
ECE C143A/C243A course project: Google cloud compute credits

Discussion - 6 (11/07/2025)
Shreeram Athreya

Discussion Goals

- [Claim Google Cloud Credit](#)
- [Set up virtual machines \(VMs\) with GPUs using Google Cloud Credit](#)
- [Set up Google Colab to connect to VM as back-end](#)

Claiming Google Cloud Credit

Google cloud credits: ECE C143A/C243A

- Google has provided us **Google Cloud Education Credits** worth \$50 per coupon
- You can use Google Cloud VMs equipped with GPUs to run deep learning code, such as existing codebases available online, for your course project

Cloud Platform Education Grants

Use credits provided to you via the Google Cloud Platform Education Grants program to access Google Cloud Platform. Get what you need to build and run your apps, websites and services.

Thank you for your interest in Google Cloud Platform Education Grants. Please fill out the form below to receive a coupon code for credit to use on Google Cloud Platform.

First Name Last Name

School Email @ucla.edu ▼

If you do not see your domain listed, please contact your course instructor: bolei@ucla.edu

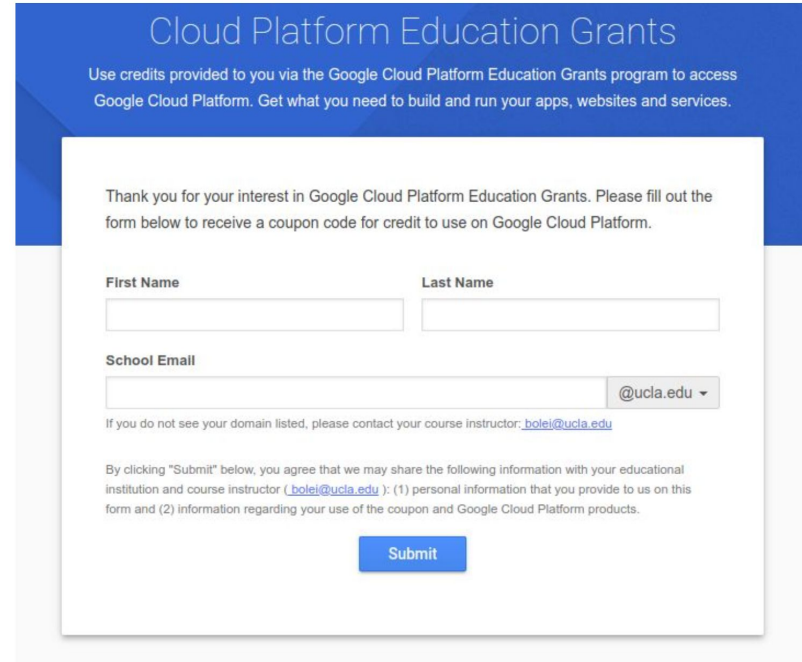
By clicking "Submit" below, you agree that we may share the following information with your educational institution and course instructor (bolei@ucla.edu): (1) personal information that you provide to us on this form and (2) information regarding your use of the coupon and Google Cloud Platform products.

Retrieve your coupon using the link below

Here is the URL you will need to access in order to request a Google Cloud coupon. You will be asked to provide your school email address and name. An email will be sent to you to confirm these details before a coupon is sent to you.

[Student Coupon Retrieval Link](#)

- You will be asked for a name and email address, which needs to match your school domain ([@ucla.edu](#) / [@g.ucla.edu](#)). A confirmation email will be sent to you with a coupon code.
- You can request a coupon from the URL and redeem it until: **1/30/2026**
- Coupon valid through: **9/30/2026**
- You can only request ONE code per unique email address.



The screenshot shows a web form titled "Cloud Platform Education Grants" with a blue header. Below the header, a message states: "Use credits provided to you via the Google Cloud Platform Education Grants program to access Google Cloud Platform. Get what you need to build and run your apps, websites and services." The main body of the form is white and contains the following elements:

- A thank-you message: "Thank you for your interest in Google Cloud Platform Education Grants. Please fill out the form below to receive a coupon code for credit to use on Google Cloud Platform."
- Two input fields for "First Name" and "Last Name".
- A "School Email" input field with a dropdown menu showing "@ucla.edu".
- A note: "If you do not see your domain listed, please contact your course instructor: bolei@ucla.edu".
- A disclaimer: "By clicking 'Submit' below, you agree that we may share the following information with your educational institution and course instructor (bolei@ucla.edu): (1) personal information that you provide to us on this form and (2) information regarding your use of the coupon and Google Cloud Platform products."
- A blue "Submit" button.

Important note on credit usage

- \$50 seems like a lot of money, but in reality, this will probably last at most one week if you run your GPU VM continuously
- **Very important: Stop your VM when not in use to make your credits last longer!**

Important note on claiming coupon

Please do not claim more than one credit coupon per person.

The number of coupons available is limited, only sufficient for 1 coupon per student. If you claim > 1 coupon, other students might not be able to claim any.

Redeeming Coupon

After submitting your coupon application, you will receive a link in your email with your unique coupon code.

Click on it and enter the necessary information

GCP credit application

Fill in the following information below to apply GCP credits to your account listed below.

First name *

Last name *

Account email

Credits will be applied to this account. If you'd like to apply credits to a different account, specify your preference [here](#).

Coupon code *

Terms and conditions

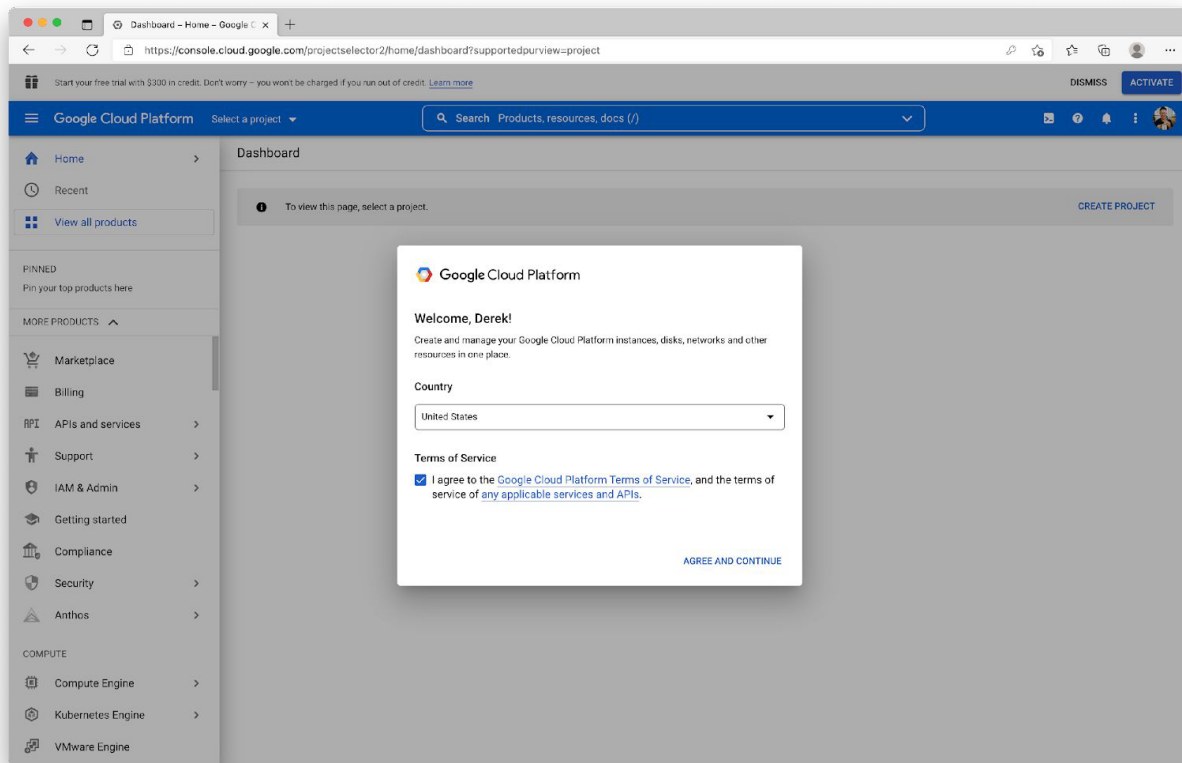
The following terms and conditions apply to the credit you received for Google Cloud products (the "Credit(s)").

The Credit is subject to valid registration and acceptance of an account with Google Cloud and satisfaction of any applicable eligibility requirements including the Google Cloud Platform [Terms of Service](#). You will be responsible for all usage in excess of the Credit and you may not be notified once the Credit is exhausted. The Credit is non-transferable and may not be sold or bartered. The Credit is valid for a limited time only and expires on the date indicated when you receive the applicable Credit code or on such date as designated by Google (in which case the earlier date applies). You may not use

Create Instance with GPU on GCP

1. Create project

- Click "Create Project"
- Or "New Project" after clicking the project name next to the "Google Cloud Platform" title
- New project may also be accessible after the organization (e.g. "g.ucla.edu")



Share project with teammates

- “IAM & Admin” > “IAM”
- Add new user to the project, so other teammates can access the instances under this project

The screenshot displays the Google Cloud Platform IAM & Admin interface. The left sidebar shows the navigation menu with 'IAM & Admin' selected. The main content area is titled 'Permissions for project My First Project' and shows a list of principals with checkboxes for selection. A modal window titled 'Add principals to My First Project' is open on the right, showing a search bar with 'mdma@g.ucla.edu' entered, a dropdown for 'Role' set to 'Owner', and a 'Condition' section. The modal also includes 'SAVE' and 'CANCEL' buttons.

Google Cloud Platform My First Project

IAM & Admin

IAM ADD REMOVE

PERMISSION RECOMMENDATIONS HISTORY

Permissions for project My First Project

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
<input type="checkbox"/>	895953302188-compute@developer.gserviceaccount.com	Com
<input type="checkbox"/>	895953302188@cloudservices.gserviceaccount.com	Goog
<input type="checkbox"/>	imamingyu@gmail.com	Ming
<input type="checkbox"/>	telinwu@g.ucla.edu	

Add principals to My First Project

Add principals and roles for My First Project resource

Enter one or more principals below. Then select a role for these principals to grant them access to your resources. Multiple roles allowed. [Learn more](#)

New principals

mdma@g.ucla.edu

Role

Owner

Condition

[Add condition](#)

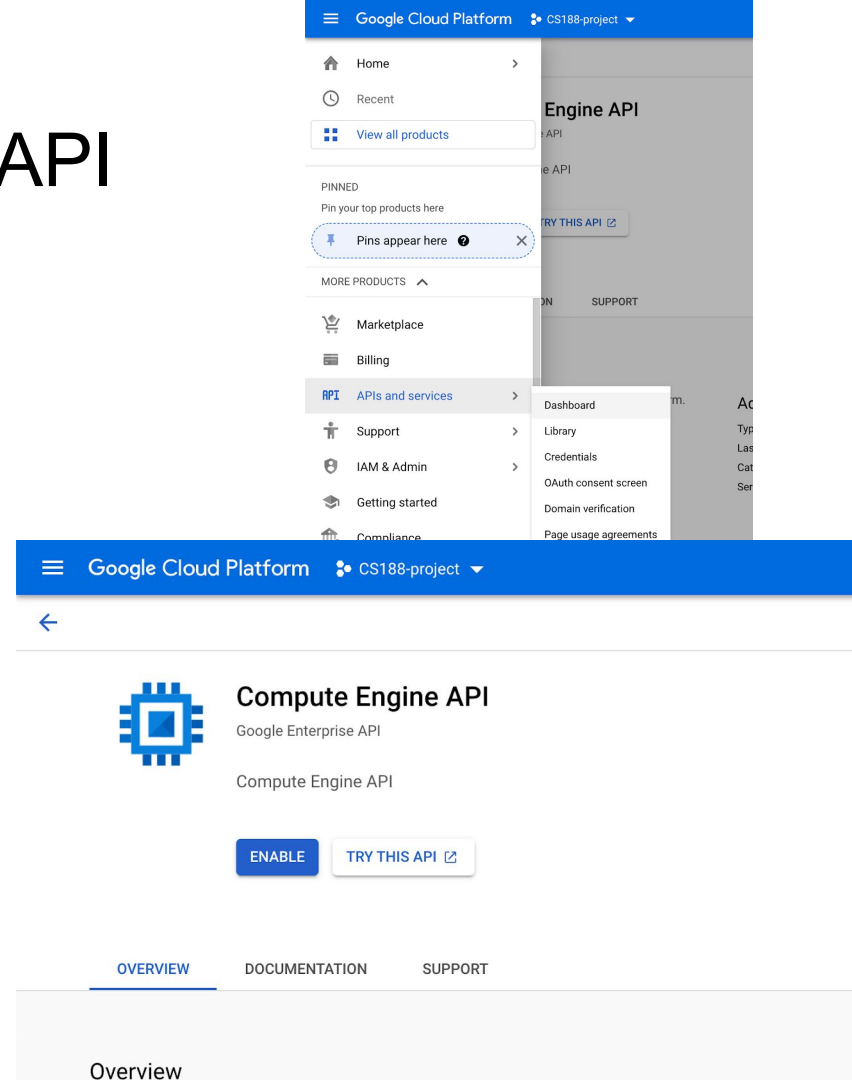
Full access to most Google Cloud resources See the list of included permissions.

+ ADD ANOTHER ROLE

SAVE CANCEL

2. Enable Compute Engine API

- It will prompt you to enable to the API when you first open the interfaces for Compute Engine
- Otherwise you can enable the API at "API and services" > "Dashboard" > Search "Compute Engine API" > Enable
- This can take several minutes



3. Check/change GPU quota after 48 hours

- By default, we can use 0 GPUs
- We need to request an increase in GPU quota
- [Resource quotas | Compute Engine Documentation | Google Cloud](#)
- Check quota at “IAM & Admin” > “Quotas”
- Add “GPUs (all regions)” in the filter
- Select quota item, click “Edit Quotas” (click the triple dots)
- Submit quota change request, need 24-48 hours to get response
 - Submit the quota increase request after 48 hours of creating your project, otherwise it will be declined
- us-west2 GPUs might already be available without making a quota request.

The screenshot shows the Google Cloud Platform interface for project "cs188". The main heading is "Quotas & System Limits for project 'cs188'". Below this, there are tabs for "QUOTAS & SYSTEM LIMITS" and "INCREASE REQUESTS". A section titled "Set up quota & system limit alerts" is visible. A table at the bottom lists quotas, with "Compute Engine API" selected. A modal window on the right shows the "Edit quota" for "Compute Engine API". The modal has a "New value" field set to "2" and a "Request description" field with the text "Plan to use 2 GPUs for deep learning coursework".

cs188 Search (/) for resources, docs, products, and more

Quotas & System Limits for project "cs188"

QUOTAS & SYSTEM LIMITS INCREASE REQUESTS

Set up quota & system limit alerts
Get alerted if a quota is close to reaching its maximum. Click on ⓘ in a row to get started, or click "Learn more" to view documentation.
[LEARN MORE](#)

Current usage > 90%
0
[View quotas & system limits](#)

All quotas & system limits
12,401

Filter GPUs (all regions) Enter property name or value

Service	Name	Type	Dimensions (e.g. location)	Value	Current usage percentage	Current usage
Compute Engine API	GPUs (all regions)	Quota		0	0%	0

Edit quota

Compute Engine API

Quota: GPUs (all regions)
Current value: 0
Enter a new quota value. A value above 0 will require approval from your service provider.

New value *
2

Request description *
Plan to use 2 GPUs for deep learning coursework

Your description will be sent to your service provider and is used to evaluate your request. It's used to include the intent of the quota usage, future growth plans, region or zone, and any additional requirements or dependencies.

DONE

NEXT

- Increase quota for GPUs (all regions)

Quotas & System Limits for project "cs188"

QUOTAS & SYSTEM LIMITS INCREASE REQUESTS

Set up quota & system limit alerts
Get alerted if a quota is close to reaching its maximum. Click on ⓘ in a row to get started, or click "Learn more" to view documentation.
[LEARN MORE](#)

Current usage > 90%
0
[View quotas & system limits](#)

All quotas & system limits
12,401

Filter gpu Name: NVIDIA T4 GPUs us-west4 Enter property name or value

	Service	Name	Type	Dimensions (e.g. location)	Value	Current usage percentage ↓	Current usage
<input checked="" type="checkbox"/>	Compute Engine API	NVIDIA T4 GPUs	Quota	region : us-west4	1	0%	0
<input type="checkbox"/>	Compute Engine API	NVIDIA T4 GPUs	System limit	zone : us-west4-a	Unlimited	-	0
<input type="checkbox"/>	Compute Engine API	NVIDIA T4 GPUs	System limit	zone : us-west4-b	Unlimited	-	0
<input type="checkbox"/>	Compute Engine API	NVIDIA T4 GPUs	System limit	zone : us-west4-c	Unlimited	-	0

Step 1/2

Quota changes

Expand each service card to change individual quotas.

Edit quota

Compute Engine API

Quota: NVIDIA T4 GPUs

Dimensions: region : us-west4

Current value: 1

Enter a new quota value. A value above 1 will require approval from your service provider. ⓘ

New value *
2

Request description *
Plan to use 2 GPUs for deep learning coursework

Your description will be sent to your service provider and is used to evaluate your request. It's useful to include the intent of the quota usage, future growth plans, region or zone spread, and any additional requirements or dependencies.

DONE

NEXT

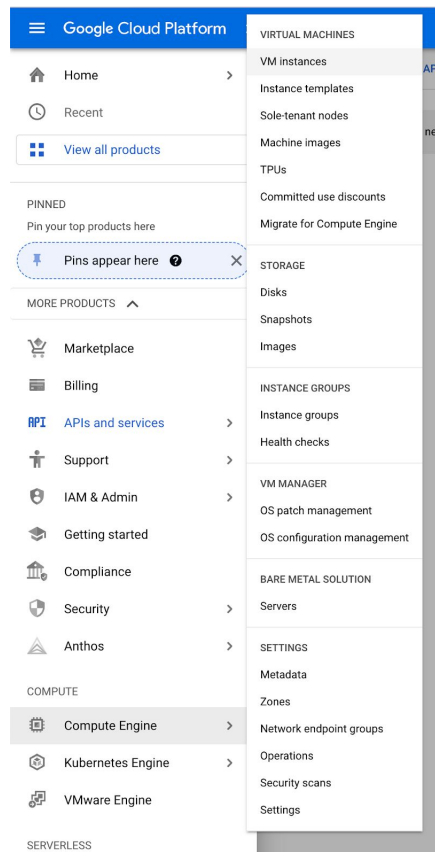
- Increase quota for specific region and type of GPU you want to use (for example NVIDIA T4 GPUs at us-west4 is limited to 1 in the screenshot)
- [You can come back to this later after you have created your VM]

GPU Choices

- [GPUs on Compute Engine | Compute Engine Documentation | Google Cloud](#)
- [GPUs pricing | Compute Engine: Virtual Machines \(VMs\) | Google Cloud](#)
- [GPU regions and zones availability | Compute Engine Documentation | Google Cloud](#)

4. Create an instance with attached GPUs

- Enter “Compute Engine” > “VM Instances” > “Create Instance”



4. Create an instance with attached GPUs

- Create an instance
- Choose region and zone that has the GPU you requested
 - Check region supported GPU types [in this link](#)
 - For example, we choose “us-west4-b” to use NVIDIA T4 GPU
 - You must have an available quota in the region requested in order to create the instance
- Choose “GPU” under “Machine configuration”
- Select GPU type and number

Name *
instance-1

MANAGE TAGS AND LABELS

Region *
us-west4 (Las Vegas)
Region is permanent

Zone *
us-west4-b
Zone is permanent

Machine configuration


General purpose Compute optimized Memory optimized **GPUs**

Graphics processing units (GPUs) accelerate specific workloads on your instances such as machine learning and data processing. [Learn More](#)

GPU type
NVIDIA T4

Number of GPUs
1

☐ Enable Virtual Workstation (NVIDIA GRID)

Series	Description	vCPUs	Memory	Platform
 N1	Balanced price & performance	1 - 96	1.8 - 624 GB	Intel Skylake

Machine type

Choose a machine type with preset amounts of vCPUs and memory that suit most workloads. Or, you can create a custom machine for your workload's particular needs. [Learn more](#)

PRESET CUSTOM

n1-standard-1 (1 vCPU, 3.75 GB memory)



vCPU
1

Memory
3.75 GB

ADVANCED CONFIGURATIONS

Monthly estimate

\$217.51

That's about \$0.30 hourly

Pay for what you use: no upfront costs and per second billing

Item	Monthly estimate
1 vCPU + 3.75 GB memory	\$39.05
1 NVIDIA T4	\$270.10
10 GB balanced persistent disk	\$1.10
Use discount	-\$92.75
Total	\$217.51

[Compute Engine pricing](#)

LESS

4. Create an instance with attached GPUs

Google Cloud

gcp-test0

Search (/) for resources, docs, products, and more

Search

Create an instance

Create VM from...

Machine configuration

n1-standard-1 (1 NVIDIA T4), asia-east1-c

OS and storage

Debian GNU/Linux 12 (bookworm)

Data protection

Snapshot schedules

Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

Operating system and storage

Name

instance-20250403-004151

Type

New balanced persistent disk

Size

10 GB

Snapshot schedule

default-schedule-1

License type

Free

Image

Debian GNU/Linux 12 (bookworm)

The selected image requires you to install an NVIDIA CUDA stack manually. To skip manual setup, click "Switch image" below to use a GPU-optimized Debian OS image with CUDA support at no additional cost.

Switch image

Change

Additional disks

+ Add new disk

+ Attach existing disk

+ Add local SSD

Container

Deploy a container image to this VM instance

Deploy container

Monthly estimate

\$207.95

That's about \$0.28 hourly

Pay for what you use: no upfront costs and per second billing

Item	Monthly estimate
1 vCPU + 3.75 GB memory	\$40.15
1 NVIDIA T4	\$255.50
10 GB balanced persistent disk	\$1.00
Use discount	-\$88.69
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$207.95

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

[Less](#)

4. Create an instance with attached GPUs

- Choose Boot disk and image

Boot disk ⓘ

Name	instance-1
Type	New balanced persistent disk
Size	10 GB
License type ⓘ	Free
Image	 Debian GNU/Linux 11 (bullseye)

The selected image requires you to install an NVIDIA CUDA stack manually. To skip manual setup, click "Switch Image" below to use a GPU-optimized Debian OS image with CUDA support at no additional cost.

[SWITCH IMAGE](#)

- Change firewall setting

- Select allow HTTP and HTTPS traffic, so you can install packages and connect to GitHub server

- Click "Create"

Boot disk

Select an image or snapshot to create a boot disk; or attach an existing disk. Can't find what you're looking for? Explore hundreds of VM solutions in [Marketplace](#) ↗

[PUBLIC IMAGES](#)

[CUSTOM IMAGES](#)

[SNAPSHOTS](#)

[ARCHIVE SNAPS](#)

Operating system

Deep Learning on Linux

Version *

Deep Learning VM with CUDA 11.8 M115

Debian 11, Python 3.10. With CUDA 11.8 preinstalled.

Boot disk type *

Balanced persistent disk

[COMPARE DISK TYPES](#)

Size (GB) *

50

Provision between 50 and 65536 GB

[SHOW ADVANCED CONFIGURATION](#)

[SELECT](#)

[CANCEL](#)

Search (/) for resources, docs, products

Confidential Computing is disabled on this VM instance


ENABLE

Container ?

Deploy a container image to this VM instance

DEPLOY CONTAINER

Boot disk ?

Name	instance-1
Type	New balanced persistent disk
Size	10 GB
License type ?	Free
Image	 Debian GNU/Linux 11 (bullseye)

CHANGE

Identity and API access ?

Service accounts ?

Service account

Boot disk

Select an image or snapshot to create a boot disk, or attach an existing disk. Can't find what you're looking for? Explore hundreds of VM solutions in [Marketplace](#)

PUBLIC IMAGES

CUSTOM IMAGES

SNAPSHOTS

ARCHIVE SNAPSHOTS

EXISTING DISKS

Operating system
Deep Learning on Linux

Version *
Deep Learning VM with CUDA 11.8 M115

Debian 11, Python 3.10. With CUDA 11.8 preinstalled.

Boot disk type *
Balanced persistent disk

COMPARE DISK TYPES

Size (GB) *
50

Provision between 50 and 65536 GB

SHOW ADVANCED CONFIGURATION

SELECT

CANCEL

Note: If you have difficulty obtaining a machine, try using another region instead

VM instances

Filter Enter property name or value

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP
<input type="checkbox"/>	!	instance-1				

VM instances

CREATE INSTANCE IMPORT VM REFRESH

INSTANCES OBSERVABILITY INSTANCE SCHEDULES

VM instances

Filter Enter property name or value

<input type="checkbox"/>	Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Cost
<input type="checkbox"/>	!	instance-1						

Related

Explore Backup and DR NEW
Back up your VMs and set up disaster recovery

View Billing report
View and manage your Compute Engine billing

Monitor VMs
View outlier VMs across the fleet and network

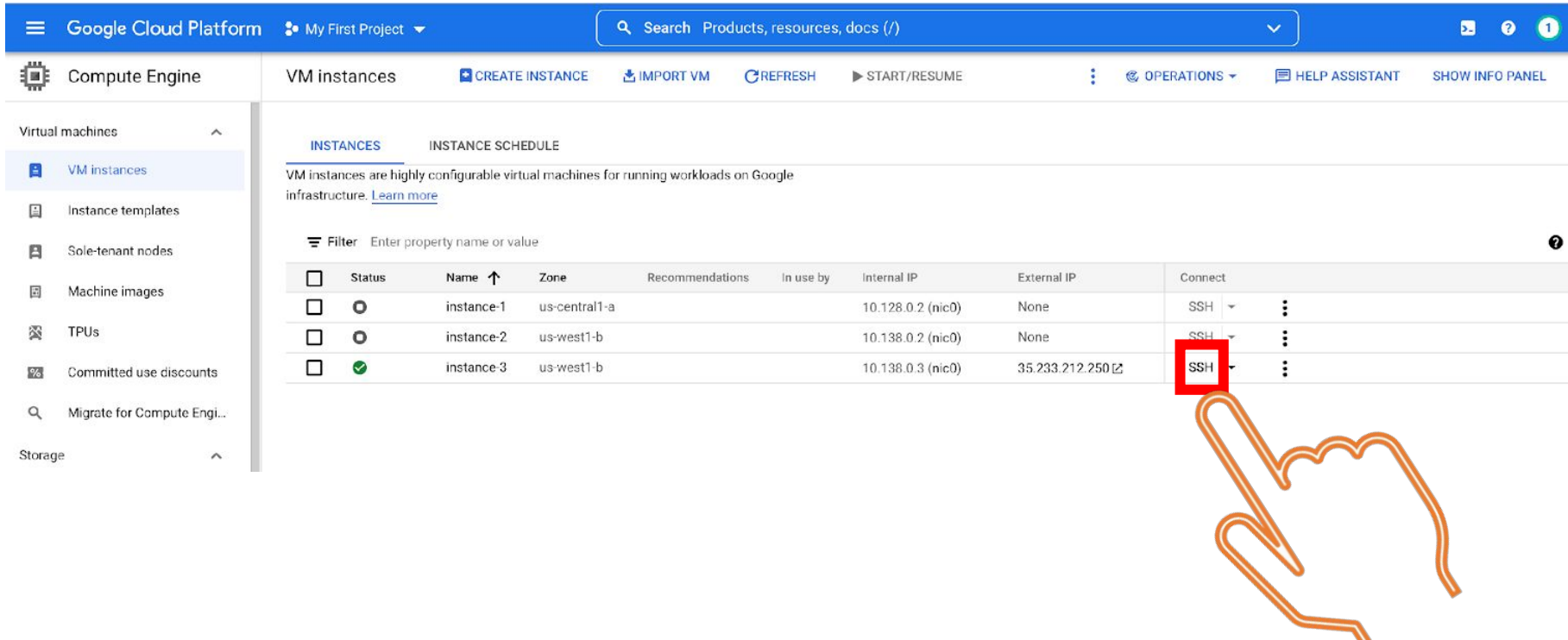
A n1-standard-1 VM instance with 1 nvidia-tesla-t4 accelerator(s) is currently unavailable in the us-west2-b zone. Alternatively, you can try your request again with a different VM hardware configuration or at a later time. For more information, see the troubleshooting documentation.

LEARN MORE

5. Install GPU driver

- If you choose the image with CUDA, your GPU driver will be installed automatically when you first login your machine
 - SSH into your machine in the Google Cloud portal (you have to login using your admin account to install the driver)
 - Input “y” when it prompts “Would you like to install the NVIDIA driver? ”

5. Install GPU driver



The screenshot shows the Google Cloud Platform interface for VM instances. The left sidebar lists navigation options under 'Virtual machines' and 'Storage'. The main content area shows a table of VM instances. The 'SSH' button for 'instance-3' is highlighted with a red box, and an orange hand icon is pointing to it.

Google Cloud Platform My First Project

Search Products, resources, docs (/)

Compute Engine VM instances CREATE INSTANCE IMPORT VM REFRESH START/RESUME OPERATIONS HELP ASSISTANT SHOW INFO PANEL

Virtual machines

- VM instances
- Instance templates
- Sole-tenant nodes
- Machine images
- TPUs
- Committed use discounts
- Migrate for Compute Engi...

Storage

INSTANCES INSTANCE SCHEDULE

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter Enter property name or value

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	○	instance-1	us-central1-a			10.128.0.2 (nic0)	None	SSH ⌵ ⋮
<input type="checkbox"/>	○	instance-2	us-west1-b			10.138.0.2 (nic0)	None	SSH ⌵ ⋮
<input type="checkbox"/>	✓	instance-3	us-west1-b			10.138.0.3 (nic0)	35.233.212.250 ↗	SSH ⌵ ⋮

5. Install GPU driver

```
SSH: instance-3 @ commanding-day-337807
https://ssh.cloud.google.com/projects/commanding-day-337807/zones/us-west1-b/instances/instance-3?authuser=0

Version: common-cul13.m87
Based on: Debian GNU/Linux 4.19.0-18-cloud-amd64 x86_64\n

Resources:
* Google Deep Learning Platform StackOverflow: https://stackoverflow.com/questions/tagged/google-dl-platform
* Google Cloud Documentation: https://cloud.google.com/deep-learning
* Google Group: https://groups.google.com/forum/#!forum/google-dl-platform

To reinstall Nvidia driver (if needed) run:
sudo /opt/deeplearning/install-driver.sh
Linux instance-3 4.19.0-18-cloud-amd64 #1 SMP Debian 4.19.208-1 (2021-09-29) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

This VM requires Nvidia drivers to function correctly. Installation takes ~1 minute.
Would you like to install the Nvidia driver? [y/n] y

Please consider adding the IAP-securd Tunnel User IAM role
to start using Cloud IAP for TCP forwarding for better
performance. Learn more Dismiss
```

```
imamingyu@instance-3: ~
https://ssh.cloud.google.com/projects/commanding-day-337807/zones/us-west1-b/instances/instance-3?authuser=0&hl=en...

Uncompressing NVIDIA Accelerated Graphics Driver for Linux-x86_64 460.73.01.....

WARNING: The nvidia-drm module will not be installed. As a result, DRM-KMS will not function with this
installation of the NVIDIA driver.

To guess the X library path '/usr/lib64' and X module path
these paths were not queryable from the system. If X fails to find the NVIDIA
install the 'pkg-config' utility and the X.Org SDK/development package for your
distribution and reinstall the driver.

Nvidia driver installed.
imamingyu@instance-3:~$ nvidia-smi
Fri Jan 21 01:20:24 2022

+-----+
| NVIDIA-SMI 460.73.01   Driver Version: 460.73.01   CUDA Version: 11.2   |
+-----+-----+-----+-----+-----+-----+
| GPU  Name            Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf    Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M. |
|                               |                    |            MIG M.     |
+-----+-----+-----+-----+-----+-----+
| 0   Tesla K80        Off          | 00000000:00:04:0 Off |    0          0      |
| N/A   36C    P0        67W / 149W | 0MiB / 11441MiB |    0%      Default   |
+-----+-----+-----+-----+-----+-----+
| 1   Tesla K80        Off          | 00000000:00:05:0 Off |    0          0      |
| N/A   52C    P0        74W / 149W | 0MiB / 11441MiB |   100%      Default   |
+-----+-----+-----+-----+-----+-----+

+-----+
| Processes: |
| GPU   GI   CI          PID    Type   Process name                      GPU Memory |
|   ID   ID             |              |           |                     Usage         |
+-----+-----+-----+-----+-----+
| No running processes found |
+-----+

imamingyu@instance-3:~$
```

5. Install GPU driver

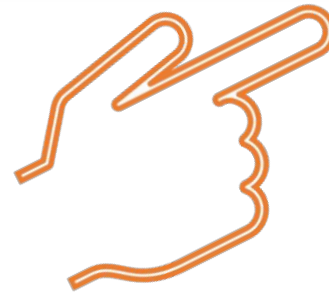
- Verify the GPU driver is installed
 - Type “nvidia-smi” command, you should see this if the driver is installed successfully

5. Install GPU driver

- Otherwise you could follow the steps in the following link
 - [Installing GPU drivers | Compute Engine Documentation | Google Cloud](#)
- We need to install
 - NVIDIA driver
 - CUDA toolkit
 - CUDA runtime

Turn off your machine when it's not using

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect	
<input type="checkbox"/>	●	instance-1	us-central1-a			10.128.0.2 (nic0)	None	SSH ▾	⋮
<input type="checkbox"/>	●	instance-2	us-west1-b			10.138.0.2 (nic0)	None	SSH ▾	⋮
<input type="checkbox"/>	✓	instance-3	us-west1-b			10.138.0.3 (nic0)	35.233.212.250 ↗	SSH ▾	⋮



- Start/Resume
- Stop**
- Suspend
- Reset
- Delete
- View network details
- Create new machine image
- View logs
- View monitoring

- So you can save some credit

~~Setup Google Colab using VM as Backend~~

Google Colab is now deprecated from VMs.

[More Info](#)

Alternatives:

- Connect to VM with SSH and VSCode (recommended)
 - [Develop code using a local VS Code editor | Cloud Workstations | Google Cloud](#)
 - [Remote Development using SSH](#)
- gcloud CLI and JupyterLab
 - [Quickstart: Create a Deep Learning VM instance by using the gcloud CLI](#)
 - [Connect to JupyterLab | Deep Learning VM Images | Google Cloud](#)

Tips for Experiments on Remote Machine

Connect to your instance

- If you would like to connect to your machine using terminal directly, instead of using the browser-based ssh window
- Create key (Detailed tutorial: [How to Use SSH Public Key Authentication – ServerPilot](#))
 - Using command ssh-keygen
 - You will keep the private key (for example id_rsa) in your local computer
- Add key
 - Add public key (like id_rsa.pub) to your Google Cloud instance setting
 - Click into your instance, click “Edit” in the top navigation bar, find “SSH key”, click “Add Item”, enter your public SSH key content there
- Connect your remote instance from your local terminal

```
ssh -i key_path username@external_ip_address
```
- [Connecting to Linux VMs using advanced methods | Compute Engine Documentation | Google Cloud](#)

Access file and coding remotely

- You will need to edit code and run the updated codebase with new implementation
- Choice 1: VS Code
 - [Developing on Remote Machines using SSH and Visual Studio Code](#)
- Choice 2: PyCharm
 - [Getting started with remote development | PyCharm \(jetbrains.com\)](#)
- Choice 3: transfer files by scp/sftp
 - Using scp/sftp to transfer file/code from your local machine to the remote machine

Monitor and specify GPU usage

- Check whether your job is running on GPU, memory usage, job ID etc
 - `nvidia-smi`
- Specify which GPU(s) to use
 - `export CUDA_VISIBLE_DEVICES="0"`
 - `export CUDA_VISIBLE_DEVICES="0,1,2"`
 - `export CUDA_VISIBLE_DEVICES=""`

Run experiments in background

- Use tmux to run your job in background, so your job can continue running if your ssh session broke
- `tmux new -s exp1`
 - Create a new tmux session
- control + b, then press d
 - Exit the session
- `tmux a -t exp1`
 - Enter the session exp1 again
- `tmux ls`
 - See all active sessions

Install environment and run code

Install miniconda

```
>>> wget https://repo.anaconda.com/miniconda/Miniconda3-latest-Linux-x86\_64.sh
```

```
>>> sh Miniconda3-latest-Linux-x86_64.sh
```

Create conda environment

```
>>> conda create -n ece239as python==3.xx
```

```
>>> conda activate ece239as
```

Install dependencies needed

```
>>> conda install pip
```

```
>>> pip3 --no-cache-dir install torch==1.10.1+cu113 torchvision==0.11.2+cu113  
torchaudio==0.10.1+cu113 -f https://download.pytorch.org/whl/cu113/torch_stable.html
```