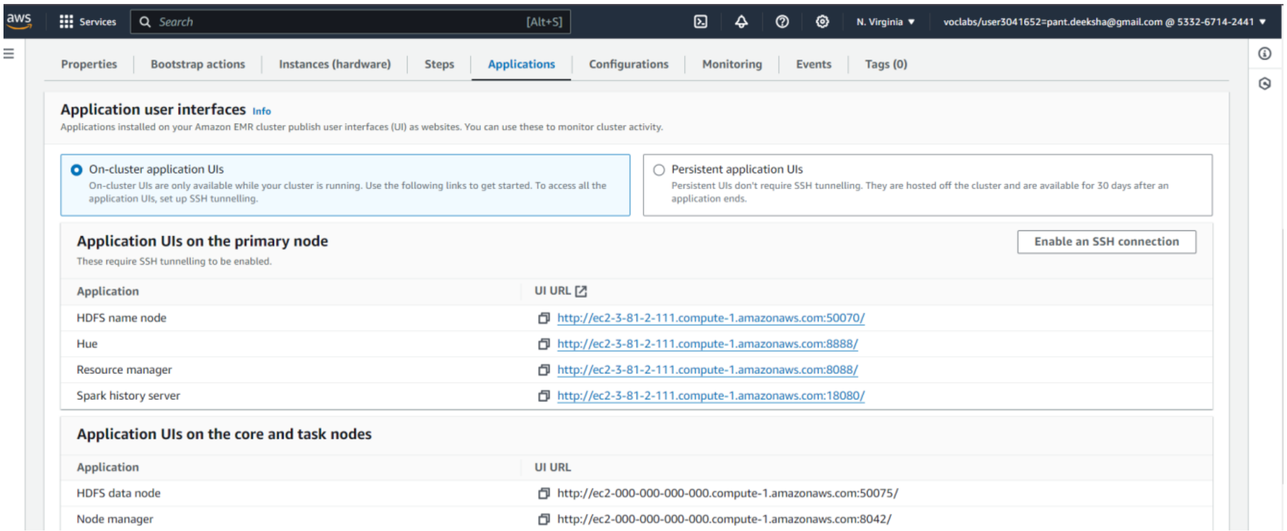
Logic For Final Submission

Setting up the Hue Interface for Query execution in the EMR cluster's Application Tab:



Properties | Bootstrap actions | Instances (hardware) | Steps | Applications | Configurations | Monitoring | Events | Tags (0)

Application user interfaces Info

Applications installed on your Amazon EMR cluster publish user interfaces (UI) as websites. You can use these to monitor cluster activity.

● On-cluster application UIs
On-cluster UIs are only available while your cluster is running. Use the following links to get started. To access all the application UIs, set up SSH tunnelling.

○ Persistent application UIs
Persistent UIs don't require SSH tunnelling. They are hosted off the cluster and are available for 30 days after an application ends.

Application UIs on the primary node

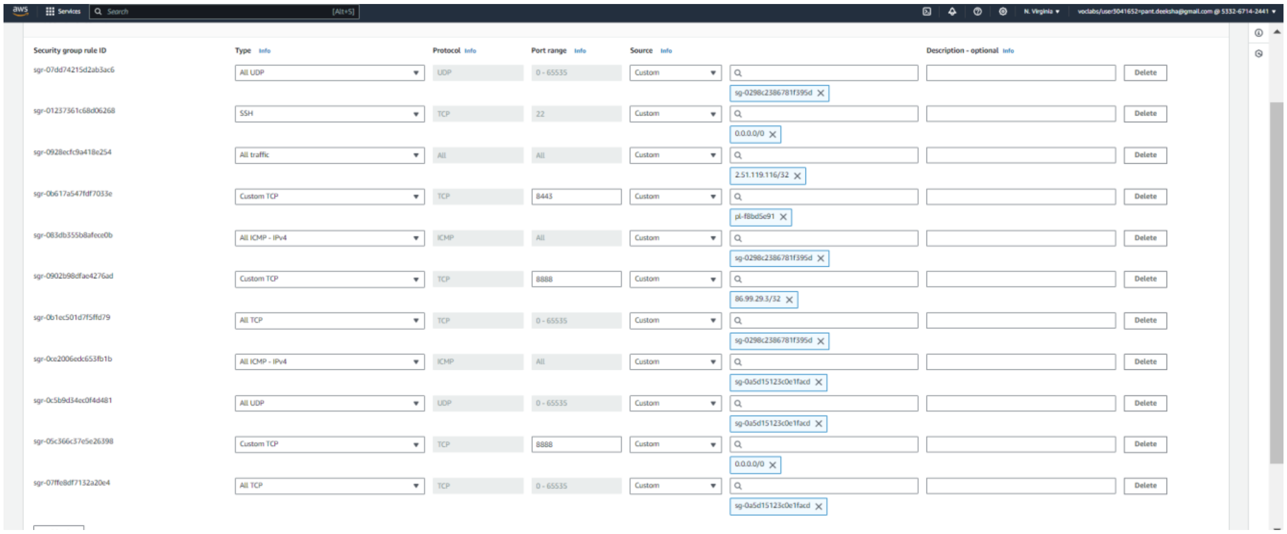
These require SSH tunnelling to be enabled.

Application	UI URL
HDFS name node	http://ec2-3-81-2-111.compute-1.amazonaws.com:50070/
Hue	http://ec2-3-81-2-111.compute-1.amazonaws.com:8888/
Resource manager	http://ec2-3-81-2-111.compute-1.amazonaws.com:8088/
Spark history server	http://ec2-3-81-2-111.compute-1.amazonaws.com:18080/

Application UIs on the core and task nodes

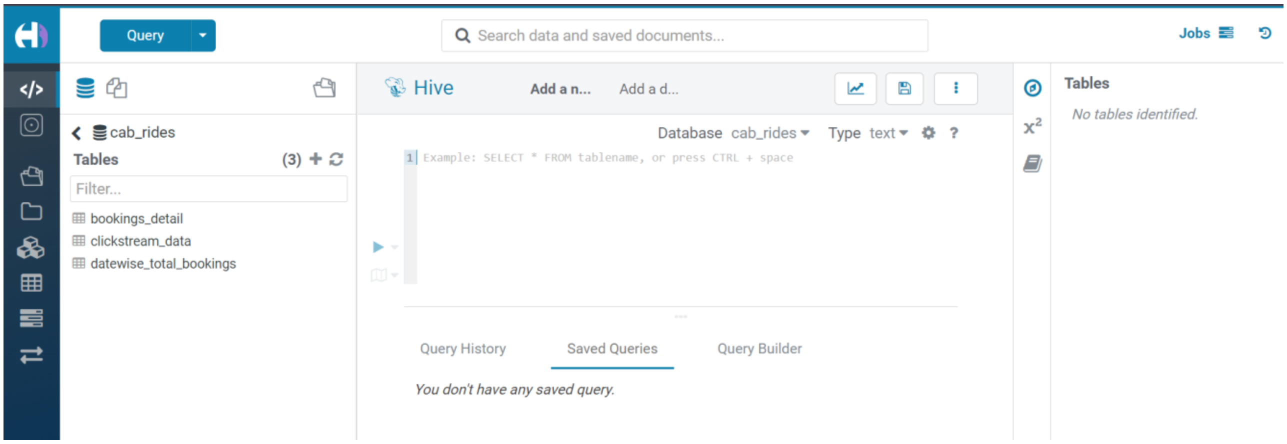
Application	UI URL
HDFS data node	http://ec2-000-000-000-000.compute-1.amazonaws.com:50075/
Node manager	http://ec2-000-000-000-000.compute-1.amazonaws.com:8042/

Modifying the Security group properties of the master node for HUE configuration



Security group rule ID	Type	Protocol	Port range	Source		Description - optional	
sgr-07dd74215d2ab3ac6	All UDP	UDP	0 - 65535	Custom	sg-0298c2386781f395d		Delete
sgr-01237361c68d06268	SSH	TCP	22	Custom	0.0.0.0/0		Delete
sgr-0928ecfc9a418e254	All traffic	All	All	Custom	2.51.119.116/32		Delete
sgr-0b617a547fdf7033e	Custom TCP	TCP	8443	Custom	pl-f8bd5e91		Delete
sgr-083db355b8afece0b	All ICMP - IPv4	ICMP	All	Custom	sg-0298c2386781f395d		Delete
sgr-0902b98dfae4276ad	Custom TCP	TCP	8888	Custom	86.99.29.3/32		Delete
sgr-0b1ec501d7f5ffd79	All TCP	TCP	0 - 65535	Custom	sg-0298c2386781f395d		Delete
sgr-0ce2006edc653fb1b	All ICMP - IPv4	ICMP	All	Custom	sg-0a5d15123c0e1facd		Delete
sgr-0c5b9d34ec0f4d481	All UDP	UDP	0 - 65535	Custom	sg-0a5d15123c0e1facd		Delete
sgr-05c366c37e5e26398	Custom TCP	TCP	8888	Custom	0.0.0.0/0		Delete
sgr-07ffe8df7132a20e4	All TCP	TCP	0 - 65535	Custom	sg-0a5d15123c0e1facd		Delete

HUE GUI connected with 'cab_rides' database:



```
Example: SELECT * FROM tablename, or press CTRL + space
```

No tables identified.

You don't have any saved query.

Task 5: Calculate the total number of different drivers for each customer.

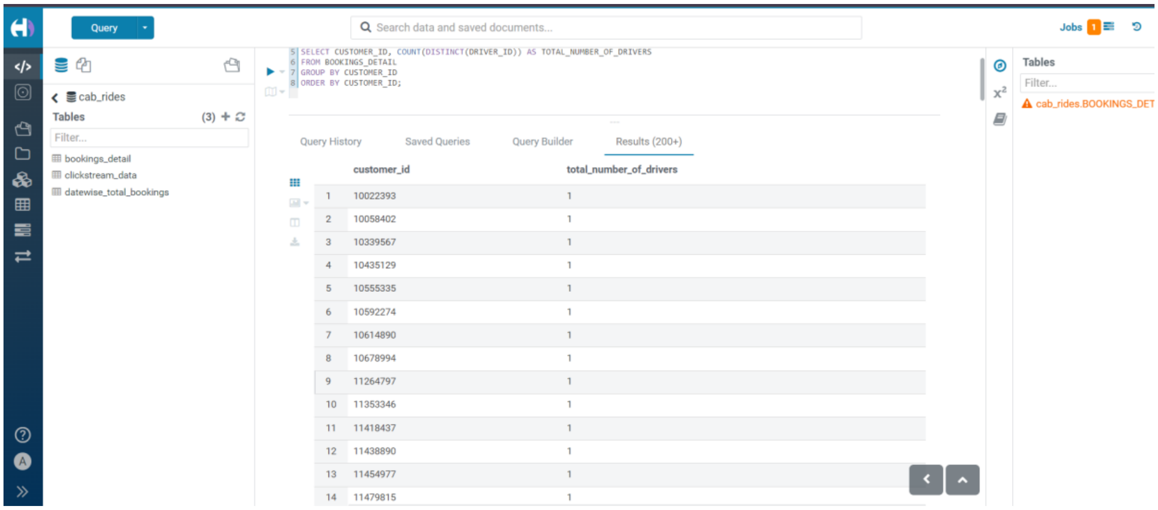
Query:

SELECT CUSTOMER_ID, COUNT(DISTINCT(DRIVER_ID)) AS TOTAL_NUMBER_OF_DRIVERS
FROM BOOKINGS_DETAIL
GROUP BY CUSTOMER_ID
ORDER BY CUSTOMER_ID;

Logic:

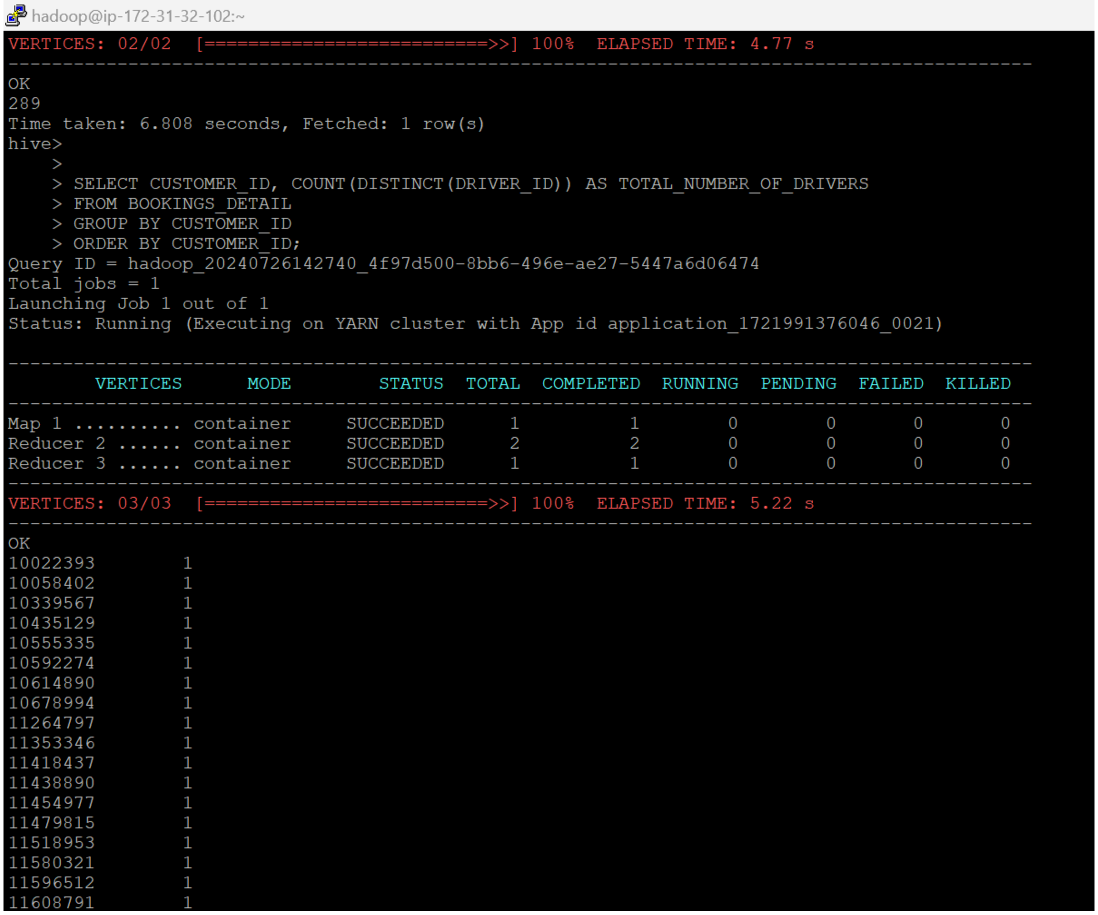
The above query counts the number of unique drivers grouping by each customer id using the table Bookings_detail. The result is sorted based on the customer id.

Output:



```
SELECT CUSTOMER_ID, COUNT(DISTINCT(DRIVER_ID)) AS TOTAL_NUMBER_OF_DRIVERS
FROM BOOKINGS_DETAIL
GROUP BY CUSTOMER_ID
ORDER BY CUSTOMER_ID;
```

	customer_id	total_number_of_drivers
1	10022393	1
2	10058402	1
3	10339567	1
4	10435129	1
5	10555335	1
6	10592274	1
7	10614890	1
8	10678994	1
9	11264797	1
10	11353346	1
11	11418437	1
12	11438890	1
13	11454977	1
14	11479815	1



hadoop@ip-172-31-32-102:~

```
VERTICES: 02/02  [==========================>>] 100%  ELAPSED TIME: 4.77 s
----------------------------------------------------------------------------------------------
OK
289
Time taken: 6.808 seconds, Fetched: 1 row(s)
hive>
    >
    > SELECT CUSTOMER_ID, COUNT(DISTINCT(DRIVER_ID)) AS TOTAL_NUMBER_OF_DRIVERS
    > FROM BOOKINGS_DETAIL
    > GROUP BY CUSTOMER_ID
    > ORDER BY CUSTOMER_ID;
Query ID = hadoop_20240726142740_4f97d500-8bb6-496e-ae27-5447a6d06474
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      2          2        0        0       0       0
Reducer 3 ...... container     SUCCEEDED      1          1        0        0       0       0
----------------------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 5.22 s
----------------------------------------------------------------------------------------------
OK
10022393        1
10058402        1
10339567        1
10435129        1
10555335        1
10592274        1
10614890        1
10678994        1
11264797        1
11353346        1
11418437        1
11438890        1
11454977        1
11479815        1
11518953        1
11580321        1
11596512        1
11608791        1
```

Task 6: Calculate the total rides taken by each customer.

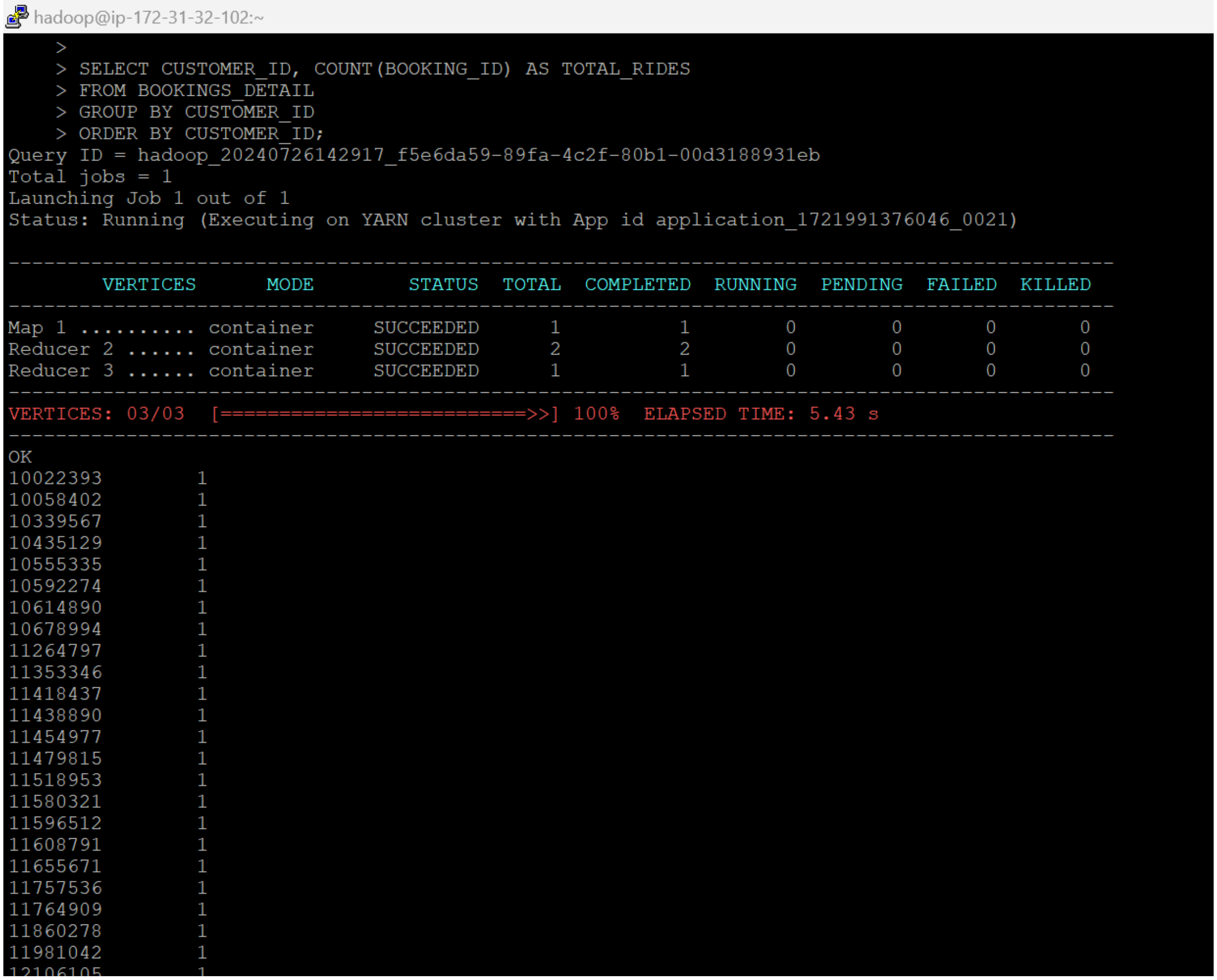
Query:-

```
SELECT CUSTOMER_ID, COUNT(BOOKING_ID) AS TOTAL_RIDES
FROM BOOKINGS_DETAIL
GROUP BY CUSTOMER_ID
ORDER BY CUSTOMER_ID;
```

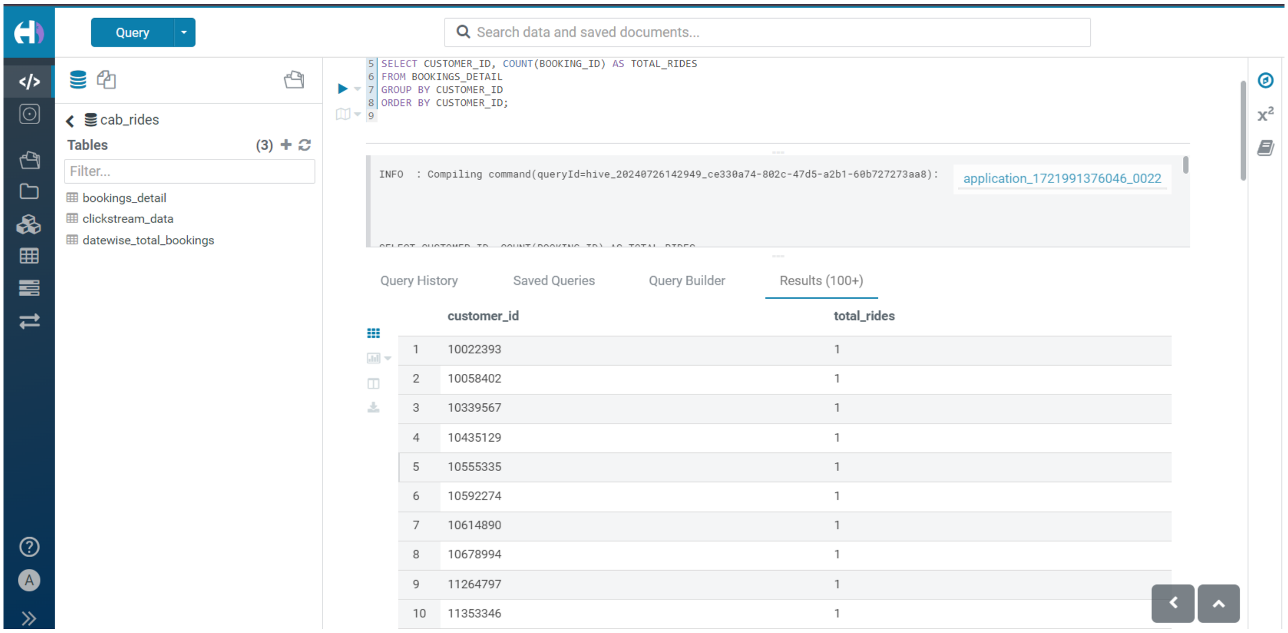
Logic:

The above query counts the number of Booking id's grouping by each customer id using the table Bookings_detail. The result is sorted based on the customer id.

Output:-



```
    >
    > SELECT CUSTOMER_ID, COUNT(BOOKING_ID) AS TOTAL_RIDES
    > FROM BOOKINGS_DETAIL
    > GROUP BY CUSTOMER_ID
    > ORDER BY CUSTOMER_ID;
Query ID = hadoop_20240726142917_f5e6da59-89fa-4c2f-80b1-00d3188931eb
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      2          2        0        0       0       0
Reducer 3 ...... container     SUCCEEDED      1          1        0        0       0       0
----------------------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 5.43 s
----------------------------------------------------------------------------------------------
OK
10022393        1
10058402        1
10339567        1
10435129        1
10555335        1
10592274        1
10614890        1
10678994        1
11264797        1
11353346        1
11418437        1
11438890        1
11454977        1
11479815        1
11518953        1
11580321        1
11596512        1
11608791        1
11655671        1
11757536        1
11764909        1
11860278        1
11981042        1
12106105        1
```



```
SELECT CUSTOMER_ID, COUNT(BOOKING_ID) AS TOTAL_RIDES
FROM BOOKINGS_DETAIL
GROUP BY CUSTOMER_ID
ORDER BY CUSTOMER_ID;
```

```
INFO  : Compiling command(queryId=hive_20240726142949_ce330a74-802c-47d5-a2b1-60b727273aa8):
```

application_1721991376046_0022

	customer_id	total_rides
1	10022393	1
2	10058402	1
3	10339567	1
4	10435129	1
5	10555335	1
6	10592274	1
7	10614890	1
8	10678994	1
9	11264797	1
10	11353346	1

Task 7: Find the total visits made by each customer on the booking page and the total ‘Book Now’ button presses. This can show the conversion ratio.
The booking page id is ‘e7bc5fb2-1231-11eb-adc1-0242ac120002’. The Book Now button id is ‘fcba68aa-1231-11eb-adc1-0242ac120002’. You also need to calculate the conversion ratio as part of this task. Conversion ratio can be calculated as **Total 'Book Now' Button Press/Total Visits made by customer on the booking page**.

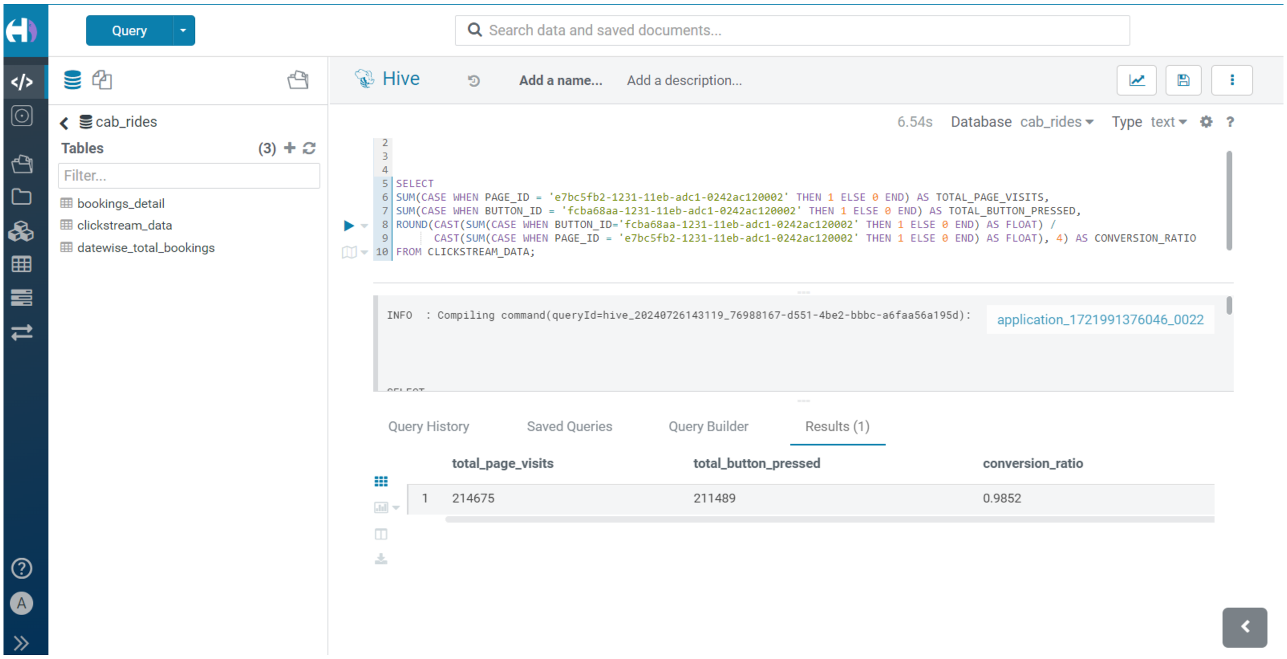
Query:-

```
SELECT
SUM(CASE WHEN PAGE_ID = 'e7bc5fb2-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS TOTAL_PAGE_VISITS,

SUM(CASE WHEN BUTTON_ID = 'fcba68aa-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS TOTAL_BUTTON_PRESSED,

ROUND(CAST(SUM(CASE WHEN BUTTON_ID='fcba68aa-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS FLOAT) /
    CAST(SUM(CASE WHEN PAGE_ID = 'e7bc5fb2-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS FLOAT), 4) AS
CONVERSION_RATIO
FROM CLICKSTREAM_DATA;
```

Logic:

1. The above query counts the total visits made on the booking page when booking page id is ‘e7bc5fb2-1231-11eb-adc1-0242ac120002’ using the table clickstream_data.
2. Counts the total ‘Book Now’ button presses when Book Now button id is ‘fcba68aa-1231-11eb-adc1-0242ac120002’ using the table clickstream_data.
3. Calculated Conversion ratio as 1st count value/2nd count value

Output:-

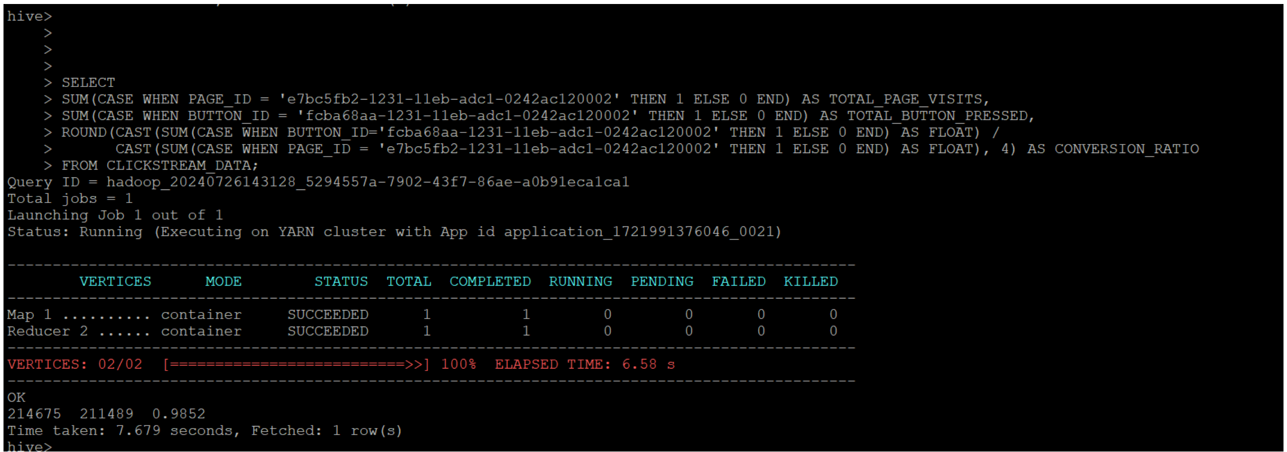


```
SELECT
SUM(CASE WHEN PAGE_ID = 'e7bc5fb2-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS TOTAL_PAGE_VISITS,
SUM(CASE WHEN BUTTON_ID = 'fcba68aa-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS TOTAL_BUTTON_PRESSED,
ROUND(CAST(SUM(CASE WHEN BUTTON_ID='fcba68aa-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS FLOAT) /
      CAST(SUM(CASE WHEN PAGE_ID = 'e7bc5fb2-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS FLOAT), 4) AS CONVERSION_RATIO
FROM CLICKSTREAM_DATA;
```

```
INFO  : Compiling command(queryId=hive_20240726143119_76988167-d551-4be2-bbbc-a6faa56a195d):
```

application_1721991376046_0022

	total_page_visits	total_button_pressed	conversion_ratio
1	214675	211489	0.9852



```
hive>
    >
    >
    >
    > SELECT
    > SUM(CASE WHEN PAGE_ID = 'e7bc5fb2-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS TOTAL_PAGE_VISITS,
    > SUM(CASE WHEN BUTTON_ID = 'fcba68aa-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS TOTAL_BUTTON_PRESSED,
    > ROUND(CAST(SUM(CASE WHEN BUTTON_ID='fcba68aa-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS FLOAT) /
    >       CAST(SUM(CASE WHEN PAGE_ID = 'e7bc5fb2-1231-11eb-adc1-0242ac120002' THEN 1 ELSE 0 END) AS FLOAT), 4) AS CONVERSION_RATIO
    > FROM CLICKSTREAM_DATA;
Query ID = hadoop_20240726143128_5294557a-7902-43f7-86ae-a0b91eca1ca1
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: 6.58 s
----------------------------------------------------------------------------------------------
OK
214675  211489  0.9852
Time taken: 7.679 seconds, Fetched: 1 row(s)
hive>
```

** There is slight difference (0.9852~0.9688=0.0164) ~=1.6% in the conversion ratio as per the validation document due to the additional 16 records present in the loaded clickstream data in HDFS.

Task 8: Calculate the count of all trips done on black cabs.

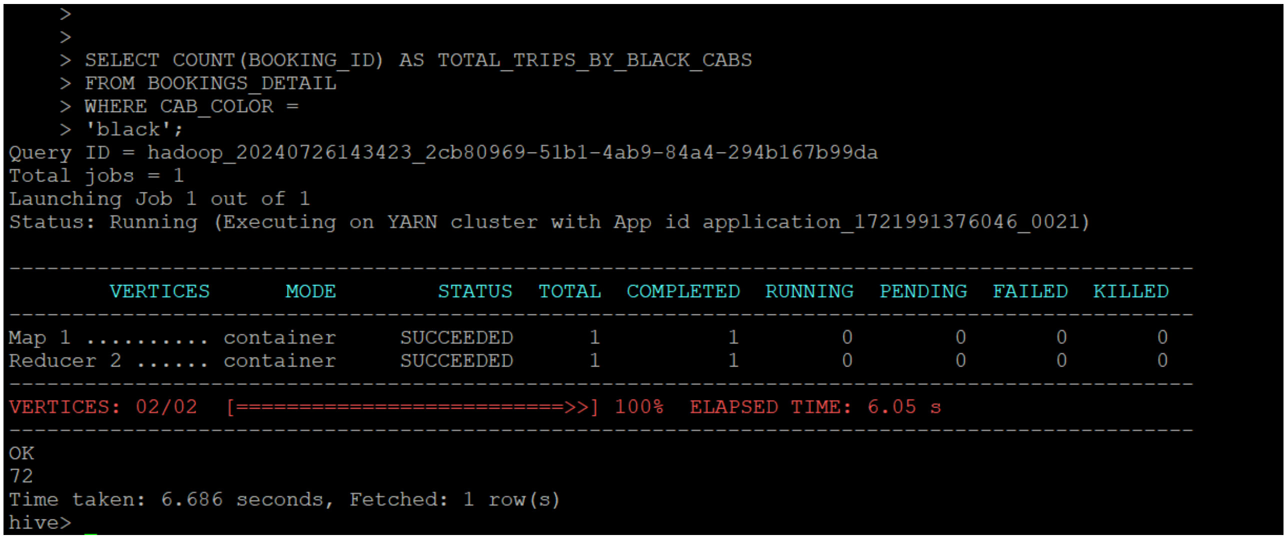
Query:-

```
  SELECT COUNT(BOOKING_ID) AS TOTAL_TRIPS_BY_BLACK_CABS
  FROM BOOKINGS_DETAIL
  WHERE CAB_COLOR = 'black';
```

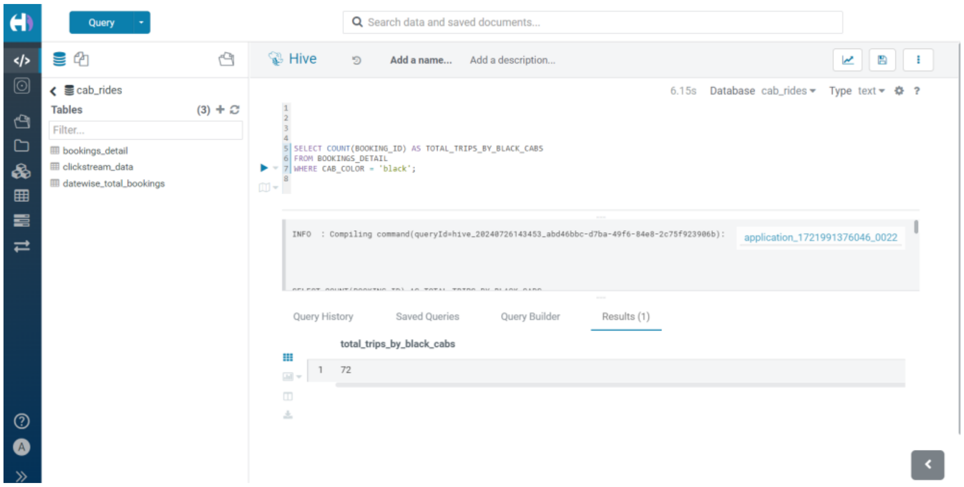
Logic:

The above query counts the number of Booking id’s when the color of the cab is ‘Black’ using the table Bookings_detail.

Validation:



```
    >
    >
    > SELECT COUNT(BOOKING_ID) AS TOTAL_TRIPS_BY_BLACK_CABS
    > FROM BOOKINGS_DETAIL
    > WHERE CAB_COLOR =
    > 'black';
Query ID = hadoop_20240726143423_2cb80969-51b1-4ab9-84a4-294b167b99da
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: 6.05 s
----------------------------------------------------------------------------------------------
OK
72
Time taken: 6.686 seconds, Fetched: 1 row(s)
hive>
```



```
SELECT COUNT(BOOKING_ID) AS TOTAL_TRIPS_BY_BLACK_CABS
FROM BOOKINGS_DETAIL
WHERE CAB_COLOR = 'black';
```

```
INFO  : Compiling command(queryId=hive_20240726143453_abd46bbc-d7ba-49f6-84e8-2c75f923906b):
```

application_1721991376046_0022

	total_trips_by_black_cabs
1	72

Task 9: Calculate the total amount of tips given date wise to all drivers by customers.

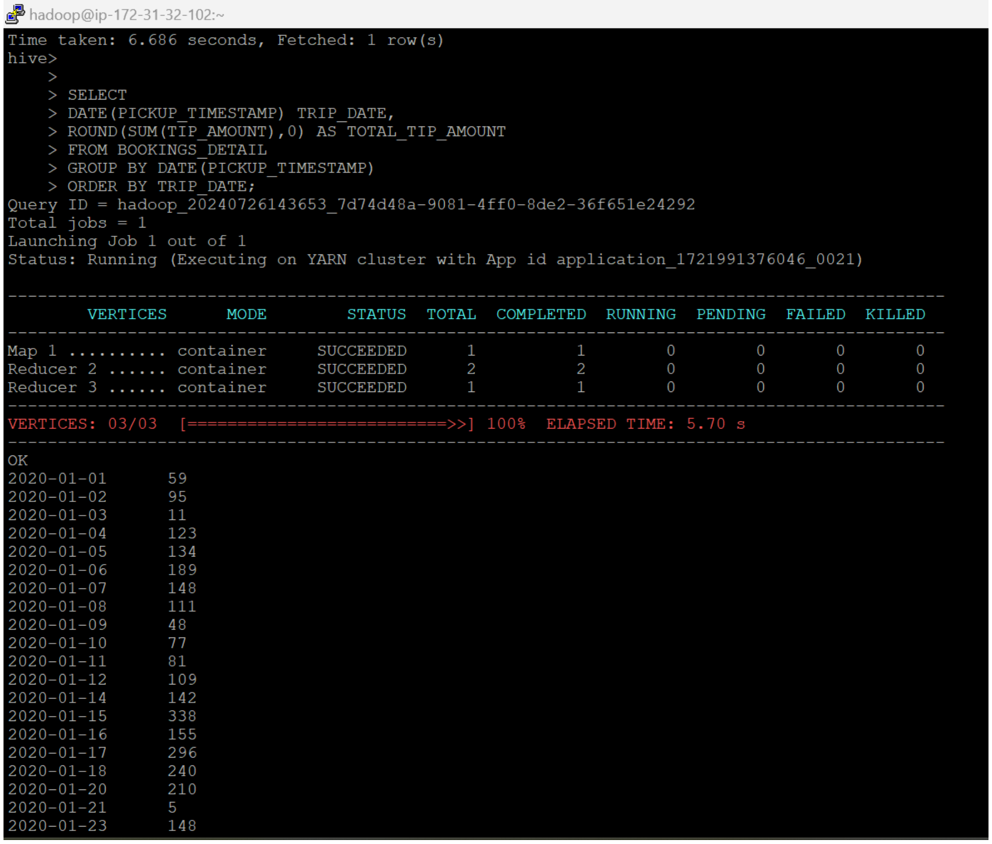
Query:-

```
SELECT
DATE(PICKUP_TIMESTAMP) TRIP_DATE,
ROUND(SUM(TIP_AMOUNT),0) AS TOTAL_TIP_AMOUNT
FROM BOOKINGS_DETAIL
GROUP BY DATE(PICKUP_TIMESTAMP)
ORDER BY TRIP_DATE;
```

Logic:

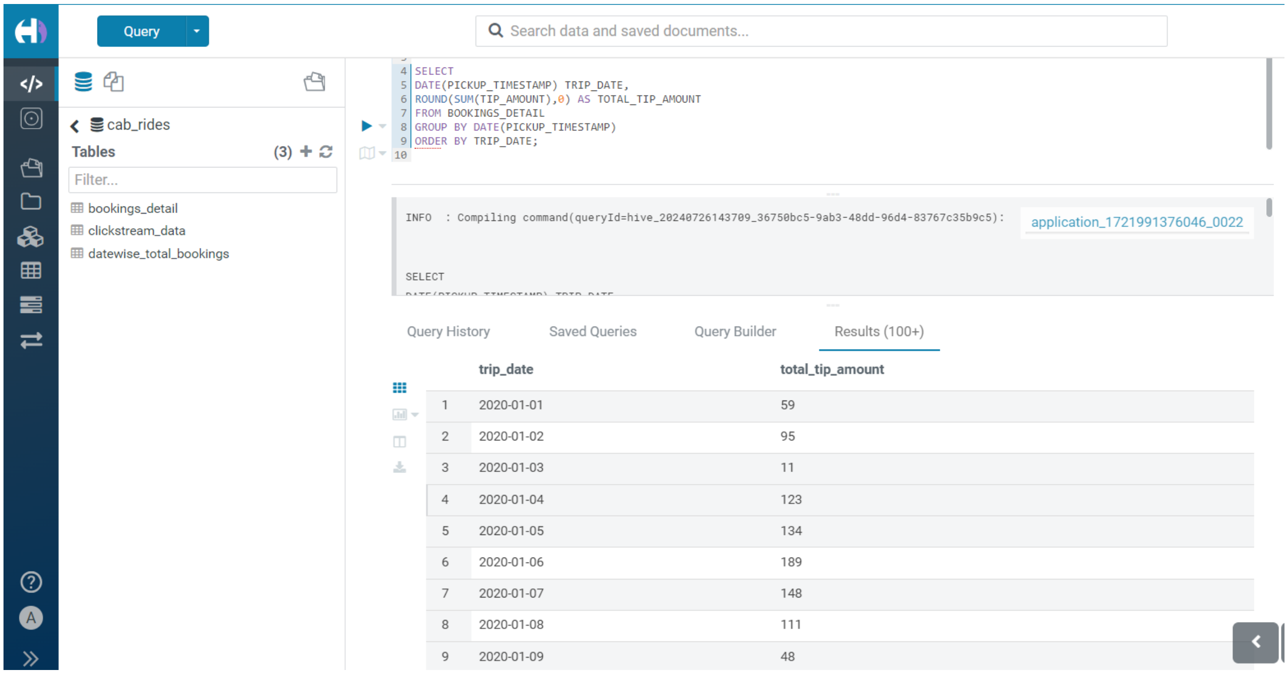
The above query adds the tip amount grouping by each pickup date (Pickup timestamp converted to date) using the table Bookings_detail, then round up the total tip amount. The result is sorted based on the Trip date.

Output:



hadoop@ip-172-31-32-102:~

```
Time taken: 6.686 seconds, Fetched: 1 row(s)
hive>
    >
    > SELECT
    > DATE(PICKUP_TIMESTAMP) TRIP_DATE,
    > ROUND(SUM(TIP_AMOUNT),0) AS TOTAL_TIP_AMOUNT
    > FROM BOOKINGS_DETAIL
    > GROUP BY DATE(PICKUP_TIMESTAMP)
    > ORDER BY TRIP_DATE;
Query ID = hadoop_20240726143653_7d74d48a-9081-4ff0-8de2-36f651e24292
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      2          2        0        0       0       0
Reducer 3 ...... container     SUCCEEDED      1          1        0        0       0       0
----------------------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 5.70 s
----------------------------------------------------------------------------------------------
OK
2020-01-01      59
2020-01-02      95
2020-01-03      11
2020-01-04      123
2020-01-05      134
2020-01-06      189
2020-01-07      148
2020-01-08      111
2020-01-09      48
2020-01-10      77
2020-01-11      81
2020-01-12      109
2020-01-14      142
2020-01-15      338
2020-01-16      155
2020-01-17      296
2020-01-18      240
2020-01-20      210
2020-01-21      5
2020-01-23      148
```



```
SELECT
DATE(PICKUP_TIMESTAMP) TRIP_DATE,
ROUND(SUM(TIP_AMOUNT),0) AS TOTAL_TIP_AMOUNT
FROM BOOKINGS_DETAIL
GROUP BY DATE(PICKUP_TIMESTAMP)
ORDER BY TRIP_DATE;
```

```
INFO  : Compiling command(queryId=hive_20240726143709_36750bc5-9ab3-48dd-96d4-83767c35b9c5):

SELECT
```

application_1721991376046_0022

	trip_date	total_tip_amount
1	2020-01-01	59
2	2020-01-02	95
3	2020-01-03	11
4	2020-01-04	123
5	2020-01-05	134
6	2020-01-06	189
7	2020-01-07	148
8	2020-01-08	111
9	2020-01-09	48

Task 10: Calculate the total count of all the bookings with ratings lower than 2 as given by customers in a particular month.

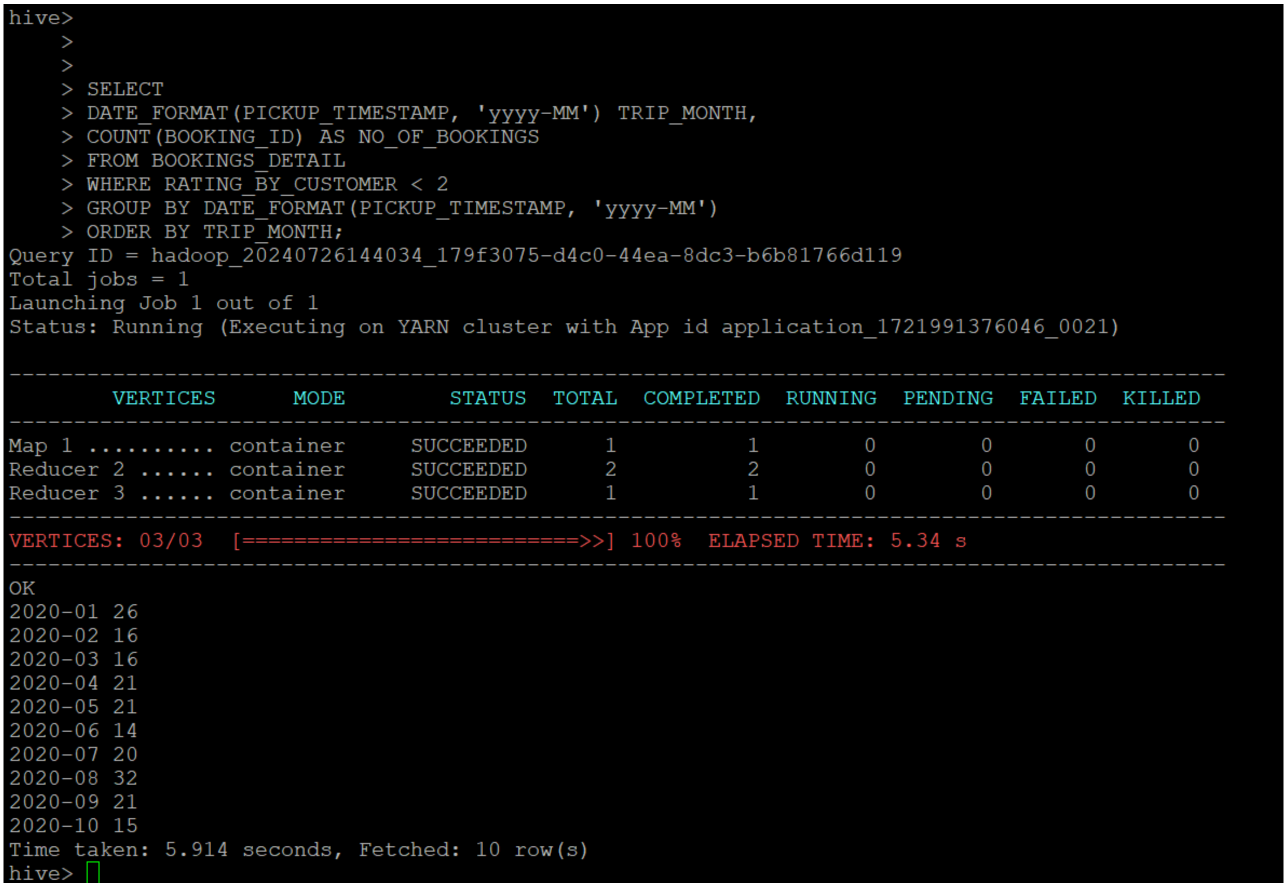
Query:-

```
SELECT
DATE_FORMAT(PICKUP_TIMESTAMP, 'yyyy-MM') TRIP_MONTH,
COUNT(BOOKING_ID) AS NO_OF_BOOKINGS
FROM BOOKINGS_DETAIL
WHERE RATING_BY_CUSTOMER < 2
GROUP BY DATE_FORMAT(PICKUP_TIMESTAMP, 'yyyy-MM')
ORDER BY TRIP_MONTH;
```

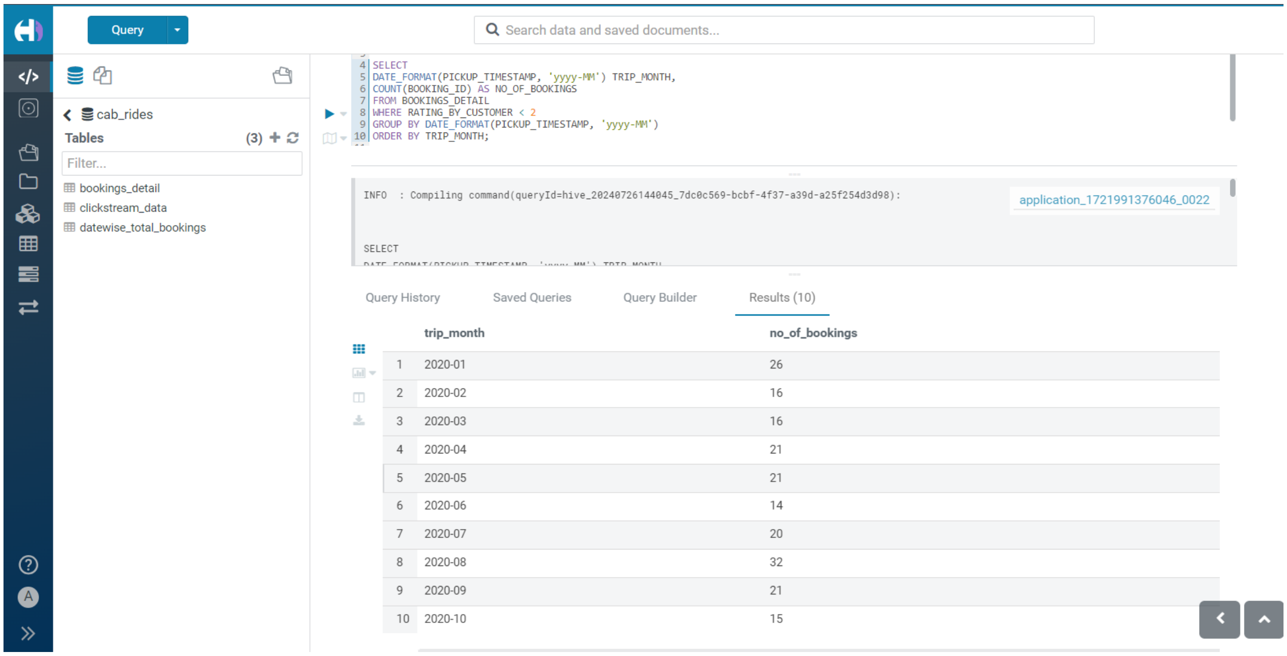
Logic:

The above query counts the total booking id grouping by each pickup year-month (Pickup timestamp converted to date in the format year-month) using the table Bookings_detail where the ratings given by the customer is less than 2. The result is sorted based on the pickup year-month.

Output:



```
hive>
    >
    >
    > SELECT
    > DATE_FORMAT(PICKUP_TIMESTAMP, 'yyyy-MM') TRIP_MONTH,
    > COUNT(BOOKING_ID) AS NO_OF_BOOKINGS
    > FROM BOOKINGS_DETAIL
    > WHERE RATING_BY_CUSTOMER < 2
    > GROUP BY DATE_FORMAT(PICKUP_TIMESTAMP, 'yyyy-MM')
    > ORDER BY TRIP_MONTH;
Query ID = hadoop_20240726144034_179f3075-d4c0-44ea-8dc3-b6b81766d119
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      2          2        0        0       0       0
Reducer 3 ...... container     SUCCEEDED      1          1        0        0       0       0
----------------------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 5.34 s
----------------------------------------------------------------------------------------------
OK
2020-01 26
2020-02 16
2020-03 16
2020-04 21
2020-05 21
2020-06 14
2020-07 20
2020-08 32
2020-09 21
2020-10 15
Time taken: 5.914 seconds, Fetched: 10 row(s)
hive>
```



```
SELECT
DATE_FORMAT(PICKUP_TIMESTAMP, 'yyyy-MM') TRIP_MONTH,
COUNT(BOOKING_ID) AS NO_OF_BOOKINGS
FROM BOOKINGS_DETAIL
WHERE RATING_BY_CUSTOMER < 2
GROUP BY DATE_FORMAT(PICKUP_TIMESTAMP, 'yyyy-MM')
ORDER BY TRIP_MONTH;
```

```
INFO  : Compiling command(queryId=hive_20240726144045_7dc0c569-bcbf-4f37-a39d-a25f254d3d98):

SELECT
```

application_1721991376046_0022

	trip_month	no_of_bookings
1	2020-01	26
2	2020-02	16
3	2020-03	16
4	2020-04	21
5	2020-05	21
6	2020-06	14
7	2020-07	20
8	2020-08	32
9	2020-09	21
10	2020-10	15

Task 11: Calculate the count of total iOS users.

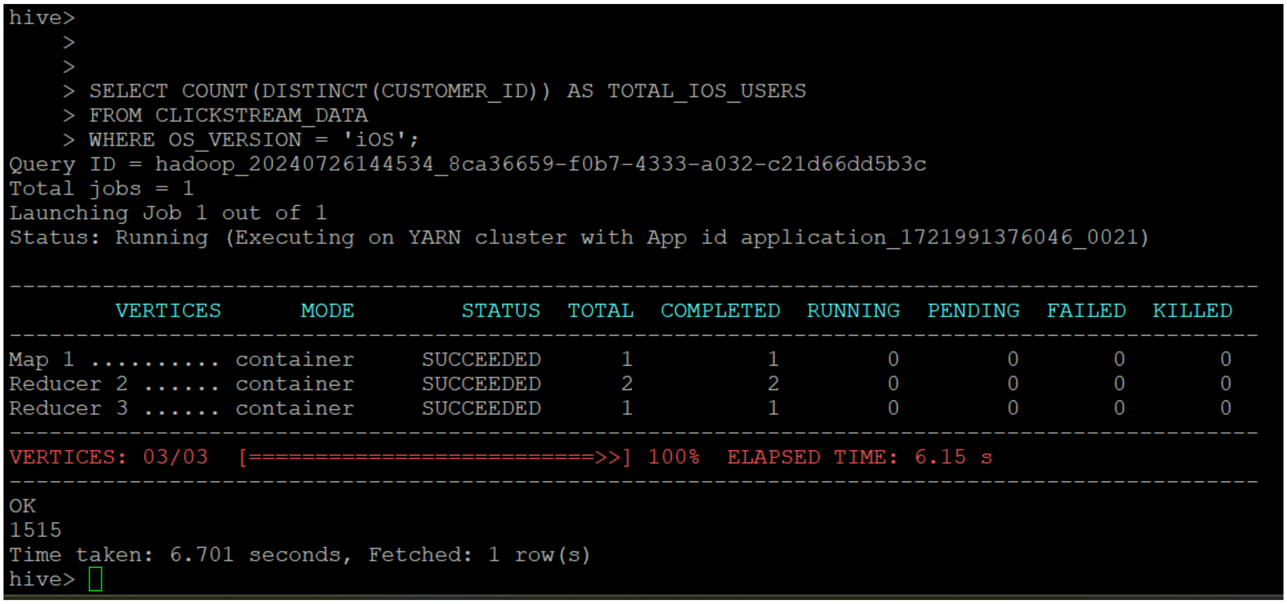
Query:-

SELECT COUNT(DISTINCT(CUSTOMER_ID)) AS TOTAL_IOS_USERS
FROM CLICKSTREAM_DATA
WHERE OS_VERSION = 'iOS';

Logic:

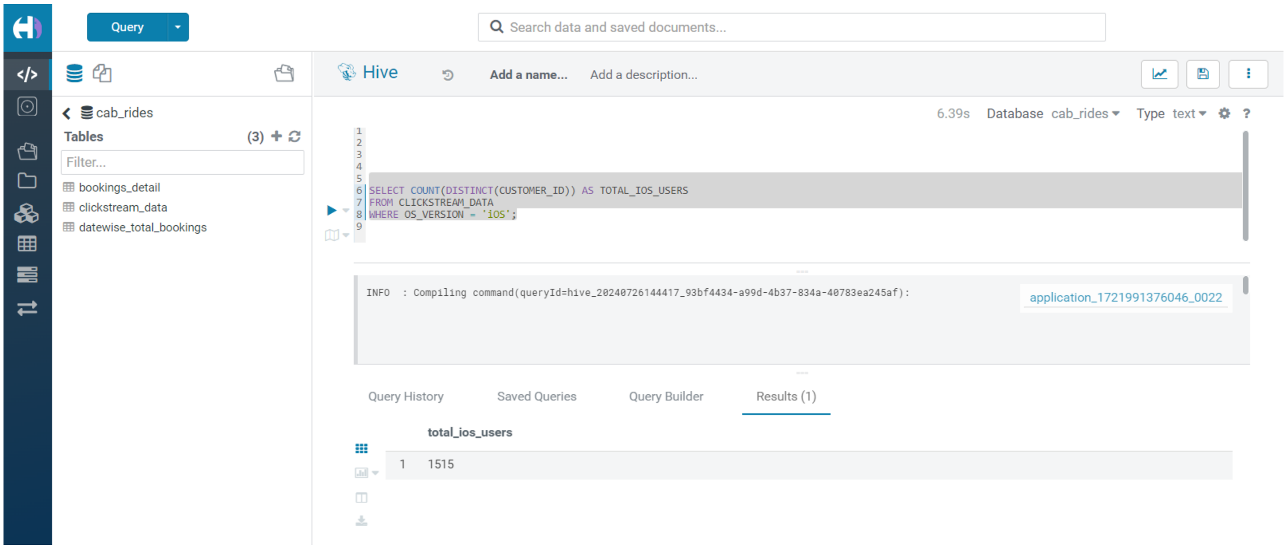
The above query counts the unique customer id where OS version is ‘iOS’ from the table clickstream_data.

Output:-



```
hive>
    >
    >
    > SELECT COUNT(DISTINCT(CUSTOMER_ID)) AS TOTAL_IOS_USERS
    > FROM CLICKSTREAM_DATA
    > WHERE OS_VERSION = 'iOS';
Query ID = hadoop_20240726144534_8ca36659-f0b7-4333-a032-c21d66dd5b3c
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      2          2        0        0       0       0
Reducer 3 ...... container     SUCCEEDED      1          1        0        0       0       0
----------------------------------------------------------------------------------------------
VERTICES: 03/03  [==========================>>] 100%  ELAPSED TIME: 6.15 s
----------------------------------------------------------------------------------------------
OK
1515
Time taken: 6.701 seconds, Fetched: 1 row(s)
hive>
```

** There is slight difference 12 records as per the validation document due to the additional 16 records present in the loaded clickstream data in HDFS.



```
SELECT COUNT(DISTINCT(CUSTOMER_ID)) AS TOTAL_IOS_USERS
FROM CLICKSTREAM_DATA
WHERE OS_VERSION = 'iOS';
```

```
INFO  : Compiling command(queryId=hive_20240726144417_93bf4434-a99d-4b37-834a-40783ea245af):
```

application_1721991376046_0022

	total_ios_users
1	1515