

FINAL PROJECT ATTRIBUTES

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Team ID	PNT2022TMID11042
Project Name	SMART SOLUTIONS FOR RAILWAYS

TEAM MEMBERS :

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INTRODUCTION

PROJECT OVERVIEW :

Smart Solutions for railways is designed to reduced the work load of the user and also the use of paper. Here in this project we have the following features .A Web page is designed for the public where they can book tickets by seeing the available seats.After booking the train, the person will get a QR code which has to be shown to the Ticket Collector while boarding the train.The ticket collectors can scan the QR code to identify the personal details.A GPS module is present in the train to track it. The live status of the journey is updated in the Web app continuously. All the booking details of the customers will be stored in the database with a unique ID and they can be retrieved back when the Ticket Collector scans the QR Code.

LITERATURE SURVEY :

A literature review is a comprehensive summary of previous researches on the topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research.

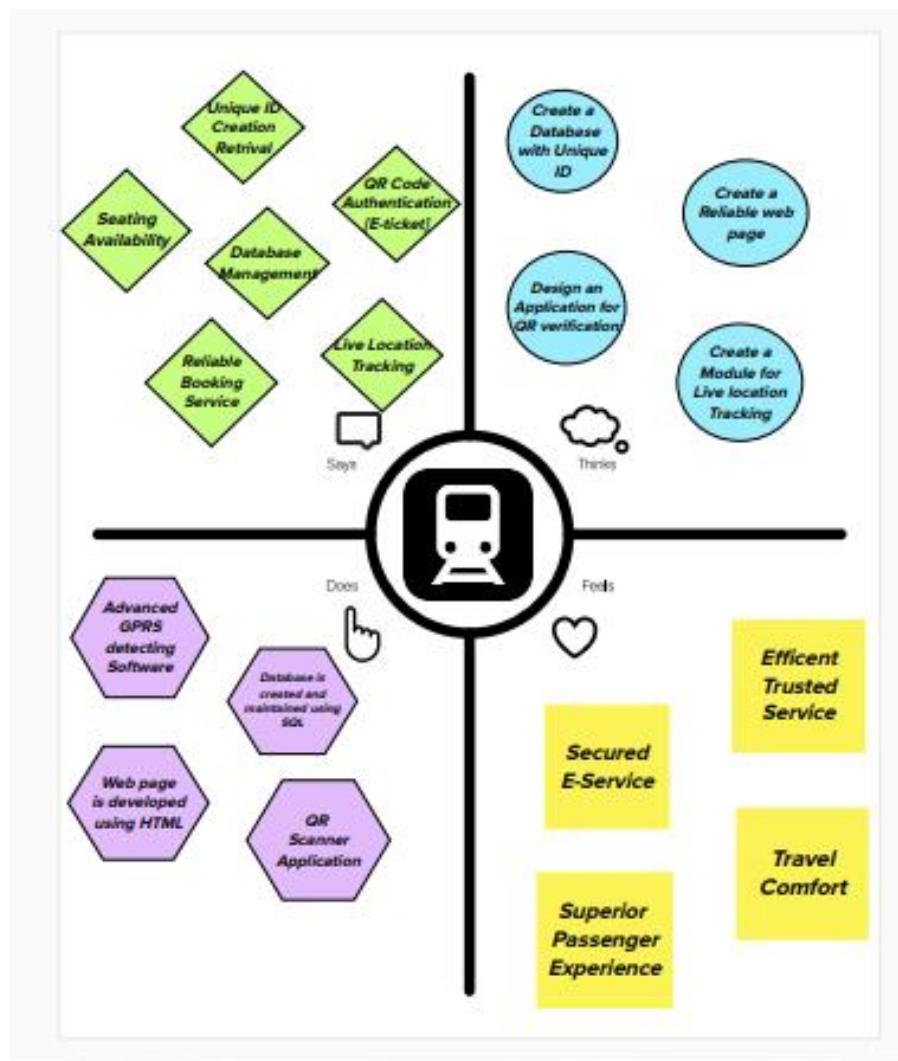
- G.Leena and Chetan Singh , “International Journal of Computer Applications” published on web source 2017. In order to reduce accidents at unmanned railway gates, the goal of this study is to automate numerous procedures connected to the opening and closing of railway gates. Using GSM technology, this automatic system notifies the station master of the train’s location and

recognizes the individual who is excessively yanking the chains. Additionally, it detects track breakages and unwelcome impediments using an anti-collision technology. Since it will recognize the coming of the train and close the gate as necessary, this automatic railway system decreases the amount of time that road users must wait at railway crossings.

- Sushant M. Gajbhiye and Raju A. Bondre , “International Journal of Engineering and Technical Research V9(02)” published on web source 2020 . The main objective of this research article is to reduce the frequency of railroad accidents that occur at level crossings (Intersection Points). The railway system is the most widely used and least expensive mode of transportation in India. Because there are more people using the rails and it is challenging to stop the railroad anywhere to prevent an accident, this has substantial drawbacks. Level crossings currently operate on an unmanned basis, which leads to a lot of accidents because no one is present to check that the railway gate opens when a train approaches the crossing.
- Ishan Mishra Published in web source on “April 2020” . In terms of travel, the railroad is the most affordable and convenient form of transportation in our nation. Many individuals in India utilize trains to travel to different locations, and some use Indian Railways on a daily basis. As a result, a lot of people entrust the railroads with their lives on a regular basis, putting their lives in danger if they are unsafe or prone to accidents. The level crossing where the railroad tracks and the road converge is the site of many railroad accidents, most of which are caused by human error.
- Masharul Bin Mahfuz Published in web source on “2018” .In order to avoid risks like crashes and derailments, this study proposes a method for an intelligent and automatic management of a railway transportation system. The system was created with Bangladesh in mind, but it may also be simply applied to any other railway infrastructure. The system includes automatic signaling and gate control at level crossings using light emitting diodes (LEDs) and servo motors, active train detection using global positioning satellite system (GNSS) coordinates, obstacle detection at level crossings using long-range infrared, automatic and manual communication between trains and level crossings using GSM technology, and development of a web-based central control.

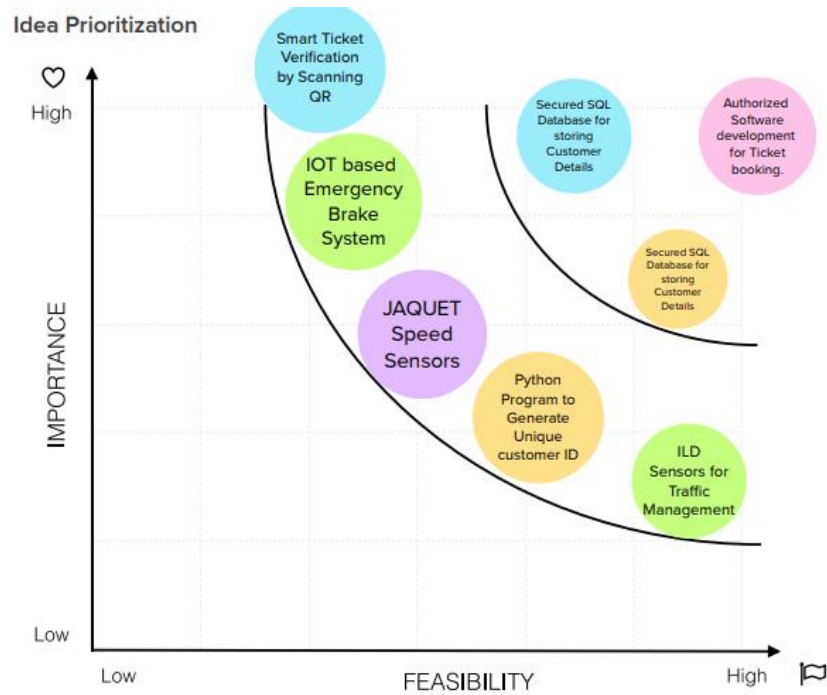
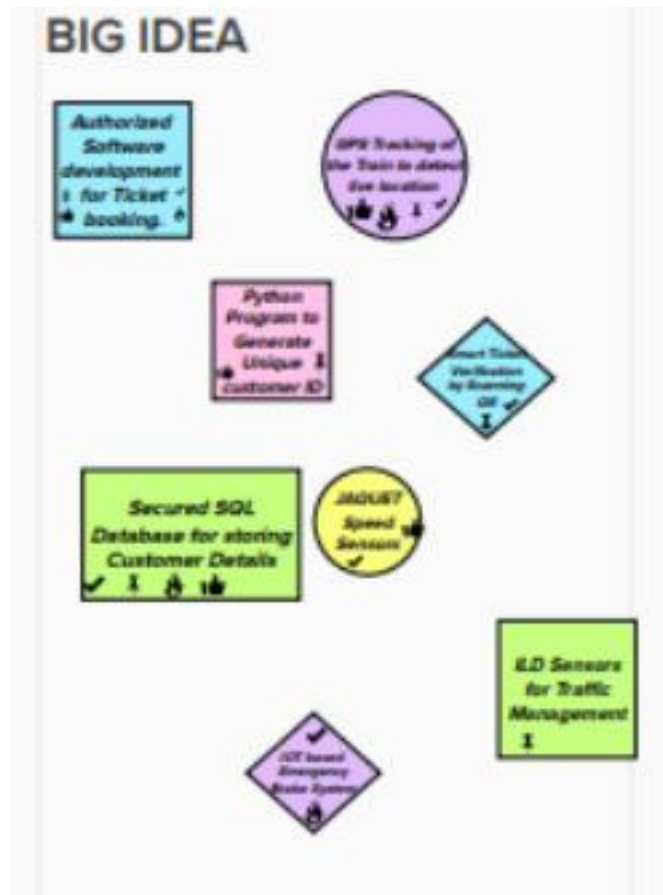
EMPATHY MAP :

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. It helps us to understand the customer's pain, gain and difficulties from their point of view.



IDEATION :

Brainstorming is a group problem-solving method that helped us to gather and organize various ideas and thoughts from teammembers.



PROPOSED SOLUTION :

It helped us to analyze and examine our solution more in the grounds of uniqueness, social impact, business model, scalability etc.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Smart Solutions for railways is designed to reduced the work load of the user and also the use of paper.
2.	Idea / Solution description	A Web page is developed for ticket booking by seeing the seat availability and ID verification using the QR code.
3.	Novelty / Uniqueness	The ticket booking process becomes very easy and smart verification using QR reduces the use of papers.
4.	Social Impact / Customer Satisfaction	The Customers find it very convenient and experience a secured journey.
5.	Business Model (Revenue Model)	Reduction of paper usage, simple process and Unique database storage with QR verification.
6.	Scalability of the Solution	It can be used for all modes of transport including the public and private sectors.

REQUIREMENT ANALYSIS :

It briefs about functional and non-functional requirements. It involves the various steps in the entire process. It also specifies features usability, security, reliability, performance, availability and scalability.

FUNCTIONAL REQUIREMENTS :

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Requirements	Ticket Booking through Seat availability Unique ID verification using QR code

FR-2	User Registration	Manual Registration Registration through webpage Registration through Application
FR-3	User Confirmation	Confirmation via Phone Confirmation via Email Confirmation via OTP
FR-4	Payment options	Direct cash payment Net Banking/UPI Credit/Debit/ATM Card
FR-5	Service Feedback	Through Webpage Through Phone calls

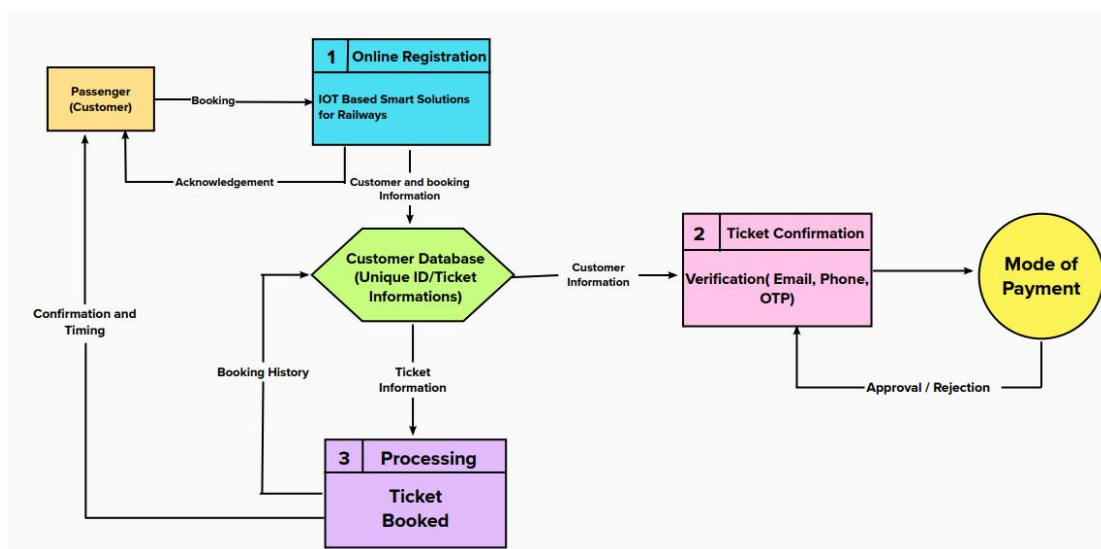
NON-FUNCTIONAL REQUIREMENTS:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Should be easy for the customers to book the tickets by seeing the seat availability. Even senior citizens should not find any difficulty in ticket booking.
NFR-2	Security	Application has to be secured with 2 step authorisation Passwords and passkeys will be assigned as per the users need.
NFR-3	Reliability	Software should be updated periodically. Required measures should be taken during server failure.
NFR-4	Performance	The Web application must have a good user interface. Payment should also be simpler and faster.
NFR-5	Availability	All the features will be available when the user requires and customization has to be done according to the user preference.

PROJECT DESIGN :

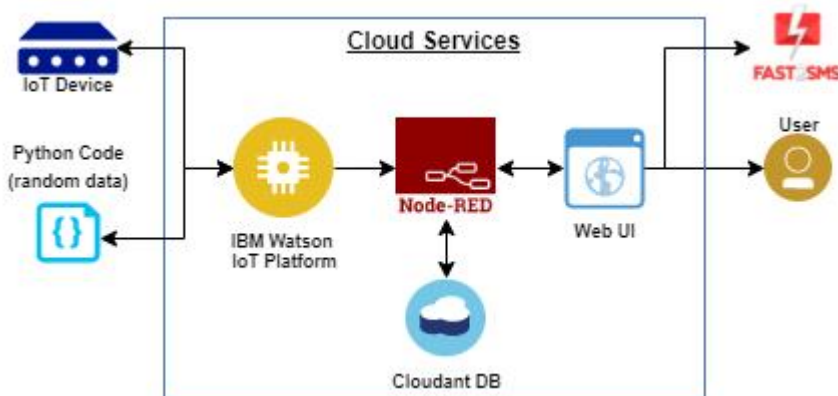
DATA FLOW DIAGRAM :

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.



SOLUTION ARCHITECTURE :

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. It helped us understand the features and components used to complete the project.



USER STORIES :

User Story Number	User Story / Task	Story Points	Priority
USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High
USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High
USN-3	As a user, I can register for the application through Facebook	2	Low
USN-4	As a user, I can register for the application through Gmail	2	Medium
USN-5	As a user, I can log into the application by entering email & password	1	High
USN-6	As a user, I can log into the application by entering email & password and access all the resources and services available	2	High
User Story Number	User Story / Task	Story Points	Priority
USN-1	As a customer data controller, I log into my profile and start monitoring the customer updates	3	High
USN-2	I receive all the information about customer journey from web . Whenever there is change in journey, corresponding updates are made.	2	Medium

USN-1	With the seat availability, the tickets are booked and the customer gets a QR code after booking	3	High
USN-2	With the GPS module present in the train for tracking we can update the live status of the journey in the web app continuously.	2	Medium
USN-1	As a ticket collector, I scan the QR code to identify the person's details.	3	High
USN-1	As an administrator, I ensure that all departments work co-ordinated and ensure the accuracy and efficiency.	2	Medium

CODING AND SOLUTION :

- **IoT technologies help railways successfully manage passenger safety, operational efficiency, and the passenger experience.**
- **Smart sensors can be used to track important assets, manage passenger flow, and enable predictive maintenance.**
- **Operators that modernize their core technology and transportation infrastructure and integrate Internet of Things (IoT) technology, artificial intelligence (AI), and deep learning capabilities will benefit from rich data and insights that can help tackle the challenges of today—increasing demand, legacy infrastructure capacity limitations, and growing passenger experience expectations.**
- **Today, railways are more important than ever as country and city governments are being asked to find innovative ways to safely get back to business post- COVID, meet the changing needs of their citizens, address urban population increases, and reduce their environmental impact.**

PYTHON CODE FOR GPS TRACKING :

```
import wiotp.sdk.device
import time
import random
myConfig = {
    "identity": {
        "orgId": "vu9ol9",
        "typeId": "SSR",
        "deviceId": "13517860"
    },
    "auth": {
```

```

"token": "dUxd63sy-r11YI?n)2"
}
}
def myCommandCallback (cmd):
print ("Message received from IBM IoT Platform: %s" % cmd.data['command'])
m=cmd.data['command']
client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()
def pub (data):
client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0,
onPublish=None)
print ("Published data Successfully: %s", myData)
while True:
myData={'name': 'Train1', 'lat': 17.6387448, 'lon': 78.4754336}
pub (myData)
time.sleep (3)
#myData={'name': 'Train2', 'lat': 17.6387448, 'lon': 78.4754336}
#pub (myData)
#time.sleep (3)
myData={'name': 'Train1', 'lat': 17.6341908, 'lon': 78.4744722}
pub(myData)
time.sleep(3)
myData={'name': 'Train1', 'lat': 17.6340889, 'lon': 78.4745052}
pub (myData)
time.sleep (3)
myData={'name': 'Train1', 'lat': 17.6248626, 'lon': 78.4720259}
pub (myData)
time.sleep (3)
myData={'name': 'Train1', 'lat': 17.6188577, 'lon': 78.4698726}
pub (myData)
time.sleep (3)
myData={'name': 'Train1', 'lat': 17.6132382, 'lon': 78.4707318}
pub (myData)
time.sleep (3)
client.commandCallback = myCommandCallback
client.disconnect ()

```

PYTHON CODE FOR QR SCANNER :

```

from ibmcloudant import couchDbSessionAuthenticator
from ibm_cloud_sdk_core.authenticators import
BasicAuthenticator
authenticator = BasicAuthenticator('apikey-v2-
16u3crmdpkgghxefdikvpssoh5fwezrmuup5f
v5g3ubz','b0ab119f45d3e6255eabb97
service=Cloudantv1(authenticator=authentic
ator)

```

```

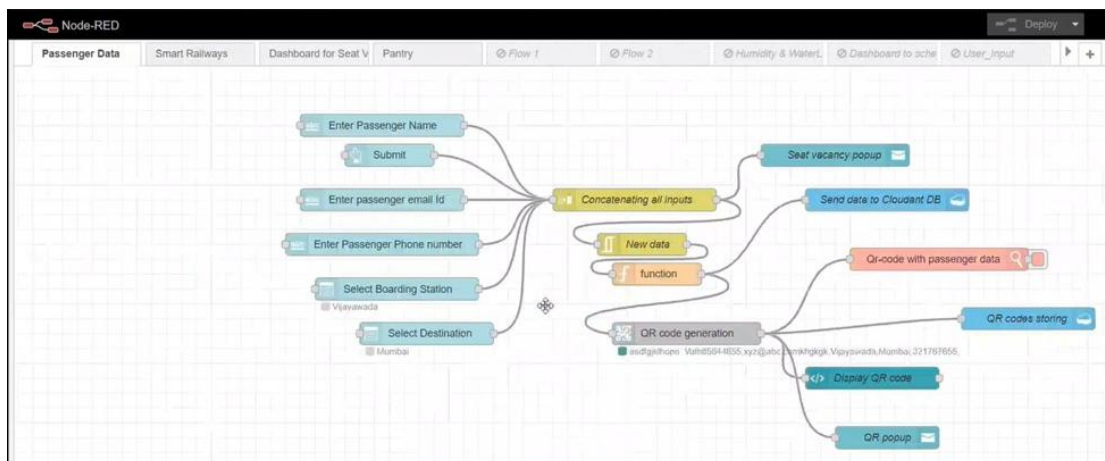
service.set_service_url('https://apikey-v2-
16u3crmdpkghhxefdikvpssoh5fwezrmuup
5fv5g3ubz:b0ab119f45d3e6255eabb978
cap=cv2.VideoCapture(0)
font=cv2.FONT_HERSHEY_PLAIN
while True:
    __,frame=cap.read(0)
    decodeObjects=pyzbar.decode(frame)
    for obj in decodeObjects:
        #print("Data",obj.data)
        a=obj.data.decode('UTF-8')
        cv2.putText(frame,"Ticket",(50,50),font,2,(255,0,0),3)
        #print(a)
    try:
        response=service.get_document(db='booking',doc_id=
a).get_result()
        print(response)
        time.sleep(5)
    except Exception as e:
        print("Not valid Ticket")
        time.sleep(5)
    cv2.imshow("Frame",frame)
    if cv2.waitKey(1) & 0xFF==ord('q'):
        break
    cap.release()
    cv2.destroyAllWindows()
    client.disconnect()

```

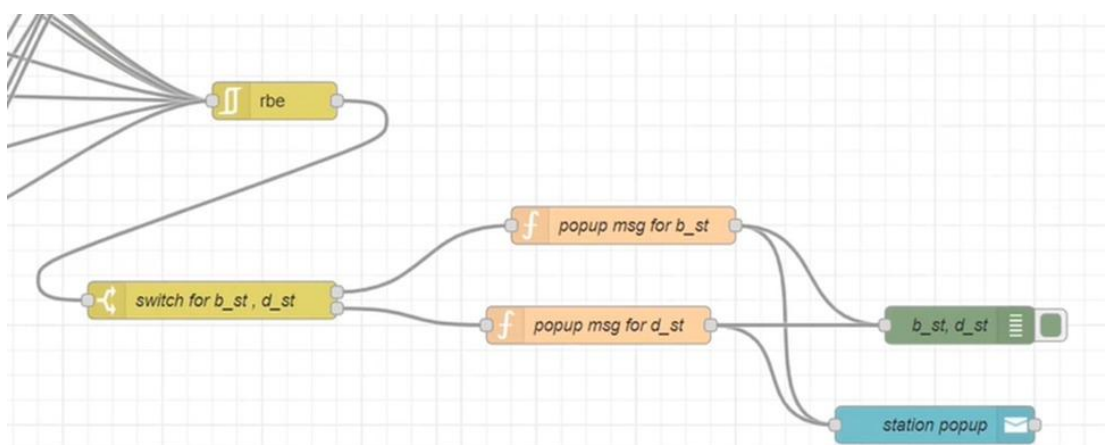
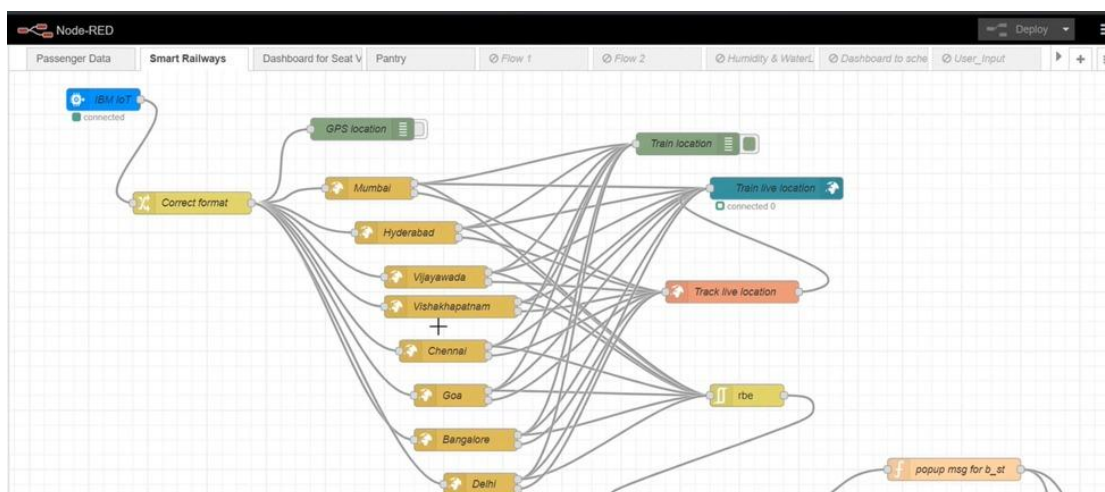
TESTING :

TEST CASES :

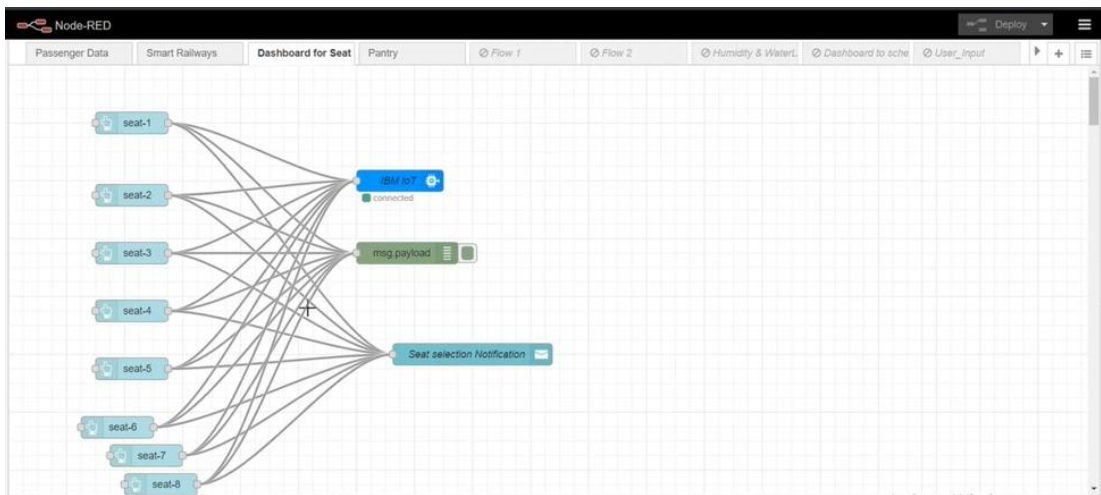
PASSENGER DATA



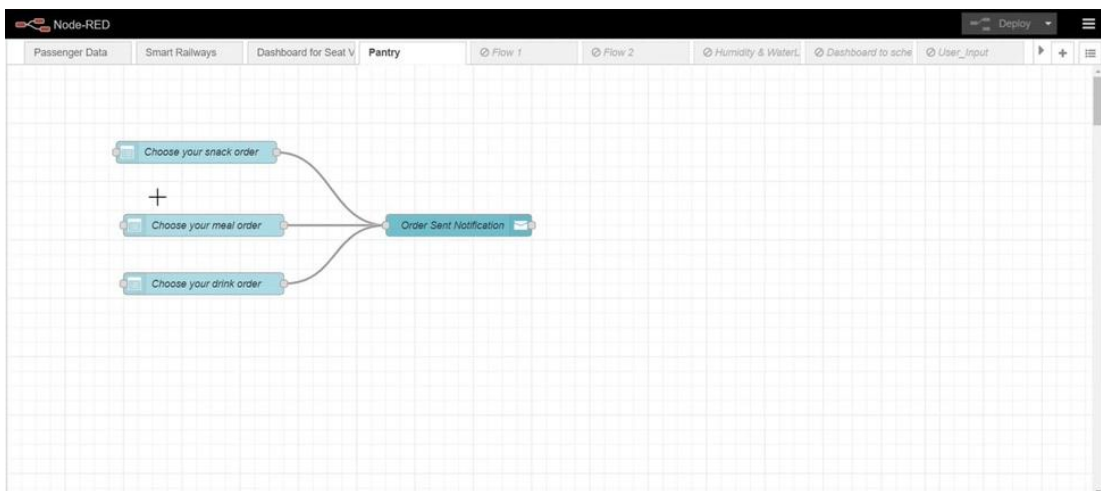
SMART RAILWAYS



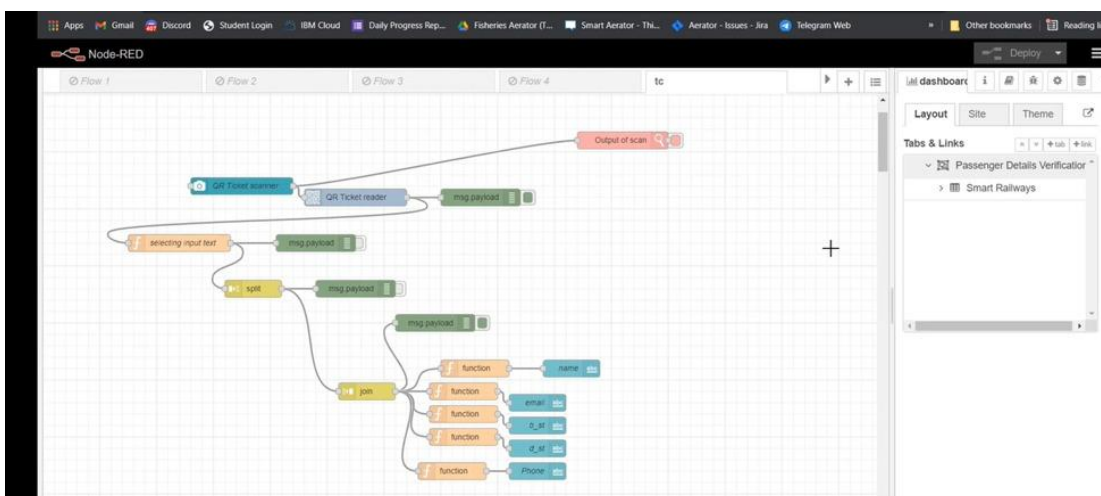
DASHBOARD FOR SEAT VACANCY :



PANTRY



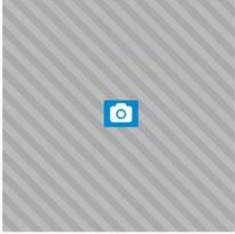
TC



SCANNED OUTPUT AT TC

Passenger Details Verification

Smart Railways



Passenger Name Sai Prathyusha.Nim

Passenger Email fshlgshgh@sdijsg.co

Boarding Station Vijayawada

Destination station Bangalore

Phone number 45156654654747541

Activate Windows
Go to Settings to activate Windows

ADVANTAGES :

- Increased efficiency
- Reduced downtime
- Enhanced safety
- Increased passenger satisfaction

DISADVANTAGES :

- To establish the entire network it is quite a costly task. Since these are the issues of the government cost doesn't matter a lot.
- The Arduino board is a delicate device so it has to be handled carefully.

CONCLUSION :

Thus using this project the work load of the user is reduced along with the use of paper. This project made complex processes easy to all users. Secured payment of the app made it more trust worthy. It also increased the dependency of users on the latest technology .With less time complexity it is much more better than the conventional method.