Problem:

imagine working as data scientist at one airlines company and are given the problem of comparing and optimizing performance for that company.

Data set:

On-Time Performance data, downloaded from Bureau of Transportation Statistics, covers passenger airline travel within the United States from January 2011 to March 2016. I selected 32 features, as shown below:

[1] "YEAR" "QUARTER" "MONTH"

[4] "DAY_OF_MONTH" "DAY_OF_WEEK" "FL_DATE"

[7] "UNIQUE CARRIER" "AIRLINE ID" "CARRIER"

[10] "FL_NUM" "ORIGIN_AIRPORT_ID"

"ORIGIN AIRPORT SEQ ID"

[13] "ORIGIN_CITY_MARKET_ID" "ORIGIN" "ORIGIN_CITY_NAME"

[16] "ORIGIN_STATE_ABR" "ORIGIN_STATE_NM"

"DEST AIRPORT ID"

[19] "DEST_AIRPORT_SEQ_ID" "DEST_CITY_MARKET_ID" "DEST"

[22] "DEST_CITY_NAME" "DEST_STATE_ABR" "DEST_STATE_NM"

[25] "CRS_DEP_TIME" "DEP_TIME" "DEP_DELAY"

[28] "DEP_DELAY_NEW" "ARR_TIME" "ARR_DELAY"

[31] "ARR_DELAY_NEW" "X"

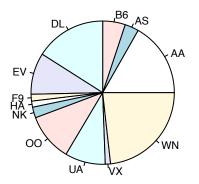
Questions

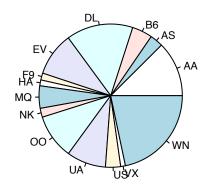
- 1. Show the flight route of American Airlines in the early 2016.
- 2. Show the coverage of each carrier according to the number of flight records in each year.
- 3 What are the range of Arrive Delay of top six Airlines Co. in year 2016, 2015, 2014, 2013, 2012 and 2011?
- 4. What are the range of departure delay of the top six companies in year 2016, 2015, 2014, 2013, 2012 and 2011?
- 5. Mean Departure Delay at major Airports in 2016
- 6. Mean Arrival Delay at major Airports in 2016

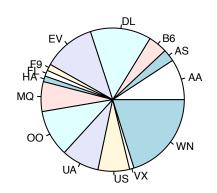
Some interesting findings are presented in the following pages, in the order accordance with the order of the questions.

Flight Route of AA in the early 2016





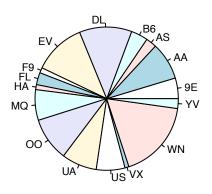


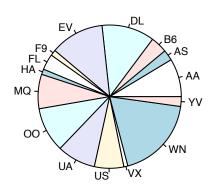


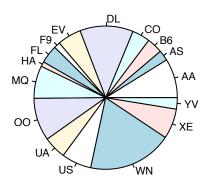
Coverage of Airlines in 2013

Coverage of Airlines in 2012

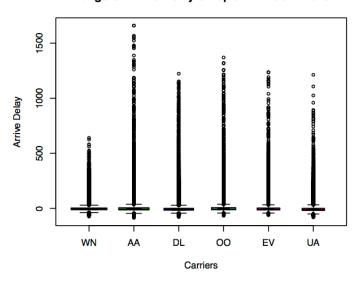
Coverage of Airlines in 2011



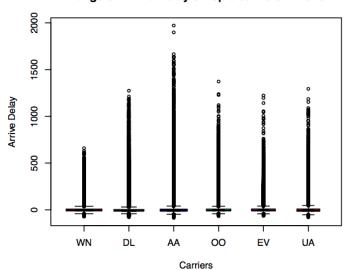




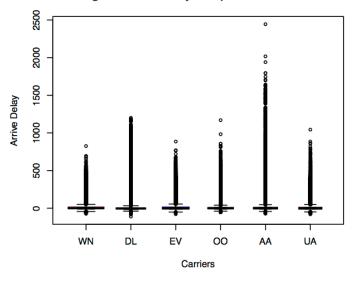
Range of Arrive Delay of top 6 Airlines in 2016



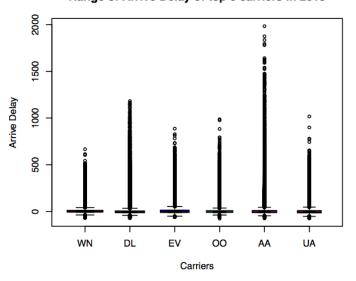
Range of Arrive Delay of top 6 carriers in 2015



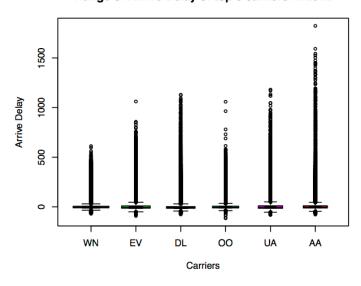
Range of Arrive Delay of top 6 carriers in 2014



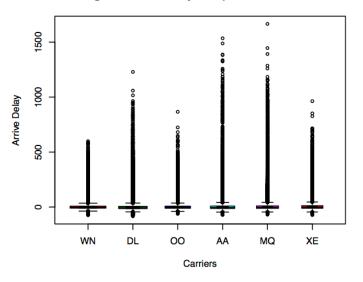
Range of Arrive Delay of top 6 carriers in 2013



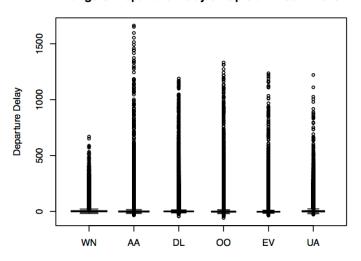
Range of Arrive Delay of top 6 carriers in 2012



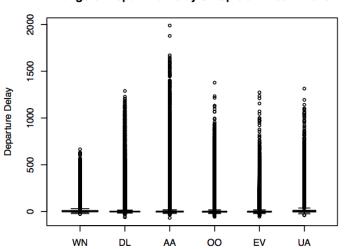
Range of Arrive Delay of top 6 carriers in 2011



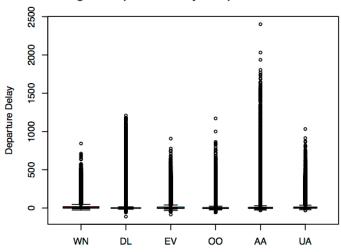
Range of Departure Delay of top 6 airlines in 2016



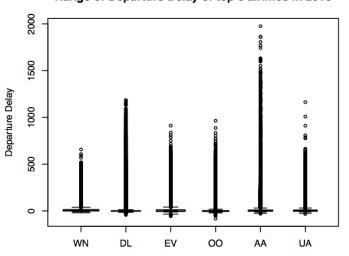
Range of Departure Delay of top 6 airlines in 2015



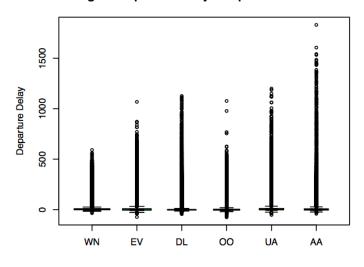
Range of Departure Delay of top 6 airlines in 2014



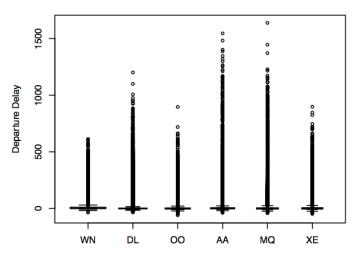
Range of Departure Delay of top 6 airlines in 2013

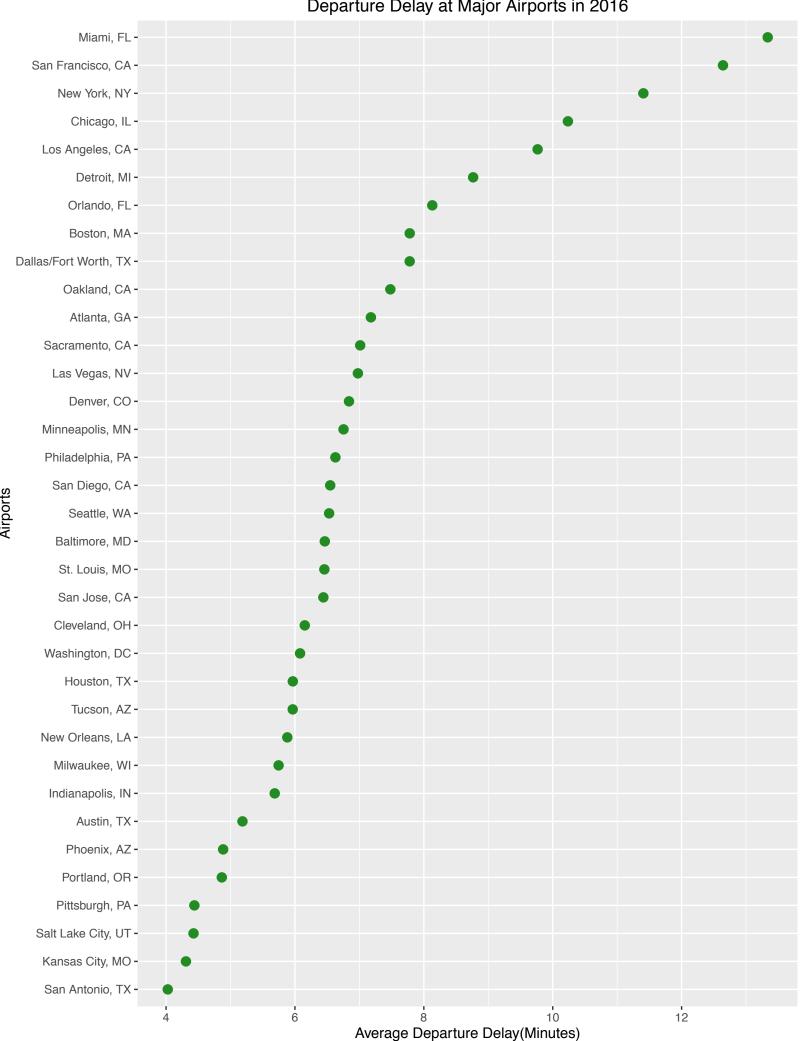


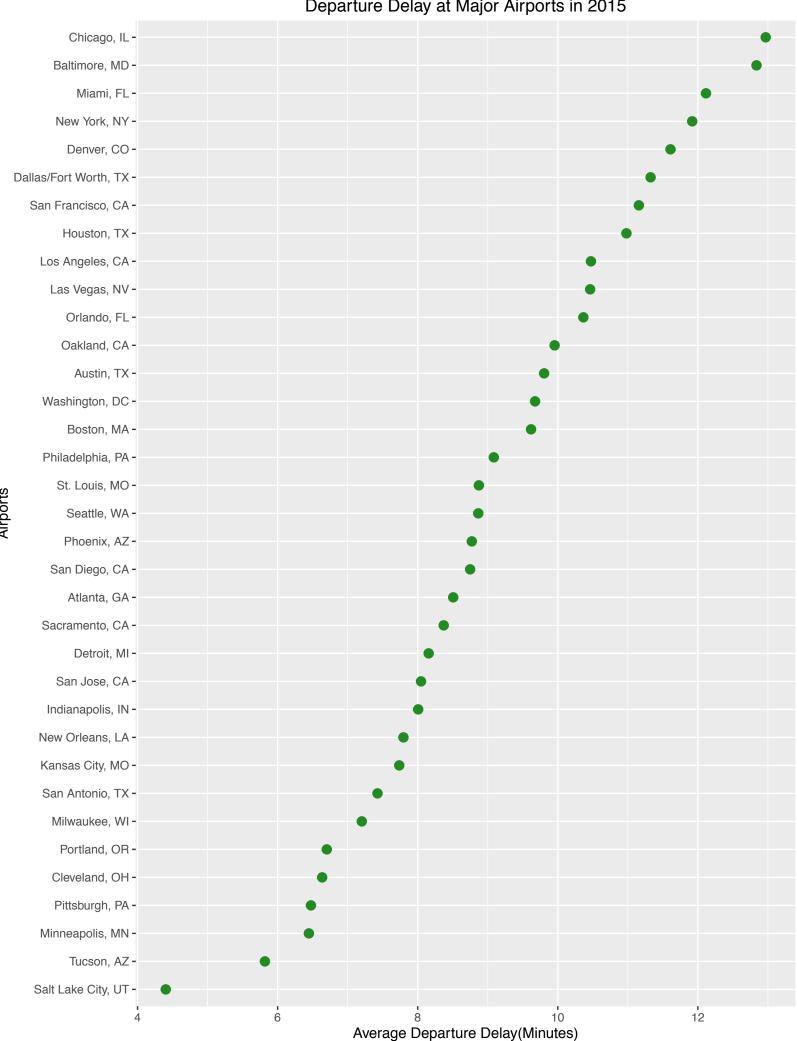
Range of Departure Delay of top 6 airlines in 2012



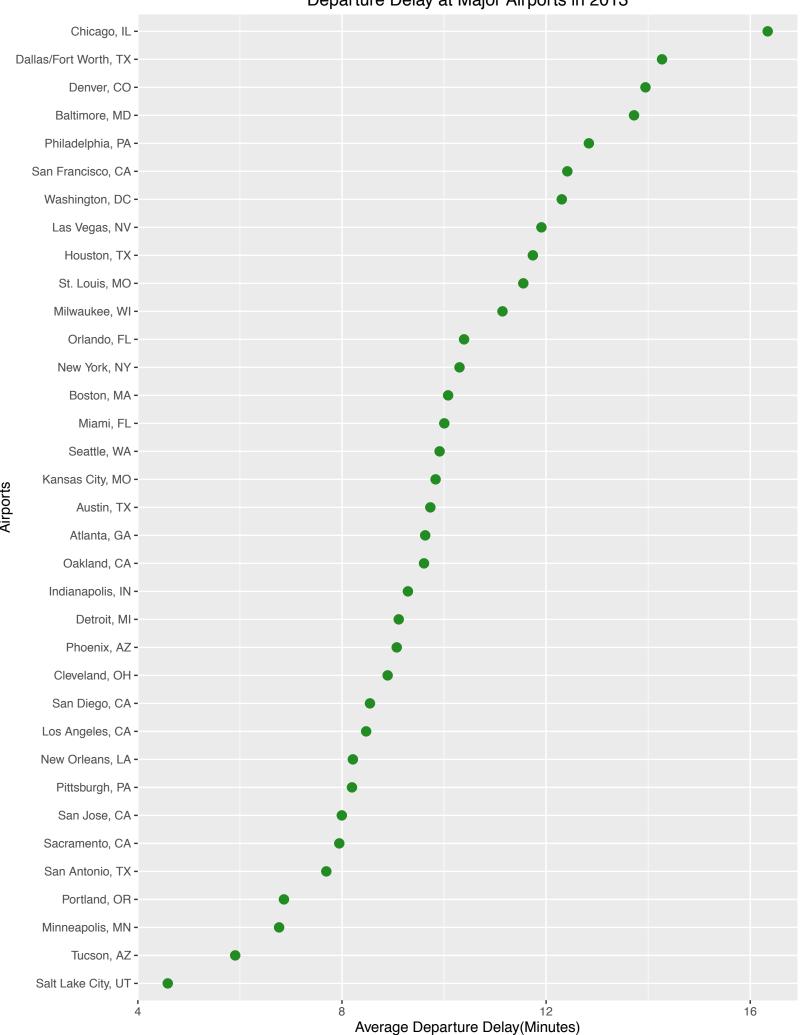
Range of Departure Delay of top 6 airlines in 2011

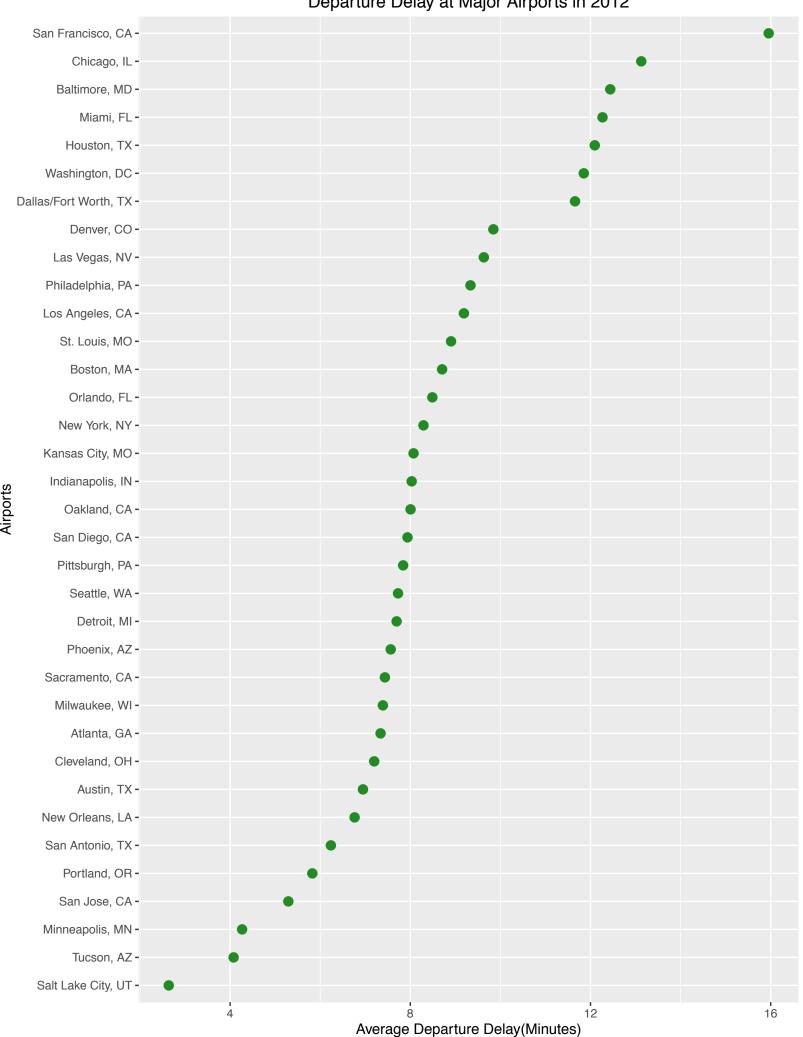




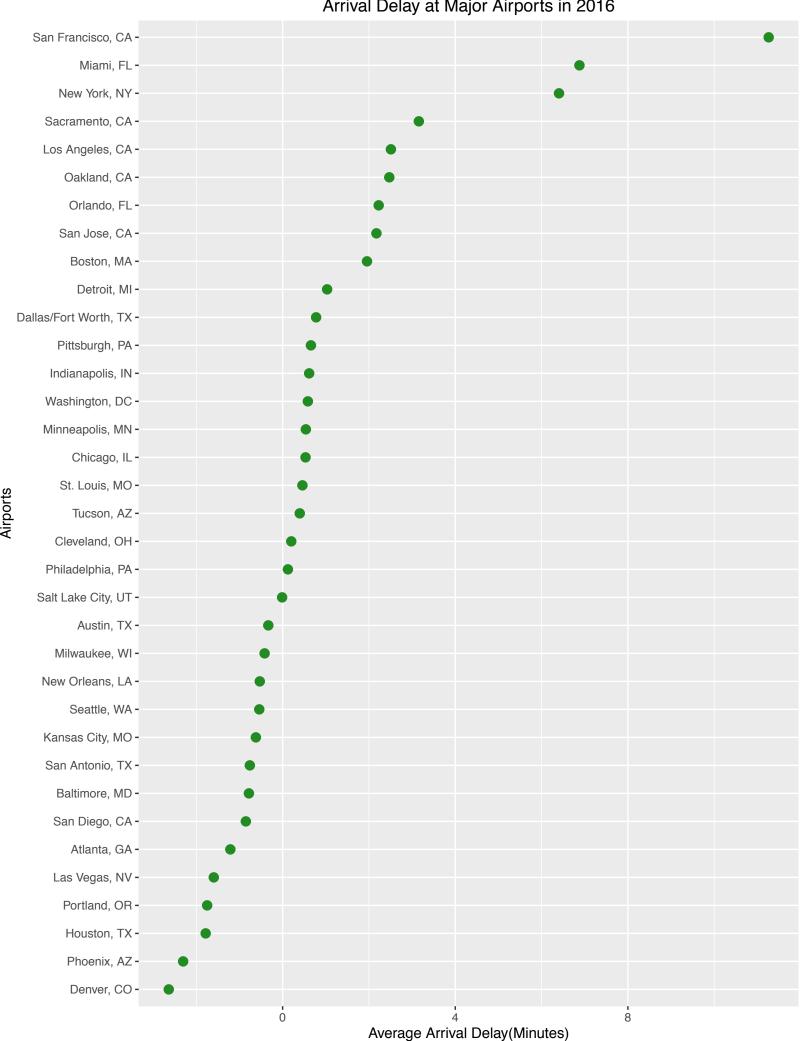


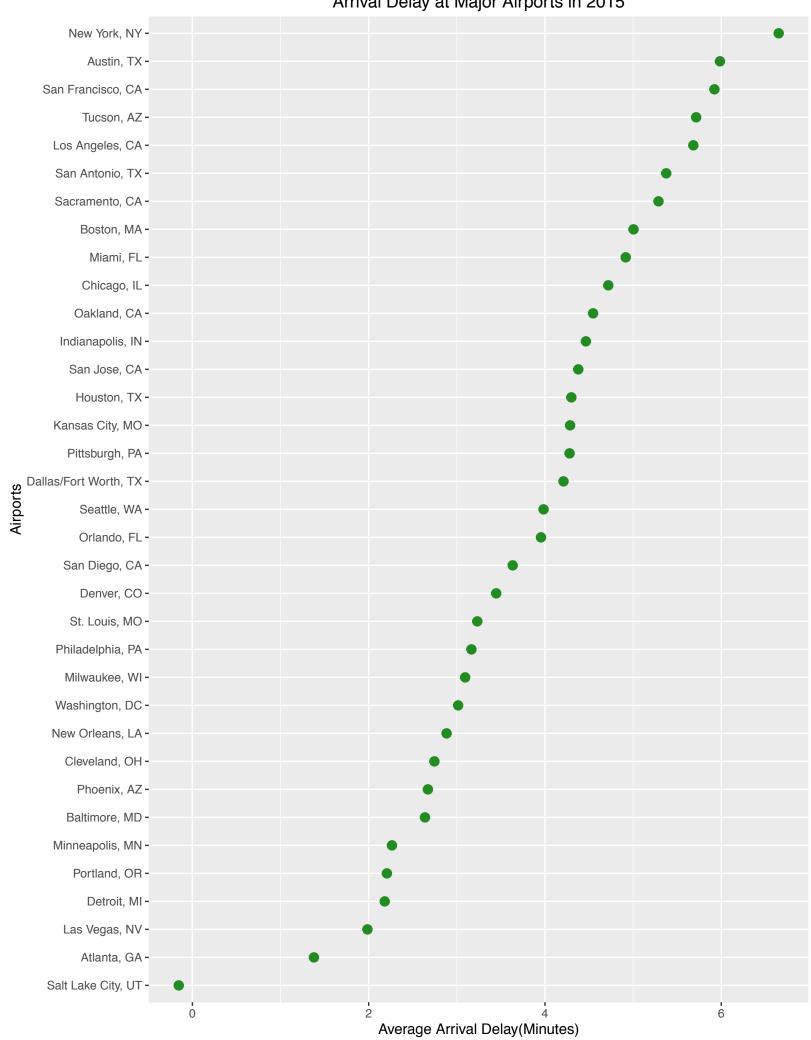
Departure Delay at Major Airports in 2014 Chicago, IL -Denver, CO -Baltimore, MD -Orlando, FL -Dallas/Fort Worth, TX -San Francisco, CA -Oakland, CA -Las Vegas, NV -Philadelphia, PA -St. Louis, MO -Houston, TX -Washington, DC -Phoenix, AZ -New York, NY -Milwaukee, WI -Kansas City, MO -Indianapolis, IN -Austin, TX -New Orleans, LA -San Diego, CA -Boston, MA -Los Angeles, CA -San Jose, CA -Sacramento, CA -Cleveland, OH -San Antonio, TX -Atlanta, GA -Seattle, WA -Miami, FL-Detroit, MI -Pittsburgh, PA -Minneapolis, MN -Tucson, AZ -Portland, OR -Salt Lake City, UT -12 16 Average Departure Delay(Minutes)

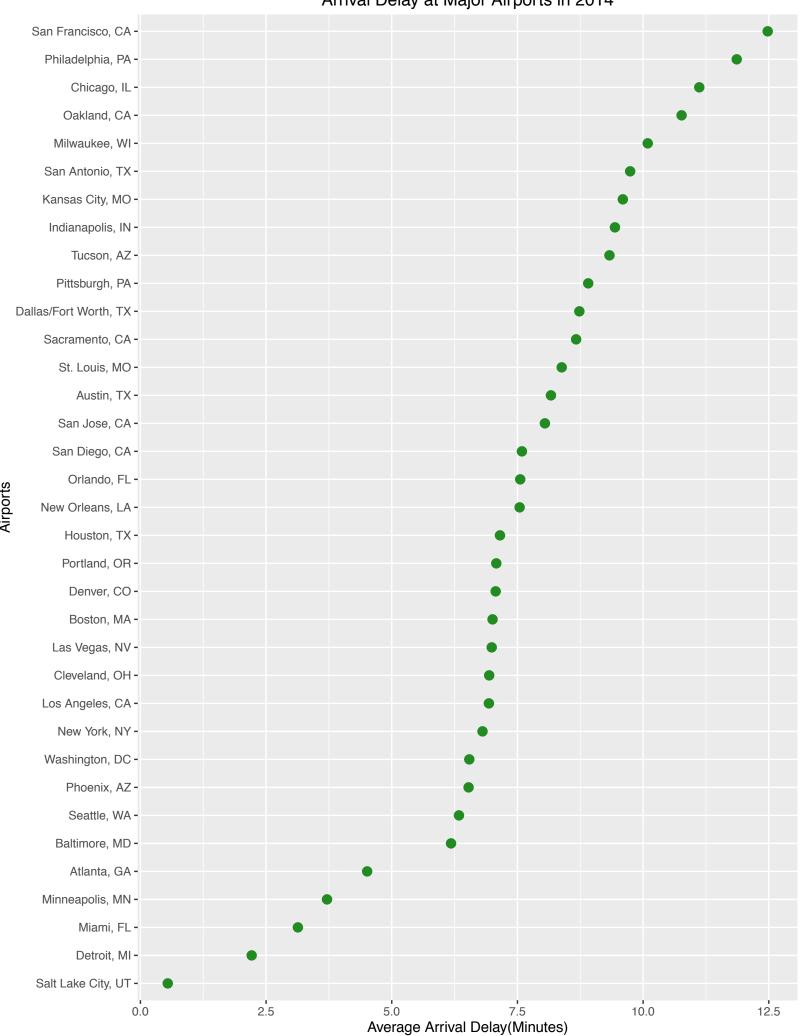


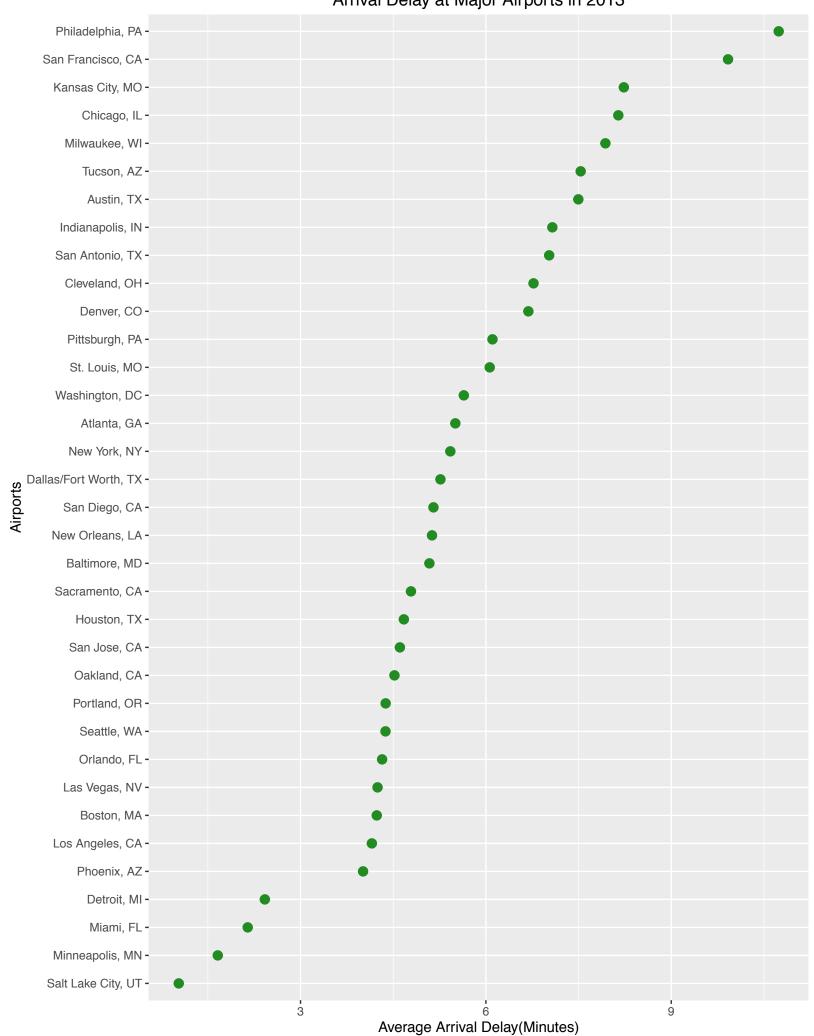


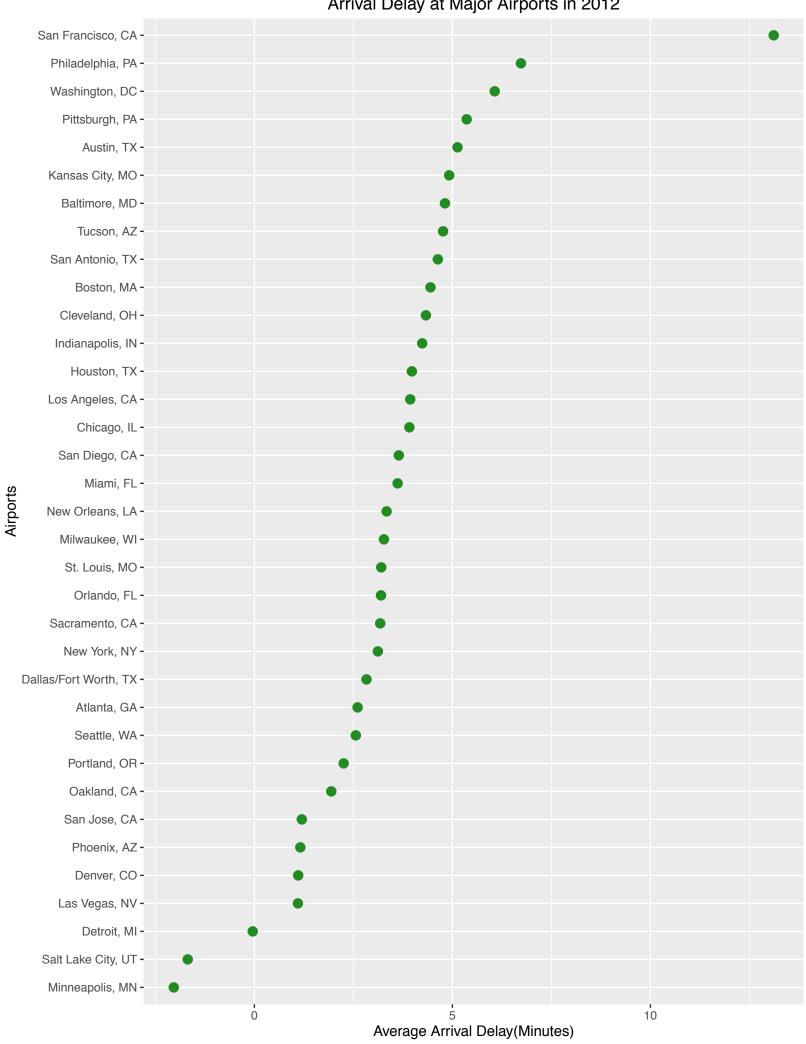
Departure Delay at Major Airports in 2011 San Francisco, CA -Baltimore, MD -Philadelphia, PA -Chicago, IL -Miami, FL-Phoenix, AZ -Denver, CO -St. Louis, MO -Las Vegas, NV -Pittsburgh, PA -Houston, TX -Boston, MA -Orlando, FL -Kansas City, MO -Washington, DC -Dallas/Fort Worth, TX -Indianapolis, IN -New York, NY -Oakland, CA -Milwaukee, WI -Atlanta, GA -Sacramento, CA -Detroit, MI -San Diego, CA -New Orleans, LA -Los Angeles, CA -San Antonio, TX -Austin, TX -Minneapolis, MN -San Jose, CA -Cleveland, OH -Seattle, WA -Portland, OR -Tucson, AZ -Salt Lake City, UT -6 10 12 Average Departure Delay(Minutes)











Arrival Delay at Major Airports in 2011 San Francisco, CA -Philadelphia, PA -Boston, MA -Tucson, AZ -Cleveland, OH -Pittsburgh, PA -Washington, DC -Milwaukee, WI -Chicago, IL -Kansas City, MO -Indianapolis, IN -Austin, TX -San Antonio, TX -St. Louis, MO -Houston, TX -New York, NY -Sacramento, CA -San Diego, CA -Los Angeles, CA -Baltimore, MD -New Orleans, LA -San Jose, CA -Phoenix, AZ -Atlanta, GA -Miami, FL-Oakland, CA -Portland, OR -Seattle, WA -Orlando, FL -Denver, CO -Las Vegas, NV -Detroit, MI -Dallas/Fort Worth, TX -Minneapolis, MN -Salt Lake City, UT -0 10 Average Arrival Delay(Minutes)