UBER SUPPLY-DEMAND GAP ANALYSIS

Presented by-

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Business Objective

Uber is losing out a lot of business due to demand-supply gap in few areas. One such area of focus is trips to Airport from city and vice versa. Mainly because airports are located outside the city, the trip time is high and due to unavailability of passengers immediately from the airport, the wait time is also high. This is causing a lot of issues for the customers like frequent request cancellations and unavailability of drivers.

With the given data set, the objective is to –

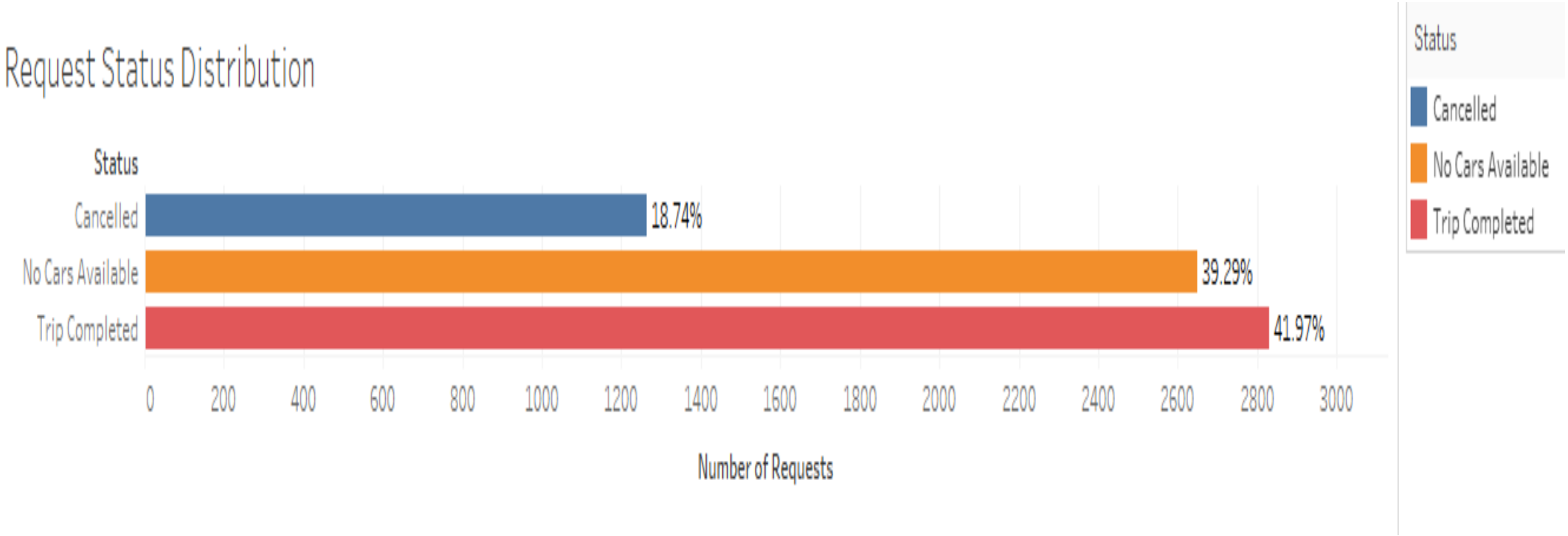
- Analyse the given data for trips between City-Airport and vice versa to drill down to demand-supply gap areas.
- Find root cause or hypothesis for the gap.
- Prove the hypothesis through given data.
- Suggest mitigation plan for the issue.

Problem solving methodology

- Data cleaning
- Understanding data
- Adding new variables/ derived metrics
- Finding trends from data
- Performing Root cause analysis using top-down approach
- Proving hypothesis via data
- Providing mitigation plan for issues

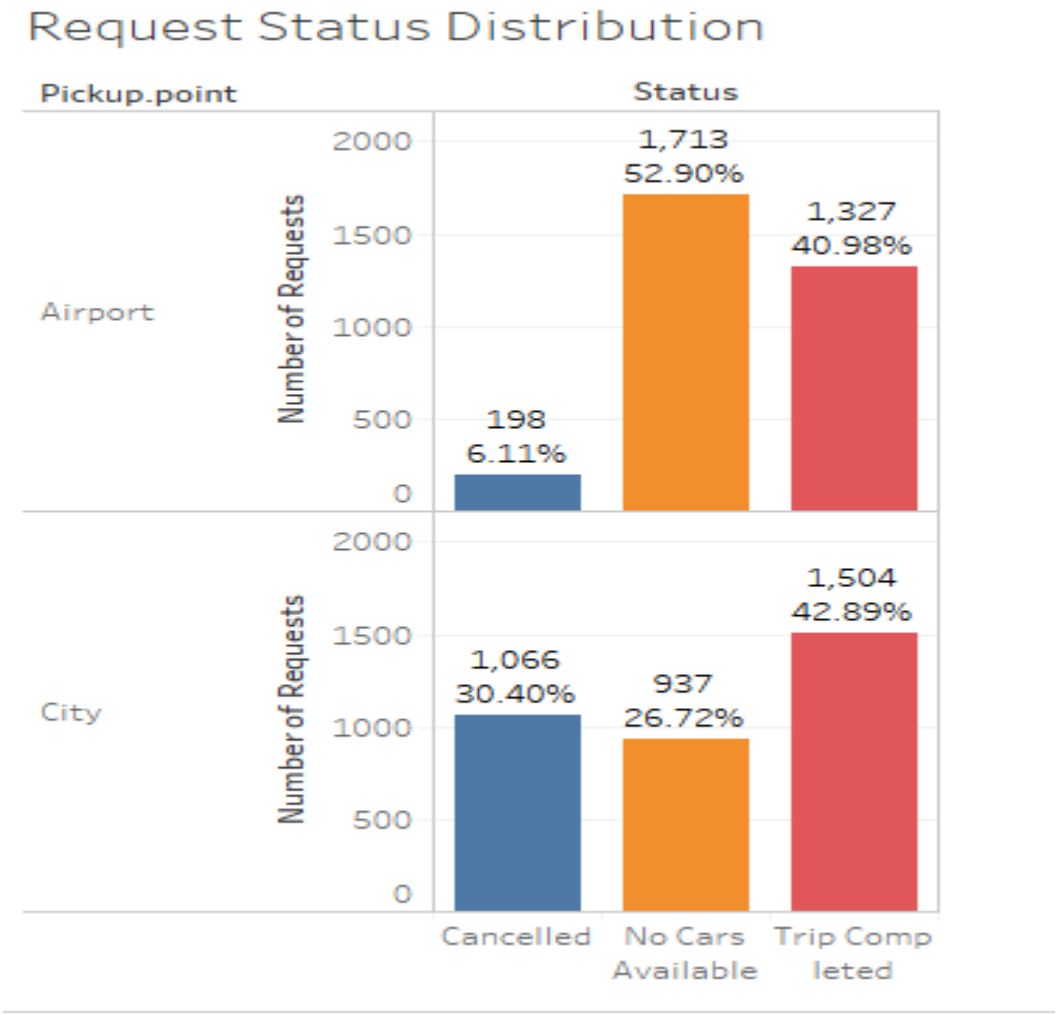
Understanding data - Request Status

From the given sample data for 5 days(Mon,11-7-2016 to Fri,15-7-2016), we see only 42% requests could be completed. Rest of the 52% requests either got cancelled or were not completed due to unavailability of drivers causing revenue loss to Uber and a lot of customer dissatisfaction.



City-Airport & Airport-City Comparison

- From Airport to City 51% requests were failed as no cars were available.
- This suggests that probably no drivers were available to pick passengers from Airport.
- From City to Airport both cancellations and no cars available are problematic areas at 30% and 27% respectively.
- Here 30% requests are cancelled as driver was unable to take passenger from City to airport or some other fault happened.
- Also, 26% requests show non availability of cars for City-Airport route alone.



Root cause analysis

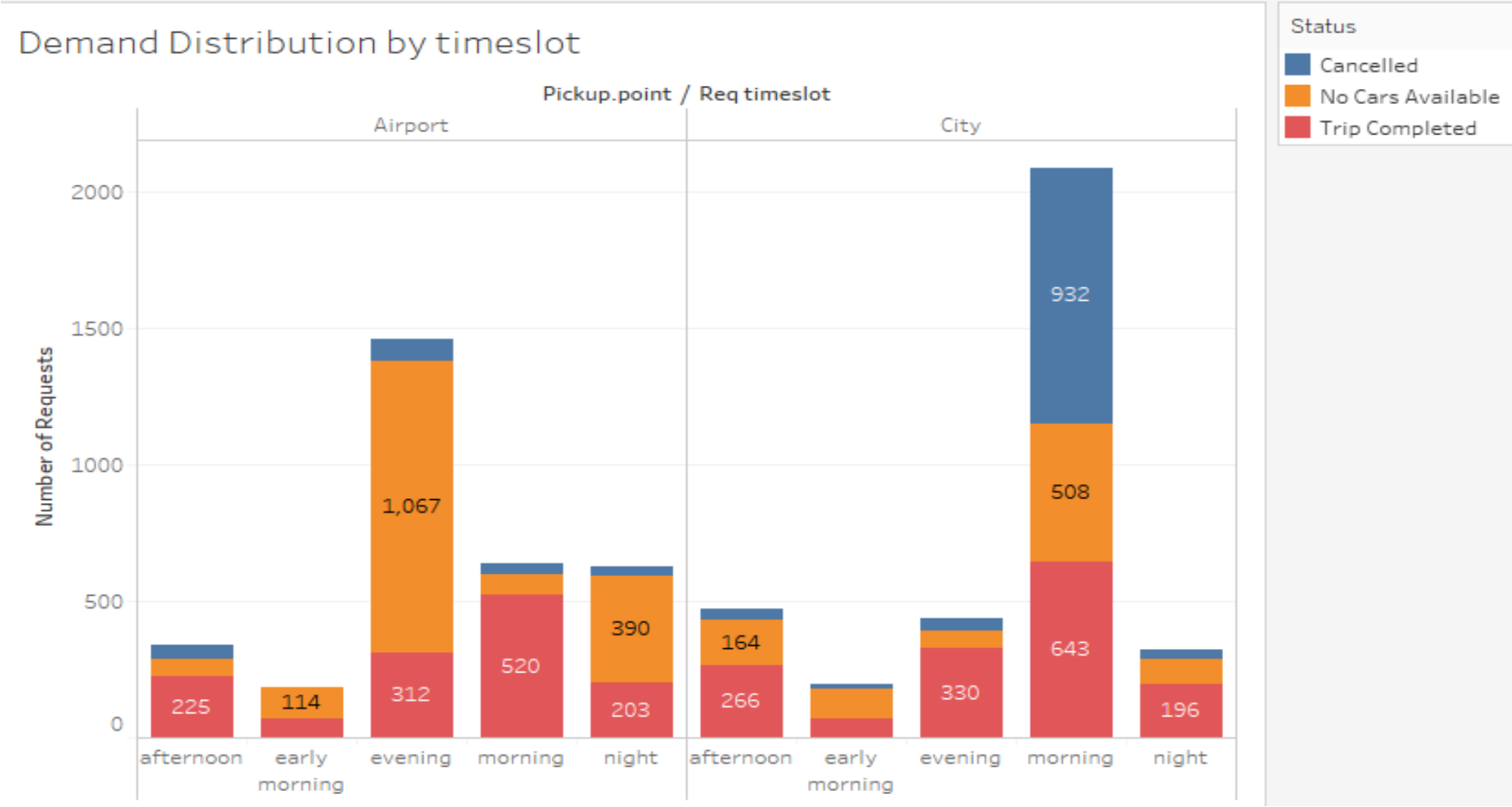
To understand the demand for Airport-City and City-Airport better, we can have the request time divided into time slots. The referred logic is as below-

Time	Time slot
00:00-04:00	Early morning
04:00 - 12:00	Morning
12:00 - 17:00	Afternoon
17:00-21:00	Evening
21:00-23:59	Night

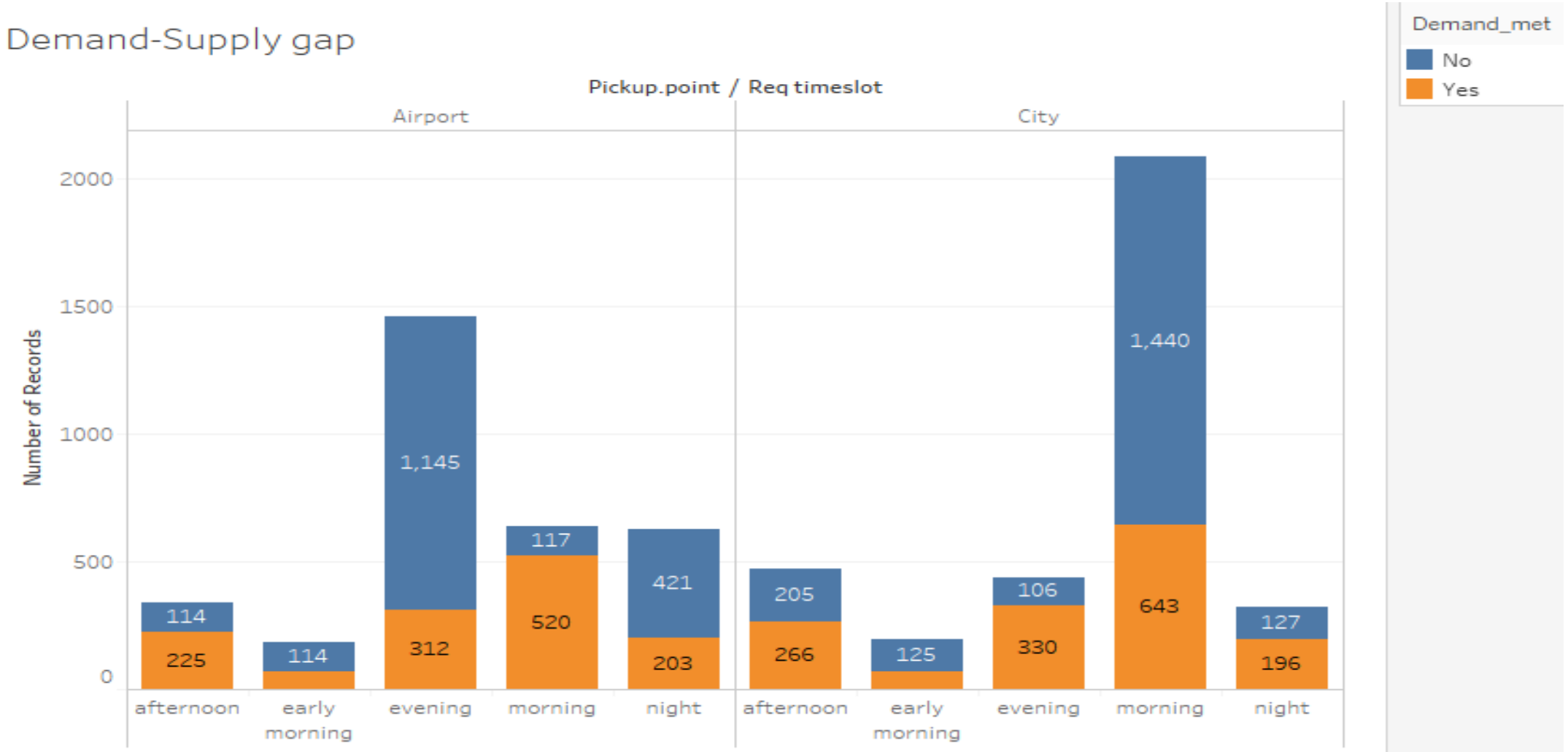
The graph in next page shows For City-Airport Demand is high during morning. For Airport-City Demand is high during evening and night. Clearly, this is the most important time-slot to target and the issue is we aren't able to meet these soaring demands. The points which we can try to prove thorough data are-

1) City-Airport -A lot of take-offs happen in the morning making demands high. The driver needs to come all over to city again without a ride to pick up another customer. As it is both high on time and resources, a lot of cancellations are happening here.
2) Airport-City -For flights landing late in the evening/night, there is not enough supply of drivers available for pickup from airport as by that time most of the drivers have ended their shift, hence cars are not available.

Demand Distribution across timeslots



Demand-Supply Gap plot



Demand-Supply gap analysis

- Since we now know the areas to focus are high demand time zones, i.e. morning for City-Airport and evenings/night for Airport-City trips, we can analyse the extent of the gap and look at the possible solutions.
- Demand = Total number of requests created.
- Supply = Total number of trips completed (Shown as variable Demand_met = “Yes”)
- Gap = Total number of trips cancelled + No driver found (Shown as variable Demand_met = “No”)
- Demand = Supply + Gap which is shown in the following graph
- Analysing the data for City-Airport shows huge 69% Gap in supply for morning trips.
- This means average gap of 288 cabs daily for morning City-Airport requirements.

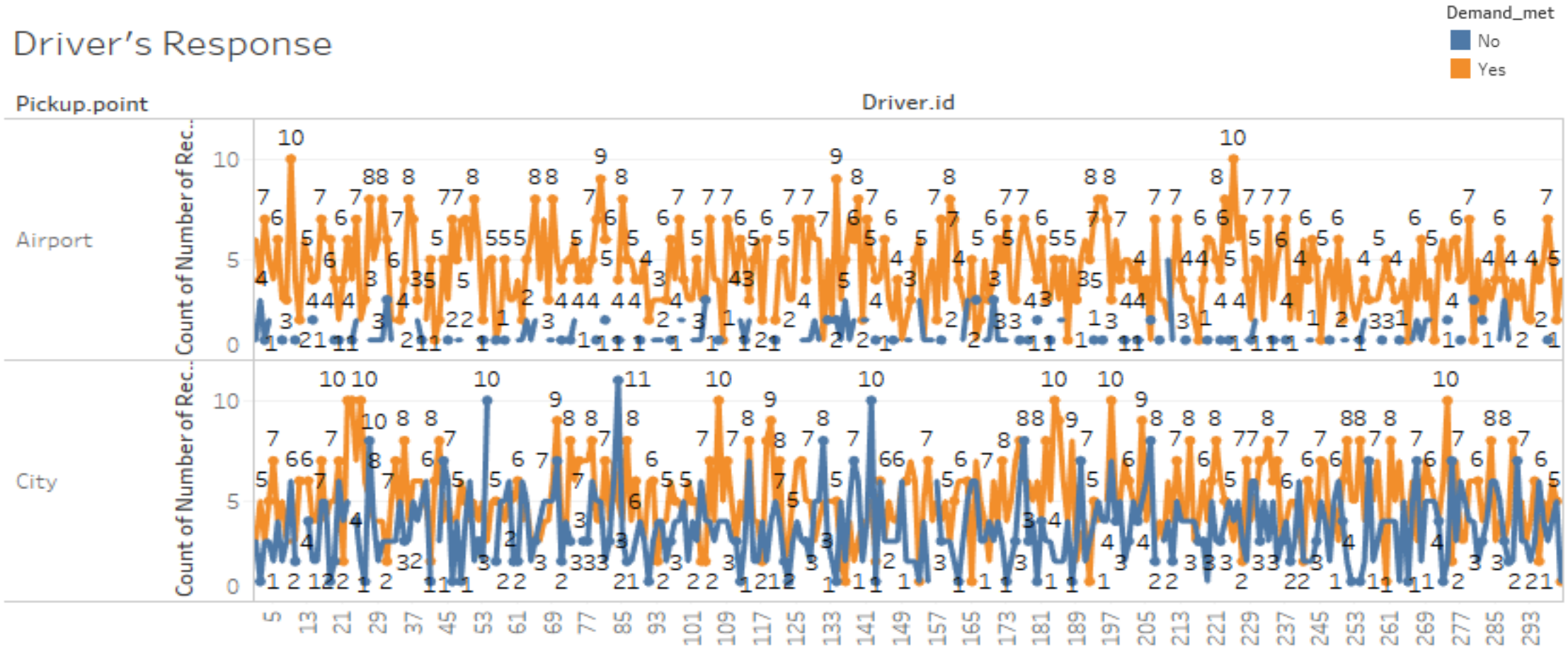
	Supply-Gap for City-Airport				
Demand met	early morning	morning	afternoon	evening	night
No	125	1440	205	106	127
Yes	69	643	266	330	196

- Similar analysis of Airport-City data shows a whopping 75% gap in supply during evening/night.

	Supply-Gap for Airport-City				
Demand met	early morning	morning	afternoon	evening	night
No	114	117	114	1145	421
Yes	67	520	225	312	203

- A gap in demand can be due to driver's cancellation and unavailability of drivers.
- The graph in the next page shows how all 300 drivers responded to various trips for these 5 days.
- For City-Airport trips, the blue lines highlight that drivers cancelled the requests as they could not do multiple trips required every day.
- On an average, each driver could do one City-Airport trip per day. Due to long travel and wait time due to unavailability of passengers at airport in the morning, drivers end up cancelling the requests.
- For Airport-City trips, minimal blue lines show that though there were minimum cancellations but the gap in supply is being caused by unavailability of drivers during evening/nights to pickup passengers from the Airport.
- This proves both the hypothesis points.

Drivers' Response



Solutions to mitigate the issue

- There is a clear indication that Uber needs more drivers to cater to the heavy Demand. So first step would be have more drivers in the pool ASAP to avoid such issues.
- Looking at the data we may be in need of doubling the workforce to meet the demand (300 more Drivers approx.)
- Having clearly defined trip routes for drivers may also help. Drivers located near the airport may be preferred for night shifts to pickup passengers from Airport to City and the same driver can be used for dropping passenger from City to Airport in early morning and then his shift ends.
- Option of pooling should be strongly recommended to passengers to avoid cancellations for City to Airport travel in the morning.

Summary

- Uber is losing out on a lot of revenue due to demand-supply gap
- With data for trip details between City to Airport and vice versa for 5 days, we got useful insights .
- A lot of cancellations happen in the morning for City to Airport trip due to long travel and costlier option of coming back to city without a ride. This caused 69% gap in Demand and Supply.
- For the trips from Airport to City, the demand is very high for late evenings and night but there are not enough drivers causing 75% gap in Demand and Supply.
- As a solution, we can increase number of drivers with immediate effect.
- Special hiring can be done for route specific drivers to cater to only late night and then early morning trips from and to Airport.
- We can suggest passengers to opt for car pooling to avoid cancellations.