Building
Modern Data Stacks

Project Brief

Adventure Works

Adventure works is a bicycle manufacturing company. This project demonstrated how to build data pipelines for an e-commerce, implement machine learning models, and develop business intelligence reporting solutions.

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Building
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First Things First !!!

Four Key Questions

I. Where do we consolidate our data ? > Storage
II. How will we get it there ? > Ingestion
III. How will we clean it up? > Transformation
IV. How will we analyze it? > Reporting

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The
Big Choice

Data Stack

Popular Options

Storage > Snowflake, BigQuery, s3, Redshift
Ingestion > Airbyte, Airflow, Fivetran
Transformation > dbt
Reporting > Tableau, Power BI, Looker, Superset

N/B This is not an exhaustive list.

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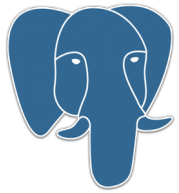
Data Stack Architecture Design

Source

PostgreSQL



Ingestion

Airflow

+

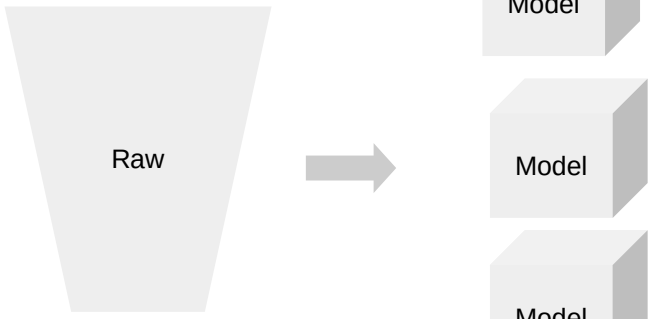
Python

Storage
BigQuery

Amazon **Redshift**

Transformation
dbt

dbt



Reporting

Looker

looker

End Goal

Put data to use

“Data is like garbage. You’d better know what you are going to do with it before you collect it.”

~ Mark Twain

PROJECTS

01

Storage/Database/Data Warehouse
Google BigQuery
Snowflake
AWS Redshift

02

Ingestion
Apache Airflow
Airbyte
Dagster

03

Transformation
Setting up dbt
Building Models

04

Reporting
Looker
Tableau
Power BI

02

INGESTION – Apache Airflow

Setting up Apache Airflow - Documentation

Python ELT (Extract Load Transform) script

```
# importing libraries

from airflow.decorators import dag, task
from datetime import datetime, timedelta
import requests
from google.cloud import bigquery
import pandas as pd
import psycopg2
from io import StringIO
```

02

INGESTION

Setting up Apache Airflow

Defining a DAG - Directed Acyclic Graph

```
args{
    ”owner”:”gwayi”,
    "retries": 1,
    "retry_delay":timedelta(minutes=5)
    }


@dag(
    default_arguments = args
    schedule=timedelta(minutes=30),
    start_date=datetime(2024, 7, 29),
    catchup=False,
    tags=['Team B']
    )
```

02

INGESTION

Setting up Apache Airflow

Extract Task Group – Source PostgreSQL Database

```
@task()
def extract():
  try:
     src_cursor.execute(sql)
     tables = cursor.fetchall()

     output = {}

     for table in tables:
       cursor.execute(f"SELECT *
              FROM {table[0]}")
rows = cursor.fetchall()

output.update({table[0]: rows})
       return output

    except Exception as e:
        print("extract error:" +
str(e))

    finally:
        connection.close()
output = extract()
```

02

INGESTION

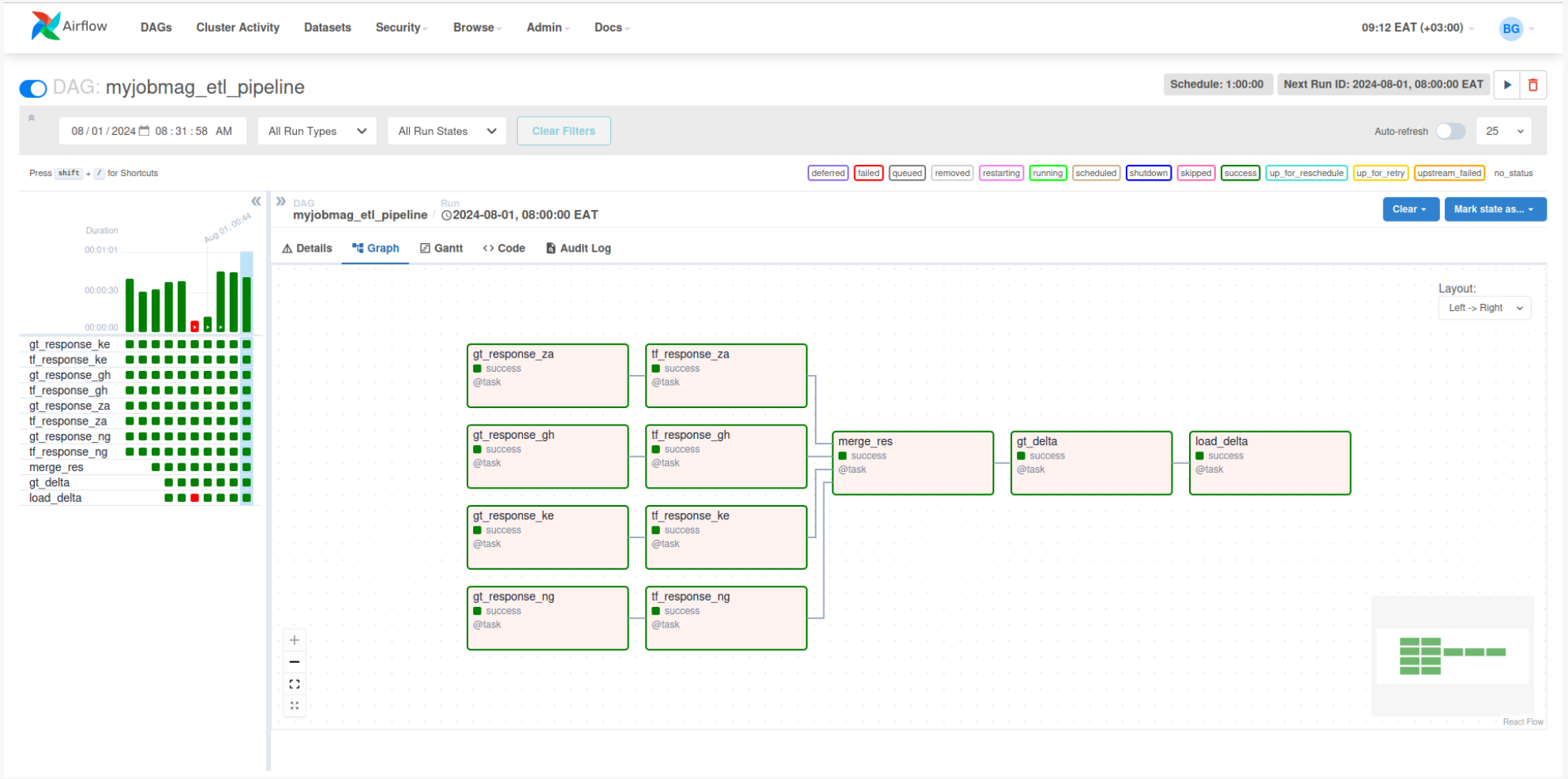
Setting up Apache Airflow

Load Task Group – Destination BigQuery

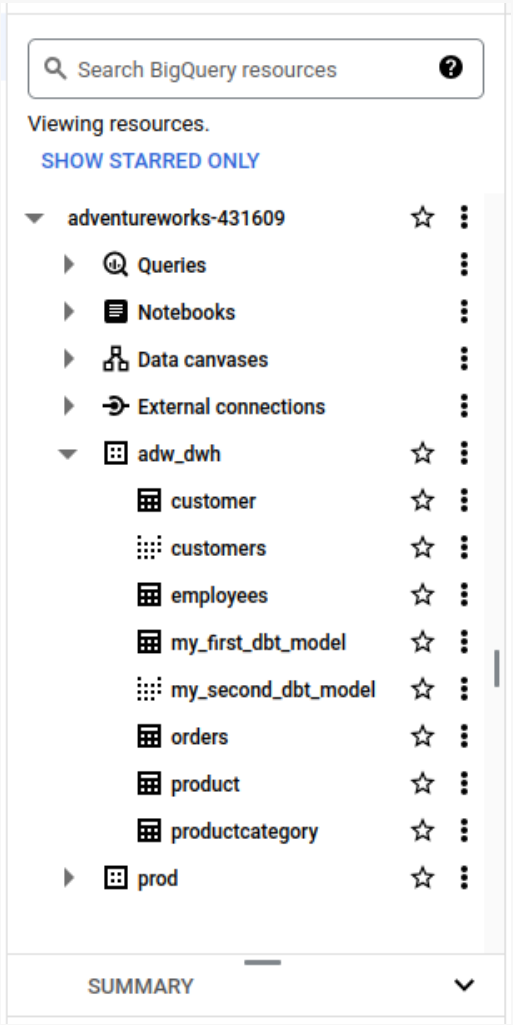
```
task()
@def load(dict):
    pandas_gbq.to_gbq(
        df,

        project_id=project_id,
        if_exists=append,
load(data)
```

```
Set dependencies

extract = extract()
load = load(extract)

extract >> load
```

Orchestrating Data Pipeline - Airflow



Google BigQuery



SCHEMA | DETAILS | PREVIEW | TABLE EXPLORER PREVIEW | INSIGHTS PREVIEW | LINEAGE

Row	customerid	firstname	lastname	fullname
1	1305	A.	Leonetti	A. Leonetti
2	1305	A.	Leonetti	A. Leonetti
3	829	Ed	Dudenhoefer	Ed Dudenhoefer
4	829	Ed	Dudenhoefer	Ed Dudenhoefer
5	1953	H.	Valentine	H. Valentine
6	1953	H.	Valentine	H. Valentine
7	539	Jo	Brown	Jo Brown
8	539	Jo	Brown	Jo Brown
9	1917	Abe	Tramel	Abe Tramel
10	1917	Abe	Tramel	Abe Tramel
11	323	Amy	Alberts	Amy Alberts
12	323	Amy	Alberts	Amy Alberts
13	735	Amy	Consentino	Amy Consentino
14	735	Amy	Consentino	Amy Consentino
15	1033	Ann	Hass	Ann Hass
16	1033	Ann	Hass	Ann Hass
17	437	Ann	Beebe	Ann Beebe