

Google Cloud Pub/Sub: Qwik Start - Python

GSP094



Overview

The Google Cloud Pub/Sub service allows applications to exchange messages reliably, quickly, and asynchronously. To accomplish this, a data producer publishes messages to a Cloud Pub/Sub topic. A subscriber client then creates a subscription to that topic and consumes messages from the subscription. Cloud Pub/Sub persists messages that could not be delivered reliably for up to seven days.

In this lab you will learn how to get started publishing messages with Cloud Pub/Sub using the Python client library.

What you'll do

In this lab, you'll do the following:

- Learn the basics of Pub/Sub.
- Create and list a Pub/Sub topic.
- Create and list a Pub/Sub subscription.
- Publish messages to a topic.
- Use a pull subscriber to output individual topic messages.

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:

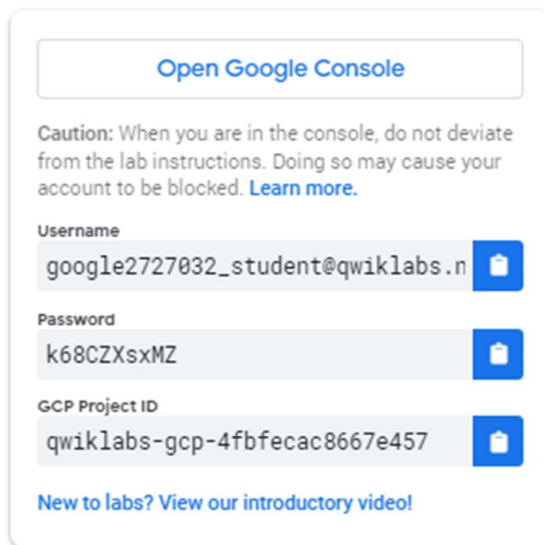
- Access to a standard internet browser (Chrome browser recommended).
- Time to complete the lab.

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.

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

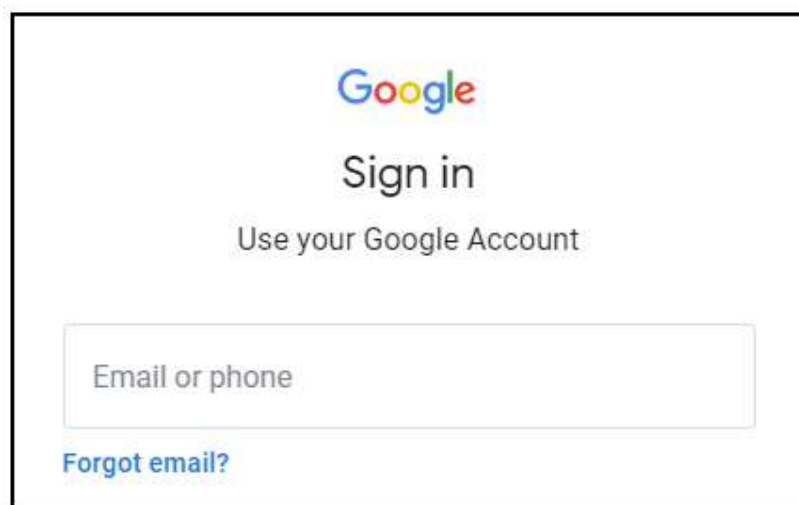
1. Click the **Start Lab** button. If you need to pay for the lab, a pop-up opens for you to select your payment method. On the left is a panel populated with the temporary credentials that you must use for this lab.



The screenshot shows a panel with the following content:

- A button labeled "Open Google Console".
- A caution message: "Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. [Learn more.](#)"
- A "Username" field containing "google2727032_student@qwiklabs.n" with a copy icon.
- A "Password" field containing "k68CZXsxMZ" with a copy icon.
- A "GCP Project ID" field containing "qwiklabs-gcp-4fbfecac8667e457" with a copy icon.
- A link at the bottom: "New to labs? View our introductory video!"

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.

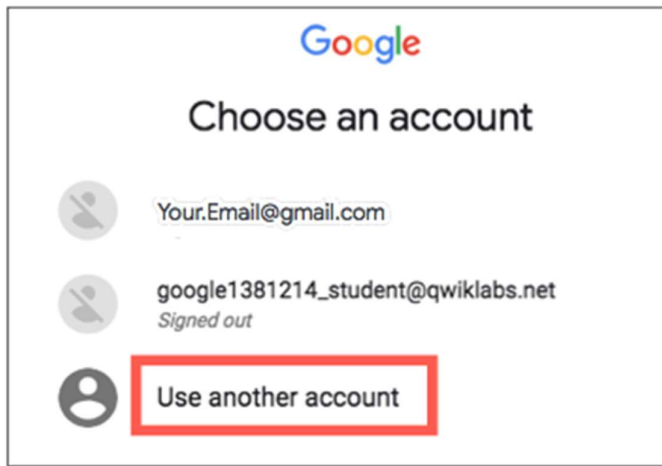


The screenshot shows the Google Sign in page with the following content:

- The Google logo.
- The text "Sign in".
- The text "Use your Google Account".
- A text input field labeled "Email or phone".
- A link labeled "Forgot email?" below the input field.

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.

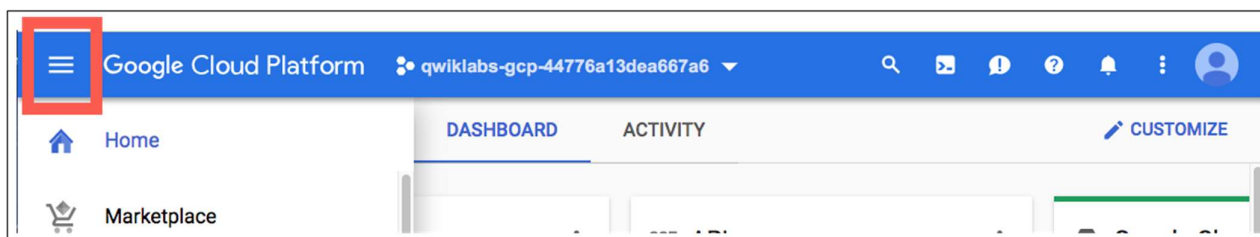
Important: You must use the credentials from the Connection Details panel. Do not use your Qwiklabs credentials. If you have your own Google Cloud account, do not use it for this lab (avoids incurring charges).

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.

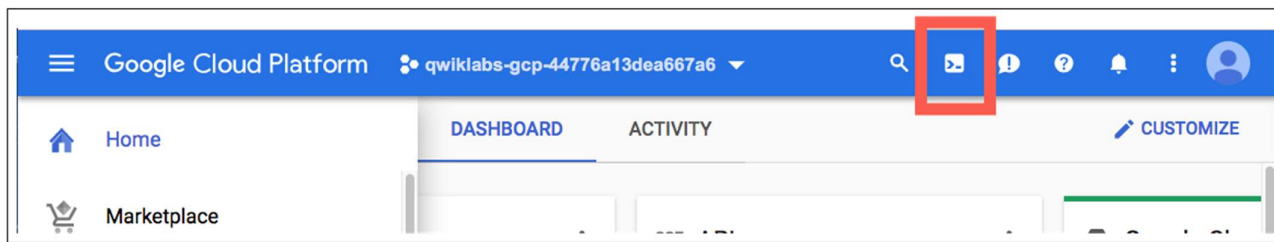
Note: You can view the menu with a list of Google Cloud Products and Services by clicking the **Navigation menu** at the top-left.



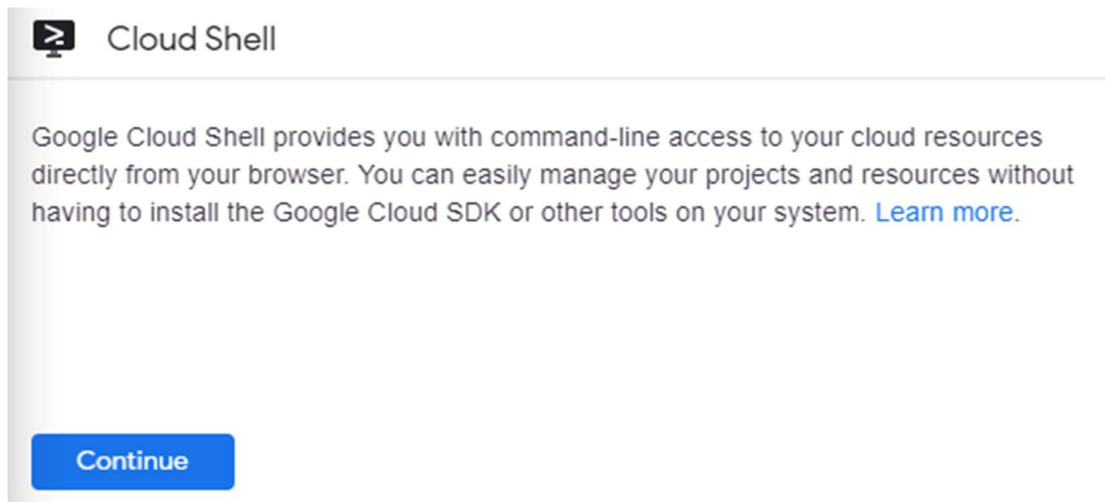
Activate Cloud Shell

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.

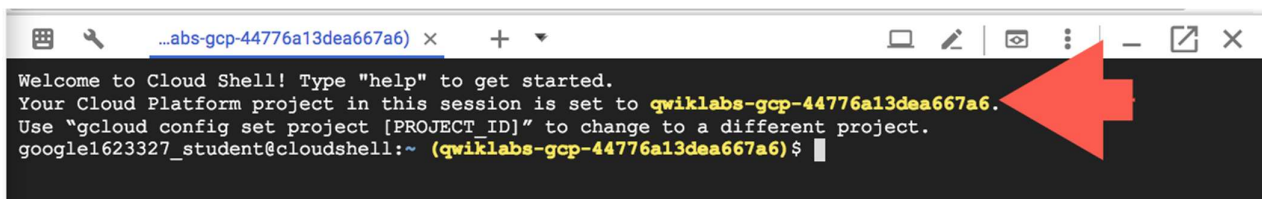
In the Cloud Console, in the top right toolbar, click the **Activate Cloud Shell** button.



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*. For example:



`gcloud` is the command-line tool for Google Cloud. It comes pre-installed on Cloud Shell and supports tab-completion.

You can list the active account name with this command:

```
gcloud auth list
```

(Output)

```
Credentialed accounts:
- <myaccount>@<mydomain>.com (active)
```

(Example output)

```
Credentialed accounts:
- google1623327_student@qwiklabs.net
```

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` see the [gcloud command-line tool overview](#).

Create a virtual environment

Execute the following command to download and update the packages list.

```
sudo apt-get update
```

Python virtual environments are used to isolate package installation from the system.

```
sudo apt-get install virtualenv
```

If prompted [Y/n], press Y and then Enter.

```
virtualenv -p python3 venv
```

Activate the virtual environment.

```
source venv/bin/activate
```

Install the client library

Run the following to install the client library:

```
pip install --upgrade google-cloud-pubsub
```

Get the sample code by cloning a GitHub repository:

```
git clone https://github.com/googleapis/python-pubsub.git
```

Navigate to the directory:

```
cd python-pubsub/samples/snippets
```

Pub/Sub - the Basics

Google Cloud Pub/Sub is an asynchronous global messaging service. There are three terms in Pub/Sub that appear often: *topics*, *publishing*, and *subscribing*.

A topic is a shared string that allows applications to connect with one another through a common thread.

Publishers push (or publish) a message to a Cloud Pub/Sub topic. Subscribers will then make a *subscription* to that thread, where they will either pull messages from the topic or configure webhooks for push subscriptions. Every subscriber must acknowledge each message within a configurable window of time.

In sum, a publisher creates and sends messages to a topic and a subscriber creates a subscription to a topic to receive messages from it.

Pub/Sub in Google CCloud

Pub/Sub comes preinstalled in the Cloud Shell, so there are no installations or configurations required to get started with this service. In this lab you use Python to create the topic, subscriber, and then view the message. You use a gcloud command to publish the message to the topic.

Create a topic

To publish data to Cloud Pub/Sub you create a topic and then configure a publisher to the topic.

Set the environment variable `GOOGLE_CLOUD_PROJECT`. You can find your Project ID in the CONNECTION DETAILS:

```
export GLOBAL_CLOUD_PROJECT=GCP Project ID
```

`publisher.py` is a script that demonstrates how to perform basic operations on topics with the Cloud Pub/Sub API. View the content of publisher script:

```
cat publisher.py
```

Note: Alternatively, you can use the shell editors that are installed on Cloud Shell, such as nano or vim or use the Cloud Shell code editor to view `python-docs-samples/pubsub/cloud-client/publisher.py`. For information about the publisher script:

```
python publisher.py -h
```

Example Output, do not copy

```
usage: publisher.py [-h]
                    project
                    {list,create,delete,publish,publish-with-custom-attributes,publish-
with-futures,publish-with-error-handler,publish-with-batch-settings}
                    ...

This application demonstrates how to perform basic operations on topics
with the Cloud Pub/Sub API.

For more information, see the README.md under /pubsub and the documentation
at https://cloud.google.com/pubsub/docs.

positional arguments:
  project                Your Google Cloud project ID
  {list,create,delete,publish,publish-with-custom-attributes,publish-with-
futures,publish-with-error-handler,publish-with-batch-settings}
  list                  Lists all Pub/Sub topics in the given project.
  create                Create a new Pub/Sub topic.
  delete                Deletes an existing Pub/Sub topic.
  publish               Publishes multiple messages to a Pub/Sub topic.
  publish-with-custom-attributes
                        Publishes multiple messages with custom attributes to
                        a Pub/Sub topic.
  publish-with-futures  Publishes multiple messages to a Pub/Sub topic and
                        prints their message IDs.
  publish-with-error-handler
                        Publishes multiple messages to a Pub/Sub topic with an
                        error handler.
  publish-with-batch-settings
                        Publishes multiple messages to a Pub/Sub topic with
                        batch settings.

optional arguments:
  -h, --help            show this help message and exit
```


Run the publisher script to create Pub/Sub Topic:

```
python publisher.py $GLOBAL_CLOUD_PROJECT create MyTopic
```

Example Output, do not copy

```
Topic created: name: "projects/qwiklabs-gcp-fe27729bc161fb22/topics/MyTopic"
```

Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully created a Cloud Pub/Sub topic, you will see an assessment score.

This command returns a list of all Pub/Sub topics in a given project:

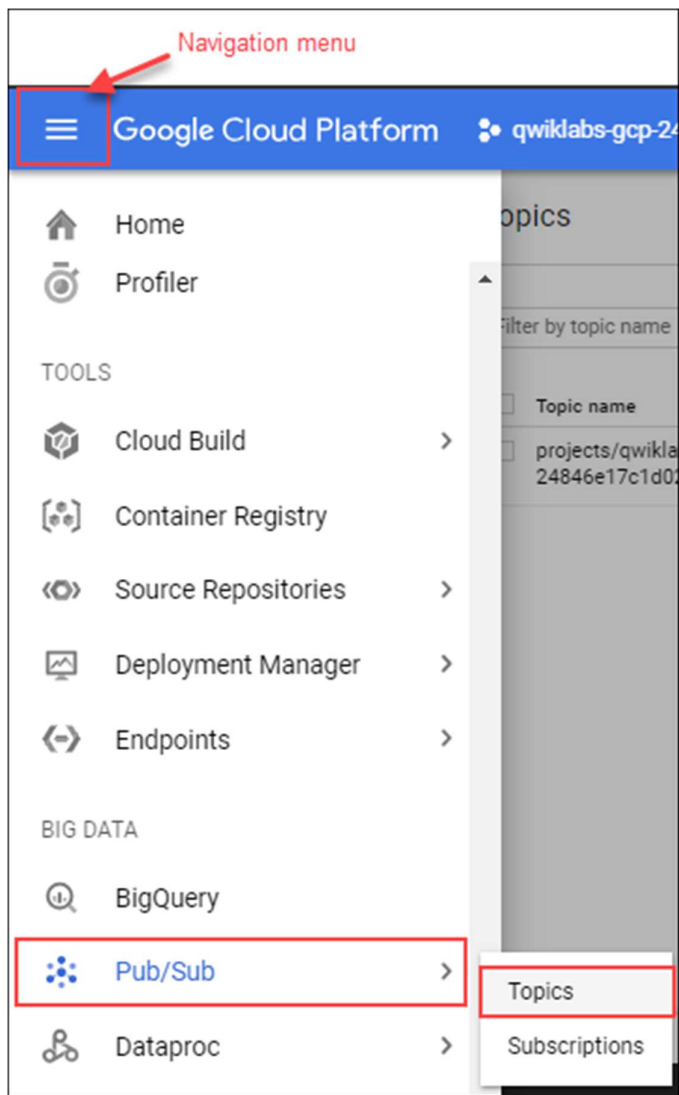
```
python publisher.py $GLOBAL_CLOUD_PROJECT list
```

Example Output, do not copy

```
name: "projects/qwiklabs-gcp-fe27729bc161fb22/topics/MyTopic"
```

You can also view the topic you just made in the Cloud Console.

Navigate to **Navigation menu > Pub/Sub > Topics**.



You should see MyTopic.

Topics					+ CREATE TOPIC	DELETE	SHOW INFO PANEL
Filter table							
<input type="checkbox"/>	Topic ID ↑	Encryption	Topic name	Labels			
<input type="checkbox"/>	MyTopic	Google-managed	projects/qwiklabs-gcp-016a88daa96d49f2/topics/MyTopic	—			

Create a subscription

Create a Pub/Sub subscription for topic with `subscriber.py` script:

```
python subscriber.py $GLOBAL_CLOUD_PROJECT create MyTopic MySub
```

Test Completed Task

Click **Check my progress** to verify your performed task. If you have successfully created a Cloud Pub/Sub subscription, you will see an assessment score.

This command returns a list of subscribers in given project:

```
python subscriber.py $GLOBAL_CLOUD_PROJECT list-in-project
```

You'll see only one subscription because you've made only one subscription.

Example output (do not copy)

```
projects/qwiklabs-gcp-7877af129f04d8b3/subscriptions/MySub
```

Check out the subscription you just made in the console. In the left pane, click **Subscriptions**. You should see the subscription name and other details.

Subscriptions

CREATE SUBSCRIPTION

DELETE

SHOW INFO PANEL

Filter table

<input type="checkbox"/>	Subscription ID ↑	Delivery type	Topic name	Subscription name	Acknowledge deadline	Labels	
<input type="checkbox"/>	MySub	Pull	projects/qwiklabs-gcp-016a88daa96d...	projects/qwiklabs-gcp-016a88daa96d49f2/...	10 seconds	—	<div><div></div><div></div></div>

For information about the `subscriber` script:

```
python subscriber.py -h
```

Output, do not copy

```
usage: subscriber.py [-h]
                    project
                    {list_in_topic,list_in_project,create,create-
push,delete,update,receive,receive-custom-attributes,receive-flow-control,receive-
synchronously,listen_for_errors}
                    ...
```

This application demonstrates how to perform basic operations on subscriptions with the Cloud Pub/Sub API.

For more information, see the README.md under /pubsub and the documentation at <https://cloud.google.com/pubsub/docs>.

positional arguments:

project	Your Google Cloud project ID
{list_in_topic,list_in_project,create,create-push,delete,update,receive,receive-custom-attributes,receive-flow-control,receive-synchronously,listen_for_errors}	
list_in_topic	Lists all subscriptions for a given topic.
list_in_project	Lists all subscriptions in the current project.
create	Create a new pull subscription on the given topic.
create-push	Create a new push subscription on the given topic.
delete	Deletes an existing Pub/Sub topic.
update	Updates an existing Pub/Sub subscription's push endpoint URL. Note that certain properties of a subscription, such as its topic, are not modifiable.
receive	Receives messages from a pull subscription.
receive-custom-attributes	Receives messages from a pull subscription.
receive-flow-control	Receives messages from a pull subscription with flow control.
receive-synchronously	Pulling messages synchronously.
listen_for_errors	Receives messages and catches errors from a pull subscription.

optional arguments:

-h, --help	show this help message and exit
------------	---------------------------------

Publish messages

Now that you've set up `MyTopic` (the topic), a subscription to `MyTopic` (`MySub`), see if you can use `gcloud` commands to publish a message to `MyTopic`.

Publish the message "Hello" to `MyTopic`:

```
gcloud pubsub topics publish MyTopic --message "Hello"
```

Publish a few more messages to `MyTopic`—run the following commands (replacing `<YOUR NAME>` with your name and `<FOOD>` with a food you like to eat):

```
gcloud pubsub topics publish MyTopic --message "Publisher's name is <YOUR NAME>"
gcloud pubsub topics publish MyTopic --message "Publisher likes to eat <FOOD>"
gcloud pubsub topics publish MyTopic --message "Publisher thinks Pub/Sub is awesome"
```

View messages

Now that you've published messages to `MyTopic`, pull and view the messages using `MySub`.

Use `MySub` to pull the message from `MyTopic`:

```
python subscriber.py $GLOBAL_CLOUD_PROJECT receive MySub
```

Example output (do not copy)

```
Listening for messages on projects/qwiklabs-gcp-7877af129f04d8b3/subscriptions/MySub
Received message: Message {
  data: 'Publisher thinks Pub/Sub is awesome'
  attributes: {}
}
Received message: Message {
  data: 'Hello'
  attributes: {}
}
Received message: Message {
  data: 'Publisher's name is Harry'
  attributes: {}
}
Received message: Message {
  data: 'Publisher likes to eat cheese'
  attributes: {}
}
```

Click **Ctrl+c** to stop listening.

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.

Google Cloud Pub/Sub service allows applications to exchange messages reliably, quickly, and asynchronously.
True

A _____ is a shared string that allows applications to connect with one another.
topic

Congratulations!

You used the Python created a Pub/Sub topic, published to the topic, created a subscription, then used the subscription to pull data from the topic.



Finish Your Quest

Continue your Quest with [Baseline: Infrastructure](#). A Quest is a series of related labs that form a learning path. Completing this Quest earns you the badge above, 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 this Quest](#) and get immediate completion credit if you've taken this lab. [See other available Qwiklabs Quests](#).

Take Your Next Lab

- [Pub/Sub Lite: Qwik Start](#). Complementing Pub/Sub, [Pub/Sub Lite](#) is a zonal service for messaging systems with predictable traffic patterns. If you publish 1 MiB-1 GiB of messages per second, Pub/Sub Lite is a low cost option for high-volume event ingestion.

Next Steps /Learn More

- This lab is 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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