document would form the baseline for design, construction and whitepapers of the proposed system.

3.1.2 Intended Audience

This document is intended for the following group of readers:-

- Application Designers
- Developers
- Testers

3.1.3 Project Scope

This process, procedures, and guidelines can be applied to any software project. The extendibility of the software project is not limited to small software firms & industries but will also cater to the needs of big enterprises and software firms that follow these types of processes [81].

1]. With the help of this product you can monitor the various activities of the organization, which will help your organization, improve its productivity and also the standard processes will be followed to get a better output from the peoples who are working in the organization.
2]. It will provide various services to the different levels of the software project and will provide services to the peoples involved the different levels of the project development lifecycle.

3]. The client can view the milestone and the progress of his project he can also view what are the defects that have arrived in his project so that the necessary actions can be taken.

As no system is a perfect system there are some limitation of this product too some of the limitation of the product are listed below.

a) Environmental Hazards
b) Technical Hazards
c) Human Hazards

These are some of the limitations.

3.1.4 Design and Implementation Details

a) Hardware Limitations:

The LAN, Internet should be working properly and the connections should be made properly so that the application can be viewed from anywhere and at any place easily. The GSM modem should be properly installed and should be configured to send messages of the daily reports of the project to the client cell phone.

b) Relationships to other Input/output:

The GSM system will be configured to interact with the computer system and the VS.NET environment so that the interaction between
the .NET framework and the GSM will have a connection. SOA has a vital exploration and enrichment in the software development project supports to manage the project easily without considering the limitation of the infrastructure required for development of the project [53].

c) **Reliability Requirement:**

The GSM system that will be connected should be highly reliable so that the appropriate connections can be made to the system also the product should give the reliable inputs to the GSM system so that the exact report will be delivered to the client. All the inputs to the system should be in the specified format so that the product will function properly. The software Process Improvement barriers (SPI) is also important for the project managers who are in charge of the SPI identification in the software engineering project [47].

d) **Safety and security considerations.**

The various authentication will be provided for the security of the system on client side. There will also be different antispyware programs that will be used to protect the system against the different spyware entering the system so that the data will be protected against the spywares. The conflict detection is also important in project management as the software configuration management tools are not best suited for the graphical data management its only best suited for the textual data management so its also important to manage changes in the graphical data changes [46].
The major design constraints are:

- The minimum requirement for CPMS is to run on any operating systems.
- The application is built using C#, MS SQL database.
- Application should deploy on Microsoft azure.

3.1.5 Assumptions and Dependencies

- Web Browser chrome, Mozilla Firefox 3.0 or any similar variants
- Internet Connection

3.2 System Features

3.2.1 Dashboard

The view at a glance is such designed that it will provide all the insights of the project under development to the management and the project manager it has various features which incorporate the flow of the software project and gives us the visibility to access and commit changes to the software projects under design hence the top management gets an overall functioning and status report of the project under development [116].

3.2.2 Project Planning

- Project templates

Help the organization to gear up with the new software development requirements to be executed by the industry all the tasks and the start, end dates will be automatically adjusted
and reframed according to the new project undertaken by the software industry [116].

### 3.2.3 Project Tracking

Most of the software engineering projects today are having major fallbacks because of inadequate management of the tasks. There should be a health indicator for each task which shows if the task is in time, beforetime or will be delayed due to some resource capability so that the delay incurred in the project delivery can be easily tracked and rectified. Alert systems are available which give email support alerts to keep the task on time the delay. Progress of the tasks is emailed to the higher authority of the software project under development.

- **Follow / Unfollow**

  You can follow any project in which you are interested if you want to unfollow then you are just one click away. If you decided to follow again then you can follow project again. After unfollowing project you will not get any notification of unfollowed project.

### 3.2.4 Resource Management

- **Cross-project resource conflict finder**

  We are considering developer as a resource. Project manager should not assign two tasks to same developer on same time.
• Manage Team

In this feature you can manage your team members assign them role according to your project.

3.2.5 Alliance
Alert systems are designed in the project so that any updates in the various phases of SDLC or any document updating is easily notified through emails most of the times a meeting needs to be scheduled to review the documents of the project or some other tasks in the project. A meeting room is provided online where the collaborators of the software project under development can come together and discuss and resolve issues and go through and collaborate on the various documents, which are related to the project under development and prepare a finally updated document for the project.

3.2.6 Autosuggestion
A auto fill and auto suggestion system is in place where most of the time you will save time in figuring out the right contents or the links when you know few words of the requirement the autocomplete will complete the sentence for you.

3.2.7 Alerting systems
The various important alert systems are in active mode which help the members to keep track of the various activities related to the ongoing project progress the alert systems are configured to send email notifications on various features of the software updating and task assignments and delays [62].
3.2.8 Customizations

The collaborators of the project get various updated on the ongoing project development phases. According to the availability of the collaborators he can connect to the project MS and resolve the status issues which he/she is prompted.

3.2.9 Reports

Customized reports can be generated and finally these reports/ documents can be shared with the group members of the project all the collaborators can add or modify the reports and use the report according to their requirements.

3.2.10 Safety

The collaborative PMS has fine grained security policies which can be defined at various levels in the organization so that the security bridge issues can be resolved there is a specialized object designed to handle this task.

3.2.11 API

Most of the features of the CPMS have been designed in the form of API’s, which can be used to integrate with most of the brand names in project management today.

3.2.12 Reminder

Reminder feature help user to set his/her reminder on system so that they do not have remember all these things. Reminder feature will sent user notification automatically about reminder.
3.2.13 Single Login Multiple Roles

In following description we are explaining what is single login multiple role's concept. Above diagram briefly explaining what is “single login multiple role” concept. Let’s first understand what is multiple roles and then single login.

**Multiple Roles:**

This is very important feature of our CPMS. As we know that every project consist of different stakeholder and they are involve in project development lifecycle in one and other ways. So our system include all these stakeholder using three role Software engineering project management mainly revolves around the peoples who are included in the development of software specifically the developer as he is the person who is responsible for delivering the software in time with right features and functionality so that the software development process does not suffer [5].

1) Manager- it is stakeholder which is responsible to success and failure of project which manage all development team by assigning task to them. And manager can only invite other people to join in project.
2) Developer: This is person who is responsible for actual construction, testing and deployment of project. This role has great importance in software development.

3) Guest: This is minimum access right person which can only see thing without making any changes in documentation of project. These people may include sales manager, customer or other people who has some interest in this project.

**Single Login:**

It is often happen that person who is working on one project as developer may work as manager on second and as guest on another so he has different role with respective to different project so how he can manage all these projects. Our PMS has solution for it. We are providing simple single login which allow to enter user into his/her projects world where every project .Where there may be all project on which he/she is working in different role listed very neatly. Functionality and access will be change depends on role of user from selected project. So it is become very easy to user to manage all projects in such diverse world.

### 3.3 Outside Interface Requirements

#### 3.3.1 User Interface:

There will be one main interface which displays the HOME PAGE of the application through the viewer. It will contain a LOG IN page for the client. The user edge on the client side will be basically the details of the client. The
scheduling of the various activities will also have a user interface where in the user can enter the scheduling as per his privileges. Today the companies are more concentrated on the schedules of engineering solutions provided by the software’s also the quantity of the projects are increasing hence there is a project lay off or project most of the projects fall short of the time and some time money as companies, which are executing the project, are trying to reduce the time duration and the cost of the software project which is totally a conflict. Thus using the GAs (generic Algorithm) this issues can be resolved [23]. Quality Planning will also have a user interface, which will describe the Quality aspects, and the testing will be one of the approaches to the quality management. Software outcome with the help of tools used to monitor the project cycle we can draw the utilization chart of the project under development various layouts have been prepared to check the software also testing the various aspects of the solution [20]. The risk management will also have a user interface where in the various peoples of the company and the client can also suggest the various risks to the company basically it will be user to have an interaction between the client and the company and this discussion will help in solving the risks of the project [57]. The measurement and tracking planning will have a interface which will be used by the project manager and the project lead so as to keep track of the project and the personals in this the different concepts of measurement such as metrics and measurement and process monitoring through statistical process control will be used the measurements will be like .The project tracking will be useful to the project manager as the manager will get the perceptibility into the project performance so that they can determine whether any action needs to be taken
to complete the project goals. Nokia uses the software management tools and also how the daily activity can be trapped using the software tools there are different tools which explain about the timely delivery of the software product to the end client [4]. There is a huge gap between the industry project management and the academic project management and its important to bridge this gap by designing a common solution for the different need to suite both the academia and the industrial research [58, 59, 68]. The project manager should always monitor the project details and the project tracking should be carried out to check if the project is being developed in the right direction of outcome. Its important to manage the software development activity so a to reduce project failures [76].

3.3.2 Hardware Interface:

The hardware interface that will be required will be the GSM Modem that will be used to send the daily details to the client on to his mobile phone using the SMS facility. The client will get the daily details in the form of SMS that he can view at any point of time the system will also have the internet connection so that the user of the system can access the system from anywhere in the organization sitting at his place.

- Operating Systems: Windows 9x/XP, Windows ME, Windows Vista, Windows 7 or any similar variants of other operating systems.
- Processor: Pentium 3.0 GHz or higher.
- RAM: 256 Mb or more
- Hard Drive: 20 GB or more
- Cloud platform: Microsoft Azure
- Cloud storage: SQL azure
3.3.3 **Software Interface:**

This interface is required to launch the web pages created by the Microsoft .NET software. The ASPX pages will be loaded at this server.

- **Name:** Visual Studio.NET  
- **Version number:** 2010  
- **Source:** [www.microsoft.com](http://www.microsoft.com)

This interface is used to run the ASPX pages.

- **Name:** Google Chrome  
- **Source:** [www.google.com/chrome](http://www.google.com/chrome)

This is used for the security and the also is useful while running the ASPX web pages.

- **Name:** Service pack 3 for windows Xp  
- **Source:** [www.Microsoft.com](http://www.Microsoft.com)

This is required at the time of installation of the Microsoft .NET 2008 on to your system.

3.3.4 **Communications Interfaces:**

The system requires the TCP/IP, UDP, Internet for the communication as the client and the different users which are located remotely from the server machine so the data that will be feed into the system will be feed from the clients or the remote employees computer system and will be updated on the server computer system the system will also have a communication with the GSM modem which will be used to send the daily details to the client on his
mobile phone. The software project quality totally depends on the knowledge of the software engineer so that the end product is good and quality is achieved so its important to have highly skilled workforce for the development of the software product [29]. The software projects have been implemented by students which perform various activities which was demonstrated in the SCORE is the students project activity to design good software projects. The software engineering should involve live demos and tools that can be used by the students and can collaborate on a given software engineering project [13, 54].

3.3.5 The Model View controller (MVC)

The Model view controller is having a great feature, which segregates the representation of information, and the various interactions involved of the computer user and the interaction with it.

Figure 3.1 Collaboration of Model View Controller Components.
The MVC model is very useful in the project most of the design revolves across the MVC controller. The MVC contains three main parts Model View and the Controller in figure 3.1 these are explained as follows; the portfolio management is also important. It’s difficult to manage the overview of the software project and also its difficult to keep track of this overview for long-term software project [2].

3.3.6 Model:

The model manages the behavior and the data of the application domain under development the research project has a model implemented which actually manages the data flow of the system all the information that flows in and out of the system is using the model. As there is a huge amount of information that needs to be stored about the project the cloud platform provides the scalability of the storage as and when needed [77]. Information and the data that is maintained in the system is on the cloud server the information extraction and uploading is done on the cloud server the cloud domain information exchange is implemented using the Model system architecture model plays a vital role in the research project implementation the behavior of the system is managed by the model which actually extracts the information and exchanges information as and when it is required by the view controller the view controller request for the information to the model controller and the information is granted by the model controller to the view controller information flow and exchange are easily managed using the model. The controller depend on the model to get the information as and when required by the system the model plays a vital role to exchange information from the MVC the controller and the view are different from the model key center point of information access to both the view and the controller model stores all the information required and requested by the view and the controller ready so that as soon as there is a request from view or the controller
model can easily provide the information to them. The Model-View-Controller is a design pattern used for separation of the database, Interface logic and the Business logic.

**View:**

It is basically used to manage the display information in my research work most of the display work that is implemented is using the View. The user interface screens mainly contain the view which is used to represent the information on the screen and exchange information across the screens. The view will actually contact the model to extract the information and then display the information accordingly. All the information is captured from the model and then passed to the view which holds the information that needs to be displayed and then is pushed to the screen in the user intended fashion. The view holds all the data and the display information which will be represented on the user's screen and most of the extraction of information is done using the view. Information display in my research project is handled using the view controller. The view holds the information and according to the user interface design, the view can display the information on the screen as and when required. View can also request information from the model simultaneously as and when more information is required to be displayed. The view plays a vital role in information presentation to the user of the system.

**Controller:**

The Controller is the key element which actually keeps an eye on the information that is input using various input devices. It also informs the view and the model to take action accordingly for the user provided input. If the user is filling the form about the project, the inputs from the user are taken care by the controller. It also informs the
view and the model simultaneously that there is some operation or action being performed on the user interface accordingly the action is taken by the model and the data is stored or accessed from the database system. The controller is responsible for all the actions that take place on the user input screen all the operations that are performed and recorded by the controller and appropriate action is taken care by the view or the model if the view is requested by the controller then the information is displayed on the screen and if the controller informs the model data is stored from the user interface screen to the database also some time the controller request for the information so that the information can be displayed to the end user at that time the view comes into picture and then view request information from the model and displays the information requested by the controller to the view.

3.3.7 JSon

**Json or JavaScript Object Notation**, is also used in the design of my research project this language was very helpful while designing the complicated text data. Some time huge text data needs to be handled in my research project so I had to use Json to have a easy understanding of the standards and easily understandable data interchange [117]. The information to be viewed I a readable form Jason was very important . XML form so that data can be exchanged easily throughout the software design. XML is the best medium to exchange information across application cycle where ever and when ever information has to be extracted and pushed to the other module of the system.
3.4 Nonfunctional Requirements

3.4.1 Performance Requirements

a) Static numerical requirements:

- **The number of terminal to be supported:**
  The system can support as many number of terminals as required by the client or the company basically it will depend on the cloud capability and the speed of the network also it depends on the server capacity. But it can be installed on N number of terminals so out of 100% of the terminals 95% of the terminals will be supported by the system.

- **The number of simultaneous users to be supported:**
  The system can support the entire user in the company and also the client that are attached to the company for their work so simultaneously multiple users can login into the system so out of 100% of simultaneous users that will login all 95% of the users will have simultaneous access to the system.

- **Amount and type of information to be handled:**
  The system will handle a huge amount of information, which also the operational execution speed of the server machine system is installed 100% information will be handled properly by the system.
b) **Dynamic numerical requirements:**

The system will process huge amount of the data simultaneously so 95% of the data will be processed with in 1 second rather the operator shall not have to wait for the transaction at all the system will provide high speed of access to the data and the searching of the data will be done faster.

### 3.4.2 Safety Requirements

The backup will be taken care by the system itself and will be uploaded to the backup server.

### 3.4.3 Enhanced Protection of Data

The various authentication will be provided for the security of the system on client side and the company side as the also the different access rights will be given to the different peoples in case of the different access and not only that there will also be different spyware programs that will be used to protect the system against the different spyware entering the system so that the data will be protected against the spywares.

### 3.4.4 Software Quality Attributes

a) **Reliability**

The system is easily portable and can be deployed on various environments of the software also its highly reliable and can be trusted upon “the software product that will be developed will be highly reliable in terms of the portability and the will operate properly anywhere and at any time the system will provide the a highly reliable solution to the client as all the current and the previous history of the projects will be used and will be visible to the user of
the system.

As we are using Cloud PMS is more reliable.

b) Availability

Like reliability factor the availability of the software engineering project is also a crucial point the software project should have maximum uptime at the extreme conditions also.

\[ \text{Availability} = \left( \frac{\text{meantime to failure}}{\text{meantime to failure} + \text{meantime to repair}} \right) \times 100\%. \]

The availability of the software uptime is more critical which directly accounts to the maintainability of the software development system will be available to use whenever or wherever the user goes he will be able to access the system data effectively and efficiently.

c) Security

The high level of security to the sensitive data of the user as only the authenticated persons will be allowed to access this data. The client accounts are different from the company users account any user that logins will be identified according to his designation also the spyware protection will be provided so that the illegal access to the system cannot be made security verifies which will be protected from the vulnerability that may occur the system will also be protected from the vulnerability and the software worms that attack so a total security measure will be taken to protect the clients and the company data.
d) Portability

The system which will be designed will be highly portable that means that it can be easily transposed from one environment to another. As we are using Cloud for deployment PMS is highly portable.

3.5 Analysis Models

3.5.1 Data Flow Diagram

Figure 3.2 Data Flow Diagram
3.5.2 Class Diagram

Figure 3.3 Class Diagram
3.5.3 State-transition Diagram

Diagram Name: State Machine Diagram

Figure 3.4 State-transition Diagram
3.6 System Implementation Plan

3.6.1 How are you going to proceed?

This research project has implemented the designing level, which include a user-friendly Graphical User Interface (GUI) and working on the UI Map of the entire system that entirely explains the application flow. At the software development level, The location based information extraction and utilization is also important in certain cases when required in the software projects [25], the software has the basic modules for the interaction between the application and the API providers. Entire work is divided into modules. The most important part is the team collaboration and team management developed modules can then be integrated to complete the system. This will be followed by the testing phase.