

RKE2 Kubernetes Cluster Setup on Google Cloud Platform



RKE2



Objective

Set up a two-node Kubernetes cluster using RKE2 (Rancher Kubernetes Engine 2) on GCP:

- One control-plane (master) node
 - One worker node
 - Firewall rules to allow required traffic
-

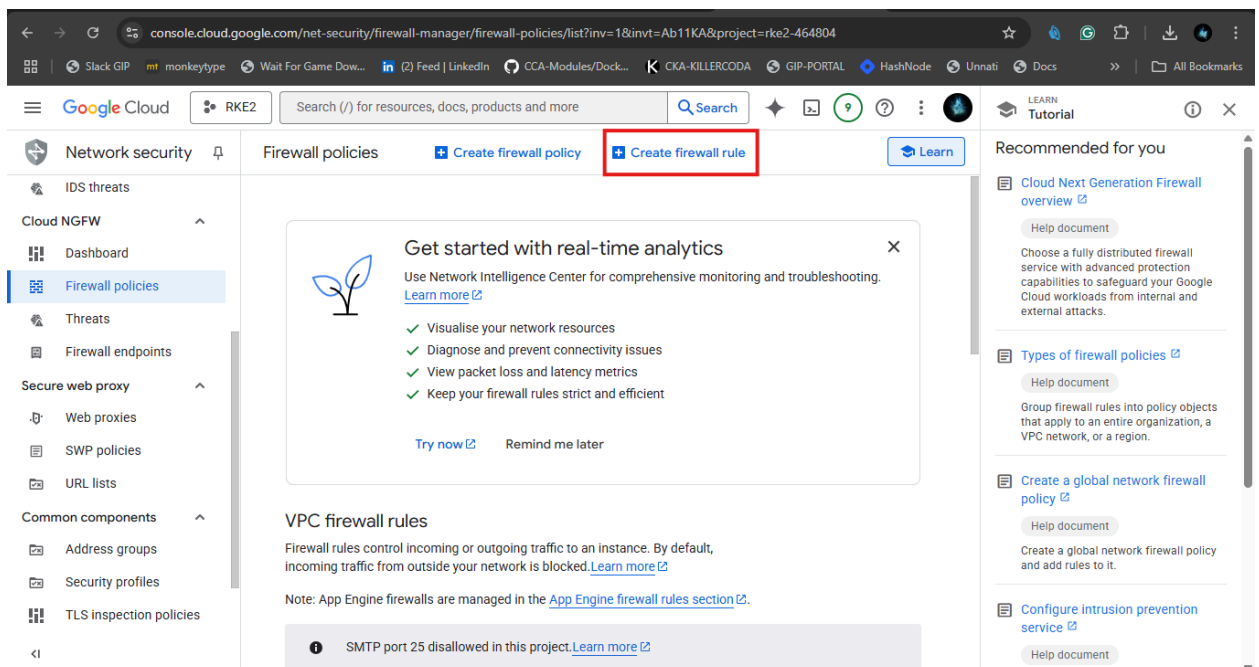
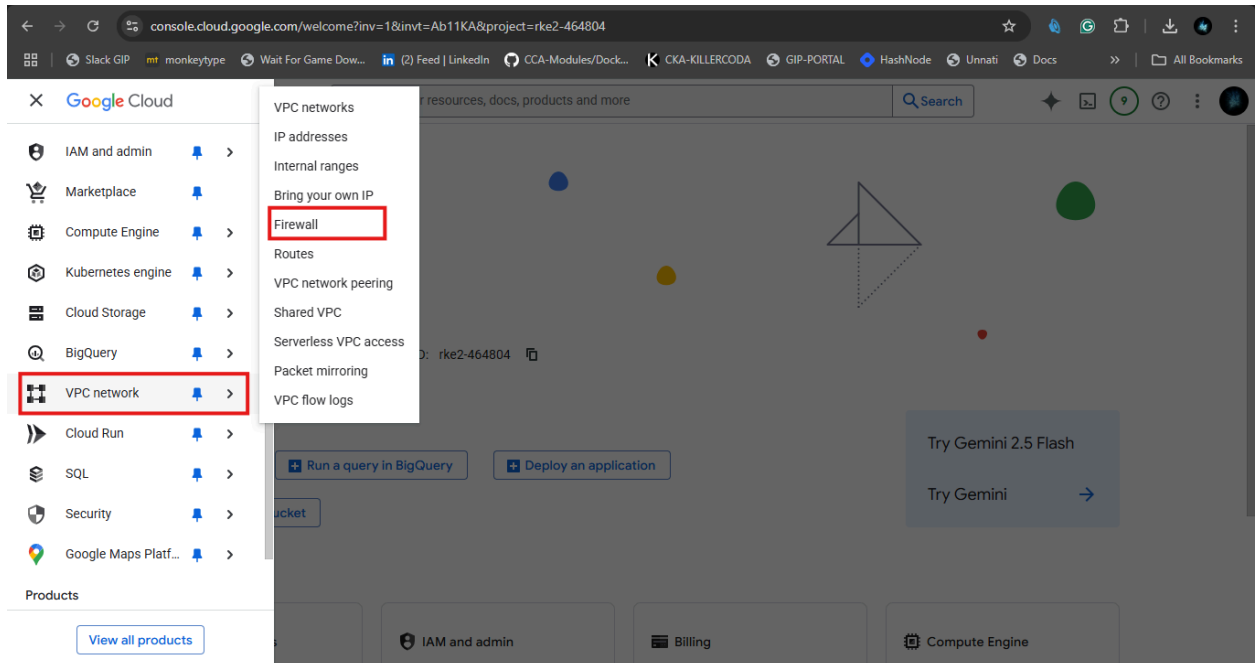
1. Prerequisites

- A Google Cloud Platform account
 - A GCP project with billing enabled
 - Basic Linux and terminal knowledge
 - (Optional) gcloud CLI installed
-

2. Create a Firewall Rule in GCP

Option A: Using Google Cloud Console

1. Go to: **VPC Network > Firewall > Create Firewall Rule**



2. Use these values:

- Name: **allow-rke2-ports**
- Direction: **Ingress**
- Action: **Allow**
- Targets: All instances in the network
- Source IP ranges: **0.0.0.0/0**

Protocols and Ports:

tcp:22, 6443, 9345, 10250, 8472, 30000-32767

○

3. Click "Create"

The screenshot shows the Google Cloud console interface for creating a firewall rule. The left sidebar contains a navigation menu with options like 'Network security', 'IDS threats', 'Cloud NGFW', 'Dashboard', 'Firewall policies', 'Threats', 'Firewall endpoints', 'Secure web proxy', 'Web proxies', 'SWP policies', 'URL lists', 'Common components', 'Address groups', 'Security profiles', and 'TLS inspection policies'. The main content area is titled 'Create a firewall rule' and includes a description of firewall rules. The 'Name' field is set to 'allow-rke2-port' and the 'Direction of traffic' is set to 'Ingress'. The 'Logs' section is set to 'Off'. The 'Network' is set to 'default' and the 'Priority' is set to '1000'. A tooltip is visible over the 'Name' field, showing the text 'allow-rke2-ports'.

Google Cloud RKE2 Search (/) for resources, docs, products and more

Network security Create a 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 * allow-rke2-port

Lowercase letters, hyphens, and underscores only. No spaces or special characters.

Description

Logs

Turning on firewall logs can generate a large number of logs, which can increase costs in Logging. [Learn more](#)

☐ On

☒ Off

Network * default

Priority * 1000 [Compare](#)

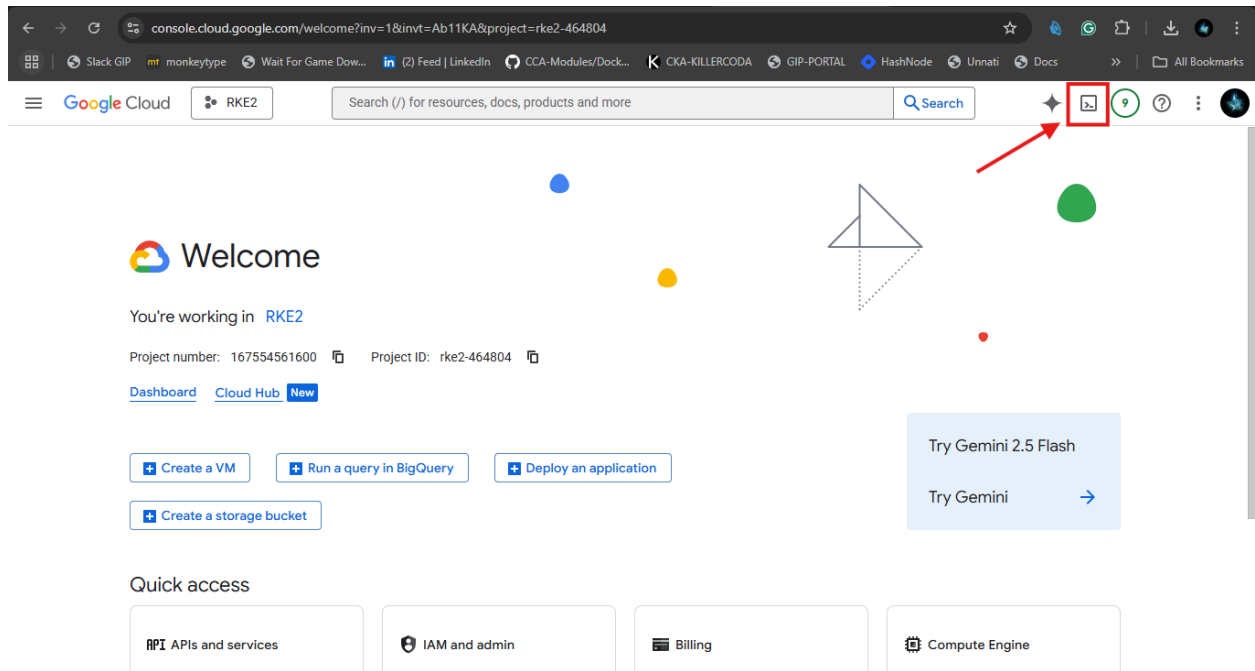
Priority can be 0-65535

Direction of traffic

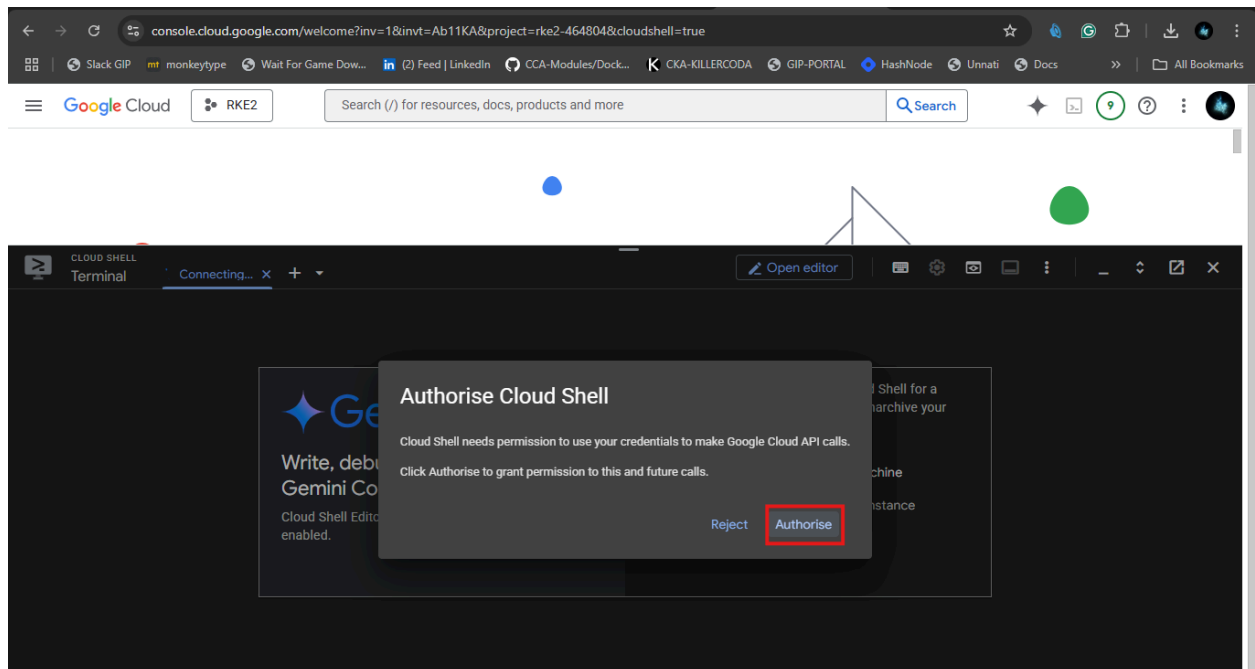
☒ Ingress

Option B: Using gcloud CLI

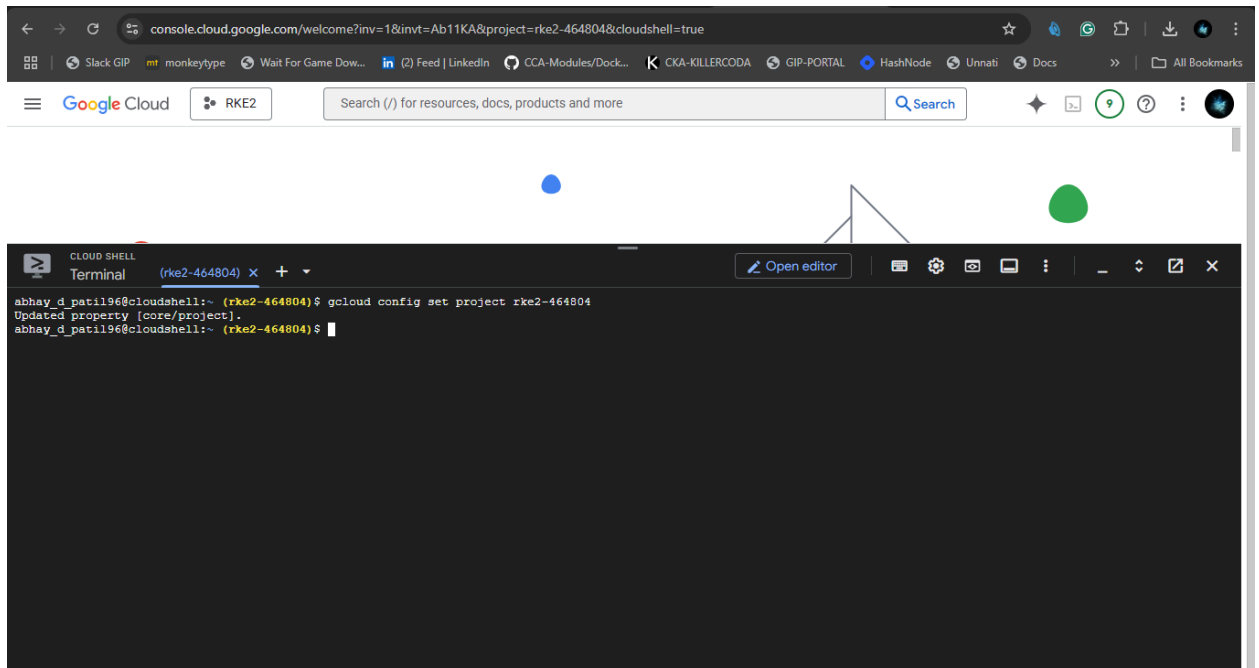
1) Open gcloud CLI console.



2) Authorise the cloud shell.



- 3) Set Project Use ``gcloud config set project [PROJECT_ID]`` to change to a different project.



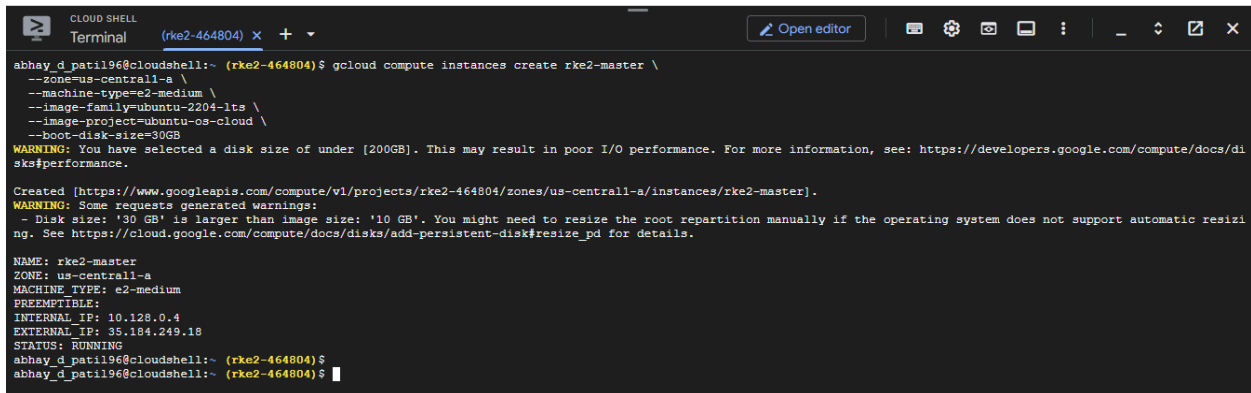
- 4) Insert following command in gcloud CLI.

```
gcloud compute firewall-rules create allow-rke2-ports \
  --direction=INGRESS \
  --priority=1000 \
  --network=default \
  --action=ALLOW \
  --rules=tcp:22,tcp:6443,tcp:9345,tcp:10250,tcp:8472,tcp:30000-32767 \
  --source-ranges=0.0.0.0/0
```



3. Launch the RKE2 Master Node

```
gcloud compute instances create rke2-master \
  --zone=us-central1-a \
  --machine-type=e2-medium \
  --image-family=ubuntu-2204-lts \
  --image-project=ubuntu-os-cloud \
  --boot-disk-size=30GB
```

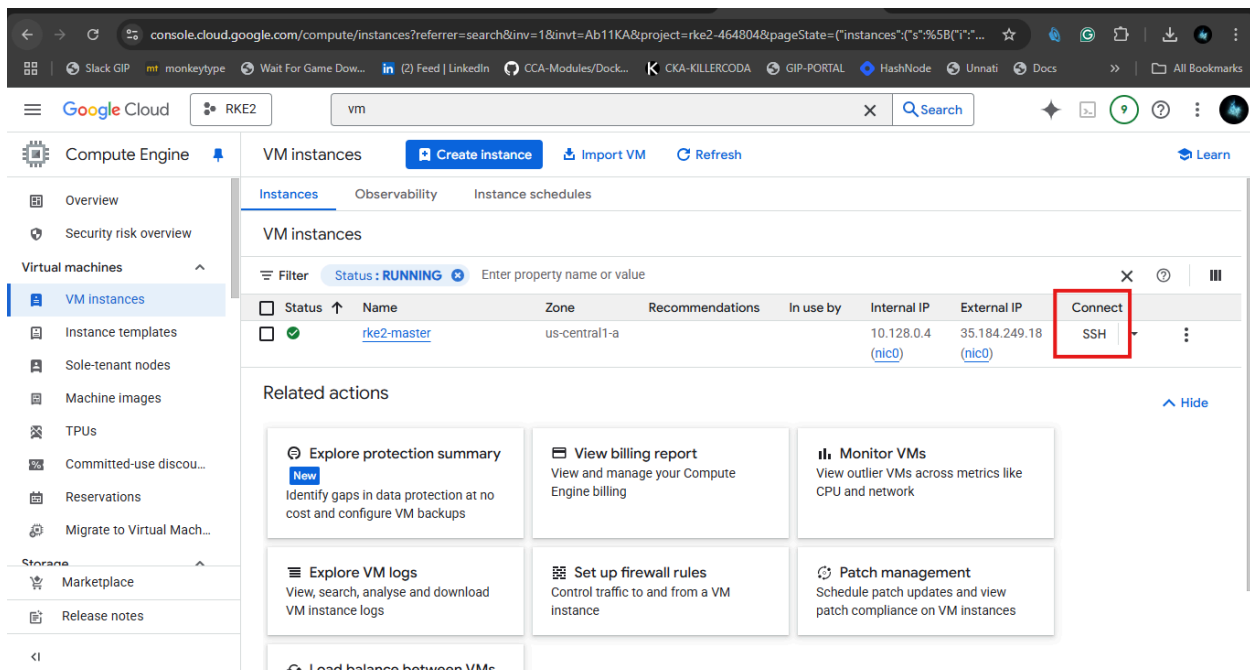


```
CLOUD SHELL
Terminal (rke2-464804) x +
Open editor

abhay_d_patil196@cloudshell:~ (rke2-464804) $ gcloud compute instances create rke2-master \
  --zone=us-central1-a \
  --machine-type=e2-medium \
  --image-family=ubuntu-2204-lts \
  --image-project=ubuntu-os-cloud \
  --boot-disk-size=30GB
WARNING: You have selected a disk size of under [200GB]. This may result in poor I/O performance. For more information, see: https://developers.google.com/compute/docs/disks#performance.
Created [https://www.googleapis.com/compute/v1/projects/rke2-464804/zones/us-central1-a/instances/rke2-master].
WARNING: Some requests generated warnings:
- Disk size: '30 GB' is larger than image size: '10 GB'. You might need to resize the root repartition manually if the operating system does not support automatic resizing. See https://cloud.google.com/compute/docs/disks/add-persistent-disk#resize_pd for details.
NAME: rke2-master
ZONE: us-central1-a
MACHINE_TYPE: e2-medium
PREEMPTIBLE:
INTERNAL_IP: 10.128.0.4
EXTERNAL_IP: 35.184.249.18
STATUS: RUNNING
abhay_d_patil196@cloudshell:~ (rke2-464804) $
abhay_d_patil196@cloudshell:~ (rke2-464804) $
```

SSH into the VM:

```
gcloud compute ssh rke2-master
```

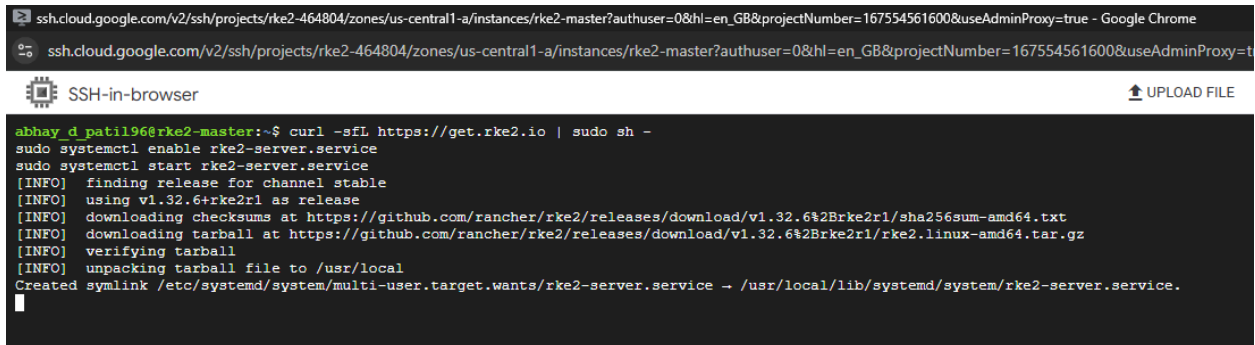


The screenshot shows the Google Cloud console interface. The left sidebar contains navigation options like 'Compute Engine', 'Virtual machines', 'Instance templates', and 'Machine images'. The main content area is titled 'VM instances' and shows a table of running instances. The 'rke2-master' instance is listed with status 'RUNNING', zone 'us-central1-a', and external IP '35.184.249.18'. A red box highlights the 'Connect' button in the 'Connect' column, which has a dropdown menu showing 'SSH'. Below the table, there are several 'Related actions' cards such as 'Explore protection summary', 'View billing report', 'Monitor VMs', 'Explore VM logs', 'Set up firewall rules', and 'Patch management'.

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
✓	rke2-master	us-central1-a			10.128.0.4 (nic0)	35.184.249.18 (nic0)	Connect SSH

4. Install RKE2 (Server) on the Master Node

```
curl -sfL https://get.rke2.io | sudo sh -  
sudo systemctl enable rke2-server.service  
sudo systemctl start rke2-server.service
```



The screenshot shows a terminal window with the following content:

```
ssh.cloud.google.com/v2/ssh/projects/rke2-464804/zones/us-central1-a/instances/rke2-master?authuser=0&hl=en_GB&projectNumber=167554561600&useAdminProxy=true - Google Chrome  
ssh.cloud.google.com/v2/ssh/projects/rke2-464804/zones/us-central1-a/instances/rke2-master?authuser=0&hl=en_GB&projectNumber=167554561600&useAdminProxy=t  
SSH-in-browser  
UPLOAD FILE  
abhay_d_patil96@rke2-master:~$ curl -sfL https://get.rke2.io | sudo sh -  
sudo systemctl enable rke2-server.service  
sudo systemctl start rke2-server.service  
[INFO] finding release for channel stable  
[INFO] using v1.32.6+rke2r1 as release  
[INFO] downloading checksums at https://github.com/rancher/rke2/releases/download/v1.32.6%2Brke2r1/sha256sum-amd64.txt  
[INFO] downloading tarball at https://github.com/rancher/rke2/releases/download/v1.32.6%2Brke2r1/rke2.linux-amd64.tar.gz  
[INFO] verifying tarball  
[INFO] unpacking tarball file to /usr/local  
Created symlink /etc/systemd/system/multi-user.target.wants/rke2-server.service -> /usr/local/lib/systemd/system/rke2-server.service.  
█
```

Add RKE2 binary path:

```
echo 'export PATH=$PATH:/var/lib/rancher/rke2/bin' >> ~/.bashrc  
source ~/.bashrc
```

5. Configure kubectl on the Master Node

```
mkdir -p ~/.kube  
sudo cp /etc/rancher/rke2/rke2.yaml ~/.kube/config  
sudo chown $USER:$USER ~/.kube/config
```

Verify:

```
kubectl get nodes
```

```
ssh.cloud.google.com/v2/ssh/projects/rke2-464804/zones/us-central1-a/instances/rke2-master?authuser=0&hl=en_GB&
ssh.cloud.google.com/v2/ssh/projects/rke2-464804/zones/us-central1-a/instances/rke2-master?authu

SSH-in-browser

abhay_d_patil96@rke2-master:~$ kubectl get nodes
NAME                STATUS    ROLES                  AGE      VERSION
rke2-master         Ready    control-plane,etcd,master  2m5s    v1.32.6+rke2r1
abhay_d_patil96@rke2-master:~$
```

6. Launch the RKE2 Worker Node

```
gcloud compute instances create rke2-worker \
  --zone=us-central1-a \
  --machine-type=e2-medium \
  --image-family=ubuntu-2204-lts \
  --image-project=ubuntu-os-cloud
```

```
console.cloud.google.com/welcome?inv=1&invnt=Ab11Tw&project=rke2-464804&cloudshell=true
Slack GIP  monkeytype  Wait For Game Dow...  (2) Feed | LinkedIn  CCA-Modules/Dock...  CKA-KILLERCODA  GIP-PORTAL  HashNode  Unnati  Docs  Search (/) for resources, docs, products and more  Search  Activate Cloud Shell (G then S)

CLOUD SHELL
Terminal (rke2-464804) x + Open editor
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to rke2-464804.
Use 'gcloud config set project [PROJECT_ID]' to change to a different project.
abhay_d_patil96@cloudshell:~ (rke2-464804) $ gcloud compute instances create rke2-worker \
  --zone=us-central1-a \
  --machine-type=e2-medium \
  --image-family=ubuntu-2204-lts \
  --image-project=ubuntu-os-cloud
Created [https://www.googleapis.com/compute/v1/projects/rke2-464804/zones/us-central1-a/instances/rke2-worker].
NAME: rke2-worker
ZONE: us-central1-a
MACHINE_TYPE: e2-medium
PREEMPTIBLE:
INTERNAL_IP: 10.128.0.5
EXTERNAL_IP: 34.57.124.128
STATUS: RUNNING
abhay_d_patil96@cloudshell:~ (rke2-464804) $
```


SSH into it:

gcloud compute ssh rke2-worker

The screenshot shows a Google Cloud Shell terminal window with the following content:

```
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-1032-gcp x86_64)

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

System information as of Fri Jul  4 07:13:28 UTC 2025

System load:  0.46           Processes:    110
Usage of /:   22.0% of 9.51GB Users logged in:  0
Memory usage: 6%           IPv4 address for ens4: 10.128.0.5
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

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.

abhay_d_patil96@rke2-worker:~$
```

On the right side of the terminal, there is a table showing VM instances:

Internal IP	External IP	Connect
10.128.0.4 (nic0)	35.184.249.18 (nic0)	SSH
10.128.0.5 (nic0)	34.57.124.128 (nic0)	SSH

Below the table, there are two sections: "Monitor VMs" and "Patch management".

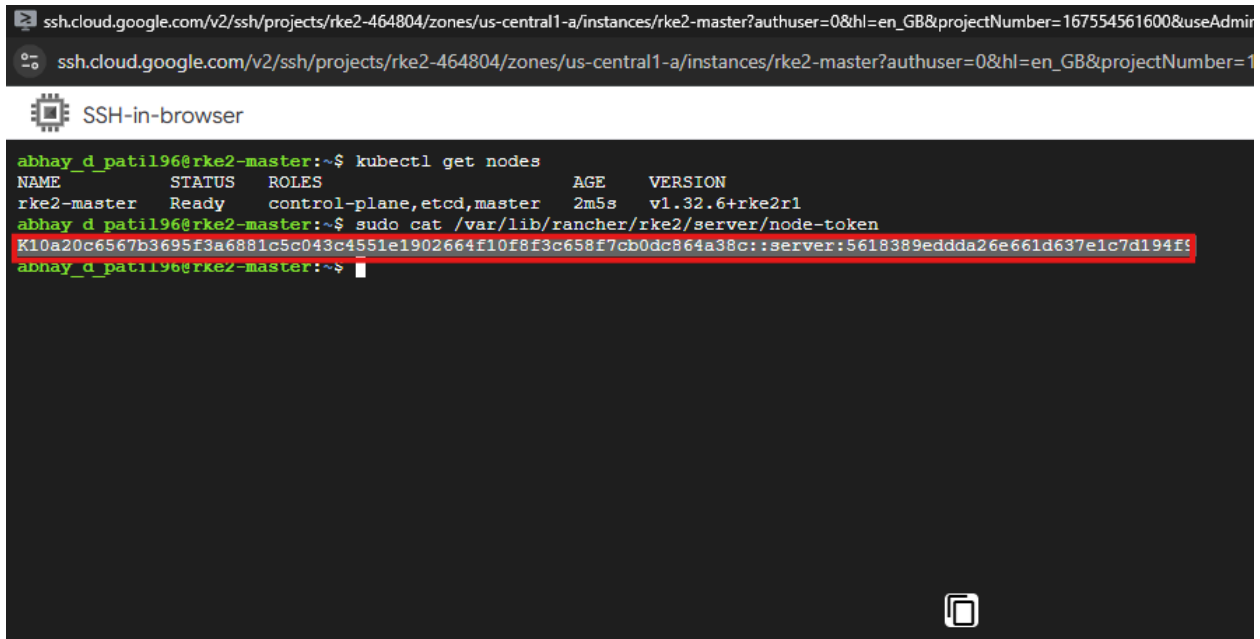
At the bottom of the terminal window, there is a "CLOUD SHELL" header and a "Terminal" tab for the instance "rke2-464804".

7. Install RKE2 (Agent) on the Worker Node

Step 1: Get the Join Token from the Master

On the **master node**, run:

```
sudo cat /var/lib/rancher/rke2/server/node-token
```



The image shows an SSH-in-browser terminal window. At the top, there are two browser address bars showing the URL: `ssh.cloud.google.com/v2/ssh/projects/rke2-464804/zones/us-central1-a/instances/rke2-master?authuser=0&hl=en_GB&projectNumber=167554561600&useAdmin`. Below the address bars is a gear icon and the text "SSH-in-browser". The terminal window shows the following commands and output:

```
abhay_d_patil196@rke2-master:~$ kubectl get nodes
NAME                STATUS    ROLES                  AGE      VERSION
rke2-master         Ready     control-plane,etcd,master 2m5s     v1.32.6+rke2r1
abhay_d_patil196@rke2-master:~$ sudo cat /var/lib/rancher/rke2/server/node-token
K10a20c6567b3695f3a6881c5c043c4551e1902664f10f8f3c658f7cb0dc864a38c::server:5618389eddda26e661d637e1c7d194f6
```

Copy this token.

Step 2: Create Agent Config on the Worker Node

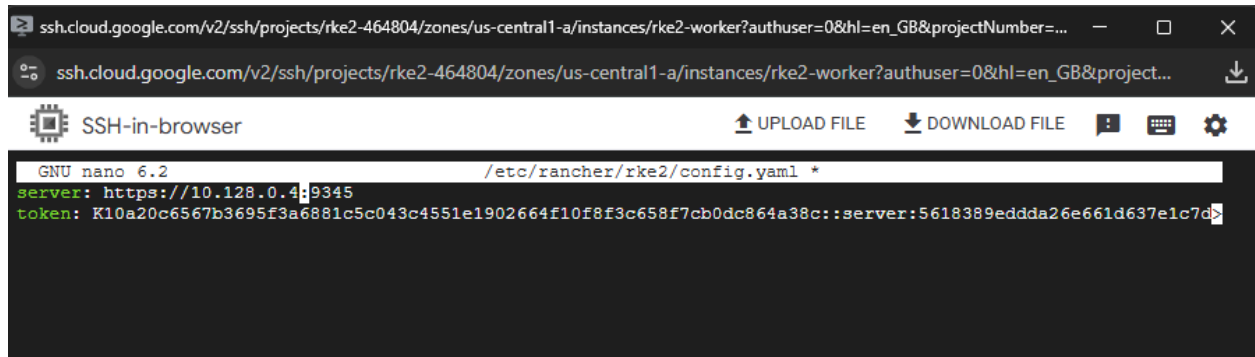
```
sudo mkdir -p /etc/rancher/rke2
```

Then:

```
sudo nano /etc/rancher/rke2/config.yaml
```

Paste:

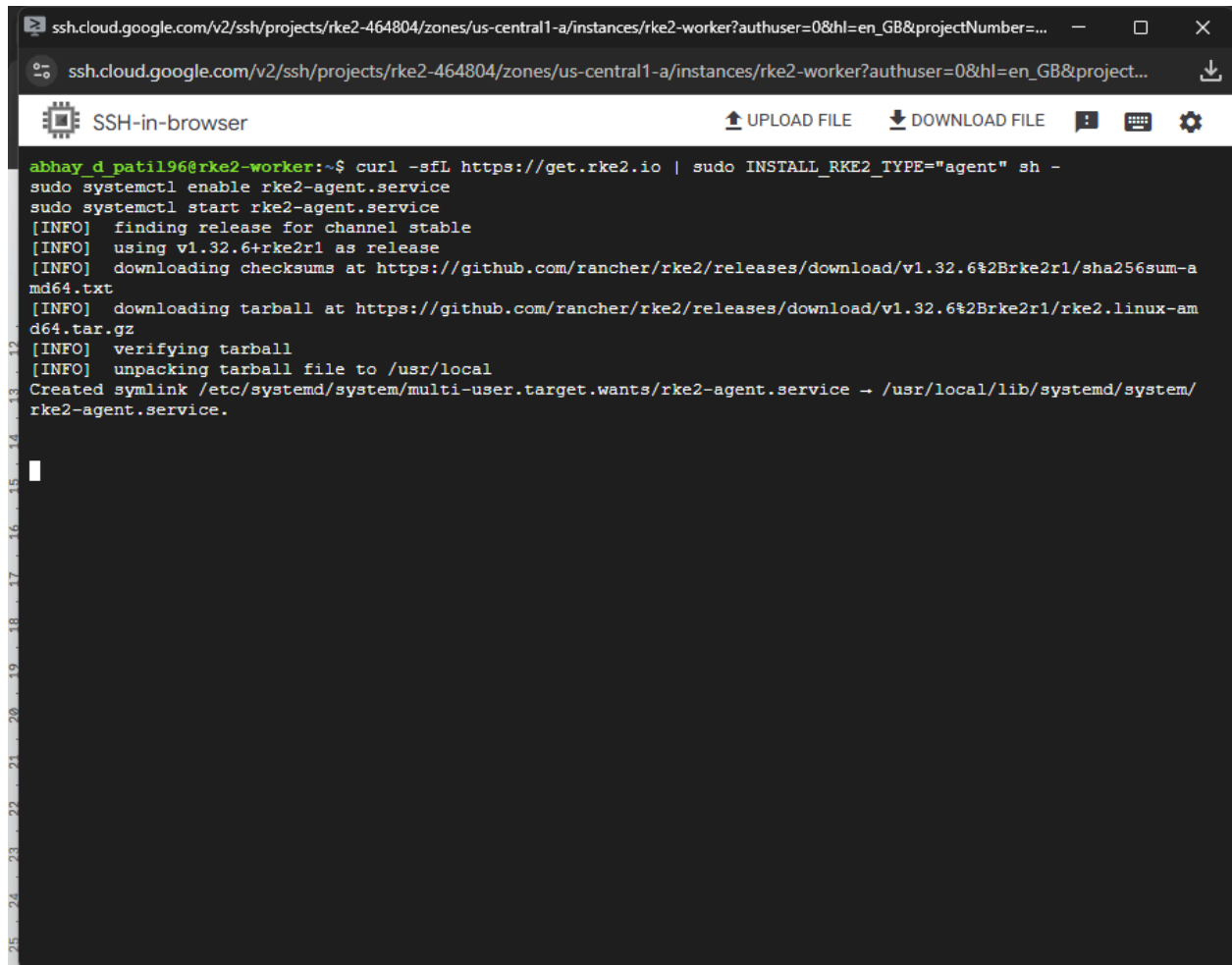
```
server: https://<MASTER_INTERNAL_IP>:9345
token: <PASTE_TOKEN_HERE>
```



```
GNU nano 6.2 /etc/rancher/rke2/config.yaml *
server: https://10.128.0.4:9345
token: K10a20c6567b3695f3a6881c5c043c4551e1902664f10f8f3c658f7cb0dc864a38c::server:5618389eddda26e661d637e1c7d
```

Step 3: Install and Start the Agent

```
curl -sL https://get.rke2.io | sudo INSTALL_RKE2_TYPE="agent" sh -
sudo systemctl enable rke2-agent.service
sudo systemctl start rke2-agent.service
```



```
abhay_d_patil96@rke2-worker:~$ curl -sL https://get.rke2.io | sudo INSTALL_RKE2_TYPE="agent" sh -
sudo systemctl enable rke2-agent.service
sudo systemctl start rke2-agent.service
[INFO] finding release for channel stable
[INFO] using v1.32.6+rke2r1 as release
[INFO] downloading checksums at https://github.com/rancher/rke2/releases/download/v1.32.6%2Brke2r1/sha256sum-amd64.txt
[INFO] downloading tarball at https://github.com/rancher/rke2/releases/download/v1.32.6%2Brke2r1/rke2.linux-amd64.tar.gz
[INFO] verifying tarball
[INFO] unpacking tarball file to /usr/local
Created symlink /etc/systemd/system/multi-user.target.wants/rke2-agent.service -> /usr/local/lib/systemd/system/rke2-agent.service.
```

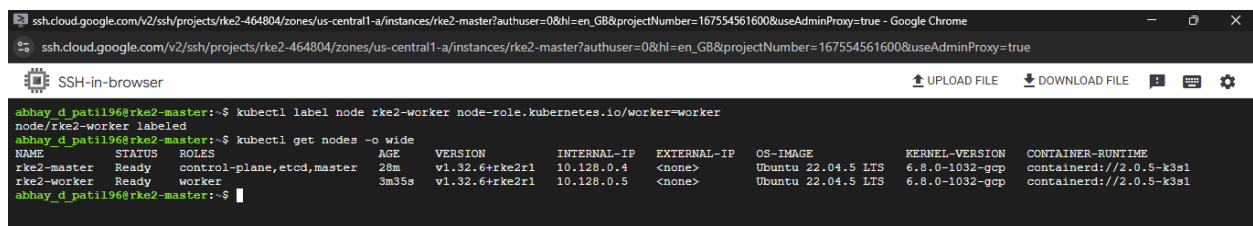
8. Label the Worker Node (Optional but Recommended)

Run this on the master:

```
kubectl label node rke2-worker node-role.kubernetes.io/worker=worker
```

Verify:

```
kubectl get nodes -o wide
```



The screenshot shows a terminal window titled "SSH-in-browser" with the following content:

```
abhay_d_patil196@rke2-master:~$ kubectl label node rke2-worker node-role.kubernetes.io/worker=worker
node/rke2-worker labeled
abhay_d_patil196@rke2-master:~$ kubectl get nodes -o wide
```

NAME	STATUS	ROLES	AGE	VERSION	INTERNAL-IP	EXTERNAL-IP	OS-IMAGE	KERNEL-VERSION	CONTAINER-RUNTIME
rke2-master	Ready	control-plane,etcd,master	28m	v1.32.6+rke2r1	10.128.0.4	<none>	Ubuntu 22.04.5 LTS	6.8.0-1032-gcp	containerd://2.0.5-k3s1
rke2-worker	Ready	worker	3m35s	v1.32.6+rke2r1	10.128.0.5	<none>	Ubuntu 22.04.5 LTS	6.8.0-1032-gcp	containerd://2.0.5-k3s1

```
abhay_d_patil196@rke2-master:~$
```

9) Clean-Up (Optional)

bash

CopyEdit

```
gcloud compute instances delete rke2-master rke2-worker
```

```
gcloud compute firewall-rules delete allow-rke2-ports
```

References

- [Official RKE2 Docs](#)
- [GCP Compute Engine Docs](#)