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

BRIAN GWAYI

Data Stack

Popular Options

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

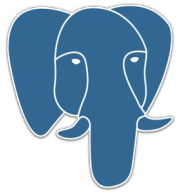
N/B This is not an exhaustive list.

BRIAN GWAYI

Data Pipeline Architecture Design

Source

PostgreSQL



Ingestion

Airflow

+

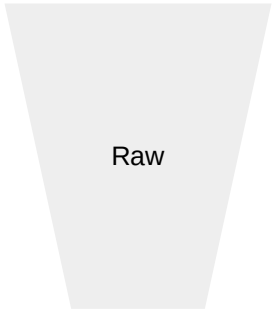
Python

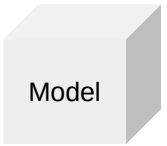
Storage
BigQuery

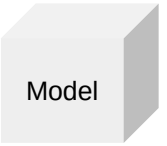
Amazon **Redshift**

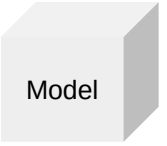
Transformation
dbt

dbt









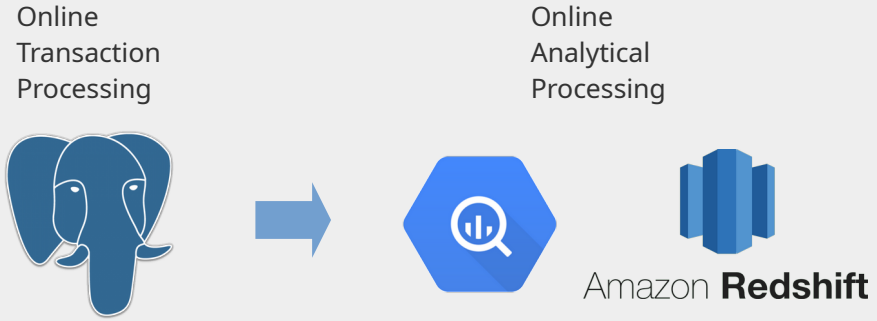
Reporting

Looker

looker

End Goal

Push data



BRIAN GWAYI

Content

01 **Storage/Database**
Setting Google BigQuery

02 **Ingestion**
Setting up Apache Airflow
Writing elt Python script
Orchestrate data pipeline

03 **Transformation**
Setting up dbt
Transformation

04 **Reporting**
Connecting Looker

02

Ingestion

Setting up Apache Airflow

– Airflow Documentation

- Production Deployment Documentation

Writing ELT Python Script

- .py Code - Extract & Load

```
# 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

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

```
@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

Task 2

Extract tables

```
@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)
```

02

Writing ELT Python Script

- .py Code - Extract & Load

Task 3

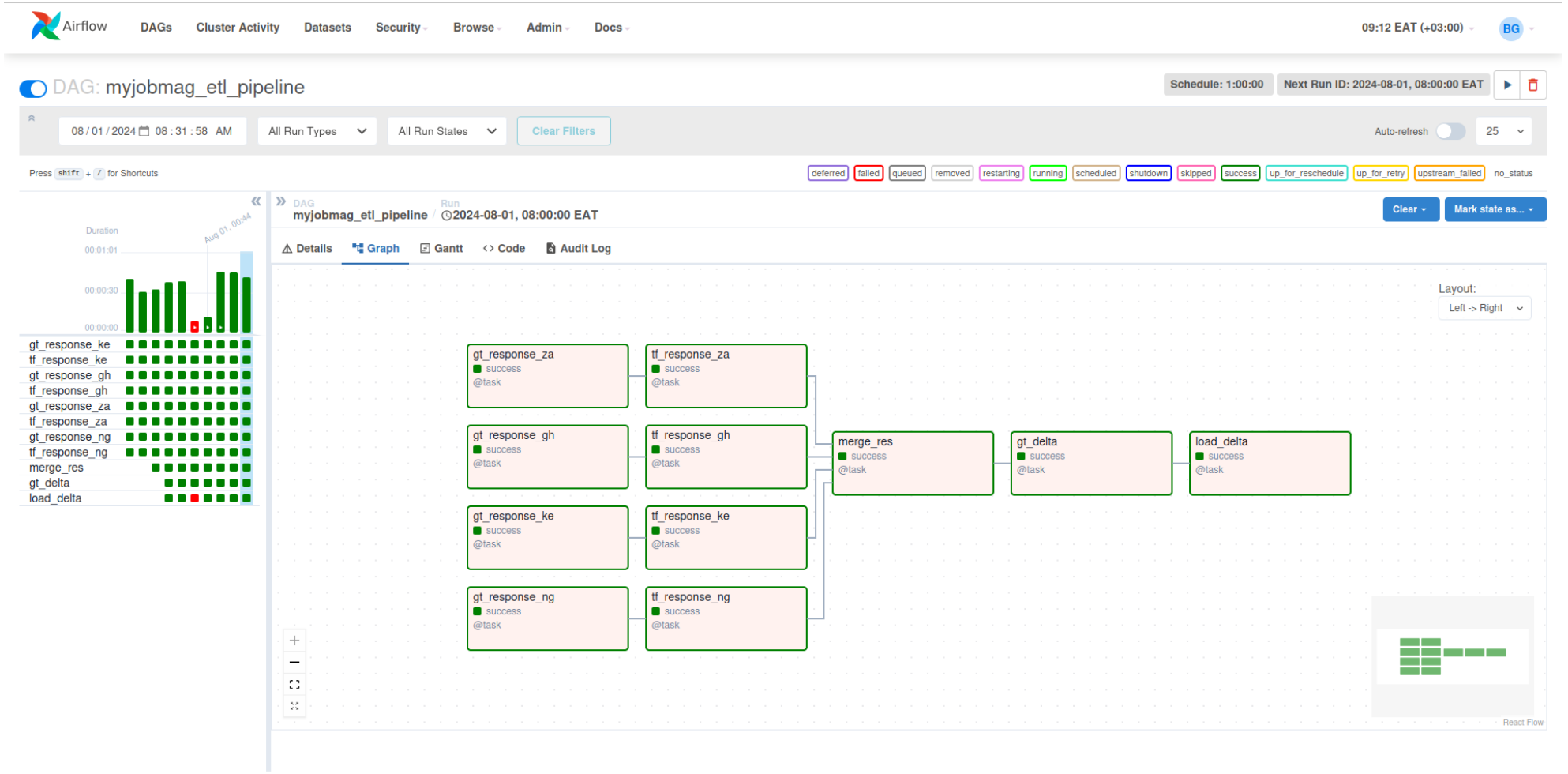
Upsert rowsBigQuery

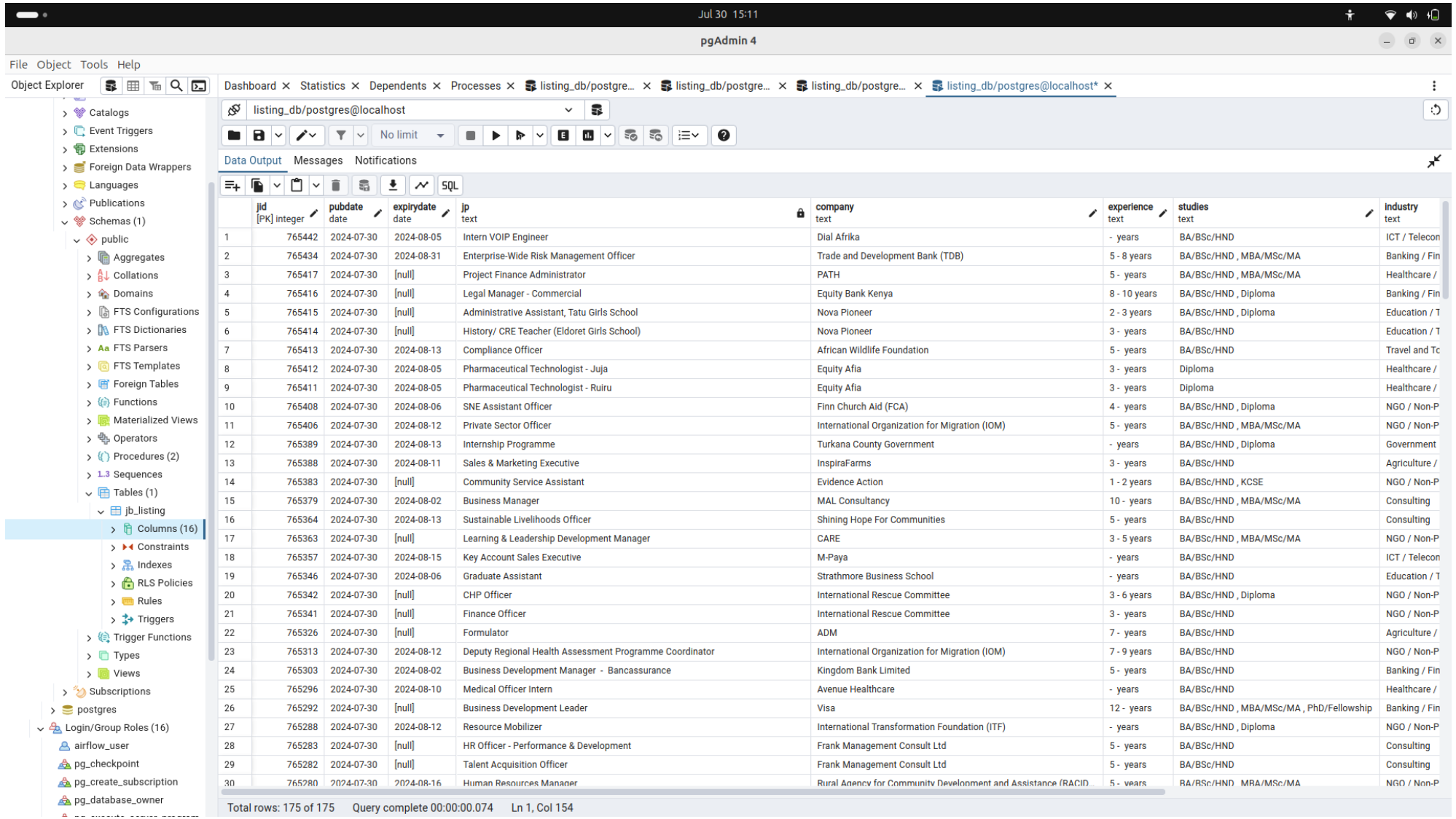
```
@task()
def upsert_tbls(df):
        client = bigquery.Client()
        table_id = "adventureworks-431609.adw_dwh.customer"
        job = client.load_table_from_dataframe(df, table_id)
        job.result()
        print(f"uploading data to Google BigQuery is {job.state}")
upsert()
```

02

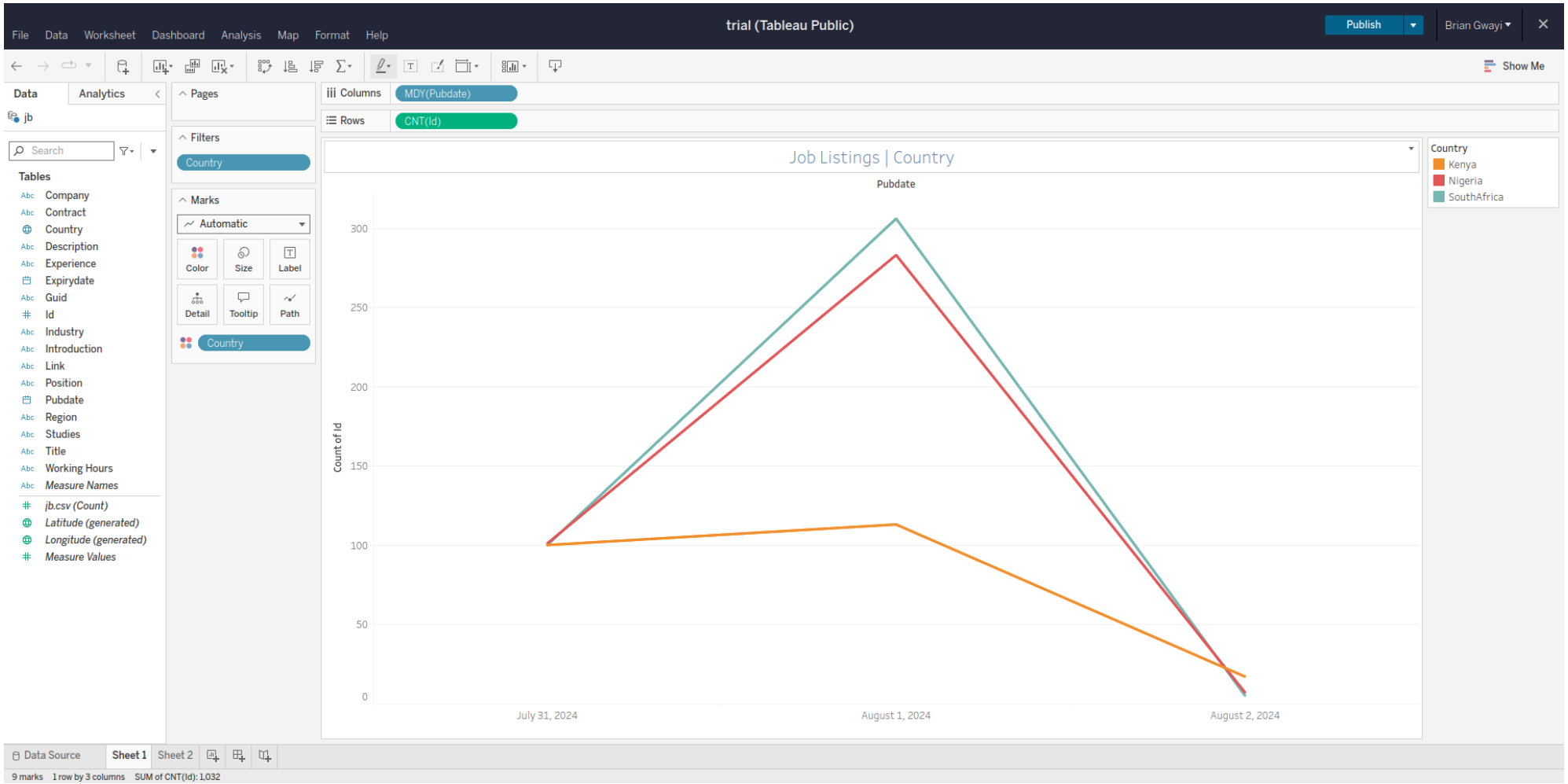
Ingestion

Orchestrating Workflow – Apache Airflow



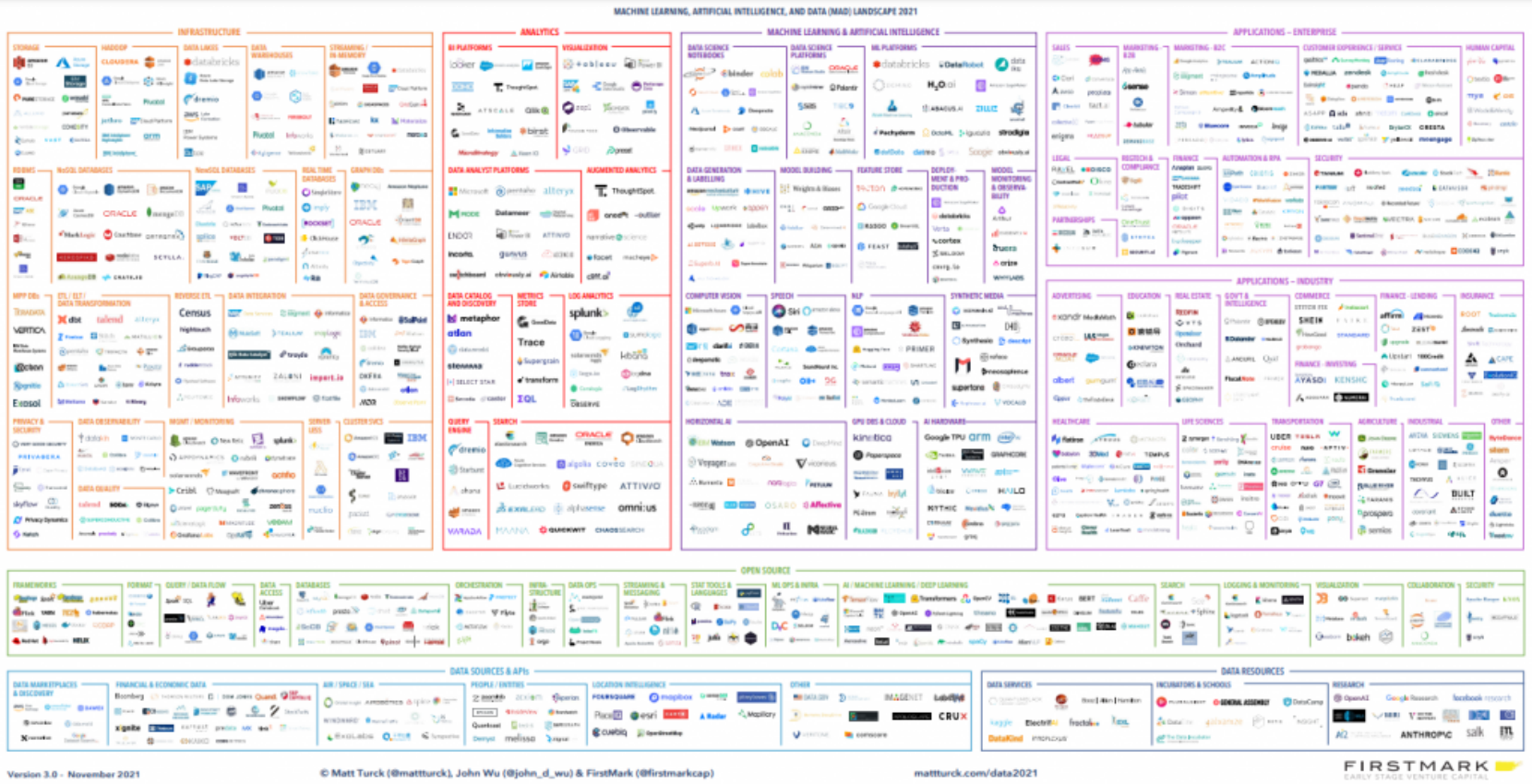


	jid [PK] integer	pubdate date	expirydate date	jp text	company text	experience text	studies text	industry text
1	765442	2024-07-30	2024-08-05	Intern VOIP Engineer	Dial Afrika	- years	BA/BSc/HND	ICT / Telecon
2	765434	2024-07-30	2024-08-31	Enterprise-Wide Risk Management Officer	Trade and Development Bank (TDB)	5 - 8 years	BA/BSc/HND , MBA/MSc/MA	Banking / Fin
3	765417	2024-07-30	[null]	Project Finance Administrator	PATH	5 - years	BA/BSc/HND , MBA/MSc/MA	Healthcare /
4	765416	2024-07-30	[null]	Legal Manager - Commercial	Equity Bank Kenya	8 - 10 years	BA/BSc/HND , Diploma	Banking / Fin
5	765415	2024-07-30	[null]	Administrative Assistant, Tatu Girls School	Nova Pioneer	2 - 3 years	BA/BSc/HND , Diploma	Education / T
6	765414	2024-07-30	[null]	History/ CRE Teacher (Eldoret Girls School)	Nova Pioneer	3 - years	BA/BSc/HND	Education / T
7	765413	2024-07-30	2024-08-13	Compliance Officer	African Wildlife Foundation	5 - years	BA/BSc/HND	Travel and Tc
8	765412	2024-07-30	2024-08-05	Pharmaceutical Technologist - Juja	Equity Afia	3 - years	Diploma	Healthcare /
9	765411	2024-07-30	2024-08-05	Pharmaceutical Technologist - Ruiru	Equity Afia	3 - years	Diploma	Healthcare /
10	765408	2024-07-30	2024-08-06	SNE Assistant Officer	Finn Church Aid (FCA)	4 - years	BA/BSc/HND , Diploma	NGO / Non-P
11	765406	2024-07-30	2024-08-12	Private Sector Officer	International Organization for Migration (IOM)	5 - years	BA/BSc/HND , MBA/MSc/MA	NGO / Non-P
12	765389	2024-07-30	2024-08-13	Internship Programme	Turkana County Government	- years	BA/BSc/HND , Diploma	Government
13	765388	2024-07-30	2024-08-11	Sales & Marketing Executive	InspiraFarms	3 - years	BA/BSc/HND	Agriculture /
14	765383	2024-07-30	[null]	Community Service Assistant	Evidence Action	1 - 2 years	BA/BSc/HND , KCSE	NGO / Non-P
15	765379	2024-07-30	2024-08-02	Business Manager	MAL Consultancy	10 - years	BA/BSc/HND , MBA/MSc/MA	Consulting
16	765364	2024-07-30	2024-08-13	Sustainable Livelihoods Officer	Shining Hope For Communities	5 - years	BA/BSc/HND	Consulting
17	765363	2024-07-30	[null]	Learning & Leadership Development Manager	CARE	3 - 5 years	BA/BSc/HND , MBA/MSc/MA	NGO / Non-P
18	765357	2024-07-30	2024-08-15	Key Account Sales Executive	M-Paya	- years	BA/BSc/HND	ICT / Telecon
19	765346	2024-07-30	2024-08-06	Graduate Assistant	Strathmore Business School	- years	BA/BSc/HND	Education / T
20	765342	2024-07-30	[null]	CHP Officer	International Rescue Committee	3 - 6 years	BA/BSc/HND , Diploma	NGO / Non-P
21	765341	2024-07-30	[null]	Finance Officer	International Rescue Committee	3 - years	BA/BSc/HND	NGO / Non-P
22	765326	2024-07-30	[null]	Formulator	ADM	7 - years	BA/BSc/HND	Agriculture /
23	765313	2024-07-30	2024-08-12	Deputy Regional Health Assessment Programme Coordinator	International Organization for Migration (IOM)	7 - 9 years	BA/BSc/HND	NGO / Non-P
24	765303	2024-07-30	2024-08-02	Business Development Manager - Bancassurance	Kingdom Bank Limited	5 - years	BA/BSc/HND	Banking / Fin
25	765296	2024-07-30	2024-08-10	Medical Officer Intern	Avenue Healthcare	- years	BA/BSc/HND	Healthcare /
26	765292	2024-07-30	[null]	Business Development Leader	Visa	12 - years	BA/BSc/HND , MBA/MSc/MA , PhD/Fellowship	Banking / Fin
27	765288	2024-07-30	2024-08-12	Resource Mobilizer	International Transformation Foundation (ITF)	- years	BA/BSc/HND , Diploma	NGO / Non-P
28	765283	2024-07-30	[null]	HR Officer - Performance & Development	Frank Management Consult Ltd	5 - years	BA/BSc/HND	Consulting
29	765282	2024-07-30	[null]	Talent Acquisition Officer	Frank Management Consult Ltd	5 - years	BA/BSc/HND	Consulting
30	765280	2024-07-30	2024-08-16	Human Resources Manager	Rural Agency for Community Development and Assistance (RACID...	5 - years	BA/BSc/HND , MBA/MSc/MA	NGO / Non-P


File Data Worksheet Dashboard Analysis Map Format Help
trial (Tableau Public)
Publish
Brian Gwayi
Show Me
Data
Analytics
jb
Search
Tables
Abc Company
Abc Contract
Country
Abc Description
Abc Experience
Expirydate
Abc Guid
Id
Abc Industry
Abc Introduction
Abc Link
Abc Position
Pubdate
Abc Region
Abc Studies
Abc Title
Abc Working Hours
Abc Measure Names
jb.csv (Count)
Latitude (generated)
Longitude (generated)
Measure Values
Pages
Filters
Country
Marks
Automatic
Color
Size
Label
Detail
Tooltip
Path
Country
Columns
MDY(Pubdate)
Rows
CNT(Id)
Job Listings | Country
Pubdate
Count of Id
300
250
200
150
100
50
0
July 31, 2024
August 1, 2024
August 2, 2024
Country
Kenya
Nigeria
SouthAfrica
Data Source
Sheet 1
Sheet 2
9 marks 1 row by 3 columns SUM of CNT(Id): 1,032

Modern Data Stack Ecosystem 2024

The right tools for building robust data stack architecture will be bases on Combination of budget, skillset, data sources and preferences.



01 Storage
Set up BigQuery