Flight Delays Analysis - Final Summary Report

1. Introduction

Flight delays are a major concern for both airlines and passengers. This project aimed to analyze flight delay patterns and identify the impact of various factors such as scheduled time, carrier, weather conditions, and day of the week on flight delays. The dataset used for this analysis contained 2,201 flight records with key variables including departure time, weather status, and delay status.

2. Key Findings

2.1 Flight Delays Overview

- **19.45% of flights were delayed**, while **80.55% were on-time**.
- The majority of flights operated without delays, but a considerable portion still faced disruptions.

2.2 Delays by Scheduled Time

- The histogram of scheduled times showed a **higher concentration of flights in the morning and evening**.
- Delays were **more frequent during late evening and night hours**, suggesting possible congestion or operational constraints.

2.3 Delays by Carrier

- Among the airlines analyzed, **DH had the highest number of flights (551), followed by RU (408) and US (404)**.
- Some carriers experienced **higher delay rates** than others, indicating possible operational inefficiencies or scheduling bottlenecks.

2.4 Delays by Day of the Week

- The number of flights was evenly distributed across the week, with **Fridays (391) and Thursdays (372) having the most flights**.
- Delays did not show a strong correlation with any particular day, suggesting that they are influenced more by time of day and airline performance rather than the weekday itself.

2.5 Weather Impact on Delays

- Only **32 flights (1.45%) were affected by bad weather**, indicating that **weather was not a major contributing factor to delays** in this dataset.
- However, when bad weather did occur, **delays were significantly more common**, confirming the expected impact of adverse weather conditions on flight punctuality.

3. Conclusion & Recommendations

3.1 Conclusion

- Flight delays occur at a **moderate rate (around 19.45%)**, with **late evening flights being the most affected**.
- **Certain airlines experience more delays than others**, suggesting a need for operational improvements.
- **Weather does impact delays, but it was not a primary factor in this dataset.**

3.2 Recommendations

1. **Optimize Scheduling** – Airlines should consider revising schedules, especially during late-night hours, to reduce congestion.
2. **Improve Airline Performance** – Carriers with higher delay rates should review operational procedures to enhance punctuality.
3. **Monitor Peak Hours** – Authorities should focus on improving air traffic control efficiency during peak flight hours.
4. **Weather Preparedness** – Even though weather was not a major factor, airlines should still enhance contingency plans for extreme conditions.

4. Next Steps

Future analyses could explore **seasonal trends in delays, impact of flight distance, and predictive modeling** to better anticipate delays before they occur.

End of Report