LOCOMOTIVE

Online Railway Reservation System

POC & LLD

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0.0 DOCUMENT APPROVAL

Approvers of this document

Name	Department	Role	Signature	Date

Document Change history

Document Version	Author	Date	Description
1.00	Soumyadip Mukherjee	10/07/2022	Initial Creation of the LLD.

1.0 Document Purpose

The documents contain a detailed description of the solution architecture of the Online Railway Ticket Reservation System.

2.0 Intended Audience

Role	Nature of Engagement in the Online Railway Reservation System Architecture
Product Owner/SME	Key stakeholder to ensure that the architecture is aligned with business goals.
Business Analysts	Business analysts are one of the stakeholders who are informed with the key architectural decisions.
Enterprise Architects	To enforce Customer management Platform Architecture is aligned to business goals and architecture, architectural guidelines.
Solution Architects	To ensure solution design and architecture is aligned to business requirements, architectural guidelines.
Developers	Use Technical Architecture Document as the guiding document for detail design and implantation approach to align with Customer management Microservice
End-User	An End- user can check the train timings, train fares and other trains information and book/cancel a ticket.

3.0 Project Background & Objectives

3.1 Project Background

Online Railway Reservation System leads to perform Management of railway ticket booking details where one can register themselves and perform various operations related to railway ticket booking.

3.2 Project Objectives

Online Railway Reservation System will perform various operations like reservation, cancellation of ticket Details.

The user of this system should first register for any interaction with the system. Once registered, he/she will be provided with an email and password for the user to log in. After logging in the user should select the kind of activity, he would like to perform like booking a ticket, cancelling a ticket, look out for help and so on.

3.3 System Requirements

3.3.0 Development Environment

1. Database: Microsoft SQL Server Management Studio 18
2. Operating System: Windows 10 or higher
3. SDK and IDE: .NET 5, Visual Studio 2019 or Higher, Visual Studio Code
4. Web Browser: Latest Browser
5. Internet Connectivity
6. 8 GB RAM (Recommended)
7. Minimum 4 GB of free storage
8. Processor – 2 GHz or higher

3.3.1 Testing Environment

9. Database: Microsoft SQL Server Management Studio 18
10. Operating System: Windows 10
11. SDK and IDE: .NET 5, Visual Studio 2019 or Higher, Visual Studio Code
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14. 8 GB RAM (Recommended)
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3.3.2 Hosting Environment

1. Web Browser: Latest Browser
2. 8 GB RAM (Recommended)
3. Minimum 4 GB of free storage
4. Processor – 2 GHz or higher

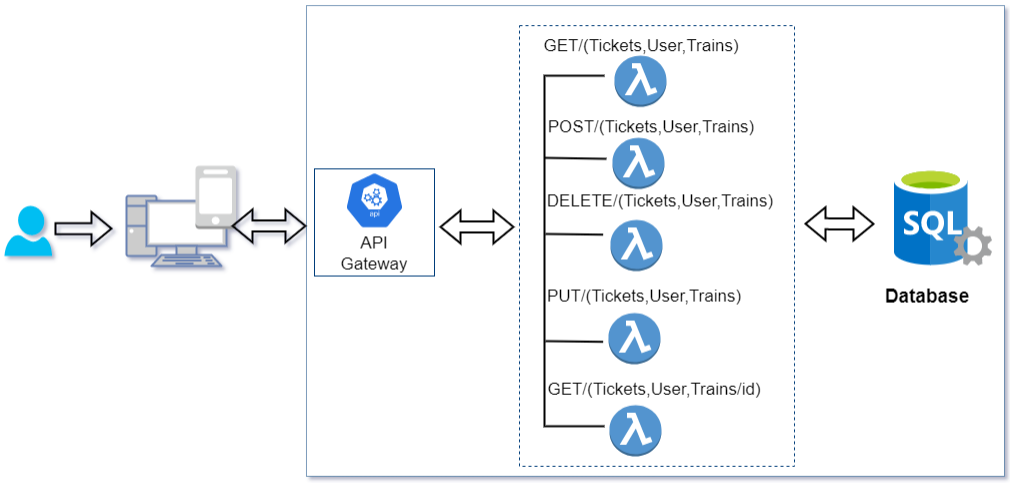
3.4 Technologies Used

1. Angular 10
2. ASP .Net Web API (.NET Version 3.1)
3. Microsoft SQL Server Management Studio 18

4.0 Design Pattern

Serial no.	Name	Description
1	Angular	Creating a user interface (Front-end), and consuming API services.
2	Database	For storing, maintaining and accessing user, train and booking details.
3	API	Using HTTP requests, we will use the respective action to trigger various operations

5.0 Solution Diagram



6.0 Solution Steps

6.1 User

Registering User

1. User will be able to register himself by entering the details like Name, age, sex, address, Phone, email and Password.
2. After filling the user credentials the form is validated.
3. If the validation is successful, by clicking the submit button browser directs the request to customer registration API.
4. The call reaches the API gateway.
5. API gateway does the routing and saves the data in the database.
6. Once a user is successfully registered an alert is displayed and the user is redirected to the login page.

Viewing Train and Fare Details

1. User will be able to view trains without logging in.

2. User can view trains by providing Destination Station, Arrival Station and date of journey.
3. Call reaches the API gateway.
4. **GetTrains(parameter1, parameter2,parameter3)** is invoked.
5. If the trains are found with the given parameters it is displayed along with their fare, to the user otherwise an alert ('No trains found') is displayed.

Booking of tickets

1. After a user found their suitable train, the user will click on Book Now button.
2. In order to book the train, the user will have to log in first.
3. The user will be redirected to the Log in page where they can fill their details and if they do not have an account they can click on Sign-up.
4. Once the user is logged in, they can add passenger (max. 6 at a time).
5. Once the passengers are added fare details are updated and displayed to the user.
6. The user can then Pay and Book a ticket.
7. An alert is shown after successful booking.
8. A user can track their booking status by clicking on bookings.
9. The API will then getUserBookings() by user ID.

Cancellation of tickets

1. User can also cancel a booked ticket if they require.
2. When the user clicks on booking and sees their status there will be a cancel button.
3. After clicking on cancel button an alert is displayed ('Are you sure you want to cancel?')

6.2 Admin

1.Admin will be able to edit and add new train, add news Classes in trains and fare details and get report of all the Passengers for a particular train.

2.GetAllTrains() will let the admin view all the train details.

3.GetCustomerById() will allow Admin to view customer details by ID.

7.0 Classes/Functions

Serial no.	Class	Description

1	Model Class	Model for holding the booking schema details for user, train, booking, ticket and transaction respectively.
2	Repository	The Interface in Data Access Layer for the user, train, booking, ticket and transaction model respectively.
3	Controller	Controller handles the incoming HTTP requests and send the response back to the caller.
4	Services	It's the Business Access Layer holding the Business Logic and meditates the communication between the controller and repository (Data Access) Layer.

8.0 Database Diagram

User Table

Sl no.	Name	Type
1 (PK)	**UserID**	**Numeric**
2	**Name**	**Varchar(50)**
3	**Email**	**Varchar(50)**
4	**Address**	**Varchar(100)**
5	**Mobile**	**Varchar(10)**
6	**Password**	**Varchar(20)**
7	**isActive**	**Boolean**

Booking Table

Sl no.	Name	Type
1 (PK)	**BookingID**	**Numeric**
2 (FK)	**TrainID**	**Numeric**
3 (FK)	**UserID**	**Numeric**
4	**Classes**	**Varchar(20)**
5	**Date**	**Date Time**
6	**Status**	**Varchar(20)**
7	**SeatNum**	**Numeric**
8 (FK)	**PassengerID**	**Numeric**
9	**Fare**	**Decimal(10,2)**

Train Table

Sl no.	Name	Type
1 (PK)	**TrainID**	**Numeric**
2	**Name**	**Varchar(50)**
3	**Arrival Time**	**Varchar(20)**
4	**DepartureTime**	**Varchar(20)**
5	**Arrival Date**	**Date Time**
6	**Departure Date**	**Date Time**
7	**Arrival Station**	**Varchar(20)**
8	**Departure Station**	**Varchar(20)**
9	**Distance**	**Decimal(10,2)**
10	**isActive**	**Boolean**

Transaction Table

Sl no.	Name	Type
1 (PK)	**TransactionID**	**Numeric**
2 (FK)	**BookingID**	**Numeric**
3	**Fare**	**Decimal(10,2)**
4	**Status**	**Varchar(20)**

Passenger Table

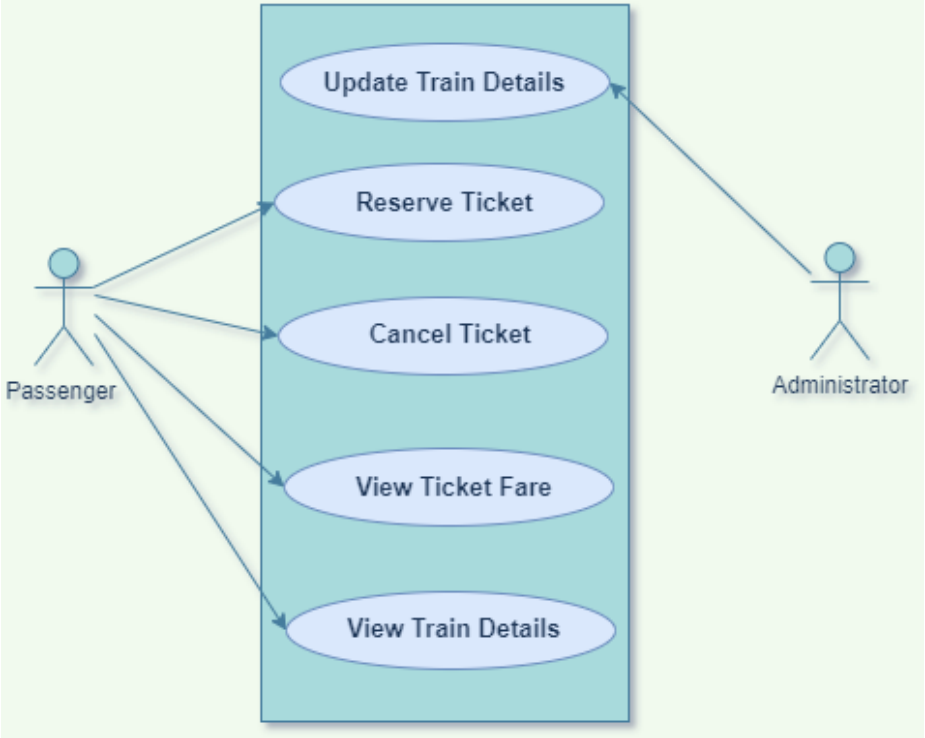
Sl no.	Name	Type
1 (PK)	**PassengerID**	**Numeric**
2 (FK)	**UserID**	**Numeric**
3	**Name**	**Varchar(20)**
4	**Age**	**Varchar(20)**
5	**Gender**	**Varchar(20)**
6	**Class**	**Varchar(20)**

Seat Table

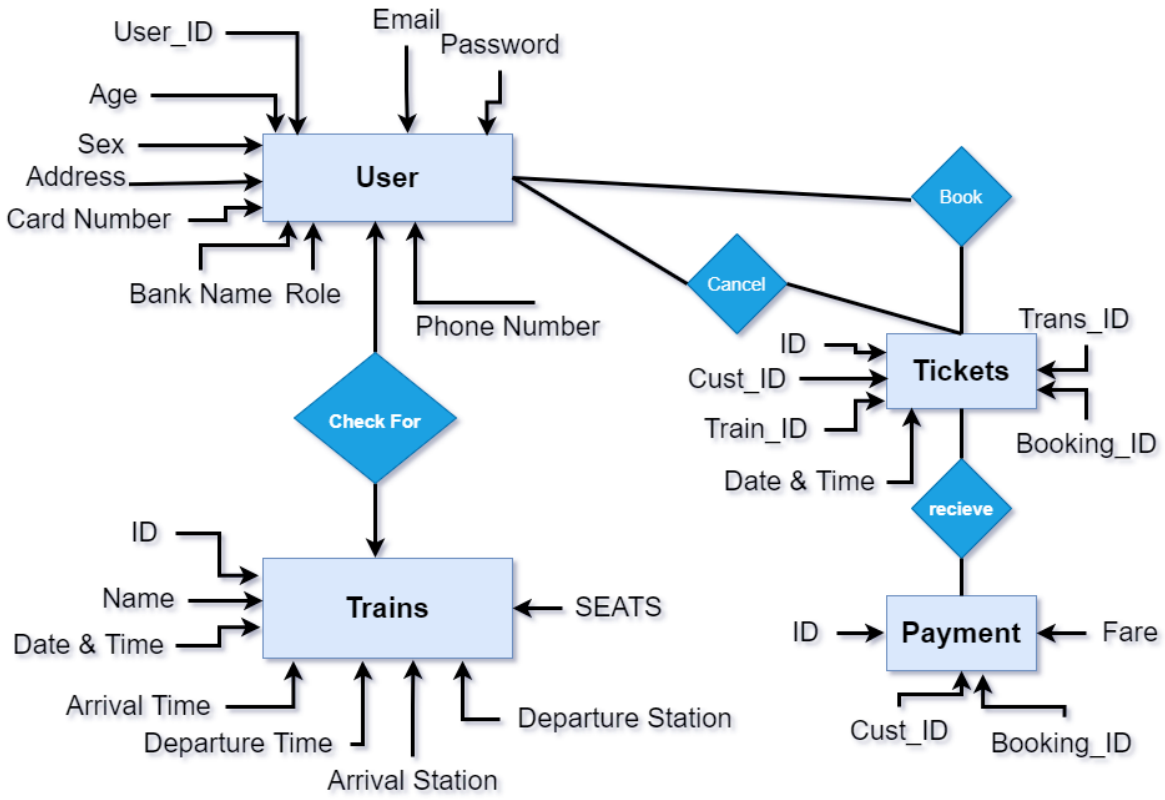
Sl no.	Name	Type
1 (PK)	**SeatID**	**Numeric**
2 (FK)	**TrainID**	**Numeric**
3	**FirstAC**	**Varchar(20)**

4	**SecondAC**	**Varchar(20)**
5	**Sleeper**	**Varchar(20)**
6	**Total**	**Varchar(20)**

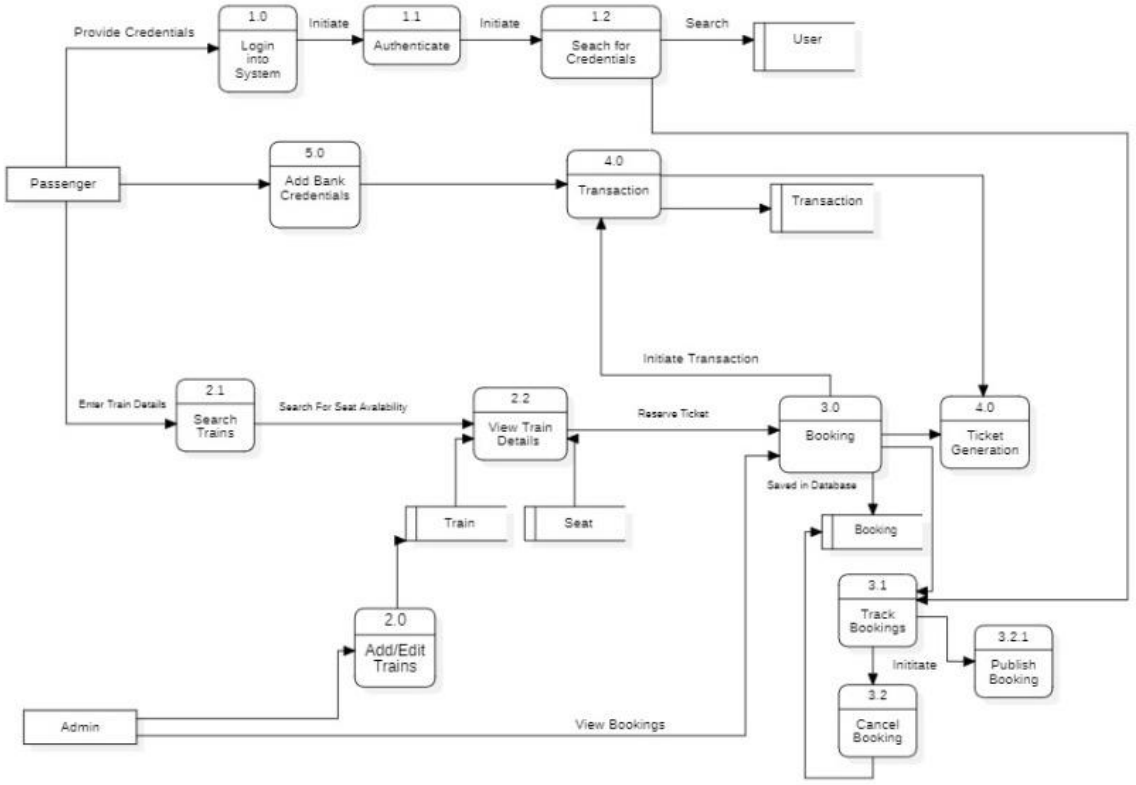
9.0 Use Case Diagram



10.0 Entity Relationship Diagram



11.0 Data Flow Diagram



12.0 API Canvas

12.1 User

Service	Path	Verb	API Description	Role	Auth
Customer-management	/Customer	POST	To register a customer	No	True

Customer-management	/Customer/Id	GET	To get a customer by Id	Admin	True
Customer-management	/Customer	GET	To get the list of customers	Admin	True

12.2 Booking

Service	Path	Verb	API Description	Role	Auth
Booking-management	/booking	POST	To reserve a ticket	No	True
Booking-management	/Booking/Id	DELETE	To delete a Booking	No	True
Booking-management	/Booking	PUT	To update Booking details	No	True
Booking-management	/Booking/Id	GET	To get the Booking Details by Id	No	True

12.3 Train

Service	Path	Verb	API Description	Role	Auth
Train-management	/train	POST	To add Booking	Admin	True

Train-management	/Booking/ID	PUT	To update the details of a train	Admin	True
Train-management	/train	GET	To get the list of the trains	No	True