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 book flights and query about flights so we need a robust system to actually help them give the best experience possible. This doc is solely responsible for the backend part of the system. We want to prepare whole backend keeping the fact in mind that the code base should be as maintainable as possible.

Functional Requirements:-

* User should be able to search for flights from one place to another
  + User should be able to mention the source and destination details;
  + User should be able to select the class of the flights[Not be mandatory]
  + User should be able to select the no. of seats they want to book[Not be mandatory]
  + Based on the above data we want to list the flights.
  + We should show our users the best available flights at the top based 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, airline, stops.
    - **[v2] we can add support more filters**
  + 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 book a flight considering that user is registered on that platform
  + - User should be able to cancel a booking, and then based on some criteria we can initiate a refund for them
    - User should be able to request and book excess luggage for every flight
* For making a booking 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
* Notifications via email for completing online check-in before 3 hours of departure.
* Notifications to user about any flight delay
* User should be able to review the flight journey if and only if they have booked a flight.
* Review mechanism should involve star rating along with a comment
* While listing any flight we should also display the review of the flight
* User should be able to authenticate to our system using email and password
  + **[v2] Support ticketing , where user can raise their queries**.
* Listing FAQ which will we static data
  + **[v2] prepare seat selection**
* Coupons for discounts and offers
* Whie making a booking a person can reserve more than one seats with one login id

Non-Functional Requirements:-

* We can except that we are going to have more flight searches than flight bookings
* The system need to be accurate in terms of booking
* Expect that we will be having approx. 1 lakh total users , 5 lakh booking might come up in one quarter
* So in one day we can except 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 flight prices before user makes the final bookings
* Concurrency should be handles , using rdbms should be the good solution

Capacity Estimation:-

* Storage estimates-
  + For upcoming 5 years , 80,00,000 bookings, 2,00,000 users. Considering all the users records and booking records take 10 mb of data, then overall 10tb of memory should be fine for our initial pilot run.
* Traffic estimates- if we consider 10:1 as the search:booking ratio, then at max we except 150000 search queries a day. 2 query/s

Search and flight service:

* Create flight
* Delete flight
* Update flight
* Search flight
  + Based on multiple filteration criteria we can search for flights
  + Paginationn