

Airline Flight Reservation System

Team 2					
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1. OVERVIEW

Our project is to develop a database dedicated to the Flight Reservation System component of an Airline company, say for example American Airlines. The business requirement is restricted to the flights exclusive to the Airline company. Note that this is different than general ticketing systems like Kayak or Expedia which allows users to book flight tickets from multiple Airlines.

This document outlines the problem statement and the objectives of the team. We also provide the Entity Relationship diagram of our proposed database structure and a detailed listing of our entities.

2. PROBLEM STATEMENT

“It’s a small world.”

The world is now a global village because of the interconnectedness provided by air travel. Just in the USA the FAA manage 45,000 average daily flights. Almost every airline company in the world have their own dedicated booking system available on their websites. Given that many flights are operated by a single airline on daily basis, vast amounts of booking data are generated. The booking data is crucial for the successful and safe business operation for any airline company. The database infrastructure supporting the booking system should be well-designed, robust and scalable to handle the growing the demand for air travel, constant change of operations plans by the airline and above all else for customer satisfaction and retention. We are proposing a database solution solely dedicated to the Flight Reservation System component for a single Airline company.

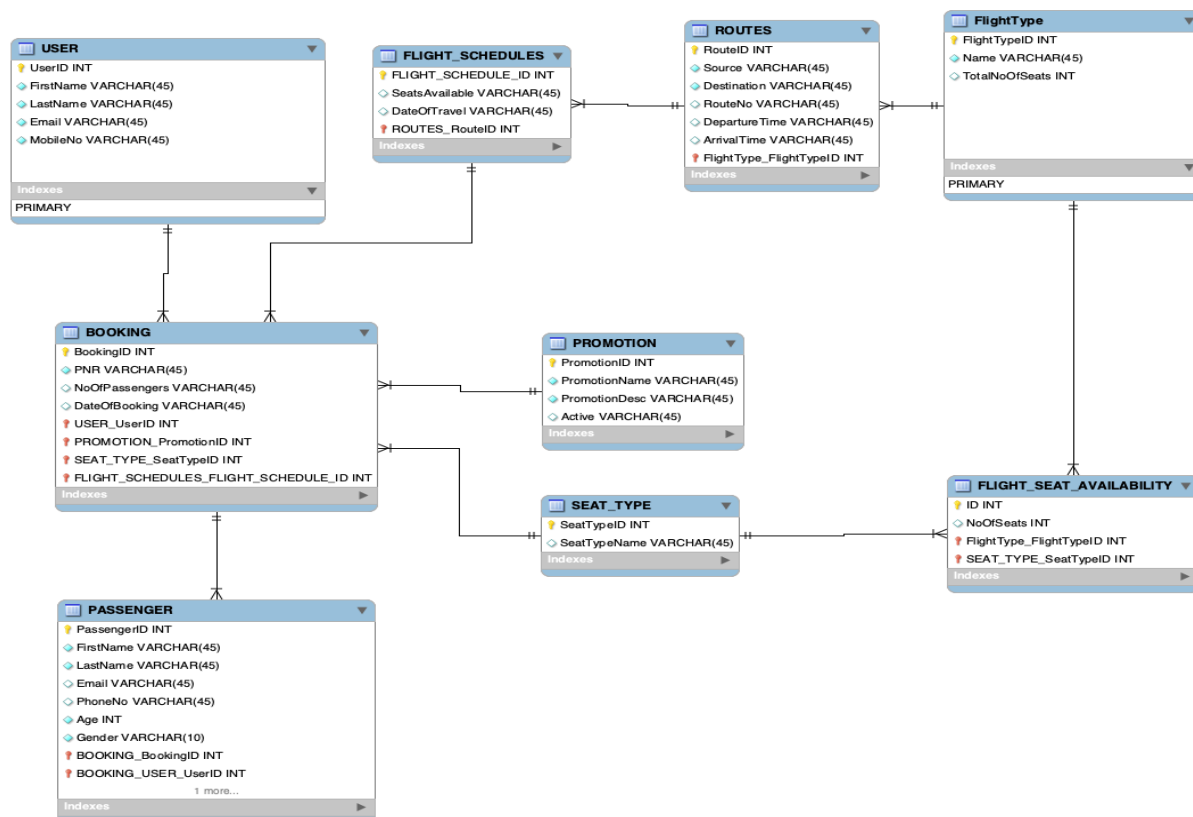
3. OBJECTIVES

Below are the objectives we have identified

1. A flexible solution for the Airline company to be able to
 - 1.1. Maintain Routes that they provide
 - 1.2. Manage the different Flight Types they operate
 - 1.3. Operate Flights for each day
2. List of objectives from the customer perspective
 - 2.1. Book flight tickets for available Flight Schedules
 - 2.2. Have multiple passengers in one booking
 - 2.3. Select booking type – Economy/Business
 - 2.4. Apply promotions to a booking
3. Reading & updating of seat availability

4. ENTITY RELATIONSHIP DIAGRAM

When it comes to designing a database, Entity Relationship (ER) diagrams play a big role. Based on the business idea, we have drafted a representation of the ER model containing tables with relations.



5. BUSINESS PROBLEM (Draft Version for Project_1)

Our solution aims at solving the following problems

1. An Airline Company can be providing multiple Routes to their customers, and they need to manage their Routes. A Route defines the Source and Destination and the time of departure.

Solution: We are maintaining a separate entity called Routes which would contain all the operation routes of the Airline. As the business grows, new operational routes can be added to this table.

2. An Airline Company can have different types of flights (example A320, A330) and different classes of tickets (example Economy, First Class)

Solution: Flights of a certain type (example Airbus 320) would be having the same seating map and the airline would segregate the seats similarly for all flights of that type. We have an entity called FlightType which would consist of records describing the Flight Model/Type (example Airbus 370) and the no of seats.

Next, we added another entity named SeatType that would consist of records describing the different classes of Tickets operated by the Airline.

Finally, the entity Flight_Seat_Availability would tell us how many seats are allocated for a particular class of ticket for a Flight Type

3. Generally, customers book tickets in advance and therefore we need to handle this scenario.

Solution: Any airline company allows customers to book tickets in advance to a certain time limit i.e. one cannot book a ticket beyond a certain date. Our solution implements the same constraint. We have an entity called Flight_Schedules which would be pre-populated with the operational flight details for each day till a certain date. This is a one-time operation that would take place periodically. Consequently, the customer can book tickets in advance.

4. The development team should be able to develop APIs and a business logic to prevent overbooking of seats.

Solution: We have added multiple entities and relations to be able to compute the number of available seats for a particular seat type. The backend engineers could consume the data from these entities to easily compute the number of remaining seats.

6. ASSUMPTIONS

- Our business requirement allows only registered users to reserve flight tickets
- A single booking is assigned a single promotion only

- A single booking is assigned a single seat type (i.e. Economy/ Business), meaning all passengers will have the same seat type

7. TABLES

Based on the business, we have created an idea of how many tables this system will consist of. These tables will define the database through column name, data type, constraints, and the description of those entities.

7.1 USER Table

This table will store the details of the users registered with the Airline Company.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
UserID	Number	PK Not Null	This represents unique ID for the user
FirstName	Varchar	Not Null	This represents the first name of the user
LastName	Varchar	Not Null	This represents the last name of the user
Email	Varchar	Not Null, Unique	This represents the email id of the user
MobileNo	Varchar	Unique	This represents the mobile number of the user

7.2 FLIGHT_SCHEDULES Table

This table will store the details of the flight schedules i.e. the flights available to the user for booking.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
Flight_Schedule_ID	Number	PK Not Null	This represents the primary key for this table
SeatsAvailable	Varchar	NOT Null	This represents the no of seats available for the particular date of travel
DateOfTravel	Varchar	NOT NULL	This represents the date of travel available for the end user
RouteId	Number	FK	This represents the route Id for the flight schedule

7.3 ROUTES Table

This table will store the details of the routes operated by the Airline Company.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
RouteID	Number	PK Not Null	This represents the Route Id for the airline
Source	Varchar	Not Null	This represents the source of the airline journey
Destination	Varchar	Not Null	This represents the destination of the airline journey
RouteNo	Varchar	Not Null, Unique	This represents the route no for the airline journey
DepartureTime	Varchar	Not Null	The time from which the flight will take off from the source
ArrivalTime	Varchar	Not Null	The time on which the airline will land on the destination
FlightType ID	Number	FK	This represents the flight type like Airbus 300 or Airbus 550

7.4 FLIGHTTYPE Table

This table will store the details of the different flight types operated by the Airline Company.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
FlightTypeID	Number	PK Not Null	This represents the primary key for this table
Name	Varchar	NOT Null	This represents the name of the airflight type
TotalNoOfSeats	Number	NOT NULL	This represents the total no of seats the flight has based on their type

7.5 PROMOTION Table

This table will store the details of the various promotions offered by the Airline Company.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
PromotionID	Number	PK Not Null	This represents the primary key for this table
PromotionName	Varchar	NOT Null, Unique	This represents the name of the promotion being offered by the airlines
PromotionDesc	Varchar	NOT NULL	This represents the description of the promotion
Active	Varchar	NOT NULL	This represents whether the promotion is active or not.

7.6 SEAT_TYPE Table

This table represents the various classes of booking (i.e. Economy, First Class) offered by the Airline Company.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
SeatTypeID	Number	PK Not Null	This represents the primary key for this table
SeatTypeName	Varchar	NOT Null	This represents the seat type name like economy, business class or premium class etc...

7.7 PASSENGER Table

This table stores the details of the passengers for each booking.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
PassengerID	Number	PK Not Null	This represents unique ID for the user
FirstName	Varchar	Not Null	This represents the first name of the passenger
LastName	Varchar	Not Null	This represents the last name of the passenger
Email	Varchar	Not Null, Unique	This represents the email id of the passenger
PhoneNo	Varchar	Unique	This represents the mobile number of the passenger
Age	Number	NOT NULL	This represents the age of the passenger

7.8 BOOKING Table

This table stores the details of the bookings done by the customers.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
BookingID	Number	PK Not Null	This represents unique ID for the user
PNR	Varchar	Not Null	This represents the code which is used for boarding purposes and check in
NoOfPassengers	Varchar	Not Null	This represents no of passenger for a particular Booking ID
DateOfBooking	Varchar	Not Null, Unique	This represents the date on which the user made the booking
UserID	Number	FK	This represents the foreign key from the user table
PromotionID	Number	FK	This represents foreign key from the promotions table
SeatTypeID	Number	FK	This represents foreign key from the Seat_type table
FlightScheduleID	Number	FK	This represents foreign key from the Flight_Schedules table
RouteID	Number	FK	This represents foreign key from the Routes table

7.9 FLIGHT_SEAT_AVAILABILITY Table

This table stores the details of the no of seats allocated for each seat type by the Airline Company.

<u>Column Name</u>	<u>Data Type</u>	<u>Constraints</u>	<u>Description</u>
ID	Number	PK Not Null	This represents the primary key for this table
NoOfSeats	Number	NOT Null	This represents the no of seats the tier is based upon
FlightTypeID	Number	FK	This represents foreign key from FlightType table
SeatTypeID	Number	FK	This represents foreign key from Seattype table