Logistics Routing Management

Content

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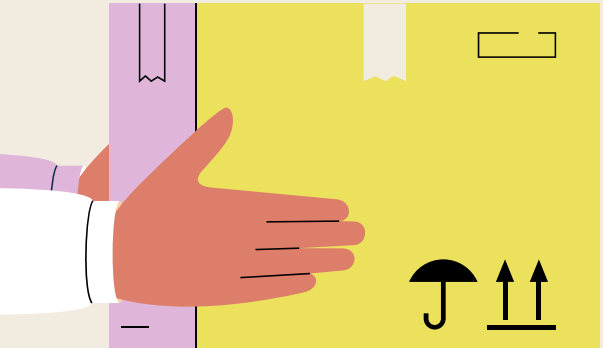
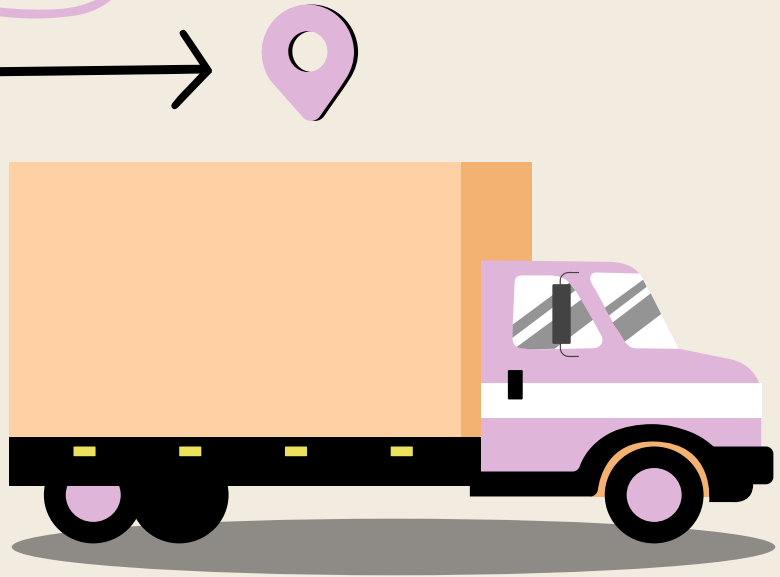
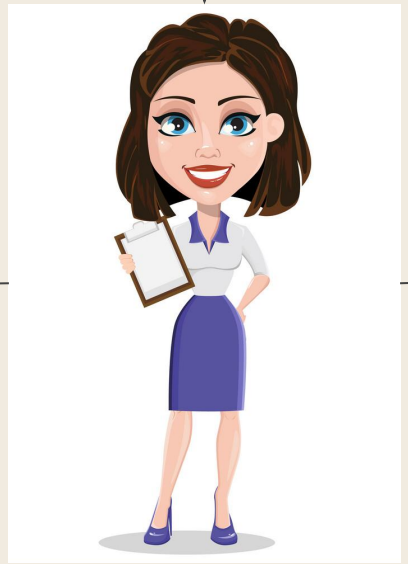
- How to evaluate success?
- Almost Finished Product
- Future improvements

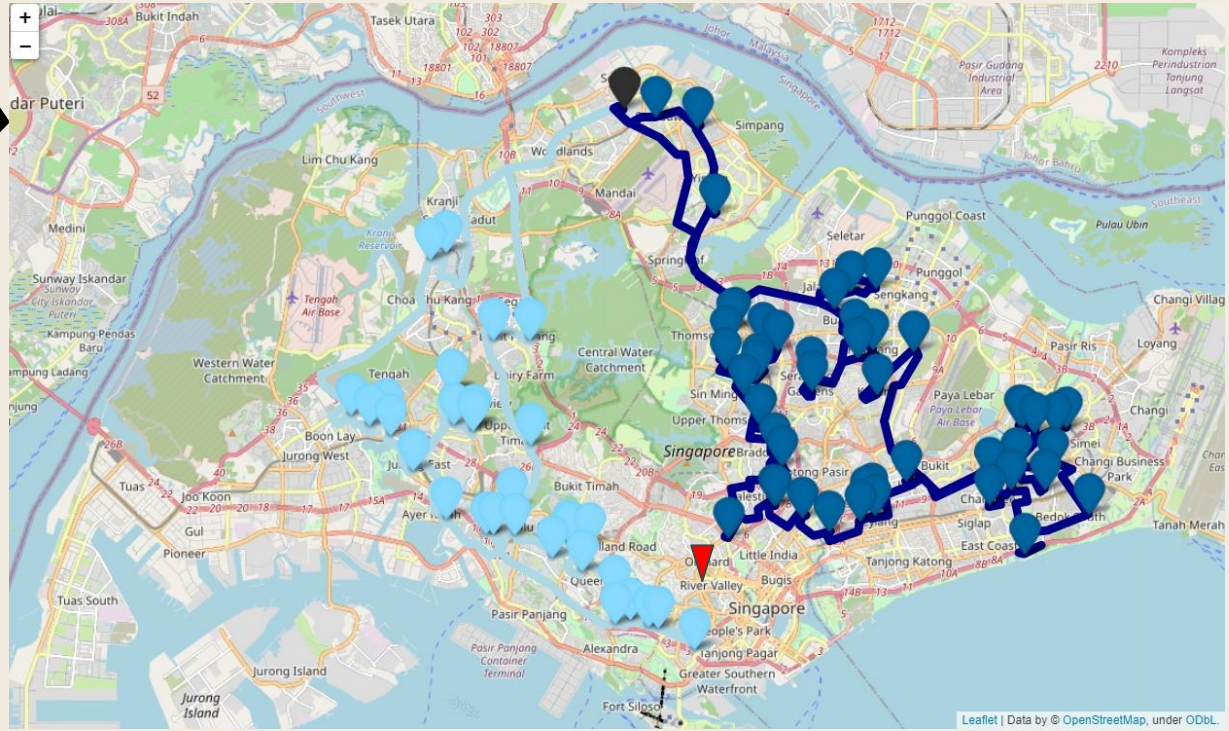




01

Current Process




Bukit Indah
Tasek Utara
Johor
Malaysia
Singapore
Pasir Gudang Industrial Area
Kompleks Perindustrian Tanjung Langsat
Lim Chu Kang
Kranji
Mandai
Simpang
Punggol Coast
Seletar
Punggol
Pulau Ubin
Medini
Sunway Iskandar
Kampung Pendas Baru
Tengah Air Base
Western Water Catchment
Tengah
Central Water Catchment
Pasir Ris
Loyang
Changi Villag
Paya Lebar
Paya Lebar Air Base
Changi
Simei
Changi Business Park
Boon Lay
Jurong West
Singapore
Bukit
Tuas
Joo Koon
Bukit Timah
Siglap
Tanah Merah
Gul
Pioneer
Little India
Tanjong Katong
River Valley
Bugis
Singapore
Tuas South
Pasir Panjang
Alexandra
Greater Southern Waterfront
Jurong Island
Fort Siloso
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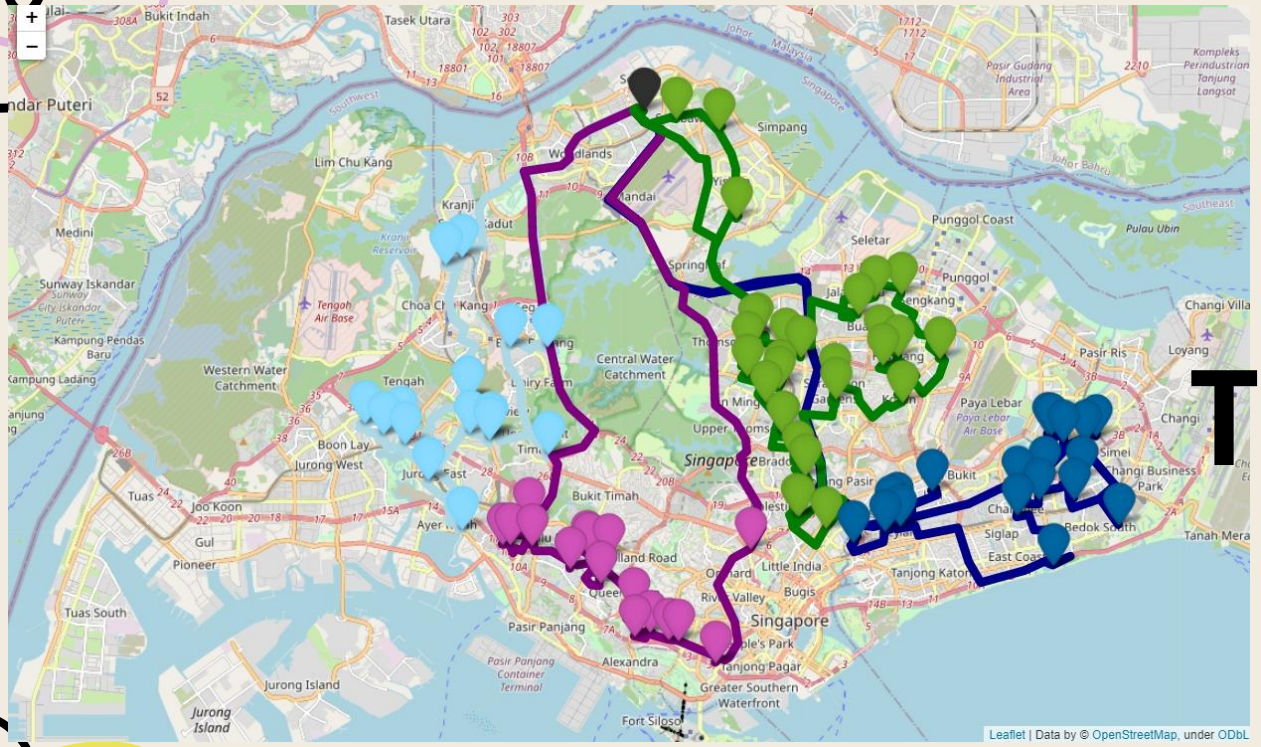
02

Problems:

- Denying Responsibility
- Arguing his way out
- Threatening to quit
- Creating a toxic environment for admin
- etc

Focus on making location assignment clear and as fair as possible


Bukit Indah
Tasek Utara
Johor
Malaysia
Singapore
Kompleks Perindustrian Tanjung Langsat
Pasir Gudang Industrial Area
Johor Bahru
Southeast
Pulau Ubin
Punggol Coast
Punggol
Seletar
Simpang
Woodlands
Lim Chu Kang
Kranji
Medini
Sunway Iskandar
Kampung Pendas Baru
Kampung Ladang
Tengah Air Base
Western Water Catchment
Central Water Catchment
Tengah
Boon Lay
Jurong West
Tuas
Joo Koon
Gul
Pioneer
Tuas South
Jurong Island
Bukit Timah
Pasir Panjang
Pasir Panjang Container Terminal
Alexandra
Singapore
Little India
Bugis
Tanjong Pagar
Greater Southern Waterfront
Fort Siloso
Paya Lebar
Paya Lebar Air Base
Pasir Ris
Changi
Changi Business Park
Changi Villa
Loyang
Tanah Merah
Bedok South
East Coast
Siglap
Tanjong Katong
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03

The Idea

Create Database

Google Maps API

Name	Lat	Lng
ng teng fong hospital, singapore	1.333745	103.7454
oh guan lee, singapore	1.311447	103.8674
old airport road food centre, singapore	1.308241	103.8858
pereira road, singapore	1.337738	103.886
qaseh kitchen, singapore	1.4512	103.7935
queensway shopping centre, singapore	1.287553	103.8035
sembawang hills food centre, singapore	1.372288	103.829
the clementi mall, singapore	1.314918	103.7643
tiong bahru food centre, singapore	1.285138	103.8329

Distance Array

Open Source Routing Machine

	10 north bridge road, singapore	10 woodlands terrace, singapore	105 hougang avenue 1, singapore	107 tampines street 11, singapore	ıti st
10 north bridge road, singapore	0	26.02	9.14	13.89	1
10 woodlands terrace, singapore	24.64	0	22.33	28.66	1
105 hougang avenue 1, singapore	7.71	22.31	0	8.81	1
107 tampines street 11, singapore	12.57	28.8	9.54	0	2
107a clementi street 12, singapore	13.62	19.62	17.29	24.53	
116 aljunied, singapore	3.41	24.27	5.51	9.69	1
118a canberra cres, singapore	21.06	4.85	18.75	25.08	2
119 aljunied, singapore	3.72	26.16	5.83	9.44	1
121 paya lebar way, singapore	5.36	24.83	5.78	10.14	1
.23 bedok north street 2, singapore	11.71	31.91	9.5	5.16	2
124 lor 1 toa payoh, singapore	6.72	17.6	7.38	14.93	1
127 bukit merah lane 1, singapore	9.64	25	16.31	23.79	7
13 cantonment road, singapore	4.95	28.72	13.61	17.15	1
130 choa chu kang, singapore	17.85	14.56	19.83	27.45	8
.34 jurnog gateway road, singapore	18.99	19.21	20.84	28.45	5
146 silat road, singapore	6.48	29.26	14.14	20.63	1
152 mei ling street, singapore	9.98	23.69	15	22.21	6
55 bukit batok street 31, singapore	16.49	16.63	19.65	27.27	7
56 bukit batok street 31, singapore	16.49	16.63	19.65	27.27	7
15b lor liput, singapore	10.44	22.83	14.14	21.35	4
16 bedok south road, singapore	11.75	31.67	9.27	5.51	2
.62 ang mo kio avenue 4, singapore	10.67	13.37	8.42	18.77	1
163 bukit merah central, singapore	7.97	25.89	15.63	22.12	8
163 gangsaa road, singapore	16.22	13.31	18.2	25.81	7
7 upper boon keng road, singapore	2.29	24.96	7.46	11.71	1

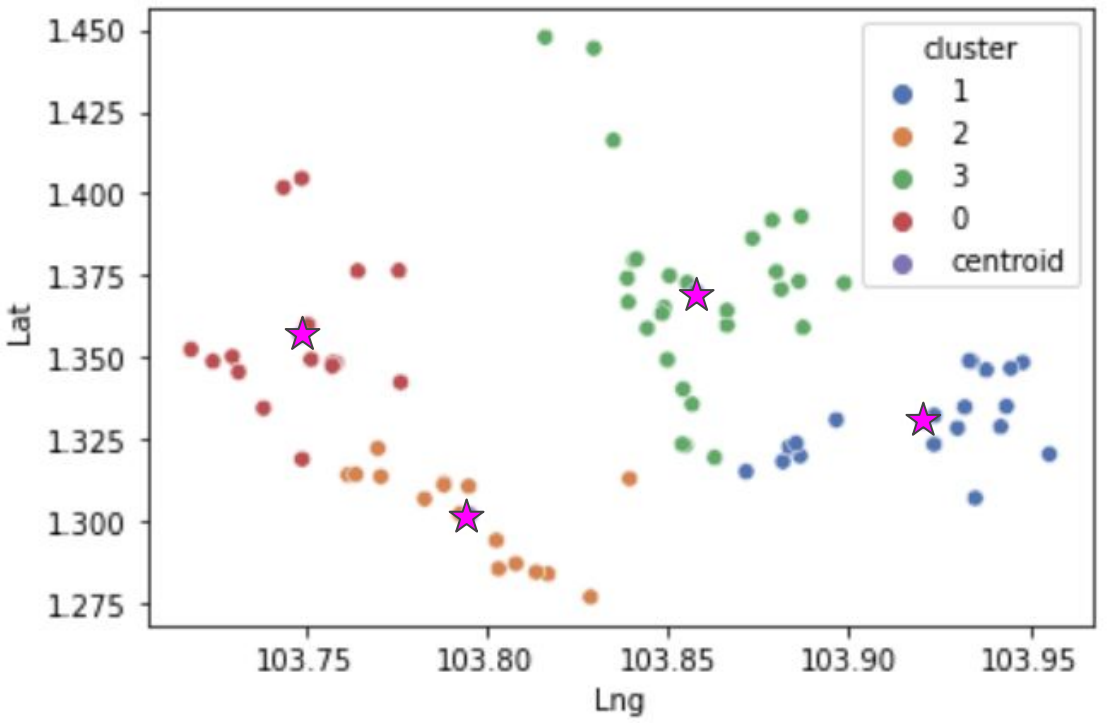
Daily Locations

	0
69	823a tampines street 81, singapore
70	848 yishun street 81, singapore
71	89 circuit road, singapore
72	90 whampoa drive, singapore
73	91 whampoa drive, singapore
74	923 hougang street 91, singapore
75	abc brickworks, singapore
76	beauty world centre, singapore
77	bedok food centre, singapore
78	biomedical grove, singapore
79	chomp chomp food centre, singapore
80	east coast lagoon food village, singapore

K Means

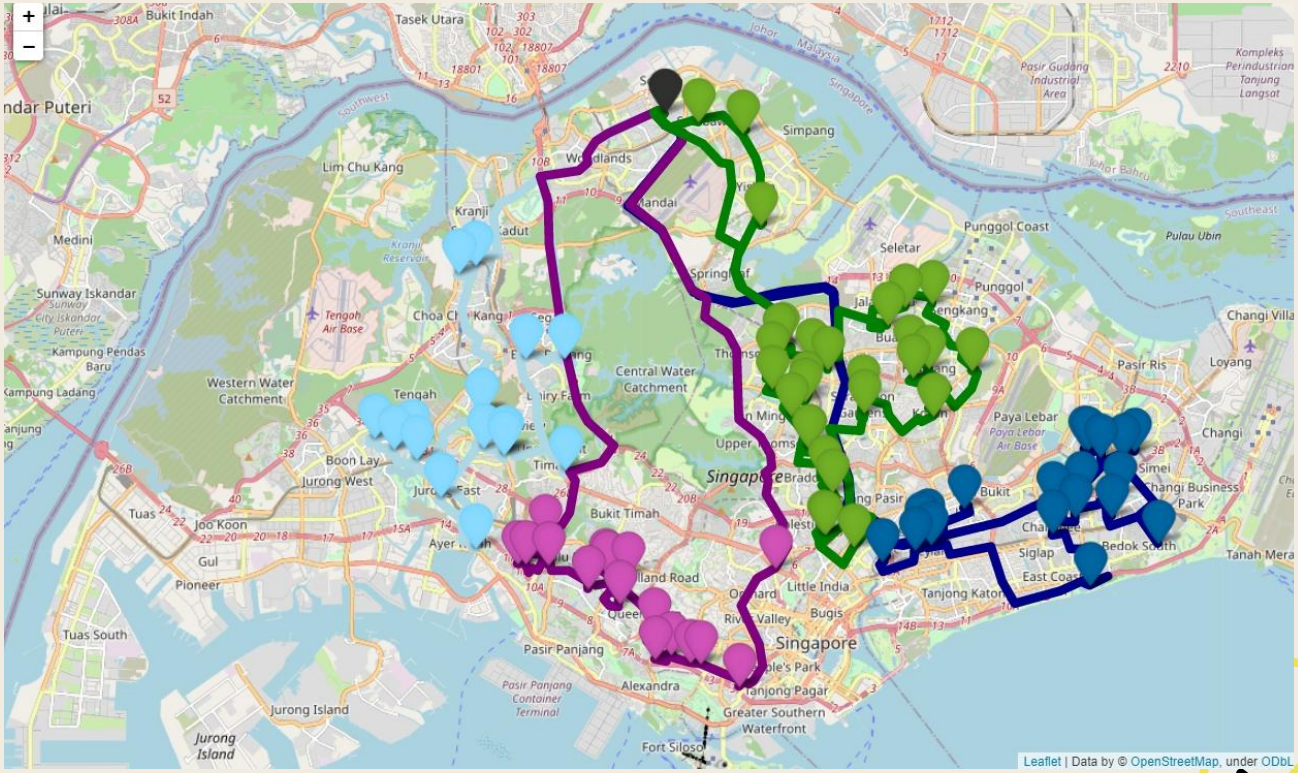
- Number Of Drivers Available (Number of Clusters, 4 in this case)
- Daily Locations
- Customer Database

K Means


cluster
1
2
3
0
centroid
Lat
Lng
1.450
1.425
1.400
1.375
1.350
1.325
1.300
1.275
103.75
103.80
103.85
103.90
103.95

Routing

Open Source Routing Machine



04

Evaluate Success

No One Size Fits All
Dependant on Situation

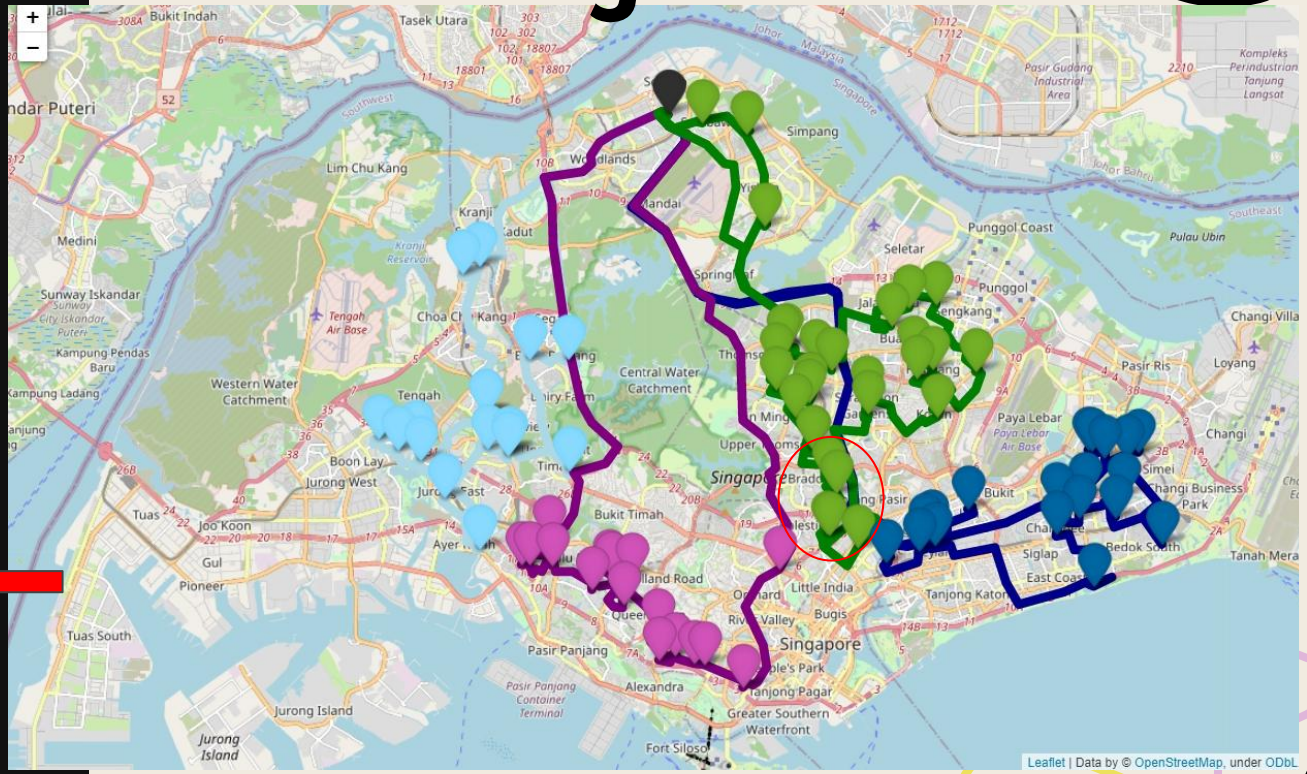
Re Routing

```
Vehicle  0
Traveling Duration:  1 hrs 45 mins
Distance:  62.69 km
Number of Locations:  18
lightblue
duration distance:  1hrs 34mins
duration distance + buffer:  4hrs 34mins
---

Vehicle  1
Traveling Duration:  2 hrs 14 mins
Distance:  99.93 km
Number of Locations:  20
darkblue
duration distance:  2hrs 30mins
duration distance + buffer:  5hrs 50mins
---

Vehicle  2
Traveling Duration:  1 hrs 41 mins
Distance:  66.95 km
Number of Locations:  17
purple
duration distance:  1hrs 40mins
duration distance + buffer:  4hrs 30mins
---

Vehicle  3
Traveling Duration:  2 hrs 18 mins
Distance:  83.07 km
Number of Locations:  30
green
duration distance:  2hrs 5mins
duration distance + buffer:  7hrs 5mins
---
```



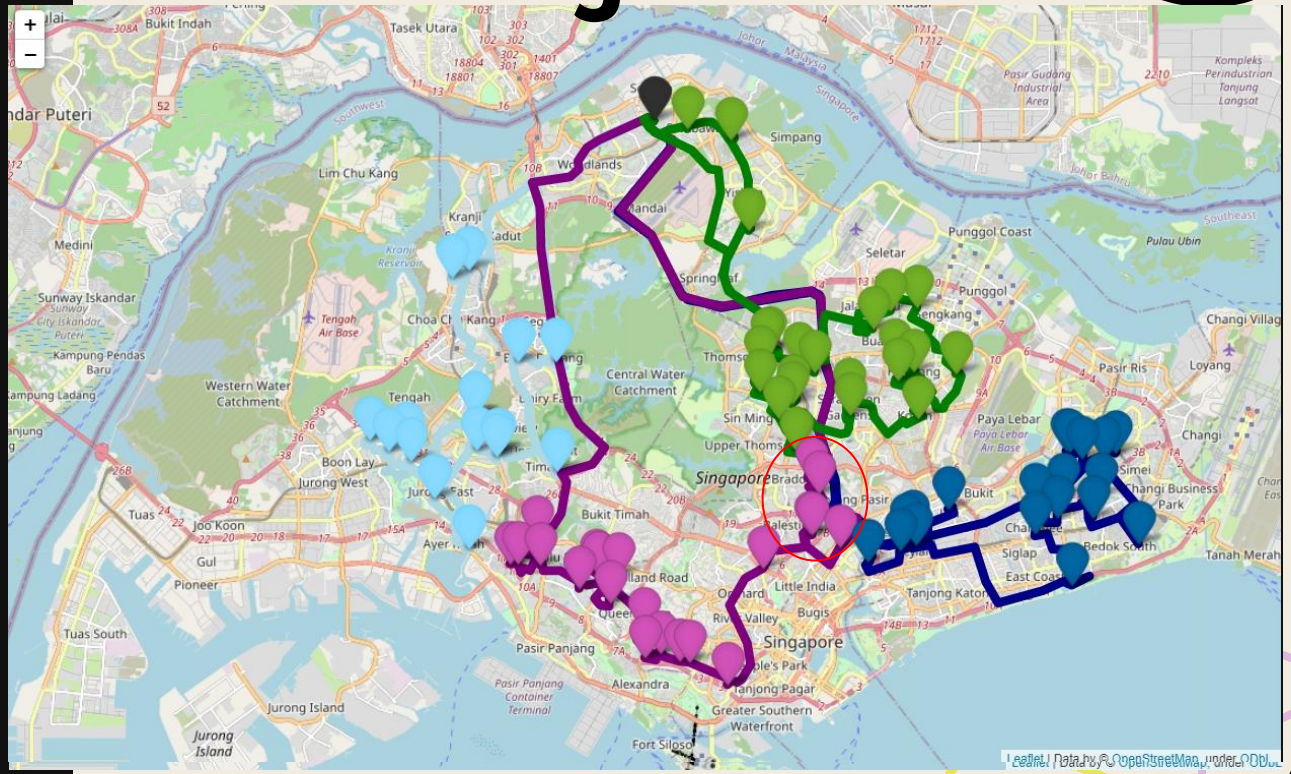
Re Routing

```
Vehicle  0
Traveling Duration:  1 hrs 45 mins
Distance:  62.69 km
Number of Locations:  18
lightblue
duration distance:  1hrs 34mins
duration distance + buffer:  4hrs 34mins
---

Vehicle  1
Traveling Duration:  2 hrs 14 mins
Distance:  99.93 km
Number of Locations:  20
darkblue
duration distance:  2hrs 30mins
duration distance + buffer:  5hrs 50mins
---

Vehicle  2
Traveling Duration:  1 hrs 58 mins
Distance:  79.84 km
Number of Locations:  22
purple
duration distance:  2hrs 0mins
duration distance + buffer:  5hrs 40mins
---

Vehicle  3
Traveling Duration:  1 hrs 55 mins
Distance:  68.63 km
Number of Locations:  25
green
duration distance:  1hrs 43mins
duration distance + buffer:  5hrs 53mins
---
```



Almost Finished Product

http://localhost:8501/

05

Future

- Look into other clustering methods (Minimum Spanning Tree)
- Add recluster function to streamlit that edits cluster directly in csv
- Add physical weight of goods into the equation

Thanks!

Do you have any questions?

darrentu@gmail.com

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