Project: Adventure Works

Foundation 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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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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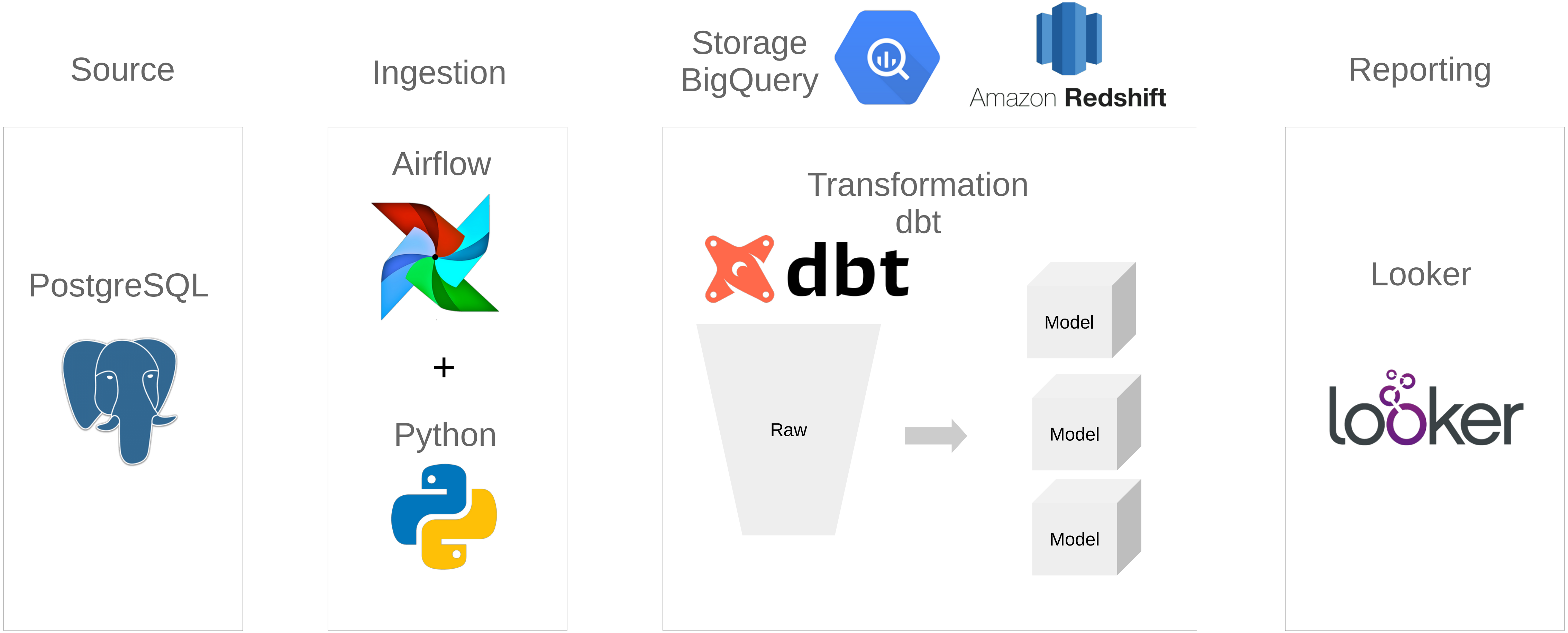
Simple Modern Data Stack Architecture



Source

PostgreSQL

Ingestion

Airflow

+

Python

Storage
BigQuery

Transformation
dbt

Raw

Model

Model

Model

Reporting

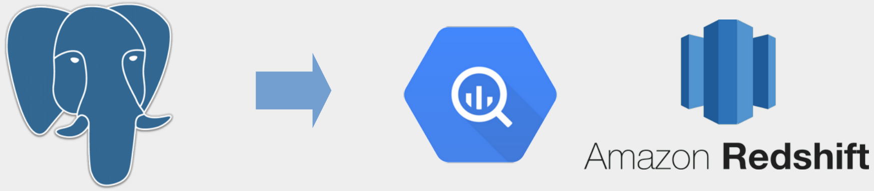
Looker

End Goal

Push data

Online Transaction Processing

Online Analytical Processing



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Content

01

Storage/Database
Setting Google BigQuery | AWS Redshift

02

Ingestion
Setting up Apache Airflow
Writing ELT Python script
Orchestrate data pipeline

03

Transformation
Setting up dbt

04

Reporting
Connecting Looker

02

Ingestion

Setting up Apache Airflow

– Airflow Documentation

- Production Deployment Documentation

Writing ELT Python Script

- .py Code - Extract & Load

Python

```python
# 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

– Airflow Documentation

- Production Deployment Documentation

Writing ELT Python Script

- .py Code - Extract & Load

Python

```
# instantiating DAG

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 Writing ELT Python Script

- .py Code - Extract & Load

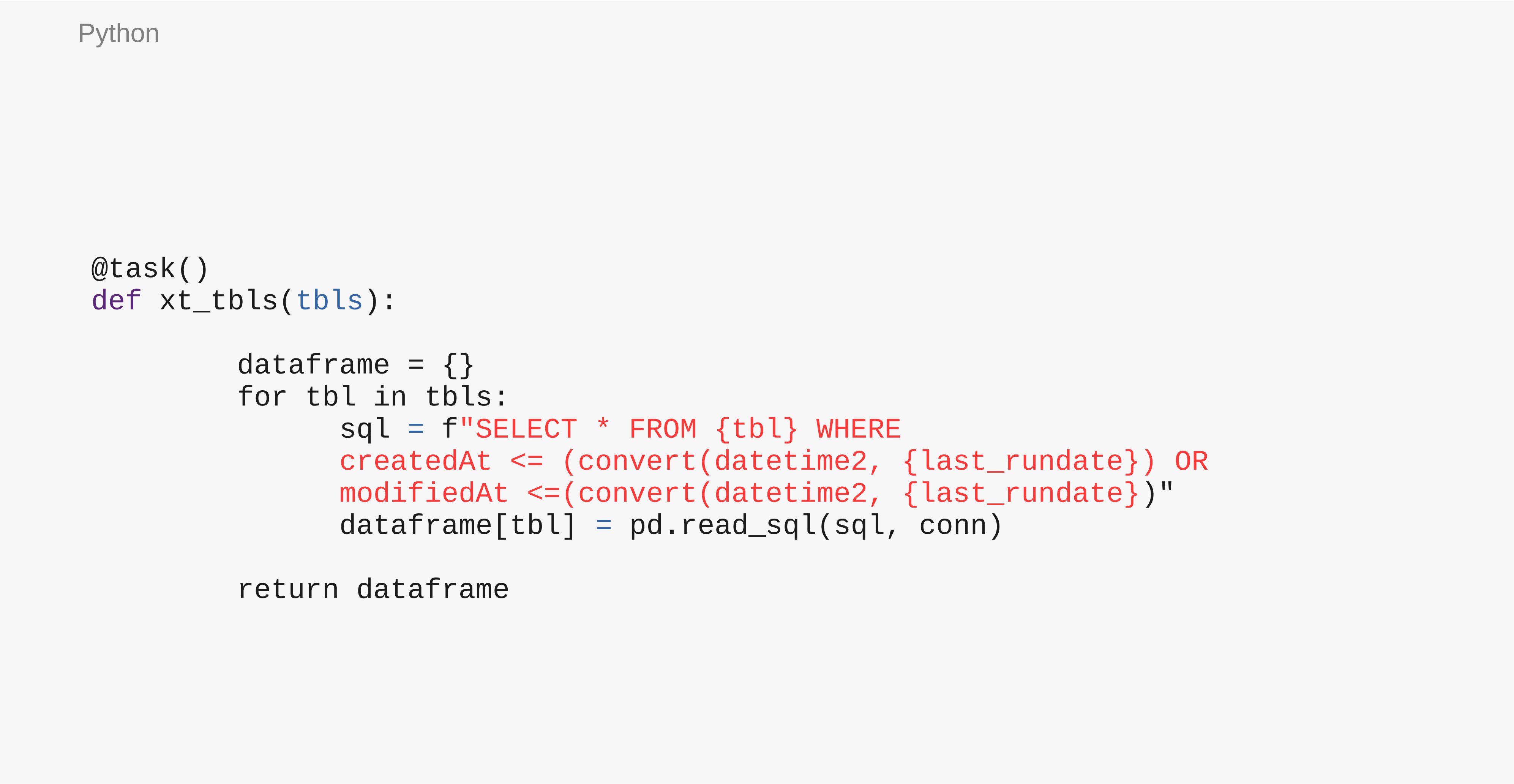
Python

```
@task()
def gt_tbls(conn):

     sql = """SELECT table_name
     FROM information_schema.tables
     WHERE table_type = 'BASE TABLE'
     AND table_catalog = 'adventure_works'
     AND table_schema NOT IN
     ('pg_catalog','information_schema');"""

     cursor = conn.cursor()
     cursor.execute(sql)
     tbls=cursor.fetchall()

     conn.commit()
     conn.close()

     tbls = [x[0] for x in tbls]
     Return tbls
```

02

Writing ELT Python Script

[- .py Code - Extract & Load]



Python

```python
@task()
def xt_tbls(tbls):

        dataframe = {}
        for tbl in tbls:
              sql = f"SELECT * FROM {tbl} WHERE
              createdAt <= (convert(datetime2, {last_rundate}) OR
              modifiedAt <=(convert(datetime2, {last_rundate})"
              dataframe[tbl] = pd.read_sql(sql, conn)

        return dataframe
```

02

Writing ELT Python Script

- .py Code - Extract & Load

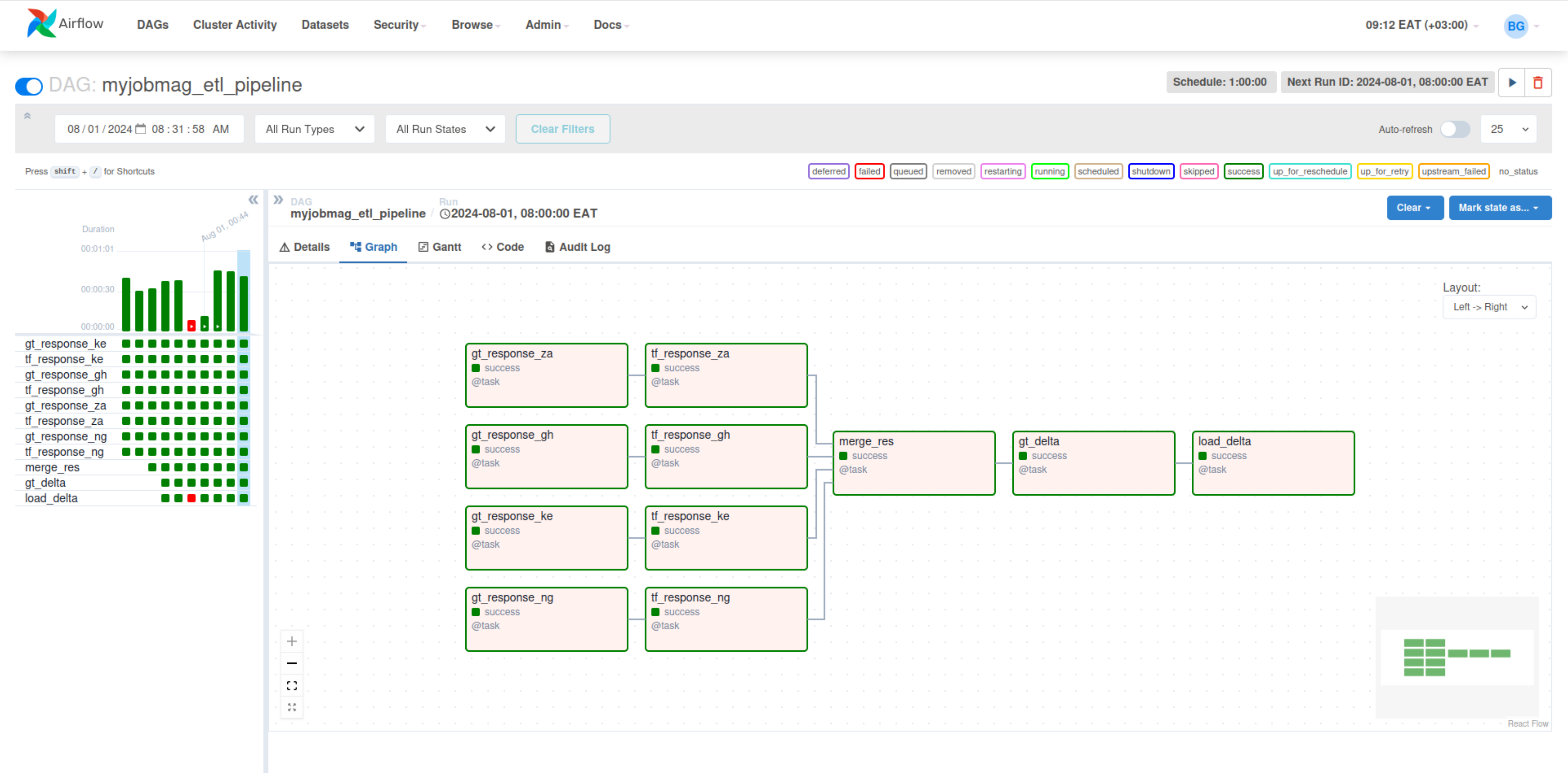
Python

```python
@task()

def upsert_tbls(df):
        client = bigquery.Client()
        table_id = "adventureworks-431609.adw_dwh.customer"
        job = client.load_table_from_dataframe(df, table_id)
        job.result()
        print(f"uploading data to Google BigQuery is {job.state}")
upsert_tbla()
```

02

Ingestion

Orchestrating & Running Workflow – Apache Airflow



DAG: myjobmag_etl_pipeline

Schedule: 1:00:00

Next Run ID: 2024-08-01, 08:00:00 EAT

08 / 01 / 2024 08 : 31 : 58 AM

All Run Types

All Run States

Auto-refresh 25

gt_response_ke
tf_response_ke
gt_response_gh
tf_response_gh
gt_response_za
tf_response_za
gt_response_ng
tf_response_ng
merge_res
gt_delta
load_delta

DAG myjobmag_etl_pipeline / Run 2024-08-01, 08:00:00 EAT

gt_response_za success @task

tf_response_za success @task

gt_response_gh success @task

tf_response_gh success @task

gt_response_ke success @task

tf_response_ke success @task

gt_response_ng success @task

tf_response_ng success @task

merge_res success @task

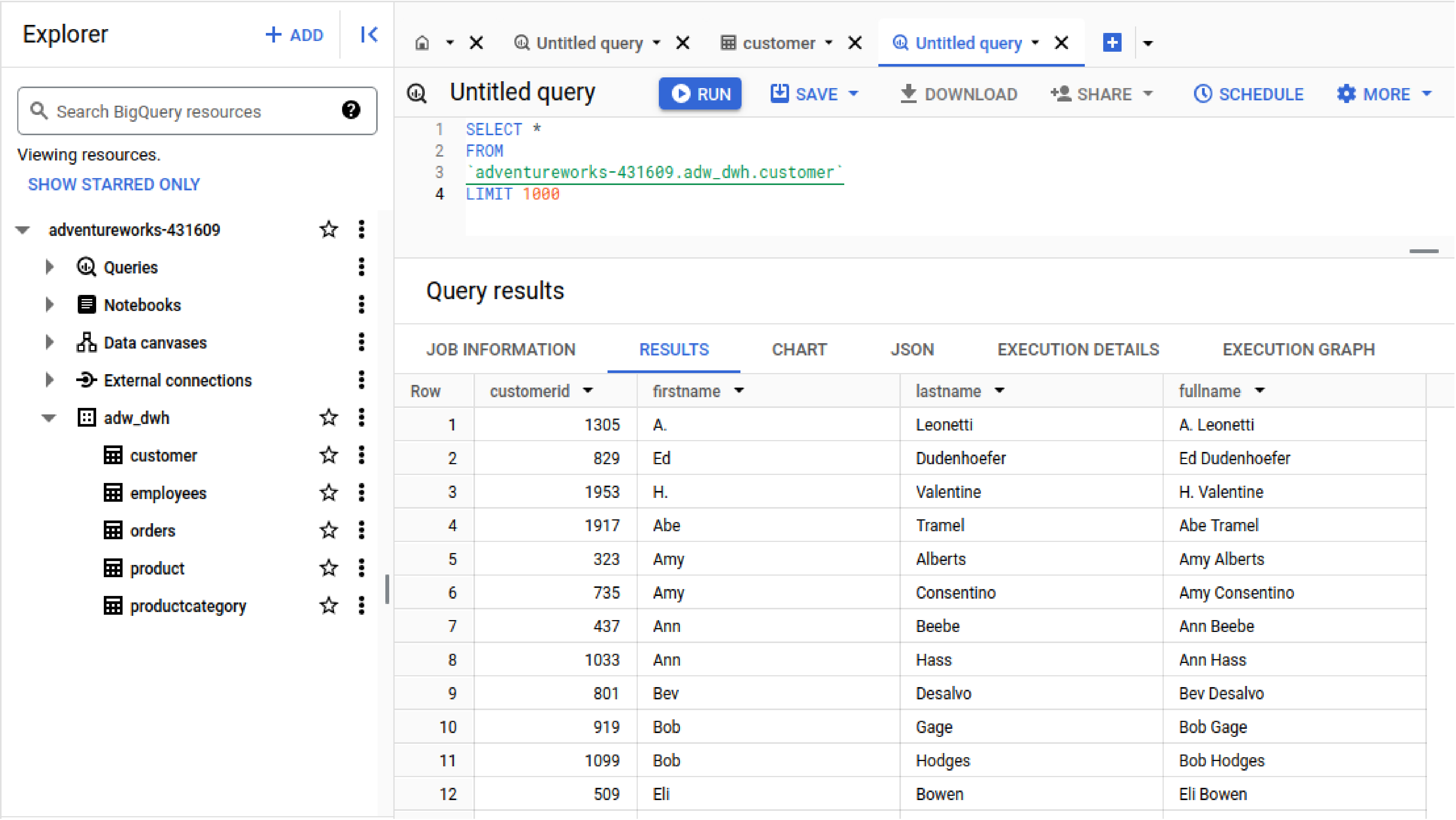
gt_delta success @task

load_delta success @task

02

Ingestion

Data loaded in Google BigQuery



```sql
SELECT *
FROM
`adventureworks-431609.adw_dwh.customer`
LIMIT 1000
```

Row	customerid	firstname	lastname	fullname
1	1305	A.	Leonetti	A. Leonetti
2	829	Ed	Dudenhoefer	Ed Dudenhoefer
3	1953	H.	Valentine	H. Valentine
4	1917	Abe	Tramel	Abe Tramel
5	323	Amy	Alberts	Amy Alberts
6	735	Amy	Consentino	Amy Consentino
7	437	Ann	Beebe	Ann Beebe
8	1033	Ann	Hass	Ann Hass
9	801	Bev	Desalvo	Bev Desalvo
10	919	Bob	Gage	Bob Gage
11	1099	Bob	Hodges	Bob Hodges
12	509	Eli	Bowen	Eli Bowen

03

Transformation

Getting started with dbt

- Getting started documentation

Terminal

```
python -m venv adw_dbt # create virtual environment

cd adw_dbt # change into directory

source adw_dbt-env/bin/activate # activate environment

pip install dbt-core dbt-bigquery # install dbt + adapter

dbt –version # check version

dbt init <project_name> # initiate dbt project

dbt debug # debug setup

dbt run # run dbt models
```

03

Transformation

Building Data Models

Python