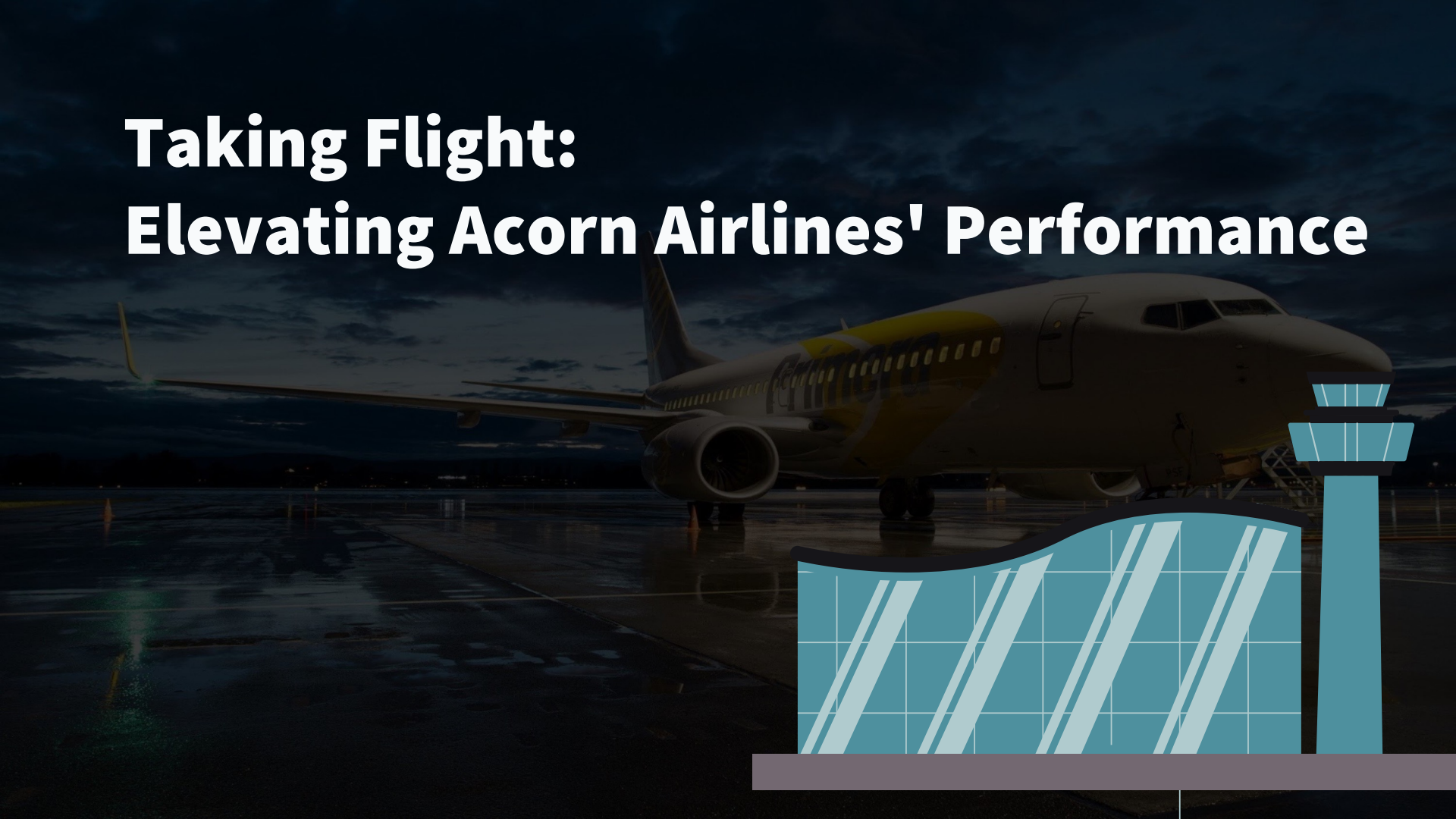
Taking Flight:
Elevating Acorn Airlines' Performance



What We Hope To Achieve?

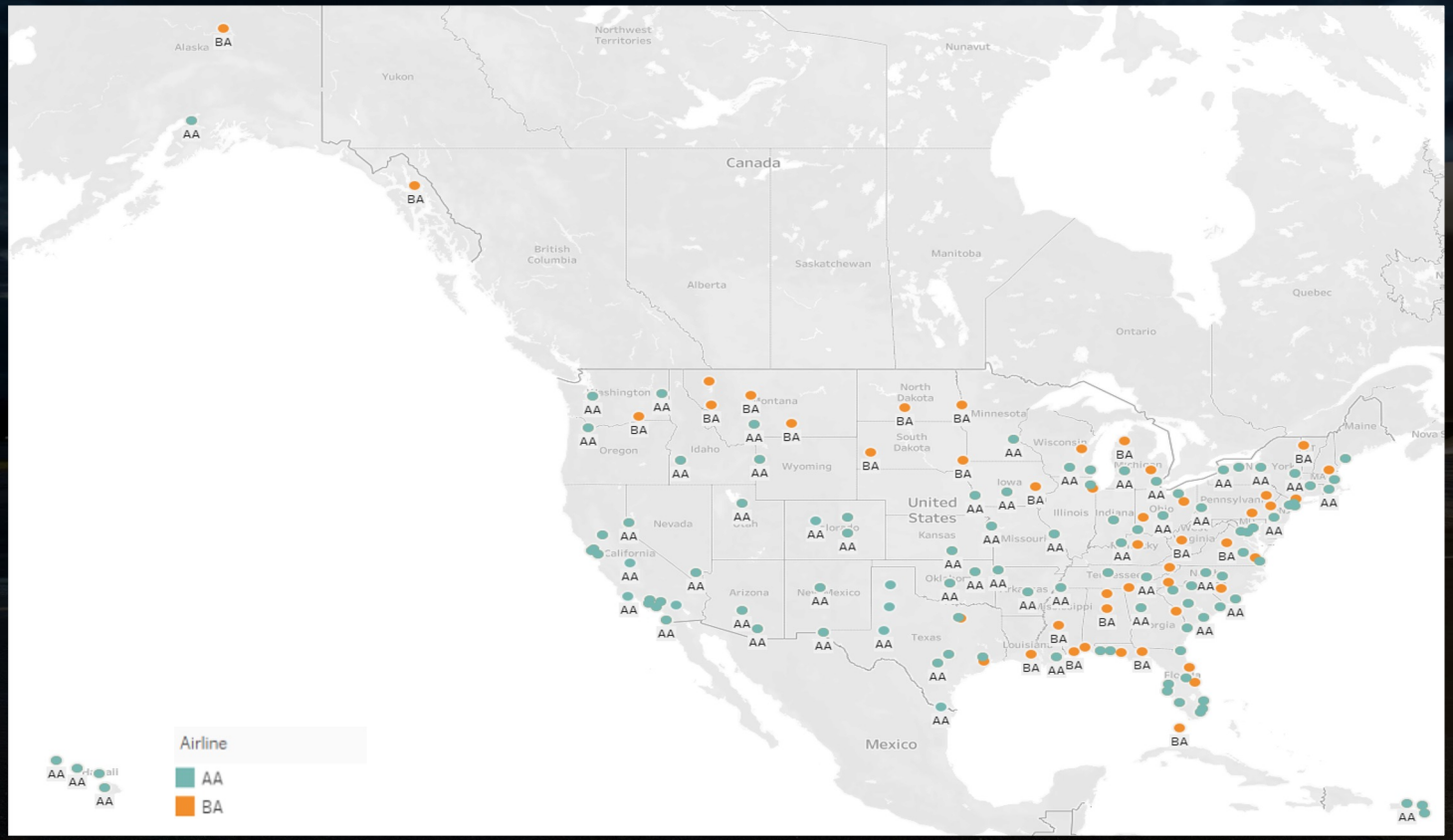
1. Highlight the strengths of Acorn Airlines as compared to Berry Airlines
2. Highlight the weaknesses that Acorn Airlines currently faces as compared to Berry Airlines
3. Better understand the factors that contributes to arrival delays for Acorn Airlines and how do they compare against Berry Airlines
4. Provide solutions to the future outlook of Acorn airlines

Indicators of Good Performance

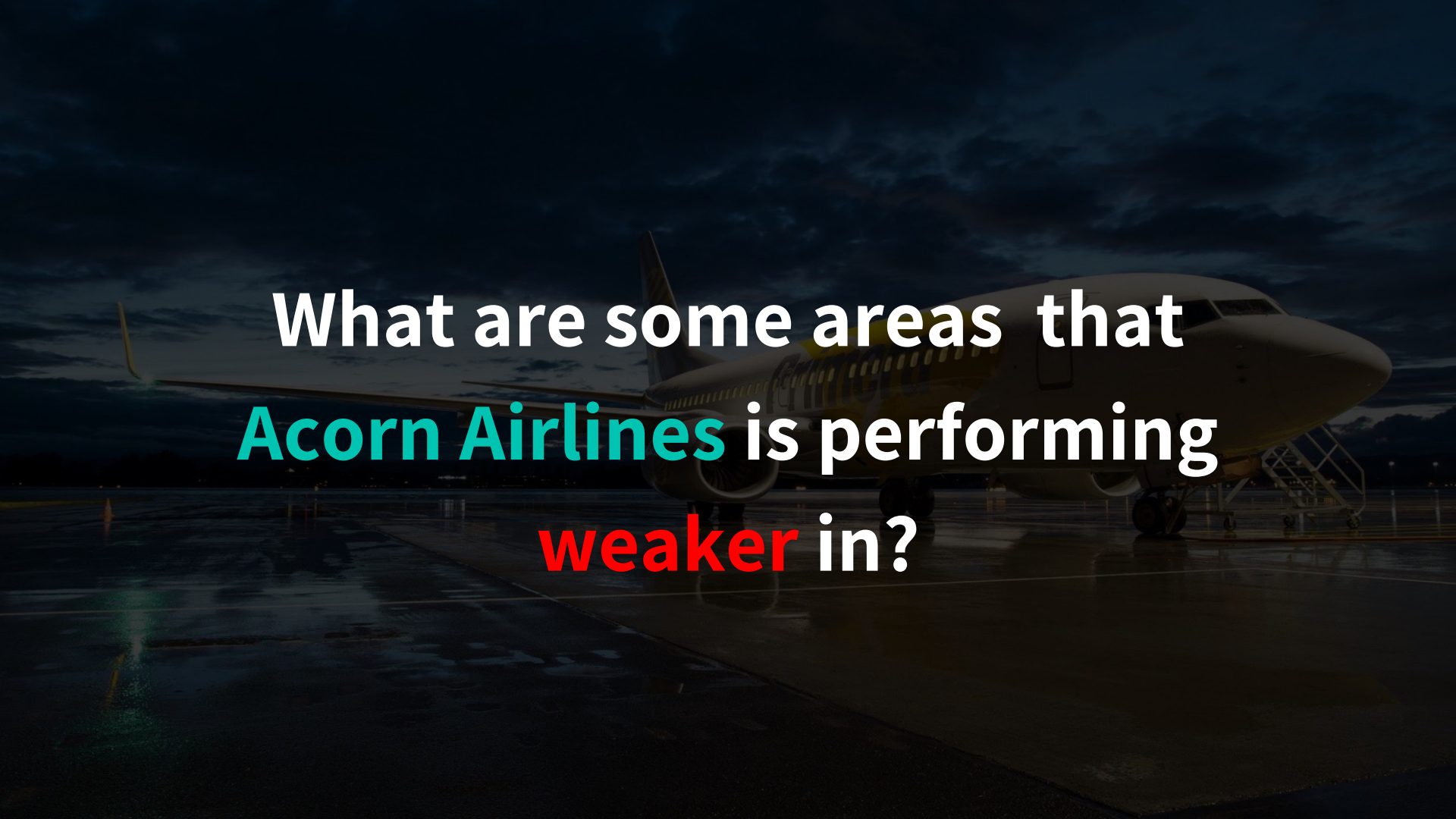
1. High variety of destination and origin airport covered
2. High number of flights provided
3. Low average arrival delay
4. Low average departure delay
5. High efficiency (Low Taxi In & Low Taxi Out Time)
6. Low number of cancelled flights
7. Low number of diverted flights


What areas are Acorn Airlines
doing well in?

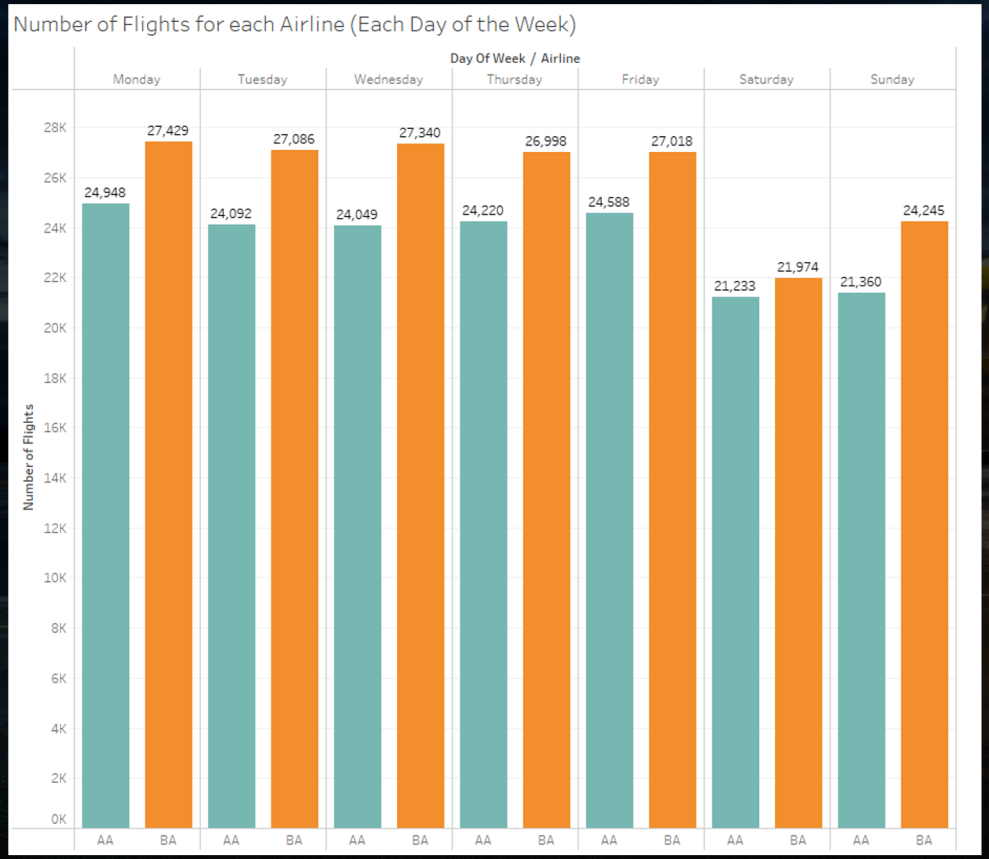
Areas Covered By Both Airlines?



Acorn Airlines has flights to **most parts** of USA while Berry Airlines only has flights to the **Eastern and Northern** regions of USA

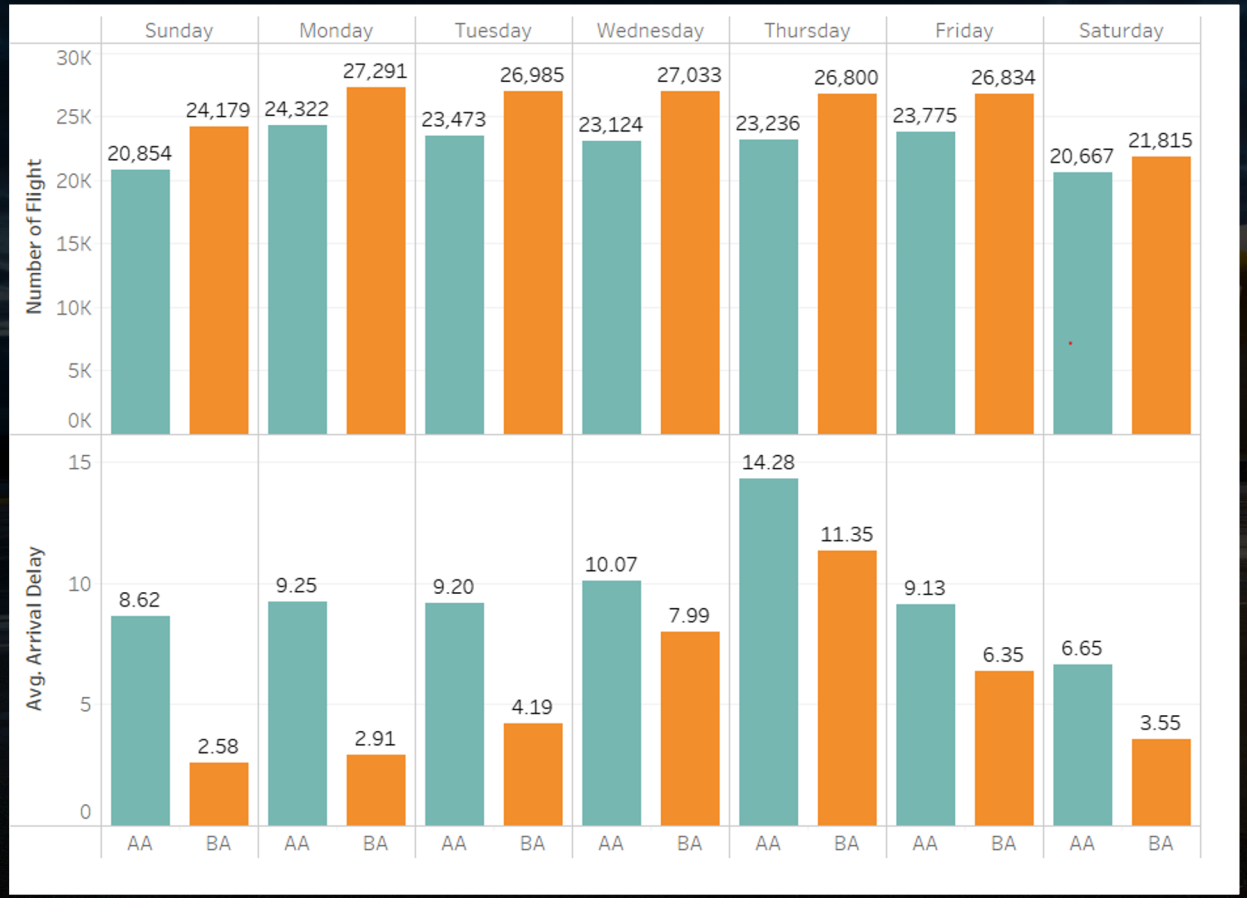

What are some areas that
Acorn Airlines is performing
weaker in?

Less Number Of Flights



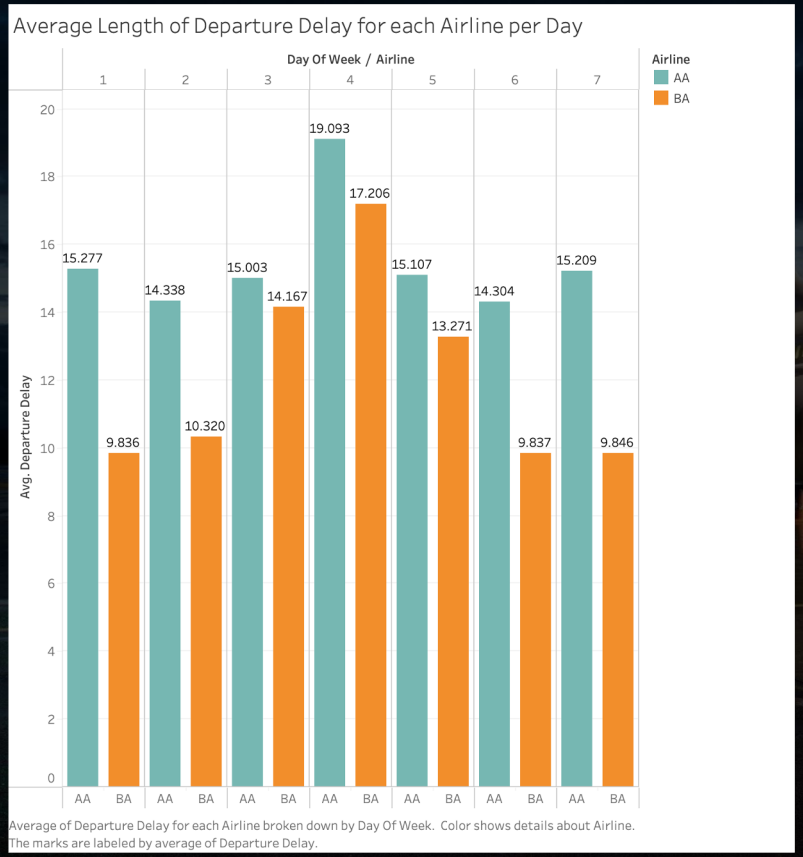
Throughout the week, Berry Airlines provide a higher number of flights as compared to Acorn Airlines

Longer Arrival Delay



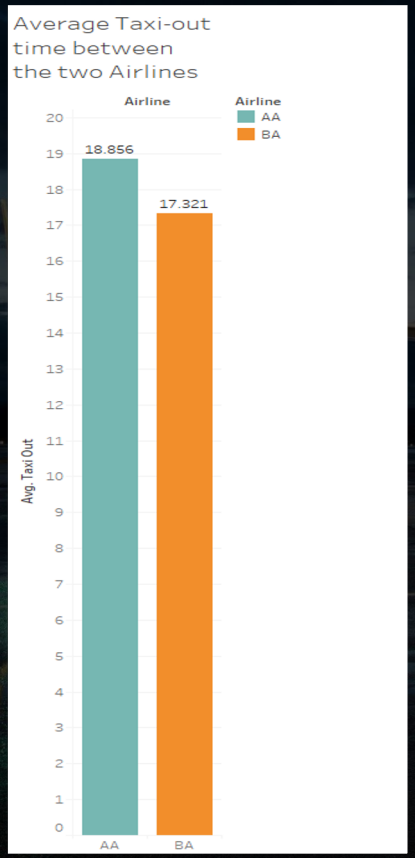
Average Length of Arrival Delay for Acorn Airlines is higher than Berry Airlines across all 7 days

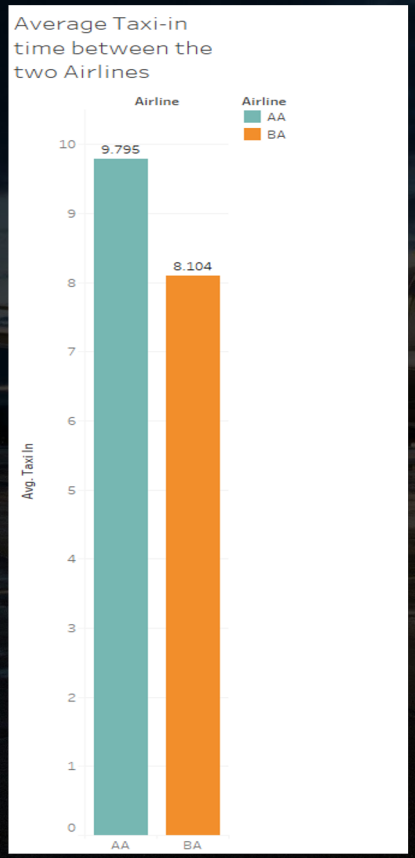
Longer Departure Delay



Average Duration of Departure Delay for Acorn Airlines is higher than Berry Airlines across all 7 days

Longer Average Taxi In & Out Time

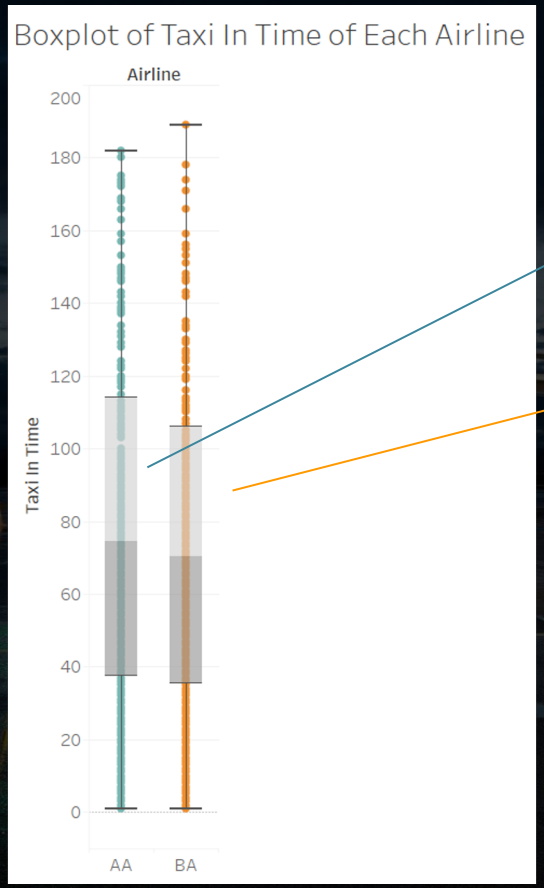




On average, Acorn Airlines takes 1.535 minutes longer than Berry Airlines to taxi out

Furthermore, on average, Acorn Airlines takes 1.691 minutes longer than Berry airlines to taxi in

Longer Median Taxi In Time



Acorn Airlines

Upper Whisker:	182
Upper Hinge:	114
Median:	74.5
Lower Hinge:	37.5
Lower Whisker:	1

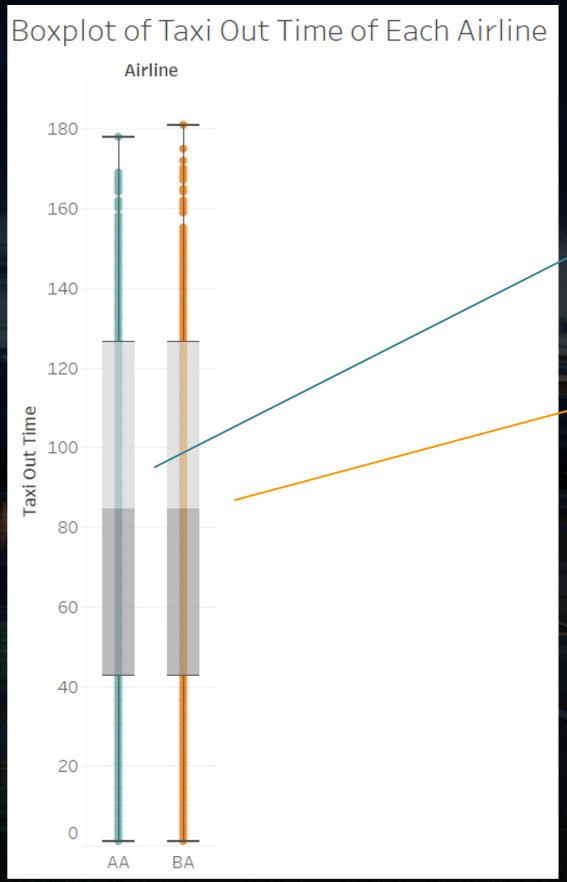
Berry Airlines

Upper Whisker:	189
Upper Hinge:	106
Median:	70.5
Lower Hinge:	35.5
Lower Whisker:	1

- The median Taxi In for Acorn Airlines is 74.5
- The median Taxi In for Berry Airlines is 70.5

Acorn Airlines' Taxi In median is longer than Berry Airlines'

Longer Median Taxi In Time



Acorn Airlines

Upper Whisker:	178
Upper Hinge:	126.5
Median:	84.5
Lower Hinge:	42.5
Lower Whisker:	1

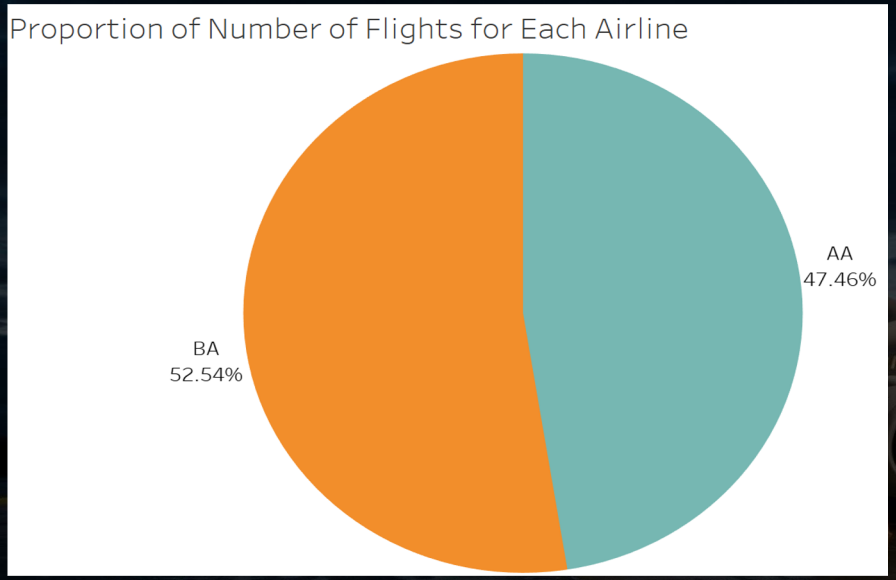
Berry Airlines

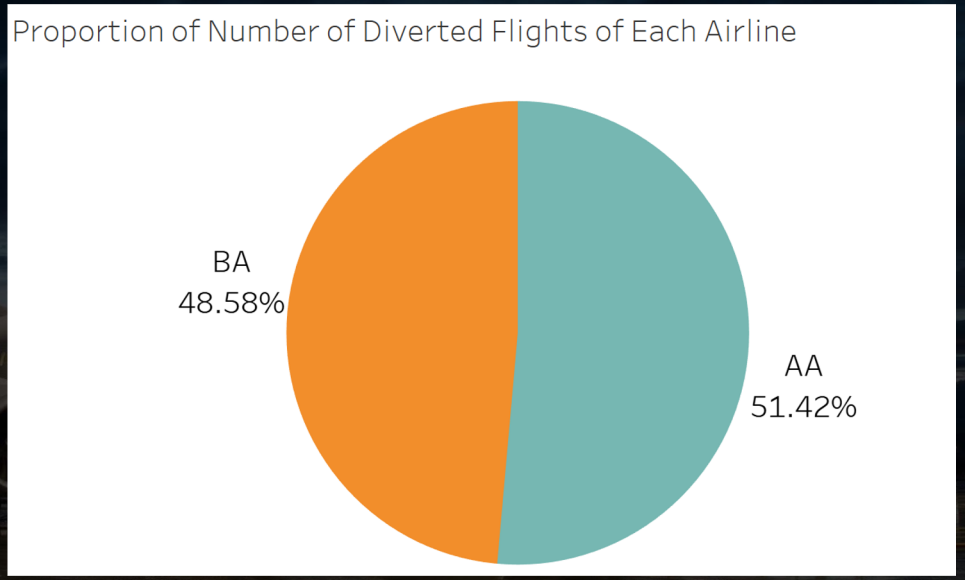
Upper Whisker:	181
Upper Hinge:	126.5
Median:	84.5
Lower Hinge:	42.5
Lower Whisker:	1

- The median Taxi Out for Acorn Airlines is 84.5
- The median Taxi Out for Berry Airlines is 84.5

Acorn Airlines' Taxi Out median is the same as Berry Airlines'

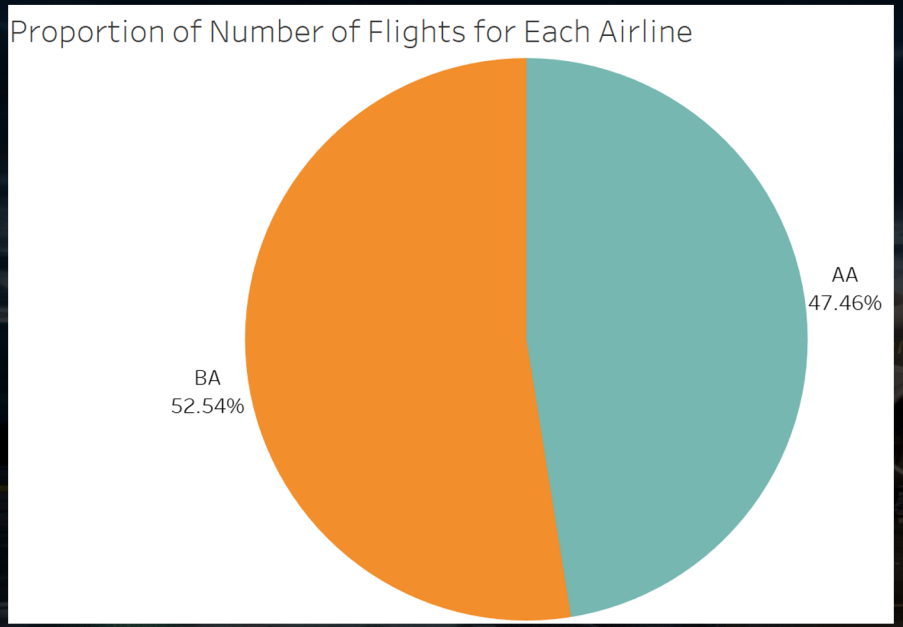
Proportion of Diverted Flights

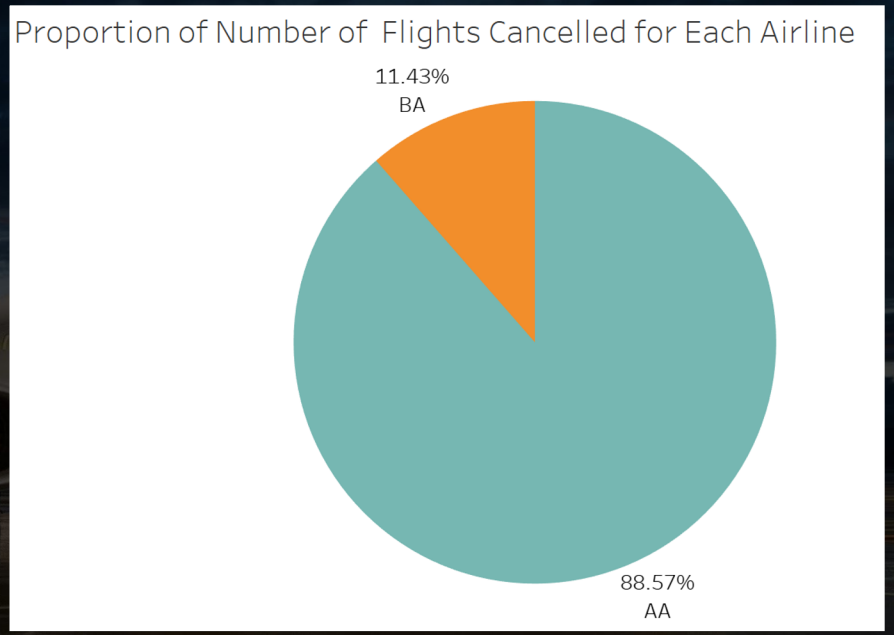




Even though Berry Airlines has more flights, Acorn Airlines has a greater proportion of diverted flights

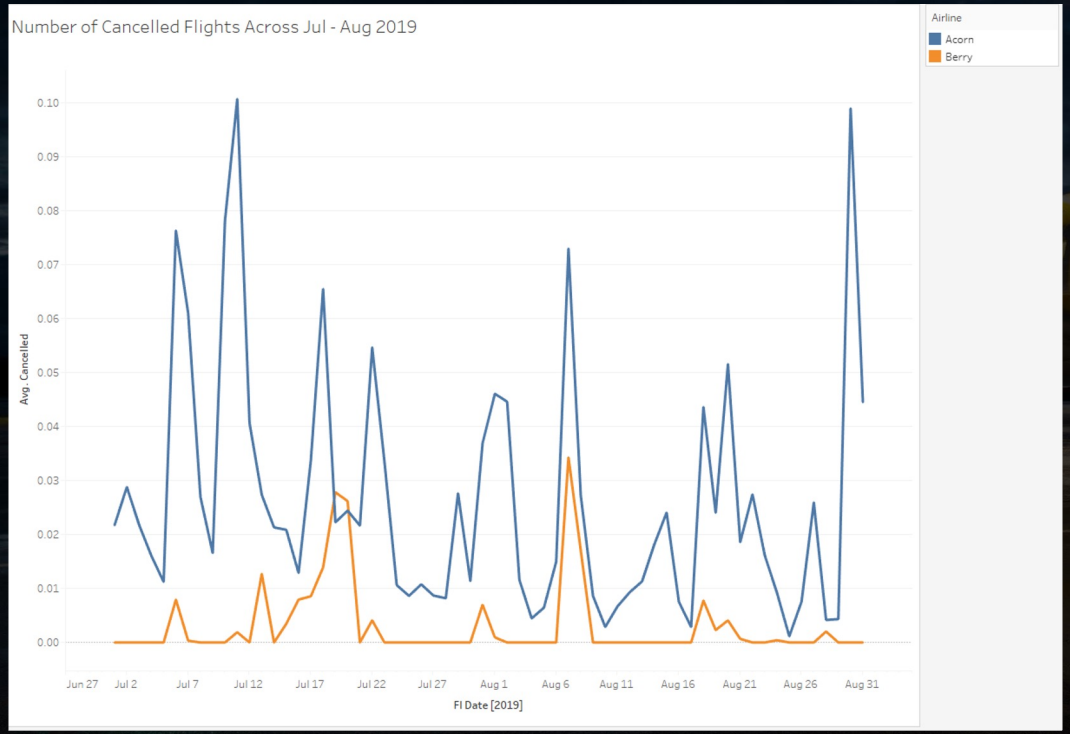
Proportion of Cancelled Flights





Even though Berry Airlines has more flights, Acorn Airlines has a significantly greater proportion of cancelled flights

Overall Trend in Flight Cancellations



Number of Cancelled Flights for Acorn Airlines is consistently more than Berry Airlines

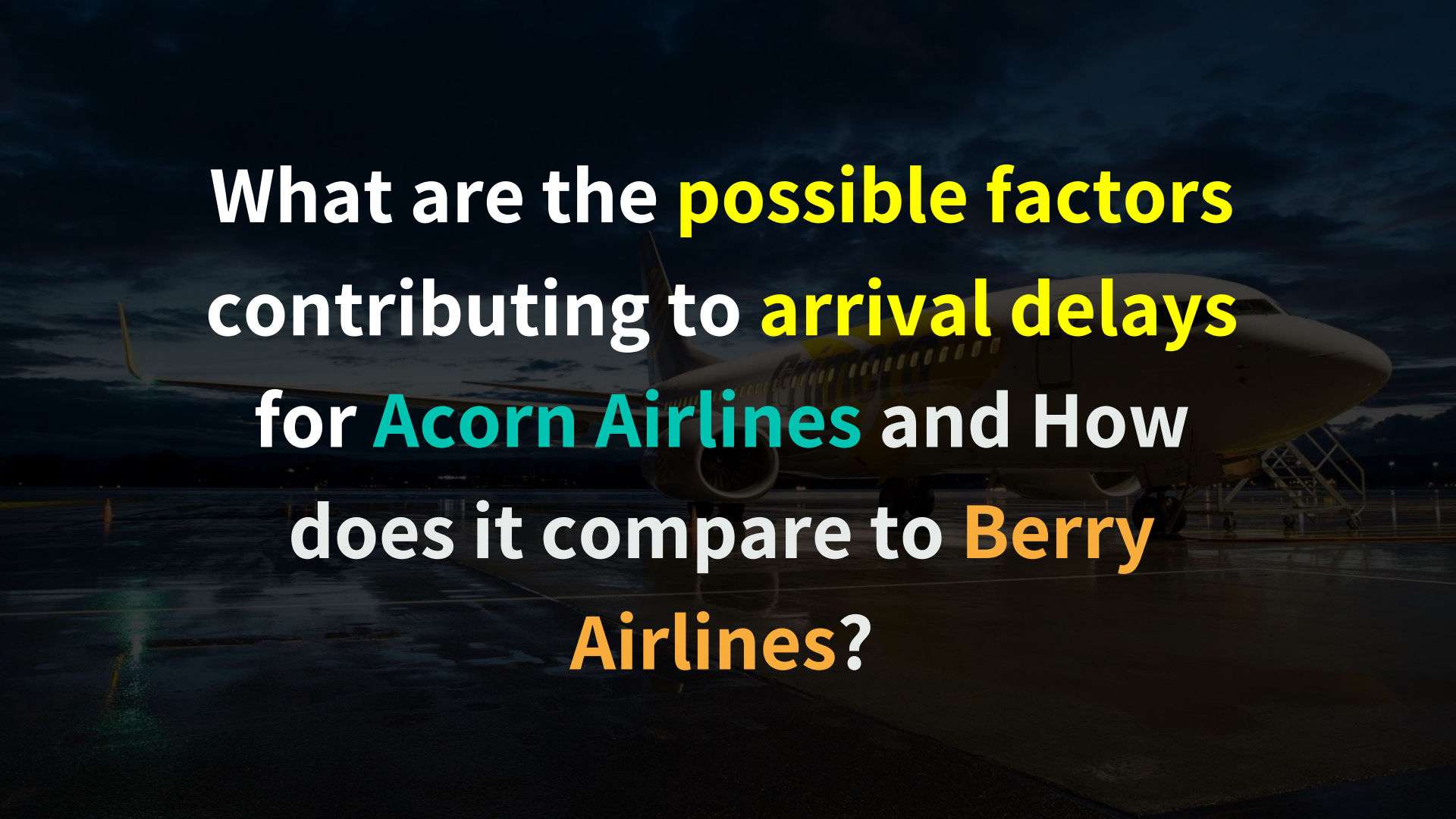
Number of Cancelled Flights for Each Airline

Airline	
AA	4,423
BA	571

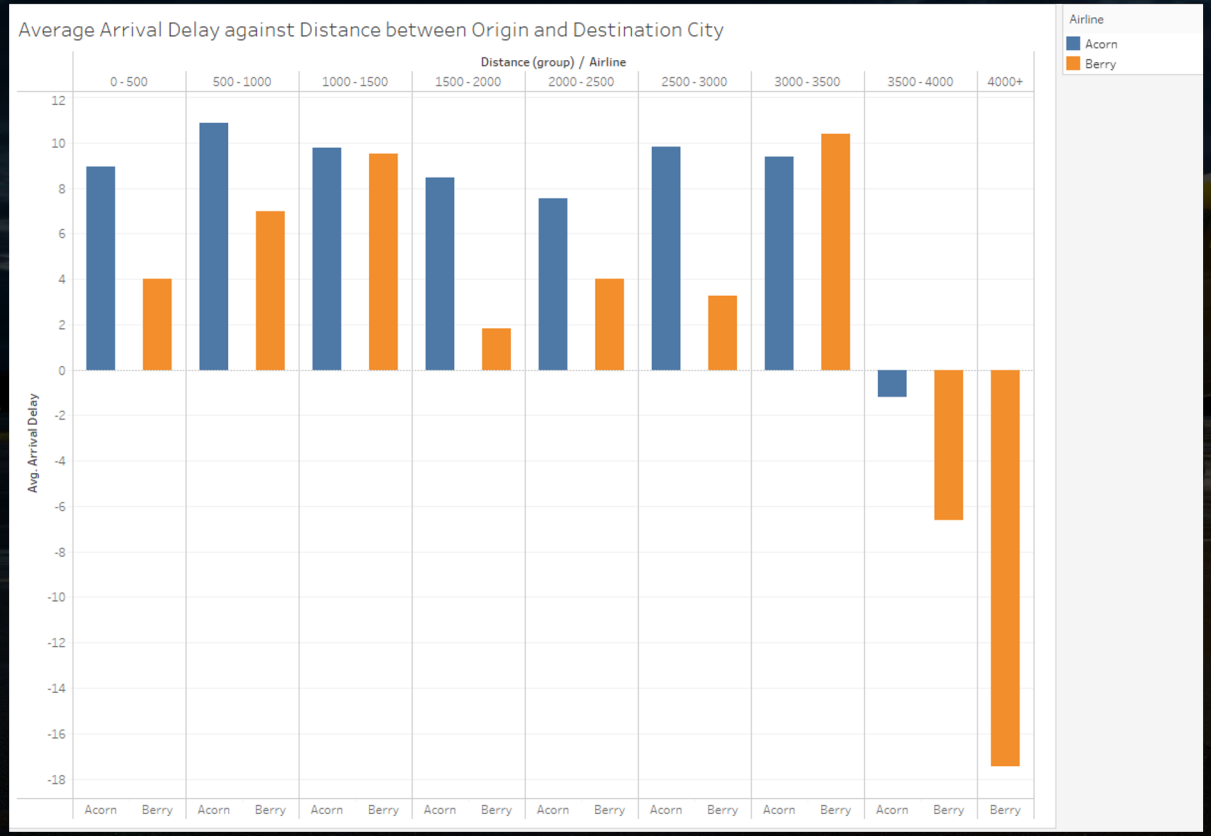
Problem 1 : Arrival Delay

What Affects Arrival Delay?

1. Airline Delay
2. Nas Delay
3. Late Aircraft Delay
4. Weather Delay
5. Security Delay


What are the possible factors contributing to arrival delays for Acorn Airlines and How does it compare to Berry Airlines?

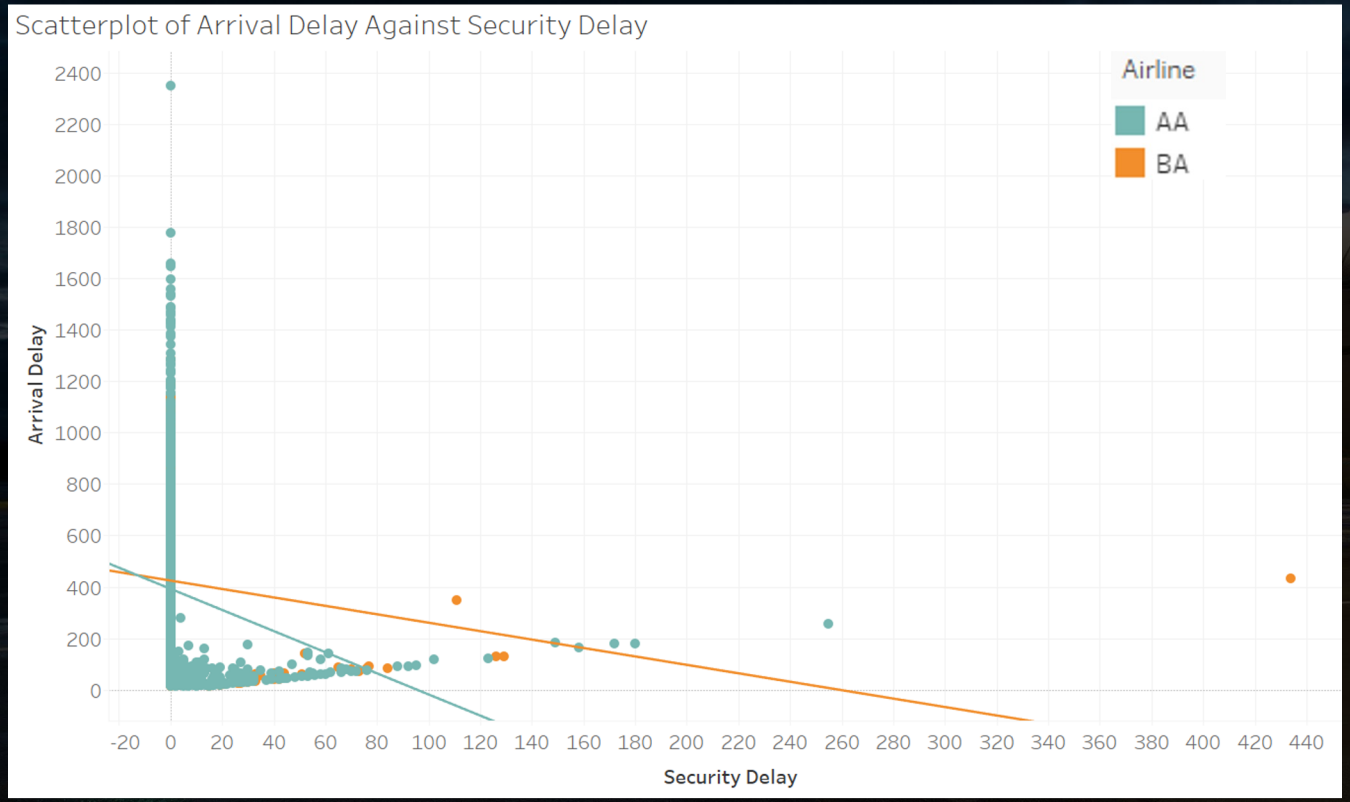
Does Distance between Origin and Destination Airport Contribute to Arrival Delays?



Acorn Airlines has LONGER Arrival Delays for almost every distance group (500m) as compared to Berry Airlines

No clear evidence that Distance affects Arrival Delays

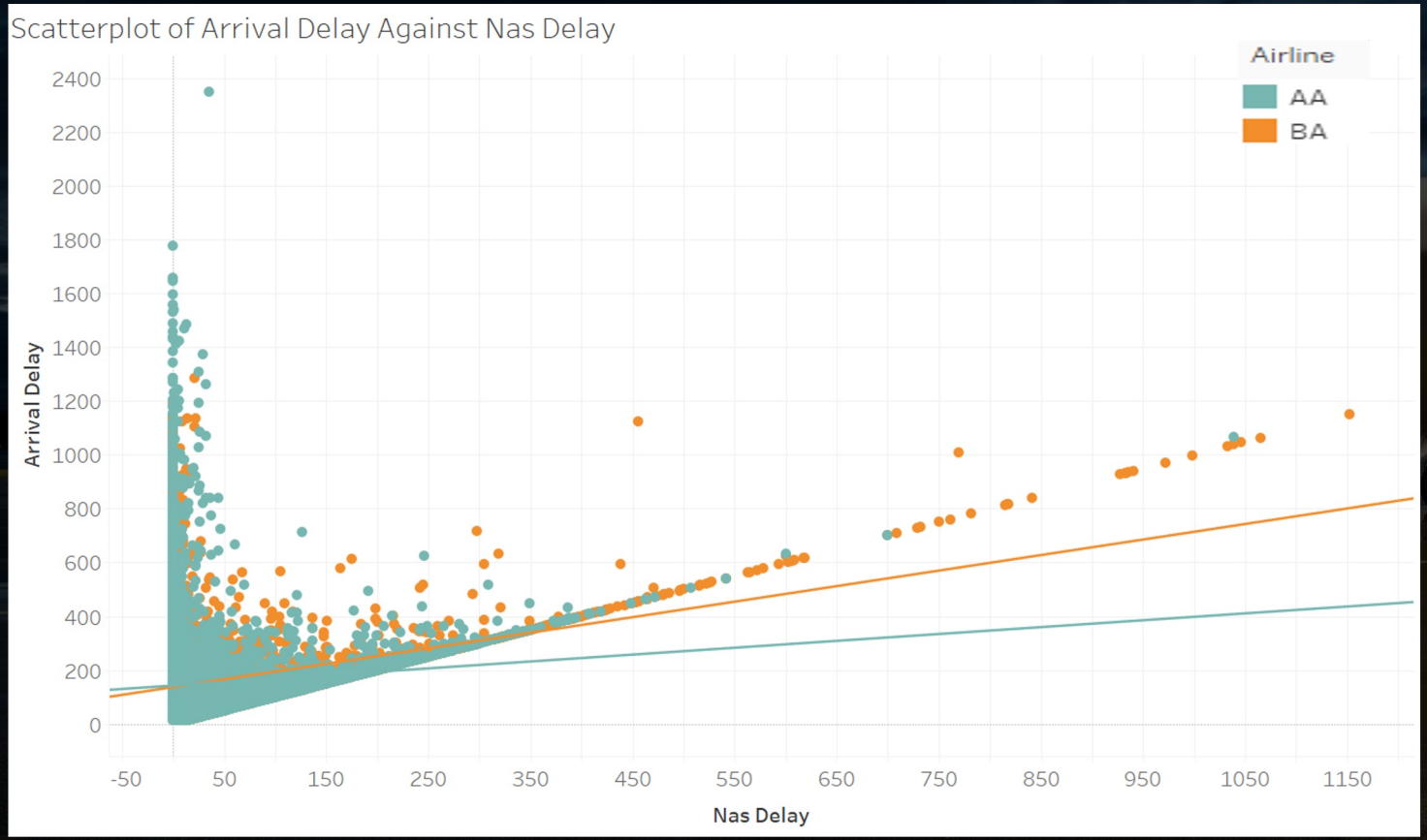
Does Security Delay affect Arrival Delay?



AA R^2: 0.0496
BA R^2: 0.0115

R^2 for both airlines are very small, very little correlation between security delay and arrival delay

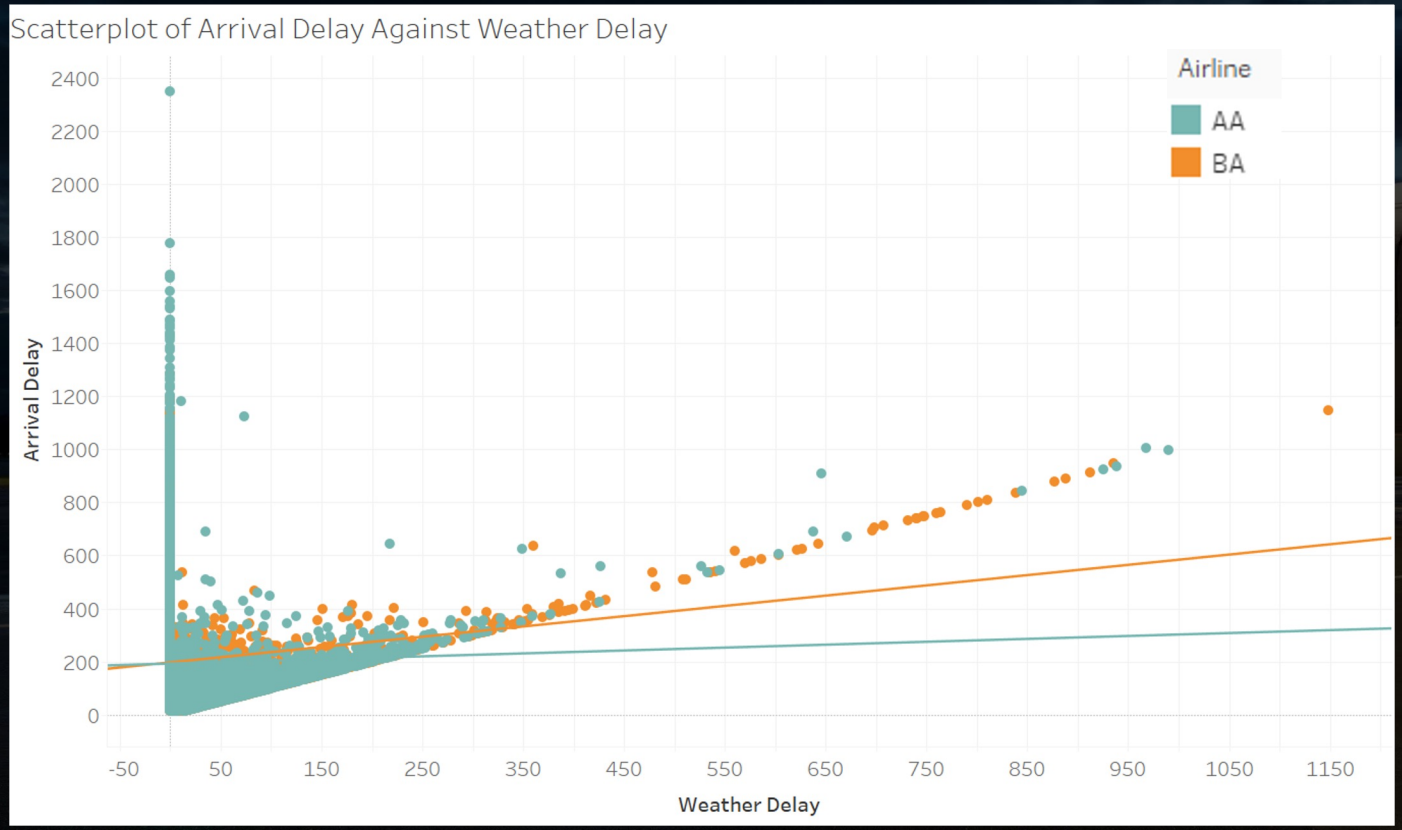
Does NAS Delay affect Arrival Delay?



AA R^2: 0.00678
BA R^2: 0.0909

R^2 for both airlines are very small, very little correlation between NAS delay and arrival delay

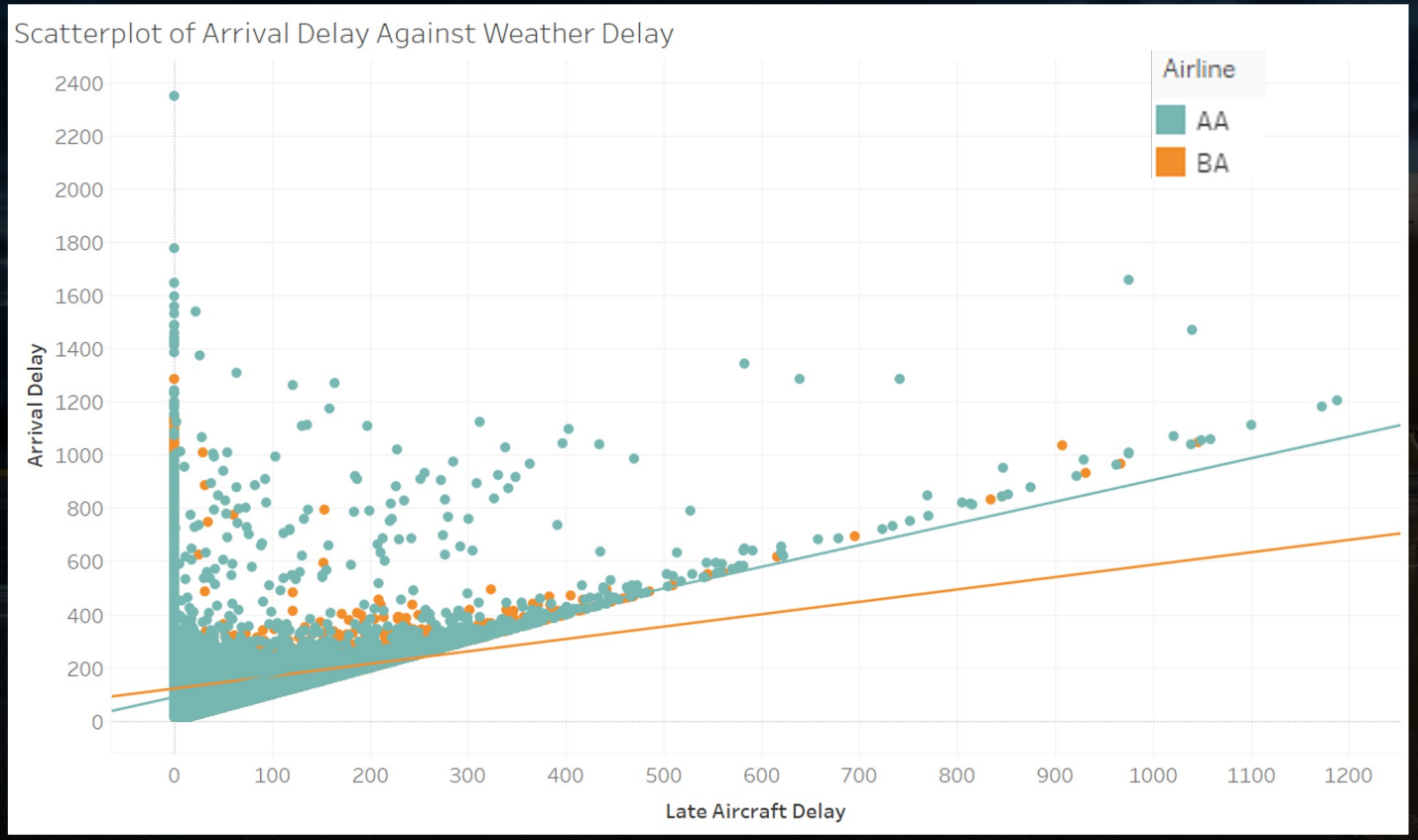
Does Weather Delay affect Arrival Delay?



AA R^2: 0.00123
BA R^2: 0.0297

R^2 for both airlines are very small, very little correlation between weather delay and arrival delays

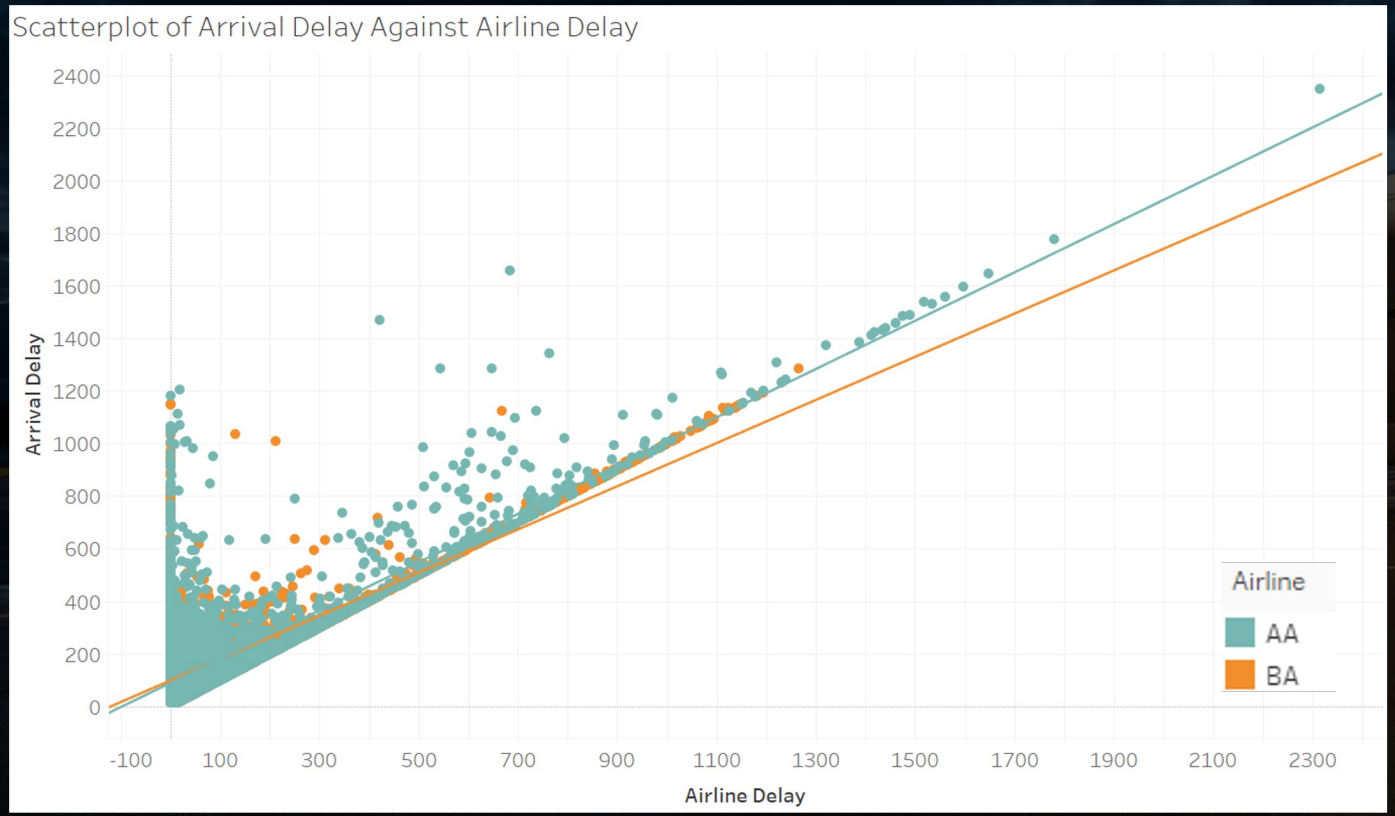
Does Late Aircraft Delay affect Arrival Delay?



AA R^2: 0.226
BA R^2: 0.0596

R^2 for both airlines are very small, very little correlation between late aircraft delay and arrival delay

Does Airline Delay affect Arrival Delays?

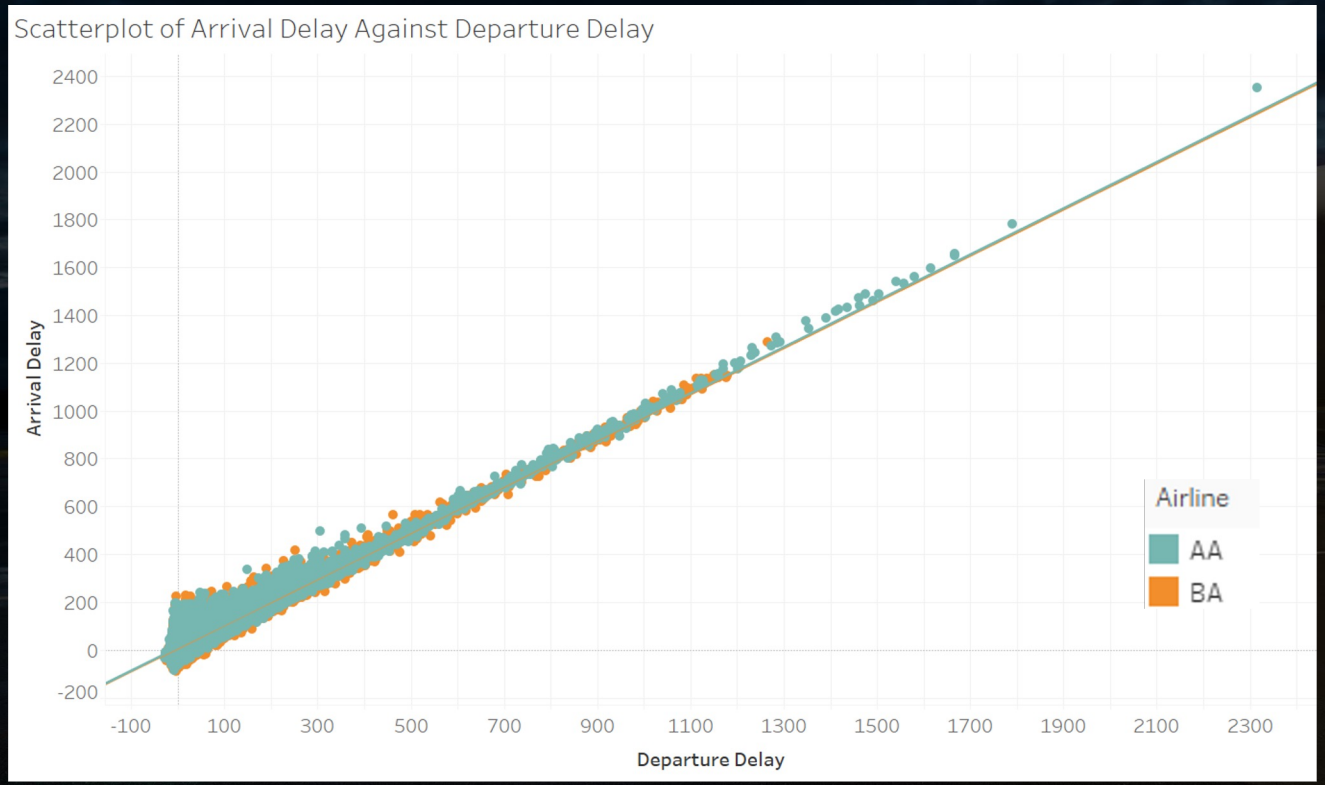


AA R^2: 0.615
BA R^2: 0.558

R^2 for both airlines are similar, and are the **largest** compared to other factors

Airline delay has a relation to **arrival delay**

Does Departure Delay affect Arrival Delays?



AA R^2: 0.950

BA R^2: 0.955

Strong positive correlation between **Departure Delay** and **Arrival Delay**

The greater the **Departure Delay**, the greater the **Arrival Delay**

Does Time of Flight affect Arrival Delay?

Most Delays at 9pm for both Airlines

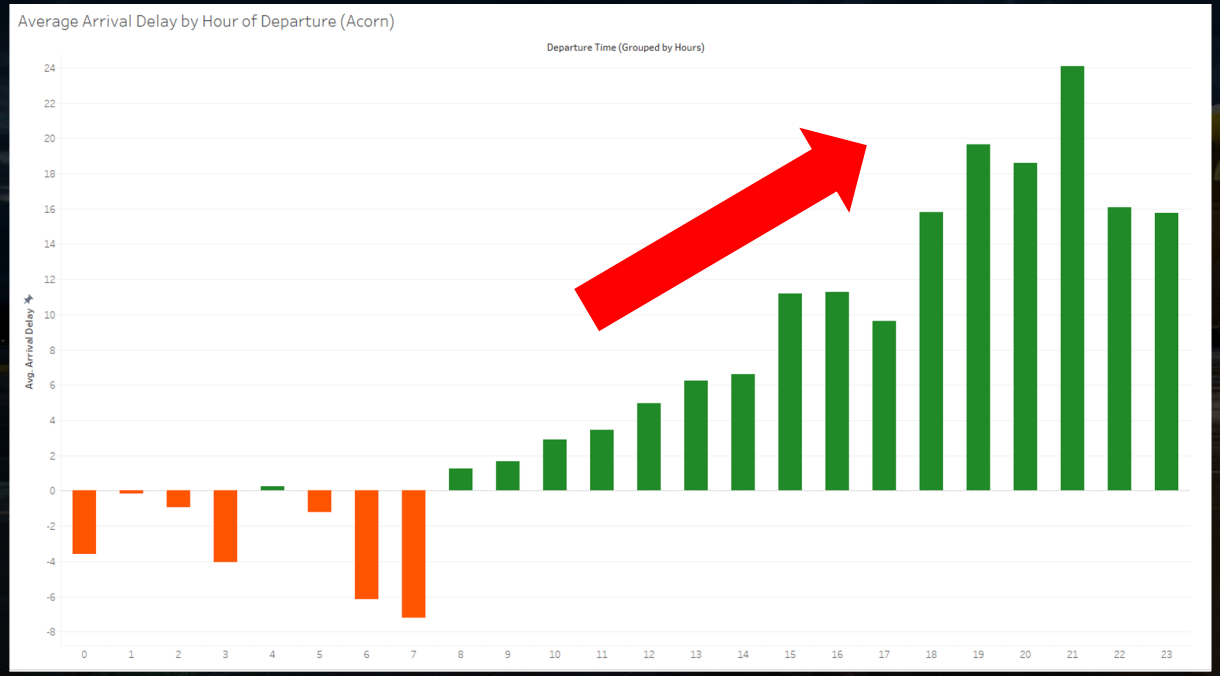
Average Delay Across 24h = 6.09 min

Average Delay Across 24h = 4.51 min

Acorn Airlines has LONGER Average Arrival Delays throughout the day as compared to Berry Airlines

Sub Problem 1:
Late Scheduled Departure Time

Impact of Departure Time on Average Arrival Delay for Acorn Airline



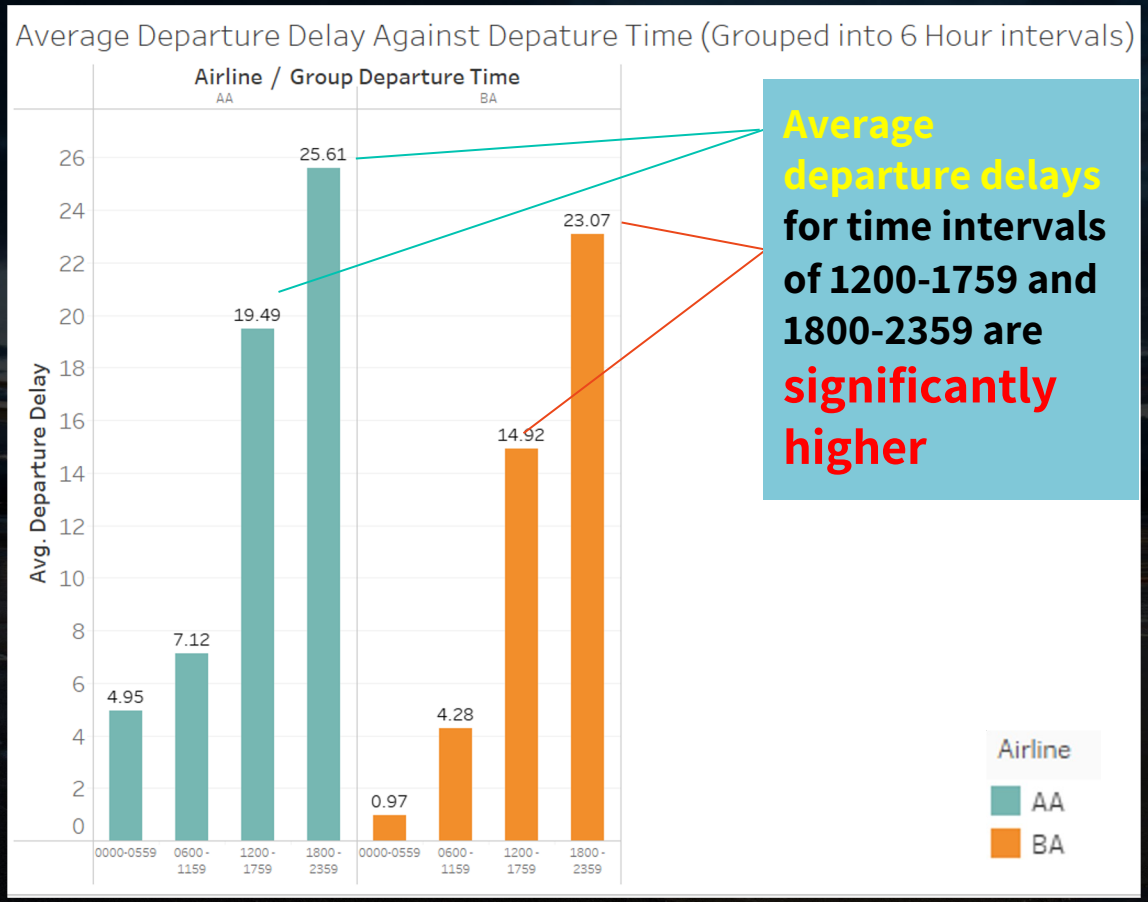
Flights from 8am - 11pm have an increasingly longer Average Arrival Delay throughout the day

The later the time of the day, the higher the average arrival delay.

Impact of Scheduled Departure Time of the Day on Average Departure Delay

Overall, average departure delay for AA is higher than BA at all time intervals

The later the scheduled departure time, the higher the average departure delay

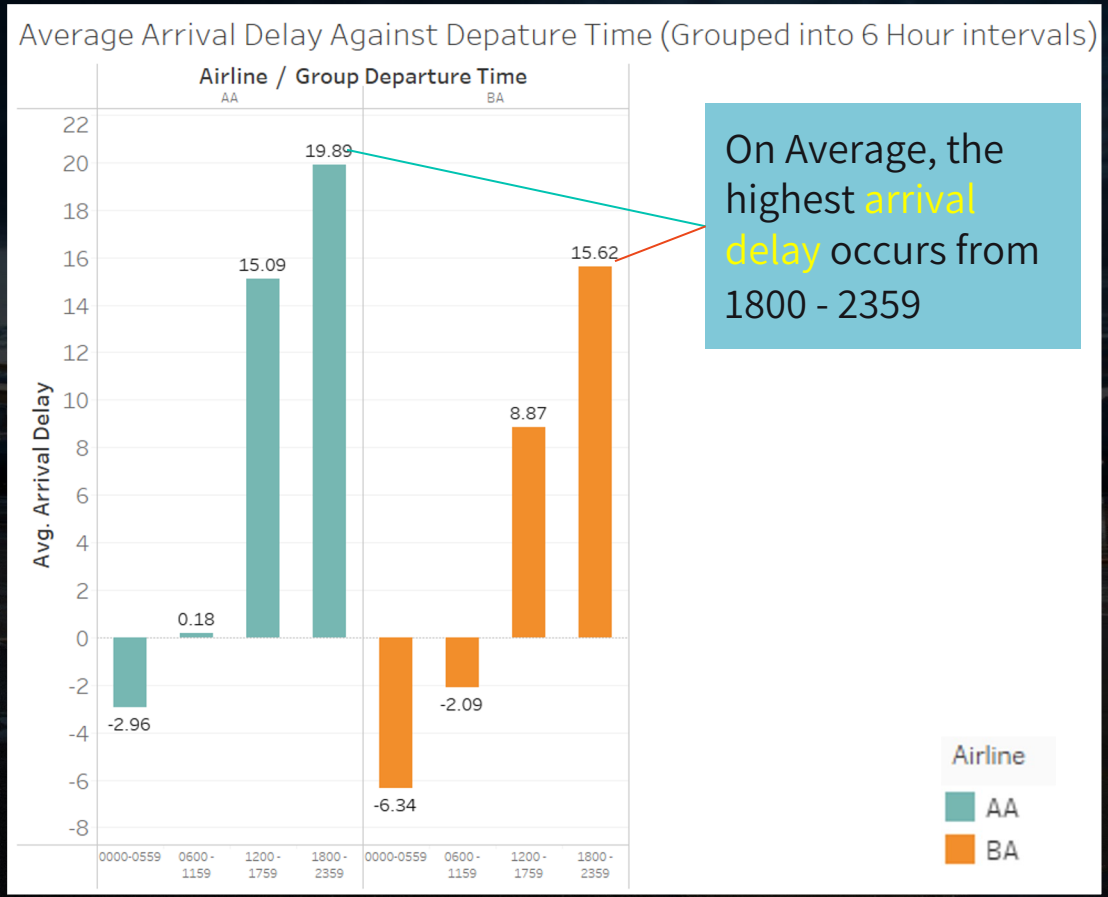


Average departure delays for time intervals of 1200-1759 and 1800-2359 are significantly higher

Impact of Scheduled Departure Time of the Day on Average Arrival Delay

Overall, average arrival delay for AA is higher than BA at all time intervals

Average arrival delay is higher from 1200 - 2359



On Average, the highest arrival delay occurs from 1800 - 2359

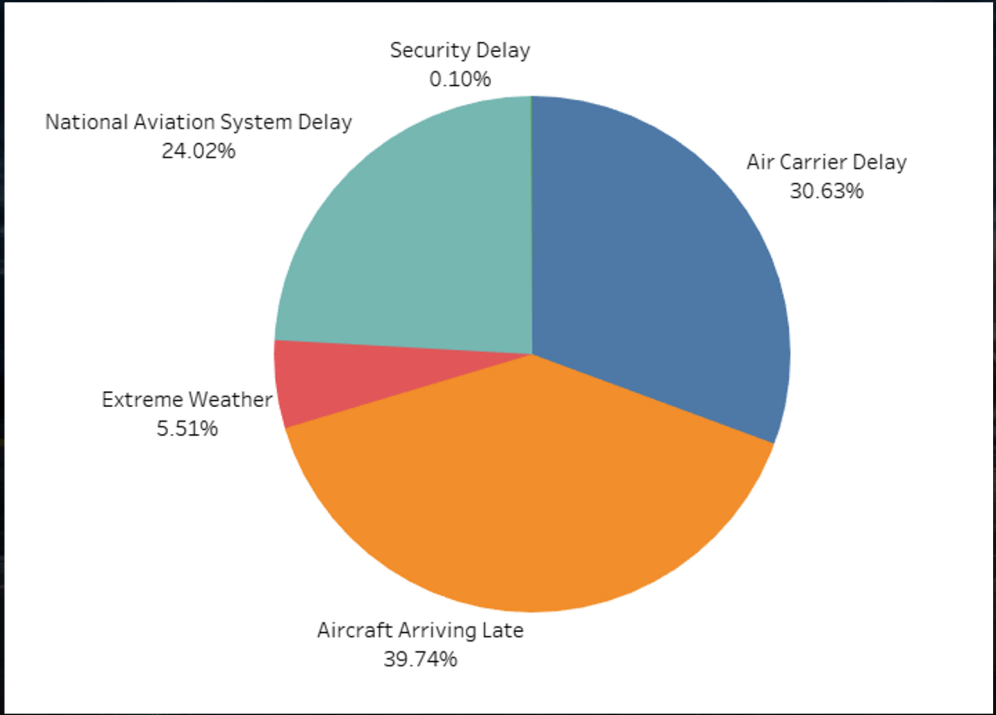
Insights:

1. Overall efficiency of the airline diminishes throughout the day as seen by how later departure time will result in departure delay
2. Workers may become less efficient as they approach the night shift due to fatigue, which can affect their general abilities and reaction times

Recommendations:

1. Implement technology solutions, such as automated check-in and baggage handling systems, to reduce the workload on airline staff and improve overall efficiency
2. Consider allocating additional manpower for late-night shifts and implementing a rotation schedule to ensure that workers are adequately rested and productive
    a. Could involve hiring part-time staff or implementing flexible scheduling options

Reasons For Delay?



The most common type of delay is Late Airline Delay (Aircraft Arriving Late)

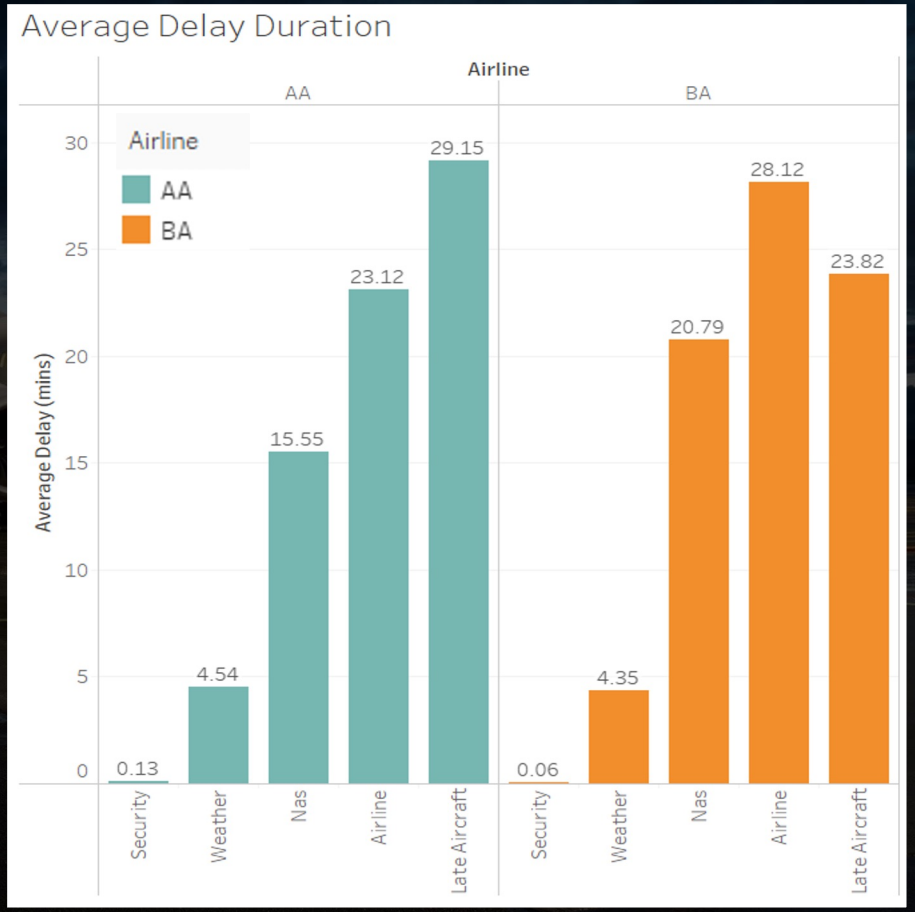
Security Delay rarely occurs

Bureau of Transportation Statistics

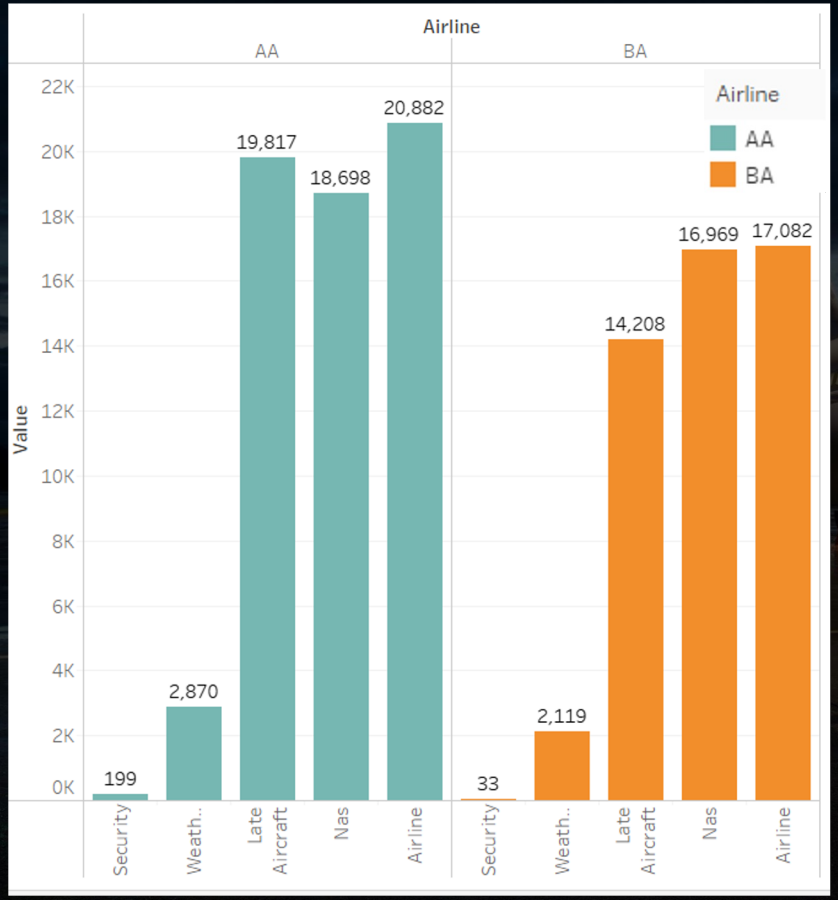
What Causes The Longest Arrival Delays?

The longest arrival delay for Acorn Airlines is due to Late Aircraft Delay

The longest arrival delay for Berry Airlines is due to Airline Delay



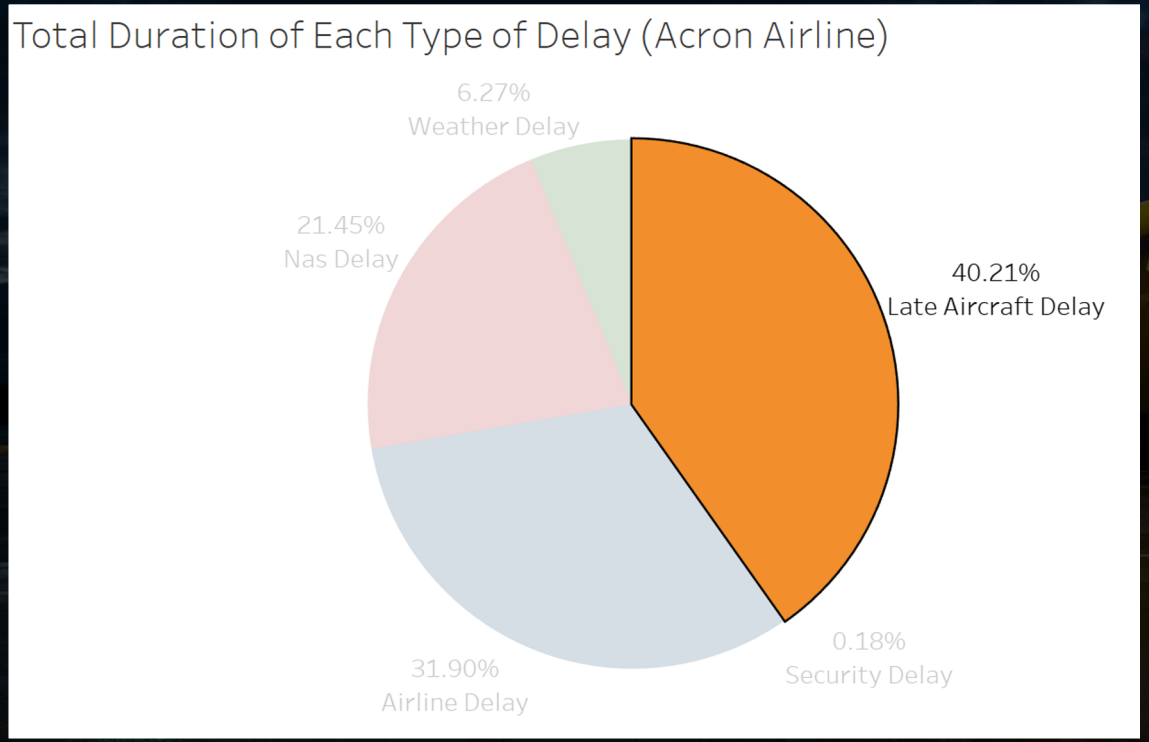
What Is The Most Frequent Delay?



Airline Delay is the most common delay for both **Acorn Airlines** and **Berry Airlines**

Sub problem 2:
Late Aircraft & Airline Delay

Severity of Each Delay for Acorn Airlines?



Late Aircraft Delay accounted for **40.21%** of total delay duration

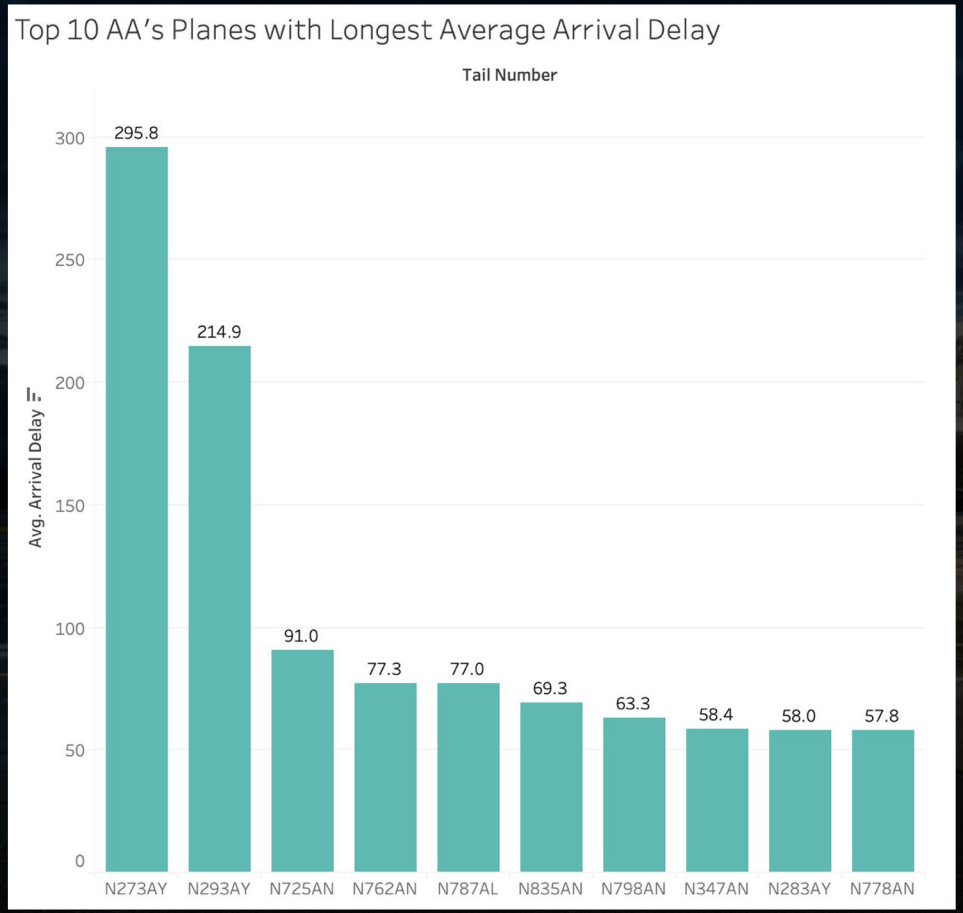
Insights

1. Late Aircraft Delay is likely caused by a ripple effect of other delays. As such, it is not of a very big concern
2. We then look at Airline Delay, which is the next longest type of Delay. A lack of manpower could lead to Airline delays in various areas such as check-in counters, boarding gates, or baggage handling

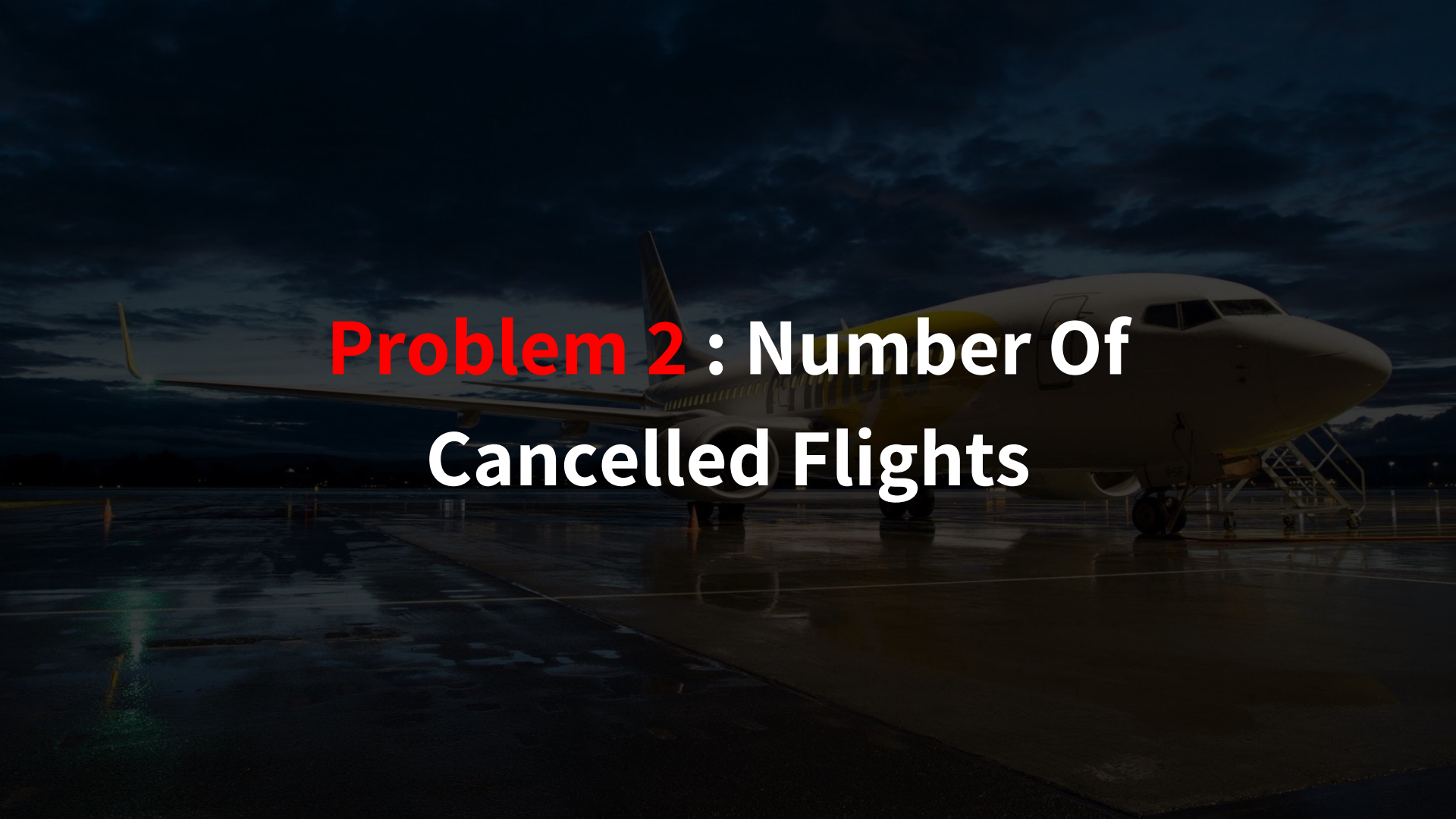
Recommendations:

1. Hire more staff or increase efficiency of workers through effective training to reduce bottlenecks in Airline Delays

Problematic Aircrafts?



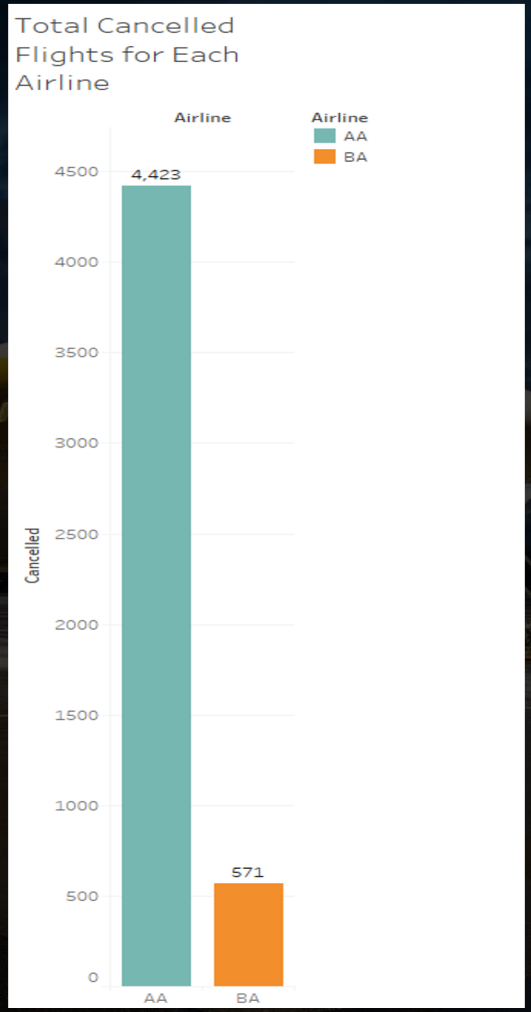
Aircrafts N272AY and N293AY have more than **2X longer Arrival Delays** as compared to the rest of the **aircrafts**



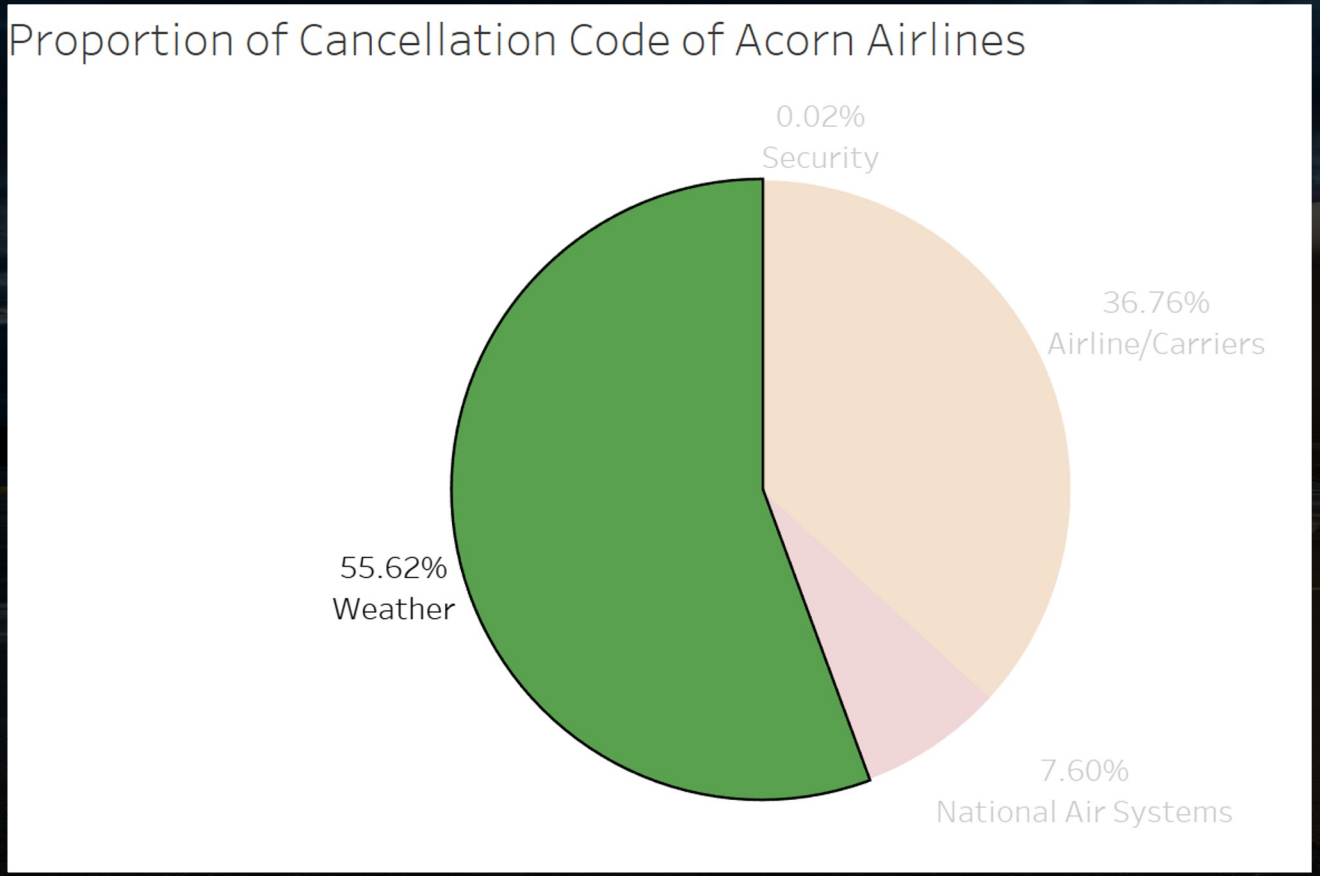
Problem 2 : Number Of Cancelled Flights

Higher Number of Cancelled Flights

Number of Cancelled Flights of Acorn Airlines is **7.75x more** than the Number of Cancelled Flights of Berry Airlines

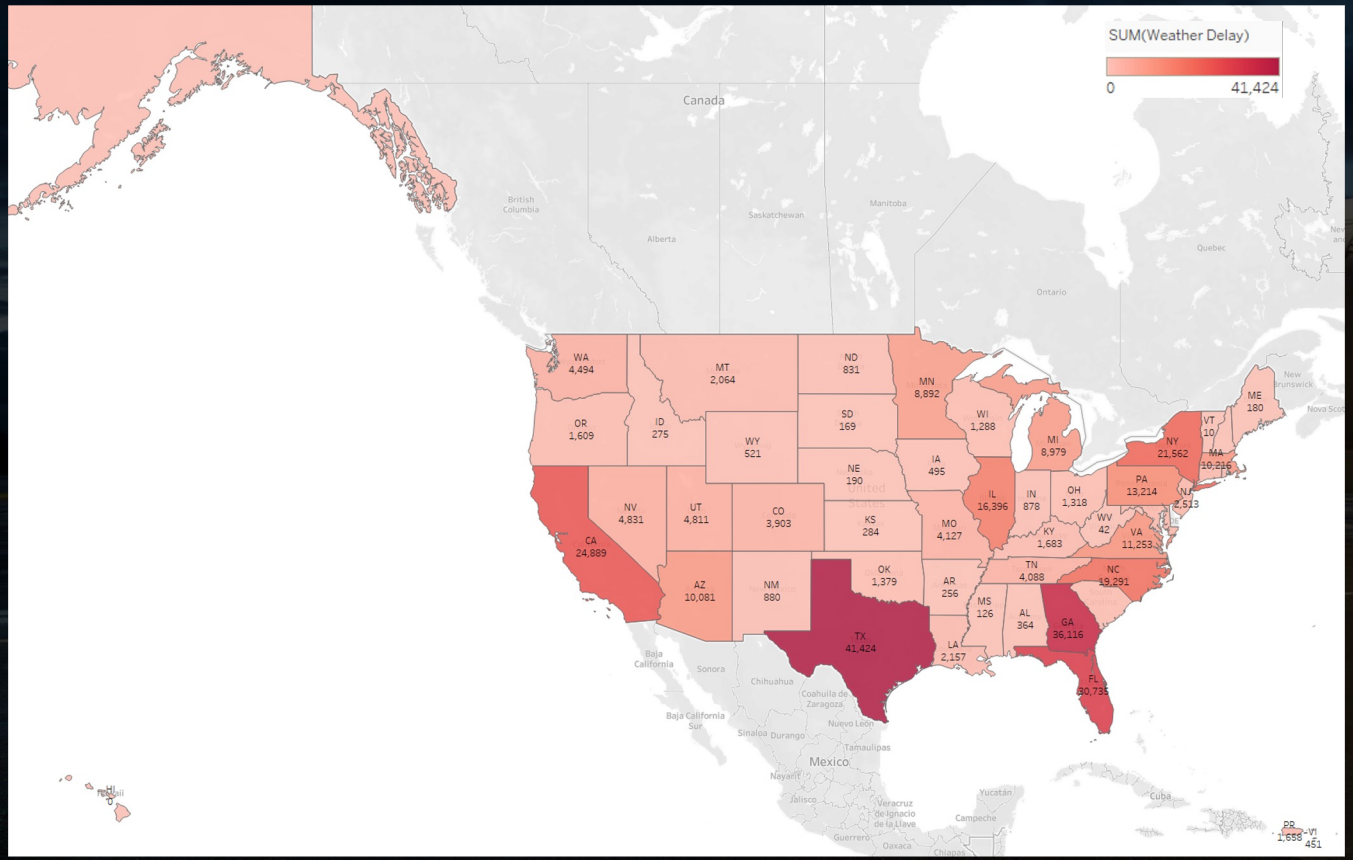


What Factors Causes Flight Cancellations?



Weather leads to the **most** number of **flight cancellations**

Does Location Affect Weather Delays?

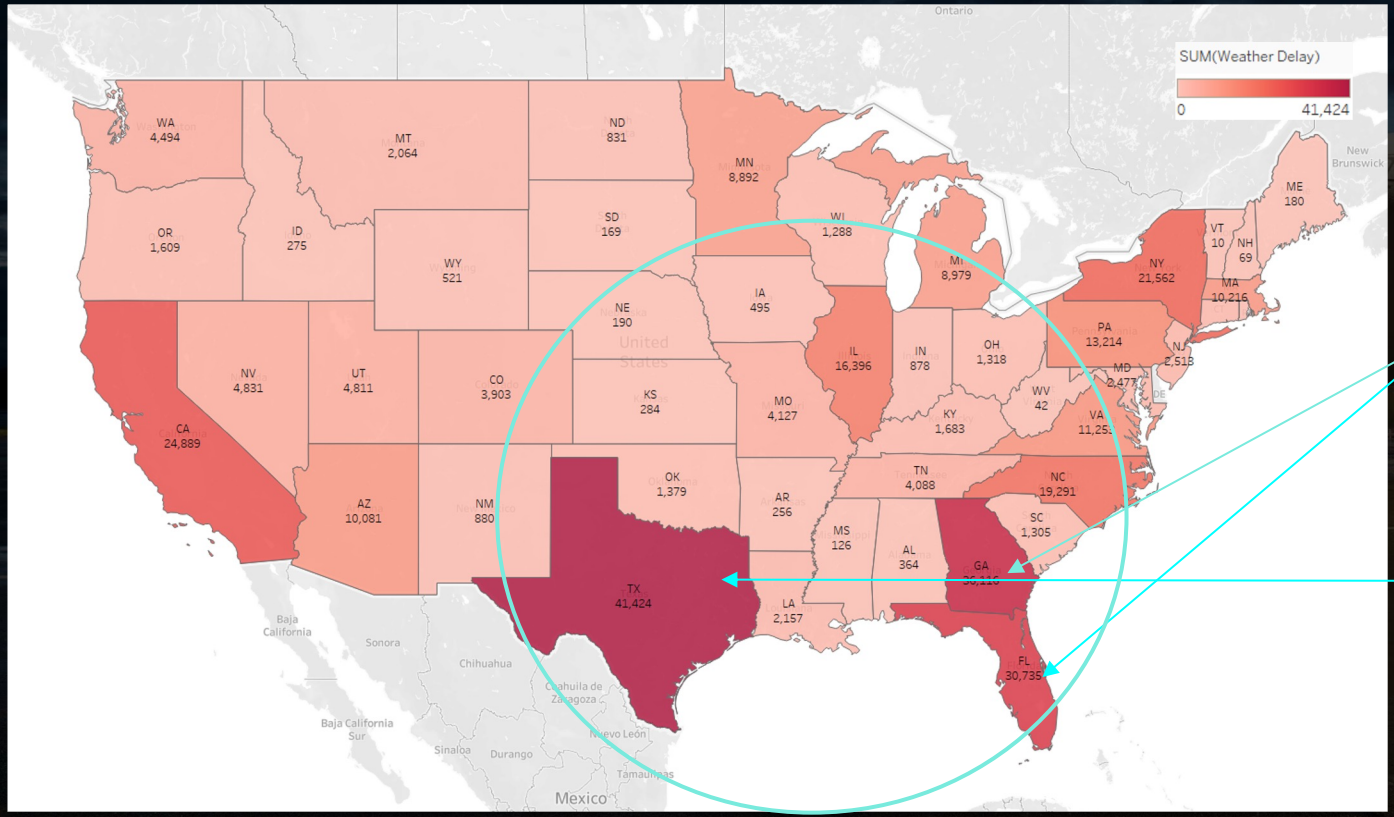


There is

more

weather delays on the coasts of USA

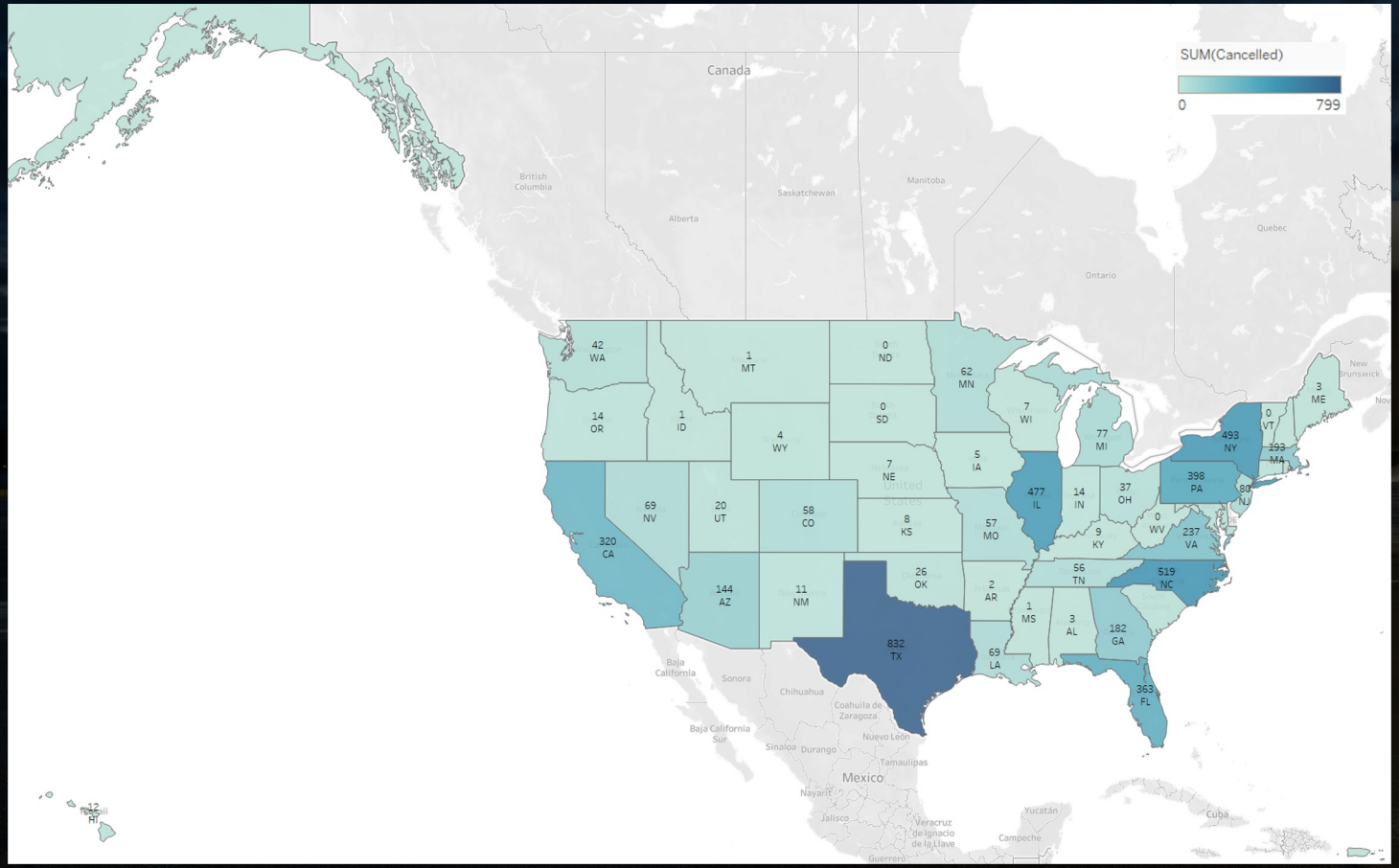
Total Weather Delay by State



Georgia and Florida also has relatively higher weather delays

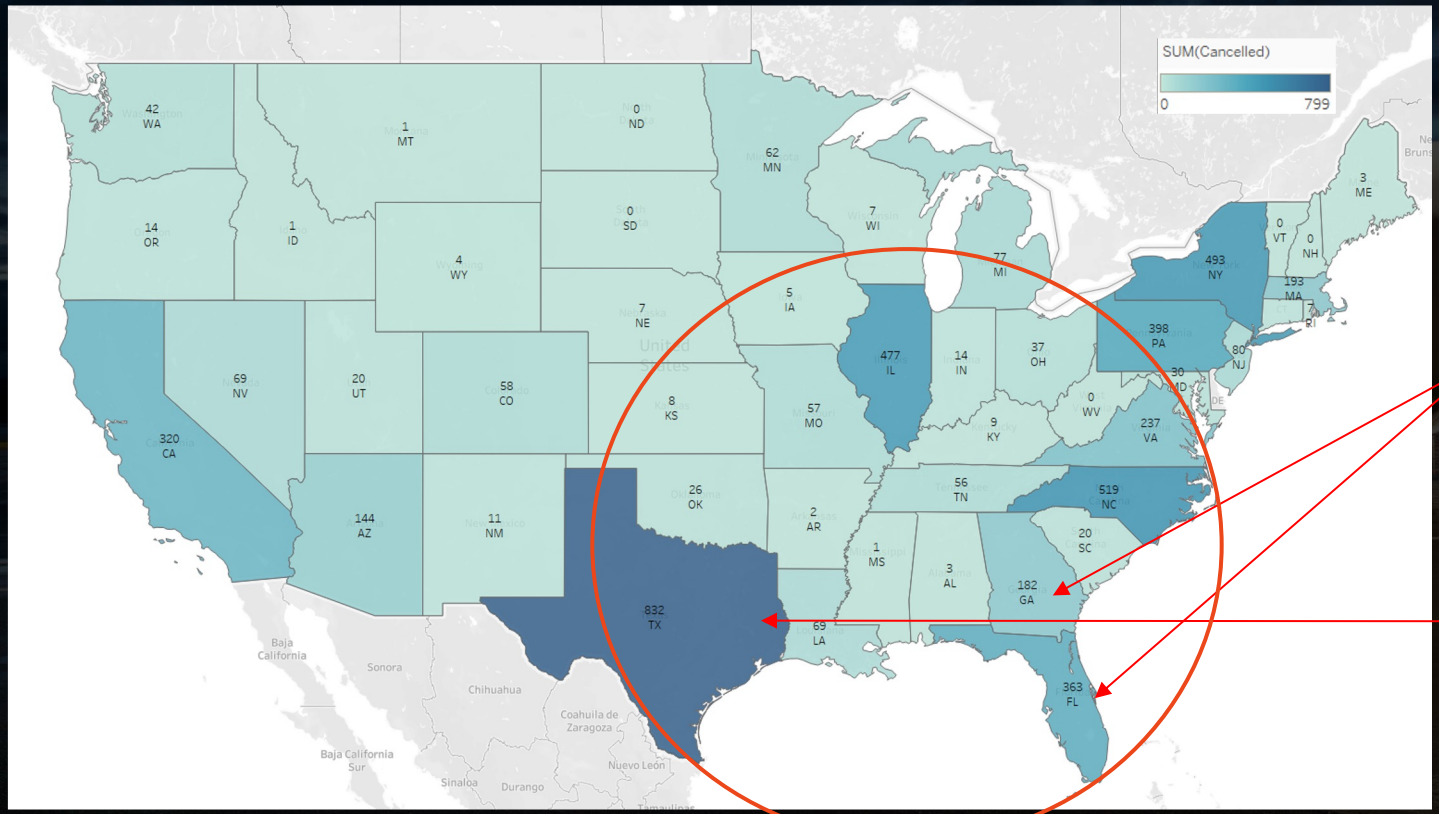
Texas has the highest overall weather delay Time

Does Location Affect Cancellation?



There is also **more** flight cancellations on the coasts of USA

Total Flight Cancellations by Origin State



Georgia and Florida also has relatively higher flight cancellations

Texas has the highest overall flight cancellations

Insights

1. Texas is the state with the most occurrences of weather delays, and states such as Georgia and Florida also have high occurrences of weather delays
2. Generally, states that experiences higher occurrences of weather delays also experiences higher occurrences of flight cancellations
3. Texas, Florida and Georgia, as well as other coastal states, are prone to worse weather conditions, which might have contributed to the high frequency of weather-related incidents
4. Inference is backed up based on high similarities between geographical graphs

Recommendation

1. Acorn Airlines should plan flight schedules around weather forecasts and prepare for possible weather-related incidents to avoid both weather delays as well as weather-related flight cancellations
2. Better planning for flights in coastal states
3. Avoid flight routes that frequently experiences bad weather

Summary

Summary of our Insights

Insights on Arrival Delays:

- Overall efficiency of the airline diminishes throughout the day
- Workers may become less efficient as they approach the night shift
- Late Aircraft Delay is likely caused by a ripple effect of other delays

Insights on Flight Cancellations:

- Texas is the state with the most occurrences of weather delays, and states such as Georgia and Florida also have high occurrences of weather delays
- Generally, states that experiences higher occurrences of weather delays also experiences higher occurrences of flight cancellations
- Texas, Florida and Georgia, as well as other coastal states, are prone to worse weather conditions, which might have contributed to the high frequency of weather-related incidents

Summary of our Recommendations

To IMPROVE arrival delays:

- Improve technological solutions, increase manpower and efficiency
- Consider allocating more manpower during Peak Periods

To REDUCE the number of Cancelled flights associated with weather delays:

- Plan flight schedules in advance around bad weather forecast
- Better planning for flights in coastal areas
- Avoid flight routes which experience bad weather


Thank You!
LET’S TAKE FORM ON ACORN!

External Sources

Bureau of Transportation Statistics. Understanding the reporting of causes of flight delays and cancellations. https://www.bts.gov/topics/airlines-and-airports/understanding-reporting-causes-flight-delays-and-cancellations (accessed Mar 30, 2023).

McCarthy, D. What are the most common reasons for flight delays in the U.S.? https://www.travelmarketreport.com/News/articles/What-Are-the-Most-Common-Reasons-For-Flight-Delays-in-the-US (accessed Mar 30, 2023).

ASPM Help. Types of delay. https://aspm.faa.gov/aspmhelp/index/Types_of_Delay.html (accessed Mar 30, 2023).

Chokshi, N. Airline flight delays got worse in 2019. here's a scorecard. https://www.nytimes.com/2020/02/19/business/air-travel-delays-airlines.html (accessed Mar 30, 2023).