



Cloud Computing



Agenda

- What is Cloud Computing
- GCP
- Create a VM on the Cloud



Cloud Computing

- What is Cloud Computing?
- Cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale.
- You typically pay only for cloud services you use, helping you lower your operating costs, run your infrastructure more efficiently, and scale as your business needs change.



Cloud Computing

Types of Cloud Services

Public clouds:

Public clouds are owned and operated by a third-party cloud service providers. All hardware, software, and other supporting infrastructure is owned and managed by the cloud provider.

Private clouds:

A private cloud is one in which the services and infrastructure are maintained on a private network, usually business or organization. It can be physically located on the company's on-site datacenter. Some may pay third-party service providers to host their private cloud.



Cloud Computing

Types of Cloud Services

Infrastructure as a Service (IaaS):

Rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems—from a cloud provider on a pay-as-you-go basis

Platform as a Service (PaaS):

Platform as a service refers to cloud computing services that supply an on-demand environment for developing, testing, delivering, and managing software applications. PaaS is designed to make it easier for developers to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network, and databases needed for development.

e.g. DataBricks, MapReduce

Software as a Service (SaaS):

Delivering software applications over the Internet, on demand and typically on a subscription basis. With SaaS, cloud providers host and manage the software application and underlying infrastructure, and handle any maintenance, like software upgrades and security patching.

e.g. Email, GitHub



Cloud Computing - GCP

Featured products

Compute Engine

Scalable, high-performance VMs.

Cloud Run

Run stateless containers on a fully managed environment or on Anthos.

Anthos

Modernize existing apps and build new apps rapidly in hybrid and multi-cloud environments.

Vision AI

Derive insights from images, text, and more with AutoML Vision and Vision API.

Cloud Storage

Object storage with global edge-caching.

Cloud SQL

MySQL, PostgreSQL, and SQL Server database services.

BigQuery

A fully managed, highly scalable data warehouse with built-in ML.

Security key enforcement

Enforce the use of security keys to help prevent account takeovers.



Cloud Computing – GCP Create a VM in the Cloud

GCP resources

GCP consists of a set of physical assets, such as computers and hard disk drives, and virtual resources, such as virtual machines (VMs), that are contained in [Google's data centers](#) around the globe. Each data center location is in a global *region*. Regions include Central US, Western Europe, and East Asia. Each region is a collection of *zones*





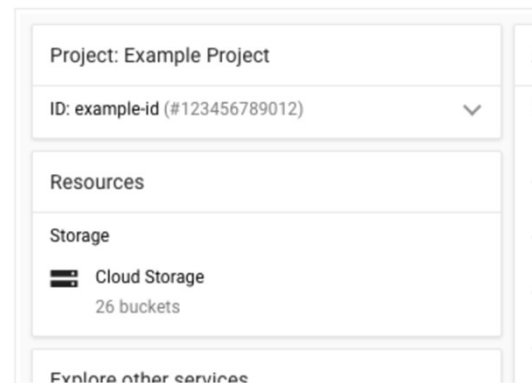
Cloud Computing – GCP Create a VM in the Cloud

Accessing resources through services

In cloud computing, what you might be used to thinking of as software and hardware products, become *services*. These services provide access to the underlying resources.

Projects

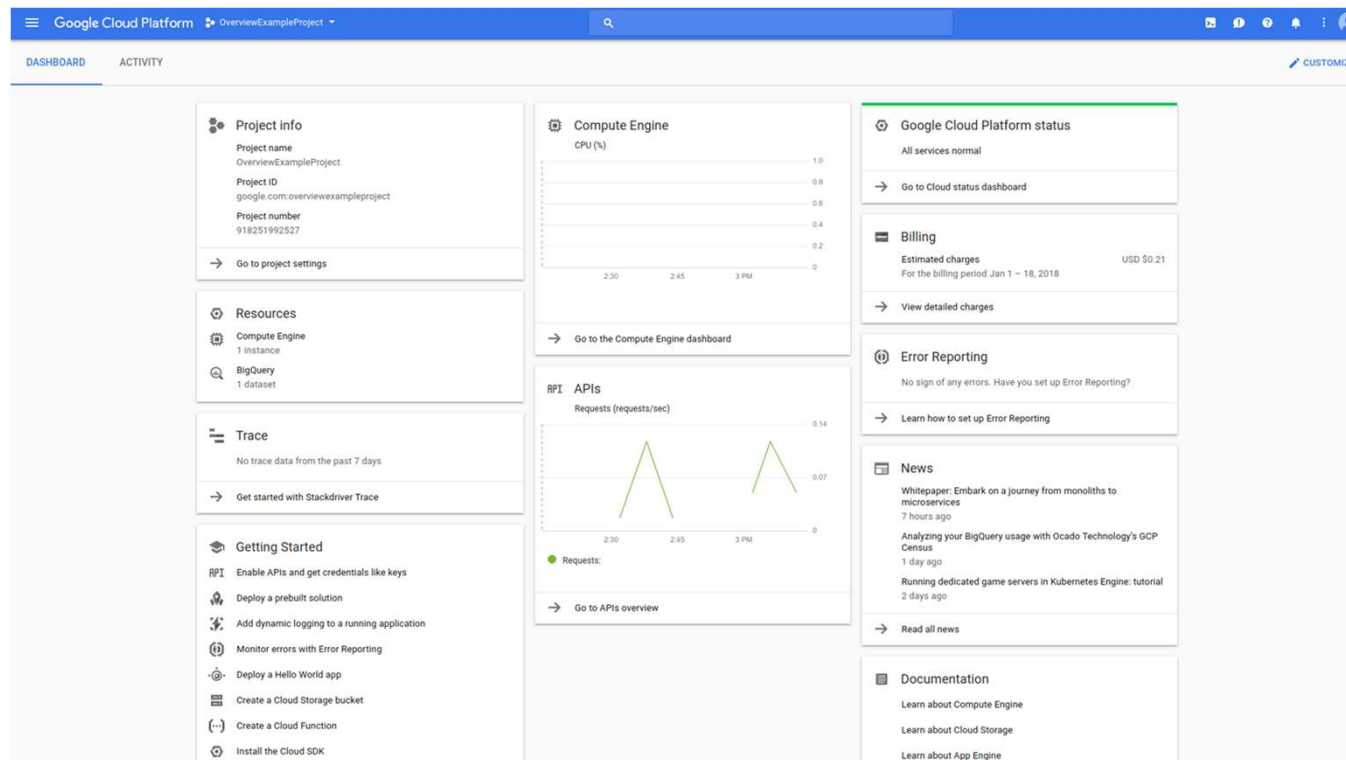
Any GCP resources that you allocate and use must belong to a project. You can think of a project as the organizing entity for what you're building. A project is made up of the settings, permissions, and other metadata that describe your applications.





Cloud Computing – GCP Create a VM in the Cloud

The [Google Cloud Console](#) provides a web-based, graphical user interface that you can use to manage your GCP projects and resources.





Cloud Computing – Compute Engine

Compute Engine lets you create and run virtual machines on Google infrastructure.

Demo – Create a VM

<https://cloud.google.com/compute/docs/quickstart-linux>

Creating a VM with GPU

<https://cloud.google.com/compute/docs/gpus/add-gpus>



Cloud Computing – Compute Engine

Install Anaconda

```
wget https://repo.continuum.io/archive/Anaconda3-2019.10-Linux-x86_64.sh
```

```
bash Anaconda3-2019.10-Linux-x86_64.sh
```

Demo



<https://cloud.google.com/>

Google Cloud

Why Google Solutions Products Pricing Getting Started

Search Docs Support English Console 0

Contact Us Get started for free

New customers get \$300 in free credits to spend on Google Cloud. All customers get free usage of 20+ products. [See offer details.](#)

Accelerate your transformation with Google Cloud

Build apps faster, make smarter business decisions, and connect people anywhere.

Get started for free

Google Cloud Next '21

Save the date

October 12-14, 2021

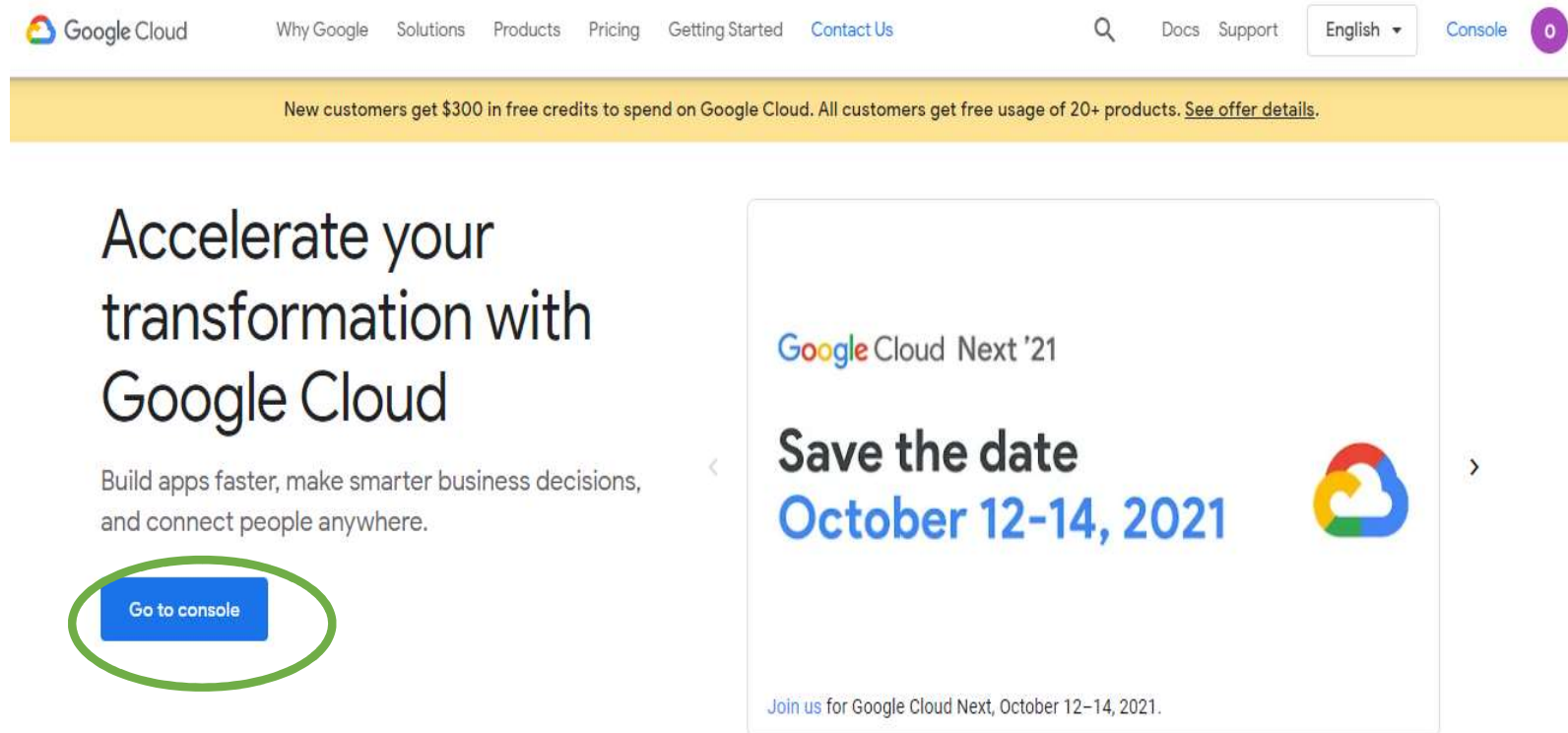
Join us for Google Cloud Next, October 12-14, 2021.

Click **Get started for free** to create google cloud account

Demo

Once register, go to <https://cloud.google.com/>

it will change to **Go to Console**



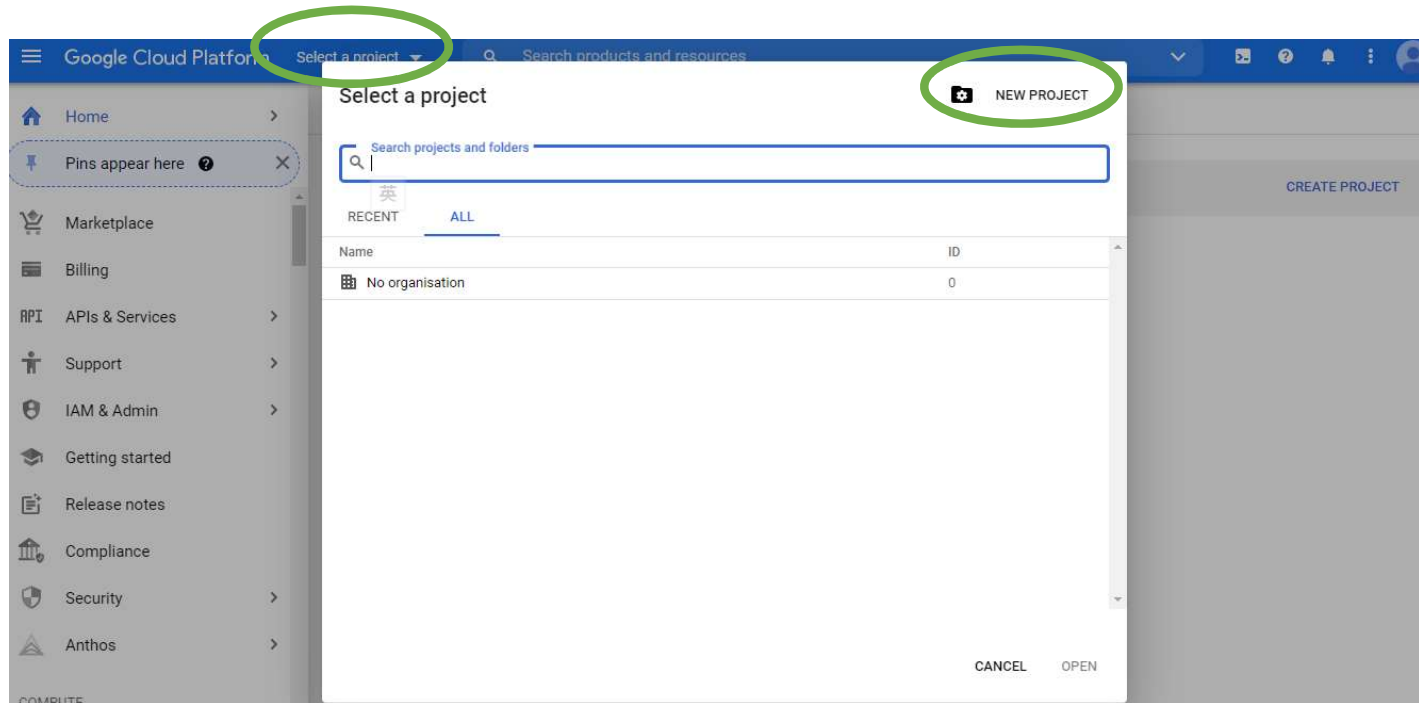
The screenshot shows the Google Cloud homepage. At the top, there is a navigation bar with the Google Cloud logo, links for 'Why Google', 'Solutions', 'Products', 'Pricing', 'Getting Started', and 'Contact Us'. On the right side of the navigation bar, there is a search icon, links for 'Docs' and 'Support', a language selector set to 'English', a 'Console' link, and a purple circle with the number '0'. Below the navigation bar is a yellow banner with the text: 'New customers get \$300 in free credits to spend on Google Cloud. All customers get free usage of 20+ products. [See offer details.](#)'. The main content area features the heading 'Accelerate your transformation with Google Cloud' and the subtext 'Build apps faster, make smarter business decisions, and connect people anywhere.' Below this, a blue button labeled 'Go to console' is circled in green. To the right of the main content is a large white box with the text 'Google Cloud Next '21', 'Save the date', and 'October 12-14, 2021'. The Google Cloud logo is also present in this box. At the bottom of the box, it says 'Join us for Google Cloud Next, October 12-14, 2021.'.

Click **Go to Console**

Demo



Click **Select a project** next to GCP
Then, click **New project** in the popup





Demo – Create a project

Google Cloud Platform Search products and resources

New Project

You have 9 projects remaining in your quota. Request an increase or delete projects. [Learn more](#)

[MANAGE QUOTAS](#)

Project name *
Project123

Project ID: project123-308808. It cannot be changed later. [EDIT](#)

Location *
No organisation [BROWSE](#)

Parent organisation or folder

[CREATE](#) [CANCEL](#)

Input Project name and click **Create**

Demo



Free trial status: \$2,326.38 credit and 90 days remaining. With a full account, you'll get unlimited access to all of Google Cloud Platform. DISMISS ACTIVATE

Google Cloud Platform Project123

Home > DASHBOARD

Pins appear here ?

Anthos >

COMPUTE

- App Engine >
- Compute Engine >
- Kubernetes Engine >
- Cloud Functions
- Cloud Run
- VMware Engine

STORAGE

PRODUCTS & PAGES

- Compute Engine
- Migrate for Compute Engine
Compute Engine
- Add VM Instance
Compute Engine > VM instances
- Committed use discounts
Compute Engine

RESOURCES

- Compute Engine default service account
Service Account – cool-bay-308802
- Compute Engine default service account
Service Account – oillioproject
- instance-1
VM Instance – oillioproject
- default-allow-http
Firewall – oillioproject
- default-allow-https
Firewall – oillioproject

Project name
Project123

Project ID
project123-3

Project numl
5146355159

ADD PEOPLE

0.2

Create my dashboard

RESOURCE CUSTOMISE

DISMISS

Cloud Platform status

ormal

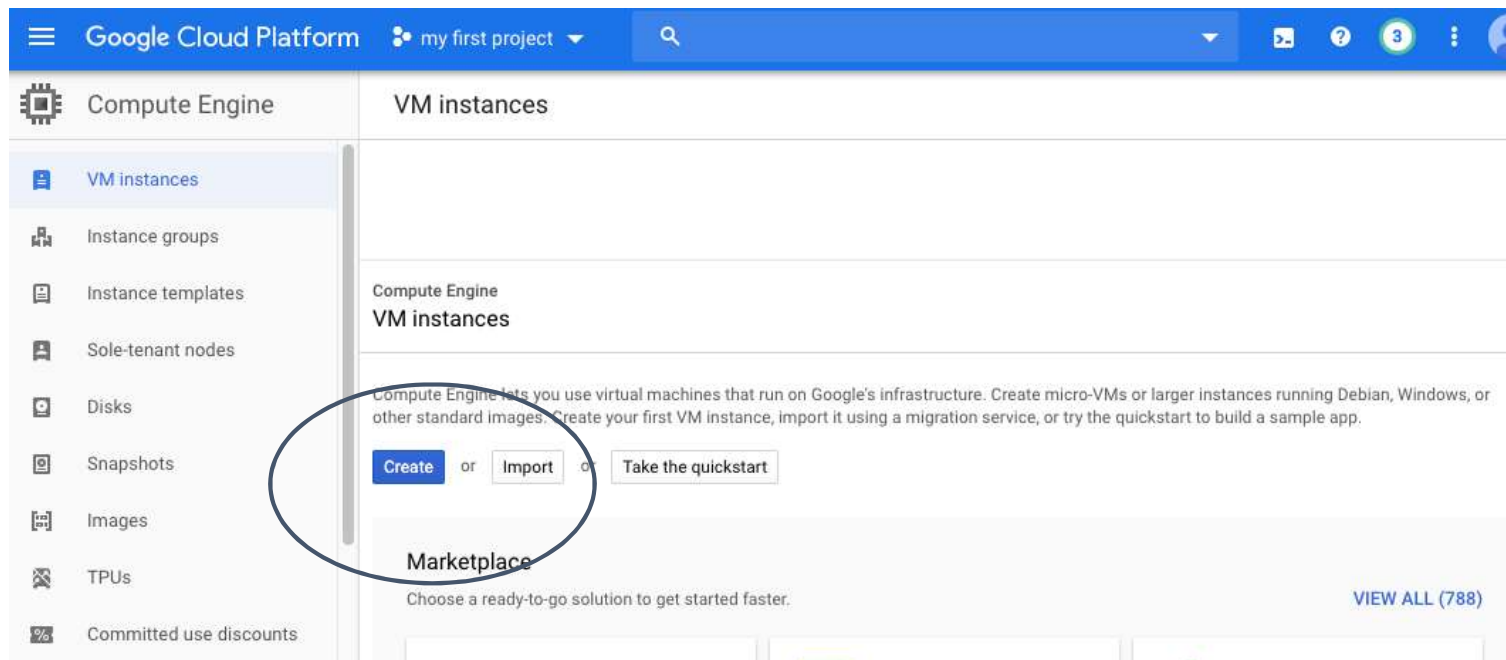
atus dashboard

Search for “Compute” and select **Compute Engine**



Demo – Create VM instance

(It takes few minutes to load..)



Click **Create**



Demo - VM instance Setting

You can check your cost of the setting.

You have \$2,338.68 free trial credits remaining

\$475.63 monthly estimate

That's about \$0.652 hourly

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

[Details](#)

Container ?

☐ Deploy a container image to this VM instance. [Learn more](#)

Boot disk ?



New 10 GB standard persistent disk

Image

Ubuntu 18.04 LTS

[Change](#)

Identity and API access ?

Service account ?

Compute Engine default service account

Access scopes ?

- ☐ Allow default access
- ☒ Allow full access to all Cloud APIs
- ☐ Set access for each API

Firewall ?

Add tags and firewall rules to allow specific network traffic from the Internet

- ☒ Allow HTTP traffic
- ☒ Allow HTTPS traffic

Taiwan region limited 1 GPU

(It takes few minutes to create VM instance)

PROVIDER INFORMATION

Management, security, disks, networking, sole tenancy

The following options have been customized:

On host maintenance

Your free trial credit will be used for this VM instance. [GCP Free Tier](#)

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

[Equivalent REST or command line](#)



Demo – Stopping VM

IMPORTANT : DON'T FORGET TO STOP YOUR VM INSTANCE AFTER YOU ARE DONE BY CLICKING ON THE THREE DOTS ON THE IMAGE ABOVE AND SELECTING STOP. OTHERWISE VM WILL KEEP CHARGING YOU ON AN HOURLY BASIS.

The screenshot shows the Google Cloud Platform console for Project123. The left sidebar shows the 'Compute Engine' section with 'VM instances' selected. The main panel displays a table of VM instances. A context menu is open for the instance 'instance-1', with the 'Stop' option highlighted. Below the table, there are 'Related Actions' such as 'View Billing Report', 'Monitor VMs', 'Explore VM logs', and 'Set up Firewall Rules'.

Name	Zone	Recommendation	In use by	Internal IP	External IP	Connect
instance-1	asia-east1-b			10.140.0.2 (nic0)	35.194.178.206	SSH

Related Actions:

- View Billing Report: View and manage your Compute Engine billing
- Monitor VMs: View outlier VMs across metrics like CPU and Network
- Explore VM logs: View, search, analyse and download VM instance logs
- Set up Firewall Rules: Control traffic to and from a VM instance



Demo – Not Stopping VM Yet

The screenshot shows the Google Cloud Platform console for Project123. The left sidebar lists various services under 'Compute Engine' and 'Storage'. The main area displays 'VM instances' with a table of instances. A context menu is open for the instance 'instance-1', with 'Start/Resume' highlighted. Below the table, there are 'Related Actions' such as 'View Billing Report', 'Monitor VMs', 'Explore VM logs', and 'Set up Firewall Rules'.

Google Cloud Platform Project123 compute

Compute Engine

Virtual machines

- VM instances
- Instance templates
- Sole-tenant nodes
- Machine images
- TPUs
- Migrate for Compute Engi...
- Committed use discounts

Storage

- Marketplace
- Release Notes

VM instances

Update from Global DNS to Zonal DNS to reduce the risk from future cross-regional outages. If you experience connection issues, you can revert this update by removing this key-value pair from the metadata page. [Learn more](#) Dismiss Update

Filter VM instances Columns

Name	Zone	Recommendation	In use by	Internal IP	External IP	Connect
instance-1	asia-east1-b			10.140.0.2 (nic0)	35.194.178.206	SSH

Related Actions

- View Billing Report: View and manage your Compute Engine billing
- Monitor VMs: View outlier VMs across metrics like CPU and Network
- Explore VM logs: View, search, analyse and download VM instance logs
- Set up Firewall Rules: Control traffic to and from a VM instance

Start/Resume

Stop

Suspend

Reset

Delete

View network details

New machine image

View logs

View monitoring

Dismiss

Click **Start/Resume** to start the VM



Demo – Create a firewall rule

(Search **VPC Network Firewall** to select **Firewall**)

The screenshot shows the Google Cloud Platform console interface. On the left, the 'VPC network' menu is expanded, and 'Firewall' is selected. The main content area displays the 'Firewall' page, which includes a description: 'Firewall rules control incoming and outgoing traffic from outside your network to resources in your network.' Below this, there is a 'Filter' section and a table of existing firewall rules. A search overlay is visible, showing results for the search query 'vpc network firewall'. The search results are divided into 'PRODUCTS & PAGES' and 'MARKETPLACE'. The 'PRODUCTS & PAGES' section lists 'Firewall' and 'VPC network'. The 'MARKETPLACE' section lists various products, including 'Citrix SD-WAN Standard Edition', 'Cloud Virtual Network', 'Cortex XSOAR', 'discrimINAT', and several 'VM-Series Next-Generation Firewall' bundles.

Name	Type
default-allow-http	Ingress
default-allow-https	Ingress
default-allow-icmp	Ingress
default-allow-internal	Ingress
default-allow-rdp	Ingress

Products & Pages	Marketplace
Firewall	Citrix SD-WAN Standard Edition
VPC network	Citrix Systems, Inc.
	Cloud Virtual Network
	Google
	Cortex XSOAR
	Palo Alto Networks, Inc.
	discrimINAT
	Chaser Systems
	VM-Series Next-Generation Firewall (Bundle1)
	Palo Alto Networks, Inc.
	VM-Series Next-Generation Firewall (Bundle2)
	Palo Alto Networks, Inc.
	VM-Series Next-Generation Firewall (BYOL and ELA)
	Palo Alto Networks, Inc.



Demo – Create a firewall rule

(Search VPC Network Firewall to select Firewall rules)

The screenshot shows the Google Cloud Platform console with the search bar containing 'vpc network firewall'. The search results are displayed in a list, with the 'Firewall' option under 'PRODUCTS & PAGES' circled. Below the search bar, there is a table of firewall rules. The table has columns for Name, Type, Ingress, Apply to all, IP ranges, Port, Action, Priority, and Direction. The first row is 'default-allow-http' with Ingress set to 'Ingress' and Action set to 'Allow'. The second row is 'default-allow-https' with Ingress set to 'Ingress' and Action set to 'Allow'. The third row is 'default-allow-icmp' with Ingress set to 'Ingress' and Action set to 'Allow'. The fourth row is 'default-allow-internal' with Ingress set to 'Ingress' and Action set to 'Allow'. The fifth row is 'default-allow-rdp' with Ingress set to 'Ingress' and Action set to 'Allow'.

(It takes few minutes to create VM instance)
Then, click Create Firewall Rule
Follow the setting in the right to create firewall rule

Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. [Learn more](#)

Name Name is permanent.

Description (Optional)

Logs
Turning on firewall logs can generate a large number of logs which can increase costs in

Create a firewall rule

Priority
Priority can be 0 - 65535 [Check priority of other firewall rules.](#)

Direction of traffic
☒ Ingress
☐ Egress

Action on match
☒ Allow
☐ Deny

Targets

Source filter

Source IP ranges

Second source filter

Protocols and ports
☒ Allow all
☒ Specified protocols and ports
☐ tcp:
☐ udp:
☐ Other protocols

[Disable rule](#)



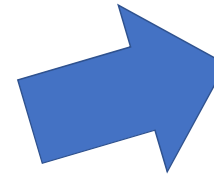
Demo - External IP addresses

Select External IP address

Then Reserve Static Address

The screenshot shows the Google Cloud Platform interface for VPC networks. The left sidebar has 'External IP addresses' selected. The main content area shows 'External IP addresses' with a description and a 'RESERVE STATIC ADDRESS' button. Below this is a table of external IP addresses.

Name	External Address	Region	Type	Version	In use by
myfirstproject	104.199.174.179	asia-east1	Static	IPv4	VM instance instance-1 (Zone asia-east1-b)



The screenshot shows the 'Reserve a static address' form. The fields are: Name (myfirstproject), Description (empty), Network Service Tier (Premium), IP version (IPv4), Type (Regional), Region (asia-east1 (Taiwan)), and Attached to (instance-1). The 'RESERVE' button is highlighted.



Input Name
Select Asia-East and Instance 1 and
Click Reserve



Demo – Start VM and install Anaconda

Select for VM instance

Scroll the right of Instances, we can get 3 dots

Click Start/Resume

Then SSH will be turned on, and we click SSH, then VM will be pop-out.

Google Cloud Platform Project123 VM instances

Compute Engine VM instances CREATE INSTANCE IMPORT VM REFRESH START / RESUME STOP LEARN HIDE INFO PANEL

Virtual machines VM instances Instance templates Sole-tenant nodes Machine images TPUs Migrate for Compute Engi... Committed use discounts

Storage Marketplace Release Notes

INSTANCES INSTANCE SCHEDULE

Filter Enter property name or value

Recommendations	In use by	Internal IP	External IP	Connect
		10.140.0.2 (nic0)	104.199.174.174	SSH

Related Actions

- View Billing Report: View and manage your Compute Engine billing
- Monitor VMs: View outlier VMs across metrics like CPU and Network
- Explore VM Logs: View, search, analyze, and download VM instance logs
- Setup Firewall Rules: Control traffic to and from a VM instance
- Manage VMs: Manage VMs

Select an instance

PERMISSIONS LABELS MONITORING

Please select at least one resource.

Start / Resume

Stop Suspend Reset Delete View network details Create new machine image View logs View monitoring



Demo – Start VM and install Anaconda

Copy and paste the following one by one in the VM Prompt to install Anaconda

```
wget https://repo.continuum.io/archive/Anaconda3-2019.10-Linux-x86_64.sh
bash Anaconda3-2019.10-Linux-x86_64.sh
source ~/.bashrc
jupyter notebook --ip=0.0.0.0 --port=8888 --no-browser &
```

1. `wget https://repo.continuum.io/archive/Anaconda3-2019.10-Linux-x86_64.sh`

```
*** System restart required ***
Last login: Wed Apr 28 06:57:14 2021 from 35.235.240.33
billioxco1@instance-1:~$ wget https://repo.continuum.io/archive/Anaconda3-2019.10-Linux-x86_64.sh
--2021-04-28 07:08:46-- https://repo.continuum.io/archive/Anaconda3-2019.10-Linux-x86_64.sh
Resolving repo.continuum.io (repo.continuum.io)... 104.18.201.79, 104.18.200.79, 2606:4700::6812:c84f, ...
Connecting to repo.continuum.io (repo.continuum.io)|104.18.201.79|:443... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://repo.anaconda.com/archive/Anaconda3-2019.10-Linux-x86_64.sh [following]
--2021-04-28 07:08:46-- https://repo.anaconda.com/archive/Anaconda3-2019.10-Linux-x86_64.sh
Resolving repo.anaconda.com (repo.anaconda.com)... 104.16.130.3, 104.16.131.3, 2606:4700::6810:8303, ...
Connecting to repo.anaconda.com (repo.anaconda.com)|104.16.130.3|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 530308481 (506M) [application/x-sh]
Saving to: 'Anaconda3-2019.10-Linux-x86_64.sh.1'

Anaconda3-2019.10-Linux-x86_64.sh.1 100%[=====>] 505.74M 208MB/s in 2.4s
```

2. `bash Anaconda3-2019.10-Linux-x86_64.sh`

```
oscarchangml@instance-2:~$ bash Anaconda3-2019.10-Linux-x86_64.sh

Welcome to Anaconda2 2019.10

In order to continue the installation process, please review the license
agreement.
Please, press ENTER to continue
>>>
Anaconda End User License Agreement

Copyright 2015, Anaconda, Inc.

All rights reserved under the 3-clause BSD License:

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer.
```

Keep Clicking Enter
then
Type Yes
then

Press Enter 2 times

Type Yes

```
Preparing transaction: done
Executing transaction: done
installation finished.
Do you wish the installer to initialize Anaconda3
by running conda init? [yes|no]
[no] >>> 
```

3. `source ~/.bashrc`

```
oscarchangml@instance-1:~$ source ~/.bashrc
oscarchangml@instance-1:~$
```

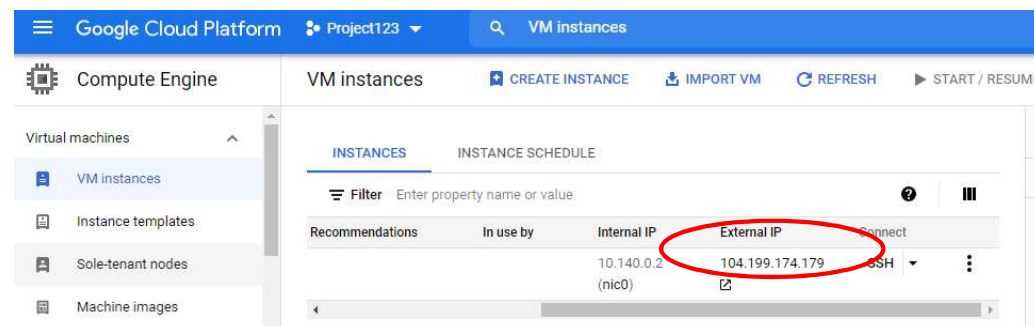
Demo – Open Jupyter Notebook

4. Type
jupyter notebook --ip=0.0.0.0 --port=8888 --no-browser &

Copy the link from VM

```
To access the notebook, open this file in a browser:
file:///home/oillioxcc1/.local/share/jupyter/runtime/nbserver-15725-open.html
Or copy and paste one of these URLs:
http://instance-1:8888/?token=ebc1b94990f9bf0af6960e3fca8f6a1064994e80a25196b4
or http://127.0.0.1:8888/?token=ebc1b94990f9bf0af6960e3fca8f6a1064994e80a25196b4
(base) oillioxcc1@instance-1:~$
```

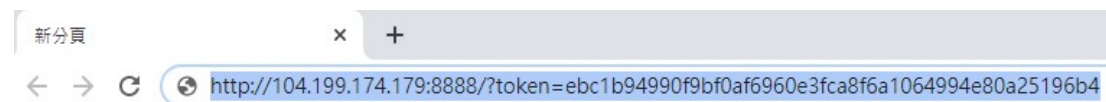
Go back to google cloud VM instance to find your External IP



Then, we can use Jupyter Notebook in VM.

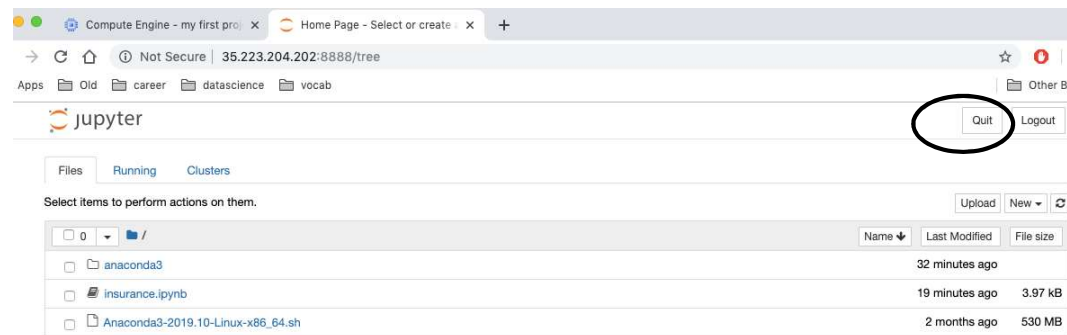


Copy the url from VM and replace instance-1 with your External IP in google cloud

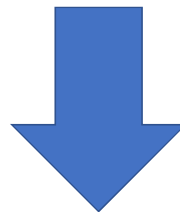




Demo – Close jupyter notebook



Click Quit to quit the jupyter notebook



```
08:41:26.798 NotebookApp]
To access the notebook, open this file in a browser:
    file:///home/oscarchangml/.local/share/jupyter/runtime/nbserver-5949-open.html
Or copy and paste one of these URLs:
    http://instance-1:8888/?token=eeb4040c2509f4f68e7e369cf7f7f5a7f757807fae6f3c9e
    or http://127.0.0.1:8888/?token=eeb4040c2509f4f68e7e369cf7f7f5a7f757807fae6f3c9e
08:41:41.647 NotebookApp] 302 GET /?token=eeb4040c2509f4f68e7e369cf7f7f5a7f757807fae6f3c9e (42.200.145.1) 0.71ms
08:42:18.072 NotebookApp] Shutting down on /api/shutdown request.
08:42:18.073 NotebookApp] Shutting down 0 kernels
C
[1]+  Done                  jupyter notebook --ip=0.0.0.0 --port=8888 --no-browser
(base) oscarchangml@instance-1:~$
```

Control C



Demo – Stopping VM

IMPORTANT : DON'T FORGET TO STOP YOUR VM INSTANCE AFTER YOU ARE DONE BY CLICKING ON THE THREE DOTS ON THE IMAGE ABOVE AND SELECTING STOP. OTHERWISE VM WILL KEEP CHARGING YOU ON AN HOURLY BASIS.

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- Explore VM logs: View, search, analyse and download VM instance logs
- Set up Firewall Rules: Control traffic to and from a VM instance



Cloud Storage



Agenda

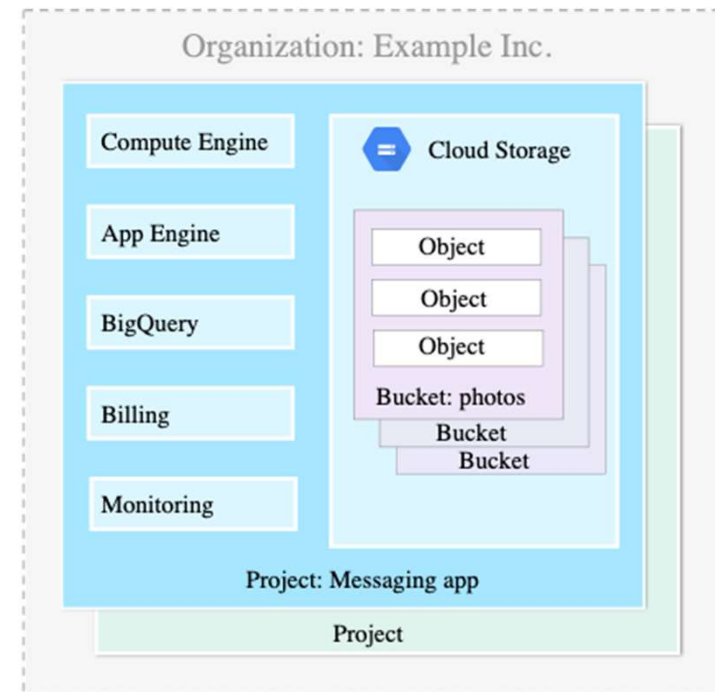
- What is Cloud Storage
- Create a Storage bucket on the Cloud



Cloud Storage

Cloud Storage is a service for storing your objects in Google Cloud

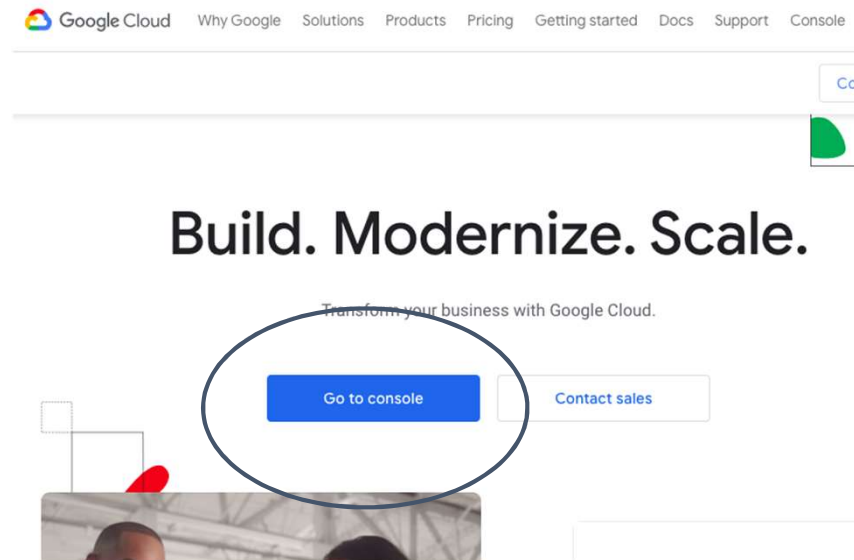
After you create a project, you can create Cloud Storage buckets, upload objects to your buckets, and download objects from your buckets.



Demo

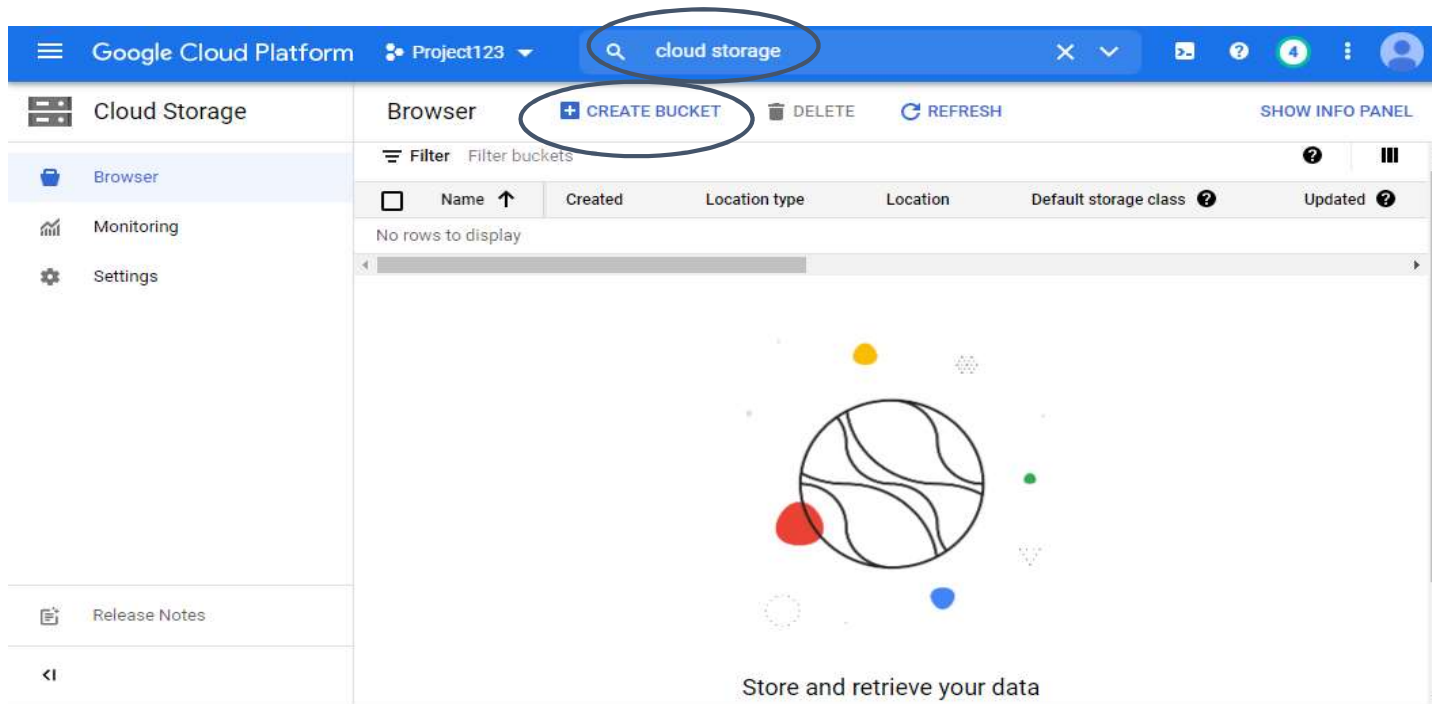


<https://cloud.google.com/>





Demo - Cloud Storage



- Search for Cloud Storage
- In the page of Cloud Storage, click Create Bucket



Demo – Create a bucket

My First Project ▼ 🔍 📧 ? 🔔 ⋮

← Create a bucket 📄 ESTIMATE C

- **Name your bucket**
Pick a globally unique, permanent name. [Naming guidelines](#)

Tip: Don't include any sensitive information
CONTINUE
- Choose where to store your data
- Choose a default storage class for your data
- Choose how to control access to objects
- Advanced settings (optional)

CREATE CANCEL

- Create name for the bucket
- And click Create



Demo – Upload a file

The screenshot shows the Google Cloud Storage console interface. On the left is a sidebar with navigation options: Storage, Browser, Transfer, Transfer for on-premises, Transfer Appliance, and Settings. The 'Storage' section is active, showing 'Bucket details' for 'myfirstbucket1223'. The 'Objects' tab is selected. In the 'Objects' tab, the 'Upload files' button is circled in blue. Other buttons visible are 'Upload folder', 'Create folder', 'Manage holds', and 'Delete'. Below the buttons is a search bar labeled 'Filter by prefix...'. The main content area shows a message: 'There are no live objects in this bucket. If you have object versioning enabled, this bucket may contain archived versions of objects, which aren't visible in the console. You can list archived object versions using [gsutil](#) or [the APIs](#).' At the bottom, there is a large grey circle with a white document icon and a plus sign, containing the text 'Drop files here or use the upload button'.

- Upload files
- (upload insurance.csv in today's student material in share drive)



Demo – File metadata

myfirstbucket1223

Objects Overview Permissions Bucket Lock

Upload files Upload folder Create folder Manage holds Delete

Filter by prefix...

Buckets / myfirstbucket1223

Name	Size	Type	Storage class	Last modified	Public access	Encryption	Retention expiration date	Holds
insurance.csv	49.09 KB	text/csv	Standard	12/30/19, 10:43:32 AM UTC+8	Not public	Google-managed key	-	None



Buckets > myfirstbucket11223 > insurance.csv

Overview

Type	application/vnd.ms-excel
Size	49.1 KB
Created	Apr 28, 2021, 5:24:43 PM
Last modified	Apr 28, 2021, 5:24:43 PM
Custom time	—
Public URL	Not applicable
Authenticated URL	https://storage.cloud.google.com/myfirstbucket11223/insurance.csv?authuser=2
gsutil URI	gs://myfirstbucket11223/insurance.csv
Permissions	
Public access	Not public
Protection	
Hold status	None
Retention policy	None

URL

We will use VM to open jupyter notebook and load the csv file in cloud to pandas



Cloud Computing & Storage



Agenda

- Access the VM and open jupyter notebook on the cloud



Demo – Access the VM

Compute Engine

VM instances

CREATE INSTANCE

SHOW INFO PANEL

LEARN

Filter VM instances

Columns

<input type="checkbox"/>	Name ^	Zone	Recommendation	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	<input checked="" type="checkbox"/> instance-1	us-central1-a			10.128.0.2 (nic0)	35.222.231.64	SSH

Start the VM Instance, and click SSH



Demo – Open Jupyter Notebook

jupyter notebook --ip=0.0.0.0 --port=8888 --no-browser &

```
(base) oscarchangml@instance-3:~$ jupyter notebook --ip=0.0.0.0 --port=8888 --no-browser &
[2] 5191
(base) oscarchangml@instance-3:~$ jupyter notebook --ip=0.0.0.0 --port=8888 --no-browser
(base) oscarchangml@instance-3:~$ cd /home/oscarchangml/anaconda2/lib/python2.7/site-packages/jupyterlab
anaconda2/lib/python2.7/site-packages/jupyterlab
[1] 07:14:59.633 NotebookApp] JupyterLab application directory is /home/oscarchangml/anaconda2/share/jupyter/lab
[1] 07:14:59.640 NotebookApp] Serving notebooks from local directory: /home/oscarchangml
[1] 07:14:59.640 NotebookApp] The Jupyter Notebook is running at:
[1] 07:14:59.641 NotebookApp] http://(instance-3 or 127.0.0.1):8888/?token=94afada48275c666ac4e78c234e09c0f89eeae1036b25525
[1] 07:14:59.641 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 07:14:59.644 NotebookApp]

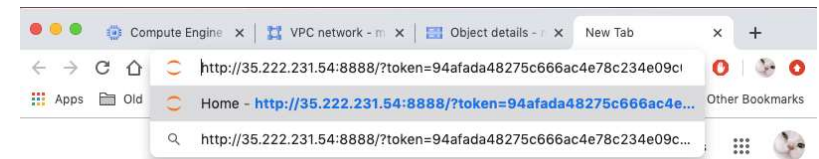
To access the notebook, open this file in a browser:
file:///home/oscarchangml/.local/share/jupyter/runtime/nbserver-5191-open.html
Or copy and paste this URL into your browser:
http://(instance-3 or 127.0.0.1):8888/?token=94afada48275c666ac4e78c234e09c0f89eeae1036b25525
[1] 07:15:32.480 NotebookApp] 302 GET / (42.200.145.1) 0.61ms
[1] 07:15:32.480 NotebookApp] 302 GET /?token=94afada48275c666ac4e78c234e09c0f89eeae1036b25525 (42.200.145.1) 0.53ms
```



Google Cloud Platform my first project						
Compute Engine						
VM instances						
Filter VM instances						
Columns						
<input type="checkbox"/>	Name	Zone	Recommendation	In use by	Internal IP	External IP
<input checked="" type="checkbox"/>	instance-1	us-central1-a			10.128.0.6 (nic0)	35.222.231.54



External IP:8888/?token=94afada48275c666ac4e78c234e09c0f89eeae1036b25525





Demo – Install gcsfs

pip install "gcsfs==0.6.0"

```
jupyter Untitled Last Checkpoint: 41 分鐘前 (unsaved changes) Logout
File Edit View Insert Cell Kernel Widgets Help Trusted Python 3
In [5]: !pip install "gcsfs==0.6.0"
Collecting gcsfs==0.6.0
  Downloading https://files.pythonhosted.org/packages/3e/9f/864a9ff497ed4ba12502c4037db8c66fde0049d9dd0388bd55b67e5c4249/gcsfs-0.6.0-py2.py3-none-any.whl
Collecting google-auth>=1.2 (from gcsfs==0.6.0)
  Using cached https://files.pythonhosted.org/packages/d2/c1/44179a1cfc5c3b5832a5f9c925161612471ec5f346bcd186235651d74f35/google-auth-1.30.0-py2.py3-none-any.whl
Collecting google-auth-oauthlib (from gcsfs==0.6.0)
  Using cached https://files.pythonhosted.org/packages/9d/d3/7541e89f1fc456eef157224f597a8bba22589db6369a03eaba68c11f07a0/google-auth-oauthlib-0.4.4-py2.py3-none-any.whl
Requirement already satisfied: requests in ./anaconda3/lib/python3.7/site-packages (from gcsfs==0.6.0) (2.22.0)
Collecting fsspec>=0.6.0 (from gcsfs==0.6.0)
  Using cached https://files.pythonhosted.org/packages/e9/91/2ef649137816850fa4f4c97c6f2eabb1a79bf0aa2c8ed198e387e373455e/fsspec-2021.4.0-py3-none-any.whl
Requirement already satisfied: decorator in ./anaconda3/lib/python3.7/site-packages (from gcsfs==0.6.0) (4.4.0)
Collecting rsa<5,>=3.1.4; python_version >= "3.6" (from google-auth>=1.2->gcsfs==0.6.0)
  Using cached https://files.pythonhosted.org/packages/e9/93/0c0f002031f18b53af7a6166103c02b9c0667be528944137cc954ec921b3/rsa-4.7.2-py3-none-any.whl
Collecting pyasn1-modules>=0.2.1 (from google-auth>=1.2->gcsfs==0.6.0)
  Using cached https://files.pythonhosted.org/packages/95/de/214830a981892a3e286c3794f41ae67a4495df1108c3da8a9f62159b9a9d/pyasn1-modules-0.2.8-py2.py3-none-any.whl
Collecting cachetools<5.0,>=2.0.0 (from google-auth>=1.2->gcsfs==0.6.0)
  Using cached https://files.pythonhosted.org/packages/bf/28/c4f5796c67ad06bb91d98d543a5e01805c1ff065e08871f78e52d2a331ad/cachetools-4.2.2-py3-none-any.whl
Requirement already satisfied: setuptools>=40.3.0 in ./anaconda3/lib/python3.7/site-packages (from google-auth>=1.2->gcsfs==0.6.0) (41.4.0)
Requirement already satisfied: six>=1.9.0 in ./anaconda3/lib/python3.7/site-packages (from google-auth>=1.2->gcsfs==0.6.0) (1.16.0)
```



Demo – Open csv by pandas

```
jupyter insurance Last Checkpoint: 2 minutes ago (unsaved changes) Logout
```

```
Edit View Insert Cell Kernel Widgets Help Trusted Kernel
```

```
In [1]: import pandas as pd
df = pd.read_csv('gs://myfirstbucket1223/insurance.csv')
```

```
In [2]: df.head()
```

```
Out[2]:
```

	age	sex	bmi	children	smoker	region	expenses
0	19	female	27.9	0	yes	southwest	16884.92
1	18	male	33.8	1	no	southeast	1725.55
2	28	male	33.0	3	no	southeast	4449.46
3	33	male	22.7	0	no	northwest	21984.47
4	32	male	28.9	0	no	northwest	3866.86

```
import pandas as pd
df = pd.read_csv([URL see p.36])
```



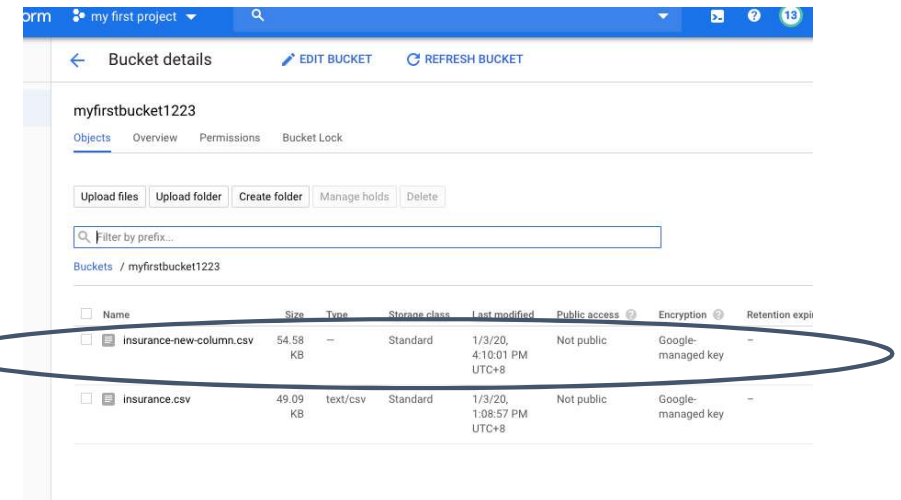
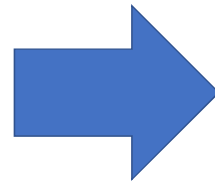
Demo – Output csv by pandas

```
jupyter insurance Last Checkpoint: 4 minutes ago (unsaved changes) Logout
File Edit View Insert Cell Kernel Widgets Help Trusted Kernel
+ -> Run C Code
1 18 male 33.8 1 no southeast 1725.55
2 28 male 33.0 3 no southeast 4449.46
3 33 male 22.7 0 no northwest 21984.47
4 32 male 28.9 0 no northwest 3866.86

In [3]: new_df = df
new_df['new column'] = new_df.index
new_df.head()

Out[3]:
   age  sex  bmi  children  smoker  region  expenses  new column
0  19  female  27.9      0    yes  southwest  16884.92      0
1  18   male  33.8      1    no   southeast  1725.55      1
2  28   male  33.0      3    no   southeast  4449.46      2
3  33   male  22.7      0    no  northwest  21984.47      3
4  32   male  28.9      0    no  northwest  3866.86      4

In [4]: new_df.to_csv('gs://myfirstbucket1223/insurance-new-column.csv', index=False, sep=',')
```



[your output df].to_csv('gs://[your bucket name]/[filename].csv', index=False, sep=',')

Ex.1

- Put other csv to the storage bucket and open it in the VM
- Do data visualization and model on the data set
- Output your new preprocessed df to bucket