PRIYADARSHINI ENGINEERING COLLEGE

Public Transport Efficiency Analysis IBM Cognos Phase-4

Development part-2 using IBM Cognos for Visualization

Introduction:

Analyzing public transport efficiency with IBM Cognos involves utilizing its robust business intelligence and data analytics capabilities to gain valuable insights from the data collected. Here's a step-by-step guide on how to perform a public transport efficiency analysis using IBM Cognos.

1. Data Collection and Integration:

Data Sources: Gather data from various sources including ridership data, operational data, financial records, customer surveys, and external factors like weather and traffic conditions.

Data Integration: Use IBM Cognos Data Manager to integrate data from different sources, ensuring it's clean, consistent, and ready for analysis.

2. Data Modeling:

Create Data Models: Use IBM Cognos Framework Manager to create data models that represent the integrated data. Define relationships, calculations, and business rules to prepare the data for analysis.

3. Report and Dashboard Creation:

Interactive Reports: Build interactive reports using IBM Cognos Report Studio to visualize key performance indicators (KPIs) such as on-time performance, ridership trends, and cost per passenger.

Dashboards: Develop dynamic dashboards using IBM Cognos Workspace to provide a real-time overview of public transport metrics. Dashboards should

include widgets displaying KPIs, route performance, and customer satisfaction scores.

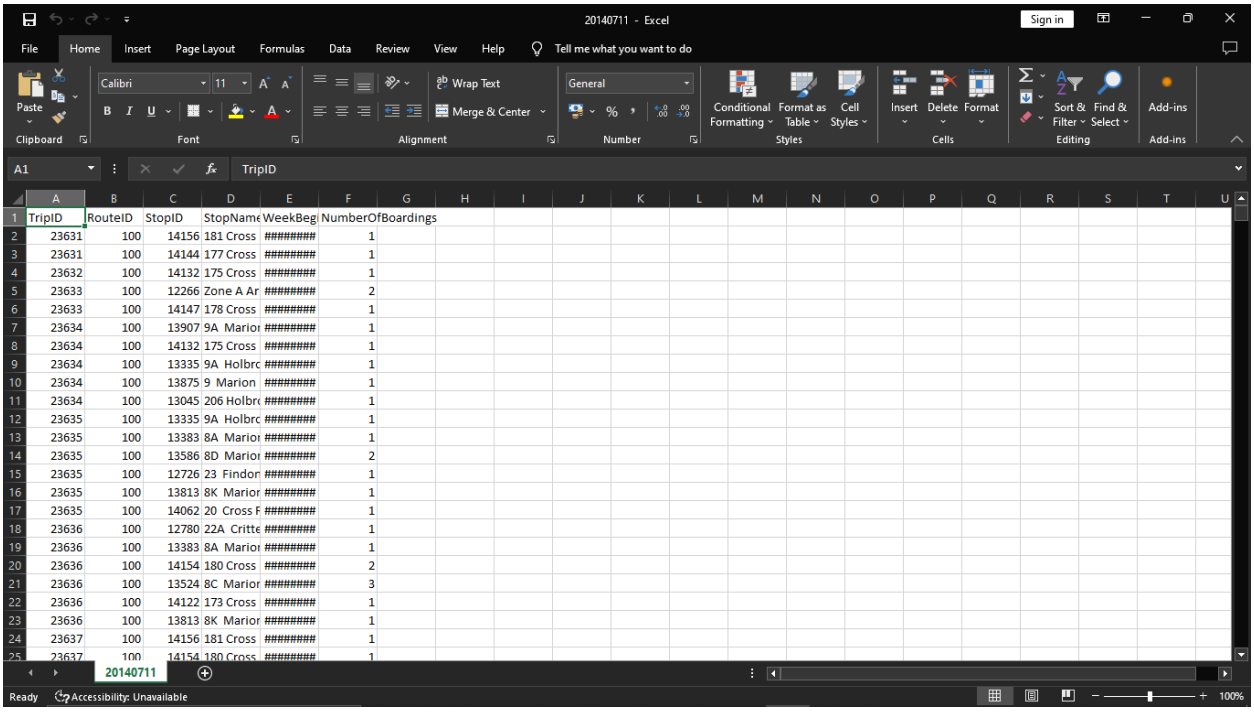
4. Data Analysis:

Ad-Hoc Analysis: Use IBM Cognos Analysis Studio for ad-hoc analysis. Explore data, identify patterns, and generate insights on the fly.

Predictive Analytics: Apply predictive modeling using IBM Cognos Statistics to forecast ridership trends and optimize routes and schedules.

DATASET:

Source: https://www.kaggle.com/datasets/rednivrug/unisys?select=20140711.CSV



The above dataset has: 1048553 Rows.

Development part-2 using IBM Cognos for visualization

Building a public transportation efficiency analysis using IBM Cognos for visualization involves several steps. In this process, you'll collect data, prepare it, create data models, and generate visualizations to analyse the efficiency of public transportation services. Here's a step-by-step guide:

Step 1: Define Your Objectives Clearly define the objectives of your analysis. Determine what aspects of public transportation efficiency you want to measure and improve, such as on-time performance, ridership, cost-effectiveness, or route optimization.

Step 2: Data Collection and Integration Collect relevant data from various sources, including historical transportation records, scheduling information, geographic data, and real-time tracking systems. Ensure that the data is accurate, complete, and up-to-date. IBM Cognos can connect to various data sources, including databases, spreadsheets, and APIs, to import and integrate data.

Step 3: Data Preparation Clean, transform, and shape your data to make it suitable for analysis. This involves handling missing data, removing duplicates, and converting data types. IBM Cognos provides data preparation tools to assist with this.

Step 4: Create Data Models Design data models that represent the relationships between different data elements. You can use IBM Cognos Framework Manager or the Data Modules feature to create data models that are optimized for performance and user-friendliness.

Step 5: Report and Dashboard Creation Now, it's time to build reports and dashboards in IBM Cognos. Here's how:

a. Create a New Report or Dashboard: Start by creating a new report or dashboard in IBM Cognos.

b. Select Data Sources: Connect your report or dashboard to the data models you've created.

c. Choose Visualization Types: Decide on the type of visualizations you want to use. This could include bar charts, line graphs, maps, and tables. IBM Cognos offers a variety of visualization options.

d. Build Visualizations: Design and customize your visualizations. For example, you can create a bar chart to display on-time performance by route or a map showing stop locations and their average wait times.

e. Create Interactivity: Add interactive elements to your dashboard, such as filters, drill-through capabilities, and parameters that allow users to interact with the data.

Step 6: Data Analysis and Insights Use the visualizations in your report or dashboard to analyze the efficiency of public transportation. Identify trends, outliers, and areas for improvement. For example, you can track the most and least efficient routes, analyze peak hours, or evaluate the impact of schedule changes.

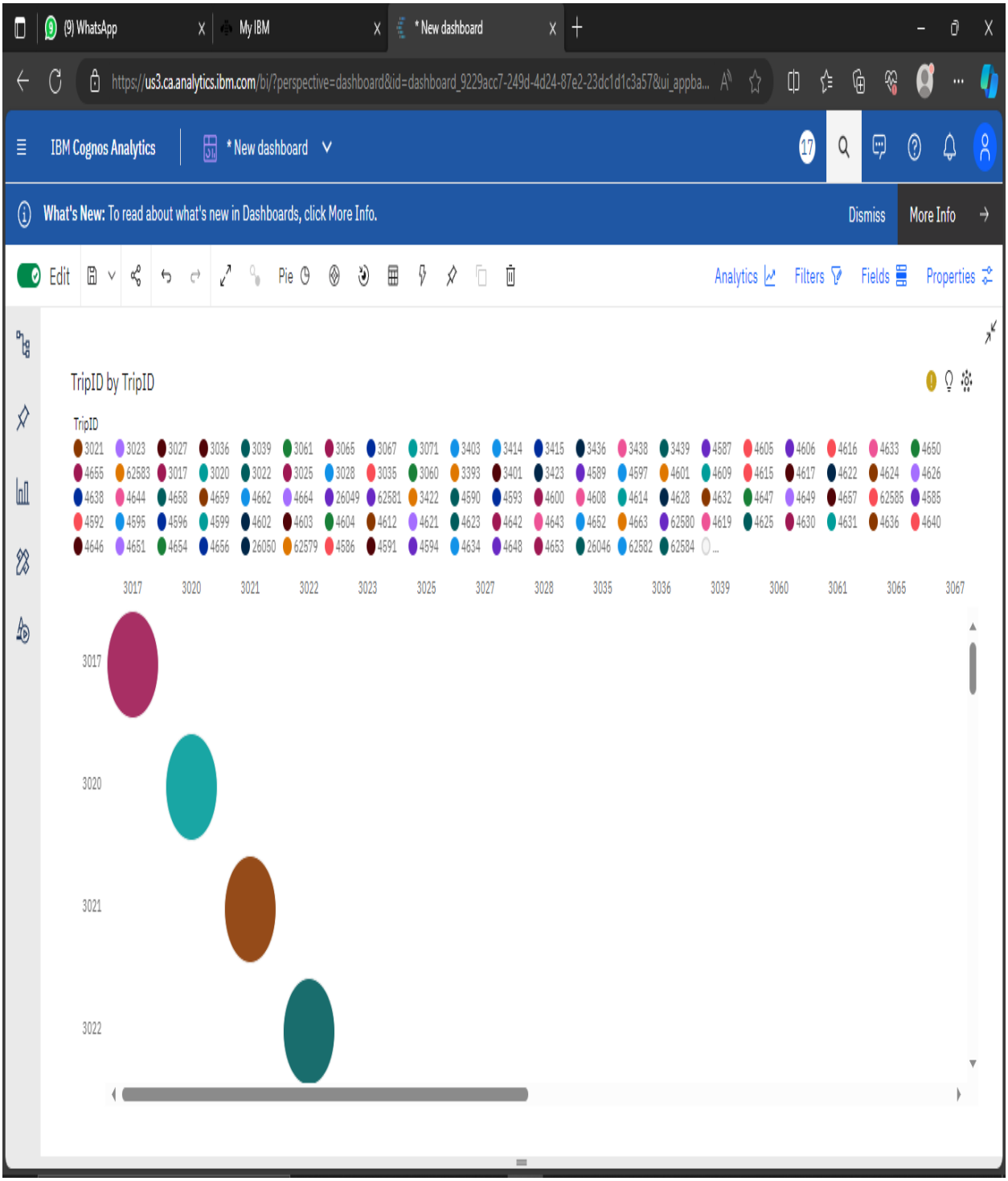
Step 7: Sharing and Collaboration IBM Cognos allows you to share your reports and dashboards with relevant stakeholders. Collaborate with decision-makers, transportation authorities, and analysts to ensure that the insights are used for making informed decisions.

Step 8: Schedule and Automation Set up schedules or triggers for your reports and dashboards to be automatically updated and shared at regular intervals. This ensures that your analysis remains up-to-date.

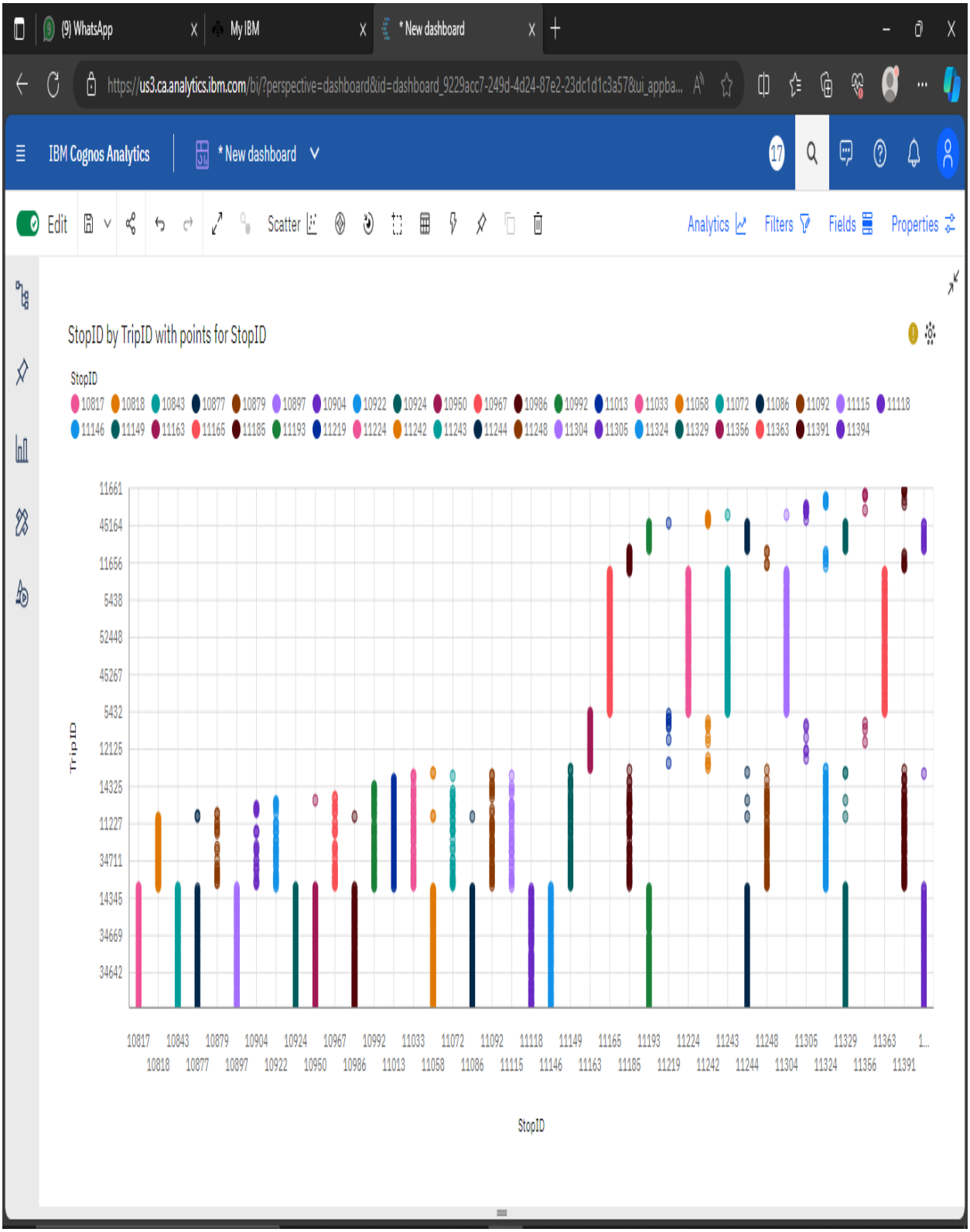
Step 9: Monitor and Iterate Continuously monitor the performance of public transportation and gather user feedback. Use this information to refine your reports and dashboards, making them more insightful and valuable.

By following these steps, you can use IBM Cognos to create an efficient and insightful analysis of public transportation. It helps decision-makers optimize transportation services and improve the overall efficiency of the system.

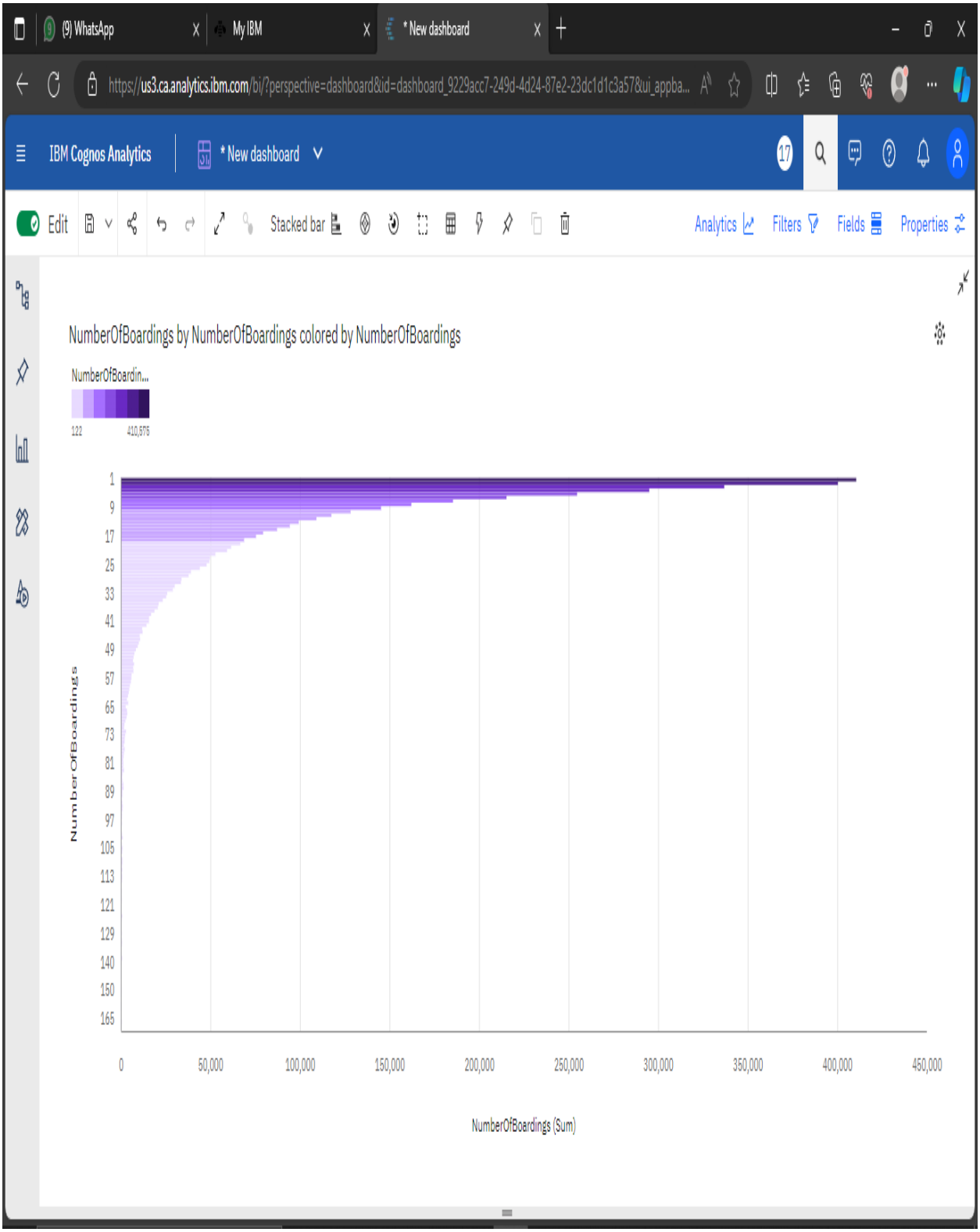
Trip ID:


(9) WhatsApp
My IBM
* New dashboard
https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&id=dashboard_9229acc7-249d-4d24-87e2-23dc1d1c3a57&ui_appba...
IBM Cognos Analytics
* New dashboard
What's New: To read about what's new in Dashboards, click More Info.
Dismiss
More Info
Edit
Pie
Analytics
Filters
Fields
Properties
TripID by TripID
TripID
3021 3023 3027 3036 3039 3061 3065 3067 3071 3403 3414 3415 3436 3438 3439 4587 4605 4606 4616 4633 4650
4655 62583 3017 3020 3022 3025 3028 3035 3060 3393 3401 3423 4589 4597 4601 4609 4615 4617 4622 4624 4626
4638 4644 4658 4659 4662 4664 26049 62581 3422 4590 4593 4600 4608 4614 4628 4632 4647 4649 4657 62585 4585
4592 4595 4596 4599 4602 4603 4604 4612 4621 4623 4642 4643 4652 4663 62580 4619 4625 4630 4631 4636 4640
4646 4651 4654 4656 26050 62579 4586 4591 4594 4634 4648 4653 26046 62582 62584
3017 3020 3021 3022 3023 3025 3027 3028 3035 3036 3039 3060 3061 3065 3067
3017
3020
3021
3022

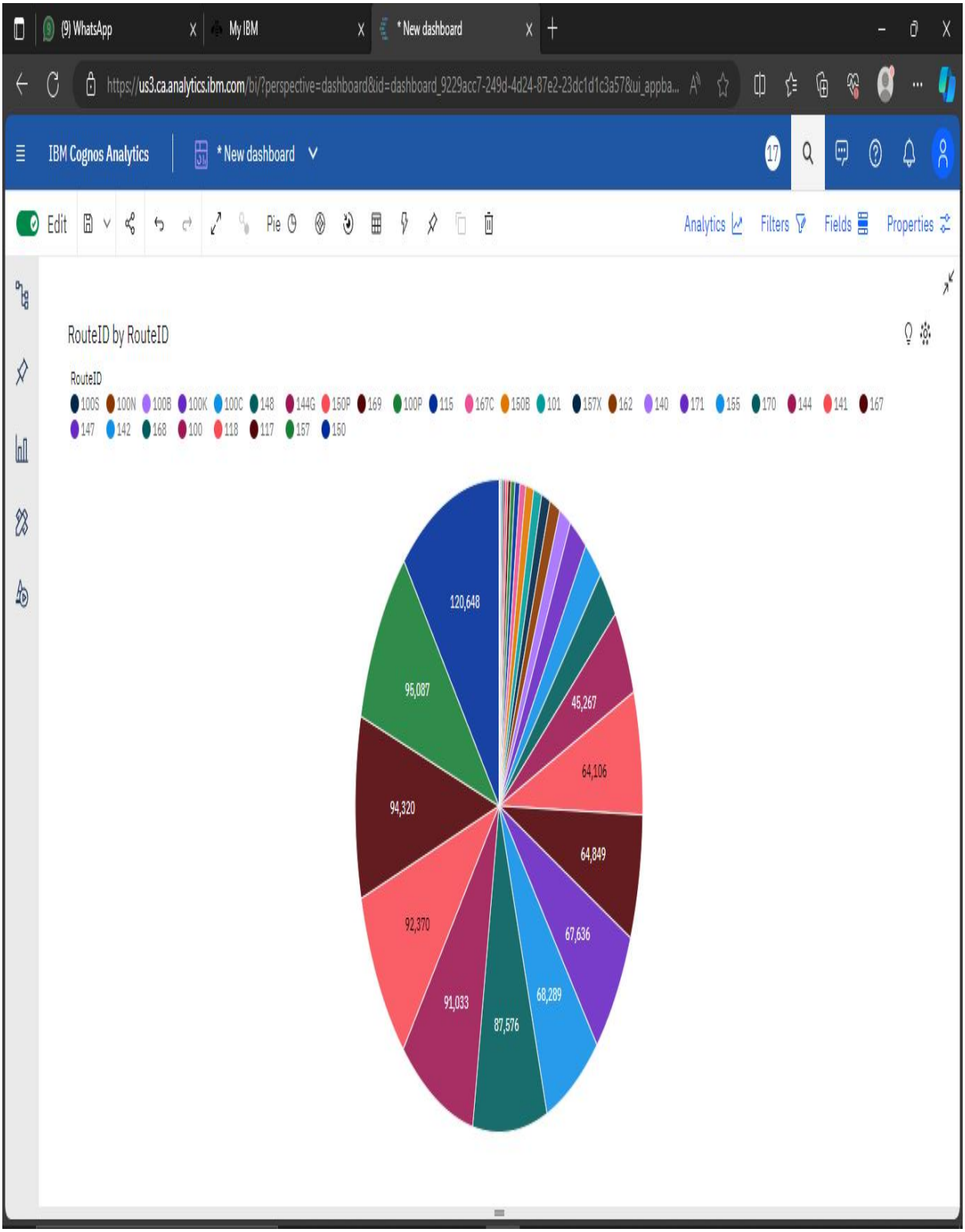
Stop ID:


(9) WhatsApp
My IBM
* New dashboard
https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&id=dashboard_9229acc7-249d-4d24-87e2-23dc1d1c3a57&ui_appba...
IBM Cognos Analytics
* New dashboard
Edit
Scatter
Analytics
Filters
Fields
Properties
StopID by TripID with points for StopID
StopID
10817 10818 10843 10877 10879 10897 10904 10922 10924 10950 10967 10986 10992 11013 11033 11058 11072 11086 11092 11115 11118
11146 11149 11163 11165 11185 11193 11219 11224 11242 11243 11244 11248 11304 11305 11324 11329 11356 11363 11391 11394
TripID
11661
45164
11656
5438
52448
45267
5432
12125
14325
11227
34711
14345
34669
34642
10817 10843 10879 10904 10924 10967 10992 11033 11072 11092 11118 11149 11165 11193 11224 11243 11248 11305 11329 11363 1...
10818 10877 10897 10922 10950 10986 11013 11058 11086 11115 11146 11163 11185 11219 11242 11244 11304 11324 11356 11391
StopID

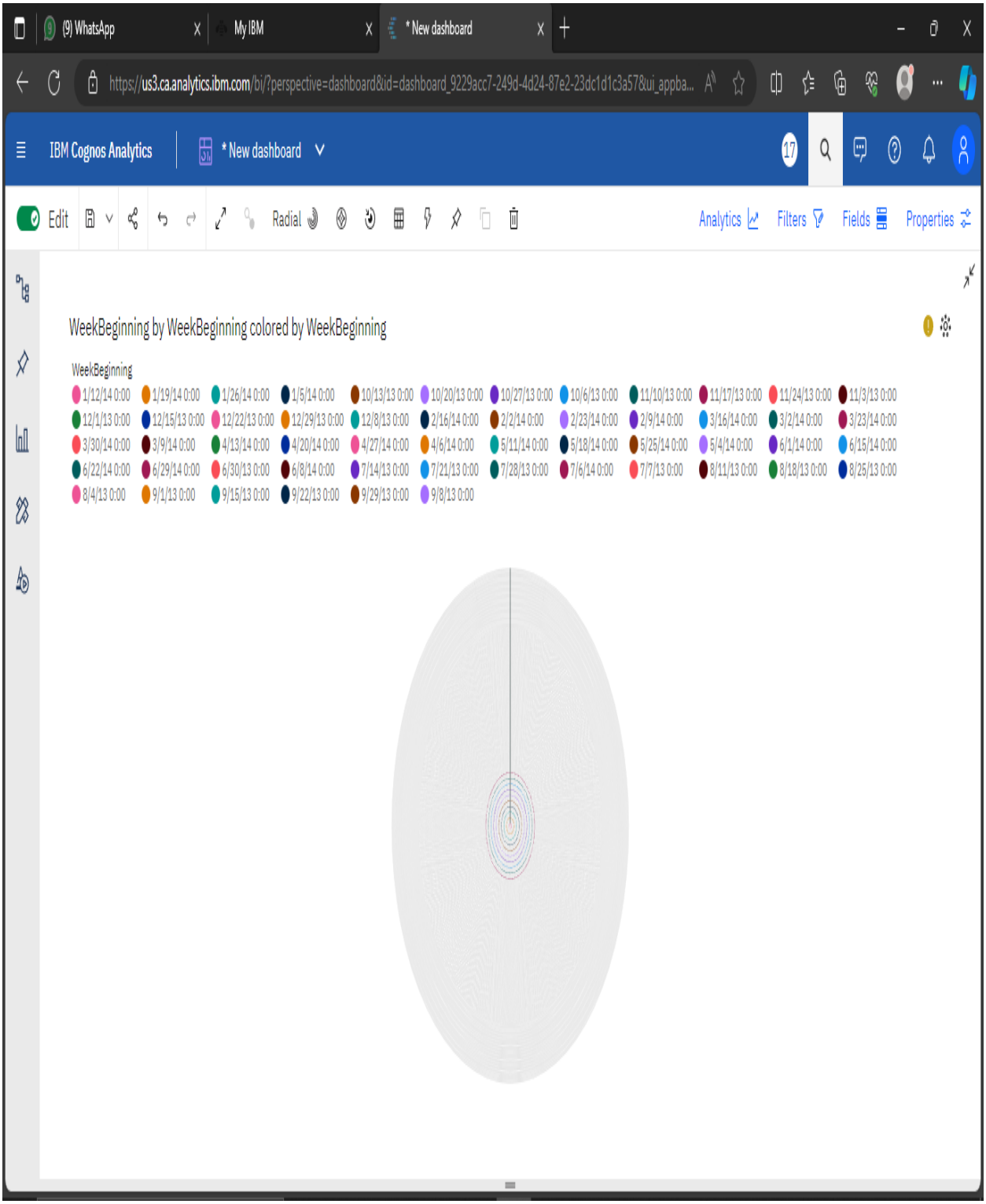
Number of boardings:



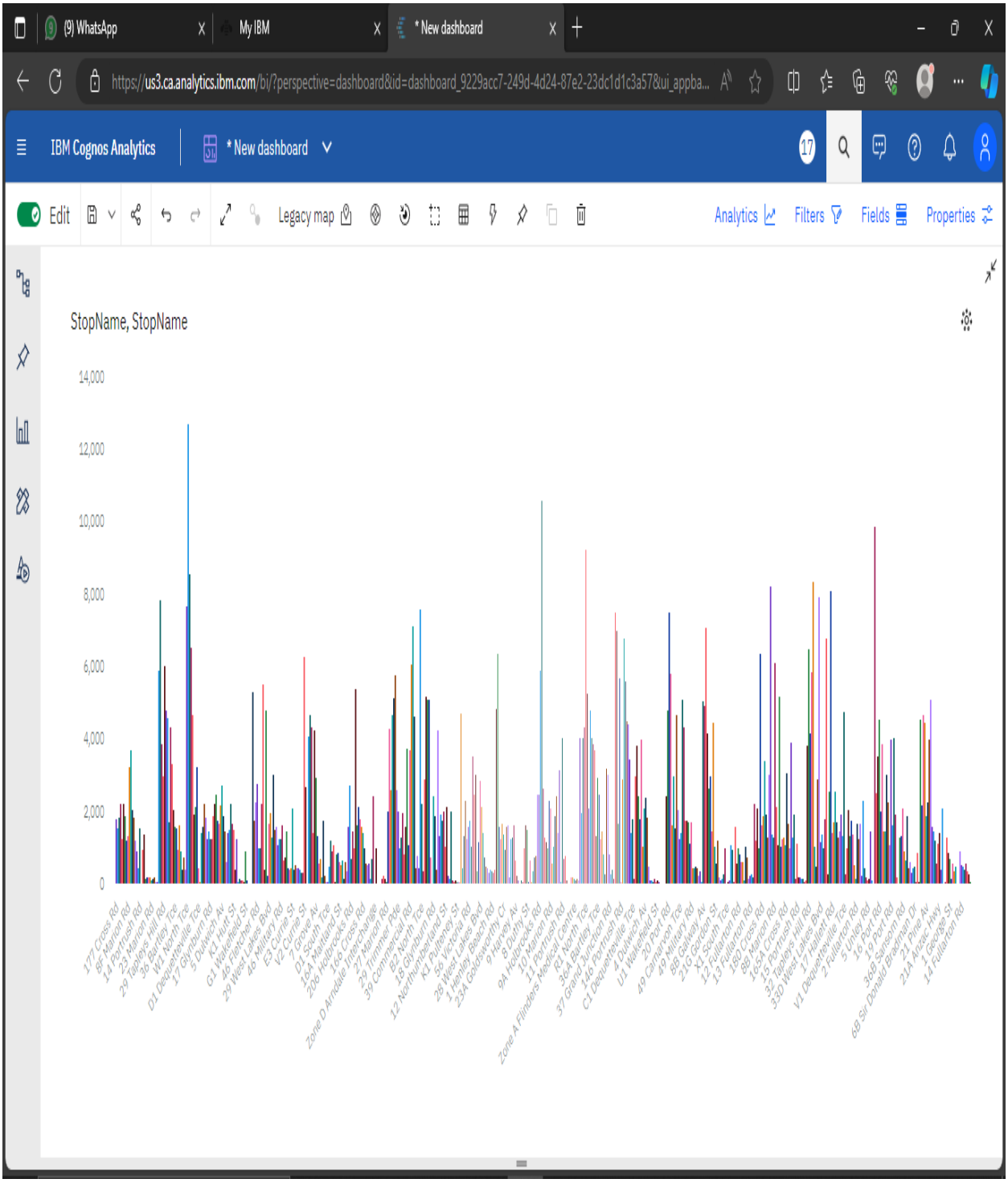
Route ID:


(9) WhatsApp
My IBM
* New dashboard
https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&id=dashboard_9229acc7-249d-4d24-87e2-23dc1d1c3a578ui_appba...
IBM Cognos Analytics
* New dashboard
Edit
Pie
Analytics
Filters
Fields
Properties
RouteID by RouteID
RouteID
100S 100N 100B 100K 100C 148 144G 150P 169 100P 115 167C 150B 101 157X 162 140 171 155 170 144 141 167
147 142 168 100 118 117 157 150
120,648
95,087
94,320
92,370
91,033
87,576
68,289
67,636
64,849
64,106
45,267

Week Beginning:



Stop Names:

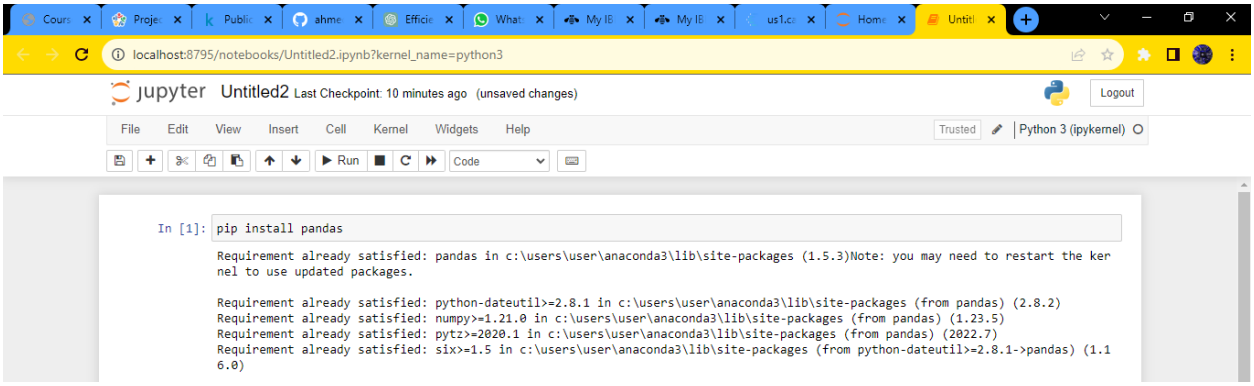

(9) WhatsApp
My IBM
* New dashboard
https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&id=dashboard_9229acc7-249d-4d24-87e2-23dc1d1c3a57&ui_appba...
IBM Cognos Analytics
* New dashboard
Edit
Legacy map
Analytics
Filters
Fields
Properties
StopName, StopName
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0

Python Integration

Objective:

In this notebook, We have explored how people are travelling from different stops in Adelaide Metropolitan area and managing the buses on each route according to the no of passenger commuting through the buses.

1. Installing pandas:

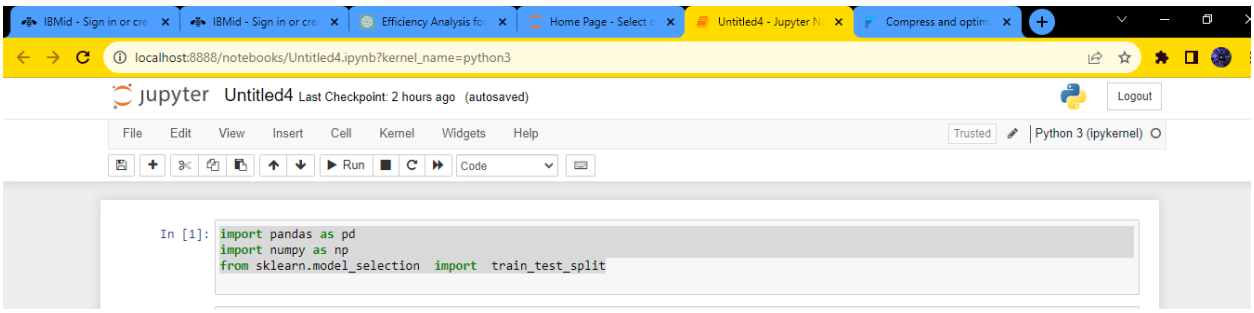


2. Importing Libraries:

import pandas as pd

import numpy as np

from sklearn.model_selection import train_test_split



3. Reading the dataset:

import pandas as pd

Replace 'your_file.csv' with the actual path to your CSV file.

```
file_path = 'C:/Project_dataset.csv'


# Read the CSV file using pandas
try:
    df = pd.read_csv(file_path)


    # Display the first few rows of the dataframe
    print("First few rows of the CSV file:")
    print(df.head())
except FileNotFoundError:
    print(f"File not found at {file_path}. Please provide a valid file path.")
except Exception as e:
    print(f"An error occurred: {e}")
```

```
In [3]: import pandas as pd

# Replace 'your_file.csv' with the actual path to your CSV file.
file_path = 'C:/Project_dataset.csv'

# Read the CSV file using pandas
try:
    df = pd.read_csv(file_path)

    # Display the first few rows of the dataframe
    print("First few rows of the CSV file:")
    print(df.head())
except FileNotFoundError:
    print(f"File not found at {file_path}. Please provide a valid file path.")
except Exception as e:
    print(f"An error occurred: {e}")
```

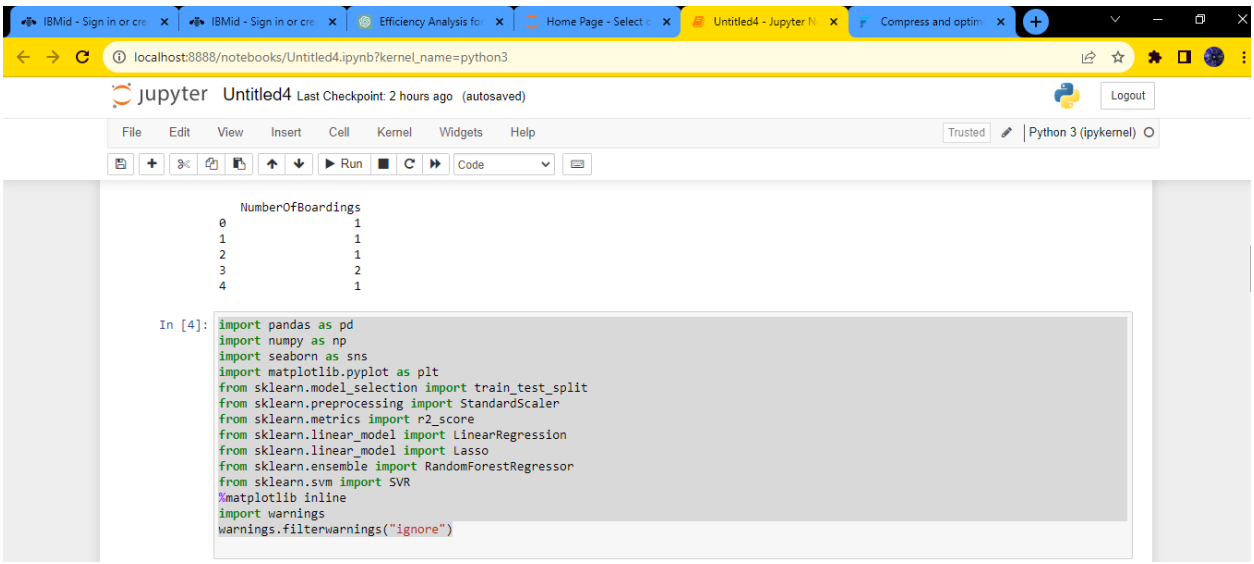
Output:

```
C:\Users\User\AppData\Local\Temp\ipykernel_3484\2929465056.py:8: DtypeWarning: Columns (1) have mixed types. Specify dtype opti
on on import or set low_memory=False.
  df = pd.read_csv(file_path)
First few rows of the CSV file:
   TripID RouteID  StopID                   StopName       WeekBeginning  \
0   23631     100   14156               181 Cross Rd  2013-06-30 00:00:00
1   23631     100   14144               177 Cross Rd  2013-06-30 00:00:00
2   23632     100   14132               175 Cross Rd  2013-06-30 00:00:00
3   23633     100   12266  Zone A Arndale Interchange  2013-06-30 00:00:00
4   23633     100   14147               178 Cross Rd  2013-06-30 00:00:00

   NumberOfBoardings
0                  1
1                  1
2                  1
3                  2
4                  1
```

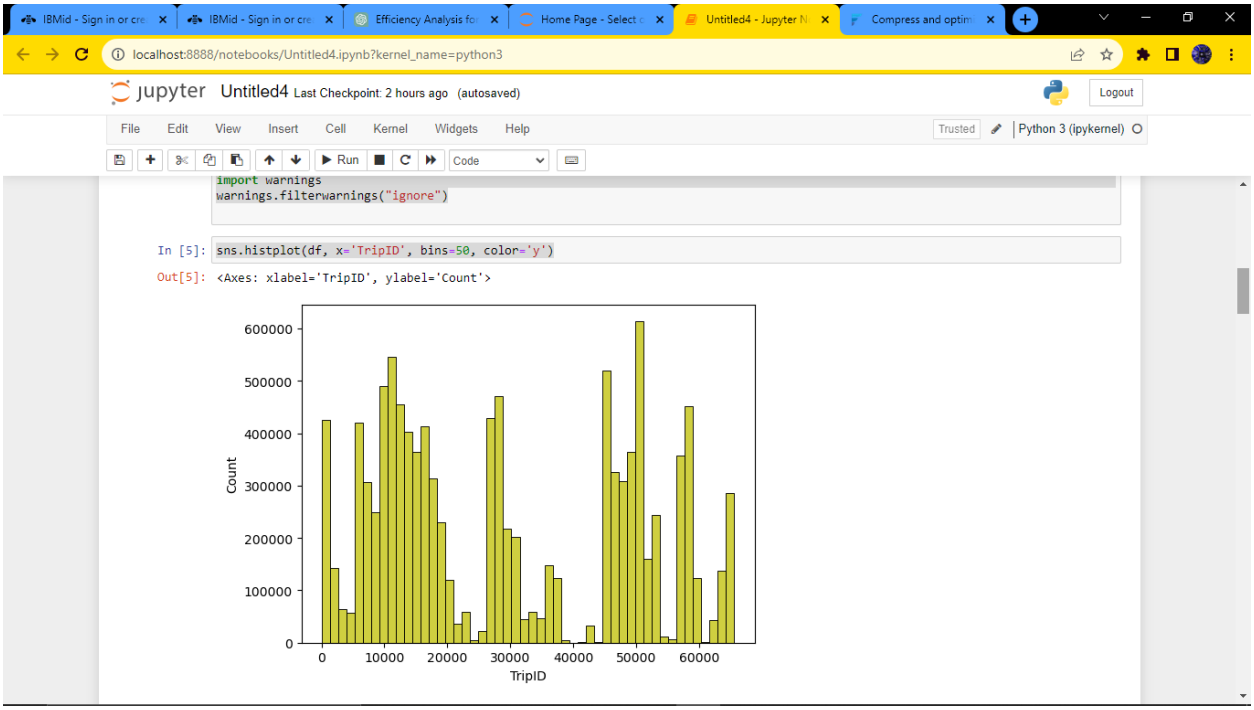
4. Loading the dataset:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import r2_score
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import Lasso
from sklearn.ensemble import RandomForestRegressor
from sklearn.svm import SVR
%matplotlib inline
import warnings
warnings.filterwarnings("ignore")
```



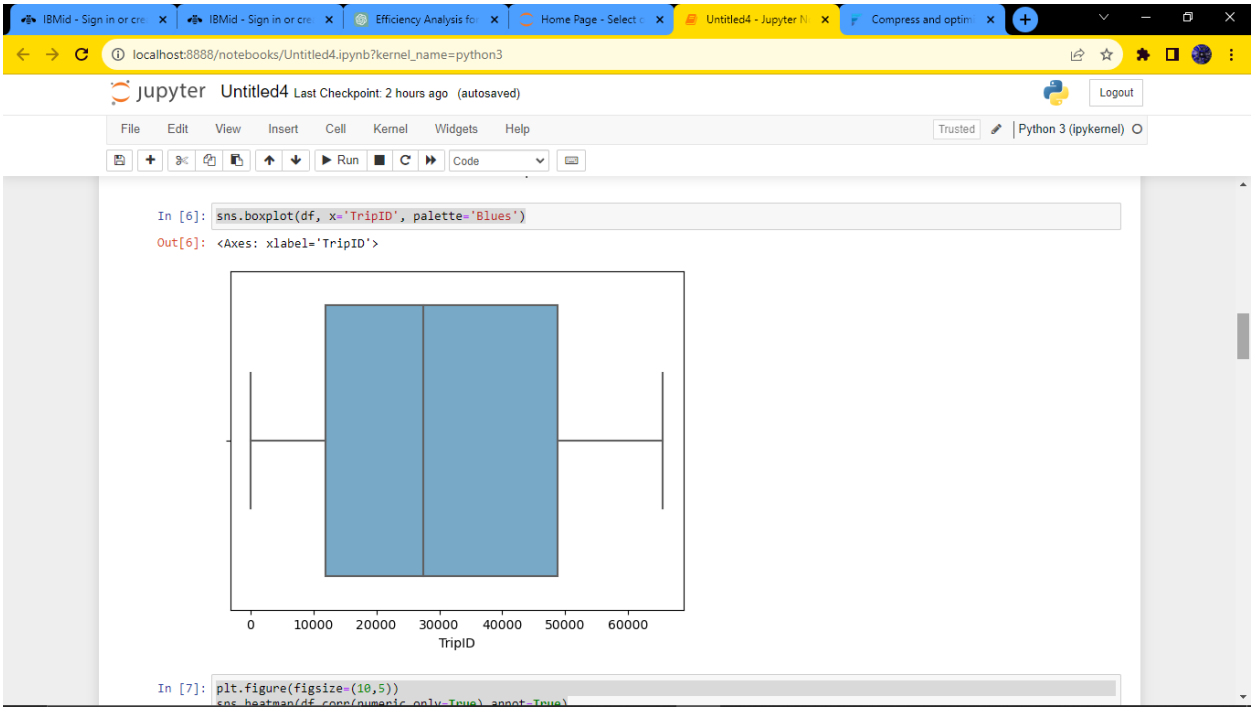
5. Bar chart:

sns.histplot(df, x='TripID', bins=50, color='y')



6. Boxplot:

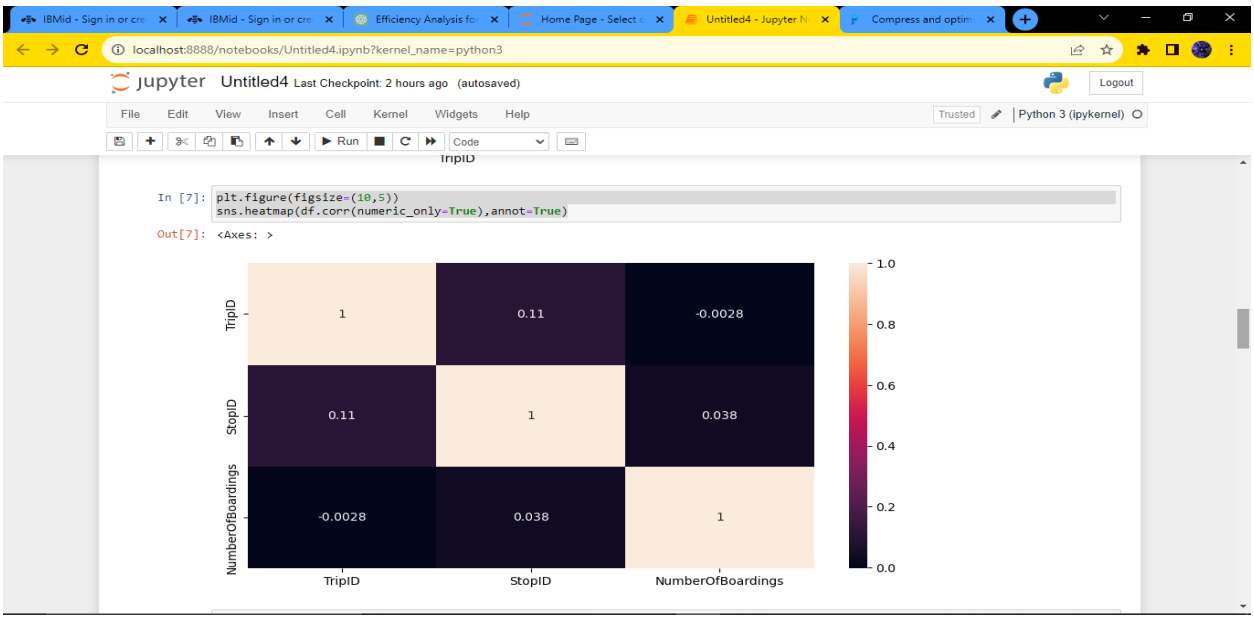
sns.boxplot(df, x='TripID', palette='Blues')



7. Heatmap:

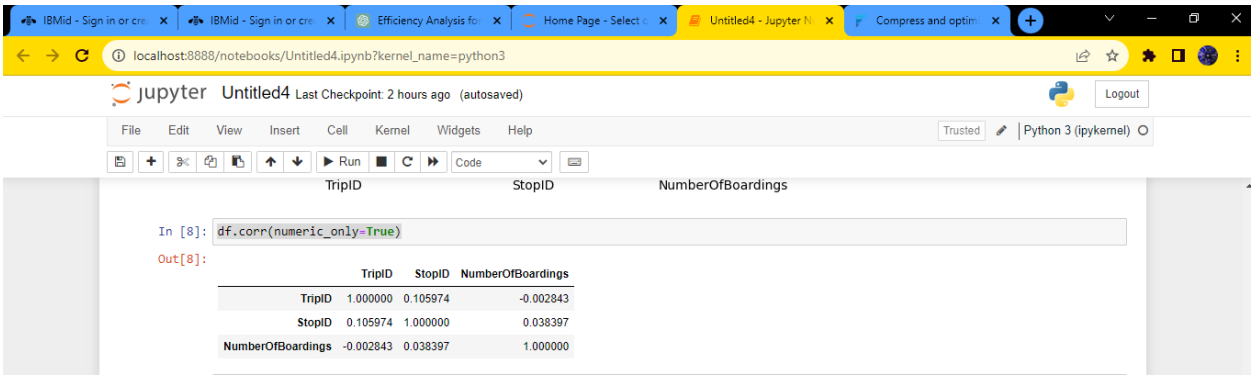
plt.figure(figsize=(10,5))

sns.heatmap(df.corr(numeric_only=True),annot=True)



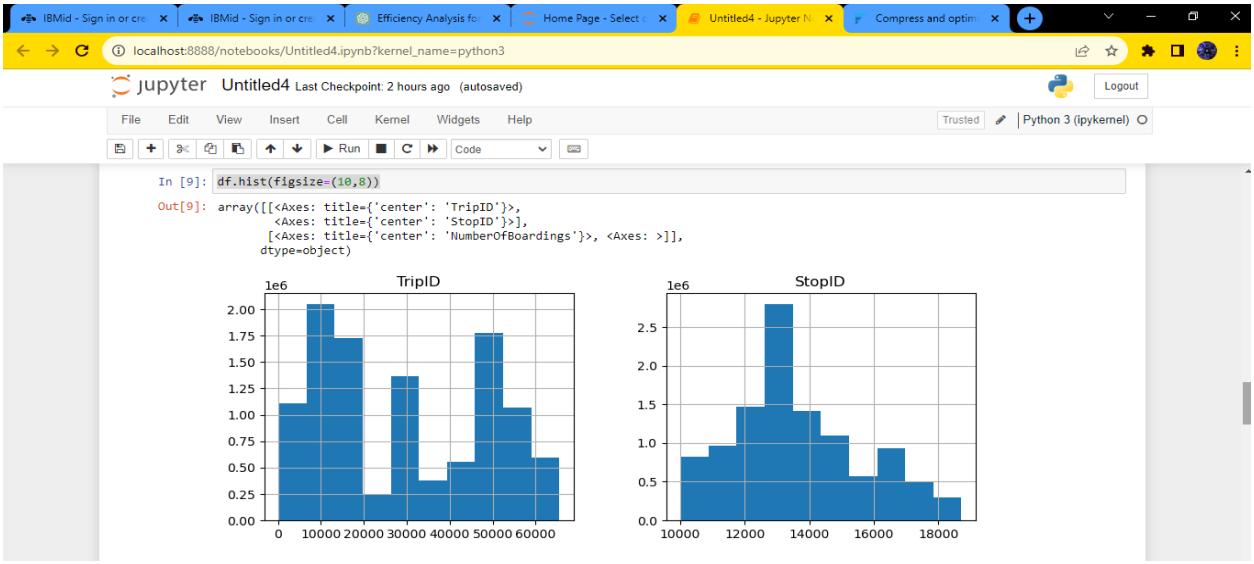
8. Correlation:

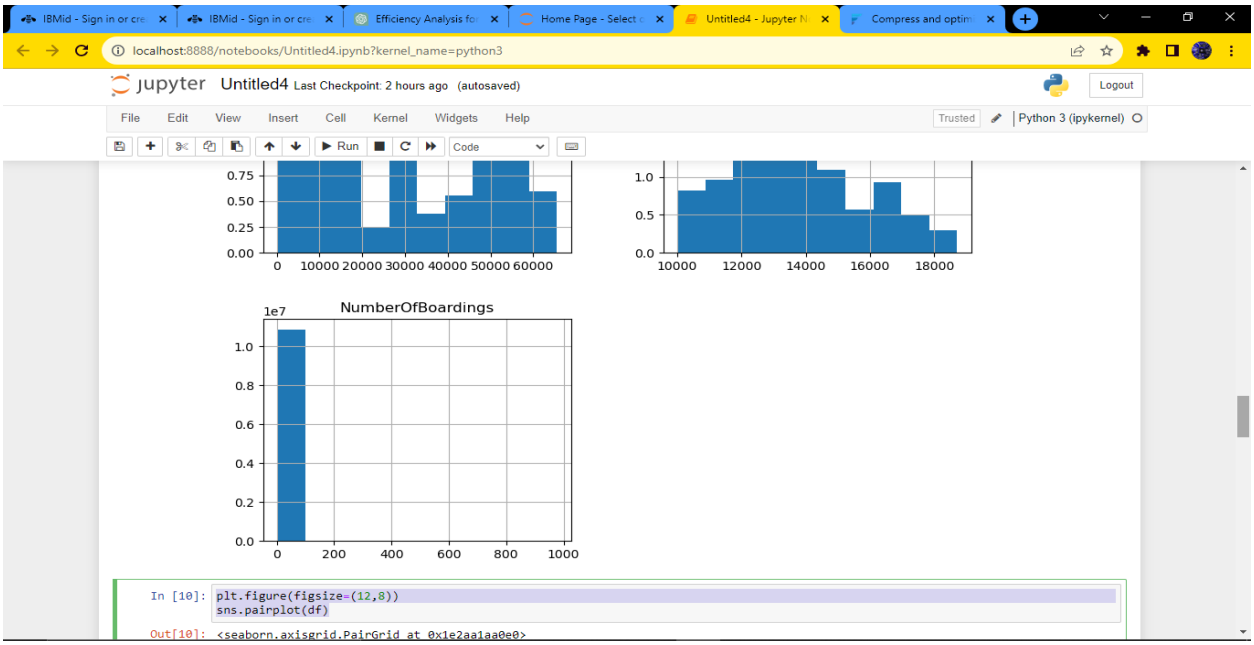
df.corr(numeric_only=True)



9. Histogram:

df.hist(figsize=(10,8))

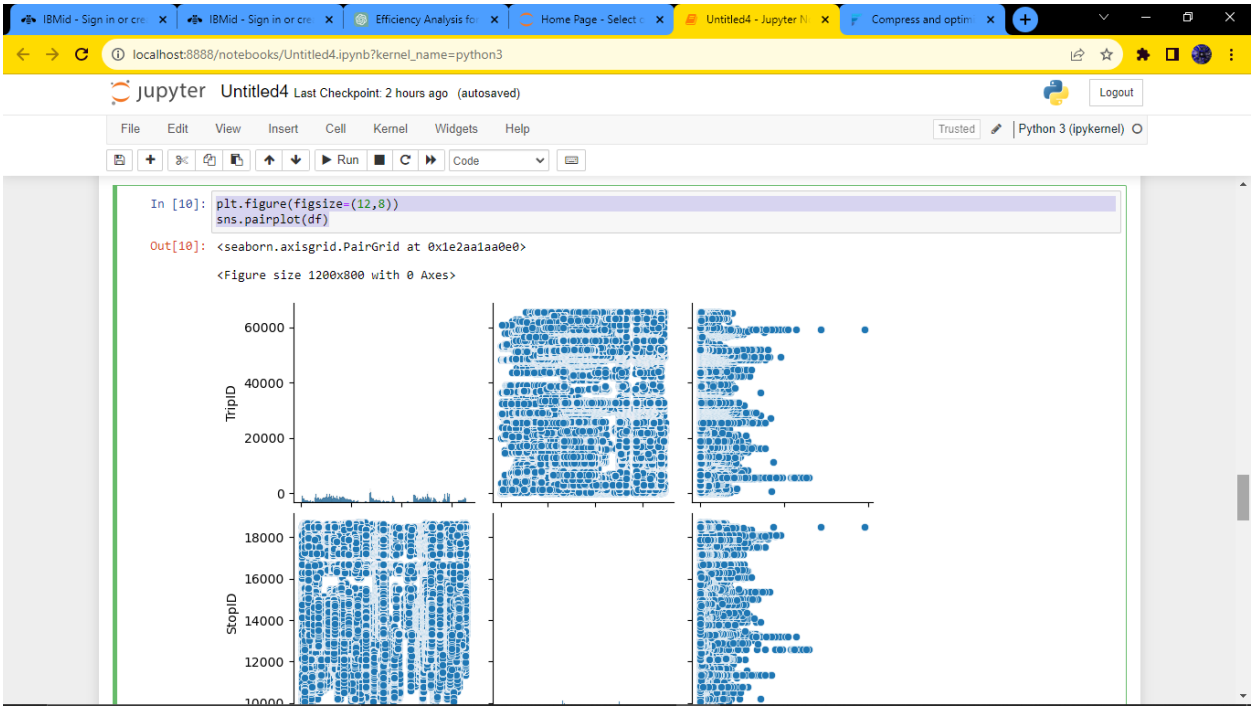


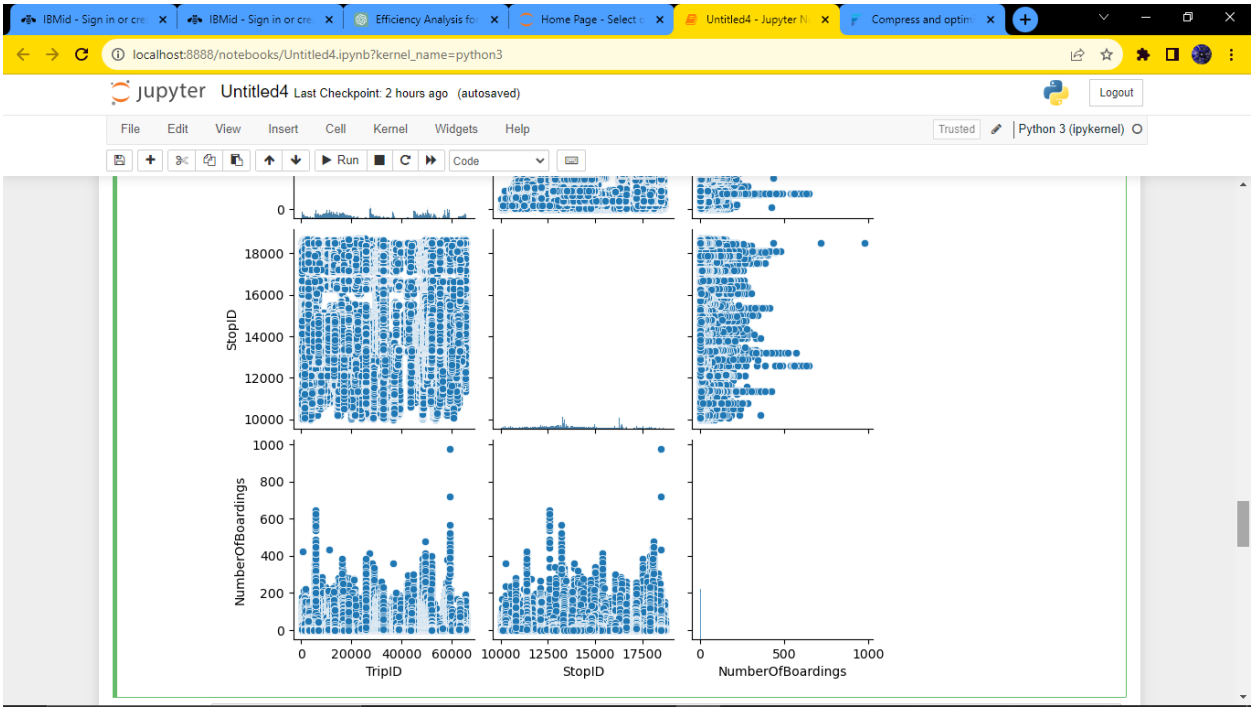


10. Pair plot:

plt.figure(figsize=(12,8))

sns.pairplot(df)





Conclusion:

In conclusion, the use of IBM Cognos for visualization in the public transportation efficiency analysis project has brought about positive changes, leading to more efficient and user-friendly services, better decision-making, and improved sustainability.