



NANYANG  
TECHNOLOGICAL  
UNIVERSITY  
SINGAPORE

NTU Academy for Professional  
and Continuing Education

# (SCTP) Advanced Professional Certificate

## **Data Science and AI**



# 1. Setting up GCP

Set up an account here:

<https://console.cloud.google.com/>

- Use any email account to sign up
- Choose a name for your GCP Project

*Note: GCP project ID has to be globally unique across all GCP users*

- You can retrieve your Project ID by clicking the button shown (in the red box)

The screenshot shows the Google Cloud Console interface. At the top, it displays "Google Cloud" and the project name "EigenAI" (with a red box around it). A search bar is at the top right. Below the header, there's a decorative graphic of colored dots and triangles. The main area is titled "Welcome" and shows "You're working in eigenai.co > EigenAI". It displays the "Project number: 1059928193415" and "Project ID: eigenai". Below this, there are four buttons: "Create a VM", "Run a query in BigQuery", "Deploy an application", and "Create a storage bucket". A "Cloud Hub" button is also present. On the right side, there are two "Try Gemini" buttons ("Try Gemini 2.0 Flash" and "Try Gemini"). Under "Quick access", there are eight boxes: "APIs & Services", "IAM & Admin", "Billing", "Compute Engine", "Cloud Storage", "BigQuery", "VPC network", and "Kubernetes Engine".

The screenshot shows the "Select a resource" interface. At the top, there's a dropdown for "eigenai.co" and a "New project" button. Below is a search bar with a magnifying glass icon. The results table has columns: "Recent", "Starred", and "All". The "Recent" section shows one item: "EigenAI" (marked with a checkmark and a red arrow pointing to the "ID" column). The "ID" column contains "eigenai". The "Name" column shows the project name, and the "Type" column shows "Project". There are three red rectangular redactions over the "Name", "Type", and "ID" columns for security.

# 1. Setting up GCP

You might be prompted to create a billing account by entering your credit card details\*.

Failure to do so may result in errors in subsequent lessons:

- **Lesson 2.2:** When downloading a file from GCS, you may encounter a "**403 error: Billing account not set up.**"
- **Lesson 2.5:** A similar error may occur when creating tables in BigQuery.
- Use the following link to ensure that your billing account is linked to your project: [Verify Billing](#)



Google requires a valid credit card to create a billing account, even when you are on [GCP Free Tier](#). Previous cohorts have successfully used certain prepaid cards available in SG.

## 2. Install gcloud CLI

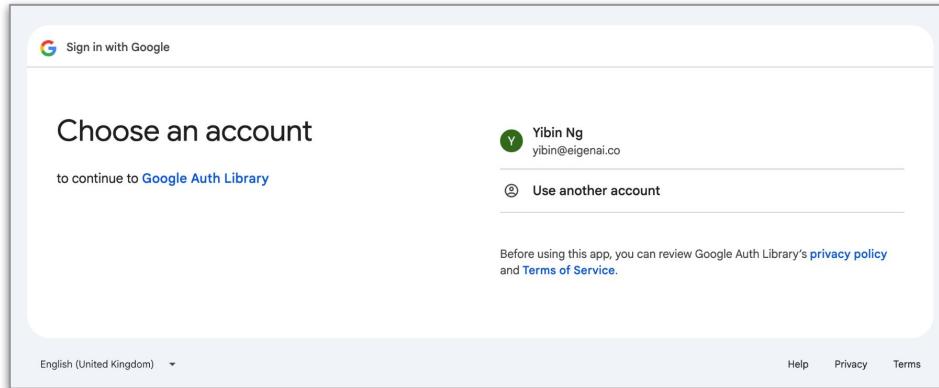
- Mac users, follow instructions here: <https://cloud.google.com/sdk/docs/install>
- Windows WSL users, please follow here: <https://cloud.google.com/sdk/docs/downloads-snap>
- Once `gcloud init` is done, to authenticate your computer to your GCP account, run:
  - WSL users: `gcloud auth application-default login`
  - Mac users: `./google-cloud-sdk/bin/gcloud auth application-default login`
  - Copy and paste the link provided into a browser

```
ngyibin@Ngs-MacBook-Pro Programs % ./google-cloud-sdk/bin/gcloud auth application-default login
Your browser has been opened to visit:

https://accounts.google.com/o/oauth2/auth?response_type=code&client_id=764086051850-6qr4p6gpi6hn506pt8ejuq83di341hur.apps.googleusercontent.co
085%2F&scope=openid+https%3A%2Fwww.googleapis.com%2Fauth%2Fuserinfo.email+https%3A%2Fwww.googleapis.com%2Fauth%2Fcloud-platform+https%3A%2F
login&state=nSjR3VNjk0bhfCDNATcBe3g1Sws7LP&access_type=offline&code_challenge=XUg26U7TrUC2E-hhA2XwHjZKvpL8xfQTztYP8QVxLEg&code_challenge_method=
```

# 2. Install gcloud CLI

Please log in using the same email account you used to set up your GCP account.



A screenshot of a web browser showing the Cloud SDK Documentation page. The main headline reads 'You are now authenticated with the gcloud CLI!' with a small dropdown menu icon next to it. Below the headline, a message says 'The authentication flow has completed successfully. You may close this window, or check out the resources below.' Underneath, there is a section titled 'Information about command-line tools and client libraries' with a link. Further down, there are sections for 'To learn more about Google Cloud CLI commands', 'To learn more about the command-line tools for App Engine, Compute Engine, Cloud Storage, BigQuery, Cloud SQL, and Cloud DNS', and 'If you're a client application developer and want to find out more about accessing Google Cloud services with a programming language or framework'. At the bottom of this section is a 'Tutorials' link. In the top right corner of the page, there are 'Was this helpful?' and 'Send feedback' buttons.

## 2. Install gcloud CLI

[Optional] Now that you are authenticated, test your setup by typing the commands:

### WSL users:

```
bq query --use_legacy_sql=false "SELECT name FROM  
bigquery-public-data.usa_names.usa_1910_current LIMIT 10"
```

### MAC users:

```
./google-cloud-sdk/bin/bq query --use_legacy_sql=false "SELECT name  
FROM bigquery-public-data.usa_names.usa_1910_current LIMIT 10"
```

name
Mary
Annie
Anna
Margaret
Helen
Elsie
Lucy
Dorothy
Mary
Margaret

You should see the following screen output.

# 3. Give yourself 'BigQuery Admin' rights

- This is in preparation for the lesson on DBT (Lesson 2.5)
- Search for '**IAM**' in the top search bar
  - **IAM:** Identity and Access Management
  - Click on the 'Edit principal' button next to your email

The screenshot shows a user's IAM page with the following details:

- User: yibin@eigenai.co
- Name: Yibin Ng
- Role: BigQuery Admin
- Permissions (Listed on the right): Advanced security insight, Advanced security insight.
- Count: 10725/11197 excess permissions
- Action: A red box highlights the 'eigenai.co' logo and edit icon.

### 3. Give yourself 'BigQuery Admin' rights

- Click '**+ Add another role**' - search for '**BigQuery Admin**'
- Click '**Save**'
- You should see this:

IAM

Allow Deny Recommendations history

Permissions for project "My First Project"

These permissions affect this project and all of its resources. [Learn more](#)

[View by principals](#) [View by roles](#)

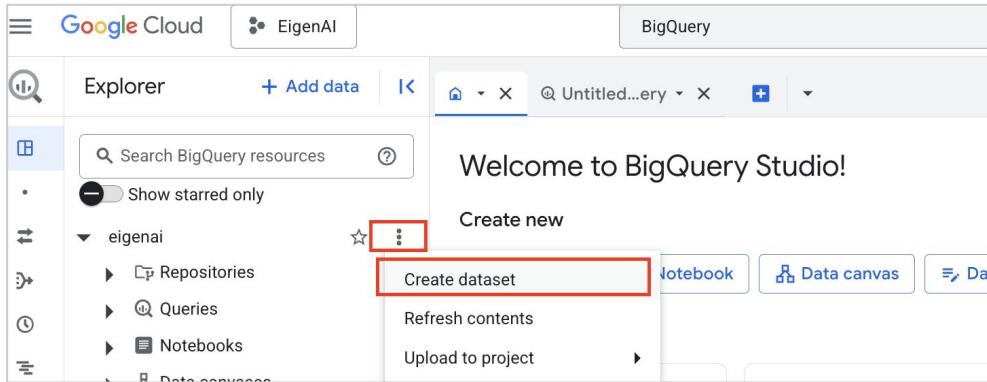
[Grant access](#) [Remove access](#)

Filter Enter property name or value

Type	Principal ↑	Name	Role	Security insights	
<input type="checkbox"/>	wongchenpang@gmail.com	Chen Pang Wong	BigQuery Admin Owner		<a href="#">Edit</a>

# 4. Create 'snapshots' folder in BQ

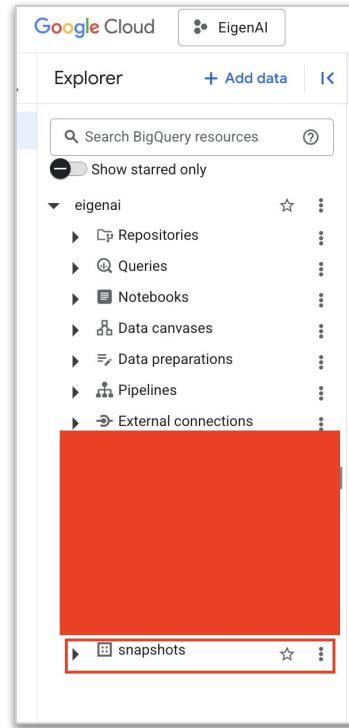
- This is in preparation for the lesson on DBT (Lesson 2.5)
- Go to BigQuery, click on the 3 dots next to your project ID, click '**Create dataset**':



- Enter '**snapshots**' as the Dataset ID
- Use the default location type ('Multi-region' - 'US')
- Click '**Create dataset**'

# 4. Create 'snapshots' folder in BQ

**'snapshots'** folder created  
in your BigQuery:



# 5. Setting up a service account

- This is in preparation for the lesson on Meltano (Lesson 2.6)
- In your Google Cloud project, search for '**IAM**' and click the result:

The screenshot shows the Google Cloud interface with the project 'meltano-learn' selected. On the left, there's a sidebar with various icons. The main area is titled 'IAM and admin / Service accounts' and shows a list of service accounts. At the top right, there's a search bar with the query 'IAM|admin'. Below the search bar, the results are displayed under 'Search results'. The first result, 'IAM' followed by 'IAM and admin', is highlighted with a red box.

Google Cloud

meltano-learn

IAM and admin / Service accounts

Service accounts + Create service account

Search results

IAM|admin

- IAM iam admin
- IAM & admin iam & admin

IAM  
IAM and admin

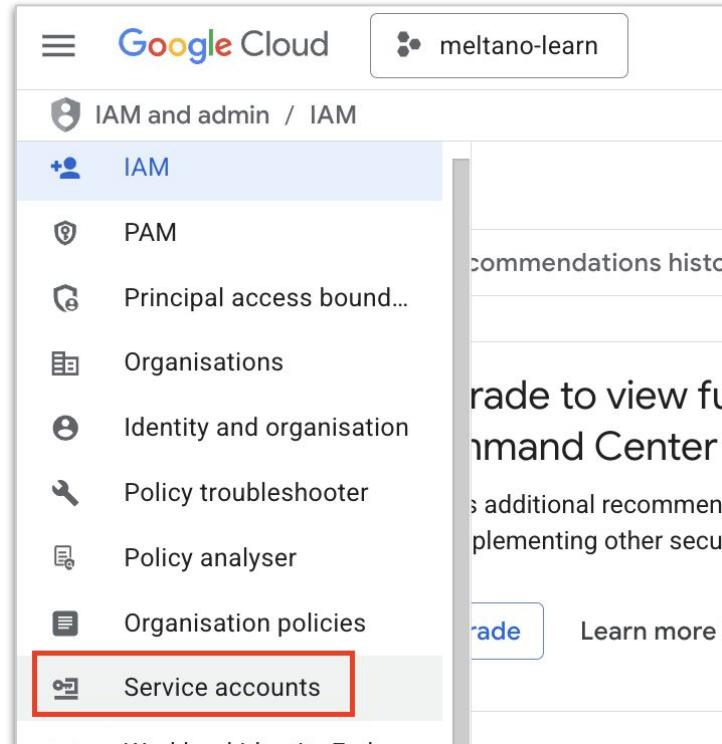
IAM and admin Resource access control

Service accounts IAM and admin

Cloud Identity Google Enterprise API

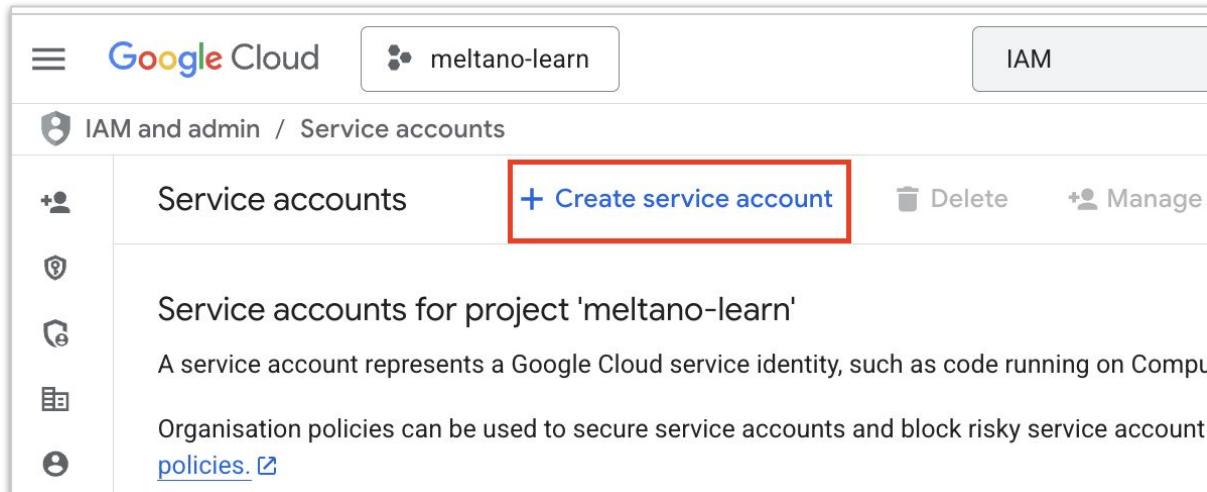
# 5. Setting up a service account

In IAM, click on '**Service accounts**':



# 5. Setting up a service account

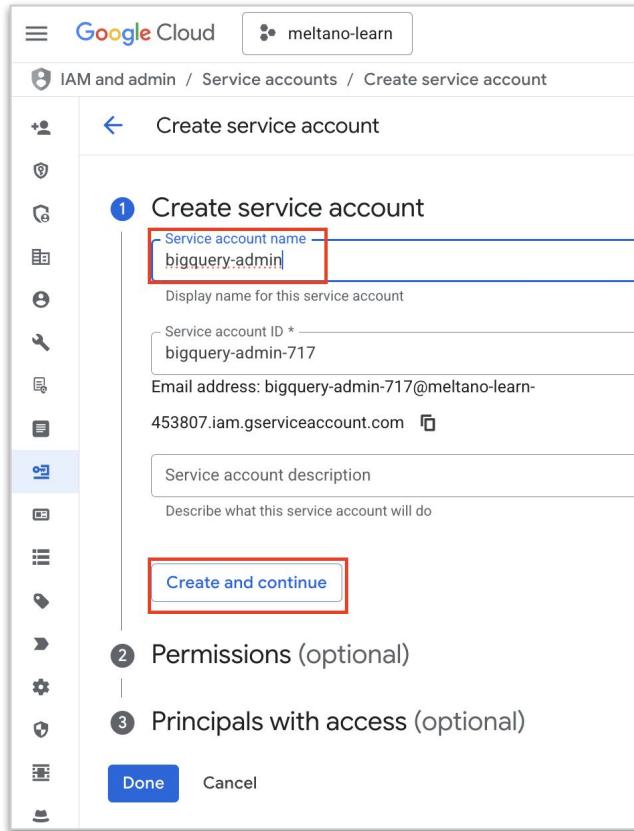
In IAM, click '**Create service account**:



The screenshot shows the Google Cloud IAM Service Accounts interface. At the top, there's a navigation bar with the Google Cloud logo, the project name 'meltano-learn', and the 'IAM' tab. Below the navigation is a sidebar with icons for IAM and admin, Compute Engine, Cloud Storage, and Organization policies. The main content area is titled 'Service accounts' and contains a 'Create service account' button, which is highlighted with a red box. There are also 'Delete' and 'Manage' buttons. Below the buttons, there's a section titled 'Service accounts for project 'meltano-learn'' with a descriptive paragraph about service accounts and a link to 'Organisation policies'.

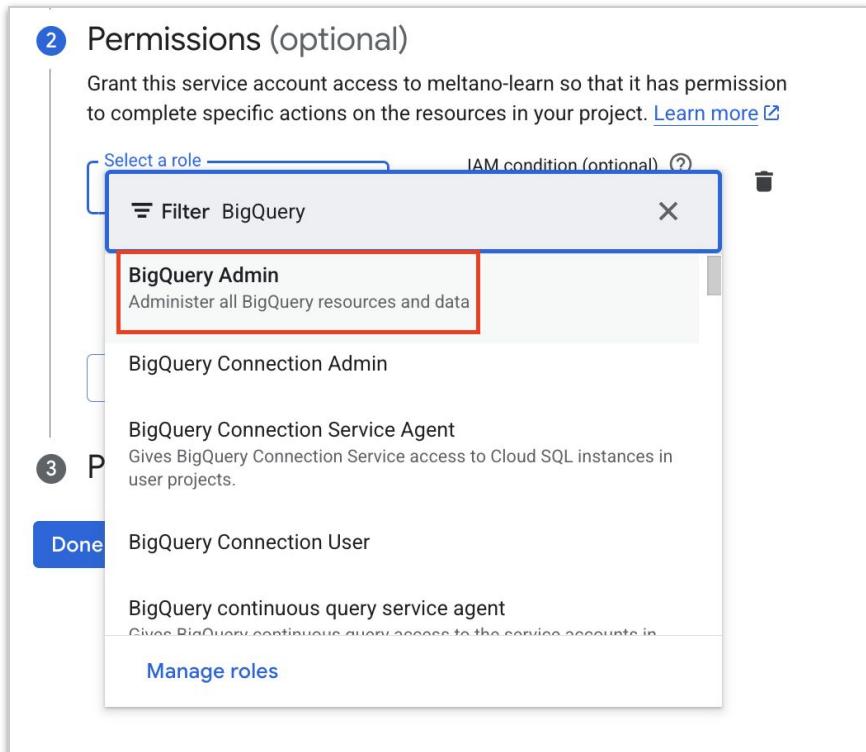
## 5. Setting up a service account

Input as shown and click  
**'Create and continue'**



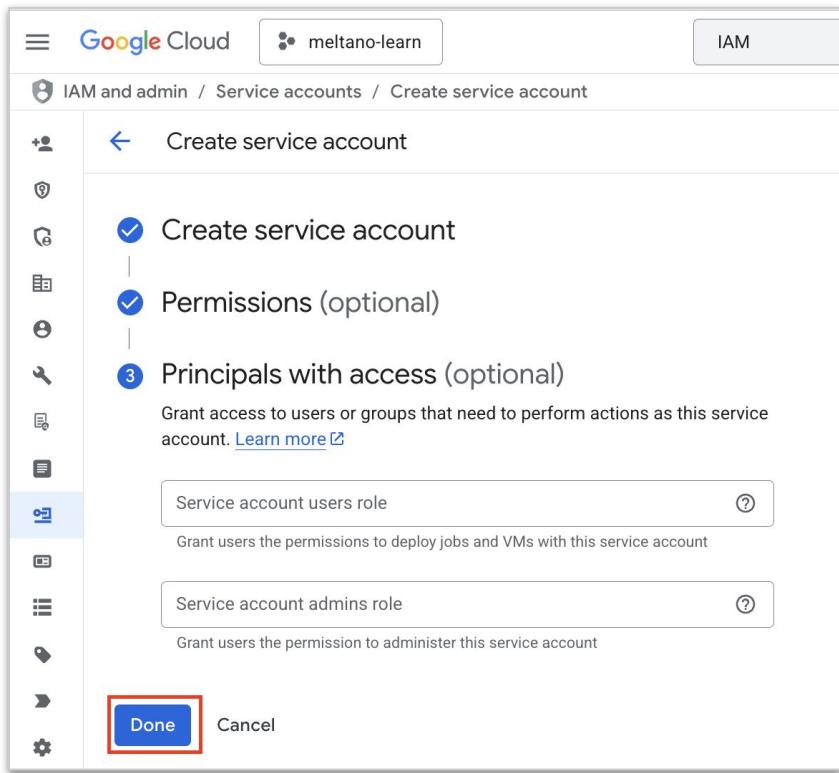
# 5. Setting up a service account

Under Permissions, search for '**BigQuery Admin**' and click '**Continue**':



# 5. Setting up a service account

Skip 'Principals with access'  
and click '**Done**':



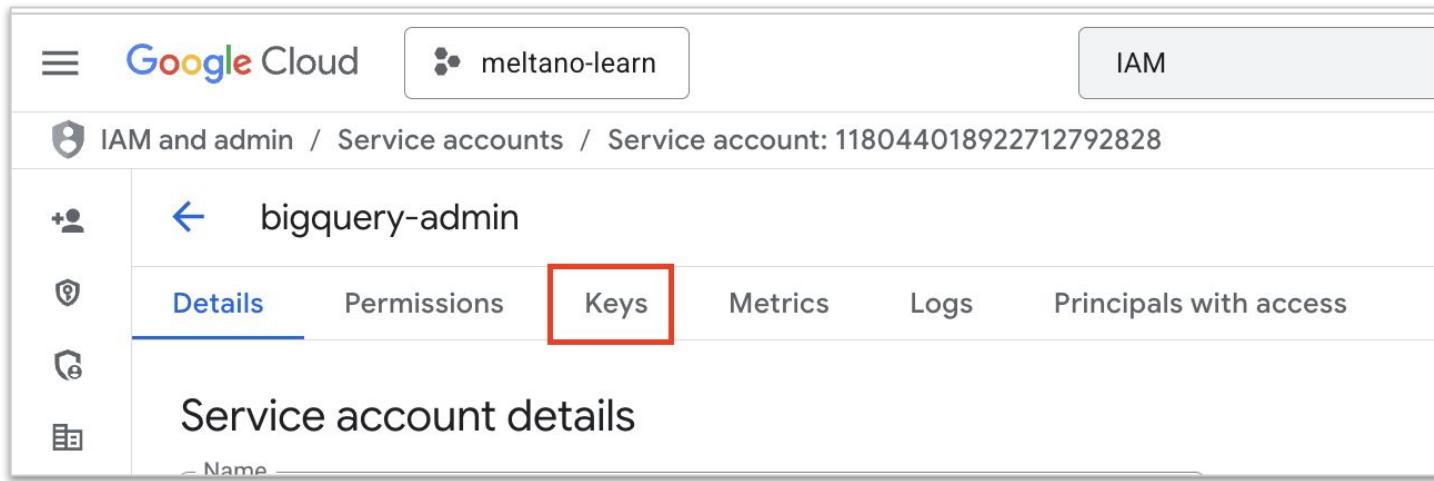
# 5. Setting up a service account

Click on the service account you just created:

<input type="checkbox"/>	 <a href="#">bigquery-admin-717@meltano-learn-453807.iam.gserviceaccount.com</a>	 Enabled	bigquery-admin
--------------------------	---	---	----------------

# 5. Setting up a service account

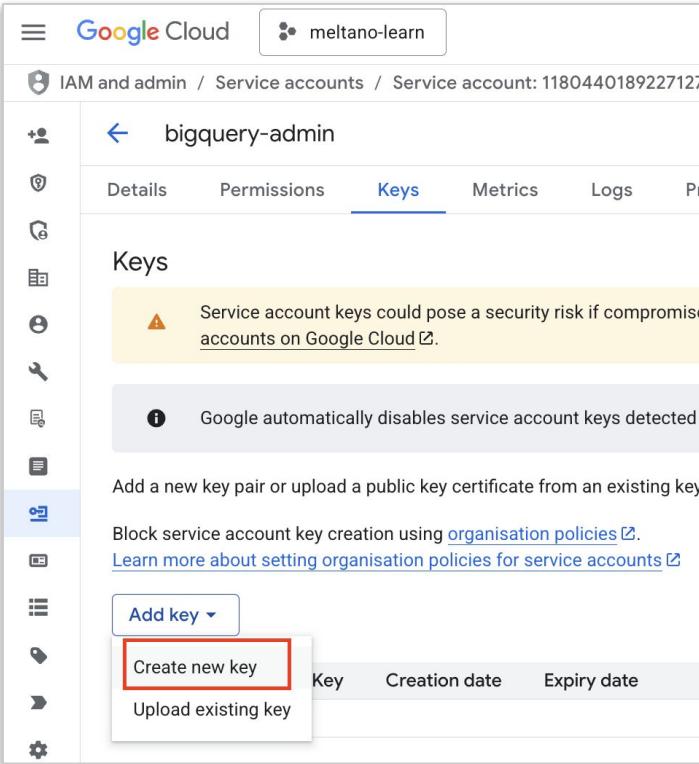
Click 'Keys':



The screenshot shows the Google Cloud IAM and admin interface for a service account named 'bq'. The top navigation bar includes the Google Cloud logo, the project name 'meltano-learn', and the 'IAM' tab. The main path is 'IAM and admin / Service accounts / Service account: 118044018922712792828'. On the left, there's a sidebar with icons for users, roles, and service accounts. The main content area shows the service account details for 'bq'. Below the title, there are tabs for 'Details' (which is underlined), 'Permissions', 'Metrics', 'Logs', and 'Principals with access'. A red box highlights the 'Keys' tab. The 'Service account details' section contains a 'Name' field with the value 'bq'.

# 5. Setting up a service account

Click 'Create new key'



# 5. Setting up a service account

- Select '**JSON**' and click '**Create**'
- A JSON file will be downloaded into your computer
- Put it into your meltano project folder (lesson 2.6)

Create private key for 'bigquery-admin'

Downloads a file that contains the private key. Store the file securely because this key cannot be recovered if lost.

Key type



JSON

Recommended



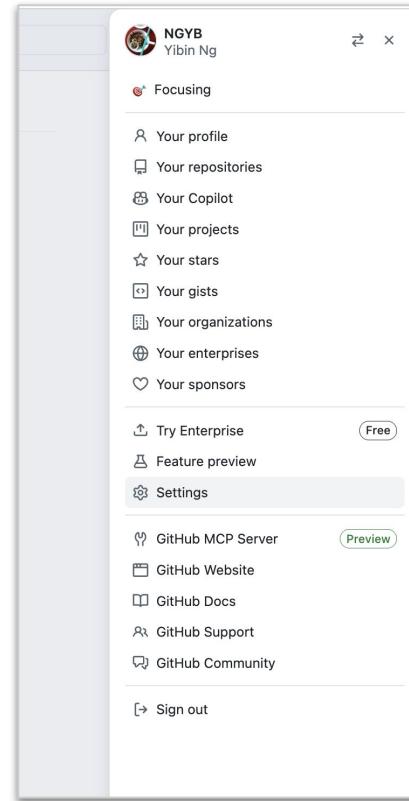
P12

For backward compatibility with code using the P12 format

Cancel Create

# 6. Generating a Github personal access token (PAT)

- This is in preparation for the lesson data extraction (Lesson 2.4)
- Go to **GitHub Settings**
  - Sign in to your GitHub account.
  - Click your profile picture in the top-right corner → **Settings**.



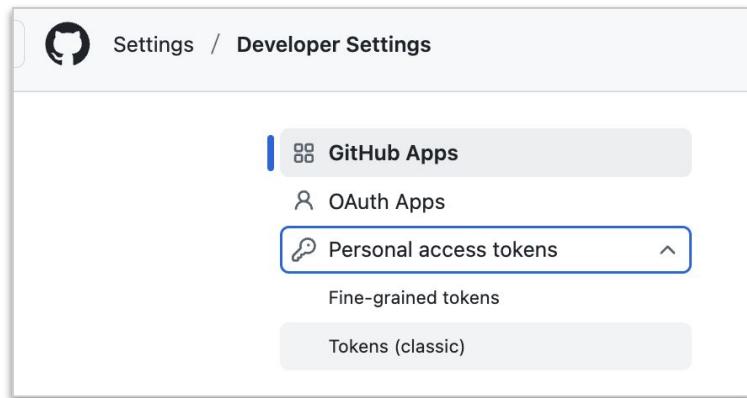
# 6. Generating a Github personal access token (PAT)

Access the Token Settings

In the left-hand menu, scroll down to **Developer Settings**.

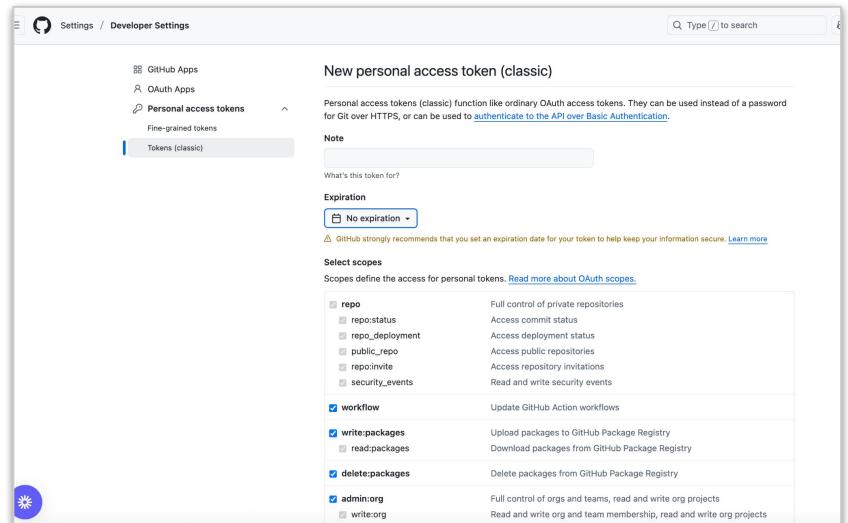
Click **Personal access tokens** → choose:

- **Tokens (classic)** — older method, works for most CLI and API tasks.



# 6. Generating a Github personal access token (PAT)

- Click **Generate new token** → Generate new token (classic).
- Give it a **note** (e.g., *"My Laptop Git Access"*).
- Set **expiration** (*recommended: 90 days*).
- Select **scopes** (*permissions*):
  - You can tick all the boxes
- Click **Generate token**.



## 6. Generating a Github personal access token (PAT)

- Copy the Token

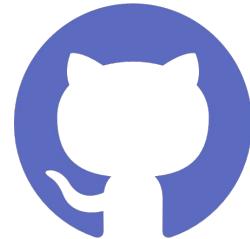
**⚠️ Important:** GitHub shows it **only once**. ⚠️

Copy it and store it securely (e.g., password manager).

- Use the Token

When Git asks for your password during `git push` or `git clone`, use:

- **Username:** your GitHub username
- **Password:** your token (paste it)



# Credits

<a href="https://www.flaticon.com/free-icons/github"  
title="github icons">Github icons created by Pixel perfect  
- Flaticon</a>