**Power BI Project Summary: Flight Performance Analysis**

**Project Title:** Flight Performance Analysis for January 1st, 2015

**Data source:** www.kaggle.com/datasets/usdot/flight-delays?select=flights.csv

**Objective:**

The primary goal of this Power BI report is to analyze the performance of flights on January 1st, 2015, including metrics such as Total flights, On-Time flights, percentage On-time, Delay flights, percentage delay, cancelled flight, and percentage cancelled. This analysis will provide insights into airline performance, flight punctuality, and operational efficiency on this specific day.

**Data Overview:**

* **Date Range:** January 1st, 2015
* **Airlines:** Various airlines including Alaska Airlines (AS), American Airlines (AA), Delta Airlines (DL), United Airlines (UA), and others.
* **Total Flights Recorded:** Data includes numerous flights with information on departure and arrival details.
* **Key Metrics:**
* Departure Delay
* Arrival Delay
* Taxi Out/Taxi In Times
* Flight Distance
* Elapsed Airtime
* Cancellations and Diversions
* Delay Reasons**:** Air System Delay, Security Delay, Airline Delay, Weather Delay, Late Aircraft

**Key Measures for Analysis:**

1. **Total Flights by Airline**: Analyze the distribution of flights among various airlines.
2. **Average Departure and Arrival Delays by Airline:** Calculate the average delay to assess airline performance.
3. **Delay Breakdown:** Break down delay reasons (weather, security, airline, late aircraft) to identify key factors affecting punctuality.
4. **Cancellations Descriptions:** Visualize the number of cancelled and diverted flights for each airline by several reasons.
5. **Flight Duration and Distance:** Visualize flight times and distances to understand long-haul vs. short-haul flights and their associated delays.
6. **Top Delayed Flights:** Highlight the most delayed flights to bring attention to significant outliers.

**Visuals & Reports in Power BI:**

**Flight Distribution (Bar Chart)**

* Displays the number of flights per airline by Cities.
* Filterable by airport, day of the week, and other attributes.

**Delayed by Airline (Bar Chart)**

* A bar chart that shows the delays for each airline.
* A trendline can show delay performance throughout the other attributes.

**Cancellations by Descriptions (Donut Chart)**

* A breakdown of flights cancelled or diverted by several reasons like Weather factor, security, National Air system, and Airline/ Carrier.
* Filterable by airlines, airports and other attributes.

**Cancellation by Day of week (Column Chart)**

* Displays flight cancellations at different weekdays.
* Helps identify the days if the week with highest and lowest cancellations to assist passengers in making informed decisions.
* Filterable by airlines, airports and other attributes.

**Flight Status (Cards)**

* A breakdown of percentage Delayed, Cancelled, and On-time flights,

**Flight State in the US (Slicer)**

* Filter by states in the US on all attributes

**Overview of flight details (Table)**

* A table displaying flights overview on (Airlines, IATA codes, Flight status, flight status percentage, total flights and distinct day of week.)
* Includes the airline cancellation reasons in table row filter.

**Insights to Derive:**

* Which airlines consistently meet their scheduled times, and which have significant delays?
* Which airports experience the highest ground delays?
* What are the most common causes of flight delays in 2015?
* Are there patterns in delays based on weekday?
* How do certain descriptions (conditions) affect cancellation and delays?

**Audience:**

* **Airline Operations Managers:** To understand flight delay causes and improve operational efficiency.
* **Airport Authorities:** To address airport-specific issues.
* **Customer Service Teams:** To better prepare for handling delays and cancellations.

**Conclusion:**

This Power BI report provides a comprehensive view of airline performance on January 1st, 2015. Through detailed visualizations and insights, stakeholders can identify areas for improvement, reduce delays, and enhance overall operational efficiency.

**Next Steps:**

* Automate data updates to track daily or monthly trends.
* Incorporate real-time data for live monitoring of flight delays and performance.
* Add drill-down capabilities for deeper analysis of specific airlines or airports.