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# **ECE C143A/C243A course project: Google cloud compute credits**

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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

The screenshot shows a web form titled "Cloud Platform Education Grants". The header text reads: "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." Below the header, a message says: "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." The form contains three input fields: "First Name" and "Last Name" (both with placeholder text), and "School Email" (with a dropdown menu showing "@ucla.edu"). A note below the email field states: "If you do not see your domain listed, please contact your course instructor: [bolei@ucla.edu](mailto:bolei@ucla.edu)". At the bottom, a note explains the terms of use: "By clicking "Submit" below, you agree that we may share the following information with your educational institution and course instructor ([bolei@ucla.edu](mailto: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 is at the bottom right.

# 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](mailto: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". The header includes the text: "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." Below the header, a message says: "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." The form has three input fields: "First Name" and "Last Name" (both are empty), and "School Email" (containing "@ucla.edu"). Below the email field is a note: "If you do not see your domain listed, please contact your course instructor: [bolei@ucla.edu](mailto:bolei@ucla.edu)". At the bottom, there is a checkbox agreement: "By clicking "Submit" below, you agree that we may share the following information with your educational institution and course instructor ([bolei@ucla.edu](mailto: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 is located at the bottom right of the form area.

# 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**

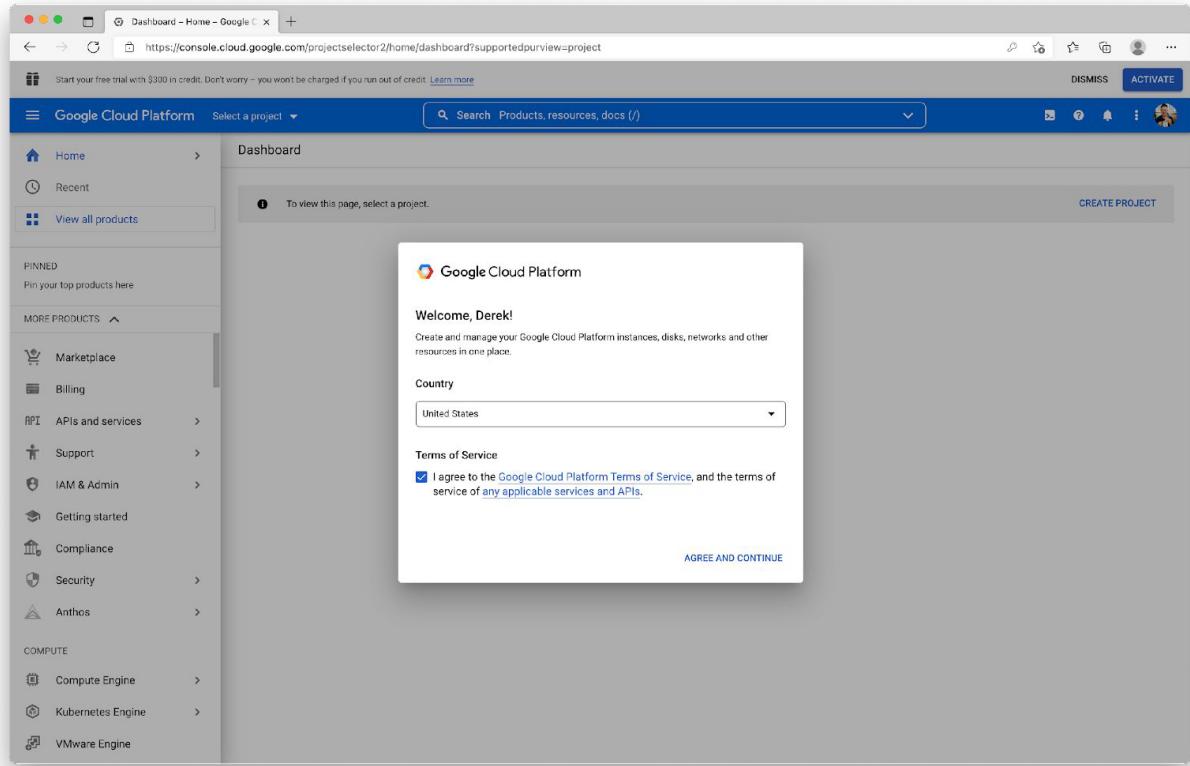
The following terms and conditions apply to the credit you received for Google Cloud products (the "Credit(s)").

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 shows the Google Cloud Platform (GCP) IAM & Admin interface. On the left, there's a sidebar with various options like IAM, Identity & Organisation, Policy troubleshooter, etc. The main area is titled "Permissions for project My First Project". It shows a list of principals (user accounts) with their names and email addresses. On the right, a modal window titled "Add principals to My First Project" is open, allowing users to add new principals and assign roles. The "New principals" field contains "mdma@g.ucla.edu", and the "Role" dropdown is set to "Owner".

Type	Principal	Name
Compute Engine	895953302188-compute@developer.gserviceaccount.com	Compute Engine
Cloud Services	895953302188@cloudservices.gserviceaccount.com	Cloud Services
User	imaminyu@gmail.com	Mingyu
User	telinwu@g.ucla.edu	Telin Wu

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 [X](#)

Role — Owner Condition [Add condition](#)

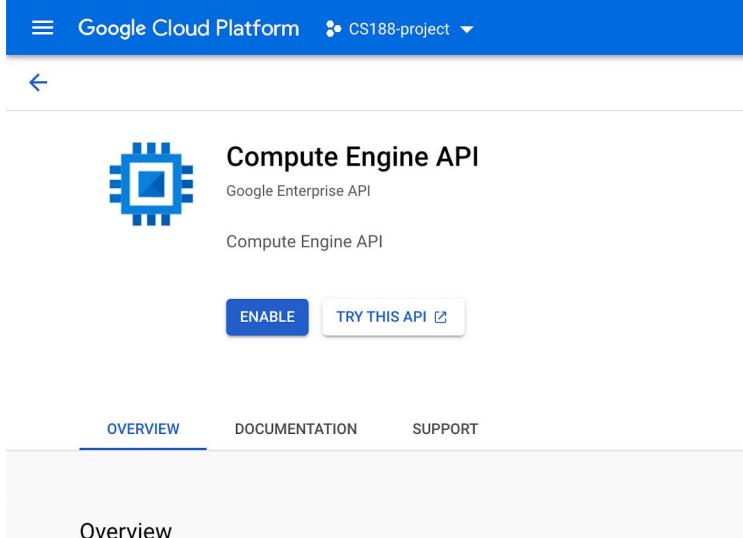
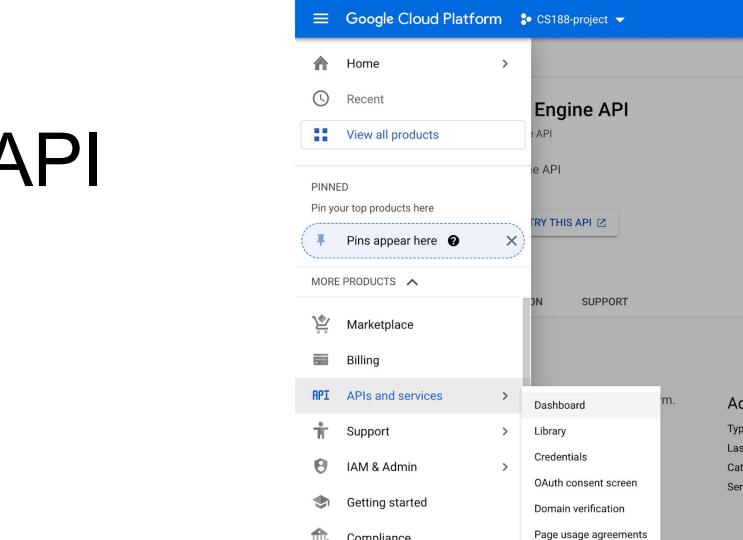
Full access to most Google Cloud resources See the list of included permissions.

+ 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 Quotas & System Limits interface for project "cs188".

**Left Panel (Quotas & System Limits):**

- Section: Set up quota & system limit alerts**
  - Icon: A bar chart with a red dot indicating usage.
  - Description: 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** button.
- Current usage > 90%**: 0
- All quotas & system limits**: 12,401
- View quotas & system limits** button.
- Filter**: GPU (all regions)
- Table:**

Service	Name	Type	Dimensions (e.g. location)	Value	Current usage percentage	Current usage
<input checked="" type="checkbox"/>	Compute Engine API	GPUs (all regions)	Quota	0	0%	0

**Right Panel (Quota Increase Request):**

- Step 1/2**
- Quota changes**: Expand each service card to change individual quotas.
- Edit quota** card for Compute Engine API:
  - Quota:** GPUs (all regions)
  - Current value:** 0
  - Description:** Enter a new quota value. A value above 0 will require approval from your service provider.
  - New value \***:
  - Request description \***: Plan to use 2 GPUs for deep learning coursework
  - Note:** 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 affected, and any additional requirements or dependencies.
  - DONE** button.

- 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
Compute Engine API	NVIDIA T4 GPUs	Quota	region: us-west4	1	0%	0
Compute Engine API	NVIDIA T4 GPUs	System limit	zone: us-west4-a	Unlimited	-	0
Compute Engine API	NVIDIA T4 GPUs	System limit	zone: us-west4-b	Unlimited	-	0
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 \*

**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

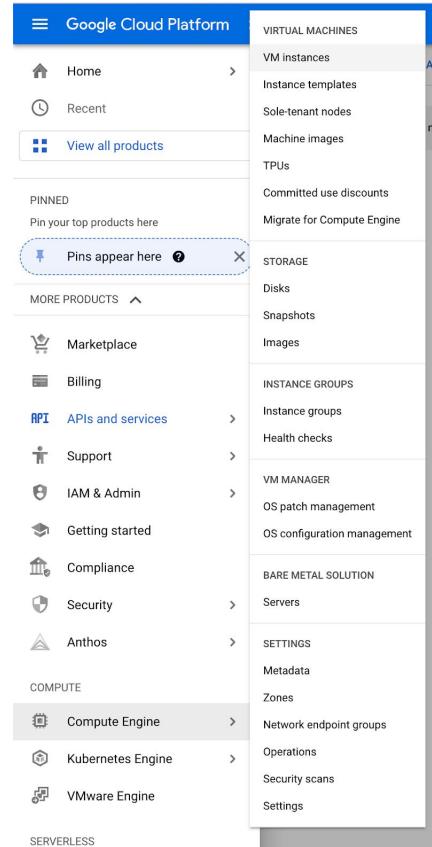
- Increase quota for specific region and type of GPU you want to use (for example NVIDIA T4 GPUs at us-west4 is limited to 1 in the screenshot)
- [You can come back to this later after you have created your VM]

# 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
<input checked="" type="radio"/> 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

The screenshot shows the Google Cloud Platform interface for creating a new VM instance. The left sidebar lists configuration sections: Machine configuration, OS and storage (circled in red), Data protection, Networking, Observability, Security, and Advanced. The main area displays the 'Operating system and storage' configuration, including the name 'instance-20250403-004151', type 'New balanced persistent disk', size '10 GB', snapshot schedule 'default-schedule-1', license type 'Free', and image 'Debian GNU/Linux 12 (bookworm)'. A note indicates that the selected image requires manual CUDA stack installation, with a 'Switch image' button. Below this are 'Additional disks' options: '+ Add new disk', '+ Attach existing disk', and '+ Add local SSD'. The 'Container' section allows deploying a container image, with a 'Deploy container' button. To the right, a 'Monthly estimate' table shows costs for vCPU, GPU, and disk, totaling \$207.95. Navigation links for Compute Engine and Cloud Operations pricing are also present.

Google Cloud gcp-test0

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

Search

Create an instance ↑ Create VM from...

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](#)

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
Boot disk type *	Balanced persistent disk
<a href="#">COMPARE DISK TYPES</a>	
Size (GB) *	50
Provision between 50 and 65536 GB	

[SHOW ADVANCED CONFIGURATION](#)

[SELECT](#) [CANCEL](#)

- Change firewall setting

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

- Click "Create"

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 <span>?</span>	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	Int
<input type="checkbox"/>		instance-1				

[INSTANCES](#) [OBSERVABILITY](#) [INSTANCE SCHEDULES](#)

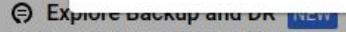
### VM instances

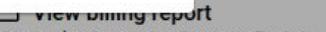
 Filter 

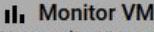
<input type="checkbox"/>	Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Cloud Router
<input type="checkbox"/>		instance-1						

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](#)

 Back up your VMs and set up disaster recovery

 View and manage your Compute Engine billing

 Monitor VMs View outlier VMs across and network

## 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

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...

INSTANCES INSTANCE SCHEDULE

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

Filter Enter property name or value

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
Up	instance-1	us-central1-a			10.128.0.2 (nic0)	None	SSH
Up	instance-2	us-west1-b			10.138.0.2 (nic0)	None	SSH
Up	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

Please consider adding the IAP-secured Tunnel User IAM role to start using Cloud IAP for TCP forwarding for better performance. [Learn more](#) [Dismiss](#)

```
Version: common-cu113.m87
Based on: Debian GNU/Linux
)
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-p
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
```

This is your username

imamingu@instance-3: ~

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.

Nvidia driver installed.

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	
N/A	36C	P0	67W / 149W	0MiB / 11441MiB	0% Default N/A

1 Tesla K80		Off		00000000:00:05.0 Off	
N/A	52C	P0	74W / 149W	0MiB / 11441MiB	100% Default N/A

Processes:

GPU ID	GI ID	CI ID	PID	Type	Process name	GPU Memory Usage
No running processes found						

imamingu@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 following steps in the following link

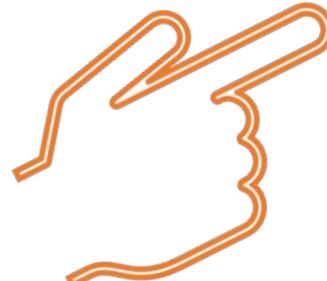
- [Installing GPU drivers | Compute Engine Documentation | Google Cloud](#)

- 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
```