Software Requirements Specification
for

HYBRID APP WAREHOUSE MANAGEMENT

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version
Group memebers	9/21/2016	Intial draft	1.0

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1.Introduction

1.1 Purpose

The purpose of this document to provide a detailed software requirement specification for building an ERP mobile application to support the warehouse management features including warehouse management reports. The goal of the warehouse management system is to provide a company management with the information needed to effectively control the movement of material with in a warehouse. Processing the functionality using a mobile device helps the companies to seek the benefits of distributed work environment through mobile technology.

Main purpose is to build a hybrid ERP mobile application. The application will contain details about purchase orders. Authenticated application wherein only few roles will be allowed to update and delete the data other roles will be allowed to view the data rather than modifying it**.** Document is intended to make stakeholders and developers to understand the application*.* A detailed scope and functionality requirements are given in the subsequent sections.

1.2 Document Conventions

This document provides the software requirements and expected behavior of the mobile application. As part of this document, high level screen shots and graphics are provided to help & understand the software requirements in a better way. These are indicative only and may undergo relevant changes (layout, color schemes, components etc.) as the project evolves.

The document provides certain statements and requirements in a bold or highlighted format to represent the significance of the same. A detailed note along with reference to the other documents are provided wherever applicable with an asterisk. All the assumptions that are made will be mentioned beforehand and no external assumptions are required*.*

1.3 Stake holders of the project and mobile application

This document is intended for the ERP companies where the warehouse functions can be executed by customer service representatives (or agents) effectively. The expected outcome of

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this project is going to support the warehouse operations team which includes Customer Service Managers, Warehouse Managers, Plant Managers, Supply Chain Managers, and Sales Managers.

The stake holders during the project execution are going to be developers, testing team & project mentor/project manager. Document is developed for understanding the complete overview of the project. This application that is made will be an industry based project. Developers can make use this document for understanding the use cases, UI flows, requirements and other aspects.

1.4 ERP – Warehouse Mobile Application Scope

Since our product is completely for corporate, we plan according to their requirements. Our product focuses on warehouse management part where in the software products are stored and updated information is sent across. This application is made up of relational database as a hybrid application which make the application work in any platform without creating a hiccup for the users. This product helps in managing all the products that are existing in any warehouse like, sales reports, purchase reports and others

The scope of the mobile application is as follows:

1. To build ERP Mobile Application for the warehouse management.
2. The mobile application needs to be developed using Hybrid Mobile Development Approach.
3. The following features are to be implemented as part of the mobile application. The features are to be thoroughly tested to ensure functionality works without any deviations
   i) Purchase Order Creation from Mobile Application.
   ii) View List of Purchase Orders
   iii) **Delete and Update the Purchase Orders**
   iv) Sales Order Reports
   v) Warehouse Management Reports
4. **Develop Graphical reports**
5. Use Responsive UI
6. The application needs to support 150 concurrent users and the design needs to be implemented to enhance the concurrent user's usage up to 500 users.
7. The application needs to provide the security features as defined by the warehouse management team policies

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1.5 References

The following are some of the references leveraged to understand the warehouse domain, mobile application development, software engineering concepts. Based on some of these reference sources, the good practices are proposed to develop the mobile application which can be platform independent, scalable and secure.

http://dlca.logcluster.org/display/LOG/Warehousing+and+Inventory+Management

http://community.mis.temple.edu/mis3504digitaldesignsections12/files/2013/09/Warehouse-Stakeholder-Case.pdf

https://en.wikipedia.org/wiki/Warehouse_management_system

http://searchmanufacturingerp.techtarget.com/definition/warehouse-management-system-WMS

http://www.infoworld.com/article/2615122/mobile-development/native--web--or-hybrid--how-to-choose-your-mobile-development-path.html

https://developer.salesforce.com/page/Native,_HTML5,_or_Hybrid:_Understanding_Your_Mobile_Application_Development_Options

http://www.3pillarglobal.com/insights/when-to-take-a-hybrid-approach-for-mobile-app-development

Books: Software Engineering by Roger S Pressman 5th edition, Software Engineering by Pankaj Jalote 4th edition.

Weblinks:https://en.wikipedia.org/wiki/Software_requirements_specification
https://drive.google.com/file/d/0B9sPtKJ_1aYrTEQ4cDFnekVmSHc/view?usp=sharing /* UI Flow (from client) */

Documents given by the customer for reference – ERP Mobile Application, UI Flow.

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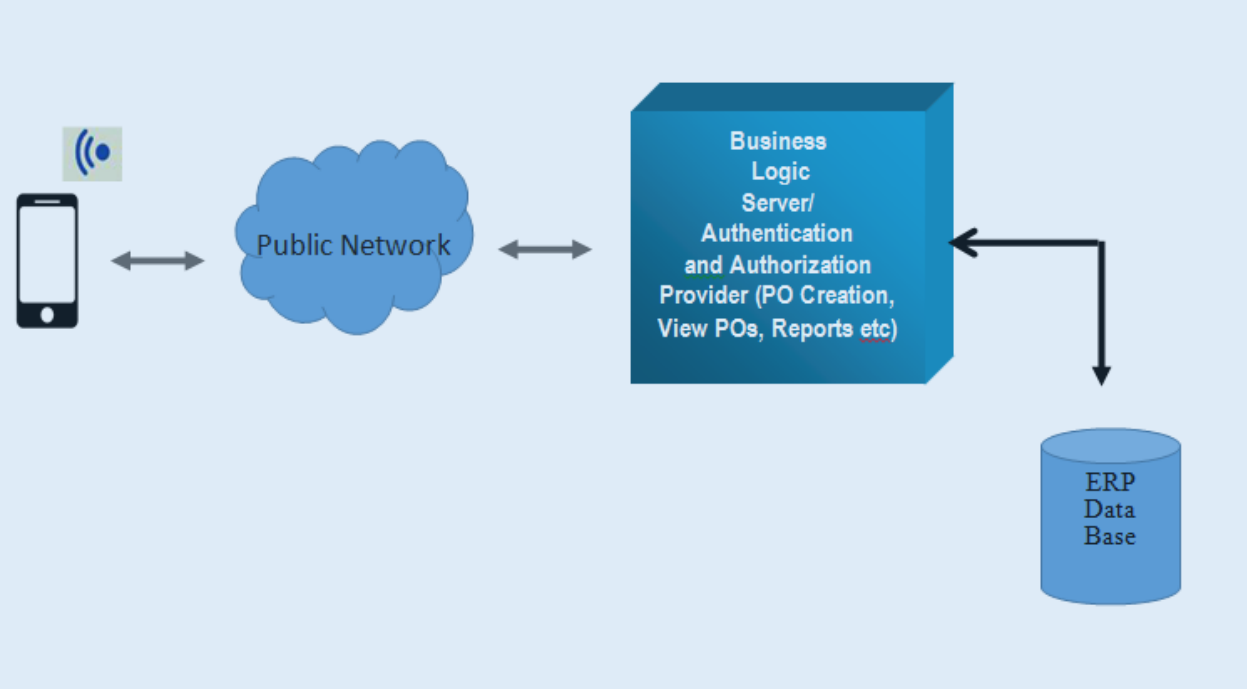
2. Overall Description

2.1 Product perspective

About ERP-Warehouse Mobile Application

The ERP-Warehouse mobile application is an application developed to provide the warehouse management functions on mobile phone. This is a new application development required for an effective & distributive warehouse management through multiplatform mobile devices.

The following diagram provides the basic components of the system and the various interfaces involved in the functionality. The application being developed will be installed on the mobile phone. When the user access the application and the required functionality, the request will be routed through the public network and triggers the business logic existing on the server. The server accesses the ERP database to serve the required output for the feature executed by the user. The output will be displayed back on the mobile phone for the user.



2.2 Application Functions

The Product (application) should shows the sales order reports and purchase order reports for the managers, field managers etc. customers can also create a purchase order. Manager can

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update and delete the sales order and purchase orders. It also shows the information about warehouse, and its sale orders and purchase orders. It should represent the purchase and sales order in graphical representation.

2.3 User Classes and Characteristics

To Operate the product. Admin(includes manager, Field manager….)/customer should first login with valid username, password and role. After logging in Admin can choose the options among warehouse management, sales order and purchase orders and product updating option for updating the number of purchase and sales order which are present in the ERP product. Warehouse management consist of warehouse details, warehouse with purchase order, warehouse with sales order, warehouse by date, inventory by item/location etc. and return shipping. He may access any of the above options. If the Admin chooses the sales order he gets a detailed report of all the sales orders, sale order status, sales order with different payment, and if he chooses the sales order status he can see the graphical representations of the sales orders. By choosing the option purchase order he gets the options of purchase order details, purchase order status, purchase order with different payment. If he wants to see the details of purchase order graphically he can select the option purchase order status. Coming to customer , he can initialize the purchase of the product.

Use Case Diagram:

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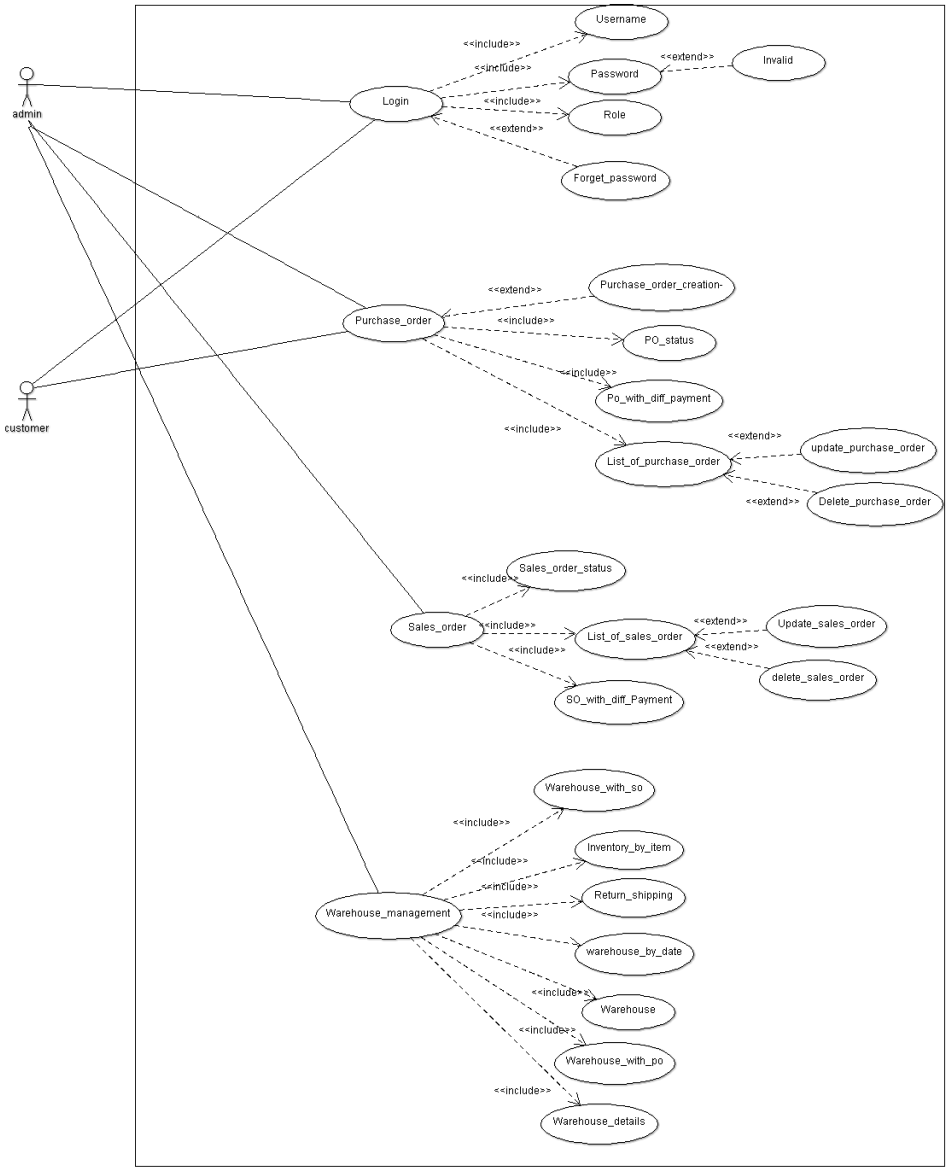

2.4 Operating Environment

As the system that is being developed is hybrid application same code base will be used to deploy in all the platforms. The framework was made responsive so users of any platform will not face any sort of problem in using the application. So, for each platform different dependencies exists as follows.

1)Web Application:Any latest browser which is updated is needed.

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2)Android Application: Kitkat and above versions are needed.

3)IOS Application: IOS 6 and above will be necessary.

4)Windows Application: Windows Mobile 6 and above will be needed.

Test Setup:

1) Mobile phones with Android and iOS
2) Mobile phones of different sizes and resolutions
3) Mobile phones with various hardware configurations (1G to 3G)

This section provides the various software and hardware requirements to develop and test the mobile application. Any additional software and hardware requirements will be mutually discussed with the warehouse management project manager and the document will be amended accordingly.

2.5 Design and Implementation Constraints

The mobile applications functionality depends mainly on the availability of network connectivity and the strength of the network (signals). The limitation of network coverage in certain locations may impair the actual functionality or desired performance.

The mobile devices may come with different hardware and software configurations (or versions). Depending on the hardware components like graphical cards, internal memory & display screen resolutions, some of the application functionality may be limited. The speed and storage capacity of the data may be constrained. The User interface in terms of component layout, color patterns may differ from device to device or make to make.

There are few API constraints with respect to making the mobile application functional on multiple platforms (like android & iOS). The functionality may slightly vary depending on the known limitations of these operating systems.

The application authentication models may vary from ERP product to product. There may be few customizations needed to suit the requirements. As complete warehouse details will be

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exsisiting in the database, it should be maintained in a secure server, also the API scripts which connects the application to the database should also be maintained in the secure server. Camel casing is used as programming convention. For CRUD ‘POST’ will be used as communication protocol over HTTPS layer.

2.6 User Documentation

As part of the project, the following various documents are developed:

1) Software requirements specification document (SRS). The current document.
2) Functional specification and Design documents
3) Test case documents
4) Source code structure document
5) User & trouble shooting document

2.7 Assumptions and Dependencies

The application is being developed based on the requirements provided and subsequent discussion with the stake holders. If there are any changes in terms of the additional software (new operating systems as windows mobile or hardware), then the application may need certain customizations.

It is assumed that the testing is carried on 4 hardware device models (mobile phones) with two different operating systems as discussed with stake holders.

Any scope changes with respect to features and performance requirements may impact the efforts and schedules estimated for this project.

The database schema requirements will be mutually discussed with the application owners and the database design will be signed-off. Any changes in the production database schema at a later date may impact the functionality of the mobile application.

The warehouse administrator provides the access to the required test environments in the user testing phase. Any delays in providing the test environment could lead to delays in final deliverable sign-off.

It is assumed that the development & test teams will have access to the application owners to discuss the progress of the project, provide the clarifications needed to complete the project at various phases of the execution. Any delays from the application owners in providing the required clarifications could lead to delays in completing the project.

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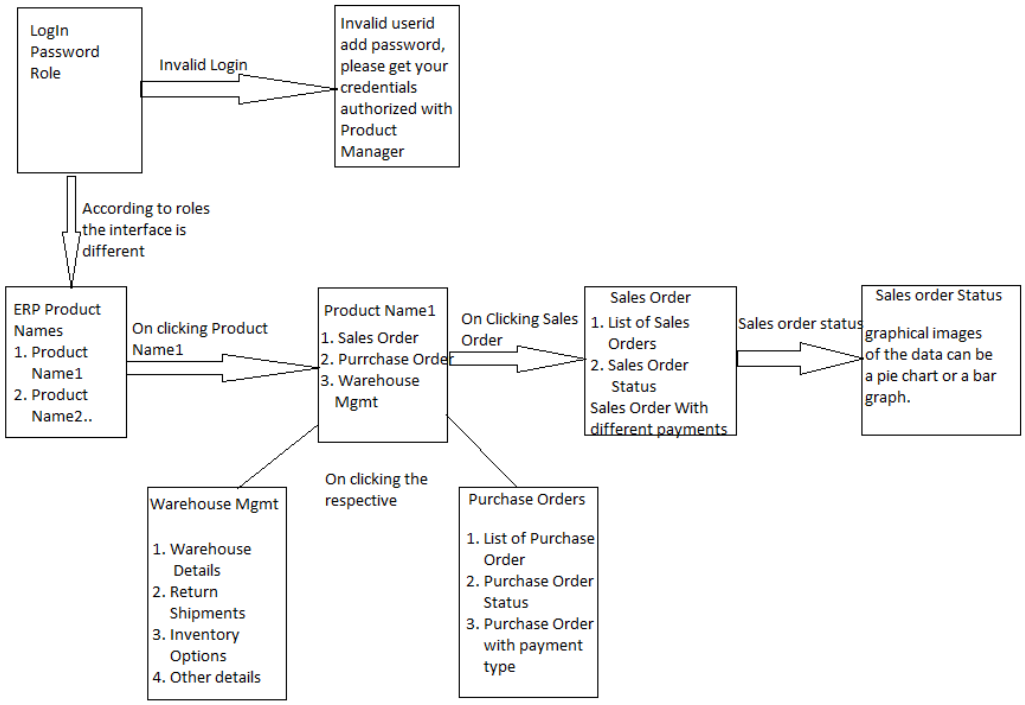
3. External Interface Requirements

3.1 User Interfaces



The following screen shots provide a high level view of the user interface required for the mobile application and the expected report formats. The detailed user interface design and various components will be developed during the design phase. The actual user interface designs will be reviewed by application owners and signed-off.

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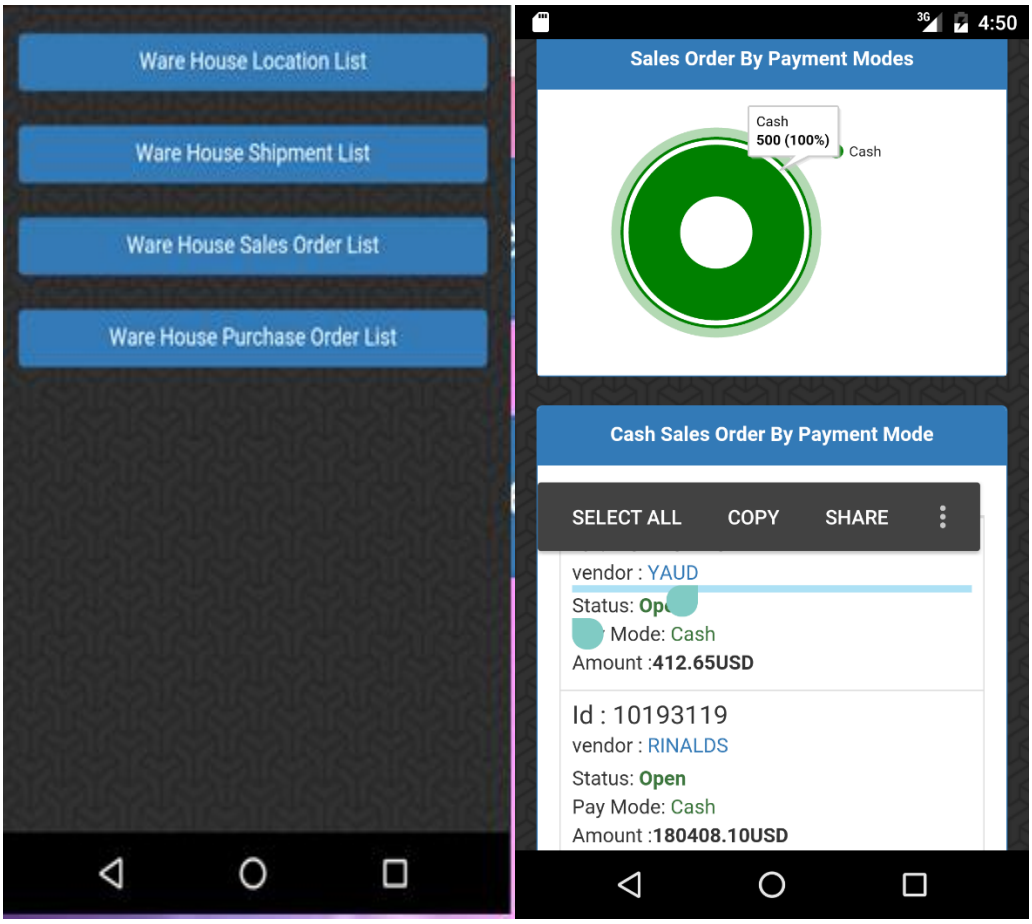

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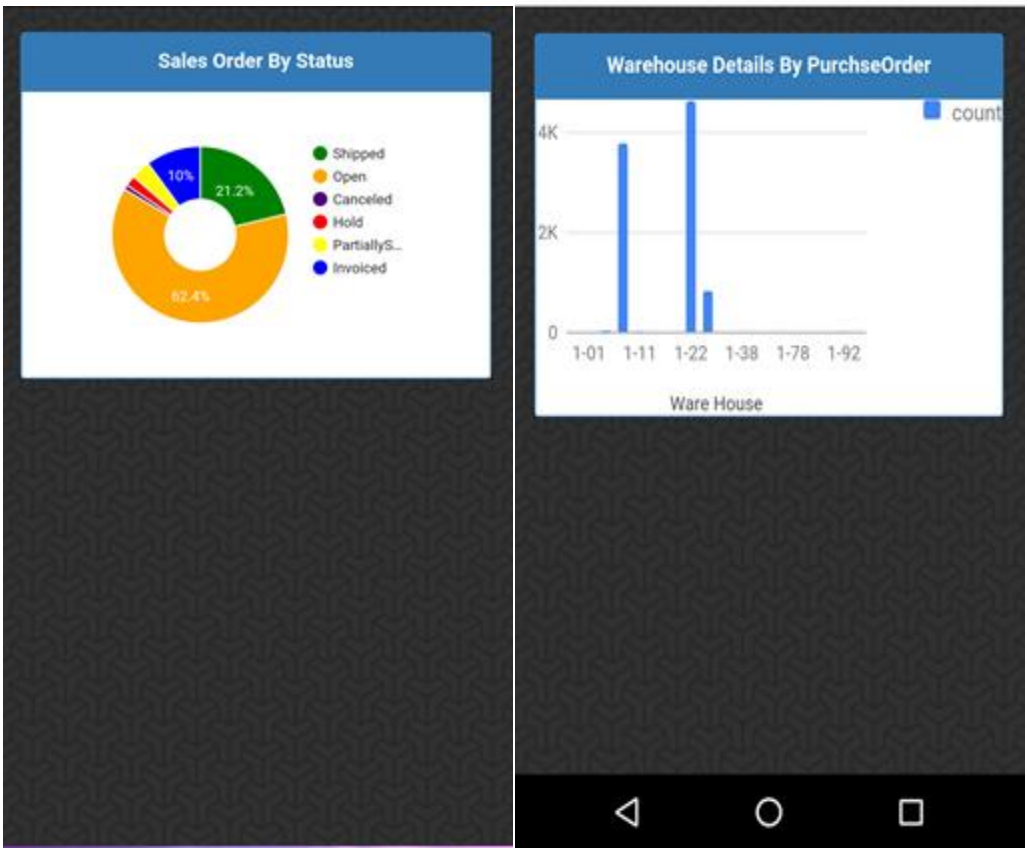

3.2 Hardware Interfaces

The mobile application will have various hardware interfaces between the source (mobile device) and the different components of the system. The mobile device will interface with the application or business logic server (having windows OS) for executing various application functionality requests. The business logic server will interface with an external database server to access the ERP database.

Depending on the size of the database, additional disk storages will be added by the system administrators. The development team will be given access to some of the mobile devices as required during the testing phase by application owners.

3.3 Software Interfaces

The following tools and libraries are required for the development of the product:

1) Install Phone Gap.
   Phone Gap is one of the popular tool which provides framework for developing Hybrid Mobile applications. This tool provides space for web view development and also provides all Phone features APIs.

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Adobe has taken over the PhoneGap. If you are planning to market your app by placing in Appstores then you need to pay some money to Adobe whenever you are placing the app in appstore.

There are many links available on google. You can follow anyone of those and install the PhoneGap framework.

Following are some of the links.

https://www.npmjs.com/package/phonegap

http://docs.phonegap.com/getting-started/1-install-phonegap/cli/

2) Install my SQL database

The SQL database is required to store the ERP data. The server component should interact with SQL database to read and write the data. The Server component need to create proper SQL queries and extract the required data.

http://dev.mysql.com/downloads/

3) Install Tomcat Server

You need to install the Server component where host the server app for interaction with database.

https://tomcat.apache.org/download-70.cgi

4) Install Android Development Tools with Eclipse.

There are many sites which offer this procedure. One can google and find easily. Here are some links for reference.

http://www.theserverside.com/tutorial/Step-by-step-guide-to-Android-development-with-Eclipse

https://www.ibm.com/developerworks/opensource/tutorials/os-eclipse-android/

The interaction with mobile interface with the business logic server and the output of which is sent to the database for extraction of the data and once the data gets approved, the output of business logic server is then displayed for the user. And application is compatible with all operating systems.

Once on clicking another specific button the same cycle goes on, i.e., first message of userid and role goes to the business logic server the data regarding the authorization and authentication of the roles is then sent to database for checking the information, and if the data

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is present the will send the output sent by the business logic server to the interface for further interaction of data with user.

3.4 Communications Interfaces

Client sends the request. That Request goes to the server from the public network (Wi-Fi…) to do a particular action (Login, showing the purchase order report..) then the server communicates with the database to update the things in the database and also to retrieve the data form the database and again the server sends the data to the client according to the clients request. Basic communication channel that will be used is HTTP.

4. Application Features

This section provides a brief description of the various features of the application. A detailed functional specification will be part of the design document.

4.1 Purchase order creation

A **purchase order** (PO) is a commercial commitment and the very first official offer issued by a buyer to a seller, indicating types, quantities, and agreed prices for products or services. It is used to control the **purchases** of the products and services from external suppliers. The mobile application will enable the sales team to create the details of the purchase in the system through this option.

The purchase order creation is an important function in the process to ensure the quick communication of the demand to the concerned teams in the warehouse management. Once the purchase order creation happens in the system, the various divisions will be informed to plan their next plan of action to fulfil the demand.

4.2 View list of purchase orders

This function enables the concerned stake holders to view the list of purchase orders, priorities and demand at any point of time. This will help plan the supply chain management better to meet the demands. The format and the required fields of this view will be provided in detail during the design phase.

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4.3 Delete and update the purchase orders

This function enables the concerned stake holders to delete or update the purchase orders based on the revised order status. The database will be updated accordingly. The screen refreshes the details once the required purchase order is either updated or deleted.

4.4 Sales order reports

This function enables the concerned stake holders to create the various sales orders in an attractive and user friendly interface. The detailed layout is provided in the design document.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The application is expected to meet certain performance criteria. However, there are other dependencies which could cause an impact on these performance criteria depending on the speed of the network, server response time, load etc.

(1) Depending on the nature of the connectivity (mobile data or Wifi), the response time is expected to be in the range of 15 – 25 seconds
(2) The display loading may depend on the data volume and may take 10 – 15 seconds
(3) The number of concurrent users are expected to be 50 in the phase 1 and upto 150 in the phase 2.

5.2 Safety Requirements

The application needs to take proper safety measures to handle the database and concerned data. The exception handling while handling the data updates needs to be handled carefully. The database locking and committing needs to be appropriate so that no data corruption happens through the functionality.

The user scenarios need to tested properly to ensure the application functionality is accurate.

5.3 Security Requirements

The application needs to implement the role based security and authentication mechanism. The various roles are administrator, sales agent, warehouse manager etc. Login credentials and

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roles should be implemented. Need to maintain these in DB with encryption. Appropriate error messages and warning messages need to be displayed.

5.4 Software Quality Attributes

The application needs to be completely tested to ensure the high availability, exception handling, platform independent, help tips wherever required and accurate reporting.

5.5 Business Rules

The application needs to follow the role based access and functionality to ensure the data security. The detailed role based matrix will be provided in the design phase based on the business rules defined by the application owners.

6. Other Requirements

The UI specification and color standards to be discussed and derived with application owners.

Appendix A: Glossary

The following table provides the interpretations or full form of the acronyms and abbreviations used in this document. As the document gets updated, this section will go through changes based on the new additions.

Acronyms/Abbreviations	Full form
SRS	Software Requirements Specification
FS	Functional Specification
DB	Database
WH	Warehouse
OS	Operating system
Android	Mobile phone OS from google
iOS	Mobile phone OS from apple
PO	Purchase Order
UI	User Interface
SQL	Structured Query Language
SE	Software Engineering

Appendix B: Analysis model:

The model we are using is agile model. It is the combination of iterative and Incremental process model.

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Appendix C: To Be Determined List

The list of mobile devices and their exact configurations needs to be finalized

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