- The second delivery of the project focuses on the following:
  - Loyalty Program.
  - Performance Enhancement.
  - Profit & Cost Analysis.
- We will follow a reversed approach for time's sake, modeling each business process separately.
- We may find the time to complete the second deliverable before the deadline, if not we will deliver what we have achieved so far!

Step 1

Step one will be modeling the loyalty program business process.

Defining Business Process

- Loyalty Program works as the following:
  - We make agreements with companies called partners.
  - When a frequent flyer (A customer holding a loyalty program card) deal with any of the partners he gets awarded some points called frequent miles.
  - The passenger can collect points also by dealing directly with us.
  - The passenger can redeem these points as a discount on a purchased ticket, as an upgrade on a flight, as extra luggage, or any other service we provide.
  - Not only that, but they can also redeem points into free drinks, free food, hotel rooms, car rental services, or any other service provided by any of our partners.
  - So, it is a 2-way agreement between us and the partners.

Defining Granularity

- We will work on the grain of each transaction made by a frequent flyer using the service of any of the agreement's parties.

Defining Dimensions

1- **TransactionID:** Degenerate Dimension that represents a unique identifier for each transaction.
2- **DateKey:** Foreign key linking to the **DateDim** table for transaction date.
3- **TimeKey:** Foreign key linking to the **TimeOfDayDim** table for transaction time.
4- **PassengerKey:** Foreign key linking to the **PassengerDim** table.
5- **PassengerProfileKey:** Foreign key linking to the **PassengerProfileDim** table.
6- **ServiceKey:** Foreign key linking to a new **ServiceDim** table.
7- **PartnerKey:** Foreign key linking to a new **PartnerDim** table.
8- **Type:** Type of transaction (e.g., Earn or Redeem).

New Dimension Description:

- ServiceDim:
  - A new dimension that describes each service provided by our company and its partners, including:
    - ServiceKey
    - ServiceID
    - Name
    - Description
    - Category (e.g., In-flight service, baggage, booking upgrades, etc.)
    - Sponsorship (fully sponsored, partially sponsored, only 1st tier, etc.)
    - Conditions (any additional conditions that must be applied in order to earn/redeem points from this service)
- PartnerDim:
  - A new dimension for partner companies, it holds the following attributes:
    - PartnerKey
    - PartnerID
    - Name
    - Type (e.g., Airline, Rental Car, Hotel, Retail, etc.)
    - Category (e.g., Partner, sponsor, Subsidiary, etc.)

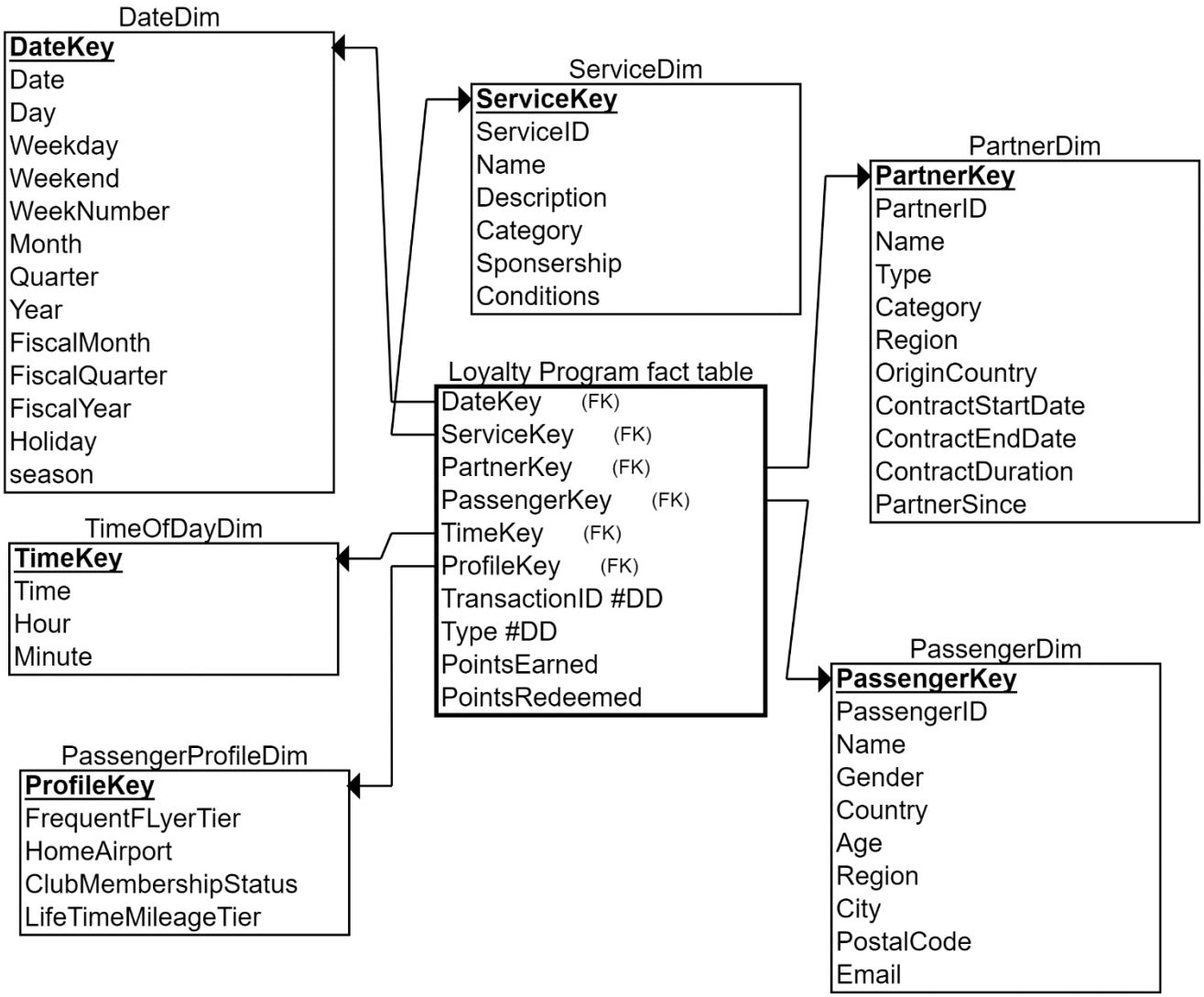
- Region
- OriginCountry
- ContractStartDate
- ContractEndDate
- ContractDuration
- PartnerSince

Defining Measurements

1- **PointsEarned:** Number of points earned in the transaction.
2- **PointsRedeemed:** Foreign key linking to the **DateDim** table for transaction date.

Now as we have integrated all flyer miles transactions together, we can fully analyze how passengers earn and redeem frequent flyer miles.

Model



Step 2

Step two will be creating aggregated fact tables on top of existing ones

- It is always a tradeoff between disk usage and performance, but in most cases, we will prioritize time/performance over storage in DWH.
- So, in this step we will create pre-aggregated fact table to get red of aggregation on run time.

ReservationsAgg Fact Table:

- We will create a monthly aggregated fact table on top of reservations fact table.
- The book suggests creating a 90-day aggregated fact table to capture reservations, but I don't see why 90 days, so we will make it a monthly grained fact table.

Defining Business Process:

- Flight Reservations.

Defining Granularity:

- Monthly.

Defining Dimension:

1- **MonthKey:** Foreign key linking to a new **DateDim** table (points to a row indicating start of month e.g. 1/1/2024).

2- **SrcAirportKey:** Foreign key linking to a new **Airport** table.

3- **DstAirportKey**: Foreign key linking to a new **Airport** table.

4- **ChannelKey**: Foreign key linking to a new **ChannelDim** table.

5- **ClassKey**: Foreign key linking to a new **ClassDim** table.

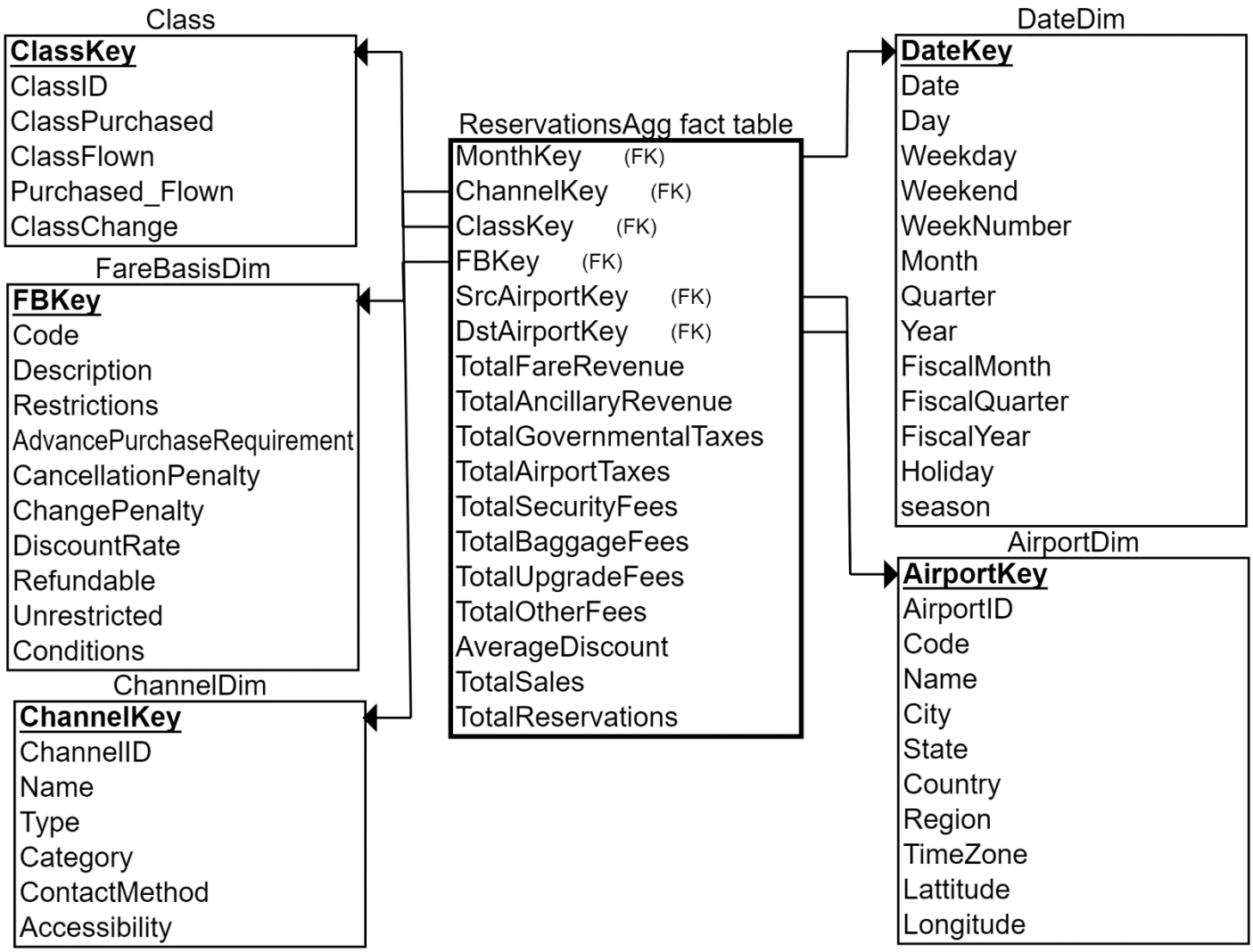
6- **FareBasisKey**: Foreign key linking to a new **FareBasisDim** table.

- Using this table, we could get our monthly sales for a specific airport for example in a much faster manner.

Defining Measurements:

- **TotalReservations:** The total number of reservations made in the month.
- **TotalFareRevenue**: Sum of TotalFare from the Reservations fact table.
- **TotalAncillaryRevenue**: Sum of AncillaryRevenue.
- **TotalGovernmentalTaxes**: Sum of GovernmentalTaxes.
- **TotalAirportTaxes**: Sum of AirportTaxes.
- **TotalSecurityFees**: Sum of SecurityFees.
- **TotalBaggageFees**: Sum of BaggageFees.
- **TotalUpgradeFees**: Sum of UpgradeFees.
- **TotalOtherFees**: Sum of OtherFees.
- **AverageDiscount**: Average of Discount applied.
- **TotalSales**: Sum of all charges – discount.

Model



FlightsAgg Fact Table:

- We will create a monthly aggregated fact table on top of flight activity fact table.
- We will create a monthly fact table to capture flights organized by the company over each month.

Defining Business Process:

- Flights.

Defining Granularity:

- Monthly.

Defining Dimension:

1- **MonthKey:** Foreign key linking to a new **DateDim** table (points to a row indicating start of month e.g. 1/1/2024).

2- **SrcAirportKey:** Foreign key linking to a new **AirportFim** table.

3- **DstAirportKey:** Foreign key linking to a new **AirportFim** table.

4- **AircraftKey**: Foreign key linking to a new **AircraftDim** table.

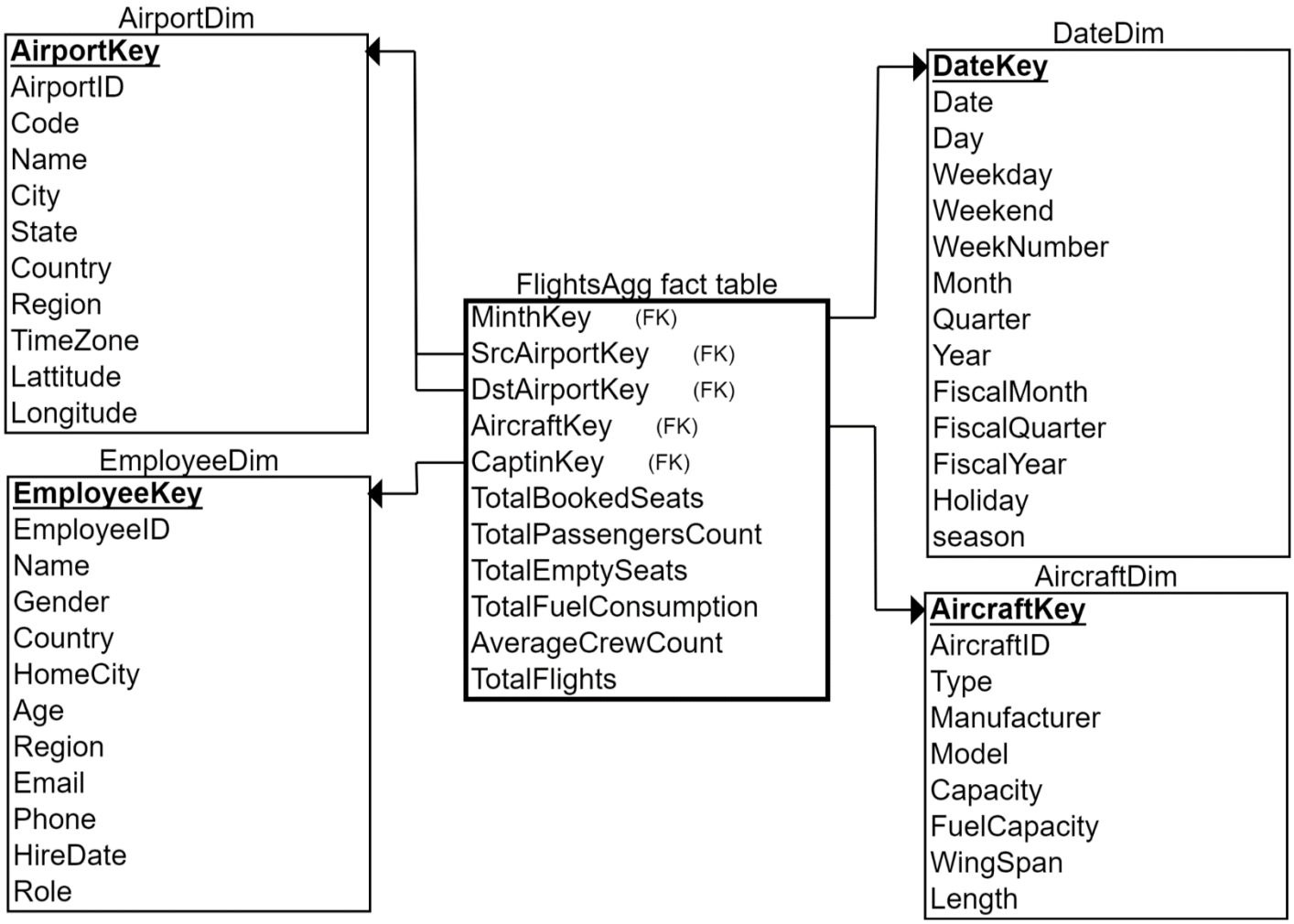
5- **CaptainKey**: Foreign key linking to a new **EmployeeDim** table.

- Using this table, we could get the number of monthly flights for each airport in a much faster manner.

Defining Measurements:

- **TotalFlights:** The total number of flights during the month.
- **TotalPassengers:** Sum of PassengersCount.
- **TotalEmptySeats:** Sum of EmptySeats.
- **TotalFuelConsumption:** Sum of FuelConsumption.
- **AverageCrewCount:** Average of CrewCount per flight.
- **TotalBookedSeats:** Sum of BookedSeats.

Model



Step 3

Step three will be Analyzing profit.

Problem statement:

- We don't provide a product that has a selling cost, we provide a service and the only cost we have is operational cost like:
  - Salaries, commissions, fuel, marketing, etc.
- So, we couldn't just put the cost or the profit as a measurement on the reservations' fact (for finance team), because we can't calculate the cost of a ticket!
- In the previous deliverable we calculated earned revenue, but here we will calculate the actual profit.

- Maintenance itself is a separate business process, and so is HR (for salaries), so is marketing campaigns, and so on.
- With the given timeframe we can't create a model to cover all these business process in order to have control over all cost and revenue sources.
- Instead, we will assume that stockholders are only interested in in analyzing profit (cost and revenue) rather than deeply analyzing the underlying business process for this cost entry.

Expenses Fact Table:

- In this fact table we will capture all company's expenses.
- Then we will integrate this table with monthly reservations fact table to create a 3-month-aggregated-profit-analysis fact table!

Defining Business Process:

- This business process captures each expense entry issued from us.
- We will capture money paid for maintenance, flight operations, salaries, marketing campaigns, commissions, etc.

Defining Granularity:

- Each expense Entry will be represented in a single row.

Defining Dimension:

1. **CostID:** Degenerate Dimension that represents a unique identifier for each cost entry.
2. **DateKey:** Foreign key Linking to **DateDim** to record when the transaction accured.
3. **TimeKey:** Foreign key Linking to **TimeOfDayDim** to record when the transaction accured.
4. **CostTypeKey:** Foreign key Linking to **CostTypeDim.**

5. **FlightKey** (optional): If costs can be directly associated with specific flights, link to **FlightDim**.
6. **DepartmentKey** (optional): Link to a **DepartmentDim**; if costs need to be tracked by department (e.g., maintenance, crew, ground services).
7. **AirportDim** (optional): If costs can be directly associated with specific airports, link to **AirportDim**.
8. **AircraftDim** (optional): If costs can be directly associated with specific aircraft, link to **AircraftDim**.

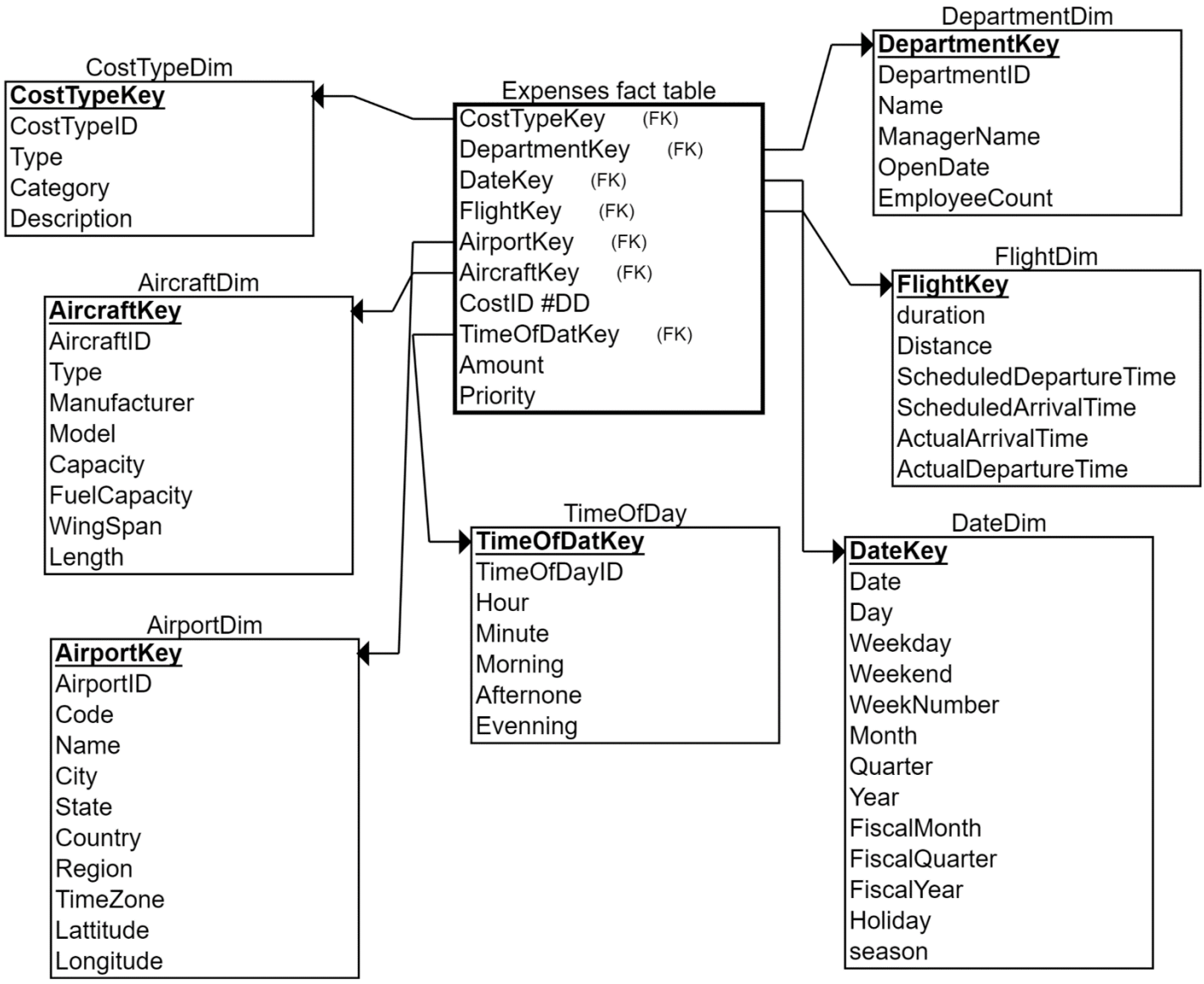
New Dimension Description:

- CostTypeDim:
  - A new dimension that describes the type of cost entry.
  - Categorizes each type of cost.
  - e.g., maintenance, salaries, commissions, marketing.
    - CostTypeKey
    - CostTypeID
    - Type (e.g., Maintenance, Salaries, Commissions, Marketing, etc.)
    - Category (e.g. Operational, HR, Marketing, etc.)
    - Description
- DepartmentDim:
  - A new dimension describing the department associated with this cost Entry.
    - DepartmentKey
    - DepartmentID
    - Name
    - ManagerName
    - OpenDate
    - EmployeesCount

Defining Measurements:

- **Amount:** The monetary amount of the cost.
- **Priority:** How much this cost entry is crucial as a scale from 1 to 10.

Model



- Now we have modeled revenues in the ReservationsAgg Fact table and modeled expenses (cost) in Expenses Fact Table.
- But we need to integrate both fact table to analyze profit as:
  - Profit=Total Revenue−Total Costs
- We will create a monthly aggregated fact table to capture the company's profit.
- This fact table will be created on top of 2 fact tables (ReservationsAgg and expenses)

Profit Fact Table:

- We will create a monthly aggregated profit fact table integrating both Expenses fact table and Reservations aggregated fact table.
- This fact table will combine monthly revenues and monthly expenses in order to analyze monthly profit.

Defining Business Process:

- Integrating Expenses Business Process with Revenue Business Process to calculate the company's profit.

Defining Granularity:

- Monthly.

Defining Dimension:

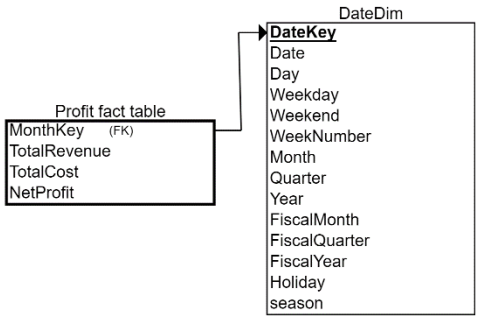
1- **MonthKey:** Foreign key linking to a new **DateDim** table (points to a row indicating start of month e.g. 1/1/2024).

- We will aggregate Expenses fact table on monthly basis, then join the aggregated table with Reservations monthly aggregated table using month to form the monthly aggregated profit table.

Defining Measurements:

- **TotalRevenue:** The total monthly revenue
  - **TotalSales** attributable in ReservationsAgg monthly aggregated fact.
- **TotalCost:** Sum of all cost-related figures for the month from the Expenses fact table.
- **NetProfit:** TotalRevenue - TotalCost.

Model



Second Delivery's Model