BigQuery: Qwik Start - Command Line

cloudskillsboost.google/focuses/577

GSP071

Google Cloud Self-Paced Labs

Overview

Storing and querying massive datasets can be time consuming and expensive without the right hardware and infrastructure. BigQuery is a serverless, highly scalable cloud data warehouse that solves this problem by enabling super-fast SQL queries using the processing power of Google's infrastructure. Simply move your data into BigQuery and let us handle the hard work. You can control access to both the project and your data based on your business needs, such as giving others the ability to view or query your data.

You can access BigQuery by using the Console, Web UI or a command-line tool using a variety of client libraries such as Java, .NET, or Python. There are also a variety of solution providers that you can use to interact with BigQuery.

This hands-on lab shows you how to use `bq`, the python-based command line tool for BigQuery, to query public tables and load sample data into BigQuery.

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 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 Console**. 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.

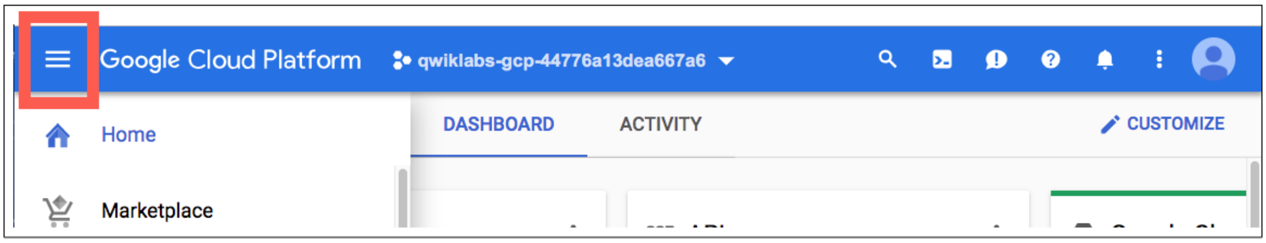
   Note: If you see the **Choose an account** dialog, click **Use Another Account**.
3. If necessary, copy the **Username** from the **Lab Details** panel and paste it into the **Sign in** dialog. Click **Next**.

4. Copy the **Password** from the **Lab Details** panel and paste it into the **Welcome** dialog. Click **Next**.

   Important: You must use the credentials from the left panel. Do not use your Google Cloud Skills Boost credentials. **Note:** Using your own Google Cloud account for this lab may incur extra charges.
5. 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 Cloud Console opens in this tab.

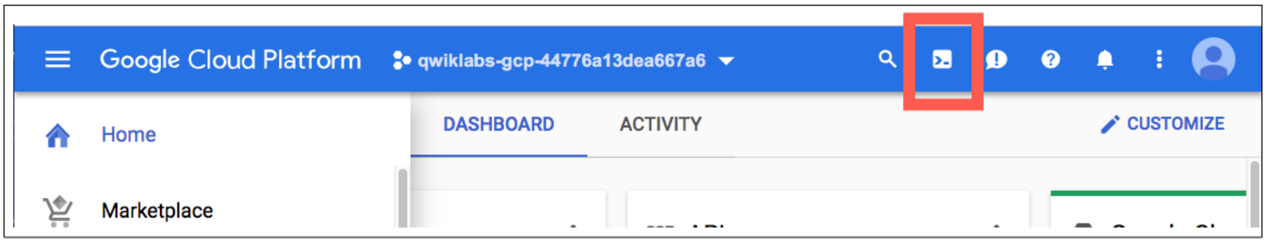
Note: You can view the menu with a list of Google Cloud Products and Services by clicking the **Navigation menu** at the top-left.



Activate Cloud Shell

Cloud Shell is a virtual machine that is loaded with development tools. It offers a persistent 5GB home directory and runs on the Google Cloud. Cloud Shell provides command-line access to your Google Cloud resources.

1. In the Cloud Console, in the top right toolbar, click the **Activate Cloud Shell** button.



2. Click **Continue**.

It takes a few moments to provision and connect to the environment. When you are connected, you are already authenticated, and the project is set to your **PROJECT_ID**. The output contains a line that declares the **PROJECT_ID** for this session:

Your Cloud Platform project in this session is set to YOUR_PROJECT_ID
`gcloud` is the command-line tool for Google Cloud. It comes pre-installed on Cloud Shell and supports tab-completion.

3. (Optional) You can list the active account name with this command:

gcloud auth list
(Output)

ACTIVE: * ACCOUNT: student-01-xxxxxxxxxxxx@qwiklabs.net To set the active account, run: $ gcloud config set account `ACCOUNT`

4. (Optional) You can list the project ID with this command:

gcloud config list project
(Output)

[core] project = <project_ID>
(Example output)

[core] project = qwiklabs-gcp-44776a13dea667a6 For full documentation of `gcloud`, in Google Cloud, Cloud SDK documentation, see the gcloud command-line tool overview.

Examine a table

BigQuery offers a number of sample tables that you can run queries against. In this lab, you'll run queries against the `shakespeare` table, which contains an entry for every word in every play.

To examine the schema of the Shakespeare table in the samples dataset, run:

```
bq show bigquery-public-data:samples.shakespeare
```

In this command you're doing the following:

- `bq` to invoke the BigQuery command line tool
- `show` is the action
- then you're listing the name of the `project:public dataset.table` in BigQuery that you want to see.

Output:

```
Last modified Schema Total Rows Total Bytes Expiration Time Partitioning Clustered
Fields Labels ----------------- -------------------------------------- ------------ ------------- ---------
--- -------------------- ------------------- -------- 14 Mar 13:16:45 |- word: string (required)
164656 6432064 |- word_count: integer (required) |- corpus: string (required) |-
corpus_date: integer (required)
```

Run the help command

When you include a command name with the help commands, you get information about that specific command. For example, the following call to `bq help` retrieves information about the `query` command.

```
bq help query
```

To see a list of all of the commands `bq` uses, run just `bq help`.

Run a query

Now you'll run a query to see how many times the substring "raisin" appears in Shakespeare's works.

To run a query, run the command `bq query "[SQL_STATEMENT]"`.

- Escape any quotation marks inside the [SQL_STATEMENT] with a \ mark, or
- Use a different quotation mark type than the surrounding marks ("versus").

Run the following standard SQL query in Cloud Shell to count the number of times that the substring "raisin" appears in all of Shakespeare's works:

```
bq query --use_legacy_sql=false \ 'SELECT word, SUM(word_count) AS count FROM
`bigquery-public-data`.samples.shakespeare WHERE word LIKE "%raisin%" GROUP BY
word'
```

In this command:

`--use_legacy_sql=false` makes standard SQL the default query syntax

Output:

```
Waiting on job_e19 ... (0s) Current status: DONE +---------------+--------+ | word | count |
+---------------+--------+ | praising | 8 | | Praising | 4 | | raising | 5 | | dispraising | 2 | |
dispraisingly | 1 | | raisins | 1 |
```

The table demonstrates that although the actual word **raisin** doesn't appear, the letters appear in order in several of Shakespeare's works.

Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully run query against public dataset, you will see an assessment score.

Run a query (dataset: samples, table: shakespeare, substring: raisin)
If you search for a word that isn't in Shakespeare's works, no results are returned.

Run following search for "huzzah", returns no matches:

```
bq query --use_legacy_sql=false \ 'SELECT word FROM `bigquery-public-data`.samples.shakespeare WHERE word = "huzzah"'
```

Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully run query against public dataset, you will see an assessment score.

Run a query (dataset: samples, table: shakespeare, substring: huzzah)

Create a new table

Now create your own table. Every table is stored inside a dataset. A *dataset* is a group of resources, such as tables and views.

Create a new dataset

Use the `bq ls` command to list any existing datasets in your project:

```
bq ls
```

You will be brought back to the command line since there aren't any datasets in your project yet.

Run `bq ls` and the `bigquery-public-data` Project ID to list the datasets in that specific project, followed by a colon (:).

```
bq ls bigquery-public-data:
```

Output:

```
datasetId ---------------------------- austin_311 austin_bikeshare austin_crime
austin_incidents austin_waste baseball bitcoin_blockchain bls
census_bureau_construction census_bureau_international census_bureau_usa
census_utility chicago_crime ...
```

Now create a dataset. A dataset name can be up to 1,024 characters long, and consist of A-Z, a-z, 0-9, and the underscore, but it cannot start with a number or underscore, or have spaces.

Use the `bq mk` command to create a new dataset named `babynames` in your Qwiklabs project:

```
bq mk babynames
```

Sample output:

```
Dataset 'qwiklabs-gcp-ba3466847fe3ceco:babynames' successfully created.
```

Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully created BigQuery dataset with name as babynames, you will see an assessment score.

Create a new dataset (name: babynames)

Run `bq ls` to confirm that the dataset now appears as part of your project:

```
bq ls
```

Sample output:

```
datasetId ------------- babynames
```

Upload the dataset

Before you can build the table, you need to add the dataset to your project. The custom data file you'll use contains approximately 7 MB of data about popular baby names, provided by the US Social Security Administration.

Run this command to add the baby names zip file to your project, using the URL for the data file:

```
curl -LO http://www.ssa.gov/OACT/babynames/names.zip
```

List the file:

```
ls
```

You can see the name of the file added to your project.

Now unzip the file:

```
unzip names.zip
```

That's a pretty big list of text files! List the files again:

ls
The `bq load` command creates or updates a table and loads data in a single step.

You will use the bq load command to load your source file into a new table called names2010 in the babynames dataset you just created. By default, this runs synchronously, and will take a few seconds to complete.

The `bq load` arguments you'll be running are:

datasetID: babynames tableID: names2010 source: yob2010.txt schema: name:string,gender:string,count:integer
Create your table:

```
bq load babynames.names2010 yob2010.txt name:string,gender:string,count:integer
```

Sample output:

```
Waiting on job_4f0c0878f6184119abfdae05f5194e65 ... (35s) Current status: DONE
```

Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully load data into dataset table, you will see an assessment score.

Load the data into a new table
Run `bq ls` and `babynames` to confirm that the table now appears in your dataset:

```
bq ls babynames
```

Output:

```
tableId Type ----------- ------- names2010 TABLE
```

Run `bq show` and your `dataset.table` to see the schema:

```
bq show babynames.names2010
```

Output:

Last modified Schema Total Rows Total Bytes Expiration Time Partitioning Clustered Fields Labels ----------------- ------------------- ------------ ------------- ----------------- -------- ----------- ------------------ -------- 13 Aug 14:37:34 |- name: string 34073 654482 12 Oct 14:37:34 |- gender: string |- count: integer By default, when you load data, BigQuery expects UTF-8 encoded data. If you have data that is in ISO-8859-1 (or Latin-1) encoding and are having problems with your loaded data, you can tell BigQuery to treat your data as Latin-1 explicitly, using the `-E` flag. For more information, see Character Encodings.

Run queries

Now you're ready to query the data and return some interesting results.

Run the following command to return the top 5 most popular girls names:

```
bq query "SELECT name,count FROM babynames.names2010 WHERE gender = 'F'
ORDER BY count DESC LIMIT 5"
```

Output:

```
Waiting on job_58c0f5ca52764ef1902eba611b71c651 ... (0s) Current status: DONE +------
----+-------+ | name | count | +----------+-------+ | Isabella | 22913 | | Sophia | 20643 | |
Emma | 17345 | | Olivia | 17028 | | Ava | 15433 | +----------+-------+
```

Run the following command to see the top 5 most unusual boys names.

```
bq query "SELECT name,count FROM babynames.names2010 WHERE gender = 'M'
ORDER BY count ASC LIMIT 5"
```

Note: The minimum count is 5 because the source data omits names with fewer than 5 occurrences.

Output:

```
Waiting on job_556ba2e5aad340a7b2818c3e3280b7a3 ... (1s) Current status: DONE +----
------+-------+ | name | count | +----------+-------+ | Aaqib | 5 | | Aaidan | 5 | | Aadhavan |
5 | | Aarian | 5 | | Aamarion | 5 | +----------+-------+
```

Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully run query against custom dataset, you will see an assessment score.

Run queries against your dataset table

Test your Understanding

Below are multiple choice questions to reinforce your understanding of this lab's concepts. Answer them to the best of your abilities.

Clean up

Run the `bq rm` command to remove the `babynames` dataset with the `-r` flag to delete all tables in the dataset.

```
bq rm -r babynames
```

Confirm the delete command by typing `Y`.

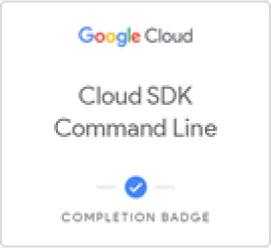
Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully removed babynames dataset, you will see an assessment score.

Remove the babynames dataset

Congratulations!

Now you can use the command line with BigQuery to manipulate data.



Finish Your Quest

This self-paced lab is part of the BigQuery for Data Warehousing, NCAA® March Madness®: Bracketology with Google Cloud, BigQuery Basics for Data Analysts, and Using the Cloud SDK Command Line Quests. A Quest is a series of related labs that form a learning path. Completing a Quest earns you a badge to recognize your achievement. You can make your badge (or badges) public and link to them in your online resume or social media account. Enroll in a Quest and get immediate completion credit if you've taken this lab. See other available Quests.

Next Steps / Learn More

This lab is also part of a series of labs called Qwik Starts. These labs are designed to give you a little taste of the many features available with Google Cloud. Search for "Qwik Starts" in the lab catalog to find the next lab you'd like to take!

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