



# Bay Area Bike Share Analysis

XIAOQIU YU

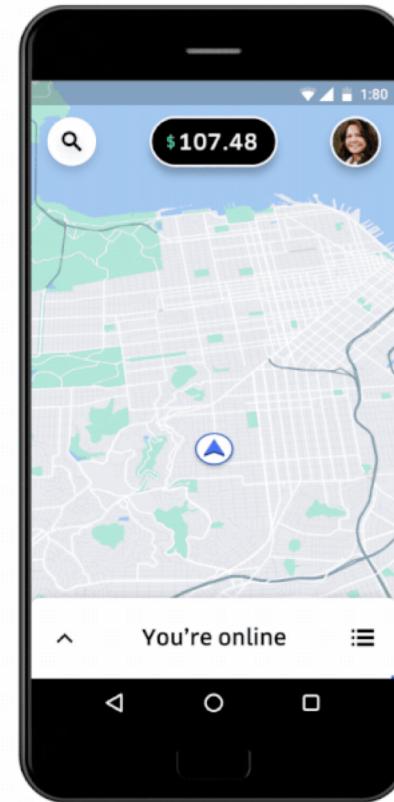


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# Agenda

- Objectives & Goals
- Data Description & Processing
- Analysis
- Recommendations
- Next steps
- Dashboard Demo



# Business Objectives



- Understand and improve bike share usage and user activeness
- Allocate bikes and resources more efficiently to different stations according to their usage patterns



# Analysis Goals

1. Understand the overall usage trend and detect potential variances
  
2. Investigate user behavior by different user segments
  - Heavy usage periods
  - Trip duration
  
3. Understand station-wide usage
  - Popular start & end stations and routes



# Data Description & Processing



## 1. Internal data

- Variables: Trip ID, Duration, Start & End Dates, Start & End Stations, User type, Bike #, Zip Code
- Time Range: 2014/03/01-2014/09/01
- 171, 792 total trips

## 2. External data source

- Bay Area BikeShare Station data
- Cities & coordinates

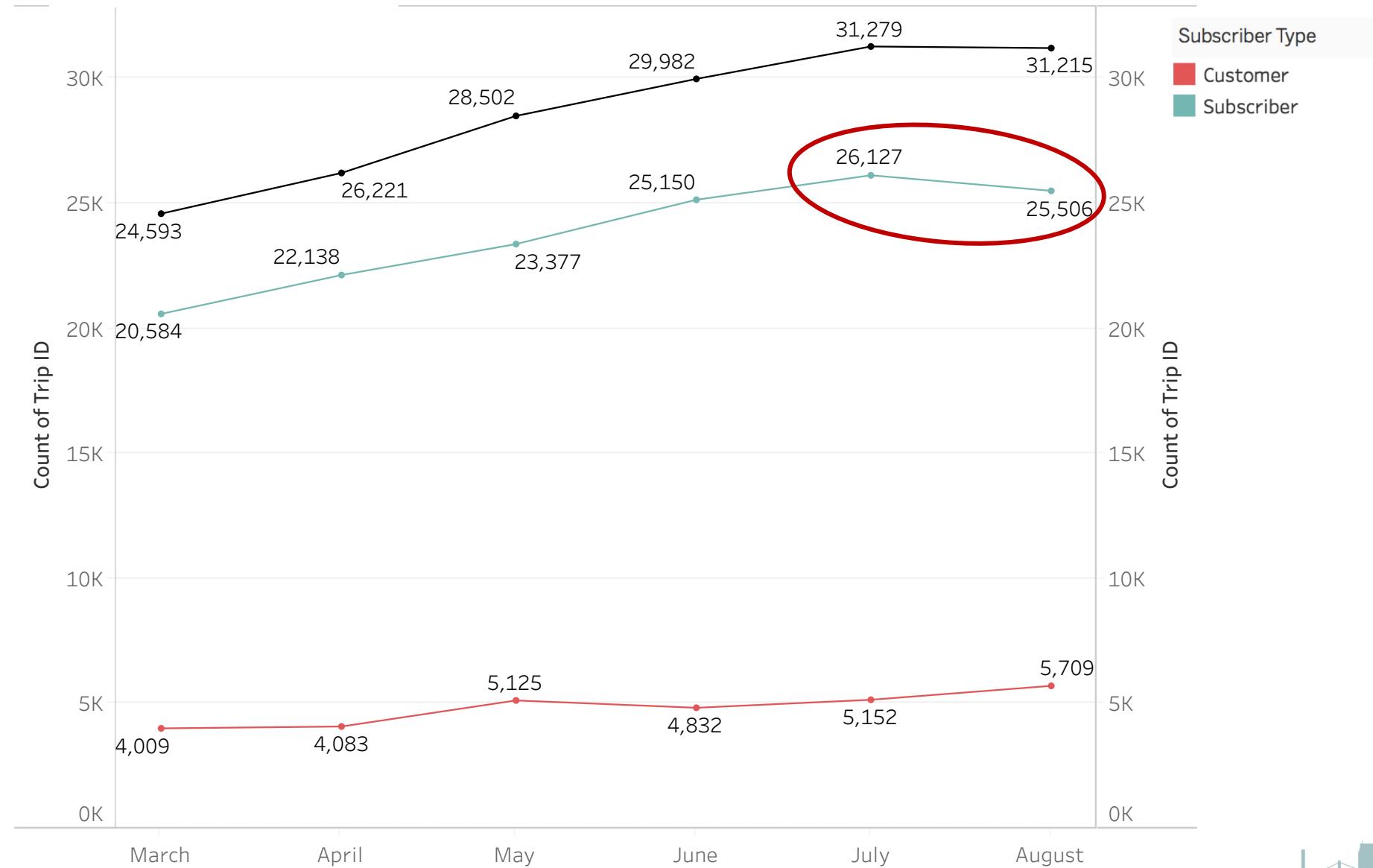




# 1. Overall Usage Trend



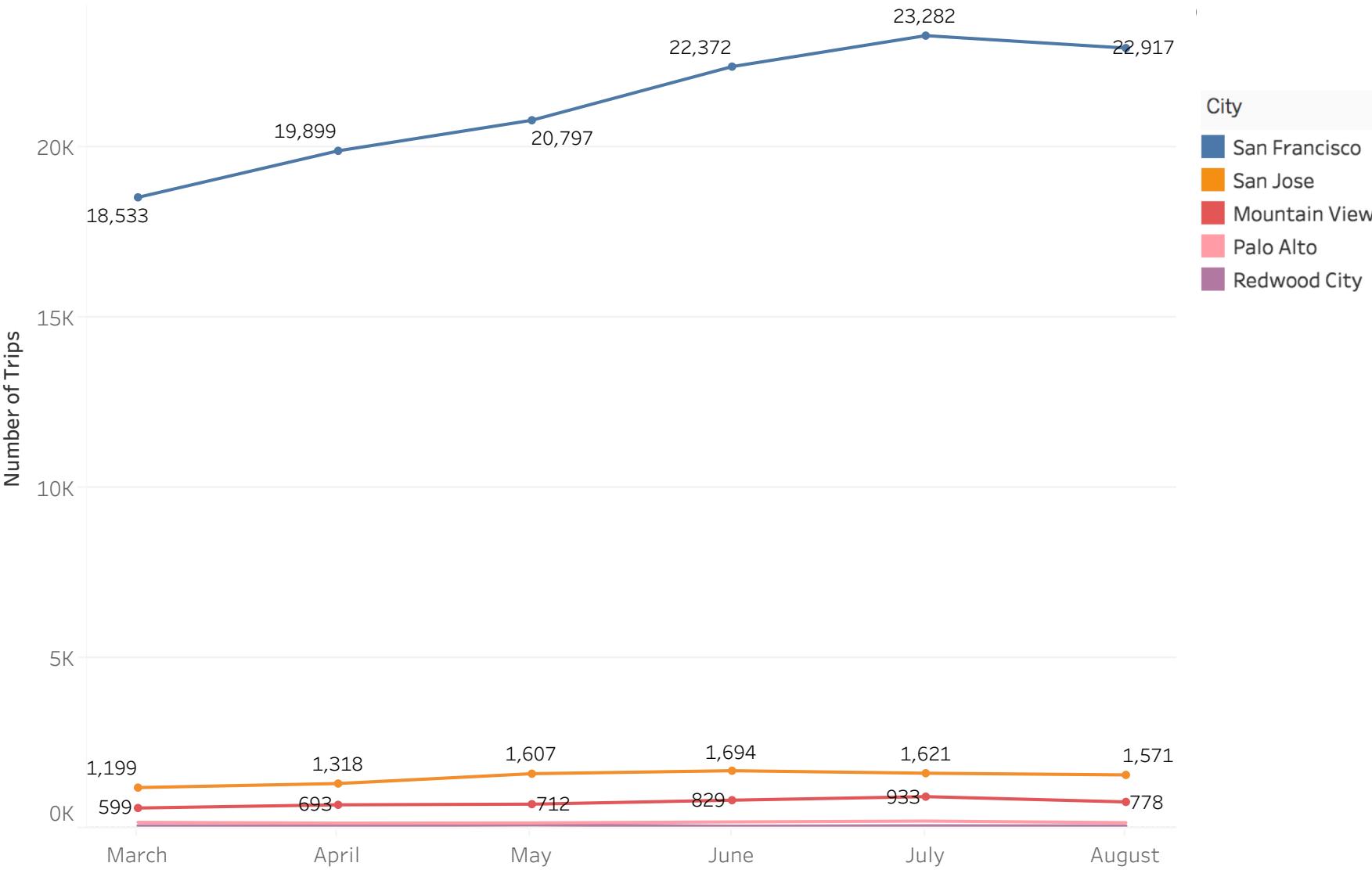
# Overall Monthly Trend



- Overall, the number of trips by month is increasing steadily and then flattens out in Aug
- Customer is growing
- Subscriber shows a decline



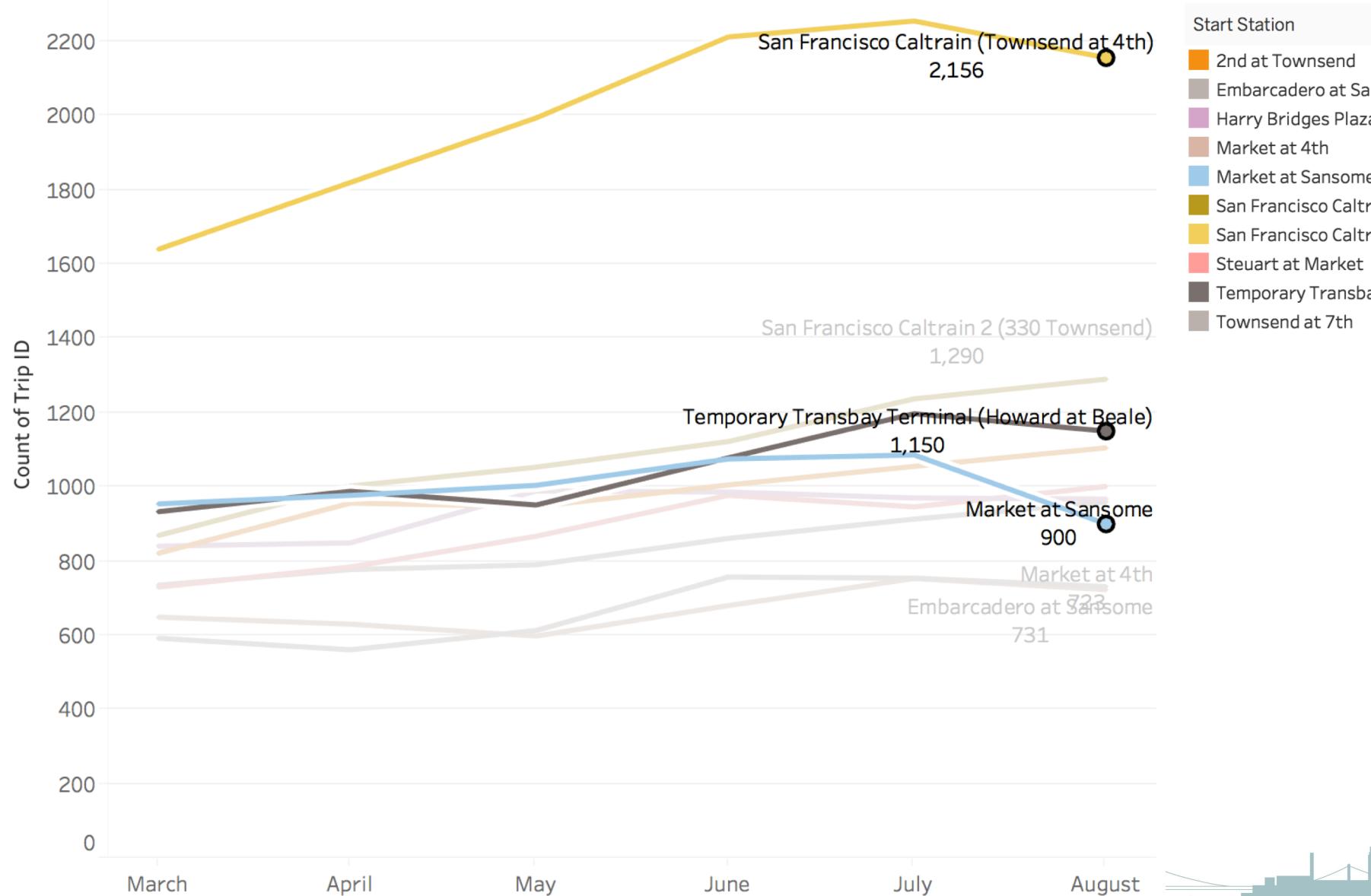
# Subscriber Monthly Trend by City



- SF accounts for 60% of total decline
- San Jose and Mountain view also show slight drops



# SF Subscriber Trend by Start Station



- Trips originated from stations **Market at Sansome, San Francisco Caltrain, Temporary Transbay Terminal** have greatest declines
- **Market at Sansome** accounts for 51% of the total decline



# Summary

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## Problem:

- Subscribers show decline in trip numbers
- 60% happened in SF, 51% started from Market at Sansome station

## Recommendations:

1. Investigate bike supply and bike quality at Market at Sansome station
2. Add user-level data to investigate more in-depth reasons and if we are losing unique users





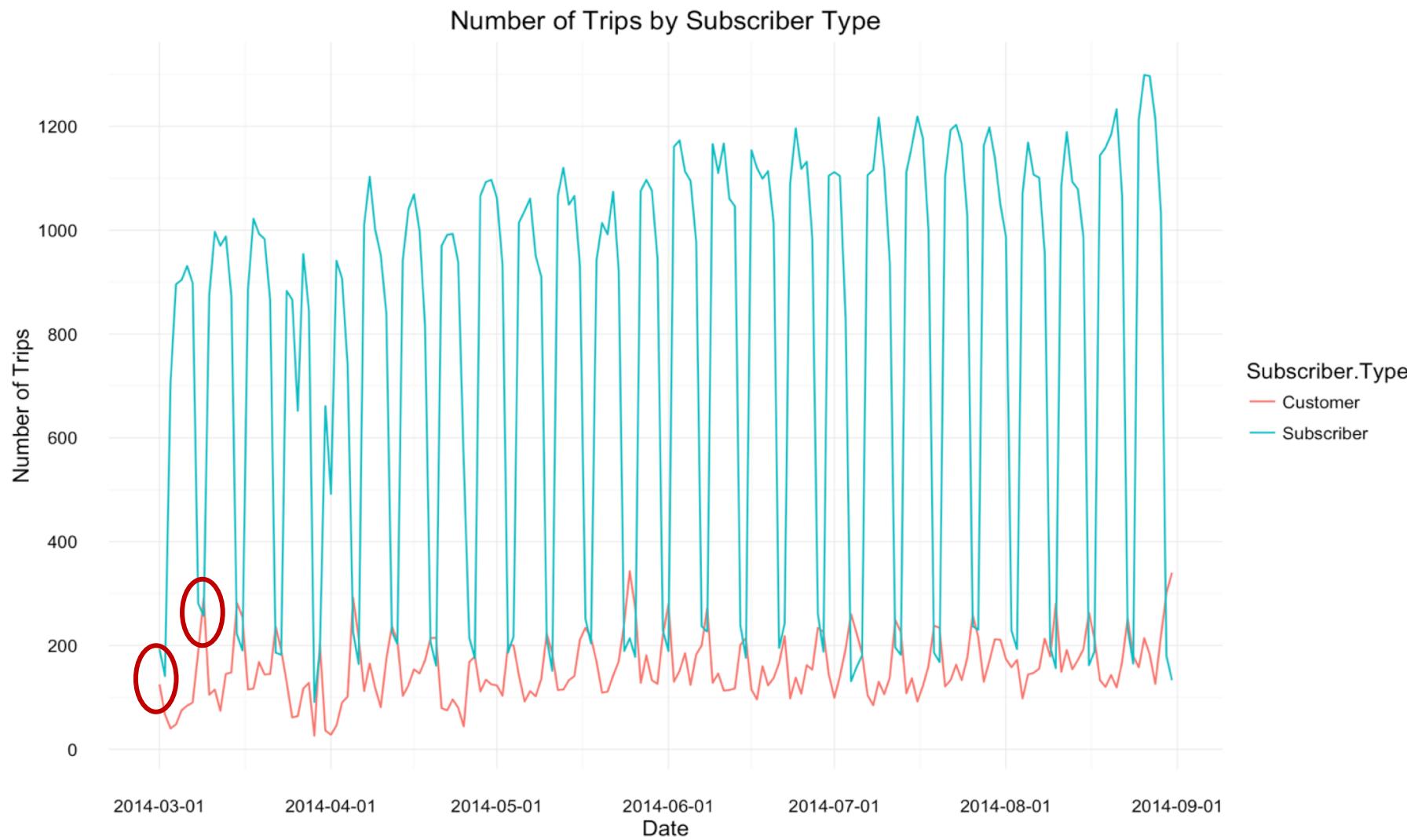
## 2. User Behavior



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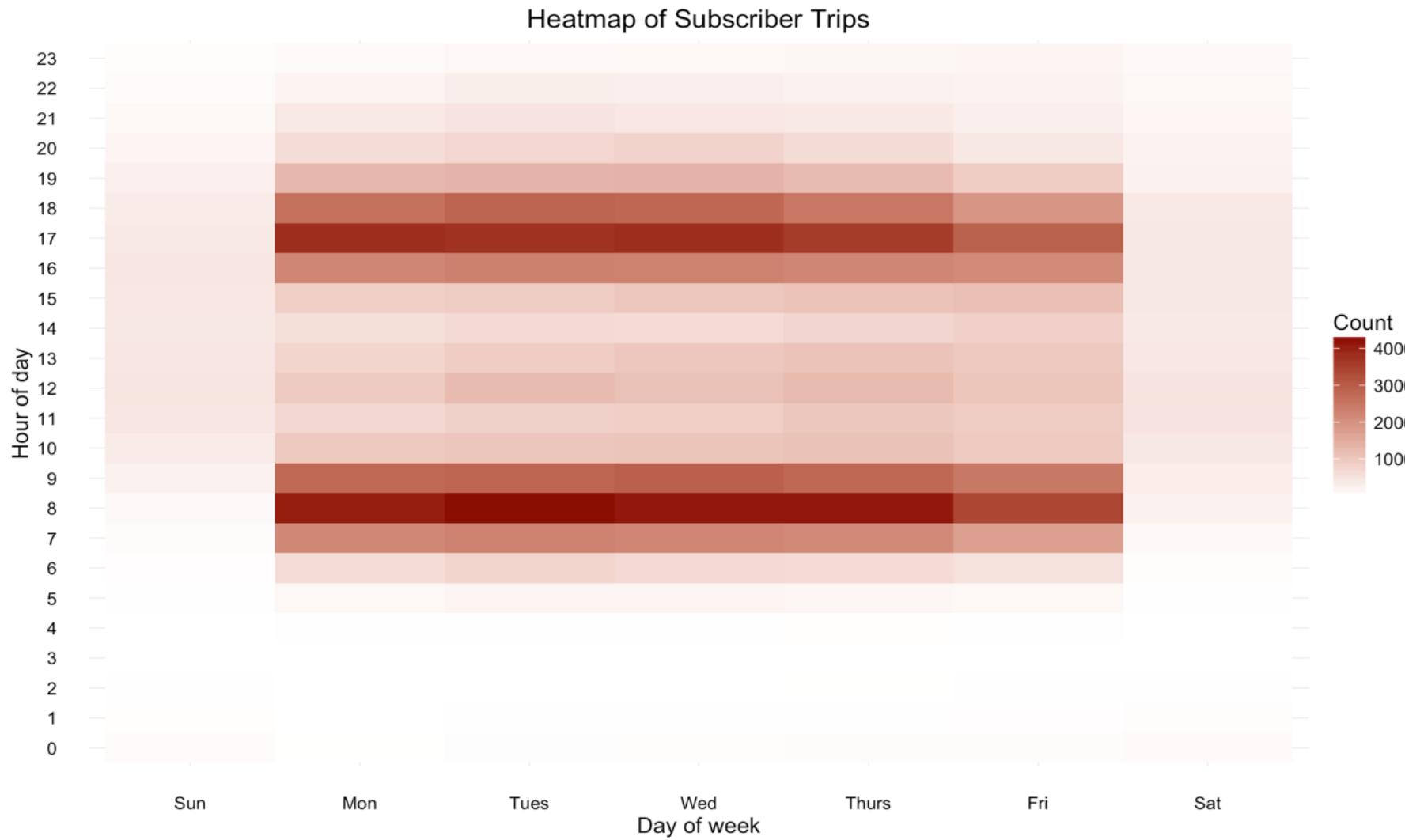
# Overall Daily Trend



- Significant weekly patterns
- Subscribers and customers show completely opposite patterns



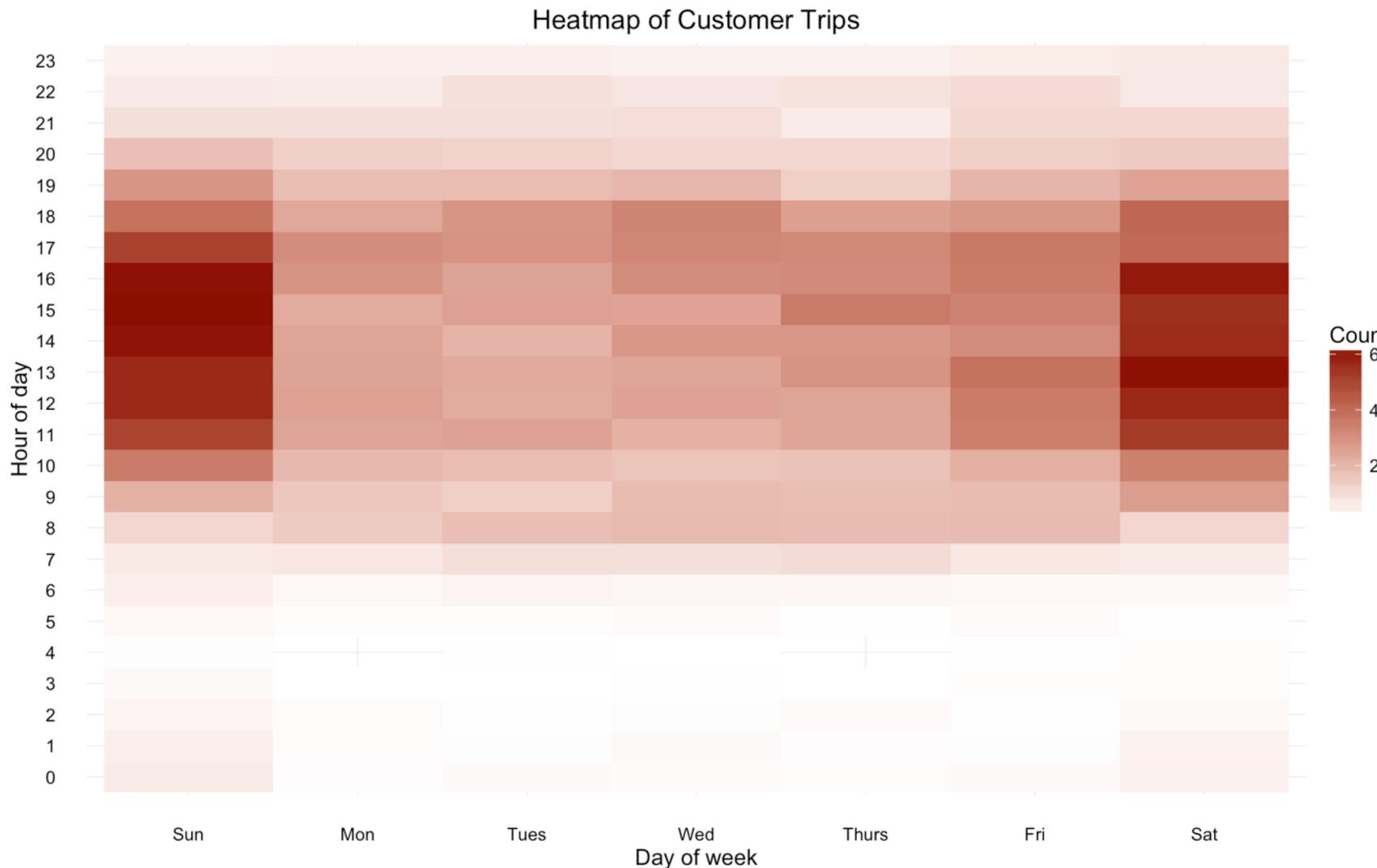
# User Behavior – Subscriber Heatmap



- Significantly heavier usage during rush hours on weekdays
- Mainly use bikeshare for commute



# User Behavior – Customer Heatmap



- Heavier usage during the daytime over the weekends
- Mainly use bikeshare for recreation



# User Behavior – Trip Duration

- Trip Duration distribution (Minutes)

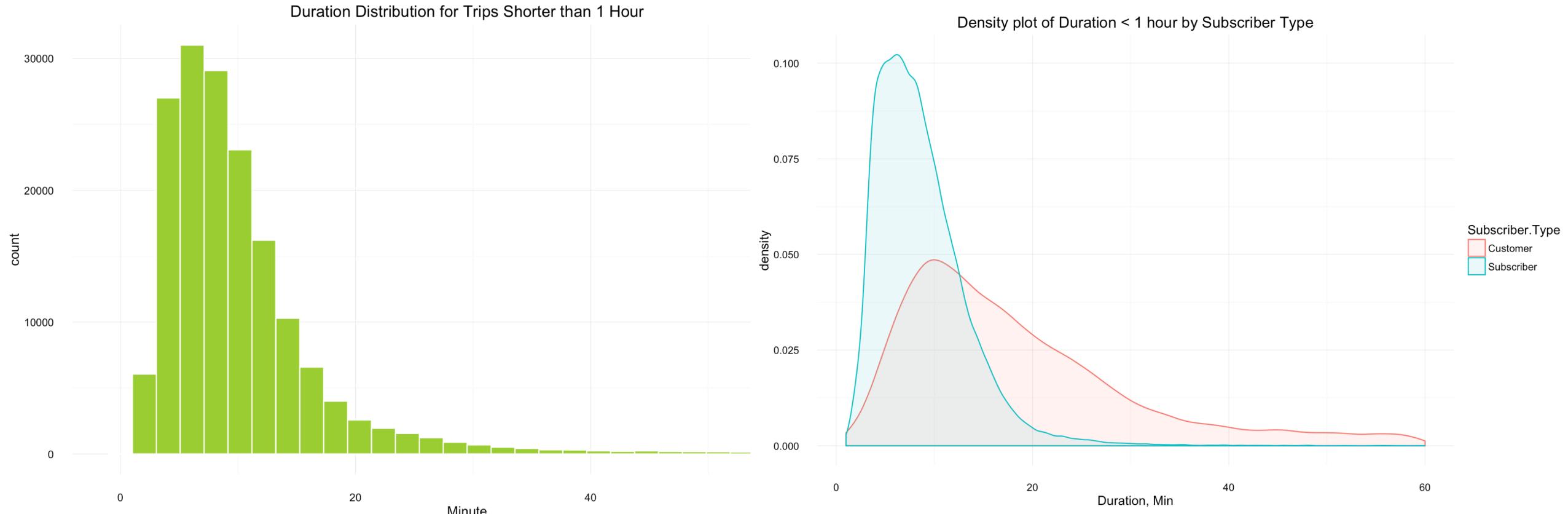
Min	Median	Mean	Max
1.0	8.6	18.9	11940

8 days

- Trips shorter than 1 hour: 96%
- Trips shorter than 1 day: 99.9%
- Trips longer than 1 day: 73 trips



# User Behavior – Trip Duration



- Trips shorter than 1 hour: most are within 20 minutes
- Customers' trip duration has higher variability



# Summary

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## Finding:

- Subscribers and customers have completely different patterns and use cases

## Recommendations:

- Tailor targeted marketing strategies for different user segments





# 3. Station Usage

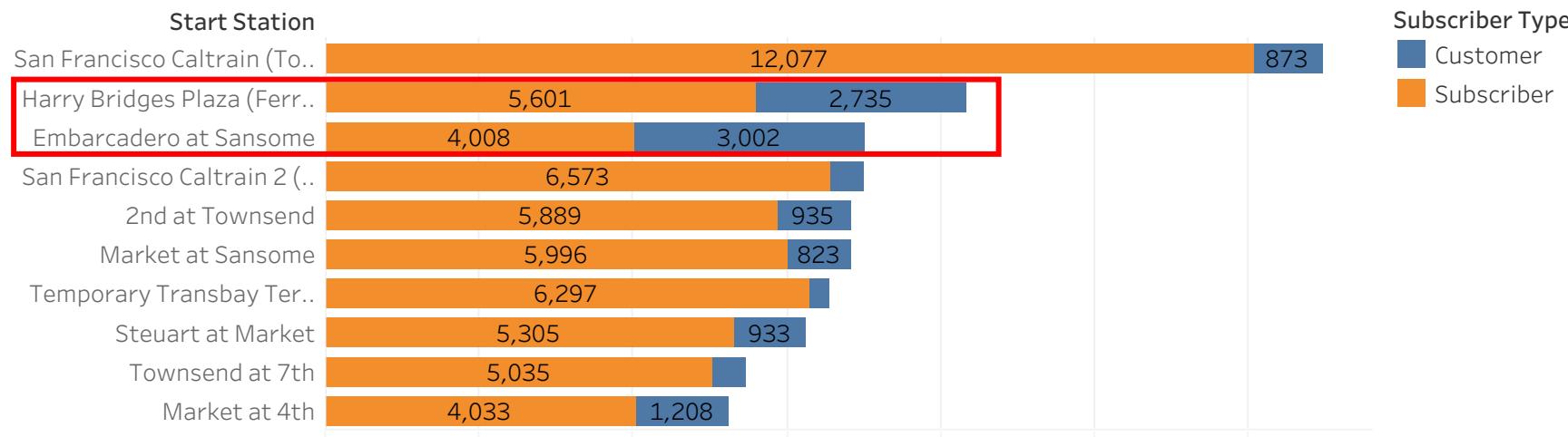


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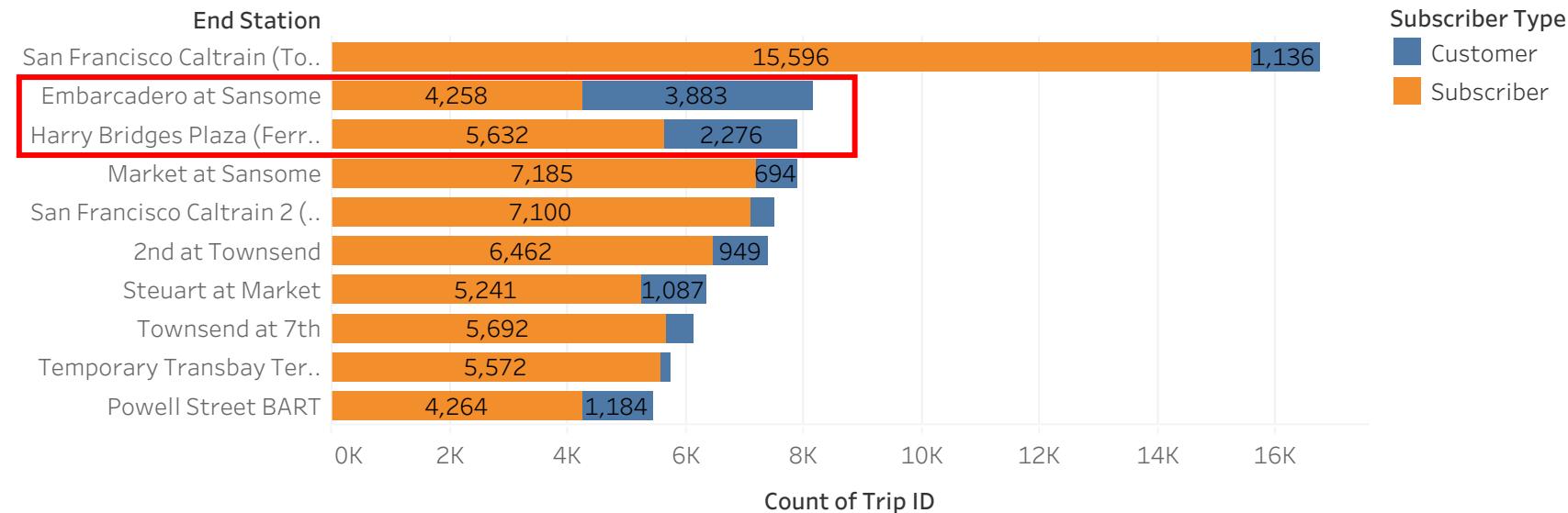


# Station Usage

## Top 10 Start Stations



## Top 10 End Stations



- San Francisco Caltrain has significantly higher usage. The majority is the subscribers
- Top 10 start & end stations are similar stations, and are all in San Francisco
- Harry Bridge Plaza and Embarcadero at Sansome has more comparable user type breakdown



# Popular Routes

## Top 10 Subscriber Routes

Route	Start Station	End Station	
65-70	Townsend at 7th	San Francisco Caltrain (Townsend at 4th)	1,461
69-65	San Francisco Caltrain 2 (330 Townsend)	Townsend at 7th	1,309
61-50	2nd at Townsend	Harry Bridges Plaza (Ferry Building)	1,003
60-74	Embarcadero at Sansome	Steuart at Market	1,000
64-77	2nd at South Park	Market at Sansome	999
67-70	Market at 10th	San Francisco Caltrain (Townsend at 4th)	939
74-70	Steuart at Market	San Francisco Caltrain (Townsend at 4th)	916
70-55	San Francisco Caltrain (Townsend at 4th)	Temporary Transbay Terminal (Howard at Beale)	913
77-64	Market at Sansome	2nd at South Park	893
50-61	Harry Bridges Plaza (Ferry Building)	2nd at Townsend	889
70-77	San Francisco Caltrain (Townsend at 4th)	Market at Sansome	889

## Top 10 Customer Routes

Route	Start Station	End Station	
50-60	Harry Bridges Plaza (Ferry Building)	Embarcadero at Sansome	813
60-60	Embarcadero at Sansome	Embarcadero at Sansome	540
50-50	Harry Bridges Plaza (Ferry Building)	Harry Bridges Plaza (Ferry Building)	409
60-50	Embarcadero at Sansome	Harry Bridges Plaza (Ferry Building)	348
48-60	Embarcadero at Vallejo	Embarcadero at Sansome	321
35-35	University and Emerson	University and Emerson	272
60-76	Embarcadero at Sansome	Market at 4th	208
50-48	Harry Bridges Plaza (Ferry Building)	Embarcadero at Vallejo	182
74-60	Steuart at Market	Embarcadero at Sansome	181
76-60	Market at 4th	Embarcadero at Sansome	180

- The most popular routes are mainly in San Francisco
- Subscribers:** near transportation hubs and commercial area
- Customers:** around tourist spots
- One popular customer route in Palo Alto



# Recommendations

## 1. Subscribers show trip decline

- Investigate supplies and bike quality at Market at Sansome station, which has the major decline
- Get user level data to further investigate subscriber decline
  - Demographics (region, gender)
  - Platform (iOS, Android)
  - Lifecycle stage (new, engaged, churned)
  - Behavior (app openings, requests, complete trips)



# Recommendations

## 2. Develop targeted strategies for different user segments

- Content strategies:  
Subscribers: commute and working life, e.g. traffic and weather forecast  
Customers: recreation and sightseeing, e.g. travel guide
- Partnership:  
Team up with local major companies and universities to reach and engage commuter segments  
Cooperate with players in travel market (e.g. online travel agencies, local search & review websites) to reach the travel segments



# Recommendations

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## 3. Efficiently allocate bike supply according to station usage

- Closely monitor stations of high usage: San Francisco City, Caltrain stations, popular traveling spots
- Adjust supplies at stations of low usage correspondingly so as to minimize idle bikes



# Next Steps

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1. Gather more data to understand seasonal patterns
  - Investigate seasonal factors that may impact user usage and behavior
2. Build forecasting models to predict the number of bikes needed for the stations





# Dashboard Demo



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# Thank you!



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