1. What is a GCP VM?

- A **Virtual Machine (VM)** is a virtualized computing instance that runs on Google's infrastructure.
- Offered via **Google Compute Engine (GCE)**.
- You can run Linux or Windows OS.
- Comparable to AWS EC2 or Azure Virtual Machines.

Instance	The actual VM you create.
Machine Type	Specifies CPU, memory, and vCPUs. Eg: e2-micro, n1-standard-1.
Image	OS used: Ubuntu, Debian, Windows, etc.
Disk	Boot disk and additional storage (Persistent, SSD, Local SSD).
Network	VPC, firewall rules, external IPs.
Zone/Region>>>	Geographic placement of your VM. Eg: us-central1-a

Abhi

SSH Key

Upload or auto-generate public SSH keys

Networking

- **Internal IP**: Private, used inside VPC.
- **External IP**: Public, allows internet access.
- **Firewall Rules**: Allow specific ports (e.g., 22 for SSH, 80 for HTTP).
- **NAT**: Needed for internet access if no external IP is assigned.

Billed per second (after 1-minute minimum).

GCP doesn't have an inbuilt option to create key pair like AWS or Azure so we need to create it outside and then add it to the google cloud.

Abhi

Two option to add it

1.Add in the metadata

Steps >>>go to cmd

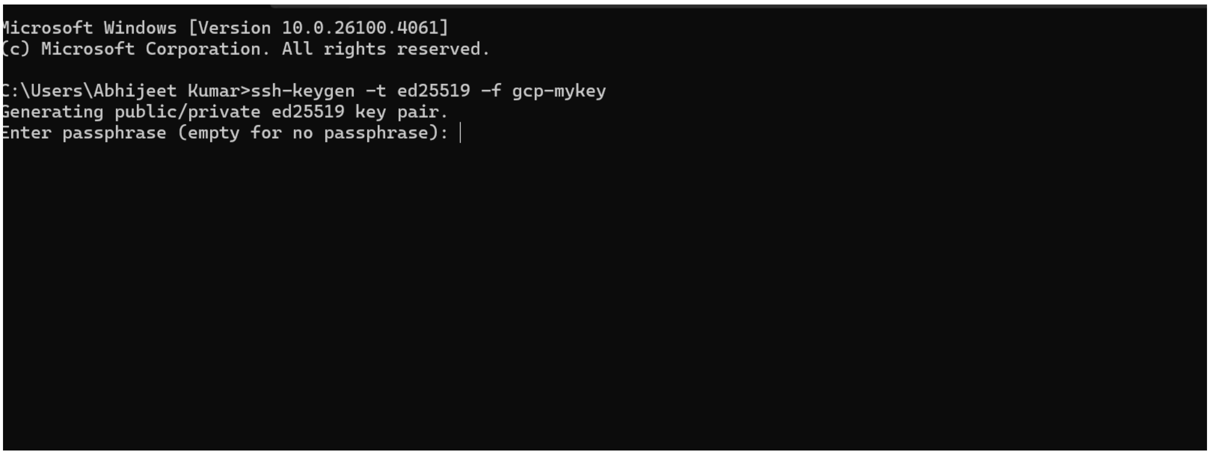
Enter: ssh-keygen -t ed25519 -f gcp-mykey

Also

ssh-keygen -t ed25519 -f gcp-mykey -C username of gcp

-t is for the algo used to create key pair ,another option is rsa

-f is for the file name ,you can also change the path from here like D:\filename

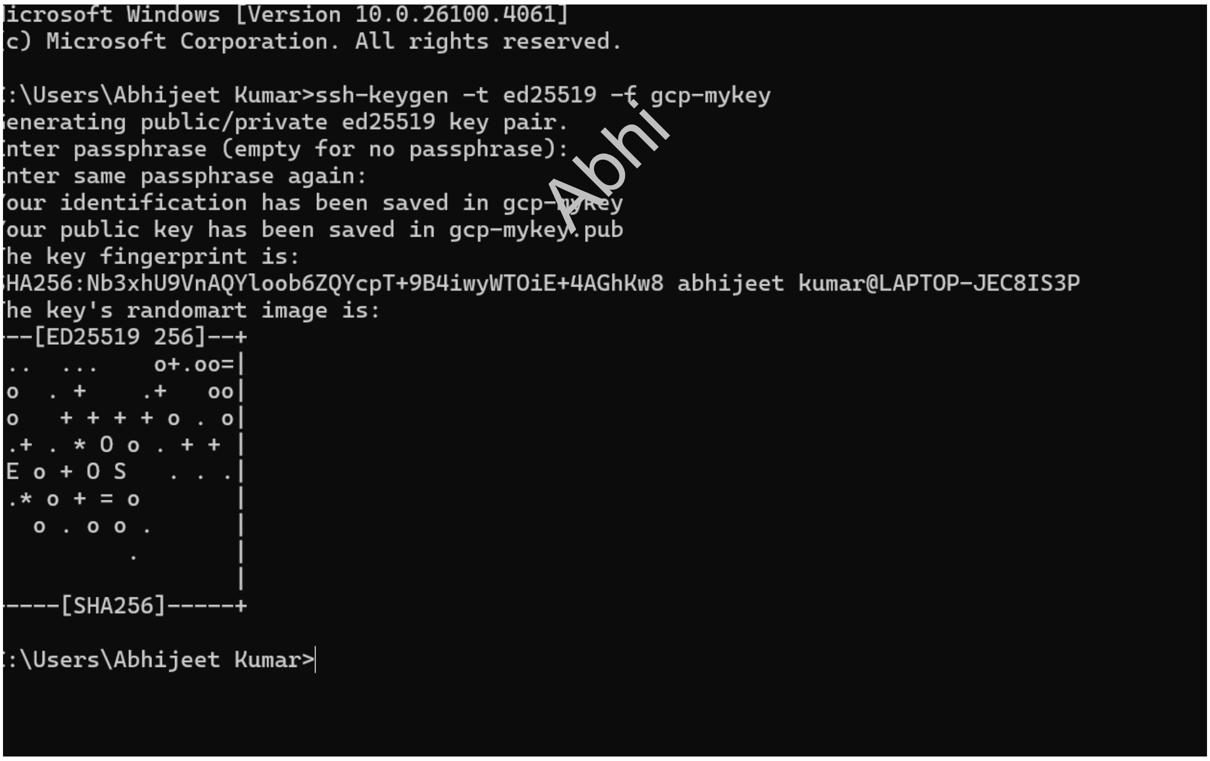


```
icrosoft Windows [Version 10.0.26100.4061]
(c) Microsoft Corporation. All rights reserved.

:\Users\Abhijeet Kumar>ssh-keygen -t ed25519 -f gcp-mykey
enerating public/private ed25519 key pair.
nter passphrase (empty for no passphrase):
```

Press enter once you see Enter passphrase

Again press enter once you see **Enter same passphrase again**:



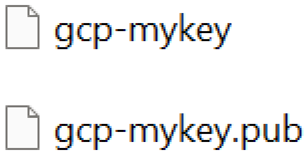
```
icrosoft Windows [Version 10.0.26100.4061]
c) Microsoft Corporation. All rights reserved.

:\Users\Abhijeet Kumar>ssh-keygen -t ed25519 -f gcp-mykey
enerating public/private ed25519 key pair.
nter passphrase (empty for no passphrase):
nter same passphrase again:
our identification has been saved in gcp-mykey
our public key has been saved in gcp-mykey.pub
he key fingerprint is:
HA256:Nb3xhU9VnAQYloob6ZQYcpT+9B4iwyWTOiE+4AGhKw8 abhijeet kumar@LAPTOP-JEC8IS3P
he key's randomart image is:
--[ED25519 256]--+
..  ...    o+.oo=|
o  . +    .+   oo|
o   + + + + o . o|
.+ . * O o . + + |
E o + O S   . . .|
.* o + = o       |
  o . o o .      |
         .       |
                 |
-----[SHA256]-----+

:\Users\Abhijeet Kumar>
```

Abhi

Key created successfully in the path C:\Users\Abhijeet Kumar which is mentioned above

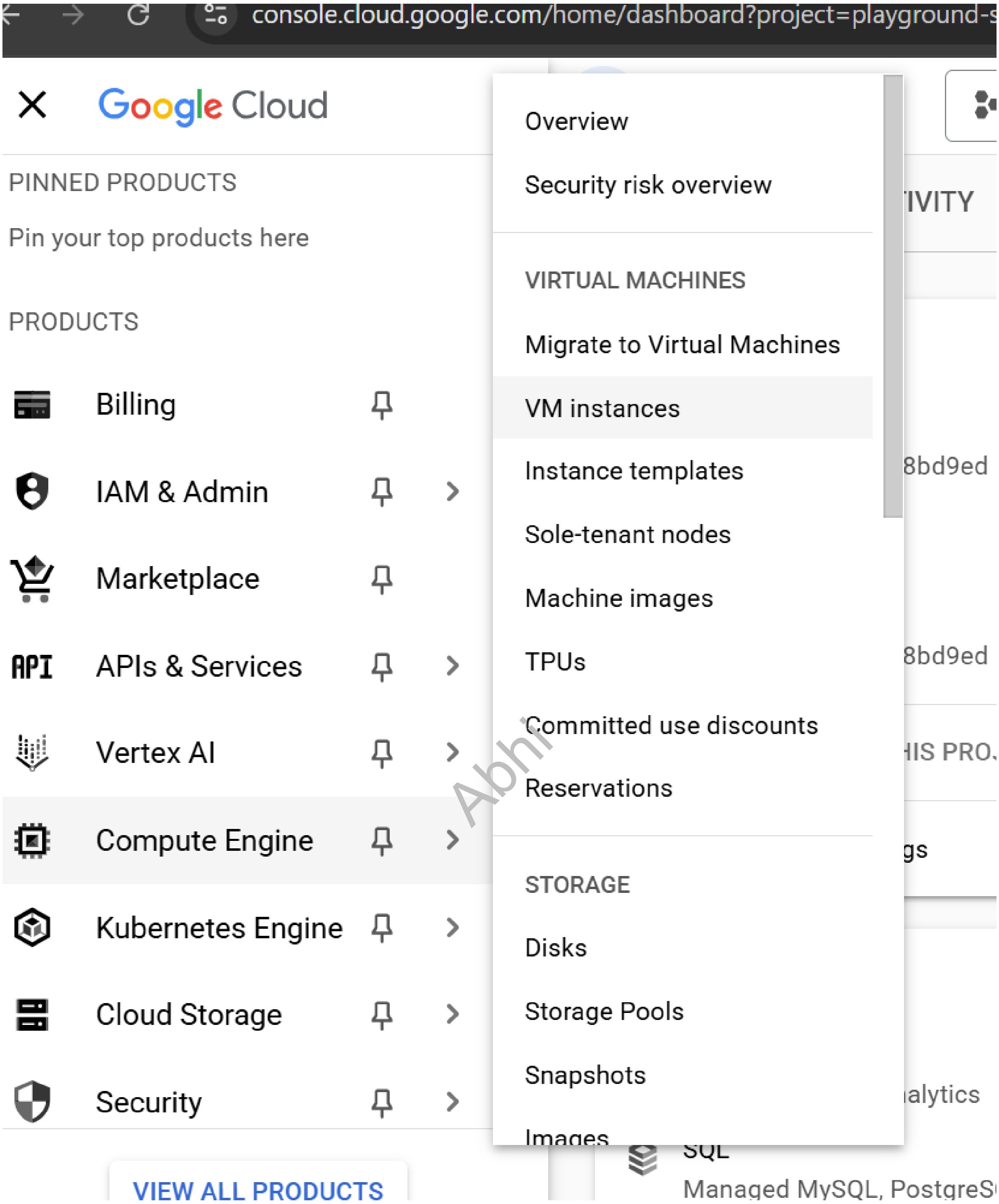

gcp-mykey
gcp-mykey.pub

Go the path and copy the content from gcp-mykey.pub

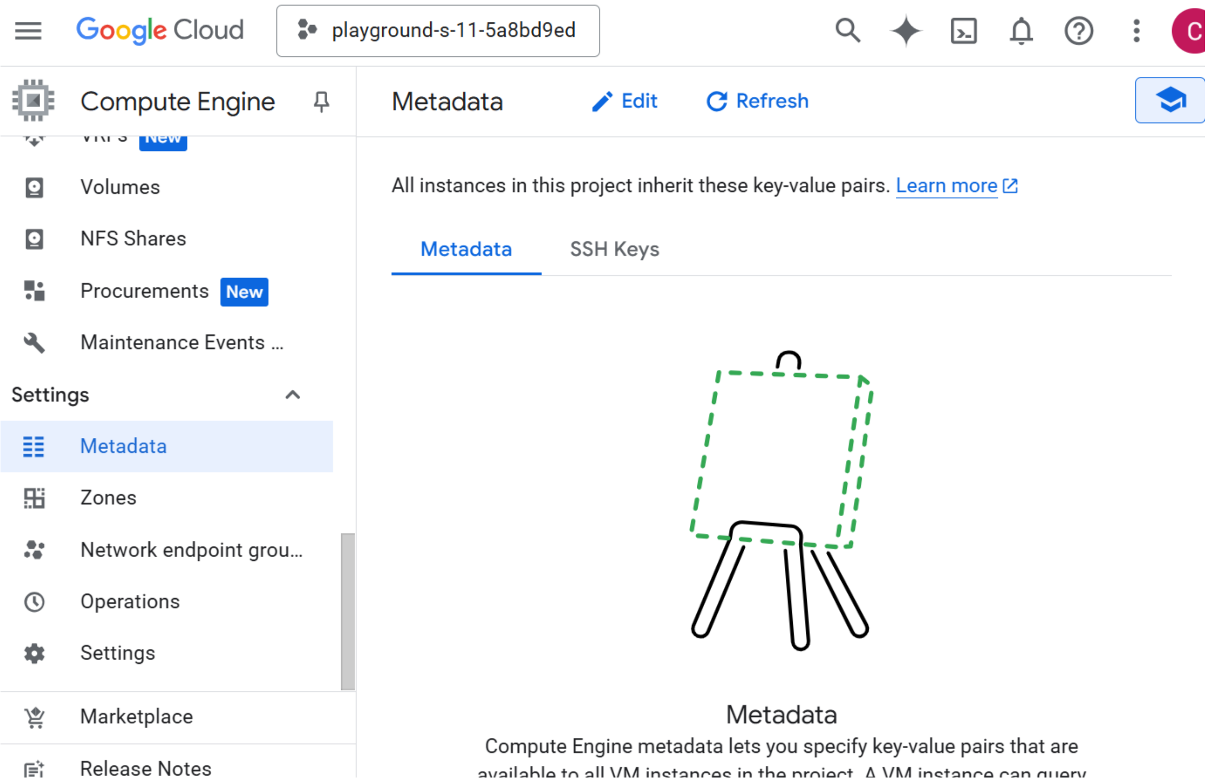
Go to compute engine and

Click on VM instances

Abhi


console.cloud.google.com/home/dashboard?project=playground-s
Google Cloud
PINNED PRODUCTS
Pin your top products here
PRODUCTS
Billing
IAM & Admin
Marketplace
APIs & Services
Vertex AI
Compute Engine
Kubernetes Engine
Cloud Storage
Security
VIEW ALL PRODUCTS
Overview
Security risk overview
VIRTUAL MACHINES
Migrate to Virtual Machines
VM instances
Instance templates
Sole-tenant nodes
Machine images
TPUs
Committed use discounts
Reservations
STORAGE
Disks
Storage Pools
Snapshots
Images
SQL
Managed MySQL, PostgreS

On the left hand side there is an option called as metadata >>click on that


Google Cloud
playground-s-11-5a8bd9ed
Compute Engine
Metadata
Edit
Refresh
Volumes
NFS Shares
Procurements New
Maintenance Events ...
Settings
Metadata
Zones
Network endpoint grou...
Operations
Settings
Marketplace
Release Notes
Metadata
SSH Keys

All instances in this project inherit these key-value pairs. Learn more

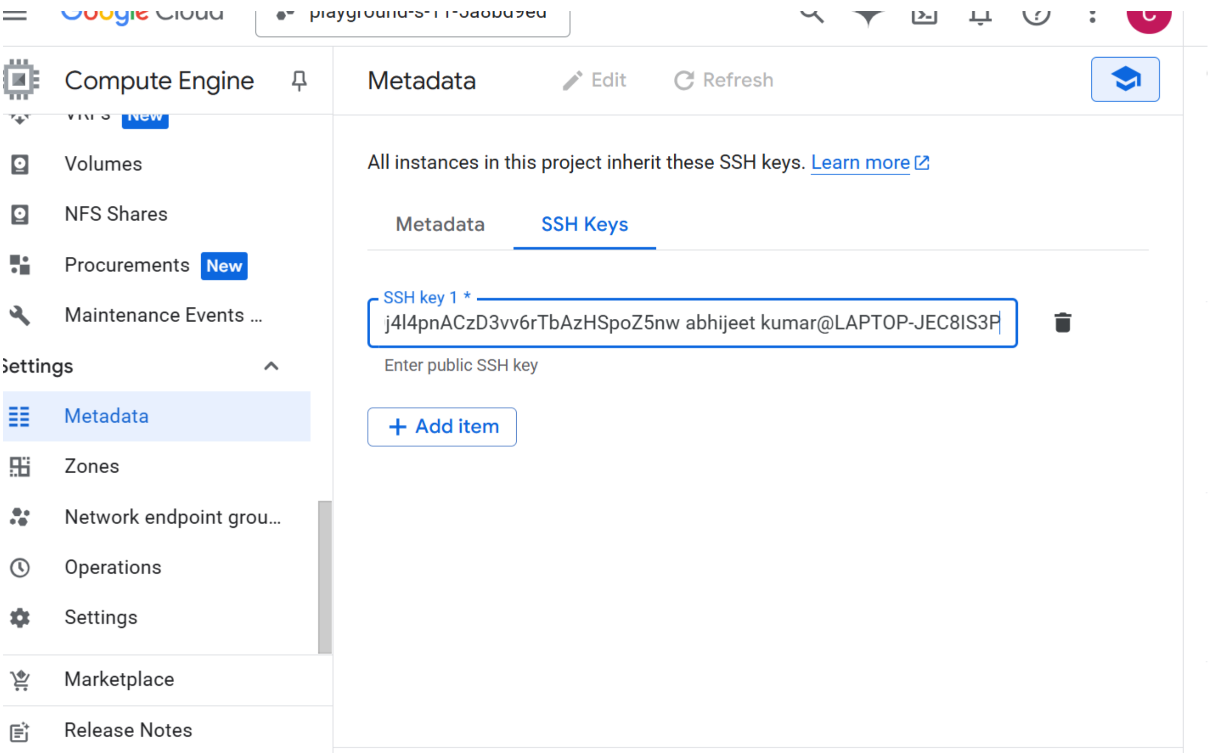
Metadata

Compute Engine metadata lets you specify key-value pairs that are

Abhi

Click on tab SSH keys

Enter the pub key


Compute Engine
Volumes
NFS Shares
Procurements New
Maintenance Events ...
Settings
Metadata
Zones
Network endpoint grou...
Operations
Settings
Marketplace
Release Notes
Metadata
Edit
Refresh
Metadata
SSH Keys
Add item

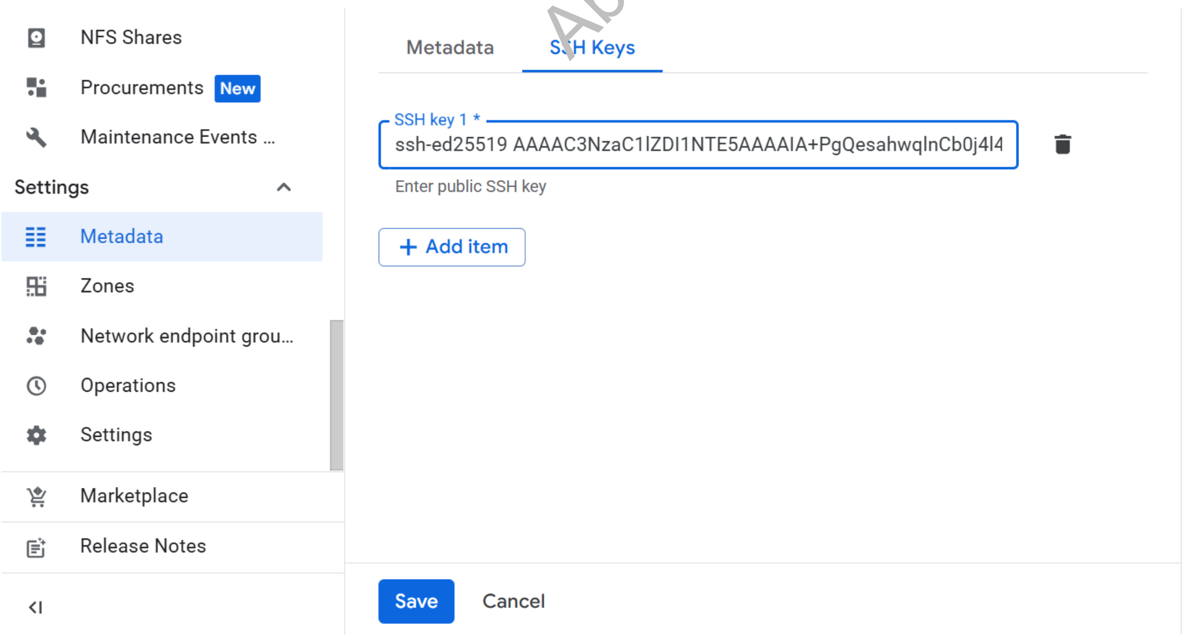
All instances in this project inherit these SSH keys. Learn more

SSH key 1 *: j4l4pnACzD3vv6rTbAzHSpoZ5nw abhijeet kumar@LAPTOP-JEC8IS3P

Enter public SSH key

Click on SAVE in bottom

Abhi

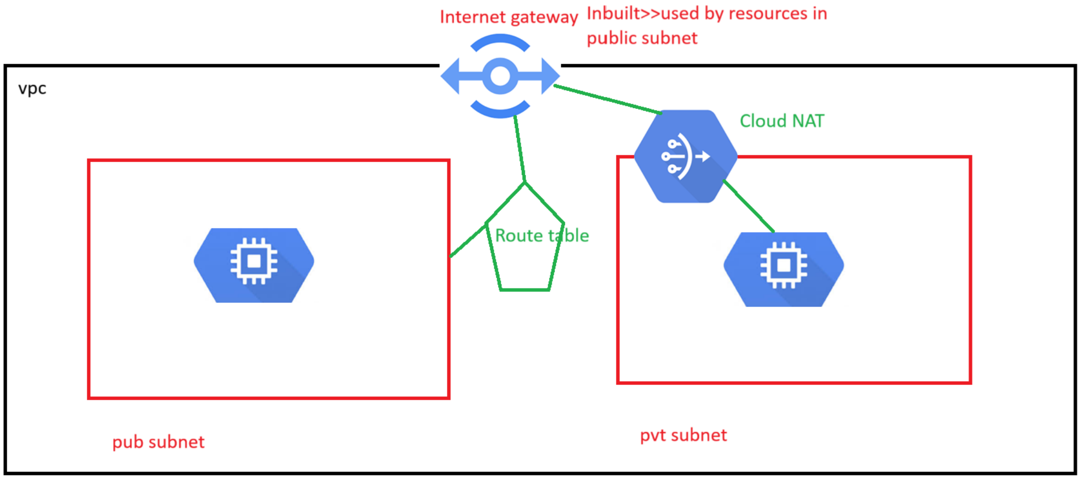

NFS Shares
Procurements New
Maintenance Events ...
Settings
Metadata
Zones
Network endpoint grou...
Operations
Settings
Marketplace
Release Notes
Metadata
SSH Keys
Add item
Save
Cancel

SSH key 1 *: ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIA+PgQesahwqlnCb0j4l4

Enter public SSH key

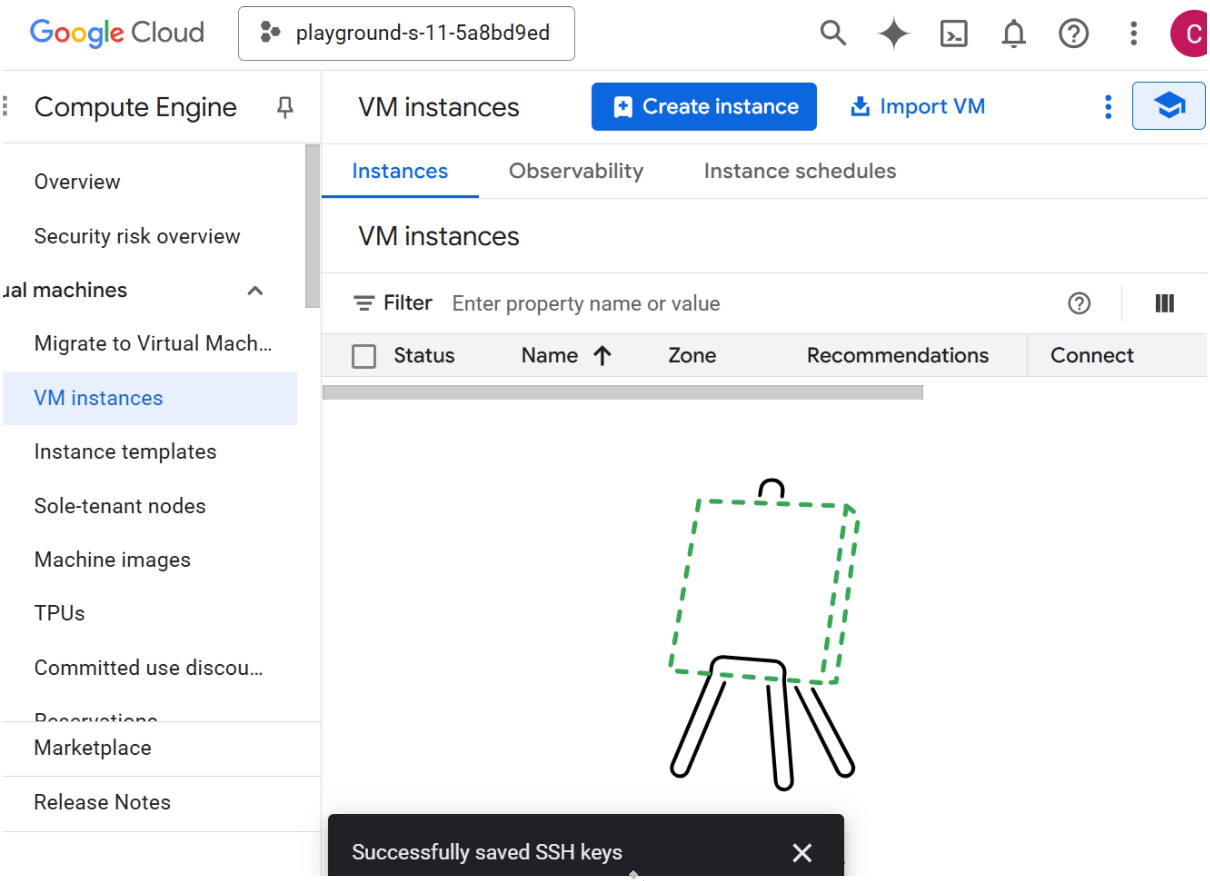
Now our task is to create a private server and install webserver with file in it but the issue is we cant connect to Pvt server directly from outside GCP console

Ex via mobaxterm


Internet gateway
Inbuilt>>used by resources in public subnet
vpc
Cloud NAT
Route table
pub subnet
pvt subnet

Abhi

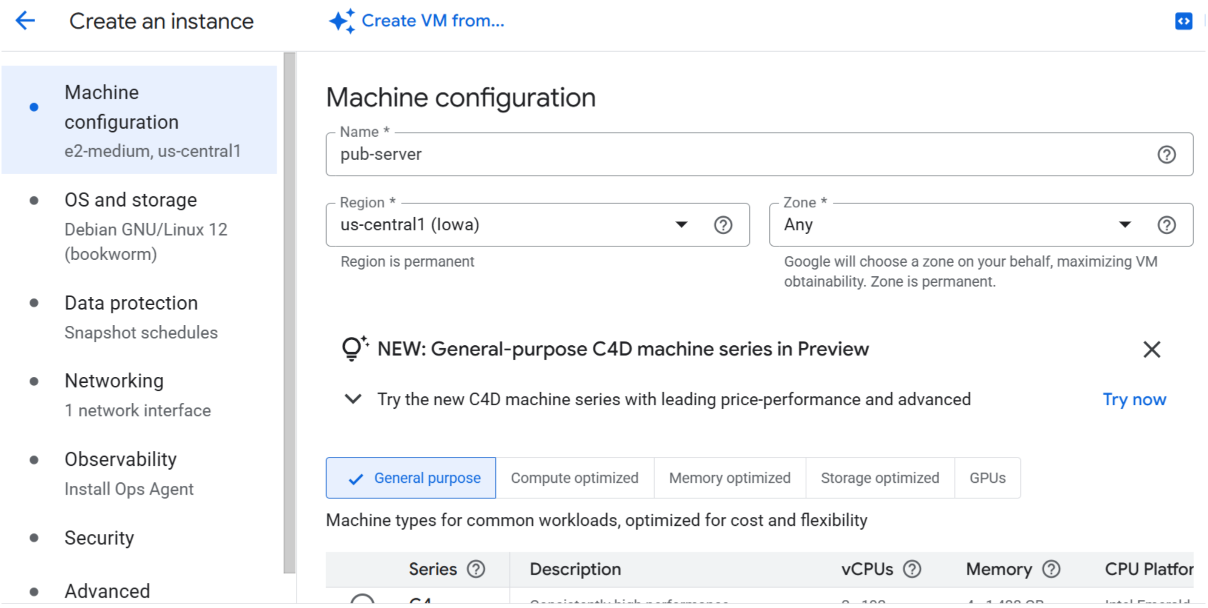
Click on create instances


Google Cloud
playground-s-11-5a8bd9ed
Compute Engine
VM instances
Create instance
Import VM
Instances
Observability
Instance schedules
VM instances
Filter Enter property name or value
Status
Name
Zone
Recommendations
Connect
Overview
Security risk overview
ual machines
Migrate to Virtual Mach...
VM instances
Instance templates
Sole-tenant nodes
Machine images
TPUs
Committed use discou...
Marketplace
Release Notes

Successfully saved SSH keys

Enter the name

Abhi


Create an instance
Create VM from...
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
GPUs
Series
Description
vCPUs
Memory
CPU Platfor

Machine configuration

Name * pub-server

Region * us-central1 (Iowa)

Region is permanent

Zone * Any

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

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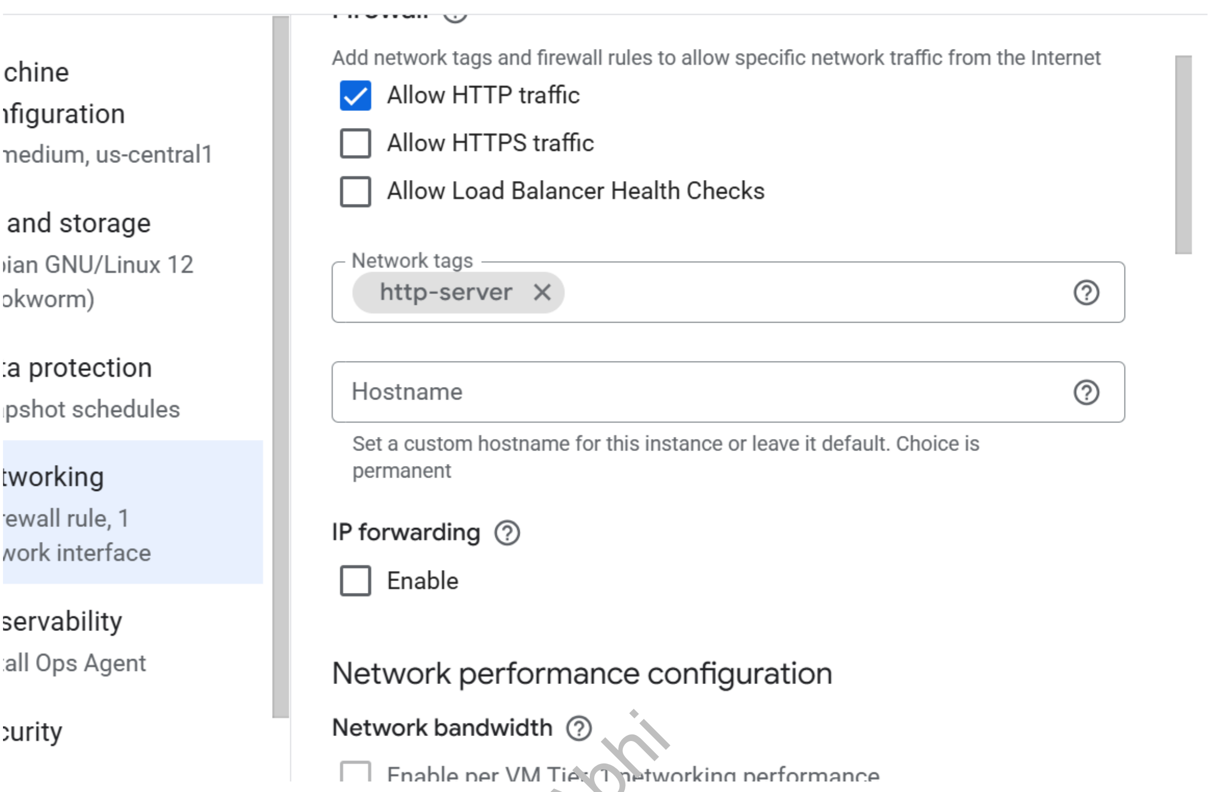
Try the new C4D machine series with leading price-performance and advanced Try now

Machine types for common workloads, optimized for cost and flexibility

Go to networking tab in left side

Also enable firewall rule in the VPC to connect via SSH and select option as for all VM instead of targeting VM with specific tags


chine
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and storage
ıian GNU/Linux 12
okworm)
:a protection
ıpshot schedules
tworking
ewall rule, 1
vork interface
servability
all Ops Agent
curity

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

☑ Allow HTTP traffic

☐ Allow HTTPS traffic

☐ Allow Load Balancer Health Checks

Network tags: http-server

Hostname

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

IP forwarding

☐ Enable

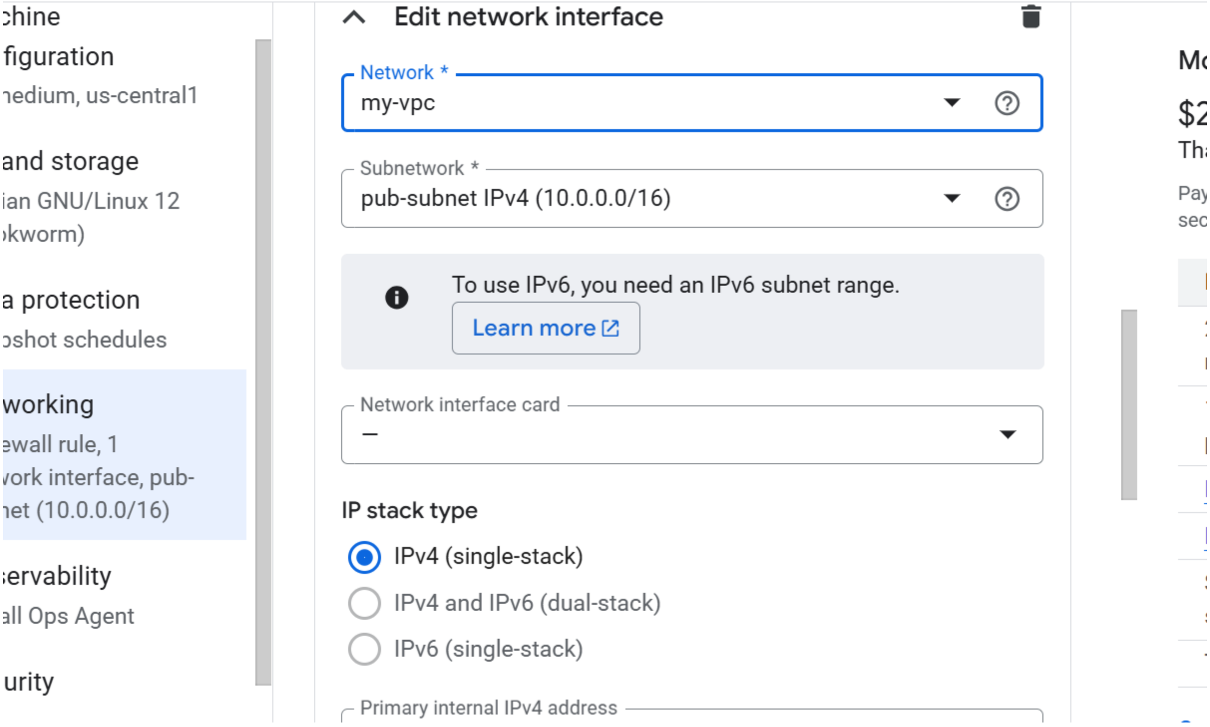
Network performance configuration

Network bandwidth

☐ Enable per VM Tier_1 networking performance

Abhi

Select the vpc and its pub subnet also select the external ip



chine
figuration
nedium, us-central1
and storage
ian GNU/Linux 12
okworm)
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oshot schedules
working
ewall rule, 1
vork interface, pub-
net (10.0.0.0/16)
servability
all Ops Agent
urity

Edit network interface

Network * my-vpc

Subnetwork * pub-subnet IPv4 (10.0.0.0/16)

To use IPv6, you need an IPv6 subnet range.

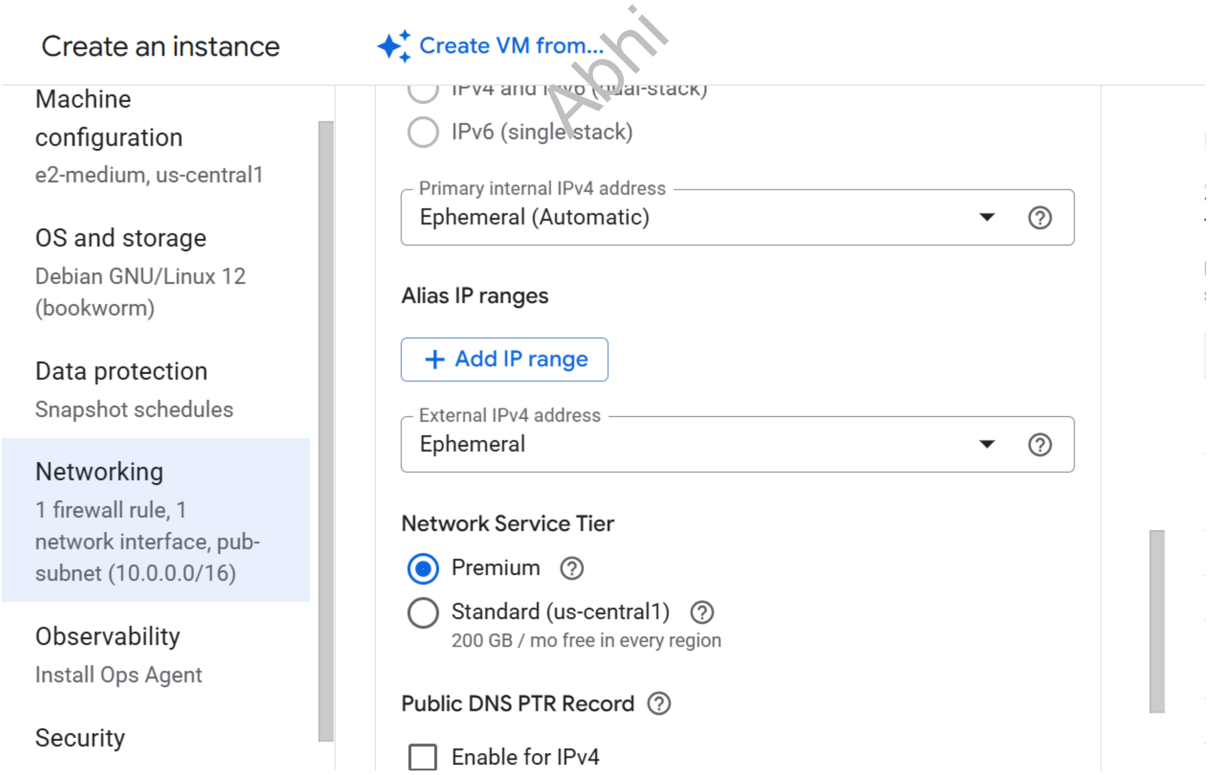
Learn more

Network interface card –

IP stack type

● IPv4 (single-stack)
○ IPv4 and IPv6 (dual-stack)
○ IPv6 (single-stack)

Primary internal IPv4 address



Create an instance
Create VM from...
Machine configuration
e2-medium, us-central1
OS and storage
Debian GNU/Linux 12 (bookworm)
Data protection
Snapshot schedules
Networking
1 firewall rule, 1 network interface, pub-subnet (10.0.0.0/16)
Observability
Install Ops Agent
Security

○ IPv4 and IPv6 (dual-stack)
○ IPv6 (single-stack)

Primary internal IPv4 address Ephemeral (Automatic)

Alias IP ranges

+ Add IP range

External IPv4 address Ephemeral

Network Service Tier

● Premium
○ Standard (us-central1)
200 GB / mo free in every region

Public DNS PTR Record

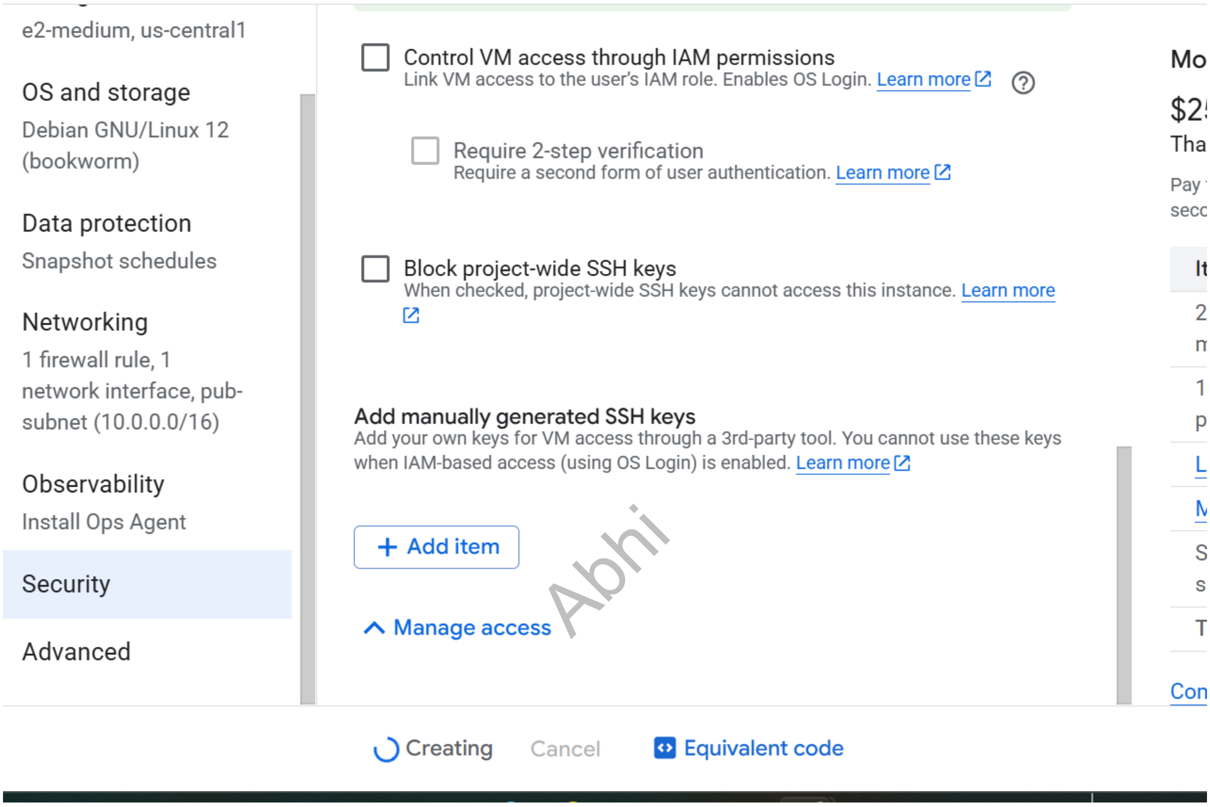
☐ Enable for IPv4

Abhi

If u want VM level key disable Block project-wide SSH keys

And add Add manually generated SSH keys

Click on create



e2-medium, us-central1

OS and storage
Debian GNU/Linux 12 (bookworm)

Data protection
Snapshot schedules

Networking
1 firewall rule, 1 network interface, pub-subnet (10.0.0.0/16)

Observability
Install Ops Agent

Security

Advanced

☐ Control VM access through IAM permissions
Link VM access to the user's IAM role. Enables OS Login. Learn more

☐ Require 2-step verification
Require a second form of user authentication. Learn more

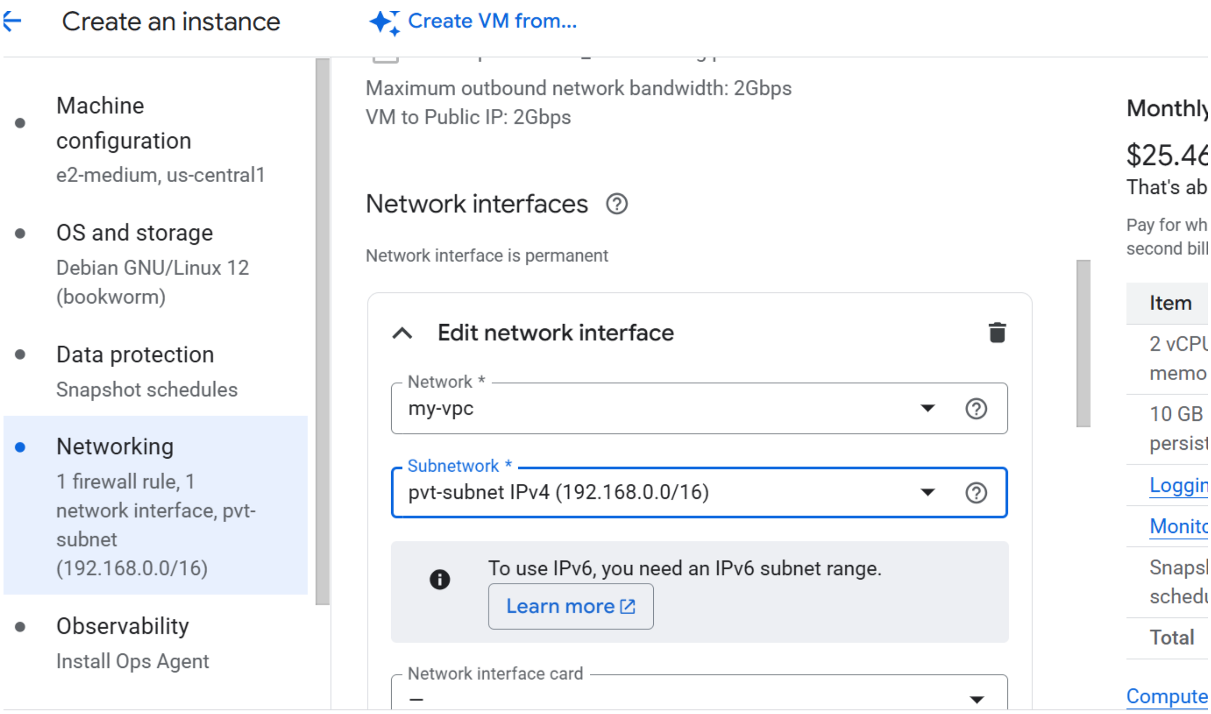
☐ Block project-wide SSH keys
When checked, project-wide SSH keys cannot access this instance. Learn more

Add manually generated SSH keys
Add your own keys for VM access through a 3rd-party tool. You cannot use these keys when IAM-based access (using OS Login) is enabled. Learn more

Public server created successfully, now create private server and don't give external IP address

Name it as pvt serv

Select pvt subnet


Create an instance

Create VM from...

- Machine configuration
  e2-medium, us-central1
- OS and storage
  Debian GNU/Linux 12 (bookworm)
- Data protection
  Snapshot schedules
- Networking
  1 firewall rule, 1 network interface, pvt-subnet (192.168.0.0/16)
- Observability
  Install Ops Agent

Maximum outbound network bandwidth: 2Gbps
VM to Public IP: 2Gbps

Network interfaces

Network interface is permanent

Edit network interface

Network *: my-vpc

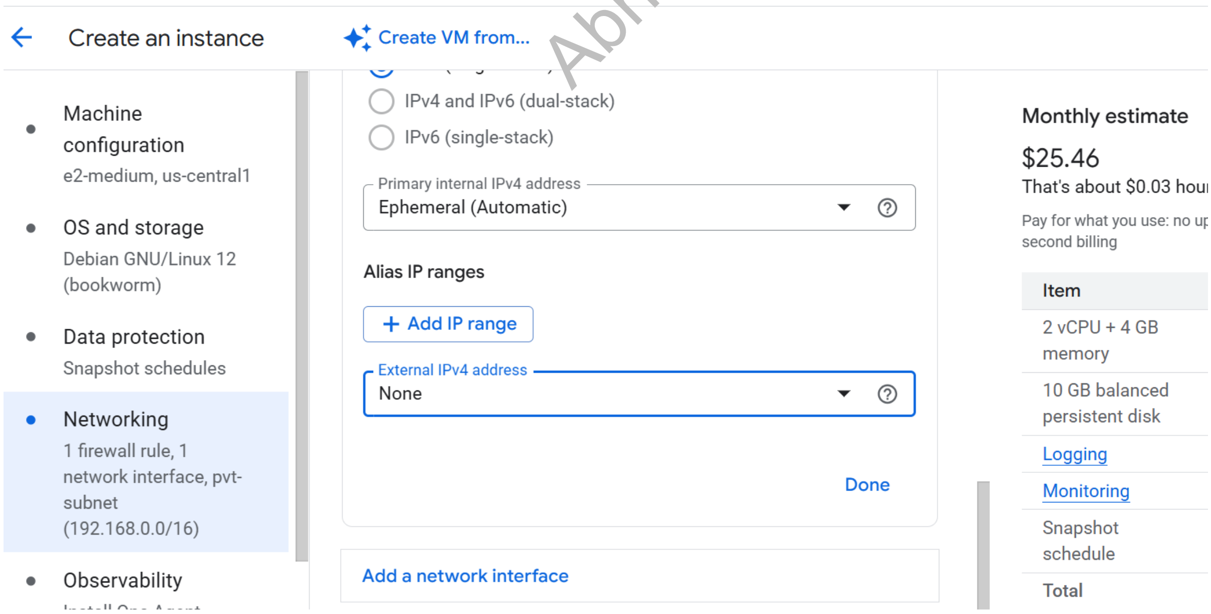
Subnetwork *: pvt-subnet IPv4 (192.168.0.0/16)

To use IPv6, you need an IPv6 subnet range.

Learn more

Network interface card: –

External Ip as none


Create an instance

Create VM from...

- Machine configuration
  e2-medium, us-central1
- OS and storage
  Debian GNU/Linux 12 (bookworm)
- Data protection
  Snapshot schedules
- Networking
  1 firewall rule, 1 network interface, pvt-subnet (192.168.0.0/16)
- Observability

○ IPv4 and IPv6 (dual-stack)
○ IPv6 (single-stack)

Primary internal IPv4 address: Ephemeral (Automatic)

Alias IP ranges

+ Add IP range

External IPv4 address: None

Done

Add a network interface

Monthly estimate

$25.46

That's about $0.03 hour

Pay for what you use: no up second billing

Item
2 vCPU + 4 GB memory
10 GB balanced persistent disk
Logging
Monitoring
Snapshot schedule
Total

Abhi

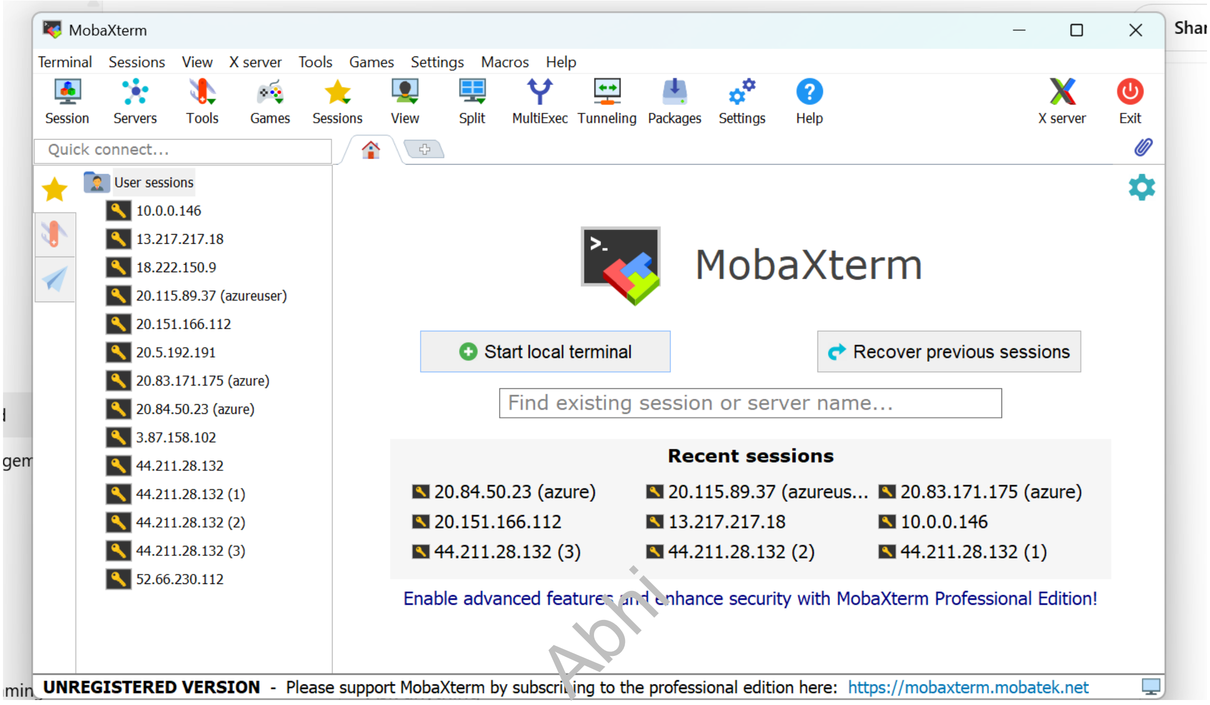
Click Create

Now goto mobaxterm ,first connect with public server

Download it if not available

https://mobaxterm.mobatek.net/download.html

home edition>>free


MobaXterm
Terminal Sessions View X server Tools Games Settings Macros Help
Session
Servers
Tools
Games
Sessions
View
Split
MultiExec
Tunneling
Packages
Settings
Help
X server
Exit
Quick connect...
MobaXterm
Start local terminal
Recover previous sessions
Find existing session or server name...

User sessions
- 10.0.0.146
- 13.217.217.18
- 18.222.150.9
- 20.115.89.37 (azureuser)
- 20.151.166.112
- 20.5.192.191
- 20.83.171.175 (azure)
- 20.84.50.23 (azure)
- 3.87.158.102
- 44.211.28.132
- 44.211.28.132 (1)
- 44.211.28.132 (2)
- 44.211.28.132 (3)
- 52.66.230.112

Recent sessions

20.84.50.23 (azure)	20.115.89.37 (azureus...	20.83.171.175 (azure)
20.151.166.112	13.217.217.18	10.0.0.146
44.211.28.132 (3)	44.211.28.132 (2)	44.211.28.132 (1)

Enable advanced features and enhance security with MobaXterm Professional Edition!

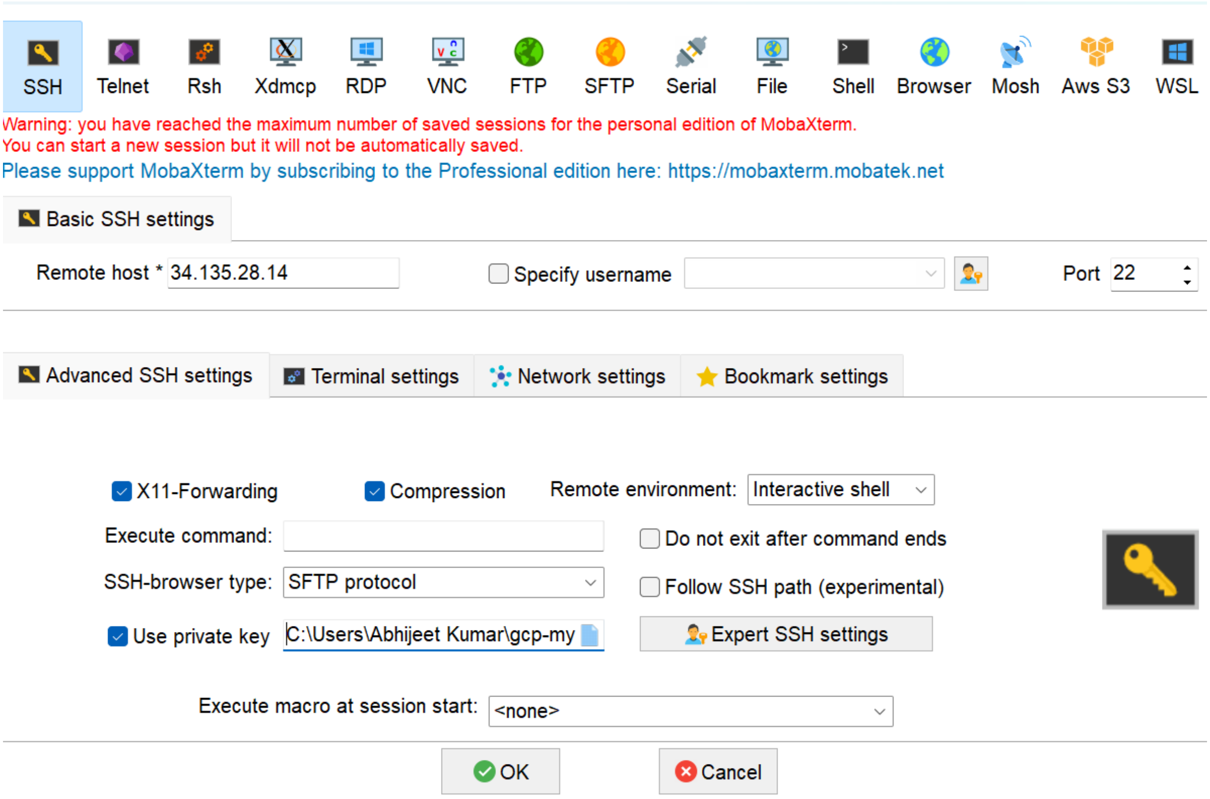
Abhi

UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net

Click on session

Enter public ip address of public server

Give the path to private key stored in the system


SSH
Telnet
Rsh
Xdmcp
RDP
VNC
FTP
SFTP
Serial
File
Shell
Browser
Mosh
Aws S3
WSL
Basic SSH settings
Advanced SSH settings
Terminal settings
Network settings
Bookmark settings
Expert SSH settings
OK
Cancel

Warning: you have reached the maximum number of saved sessions for the personal edition of MobaXterm.
You can start a new session but it will not be automatically saved.
Please support MobaXterm by subscribing to the Professional edition here: https://mobaxterm.mobatek.net

Remote host * 34.135.28.14
☐ Specify username
Port 22

☑ X11-Forwarding
☑ Compression
Remote environment: Interactive shell
Execute command:
☐ Do not exit after command ends
SSH-browser type: SFTP protocol
☐ Follow SSH path (experimental)
☑ Use private key C:\Users\Abhijeet Kumar\gcp-my
Execute macro at session start: <none>

Enter ok

And connect

Abhi

Switch to sudo user as

sudo su –

create a private key in the VM

vi gcp-mykey

add the content of private key

save and quit

:wq!

chmod 400 gcp-mykey

now use command as

ssh -i gcp-mykey Abhi@ip address (pvt server)

switch to sudo user

```
sudo su –
apt update
apt install apache2 -y
```

go to cd /var/www/html

You can see index.html there

```
systemctl start apache2
```

But with private server we cannot access the VM so we need Load balancer

Abhi