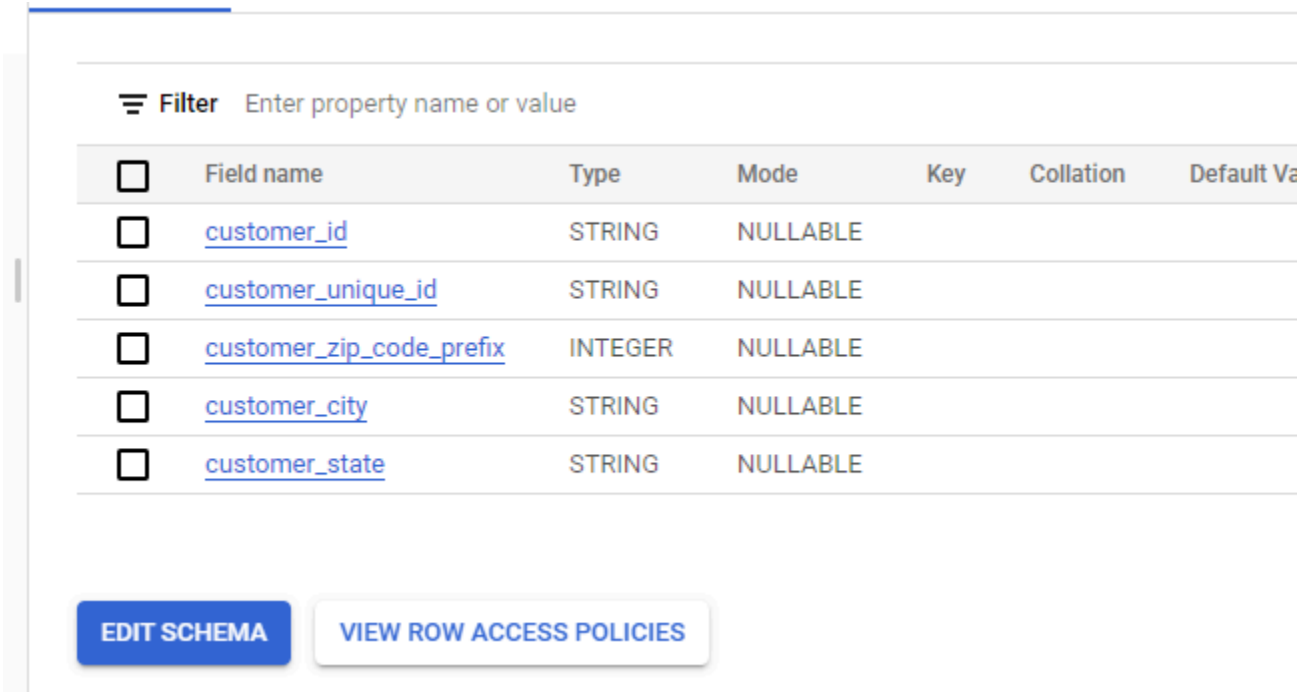
**OVERVIEW:** This particular business case focuses on the operations of Target in Brazil and provides insightful information about 100,000 orders placed between 2016 and 2018. The dataset offers a comprehensive view of various dimensions including the order status, price, payment and freight performance, customer location, product attributes, and customer reviews,By analyzing this extensive dataset, it becomes possible to gain valuable insights into Target's operations in Brazil

**Problem Statement:** To analyze the sales and operations of Target in Brazil and to extract valuable insights from it and provide actionable recommendations.

**21``zQ1-Import the dataset and do usual exploratory analysis steps like checking the structure & characteristics of the dataset:**

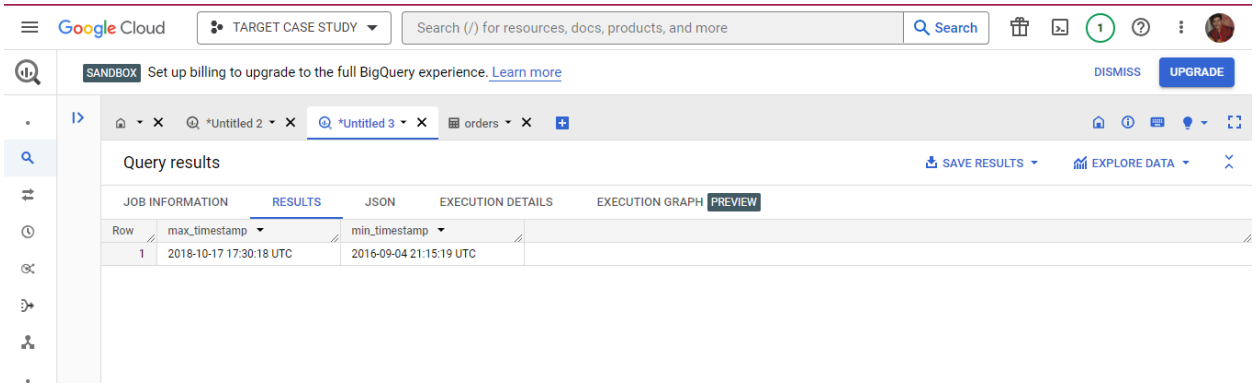
**Q1.1-Data type of all columns in the "customers" table.**

```
select
column_name, data_type
from "target_scaler".information_schema.COLUMNS
where table_name="customers"
```



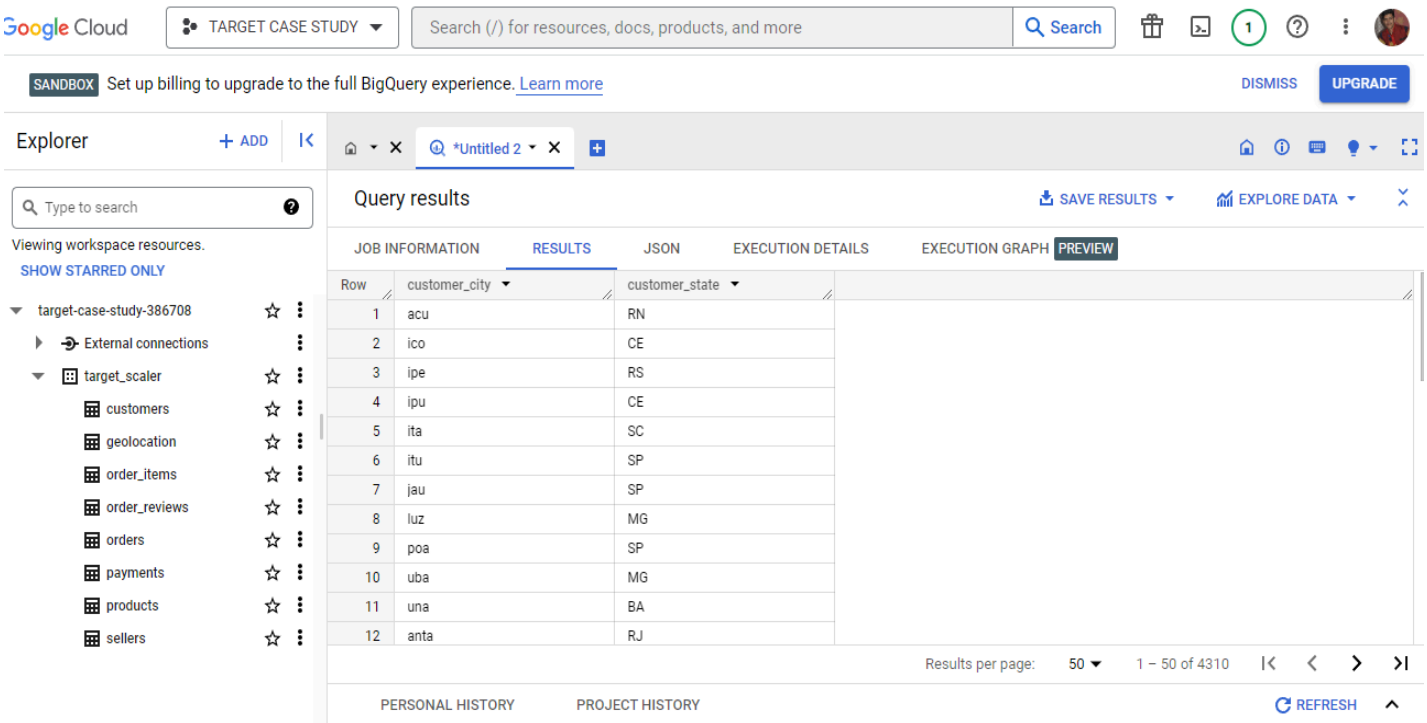

**Q1.2-Get the time range between which the orders were placed.**

```
select max(order_purchase_timestamp) as max_timestamp,min(order_purchase_timestamp) as
min_timestamp
from `target_scaler.orders`
```




## Q1.3- Count the number of Cities and States in our dataset.

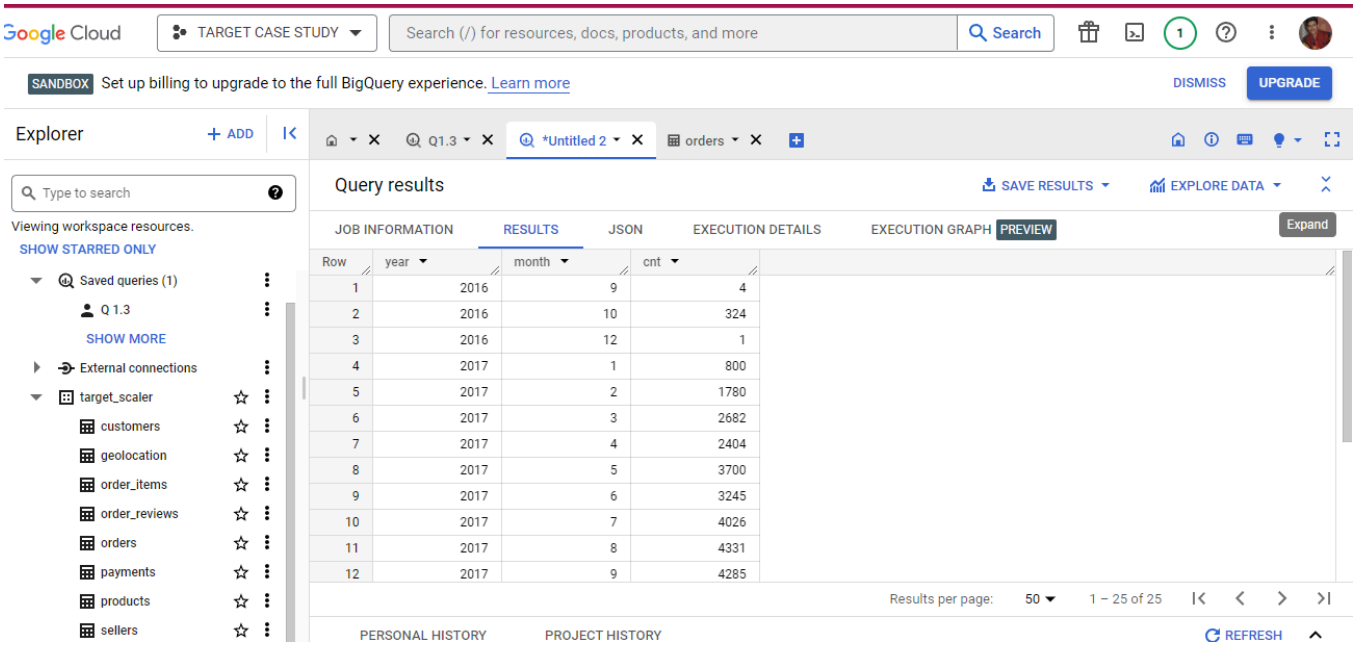
```
select distinct
customer_city, customer_state
from `target_scaler.customers`
```




## Q 2 In-depth Exploration:

**Q-2.1Is there a growing trend in the no. of orders placed over the past years? Can we see some kind of monthly seasonality in terms of the no. of orders being placed?**

```
select year, month, cnt
from
(select
extract(year from order_purchase_timestamp) as year,
extract(month from order_purchase_timestamp) as month,
count(order_id) as cnt
from `target_scaler.orders`
group by extract(year from order_purchase_timestamp),
         extract(month from order_purchase_timestamp)
) T
order by year, month;
```




## INFERENCE:

-> So from the above insights it is very noticeble that the trend for the number of orders being placed is on rise beside the months of sept. , oct. , Dec , a considerable dip in orders is seen from oct to dec

## RECOMMENDATION:

-> since the peoples of brazil are showing interest in e-commerce , target should try to diversify their products portfolio more and more, ensuring that the person of every age group comming over the website cannot go empty handed. apart from it they should move on with such tricks and ideas which ensures that count of product being ordered should always be more than the previous month, because it can be seen that the increase in orders is not that much consistent, they can move on by providing extra discount on every last sunday of the month and using social media to advertise that offers so that maximum amount of traffic can be cattered , stock clearance sales can also be organised in the months in which the sales are lowest i.e in the last quarter of the year.

## Q-2.2During what time of the day, do the Brazilian customers mostly place their orders? (Dawn, Morning, Afternoon or Night)

```
select count(distinct order_id) as order_count, classification_of_day
from
(select order_id,
CASE
when extract(hour from order_purchase_timestamp) >= 5 and extract(hour from
order_purchase_timestamp) <= 7 then "DAWN"
when extract(hour from order_purchase_timestamp) >= 7 and extract(hour from
order_purchase_timestamp) <= 12 then "MORNING"
when extract(hour from order_purchase_timestamp) >= 12 and extract(hour from
order_purchase_timestamp) <= 17 then "AFTERNOON"
ELSE "NIGHT"
END as classification_of_day
from `target_scaler.orders`)
group by classification_of_day
order by count(distinct order_id);
```

Query results

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXECUTION GRA

| Row | order_count | classification_of_day |
|---|---|---|
| 1 | 1921 | DAWN |
| 2 | 26502 | MORNING |
| 3 | 32366 | AFTERNOON |
| 4 | 38652 | NIGHT |

**INFERENCE:**

-> it can be seen that night is the most preferred time for shopping in brazil followed by afternoon , morning and dawn

**RECOMMENDATION:**

-> since the brazilians visiting the e-commerce stores is more in the night we can try to encash this time to go for more and more advertising of the products we want to make live in the future, and try to gain feedback from the peoples of different age group regarding their needs and their recommendations about that product

Apart from it we have to keep a close eye upon the products being purchased at that time by the peoples of different age and ensuring their availability is must since the traffic is more we can try to understand the purchasing habits of the customers and implementing those insights to increase the overall sales throughout the day

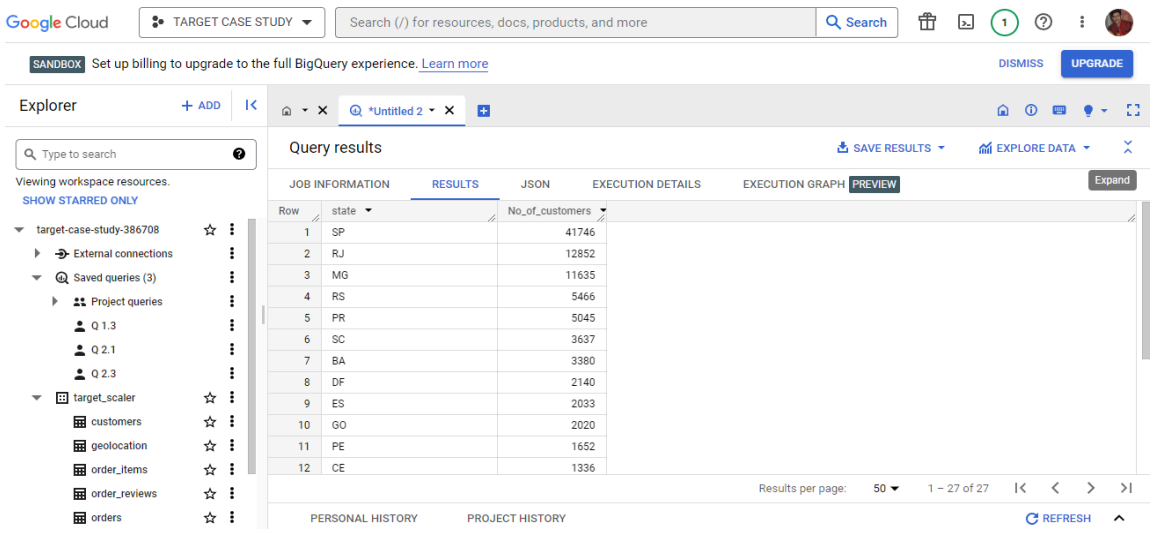
## Q-3 Evolution of E-commerce orders in the Brazil region:

### Q-3.1Get the month on month no. of orders placed in each state.

```
select
year, month, count(order_id)
from
(select
extract(month from o.order_purchase_timestamp) as month,
extract(year from o.order_purchase_timestamp) as year,
count(order_id) as cnt
from `target_scaler.orders` as o inner join `target_scaler.customers` as c
on o.customer_id = c.customer_id)
```

### Q-3.2How are the customers distributed across all the states?

```
select customer_state as state , count(customer_id) as No_of_customers
from `target_scaler.customers`
group by customer_state
order by No_of_customers desc
```




**INFERENCE:**

**-> From the above result it is clear that the state “SP” have the most number of customers**

**RECOMMENDATION:**

-> I would firstly recommend that the target must conduct a detailed study on the state "SP" and try to understand the positive behavior of their customers in that state and what is compelling them to purchase from the target and what more improvements can be done in it, and those insights from the state SP can be tried to get adjusted in other states as well to boost the sales

Apart from it we should also analyze the age group of the customers buying the most number of products and ensure that the strategies and product portfolio that is compelling them for the purchase, if can be used in other groups as well

Q4- Impact on Economy: Analyze the money movement by e-commerce by looking at order prices, freight and others.

Q4.1 Get the % increase in the cost of orders from year 2017 to 2018 (include months between Jan to Aug only).

You can use the "payment_value" column in the payments table to get the cost of orders.

```sql
with money_move_analysis as
(select p.payment_value,
extract(month from o.order_purchase_timestamp) as month,
extract(year from o.order_purchase_timestamp) as year
from `target_scaler.payments` as p inner join `target_scaler.orders` as o
on p.order_id = o.order_id),
monthly_purchase as
(select year, month, count(payment_value) as No_of_orders,
avg(payment_value) as cost from money_move_analysis
group by year, month
having month <= 8 and year between 2017 and 2018)
select
a.month, a.year, b.year, a.cost, b.cost, a.No_of_orders, b.No_of_orders,
((b.cost-a.cost)/a.cost)*100 as percentage_change
from monthly_purchase a inner join monthly_purchase b
on a.month = b.month and a.year <> b.year
order by a.year,a.month
limit 10
```

Query results

SAVE RESULTS | EXPLORE DATA

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXECUTION GRAPH

Expand

| Row | | year | year_1 | cost | cost_1 | No_of_orders | No_of_orders_1 | percentage_change |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2017 | 2018 | 162.9271058823... | 147.4288218960... | 850 | 7563 | -9.51240366196... |
| 2 | 2 | 2017 | 2018 | 154.7762513255... | 142.7593987341... | 1886 | 6952 | -7.76401578954... |
| 3 | 3 | 2017 | 2018 | 158.57017976736 | 154.3732854100... | 2837 | 7512 | -2.64671097901... |
| 4 | 4 | 2017 | 2018 | 162.5002061454... | 161.0189318906... | 2571 | 7209 | -0.91155223117... |
| 5 | 5 | 2017 | 2018 | 150.3343864097... | 161.7354099509... | 3944 | 7135 | 7.583776282650... |
| 6 | 6 | 2017 | 2018 | 148.7998777648... | 159.5077893752... | 3436 | 6419 | 7.196183069029... |
| 7 | 7 | 2017 | 2018 | 137.2209682649... | 163.9066774243... | 4317 | 6507 | 19.44725321262... |
| 8 | 8 | 2017 | 2018 | 148.2189714285... | 152.6463601074... | 4550 | 6698 | 2.987059373204... |
| 9 | 1 | 2018 | 2017 | 147.4288218960... | 162.9271058823... | 7563 | 850 | 10.51238406911... |
| 10 | 2 | 2018 | 2017 | 142.7593987341... | 154.7762513255... | 6952 | 1886 | 8.417556180490... |

## INFERENCE:

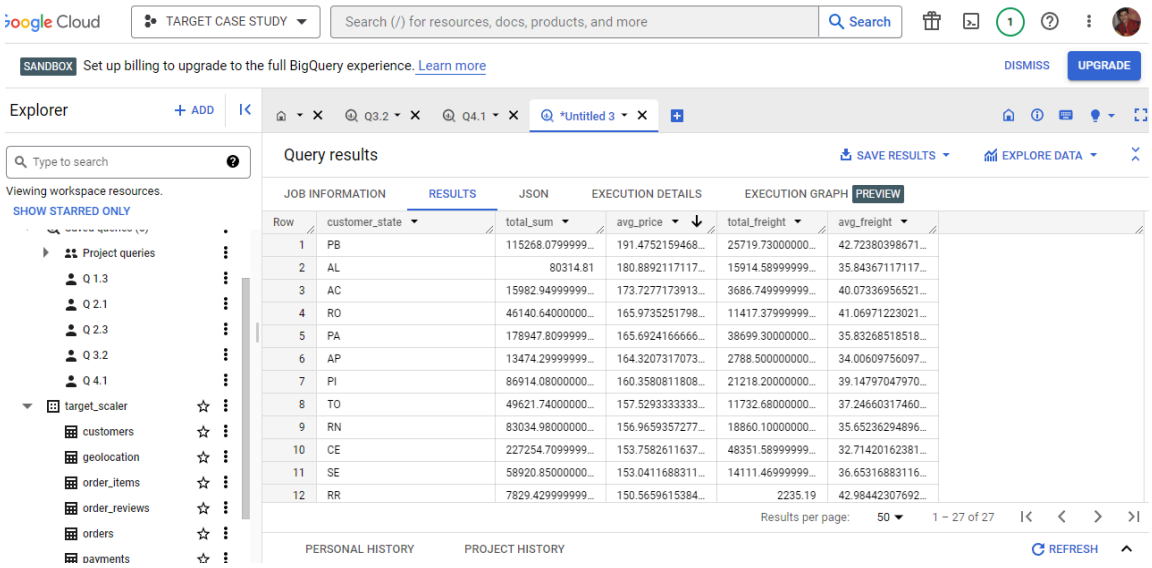
-> so from the above result it can be derived that the there is a negative change in the cost of orders from JAN to APR , slightly showing a positive trend afterwords

## RECOMMENDATION:

-> it can be seen that when the cost of orders decreased from 2017 to 2018 for the first 4 months , the sales boost and a drastic change in the number of orders being placed can be noticed same trend continues but not with that pace , so target can look after giving quarterly heavy discount sales it will help in two ways , firstly in those sales they can clear off their obsolete stock or the one which is going to be out of market soon secondly these quarterly sales will start making the customer loyal for target because we will be giving the product which will be value for money in those sales ensuring that the quality of the product is not hampered.

## Q4.2 Calculate the Total & Average value of order price for each state. And also Calculate the Total & Average value of order freight for each state.

```
select customer_state,
sum(price) as total_sum, avg(price) as avg_price,
sum(freight_value) as total_freight, avg(freight_value) as avg_freight
from `target_scaler.order_items` as o inner join `target_scaler.orders` as o1
on o.order_id = o1.order_id
inner join `target_scaler.customers` as c
on o1.customer_id = c.customer_id
group by customer_state
```




**INFERENCE:**

**-> from the above result we get the information about the top 5 states in terms of order cost and its freight**

**RECOMMENDATION:**

**-> Since we know our top 5 best performing states and it shows that the customers are picking the products from the target in those states, we can move on with minute increase in overall price of the product in these states and using that increased margin to reduce the cost in the next five states , target can also think of creating a benchmark of the price and according to that benchmark the low performing states will be given discounts.**

**Q5-Analysis based on sales, freight and delivery time.**

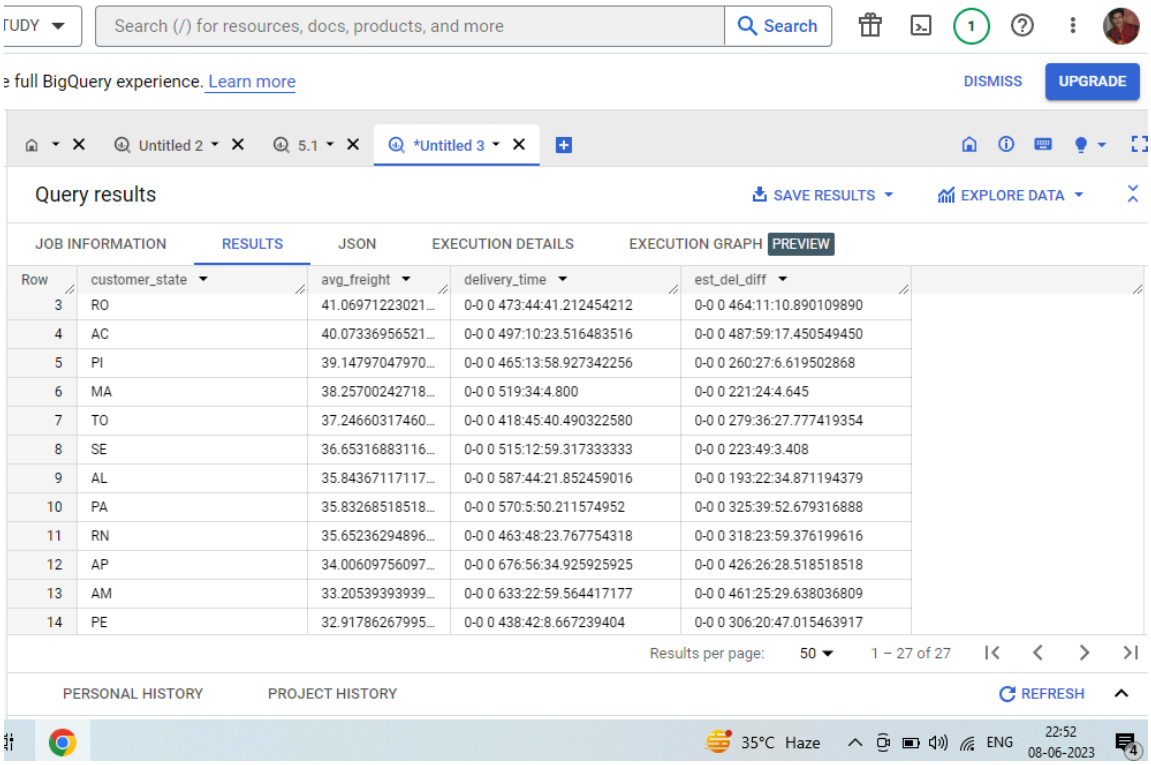
**Q 5.1Find the no. of days taken to deliver each order from the order's purchase date as delivery time.**

**Also, calculate the difference (in days) between the estimated & actual delivery date of an order.**

**Do this in a single query.**

```
select
c.customer_state, avg(freight_value) as avg_freight,
```

```
        avg(order_delivered_customer_date - order_purchase_timestamp) as delivery_time,
        avg(order_estimated_delivery_date - order_delivered_customer_date) as
est_del_diff
        from `target_scaler.customers` as c inner join `target_scaler.orders`as o
        on c.customer_id = o.customer_id
        inner join `target_scaler.order_items` as oi
        on oi.order_id = o.order_id
        group by c.customer_state
        order by avg_freight desc;
```




## INFERENCE:

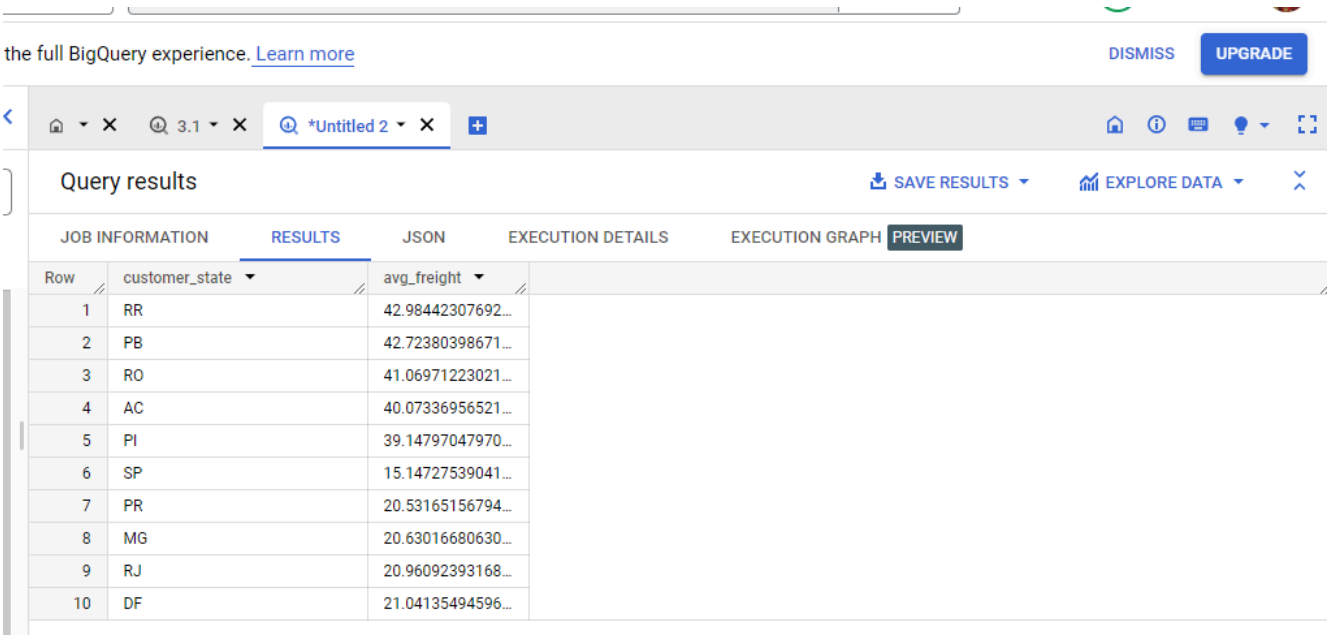
-> insights are self explanatory here

## RECOMMENDATION:

-> the best thing target can do is to remain committed to there delivery date ensuring that there are no unnecessary delays, this will frustrate the customer and will definitely refrain them from further orders, target should find the loop holes which are leading to these delays and try to solve them accordingly

## Q5.2 Find out the top 5 states with the highest & lowest average freight value.

```
(select c.customer_state, avg(freight_value) as avg_freight
from `target_scaler.orders` as o inner join `target_scaler.order_items` as oi
on o.order_id = oi.order_id
inner join `target_scaler.customers` as c
on o.customer_id = c.customer_id
group by c.customer_state
order by avg_freight desc
limit 5)
union all
(select c.customer_state, avg(freight_value) as avg_freight
from `target_scaler.orders` as o inner join `target_scaler.order_items` as oi
on o.order_id = oi.order_id
inner join `target_scaler.customers` as c
on o.customer_id = c.customer_id
group by c.customer_state
order by avg_freight asc
limit 5)
```




| Row | customer_state | avg_freight |
|---|---|---|
| 1 | RR | 42.98442307692... |
| 2 | PB | 42.72380398671... |
| 3 | RO | 41.06971223021... |
| 4 | AC | 40.07336956521... |
| 5 | PI | 39.14797047970... |
| 6 | SP | 15.14727539041... |
| 7 | PR | 20.53165156794... |
| 8 | MG | 20.63016680630... |
| 9 | RJ | 20.96092393168... |
| 10 | DF | 21.04135494596... |

**INFERENCE:**

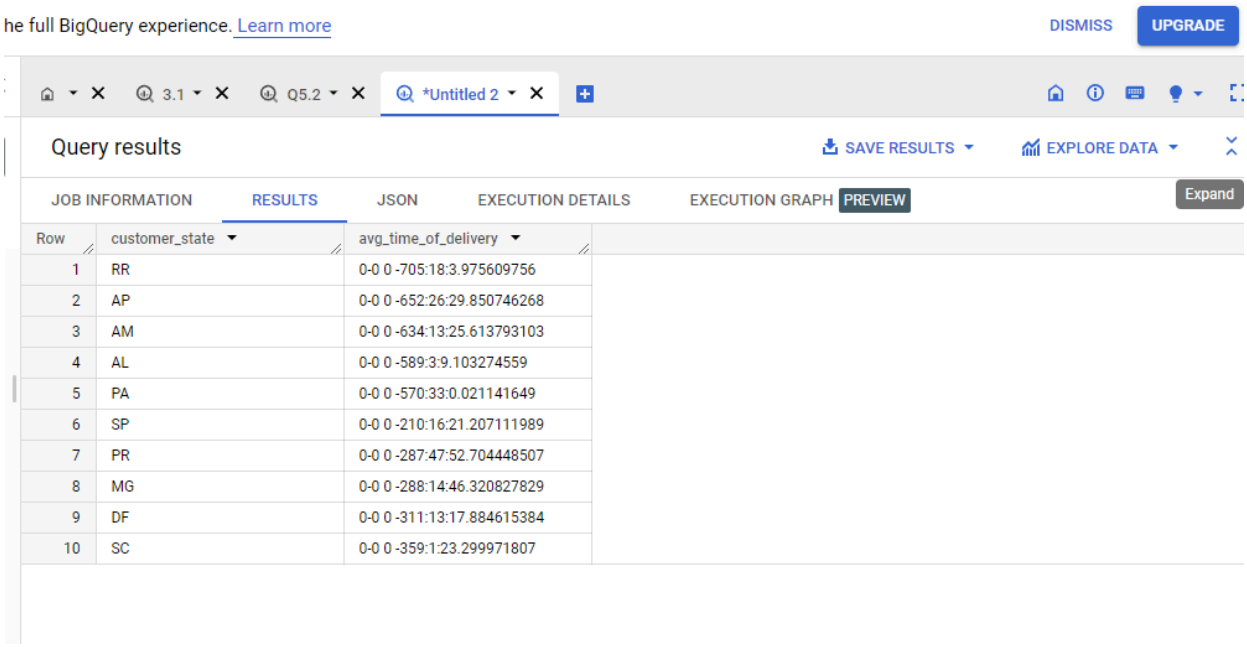
-> from the above result we can see the average freight value from the top 5 states to the lowest 5 states

**RECOMMENDATIONS:**

**-> target should do something to keep the freight cost uniform one way to do soo is by setting up its warehouses in the states with higher freight costs so that the cost may go down to some extent, also they can try to source the suppliers in each city of the state which will ensure fast and cost effective delivery**

**Q5.3 Find out the top 5 states with the highest & lowest average delivery time.**

```
(select c.customer_state, avg(order_purchase_timestamp -
order_delivered_customer_date) as avg_time_of_delivery
from `target_scaler.orders` as o inner join `target_scaler.customers` as c
on o.customer_id = c.customer_id
group by c.customer_state
order by avg_time_of_delivery asc
limit 5)
union all
(select c.customer_state, avg(order_purchase_timestamp -
order_delivered_customer_date) as avg_time_of_delivery
from `target_scaler.orders` as o inner join `target_scaler.customers` as c
on o.customer_id = c.customer_id
group by c.customer_state
order by avg_time_of_delivery desc
limit 5)
```




| Row | customer_state | avg_time_of_delivery |
|---|---|---|
| 1 | RR | 0-0 0 -705:18:3.975609756 |
| 2 | AP | 0-0 0 -652:26:29.850746268 |
| 3 | AM | 0-0 0 -634:13:25.613793103 |
| 4 | AL | 0-0 0 -589:3:9.103274559 |
| 5 | PA | 0-0 0 -570:33:0.021141649 |
| 6 | SP | 0-0 0 -210:16:21.207111989 |
| 7 | PR | 0-0 0 -287:47:52.704448507 |
| 8 | MG | 0-0 0 -288:14:46.320827829 |
| 9 | DF | 0-0 0 -311:13:17.884615384 |
| 10 | SC | 0-0 0 -359:1:23.299971807 |

**INFERENCE:**

**-> insights are self explanatory here**

**RECOMMENDATION:**

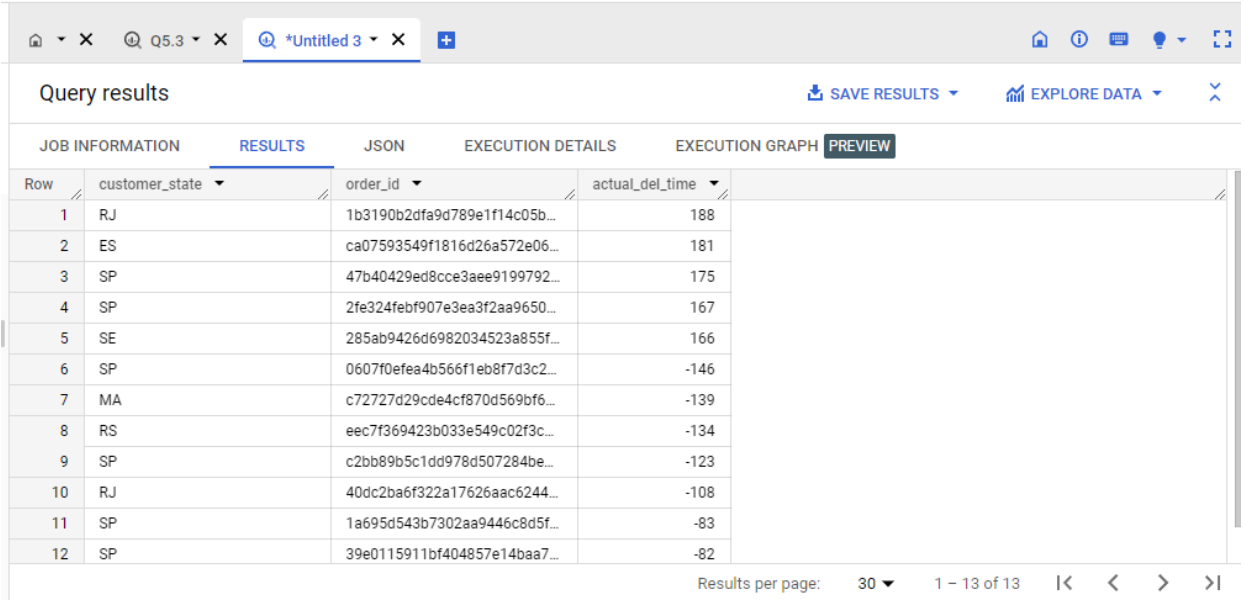
**-> Target should primarily focus on the states with the highest delivery time , this will surely gonna be affecting their sales, we can use the same approach here as well i.e setting up the local suppliers or warehouses in the states only , ,ensuring fast and cost effective delivery.**

**Q5.4 Find out the top 5 states where the order delivery is really fast as compared to the estimated date of delivery.**

```
(select c.customer_state, o.order_id,
date_diff(order_delivered_customer_date, order_estimated_delivery_date, day) as
actual_del_time
from `target_scaler.orders` as o inner join `target_scaler.customers` as c
on o.customer_id = c.customer_id
where order_delivered_customer_date is not null and order_estimated_delivery_date is
not null
order by actual_del_time desc
limit 5)
```

```
union all

(select c.customer_state, o.order_id,
date_diff(order_delivered_customer_date, order_estimated_delivery_date, day) as
actual_del_time
from `target_scaler.orders` as o inner join `target_scaler.customers` as c
on o.customer_id = c.customer_id
where order_delivered_customer_date is not null and order_estimated_delivery_date is
not null
order by actual_del_time
limit 8)
```




| Row | customer_state | order_id | actual_del_time |
|---|---|---|---|
| 1 | RJ | 1b3190b2dfa9d789e1f14c05b... | 188 |
| 2 | ES | ca07593549f1816d26a572e06... | 181 |
| 3 | SP | 47b40429ed8cce3aee9199792... | 175 |
| 4 | SP | 2fe324febf907e3ea3f2aa9650... | 167 |
| 5 | SE | 285ab9426d6982034523a855f... | 166 |
| 6 | SP | 0607f0efea4b566f1eb8f7d3c2... | -146 |
| 7 | MA | c72727d29cde4cf870d569bf6... | -139 |
| 8 | RS | eec7f369423b033e549c02f3c... | -134 |
| 9 | SP | c2bb89b5c1dd978d507284be... | -123 |
| 10 | RJ | 40dc2ba6f322a17626aac6244... | -108 |
| 11 | SP | 1a695d543b7302aa9446c8d5f... | -83 |
| 12 | SP | 39e0115911bf404857e14baa7... | -82 |



**INFERENCE:**

-> insights can be gained directly from the query

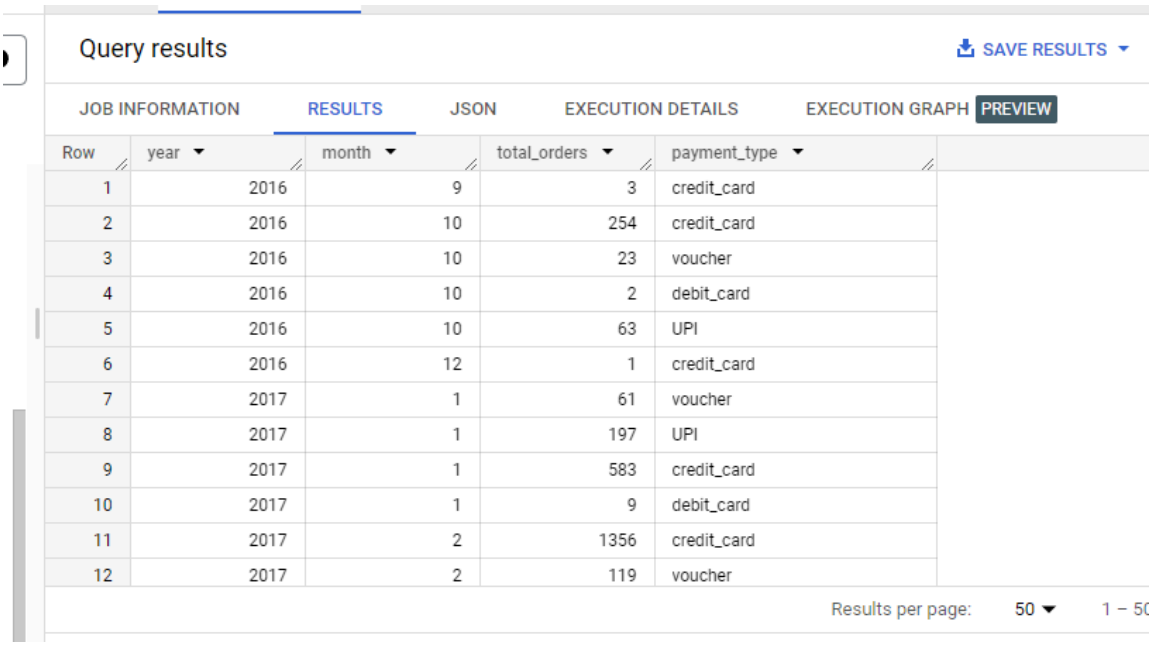
**RECOMMENDATIONS:**

-> target should try to gain insights from the states in which the order delivery is the fastest and try to implement the same in the other states as well this will ensure that at least the order will be delivered on time

## Q6-Analysis based on the payments:

### Q6.1 Find the month on month no. of orders placed using different payment types.

```sql
(select
extract(year from o.order_purchase_timestamp) as year,
extract(month from o.order_purchase_timestamp) as month,
count(o.order_id) as total_orders,
p.payment_type
from `target_scaler.orders` as o inner join `target_scaler.payments` as p
on o.order_id = p.order_id
group by year,month,p.payment_type
order by year, month)
```



Query results

SAVE RESULTS

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXECUTION GRAPH | PREVIEW

| Row | year | month | total_orders | payment_type |
|---|---|---|---|---|
| 1 | 2016 | 9 | 3 | credit_card |
| 2 | 2016 | 10 | 254 | credit_card |
| 3 | 2016 | 10 | 23 | voucher |
| 4 | 2016 | 10 | 2 | debit_card |
| 5 | 2016 | 10 | 63 | UPI |
| 6 | 2016 | 12 | 1 | credit_card |
| 7 | 2017 | 1 | 61 | voucher |
| 8 | 2017 | 1 | 197 | UPI |
| 9 | 2017 | 1 | 583 | credit_card |
| 10 | 2017 | 1 | 9 | debit_card |
| 11 | 2017 | 2 | 1356 | credit_card |
| 12 | 2017 | 2 | 119 | voucher |

Results per page: 50 1 – 5(

## INFERENCE:

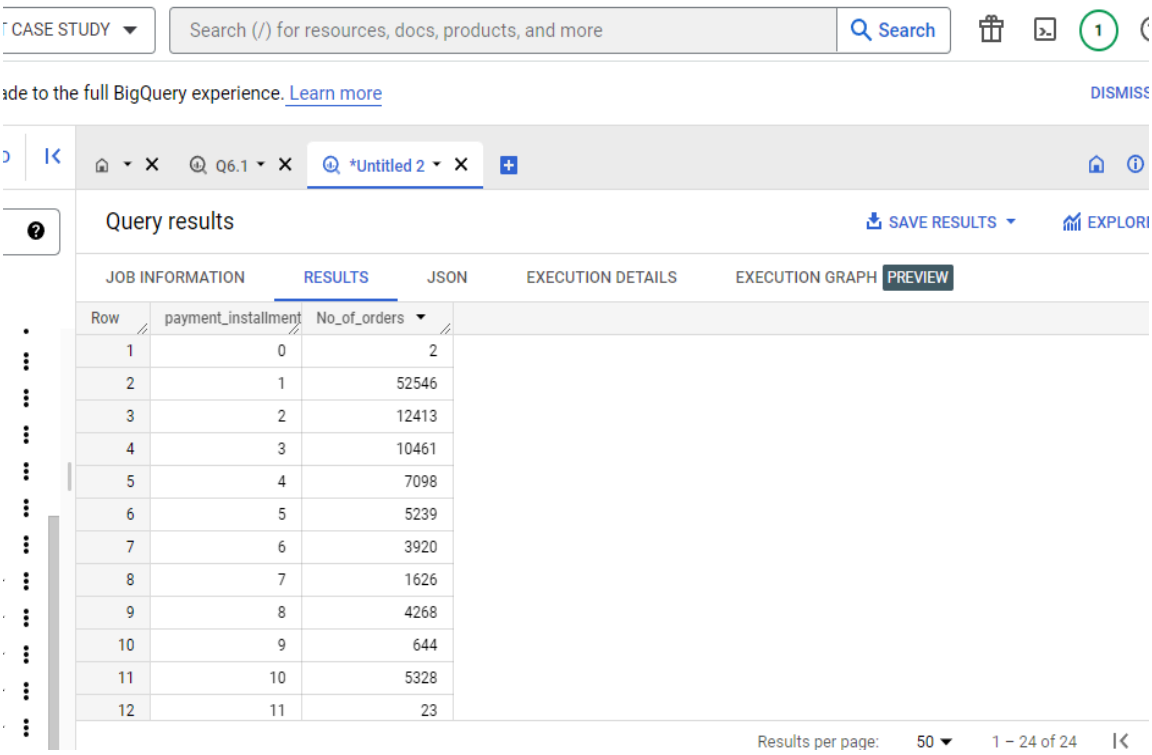
-> from the above results credit cards are the most preferred payment options

## RECOMMENDATION:

-> Since credit card is the most preferred payment options, target should tie up with various credit card companies and come with the options in which more discount can be given to the customers based on the credit card they are using, it will be a win win situation for both of the credit card companies and target, if the sale from a particular credit card is good enough target can even move on with a profit sharing model with that credit card company , periodic offers can also be given to the vouchers and UPI using customers.

**Q6.2 Find the no. of orders placed on the basis of the payment installments that have been paid.**

```
select p.payment_installments, count(o.order_id) as No_of_orders
from `target_scaler.orders` as o inner join `target_scaler.payments` as p
on o.order_id = p.order_id
group by p.payment_installments
order by p.payment_installments
```




**INFERENCE:**

**-> maximum number of orders are fully paid in 1st installment only**

**RECOMMENDATION:**

**-> one of the good sign for target is that in most of the orders its payment is not floating in the market it shows that the cash flow is going alright, most of the orders being placed are paid off in the first installment only but it also depends upon the cist of the orders, it might be possible that those orders are of lower value then others hence to increase the cash flow in the high tickets orders market as well**

target can try to give its customers some extra discount if they are willing to pay in one go.