



DATA DAY OUT

The Complex Made Easy

Advance Analytics with Tableau

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Tableau



DATA DAY OUT

“Hiding within those mounds of data is knowledge that could *change the life* of a patient, or *change the world.*”

Atul Butte – Data Miner, MD, PhD (Pediatrics)
Stanford Medicine Magazine

Session Goals

- Getting started on complex use cases in a simpler way
- How everyone can start their analytics journey
- Introduce Tableau's external analytics integration





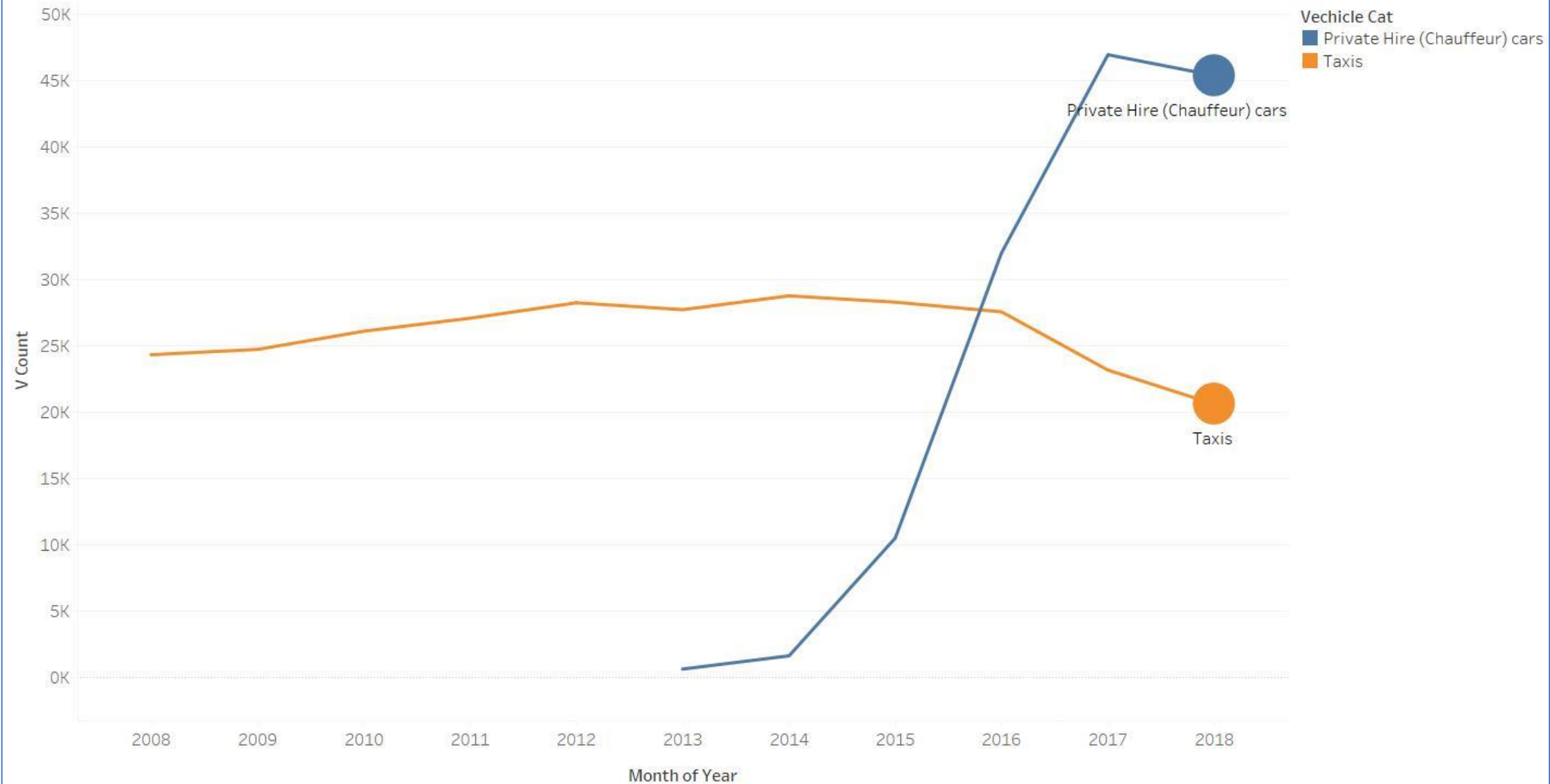
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Data Patterns

Motion Charts



Taxis VS Private Hire - January 2018



Pages

YEAR(Year)

YEAR(Year)

< 2008 >

Show history

Marks to show history for

Selected	Highlighted
Manual	All

Length

All Last: 5

Show

Marks Trails Both

Marks

Format: []

Fade: []

Trails

Format: None

https://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/FactsandFigures/MVP01-1_MVP_by_type.pdf

HDB Resale Data

4 ROOM

June 2019

Show histo..

Average Floor Area Sqm - June 2019

Average Resale Price - June 2019



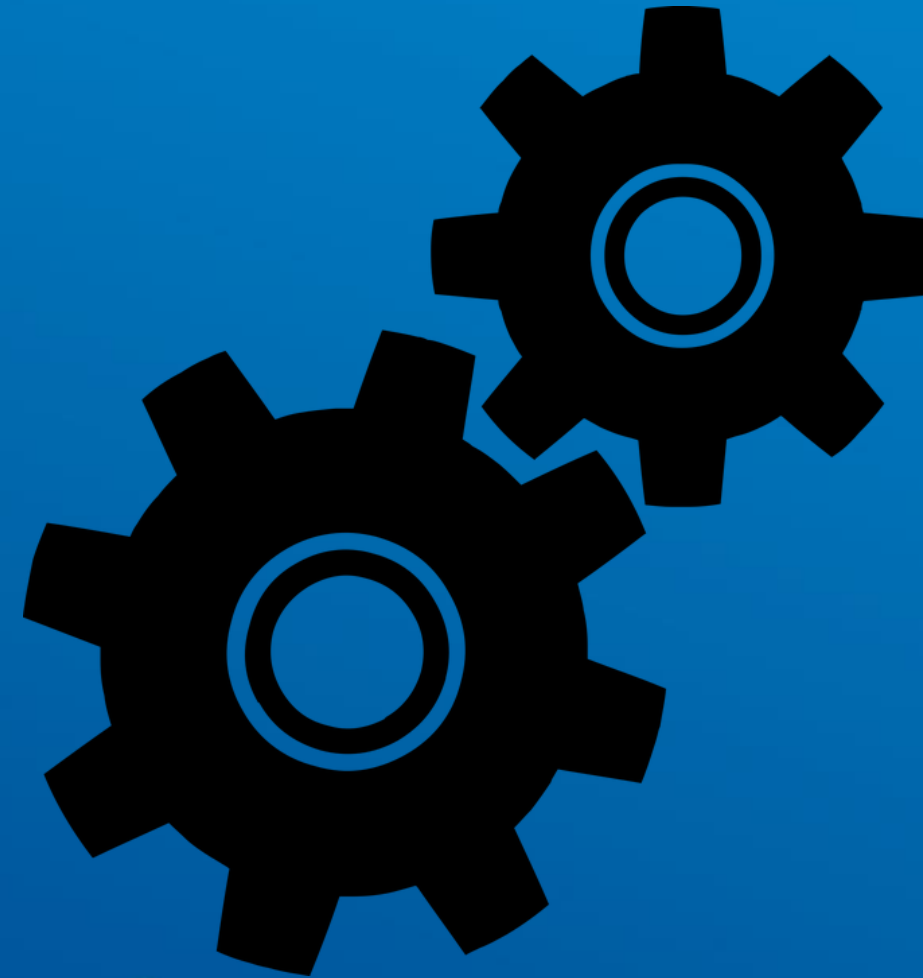
<https://data.gov.sg/dataset/resale-flat-prices>



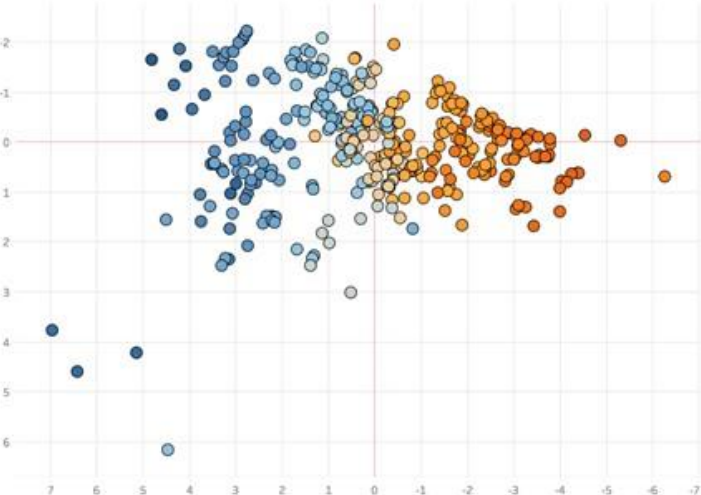
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Outlier Detection & Forecast

R / TabPy Integration



External Services Workflow



```
PCA Component 1 | Cars
```

Results are computed along Table (across)

```
SCRIPT_REAL("import pandas as pd
from sklearn.decomposition import PCA
from sklearn.preprocessing import StandardScaler

df = pd.DataFrame({'mpg':_arg1,'Cyl':_arg2,'Cost':_arg3,'EngSize':_arg4,'HP':_arg5,'Len':_arg6,'Width':_arg7})
scale = StandardScaler()
dat = scale.fit_transform(df)

n_comp = len(df.columns)
pca = PCA(n_components = n_comp)
comps = pca.fit_transform(dat)

return list(comps[:,_arg8[0]]"),
SUM([City MPG]),
SUM([Cyl]),
SUM([Dealer Cost]),
SUM([Engine Size]),
SUM([HP]), |
SUM([Len]),
SUM([Width]),
[Selected PCA Component 1])
```

The calculation is valid. 2 Dependencies. Default Table Calculation. Apply OK



Table Calculation Model Query

Compute Using

Table (across)
Cell

At the level

Restarting every



Connecting to an External Service

External Service Connection

Select an External Service

Rserve

Specify a server name and a port

Server: localhost Port: 4912

Sign in with a username and password

Username: admin

Password:

Require SSL

[Custom configuration file is specified \(click to change\)...](#)

Test Connection Cancel OK

- **Supported Connections**

- Rserve
- TabPy/MATLAB

- **Connection Information:**

- Specify Service Type
- Choose Host and Port

- **Security:**

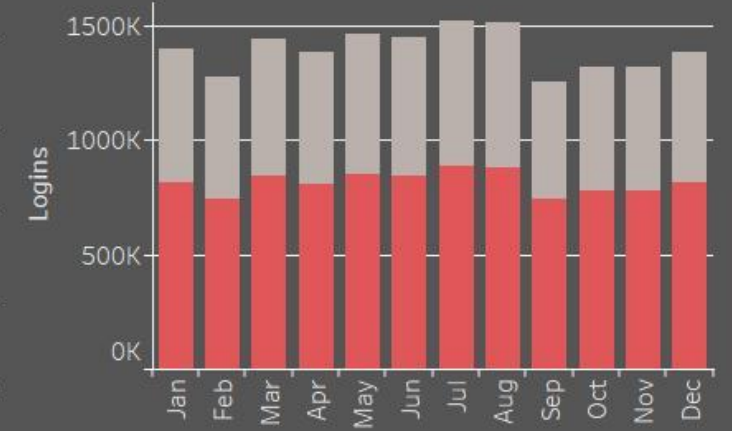
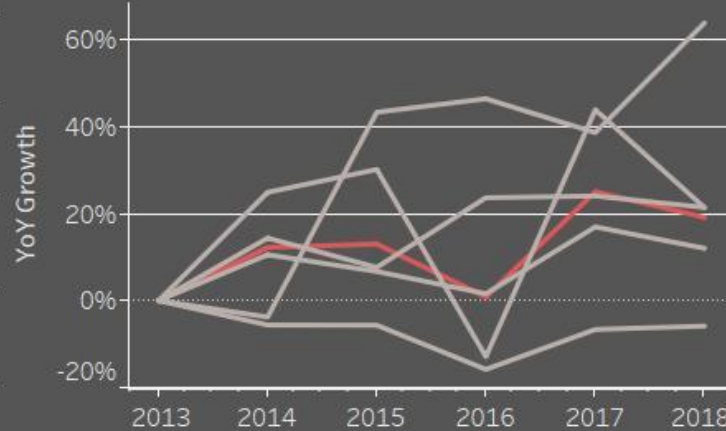
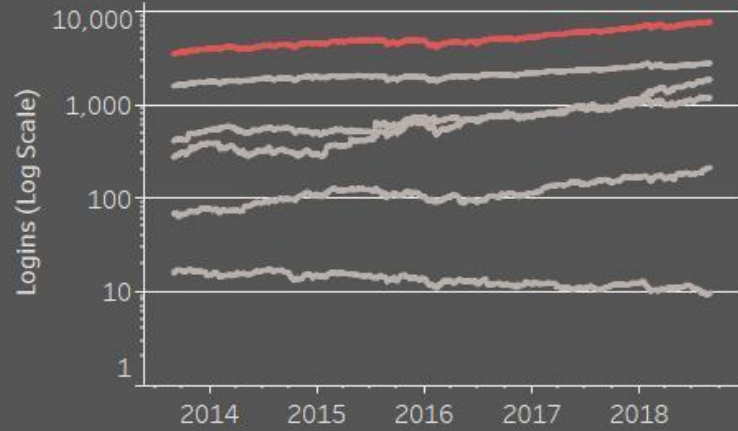
- Authenticate with Username/Password
- Set up encryption with SSL Cert

Dynamic Agency Demand Forecast With R

Periods to Forecast
180

Agency Name

- Agency 1
- Agency 2
- Agency 333
- Agency 4
- Agency 555
- Agency 6



Login Forecast - 180 Days Out



Outlier 1 2a Orders (Training Data) X

Results are computed along Table (across).

```
if SCRIPT_REAL(
  "library(mvoutlier);
  sign2(cbind(.arg1)$wfinal01",
  SUM([Selected Measure])) = 0
THEN 'Outlier' else 'Normal' end
```

The calculation is valid.

Outlier 3 2a Orders (Training Data) X

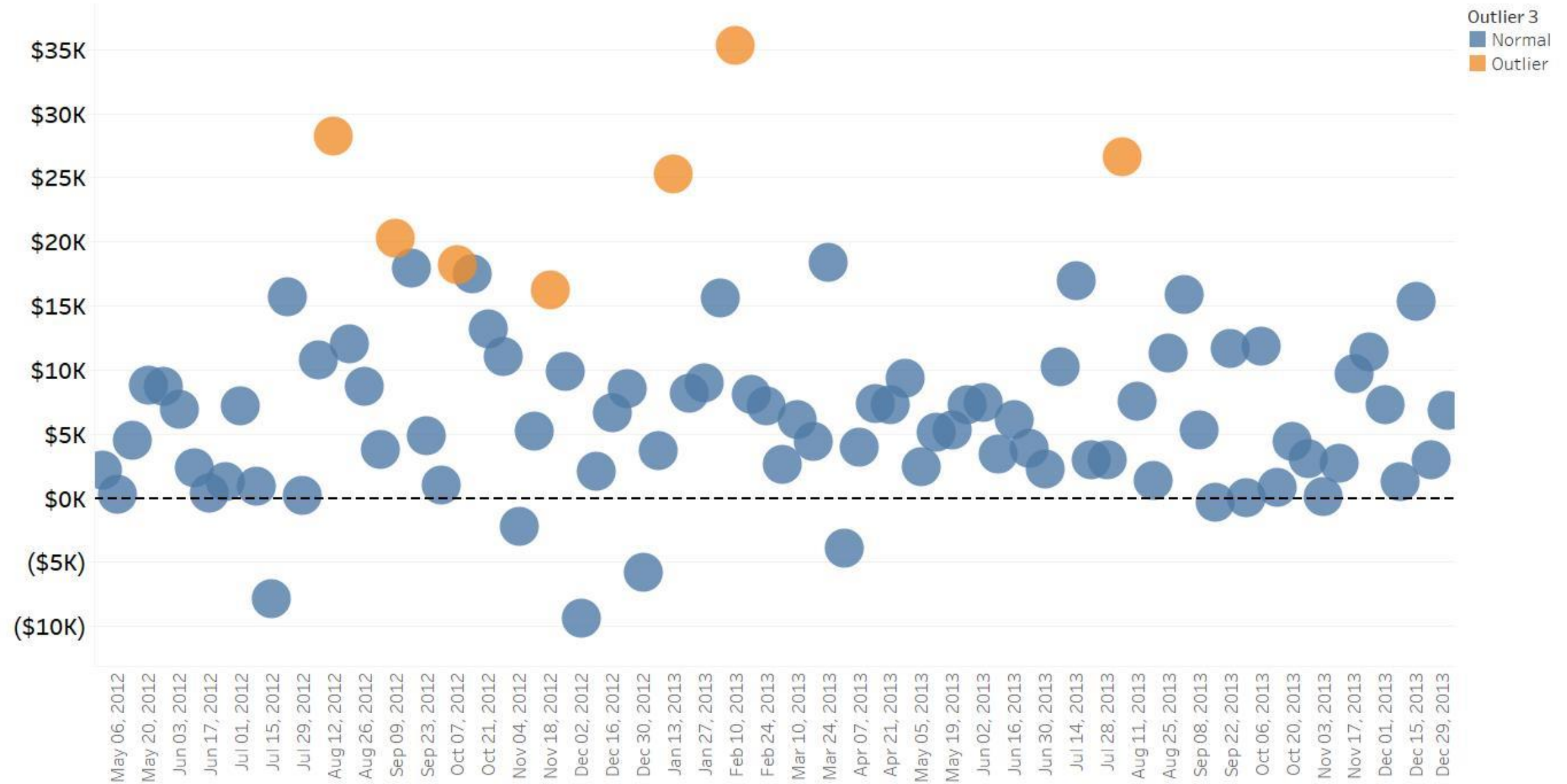
Results are computed along Table (across).

```
IF SCRIPT_REAL("
  library(pracma)
  a <- rep(1, length(.arg1))
  a[findpeaks(.arg1,threshold=quantile(.arg1,.arg2),sortstr=FALSE)[,2]]=0
  return(a)",
  sum([Selected Measure]),
  [What-If Gains Exceeds %]) = 0
THEN "Outlier"
ELSE "Normal"
END
```

The calculation is valid.

1 Dependency ▾ [Default Table Calculation](#)

Multivariate Outliers - What-If





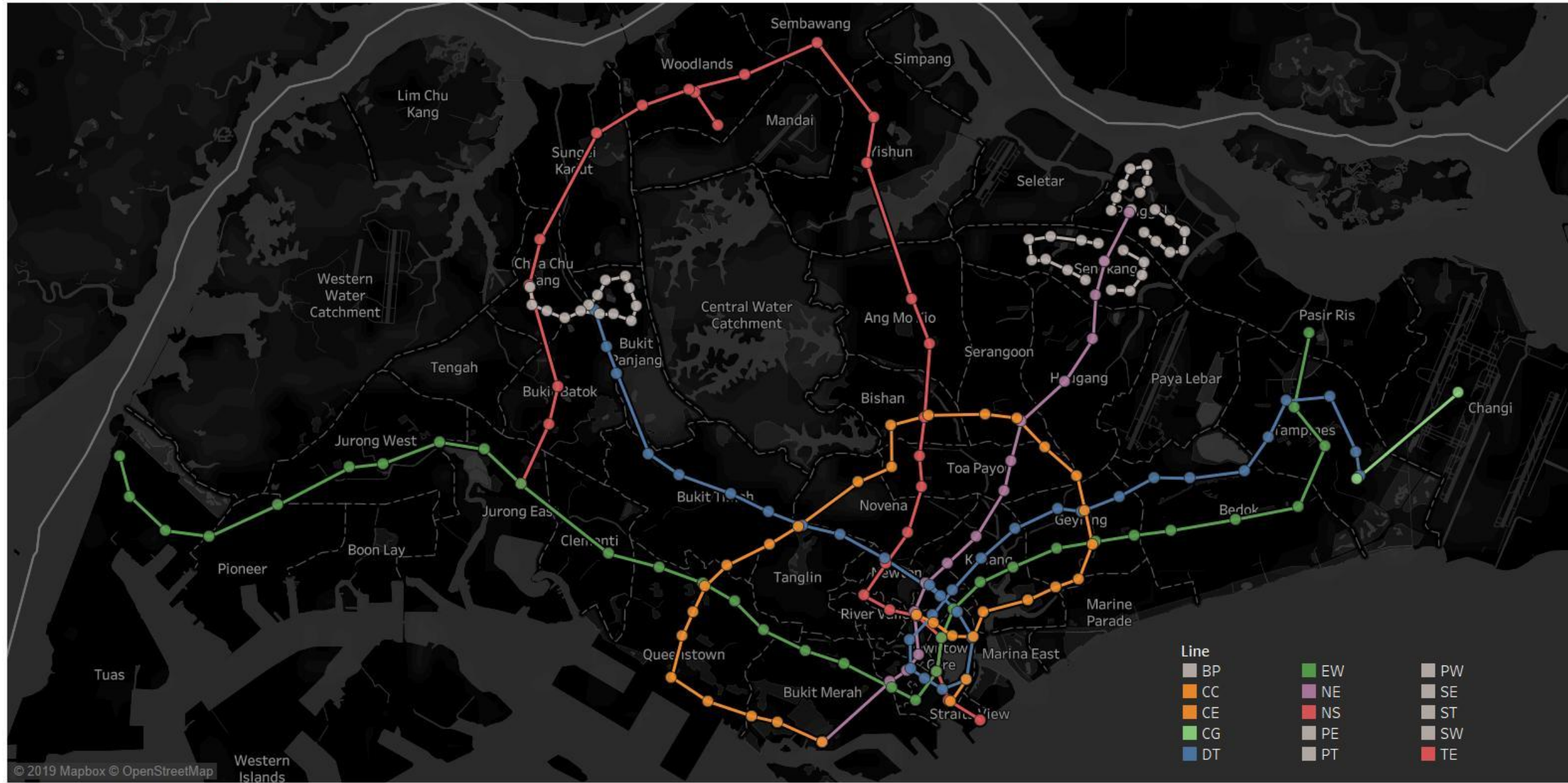
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Travel Routes & Network Maps

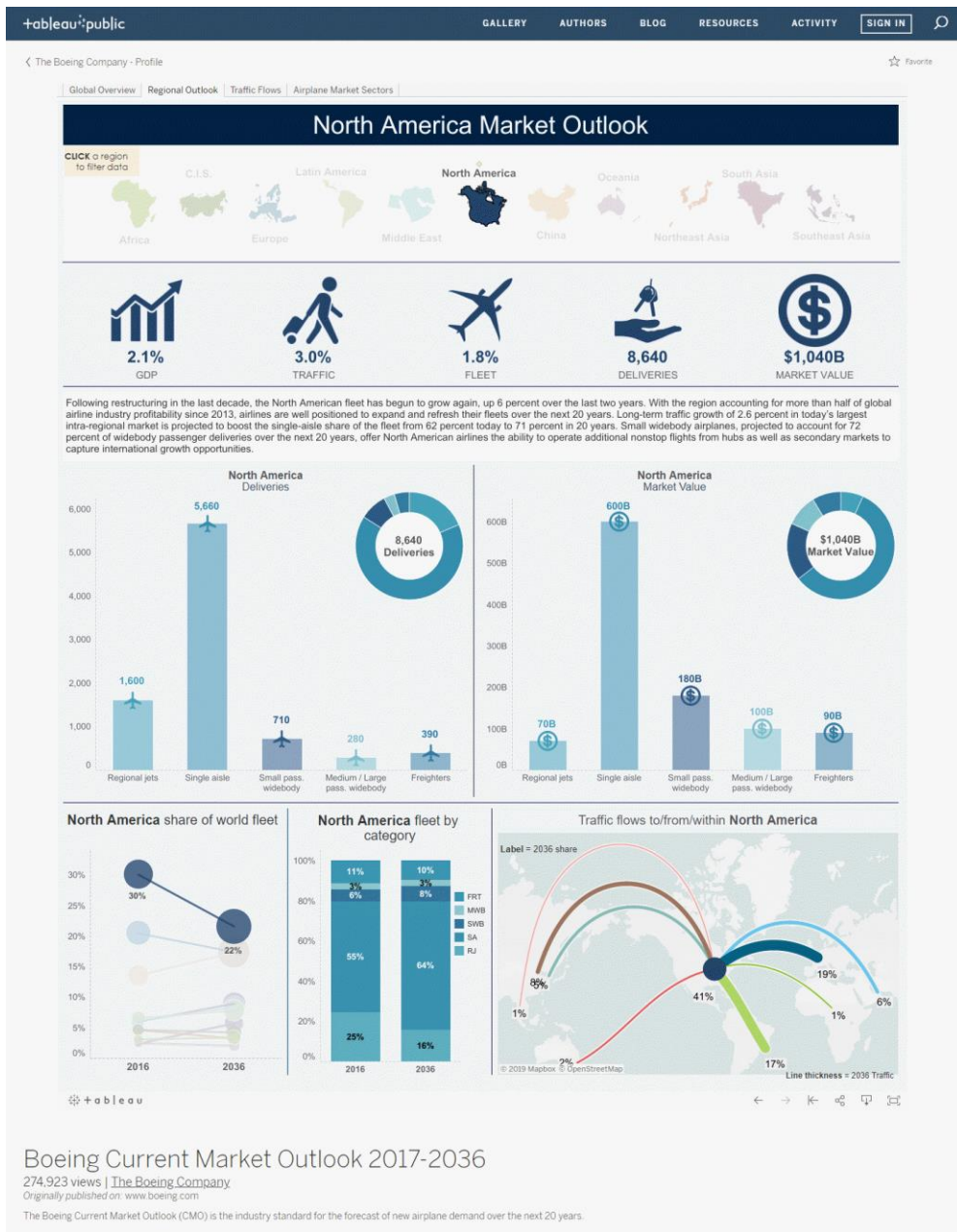
Including Geo-fencing



SMRT Network Map



<https://data.world/hxchua/train-stations-in-singapore#>



David Klein – Tableau Conference Europe

<https://public.tableau.com/en-us/gallery/tableau-conference-europe-2019-attendance-tracker?gallery=votd>

The Boeing Company (originally published on www.boeing.com)

https://public.tableau.com/profile/theboeingcompany#!/vizhome/CMO_1/GlobalOverview

Makepoint & Makeline

Departure Point 3. routes+ X

```
MAKEPOINT([Departure Latitude],[Departure Longitude])
```

The calculation is valid.

Destination Point 3. routes+ X

```
MAKEPOINT([Destination Latitude],[Destination Longitude])
```

Dependencies ▾ Apply OK

Route 3. routes+ X

```
MAKELINE([Departure Point],[Destination Point])
```

The calculation is valid.

3 Dependencies ▾ Apply OK

Routes of the World

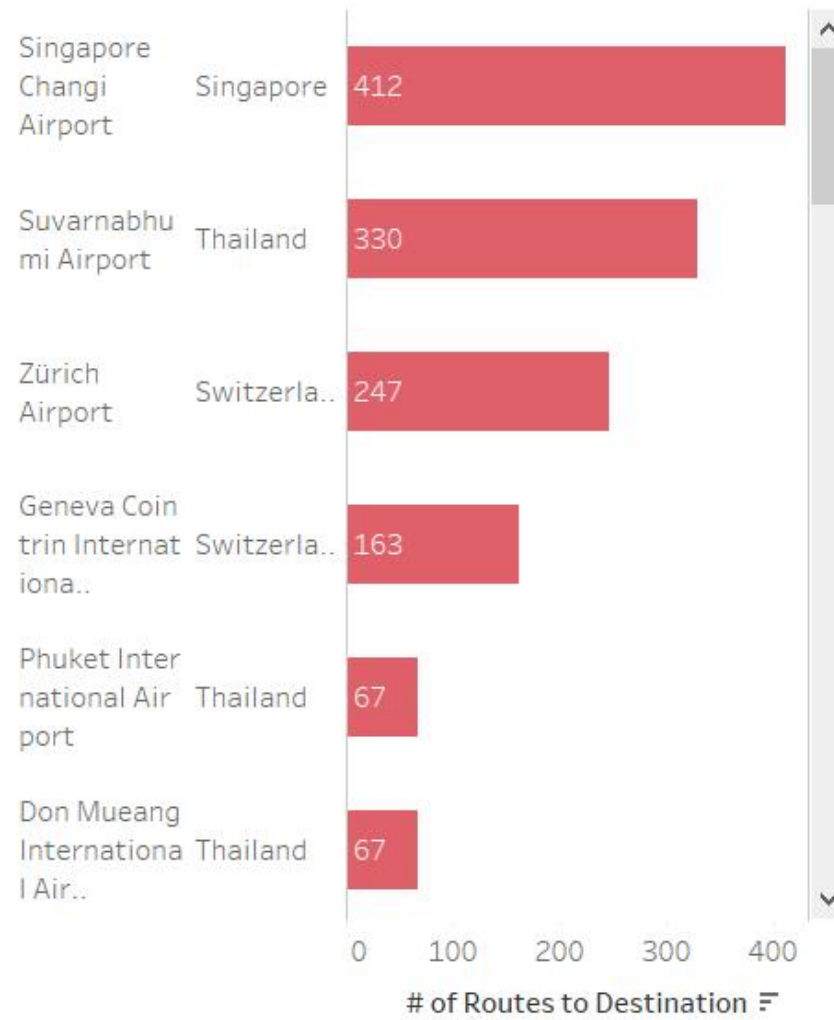
Destinat.. (Multiple values) [dropdown]

Select d.. [teal square] Departure [gold square] Destination

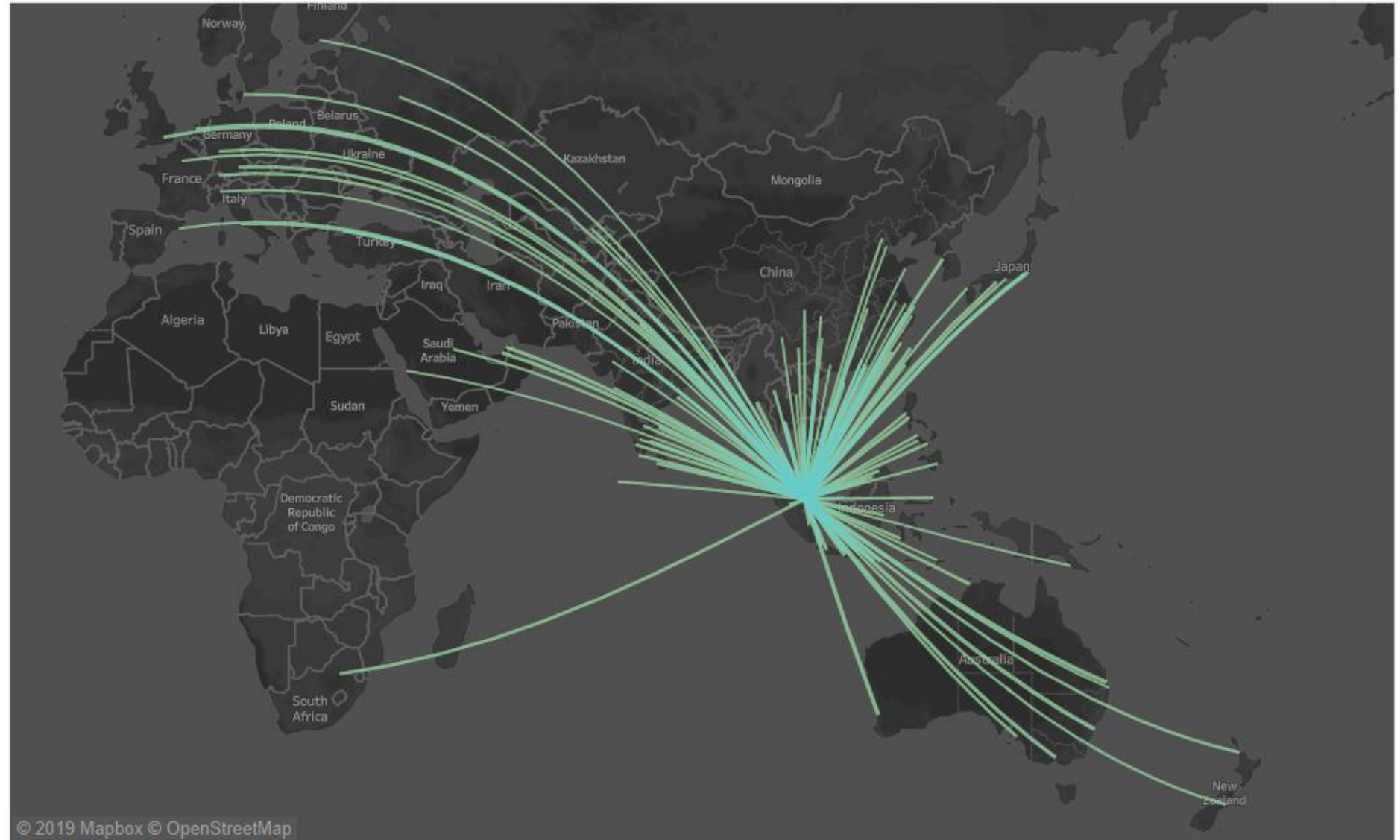
Airline N.. (All) [dropdown]

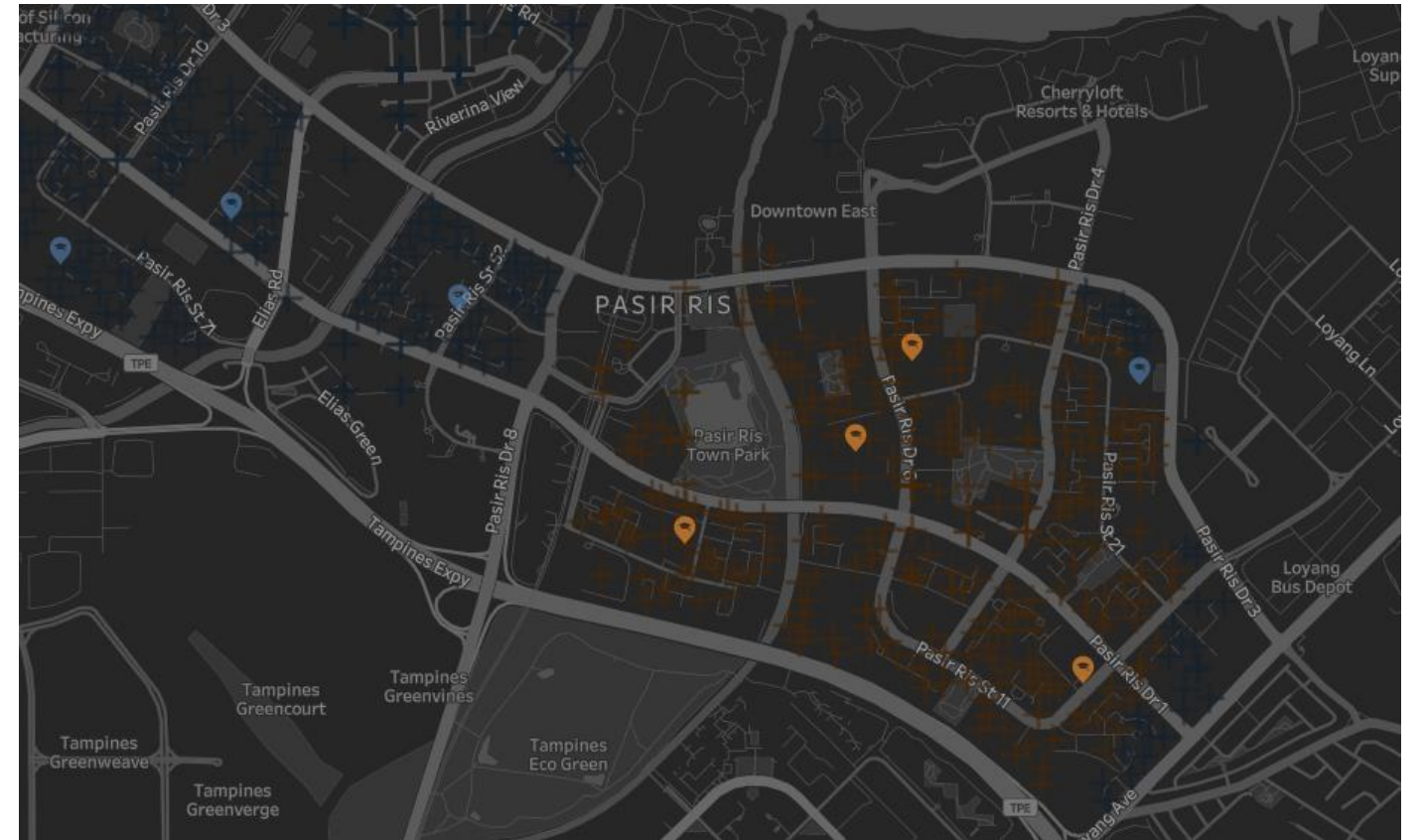
NUMBER OF ROUTES BY DESTINATION

SELECT AN AIRPORT TO SEE FLIGHTS TO AND FROM IT



ROUTES TO & FROM: Singapore Changi Airport





Set Actions

The image shows two overlapping dialog boxes in Tableau. The 'Actions' dialog is in the background, displaying a table of actions and a menu for adding new actions. The 'Edit Set Action' dialog is in the foreground, showing configuration for the 'Set LAT' action.

Actions Dialog

Actions let you create interactive relationships between data, dashboard objects, other workbook sheets and the web.

Name	Run On	Source	Fields
Highlight 4 (generated)	Select	Sch 1KM Boundary	School or Home
Set LAT	Select	Sch 1KM Boundary (...)	Lat-Set
Set LNG	Select	Sch 1KM Boundary (...)	Lng-Set

Edit Set Action Dialog

Name: Set LAT

Source Sheets

- Sch 1KM Boundary
- 1KM Boundary (checked)
- Info - 1km

Run action on:

- Hover
- Select (highlighted)
- Menu

Run on single select only

Target Set

- 3c 124K postal codes of Singapore+ (Multiple Connections)
- Lat-Set

Clearing the selection will:

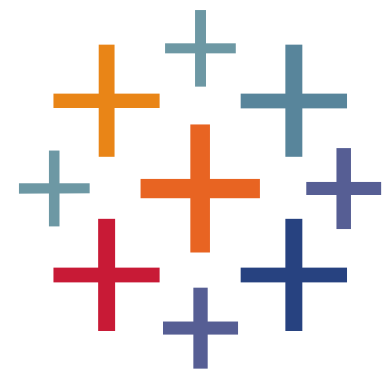
- Keep set values
- Add all values to set
- Remove all values from set

Buttons: OK, Cancel

Recap

Complex use cases made *Simple* with Tableau:

- ✓ Spotting data patterns with Motion charts
- ✓ Outlier Detection & Forecast with seamless integration with R
- ✓ Visualizing Network Maps – Train Network
- ✓ Travel Route Analysis
- ✓ Geo-fencing Analysis



+ a b l e a u[®]