Visualizing Billing Data with Google Data Studio

GSP622

Overview

Introduction

Google Data Studio allows you to unlock the power of your data with interactive dashboards and beautiful reports that inspire smarter business decisions.
With Data Studio, you can:

- **Connect**: easily access a wide variety of data. With built in and partner connectors, you can connect to virtually any type of data stream.
- **Visualize**: turn your data into compelling stories of data visualization art. You can quickly build dashboards with Data Studio's web-based reporting tools.
- **Share**: share your reports and dashboards with individuals, teams, or the world. Collaborate in real time. Embed your report on any page.
  In this lab, you will learn how to build data visualizations with Google Data Studio. You will first explore a sample Google Cloud bill and learn how to export the billing data to BigQuery—Google's serverless, highly scalable enterprise data warehouse that is designed to make data analysts more productive with unmatched price-performance. After running a few SQL queries on your billing data, you will export those metrics to Data Studio, where you will explore the service's chief features and build your own billing data visualizations.

Objectives

In this lab, you will learn how to:

- Use the billing service in the Cloud Console to explore projects and their consumption of cloud computing resources.
- Export billing data to BigQuery.
- Explore your billing data in BigQuery.
- Run SQL queries to better understand a project's consumption of Google Cloud services.
- Export your queried data to Data Studio.
- Explore Data Studio tools and generate visualizations with your queried data.
  Once you're ready, scroll down and follow the steps below to get your lab environment set up.

Setup and Requirements

Qwiklabs setup

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:

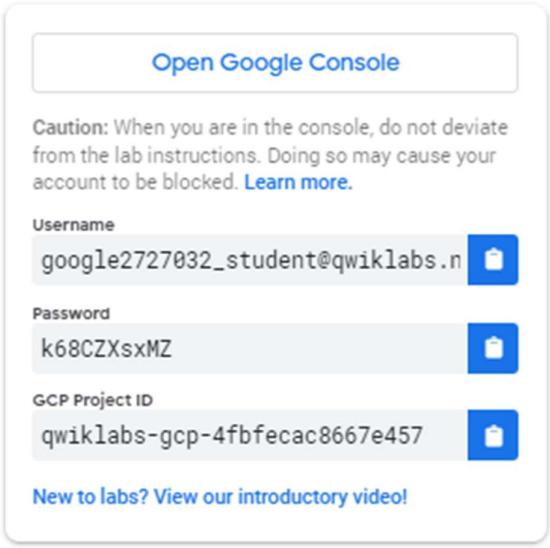
- Access to a standard internet browser (Chrome browser recommended).
- Time to complete the lab.
  Note: If you already have your own personal Google Cloud account or project, do not use it for this lab.

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

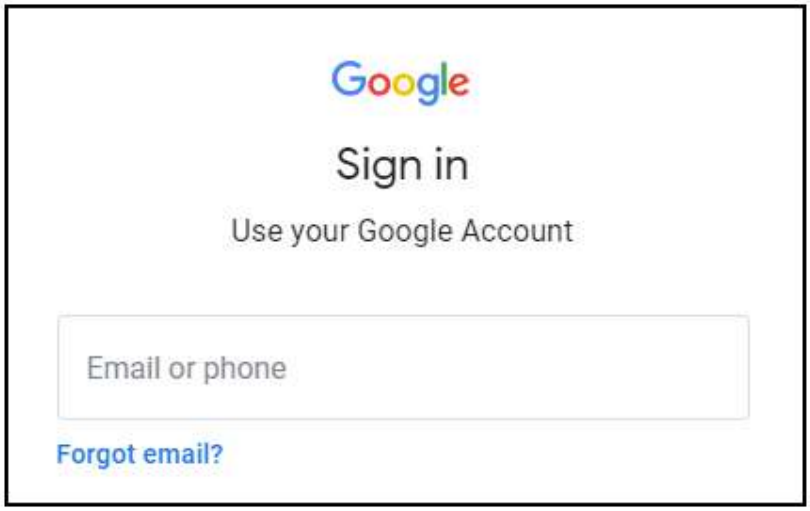
Cloud Console

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

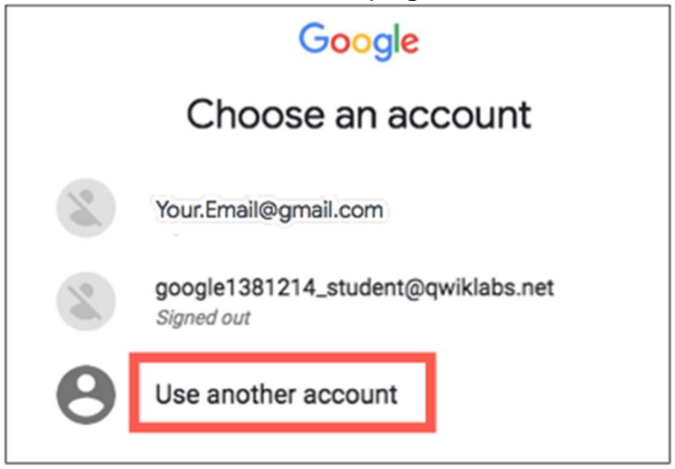


2. Copy the username, and then click **Open Google Console**. The lab spins up resources, and then opens another tab that shows the **Sign in** page.



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

If you see the **Choose an account** page, click **Use Another Account**.



3. In the **Sign in** page, paste the username that you copied from the Connection Details panel. Then copy and paste the password.

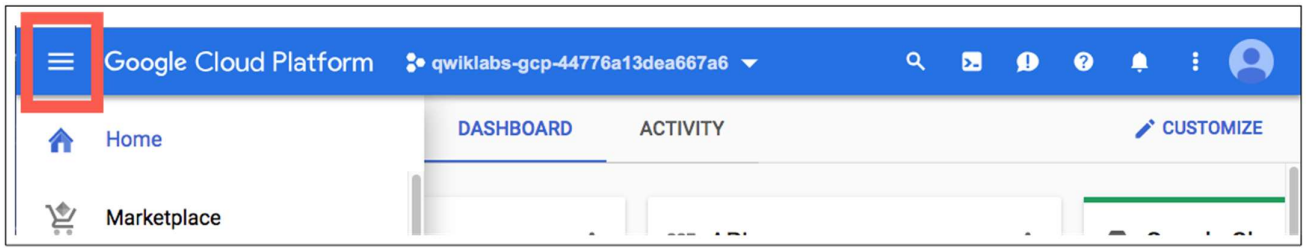
   Important: You must use the credentials from the Connection Details panel. Do not use your Qwiklabs credentials. If you have your own Google Cloud account, do not use it for this lab (avoids incurring charges).

4. 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.



Explore the demo projects and their associated bills

To explore your billing data, you first need to identify the dataset you want to focus on. This lab provides sample data for you to use.

1. On the **Navigation menu**, click **Billing**.

2. You are prompted to select a billing account—click **Manage billing accounts**. You should see one billing account named **Google Cloud Cost Management Billing Demo**.

3. Click **Google Cloud Cost Management Billing Demo**.

The **Billing Account Overview** window opens.

4. In the right panel, click **Manage** to see the Google Cloud projects associated with this billing account:

- `CTG - Storage`
- `CTG - Dev`
- `CTG - Prod`
- `CTG - Sandbox`

These four Google Cloud projects illustrate a common enterprise schema, where you have different projects for development, production, storage, and sandbox testing.

The billing data that you work with in this lab is associated with these four projects. The data is in the form of a CSV (spreadsheet) file.

5. In the left panel, click **Overview** to see the Billing Account Overview. Scroll down to explore the data and charts that track your billing account.

6. In the left panel, click **Reports** to see a Report for your billing account.

Notice the cost trends per project and when prices rise and fall. Note the other options in the left panel.

Export your data to BigQuery - information only

This section is for demonstration purposes only. Follow along, but do not try to replicate these steps in your lab environment (they will not work.) You can go through these steps in your own Google Cloud project(s) at a later time if you wish to ingest your billing data in BigQuery.

BigQuery is a fully-managed data warehouse that runs on Google Cloud. You can use BigQuery to easily query and filter large datasets, aggregate results, and perform complex operations to optimize data analysis.

The billing data you explored in the last section was exported to BigQuery when this lab spun up. This section describes the process for information purposes only.

1. In the left panel, click **Billing export**. The **Billing export** window opens with the **BigQuery Export** tab selected by default.

2. Click **EDIT SETTINGS** to show the export options.

If you click on **EDIT SETTINGS** in this lab, a "Failed to load" message is displayed. Click the back arrow on your browser to return to the previous window.

3. Set **Projects** to the project that contains your billing account.

4. Set **Billing export dataset** to the BigQuery dataset where you want to host this data.

5. Click **SAVE**.

This kicks off a job where your billing data is saved as a table in the selected BigQuery dataset. If you open the BigQuery UI you will find the table populated with your billing data. It's as easy as that!

Note that a billing export takes some time to populate (a few hours to a day).

The billing data for this lab has already been exported to a table in BigQuery. Following BigQuery's `project.dataset.table` convention, the full path to the billing data is:

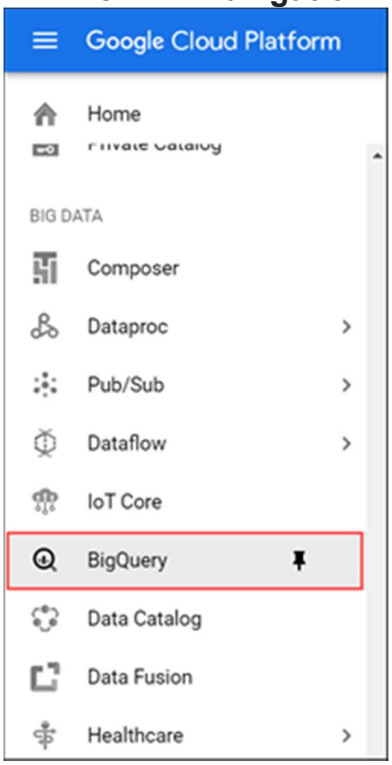
```
ctg-storage.bigquery_billing_export.gcp_billing_export_v1_01150A_B8F62B_47D999
```

You use this path to query project data.

Explore your billing data in BigQuery

The billing data was automatically exported into BiqQuery when the lab spun up. In this section, you use an SQL query in BigQuery to see what information's available.

1. On the **Navigation menu**, scroll down and click **BigQuery**.



2. If prompted with a "Welcome to BigQuery in the Cloud Console" message, click **Done**.

BigQuery opens.

3. Under Select a recent project, click the tile with your **Project ID**.

Your **Project ID** is the left panel in your lab instructions.

The BigQuery console opens. In the left panel, under **Resources**, you see your project. Your project name is your **Project ID**.

4. Run a query to view data information.

- Type or paste the following SQL query into the **Query editor**:

```
SELECT * FROM `ctg-
storage.bigquery_billing_export.gcp_billing_export_v1_01150A_B8F62B_47D999`
```

`SELECT *` returns all column values from a specified table.

- Click **Run** to run the query. You should receive similar results:

Query results SAVE RESULTS EXPLORE WITH DATA STUDIO

Query complete (0.0 sec elapsed, cached)

Job information | Results | JSON | Execution details

Row	billing_account_id	service.id	service.description	sku.id	sku.description
1	01150A-B8F62B-47D999	1F14-4801-0E16	Cloud Scheduler	A5D6-43A2-28A7	Jobs
2	01150A-B8F62B-47D999	95FF-2EF5-5EA1	Cloud Storage	1C42-50D6-1B1D	Coldline Data Retrieval
3	01150A-B8F62B-47D999	95FF-2EF5-5EA1	Cloud Storage	3953-E539-F17F	Multi-Regional Coldline Storage Asia (Early Delete)
4	01150A-B8F62B-47D999	95FF-2EF5-5EA1	Cloud Storage	2D3D-C91F-7E7C	Multi-Regional Coldline Storage Asia
5	01150A-B8F62B-47D999	95FF-2EF5-5EA1	Cloud Storage	9ADA-9AED-1B24	Class A Request Multi-Regional Storage
6	01150A-B8F62B-47D999	95FF-2EF5-5EA1	Cloud Storage	6B37-399C-BF69	GCP Storage egress between NA and APAC
7	01150A-B8F62B-47D999	F17B-412E-CB64	App Engine	8AE6-668C-FBCB	Task Queue Storage
8	01150A-B8F62B-47D999	95FF-2EF5-5EA1	Cloud Storage	0D5D-6E23-4250	Multi-Regional Storage US
9	01150A-B8F62B-47D999	95FF-2EF5-5EA1	Cloud Storage	A1F1-940B-6E1A	Class A Request Coldline Storage

Check my progress

Click **Check my progress** to verify your performed task. If you have successfully run a query to get all column values from table, you will see an assessment score.

Inspect the table (be sure to scroll left and right) and answer the following questions so you become more familiar with this data:

Roughly, how many rows of data are there?
thousands
Under the table in **Query results**, you see that there are thousands of rows of data.

Josie wants to know the BigQuery service usage on a certain date at a certain time for the CTG - Storage project. What column would have that information?
usage.amount

You found the answer to this question by looking at the BigQuery table created in your first SQL query. For more complicated questions you would run more complicated SQL queries to analyze your date. Think of the insights you could gain!

Run SQL queries in BigQuery and build data visualizations with Data Studio

You've explored a sample billing account in BigQuery that has thousands of rows of information. For this information to be useful you must be able to analyze the data to provide specific information. In BigQuery, you run SQL queries to answer questions to provide that specific information.

In this section, you ask two sample questions and use BigQuery to get that information. You then use Google Data Studio to to build report with data visualizations to share those insights.

The billing data provided in this lab is dynamic, the number of logs and rows in the table will be different. **Your query and console outputs may be different than the images in the lab instructions.**

Question 1: Which service types are most and least used

To find which service types are most and least used, you must determine:

- What types of services do the 4 projects use.
- Which service types are most and least used.

For the answers, run SQL queries on the billing data you have hosted in BigQuery.

Query to identify service types

1. Click **Compose New Query** to clear the **Query editor**.

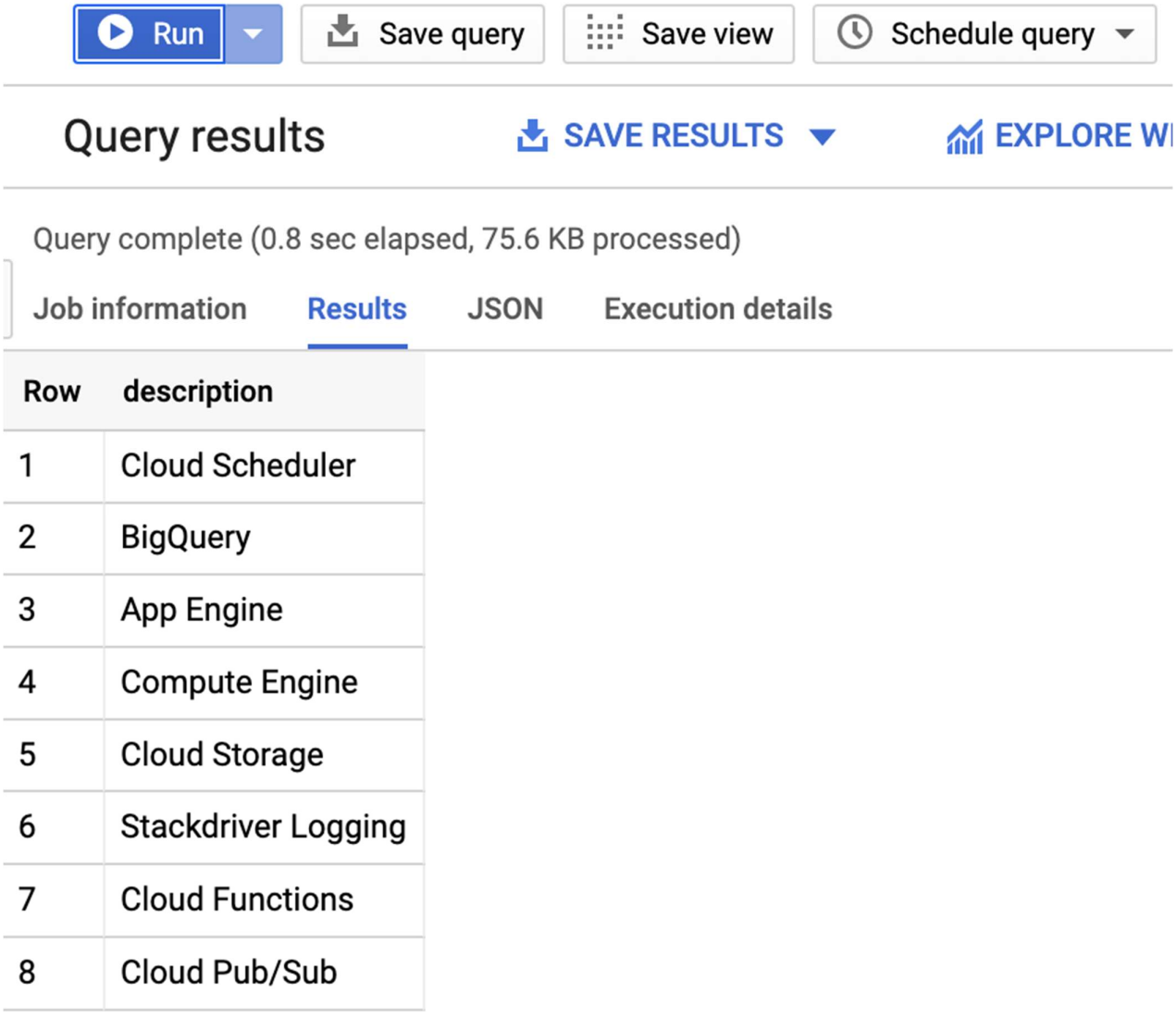
2. Type or paste the following into the **Query editor** to find out which services the four projects consume.

```
SELECT service.description FROM `ctg-
storage.bigquery_billing_export.gcp_billing_export_v1_01150A_B8F62B_47D999` GROUP BY
service.description
```

The `service.description` column tells you what Google Cloud service is associated with each log.The `GROUP BY` keyword aggregates result-set rows that share common criteria (in this case the service description) and returns all of the unique entries found for such criteria.

2. Click **Run**.

The results show that the four projects use 8 different types of Google Cloud services:



Check my progress

Click **Check my progress** to verify your performed task. If you have successfully run a query to get service.description column values, you will see an assessment score.

Query to find which service types are most and least used

1. Click **Compose New Query** to clear the **Query editor**.

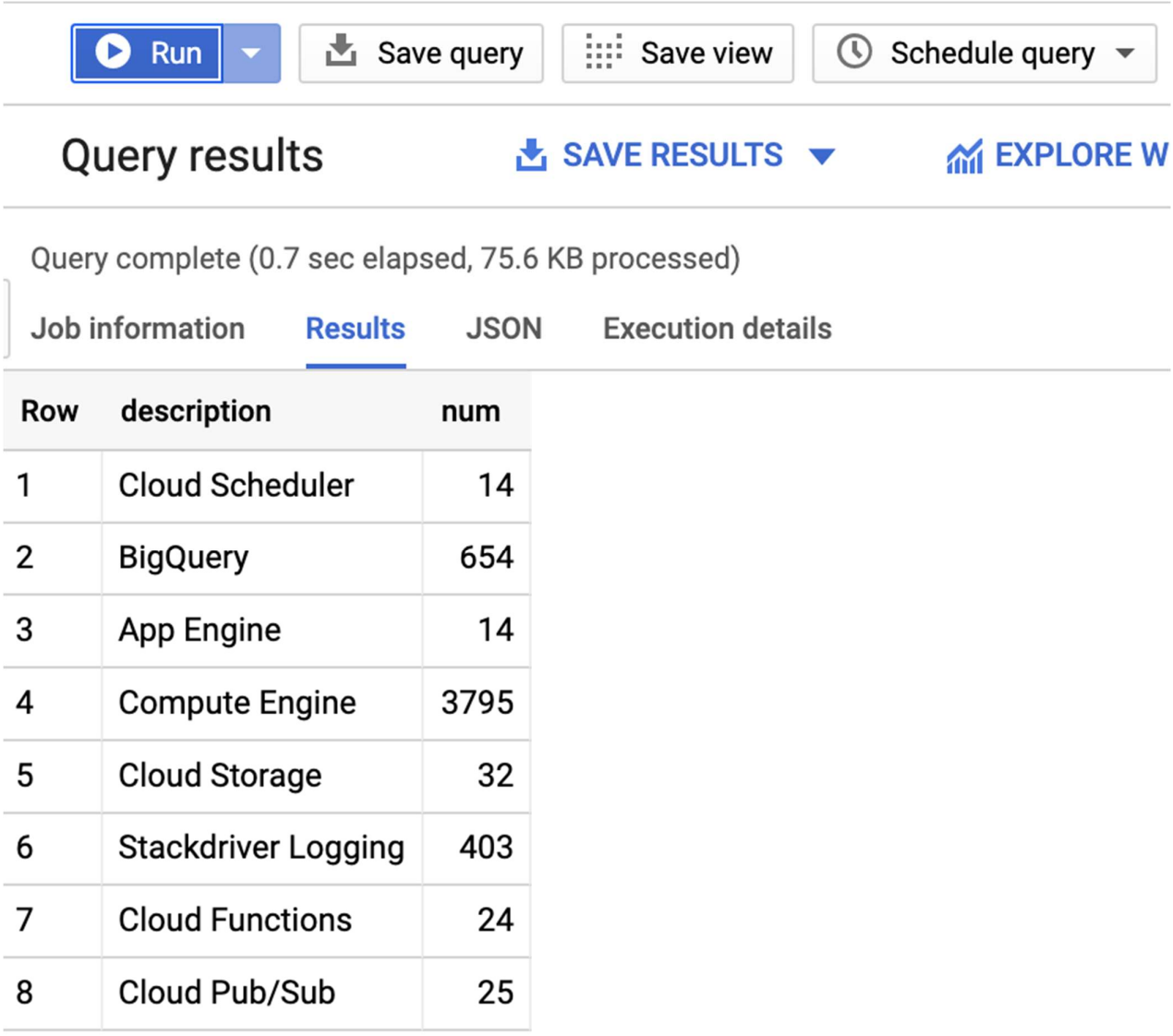
2. Type or paste in the following query into the **Query editor** to determine which service types are most and least used:

```
SELECT service.description, COUNT(*) AS num FROM `ctg-
storage.bigquery_billing_export.gcp_billing_export_v1_01150A_B8F62B_47D999` GROUP BY
service.description
```

The `COUNT(*)` function returns the number of rows that share the same criteria (in this case the service description).

3. Click **Run**.

Your results should look similar to the example table below, but your actual query output will be different.



Row	description	num
1	Cloud Scheduler	14
2	BigQuery	654
3	App Engine	14
4	Compute Engine	3795
5	Cloud Storage	32
6	Stackdriver Logging	403
7	Cloud Functions	24
8	Cloud Pub/Sub	25

In this example, and in terms of service logs, the projects use Compute Engine the most (3795 logs) and Cloud Scheduler and App Engine the least (14 logs). *Remember, your query output will be different!*

Check my progress

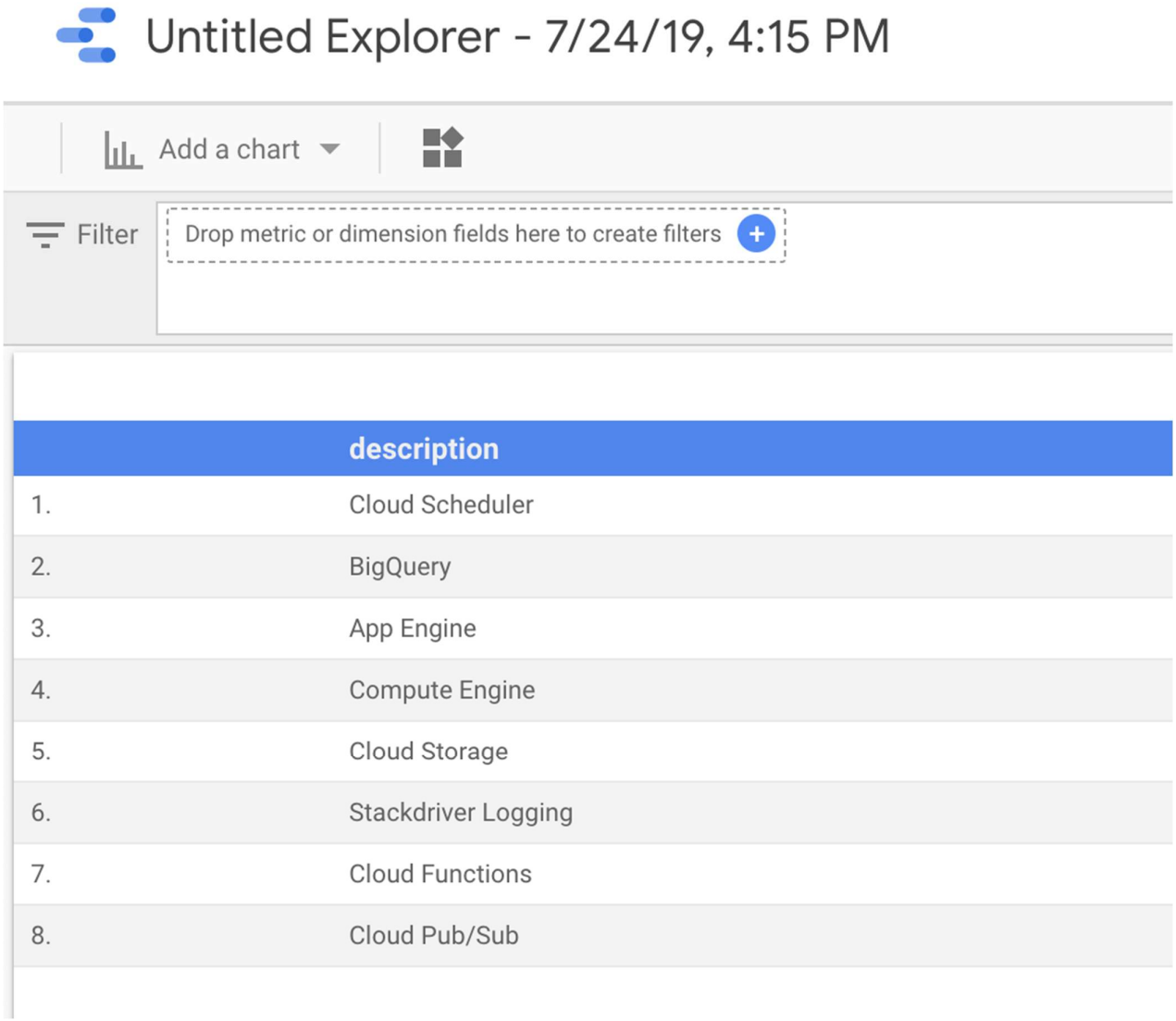
Click **Check my progress** to verify your performed task. If you have successfully run a query to find out which services are used the most and least, you will see an assessment score.

1. To the right of **Query results**, click **Explore Data**, and then **Explore with Data Studio**.

Google Data Studio opens.

2. Step through the subsequent pages:

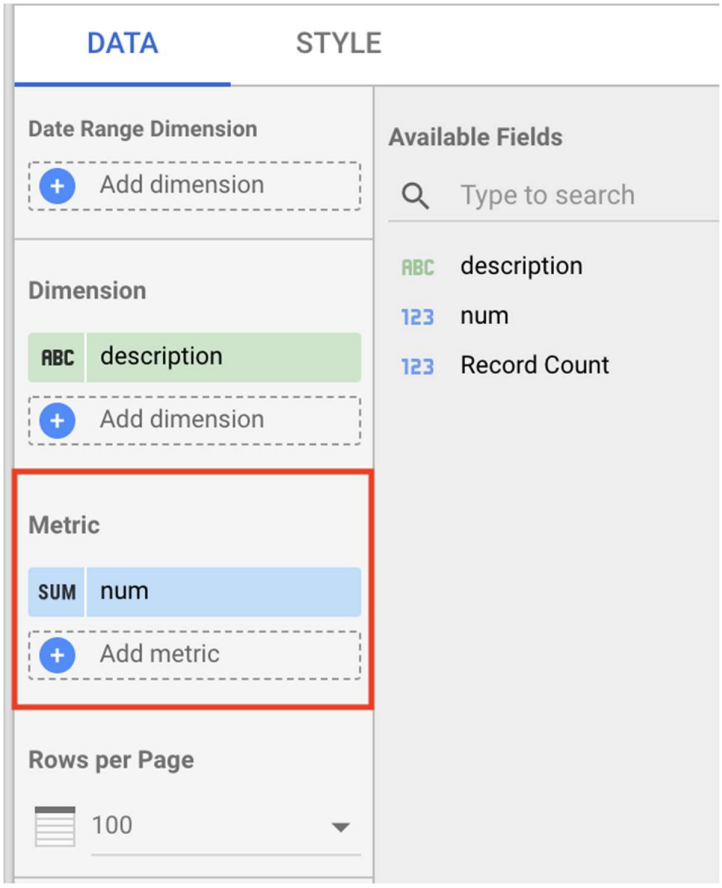
- Click **Get Started**.
- Click **Authorize**.
  You should see the following:



3. In the upper right, click **Untitled Explorer** and rename this report to **Services Breakdown**.

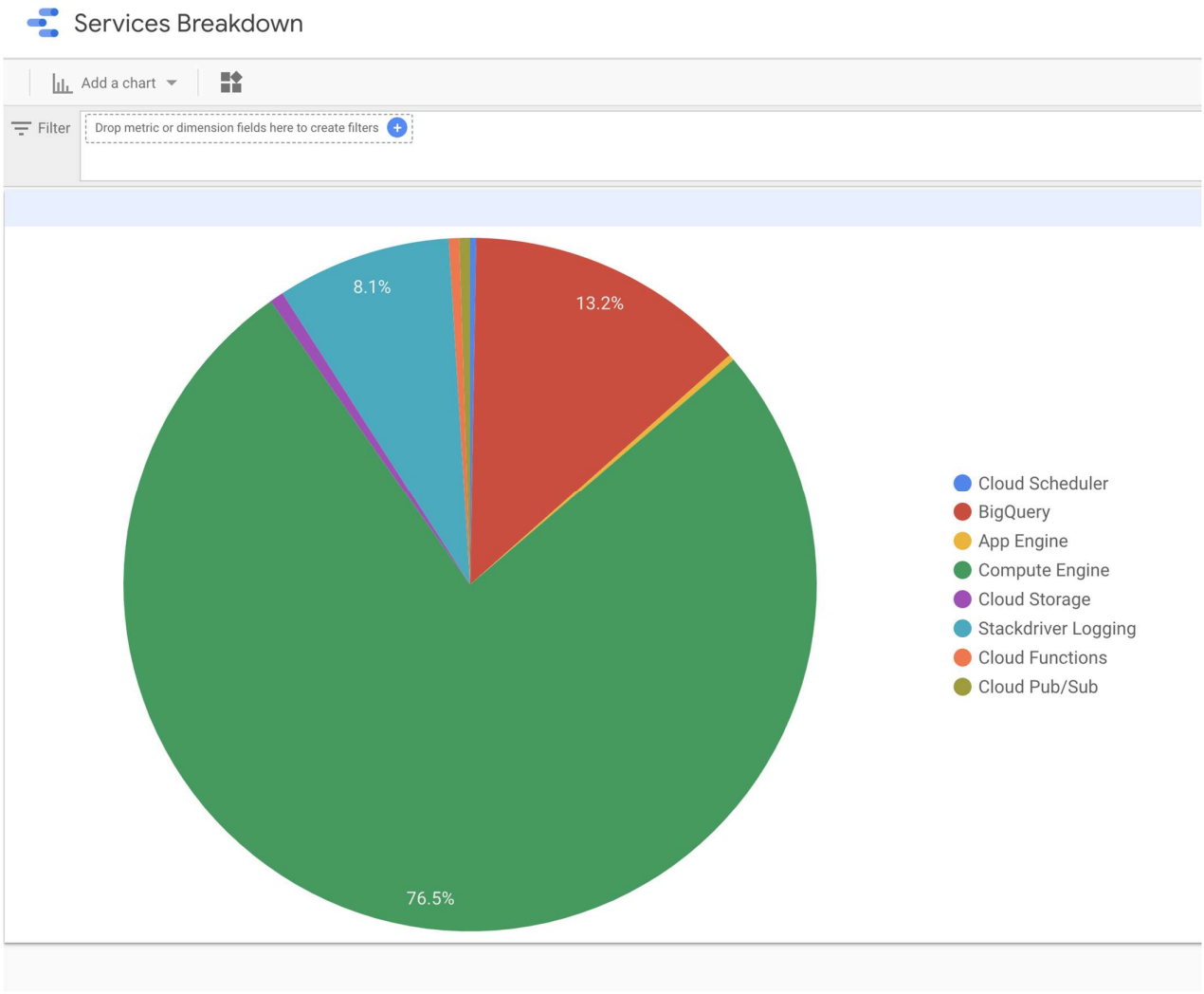
4. In the right panel, in the **Data** tab, find the **Metric** section. Hover over **Record Count** and click **X** to remove that metric.

5. Click **Add Metric** and select **num**. You may have to scroll down to see the **num** menu option.



6. In the right panel, in the **Chart > Table** section, select the **Pie Chart** table.

Data Studio generates a pie chart on the use of services:



7. Click the **SAVE** button in the top-right corner. If a "Welcome to Google Data Studio" popup appears, do the following for the subsequent dialogs:

- Click **Get Started**.
- Check the **Acknowledge the terms and conditions** box and click **Accept**.
- Check the **No, thanks** radio button for all four tips and recommendations.
- Click **Done**.

8. Click **SAVE** once more.

Close this tab open and return to the BigQuery Console. You are now ready to answer the second question.

Question 2: Which regions are most and least used?

To find which regions are most and least used across all four projects, you must determine:

- In what regions the Google Cloud services run.
- Which regions are most and least used.

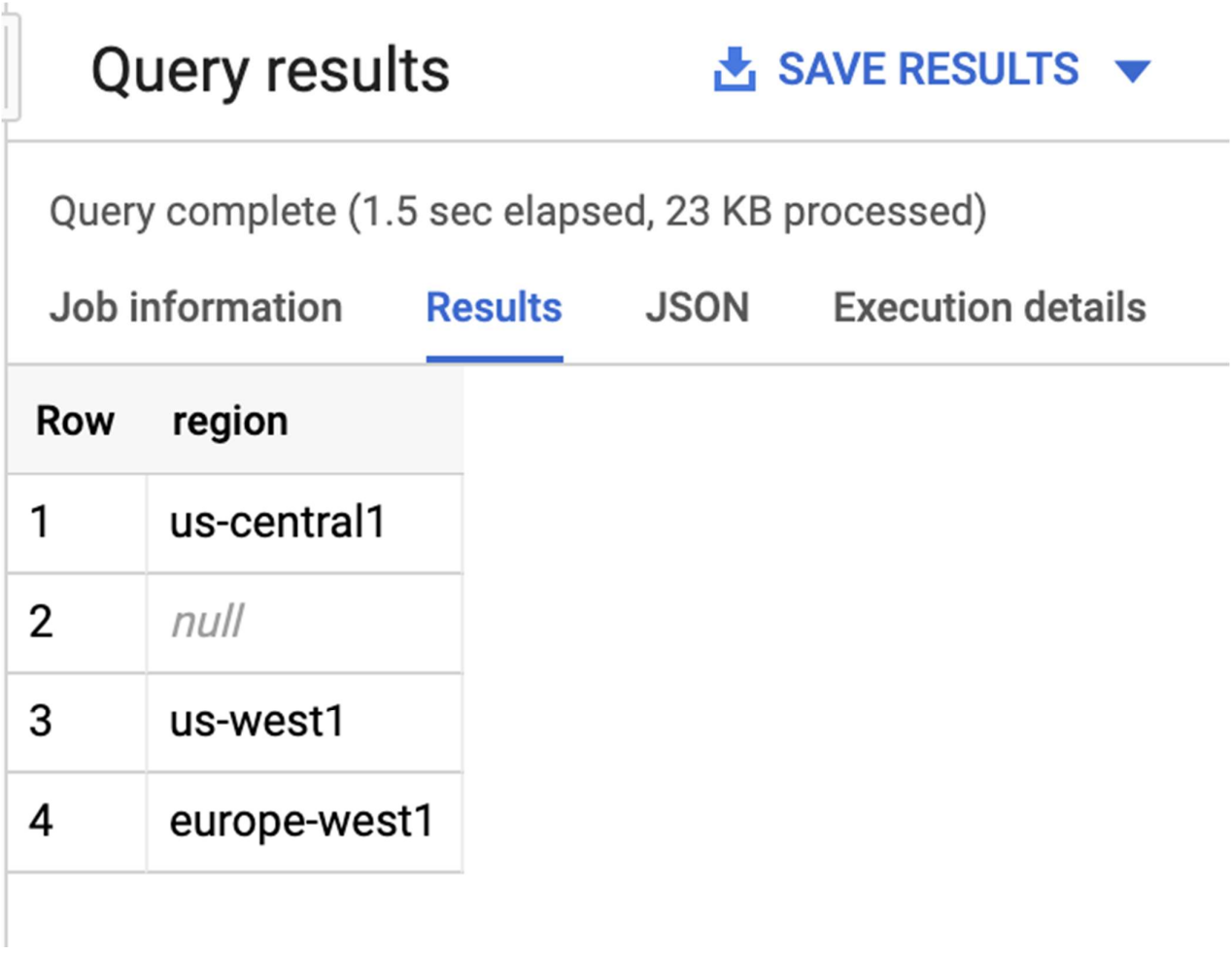
Query to determine the regions in which the Google Cloud services ran

1. Click **Compose New Query** to clear **Query editor**.
2. Type or paste the following SQL query:

```
SELECT location.region FROM `ctg-storage.bigquery_billing_export.gcp_billing_export_v1_01150A_B8F62B_47D999` GROUP BY location.region
```

The `location.region` column provides in what region the Google Cloud service ran. 3. Click **Run**.

You should see similar results. *Remember, your results will be different*:



The example results above show that project resources ran in the `us-central1`, `us-west1`, and `europe-west1` regions, or the region is `null`. A `null` region means the region is not known.

Check my progress

Click **Check my progress** to verify your performed task. If you have successfully run a query to get the region of the Google Cloud service ran, you will see an assessment score.

Query to determine which regions are used the most and least

1. In the BigQuery Console, click **Compose New Query** to clear the **Query editor**.

2. Type or paste in the following query into the **Query editor**:

```
SELECT location.region, COUNT(*) AS num FROM `ctg-
storage.bigquery_billing_export.gcp_billing_export_v1_01150A_B8F62B_47D999` GROUP BY
location.region
```

3. Click **Run**.

Your results should look similar to the example table below, but your actual query output will be different.

Row	region	num
1	us-central1	1269
2	*null*	1089
3	europe-west1	1298
4	us-west1	1305

The example results show that the projects use all regions somewhat evenly, and the "null" region is used a little less so. *Remember, your results will be different*.

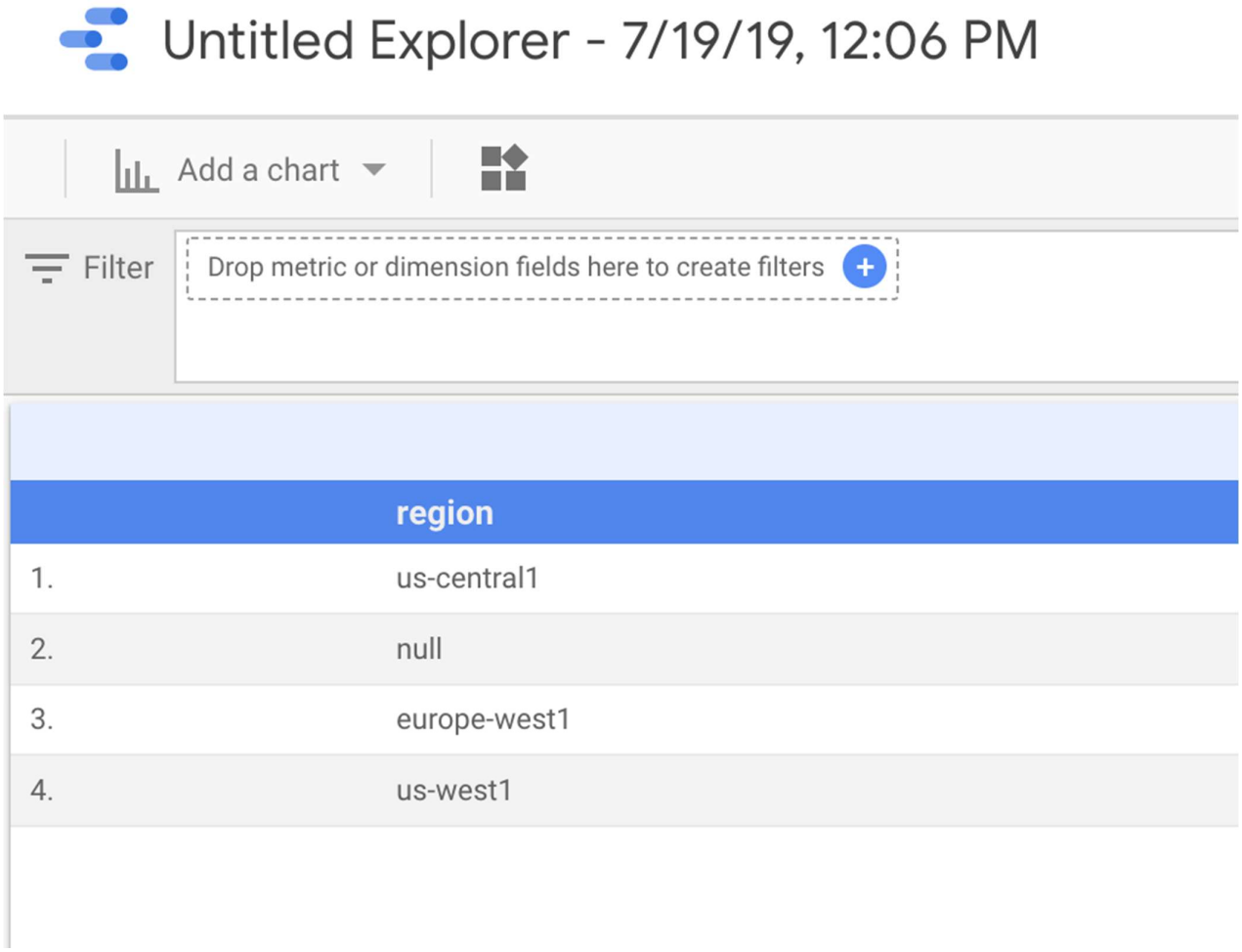
Check my progress

Click **Check my progress** to verify your performed task. If you have successfully run the query to find out which regions are used the most and the least by a service, you will see an assessment score.

Create a Data Studio visualization for regions

1. Still in the BigQuery console, to the right of **Query results**, click **Explore Data**, and then click **Explore with Data Studio**. This takes you to the Data Studio Console.

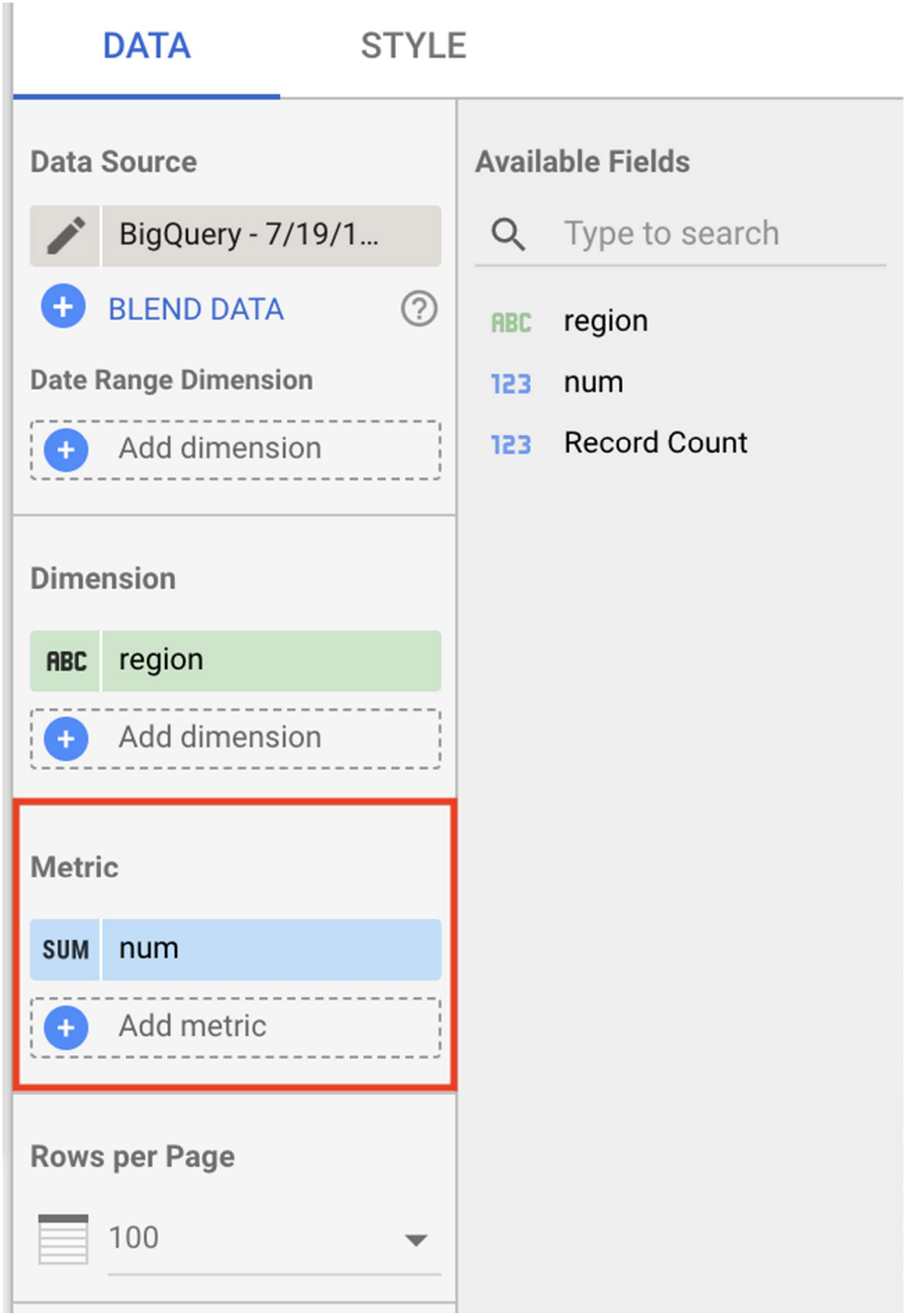
You should see the following page:



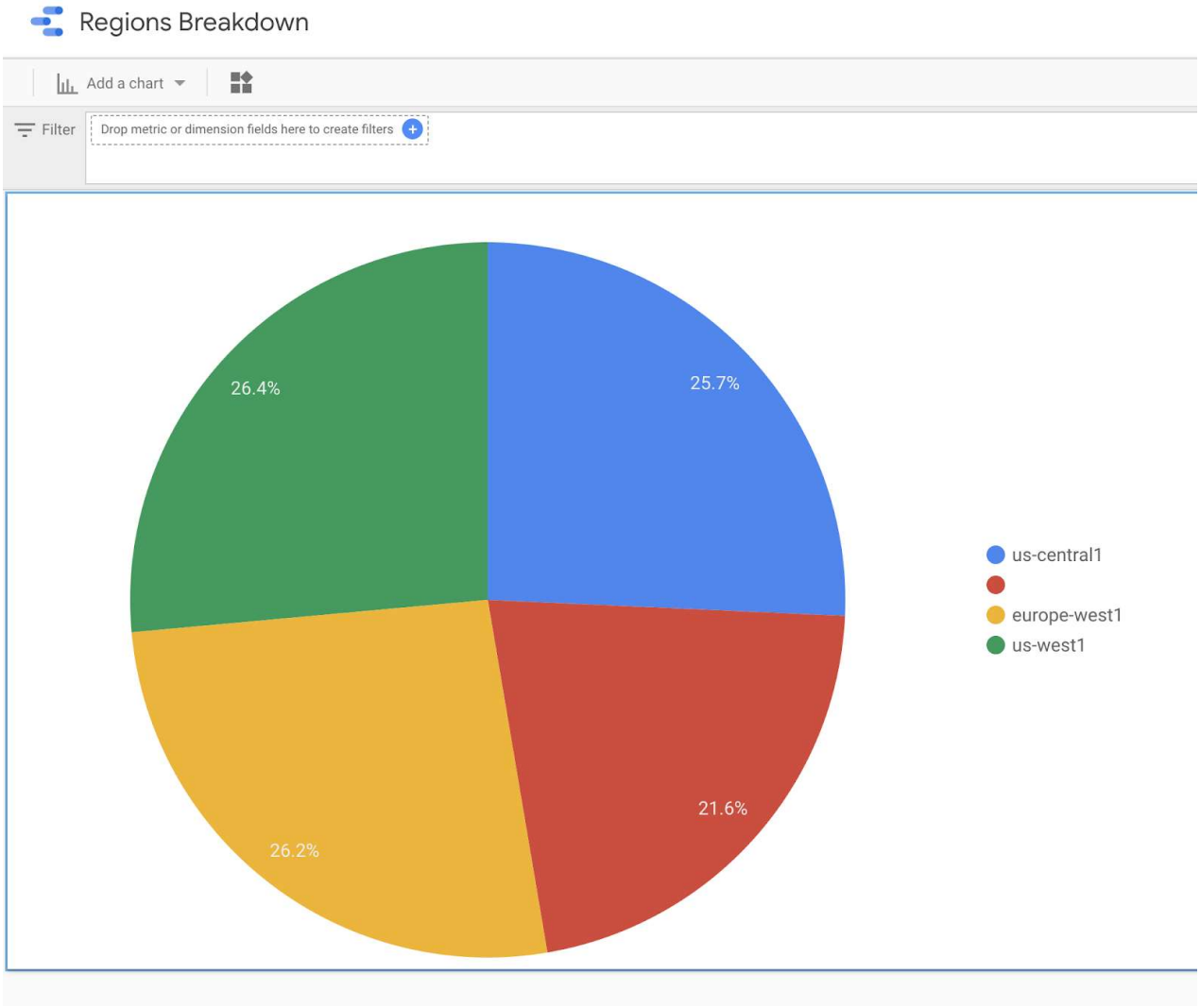
2. Click in the "Untitled Explorer" field and rename it **Regions Breakdown**.

3. In the right panel, find the **Metric** field. Hover over **Record Count** and click **X** to remove that metric.

4. Click **Add Metric** and select **num**.



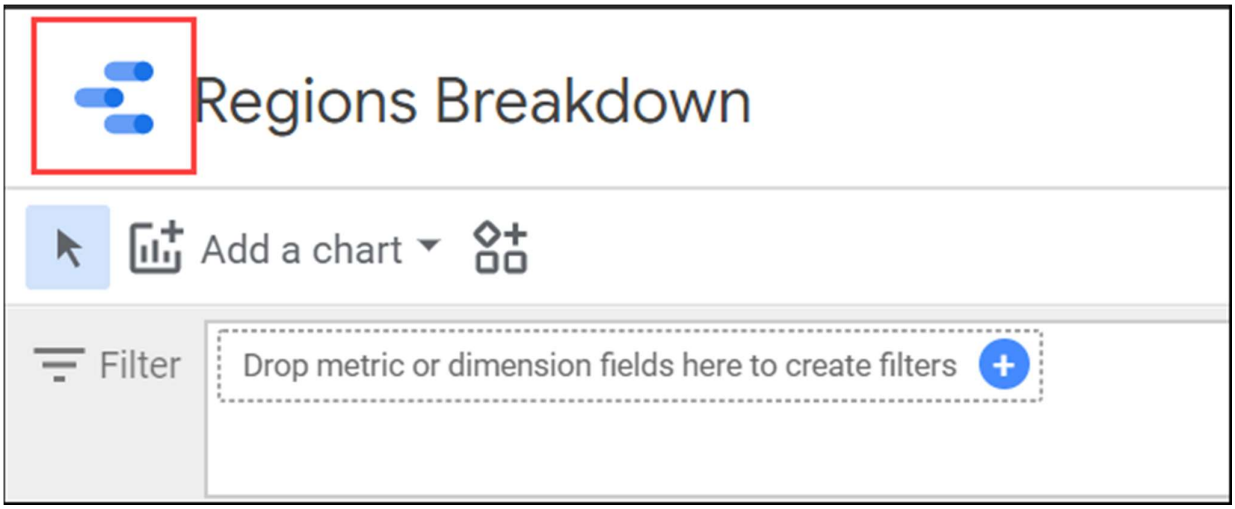
5. In the right menu, in the **Chart > Table** section, select the Pie Chart table. Data Studio generates a pie chart on the use of services:



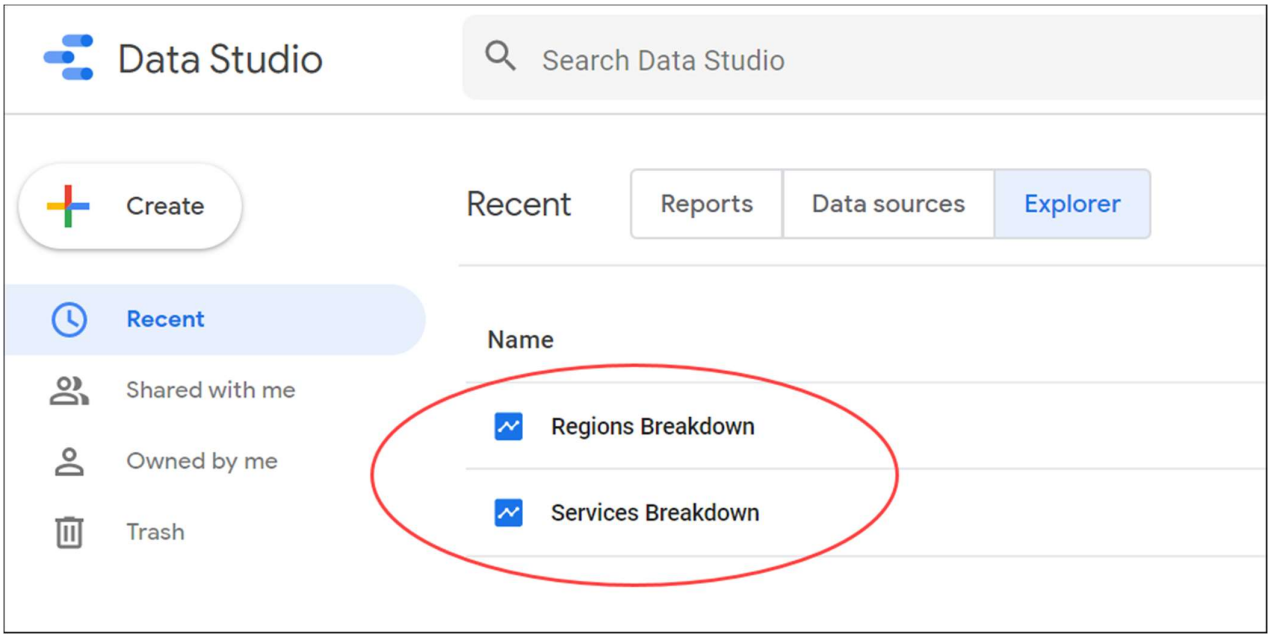
6. Click **SAVE** in the top-right corner to save your visualization.

You have successfully created two data visualizations from your billing data queries.

To see the visualizations you just created, click the icon to the right of **Regions Breakdown**:



The Data Studio console opens listing the 2 visualization you created.



Congratulations!

In this lab you explored the billing service in the console and learned how to export your billing data to BigQuery. After exploring the data with SQL queries, you exported your aggregated data to Data Studio, where you generated pie chart visualizations of service and region consumption. You are ready to take more labs in this series.

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 June 03, 2020
Lab Last Tested May 27, 2020