STEP BY STEP
PROJECT 3

Disusun Oleh:

Spiderweb Team

Spiderweb

DigitalSkola

TEAM MEMBER

KELOMPOK 5 FTDE-01

Hafidha Harfiana

Humairoh

Hermawan

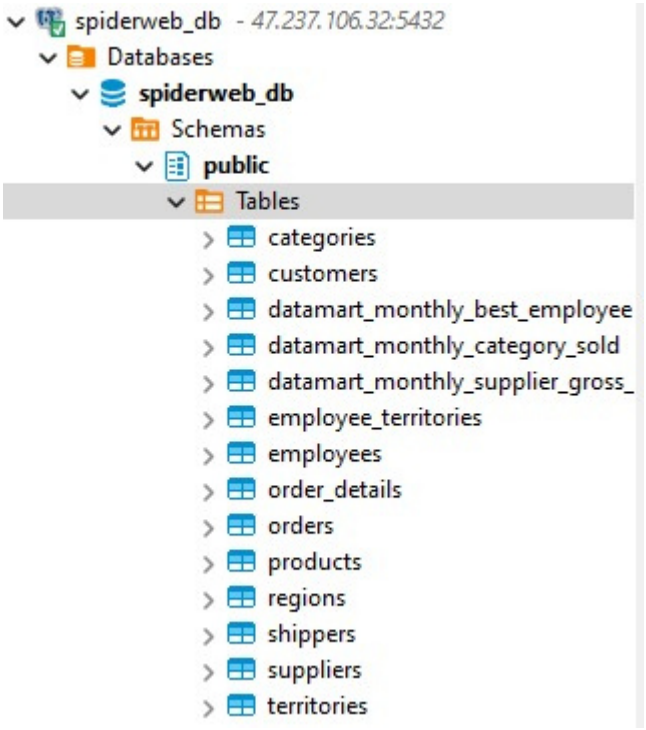
I Gusti Agung Krishna

I Putu Ferry Wstika

Fenny Inriana

FTDE-01 DigitalSkola

1. database sudah tersedia di postgre dengan rincian :



2.Menginstal lib yang diperlukan menggunakan !pip di google colab

```
!pip install psycopg2-binary pandas-gbq google-cloud-bigquery
```

3. Lalu kami memasukkan informasi koneksi ke postgreSQL (password dirahasikan untuk membuat dokumen ini)

```
import psycopg2
import pandas as pd

# Informasi koneksi
conn = psycopg2.connect(
    host="47.237.106.32",
    database="spiderweb_db",
    user="spiderweb_p3",
    password="-"
)

# Membuat cursor
cursor = conn.cursor()

# Mendapatkan nama-nama tabel
cursor.execute("""SELECT table_name FROM information_schema.tables
   WHERE table_schema = 'public'""")
tables = cursor.fetchall()

# Tampilkan daftar tabel
for table in tables:
    print(table[0])
```

4. Lalu membaca setiap tabel

```
def read_table_to_df(table_name):
    query = f"SELECT * FROM {table_name}"
    df = pd.read_sql_query(query, conn)
    return df

# Contoh membaca tabel pertama
table_name = tables[0][0]  # nama tabel pertama
df = read_table_to_df(table_name)
print(df.head())
```

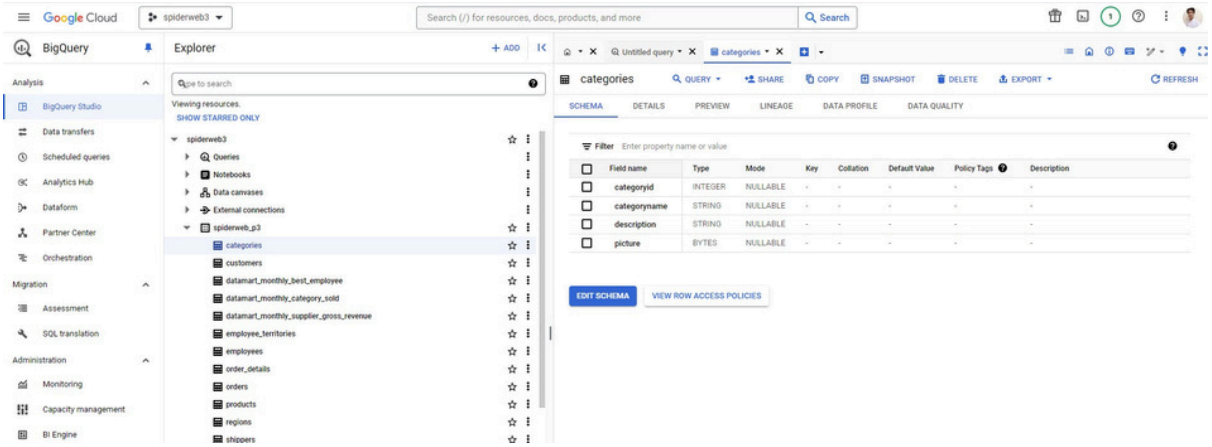
```
<ipython-input-12-e65708bb4e71>:3: UserWarning: pandas only supports SQLAlchemy connec
  df = pd.read_sql_query(query, conn)
  customerid                          companyname         contactname  \
0      ALFKI                    Alfreds Futterkiste        Maria Anders
1      ANATR  Ana Trujillo Emparedados y helados        Ana Trujillo
2      ANTON              Antonio Moreno Taquería      Antonio Moreno
3      AROUT                       Around the Horn        Thomas Hardy
4      BERGS                    Berglunds snabbköp  Christina Berglund

           contacttitle                     address        city region  \
0  Sales Representative                 Obere Str. 57      Berlin   NULL
1                 Owner  Avda. de la Constitución 2222  México D.F.   NULL
2                 Owner               Mataderos  2312  México D.F.   NULL
3  Sales Representative               120 Hanover Sq.      London   NULL
4   Order Administrator               Berguvsvägen  8       Luleå   NULL

  postalcode  country           phone             fax
0      12209  Germany     030-0074321     030-0076545
1      05021   Mexico    (5) 555-4729    (5) 555-3745
2      05023   Mexico    (5) 555-3932            NULL
3    WA1 1DP       UK  (171) 555-7788  (171) 555-6750
4   S-958 22   Sweden   0921-12 34 65   0921-12 34 67
```

5. Lalu menggunggah dataframe ke bigquery dengan ‘google-cloud-bigquery’

```
from google.cloud import bigquery

def upload_to_bigquery(df, table_id):
    job_config = bigquery.LoadJobConfig(
        write_disposition=bigquery.WriteDisposition.WRITE_TRUNCATE,
    )
    job = client.load_table_from_dataframe(df, table_id, job_config=job_config)
    job.result()  # Tunggu hingga pekerjaan selesai
    print(f"Data berhasil diunggah ke {table_id}!")

# Nama project dan dataset di BigQuery
project_id = 'spiderweb3'
dataset_id = 'spiderweb_p3'

# Loop untuk mengunggah setiap tabel ke BigQuery
for table in tables:
    table_name = table[0]
    print(f"Mengunggah tabel {table_name}...")
    df = read_table_to_df(table_name)
    table_id = f"{project_id}.{dataset_id}.{table_name}"
    upload_to_bigquery(df, table_id)
```

```
Mengunggah tabel customers...
<ipython-input-12-e65708bb4e71>:3: UserWarning: pandas only supports SQLAlchemy conn
  df = pd.read_sql_query(query, conn)
Data berhasil diunggah ke spiderweb3.spiderweb_p3.customers!
Mengunggah tabel employee_territories...
<ipython-input-12-e65708bb4e71>:3: UserWarning: pandas only supports SQLAlchemy conn
  df = pd.read_sql_query(query, conn)
Data berhasil diunggah ke spiderweb3.spiderweb_p3.employee_territories!
Mengunggah tabel employees...
<ipython-input-12-e65708bb4e71>:3: UserWarning: pandas only supports SQLAlchemy conn
  df = pd.read_sql_query(query, conn)
```

6.Kode sukses dijalankan dan data sudah tampil di bigquery. Kini kami sudah bisa melihat schema, details, dan preview dari masing-masing tabel.



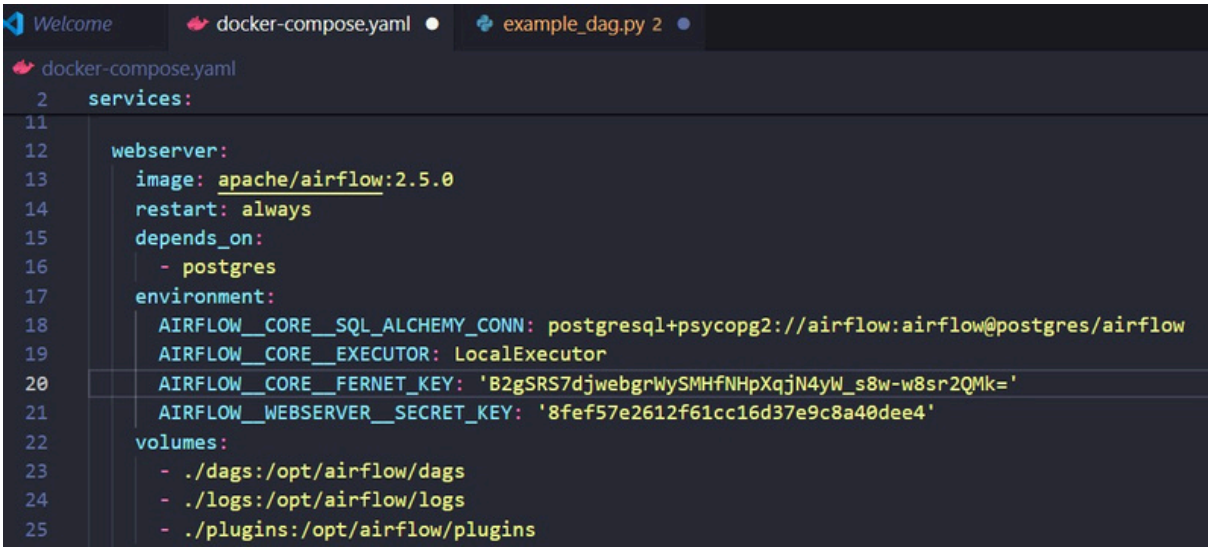
7. Pada git bash, saya membuat direktori baru dan pindah ke direktori tersebut. direktori ini bernama “airflow_docker”.

```
user@DESKTOP-39Q6M5E MINGW64 ~ (master)
$ cd airflow_docker

user@DESKTOP-39Q6M5E MINGW64 ~/airflow_docker (master)
$
```

8.Kami membuka VSCode dan memastikan bahwa folder direktori sudah terbuka untuk membuat file ocker-compose.yaml, namun sebelum itu saya mendefiniskan fernet key dan webserver secret key di git bash

```
user@DESKTOP-39Q6M5E MINGW64 ~/airflow_docker (master)
$ python -c "from cryptography.fernet import Fernet; prin
.decode())"
B2gSRS7djwebgrWySMHfNHpXqjN4yW_s8w-w8sr2QMk=

user@DESKTOP-39Q6M5E MINGW64 ~/airflow_docker (master)
$ python -c "import os; print(os.urandom(16).hex())"
8fef57e2612f61cc16d37e9c8a40dee4
```

9. Kami memasukkan unci fernet dan secret key webserver tersebut ke file docker-compose.yaml



10.Kami membuat file dag di dalam direktori dan memasukkan file example_day.py

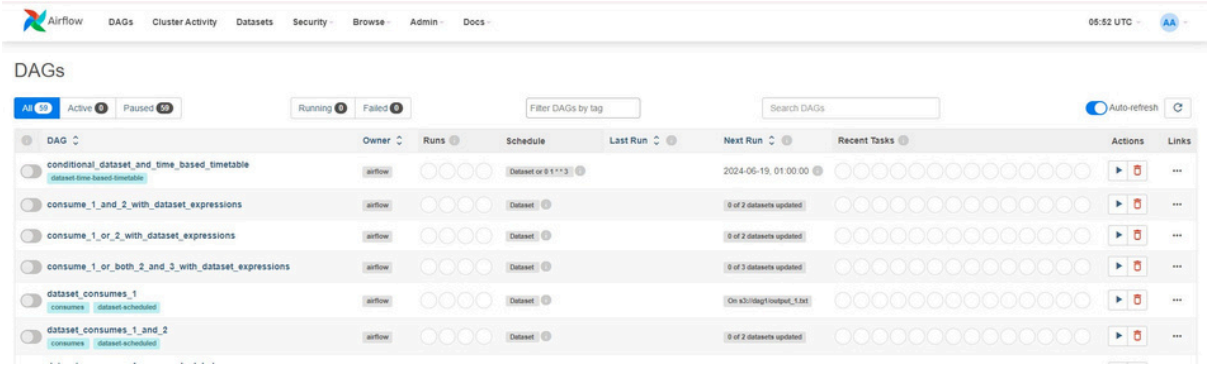
11.Kami menjalankan airflow

```
airflow-scheduler-1  | 127.0.0.1 - - [20/Jun/20
24 05:49:55] "GET /health HTTP/1.1" 200 -
airflow-webserver-1  | 127.0.0.1 - - [20/Jun/20
24:05:49:55 +0000] "GET /health HTTP/1.1" 200 3
18 "-" "curl/7.88.1"
airflow-triggerer-1  | [2024-06-20T05:50:04.388
+0000] {triggerer_job_runner.py:481} INFO - 0 t
riggers currently running
```

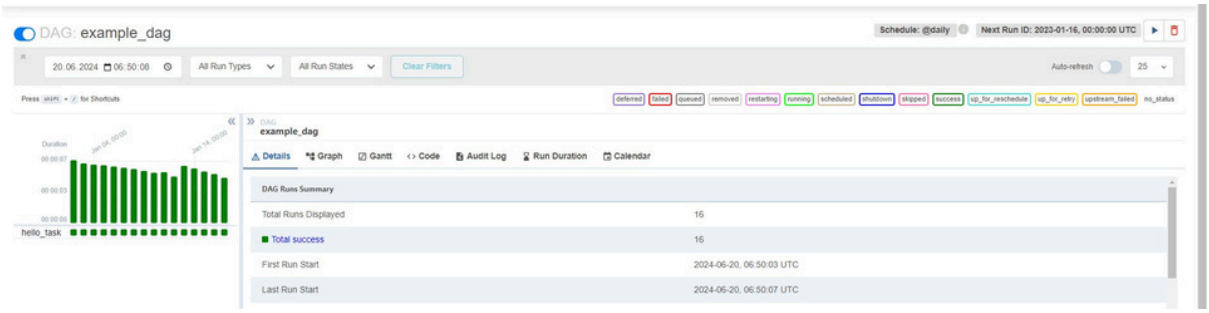
12.Kami mengecek airflow apakah running healthy

```
PS C:\Users\user\airflow_docker> docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED         STATUS                   PORTS                    NAMES
1a85964ce0b5   apache/airflow:2.9.2   "/usr/bin/dumb-init …"   4 minutes ago   Up 4 minutes (healthy)   8080/tcp                 airfl
ow_docker-airflow-triggerer-1
aced74419773   apache/airflow:2.9.2   "/usr/bin/dumb-init …"   4 minutes ago   Up 4 minutes (healthy)   8080/tcp                 airfl
ow_docker-airflow-scheduler-1
29c9ba69a301   apache/airflow:2.9.2   "/usr/bin/dumb-init …"   4 minutes ago   Up 4 minutes (healthy)   0.0.0.0:8080->8080/tcp   airfl
ow_docker-airflow-webserver-1
f84b87015107   apache/airflow:2.9.2   "/usr/bin/dumb-init …"   4 minutes ago   Up 4 minutes (healthy)   8080/tcp                 airfl
ow_docker-airflow-worker-1
b0632a3c933a   redis:7.2-bookworm     "docker-entrypoint.s…"   6 minutes ago   Up 6 minutes (healthy)   6379/tcp                 airfl
ow_docker-redis-1
9d1993a2906a   postgres:13            "docker-entrypoint.s…"   6 minutes ago   Up 6 minutes (healthy)   5432/tcp                 airfl
ow_docker-postgres-1
```

13.Kami saya akses airflow WEB UI



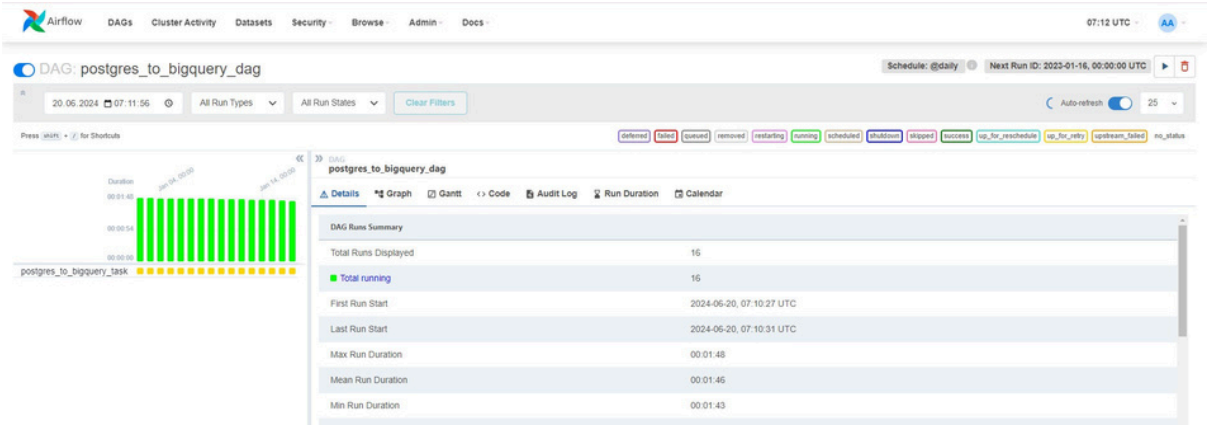
14.lalu kami mengaktifkan example_dag dan sudah memastikan task hello_task berjalan dengan sukses



15.lalu kami akan membuat DAG baru untuk mengotomatiskan proses ekstraksi data dari PostgreSQL dan mengunggahnya ke BigQuery. Misalnya, buat file `postgres_to_bigquery_dag.py` di direktori `dags`

```python
from airflow import DAG
from airflow.operators.python import Pythor
from datetime import datetime
import pandas as pd
import psycopg2
from google.cloud import bigquery
from google.oauth2 import service_account

def extract_postgres_to_df(table_name):
    conn = psycopg2.connect(
        host="47.237.106.32",
        database="spiderweb_db",
        user="spiderweb_p3",
        password="spiderweb_p3"
    )
    query = f"SELECT * FROM {table_name }"
    df = pd.read_sql_query(query, conn)
    return df
```

16. refresh airflow. lalu mengaktifkan postgres_to_biquery_dag dan sudah memastikan task task berjalan dengan sukses



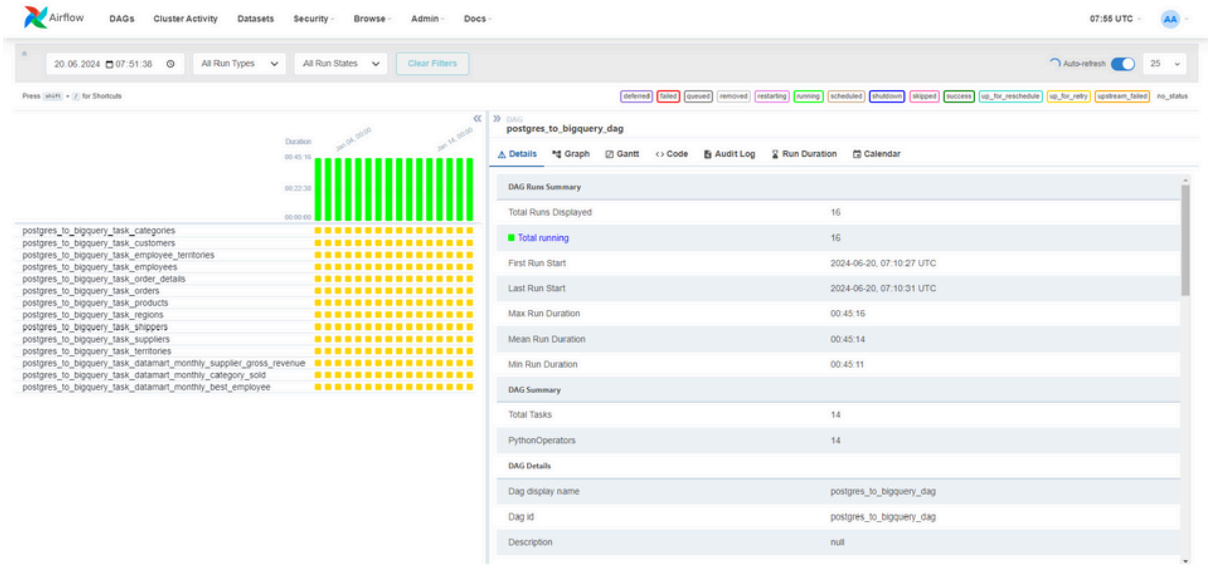
namun kami masih harus mengedit task untuk menampilkan semua tabel

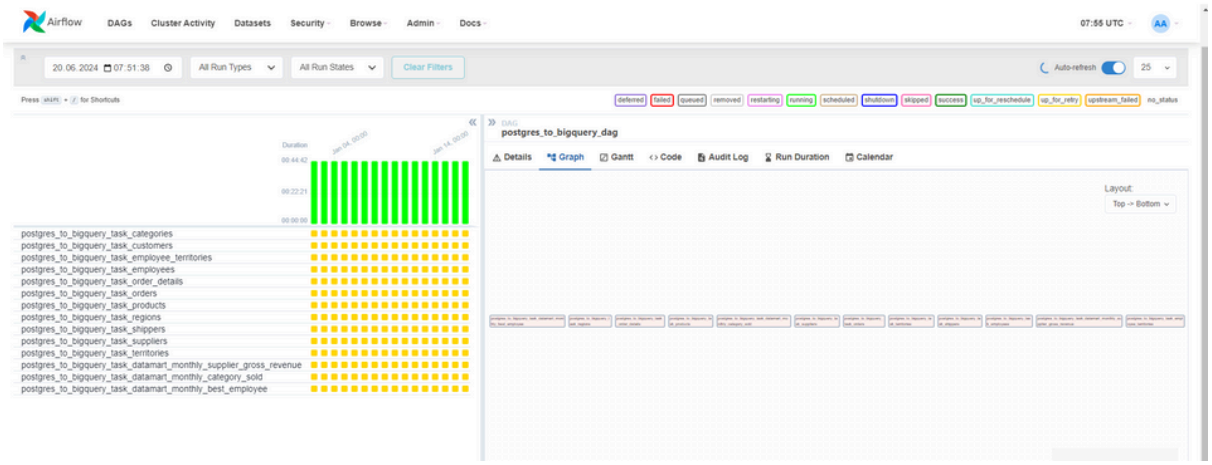
17. Kami menggunakan kode python sebagai berikut :

```python
# C:/Users/user/Downloads/spiderweb3-7a16d1d8cbf2.json

from airflow import DAG
from airflow.operators.python import PythonOperator
from datetime import datetime
import pandas as pd
import psycopg2
from google.cloud import bigquery
from google.oauth2 import service_accounte

# Definisi fungsi extract_postgres_to_df dan load_df_to_bigquery seperti sebelumnya

def postgres_to_bigquery_task(table_name, table_id, host, database, user, password, key_path):
    try:
        df = extract_postgres_to_df(host, database, user, password, table_name)
        load_df_to_bigquery(df, table_id, key_path)
        print(f"Task for table {table_name} completed successfully.")
    except Exception as e:
        print(f"Error processing table {table_name}: {str(e)}")
        raise e

# Definisi default arguments untuk DAG
default_args = {
    'owner': 'airflow',
    'depends_on_past': False,
    'start_date': datetime(2023, 1, 1),
    'retries': 1,
}

# Buat DAG
with DAG(
    'postgres_to_bigquery_dag',
    default_args=default_args,
    schedule_interval='@daily',
) as dag:
```

```python
# Daftar tabel-tabel yang ingin diekstrak dan dimuat ke BigQuery
tables_to_process = [
    {'table_name': 'categories', 'table_id': 'spiderweb3.spiderweb_p3.categories'},
    {'table_name': 'customers', 'table_id': 'spiderweb3.spiderweb_p3.customers'},
    {'table_name': 'employee_territories', 'table_id': 'spiderweb3.spiderweb_p3.employee_territories'},
    {'table_name': 'employees', 'table_id': 'spiderweb3.spiderweb_p3.employees'},
    {'table_name': 'order_details', 'table_id': 'spiderweb3.spiderweb_p3.order_details'},
    {'table_name': 'orders', 'table_id': 'spiderweb3.spiderweb_p3.orders'},
    {'table_name': 'products', 'table_id': 'spiderweb3.spiderweb_p3.products'},
    {'table_name': 'regions', 'table_id': 'spiderweb3.spiderweb_p3.regions'},
    {'table_name': 'shippers', 'table_id': 'spiderweb3.spiderweb_p3.shippers'},
    {'table_name': 'suppliers', 'table_id': 'spiderweb3.spiderweb_p3.suppliers'},
    {'table_name': 'territories', 'table_id': 'spiderweb3.spiderweb_p3.territories'},
    {'table_name': 'datamart_monthly_supplier_gross_revenue', 'table_id': 'spiderweb3.spiderweb_p3.datamart_monthly_supplier_gross_revenue'},
    {'table_name': 'datamart_monthly_category_sold', 'table_id': 'spiderweb3.spiderweb_p3.datamart_monthly_category_sold'},
    {'table_name': 'datamart_monthly_best_employee', 'table_id': 'spiderweb3.spiderweb_p3.datamart_monthly_best_employee'}
    # Tambahkan tabel-tabel lainnya sesuai kebutuhan
]

# Definisi task untuk setiap tabel
for table_info in tables_to_process:
    task_id = f'postgres_to_bigquery_task_{table_info["table_name"]}'
    PythonOperator(
        task_id=task_id,
        python_callable=postgres_to_bigquery_task,
        op_args=[table_info['table_name'], table_info['table_id'],
                 '47.237.106.32', 'spiderweb_db', 'spiderweb_p3', 'spiderweb_p3',
                 'C:/Users/user/Downloads/spiderweb3-7a16d1d8cbf2.json'],  # Ganti dengan lokasi kunci Anda
    )
```

18.lalu saya jalankan di airflow dan mendapat hasil :





DAG
postgres to bigquery dag

Details | Graph | Gantt | Code | Audit Log | Run Duration | Calendar

Parsed at: 2024-06-20, 07:51:26 UTC

```python
# C:/Users/user/Downloads/spiderweb3-7a16d1d8cbf2.json

from airflow import DAG
from airflow.operators.python import PythonOperator
from datetime import datetime
import pandas as pd
import psycopg2
from google.cloud import bigquery
from google.oauth2 import service_account

# Definisi fungsi extract_postgres_to_df dan load_df_to_bigquery seperti sebelumnya

def postgres_to_bigquery_task(table_name, table_id, host, database, user, password, key_path):
    try:
        df = extract_postgres_to_df(host, database, user, password, table_name)
        load_df_to_bigquery(df, table_id, key_path)
        print(f"Task for table {table_name} completed successfully.")
    except Exception as e:
        print(f"Error processing table {table_name}: {str(e)}")
        raise e

# Definisi default arguments untuk DAG
default_args = {
    'owner': 'airflow',
    'depends_on_past': False,
    'start_date': datetime(2023, 1, 1),
    'retries': 1,
}

# Buat DAG
with DAG(
    'postgres_to_bigquery_dag',
    default_args=default_args,
    schedule_interval='@daily',
) as dag:

    # Daftar tabel-tabel yang ingin diekstrak dan dimuat ke BigQuery
    tables_to_process = [
        {'table_name': 'categories', 'table_id': 'spiderweb3.spiderweb_p3.categories'},
        {'table_name': 'customers', 'table_id': 'spiderweb3.spiderweb_p3.customers'},
        {'table_name': 'employee_territories', 'table_id': 'spiderweb3.spiderweb_p3.employee_territories'},
        {'table_name': 'employees', 'table_id': 'spiderweb3.spiderweb_p3.employees'},
        {'table_name': 'order_details', 'table_id': 'spiderweb3.spiderweb_p3.order_details'},
        {'table_name': 'orders', 'table_id': 'spiderweb3.spiderweb_p3.orders'},
        {'table_name': 'products', 'table_id': 'spiderweb3.spiderweb_p3.products'},
        {'table_name': 'regions', 'table_id': 'spiderweb3.spiderweb_p3.regions'},
        {'table_name': 'shippers', 'table_id': 'spiderweb3.spiderweb_p3.shippers'},
        {'table_name': 'suppliers', 'table_id': 'spiderweb3.spiderweb_p3.suppliers'},
        {'table_name': 'territories', 'table_id': 'spiderweb3.spiderweb_p3.territories'},
        {'table_name': 'datamart_monthly_supplier_gross_revenue', 'table_id': 'spiderweb3.spiderweb_p3.datamart_monthly_supplier_gross_revenue'},
        {'table_name': 'datamart_monthly_category_sold', 'table_id': 'spiderweb3.spiderweb_p3.datamart_monthly_category_sold'},
        {'table_name': 'datamart_monthly_best_employee', 'table_id': 'spiderweb3.spiderweb_p3.datamart_monthly_best_employee'}
        # Tambahkan tabel-tabel lainnya sesuai kebutuhan
    ]

    # Definisi task untuk setiap tabel
    for table_info in tables_to_process:
        task_id = f'postgres_to_bigquery_task_{table_info["table_name"]}'
        PythonOperator(
            task_id=task_id,
            python_callable=postgres_to_bigquery_task,
            op_args=[table_info['table_name'], table_info['table_id'],
                     '47.237.106.32', 'spiderweb_db', 'spiderweb_p3', 'spiderweb_p3',
                     'C:/Users/user/Downloads/spiderweb3-7a16d1d8cbf2.json'],  # Ganti dengan lokasi kunci Anda
        )
```