

Data Engineering Project

**:ETL Data Integration on Covid-19 dataset based
on AWS**

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1. Glossary

1.1. ETL- Extract Transform Load

ETL stands for Extract, Transform, and Load, which is a process used in data management and data integration to gather data from various sources, transform it into a consistent format, and then load it into a target database or data warehouse. Each phase of the ETL process serves a specific purpose:

1. Extract: This phase involves extracting data from different source systems, which can be databases, spreadsheets, web services, flat files, or any other structured or unstructured datasources.
2. Transform: After extracting the data, the next step is to transform it into a standardised format that can be easily analysed and integrated with other data sources. Transformations may include data cleansing, data enrichment, aggregation, data validation, and other operations to ensure data quality and consistency.
3. Load: In the final phase, the transformed data is loaded into the target database or data warehouse, where it can be used for various purposes such as business intelligence, data analytics, reporting, or decision-making.

ETL is a fundamental process in data warehousing and data integration, enabling organisations to consolidate and analyse data from disparate sources, making it easier to derive insights and make informed business decisions. It plays a crucial role in modern data-driven environments, allowing companies to leverage data effectively and efficiently.

2. IAM

IAM stands for Identity and Access Management, and it is a crucial service provided by Amazon Web Services (AWS).

IAM enables you to securely control access to AWS resources and services for users, groups, and roles within your AWS account. With IAM, you can manage permissions and authentication for various entities, ensuring that only authorised users have the appropriate level of access to your AWS resources.

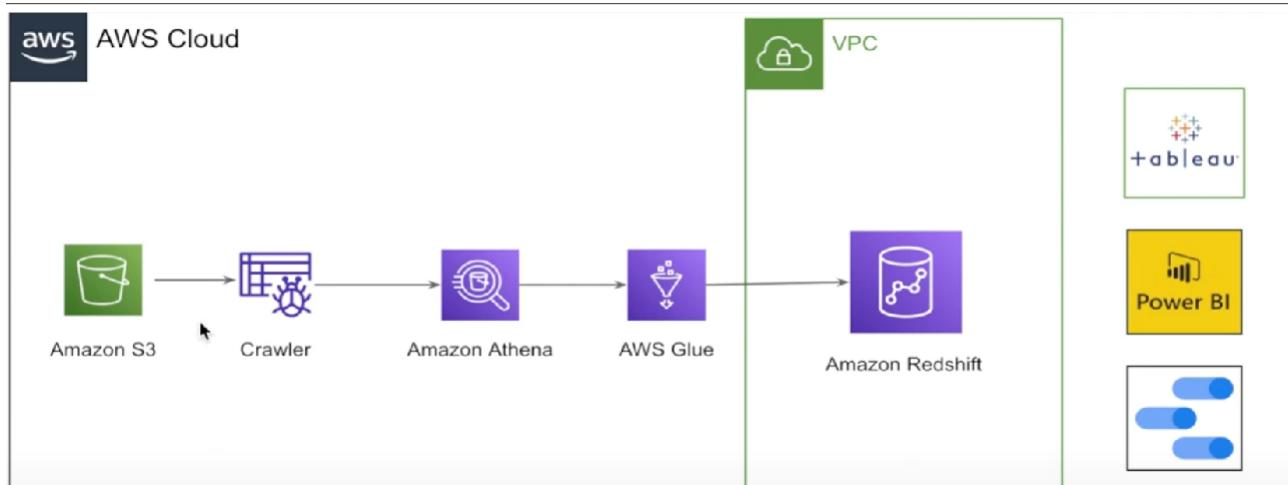
3. REDSHIFT

Redshift- Warehouse of Amazon

Amazon Redshift is a fully managed data warehousing service provided by Amazon Web Services (AWS). It's designed to handle large-scale data analytics and processing tasks, making it easier for organisations to analyse vast amounts of data and derive insights to support their decision-making processes.

1. Workflow (End to End) : Content and Context

2. The Pipeline



Extraction- Transformation Job in Athena through Python (Jupyter Notebook)
Transformed data → Amazon S3 → Amazon Redshift warehouse
Analyses- Tableau / Power BI. (*Not included in the project)

3. Covid-19 Dataset

*SOU5RCE- OPEN DATA ON AWS

- Extract data from AWS dataset

Registry of Open Data on AWS

bioinformatics biology coronavirus COVID-19 health life sciences medicine MERS SARS

Description
A centralized repository of up-to-date and curated datasets on or related to the spread and characteristics of the novel corona virus (SARS-CoV-2) and its associated illness, COVID-19. Globally, there are several efforts underway to gather this data, and we are working with partners to make this crucial data freely available and keep it up-to-date. Hosted on the AWS cloud, we have seeded our curated data lake with COVID-19 case tracking data from Johns Hopkins and The New York Times, hospital bed availability from Definitive Healthcare, and over 45,000 research articles about COVID-19 and related coronaviruses from the Allen Institute for AI.

Update Frequency
Periodically

License
Varies by dataset

Documentation
<https://aws.amazon.com/blogs/big-data/a-public-data-lake-for-analysis-of-covid-19-data/>

Managed By

See all datasets managed by Amazon Web Services.

Contact
aws-covid-19-data-lake@amazon.com

How to Cite
COVID-19 Data Lake was accessed on **DATE** from <https://registry.opendata.aws/aws-covid19-lake>.

Resources on AWS

Description
Collected COVID-19 related datasets

Resource type
S3 Bucket

Amazon Resource Name (ARN)
`arn:aws:s3:::covid19-lake`

AWS Region
`us-east-2`

AWS CLI Access (No AWS account req)
`aws s3 ls s3://covid19-lake/ --`

Explore
[Browse Bucket](#)

AWS S3 Explorer  covid19-lake

Show 50 entries

Object
alleninstitute/
archived/
aspirevc_crowd_tracing/
cdc-moderna-vaccine-distribution/
cdc-pfizer-vaccine-distribution/
cfn/
covid_knowledge_graph/
covidcast/
enigma-aggregation/
enigma-jhu-timeseries/
enigma-jhu/
enigma-nytimes-data-in-usa/
owid_vaccinations/
rearc-covid-19-nyt-data-in-usa/
rearc-covid-19-prediction-models/
rearc-covid-19-testing-data/
rearc-covid-19-world-cases-deaths-testing/

4. Amazon S3 Bucket

The screenshot shows the AWS S3 console interface. On the left, there's a sidebar with options like Buckets, Access Points, Object Lambda Access Points, Multi-Region Access Points, Batch Operations, and IAM Access Analyzer for S3. Below that is a section for Block Public Access settings. Under Storage Lens, there are links for Dashboards and AWS Organizations settings. A Feature spotlight section is also present.

The main area is titled "Amazon S3" and contains an "Account snapshot" box with a link to "View Storage Lens dashboard". Below it is a "Buckets (2) Info" section. It lists two buckets: "akshit-covid-project" and "covid-project-output". The table columns include Name, AWS Region, Access, and Creation date.

Name	AWS Region	Access	Creation date
akshit-covid-project	Asia Pacific (Mumbai) ap-south-1	Bucket and objects not public	March 19, 2023, 05:17:40 (UTC+05:30)
covid-project-output	Asia Pacific (Mumbai) ap-south-1	Objects can be public	March 19, 2023, 05:56:34 (UTC+05:30)

Inside the Bucket:

The screenshot shows the contents of the "akshit-covid-project" bucket. At the top, there are tabs for Objects (which is selected), Properties, Permissions, Metrics, Management, and Access Points.

The main area is titled "Objects (5)". It provides a brief description of objects in S3 and a link to "Amazon S3 inventory". There are buttons for Actions (with options like Copy S3 URI, Copy URL, Download, Open, Delete), Create folder, and Upload.

Below that is a search bar for "Find objects by prefix" and a "Show versions" toggle. The table lists five objects, all of which are folders:

Name	Type	Last modified	Size	Storage class
enigma-jhud/	Folder	-	-	-
enigma-nytimes-data-in-usa/	Folder	-	-	-
rearc-covid-19-testing-data/	Folder	-	-	-
rearc-usa-hospital-beds/	Folder	-	-	-
static-datasets/	Folder	-	-	-

- There will be CSV & JSON Format available in the Data Set. Extract the files as per preference. We are using CSV data
- Stage the data into the S3 bucket and make the appropriate folders as shown in the image.

5. ETL Service in AWS Glue

- Search for the AWS Glue in the search bar.
- Different ETL Service tools and workflows, triggers will be available here.
- We will use the popular tool Crawler, for Crawling the dataset onto our cloud service database which can be queried, analysed and perform different functions upon in Athena
- Add the Crawler

The screenshot shows the AWS Glue service page. On the left, there's a sidebar with navigation links: AWS Glue (selected), Data catalog, Databases, Tables, Connections, Crawlers (selected), Classifiers, Schema registries, Schemas, Settings, ETL, AWS Glue Studio (New), Blueprints, Workflows, Jobs, ML Transforms, Triggers, Dev endpoints, Notebooks, Security, and Security configurations. The main content area is titled 'Crawlers' with a sub-instruction: 'A crawler connects to a data store, progresses through a prioritized list of classifiers to determine the schema of your data'. It features a search bar with 'athena', a 'Run crawler' button, an 'Action' dropdown, and a 'Filter by tags and attributes' search bar. Below these are columns for 'Name', 'Schedule', 'Status', and 'Log'. A message says 'You don't have an' followed by a hand icon and an 'Add crawler' button. The 'Crawlers' link in the sidebar is also highlighted.

- Create a crawler by giving the path for every folder sequentially and name them according to your preferences. It will crawl all the data from the given folder of S3 bucket into the amazon Database which will be used in Athena query window, later.
- In between the process of crawling, we need to set up the different IAM roles, setting up different permissions, and giving some specific configurations for the Data.
- After IAM role, create the database name and folder, folder path.

Add crawler

- Crawler info
enigma_jhud
- Crawler source type
Data stores
- Data store
S3: s3://darshil-covi...
- IAM Role
arn:aws:iam::2069869
07456:role/s3-glue-
role
- Schedule
Run on demand
- Output
- Review all steps

Configure the crawler's output

Database i

covid_19

[Add database](#)

Prefix added to tables (optional) i

Type a prefix added to table names

► Grouping behavior for S3 data (optional)

► Configuration options (optional)

[Back](#)

[Next](#)

- After that , run the crawler of a particular folder we have crawled data of
- After 1-2 minutes, it will crawl the data into the database , which will be visible in the AWS Athena. Database folder you created.
- Perform this task for all the folders and files.

6. Data view and queries in Athena

- All the tables will be visible in Athena database like this

The screenshot shows the AWS Athena Query Editor interface. On the left, a sidebar lists several tables under the 'covid_19' database, including 'enigma_jhud', 'nytimes_data_in_usa_us_county', 'nytimes_data_in_usa_us_states', 'rearc_covid_19_testing_data_states_daily', 'rearc_covid_19_testing_dataus_daily', 'rearc_covid_19_testing_dataus_total_late_st', 'rearc_usa_hospital_beds', 'static_datacountrycode', and 'static_datacountypopulation'. Below this is a section for 'Views (0)'. The main area is titled 'Results (10)' and displays a table with 10 rows of data. The columns are labeled 'date', 'state', 'positive', 'probablecases', 'negative', 'pending', and 'totaltest'. The data shows various US states and their corresponding COVID-19 test statistics. At the top right of the results area, it says 'Time in queue: 0.122 sec' and 'Run time: 0.6'. Below the results table is a search bar labeled 'Search rows'.

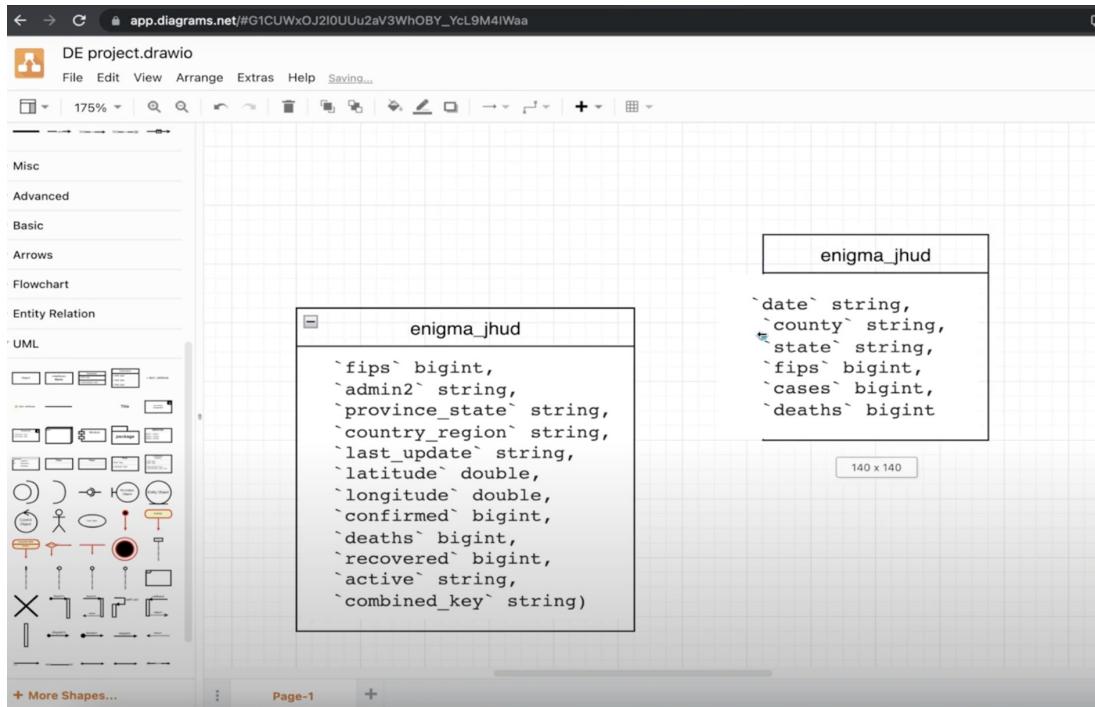
- We can run the queries in the Query field on any table to analyse the data or preview the table.
Queries will be run in SQL language
- We will extract the Schema of the table to prepare our data model

The screenshot shows the AWS Athena Query Editor interface. The left sidebar shows the same list of tables as the previous screenshot. The main area is titled 'Tables and views' and has a 'Create' button. Below it is a search bar labeled 'Filter tables and views'. The 'Tables (9)' section is expanded, showing the same list of tables. To the right, there is a preview of the 'enigma_jhud' table schema. The SQL code shown is:

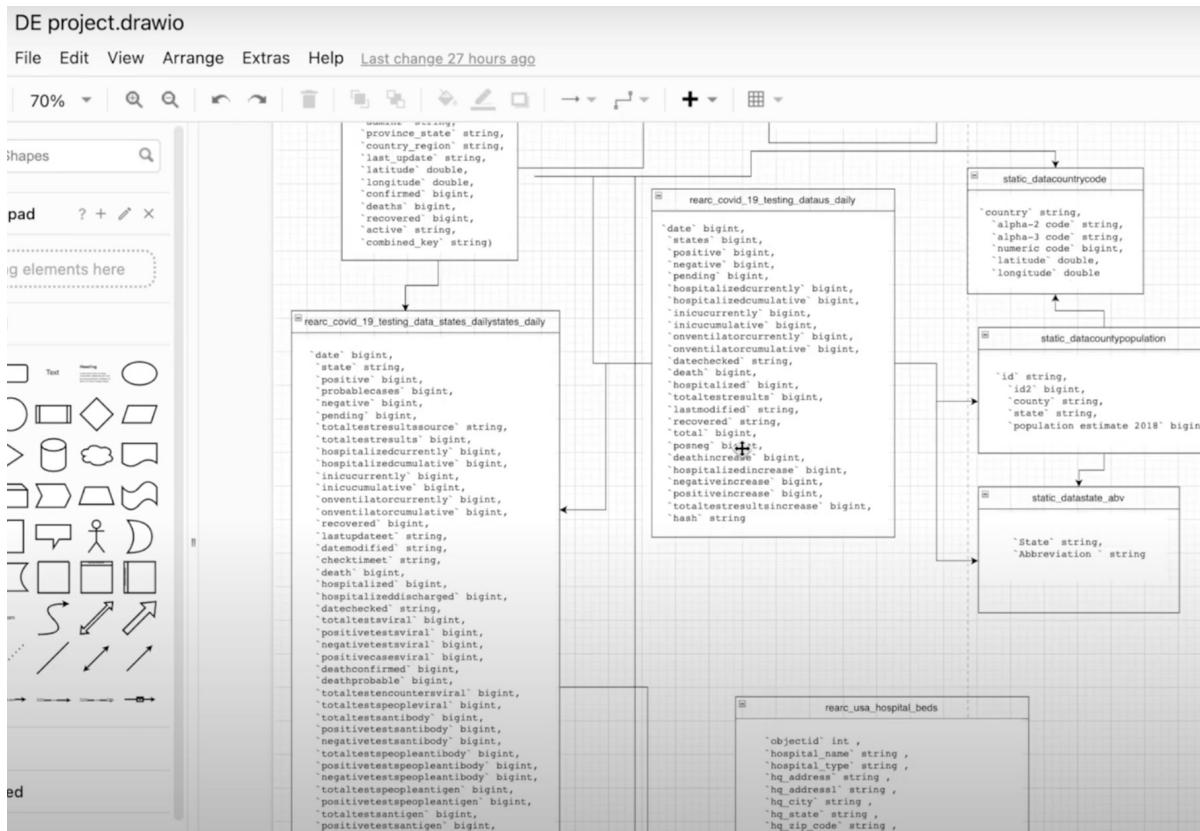
```
CREATE EXTERNAL TABLE `enigma_jhud`(`fips` bigint, `admin2` string, `province_state` string, `country_region` string, `last_update` string, `latitude` double, `longitude` double, `confirmed` bigint, `deaths` bigint, `recovered` bigint, `active` string, `combined_key` string) PARTITIONED BY(`partition_0` string) ROW FORMAT DELIMITED FIELDS TERMINATED BY ',' STORED AS INPUTFORMAT 'org.apache.hadoop.mapred.TextInputFormat' OUTPUTFORMAT 'org.apache.hadoop.hive.ql.io.HiveIgnoreKeyTextOutputFormat' LOCATION
```

7. Preparing Data Model.

- Prepare Data Model with the Schema column names for every table

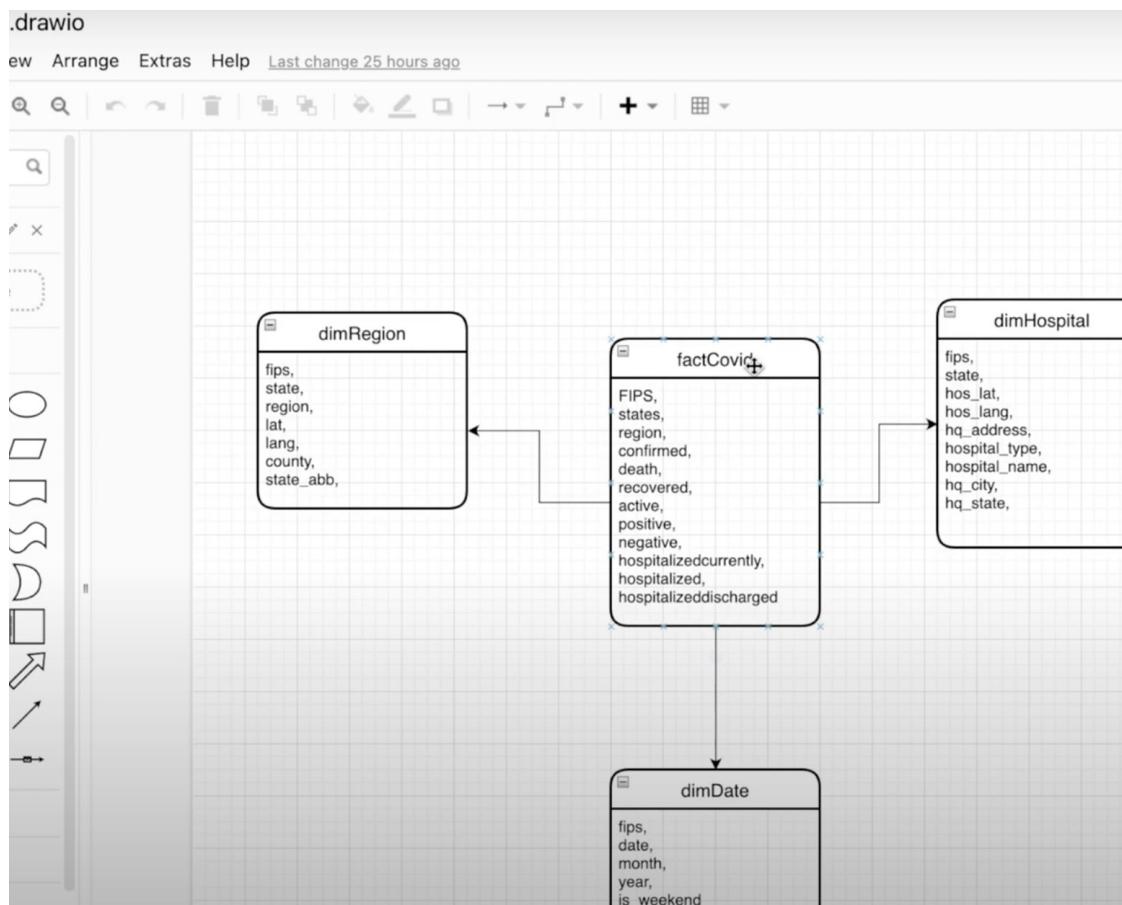


- We can use the tool [draw.io](#) for preparing data model.



- These data dimension model table can be converted to relational model afterwards

- Relational Model will look like this.



- Now we will do the following steps:-

```
relational data model
connect to athena and query data
etl job in python
save result to s3
build tables on redshift
copy data to redshift
```

8. Write ETL Job

- We will perform the ETL job in the Python (Jupyter Notebook). We can also perform this in Spark
- Import libraries like Pandas, BOTO3 for connecting AWS to your Jupiter notebook.
- Mention Access keys, Secret keys, AWS Region and other necessary details to connect system to AWS. Schema name, Staging directory, Result/Output directory to give the path to output data, bucket name and other necessary information.
*The Keys has been modified now, to secure the data

```
In [1]: import boto3
import pandas as pd
from io import StringIO # python3; python2: BytesIO
```

```
In [3]: AWS_ACCESS_KEY = "AKIATAMLBR5AF2JM526U"
AWS_SECRET_KEY = "eTgtaB8qJ1/uZ7NvAN0UpAN0DAU9G1U6IIooHPO"
AWS_REGION = "ap-south-1"
SCHEMA_NAME = "covid_19"
S3_STAGING_DIR = "s3://darshil-test-bucket/output/"
S3_BUCKET_NAME = "darshil-test-bucket"
S3_OUTPUT_DIRECTORY = "output"
```

```
In [5]: athena_client = boto3.client(
    "athena",
    aws_access_key_id=AWS_ACCESS_KEY,
    aws_secret_access_key=AWS_SECRET_KEY,
    region_name=AWS_REGION,
)
```

- We will Connect Athena to your BOTO3 client through python. By providing these data in Python
- Then with a “download and load query results” function, it will run some queries on BOTO3 client object and Athena and will save the results in the S3 bucket.

```
In [6]: Dict = {}
def download_and_load_query_results(
    client: boto3.client, query_response: Dict
) -> pd.DataFrame:
    while True:
        try:
            # This function only loads the first 1000 rows
            client.get_query_results(
                QueryExecutionId=query_response["QueryExecutionId"]
            )
        except Exception as err:
            if "not yet finished" in str(err):
                time.sleep(0.001)
            else:
                raise err
    temp_file_location: str = "athena_query_results.csv"
    s3_client = boto3.client(
        "s3",
        aws_access_key_id=AWS_ACCESS_KEY,
        aws_secret_access_key=AWS_SECRET_KEY,
        region_name=AWS_REGION,
    )
    s3_client.download_file(
        S3_BUCKET_NAME,
        f'{S3_OUTPUT_DIRECTORY}/{query_response["QueryExecutionId"]}.csv',
        temp_file_location,
    )
    return pd.read_csv(temp_file_location)
```

- We will Write another query in Python for a specific table in Athena to connect that to BOTO3 client. After successful connection with the Athena, it will give the configurations in a response.

```
In [7]: response = athena_client.start_query_execution(
    QueryString="SELECT * FROM enigma_jhud",
    QueryExecutionContext={"Database": SCHEMA_NAME},
    ResultConfiguration={
        "OutputLocation": S3_STAGING_DIR,
        "EncryptionConfiguration": {"EncryptionOption": "SSE_S3"},
    },
)
```



```
In [8]: response
```

```
Out[8]: {'QueryExecutionId': '7cc27ec6-3664-45f8-a2fd-0a6e9504402f',
'ResponseMetadata': {'RequestId': '9adcabb0-0701-4a74-9dd7-21b70451710b',
'HTTPStatusCode': 200,
'HTTPHeaders': {'content-type': 'application/x-amz-json-1.1',
'date': 'Wed, 08 Dec 2021 18:59:06 GMT',
'x-amzn-requestid': '9adcabb0-0701-4a74-9dd7-21b70451710b',
'content-length': '59',
'connection': 'keep-alive'},
'RetryAttempts': 0}}
```



```
In [9]: enigma_jhud = download_and_load_query_results(athena_client, response)
```

- We can run the function of download and load query results on this latest function query which will give us the successful extraction of database into the pandas data-frame as shown.
- In similar way, we will perform this function for every table present in Athena to load every table data into the pandas data frame.

```
In [9]: enigma_jhud = download_and_load_query_results(athena_client, response)
```



```
In [10]: enigma_jhud.head()
```

```
Out[10]:
   fips admin2 province_state country_region      last_update  latitude  longitude  confirmed  deaths  recovered  active
0   NaN     NaN       Anhui        China 2020-01-22T17:00:00    31.826   117.226      1.0    NaN     NaN     NaN
1   NaN     NaN      Beijing        China 2020-01-22T17:00:00    40.182   116.414     14.0    NaN     NaN     NaN
2   NaN     NaN  Chongqing        China 2020-01-22T17:00:00    30.057   107.874      6.0    NaN     NaN     NaN
3   NaN     NaN       Fujian        China 2020-01-22T17:00:00    26.079   117.987      1.0    NaN     NaN     NaN
4   NaN     NaN       Gansu        China 2020-01-22T17:00:00    36.061   103.834      NaN    NaN     NaN     NaN
```



```
In [ ]:
```

- We can also change the column name or set the imbalance syntax of the table in the python itself using inbuilt functions like iloc.
- This is called Data Transformation, Sorting out the messy real time data!

9. Write the dimension model

- Write the dimension model in Python on the fetched tables through the queries. (Use JOIN/MERGE functions to merge 2 columns or tables into one)

```
In [30]: factCovid.shape
Out[30]: (26418, 13)

In [31]: dimRegion_1 = enigma_jhud[['fips','province_state','country_region','latitude','longitude']]
dimRegion_2 = nytimes_data_in_usa_us_county[['fips','county','state']]
dimRegion = pd.merge(dimRegion_1, dimRegion_2, on='fips', how='inner')

In [32]: eds[['fips','state_name','latitude','longitude','hq_address','hospital_name','hospital_type','hq_city','hq_state']]

In [33]: dimDate = rearc_covid_19_testing_data_states_dailystates_daily[['fips','date']]

In [34]: dimDate.head()
Out[34]:
   fips      date
0    2 20210307
1    1 20210307
2    5 20210307
3   60 20210307
4    4 20210307
```

- Prepare the Relational Model from the Dimension model in the similar way.

```
In [132]: dimDatesql = pd.io.sql.get_schema(dimDate.reset_index(), 'dimDate')
print('.join(dimDatesql))

CREATE TABLE "dimDate" (
    "index" INTEGER,
    "fips" INTEGER,
    "date" TIMESTAMP,
    "year" INTEGER,
    "month" INTEGER,
    "day_of_week" INTEGER
)

In [134]: factCovidsql = pd.io.sql.get_schema(factCovid.reset_index(), 'factCovid')
print('.join(factCovidsql))

CREATE TABLE "factCovid" (
    "index" INTEGER,
    "fips" REAL,
    "province_state" TEXT,
    "country_region" TEXT,
    "confirmed" REAL,
    "deaths" REAL,
    "recovered" REAL,
    "active" REAL,
    "date" INTEGER,
    "positive" REAL,
    "negative" REAL,
    "hospitalizedcurrently" REAL,
    "hospitalized" REAL,
    "hospitalizeddischarged" REAL
)
```

10. Store the output in S3 Bucket

- Deploy the output bucket
- After giving the bucket name of output bucket of S3 onto the python notebook, store the data into S3 through the following code.

```
In [40]: csv_buffer = StringIO()  
  
In [41]: csv_buffer  
Out[41]: <_io.StringIO at 0x11e246710>  
  
In [42]: factCovid.to_csv(csv_buffer)  
  
In [43]: s3_resource = boto3.resource('s3')  
s3_resource.Object(bucket, 'output/factCovid.csv').put(Body=csv_buffer.getvalue())  
  
Out[43]: {'ResponseMetadata': {'RequestId': 'X5XEEM7K77YXS4Y9',  
'HostId': '0kiHRr3pTrc0jfdbAcYhc6i5vgLFp3uSDLb00ILLM3ZFjiwIjkHNRC9qwtgdyd1Lb7Bh2fiV+xo=',  
'HTTPStatusCode': 200,  
'HTTPHeaders': {'x-amz-id-2': '0kiHRr3pTrc0jfdbAcYhc6i5vgLFp3uSDLb00ILLM3ZFjiwIjkHNRC9qwtgdyd1Lb7Bh2fiV+xo=',  
'x-amz-request-id': 'X5XEEM7K77YXS4Y9',  
'date': 'Wed, 08 Dec 2021 19:19:54 GMT',  
'etag': '"2b9776182b96c2fda29a5fdbbce21dd6"',  
'server': 'AmazonS3',  
'content-length': '0'},  
'RetryAttempts': 0},  
'ETag': '"2b9776182b96c2fda29a5fdbbce21dd6"'}  
  
In [44]: csv_buffer.getvalue()  
Out[44]: ',fips,province_state,country_region,confirmed,deaths,recovered,active,date,positive,negative,hospitalizedcurrently  
,hospitalized,hospitalizeddischarged\n0,72.0,Puerto Rico,US,3.0,0.0,0.0,,20210307,101327.0,305972.0,147.0,,\n1,72.0  
,Puerto Rico,US,3.0,0.0,0.0,,20210306,101327.0,305972.0,147.0,,\n2,72.0,Puerto Rico,US,3.0,0.0,0.0,,20210305,101066
```

- Convert the data into the Csv format with the .io class defined at the start of ETL job
- Put the bucket name into the S3 , and you will get the response as output after it gets successful
- We have successfully stored the data into the S3 bucket

11. Importing data into the Amazon RedShift

- Now we need to build the schema of table into the redshift based on schema of our output of our relational data model folder in S3
- First step is, write python query to extract schema of the 1st output table. Similarly, perform this task for all other output tables.

```
In [135]: dimRegionsql = pd.io.sql.get_schema(dimRegion.reset_index(), 'dimRegion')
print(''.join(dimRegionsql))

CREATE TABLE "dimRegion" (
    "index" INTEGER,
    "fips" REAL,
    "province_state" TEXT,
    "country_region" TEXT,
    "latitude" REAL,
    "longitude" REAL,
    "county" TEXT,
    "state" TEXT
)

In [136]: dimHospitalsql = pd.io.sql.get_schema(dimHospital.reset_index(), 'dimHospital')
print(''.join(dimHospitalsql))

CREATE TABLE "dimHospital" (
    "index" INTEGER,
    "fips" REAL,
    "state_name" TEXT,
    "latitude" REAL,
    "longitude" REAL,
    "hq_address" TEXT,
    "hospital_name" TEXT,
    "hospital_type" TEXT,
    "hq_city" TEXT,
    "hq_state" TEXT
)
```

- Import library - redshift connector.
- Connect redshift with help of username, key and database and password from AWS
- Import the schema using cursor automation technique in python

```
In [137]: import redshift_connector

In [138]: conn = redshift_connector.connect(
            host='redshift-cluster-2.ctlwvzbuur6m.ap-south-1.redshift.amazonaws.com',
            database='dev',
            user='awsuser',
            password='Passw0rd123'
        )

In [139]: conn.autocommit = True

In [140]: cursor= redshift_connector.Cursor = conn.cursor()

In [141]: cursor.execute("""
            CREATE TABLE "dimDate" (
                "index" INTEGER,
                "fips" INTEGER,
                "date" TIMESTAMP,
                "year" INTEGER,
                "month" INTEGER,
                "day_of_week" INTEGER
            )
        """)

Out[141]: <redshift_connector.cursor.Cursor at 0x12fe311e0>
```

```

    "hospitalized" REAL,
    "hospitalizeddischarged" REAL
)
""")
```

Out[143]: <redshift_connector.cursor.Cursor at 0x12fe311e0>

In [144]: cursor.execute("""CREATE TABLE "dimRegion" (
 "index" INTEGER,
 "fips" REAL,
 "province_state" TEXT,
 "country_region" TEXT,
 "latitude" REAL,
 "longitude" REAL,
 "county" TEXT,
 "state" TEXT
)""")

Out[144]: <redshift_connector.cursor.Cursor at 0x12fe311e0>

In []: cursor.execute("""
copy dimDate from 's3://darshil-covid-de-project/output/dimDate.csv'
credentials 'aws_iam_role=arn:aws:iam::206986907456:role/redshift-s3-access'
delimiter ','
region 'ap-south-1'
IGNOREHEADER 1
""")

- Perform importing schema and table on the redshift for all the tables.
- Importing to redshift is successful.

Jobs A job is your business logic required to perform extract, transform and load (ETL) work. Job runs are initiated by triggers which can be scheduled or driven by events.							User preferences
Add job		Action	Filter by tags and attributes				Showing: 1 - 2 < >
<input type="checkbox"/> Name	Type	ETL language	Script location	Last modified	Job bookmark		
<input checked="" type="checkbox"/> s3_glue_covid_data	Python shell	s3://aws-glue-s...	16 December 2021 12:49...	Disable			
<input type="checkbox"/> s3_glue_redshift	Python shell	s3://aws-glue-s...	15 December 2021 8:18 ...	Disable			

- All the relational data tables will be visible on redshift.

The screenshot shows the Amazon Redshift Query editor interface. On the left, a sidebar contains icons for Dashboard, Clusters, Queries, Editor (which is selected), Config, Marketplace, Advisor, Alarms, Events, and What's New. The main area has tabs for Editor, Query history, Saved queries, and Scheduled queries. A sub-menu titled 'Resources' is open, showing a list of schemas: public, dimdate, dimhospital, dimregion, and factcovid. The public schema is selected. To the right, a query editor window is open with the title 'Query 1'. It shows the status as 'Connected' and the query text 'select * from dimhospital;'. Below the query are buttons for Run, Save, Schedule, and Clear.

The screenshot shows the results of the query 'select * from dimhospital;'. At the top, there are buttons for Run, Save, Schedule, Clear, and Send feedback. Below that, tabs for Query results and Table details are visible. The Query results tab shows 'Query 2862' completed on December 16, 2021, at 00:53:19, with an elapsed time of 00 m 08 s. The Table details tab shows the schema: index, fips, state_name, latitude, longitude, hq_address, hospital_name, and hospital_type. Two rows of data are displayed:

index	fips	state_name	latitude	longitude	hq_address	hospital_name	hospital_type
0	4013.0	Arizona	33.4955	-112.066154	650 E Indian School Rd	Phoenix VA Health Care System (AKA Carl T Hayden VA Medical Center)	VA Hospital
1	4019.0	Arizona	32.181263	-110.96589	3601 S 6th Ave	Southern Arizona VA Health Care System	VA Hospital

ETL Job is completed