Overview

BigQuery is Google's fully managed, NoOps, low cost analytics database. With BigQuery you can query terabytes and terabytes of data without having any infrastructure to manage or needing a database administrator. BigQuery uses SQL and can take advantage of the pay-as-you-go model. BigQuery allows you to focus on analyzing data to find meaningful insights.

The dataset you'll use is an ecommerce dataset that has millions of Google Analytics records for the Google Merchandise Store loaded into BigQuery. You have a copy of that dataset for this lab and will explore the available fields and row for insights.

In this lab you will learn how to create new permanent reporting tables and logical reviews from an existing ecommerce dataset.

Setup and requirements

Before you click the Start Lab button

Read these instructions. Labs are timed and you cannot pause them. The timer, which starts when you click **Start Lab**, shows how long Google Cloud resources will be made available to you.

This hands-on lab lets you do the lab activities yourself in a real cloud environment, not in a simulation or demo environment. It does so by giving you new, temporary credentials that you use to sign in and access Google Cloud for the duration of the lab.

To complete this lab, you need:

- Access to a standard internet browser (Chrome browser recommended).

> **Note:** Use an Incognito or private browser window to run this lab. This prevents any conflicts between your personal account and the Student account, which may cause extra charges incurred to your personal account.

- Time to complete the lab---remember, once you start, you cannot pause a lab.

> **Note:** If you already have your own personal Google Cloud account or project, do not use it for this lab to avoid extra charges to your account.

How to start your lab and sign in to the Google Cloud console

1. Click the **Start Lab** button. If you need to pay for the lab, a pop-up opens for you to select your payment method. On the left is the **Lab Details** panel with the following:

    - The **Open Google Cloud console** button
    - Time remaining
    - The temporary credentials that you must use for this lab
    - Other information, if needed, to step through this lab

2. Click **Open Google Cloud console** (or right-click and select **Open Link in Incognito Window** if you are running the Chrome browser).

    The lab spins up resources, and then opens another tab that shows the **Sign in** page.

    Tip: Arrange the tabs in separate windows, side-by-side.

    > **Note:** If you see the **Choose an account** dialog, click **Use Another Account**.

3. If necessary, copy the **Username** below and paste it into the **Sign in** dialog.

```
"Username"
```

content_c

You can also find the **Username** in the **Lab Details** panel.

4. Click **Next**.

5. Copy the **Password** below and paste it into the **Welcome** dialog.

```
"Password"
```

content_c

You can also find the **Password** in the **Lab Details** panel.

6. Click **Next**.

> **Important:** You must use the credentials the lab provides you. Do not use your Google Cloud account credentials.

> **Note:** Using your own Google Cloud account for this lab may incur extra charges.

7. Click through the subsequent pages:

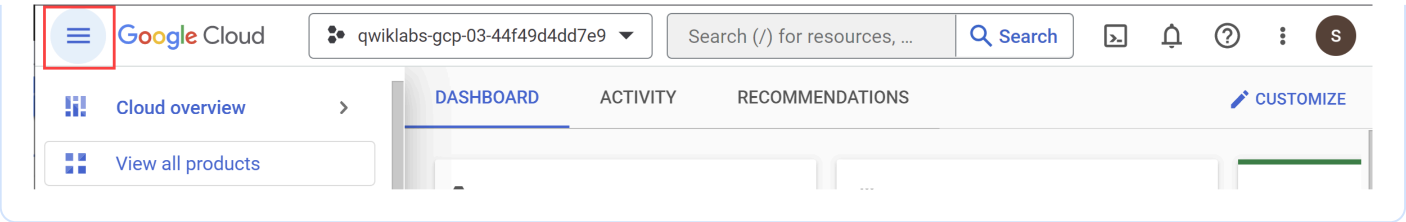
   - Accept the terms and conditions.

   - Do not add recovery options or two-factor authentication (because this is a temporary account).

   - Do not sign up for free trials.

After a few moments, the Google Cloud console opens in this tab.

> **Note:** To view a menu with a list of Google Cloud products and services, click the **Navigation menu** at the top-left.



Open the BigQuery console

1. In the Google Cloud Console, select **Navigation menu** > **BigQuery**.

The **Welcome to BigQuery in the Cloud Console** message box opens. This message box provides a link to the quickstart guide and the release notes.

2. Click **Done**.

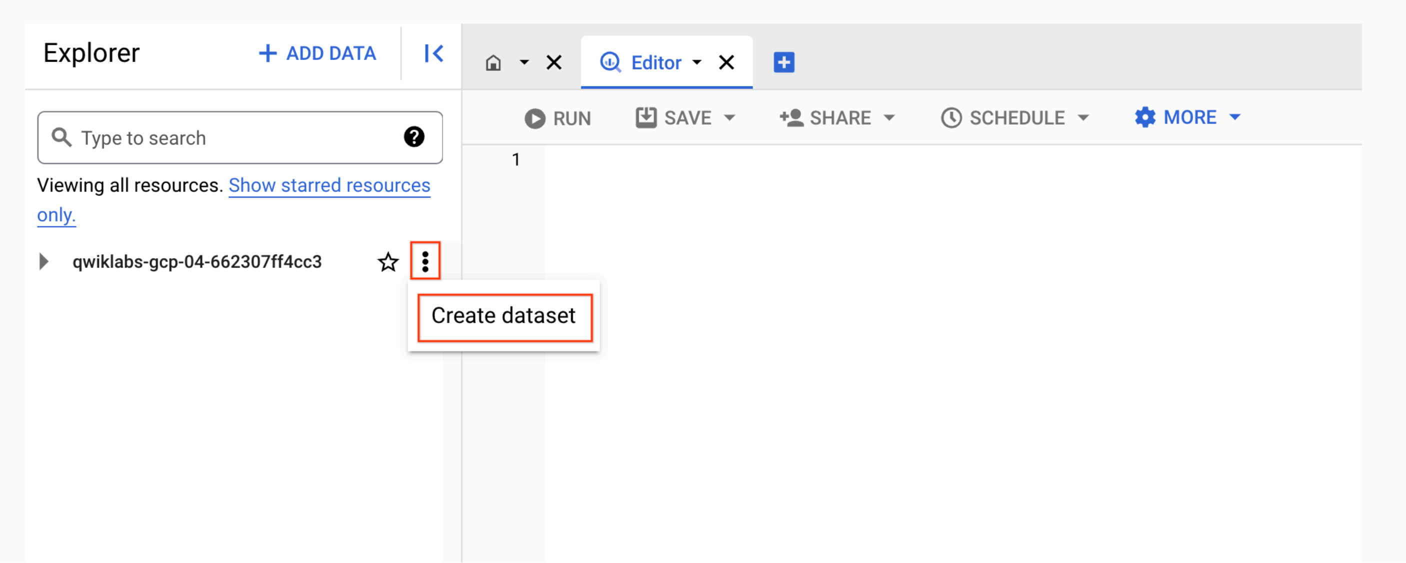
The BigQuery console opens.

Task 1. Create a new dataset to store the tables

1. In BigQuery, click on the **View actions** icon next to your project ID and select **Create dataset**.

2. Set the *Dataset ID* to **ecommerce** and leave the other options at their default values (Data Location, Default table Expiration).

3. Click **CREATE DATASET**.


Explorer
+ ADD DATA
Editor
RUN
SAVE
SHARE
SCHEDULE
MORE
Type to search
Viewing all resources. Show starred resources only.
qwiklabs-gcp-04-662307ff4cc3
Create dataset

Click *Check my progress* to verify the objective.

○

Create a new dataset to store the tables

Check my progress

Task 2. Troubleshooting CREATE TABLE statements

Your data analyst team has provided you with the below query statements designed to create a permanent table in your new ecommerce dataset. Unfortunately they're not working properly.

Diagnose why each of the queries is broken and offer a solution.

Rules for creating tables with SQL in BigQuery

Read through these create table rules which you will use as your guide when fixing broken queries:

- Either the specified **column list** or inferred columns from a **query_statement** (or both) must be present.
- When both the column list and the as **query_statement** clause are present, BigQuery ignores the names in the as **query_statement** clause and matches the columns with the column list by position.
- When the as **query_statement** clause is present and the column list is absent, BigQuery determines the column names and types from the as **query_statement** clause.
- Column names must be specified either through the column list or as **query_statement** clause.
- Duplicate column names are not allowed.

Query 1: Columns, columns, columns

- Add this query in the BigQuery **Editor**, then **Run** the query, diagnose the error, and answer the questions that follow:

```
#standardSQL

# copy one day of ecommerce data to explore
CREATE OR REPLACE TABLE ecommerce.all_sessions_raw_20170801
 OPTIONS(
   description="Raw data from analyst team into our dataset for
08/01/2017"
 ) AS
 SELECT fullVisitorId, * FROM `data-to-
insights.ecommerce.all_sessions_raw`
 WHERE date = '20170801'  #56,989 records
;
```

```
Error: CREATE TABLE has columns with duplicate name fullVisitorId at [7:2]
```

Which one of the create table rules is violated in the above query?

○

What is wrong with the previous query which lists products?

○ Rule #1 both the specified names and the query statement are present

○ Rule #5 duplicate column names are not allowed

○ Rule #2 the query statement names are ignored

Submit

Query 2: Columns revisited

- Add this query in the BigQuery **Editor**, then **Run** the query, diagnose the error, and answer the questions that follow:

content_c

```
#standardSQL

# copy one day of ecommerce data to explore
CREATE OR REPLACE TABLE ecommerce.all_sessions_raw_20170801
#schema
(
  fullVisitorId STRING OPTIONS(description="Unique visitor ID"),
  channelGrouping STRING OPTIONS(description="Channel e.g. Direct,
Organic, Referral...")
)
 OPTIONS(
   description="Raw data from analyst team into our dataset for
08/01/2017"
 ) AS
 SELECT * FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE date = '20170801'  #56,989 records
;
```

```
Error: The number of columns in the column definition list does not match the number
of columns produced by the query at [5:1]
```

Which one of the create table rules is violated in the above query?

○

What is wrong with the previous query which lists products?

○ Rule #1 both the specified names and the query statement are present

○ Rule #4 Column names must be specified either through the column list or as query_statement clause

○ Rule #2 the query statement names are ignored

○ Rule #5 duplicate column names are not allowed

Submit

Note: You cannot specify a schema of fields for a new table which does not match the number of columns returned by the query statement. In the above a two column schema was specified with `fullVisitorId` and `channelGrouping` but in the query statement all columns returned (*) was specified.

Query 3: It's valid! Or is it?

- Add this query in the BigQuery **Editor**, then **Run** the query, diagnose the error, and answer the questions that follow:

content_c

```
#standardSQL

# copy one day of ecommerce data to explore
CREATE OR REPLACE TABLE ecommerce.all_sessions_raw_20170801
#schema
(
  fullVisitorId STRING OPTIONS(description="Unique visitor ID"),
  channelGrouping STRING OPTIONS(description="Channel e.g. Direct,
Organic, Referral...")
)
 OPTIONS(
   description="Raw data from analyst team into our dataset for
08/01/2017"
 ) AS
 SELECT fullVisitorId, city FROM `data-to-
insights.ecommerce.all_sessions_raw`
 WHERE date = '20170801'  #56,989 records
;
```

```
Valid: This query will process 1.1 GiB when run.
```

○

Why is this valid query above not a good idea to run??

○ The channelGrouping should not be a STRING

○ Duplicate column names in the query statement

○ Although the number of columns match between the schema definition and the query statement, the actual column retrieved from the query statement for the channelGrouping column is not channelGrouping but rather the visitors city.

Submit

Remember **Rule #2**: when both the column list and the `as` query_statement clause are present, BigQuery ignores the names in the `as` query_statement clause and matches the columns with the column list by position.

Click *Check my progress* to verify the objective.

○

Create a table

Check my progress

Query 4: The gatekeeper

- Run the below query in the BigQuery **Editor**, then diagnose the error and answer the questions that follow:

content_c

```
#standardSQL

# copy one day of ecommerce data to explore
CREATE OR REPLACE TABLE ecommerce.all_sessions_raw_20170801
```

```
#schema
(
  fullVisitorId STRING NOT NULL OPTIONS(description="Unique visitor
ID"),
  channelGrouping STRING NOT NULL OPTIONS(description="Channel e.g.
Direct, Organic, Referral..."),
  totalTransactionRevenue INT64 NOT NULL OPTIONS(description="Revenue
* 10^6 for the transaction")
)
 OPTIONS(
   description="Raw data from analyst team into our dataset for
08/01/2017"
 ) AS
 SELECT fullVisitorId, channelGrouping, totalTransactionRevenue FROM
`data-to-insights.ecommerce.all_sessions_raw`
 WHERE date = '20170801'  #56,989 records
;
```

```
Valid: This query will process 907.52 MiB when run.
```

What happens after you execute the above valid query? What would you change to prevent this?

○ The query will fail. You need to specify fullVisitorId as nullable (NULL) to account for private browsing (e.g. Incognito)

○ The query will fail. Change the data type for totalTransactionRevenue to be STRING to account for special characters

○ The query will execute successfully.

○ The query will fail. You need to specify totalTransactionRevenue as nullable (NULL) since not all visitors will buy

Submit

Fix and re-run the modified query to confirm it executes successfully.

Query 5: Working as intended

1. Run this query in the BigQuery **Editor**, and answer the questions that follow:

content_c

```
#standardSQL

# copy one day of ecommerce data to explore
CREATE OR REPLACE TABLE ecommerce.all_sessions_raw_20170801
#schema
(
  fullVisitorId STRING NOT NULL OPTIONS(description="Unique visitor
ID"),
  channelGrouping STRING NOT NULL OPTIONS(description="Channel e.g.
Direct, Organic, Referral..."),
  totalTransactionRevenue INT64 OPTIONS(description="Revenue * 10^6
for the transaction")
)
 OPTIONS(
   description="Raw data from analyst team into our dataset for
08/01/2017"
 ) AS
 SELECT fullVisitorId, channelGrouping, totalTransactionRevenue FROM
`data-to-insights.ecommerce.all_sessions_raw`
 WHERE date = '20170801'  #56,989 records
;
```

2. Browse your **ecommerce** dataset panel to confirm the `all_sessions_raw_(1)` is present.

Why is the full table name not showing?

Answer: The table suffix 20170801 is automatically partitioned by day. If we created more tables for other days, the `all_sessions_raw_(N)` would increment by N distinct days of data. There is another lab that explores different ways of partitioning your data tables.

○

What are the key benefits to formally defining a table schema as opposed to relying on your query statement for the field names and data types?

□ You can specify field descriptions.

□ You can specify REQUIRED fields (NOT NULL)

□ You may not have any existing data yet to populate the table with inferred field names in a query statement

□ You can specify expected data types (rather than rely on inference)

Submit

Click *Check my progress* to verify the objective.

○

Working as intended

Check my progress

Query 6: Your turn to practice

Goal: In the Query Editor, create a new permanent table that stores all the transactions with revenue for August 1st, 2017.

Use the below rules as a guide:

- Create a new table in your ecommerce dataset titled **revenue_transactions_20170801**. Replace the table if it already exists.
- Source your raw data from the **data-to-insights.ecommerce.all_sessions_raw table**.
- Divide the revenue field by **1,000,000** and store it as a **FLOAT64** instead of an **INTEGER**.
- Only include transactions with revenue in your final table (hint: use a WHERE clause).
- Only include transactions on 20170801.
- Include these fields:
    - fullVisitorId as a REQUIRED string field.
    - visitId as a REQUIRED string field (hint: you will need to type convert).
    - channelGrouping as a REQUIRED string field.
    - totalTransactionRevenue as a FLOAT64 field.

- Add short descriptions for the above four fields by referring to the schema.
- Be sure to deduplicate records that have the same `fullVisitorId` and `visitId` (hint: use DISTINCT).

1. Write the answer to the above prompt in BigQuery and compare it to the answer below.

Possible Answer:

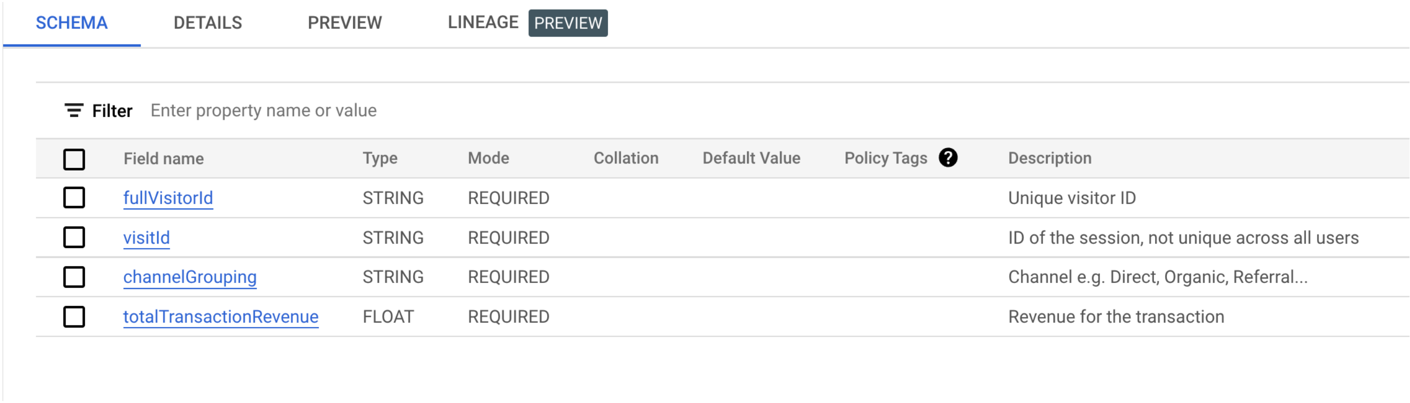
content_c

```
#standardSQL

# copy one day of ecommerce data to explore
CREATE OR REPLACE TABLE ecommerce.revenue_transactions_20170801
#schema
(
  fullVisitorId STRING NOT NULL OPTIONS(description="Unique visitor
ID"),
  visitId STRING NOT NULL OPTIONS(description="ID of the session, not
unique across all users"),
  channelGrouping STRING NOT NULL OPTIONS(description="Channel e.g.
Direct, Organic, Referral..."),
  totalTransactionRevenue FLOAT64 NOT NULL
OPTIONS(description="Revenue for the transaction")
)
 OPTIONS(
   description="Revenue transactions for 08/01/2017"
 ) AS
 SELECT DISTINCT
  fullVisitorId,
  CAST(visitId AS STRING) AS visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE date = '20170801'
      AND totalTransactionRevenue IS NOT NULL #XX transactions
;
```

2. After successfully running the query, confirm in your **ecommerce** dataset that the new table is present name as **revenue_transactions_20170801** and select it.

3. Confirm the schema against the below example. Note the field types, required, and optional description:



□	Field name	Type	Mode	Collation	Default Value	Policy Tags	Description
□	fullVisitorId	STRING	REQUIRED				Unique visitor ID
□	visitId	STRING	REQUIRED				ID of the session, not unique across all users
□	channelGrouping	STRING	REQUIRED				Channel e.g. Direct, Organic, Referral...
□	totalTransactionRevenue	FLOAT	REQUIRED				Revenue for the transaction

How many transactions are output?

○ 54 transactions

○ 101 transactions

○ 97 transactions

Submit

Handling upstream source data updates

What if the upstream raw data table `data-to-insights.ecommerce.all_sessions_raw` was updated with new transactions for 20170801? Would those be reflected in your `revenue_transactions_20170801` table?

○ Yes, you can specify an option at creation to link a downstream permanent table to a source table

○ No. Once a permanent table is created it only has the data that was originally ingested into it. Any changes to upstream data tables will not be reflected in downstream tables unless those new records are added.

Submit

What are ways to overcome stale data?

There are two ways to overcome stale data in reporting tables:

1. Periodically refresh the permanent tables by re-running queries that insert in new records. This can be done with BigQuery scheduled queries or with a Cloud Dataprep / Cloud Dataflow workflow.

2. Use logical views to re-run a stored query each time the view is selected

In the remainder of this lab you will focus on how to create logical views.

Click *Check my progress* to verify the objective.

○

Create a table

Check my progress

Task 3. Creating views

Views are saved queries that are run each time the view is called. In BigQuery, views are logical and not materialized. Only the query is stored as part of the view -- not the underlying data.

Query the latest 100 transactions

1. Copy and paste the below query and execute it in BigQuery:

content_c

```
#standardSQL
SELECT DISTINCT
  date,
  fullVisitorId,
  CAST(visitId AS STRING) AS visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE totalTransactionRevenue IS NOT NULL
 ORDER BY date DESC # latest transactions
 LIMIT 100
;
```

2. Scan through to filter the results. What was the latest transaction above $2,000?

Answer:

date	fullVisitorId	visitId	channelGrouping	totalTransactionRevenue
20170801	9947542428111966715	1501608078	Referral	2934.61

If new records were added to this public ecommerce dataset, the latest transaction would also update.

3. To save time and enable better organization and collaboration, you can save your common reporting queries as views as demonstrated below:

content_c

```
#standardSQL
CREATE OR REPLACE VIEW ecommerce.vw_latest_transactions
AS
SELECT DISTINCT
  date,
  fullVisitorId,
  CAST(visitId AS STRING) AS visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE totalTransactionRevenue IS NOT NULL
 ORDER BY date DESC # latest transactions
 LIMIT 100
;
```

Note: It is often difficult to know whether or not you are SELECTing from a Table or a View by just looking at the name. A simple convention is to prefix the view name with `vw_` or add a suffix like `_vw` or `_view`.

You can also give your view a description and labels using **OPTIONS**.

4. Copy and paste the below query and execute it in BigQuery:

content_c

```
#standardSQL
CREATE OR REPLACE VIEW ecommerce.vw_latest_transactions
OPTIONS(
  description="latest 100 ecommerce transactions",
  labels=[('report_type','operational')]
)
AS
SELECT DISTINCT
  date,
  fullVisitorId,
  CAST(visitId AS STRING) AS visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE totalTransactionRevenue IS NOT NULL
 ORDER BY date DESC # latest transactions
 LIMIT 100
;
```

5. Find the newly created `vw_latest_transactions` table in your **ecommerce** dataset and select it.

6. Select the **DETAILS** tab.

7. Confirm your view **Description** and **Labels** are properly shown in the BigQuery UI.

You can also view the query that defines the view on the Details page. This is useful for understanding the logic of views you or your team created.

Click *Check my progress* to verify the objective.

○

Create view

Check my progress

8. Now run this query to create a new view:

content_c

```
#standardSQL
# top 50 latest transactions
CREATE VIEW ecommerce.vw_latest_transactions # CREATE
```

```
OPTIONS(
  description="latest 50 ecommerce transactions",
  labels=[('report_type','operational')]
)
AS
SELECT DISTINCT
  date,
  fullVisitorId,
  CAST(visitId AS STRING) AS visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE totalTransactionRevenue IS NOT NULL
 ORDER BY date DESC # latest transactions
 LIMIT 50
;
```

```
Error: Already Exists: Table project-name:ecommerce.vw_latest_transactions
```

You'll likely receive an error if you have already created the view before. Can you see why?

Answer: The view creation statement was updated to simply be CREATE instead of CREATE OR REPLACE which will not let you overwrite existing tables or views if they already exist. A third option, CREATE VIEW IF NOT EXISTS, will allow you to only create if the table or view doesn't exist or else it will skip the creation and not error.

When would you use CREATE VIEW IF NOT EXISTS as opposed to CREATE VIEW?

○ When you want to overwrite an existing view

○ When you want to create a view if it does not already exist but avoid throwing a query error if it does exist and simply skip the creation.

○ When you want to create a new view from a new table

Submit

View creation: Your turn to practice

Scenario: Your anti-fraud team has asked you to create a report that lists the 10 most recent transactions that have an order amount of 1,000 or more for them to review manually.

Task: Create a new view that returns all the most recent 10 transactions with revenue greater than 1,000 on or after January 1st, 2017.

Use these rules as a guide:

- Create a new view in your ecommerce dataset titled "vw_large_transactions". Replace the view if it already exists.

- Give the view a description "large transactions for review".

- Give the view a label [("org_unit", "loss_prevention")].

- Source your raw data from the `data-to-insights.ecommerce.all_sessions_raw` table.

- Divide the revenue field by 1,000,000.

- Only include transactions with revenue greater than or equal to 1,000

- Only include transactions on or after 20170101 ordered by most recent first.

- Only include currencyCode = 'USD'.

- Return these fields:

    - date
    - fullVisitorId
    - visitId
    - channelGrouping
    - totalTransactionRevenue AS revenue
    - currencyCode
    - v2ProductName

- Be sure to deduplicate records (hint: use DISTINCT).

- You try:

```
/*
write the answer to the above prompt in BigQuery and compare it to the
```

content_c

```
answer given below
*/
```

Possible solution:

```
#standardSQL
CREATE OR REPLACE VIEW ecommerce.vw_large_transactions
OPTIONS(
  description="large transactions for review",
  labels=[('org_unit','loss_prevention')]
)
AS
SELECT DISTINCT
  date,
  fullVisitorId,
  visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS revenue,
  currencyCode
  #v2ProductName
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE
  (totalTransactionRevenue / 1000000) > 1000
  AND currencyCode = 'USD'
 ORDER BY date DESC # latest transactions
 LIMIT 10
;
```

content_c

Note that you need to repeat the division in the WHERE clause because you cannot use aliased field names as filters.

How much was the total for the most recent order over $1,000 and who was it for?
Hint: Query your newly created view

○ $1002.78 for fullVisitorId 8945917216741229076

○ $1001.78 for fullVisitorId 8945917216741229076

○ $1003.78 for fullVisitorId 8945917216741229076

Submit

Click *Check my progress* to verify the objective.

○

Create a new view to returns recent 10 transactions

Check my progress

Extra credit

Scenario: Your anti-fraud department is grateful for the query and they are monitoring it daily for suspicious orders. They have now asked you to include a sample of the products that are part of each order along with the results you returned previously.

Using the BigQuery string aggregation function STRING_AGG and the `v2ProductName` field, modify your previous query to return 10 of the product names in each order, listed alphabetically.

Possible solution:

content_c

```
#standardSQL
CREATE OR REPLACE VIEW ecommerce.vw_large_transactions
OPTIONS(
  description="large transactions for review",
  labels=[('org_unit','loss_prevention')]
)
AS
SELECT DISTINCT
  date,
  fullVisitorId,
  visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue,
  currencyCode,
  STRING_AGG(DISTINCT v2ProductName ORDER BY v2ProductName LIMIT 10)
AS products_ordered
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE
  (totalTransactionRevenue / 1000000) > 1000
  AND currencyCode = 'USD'
 GROUP BY 1,2,3,4,5,6
  ORDER BY date DESC # latest transactions

  LIMIT 10
```

Note the two additions here to aggregate the list of products in each order with STRING_AGG() and, since you're performing an aggregation, the necessary GROUP BY is added for the other fields.

Using SESSION_USER() in views for limiting data access

Scenario: Your data team lead has asked you to come up with a way to limit who in your organization can see the data returned by the view you just created. Order information is especially sensitive and needs to be shared only with users that have a need to see such information.

Task: Modify the view you created earlier to only allow logged in users with a qwiklabs.net session domain to be able to see the data in the underlying view. (Note: You will be creating specific user group allowlists in a later lab on access; for now you are validating based on the session user's domain).

1. To view your own session login information, run the below query that uses SESSION_USER():

```
#standardSQL
SELECT
  SESSION_USER() AS viewer_ldap;
```

content_c

You will see xxxx@qwiklabs.net.

2. Modify the below query to add an additional filter to only allow users in the `qwiklabs.net` domain to see view results:

```
#standardSQL
SELECT DISTINCT
  SESSION_USER() AS viewer_ldap,
  REGEXP_EXTRACT(SESSION_USER(), r'@(.+)') AS domain,
  date,
  fullVisitorId,
  visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue,
  currencyCode,
  STRING_AGG(DISTINCT v2ProductName ORDER BY v2ProductName LIMIT 10)
AS products_ordered
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE
```

content_c

```
  (totalTransactionRevenue / 1000000) > 1000
  AND currencyCode = 'USD'
 # add filter here
 GROUP BY 1,2,3,4,5,6,7,8
  ORDER BY date DESC # latest transactions

  LIMIT 10
```

Possible solution:

content_c

```
#standardSQL
SELECT DISTINCT
  SESSION_USER() AS viewer_ldap,
  REGEXP_EXTRACT(SESSION_USER(), r'@(.+)') AS domain,
  date,
  fullVisitorId,
  visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue,
  currencyCode,
  STRING_AGG(DISTINCT v2ProductName ORDER BY v2ProductName LIMIT 10)
AS products_ordered
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE
  (totalTransactionRevenue / 1000000) > 1000
  AND currencyCode = 'USD'
  AND REGEXP_EXTRACT(SESSION_USER(), r'@(.+)') IN ('qwiklabs.net')

 GROUP BY 1,2,3,4,5,6,7,8
  ORDER BY date DESC # latest transactions

  LIMIT 10
```

3. Execute the above query to confirm you can see records returned.

Now, remove all domains from the IN filter `REGEXP_EXTRACT(SESSION_USER(), r'@(.+)') IN ('')`, execute the query again, and confirm you see zero records returned.

4. Re-create and replace the **vw_large_transactions** view with the new query above. As an additional OPTIONS parameter, add an `expiration_timestamp` for the entire view to be 90 days from now:

content_c

```
expiration_timestamp=TIMESTAMP_ADD(CURRENT_TIMESTAMP(), INTERVAL 90
DAY).
```

Possible solution:

content_c

```
#standardSQL
CREATE OR REPLACE VIEW ecommerce.vw_large_transactions
```

```
OPTIONS(
  description="large transactions for review",
  labels=[('org_unit','loss_prevention')],
  expiration_timestamp=TIMESTAMP_ADD(CURRENT_TIMESTAMP(), INTERVAL 90
DAY)
)
AS
#standardSQL
SELECT DISTINCT
  SESSION_USER() AS viewer_ldap,
  REGEXP_EXTRACT(SESSION_USER(), r'@(.+)') AS domain,
  date,
  fullVisitorId,
  visitId,
  channelGrouping,
  totalTransactionRevenue / 1000000 AS totalTransactionRevenue,
  currencyCode,
  STRING_AGG(DISTINCT v2ProductName ORDER BY v2ProductName LIMIT 10)
AS products_ordered
 FROM `data-to-insights.ecommerce.all_sessions_raw`
 WHERE
  (totalTransactionRevenue / 1000000) > 1000
  AND currencyCode = 'USD'
  AND REGEXP_EXTRACT(SESSION_USER(), r'@(.+)') IN ('qwiklabs.net')

 GROUP BY 1,2,3,4,5,6,7,8
  ORDER BY date DESC # latest transactions

  LIMIT 10;
```

Note: The expiration_timestamp option can also be applied to permanent tables.

Click *Check my progress* to verify the objective.

○

Run a query with session_user in views for limiting data access

Check my progress

5. Confirm with the below SELECT statement you can see the data returned in the view (given your domain access) and the expiration timestamp in the view details:

```
#standardSQL
```

content_c

```
SELECT * FROM ecommerce.vw_large_transactions;
```

Congratulations!

You've successfully created tables and access-controlled views using SQL DDL (Data Definition Language) inside of BigQuery.

Take your next lab

Continue your Quest with Ingesting New Datasets into BigQuery, or check out these suggestions:

- Creating a Data Warehouse Through Joins and Unions
- Creating Date-Partitioned Tables in BigQuery

Next steps / learn more

Already have a Google Analytics account and want to query your own datasets in BigQuery? Follow this export guide.

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