

TEAM SEQUEL EXTRACT

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Some clarifications

- In AIRPORT relation, **the TIMEZONE attribute is not functionally dependent on {City+Country}** as on research; we found some cities have two airports where both airports might follow a different timeline.(https://en.wikipedia.org/wiki/List_of_cities_with_more_than_one_airport). Hence, 3-NF is not violated since there is no functional dependency in the first place.
- In ROUTE-ID relation, **DISTANCE TRAVELLED attribute is not functionally dependent on tuple {Src airport, Destination airport}** as different flights follow different routes, Eg a flight from New York to Delhi could make a stopover at Dubai or London and hence, the distance covered in these cases would be different and not just dependent source and destination
- In ROUTE-ID relation, the **Time Duration attribute is not functionally dependent on tuple {Scheduled departure time, Scheduled arrival time}** as time duration might include take-off delays, in-flight delays, etc.
- **PNR->Route id in Boarding Pass entity**
All the passengers traveling on the same PNR have different boarding pass IDs but travel on the same route id. For the boarding pass entity, the PNR number is not a superkey, but Route ID is a prime attribute as it is part of the candidate key {Aadhar_card_number+Route_id}. **Note that this is a violation of BCNF, but it does not violate 3NF.**
- After clarification with the TAs, we are **removing derived attributes** from our relational model. E.g., we are eliminating attributes like ‘is_senior_citizen’ and ‘age’ as they are derived from the attribute ‘Date of Birth.’ We have also removed the derived attribute ‘direct/stopover’ as this can be inferred from the cardinality of the result of the join of relations ‘route’ and ‘Stopover airports of the route.’We have read that the derived attributes can be included while defining ‘views’ for the database.
(<https://stackoverflow.com/questions/14526140/mysql-calculate-derived-attribute>)
- We had used SSN as ID for Passenger, whereas we had used the Aadhar card as ID for airport and airline employees. For improved consistency, we have changed the ID mode of PASSENGER from SSN to Aadhar card number.
- We have removed the attribute “COVID Zone of current address” from the PASSENGER entity after discussion with the TA. The attribute would have been useless in the post-COVID era. Also, modifying the SCHEMA to remove this attribute while the DB was already in use in real-life is not a good practice. Hence, we took this step to prevent modifying the schema after the DB is launched in phase 4.

2-NF changes

- **Addition of relation ‘PNR INFO DEDUCTION’**
In 1-NF form, the BOARDING PASS relation contains a functional dependency as follows :
{PNR number}-> {Scheduled Boarding Time, Class of Travel, Terminal number}. Here, {PNR Number} is a subset of the candidate key {PNR Number+Seat} and ‘Scheduled Boarding Time, Class of Travel, Terminal number’- all 3 are non-prime attributes. Hence, we add a separate relation ‘PNR INFO DEDUCTION’ to take care of this.
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3 NF changes

❖ (Boarding pass barcode -> PNR number) in Baggage(Luggage) relation

Comments: Each baggage is associated with a boarding pass id and a PNR. Here, there is a functional dependency of **Boarding Pass ID-> PNR**. Here, BOARDING PASS ID is not a superkey, and also, PNR is a non-prime attribute. So, we have removed PNR from the LUGGAGE relation. **But we didn't need to add a new table** as the BOARDING PASS relation already has <BOARDING PASS ID, PNR> as a sub tuple.

❖ (Aadhar card number of passenger -> {FName,MiddleName,LastName}) in 'Boarding pass' relation

Comments: For the boarding pass entity, the Aadhar card number is not a superkey, and also, FName, MiddleName, LastName are non-prime attributes. So, we removed FName, MiddleName, LastName from the BOARDING PASS relation. **But we didn't need to add a new table** as the PASSENGER entity already has <Aadhar card number, FName, MiddleName, LastName> as a sub-tuple.

❖ {Manufacturer+Plane_model}->'Capacity of Aircraft' in 'Aircraft' relation

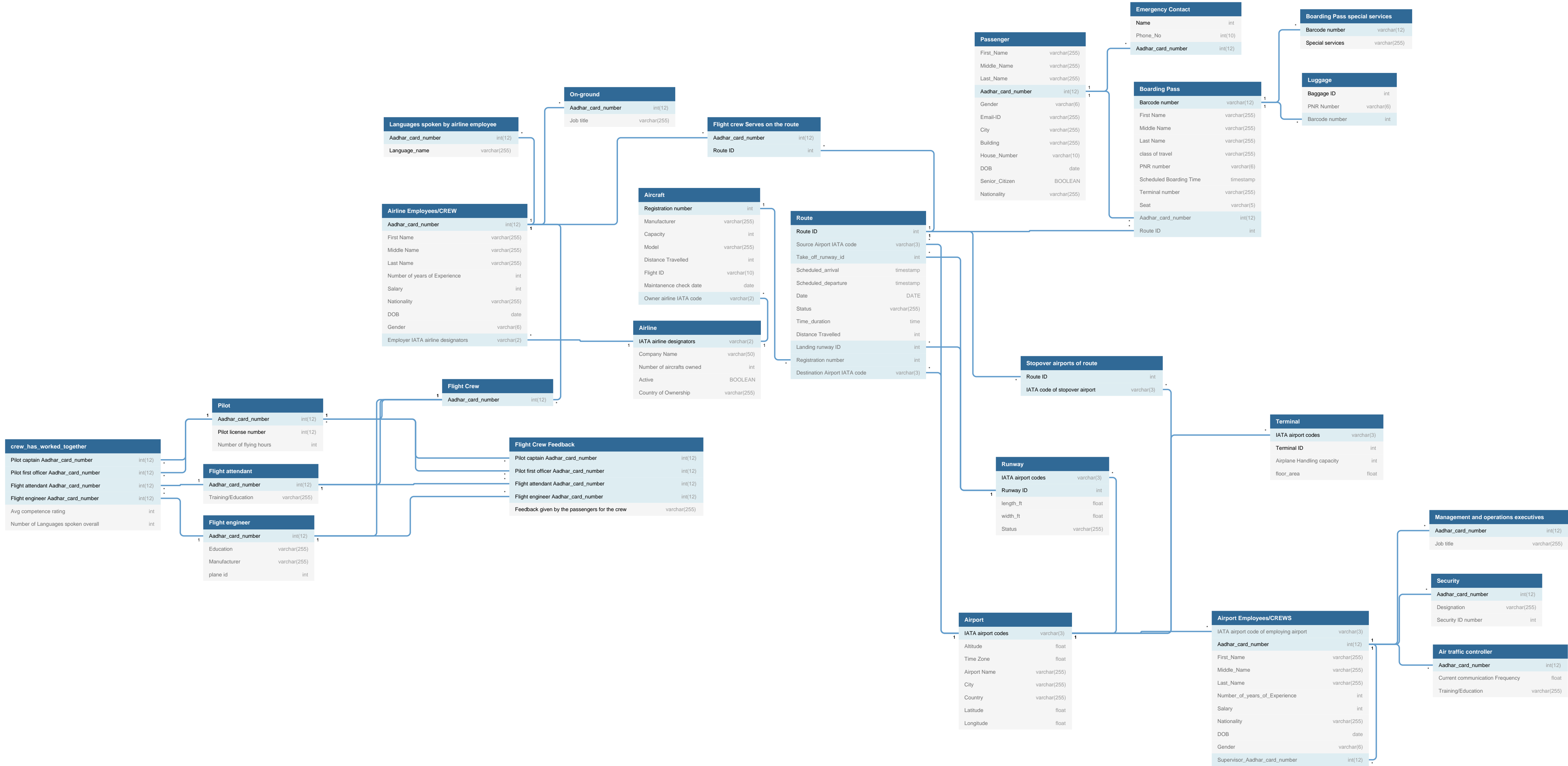
Comments: We added this as {Manufacturer+Plane_Model} is not a superkey, and Capacity is also a non-prime attribute, so this was a valid 3NF violation for which we **created a new relation 'Capacity of Aircraft.'**

1NF can also be found here : <https://dbdiagram.io/d/5f66c27c7da1ea736e2e8668>

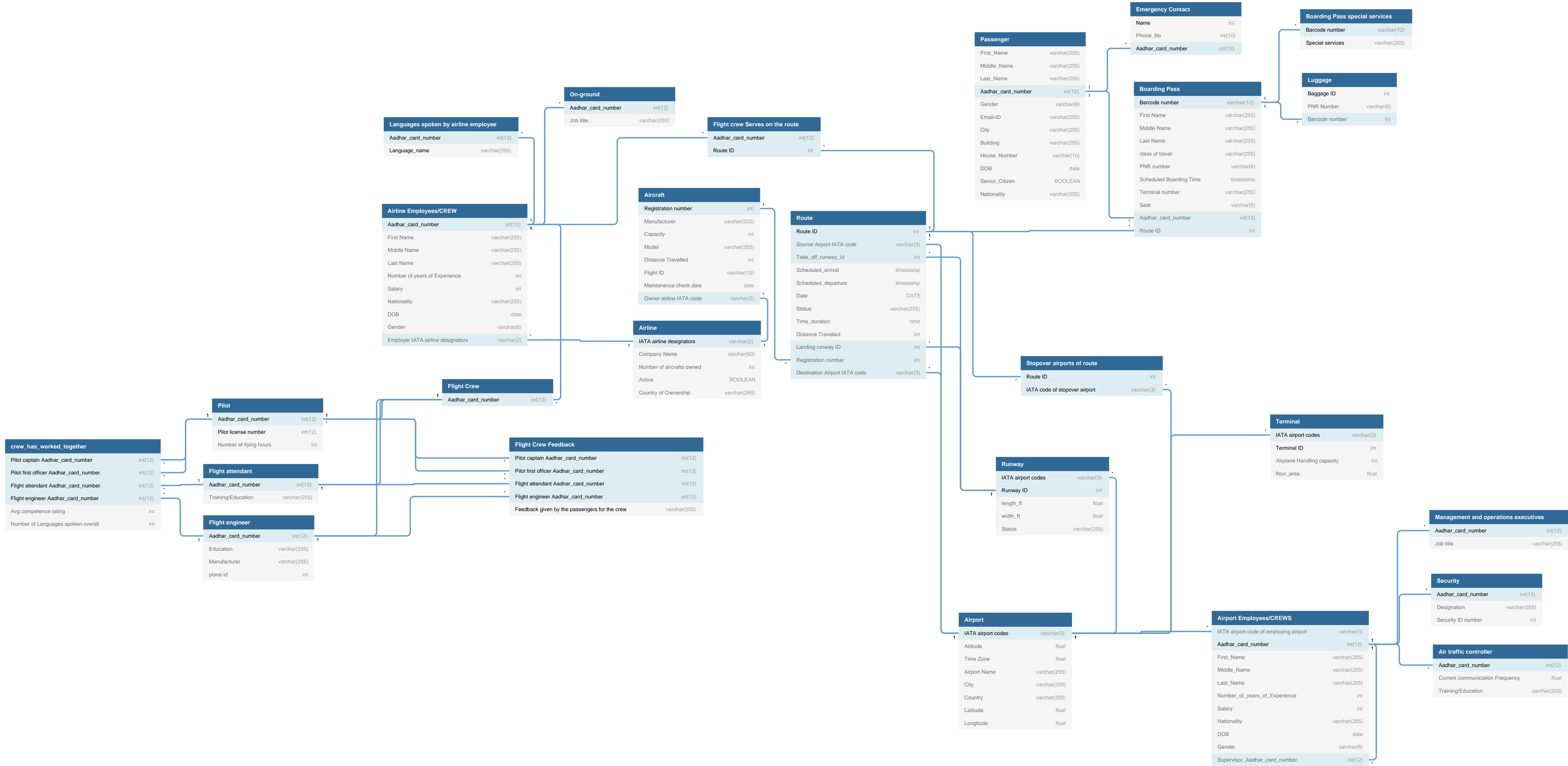
2NF can also be found here : <https://dbdiagram.io/d/5f66df447da1ea736e2e875b>

3NF can also be found here : <https://dbdiagram.io/d/5f66e0ae7da1ea736e2e8766>

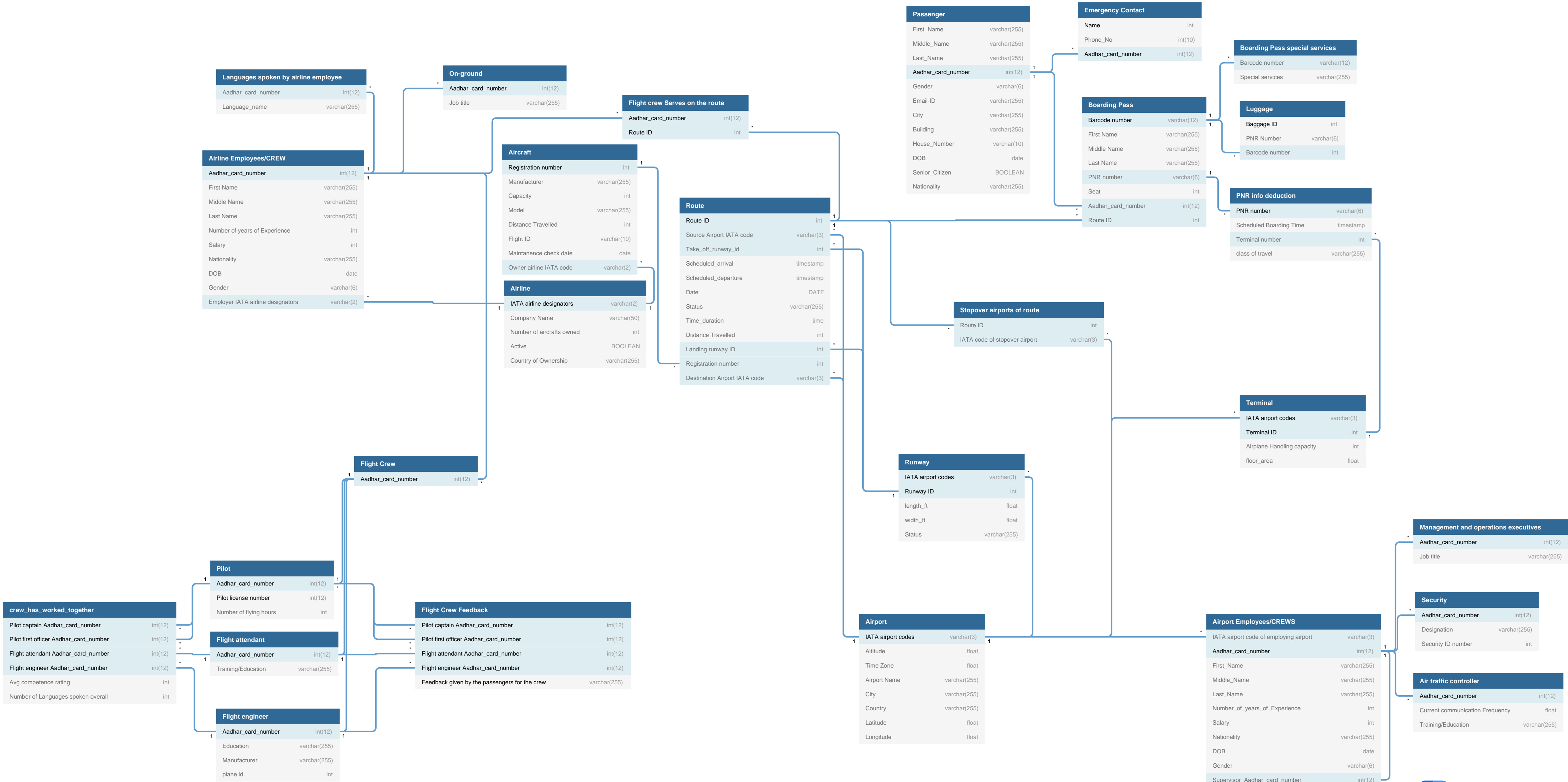
Relational Model (without normalization)



1 NF



2 NF



3 NF

