Examining BigQuery Billing Data in Google Sheets

GSP623

Overview

As organizations grow in size and collect terabytes of complex data, they need tools to house and make better sense of their information. Each business unit may need to analyze a portion of that data for specific business needs. In Finance, for example, a Financial Controller may be interested in analyzing their Cloud Billing data to answer specific questions such as:

- What was the total cost of a project last month?
- Which project consumed the most networking resources?
- What is the monthly cost broken down by team?

BigQuery helps users deal with large datasets using high speed compute power. But not everyone is a BigQuery expert or a data wizard. Many people may be more comfortable using spreadsheets to perform ad-hoc data analysis. You can use the data connector to pull your BigQuery data into a Sheet and perform your analysis.

The Sheets data connector for BigQuery is available only to G Suite Business, Enterprise, and Education accounts.

Objectives

- Open Sheets and use the data connector to connect to BigQuery
- Access data through BigQuery and import the data into Sheets
- Explore ways to analyze the data in Sheets and to then share the output with other users

Product Features

In this lab you will try out the following products and product features:

BigQuery

BigQuery is Google's serverless, highly scalable enterprise data warehouse. It is designed to make data analysts more productive. Because there is no infrastructure to manage, you can focus on uncovering meaningful insights using familiar SQL without the need for a database administrator.

Sheets

Sheets is a collaborative, smart, secure spreadsheets application for fast-moving organizations. AI features let you tap into the right insights to make meaningful business decisions. The cloud-based architecture enables you to collaborate.

Sheets data connector

Sheets data connector dynamically connects Sheets to BigQuery. This means you can connect to BigQuery, create a query, get a preview, and insert the results into a spreadsheet, all from within the Sheets interface.

Refresh your data

After you access and analyze your data, keep your insights relevant by periodically refreshing the data you work from.

Control access

Once you've created your spreadsheet, analyzed the data, and configured data refresh, show it off. Use the Share feature to give other users access to your spreadsheet(s).

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 Qwiklabs 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.

What you need

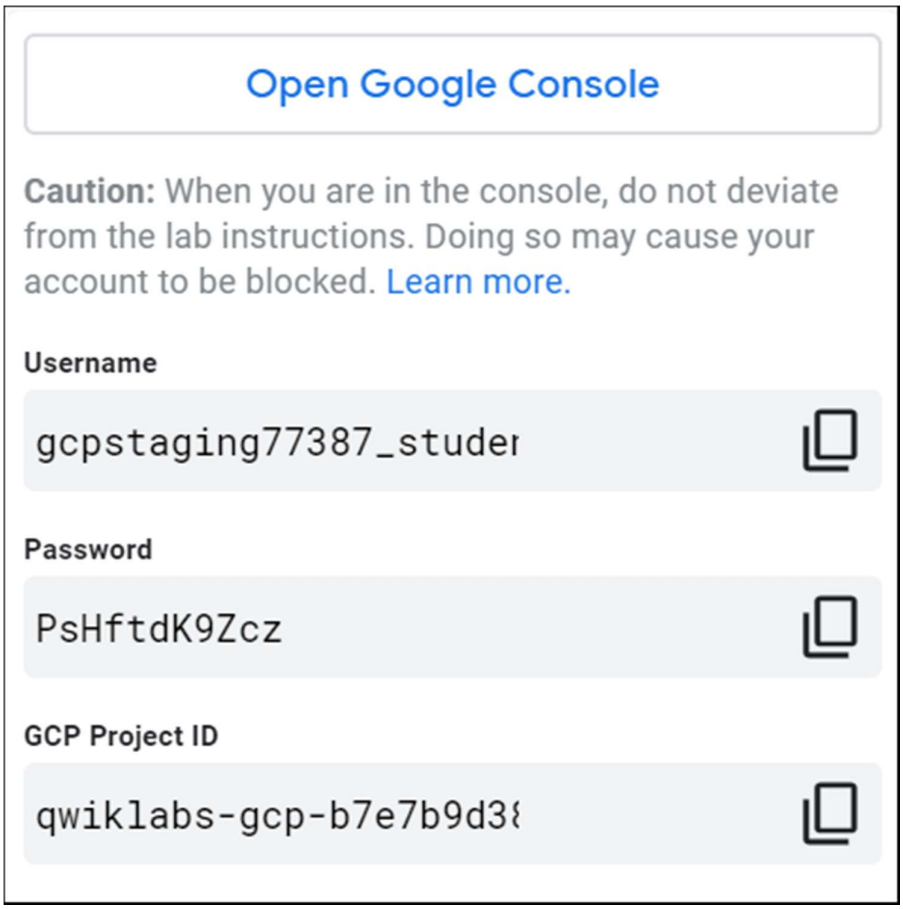
To complete this lab, you need:

- Access to a standard internet browser (Chrome browser recommended).
- Time to complete the lab.
  Note: If you already have your own personal Google Cloud account or project, do not use it for this lab.

Note: If you are using a Pixelbook, open an Incognito window to run this lab.

Start your lab

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 a panel populated with the temporary credentials that you must use for this lab.



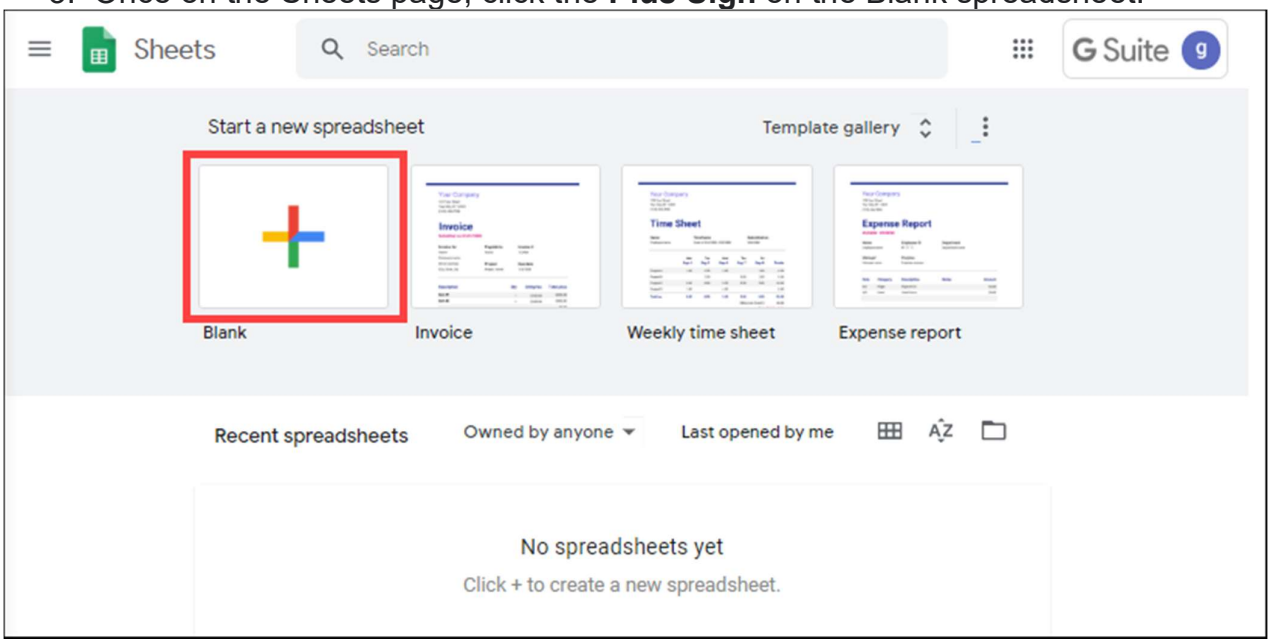
Note the **Username** and **Password**, you may need them when you open Google Sheets.

Open Sheets and connect to BigQuery

1. Click this Google Sheets link to open Sheets.
2. If you need to, **Sign in**, use the credentials given for this lab. Then:

- Accept the terms and conditions.
- Do not add recovery options or two-factor authentication (because this is a temporary account).
- Exit the **Welcome to Google Sheets** window.

3. Once on the Sheets page, click the **Plus Sign** on the Blank spreadsheet.

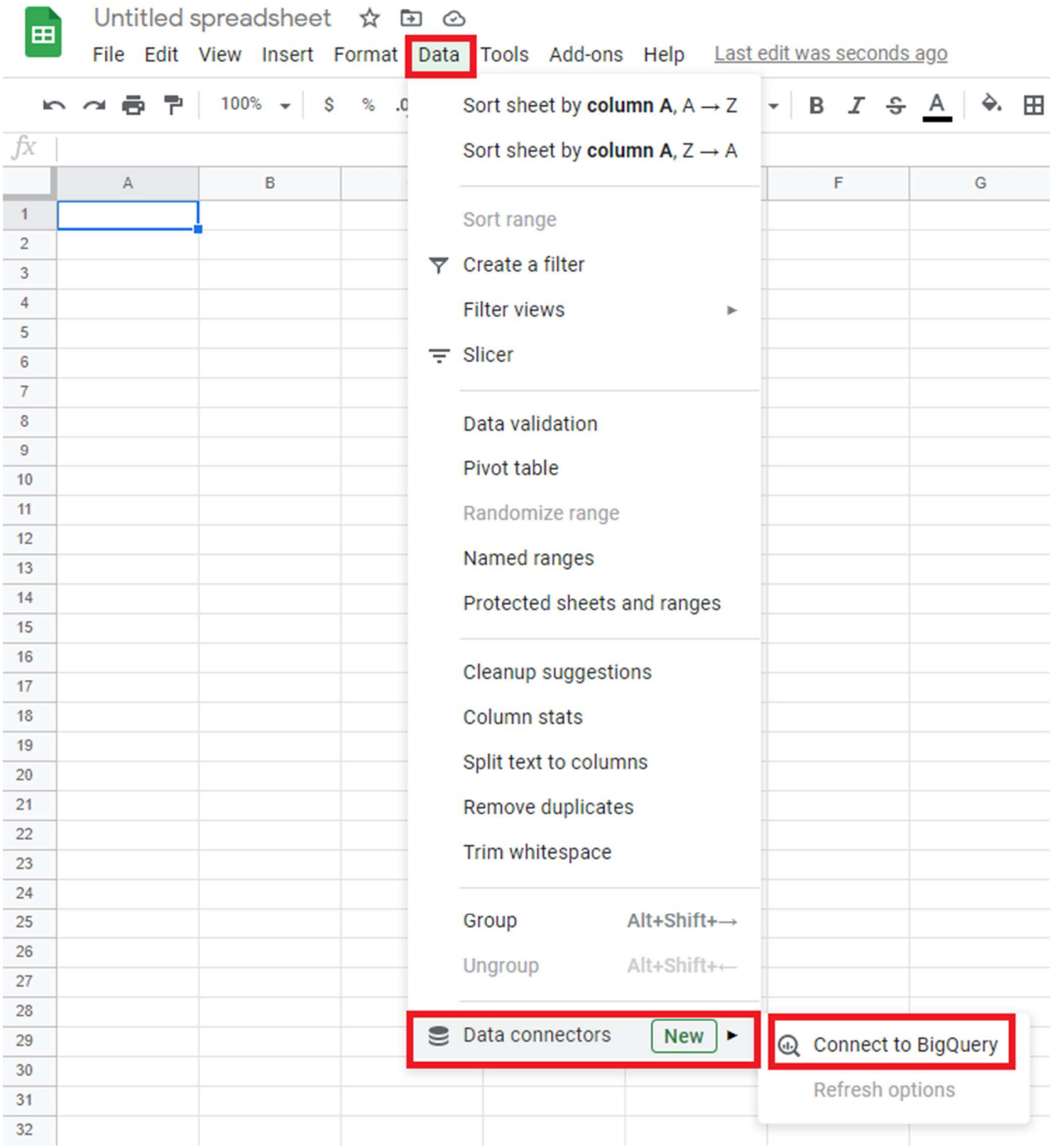


Connect to BigQuery

Be sure you query BigQuery from your lab account. You may incur charges for queries if you use your personal account.

Use Sheets to connect to BigQuery and access your billing data.

1. In the menu bar, select **Data** > **Data connectors** > **Connect to BigQuery**.

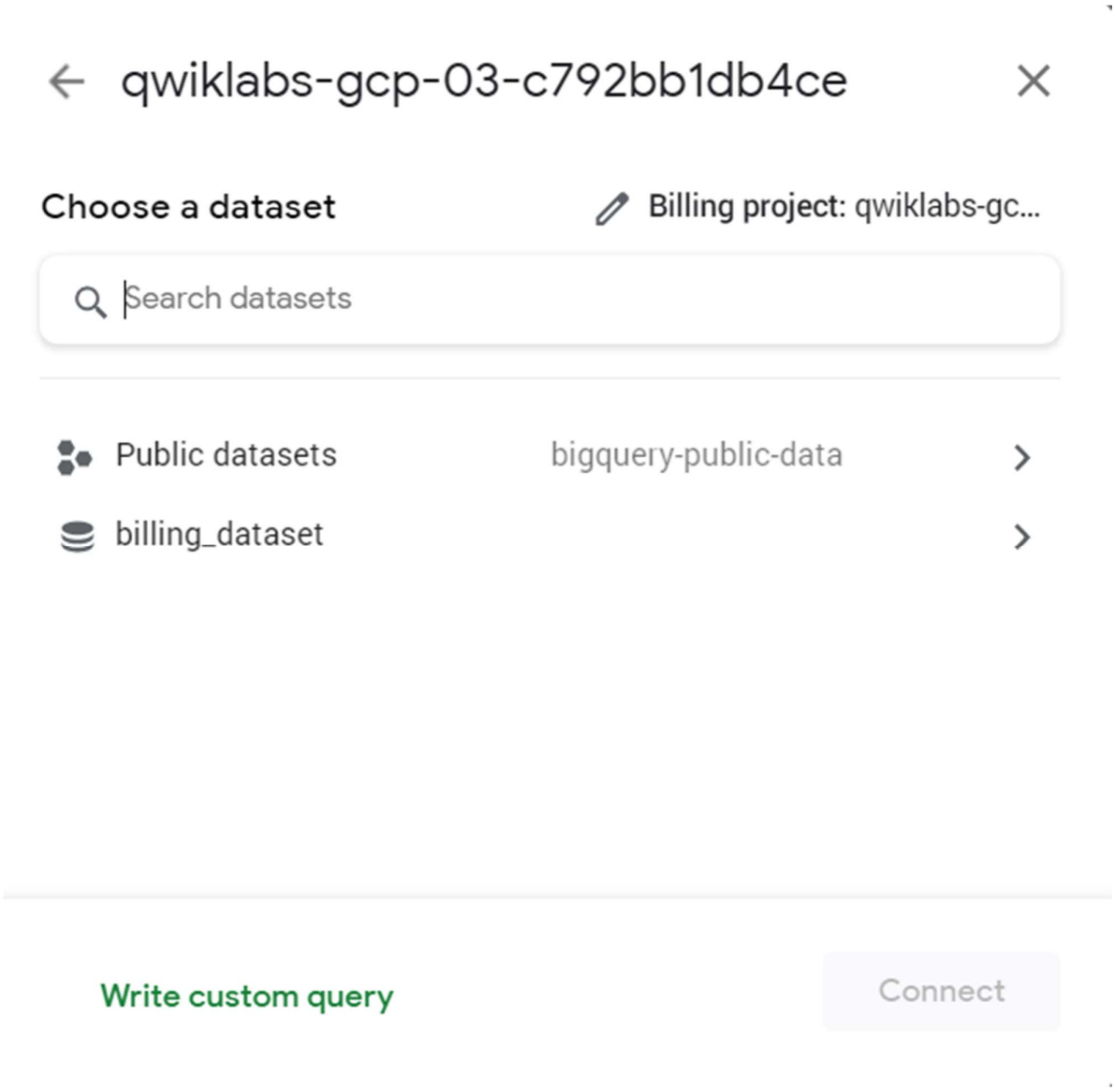


2. Click **Get Connected**.

3. In the **Add data connection** dialog, select the project that starts with "qwiklabs-gcp-".

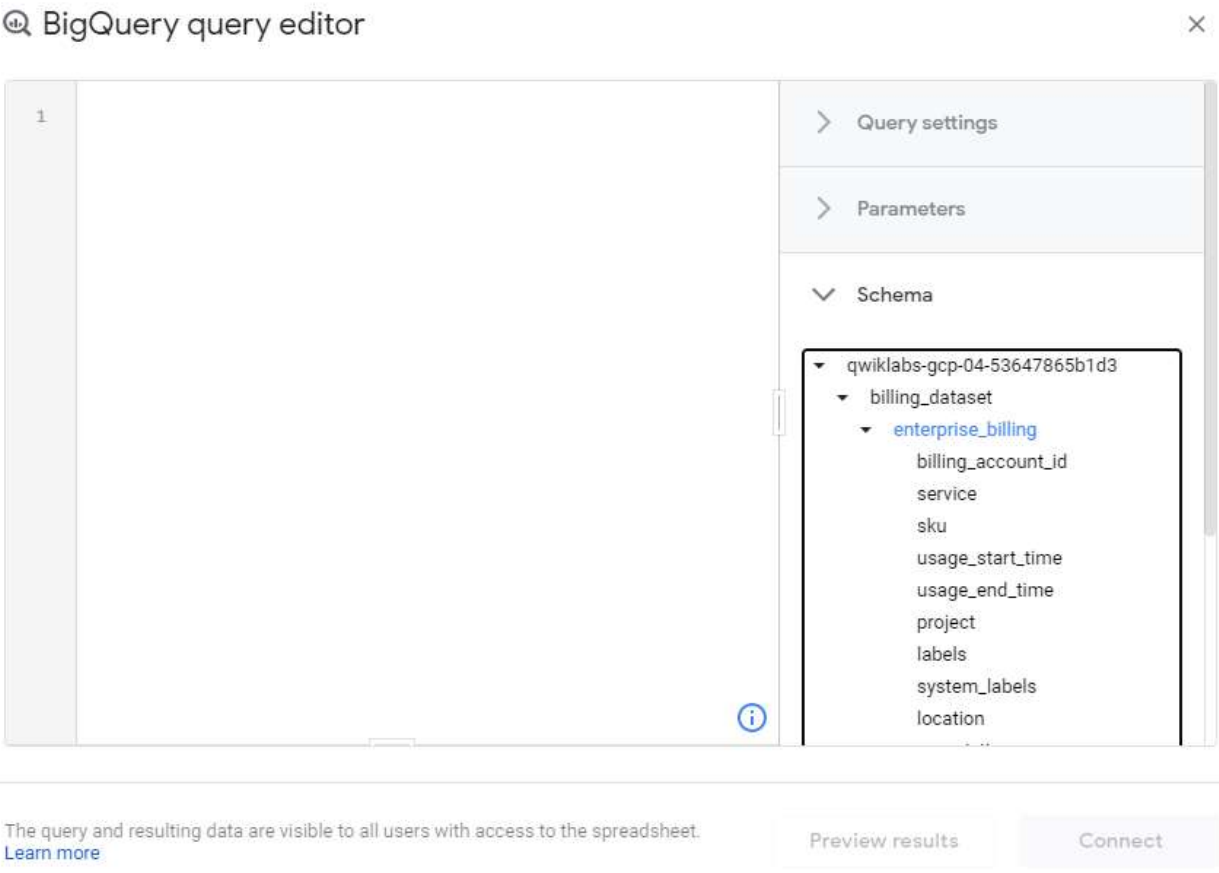
You're now ready to use the Sheets data connector to pull information from BigQuery.

4. Click **Write custom query** to open the BigQuery query editor.



5. In the BigQuery query editor, notice the right panel. The Schema section shows you your project details, which you need to create a query. In this example:

- Project: [qwiklabs-gcp-xxx]
- Dataset: billing_dataset
- Table: enterprise_billing
- Columns: all values listed under enterprise_billing


BigQuery query editor
1
Query settings
Parameters
Schema
qwiklabs-gcp-04-53647865b1d3
billing_dataset
enterprise_billing
billing_account_id
service
sku
usage_start_time
usage_end_time
project
labels
system_labels
location
The query and resulting data are visible to all users with access to the spreadsheet.
Learn more
Preview results
Connect

Write a Query

Sheets uses the Sheets data connector to query data in BigQuery, then pulls the results of the query into your spreadsheet.

To learn more about writing queries in BigQuery, take a look at the BigQuery for Marketing Analysts Quest.

Pull all the billing data into your spreadsheet

Use the Sheets data connector to query for all your billing data (from the `enterprise_billing` table), then pull it into your spreadsheet.

1. In the BigQuery query editor, type or paste this query:

```
SELECT *
FROM billing_dataset.enterprise_billing
```

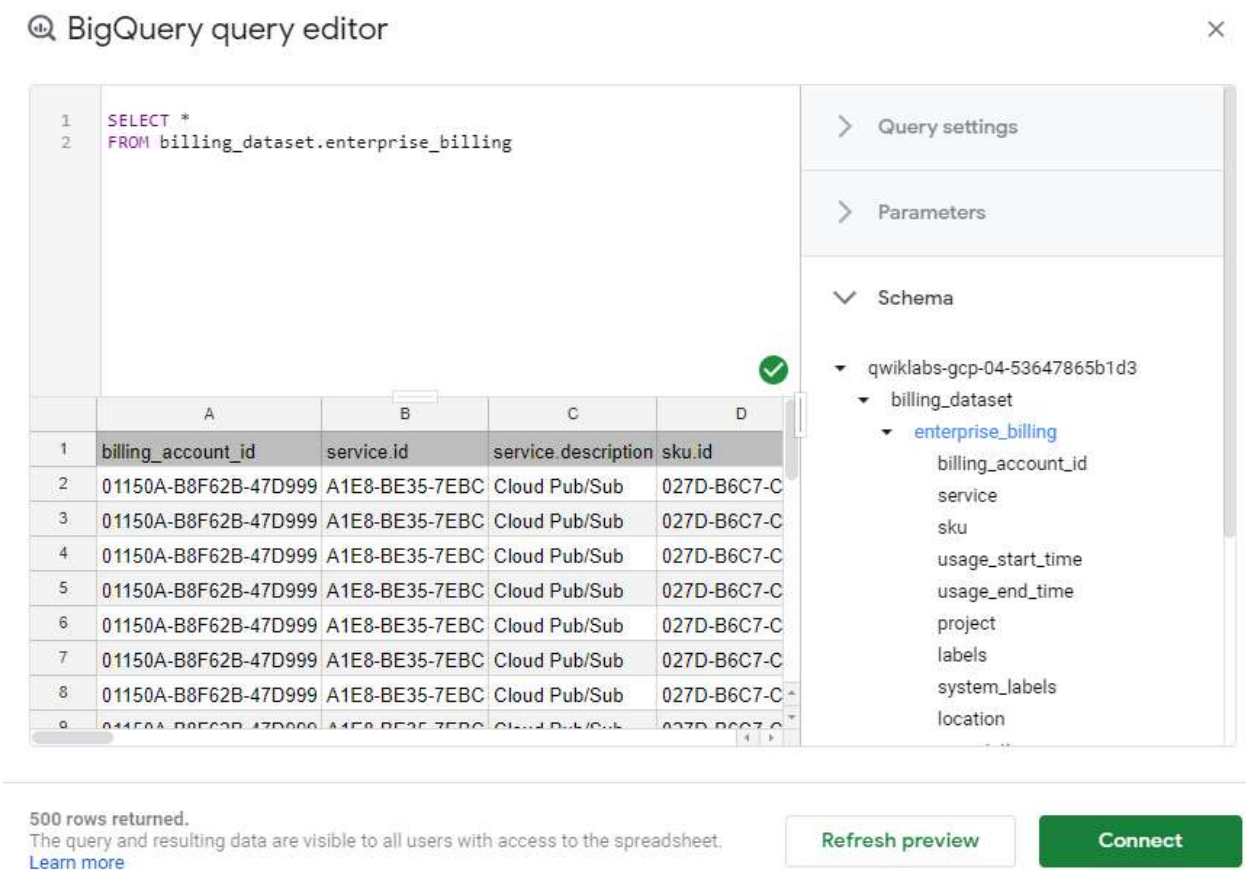
`SELECT` specifies columns. In the example above, "*" (asterisk) selects all the columns.

`FROM` specifies from where the data is pulled, in the form [dataset].[table]. In the example above, `billing_dataset.enterprise_billing`.

A green check confirms there are no errors in the script.

2. Click **Preview results** to see a sample of the returned data.

3. Click **Connect** to pull the data into your Sheet.



This creates the Connected Sheet 1 tab and pulls all the data into this tab. You can close the "Start Analyzing" dialog box.

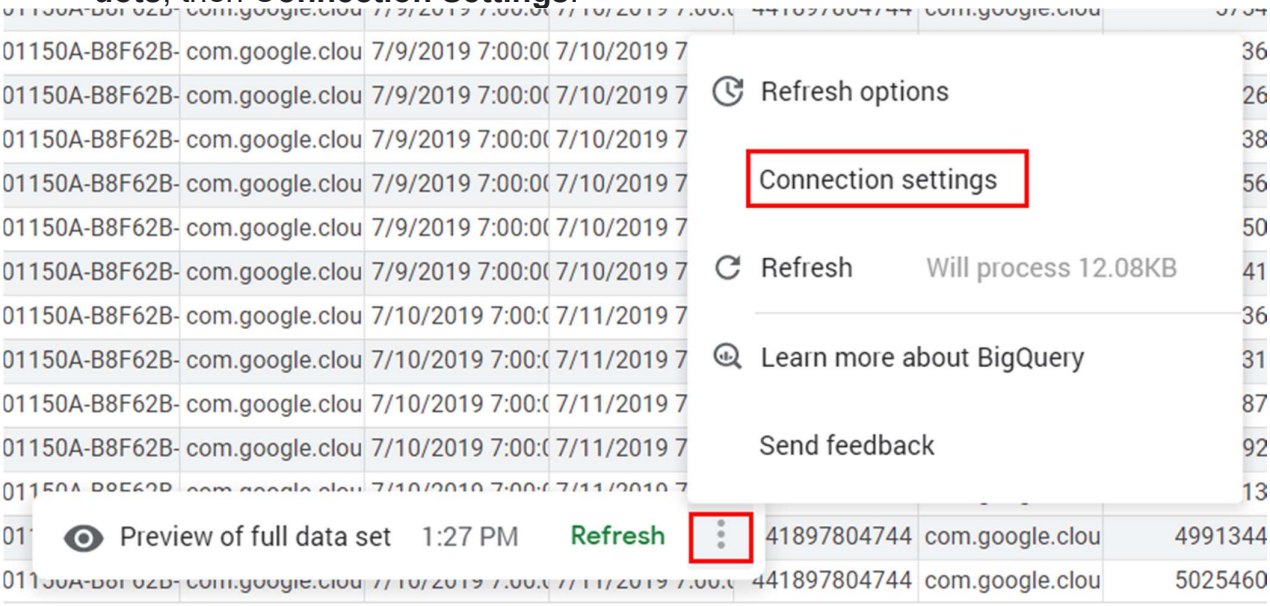
There is a time limit for a query execution of 4 minutes and 30 seconds, see Analyze BigQuery data within Sheets.
You could use the Filter feature to organize and analyze the data. However, depending on what you want to analyze, it may be more efficient to pull over a subset of your data.

Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully run a query to pull all the billing data into your spreadsheet, you will see an assessment score.

Refine your query

1. In the Preview of full data set tab, in the bottom left corner, click the **three vertical dots**, then **Connection Settings**.



The query editor opens.

2. Replace the existing query with the following to specify the columns, the project, and order of results.

```
SELECT
  billing_account_id,
  usage.amount,
  usage.unit,
  credits,
  Cost,
  Currency,
  project.ancestry_numbers,
  project.id,
  project.name,
  sku.description,
  usage_start_time,
  usage_end_time,
FROM
  billing_dataset.enterprise_billing
WHERE
  project.name IN ('CTG - Dev',
    'CTG - Prod')
  AND service.description = 'Compute Engine'
  AND cost > 0
  AND EXTRACT(month FROM usage_end_time) = 9
  AND EXTRACT(year FROM usage_end_time) = 2020
ORDER BY
  project.name
```

This query uses:

- `SELECT` to specify the columns

- `WHERE` to specify only data where the `project.name` is `CTG - Dev` or `CTG - Prod`, and the service is `Compute Engine` for the month September 2020 to limit the number of rows in the sheet.

- `ORDER BY` to do exactly that: order the results by `project.name`

3. When you see the green check, click **Connect**.

Look at your updated spreadsheet to see what changed.

Check my progress

Click **Check my progress** to verify your performed task. If you have successfully refine your query and insert data into your spreadsheet, you will see an assessment score.

Organize and analyze your spreadsheet

There are several features in Sheets to help you organize and analyze your billing data.

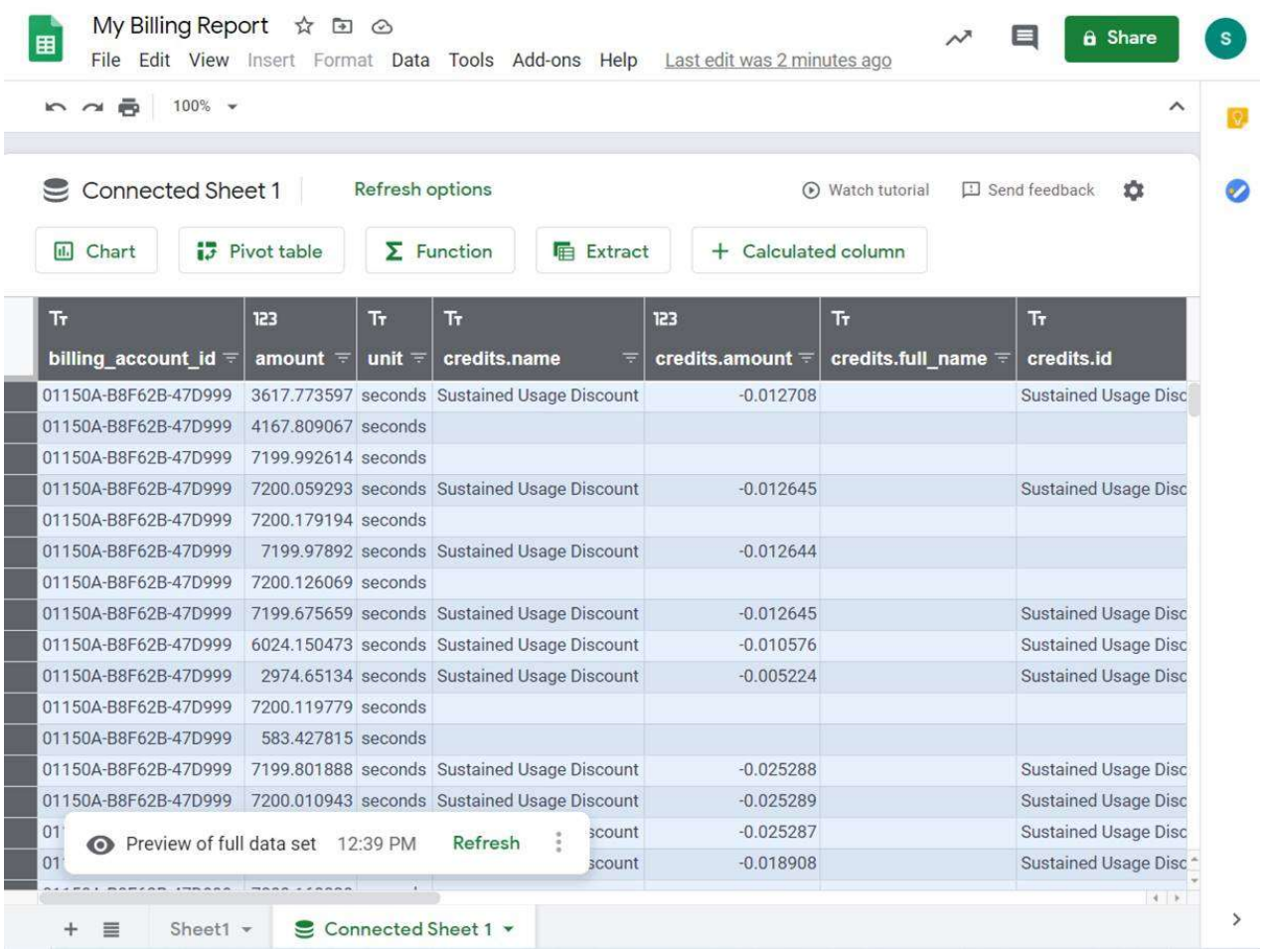
Organize your spreadsheet

1. Name your spreadsheet, then move it to a new folder.

- In the upper left, click **Untitled spreadsheet**.
- Rename the sheet "My Billing Report".
- Click **My Drive** > **New Folder** (folder icon in the bottom of the popup).
- Name the folder "Billing Reports", and then click the blue check to create the new folder.
- Click **Move here**.

2. Make the cells fit to text so you can better view your data.

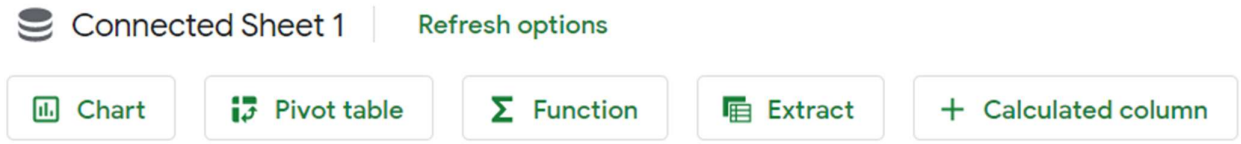
- Highlight all the columns.
- Put your cursor at the right outside edge of the top cell of the last column and double click. The cell width changes to fit the text for each column.


My Billing Report
File Edit View Insert Format Data Tools Add-ons Help Last edit was 2 minutes ago
Share
S
100%
Connected Sheet 1
Refresh options
Watch tutorial
Send feedback
Chart
Pivot table
Function
Extract
Calculated column
billing_account_id
amount
unit
credits.name
credits.amount
credits.full_name
credits.id
01150A-B8F62B-47D999 3617.773597 seconds Sustained Usage Discount -0.012708 Sustained Usage Disc
01150A-B8F62B-47D999 4167.809067 seconds
01150A-B8F62B-47D999 7199.992614 seconds
01150A-B8F62B-47D999 7200.059293 seconds Sustained Usage Discount -0.012645 Sustained Usage Disc
01150A-B8F62B-47D999 7200.179194 seconds
01150A-B8F62B-47D999 7199.97892 seconds Sustained Usage Discount -0.012644
01150A-B8F62B-47D999 7200.126069 seconds
01150A-B8F62B-47D999 7199.675659 seconds Sustained Usage Discount -0.012645 Sustained Usage Disc
01150A-B8F62B-47D999 6024.150473 seconds Sustained Usage Discount -0.010576 Sustained Usage Disc
01150A-B8F62B-47D999 2974.65134 seconds Sustained Usage Discount -0.005224 Sustained Usage Disc
01150A-B8F62B-47D999 7200.119779 seconds
01150A-B8F62B-47D999 583.427815 seconds
01150A-B8F62B-47D999 7199.801888 seconds Sustained Usage Discount -0.025288 Sustained Usage Disc
01150A-B8F62B-47D999 7200.010943 seconds Sustained Usage Discount -0.025289 Sustained Usage Disc
-0.025287 Sustained Usage Disc
-0.018908 Sustained Usage Disc
Preview of full data set 12:39 PM Refresh
Sheet1
Connected Sheet 1

Analyze your data

Calculated column

1. In ribbon, click **Calculated column**.



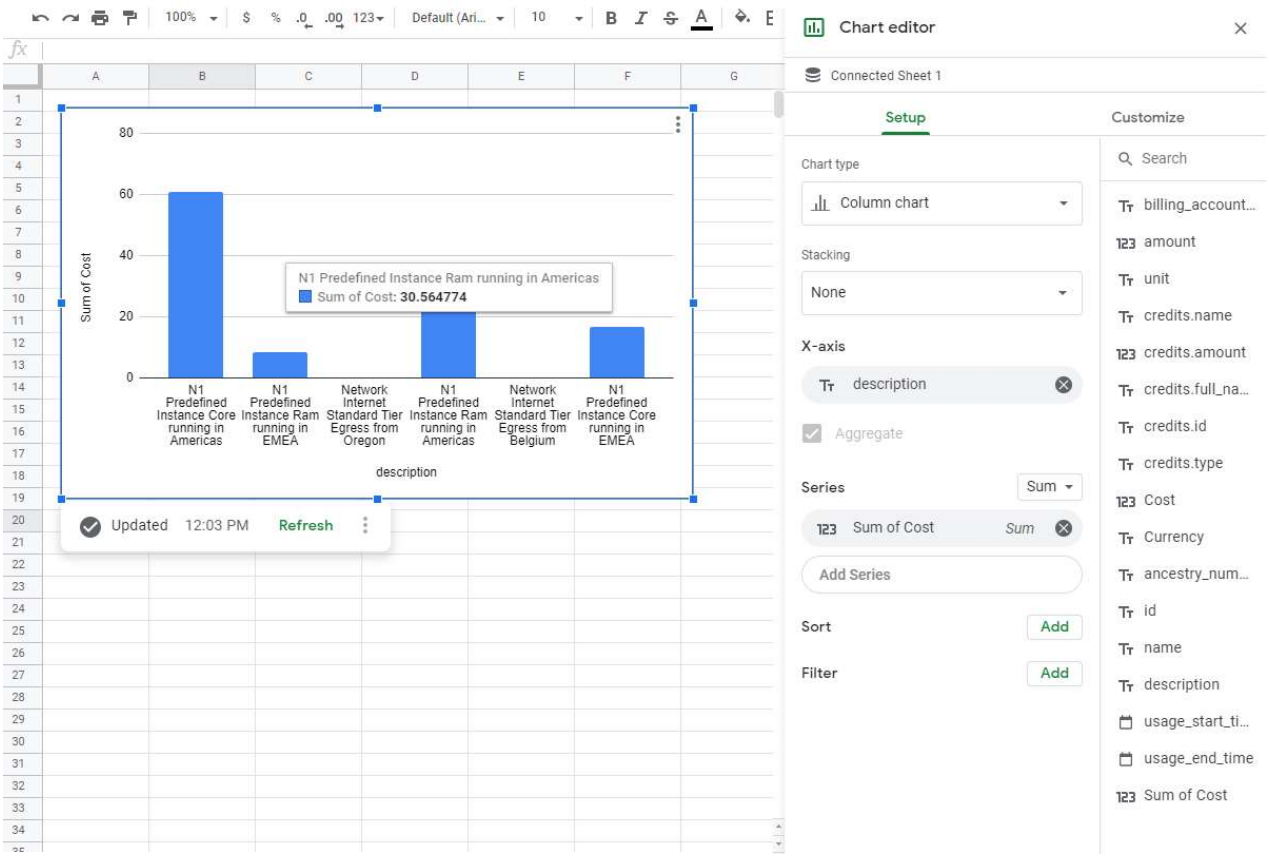
2. In the Add calculated column window, in the right column, scroll down to the Cost column and select it.

3. Click into the Calculated column name field, and call it "Sum of Cost". You'll see the columns that will be used are highlighted. Click **Add**. You'll see it added into your spreadsheet. To the bottom left click **Apply**.

Chart

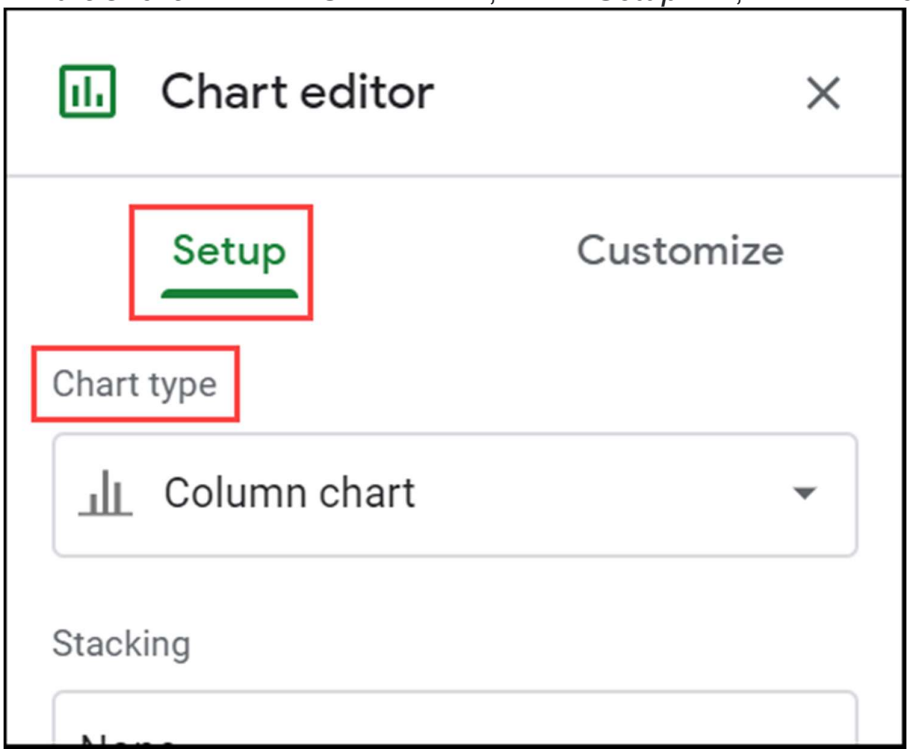
1. Click the **Chart** button in the ribbon, leave **New Sheet** selected, then click **Create**.

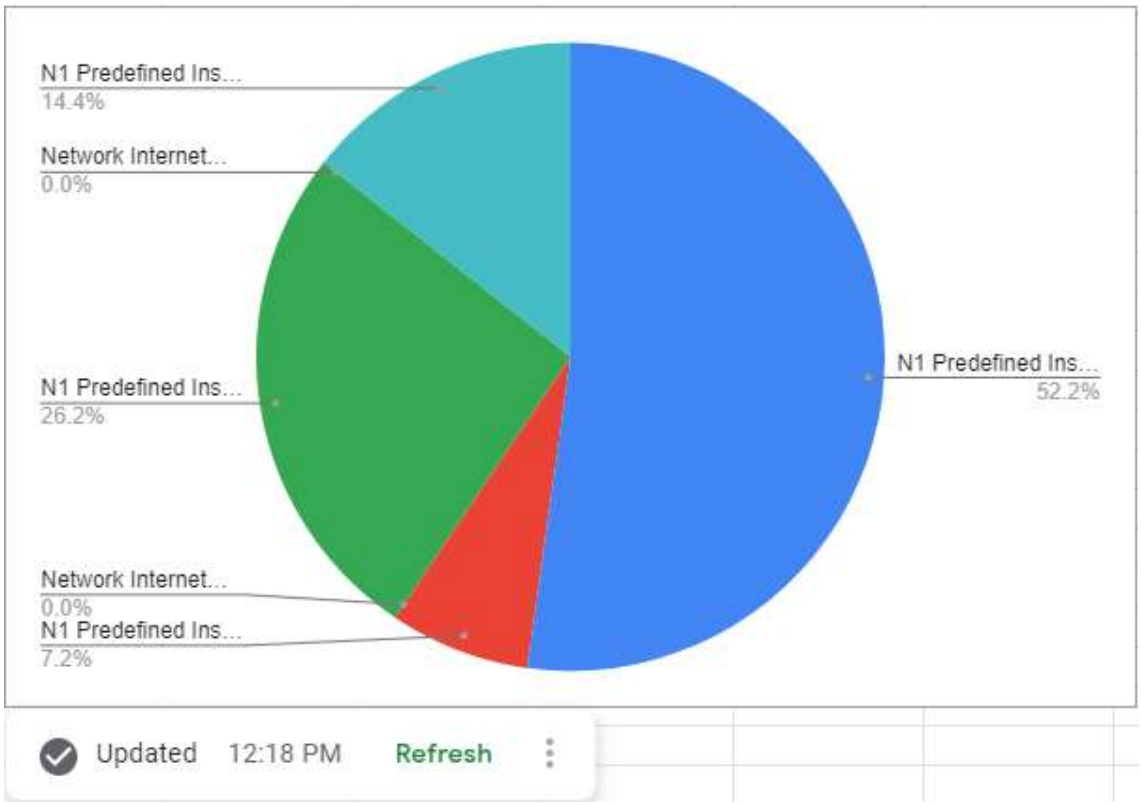
2. In the Chart Editor, from the Cutomize column, drag the **description** column up to the X-axis in the Setup column and drag **Sum of Cost** under Series in the Setup column . Click **Apply**.



3. Check out the chart. Take a few minutes to explore:

- Resize and move the chart around in the spreadsheet.
- Click on the chart, then hover over the the different areas to see the pop-up descriptions.
- Click the three vertical dots in the right corner of the chart to see what other options are available. What would this chart look like as a Pie Chart? (Hint: click the three vertical dots > **Edit chart...**. In the Chart editor, in the *Setup* tab, look at **Chart type**.)





- Can you figure out how to change the chart and axis titles? **Hint:** double click the title to select, then type a different name. To reformat, look in the Chart editor in the Customize tab.

Pivot table

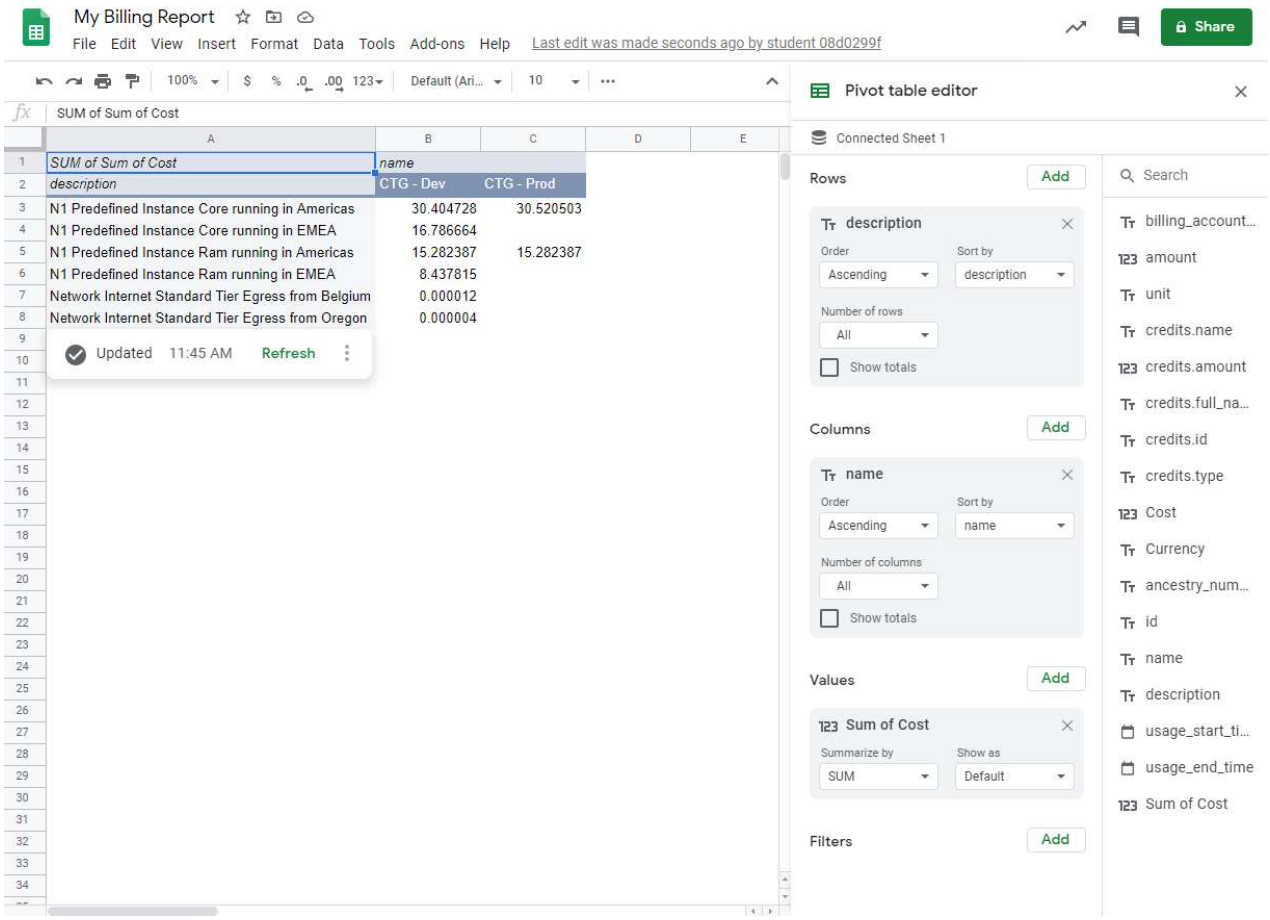
1. Return to the Connected Sheet 1 tab, then click on the **Pivot table** button in the ribbon. Leave **New Sheet** selected, then click **Create**.

2. Next, add the following columns to the Pivot Table Editor:

Field	Value
Rows	description
Columns	name
Value	Sum of Cost

3. Click **Apply**.

4. While you're here, fit the text to cell width to make the table readable and check out other updates you can make using the Pivot table editor. (Click inside the pivot table to see the Pivot table editor in the right panel.)


My Billing Report
File Edit View Insert Format Data Tools Add-ons Help
Last edit was made seconds ago by student 08d0299f
Share
SUM of Sum of Cost
SUM of Sum of Cost | name
description | CTG - Dev | CTG - Prod
N1 Predefined Instance Core running in Americas | 30.404728 | 30.520503
N1 Predefined Instance Core running in EMEA | 16.786664
N1 Predefined Instance Ram running in Americas | 15.282387 | 15.282387
N1 Predefined Instance Ram running in EMEA | 8.437815
Network Internet Standard Tier Egress from Belgium | 0.000012
Network Internet Standard Tier Egress from Oregon | 0.000004
Updated 11:45 AM
Refresh
Pivot table editor
Connected Sheet 1
Rows
Add
description
Order
Ascending
Sort by
description
Number of rows
All
Show totals
Columns
Add
name
Order
Ascending
Sort by
name
Number of columns
All
Show totals
Values
Add
Sum of Cost
Summarize by
SUM
Show as
Default
Filters
Add
Search
billing_account...
amount
unit
credits.name
credits.amount
credits.full_na...
credits.id
credits.type
Cost
Currency
ancestry_num...
id
name
description
usage_start_ti...
usage_end_time
Sum of Cost

Schedule a refresh of your data

You must periodically refresh your data to keep your spreadsheet current. When you refresh your data, all charts and pivot tables created within the spreadsheet are also refreshed.

Re-running a query in BigQuery to refresh data on your personal account may incur additional charges.
To *automatically* refresh your data, record a macro, and then add a trigger to schedule it.

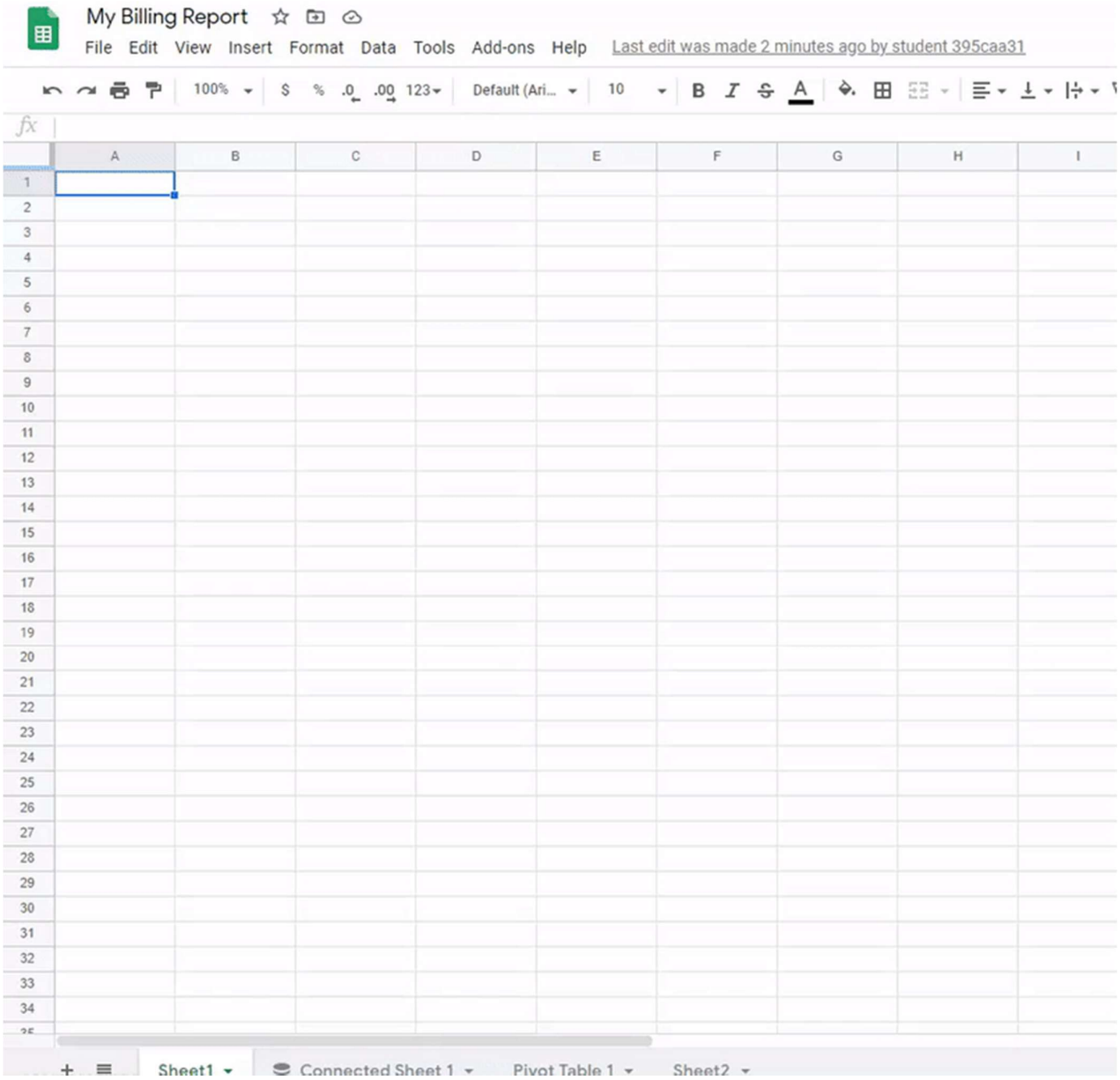
Record a macro to refresh your data

1. In your Sheet, click on a tab that that has no data, for example, Sheet1. Create a new tab if necessary.

2. From the menu, select **Tools** > **Macros** > **Record Macro**.

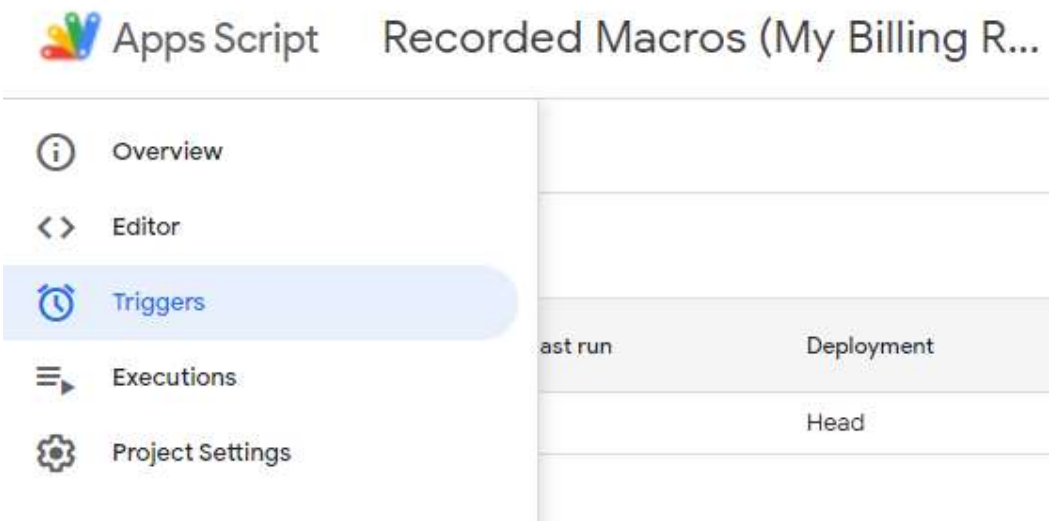
The macro starts recording steps.

3. Click the Connected Sheet 1 tab and click **Refresh** in the bottom left corner of the spreadsheet.
4. Click **Save** in the macro popup.
5. Name the macro "Refresh Data" and click **Save**.



Schedule your macro

1. From the menu bar, select **Tools** > **Script editor**.
2. In the **Recorded Macros** window, click **Triggers**.

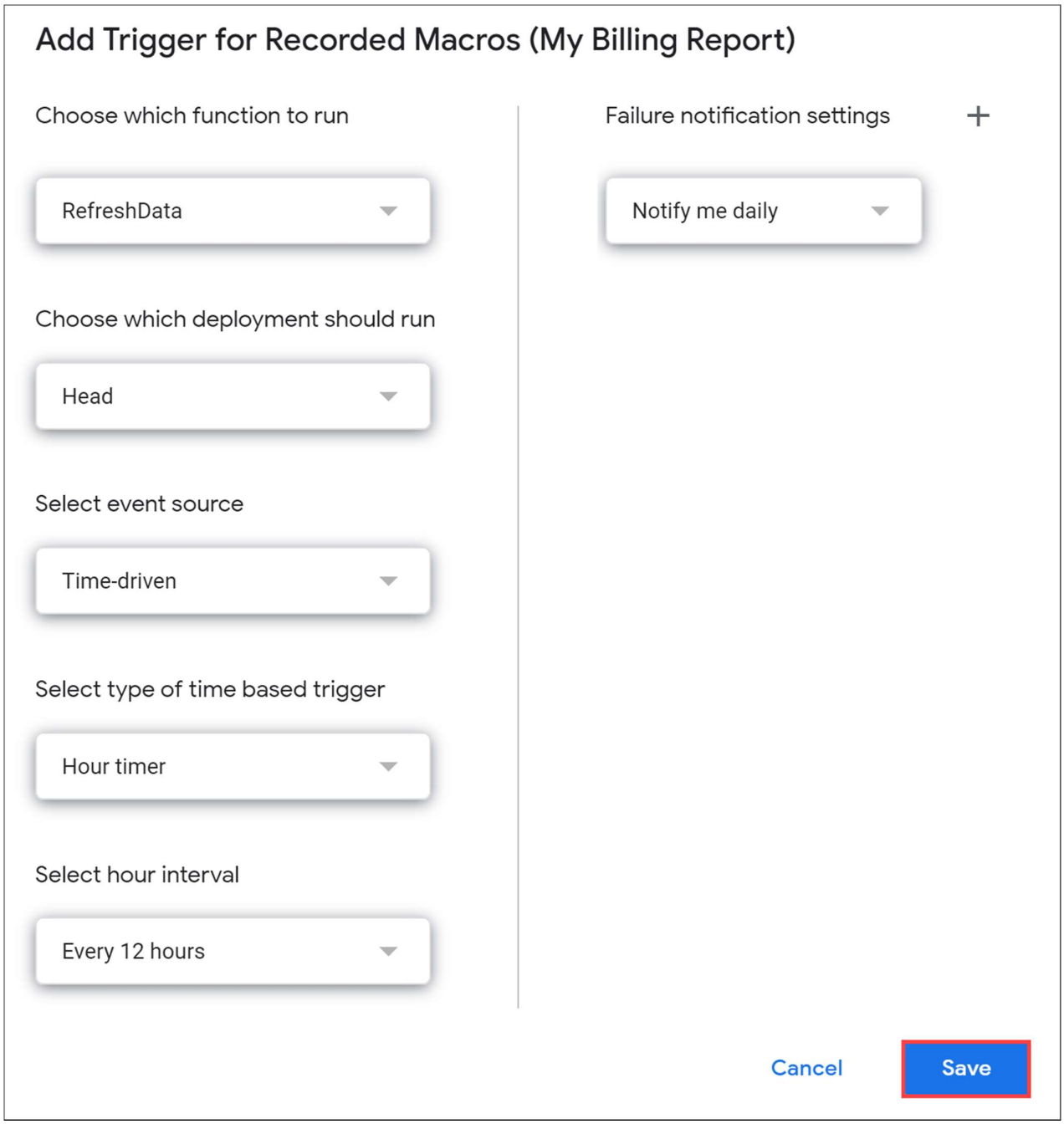


3. At the bottom right, click **Add Trigger**.

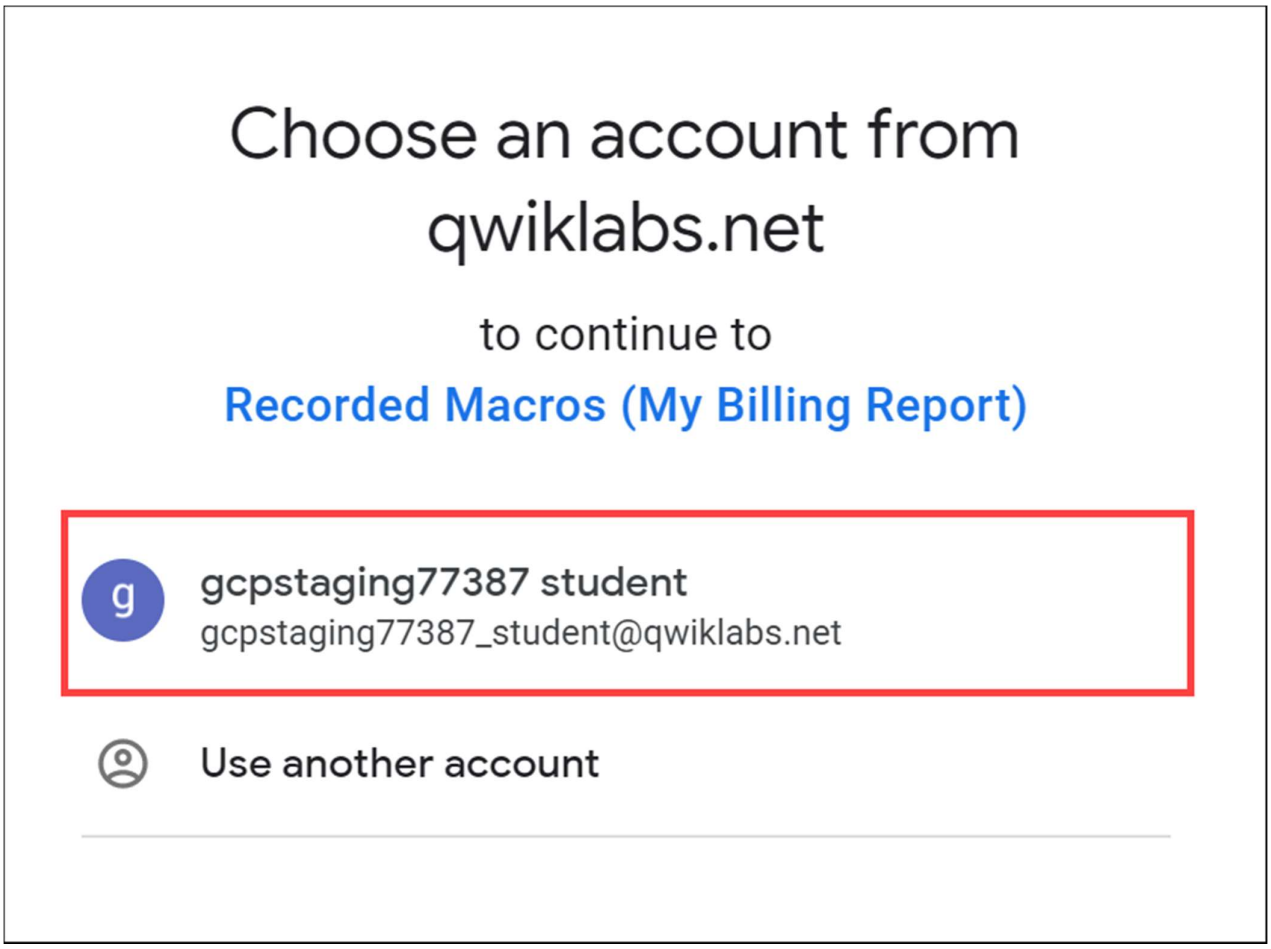
4. The default trigger starts the macro when you open the spreadsheet. Update it to start the macro every 12 hours.

- In the **Add Trigger for Recorded Macros** dialog, update the following fields and leave all others at the default values:

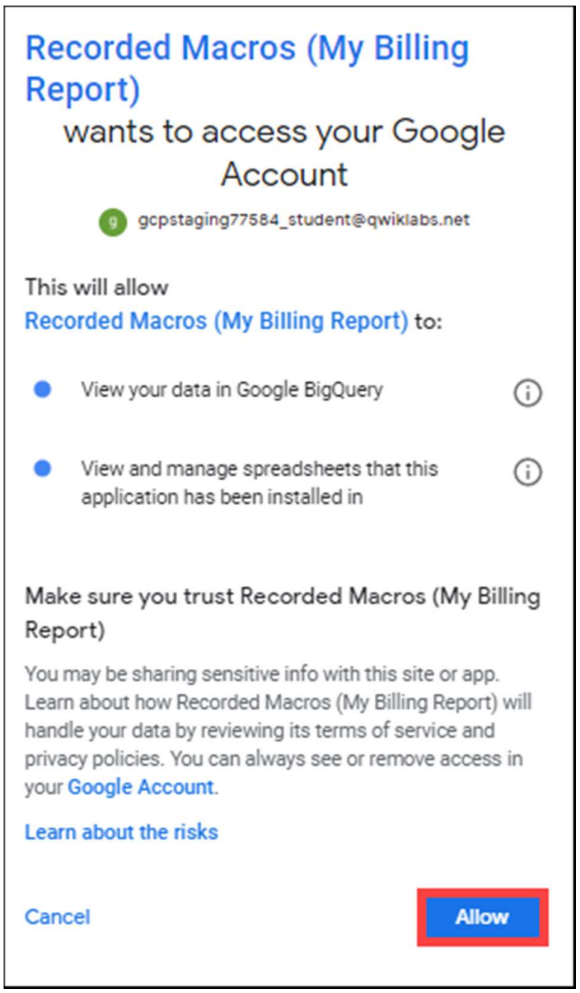
Field	Value
Select event source	Time-driven
Select type of time based trigger	Hour timer
Select hour interval	Every 12 hours



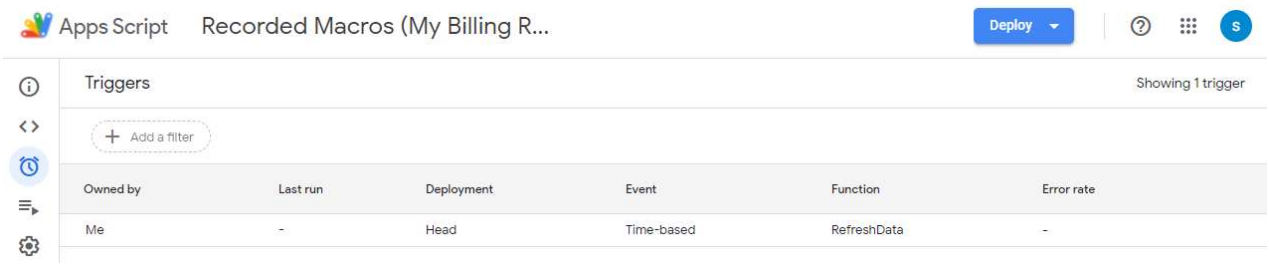
- Click **Save**.
- In the **Choose an account** dialog, click your lab **Username** to continue to Recorded Macros.



- In the **Recorded Macros wants to access your Google account** dialog, click **Allow** to allow your spreadsheet to view your data in BigQuery and view and manage spreadsheets that this application has been installed in.



View your trigger in the trigger list.



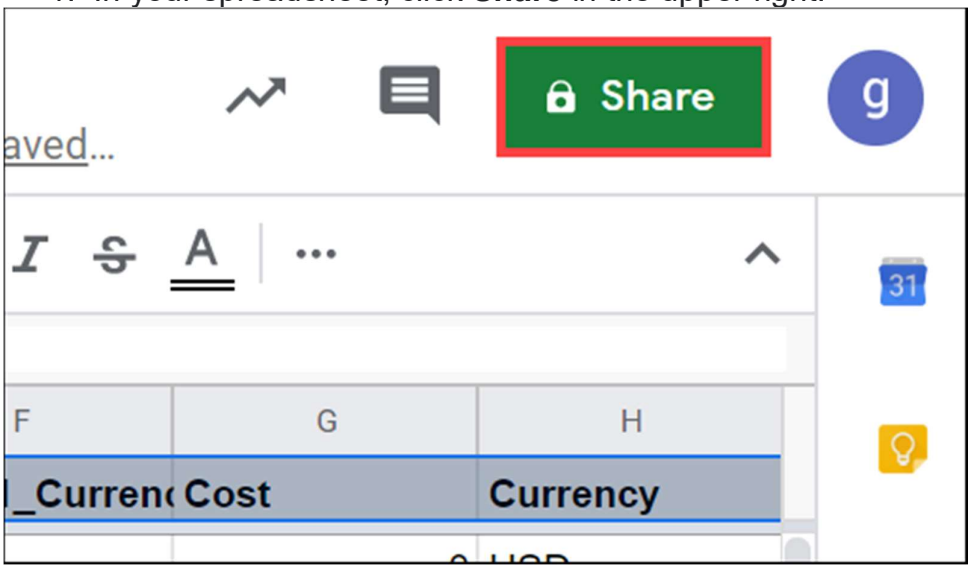
Now your spreadsheet will refresh the data from BigQuery every 12 hours.

Change who can see and edit queries and results

You determine who can see and edit queries and results by setting access to the spreadsheet. You set access by sharing your Sheet.

Share with specific people

1. In your spreadsheet, click **Share** in the upper right.



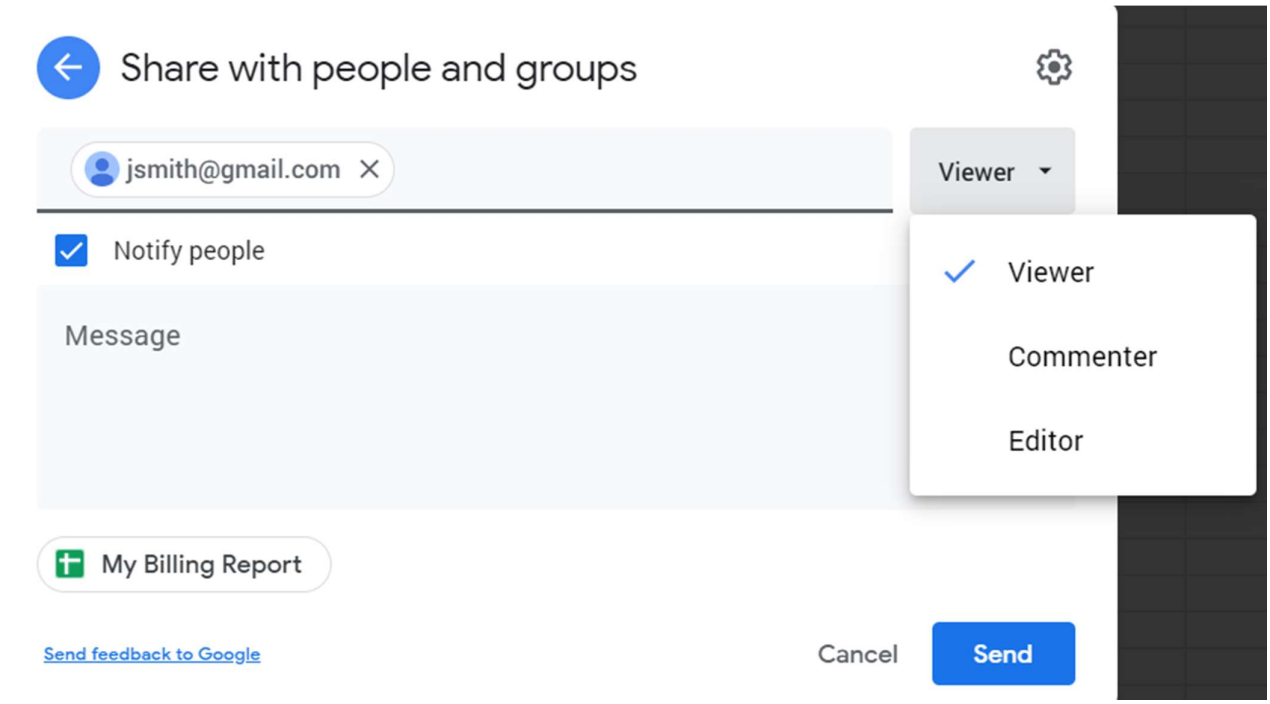
2. Under **Share with people and groups**, enter an email address that you want to share with.

If you share with an email address that is not within a G Suite Business, Enterprise and Education account, they'll only be able to view the file.

3. You cannot share files from within Qwiklabs with an email address that is not a Qwiklabs owned account.

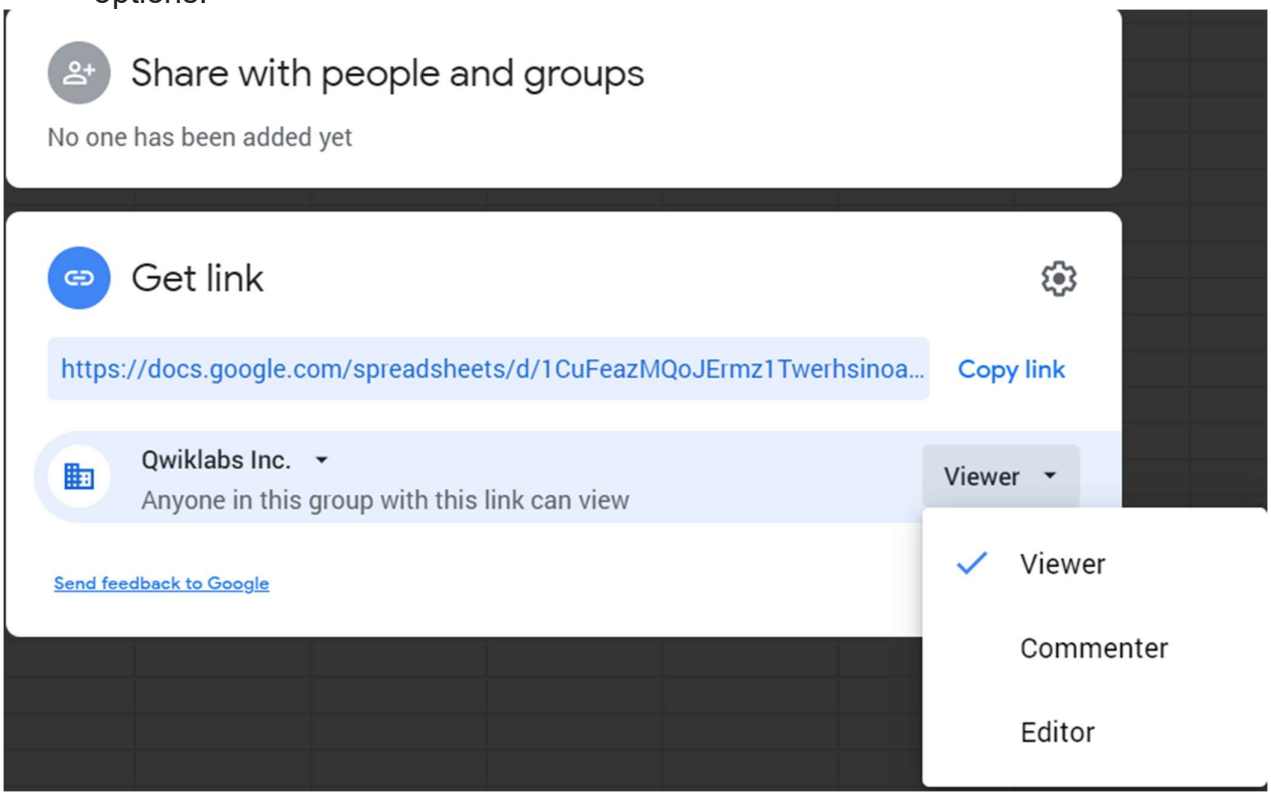
Option	Description
View	Can view, but can't change or share the file with others.
Comment	Can make comments and suggestions, but can't change or share the file with others.
Edit	Can make changes, accept or reject suggestions, and share the file with others. This includes using Sheets data connector to query the source data.

4. If you don't want to send an email notification to people, uncheck the Notify people box. If you notify people, each email address you enter will be included in the email.
5. Click **Send**.



Share with a link to the file

1. In your spreadsheet, click **Share**.
2. Click on **Get link**.
3. Click on the **Restricted** and select **Qwiklabs Inc.** dropdown to choose one of the options.



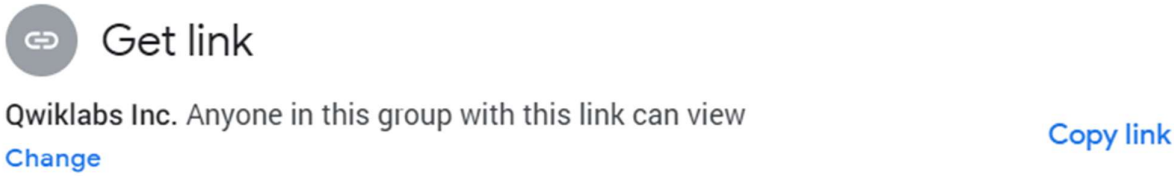
Option	Description
Can view	Can view, but can't change or share the file with others.
Can comment	Can make comments and suggestions, but can't change or share the file with others.
Can edit	Can make changes, accept or reject suggestions, and share the file with others. This includes using Sheets data connector to query the source data.

4. Click **Copy link** and paste the link in an email or any place you want to share it.

5. Click **Done**

Change who your link is shared with

1. In your sheet, in the top right, click **Share**.
2. In the Get Link dialog, under the organization name, click **Change**.



3. Use the permission dropdown to update what the group can do.

4. Click **Done**.

Congratulations!

You used the Sheets data connector to query BigQuery and pull data into your spreadsheet, then analyzed the data, scheduled the spreadsheet to automatically refresh, and reviewed how you share your spreadsheet.

Next steps / learn more

See Introduction to SQL for BigQuery and Cloud SQL to learn more about BigQuery queries.
Learn more about Google Sheets and the BigQuery connector.

Google Cloud Training & Certification

...helps you make the most of Google Cloud technologies. Our classes include technical skills and best practices to help you get up to speed quickly and continue your learning journey. We offer fundamental to advanced level training, with on-demand, live, and virtual options to suit your busy schedule. Certifications help you validate and prove your skill and expertise in Google Cloud technologies.
Manual Last Updated February 12, 2021
Lab Last Tested February 12, 2021