Airline Backend System

Objective:

We need to build a backend system that can support different features of an airline company. Our end user is going to someone who wants to book flights and query about flights so we need a robust experience possible. This docs is solely going to focus on backend part of the system. We want to prepare whole backend keeping the fact in mind that code base should be manipulated as possible.

Requirements:

- A user should be able to search for flight from one place to another.
    - User should be able to mention the source and the destination details.
    - User should be able to select the date of the journey.
        - [V2] User should be able to search for return flights and multi city flights.
    - User should be able to select the class of the flights [Not Mandatory].
    - User should be able to select the number of seats they want to book [Not Mandatory].
    - We should show our users the best available flights at the top based on time period of flights and then based on the price.
    - We need to support pagination so that we can list chunk of flights at one point of time.
    - We should support filter of flights based on Price, Departure time, Duration, Stops.
        - [V2] We can add support for more filters.

- A user should be able to book a flight considering that user is registered on the platform.
    - User should be able to cancel a booking, and then based on some criteria we can initiate a refund for them.

- o User should be able to request a book excess luggage for every flight.
- For making a booking, the user has to make a payment [dummy].
- Tracking flight prices should be possible, the user should be notified about any price drops or any delays.
- User should be able to list their previous and upcoming flights.
- User should be able to download Boarding pass if they have done online check-in.
- Online check in mechanism should be supported.
- Notification via email for completing online check-in before 3 hours of departure.
- Notifications to users about any flight delay.
- User should be able to review the flight journey if and only if they have booked a flight.
  - o Review mechanism should involve star rating along with a comment.
  - o While listing any flight we should also display the review of the flights.
- User should be able to authenticate to our system using email and password.
  - o [V2] Support ticketing, where user can raise their queries.
- Listing FAQ which will be static data
  - o [V2] Prepare seat selection.
- While making a booking a person can reserve more than one seat with one login Id.

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 the terms of booking.
- Expect that we will be having approx. 1,00,000 total users, 5,00,000 bookings might come up in one quarter
- So in one day we can expect 5000 bookings.
- System should be capable of scaling up to at least 3x the current estimated traffic.

- The system should handle real time updates to flights price, before the user makes the final booking.
- Concurrency should be handled, using RDBMS should be good solution.

Capacity Estimation:

- Storage Estimations:
  - For the upcoming 5 years, 80, 00,000 bookings, 2,00,000 users, considering all the users records and booking records take 10MB of data, the overall 10TB of memory should be fine for our initial pilot run.
- Traffic estimates – If we consider 30:1 as search: booking ratio, then at max we expect 150000 search queries a day. 2 query/s.