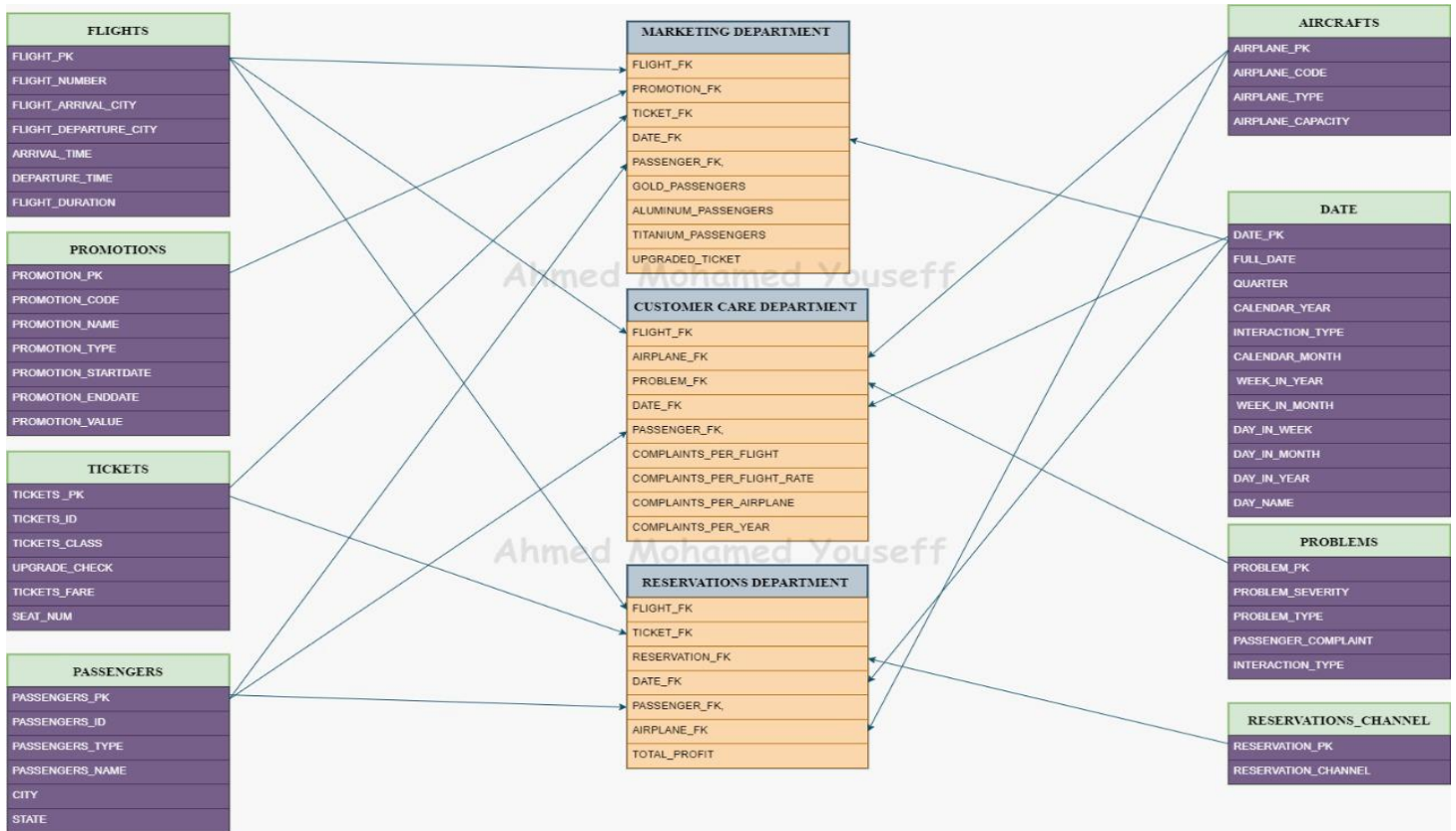


Name : Ahmed Mohamed Youseff

Logical model description



Use Galaxy Schema because the case study has 3 business processes

Fact table:

- Marketing
- Reservation
- Customer Care

Dimensions table:

- Flights
- Passengers
- Problems
- Promotions
- Tickets
- Date
- Aircrafts
- Reservation Channel

Marketing Fact Table: connected to five Dimension Tables

- ❖ **Promotions:** cover promotions offered by the airline company and their values
- ❖ **Passengers :** cover personal information of passenger and traveling miles and their type (Aluminum, Gold, Platinum, or Titanium)
- ❖ **Date :** represents the date at which the ticket has been bought and other important dates
- ❖ **Tickets :** cover the reserved ticket and the seat number. Upgrade column is by default 0 mean ticket class has been not upgraded and 1 if ticket class has been upgraded
- ❖ **Flights :** cover the flight destination and departure city. It also shows the flight duration

Customer Care Fact Table: connected to five Dimension Tables

- ❖ **Passengers :** cover personal information of passenger and traveling miles and their type (Aluminum, Gold, Platinum, or Titanium)
- ❖ **Date :** represents the date at which the ticket has been bought and other important dates
- ❖ **Flights :** cover the flight destination and departure city. It also shows the flight duration
- ❖ **Aircrafts :** This allows the finance team to keep track of the company's expenses
- ❖ **Problems :** represents passenger complaints and the level of the problem

Reservation Fact Table: connected to six Dimension Tables

- ❖ **Passengers :** cover personal information of passenger and traveling miles and their type (Aluminum, Gold, Platinum, or Titanium)
- ❖ **Date :** represents the date at which the ticket has been bought and other important dates
- ❖ **Tickets :** cover the reserved ticket and the seat number. Upgrade column is by default 0 mean ticket class has been not upgraded and 1 if ticket class has been upgraded
- ❖ **Flights :** cover the flight destination and departure city. It also shows the flight duration
- ❖ **Reservation Channel :** represents the channel used to book the ticket
- ❖ **Aircrafts :** This allows the finance team to keep track of the company's expenses

physical data model

Use SQL Server To Create Table And Schema

```
--Ahmed Mohamed Youseff
USE DWHAIRLINE
----Create Dimension Tables
CREATE TABLE TICKETS (
    TICKET_PK INT PRIMARY KEY,
    TICKET_ID VARCHAR(100),
    TICKETS_CLASS VARCHAR(100),
    TICKETS_FARE NUMERIC,
    SEAT_NUM NUMERIC(4),
    UPGRADE_CHECK NUMERIC(1) );

CREATE TABLE PROMOTIONS (
    PROMOTION_PK INT PRIMARY KEY,
    PROMOTION_CODE VARCHAR(100),
    PROMOTION_NAME VARCHAR(100),
    PROMOTION_TYPE VARCHAR(100),
    PROMOTION_STARTDATE DATE,
    PROMOTION_ENDDATE DATE,
    PROMOTION_VALUE NUMERIC(8,2) );

CREATE TABLE T_DATE (
    DATE_PK INT PRIMARY KEY,
    FULL_DATE DATE,
    CALENDAR_YEAR NUMERIC(4),
    QUARTER NUMERIC(1),
    CALENDAR_MONTH NUMERIC(2),
    WEEK_IN_YEAR NUMERIC(3),
    WEEK_IN_MONTH NUMERIC(2),
    DAY_IN_WEEK NUMERIC(1),
    DAY_IN_MONTH NUMERIC(2),
    DAY_IN_YEAR NUMERIC(4),
    DAY_NAME VARCHAR(100));

CREATE TABLE AIRCRAFTS (
    AIRPLANE_PK INT PRIMARY KEY,
    AIRPLANE_CODE VARCHAR(100),
    AIRPLANE_TYPE VARCHAR(100),
    AIRPLANE_CAPACITY NUMERIC(6) );

CREATE TABLE FLIGHTS(
    FLIGHT_PK INT PRIMARY KEY,
    FLIGHT_NUMBER NUMERIC,
    FLIGHT_ARRIVAL_CITY VARCHAR(100),
    FLIGHT_DEPARTURE_CITY VARCHAR(100),
    ARRIVAL_TIME DATE,
    DEPARTURE_TIME DATE,
    FLIGHT_DURATION NUMERIC);

CREATE TABLE PASSENGERS(
    PASSENGER_PK INT PRIMARY KEY,
    PASSENGER_ID NUMERIC,
    PASSENGER_TYPE VARCHAR(100),
    PASSENGER_NAME VARCHAR(100),
    CITY VARCHAR(100),
    STATE VARCHAR(100));

CREATE TABLE RESERVATIONS_CHANNEL(
    RESERVATION_PK INT PRIMARY KEY,
    RESERVATION_CHANNEL VARCHAR(100));
```

```

CREATE TABLE PROBLEMS(
    PROBLEM_PK INT PRIMARY KEY,
    PROBLEM_SEVERITY VARCHAR(100),
    PASSENGER_COMPLAINT VARCHAR(100),
    INTERACTION_TYPE VARCHAR(100));

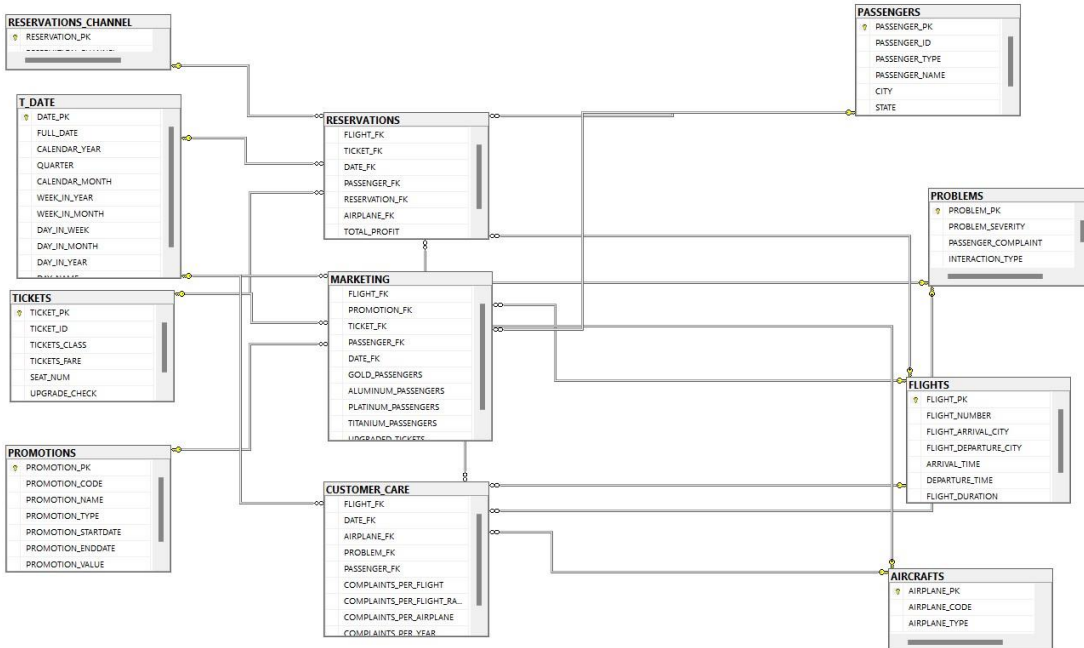
-- Create Fact Tables
CREATE TABLE MARKETING(
    FLIGHT_FK INT,
    PROMOTION_FK INT,
    TICKET_FK INT,
    PASSENGER_FK INT,
    DATE_FK INT,
    GOLD_PASSENGERS NUMERIC,
    ALUMINUM_PASSENGERS NUMERIC,
    PLATINUM_PASSENGERS NUMERIC,
    TITANIUM_PASSENGERS NUMERIC,
    UPGRADED_TICKETS NUMERIC);

CREATE TABLE CUSTOMER_CARE(
    FLIGHT_FK INT,
    DATE_FK INT,
    AIRPLANE_FK INT,
    PROBLEM_FK INT,
    PASSENGER_FK INT,
    COMPLAINTS_PER_FLIGHT NUMERIC,
    COMPLAINTS_PER_FLIGHT_RATE NUMERIC,
    COMPLAINTS_PER_AIRPLANE NUMERIC,
    COMPLAINTS_PER_YEAR NUMERIC);

CREATE TABLE RESERVATIONS(
    FLIGHT_FK INT,
    TICKET_FK INT,
    DATE_FK INT,
    PASSENGER_FK INT,
    RESERVATION_FK INT,
    AIRPLANE_FK INT,
    TOTAL_PROFIT NUMERIC);

```

AHMEDYOUSSEF.DW...LINE - Diagram_0



Generating test data Using dbforgesql Studio

The screenshot shows the dbForge SQL Studio interface. The main editor displays a SQL script for inserting data into the `dbo.AIRCRAFTS` table. The script consists of 36 `INSERT` statements, each with a unique `AIRCRAFTS_PK` value and corresponding `AIRPLANE_CODE`, `AIRPLANE_TYPE`, and `AIRPLANE_CAPACITY` values. The interface includes a menu bar, a toolbar, a Database Explorer on the left, and a status bar at the bottom.

```
-- Inserting data into table dbo.AIRCRAFTS
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (1, '80460', 'Airplane', 432)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (2, '19222', 'Helicopter', 4332)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (3, '86849', 'Airplane', 3206)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (4, '08276', 'Helicopter', 1073)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (5, '23003', 'Helicopter', 2648)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (6, '68767', 'Airplane', 3038)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (7, '47864', 'Helicopter', 2520)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (8, '44963', 'Airplane', 1292)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (9, '15878', 'Helicopter', 893)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (10, '40093', 'Helicopter', 2169)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (11, '75351', 'Airplane', 4158)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (12, '34115', 'Helicopter', 2198)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (13, '89169', 'Helicopter', 1546)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (14, '37957', 'Helicopter', 4270)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (15, '05398', 'Helicopter', 2475)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (16, '69532', 'Airplane', 630)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (17, '93261', 'Airplane', 854)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (18, '76457', 'Airplane', 723)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (19, '33589', 'Airplane', 767)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (20, '32014', 'Airplane', 912)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (21, '80231', 'Helicopter', 4567)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (22, '16874', 'Helicopter', 2452)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (23, '01414', 'Helicopter', 3084)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (24, '51627', 'Airplane', 312)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (25, '82218', 'Helicopter', 2353)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (26, '38423', 'Helicopter', 4474)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (27, '55629', 'Helicopter', 706)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (28, '76086', 'Airplane', 2140)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (29, '96465', 'Helicopter', 3644)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (30, '24936', 'Helicopter', 4331)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (31, '85820', 'Airplane', 1158)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (32, '48781', 'Airplane', 4168)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (33, '84404', 'Airplane', 2379)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (34, '62008', 'Helicopter', 2128)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (35, '94299', 'Airplane', 1834)
INSERT dbo.AIRCRAFTS(AIRCRAFTS_PK, AIRPLANE_CODE, AIRPLANE_TYPE, AIRPLANE_CAPACITY) VALUES (36, '47426', 'Airplane', 4140)
```

The screenshot shows the dbForge SQL Studio interface with the Data Generator tab selected. The 'Tables and columns to populate' list includes `dbo.AIRCRAFTS (1000)`, `dbo.CUSTOMER_CARE (1000)`, `dbo.FLIGHTS (1000)`, `dbo.MARKETING (1000)`, `dbo.PASSENGERS (1000)`, `dbo.PROBLEMS (1000)`, `dbo.PROMOTIONS (1000)`, `dbo.RESERVATIONS (1000)`, `dbo.RESERVATIONS_CHANNEL (1000)`, `dbo.sysdiagrams (1000)`, `dbo.T_DATE (1000)`, and `dbo.TICKETS (1000)`. The 'Row distribution mode' is set to 'By specified number of' with a value of 1,000 rows. The 'Truncate data from table before generation' checkbox is checked. The 'Preview of data to be generated (first 50 rows of 1000)' shows a table with columns `PROBLEM_PK`, `PROBLEM_SEVERITY`, `PASSENGER_COMPLAINT`, and `INTERACTION_TYPE`.

PROBLEM_PK	PROBLEM_SEVERITY	PASSENGER_COMPLAINT	INTERACTION_TYPE
1	severe	flight_cancellation	survey
2	Mild	Passport_loss	letter
3	extreme	Passport_loss	email
4	severe	Passport_loss	email
5	Mild	flight_delay	letter
6	extreme	flight_cancellation	letter