

EECS 498 System Design of a Search Engine

Winter 2026

Lab 10: Intro to Google Cloud Platform

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Agenda

- Redeeming credits
- Logging into GCP
- Creating a Virtual Machine instance in Compute Engine
- Adding SSH Keys
- Installing dependencies
- Running your LinuxGetSsl application
- Stopping / Suspending / Starting / Deleting instances

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Redeeming Credits

If you have not yet redeemed GCP Education credits, let's do so now

1. Fill out the form in [EdStem Post#79](#) where each student uses their email
2. You will receive an email in your inbox to verify your account. Verify
3. You will receive an email in your inbox with the coupon code
4. Redeem this coupon code at <https://console.cloud.google.com/edu>

1. Fill out this form with each student using their own email

Cloud Platform Education Grants

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

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

First Name

Last Name

School Email

@umich.edu

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

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

[Submit](#)



Dear [Rickey](#),

Thank you for your interest in downloading a Google Cloud coupon code. Please click on this [link](#) to verify your email address and a code will be sent to your email account.

Instructor Name: [Nicole Hamilton](#)

Email Address: nham@umich.edu

School: [University of Michigan-Ann Arbor](#)

Course/project: [EECS 498 System Design of a Search Engine feb26](#)

If you have any questions, please contact your course instructor as listed above.

Thanks,

Google Cloud Education Programs Team

2. Verify your email



Dear [Rickey](#),

Here is your Google Cloud Coupon Code: **3UGP-YN2C-KC89-EH4E**

Click [\[here\]](#) to redeem.

Course/Project Information

Instructor Name: [Nicole Hamilton](#)

Email Address: nham@umich.edu

School: [University of Michigan-Ann Arbor](#)

Course/project: [EECS 498 System Design of a Search Engine feb26](#)

Activation Date: [2/11/2026](#)

Redeem By: [6/11/2026](#)

Coupon Valid Through: **2/11/2027**

3. Receive the
coupon code

If you have any questions, please contact your course instructor as listed above.

Thanks,
Google Cloud Education Programs Team



GCP credit application

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

First name *

Rickey

Last name *

Dong

Account email

rickeyd@umich.edu

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

Coupon code *

4. Redeem the coupon code

Terms and conditions

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

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

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- Running your LinuxGetSsl application
- Stopping / Suspending / Starting / Deleting instances

Signing In

First, look up “GCP console” or go to: <https://console.cloud.google.com/>

Start your Free Trial with \$300 in credit. Don't worry—you won't be charged if you run out of credits. [Learn more](#)

Dismiss [Start free](#)

Google Cloud Select a project Search (/) for resources, docs, products, and more Search



Welcome, Christopher Davis

Try Google Cloud with \$300 in free credits

- ✓ Access to Google Cloud products and services
- ✓ 90 days to spend your credits
- ✓ No billing during trial

[Try for free](#)

Other options

Try Gemini 2.0 Flash

[Try Gemini](#)

Configure Google Cloud for scalable, production-ready enterprise workloads.

[Google Cloud setup](#)

Popular getting started resources

Filter by [Web, Mobile, Game, Storage](#) [Containers, VMs, Hybrid/Multi, Move Workload](#) [Data, AI/ML](#) [Maps, APIs](#) [General](#)

Products

Signing In

First, look up “GCP console” or go to: <https://console.cloud.google.com/>

Note: in addition to the student credits, each new GCP account can claim **\$300** in free credits!

- That's at least \$1500 - \$1800 in completely free credits!

Project

Now, we will create a GCP project.

Projects encapsulate all the cloud services used for a given application.

- Can view consolidated billing and set budgets
- Monitor CPU / memory / storage usage

Let's create our own project on the GCP console.

Start your Free Trial with \$300 in credit. Don't worry—you won't be charged if you run out of credits. [Learn more](#)

Dismiss [Start free](#)

Google Cloud

Select a project

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

Search

✦ ↗ 🔔 ⋮





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Products



Google Cloud



umich.edu

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

Search



Welcome, Pickey Dong

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- ✓ 90 days to spend your credits
- ✓ No billing during trial

Try for free

Other options

Try Gemini 2.0 Flash

Try Gemini

Available, production-

If you're using the student credit, it might look like this.

Popular getting started resources

Filter by

Web, Mobile, Game, Storage

Containers, VMs, Hybrid/Multi, Move Workload

Data, AI/ML

Maps, APIs

General

Products

console.cloud.google.com

Google Cloud

eeecs542

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

Search

4

Select a resource

New project

No organization

Search projects and folders

Recent

Starred

All

	Name	Type	ID	
✓	 eeecs542 ⓘ	Project	maia-489721	☆
	 No organization ⓘ	Organization	0	

Cancel

You've activated

Use any remaining



Recommended

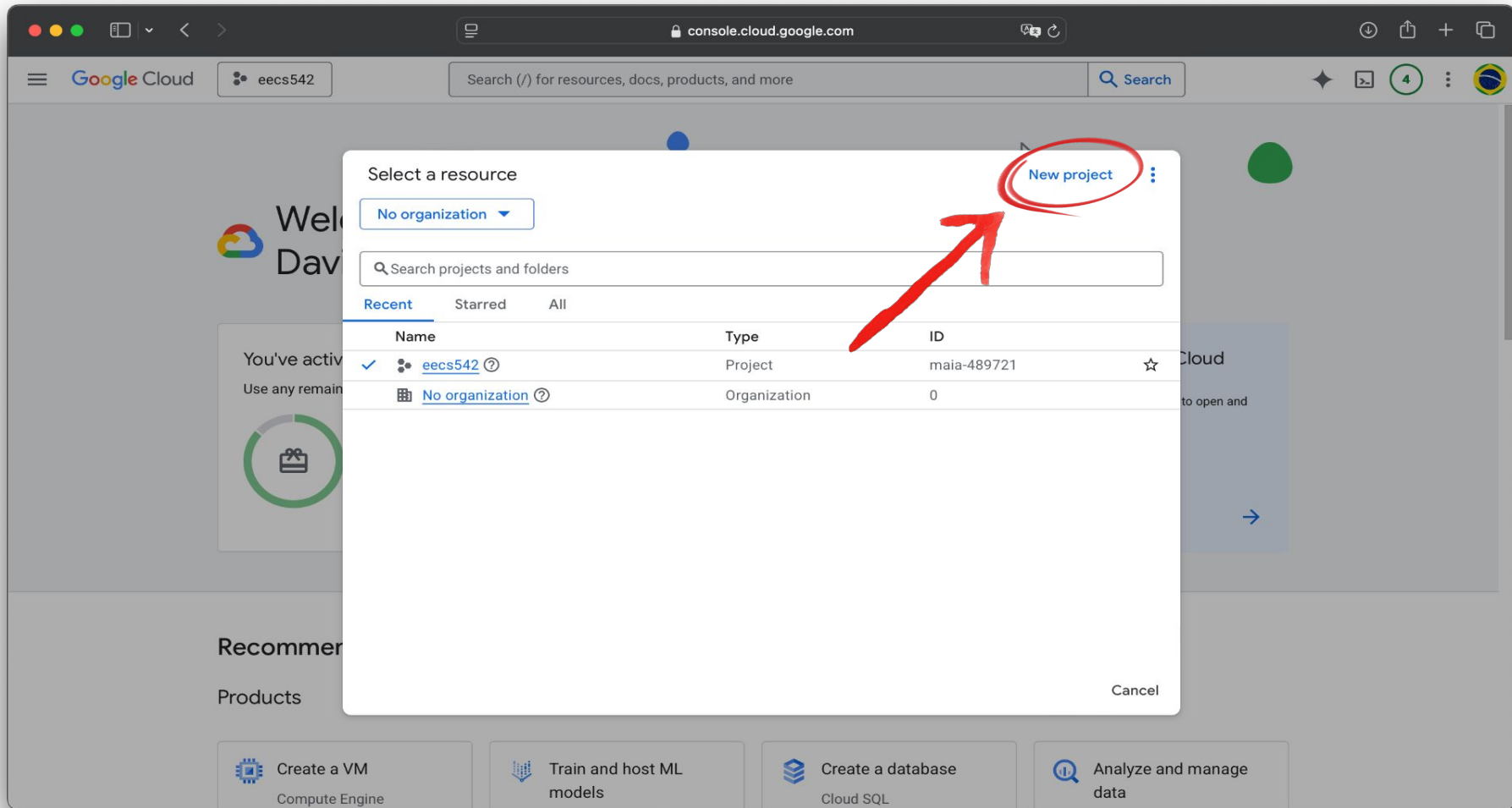
Products

 Create a VM
Compute Engine

 Train and host ML
models

 Create a database
Cloud SQL

 Analyze and manage
data



Project

Now, we will name and configure your project.

A project has the following fields:

- **Name:** the name of your project.
- **Organization:** the organization your project is under, which tells GCP how to organize billing. This will be umich.edu if using the student credit.
- **Parent resource:** which billing resource to actual send invoices to.

New Project

Project name *
MyExampleProject



Project ID: myexampleproject-492215. It cannot be changed later. [Edit](#)

Organization *
umich.edu



Select an organization to attach it to a project. This selection can't be changed later.

Parent resource *

[Browse](#)

Select the organization or folder where this resource will be created

Create

Cancel

Project name.



New Project

Project name *
MyExampleProject



Project ID: myexampleproject-492215. It cannot be changed later. [Edit](#)

Organization *
umich.edu



Select an organization to attach it to a project. This selection can be changed later.

Parent resource *
[Browse](#)

Select the organization or folder where this resource will be created

[Create](#) [Cancel](#)



Organization. Should be **umich.edu** if on student credit.

New Project

Project name *
MyExampleProject ?

Project ID: myexampleproject-492215. It cannot be changed later. [Edit](#)

Organization *
umich.edu ▼ ?

Select an organization to attach it to a project. This selection can't be changed later.

Parent resource *
[Browse](#)

Select the organization or folder where this resource will be created

[Create](#) [Cancel](#)

Now we set the resource within the organization (for student credit).



New Project

Project name *

MyExampleProject

Project ID: myexampleproject-492215. It cannot be changed.

Organization *

umich.edu

Select an organization to attach it to a project. This selection is permanent.

Parent resource *

You must select a parent organization or folder.

Create

Cancel

Search folders



Name

Type

ID



umich.edu



Organization

715302536254



self-created

Folder

635890743054

Select

Cancel

It will be umich.edu > self-created

New Project

Project name *
MyExampleProject ?

Project ID: myexampleproject-492215. It cannot be changed later. [Edit](#)

Organization *
umich.edu ▼ ?

Select an organization to attach it to a project. This selection can't be changed later.

Parent resource *
self-created Browse

Select the organization or folder where this resource will be created

Create Cancel

This is the final configuration
for a student credit project.

console.cloud.google.com

Google Cloud

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

Search

4

New Project

 You have 21 projects remaining in your quota. Request an increase or delete projects. [Learn more](#)

[Manage Quotas](#)

Project name *

MyExampleProject

Project ID: myexampleproject-492020. It cannot be changed later. [Edit](#)

Organization *

No organization

Select an organization to attach it to a project. This selection can't be changed later.

Parent resource *

 No organization [Browse](#)

Select the organization or folder where this resource will be created

Create

Cancel

Alternatively, if you're on the free credit, you don't need to worry about organization or resource for now.

Google Cloud

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

New Project

You have 21 projects remaining in your quota. Request an increase or delete projects. [Learn more](#)

[Manage Quotas](#)

Project name *
MyExampleProject

Project ID: myexampleproject-492020. It cannot be changed later. [Edit](#)

Organization *
No organization

Select an organization to attach it to a project. This selection can't be changed later.

Parent resource *
No organization [Browse](#)

Select the organization or folder where this resource will be created

[Create](#) [Cancel](#)

Hit **Create** to make the project.

console.cloud.google.com

Google Cloud MyExampleProject Search (/) for resources, docs, products, and more Search

Welcome, Christopher Davis

You've activated your free trial. Use any remaining credits by June 8, 2020.

\$39 out of \$300 credits used
Expires June 8, 2026

[Add people to your project](#)
[Set up budget alerts](#)
[Review product spend](#)
[See all credit usage](#)

Try Gemini Cloud Assist chat
(Tip: use Option G to open and close the chat)

Chat now →

Recommended based on your interest in General

Products

Create a VM Train and host ML Create a database Analyze and manage

This is your current project; make sure it's the right one.

Agenda

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- Logging into GCP
- **Creating a Virtual Machine instance in Compute Engine**
- Adding SSH Keys
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- Running your LinuxGetSsl application
- Stopping / Suspending / Starting / Deleting instances

Creating a VM Instance

Let's create our first Virtual Machine (VM) instance.

- VMs are created through the GCP *Compute Engine* service
- They are the most basic computing / server units for GCP
 - Equivalent to AWS EC2

Creating a VM Instance

The steps to make one are as follows:

1. Activate Compute Engine (if it's your first time)
2. Create an instance – specify vCPUs, RAM, OS, and storage type & amount

Creating a VM Instance

The steps to make one are as follows:

1. **Activate Compute Engine (if it's your first time)**
2. Create an instance – specify vCPUs, RAM, OS, and storage type & amount

Welcome, Christopher

Open the sidebar here.

You've activated your full account

Use any remaining credits, then pay as you go.

\$39 out of \$300 credits
used

Expires June 8, 2026

You're working on project [MyExampleProject](#) ?

Number: 53193759241 ID: myexampleproject-492020

[Add people to your project](#)[Set up budget alerts](#)[Review product spend](#)[See all credit usage](#)

Try Gemini Cloud

Assist chat

(Tip: use Option G to open and
close the chat)

Chat now

Recommended based on your interest in [General](#) ▾

Products



Create a VM



Train and host ML



Create a database



Analyze and manage

The screenshot shows the Google Cloud console interface. On the left, the navigation menu is open. Under the 'Products' section, 'Compute Engine' is highlighted with a red circle and a red arrow pointing down to it. A second red circle and arrow point from 'Compute Engine' to 'VM instances' in the sub-menu. A yellow text box on the right contains the instruction: 'Hover over **Compute Engine**, then click on **VM instances**.' The background shows the main console area with a search bar and various project management options.

Google Cloud

Cloud Hub >

Cloud overview >

Solutions >

Recently visited >

Favorite products

Favorite products appear here

Products

Billing ☆

IAM & Admin ☆ >

Marketplace ☆

APIs & Services ☆ >

Vertex AI ☆ >

Compute Engine ☆ >

Kubernetes Engine ☆ >

Cloud Storage ☆ >

Security ☆ >

Overview

Security risk 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

Consistency Groups

Instance groups

Instance groups

Health checks

Search

Christopher

You're working on project **MyExampleProject** @

Number: 53193759241

[Add people to your project](#)

[Set up budget alerts](#)

[Review product spend](#)

[See all credit usage](#)

Chat now →

our interest in **General**

Create a database

Analyze and manage

Open "https://console.cloud.google.com/compute/instances?authuser=0&project=myexampleproject-492020" in a new tab

Hover over *Compute Engine*, then click on *VM instances*.

console.cloud.google.com

Google Cloud MyExampleProject

Product details

 **Compute Engine API**
[Google Enterprise API](#)

Compute Engine API

Enable Try it

Overview Documentation Support Related Products

Overview
Creates and runs virtual machines on Google Cloud Platform.

Additional details
Type: [SaaS & APIs](#)
Last product update: 3/23/23
Category: [Compute](#), [Networking](#), [Google Enterprise APIs](#)
Service name: compute.googleapis.com

Tutorials and documentation
[Learn more](#)

If this is your first time for this project, you will see this screen.

Click **Enable**, and then wait for it to load. It may take a minute to finish.

console.cloud.google.com

Google Cloud MyExampleProject

Product details

 **Compute Engine API**
[Google Enterprise API](#)

Compute Engine API

Enable [Try it](#)

[Overview](#) [Documentation](#) [Support](#) [Related Products](#)

Overview
Creates and runs virtual machines on Google Cloud Platform.

Additional details
Type: [SaaS & APIs](#)
Last product update: 3
Category: [Compute, Network](#)
Service name: compute.googleapis.com

Tutorials and documentation
[Learn more](#)

If this is your first time for this project, you will see this screen.

Click **Enable**, and then wait for it to load. It may take a minute to finish.

You might need to reload the page after a minute or two.

Google Cloud console interface showing the **VM instances** page for project **MyExampleProject**. The left sidebar lists navigation options under **Compute Engine**, with **VM instances** selected. The main content area displays the **VM instances** table, which is currently empty. A yellow callout box highlights the navigation path: **Compute Engine > VM Instances**.

VM instances

Filter: Enter property name or value

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

After waiting (and perhaps reloading and going back to **Compute Engine > VM Instances**), you will see this screen.

Compute Engine lets you use virtual machines that run on Google's infrastructure. Create micro-VMs or larger instances running Debian, Windows, or other standard images. Create your first VM instance, import it using a migration service, or try the quickstart to build a sample app.

Creating a VM Instance

The steps to make one are as follows:

1. Activate Compute Engine (if it's your first time)
2. **Create an instance – specify vCPUs, RAM, OS, and storage type & amount**

Creating a VM Instance

Now that the *Compute Engine* API has been enabled, we can create our first VM instance!

We can specify:

- Class of CPUs/hardware
- Number of vCPUs and amount of memory
- OS distribution and version
- Storage type and amount
- Networking and firewalls
- IO interfaces, GPUs, etc.

Google Cloud console interface for VM instances.

Navigation:

- Google Cloud logo
- Project: MyExampleProject
- Search bar: Search (/) for resources, docs, products, and more
- Compute Engine section
- Left sidebar: Overview, Security risk 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), Marketplace, Release Notes.

VM instances section:

- Buttons: Create instance (highlighted with a red circle and arrow), Import VM, Refresh
- Tabs: Instances (selected), Observability, Instance schedules
- Filter bar: Filter Enter property name value
- Table headers: Status, Name ↑, Zone, Recommendations, In use by, Internal IP, External IP, Connect

Instructions:

- Click *Create instance*.

VM Instances

Compute Engine lets you use virtual machines that run on Google's infrastructure. Create micro-VMs or larger instances running Debian, Windows, or other standard images. Create your first VM instance, import it using a migration service, or try the quickstart to build a sample app.

Google Cloud

MyExampleProject

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

Search

1

Create an instance

Create VM from...

Equivalent code

Machine configuration

e2-medium, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

Data protection

Snapshot schedules

Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

Machine configuration

Name *

instance-20260401-203728

Region *

us-central1 (Iowa)

Region is permanent

Zone *

Any

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

Generate machine type suggestions with Gemini

New

Prompt

Generate

Describe your workload and requirements (like cost or performance). Generating machine type suggestions is free.

Low-cost web server

Low-volume database

AI/ML inference

General purpose

Compute optimized

Memory optimized

Storage optimized

GPUs

Machine types for common workloads, optimized for cost and flexibility

	Series	Description	vCPUs	Memory	CPU Platform
☐	C4	Consistently high performance	2 - 288		
☐	C4A	Arm-based consistently high performance	1 - 96		
☐	C4D	Consistently high performance	2 - 384	3 - 3,072 GB	AMD Turin
☐	N4	Flexible & cost-optimized	2 - 80	4 - 640 GB	Intel Emerald

Create

Cancel

Equivalent code

Monthly estimate

\$25.46

That's about \$0.03 hourly

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

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$25.46

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

You will get this menu.

Creating a VM Instance

On this menu, we will be able to:

- Name our instance
- Set its region and zone
- Select the series of machine and its hardware
- Choose our OS and storage

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- **Name our instance**
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Google Cloud

MyExampleProject

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

Search

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e2-medium, us-central1

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Install Ops Agent

Security

Advanced security

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instance-20260401-203728

Region *
us-central1 (Iowa)

Zone *
Any

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C4D

Consistently high performance

2 - 384

3 - 3,072 GB

AMD Turin

N4

Flexible & cost-optimized

2 - 80

4 - 640 GB

Intel Emerald Rapids

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Snapshot schedule	Cost varies
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[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

You can set a name for the instance here.

You can just use the default name for the demo.

Creating a VM Instance

On this menu, we will be able to:

- Name our instance
- **Set its region and zone (i.e., which datacenter it's located in)**
- Select the series of machine and its hardware
- Choose our OS and storage

Google Cloud console interface showing the "Create an instance" page. The page is titled "Create an instance" and includes a sidebar with navigation options: Machine configuration, OS and storage, Data protection, Networking, Observability, Security, and Advanced.

The main configuration area is titled "Machine configuration" and includes fields for Name, Region, and Zone. The Region is set to "us-central1 (Iowa)" and is circled in red. A red arrow points to the "Generate machine type suggestions with Gemini" button.

A yellow box contains the text: "You can select a region here. Just use the default (e.g., us-central1, as it's the closest to us, and not too crowded)."

The right sidebar shows a "Monthly estimate" of \$25.46, broken down by item: 2 vCPU + 4 GB memory (\$24.46) and 10 GB balanced persistent disk (\$1.00). It also includes links for Logging, Monitoring, and Snapshot schedule.

At the bottom, there are buttons for "Create", "Cancel", and "Equivalent code".

Google Cloud

MyExampleProject

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

Search

1

Create an instance

Create VM from...

Equivalent code

Machine configuration

e2-medium, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

Data protection

Snapshot schedules

Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

Machine configuration

Name *

instance-20260401-203728

Region *

us-central1 (Iowa)

Zone *

Any

Region is permanent

Generate machine type suggestions with Gemini

Prompt

Describe your workload and requirements (like cost or performance). Generating machine type suggestions is free.

Low-cost web server

Low-volume database

/ML inference

General purpose

Compute optimized

Memory optimized

Storage optimized

GPUs

Machine types for compute

Series				
☐ C4	Consistently high performance	2 - 268	4 - 2,292 GB	Intel Emerald
☐ C4A	Arm-based consistently high performance	1 - 96	2 - 768 GB	Google Axion
☐ C4D	Consistently high performance	2 - 384	3 - 3,072 GB	AMD Turin
☐ N4	Flexible & cost-optimized	2 - 80	4 - 640 GB	Intel Emerald

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\$25.46

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

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$25.46

[Compute Engine pricing](#)

[Operations pricing](#)

Create

Cancel

Equivalent code

You can keep Zone as "Any" for now.

Creating a VM Instance

On this menu, we will be able to:

- Name our instance
- Set its region and zone (i.e., which datacenter it's located in)
- **Select the series of machine and its hardware**
- Choose our OS and storage

Google Cloud

MyExampleProject

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Search

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Install Ops Agent

Security

Advanced

Machine configuration

Name *

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Generate machine type suggestions with Gemini

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Machine types for common workloads, optimized for cost and flexibility

	Series ?	Description	vCPUs ?	Memory ?	CPU Platfor
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☐	C4A	Arm-based consistently high performance	1 - 96	2 - 768 GB	Google Axion
☐	C4D	Consistently high performance	2 - 384	3 - 3,072 GB	AMD Turin
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Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$25.46

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

Creating a VM Instance (Series)

Machine series are categorized groupings of VM presets designed for particular workloads. They have different CPU hardware, different ranges for vCPU counts and memory, and different storage options.

For example:

- General Purpose: N4, N2, N2D, E2
 - Everyday workloads like web servers, dev environments, etc.
- Compute Optimized: C2, C3, C4, H3
 - High performance computing; high clock speeds
- Memory Optimized: M1, M2, M3, M4
 - Suited for large, in-memory databases; high memory to vCPU ratio
- Accelerator Optimized: G2, A2
 - GPUs for deep learning

Creating a VM Instance (Series)

We only need something cheap for this tutorial, so let's choose the E2 (General Purpose) VM class.

Beyond the series, we can also choose the *type* of machine. I.e., configure the exact number of vCPUs and memory.

We can choose between a number of presets, or select custom values ourselves. Let's use a simple preset.

Google Cloud

MyExampleProject

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

Search

Create an instance

Create VM from...

Equivalent code

Machine configuration

e2-medium, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

Data protection

Snapshot schedules

Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

General purpose

Compute optimized

Memory optimized

Storage optimized

Machine types for common workloads, optimized for cost and flexibility

	Series ?	Description	vCPUs ?	Memory ?	CPU Platfor
☐	C4	Consistently high performance	2 - 288	4 - 2,232 GB	Intel Emerald
☐	C4A	Arm-based consistently high performance	1 - 96	2 - 768 GB	Google Axion
☐	C4D	Consistently high performance	2 - 384	3 - 3,072 GB	AMD Turin
☐	N4	Flexible & cost-optimized	2 - 80	4 - 640 GB	Intel Emerald
☐	N4A	Arm-based flexibility & cost optimization	1 - 64	2 - 512 GB	Google Axion
☐	N4D	Flexible & cost-optimized	2 - 96	4 - 768 GB	AMD Turin
☐	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
☐	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

That's about \$0.03 hourly

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

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$25.46

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

Create

Cancel

Equivalent code

Scroll down to see all the series.

Google Cloud

MyExampleProject

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Create an instance

Create VM from...

Equivalent code

Machine configuration

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OS and storage

Debian GNU/Linux 12 (bookworm)

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Security

Advanced

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Compute optimized

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☐	C4D	Consistently high performance	2 - 384	3 - 3,072 GB	AMD Turin
☐	N4	Flexible & cost-optimized	2 - 80	4 - 640 GB	Intel Emerald
☐	N4A	Arm-based flexibility & cost optimization	1 - 64	2 - 512 GB	Google Axion
☐	N4D	Flexible & cost-optimized	2 - 96	4 - 768 GB	AMD Turin
☐	C3	Consistently high performance	4 - 192	8 - 1,536 GB	Intel Sapphire
☐	C3D	Consistently high performance			
☒	E2	Low cost, day-to-day computing			
☐	N2	Balanced price & performance			
☐	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

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Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$25.46

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

Create

Cancel

Equivalent code

Scroll down to see all the series.

We want series E2.

Google Cloud

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Search

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e2-medium, us-central1

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Advanced

C3D

Consistently high performance

E2

Low cost, day-to-day computing

N2

Balanced price & performance

N2D

Balanced price & performance

T2A

Scale-out workloads

T2D

Scale-out workloads

N1

Balanced price & performance

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

Provisioning model

VM provisioning model

Standard

Determines how long your VMs will run. Choice is permanent

We want series E2.

Monthly estimate

\$25.46

That's about \$0.03 hourly

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

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$25.46

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Create

Cancel

Equivalent code

Click here to choose a vCPU/RAM preset.

Google Cloud

MyExampleProject

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Search

1

Create an instance

Create VM from...

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Machine configuration

e2-medium, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

Data protection

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Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

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

Filter

instance sizes

Shared-core

Standard

High memory

High CPU

e2-medium

1-2 vCPU (1 shared core), 4 GB memory

e2-micro

0.25-2 vCPU (1 shared core), 1 GB memory

e2-small

0.5-2 vCPU (1 shared core), 2 GB memory

vCPU

1-2 vCPU (1 shared core)

Memory

4 GB

Advanced configurations

Provisioning model

VM provisioning model

Standard

Determines how long your VMs will run. Choice is permanent

Create

Cancel

Equivalent code

Monthly estimate

\$25.46

That's about \$0.03 hourly

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

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$25.46

[Compute Engine pricing](#)
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[Less](#)

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Advanced

C3D

Consistently high performance

4 - 360

8 - 2,880 GB

AMD Genoa

E2

Low cost, day-to-day computing

0.25 - 3

1 - 128 GB

Intel Broadwe

N2

Balanced price & performance

2 - 128

2 - 864 GB

Intel Cascade

Filter instance sizes

Shared core

Standard

High memory

High CPU

e2-standard-2

2 vCPU (1 core), 8 GB memory

e2-standard-4

4 vCPU (2 core), 16 GB memory

e2-standard-8

8 vCPU (4 core), 32 GB memory

e2-standard-16

16 vCPU (8 core), 64 GB memory

e2-standard-32

32 vCPU (16 core), 128 GB memory

vCPU

Memory

Select **Standard** > **e2-standard-2**

Provisioning model

VM provisioning model

Standard

Determines how long your VMs will run. Choice is permanent

Create

Cancel

Equivalent code

Monthly estimate

\$25.46

That's about \$0.03 hourly

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

Item	Monthly estimate
2 vCPU + 4 GB memory	\$24.46
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$25.46

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Google Cloud

MyExampleProject

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Create VM from...

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e2-standard-2, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

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Security

Advanced

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

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-standard-2 (2 vCPU, 1 core, 8 GB memory)

vCPU

2 (1 core)

Memory

8 GB

Advanced configurations

Provisioning model

VM provisioning model

Standard

Determines

Create

Monthly estimate

\$49.92

That's about \$0.07 hourly

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

Item	Monthly estimate
2 vCPU + 8 GB memory	\$48.92
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$49.92

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

Current configuration.
We want e2-standard-2.

Google Cloud console showing the "Create an instance" page for project "MyExampleProject". The page displays various configuration options and a table of machine types.

Machine Type Selection Table:

Machine Type	Series	Performance	CPUs	Memory	Processor
e2-standard-2	C3D	Consistently high performance	4 - 360	8 - 2,880 GB	AMD Genoa
e2-standard-2	T2D	Scale-out workloads	1 - 60	4 - 240 GB	AMD Milan
e2-standard-2	N1	Balanced price & performance	0.25 - 96	0.6 - 624 GB	Intel Haswell

Configuration Summary:

- Preset:** Custom
- Machine Type:** e2-standard-2 (2 vCPU, 1 core, 8 GB memory)
- vCPU:** 2 (1 core)
- Memory:** 8 GB
- Provisioning model:** Standard

Monthly estimate: \$49.92
That's about \$0.07 hourly

Itemized Monthly Estimate:

Item	Monthly estimate
2 vCPU + 8 GB memory	\$48.92
10 GB balanced persistent disk	\$1.00
Total	\$49.92

Annotations:

- Yellow box:** "You can see the (estimated) billing cost for your machine type here." (Points to the machine type selection table)
- Yellow box:** "Both hourly and monthly." (Points to the configuration summary)
- Red circle:** Highlights the "Monthly estimate" section.
- Red arrow:** Points from the machine type selection table to the monthly estimate.

Google Cloud

MyExampleProject

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

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Create an instance

Create VM from...

Equivalent code

Machine configuration

e2-standard-2, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

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Advanced

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

T2D

Scale-out workloads

1 - 50

4 - 240 GB

AMD Milan

T2D

Scale-out workloads

5 - 96

8 - 624 GB

Intel Haswell

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-standard-2 (2 vCPU, 1 core, 8 GB memory)

vCPU

2 (1 core)

Memory

8 GB

Advanced configurations

Provisioning model

VM provisioning model

Standard

Determines how long your VMs will run. Choice is permanent

Create

Cancel

Equivalent code

Monthly estimate

\$49.92

That's about \$0.07 hourly

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

Item	Monthly estimate
2 vCPU + 8 GB memory	\$48.92
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$49.92

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

You can see an itemized breakdown below.

Creating a VM Instance (Type)

In the above example, I showed:

- **e2-standard-2 (2 vCPU, 1 core, 8 GB memory)**, for \$49.92 / month

Consider another machine configuration:

- **n2-standard-16 (16 vCPU, 8 cores, 64 GB memory)**, for \$567.17 / month

That's a big difference in price!

- You have to choose your machines carefully, balancing cost vs performance
- There are other ways to minimize cost, which we'll cover later

For now, just select the **cheap option** (e2-standard-2)!

Creating a VM Instance

On this menu, we will be able to:

- Name our instance
- Set its region and zone (i.e., which datacenter it's located in)
- Select the series of machine and its hardware
- **Choose our OS and storage**

Creating a VM Instance (OS / Storage)

We have selected the compute resources—CPU and RAM—for our VM instance.

Now, we need to specify the OS and storage type / amount we desire.

GCP supports a number of preset OS images, and it is even possible to use your own custom baked image (more on that in a later guide).

Google Cloud

MyExampleProject

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Create an instance

Create VM from...

Equivalent code

Machine configuration

e2-standard-2 (2 vCPU, 8 GB memory)

OS and storage

Debian GNU/Linux 12 (bookworm)

Data protection

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1 network interface

Observability

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Security

Advanced

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 Broadwell

N2

Balance

scade

N2D

Balance

lan

T2A

Scale-o

Altra

T2D

Scale-o

lan

N1

Balance

swell

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-standard-2 (2 vCPU, 1 core, 8 GB memory)

vCPU

2 (1 core)

Memory

8 GB

Advanced configurations

Provisioning model

VM provisioning model

Standard

Determines how long your VMs will run. Choice is permanent

Create

Cancel

Equivalent code

Monthly estimate

\$49.92

That's about \$0.07 hourly

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

Item	Monthly estimate
2 vCPU + 8 GB memory	\$48.92
10 GB balanced persistent disk	\$1.00
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$49.92

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

 Equivalent code

Google Cloud

MyExampleProject

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

Search

Create an instance

Create VM from...

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Machine configuration

e2-standard-2, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

Data protection

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Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

Operating system and storage

Name

instance-20260401-203728

Type

New balanced persistent disk

Size

10 GB

Snapshot schedule

default-schedule-1

License type

Free

Image

Debian GNU/Linux

Change

Additional disks

+ Add new disk

+ Attach existing disk

+ Add local SSD

Container

Deprecated

Deploy a container image to this VM instance

Deploy container

Monthly estimate

\$49.92

That's about \$0.07 hourly

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

Item	Monthly estimate
GB memory	\$48.92
enced persistent	\$1.00
	Cost varies
	Cost varies
Snapshot schedule	Cost varies
Total	\$49.92

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

[Less](#)

Click here to change the OS and boot disk type.

Create

Cancel

Equivalent code

Google Cloud

MyExampleProject

Create an instance

Create VM from...

Machine configuration

e2-standard-2, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

Data protection

Snapshot schedules

Networking

1 network interface

Observability

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Advanced

Operating system

Name

Type

Size

Snapshot schedule ?

License type ?

Image

Change

Additional disks

+ Add new disk

-

Container

Deprecate

Deploy a container image to this instance

Deploy container

Create

Cancel

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 12 (bookworm)

x86/64, amd64 built on 20260310

Boot disk type *

Balanced persistent disk

Compare disk types

Size (GB) *

10

Provision between 10 and 65536 GB

Show advanced configuration

Select

Cancel

OS and version.

Google Cloud

MyExampleProject

Create an instance

Create VM from...

Machine configuration

e2-standard-2, us-central1

OS and storage

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Operating system

Name

Type

Size

Snapshot schedule ?

License type ?

Image

Change

Additional disks

+ Add new disk

Container

Deprecate

Deploy a container image to this instance

Deploy container

Create

Cancel

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

Filter ubuntu

Ubuntu

Ubuntu Accelerator Optimized

Ubuntu Pro

Compare disk types

Size (GB) *
10
Provision between 10 and 65536 GB

Show advanced configuration

Select

Cancel

Let's use Ubuntu for the demo. Scroll down or filter and select it.

Google Cloud

MyExampleProject

Create an instance

Create VM from...

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e2-standard-2, us-central1

OS and storage

Debian GNU/Linux 12 (bookworm)

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Operating system

Name

Type

Size

Snapshot schedule ?

License type ?

Image

Change

Additional disks

+ Add new disk

Container Deprecate

Deploy a container image to this instance

Deploy container

Create

Cancel

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

Ubuntu

Version *

Ubuntu 25.10 Minimal

Boot disk type *

Balanced persistent disk

Compare disk types

Size (GB) *

10

Provision between 10 and 65536 GB

Show advanced configuration

Select

Cancel

Leave the version as default.

Creating a VM Instance (OS / Storage)

For now, let's choose **Ubuntu: Ubuntu 25.10 (Minimal)**.

The next thing to do is to set the (boot disk) storage type and size.

GCP supports a number of disk types; however, the exact types available to you depend on your VM's class (C2 vs N2 vs G2 vs etc.).

I will give an overview of the basic ones.

Here are the primary GCP disk types:

1. **Persistent Disks** (Network-Attached)

- These persist beyond the life of the instance, meaning data stays even if the VM is stopped or deleted (more on that later)
- **Standard Persistent Disk:** backed by HDD; slow but cheap
- **Balanced Persistent Disk:** backed by SSD; good for general purpose usage
- **SSD Persistent Disk:** backed by SSD; high performance and low-latency
- **Extreme Persistent Disk:** SSD-based performance; more control over throughput scaling

2. **Local SSD** (NVME)

- Physically attached to machine. Lowest latency + highest IOPS
- *However*, it is ephemeral — data is *lost* when the VM is stopped or deleted (!!!)

3. **Hyperdisk**

- Next-generation block storage that lets you independently scale capacity, IOPS, and throughput to optimize performance and reduce costs.

Google Cloud

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Name

Type

Size

Snapshot schedule ?

License type ?

Image

Change

Additional disks

+ Add new disk

Container

Deprecate

Deploy a container image to this instance

Deploy container

Create

Cancel

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

Ubuntu

Version *

Ubuntu 25.10 Minimal

x86_64, amd64 questing minimal image built on 2026-03-20

Boot disk type *

Balanced persistent disk

Compare disk types

Size (GB) *

10

Provision between 10 and 65536 GB

Show advanced configuration

Select

Cancel

Let's change the disk type.

Google Cloud console interface showing the "Create an instance" wizard. The "OS and storage" section is selected, displaying configuration options for the operating system and storage.

Operating system

- Machine configuration: e2-standard-2, us-central1
- OS and storage**: Debian GNU/Linux 12 (bookworm)
- Data protection: Snapshot schedules
- Networking: 1 network interface
- Observability: Install Ops Agent
- Security
- Advanced

Additional disks

- + Add new disk

Container (Deprecated)

Deploy a container image to this instance

Deploy container

Create Cancel

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: Ubuntu

Version *: Ubuntu 25.10 Minimal

x86_64, amd64 questing minimal image built on 2026-03-20

Boot disk type *

- Balanced persistent disk
- Extreme persistent disk
- SSD persistent disk
- Standard persistent disk**

Provision between 10 and 65536 GB

Show advanced configuration

Select Cancel

We will just use **standard persistent disk** for the demo.

Google Cloud console showing the "Create an instance" wizard for "MyExampleProject". The "OS and storage" section is selected, showing the operating system as "Debian GNU/Linux 12 (bookworm)".

The "Boot disk" configuration panel is open, showing the following settings:

- Operating system: Ubuntu
- Version: Ubuntu 25.10 Minimal
- Boot disk type: Standard persistent disk
- Size (GB): 10

A red circle highlights the "Size (GB)" field, and a red arrow points to it from a yellow callout box.

Can change disk size here. The default (10 GB) is enough for the demo.

The "Additional disks" section shows a button to "+ Add new disk". The "Container" section shows a button to "Deploy container".

Google Cloud console.cloud.google.com

MyExampleProject

Create an instance [Create VM from...](#)

- Machine configuration
e2-standard-2, us-central1
- OS and storage**
Debian GNU/Linux 12 (bookworm)
- Data protection
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- Networking
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- Observability
Install Ops Agent
- Security
- Advanced

Operating system

Name
Type
Size
Snapshot schedule ?
License type ?
Image

[Change](#)

Additional disks

[+ Add new disk](#)

Container Deprecate
Deploy a container image to this instance

[Deploy container](#)

[Create](#) [Cancel](#)

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
Ubuntu

Version *
Ubuntu 25.10 Minimal

x86/64, amd64 questing minimal image built on 2026-03-20

Boot disk type *
Standard persistent disk

[Compare disk types](#)

Size (GB) *
10

Provision between 10 and 65536 GB

[Show advanced configuration](#)

[Select](#) [Cancel](#)

Press **Select** to finalize our OS & boot disk selection.

Google Cloud

MyExampleProject

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

Search

1

Create an instance

Create VM from...

Equivalent code

Machine configuration

e2-standard-2, us-central1

OS and storage

Ubuntu 25.10 Minimal

Data protection

Snapshot schedules

Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

Operating system and storage

Name

instance-20260401-203728

Type

New standard persistent disk

Size

10 GB

Snapshot schedule

default-schedule-1

License type

Free

Image

Ubuntu 25.10 Minimal

Change

Additional disks

+ Add new disk

+ Attach existing disk

+ Add local SSD

Container

Deprecated

Deploy a container image to this VM instance

Deploy container

Monthly estimate

\$49.32

That's about \$0.07 hourly

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

Item	Monthly estimate
2 vCPU + 8 GB memory	\$48.92
10 GB standard persistent disk	\$0.40
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$49.32

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

Google Cloud console interface showing the "Create an instance" wizard for "MyExampleProject". The "OS and storage" tab is selected, showing the configuration for the operating system and storage.

Operating system and storage

Name: instance-20260401-203728
Type: New standard persistent disk
Size: 10 GB
Snapshot schedule: default-schedule-1
License type: Free
Image: Ubuntu 25.10 Minimal

Additional disks

+ Add new disk + Attach existing disk + Add local SSD

Monthly estimate

\$49.32
That's about \$0.07 hourly
Pay for what you use: no upfront costs and per second billing

Item	Monthly estimate
2 vCPU + 8 GB memory	\$48.92
10 GB standard persistent disk	\$0.40

Annotations:

- A red oval highlights the "Additional disks" section, with a red arrow pointing to it from the yellow box on the right.
- A yellow box on the right contains the text: "Can add additional disks here, separate to the boot disk."
- A yellow box at the bottom contains the text: "E.g., a local SSD for scratch data (if your series supports it), or an existing disk."

Creating a VM Instance (Networking)

We have now finished configuring our VM instance.

As you might have noticed, there are a lot of other tabs and “advanced” configuration options. For the most part (and especially right now), you don’t have to worry about them.

There is one slight exception that matters for later in the course:

- The firewall (and outside HTTP/S traffic)

If you want to accept *incoming* outside requests (e.g., your front-end webserver), then you need to enable HTTP/S in the firewall settings, located in the *Network* tab.

Google Cloud

MyExampleProject

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

Search

Create an instance

Create VM from...

Equivalent code

Machine configuration

e2-standard-2, us-central1

OS and storage

Ubuntu 25.10 Minimal

Data protection

Snapshot schedules

Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

Networking

Firewall

Select firewall rules to allow specific network traffic from the Internet. Firewall rules will only be applied when an instance is created.

☐ Allow HTTP traffic

☐ Allow HTTPS traffic

☐ Allow Load Balancer Health Checks

Network tags

Network tags

Hostname

Hostname

Set a custom hostname for this instance or leave it default. Choice is permanent.

IP forwarding

☐ Enable

Network performance configuration

Network bandwidth

☐ Enable per VM Tier_1 networking performance

Create

Cancel

Equivalent code

Monthly estimate

\$49.32

That's about \$0.07 hourly

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

Item	Monthly estimate
2 vCPU + 8 GB memory	\$48.92
10 GB standard persistent disk	\$0.40
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$49.32

[Compute Engine pricing](#)

You would select **Allow HTTP(S) traffic** for a web-server. The demo (and your crawler) **doesn't** need this, since it only *sends* requests. For security, leave it **off**.

Google Cloud

MyExampleProject

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

Search

Create an instance

Create VM from...

Equivalent code

Machine configuration

e2-standard-2, us-central1

OS and storage

Ubuntu 25.10 Minimal

Data protection

Snapshot schedules

Networking

1 network interface

Observability

Install Ops Agent

Security

Advanced

Machine configuration

Name *

instance-20260401-203728

Region *

us-central1 (Iowa)

Region is permanent

Zone *

Any

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

Generate machine type suggestions with Gemini

New

Prompt

Generate

Describe your workload and requirements (like cost or performance). Generating machine type suggestions is free.

Low-cost web server

Low-volume database

AI/ML inference

General purpose

Compute optimized

Memory optimized

Storage optimized

GPUs

Machine types for common workloads, optimized for cost and flexibility

Series	Description	vCPUs	Memory	CPU Platform
C4D	Consistently high performance	2 - 288	4 - 2,232 GB	Intel Emerald
N4	Flexible & cost-optimized	2 - 80	4 - 640 GB	Intel Emerald

Create

Cancel

Equivalent code

Monthly estimate

\$49.32

That's about \$0.07 hourly

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

Item	Monthly estimate
2 vCPU + 8 GB memory	\$48.92
10 GB standard persistent disk	\$0.40
Logging	Cost varies
Monitoring	Cost varies
Snapshot schedule	Cost varies
Total	\$49.32

[Compute Engine pricing](#)

[Cloud Operations pricing](#)

Less

Now, we **Create** the VM.

Google Cloud

MyExampleProject

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

Search

Compute Engine

Overview

Security risk 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

Marketplace

Release Notes

VM instances

Create instance

Import VM

Refresh

Learn

Instances

Observability

Instance schedules

VM instances

Filter Enter property name or value

Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☒	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH ▾ ⋮

Related actions

Hide

Fix data protection gaps

Assess data protection gaps at no cost. You can use the Backup and DR Service to configure VM backup with backup vault storage.

Go to Backup and DR

Go to Monitoring

Go to Logs explorer

Set up firewall rules

Patch management

Load balance between VMs

After a bit of time, it will deploy and the **Status** will become green.

Google Cloud console interface showing VM instances.

Left Sidebar (Navigation):

- Google Cloud
- MyExampleProject
- Search (/) for resources, docs, products, and more
- Compute Engine
- Overview
- Security risk overview
- Virtual machines
 - VM instances (selected)
- Instance templates
- Sole-tenant nodes
- Machine images
- TPUs
- Committed use discounts
- Reservations
- Migrate to Virtual Machines
- Storage
 - Disks
 - Storage Pools
 - Snapshots
- Marketplace
- Release Notes

Main Content Area:

VM instances

Instances | Observability | Instance schedules

Filters: Enter property name as value

Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☐	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH ▾ ⋮

Related actions

Fix data protection gaps
Assess data protection gaps at the Backup and DR Service to c with backup vault storage.
[Go to Backup and DR](#)

Set up firewall rules

Patch management

Load balance between VMs

Annotation: This menu will list your created VM instances, along with their status, settings, and some metadata fields.

Google Cloud console screenshot showing VM instances. The **External IP** (34.70.186.53) is highlighted with a red circle and an arrow. A yellow box explains that this is the VM's static IP used for connection.

VM instances table:

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☒	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH

Related actions:

- Fix data protection g...
Assess data protection g...
the Backup and DR Service...
with backup vault storage.
[Go to Backup and DR](#)
- Set up firewall rules
- Explore VM logs
search, analyze, and download VM instance

In particular, note the **External IP**.

It is the VM's static IP (as long as the VM is alive). This is the address you use to connect to it via (TCP) sockets or SSH.

Google Cloud console interface showing VM instances. A red box highlights a table with VM details, and a red arrow points to the external IP address.

In use by	Internal IP	External IP	Connect
	10.128.0.2 (nic0)	34.70.186.53 (nic0) 	SSH ▾

Go to Backup and DR | Go to Monitoring | Go to Logs explorer

Set up firewall rules

Hovering over gives you the option to copy it by clicking. You will need to copy this IP later, so keep this window open.

WARNING: you will be billed continuously for as long as this VM is running!

To stop being billed for compute, you must *stop* or *suspend* it.

To stop being billed for storage or anything else, you must *delete* it.

This is covered at the end.

Do *NOT* skip this step, or your budget will run out fast!

Agenda

- Redeeming credits
- Logging into GCP
- Creating a Virtual Machine instance in Compute Engine
- **Adding SSH Keys**
- Installing dependencies
- Running your LinuxGetSsl application
- Stopping / Suspending / Starting / Deleting instances

Connecting to a VM Instance (SSH)

Our VM instance is now up and running! So, how do we tell it what to run?

The simplest way is to just SSH into it, so you can use it like any other remote Linux server (e.g., CAEN, GreatLakes).

GCP provides two (main) ways to do so:

1. SSH via the web console
2. SSH from your local terminal

Connecting to a VM Instance (SSH)

Our VM instance is now up and running! So, how do we tell it what to run?

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GCP provides two (main) ways to do so:

1. **SSH via the web console**
2. SSH from your local terminal

Google Cloud console interface showing VM instances.

Left Sidebar:

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- MyExampleProject
- Search (/) for resources, docs, products, and more
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- Marketplace
- Release Notes

Main Content Area:

VM instances

Instances | Observability | Instance schedules

Filter Enter property name or value

Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☐	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH

Related actions:

- Fix data protection gaps
 - Assess data protection gaps at no cost. You can use the Backup and DR Service to configure VM instances with backup vault storage.
 - [Go to Backup and DR](#)
- Explore VM logs
 - View, search, analyze, and download VM instance logs
 - [Go to Logs explorer](#)
- Set up firewall rules
- Patch management
- Load balance between VMs

Annotation: Click the **SSH** button, under Connect.

```
ssh.cloud.google.com
SSH-in-browser
Welcome to Ubuntu 25.10 (GNU/Linux 6.17.0-1009-gcp x86_64)

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

This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.

24 updates can be applied immediately.
11 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

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

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

christophercdavis27@instance-20260401-203728:~$
```

Search

Learn

Use by	Internal IP	External IP	Connect
	10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH

Hide

Explore VM logs

View, search, analyze, and download VM instance

Snapshots

Go to Backup and DR

Marketplace

Go to Monitoring

Release Notes

Go to Logs explorer

Set up firewall rules

Patch management

Load balance between VMs

Now you are connected.

Connecting to a VM Instance (SSH)

Our VM instance is now up and running! So, how do we tell it what to run?

The simplest way is to just SSH into it, so you can use it like any other remote Linux server (e.g., CAEN, GreatLakes).

GCP provides two (main) ways to do so:

1. SSH via the web console
2. **SSH from your local terminal**

Connecting to a VM Instance (SSH – local)

The other—probably preferred—method is to SSH directly from your local device. Here are the steps to do that:

1. Create a local SSH key. For instance:

```
ssh-keygen -t rsa -b 4096 -f ~/.ssh/gcp_key -C "YOUR_USERNAME"
```

Replace `YOUR_USERNAME` with the exact username you want to log on to the VM with.

2. Copy the SSH key you made

i.e., copy the output of `cat ~/.ssh/gcp_key.pub`

3. Paste it as a new entry into the VM's SSH key settings

4. Connect to the VM

```
ssh -i ~/.ssh/gcp_key YOUR_USERNAME@VM_EXTERNAL_IP_ADDRESS
```

Connecting to a VM Instance (SSH – local)

The other—probably preferred—method is to SSH directly from your local device. Here are the steps to do that:

1. Create a local SSH key. For instance:

```
ssh-keygen -t rsa -b 4096 -f ~/.ssh/gcp_key -C "YOUR_USERNAME"
```

Replace `YOUR_USERNAME` with the exact username you want to log on to the VM with.

2. Copy the SSH key you made
i.e., copy the output of `cat ~/.ssh/gcp_key.pub`

3. Paste it as a new entry into the VM's SSH key settings

4. Connect to the VM

```
ssh -i ~/.ssh/gcp_key YOUR_USERNAME@VM_EXTERNAL_IP_ADDRESS
```

Connecting to a VM Instance (SSH – local)

The other—probably preferred—method is to SSH directly from your local device. Here are the steps to do that:

1. Create a local SSH key. For instance:

```
ssh-keygen -t rsa -b 4096 -f ~/.ssh/gcp_key -C "YOUR_USERNAME"
```

Replace `YOUR_USERNAME` with the exact username you want to log on to the VM with.

2. Copy the SSH key you made

i.e., copy the output of `cat ~/.ssh/gcp_key.pub`

3. Paste it as a new entry into the VM's SSH key settings

4. Connect to the VM

```
ssh -i ~/.ssh/gcp_key YOUR_USERNAME@VM_EXTERNAL_IP_ADDRESS
```

Google Cloud console interface showing VM instances.

Left Sidebar (Navigation):

- Google Cloud
- MyExampleProject
- Search (/) for resources, docs, products, and more
- Compute Engine
- Overview
- Security risk overview
- Virtual machines
 - VM instances (selected)
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Main Content Area:

VM instances

Filter: Enter property name or value

Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☒	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH

Related actions

- Fix data protection gaps**
Assess data protection gaps at the Backup and DR Service to... with backup vault storage.
[Go to Backup and DR](#)
- Monitor VMs**
like CPU and
[Go to Logs explorer](#)
- Explore VM logs**
View, search, analyze, and download VM instance logs
[Go to Logs explorer](#)
- Set up firewall rules**
- Patch management**
- Load balance between VMs**

Annotation: A red circle highlights the VM name [instance-20260401-203728](#), and a red arrow points to it from a yellow box containing the text: "Click the VM's name to configure it."

Google Cloud console interface showing the details of a Compute Engine instance named "instance-202...".

The left sidebar lists navigation options: Overview, Security risk overview, Virtual machines (selected), VM instances (selected), Instance templates, Sole-tenant nodes, Machine images, TPUs, Committed use discounts, Reservations, Migrate to Virtual Machines, Storage (Disks, Storage Pools, Snapshots), Marketplace, and Release Notes.

The top navigation bar includes the Google Cloud logo, the project name "MyExampleProject", a search bar, and a notification icon with 3 alerts.

The instance details page shows tabs for Details, Observability, and OS Info. The "Edit" button is circled in red, and a red arrow points to it. A yellow box with the text "Click on *Edit*." is overlaid on the page.

The "Logs" section displays links for Logging, Serial port 1 (console), Serial port 2, Serial port 3, and Serial port 4.

The "Basic information" section provides details about the instance:

Field	Value
Name	instance-20260401-203728
Instance Id	6867609635153542889
Description	None
Type	Instance
Status	Running
Creation time	Apr 1, 2026, 9:02:00 PM UTC-04:00
Location	us-central1-f

At the bottom, there is a link for "Equivalent code".

Google Cloud console interface showing the "Edit instance-20260401-203728 instance" page. The left sidebar lists navigation options: Overview, Security risk 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), Marketplace, and Release Notes.

The main content area displays settings for the instance. Under "SSH Keys", there are two input fields for public SSH keys. The first field contains the text "ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIb". The second field contains the text "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQBAAGJ1NkLlgBPM4/L3k6". Below these fields is a red circle around the "+ Add item" button, with a red arrow pointing to it.

Annotations include a large red bracket on the right side of the SSH Keys section and a yellow box with the text: "Scroll down to **SSH Keys** and add a new one via **Add item**."

Buttons at the bottom include "Save" and "Cancel".

Google Cloud

MyExampleProject

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

Search

Compute Engine

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Marketplace

Release Notes

Edit instance-20260401-203728 instance

Turn on all settings for the most secure configuration.

☐

Turn on Secure Boot

☒

Turn on vTPM

☒

Turn on Integrity Monitoring

SSH Keys

These keys allow access only to this instance, unlike project-wide SSH keys. [Learn more](#)☐ Block project-wide SSH keysWhen checked, project-wide SSH keys cannot access this instance. [Learn more](#)

SSH key 1 *

ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIb

Enter public SSH key

SSH key 2 *

ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQBAAGJ1NkLlgBPM4/L3k6

Enter public SSH key

SSH key 3 *

Enter public SSH key

+ Add item

Identity and API access

Save Cancel

Paste your key here.

Google Cloud console interface showing the "Edit instance-20260401-203728 instance" page. The left sidebar lists navigation options: Overview, Security risk 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), Marketplace, and Release Notes.

The main content area displays settings for the instance:

- Turn on all settings for the most secure configuration.
- Turn on Secure Boot [?](#)
- Turn on vTPM [?](#)
- Turn on Integrity Monitoring [?](#)
- SSH Keys: These keys allow access only to this instance, unlike project-wide SSH keys. [Learn more](#)
- Block project-wide SSH keys: When checked, project-wide SSH keys cannot access this instance. [Learn more](#)
- SSH key 1: `ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIb...`
- SSH key 2: `ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQBAAGJ1NkLlgBPM4/L3k6`
- + Add item
- Identity and API access [?](#)
- Service accounts [?](#): You must stop the VM instance to edit its service account

At the bottom, there are "Save" and "Cancel" buttons. A red arrow points to the "Save" button, which is circled in red. A yellow box contains the text: "Then, **Save** the new settings."

Connecting to a VM Instance (SSH – local)

The other—probably preferred—method is to SSH directly from your local device. Here are the steps to do that:

1. Create a local SSH key. For instance:

```
ssh-keygen -t rsa -b 4096 -f ~/.ssh/gcp_key -C "YOUR_USERNAME"
```

Replace `YOUR_USERNAME` with the exact username you want to log on to the VM with.

2. Copy the SSH key you made

i.e., copy the output of `cat ~/.ssh/gcp_key.pub`

3. Paste it as a new entry into the VM's SSH key settings

4. Connect to the VM

```
ssh -i ~/.ssh/gcp_key YOUR_USERNAME@VM_EXTERNAL_IP_ADDRESS
```

Connecting to a VM Instance (SSH – local)

Connect to the VM via SSH:

```
ssh -i ~/.ssh/gcp_key YOUR_USERNAME@VM_EXTERNAL_IP_ADDRESS
```

For example:

```
ssh -i ~/.ssh/gcp_key nhamilton@127.0.0.1
```

Agenda

- Redeeming credits
- Logging into GCP
- Creating a Virtual Machine instance in Compute Engine
- Adding SSH Keys
- **Installing dependencies**
- **Running your LinuxGetSsl application**
- Stopping / Suspending / Starting / Deleting instances

Linux Environments

The OS images that Google provide are minimal: you will have to install any dependencies or tools you plan on using.

Luckily, this is usually pretty simple for common libraries / applications via the OS' installed package manager.

If you used the default Debian or Ubuntu GCP images (like in this tutorial), then the package manager will be Advanced Package Tool (apt).

I will now go over installing common dependencies for Linux C++ applications (e.g., your *LinuxGetSsl*) on the remote server.

Install Common C++ Dependencies (Ubuntu / Debian)

Step 1: Update your package lists

Always do this on a fresh VM to ensure you download the latest versions of the packages.

```
sudo apt update && sudo apt upgrade -y
```

Step 2: Install common build and tooling dependencies

There is a `build-essential` meta package that contains `g++/gcc`, `make`, and `libc6-dev` (std library headers). You can add any other essential tools, like `git` and `cmake`, or maybe `gdb`.

```
sudo apt install -y build-essential cmake git gdb
```

Step 3: Verify installation

Make sure the C++ compiler is installed (and at a reasonable version).

```
g++ --version  
cmake --version
```

Install Application-Specific Dependencies

Step 1: Install Application-Specific Dependencies

Our *LinuxGetSsl* uses two 3rd party dependencies: OpenSSL and ZLib. So, we install them:

```
sudo apt install -y libssl-dev zlib1g-dev
```

Step 2: Make Location on Remote for our Code

We can also set up a location to hold our *LinuxGetSsl* project:

```
mkdir LinuxGetSsl
```

Moving Code to Remote Server

Step 1: Go to *Local* Source Location

On a ***new local terminal window***, travel with `cd` to the directory containing your *LinuxGetSsl* code. It should be the root, containing the `Makefile` and all of the `.cpp` sources required to build.

```
cd local/path/to/LinuxGetSsl
```

Step 2: Copy over your Code (via `scp`)

Now, we copy this code over. We will use `scp`, but `rsync` and others work, too.

```
scp -i ~/.ssh/gcp_key LinuxGetSsl.cpp Makefile {USER}@{IP}:LinuxGetSsl
```

Where again `{USER}` is the username you set when making the SSH key, and `{IP}` is the **external ip** of the VM instance that you can copy from the GCP console.

Building & Running *LinuxGetSsl*

Now, your code should be on the remote environment.

You can verify this from the remote SSH terminal:

```
ls ~/LinuxGetSsl  
cd LinuxGetSsl
```

You can then build and run it like usual!

Try running `make` and then using *LinuxGetSsl* to fetch a webpage.

E.g., <https://hamiltonlabs.com>

```
./LinuxGetSsl https://hamiltonlabs.com
```

Agenda

- Redeeming credits
- Logging into GCP
- Creating a Virtual Machine instance in Compute Engine
- Adding SSH Keys
- Installing dependencies
- Running your LinuxGetSsl application
- **Stopping / Suspending / Starting / Deleting instances**

VM Lifetime

Now you're fully set up with a basic VM!

As you've probably noticed before, running a VM can be expensive, especially if you don't actually need to run it 24/7.

Luckily, there are ways to save money if you don't need your VM active. These are the options:

- **Stop:** shuts off VM, losing anything in RAM or local SSDs
- **Suspend:** freezes VM, preserving memory and local SSDs
- **Delete:** deletes the VM and all of its resources

Note: even while stopped/suspended, you **will still be billed for storage!**

Google Cloud console interface showing VM instances.

Left Sidebar (Navigation):

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Main Content Area:

VM instances

Instances | Observability | Instance schedules

Filter: Enter property name or value

Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☒	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH

Related actions

- Fix data protection gaps
- Monitor VMs
- Explore VM logs
- Set up firewall rules
- Patch management
- Load balance between VMs

Annotation: A red circle highlights the status column of the VM instance, and a red arrow points to it. A yellow box contains the text: "Select the VM you want to stop/suspend/delete."

Google Cloud console interface showing VM instances. The "Stop" and "Suspend" buttons are circled in red.

If you click *Stop* or *Suspend*, it will temporarily pause the VM.

You won't be billed for compute, but you will be billed for storage.

Related actions:

- Fix data protection gaps
- Monitor VMs
- Explore VM logs
- Set up firewall rules
- Patch management
- Load balance between VMs

VM instances table:

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☒	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH

Google Cloud console interface showing VM instances.

Left Sidebar:

- Compute Engine
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 - Disks
 - Storage Pools
 - Snapshots
 - Marketplace
 - Release Notes

Main Content Area:

VM instances

Instances | Observability | Instance schedules

1 **Start / Resume** Stop Suspend Reset Create a group based on this vm More actions

Filter Enter property name or value

Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☒	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH

Related actions

Start / Resume resumes the VM after stopping/suspending.

Go to Backup and DR

Go to Monitoring

Go to Logs explorer

Set up firewall rules

Patch management

Load balance between VMs

Explore VM logs

View, search, analyze, and download VM instance logs

Google Cloud console interface showing VM instances. The left sidebar lists navigation options: Overview, Security risk overview, Virtual machines (selected), VM instances (selected), Instance templates, Sole-tenant nodes, Machine images, TPUs, Committed use discounts, Reservations, Migrate to Virtual Machines, Storage (Disks, Storage Pools, Snapshots), Marketplace, and Release Notes.

The main content area displays the "VM instances" page. A table lists the instances:

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect	
☒	☒	instance-20260401-203728	us-central1-f		10.128.0.2 (nic0)	34.70.186.53 (nic0)	SSH	

A red arrow points to the three dots menu icon in the "Connect" column. A yellow box contains the text: "To delete the VM, click the three dots here to open a menu."

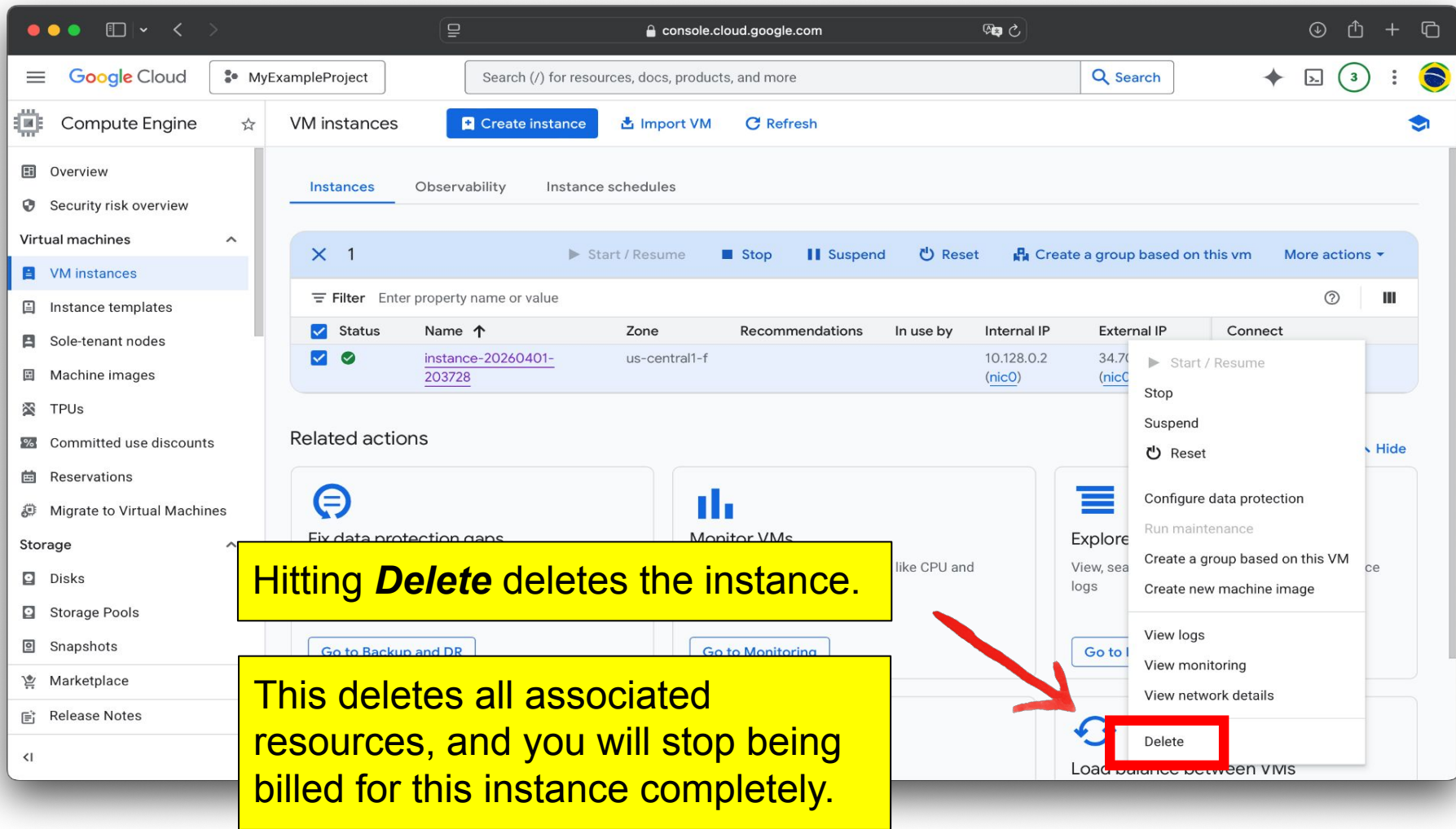
Below the table, the "Related actions" section includes:

- Fix data protection gaps (Assess data protection gaps at no cost. You can use the Backup and DR Service to configure VM backups with backup vault storage. [Go to Backup and DR](#))
- Monitor (View of network [Go to Monitoring](#))
- Go to Logs explorer
- Set up firewall rules
- Patch management
- Load balance between VMs

Google Cloud console screenshot showing VM instances. The instance `instance-20260401-203728` is selected. A context menu is open, showing actions like Start / Resume, Stop, Suspend, Reset, etc. The **Delete** option is highlighted with a red box and a red arrow. Two yellow callout boxes provide instructions:

Hitting **Delete** deletes the instance.

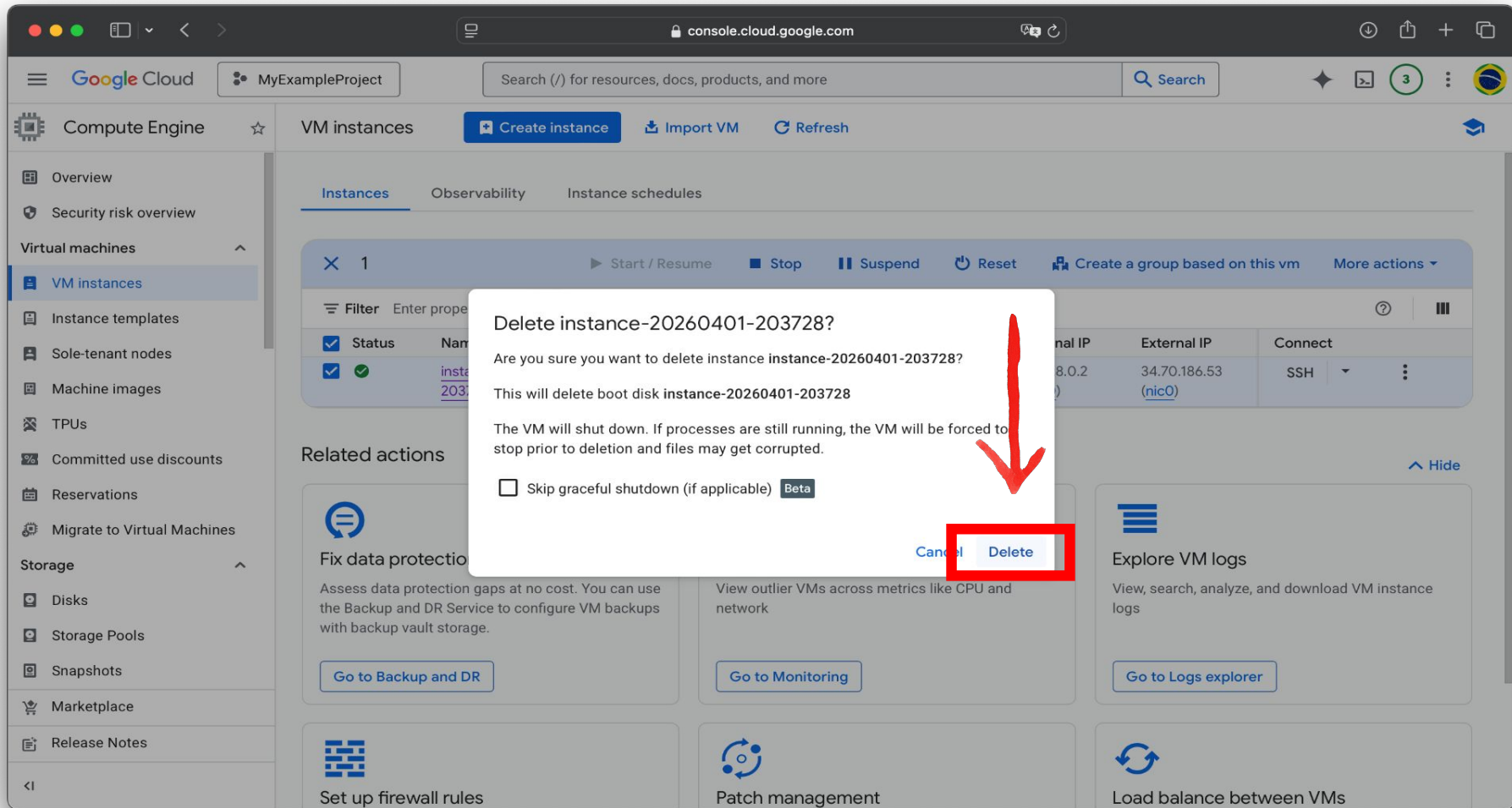
This deletes all associated resources, and you will stop being billed for this instance completely.



The screenshot shows the Google Cloud console interface. On the left is a navigation sidebar with categories like Compute Engine, Virtual machines, Storage, and Marketplace. The main area is titled 'VM instances' and shows a table with one instance: 'instance-20260401-203728' in the 'us-central1-f' zone. A context menu is open over the instance, listing various actions. The 'Delete' option at the bottom of the menu is highlighted with a red rectangular box. A red arrow points from the left towards this box. Two yellow text boxes with black text are overlaid on the image, providing instructions about the delete action.

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
☒	instance-20260401-203728	us-central1-f			10.128.0.2 (nic0)	34.7... (nic0)	Start / Resume

- Start / Resume
- Stop
- Suspend
- Reset
- Create a group based on this vm
- Configure data protection
- Run maintenance
- Create a group based on this VM
- Create new machine image
- View logs
- View monitoring
- View network details
- Delete**



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Instances Observability Instance schedules

VM instances

Filter Enter property name or value

Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
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After a while, the instance will finish deletion, and will disappear from the **VM instances** menu.

VM Instances

Compute Engine lets you use virtual machines that run on Google's infrastructure. Create micro-VMs or larger instances running Debian, Windows, or other standard images. Create your first VM instance, import it using a migration service, or try the quickstart to build a sample app.

VM Summary

You now know how to create, configure, pause, and kill a custom VM on GCP.

Doing all this by hand (as in this tutorial) is simple enough for most development and small-scale production environments.

However, there are more efficient / reproducible ways of managing these instances, which might be nice for a bunch of copies of a distributed server, such as the `gcloud` CLI. There are even Continuous Integration (CI) utilities that can interface directly with your (Github) source code.

I will cover all of these in a later guide, but you now have enough to begin your GCP development.