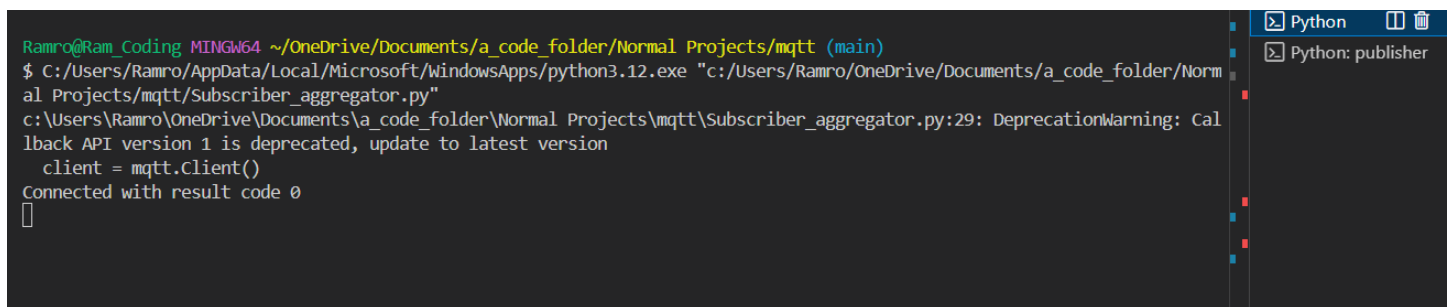# MQTT Data from California Reservoirs and Report
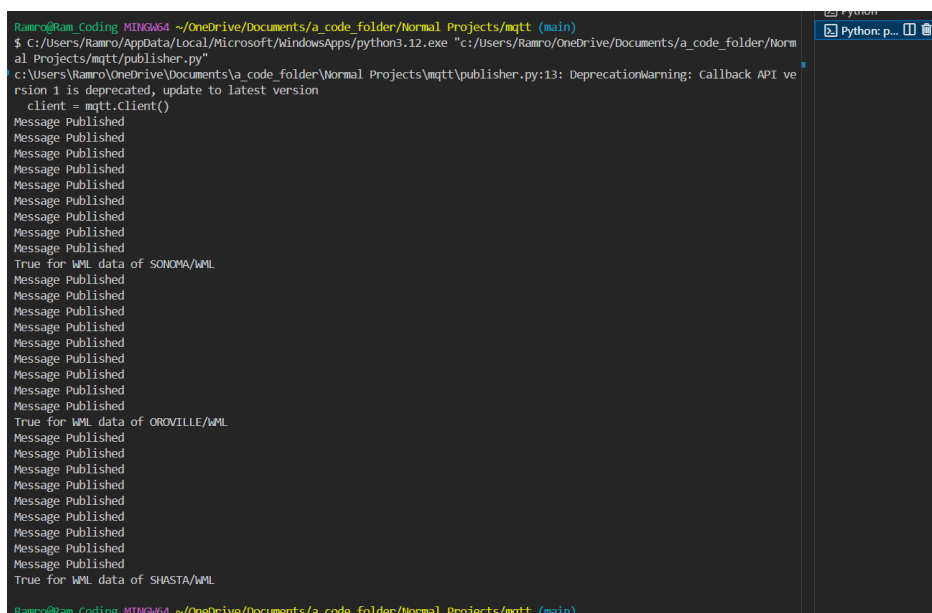
Steps followed for this assignment:

1. The data sets were converted to Json object files individually, totaling three Json files.
2. Separate topics were setup for each reservoir.
3. The subscriber was initiated to listen to the port for the publishing topics.
4. The Json data for each reservoir was published in the corresponding topics one topic at a time in a consecutive manner using a for loop.
5. The published Json data was subscribed from the topics and aggregated using a single subscriber again using for loop to toggle between topics and reconstructed data into a single csv file for plotting purposes. (During the action of publishing and subscribing, the Json object was converted into Json format strings as the mqtt broker does not support dictionary data type)
6. Cols Historic_average, capacity and storage were computed on the csv read pandas data frame.
7. With the final data frame, plots were created for one specific point in time across all the reservoirs for the mutated cols.

Subscriber listening the topics on the port:

publishers publishing the data by the topic:

Json Data:

```
>>> json_data
[[{'Date': '9/29/2024', 'TAF': '192'}, {'Date': '9/30/2024', 'TAF': '193'}, {'Date': '10/1/2024', 'TA
F': '192'}, {'Date': '10/2/2024', 'TAF': '194'}, {'Date': '10/5/2024', 'TAF': '193'}, {'Date': '10/4/
2024', 'TAF': '191'}, {'Date': '10/5/2024', 'TAF': '193'}, {'Date': '10/6/2024', 'TAF': '192'}, {'Dat
e': '10/7/2024', 'TAF': '192'}], [{'Date': '9/29/2024', 'TAF': '2000'}, {'Date': '9/30/2024', 'TAF':
'2001'}, {'Date': '10/1/2024', 'TAF': '1999'}, {'Date': '10/2/2024', 'TAF': '2000'}, {'Date': '10/5/2
024', 'TAF': '2000'}, {'Date': '10/4/2024', 'TAF': '2000'}, {'Date': '10/5/2024', 'TAF': '2000'}, {'D
ate': '10/6/2024', 'TAF': '2000'}, {'Date': '10/7/2024', 'TAF': '2000'}], [{'Date': '9/29/2024', 'TAF
': '2720'}, {'Date': '9/30/2024', 'TAF': '2727'}, {'Date': '10/1/2024', 'TAF': '2721'}, {'Date': '10/
2/2024', 'TAF': '2727'}, {'Date': '10/5/2024', 'TAF': '2722'}, {'Date': '10/4/2024', 'TAF': '2721'},
{'Date': '10/5/2024', 'TAF': '2727'}, {'Date': '10/6/2024', 'TAF': '2726'}, {'Date': '10/7/2024', 'TA
F': '2727'}]]
>>>
```

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Intermediate CSV Data screenshot:

publisher.py   ▦ aggregated_data.csv ✕   Subscriber_aggregator.py   wml_plot.py

▦ aggregated_data.csv > ▢ data

```
1    Date,TAF,topic
2    9/29/2024,192,SONOMA/WML
3    9/30/2024,193,SONOMA/WML
4    10/1/2024,192,SONOMA/WML
5    10/2/2024,194,SONOMA/WML
6    10/5/2024,193,SONOMA/WML
7    10/4/2024,191,SONOMA/WML
8    10/5/2024,193,SONOMA/WML
9    10/6/2024,192,SONOMA/WML
10   10/7/2024,192,SONOMA/WML
11   9/29/2024,2000,OROVILLE/WML
12   9/30/2024,2001,OROVILLE/WML
13   10/1/2024,1999,OROVILLE/WML
14   10/2/2024,2000,OROVILLE/WML
15   10/5/2024,2000,OROVILLE/WML
16   10/4/2024,2000,OROVILLE/WML
17   10/5/2024,2000,OROVILLE/WML
18   10/6/2024,2000,OROVILLE/WML
19   10/7/2024,2000,OROVILLE/WML
20   9/29/2024,2720,SHASTA/WML
21   9/30/2024,2727,SHASTA/WML
22   10/1/2024,2721,SHASTA/WML
23   10/2/2024,2727,SHASTA/WML
24   10/5/2024,2722,SHASTA/WML
25   10/4/2024,2721,SHASTA/WML
26   10/5/2024,2727,SHASTA/WML
27   10/6/2024,2726,SHASTA/WML
28   10/7/2024,2727,SHASTA/WML
29
```

Plot:

Hist Avg, Capacity, and Storage by Topic for Date: October 1, 2024