Smart solutions for railways

Team id:PNT2022TMID08702

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in

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Dr. MAHALINGAM COLLEGE OF ENGINEERING AND TECHNOLOGY An Autonomous Institution Affiliated to ANNAUNIVERSITY CHENNAI – 600 025

CHAPTER -1

INTRODUCTION

1.1 PROJECT OVERVIEW

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. Gain knowledge of Watson IoT Platform. Connecting IoT devices to the Watson IoT platform and exchanging the sensor data. Gain knowledge on IBM Cloudant DB. Explore Python client libraries of Watson IoT Platform. Explore Python library for integrating OpenCV for accessing the Live Camera Input scan the QR code in live streaming and retrieve the QR code details Gain knowledge on web application development. Gain knowledge of storing the data in Cloudant DB Generating QR codes with the required data.

1.2 PURPOSE

Smart Solutions for railways are designed to reduce the work load of the user and also the use of paper Automation has affected every aspect of our daily lives. More improvements are being introduced in almost all fields to reduce human effort and save time. There will an app for the public through which they can book tickets by seeing theavailable seats. After booking the person will get a QR code which has to be shown to the Tickets Collector at boarding. He scans the QR code to identify the personal details. Through this app the traveller can order the food, the pantry section will get the notification of order. A GPS module is present in the train to track it. The live status of the journey is updated in the app continuously. The user can set a notification for intimation the train live status for both boarding and destination stations.

CHAPTER -2

LITERATURE SURVEY

S.No	TITLE	JOURNAL	AUTHOR	CHALLENGES / FUTURE WORK
1	Planning, Analysing and Designing of Smart Railway Station	Internation alJournal of Creative Research Thoughts (2020)	Soundappan.S, Srimaan.R, Venatesh.G, Sriram.M.	The journal describesabout implementationfor one particular junction.
2	Authentication Systemfor Smart Railway Station	International Journal for Modern Trendsin Science and Technology (2018)	Swati R.Khokale, Vaibhav U.Bunde, Shweta B.Karande, Shyam Ingale, Mayuri Ghaywat.	➢ The authentication system focused onproviding platformtickets through web app. ➢ This leads to paperless tickets and helps to reduce crime in the platform.
3	Smart Railway Crossingusing Microcontroller.	Internation alJournal of Engineerin gResearch & Technology (2020)	Sushant M.Gajbhiye, Raju A.Bondre,Zen P.Raut.	The objective of the research was to handle and control thesystem of railway gate by applying microcontroller.
4	Autonomous Rail TrackInspection using VisionBased System.	Internation al Conference Computer Intelligence .	M.Singh, S.Singh, J.Jaiswal, J.Hempshal l.	➢ Automatically recognizes videosequence clips. ➢ Can’t link together disconnected pixels.

5	Rail Crack Detection based on the adaptive noise cancellation method of EMD at high speed	IEEE International Instrumentation and Measurement Technology Conference	Xin Zhang, Yan Wang, Kangwei Wang,Yi Shen.	Signals at different speeds are investigated by the proposed method and the interference of noise signals is suppressed effectively.
6	Safety verification for train traffic control communication	IEEE journal on selected areas in communication (2012)	G.Tarnai	A safety connection between train and trackside is established using a safety communication protocol.
7	Ultrasonic characterization of defects in rails.	Insight-Non-Destructive Testing and Condition Monitoring (2002)	R.Clark, S.Singh, C.Haist	An alternative to electrical scanning and continuous beam steering was proposed using
8	Passenger Monitoring Model for Easily Accessible Public Trams/Trains	12th International Conference on Engineering/ Electronics, Computer , Tele-communication and Information Technology (2015)	Roman Khoeblal, Teeravisit Laohapen saeng, Roungsan Chaisrich aroen.	➢ A single public transportation card was used to travel throughout the country. ➢ Applicable only for passenger monitoring.

2.1 EXISTING PROBLEMS

Most of the public transportation infrastructure in Indian cities is directly accessible. The majority of the train stations are located in an open and “gate- free” environment, easily available to everyone and hence introduces potential malfunctions in the system. This is why fare dodging is the results show that by making use of a different system architecture and improvement in catching free rides in a much earlier stage is inspectors. In their busy schedule as fast roaming world public in need of online booking process. The queues in front of the ticket counters in railway stations have been drastically increased over the period of time.

2.2 REFERENCES

[1] S. Sawadisavi J. Edwards, E. Resend, J. Hart, C. Barkan, and N.Ahuja, “Development of a machine vision system for inspection of railroad track,” in Proc, Amer. Railway Eng.MaintenanceWay Assoc. Annu. 2012

[2] M. Singh, S. Singh, J. Jaiswal, and J. Hempshall, “Autonomous railtrack inspection using vision based system,” in Proc. IEEE int. Conf.

Comput.Intell. Homeland Secur. Pers. Safety, 2009

[3] J. Lin, S. Luo, Q. Li, H. Zhang, and S. Ren, “Real-time rail head surface defect detection: A geometrical approach,” in Proc. IEEE Int. SympIndust. Electron., 2009.

[4] R. Clark, S. Singh, and C. Haist, “Ultrasonic characterization of defects in rails.” Insight, vol.44, no. 6, pp.341-347, 2002

[5] R. Edwards, S. Dixon, and X. Jian, “Characterisation of defects in the railhead using ultrasonic surface waves,” NDT & E Int., vol.39, no.6, pp. 468- 475, 2006.

[6] Ramavath Swetha, P.V. Prasad Reddy, “Railway Track Crack Detection Autonomous Vehicle” ISSN, vol.4, Issue 2015.

[7] P. Navaraja, “Crack Detection System For Railway Track By Using Ultrasonic And Pir Sensor” IJAIC-2014

[8] A. H. Cribbens, “Solid-state interlocking (SSI): an integrated electronic signaling system for mainline railways,” IEE proceedings, 2012

[10] G. Tarnai, “Safety verification for train traffic control communications," IEEE journal on selected areas in communications, vol. sac-4, no. I, 2012

2.3PROBLEM STSTEMENT DEFINITION

Indian Railways is the premier transport organization of the country is the largest rail network in Asia and the world's second largest under one management. Consumers have fast adapted to digitalization in the retail and banking space. The transport industry, including rail companies, is also transforming to meet passenger expectations with superior services. They offer e-tickets, scheduling information, and other solutions to travellers via smartphones and emails. A web page is designed for booking tickets which generates a QR code that is scanned by the ticket collector. The live location of the individual passenger is tracked using GPS module and stored in the cloud. The QR code contains a unique ID which contains the complete information about the individual passenger that is stored in cloud. IoT can help take this experience a step ahead.

WHO?

Replace with the top voted persona

passengers travelling using physical tickets
some apps desn't show correct train location
Government faces financial loses

WHAT?

Replace with the top voted challenge

QR code-based ticket
queue is reduced
update the current GPS location of the train
time-saving
it helps to improve government financial issues
easy to book and cancel the tickets

WHERE/ WHEN?

Replace with the top voted context

railways journey
for ticket reservation

WHY?

Replace with the top voted value for the customer

Customer value/benefit

customer value-to avoid chances of missing train /tickets the train live location throughout the journey
easy to use and customizing mode very easy(ex;cancel /booking)

Replace with the top voted value for the business

Business value/benefit

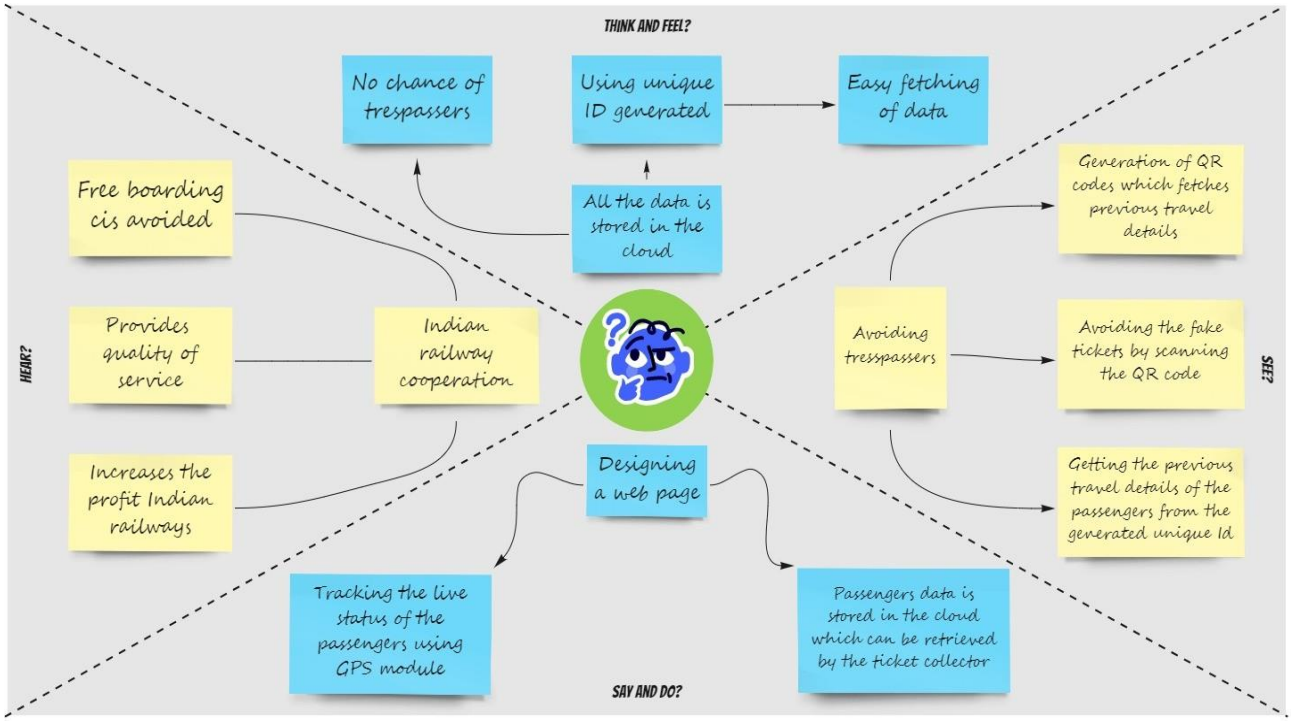
business value-it used to increase in passenger and revenue
low maintenance cost

CHAPTER -3

IDEATION & PROPOSED SOLUTION

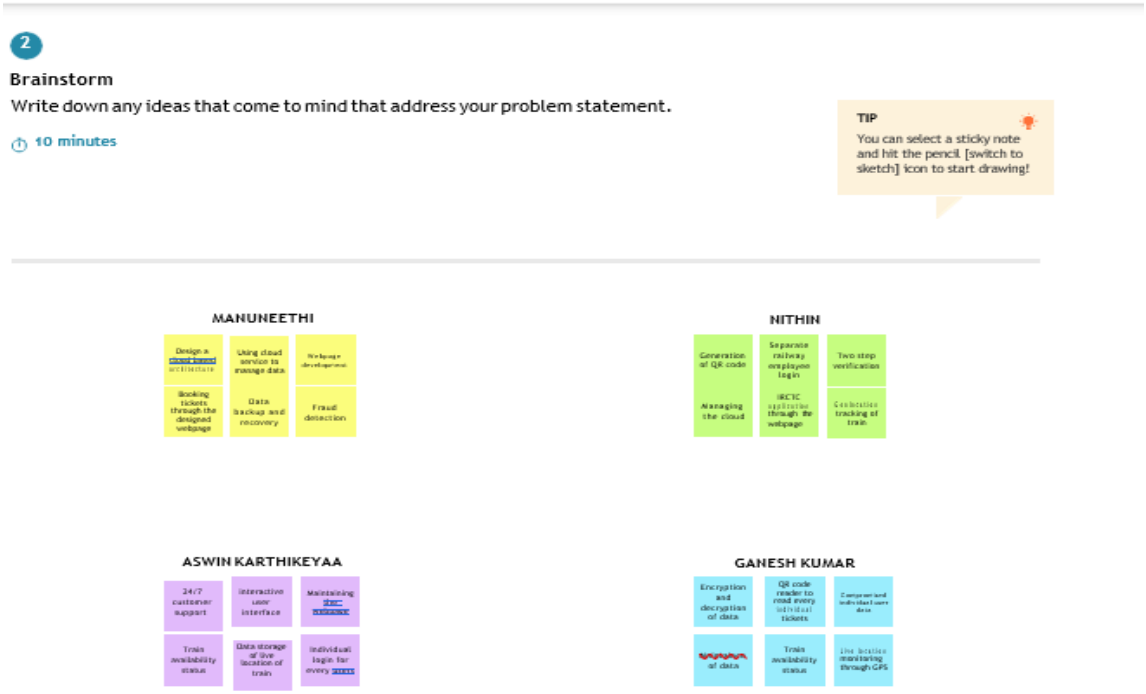
3.1 EMPATHY MAP CANVAS

An Empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user person, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community. In this activity you are expected to prepare the empathy map canvas to capture the user Pains & Gains, Prepare list of problem statements.



3.2 IDEATION & BRAINSTORMING

Brainstorming is one of the primary methods employed during the ideation stage of a typical Design Thinking process. Ideation refers to the whole creative process of coming up with and communicating new ideas. It can take many different forms, from coming up with a totally new idea to combining multiple existing ideas to create a new process or organizational system. Ideation is similar to a practice known as brainstorming. IN this activity you are expected to list the ideas by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.

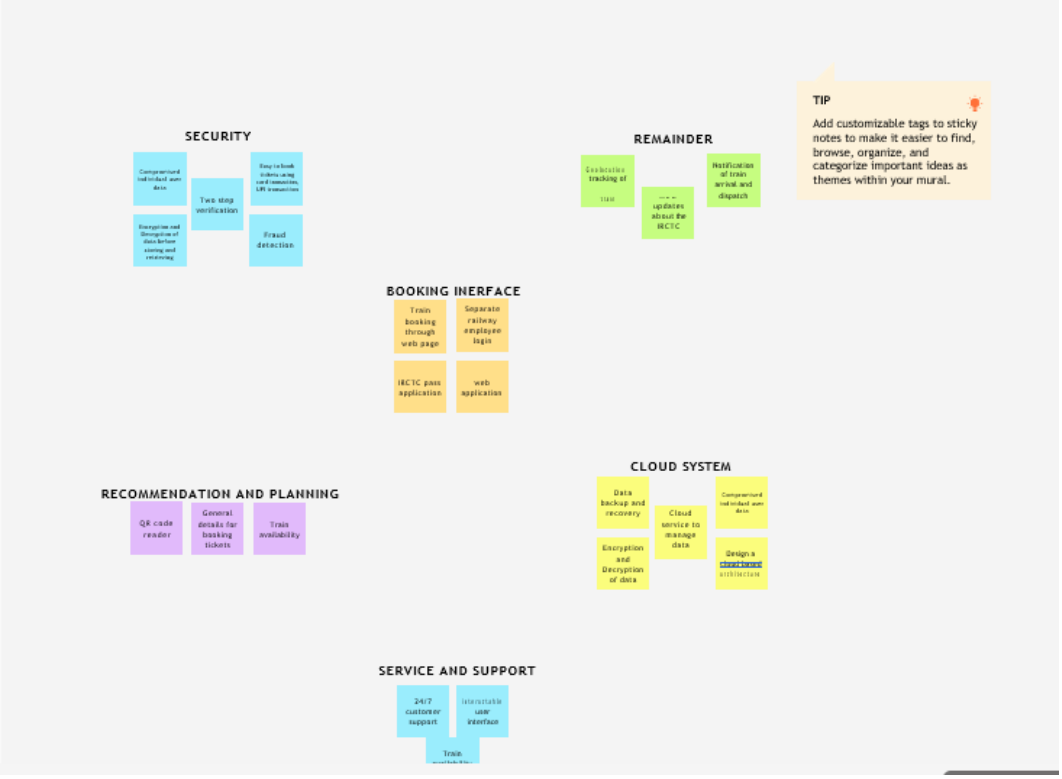


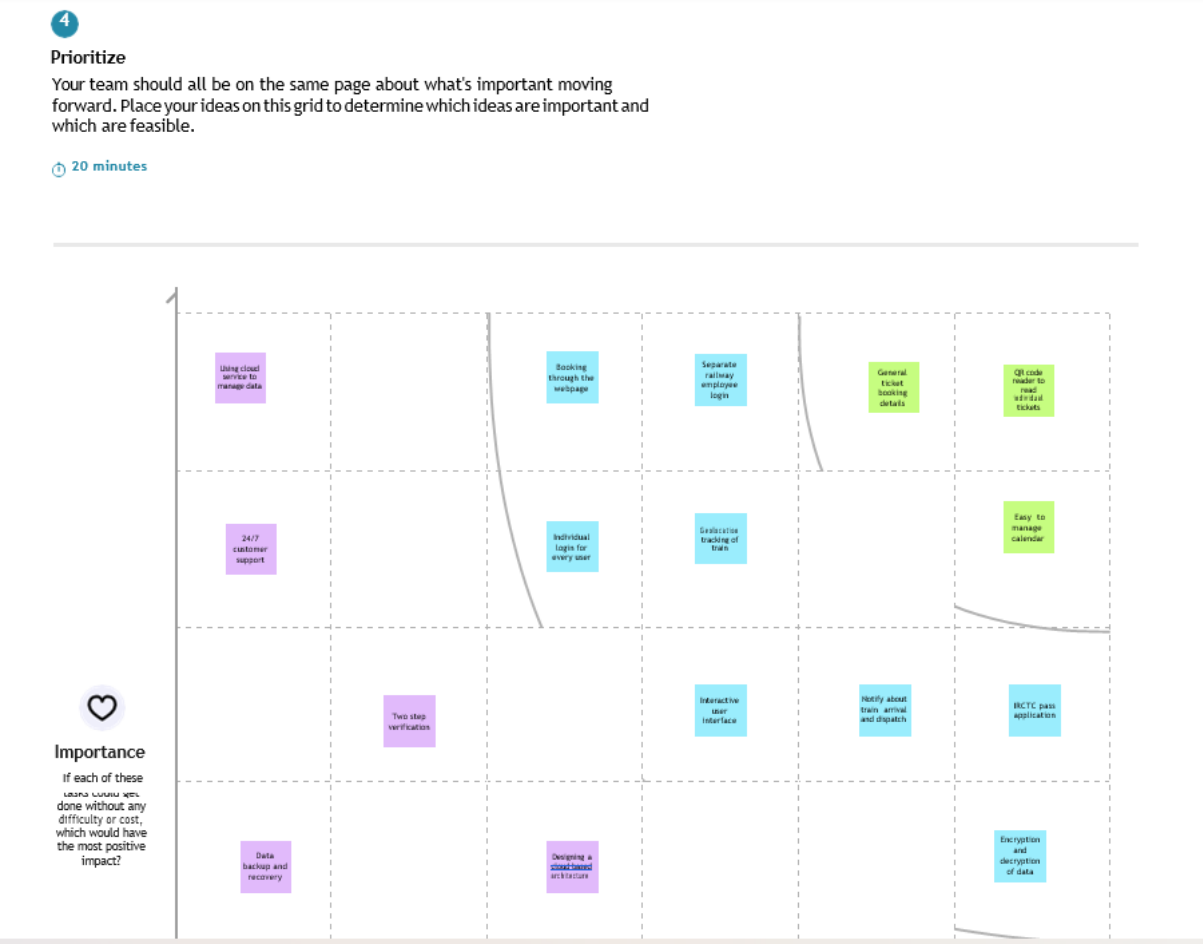
3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes



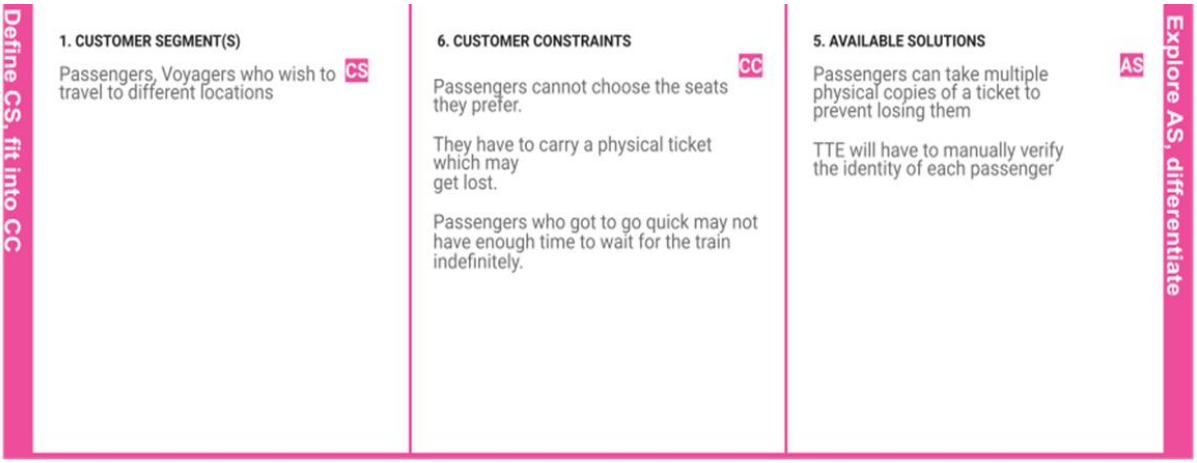


3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to besolved)	Present railway network is overburdened whichrequires smart solutions to meet the new challenges of a fast-growing economy.
2.	Idea / Solution description	A web page is designed for booking tickets which generates a QR code that is scanned by the ticket collector. The live location of the train is tracked using GPS module and stored in the cloud. contains the complete information about the individual passenger.

3.	Novelty / Uniqueness	A unique web page is designed with smooth interface to book tickets which generates a QRcode. The QR code contains a unique ID whichcontains the complete information about the past travel info that is stored in cloud.
4.	Social Impact / Customer Satisfaction	Tracking the live location of the train that helpsthe passenger to manage their timing. User friendly online ticket booking interface that canbe even used by the people who have not already used such ticket booking platforms.
5.	Business Model (Revenue Model)	Mainly focused for providing services to thepublic who relies on railways as their major mode of transport. As IRCTC is the major railways network application provides a major support.
6.	Scalability of the Solution	As the project involves public sector it providesa greater chance for growth as it contributes greatly to the economy by increasing GDP.

3.4 PROBLEM SOLUTION FIT



Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

The live location of the train must be easily accessible by the users

Ticket verification must be streamlined

Unnecessary documents should not be carried by passengers

9. PROBLEM ROOT CAUSE. RC

Train booking infrastructure is outdated

Popularity of train travel has exploded

Trains are rarely on schedule

7. BEHAVIOUR BE

Bring original documents on train rides

Take multiple copies of train tickets

Arrive at station early to ensure they don't miss the train

Focus on J&P, tap into BE, understand RC

3. TRIGGERS TR

Holidays

Neighbours going on vacation

Work-related travel

4. EMOTIONS: BEFORE / AFTER

Confident -> Confused: No way to know about thevalidity of the ticket

Excited -> Impatient: Not sure when train will arrive

Energetic -> Tired: TTE ticket verification takes too long per person

10. YOUR SOLUTION

Using GPS modules to provide users with thetrain's location and estimated time of arrival.

A web UI will be used as a portal for users, which also generates unique QR codes on successfulticket booking.

QR codes can be used to streamline the ticket verification process.

8. CHANNELS of BEHAVIOUR

8.1 ONLINE

Ticket booking through IRCTC website

8.2 OFFLINE

Arriving at station early to check train status

Verifying passenger's ID proof

Identify strong TR & EM

CHAPTER -4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Web application	▪ User friendly environment ▪ Efficient Database Connectivity ▪ Resistance to network issues
FR-2	Ticket Booking	▪ Information about seat availability ▪ Appropriate price details ▪ Easy payment options.
FR-3	Booking Confirmation	▪ Unique QR Code generation ▪ Quick Response ▪ Good Connectivity with Cloud Database
FR-4	Ticket Checker(Passenger identification)	▪ QR Code Scanner ▪ Quick response from portal
FR-5	GPS Module	▪ Sharing live location of train ▪ Service without any interption

4.2 NON-FUNCTIONAL REQUIREMENT

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Finest web application that allows users to make booking based on the availability.
NFR-2	Security	For each booking unique QR Code is generated

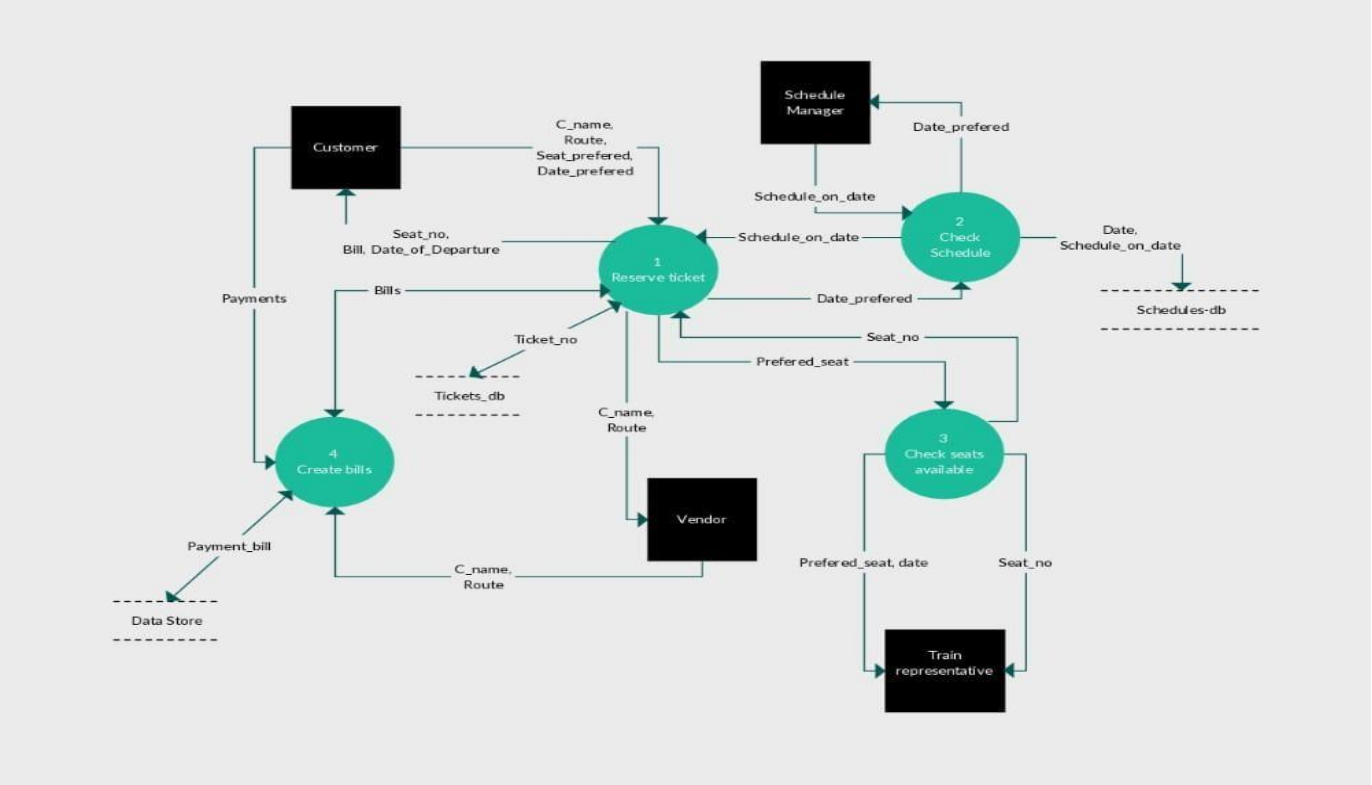
NFR-3	Reliability	Highly reliable since the unique QR Code generated helps to make proper evaluation of ticket booking
NFR-4	Performance	Better performance compared to ordinary ticket booking system as cloud database is used the server provides wide range of service without any lagging in the system
NFR-5.	Availability	Service provided by clouddatabase – establishes a wider range of availability of services.
NFR-6	Scalability.	Better scalability since the tracking of live location is possible for all the passengers throughout their journey.Better service scalability –in case of both ticket booking and ticket evaluation system.

CHAPTER-5

PROJECT DESIGN

5.1 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.



5.2 SOLUTION AND TECHNOLOGY ARCHITECTURE

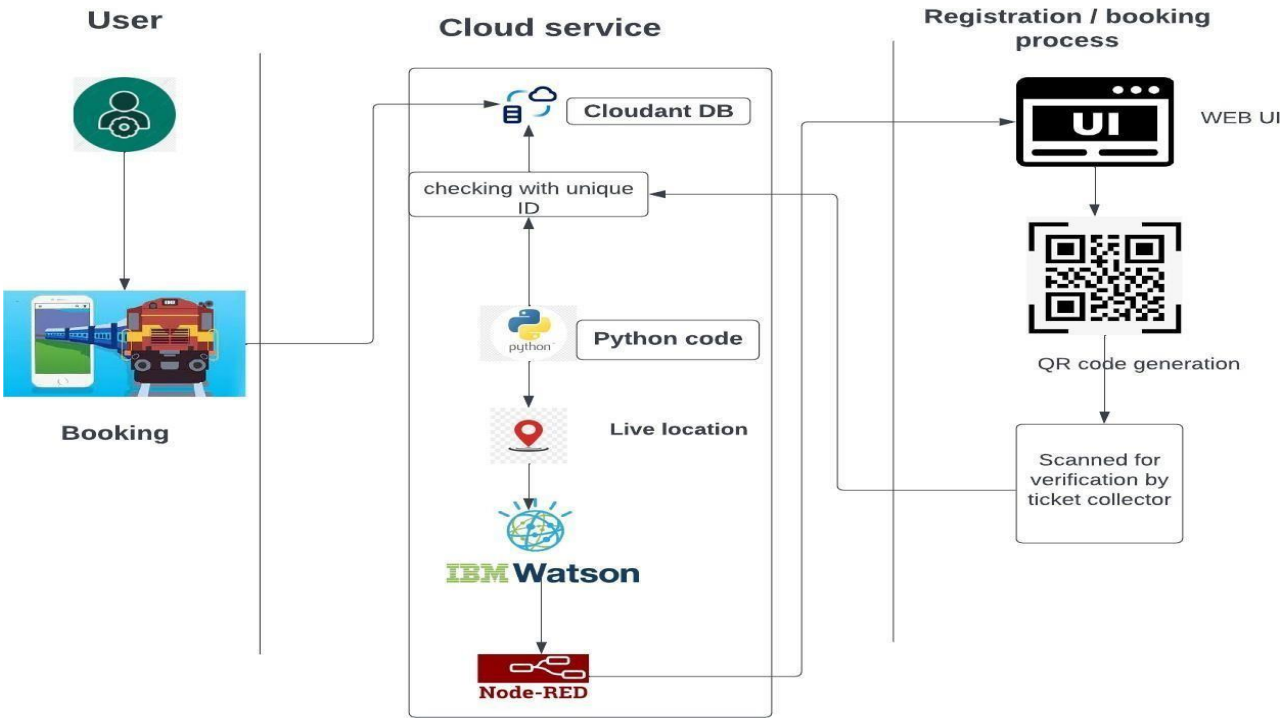


Table 1- **Components and Technology**

S.No	Component	Description	Technology
1	User Interface	User interactionwith application. E.g: Web UI, Mobile App,etc..	HTML ,CSS, java Script, SMS for Web UI
2	Application Logic1	Processing logic of the application	Python script website application
3	Database	Data Organization, Retrieval ,etc.	MySQL, NoSQL, unique code generation, locationco-ordination details.
4	Cloud Database	DBaa Services, provide network access.	creating IBM Watson IOT Platform

5	File Storage	Hierarchical storage requirements	IBM Block Storage or Other Storage Service or Local File system.
6	External API-1	Purpose of External API used in the application	Node-RED key API
7	External API-2	Purpose of External API used in the application	Aadhar API, to identify, verify passenger information.
8	Machine Learning Model	Need of Machine Learning Model	Object Recognition Model, QR Codegeneration,scanning and validation.
9	Infrastructure (Serve/Cloud)	Application Deployment on local and cloud system	Local, Cloud Foundry, etc.

Table-2: **Application Characteristics**

S.No	Characteristics	Description	Technology
1	Open Source Framework	List of Open-source frameworks used in application	Python, HTML Java Script, Angular JS and Node
2	Security Implementation	List of all the security/ access controls implemented.	Encryption, IAM Controls, etc
3	Architecture scalability	Justifies the scalability of architecture	Increasing database capacity and combining featuresfor easy accessibility.

4	Availability	Determining the availability of application.	Cookies are used for storing user data and to enhance the processing speed.
5	Performance	deducing consideration for the performance of the application.	Highly responsive servers are required to managenumber of requestsper second.

5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Passenger	Registration	USN-1	As a passenger, I want to create a login credentials so I can securely access myself service online account.	Input data fields to enter: 1.Username/email 2.Password 3.Re-enter password 4.Security question 5.Security answer	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for creating an account.	I can receive confirmation email & click confirm.	High	Sprint-1
		USN-3	As a user, I can also create an account using Google.	I can register & access my account by using Google Login details.	High	Sprint-2
		USN-4	As a user, I can also create an account using social media accounts.	I can register & access my account by using social media login details.	Medium	Sprint-3
	Login	USN-5	As a user, I can login to the account by entering my email and password. As a user, I can reset my password if I have forgotten my password.	I can login to the system so that my information can only be accessed by me.	High	Sprint-1
	Account	USN-6	As a user, I can view my personal account. As a user, I can edit my Profile. .	I can use my personal account for booking process.	High	Sprint-1
Customer Care Executive		CCE-1	As a customer care executive, I can take complaints, answer calls from the customers regarding all the queries.	Pays attention to customer satisfaction to understand what services need improvements.	High	

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Administrator		ADMIN-1	As an administrator I receive an email notification when a new user is registered.	The admin has the control over the new user by receiving a notification. .	High	
		ADMIN-2	As an administrator I am able to add a new person to the database.	The admin has the ability to access the database.	Medium	
		ADMIN-3	As an administrator I am able to view content that to be viewed.	The details of the user should be given to the administrator when they request it.	Medium	

CHAPTER-6

PROJECT PLANING AND SCHEDULING

6.1SPINT PLANNING AND ESTIMATION

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

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 user data	10	High	Manuneethi Nithin
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application and can login to the application	10	High	Ganesh kumar Aswin
Sprint-2	Ticket Reservation and tracking	USN-3	As a user I can login and booktickets.	15	High	Nithin Aswin
Sprint-2		USN-4	As a user, I can track the exact location of the train	5	Medium	Ganesh Manuneethi
Sprint-3	Connection with service provider	USN-5	As a User , I can utilize the services like payment gateways by receiving OTPs	20	High	Manuneethi Nithin Ganesh kumar Aswin
Sprint-4	QR code generation	USN-7	As a user , I am able to get a QR code for ticket verification	20	High	Manuneethi Nithin Ganesh kumar Aswin

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

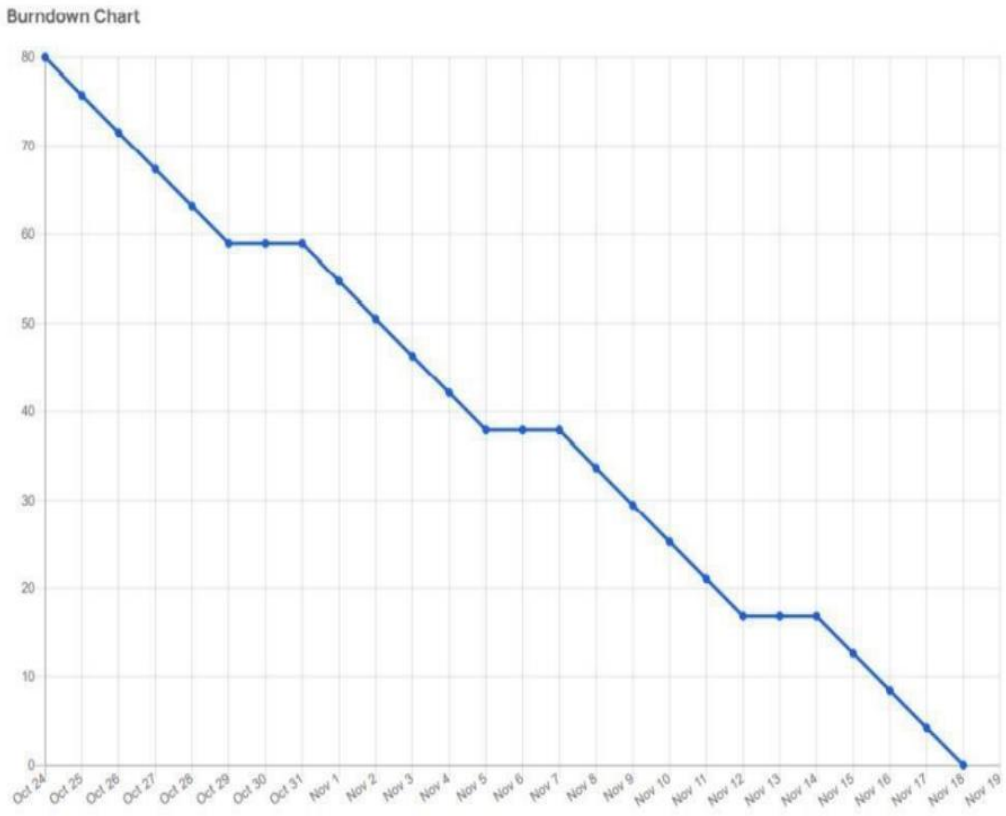
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022		
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022		
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022		
Sprint-4	20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

Velocity:

We have a 6-day sprint duration, and the velocity of the team is 20 (points per sprint). The team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{6} = 3.33$$

Burndown Chart:



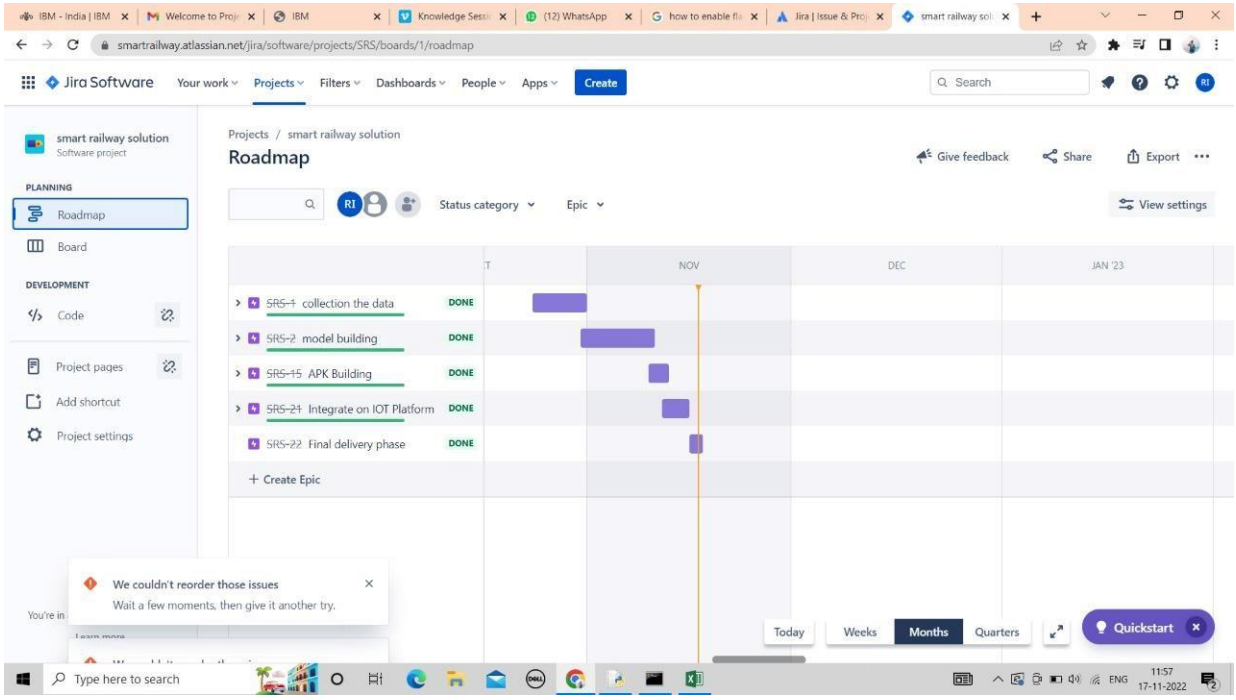
6.2 REPORTS FROM JIRA

JIRA is a software testing tool developed by the Australian Company Atlassian. It is abug tracking tool that reports all the issues related to your software or mobile apps. Theword JIRA comes from the Japanese word, i.e., "Gojira" which means Godzilla.

A) CREATE A ROADMAP IN JIRA SOFTWARE

- 1. Create a new Jira Software project or go to an existing project and then navigate to the sidebar and click Roadmap.
- 2. Click (+) create epic on the roadmap to create epics directly on yourroadmap.

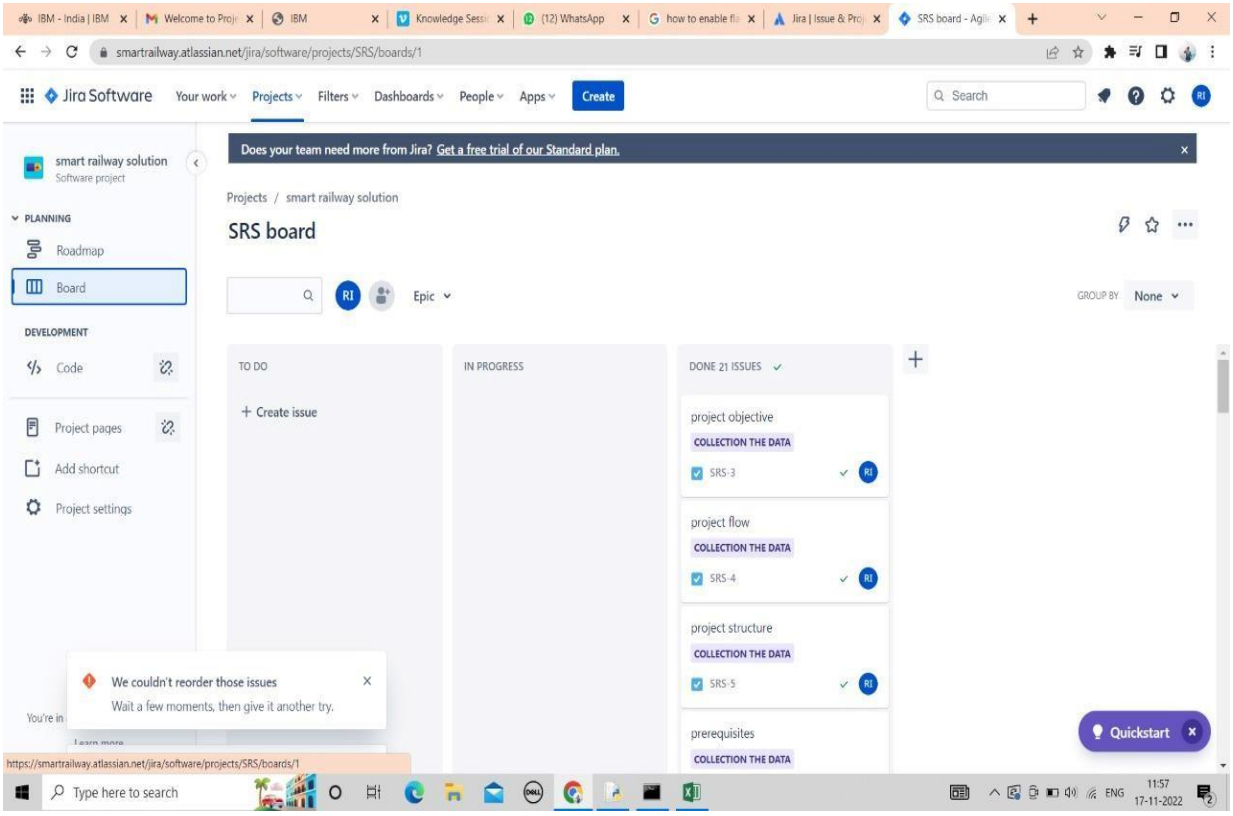
- 3. Name your epic and hit enter.
- 4. Add child-issues to your epic from the roadmap by clicking + next to the epic name.

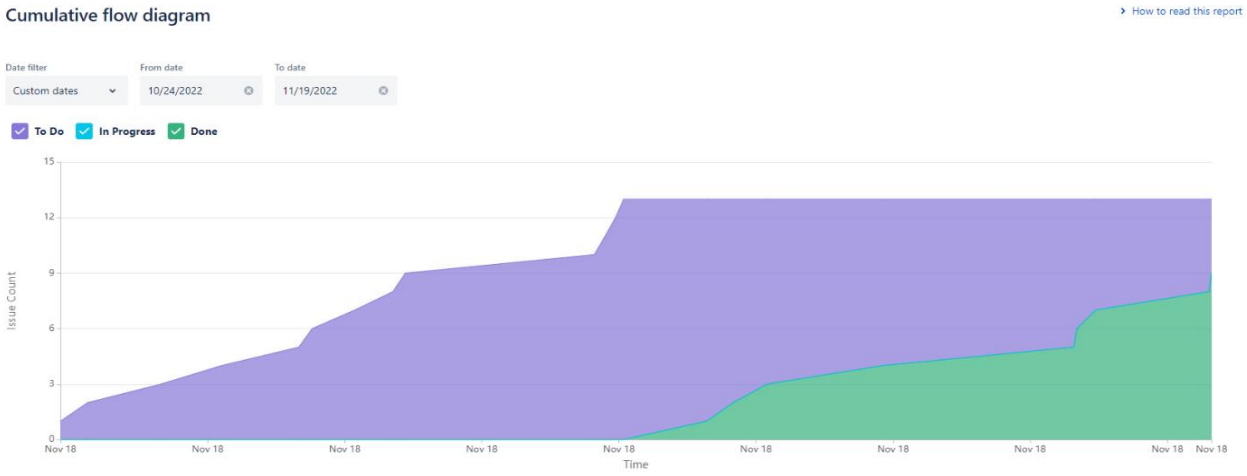


B) CREATE AN SRS BOARD IN JIRA SOFTWARE

The functions of Jira scrum board are listed below:

- Improve team focus and organization.
- Promote sprint planning and iterative development.
- Increase communication and transparency.
- **Improve Team Focus and Organization:** Normally teams will notremember the deadlines of the project because of their more...
- **Promote Sprint Planning and Iterative Development:** The min use ofthe scrum board is the sprint. This helps in giving a...
- **Increase Communication and Transparency:** Jira scrum board is the only tool where all the work of...


smartrailway.atlassian.net/jira/software/projects/SRS/boards/1
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
smart railway solution
Software project
PLANNING
Roadmap
Board
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
Does your team need more from Jira? Get a free trial of our Standard plan.
Projects / smart railway solution
SRS board
Epic
GROUP BY None
TO DO
+ Create issue
IN PROGRESS
DONE 21 ISSUES
project objective
COLLECTION THE DATA
SRS-3
project flow
COLLECTION THE DATA
SRS-4
project structure
COLLECTION THE DATA
SRS-5
prerequisites
COLLECTION THE DATA
We couldn't reorder those issues
Wait a few moments, then give it another try.
Quickstart
https://smartrailway.atlassian.net/jira/software/projects/SRS/boards/1
Type here to search
ENG
11:57
17-11-2022


Cumulative flow diagram
How to read this report
Date filter
Custom dates
From date
10/24/2022
To date
11/19/2022
To Do
In Progress
Done
Issue Count
15
12
9
6
3
0
Nov 18
Time

CHAPTER-7

TESTING

				14-Nov-22		
				PNT2022TMID08702		
				Smart Solutions for Railways		
				4 marks		
Test case ID	**Feature Type**	**Component**	**Test Scenario**	**Steps To Execute**	**Test Data**	**Expected Result**
1	Functional	Registration	Registration through the form by Filling in my details	1.Click on register 2.Fill the registration form 3.click Register	Username: MANU password: admin	Registration form to be filled i displayed
2	UI	Generating OTP	Generating the otp for further process	1.Generating of OTP number	GENERATED OTP : 536328	user can register through pho numbers and to get otp numb
3	Functional	OTP verification	Verify user otp using mail	1.Enter gmail id and enter password 2.click submit	Username: MANU password: admin	OTP verifed is to be displayed
4	Functional	Login page	Verify user is able to log into application with InValid credentials	1.Enter into log in page 2.Click on My Account dropdown button 3.Enter InValid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: MANU password: admin	Application should show 'Inco email or password ' validation message.
				1.As a user, I can enter the start and	Username: Manu	A user can view about the ava

Test case ID	**Feature Type**	**Component**	**Test Scenario**	**Steps To Execute**	**Test Data**	**Expected Result**
4	Functional	Login page	Verify user is able to log into application with InValid credentials	1.Enter into log in page 2.Click on My Account dropdown button 3.Enter InValid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: MANU password: admin	Application should show 'Inco email or password ' validation message.
5	Functional	Display Train details	The user can view about the available train details	1.As a user, I can enter the start and destination to get the list of trains available connecting the above	Username: Manu password: admin	A user can view about the ava trains to enter start and destir details

Date	15/11/2022
Team ID	PNT2022TMID08702
Project Name	Project - smart railways
Maximum Marks	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Acti
TC-007	generation	qr code generation	verify the generation QR code	login and seletion process , net banking	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login 5.fill required details to select destination , seats 6. click submit to book tickets	nil	QR code generation	working
TC-008	notification manager	notification manager	verify notification	generation QR code	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login 5.fill required details to select destination , seats 6. click submit to book tickets 7. qr code generation	nil	display-"ticket has been confirmed"	working
TC -009	functional- login page	Login page	verify the forgot password	internet, device to handle	1.Enter URL and click go 2 . click forget password 3. create user name and password	sample user name and password	create new password	working
TC-010	UI- home page	home page	display help	logged in	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login	nil	onclick help button	working

Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets
verify the generation QR code	login and seletion process , net banking	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login 5.fill required details to select destination , seats 6. click submit to book tickets	nil	QR code generation	working as expected	pass	all clear to proceed
verify notification	generation QR code	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login 5.fill required details to select destination , seats 6. click submit to book tickets 7. qr code generation	nil	display-"ticket has been confirmed"	working as expected	pass	all clear to proceed
verify the forgot password	internet, device to handle	1.Enter URL and click go 2 . click forget password 3. create user name and password	sample user name and password	create new password	working as expected	pass	all clear to proceed
display help	logged in	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login	nil	onclick help button	working as expected	pass	all clear to proceed

7.1 USER ACCEPTANCE TESTING

Acceptance Testing

UAT Execution & Report Submission

Date	17 November 2022
Team ID	PNT2022TMID08702
Project Name	IOT-smart solution for railways
Maximum Marks	4 Marks

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	11	4	2	3	20
Duplicate	0	0	4	3	7
External	3	2	0	1	6
Fixed	9	4	3	15	31
Not Reproduced	0	0	1	0	1
Skipped	1	1	1	3	6
Won't Fix	0	3	2	1	6
Totals	24	14	14	26	77

3. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

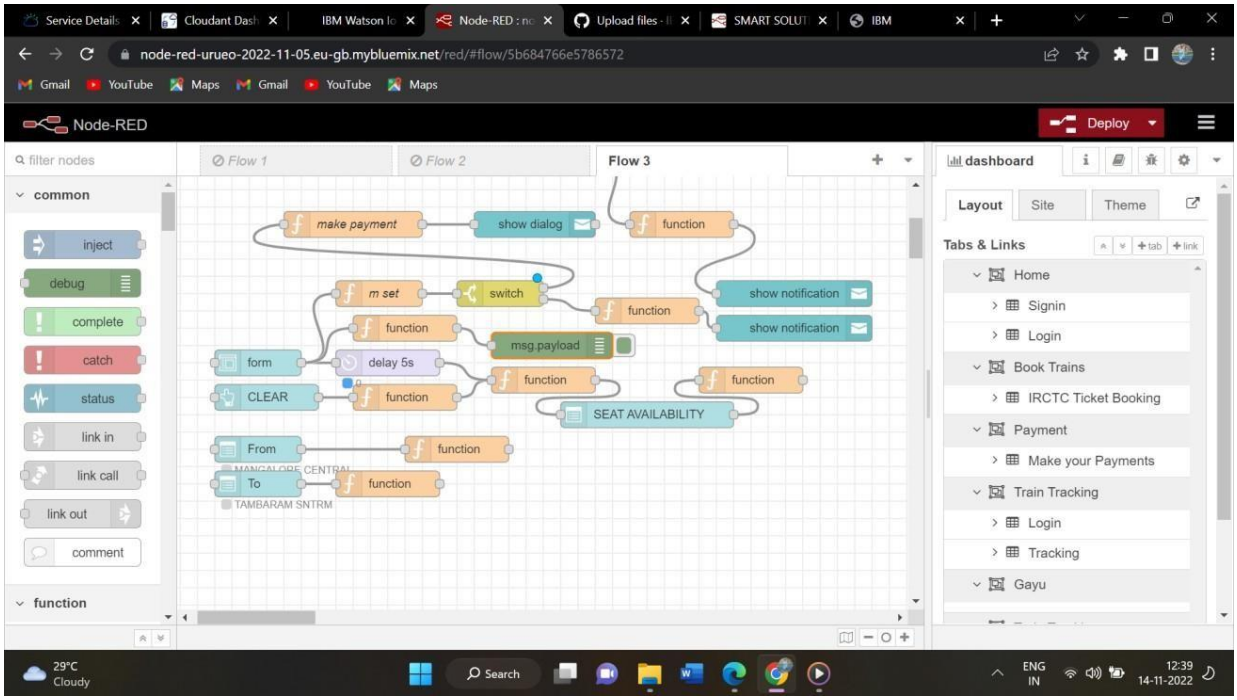
Section	Total Cases	Not Tested	Fail	Pass
Functional	2	0	0	2
UI	2	0	0	2
Verification	1	0	0	1
Notification manager	1	0	0	1
Payment process	1	0	0	1
Generation	1	0	0	1

CHAPTER-8

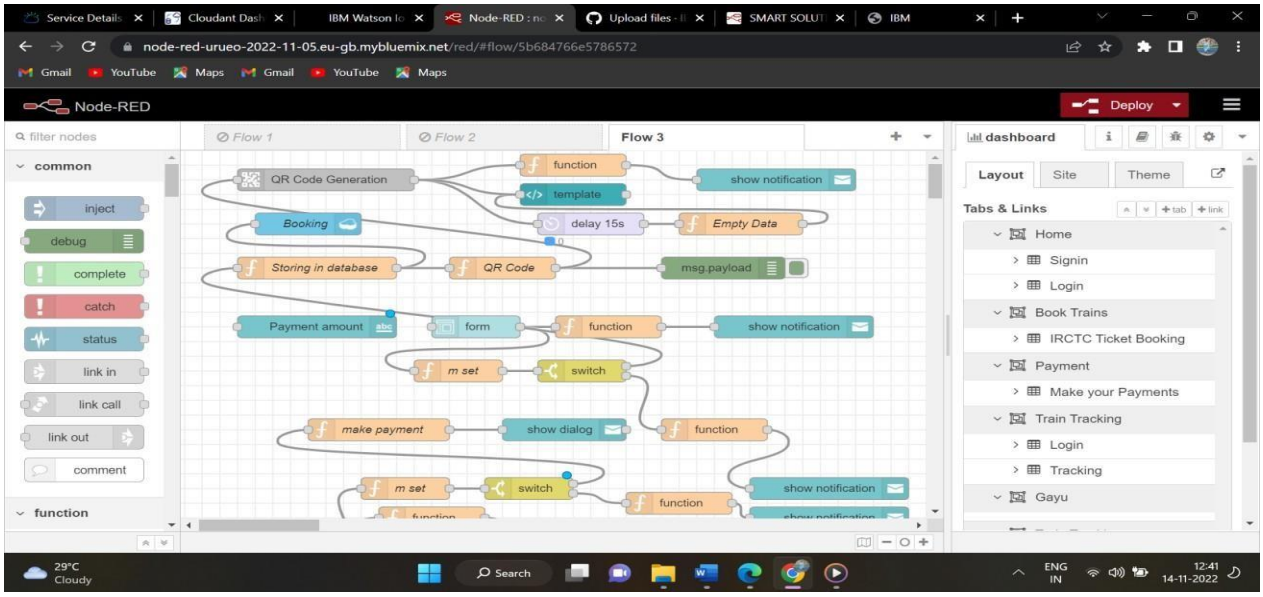
RESULTS

8.1 PERFORMANCE METRICS

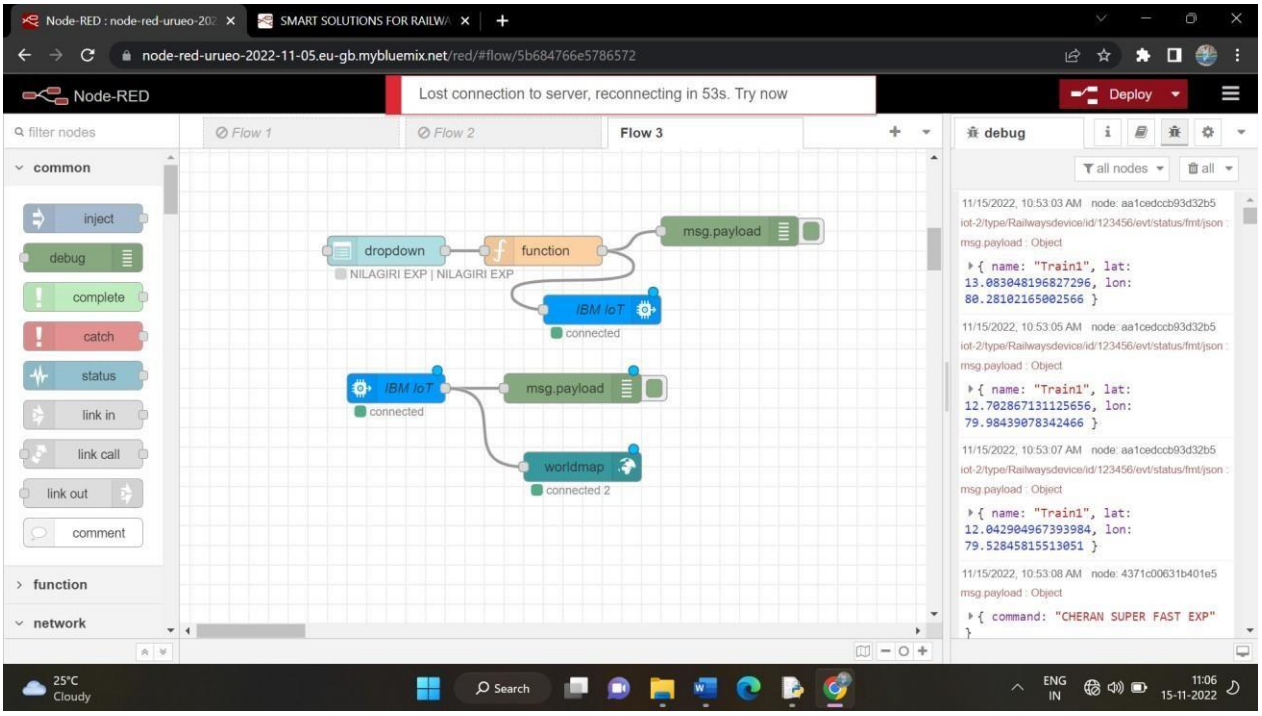
A) NODE-RED FLOW FOR TICKET BOOKING



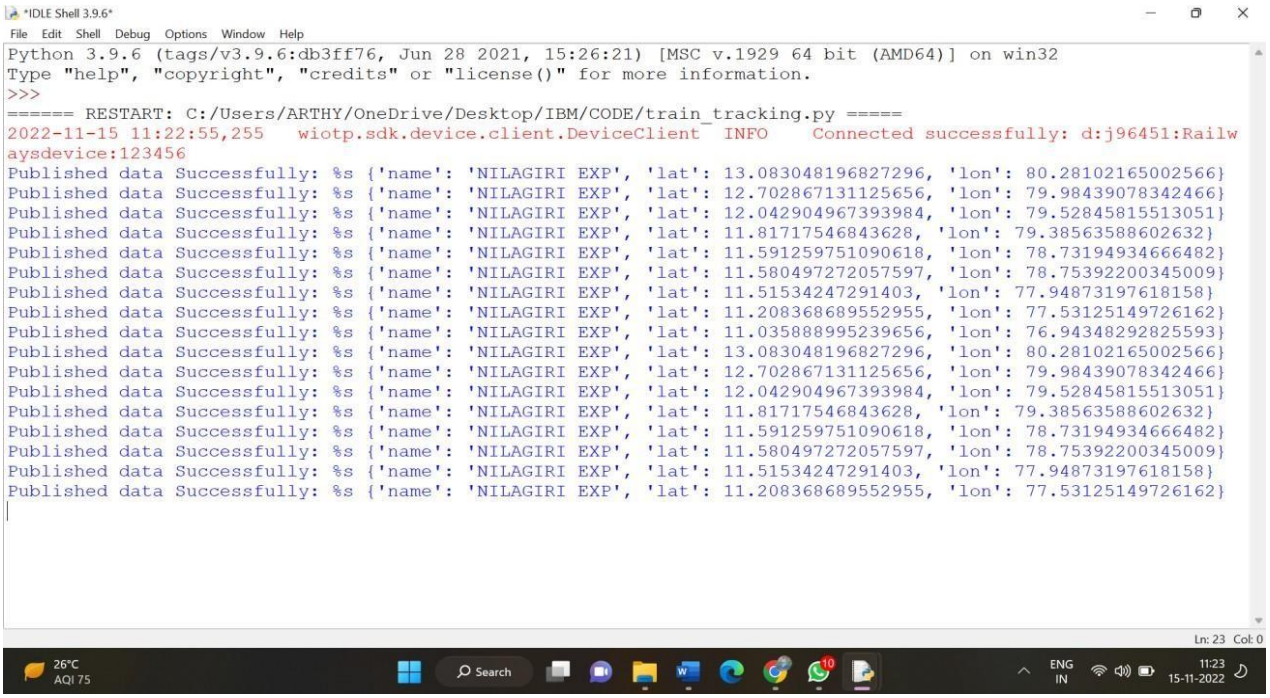
B) NODE-RED FLOW FOR PAYMENT



C) NODE-RED FLOW FOR TRAIN TRAKCING



8.2) PYTHON OUTPUT



CHAPTER-9

ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- No need of taking print out.
- Counter ticket has to be handled with care, but SMS on mobile is more than enough.
- You are becoming environment friendly and contributing for greener planet by ignoring printout.
- Making use of technology which urges companies (govt./private) to have more advancement in technology for better provision of services to customers.
- No need of taking out wallet and showing your ticket to TTE,just tell your name to TTE that you are passenger with a valid proof.
- While booking counter ticket you had to carry cash and while booking E- ticket you are paying through online directly from bank which makes work easier for you.

DISADVANTAGES:

Main disadvantage of railway reservation system is that we are not sure of getting a berth of our choice after first day of reservation in 120-day advance reservation period. This makes most of senior citizens women with infants and small children who are badly in need of lower berth at the mercy of other passengers.

CHAPTER-10

CONCLUSION

Smart Solutions for railways are designed to reduce the work load of the user and also the use of paper automation has affected every aspect of our daily lives. More improvements are being introduced in almost all fields to reduce human effort and save time. There will an app for the public through which they can book tickets by seeing the available seats. After booking the person will get a QR code which has to be shown to the Tickets Collector at boarding. He scans the QR code to identify the personal details. Through this app the traveller can order the food, the pantry section will get the notification of order. A GPS module is present in the train to track it. The live status of the journey is updated in the app continuously. The user can set a notification for intimation the train live status for both boarding and destination stations.

Thus, we conclude that our project helps to book tickets in the online website at any place and to track the live location of the train. We can reduce the paper work and work load for the users and railway authentication.

CHAPTER – 11

FUTURE SCOPE

This project has a large scope as it has the following features which helps in making it easy to use understand and modify it

1.Automation of reservation status.
2.No need to do paper work.
3.To save the environment by using paper free work.
4.To increase the accuracy and efficiency of software.
5.Management of online database.
6.Management of online payment.

This web application can be readily used by non-programming personal avoiding human handled chance of error. This project is used by three types of users

1.Railway administrators
2.Authorized railway reservation counters.

Main points are:

- Simplified management of passengers
- Can be used online
- Online payment system
- Human friendly interface

CHAPTER –12

APPENDIX

SOURCE CODE

PYTHON CODE FOR GPS

```
import wiotp.sdk.device
import time
import random
myConfig = {
        "identity": {
                "orgId": " 12s377",
                "typeId": " Raspberry",
                "deviceId":" 123"
        },
        "auth": {

                "token": " 12345678"
        }
}

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':13.08363 ,'lon': 80.27080}pub

        (myData)
```

```
time.sleep (2)
myData={'name': 'Train2', 'lat': 12.40797,'lon': 79.81410}pub
(myData)
time.sleep (2)

myData={'name': 'Train1', 'lat': 11.83331,'lon':
79.37465}pub(myData) time.sleep(6)

myData={'name': 'Train1', 'lat': 11.59664,'lon': 78.69899}pub
 (myData)
time.sleep (6)


myData={'name': 'Train1', 'lat': 11.63431,'lon': 78.11122}pub
(myData)
time.sleep (6)

myData={'name': 'Train1', 'lat': 11.32207,'lon': 77.61684}pub
 (myData)
time.sleep (6)

myData={'name': 'Train1', 'lat': 11.03107,'lon': 76.96864}pub
(myData)
time.sleep (6)

client.commandCallback = myCommandCallbackclient.disconnect ()
```

CODE FOR QR SCANNER

```
import cv2

import time

import numpy as np

import pyzbar.pyzbar as pyzbar

from ibmcloudant. cloudant_v1 import CloudantV1 from

ibmcloudant import CouchDbSessionAuthenticator

from ibm_cloud_sdk_core.authenticators import BasicAuthenticator

authenticator = BasicAuthenticator('apikey-v2-
l2fbdnxi81dzhqd35dh2stpxiddi2a7r9xzn7o4yslc','bd447d6dce6b242650b50a0598fb7bec')

service=CloudantV1(authenticator=authenticator)
```

```
service.set_service_url('https://apikey-v2-
l2fbdnxi81dzhqd35dh2stpxiddi2a7r9xzn7o4yslc:bd447d6dce6b242650b50a0598fb7bec@0000ea1a-
955f-48ed-aeb9-e6679f14408a-bluemix.cloudantnosqldb.appdomain.cloud')

cap = cv2.VideoCapture(0)

font = cv2.FONT_HERSHEY_PLAIN

while True:

_, frame=cap.read()

decodedObjects=pyzbar.decode(frame)for obj in

decodedObjects:

#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)
```

PROJECT DEMONSTRATION LINK

https://youtu.be/gl1c3rBMjRo

PROJECT GitHub LINK

https://github.com/IBM-EPBL/IBM-Project-6894-1658842173