Covid-19: Cases Data Project(Batch processing)

What is Batch Processing?

Data which is collected over time and then fed into a system where "meaning" is extracted and further it is stored(warehouses) or it is used to process.

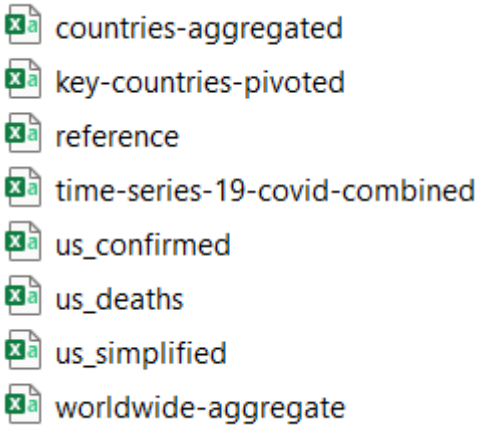
For e.g., *Daily processing of bills in a retail shop*.

Context:

- A new coronavirus designated 2019-nCoV was first identified in Wuhan, the capital of China's Hubei province.
- People developed pneumonia without a clear cause and for which existing vaccines or treatments were not effective.
- The virus has shown evidence of human-to-human transmission.
- Transmission rate (rate of infection) appeared to escalate in mid-January 2020
- As of 15th May 2023, approximately 69,27,378 deaths have been confirmed.

Dataset:

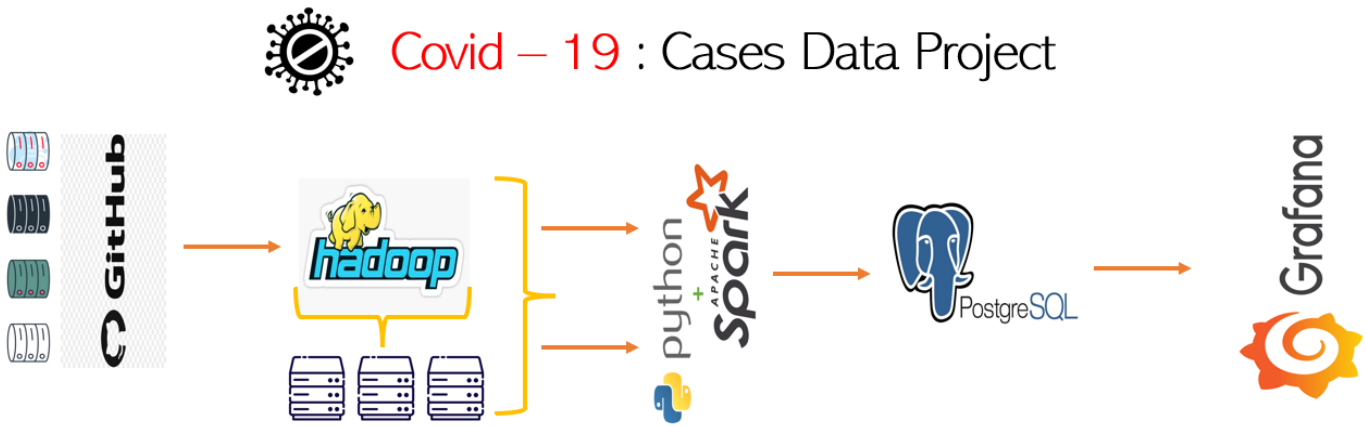
- There are 2,31,745 rows present in the dataset.
- There are 6 columns(Date, Country, State, Confirmed, Recovered, Deaths) in the dataset.
- Data present in the dataset are from **2020 To 2022**.
- We will be considering "time-series-19-covid-combined" table.



Tech Stack:

a. Hadoop with two main components(HDFS & YARN) *
b. Python*
c. Anaconda(IDE)*
d. Spark/PySpark*
e. SQL(PostgreSQL/MySQL)*
f. NoSQL(Cassandra/HBase)
g. Dashboarding(Tableau, Power-BI, Grafana*, Kibana)

High-Level Diagram:



Milestones:

- **Milestone – 1**
  - Clone/Download file from Git repo & save it in your local.
  - GitHub - datasets/covid-19: Novel Coronavirus 2019 time series data on cases

- **Milestone – 2**

- Setup Hadoop in local.
- Here we need to focus on only two main components of Hadoop(HDFS & YARN)
- HDFS is distributed file system so now copy that file from local to HDFS.
- *hdfs dfs mkdir /dir_name*
- *hdfs dfs -ls /*
- *hdfs dfs -copyFromLocal "path" /dir_name_in_Hadoop*
- *hdfs dfs -ls /dir_name*

- **Milestone – 3**

- Setup spark in your local.
  - We need to install Spark in our local and further we need to instantiate.
  - To initiate we need we can use "spark" in the CMD, or we can use it in Jupyter Notebook.
- Write a spark application which reads file from HDFS and creates a DataFrame.
  a. With the help of Spark we could pull the data from HDFS(Hadoop Distributed File System) and create a DataFrame.
- Just looking a quick view, we can understand how many columns are there and we can plan what type of further transformation we could do.

- **Milestone – 4**

- Following basic transformation on the data:
  1. Ingesting only the required columns.
  2. Dropping duplicate values
  3. Null handling transformation for all the columns.
     String: NA
     INT: 0

Float: 0.0
Date/Timestamp: 1800-01-01

4. Column renaming
5. Type casting according to the required data type.

Milestone – 5

- Aggregate data in spark application.

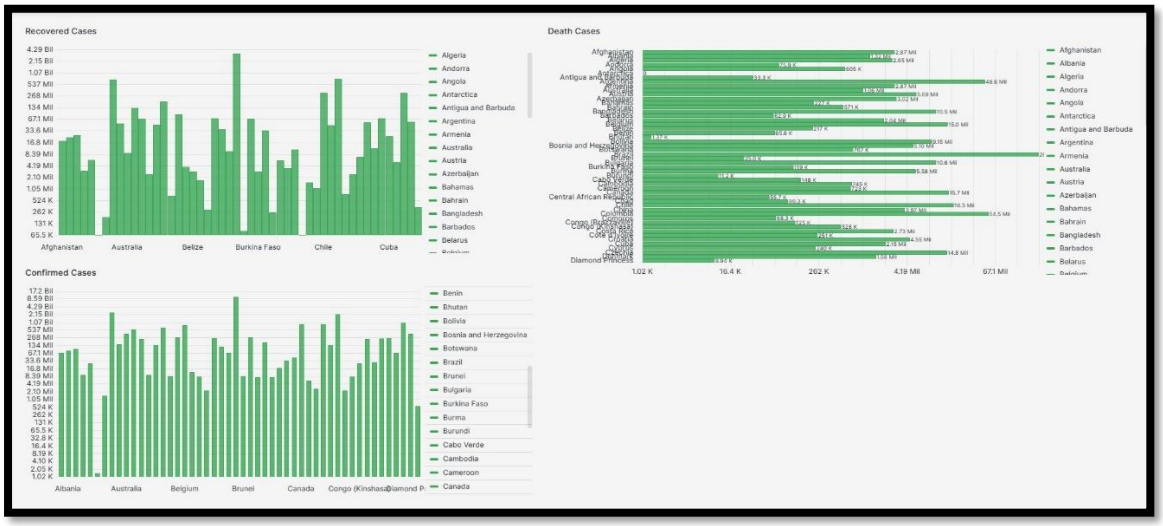
1. *How many total cases so far?*
2. *How many recovered cases so far?*
3. *How many deaths so far?*

Milestone – 5

- Write the aggregated data in output table using transactional database like MySQL/Postgres or in NoSQL database.

Milestone – 6

- Use dashboard tool: Grafana
- Plugins: World-map/ Geo-Map
- Dashboard Link: http://localhost:3000/goto/xd4_gDQ4R?orgId=1



Ref Link:

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8. Load DataFrames To PostgreSQL 10x Faster | Towards Data Science
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10. Pyspark write to postgres - spark write to postgres - Projectpro
11. postgresql - unable to connect to server for Postgres - Stack Overflow
12. python - DataFrame constructor not properly called - Stack Overflow
13. postgresql - OperationalError: (psycopg2.OperationalError) could not translate host name "143@postgres" to address: Unknown server error - Stack Overflow