

AIRLINES DATA ANALYSIS



Project Overview : This project analyzes an airline dataset of **300,000+ flight records** to uncover business insights using **PostgreSQL** and visualize them with **Power BI**.

The dataset includes flight details such as airline, route, stops, duration, ticket class, price, and booking lead time.



Tools we used in an Airlines Data Analytics Project :

1. Data Storage & Preparation

- Microsoft Excel
- Google Sheet
- Python (Data preprocessing, cleaning if required)

2. Data Transformation & Querying

- SQL (Structured Query Language) Filtering, grouping, bucketing, aggregation, joins)
- Views / CTEs (Create reusable logical tables in SQL)
- Window Functions (Ranking, running averages, percentiles)

3. Data Visualization & Reporting

- Power BI Desktop (Primary dashboard & visualization tool)
- Power Query (inside Power BI) Clean, reshape, and transform data
- DAX (Data Analysis Expressions)
- PowerPoint (For final presentation with visual insights from Power BI)



Execution Blueprint :

1. **Import** the CSV into a SQL database (e.g., PostgreSQL).
2. **Run SQL queries** to validate metrics and exports for reference.
3. **Load cleaned data into Power BI.**
4. **Define relationships**, create dimension tables, and establish modeling.
5. **Build dashboard pages**
6. **Add interactivity** via slicers (Class, Stop).
7. **Annotate insights:** highlight top performers, anomalies, and recommendations.

SQL Business Queries

1. List all distinct airlines
2. Count total flights
3. Total Flights by source city
4. Total Flights by destination city
5. Flight count per airline
6. Class-wise ticket distribution
7. Top 5 most common routes
8. Average ticket price by class
9. Minimum and maximum price
10. How Many Flights with non-stop route
11. How many Flights with 1 or more stops
12. Flights departing from a specific city with the specific time(e.g., morning)
13. Flights arriving from a specific city with the specific time(e.g., morning)
14. Total Revenue per Airlines

Medium Queries

1. Average price per route
2. Average days left before departure
3. Class-wise average days left
4. Routes with average price above 10,000
5. Flight count per stop type
6. Average price per stop type
7. Top 5 most expensive flights
8. Flights with more than 15 days left and price < 5000
9. Revenue by source city
10. Revenue by destination city
11. Route profitability ranking
12. Flights by time of day
13. Flight distribution by class and stop type
14. Price range per airline
15. Average duration per route
16. Flights within a specific price range
17. Flights grouped by days left buckets
18. Airline with highest average ticket price

Advanced Queries

1. Rank flights by price per route
2. Running total revenue per airline
3. Moving average of price (last 3 flights by airline)
4. Compare price of non-stop vs 1-stop flights
5. Time-based price analysis (day buckets vs price)
6. Rank cheapest flights per airline
7. Dense rank of flight duration per route
8. Compare current price with previous flight on same route --[LAG()>value in previous row]
9. Show future price for same route --[LEAD()> value in next row]
10. Divide all flights into 4 price quartiles --[NTILE(n)-Divides rows into n equal buckets]
11. Show first and last recorded price for each route --[FIRST_VALUE() | LAST_VALUE()]
12. Show 3rd cheapest flight per airline --[NTH_VALUE() Returns the nth value in the window]
13. Flight count per route visible on each row
14. flight moving average per airline

BONUS

Create View for Airlines Analysis

