

23rd April 2020

CERTIFICATE OF INTERNSHIP

This is to certify that Ms. Kalyani Gokhale, who is pursuing her MCA from Institute of Management and Career Courses, Pune is undergoing her internship with Intellore Systems Pvt Ltd.

She is working on development of “Project Management Dashboard” as part of our development team.

She has interned with us from January 6th 2020 to June 5th 2020

For Intellore Systems Private Ltd.



Prasanna Rege

Director www.intellore.com Intellore Systems Pvt. Ltd.

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Acknowledgement

I am very glad to take this opportunity to acknowledge all those who helped me in designing, developing and successful execution of my Project “**Project Management Dashboard**”.

I would like to extend my thanks and gratitude to my project guide **Dr. Shweta Meshram** (Assistant Professor, IMCC) – Internal Guide and **Mrs. Anushree Aurangabadkar** - External Guide for their valuable guidance and timely assistance throughout the development of this project.

I would also like to extend my thanks and gratitude to **Dr. Santosh Deshpande** (Director, IMCC), **Dr. Ravindra Vaidya** (HOD, IMCC) and **Dr. Manasi Bhate** (Head – Training and Placement, IMCC) for their constant help and support.

Last but not the least, I would like to thank all the teaching and non-teaching faculties for their cooperation.

- Kalyani Gokhale

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CHAPTER 1
INTRODUCTION

1.1 Company Profile

Intellore Systems Pvt. Ltd. is a young company of experienced professionals. The company provides co-creation technology services for our customers and their ecosystem partners enabling each stage of their digital transformation journey for them to innovate and create new value for all the stakeholders. These services, where the IP of the offering belongs to our customer, range from domain-specific intelligent sensor / edge devices to cloud platforms right up to Differentiated / Insightful enterprise applications. These services for today's fast-evolving digital and connected enterprises are based on the solid foundation of vast proven experience and track record in "embedded systems services" and "application software development services" collectively brought in by our founder-directors and the founding-staff. Intellore serves customers from geographies of North America, UK, Europe, Australia and India. In the fast-emerging digital world of blurring industry domains and boundaries, Intellore serves industry verticals such as Intelligent Manufacturing, Intelligent Energy, Intelligent Buildings, Intelligent Healthcare, Intelligent

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Transportation, Intelligent Cities, Intelligent Work-sites and Intelligent Digital Platforms. Intellore's Partnering Solutions comprises the "resource-based" (ODC, FTE, T & M) engagement models where we specialize in assembling and managing dedicated teams of highly skilled technical professionals to augment your in-house resources as well as "project-based" engagements that deliver the exact scope-of-work based on our experience, expertise, knowledge and reusable frameworks for a fixed price.

1.2 Existing System and Need for system

Information is fragmented and in various files-

- Order Bookings are stored in spreadsheets.
- Project details (timesheet data) stored in Microsoft Project files.
- Resource management is excel based.

There is no integration between Order booking process and Order Approval process.

Project forecasting is a manual process.

system for managing projects.

Effects:

- 1) Prone for errors
- 2) Duplication of information

3) Increased human effort

Currently there is no such tool that meets this requirement where a project can be tracked from receipt of its order to closure. Hence there arises a need to develop an integrated project management dashboard to monitor financial health of projects and resource utilization.

1.3 Scope of work

The product consists of following modules:

User/Role Management Module

- 1) Register Site Admin
- 2) Creates other users and assigns roles

Order Booking Module

1) Order is received

2) Sales person enters Purchase order (PO) info in system

along with following information:-

1) Adds existing customer or new customer

2) Purchase Order number and date

3) PO Value and Currency

4) Exchange rate

5) Cost information (hours of labour, external costs)

6) Invoice milestones

Above SPO is submitted to Sales approver and Operations manager and Sales Approver for approval.

3) Operations manager approves of Order Booking and assigns a Project Manager for the same.

Project Management Module

10 Project Manager enters forecast for project duration.

7 On a monthly basis Project Manager

9) Updates actual external costs

10) Enters invoicing data

- Updates forecasts

Project Management Module

Project Manager performs following tasks-

1. Adds New Resource along with their information such as Discipline, Skill etc.
2. Updates Resource capacity for current and upcoming months.
43. Assigns resources (and allocates hours budget)

Reporting Module

- 1) [View Sales Summary](#)~~Finding~~
- 2) Project schedule performance
- 3) [View Project cost performance](#)
- 4) [Resource utilization](#)

1.4 Operating Environment

HARDWARE REQUIREMENTS –

PROCESSOR : i3 3rd Gen Quad core

HARD DISK : 200GB

RAM : 16GB

OUTPUT DEVICES : LCD Monitor, Printer

INPUT DEVICES : Keyboard, Mouse

SOFTWARE REQUIREMENTS –

Server Side -

OPERATING SYSTEM- Any operating system

FRONT END- React JS, Bootstrap, CSS

BACK END - Mongo DBB

Client Side -

OPERATING SYSTEM- Any operating system

WEB BROWSER- Mozilla Firefox, Google Chrome or any compatible web browser

1.5 Detail Description of technology used

Front End :

React JS :

1) Declarative-

2) React makes it painless to create interactive UIs. Design simple views for each state in your application, and React will efficiently update and render just the right components when your data changes. Declarative views make your code more predictable and easier to debug.

3) Component-Based

Build encapsulated components that manage their own state, then compose them to make complex UIs.

Since component logic is written in JavaScript instead of templates, you can easily pass rich data through your app and keep state out of the DOM.

4) Learn Once, Write Anywhere

We don't make assumptions about the rest of your technology stack, so you can develop new features in React without rewriting existing code.

React can also render on the server using Node and power mobile apps using React Native.

5) A Simple Component

React components implement a `render()` method that takes input data and returns what to display. This example uses an XML-like syntax called JSX. Input data that is passed into the component can be accessed by `render()` via `this.props`.

JSX is optional and not required to use React. Try the Babel REPL to see the raw JavaScript code produced by the JSX compilation step.

6) A Stateful Component

In addition to taking input data (accessed via `this.props`), a component can maintain internal state data (accessed via `this.state`). When a component's state data changes, the rendered markup will be updated by re-invoking `render()`.

7) An Application

Using props and state, we can put together a small Todo application. This example uses state to track the current list of items as well as the text that the user has entered. Although event handlers appear to be rendered inline, they will be collected and implemented using event delegation.

8) A Component Using External Plugins

React allows you to interface with other libraries and frameworks. This example uses **remarkable**, an external Markdown library, to convert the `<textarea>`'s value in real time.

Middleware :

Node JS :

As an asynchronous event-driven JavaScript runtime, Node.js is designed to build scalable network applications. In the following "hello world" example, many connections can be handled concurrently. Upon each connection, the callback is fired, but if there is no work to be done, Node.js will sleep.

This is in contrast to today's more common concurrency model, in which OS threads are employed. Thread-based networking is relatively inefficient and very difficult to use. Furthermore, users of Node.js are free from worries of dead-locking the process, since there are no locks. Almost no function in Node.js directly performs I/O, so

the process never blocks. Because nothing blocks, scalable systems are very reasonable to develop in Node.js.

If some of this language is unfamiliar, there is a full article on [Blocking vs. Non-Blocking](#).

Node.js is similar in design to, and influenced by, systems like Ruby's Event Machine and Python's Twisted. Node.js takes the event model a bit further. It presents an event loop as a runtime construct instead of as a library. In other systems, there is always a blocking call to start the event-loop. Typically, behavior is defined through callbacks at the beginning of a script, and at the end a server is started through a blocking call like `EventMachine::run()`. In Node.js, there is no such start-the-event-loop call. Node.js simply enters the event loop after executing the input script. Node.js exits the event loop when there are no more callbacks to perform. This behavior is like browser JavaScript — the event loop is hidden from the user.

HTTP is a first-class citizen in Node.js, designed with streaming and low latency in mind. This makes Node.js well suited for the foundation of a web library or framework.

Node.js being designed without threads doesn't mean you can't take advantage of multiple cores in your environment. Child processes can be spawned by using our `child_process.fork()` API, and are designed to be easy to communicate with. Built upon that same interface is the cluster module, which allows you to share sockets between processes to enable load balancing over your cores.

Backend :

MongoDB :

MongoDB is a document database with the scalability and flexibility that you want with the querying and indexing that you need.

MongoDB is cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with schema. MongoDB

is developed by MongoDB Inc. and licensed under the Server Side Public License (SSPL).

Main features

Ad hoc queries

MongoDB supports field, range query, and regular expression searches.^[9] Queries can return specific fields of documents and also include user-defined JavaScript functions. Queries can also be configured to return a random sample of results of a given size.

Indexing

Fields in a MongoDB document can be indexed with primary and secondary indices.

Replication

MongoDB provides high availability with replica sets. A replica set consists of two or more copies of the data. Each replica set member

may act in the role of primary or secondary replica at any time. All writes and reads are done on the primary replica by default. Secondary replicas maintain a copy of the data of the primary using built-in replication. When a primary replica fails, the replica set automatically conducts an election process to determine which secondary should become the primary. Secondaries can optionally serve read operations, but that data is only eventually consistent by default.

Load balancing

MongoDB scales horizontally using sharding. The user chooses a shard key, which determines how the data in a collection will be distributed. The data is split into ranges (based on the shard key) and distributed across multiple shards. (A shard is a master with one or more replicas.). Alternatively, the shard key can be hashed to map to a shard – enabling an even data distribution.

MongoDB can run over multiple servers, balancing the load or duplicating data to keep the system up and running in case of hardware failure.

File storage

MongoDB can be used as a file system, called GridFS, with load balancing and data replication features over multiple machines for storing files.

This function, called grid file system, is included with MongoDB drivers. MongoDB exposes functions for file manipulation and content to developers. GridFS can be accessed using mongofiles utility or plugins for Nginx and lighttpd. GridFS divides a file into parts, or chunks, and stores each of those chunks as a separate document.

Aggregation

MongoDB provides three ways to perform aggregation: the aggregation pipeline, the map-reduce function, and single-purpose aggregation methods.

Map-reduce can be used for batch processing of data and aggregation operations. But according to MongoDB's documentation, the Aggregation Pipeline provides better performance for most aggregation operations.

The aggregation framework enables users to obtain the kind of results for which the SQL GROUP BY clause is used. Aggregation operators can be strung together to form a pipeline – analogous to Unix pipes. The aggregation framework includes the \$lookup operator which can join documents from multiple collections, as well as statistical operators such as standard deviation.

Server-side JavaScript execution

JavaScript can be used in queries, aggregation functions (such as MapReduce), and sent directly to the database to be executed.

Capped collections

MongoDB supports fixed-size collections called capped collections. This type of collection maintains insertion order and, once the specified size has been reached, behaves like a circular queue.

Transactions

Support for multi-document ACID transactions was added to MongoDB with the General Availability of the 4.0 release in June 2018.

CHAPTER 2
PROPOSED SYSTEM

2.1 Proposed System

The Project Management System is divided into workflows based on the role of the User

1) User Management Workflow- Site Admin

The site admin has to sign up to use the system. He will enter the following details-

- First Name
- Last Name
- Email ID
- Password

He is shown the landing page where he has to fill in organization details to set up the system.

- Company Name
- Country
- Organization Strength
- Home Currency
- Hourly Burdened Cost- actual cost of a company to have an employee, aside from the salary the employee

earns. Labor burden costs include benefits that a company must, or chooses to, pay for employees included on their payroll

Site Admin adds additional users which can further use this system-

- Sales User
- Operations Manager
- Project Manager

2) Sales Workflow- Sales User

Sales User is categorized into two types, Sales Manager (higher management) and Sales User.

Sales User logs in the application.

He is shown Sales Order Summary for last 12 months, which have been created by him. He can change the date range by entering appropriate 'From' and 'To' months and clicks on Apply to filter the orders.

He clicks on Sales Order Entry button in the sidebar and the entire form for entry is displayed.

If customer is an existing one, he selects the customer name from the dropdown list and entire information about the customer gets prepopulated. User can later edit all this data.

User supplies all information on Sales Order Entry such as-

- Engagement Model- T&M (hourly rate) or Lumpsum (fixed rate)
- Service Type and Deliverable Type- Hardware, Services, Reimbursement, Embedded, Software and Hybrid.
- Order Type- Original or Change Order
- Purchase Order Details
- Project No. and Name – Project No. is generated automatically. User can input the name for the project. This project is linked to the current order.
- Cost Component

As and when user enters all this data, Gross Margin and Gross Margin % is shown to the user. He can save all this data and

click on Submit for approval for the order to be approved by higher management.

He is redirected to Sales Order Approval screen. Here, user enters the user id of the approvers, which are Sales Order Approver (By Sales Manager) and Operations Approver (Operations Manager) and clicks on Submit. The order is then sent to the respective managers for their review.

3) Order Approval Workflow

The order is then sent to the Sales Approver (Manager) for review. He can view the approvals list on the Approve Sales Order screen and can perform three operations by clicking on any of the following buttons-

- Review Order- User can review the order
- Reject Order- Upon clicking this option a popup appears where he can supply reason for rejecting the order and when he submits it the Sales User responsible for booking the order is sent an email along with the rejection reason.

- Approve Order- The order is then sent to the Operations Manager for his approval.

The Operations Manager logs into the system and sees a list of orders awaiting his approval by clicking on Accept Sales Order tab from the sidebar.

He can also perform tasks like Review Order, Approve and Reject order. While accepting the order, he has to assign a Project Manager to the order first.

4) Operations Workflow

When Operations Manager logs in to the system, he is shown the Operations Dashboard where he can view Overall Project Schedule Performance and Project Cost Performance.

When he clicks on Overall Project Schedule Performance, he is redirected to My Projects Dashboard screen where he gets an entire overview of all projects approved by him.

He can view status of the projects by selecting month from the calendar range for a filtered view.

Project details such as Project Number, booked margin is shown along with other details like EAC Margin, Unbilled revenue (described in the detailed summary)

To get a detailed summary, user has to select a project name and he is redirected to Project Detailed Summary page.

On this page, user can view details of project such as Customer name, Project Name, Order Value, Revenue budget, Cost budget, Booked Margin and Booked Margin % (which are prepopulated)

He is shown costs for all the months from when the project started upto the current month. They are following-

- ITD Cost
- ITD Revenue
- Current Month Cost
- Current Month Revenue
- ETC Cost
- ETC Revenue
- EAC Cost

- EAC Revenue
- EAC Margin %
- Unbilled Revenue

If the unbilled revenue is a negative number, it can be a point of concern for management's decision making process.

5) Project Management Workflow – Project Manager

When this user logs into the system, he sees the Projects Dashboard to get an overview of all projects assigned to him.

To get detailed summary of any project, he can click on a project name and then he is directed to Projects Detailed Summary page (same as which is displayed to the Operations Manager)

The Project Manager can add Cost and Revenue for this month, and can get an overview of the project's status.

He can view the Actuals and update Forecast by clicking on Update Actuals and Forecast button. He is then redirected to this page, where he is shown default actuals (view only) and he can add costs procured for the current month, which in turn raises an invoice. He can save these costs and then can be redirected to detailed summary of the

project where he can see the change in the unbilled revenue of the project, which was updated when an invoice was raised for the current month, which is calculated by subtracting Invoice value from Unbilled Revenue. The change is further reflected on the project dashboard as well.

6) Resource Management Workflow- Project Manager

Project Manager can add resources to be allocated to the projects under this flow.

He has to add the following details-

- Resource Name
- Discipline
- Skill
- Type
- Active

User has to update capacity of the resource under Resource Capacity screen for current and future months

User allocates resources to certain projects under Resource Allocation screen. User has to select Customer and Project Name, Required Skill and then he gets a list of available resources whose skill matches with the required skill. He selects desired resource name and then assigns them to that project. He then allocates resource for current and future months. The allocation is calculated by subtracting the inavailability of the resource (which depends on factors like active/ inactive, and any other allocation for other project) from their capacity.

7) Reporting Module- all users

This view is available for all users to get an overview of all the factors of the system such as Sales Order entries, Resource Allocation, Project Cost and Schedule Performance, etc.

2.2 Objectives of System

Our goal is to develop an integrated project management dashboard to monitor financial health of projects and resource utilization as currently there is no such tool that meets this requirement where a project can be tracked from receipt of its order till it's closure.

The Project Management System will be having different users and the objectives of the system can be categorized based on the type of the user-

1. Site Admin

Site admin must be able to signup in the system using his credentials. He must be able to setup organization details and add users along with their department and roles.

2. Sales User

He must be able to log into the system using his login credentials and he should be displayed Sales Order Summary for a period of 12 months.

Sales User should be able to add new order into the system using Sales Order Entry.

He should be able to add new Customer if the order is not for the existing customer.

He should be able to submit the order for Approval.

In the Approvals Workflow he must be able to select user ID for Sales Order Approver (Sales Manager) and Operations Manager to submit for approval.

The Sales Approver should be able to see a list of orders awaiting for his approval in the Approve Sales Order screen. He should be able to review the order, accept or reject it.

3. Operations Manager

When the Ops Manager logs into the system he should be able to see Operations Dashboard. He should be able to get redirected to the Projects Dashboard to get an overview of all the projects approved by him. If he has orders awaiting his acceptance, he should be able to view

that list in the Accept Sales Order screen. When he accepts an order, he should be able to assign a Project Manager to it.

The Ops Manager should be able to view detailed summary of a project in the Project Detailed Summary screen. This overview is necessary for management's decision making process.

4. Project Manager

The Project Manager should be able to login and view his dashboard in the My Projects Dashboard view. In this view he will find all the projects which have been assigned to him. He can click on any project and get an entire view of the project costs.

He can update actuals and forecast by clicking on Update Actuals and Forecast button which redirects him to that page. Here he can view all the actuals and be able to add costs for forecasting. These changes should be reflected in the project costs in the Project Detailed Summary view. He should be able to add new resources in the Resource Management view.

He should be able to enter valid details such as resource name, discipline, type and skill of the resource.

He should be able to update capacity of the resources for current and future months (forecasting) in Resource Capacity view.

In the Resource Allocation view, he should be able to allocate resources to different projects and plan allocation for future months.

2.3 User Requirements

The client wants to add following functionalities in the system.

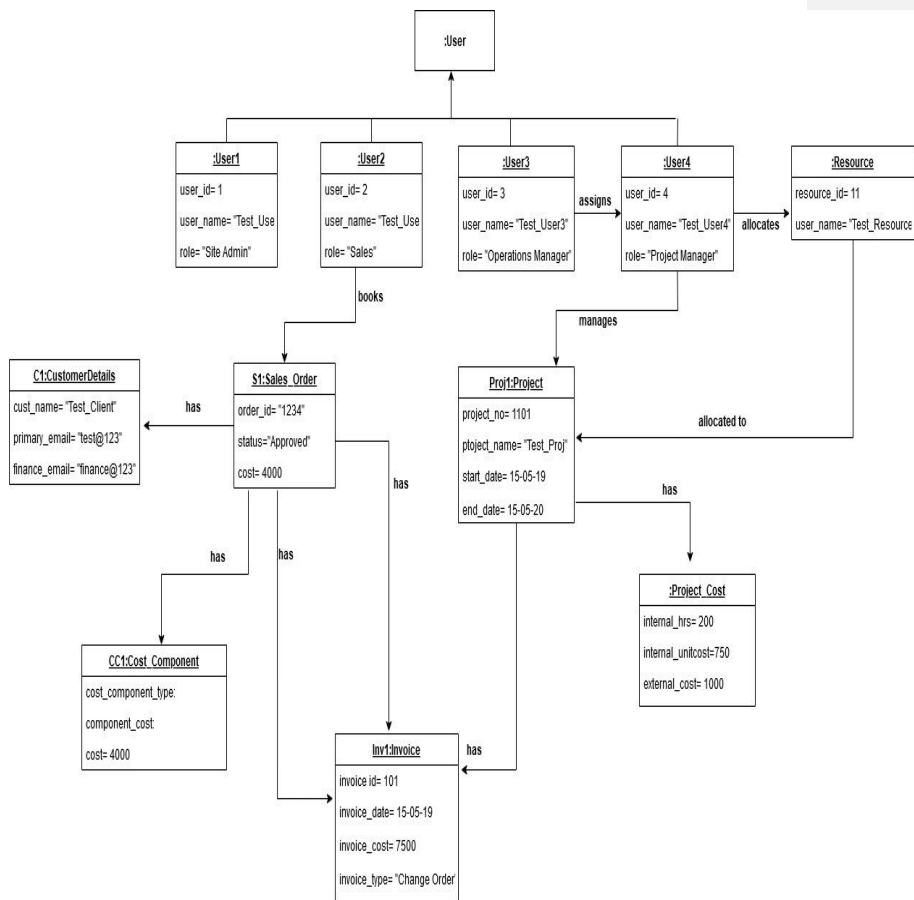
- Any user with the valid credentials must be able to log into the system.
- The user should be able to access screens specific to the role of the user. Although this functionality is yet to be completely developed, currently user can only access screens specific to the role.

For example, Site Admin should only have access to User Management flow. Sales user can only have access to create/edit an order and be able to view Sales Summary with respect to all the orders booked by him. Only he should have access to Approvals Workflow. Operations manager should have an overview of overall project cost and schedule performance. He should not have access to Resource Management workflow, inlike Project Managers. Project Manager must only have access to all the projects that have been assigned to him. He should be able to update actuals and forecast costs for a project.

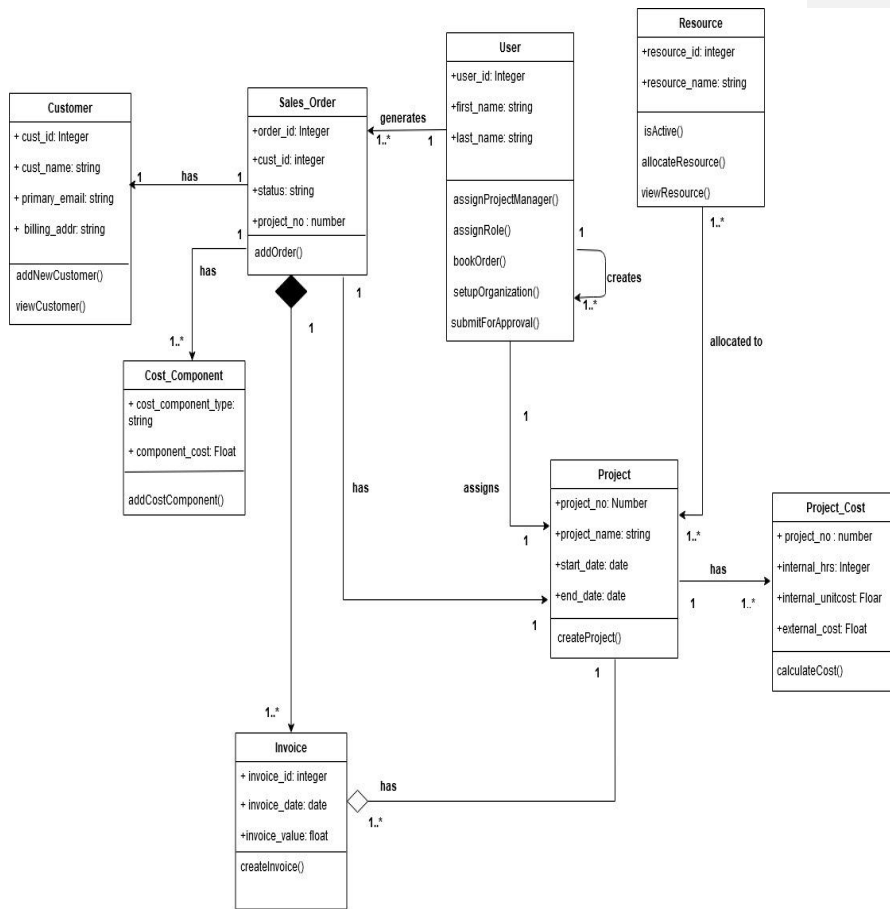
- While rejecting an order, the rejection reason must be mailed to the Sales User for his scrutiny.
- Resource allocation must match with Internal Hours cost.
- Colouring conventions for EAC margin % in the order of their importance :-
 - A. Green – if EAC % higher than booked margin.
 - B. Amber- if EAC% lower than booked margin but higher than 20%
 - C. Red- if less than 20%

CHAPTER 3
ANALYSIS & DESIGN

3.1 Object Diagram

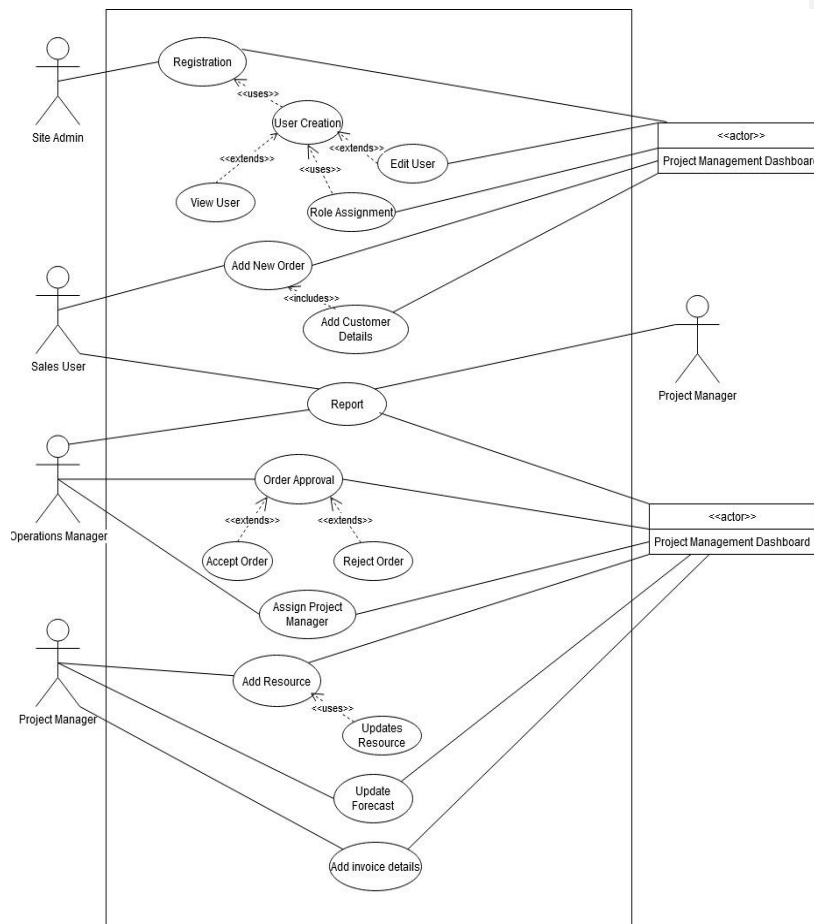


3.2 Class Diagram

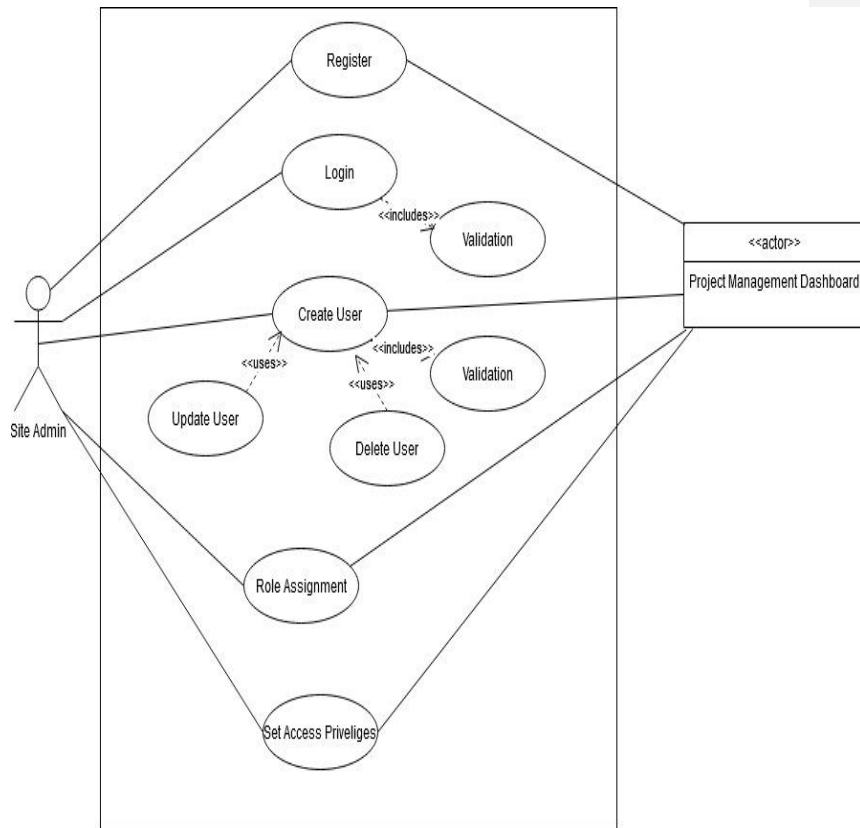


2.33.3 Use Case Diagrams

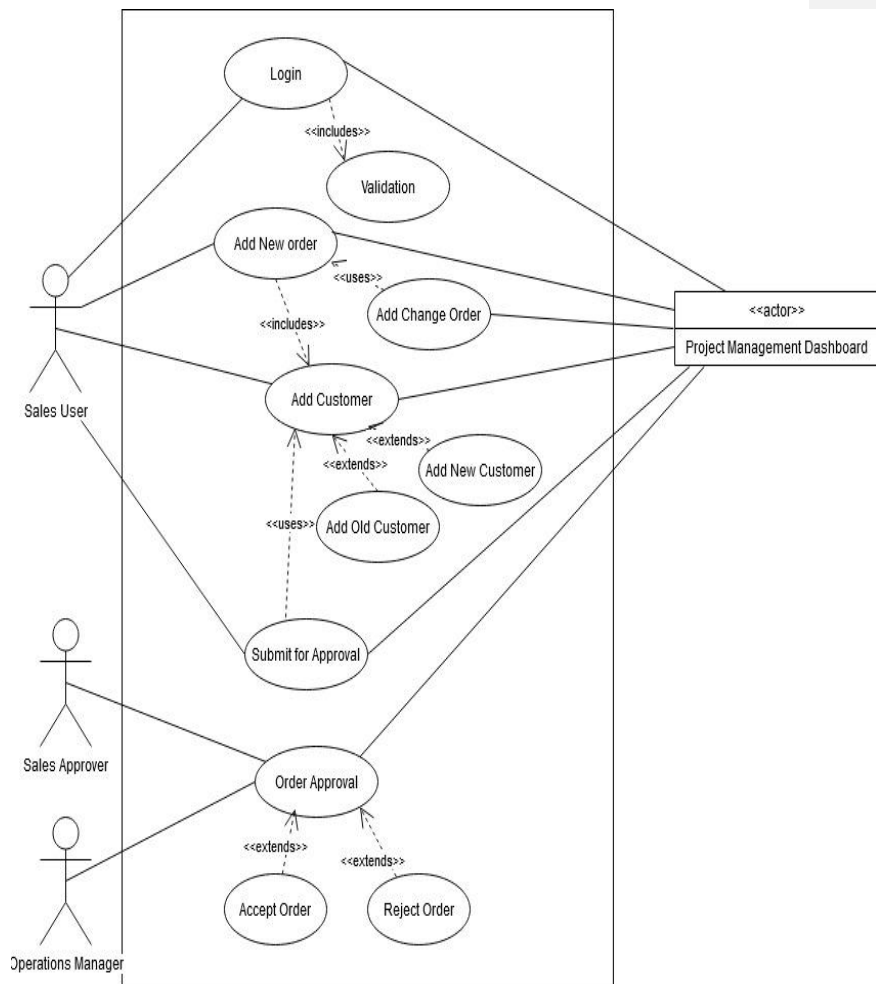
1) Main use-case diagram



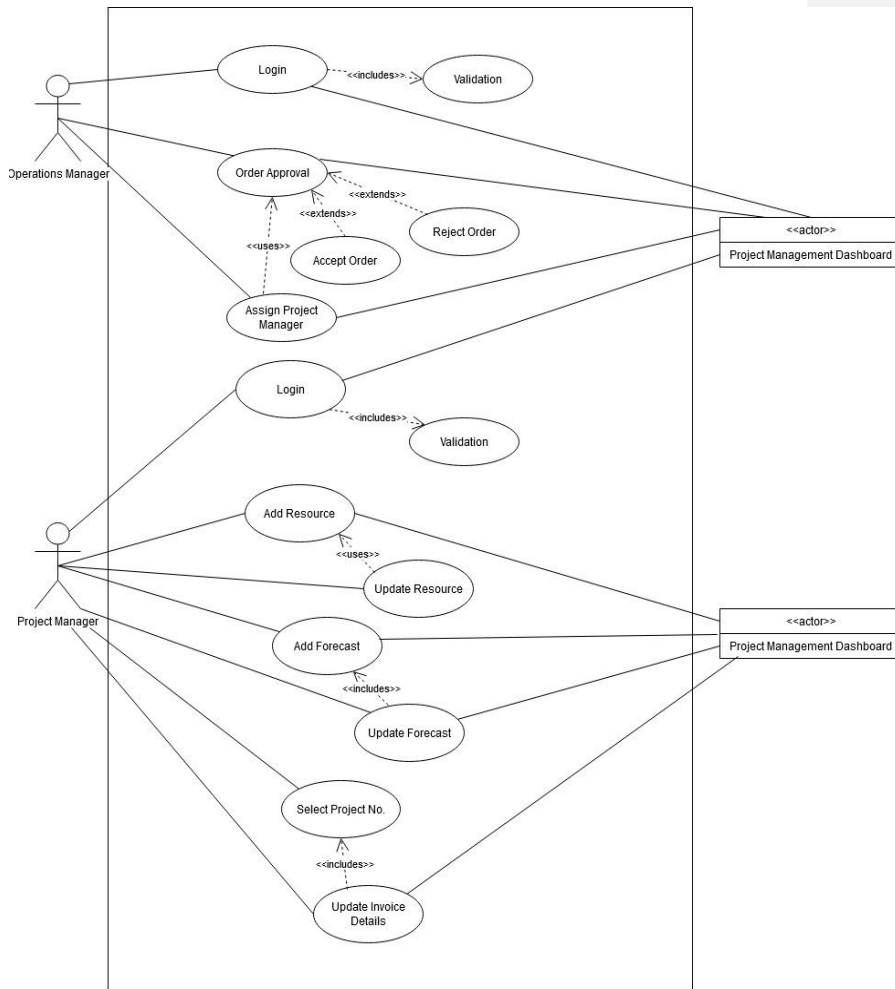
2) User-Creation



3) Order Booking

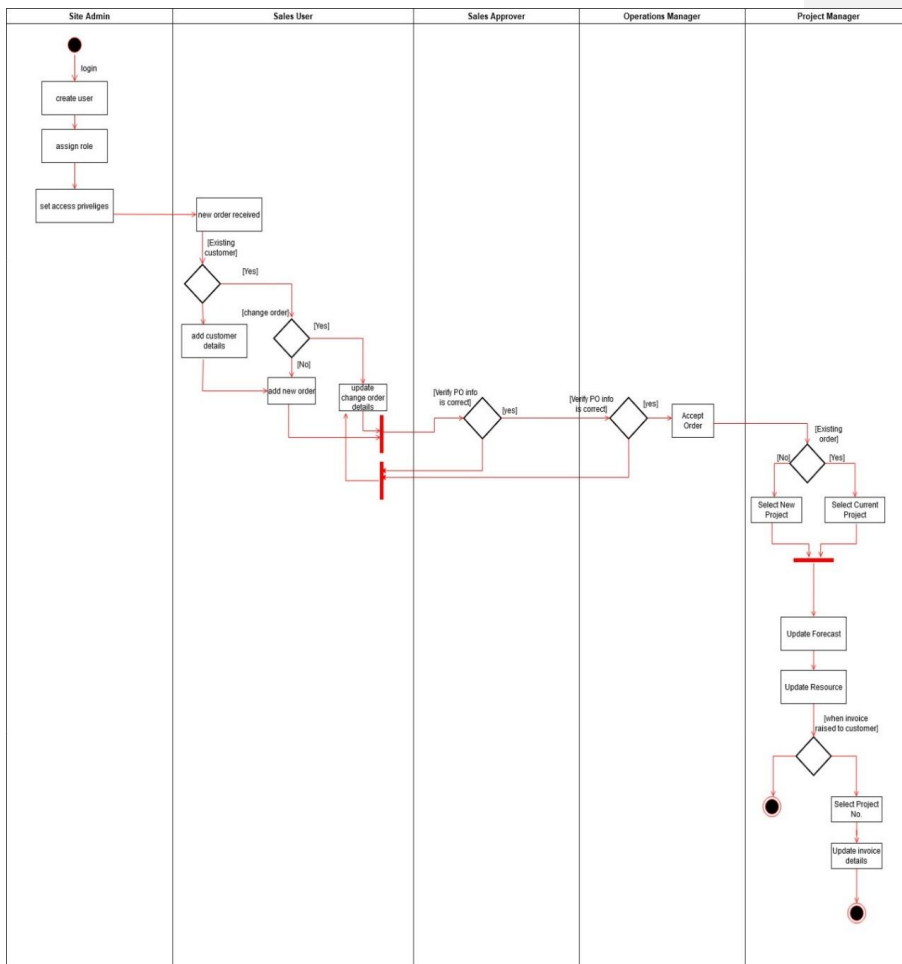


4) Project Management



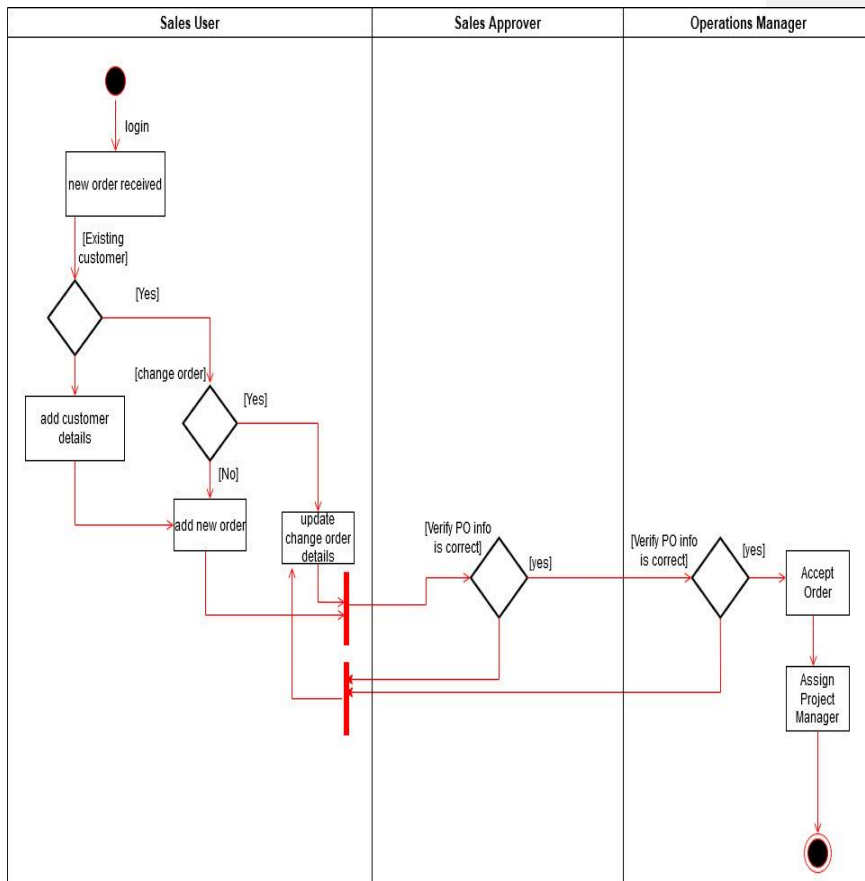
3.4 Activity Diagram

4.1) Main

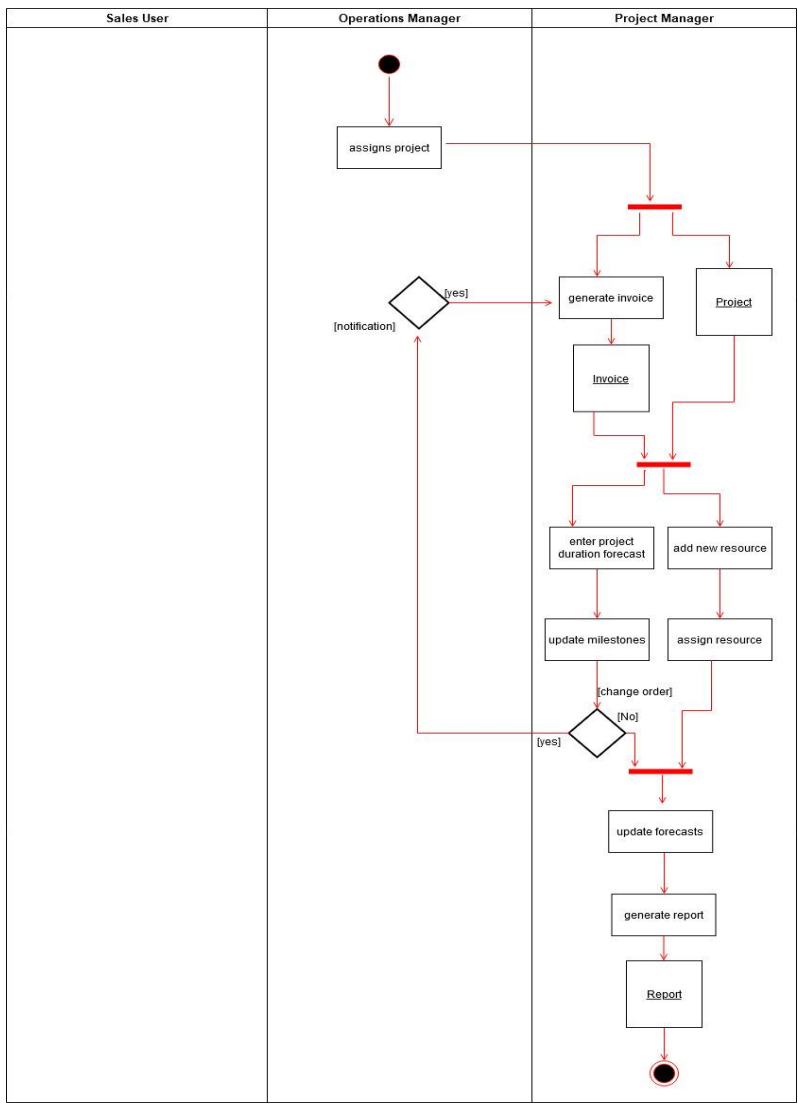


5.2) Order

Booking

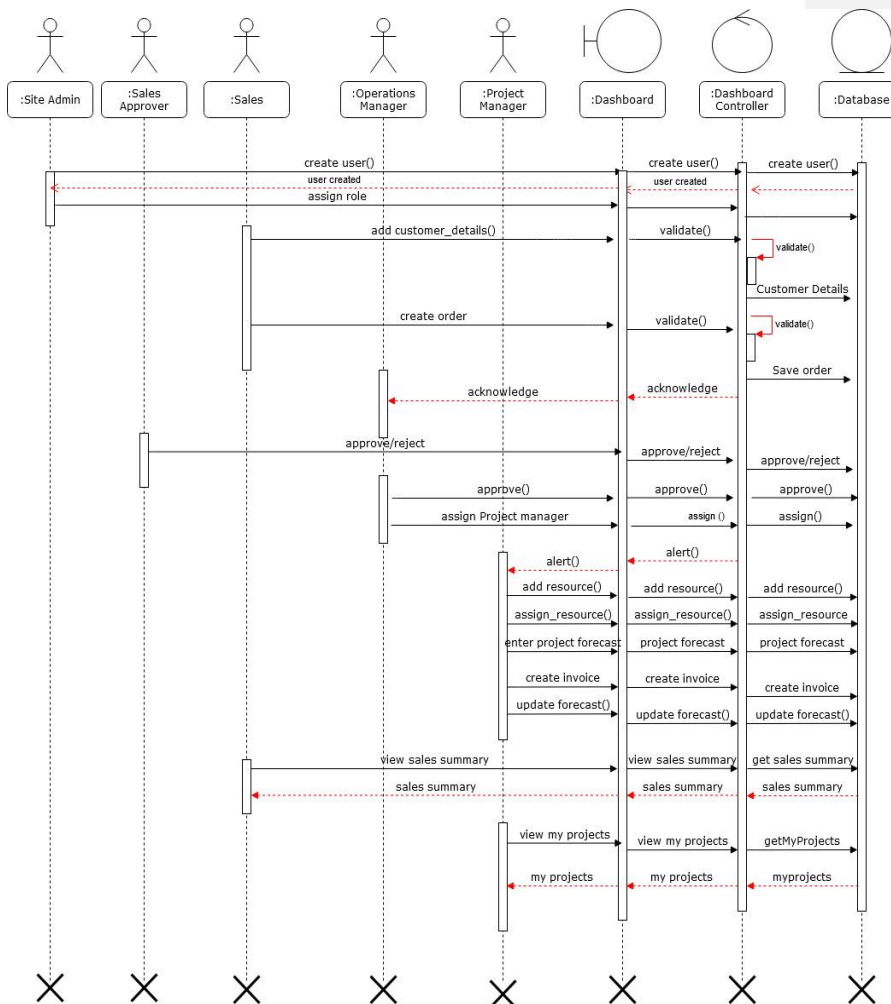


6.3) Project Management

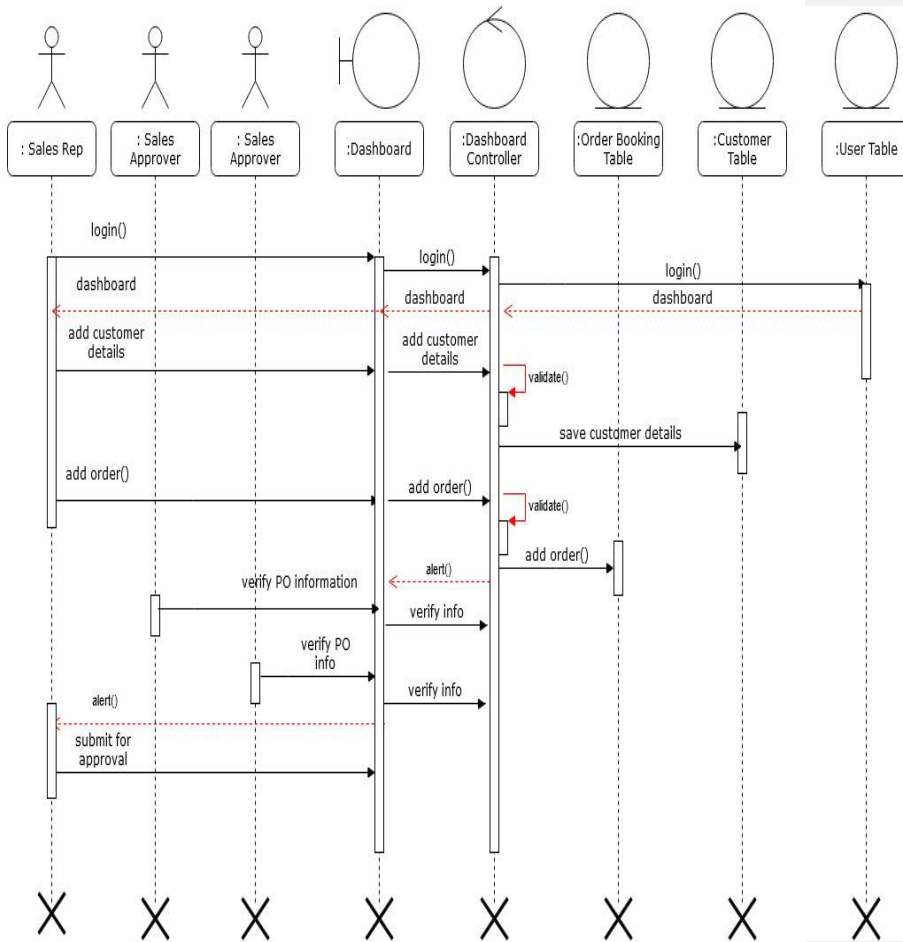


2.43.4 Sequence Diagrams

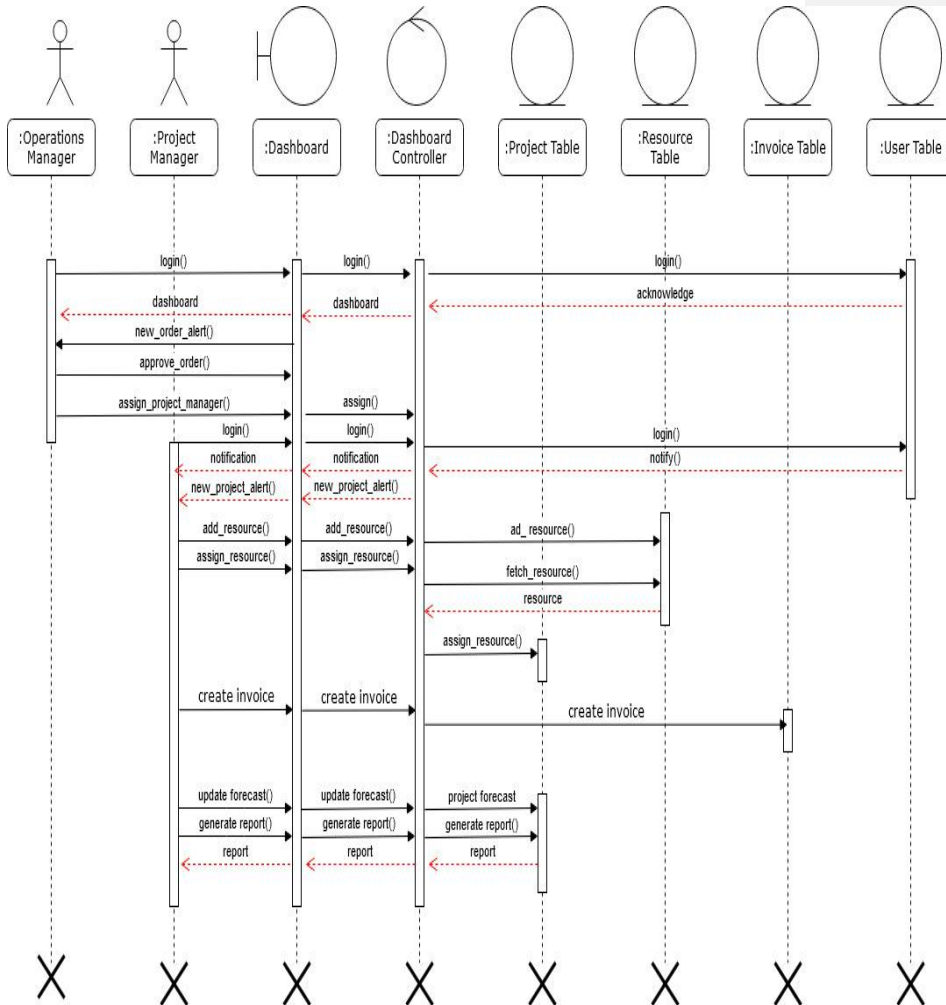
1) Main



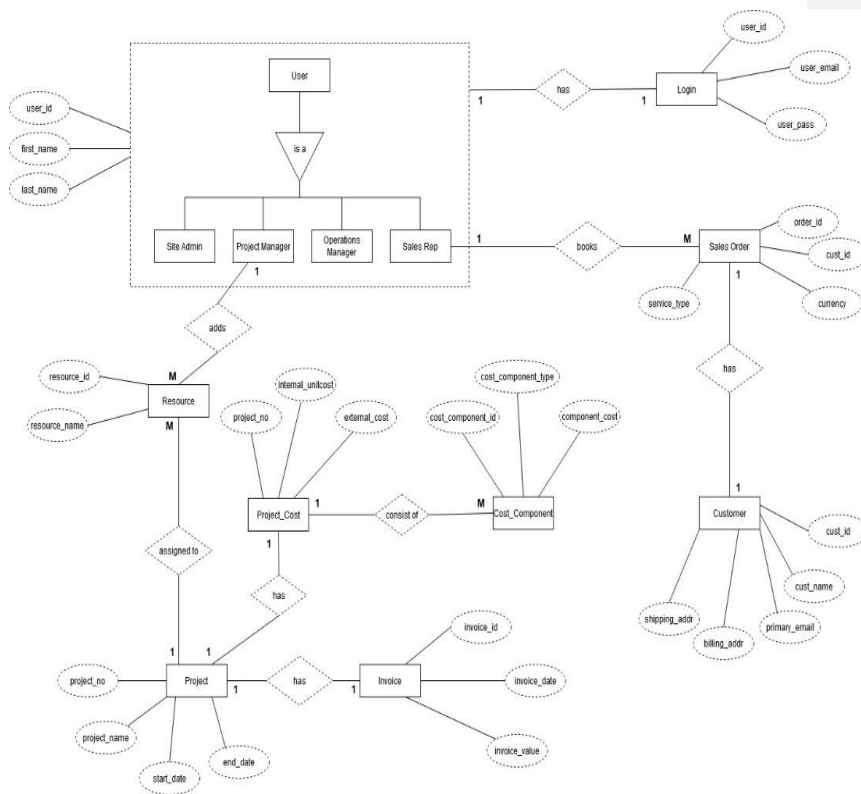
2) Order Booking



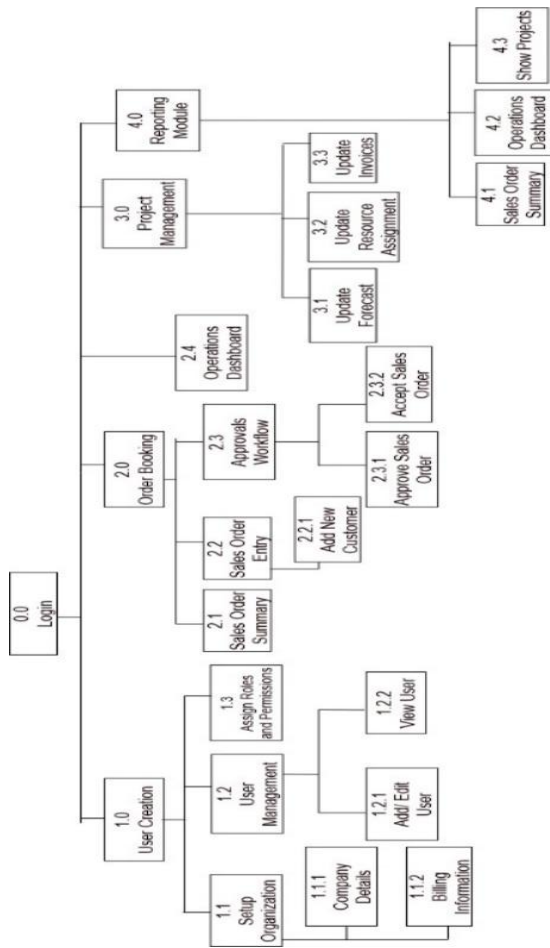
3) Project Management



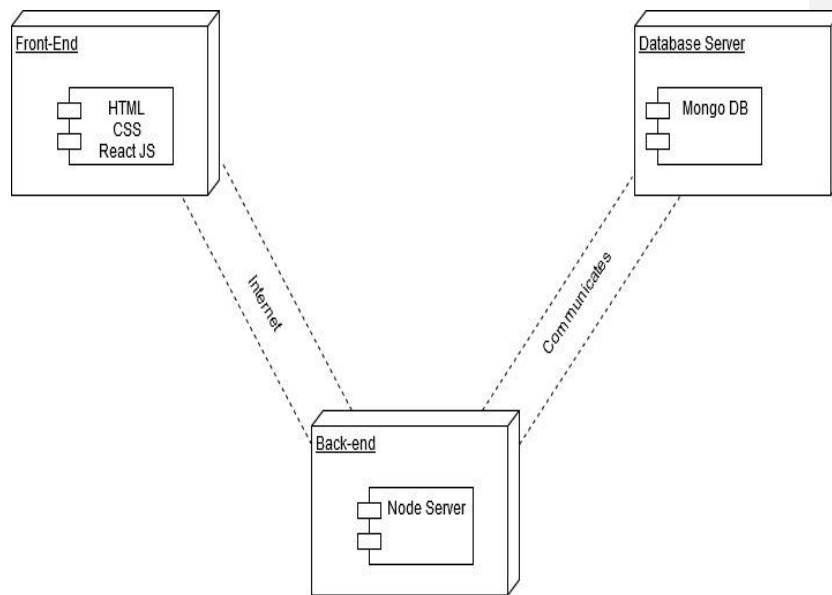
3.6 Entity Relationship Diagram



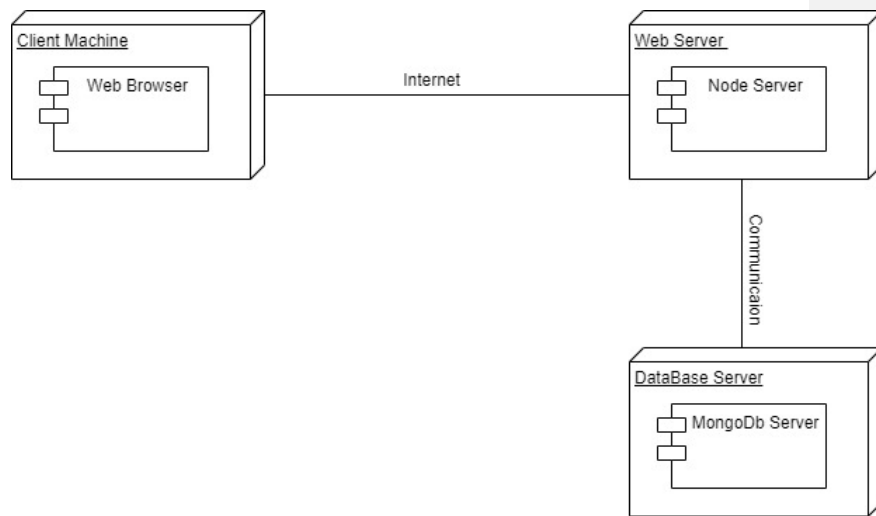
3.7 Module Hierarchy Diagram



3.8 Component Diagram



3.9 Deployment Diagram



3.10 Module Specifications

Project management system is divided into modules where functionalities are based on the role of the user.

1) User Management Module-

The site admin has to sign up to use the system. He will enter the following details-

- First Name
- Last Name
- Email ID
- Password

He is shown the landing page where he has to fill in organization details to set up the system.

- Company Name
- Country
- Organization Strength
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- Operations Manager
- Project Manager

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Sales User logs in the application.

He is shown Sales Order Summary for last 12 months, which have been created by him. He can change the date range by

entering appropriate 'From' and 'To' months and clicks on Apply to filter the orders.

He clicks on Sales Order Entry button in the sidebar and the entire form for entry is displayed.

If customer is an existing one, he selects the customer name from the dropdown list and entire information about the customer gets prepopulated. User can later edit all this data.

User supplies all information on Sales Order Entry such as-

- Engagement Model- T&M (hourly rate) or Lumpsum (fixed rate)
- Service Type and Deliverable Type- Hardware, Services, Reimbursement, Embedded, Software and Hybrid.
- Order Type- Original or Change Order
- Purchase Order Details
- Project No. and Name – Project No. is generated automatically. User can input the name for the project. This project is linked to the current order.

- Cost Component

As and when user enters all this data, Gross Margin and Gross Margin % is shown to the user. He can save all this data and click on Submit for approval for the order to be approved by higher management.

He is redirected to Sales Order Approval screen. Here, user enters the user id of the approvers, which are Sales Order Approver (By Sales Manager) and Operations Approver (Operations Manager) and clicks on Submit. The order is then sent to the respective managers for their review.

The order is then sent to the Sales Approver (Manager) for review. He can view the approvals list on the Approve Sales Order screen and can perform three operations by clicking on any of the following buttons-

- Review Order- User can review the order
- Reject Order- Upon clicking this option a popup appears where he can supply reason for rejecting the order and when he submits it the Sales User responsible

for booking the order is sent an email along with the rejection reason.

- Approve Order- The order is then sent to the Operations Manager for his approval.

The Operations Manager logs into the system and sees a list of orders awaiting his approval by clicking on Accept Sales Order tab from the sidebar.

He can also perform tasks like Review Order, Approve and Reject order. While accepting the order, he has to assign a Project Manager to the order first.

3) Operations Module

When Operations Manager logs in to the system, he is shown the Operations Dashboard where he can view Overall Project Schedule Performance and Project Cost Performance.

When he clicks on Overall Project Schedule Performance, he is redirected to My Projects Dashboard screen where he gets an entire overview of all projects approved by him.

He can view status of the projects by selecting month from the calendar range for a filtered view.

Project details such as Project Number, booked margin is shown along with other details like EAC Margin, Unbilled revenue (described in the detailed summary)

To get a detailed summary, user has to select a project name and he is redirected to Project Detailed Summary page.

On this page, user can view details of project such as Customer name, Project Name, Order Value, Revenue budget, Cost budget, Booked Margin and Booked Margin % (which are prepopulated)

He is shown costs for all the months from when the project started upto the current month. They are following-

- ITD Cost
- ITD Revenue
- Current Month Cost
- Current Month Revenue
- ETC Cost

- ETC Revenue
- EAC Cost
- EAC Revenue
- EAC Margin %
- Unbilled Revenue

If the unbilled revenue is a negative number, it can be a point of concern for management's decision making process.

4) Project Management Module-

When this user logs into the system, he sees the Projects Dashboard to get an overview of all projects assigned to him.

To get detailed summary of any project, he can click on a project name and then he is directed to Projects Detailed Summary page (same as which is displayed to the Operations Manager)

The Project Manager can add Cost and Revenue for this month, and can get an overview of the project's status.

He can view the Actuals and update Forecast by clicking on Update Actuals and Forecast button. He is then redirected to this page, where

he is shown default actuals (view only) and he can add costs procured for the current month, which in turn raises an invoice. He can save these costs and then can be redirected to detailed summary of the project where he can see the change in the unbilled revenue of the project, which was updated when an invoice was raised for the current month, which is calculated by subtracting Invoice value from Unbilled Revenue. The change is further reflected on the project dashboard as well.

5) Resource Management Module-

Project Manager can add resources to be allocated to the projects under this flow.

He has to add the following details-

- Resource Name
- Discipline
- Skill
- Type

- Active

User has to update capacity of the resource under Resource Capacity screen for current and future months

User allocates resources to certain projects under Resource Allocation screen. User has to select Customer and Project Name, Required Skill and then he gets a list of available resources whose skill matches with the required skill. He selects desired resource name and then assigns them to that project. He then allocates resource for current and future months. The allocation is calculated by subtracting the inavailability of the resource (which depends on factors like active/ inactive, and any other allocation for other project) from their capacity.

6) Reporting Module- all users

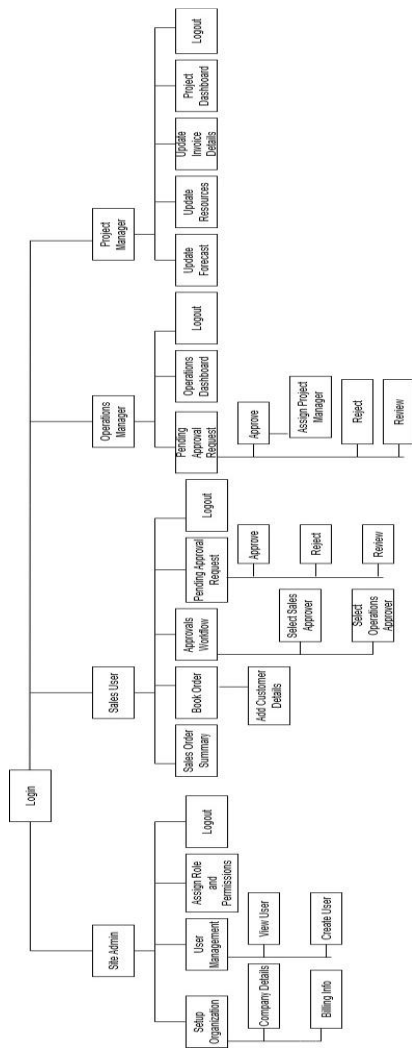
This view is available for all users to get an overview of all the factors of the system such as

- Sales Order Summary

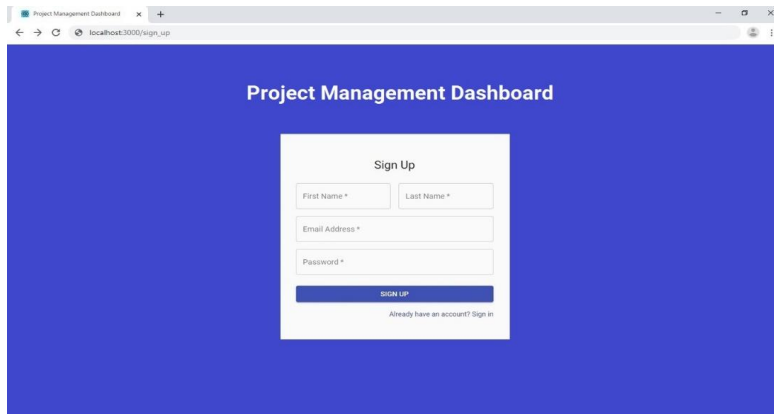
- Resource Allocation
- Project Cost Performance and
- Project Schedule Performance

|

3.12 Web Site Map Diagram



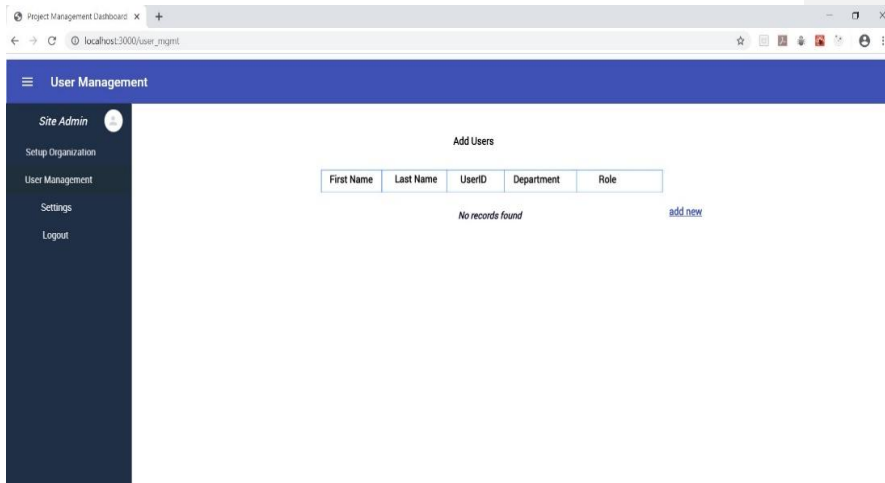
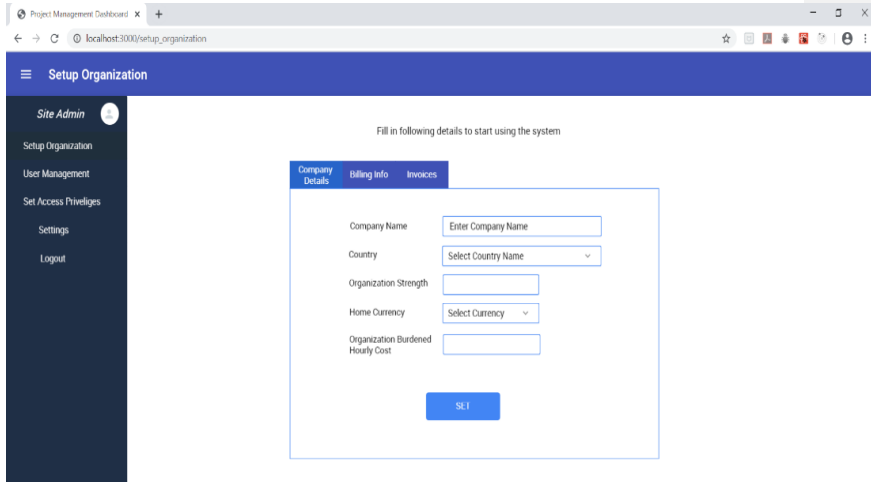
3.13 User Interface Design

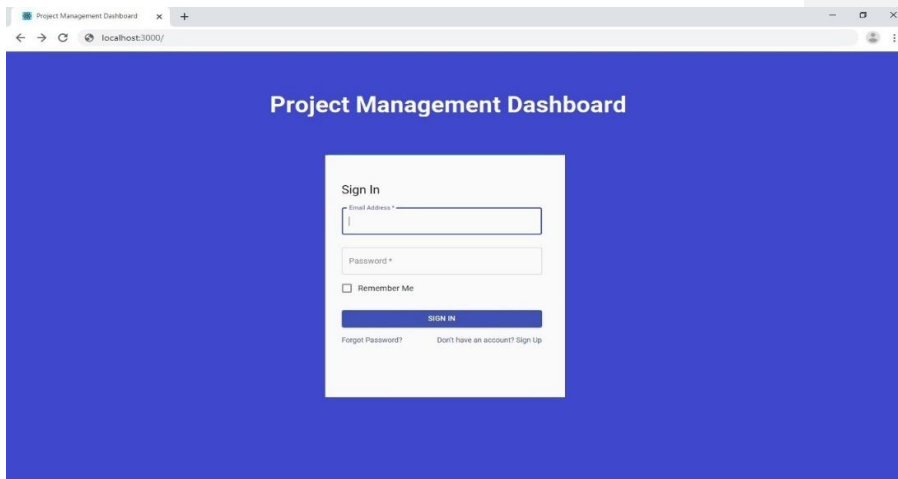
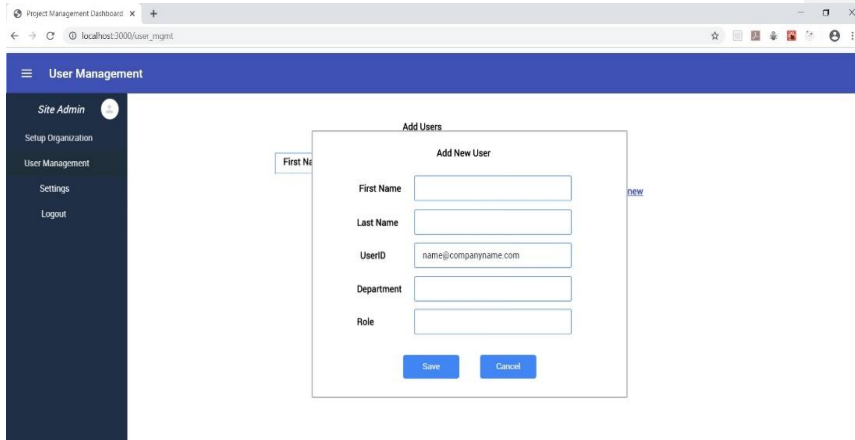


Welcome to Project Management Dashboard

To start using this Portal complete following steps....

- Setup Organization
- Add Users
- Set Access Privileges





Project Management Dashboard x +

localhost:3000/order_entry

Sales Order Entry

Sales Engineer

- Sales Order Summary
- Sales Order Entry
- Edit Sales Order
- Sales Order Approval
- Settings
- Logout

Select Customer Name

Customer Name

Address

Address Line 1
 Address Line 2
 Address Line 3

Bill To

Address Line 1
 Address Line 2
 Address Line 3

Ship To

Address Line 1
 Address Line 2
 Address Line 3

Customer Contact - Business

Name
 Contact No
 Email

Customer Contact - Finance

Name
 Contact No
 Email

Country **Account Owner** **Currency** **Engagement Model** **Service Type** **Deliverable Type**

Order Type **Purchase Order No** **Purchase Order Date** **Purchase Order Value** **Exchange Rate** **Value in INR**

Total Value

Project No Project Name

Cost Component	Hours/No	Rate	Exchange Rate	Cost in INR
No components added				
Total Cost				-
Gross Margin				-
Gross Margin %				-

Project Management Dashboard x +

localhost:3000/order_approval

Sales Order Approval

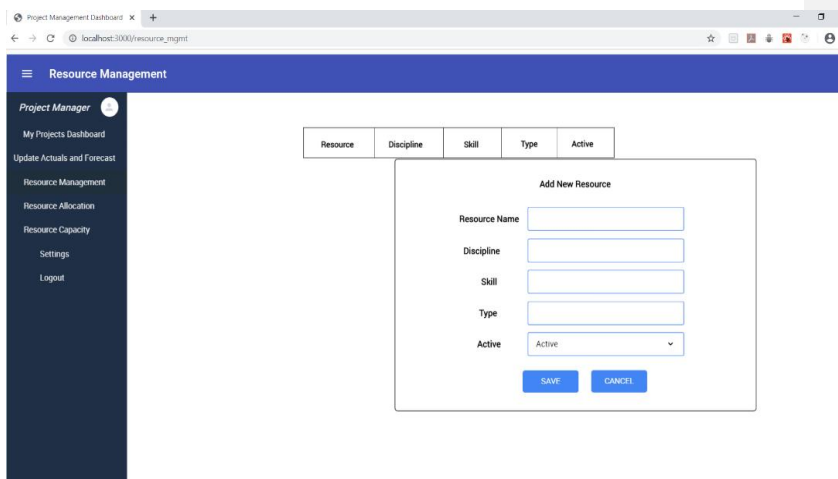
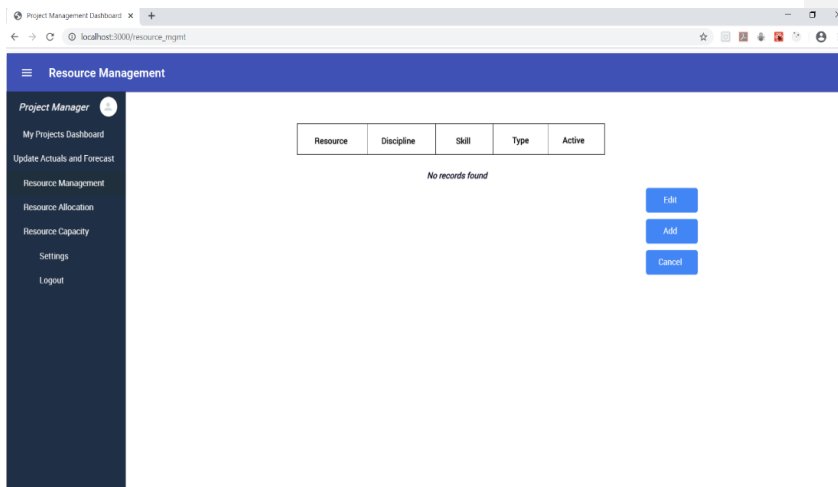
Sales Engineer

- Sales Order Summary
- Sales Order Entry
- Edit Sales Order
- Sales Order Approval
- Settings
- Logout

Select Order Approvers

Select Sales Approver

Select Operations Approver



3.14 Data Dictionary

Sr. No	Field Name	Data-type	Width	Description	Table Name
1	acc_owner	Integer	5	user_id of account user	Customer
2	billing_addr	Varchar	100	billing address	Customer
3	business_contact_email	Varchar	35	business contact email	Customer
4	business_contact_name	Varchar	25	business contact name	Customer
5	business_contact_telephone	Number	10	business contact telephone	Customer
6	calendar_month	Date	-	calendar month	Project_Cost
7	company_id	Integer	5	Organization ID	organization_master

8	company_name	Varchar	30	Organization name	organization_master
9	component_cost	Float	8	component cost	Cost_Component
10	cost_component_ex_rate	Float	8	cost component exchange rate	Cost_Component
11	cost_component_id	Integer	5	cost component id	Sales_Order_Master, Cost_Component
12	cost_component_rate	Integer	5	cost component rate	Cost_Component
13	cost_component_type	Varchar	15	cost component type	Cost_Component
14	cost_component_units	Integer	5	cost component units	Cost_Component
15	country	enum	-	country	Customer

16	country_id	Integer	5	country id	Country_Master
17	country_name	Varchar	20	country name	Country_Master
18	currency	enum	-	currency	Sales_Order_Master, Currency_Master
19	currency_id	Integer	5	currency id	Currency_Master
20	cust_id	Integer	5	customer id	Sales_Order_Master, Customer
21	cust_name	Varchar	25	customer name	Customer
22	cust_type	enum	-	customer type	Customer
23	deliverable_type	enum	-	deliverable type	Sales_Order_Master
24	department	Varchar	25	department	User_Role
25	end_date	Date	-	end date	Project_Master

					er
26	engagement_model	enum	-	engagement model	Sales_Order_Master
27	exchange_rate	Integer	5	exchange rate	Sales_Order_Master
28	external_cost	Float	8	external cost	Project_Cost
29	finance_contact_email	Varchar	35	finance contact email	Customer
30	finance_contact_name	Varchar	25	finance contact name	Customer
31	finance_contact_telephone	Number	10	finance contact telephone	Customer
32	first_name	Varchar	15	first name	User
33	home_currency	Varchar	15	currency	organization_master

34	internal_hrs	Integer	5	internal hours	Project_Cost
35	internal_unitcost	Float	8	internal unit cost	Project_Cost
36	invoice_date	Date	-	invoice date	Invoice
37	invoice_id	Integer	5	invoice id	Invoice
38	invoice_value	Number	10	invoice value	Invoice
39	labour_burdened_cost	Float	8	labour cost	organization_master
40	last_name	Varchar	20	last name	User
41	material_cost	Float	8	material cost	Project_Cost
42	order_id	Integer	5	order id	Sales_Order_Master
43	order_type	enum	-	order type	Sales_Order_Master
44	org_strength	Integer	5	Organization strength	organization_master

45	po_date	Date	-	purchase order date	Sales_Order_Master
46	po_no	Integer	5	purchase order number	Sales_Order_Master
47	po_value	Number	10	purchase order value	Sales_Order_Master
48	primary_email	Varchar	35	customer email	Customer
49	project_name	Varchar	35	project name	Project_Master, Sales_Order_Master, Project_Master
50	project_no	Number	10	project id	Sales_Order_Master
51	registered_address	Varchar	100	registered address	Customer
52	resource_id	Integer	5	resource id	Resource_Master

53	resource_name	Varchar	20	resource name	Resource_Master
54	role	Varchar	20	role	User_Role
55	service_type	enum	-	service type	Sales_Order_Master
56	shipping_addr	Varchar	100	shipping address	Customer
57	start_date	Date	-	start date	Project_Master
58	status	Varchar	10	status	Sales_Order_Master
59	t&l_cost	Float	8	t&l cost	Project_Cost
60	user_email	Varchar	30	user email	Login
61	user_id	Integer	5	user id	User_Role, Login
62	user_pass	Varchar	15	user pass	Login

3.15 Table specifications

1) Customer

SR NO.	Field Name	Data Type	Width	Constraint
1	cust_id	Integer	5	Primary Key
2	cust_name	Varchar	25	Not Null
3	primary_email	Varchar	35	Not Null
4	billing_addr	Varchar	100	Not Null
5	shipping_addr	Varchar	100	Not Null
6	country	enum	-	Not Null
7	cust_type	enum	-	Not Null
8	acc_owner	Integer	5	Foreign Key
9	registered_address	Varchar	100	Not Null
10	business_contact_name	Varchar	25	Not Null

11	business_contact_telephon e	Numbe r	10	Not Null
12	business_contact_email	Varchar	35	Not Null
13	finance_contact_name	Varchar	25	Not Null
14	finance_contact_telephone	Numbe r	10	Not Null
15	finance_contact_email	Varchar	35	Not Null

2) Invoice

SR NO.	Field Name	Data Type	Width	Constraint
1	invoice_id	Integer	5	Primary Key
2	invoice_date	Date	-	Not Null
3	invoice_value	Number	10	Not Null

3) Sales Order Master

SR NO.	Field Name	Data Type	Width	Constraint
1	order_id	Integer	5	Primary Key
2	cust_id	Integer	5	Foreign Key
3	po_no	Integer	5	Not Null
4	po_date	Date	-	Not Null
5	po_value	Number	10	Not Null
6	exchange_rate	Integer	5	Not Null
7	currency	enum	-	Not Null
8	service_type	enum	-	Not Null
9	engagement_model	enum	-	Not Null
10	deliverable_type	enum	-	Not Null
11	order_type	enum	-	Not Null
12	status	Varchar	10	Not Null
13	cost_component_id	Integer	5	Foreign Key

18	project_no	String	10	Foreign Key
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4) Cost_Component

SR NO.	Field Name	Data Type	Width	Constraint
1	cost_component_id	Integer	5	Primary Key
2	cost_component_type	Varchar	15	Not Null
3	cost_component_units	Integer	5	Not Null
4	cost_component_rate	Integer	5	Not Null
5	cost_component_ex_rate	Float	8	Not Null
6	component_cost	Float	8	Not Null

5) Resource_Master

SR NO.	Field Name	Data Type	Width	Constraint
1	resource_id	Integer	5	Primary Key
2	resource_name	Varchar	20	Not Null

6) User

SR NO.	Field Name	Data Type	Width	Constraint
1	user_id	Integer	5	Primary Key
2	first_name	Varchar	15	Not Null
3	last_name	Varchar	20	-

7) Login

SR NO.	Field Name	Data Type	Width	Constraint
1	user_id	Integer	5	Foreign Key
2	user_pass	Varchar	15	Not Null
3	user_email	Varchar	30	Email address for User

8) User_Role

SR NO.	Field Name	Data Type	Width	Constraint
1	user_id	Integer	5	Foreign Key
2	role	Varchar	20	Not Null
3	department	Varchar	25	Not Null

9) Country_Master

SR NO.	Field Name	Data Type	Width	Constraint
1	country_id	Integer	5	Primary Key
2	country_name	Varchar	20	Not Null

10) Currency_Master

SR NO.	Field Name	Data Type	Width	Constraint
1	currency_id	Integer	5	Primary Key
2	currency	Varchar	20	Not Null

11) Project_Cost

SR NO.	Field Name	Data Type	Width	Constraint
1	project_no	Number	10	Foreign Key
2	calendar_month	Date	-	Not Null
3	internal_hrs	Integer	5	Not Null
4	internal_unitcost	Float	8	Not Null
5	external_cost	Float	8	Not Null
6	material_cost	Float	8	Not Null
7	t&l_cost	Float	8	Not Null

12) Project

SR NO.	Field Name	Data Type	Width	Constraint
1	project_no	Number	10	Primary Key

2	project_name	Varchar	35	Not Null
3	start_date	Date	-	Not Null
4	end_date	Date	-	Not Null

13) Organization_Master

SR NO.	Field Name	Data Type	Width	Constraint
1	company_id	Integer	5	Primary Key
1	company_name	Varchar	10	Not Null
2	org_strength	Integer	5	Not Null
3	home_currency	Varchar	5	Not Null
4	labor_burdened_cost	Integer	5	Not Null

3.16 Test Procedures and Implementation

Software testing is a critical element of software quality assurance & represents the ultimate review of specification, design and code generation.

It is the process of executing a program with a primary objective of finding errors. Testing gives the guarantee that the software does not fail and runs according to its specification and in the way the end user expects.

This can be done by various software testing techniques which provide a systematic guidance for designing tests that exercise the internal logic of software components, and exercise the input and output domains of the program to uncover errors in programming functions, behavior and performance.

Testing is the exposure of system to trial input to see whether it produces correct output. Testing is the process of detecting presence of faults. Once the source code has been generated, software must be

tested to uncover as many errors as possible before delivery to your customer. Our goal is to design a series of test cases that have likelihood of finding errors. That's where Software testing Techniques enter into the picture. A set of test cases designed to exercise both internal logic and external requirements is designed and documented, expected results are defined and actual results are recorded.

Testing Objectives:-

The testing objectives are summarized in the following three steps

1. Testing is the process of executing a program with the intent of finding a bug.
2. A good case is one that has a high probability of finding an as yet undiscovered error.
3. A successful test is the one that uncover yet an undiscovered error.

Unit testing:

Unit testing, also known as component testing refers to tests that verify the functionality of a specific section of code usually at the functional level. In an object-oriented environment, this is usually at class-level and the minimal unit tests include the constructors and destructors. These type of tests are usually written by developers as they work on code (white-box style), to ensure that the specific function is working as expected.

One function might have multiple tests, to catch corner cases or other branches in the code. Unit testing alone cannot verify the functionality of a piece of software, but rather is

used to assure that the building blocks of the software work independently of each other.

Integration Testing

Integration Testing is any type of software testing that seeks to verify the interfaces between components against a software design. Software components may be integrated in an interactive way or all together ("big bang"). Normally the former is considered a better practice since it allows interface issues to be localized more quickly and fixed.

Integration testing works to expose defects in the interfaces and interaction between integrated components (modules). Progressively user groups of tested software components corresponding to elements of the architectural design are integrated and tested until the software works as a software.

System Testing :

SystemTesting tests a completely integrated system to verify that it meets its requirements.

The testing phase is an important part of software development, It is the process of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied.

Acceptance Testing :

Acceptance testing is performed with realistic data of the client to demonstrate that the software is working satisfactorily. Testing here is focused on external behaviour of the system; the internal logic of the program is not emphasized.

Test cases should be selected so that the largest number of attributes of an equivalence class is exercised at once.

The testing phase is an important part of software development. It is the process of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied.

Acceptance testing is performed along with the client to show that to see that all requirements are satisfied whatever may be the attributes its working well provided all the attributes are valid. If not it displays corresponding messages for getting valid attributes.

Alpha Testing:

Alpha testing is simulated or actual operational testing by potential users/customers or an independent test team at the developers site. Alpha testing is often employed for off-the-shelf software as a form of internal acceptance testing, before the software goes to beta testing.

Beta Testing:

Beta testing comes after alpha testing and can be considered a form of external user acceptance testing. Versions of the software, known beta versions, are released to a limited audience outside of the programming team. The software is released to groups of people so

that further testing can ensure the products have few faults or bugs.

Sometimes, beta versions are made available to the open public to increase the feedback filled to a maximal number of future users.

Usability Testing:

Usability testing is needed to check if the user interface is easy to use and understand. It is connected mainly with the use of the application.

Security Testing:

Security testing is essential for software that processes confidential data to prevent system intrusion by hackers.

White Box Testing :

This is the unit testing method where a unit will be taken at a time and tested thoroughly at a statement level to find the maximum possible errors.

We tested stepwise every piece of code, taking care that every statement in the code is executed at least once; the white box testing is also called glass box Testing.

Black Box Testing

This testing method considers a module as a single unit and checks the unit at interface and communication with other modules rather getting into details as statement level. Output for a given set of input combinations are forwarded other module.

TEST CASES :

Test Case ID	Test Scenario	Steps to perform	Expected Result	Actual Result	Pass/Fail
Gen1.1	Sign up the system	1.Enter valid user details like name, email. 2.Enter valid password 3.click on sign up	System must allow the user to signup if the details are valid and user landing screen must be displayed	User enters the system and user landing screen is display ed	Pass

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Gen1.2	Log in the system	1.Enter valid user id 2.Enter valid password 3.click on login	System must allow the user to login and homepage must be displayed	User enters the system and homepa ge is display ed	Pass
Gen1.3	Navigate through modules	1.Click on various tabs and modules at the homepage	System must allow the user to click on various tabs and modules at the landing page	System allows the user enter the clicked tabs and module s at the	Pass

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				landing page	
Ad1.1	Add users	1.Click on add user tab 2.Enter user details 3.Click on add button	System must allow admin to enter user details and add new record	Admin can enter user details and new recorde d is added after clicking on add button	Pass

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Ad1.2	Edit User	<p>1.Click on edit user link</p> <p>Select the user to edit.</p> <p>2.Edit the required details</p> <p>3.click on save button to save the changes</p>	<p>System must allow to fetch older record and edit the changes after clicking on save</p>	<p>Admin can fetch the older record and edit the details and can save the changes after clicking on save button</p>	<p>Pass</p>
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Ad1.3	Setup organisati on (first time login)	1.Click the 'set organisati on' tab 2.Enter the necessary organisati on details like company name, strength, billing info etc 3.Click on Set button	System must allow Admin to select the set organisatio n for the first time log in and enter the required company details and save the changes after clicking on Set button	Admin can select the set organis ation tab and enter the require d details of the compan y and the data is being saved after	Pass
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				clicking on Set button	
Sal1.1	Prepare sales order entry	1.Click on sales order entry. 2.Make a sales order entry based on the PO received by the customer 2.Enter the mandatory fields to create the	System should allow the user to make a sales order entry based on the PO received and also must raise a flag if any of the required	System is allowin g user to make a sales order based on the PO receive d by the custom er and also it	Pass

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		sales order such as SO number, ref. to PO, customer details, etc.	field in not filled.	gives alert if any of the require d field is missed to enter.	
Sal1.2	Add New Customer	1.Click on Add New Customer tab for a new customer 2.Fill in details of the	System should allow the user to add new customer based on the sales order and	System is allowin g the user add the custom er based on the	Pass

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		customer like name, country, customer type, address, contact details	must raise a flag if the user has not entered any of the mandatory field	sales order and is also raising flag if any of the mandatory field is not filled.	
Sal1.3	Edit sales order	1.Click on edit sales order 2.Select the	System should allow user to select the required	System allows the user to select the	Pass

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		customer name to view order 3.Click on okay to save the changes and direct the sales order to be submitted for approvals	sales order based on the customer name and edit the necessary changes and save those changes and click on Submit for Approval	require d sales order and amend it and also it allows to save changes and clicks on Submit for Approv al Button	
--	--	--	---	--	--

Sal1.4	Approvals Workflow	1.Click on Workflow 2.Select the name of Sales Order Approver and Operation s Manager Approver and Click on Submit for Approval	System should allow the user to select the approvers names from the dropdown list of users and upon submitting system should set the status of the order as pending for approval	System allows the user to select the name of order approve rs and allows user to Submit for Approv al. System then sets the	Pass
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				status of the order as pending for approva l	
Sal1.5	Sales order Summary	1.Click on sales order Summary. 2.Select the month from the fiscal year for which users wants to view the	System should allow the user to select the required month and must display a list of all sales order	System allows user to view orders for the period of months selected from	Pass

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		sales order summary 3.System will display all the sales order requested for the selected months	for the selected months	the dropdo wn list	
Sales1.6	Approve Sales Order	1.Click on Approve Sales Order 2.Select the sales	System should allow the user to select the sales order for review	System is allowin g the user to select the	

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		order for review	and approve	sales order	
		3. Click on Approve/ Accept order	and send it to the Operations Manager for approval	and also it approve s and send for Operati	
			once clicked on approve button.	ons Manage r once the data is verified and clicked on	

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				approve button	
Ops1.1	Accept Sales order	1.Click on Accept Sales Order 2.Select review order 3.check the mandatory data in the sales order 4.click on accept button	System should allow the user to select sales order and approve and assign Project Manager once the data is checked and clicked on accept button.	System is allowin g the user to select the require d open sales order also it approve s and sends the	Pass

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				sales order once the data is verified and clicked on accept button	
Ops1.2	Operations Dashboard	1.Click on Operations Dashboard 2.Select the required sales order	System must allow the user to view all orders approved by him.	System is allowin g the user to view all orders approve	Pass

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				d by him.	
Pro1.1	My Projects Dashboar d(Project Manager)	1.Select Month to retrieve Projects against that Month	System should allow user to view projects assigned to him by selecting month against which the projects are currently ongoing	System is allowin g user to view projects and gives an overvie w of all the projects assigne d to him against the	Pass

				selected month	
Pro1.2	Project Detailed Summary	1.User selects a project from the Projects Dashboard to get detailed Summary	User should be able to get a detailed summary of the project by clicking on Get Summary button	System allows user to get summar y of the project by clicking on Get Summa ry button	Pass
Pro1.3	Update Actuals	1.User sees this	User should be	User is able to	Pass

	and Forecast	page when he clicks on Update Actuals and Forecast button in the previous tab 2.User views Actuals and can update Forecast for the	able to view this page when he clicks on Update Actuals and Forecast button on previous tabs. He should not be able to edit the Actuals, but be able to Update forecast by adding	view the actuals and update project costs for the next months	
--	-----------------	--	--	--	--

		particular month	project costs for the next months		
Res1.1	Resource Managem ent	1.User clicks on add new resource under this page and enter their informatio n such as Resource name, discipline, skill, type,	System should allow user to view all the resource under this page and update their informatio n	System is allowin g user to view and add new resourc e and update resourc e details as and	Pass

		is Active etc. 2.He can edit resource to update their informatio n		when require	
Res1.2	Resource Allocation	1.User selects Customer Name, Project Name and Required skills from the drop	System must fetch all the available Customers, Projects and add Required skill from	System is allowin g user to select Custom er name, project	Pass

		down list and then clicks on assign resource 2.User selects resource available from the list of available resource with desired skills and assign them to	the dropdown list. 2.System should be able to show a list of all available resources with their respective skillsets that matches with the required skill and	and require skill from the dropdo wn list. System then allows user to view all availabl e resourc es whose skillset	
--	--	--	--	--	--

		that project	must allow user to assign that resource to the project	matches with the require d skillset and allows him to assign that resourc e to the project	
--	--	-----------------	--	--	--

CHAPTER 4
USER MANUAL

4.1 User Manual

For any system to be successful it is important that the intended user find the system easy to operate. The purpose of the user manual is to make user acquainted with the system and help user understand the system and operate it conveniently. The User Manual is prepared reflexively because it is an item that must accompany every system.

The manual contain several screenshots that describes how to use the entire system. This Manual helps user to navigate efficiently through the system and help user to solve issues wherever they occur.

[View Sales Summary](#)

[User can view all Sales Orders entered by him in this tab](#)

[My Projects Dashboard](#)

[User can view Projects assigned to him under this tab](#)

[Project Detailed Summary](#)

[User can view his Project Forecast in this tab](#)

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4.2 Operations Manual

Sign Up & Setup Organization information

1. Enter registration details to signup.
2. On Setup Organization page, fill in necessary details to start using the system.

Create Users & Select Role

In the User Management tab add new user by clicking the '+' button.

Sales Order Entry

1. On Show Sales Summary screen click on Add New Order
2. Fill in appropriate details, click on save to save them and Submit for approval

Edit Sales Order Entry

1. Click on Edit Sales Order Entry and select Customer Name to view order
2. Fill in appropriate details and Submit for approval

Submit For Approval

1. Select Sales Approver and Operations Manager and click on Submit

Approve Sales Order

Select appropriate command for the list of Sales Order to be approved by Sales Manager (Approver)

Accept Sales Order

Select appropriate command for the list of Sales Order to be accepted by Operations Manager, Review, Approve or Reject Order.

By clicking on Approve, Assign a Project Manager by selecting their name from the list of Managers.

By clicking on Rejecting order, give a rejection reason and click on submit to reject the order

Sales Order Entry

1. On Show Sales Summary screen click on Add New Order

2. Fill in appropriate details and Submit for approval

4.3 Program Specifications

User Management

Module	User Management
Program Name	User
Purpose	Add User details to the User table
Input Details	The required fields should not be blank and the user should provide valid data for each field.
Output	The details of the user are stored in the User table

Sales Order Summary

Module	Order Booking
Program Name	Sales Order Summary
Purpose	User should be able to view all sales orders for 12 months

Input Details	The user should provide valid month for filtered view
Output	The sales orders are fetched from Sales Order table and viewed to the user

Sales Order Entry

Module	Order Booking
Program Name	Sales Order Entry
Purpose	Add order to Sales_Order table
Input Details	The required fields should not be blank and the user should provide valid data for each field.
Output	The order details are stored in the Sales_Order table

Add New Customer

Module	Order Booking
Program Name	Add New Customer
Purpose	Add Customer_details for the respective order entry
Input Details	The required fields should not be blank and the user should provide valid data for each field.
Output	The customer details are stored in the Customer Table

Approvals Workflow

Module	Order Booking
Program Name	Approvals Workflow
Purpose	Submit order for approval
Input Details	The user should select the name of the Sales Approver and Operations Manager

Output	The sales order is submitted to the respective individuals for their review
--------	---

Approve Sales Order

Module	Order Booking
Program Name	Approve Sales Order
Purpose	Approve/ Reject sales order
Input Details	The Sales approver should be able to review the order, and provide appropriate action by approving or rejecting it
Output	The order is then sent to the Ops Manager for acceptance

Accept Sales Order

Module	Order Booking
Program Name	Accept Sales Order

Purpose	Approve/ Reject sales order
Input Details	The Ops Manager should be able to review the order, and provide appropriate action by approving or rejecting it.
Output	The Ops Manager performs necessary action on the order

Assign Project Manager

Module	Project Management
Program Name	Assign PM
Purpose	Ops Manager assigns Project Manager (PM) for the project mapped with the order id recently booked
Input Details	The Ops Manager should be able to select the name of the PM by selecting from the dropdown list

Output	The project_no from Project table mapped to the order_id from the Sales_Order table is assigned to the Project Manager upon the order acceptance
--------	--

My Projects Dashboard(Project Manager)

Module	Project Management
Program Name	My Projects Dashboard
Purpose	View projects assigned under him
Input Details	The year must be provided by the user by using filter
Output	The projects are fetched with the filtered view from the Project Table in the database

My Projects Dashboard(Operations Manager)

Module	Project Management
Program Name	My Projects Dashboard
Purpose	View projects assigned under him
Input Details	The fiscal year must be provided by the user by selecting appropriate month and year in the filtering section
Output	The projects are fetched from the Project Table in the database

My Projects Detailed Summary

Module	Project Management
Program Name	My Projects Detailed Summary
Purpose	View detailed information about a single project assigned to the Project Manager for forecasting
Input Details	The user selects a project under scrutiny

Output	The projects are fetched from the Project Table along with other details from Customer, Sales_Order table
--------	---

Drawbacks and Limitations:

As the project is currently under development, following features are to yet to be developed:

1. Access privileges functionality- Currently user can access pages based on roles. API for setting access privileges is under construction.
2. PO cannot be viewed in this application. The user has to add PO No. Value and Date details in order to map the PO with the Sales Order Booking.
3. Third party integrations with Microsoft Project and Jira are not currently available with this application, which will make the process flow easier
4. Invoices created by Project Managers cannot be viewed.

Proposed Enhancements :

1. Adding functionality of setting Access Privileges so that user can only access screens that have been filtered for him.
2. Third party integration with Excel, Microsoft Project and Jira for timesheet data.
3. Information like Billing Info and Invoice details to be added.
4. Dashboard views to be modified to make them more informative.
5. Reporting module is under construction.

Conclusions :

Working on the project was good experience. I understand the importance of Planning and designing as a part of software development. The project made me realize the significance of developing software for the company, where the sole aim is to learn.

For developing this application, technologies such as HTML, CSS, React JS, Bootstrap, Node JS are used which are in great demand in IT market currently for developing Web Applications.

Bibliography:

Websites:

- <https://www.stackoverflow.com>
- <https://www.github.com>
- <https://material.io/design/>

ANNEXURE 1
USER INTERFACE SCREEN

Sign Up

Project Management Dashboard

Sign Up

First Name * Last Name *

Email Address *

Password *

[Already have an account? Sign in](#)

Sign In

Project Management Dashboard

Sign In

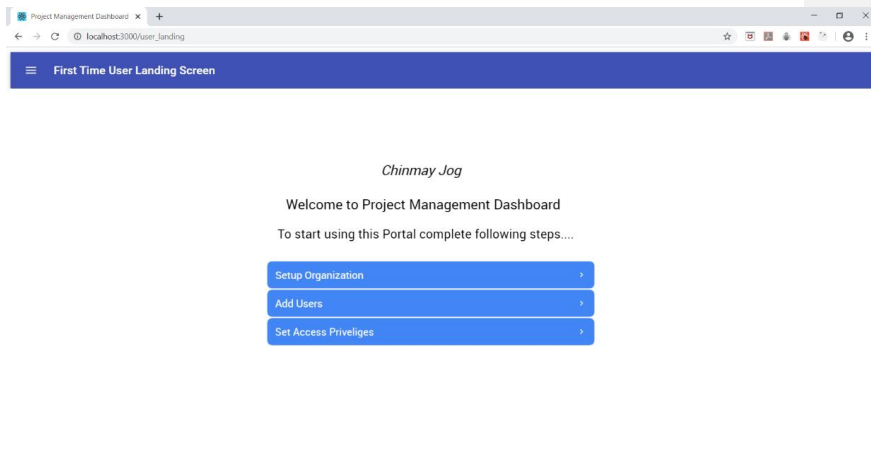
Email Address *

Password *

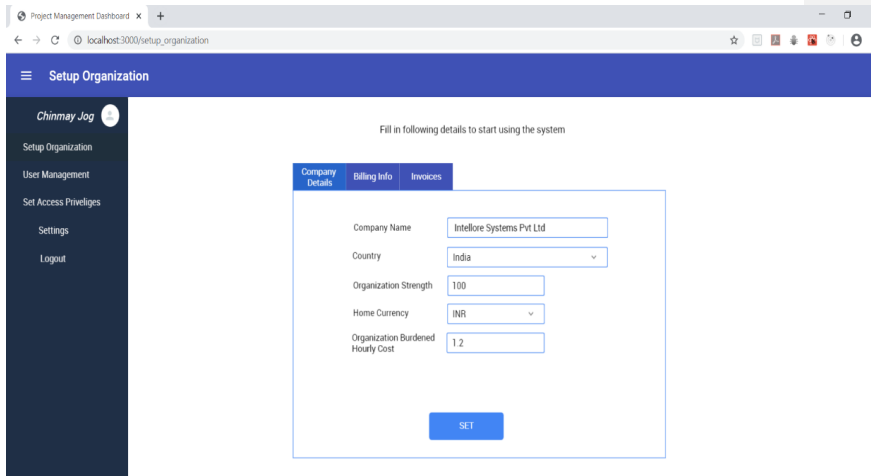
Remember Me

[Forgot Password?](#) [Don't have an account? Sign Up](#)

User Landing Screen



Setting Up Organization Details



User Management

The screenshot shows a web browser window with the URL localhost:3000/user_mgmt. The page title is "User Management". On the left, there is a dark sidebar with the user profile "Chinmay Jog" and a menu with items: "Setup Organization", "User Management", "Set Access Privileges", "Settings", and "Logout". The main content area is titled "Add Users" and contains a table with the following data:

First Name	Last Name	UserID	Department	Role	
Chinmay	Jog	cjog@intellore.com	Business	Site Admin	edit
Shripad	Joshi	sjoshi@intellore.com	Sales	Sales Head	edit
Pankaj	Borle	pborle@intellore.com	Sales	Sales Engineer	edit
Anish	Shah	ashah@intellore.com	Operations	Operations Manager	edit
Nikhil	Pawar	npawar@intellore.com	Project	Project Manager	edit
Mansi	Amin	mamin@intellore.com	Project	Project Manager	edit

Below the table, there is a link labeled "add new".

Adding New User

The screenshot shows the same web browser window as above, but with a modal form titled "Add New User" open. The form contains the following fields:

- First Name:
- Last Name:
- UserID:
- Department:
- Role:

At the bottom of the form are two buttons: "Save" and "Cancel".

Sales Order Summary (Sales Engineer)

The screenshot shows a web browser window with the URL localhost:3000/sales_summary. The page title is "Sales Order Summary". On the left, there is a dark sidebar with the user name "Pankaj Borle" and a list of navigation items: "Sales Order Summary", "Sales Order Entry", "Edit Sales Order Entry", "Sales Order Approval", "Settings", and "Logout". The main content area features a date range selector at the top, currently set to "From Jan 2019" and "To March 2020", with "apply" and "clear" buttons. Below this is a table with the following data:

Month	Customer Name	Project Name	Project Code	Country	Deliverable	PO No	PO Value	Currency	PO Value in INR
Jan 2019	ABC Ltd	This is That Integration	101	India	Embedded	12345	1,800,000	INR	1,800,000
May 2019	BCD Ltd	ABC Management	102	USA	Hybrid	23456	5,000	USD	25,000

At the bottom right of the table, it says "Total Value in INR 1,825,000".

Sales Order Entry

The screenshot shows a web browser window with the URL localhost:3000/order_entry. The page title is "Sales Order Entry". The sidebar is identical to the previous screenshot. The main content area is a form for creating a sales order. It includes several sections:

- Select Customer Name:** A dropdown menu showing "ABC Ltd" and an "Add New" button.
- Address:** A dropdown menu showing "22 South Park Pune, Mah 411052".
- Bill To:** A dropdown menu showing "22 South Park Pune, Mah 411052".
- Ship To:** A dropdown menu showing "22 South Park Pune, Mah 411052".
- Customer Contact - Business:** Fields for Name (Makrand Patil), Contact No (9120 254 466), and Email (mp@abc.com).
- Customer Contact - Finance:** Fields for Name (Jay Gokhale), Contact No (91 20 444 555), and Email (jay@abc.com).
- Country:** A dropdown menu showing "India".
- Account Owner:** A dropdown menu showing "Pankaj".
- Currency:** A dropdown menu showing "INR".
- Engagement Model:** A dropdown menu showing "Lumossus".
- Service Type:** A dropdown menu showing "Services".
- Deliverable Type:** A dropdown menu showing "Embedded".
- Order Type:** A dropdown menu showing "Original".
- Purchase Order No:** A text input field containing "12345".
- Purchase Order Date:** A date picker showing "17-Jan-2019".
- Purchase Order Value:** A text input field containing "1,800,000".
- Exchange Rate:** A text input field containing "1".
- Value in INR:** A text input field containing "1,800,000".

Below these fields, there is a summary section:

Project No	101
Project Name	This is that integration

At the bottom, there is a table for cost components:

Cost Component	Hours/No	Rate	Exchange Rate	Cost in INR
Project Management	800	200	1	1,60,000
Engineering Labor	5200	200	1	1,040,000

Summary totals:

- Total Cost: 1,200,000
- Gross Margin: 600,000
- Gross Margin %: 33%

Buttons for "Cancel", "Save", and "Submit for Approval" are located on the right side of the form.

Edit Sales Order

Project Management Dashboard x +

localhost:3000/add_cust

Add New Customer

Pankaj Borle

- Sales Order Summary
- Sales Order Entry
- Edit My Sales Order
- Sales Order Approval
- Settings
- Logout

Fill in following details to add a new customer :

Customer Name	Country	Customer Type	Account Owner
BCD Ltd	USA	OEM	Pankaj

Address	Bill To	Ship To
Abcd Foster City, CA 94004	Abcd Foster City, CA 94004	XYZ Fremont, CA 94536

Customer Contact - Business	Customer Contact - Finance
Name: John Doe	Name: Steve Maxwell
Contact No: 643 435 4455	Contact No: 643 555 4444
Email: jdoe@asc.com	Email: smax@asc.com

Save

Adding New Customer

Project Management Dashboard x +

localhost:3000/wdct_order

Edit Sales Order Entry

Pankaj Borle

- Sales Order Summary
- Sales Order Entry
- Edit My Sales Order
- Sales Order Approval
- Settings
- Logout

Select Customer Name: BCD Ltd

Address: 22 South Street, Foster City, CA, 94004

Bill To: 22 South Street, Foster City, CA, 94004

Ship To: XYZ, Fremont, CA, 94536

Customer Contact - Business	Customer Contact - Finance
Name: John Doe	Name: Steve Maxwell
Contact No: 643 435 4455	Contact No: 643 555 4444
Email: jdoe@asc.com	Email: smax@asc.com

Country: USA	Account Owner: Shripad	Currency: USD	Engagement Model: Capacity (FTE)	Service Type: Hardware	Deliverable Type: Hybrid
--------------	------------------------	---------------	----------------------------------	------------------------	--------------------------

Order Type: Engineer	Purchase Order No: 23456	Purchase Order Date: 28-Apr-2019	Purchase Order Value: 10,000,000	Exchange Rate: 71.5	Value in INR: 715,000,000
Change Order: 23457		28-May-2019	5000	70.2	351,000
Total Value			100,005,000		715,351,000

Project No: 782	Project Name: ABC Management
-----------------	------------------------------

Cost Component	Hours/No.	Rate	Exchange Rate	Cost in INR
Project Management	2000	675	1	1,350,000
Engineering Labour	10200	675	1	6,885,000
Total Cost				8,235,000
Gross Margin				707,116,000
Gross Margin %				98.8%

Cancel

Save

Submit for Approval

Sales Order Approval

Project Management Dashboard x +

localhost:3000/order_approval

Sales Order Approval

Pankaj Borle

- Sales Order Summary
- Sales Order Entry
- Edit Sales Order Entry
- Sales Order Approval
- Settings
- Logout

Select Order Approvers

Select Sales Approver: pborle@intellio.com

Select Operations Approver: ashah@intellio.com

Submit for Approval

Sales Summary (Sales Head/ Manager/ Approver)

Project Management Dashboard x +

localhost:3000/sales_summary

Sales Order Summary

Shripad Joshi

- Sales Order Summary
- Sales Order Entry
- Edit Sales Order Entry
- Sales Order Approval
- Settings
- Logout

From: Jan 2019 To: Jan 2020 [apply](#) [clear](#)

Month	Customer Name	Project Name	Project Code	Country	Deliverable	PO No	PO Value	Currency	PO Value in INR
Jan 2019	ABC Ltd	This is That Iteration	101	India	Embedded	12345	1,000,000	USD	70,000,000
May 2019	BCD Ltd	ABC Management	102	USA	Hybrid	23456	5,000	AUD	25,000
Dec 2019	KYZ Ltd	KYZ Ops	103	UK	Software	11567	20,000	GBP	1,800,000

Total Value in INR: 71,825,000

Approve Sales Order

The screenshot shows a web browser window with the URL `localhost:3000/sales_approval`. The page title is "Sales Order Approval". On the left, there is a sidebar with the user name "Shripad Joshi" and a menu with items: "Sales Order Summary", "Sales Order Entry", "Edit Sales Order Entry", "Approve Sales Order", "Settings", and "Logout". The main content area is titled "Approval List" and contains a table with the following data:

Customer Name	Project Name	Project Code	Order Type	Order Value	
ABC Ltd	This to That Integration	101	Original	1,800,000	<button>Review Order</button> <button>Approve</button> <button>Reject</button>
BCD Ltd	ABC Management	102	Change Order	25,000	<button>Review Order</button> <button>Approve</button> <button>Reject</button>
XYZ Ltd	XYZ Ops	103	Original	20,000	<button>Review Order</button> <button>Approve</button> <button>Reject</button>

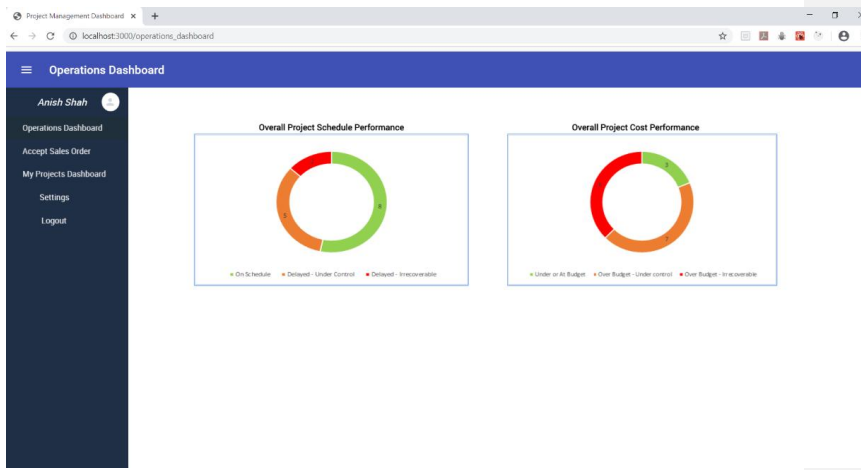
Rejecting a Sales Order

The screenshot shows the same "Sales Order Approval" page as above. A modal dialog is open over the table, specifically over the row for "XYZ Ltd". The dialog has the following content:

- Project Name: XYZ Ops
- Enter Valid Reason for Rejection
- Deliverable Type to be changed to Software
- Submit button

On the right side of the dialog, there are three "Reject" buttons, one for each row in the table.

Operations Dashboard

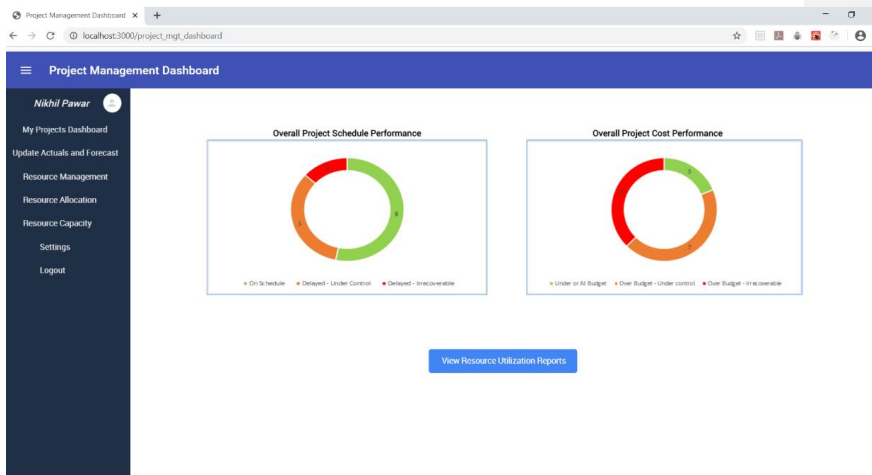


Accept Sales Order

The screenshot shows the 'Accept Sales Order' interface. It features the same dark blue sidebar as the previous page. The main content area displays an 'Approval List' table with the following data:

Customer Name	Project Name	Project Code	Order Type	Order Value	Assign PM	Review Order	Approve	Reject
ABC Ltd	This to That Innovation	101	Change Order	1,800,000	N/A	Review Order	Approve	Reject
BCD Ltd	ABC Management	102	Original	5,200	Mansu	Review Order	Approve	Reject
XYZ Ltd	XYZ Dev	103	Original	20,000	Mansu	Review Order	Approve	Reject

Project Management Dashboard



Resources Management

The screenshot shows the Resources Management page. The left sidebar is identical to the dashboard view. The main content area contains a table with 19 resource entries. To the right of the table are three blue buttons: 'Edit', 'Add', and 'Cancel'.

Resource	Discipline	Skill	Type	Active
Resource 1	Embedded	Trainee	ISPL	Inactive
Resource 2	Software	SW_JOS	ISPL	Inactive
Resource 3	Embedded	FW_EndDC	ISPL	Active
Resource 4	Embedded	Trainee	Trainee	Active
Resource 5	Software	SW_Test	ISPL	Active
Resource 6	Software	SW_Web	Contractor	Active
Resource 7	Embedded	FW_OS_RTOS	Contractor	Active
Resource 8	Software	SW_Web	Contractor	Active
Resource 9	Project Management	PM	ISPL	Active
Resource 10	Software	SW_Web	ISPL	Inactive
Resource 11	Embedded	HW_Mixed	ISPL	Inactive
Resource 12	Embedded	HW_CAD	Contractor	Active
Resource 13	Embedded	FW_EndDC	ISPL	Inactive
Resource 14	Software	SW_Android	ISPL	Active
Resource 15	Software	SW_Desktop	Contractor	Inactive
Resource 16	Embedded	HW_Mixed	ISPL	Active
Resource 17	Embedded	Trainee	ISPL	Inactive
Resource 18	Software	SW_UI_Designer	ISPL	Active
Resource 19	Software	SW_Web	ISPL	Inactive

Add New Resource

Add New Resource

Resource Name:

Discipline:

Skill:

Type:

Active:

Resource	Discipline	Skill	Type	Active
Resource 1				
Resource 2				
Resource 3				
Resource 4				
Resource 5				
Resource 6				
Resource 7				
Resource 8				
Resource 9				
Resource 10				
Resource 11				
Resource 12				
Resource 13	Embedded	FW_CIRCA	ISPL	Inactive
Resource 14	Software	SW_Android	ISPL	Active
Resource 15	Software	SW_Desktop	Contractor	Inactive
Resource 16	Embedded	HW_Mixed	ISPL	Active
Resource 17	Embedded	Trainee	ISPL	Inactive
Resource 18	Software	SW_UI_Designer	ISPL	Active
Resource 19	Software	SW_Web	ISPL	Inactive

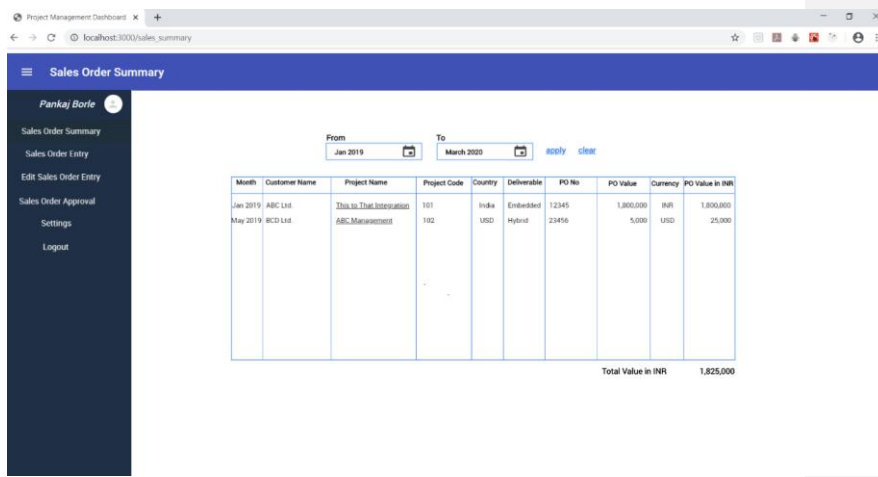
Add Resource Capacity

Add Resource Capacity for a month by clicking on appropriate cell

Resource Name	Jan-20	Feb-20	Mar-20	April-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20
Resource 1	0	0	0	0	0	0	0	0	0	0	0	0
Resource 2	0	0	0	0	0	0	0	0	0	0	0	0
Resource 3	160	160	160	160	160	160	160	160	160	160	160	160
Resource 4	160	160	160	160	160	160	160	160	160	160	160	160
Resource 5	160	160	160	160	160	160	160	160	160	160	160	160
Resource 6	160	160	160	160	160	160	160	160	160	160	160	160
Resource 7	160	160	160	160	160	160	160	160	160	160	160	160
Resource 8	160	160	160	160	160	160	160	160	160	160	160	160
Resource 9	160	160	160	160	160	160	160	160	160	160	160	160
Resource 10	0	0	0	0	0	0	0	0	0	0	0	0
Resource 11	0	0	0	0	0	0	0	0	0	0	0	0
Resource 12	160	160	160	160	160	160	160	160	160	160	160	160
Resource 13	0	0	0	0	0	0	0	0	0	0	0	0
Resource 14	160	160	160	160	160	160	160	160	160	160	160	160
Resource 15	0	0	0	0	0	0	0	0	0	0	0	0
Resource 16	160	160	160	160	160	160	160	160	160	160	160	160
Resource 17	0	0	0	0	0	0	0	0	0	0	0	0
Resource 18	160	160	160	160	160	160	160	160	160	160	160	160
Resource 19	0	0	0	0	0	0	0	0	0	0	0	0
Resource 20	160	160	160	160	160	160	160	160	160	160	160	160
Resource 21	160	160	160	160	160	160	160	160	160	160	160	160
Resource 22	160	160	160	160	160	160	160	160	160	160	160	160

ANNEXURE 2
OUTPUT REPORTS WITH DATA

Sales Order Summary (Sales Engineer)

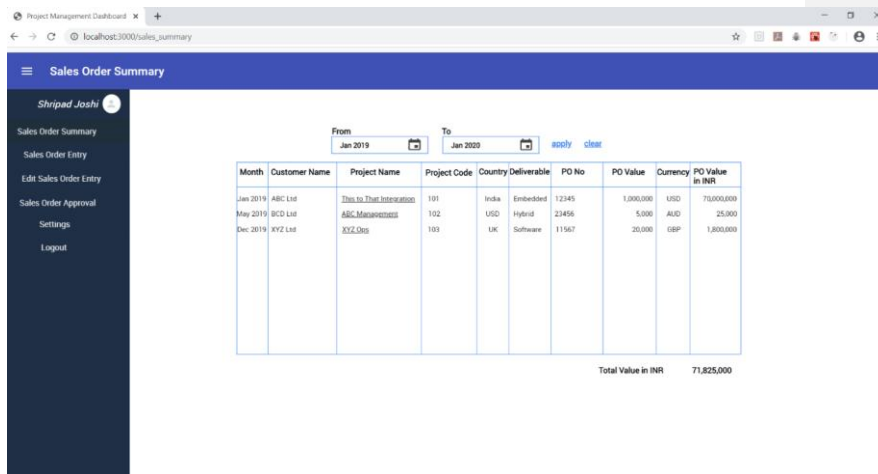


The screenshot shows a web application interface for a Sales Engineer. The user is Pankaj Borle. The page title is "Sales Order Summary". The date range is set from Jan 2019 to March 2020. The table displays two sales orders:

Month	Customer Name	Project Name	Project Code	Country	Deliverable	PO No	PO Value	Currency	PO Value in INR
Jan 2019	ABC Ltd	This is That Integration	101	India	Embedded	12345	1,800,000	INR	1,800,000
May 2019	BCD Ltd	ABC Management	102	USA	Hybrid	23456	5,000	USD	25,000

Total Value in INR: 1,825,000

Sales Summary (Sales Head/ Manager/ Approver)

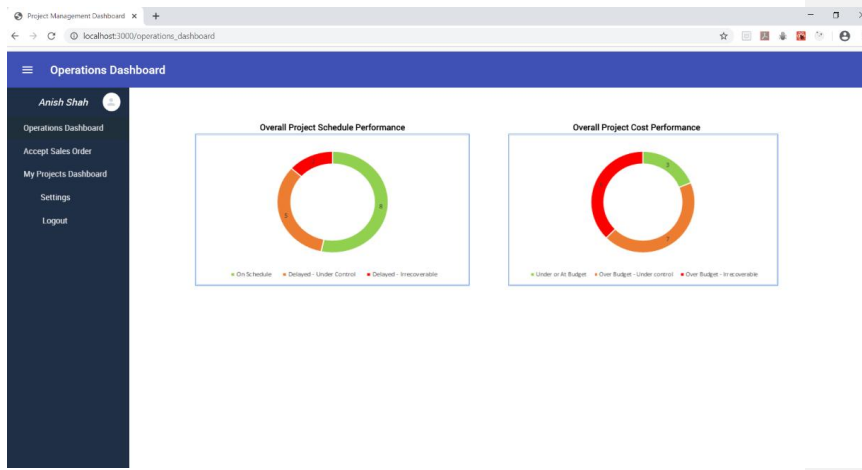


The screenshot shows a web application interface for a Sales Head/ Manager/ Approver. The user is Shipad Joshi. The page title is "Sales Order Summary". The date range is set from Jan 2019 to Jan 2020. The table displays three sales orders:

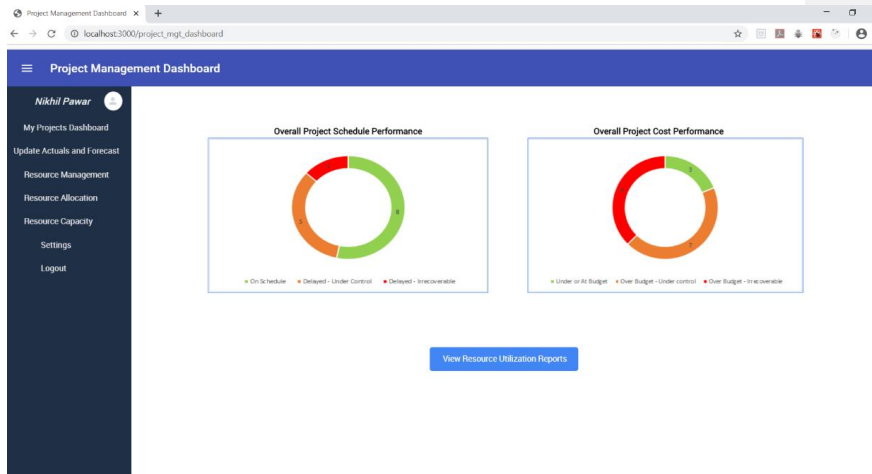
Month	Customer Name	Project Name	Project Code	Country	Deliverable	PO No	PO Value	Currency	PO Value in INR
Jan 2019	ABC Ltd	This is That Integration	101	India	Embedded	12345	1,000,000	USD	70,000,000
May 2019	BCD Ltd	ABC Management	102	USA	Hybrid	23456	5,000	AUD	25,000
Dec 2019	KYZ Ltd	KYZ Ops	103	UK	Software	11567	20,000	GBP	1,800,000

Total Value in INR: 71,825,000

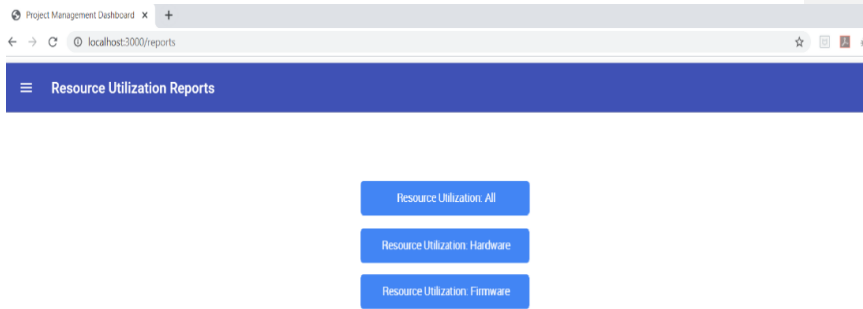
Operations Dashboard



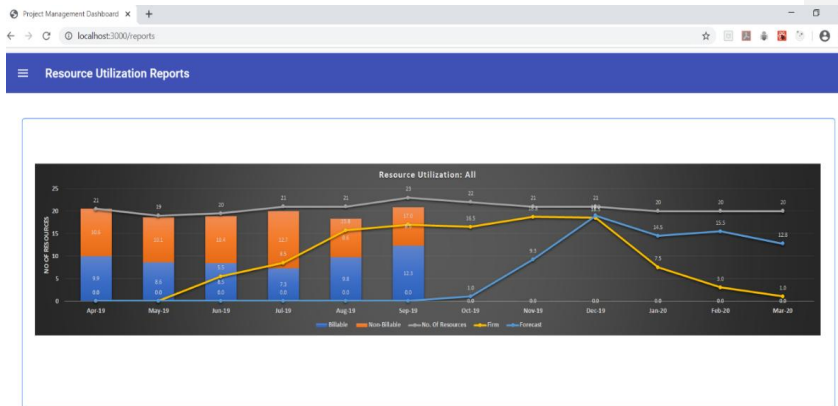
Project Management Dashboard



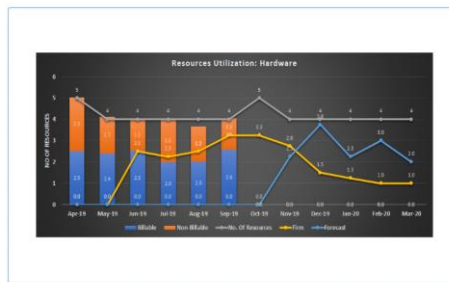
Reports Page



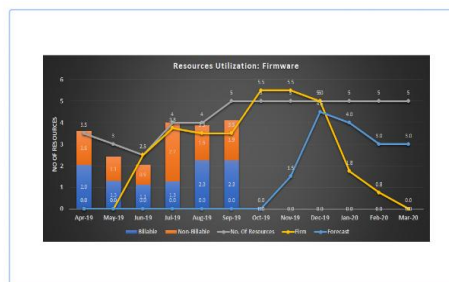
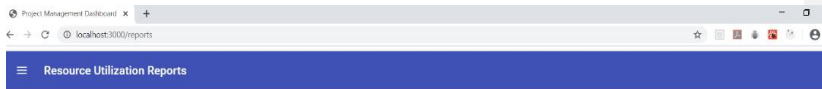
Resource Utilization- All



Resource Utilization- Hardware



Resource Utilization- Firmware



ANNEXURE 3
SAMPLE PROGRAM CODE

Login.js

```
import Button from '@material-ui/core/Button';

import Container from '@material-ui/core/Container';

import CssBaseline from '@material-ui/core/CssBaseline';

import { TextField, Typography, makeStyles,
  FormControlLabel, Checkbox, Grid, Link } from
  '@material-ui/core';

import { useState } from 'react';

import { useRouter } from 'next/router';

const Styles = makeStyles(theme => ({
  paper: {
    marginTop: theme.spacing(8),
```

```
    flexDirection: 'column',

    alignItems: 'center',

  },

  form: {

    width: '100%', // Fix IE 11 issue.

    marginTop: theme.spacing(1),

  },

  submit: {

    margin: theme.spacing(3, 0, 2),

  },

}))
```

```
export default function SignIn() {
```

```
const classes = Styles();

const [email, setEmail] = useState("");

const [password, setPassword] = useState("");

const router = useRouter();

return (

  <Container component="main" maxWidth="xs">

    <CssBaseline/>

    <div className={classes.paper}>

      <Typography component="h1" variant="h5">

        Sign In

      </Typography>

      <form className={classes.form} noValidate

action="/api/authenticate" method="post">
```

```
    {router && router.query && router.query.fail ?  
<p style={{color: 'red'}}>Incorrect email or password</p> :  
null}
```

```
<TextField  
  variant="outlined"  
  margin="normal"  
  required  
  fullWidth  
  id="email"  
  label="Email Address"  
  name="email"  
  autoComplete="email"  
  autoFocus
```

```
value={email}

onChange={e => setEmail(e.target.value)}

/>

<TextField

  variant="outlined"

  margin="normal"

  required

  fullWidth

  id="password"

  label="Password"

  name="password"

  type="password"

  autoComplete="current-password"
```

```
        value={password}

        onChange={e                =>
setPassword(e.target.value)}

    />

    <FormControlLabel

        control={<Checkbox    value="remember"
color="primary"/>}

        label="Remember Me"

    />

    <Button

        type="submit"

        fullWidth

        variant="contained"
```



```
color="primary"
```

```
className={classes.submit}
```

```
>
```

```
Sign In
```

```
</Button>
```

```
<Grid container>
```

```
<Grid item xs>
```

```
<Link href="#" variant="body2">
```

```
Forgot Password?
```

```
</Link>
```

```
</Grid>
```

```
<Grid item>
```

```
<Link href="/signup" variant="body2">
```

```
        {"Don't have an account? Sign Up"}
      </Link>
    </Grid>
  </Grid>
</form>
</div>
</Container>
);
}
```

Userlanding.js

```
import React from 'react';

import { makeStyles } from '@material-ui/core/styles';
```

```
import AppBar from '@material-ui/core/AppBar';

import Toolbar from '@material-ui/core/Toolbar';

import Typography from '@material-ui/core/Typography';

import Button from '@material-ui/core/Button';

import IconButton from '@material-ui/core/IconButton';

import MenuIcon from '@material-ui/icons/Menu';

import { Grid, Card, Tab } from '@material-ui/core';

import ArrowForwardIosIcon from '@material-
ui/icons/ArrowForwardIos';

const useStyles = makeStyles(theme => ({

  root: {

    flexGrow: 1,

  },
```

```
menuButton: {  
  
  marginRight: theme.spacing(2),  
  
},  
  
title: {  
  
  flexGrow: 1,  
  
},  
  
paper: {  
  
  marginTop: theme.spacing(8),  
  
  flexDirection: 'column',  
  
  alignItems: 'center',  
  
},  
  
h1:{  
  
  marginTop: theme.spacing(10),
```

```
    fontFamily: 'Roboto, sans-serif',  
  
    fontWeight: 400,  
  
    fontSize: 35,  
  
    textAlign: 'center',  
  
  },  
  
  h2: {  
  
    marginTop: theme.spacing(10),  
  
    marginBottom: theme.spacing(0),  
  
    fontSize: 25,  
  
    textAlign: 'center',  
  
  },  
  
  username: {  
  
    marginTop: theme.spacing(5),
```

```
    fontFamily: 'Rubik, sans-serif',

    fontWeight: 400,

    fontSize: 35,

    textAlign: 'center',
  },

  submit: {

    margin: theme.spacing(0, 0, 1),

    height: 50,

    borderColor: 'secondary' ,

    textAlign: 'left',

    position: "relative",

  },

  box: {
```

```
margin: theme.spacing(3,50,3),

boxAlign: 'center',

width: '50%',

},

arrowicon: {

  position: "absolute",

  right: 5,

  color: "grey",

},

}));

export default function UserLanding() {

  const classes = useStyles();
```

```
return (  
  
  <div className={classes.root}>  
  
    <AppBar position="static">  
  
      <Toolbar>  
  
        <IconButton                                edge="start"  
className={classes.menuButton}  color="inherit"  aria-  
label="menu">  
  
          <MenuIcon />  
  
        </IconButton>  
  
        <Typography                                variant="h6"  
className={classes.title}>  
  
          First Time User Landing Screen  
  
        </Typography>
```



```
</Toolbar>
```

```
</AppBar>
```

```
<Typography variant="h1" className={classes.paper,  
classes.h1, classes.username}>
```

Johnny Bravo

```
</Typography>
```

```
<Typography variant="h1" className={classes.paper,  
classes.h1}>
```

Welcome to Project Management Dashboard

```
</Typography>
```

```
<Typography variant="h2" className={classes.paper,  
classes.h2}>
```

Complete the following steps to start using this portal..

```
</Typography>
```

```
<Grid className={classes.box}>
```

```
<Button className={classes.submit}
```

```
type="submit"
```

```
  fullWidth
```

```
  variant="contained"
```

```
  color="background"
```

```
  className={classes.submit}
```

```
>
```

```
  Setup Organization
```

```
  <ArrowForwardIoIcon
```

```
className={classes.arrowicon}/>
```

```
</Button>
```

```
<Button className={classes.submit}
type="submit"
    fullWidth
    variant="contained"
    color="background"
    className={classes.submit}
>
  Add Users
  <ArrowForwardIosIcon
className={classes.arrowicon}/>
</Button>
<Button className={classes.submit}
type="submit"
```

```
        fullWidth
        variant="contained"
        color="background"
        className={classes.submit}
    >
        Set Access Privileges
        <ArrowForwardIcon
className={classes.arrowicon}/>
    </Button>
</Grid>
</div>
);
}
```