Flight Booking App using MERN

1. Abstract

This project report presents a Flight Booking App designed to simplify and enhance the process of planning and managing air travel. The app provides users with the ability to search for flights in real-time, compare prices across airlines, book tickets, select seats, and receive digital confirmations. Built using the MERN stack (MongoDB, Express, React, and Node.js), the application ensures secure transactions, scalability, and user-friendly interfaces. Integration with third-party APIs for flight data and payment gateways offers a comprehensive solution for modern travel needs.

2. Introduction

Purpose of the Platform

The purpose of the Flight Booking App is to provide travelers with a streamlined, hassle-free experience in planning and booking flights. The app simplifies complex flight booking processes while ensuring user data and payment information are handled securely.

Problem Statement

The Flight Booking App addresses common challenges faced by travelers, including:

- The complexity of searching and comparing flights across multiple airlines.
- Inefficient booking processes that require multiple steps.
- Security concerns in handling personal and payment data.
- Limited options for managing bookings post-purchase.

3. Key Features

1. User Roles and Access Control

- **Customer**:
  Customers can search for flights, book tickets, manage bookings, and receive notifications about booking updates and flight status.

- **Admin**:
  Admins manage flight schedules, ticket pricing, customer accounts, and handle any disputes or cancellations.

2. Customer Functionalities

- **Flight Search**: Search flights based on source, destination, date, number of passengers, and budget.
- **Price Comparison**: Compare ticket prices from multiple airlines for better decision-making.
- **Booking Management**: Book tickets, select preferred seats, and manage trip details.
- **Notifications**: Receive email or SMS updates for booking confirmations, cancellations, or delays.
- **Profile Management**: Manage personal details, payment preferences, and travel history.

3. Admin Functionalities

- **Flight Data Management**: Add, edit, or remove flight schedules and pricing.
- **User Management**: Handle customer inquiries, accounts, and refund requests.
- **Content Oversight**: Monitor and manage promotional offers, notifications, and app updates.

4. Technical Architecture

Frontend

- **Framework**: React is used to build an interactive and responsive user interface.
- **UI Components**: Bootstrap and custom CSS are used for a user-friendly design.
- **Protected Routes**: JWT tokens ensure only authorized users can access sensitive pages.

Backend

- **Framework**: Node.js and Express handle server-side logic and API requests.
- **Authentication and Security**: JWT tokens secure user sessions and sensitive data.
- **Payment Integration**: Third-party payment APIs ensure smooth and secure transactions.
- **Flight Data API**: Integrate with airline APIs to fetch flight schedules, pricing, and availability.

Database

- **Database Choice**: MongoDB Atlas is used for storing user profiles, bookings, flight schedules, and transaction data.
- **Data Structure**: Models for customers, admins, bookings, and flight schedules.

5. Workflow

1. Customer Workflow

- **Step 1**: Sign up/Login -> Search for flights -> Compare prices -> Book a ticket.
- **Step 2**: Make payment -> Select seat -> Receive e-ticket and confirmation email.
- **Step 3**: View/manage bookings -> Cancel or modify if necessary.

2. Admin Workflow

- **Step 1**: Login -> Monitor user and booking activity -> Manage flight data.
- **Step 2**: Update schedules -> Handle user inquiries and refund requests.
- **Step 3**: Monitor analytics and app performance.

6. Security Measures

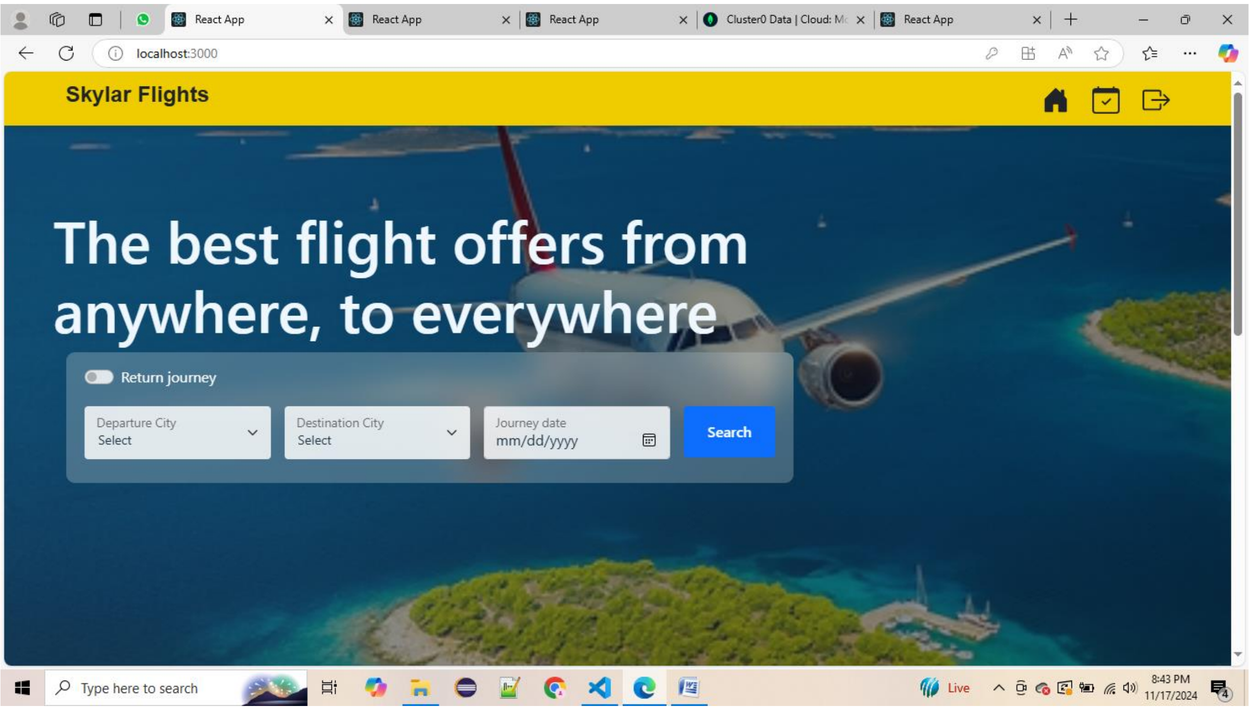
- **JWT Tokens**: Used for secure session management and to protect sensitive user data.
- **Password Hashing**: Ensures that all passwords are securely encrypted before storage.
- **Payment Security**: Integration with PCI DSS-compliant payment gateways for secure transactions.

7. Future Scope

- **Dynamic Pricing**: Real-time updates for ticket pricing based on demand and availability.
- **Loyalty Programs**: Introduce reward points for frequent users.
- **Multi-City Booking**: Allow users to book multi-leg flights in a single transaction.
- **Travel Insurance**: Option for customers to purchase insurance during booking.

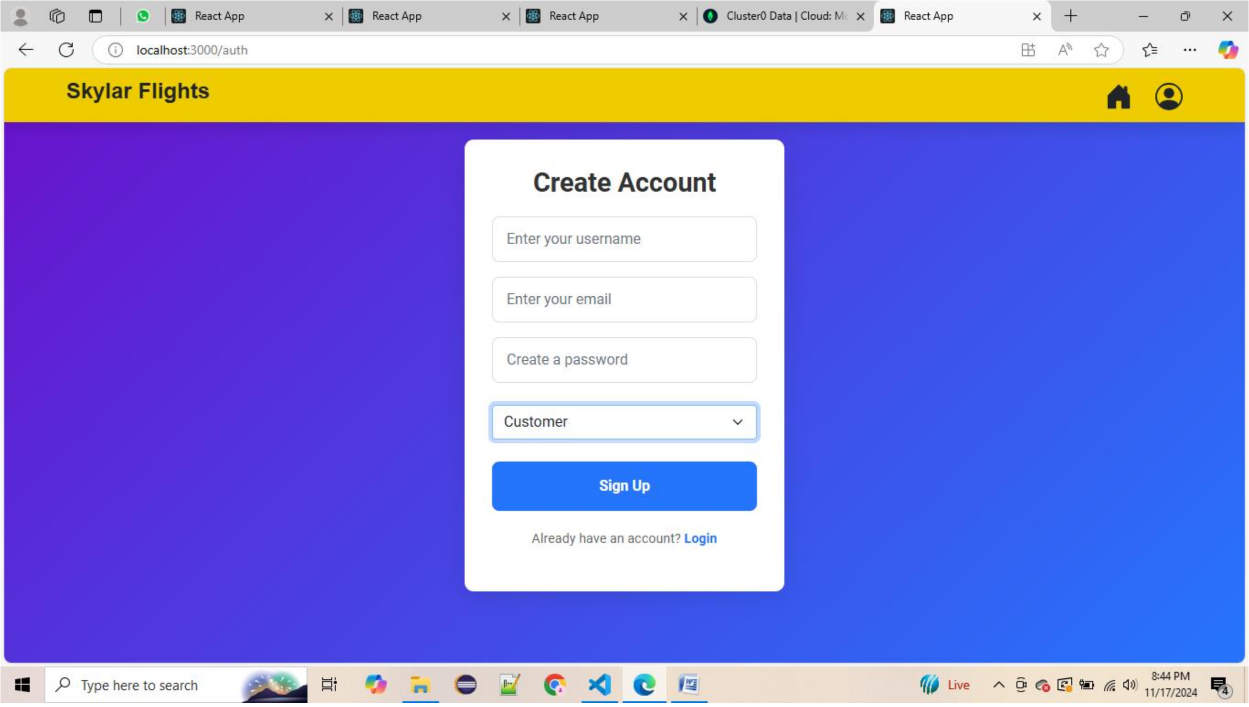
Output Screenshots

- **Landing Page**: Displays flight search options and promotional banners.



The best flight offers from anywhere, to everywhere

- **Customer Login**: Secure login page for customers.



Create Account

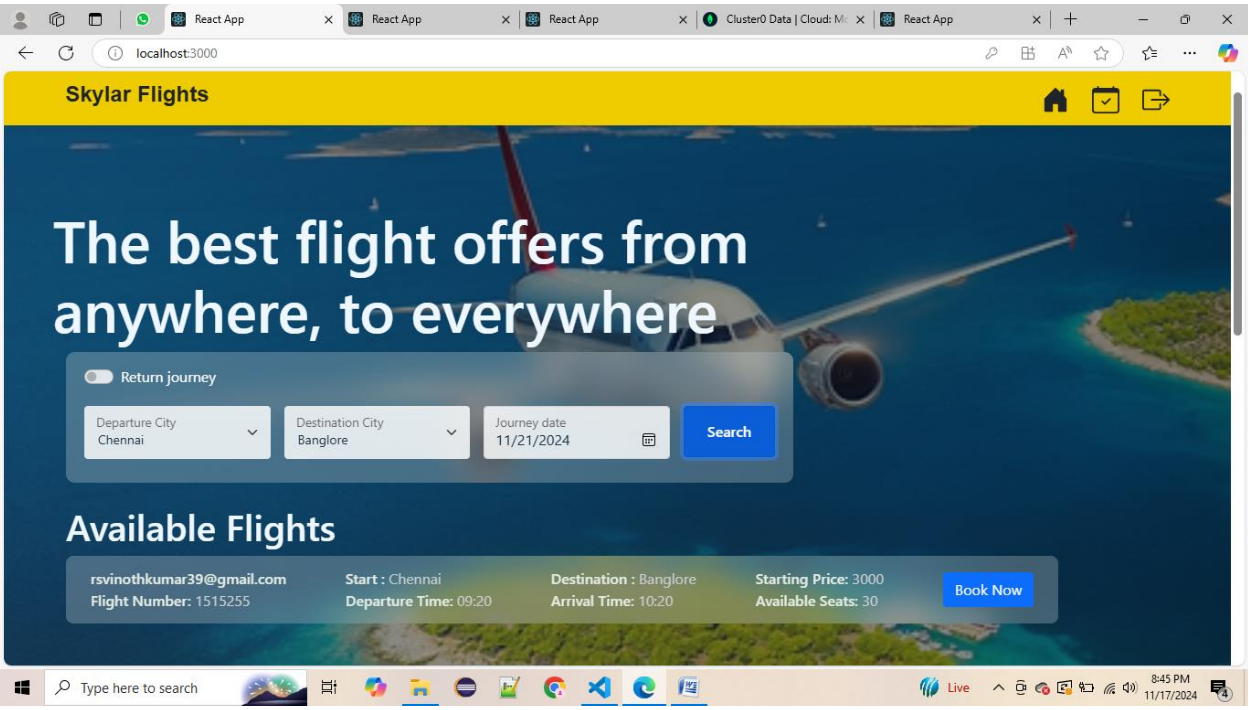
Enter your username

Enter your email

Create a password

Customer

- **Flight Search Results**: List of available flights matching user criteria.



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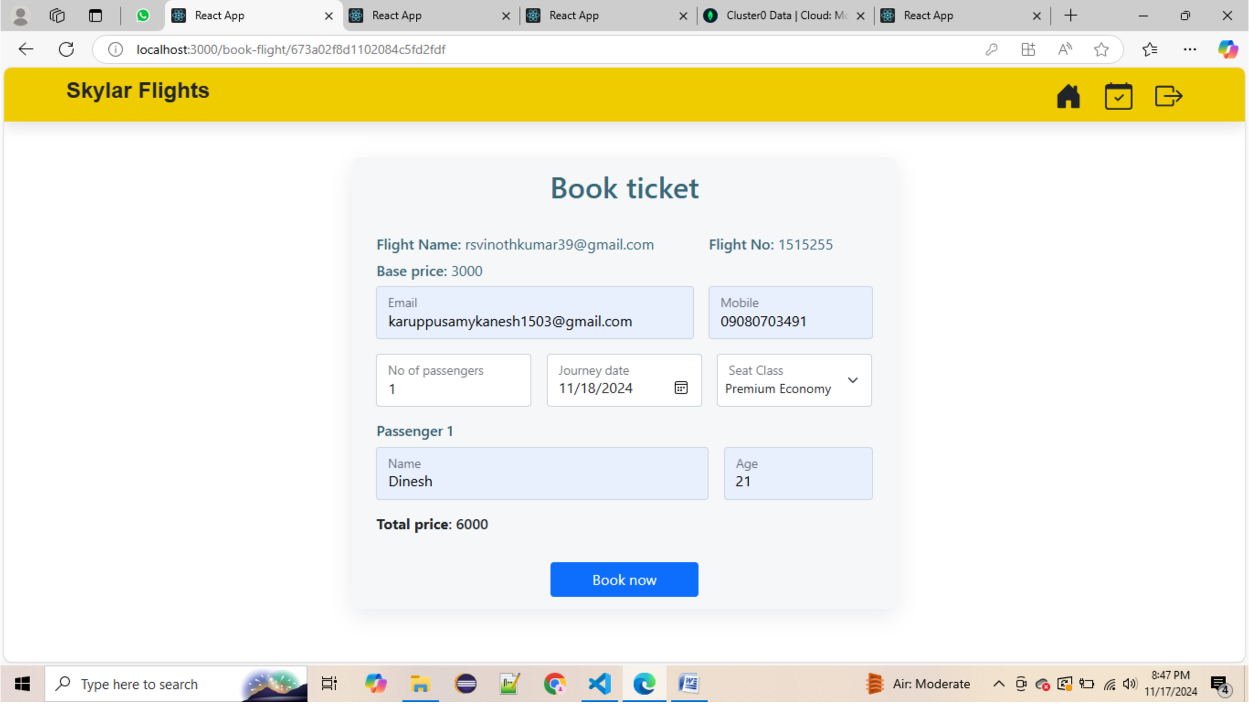
Return journey

Departure City: Chennai
Destination City: Banglore
Journey date: 11/21/2024

Available Flights

rsvinothkumar39@gmail.com
Flight Number: 1515255
Start : Chennai
Departure Time: 09:20
Destination : Banglore
Arrival Time: 10:20
Starting Price: 3000
Available Seats: 30

- **Booking Page**: Allows users to select seats, enter passenger details, and make payments.



Book ticket

Flight Name: rsvinothkumar39@gmail.com
Flight No: 1515255
Base price: 3000

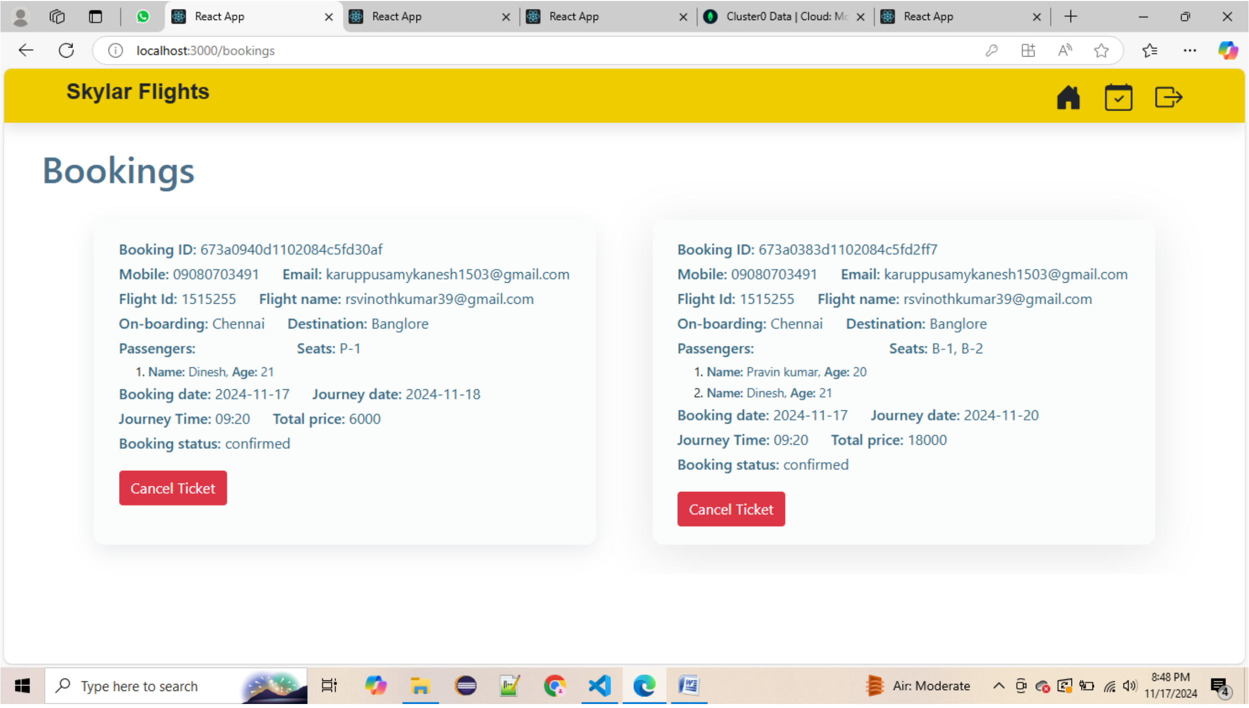
Email: karuppusamykanesh1503@gmail.com
Mobile: 09080703491
No of passengers: 1
Journey date: 11/18/2024
Seat Class: Premium Economy

Passenger 1

Name: Dinesh
Age: 21

Total price: 6000

- **Booking Confirmation Page**: Displays ticket details and downloadable e-ticket.



Skylar Flights

Bookings

Booking ID: 673a0940d1102084c5fd30af
Mobile: 09080703491 **Email:** karuppusamykanesh1503@gmail.com
Flight Id: 1515255 **Flight name:** rsvinothkumar39@gmail.com
On-boarding: Chennai **Destination:** Banglore
Passengers: **Seats:** P-1

1. **Name:** Dinesh, **Age:** 21

Booking date: 2024-11-17 **Journey date:** 2024-11-18
Journey Time: 09:20 **Total price:** 6000
Booking status: confirmed

Cancel Ticket

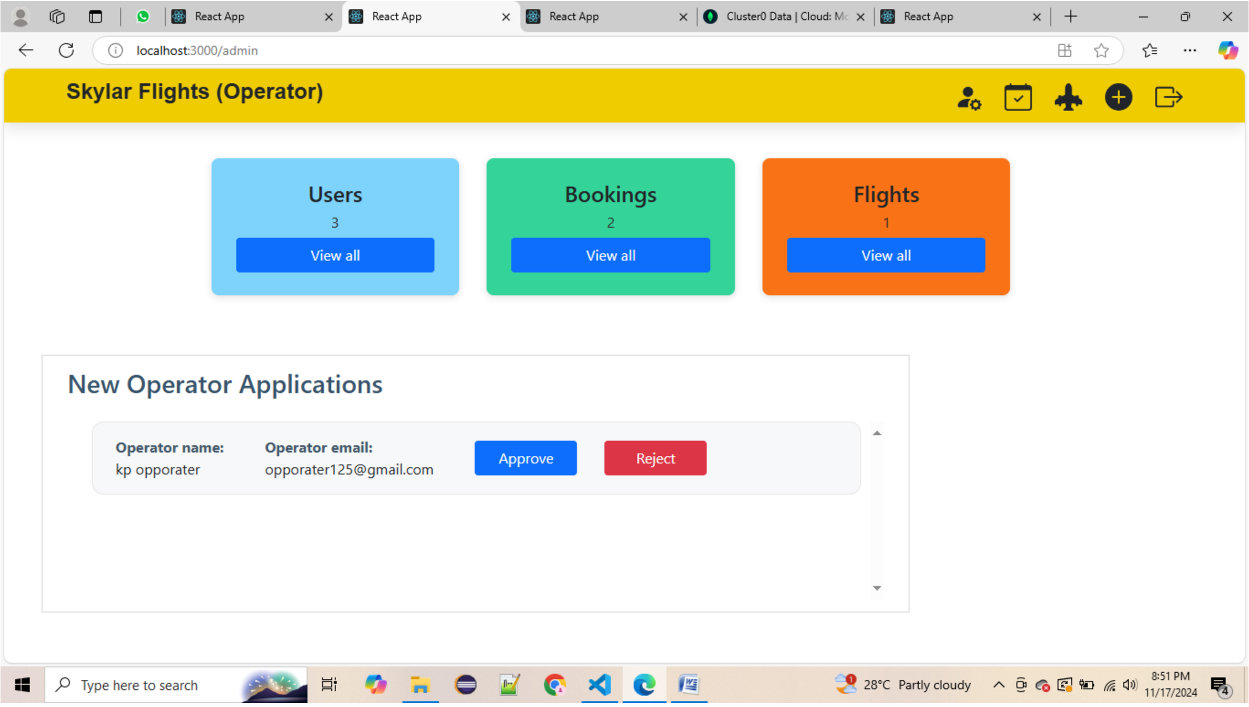
Booking ID: 673a0383d1102084c5fd2ff7
Mobile: 09080703491 **Email:** karuppusamykanesh1503@gmail.com
Flight Id: 1515255 **Flight name:** rsvinothkumar39@gmail.com
On-boarding: Chennai **Destination:** Banglore
Passengers: **Seats:** B-1, B-2

1. **Name:** Pravin kumar, **Age:** 20
2. **Name:** Dinesh, **Age:** 21

Booking date: 2024-11-17 **Journey date:** 2024-11-20
Journey Time: 09:20 **Total price:** 18000
Booking status: confirmed

Cancel Ticket

- **Admin Dashboard**: Overview of flights, bookings, and user activities.



Skylar Flights (Operator)

Users	Bookings	Flights
3	2	1
View all	View all	View all

New Operator Applications

Operator name: kp opporater **Operator email:** opporater125@gmail.com Approve Reject