Uber Supply – Demand Gap

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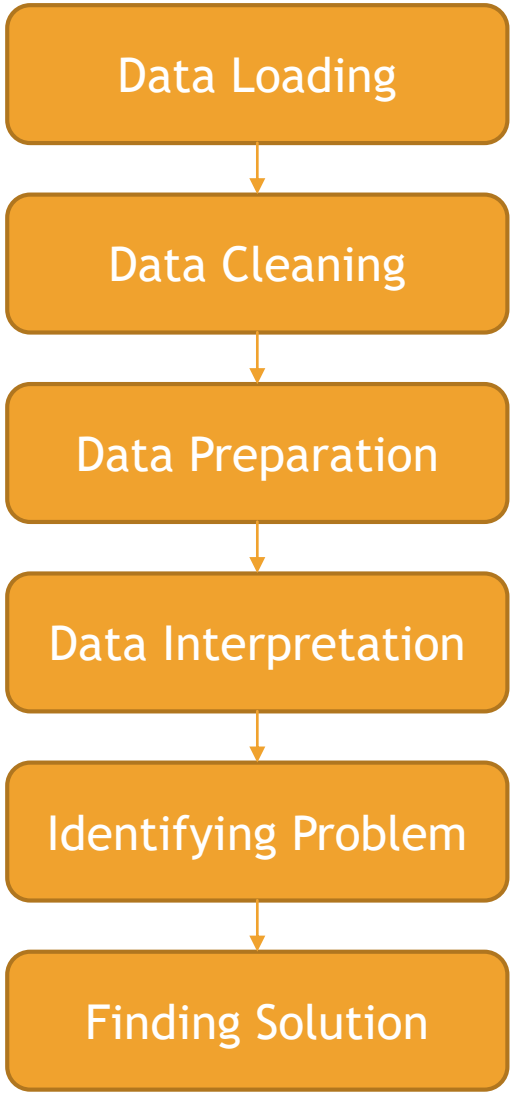
Business Objective

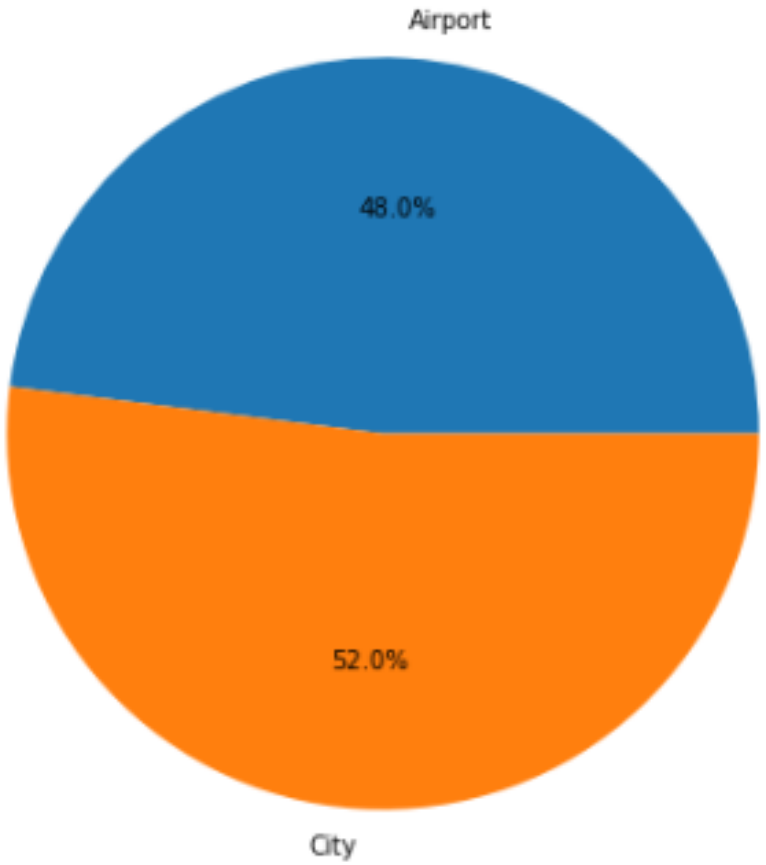
- The aim of analysis is to identify the root cause of the problem (i.e. cancellation and non-availability of cars) and recommend ways to improve the situation.

Methodologies



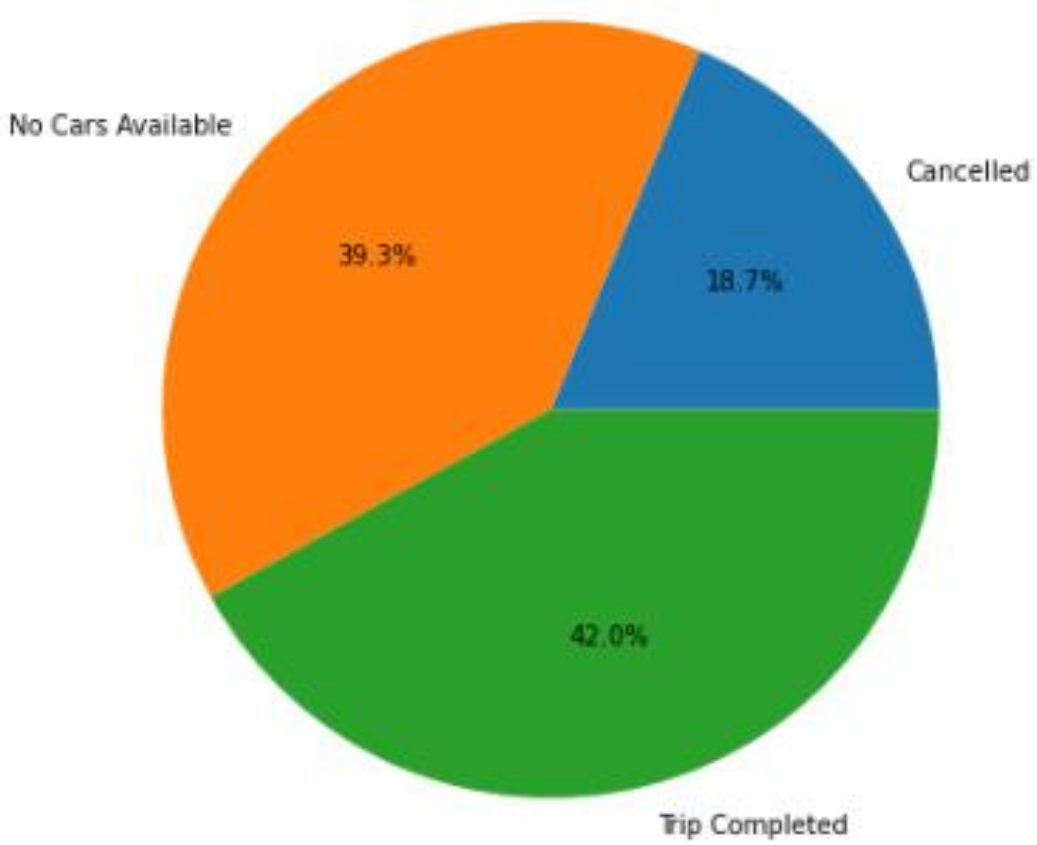
- Load the dataset to I-python notebook
- Data cleaning to avoid the impact of unstructured data on final results
- Format date and time fields
- Derive new variables required for data analysis
- Identify the problem using plots visualization on different attributes
- Recommend ways to solve the problem

Request Pattern at Pickup Point



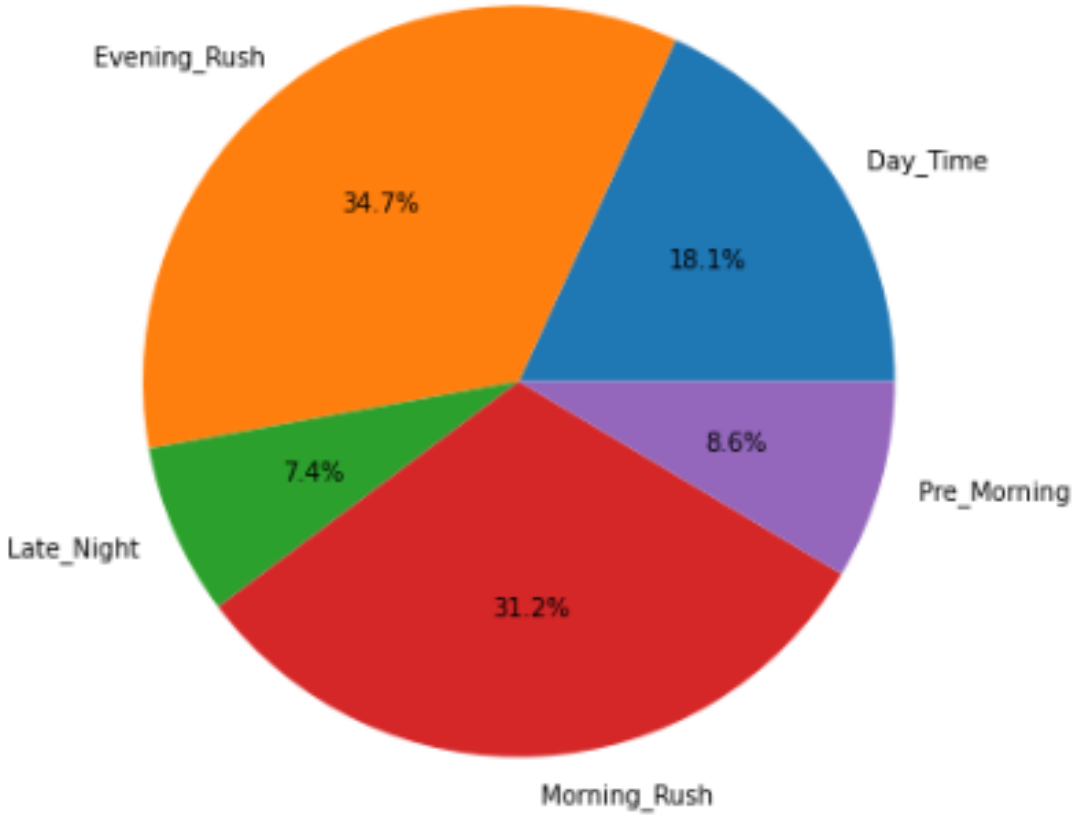
Pickup Point	Request id
Airport	3238
City	3507
Total	**6745**

Status of Request id



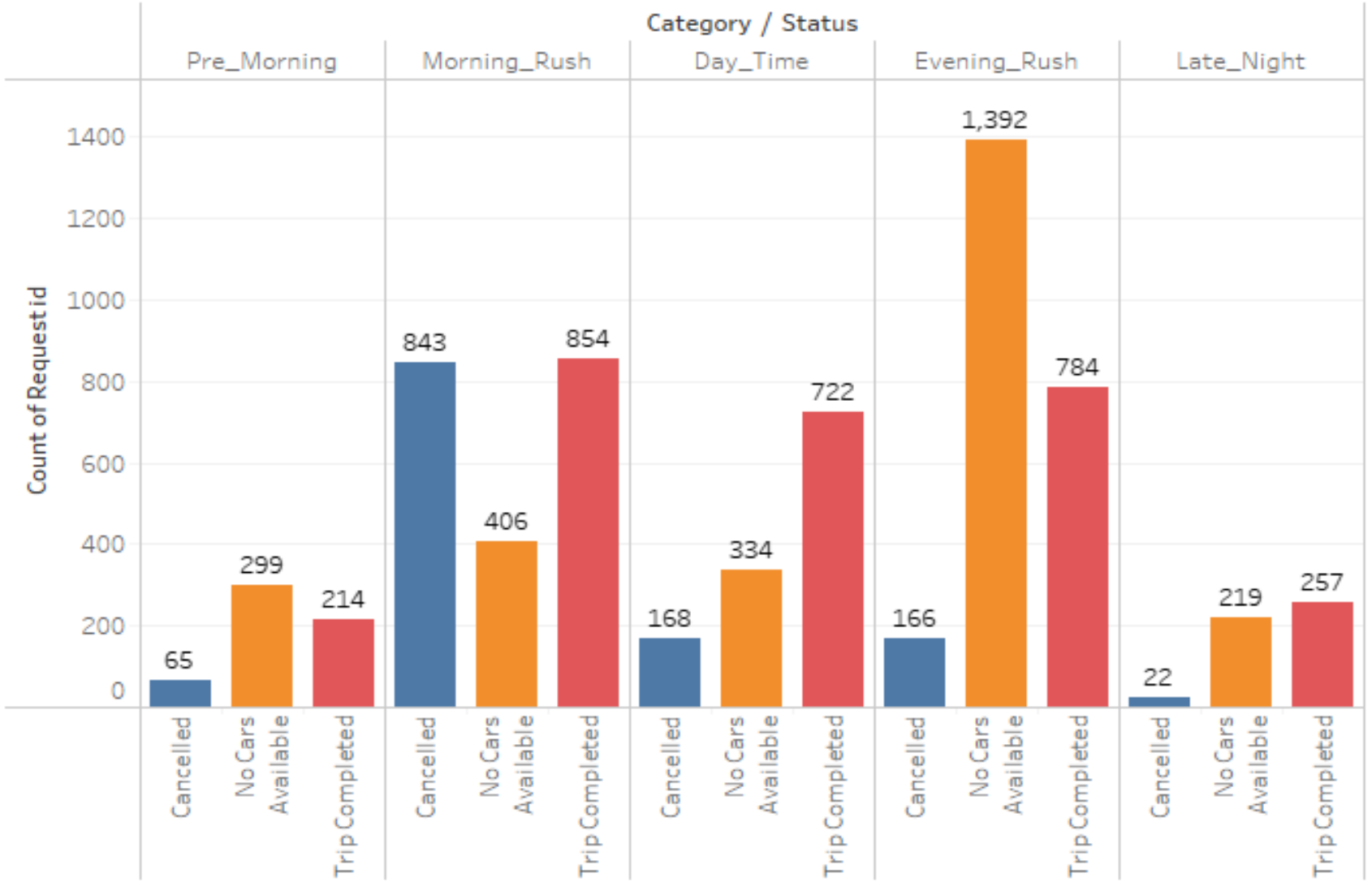
Status	Request id
Trip Completed	2831
Cancelled	1264
No Cars Available	2650
Total	6745

Request Pattern in Different Time Category



Category	Request id
Pre_Morning	1224
Morning_Rush	2342
Day_Time	498
Evening_Rush	2103
Late_Night	578
Total	6745

Request Pattern in Different Time Category



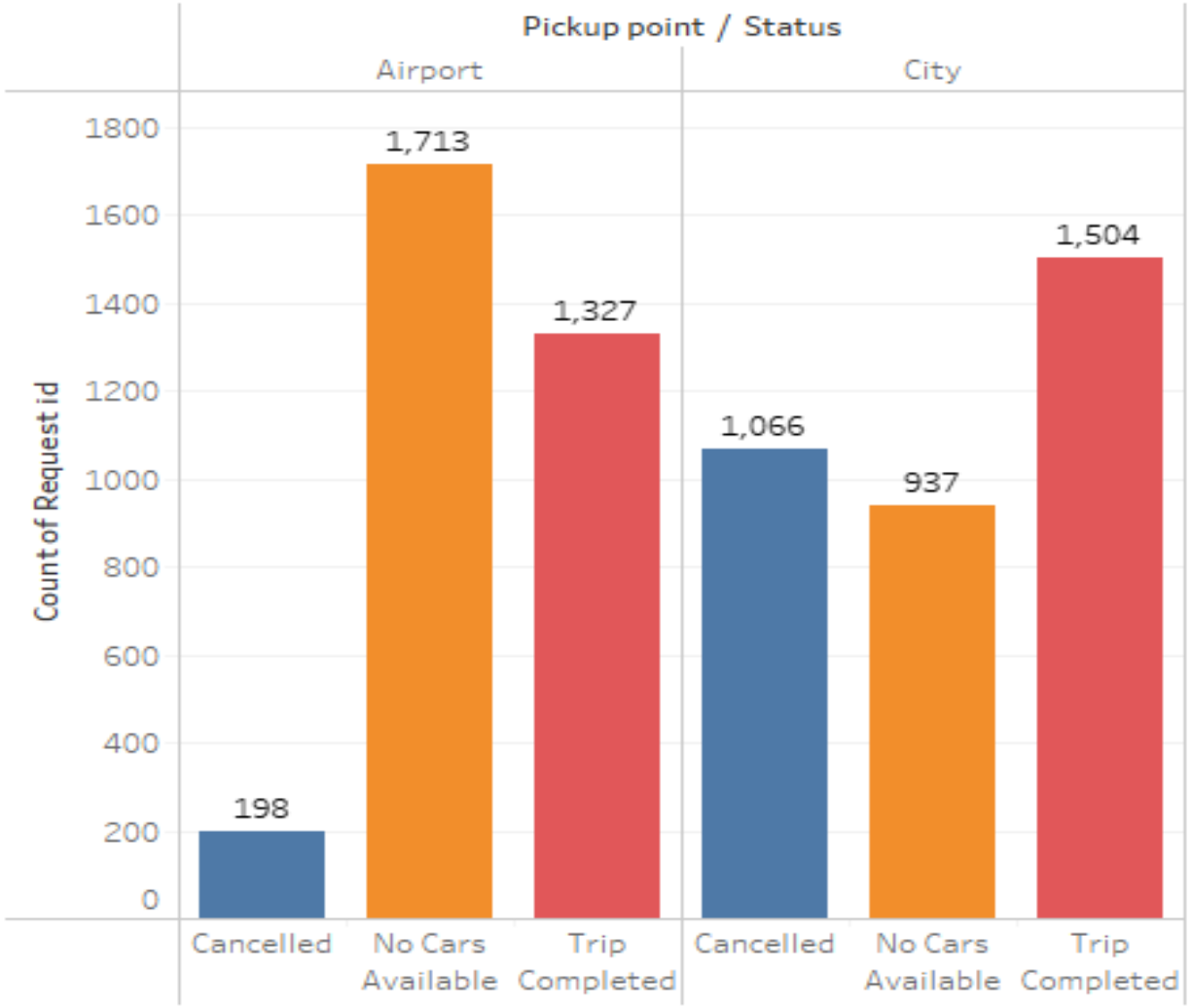
Request Pattern in Different Time Category

Category	Trip Completed	Cancelled	No Cars Available
Pre_Morning	214	65	299
Morning_Rush	854	843	406
Day_Time	722	168	334
Evening_Rush	784	166	1392
Late_Night	257	22	219
Total	**2831**	**1264**	**2650**

Plot Trend

Cancellation in Morning is high and there is huge count of 'No Cars Available' in Evening

Request Pattern at Pickup Point



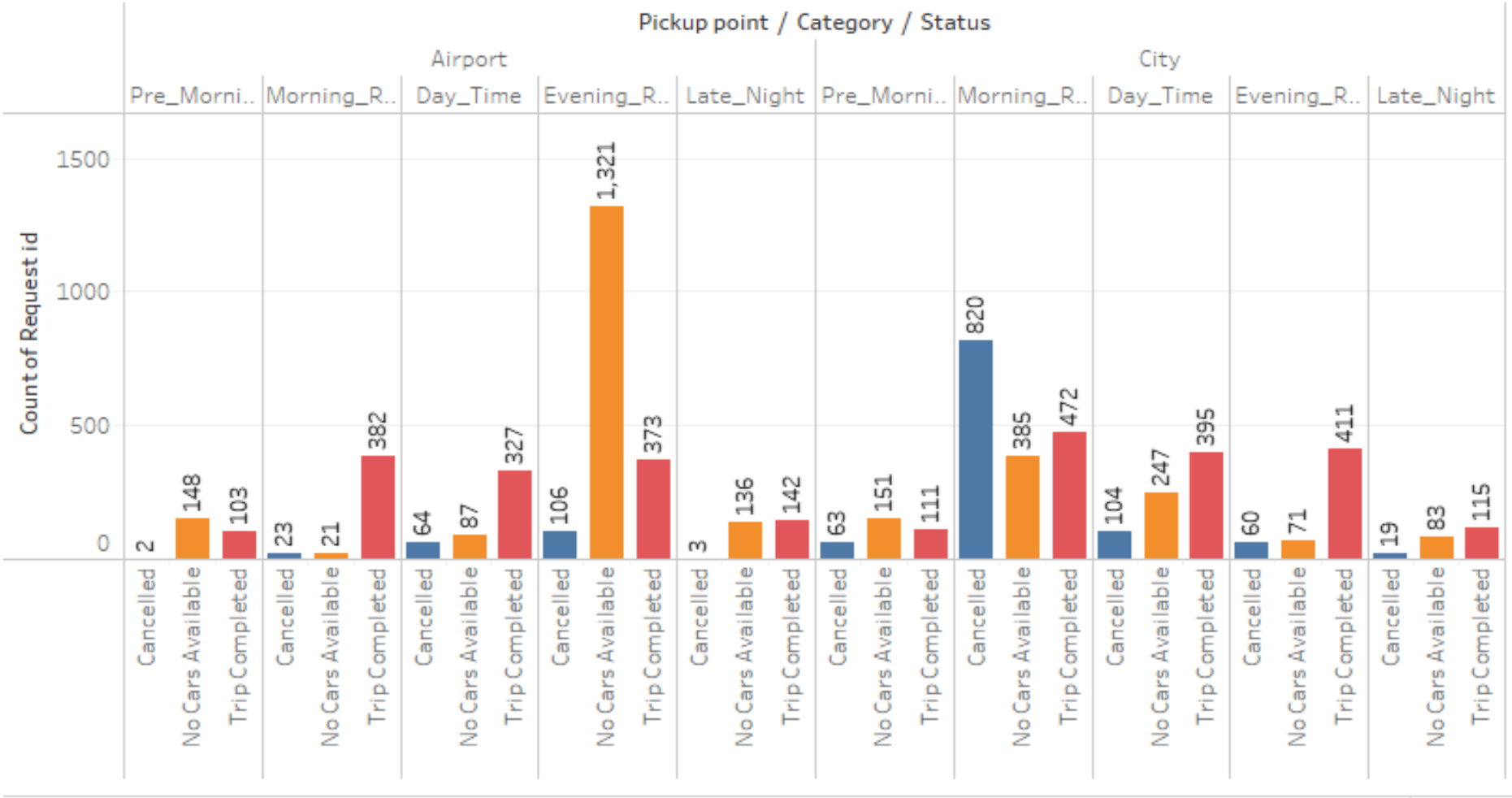
Request Pattern at Pickup Point

Status	Airport	City
Trip Completed	1327	1504
Cancelled	198	1066
No Cars Available	1713	937
Total	**3238**	**3507**

Plot Trend

We can easily identify that there is a high count of 'No Cars Available' at 'Airport'. Explanation to this is that drivers are more likely to cancel requests in 'City' which cause Non Availability of cars at 'Airport'.

Identifying most Problematic type of Requests (City -> Airport / Airport-> City)



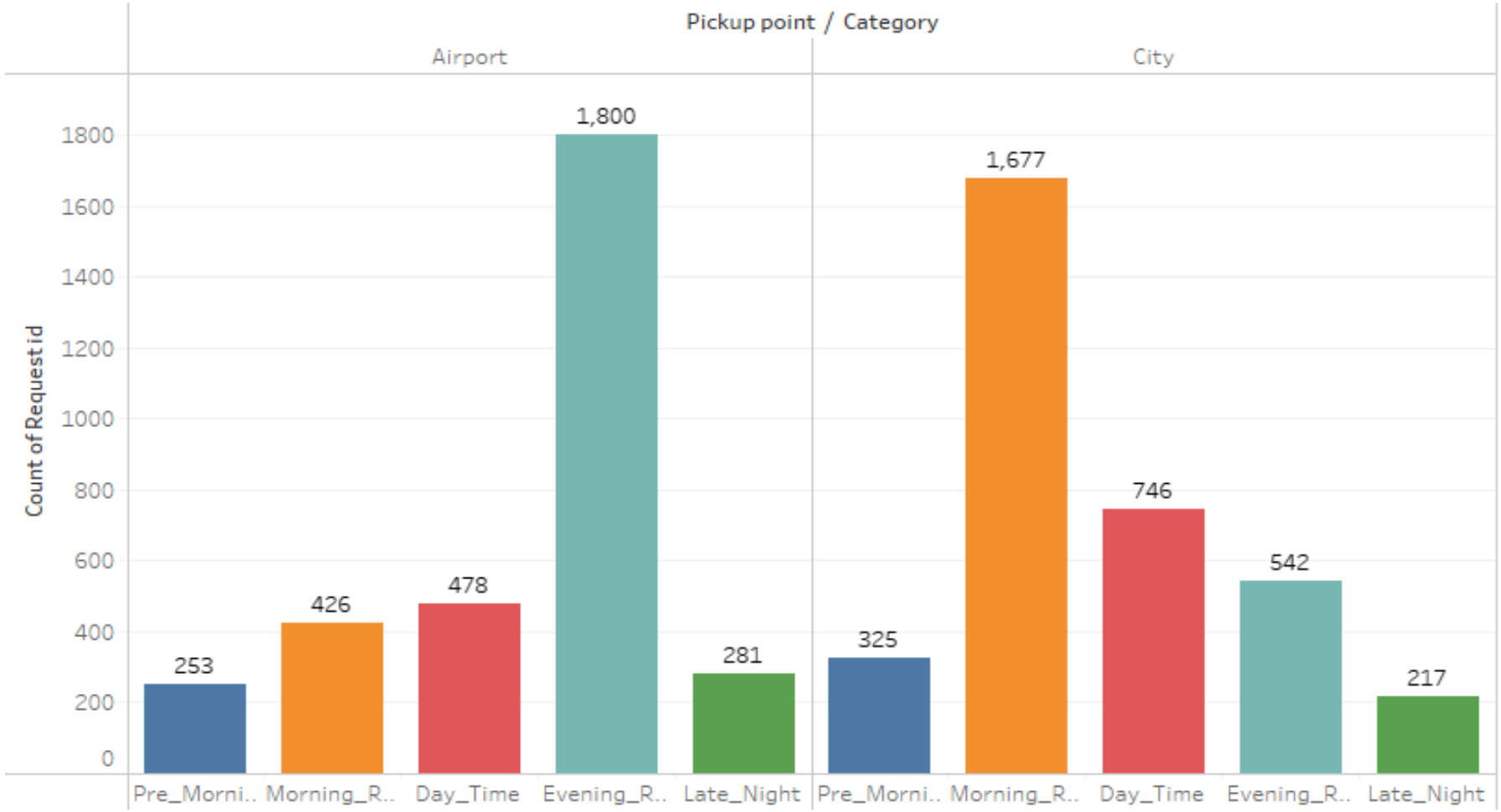
Identifying most Problematic type of Request (City -> Airport / Airport-> City)

Category	Pickup point	Trip Completed	Cancelled	No Cars Available
Day_Time	Airport	327	64	87
	City	395	104	247
Evening_Rush	Airport	373	106	1321
	City	411	60	71
Late_Night	Airport	142	3	136
	City	115	19	83
Morning_Rush	Airport	382	23	21
	City	472	820	385
Pre_Morning	Airport	103	2	148
	City	111	63	151

Plot Trend

We can clearly see that most requests gets cancelled in 'City' during the 'Morning' hours which eventually leads to 'Non Availability of Cars' at 'Airport' in 'Evening' hours.

Request at Pickup Point in Different Time Category



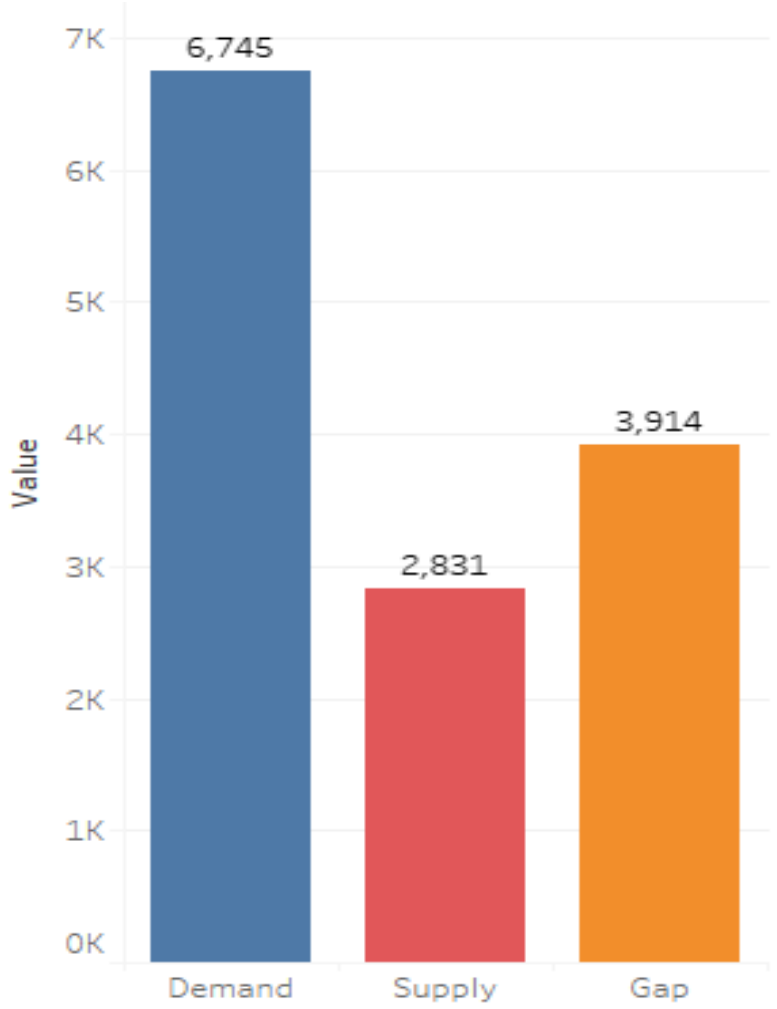
Request at Pickup Point in Different Time Category

Pickup Point	Category	Value
Airport	Day_Time	478
	Evening_Rush	1800
	Late_Night	281
	Morning_Rush	426
	Pre_Morning	253
City	Day_Time	746
	Evening_Rush	542
	Late_Night	217
	Morning_Rush	1677
	Pre_Morning	325

Plot Trend

- At 'City', we have high demand in 'Morning_Rush' hours.
- At 'Airport', we have high demand in 'Evening_Rush' hours.

Demand-Supply Gap

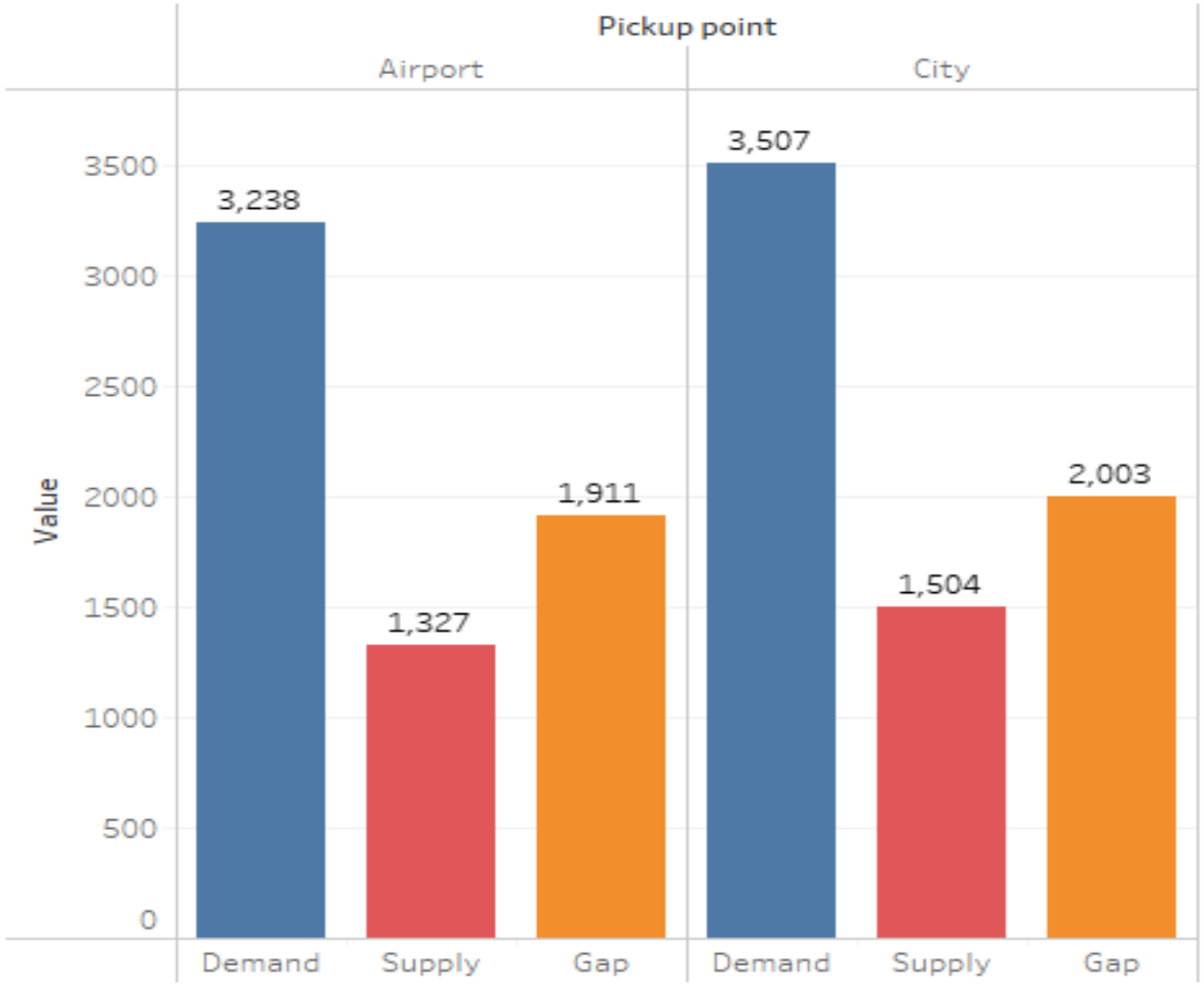


Demand	Supply	Gap
6745	2831	3914

Plot Trend

- Demand is 6745 and supply is just 2831 (i.e. 41.97% Supply)
- Gap is 3914 (i.e. 58.03% Gap)

Demand-Supply Gap at Pickup Point

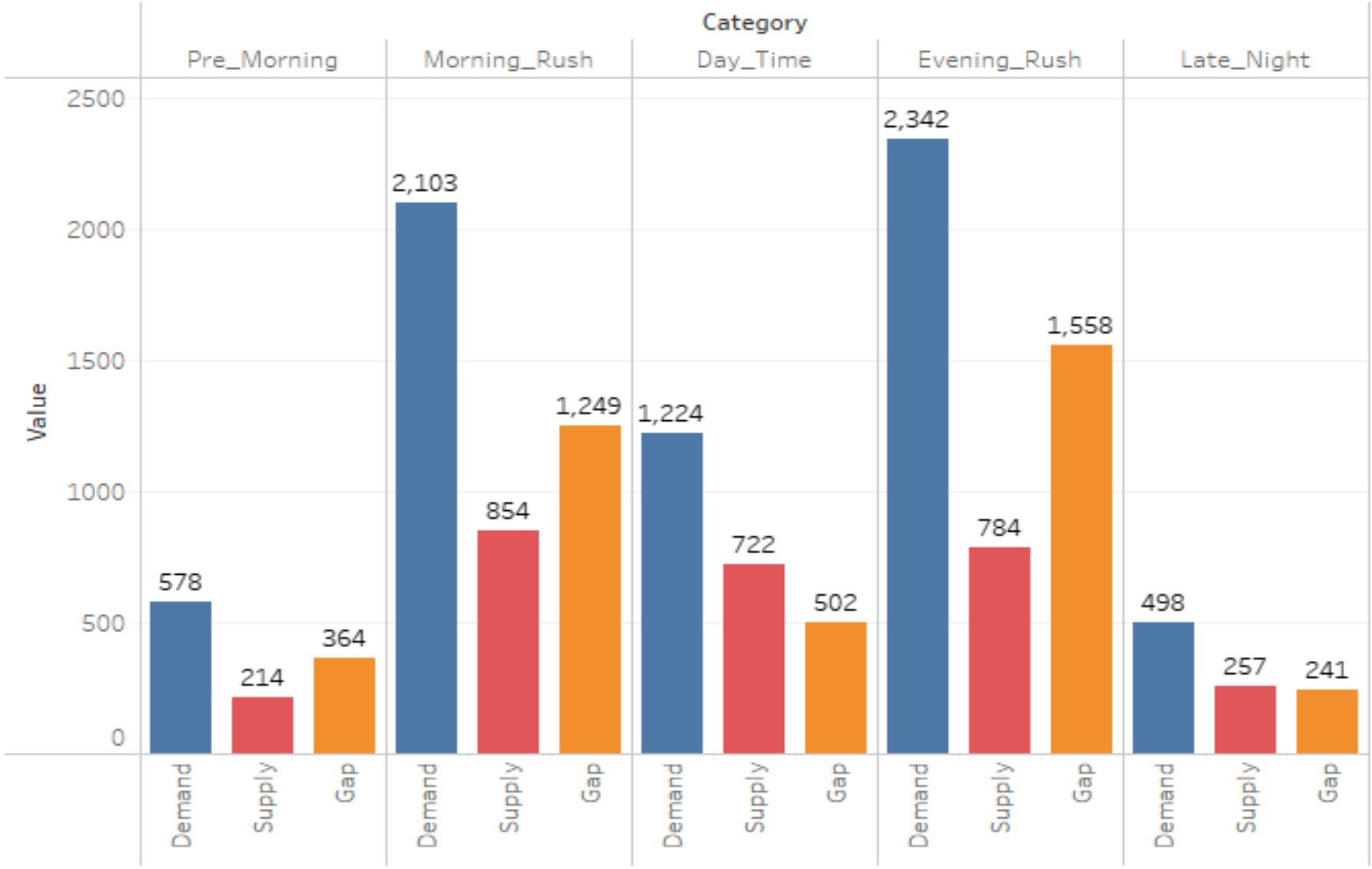


Pickup point	Demand	Supply	Gap
Airport	3238	1327	1911
City	3507	1504	2003
Total	**6745**	**2831**	**3914**

Plot Trend

Gap is higher in 'City'. So, if we can fill this Gap, we will be able to fill the 'Airport' gap.

Demand-Supply Gap in Different Time Category



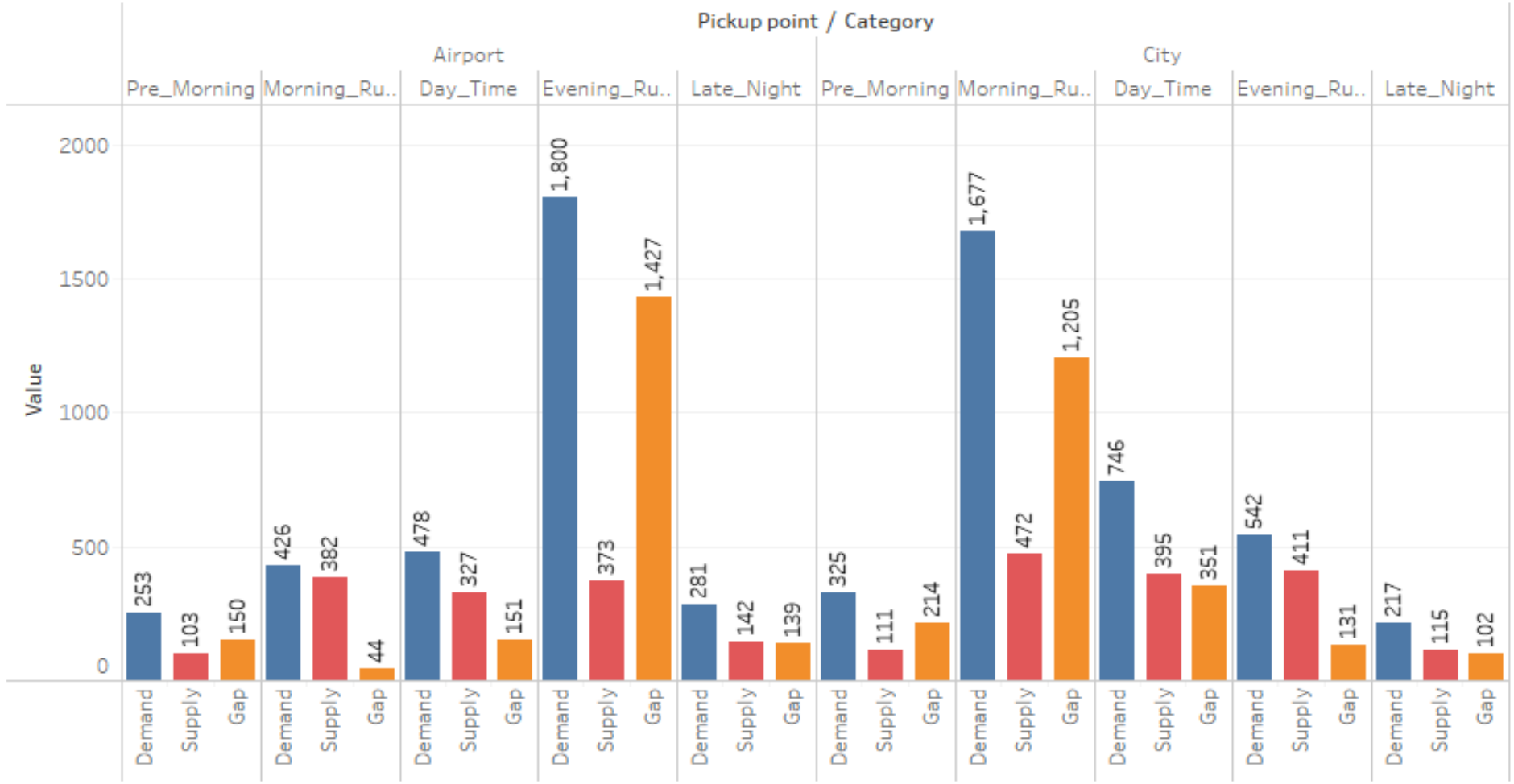
Demand-Supply Gap in Different Time Category

Category	Demand	Supply	Gap
Day_Time	1224	722	502
Evening_Rush	2342	784	1558
Late_Night	498	257	241
Morning_Rush	2103	854	1249
Pre_Morning	578	214	364
Total	**6745**	**3914**	**2831**

Plot Trend

Gap is highest in 'Morning_Rush' hours and 'Evening_Rush' hours.

Demand-Supply Gap at Pickup Point in Different Time Category



Demand-Supply Gap at Pickup Point in Different Time Category

Pickup point	Category	Demand	Supply	Gap
Airport	Day_Time	478	327	151
	Evening_Rush	1800	373	1427
	Late_Night	281	142	139
	Morning_Rush	426	382	44
	Pre_Morning	253	103	150
	Total	**3238**	**1327**	**1911**
City	Day_Time	746	395	351
	Evening_Rush	542	411	131
	Late_Night	217	115	102
	Morning_Rush	1677	472	1205
	Pre_Morning	325	111	214
	Total	**3507**	**1504**	**2003**

Reason Behind Demand-Supply Gap

- Drivers are cancelling trips ‘City’ -> ‘Airport’ in ‘Morning_Rush’ hours due to low demand on trips ‘Airport’ -> ‘City’ during ‘Morning_Rush’ and ‘Day_Time’ hours.

- Because the number of cars coming to ‘Airport’ is low, the non-availability of cars is very high in ‘Evening_Rush’ hours at ‘Airport’.

Possible Solutions for Demand-Supply Gap

- We can coordinate with various airlines to know the demand in morning hours and distribute these demands to drivers. By this we can motivate out drivers to take more trips. This may reduce the cancellation of trips. This can bring more drivers to take trips in morning hours which will reduce the non-availability of car.

- Restrict the number of cancellation of trips by drivers by imposing some penalties.

- Give discounts to passengers who book trips ‘Airport’ -> ‘City’ in ‘Morning_Rush’ hours and trips ‘City’ -> ‘Airport’ in ‘Evening_Rush’ hours. By this, we can create more demand and compete with other taxi drivers in rush hours which will help in non-availability of cars during ‘Evening_Rush’ hours at ‘Airport’.

Thank You