

TRAFFIC AND CAPACITY ANALYTICS FOR MAJOR PORTS

NALAIYA THIRAN PROJECT BASED LEARNING

ON

PROFESSIONAL READINESS FOR INNOVATION,

EMPLOYABILITY AND ENTREPRENEURSHIP

A PROJECT REPORT

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1.INTRODUCTION

1.1 Project overview

India has been the world's fastest-growing major economy for four of the past five years, due to rising demand for goods and services. The movement of goods across the country and beyond its borders has created economic opportunities for millions of India's citizens. Today, the logistics sector represents five percent of India's Gross Domestic Product (GDP)¹ and employs 2.2 crore people. India handles 4.6 billion tonnes of goods each year, amounting to a total annual cost of INR 9.5 lakh crore. These goods represent a variety of domestic industries and products: 22 percent are agricultural goods, 39 percent are mining products, and 39 percent are manufacturing-related commodities.

Trucks and other vehicles handle most of the movement of these goods. Railways, coastal and inland waterways, pipelines, and airways account for the rest. Recognising the critical role of the sector in the country's future, the Government of India (GOI) is pursuing a range of actions to improve its logistics performance. These include the development of dedicated rail-based freight corridors, improvements to the capacity and connectivity of coastal and inland waterbased shipping. It is also looking at the buildout of road infrastructure projects such as Bharatmala and the Golden Quadrilateral, and the creation of supportive policies. As national freight activity grows about five-fold by 2050, India's freight transport ecosystem has a critical role to play in supporting India's ambitious priorities. Some of these include international competitiveness, job growth, urban and rural livelihoods, and clean air and environment.

As products are made, they move along a supply chain until they reach the consumer. To move those goods, the logistics sector combines vehicles and warehouses, all of which are selected to efficiently move and process

them. The types of vehicles and storage facilities selected are typically based on the type of goods being moved and the distance over which they are being moved. This process of supply chain managers efficiently deploying and using a set of vehicles and warehouses to move goods through the production process to their final use by consumers is critical to the wellbeing of communities and economies.

To sustain the growing demand for freight transport without driving existing externalities to extreme levels, Indian stakeholders need to take steps to shift to a new freight paradigm that is more cost-effective, clean, and efficient. This new freight transportation paradigm will also help India achieve its development goals, including improved air quality, improved GDP, better public health, enhanced logistics productivity, more employment opportunities, and is in-line with India's clean mobility ambitions. With a strong foundation of supportive policies and market trends, India can leverage the opportunities by implementing a set of solutions.

1.2 Purpose

The purpose of this project is to improve the railway market share in some commodities and overcome the challenges and maintain sustainable growth in all its commodities. We also try to reduce the congestion on rail corridors and improving port connectivity. And lastly help in the development of dedicated freight corridor across Key ports. All of this is done by analysing already existing data or new data on Railway traffic and data on amount of capacity of passenger and goods a train carries from each port.

Skill tag:

By the end of this Project, you will:

- Know fundamental concepts and can work on IBM Cognos Analytic ●

Gain a broad understanding of plotting different graphs.

2.IDEATION PHASE

2.1 Literature Survey

S.no	Tittle	Publication year	Author	Summary
1	PERFORMANC E ANALYSIS OF MAJOR PORTS IN INDIA: A QUANTITATIV E APPROACH	January, 2016	Anindita-Mandal	The performance of 13 significant Indian ports is examined in the report with regard to important operational performance indicators. India's participation in global trade is growing as a result of its rapid economic expansion. This increases the strain on these ports, which handle a sizable amount of the commerce, to operate as efficiently as possible. The study examines the state of each port in various performance categories by conducting a systematic analysis of various performance

				indicators over a 10-year period (from 2003 to 2013).
2	ENHANCING PORT ACTIVITIES USING INFORMATION AND COMMUNICATION TECHNOLOGY.	April,2020	Shuhong Peng, Junaid Quair	The topic of this essay is how to employ technological improvements to enhance port services and operations. The goal is to provide a comprehensive study of the limited research on smart ports with a focus on the role of ICT (Information and Communication Technology). A few of the port services that are optimised by smart port management include commodity inspection, customs clearance, transportation planning, procedures, and applications, customer service, market information exchange, and insurance provisioning. It has been suggested to use IoT

				platforms to build a networked and collaborative platform that enables information sharing among various hardware and infrastructures in order to install smart applications.
3	CONCENTRATION ANALYSIS OF CONTAINER TERMINALS IN INDIA.	July,2021	K.Chandrasekhar Iyer, V.P.S.N.Nayana m	This article investigates India's container terminals' propensity for reconcentration. India's container terminals have grown by 46% in the last five years, and since 2015, they have grown by 9% annually. To take advantage of the underutilised capacity at container terminals, efforts to modernise equipment and digitise processes have been made. This has led to a rise in the use of container terminals across the nation. In terms of the growth share matrix over

				the under-consideration period, the Adani International Container Terminal (AICT) has emerged as the top performer. analyses India's container terminals' tendencies toward reconcentration.
4	AN INTEGRATED BERTH ALLOCATION AND YARD ASSIGNMENT PROBLEM FOR BULK PORTS: FORMULATION AND CASE STUDY	August,2015	Jasem AlHammadi and Ali Diabat	As a result of the effects of globalisation during the past 10 years, maritime transportation has seen remarkable growth. The rapidly growing demand for commodities supplied by water has led to a lot of attention being paid to improving port efficiency by encouraging the efficient use of available resources. Optimization is crucial in achieving the economical goal of improving port efficiency

				as opposed to the pricey alternative of increasing existing capacity. The integrated dynamic hybrid berth allocation and yard assignment problem is examined in the context of bulk ports in the current research (BYAP). Key ideas are taken into account in order to construct an usable and realistic model.
5	FROM HISTORICAL POSITIONING DATA TO UNSUPERVISED MARITIME TRAFFIC MONITORING	May,2017	Virginia Fernandez Argudas,Giuliana Pallota,Michele Vespe	Due to the high volume of maritime traffic and its consequences on the economy, ecology, safety, and security, a system that can monitor maritime traffic without supervision is required. An automated method for creating synthetic maritime traffic is suggested in this research. The primary goal of marine surveillance is to make it possible to

				<p>automatically monitor, analyse, and comprehend nautical activity. To improve the MSA, the proposed technique is utilised to analyse, model, and depict large amounts of marine traffic data (Maritime Situational Awareness). Creates a network-based picture of maritime traffic by analysing past selfreporting positioning data. The representation of maritime traffic using self-reporting data has been addressed by a number of ways. They are spatio-temporal techniques and spatialgrid approaches, respectively. Anomaly identification, scenario forecasting, and real-time automated maritime traffic monitoring have been completed.</p>
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2.2 Existing Problem

The importance of the efficiency and performance of a port has been recognized for many years. The performance of ports has been measured by two types of indicators, financial and operational. This study focuses on operational indicators of port performance. One of the first studies addressing this topic defined two metrics from the field of traffic engineering: “occupancy,” the percentage of time that all berths are occupied (“berth occupancy rate”); and “congestion,” the percentage of time that the number of ships in port exceeds the number of available berths (Nicolaou, 1967).

The first indicator has the drawback of not describing how occupancy is distributed over time. For example, 50% berth occupancy is as true of a situation in which half of the berths are always occupied and half are always empty, as it is of all berths being occupied half of the time. These clearly different scenarios point out the need for an additional indicator. The second indicator described above, congestion, does not quite meet the need because large ports encompassing long sailing distances can accommodate more sailing vessels than berths without technically being congested. Another study proposed different operational indicators, most of which were related to the productivity of cranes and tons of cargo loaded/unloaded hour.

Others, such as waiting time, service time and turn-around time, are more directly and comprehensively related to the operational performance of the port (UNCTAD, 1976). The ratio of waiting time to service time has proven to be an appropriate measure of timeliness of service of the terminal. Generally, acceptable values for this ratio are 30% and below (UNCTAD, 1985). The significance of this ratio is, however, determined by specific rules, and by the costs associated with waiting.

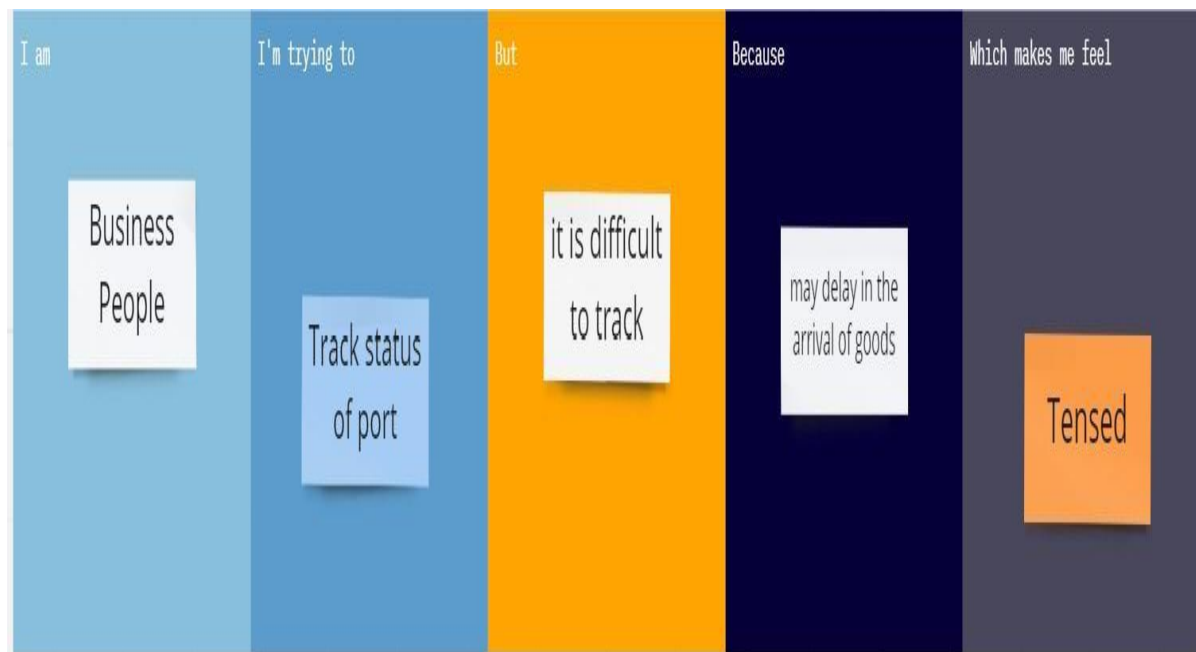
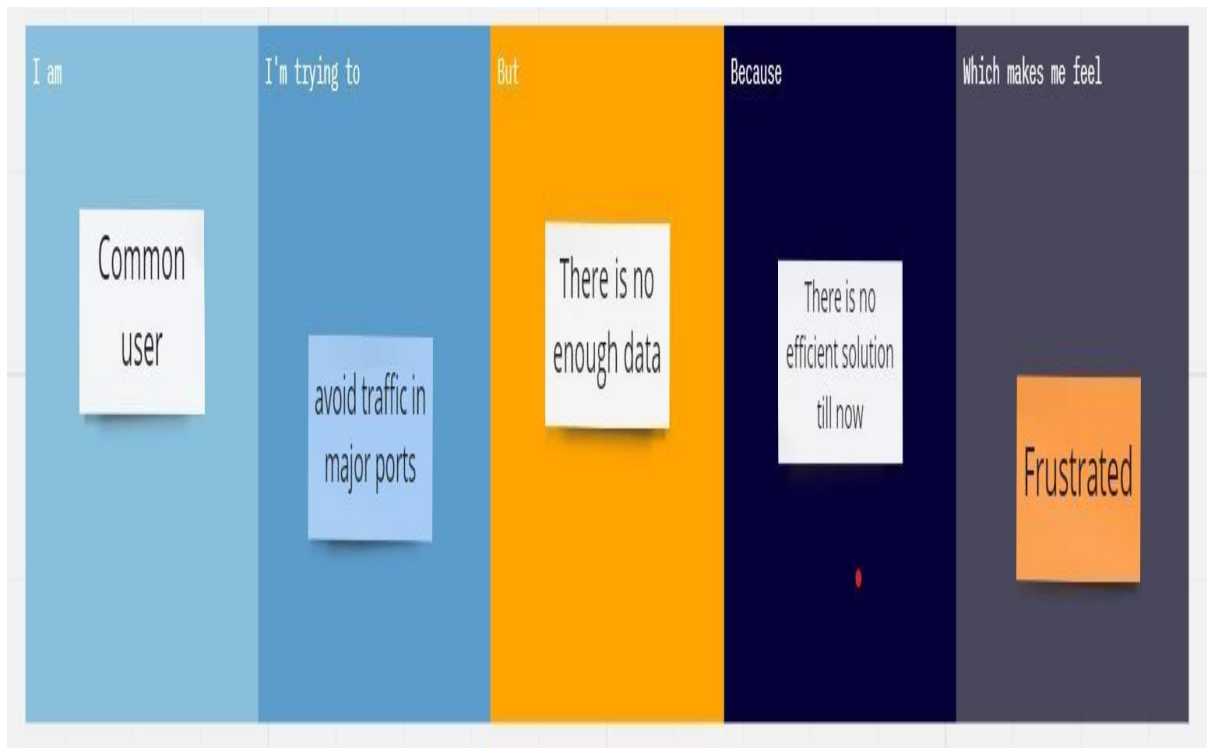
Moreover, the use of this indicator alone can result in misleading information if a very low wait-to-service ratio is caused by a very inefficient service team. Other indicators related to throughput from, for example, berths or cranes are useful from some perspectives, but they are related to terminal performance, and not specifically to port traffic performance.

2.3 problem statement definition :

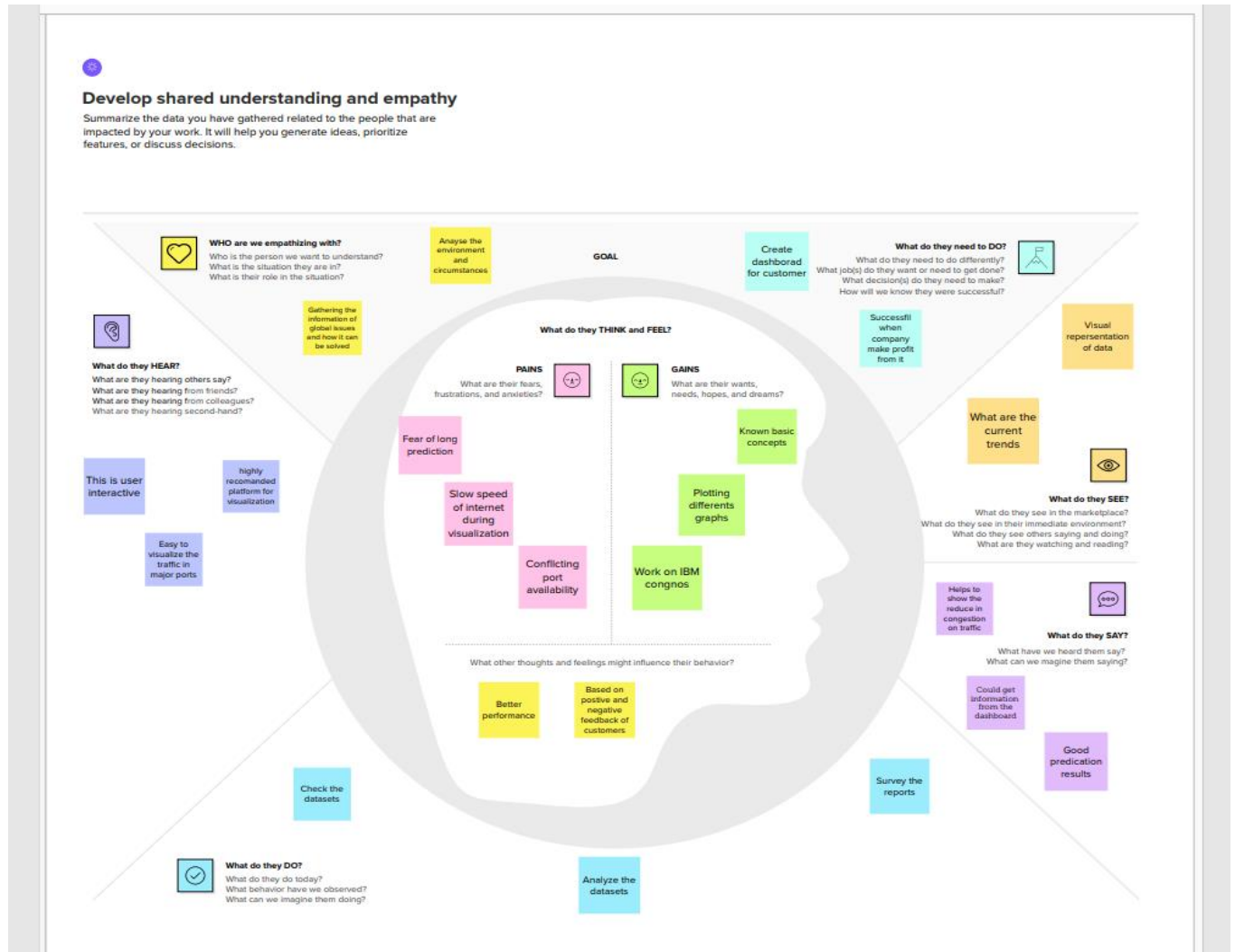
I am	Describe customer with 3-4 key characteristics - <i>who are they?</i>	Describe the customer and their attributes here
I'm trying to	List their outcome or "job" the care about - <i>what are they trying to achieve?</i>	List the thing they are trying to achieve here
but	Describe what problems or barriers stand in the way - <i>what bothers them most?</i>	Describe the problems or barriers that get in the way here
because	Enter the "root cause" of why the problem or barrier exists - <i>what needs to be solved?</i>	Describe the reason the problems or barriers exist
which makes me feel	Describe the emotions from the customer's point of view - <i>how does it impact them emotionally?</i>	Describe the emotions the result from experiencing the problems or barriers

Customer Problem Statement Template: Create a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love.

A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.



2.4 Emapathy map canvas

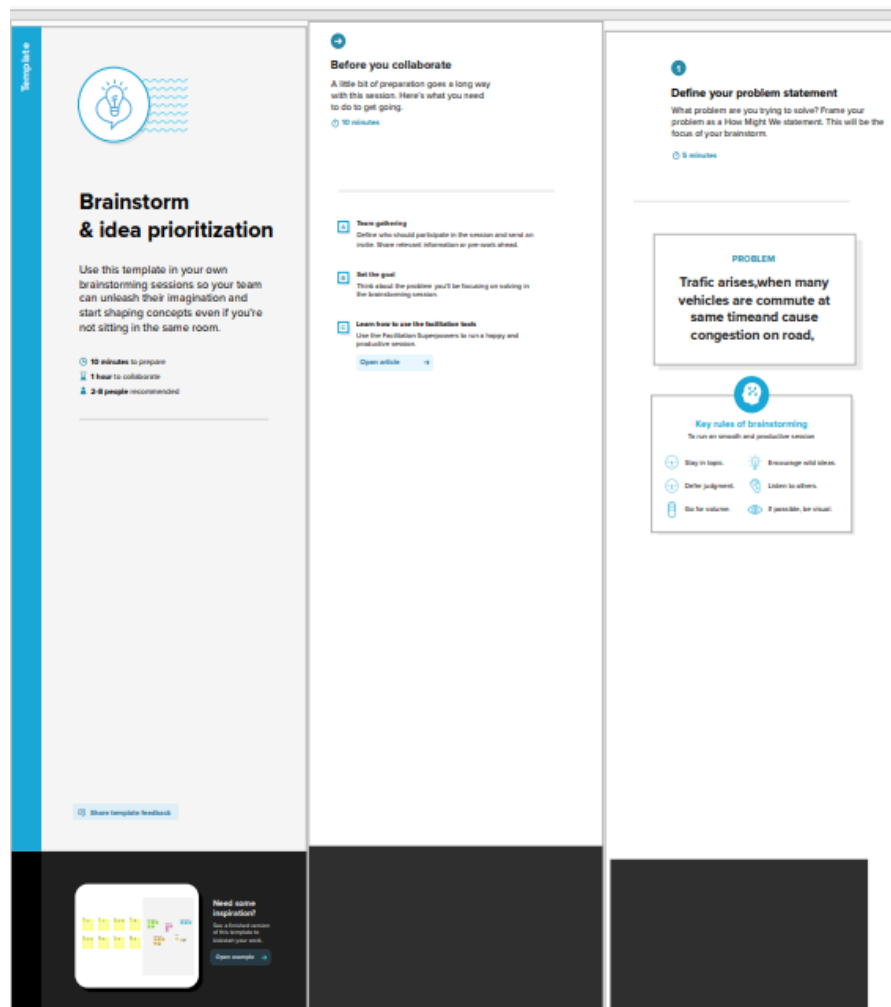


2.5 Ideation and Brain storming :

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping

2 Brainstorm

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

10 minutes

suruthi

Origin and destination study

Accident studies

Traffic flow characteristics

Traffic volume studies

Traffic capacity studies

bavani

To examine areas of frequent accidents

Forecasted traffic

Distance improvements

Predicted congestion lengths

Existing congestion

yogeshwari

Crash history

Signs, markings, signals

Proposed developments

Expected developments

For a roadway construction project

santhiya

Changes of land of use

Traffic volume

Level of service

To examine locations with complicated roadway geometrics

Demand or capacity related

TP: You can select a sticky note and let the panel (switch to select) to select the sticky note.

3 Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

20 minutes

TP: Add contentable tags to sticky notes to make it easier to find, organize, organize, and categorize important ideas as discussed during your work.

Reduce the congestion on rail corridors

Improving port connectivity

To develop the scalable,workable model in port infrastructure

Use Dashboard to ensure the less traffic on ports

Step-3: Idea Prioritization

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

The grid is a 5x5 matrix with 'Importance' on the vertical axis and 'Feasibility' on the horizontal axis. A curved line from the top-left to the bottom-right divides the grid into two sections. Ideas are placed in colored boxes: purple for high importance/low feasibility, blue for high importance/high feasibility, orange for low importance/low feasibility, and pink for low importance/high feasibility. A 'TP' (Tip) box is located in the bottom-left quadrant.

Importance
If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

Feasibility
Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

TP
Participants can use their markers to point at where sticky notes should go on the grid. The facilitator can confirm the quality using the laser pointer holding the 4 key on the keyboard.

5

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

- Show the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

- Strategy blueprint**
Define the components of a new idea or strategy.
[Open the template](#)
- Customer experience journey map**
Understand customer needs, motivations, and obstacles for an experience.
[Open the template](#)
- Strengths, weaknesses, opportunities & threats**
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
[Open the template](#)

[Share template feedback](#)

A sequence of four icons showing the process flow: 1. A grid with a single idea. 2. A grid with multiple ideas. 3. A grid with ideas being moved or prioritized. 4. A grid with ideas being finalized or shared.

3.PROJECT DESIGN PHASE 1

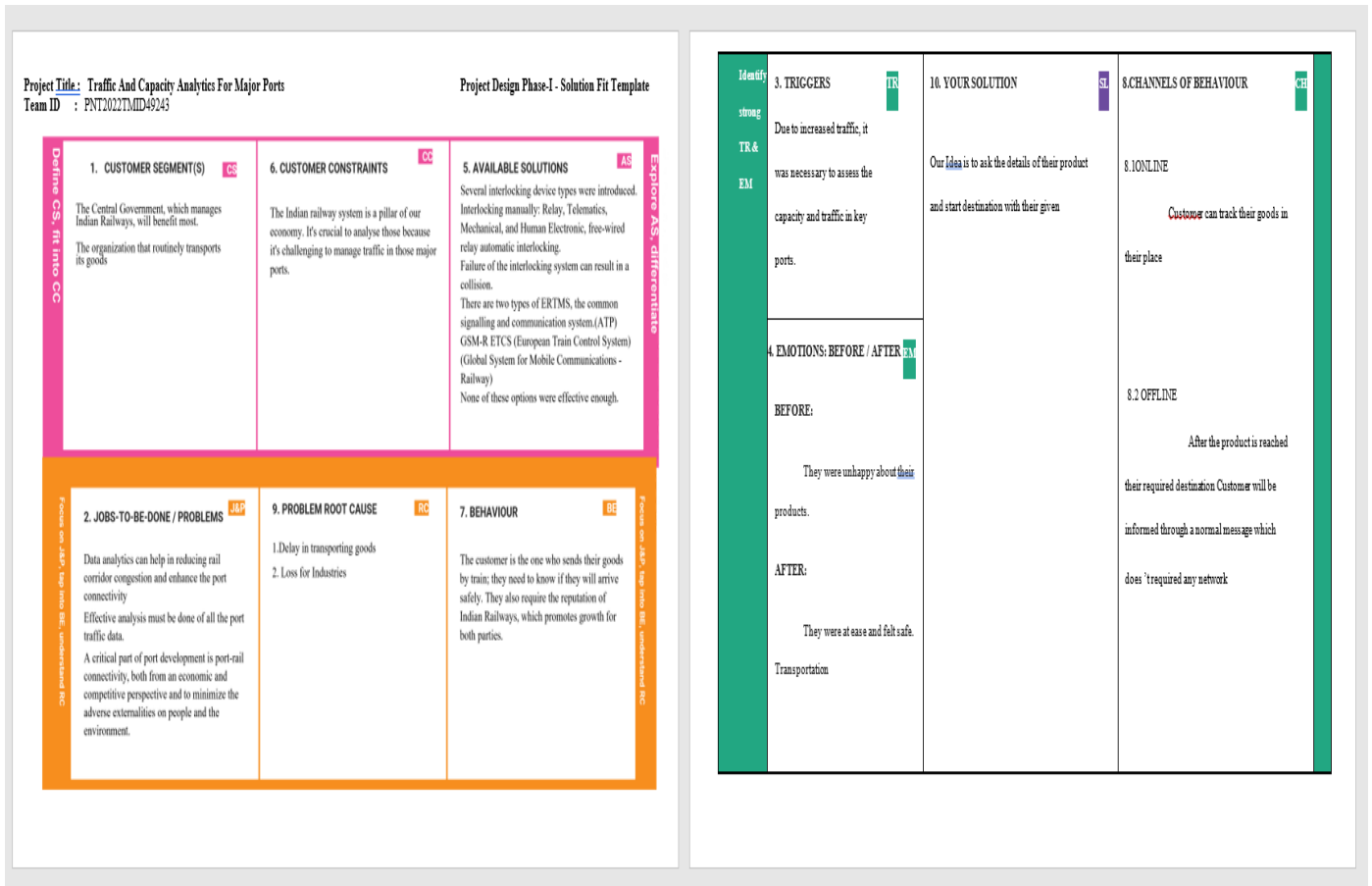
3.1 Proposed solution:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Improving port connectivity and reducing the congestion on the rail corridors using Data Analytics. Overpopulation is the main reason behind a traffic jam.
2.	Idea / Solution description	Smart ports are an effective solution to increase the network capacity and frequency of the rail freight. Proper loading and unloading of freights with IOT aid can influence the rail freight with safe transportation and build trust on people to increase use of rail freight.
3.	Novelty / Uniqueness	Traffic survey and assessment of traffic volumes identification of technically and economically viable route /Alignment.

4.	Social Impact / Customer Satisfaction	Adequate resources will be provided. India's electrical crisis 86% of the open wages on the railway are used to deliver poles to different power plants in India. An appropriate supply of resources will be made available to prevent power outages.
5.	Business Model (Revenue Model)	Railway ports provide for the tracking of the flow of commodities being transferred from one location to another. Government can ensure reduced traffic on the ports by using a data analytics dashboard.
6.	Scalability of the Solution	With the establishment of the railway as a development effort and the use of data analytics, the Indian economy has moved into a high growth zone.

3.2 Problem solution fit:



3.3 Solution Architecture:

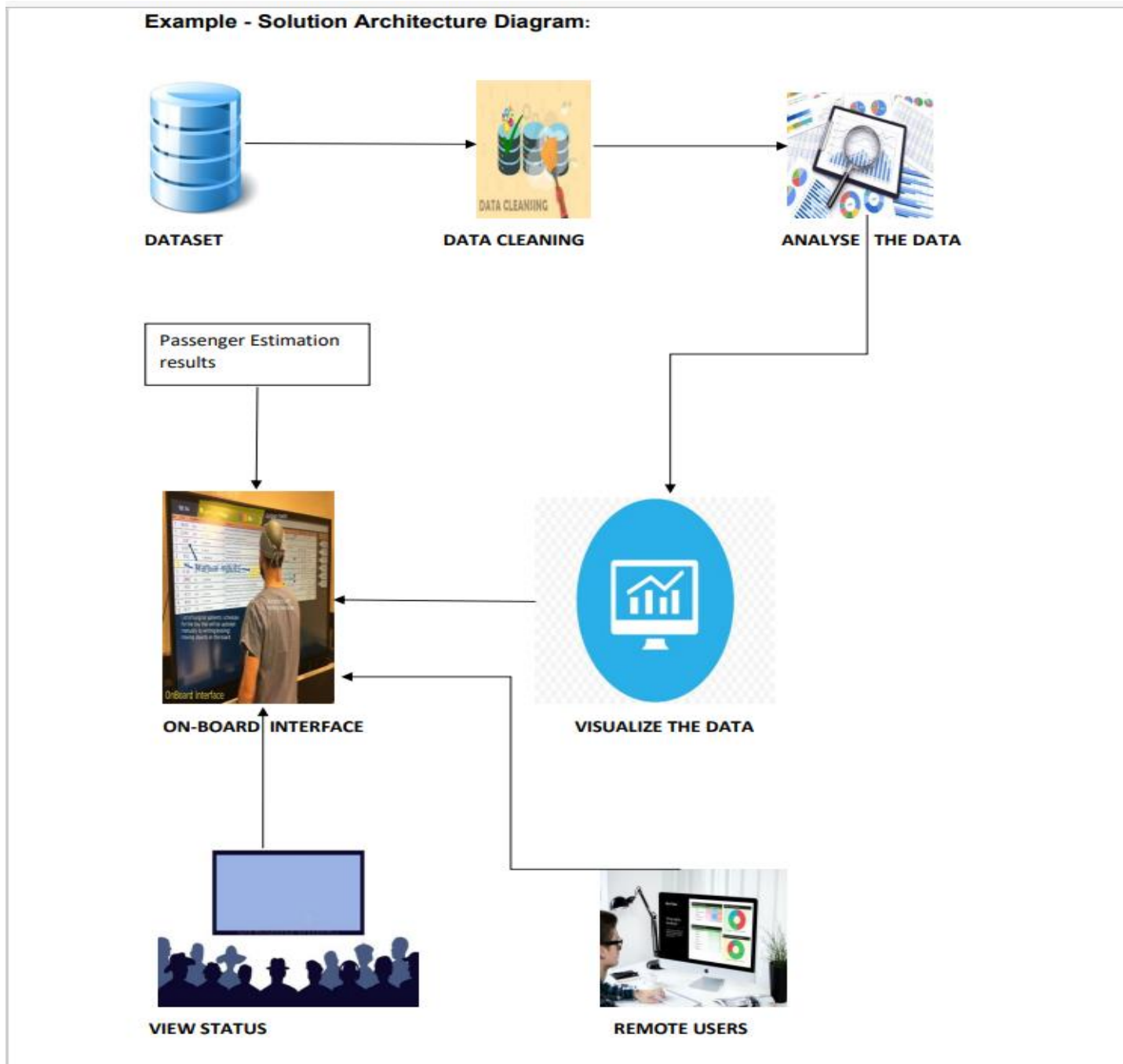
Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.

➤ Describe the structure, characteristics, behaviour, and other aspects of the software to project stakeholders.

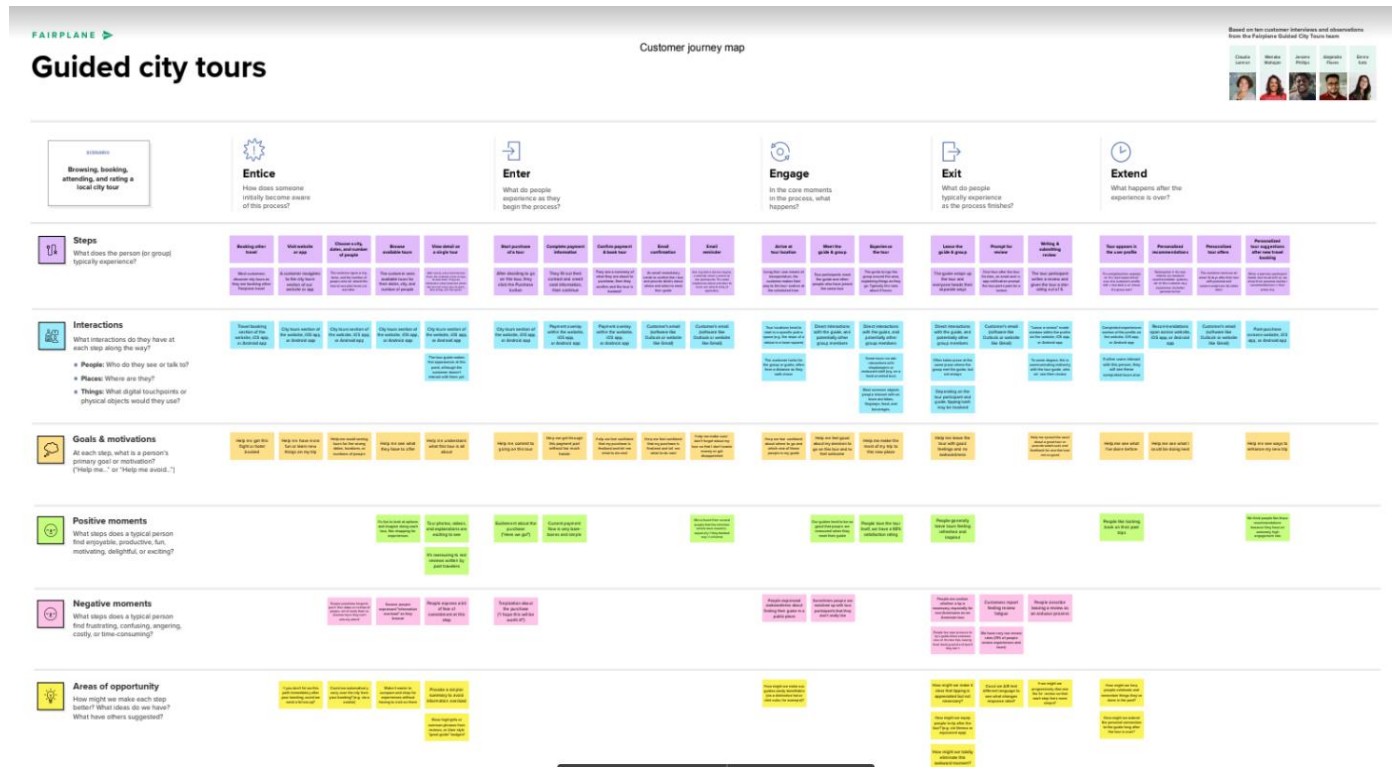
➤ Define features, development phases, and solution requirements.

➤ Provide specifications according to which the solution is defined, managed, and delivered.



4 PROJECT DESIGN PHASE 2

4.1 Customer Journey:



4.2 Functional Requirements :

Following are the functional requirements of the proposed solution.:

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 Confirmation via SMS
FR-3	User Input Acceptance	The dashboard accepts user Input by means of selecting the location of the ports.
FR-4	Options for user to filter location of ports	The user can use filter options to view ports by countries.
FR-5	Visualization of ports	The dashboard provides various visualization techniques to understand the flow.

4.3 Non Functional Requirements :

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The dashboard is able to provide the user the consistency and the aesthetic they expect. The user can constantly use the dashboard without any flow in the visual quality.
NFR-2	Security	The dashboard is much secured that the data of the users are kept confidential and also it is not prone to any kind of attacks.

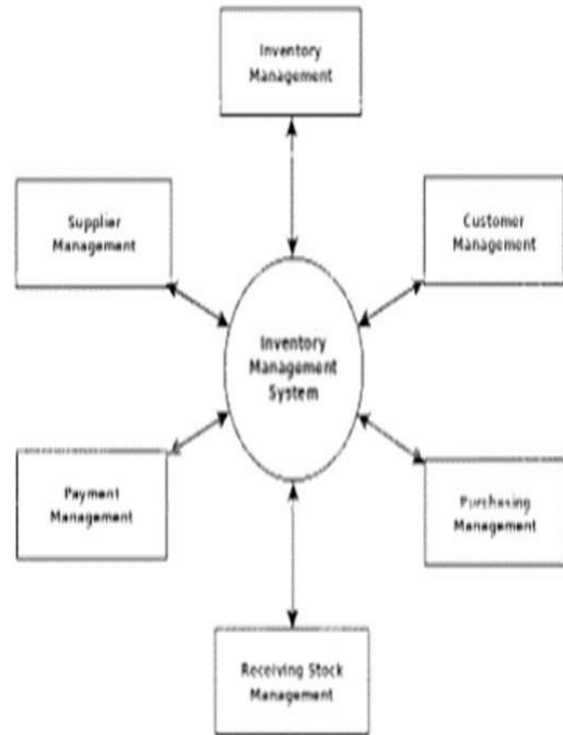
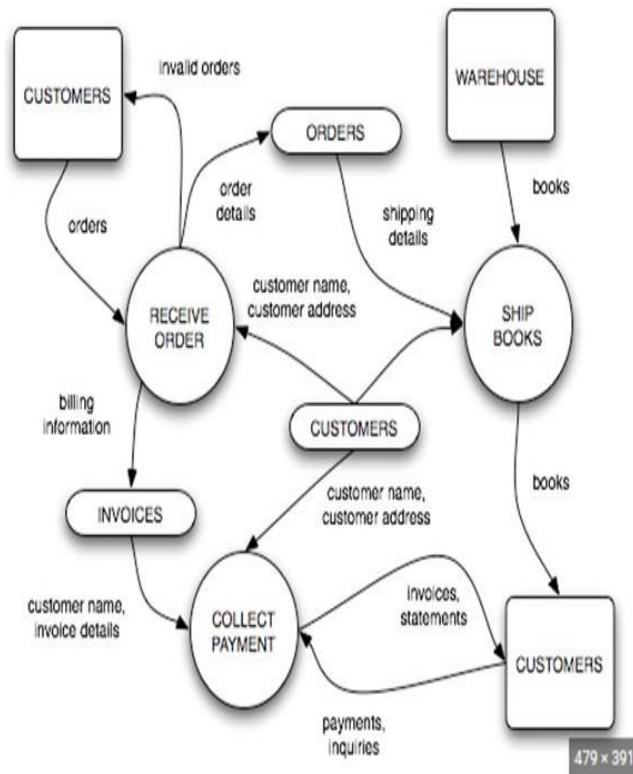
NFR-3	Reliability	The failure rate is minimal and the failure can easily be rectified using the measures. Thus this makes the dashboard much reliable.
NFR-4	Performance	The dashboard gives better performance. It provides the user a convenient and flexible user interface.
NFR-5	Availability	The dashboard is always available to serve the users. The availability is ensured in such a way that the user can access the dashboard any time anywhere.
NFR-6	Scalability	The dashboard is highly scalable. It can withstand any increase or decrease of loads

4.4 Data Flow Diagrams :

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

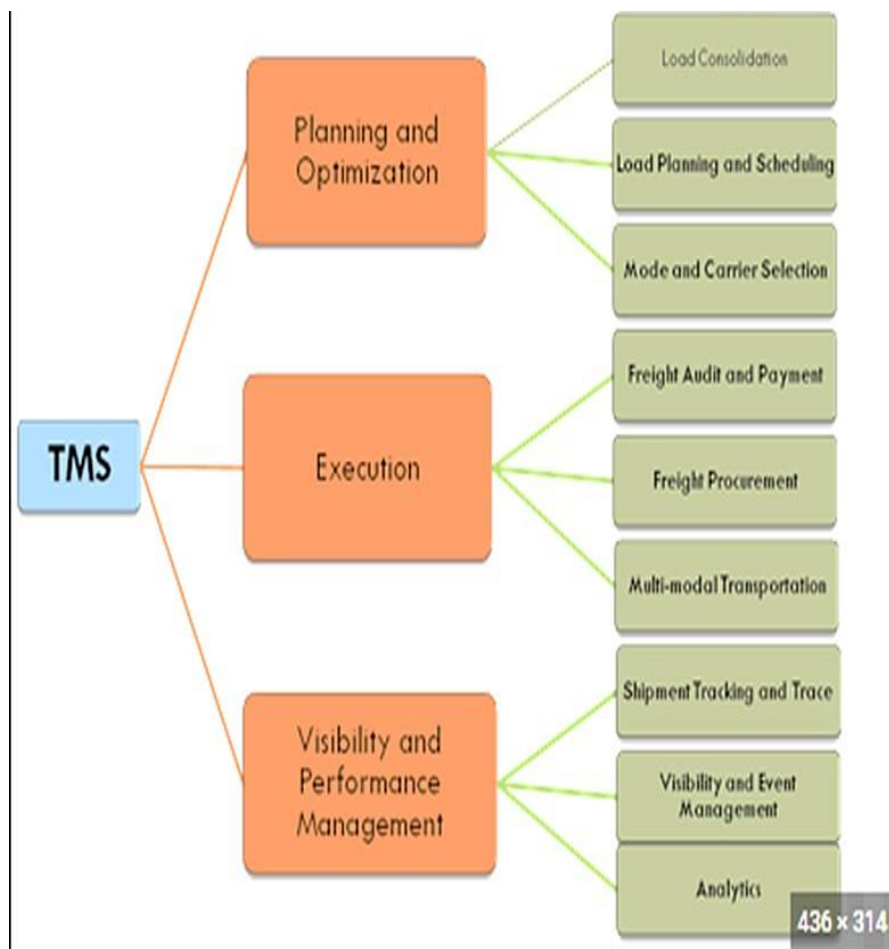
Basic Logistic freight forward system DFD:

DFD :



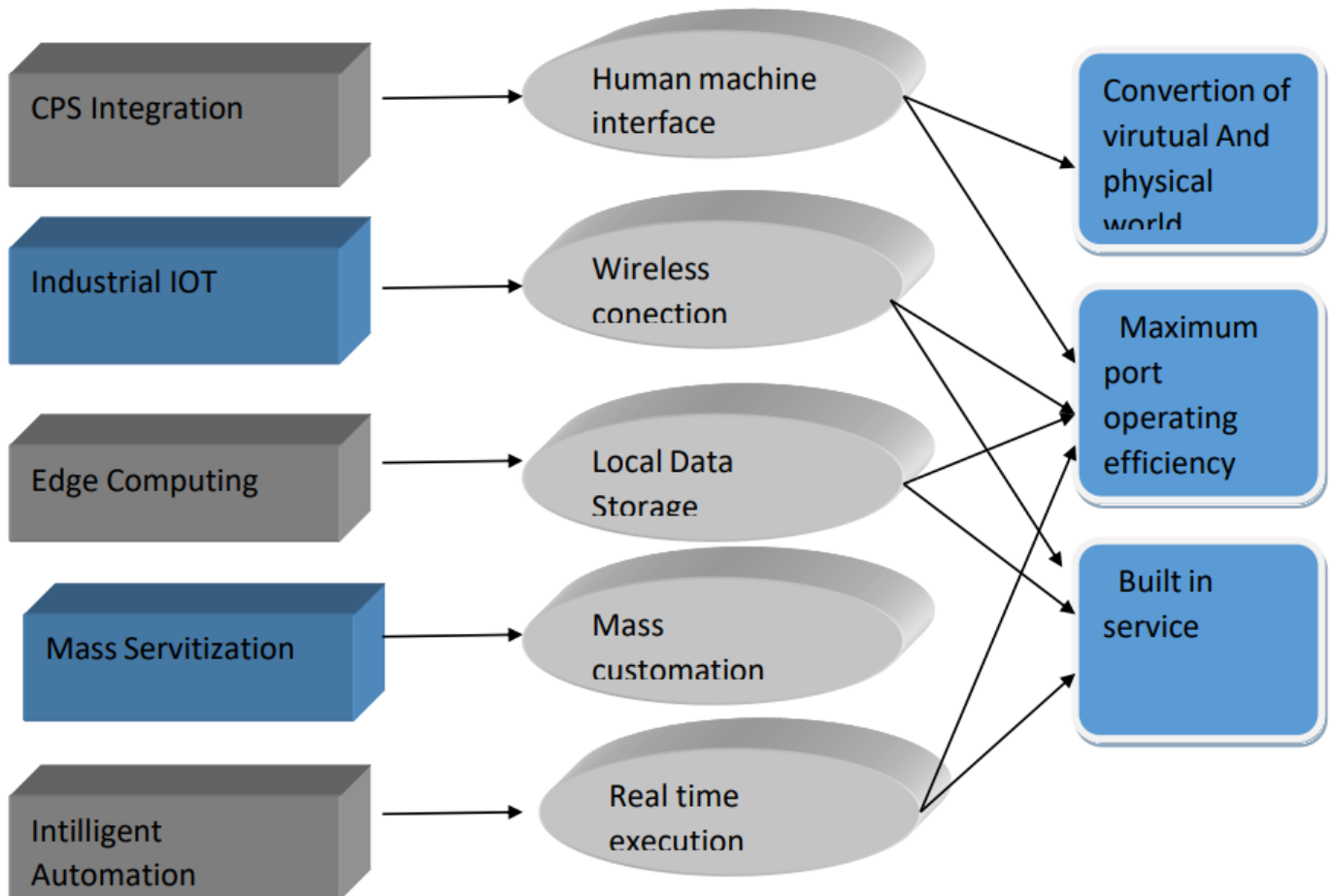
Traffic and Capacity analytics for major ports

Transport Management System(TMS) DFD:



4.5 Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2.



Port infrastructure and stack holder	Enabling Technologies	Smart port service	Smart port goals
<ul style="list-style-type: none"> • Road • Rail • Bridge • Parking • Shipping 	<ul style="list-style-type: none"> • Sensor • IoT • Fog Computing • Cloud Computing • Big data Technology 	<ul style="list-style-type: none"> • Port monitoring • Infrastructure Management • Energy management 	<ul style="list-style-type: none"> • Economic Developmet • Energy awareness

Table 1: Technology and Component

s.no	Component	Description	Technology
1	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc	HTML, CSS, JavaScript
2	Application Logic-1	Logic for a process in the application	Python
3	Application Logic-2	Logic for a process in the application	IBM Watson STT service
4	Application Logic-3	Logic for a process in the application	IBM Watson Assistant
5	Data base	Data Type, Configurations etc.	MySQL
6	Cloud Database	Database Service on Cloud	IBM Cloudant etc.

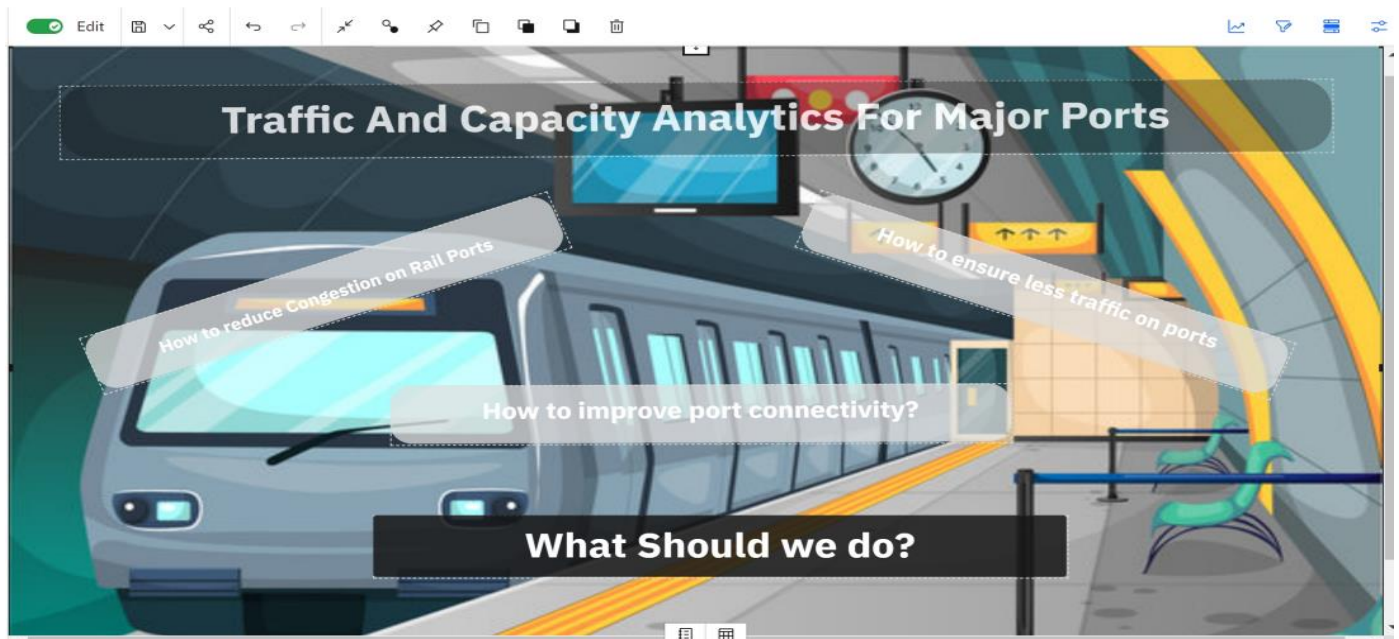
7	File Storage	File storage requirements	IBM Block Storage
8	External API-1	Purpose of External API used in the application	IBM Weather API, etc.
9	External API-2	Purpose of External API used in the application	Aadhar API, etc.
10	Machine Learning Model	Purpose of Machine Learning Model	Object Recognition Model, etc.
11	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, Cloud Foundry, Kubernetes, etc.

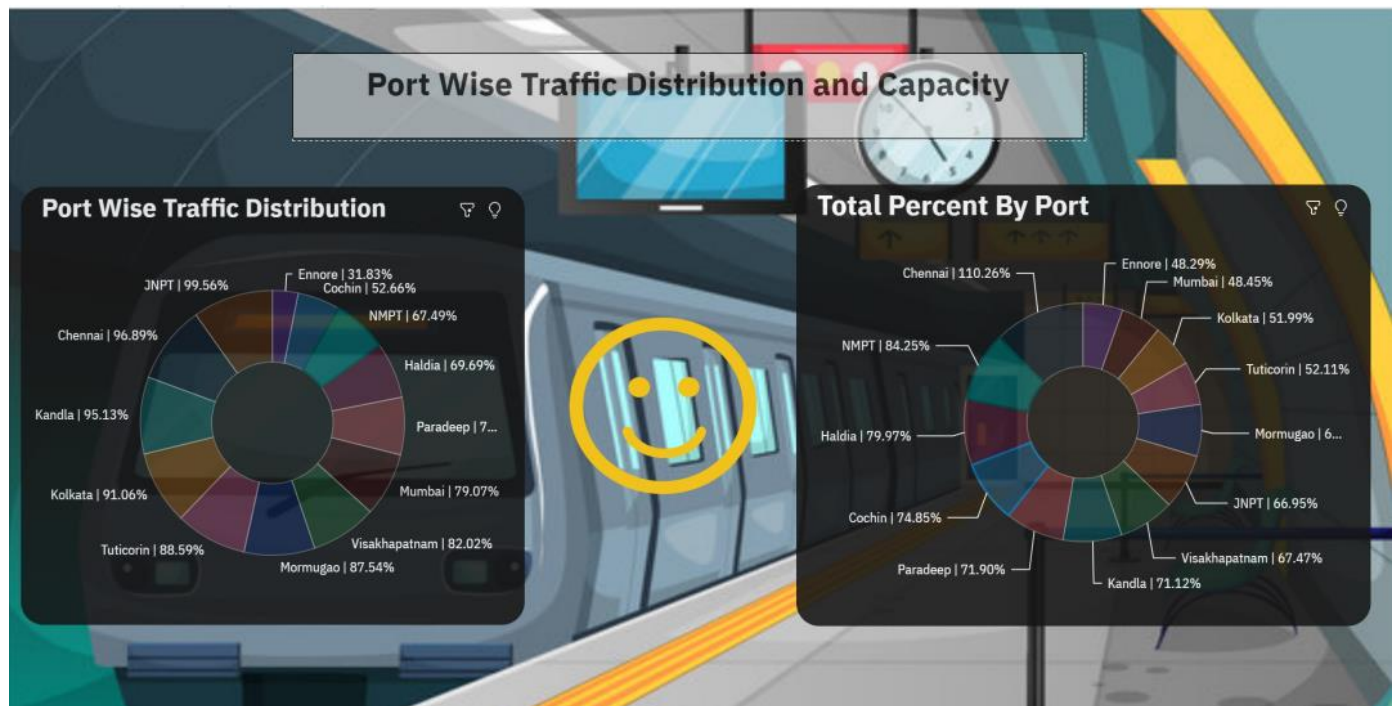
Table-2: Application Characteristics:

S.no	Characteristic	Description	Tecnology
1	Open-Source Frameworks	List the open-source frameworks used	Technology of Opensource framework
2	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	e.g. SHA-256, Encryptions, IAM Controls, OWASP etc.
3	Scalable Architecture	Justify the scalability of architecture (3 – tier, Micro-services)	Technology used

4	Availability	Justify the availability of application (e.g. use of load balancers, distributed servers etc.)	Technology used
5	Performance	Design consideration for the performance of the application (number of requests per sec, use of Cache, use of CDN's) etc.	Technology used
7	Appilication	Design uesd	Technology used

4.6 User Stories:





5.PROJECT PLANNING AND DEVELOPMENT PHASE

5.1 Sprints Delivery Scheduling :

Sprint Number	Functional Requirement (Epic)	User Story	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Working with the data set	USN-1	Understanding the dataset	10	Medium	Santhiya,Sriyokeshwari, Suruthi,Bavani.
Sprint-1	Working with the data set	USN-2	Loading the data set.	10	High	Santhiya,Sriyokeshwari, Suruthi,Bavani.

Sprint-2	Prepare the data	USN-3	Convert the data into required format	10	Medium	Santhiya,Sriyokeshwari, Suruthi,Bavani.
Sprint-2	Data exploration	USN-4	Explore the data's which is uploaded in the IBM Cognos	10	Medium	Santhiya,Sriyokeshwari, Suruthi,Bavani.
Sprint-3	Data visualization	USN-5	Creating the data visualization on chart	10	High	Santhiya,Sriyokeshwari, Suruthi,Bavani.
Sprint-3	Dashboard	USN-6	Creating a dashboard	10	High	Santhiya,Sriyokeshwari, Suruthi,Bavani.
Sprint-4	Report	USN-7	Creating the report	10	High	Santhiya,Sriyokeshwari, Suruthi,Bavani.
Sprint-4	Export	USN-8	Export the report to the GitHub	10	High	Santhiya,Sriyokeshwari, Suruthi,Bavani.

5.2 Sprint Planning And Estimation :

Project Tracker, Velocity & Burndown Chart:(4 Marks)

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	4Days	01 Nov2022	04 Nov2022	20	04 Nov2022
Sprint-2	20	5Days	05 Nov2022	10 Nov2022	20	05 Nov2022
Sprint-3	20	4Days	11 Nov2022	14 Nov2022	20	14 Nov2022
Sprint-4	20	4Days	15 Nov2022	19 Nov2022	20	19 Nov2022

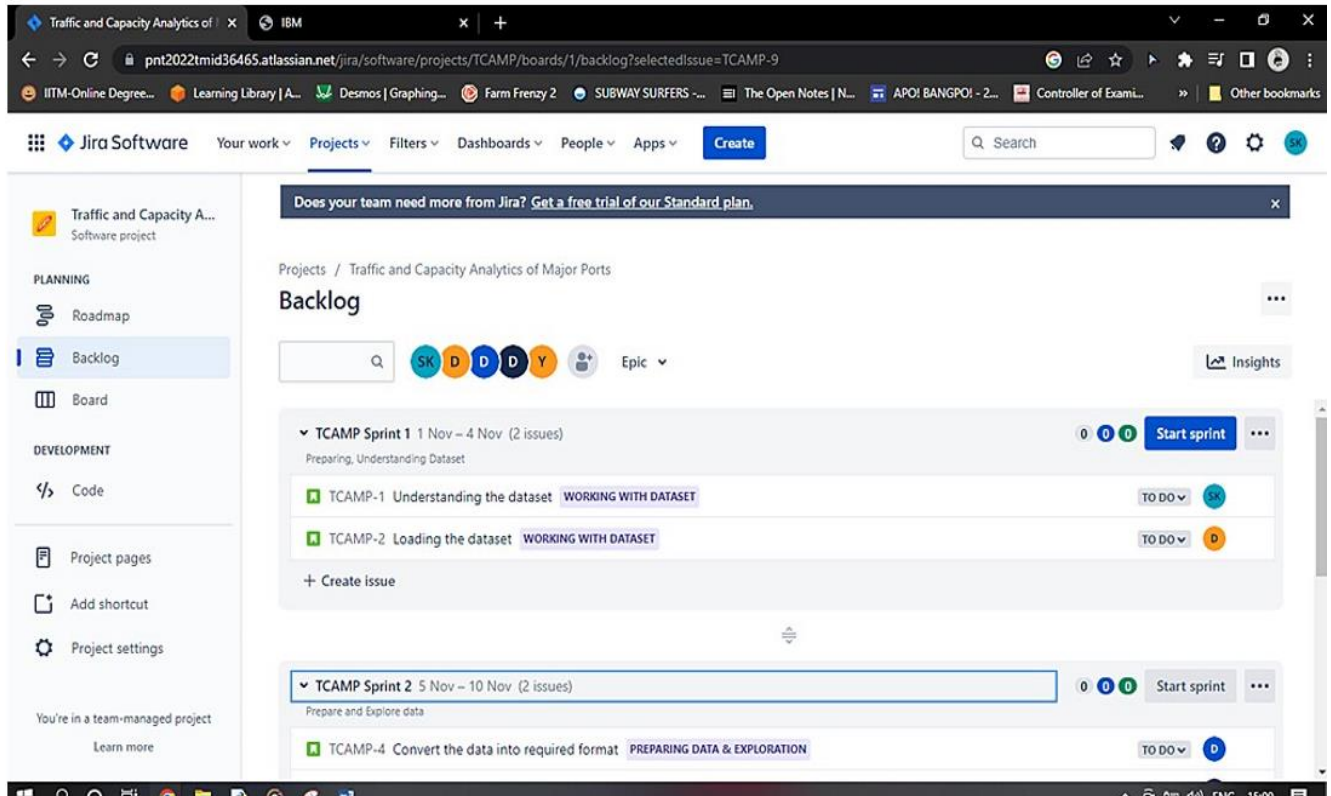
Velocity: Imagine we have a 4-day sprint duration, and the velocity of the team is 20 (points per sprint).

Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \text{Sprint duration} / \text{Velocity} = 80 / 4 = 20$$

5.3 Reports From Jira:

Sprints :



Browser: Traffic and Capacity Analytics of | x IBM

URL: pnt2022mid36465.atlassian.net/jira/software/projects/TCAMP/boards/1/backlog?selectedIssue=TCAMP-9

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Projects / Traffic and Capacity Analytics of Major Ports

Backlog

SK D D D Y Epic

TCAMP Sprint 1 1 Nov – 4 Nov (2 issues) 0 0 0 Start sprint

Preparing, Understanding Dataset

- TCAMP-1 Understanding the dataset WORKING WITH DATASET TO DO SK
- TCAMP-2 Loading the dataset WORKING WITH DATASET TO DO D

+ Create issue

TCAMP Sprint 2 5 Nov – 10 Nov (2 issues) 0 0 0 Start sprint

Prepare and Explore data

- TCAMP-4 Convert the data into required format PREPARING DATA & EXPLORATION TO DO D

Windows taskbar: 15:00

Browser: Traffic and Capacity Analytics of | x IBM

URL: pnt2022mid36465.atlassian.net/jira/software/projects/TCAMP/boards/1/backlog?selectedIssue=TCAMP-9

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Projects / Traffic and Capacity Analytics of Major Ports

Backlog

SK D D D Y Epic

TCAMP Sprint 1 1 Nov – 4 Nov (2 issues) 0 0 0 Start sprint

Preparing, Understanding Dataset

- TCAMP-1 Understanding the dataset WORKING WITH DATASET TO DO SK
- TCAMP-2 Loading the dataset WORKING WITH DATASET TO DO D

+ Create issue

TCAMP Sprint 2 5 Nov – 10 Nov (2 issues) 0 0 0 Start sprint

Prepare and Explore data

- TCAMP-4 Convert the data into required format PREPARING DATA & EXPLORATION TO DO D

Windows taskbar: 15:01

Edit sprint: TCAMP Sprint 1

Sprint name*
TCAMP Sprint 1

Duration
custom

Start date
11/1/2022 1:00 AM

End date
11/4/2022 1:00 AM

Sprint goal
Preparing, Understanding Dataset

TCAMP board - Agile board - Jira x IBM x +

pnt2022mid36465.atlassian.net/jira/software/projects/TCAMP/boards/1

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Projects / Traffic and Capacity Analytics of Major Ports

TCAMP Sprint 1 0 days remaining Complete sprint

Preparing, Understanding Dataset

TO DO 2 ISSUES

Understanding the dataset
WORKING WITH DATASET
TCAMP-1 SK

Loading the dataset
WORKING WITH DATASET
TCAMP-2 D

IN PROGRESS

DONE ✓

GROUP BY None Insights

Quickstart

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TCAMP board - Agile board - Jira x IBM x +

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Projects / Traffic and Capacity Analytics of Major Ports

TCAMP Sprint 1 0 days remaining Complete sprint

Preparing, Understanding Dataset

TO DO

IN PROGRESS 1 ISSUE

Loading the dataset
WORKING WITH DATASET
TCAMP-2 D

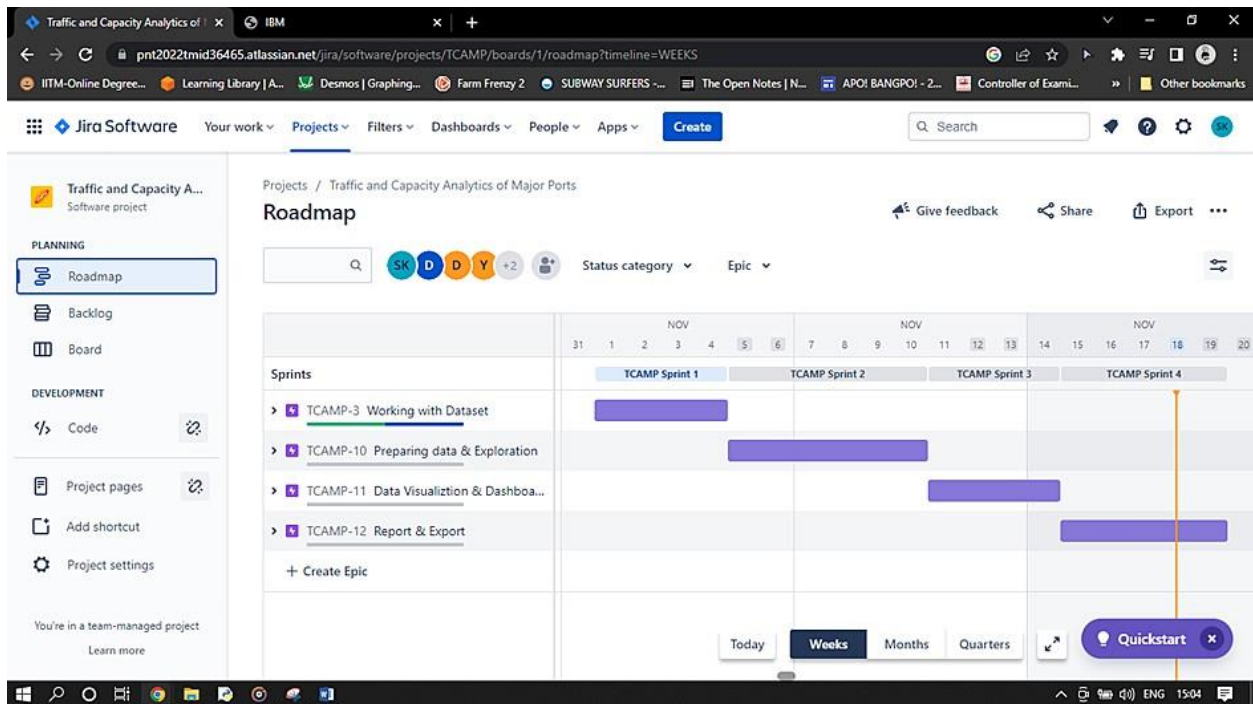
DONE 1 ISSUE ✓

Understanding the dataset
WORKING WITH DATASET
TCAMP-1 ✓ SK

GROUP BY None Insights

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6.TESTING

6.1 Performance Testing :

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

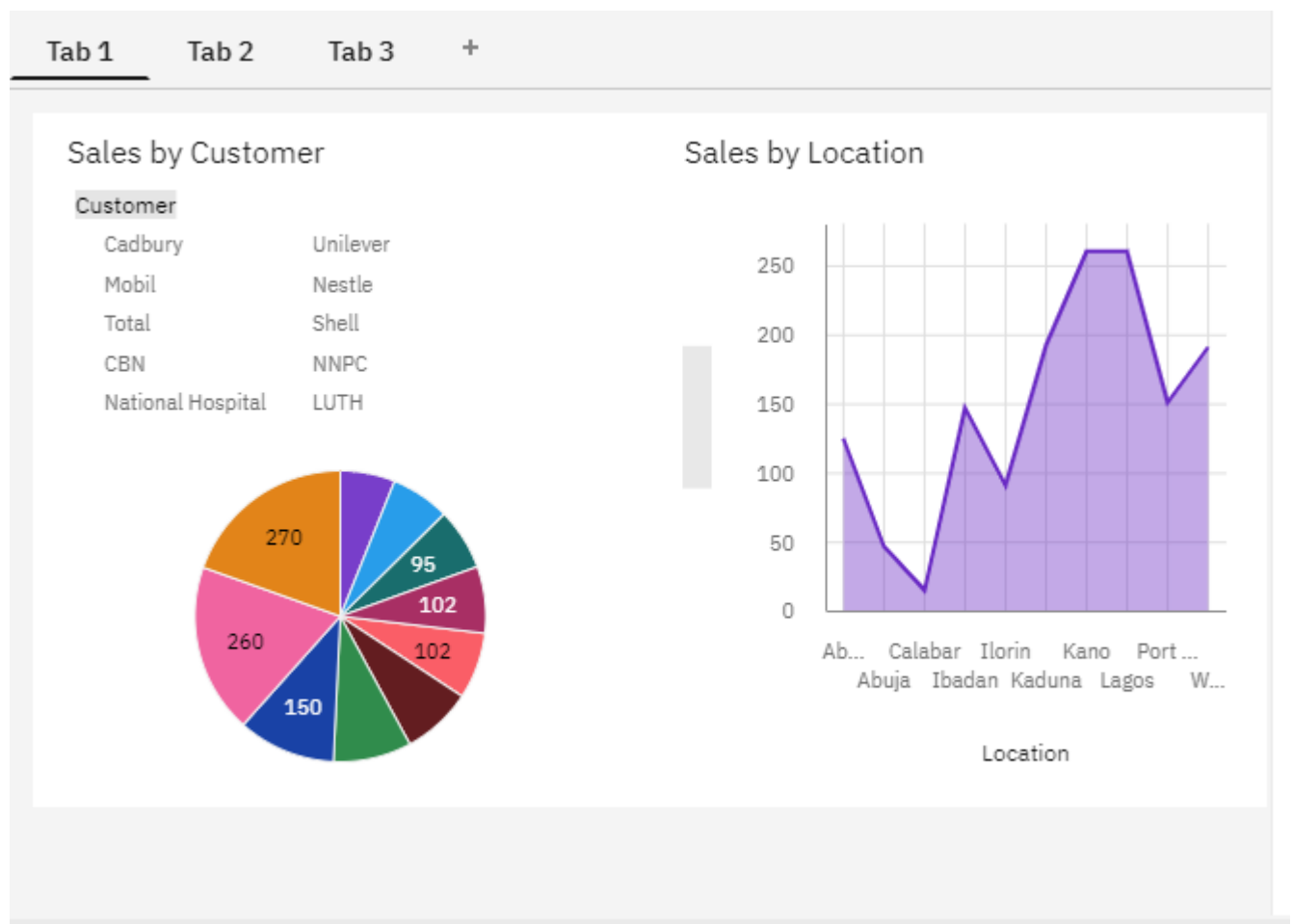
S.No.	Parameter	Screenshot / Values
1.	Dashboard design	No of Visualizations / Graphs – 7/16
2.	Data Responsiveness	6 data Responsiveness
3.	Amount Data to Rendered (DB2 Metrics)	88

4.	Utilization of Data Filters	3/6
5.	Effective User Story	No of Scene Added - 8
6.	Descriptive Reports	No of Visualizations / Graphs – 7/16

7. RESULT

7.1 Performance Metrics

An Interactive Dashboard Has been Created:



Sales by Sales Rep

Sales Rep

P. Michaels

S. Sunday

A. Oni



Received Inventory from Supplier

Column

Received Inventory (Sum)



Inventory Stock for Warehouse Locations

Amuwo

Apapa

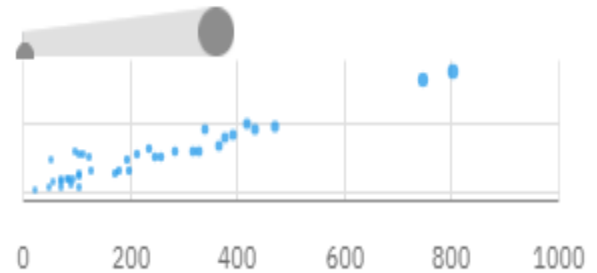
Calabar

Ikeja

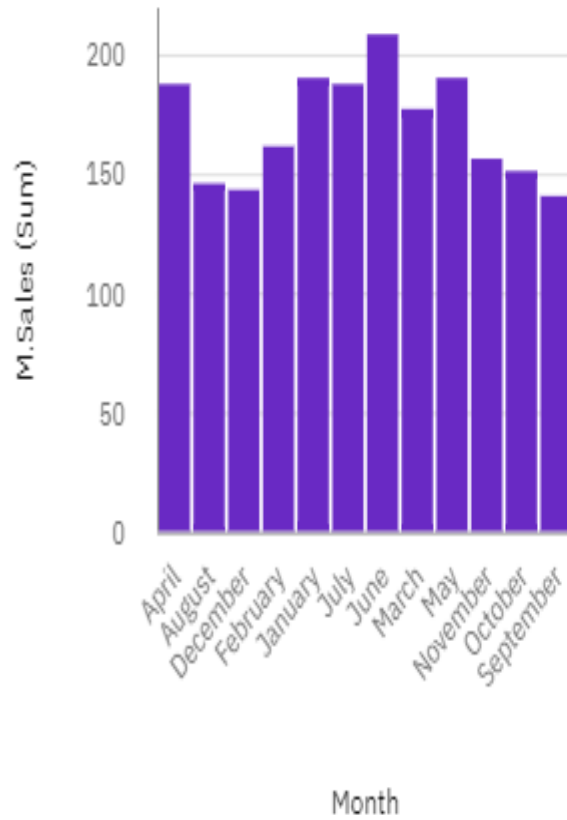


Sales trend

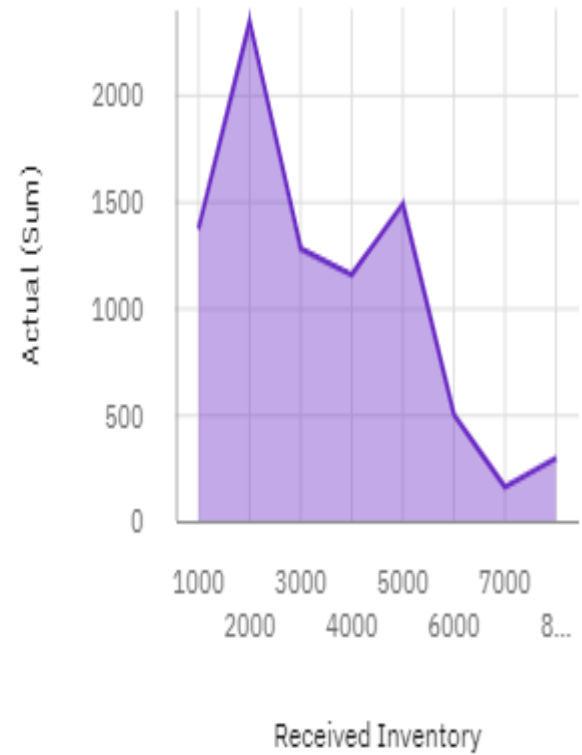
Actual (Sum)



Monthly Sales by Product



Actual and Received Inventory by Month



7.2 Advantages & Disadvantages

ADVANTAGES

- Really simple to make virtualization
- Easier to analyse Data
- Easy to predict using visualizations
- Easy to understand by anyone
- Helps in constructing plan for foreseeable future

DISADVANTAGES

- Need to have an Account to upload data and create new Virtualizations
- Virtualization needs to be updated regularly
- Real-time Live update is not possible yet
- If the uploaded data is wrong the virtualization might be wrong

8. CONCLUSION

Traffic and Capacity analysis of major ports across India is done and various insights were drawn from it. An Interactive dashboard has been created from the given data set. The data was cleaned, prepared, understood and visualized using various visualization tools in IBM Cognos Analytics with Watson.

The visualizations created are listed below:

1. Port-wise Traffic Distribution, Port wise Capacity Distribution
2. Port-wise Traffic vs Capacity by Line Chart
3. Port-wise Traffic Projected vs Achieved by Column Chart
4. Port-wise Traffic Projected vs Achieve by Stacked Column Chart
5. Port-wise Total Capacity Projects vs Total Capacity Achieve by Line and Bar Chart

6. Port-wise Traffic Projects vs Total Projected by Area Chart
7. Port-wise Total Capacity Achieve, Traffic Achieved using Stacked Bar
8. Filters
9. Port-wise Total Capacity Achieved using Map
10. Summary Cards and Visual using Total Capacity vs Actual Capacity Column Chart

8.1 Reference

1. Ministry of Commerce and Industry, 2020, “Press Release on National Logistics Policy”. Government of India <https://commerce.gov.in/pressreleases/national-logisticspolicy-will-be-released-soon-policy-to-create-a-single-window-e-logistics-market-will-generate-employment-and-make-smes-competitive-nirmala-sitharaman/>
2. . Dedicated Freight Corridor Corporation of India Limited, <https://dfccil.com/>

8.2 Future Scope

In the future subsequent updates, the project can be made so that the data can be updated in Real-Time. Further UI updates can also be made to make it more presentable and user friendly. More utilities can be added to the website

9. APPENDIX

9.1 Gitrepo link :

<https://github.com/IBM-EPBL//IBM-Project-32590-1660210909>