# Airflow Mini-Project (DAG Scheduling) Readme

## Scope

With this mini-project, we  utilize Apache Airflow to orchestrate a pipeline:

- Download the daily price data with one minute interval for the two symbols. Each symbol will have a separate task, Task1 (t1) and Task2 (t2), which run independently and in parallel.
- -Save both datasets into CSV files and load them to a  data location for query. Each symbol will have a  separate task, Task3 (t3) and Task4 (t4), which run independently and in parallel.
- Run your custom query on the downloaded dataset for both symbols, Task5 (t5). Before this step executes, all previous tasks must complete.

- Use Celery Executor in Airflow to run the job.

The source data has the following schema.

| Column | Type |
|---|---|
| date time | STRING |
| open | DECIMAL |
| high | DECIMAL (highest price within the time interval) |
| low | DECIMAL (lowest price within the time interval) |
| close | DECIMAL (the last price of the time interval) |
| adj close | DECIMAL |
| volume | DECIMAL |

## Airflow- set up

With this project,  we will set up Airflow using docker following the below link:

Running Airflow in Docker — Airflow Documentation (apache.org)

Basically,  we will using Docker Compose to create and  run multi-container Docker applications, which include:

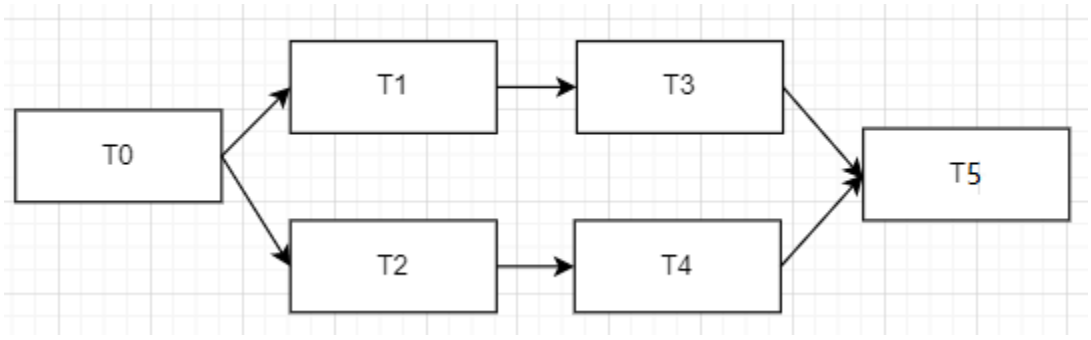
- airflow-scheduler - The scheduler monitors all tasks and DAGs, then triggers the task instances once their dependencies are complete.
- airflow-webserver - The webserver is available at http://localhost:8080.
- airflow-worker - The worker that executes the tasks given by the scheduler.
- airflow-init - The initialization service.
- postgres - The database.
- redis - The redis - broker that forwards messages from scheduler to worker.

For more details of set up the system, please read 'Airflow Mini-Project System Setup Steps.pdf'

## DAG

A DAG (Directed Acyclic Graph) is the core concept of Airflow, collecting Tasks together, organized with dependencies and relationships to say how they should run.

In this project, we define a DAG named 'dag_marketvol' : It defines six tasks and dictates the order in which they have to run, and which tasks depend on what others. The DAG is defined in python script named 'dag_marketvol.py'.




Task list

| Task-id | Type & script | Description |
|---|---|---|
| T0 | (BasOperator) | To create a temporary directory for current day's data download |

| | | |
|---|---|---|
| | cr_folder.sh | (/tmp/data/20220617) |
| T1 | (PythonOperator) Download_stock (symbol='AAPL') | Download data file for symbol 'AAPL' and save to the temp folder created at step T0 (i.e,/tmp/data/20220617/AAPL_20220617.csv). |
| T2 | (PythonOperator) Download_stock (symbol='TSLA') | Download data file for symbol 'TSLA" and save to the temp folder (for example, /tmp/data/20220617/TSLA_20220617.csv) |
| T3 | (BasOperator) mv_file1.sh | Move the download 'AAPL' data file (AAPL_20220617.csv) to data location '/tmp/query/' |
| T4 | (BasOperator) mv_file2.sh | Move the download 'TSLA' data file ( TSLAL_20220617.csv) to data location '/tmp/query/' |
| T5 | (PythonOperator) get_stock_avg | Query both files that are located in the query folder ( '/tmp/query') using Pandas library |

Python method for downloading

| **Method** | **Functions** |
|---|---|
| download_stock (symbol) | Download the data files of the stock of the given symbol |

Python methods for Query

| **Method** | **Functions** |
|---|---|
| read_stock((file_folder, symbol) | Read data file of the given symbol from the specified local utilizing Pandas library.<br>For example, it reads data from file /tmp/query/AAPL_20220618.csv and return dataframe |
| get_stock_avg(file_folder ) | Read both AAPL, TSLA data files of current date (such as AAPL_20220618.csv TSLA_20220618.csv) from the given location and display the counts and average 'open' value. |