Airline Performance Analysis Report

1. Project Title

Airline Performance Analysis Using Power BI

2. Objective

The primary objective of this project is to analyze airline data related to flights, booking statuses, passenger counts, and performance ratings using Power BI. The goal is to create a comprehensive, interactive dashboard that enables stakeholders to monitor flight operations, identify delays or cancellations, and understand passenger trends and service quality metrics.

3. Tools & Technologies Used

- Power BI Desktop – for data transformation, modeling, and visualization
- Power Query – for cleaning and merging datasets
- DAX (Data Analysis Expressions) – for creating custom measures and calculations
- Power BI Service – for publishing, sharing, and setting refresh schedules

4. Datasets Used

- Flight_Information.csv – Contains FlightID, FlightNumber, Airline, Destination, Status
- Passenger_Information.csv – Contains PassengerID, FlightID, SeatNumber
- Ticket_Information.csv – Contains TicketID, FlightID, BookingStatus

5. Process Overview

1. A. Data Preparation & Cleaning

- Imported all three CSV datasets into Power BI
- Handled missing values, removed duplicates, and formatted columns (e.g., date fields, text casing)
- Performed Left Join merges to preserve all flight records even if some had no ticket data

2. B. Data Transformation & Modeling

- Created relationships between FlightID in all tables
- Created calculated columns for:
   - Flight Rating: Based on status (e.g., Best for On-Time, To Be Improved otherwise)
   - Conditional formatting for status colors
- Created DAX measures such as:
   - Total Flights
   - Total Passengers
   - Total Tickets
   - % Share of Flights by Airline

3. C. Visualization & Dashboarding

- Created the following visual elements:
  - Table: Flight details with conditional background formatting (Red, Yellow, Green)
  - Donut Chart: Flight Status Breakdown (Cancelled, Delayed, On-Time)
  - Bar Chart: Passengers by Airline
  - Decomposition Tree: Flights by Airline and Destination
  - Matrix Table: Airline-wise performance summary
  - Rating Pie: Ratings of flights (Best vs To Be Improved)
- Used slicers for Airline and Destination filters
- Enabled Drill-through to view detailed insights for a selected airline
- Applied custom titles, color themes, data labels, and visual grouping

6. Key Findings & Insights

- Airline A and Airline D led in flight and passenger count (23 each)
- Houston and Chicago had the highest frequency of delayed and cancelled flights
- Only 34% of flights were on time, with a significant portion delayed (41%) and cancelled (25%)
- Ratings indicate that 59.49% of flights were rated as 'Best,' while 40.51% needed improvement
- Flight punctuality was better for Airline A and Airline C, with Airline B showing the lowest volume and engagement

7. Recommendations

- Investigate reasons for repeated delays in Houston and Chicago routes
- Optimize flight schedules or ground operations for better punctuality
- Maintain and reward high-performing airlines like Airline A
- Use drill-through analysis for focused operational decisions per airline

8. Conclusion

This Power BI-based dashboard provides an interactive, real-time view of airline performance. It enables management to make data-driven decisions, improve flight service reliability, and enhance passenger satisfaction.

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