Hive Assignment

Step 1 : Get data files in Master node

```
wget https://e-commerce-events-ml.s3.amazonaws.com/2019-Oct.csv
```

```
wget https://e-commerce-events-ml.s3.amazonaws.com/2019-Nov.csv
```

Step 2 : remove UTC from the timestamp column before loading the data

```
sed -i -e 's/ UTC//g' 2019-Oct.csv

sed -i -e 's/ UTC//g' 2019-Nov.csv
```

Step 3 : Import csv files in HDFS by running following steps

```
hdfs dfs -mkdir /user/hive_assignment

hdfs dfs -put 2019-Nov.csv /user/hive_assignment/

hdfs dfs -put 2019-Oct.csv /user/hive_assignment/
```

Step 4 : Verify if the files are imported in HDFS succesfully.

```
hdfs dfs -ls /user/hive_assignment/

hdfs dfs -cat /user/hive_assignment/2019-Nov.csv | head

hdfs dfs -cat /user/hive_assignment/2019-Oct.csv | head
```

Step 5 : Enter into Hive console by typing 'hive'

Step 6 : Create database and required tables using following commands

```
create database if not exists ECom comment "Created to store events done on website" with
dbproperties('creator'='Prakash','date'='30-01-2021');

show databases;

use ecom;

create external table if not exists event_nov (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 delimited fields terminated by ',' lines terminated by '\n' stored as textfile
tblproperties("skip.header.line.count"="1") ;


create external table if not exists event_oct (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 delimited fields terminated by ',' lines terminated by '\n' stored as textfile
tblproperties("skip.header.line.count"="1") ;


show tables;
```

Step 7 : Load data to both tables created for October and November

```
load data inpath '/user/hive_assignment/2019-Nov.csv' into table event_nov;

load data inpath '/user/hive_assignment/2019-Oct.csv' into table event_oct;

set hive.cli.print.header=true;

select * from event_nov limit 10;

select * from event_nov limit 10;
```

Step 8 : Consolidate the data of October and November in a single table

```
create table events

as

(

select 'Nov' as Month,* from event_nov

union all

select 'Oct' as Month,* from event_oct

)
```

Step 9 : Create partitioning(Static partitioning was used) and bucketing. (I have chosen month and event_type for partitioning and product_id for bucketing. I chose this because most of the queries were based on event type and month. Both columns were having low cardinality)

```
create table if not exists part_events (event_time timestamp,product_id string,category_id
string,category_code string,brand string,price float,user_id bigint,user_session string) partitioned by
(month string,event_type string) clustered by (product_id) into 5 buckets row format delimited fields
terminated by ',' lines terminated by '\n';


insert into part_events partition( month='Oct', event_type='cart') select
event_time,product_id,category_id,category_code,brand,price,user_id, user_session from events
where month='Oct' and event_type='cart';


insert into part_events partition( month='Oct', event_type='remove_from_cart') select
event_time,product_id,category_id,category_code,brand,price,user_id, user_session from events
where month='Oct' and  event_type='remove_from_cart';


insert into part_events partition( month='Oct' ,event_type='view') select
event_time,product_id,category_id,category_code,brand,price,user_id, user_session from events
where month='Oct' and  event_type='view';
```

```
insert into part_events partition( month='Oct' ,event_type='purchase') select
event_time,product_id,category_id,category_code,brand,price,user_id, user_session from events
where month='Oct' and  event_type='purchase';
```

```
insert into part_events partition( month='Nov', event_type='cart') select
event_time,product_id,category_id,category_code,brand,price,user_id, user_session from events
where month='Nov' and event_type='cart';
```

```
insert into part_events partition(month='Nov',event_type='remove_from_cart') select
event_time,product_id,category_id,category_code,brand,price,user_id, user_session from events
where month='Nov' and  event_type='remove_from_cart';
```

```
insert into part_events partition(month='Nov',event_type='view') select
event_time,product_id,category_id,category_code,brand,price,user_id, user_session from events
where month='Nov' and  event_type='view';
```

```
insert into part_events partition(month='Nov',event_type='purchase') select
event_time,product_id,category_id,category_code,brand,price,user_id, user_session from events
where month='Nov' and  event_type='purchase';
```

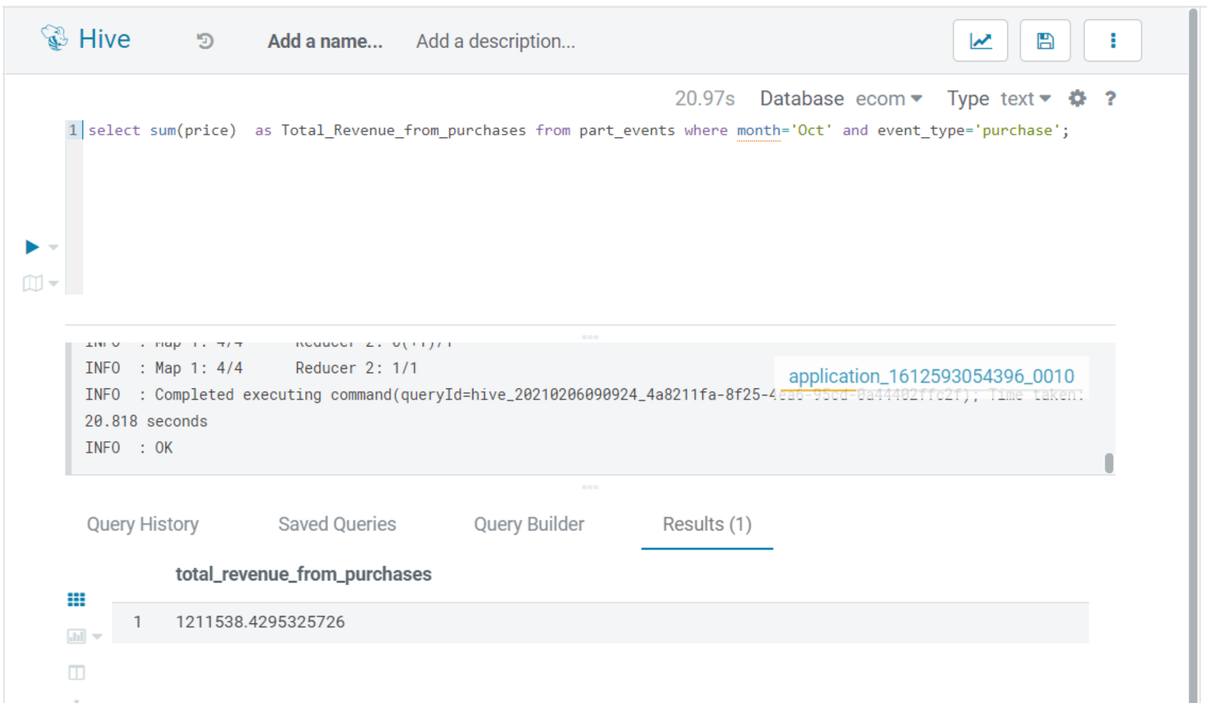
Step 10 : Verify if partitioning and bucketing is done

```
hdfs dfs -ls /user/hive/warehouse/ecom.db/part_events
```

Step 11 : Run a test if the query will be optimized after partitioning.(I have checked the performance for question #1)

I have queried the events table directly which is not partitioned and it is taking 21 seconds. However when I used the partitioned table it is giving result in 12 seconds. There is a improvement of 43 percent. Please find the screenshot below.

select sum(price) as Total_Revenue_from_purchases from events where month='Oct' and event_type='purchase';



20.97s Database ecom Type text

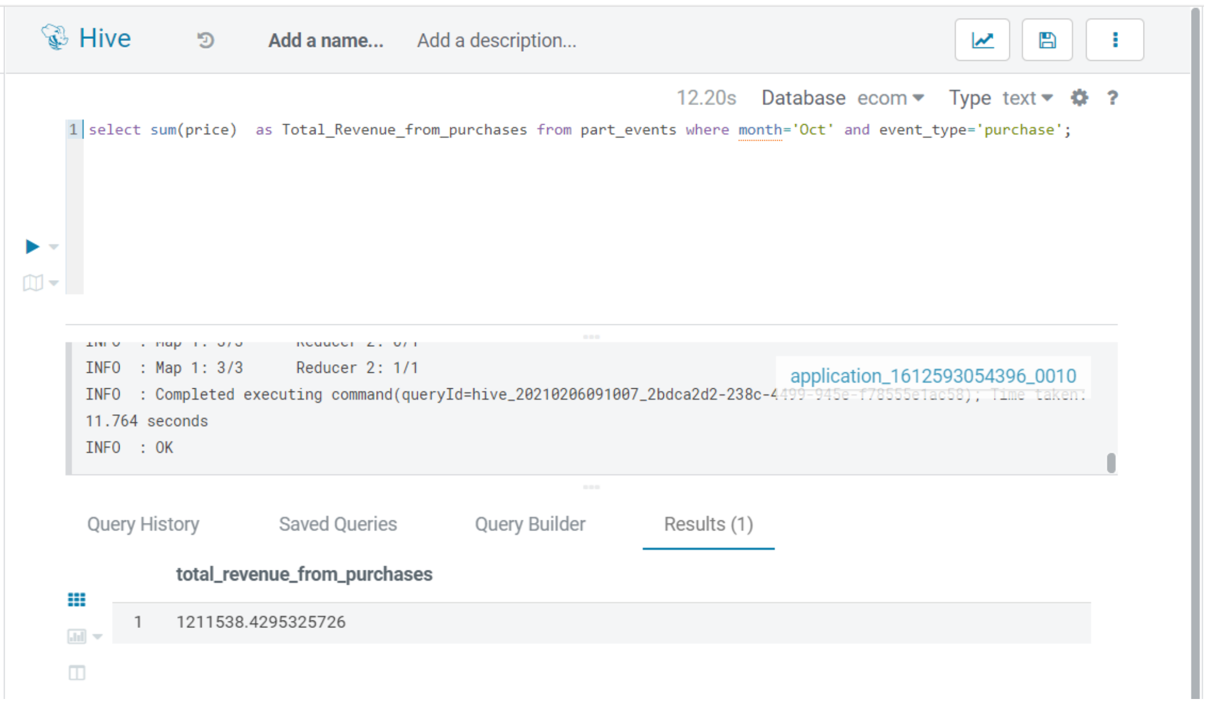
```
select sum(price)  as Total_Revenue_from_purchases from part_events where month='Oct' and event_type='purchase';
```

```
INFO  : Map 1: 4/4      Reducer 2: 1/1
INFO  : Completed executing command(queryId=hive_20210206090924_4a8211fa-8f25-4
20.818 seconds
INFO  : OK
```

application_1612593054396_0010

```
   total_revenue_from_purchases
1  1211538.4295325726
```

select sum(price) as Total_Revenue_from_purchases from part_events where month='Oct' and event_type='purchase';



12.20s Database ecom Type text

```
select sum(price)  as Total_Revenue_from_purchases from part_events where month='Oct' and event_type='purchase';
```

```
INFO  : Map 1: 3/3      Reducer 2: 1/1
INFO  : Completed executing command(queryId=hive_20210206091007_2bdca2d2-238c-4
11.764 seconds
INFO  : OK
```

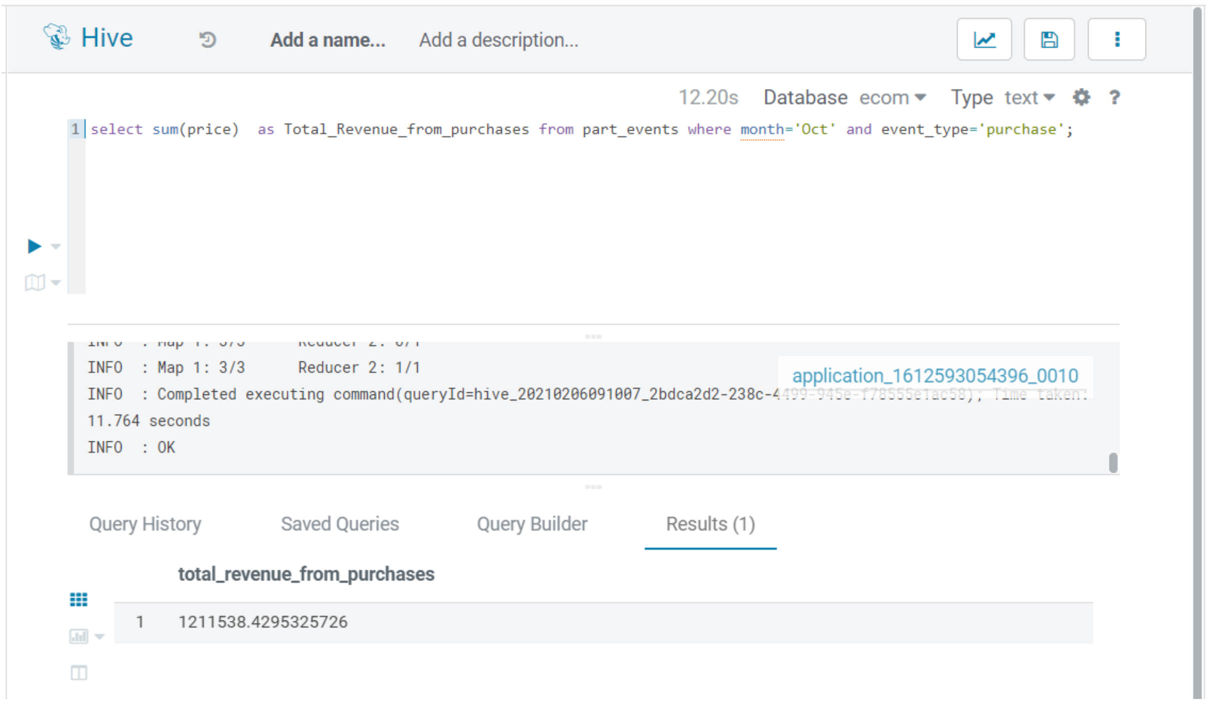
application_1612593054396_0010

```
   total_revenue_from_purchases
1  1211538.4295325726
```

Step 12 : Answer the Questions asked. Please find below the Answers of all queries/questions.

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

   select sum(price) as Total_Revenue_from_purchases from part_events where month='Oct' and event_type='purchase';



Hive | Add a name... | Add a description...

12.20s Database ecom Type text

```
select sum(price)  as Total_Revenue_from_purchases from part_events where month='Oct' and event_type='purchase';
```

```
INFO  : Map 1: 3/3      Reducer 2: 1/1
INFO  : Completed executing command(queryId=hive_20210206091007_2bdca2d2-238c-4499-945e-f78555e1ac58); Time taken:
11.764 seconds
INFO  : OK
```

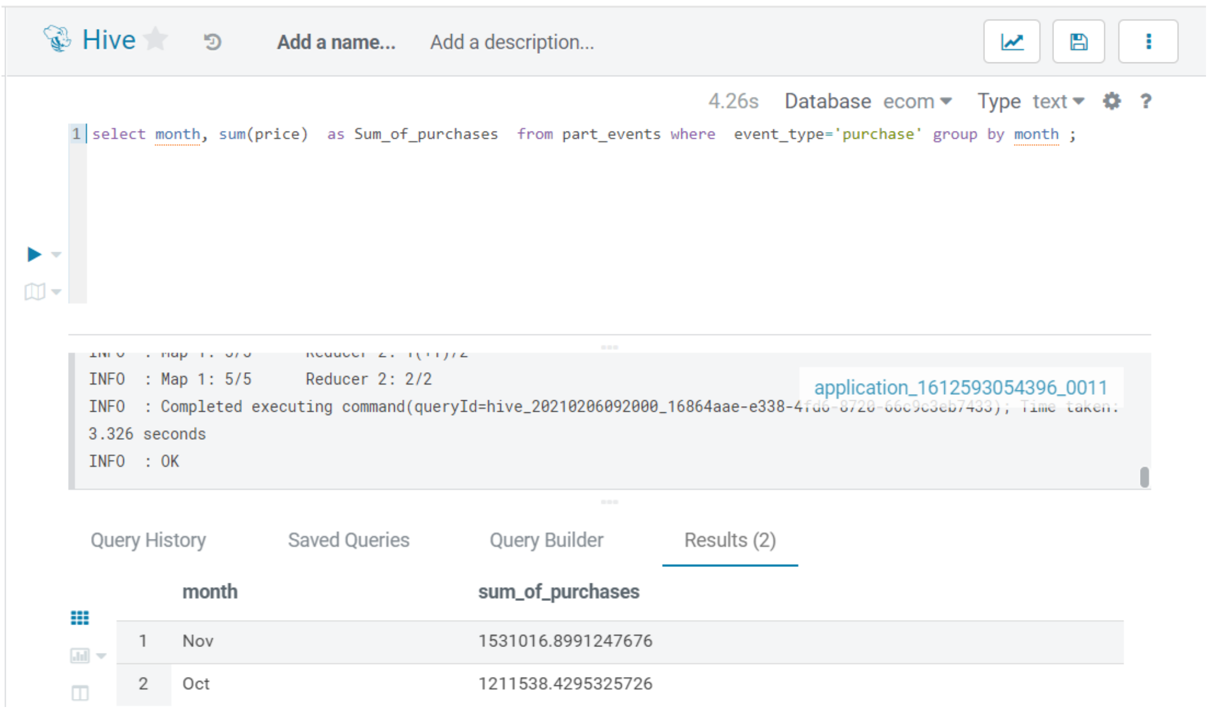
application_1612593054396_0010

Query History | Saved Queries | Query Builder | Results (1)

	total_revenue_from_purchases
1	1211538.4295325726

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

   select month, sum(price) as Sum_of_purchases from part_events where event_type='purchase' group by month ;



```
select month, sum(price)  as Sum_of_purchases  from part_events where  event_type='purchase' group by month ;
```

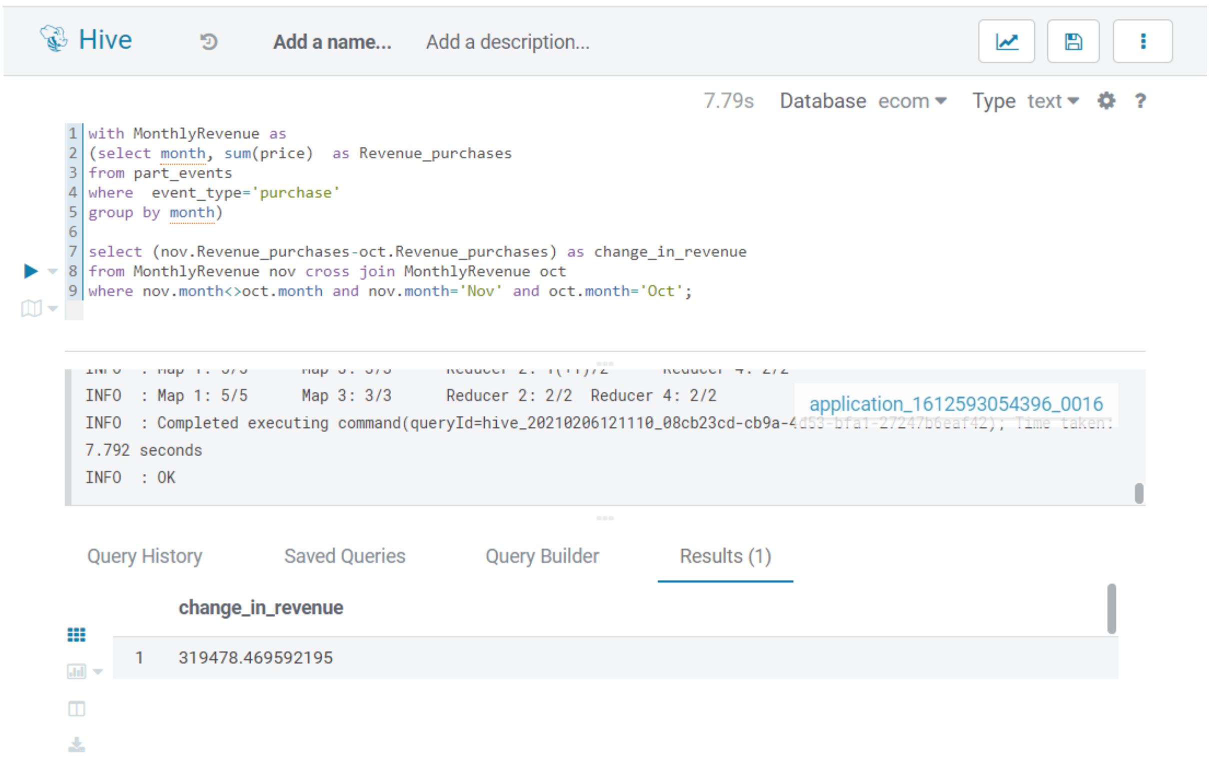
```
INFO  : Map 1: 5/5      Reducer 2: 2/2
INFO  : Completed executing command(queryId=hive_20210206092000_16864aae-e338-4fd6-8720-66c9c3eb7433); Time taken:
3.326 seconds
INFO  : OK
```

application_1612593054396_0011

	month	sum_of_purchases
1	Nov	1531016.8991247676
2	Oct	1211538.4295325726

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

```
with MonthlyRevenue as
(select month, sum(price)  as Revenue_purchases
from part_events
where  event_type='purchase'
group by month)

select (nov.Revenue_purchases-oct.Revenue_purchases) as change_in_revenue
from MonthlyRevenue nov cross join MonthlyRevenue oct
where nov.month<>oct.month and nov.month='Nov' and oct.month='Oct';
```



```
with MonthlyRevenue as
(select month, sum(price)  as Revenue_purchases
from part_events
where  event_type='purchase'
group by month)

select (nov.Revenue_purchases-oct.Revenue_purchases) as change_in_revenue
from MonthlyRevenue nov cross join MonthlyRevenue oct
where nov.month<>oct.month and nov.month='Nov' and oct.month='Oct';
```

```
INFO  : Map 1: 5/5      Map 3: 3/3      Reducer 2: 2/2  Reducer 4: 2/2
INFO  : Completed executing command(queryId=hive_20210206121110_08cb23cd-cb9a-4d53-bfa1-27247b6eaf42); Time taken:
7.792 seconds
INFO  : OK
```

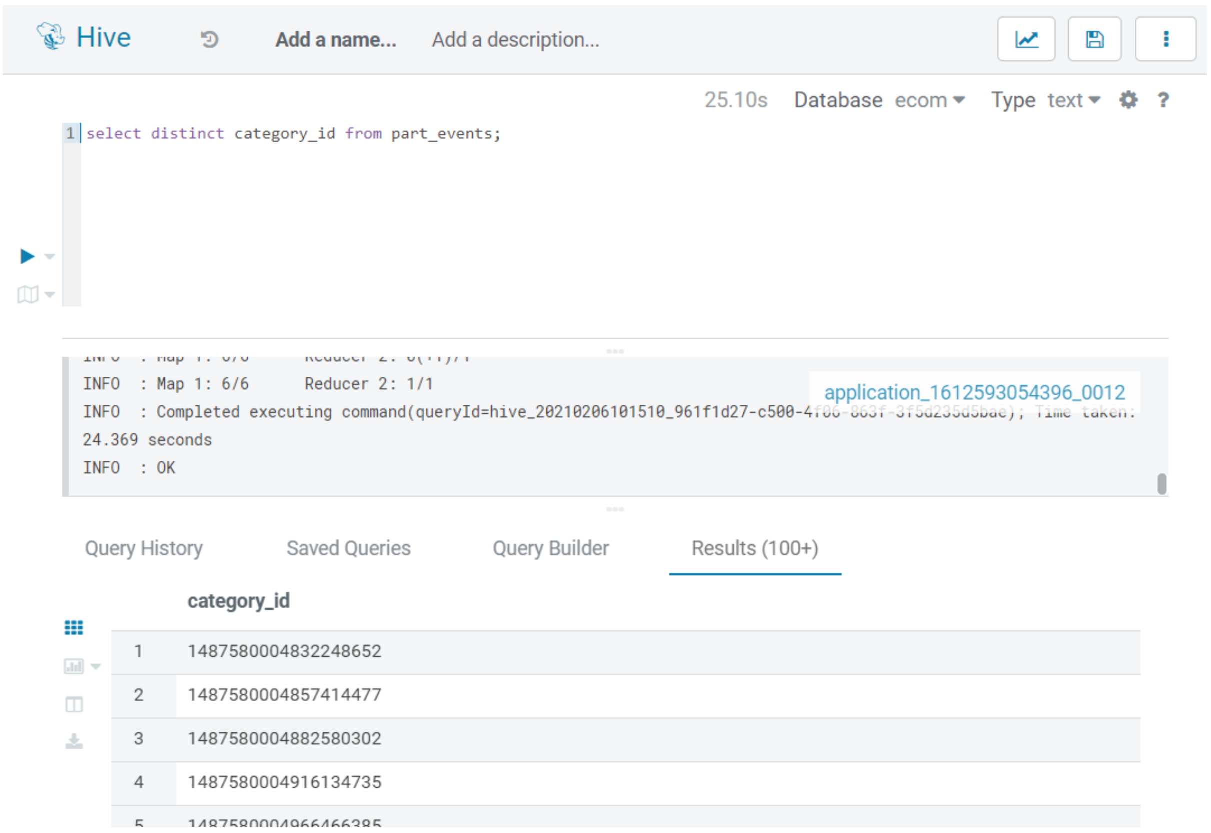
application_1612593054396_0016

	change_in_revenue
1	319478.469592195

Note: use set hive.strict.checks.cartesian.product = False for cross product.

4. Find distinct categories of products.

   select distinct category_id from part_events;



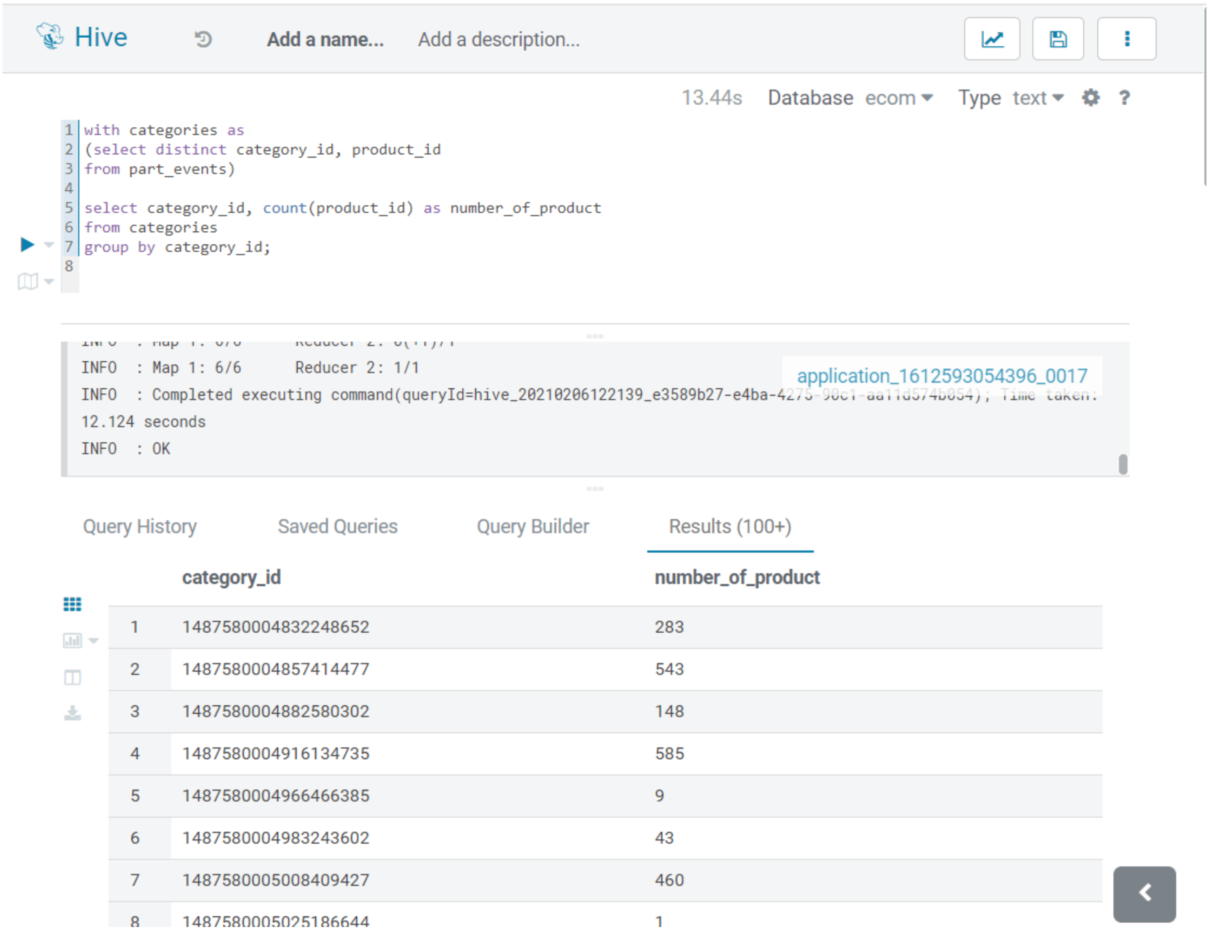
```
select distinct category_id from part_events;
```

```
INFO  : Map 1: 6/6      Reducer 2: 1/1
INFO  : Completed executing command(queryId=hive_20210206101510_961f1d27-c500-4f06-863f-3f5d235d5bae); Time taken:
24.369 seconds
INFO  : OK
```

	category_id
1	1487580004832248652
2	1487580004857414477
3	1487580004882580302
4	1487580004916134735
5	1487580004966466385

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

   with categories as (select distinct category_id, product_id from part_events)
   select category_id, count(category_id) from categories group by category_id;



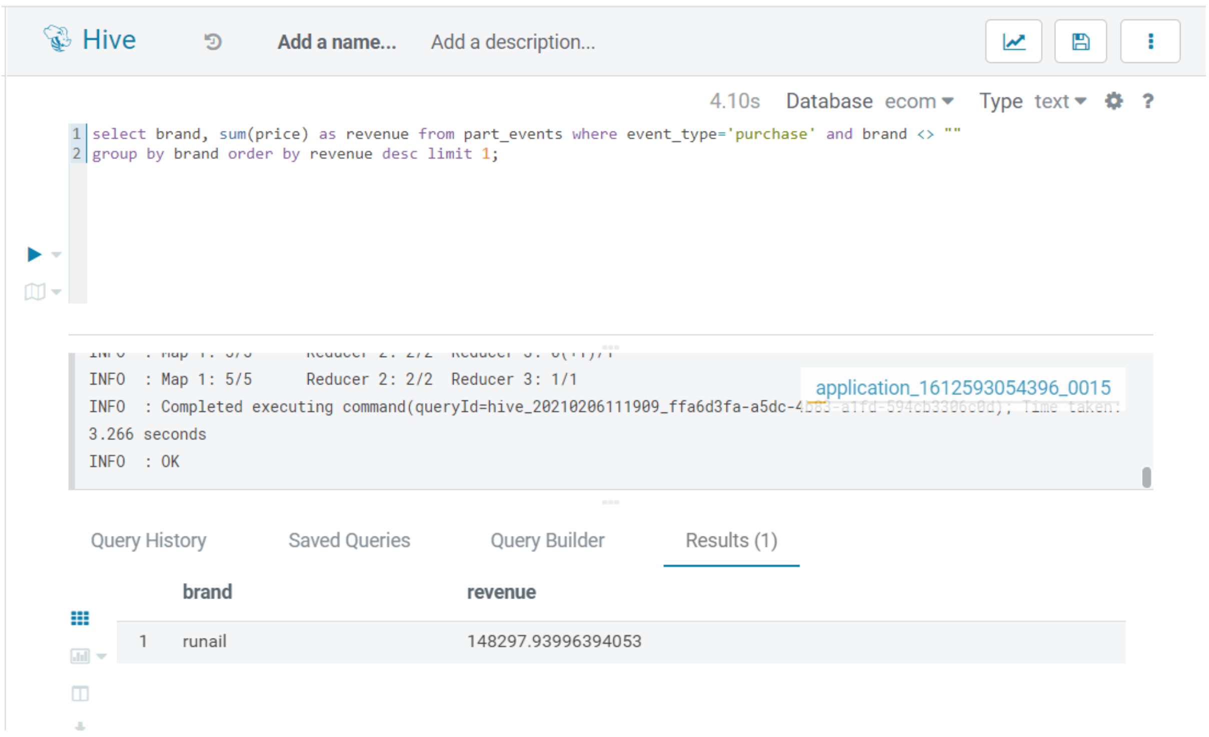
```
with categories as
(select distinct category_id, product_id
from part_events)

select category_id, count(product_id) as number_of_product
from categories
group by category_id;
```

```
INFO  : Map 1: 6/6      Reducer 2: 1/1
INFO  : Completed executing command(queryId=hive_20210206122139_e3589b27-e4ba-4275-90c1-aa11d574b054); Time taken:
12.124 seconds
INFO  : OK
```

	category_id	number_of_product
1	1487580004832248652	283
2	1487580004857414477	543
3	1487580004882580302	148
4	1487580004916134735	585
5	1487580004966466385	9
6	1487580004983243602	43
7	1487580005008409427	460
8	1487580005025186644	1

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

   select brand, sum(price) as revenue from part_events where event_type='purchase' and brand <> ""
   group by brand order by revenue desc limit 1;



```
select brand, sum(price) as revenue from part_events where event_type='purchase' and brand <> ""
group by brand order by revenue desc limit 1;
```

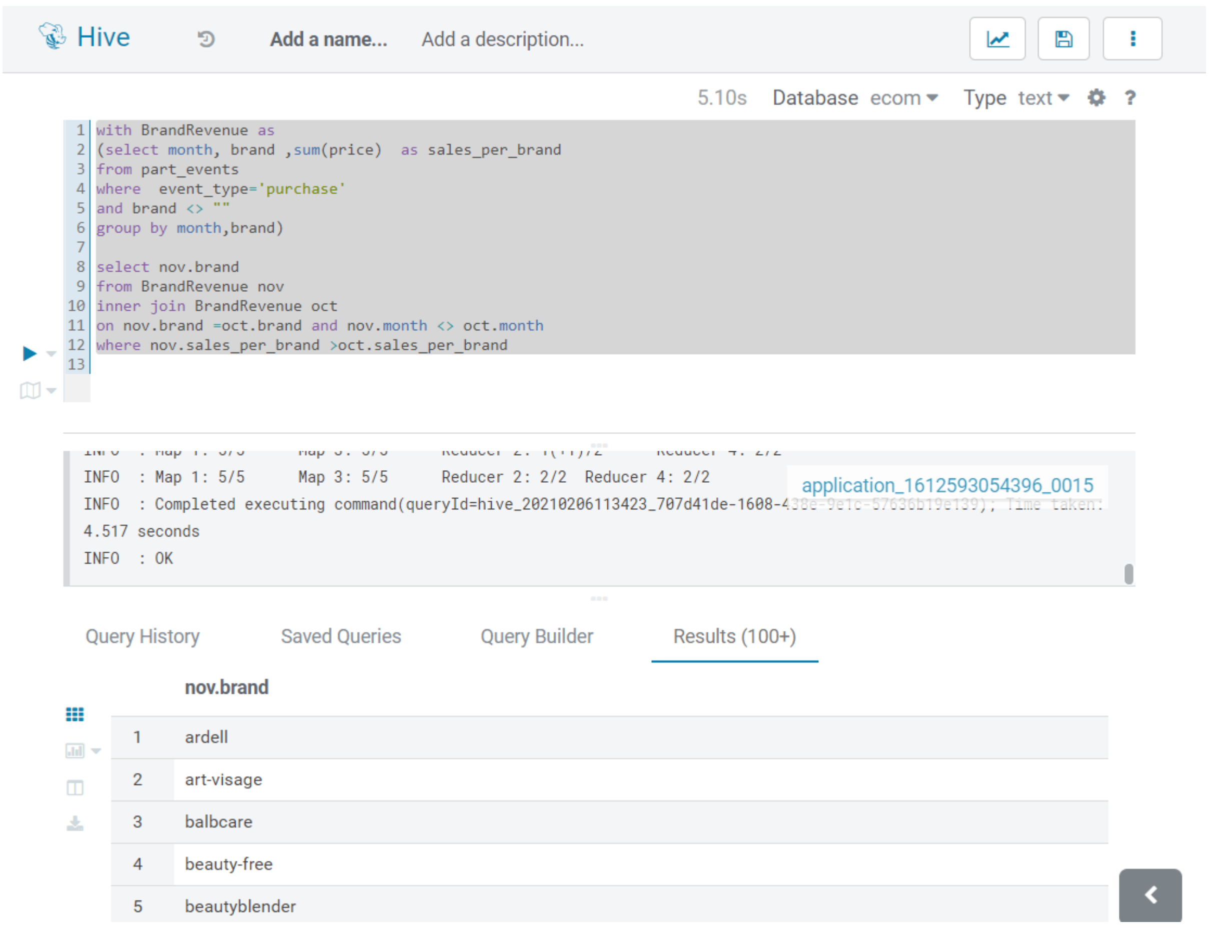
```
INFO  : Map 1: 5/5      Reducer 2: 2/2  Reducer 3: 1/1
INFO  : Completed executing command(queryId=hive_20210206111909_ffa6d3fa-a5dc-4b83-a1fd-594cb3306c0d); Time taken:
3.266 seconds
INFO  : OK
```

application_1612593054396_0015

	brand	revenue
1	runail	148297.93996394053

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

```
with BrandRevenue as
(select month, brand ,sum(price)  as sales_per_brand
from part_events
where  event_type='purchase'
and brand <> ""
group by month,brand)

select nov.brand
from BrandRevenue nov
inner join BrandRevenue oct
on nov.brand =oct.brand and nov.month <> oct.month
where nov.sales_per_brand >oct.sales_per_brand
```


Hive   Add a name...   Add a description...

5.10s   Database ecom   Type text

```
with BrandRevenue as
(select month, brand ,sum(price)  as sales_per_brand
from part_events
where  event_type='purchase'
and brand <> ""
group by month,brand)

select nov.brand
from BrandRevenue nov
inner join BrandRevenue oct
on nov.brand =oct.brand and nov.month <> oct.month
where nov.sales_per_brand >oct.sales_per_brand
```

```
INFO  : Map 1: 5/5      Map 3: 5/5      Reducer 2: 2/2  Reducer 4: 2/2
INFO  : Completed executing command(queryId=hive_20210206113423_707d41de-1608-4...); Time taken:
4.517 seconds
INFO  : OK
```

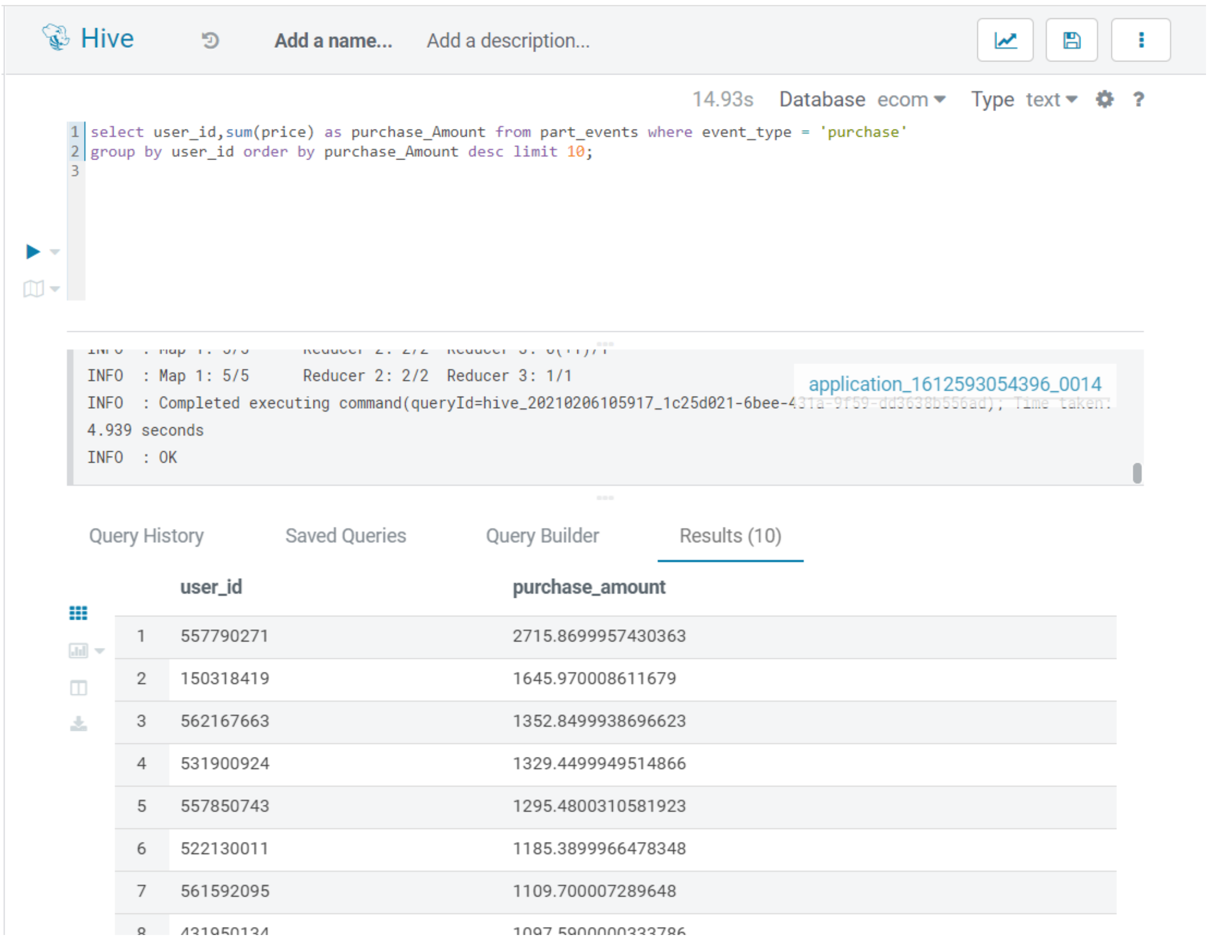
application_1612593054396_0015

Query History   Saved Queries   Query Builder   Results (100+)

	nov.brand
1	ardell
2	art-visage
3	balbcare
4	beauty-free
5	beautyblender

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 on purchases.

select user_id,sum(price) as purchase_Amount from part_events where event_type = 'purchase'
group by user_id order by purchase_Amount desc limit 10;



```
select user_id,sum(price) as purchase_Amount from part_events where event_type = 'purchase'
group by user_id order by purchase_Amount desc limit 10;
```

```
INFO  : Map 1: 5/5      Reducer 2: 2/2  Reducer 3: 1/1
INFO  : Completed executing command(queryId=hive_20210206105917_1c25d021-6bee-431a-9f59-dd3638b556ad); Time taken:
4.939 seconds
INFO  : OK
```

application_1612593054396_0014

	user_id	purchase_amount
1	557790271	2715.8699957430363
2	150318419	1645.970008611679
3	562167663	1352.8499938696623
4	531900924	1329.4499949514866
5	557850743	1295.4800310581923
6	522130011	1185.3899966478348
7	561592095	1109.700007289648
8	431950134	1097.5900000333786

Step 13 : Dropped all tables and database and Terminated the cluster. I have tried to do all this in one go so as to prevent heavy costing due to extended use.