HIVE CASE STUDY

DA Track

Done by

Mr. PARAMESH E

PROBLEM STATEMENT

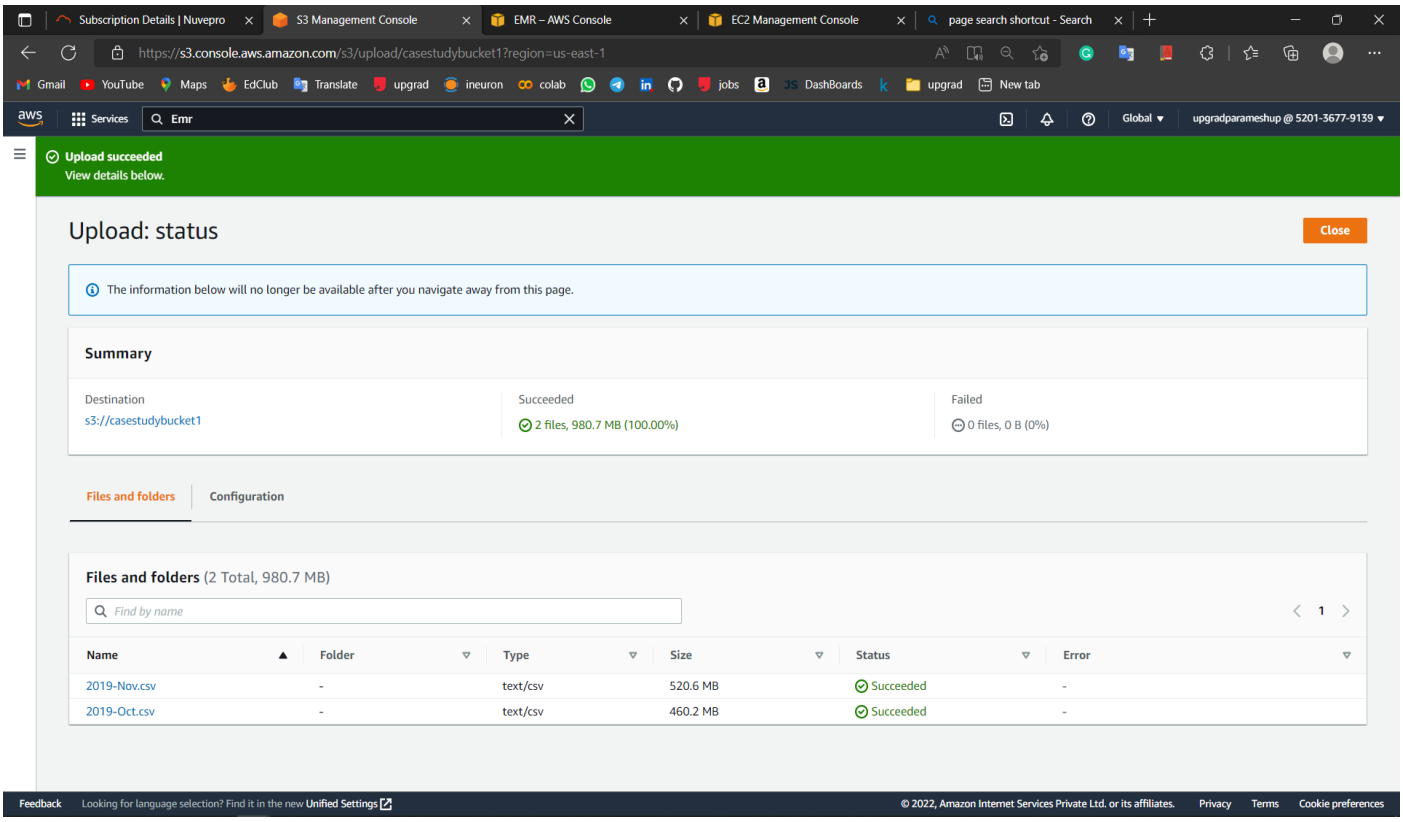
With online sales gaining popularity, tech companies are exploring ways to improve their sales by analysing customer behavior and gaining insights about product trends. Furthermore, the websites make it easier for customers to find the products they require without much scavenging. Needless to say, the role of big data analysts is among the most sought-after job profiles of this decade. Therefore, as part of this assignment, we will be challenging you, as a big data analyst, to extract data and gather insights from a real-life data set of an e-commerce company.

The implementation phase divided into the following parts:

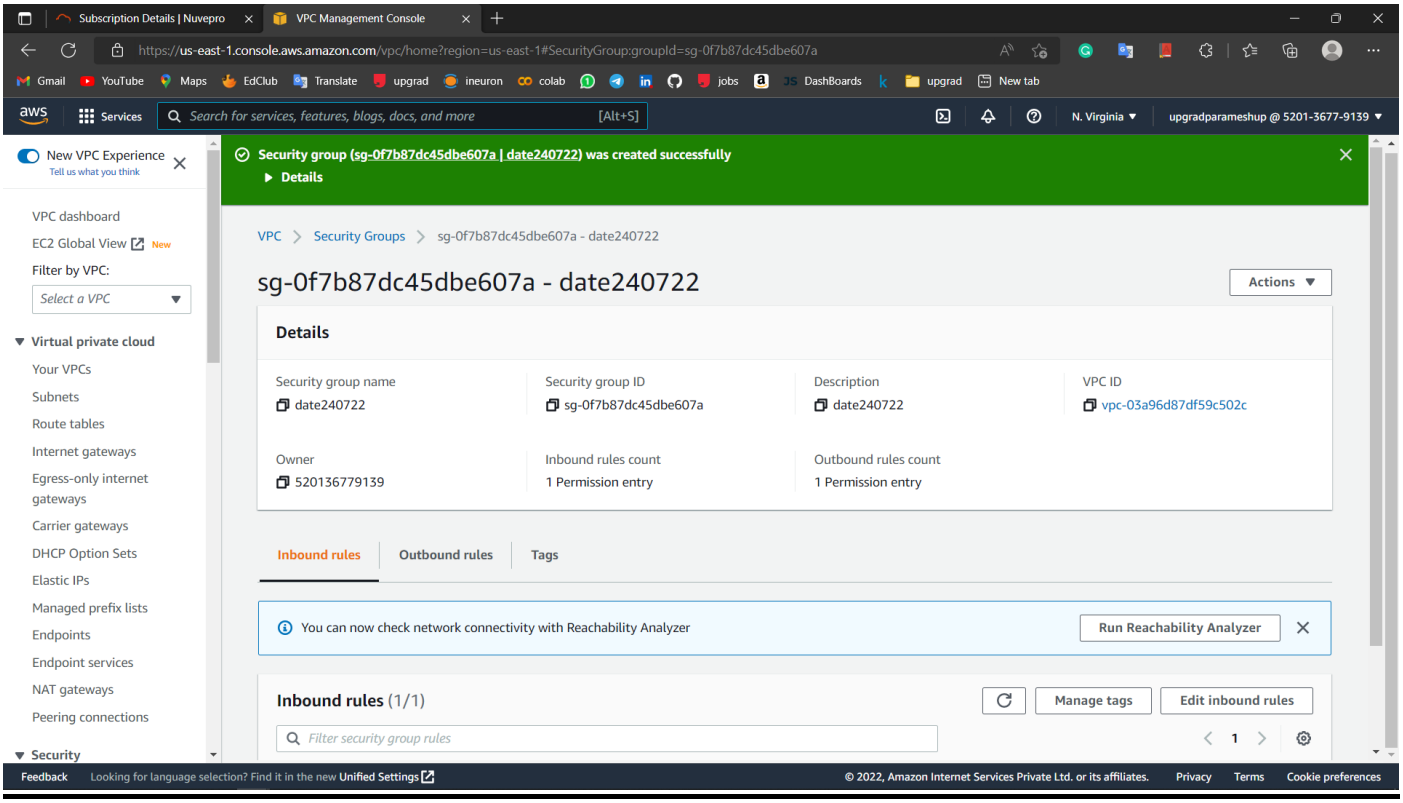
1. Copying the data set into the HDFS:
2. Launch an EMR cluster that utilizes the Hive services,
3. Move the data from the S3 bucket into the HDFS
4. Creating the database and launching Hive queries on your EMR cluster:
5. Create the structure of your database,
6. Use optimized techniques to run your queries as efficiently as possible
7. Show the improvement of the performance after using optimization on any single query.
8. Running Hive queries to answering the questions given
9. Cleaning up
10. Drop database,
11. Terminate cluster.

Copying the data set into the HDFS:

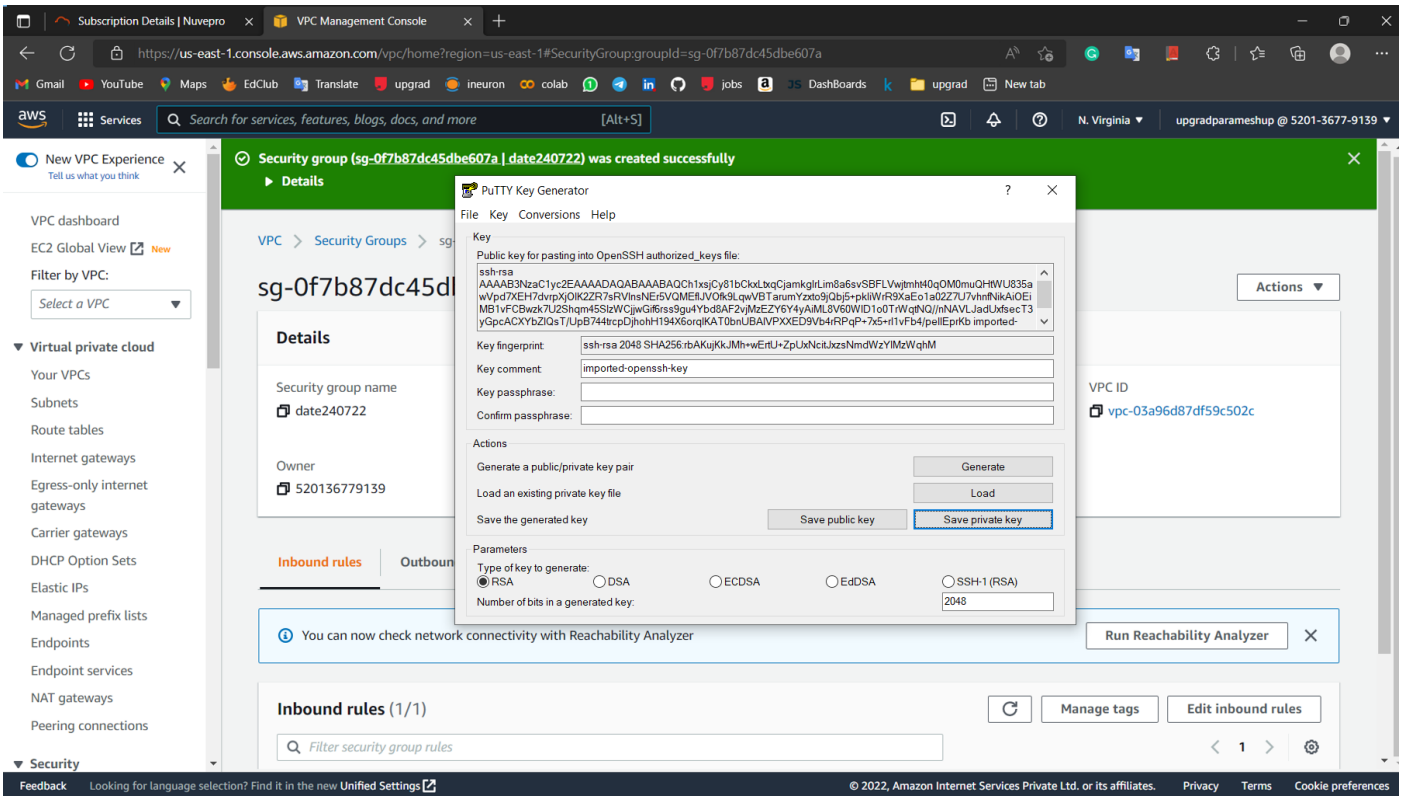
Uploading data into the S3 buckets called casestudybucket1



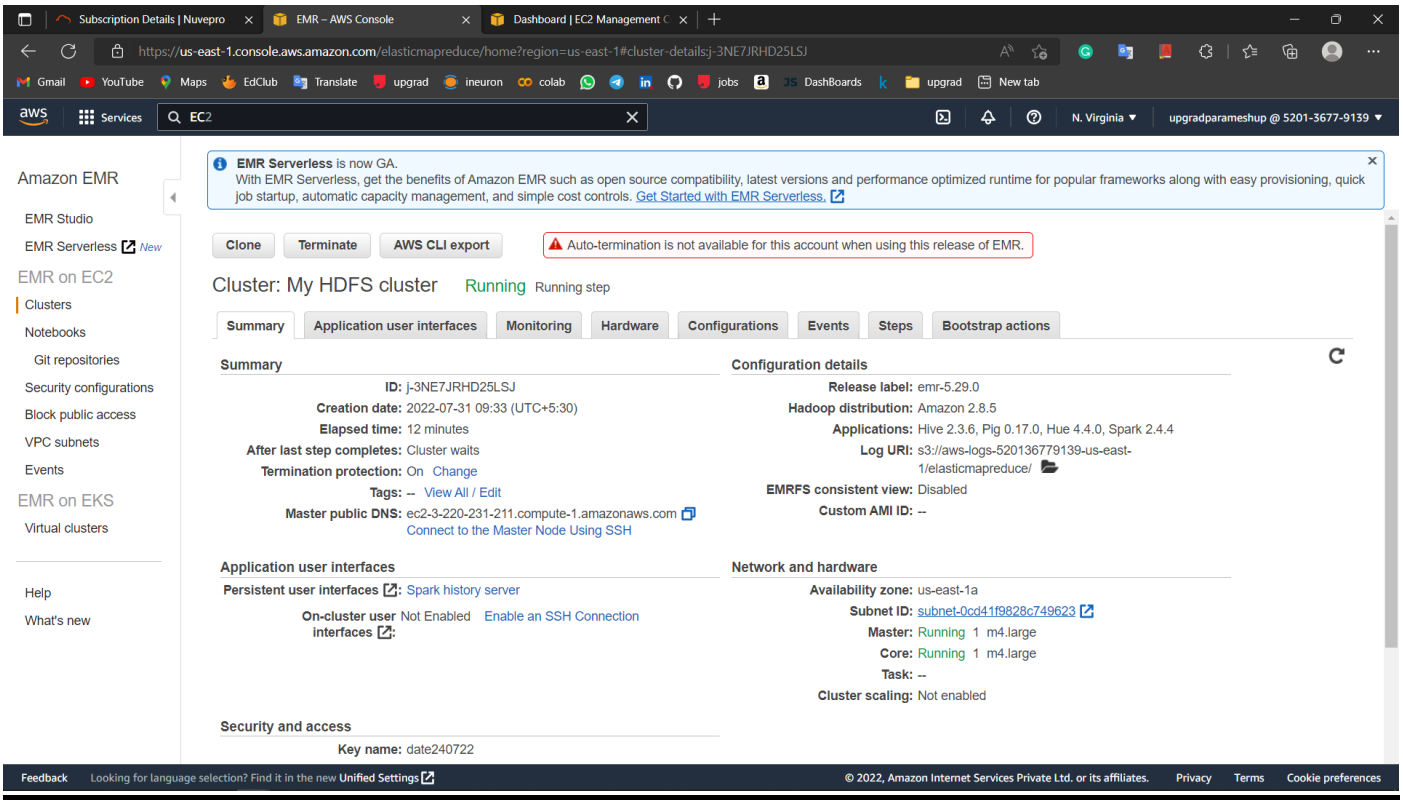
Creating security groups



Generating ppk file from putty key generator



Launch an EMR cluster that utilizes the Hive services



Successfully Created EMR Cluster as well as Connected to Putty CLI Console Hadoop

```
hadoop@ip-10-0-14-76:~
Using username "hadoop".
Authenticating with public key "imported-openssh-key"
Last login: Sun Jul 31 04:14:54 2022

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
64 package(s) needed for security, out of 93 available
Run "sudo yum update" to apply all updates.

EEEEEEEEEEEEEEEEEEEE MMMMMMMM           MMMMMMMM RRRRRRRRRRRRRRR
E::::::::::::::::::E M:::::::M         M:::::::M R::::::::::::::R
EE::::::EEEEEEEEE::E M::::::::M       M::::::::M R::::RRRRRR::::R
  E::::E       EEEEE M:::::::::M     M:::::::::M RR::::R      R::::R
  E::::E             M::::::M:::M   M:::M::::::M   R::::R      R::::R
  E::::::EEEEEEEEEE  M::::::M M:::M M:::M M::::::M   R::::RRRRRR::::R
  E::::::::::::::::E M::::::M  M:::M:::M  M::::::M   R::::::::::::RR
  E::::::EEEEEEEEEE  M::::::M   M:::::M   M::::::M   R::::RRRRRR::::R
  E::::E             M::::::M    M:::M    M::::::M   R::::R      R::::R
  E::::E       EEEEE M::::::M     MMM     M::::::M   R::::R      R::::R
EE::::::EEEEEEEE::::E M::::::M             M::::::M   R::::R      R::::R
E::::::::::::::::::E M::::::M             M::::::M RR::::R      R::::R
EEEEEEEEEEEEEEEEEEEE MMMMMMM              MMMMMMM RRRRRRR      RRRRRR

[hadoop@ip-10-0-14-76 ~]$ pwd
/home/hadoop
[hadoop@ip-10-0-14-76 ~]$
```

Making directory in Hadoop

```
[hadoop@ip-10-0-14-76 ~]$ pwd
/home/hadoop
[hadoop@ip-10-0-14-76 ~]$ hadoop fs -ls
[hadoop@ip-10-0-14-76 ~]$ ls
[hadoop@ip-10-0-14-76 ~]$ hadoop fs -ls /
Found 4 items
drwxr-xr-x   - hdfs hadoop          0 2022-07-31 04:10 /apps
drwxrwxrwt   - hdfs hadoop          0 2022-07-31 04:13 /tmp
drwxr-xr-x   - hdfs hadoop          0 2022-07-31 04:10 /user
drwxr-xr-x   - hdfs hadoop          0 2022-07-31 04:10 /var
[hadoop@ip-10-0-14-76 ~]$ hadoop fs -mkdir /hivecasestudy
[hadoop@ip-10-0-14-76 ~]$ hadoop fs -ls /
Found 5 items
drwxr-xr-x   - hdfs   hadoop          0 2022-07-31 04:10 /apps
drwxr-xr-x   - hadoop hadoop          0 2022-07-31 04:17 /hivecasestudy
drwxrwxrwt   - hdfs   hadoop          0 2022-07-31 04:13 /tmp
drwxr-xr-x   - hdfs   hadoop          0 2022-07-31 04:10 /user
drwxr-xr-x   - hdfs   hadoop          0 2022-07-31 04:10 /var
[hadoop@ip-10-0-14-76 ~]$
```

Moving datasets from the S3 bucket into the HDFS as follows respectively

All the bytes successfully copied to HDFS

```
[hadoop@ip-10-0-14-76 ~]$ hadoop distcp 's3://casestudybucket1/2019-Nov.csv' /hivecasestudy/2019-Nov.csv
```

```
                Bytes Copied=545839412
                Bytes Expected=545839412
                Files Copied=1
[hadoop@ip-10-0-14-76 ~]$ hadoop distcp 's3://casestudybucket1/2019-Oct.csv' /hivecasestudy/2019-Oct.csv
```

```
                Bytes Copied=482542278
                Bytes Expected=482542278
                Files Copied=1
[hadoop@ip-10-0-14-76 ~]$
```

Looking datasets at HDFS hivecasestudy folder

hadoop@ip-10-0-14-76:~

```
[hadoop@ip-10-0-14-76 ~]$ hadoop fs -ls /
Found 5 items
drwxr-xr-x   - hdfs   hadoop          0 2022-07-31 04:10 /apps
drwxr-xr-x   - hadoop hadoop          0 2022-07-31 04:20 /hivecasestudy
drwxrwxrwt   - hdfs   hadoop          0 2022-07-31 04:13 /tmp
drwxr-xr-x   - hdfs   hadoop          0 2022-07-31 04:10 /user
drwxr-xr-x   - hdfs   hadoop          0 2022-07-31 04:10 /var
[hadoop@ip-10-0-14-76 ~]$ hadoop fs -ls /hivecasestudy/
Found 2 items
-rw-r--r--   1 hadoop hadoop  545839412 2022-07-31 04:19 /hivecasestudy/2019-Nov.csv
-rw-r--r--   1 hadoop hadoop  482542278 2022-07-31 04:20 /hivecasestudy/2019-Oct.csv
[hadoop@ip-10-0-14-76 ~]$
```

Launching Hive

```
[hadoop@ip-10-0-14-76 ~]$ hive

Logging initialized using configuration in file:/etc/hive/conf.dist/hive-log4j2.properties Async: false
```

Launching Hive queries on EMR cluster

Cross-Checking Databases

```
hive> show databases;
OK
default
Time taken: 1.081 seconds, Fetched: 1 row(s)
```

Creating ecommerce database and starting to use ecommerce db

```
hive> CREATE DATABASE IF NOT EXISTS ecommerce;
OK
Time taken: 0.577 seconds
hive> show databases;
OK
default
ecommerce
Time taken: 0.032 seconds, Fetched: 2 row(s)
hive> use ecommerce;
OK
Time taken: 0.094 seconds
hive>
```

Creating an external table from the raw data

```
hadoop@ip-10-0-14-76:~
hive> create external table if not exists ecomstats ( event_time timestamp, event_type string ,  product_id string , category_id string , category_code string , brand strin
g , price float , user_id bigint , user_session string) ROW FORMAT SERDE 'org.apache.hadoop.hive.serde2.OpenCSVSerde' WITH SERDEPROPERTIES ("separatorChar"=" , "  , "quoteC
har"="\"", "escapeChar"="\\") stored as textfile location '/hivecasestudy' TBLPROPERTIES ("skip.header.line.count"="1");
OK
Time taken: 0.527 seconds
hive> show tables;
OK
ecomstats
Time taken: 0.147 seconds, Fetched: 1 row(s)
hive>
```

QUERY:

create external table if not exists ecomstats (event_time timestamp, event_type string , product_id string , category_id string , category_code string , brand string , price float , user_id bigint , user_session string) ROW FORMAT SERDE 'org.apache.hadoop.hive.serde2.OpenCSVSerde' WITH SERDEPROPERTIES ("separatorChar"=" , " , "quoteChar"="\" ", "escapeChar"="\\") stored as textfile location '/hivecasestudy' TBLPROPERTIES ("skip.header.line.count"="1");

Describing variables of ecomstats table

```
hive> desc ecomstats;
OK
event_time              string                  from deserializer
event_type              string                  from deserializer
product_id              string                  from deserializer
category_id             string                  from deserializer
category_code           string                  from deserializer
brand                   string                  from deserializer
price                   string                  from deserializer
user_id                 string                  from deserializer
user_session            string                  from deserializer
Time taken: 0.134 seconds, Fetched: 9 row(s)
```

Loading the both datasets into the ecomstats table

```
hive> LOAD DATA INPATH '/hivecasestudy/2019-Nov.csv' into table ecomstats ;
Loading data to table ecommerce.ecomstats
OK
Time taken: 2.22 seconds
hive> LOAD DATA INPATH '/hivecasestudy/2019-Oct.csv' into table ecomstats ;
Loading data to table ecommerce.ecomstats
OK
Time taken: 0.846 seconds
hive>
```

With the Hive tool enabling header True and

Looking the ecomstats table

```
hive> set hive.cli.print.header=true;
hive> select * from ecomstats limit 5;
OK
ecomstats.event_time    ecomstats.event_type    ecomstats.product_id    ecomstats.category_id   ecomstats.category_code ecomstats.brand ecomstats.price ecomst
comstats.user_session
2019-11-01 00:00:02 UTC view    5802432 1487580009286598681                     0.32    562076640       09fafd6c-6c99-46b1-834f-33527f4de241
2019-11-01 00:00:09 UTC cart    5844397 1487580006317032337                     2.38    553329724       2067216c-31b5-455d-a1cc-af0575a34ffb
2019-11-01 00:00:10 UTC view    5837166 1783999064103190764             pnb     22.22   556138645       57ed222e-a54a-4907-9944-5a875c2d7f4f
2019-11-01 00:00:11 UTC cart    5876812 1487580010100293687             jessnail        3.16    564506666       186c1951-8052-4b37-adce-dd9644b1d5f7
2019-11-01 00:00:24 UTC remove_from_cart        5826182 1487580007483048900                     3.33    553329724       2067216c-31b5-455d-a1cc-af0575a34ffb
Time taken: 0.212 seconds, Fetched: 5 row(s)
hive>
```

From Dynamic Partitioning Tools Creating Optimized Hive table partitioned by Event_type and Cluster by User_id with 6 buckets

- **Enabling Dynamic Partitioning tools**

```
hive> SET hive.exec.dynamic.partition = true;
hive> SET hive.exec.dynamic.partition.mode=nonstrict;
```

- **Using optimized techniques Creating Optimized Table called dynamicstats and Confirming**

```
hive> Create external table if not exists dynamicstats (event_time timestamp, product_id string, category_id string, category_code string, brand string, pric
e float, user_id bigint, user_session string) partitioned by (event_type string) clustered by (user_id) into 6 buckets ROW FORMAT SERDE 'org.apache.hadoop.hi
ve.serde2.OpenCSVSerde' stored as textfile;
OK
Time taken: 0.118 seconds
hive> show tables;
OK
tab_name
dynamicstats
ecomstats
Time taken: 0.024 seconds, Fetched: 2 row(s)
hive>
```

QUERY:

Create external table if not exists dynamicstats (event_time timestamp, product_id string, category_id string, category_code string, brand string, price float, user_id bigint, user_session string) partitioned by (event_type string) clustered by (user_id) into 6 buckets ROW FORMAT SERDE 'org.apache.hadoop.hive.serde2.OpenCSVSerde' stored as textfile;

- **Describe Dynamicstats Variables**

```
hive> desc dynamicstats;
OK
col_name            data_type           comment
event_time                  string                      from deserializer
product_id                  string                      from deserializer
category_id                 string                      from deserializer
category_code               string                      from deserializer
brand                       string                      from deserializer
price                       string                      from deserializer
user_id                     string                      from deserializer
user_session                string                      from deserializer
event_type                  string

# Partition Information
# col_name                  data_type                   comment

event_type                  string
Time taken: 0.109 seconds, Fetched: 14 row(s)
hive>
```

- **Loading Data into the Dynamicstats table from ecomstats table**

```
hive> insert into dynamicstats partition (event_type ) select event_time , product_id ,  category_id , category_code , brand , price , user_id , user_session
 , event_type  from ecomstats ;
Query ID = hadoop_20220731044122_983a92c0-2985-448d-94dc-f9eb06c31303
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0004)

--------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      2          2        0        0       0       0
Reduce 2 ...... container     SUCCEEDED      5          5        0        0       0       0
--------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 168.47 s
--------------------------------------------------------------------------------
Loading data to table ecommerce.dynamicstats partition (event_type=null)

Loaded : 4/4 partitions.
         Time taken to load dynamic partitions: 0.439 seconds
         Time taken for adding to write entity : 0.002 seconds
OK
event_time      product_id      category_id     category_code   brand   price   user_id user_session    event_type
Time taken: 170.682 seconds
hive>
```

- **Looking at the table dynamicstats**

```
hive> select * from dynamicstats limit 5;
OK
dynamicstats.event_time dynamicstats.product_id dynamicstats.category_id        dynamicstats.category_code      dynamicstats.brand      dynamicstats.price  d
ynamicstats.user_id     dynamicstats.user_session       dynamicstats.event_type
2019-10-11 08:11:33 UTC 5810136 1487580009445982239             irisk   1.43    486338323       01764e46-afbe-4de8-9044-77c379c518bf    cart
2019-10-07 20:53:42 UTC 5846385 1487580008145748965             lovely  5.70    557752292       bf1270da-9f66-bcee-f336-10f51a280e65    cart
2019-10-07 20:53:45 UTC 5857007 1487580009496313889             runail  3.17    523616115       5b2ba38b-d66c-4127-bc23-275f06541525    cart
2019-10-07 20:54:35 UTC 5817702 1487580009496313889                     0.63    523616115       5b2ba38b-d66c-4127-bc23-275f06541525    cart
2019-10-07 20:54:36 UTC 5817702 1487580009496313889                     0.63    523616115       5b2ba38b-d66c-4127-bc23-275f06541525    cart
Time taken: 0.342 seconds, Fetched: 5 row(s)
```

- **Looking at the partitions Created in dynamicstats table**

```
hive> show partitions dynamicstats ;
OK
partition
event_type=cart
event_type=purchase
event_type=remove_from_cart
event_type=view
Time taken: 0.07 seconds, Fetched: 4 row(s)
hive>
```

- **Looking at the Partitions Created in HDFS**

```
[hadoop@ip-10-0-14-76 ~]$ hadoop fs -ls /user/hive/warehouse/ecommerce.db/dynamicstats ;
Found 4 items
drwxrwxrwt   - hadoop hadoop          0 2022-07-31 04:44 /user/hive/warehouse/ecommerce.db/dynamicstats/event_type=cart
drwxrwxrwt   - hadoop hadoop          0 2022-07-31 04:44 /user/hive/warehouse/ecommerce.db/dynamicstats/event_type=purchase
drwxrwxrwt   - hadoop hadoop          0 2022-07-31 04:44 /user/hive/warehouse/ecommerce.db/dynamicstats/event_type=remove_from_cart
drwxrwxrwt   - hadoop hadoop          0 2022-07-31 04:44 /user/hive/warehouse/ecommerce.db/dynamicstats/event_type=view
[hadoop@ip-10-0-14-76 ~]$
```

QUESTION AND ANSWERS

- **We will be Comparing queries efficiency between Hive table ecomstats and Optimized Hive table dynamicstats.**

1. **Find the total revenue generated due to purchases made in October?**

Answer: The total revenue generated due to the purchases in the month of October is 1211538.4299997438

Query:

Select avg(price)*count(event_type) as total_revenue from ecomstats where month(event_time) =10 and event_type = 'purchase';

- **ecomstats Time taken = 66.76 s**

```
hive> select avg(price)*count(event_type) as total_revenue from ecomstats where month(event_time) =10 and event_type = 'purchase';
Query ID = hadoop_20220731043633_afe48fed-b699-43c5-8068-af2d7adb2f1e
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_1659240713505_0004)

--------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      2          2        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 66.76 s
--------------------------------------------------------------------------------
OK
total_revenue
1211538.4299997438
Time taken: 79.952 seconds, Fetched: 1 row(s)
hive>
```

- **dynamicstats Time taken = 25.53 s**

```
hive> select avg(price)*count(event_type) as total_revenue from dynamicstats where month(event_time) =10 and event_type = 'purchase';
Query ID = hadoop_20220731044845_32150b54-4ae0-457c-b209-3f2fb6aba048
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0005)

--------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      3          3        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 25.53 s
--------------------------------------------------------------------------------
OK
total_revenue
1211538.429999948
Time taken: 29.239 seconds, Fetched: 1 row(s)
hive>
```

Looking at the results, the improvement of the performance after using optimization is much better so we will be using dynamicstats for answering the next questions.

2. **Write a query to yield the total sum of purchases per month in a single output.**

QUERY:

select month(event_time) as month_purchases, count(product_id) as total_purchases from ecomstats where event_type = 'purchase' group by month(event_time);

Answer: in November purchases is gone high as compared to October

Month_purchases	**total_purchases**
10	245624
11	322417

```
hive> select month(event_time) as month_purchases, count(product_id) as total_purchases
    > from dynamicstats where event_type = 'purchase' group by month(event_time);
Query ID = hadoop_20220731045305_20e57aa8-a490-449b-b2ec-58c3d170a2f8
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0005)

--------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      3          3        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 26.11 s
--------------------------------------------------------------------------------
OK
month_purchases total_purchases
10      245624
11      322417
Time taken: 27.444 seconds, Fetched: 2 row(s)
hive>
```

3. **Write a query to find the change in revenue generated due to purchases from October to November?**

QUERY:

WITH monthly_sales as (select round (sum (case when date_format (event_time, 'MM')=11 then price else 0 end),2) as sale_nov, round (sum (case when date_format (event_time, 'MM') =10 then price else 0 end),2) as sale_oct from dynamicstats where event_type = 'purchase' and date_format (event_time, 'MM') in ('10', '11')) select sale_nov, sale_oct, (sale_nov - sale_oct) as change_in_revenue from monthly_sales;

ANWER: November month Generated Revenue, There is increase in revenue from October to November is 319478.47,

Sale_nov	sale_oct	change_in_revenue
1531016.9	1211538.43	319478.47

```
hadoop@ip-10-0-14-76:~
hive> WITH monthly_sales as (select round (sum (case when date_format (event_time, 'MM')=10 then price else 0 end),2) as sale_oct, round (sum (case when date
_format (event_time, 'MM') =11 then price else 0 end),2) as sale_nov from dynamicstats where event_type = 'purchase' and date_format (event_time, 'MM') in ('
10', '11')) select sale_nov, sale_oct, (sale_nov - sale_oct) as change_in_revenue from monthly_sales;
Query ID = hadoop_20220731045755_bac7c148-a8a0-47da-83e4-5472db4f0e41
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0005)

--------------------------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------------------------
Map 1 ........... container     SUCCEEDED      3          3        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 40.46 s
--------------------------------------------------------------------------------------------------
OK
sale_nov        sale_oct        change_in_revenue
1531016.9       1211538.43      319478.47
Time taken: 41.197 seconds, Fetched: 1 row(s)
hive>
```

4. **Find distinct categories of products. Categories with null category code can be ignored?**

QUERY:

select distinct split(category_code,'\\.')[0] as product_category from dynamicstats where split(category_code,'\\.')[0] IS NOT NULL;

ANSWER: distinct categories of products

Furniture

Appliances

Accessories

Apparel

Sport

Stationary

```
hive> select distinct split(category_code,'\\.')[0] as product_category from dynamicstats where split(category_code,'\\.')[0] IS NOT NULL;
Query ID = hadoop_20220731050158_29781378-05a5-4dc1-9aa1-4467e583ba48
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0005)

--------------------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------------------
Map 1 ........... container     SUCCEEDED      6          6        0        0       0       0
Reduce 2 ...... container     SUCCEEDED      5          5        0        0       0       0
--------------------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 75.86 s
--------------------------------------------------------------------------------------------
OK
product_category

furniture
appliances
accessories
apparel
sport
stationery
Time taken: 76.488 seconds, Fetched: 7 row(s)
hive>
```

5. **Find the total number of products available under each category?**

QUERY:

select split(category_code,'\\.')[0] as product_category, count(product_id) as total_products from dynamicstats where split(category_code,'\\.')[0] IS NOT NULL group by split(category_code,'\\.')[0];

ANSWER: Appliances category having maximum number of products followed by stationary category

product_category	total_products
Furniture	23604
Appliances	61736
Accessories	12929
Apparel	18232
Sport	2
Stationary	26722

hadoop@ip-10-0-14-76:~

```
hive> select split(category_code,'\\.')[0] as product_category, count(product_id) as total_products from dynamicstats
    > where split(category_code,'\\.')[0] IS NOT NULL group by split(category_code,'\\.')[0];
Query ID = hadoop_20220731050445_76e553d9-370b-4efa-9b6c-5ae5c2c9a111
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0005)

--------------------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      6          6        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      5          5        0        0       0       0
--------------------------------------------------------------------------------------------
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 77.68 s
--------------------------------------------------------------------------------------------
OK
product_category        total_products
        8594895
furniture       23604
appliances      61736
accessories     12929
apparel 18232
sport   2
stationery      26722
Time taken: 78.392 seconds, Fetched: 7 row(s)
hive>
```

6. **Which brand had the maximum sales in October and November combined?**

QUERY:

select brand, round(sum(price),2) as Sales from dynamicstats where brand <>'' and event_type = 'purchase' group by brand order by Sales desc limit 1;

ANSWER: Runail brand had the maximum sales 148297.94 in October and November combined

BRAND	**SALES**
Runail	148297.94

hadoop@ip-10-0-14-76:~

```
hive> select brand, round(sum(price),2) as Sales from dynamicstats
    > where brand <>'' and event_type = 'purchase' group by brand order by Sales desc limit 1;
Query ID = hadoop_20220731050741_a538c2ad-2d04-402c-90e8-8d718b81d843
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0005)

--------------------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------------------
Map 1 ........... container     SUCCEEDED      3          3        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      1          1        0        0       0       0
Reducer 3 ...... container     SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 23.00 s
--------------------------------------------------------------------------------------------
OK
brand   sales
runail  148297.94
Time taken: 23.732 seconds, Fetched: 1 row(s)
hive>
```

7. **Which brands increased their sales from October to November?**

QUERY:

WITH monthly_sales as (select brand, round (sum (case when date_format (event_time, 'MM') = 10 then price else 0 end),2) as sale_oct, round (sum (case when date_format (event_time, 'MM') =11 then price else 0 end),2) as sale_nov from dynamicstats where event_type = 'purchase' and date_format (event_time, 'MM') in ('10', '11') group by brand) select brand, sale_oct, sale_nov, (sale_nov - sale_oct) as difference_in_sales from monthly_sales where (sale_nov - sale_oct) > 0 order by difference_in_sales desc;

ANSWER:

```
hadoop@ip-10-0-14-76:~
hive> WITH monthly_sales as (select brand, round ( sum (case when date_format (event_time, 'MM') = 10 then price else 0 end),2) as sale_oct,
    > round (sum (case when date_format (event_time, 'MM') =11 then price else 0 end),2) as sale_nov from dynamicstats
    > where event_type = 'purchase' and date_format (event_time, 'MM') in ('10', '11') group by brand)
    > select brand, sale_oct, sale_nov, (sale_nov - sale_oct) as difference_in_sales from monthly_sales
    > where (sale_nov - sale_oct) > 0 order by difference_in_sales desc;
Query ID = hadoop_20220731051713_e5e250a5-722d-4381-baa8-bc5dd14c79fa
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0006)

--------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------
Map 1 .......... container     SUCCEEDED      3          3        0        0       0       0
Reducer 2 ...... container     SUCCEEDED      1          1        0        0       0       0
Reducer 3 ...... container     SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 43.03 s
--------------------------------------------------------------------------------
OK
brand   sale_oct        sale_nov        difference_in_sales
        474679.06       619509.24       144830.18
grattol 35445.54        71472.71        36027.170000000006
uno     35302.03        51039.75        15737.720000000001
lianail 5892.84 16394.24        10501.400000000001
ingarden        23161.39        33566.21        10404.82
strong  29196.63        38671.27        9474.639999999996
jessnail        26287.84        33345.23        7057.390000000003
cosmoprofi      8322.81 14536.99        6214.18
polarus 6013.72 11371.93        5358.21
runail  71539.28        76758.66        5219.380000000005
freedecor       3421.78 7671.8  4250.02
staleks 8519.73 11875.61        3355.880000000001
bpw.style       11572.15        14837.44        3265.290000000001
lovely  8704.38 11939.06        3234.680000000003
marathon        7280.75 10273.1 2992.3500000000004
haruyama        9390.69 12352.91        2962.2199999999993
yoko    8756.91 11707.88        2950.9699999999993
italwax 21940.24        24799.37        2859.1299999999974
benovy  409.62  3259.97 2850.35
kaypro  881.34  3268.7  2387.3599999999997
estel   21756.75        24142.67        2385.9199999999983
concept 11032.14        13380.4 2348.26
kapous  11927.16        14093.08        2165.92
f.o.x   6624.23 8577.28 1953.050000000001
```

```
hadoop@ip-10-0-14-76:~
f.o.x   6624.23 8577.28 1953.050000000001
masura  31266.08        33058.47        1792.3899999999994
milv    3904.94 5642.01 1737.0700000000002
beautix 10493.95        12222.95        1729.0
artex   2730.64 4327.25 1596.6100000000001
domix   10472.05        12009.17        1537.1200000000008
shik    3341.2  4839.72 1498.5200000000004
smart   4457.26 5902.14 1444.88
roubloff        3491.36 4913.77 1422.4100000000003
levrana 2243.56 3664.1  1420.54
oniq    8425.41 9841.65 1416.2399999999998
irisk   45591.96         46946.04        1354.0800000000017
severina        4775.88 6120.48 1344.5999999999995
joico   705.52  2015.1  1309.58
zeitun  708.66  2009.63 1300.9700000000003
beauty-free     554.17  1782.86 1228.69
swarovski       1887.93 3043.16 1155.2299999999998
de.lux  1659.7  2775.51 1115.8100000000002
metzger 5373.45 6457.16 1083.71
markell 1768.75 2834.43 1065.6799999999998
sanoto  157.14  1209.68 1052.54
nagaraku        4369.74 5327.68 957.9400000000005
ecolab  262.85  1214.3  951.4499999999999
art-visage      2092.71 2997.8  905.0900000000001
levissime       2227.5  3085.31 857.81
missha  1293.83 2150.28 856.4500000000003
solomeya        1899.7  2685.8  786.1000000000001
rosi    3077.04 3841.56 764.52
refectocil      2716.18 3475.58 759.4000000000001
kaaral  4412.43 5086.07 673.6399999999994
kosmekka        1181.44 1813.37 631.9299999999998
kinetics        6334.25 6945.26 611.0100000000002
browxenna       14331.37        14916.73        585.3599999999988
airnails        5118.9  5691.52 572.6200000000008
uskusi  5142.27 5690.31 548.04
coifin  903.0   1428.49 525.49
s.care  412.68  913.07  500.39000000000004
limoni  1308.9  1796.6  487.6999999999998
matrix  3243.25 3726.74 483.4899999999998
gehwol  1089.07 1557.68 468.6100000000001
greymy  29.21   489.49  460.28000000000003
bioaqua 942.89  1398.12 455.2299999999999
farmavita       837.37  1291.97 454.6
sophin  1067.86 1515.52 447.6600000000001
yu-r    271.41  673.71  402.3
```

hadoop@ip-10-0-14-76:~

```
yu-r     271.41  673.71  402.3
kiss     421.55  817.33  395.78000000000003
naomi    0.0     389.0   389.0
lador    2083.61 2471.53 387.9200000000001
ellips   245.85  606.04  360.18999999999994
jas      3318.96 3657.43 338.4699999999998
lowence  242.84  567.75  324.90999999999997
nitrile  847.28  1162.68 315.4000000000001
shary    871.96  1176.49 304.53
kims     330.04  632.04  301.99999999999994
happyfons        801.92  1091.59 289.66999999999996
kocostar         310.85  594.93  284.0799999999999
insight  1443.7  1721.96 278.26
candy    534.96  799.38  264.41999999999996
bluesky  10307.24        10565.53        258.2900000000009
beauugreen       511.51  768.35  256.84000000000003
protokeratin     201.25  456.79  255.54000000000002
trind    298.07  542.96  244.89000000000004
entity   479.71  719.26  239.55
skinlite         651.94  890.45  238.51
provoc   827.99  1063.82 235.82999999999993
fedua    52.38   263.81  211.43
ecocraft         41.16   241.95  200.79
keen     236.35  435.62  199.27
mane     66.79   260.26  193.46999999999997
freshbubble      318.7   502.34  183.64
matreshka        0.0     182.67  182.67
chi      358.94  538.61  179.67000000000002
cristalinas      427.63  584.95  157.32000000000005
farmona  1692.46 1843.43 150.97000000000003
latinoil         249.52  384.59  135.06999999999996
miskin   158.04  293.07  135.03
elizavecca       70.53   204.3   133.77
nefertiti        233.52  366.64  133.11999999999998
finish   98.38   230.38  132.0
igrobeauty       513.66  645.07  131.41000000000008
dizao    819.13  945.51  126.38
osmo     645.58  762.31  116.7299999999999
batiste  772.4   874.17  101.76999999999998
carmex   145.08  243.36  98.28
eos      54.34   152.61  98.27000000000001
depilflax        2707.07 2803.78 96.71000000000004
enjoy    41.35   136.57  95.22
kerasys  430.91  525.2   94.29000000000002
aura     83.95   177.51  93.55999999999999
```

hadoop@ip-10-0-14-76:~

```
laboratorium     246.5   312.52  66.01999999999998
inm      288.02  351.21  63.19
dewal    0.0     61.29   61.29
marutaka-foot    49.22   109.33  60.11
kares    0.0     59.45   59.45
profhenna        679.23  736.85  57.620000000000005
koelcia  55.5    112.75  57.25
balbcare         155.33  212.38  57.04999999999998
elskin   251.09  307.65  56.559999999999974
foamie   35.04   80.49   45.449999999999996
ladykin  125.65  170.57  44.91999999999999
likato   296.06  340.97  44.910000000000025
mavala   409.04  446.32  37.27999999999997
vilenta  197.6   231.21  33.610000000000014
beautyblender    78.74   109.41  30.67
biore    60.65   90.31   29.660000000000004
orly     902.38  931.09  28.710000000000036
estelare         444.81  471.87  27.060000000000002
profepil         93.36   118.02  24.659999999999997
blixz    38.95   63.4    24.449999999999996
binacil  0.0     24.26   24.26
godefroy         401.22  425.12  23.899999999999977
glysolid         69.73   91.59   21.86
veraclara        50.11   71.21   21.099999999999994
juno     0.0     21.08   21.08
kamill   63.01   81.49   18.479999999999997
treaclemoon      163.37  181.49  18.120000000000005
supertan         50.37   66.51   16.140000000000008
barbie   0.0     12.39   12.39
deoproce         316.84  329.17  12.330000000000041
rasyan   18.8    28.94   10.14
fly      17.14   27.17   10.030000000000001
tertio   236.16  245.8   9.640000000000015
jaguar   1102.11 1110.65 8.540000000000191
soleo    204.2   212.53  8.330000000000013
neoleor  43.41   51.7    8.290000000000006
moyou    5.71    10.28   4.569999999999999
bodyton  1376.34 1380.64 4.300000000000182
skinity  8.88    12.44   3.5599999999999987
helloganic       0.0     3.1     3.1
grace    100.92  102.61  1.6899999999999977
cosima   20.23   20.93   0.6999999999999993
ovale    2.54    3.1     0.56
Time taken: 43.67 seconds, Fetched: 161 row(s)
hive>
```

hadoop@ip-10-0-14-76:~

```
kerasys  430.91  525.2   94.29000000000002
aura     83.95   177.51  93.55999999999999
plazan   101.37  194.01  92.63999999999999
koelf    422.73  507.29  84.56
nirvel   163.04  234.33  71.29000000000002
konad    739.83  810.67  70.83999999999992
egomania         77.47   146.04  68.57
cutrin   299.37  367.62  68.25
laboratorium     246.5   312.52  66.01999999999998
inm      288.02  351.21  63.19
dewal    0.0     61.29   61.29
marutaka-foot    49.22   109.33  60.11
kares    0.0     59.45   59.45
profhenna        679.23  736.85  57.620000000000005
koelcia  55.5    112.75  57.25
balbcare         155.33  212.38  57.04999999999998
elskin   251.09  307.65  56.559999999999974
foamie   35.04   80.49   45.449999999999996
ladykin  125.65  170.57  44.91999999999999
likato   296.06  340.97  44.910000000000025
mavala   409.04  446.32  37.27999999999997
vilenta  197.6   231.21  33.610000000000014
beautyblender    78.74   109.41  30.67
biore    60.65   90.31   29.660000000000004
orly     902.38  931.09  28.710000000000036
estelare         444.81  471.87  27.060000000000002
profepil         93.36   118.02  24.659999999999997
blixz    38.95   63.4    24.449999999999996
binacil  0.0     24.26   24.26
godefroy         401.22  425.12  23.899999999999977
glysolid         69.73   91.59   21.86
veraclara        50.11   71.21   21.099999999999994
juno     0.0     21.08   21.08
kamill   63.01   81.49   18.479999999999997
treaclemoon      163.37  181.49  18.120000000000005
supertan         50.37   66.51   16.140000000000008
barbie   0.0     12.39   12.39
deoproce         316.84  329.17  12.330000000000041
rasyan   18.8    28.94   10.14
fly      17.14   27.17   10.030000000000001
tertio   236.16  245.8   9.640000000000015
jaguar   1102.11 1110.65 8.540000000000191
soleo    204.2   212.53  8.330000000000013
neoleor  43.41   51.7    8.290000000000006
moyou    5.71    10.28   4.569999999999999
```

8. **Your company wants to reward the top 10 users of its website with a Golden Customer plan. Write a query to generate a list of top 10 users who spend the most?**

QUERY:

select user_id, round(sum(price),2) as total_purchase from dynamicstats where event_type = 'purchase' group by user_id order by total_purchase desc limit 10;

ANSWER:

```
hive> select user_id, round(sum(price),2) as total_purchase from dynamicstats
    > where event_type = 'purchase' group by user_id order by total_purchase desc limit 10;
Query ID = hadoop_20220731051549_1c96b3ac-4d5f-4ee8-8c2a-77bbaaf705f0
Total jobs = 1
Launching Job 1 out of 1
Status: Running (Executing on YARN cluster with App id application_1659240713505_0006)

--------------------------------------------------------------------------------
        VERTICES      MODE        STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
--------------------------------------------------------------------------------
Map 1 ..........  container     SUCCEEDED      3          3        0        0       0       0
Reducer 2 ......  container     SUCCEEDED      1          1        0        0       0       0
Reducer 3 ......  container     SUCCEEDED      1          1        0        0       0       0
--------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 28.31 s
--------------------------------------------------------------------------------
OK
user_id total_purchase
557790271       2715.87
150318419       1645.97
562167663       1352.85
531900924       1329.45
557850743       1295.48
522130011       1185.39
561592095       1109.7
431950134       1097.59
566576008       1056.36
521347209       1040.91
Time taken: 29.081 seconds, Fetched: 10 row(s)
hive>
```

DROPING TABLES:

- **Dropping dynamicstats table**

```
hive> drop table dynamicstats;
OK
Time taken: 0.17 seconds
```

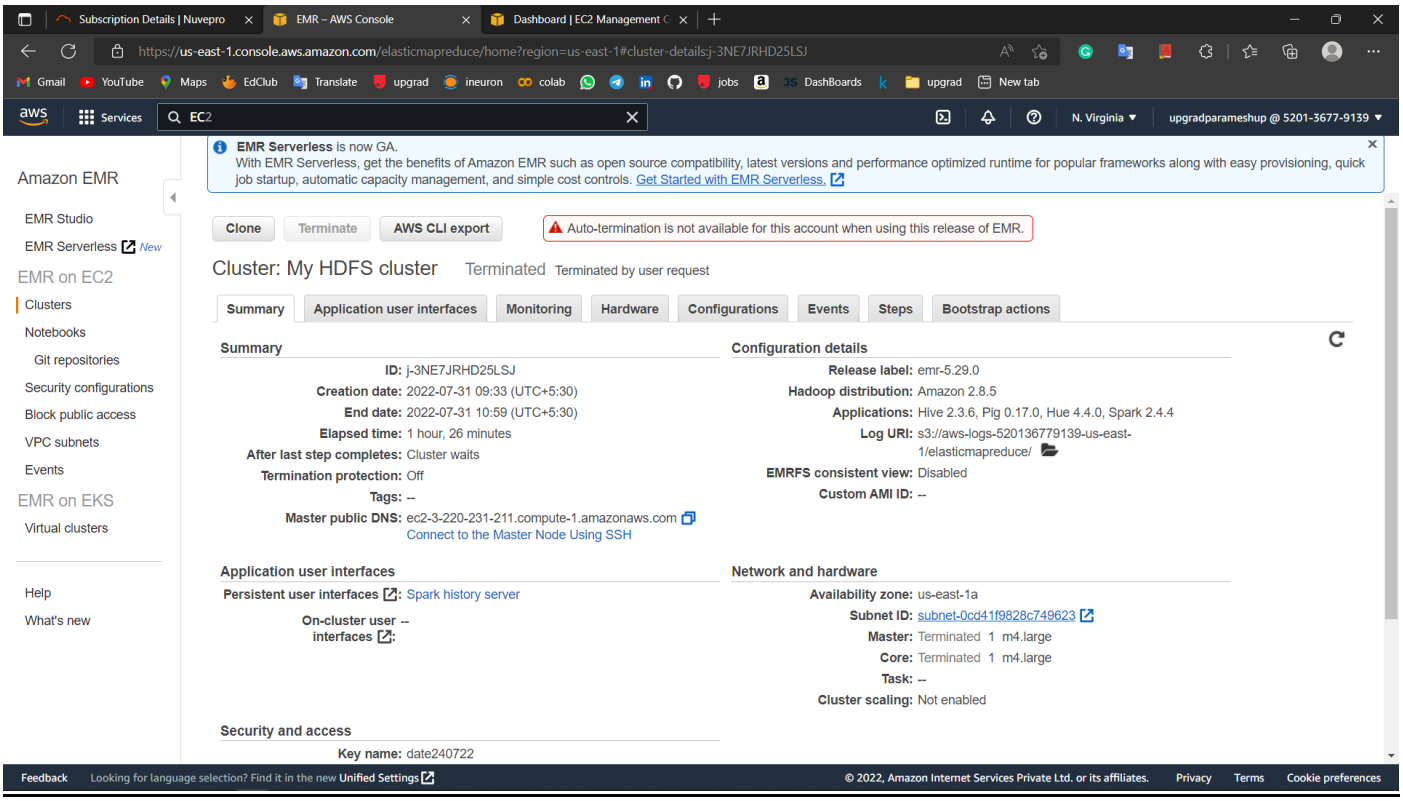
- **Dropping ecomstats table**

```
hive> drop table ecomstats;
OK
Time taken: 0.109 seconds
```

DROPPING DATABASE

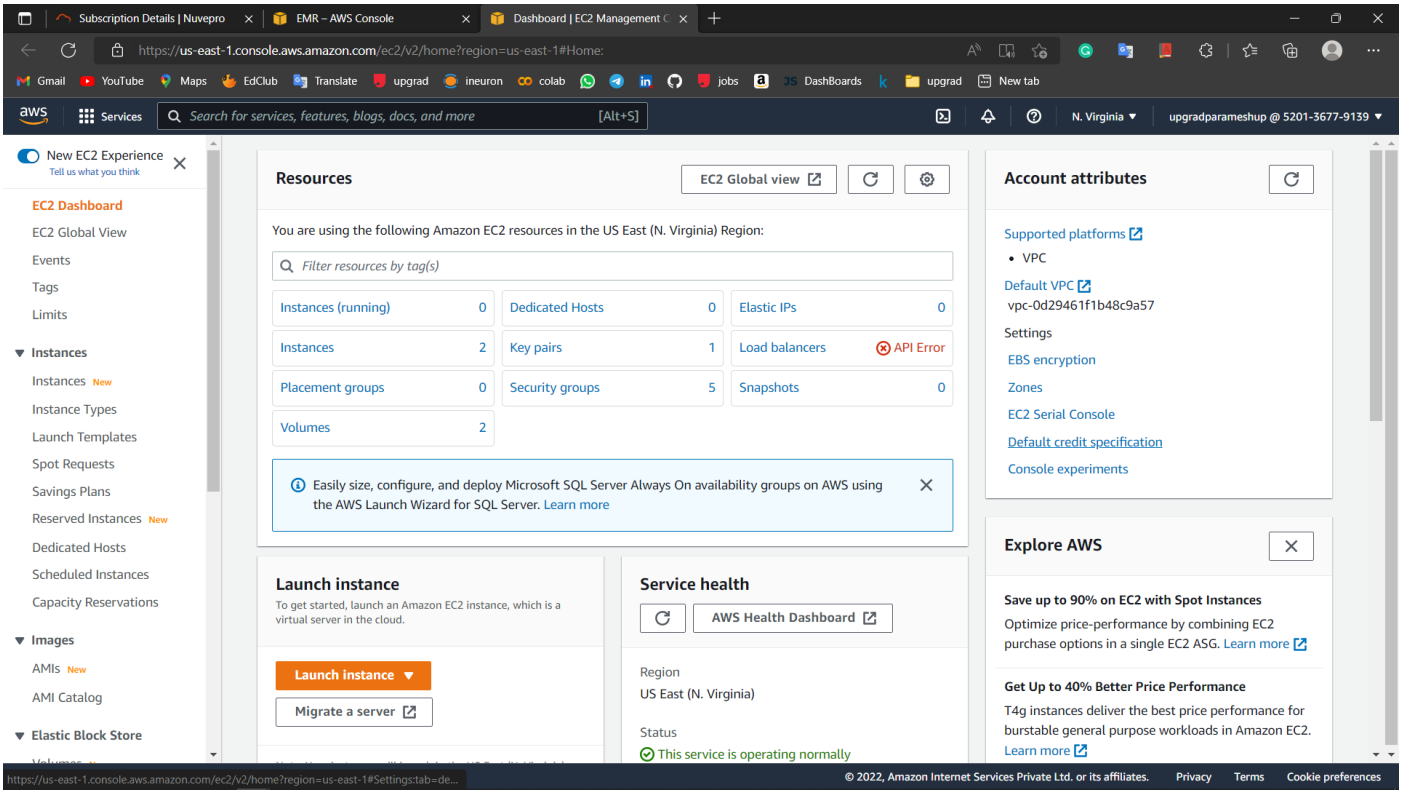
```
hive> drop database ecommerce;
OK
Time taken: 0.069 seconds
hive>
```

TERMINATING EMR CLUSTER



CONFIRMING:

In Instances running showing ZERO



CONCLUSION:

- **1211538.4299997438 revenue generated due to purchases made in October**
- **the total sum of purchases per month in OCTOBER is 245624 and navember 322417**
- **319478.47 revenue generated due to purchases from October to November.**
- **Appliances category having 61736 highest products and followed by stationary category with 26722 number of products available under category.**
- **Runail is the brand had the maximum sales in October and November combined**

THANK YOU

CASE STUDY DONE BY

PARAMESH E