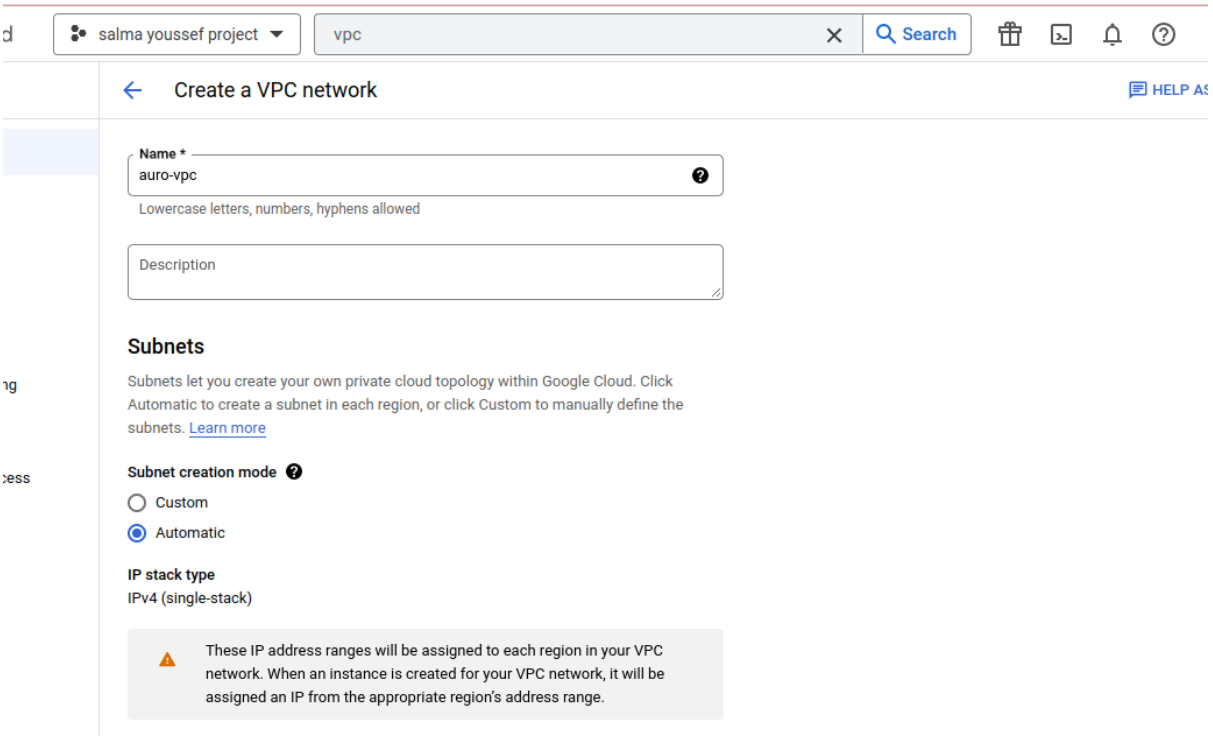
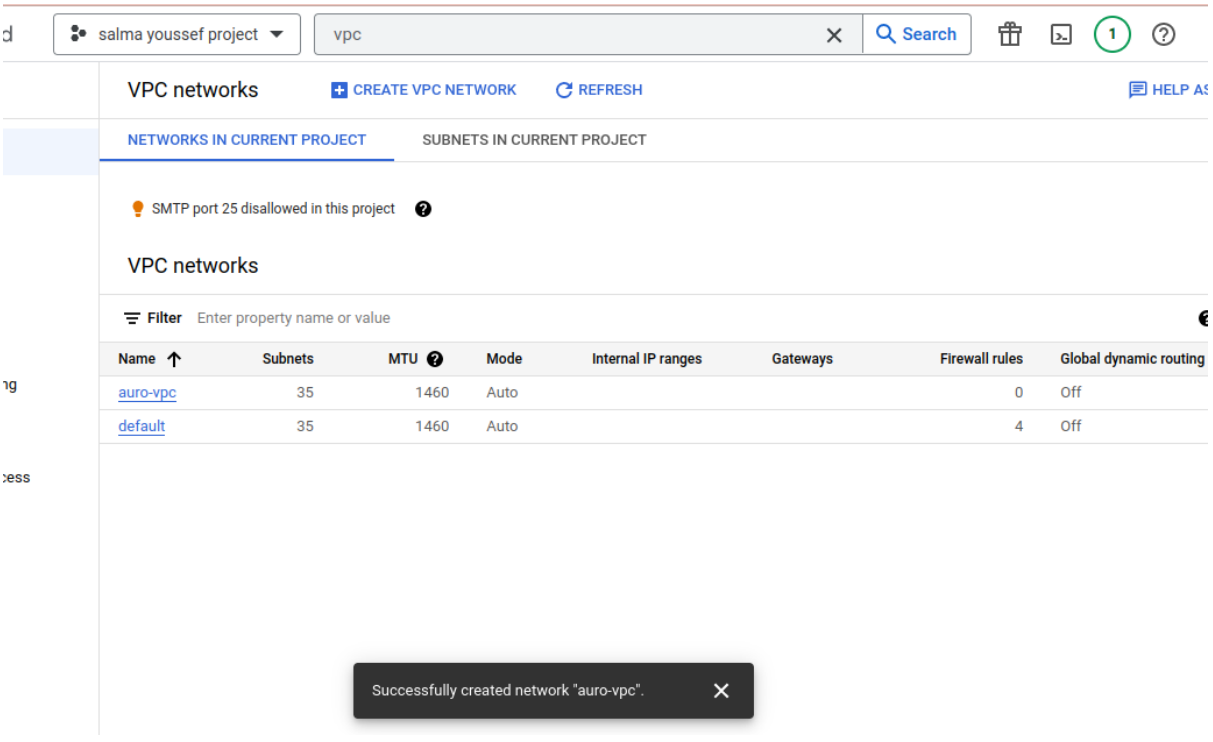
Lab 2.1

Q1:

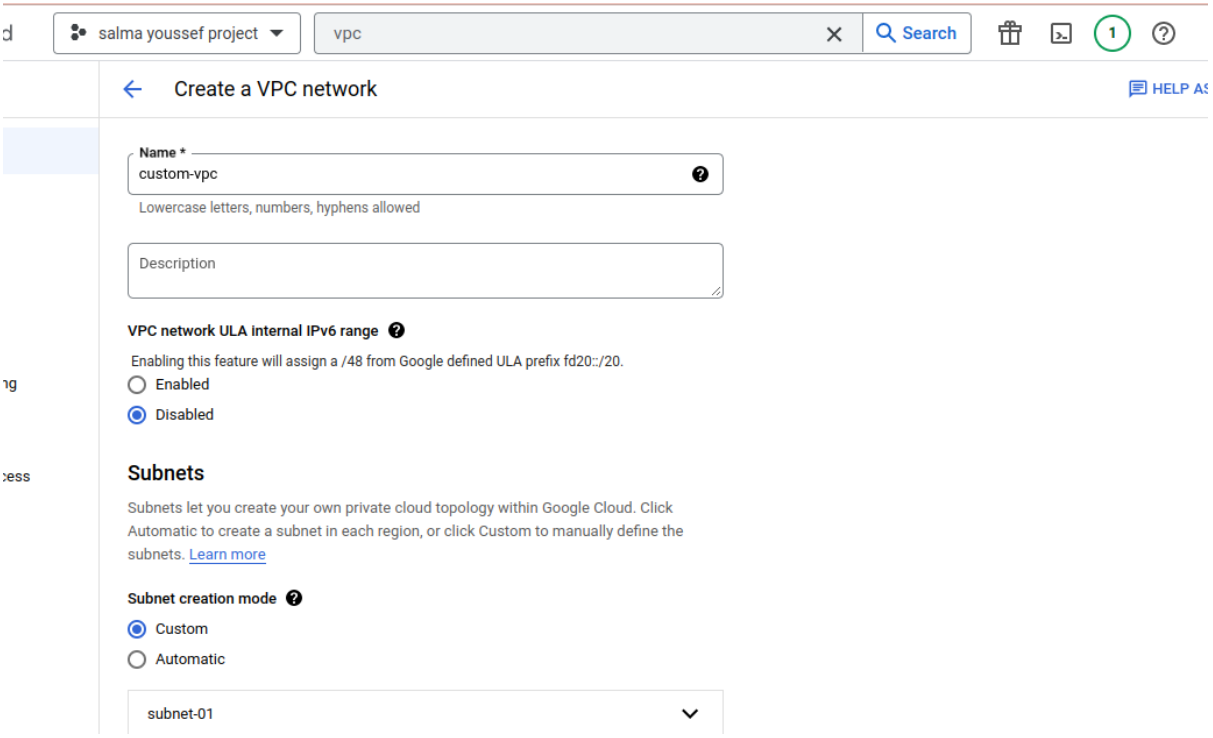


35 subnets

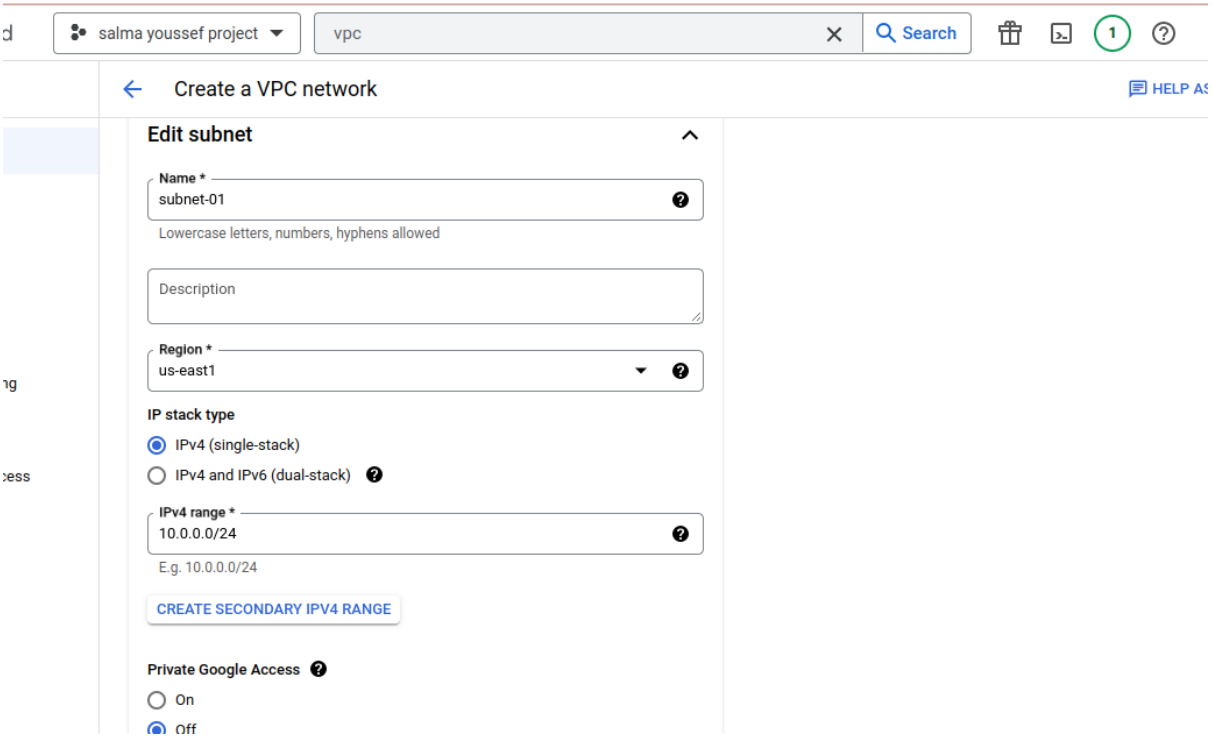


Q2:

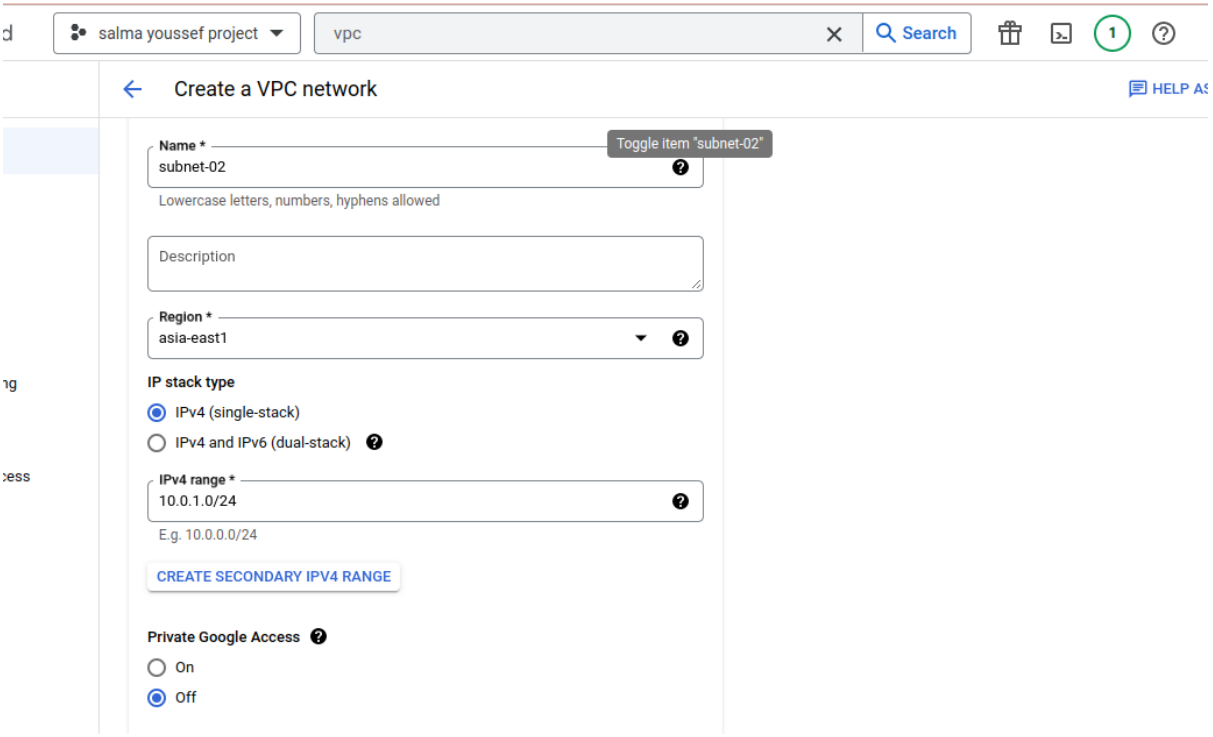
custom-vpc:

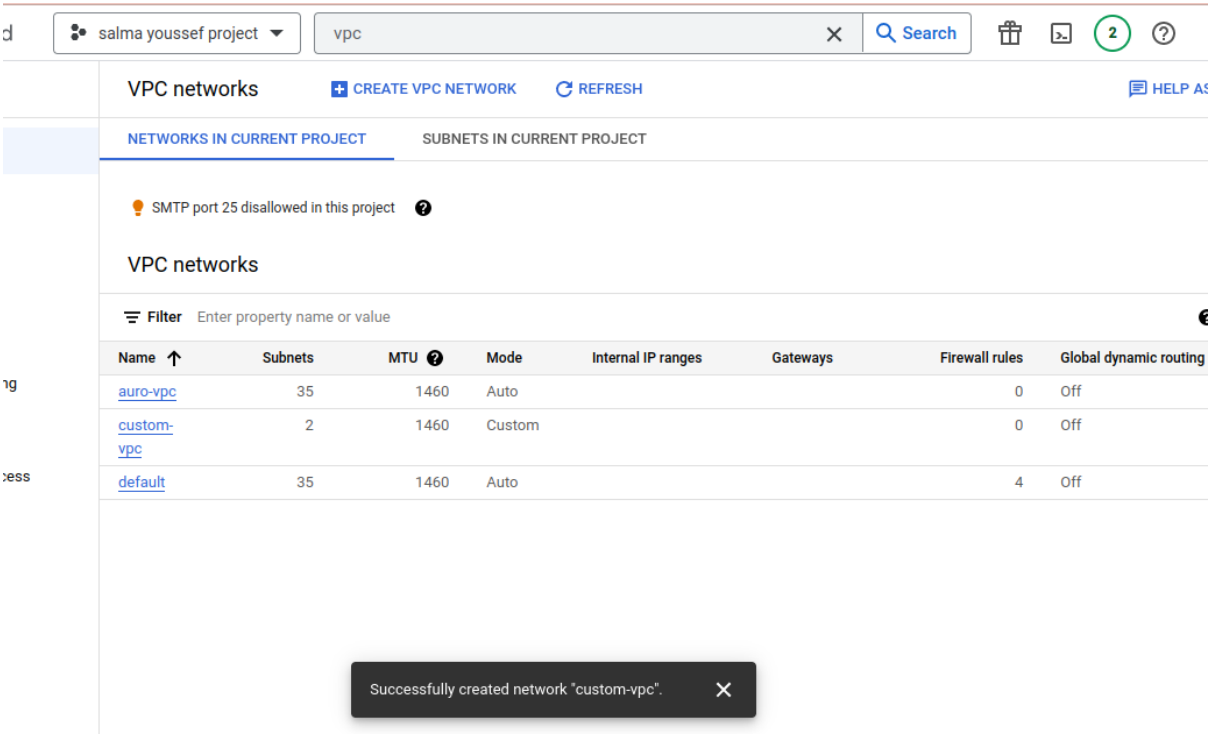


subnet-01:



subnet-02:





Q3:

vpc list:

```
salmamyoussef@salmamyoussef-Satellite-C55-B:~$ gcloud compute networks list
NAME         SUBNET_MODE  BGP_ROUTING_MODE  IPV4_RANGE  GATEWAY_IPV4
auro-vpc     AUTO         REGIONAL
custom-vpc   CUSTOM       REGIONAL
default      AUTO         REGIONAL
salmamyoussef@salmamyoussef-Satellite-C55-B:~$
```

subnets of auto-vpc:

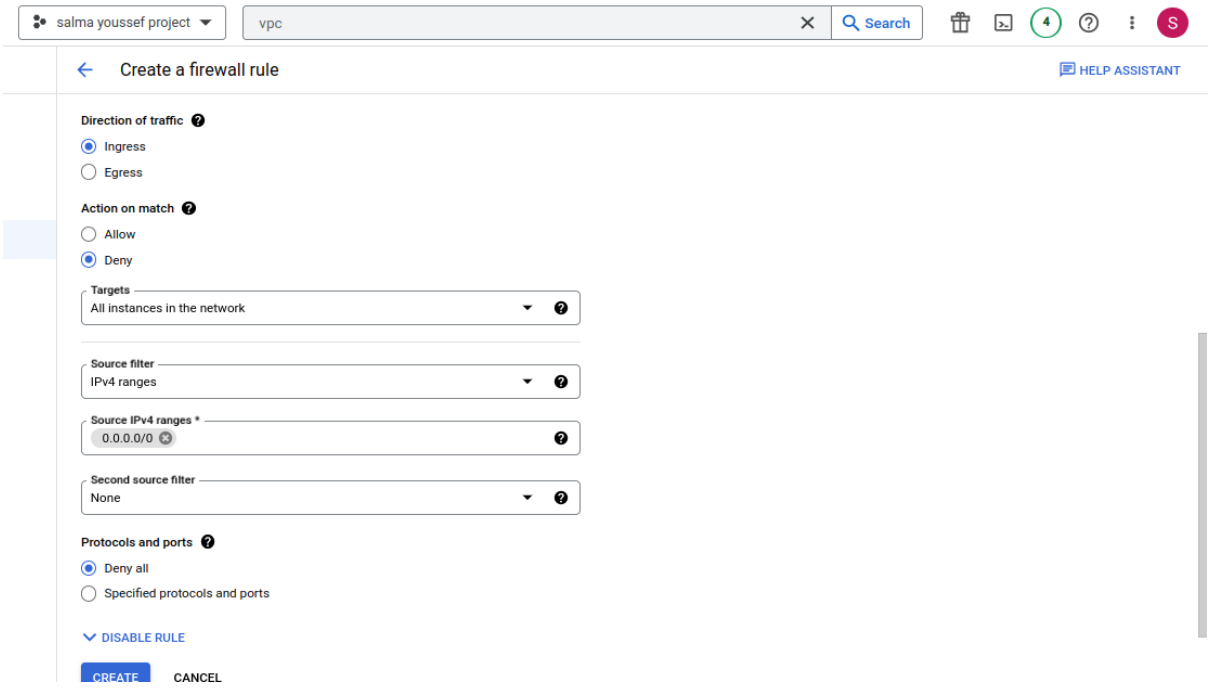
```
salmamyoussef@salmamyoussef-Satellite-C55-B:~$ gcloud compute networks lissalmamyoussef@salmamyoussef-Satellite-C55-B:~$ gcloud compute networ
ks subnets list --network=auro-vpc
NAME      REGION                   NETWORK   RANGE          STACK_TYPE  IPV6_ACCESS_TYPE  INTERNAL_IPV6_PREFIX  EXTERNAL_IPV6_PREFIX
auro-vpc  us-central1              auro-vpc  10.128.0.0/20  IPV4_ONLY
auro-vpc  europe-west1             auro-vpc  10.132.0.0/20  IPV4_ONLY
auro-vpc  us-west1                 auro-vpc  10.138.0.0/20  IPV4_ONLY
auro-vpc  asia-east1               auro-vpc  10.140.0.0/20  IPV4_ONLY
auro-vpc  us-east1                 auro-vpc  10.142.0.0/20  IPV4_ONLY
auro-vpc  asia-northeast1          auro-vpc  10.146.0.0/20  IPV4_ONLY
auro-vpc  asia-southeast1          auro-vpc  10.148.0.0/20  IPV4_ONLY
auro-vpc  us-east4                 auro-vpc  10.150.0.0/20  IPV4_ONLY
auro-vpc  australia-southeast1     auro-vpc  10.152.0.0/20  IPV4_ONLY
auro-vpc  europe-west2             auro-vpc  10.154.0.0/20  IPV4_ONLY
auro-vpc  europe-west3             auro-vpc  10.156.0.0/20  IPV4_ONLY
auro-vpc  southamerica-east1       auro-vpc  10.158.0.0/20  IPV4_ONLY
auro-vpc  asia-south1              auro-vpc  10.160.0.0/20  IPV4_ONLY
auro-vpc  northamerica-northeast1  auro-vpc  10.162.0.0/20  IPV4_ONLY
auro-vpc  europe-west4             auro-vpc  10.164.0.0/20  IPV4_ONLY
auro-vpc  europe-north1            auro-vpc  10.166.0.0/20  IPV4_ONLY
auro-vpc  us-west2                 auro-vpc  10.168.0.0/20  IPV4_ONLY
auro-vpc  asia-east2               auro-vpc  10.170.0.0/20  IPV4_ONLY
auro-vpc  europe-west6             auro-vpc  10.172.0.0/20  IPV4_ONLY
auro-vpc  asia-northeast2          auro-vpc  10.174.0.0/20  IPV4_ONLY
auro-vpc  asia-northeast3          auro-vpc  10.178.0.0/20  IPV4_ONLY
auro-vpc  us-west3                 auro-vpc  10.180.0.0/20  IPV4_ONLY
auro-vpc  us-west4                 auro-vpc  10.182.0.0/20  IPV4_ONLY
auro-vpc  asia-southeast2          auro-vpc  10.184.0.0/20  IPV4_ONLY
auro-vpc  europe-central2          auro-vpc  10.186.0.0/20  IPV4_ONLY
auro-vpc  northamerica-northeast2  auro-vpc  10.188.0.0/20  IPV4_ONLY
auro-vpc  asia-south2              auro-vpc  10.190.0.0/20  IPV4_ONLY
auro-vpc  australia-southeast2     auro-vpc  10.192.0.0/20  IPV4_ONLY
auro-vpc  southamerica-west1       auro-vpc  10.194.0.0/20  IPV4_ONLY
auro-vpc  europe-west8             auro-vpc  10.198.0.0/20  IPV4_ONLY
auro-vpc  europe-west9             auro-vpc  10.200.0.0/20  IPV4_ONLY
auro-vpc  us-east5                 auro-vpc  10.202.0.0/20  IPV4_ONLY
auro-vpc  europe-southwest1        auro-vpc  10.204.0.0/20  IPV4_ONLY
auro-vpc  us-south1                auro-vpc  10.206.0.0/20  IPV4_ONLY
auro-vpc  me-west1                 auro-vpc  10.208.0.0/20  IPV4_ONLY
```

subnets of custom-vpc:

```
salmamyoussef@salmamyoussef-Satellite-C55-B:~$ gcloud compute networks subnets list --network=custom-vpc
NAME       REGION    NETWORK     RANGE         STACK_TYPE  IPV6_ACCESS_TYPE  INTERNAL_IPV6_PREFIX  EXTERNAL_IPV6_PREFIX
subnet-01  us-east1  custom-vpc  10.0.0.0/24   IPV4_ONLY
subnet-02  us-west2  custom-vpc  10.0.1.0/24   IPV4_ONLY
salmamyoussef@salmamyoussef-Satellite-C55-B:~$
```

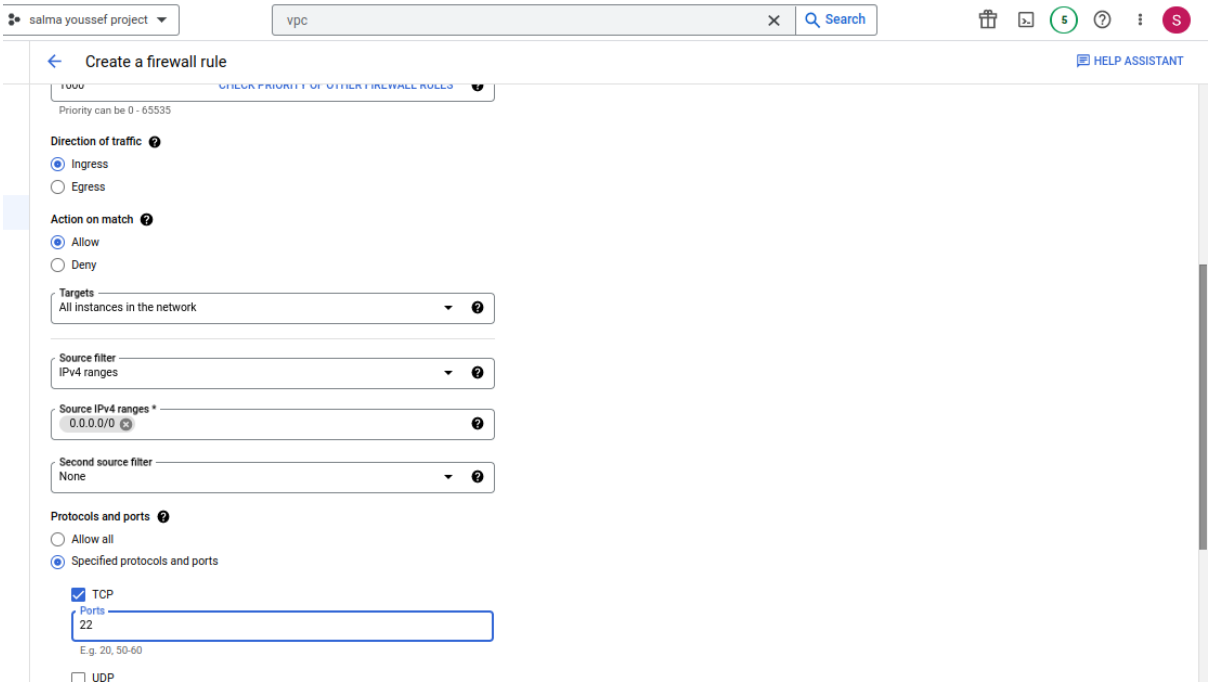
Q4:

Block internet access:

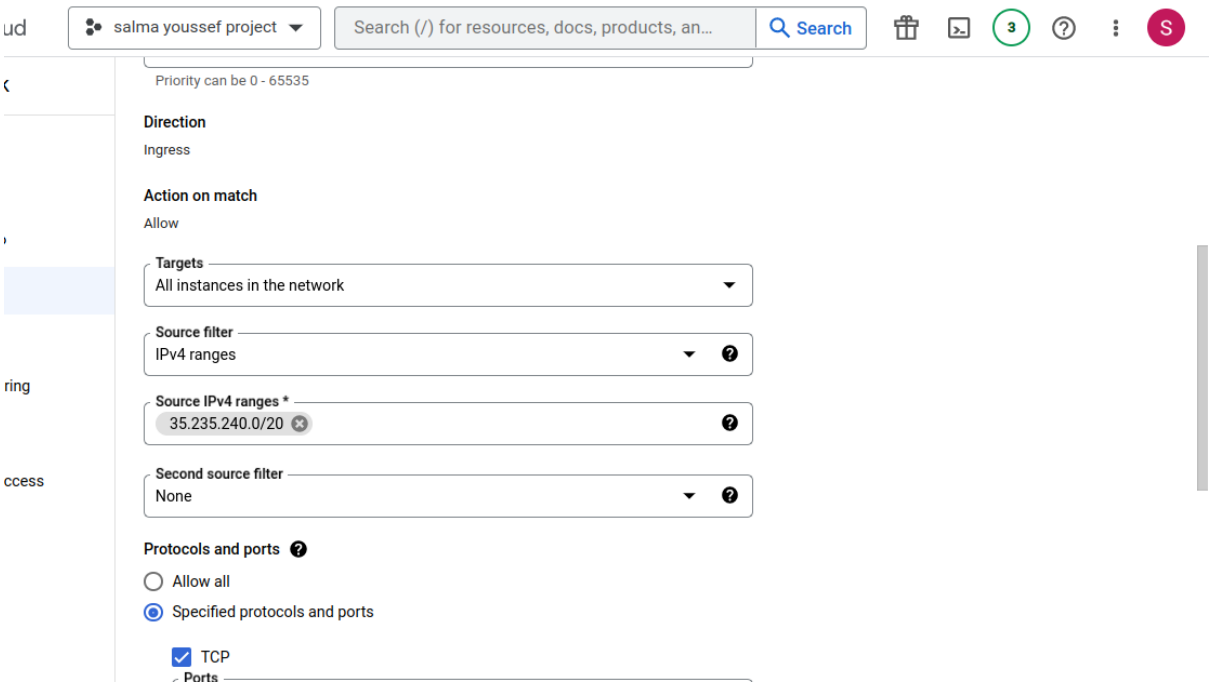


Q5:

allow ssh to all VMs:



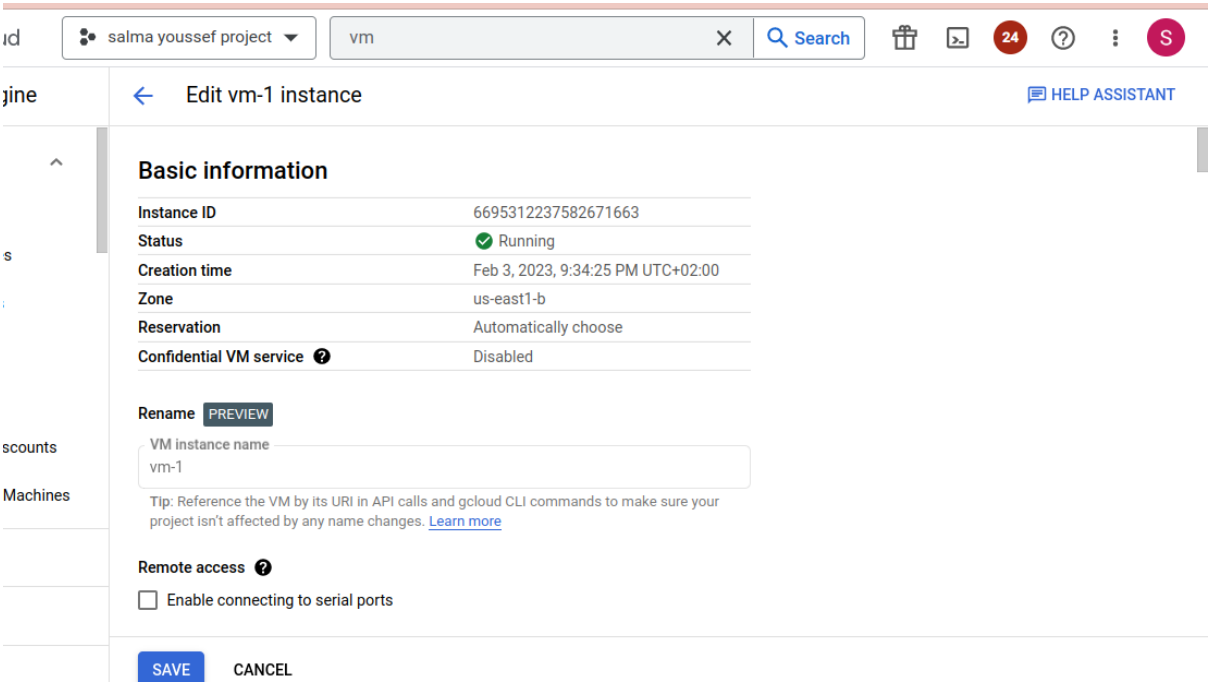
Q6:

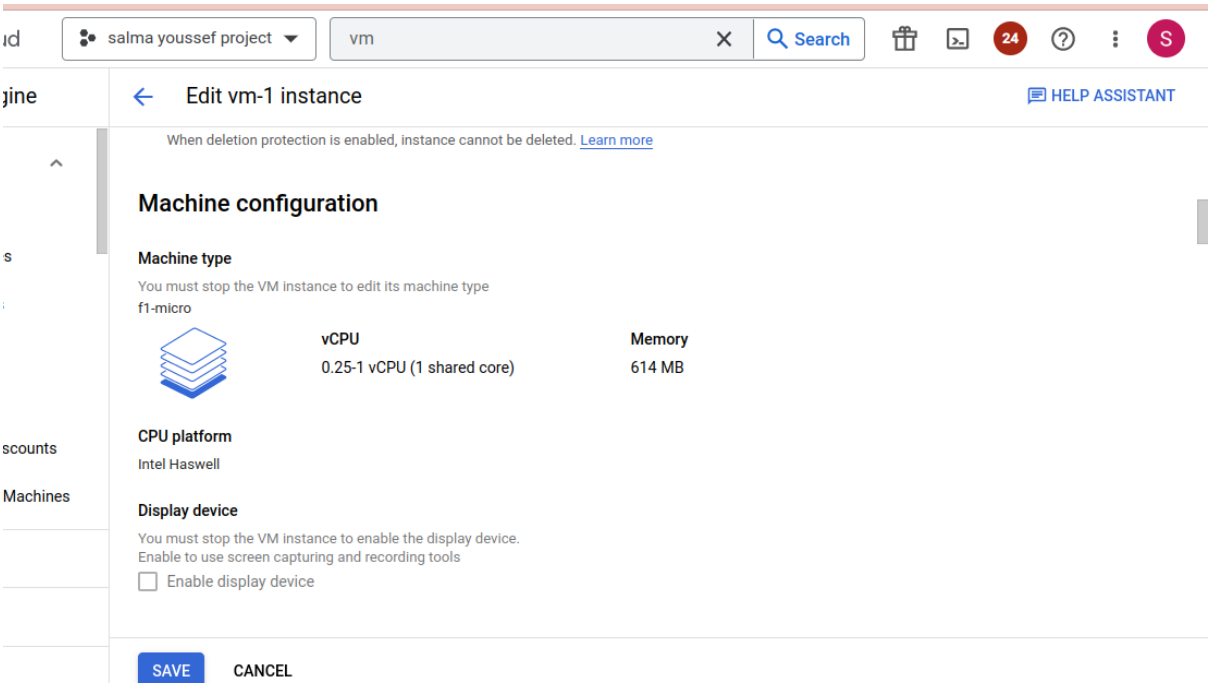


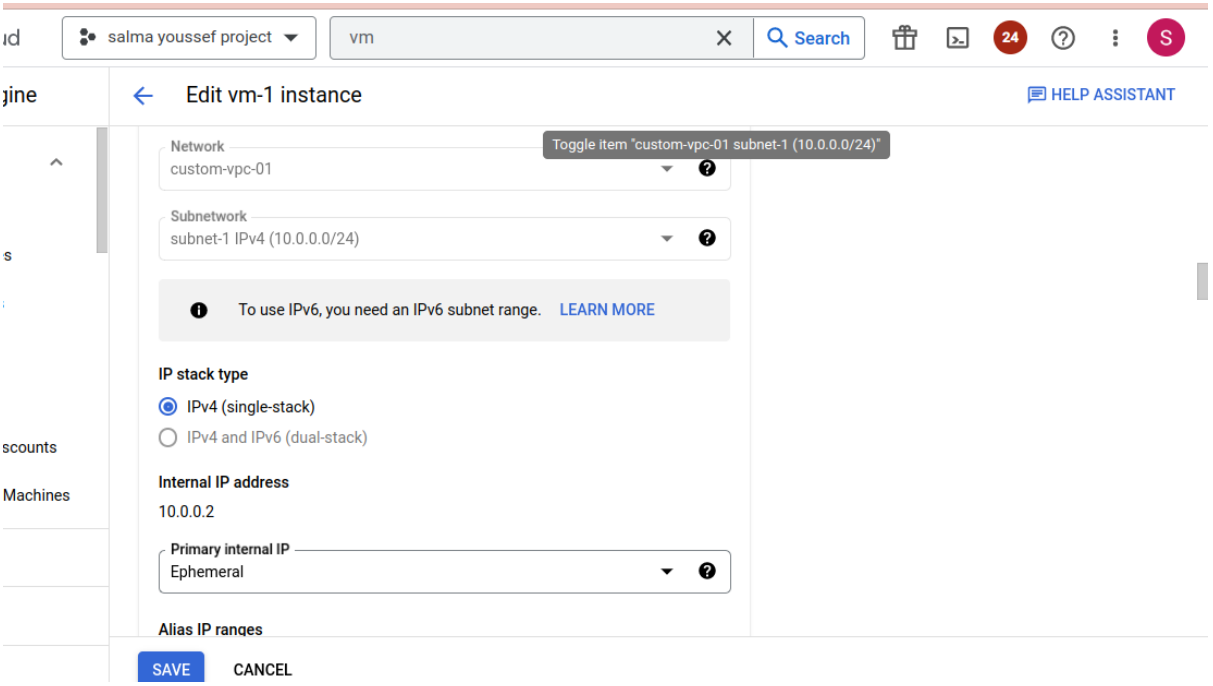
LAB 2.2

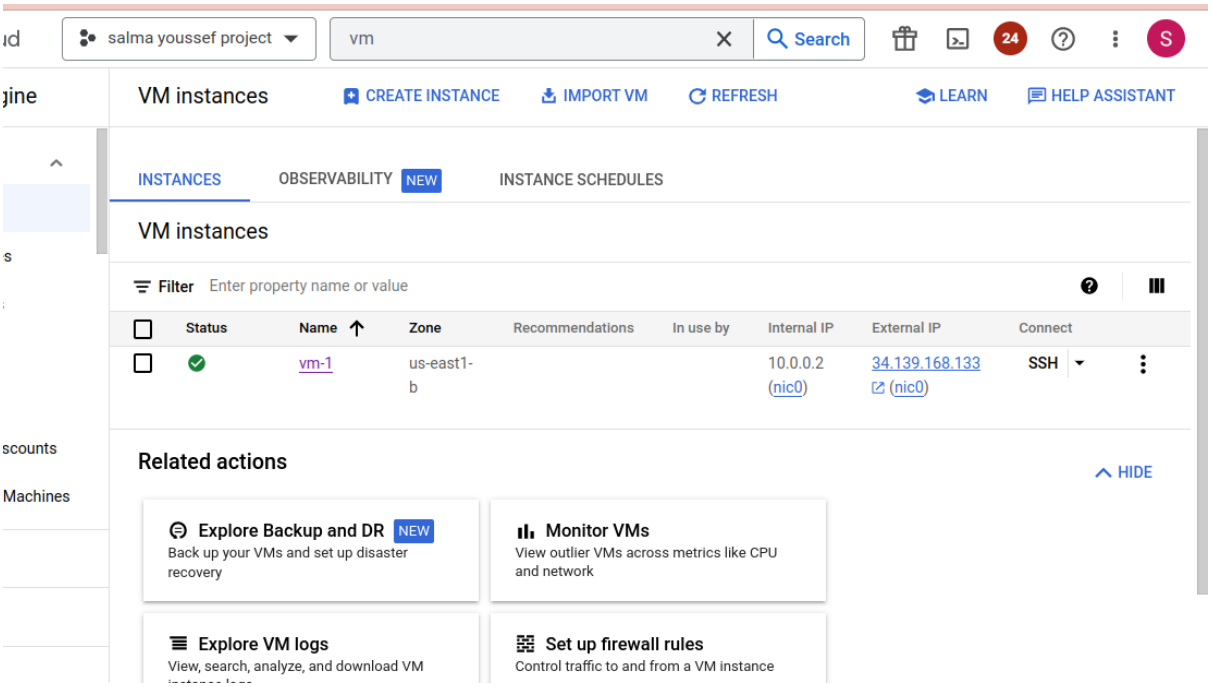
Q1:

instance creation:


salma youssef project
vm
Search
24
S
Edit vm-1 instance
HELP ASSISTANT
Basic information
Instance ID
6695312237582671663
Status
Running
Creation time
Feb 3, 2023, 9:34:25 PM UTC+02:00
Zone
us-east1-b
Reservation
Automatically choose
Confidential VM service
Disabled
Rename
PREVIEW
VM instance name
vm-1
Tip: Reference the VM by its URI in API calls and gcloud CLI commands to make sure your project isn't affected by any name changes. Learn more
Remote access
Enable connecting to serial ports
SAVE
CANCEL


salma youssef project
vm
Search
24
S
Edit vm-1 instance
HELP ASSISTANT
When deletion protection is enabled, instance cannot be deleted. Learn more
Machine configuration
Machine type
You must stop the VM instance to edit its machine type
f1-micro
vCPU
0.25-1 vCPU (1 shared core)
Memory
614 MB
CPU platform
Intel Haswell
Display device
You must stop the VM instance to enable the display device.
Enable to use screen capturing and recording tools
Enable display device
SAVE
CANCEL

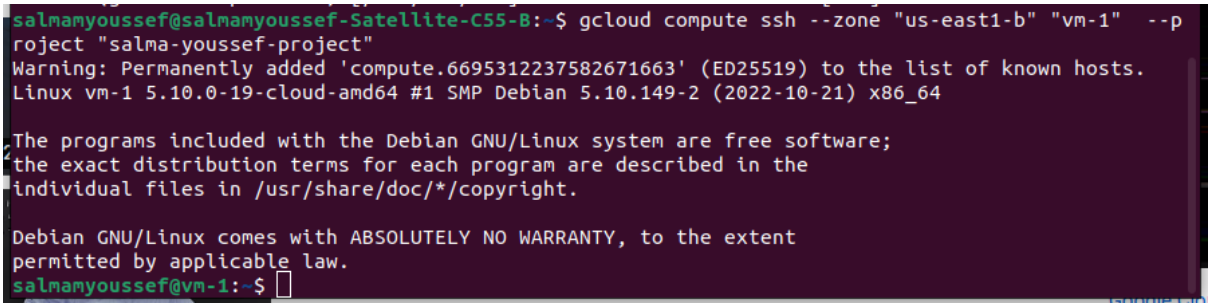




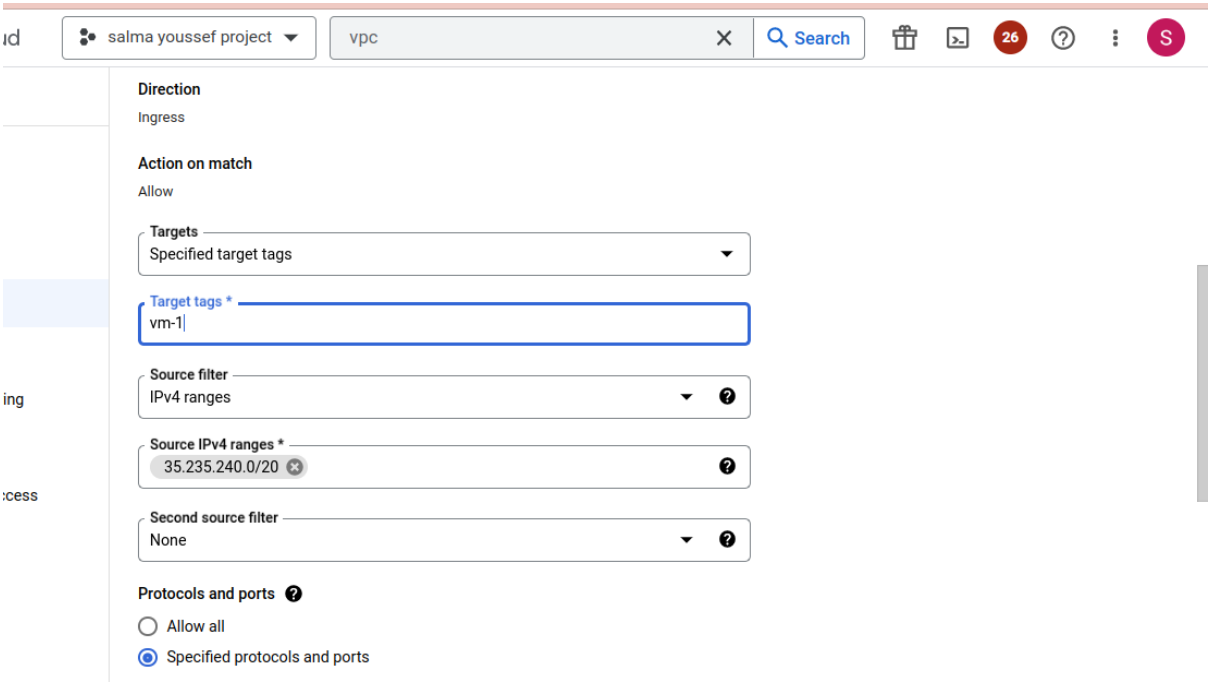
ssh:

1. through the browser:

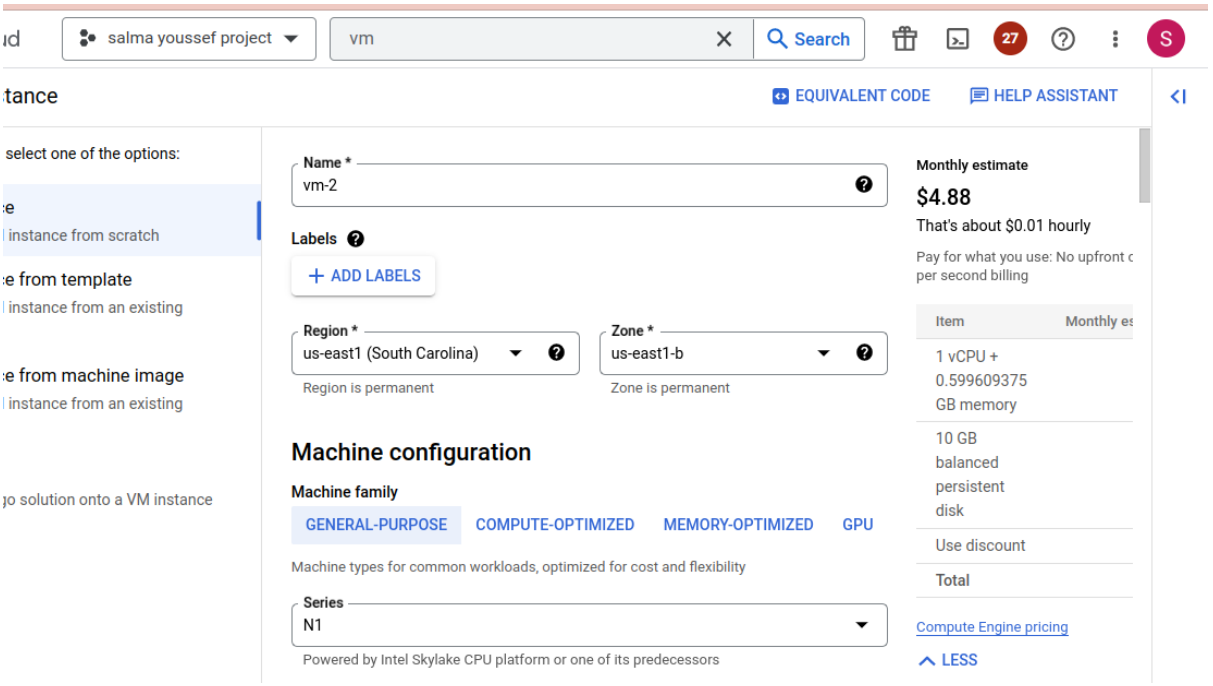
2. using gcloud:

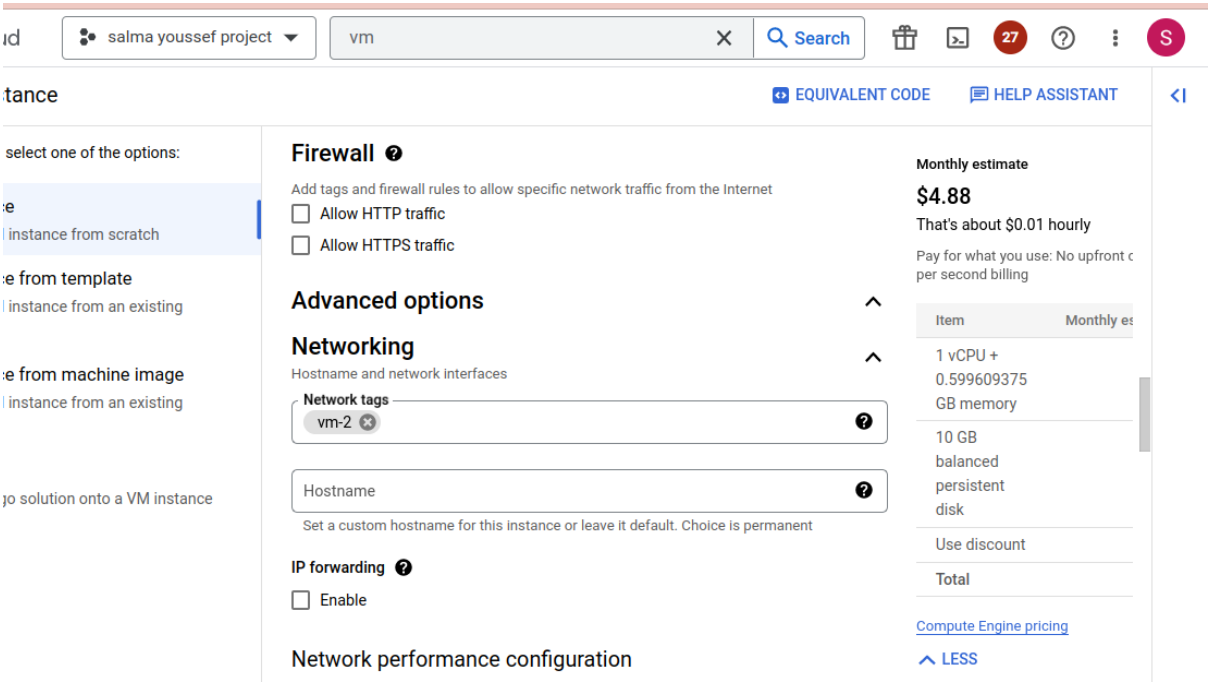


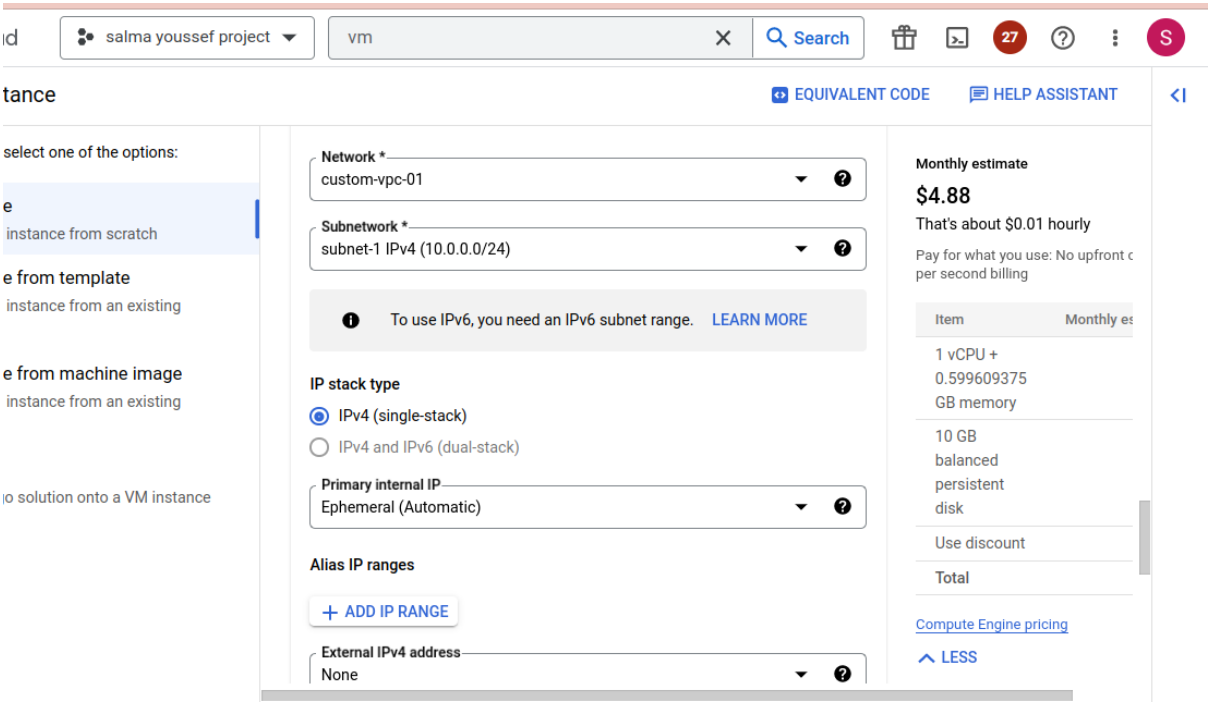
enforce ssh:


salma youssef project
vpc
Search
26
Direction
Ingress
Action on match
Allow
Targets
Specified target tags
Target tags *
vm-1
Source filter
IPv4 ranges
Source IPv4 ranges *
35.235.240.0/20
Second source filter
None
Protocols and ports
Allow all
Specified protocols and ports

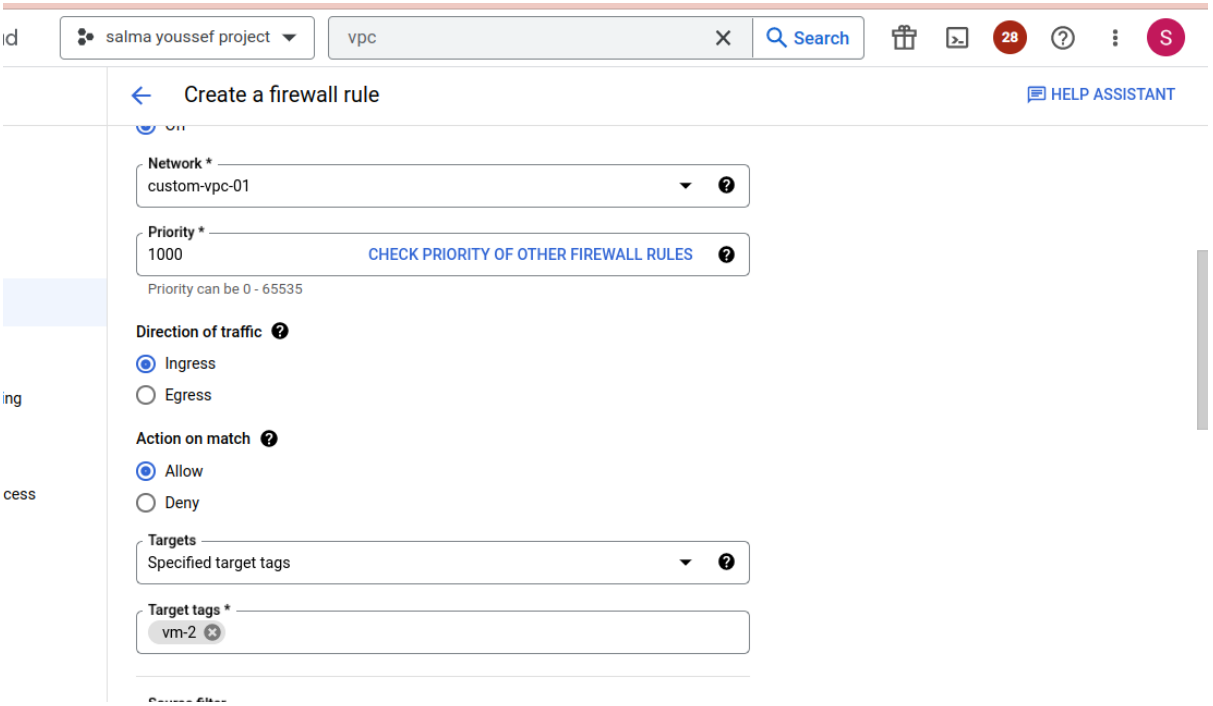
Q2:

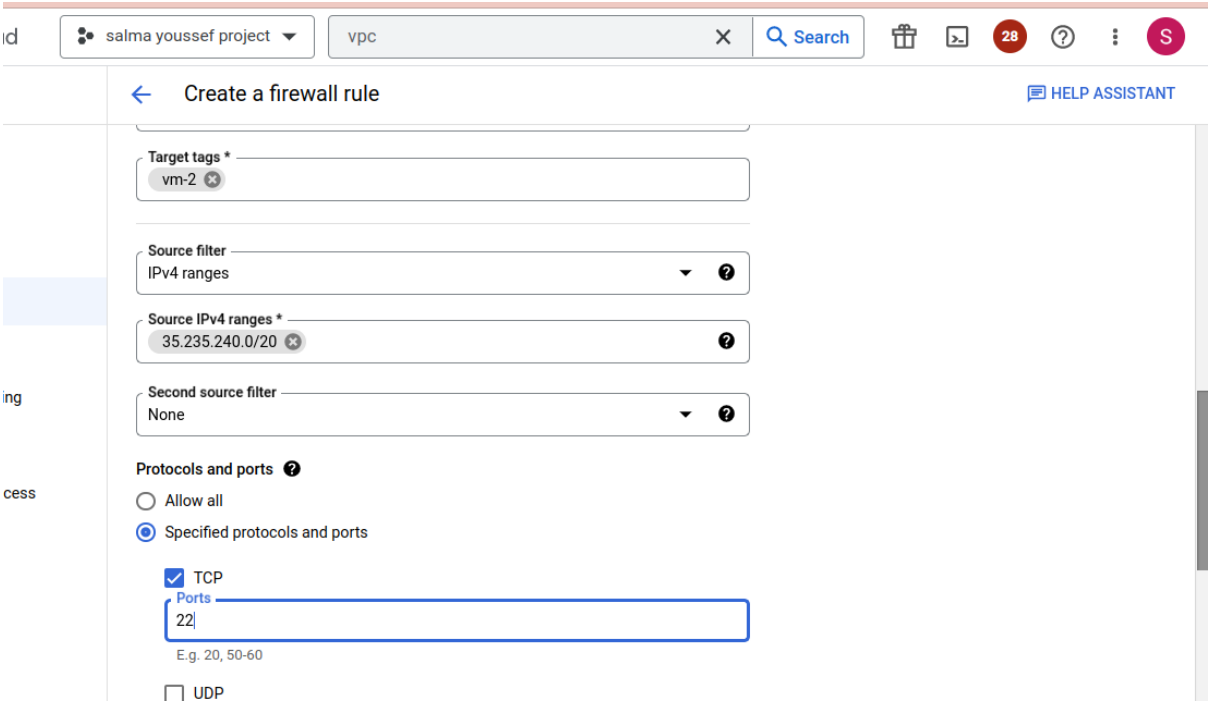

salma youssef project
vm
Search
27
EQUIVALENT CODE
HELP ASSISTANT
select one of the options:
instance from scratch
from template
instance from an existing
from machine image
instance from an existing
solution onto a VM instance
Name *
vm-2
Labels
ADD LABELS
Region *
us-east1 (South Carolina)
Region is permanent
Zone *
us-east1-b
Zone is permanent
Machine configuration
Machine family
GENERAL-PURPOSE
COMPUTE-OPTIMIZED
MEMORY-OPTIMIZED
GPU
Machine types for common workloads, optimized for cost and flexibility
Series
N1
Powered by Intel Skylake CPU platform or one of its predecessors
Monthly estimate
$4.88
That's about $0.01 hourly
Pay for what you use: No upfront
per second billing
Item
Monthly
1 vCPU + 0.599609375 GB memory
10 GB balanced persistent disk
Use discount
Total
Compute Engine pricing
LESS

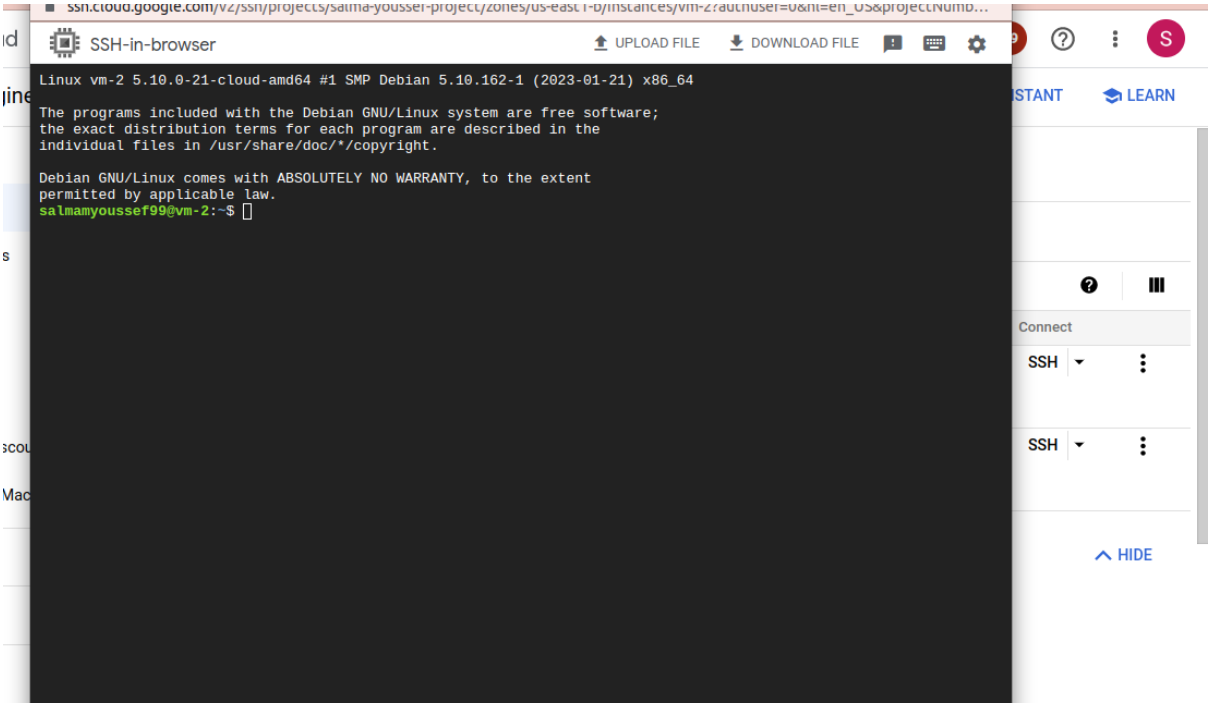

salma youssef project
vm
Search
27
S
tance
EQUIVALENT CODE
HELP ASSISTANT
select one of the options:
e
instance from scratch
e from template
instance from an existing
e from machine image
instance from an existing
o solution onto a VM instance
Firewall
Add tags and firewall rules to allow specific network traffic from the Internet
Allow HTTP traffic
Allow HTTPS traffic
Advanced options
Networking
Hostname and network interfaces
Network tags
vm-2
Hostname
Set a custom hostname for this instance or leave it default. Choice is permanent
IP forwarding
Enable
Network performance configuration
Monthly estimate
$4.88
That's about $0.01 hourly
Pay for what you use: No upfront c
per second billing
Item
Monthly es
1 vCPU +
0.599609375
GB memory
10 GB
balanced
persistent
disk
Use discount
Total
Compute Engine pricing
LESS


salma youssef project
vm
Search
27
S
tance
EQUIVALENT CODE
HELP ASSISTANT
select one of the options:
e
instance from scratch
e from template
instance from an existing
e from machine image
instance from an existing
o solution onto a VM instance
Network *
custom-vpc-01
Subnetwork *
subnet-1 IPv4 (10.0.0.0/24)
To use IPv6, you need an IPv6 subnet range.
LEARN MORE
IP stack type
IPv4 (single-stack)
IPv4 and IPv6 (dual-stack)
Primary internal IP
Ephemeral (Automatic)
Alias IP ranges
ADD IP RANGE
External IPv4 address
None
Monthly estimate
$4.88
That's about $0.01 hourly
Pay for what you use: No upfront c
per second billing
Item
Monthly es
1 vCPU +
0.599609375
GB memory
10 GB
balanced
persistent
disk
Use discount
Total
Compute Engine pricing
LESS

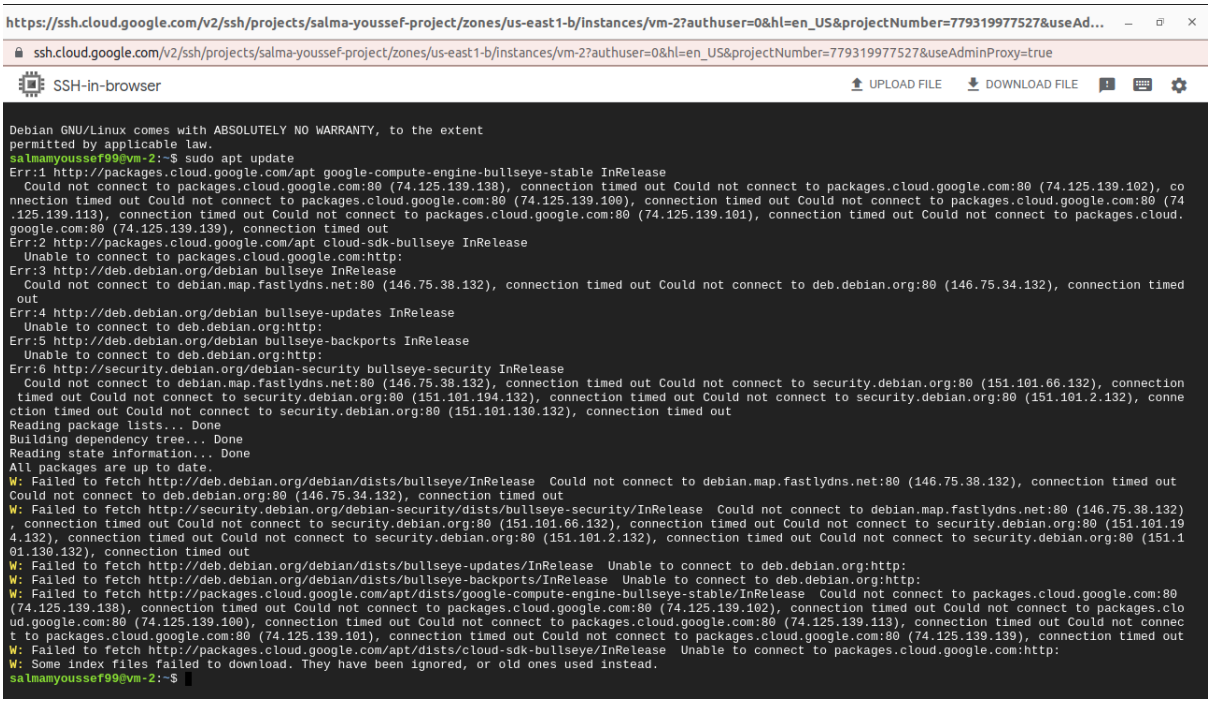
ssh:


salma youssef project
vpc
Search
28
S
Create a firewall rule
HELP ASSISTANT
Network *
custom-vpc-01
Priority *
1000
CHECK PRIORITY OF OTHER FIREWALL RULES
Priority can be 0 - 65535
Direction of traffic
Ingress
Egress
Action on match
Allow
Deny
Targets
Specified target tags
Target tags *
vm-2


salma youssef project
vpc
Search
28
S
Create a firewall rule
HELP ASSISTANT
Target tags *
vm-2
Source filter
IPv4 ranges
Source IPv4 ranges *
35.235.240.0/20
Second source filter
None
Protocols and ports
Allow all
Specified protocols and ports
TCP
Ports
22
E.g. 20, 50-60
UDP



is it possible to update packages? No because it's private vm has no internet connection



Q3:

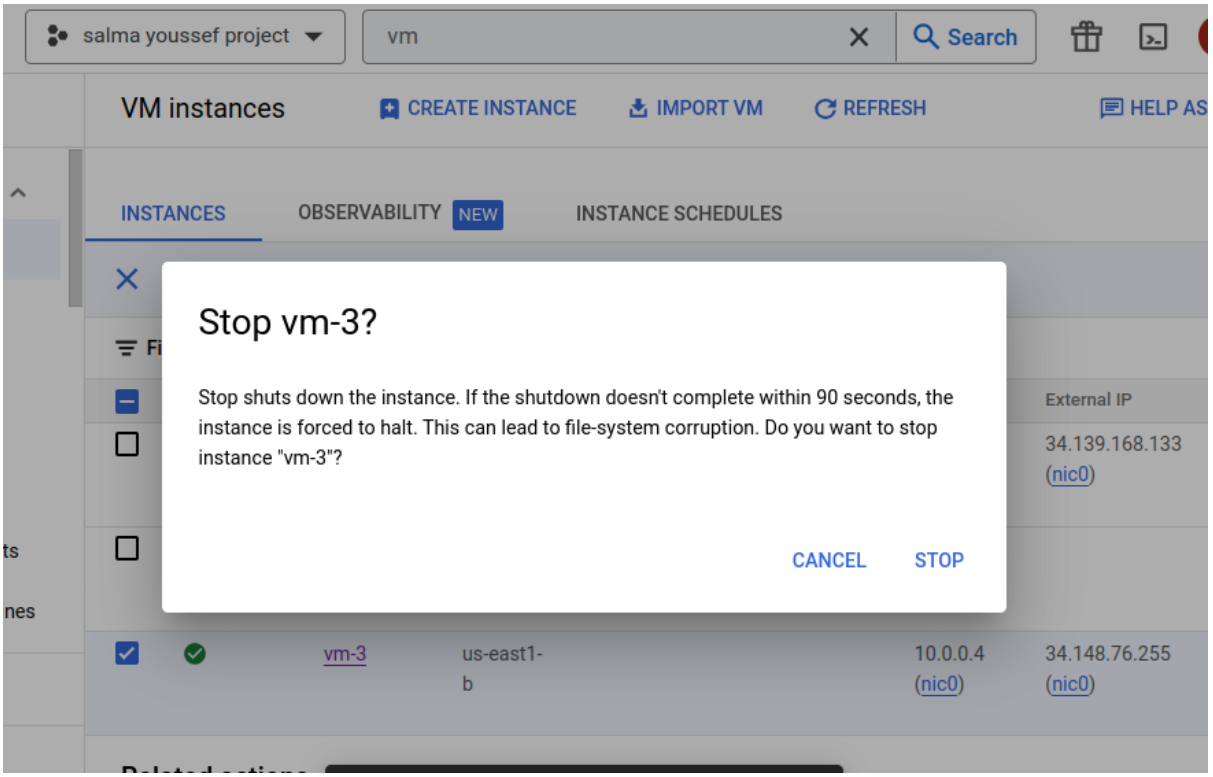
ssh and update the packages:

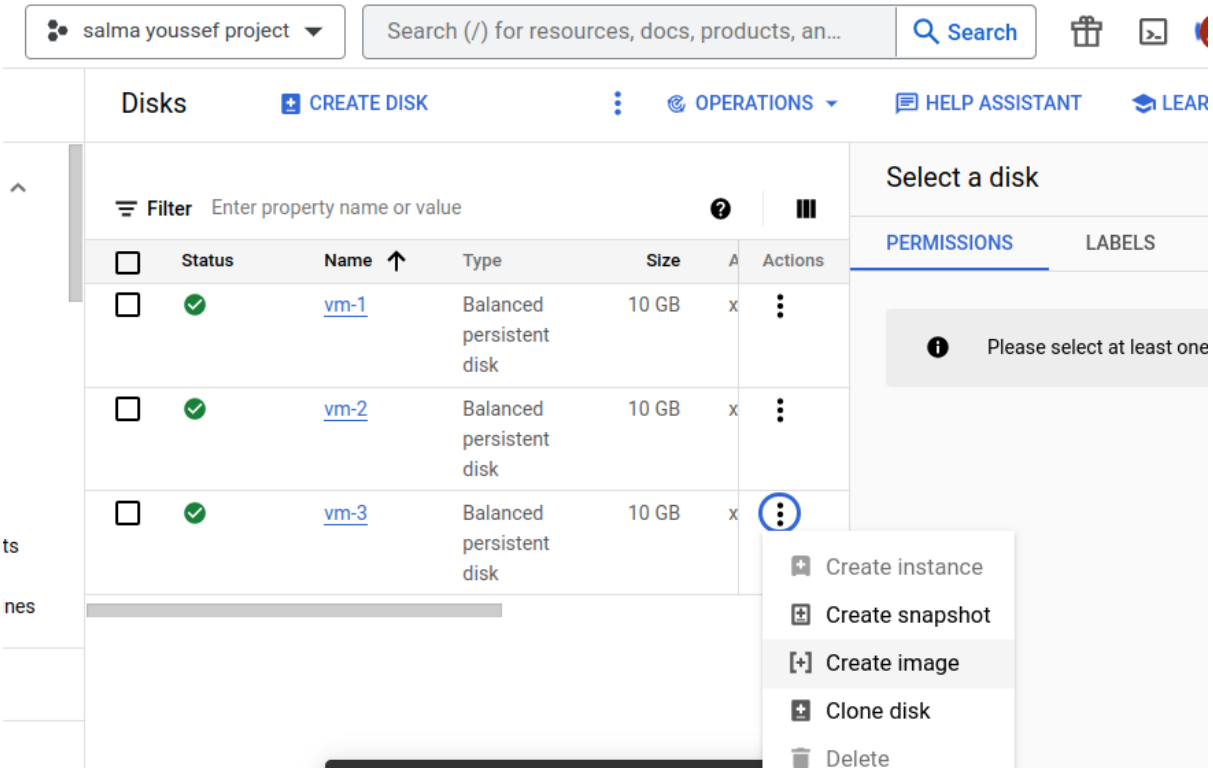
```
salmamyoussef@salmamyoussef-Satellite-C55-B:~$ ssh -i ~/.ssh/google_compute_engine.pub salmamyous
sef@34.148.76.255
The authenticity of host '34.148.76.255 (34.148.76.255)' can't be established.
ED25519 key fingerprint is SHA256:PE9qnT3O2ihhMqIywI52K25utWwjw50mOHUFk9CjBX8.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '34.148.76.255' (ED25519) to the list of known hosts.
Linux vm-3 5.10.0-21-cloud-amd64 #1 SMP Debian 5.10.162-1 (2023-01-21) x86_64

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

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
salmamyoussef@vm-3:~$ sudo apt install
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
salmamyoussef@vm-3:~$
```

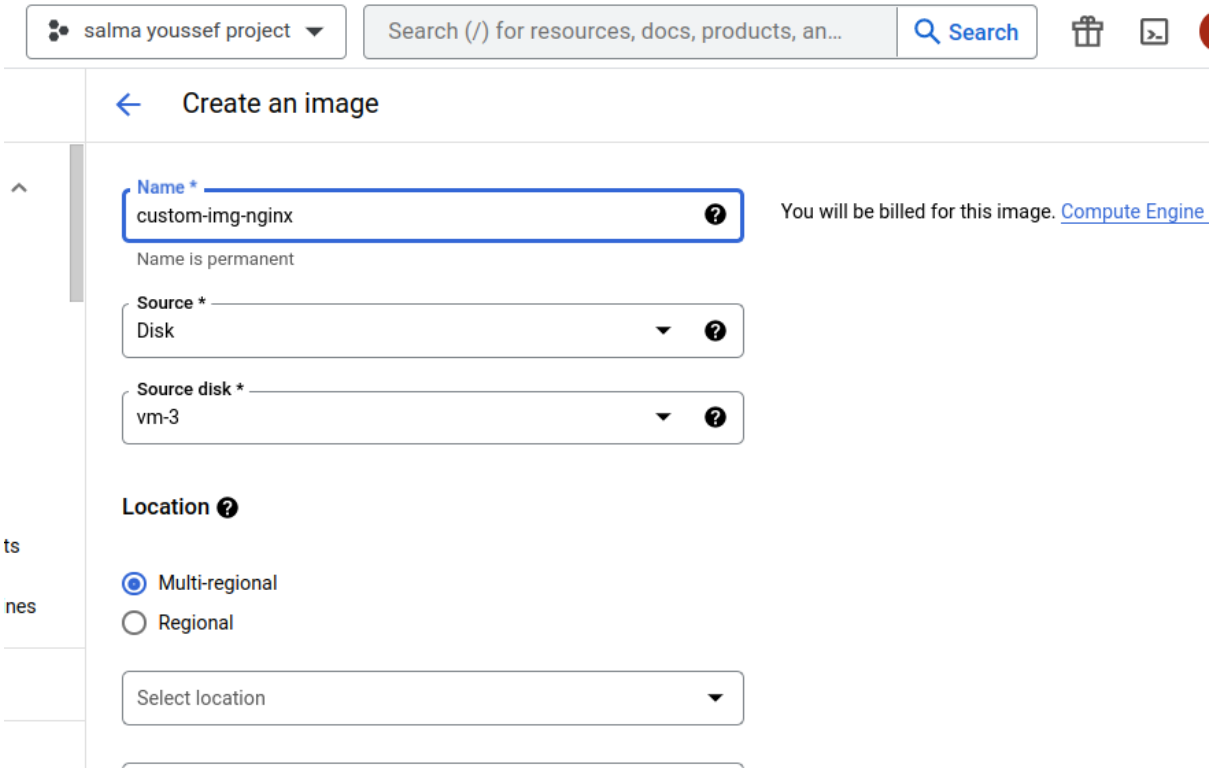
install nginx and test it:

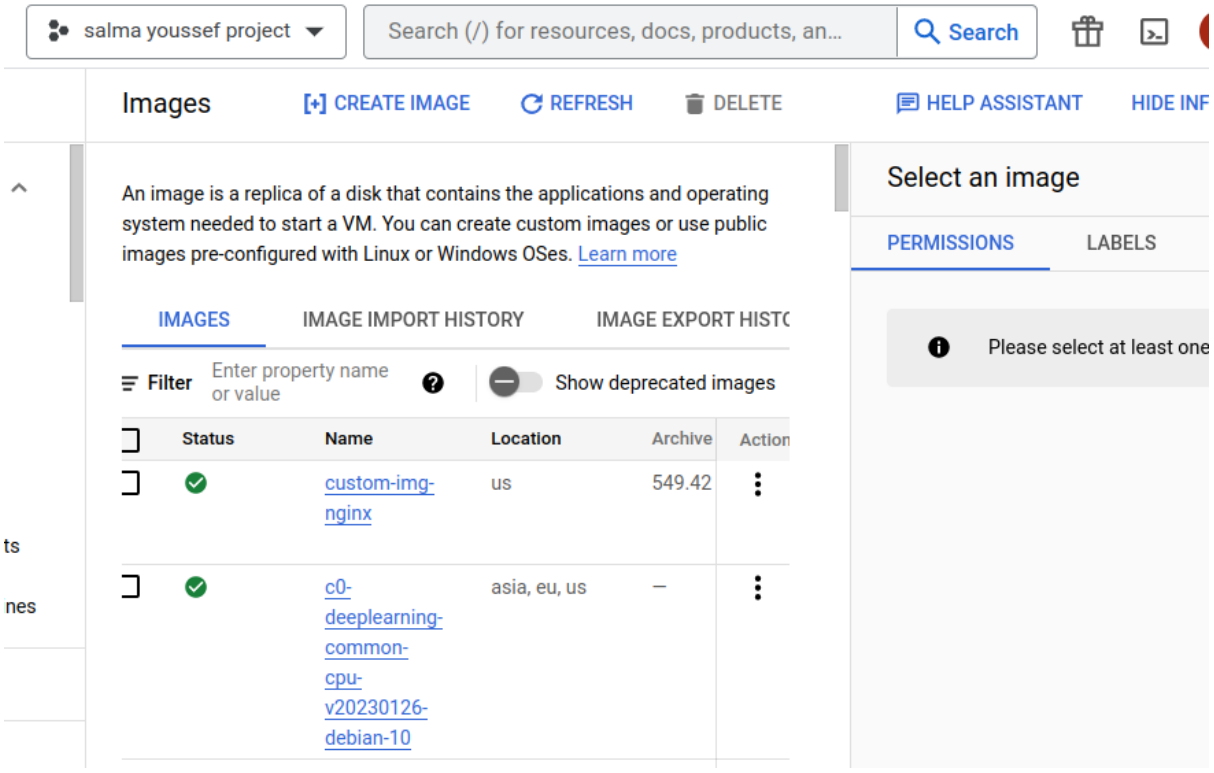
```
salmamyoussef@vm-3:~$ sudo systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
     Active: active (running) since Fri 2023-02-03 20:55:35 UTC; 13s ago
       Docs: man:nginx(8)
    Process: 1632 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exit>
    Process: 1633 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, statu>
   Main PID: 1823 (nginx)
      Tasks: 3 (limit: 4691)
     Memory: 3.6M
        CPU: 39ms
     CGroup: /system.slice/nginx.service
             ├─1823 nginx: master process /usr/sbin/nginx -g daemon on; master_process on;
             ├─1825 nginx: worker process
             └─1826 nginx: worker process

Feb 03 20:55:35 vm-3 systemd[1]: Starting A high performance web server and a reverse proxy serv>
Feb 03 20:55:35 vm-3 systemd[1]: Started A high performance web server and a reverse proxy serve>
lines 1-17/17 (END)
```

create custom image:


salma youssef project
vm
Search
VM instances
CREATE INSTANCE
IMPORT VM
REFRESH
HELP AS
INSTANCES
OBSERVABILITY
NEW
INSTANCE SCHEDULES
Stop vm-3?
Stop shuts down the instance. If the shutdown doesn't complete within 90 seconds, the instance is forced to halt. This can lead to file-system corruption. Do you want to stop instance "vm-3"?
CANCEL
STOP
External IP
34.139.168.133 (nic0)
vm-3
us-east1-b
10.0.0.4 (nic0)
34.148.76.255 (nic0)


salma youssef project
Search (/) for resources, docs, products, an...
Search
Disks
CREATE DISK
OPERATIONS
HELP ASSISTANT
LEAR
Filter
Enter property name or value
Status
Name
Type
Size
Actions
vm-1
Balanced persistent disk
10 GB
vm-2
Balanced persistent disk
10 GB
vm-3
Balanced persistent disk
10 GB
Select a disk
PERMISSIONS
LABELS
Please select at least one
Create instance
Create snapshot
Create image
Clone disk
Delete


salma youssef project
Search (/) for resources, docs, products, an...
Search
Create an image
Name *
custom-img-nginx
Name is permanent
You will be billed for this image. Compute Engine
Source *
Disk
Source disk *
vm-3
Location
Multi-regional
Regional
Select location


salma youssef project
Search (/) for resources, docs, products, an...
Search
Images
CREATE IMAGE
REFRESH
DELETE
HELP ASSISTANT
HIDE INF
An image is a replica of a disk that contains the applications and operating system needed to start a VM. You can create custom images or use public images pre-configured with Linux or Windows OSes. Learn more
IMAGES
IMAGE IMPORT HISTORY
IMAGE EXPORT HISTC
Filter
Enter property name or value
Show deprecated images
Status
Name
Location
Archive
Action
custom-img-nginx
us
549.42
c0-deeplearning-common-cpu-v20230126-debian-10
asia, eu, us
–
Select an image
PERMISSIONS
LABELS
Please select at least one

Q4:

Create an instance template

LEARN

Describe a VM instance once and then use that template to create groups of identical instances
Learn more

Name *
nginx-template

Labels

+ ADD LABELS

Machine configuration

Machine family

GENERAL-PURPOSE | COMPUTE-OPTIMIZED | MEMORY-OPTIMIZED | GPU

Machine types for common workloads, optimized for cost and flexibility

Series
N1

Powered by Intel Skylake CPU platform or one of its predecessors

Machine type
f1-micro (1 vCPU, 614 MB memory)

vCPU | Memory

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

Source project for images *
salma-youssef-project

CHANGE

Show deprecated images

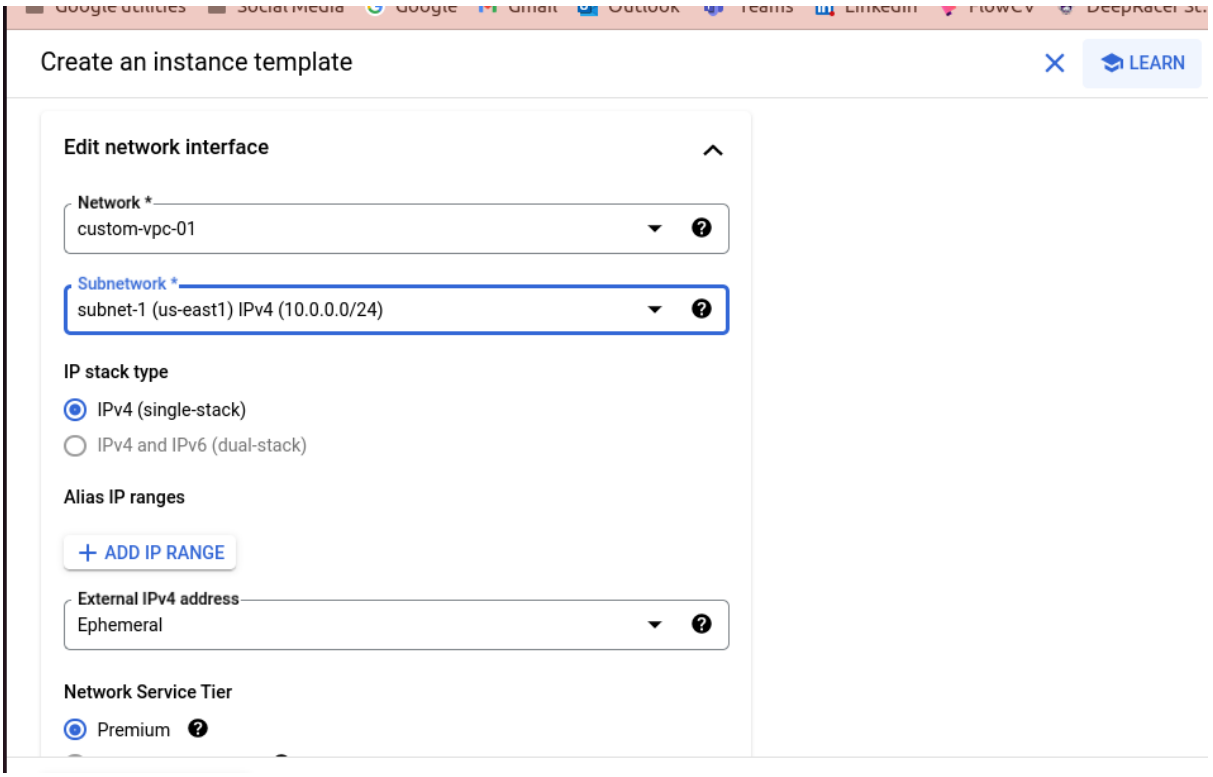
Image *
custom-img-nginx

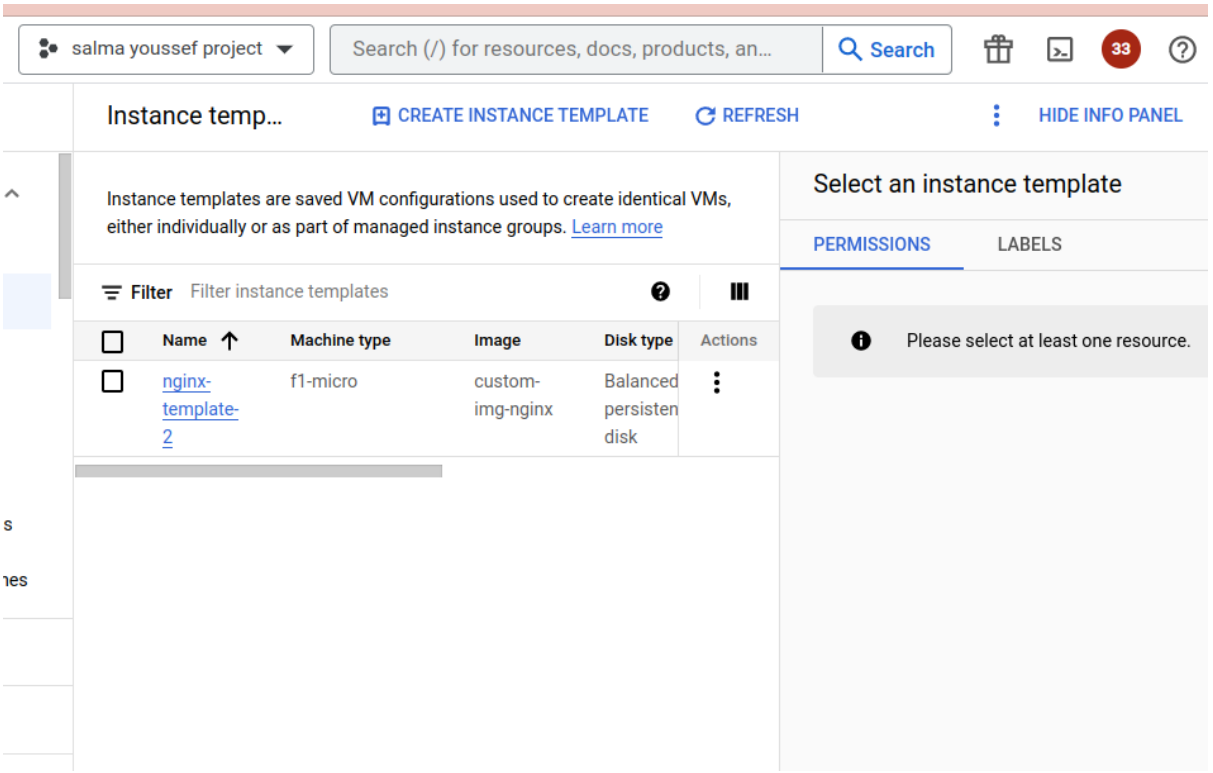
x86/64, Created on Feb 3, 2023, 11:21:47 PM

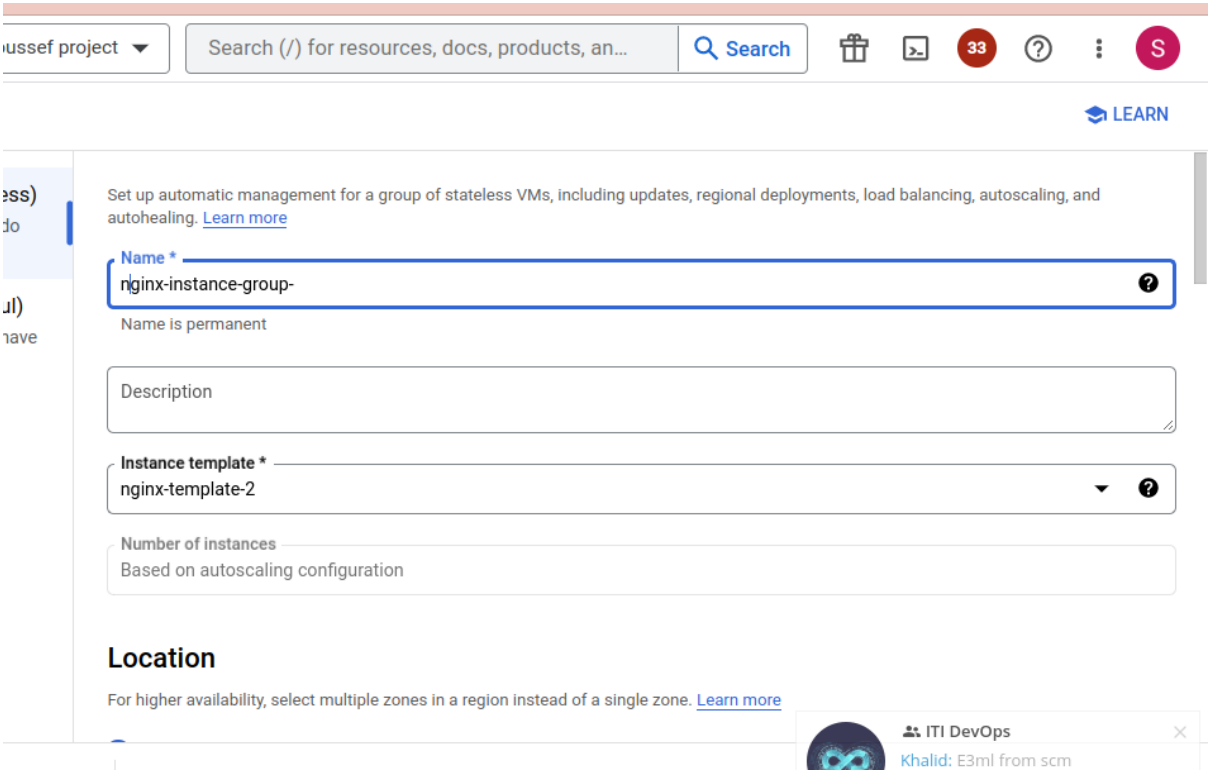
Boot disk type *
Balanced persistent disk

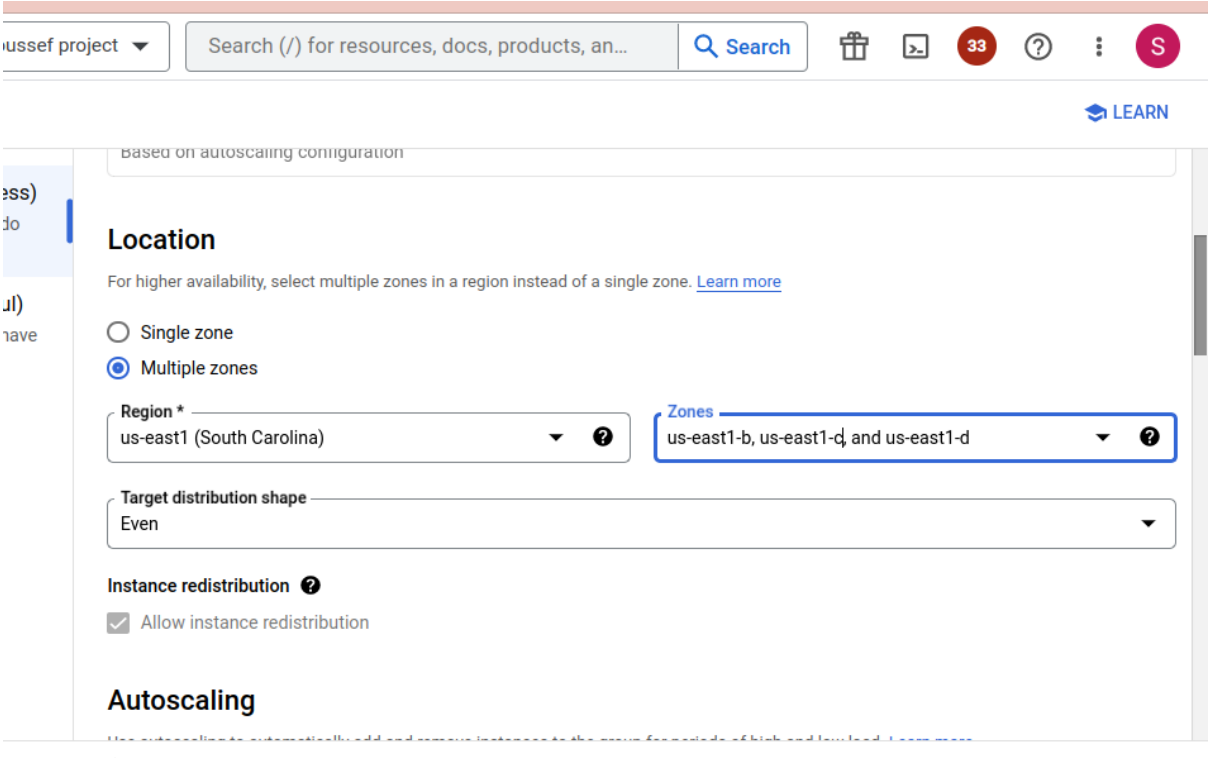
COMPARE DISK TYPES

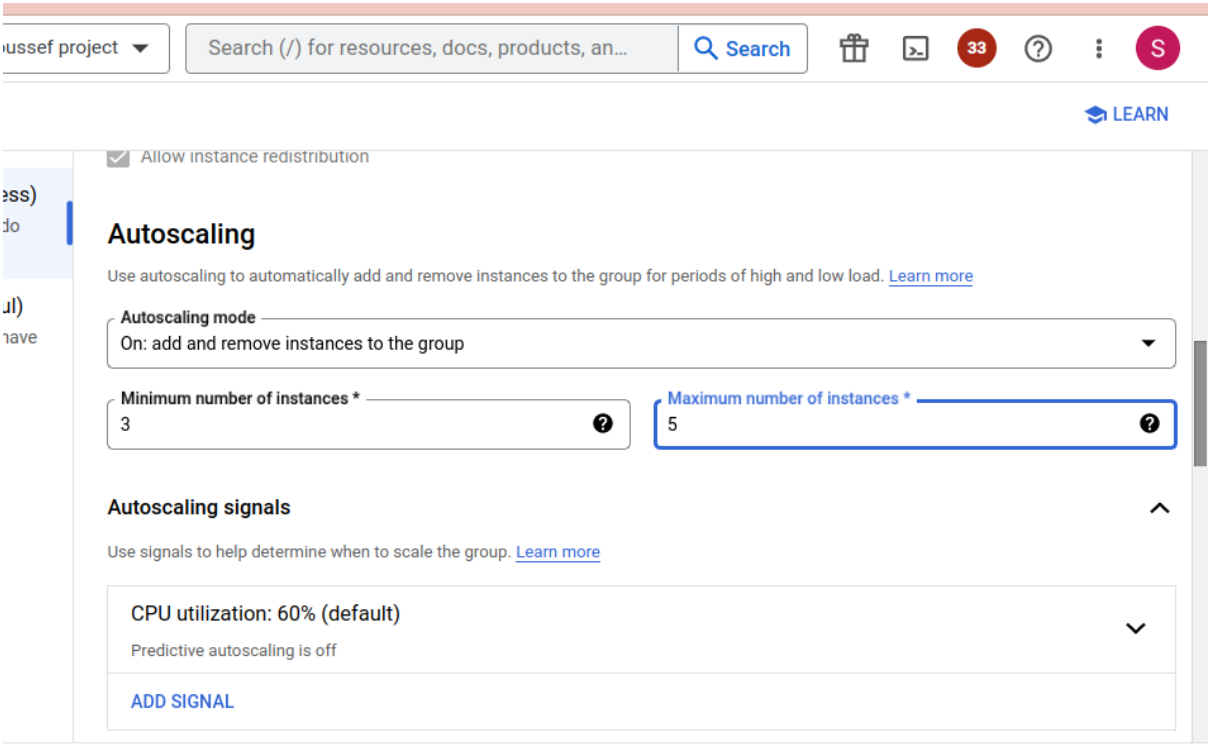
Size (GB) *
10

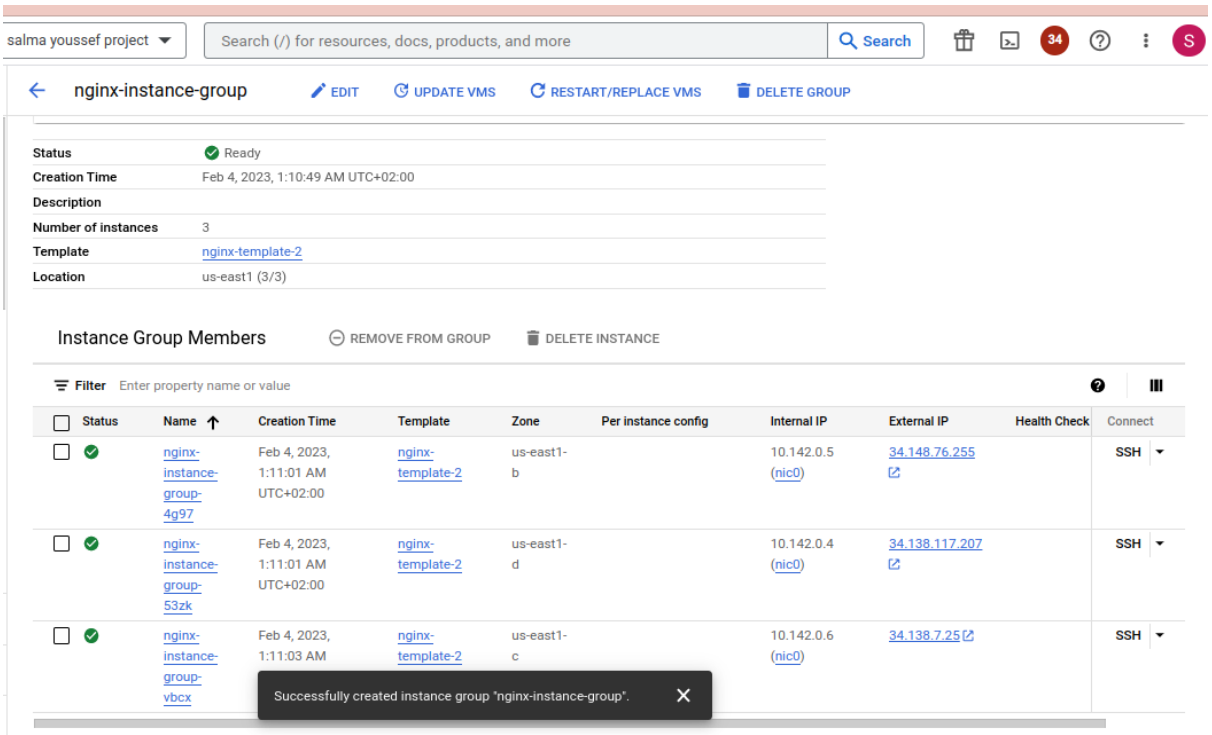

Create an instance template
LEARN
Edit network interface
Network *
custom-vpc-01
Subnetwork *
subnet-1 (us-east1) IPv4 (10.0.0.0/24)
IP stack type
IPv4 (single-stack)
IPv4 and IPv6 (dual-stack)
Alias IP ranges
ADD IP RANGE
External IPv4 address
Ephemeral
Network Service Tier
Premium


salma youssef project
Search (/) for resources, docs, products, an...
Search
33
Instance temp...
CREATE INSTANCE TEMPLATE
REFRESH
HIDE INFO PANEL
Instance templates are saved VM configurations used to create identical VMs, either individually or as part of managed instance groups. Learn more
Filter
Filter instance templates
Name
Machine type
Image
Disk type
Actions
nginx-template-2
f1-micro
custom-img-nginx
Balanced persisten disk
Select an instance template
PERMISSIONS
LABELS
Please select at least one resource.


ussef project
Search (/) for resources, docs, products, an...
Search
33
S
LEARN
Set up automatic management for a group of stateless VMs, including updates, regional deployments, load balancing, autoscaling, and autohealing. Learn more
Name *
nginx-instance-group-
Name is permanent
Description
Instance template *
nginx-template-2
Number of instances
Based on autoscaling configuration
Location
For higher availability, select multiple zones in a region instead of a single zone. Learn more
ITI DevOps
Khalid: E3ml from scm


ussef project
Search (/) for resources, docs, products, an...
Search
33
S
LEARN
Based on autoscaling configuration
Location
For higher availability, select multiple zones in a region instead of a single zone. Learn more
Single zone
Multiple zones
Region *
us-east1 (South Carolina)
Zones
us-east1-b, us-east1-c, and us-east1-d
Target distribution shape
Even
Instance redistribution
Allow instance redistribution
Autoscaling


ussef project
Search (/) for resources, docs, products, an...
Search
33
S
LEARN
Allow instance redistribution
Autoscaling
Use autoscaling to automatically add and remove instances to the group for periods of high and low load. Learn more
Autoscaling mode
On: add and remove instances to the group
Minimum number of instances *
3
Maximum number of instances *
5
Autoscaling signals
Use signals to help determine when to scale the group. Learn more
CPU utilization: 60% (default)
Predictive autoscaling is off
ADD SIGNAL


salma youssef project
Search (/) for resources, docs, products, and more
Search
34
S
nginx-instance-group
EDIT
UPDATE VMS
RESTART/REPLACE VMS
DELETE GROUP
Status
Ready
Creation Time
Feb 4, 2023, 1:10:49 AM UTC+02:00
Description
Number of instances
3
Template
nginx-template-2
Location
us-east1 (3/3)
Instance Group Members
REMOVE FROM GROUP
DELETE INSTANCE
Filter
Enter property name or value
Status
Name
Creation Time
Template
Zone
Per instance config
Internal IP
External IP
Health Check
Connect
nginx-instance-group-4g97
Feb 4, 2023, 1:11:01 AM UTC+02:00
nginx-template-2
us-east1-b
10.142.0.5 (nic0)
34.148.76.255
SSH
nginx-instance-group-53zk
Feb 4, 2023, 1:11:01 AM UTC+02:00
nginx-template-2
us-east1-d
10.142.0.4 (nic0)
34.138.117.207
SSH
nginx-instance-group-vbcx
Feb 4, 2023, 1:11:03 AM
nginx-template-2
us-east1-c
10.142.0.6 (nic0)
34.138.7.25
SSH
Successfully created instance group "nginx-instance-group".