11-785 INTRODUCTION TO DEEP LEARNING

RECITATION 0.9

SPRING 2026

Google Cloud Platform

TA: Yabsera Yemanberhan

GCP CONTENT

- GCP account setup
- How to request quota increase
- How to create a VM Instance
- How to connect to a VM from your device

REQUIREMENTS

- IDE with SSH support: Visual Studio Code
- Credit or Debit card detail, with around 2$

HOW TO CREATE A GCP ACCOUNT

cloud.google.com/?hl=en

Courses | Library | Piazza QA | CMU SIO | LinkedIn Learning | Oreilly | Scite | Ace Interview Prep | Perplexity | Microsoft Copilot | NotebookLM | Note... | Gemini | All Bookmarks

Google Cloud

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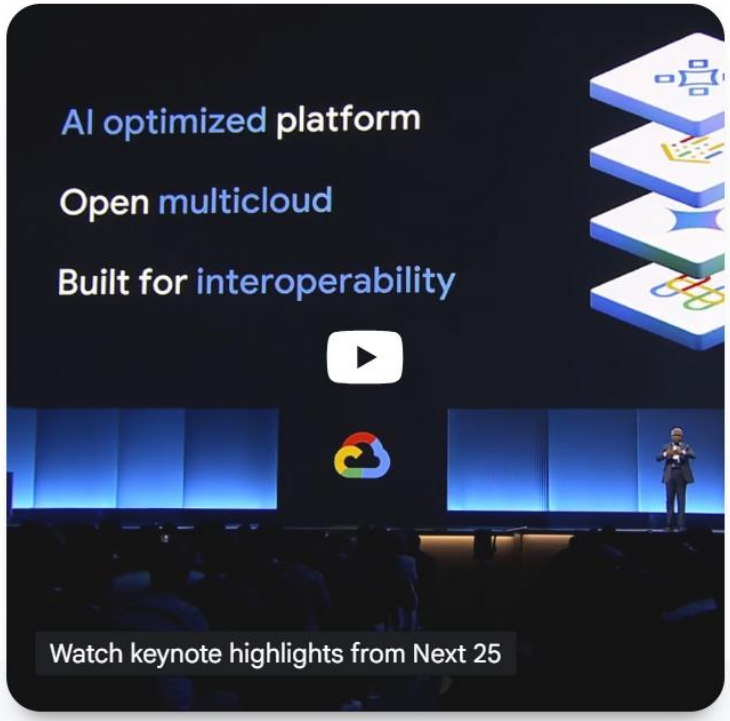

What's new in AI | Developers | Business leaders

Step 2 of 2 Payment Information Verification

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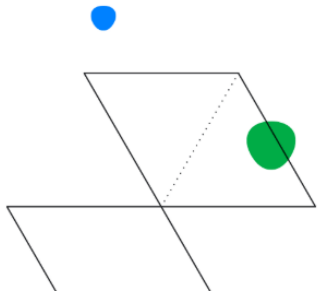

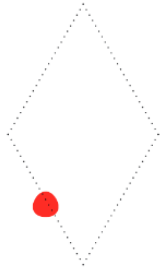

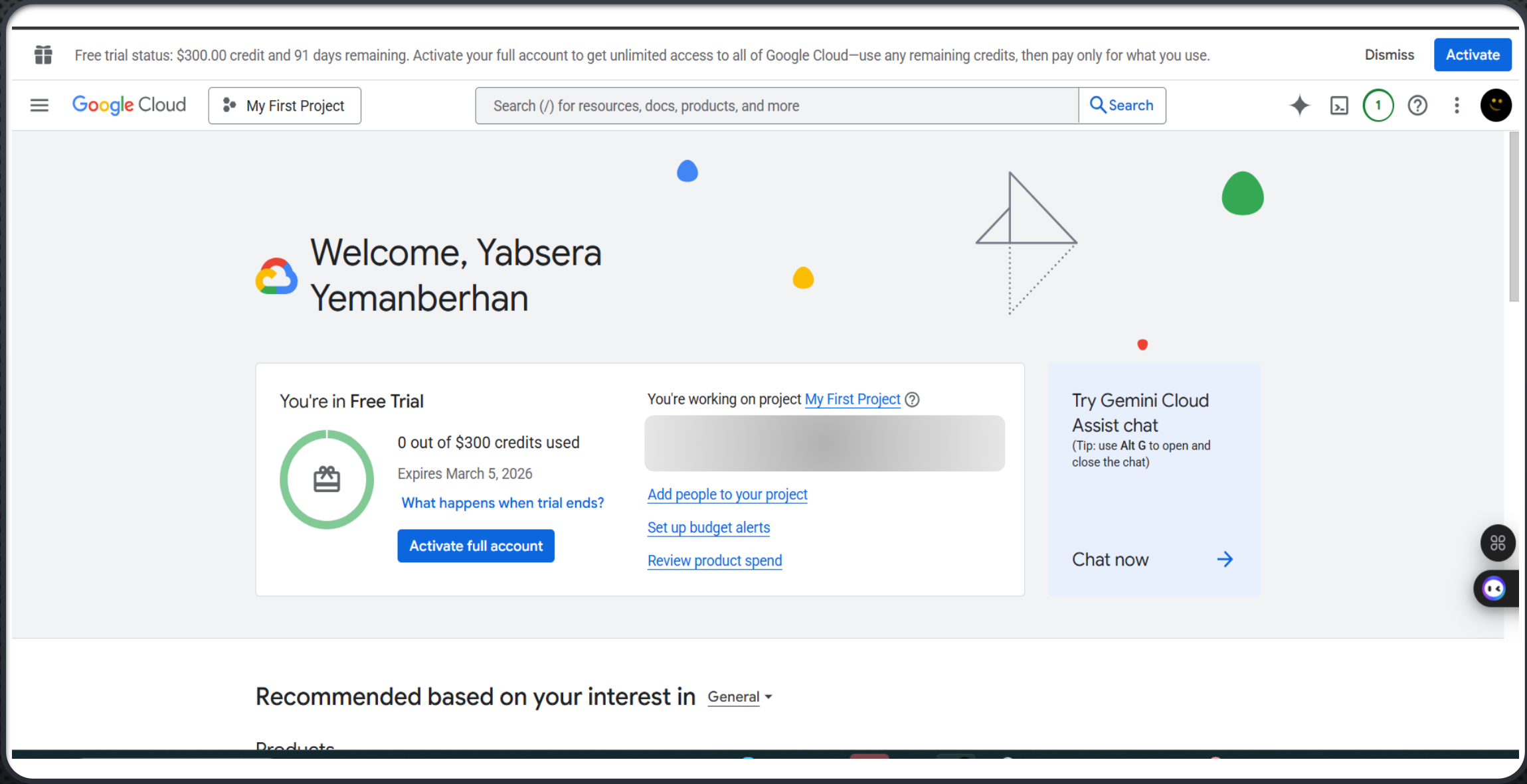
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Expires March 5, 2026
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Recommended based on your interest in General
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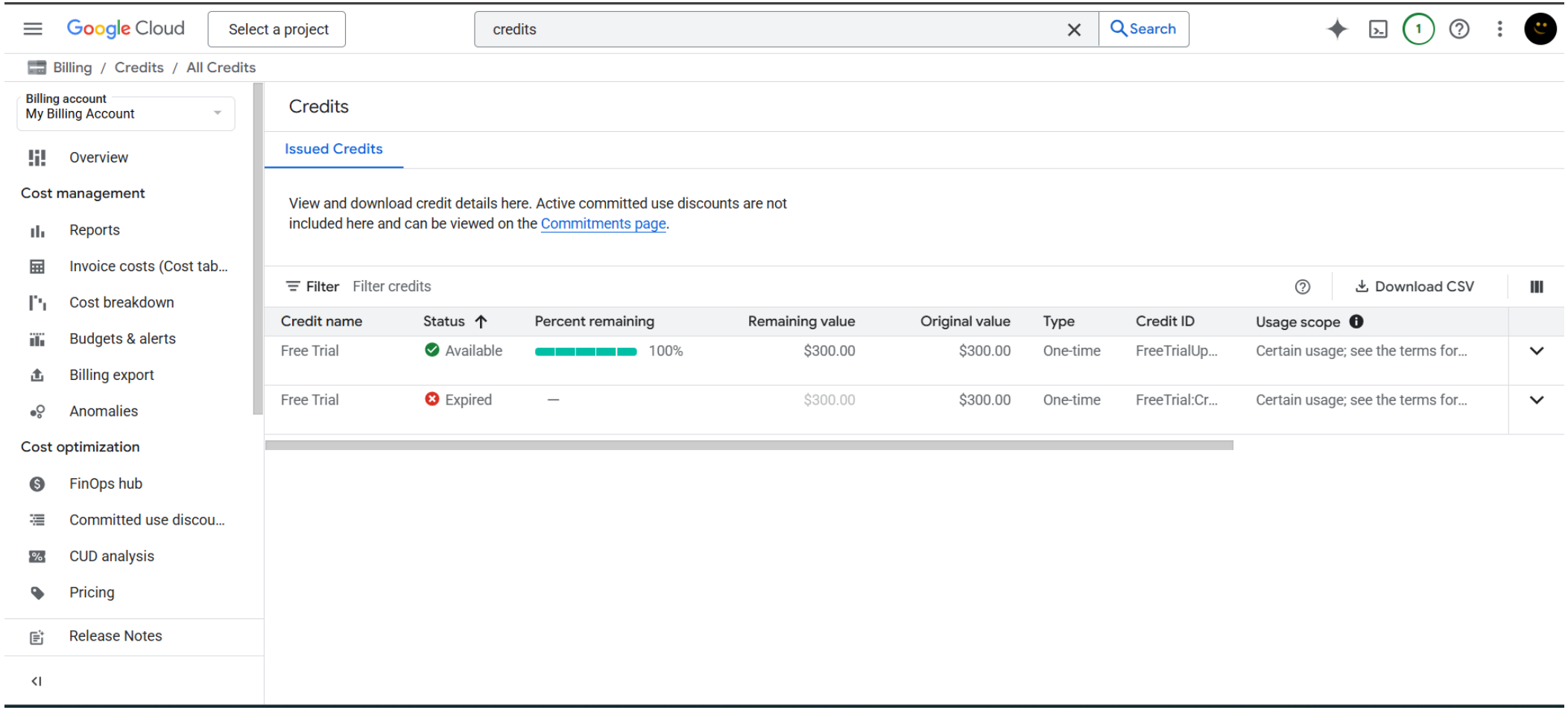
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Filter credits
Download CSV
Credit name
Status
Percent remaining
Remaining value
Original value
Type
Credit ID
Usage scope
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Certain usage; see the terms for...
Free Trial
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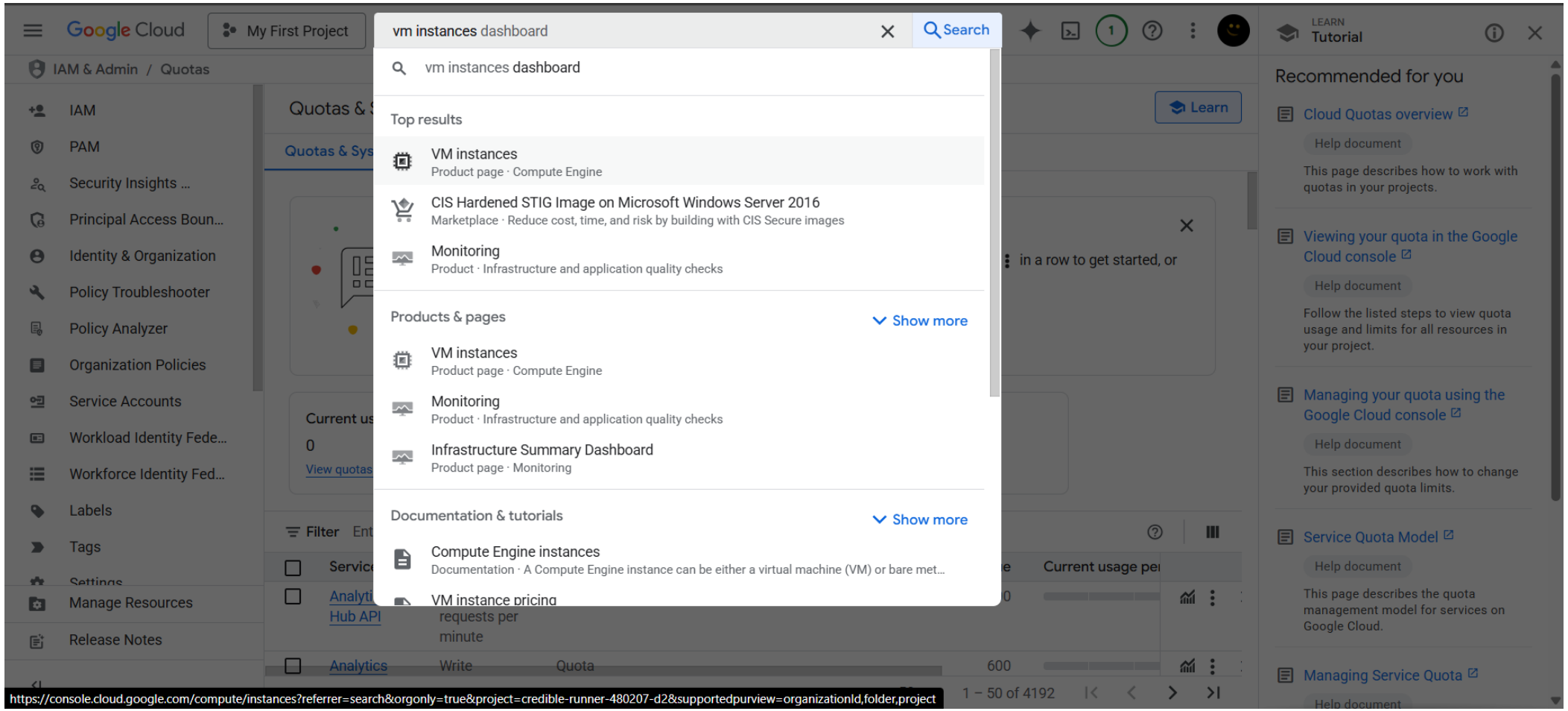
ACTIVATING COMPUTE ENGINE & REQUESTING QUOTA INCREASE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Help document
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Viewing your quota in the Google Cloud console
Help document
Follow the listed steps to view quota usage and limits for all resources in your project.
Managing your quota using the Google Cloud console
Help document
This section describes how to change your provided quota limits.
Service Quota Model
Help document
This page describes the quota management model for services on Google Cloud.
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Analytics Hub API
requests per minute
Analytics
Write
Quota
600
1 – 50 of 4192
https://console.cloud.google.com/compute/instances?referrer=search&orgonly=true&project=credible-runner-480207-d2&supportedpurview=organizationId,folder,project

Google Cloud | My First Project

Product details

Compute Engine API

Google Enterprise API

Compute Engine API

Enable | Try this API

Overview | Documentation | Support | Related Products

Overview

Creates and runs virtual machines on Google Cloud Platform.

Additional details

Type: SaaS & APIs
Last product update: 3/24/23
Category: Compute, Networking, Google Enterprise APIs
Service name: compute.googleapis.com

Tutorials and documentation

Google Cloud | My First Project | vm instances | Search

Compute Engine

- Overview
- Security risk overview

Virtual machines

- VM instances
- Instance templates
- Sole-tenant nodes
- Machine images
- TPUs
- Committed use discou...
- Reservations
- Migrate to Virtual Mach...

Storage

- Disks
- Marketplace
- Release Notes

VM instances | Create instance | Import VM | Refresh | Learn

Instances | Observability | Instance schedules

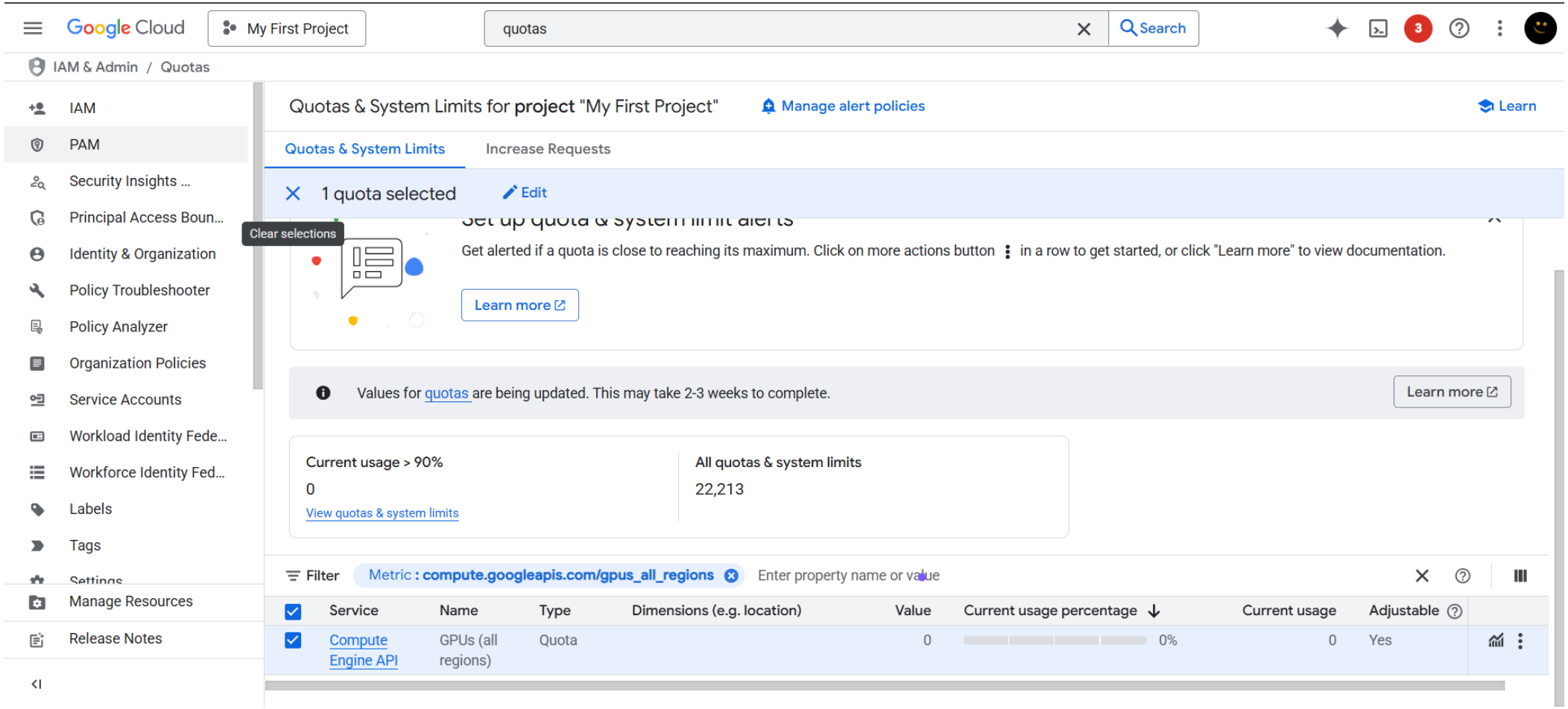
VM instances

Filter | Enter property name or value

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect

VM Instances

Compute Engine lets you use virtual machines that run on Google's infrastructure. Create micro-VMs or larger instances running Debian, Windows, or other standard images. Create your first VM instance, import it using a migration service, or try the quickstart to build a sample app.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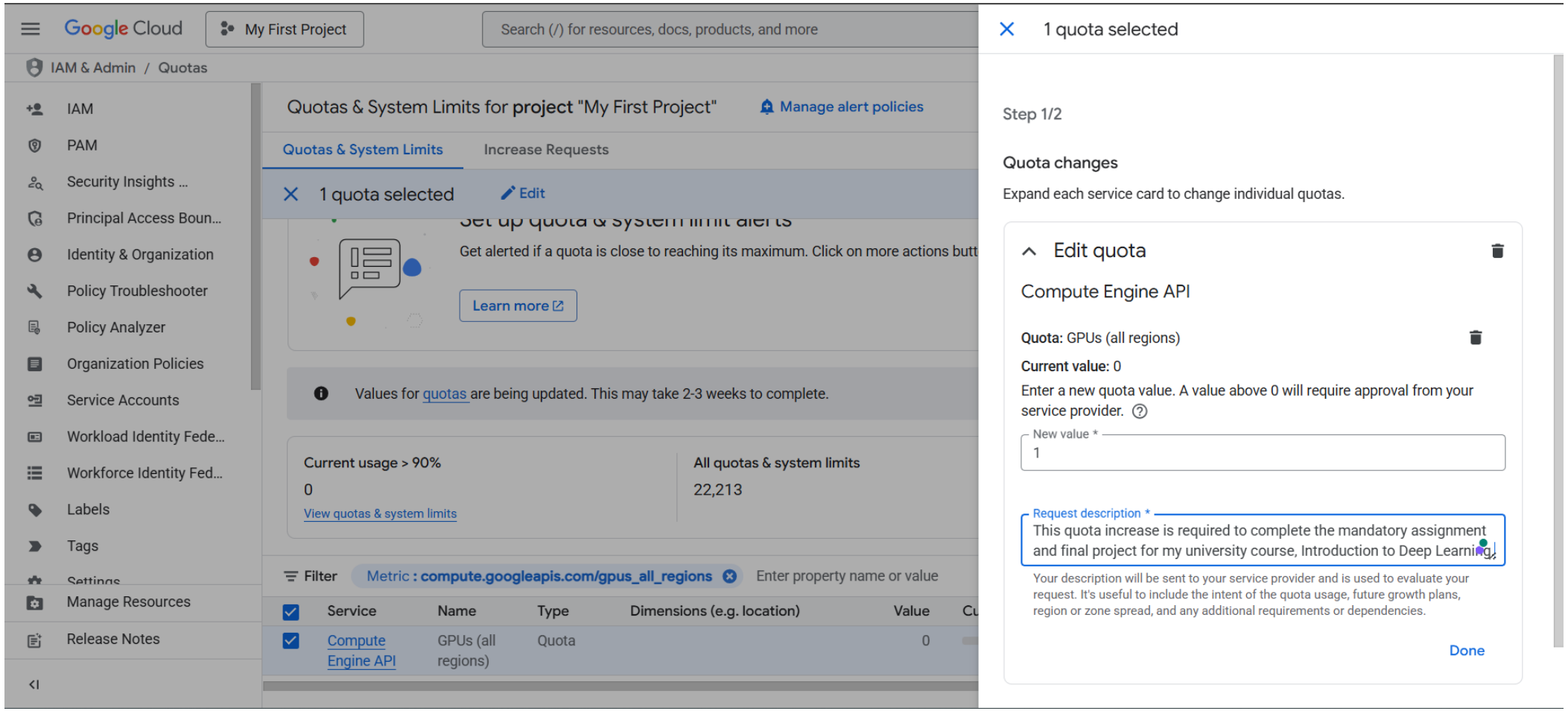
Tags
Settings
Manage Resources
Release Notes
Clear selections
Quotas & System Limits for project "My First Project"
Manage alert policies
Learn
Quotas & System Limits
Increase Requests
1 quota selected
Edit
Get alerted if a quota is close to reaching its maximum. Click on more actions button in a row to get started, or click "Learn more" to view documentation.
Learn more
Values for quotas are being updated. This may take 2-3 weeks to complete.
Learn more
Current usage > 90%
0
View quotas & system limits
All quotas & system limits
22,213
Filter
Metric : compute.googleapis.com/gpus_all_regions
Enter property name or value
Service
Name
Type
Dimensions (e.g. location)
Value
Current usage percentage
Current usage
Adjustable
Compute Engine API
GPUs (all regions)
Quota
0
0%
0
Yes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22,213
Filter
Metric : compute.googleapis.com/gpus_all_regions
Enter property name or value
Service
Name
Type
Dimensions (e.g. location)
Value
Compute Engine API
GPUs (all regions)
Quota
0
1 quota selected
Step 1/2
Quota changes
Expand each service card to change individual quotas.
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 *
1
Request description *
This quota increase is required to complete the mandatory assignment and final project for my university course, Introduction to Deep Learning.
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

SSH SETUP

- SSH stands for **Secure Shell**.
- It's a protocol (and a tool) used to **securely connect to another computer over a network**.
- SSH allows you to:
  - Log into a remote computer's terminal.
  - Run commands on that machine as if you're physically there.
  - Transfer files securely
  - Set up port forwarding, tunnels, and other networking tasks.

Learn more about SSH

Move to your local terminal and execute below commands. If you're using Windows make sure to run them in PowerShell or Git Bash. Remove the comments when pasting.

- $ cd ~ # Go to your home directory
- $ mkdir .ssh # Create a .ssh folder if you don't have it
- $ cd .ssh
- $ ssh-keygen -t rsa -b 4096 # This is to create a private key
- $ Enter file to save the key: IDL_GCP # This will create a file IDL_GCP.pub, passphrase isn't necessary but you can add it if you want.
- $ cat IDL_GCP.pub # To check contents of the file

Copy the contents and open SSH keys on GCP.
Note your username which can be found between "==" and the "@" in your public key.

```
PS C:\Users\STUDENT> cd .ssh
PS C:\Users\STUDENT\.ssh> ls


    Directory: C:\Users\STUDENT\.ssh


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----         4/29/2025   9:12 PM            163 config
-a----         2/19/2025   2:24 PM           2610 id_rsa
-a----         2/19/2025   2:24 PM            574 id_rsa.pub
-a----          9/5/2025   2:34 PM           2589 known_hosts
-a----          9/5/2025   2:34 PM           1845 known_hosts.old


PS C:\Users\STUDENT\.ssh> ssh-keygen -t rsa -b 4096
Generating public/private rsa key pair.
Enter file in which to save the key (C:\Users\STUDENT/.ssh/id_rsa): IDL_GCP
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in IDL_GCP
Your public key has been saved in IDL_GCP.pub
The key fingerprint is:
SHA256:8dmfbIuPZBHN5r0V75+Fe8HyTMJ6tCVxsbOjS8aj/eE student@STUDENT-199
The key's randomart image is:
+---[RSA 4096]----+
|                 |
|             o . |
|        .   . +.o|
|         o o = =o|
|        S o + = *|
|            .X @o|
|            ==^o=|
|           +=Bo=*|
|           .+++E.|
+----[SHA256]-----+
PS C:\Users\STUDENT\.ssh>
```

```
PS C:\Users\STUDENT\.ssh> ls


    Directory: C:\Users\STUDENT\.ssh


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----         4/29/2025   9:12 PM            163 config
-a----         12/6/2025  12:31 PM           3381 IDL_GCP
-a----         12/6/2025  12:31 PM            746 IDL_GCP.pub
-a----         2/19/2025   2:24 PM           2610 id_rsa
-a----         2/19/2025   2:24 PM            574 id_rsa.pub
-a----          9/5/2025   2:34 PM           2589 known_hosts
-a----          9/5/2025   2:34 PM           1845 known_hosts.old


PS C:\Users\STUDENT\.ssh> cat .\IDL_GCP.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQDFUtTanD0y2XMVQu3hb+1wqiH/GrDyf+jYe2u7eJbrXhEhx29J+dfsIf6gd7sHnj/bY2OGjaWmqz4YDMyo5NQZBwSOpX1KC3h/ixqTMmzsLt56V0jL7Q2x
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PS C:\Users\STUDENT\.ssh>
```
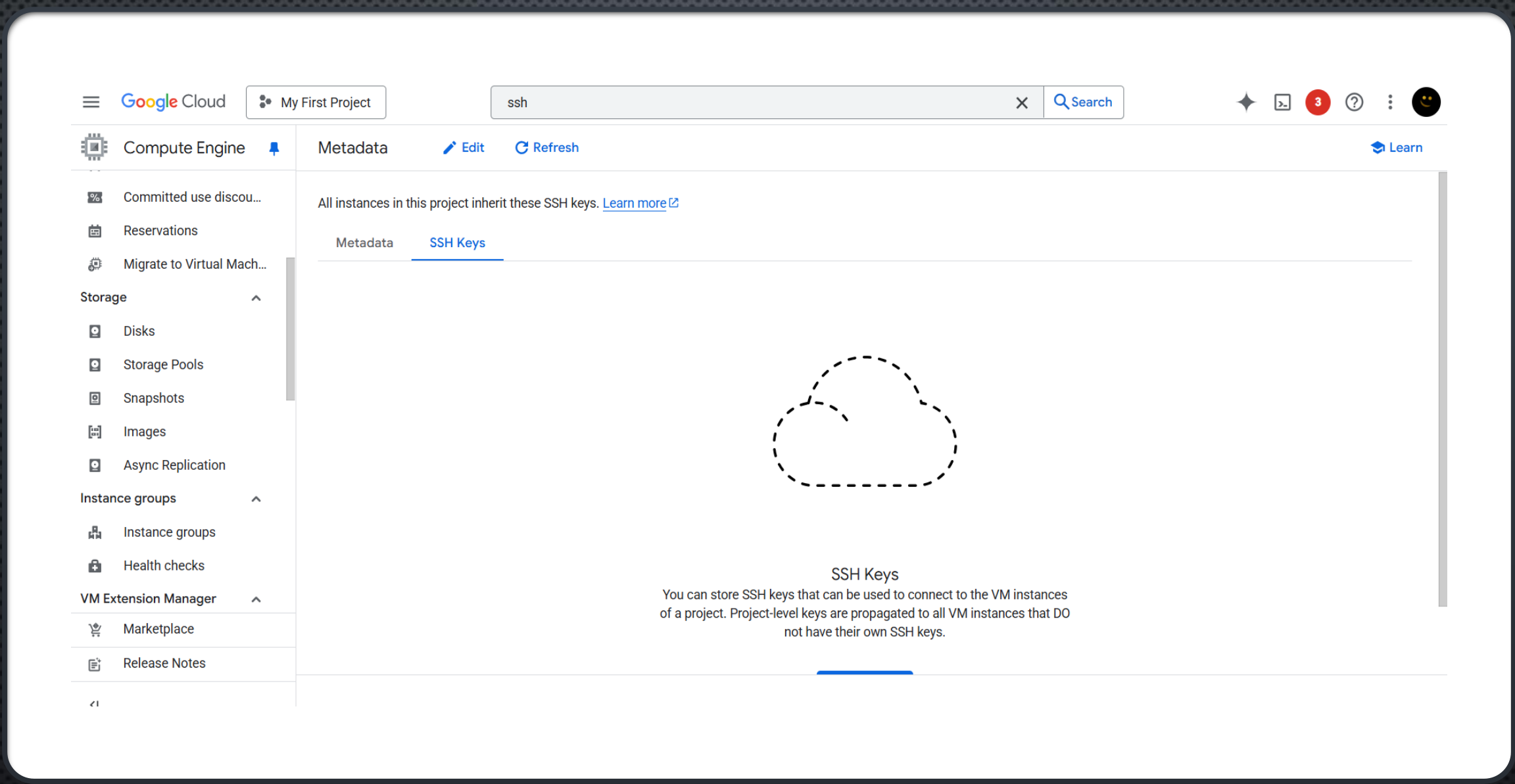

username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Disks
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Snapshots
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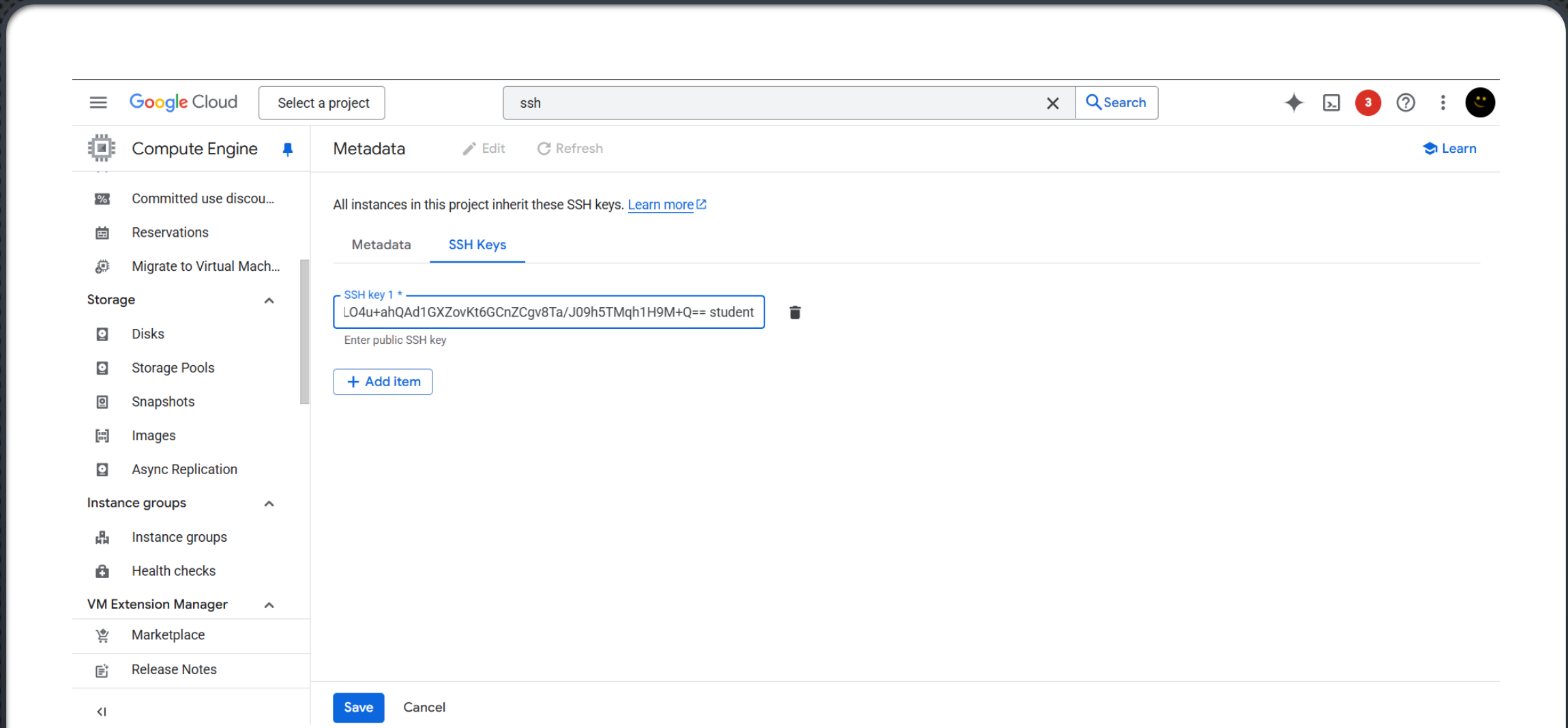
Async Replication
Instance groups
Instance groups
Health checks
VM Extension Manager
Marketplace
Release Notes
All instances in this project inherit these SSH keys. Learn more
Metadata
SSH Keys
SSH Keys
You can store SSH keys that can be used to connect to the VM instances of a project. Project-level keys are propagated to all VM instances that DO not have their own SSH keys.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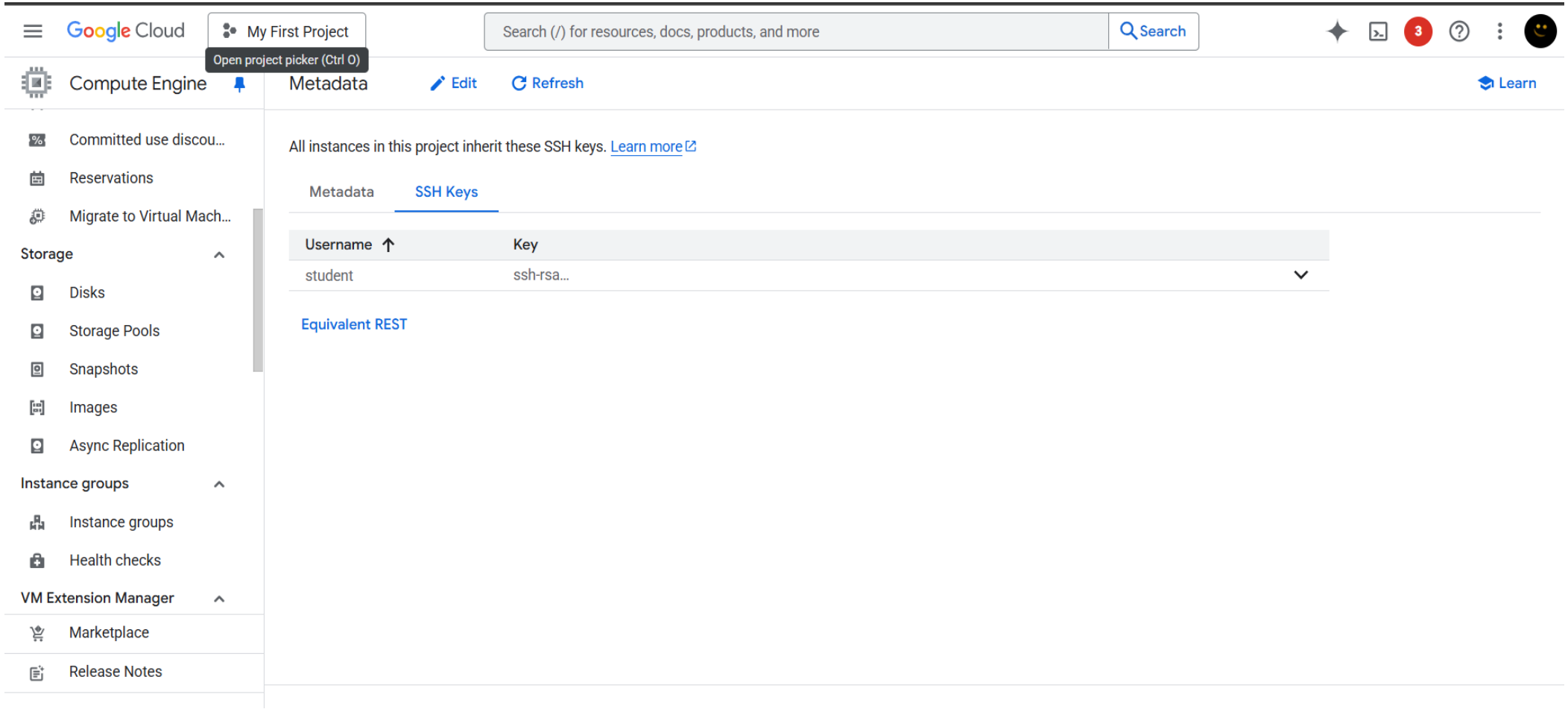
Release Notes
All instances in this project inherit these SSH keys. Learn more
Metadata
SSH Keys
SSH key 1 *
LO4u+ahQAd1GXZovKt6GCnZCgv8Ta/J09h5TMqh1H9M+Q== student
Enter public SSH key
+ Add item
Save
Cancel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Key
student
ssh-rsa...
Equivalent REST

CREATING VM INSTANCE

- You can also check for which GPU regions have what compute available from https://cloud.google.com/compute/docs/gpus/gpu-regions-zones
- This would be helpful in your later assignments and projects.
- We will be looking into VM instances. These are similar to EC2 instances provided by AWS.

- Copy the external IP given here and open VC code.

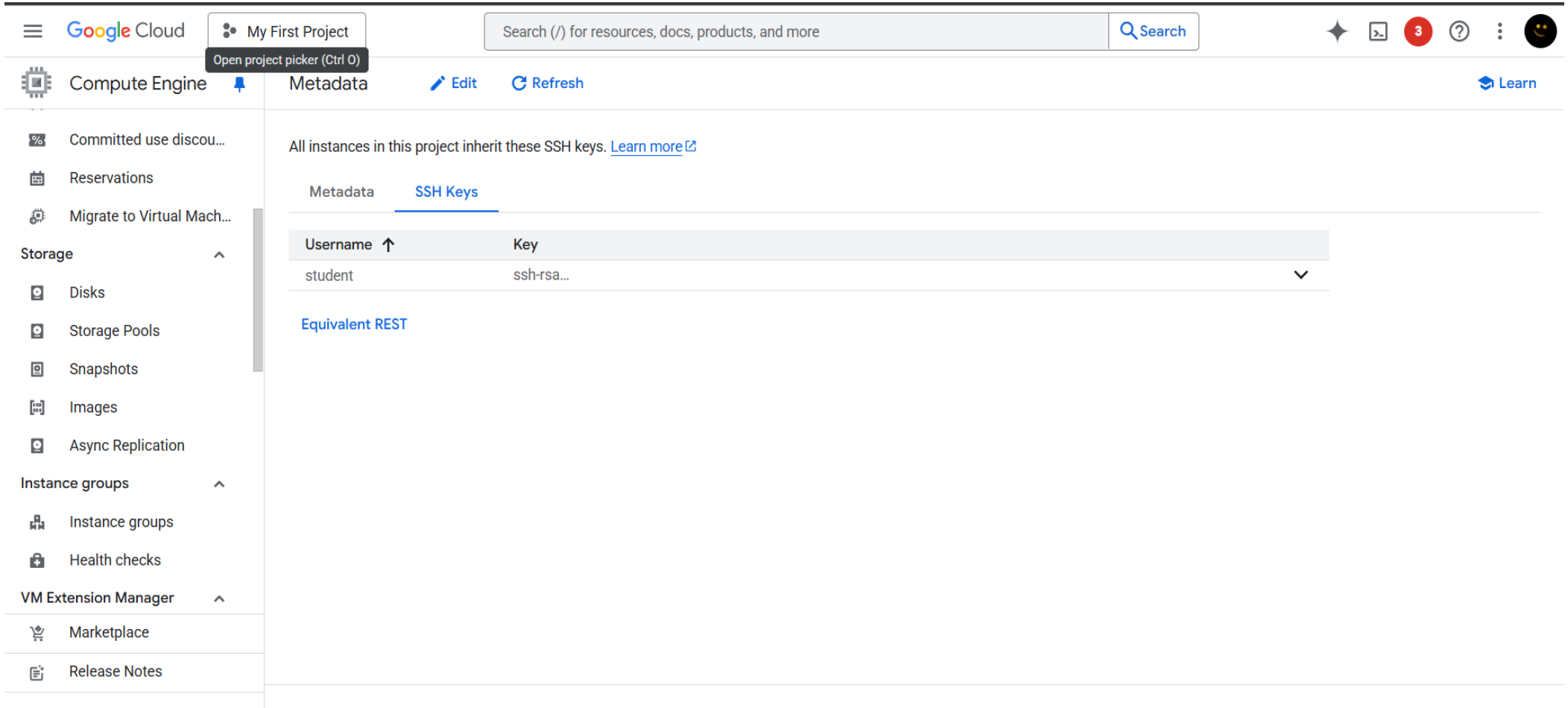
- Install Remote-ssh client extension from Microsoft.

- Click on the “Connect to Host” then click “Configure SSH Hosts”, default ssh path and add below code
  - Host IDL_GCP_VM
  - HostName ExternalIP
  - IdentityFile ~/.ssh/
  - User your_user_name

It should look something like this:

```
Host IDL_GCP_VM
  HostName 34.125.169.92
  IdentityFile ~/.ssh/IDL_GCP
  User student
```

Once connected run the setup scripts either for CPU only or CPU and GPU, which can be found here.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ssh-rsa...
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ALWAYS REMEMBER TO DELETE YOU VM INSTANCE AFTER YOU'RE DONE

THANK YOU!