

## **INVENTORY MANAGEMENT SYSTEM FOR RETAILERS**

### **REPORT**

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## **INTRODUCTION**

### **Project Overview**

Whether the stocked goods are company assets, raw materials and supplies, or finished goods that are ready to be sent to vendors or end users, an inventory management system is the combination of technology (hardware and software), processes, and procedures that oversees the monitoring and maintenance of stocked goods. An entire inventory management system includes a method for cataloguing each inventory item and the data it carries, such as asset tags or barcode labels. system for managing inventories,Hardware for reading barcode labels, such as mobile devices with barcode scanning apps or handheld barcode scanners,A central database and point of reference for all inventory is provided by inventory management software, which also has the ability to analyse data, provide reports, predict demand in the future, and do other things.

### **Purpose**

The basic goal of inventory management is to make it simple and effective for organisations to order, stock, store, and use inventory. You'll always be aware of the things you have on hand, their quantity, and location if you manage your inventory well.Additionally, good inventory management practises help you comprehend how you use your stock and how demand varies over time. You may focus on what you really need, what is unnecessary, and what is just a waste of money. That is the use of inventory management to put inventory control into effect. Inventory control, incidentally, involves striking a balance between keeping enough inventory on hand to meet demand at all times and minimising the cost of acquiring and maintaining inventory.

## LITERATURE SURVEY

Title - Year	Authors	Description	Merits
Algorithmic Approaches to Inventory Management Optimization - 2021	Hector D Perez, Christian D Hubbs, Can Li, Ignacio E Grossmann	This paper takes two sales scenarios for an unfulfilled demand involving a single product and the modelling and optimizing of daily replenishment requests have been implemented by deterministic linear programming, multi-stage stochastic linear programming, and reinforcement learning methods.	The comparative study of the performance of the three methods on the basis of profit, service level, and inventory profiles indicate the advantages and suitability of each approach over the other.
A Novel Fuzzy MCDM Model for Inventory Management in order to increase business efficiency - 2021	Dragan Vukasović, Dejan Gligović, Svetlana Terzić, Željko Stević, Perica Macura	In the first model, Fuzzy full consistency Method (FUCOM) and the fuzzy Evaluation based on Distance from Average Solution (EDAS) methods have been integrated for sorting products in the inventory based on unit price, procurement costs and demand. In the second model, FUCOM and ABC analysis have been integrated for sorting inventory considering significance of criteria.	The comparison has shown that these 2 novel models perform better when compared to the traditional approaches driving business efficiency.

<p>Inventory management for retail companies: A literature review and current trends-<b>2021</b></p>	<p>Cinthya Vanessa Munoz Macas, Jorge Andres Espinoza Aguirre, Rodrigo Arcentales Carrion, Mario Pena</p>	<p>Retail companies have acquired significant importance within several countries due to their high economic contribution. Therefore, the need to analyze their KPIs becomes highly significant, as well as their different systems, methodologies, and tools used within inventory management and optimization. Retail companies have acquired significant importance within several countries due to their high economic contribution</p>	<p>Therefore, the need to analyze their KPIs becomes highly significant, as well as their different systems, methodologies, and tools used within inventory management and optimization.</p>
<p>Research paper on Inventory management system - <b>2018</b></p>	<p>Punam Khobragade, Roshni Selokar, Rina Maraskolhe, Prof.Manjusha Talmale</p>	<p>Inventory Management System is software which is helpful for the businesses operate hardware stores, where storeowner keeps the records of sales and purchase. Generating backup data is a critical process in a project for our shopkeeper. This work can be categorized as time consuming job and need high accuracy when placing the proper materials with its quantity</p>	<p>Research strategy can be characterized as efficient and purposive examination of actualities with a goal deciding the powerful relationship among such certainties and research between at least two wonders from the broad writing study it is much clearer to contribute specifically for the effective consummation of the venture, are impacted by stock administration framework.</p>

## Existing problem

- **Centralized Tracking:** Take into account upgrading to tracking software with automated functionality for purchase and reordering. Platforms for inventory management offer centralised, cloud-based databases that enable precise, automatic inventory changes and continuous data backup.
- **Transparent Performance:** To address warehouse inefficiencies, track and publish warehouse performance measures like inventory turnover, customer satisfaction, and order processing time. Share this information with your team and vendors.
- **Stock auditing:** Regular stock auditing procedures, such as daily cycle counting, minimise human error and supply more precise, up-to-date inventory data for controlling cash flow. For more precise financial data, categorise audits and cycle count smaller inventory samples on a regular basis.

## References

- <https://www.mdpi.com/2227-9717/9/1/102>
- <https://journals.vilniustech.lt/index.php/TEDE/article/view/14427> (
- <https://www.irjet.net/archives/V5/i4/IRJET-V5I448.pdf>
- [https://www.researchgate.net/publication/352235223\\_Inventory\\_management\\_for\\_retail\\_companiesA\\_literature\\_review\\_and\\_current\\_trends#read](https://www.researchgate.net/publication/352235223_Inventory_management_for_retail_companiesA_literature_review_and_current_trends#read)
- [https://docs.oracle.com/cd/E26228\\_01/doc.93/e21560/ovrvw\\_inv\\_mgmt.htm#WEA](https://docs.oracle.com/cd/E26228_01/doc.93/e21560/ovrvw_inv_mgmt.htm#WEA)

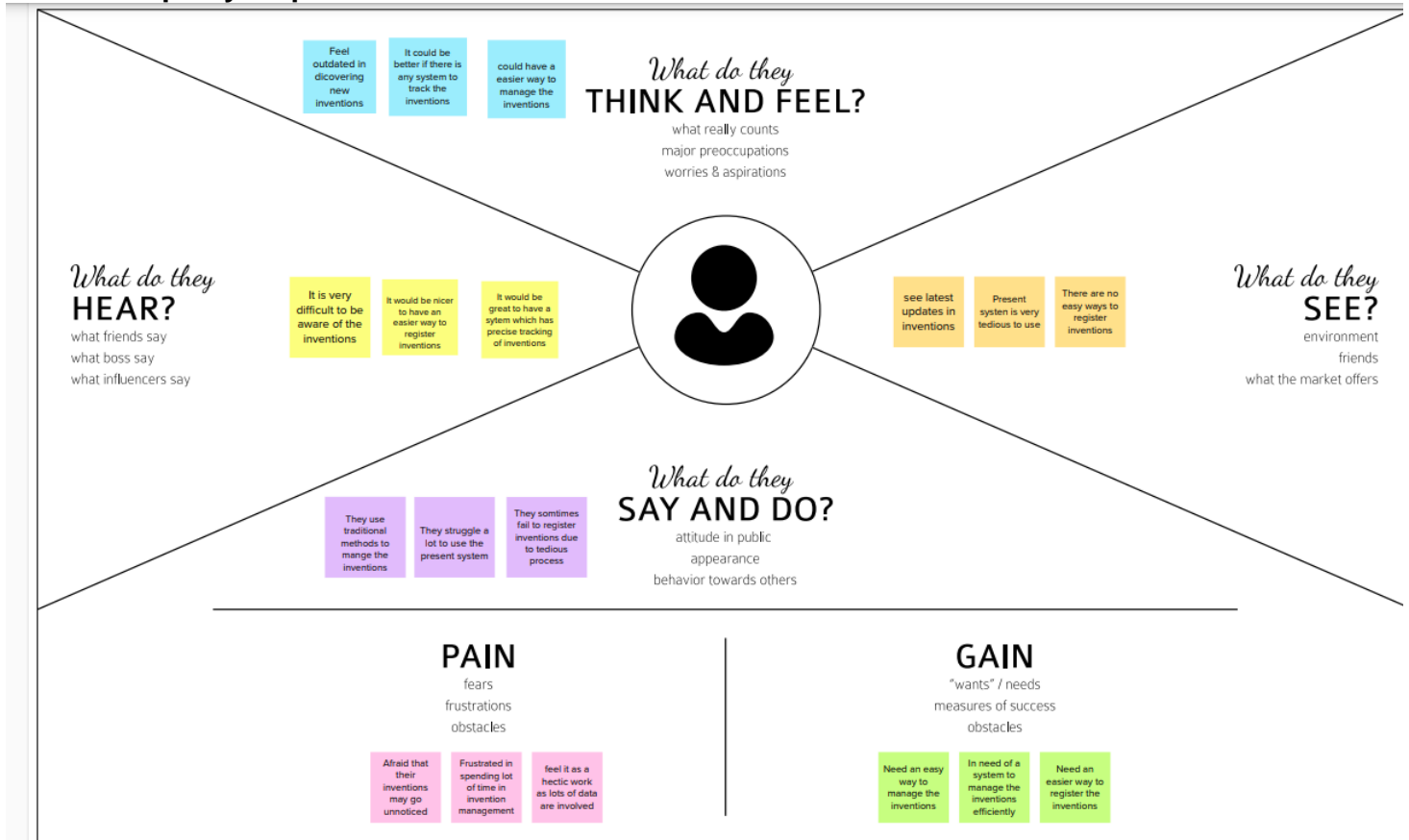
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## Problem Statement Definition

The company's issue is that they don't have a structured system in place to track and maintain their inventory data. Because they only retain the inventory data in the logbook and are not properly organised, the admin finds it challenging to record the data promptly and safely.

## IDEATION & PROPOSED SOLUTION

### Empathy Map Canvas





## Ideation & Brainstorming

### Hemavarshini B

Track and update stock levels for each product

Analyze trends in fast moving goods by collecting data

Use an interactive dashboard to display data

The inventory must handle high traffic during festive times

Display the last update to inventory with time stamp

Concurrent access of the same product should be disabled

### Sanjai S

The products should be delivered in a FIFO basis

The retrieval and updation must take least amount of time

The UI should be friendly enough for the sales team

Database Integrity has to be maintained through protocols

Inventory mustn't contain expired or stale goods

Review the inventory once a week to align it with business goals

### Udhayakumaran H

Use JIT inventory management

Employ a safety stock Inventory

Automate Inventory management System

Get feedback from users to improve the performance

Use software to simplify stock

Using Batch tracking

### Sruthi S

Forecast inventory accurately

Employ a conventional manufacturing strategy

Use material requirement planning

Employ the economic order quantity model

Integrate with mobile technology

Use a consignment inventory strategy

### Inventory Database

Concurrent access of the same product should be disabled

Database Integrity has to be maintained through protocols

### Inventory Management Application

Use an interactive dashboard to display data

The UI should be friendly enough for the sales team

Get feedback from users to improve the performance

Integrate with mobile technology

### Inventory Management Software

Use JIT inventory management

The inventory must handle high traffic during festive times

The retrieval and updation must take least amount of time

### Logistics

Use material requirement planning

Using Batch tracking

### Analyzing Inventory

Forecast inventory accurately

Analyze trends in fast moving goods by collecting data

### Stock Management

Track and update stock levels for each product

Use software to simplify stock

### Optimization Techniques

Use a consignment inventory strategy

Employ a conventional manufacturing strategy

### Additional Features

Display the last update to inventory with time stamp

Automate Inventory management System

### Stock Delivery

The products should be delivered in a FIFO basis

### Quality Control

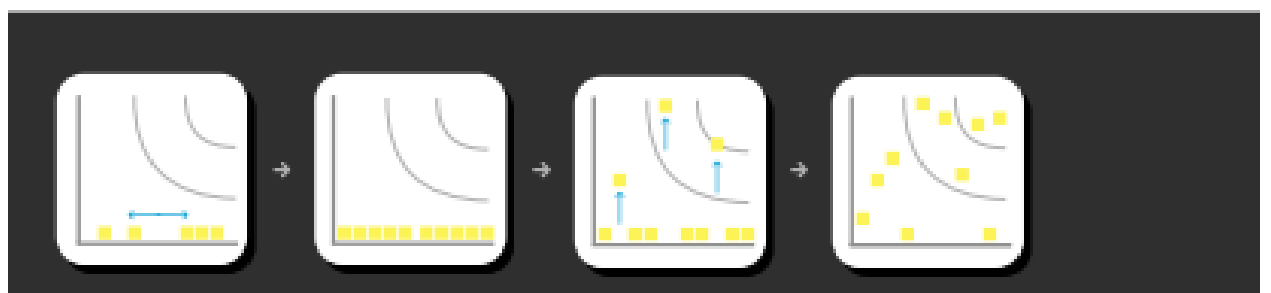
Inventory mustn't contain expired or stale goods

Employ a safety stock Inventory

### Business Requirements

Review the inventory once a week to align it with business goals

Employ the economic order quantity model



## Proposed Solution

Date	24 September 2022
Team ID	PNT2022TMID12716
Project Name	Inventory Management System for Retailers

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The retail companies are not facilitated with an organized system for tracking the orders of the customers. It is a very hectic process for the companies to keep track of the records and delivery correctly without any mismatch and to provide on time delivery. In order to meet the requirements of the customers with ease, an inventory management system should be built for handling stocks, orders and delivery efficiently.
2.	Idea / Solution description	In order to manage stocks, the customers can be provided with a mobile application through which the customers can place orders track the delivery and register their queries and feedback for which the customers must have created an individual account. Using this application the retailers will be able to efficiently handle the placed orders by updating new stocks, deleting the old ones, and keeping track of the number of stocks .There can be a facility to indicate the low number of stocks.
3.	Novelty / Uniqueness	<p>An informative app which gives all the details about different orders placed by the customer</p> <p>Providing tracking facilities for retailers which will help them keep a check about the precise delivery of the orders in the right place at promised time.</p> <p>Providing an indication when the number of stocks are low which will avoid the situation of running out of stock.</p>

4.	Social Impact / Customer Satisfaction	<p>From the view point of the corporate there must be a positive impact on the society which would also increase the revenue of the company. This must bring in social transformations with fair business practices which will make the lives of the people easier as they will have easy access to the stocks.</p> <p>Customer satisfaction is an important evaluation criteria to know how the customers have liked a product or a service when compared to their expectation. Feedback must be got from the customers and services must be improved in specific areas of customers interest in a way that increases customer's repurchase.</p>
5.	Business Model (Revenue Model)	<p>We propose efficient inventory management system that is capable of reducing the effort and errors and which is also capable of increasing the profit and customer satisfaction by introducing strategical ideas and technical implementation.</p> <ul style="list-style-type: none"> <li>● Providing user friendly platforms for the user</li> <li>● Preparing and implementing strategies for no or minimal loss</li> <li>● Using attractive advertisements which are closely related to the lifestyle of people.</li> <li>● Providing attractive discounts and users to the customers.</li> </ul>
6.	Scalability of the Solution	<ul style="list-style-type: none"> <li>● An application to monitor all the orders</li> <li>● Shrinkage or expansion of stock database as per requirement</li> <li>● Providing trustworthy support for the customer by allowing direct querying facility with the retailers</li> </ul>

## Problem Solution fit

### INVENTORY MANAGEMENT SYSTEM FOR RETAILERS

Team ID : PNT2022TMID12716

Problem-Solution Fit

Define CS, fit into CL	<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> <ul style="list-style-type: none"> <li>Retailers, manufacturers, distributors who are struggling to managing and maintaining inventory to optimize their warehouse and notify the unavailability of stocks</li> </ul>	<b>6. CUSTOMER LIMITATIONS</b> <span>CL</span> <small>EG. BUDGET, DEVICES</small> <ul style="list-style-type: none"> <li>Stock availability</li> <li>Total number of orders placed</li> <li>Delay in delivery</li> <li>Network restrictions</li> </ul>	<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> <small>PROS &amp; CONS</small> <ul style="list-style-type: none"> <li>Maintain the record of the stocks</li> <li>Forecast demand</li> <li>Plan production and distribution</li> </ul>	Explore AS, differentiate
	<b>2. PROBLEMS / PAINS</b> <span>PR</span> <small>+ ITS FREQUENCY</small> <ul style="list-style-type: none"> <li>Avoid overstocking</li> <li>Selling expired stock</li> <li>Poor demand forecasting</li> <li>Management of the inventory</li> </ul>	<b>9. PROBLEM ROOT / CAUSE</b> <span>RC</span> <ul style="list-style-type: none"> <li>Time consuming manual work prone to error</li> <li>Improper import of a product</li> <li>Poor UX &amp; UI</li> <li>Proper maintenance of inventory</li> </ul>	<b>7. BEHAVIOR</b> <span>BE</span> <small>+ ITS INTENSITY</small> <ul style="list-style-type: none"> <li>Enquire the retailers in the neighborhood</li> <li>Provides better customer service through fast delivery and less shipping cost</li> <li>Consumes more time for checking the stock of a product</li> </ul>	Focus on PR, tap into BE, understand RC
Identify strong TR & EM	<b>3. TRIGGERS TO ACT</b> <span>TR</span> <ul style="list-style-type: none"> <li>Difficulty in maintaining huge number of stocks[products]</li> </ul>	<b>10. YOUR SOLUTION</b> <span>SL</span> <ul style="list-style-type: none"> <li>Creating an Inventory Management System for Retailers on a cloud based environments, where the stock details are stored in a online database platform.</li> <li>Tracks the real-time inventory and alerts the retailers when a stock going to be unavailable through email or SMS</li> </ul>	<b>8. CHANNELS of BEHAVIOR</b> <span>CH</span> <p>ONLINE</p> <ul style="list-style-type: none"> <li>Since it is a cloud based inventory management system it is easy to access anywhere.</li> </ul>	Extract online & offline CH of BE
	<b>4. EMOTIONS</b> <span>EM</span> <small>BEFORE / AFTER</small> <ul style="list-style-type: none"> <li>Before: difficult to keep tracks of stock availability</li> <li>After: easy to maintain and know the stocks to be inadequate or adequate</li> </ul>		<p>OFFLINE</p> <ul style="list-style-type: none"> <li>SMS notifications</li> <li>Creating awareness among the retailers</li> </ul>	

## REQUIREMENT ANALYSIS

### Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Successful Log In	Sign into the application using the registered email ID and password
FR-4	Update inventory details	Notification through alert message and Email[if needed]
FR-5	Add new stock	Update the database through python/flask and notified through Email[if needed]
FR-6	Unavailability of stock	Alert notification through Email or SMS

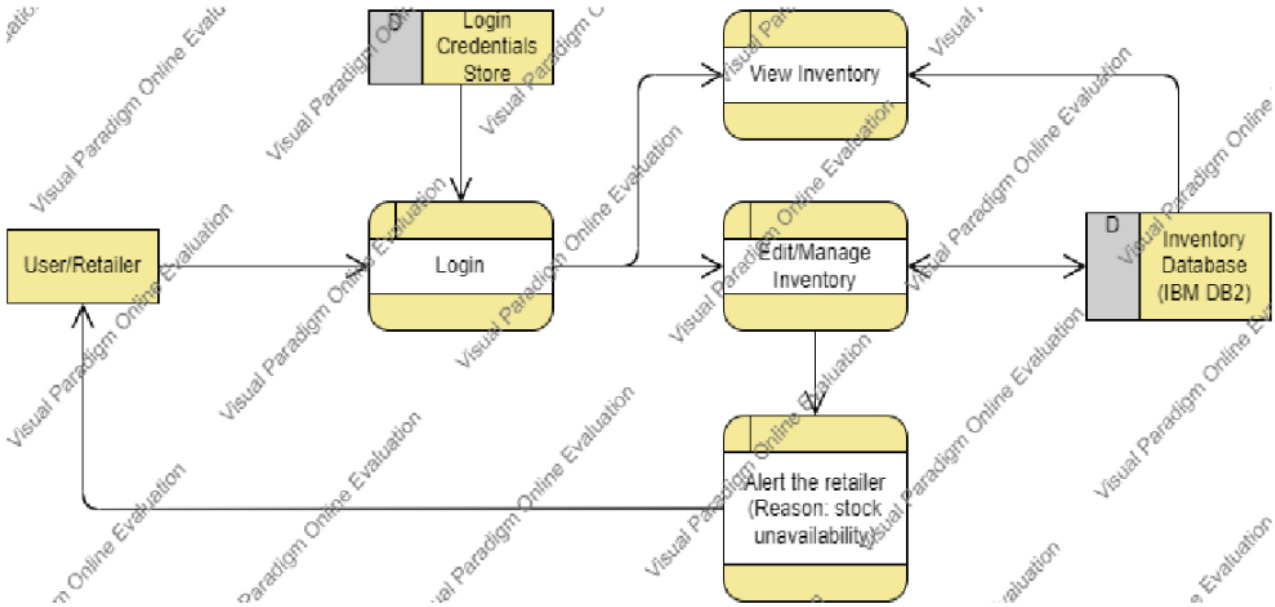
## Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	When the account is created in the application, all the details about the stock has to be filled. And when the stocks are no more left, the application will get to know this and does the process
NFR-2	<b>Security</b>	The software should be handled only by the administrator and authorized users. Only the administrator has the right to create new accounts and generating inventory.
NFR-3	<b>Reliability</b>	In the event of application failure due to software or hardware, the software should be able to connect to the database
NFR-4	<b>Performance</b>	The performance of the application must be capable of handling multiple users at a time flexibly without causing errors
NFR-5	<b>Availability</b>	The system is designed to monitor systems are designed to monitor product availability, determine purchasing schedules for better customer interaction

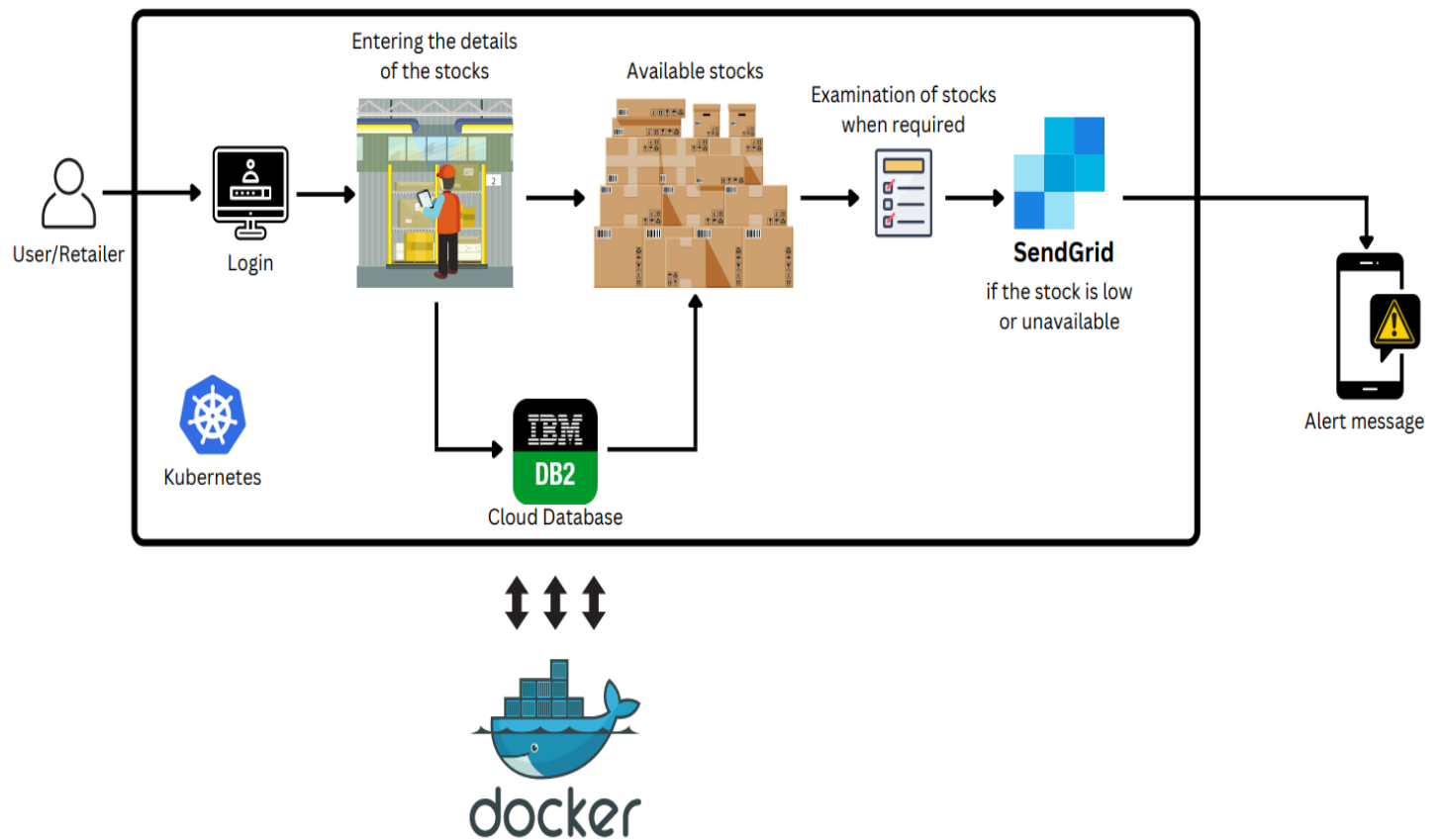


## PROJECT DESIGN

## Data Flow Diagrams



## Solution & Technical Architecture



## User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-4	As a user, I can log into the application by entering email & password		High	Sprint-1
	Alert	USN-5	When the stock is going to be out of stock in the inventory, the retailer should be alerted with a mail or SMS	Mail or SMS to the retailer	Medium	Sprint-3
	View Inventory	USN-6	After logging in, the user should be able to view the inventory in his homepage	Inventory details displayed in the screen	Medium	Sprint-2
	Edit Inventory	USN-7	The user should be able to update or edit the inventory	Changes can be viewed in View Inventory	Medium	Sprint-2
	Logout	USN-8	As an user, I can logout of my application whenever needed, by clicking on logout button	Back to login page	High	Sprint-1

## PROJECT PLANNING & SCHEDULING

### Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my username, password, and email.	20	High	Hemavarshini B Sanjai S Sruthi S Udhayakumaran H
Sprint-2	Login	USN-2	As a user, I can sign in the application by entering username & password	10	High	Hemavarshini B Sanjai S Sruthi S Udhayakumaran H
Sprint-3	Add and delete inventory	USN-3	As a user, I can enter the stocks to be added	20	High	Hemavarshini B Sanjai S Sruthi S Udhayakumaran H
Sprint-4	Update inventory	USN-4	As a user, I can update the stock information	10	High	Hemavarshini B Sanjai S Sruthi S Udhayakumaran H
Sprint-4	Alert email	USN-5	As a user, I'll receive indication when the stock is low.	10	Medium	Hemavarshini B Sanjai S Sruthi S Udhayakumaran H
Sprint-2	Logout	USN-6	User can log out	10	High	Hemavarshini B Sanjai S Sruthi S Udhayakumaran H

## Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	6	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	4	5 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	9	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	4	19 Nov 2022

## Reports from JIRA

▼ IMS Sprint 1 Add dates (6 issues)

0 0 0 Start sprint ...

IMS-1 import the packages TO DO

IMS-2 Create the setup environment TO DO

IMS-3 Design Login page TO DO

IMS-4 Design Home page TO DO

IMS-5 Design the dashboard TO DO

IMS-6 Logout option TO DO

▼ IMS Sprint 2 Add dates (3 issues)

0 0 0 Start sprint ...

IMS-7 creating the cloud account TO DO

IMS-8 create a database in the cloud TO DO

IMS-9 Implement Add inventory details function TO DO

+ Create issue

▼ IMS Sprint 3 Add dates (2 issues)

0 0 0 Start sprint ...

IMS-10 Update the inventory details option TO DO

IMS-11 Delete the inventory details option TO DO

+ Create issue

▼ IMS Sprint 3 Add dates (2 issues)

0 0 0 Start sprint ...

IMS-10 Update the inventory details option TO DO

IMS-11 Delete the inventory details option TO DO

+ Create issue

## CODING & SOLUTIONING

### DASHBOARD

```
<nav class="navbar navbar-light bg-light p-3">
  <div class="d-flex col-12 col-md-3 col-lg-2 mb-2 mb-lg-0 flex-wrap flex-md-nowrap
justify-content-between">
    <a class="navbar-brand" href="#">
      Inventory Management System for Retailers
    </a>
    <button class="navbar-toggler d-md-none collapsed mb-3" type="button" data-
toggle="collapse" data-target="#sidebar" aria-controls="sidebar" aria-expanded="false" aria-
label="Toggle navigation">
      <span class="navbar-toggler-icon"></span>
    </button>
  </div>
  <div class="col-12 col-md-5 col-lg-8 d-flex align-items-center justify-content-md-end
mt-3 mt-md-0">

    <div class="dropdown">
      <button class="btn btn-secondary dropdown-toggle" type="button"
id="dropdownMenuButton" data-toggle="dropdown" aria-expanded="false">
        Hello, {{user_name}}
      </button>
      <ul class="dropdown-menu" aria-labelledby="dropdownMenuButton">
        <li><a class="dropdown-item" href="{{ url_for('logout') }}">Sign
out</a></li>
      </ul>
    </div>
  </div>
</nav>
<div class="container-fluid">
  <div class="row">
    <nav id="sidebar" class="col-md-3 col-lg-2 d-md-block bg-light sidebar collapse">
      <!-- sidebar content goes in here -->
      <div class="position-sticky pt-md-5">
        <ul class="nav flex-column">
          <li class="nav-item">
            <a class="nav-link active" aria-current="page"
href="{{url_for('dashboard')}}">
              <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
viewBox="0 0 24 24" fill="none" stroke="currentColor" stroke-width="2" stroke-linecap="round"
stroke-linejoin="round" class="feather feather-home"><path d="M3 9l9-7 9 7v11a2 2 0 0 1-2
2H5a2 2 0 0 1-2 2z"></path><polyline points="9 22 9 12 15 12 15 22"></polyline></svg>
              <span class="ml-2">Dashboard</span>
            </a>
          </li>
          <li class="nav-item">
            <a class="nav-link" href="{{url_for('add_items')}}">
              <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
fill="currentColor" class="bi bi-file-plus" viewBox="0 0 16 16">
```

```

        <path d="M8.5 6a.5.5 0 0 0-1 0v1.5H6a.5.5 0 0 0 0
1h1.5V10a.5.5 0 0 0 1 0V8.5H10a.5.5 0 0 0 0-1H8.5V6z"/>
        <path d="M2 2a2 2 0 0 1 2-2h8a2 2 0 0 1 2 2v12a2 2 0 0 1-2
2H4a2 2 0 0 1-2-2V2zm10-1H4a1 1 0 0 0-1 1v12a1 1 0 0 0 1 1h8a1 1 0 0 0 1-1V2a1 1 0 0 0-1-1z"/>
    </svg>
    <span class="ml-2">Add New Stock</span>
</a>
</li>
<li class="nav-item">
    <a class="nav-link" href="{{url_for('view_inventory')}}">
        <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
viewBox="0 0 24 24" fill="none" stroke="currentColor" stroke-width="2" stroke-linecap="round"
stroke-linejoin="round" class="feather feather-shopping-cart"><circle cx="9" cy="21"
r="1"></circle><circle cx="20" cy="21" r="1"></circle><path d="M1 1h4l2.68 13.39a2 2 0 0 0 2
1.61h9.72a2 2 0 0 0 2-1.61L23 6H6"></path></svg>
        <span class="ml-2">View Inventory</span>
    </a>
</li>
<li class="nav-item">
    <a class="nav-link" href="{{url_for('update_item')}}">
        <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
fill="currentColor" class="bi bi-arrow-up-circle" viewBox="0 0 16 16">
            <path fill-rule="evenodd" d="M1 8a7 7 0 1 0 14 0A7 7 0 0 0 1
8zm15 0A8 8 0 1 1 0 8a8 8 0 0 1 16 0zm-7.5 3.5a.5.5 0 0 1-1 0V5.707L5.354 7.854a.5.5 0 1 1-
.708-.708l3-3a.5.5 0 0 1 .708 0l3 3a.5.5 0 0 1-.708.708L8.5 5.707V11.5z"/>
        </svg>
        <span class="ml-2">Update Item</span>
    </a>
</li>

```

## INDEX

```

<body>
    <br><br>
    <h1
        class="text-green text-center font-weight-bold"
        style="font-size: 40px;"
    >
    Inventory Management System for Retailers
    </h1>

    <br><br>
    <center>
    <div class="container" style="background-color: whitesmoke; border-radius: 10px; width:
500px; height: 310px;">
        <div class="col-lg-5 m-auto d-block" >
            <br><br><br><br>
            <div class="container text-center mb-5">
                <button class="btn btn-primary" onclick="location.href='/login_page'"><i
class="bi-door-open"></i> Login</button>
            <br>
            <hr>

```

```

        <button class="btn btn-info text-white"
onclick="location.href='/registration_page'"><i class="bi-person-plus"></i> Register</button>
    </div>

</div>
</div>
<br><br>
{{message}}
</center>
</body>
</html>

```

## LOGIN

```

Inventory Management System for Retailers
</h1>
<br><br>
<h4 class="text-blue text-center font-weight-bold" style="font-size: 20px;">
    LOGIN
</h4>

<div class="container">
    <br />

    <div class="col-lg-5 m-auto d-block" style="background-color: whitesmoke;border-radius:
15px;">
        <br>
        <form action="/validate" onsubmit="{{ url_for('validate') }}" class="bg-light"
method="post">
            <div class="form-group" style="background-color: whitesmoke;">
                <label for="user" class="font-weight-regular"> Username </label>
                <input
                    type="text"
                    name="user"
                    class="form-control"
                    id="user"
                    autocomplete="off"
                />
                <span id="username_Alert" class="text-danger font-weight-regular">
                    {{nme}} </span>
            </div>

            <div class="form-group" style="background-color: whitesmoke;">
                <label class="font-weight-regular"> Password </label>
                <input
                    type="password"
                    name="pass"
                    class="form-control"
                    id="pass"
                    autocomplete="off"
                />
                <span id="password_Alert" class="text-danger font-weight-regular">

```





```
        type="text"
        name="email"
        class="form-control"
        id="email"
        autocomplete="off"
        required
    />
    <span id="emailids" class="text-danger font-weight-regular"> {{mail}} </span>
</div>

<div class="form-group" style="background-color: whitesmoke;">
    <label for="user" class="font-weight-regular"> Username </label>
    <input
        type="text"
        name="user"
        class="form-control"
        id="user"
        autocomplete="off"
        required
    />
    <span id="username" class="text-danger font-weight-regular"> {{usr}} </span>
</div>

<div class="form-group" style="background-color: whitesmoke;">
    <label class="font-weight-regular"> Password </label>
    <input
        type="password"
        name="pass"
        class="form-control"
        id="pass"
        autocomplete="off"
        required
    />
    <span id="passwords" class="text-danger font-weight-regular"> {{pwd}} </span>
</div>

<div class="form-group" style="background-color: whitesmoke;">
    <label class="font-weight-regular"> Confirm Password </label>
    <input
        type="password"
        name="conpass"
        class="form-control"
        id="conpass"
        autocomplete="off"
        required
    />
    <span id="confrmpass" class="text-danger font-weight-regular"> {{cpwd}} </span>
</div>

<div class="form-group" style="background-color: whitesmoke;">
    <label class="font-weight-regular"> Mobile Number </label>
    <input
```

```
        type="text"  
        name="mobile"  
        class="form-control"  
        id="mobile"  
        autocomplete="off"  
    />  
    <span id="mobilen0" class="text-danger font-weight-regular"> {{mble}} </span>  
</div>  
  
    <input  
        type="submit"  
        name="submit"  
        value="Submit"  
        class="btn btn-primary"  
        autocomplete="off"  
    />  
    <input  
        type="reset"  
        name="reset"  
        value="Reset"  
        class="btn btn-secondary"  
        autocomplete="off"  
    />  
    &nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&nbsp;&~  
    <a href="{{url_for('login')}}">Login</a>  
</form>  
<br>  
</div>  
</div>  
{{msg}}  
<br><br>
```

## UPDATE ITEM

```
<body>
  <nav class="navbar navbar-light bg-light p-3">
    <div class="d-flex col-12 col-md-3 col-lg-2 mb-2 mb-lg-0 flex-wrap flex-md-nowrap
justify-content-between">
      <a class="navbar-brand" href="#">
        Inventory Management System for Retailers
      </a>
      <button class="navbar-toggler d-md-none collapsed mb-3" type="button" data-
toggle="collapse" data-target="#sidebar" aria-controls="sidebar" aria-expanded="false" aria-
label="Toggle navigation">
        <span class="navbar-toggler-icon"></span>
      </button>
    </div>
    <div class="col-12 col-md-5 col-lg-8 d-flex align-items-center justify-content-md-end
mt-3 mt-md-0">

      <div class="dropdown">
```

```

        <button class="btn btn-secondary dropdown-toggle" type="button"
id="dropdownMenuButton" data-toggle="dropdown" aria-expanded="false">
        Hello, {{user_name}}
    </button>
    <ul class="dropdown-menu" aria-labelledby="dropdownMenuButton">
        <li><a class="dropdown-item" href="{{ url_for('logout') }}">Sign
out</a></li>
    </ul>
</div>
</div>
</nav>
<div class="container-fluid">
    <div class="row">
        <nav id="sidebar" class="col-md-3 col-lg-2 d-md-block bg-light sidebar collapse">
            <!-- sidebar content goes in here -->
            <div class="position-sticky pt-md-5">
                <ul class="nav flex-column">
                    <li class="nav-item">
                        <a class="nav-link" aria-current="page"
href="{{url_for('dashboard')}}">
                            <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
viewBox="0 0 24 24" fill="none" stroke="currentColor" stroke-width="2" stroke-linecap="round"
stroke-linejoin="round" class="feather feather-home"><path d="M3 9l9-7 9 7v11a2 2 0 0 1-2
2H5a2 2 0 0 1-2-2z"></path><polyline points="9 22 9 12 15 12 15 22"></polyline></svg>
                            <span class="ml-2">Dashboard</span>
                        </a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link" href="{{url_for('add_items')}}">
                            <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
fill="currentColor" class="bi bi-file-plus" viewBox="0 0 16 16">
                                <path d="M8.5 6a.5.5 0 0 0-1 0v1.5H6a.5.5 0 0 0 0
1h1.5V10a.5.5 0 0 0 1 0V8.5H10a.5.5 0 0 0 0-1H8.5V6z"/>
                                <path d="M2 2a2 2 0 0 1 2-2h8a2 2 0 0 1 2 2v12a2 2 0 0 1-2
2H4a2 2 0 0 1-2-2V2zm10-1H4a1 1 0 0 0-1 1v12a1 1 0 0 0 1 1h8a1 1 0 0 0 1-1V2a1 1 0 0 0-1-1z"/>
                            </svg>
                            <span class="ml-2">Add New Stock</span>
                        </a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link" href="{{url_for('view_inventory')}}">
                            <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
viewBox="0 0 24 24" fill="none" stroke="currentColor" stroke-width="2" stroke-linecap="round"
stroke-linejoin="round" class="feather feather-shopping-cart"><circle cx="9" cy="21"
r="1"></circle><circle cx="20" cy="21" r="1"></circle><path d="M1 1h4l2.68 13.39a2 2 0 0 0 2
1.61h9.72a2 2 0 0 0 2-1.61L23 6H6"></path></svg>
                            <span class="ml-2">View Inventory</span>
                        </a>
                    </li>
                    <li class="nav-item">
                        <a class="nav-link active" href="{{url_for('update_item')}}">

```

```

                <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
fill="currentColor" class="bi bi-arrow-up-circle" viewBox="0 0 16 16">
                    <path fill-rule="evenodd" d="M1 8a7 7 0 1 0 14 0A7 7 0 0 0 1
8zm15 0A8 8 0 1 1 0 8a8 8 0 0 1 16 0zm-7.5 3.5a.5.5 0 0 1-.1 1-1 0V5.707L5.354 7.854a.5.5 0 1 1-
.708-.708l3-3a.5.5 0 0 1 .708 0l3 3a.5.5 0 0 1-.708.708L8.5 5.707V11.5z"/>
                </svg>
                <span class="ml-2">Update Item</span>
            </a>
        </li>

```

## VIEW INVENTORY

```

<body>
    <nav class="navbar navbar-light bg-light p-3">
        <div class="d-flex col-12 col-md-3 col-lg-2 mb-2 mb-lg-0 flex-wrap flex-md-nowrap
justify-content-between">
            <a class="navbar-brand" href="#">
                Inventory Management System for Retailers
            </a>
            <button class="navbar-toggler d-md-none collapsed mb-3" type="button" data-
toggle="collapse" data-target="#sidebar" aria-controls="sidebar" aria-expanded="false" aria-
label="Toggle navigation">
                <span class="navbar-toggler-icon"></span>
            </button>
        </div>
        <div class="col-12 col-md-5 col-lg-8 d-flex align-items-center justify-content-md-end
mt-3 mt-md-0">

            <div class="dropdown">
                <button class="btn btn-secondary dropdown-toggle" type="button"
id="dropdownMenuButton" data-toggle="dropdown" aria-expanded="false">
                    Hello, {{user_name}}
                </button>
                <ul class="dropdown-menu" aria-labelledby="dropdownMenuButton">
                    <li><a class="dropdown-item" href="{{ url_for('logout') }}">Sign
out</a></li>
                </ul>
            </div>
        </div>
    </nav>
    <div class="container-fluid">
        <div class="row">
            <nav id="sidebar" class="col-md-3 col-lg-2 d-md-block bg-light sidebar collapse">
                <!-- sidebar content goes in here -->
                <div class="position-sticky pt-md-5">
                    <ul class="nav flex-column">
                        <li class="nav-item">
                            <a class="nav-link" aria-current="page"
href="{{url_for('dashboard')}}">
                                <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
viewBox="0 0 24 24" fill="none" stroke="currentColor" stroke-width="2" stroke-linecap="round"

```

```

stroke-linejoin="round" class="feather feather-home"><path d="M3 919-7 9 7v11a2 2 0 0 1-2
2H5a2 2 0 0 1-2-2z"></path><polyline points="9 22 9 12 15 12 15 22"></polyline></svg>
    <span class="ml-2">Dashboard</span>
  </a>
</li>
<li class="nav-item">
  <a class="nav-link" href="{{url_for('add_items')}}">
    <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
fill="currentColor" class="bi bi-file-plus" viewBox="0 0 16 16">
      <path d="M8.5 6a.5.5 0 0 0-1 0v1.5H6a.5.5 0 0 0 0
1h1.5V10a.5.5 0 0 1 0V8.5H10a.5.5 0 0 0 0-1H8.5V6z"/>
      <path d="M2 2a2 2 0 0 1 2-2h8a2 2 0 0 1 2 2v12a2 2 0 0 1-2
2H4a2 2 0 0 1-2-2V2zm10-1H4a1 1 0 0 0-1 1v12a1 1 0 0 0 1 1h8a1 1 0 0 0 1-1V2a1 1 0 0 0-1-1z"/>
    </svg>
    <span class="ml-2">Add New Stock</span>
  </a>
</li>
<li class="nav-item">
  <a class="nav-link active" href="{{url_for('view_inventory')}}">
    <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
viewBox="0 0 24 24" fill="none" stroke="currentColor" stroke-width="2" stroke-linecap="round"
stroke-linejoin="round" class="feather feather-shopping-cart"><circle cx="9" cy="21"
r="1"></circle><circle cx="20" cy="21" r="1"></circle><path d="M1 1h412.68 13.39a2 2 0 0 0 2
1.61h9.72a2 2 0 0 0 2-1.61L23 6H6"></path></svg>
    <span class="ml-2">View Inventory</span>
  </a>
</li>
<li class="nav-item">
  <a class="nav-link" href="{{url_for('update_item')}}">
    <svg xmlns="http://www.w3.org/2000/svg" width="24" height="24"
fill="currentColor" class="bi bi-arrow-up-circle" viewBox="0 0 16 16">
      <path fill-rule="evenodd" d="M1 8a7 7 0 1 0 14 0A7 7 0 0 0 1
8zm15 0A8 8 0 1 1 0 8a8 8 0 0 1 16 0zm-7.5 3.5a.5.5 0 0 1-1 0V5.707L5.354 7.854a.5.5 0 1 1-
.708-.708l3-3a.5.5 0 0 1 .708 0l3 3a.5.5 0 0 1-.708.708L8.5 5.707V11.5z"/>
    </svg>
    <span class="ml-2">Update Item</span>
  </a>
</li>

```

**Database Schema (if Applicable)**

Name	Data type	Nullable	Length	Scale
PID	VARCHAR	N	10	0
PNAME	VARCHAR	N	32	0
STOCK	INTEGER	N		0
DATE	VARCHAR	N	10	0

Name	Data type	Nullable	Length	Scale
NAME	VARCHAR	N	32	0
EMAIL	VARCHAR	N	32	0
USERNA ME	VARCHAR	N	20	0
PASSWO RD	VARCHAR	N	20	0
MOBILE	VARCHAR	Y	10	0

## TESTING

### Test Cases

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Expected Result	Status
LoginPage_TC_O01	Functional	Login Page	Verify user is able to see the Login/Registration popup when user enters the site.	1. Enter URL and click go 2. Verify login/Signup popup displayed or not	Login/Signup popup should display	Pass
LoginPage_TC_O02	UI	Login Page	Verify the UI elements in Login/Signup popup	1. Enter URL and click go 2. Verify login/Signup popup with below UI elements: a. name text box b. email text box c. password text box d. Login button e. New customer? Registration link	Application should show below UI elements: a. email text box b. password text box c. Login button with orange colour d. New customer? Create account link e. Last password? Recovery password link	Pass
LoginPage_TC_O03	Functional	Login page	Verify user is able to log into application with Valid credentials	1. Enter URL and click go 2. Enter Valid username/email in Email text box 3. Enter valid password in password text box 4. Click on login button	User should be able to navigate to user account homepage.	Pass
LoginPage_TC_O04	Functional	Login page	Verify user is able to log into application with Invalid credentials	1. Enter URL and click go 2. Enter Invalid username/email in Email text box 3. Enter valid password in	Application should show 'Incorrect email or password' validation	Pass

				password text box 4.Click on login button	message.	
LoginPag e_TC_O O5	Function al	Logi n pag e	Verify user is able to log into application with InValid credentials	1.Enter URL and clickgo 2.Enter Valid username/emai l inEmail text box	Applicatio n should show 'Incorrect email or password '	Pass



## User Acceptance Testing

### Defect Analysis

Resolution	Severity1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	2	18
Fixed	6	2	2	2	12
Skipped	0	0	0	1	1
Won't Fix	0	0	0	1	1
Totals	16	6	4	6	32

### Test Case Analysis

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	8	0	0	8
Client Application	17	0	0	17
Security	2	0	0	2
Exception Reporting	2	0	0	2
Final Report Output	5	0	0	5
Version Control	1	0	0	1

## ADVANTAGES & DISADVANTAGES

### Merits

- **Better Inventory Accuracy:** With solid inventory management, you know what's in stock and order only the amount of inventory you need to meet demand.
- **Reduced Risk of Overselling:** Inventory management helps track what's in stock and what's on backorder, so you don't oversell products.
- **Cost Savings:** Stock costs money until it sells. Carrying costs include storage handling and transportation fees, insurance and employee salaries. Inventory is also at risk of theft, loss from natural disasters or obsolescence.
- **Avoiding Stockouts and Excess Stock:** Better planning and management helps a business minimize the number of days, if any, that an item is out of stock *and* avoid carrying too much inventory.
- **Greater Insights:** With inventory tracking and stock control, you can also easily spot sales trends or track recalled products or expiry dates.
- **Better Terms With Vendors and Suppliers:** Inventory management also provides insights about which products sell and in what volume. Use that knowledge as leverage to negotiate better prices and terms with suppliers.
- **More Productivity:** Good inventory management solutions save time that could be spent on other activities.
- **Increased Profits:** A better understanding of both availability and demand leads to higher inventory turnover, which leads to greater profits.
- **A More Organized Warehouse:** An efficient warehouse with items organized based on demand, which items are often sold together and other factors reduces labor costs and speeds order fulfillment.
- **Better Customer Experience:** Customers that receive what they order on time are more loyal.

### Demerits

- **Bureaucracy:** even though inventory management allows employees at every level of the company to read and manipulate company stock and product inventory, the infrastructure required to build such a system adds a layer of bureaucracy to the whole process and the business in general.
- **Impersonal touch:** another disadvantage of inventory management is a lack of personal touch. Large supply chain management systems make products more accessible across the globe and most provide customer service support in case of difficulty, but the increase in infrastructure can often mean a decrease in the personal touch that helps a company to stand out above the rest.
- **Production problem:** even though inventory management can reveal to you the amount of stock you have at hand and the amount that you have sold off, it can also hide production problems that could lead to customer service disasters. Since the management places almost all of its focus on inventory management to the detriment of quality control, broken or incorrect items that would normally be discarded are shipped along with wholesome items.

## **CONCLUSION**

Inventory management is a complex job, especially for large businesses. And with the business growth, it becomes more challenging. Inventory automation is the essential technique to make the job easier. By utilizing inventory management software, such as eSwap, businesses can cut the heaviest part of stock management. Forecasting, counts, purchasing, tracking will become automated and synchronized in one place. As a result, businesses reduce human error and human resource waste. Inventory management is a very complex but essential part of the supply chain. An effective inventory management system helps to reduce stock-related costs such as warehousing, carrying, and ordering costs.

## **FUTURE SCOPE**

- The Fourth Industrial Revolution will continue to drive technological change that will impact the way that we manage inventories.
- Successful companies will view inventory as a strategic asset, rather than an aggravating expense or an evil to be tolerated.
- Collaboration with supply chain partners, coupled with a holistic approach to supply chain management, will be key to effective inventory management.
- The nature of globalization will change, impacting inventory deployment decisions dramatically.
- Increased focus on supply chain security, and concerns about the quality of inventory itself, will be primary motivators to changing supply chain and inventory strategy.

## APPENDIX

### Source Code

<https://github.com/IBM-EPBL/IBM-Project-13361-1659517109/tree/main/Final%20Delivery/Project>

### GitHub Link

<https://github.com/IBM-EPBL/IBM-Project-13361-165951710>

### WebApp Link

<http://169.51.203.120:31015/>

### Demo Link

[https://drive.google.com/file/d/1RQluZ\\_PoYfkUlzSHm0z5DM2Aa60Kjp\\_a/view?usp=sharing](https://drive.google.com/file/d/1RQluZ_PoYfkUlzSHm0z5DM2Aa60Kjp_a/view?usp=sharing)