

RETAIL STORE STOCK INVENTORY ANALYTICS

NALAIYA THIRAN IBM PROJECT REPORT

TEAM ID : PNT2022TMID00800

Submitted By

LALITH ADITYA V H	211419104145
MANOJ KUMAR T	211419104162
MOHAMED ABDULLAH A	211419104166
MOHANRAJ D	211419104168

CONTENT

1. INTRODUCTION

Project overview

1.2.Purpose

2. LITERATURE SURVEY

2.1.Existing problem

2.2.Problem statement

3. IDEATION PHASE

Brainstorm & idea prioritization

3.2.Empathy Map

4. REQUIREMENT ANALYTICS

4.1.Functional requirement

4.2.Non-Functional requirement

5. PROJECT DESIGN PHASE -I

5.1.Proposed Solution

5.2.Problem SolutionFit

5.3.Solution Architecture

6. PROJECT PLAINING

Sprint Planning & Estimation

6.2.Sprint Delivery Schedule

7. CODING & SOLUTIONING

7.1.Feature 1

7.2.Feature 2

8. TESTING

Test Cases

User Acceptance Testing

9. RESULTS

Performance Metrics

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

INTRODUCTION:

Today, people are shopping in ways never before imagined as they piece together the online and in-store shopping experience to best meet their needs. It's more important than ever to meet your customers where they prefer to shop and put them at the centre of your marketing and customer experience. In this guide, you'll learn how to better connect with customers on these new shopping journeys and drive more sales. We've collected the most useful tools, product recommendations, and consumer insights to help you achieve your business and marketing objectives. Whether you're looking to optimise your existing marketing mix or make a game plan for the holiday season, this guide has you covered. Inventory management is an essential part of running a successful retail business. It's important to have a solid strategy to avoid overselling, stocking out, and keeping track of your inventory levels. The project contains the dashboard, report and story. Embed dashboard, report and story in html page and web app.

PROJECT OVERVIEW:

The retail industry has gone through tremendous technological changes in the past few decades. The advent of e-commerce and online retail websites has pushed retail companies to embrace technology. However, few companies still employ traditional business methods. Eventually, only those companies which adopt technology can optimise their business growth. Paper based processes can curb the growth of your retail business. Especially, inventory Management without the use of technology can be cumbersome. Inventory is a vital aspect of any retail enterprise. If it is not managed efficiently, it could have a ripple effect on other retail in-store processes. The retail inventory management software would help you handle complex inventory processes easily. The retail world involves constant competition, to get consumers' attention, and ultimately convince them to make a purchase. This is why you need retail inventory software that makes life behind the scenes easier and more automated. With automation in production, simplified stock tracking, and integrations for sales, accounting, and shipping. It's ideal for owners who want a wider view of their business, and more time to focus on long-term growth. Paper-based retail inventory management can take a lot of time and effort. The retail inventory management software can cut short your in-store inventory process cycles through automation. Automation would give you time to focus on other productive business tasks. Retailers are witnessing a historic shift in the way consumers shop. Today's consumers can

easily compare prices, research products, and make purchasing decisions that align with their lifestyle. Whether online or instore, retail customers have come to expect shopping experiences to be personalised to their unique needs and preferences, order fulfilment and returns that are hassle-free, and responsive customer service available via multiple channels. Analytics for retailers enables a data-driven approach to meet these expectations. Online retail inventory management Empty digital store shelves represent lost sales opportunities and can cause customers to migrate to competitors who are able to consistently keep desired products in stock. With potentially hundreds or thousands of items for sale, traditional threshold based models of inventory management are not sufficient..

PURPOSE:

Saves Time Paper-based retail inventory management can take a lot of time and effort. The retail inventory management software can cut short your in-store inventory process cycles through automation. Automation would give you time to focus on other productive business tasks

PROCESS EFFICIENCY

Inventory management is one of the crucial retail processes. Thus, any discrepancy in the inventory control would impact all other operations in your company. The retail inventory software can streamline the inventory processes, which would, in turn, improve the efficiency of your entire business.

COST-EFFECTIVE

Manual inventory control would increase your labour and process costs. The software would not only help you save time, but it would also help you reduce costs. As a result, the profitability of your business would improve. Also, you can invest the excess funds in activities that promote your business growth.

LITERATURE SURVEY

EXISTING PROBLEM:

UNCLEAR COMMUNICATION

Even in straightforward business processes, miscommunication can cause irreversible damage to efficiency. You can only imagine the far-reaching impact it would have on a complex and multifarious process, like inventory management. As inventory management has numerous components, clear communication is vital for a seamless flow. For instance, having the correct prices is critical to print the price labels for the products in the inventory. However, if an update in the prices is not communicated before printing the labels, the products would go out with the wrong price labels. The revisions for such errors would take a lot of time. Furthermore, if the miscommunication is not detected in time, it would affect the sales and profitability of the company. Automation can help you streamline your communication flow across the departments. A retail inventory automation software would provide real-time information about the inventory. Correct and timely information would decrease events of miscommunication.

INADEQUATE ACCESS

Generally, insufficient access to information would lead to miscommunication issues. Every department needs to have access to data that is crucial to their processes. Hence, the impact of the lack of proper access is not limited to individual processes. But it also affects the complete retail inventory management. In the absence of adequate access, your team would resemble disconnected groups. Lack of access would leave them uninformed, which, in turn, affects their productivity. Therefore, better access would improve the efficiency of inventory and other business processes. You can simplify your accessibility issue with retail inventory management software. The software can efficiently manage the access of the users, which would, in turn, improve the quality of the process.

INEFFICIENT WAREHOUSE MANAGEMENT

Warehouse management is a core component of brick-and-mortar retail inventories. Hence, ineffective warehouse management would affect the complete retail inventory process. A decentralised inventory management system would compromise the accuracy of the operations. Many aspects of warehouse management would be vulnerable to errors without

integrated software.

SPOILED GOODS

Inventory management is more complicated for retail companies that deal with perishable goods. Expiration dates become crucial in the inventory tracking process. Inefficient inventory tracking can cause considerable stock and monetary loss for retail businesses. For instance, the warehouse staff sends out a shipment of products with a later expiration date while warehousing considerable stock with an earlier expiration date. This error would not only hamper the process cycle but would also increase the risk of spoilage of the product with an earlier expiration date. You can manage this issue with the introduction of technology. A retail inventory management solution can track the status of perishable goods and help you reduce spoilage.

REFERENCES

- [1] R. Ishfaq, C. C. Delee, B. J. Gibson, y U. Raja, “Realignment of the physical distribution process in omnichannel fulfilment”, *International Journal of Physical Distribution & Logistics Management*, vol. 46, núm. 6/7, pp. 543–561, jul. 2016, doi: 10.1108/IJPDLM-02-2015-0032.
- [2] J. Kembro y A. Norrman, “Exploring trends, implications and challenges for logistics information systems in omnichannels : Swedish retailers’ perception”, *International Journal of Retail and Distribution Management*, vol. 47, núm. 4, pp. 384–411, 2019, doi:10.1108/IJRDM-07-2017-0141
- [3] G. Hançerlioğulları, A. Şen, y E. A. Aktunç, “Demand uncertainty and inventory turnover performance: an empirical analysis of the US retail industry”, *International Journal of Physical Distribution and Logistics Management*, vol. 46, núm.6–7, pp.681–708, 2016, doi:10.1108/IJPDLM-12-2014-030
- [4] J. D. Sterman y G. Dogan, “‘I’m not hoarding, i’m just stocking up before the hoarders get here.’: Behavioural causes of phantom ordering in supply chains”, *Journal of Operations Management*, vol. 39, pp. 6– 22, 2015.

Y. Wang, S. W. Wallace, B. Shen, y T.-M. Choi, “Service supply chain management: A review of operational models”, *European Journal of Operational Research*, vol. 247, núm. 3, pp. 685–698, 2015.

[5] S. Mahar y P. D. Wright, “The value of postponing online fulfilment decisions in multichannel retail/e-tail organisations”, *Computers & operations research*, vol. 36, núm. 11, pp.3061–3072, 2009

[6] A. Hübner, A. Holzapfel, y H. Kuhn, “Operations management in multi-channel retailing: an exploratory study”, *Operations Management Research*, vol. 8, núm. 3–4, pp.84–100, 2015.

[7] A. Hübner, H. Kuhn, J. Wollenburg, y A. Trautrim, “From bricks-and mortar to bricks-and-clicks—logistics networks in omni-channel grocery retailing”, *Empirical Studies in MultiChannel and OmniChannel Retail Operations and Logistics*, p. 102, 2018.

[8] A. Fink, *Conducting research literature reviews: From the internet to paper*. Sage publications, 2019

[9] A. Cooke, D. Smith, y A. Booth, “Beyond PICO: the SPIDER tool for qualitative evidence synthesis”, *Qualitative health research*, vol. 22, núm. 10, pp. 1435–1443, 2012

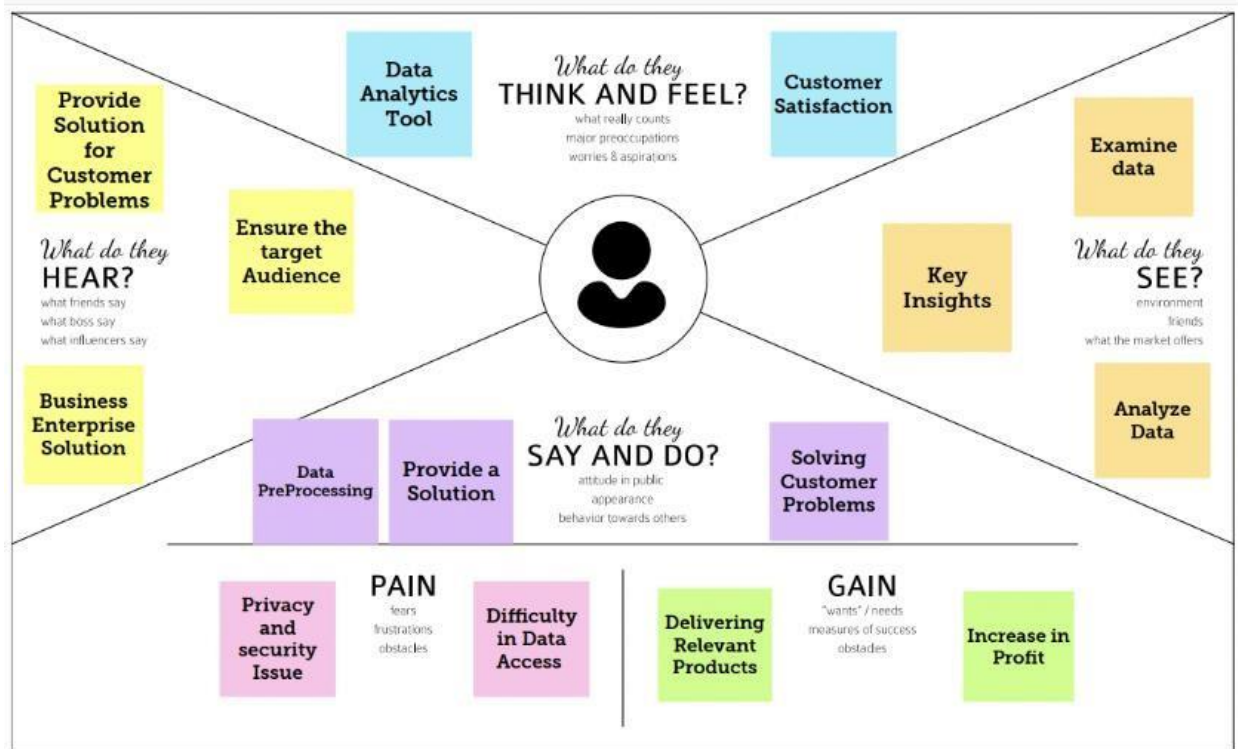
PROBLEM STATEMENT DEFINITION

Effective loss prevention and asset protection efforts are essential to minimising these values—known as stock loss, inventory shrink or simply shrink—and preserving profitability. The challenge is a significant one, however, because while robberies are relatively infrequent for the average business, shoplifting/ORC and employee theft can accommodate for more than two-thirds of shrink. Human error, paperwork snafus, spoilage, and other factors account for the remaining third. With inventory levels under assault in both cyberspace and the real world, effective inventory management requires a sophisticated and strategic approach in order to recover value—or prevent its loss in the first place.

- Slow order fulfilment
- Shipping errors
- Inaccurate or incomplete returns
- No connection between purchase orders, shipping documents, and invoices sent
- High storage costs and less space for more successful products due to excess inventory

IDEATION & PROPOSED SOLUTION

EMPATHY MAP CANVAS



IDEATION & BRAINSTORMING

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

Lalith Aditya

Warehouse
space
insufficiency

Product
Expiration

**Effects of
Over stock**

Unsold
stocks

Loss in
Buisness

Manoj Kumar

Prevents
Wastage

Improves
profit
margins

**Importance
of Inventory
Management
in Retail**

Decrease
Inventory
Cost

Minimizes
the OUT
OF
STOCK

Abdullah

Prevents
over
stock

alert
demand
stock

**Frequent
Analysis of
Data**

information
of stock
sold

set offers
on
expiring
stocks

Mohanraj

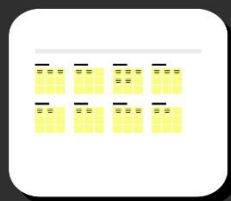
price
optimization

future
performance
predction

**Strategic
areas in data
analytics for
retailers**

demand
predction

identifying
customers



PROPOSED SOLUTION

1 PROBLEM STATEMENT

To create an application to Manage the inventory for Solution Description. This application is used to help stores and ecommerce sellers satisfy customers, Reduce costs and increase Profits.

2 UNIQUENESS

This application has the Uniqueness of easy handling Of huge inventory and helps The merchants to maintain the Stock up to date.

3 CUSTOMER SATISFACTION

Their customers are very much Satisfied because of the easy Maintenance of the record And which is also a paperless Approach.

4 BUSINESS MODEL

This model includes the Information like products or Services, the business plans To sell, target markets, and Any anticipated expenses.

5 SCALABILITY OF THE SOLUTION

This application is the measure of a system's ability To increase or decrease in performance and cost in response to changes in Application and system Processing demands.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The example used here will be a Fruit shop owner who's owning a small shop and a small inventory and the problem faced by him/her is how to manage the inventory of the goods as per the demand and the goodness of the fruit.
2.	Idea / Solution description	<ul style="list-style-type: none">As per inventory management software we can see which stock is having the most movement and which has the least and restock according to the need.if the stock(fruit) is starting to enter the rotting stage then the vendor can move that stock to another processing industry(juice shop)where there they will process and sell it in another model
3.	Novelty / Uniqueness	<ul style="list-style-type: none">Let it be restocking of stocks according to the demand we can priorly identify what season is coming and what fruit will be mostly demanded for and stock it according to the need.The unique idea from this model will be if the fruits start entering into the rotting stage then the software will update it and place an alert to move that stock out to another person (juice stall) so that the fruit is not wasted completely.
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none">By this solution method the customer will always get a fresh and perfect fit goods according to their need be it fresh fruit or be it a fruit juice.A positive awareness will be spread on not to waste any food items.

5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> • This idea business model will increase the number of sales in accordance to quantity of stock available because the stocks are only stored in the warehouse depending only upon the demand from the customers. • If suppose the the vendor buys the banana(per dozen) for Rs.5/dozen there will be revenue here from two different ways : <ul style="list-style-type: none"> a) Will be by selling the fresh bananas directly to customer at a good amount of margin keep it Rs.14/dozen. b) The other will be if the banana starts approaching the rotting stage then the stock can be sold to the juice vendor at a lesser margin keep it Rs.7/dozen. • This method will result in comparatively no loss from the price of stock bought from the only the profitability will change depending on how much margin it sells of the above two.
6.	Scalability of the Solution	<p>The scalability on this model is high as there involves no wastage of food and the inventory space can be managed very efficiently and since the percentage of loss occurring is very less compared to other models and it is very suitable for small fruit shops.</p>

PROBLEM SOLUTION FIT

CUSTOMER SEGMENT(S)

The merchants are the Customer. The shop owners are the customers.

JOBS-TO-BE-DONE/PROBLEMS

The stocks to be maintained Up to date. Monitor the daily Sales, monthly sales and the Yearly sales and the overall Sales of the individual Stocks

CONSUMER CONSTRAINTS

It requires less man power. It is budget friendly and does not require more amount for Installation and maintenance. It can be accessed in offline mode also.

AVAILABLE SOLUTIONS

The entered data will be automatically stored in the database. The user has no need to store the data every time only by just clicking the save button. This reduces the loss of the data.

Problem-Solution Fit			
Define CS, fit into CL	1. CUSTOMER SEGMENT(S) Who is your customer? The customer here is a "Fruit Shop Owner"	6. CUSTOMER LIMITATIONS EG. BUDGET, DEVICES What limit your customer to act when problem occurs? Spending power, No cash in pocket, Risk factor to an extent.	5. AVAILABLE SOLUTIONS PLUSES & MINUSES What solution are available to the customer when he/she is facing the problem? What he/she tried in the past? <ul style="list-style-type: none">The sudden changes in demand which is directly proportional to the price surge can be identified previously and stocked accordingly.He/she tried to predict the surges and drops according to what they only experienced.
	Focus on PR, tap into BE, understand RC	2. PROBLEMS / PAINS + ITS FREQUENCY Which problem do you solve for your customer? <ul style="list-style-type: none">Periodic changes according to seasonDaily Transportation costsLocating the warehouse for restockingShort life of the fresh fruitsSudden surge in prices based on demands	9. PROBLEM ROOT / CAUSE What is the root of every problem from the list? <ul style="list-style-type: none">People think that managing a inventory through a digital form will be difficult and the managing the software will cost too much money.People have kept a mindset that increase/decrease of demand cannot be predicted before itself.
Identify strong TR & EM		3. TRIGGERS TO ACT What triggers customer to act? <ul style="list-style-type: none">Seeing the immense wastage of fruits due to less salesReading about innovative ideas on better management on the internet.	10. YOUR SOLUTION <ul style="list-style-type: none">Analysing the previous year climatic changes will determine the grocery's demand and that will create a good path to invest in right fruitsMonitoring and predicting the ups and downs in market by previous year statistics will helps us to make a alternative changes in the field.Always have a plan b for storing the stocks in warehouse will help us to get avoid in some emergency situation.
	4. EMOTIONS BEFORE / AFTER Which emotions do people feel before after this problem is solved? <ul style="list-style-type: none">Frustration, helplessness, demotivatedSatisfaction, Confident, Calm state of mind.		

4.REQUIREMENT ANALYSIS

FUNCTIONAL REQUIREMENT

Online Food Delivery System

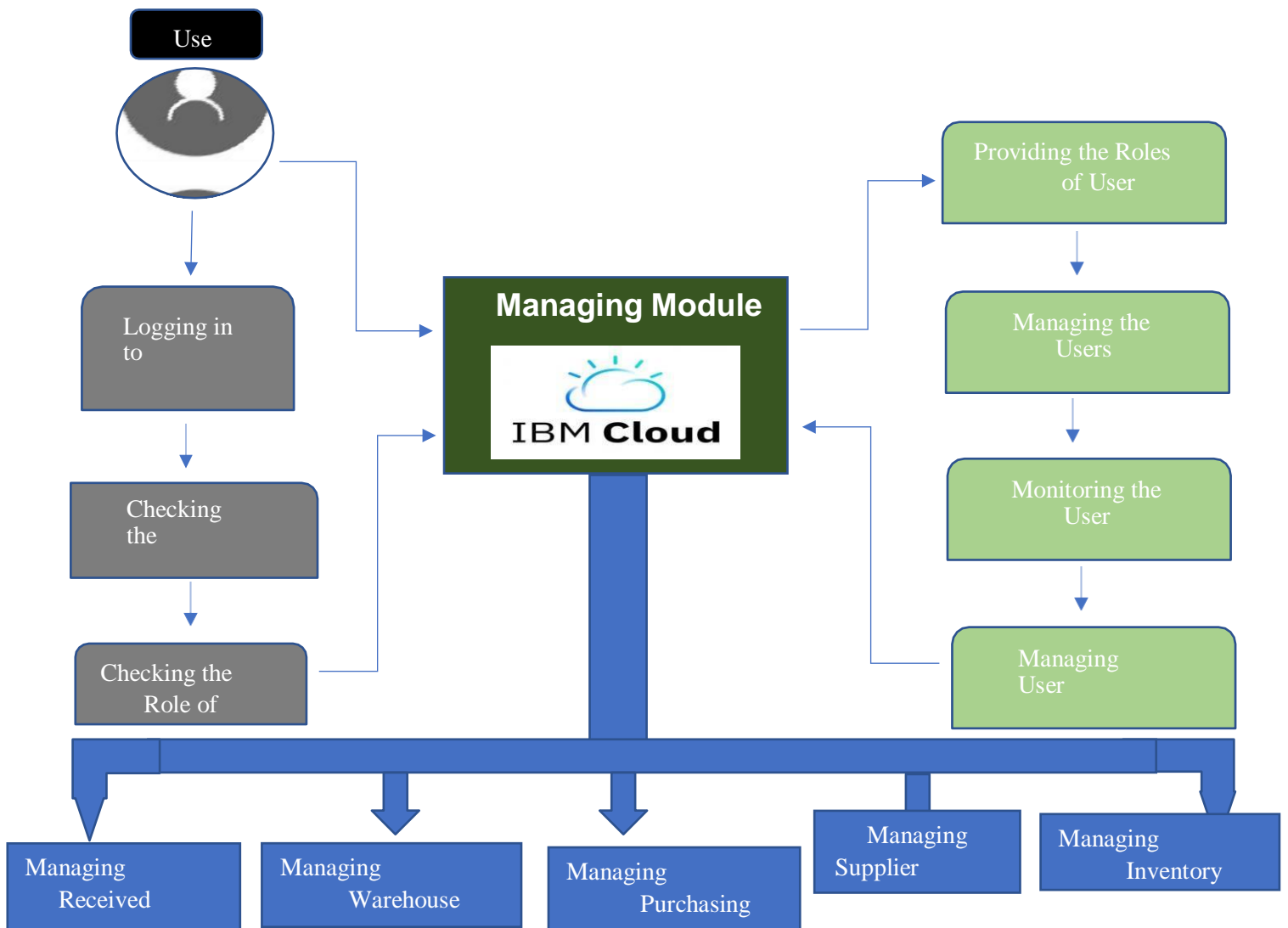
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Registration	Registration through app. If customer wants to order the food He/she must be registered, unregistered customer can't for ordering.
FR-2	Login	Login through valid user id. Login through valid password for ordering.
FR-3	Display the Menu	In this system all the items are displayed with Their rates.
FR-4	Modify Menu	System can make changing in menu like adding or removing food items which are not available.
FR-5	Select food item's	Items are selected customer feel free to Order.
FR-6	Changes to order	The customer can make changings in order like He/she can delete or add food items in order.
FR-7	Review the order before Submitting	Customer Name, Phone number, Location (address), and placed order, then finally order is submitted.
FR-8	Payment	For customers there are many type of secure billing will be prepaid as debit or credit card, post paid as after delivering, check or bank draft.
FR-9	Provide delivery and payment details	Here bill is generated, order No, and payment is given and confirmation of delivery is done.
FR-10	Logout	After the payment or surf the product the customer will logout.

Non-Functional requirement

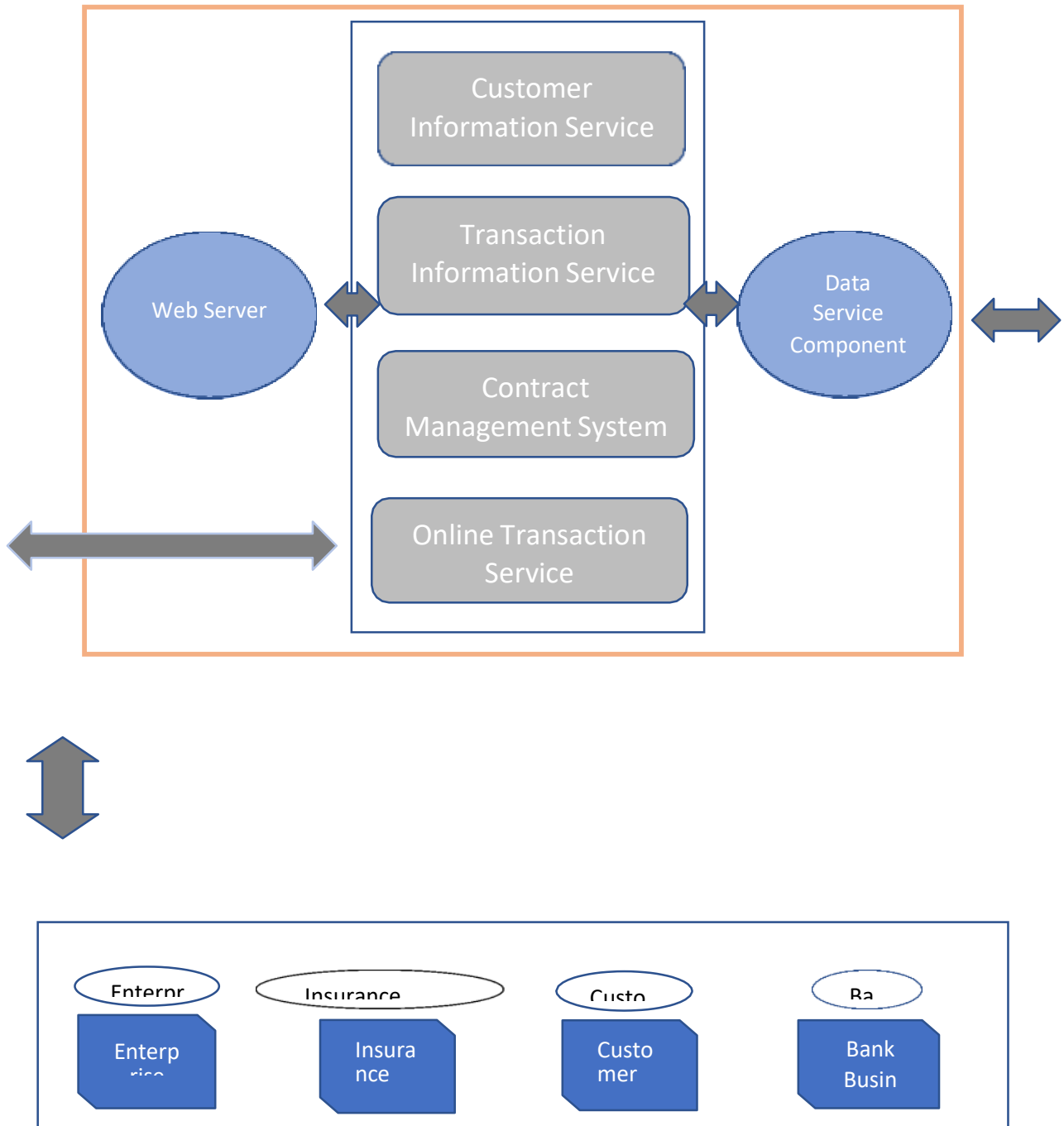
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	System should be easily used by the customer.
NFR-2	Security	Application should not be most vulnerable to any exploitation. That is strict authentication mechanisms to be applied to the system.
NFR-3	Reliability	The ability of the system to behave consistently in a user acceptable manner when operating within the Environment for which the system was intended.
NFR-4	Performance	Online food delivery application to order food that provides instant delivery for food. The app should be able to handle the load of many users at peak hours where maximum orders placed should be a particular minute. Performance should be fast.
NFR-5	Availability	The system should be available at all times, meaning the user can access it using a web browser, only restricted by the down time of the server on which system runs.
NFR-6	Scalability	Which an application performance is measured in terms of its ability to scale up or scale down the number of users requests or other such performance measure attributes. Scalability can be performed at a hardware, software, or database level.

PROJECT DESIGN

DATA FLOW DIAGRAM



SOLUTION & TECHNICAL ARCHITECTURE



USER STORIES

A user story is a small, self-contained unit of development work designed to accomplish a specific goal within a product. A user story is usually written from the user's perspective and follows the format: "As [a user persona], I want [to perform this action] so that [I can accomplish this goal]."

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Fruit Vendor)	Registration	USN-1	As a Fruit Vendor, I can know the previous year statistics about the fruits	I can access my account dashboard	High	Sprint-1
	Data Modules	USN-2	As a Fruit Vendor, I can receive confirmation message once the Stocks were restored	I can receive confirmation message & click confirm	High	Sprint-1
	Dashboard	USN-3	As a Fruit Vendor, I want to know my warehouse locations instantly	I can access the dashboard with my individual Login id/ password	Low	Sprint-2
	Login	USN-4	As a Fruit Vendor, I can identify the sudden ups and downs in market.	I can know the market statement by the analytics	Medium	Sprint-1
	Dashboard	USN-5	As a Fruit Vendor, I can log into my stock activities	I can know my day-to-day activities by the mean of having acceptance to view the data	High	Sprint-1
Customer (Stock broker)	Login	USN-1	As a Stock broker, I can know my shares in the market by the analytics	I can know my value of stock in current trend by my analytics itself	High	Sprint-1
	Report	USN-2	As a Stock Broker, I can find the valuable stock at the period of time.	I can know my all-market details and reports by own Data analytics crew.	Medium	Sprint-2

	Data Exploration	USN-3	As a Stock Broker, I can predict the hike of the product	I can easily go through the movement of stocks in previous year drops and downs.	High	Sprint-2
Customer (restaurant)	Data module	USN1	As a Restaurant owner, I can easily able to know my traditional customers	I can easily segregate the daily customer list through the analytics	Medium	Sprint-3

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
	Report	USN2	As a Restaurant owner, I can create my unique menu for my customer	I can easily find the taste of an customer by their orders and by my sales	Medium	Sprint-1
	Story	USN3	As a restaurant owner, I can able to see a visual representation of my way of journey	I can easily identify my mistake and turnover of my organization	Low	Sprint-1

PROJECT PLANNING & SCHEDULING

The planning process requires a thorough look into the Retail Store motives to determine what strategies to implement. While it may be time-consuming, drafting a detailed plan is essential for successful execution. Retailers can begin by following seven general steps-

SET GOALS

Businesses need to set specific short and long-term goals. Instead of setting a general objective to increase sales, management should set benchmarks regarding which product performances need to improve, specific revenue goals, and ideal profit margins for each item. Retail Store can further break down their goals into two categories

INTERNAL OBJECTIVES

Retail management should pull reports and set practical sales and revenue goals based on product performance. Organisations can set clear monthly, quarterly, and annual targets to motivate employees and keep them focused on boosting sales.

EXTERNAL OBJECTIVES

External goals refer to a retailer's overall performance according to customers and their experience. This can include customer service, retention, loyalty, and product pricing. Retail stores should aim to create a personalised experience that attracts and generates returning customers.

ANALYSE THE MARKET

Once the company's objectives are clearly defined, it is time to analyse the current market. Research can expose competitors' strategies, performance, and weaknesses, as well as

consumer expectations. This allows companies to develop a plan of action that fulfils customer needs and stands apart from the competition.

Research can also define any risks and opportunities the Retail Store may be exposed to and how to respond. Retailers can anticipate upcoming events through risk management and planning, so they are not caught off-guard. Through this process, businesses can analyse their own strengths and weaknesses, allowing them to improve the necessary areas. This may include financial planning, resource allocation, and staffing.

SPRINT PLANNING & ESTIMATION

Sprint planning is an event in scrum that defines what can be delivered in the upcoming sprint and how that work will be achieved. The sprint is a set period of time where all the work is done. However, before you can leap into action you have to set up the sprint. You need to decide on how long the time box is going to be, the sprint goal, and where you're going to start. The sprint planning session kicks off the sprint by setting the agenda and focus. If done correctly, it also creates an environment where the team is motivated, challenged, and can be successful. Bad sprint plans can derail the team by setting unrealistic expectation

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 email, password, and confirming my password.	2	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application.	1	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-2		USN-3	As a user, I can register for the application through Facebook.	2	Low	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-1		USN-4	As a user, I can register for the application through Gmail.	2	Medium	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password.	1	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-2	Dashboard	USN-6	As a user, I can access the dashboard after successfully logging in.	2	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D

SPRINT DELIVERY SCHEDULE

In Agile product development, a sprint is a set period of time during which specific work has to be completed and made ready for review. Each sprint begins with a planning meeting. During the meeting, the product owner (the person requesting the work) and the development team agree upon exactly what work will be accomplished during the sprint. The development team has the final say when it comes to determining how much work can realistically be accomplished during the sprint, and the product owner has the final say on what criteria need to be met for the work to be approved and accepted. The duration of a sprint is determined by the scrum master, the team's facilitator and manager of the Scrum framework. Once the team reaches a consensus for how many days a sprint should last, all future sprints should be the same. Traditionally, a sprint lasts 30 days. After a sprint begins, the product owner must step back and let the team do their work. During the sprint, the team holds daily stand-up meetings to discuss progress and brainstorm solutions to challenges. The project owner may attend these meetings as an observer but is not allowed to participate unless it is to answer questions. (See pigs and chickens).

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2	Upload Dataset	USN-7	As a user, I can upload dataset from the device that is being used.	3	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-3		USN-8	As a user, I can view the monthly sales of stock for the dataset.	3	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-3		USN-9	As a user, I can view the monthly sales of stock for the dataset.	4	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-3		USN-10	As a user, I can view the monthly revenue of the stock for the dataset.	4	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-4		USN-11	As a user, I can view the summary of the retail stock dataset.	4	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-4	Analyse	USN-12	As a user, I can analyse and find which products are low in stock and it's availability.	5	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D
Sprint-4	Prediction	USN-13	As a user, I see the prediction of the specific product's future sales expectation.	5	High	Lalith Aditya V H Manoj kumar T Mohamed Abdullah A Mohanraj D

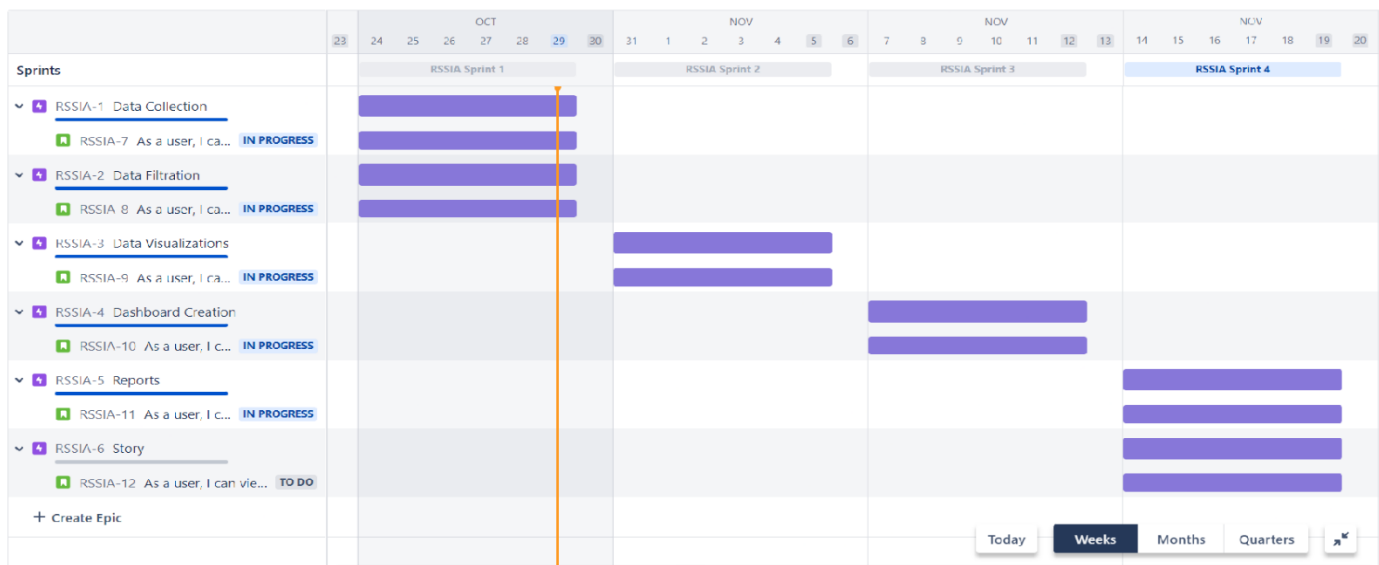
VELOCITY

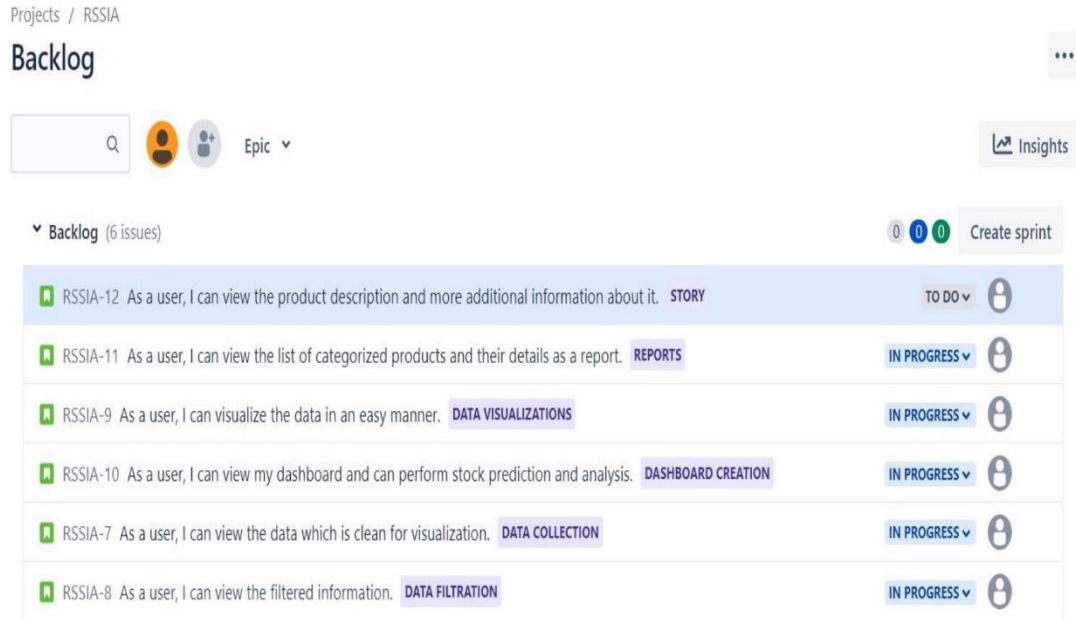
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	6	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	8	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	14	19 Nov 2022

REPORTS FROM JIRA

The Jira is very useful for creating milestones which shows the project sprint timelines clearly; the sprints are planned and completed within the given time limit.

PLANNING TOOL:





CODING & SOLUTIONING

FEATURE 1

Dataset from External API are uploaded and DB is created using IBM cloud. Then Dashboard, Story, Report is created using the external API imported dataset and the IBMDB2 cloud database is used to create the dashboard, story, report.

FEATURE 2

Embedded Dashboard, Story, Report is created using the external API imported dataset and the IBMDB2 cloud database is used to create the embedded dashboard, story, report.

DATABASE SCHEMA

The database schema is for retailDB2 connection of the data server.

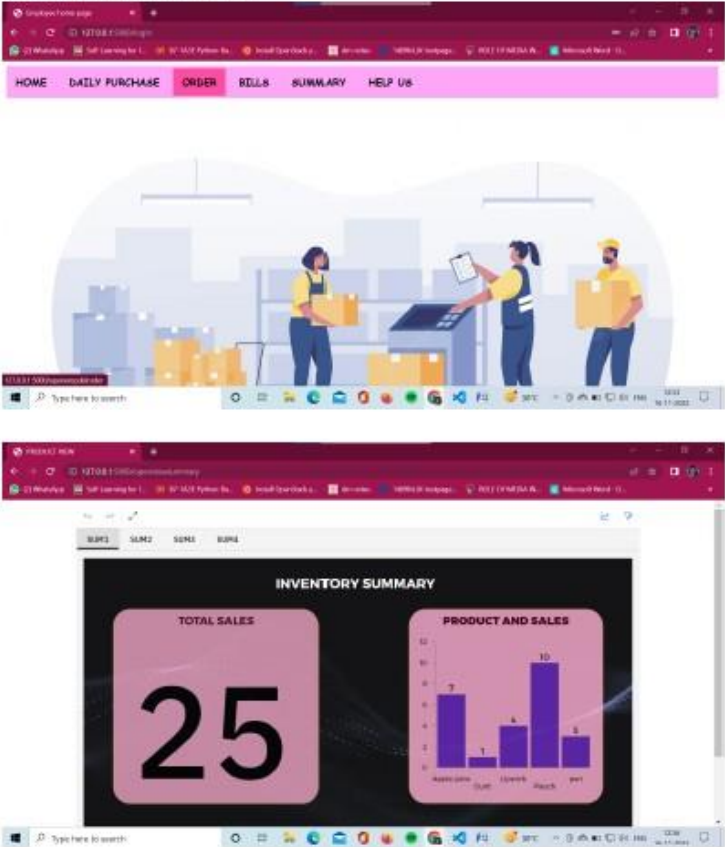
TESTING

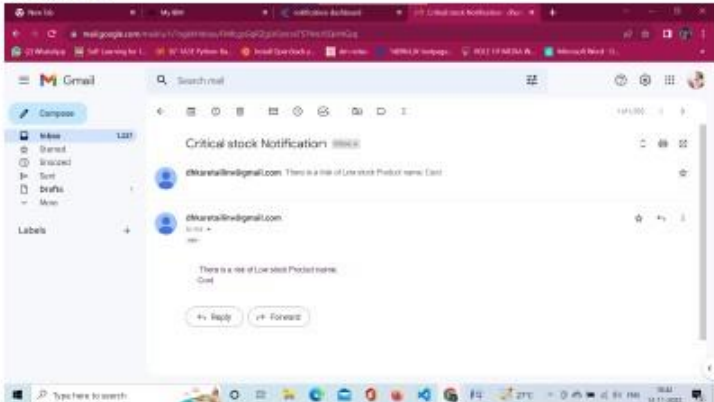

TEST CASES

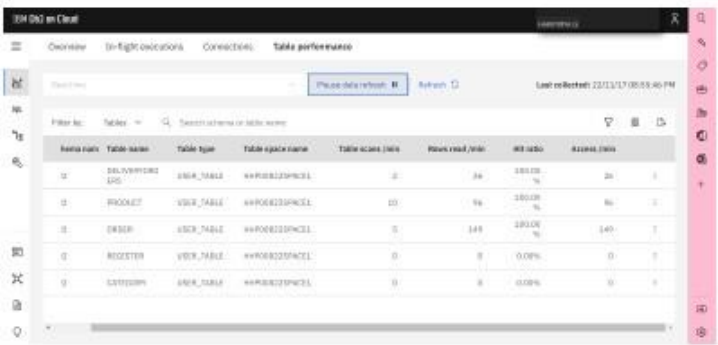
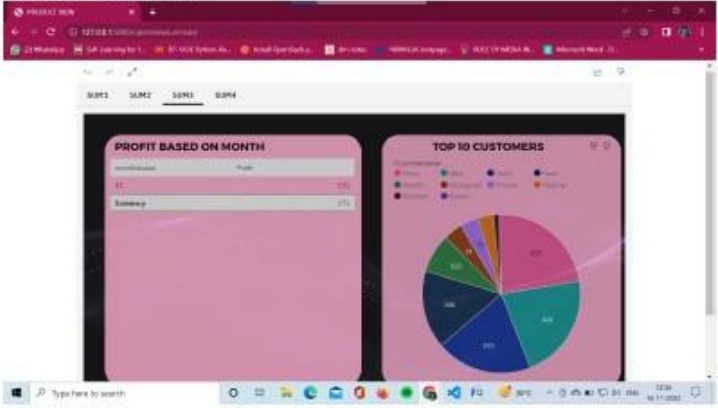
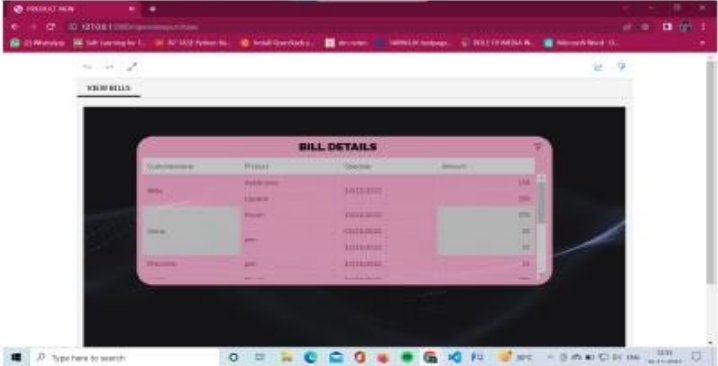
The test case is to download the dataset from an external API and connect DB2 connectivity. Create a dashboard,report and story. Embed the dashboard,report and story to a simple html. Create an web app and embed the dashboard, report and story which you have created

USER ACCEPTANCE TESTING

The test case report and UAT Execution & Report Submission are created.The test case report consists of feature type, component, test scenario, prerequisite, steps to execute, test data,expected result, actual result, status, comments, TC for automation, bug ID and executed by columns.UAT Execution & Report Submission consists of purpose of document, defect analysis and test case analysis.

S.No.	Parameter	Screenshot / Values
1.	Dashboard design	<p>No of Visualizations -3</p> 

2.	Data Responsiveness	<p>1.While ordering / booking products the product count in the table gets reduced and whenever the quantity reaches the low stock limit alert will be sent to the retailer mail regarding low stock.</p>  <p>2.While Adding the daily purchase ,purchase details are stored in the ibm_db2 table.</p> 
----	---------------------	--

3.	Amount Data to Rendered (DB2 Metrics)	<p>Depending on the load of data by the retailer Range 1-10000</p> 
4.	Utilization of Data Filters	<p>Top ten customers are filtered and visualized based on purchase amount</p> 
5.	Effective User Story	<p>No of user stories - 4</p> <ol style="list-style-type: none"> 1.order product 2.view summary' 3.view bills 4.Add daily purchase
6.	Descriptive Reports	<p>No of Visualizations -1</p> <ol style="list-style-type: none"> 1.List of bills 

RESULTS

PERFORMANCE METRICS

The Performance testing consists of dashboard design, data responsiveness, amount of data to be rendered from the utilisation of data filters, effective user story and descriptive report.

Section	Total Cases	Not Tested	Fail	Pass
Client Application	30	0	0	30
Security	3	0	0	3
Outsource Shipping	3	0	0	3
Exception Reporting	2	0	0	2
Final Report Output	4	0	0	4
Version Control	2	0	0	2

ADVANTAGES & DISADVANTAGES

ADVANTAGES

Easy access to market - in many ways the access to market for entrepreneurs has never been easier. Online marketplaces such as eBay and Amazon allow anyone to set up a simple online shop and sell products within minutes. See selling through online marketplaces.Reduced overheads - selling online can remove the need for expensive retail premises and customer-facing staff, allowing you to invest in better marketing and customer experience on your e-commerce site.

Potential for rapid growth - selling on the internet means traditional constraints to retail growth - eg finding and paying for larger - are not major factors. With a good digital marketing strategy and a plan to scale up order fulfilment systems, you can respond and boost growing sales. See planning for e- commerce.Widen your market / export - one major advantage over premises-based retailers is the ability to expand your market beyond local customers very quickly. You may discover a strong demand for your products in other countries which you can respond to by targeted marketing, offering your website in a different language, or perhaps

partnering with an overseas company. See basics of exporting.

Customer intelligence - ability to use online marketing tools to target new customers and website analysis tools to gain insight into your customers' needs. For advice on improving your customer's on-site experience, read how to measure your online marketing. Website costs – planning, designing, creating, hosting, securing and maintaining a professional e-commerce website isn't cheap, especially if you expect large and growing sales volumes. See common e-commerce pitfalls. Infrastructure costs – even if you aren't paying the cost of customer-facing premises, you'll need to think about the costs of physical space for order fulfilment, warehousing goods, dealing with returns and staffing for these tasks. See fulfilling online orders. Security and fraud – the growth of online retail market has attracted the attention of sophisticated criminal elements. The reputation of your business could be fatally damaged if you don't invest in the latest security systems to protect your website and transaction processes. See e-commerce pitfalls – security weaknesses.

DISADVANTAGES

Legal issues – getting to grips with e-commerce and the law can be a challenge and you'll need to be aware of, and plan to cope with, the additional customer rights which are attached to online sales. See the law and selling online. Advertising costs – while online marketing can be a very efficient way of getting the right customers to your products, it demands a generous budget. This is especially true if you are competing in a crowded sector or for popular keywords. See pay-per-click and paid search advertising. Customer trust – it can be difficult to establish a trusted brand name, especially without a physical business with a track record and face-to-face interaction between customers and sales staff. You need to consider the costs of setting up a good customer service system as part of your online offering. See manage your customer service.

CONCLUSION

For the success of the program, the managers of the retail stores must formulate a modern way of managing the inventory by instituting electronic systems to take care of the resources of the company. This ensures that they can be accounted for and there are proper records available all the time for reference to be made when the need arises. Besides, the retail management system is necessary for ensuring that there is accountability in the way the company handles its

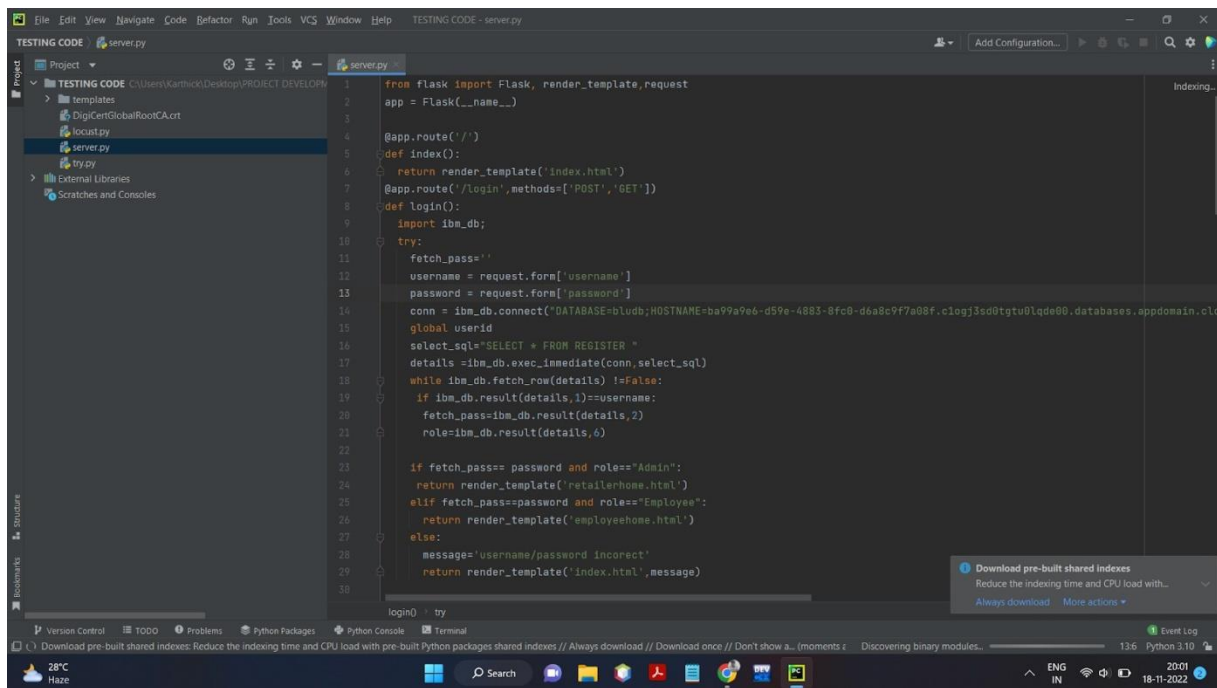
stock. It helps in saving time. Retail companies have acquired significant importance within several countries due to their high economic contribution. Therefore, the need to analyse their KPIs becomes highly significant, as well as their different systems, methodologies, and tools used within inventory management and optimization. From the aspects mentioned above, the main trends in inventory management

FUTURE SCOPE

The enhanced version of the web application is created using the updated dashboard, report and story using the updated dataset and with better DB connectivity.

APPENDIX

SOURCE CODE



```
1 from flask import Flask, render_template, request
2 app = Flask(__name__)
3
4 @app.route('/')
5 def index():
6     return render_template('index.html')
7 @app.route('/login', methods=['POST', 'GET'])
8 def login():
9     import ibm_db;
10    try:
11        fetch_pass=''
12        username = request.form['username']
13        password = request.form['password']
14        conn = ibm_db.connect("DATABASE=bludb;HOSTNAME=ba99a9e6-d59e-4883-8fc0-d6a8c9f7a08f.clogj3cd0gtu0lqde00.databases.appdomain.cloud;UID=root;PWD=ibm1234567890;DBTYPE=IBM")
15        global userid
16        select_sql="SELECT * FROM REGISTER "
17        details =ibm_db.exec_immediate(conn,select_sql)
18        while ibm_db.fetch_row(details) !=False:
19            if ibm_db.result(details,1)==username:
20                fetch_pass=ibm_db.result(details,2)
21                role=ibm_db.result(details,6)
22
23            if fetch_pass== password and role=="Admin":
24                return render_template('retailerhome.html')
25            elif fetch_pass==password and role=="Employee":
26                return render_template('employeehome.html')
27            else:
28                messages='username/password incorrect'
29                return render_template('index.html',message)
30    except:
```

GITHUB LINK

<https://github.com/IBM-EPBL/IBM-Project-3482-1658569370>