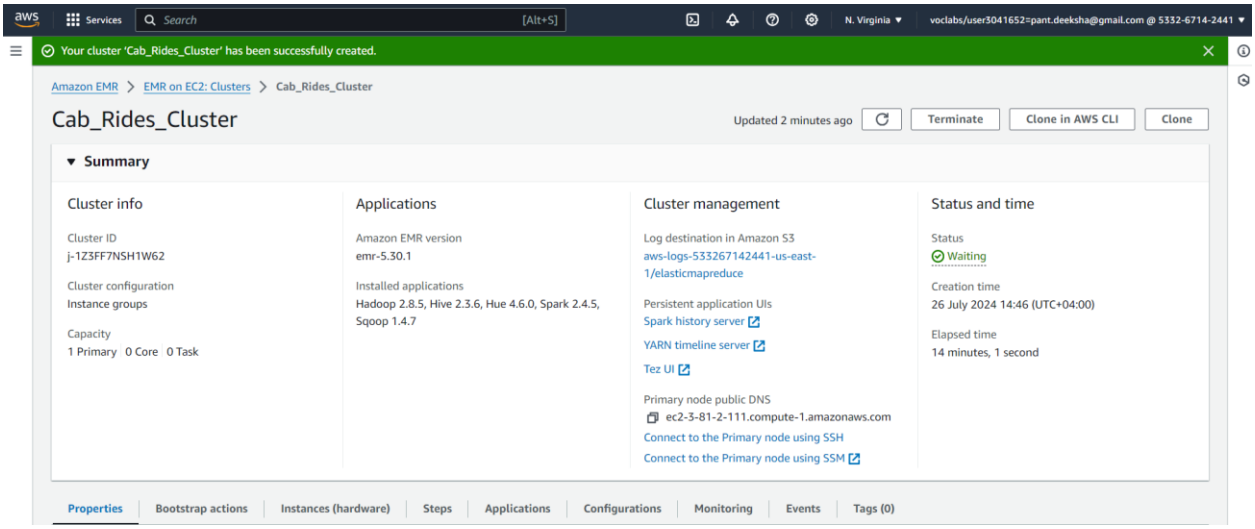
Logic For First Submission

1. **Created an EMR cluster('Cab_Rides_Cluster') with Hadoop, Sqoop, Hive, Hue and Spark installed.**



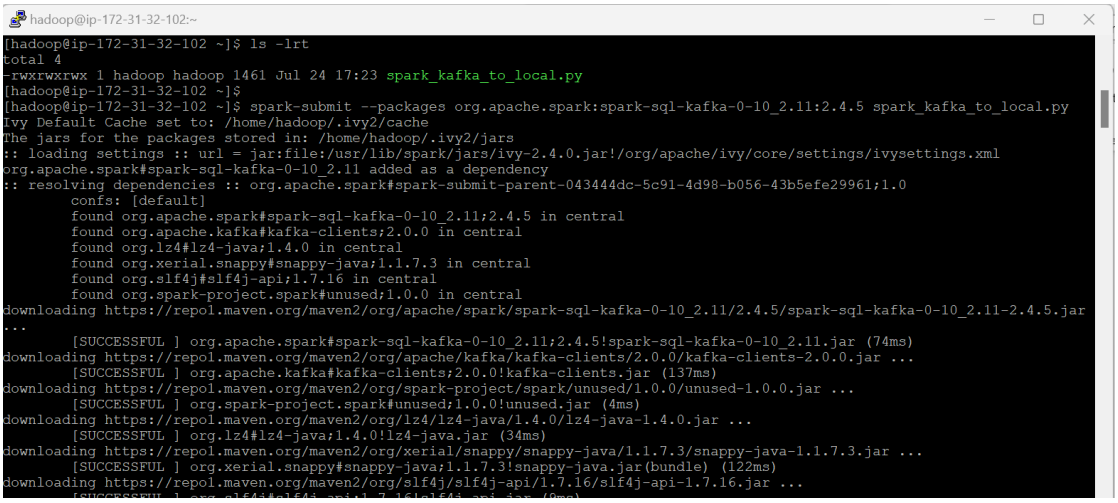
2. **Loading streaming data from Kafka to HDFS**

2.1 Developing a Pyspark file(spark_kafka_to_local.py) to read clickstream data from Kafka topic with below details

- Bootstrap-server - 18.211.252.152
- Port - 9092
- Topic - de-capstone5

2.2 Running the file 'spark_kafka_to_local.py' using 'spark-submit' command with the necessary Kafka package dependency

spark-submit --packages org.apache.spark:spark-sql-kafka-0-10_2.11:2.4.5 spark_kafka_to_local.py



2.3 Validating the directory and data of files created by Pyspark file in HDFS:

hadoop fs -ls /user/root/clickstream_dump

```
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$ hadoop fs -ls /user/root/clickstream_dump
Found 2 items
drwxr-xr-x   - hadoop hadoop          0 2024-07-26 13:35 /user/root/clickstream_dump/_spark_metadata
-rw-r--r--   1 hadoop hadoop  134217728 2024-07-26 13:35 /user/root/clickstream_dump/part-00000-0698da1b-86e2-4df0-a610-3139f7081ea9-c000
.json
```

hadoop fs -cat /user/root/clickstream_dump/part-00000-0698da1b-86e2-4df0-a610-3139f7081ea9-c000.json | head -n 5

```
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$ hadoop fs -cat /user/root/clickstream_dump/part-00000-0698da1b-86e2-4df0-a610-3139f7081ea9-c000.json | head
-n 5
{"value_str":"{\"customer_id\": \"18213492\", \"app_version\": \"1.4.31\", \"OS_version\": \"iOS\", \"lat\": \"5.676968\", \"lon\": \"16.
753712\", \"page_id\": \"e7bc5fb2-1231-11eb-adc1-0242ac120002\", \"button_id\": \"fcba68aa-1231-11eb-adc1-0242ac120002\", \"is_button_cli
ck\": \"No\", \"is_page_view\": \"No\", \"is_scroll_up\": \"No\", \"is_scroll_down\": \"No\", \"timestamp\\n\": \"2020-01-18 19:44:43\\n\
"}"}
{"value_str":"{\"customer_id\": \"21531056\", \"app_version\": \"3.4.16\", \"OS_version\": \"Android\", \"lat\": \"-77.6658015\", \"lon\"
: \"28.740867\", \"page_id\": \"de545711-3914-4450-8c11-b17b8dabb5e1\", \"button_id\": \"a95dd57b-779f-49db-819d-b6960483e554\", \"is_but
ton_click\": \"Yes\", \"is_page_view\": \"No\", \"is_scroll_up\": \"No\", \"is_scroll_down\": \"No\", \"timestamp\\n\": \"2020-09-09 23:4
9:34\\n\"}"}
{"value_str":"{\"customer_id\": \"89193671\", \"app_version\": \"3.1.27\", \"OS_version\": \"iOS\", \"lat\": \"68.5232875\", \"lon\": \"1
11.807065\", \"page_id\": \"e7bc5fb2-1231-11eb-adc1-0242ac120002\", \"button_id\": \"e1e99492-17ae-11eb-adc1-0242ac120002\", \"is_button_
click\": \"Yes\", \"is_page_view\": \"Yes\", \"is_scroll_up\": \"No\", \"is_scroll_down\": \"No\", \"timestamp\\n\": \"2020-02-04 02:01:0
4\\n\"}"}
{"value_str":"{\"customer_id\": \"92968159\", \"app_version\": \"2.2.24\", \"OS_version\": \"Android\", \"lat\": \"-33.9557165\", \"lon\"
: \"-81.838663\", \"page_id\": \"de545711-3914-4450-8c11-b17b8dabb5e1\", \"button_id\": \"fcba68aa-1231-11eb-adc1-0242ac120002\", \"is_bu
tton_click\": \"Yes\", \"is_page_view\": \"No\", \"is_scroll_up\": \"Yes\", \"is_scroll_down\": \"No\", \"timestamp\\n\": \"2020-05-11 01
:22:55\\n\"}"}
{"value_str":"{\"customer_id\": \"68273069\", \"app_version\": \"4.4.30\", \"OS_version\": \"Android\", \"lat\": \"42.389278\", \"lon\":
\"-113.983992\", \"page_id\": \"e7bc5fb2-1231-11eb-adc1-0242ac120002\", \"button_id\": \"fcba68aa-1231-11eb-adc1-0242ac120002\", \"is_but
ton_click\": \"Yes\", \"is_page_view\": \"Yes\", \"is_scroll_up\": \"No\", \"is_scroll_down\": \"Yes\", \"timestamp\\n\": \"2020-05-22 22
:23:13\\n\"}"}
cat: Unable to write to output stream.
```

2.4 Developing a Pyspark file 'spark_local_flatten.py' for transforming/flattening the loaded Kafka data to a more structured format in HDFS

2.5 Executing the file 'spark_local_flatten.py' to flatten .json file in HDFS to .csv format with the necessary Kafka package dependency:

spark-submit --packages org.apache.spark:spark-sql-kafka-0-10_2.11:2.4.5 spark_local_flatten.py

```
hadoop@ip-172-31-32-102:~
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$ spark-submit --packages org.apache.spark:spark-sql-kafka-0-10_2.11:2.4.5 spark_local_flatten.py
```

```
hadoop@ip-172-31-32-102:~
[hadoop@ip-172-31-32-102 ~]$ spark-submit --packages org.apache.spark:spark-sql-kafka-0-10_2.11:2.4.5 spark_local_flatten.py
Ivy Default Cache set to: /home/hadoop/.ivy2/cache
The jars for the packages stored in: /home/hadoop/.ivy2/jars
:: loading settings :: url = jar:file:/usr/lib/spark/jars/ivy-2.4.0.jar!/org/apache/ivy/core/settings/ivysettings.xml
org.apache.spark#spark-sql-kafka-0-10_2.11 added as a dependency
:: resolving dependencies :: org.apache.spark#spark-submit-parent-f561d178-502d-4b74-bbb5-581e53735359;1.0
        confs: [default]
        found org.apache.spark#spark-sql-kafka-0-10_2.11;2.4.5 in central
        found org.apache.kafka#kafka-clients;2.0.0 in central
        found org.lz4#lz4-java;1.4.0 in central
        found org.xerial.snappy#snappy-java;1.1.7.3 in central
        found org.slf4j#slf4j-api;1.7.16 in central
        found org.spark-project.spark#unused;1.0.0 in central
:: resolution report :: resolve 358ms :: artifacts dl 9ms
        :: modules in use:
        org.apache.kafka#kafka-clients;2.0.0 from central in [default]
        org.apache.spark#spark-sql-kafka-0-10_2.11;2.4.5 from central in [default]
        org.lz4#lz4-java;1.4.0 from central in [default]
        org.slf4j#slf4j-api;1.7.16 from central in [default]
        org.spark-project.spark#unused;1.0.0 from central in [default]
        org.xerial.snappy#snappy-java;1.1.7.3 from central in [default]
        ---------------------------------------------------------------------
        |                  |            modules            ||   artifacts   |
        |       conf       | number| search|dwnlded|evicted|| number|dwnlded|
        ---------------------------------------------------------------------
        |      default     |   6   |   0   |   0   |   0   ||   6   |   0   |
        ---------------------------------------------------------------------
:: retrieving :: org.apache.spark#spark-submit-parent-f561d178-502d-4b74-bbb5-581e53735359
        confs: [default]
        0 artifacts copied, 6 already retrieved (0kB/11ms)
```

2.6 Validating the directory and contents of flattened file (.csv from .json) in HDFS:

hadoop fs -ls /user/root/clickstream

```
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$ hadoop fs -ls /user/root/clickstream
Found 1 items
drwxr-xr-x   - hadoop hadoop          0 2024-07-26 13:40 /user/root/clickstream/_temporary
[hadoop@ip-172-31-32-102 ~]$ hadoop fs -ls /user/root/clickstream
Found 2 items
-rw-r--r--   1 hadoop hadoop          0 2024-07-26 13:40 /user/root/clickstream/_SUCCESS
-rw-r--r--   1 hadoop hadoop   85468739 2024-07-26 13:40 /user/root/clickstream/part-00000-92e9241c-50b9-47dc-a89a-038a0dd6a675-c000.csv
[hadoop@ip-172-31-32-102 ~]$
```

hadoop fs -cat /user/root/clickstream/part-00000-92e9241c-50b9-47dc-a89a-038a0dd6a675-c000.csv| head -n 5

```
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$ hadoop fs -cat /user/root/clickstream/part-00000-92e9241c-50b9-47dc-a89a-038a0dd6a675-c000.csv| head -n 5
customer_id,app_version,OS_version,lat,lon,page_id,button_id,is_button_click,is_page_view,is_scroll_up,is_scroll_down,timestamp
18213492,1.4.31,iOS,5.676968,16.753712,e7bc5fb2-1231-11eb-adc1-0242ac120002,fcba68aa-1231-11eb-adc1-0242ac120002,No,No,No,No,""
21531056,3.4.16,Android,-77.6658015,28.740867,de545711-3914-4450-8c11-b17b8dabb5e1,a95dd57b-779f-49db-819d-b6960483e554,Yes,No,No,No,""
89193671,3.1.27,iOS,68.5232875,111.807065,e7bc5fb2-1231-11eb-adc1-0242ac120002,e1e99492-17ae-11eb-adc1-0242ac120002,Yes,Yes,No,No,""
92968159,2.2.24,Android,-33.9557165,-81.838663,de545711-3914-4450-8c11-b17b8dabb5e1,fcba68aa-1231-11eb-adc1-0242ac120002,Yes,No,Yes,No,""
cat: Unable to write to output stream.
[hadoop@ip-172-31-32-102 ~]$
```

3. Loading data from AWS RDS to Hadoop

3.1 Installing MySQL connector

wget https://de-mysql-connector.s3.amazonaws.com/mysql-connector-java-8.0.25.tar.gz
tar -xvf mysql-connector-java-8.0.25.tar.gz

```
hadoop@ip-172-31-32-102:~
[hadoop@ip-172-31-32-102 ~]$ wget https://de-mysql-connector.s3.amazonaws.com/mysql-connector-java-8.0.25.tar.gz
--2024-07-26 11:23:00--  https://de-mysql-connector.s3.amazonaws.com/mysql-connector-java-8.0.25.tar.gz
Resolving de-mysql-connector.s3.amazonaws.com (de-mysql-connector.s3.amazonaws.com)... 3.5.29.246, 52.217.197.161, 52.217.49.164, ...
Connecting to de-mysql-connector.s3.amazonaws.com (de-mysql-connector.s3.amazonaws.com)|3.5.29.246|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 4079310 (3.9M) [application/x-gzip]
Saving to: 'mysql-connector-java-8.0.25.tar.gz.1'

100%[=======================================================================================>] 4,079,310   --.-K/s   in 0.1s

2024-07-26 11:23:00 (28.6 MB/s) - 'mysql-connector-java-8.0.25.tar.gz.1' saved [4079310/4079310]

[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$ tar -xvf mysql-connector-java-8.0.25.tar.gz
mysql-connector-java-8.0.25/
mysql-connector-java-8.0.25/src/
mysql-connector-java-8.0.25/src/build/
mysql-connector-java-8.0.25/src/build/java/
mysql-connector-java-8.0.25/src/build/java/documentation/
mysql-connector-java-8.0.25/src/build/java/instrumentation/
mysql-connector-java-8.0.25/src/build/misc/
mysql-connector-java-8.0.25/src/build/misc/debian.in/
mysql-connector-java-8.0.25/src/build/misc/debian.in/source/
mysql-connector-java-8.0.25/src/demo/
mysql-connector-java-8.0.25/src/demo/java/
mysql-connector-java-8.0.25/src/demo/java/demo/
mysql-connector-java-8.0.25/src/demo/java/demo/x/
mysql-connector-java-8.0.25/src/demo/java/demo/x/devapi/
mysql-connector-java-8.0.25/src/generated/
mysql-connector-java-8.0.25/src/generated/java/
```

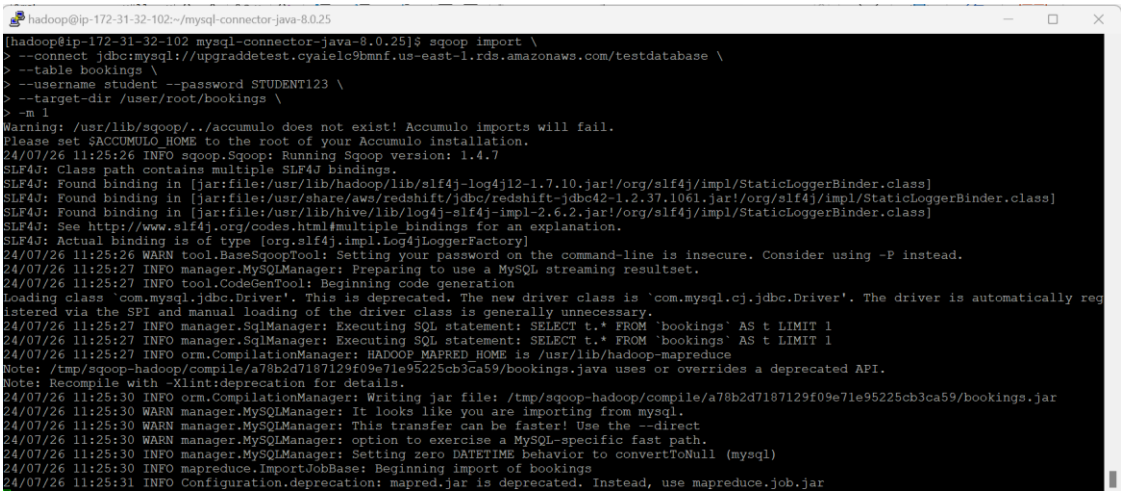
cd mysql-connector-java-8.0.25/
sudo cp mysql-connector-java-8.0.25.jar /usr/lib/sqoop/lib

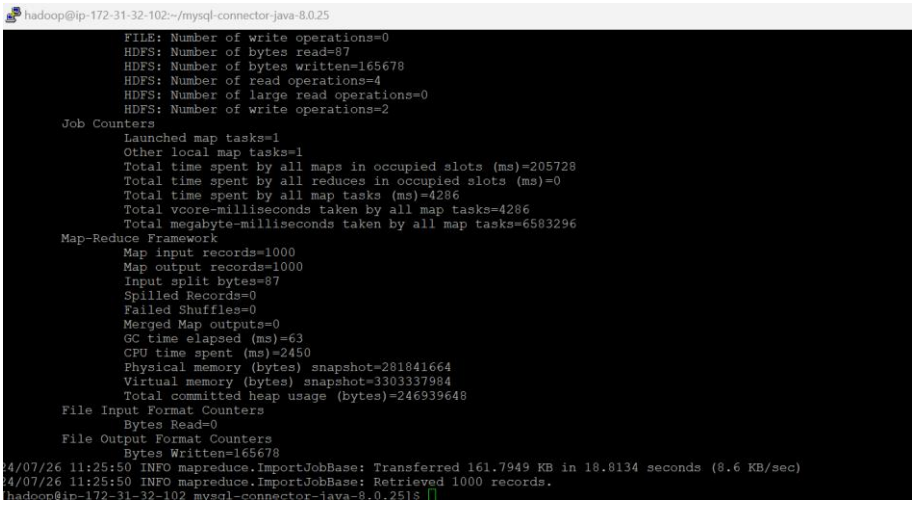
```
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$ cd mysql-connector-java-8.0.25/
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$ sudo cp mysql-connector-java-8.0.25.jar /usr/lib/sqoop/lib
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$
```

3.2 Ingesting batch data (bookings data stored in the RDS) to Hadoop using Sqoop import command

```
sqoop import \
--connect jdbc:mysql://upgraddetest.cyaielc9bmnf.us-east-1.rds.amazonaws.com/testdatabase \
--table bookings \
--username student --password STUDENT123 \
--target-dir /user/root/bookings \
-m 1
```

Where:
RDS Connection String-> jdbc:mysql://upgraddetest.cyaielc9bmnf.us-east-1.rds.amazonaws.com/testdatabase
Username-> student
Password-> STUDENT123
Table Name-> bookings
Target directory-> /user/root/bookings
No of mappers-> 1





** *No of records ingested is matching is matching with the validation documents*

3.3 Validating the directory and files created in HDFS

hadoop fs -ls /user/root/bookings

```
24/07/26 11:25:50 INFO mapreduce.ImportJobBase: Transferred 161.7949 KB in 18.8134 seconds (8.6 KB/sec)
24/07/26 11:25:50 INFO mapreduce.ImportJobBase: Retrieved 1000 records.
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$ hadoop fs -ls /user/root/bookings
Found 2 items
-rw-r--r--   1 hadoop hadoop          0 2024-07-26 11:25 /user/root/bookings/_SUCCESS
-rw-r--r--   1 hadoop hadoop     165678 2024-07-26 11:25 /user/root/bookings/part-m-00000
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$
```

Checking the first 5 records of the file generated :

hadoop fs -cat /user/root/bookings/part-m-00000 | head -n 5

```
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$ hadoop fs -cat /user/root/bookings/part-m-00000 | head -n 5
BK8968087150,51811359,15055660,2.2.14,Android,-49.4319655,103.917851,-58.8043875,146.477367,2020-06-23 19:33:10.0,2020-06-06 09:02:10.0,534,83
,INR,black,054-38-4479,4,3,3
BK629851904,31663218,60872180,3.4.1,iOS,-83.5408405,175.80085,86.20705,128.367238,2020-05-23 12:22:04.0,2020-08-09 19:02:56.0,126,67,INR,lime,
796-39-6801,3,2,4
BK1797410350,86869399,94276051,4.1.36,iOS,-67.8930645,55.234128,-51.1079,-31.07475,2020-05-19 14:14:32.0,2020-08-23 18:38:39.0,297,63,INR,oliv
e,748-73-1579,1,3,3
BK5788246325,58230837,45457227,2.4.27,Android,13.707887,113.499943,54.3812915,-18.437751,2020-03-24 01:30:15.0,2020-05-19 11:16:45.0,932,32,IN
R,white,558-80-6346,3,2,2
BK8342703255,84232510,86494681,4.1.34,Android,-6.091461,-114.649789,22.8449505,70.137827,2020-08-03 19:10:52.0,2020-03-24 08:25:40.0,260,7,INR
,blue,068-72-1637,3,3,3
cat: Unable to write to output stream.
[hadoop@ip-172-31-32-102 mysql-connector-java-8.0.25]$
```

4. Loading Aggregate bookings data into HDFS

4.1 Creating Pyspark file “datewise_bookings_aggregates_spark.py” to find date-wise total bookings data.

4.2 Executing the file “datewise_bookings_aggregates_spark.py to generate aggregated data (.csv format) in HDFS using spark-submit command with the necessary Kafka package dependency:

spark-submit --packages org.apache.spark:spark-sql-kafka-0-10_2.11:2.4.5 /home/hadoop/datewise_bookings_aggregates_spark.py

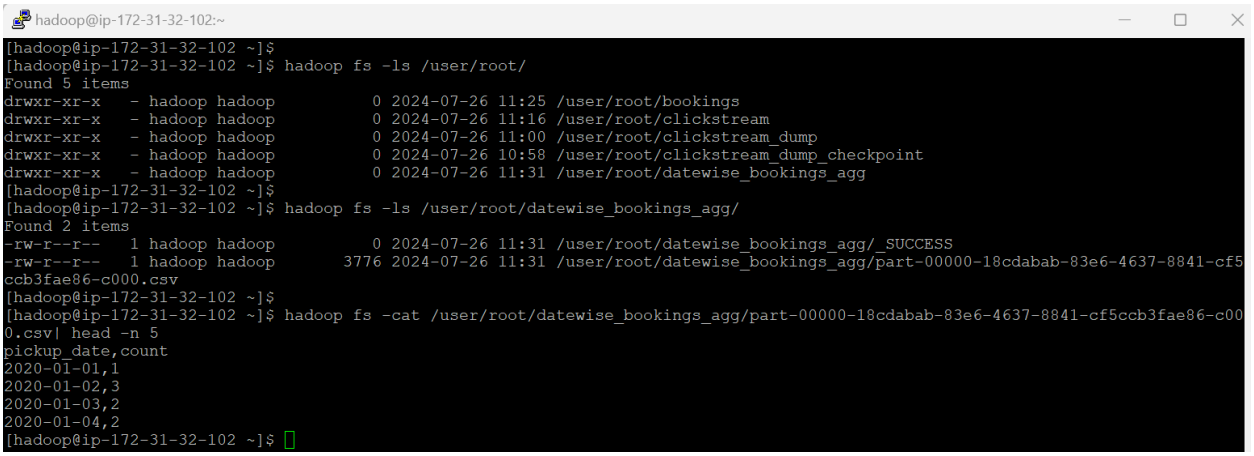
```
hadoop@ip-172-31-32-102:~
[hadoop@ip-172-31-32-102 ~]$
[hadoop@ip-172-31-32-102 ~]$ spark-submit --packages org.apache.spark:spark-sql-kafka-0-10_2.11:2.4.5 datewise_bookings_aggregat
es_spark.py
```

```
hadoop@ip-172-31-32-102:~
es_spark.py
Ivy Default Cache set to: /home/hadoop/.ivy2/cache
The jars for the packages stored in: /home/hadoop/.ivy2/jars
:: loading settings :: url = jar:file:/usr/lib/spark/jars/ivy-2.4.0.jar!/org/apache/ivy/core/settings/ivysettings.xml
org.apache.spark#spark-sql-kafka-0-10_2.11 added as a dependency
:: resolving dependencies :: org.apache.spark#spark-submit-parent-ac38adc0-af7d-493b-ae1c-101dcd86d73a;1.0
        confs: [default]
        found org.apache.spark#spark-sql-kafka-0-10_2.11;2.4.5 in central
        found org.apache.kafka#kafka-clients;2.0.0 in central
        found org.lz4#lz4-java;1.4.0 in central
        found org.xerial.snappy#snappy-java;1.1.7.3 in central
        found org.slf4j#slf4j-api;1.7.16 in central
        found org.spark-project.spark#unused;1.0.0 in central
:: resolution report :: resolve 341ms :: artifacts dl 10ms
        :: modules in use:
        org.apache.kafka#kafka-clients;2.0.0 from central in [default]
        org.apache.spark#spark-sql-kafka-0-10_2.11;2.4.5 from central in [default]
        org.lz4#lz4-java;1.4.0 from central in [default]
        org.slf4j#slf4j-api;1.7.16 from central in [default]
        org.spark-project.spark#unused;1.0.0 from central in [default]
        org.xerial.snappy#snappy-java;1.1.7.3 from central in [default]
        ---------------------------------------------------------------------
        |                  |            modules            ||   artifacts   |
        |       conf       | number| search|dwnlded|evicted|| number|dwnlded|
        ---------------------------------------------------------------------
        |      default     |   6   |   0   |   0   |   0   ||   6   |   0   |
        ---------------------------------------------------------------------
:: retrieving :: org.apache.spark#spark-submit-parent-ac38adc0-af7d-493b-ae1c-101dcd86d73a
        confs: [default]
        0 artifacts copied, 6 already retrieved (0kB/10ms)
```

4.3 Validating the directory and file contents containing the aggregated bookings data in HDFS

hadoop fs -ls /user/root/datewise_bookings_agg/

Checking the first few records of the file generated:
hadoop fs -cat /user/root/datewise_bookings_agg/part-00000-18cdabab-83e6-4637-8841-cf5ccb3fae86-c000.csv| head -n 5



5. Creating and loading the data in Hive-Managed Database & Tables.

5.1 Connecting to Hive instance and creating the database named ‘cab_rides’
create database cab_rides;
use cab_rides;

5.2 Creating tables in Hive

```
CREATE TABLE IF NOT EXISTS clickstream_data (
  customer_id INT,
  app_version STRING,
  os_version STRING,
  lat DOUBLE,
  lon DOUBLE,
  page_id STRING,
  button_id STRING,
  is_button_click BOOLEAN,
  is_page_view BOOLEAN,
  is_scroll_up BOOLEAN,
  is_scroll_down BOOLEAN,
  time_stamp TIMESTAMP
) ROW FORMAT DELIMITED
 FIELDS TERMINATED BY ','                    //To load the file with comma as delimiter
tblproperties('skip.header.line.count' = '1');    //To skip the header present in the file
```

```
hive>
    >
    >
    > CREATE TABLE IF NOT EXISTS clickstream_data (
    >   customer_id INT,
    >   app_version STRING,
    >   os_version STRING,
    >   lat DOUBLE,
    >   lon DOUBLE,
    >   page_id STRING,
    >   button_id STRING,
    >   is_button_click BOOLEAN,
    >   is_page_view BOOLEAN,
    >   is_scroll_up BOOLEAN,
    >   is_scroll_down BOOLEAN,
    >   time_stamp TIMESTAMP
    > ) ROW FORMAT DELIMITED
    >  FIELDS TERMINATED BY ','
    > tblproperties('skip.header.line.count' = '1');
OK
Time taken: 0.078 seconds
```

```
CREATE TABLE IF NOT EXISTS bookings_detail (
  booking_id STRING,
  customer_id INT,
  driver_id INT,
  customer_app_version STRING,
  customer_phone_os_version STRING,
  pickup_lat DOUBLE,
  pickup_lon DOUBLE,
  drop_lat DOUBLE,
  drop_lon DOUBLE,
  pickup_timestamp TIMESTAMP,
  drop_timestamp TIMESTAMP,
  trip_fare DECIMAL(10, 2),
  tip_amount DECIMAL(10, 2),
  currency_code STRING,
  cab_color STRING,
  cab_registration_no STRING,
  customer_rating_by_driver INT,
  rating_by_customer INT,
  passenger_count INT
) ROW FORMAT DELIMITED
 FIELDS TERMINATED BY ',' ;                    //To load the file with comma as delimiter
```

```
hive>
    > CREATE TABLE IF NOT EXISTS bookings_detail (
    >   booking_id STRING,
    >   customer_id INT,
    >   driver_id INT,
    >   customer_app_version STRING,
    >   customer_phone_os_version STRING,
    >   pickup_lat DOUBLE,
    >   pickup_lon DOUBLE,
    >   drop_lat DOUBLE,
    >   drop_lon DOUBLE,
    >   pickup_timestamp TIMESTAMP,
    >   drop_timestamp TIMESTAMP,
    >   trip_fare DECIMAL(10, 2),
    >   tip_amount DECIMAL(10, 2),
    >   currency_code STRING,
    >   cab_color STRING,
    >   cab_registration_no STRING,
    >   customer_rating_by_driver INT,
    >   rating_by_customer INT,
    >   passenger_count INT
    > ) ROW FORMAT DELIMITED
    >  FIELDS TERMINATED BY ',' ;
OK
Time taken: 0.331 seconds
hive>
```

```
CREATE TABLE IF NOT EXISTS datewise_total_bookings (
  pickup_date DATE,
  total_bookings INT
) ROW FORMAT DELIMITED
FIELDS TERMINATED BY ','                    //To load the file with comma as delimiter
tblproperties('skip.header.line.count' = '1');    //To skip the header present in the file
```

```
hive> CREATE TABLE IF NOT EXISTS datewise_total_bookings (
    >   pickup_date DATE,
    >   total_bookings INT
    > ) ROW FORMAT DELIMITED
    >  FIELDS TERMINATED BY ',' ;
OK
Time taken: 0.059 seconds
```

5.3 Loading the Clickstream data into Hive tables using files in HDFS & validating the contents of the tables created.

```
LOAD DATA INPATH '/user/root/clickstream/part-00000-92e9241c-50b9-47dc-a89a-038a0dd6a675-c000.csv'
OVERWRITE INTO TABLE clickstream_data;
```

Checking the first few records of the table loaded:

```
Select * from clickstream_data limit 2;
```

```
   > LOAD DATA INPATH '/user/root/clickstream/part-00000-92e9241c-50b9-47dc-a89a-038a0dd6a675-c000.csv' OVERWRI
INTO TABLE clickstream_data;
oading data to table cab_rides.clickstream_data
K
ime taken: 1.005 seconds
ive>
   >
   > select * from clickstream_data limit 2;
K
8213492        1.4.31  iOS     5.676968        16.753712       e7bc5fb2-1231-11eb-adc1-0242ac120002    fcba68aa-
31-11eb-adc1-0242ac120002       NULL    NULL    NULL    NULL    NULL
1531056        3.4.16  Android -77.6658015      28.740867       de545711-3914-4450-8c11-b17b8dabb5e1    a95dd57b-
9f-49db-819d-b6960483e554       NULL    NULL    NULL    NULL    NULL
ime taken: 0.187 seconds, Fetched: 2 row(s)
```

Checking the count of records ingested into the table:
SELECT COUNT(DISTINCT(CUSTOMER_ID)) FROM CLICKSTREAM_DATA ;

```
hive>
    >
    >
    >
    > SELECT  COUNT(DISTINCT(CUSTOMER_ID))
    > FROM CLICKSTREAM_DATA ;
Query ID = hadoop_20240726145111_b0b7c1ba-fd86-4ee1-ba10-d998966bdb7f
Total jobs = 1
Launching Job 1 out of 1
Tez session was closed. Reopening...
Session re-established.
Status: Running (Executing on YARN cluster with App id application_1721991376046_0023)

--------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      1          1        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      2          2        0        0       0       0
Reducer 3 ...... container     SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 6.45 s
--------------------------------------------------------------------------------
OK
3000
Time taken: 13.464 seconds, Fetched: 1 row(s)
hive>
```

** *No of records ingested is having slight difference of 16 records with the validation documents due to live streaming data.*

Clickstream Table Count

Please check the number of records in the clickstream table

```
Number of records - 2984
```

5.4 Loading the Bookings data into Hive tables using files in HDFS & validating the contents of the tables created:
LOAD DATA INPATH '/user/root/bookings/part-m-00000' OVERWRITE INTO TABLE bookings_detail;

Checking the count of records ingested into the table:
select count(*) from bookings_detail;

```
hadoop@ip-172-31-32-102:~
hive>
    >
    > LOAD DATA INPATH '/user/root/bookings/part-m-00000'
    > OVERWRITE INTO TABLE bookings_detail;
Loading data to table cab_rides.bookings_detail
OK
Time taken: 0.454 seconds
hive>
    > select count(*) from bookings_detail;
Query ID = hadoop_20240726115232_12e64393-99df-4cd1-9a01-0bff7ac6d35d
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1721991376046_0005)

----------------------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
----------------------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      1          1        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      1          1        0        0       0       0
----------------------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 4.86 s
----------------------------------------------------------------------------------------------
OK
1000
Time taken: 5.423 seconds, Fetched: 1 row(s)
hive>
```

*** No of records ingested is matching is matching with the validation documents*

5.5 Loading the Date-wise total bookings data into Hive tables using files in HDFS & validating the contents of the tables created

LOAD DATA INPATH '/user/root/datewise_bookings_agg/part-*.csv' OVERWRITE INTO TABLE datewise_total_bookings;

```
hive>
    > LOAD DATA INPATH '/user/root/datewise_bookings_agg/part-*.csv' OVERWRITE INTO TABLE datewise_total_bookings;

Loading data to table cab_rides.datewise_total_bookings
OK
Time taken: 1.026 seconds
hive>
    > select * from datewise_total_bookings limit 2;
OK
2020-01-01      1
2020-01-02      3
Time taken: 0.147 seconds, Fetched: 2 row(s)
hive>
```

Checking the count of records ingested into the table
select count(*) from datewise_total_bookings;

```
hive>
    > select count(*) from datewise_total_bookings;
Query ID = hadoop_20240726142239_f2361e51-786c-4b61-899a-d846ab36d5b9
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1721991376046_0021)

----------------------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
----------------------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      1          1        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      1          1        0        0       0       0
----------------------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 4.77 s
----------------------------------------------------------------------------------------------
OK
289
Time taken: 6.808 seconds, Fetched: 1 row(s)
hive>
```

*** No of records ingested is matching is matching with the validation documents*

Bookings Aggregates Table Count

Please check the number of records in the bookings aggregates table

```
Number of records - 289
```