



# High Cloud Airlines

Leveraging data analytics to optimize airline operations, improve passenger experiences, and drive revenue growth. This project utilizes Excel, Power BI, Tableau, and SQL to deliver actionable insights.

BY GROUP 2

# Project Objectives and Tools

## Analyze Passenger Trends

Identify key factors influencing passenger behavior and preferences to enhance marketing strategies.



## Optimize Passengers

Utilize data to maximize profits.

## Improve Performance

Reduce delays and enhance overall flight operations through predictive analytics.



# Excel: Data Cleaning & Initial Insights

**KPI**  
Making KPI for strategic resource allocation.



## Patterns

Analyzing patterns and their causes to improve performance.

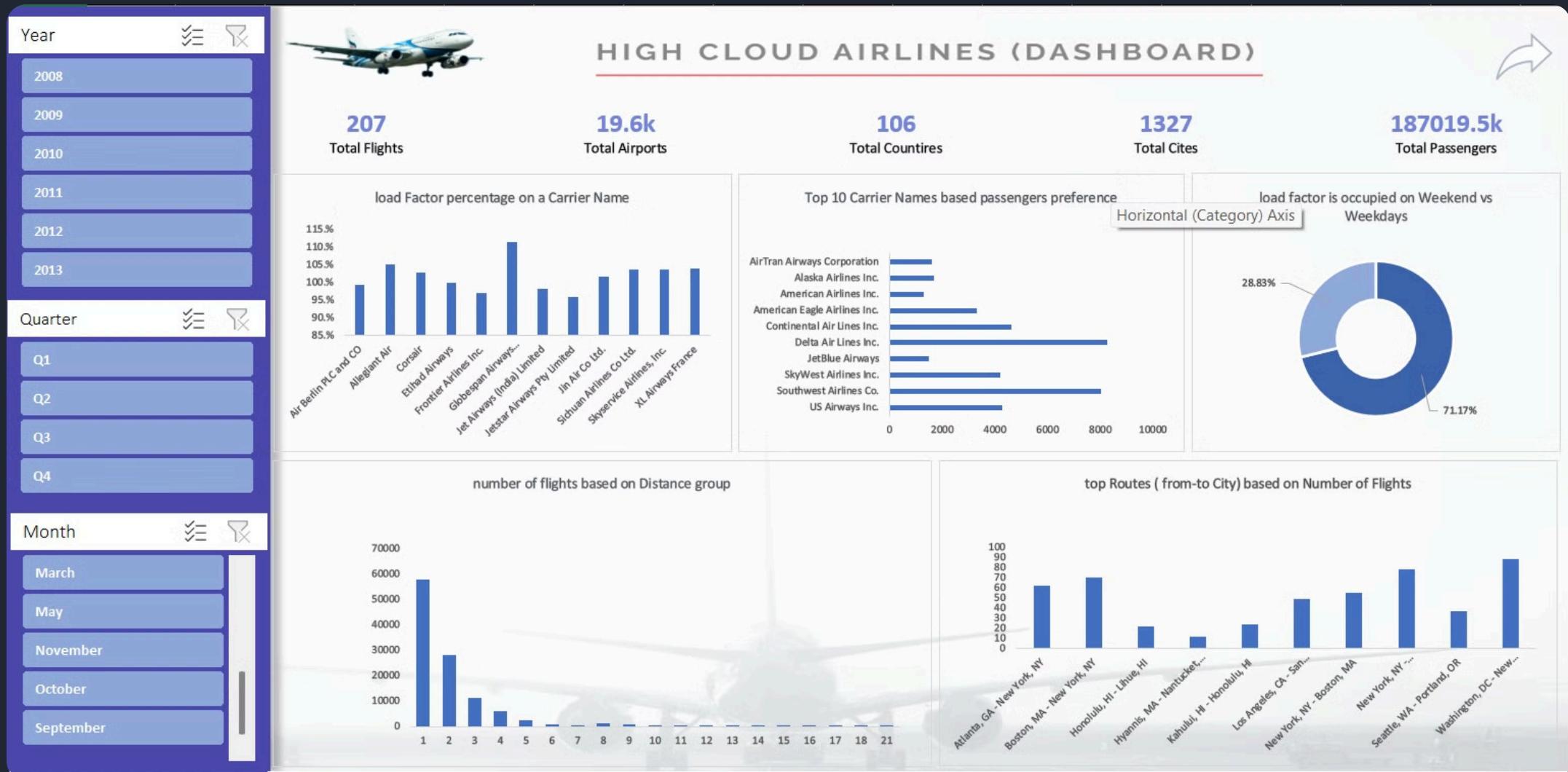
## Load Factor

Understanding Airlines behavior BY the Load Factor

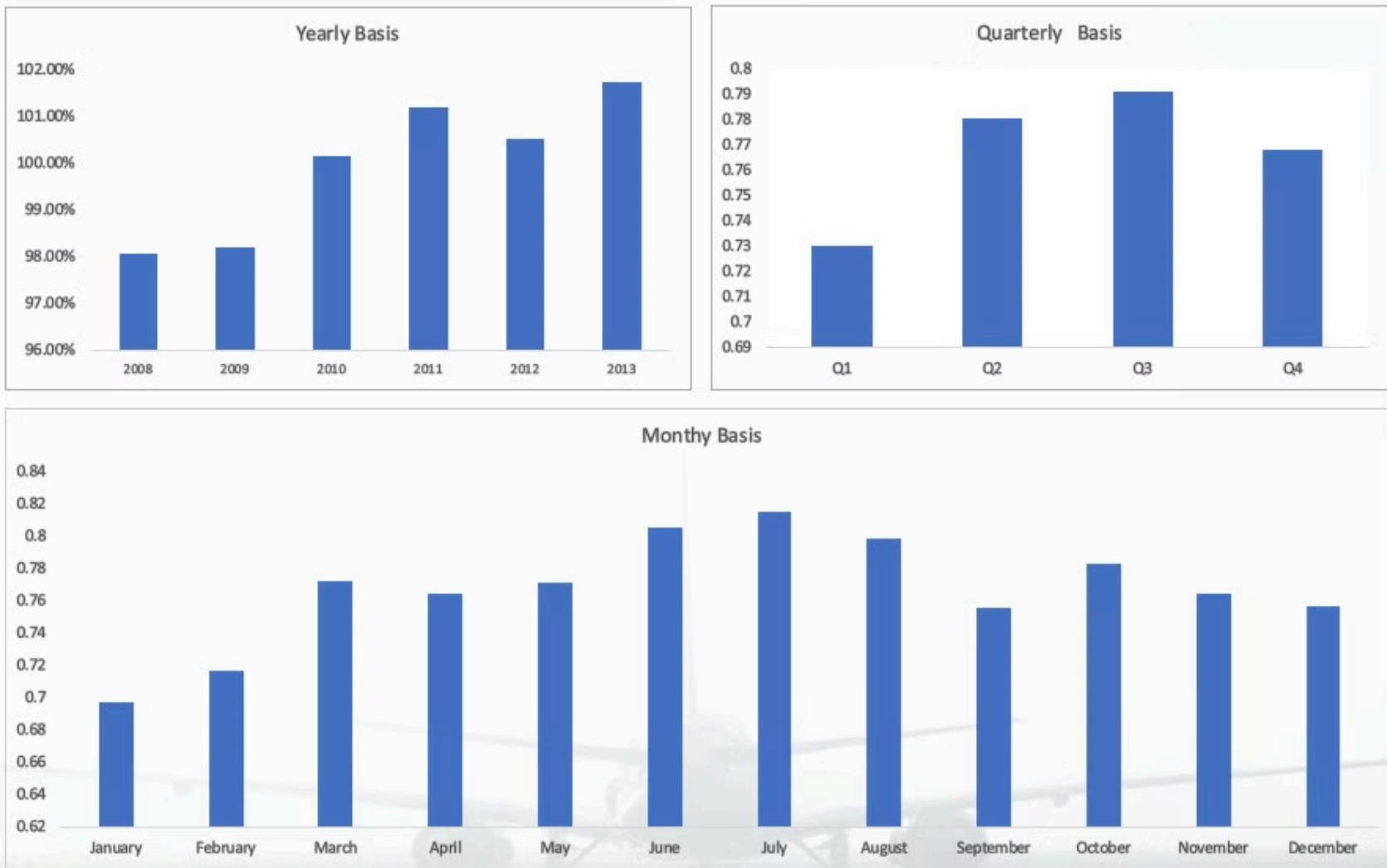


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# Excel Dashboard



### Load Factor percentage on a yearly , Quarterly , Monthly basis ( Transported passengers / Available seats)



# Excel Dashboard Insights

- **Overall Performance:** This dashboard provides a snapshot of High Cloud Airlines' key metrics. We see a significant number of total passengers (187,019.5k), served by a substantial fleet (207 total flights) across a wide network (19.6k airports, 106 countries, and 1327 cities).
- **Load Factor Trends:** The "Load Factor" chart reveals the percentage of available seats filled by passengers. We can analyze this by carrier and identify top performers (e.g., AirTran Airways Corporation showing high utilization). The accompanying pie chart highlights the overall load factor split between weekends and weekdays, giving insights into peak travel times.
- **Passenger Preferences:** The "Top 10 Carrier Names" chart helps us understand customer choices and market share. This information can be used to refine marketing strategies and partnerships.
- **Flight Distribution:** The "Number of Flights Based on Distance Group" chart visualizes flight frequency across different route lengths. This helps in optimizing resource allocation and scheduling.
- **Popular Routes:** The "Top Routes" chart pinpoints the most frequently traveled city pairs. This data is valuable for route planning, pricing decisions, and targeted promotions.



# Power BI: Interactive Dashboards

## Real-Time Data

Power BI provides real-time data connectivity and easy integration with airline databases for up-to-date information.

## Booking Trends

Analyzing passenger booking patterns to anticipate demand and adjust capacity accordingly.

## Revenue Comparison

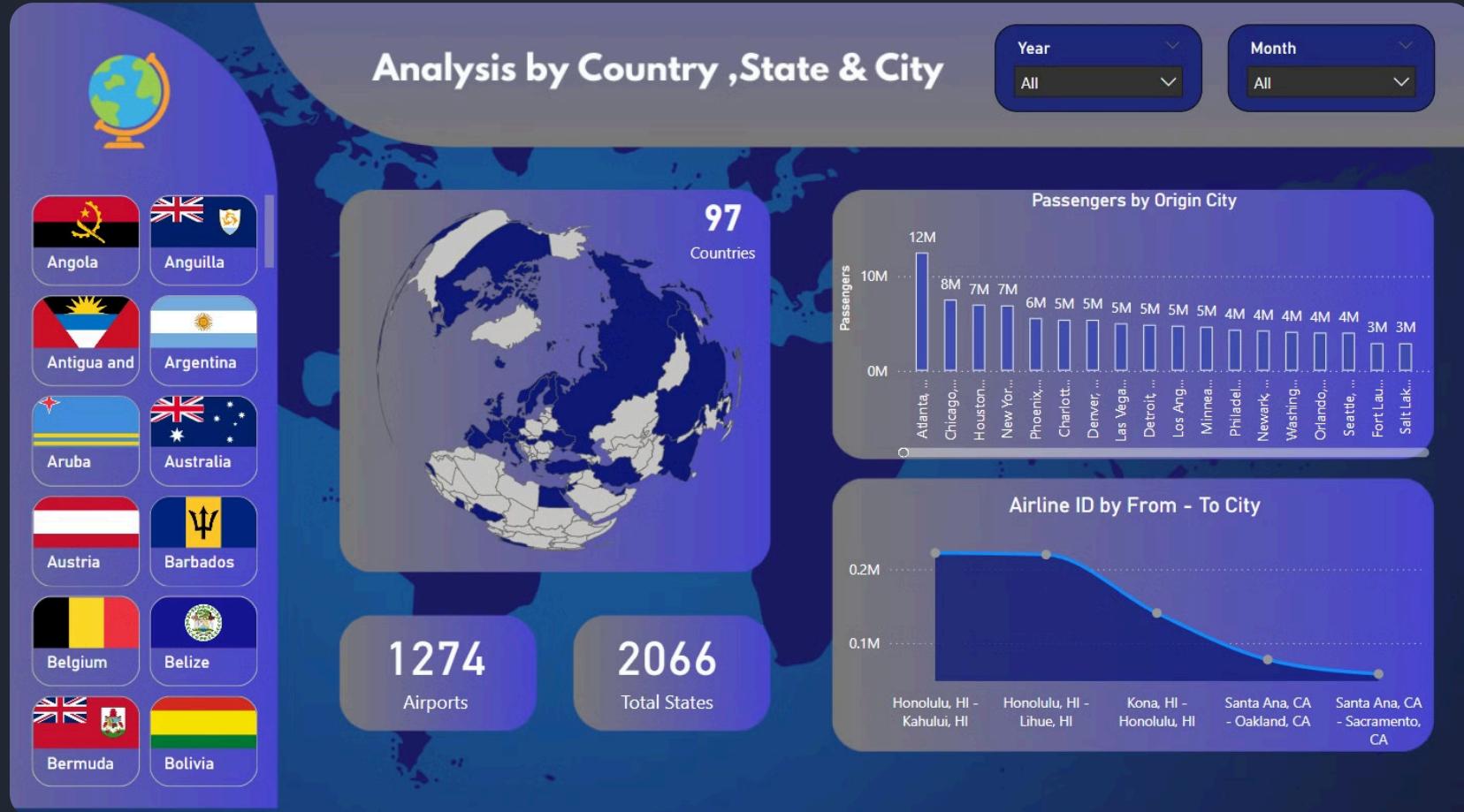
Comparing revenue across different airline classes to optimize pricing strategies.

## INTRO



We see categories like 'Airports', 'Countries', 'Cities', and 'States' along with corresponding numerical values. This suggests an analytical approach, possibly examining High Cloud Airlines' reach and operational scale across 1274 airports, 97 countries, 1176 cities and 67 states.

# Analysis

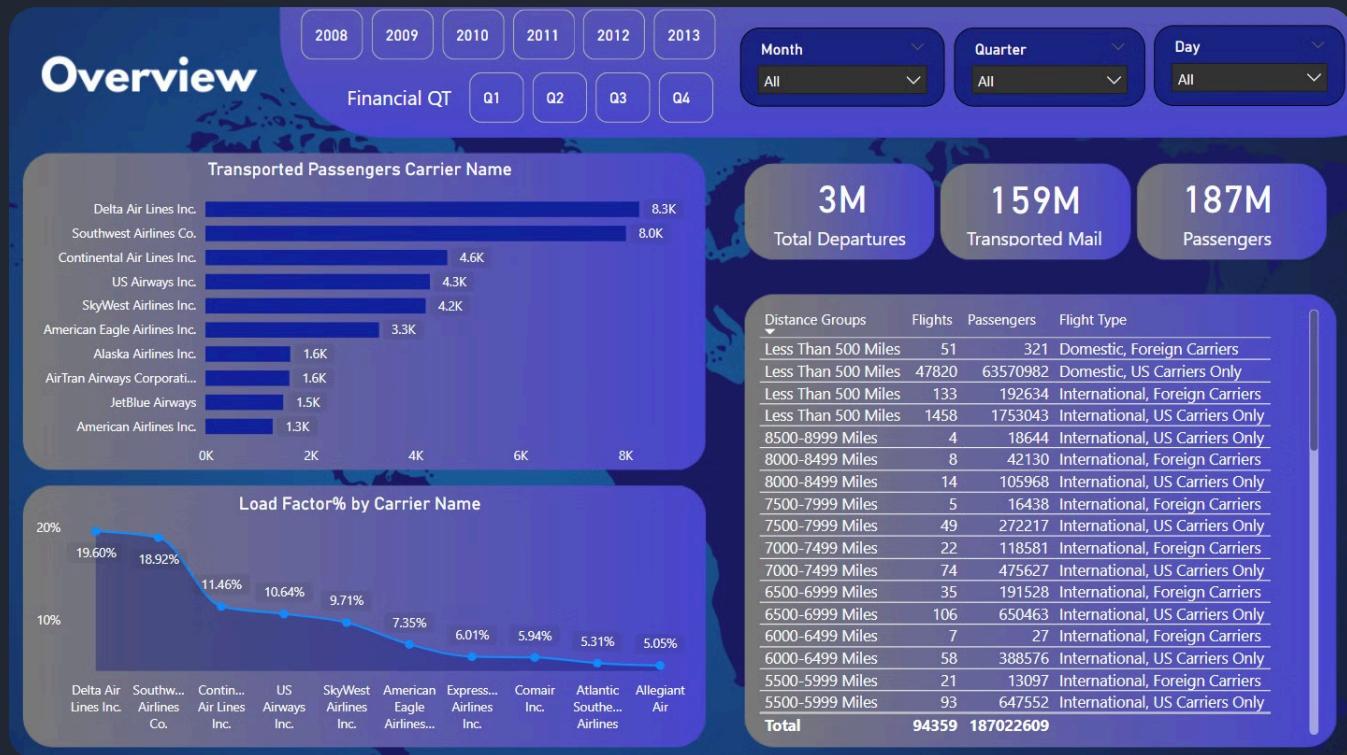


This dashboard provides a comprehensive analysis of airline passenger data, spanning 97 countries, 1274 airports, and 2066 states. Interactive filters allow for exploration by year and month, revealing trends and patterns across a vast dataset.



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# Overview



This dashboard provides a high-level overview of airline performance and passenger data. Key metrics include total departures (3M), transported mail (159M), and passengers (187M). Users can filter by year, quarter, month, and even day. The "Transported Passengers by Carrier Name" table and "Load Factor%" chart allow for airline comparisons. The "Distance Groups" table shows flight data categorized by distance, offering insights into route types and passenger volume. Overall, it's a snapshot of airline activity with interactive elements for deeper analysis.

# Detail



This "Detail" view dives deeper into airline performance. It shows load factor breakdowns by weekend/weekday and by time period (year, quarter, month). Key metrics include total payload (65bn), transported freight (1bn), and airtime (260M hours). A detailed table lists records with load factor, passenger count, freight, and aircraft type, allowing for granular analysis of airline operations. Filters for country, state, and city allow for focused exploration.



# Tableau: Advanced Data Visualization

## 1 Trends

Visualize trends over various time periods to identify growth opportunities.

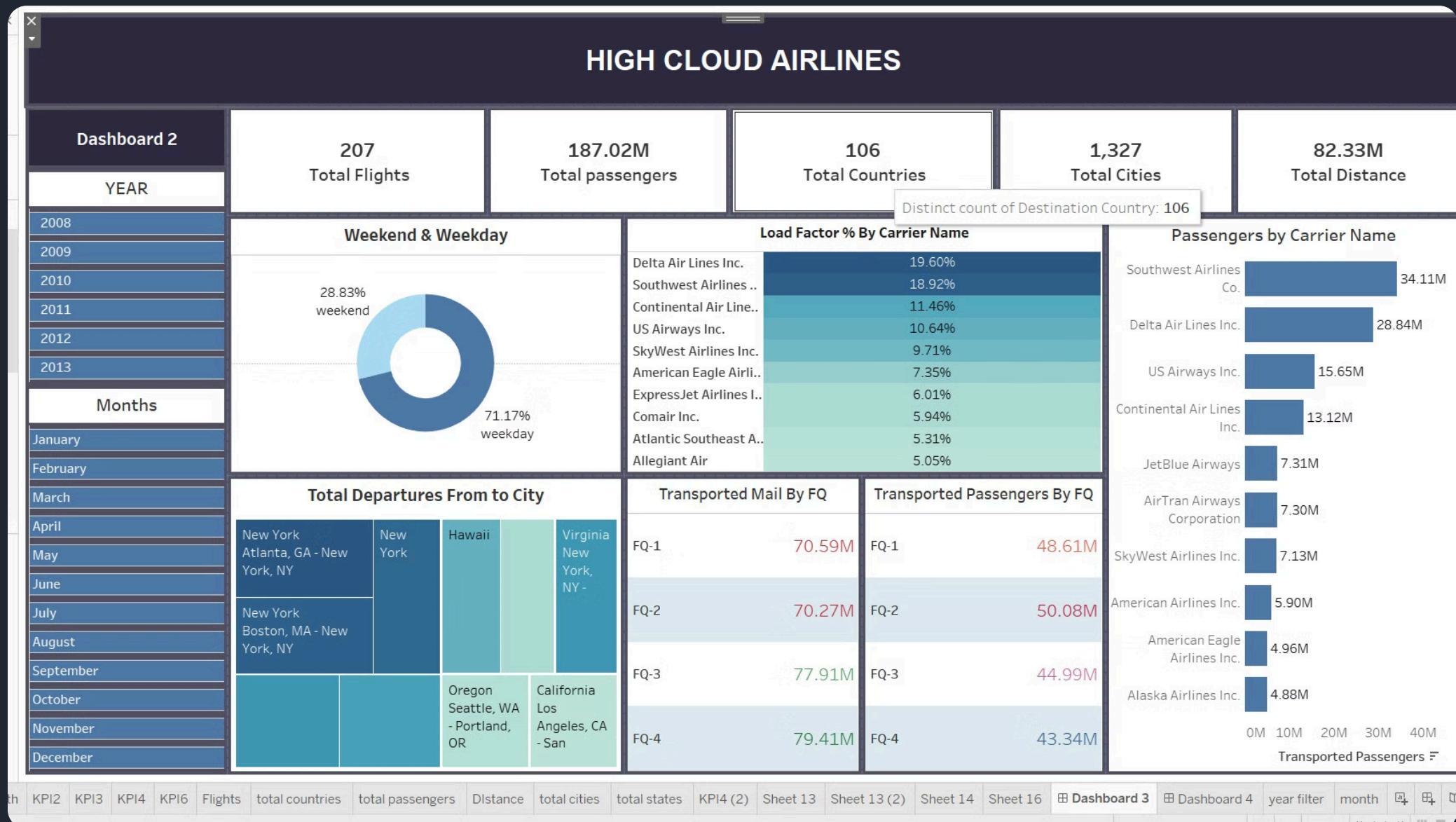
## 2 Segmentation

Segmentation based on travel behavior for targeted marketing campaigns.

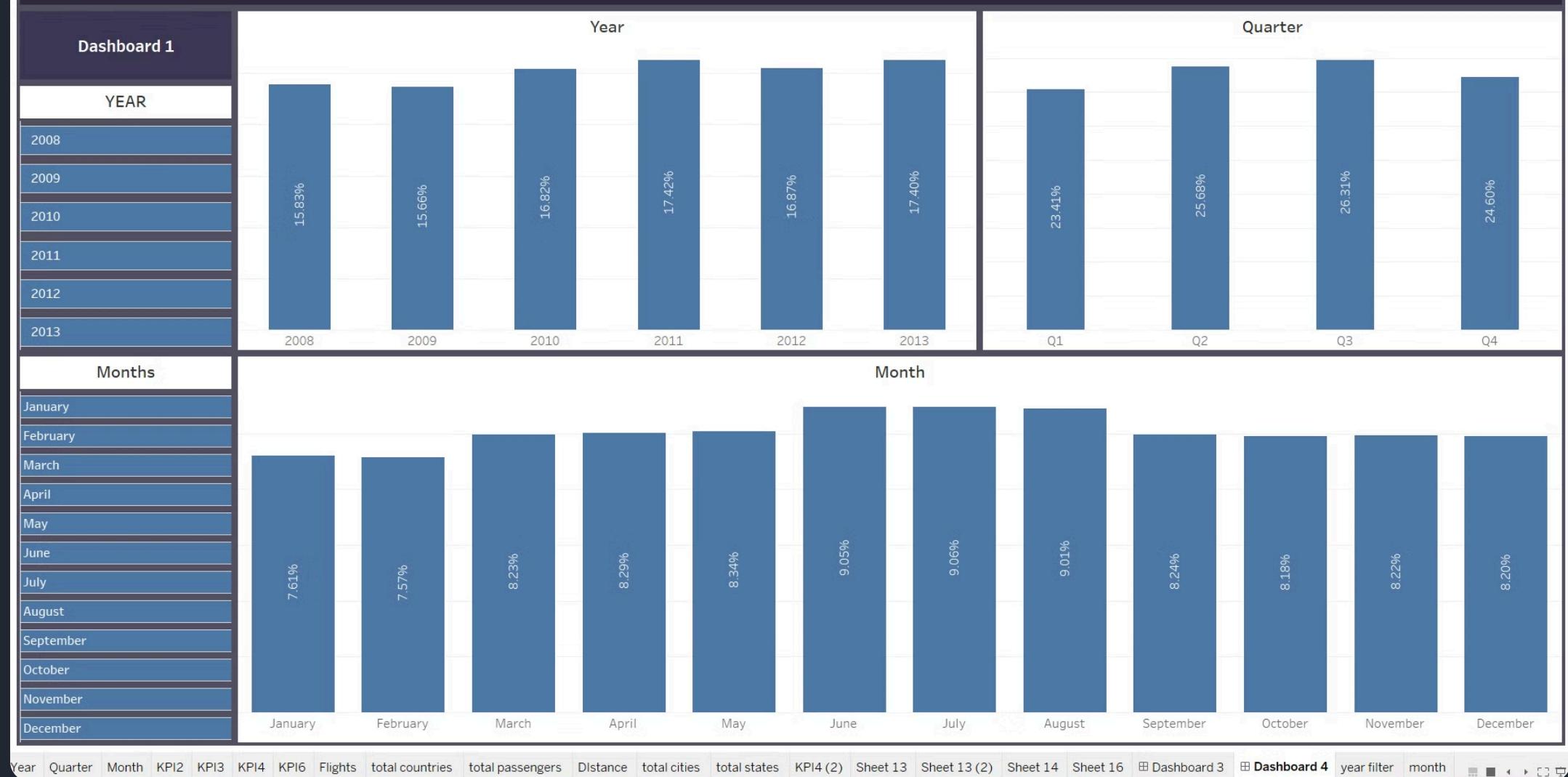
## 3 Geographical Analysis

Used Maps to visualize flight density and identify patterns.

# TABLEAU DASHBOARD



## LOAD FACTOR BY YEAR- QUARTER AND MONTH



# INSIGHTS

- **Broad Metrics:** High Cloud Airlines demonstrates its reach with 207 total flights across 106 countries and 1,327 cities, serving a massive 187.02 million passengers and covering 82.33 million in total distance.
- **Load Factor Dynamics:** The "Load Factor % By Carrier Name" chart reveals how full flights are on average, a critical metric for profitability. We can see Delta Air Lines leading here. The pie chart next to it emphasizes the split between weekend and weekday load factors, showing a higher utilization on weekdays (71.17%).
- **Passenger Distribution by Carrier:** The "Passengers by Carrier Name" chart shows the actual passenger numbers, with Southwest Airlines leading. This helps understand market share and customer preference.
- **Mail and Passenger Trends by Flight Quarter:** The "Transported Mail By FQ" and "Transported Passengers By FQ" sections show quarterly trends. While mail volume seems relatively consistent, passenger numbers vary. This might be due to seasonal factors or specific route promotions.
- **Popular Routes:** The "Total Departures From to City" section highlights key routes. New York to Atlanta and New York to Boston are clearly popular, indicating strong demand in these corridors. It also shows a concentration of traffic within the US.
- **Filtering Capabilities:** The dashboard includes interactive elements like year and month filters, allowing for deeper dives into specific time periods.

In summary, this dashboard provides a holistic view of High Cloud Airlines' operations, highlighting key performance indicators, passenger trends, and network characteristics. It allows for quick assessments and data-driven decisions.

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# SQL: Efficient Data Querying

1

KPI

# Making KPIs for strategic resource allocation.

2

# Patterns

# Analyzing patterns and their causes to improve performance.

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## Load Factor

Understanding Airlines behavior BY the Load Factor

# SQL

```

52     WEEKDAY(flight_date) AS Weekdayno, -- (0=Monday, 6=Sunday)
53     DATE_FORMAT(flight_date, '%W') AS Weekdayname,
54     CASE
55         WHEN MONTH(flight_date) BETWEEN 4 AND 12 THEN MONTH(flight_date) - 3
56         ELSE MONTH(flight_date) + 9
57     END AS FinancialMonth,
58     CASE
59         WHEN MONTH(flight_date) BETWEEN 4 AND 6 THEN 'Q1'
60         WHEN MONTH(flight_date) BETWEEN 7 AND 9 THEN 'Q2'
61         WHEN MONTH(flight_date) BETWEEN 10 AND 12 THEN 'Q3'
62         ELSE 'Q4'
63     END AS FinancialQuarter
64
65     FROM Maindata;

```

```

80 --- Q 3. Find the load Factor percentage on a Carrier Name basis ( Transported passengers / Available seats)
81
82 • SELECT
83     Carrier_Name, SUM(transported_passengers), SUM(available_seats),
84     SUM(transported_passengers) / SUM(available_seats) * 100
85     AS load_Factor
86
87     FROM maindata
88     GROUP BY Carrier_Name
89     ORDER BY load_Factor DESC;

```

Carrier_Name	SUM(transported_passengers)	SUM(available_seats)	load_Factor
Allegiant Air	1813373	2026963	89.4626
Spirit Air Lines	1697076	2044827	82.9936
Frontier Airlines Inc.	2831867	3428818	82.5902
Continental Air Lines Inc.	9200585	11176248	82.3227
Grand Canyon Airlines, Inc. d/b/a Grand Canyo...	65734	81191	80.9622

```

111
112     CASE
113         WHEN DAYOFWEEK(flight_date) IN (1, 7) THEN 'Weekend'
114         ELSE 'Weekday'
115     END AS Week_Type,
116     SUM(transported_passengers) AS Total_Transported_Passengers,
117     SUM(Available_Seats) AS Total_Available_Seats,
118     (SUM(transported_passengers) / SUM(Available_Seats) * 100) AS Load_Factor_Percentage
119
120     FROM maindata
121
122     GROUP BY Week_Type;

```

Week_Type	Total_Transported_Passengers	Total_Available_Seats	Load_Factor_Percentage
Weekend	0	27129	0.0000

```

92     Carrier_Name,
93     SUM(transported_passengers) AS Total_Passengers
94
95     FROM maindata
96     GROUP BY Carrier_Name
97     ORDER BY Total_Passengers DESC
98     LIMIT 10;

```

Carrier_Name	Total_Passengers
Southwest Airlines Co.	34107505
Delta Air Lines Inc.	23700316
US Airways Inc.	13637626

```

67
68 • SELECT
69     YEAR(flight_date) AS Year,
70     QUARTER(flight_date) AS Quarter,
71     MONTH(flight_date) AS Monthno,
72     SUM(transported_passengers) AS Total_Transported_Passengers,
73     SUM(Available_Seats) AS Total_Available_Seats,
74     (SUM(transported_passengers) / SUM(Available_Seats) * 100) AS load_Factor
75
76     FROM maindata
77     GROUP BY YEAR(flight_date), QUARTER(flight_date), MONTH(flight_date)
78     ORDER BY Year, Quarter, Monthno
79     LIMIT 1000;

```

Year	Quarter	Monthno	Total_Transported_Passengers	Total_Available_Seats	load_Factor
HULL	HULL	HULL	159449474	208019663	76.6512
2008	1	1	0	693	0.0000
2008	1	2	0	1171	0.0000
2008	1	3	0	2722	0.0000

```

123     Distance_Group_ID ,
124     COUNT(*) AS Total_Flights
125
126     FROM Maindata
127     GROUP BY Distance_Group_ID
128     ORDER BY Distance_Group_ID;

```

Distance_Group_ID	Total_Flights
1	58263
2	25996
3	8606

# Overcoming Data Challenges

## Data Inconsistencies

Addressed through standardized data cleaning workflows.



## Large Datasets

Managed efficiently with SQL database optimization.

## Insight Integration

Improved with Power BI and Tableau dashboards.



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# Looking Ahead: Future Enhancements



## Predictive Analytics & AI:

Integrating predictive modeling and machine learning algorithms could forecast future demand, optimize pricing strategies, and personalize customer experiences.

This would allow High Cloud Airlines to anticipate market changes and proactively adjust operations for maximum efficiency and profitability.



## Enhanced Data Integration:

Future iterations could incorporate data from additional sources like social media sentiment, competitor analysis, and macroeconomic indicators. This broader perspective would provide more nuanced insights into market trends and customer behavior, enabling more proactive and strategic decision-making..



## Interactive Exploration & Visualization:

Enhancements to the dashboard's interactivity, such as drill-downs, cross-filtering, and customizable visualizations, would empower users to explore the data more deeply and uncover hidden patterns.



# GROUP MEMBERS



GUIDED BY - SRINIVAS SIR & HARRESH SIR

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1. ATHARVA PAWAR
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Thank you

