

# Creating a Data Warehouse Through Joins and Unions

GSP413



- BigQuery offers a fully managed, serverless analytics database for querying massive datasets with SQL, eliminating infrastructure needs.
- This lab analyzes millions of Google Analytics records from the Google Merchandise Store ecommerce dataset to discover insights.
- You'll examine dataset fields and rows to understand the data structure thoroughly.
- The core focus involves creating reporting tables using SQL JOINS and UNION operations.
- Partnering with marketing, you'll build a data warehouse merging ecommerce data, inventory levels, and product review sentiments.



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[Learn more.](#)

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Password

DqoDCqUxSAAr



Project ID

qwiklabs-gcp-01-c7d4489



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 your tables

To get started, create a new dataset titled **ecommerce** in BigQuery to store your tables.

1. In the left pane, click on the name of your BigQuery project (`qwiklabs-gcp-xxxx`).

2. Click on the three dots next to your project name, then select **Create dataset**.

The **Create dataset** dialog opens.

3. Set the **Dataset ID** to `ecommerce`, leave all other options at their default values.

4. Click **Create dataset**.

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Check out what's new in Studio

- Files explorer
- Gemini in queries
- Apache Spark
- Visualization Cell
- Notebook gallery

Organize and share

The new Files explorer provides a central location for managing files, notebooks, and more) into a single pane.

To get started with better organization, click the gear icon in the left pane. [Learn more](#)

Job history

Create dataset

Project ID \* qwiklabs-gcp-01-c7d4489908ce Change

Dataset ID \* ecommerce Letters, numbers, and underscores allowed

Some locations have been restricted due to a policy set by your organization. [Learn more about restricting locations.](#)

Data location

Tags

Advanced options

Create dataset Cancel

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## Task 2. Explore the product sentiment dataset

Your data science team has run all of your product reviews through the API and provided you with the average sentiment score and magnitude for each of your products.

The project with your marketing team's dataset is **data-to-insights**. BigQuery public datasets are not displayed by default in BigQuery. The queries in this lab will use the **data-to-insights** dataset even though you cannot see it.

1. First, create a copy of the table that the data science team made so you can read it:

```
create or replace TABLE ecommerce.products AS
SELECT
*
FROM
`data-to-insights.ecommerce.products`
```

**Note:** This is only for you to review, the queries in this lab will be using the **data-to-insights** project.

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Untitled query Run Save Download Share Schedule Open in

```
1 create or replace TABLE ecommerce.products AS
2 SELECT
3 *
4 FROM
5 `data-to-insights.ecommerce.products`
```

Query completed Using on-demand processing quota

Query results Job information Results Execution details Execution graph Go to table

This statement created a new table named products.

Job history Show

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1. Navigate to the **ecommerce > products** dataset and click the **Preview** tab to see the data.

How many Aluminum Handy Emergency Flashlights have been ordered?



66



90



0



85



Submit

2. Click the **Schema** tab.

What data type are the **sentimentScore** and **sentimentMagnitude** fields?

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Create a query that shows the top 5 products with the most positive sentiment

1. In the **Query Editor**, write your SQL query.

Possible solution:

```
SELECT
  SKU,
  name,
  sentimentScore,
  sentimentMagnitude
FROM
  `data-to-insights.ecommerce.products`
ORDER BY
  sentimentScore DESC
LIMIT 5
```

What product has the highest sentiment?

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SELECT \* FROM `data-to-insights.ecommerce.products`

```
FROM
`data-to-insights.ecommerce.products`
ORDER BY
sentimentScore DESC
LIMIT 5
```

What product has the highest sentiment?

- USB wired soundbar - in store only
- Stylus Pen w/ LED Light
- G Noise-reducing Bluetooth Headphones
- G Noise-reducing Bluetooth Headphones

[Submit](#)

2. Revise your query to show the top 5 products with the most negative sentiment and filter out NULL values.

Possible solution:

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2. Revise your query to show the top 5 products with the most negative sentiment and filter out NULL values.

Possible solution:

```
SELECT
SKU,
name,
sentimentScore,
sentimentMagnitude
FROM
`data-to-insights.ecommerce.products`
WHERE sentimentScore IS NOT NULL
ORDER BY
sentimentScore
LIMIT 5
```

What is the product with the lowest sentiment?

What is the product with the lowest sentiment?

7 inch Dog Frisbee

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```
sentimentMagnitude
FROM
`data-to-insights.ecommerce.products`
WHERE sentimentScore IS NOT NULL
ORDER BY
  sentimentScore
LIMIT 5
```

What is the product with the lowest sentiment?

What is the product with the lowest sentiment?

- 7 inch Dog Frisbee
- Mens Vintage Henley
- Womens Convertible Vest-Jacket Sea Foam Green
- 4 Womens Vintage Hero Tee Platinum

Submit



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## Task 3. Join datasets to find insights

**Scenario:** It's the first of the month and your inventory team has informed you that the `orderedQuantity` field in the product inventory dataset is out of date. They need your help to query the total sales by product for 08/01/2017 and reference that against the current stock levels in inventory to see which products need to be resupplied first.

### Calculate daily sales volume by productSKU

1. Create a new table in your `ecommerce` dataset with the below requirements:

- Title it `sales_by_sku_20170801`
- Source the data from `data-to-insights.ecommerce.all_sessions_raw`
- Include only distinct results
- Return `productSKU`
- Return the total quantity ordered (`productQuantity`). Hint: Use a `SUM()` with a `IFNULL` condition
- Filter for only sales on `20170801`
- `ORDER BY` the SKUs with the most orders first

Possible solution:

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- Filter for only sales on 20170801
- ORDER BY the SKUs with the most orders first

Possible solution:

```
# pull what sold on 08/01/2017
CREATE OR REPLACE TABLE ecommerce.sales_by_sku_20170801 AS
SELECT
    productSKU,
    SUM(IFNULL(productQuantity,0)) AS total_ordered
FROM
    `data-to-insights.ecommerce.all_sessions_raw`
WHERE date = '20170801'
GROUP BY productSKU
ORDER BY total_ordered DESC #462 skus sold
```

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```
SUM(IFNULL(productQuantity, 0)) AS total_ordered  
FROM  
`data-to-insights.ecommerce.all_sessions_raw`  
WHERE date = '20170801'  
GROUP BY productSKU  
ORDER BY total_ordered DESC #462 skus sold
```

2. Click on the `sales_by_sku` table, then click the **Preview** tab.

How many distinct product SKUs were sold?

Answer: 462

True or false: GGOEGOAQ012899 is the top selling product SKU.

True

False

Next, enrich your sales data with product inventory information by joining the two datasets.

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Next, enrich your sales data with product inventory information by joining the two datasets.

#### Join sales data and inventory data

1. Using a JOIN, enrich the website ecommerce data with the following fields from the product inventory dataset:

- name
- stockLevel
- restockingLeadTime
- sentimentScore
- sentimentMagnitude

2. Complete the partially written query:

```
# join against product inventory to get name
SELECT DISTINCT
    website.productSKU,
    website.total_ordered,
    inventory.name,
    inventory.stockLevel
```

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2. Complete the partially written query:

```
# join against product inventory to get name
SELECT DISTINCT
    website.productSKU,
    website.total_ordered,
    inventory.name,
    inventory.stockLevel,
    inventory.restockingLeadTime,
    inventory.sentimentScore,
    inventory.sentimentMagnitude
FROM
    ecommerce.sales_by_sku_20170801 AS website
    LEFT JOIN `data-to-insights.ecommerce.products` AS inventory
ORDER BY total_ordered DESC
```

Possible solution:

```
# join against product inventory to get name
SELECT DISTINCT
    website.productSKU,
```

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  - products
  - sales\_by\_sku\_(1)

Untitled query Run Save Download Share Schedule

```
1 # join against product inventory to get name
2 SELECT DISTINCT
3     website.productSKU,
4     website.total_ordered,
5     inventory.name,
6     inventory.stockLevel,
7     inventory.restockingLeadTime,
8     inventory.sentimentScore,
9     inventory.sentimentMagnitude
10 FROM
11     ecommerce.sales_by_sku_20170801 AS website
12     LEFT JOIN `data-to-insights.ecommerce.products` AS inventory
```

Query completed with errors

Query results Save results Open in

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LEFT JOIN must have an immediately following ON or USING clause at [12:3]

Job history Show

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```
# join against product inventory to get name
SELECT DISTINCT
    website.productSKU,
    website.total_ordered,
    inventory.name,
    inventory.stockLevel,
    inventory.restockingLeadTime,
    inventory.sentimentScore,
    inventory.sentimentMagnitude
FROM
    ecommerce.sales_by_sku_20170801 AS website
    LEFT JOIN `data-to-insights.ecommerce.products` AS inventory
        ON website.productSKU = inventory.SKU
ORDER BY total_ordered DESC
```

3. Modify the query you wrote to now include:

- A calculated field of (total\_ordered / stockLevel) and alias it "ratio". Hint: Use SAFE\_DIVIDE(field1,field2) to avoid dividing by 0 errors when the stock level is 0.
- Filter the results to only include products that have gone through 50% or more of their inventory already at the beginning of the month

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3. Modify the query you wrote to now include:

- A calculated field of (`total_ordered / stockLevel`) and alias it "ratio". **Hint:** Use `SAFE_DIVIDE(field1,field2)` to avoid dividing by 0 errors when the stock level is 0.
- Filter the results to only include products that have gone through 50% or more of their inventory already at the beginning of the month

Possible solution:

```
# calculate ratio and filter
SELECT DISTINCT
    website.productSKU,
    website.total_ordered,
    inventory.name,
    inventory.stockLevel,
    inventory.restockingLeadTime,
    inventory.sentimentScore,
    inventory.sentimentMagnitude,
    SAFE_DIVIDE(website.total_ordered, inventory.stockLevel) AS
    ratio
```

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```
# calculate ratio and filter
SELECT DISTINCT
    website.productSKU,
    website.total_ordered,
    inventory.name,
    inventory.stockLevel,
    inventory.restockingLeadTime,
    inventory.sentimentScore,
    inventory.sentimentMagnitude,

    SAFE_DIVIDE(website.total_ordered, inventory.stockLevel) AS
ratio
FROM
    ecommerce.sales_by_sku_20170801 AS website
    LEFT JOIN `data-to-insights.ecommerce.products` AS inventory
    ON website.productSKU = inventory.SKU

# gone through more than 50% of inventory for the month
WHERE SAFE_DIVIDE(website.total_ordered,inventory.stockLevel) >=
.50

ORDER BY total_ordered DESC
```

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```
LEFT JOIN data_label_insights.ecommerce.products AS inventory  
ON website.productSKU = inventory.SKU  
  
# gone through more than 50% of inventory for the month  
WHERE SAFE_DIVIDE(website.total_ordered,inventory.stockLevel) >=  
.50  
  
ORDER BY total_ordered DESC
```

What is the name of the top selling product and what percent of its inventory has been sold already?

Android Infant Short Sleeve Tee Pewter with 7 product orders out of 2 in stock

Leather Journal-Black with 250 product orders out of 354 in stock

Youth Short Sleeve Tee Red with a restocking leadtime of 9

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## Task 4. Append additional records

Your international team has already made in-store sales on 08/02/2017 which you want to record in your daily sales tables.

Create a new empty table to store sales by productSKU for 08/02/2017

1. For the schema, specify the following fields:

- table name is ecommerce.sales\_by\_sku\_20170802
- productSKU STRING
- total\_ordered as an INT64 field

Possible solution:

```
CREATE OR REPLACE TABLE ecommerce.sales_by_sku_20170802
(
  productSKU STRING,
```

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- productSKU STRING
- total\_ordered as an INT64 field

Possible solution:

```
CREATE OR REPLACE TABLE ecommerce.sales_by_sku_20170802
(
  productSKU STRING,
  total_ordered INT64
);
```

2. Confirm you now have two date-shared sales tables - use the dropdown menu next to the **Sales\_by\_sku** table name in the table results, or refresh your browser to see it listed in the left menu:

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ecommerce

sales\_by\_sku\_(2)

3. Insert the sales record provided to you by your sales team:

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ecommerce

- products
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- sales\_by\_sku\_20170802

Untitled query Run Save Download Share Schedule

```
1 CREATE OR REPLACE TABLE ecommerce.sales_by_sku_20170802
2 (
3 productSKU STRING,
4 total_ordered INT64
5 );
```

Query completed

Query results Save results Open in

Job information Results Execution details Execution graph

This statement created a new table named sales\_by\_sku\_20170802. Go to table

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to see it listed in the left menu:

01:14:25

Time limit

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ecommerce

sales\_by\_sku\_(2)

3. Insert the sales record provided to you by your sales team:

```
INSERT INTO ecommerce.sales_by_sku_20170802
(productSKU, total_ordered)
VALUES('GGOEGHPA002910', 101)
```

Copied!



4. Confirm the record appears by previewing the table - click on the table name to see the results.

## Append together historical data

There are multiple ways to append together data that has the same schema. Two common ways are using UNIONs and table wildcards.

• Union is an SQL operator that appends together rows from different result sets.

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Congratulations!



BigQuery – qwiklabs-gcp-01-c7d4489908ce

https://console.cloud.google.com/bigquery?project=qwiklabs-gcp-01-c7d4489908ce&ws=!1m10!1m4!4m3!1sqwiklabs-gcp-01-c7d4489908ce!2s...

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ecommerce

- products
- sales\_by\_sku\_(1)
- sales\_by\_sku\_20170802

Untitled query Run Save Download Share Schedule

```
1 INSERT INTO ecommerce.sales_by_sku_20170802
2 (productSKU, total_ordered)
3 VALUES('GGOEGHPA002910', 101)
```

Query completed

Query results Save results Open in

This statement added 1 row to sales\_by\_sku\_20170802. Go to table

Job information Results Execution details Execution graph

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student-02-007893f6a143e



Password

DqoDCqUxSAAr



Project ID

qwiklabs-gcp-01-c7d4489f



## Append together historical data

There are multiple ways to append together data that has the same schema. Two common ways are using UNIONs and table wildcards.

- **Union** is an SQL operator that appends together rows from different result sets.
- **Table wildcards** enable you to query multiple tables using concise SQL statements. Wildcard tables are available only in standard SQL.

1. Write a UNION query that will result in all records from the below two tables:

- ecommerce.sales\_by\_sku\_20170801
- ecommerce.sales\_by\_sku\_20170802

```
SELECT * FROM ecommerce.sales_by_sku_20170801
UNION ALL
SELECT * FROM ecommerce.sales_by_sku_20170802
```

**Note:** The difference between a UNION and UNION ALL is that a UNION will not include duplicate records.

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What is a pitfall of having many daily sales tables? You will have to write many UNION statements chained together.

A better solution is to use the table wildcard filter and \_TABLE\_SUFFIX filter.

2. Write a query that uses the (\*) table wildcard to select all records from ecommerce.sales\_by\_sku\_ for the year 2017.

Possible solution:

```
SELECT * FROM `ecommerce.sales_by_sku_2017`
```



3. Modify the previous query to add a filter to limit the results to just 08/02/2017.

Possible solution:

```
SELECT * FROM `ecommerce.sales_by_sku_2017`  
WHERE _TABLE_SUFFIX = '0802'
```



Note: Another option to consider is to create a Partitioned Table which

Check complete. Points earned: 25. Message: Assessment Completed!

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```
SELECT * FROM `ecommerce.sales_by_sku_2017`
```

3. Modify the previous query to add a filter to limit the results to just 08/02/2017.

Possible solution:

```
SELECT * FROM `ecommerce.sales_by_sku_2017`  
WHERE _TABLE_SUFFIX = '0802'
```

**Note:** Another option to consider is to create a Partitioned Table which automatically can ingest daily sales data into the correct partition.

A UNION ALL join does not include duplicate records.

True

False

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