

Travel Agency Database System

1. Introduction

This project presents the design and implementation of a **relational database system** for a travel agency using **PostgreSQL**. The database is developed to support essential business processes such as customer management, booking management, payment tracking, and service evaluation through reviews. The project is intended for **academic and educational purposes**, demonstrating practical application of database design principles and SQL querying techniques.

2. Objectives

The primary objectives of this project are:

- To design a normalized relational database schema for a travel agency
 - To define relationships between entities using primary and foreign keys
 - To enforce data integrity through constraints
 - To populate the database with representative sample data
 - To demonstrate data retrieval and analysis using SQL queries
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3. Technologies Used

- **Database Management System:** PostgreSQL
 - **Language:** SQL
 - **Database Concepts Applied:**
 - Relational modeling
 - Entity relationships
 - Constraints and validation rules
 - Indexing
 - Aggregation and analytical queries
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4. Database Schema Description

The database consists of multiple interrelated tables representing real-world entities within a travel agency system.

4.1 Core Tables

- **Customers:** Stores personal and contact information of customers.
- **Agents:** Stores information related to travel agents.
- **Destinations:** Contains data about travel destinations.
- **Packages:** Represents travel packages offered by the agency.
- **Bookings:** Records customer bookings for travel packages.
- **Payments:** Stores payment details associated with bookings.

- **Reviews:** Captures customer feedback and ratings for packages.
- **Activities:** Stores activities that can be associated with bookings.

4.2 Associative Tables

- **BookingActivities:** Resolves the many-to-many relationship between bookings and activities.
 - **PackageDestinations:** Resolves the many-to-many relationship between packages and destinations.
 - **AgentBookings:** Associates agents with bookings.
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5. Data Integrity and Constraints

To ensure accuracy and consistency of data, the following mechanisms are implemented:

- **Primary Keys** for unique identification of records
 - **Foreign Keys** to enforce referential integrity
 - **CHECK constraints** for:
 - Valid email formats
 - Positive monetary values
 - Valid rating ranges (1–5)
 - **DEFAULT values** for timestamp attributes
 - **Indexes** to improve query performance on frequently accessed columns
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6. Sample Data

The database is populated with sample data representing customers, agents, destinations, packages, bookings, payments, reviews, and activities. This data enables immediate testing and validation of database functionality and query correctness.

7. SQL Queries and Analysis

A set of SQL queries is included to demonstrate data retrieval, aggregation, and analysis. These queries cover the following scenarios:

- Identification of customers who have made bookings
- Counting the number of bookings per customer
- Calculation of total revenue generated
- Determination of average package ratings
- Classification of customers based on spending levels
- Identification of inactive customers
- Use of subqueries and window functions for advanced analysis

These queries illustrate practical use of SQL for reporting and decision support.

8. Execution Instructions

To execute this project:

1. Install PostgreSQL on the local system
 2. Create a new database
 3. Execute the provided SQL script to create tables and constraints
 4. Insert the sample data
 5. Run the provided queries to analyze the database
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9. Limitations and Future Enhancements

While the current implementation fulfills its academic objectives, future improvements may include:

- Implementation of database views for reporting
 - Use of stored procedures and triggers
 - Role-based access control
 - Integration with an application-level backend
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10. Conclusion

This project demonstrates a complete relational database solution for a travel agency scenario. It applies fundamental and advanced database concepts in a structured manner, making it suitable for academic evaluation and as a foundation for further system development.

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