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A Simple Dataflow Pipeline (Python) 2.5 | Google Cloud Skills Boost

Qwiklabs : 9-11 minutes

Overview

In this lab, you will open a Dataflow project, use pipeline filtering, and execute the pipeline locally and on the cloud.

- Open Dataflow project
- Pipeline filtering
- Execute the pipeline locally and on the cloud

Objective

In this lab, you learn how to write a simple Dataflow pipeline and run it both locally and on the cloud.

- Setup a Python Dataflow project using Apache Beam
- Write a simple pipeline in Python
- Execute the query on the local machine
- Execute the query on the cloud

Setup

For each lab, you get a new Google Cloud project and set of resources for a fixed time at no cost.

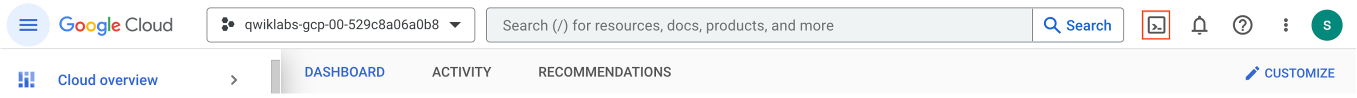
1. Sign in to Qwiklabs using an **incognito window**.
2. Note the lab's access time (for example, `1:15:00`), and make sure you can finish within that time. There is no pause feature. You can restart if needed, but you have to start at the beginning.
3. When ready, click **Start lab**.
4. Note your lab credentials (**Username** and **Password**). You will use them to sign in to the Google Cloud Console.
5. Click **Open Google Console**.
6. Click **Use another account** and copy/paste credentials for **this** lab into the prompts. If you use other credentials, you'll receive errors or **incur charges**.
7. Accept the terms and skip the recovery resource page.

Activate Google Cloud Shell

Google 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.

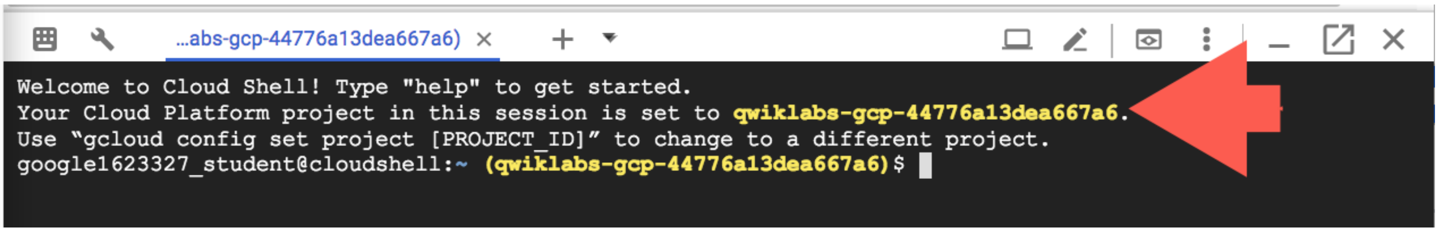
Google Cloud Shell provides command-line access to your Google Cloud resources.

1. In Cloud console, on the top right toolbar, click the Open Cloud Shell button.


Google Cloud
qwiklabs-gcp-00-529c8a06a0b8
Search (/) for resources, docs, products, and more
Search
S
Cloud overview
DASHBOARD
ACTIVITY
RECOMMENDATIONS
CUSTOMIZE

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*. For example:



```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-44776a13dea667a6.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
google1623327_student@cloudshell:~ (qwiklabs-gcp-44776a13dea667a6)$
```

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: - @.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 =

Example output:

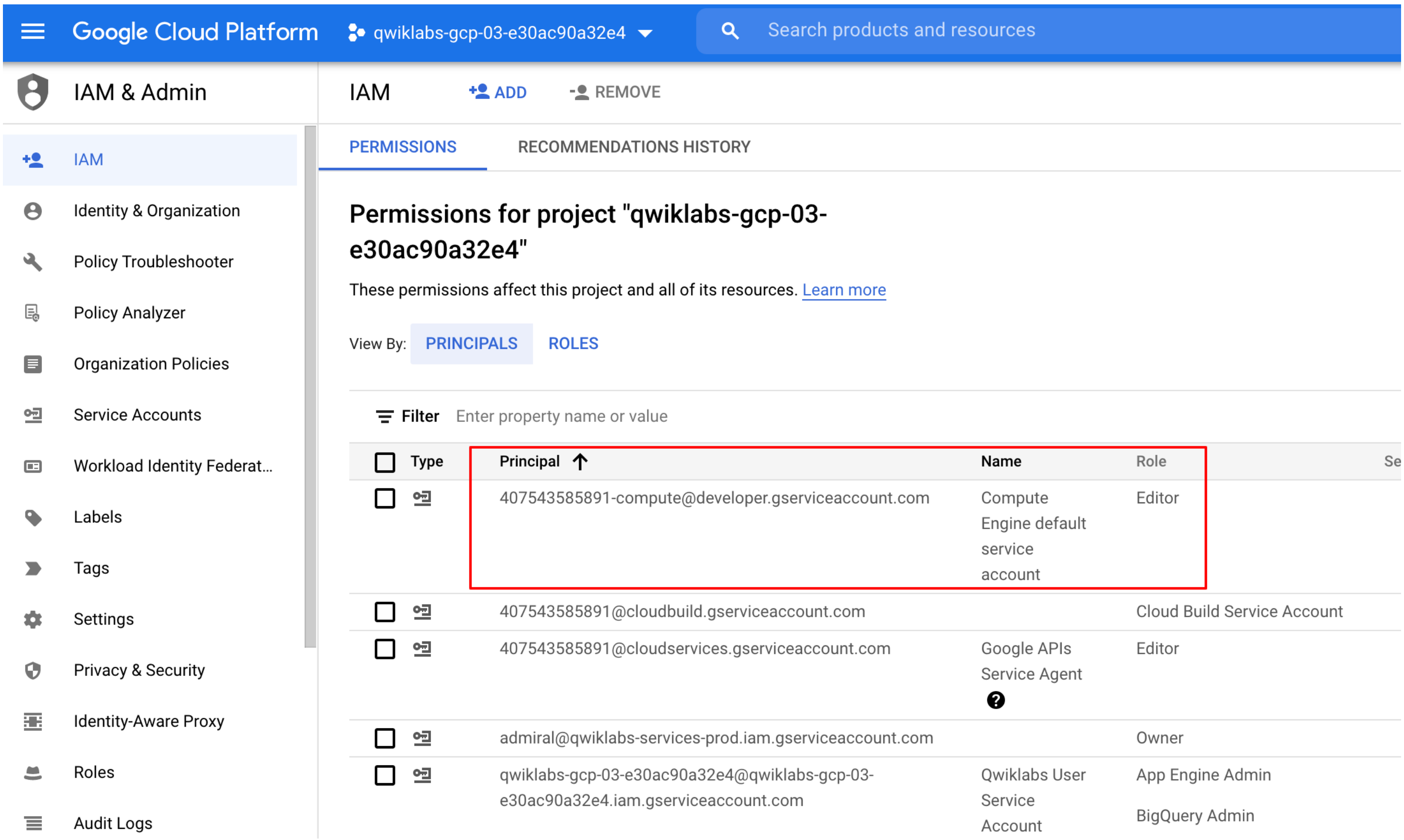
[core] project = qwiklabs-gcp-44776a13dea667a6 **Note:** Full documentation of **gcloud** is available in the gcloud CLI overview guide .

Check project permissions

Before you begin your work on Google Cloud, you need to ensure that your project has the correct permissions within Identity and Access Management (IAM).

1. In the Google Cloud console, on the **Navigation menu** (☰), select **IAM & Admin** > **IAM**.

2. Confirm that the default compute Service Account `{project-number}-compute@developer.gserviceaccount.com` is present and has the `editor` role assigned. The account prefix is the project number, which you can find on **Navigation menu** > **Home**.



Permissions for project "qwiklabs-gcp-03-e30ac90a32e4"

These permissions affect this project and all of its resources. Learn more

View By: PRINCIPALS ROLES

Filter Enter property name or value

☐	Type	Principal ↑	Name	Role	Se
☐		407543585891-compute@developer.gserviceaccount.com	Compute Engine default service account	Editor	
☐		407543585891@cloudbuild.gserviceaccount.com		Cloud Build Service Account	
☐		407543585891@cloudservices.gserviceaccount.com	Google APIs Service Agent	Editor	
☐		admiral@qwiklabs-services-prod.iam.gserviceaccount.com		Owner	
☐		qwiklabs-gcp-03-e30ac90a32e4@qwiklabs-gcp-03-e30ac90a32e4.iam.gserviceaccount.com	Qwiklabs User Service Account	App Engine Admin BigQuery Admin	

Note: If the account is not present in IAM or does not have the `editor` role, follow the steps below to assign the required role.

1. In the Google Cloud console, on the **Navigation menu**, click **Home**.

2. Copy the project number (e.g. `729328892908`).

3. On the **Navigation menu**, select **IAM & Admin** > **IAM**.

4. At the top of the **IAM** page, click **Add**.

5. For **New principals**, type:

{project-number}-compute@developer.gserviceaccount.com

6. Replace `{project-number}` with your project number.
7. For **Role**, select **Project** (or Basic) > **Editor**.
8. Click **Save**.

Task 1. Ensure that the Dataflow API is successfully enabled

- Execute the following block of code in the Cloud Shell:

```
gcloud services disable dataflow.googleapis.com --force gcloud services enable dataflow.googleapis.com
```

Task 2. Preparation

Open the SSH terminal and connect to the training VM

You will be running all code from a curated training VM.

1. In the console, on the **Navigation menu** (≡), click **Compute Engine** > **VM instances**.

2. Locate the line with the instance called **training-vm**.

3. On the far right, under **Connect**, click on **SSH** to open a terminal window.

4. In this lab, you will enter CLI commands on the **training-vm**.

Download code repository

- Download a code repository to use in this lab. In the **training-vm** SSH terminal enter the following:

```
git clone https://github.com/GoogleCloudPlatform/training-data-analyst
```

Create a Cloud Storage bucket

Follow these instructions to create a bucket.

1. In the console, on the **Navigation menu**, click **Cloud overview**.

2. **Select and copy** the Project ID.

For simplicity use the Project ID found in the Lab details panel is already globally unique. Use it as the bucket name.

3. In the console, on the **Navigation menu**, click **Cloud Storage** > **Buckets**.
4. Click **+ Create**.
5. Specify the following, and leave the remaining settings as their defaults:

Property	Value (type value or select option as specified)
Name	`<your unique bucket name (Project ID)>`
Location type	`Multi-Region`

6. Click **Create**.
7. If you get the `Public access will be prevented` prompt, select `Enforce public access prevention on this bucket` and click **Confirm**.

Record the name of your bucket to use in subsequent tasks.

8. In the **training-vm** SSH terminal enter the following to create an environment variable named "BUCKET" and verify that it exists with the echo command:

BUCKET="<your unique bucket name (Project ID)>" echo $BUCKET

You can use `$BUCKET` in terminal commands. And if you need to enter the bucket name <your-bucket> in a text field in the console, you can quickly retrieve the name with `echo $BUCKET`.

Task 3. Pipeline filtering

The goal of this lab is to become familiar with the structure of a Dataflow project and learn how to execute a Dataflow pipeline.

1. Return to the **training-vm** SSH terminal and navigate to the directory `/training-data-analyst/courses/data_analysis/lab2/python` and view the file `grep.py`.
2. View the file with Nano. **Do not make any changes to the code:**

cd ~/training-data-analyst/courses/data_analysis/lab2/python nano grep.py

3. Press CTRL+X to exit Nano.

Can you answer these questions about the file `grep.py`?

- What files are being read?
- What is the search term?
- Where does the output go?

There are three transforms in the pipeline:

- What does the transform do?
- What does the second transform do?
- Where does its input come from?
- What does it do with this input?
- What does it write to its output?
- Where does the output go?
- What does the third transform do?

Task 4. Execute the pipeline locally

1. In the **training-vm** SSH terminal, locally execute `grep.py`:

python3 grep.py **Note**: Ignore the warning if any.

The output file will be `output.txt`. If the output is large enough, it will be sharded into separate parts with names like: `output-00000-of-00001`.

2. Locate the correct file by examining the file's time:

ls -al /tmp

3. Examine the output file(s).

4. You can replace "-*" below with the appropriate suffix:

```
cat /tmp/output-*
```

Does the output seem logical?

Task 5. Execute the pipeline on the cloud

1. Copy some Java files to the cloud. In the **training-vm** SSH terminal, enter the following command:

```
gcloud storage cp ../javahelp/src/main/java/com/google/cloud/training/dataanalyst/javahelp/*.java
gs://$BUCKET/javahelp
```

2. Using Nano, edit the Dataflow pipeline in `grepc.py`:

```
nano grepc.py
```

3. Replace PROJECT and BUCKET with your Project ID and Bucket name.

Example strings before you update:

```
PROJECT='cloud-training-demos' BUCKET='cloud-training-demos'
```

Example strings after edit (use your values):

```
PROJECT='qwiklabs-gcp-your-value' BUCKET='qwiklabs-gcp-your-value'
```

Save the file and close Nano by pressing the CTRL+X key, then type Y, and press Enter.

4. Submit the Dataflow job to the cloud:

```
python3 grepc.py
```

Because this is such a small job, running on the cloud will take significantly longer than running it locally (on the order of 7-10 minutes).

5. Return to the browser tab for the console.

6. On the **Navigation menu**, click **Dataflow** and click on your job to monitor progress.

7. Wait for the **Job status** to be **Succeeded**.

8. Examine the output in the Cloud Storage bucket.

9. On the **Navigation menu**, click **Cloud Storage > Buckets** and click on your bucket.

10. Click the **javahelp** directory.

This job generates the file `output.txt`. If the file is large enough, it will be sharded into multiple parts with names like: `output-0000x-of-000y`. You can identify the most recent file by name or by the **Last modified** field.

11. Click on the file to view it.

Alternatively, you can download the file via the **training-vm** SSH terminal and view it:

```
gcloud storage cp gs://$BUCKET/javahelp/output* . cat output*
```

End your lab

When you have completed your lab, click **End Lab**. Google Cloud Skills Boost removes the resources you’ve used and cleans the account for you.

You will be given an opportunity to rate the lab experience. Select the applicable number of stars, type a comment, and then click **Submit**.

The number of stars indicates the following:

- 1 star = Very dissatisfied
- 2 stars = Dissatisfied
- 3 stars = Neutral
- 4 stars = Satisfied
- 5 stars = Very satisfied

You can close the dialog box if you don't want to provide feedback.

For feedback, suggestions, or corrections, please use the **Support** tab.