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REPORT ON
MINI PROJECT

XENOS

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Course Name : Database Management System

Semester: IV SEM Section: C

Submitted To:

Dr. Pradeep Kanchan
Assistant Professor Gd-III
Department of CSE, NMAMIT

Submitted By:

NAME: Shaldon Barnes USN:NNM23CS172

NAME: Sharanya Aithal K.S. USN:NNM23CS177

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Signature of Course Instructor

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Shaldon Barnes
NNM23CS172

ABSTRACT

“XENOS” is a comprehensive airport operation management system designed as a database-driven application to efficiently streamline and manage core airport activities. It handles critical aspects such as flight schedules, passenger information, and reporting functionalities tailored for airport staff, employees, and crew members. By automating essential airport processes, XENOS enhances operational efficiency, ensures data accuracy, and strengthens overall security across the airport ecosystem.

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INTRODUCTION

Airports are complex environments that require efficient management systems to handle a wide range of operations , from flight scheduling to passenger handling and employee coordination. Traditional methods often involve manual processes that are time-consuming and error-prone.

XENOS is a database-driven Airport Operation Management System developed to streamline and automate essential airport activities. The system is designed to manage flight schedules, passenger details, employee data, and reporting functionalities. All in one unified platform. It ensures that airport staff, employees, and crew members can efficiently access, update, and manage the information relevant to their roles.

By integrating automation into key airport processes, XENOS improves operational efficiency, enhances accuracy, and ensures higher security standards. With a user-friendly interface and real-time data access, the system reduces manual workload and enables better coordination across various departments within the airport.

PROBLEM STATEMENT

Airports handle a vast amount of data and operations on a daily basis, including flight management, passenger processing, and staff coordination. Many existing systems used for airport operations are either fragmented, partially manual, or outdated, leading to inefficiencies, data inconsistencies, delays, and potential security risks.

The lack of a centralized, automated, and user-friendly system results in increased workload for airport staff, slower decision-making, and difficulty in accessing real-time information. This can directly impact airport performance, passenger satisfaction, and overall operational safety.

There is a clear need for a comprehensive airport operation management system that can centralize data, automate workflows, improve communication, and ensure the secure handling of sensitive information.

XENOS is proposed to solve these challenges by providing a database-driven platform that efficiently manages flight schedules, passenger details, staff operations, and reporting functionalities all in one place.

OBJECTIVES

The general objective of this project is to develop a reliable, centralized, and user-friendly Airport Operation Management System that automates and streamlines essential airport processes, enhancing efficiency, accuracy, and coordination among airport staff, employees, and crew members.

Specific objectives are:

1. 24×7 access to flight schedules, passenger data, and staff details
2. Organize flight and crew schedules more effectively
3. Reduce manual work for staff by automating data entry and reporting
4. Allow employees and crew to view their schedules and assignments anytime
5. Access the system through desktops, laptops, tablets, and mobile phones
6. Improve communication between departments through centralized data access
7. Minimize errors in data handling and improve operational accuracy
8. Manage multiple terminals, airlines, and departments within a single platform
9. Enhance security with role-based access control and secure login
10. Improve staff productivity by reducing paperwork and redundant tasks

HARDWARE/SOFTWARE REQUIREMENT

Hardware:

- 1.6GHz or faster processor
- At least 1GB of RAM
- Stable internet connection

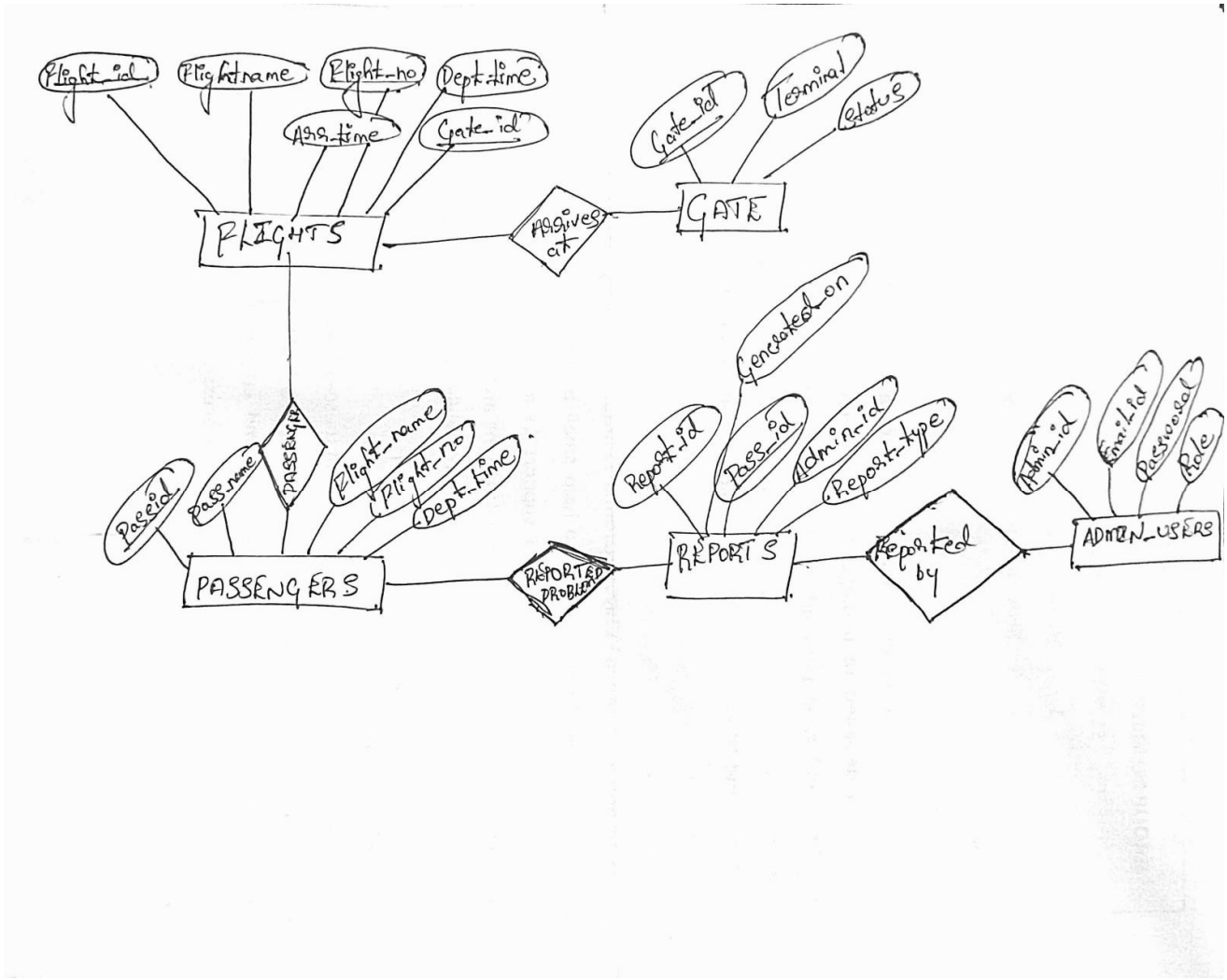
Software:

- Latest browser version recommended (Chrome, Firefox, etc.)
- VS CODE TEXT EDITOR installed

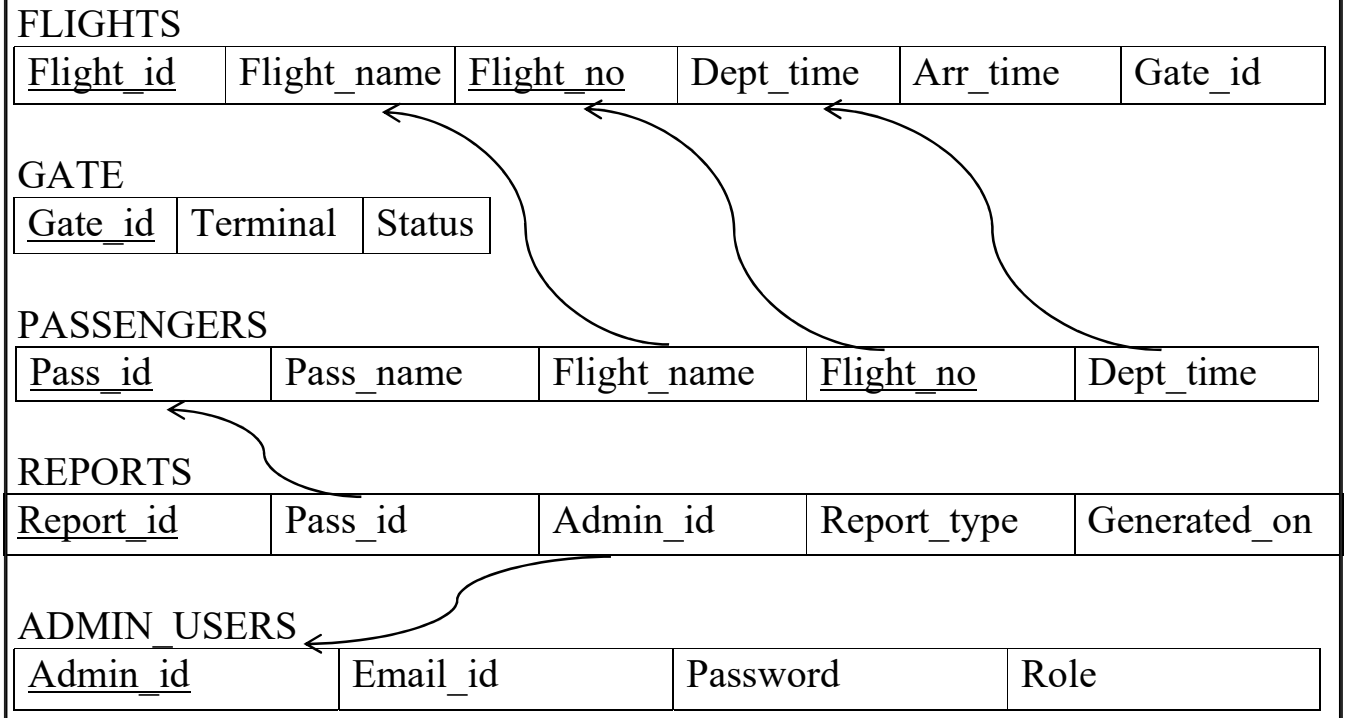
METHODOLOGY

The XENOS begins with a secure Sign In page, which serves as the entry point for all users. Users are required to log in using their registered email ID and password. Once successfully signed in, users are redirected to the Home Page, which serves as the central dashboard of the system. From the Home Page, users can navigate to various modules including Flights, Passengers, and Reports. The Flights page displays real-time data of all scheduled flights along with arrival/departure times, status updates, and destinations. Authorized users can add, modify, or delete flight records. The Passengers page allows viewing and managing of passenger details such as seat number, check-in status, and baggage information. The Reports page enables the generation of detailed reports on flight activity, passenger flow, and staff operations, which can be filtered by date or category and exported in various formats. The system features a role-based access model to ensure that only authorized personnel can view or manage specific data. Designed with a responsive interface, the platform is accessible across desktops, tablets, and mobile devices. All operations are supported by a centralized database, enabling real-time updates, data consistency, and efficient management of airport operations.

ER-DIAGRAM:


Flight_id
Flightname
Flight_no
Dept_time
Arr_time
Gate_id
FLIGHTS
Assigned at
GATE
Gate_id
Terminal
status
Passenger
Pass_id
Pass_name
Flight_name
Flight_no
Dept_time
PASSENGERS
Generated_on
Report_id
Pass_id
Admin_id
Report_type
REPORTS
REPORTED PROBLEM
Reported by
Admin_id
Email_id
Password
Role
ADMIN_USERS

SCHEMA DIAGRAM:



IMPLEMENTATION

The following software components need to be downloaded and installed to successfully run the **XENOS** project:

1. **Visual Studio Code (or any code editor)** can be downloaded and installed from https://code.visualstudio.com/.
2. **Node.js (version 18 or higher)** must be installed from https://nodejs.org/.
3. **PostgreSQL**, along with **pgAdmin** for managing the database, can be downloaded from https://www.postgresql.org/.

Once the required software is installed, the project setup and initialization can be done by following these steps:

Step 1: Initialize the Node.js project using the terminal with the command:

npm init -y

Step 2: Install the necessary dependencies for the server using the command:

npm install express pg path

Step 3: Set up the PostgreSQL database. Create the necessary tables and define their attributes using SQL queries or pgAdmin.

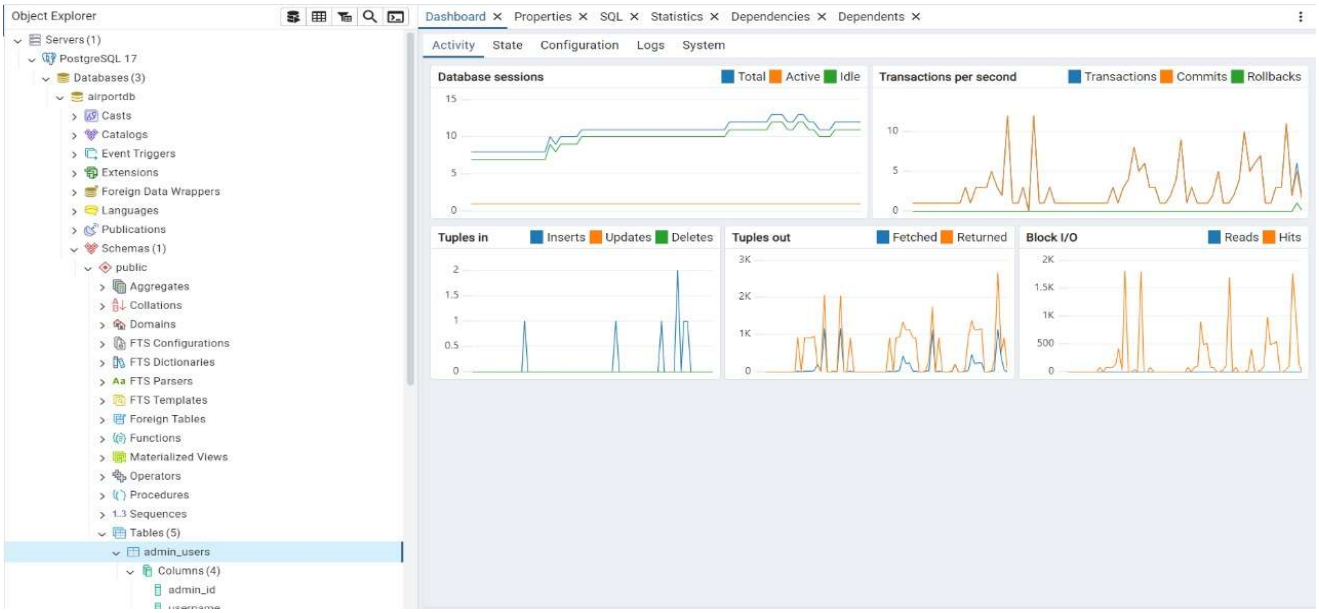
Step 4: Start the back end server by running the following command in the terminal:

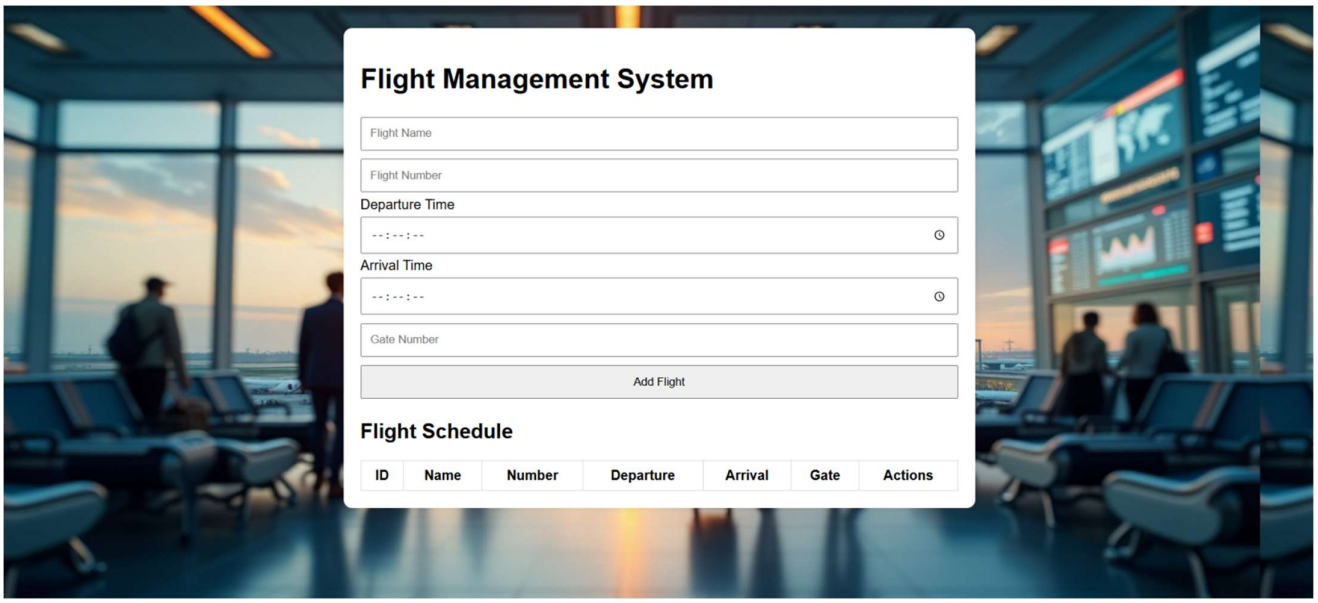
node server.js

Step 5: Once the server is running, access the system via your browser at:

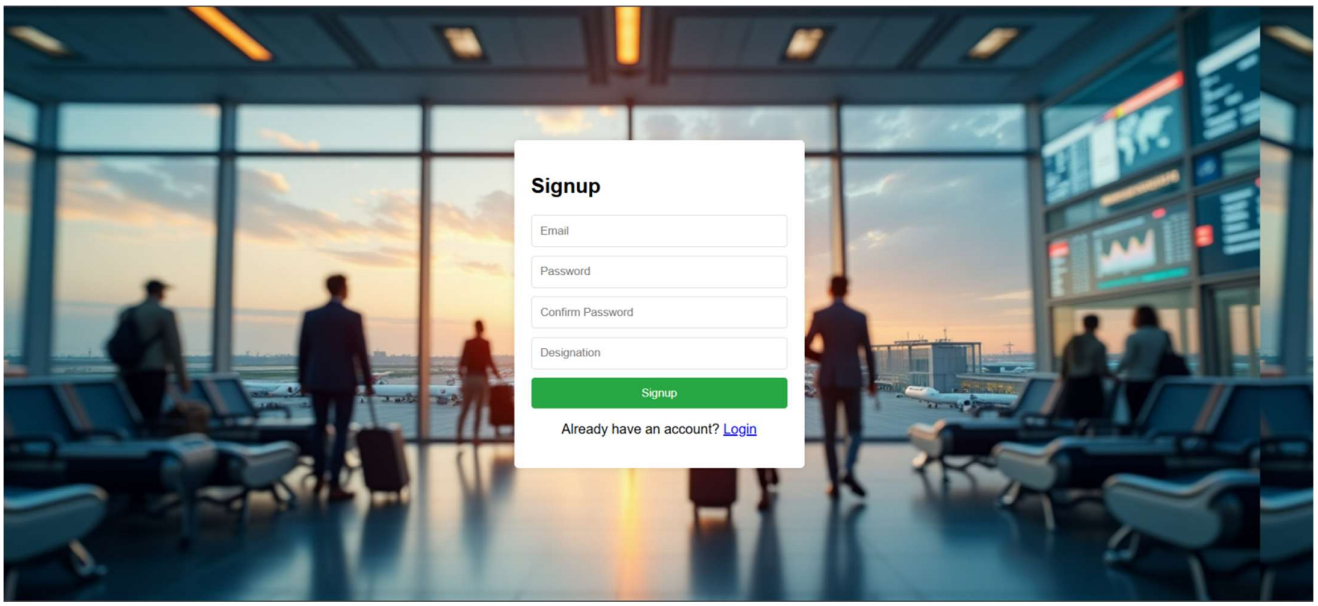
1. http://localhost:3000/signup.html – for user registration
2. http://localhost:3000/flights.html – for managing flight details
3. http://localhost:3000/report.html – for report generation

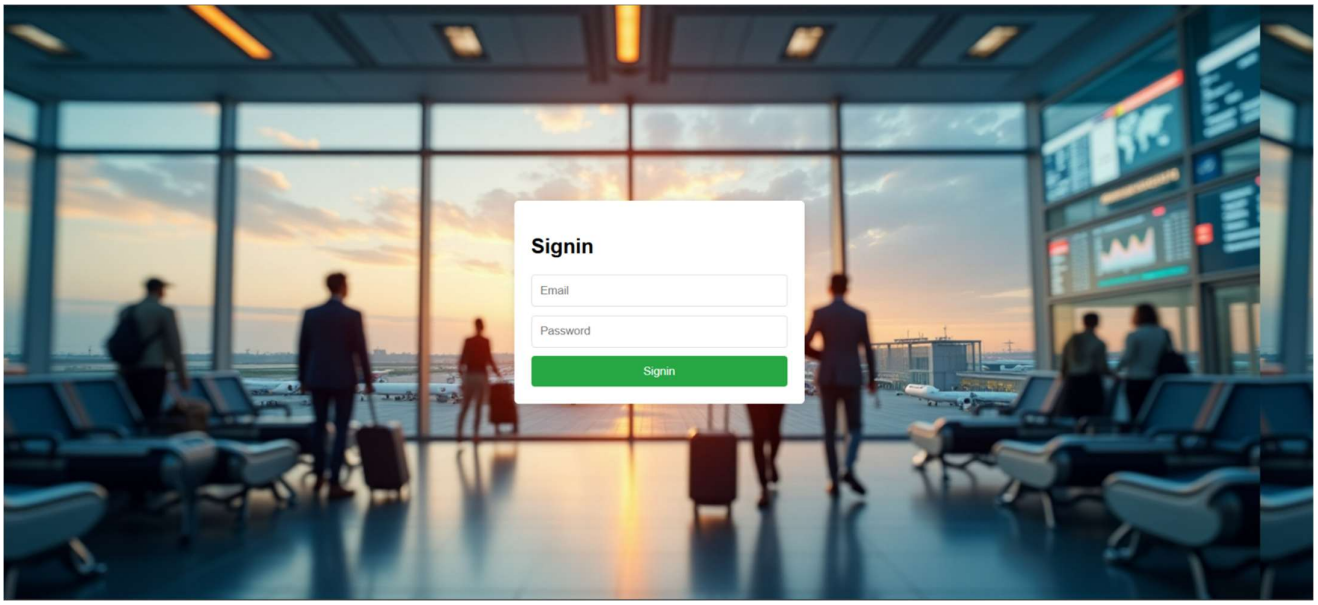
With these steps, the **XENOS** system will be fully functional and ready for use. The modular design ensures a smooth user experience while maintaining strong back end integration with the PostgreSQL database.

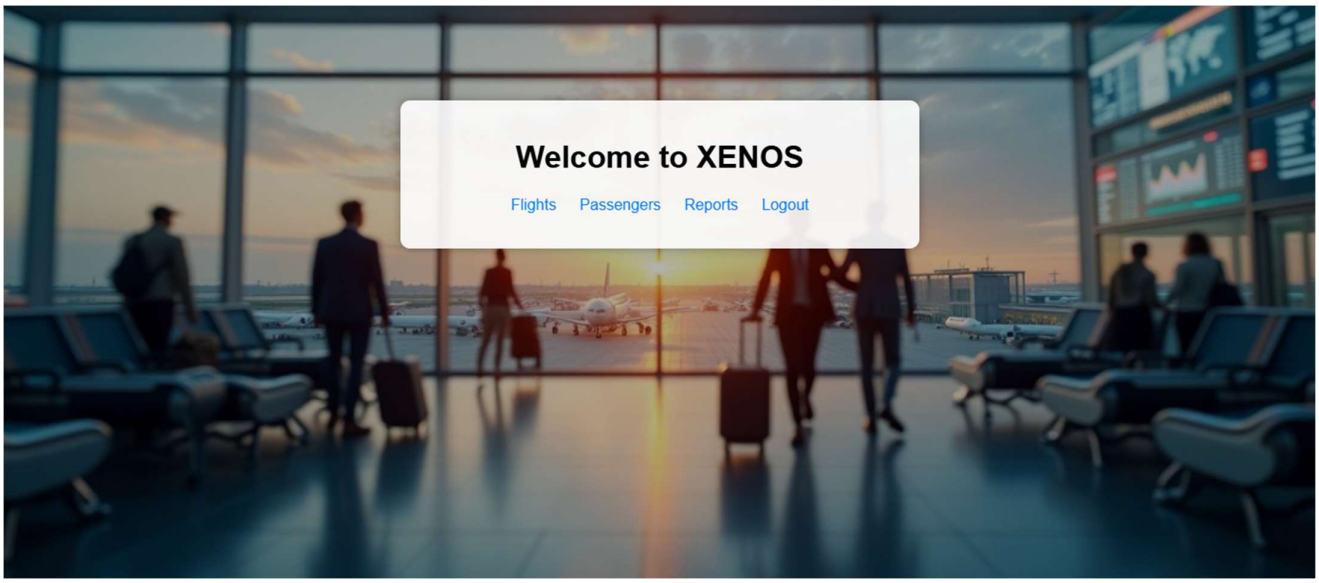

Object Explorer
Servers (1)
PostgreSQL 17
Databases (3)
airportdb
Casts
Catalogs
Event Triggers
Extensions
Foreign Data Wrappers
Languages
Publications
Schemas (1)
public
Aggregates
Collations
Domains
FTS Configurations
FTS Dictionaries
FTS Parsers
FTS Templates
Foreign Tables
Functions
Materialized Views
Operators
Procedures
Sequences
Tables (5)
admin_users
Columns (4)
admin_id
Dashboard
Properties
SQL
Statistics
Dependencies
Dependents
Activity
State
Configuration
Logs
System
Database sessions
Total
Active
Idle
Transactions per second
Transactions
Commits
Rollbacks
Tuples in
Inserts
Updates
Deletes
Tuples out
Fetched
Returned
Block I/O
Reads
Hits

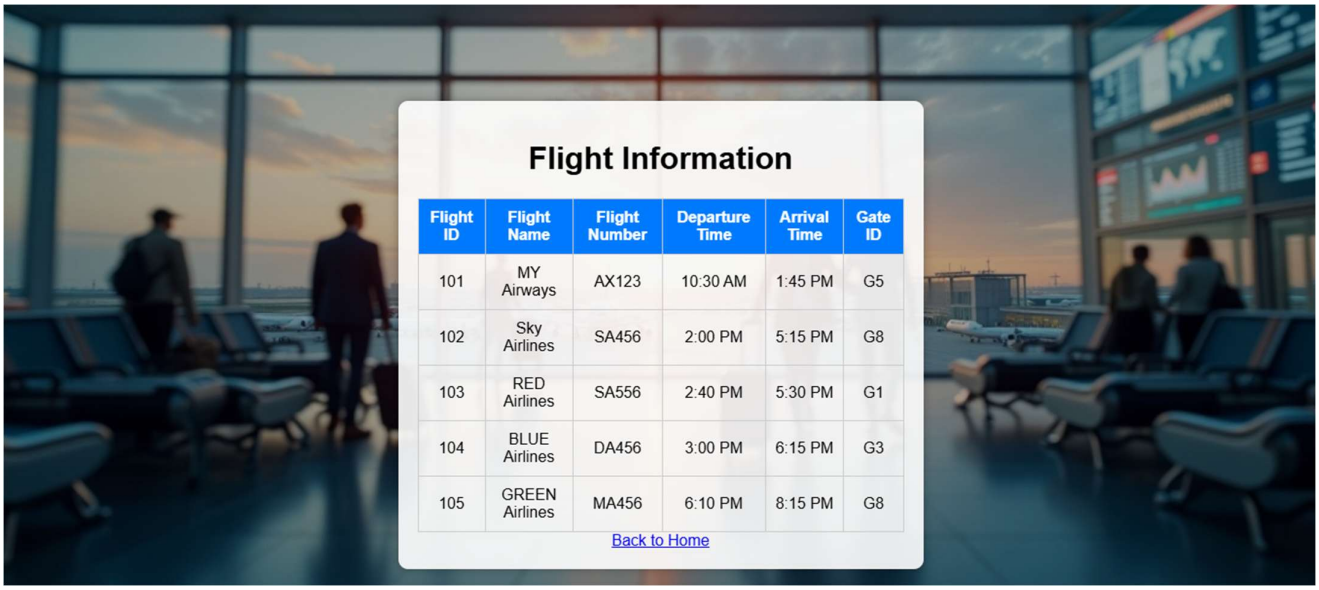

Flight Management System
Flight Name
Flight Number
Departure Time
--:--:--
Arrival Time
--:--:--
Gate Number
Add Flight
Flight Schedule
ID
Name
Number
Departure
Arrival
Gate
Actions

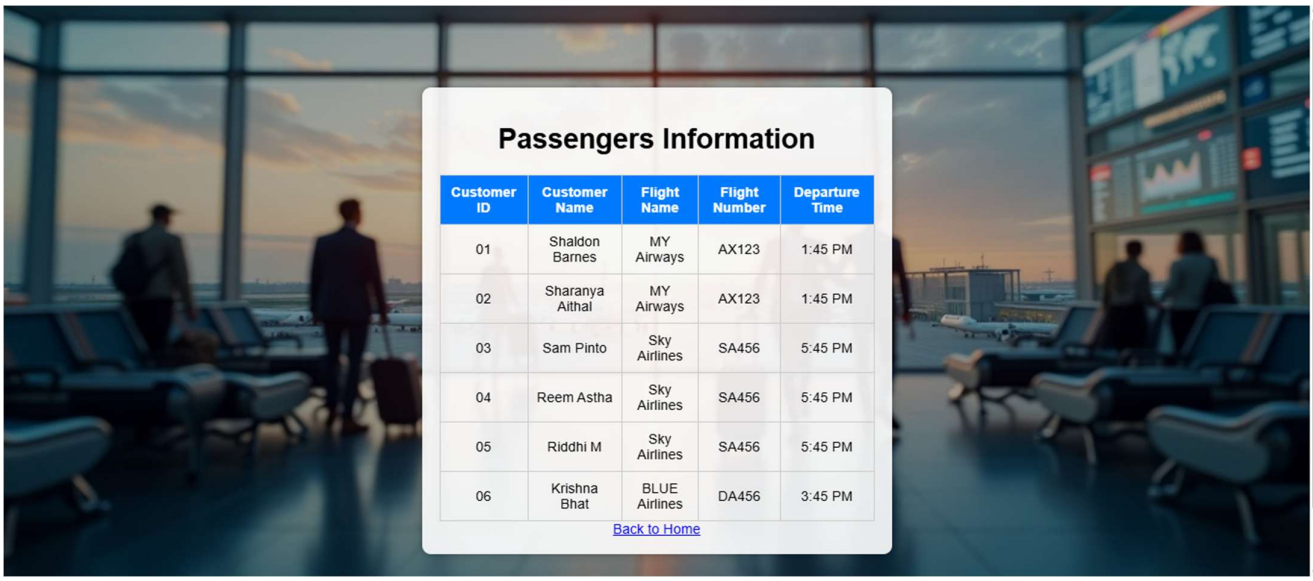
OUTPUTS

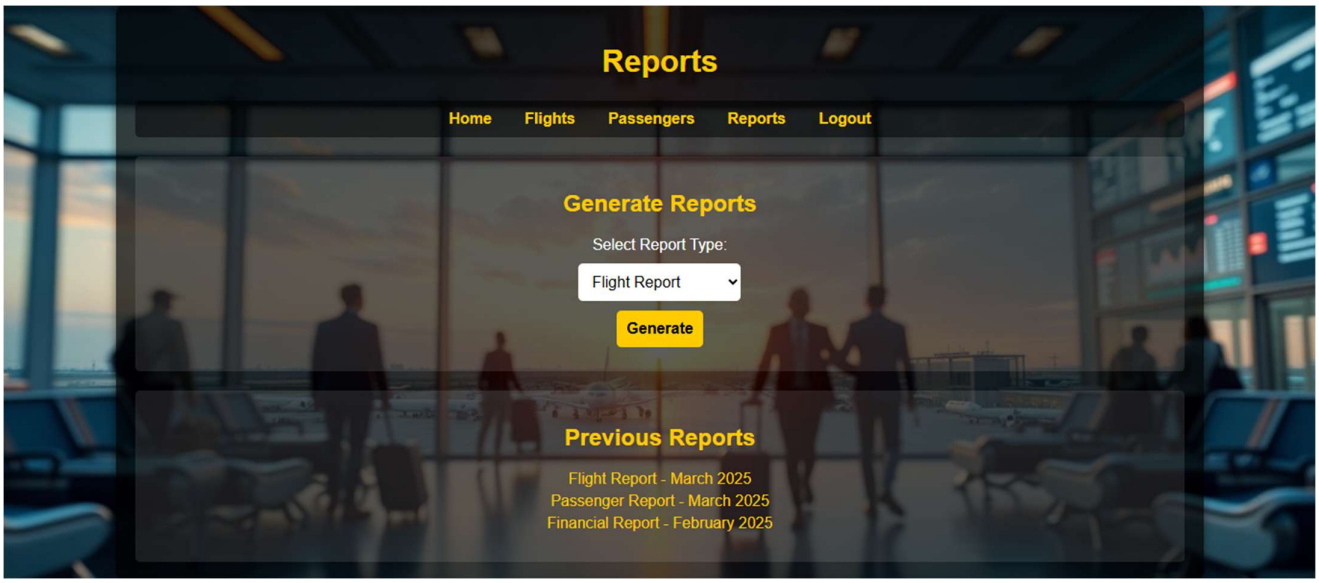

Signup
Email
Password
Confirm Password
Designation
Signup
Already have an account? Login


Signin
Email
Password
Signin


Welcome to XENOS
Flights
Passengers
Reports
Logout


Flight Information
Flight ID
Flight Name
Flight Number
Departure Time
Arrival Time
Gate ID
101
MY Airways
AX123
10:30 AM
1:45 PM
G5
102
Sky Airlines
SA456
2:00 PM
5:15 PM
G8
103
RED Airlines
SA556
2:40 PM
5:30 PM
G1
104
BLUE Airlines
DA456
3:00 PM
6:15 PM
G3
105
GREEN Airlines
MA456
6:10 PM
8:15 PM
G8
Back to Home


Passengers Information
Customer ID
Customer Name
Flight Name
Flight Number
Departure Time
01
Shaldon Barnes
MY Airways
AX123
1:45 PM
02
Sharanya Aithal
MY Airways
AX123
1:45 PM
03
Sam Pinto
Sky Airlines
SA456
5:45 PM
04
Reem Astha
Sky Airlines
SA456
5:45 PM
05
Riddhi M
Sky Airlines
SA456
5:45 PM
06
Krishna Bhat
BLUE Airlines
DA456
3:45 PM
Back to Home


Reports
Home
Flights
Passengers
Reports
Logout
Generate Reports
Select Report Type:
Flight Report
Generate
Previous Reports
Flight Report - March 2025
Passenger Report - March 2025
Financial Report - February 2025

CONCLUSION AND FUTURE SCOPE

The XENOS is designed to streamline and automate key airport functions such as flight scheduling, passenger information management, and report generation. Developed using web technologies like HTML, CSS, JAVA SCRIPT, and backed by a NODE JS, & POSTGRESQL the system provides a centralized and secure platform for airport staff, crew, and administrative users. With an intuitive interface and real-time data handling capabilities, XENOS enhances operational efficiency, reduces manual errors, and ensures smooth coordination across departments.

The modular structure of the system comprising Sign In, Home Page, Flights, Passengers, and Reports ensures that users can easily navigate and manage their respective tasks. Secure login, role-based access, and seamless data flow between modules contribute to both the functionality and reliability of the system. The platform not only simplifies the workload of airport employees but also improves the overall management of day-to-day operations.

In the future, the XENOS system can be enhanced with features such as mobile application support for staff and crew to access data on the go, integration of real-time flight tracking for accurate updates, and automated notifications for delays or schedule changes. Additional improvements may include a baggage tracking module, advanced data analytics for better decision-making, and a multilingual interface to support international users. Introducing a passenger self-service portal for online check-ins and updates can further streamline operations and improve user convenience. These enhancements will make the system more efficient, scaleable, and user-friendly.

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3. https://www.w3schools.com/js/