UBER CASE STUDY

SUBMISSION

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Uber Supply-Demand Gap case study

Business understanding

- You may have some experience of **travelling to and from airport** and face the problem of either cancellations or non availability of cars.
- Well, if these are the problems faced by customers, these are the issues that **impact Uber business** as well
- If drivers cancels the request or no cabs are available**, Uber loses out on its revenue**.

Business objectives

- The aim of the analysis is **to root cause** of the problem and **recommend ways** to improve situation
- Present the root cause and **possible hypothesis** of the problem and recommend ways to improve them

Business problem

- To understand how the marketplace is working for the demand to and from the airport

The kind of data available:

Unstructured data : It could be ops data or from customer raising trouble tickets regarding the Non availability of cabs and cancellations

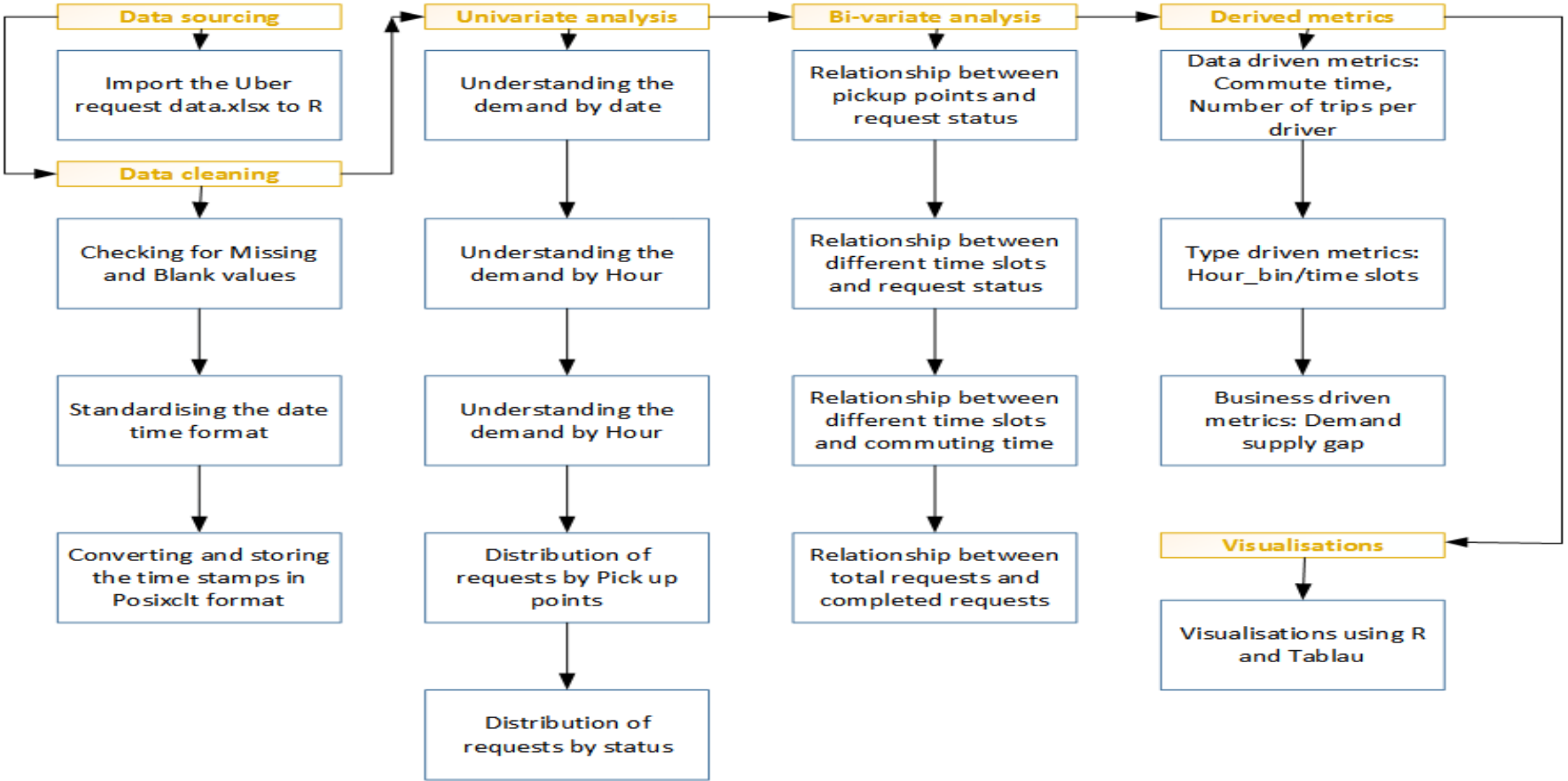
Structured data: Comes from the data warehouse where details at the trip level/driver level can be retrieved

Meta data available for the analysis

- There are six attributes associated with each request made by a customer:

- **Request id:** A unique identifier of the request
- **Time of request:** The date and time at which the customer made the trip request
- **Drop-off time:** The drop-off date and time, in case the trip was completed
- **Pick-up point:** The point from which the request was made
- **Driver id:** The unique identification number of the driver
- **Status of the request:** The final status of the trip, that can be either completed, cancelled by the driver or no cars available

Problem Solving Methodology



Specific characteristics of the trips

Trip duration and median trips made by the drivers

1. The median commute time (Request time stamp- Drop time stamp) is around 52 min(approx.)
2. Average number of trips made by a driver is around 9 trips (aggregated along the 5 days)

Number of trip requests to and from Airport

- Airport to city : 3238
- City to airport : 3507

Date / time observations

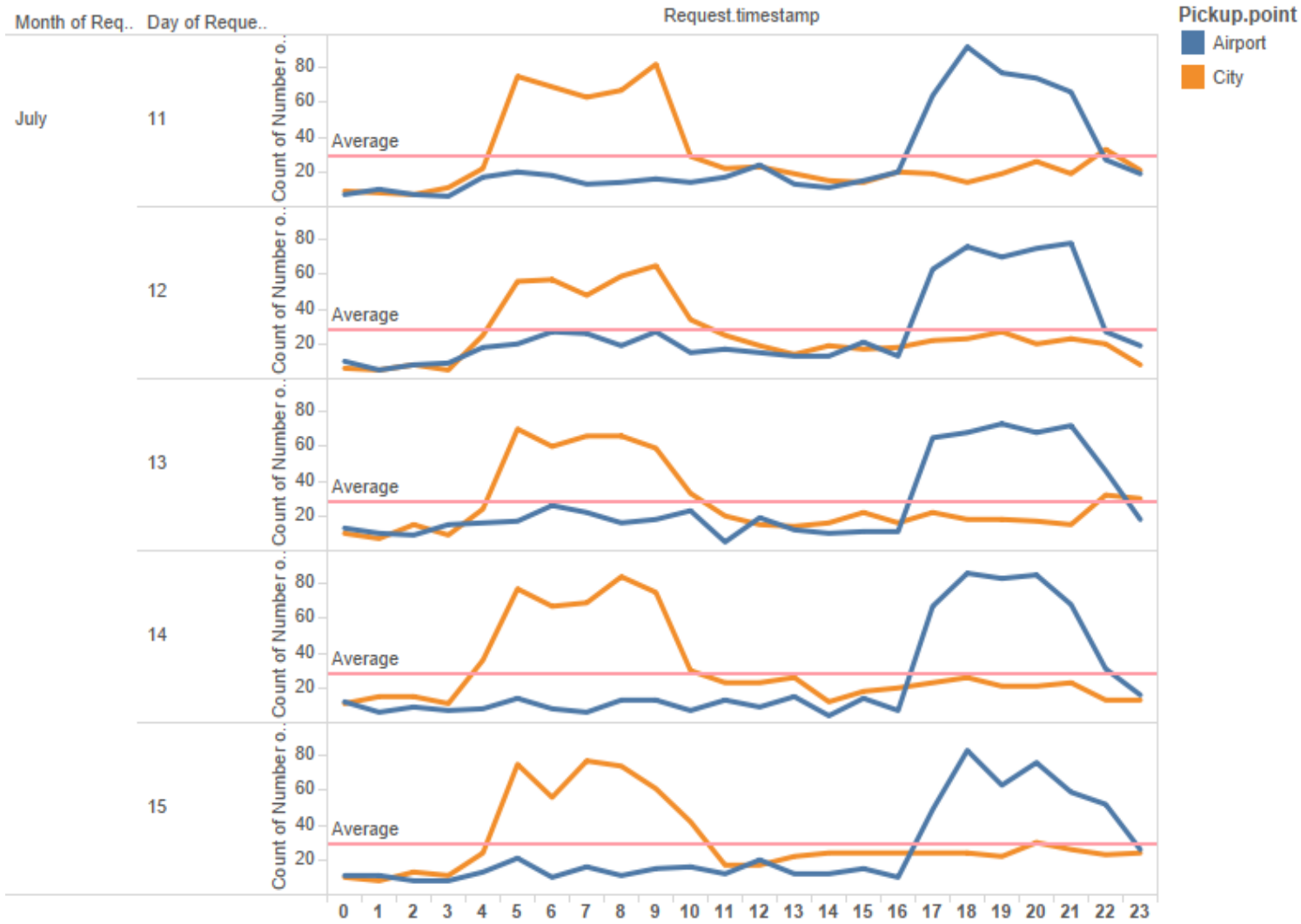
- The requests pattern are similar across all the 5 days
- Based on the pattern of requests from 0 to 23rd Hours, binning into 5 time slots
- Airport (as pickup point) has highest number of requests (1800 requests) during evening rush hour
- City (as pickup point) has the highest number of requests(1677 requests) during morning rush hour

Status (Cancelled/No cars available) observations

- Airport to city: has highest (19.5% of total requests) incidents of no cars available during evening rush hour
- City to airport : has highest (12.16% of total requests) incidents of cancellations during morning rush hour

Demand by date

demand_by_date(Distribution of requests for different dates)

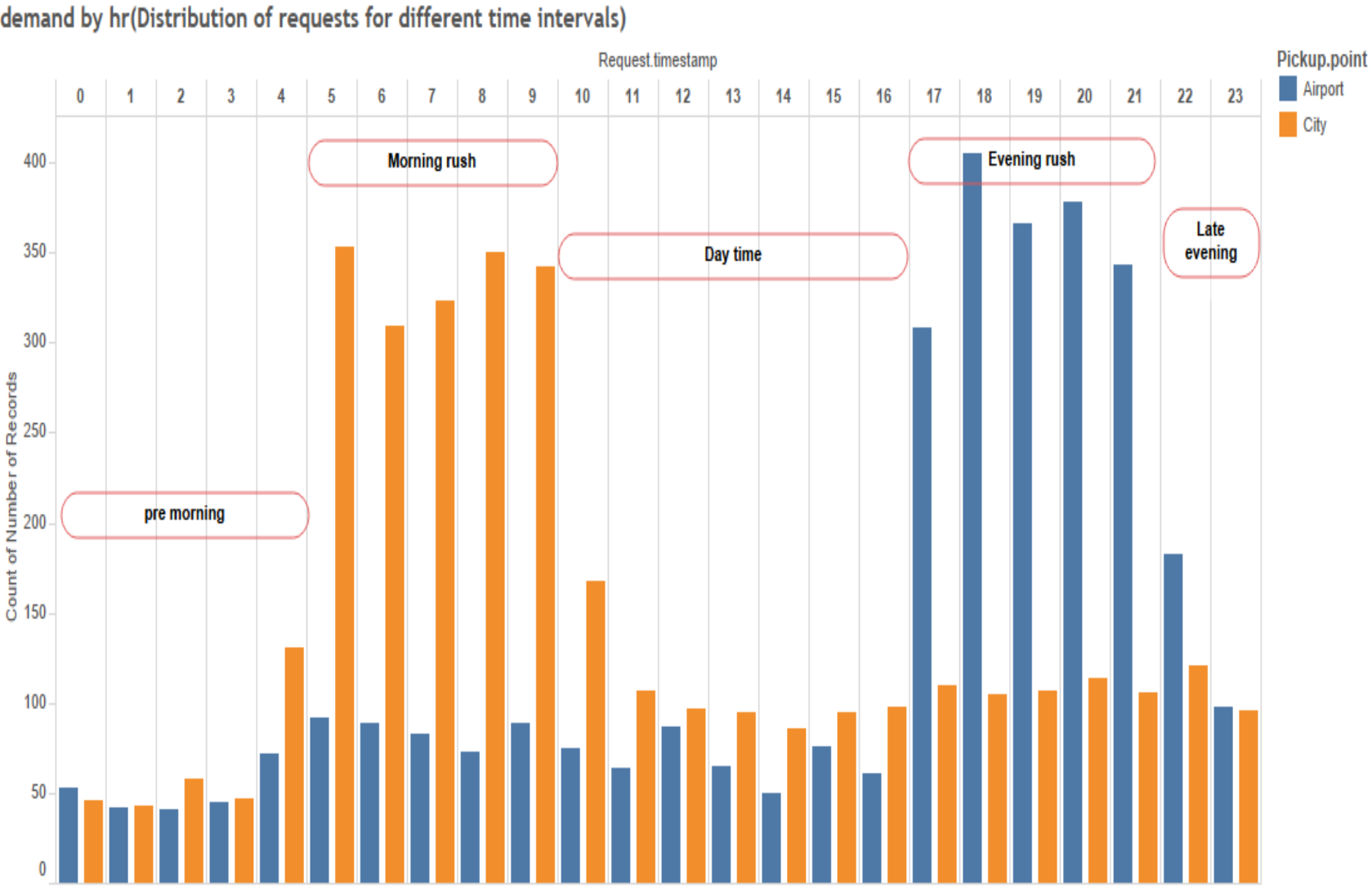


The trend of count of Number of Records for Request.timestamp Hour broken down by Request.timestamp Month and Request.timestamp Day. Color shows details about Pickup.point.

Findings

- The distribution of requests are same across the 5 days
- Since the pattern is consistent, aggregating the data by dates

Demand by hours of the day



Findings

- There is a pattern of requests for specific time intervals of the day
- Observing the pattern, binning the hours into 5 time slots
- 5 time slots being :

Pre morning : 12 AM to 4 AM

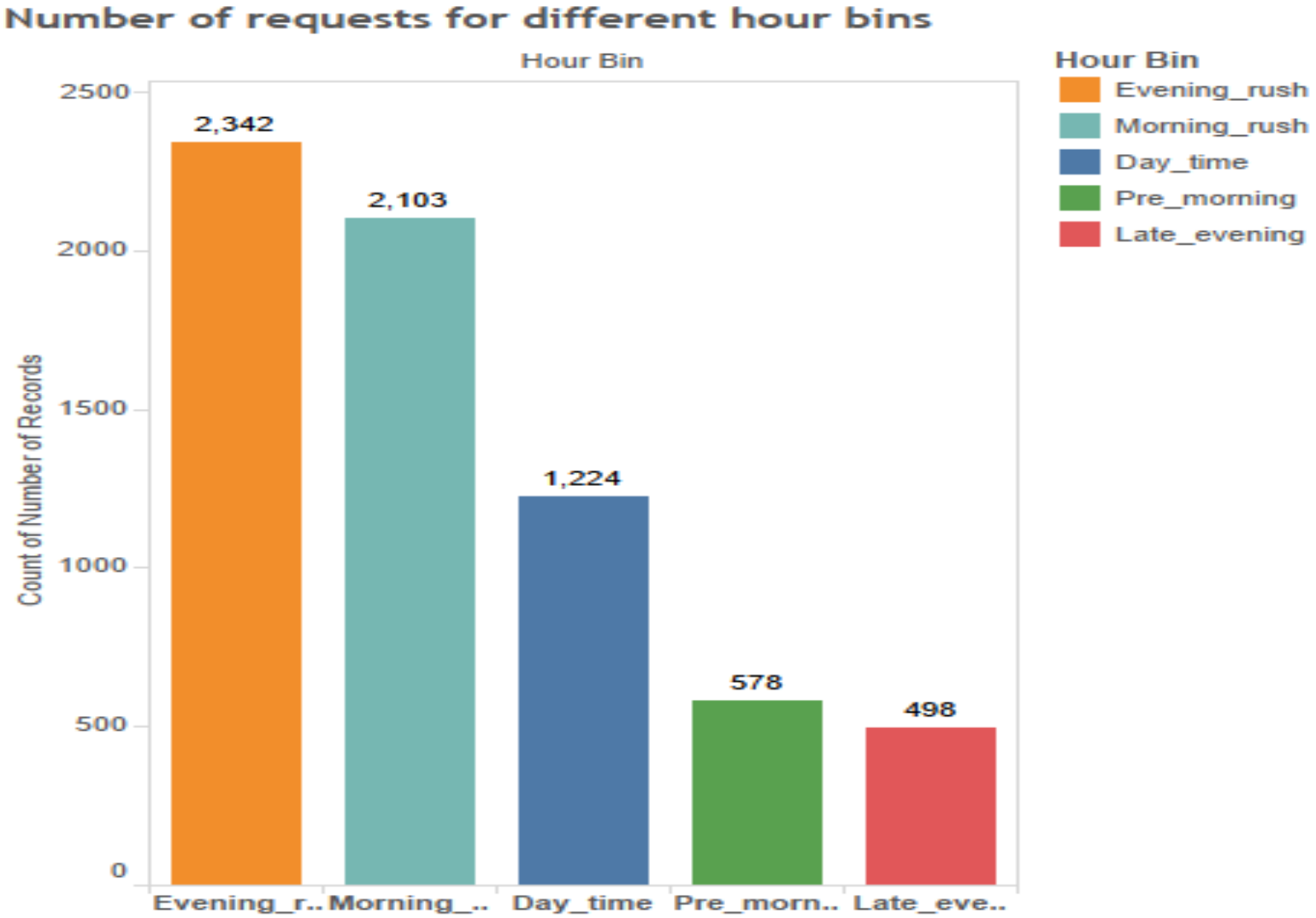
Morning rush : 5AM to 9AM

Day time : 10 AM to 4PM

Evening rush : 5PM TO 9PM

Late evening : 10 PM to 11 PM

Number of requests for different time slots

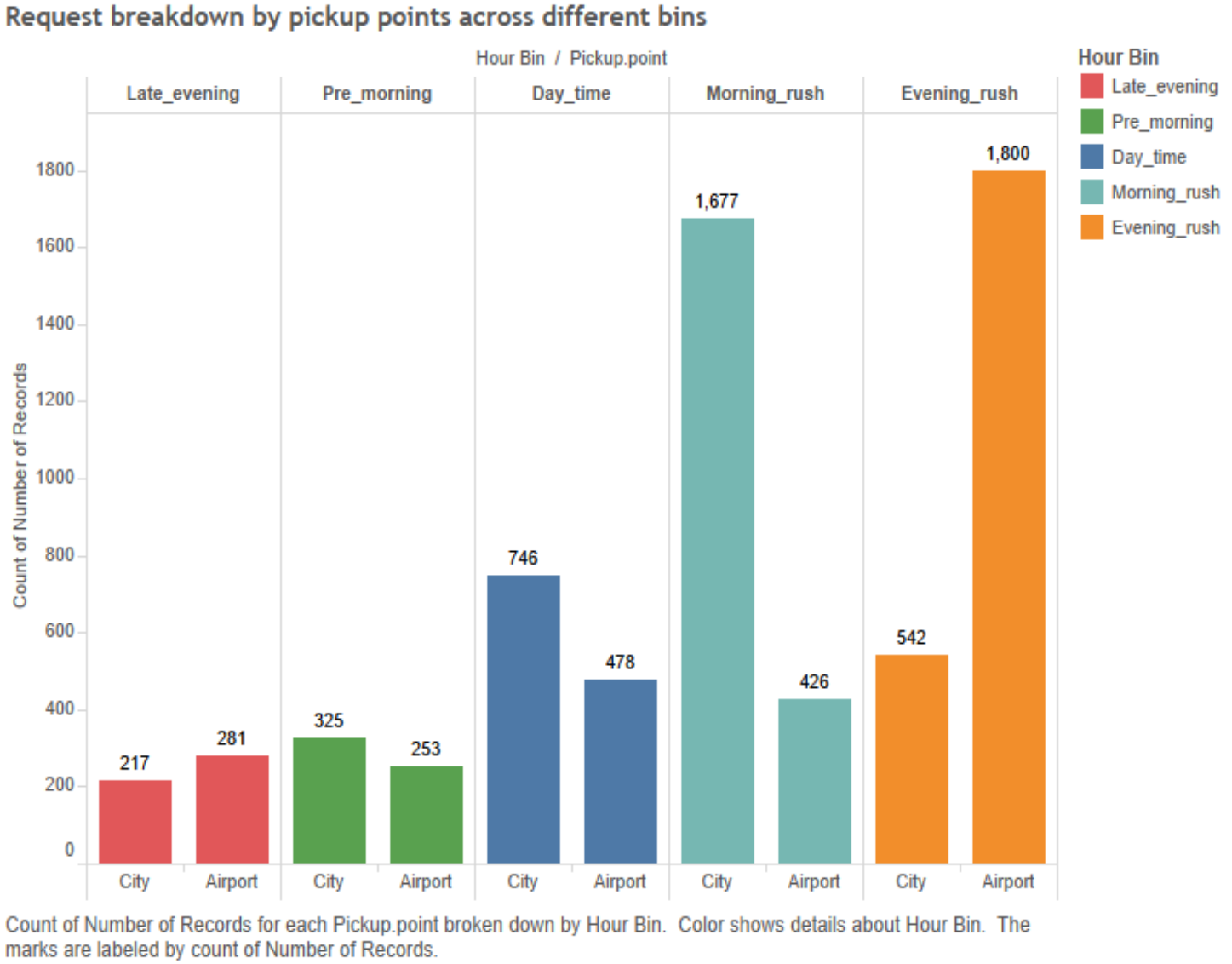


Count of Number of Records for each Hour Bin. Color shows details about Hour Bin. The marks are labeled by count of Number of Records.

Findings

- The number of requests for the Evening rush and Morning rush hour has the highest number of requests, and subjected to further investigation

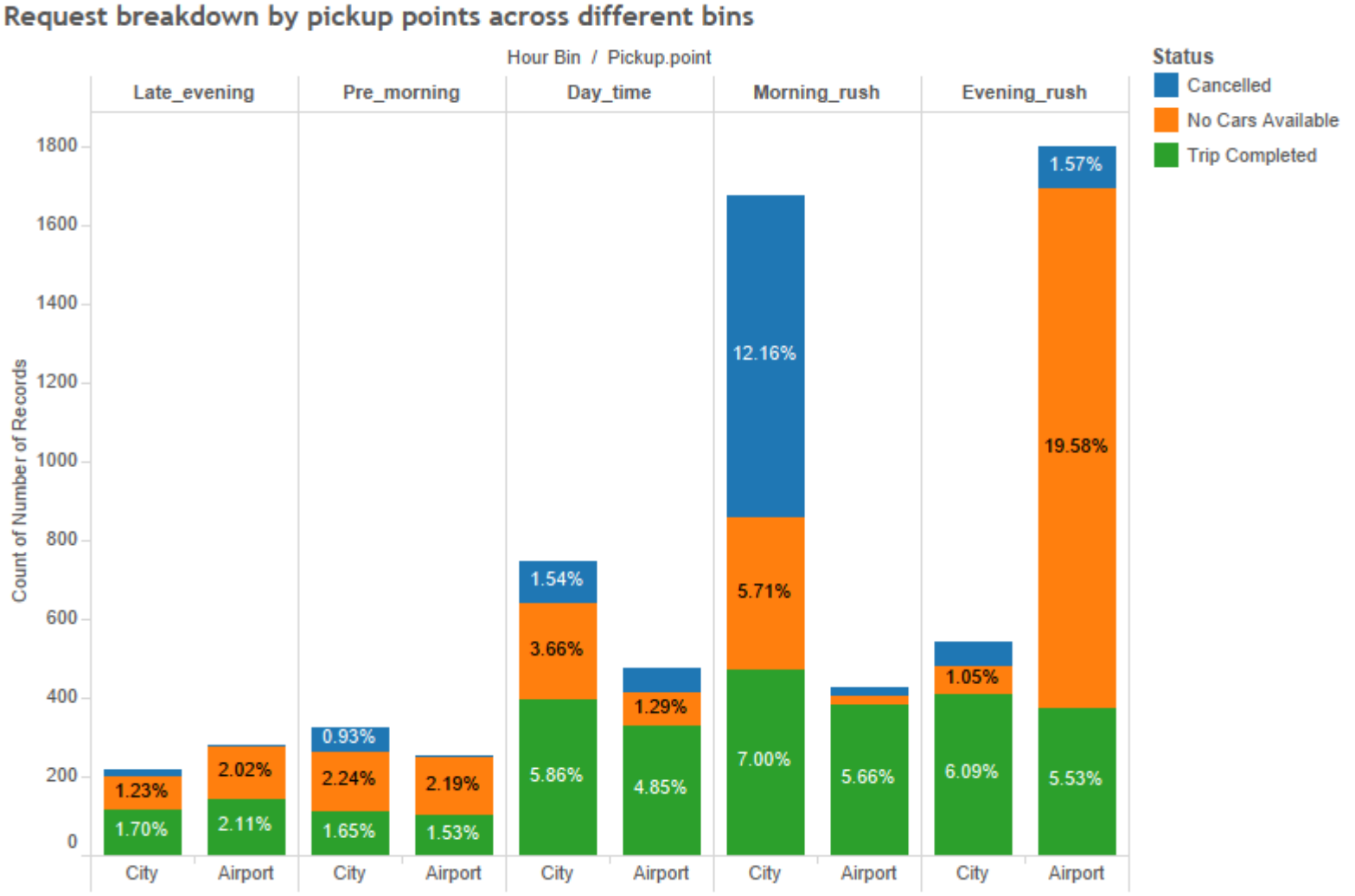
Number of requests for different time slots by pickup points



Findings

Airports have higher demand in evening rush hour and City has higher demand in morning rush hour

Identifying the problem areas in different time slots



Findings

1. 19.58% of requests originating from airport have no cars available during evening rush hour
2. 12.16% of requests originating from City are cancelled during morning rush hour

Demand and supply gap analysis from City to Airport

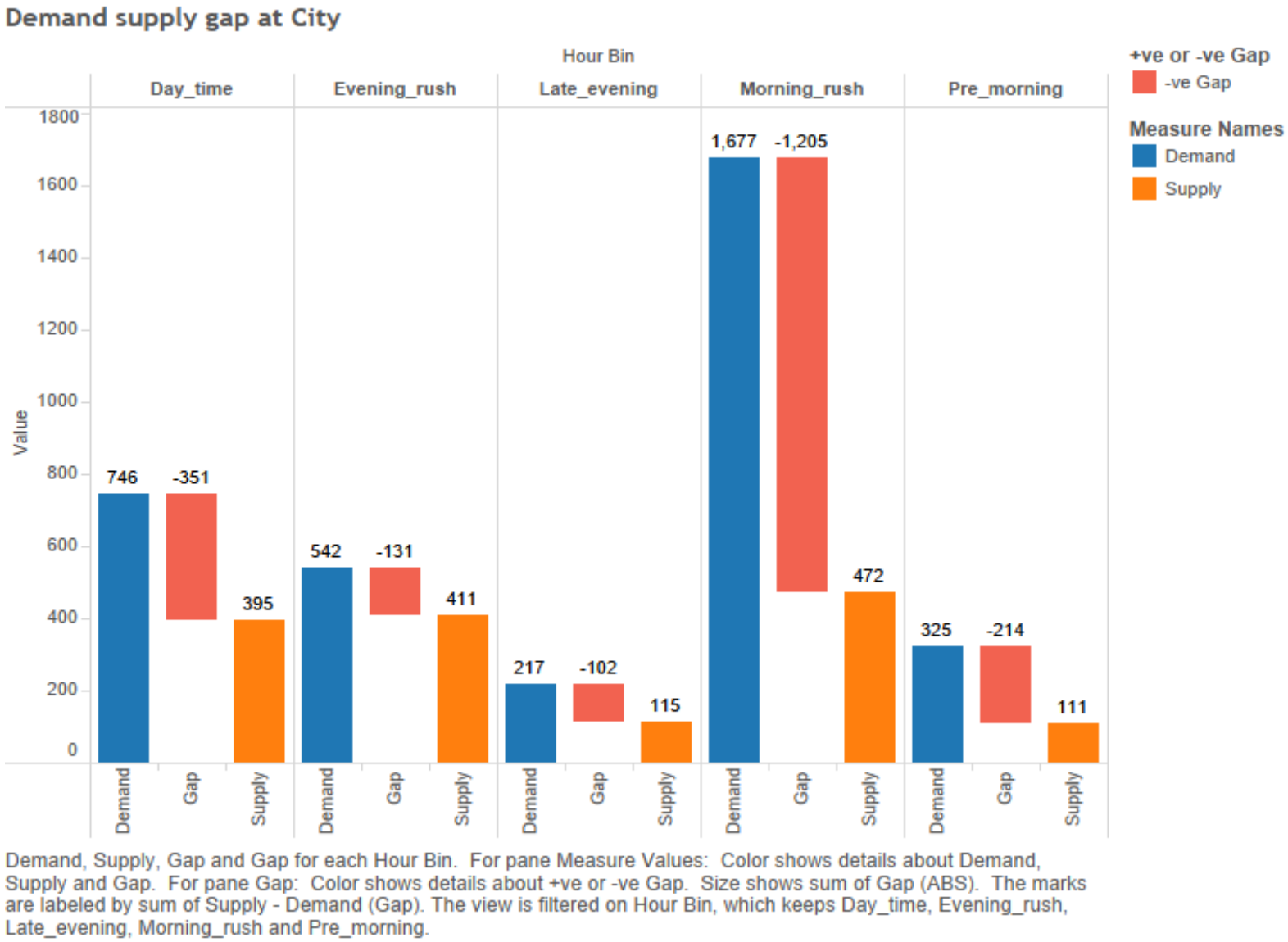
Demand and supply gap at the City:

For this case, the demand is the number of trip requests made at the city, whereas the supply is the number of trips completed from city to the airport.

SUMMARY STATISTICS

	hour_bin	total_requests	completed_Requests	demandsupply_gap	cancelled_num	no_cars_available_num	cancelled_cars_percentage	notavailable_cars_percentage
1	Day_time	746	395	351	104	247	29.63	70.3
2	Evening_rush	542	411	131	60	71	45.80	54.2
3	Late_evening	217	115	102	19	83	18.63	81.3
4	Morning_rush	1677	472	1205	820	385	68.05	31.9
5	Pre_morning	325	111	214	63	151	29.44	70.5

Demand and supply gap analysis from City to Airport



Demand, Supply, Gap and Gap for each Hour Bin. For pane Measure Values: Color shows details about Demand, Supply and Gap. For pane Gap: Color shows details about +ve or -ve Gap. Size shows sum of Gap (ABS). The marks are labeled by sum of Supply - Demand (Gap). The view is filtered on Hour Bin, which keeps Day_time, Evening_rush, Late_evening, Morning_rush and Pre_morning.

Findings

1.Morning rush hour has the highest demand supply gap.

2. There is a -ve delta of 1205 requests between the Demand and supply at the Morning rush hour for requests originating from city.

Demand and supply gap analysis from Airport to City

Demand and supply gap at the Airport:

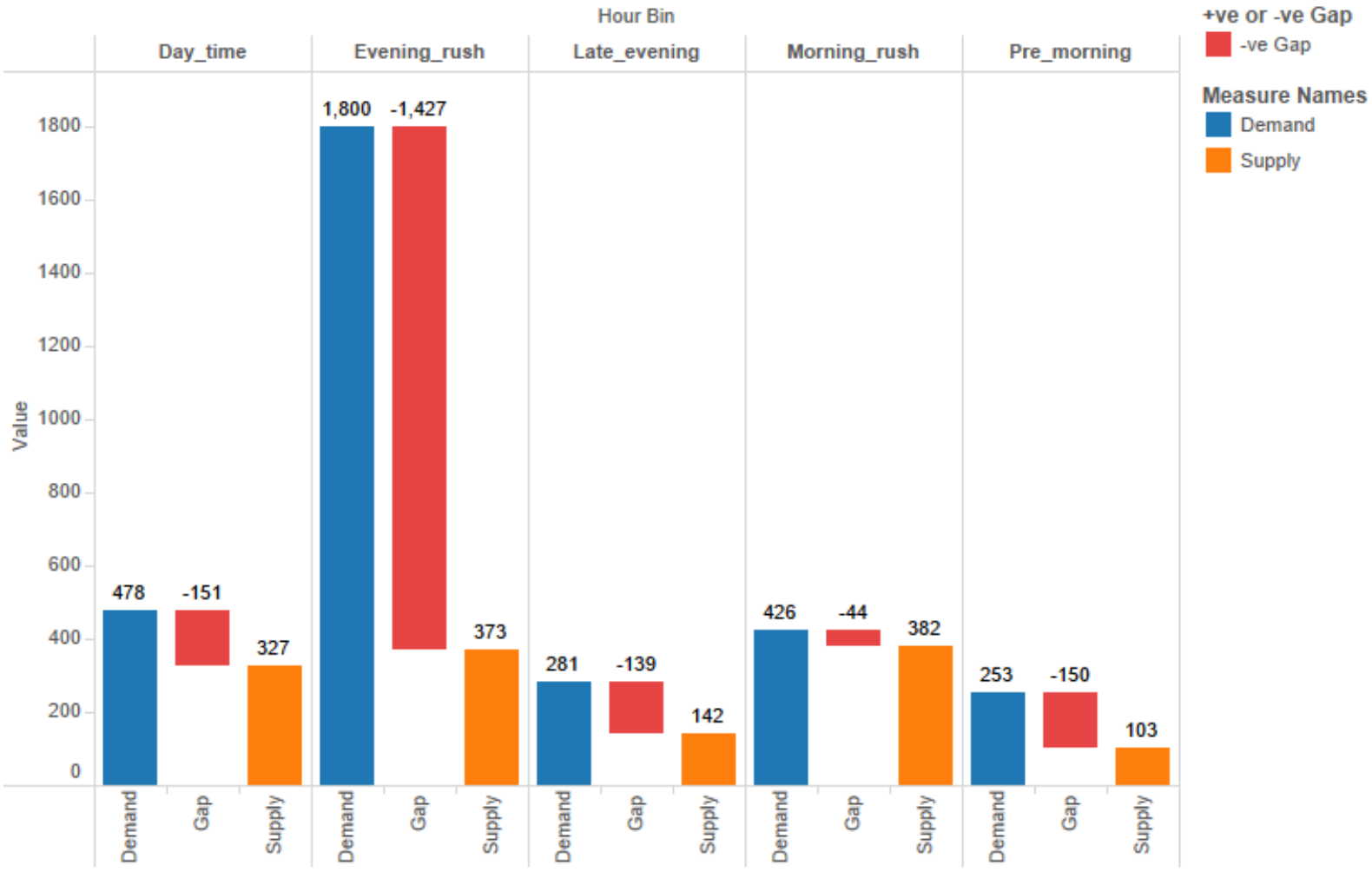
For this case, the demand is the number of trip requests made at the Airport, whereas the supply is the number of trips completed from Airport to city.

SUMMARY STATISTICS

	hour_bin	total_requests	completed_Requests	demandsupply_gap	cancelled_num	no_cars_available_num	cancelled_cars_percentage	notavailable_cars_percentage
1	Day_time	478	327	151	64	87	42.38	57.62
2	Evening_rush	1800	373	1427	106	1321	7.43	92.57
3	Late_evening	281	142	139	3	136	2.16	97.84
4	Morning_rush	426	382	44	23	21	52.27	47.73
5	Pre_morning	253	103	150	2	148	1.33	98.67

Demand and supply gap analysis from Airport to City

Demand supply gap at Airport



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Findings

1.Evening rush hour has the highest demand supply gap.

2. There is a -ve delta of 1427 requests between the Demand and supply at the Evening rush hour for requests originating from Airport.

Hypothesis for the Demand supply gap

The problem is to fix the issue organically :

This implies to study the data and efficiently optimize the headcount of the partner drivers in order to fulfill the high demand occurring at the evening and morning rush hours

- Completed requests indicates the reliability of the requests and tell how market place is
- Higher completed to request ration indicates better supply and lesser number means supply not able to meet the demand
- In the context of data given , the average commute time is similar across days and time , so the traffic is not impacting the demand and supply gap

Why the cancellations is high during the Morning rush hour?

Possible hypothesis

- Cancellations going to the Airport(i.e. from city to airport) were high at Morning rush hour because the airport trips takes a long time to get to the airport , there is amount of time the drivers will have to wait at the airport to get a trip back and this does not make economic sense to get back empty. Based on the incoming flight patterns there will be a huge variance as to when the driver will get the next trip.
- Since the idle time or the waiting time is greater at the airport there is under utilization of time and the drivers are not motivated to stay idle where they could be making other drips at the city
- If there are more number of flights landing during morning hours , there will be higher demand and lesser waiting time for the driver.

Hypothesis for the Demand supply gap(cont.)

Why the non availability of cabs and demand is high during the Evening rush hour?
Possible hypothesis

- There are lot of international flights landing during the evening rush hour.
- There is not enough of organic supply to meet the demand at the airport , as in , among the drivers who are available for working on that are not available during the evening shifts
- The reason for the non availability of the cabs is because this is when the shift end for the partner drivers.

Recommendations to reach a marketplace equilibrium organically

Fixing the cancelation issues :

- Incentivize the driver partners to become loyal uber partners so that they don't look for alternatives for cancellations of requests, rather accept them. Ensure by establishing a clear communication model with driver partners
- Encourage car pooling so that driver has more than one passenger that returns back from airport to city for the same time slot
- Sign up dedicated driver partners from Uber for the morning flights and these drivers fulfill the requests specifically from city to airport for specific time slot.

Fixing the non availability of cabs:

- Give flexible options to drivers to enable login at peak or evening rush hours and off during low key hours of the day
- Study historical data to position drivers in areas of high demand 2 to 3 hours prior to the request time slots.
- Surge the price during peak times so that drivers are motivated to stay on to cash the extra bonus, lucrative cash prizes if they service during peak times