| | |
|---|---|
| **Batch:** A-4 | **Roll No.:** 16010122151 |
| **Experiment No.** 06 | |
| **Signature of the Staff In-charge with date** | |

**Title: Creating a Virtual Machine on GCP using Google Cloud Skills Boost**

**Objective:** To create a Virtual Machine on GCP using Google Cloud Skills Boost

**Expected Outcome of Experiment:**

| CO | Outcome |
|---|---|
| 2 | Build cloud services and applications |
| 4 | Investigate the system virtualization and outline its role in enabling the cloud computing System model |

**Books/ Journals/ Websites referred:**

https://www.cloudskillsboost.google/

https://www.cloudskillsboost.google/focuses/3563?parent=catalog

**Abstract**:-

This experiment demonstrates the creation of a Virtual Machine (VM) on Google Cloud Platform (GCP) using Google Cloud Skills Boost. The process involved configuring VM instances, selecting appropriate machine types, and deploying the VM successfully. The experiment highlights the practical application of cloud computing principles and virtualization technologies.

**Related Theory: -**

Virtualization is a foundational technology in cloud computing, enabling the creation of virtual instances of physical hardware. Google Cloud Platform (GCP) leverages this technology to provide scalable and flexible VM services. Key concepts include:

- Virtual Machines (VMs): Emulate physical computers, allowing multiple OS instances to run on a single physical machine.
- Hypervisor: Software that manages VMs, allocating resources like CPU, memory, and storage.
- GCP Services: Offers tools like Compute Engine for VM deployment, supporting customizable configurations for diverse workloads.

Virtualization enhances resource utilization, cost efficiency, and scalability, making it integral to modern cloud infrastructure.

**Implementation Details:**

1. **Enlist all the Steps followed and various options explored**

Step 1: Accessed Google Cloud Skills Boost and navigated to the VM creation lab.

Step 2: Selected a project and region for VM deployment.

Step 3: Configured VM specifications (machine type, CPU, memory).

Step 4: Chose a boot disk (OS image) and adjusted storage settings.

Step 5: Explored networking options (firewall rules, IP addresses).

Step 6: Launched the VM and verified its status via the GCP dashboard.

2. **Explain your program logic, classes and methods used.**

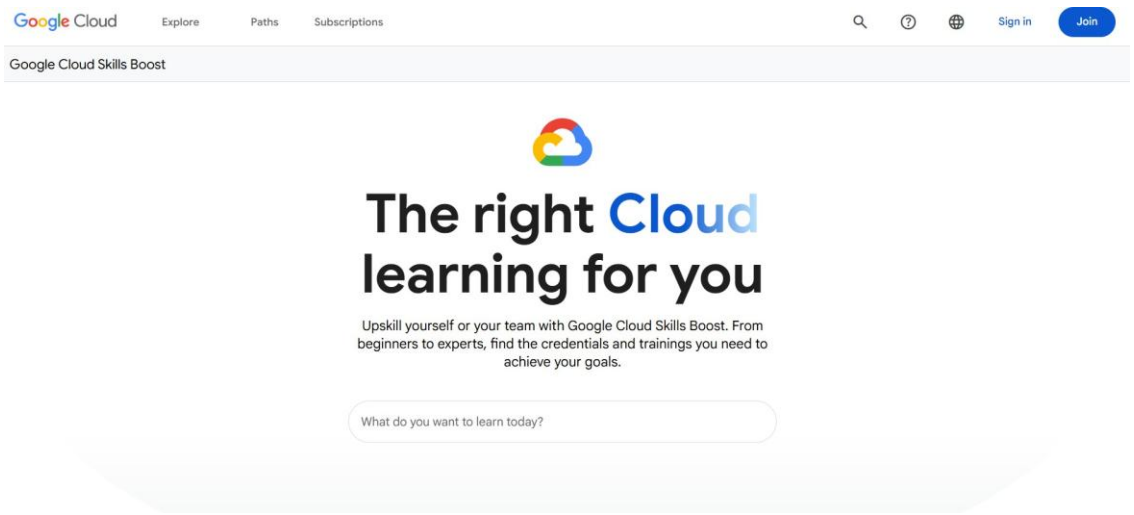
   The process utilized GCP's web-based interface, with no custom programming required. Key actions included:

   - Resource Allocation: Using GCP's Compute Engine API to provision resources.
   - Configuration Management: Setting parameters via the Cloud Console UI.

3. **Explain the Importance of the approach followed by you**

   - **Hands-on Learning: Reinforced understanding of cloud infrastructure.**
   - **Scalability: Demonstrated how VMs adapt to varying workloads.**
   - **Cost-Efficiency: Highlighted pay-as-you-go pricing models.**

**SCREENSHOTS:**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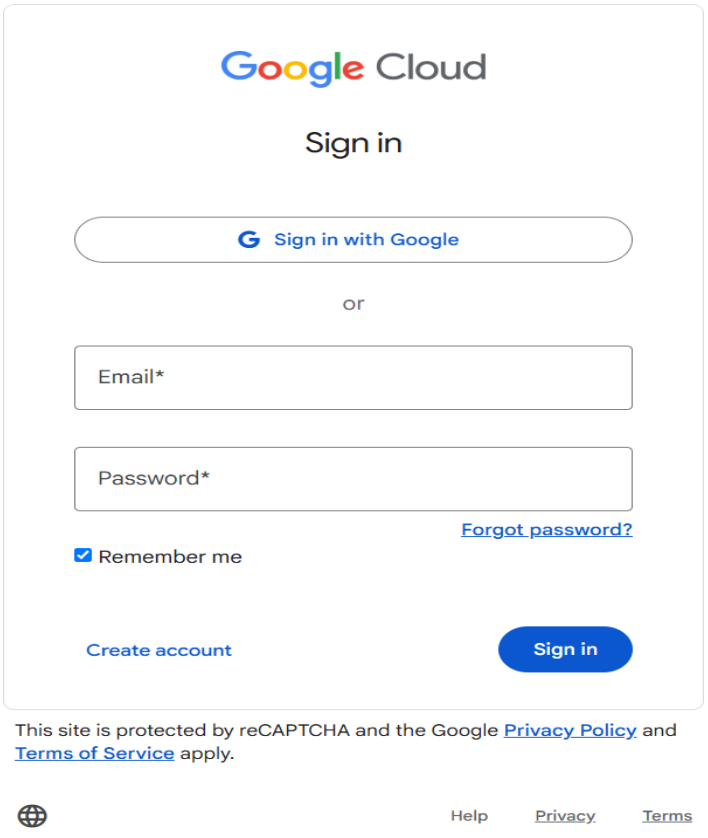
The right Cloud learning for you
Upskill yourself or your team with Google Cloud Skills Boost. From beginners to experts, find the credentials and trainings you need to achieve your goals.
What do you want to learn today?


Google Cloud
Sign in
Sign in with Google
or
Email*
Password*
Forgot password?
Remember me
Create account
Sign in
This site is protected by reCAPTCHA and the Google Privacy Policy and Terms of Service apply.
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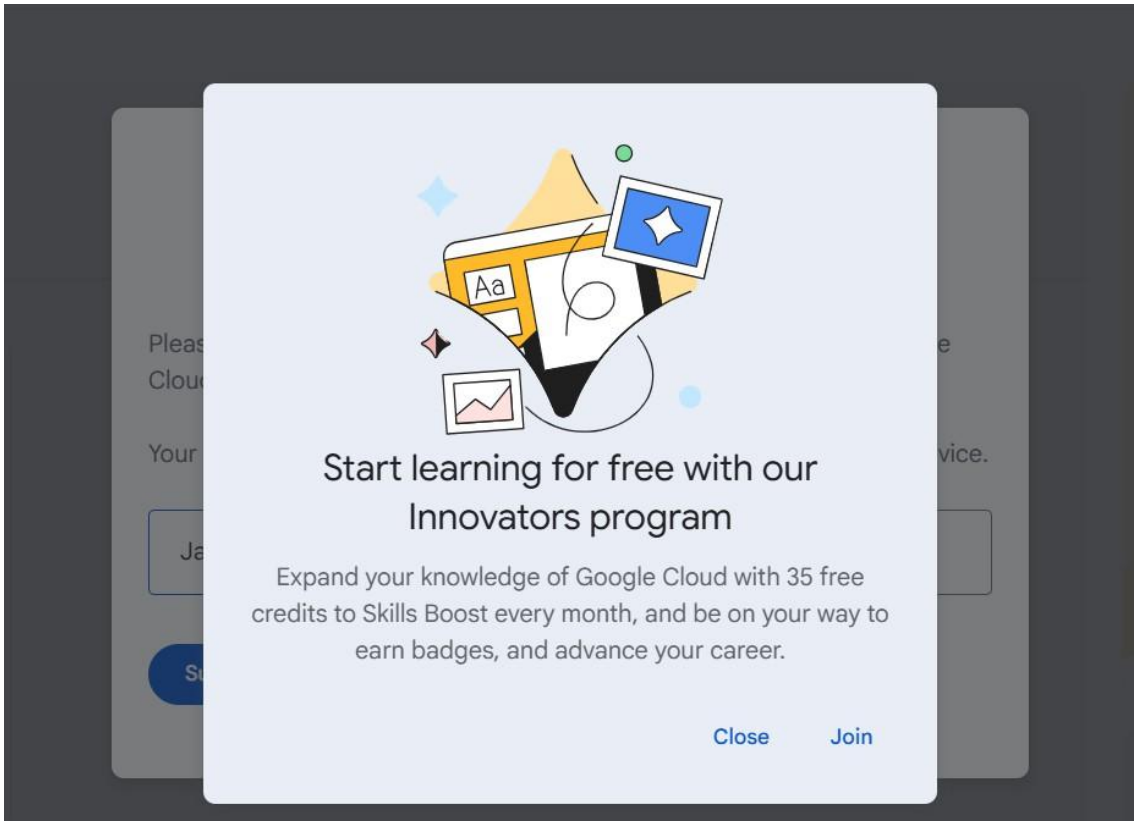
Privacy
Terms


Start learning for free with our Innovators program
Expand your knowledge of Google Cloud with 35 free credits to Skills Boost every month, and be on your way to earn badges, and advance your career.
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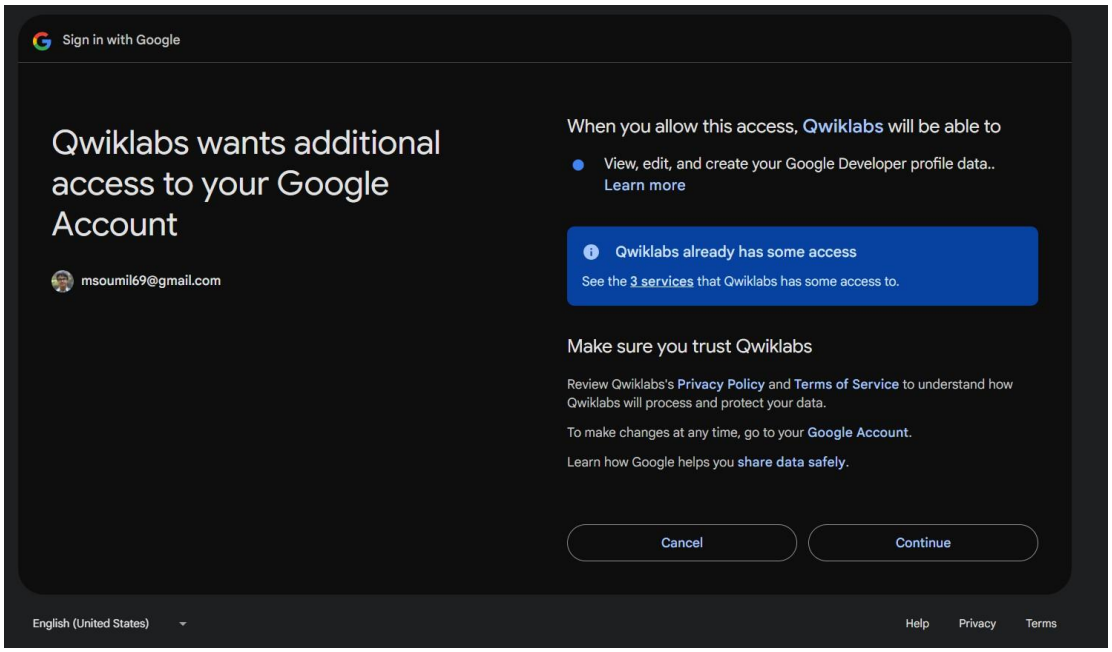
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Learn how Google helps you share data safely.
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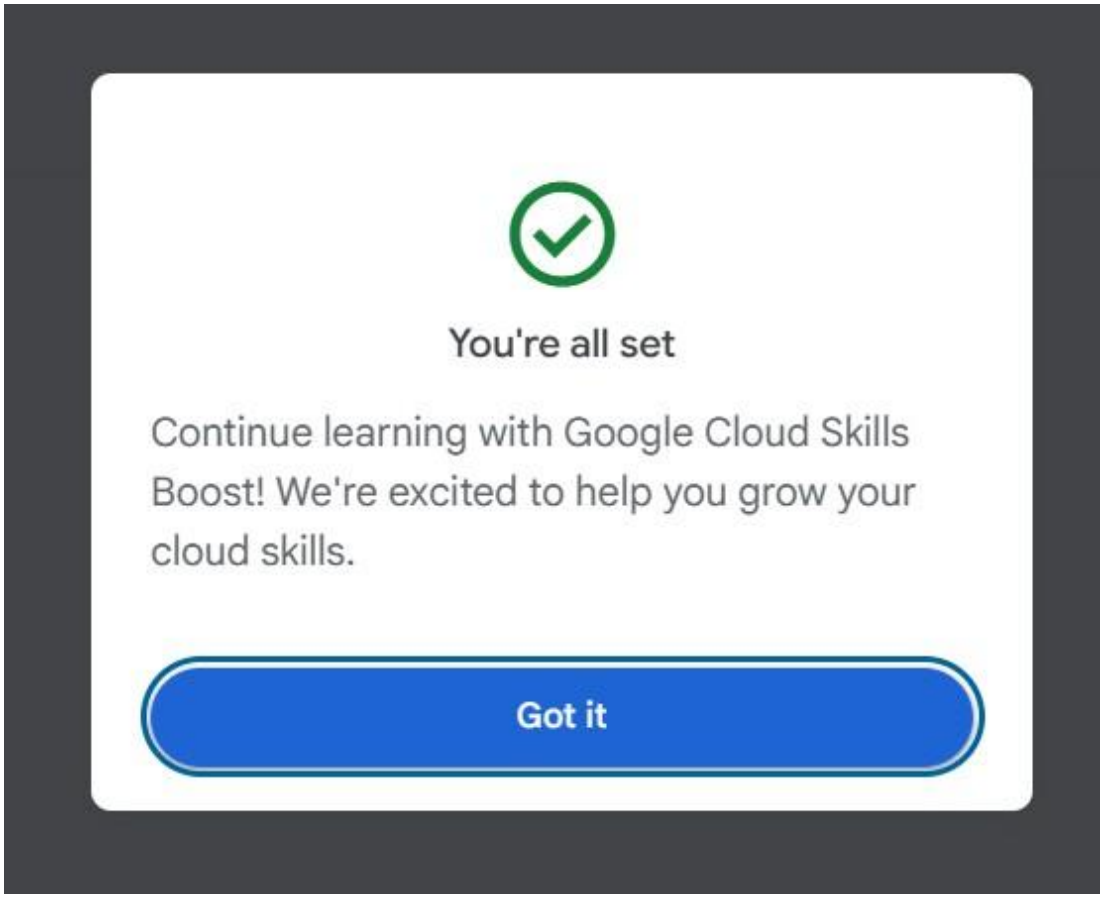
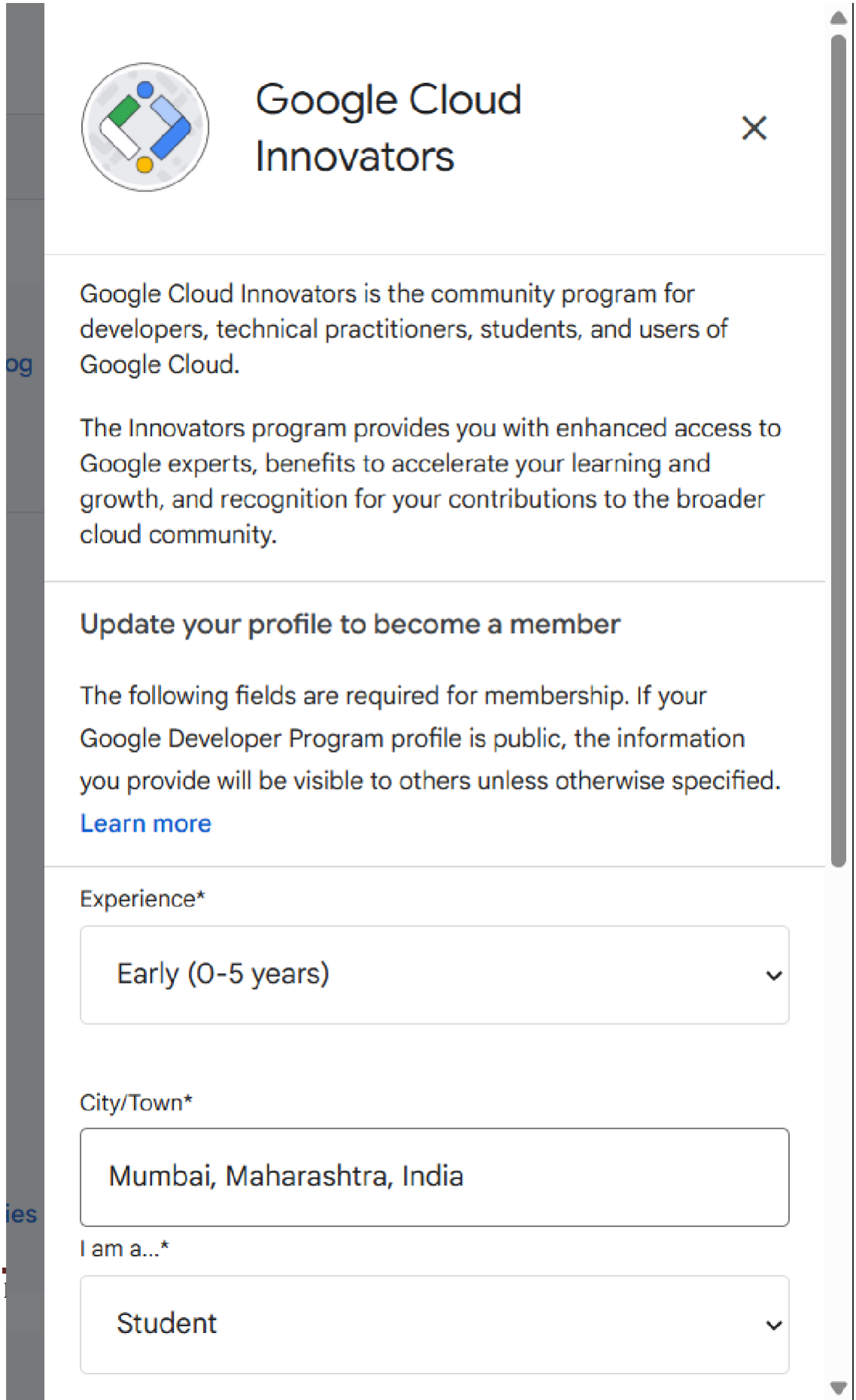

You're all set
Continue learning with Google Cloud Skills Boost! We're excited to help you grow your cloud skills.
Got it


Google Cloud Innovators
Google Cloud Innovators is the community program for developers, technical practitioners, students, and users of Google Cloud.
The Innovators program provides you with enhanced access to Google experts, benefits to accelerate your learning and growth, and recognition for your contributions to the broader cloud community.
Update your profile to become a member
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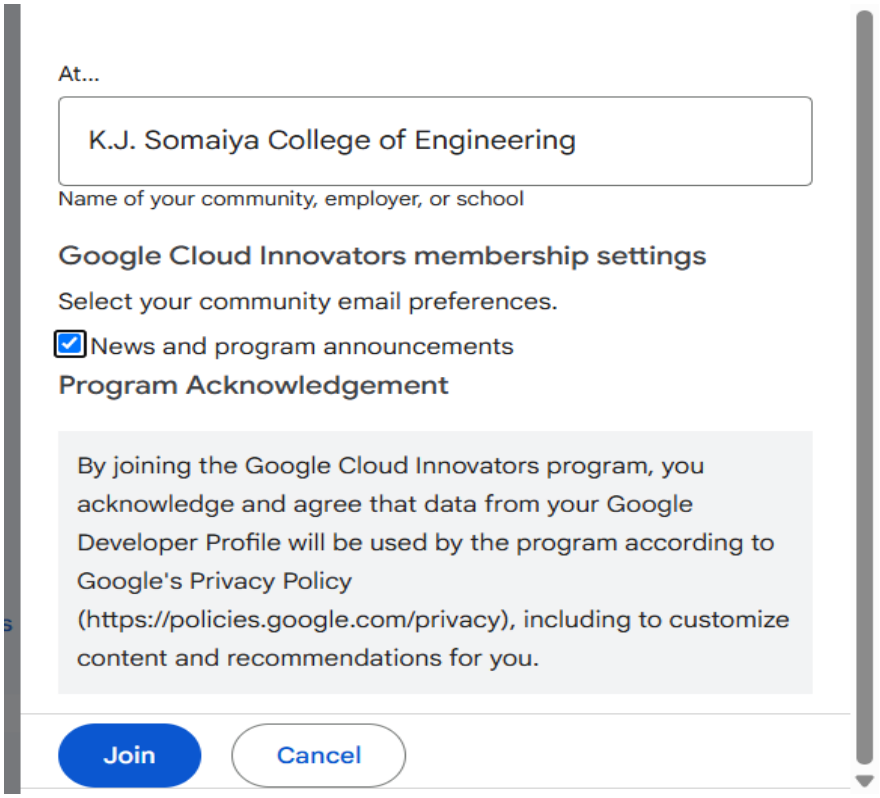
City/Town*
Mumbai, Maharashtra, India
I am a...*
Student


At...
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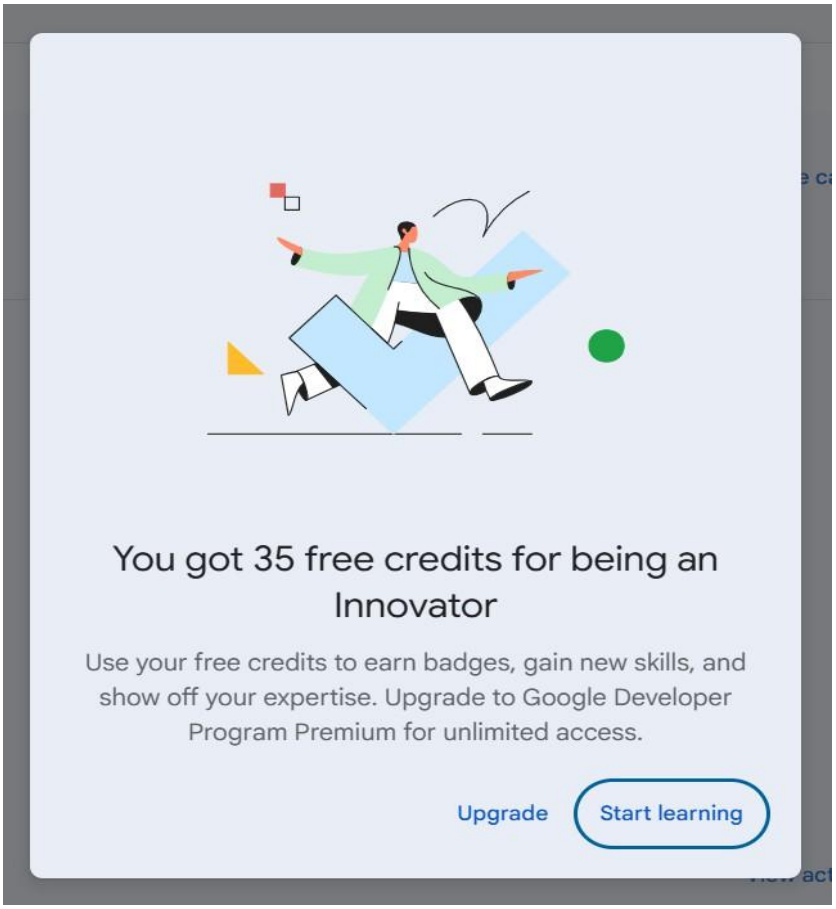
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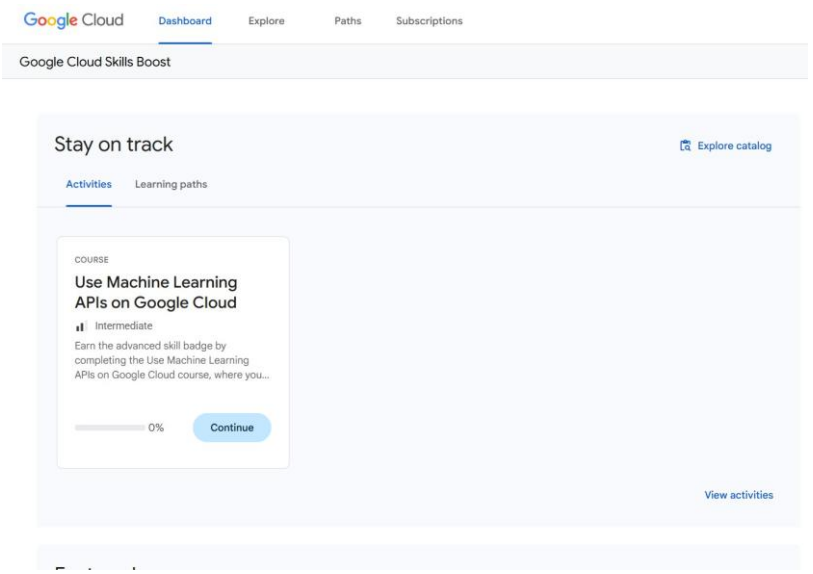
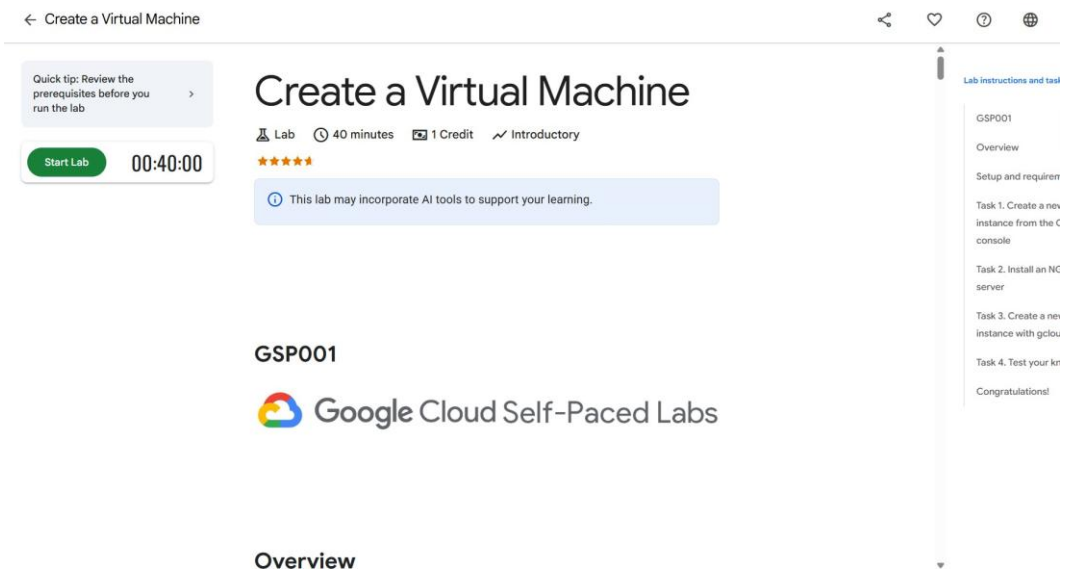
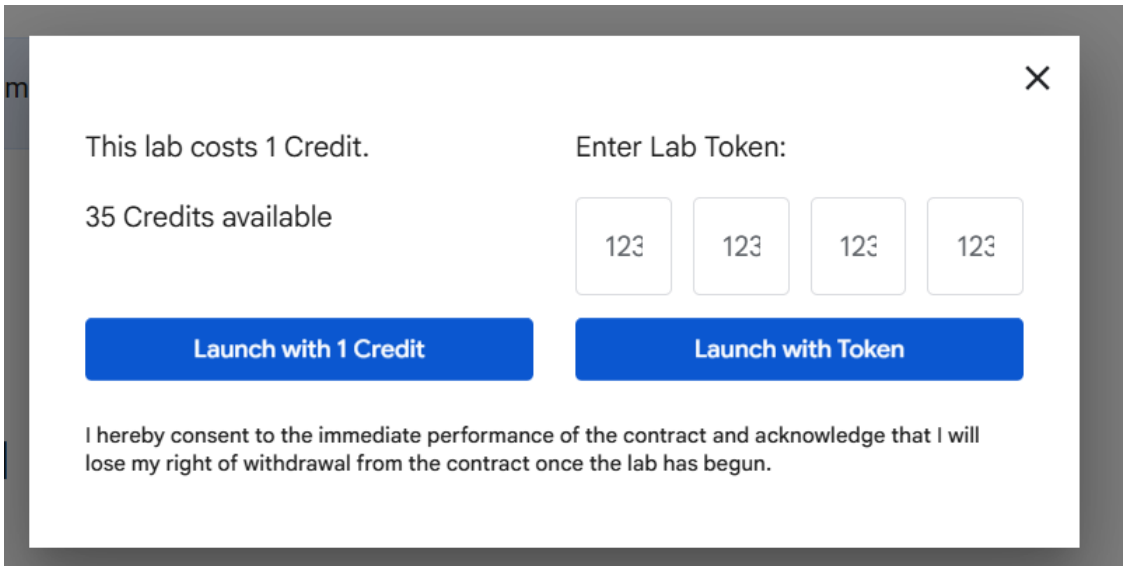
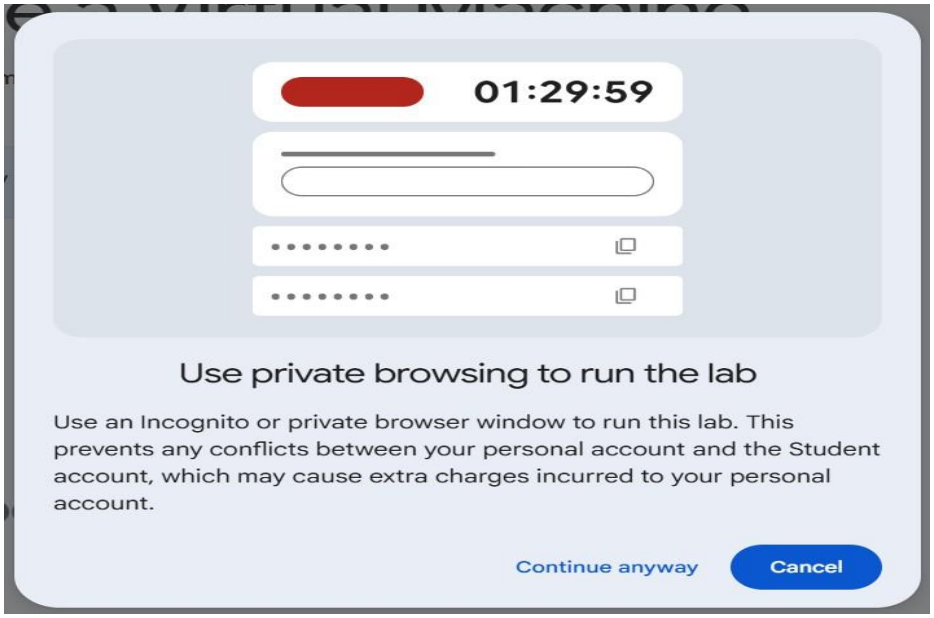
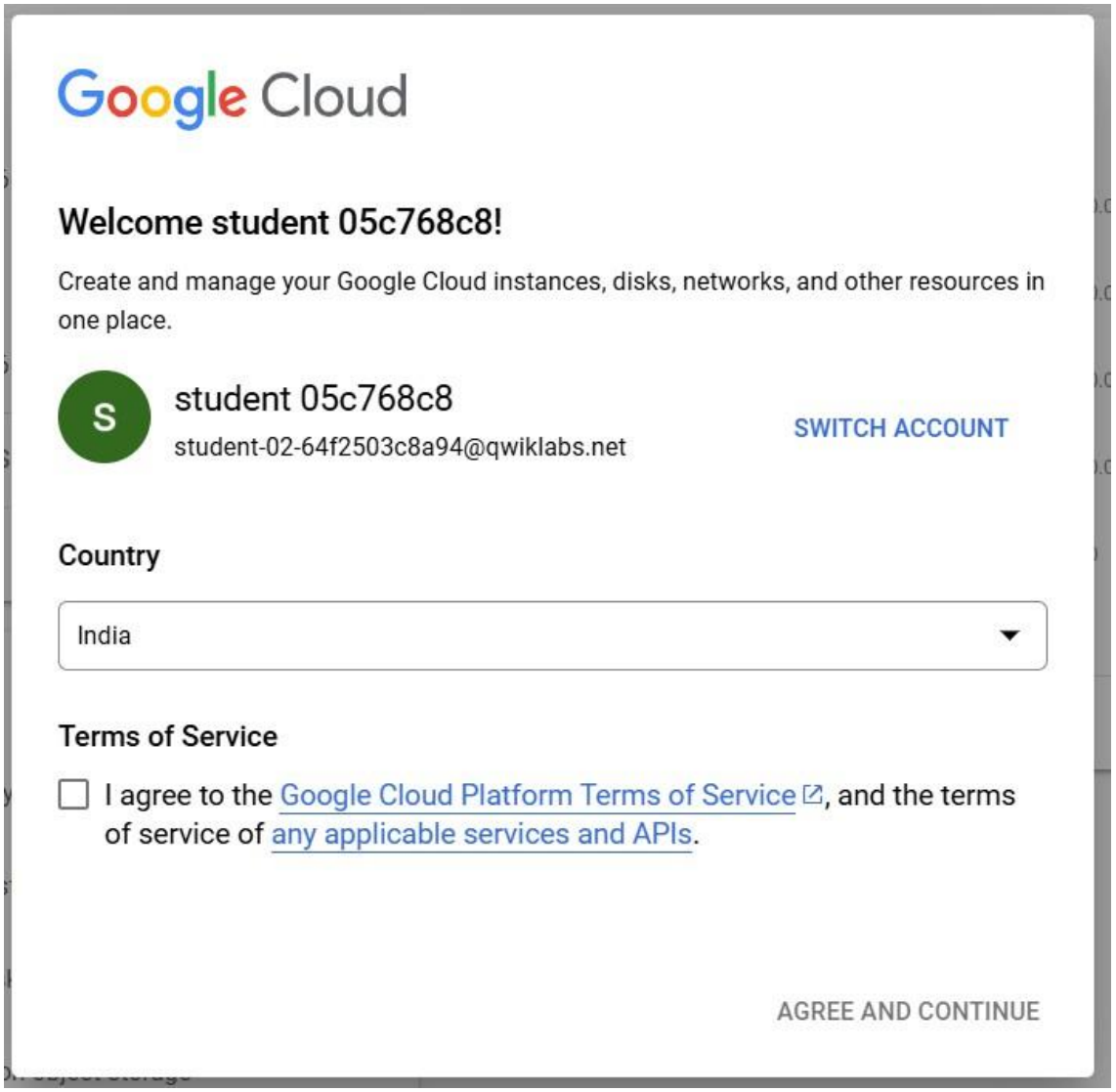
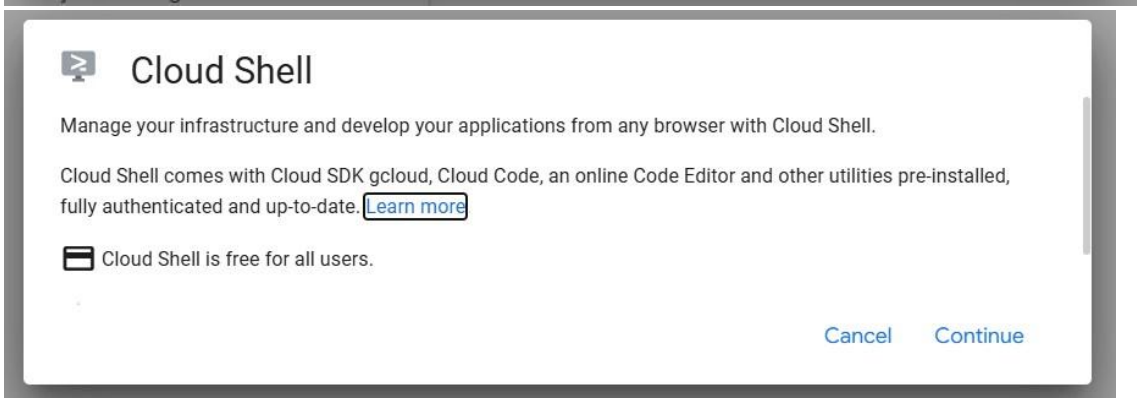

Google Cloud
Dashboard
Explore
Paths
Subscriptions
Google Cloud Skills Boost
Stay on track
Explore catalog
Activities
Learning paths
COURSE
Use Machine Learning APIs on Google Cloud
Intermediate
Earn the advanced skill badge by completing the Use Machine Learning APIs on Google Cloud course, where you...
0%
Continue
View activities

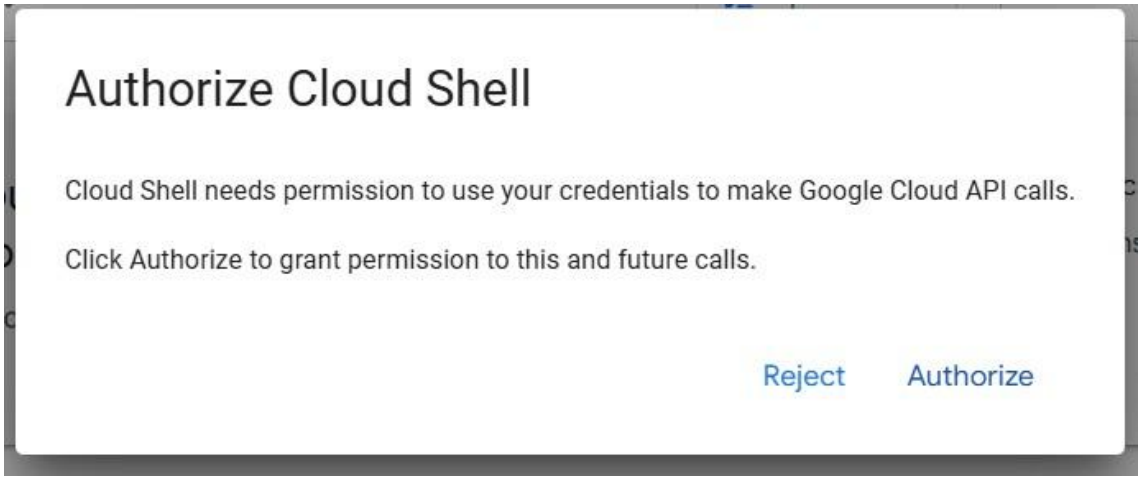

Create a Virtual Machine
Quick tip: Review the prerequisites before you run the lab
Start Lab
00:40:00
Create a Virtual Machine
Lab
40 minutes
1 Credit
Introductory
This lab may incorporate AI tools to support your learning.
GSP001
Google Cloud Self-Paced Labs
Overview

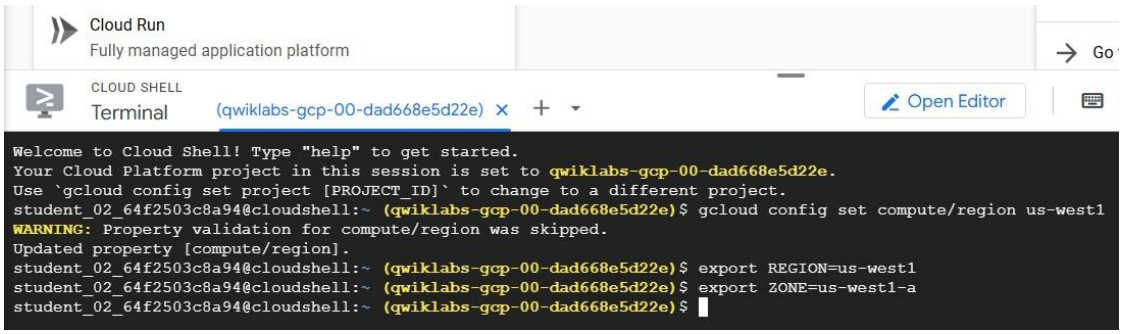

This lab costs 1 Credit.
35 Credits available
Enter Lab Token:
123
123
123
123
Launch with 1 Credit
Launch with Token
I hereby consent to the immediate performance of the contract and acknowledge that I will lose my right of withdrawal from the contract once the lab has begun.

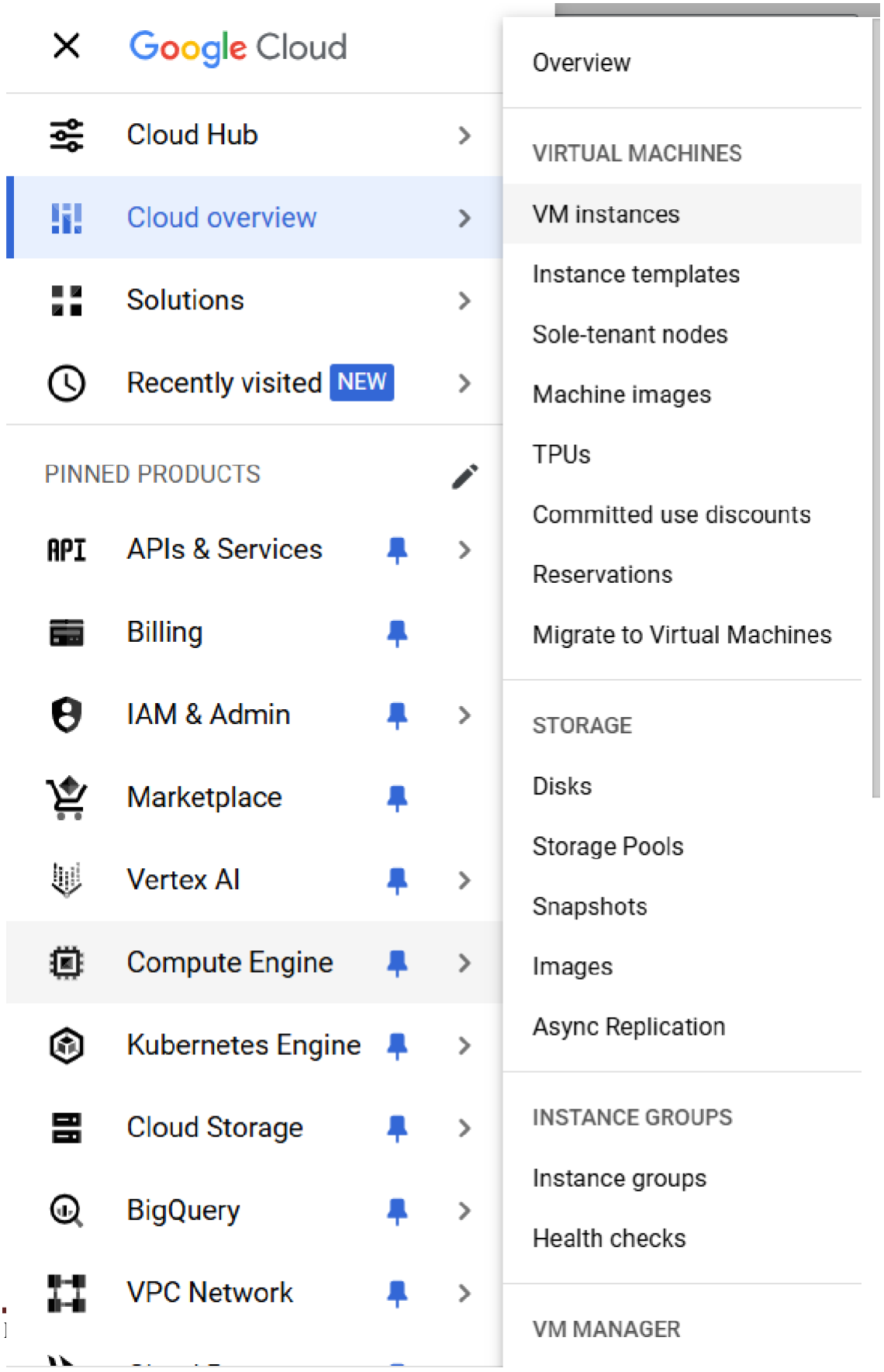

01:29:59
Use private browsing to run the lab
Use an Incognito or private browser window to run this lab. This prevents any conflicts between your personal account and the Student account, which may cause extra charges incurred to your personal account.
Continue anyway
Cancel

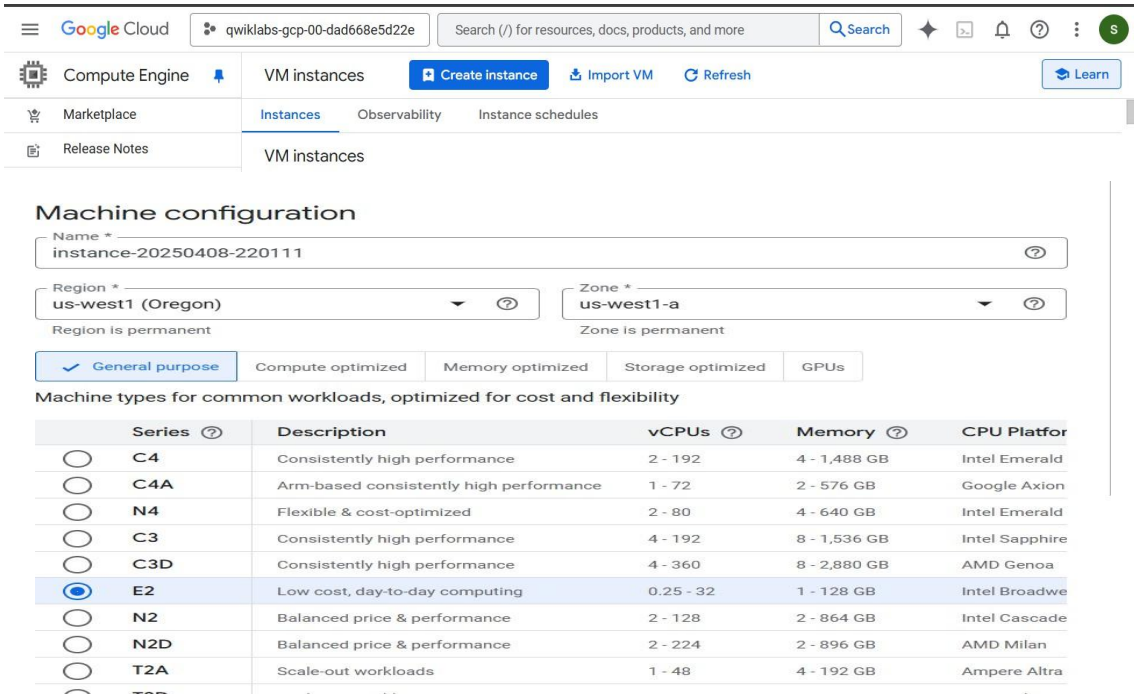

Google Cloud
Welcome student 05c768c8!
Create and manage your Google Cloud instances, disks, networks, and other resources in one place.
S
student 05c768c8
student-02-64f2503c8a94@qwiklabs.net
SWITCH ACCOUNT
Country
India
Terms of Service
I agree to the Google Cloud Platform Terms of Service, and the terms of service of any applicable services and APIs.
AGREE AND CONTINUE

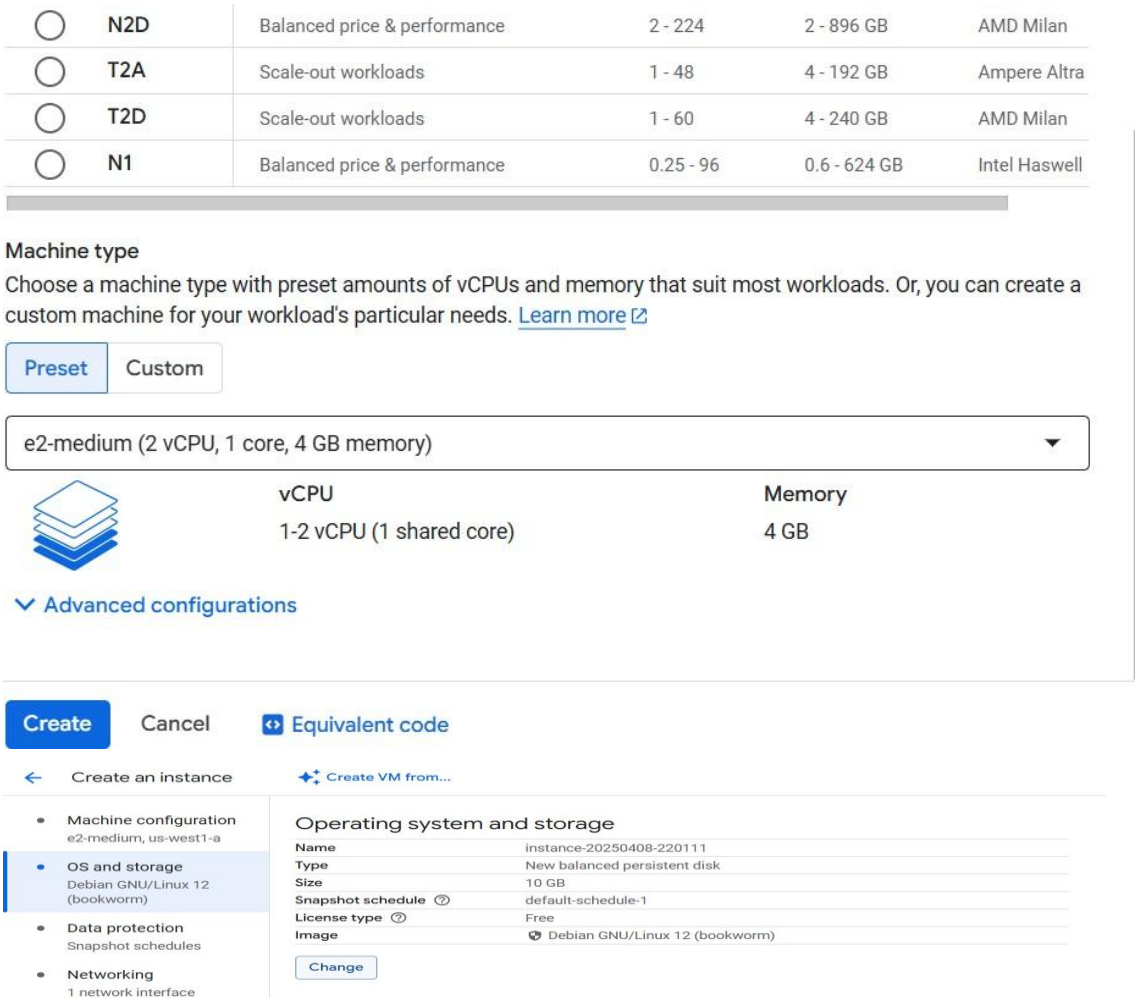

Cloud Shell
Manage your infrastructure and develop your applications from any browser with Cloud Shell.
Cloud Shell comes with Cloud SDK gcloud, Cloud Code, an online Code Editor and other utilities pre-installed, fully authenticated and up-to-date. Learn more
Cloud Shell is free for all users.
Cancel
Continue

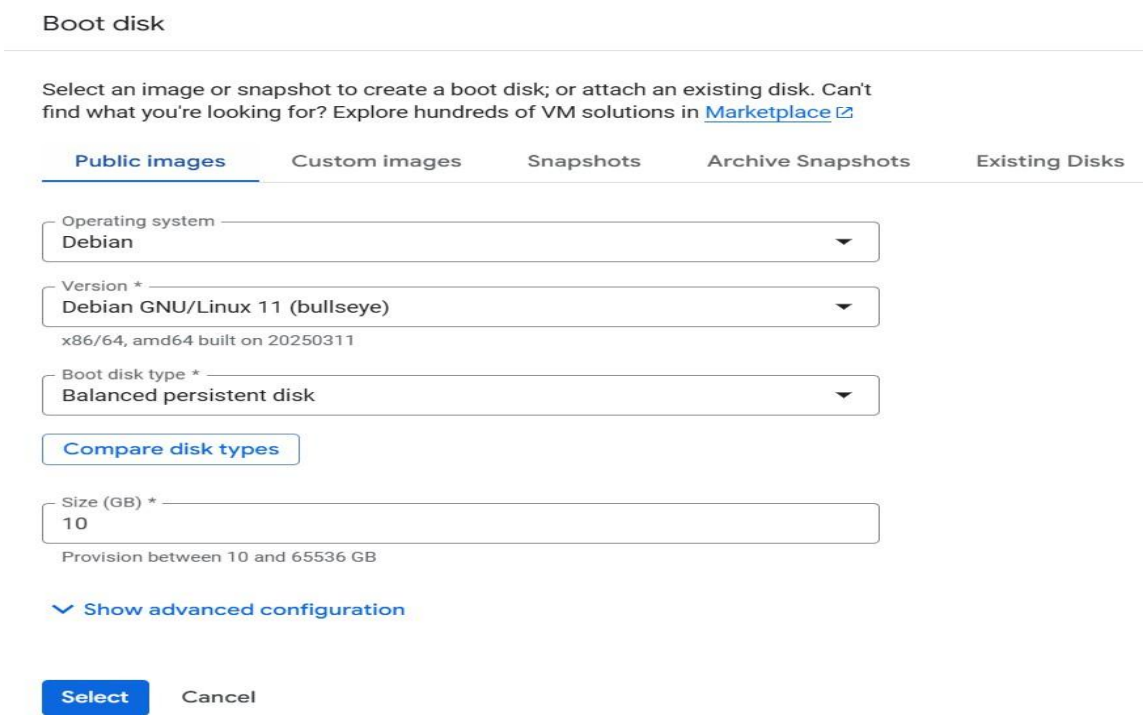

Authorize Cloud Shell
Cloud Shell needs permission to use your credentials to make Google Cloud API calls.
Click Authorize to grant permission to this and future calls.
Reject
Authorize

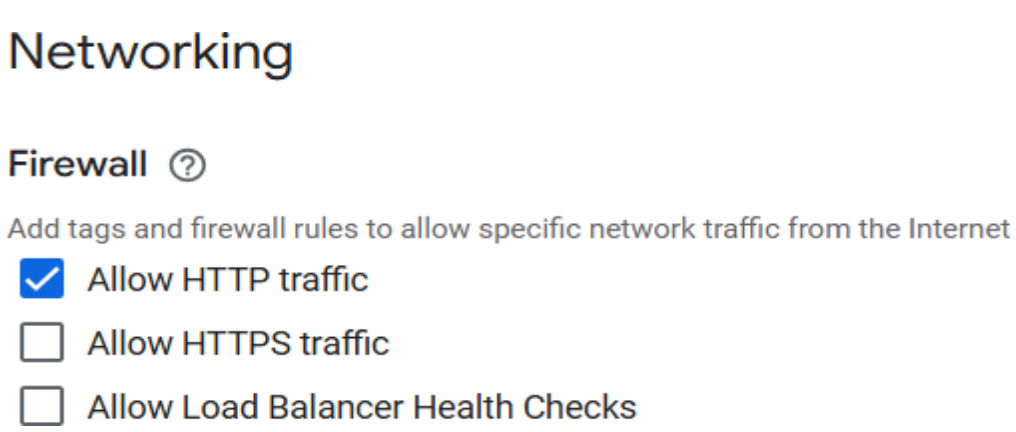

Cloud Run
Fully managed application platform
CLOUD SHELL
Terminal
(qwiklabs-gcp-00-dad668e5d22e)
Open Editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-dad668e5d22e.
Use `gcloud config set project [PROJECT_ID]` to change to a different project.
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ gcloud config set compute/region us-west1
WARNING: Property validation for compute/region was skipped.
Updated property [compute/region].
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ export REGION=us-west1
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ export ZONE=us-west1-a
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$

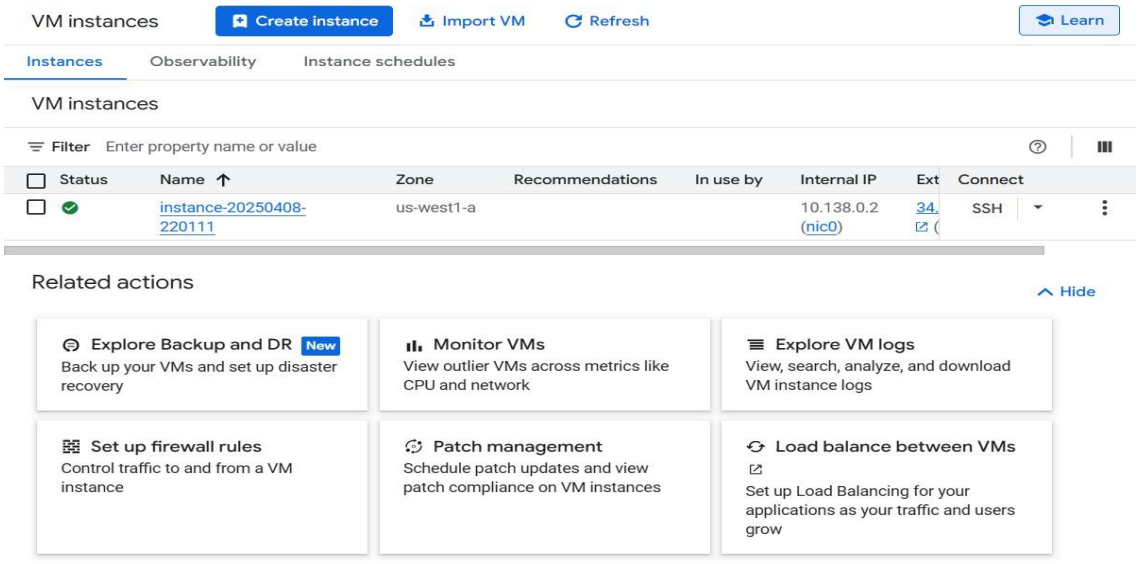

Google Cloud
Cloud Hub
Cloud overview
Solutions
Recently visited
NEW
PINNED PRODUCTS
APIs & Services
Billing
IAM & Admin
Marketplace
Vertex AI
Compute Engine
Kubernetes Engine
Cloud Storage
BigQuery
VPC Network
Overview
VIRTUAL MACHINES
VM instances
Instance templates
Sole-tenant nodes
Machine images
TPUs
Committed use discounts
Reservations
Migrate to Virtual Machines
STORAGE
Disks
Storage Pools
Snapshots
Images
Async Replication
INSTANCE GROUPS
Instance groups
Health checks
VM MANAGER

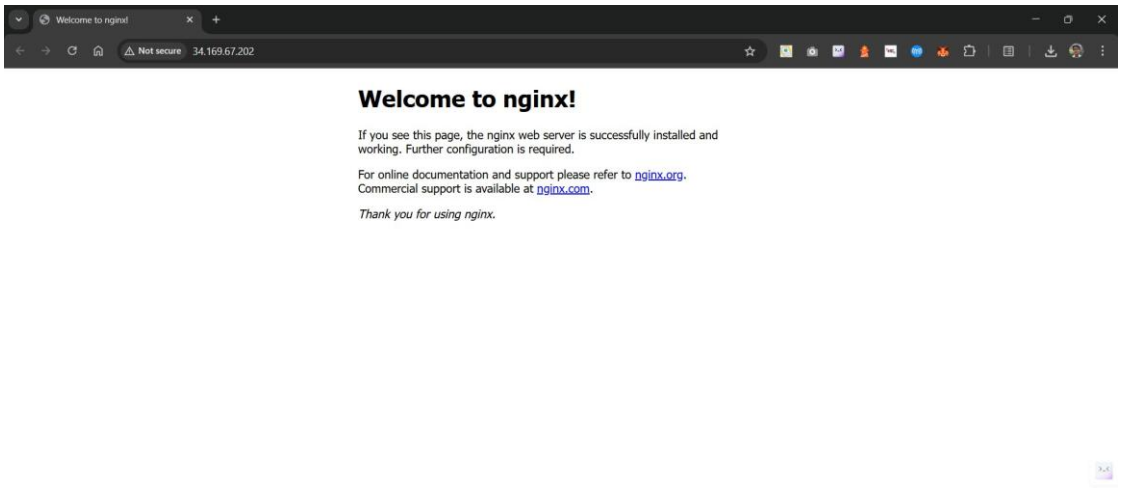

Google Cloud
qwiklabs-gcp-00-dad668e5d22e
Search (/) for resources, docs, products, and more
Search
Compute Engine
VM instances
Create instance
Import VM
Refresh
Learn
Marketplace
Release Notes
Instances
Observability
Instance schedules
VM instances
Machine configuration
Name *
instance-20250408-220111
Region *
us-west1 (Oregon)
Region is permanent
Zone *
us-west1-a
Zone is permanent
General purpose
Compute optimized
Memory optimized
Storage optimized
GPUs
Machine types for common workloads, optimized for cost and flexibility
Series
Description
vCPUs
Memory
CPU Platfor
C4
Consistently high performance
2 - 192
4 - 1,488 GB
Intel Emerald
C4A
Arm-based consistently high performance
1 - 72
2 - 576 GB
Google Axion
N4
Flexible & cost-optimized
2 - 80
4 - 640 GB
Intel Emerald
C3
Consistently high performance
4 - 192
8 - 1,536 GB
Intel Sapphire
C3D
Consistently high performance
4 - 360
8 - 2,880 GB
AMD Genoa
E2
Low cost, day-to-day computing
0.25 - 32
1 - 128 GB
Intel Broadwe
N2
Balanced price & performance
2 - 128
2 - 864 GB
Intel Cascade
N2D
Balanced price & performance
2 - 224
2 - 896 GB
AMD Milan
T2A
Scale-out workloads
1 - 48
4 - 192 GB
Ampere Altra

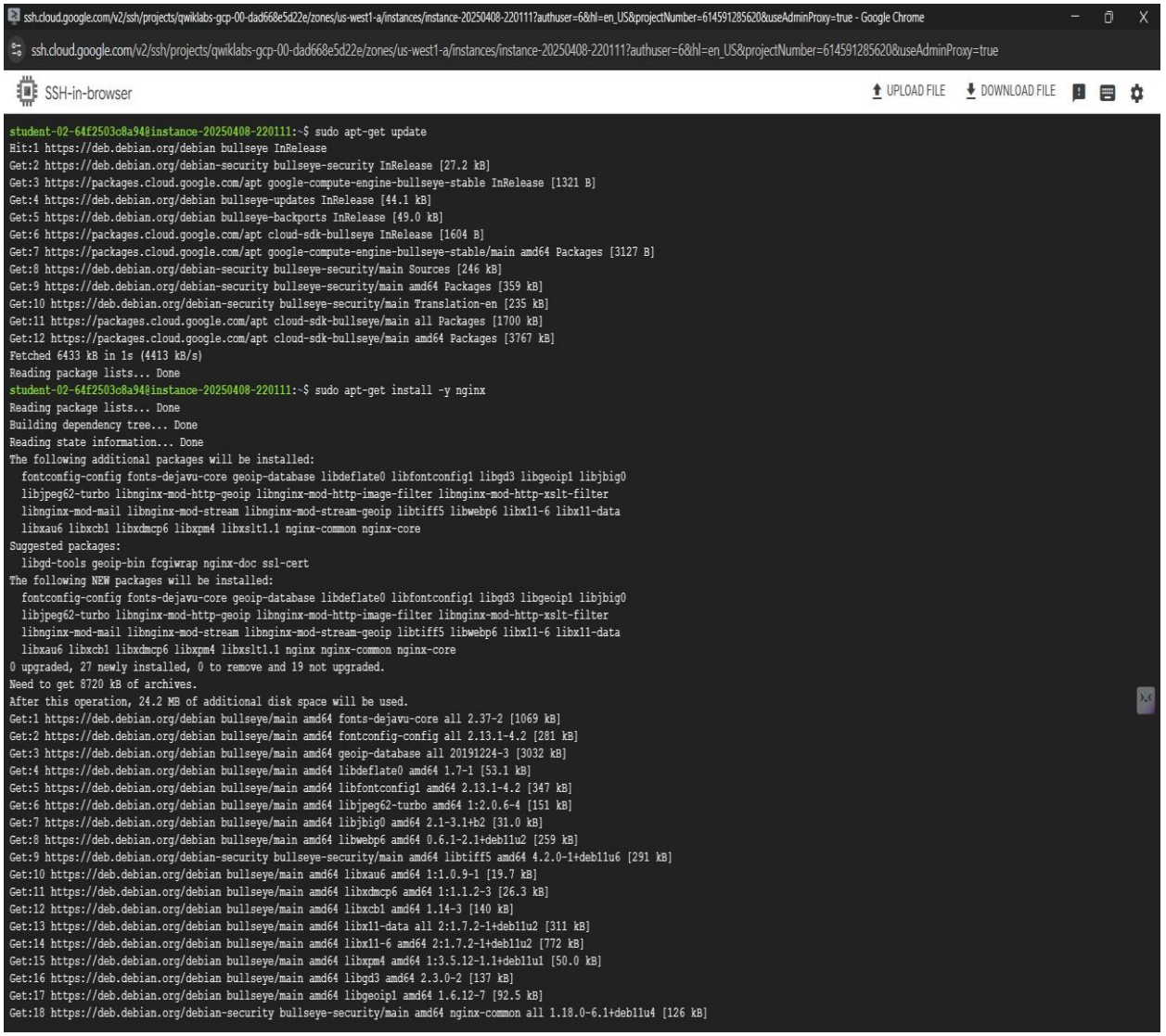

N2D
Balanced price & performance
2 - 224
2 - 896 GB
AMD Milan
T2A
Scale-out workloads
1 - 48
4 - 192 GB
Ampere Altra
T2D
Scale-out workloads
1 - 60
4 - 240 GB
AMD Milan
N1
Balanced price & performance
0.25 - 96
0.6 - 624 GB
Intel Haswell
Machine type
Choose a machine type with preset amounts of vCPUs and memory that suit most workloads. Or, you can create a custom machine for your workload's particular needs. Learn more
Preset
Custom
e2-medium (2 vCPU, 1 core, 4 GB memory)
vCPU
1-2 vCPU (1 shared core)
Memory
4 GB
Advanced configurations
Create
Cancel
Equivalent code
Create an instance
Create VM from...
Machine configuration
e2-medium, us-west1-a
OS and storage
Debian GNU/Linux 12 (bookworm)
Data protection
Snapshot schedules
Networking
1 network interface
Operating system and storage
Name
instance-20250408-220111
Type
New balanced persistent disk
Size
10 GB
Snapshot schedule
default-schedule-1
License type
Free
Image
Debian GNU/Linux 12 (bookworm)
Change


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
Debian
Version *
Debian GNU/Linux 11 (bullseye)
x86/64, amd64 built on 20250311
Boot disk type *
Balanced persistent disk
Compare disk types
Size (GB) *
10
Provision between 10 and 65536 GB
Show advanced configuration
Select
Cancel


Networking
Firewall
Add tags and firewall rules to allow specific network traffic from the Internet
Allow HTTP traffic
Allow HTTPS traffic
Allow Load Balancer Health Checks


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
Ext
Connect
instance-20250408-220111
us-west1-a
10.138.0.2 (nic0)
SSH
Related actions
Hide
Explore Backup and DR
New
Back up your VMs and set up disaster recovery
Monitor VMs
View outlier VMs across metrics like CPU and network
Explore VM logs
View, search, analyze, and download VM instance logs
Set up firewall rules
Control traffic to and from a VM instance
Patch management
Schedule patch updates and view patch compliance on VM instances
Load balance between VMs
Set up Load Balancing for your applications as your traffic and users grow


Welcome to nginx!
Not secure
34.169.67.202
Welcome to nginx!
If you see this page, the nginx web server is successfully installed and working. Further configuration is required.
For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.
Thank you for using nginx.


ssh.cloud.google.com/v2/ssh/projects/qwiklabs-gcp-00-dad668e5d22e/zones/us-west1-a/instances/instance-20250408-220111?authuser=6&hl=en_US&projectNumber=614591285620&useAdminProxy=true - Google Chrome
ssh.cloud.google.com/v2/ssh/projects/qwiklabs-gcp-00-dad668e5d22e/zones/us-west1-a/instances/instance-20250408-220111?authuser=6&hl=en_US&projectNumber=614591285620&useAdminProxy=true
SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE
student-02-64f2503c8a94@instance-20250408-220111:~$ sudo apt-get update
Hit:1 https://deb.debian.org/debian bullseye InRelease
Get:2 https://deb.debian.org/debian-security bullseye-security InRelease [27.2 kB]
Get:3 https://packages.cloud.google.com/apt google-compute-engine-bullseye-stable InRelease [1321 B]
Get:4 https://deb.debian.org/debian bullseye-updates InRelease [44.1 kB]
Get:5 https://deb.debian.org/debian bullseye-backports InRelease [49.0 kB]
Get:6 https://packages.cloud.google.com/apt cloud-sdk-bullseye InRelease [1604 B]
Get:7 https://packages.cloud.google.com/apt google-compute-engine-bullseye-stable/main amd64 Packages [3127 B]
Get:8 https://deb.debian.org/debian-security bullseye-security/main Sources [246 kB]
Get:9 https://deb.debian.org/debian-security bullseye-security/main amd64 Packages [359 kB]
Get:10 https://deb.debian.org/debian-security bullseye-security/main Translation-en [235 kB]
Get:11 https://packages.cloud.google.com/apt cloud-sdk-bullseye/main all Packages [1700 kB]
Get:12 https://packages.cloud.google.com/apt cloud-sdk-bullseye/main amd64 Packages [3767 kB]
Fetched 6433 kB in 1s (4413 kB/s)
Reading package lists... Done
student-02-64f2503c8a94@instance-20250408-220111:~$ sudo apt-get install -y nginx
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
fontconfig-config fonts-dejavu-core geoip-database libdeflate0 libfontconfig1 libgd3 libgeoip1 libjbig0
libjpeg62-turbo libnginx-mod-http-geoip libnginx-mod-http-image-filter libnginx-mod-http-xslt-filter
libnginx-mod-mail libnginx-mod-stream libnginx-mod-stream-geoip libtiff5 libwebp6 libx11-6 libx11-data
libxau6 libxcb1 libxdmcp6 libxpm4 libxslt1.1 nginx-common nginx-core
Suggested packages:
libgd-tools geoip-bin fcgiwrap nginx-doc ssl-cert
The following NEW packages will be installed:
fontconfig-config fonts-dejavu-core geoip-database libdeflate0 libfontconfig1 libgd3 libgeoip1 libjbig0
libjpeg62-turbo libnginx-mod-http-geoip libnginx-mod-http-image-filter libnginx-mod-http-xslt-filter
libnginx-mod-mail libnginx-mod-stream libnginx-mod-stream-geoip libtiff5 libwebp6 libx11-6 libx11-data
libxau6 libxcb1 libxdmcp6 libxpm4 libxslt1.1 nginx nginx-common nginx-core
0 upgraded, 27 newly installed, 0 to remove and 19 not upgraded.
Need to get 8720 kB of archives.
After this operation, 24.2 MB of additional disk space will be used.
Get:1 https://deb.debian.org/debian bullseye/main amd64 fonts-dejavu-core all 2.37-2 [1069 kB]
Get:2 https://deb.debian.org/debian bullseye/main amd64 fontconfig-config all 2.13.1-4.2 [281 kB]
Get:3 https://deb.debian.org/debian bullseye/main amd64 geoip-database all 20191224-3 [3032 kB]
Get:4 https://deb.debian.org/debian bullseye/main amd64 libdeflate0 amd64 1.7-1 [53.1 kB]
Get:5 https://deb.debian.org/debian bullseye/main amd64 libfontconfig1 amd64 2.13.1-4.2 [347 kB]
Get:6 https://deb.debian.org/debian bullseye/main amd64 libjpeg62-turbo amd64 1:2.0.6-4 [151 kB]
Get:7 https://deb.debian.org/debian bullseye/main amd64 libjbig0 amd64 2.1-3.1+b2 [31.0 kB]
Get:8 https://deb.debian.org/debian bullseye/main amd64 libwebp6 amd64 0.6.1-2.1+deb11u2 [259 kB]
Get:9 https://deb.debian.org/debian-security bullseye-security/main amd64 libtiff5 amd64 4.2.0-1+deb11u6 [291 kB]
Get:10 https://deb.debian.org/debian bullseye/main amd64 libxau6 amd64 1:1.0.9-1 [19.7 kB]
Get:11 https://deb.debian.org/debian bullseye/main amd64 libxdmcp6 amd64 1:1.1.2-3 [26.3 kB]
Get:12 https://deb.debian.org/debian bullseye/main amd64 libxcb1 amd64 1.14-3 [140 kB]
Get:13 https://deb.debian.org/debian bullseye/main amd64 libx11-data all 2:1.7.2-1+deb11u2 [311 kB]
Get:14 https://deb.debian.org/debian bullseye/main amd64 libx11-6 amd64 2:1.7.2-1+deb11u2 [772 kB]
Get:15 https://deb.debian.org/debian bullseye/main amd64 libxpm4 amd64 1:3.5.12-1.1+deb11u1 [50.0 kB]
Get:16 https://deb.debian.org/debian bullseye/main amd64 libgd3 amd64 2.3.0-2 [137 kB]
Get:17 https://deb.debian.org/debian bullseye/main amd64 libgeoip1 amd64 1.6.12-7 [92.5 kB]
Get:18 https://deb.debian.org/debian-security bullseye-security/main amd64 nginx-common all 1.18.0-6.1+deb11u4 [126 kB]

```
Get:20 https://deb.debian.org/debian-security bullseye-security/main amd64 libnginx-mod-http-image-filter amd64 1.18.0-6.1+deb11u4 [102 kB]
Get:21 https://deb.debian.org/debian-security bullseye-security/main amd64 libxslt1.1 amd64 1.1.34-4+deb11u2 [240 kB]
Get:22 https://deb.debian.org/debian-security bullseye-security/main amd64 libnginx-mod-http-xslt-filter amd64 1.18.0-6.1+deb11u4 [101 kB]
Get:23 https://deb.debian.org/debian-security bullseye-security/main amd64 libnginx-mod-mail amd64 1.18.0-6.1+deb11u4 [130 kB]
Get:24 https://deb.debian.org/debian-security bullseye-security/main amd64 libnginx-mod-stream amd64 1.18.0-6.1+deb11u4 [155 kB]
Get:25 https://deb.debian.org/debian-security bullseye-security/main amd64 libnginx-mod-stream-geoip amd64 1.18.0-6.1+deb11u4 [97.8 kB]
Get:26 https://deb.debian.org/debian-security bullseye-security/main amd64 nginx-core amd64 1.18.0-6.1+deb11u4 [516 kB]
Get:27 https://deb.debian.org/debian-security bullseye-security/main amd64 nginx all 1.18.0-6.1+deb11u4 [93.1 kB]
Fetched 8720 kB in 30s (287 kB/s)
Preconfiguring packages ...
Selecting previously unselected package fonts-dejavu-core.
(Reading database ... 69550 files and directories currently installed.)
Preparing to unpack .../00-fonts-dejavu-core_2.37-2_all.deb ...
Unpacking fonts-dejavu-core (2.37-2) ...
Selecting previously unselected package fontconfig-config.
Preparing to unpack .../01-fontconfig-config_2.13.1-4.2_all.deb ...
Unpacking fontconfig-config (2.13.1-4.2) ...
Selecting previously unselected package geoip-database.
Preparing to unpack .../02-geoip-database_20191224-3_all.deb ...
Unpacking geoip-database (20191224-3) ...
Selecting previously unselected package libdeflate0:amd64.
Preparing to unpack .../03-libdeflate0_1.7-1_amd64.deb ...
Unpacking libdeflate0:amd64 (1.7-1) ...
Selecting previously unselected package libfontconfig1:amd64.
Preparing to unpack .../04-libfontconfig1_2.13.1-4.2_amd64.deb ...
Unpacking libfontconfig1:amd64 (2.13.1-4.2) ...
Selecting previously unselected package libjpeg62-turbo:amd64.
Preparing to unpack .../05-libjpeg62-turbo_1%3a2.0.6-4_amd64.deb ...
Unpacking libjpeg62-turbo:amd64 (1:2.0.6-4) ...
Selecting previously unselected package libjbig0:amd64.
Preparing to unpack .../06-libjbig0_2.1-3.1+b2_amd64.deb ...
Unpacking libjbig0:amd64 (2.1-3.1+b2) ...
Selecting previously unselected package libwebp6:amd64.
Preparing to unpack .../07-libwebp6_0.6.1-2.1+deb11u2_amd64.deb ...
Unpacking libwebp6:amd64 (0.6.1-2.1+deb11u2) ...
Selecting previously unselected package libtiff5:amd64.
Preparing to unpack .../08-libtiff5_4.2.0-1+deb11u6_amd64.deb ...
Unpacking libtiff5:amd64 (4.2.0-1+deb11u6) ...
Selecting previously unselected package libxau6:amd64.
Preparing to unpack .../09-libxau6_1%3a1.0.9-1_amd64.deb ...
Unpacking libxau6:amd64 (1:1.0.9-1) ...
Selecting previously unselected package libxdmcp6:amd64.
Preparing to unpack .../10-libxdmcp6_1%3a1.1.2-3_amd64.deb ...
Unpacking libxdmcp6:amd64 (1:1.1.2-3) ...
Selecting previously unselected package libxcb1:amd64.
Preparing to unpack .../11-libxcb1_1.14-3_amd64.deb ...
Unpacking libxcb1:amd64 (1.14-3) ...
Selecting previously unselected package libx11-data.
Preparing to unpack .../12-libx11-data_2%3a1.7.2-1+deb11u2_all.deb ...
Unpacking libx11-data (2:1.7.2-1+deb11u2) ...
Selecting previously unselected package libx11-6:amd64.
Preparing to unpack .../13-libx11-6_2%3a1.7.2-1+deb11u2_amd64.deb ...
```

```
Selecting previously unselected package libgeoip1:amd64.
Preparing to unpack .../16-libgeoip1_1.6.12-7_amd64.deb ...
Unpacking libgeoip1:amd64 (1.6.12-7) ...
Selecting previously unselected package nginx-common.
Preparing to unpack .../17-nginx-common_1.18.0-6.1+deb11u4_all.deb ...
Unpacking nginx-common (1.18.0-6.1+deb11u4) ...
Selecting previously unselected package libnginx-mod-http-geoip.
Preparing to unpack .../18-libnginx-mod-http-geoip_1.18.0-6.1+deb11u4_amd64.deb ...
Unpacking libnginx-mod-http-geoip (1.18.0-6.1+deb11u4) ...
Selecting previously unselected package libnginx-mod-http-image-filter.
Preparing to unpack .../19-libnginx-mod-http-image-filter_1.18.0-6.1+deb11u4_amd64.deb ...
Unpacking libnginx-mod-http-image-filter (1.18.0-6.1+deb11u4) ...
Selecting previously unselected package libxslt1.1:amd64.
Preparing to unpack .../20-libxslt1.1_1.1.34-4+deb11u2_amd64.deb ...
Unpacking libxslt1.1:amd64 (1.1.34-4+deb11u2) ...
Selecting previously unselected package libnginx-mod-http-xslt-filter.
Preparing to unpack .../21-libnginx-mod-http-xslt-filter_1.18.0-6.1+deb11u4_amd64.deb ...
Unpacking libnginx-mod-http-xslt-filter (1.18.0-6.1+deb11u4) ...
Selecting previously unselected package libnginx-mod-mail.
Preparing to unpack .../22-libnginx-mod-mail_1.18.0-6.1+deb11u4_amd64.deb ...
Unpacking libnginx-mod-mail (1.18.0-6.1+deb11u4) ...
Selecting previously unselected package libnginx-mod-stream.
Preparing to unpack .../23-libnginx-mod-stream_1.18.0-6.1+deb11u4_amd64.deb ...
Unpacking libnginx-mod-stream (1.18.0-6.1+deb11u4) ...
Selecting previously unselected package libnginx-mod-stream-geoip.
Preparing to unpack .../24-libnginx-mod-stream-geoip_1.18.0-6.1+deb11u4_amd64.deb ...
Unpacking libnginx-mod-stream-geoip (1.18.0-6.1+deb11u4) ...
Selecting previously unselected package nginx-core.
Preparing to unpack .../25-nginx-core_1.18.0-6.1+deb11u4_amd64.deb ...
Unpacking nginx-core (1.18.0-6.1+deb11u4) ...
Selecting previously unselected package nginx.
Preparing to unpack .../26-nginx_1.18.0-6.1+deb11u4_all.deb ...
Unpacking nginx (1.18.0-6.1+deb11u4) ...
Setting up libxau6:amd64 (1:1.0.9-1) ...
Setting up libxdmcp6:amd64 (1:1.1.2-3) ...
Setting up libxcb1:amd64 (1.14-3) ...
Setting up libdeflate0:amd64 (1.7-1) ...
Setting up nginx-common (1.18.0-6.1+deb11u4) ...
Created symlink /etc/systemd/system/multi-user.target.wants/nginx.service → /lib/systemd/system/nginx.service.
Setting up libjbig0:amd64 (2.1-3.1+b2) ...
Setting up libjpeg62-turbo:amd64 (1:2.0.6-4) ...
Setting up libx11-data (2:1.7.2-1+deb11u2) ...
Setting up libwebp6:amd64 (0.6.1-2.1+deb11u2) ...
Setting up fonts-dejavu-core (2.37-2) ...
Setting up libxslt1.1:amd64 (1.1.34-4+deb11u2) ...
Setting up libgeoip1:amd64 (1.6.12-7) ...
Setting up libx11-6:amd64 (2:1.7.2-1+deb11u2) ...
Setting up libtiff5:amd64 (4.2.0-1+deb11u6) ...
Setting up geoip-database (20191224-3) ...
Setting up libnginx-mod-mail (1.18.0-6.1+deb11u4) ...
Setting up libxpm4:amd64 (1:3.5.12-1.1+deb11u1) ...
Setting up fontconfig-config (2.13.1-4.2) ...
```

```
Setting up libnginx-mod-stream (1.18.0-6.1+deb11u4) ...
Setting up libnginx-mod-stream-geoip (1.18.0-6.1+deb11u4) ...
Setting up libnginx-mod-http-xslt-filter (1.18.0-6.1+deb11u4) ...
Setting up libnginx-mod-http-geoip (1.18.0-6.1+deb11u4) ...
Setting up libfontconfig1:amd64 (2.13.1-4.2) ...
Setting up libgd3:amd64 (2.3.0-2) ...
Setting up libnginx-mod-http-image-filter (1.18.0-6.1+deb11u4) ...
Setting up nginx-core (1.18.0-6.1+deb11u4) ...
Upgrading binary: nginx.
Setting up nginx (1.18.0-6.1+deb11u4) ...
Processing triggers for man-db (2.9.4-2) ...
Processing triggers for libc-bin (2.31-13+deb11u11) ...
student-02-64f2503c8a94@instance-20250408-220111:~$ ps auwx | grep nginx
root        2169  0.0  0.2  56384 11556 ?        S    22:10   0:00 nginx: master process /usr/sbin/nginx -g daemon on; master_process on;
www-data    2172  0.0  0.2  68036 10924 ?        S    22:10   0:00 nginx: worker process
www-data    2173  0.0  0.2  68036 10948 ?        S    22:10   0:00 nginx: worker process
student+    2241  0.0  0.0   5132   708 pts/0    S+   22:12   0:00 grep nginx
student-02-64f2503c8a94@instance-20250408-220111:~$
```

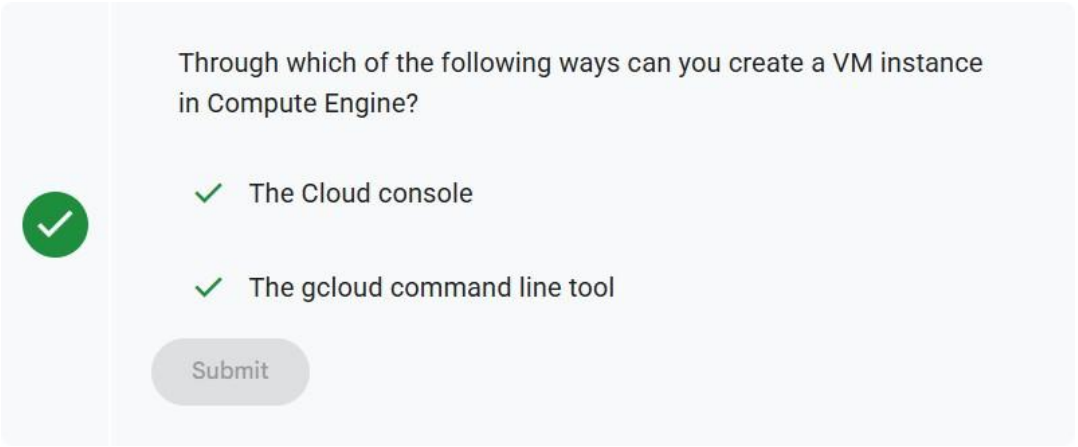
```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to qwiklabs-gcp-00-dad668e5d22e.
Use `gcloud config set project [PROJECT_ID]` to change to a different project.
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ gcloud config set compute/region us-west1
WARNING: Property validation for compute/region was skipped.
Updated property [compute/region].
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ export REGION=us-west1
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ export ZONE=us-west1-a
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ gcloud compute instances create gcelab2 --machine-type e2-medium --zone=$ZONE
Created [https://www.googleapis.com/compute/v1/projects/qwiklabs-gcp-00-dad668e5d22e/zones/us-west1-a/instances/gcelab2].
NAME: gcelab2
ZONE: us-west1-a
MACHINE_TYPE: e2-medium
PREEMPTIBLE:
INTERNAL_IP: 10.138.0.3
EXTERNAL_IP: 35.247.59.252
STATUS: RUNNING
```

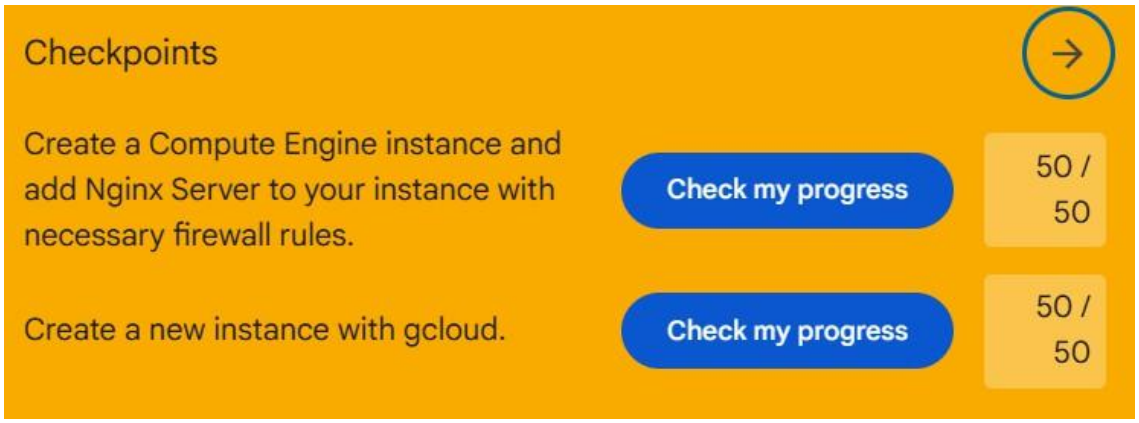
```
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ gcloud compute instances create --help
```

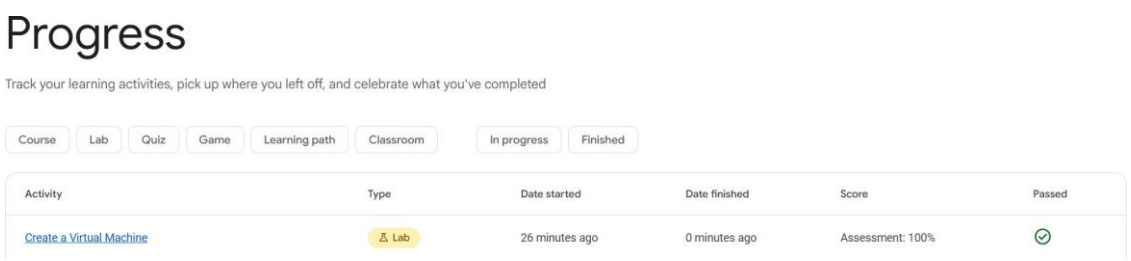
```
NAME
    gcloud compute instances create - create Compute Engine virtual machine
        instances

SYNOPSIS
    gcloud compute instances create INSTANCE_NAMES [INSTANCE_NAMES ...]
        [--accelerator=[count=COUNT],[type=TYPE]] [--async]
        [--availability-domain=AVAILABILITY_DOMAIN]
        [--no-boot-disk-auto-delete]
        [--boot-disk-device-name=BOOT_DISK_DEVICE_NAME]
        [--boot-disk-interface=BOOT_DISK_INTERFACE]
        [--boot-disk-provisioned-iops=BOOT_DISK_PROVISIONED_IOPS]
        [--boot-disk-provisioned-throughput=BOOT_DISK_PROVISIONED_THROUGHPUT]
        [--boot-disk-size=BOOT_DISK_SIZE] [--boot-disk-type=BOOT_DISK_TYPE]
        [--can-ip-forward] [--create-disk=[PROPERTY=VALUE,...]]
        [--csek-key-file=FILE] [--deletion-protection]
        [--description=DESCRIPTION]
        [--discard-local-ssds-at-termination-timestamp=DISCARD_LOCAL_SSDS_AT_TERMINATION_TIMESTAMP]
        [--disk=[auto-delete=AUTO-DELETE],[boot=BOOT],[device-name=DEVICE-NAME],
          [force-attach=FORCE-ATTACH],
          [interface=INTERFACE],[mode=MODE],[name=NAME],[scope=SCOPE]]
        [--enable-display-device] [--[no-]enable-nested-virtualization]
        [--[no-]enable-uefi-networking] [--erase-windows-vss-signature]
        [--external-ipv6-address=EXTERNAL_IPV6_ADDRESS]
        [--external-ipv6-prefix-length=EXTERNAL_IPV6_PREFIX_LENGTH]
        [--host-error-timeout-seconds=HOST_ERROR_TIMEOUT_SECONDS]
        [--hostname=HOSTNAME]
        [--instance-termination-action=INSTANCE_TERMINATION_ACTION]
        [--internal-ipv6-address=INTERNAL_IPV6_ADDRESS]
:
```

```
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$ gcloud compute ssh gcelab2 --zone=us-west1-a
WARNING: The private SSH key file for gcloud does not exist.
WARNING: The public SSH key file for gcloud does not exist.
WARNING: You do not have an SSH key for gcloud.
WARNING: SSH keygen will be executed to generate a key.
This tool needs to create the directory [/home/student_02_64f2503c8a94/.ssh] before being able to generate SSH keys.

Do you want to continue (Y/n)?  Y

Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/student_02_64f2503c8a94/.ssh/google_compute_engine
Your public key has been saved in /home/student_02_64f2503c8a94/.ssh/google_compute_engine.pub
The key fingerprint is:
SHA256:z2Mn41GfWwYxLEXAk2J0XdOWowWm+4MQij821Z3iedk student_02_64f2503c8a94@cs-155722439116-default
The key's randomart image is:
+---[RSA 3072]----+
|         ...oB+o+|
|          o.*o.++|
|         o o..*..|
|      . . o oo.o |
|     . .So +.o.  |
|      . .oo.=.oo |
|       =  O+.=oEo|
|      . oo *. .+ |
|           .   .  |
+----[SHA256]-----+
Warning: Permanently added 'compute.1628597120092610225' (ED25519) to the list of known hosts.
Linux gcelab2 6.1.0-31-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.128-1 (2025-02-07) 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.
student-02-64f2503c8a94@gcelab2:~$
```

```
student-02-64f2503c8a94@gcelab2:~$ exit
logout
Connection to 35.247.59.252 closed.
student_02_64f2503c8a94@cloudshell:~ (qwiklabs-gcp-00-dad668e5d22e)$
```




**Conclusion:-Successfully created a GCP VM, gaining practical insights into cloud virtualization and resource management.**