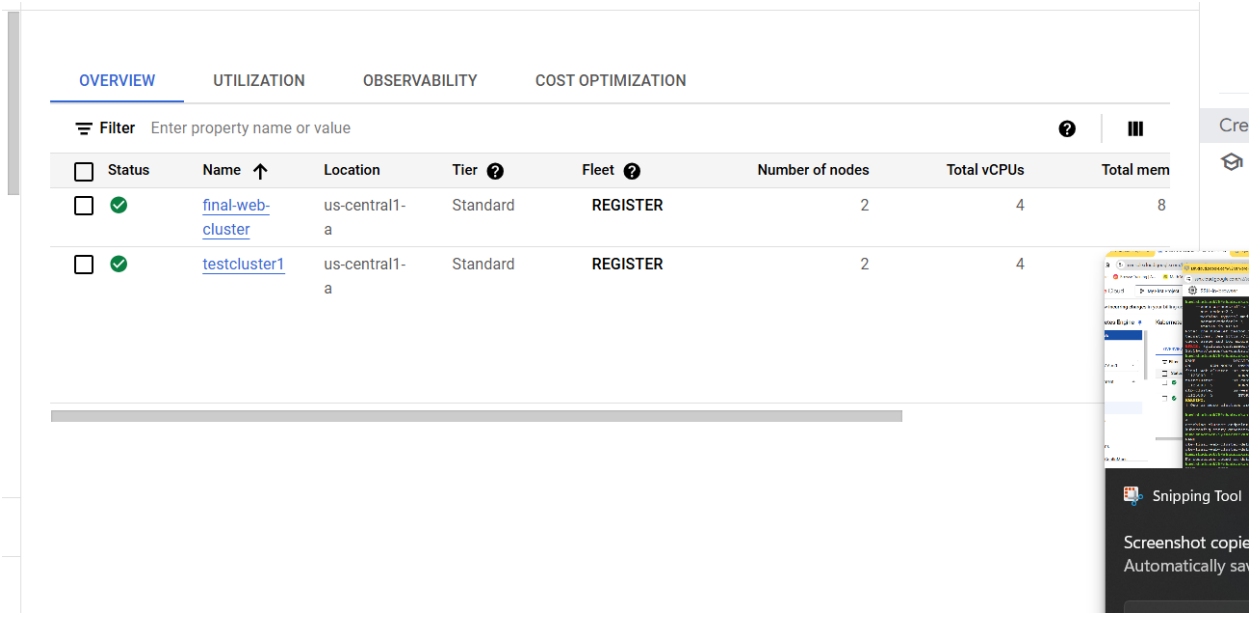
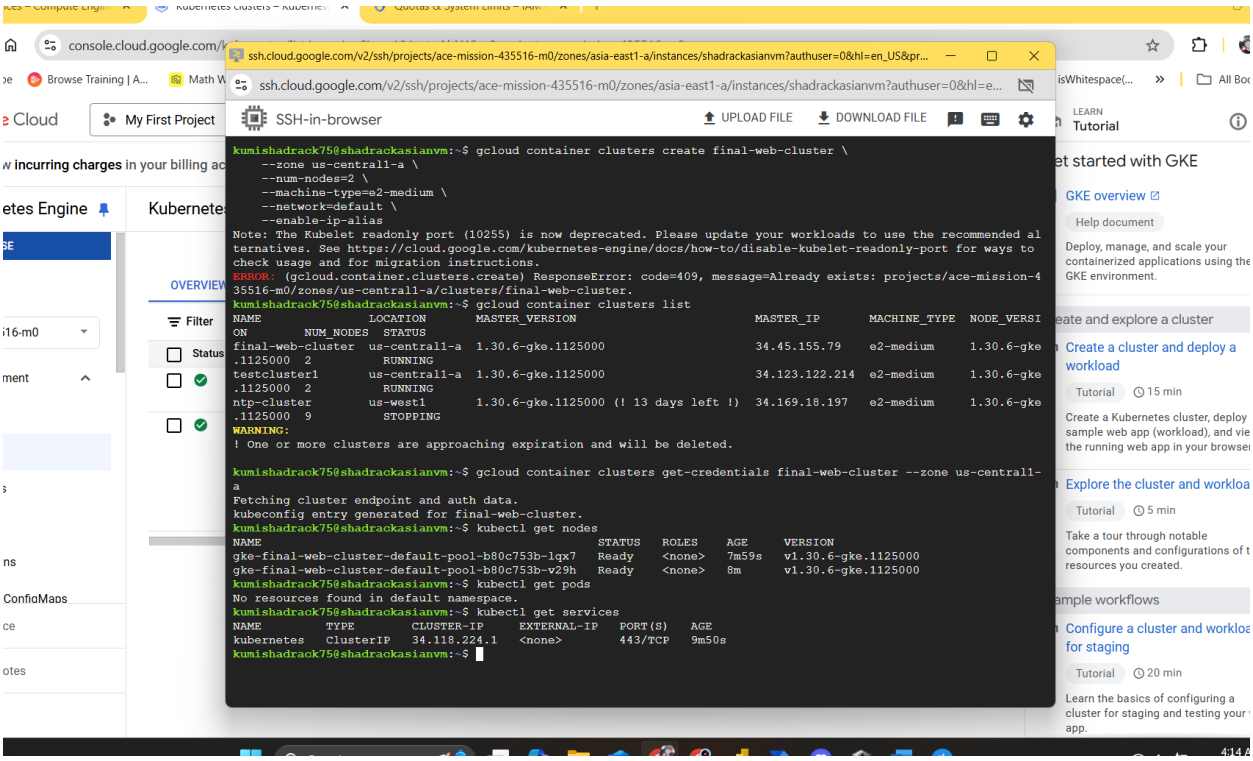
1. Create a GKE Cluster

1. **GCP Project Setup**:
    - Navigate to the Google Cloud Console.
    - Create a new project and enable the **Google Kubernetes Engine API**.
2. **Cluster Configuration**:
    - Use the **GKE Console** or **gcloud CLI** to create a cluster:





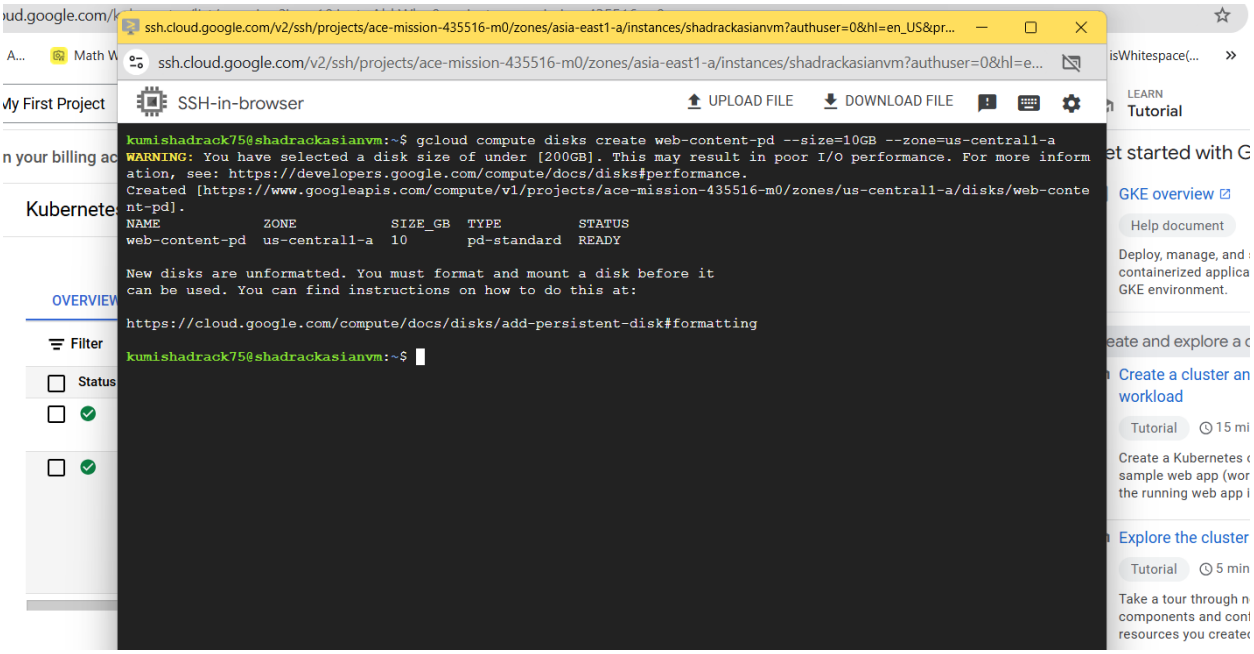
Note the cluster's name, zone (us-central1-a), machine type, and number of nodes.

Firewall Rules:

- Ensure the default VPC network has firewall rules to allow external traffic on the web server's port (e.g., HTTP/80).

2. Create a Persistent Disk

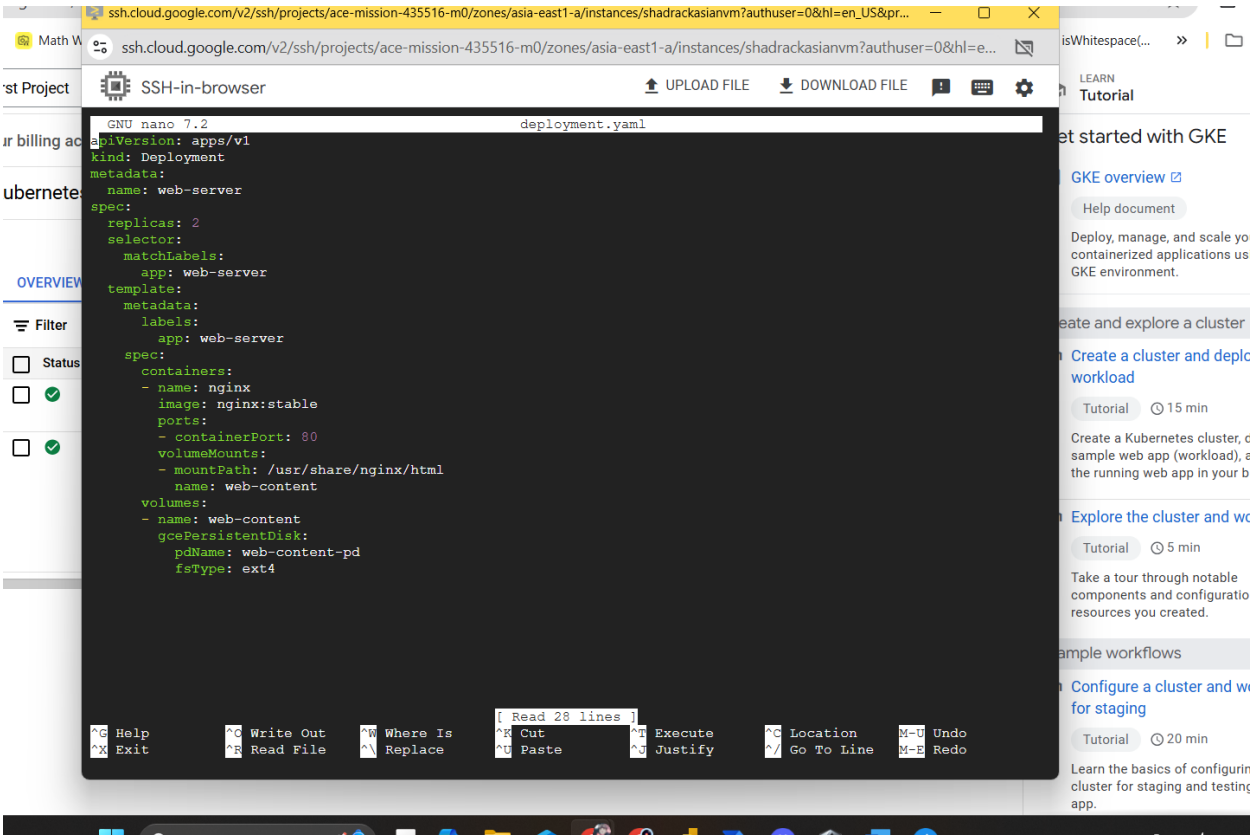
1. **Persistent Disk Setup**:
    - Create a 10GB Persistent Disk:



Document its name (web-content-pd), size, and zone.

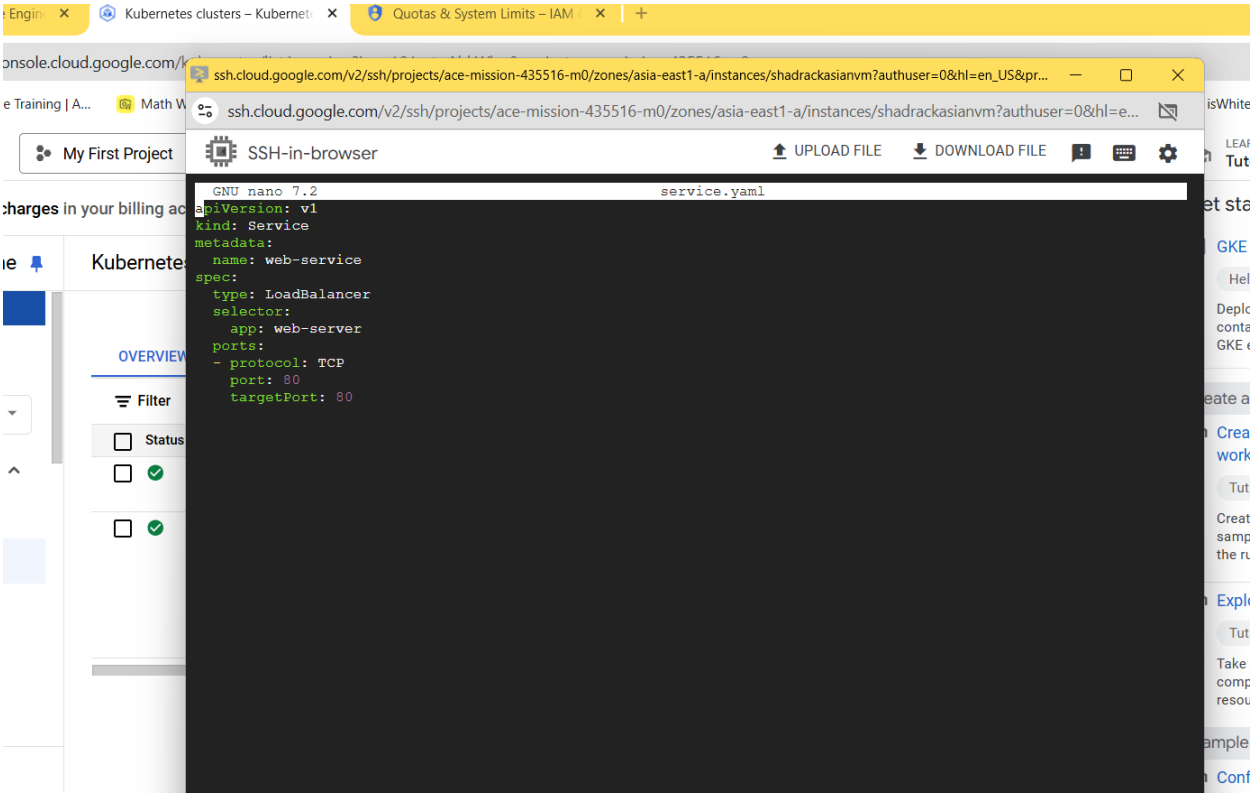
3. Deploy the Web Server

1. **Choose Container Image**:
    - Use a pre-built Nginx image: nginx:stable.
2. **Create Deployment Manifest**:
    - Save the following to deployment.yaml



Create Service Manifest:

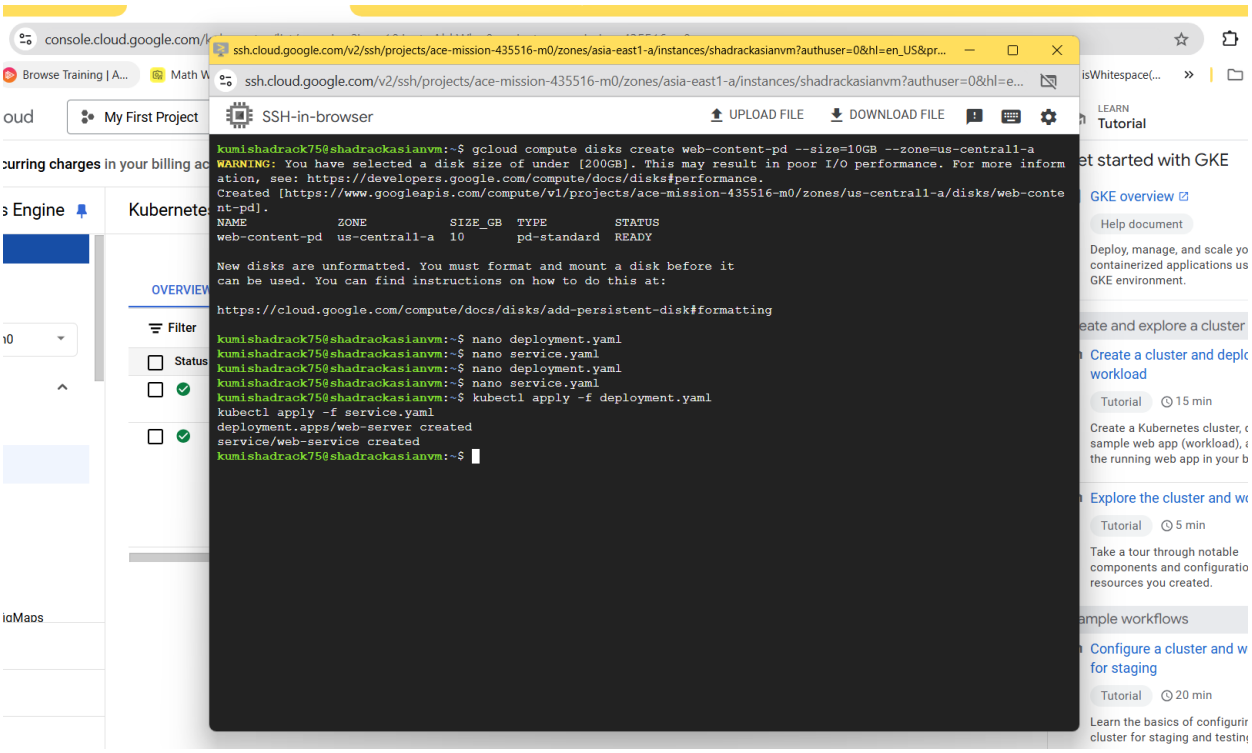
- Save the following to service.yaml



Deploy Resources:

kubectl apply -f deployment.yaml

kubectl apply -f service.yaml

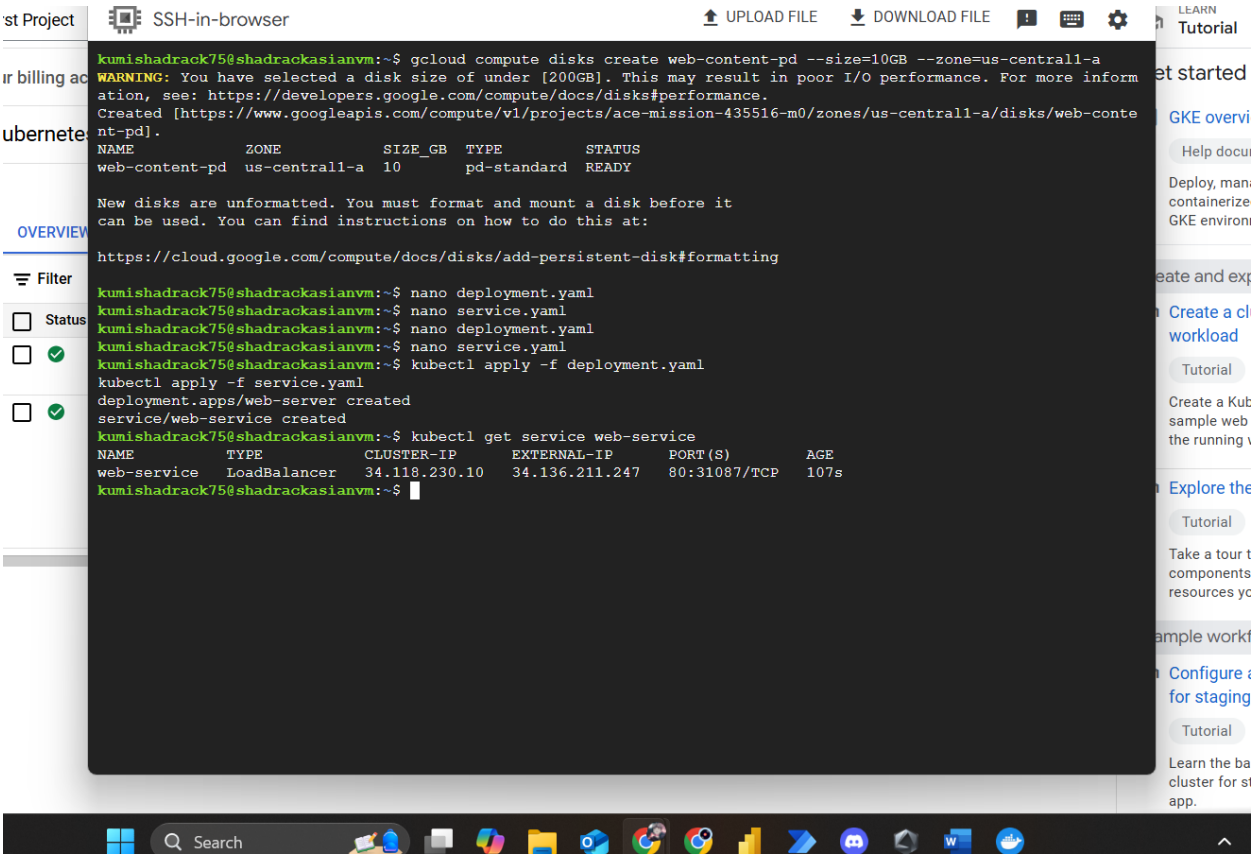


Verify Deployment:

- Get the external IP address:

kubectl get service web-service

Test access using a browser or curl.



4. Configure Monitoring

1. **Enable GKE Monitoring**:
    - Use **Metrics Explorer** in the Cloud Console to monitor:
        - CPU and memory usage.
        - HTTP request metrics.
        - Disk I/O performance.
2. **Set Alerts**:
    - Configure alerts for critical metrics:
        - Navigate to **Monitoring** > **Alerting** in Cloud Console.
        - Add policies for thresholds (e.g., CPU > 80%, HTTP errors).

3. **Security Monitoring**:
    - Enable **Cloud Security Command Center** for threat detection.

5. Test the Web Server

1. **Verify Content Serving**:
    - Check the web server by accessing its external IP

curl http://<EXTERNAL_IP>

Simulate Failures:

- Kill a pod to test high availability

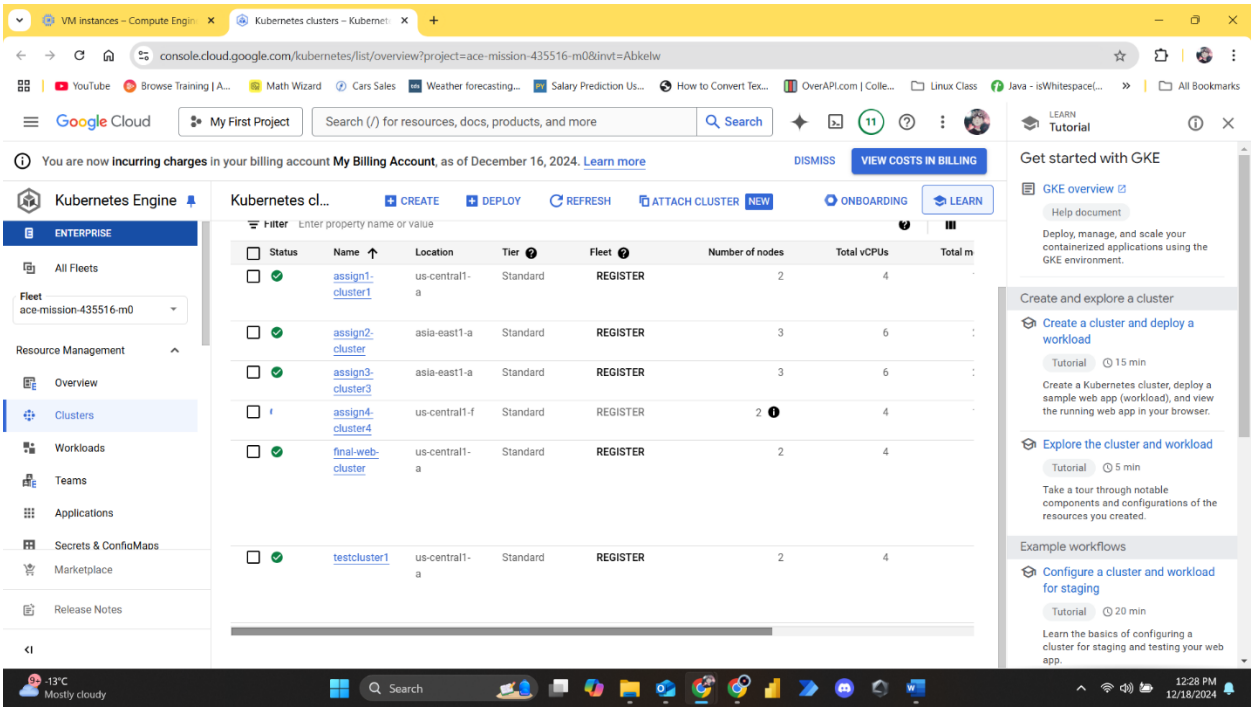
kubectl delete pod <pod-name>

Verify traffic is routed to healthy pods

Trigger Alerts:

- Stress-test resources to ensure alerts work:

kubectl exec <pod-name> -- stress --cpu 4 --timeout 60


VM instances – Compute Engine
Kubernetes clusters – Kubernetes
console.cloud.google.com/kubernetes/list/overview?project=ace-mission-435516-m0&invt=Abkelw
Google Cloud
My First Project
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Kubernetes Engine
Kubernetes cl...
CREATE
DEPLOY
REFRESH
ATTACH CLUSTER
NEW
ONBOARDING
LEARN
ENTERPRISE
All Fleets
Fleet
ace-mission-435516-m0
Resource Management
Overview
Clusters
Workloads
Teams
Applications
Secrets & ConfigMaps
Marketplace
Release Notes
Filter
Enter property name or value
Status
Name
Location
Tier
Fleet
Number of nodes
Total vCPUs
assign1-cluster1
us-central1-a
Standard
REGISTER
2
4
assign2-cluster
asia-east1-a
Standard
REGISTER
3
6
assign3-cluster3
asia-east1-a
Standard
REGISTER
3
6
assign4-cluster4
us-central1-f
Standard
REGISTER
2
4
final-web-cluster
us-central1-a
Standard
REGISTER
2
4
testcluster1
us-central1-a
Standard
REGISTER
2
4
LEARN
Tutorial
Get started with GKE
GKE overview
Help document
Deploy, manage, and scale your containerized applications using the GKE environment.
Create and explore a cluster
Create a cluster and deploy a workload
Tutorial
15 min
Create a Kubernetes cluster, deploy a sample web app (workload), and view the running web app in your browser.
Explore the cluster and workload
Tutorial
5 min
Take a tour through notable components and configurations of the resources you created.
Example workflows
Configure a cluster and workload for staging
Tutorial
20 min
Learn the basics of configuring a cluster for staging and testing your web app.
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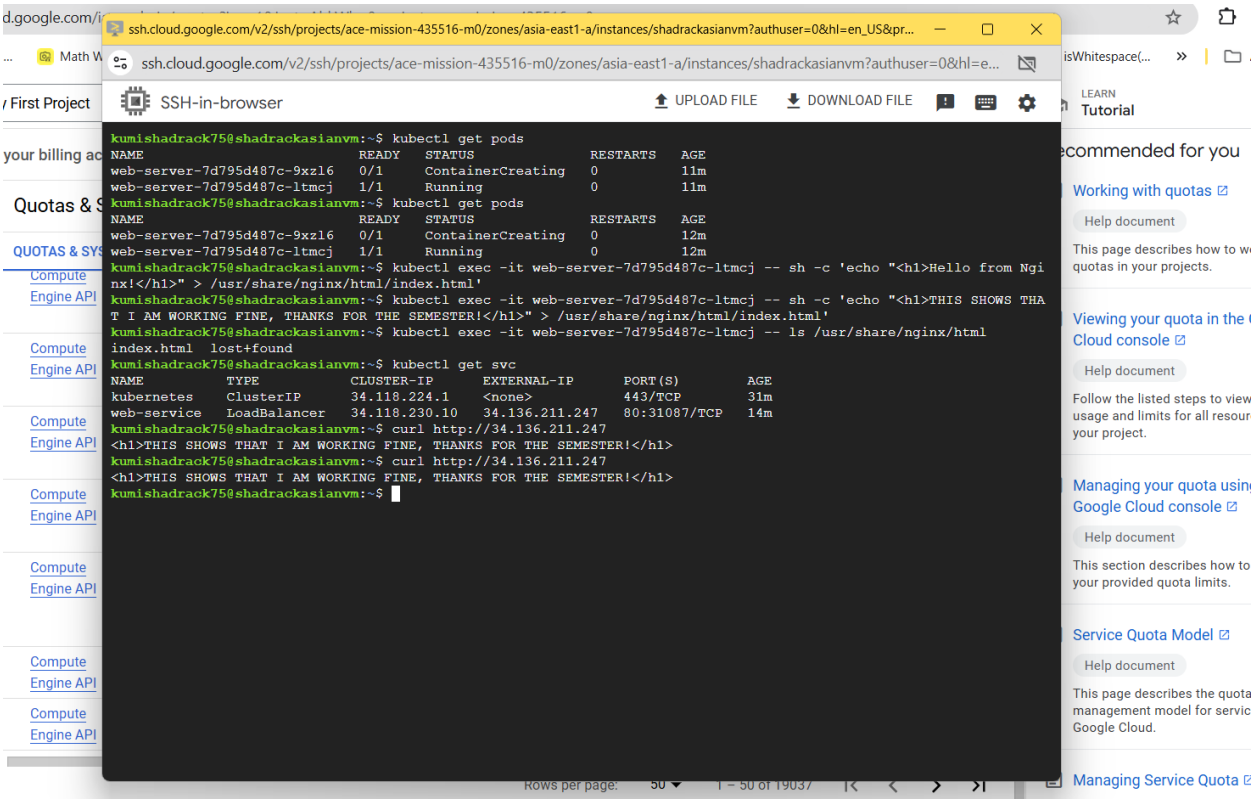
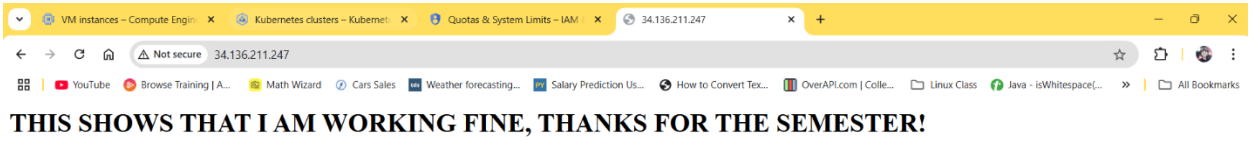

ssh.cloud.google.com/v2/ssh/projects/ace-mission-435516-m0/zones/asia-east1-a/instances/shadrackasianvm?authuser=0&hl=en_US&pr...
SSH-in-browser
UPLOAD FILE
DOWNLOAD FILE
kumishadrack75@shadrackasianvm:~$ kubectl get pods
NAME READY STATUS RESTARTS AGE
web-server-7d795d487c-9xzl6 0/1 ContainerCreating 0 11m
web-server-7d795d487c-ltmcj 1/1 Running 0 11m
kumishadrack75@shadrackasianvm:~$ kubectl get pods
NAME READY STATUS RESTARTS AGE
web-server-7d795d487c-9xzl6 0/1 ContainerCreating 0 12m
web-server-7d795d487c-ltmcj 1/1 Running 0 12m
kumishadrack75@shadrackasianvm:~$ kubectl exec -it web-server-7d795d487c-ltmcj -- sh -c 'echo "<h1>Hello from Nginx!</h1>" > /usr/share/nginx/html/index.html'
kumishadrack75@shadrackasianvm:~$ kubectl exec -it web-server-7d795d487c-ltmcj -- sh -c 'echo "<h1>THIS SHOWS THAT I AM WORKING FINE, THANKS FOR THE SEMESTER!</h1>" > /usr/share/nginx/html/index.html'
kumishadrack75@shadrackasianvm:~$ kubectl exec -it web-server-7d795d487c-ltmcj -- ls /usr/share/nginx/html
index.html lost+found
kumishadrack75@shadrackasianvm:~$ kubectl get svc
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
kubernetes ClusterIP 34.118.224.1 <none> 443/TCP 31m
web-service LoadBalancer 34.118.230.10 34.136.211.247 80:31087/TCP 14m
kumishadrack75@shadrackasianvm:~$ curl http://34.136.211.247
<h1>THIS SHOWS THAT I AM WORKING FINE, THANKS FOR THE SEMESTER!</h1>
kumishadrack75@shadrackasianvm:~$ curl http://34.136.211.247
<h1>THIS SHOWS THAT I AM WORKING FINE, THANKS FOR THE SEMESTER!</h1>
kumishadrack75@shadrackasianvm:~$


Not secure 34.136.211.247
THIS SHOWS THAT I AM WORKING FINE, THANKS FOR THE SEMESTER!