Airline Backend System

Objective

We need to build a backend system that can support different features for an airline company.Our end user is going to be someone who wants to book flights and query about flights, so we need a robust system to actually help them give the best experience possible. This document is solely going to focus on the backend part of the system. We want to prepare the whole backend, keeping in mind that the codebase should be as maintainable as possible.

Requirements:

- A user should be able to search for flights from one place to another
    - A user should be able to mention the source and destination details
    - The user should be able to select the date of the journey
        - [V2] The user should be able to search for return flights and multi-city flights.
    - The User should be able to select the class of flights (non-mandatory).
    - Now, based on the above data, we will list the flights.
    - We should show our users the best available flights at the top based on the time period of the flight and then based on the price.
    - we need to support pagination so that we can list chunks of flights at one point in time
    - We should support filters for flights based on price, departure time, duration, airline, and stops.
        - [V2] We can add more filters.
- A user should be able to book a flight considering that they are registered on the platform.
    - Users should be able to cancel a booking and then, based on some criteria, we can initiate a refund for them
    - Users should be able to request and book excess luggage for every flight.
- To make a booking, the user has to make a payment.
- Users should be able to list their previous and upcoming flights
- Users should be able to download the boarding pass if they have done so. online check-in.
- An online check-in mechanism should be supported.
- Notification by email for completing online check-in before 3 hours of departure.
- Notification to users about any flight delay.

- Users should be able to review flight journey if and only if they have booked a flight
    - The review mechanism should involve a star rating along with a comment.
    - While listing any flight, we should also display the review of the flight.
- Users should be able to authenticate with our system using their email and password.
    - [V2] supports ticketing so that users can raise their queries.
- Listing FAQ which will be static data
    - [V2] Prepare seat selection
- Coupons for discounts and offers

Non-functional Requirements

- We can expect that we are going to have more flight searches than flight bookings.
- The system needs to be accurate in terms of bookings.
- We expect that we will have approximately 1,00,000 users and 2,00,000 bookings in one quarter.
- So in one day, we can expect 2000 bookings.
- The system should be capable of scaling up to at least 3 times the current estimated traffic.
- The system should handle real-time updates to flight prices before the user makes the final booking.
- Concurrency should be handled, and using an RDBMS should be a good solution.

Capacity Estimation

- **Storage estimates:**
    - For the upcoming 5 years, there will be 80,00,000 bookings and 2,00,000 users. Considering all the user's records and the booking records take 10 MB of data, the overall 10 TB of memory should be fine for our initial pilot run
- **Traffic estimates:**
    - if we consider 30:1 as the search: booking ratio, then at maximum, we can expect 150000 search queries a day. 2query/s