Storing and processing database for data on the Airbnb use case.

Conception Phase

DLBDSPBDM01 – Project: Build a Data Mart in SQL

B.S.c. Data Science

Christopher Masukume

Matriculation: 92127417

Tutor: Prof. Shahram Dadashnia

Abstract

The Airbnb project's goal is to provide a database that stores and processes data relating to the Airbnb use case. The goal is to build a platform that connects guests with hosts who offer their residences for short-term rentals. Users will be able to search and book accommodations through the system, and hosts will be able to post and manage their properties.

To do this, we first created an Entity Relationship Model (ERM) that represents the entities and their attributes, as well as their relationships. This gave us a clear picture of the data that needed to be stored and processed in the system. Following that, we created a requirements specification that assessed the system's roles, activities, data, and functionalities. This aided us in determining the features and functionalities that the database must offer. Our solution strategy entails developing a database that can handle a huge volume of data and users, as well as implementing adequate authentication and authorization systems to assure security and reliability. We will implement the database using modern database technologies such as MySQL or MongoDB, and we will ensure that it is scalable and capable of handling a huge number of transactions.

Overall, we want to build a strong and dependable database that allows visitors and hosts to quickly search and book lodgings or advertise their properties for rental.

Roles

There are two main roles in the Airbnb system: guests and hosts.

1. Guests: Guests are users who are looking for accommodations. They can search for properties based on their preferences, view listings, and make reservations.
2. Hosts: Hosts are users who own properties and want to rent them out. They can create and manage listings, respond to inquiries from guests, and manage reservations.

Actions

1. Guests:

- Guests can search for listings based on criteria and be able to view the listings through the photos, descriptions and reviews provided. After viewing the listing, the user can make bookings to the listing they are interested in for a specific date and several people where after their stay they can leave a review.

2. Hosts:

- Create Listings, manage them by updating details, photos, and availability, respond to enquiries to provide some information about their listings and answer questions and manage bookings; accept or decline bookings based on availability.

Required Data and Functions

Here are the data and functions required for the Airbnb system:

1. Users:

- User Registration: Users should be able to register for the Airbnb system, providing their basic information such as name, email, and password.
- User Login: Users should be able to log in to the system using their registered email and password.

2. Listings:

- Create and View Listings: Hosts should be able to create listings for their properties, specifying details such as description, price, location which the guests will be able to search and view on the platform. The host should be able to make updates on the listings.

3. Bookings:

- Make and manage Bookings: Guests should be able to make reservations for listings, specifying the dates of their stay, the number of guests, and other preferences. Hosts should manage listings based on availability.

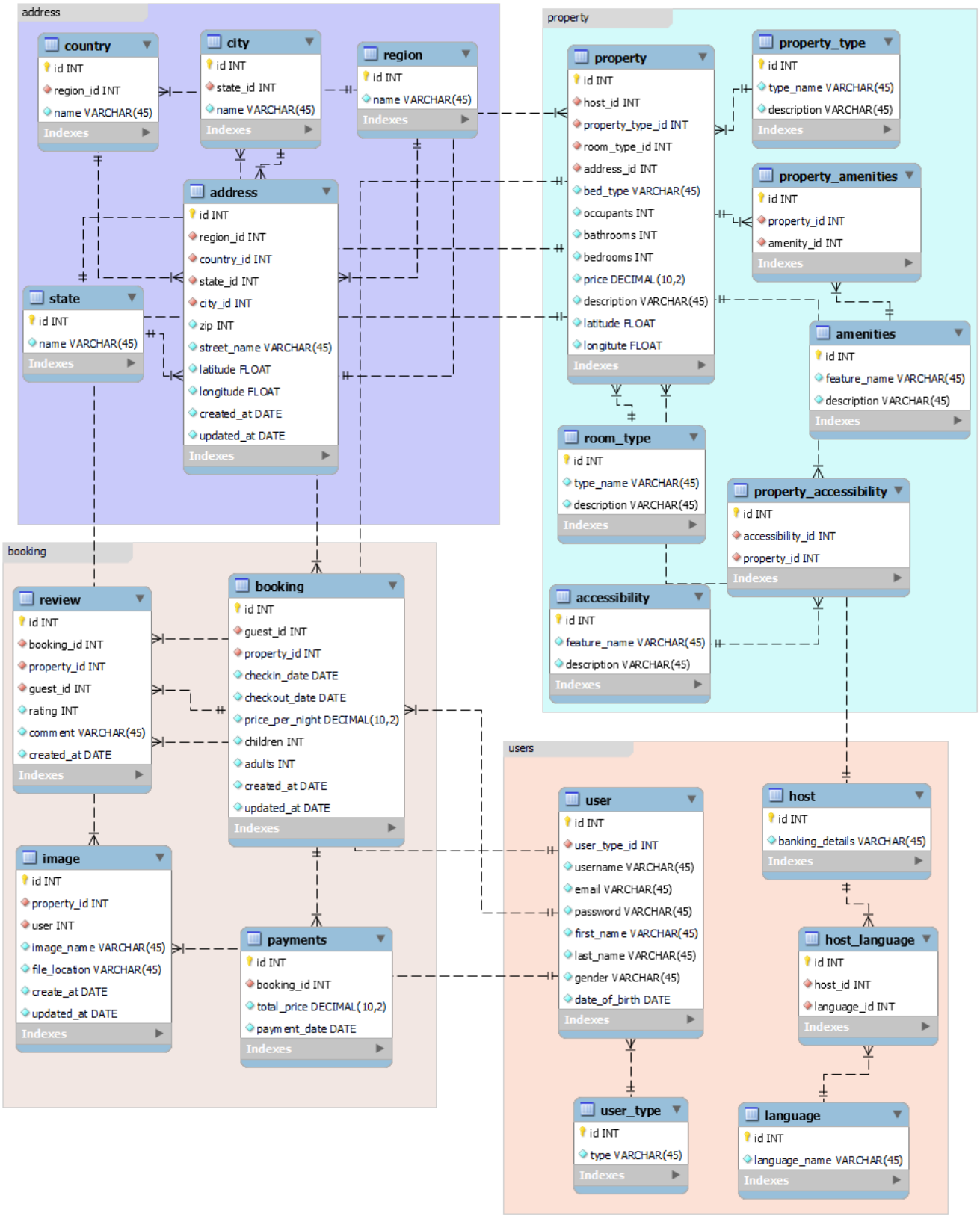
4. Reviews:

- Leave Reviews: Guests should be able to leave reviews of the listings they have stayed in, giving ratings and comments.

5. Payments:

- Process Payments: The system should be able to process payments for reservations made by guests and transfer the money to hosts.

Entity Relationship Model (ERM)



Schema Report for database: airbnb

Table List

Table: accessibility

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
feature_name	VARCHAR(45)	Yes	No	No		
description	VARCHAR(45)	Yes	No	No		

Table List

Table: address

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
region_id	INT	Yes	No	Yes		
country_id	INT	Yes	No	Yes		
state_id	INT	Yes	No	Yes		
city_id	INT	Yes	No	Yes		
zip	INT	Yes	No	No		
street_name	VARCHAR(45)	Yes	No	No		
latitude	FLOAT	Yes	No	No		
longitude	FLOAT	Yes	No	No		
created_at	DATE	Yes	No	No		
updated_at	DATE	Yes	No	No		

Table List

Table: amenities

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
feature_name	VARCHAR(45)	Yes	No	No		
description	VARCHAR(45)	Yes	No	No		

Table List

Table: booking

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
guest_id	INT	Yes	No	Yes		
property_id	INT	Yes	No	Yes		
checkin_date	DATE	Yes	No	No		
checkout_date	DATE	Yes	No	No		
price_per_night	DECIMAL(10,2)	Yes	No	No		
children	INT	Yes	No	No		
adults	INT	Yes	No	No		
created_at	DATE	Yes	No	No		
updated_at	DATE	Yes	No	No		

Table List

Table: city

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
state_id	INT	Yes	No	Yes		
name	VARCHAR(45)	Yes	No	No		

Table List

Table: country

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
region_id	INT	Yes	No	Yes		
name	VARCHAR(45)	Yes	No	No		

Table List

Table: host

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
banking_details	VARCHAR(45)	Yes	No	No		

Table List

Table: host_language

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
host_id	INT	Yes	No	Yes		
language_id	INT	Yes	No	Yes		

Table List

Table: image

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
property_id	INT	Yes	No	Yes		
user	INT	Yes	No	Yes		
image_name	VARCHAR(45)	Yes	No	No		
file_location	VARCHAR(45)	Yes	No	No		
create_at	DATE	Yes	No	No		
updated_at	DATE	Yes	No	No		

Table List

Table: language

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
language_name	VARCHAR(45)	Yes	No	No		

Table List

Table: payments

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
booking_id	INT	Yes	No	Yes		

total_price	DECIMAL(10,2)	Yes	No	No		
payment_date	DATE	Yes	No	No		

Table List

Table: property

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
host_id	INT	Yes	No	Yes		
property_type_id	INT	Yes	No	Yes		
room_type_id	INT	Yes	No	Yes		
address_id	INT	Yes	No	Yes		
bed_type	VARCHAR(45)	Yes	No	No		
occupants	INT	Yes	No	No		
bathrooms	INT	Yes	No	No		
bedrooms	INT	Yes	No	No		
price	DECIMAL(10,2)	Yes	No	No		
description	VARCHAR(45)	Yes	No	No		
latitude	FLOAT	Yes	No	No		
longitute	FLOAT	Yes	No	No		

Table List

Table: property_accessibility

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
accessibility_id	INT	Yes	No	Yes		
property_id	INT	Yes	No	Yes		

Table List

Table: property_amenities

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
property_id	INT	Yes	No	Yes		
amenity_id	INT	Yes	No	Yes		

Table List

Table: property_type

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
type_name	VARCHAR(45)	Yes	No	No		
description	VARCHAR(45)	Yes	No	No		

Table List

Table: region

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
name	VARCHAR(45)	Yes	No	No		

Table List

Table: review

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
booking_id	INT	Yes	No	Yes		
property_id	INT	Yes	No	Yes		
guest_id	INT	Yes	No	Yes		
rating	INT	Yes	No	No		
comment	VARCHAR(45)	Yes	No	No		
created_at	DATE	Yes	No	No		

Table List

Table: room_type

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		

type_name	VARCHAR(45)	Yes	No	No		
description	VARCHAR(45)	Yes	No	No		

Table List

Table: state

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
name	VARCHAR(45)	Yes	No	No		

Table List

Table: user

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
user_type_id	INT	Yes	No	Yes		
username	VARCHAR(45)	Yes	No	No		
email	VARCHAR(45)	Yes	No	No		
password	VARCHAR(45)	Yes	No	No		
first_name	VARCHAR(45)	Yes	No	No		
last_name	VARCHAR(45)	Yes	No	No		
gender	VARCHAR(45)	Yes	No	No		
date_of_birth	DATE	Yes	No	No		

Table List

Table: user_type

Table Comments	

Columns

Name	Data Type	Not Null	PK	FK	Default	Comment
id	INT	Yes	Yes	No		
type	VARCHAR(45)	Yes	No	No		

Table List