Cloud: MAANG Stock Price Analysis

By

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End-Goal

In a rapidly evolving financial market, staying ahead of the trend analysis is essential for making informed investment decisions.

We also aim to explore the external factors that impact the stock price and the level of risk associated with their securities.

This project seeks to develop a data-driven solution to address the complexities of analyzing the historical stock prices of MAANG companies and identify the market conditions and external factors that could help make informed investment decisions.

The ultimate end goal of this project is to ensure we get valuable insights to empower and help investors, analysts and traders make informed decisions

The project aims to predict the effectiveness of trading strategies by back tracing with historical data insights

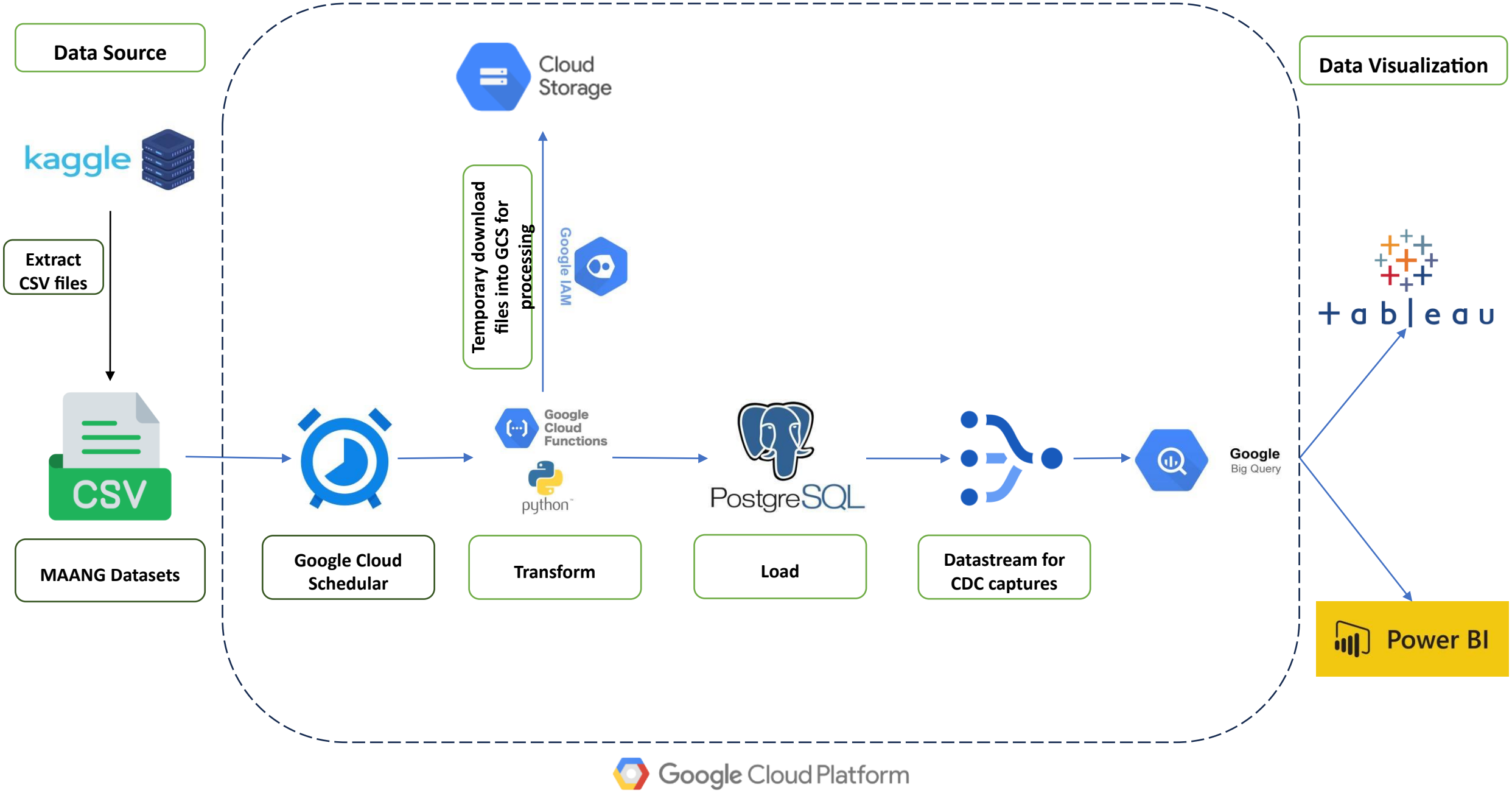
Data Source

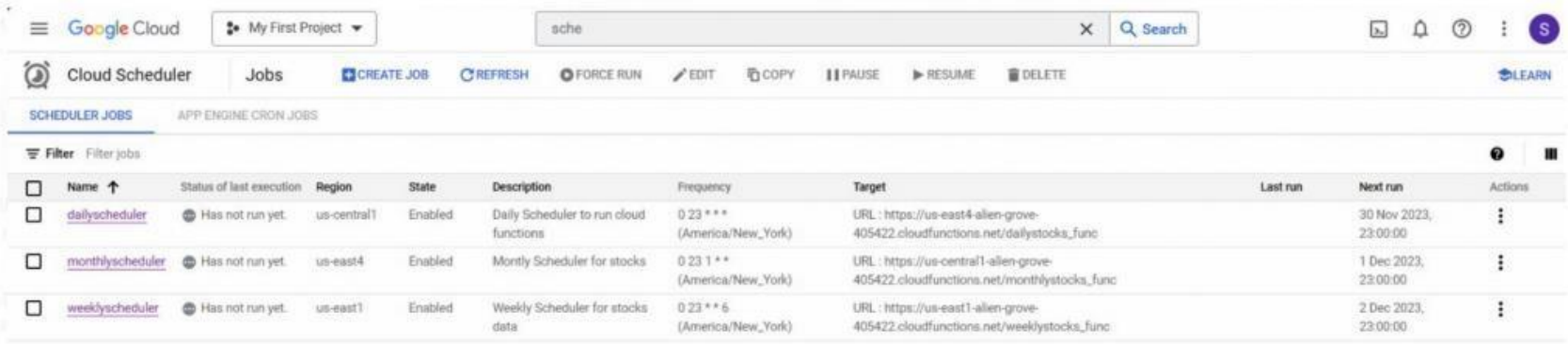
and provide actionable insights to make data-driven decisions about the trends, opportunities, and volatility

Furthermore, by developing an efficient cloud-based data engineering solution that can handle large volumes of data for real-time analysis.

- This dataset includes the historical data of stock prices for MAANG companies. It contains the daily, weekly, and monthly stock prices for each company, and they are automatically updated daily
- This dataset has 15 datasets, and each file has around 7 columns. Here we have daily, monthly, and weekly data for each of the companies from the years 2000 -2023.
- http://www.kaggle.com/datasets/nikhil1e9/ne8lix-stockprice/

Data Pipeline Architecture





Name	Status of last execution	Region	State	Description	Frequency	Target	Last run	Next run	Actions
dailyscheduler	Has not run yet.	us-central1	Enabled	Daily Scheduler to run cloud functions	0 23 * * * (America/New_York)	URL : https://us-east4-alien-grove-405422.cloudfunctions.net/dailystocks_func		30 Nov 2023, 23:00:00	
monthlyscheduler	Has not run yet.	us-east4	Enabled	Montly Scheduler for stocks	0 23 1 * * (America/New_York)	URL : https://us-central1-alien-grove-405422.cloudfunctions.net/monthlystocks_func		1 Dec 2023, 23:00:00	
weeklyscheduler	Has not run yet.	us-east1	Enabled	Weekly Scheduler for stocks data	0 23 * * 6 (America/New_York)	URL : https://us-east1-alien-grove-405422.cloudfunctions.net/weeklystocks_func		2 Dec 2023, 23:00:00	

- We have adopted py scripts for daily, weekly, and monthly to transform and insert the 15 files into cloud Postgres. Here, we used the Kaggle API instead of downloading the 15 files into the local or cloud bucket, as the data is very dynamic and changes daily.
- We are using a cloud scheduler to trigger the cloud functions.

Data Ingestion – Cloud Schedular

Cloud Functions

Google Cloud | My First Project | Search (/) for resources, docs, products and more | Search

Cloud Functions ← Function details EDIT DELETE COPY LEARN

dailystocks_func 2nd gen (Deployed at 29 Nov 2023, 22:21:11) URL: https://us-east4-alien-grove-405422.cloudfunctions.net/dailystocks_func

Powered by Cloud Run
dailystocks-func

METRICS | DETAILS | SOURCE | VARIABLES | TRIGGER | PERMISSIONS | LOGS | TESTING

Runtime : Python 3.9 Entry point : daily_stocks EDIT DOWNLOAD ZIP

main.py

requirements.txt

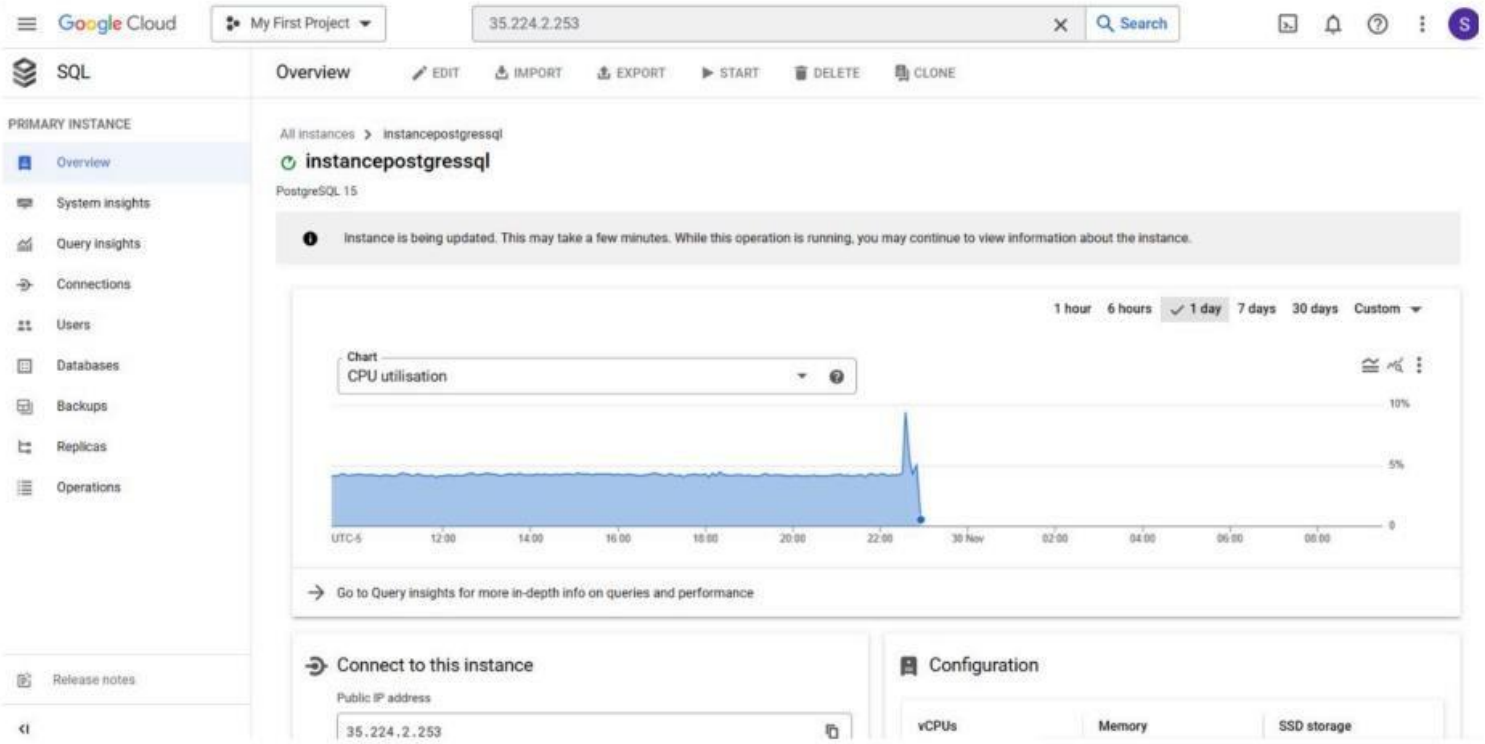
```python
register_adapter(np.int64, AsIs)

api = KaggleApi()
api.authenticate()

# credentials = service_account.Credentials.from_service_account_file('alien-grove-405422-bb57fda72219.json')
gcp_key_decoded = base64.b64decode(os.environ.get('gcs_base64'))
credentials_json = json.loads(gcp_key_decoded.decode('utf-8'))
database_pass = base64.b64decode(os.environ.get("DB_PASSWORD")).decode('utf-8')
database_name = base64.b64decode(os.environ.get("DB_NAME")).decode('utf-8')

gcp_credentials = service_account.Credentials.from_service_account_info(credentials_json)
@functions_framework.http
def daily_stocks(request):
    api = KaggleApi()
    api.authenticate()
    download_dataset(None)
    return "Kaggle API authenticated, Daily data is extracted, transformed and loaded into Postgres DB"
```

Cloud SQL Postgres


Google Cloud
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Search
SQL
Overview
EDIT
IMPORT
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CLONE
PRIMARY INSTANCE
Overview
System insights
Query insights
Connections
Users
Databases
Backups
Replicas
Operations
Release notes
All instances > instancepostgressql
instancepostgressql
PostgreSQL 15
Instance is being updated. This may take a few minutes. While this operation is running, you may continue to view information about the instance.
1 hour
6 hours
1 day
7 days
30 days
Custom
Chart
CPU utilisation
10%
5%
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16:00
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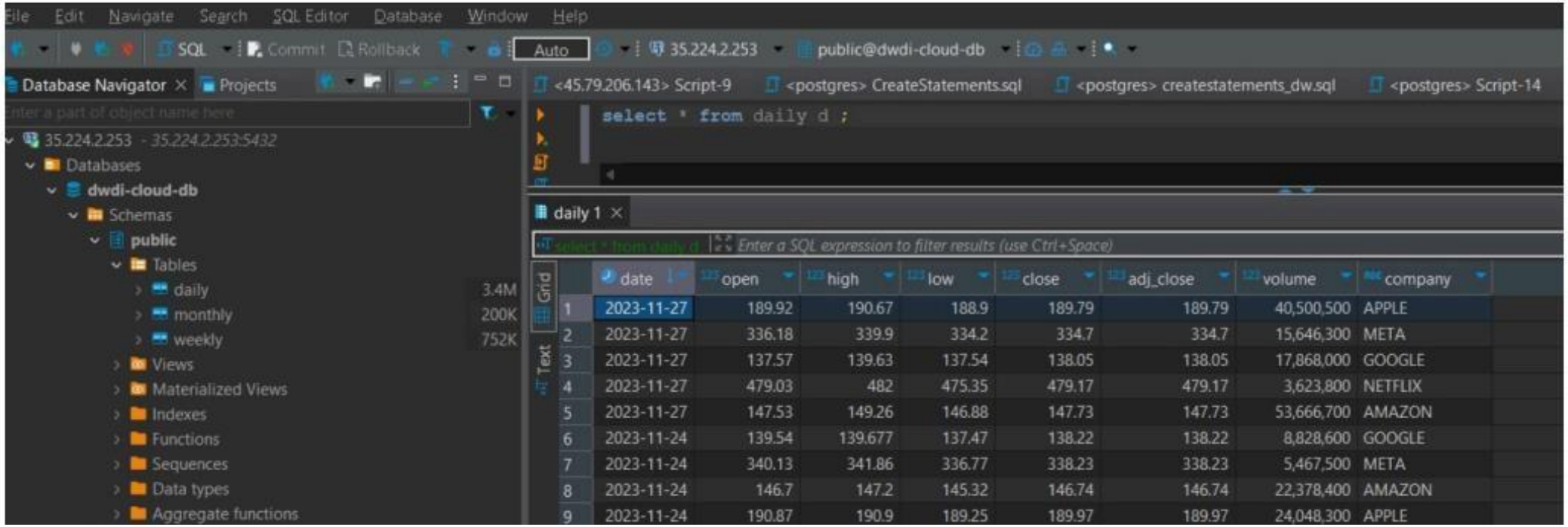
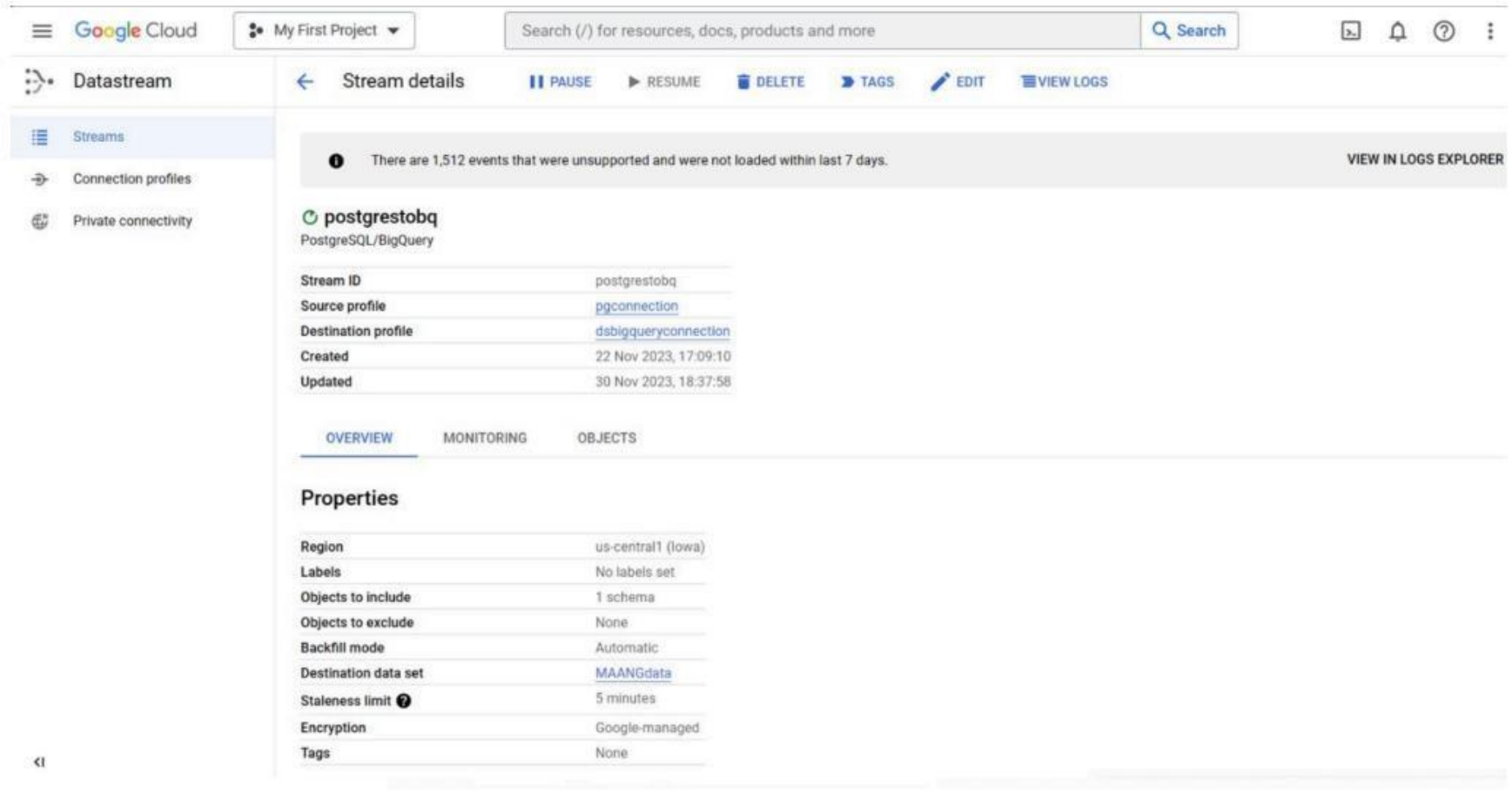
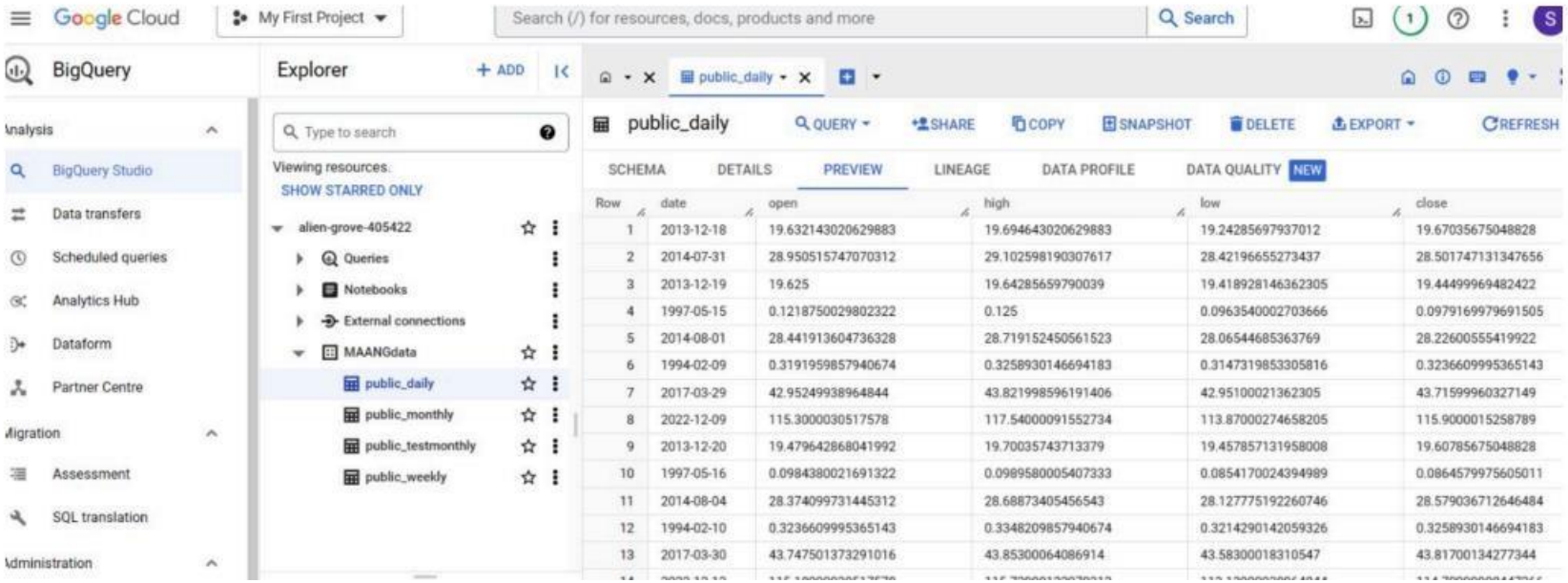
Go to Query insights for more in-depth info on queries and performance
Connect to this instance
Public IP address
35.224.2.253
Configuration
vCPUs
Memory
SSD storage



Database Connection



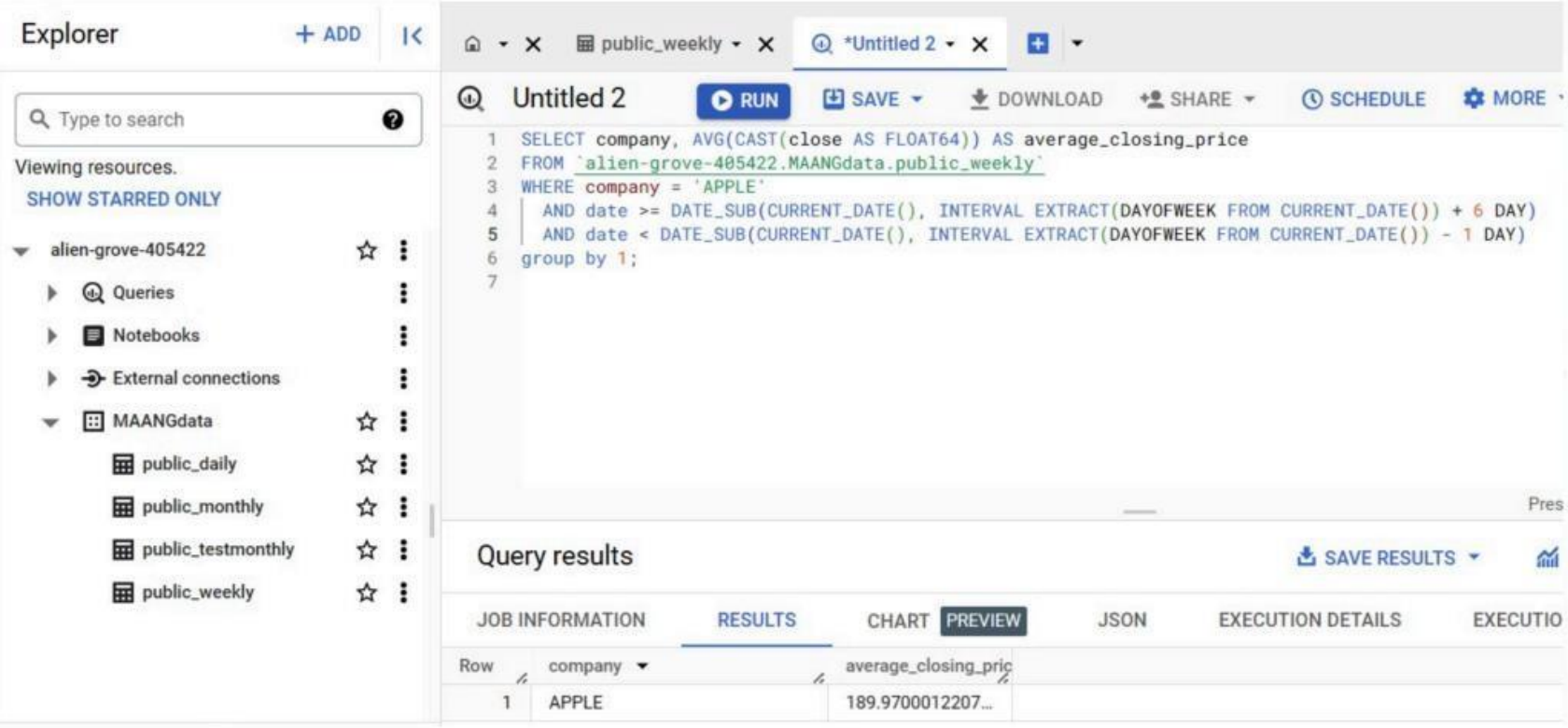
Data Ingestion From Cloud SQL to Bigquery using DataStream



Row	date	open	high	low	close
1	2013-12-18	19.632143020629883	19.694643020629883	19.24285697937012	19.67035675048828
2	2014-07-31	28.950515747070312	29.102598190307617	28.42196655273437	28.501747131347656
3	2013-12-19	19.625	19.64285659790039	19.418928146362305	19.44499969482422
4	1997-05-15	0.1218750029802322	0.125	0.0963540002703666	0.0979169979691505
5	2014-08-01	28.441913604736328	28.719152450561523	28.06544685363769	28.22600555419922
6	1994-02-09	0.3191959857940674	0.3258930146694183	0.3147319853305816	0.3236609995365143
7	2017-03-29	42.95249938964844	43.821998596191406	42.95100021362305	43.71599960327149
8	2022-12-09	115.3000030517578	117.54000091552734	113.87000274658205	115.9000015258789
9	2013-12-20	19.479642868041992	19.70035743713379	19.457857131958008	19.60785675048828
10	1997-05-16	0.0984380021691322	0.0989580005407333	0.0854170024394989	0.0864579975605011
11	2014-08-04	28.374099731445312	28.68873405456543	28.127775192260746	28.579036712646484
12	1994-02-10	0.3236609995365143	0.3348209857940674	0.3214290142059326	0.3258930146694183
13	2017-03-30	43.747501373291016	43.85300064086914	43.58300018310547	43.81700134277344

Bigquery Data Warehouse

1. Calculate the average closing price for last week for Apple:



Analytical Queries

2. What is the opening stock price for Meta in the month of October?

```sql
SELECT company, open
FROM `alien-grove-405422.MAANGdata.public_monthly`
WHERE company = 'META'
  AND EXTRACT(MONTH FROM date) = 10
  AND EXTRACT(YEAR FROM date) = EXTRACT(YEAR FROM CURRENT_DATE());
```

Query results

JOB INFORMATION | RESULTS | CHART PREVIEW | JSON | EXECUTION

Row	company	open
1	META	302.739990234375

Cont.

3. Which is the lowest trading price and company in the month of November?

```sql
WITH MonthlyLowestPrices AS (
  SELECT company, MIN(low) AS lowest_trading_price
  FROM `alien-grove-405422.MAANGdata.public_monthly`
  WHERE EXTRACT(MONTH FROM date) = 11
    AND EXTRACT(YEAR FROM date) = EXTRACT(YEAR FROM CURRENT_DATE())
  GROUP BY company
)

SELECT company, lowest_trading_price
FROM MonthlyLowestPrices
ORDER BY lowest_trading_price ASC
LIMIT 1;
```

Query results

JOB INFORMATION | RESULTS | CHART PREVIEW | JSON | EXECUT

Row	company	lowest_trading_price
1	GOOGLE	124.9250030517578

Cont.

Cont.

4. On the 27th of November, what were the top 3 stocks sold and by which company?

RUN SAVE QUERY DOWNLOAD SHARE

```
SELECT company, SUM(volume) AS total_volume
FROM `alien-grove-405422.MAANGdata.public_daily`
WHERE DATE(date) = DATE('2023-11-27')
GROUP BY company
ORDER BY total_volume DESC
LIMIT 3;
```

Query results

JOB INFORMATION | RESULTS | CHART PREVIEW | JSON

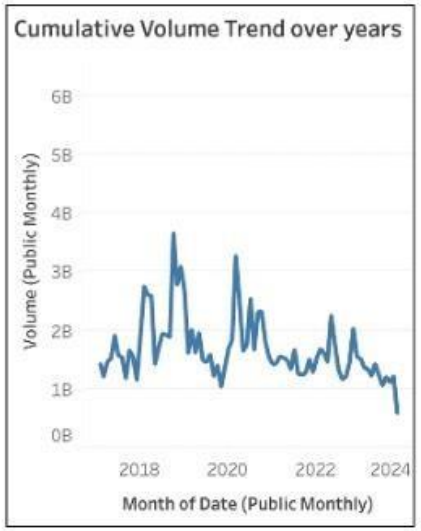
Row	company	total_volume
1	AMAZON	53666700
2	APPLE	40500500
3	GOOGLE	17868000

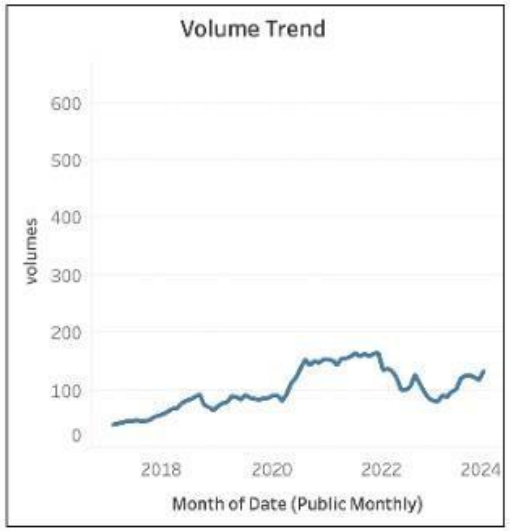
Tableau Dashboard

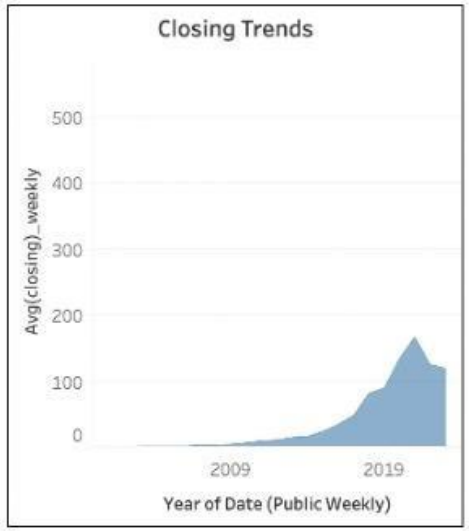
STOCK ANALYSIS - AMAZON

Date (Public Monthly)
1/13/2017 11/1/2023

Company (Public Monthly)







High and Low

Company	High (..	Low (Public ..
AMAZON	188.65400..	165.34899..
	188.10749..	164.17750..
	177.99400..	165.19500..
	177.49949..	163.69949..
	177.69999..	155.77749..
	177.61250..	143.55000..
	176.24299..	158.61000..
	174.81199..	150.94999..
	174.33250..	156.36849..
	174.75	153.64999..
	173.62899..	158.78799..
	173.94999..	158.8125
	171.39999..	135.35200..