

<TOP>

Feb 21, 2025

How to Import

The process is pretty straightforward—you can create the VM with just a single command. However, the initial setup and the post-creation configuration can be quite confusing and tedious.

- First, upload the .ova file to a Google Cloud Platform (GCP) bucket via GCloud CLI or the console UI. You can run cloud CLI locally in a terminal or in the Cloud shell. (I uploaded the file through the console, hence I will skip the gcloud CLI here.)
- Set up a **host project** and a **target project**, both of which could be the same project. e.g. I chose “P1 Udacity Robotics 20250220” as both. Set up roles and permissions in GCP IAM (similar to AWS IAM) by following [the official documentation](#).
e.g. Find the the service account used to run a Compute Engine instance:
`service-HOST_PROJECT_NUMBER@gcp-sa-vmmigration.iam.gserviceaccount.com`

✓✓✓ Feb 24, 2025 Update: In the section below I introduce 2 ways to create an instance from the .ova file. I would recommend the 2nd way, unzip .ova -> .vmdk -> create an image (not machine image) from .vmdk -> create an instance from image.

- Then, spend some time on choosing the right VM type, and [create a Virtual Machine instance from the .ova file](#). During the creation, you can check the progress by visiting “GCP Compute Engine -> Storage -> Disks”. Once it is created, you can find the VM in “Compute Engine -> Virtual machines -> VM instances”. You can find the code template on the console after configuring the instance type under the “CREATE INSTANCE” tab.

```
✓ $ gcloud compute instances import instance-robond-cpu-20250222 \
  --source-uri=gs://p1_udacity_robotics/Ubuntu_64-bit_Robo_V2.1.0.ova \
  --zone=us-central1-a \
  --os=ubuntu-1604 \
  --machine-type=n1-highmem-8 ## e2-medium - probably no need to
use small instance for import
—accelerator=count=1,type=nvidia-tesla-t4-vws ## ✗ the “import” command doesn’t
have this argument
```

e.g. You can create a GPU instance with a lot of configuration. However you can't do it with the "import" command.

```
$ gcloud compute instances create instance-robond-20250223-000614
--project=tactile-timer-451521-d6 --zone=us-central1-a
--machine-type=n1-highmem-8
--network-interface=network-tier=PREMIUM,stack-type=IPV4_ONLY,subnet=default --maintenance-policy=TERMINATE --provisioning-model=STANDARD
--service-account=823353037229-compute@developer.gserviceaccount.com
--scopes=https://www.googleapis.com/auth/devstorage.read_only,https://www.googleapis.com/auth/logging.write,https://www.googleapis.com/auth/monitoring.write,https://www.googleapis.com/auth/service.management.readonly,https://www.googleapis.com/auth/servicecontrol,https://www.googleapis.com/auth/trace.append
--accelerator=count=1,type=nvidia-tesla-t4
--create-disk=auto-delete=yes,boot=yes,device-name=instance-robond-20250223-000614,image=projects/debian-cloud/global/images/debian-12-bookworm-v20250212,mode=rw,size=100,type=pd-balanced --no-shielded-secure-boot
--shielded-vtpm --shielded-integrity-monitoring
--labels=goog-ec-src=vm_add-gcloud --reservation-affinity=any
```

✓ Use the above command to create a CPU instance, then **edit the instance** to add GPU (accelerator).

Choose "**terminate maintenance**" rather than "migrate", or you will get the Error: Instances with guest accelerators do not support live migration.

Once you have successfully edited the instance, you can try to start it. However, certain GPU types might not be available in certain zones.

e.g. The Nvidia T4 is almost impossible to obtain.

Machine configuration

Machine type	n1-highmem-8 (8 vCPUs, 52 GB Memory)
CPU platform	Unknown CPU Platform
Minimum CPU platform	None
Architecture	x86/64
vCPUs to core ratio [?]	—
Custom visible cores [?]	—
All-core turbo-only mode [?]	—
Display device	Disabled
	Enable to use screen capturing and recording tools
GPUs	1 x NVIDIA Tesla P4 Virtual Workstation
Resource policies	

← → ↻ console.cloud.google.com/compute/instancesAdd?hl=en&project=tactile-timer-451521-d6

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Search

← Create an instance CREATE VM FROM...

Machine configuration

n1-highmem-8 (1 NVIDIA T4), us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

Networking

1 network interface

Observability

Security

Advanced

Machine configuration

Name *

instance-20250222-074426

Region *

us-central1 (Iowa)

Zone *

Any

Region is permanent

Google will choose a zone on your behalf, maximizing VM obtainability. Zone is permanent.

General purpose

Compute optimized

Memory optimized

Storage 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	CPU Platform
N1	Balanced price & performance	1 - 96	1.8 - 624 GB	Intel Haswell

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-highmem-8 (8 vCPU, 4 core, 52 GB memory)

vCPU

8 (4 cores)

Memory

52 GB

CREATE

CANCEL

EQUIVALENT CODE

EQUIVALENT CODE

Equivalent code

COMMAND LINE

REST

TERRAFORM

1

gcloud compute instances create

instance-20250222-074426 \

2

--project=tactile-timer-451521-d6 \

3

--zone=us-central1-a \

4

--machine-type=n1-highmem-8 \

5

--network-interface=network-tier=PREMIUM,

stack-type=IPV4_ONLY,subnet=default \

6

--maintenance-policy=TERMINATE \

7

--provisioning-model=STANDARD \

8

--service-account=823353837229-compute@developer.

gserviceaccount.com \

9

--scopes=https://www.googleapis.com/auth/

devstorage.read_only,https://www.googleapis.com/

auth/logging.write,https://www.googleapis.com/

auth/monitoring.write,https://www.googleapis.com/

auth/service.management.readonly,https://www.

googleapis.com/auth/servicecontrol,https://www.

googleapis.com/auth/trace.append \

10

--accelerator=count=1,

type=nvidia-tesla-t4-vws \

11

--create-disk=auto-delete=yes,boot=yes,

device-name=instance-20250222-074426,

image=projects/debian-cloud/global/images/

debian-12-bookworm-v20250212,mode=rw,size=10,

type=pd-balanced \

12

--no-shielded-secure-boot \

13

--shielded-vtpm \

14

--shielded-integrity-monitoring \

15

--labels=goog-ec-src=vm-add-gcloud \

16

--reservation-affinity=any

Monthly estimate

\$567.66

That's about

\$0.78 hourly

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

Item

8 vCPU + 52 GB memory

1 NVIDIA T4

NVIDIA GRID license fee

10 GB balanced persistent disk

Use discount

Total

COPY

RUN IN CLOUD SHELL

View gcloud reference

Machine configuration

Name *
instance-robond-20250223-000614

Region *
us-central1 (Iowa)

Zone *
Any

Region is permanent

Google will choose a zone on your behalf, maximizing VM obtainability. Zone is permanent.

General purpose Compute optimized Memory optimized Storage 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	CPU Platform
N1	Balanced price & performance	1 - 96	1.8 - 624 GB	Intel Haswell

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-highmem-8 (8 vCPU, 4 core, 52 GB memory)

	vCPU	Memory
	8 (4 cores)	52 GB

Monthly estimate

\$430.66
That's about \$0.59 hourly

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

Item	Monthly estimate
8 vCPU + 52 GB memory	\$345.44
1 NVIDIA T4	\$255.50
100 GB balanced persistent disk	\$10.00
Use discount	-\$180.28
Total	\$430.66

[Compute Engine pricing](#)

[LESS](#)

- **Import a machine image to Compute Engine** (if you don't create instance from .ova)

- locally **tar -xvf** unzip the **.ova file**. upload the **.vmdk file** to a gcp bucket. Import the machine image from the Compute Engine console or by using the following gcloud cli.

```
$ gcloud alpha migration vms machine-image-imports create IMAGE_NAME \
--source-file=SOURCE_FILE \
--location=REGION_ID \
--target-project=projects/HOST_PROJECT_ID/locations/global/targetProjects/TARGET_PROJECT
```

e.g. (I haven't tried this command.)

```
$ gcloud alpha migration vms machine-image-imports create image_robond_20250223
--source_file=gs://p1_udacity_robotics/Ubuntu_64-bit_Robo_V2.1.0.ova
--location=central1
--target-project=projects/tactile-timer-451521-d6/locations/targetProjects/tactile-timer-451521-d6
```


console.cloud.google.com/storage/browser/p1_udacity_robotics?pageState={"StorageObjectListTable":{"f":"%2558%255D"}}&project=tactile-timer-451521-d6

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Cloud Storage

OverviewBucketsMonitoringSettings

Bucket details

GO TO PATHREFRESHLEARN

Locationus-south1 (Dallas)Storage classStandardPublic accessNot publicProtectionSoft DeleteHierarchical namespaceEnabled

OBJECTSCONFIGURATIONPERMISSIONSPROTECTIONLIFECYCLEOBSERVABILITYINVENTORY REPORTSOPERATIONS

Folder browser

p1_udacity_robotics

Buckets > p1_udacity_robotics

CREATE FOLDERUPLOADTRANSFER DATAOTHER SERVICES

Filter by name prefix onlyFilter objects and foldersShow Live objects only

	Name	Size	Type	Created	Storage class	Last modified
<input type="checkbox"/>	Ubuntu_64-bit_Robo_V2.1.0-disk1...			Feb 23, 2025, 3:14:45 PM	Standard	Feb 23, 2025, 3:14:45 PM
<input type="checkbox"/>	Ubuntu_64-bit_Robo_V2.1.0-disk1.vmdk			Feb 20, 2025, 7:51:01 PM	Standard	Feb 20, 2025, 7:51:01 PM
<input type="checkbox"/>	Ubuntu_64-bit_Robo_V2.1.0.ova	4.9 GB	application/octet-stream	Feb 20, 2025, 7:51:01 PM	Standard	Feb 20, 2025, 7:51:01 PM

← → ↺

console.cloud.google.com/compute/mfce/images/create?project=tactile-timer-451521-d6

Google Cloud

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Compute Engine / M2VM / Image imports / Create image

Overview

Virtual machines

VM instances

Instance templates

Sole-tenant nodes

Machine images

TPUs

Committed use discounts

Reservations

Migrate to Virtual Machines

Storage

Disks

Storage Pools

Snapshots

Images

Marketplace

Release Notes

← Create an image

Name *

image-998338-robond

Image import ID: image-998338-robond. It cannot be changed later. [EDIT](#)

Source Cloud Storage file *

☒ p1_udacity_robotics/Ubuntu_64-bit_Robo_V2.1.0-disk1.vmdk [?](#) [BROWSE](#)

Migrate to Virtual Machines service account service-823353037229@gcp-sa-vmmigration.iam.gserviceaccount.com needs to have the `storage.objects.get` permission on the selected source file

Region *

us-central1 [?](#)

Target project *

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Family

[?](#)

Description

☐ Skip OS adaptation [?](#)

☐ Generalize [?](#)

Licenses [?](#)

License type

CREATE

Failed to create image.

Failed to create image.

Additional information:

generic::permission_denied: Permission "storage.objects.get" denied on "gs://p1_udacity_robotics/Ubuntu_64-bit_Robo_V2.1.0-disk1.vmdk", or it may not exist: Please make sure the service account "service-823353037229@gcp-sa-vmmigration.iam.gserviceaccount.com" is granted with the Storage Object Viewer role.

This can be done with the following command: `gcloud storage buckets add-iam-policy-binding gs://p1_udacity_robotics --member=serviceAccount:service-823353037229@gcp-sa-vmmigration.iam.gserviceaccount.com --role=roles/storage.objectViewer`

Tracking number: c5594671354209651

SEND FEEDBACK CLOSE

✓ \$ `gcloud storage buckets add-iam-policy-binding gs://p1_udacity_robotics --member=serviceAccount:service-823353037229@gcp-sa-vmmigration.iam.gserviceaccount.com --role=roles/storage.objectViewer`

The screenshot shows the Google Cloud console interface. The left sidebar contains navigation links for Compute Engine, VM instances, Instance templates, Machine images, TPUs, and Storage. The main content area is titled 'Migrate to Virtual Machines' and shows a table of 'Image imports'. One import job is listed with the status 'Failed just now'. An error dialog box is open, displaying the following text:

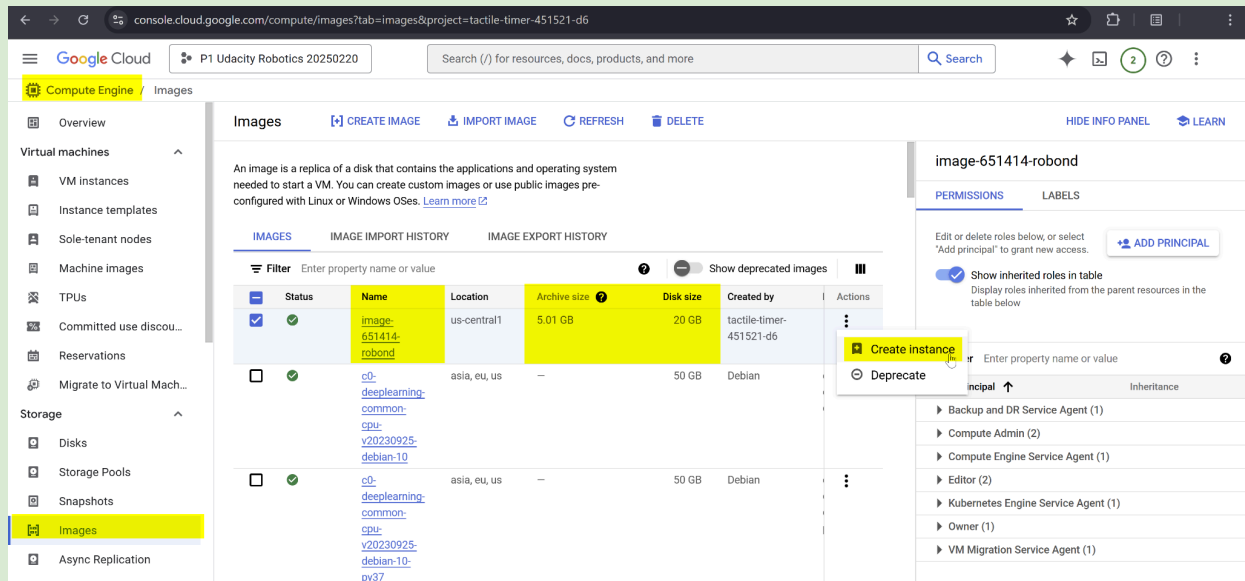
Error:
Image import process failed to read the provided source image file "Ubuntu_64-bit_Robo_V2.1.0-disk1.vmdk" due to: The image file is corrupt or uses unsupported format.

Recommendation:
Please verify the image file is valid. In Linux this can be done using the command: `qemu-img check [F FORMAT] DISK_FILE`. In Windows this can be done using the command: `qemu-img.exe check DISK_FILE`.

🟢 ⚠️ Issue solved: Here my .vmdk file is corrupted. Because I didn't wait for the "tar -xvf" command to end its execution. It takes a while to unzip and then upload to the cloud.

\$ `sudo tar -xvf 'Ubuntu 64-bit Robo V2.1.0.ova'`

\$ `qemu-img check -f vmdk <disk_file>` (<- not sure whether this works)



👉 Tips:

- If you create an instance from an image (not a machine image), you can change the disk type and size. Here I will change it from 20GB to 40GB. This way offers more flexibility to choose the hardware than directly creating an instance by importing an .ova file.
- You can start from a less capable instance, if later you think it is not working well, you can stop the instance and edit it to increase the hardware capability.

NVIDIA L4 \$408.83 per month

NVIDIA Tesla P4 \$438.00 (almost impossible to obtain)

NVIDIA V100 \$1,810.40

NVIDIA A100 40GB \$2,141.75

- Finally, you can connect to the VM via SSH. Here I choose SSH via the gcloud command line (find and copy it on the console). e.g. GCP will generate the following code (I didn't type it), run it in the Cloud Shell.

```
$ gcloud compute ssh --zone "us-central1-a" "instance-20250221" --project "tactile-timer-451521-d6"
```

Verify the instance by:

```
$ echo "Hello world!"
```

```
$ cat /etc/os-release
```

```
NAME="Ubuntu"
```

```
VERSION="16.04.2 LTS (Xenial Xerus)"
```

```
ID=ubuntu
```

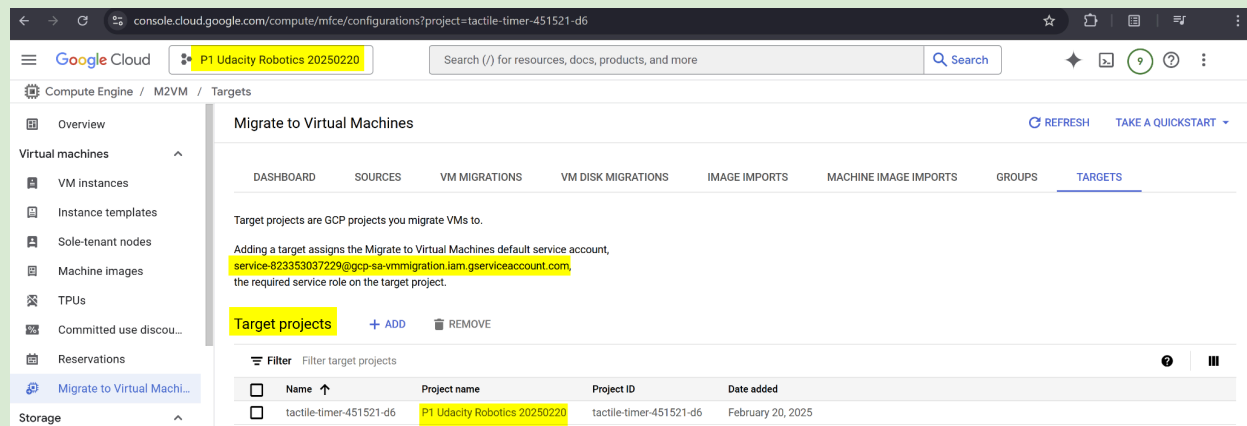
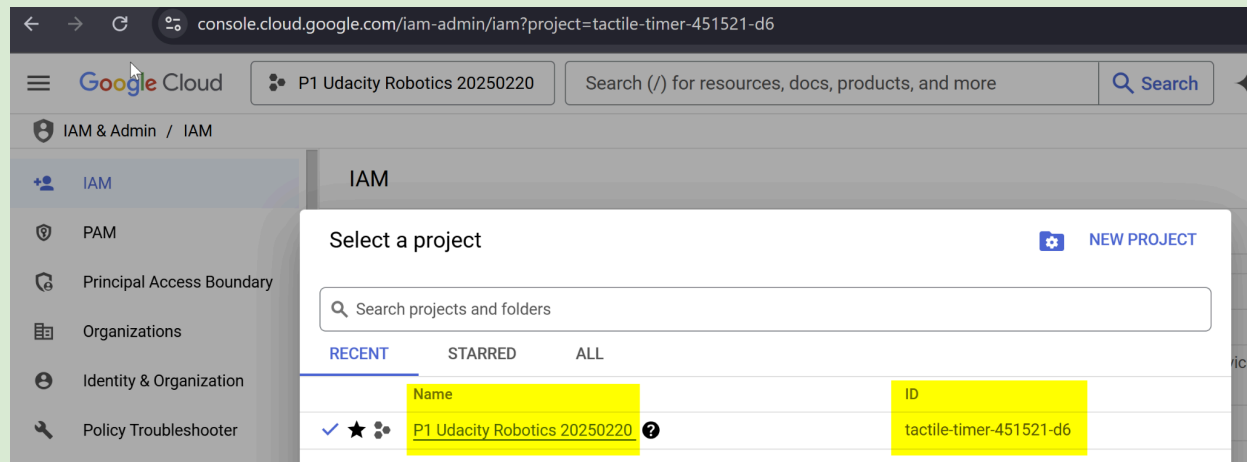
```
ID_LIKE=debian
```

```
PRETTY_NAME="Ubuntu 16.04.2 LTS"
```

```
VERSION_ID="16.04"
```

```
HOME_URL="http://www.ubuntu.com/"
SUPPORT_URL="http://help.ubuntu.com/"
BUG_REPORT_URL="http://bugs.launchpad.net/ubuntu/"
VERSION_CODENAME=xenial
UBUNTU_CODENAME=xenial
```

⚠ Note: I ended up creating the instance twice and left it running for some post-configuration. The next day, the billing showed it cost around \$2 USD.



← → ↻ console.cloud.google.com/iam-admin/iam?project=tactile-timer-451521-d6

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9 ?

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IAM & Admin / IAM

IAM

PAM

Principal Access Boundary

Organizations

Identity & Organization

Policy Troubleshooter

Policy Analyzer

Organization Policies

Service Accounts

Workload Identity Federat...

Workforce Identity Federa...

Labels

Tags

Settings

Privacy & Security

Manage Resources

Release Notes



























IAM

LEARN

ALLOW

DENY

RECOMMENDATIONS HISTORY

<input type="checkbox"/>	 9.2.3.3.30.3 / 2.2.9@cloudservices.gserviceaccount.com	Google Arts Service Agent	
<input type="checkbox"/>	 GCP Network Management Service Agent (1)		
<input type="checkbox"/>	 Owner (1)		
<input type="checkbox"/>	 Project IAM Admin (1)		
<input type="checkbox"/>	 823353037229-compute@developer.gserviceaccount.com	Compute Engine default service account	
<input type="checkbox"/>	 Service Account Key Admin (1)		
<input type="checkbox"/>	 service-823353037229@gcp-sa-vmmigration.iam.gserviceaccount.com	Cloud VM Migration Service Account	
<input type="checkbox"/>	 Service Account Token Creator (1)		
<input type="checkbox"/>	 823353037229@cloudbuild.gserviceaccount.com	Legacy Cloud Build Service Account	
<input type="checkbox"/>	 Service Account User (2)		
<input type="checkbox"/>	 823353037229@cloudbuild.gserviceaccount.com	Legacy Cloud Build Service Account	
<input type="checkbox"/>	 service-823353037229@gcp-sa-vmmigration.iam.gserviceaccount.com	Cloud VM Migration Service Account	
<input type="checkbox"/>	 VM Migration Administrator (2)		
<input type="checkbox"/>	 823353037229-compute@developer.gserviceaccount.com	Compute Engine default service account	
<input type="checkbox"/>	 service-823353037229@gcp-sa-vmmigration.iam.gserviceaccount.com	Cloud VM Migration Service Account	
<input type="checkbox"/>	 VM Migration Service Agent (1)		
<input type="checkbox"/>	 service-823353037229@gcp-sa-vmmigration.iam.gserviceaccount.com	Cloud VM Migration Service Account	

Recommended for you

IAM overview

Help document

Basic IAM concepts and access management in Google Cloud.

Grant an IAM role using the Google Cloud console

Help document

Use the Google Cloud console to grant IAM roles to principals at the project level.

Choose predefined roles

Help document

Choose which predefined roles to grant to users.

Basic and predefined roles reference

Help document

IAM roles that you can grant to identities to access Google Cloud resources.

Manage access to projects, folders, and organizations

Help document

Grant, change, and revoke access to projects, folders, and organizations.

Troubleshoot IAM permissions

```

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to tactile-timer-451521-d6.
Use 'gcloud config set project [PROJECT ID]' to change to a different project.
GCP@cloudshell:~$ gcloud compute instances import instance-20250221-214338 \
  --source-uri=gs://p1_udacity_robotics/ubuntu_64-bit_Robo_V2.1.0.ova \
  --zone=us-central1-a \
  --os=ubuntu-1604 \
  --machine-type=n2-highmem-8
WARNING: Importing OVF. This may take 40 minutes for smaller OVF's and up to a couple of hours for larger OVF's.
Created [https://cloudbuild.googleapis.com/v1/projects/tactile-timer-451521-d6/locations/us-central1/builds/93f2a645-5cd5-46e2-acbf-77fd21aee1bb].
Logs are available at [https://console.cloud.google.com/cloud-build/builds;region=us-central1/93f2a645-5cd5-46e2-acbf-77fd21aee1bb;project=tactile-timer-451521-d6].
Starting build "93f2a645-5cd5-46e2-acbf-77fd21aee1bb"
[import-ovf]: 2025-02-21T06:58:12Z Starting OVF import workflow.
[import-ovf]: 2025-02-21T06:58:13Z Creating scratch bucket 'tactile-timer-451521-d6-ovf-import-bkt-us-central1' in us-central1 region
[import-ovf]: 2025-02-21T06:58:14Z Extracting gs://p1_udacity_robotics/ubuntu_64-bit_Robo_V2.1.0.ova OVA archive to gs://tactile-timer-451521-d6-ovf-import-bkt-us-central1/9ww73/ovf
[import-ovf]: 2025-02-21T06:58:14Z Extracting: Ubuntu 64-bit Robo V2.1.0.ovf to gs://tactile-timer-451521-d6-ovf-import-bkt-us-central1/9ww73/ovf/Ubuntu 64-bit Robo V2.1.0.ovf
[import-ovf]: 2025-02-21T06:58:15Z Extracting: Ubuntu 64-bit Robo V2.1.0.ovf to gs://tactile-timer-451521-d6-ovf-import-bkt-us-central1/9ww73/ovf/Ubuntu 64-bit Robo V2.1.0.ovf
[import-ovf]: 2025-02-21T06:58:15Z Extracting: Ubuntu 64-bit Robo V2.1.0.ovf to gs://tactile-timer-451521-d6-ovf-import-bkt-us-central1/9ww73/ovf/Ubuntu 64-bit Robo V2.1.0-disk1.vmdk
[import-ovf]: 2025-02-21T06:59:19Z Found gs://tactile-timer-451521-d6-ovf-import-bkt-us-central1/9ww73/ovf/Ubuntu 64-bit Robo V2.1.0-disk1.vmdk
[import-ovf]: 2025-02-21T06:59:19Z Will create instance of 'n2-highmem-8' machine type.
[import-ovf]: 2025-02-21T06:59:19Z Importing boot disk image ...
[import-ovf]: 2025-02-21T06:59:19Z Inspecting the image file...

```

Disks

CREATE DISK REFRESH DELETE

Filter

Enter property name or value

Status	Name	Type	Size	Architecture	Zone(s)	In use by	Actions
<input checked="" type="checkbox"/>	disk-boot-image-instance-20250221-214338	SSD persistent disk	20 GB		us-central1-a		

disk-boot-image-instance-20250221-214338

PERMISSIONS LABELS

Edit or delete roles below, or select 'Add principal' to grant new access.

☒ Show inherited roles in table

Display roles inherited from the parent resources in the table below

Filter

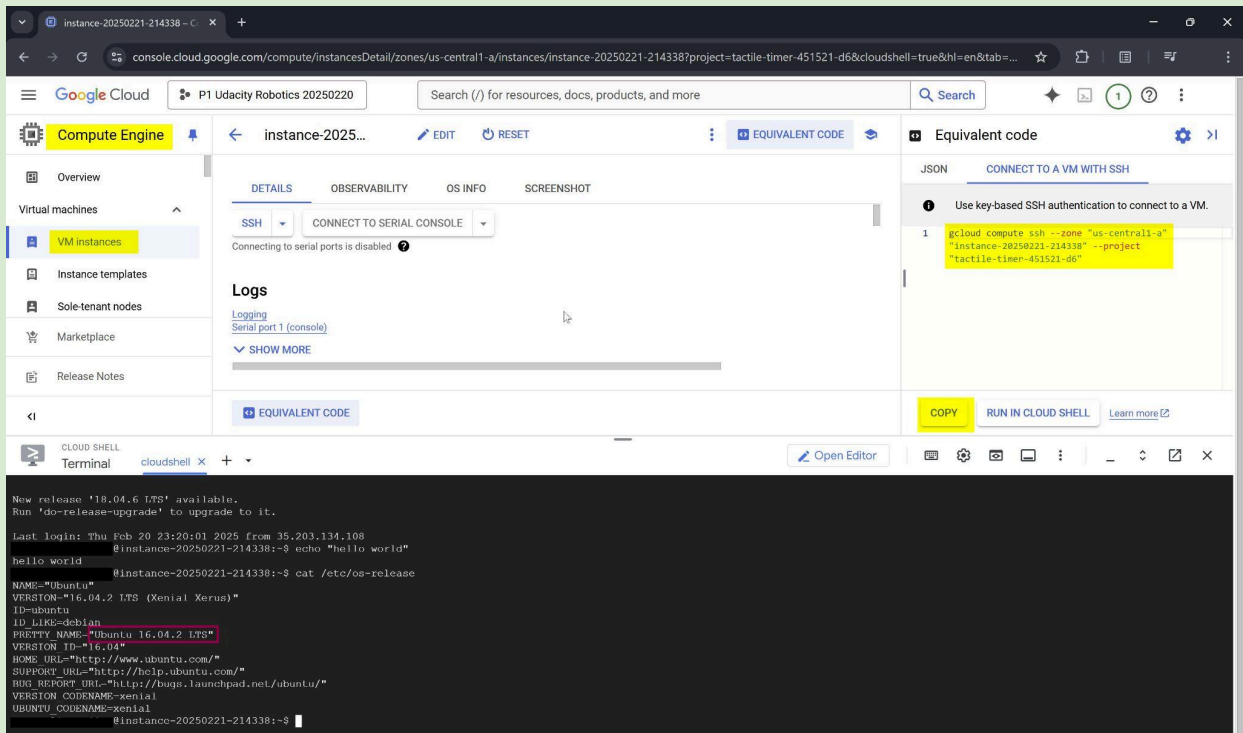
Enter property name or value

Role / Principal	Inheritance
Compute Admin (1)	
Compute Engine Service Agent (1)	
Editor (2)	
Owner (1)	
VM Migration Service Agent (1)	

cloudshell

The connection to your Google Cloud Shell was lost.

Close Reconnect



Configure the VM

- Update the image
\$ sudo apt-get update && sudo apt-get upgrade -y --allow-unauthenticated

⚠️ Note: After updating the image, I wanted to create an **instant snapshot** for the VM. Because the following steps messed up the machine once.

- **【Skip this part】**
Check privileges and ~~change GCP assigned user name~~.
The original image has two users: **robond** (password: robo-nd) and **ubuntu** (no password)
Don't change the GCP assigned username for the SSH access relies on this user.
\$ whoami
\$ sudo su - ## change to root user
\$ groups ## check root privileges
\$ sudo su - <GCP-assigned-user-name>
\$ <GCP-assigned-user-name>@instance-20250221-214338:~\$ groups
<GCP-assigned-user-name>
<GCP-assigned-user-name> : <GCP-assigned-user-name> adm dialout cdrom floppy audio dip video plugdev netdev lxd ubuntu google-sudoers
If a group exists with the same name, you can change it using:


```

$ sudo groupmod -n nov05 <GCP-assigned-user-name> ## change group name
$ sudo usermod -l nov05 <GCP-assigned-user-name> ## change the user
name
$ sudo mv /home/<GCP-assigned-user-name> /home/nov05 ## change home
dir name
$ sudo usermod -d /home/nov05 -m nov05 ## attach home directory to the new
username

```

- Now it is about enabling a remote GUI, or you can't see anything from the VM.
 - 【Skip this command】Check whether it has a Virtual Network Computing (VNC) server installed. The answer for this image is no.

```
$ dpkg -l | grep vnc
```


- Install X2Go server on the VM (Ubuntu 16.04):

```

$ sudo apt update
$ sudo apt-get install lubuntu-desktop ⚠️
$ sudo apt-get install lubuntu-core
$ sudo apt-get install x2goserver x2goserver-xsession ⚠️
E: Unable to locate package x2goserver
E: Unable to locate package x2goserver-xsession
$ sudo sh -c 'echo "deb http://packages.x2go.org/debian stable main">
/etc/apt/sources.list.d/x2go.list'
$ sudo apt install wget
$ wget https://packages.x2go.org/keys/x2go.asc ⚠️

```

<https://wiki.x2go.org/doku.php/wiki:repositories:ubuntu>
<https://wiki.x2go.org/doku.php/doc:installation:x2goclient>


-  The following command works fine.

```

$ sudo apt -y install xfce4
$ sudo add-apt-repository ppa:x2go/stable
$ sudo apt-get update ## ⚠️ Issue solved
$ sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys
F42ED6FBAB17C654 ## you might not need this
$ sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys
32EE5355A6BC6E42 ## you might not need this
$ sudo apt-get -y install x2goserver x2goserver-xsession

```

- Install a X2GO client on the local machine. Mine is on **Windows 11**.
 - Download [the latest x2goclient for Windows](#) and install. Administrator rights required for a normal install.

 Note: I checked with my local VM, the image has installed lubuntu-desktop.
 robond@udacity:~/catkin_ws\$ echo \$DESKTOP_SESSION

Lubuntu

console.cloud.google.com/compute/snapshotsAdd?cloudshell=true&hl=en&project=tactile-timer-451521-d6

Google Cloud P1 Udacity Robotics 20250220 Search (/) for resources, docs, products, and more

Compute Engine / Snapshots / Create snapshot

← Create a snapshot EQUIVALENT CODE

Snapshots are backups of persistent disks. They're commonly used to recover, transfer, or make data accessible to other resources in your project. [Learn more](#)

Name *
snapshot-robond-initial-state
Name is permanent

Description
The image has just been created from .ova file and updated via
"\$ sudo apt-get update && sudo apt-get upgrade -y".

Snapshot source type *
Disk

Source disk *
instance-20250221

Type *
☐ Snapshot
Standard backup and disaster recovery; stored in a separate location from your disk
☒ Instant snapshot
Rapid restoration; stored in the same location as your disk
☐ Archive snapshot
Long term storage for infrequently-accessed data; stored in a separate location from your disk

COMPARE SNAPSHOT TYPES

CREATE CANCEL EQUIVALENT CODE

console.cloud.google.com/compute/snapshots?cloudshell=true&hl=en&project=tactile-timer-451521-d6&tab=instant_snapshots

Google Cloud P1 Udacity Robotics 20250220 Search (/) for resources, docs, products, and more

Compute Engine / Snapshots

Instant snapshots CREATE SNAPSHOT CREATE SNAPSHOT SCHEDULE REFRESH DELETE LEARN HIDE INFO PANEL

Use instant snapshots to save a persistent disk's data in that disk's region or zone, providing faster recovery than standard snapshots. [Learn more](#)

COMPARE SNAPSHOT TYPES

SNAPSHOTS ARCHIVE SNAPSHOTS INSTANT SNAPSHOTS NEW SNAPSHOT SCHEDULES

Filter Enter property name or value

<input type="checkbox"/>	Status	Name ↑	Location	Snapshot size	Creation time	Source disk	Dis
<input type="checkbox"/>	✓	snapshot-robond-initial-state	us-central1-a	0 B	Feb 21, 2025, 12:36:00 PM UTC-06:00	instance-20250221	2

Select an instant snapshot

PERMISSIONS LABELS

Please select at least one resource.

Google Cloud Console - VM instances page. The page displays a table of VM instances and related actions.

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input checked="" type="checkbox"/>	instance-20250221	us-central1-a			10.128.0.13 (nic0)	[redacted] (nic0)	SSH

Related actions:

- Set up VM backups (NEW)
- View billing report
- Monitor VMs
- Explore VM logs
- Set up firewall rules
- Patch management
- Load balance between VMs

Google Cloud Console - IP addresses page. The page displays a table of IP addresses and a 'Select address' panel.

Name	IP address	Access type	Region	Type	Version	In use by	Actions
robond	[redacted]	External	us-central1	Static	IPv4	VM instance instance-20250221 (Zone us-central1-a)	
-	[redacted]	Internal	us-central1	Ephemeral	IPv4	VM instance instance-20250221 (Zone us-central1-a)	

Select address panel: No addresses selected.

👉 Tips: Snapshot, instant snapshot, disk, image, machine image, etc.

- You can take a snapshot of an instance, create a disk from the snapshot, create another instance and attach the newly created disk as boot disk or additional storage.
- In my case, I first created a cpu instance, after I installed all the packages and made sure it could be accessed remotely via X2GO, I took a snapshot, and created a disk. Then I created a gpu instance and attached the newly created disk to it.

- ⚠ Update: The following method **isn't** the best option for me. Unzip .ova, upload its .vmdk to a bucket. create an image (not a machine image) from the .vmdk. create an instance from the image, which has been documented in the “How to import” section.

I have deleted all the instances and started over. This time, I will

- import OVA to create an instance “**instance-robond-cpu-***”
assign static IP, add SSH pub key, verify SSH login
- take an instant snapshot, “**snapshot-robond-cpu-import-***”
- create a disk “**disk-from-snapshot-robond-import-***” from “**snapshot-robond-cpu-import-***”, 100GB
- ~~stop the instance to edit, change type to gpu, change name to “**instance-robond-gpu-***”,~~
Create a gpu instance “**instance-robond-gpu-***”, L2
- ~~Nvidia Tesla P4 (P4 causes SSH error; T4 is impossible to obtain)~~
Enable display device, Enable Virtual Workstation (NVIDIA GRID)
~~On host maintenance = Terminate VM instance~~
- \$ sudo apt-get update && sudo apt-get upgrade -y
install x2go, x11, etc. to enable remote desktop
git clone my repos (so far there are 3 repos)
- take a snapshot, “**snapshot-robond-gpu-p1-p2**”

The screenshot shows the Google Cloud Platform console for creating a new instance. The 'OS and storage' tab is active, displaying the following configuration:

- Name:** Instance-robond-cpu-20250222
- Type:** Existing SSD persistent disk
- Size:** 20 GB
- Snapshot schedule:** No schedule selected
- License type:** Free
- Existing disk:** Instance-20250221

The **Monthly estimate** is \$309.45, which is approximately \$0.42 hourly. The estimate includes 8 vCPU + 64 GB memory (\$382.56), 20 GB SSD persistent disk (\$3.40), and a Use discount of -\$76.51.

The **Equivalent code** section shows the following Terraform snippet:

```
1 gcloud compute instances create
  instance-robond-cpu-20250222 \
2   --project=tactile-timer-451521-d6 \
3   --zone=us-central1-a \
4   --machine-type=n2-highmem-8 \
5   --network-interface=network-tier=PREMIUM,
  stack-type=IPV4_ONLY,subnet=default \
6   --maintenance-policy=TERMINATE \
7   --provisioning-model=STANDARD \
8   --service-account=823353037229-compute@developer.
  gserviceaccount.com \
9   --scopes=https://www.googleapis.com/auth/
  devstorage.read_only,https://www.googleapis.com/
  auth/logging.write,https://www.googleapis.com/
  auth/monitoring.write,https://www.googleapis.com/
  auth/service.management.readonly,https://www.
  googleapis.com/auth/trace.append \
10  --disk=bootesys,device-name=Instance-20250221,
  mode=rw,name=Instance-20250221 \
11  --labels=goog-ec-src=vm_add-gcloud \
12  --reservation-affinity=any
```

Filter	Name	IP address	Access type	Region	Type	Version	In use by	Actions
	robond	10.128.0.13	External	us-central1	Static	IPv4	VM instance instance-robond-cpu-20250222 (Zone us-central1-a)	
	robond-gpu	10.128.0.15	External	us-central1	Static	IPv4	VM instance instance-robond-gpu-20250221 (Zone us-central1-a)	
	-	10.128.0.13	Internal	us-central1	Ephemeral	IPv4	VM instance instance-robond-cpu-20250221 (Zone us-central1-a)	
	-	10.128.0.15	Internal	us-central1	Ephemeral	IPv4	VM instance instance-robond-cpu-20250221 (Zone us-central1-a)	

Google GenAI output:

In Google Cloud Platform, a "disk" is a storage unit within a VM, while a "snapshot" is a point-in-time copy of a single disk, a "machine image" is a backup of an entire VM including all attached disks, and an "instant snapshot" is a near-instantaneous snapshot of a disk, allowing for very fast restores; essentially, **a snapshot is a backup of a single disk, while a machine image is a backup of an entire VM with all its disks.** [1, 2, 3, 4, 5, 6]

Key differences: [2, 4, 7]

- **Disk:** A basic storage unit within a VM, like a hard drive on a physical machine. [2, 4, 7]
- **Snapshot:** A copy of a single disk at a specific point in time, allowing you to restore that exact state of the disk later. [1, 2, 8]
- **Machine Image:** A backup of an entire VM, capturing the state of all disks attached to the instance. [1, 2, 3]
- **Instant Snapshot:** A type of snapshot that is created almost instantly, ideal for quick restores from a specific point in time. [1, 5, 6]

Example Use Cases: [2, 7]

- **Snapshot:** Backup a database disk on a VM to quickly restore to a previous state if needed. [2, 7]
- **Machine Image:** Create a standard VM configuration to quickly deploy new instances with the same settings. [1, 3, 4]
- **Instant Snapshot:** Capture a snapshot of an application during a critical update to quickly roll back if issues arise. [5, 6]

Generative AI is experimental.

- [1] <https://cloud.google.com/compute/docs/machine-images>
- [2] https://www.youtube.com/watch?v=RvTJjD_l6Cs
- [3] <https://cloud.google.com/compute/docs/disks/data-protection>
- [4] <https://cloud.google.com/compute/docs/disks/snapshots>
- [5] <https://cloud.google.com/compute/docs/disks/instant-snapshots>
- [6] <https://cloud.google.com/blog/products/compute/introducing-compute-engine-instant-snapshots>
- [7] <https://cloud.google.com/compute/docs/disks/restore-snapshot>
- [8] <https://diana-moraa.medium.com/snapshots-and-images-in-google-cloud-platform-406b23224e9f>

Connect to the VM instance from remote

- Access the VM instance from a local machine via SSH login
 - Go to “VPC networks -> IP Addresses -> Reserve external static IP addresses”
Reserve a static external IP address for the VM instance
 - Get the VM instance external IP address in “GCP Compute Engine”
 - Go to “VPC Network -> default (for the GCP project “P1 Udacity Robotics 20250220”) -> Firewalls (tab) -> “default-allow-ssh””.
Make sure the ingress ssh traffic is allowed.
Check region (in my case it is “us-central1”).
Check Protocols and ports tcp:22
- Check the Google Cloud documentation: [Connect to VMs -> OpenSSH client](#)
 - [Create SSH keys](#)
\$ ssh-keygen -t rsa -f
C:\Users\<WINDOWS_USER>\.ssh\<KEY_FILENAME> -C
<VM_USERNAME>
e.g. \$ ssh-keygen -t rsa -f d:\users\guido\.ssh\gcp-robond-ssh-key -C
robond
 - Download Google Cloud CLI and install it on Windows
<https://dl.google.com/dl/cloudsdk/channels/rapid/GoogleCloudSDKInstaller.exe>
 - [add an SSH public key to an OS Login profile](#)

- from local machine: install gcloud cli, configure the system path, you can run gcloud command in PowerShell

```
$ gcloud compute os login ssh-keys add \
--key-file=KEY_FILE_PATH \
--project=PROJECT \
--ttl=EXPIRE_TIME
```

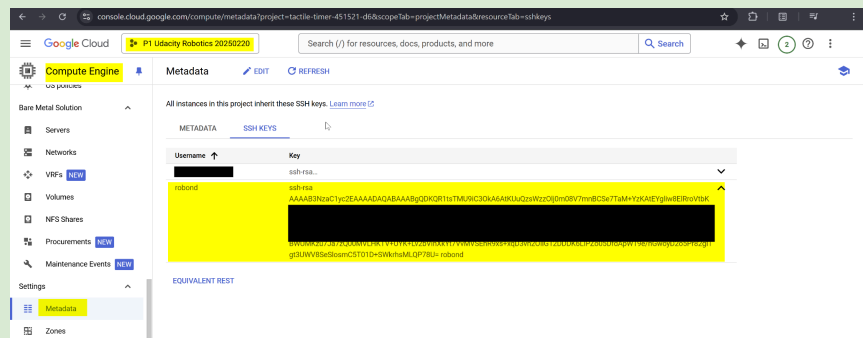
- from Cloud Shell

```
$ gcloud compute os login ssh-keys add \
--key=KEY \
--project=PROJECT \
--ttl=EXPIRE_TIME
```

```
$ gcloud compute os login ssh-keys add
```

```
--key-file="D:\\Users\\guido\\.ssh\\gcp-robond-ssh-key.pub" --project=tactile-timer-451521-d6
--ttl=30d
```

- ☒ ☒ ☒ If you want an instance-level ssh access, login the VM instance with gcloud CLI + SSH. Paste the SSH public key content to the following file
\$ `nano ~/.ssh/authorized_keys`
- ☒ if you want an project-level ssh access, add your ssh public key in “Compute Engine -> Metadata -> SSH KEYS”.
e.g. in this case, “robond” is a user of my Udacity course instance. If there is a “robond” user also in another instance, the ssh private key can be used to login that instance as well.



- Connect to the VM instance from local machine PowerShell
\$ `ssh -i <PATH_TO_PRIVATE_KEY>`
`<VM_USERNAME>@<VM_EXTERNAL_IP>`
e.g. \$ `ssh -i "D:\\Users\\guido\\.ssh\\gcp-robond-ssh-key" robond@*.*.*.*`
- Connect to the VM instance from X2GO Client from local machine
set host = GCP VM instance external IP address

console.cloud.google.com/networking/networks/details/default?project=tactile-timer-451521-d6&hl=en&pageTab=FIREWALL_POLICIES

Google Cloud P1 Udacity Robotics 20250220 Search (/) for resources, docs, products, and more

VPC Network / VPC networks / Network: default

VPC networks

IP addresses
Internal ranges
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
VPC Flow Logs

VPC network details DELETE VPC NETWORK

default

OVERVIEW SUBNETS STATIC INTERNAL IP ADDRESSES FIREWALLS FIREWALL ENDPOINTS ROUTES VPC NETWORK PEERING PRIVATE SERV

ADD FIREWALL RULE DELETE

Filter Enter property name or value

Name	Enforcement order	Type	Deployment scope	Rule priority	Targets	Source	Destination	Protocols and p
▼ vpc-firewall-rules	1	VPC firewall rules	Global					
default-allow-ssh		Ingress firewall rule	Global	65534	Appl...	IPv4 ranges:	—	tcp:22
default-allow-internal		Ingress firewall rule	Global	65534	Appl...	IPv4 ranges:	—	tcp:0-65535 udp:0-65535 icmp
default-allow-icmp		Ingress firewall rule	Global	65534	Appl...	IPv4 ranges:	—	icmp
default-allow-rdp		Ingress firewall rule	Global	65534	Appl...	IPv4 ranges:	—	tcp:3389

EQUIVALENT REST

console.cloud.google.com/compute/metadata?hl=en&project=tactile-timer-451521-d6&scopeTab=projectMetadata&resourceTab=sshkeys

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Compute Engine

Instance groups
Health checks

VM Manager

Patch
OS policies

Bare Metal Solution

Servers
Networks
VRFs
Volumes
NFS Shares
Procurements
Maintenance Events ...

Settings

Metadata
Zones
Network endpoint grou...

Metadata EDIT REFRESH

All instances in this project inherit these SSH keys. [Learn more](#)

METADATA SSH KEYS

Username	Key
	ssh-rsa AAAAAB3NzaC1yc2EAAAADAQABAgQCrJmQwKmw+hGnWAXvTY11WxPlvGIN6++0qdt5wOgFI/OcjGffRjuIUGT6+nNLxUxsWfc+ ra1Mm857/i8uj81LmpbojuHos= @cs-578344795110-default

EQUIVALENT REST

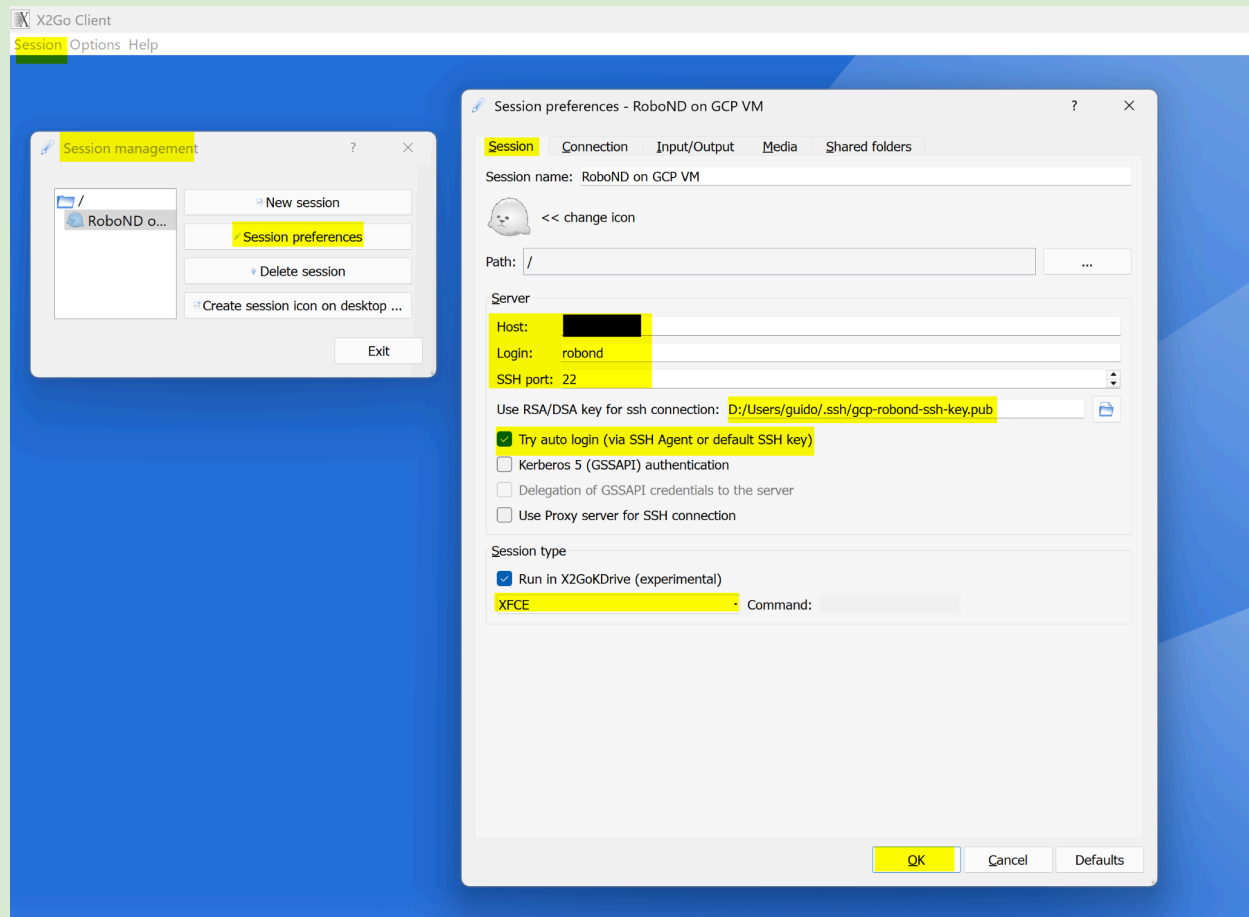

```
(base) PS D:\github\udacity-nd209-robots-software-engineering-nanodegree> ssh -i "D:\Users\guido\.ssh\gcp-robond-ssh-key" robond@robond@
robond@'s password:
Permission denied, please try again.
robond@'s password:
Permission denied, please try again.
robond@'s password:
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.8.0-58-generic x86_64)

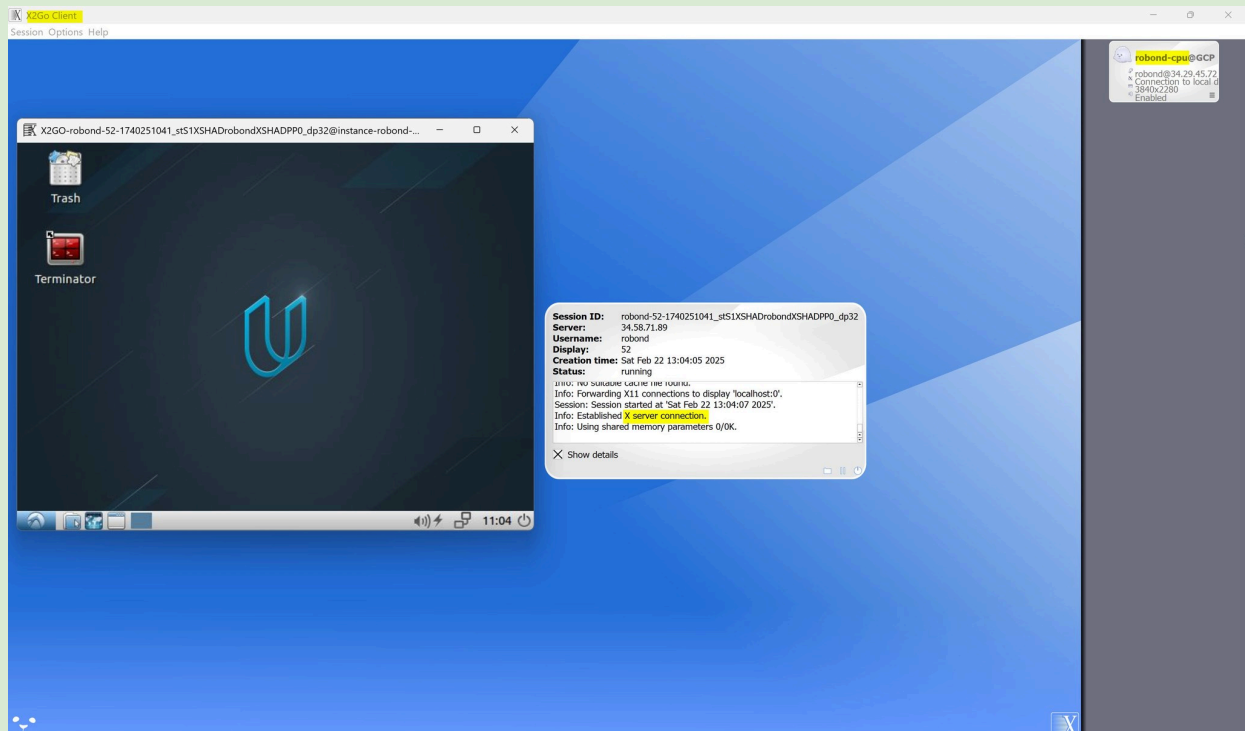
 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

415 packages can be updated.
32 updates are security updates.

New release '18.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Fri Feb 21 16:12:17 2025 from [REDACTED]
Do you want to source ROS in this workspace (y/n): y
ROS sourced!
robond@instance-20250221:~$
```





- Check the GPU

\$ lspci | grep -i nvidia

```
robond@instance-20250221:~/myrobot/world$ lspci | grep -i nvidia
00:04.0 3D controller: NVIDIA Corporation GP104GL [Tesla P4] (rev a1)
```

- Install cuda

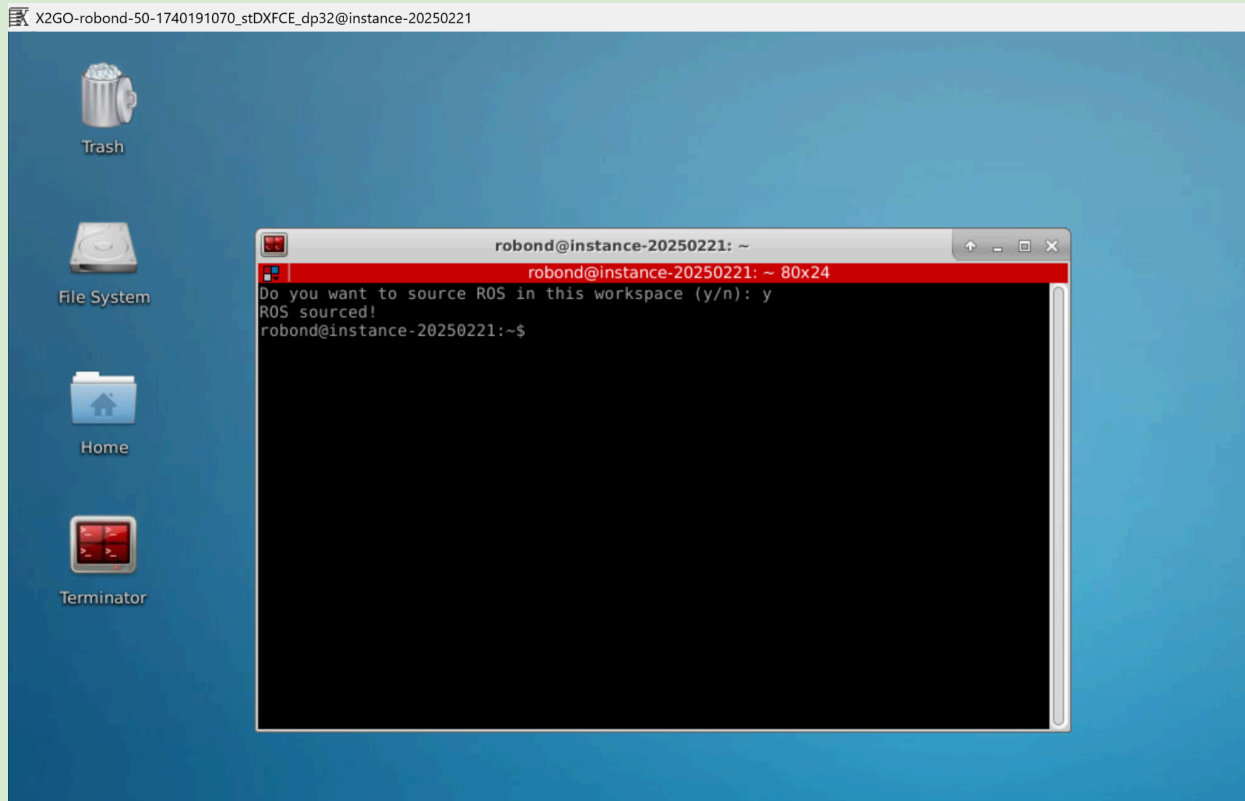
\$ sudo apt-get install nvidia-cuda-toolkit

```
robond@instance-20250221:~/myrobot/world$ nvcc --version
nvcc: NVIDIA (R) Cuda compiler driver
Copyright (c) 2005-2015 NVIDIA Corporation
Built on Tue_Aug_11_14:27:32_CDT_2015
Cuda compilation tools, release 7.5, V7.5.17
```

```
robond@instance-20250221:~/myrobot/world$ glxinfo | grep "OpenGL version"
OpenGL version string: 1.2 (1.5 Mesa 6.4.2)
```

Set up workspaces

- Follow [my main course repo](#), download code repos, etc.
 - Change user, [sudo] password for robond: is “**robo-nd**”.
- “Do you want to source ROS in this workspace (y/n):”, answer “y”.
- \$ sudo su - robond**



- Git clone project 1 - build my “UdacityOffice” gazebo world. The following commands should show the office model in Gazebo.
If you have forked the repo to your own and created a personal token for commit, add the token when cloning the repo to the VM instance.

```
$ cd ~  
$ git clone -b master  
https://<GitHub-personal-token>@github.com/nov05/udacity-RoboND-myrobot.git  
myrobot  
$ cd myrobot/build  
$ sudo cmake ..  
$ sudo make    ## You might get errors if your system is not up to date!
```

```
$ export
GAZEBO_PLUGIN_PATH=${GAZEBO_PLUGIN_PATH}:/home/robond/myrobot/build
$ echo $GAZEBO_PLUGIN_PATH
$ cd ~/myrobot/world
$ gazebo UdacityOffice --verbose
```

🟡⚠️ However I chose a VM instance type without GPU, which might have caused the error in the screenshot. So I decided to take another snapshot of the instance, and migrate it to a GPU VM instance. (Update: It seems that ~~both Gazebo and X11~~ require GPU, but not CUDA. However, with CUDA enabled, Gazebo can render faster.)

Feb 24, 2025 Update: This is caused by the X2GO client session preference - If it is not X11, Gazebo won't start.

```
robond@instance-20250221: ~/myrobot/world
Do you want to source ROS in this workspace (y/n): y
ROS sourced!
robond@instance-20250221:~/myrobot/world$ cd myrobot/world
robond@instance-20250221:~/myrobot/world$ gazebo UdacityOffice --verbose
Gazebo multi-robot simulator, version 7.16.1
Copyright (C) 2012 Open Source Robotics Foundation.
Released under the Apache 2 License.
http://gazebo.org

Gazebo multi-robot simulator, version 7.16.1
Copyright (C) 2012 Open Source Robotics Foundation.
Released under the Apache 2 License.
http://gazebo.org

[Msg] Waiting for master.
[Msg] Waiting for master.
[Msg] Connected to gazebo master @ http://127.0.0.1:11345
[Msg] Connected to gazebo master @ http://127.0.0.1:11345
[Msg] Publicized address: 10.128.0.13
[Msg] Publicized address: 10.128.0.13
[Err] [RenderEngine.cc:749] Unable to create glx visual
[Wrn] [RenderEngine.cc:97] Unable to create X window. Rendering will be disabled
[Wrn] [RenderEngine.cc:301] Cannot initialize render engine since render path type is NONE. Ignore this warning if rendering has been turned off on purpose.
[Err] [RenderEngine.cc:749] Unable to create glx visual
[Wrn] [RenderEngine.cc:97] Unable to create X window. Rendering will be disabled
[Wrn] [RenderEngine.cc:301] Cannot initialize render engine since render path type is NONE. Ignore this warning if rendering has been turned off on purpose.
[Wrn] [ModelDatabase.cc:340] Getting models from[http://models.gazebo.org/]. This may take a few seconds.
[Err] [GLWidget.cc:179] GLWidget could not create a scene. This will likely result in a blank screen.
[Err] [ModelEditor.cc:95] User camera is NULL. Non-editable models will keep their original material
gzclient: /usr/include/boost/smart_ptr/shared_ptr.hpp:648: typename boost::detail::sp_member_access<T>::type boost::shared_ptr<T>::operator->() const [with T = gazebo::rendering::UserCamera; typename boost::detail::sp_member_access<T>::type = gazebo::rendering::UserCamera]: Assertion 'px != 0' failed.
robond@instance-20250221:~/myrobot/world$
```

- Course 3, simple_arm
 - Launch the arm. <PAT> = GitHub Personal Access Token


```
$ mkdir -p ~/catkin_ws/src
$ cd ~/catkin_ws/src
$ catkin_init_workspace
$ cd ~/catkin_ws
$ catkin_make
$ cd ~/catkin_ws/src/
$ git clone -b first_interaction
https://<PAT>@github.com/nov05/udacity-RoboND-simple_arm simple_arm
$ cd ~/catkin_ws
$ catkin_make
```

```
$ source devel/setup.bash
$ rosdep install -i simple_arm    ## output: e.g. #All required rosdeps installed
successfully
$ rosdep check simple_arm        ## output: e.g. All system dependencies have
been satisfied
$ roslaunch simple_arm robot_spawn.launch
```

- Run the simple_mover mode in another terminal


```
$ cd ~/catkin_ws/
$ source devel/setup.bash
$ rosrunc simple_arm simple_mover
```
- To view the camera image stream, in one terminal:


```
$ rqt_image_view /rgb_camera/image_raw    ## or
$ rosrunc rqt_image_view rqt_image_view
```

🟡⚠️ Issue: The /rgb_camera/image_raw topic is listed by “\$ rostopic list”. However, this line doesn’t work on the Cloud VM instance.

“\$ rostopic info /rgb_camera/image_raw” works as well.

“\$ rospack find rqt” can’t find [the package “rqt”](#).

```
robond@udacity:~/catkin_ws$ rospack find rqt_image_view
/opt/ros/kinetic/share/rqt_image_view
```

- ☒ ROS——问题解决: rqt工具包中image_view消失; bash: rosrunc rqt_image_view未找到命令

Irving.Gao 于 2021-08-12 17:25:19 发布

https://blog.csdn.net/qq_45779334/article/details/119649421 (web archive)

```
$ sudo apt-get install ros-kinetic-rqt
```

```
$ sudo apt-get install ros-kinetic-rqt-common-plugins
```

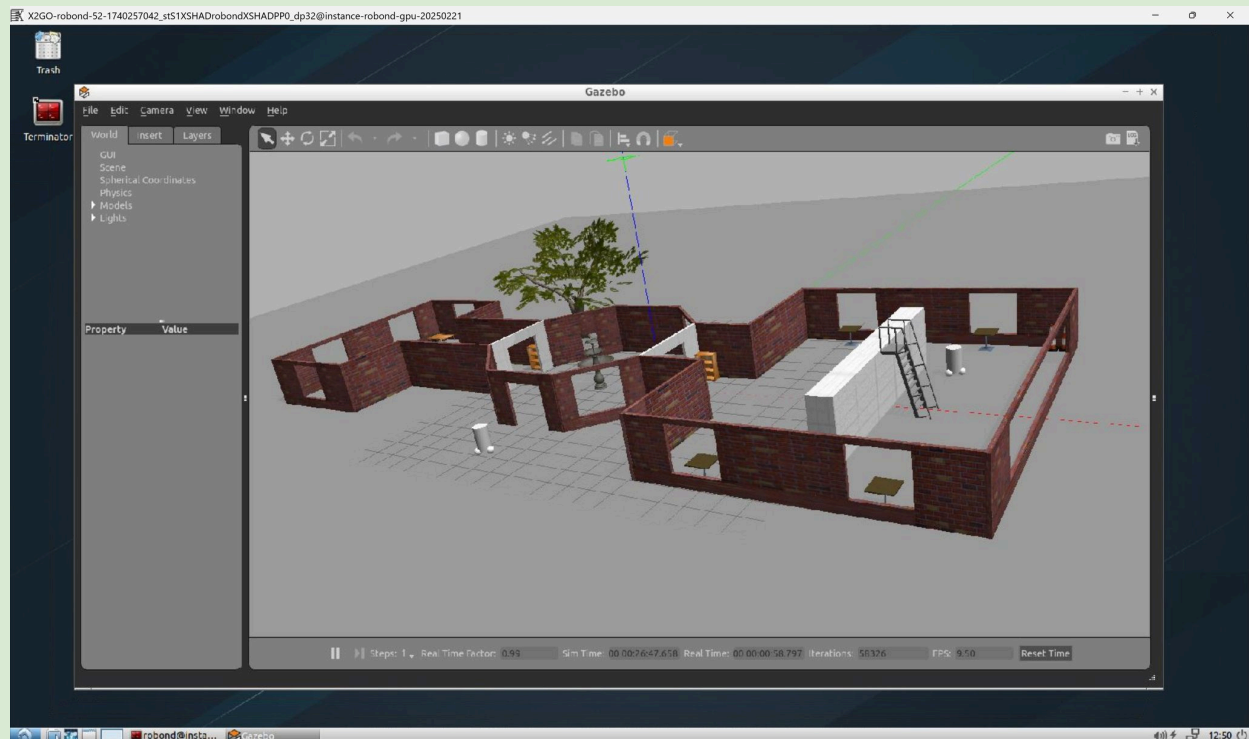
```
$ rm ~/.config/ros.org/rqt_gui.ini
```

🟡⚠️ installed the package. however the system asked me to run

```
$ sudo apt-get update && sudo apt-get install --only-upgrade python-catkin-pkg
```

```
robond@instance-robond-gpu-20250221:~/catkin_ws$ rqt_image_vie
w /rgb_camera/image_raw
[ERROR] [1740268102.704720563]: Failed to load nodelet [rqt_im
age_view/ImageView_0] of type [rqt_image_view/ImageView]: Fail
ed to load library /opt/ros/kinetic/lib//librqt_image_view.so.
Make sure that you are calling the PLUGINLIB_EXPORT_CLASS mac
ro in the library code, and that names are consistent between
this macro and your XML. Error string: Could not load library
(Poco exception = libopencv_core3.so.3.3: cannot open shared o
bject file: No such file or directory)
RosPluginlibPluginProvider::load_explicit_type(rqt_image_view/
ImageView) failed creating instance
PluginManager::load_plugin() could not load plugin "rqt_image
view/ImageView": RosPluginlibPluginProvider::load() could not l
oad plugin "rqt_image_view/ImageView"
terminate called after throwing an instance of 'boost::excepti
on_detail::clone_impl<boost::exception_detail::error_info_inje
ctor<boost::lock_error> >'
what(): boost: mutex lock failed in pthread_mutex_lock: Inv
alid argument
Aborted (core dumped)
```

Feb 24, 2025 update: I unzipped the .ova file to .vmdk, and created an image (note machine image) from the .vmdk file, then created an instance (w/o gpu) from the image. and did all the update, installation, git cloning, etc. and the issues are gone.



~~Create machine image, then create an instance with GPU from the image~~

⚠ Don't create VM instance with machine image, ~~for users, packages in the source instance won't be copied to the target instance.~~ Create from the .ova file again.

✓ However you can create a "disk" from a snapshot, then create an instance and attach the disk, or edit an instance to change the disk attached, which preserve all the packages and states.

- Certain GPU instances might not be available in certain zones.
- Official documentation: [GPU availability by regions and zones](#)

console.cloud.google.com/compute/machineImages?hl=en&project=tactile-timer-451521-d6

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Compute Engine Machine images CREATE MACHINE IMAGE IMPORT MACHINE IMAGE REFRESH DELETE LEARN

Overview
Virtual machines
VM instances
Instance templates
Sole-tenant nodes

A machine image contains a VM's properties, metadata, permissions, and data from all its attached disks. You can use a machine image to **create**, backup, or restore a VM. [Learn more](#)

Filter Enter property name or value

Status	Name	Source instance	Machine type	Architecture	Storage location	Creation time	Actions
	robond-image-20250221	instance-20250221	n2-highmem-8	-		Feb 21, 2025, 11:10:11 PM UTC-06:00	

console.cloud.google.com/compute/instancesAdd?creationFlow=fromMachineImage&machineImageName=robond-image-20250221&hl=en&project=tactile-timer-451521-d6

Google Cloud P1 Udacity Robotics 20250220 Search (/) for resources, docs, products, and more

Create an instance CREATE VM FROM... EQUIVALENT CODE

Machine configuration

- Machine configuration
n1-highmem-8 (1 NVIDIA T4), us-central1-a
- OS and storage
instance-20250221
- Networking
1 network interface
- Observability
- Security
- Advanced

Machine configuration

Name *
robond-20250222-053136

Region *
us-central1 (Iowa)

Zone *
us-central1-a

Region is permanent Zone is permanent

General purpose Compute optimized Memory optimized Storage 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	CPU Platform
	N1	Balanced price & performance	1 - 96	1.8 - 624 GB

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-highmem-8 (8 vCPU, 4 core, 52 GB memory)

vCPU	Memory
8 (4 cores)	52 GB

CREATE CANCEL EQUIVALENT CODE

Monthly estimate

\$570.06
That's about **\$0.78 hourly**

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

Item	Monthly estimate
8 vCPU + 52 GB memory	\$345.44
1 NVIDIA T4	\$255.50
NVIDIA GRID license fee	\$146.00
20 GB SSD persistent disk	\$3.40
Use discount	-\$180.28
Total	\$570.06

[Compute Engine pricing](#)

[LESS](#)

Show desktop

- Request to increase the GPU quota

console.cloud.google.com/iam-admin/quotas?limit=GPUS-ALL-REGIONS-per-project&metric=compute.googleapis.com%2Fgpuus_all_regions&service=compute.googleapis.com...

Google Cloud P1 Udacity Robotics 20250220 Search (/) for resources, docs, products, and more

IAM & Admin / Quotas

Quotas & System Limits for project "P1 Udacity Robotics 20250220"

MANAGE ALERT POLICIES LEARN

QUOTAS & SYSTEM LIMITS INCREASE REQUESTS

Values for quotas are being updated. This may take 2-3 weeks to complete. [LEARN MORE](#)

Current usage > 90%
0

All quotas & system limits
20,327

[View quotas & system limits](#)

Service ID: compute.googleapis.com Metric: compute.googleapis.com/gpus_all_regions

Limit name: GPUS-ALL-REGIONS-per-project

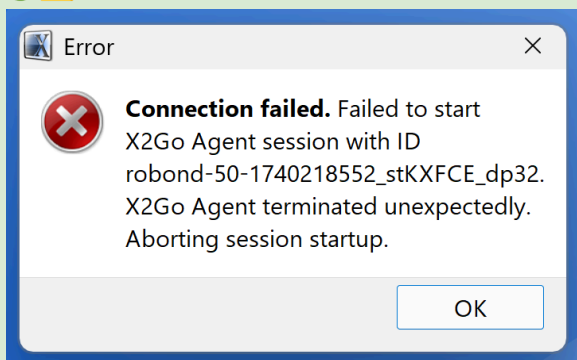
Service	Name	Type	Dimensions (e.g. location)	Value	Current usage percentage
	Compute Engine API	Quota	GPUs (all regions)	1	0%

Recommended for you

- Working with quotas
[Help document](#)
This page describes how to work with quotas in your projects.
- 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](#)

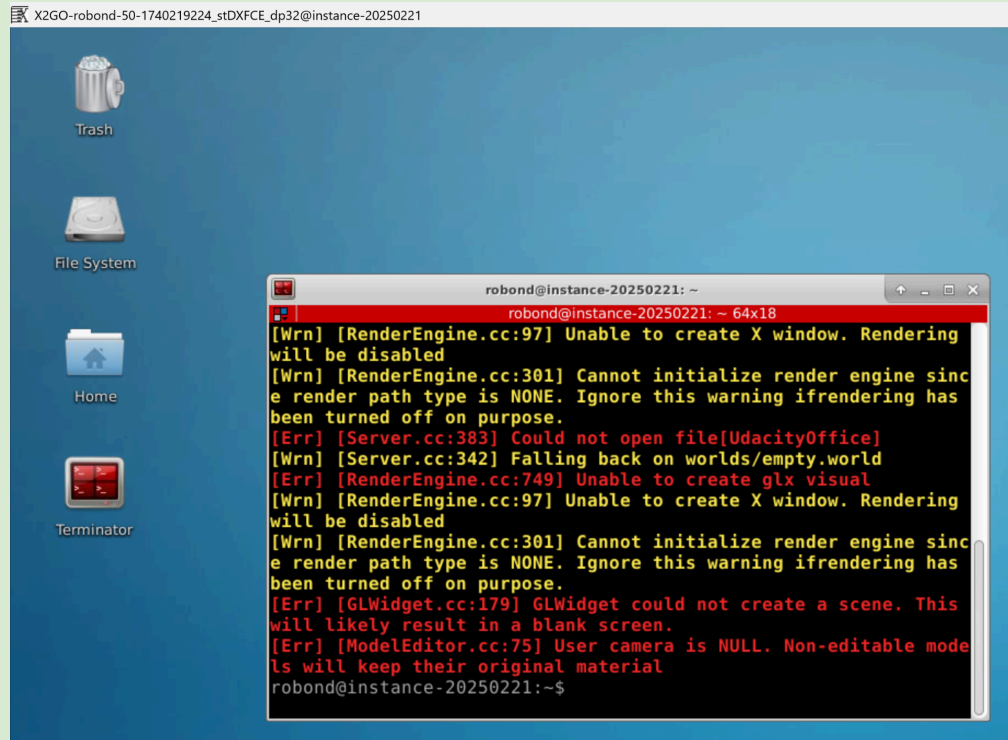
! Issues and solutions

🟢 ! Issue solved.



- Make sure x2goserver is installed on the VM instance.
`$ dpkg -l | grep x2goserver`
- Make sure ssh pub key is pasted to the VM
`$ sudo cat /home/<GCP-assigned-user>/.ssh/authorized_keys`
- It seems the x2go client had some issue. I just changed the session type in the preference and started the client a few times. The issue was gone.

🟢 ! Issue solved: [Gazebo won't launch](#). Solution: You can do it with the “x2go client - session preference - session type - X2GO/X11 Desktop Sharing”, but not with the “XFCE” option, and with X11 Forwarding allowed.



[Err] [RenderEngine.cc:749] Unable to create glx visual
 [Wrn] [RenderEngine.cc:97] Unable to create X window. Rendering will be disabled
 [Wrn] [RenderEngine.cc:301] Cannot initialize render engine since render path type is NONE. Ignore this warning if rendering has been turned off on purpose.
 [Err] [GLWidget.cc:179] GLWidget could not create a scene. This will likely result in a blank screen.
 [Err] [ModelEditor.cc:75] User camera is NULL. Non-editable models will keep their original material

- It might be an X11 problem. ([StackExchange](#))
- ☒ [Configure X11 in Ubuntu](#)

Edit ssh_config and sshd_config files:

ForwardX11 yes

ForwardX11Trusted yes

\$ sudo nano /etc/ssh/ssh_config

\$ sudo nano /etc/ssh/sshd_config

⚠ Issue: Cloud Ubuntu VM with xorg x11 on x2go desktop has 800*600 low resolution, and there are no other resolution options to choose from.

And it seems not to be able to copy and paste with the x2go client “x2go/x11 desktop sharing” session type.

robond@instance-20250224-015140:~\$ xrandr --listactivemonitors

xrandr: Failed to get size of gamma for output default

Monitors: 1

0: +default 1280/339x768/203+0+0 default

- [xrandr --output eDP1 --auto --scale-from 3840x2160](#)
- [September 30th, 2015 #2 seattle vic](#)

“1. Insert a dummy video driver: **sudo apt-get install xserver-xorg-video-dummy**

2. Since there's no default **xorg.conf** file that I could find anywhere, AND there are several locations where you can supposedly put it (/etc/X11, /usr/share/X11, ~) I created one and placed it in **/etc/X11**”

```
Section "Device" Identifier "Configured Video Device"
```

```
Driver "dummy"
```

```
VideoRam 256000
```

```
EndSection
```

```
Section "Monitor"
```

```
Identifier "Configured Monitor"
```

```
HorizSync 5.0 - 1000.0
```

```
VertRefresh 5.0 - 200.0
```

```
Modeline "1920x1080" 148.50 1920 2448 2492 2640 1080 1084 1089 1125
```

```
+Hsync +Vsync
```

```
# Modeline "1280x800" 24.15 1280 1312 1400 1432 800 819 822 841
```

```
EndSection
```

```
Section "Screen"
```

```
Identifier "Default Screen"
```

```
Monitor "Configured Monitor"
```

```
Device "Configured Video Device"
```

```
DefaultDepth 24
```

```
SubSection "Display"
```

```
Depth 24
```

```
Modes "1920x1080"
```



```
EndSubSection
```

```
EndSection
```

[StackExchange, answered May 26, 2021 at 18:27](#)

“I'm running Ubuntu 15.04. Once I knew that X does pick up the xorg.org file in /etc/X11, the real challenge was to find the settings that work.”

“I removed the xorg.conf file I had created in the original post and followed the instructions at the above link. I had to comment out the 1920X1080 modeline to get it to work (not sure why but it worked so I'm not complaining). Was able to connect to the desktop at the desired resolution 1920x1080 using NoMachine.”

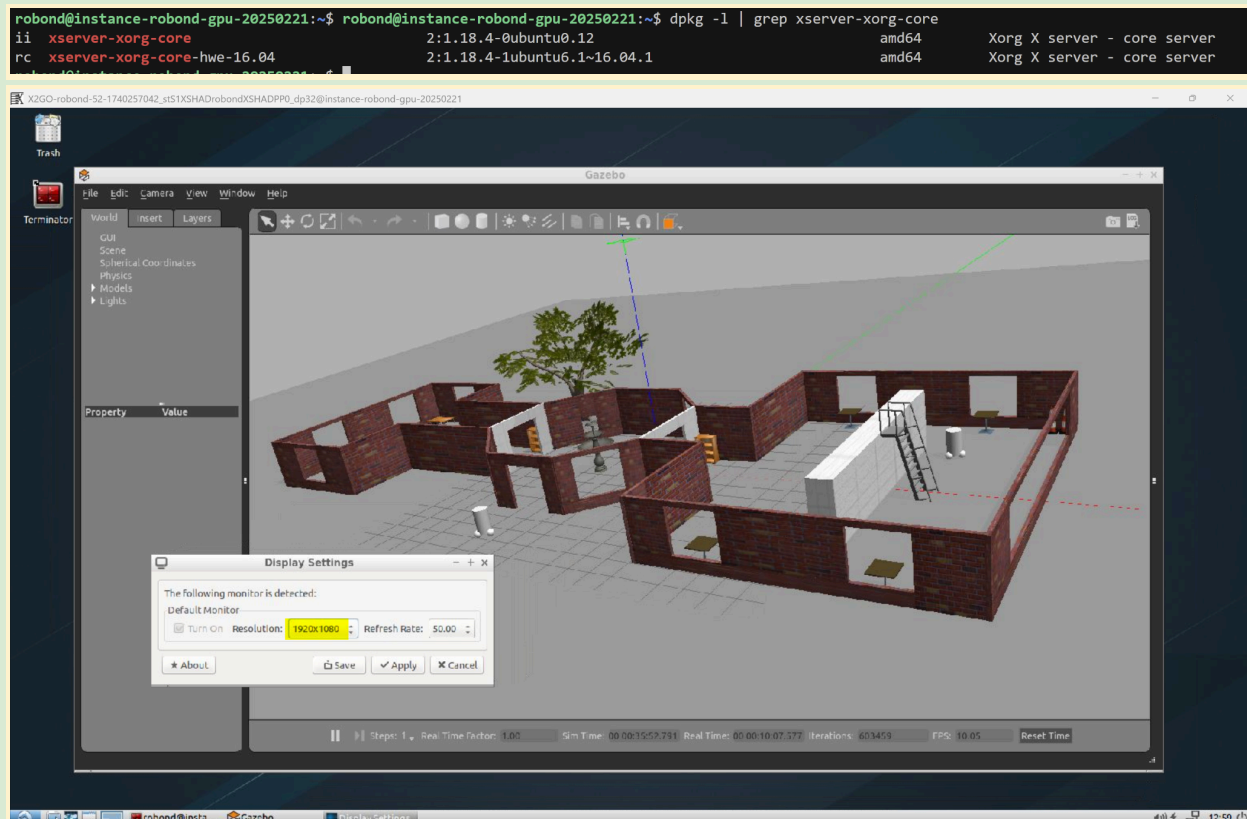
-   I ran the following commands. It worked, the desktop image stretched out, however it is not clear. And copy-paste is not working.

```
$ sudo apt-get install xserver-xorg-core
```

```
$ sudo apt-get install xserver-xorg-video-dummy
```

```
$ cd /etc/X11
```

```
$ sudo nano xorg.conf
$ sudo apt autoremove
```



👉 Notes: [Other remote desktop issues](#)

⚠ Issue: [\\$ rosrn rviz rviz doesn't work.](#)

Stereo is NOT SUPPORTED.

OpenGL version: 3 (GLSL 1.3)

terminate called after throwing an instance of 'std::runtime_error'

what(): Duration is out of dual 32-bit range

```
robond@instance-20250224-015140:~/catkin_ws$ rosrn rviz rviz
[ INFO] [1740432218.101778656]: rviz version 1.12.10
[ INFO] [1740432218.101838755]: compiled against Qt version 5.5.1
[ INFO] [1740432218.101871848]: compiled against OGRE version 1.9.0 (Ghadamon)
[ INFO] [1740432218.229595184]: Stereo is NOT SUPPORTED
[ INFO] [1740432218.229705431]: OpenGL version: 3 (GLSL 1.3).
terminate called after throwing an instance of 'std::runtime_error'
what(): Duration is out of dual 32-bit range
Aborted (core dumped)
```

[Run RViz from remote docker using X11](#)

Asked by Elgin.D on 2020-04-19 21:19:53 UTC

<https://medium.com/@viirya/setting-up-linux-gui-container-on-mac-728194b20e78>

r/ROS • 1 mo.ago Siliqy8

[RViz on a remote computer?](#)

⚠ Issue: [can't ssh access GPU VM instances. if I change machine type to CPU, it is fine to ssh connect.](#)

Feb 24, 2025 Update: the issue persists. However, I find that I can use x11 without gpu.

The screenshot shows the Google Cloud console interface for an instance named 'instance-robo...'. The top navigation bar includes the Google Cloud logo, the instance name, and a search bar. Below the navigation bar, there are tabs for 'DETAILS', 'OBSERVABILITY', 'OS INFO', and 'SCREENSHOT'. The 'DETAILS' tab is active, showing a 'SSH' button and a 'CONNECT TO SERIAL CONSOLE' button. Below these buttons, there is a 'Logs' section with a 'Serial port 1 (console)' link. The 'Basic information' section displays the following details:

Field	Value
Name	instance-robo-20250223-223520
Instance Id	1892043073925813246
Description	None
Type	Instance
Status	Running
Creation time	Feb 23, 2025, 5:19:46 PM UTC-06:00

The screenshot shows the serial port output for the instance 'instance-robo-20250223-223520'. The output is displayed in a text area with a 'REFRESH' button. The output shows the following boot process details:

```
[2J [01;01H [=3h [2J [01;01H [2J [01;01H [=3h [2J [01;01HCSM BBS Table full.

UEFI: Failed to load image.
Description: UEFI nvme_card-pd
FilePath: PciRoot(0x0)/Pci(0x6,0x0)/NVMe(0x1,00-00-00-00-00-00-00-00)
OptionNumber: 1.
Status: Not Found.

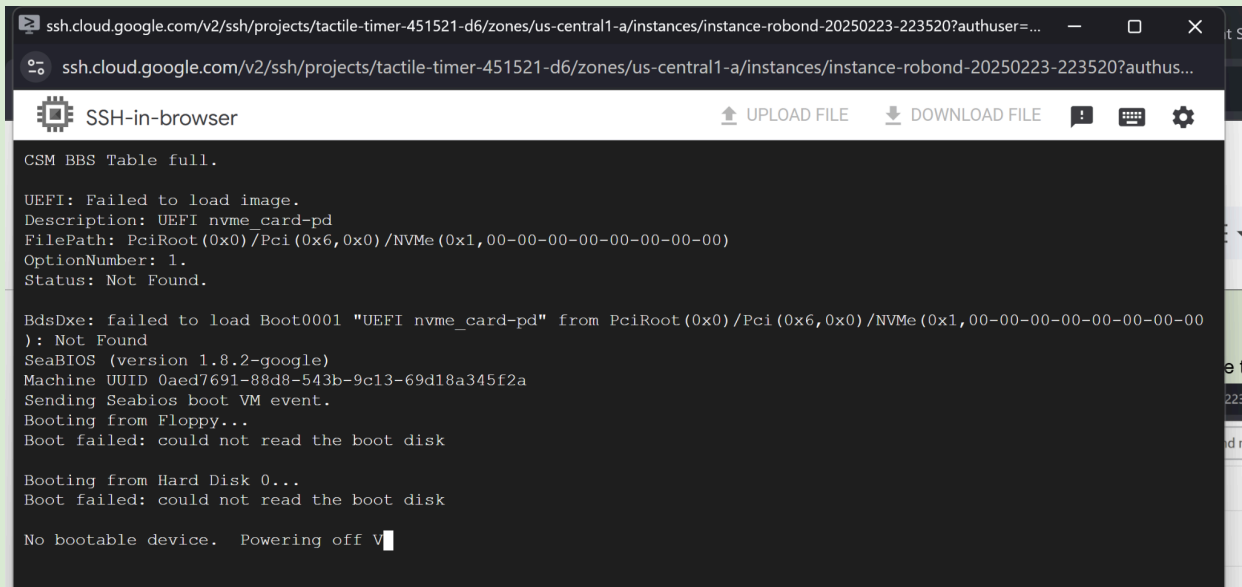
BdsDxe: failed to load Boot0001 "UEFI nvme_card-pd" from PciRoot(0x0)/Pci(0x6,0x0)/NVMe(0x1,00-00-00-00-00-00-00-00): Not Found
SeabIOS (version 1.8.2-google)
Machine UUID 0aed7691-88d8-543b-9c13-69d18a345f2a
Sending Seabios boot VM event.
Booting from Floppy...
Boot failed: could not read the boot disk

Booting from Hard Disk 0...
Boot failed: could not read the boot disk

No bootable device. [2J [01;01H [=3h [2J [01;01H [2J [01;01H [=3h [2J [01;01HCSM BBS Table full.

UEFI: Failed to load image.
Description: UEFI nvme_card-pd
FilePath: PciRoot(0x0)/Pci(0x6,0x0)/NVMe(0x1,00-00-00-00-00-00-00-00)
OptionNumber: 1.
Status: Not Found.

BdsDxe: failed to load Boot0001 "UEFI nvme_card-pd" from PciRoot(0x0)/Pci(0x6,0x0)/NVMe(0x1,00-00-00-00-00-00-00-00): Not Found
SeabIOS (version 1.8.2-google)
Machine UUID 0aed7691-88d8-543b-9c13-69d18a345f2a
Sending Seabios boot VM event.
Booting from Floppy...
Boot failed: could not read the boot disk
```



```
ssh.cloud.google.com/v2/ssh/projects/tactile-timer-451521-d6/zones/us-central1-a/instances/instance-robond-20250223-223520?authuser=...
SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE

CSM BBS Table full.

UEFI: Failed to load image.
Description: UEFI nvme_card-pd
FilePath: PciRoot(0x0)/Pci(0x6,0x0)/NVMe(0x1,00-00-00-00-00-00-00-00)
OptionNumber: 1.
Status: Not Found.

BdsDxe: failed to load Boot0001 "UEFI nvme_card-pd" from PciRoot(0x0)/Pci(0x6,0x0)/NVMe(0x1,00-00-00-00-00-00-00-00): Not Found
SeaBIOS (version 1.8.2-google)
Machine UUID 0aed7691-88d8-543b-9c13-69d18a345f2a
Sending Seabios boot VM event.
Booting from Floppy...
Boot failed: could not read the boot disk

Booting from Hard Disk 0...
Boot failed: could not read the boot disk

No bootable device. Powering off VM
```

Editing VM instance "instance-robond-20250223-223520" failed. Error: Invalid accelerator specs for 'g2-standard-4' instances. Accelerator name: 'nvidia-tesla-p4-vws', count 1. Supported accelerator(s): [nvidia-l4, nvidia-l4-vws].

Reference

- [How to run your VirtualBox OVA Applications on Google Cloud](#)

Adrian Roque Jan 10, 2021

This post introduced another way to set up the virtual machine. First upload .ova to a GCP bucket, then create a machine image from .ova, and then create a VM from the machine image.

- Digital Ocean Tutorial
[How To Set Up a Remote Desktop with X2Go on Ubuntu 20.04](#) ⚠ The course image is on **Ubuntu 16.04.7 LTS**.
Published on July 14, 2020
- <https://forum.odroid.com/viewtopic.php?t=46864>
<https://serverok.in/ubuntu-16-x2go-server>

Re: Ubuntu MATE 16.04.7 and X2Go Server

by **Mandolino** » Sat Sep 02, 2023 4:58 am

Hello,

The team behind the X2Go project has release a new build of **the packages (2023-08-18)** that fix the issue with **the xserver-x2gokdrive dependency on Ubuntu 16.04 AND 18.04**. From now, X2Go Server can be installed with the following commands :

CODE: SELECT ALL

```
sudo add-apt-repository ppa:x2go/stable
sudo apt-get update
sudo apt-get install x2goserver x2gomatebindings
```

```
apt -y install xfce4
add-apt-repository ppa:x2go/stable
apt-get update
apt-get -y install x2goserver x2goserver-xsession
(apt-get -y install x2goserver x2gomatebindings)
```

- <https://blog.hostonnet.com/x2go-ubuntu>
X2Go client
- r/linux_gaming 9 mo. ago Fluffy_Wafer_9212
[I made a guide to help you install & manage the NVIDIA GPU drivers \(including driver 555\) on your Ubuntu system\(s\)](#)
“Never, ever, install using Nvidia's .run script - Wait until the Launchpad PPA has the driver available.
The .run script overwrites important libraries.”
- [u/ad97lb • 2y ago](#)
For running a heavy application, it's pretty good I'd say. I installed ROS Noetic on it, all the cuda drivers, Pytorch and have been running a DRL training that connects to Gazebo and Rviz and the GPU is being used fully but my Nvidia GPU isn't that great. It's an Nvidia GeForce MX450.
Qkumbazoo • 2y ago
I don't know which was more painful, running gazebo sim without a gpu or installing the cuda drivers on linux. You might have better luck though.

<END>