

BUSINESS DATA VISUALIZATION



INTRODUCTION

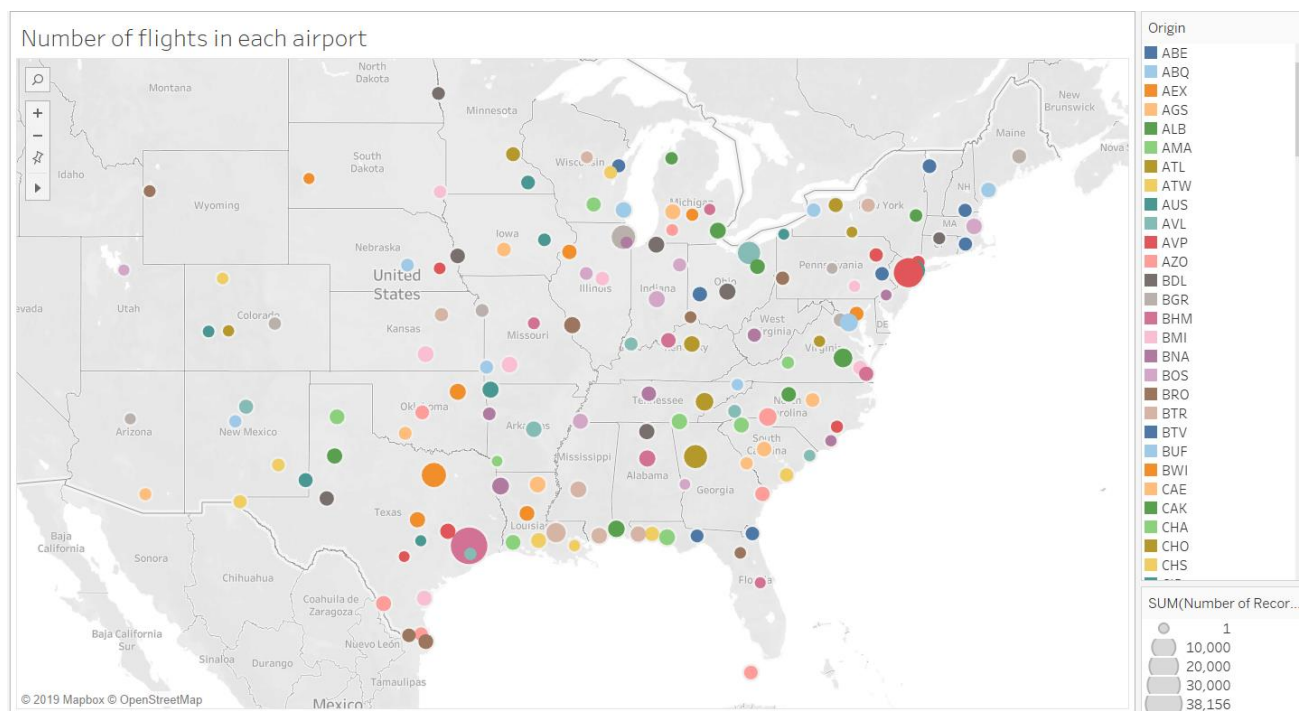
Our goal of the Project is to make visual dashboards using Tableau that provides a visual overview of the airline's key performance features. Our group focuses on **ExpressJet Airlines, Inc.** which is a leading American regional airline based in Atlanta, Georgia, USA. The airline flies more than 3,300 weekly flights from bases in Chicago, Cleveland, Houston, Newark, etc.

Our focus is to understand the on-time performance of the Express Jet airline and for this we illustrate how various attributes like departure delay and arrival delay of the airline are varying based on months, weeks, cities, airports.

VISUALIZATION 1:

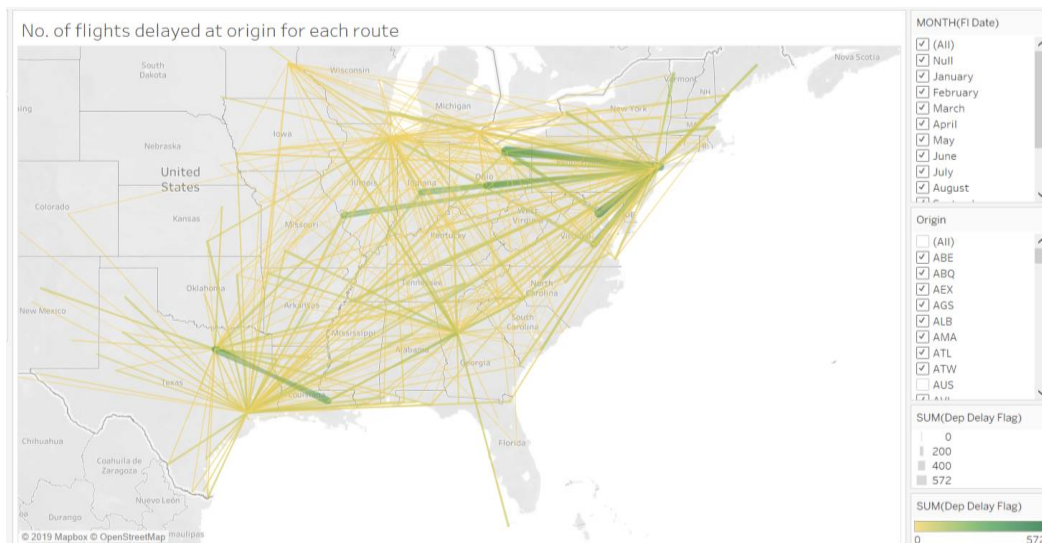
Number of flights operating from each airport

To understand the magnitude of air traffic in the airports where ExpressJet Airlines operates its domestic flights, we first plot the number of flights operating from each airport and find the average delay time at each origin airport.



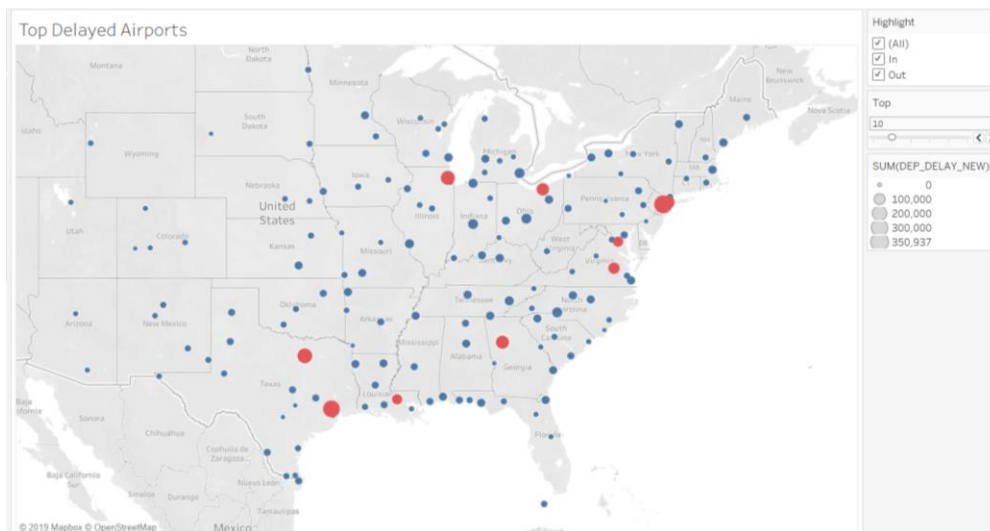
The Map depicts the airport locations which fly ExpressJet Airline and the Pie Chart for each airport depicts the route of the flights with the number of flights flying across the route. Houston/ George Bush Intercontinental Airport in Texas (IAH) holds the highest number of routes covered followed by Newark Liberty International Airport located in New Jersey (EWR). This plot helped us analyze the type of traffic handled by airports and to identify the geographical segmentation of flight data.

Below is a representation of flight network operated by ExpressJet.



This network graph shows the no. of flights that are delayed from each origin city w.r.t to each route in the year of 2018. We see that there have been highest number of 572 delayed flights between CLE (Cleveland) and LGA (New York) airports in 2018. We can also visualize the count of delayed flights for each month by the filter that is added. The varying color gradient gives the increase in count of delayed flights at each route.

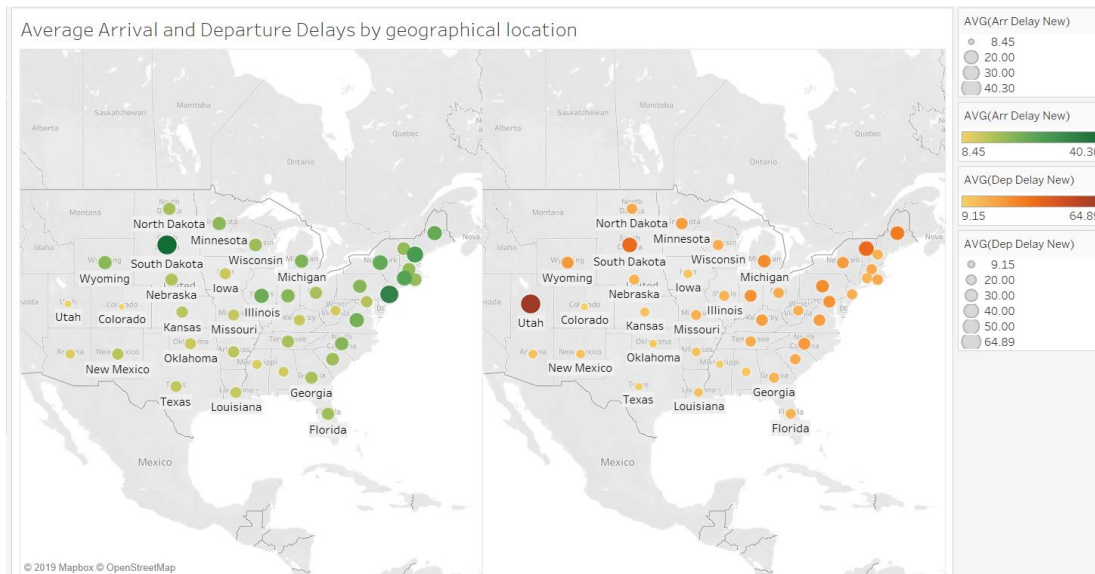
Top Delayed Airports



In the above visualization we can get the top 10 airports which have highest delays in the United States. IAH, ORD, DFW, ATL, BTR, RIC, DCA, EWR, LGA, CLE are the airports with maximum delay time. We can use these visualizations to help passengers who are taking a flight from a city with multiple airports to choose the one with lower average delay time.

VISUALIZATION 2:

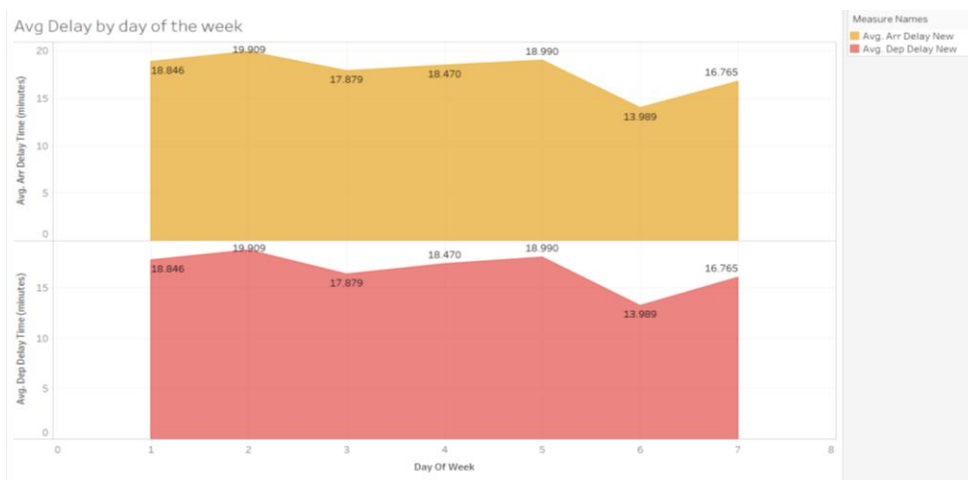
Average Arrival and Departure Delays based on State



We can infer from the plot that the airports in Utah have the maximum average departure delay of 64.89 minutes, which means that the airports in State ,Utah are having a poor performance of departure and the State with the least departure delay is Colorado. All the airports combinedly in South Dakota state have an average arrival delay of 40.30 minutes which is the highest among all the other states and Colorado having the least average arrival delays

VISUALIZATION 3:

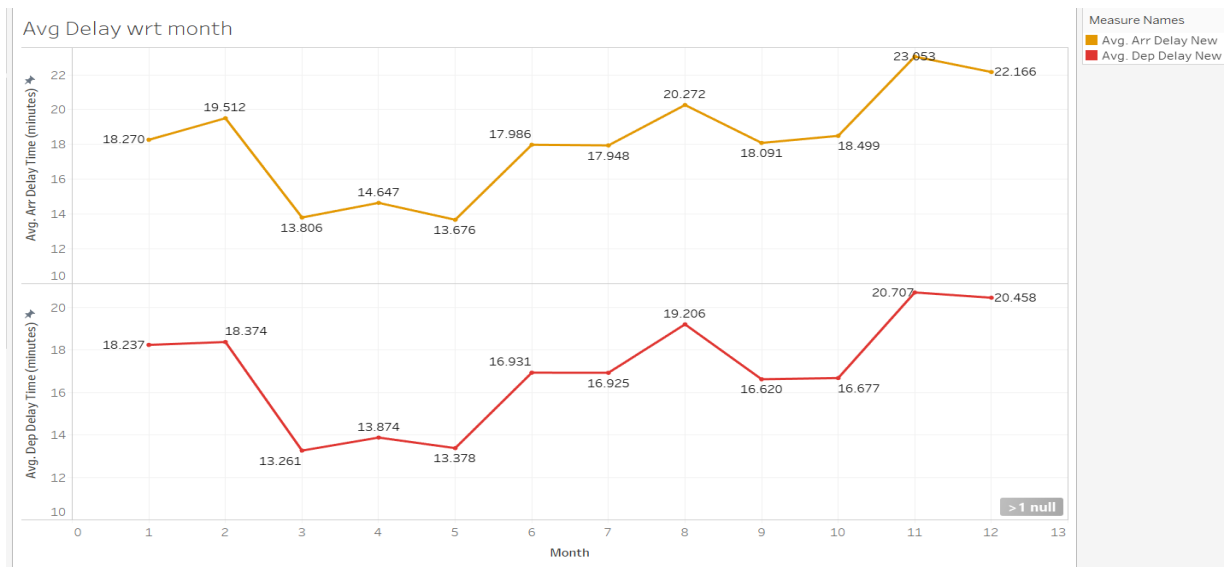
Departure and Arrival Delays by Week (excluded early arrivals and departures)



Average Arrival Delay for seven days of the week in the year 2018 represented in yellow and Average Departure Delay represented in Pink in the graph. Maximum arrival & departure delays occurred on Tuesdays and Fridays and least delays on Saturdays.

VISUALIZATION 4:

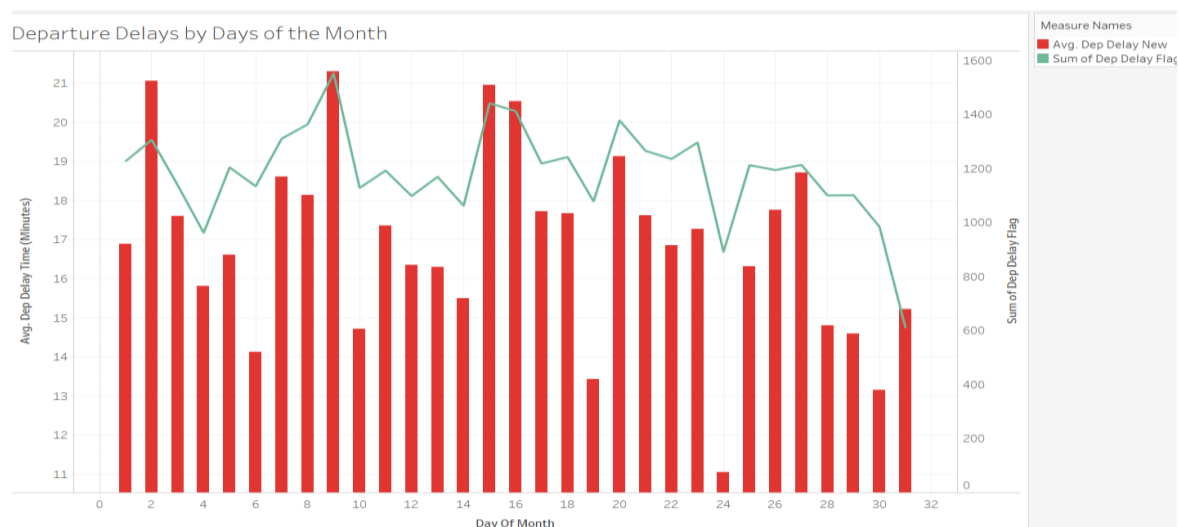
Departure and Arrival Delays by Month (excluded early arrivals and departures)



Average Arrival Delay represented in yellow and Average Departure Delay represented in Red in the graph which is for 12 months of 2018. Looking at the trends we observe that the highest arrival & departure delays occurred in November and December. One possible reason for this increase could be the increase in the number of flyers in the Holiday season. We also see that the least Average departure delays are in the March and May months.

VISUALIZATION 5:

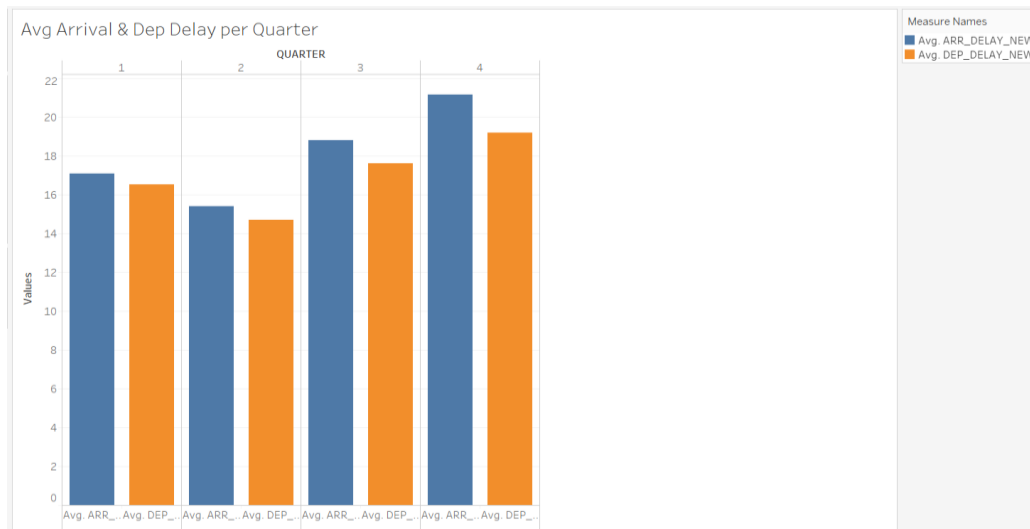
Departure Delays based on Day of month



Though there is not much significant trend observed, From the plot we can infer that the delays tend to decrease by the end of the month.

VISUALIZATION 6:

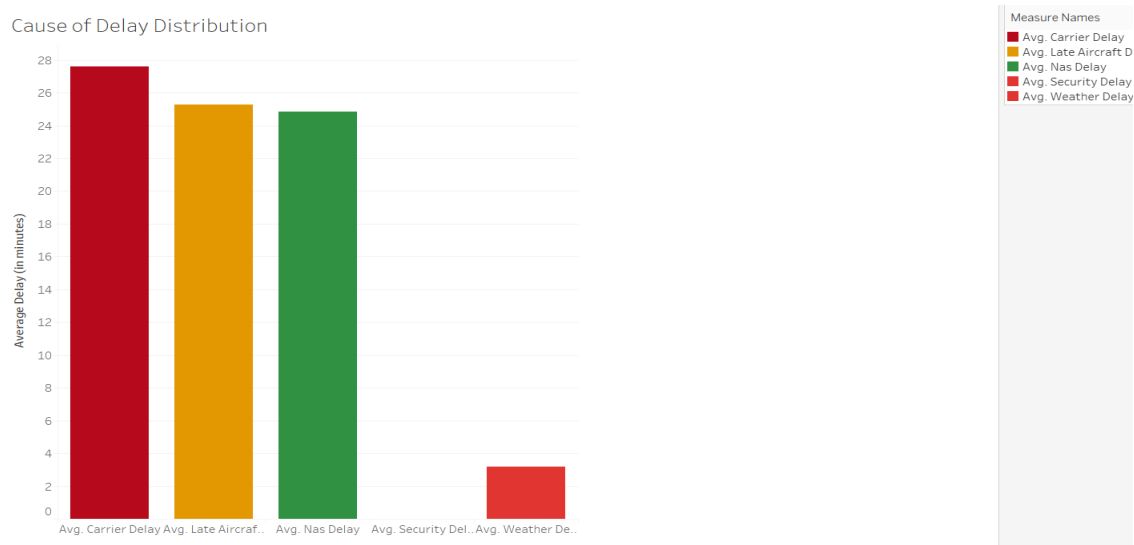
Average Arrival and Departure Delays in minutes Quarter basis



In the bar plot above, the average arrival and departure delay (in minutes) have been plot for four quarters of the year 2018. The maximum delays have occurred in the 4th quarter (during the month of October, November, December). The possible reason for this trend could be the increase in the number of passengers during the Holiday season.

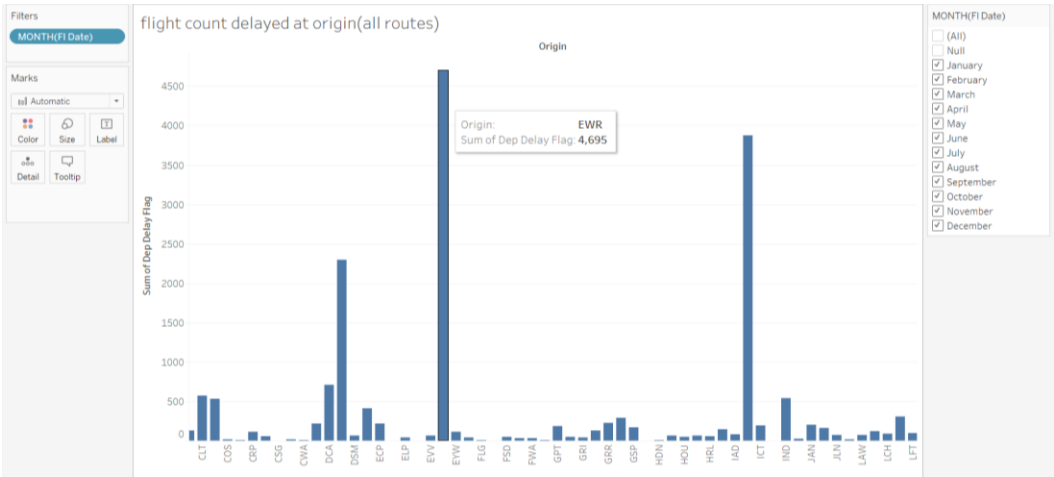
VISUALIZATION 7:

Cause of Delays Distribution



Flight delay are caused by various reasons. From the plot we can see that the Carrier delay (minutes) contributes the most towards the overall delay and security delay contributes the least. There is no delay because of Security. The takeaway point is that we can drill down into more reason for high value of Carrier delay.

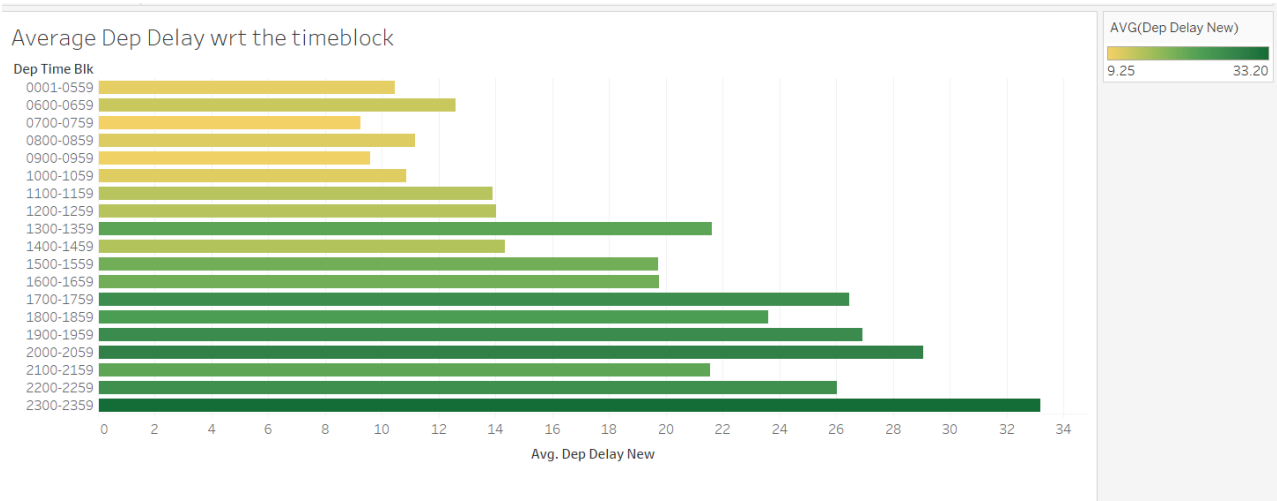
The average departure delay of flights from Elmira/Corning, airport in New York (ELM) is the highest with 194.5 mins but has the lowest number of flights that is, 2 flights flying, while the lowest average departure delay of 1.4 mins is recorded by the flights flying from ILM with 30 flights. Houston/ George Bush Intercontinental Airport in Texas (IAH) holds the highest number of flights that is, 38,156 flights, however the average departure delay is comparatively low with 7.7 mins.



The following bar chart shows the total no. of delays that have occurred from a city in 2018 and can be filtered based on month for comparison. Overall, EWR airport has the highest no. of delayed flights in the year 2018.

VISUALIZATION 9:

Average Departure Delay in a time period in a day



The plot above depicts the average departure delay (in minutes) for different time blocks in a day. Most flights have the greatest average departure delay (of 33.20 minutes) during 23:00-23:59 hours; while the time block of 07:00-07:59 hours has the lowest value of average departure delay of 9.25 minutes

We provided a visual overview of the airline's key performance features like average arrival and departure delays and different routes of the airline. We looked at the average departure and arrival delays on different grains. The trends of the airline with respect to airport, city and state are represented in a graphical format which helps to foresee business, analyze the airlines performance. But there is a greater scope of improvement and we can identify new patterns. The use of Tableau to create the visualizations helped to visually represent Express Jet airlines data.