

An aerial, black and white photograph of a city skyline, likely New York City, viewed from a high altitude. The city is densely packed with skyscrapers and buildings. In the foreground on the right, a large, white, curved structure, which appears to be the wing or tail of a large commercial airplane, is visible, partially obscuring the city view. The image has a high-contrast, slightly grainy texture.

EXPLORING THE RELATIONSHIP BETWEEN AIRLINE FLIGHT DELAYS AND WEATHER CONDITIONS

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Exploring the Relationship Between Airline Departure Delays and Weather Conditions

Question:

Is weather the most common reason for airline departure delays?



Sourcing the Data

 OpenWeather



Consolidating and Merging the Data

Historical weather data by weather condition type 2017-2019

AA, DL, and UA departure delays from ORD 2017-2019 by delay type

Weather Data

Daily 2017-2019

Weather Types:

Rain
Snow
Clouds
Wind
Storm



Airline Delay Statistics

Daily 2017-2019

American, United, Delta

Delay Types:

Late Aircraft Arrival
National Aviation System
Carrier
Security
Weather

Merged Data Set

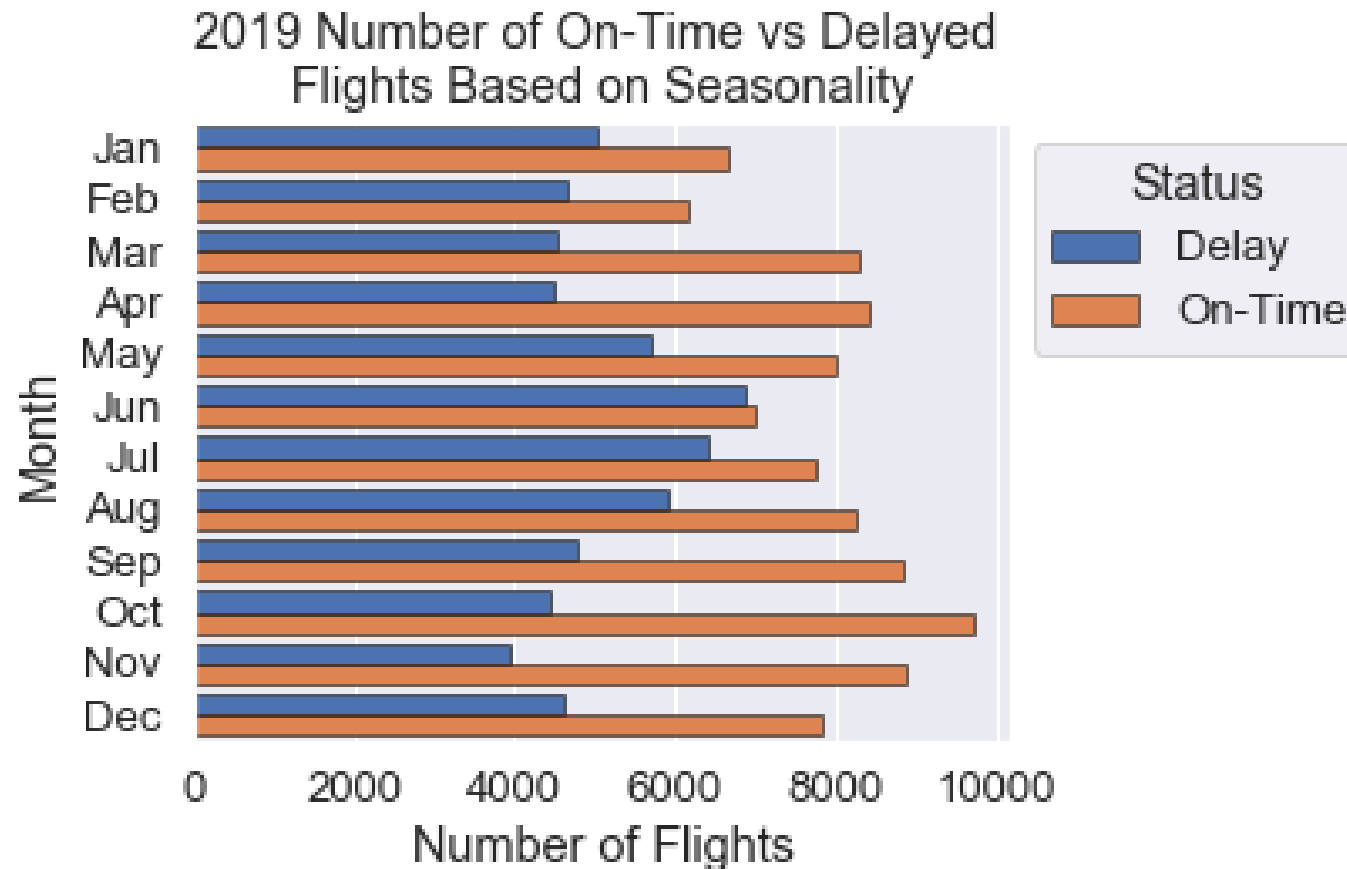
Airlines: United, American, and
Delta

O'Hare International Airport
Departures

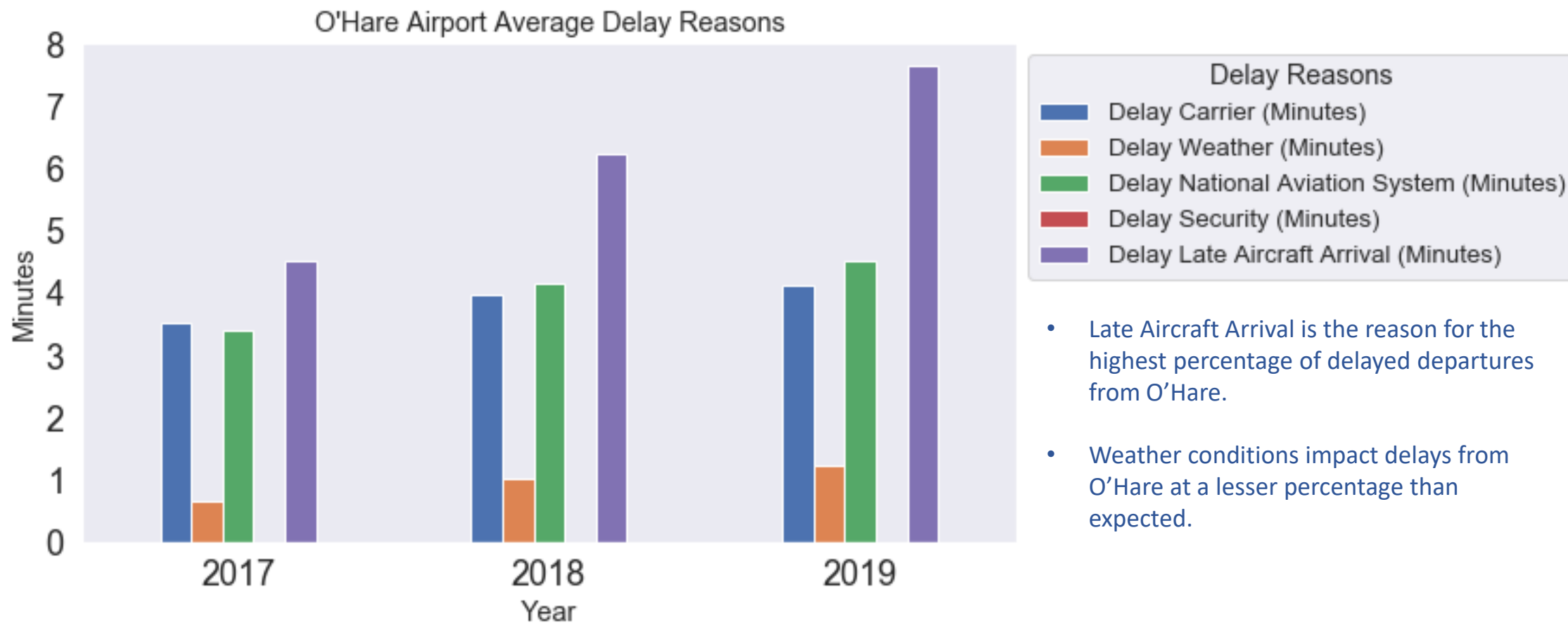
Recorded Delay Reasons

Weather Statistics

2017-2019

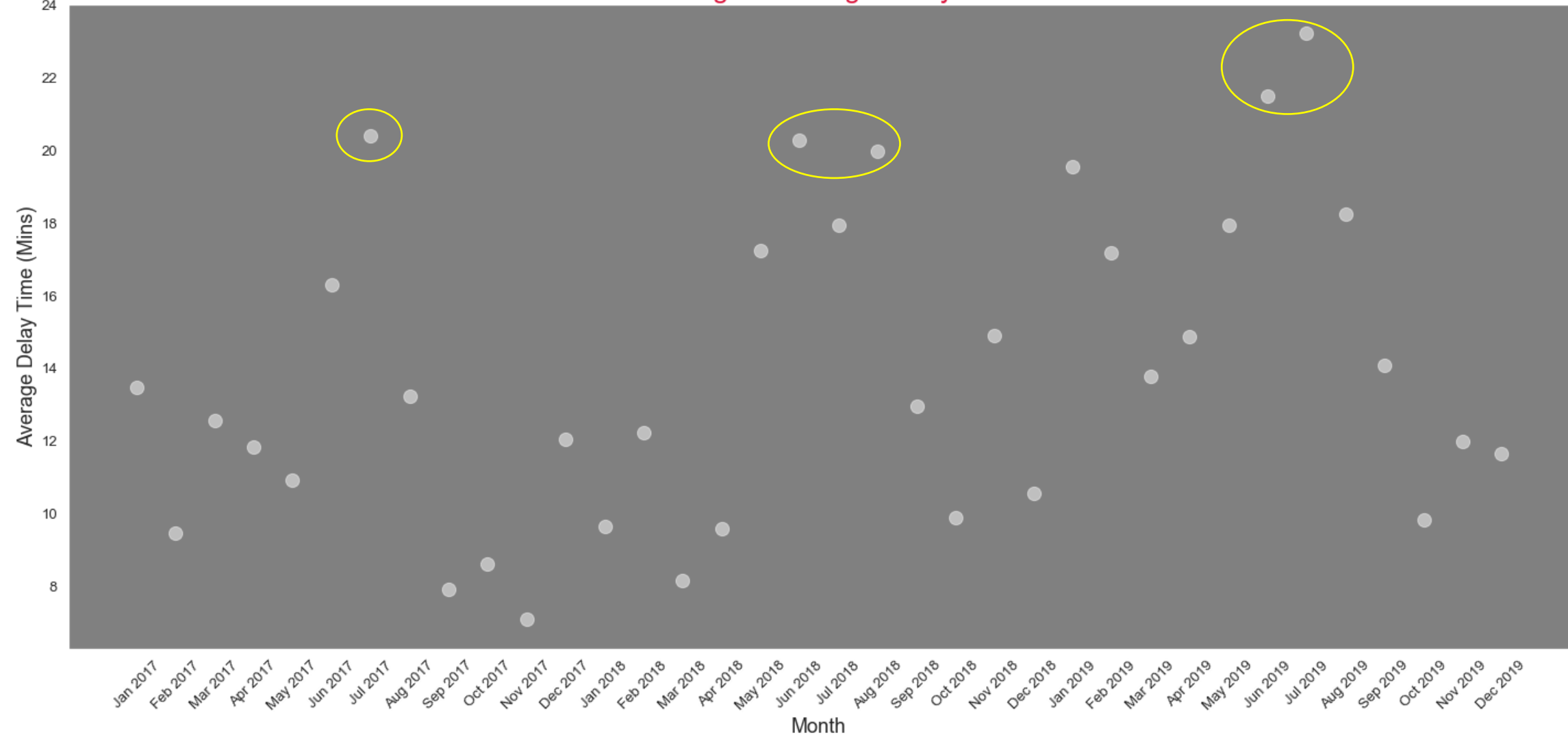


- Ratio of delayed flight departures to on-time flight departures is higher than expected
- May-June flights are delayed at a higher rate, indicating seasonality may be a factor



- Late Aircraft Arrival is the reason for the highest percentage of delayed departures from O'Hare.
- Weather conditions impact delays from O'Hare at a lesser percentage than expected.

Total Flights Average Delay Time



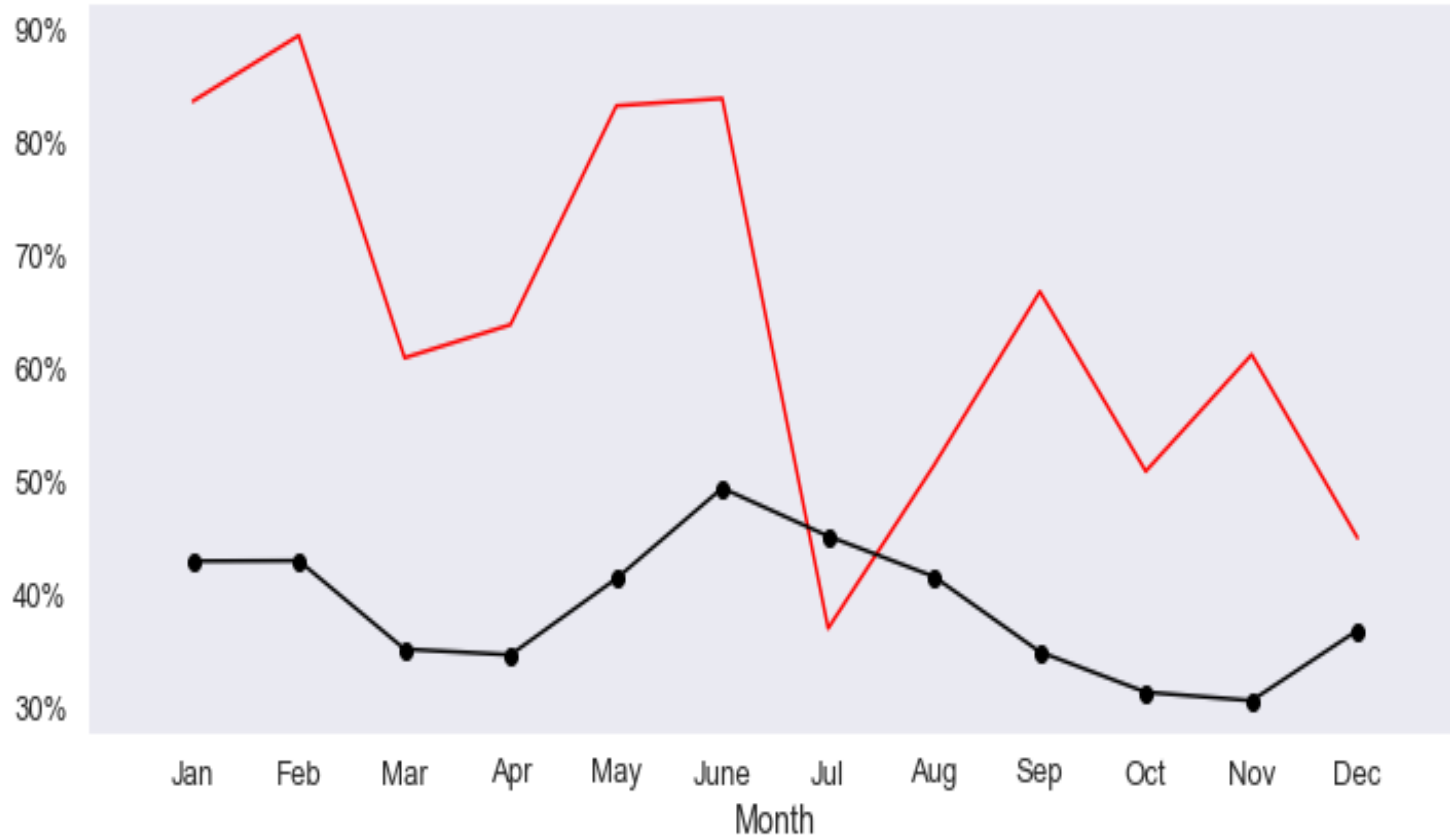
Average Delay Time By Airline



Average Delay Due to Late Aircraft Arrival By Airline



Correlation Between Delay Flight & Bad Weather Flight Percentage



- We do not see a strong correlation between weather and departure delays.
- Further analysis is needed to determine the variance for July 2019
- Percentage of flights departing in unfavorable weather conditions.
- Percentage of flights that are departing late.

Conclusions and Implications

- Weather is not the principle factor in the delay of flight departures.
- Weather ranks near the bottom of reasons for flight departure delays.
- Late aircraft is the leading cause of flight departure delays at O'Hare Int'l Airport.

What would we research further if we had the opportunity?

- We see that Delta Airlines struggles with delays more so than United and American. We would like to investigate the reasons for this. Does Delta Airlines have a smaller fleet? Do they have an aging fleet? Do they have a higher percentage of departures to available gates?
- After reviewing our plots and the source data, we would like to explore the reasons behind the late arrivals of aircraft, as that is the most common reason for departure delays.