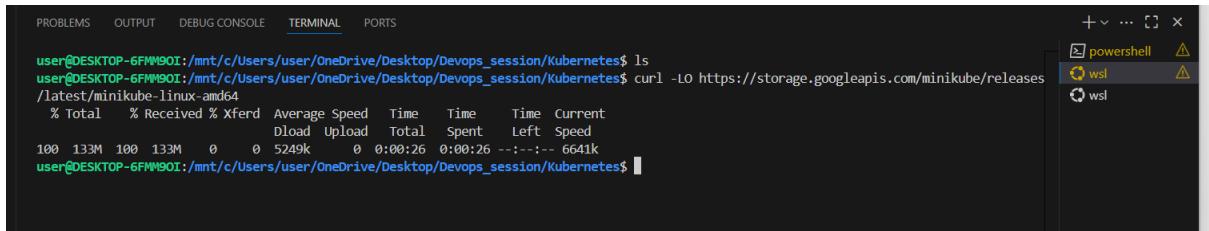


10-10-2025

Day-3:- Kubernetes

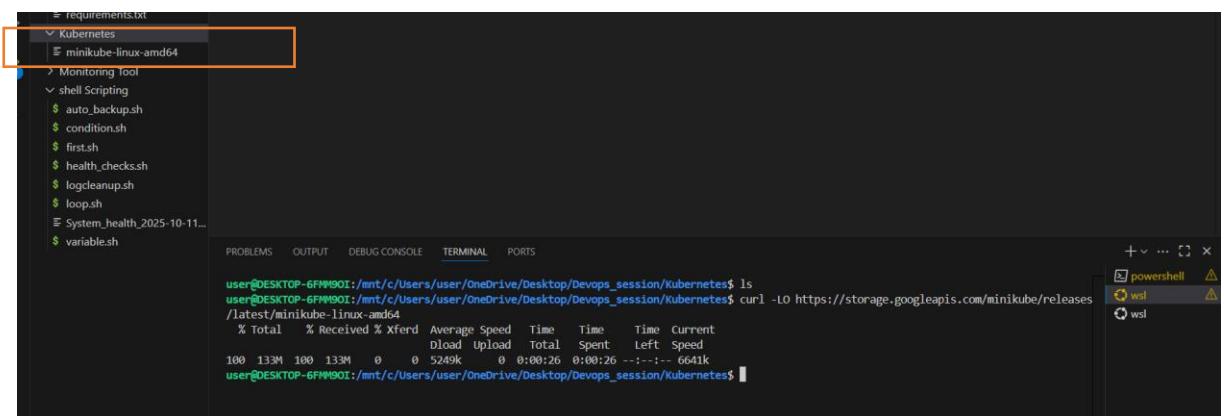
- first **downloads the latest Minikube binary file** (for Linux, 64-bit systems) from the official **Google Cloud Storage** where Minikube releases are hosted using :-

```
curl -LO https://storage.googleapis.com/minikube/releases/latest/minikube-linux-amd64
```



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$ ls
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$ curl -LO https://storage.googleapis.com/minikube/releases/latest/minikube-linux-amd64
% Total % Received % Xferd Average Speed Time Time Current
          Dload Upload Total Spent Left Speed
100 133M 100 133M 0 0 5249k 0 0:00:26 0:00:26 ---:--- 6641k
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$
```

- After running this, you will get a file named:
minikube-linux-amd64 in your current directory.



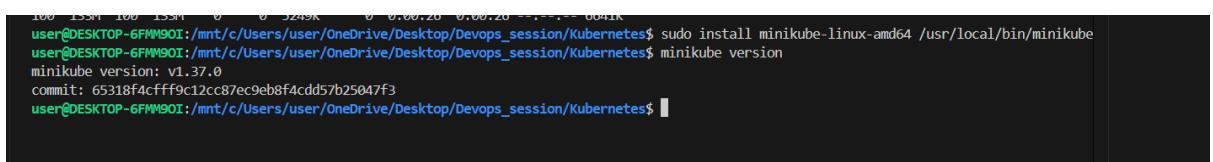
```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$ ls
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$ curl -LO https://storage.googleapis.com/minikube/releases/latest/minikube-linux-amd64
% Total % Received % Xferd Average Speed Time Time Current
          Dload Upload Total Spent Left Speed
100 133M 100 133M 0 0 5249k 0 0:00:26 0:00:26 ---:--- 6641k
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$
```

- Installs **Minikube** (the Kubernetes local cluster tool) into the system's path so you can run minikube from anywhere.

```
sudo install minikube-linux-amd64 /usr/local/bin/minikube
```

- Verifies that Minikube was successfully installed and shows its version.

```
minikube version
```



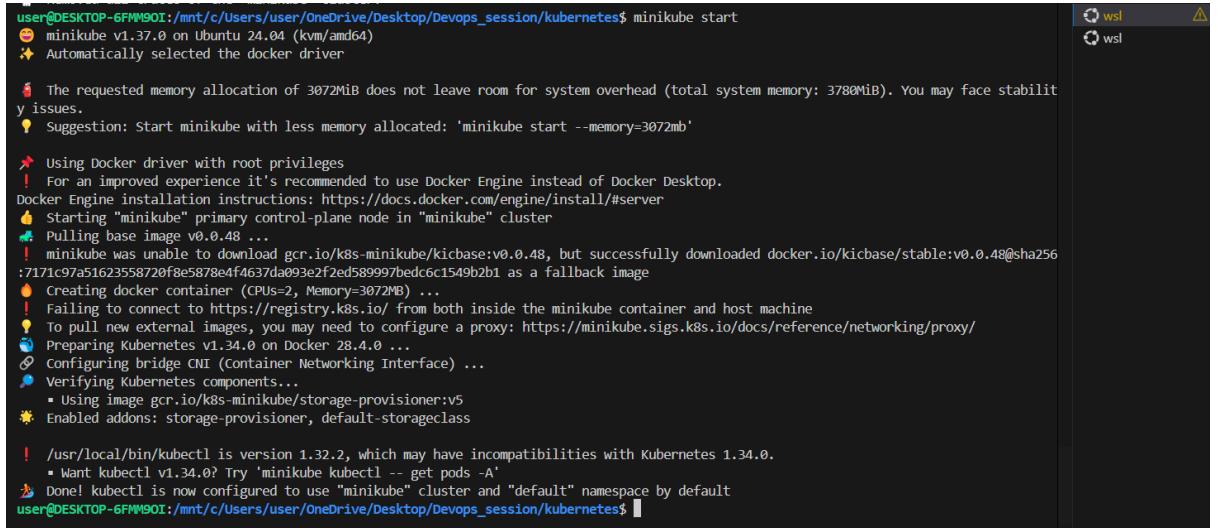
```
100 133M 100 133M 0 0 3249K 0 0:00:20 0:00:20 ---:--- 6641k
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$ sudo install minikube-linux-amd64 /usr/local/bin/minikube
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$ minikube version
minikube version: v1.37.0
commit: 65318f4cfffc12cc87ec9eb8f4cd57b25047f3
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/Kubernetes$
```

- Starts a local Kubernetes cluster inside a VM or container. It sets up the Kubernetes control plane and worker node.

minikube start

if any Error is display so run following commands:-

sudo apt update & sudo apt upgrade



```

user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ minikube start
😄 minikube v1.37.0 on Ubuntu 24.04 (kvm/amd64)
⭐ Automatically selected the docker driver

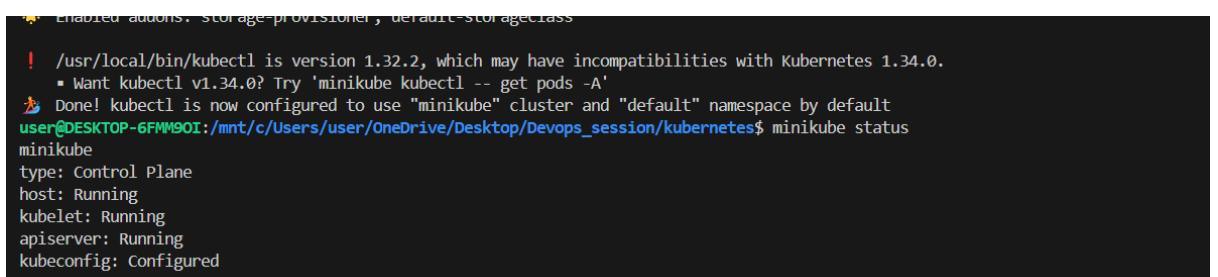
❗ The requested memory allocation of 3072MiB does not leave room for system overhead (total system memory: 3780MiB). You may face stability issues.
💡 Suggestion: Start minikube with less memory allocated: 'minikube start --memory=3072mb'

📌 Using Docker driver with root privileges
❗ For an improved experience it's recommended to use Docker Engine instead of Docker Desktop.
Docker Engine installation instructions: https://docs.docker.com/engine/install/#server
👉 Starting "minikube" primary control-plane node in "minikube" cluster
🌐 Pulling base image v0.0.48 ...
❗ minikube was unable to download gcr.io/k8s-minikube/kicbase:v0.0.48, but successfully downloaded docker.io/kicbase/stable:v0.0.48@sha256:7171c97a51623558720f9e5878e4f4637da993e2f2ed589997bedcc6c1549b2b1 as a fallback image
🔥 Creating docker container (CPUs=2, Memory=3072MB) ...
❗ Failing to connect to https://registry.k8s.io/ from both inside the minikube container and host machine
💡 To pull new external images, you may need to configure a proxy: https://minikube.sigs.k8s.io/docs/reference/networking/proxy/
🌐 Preparing Kubernetes v1.34.0 on Docker 28.4.0 ...
🔗 Configuring bridge CNI (Container Networking Interface) ...
🌐 Verifying Kubernetes components...
▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
🌟 Enabled addons: storage-provisioner, default-storageclass

❗ /usr/local/bin/kubectl is version 1.32.2, which may have incompatibilities with Kubernetes 1.34.0.
▪ Want kubectl v1.34.0? Try 'minikube kubectl -- get pods -A'
👉 Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ 
```

- Checks the current status of the Minikube cluster — shows whether the cluster, API server, and kubelet are running.

minikube status



```

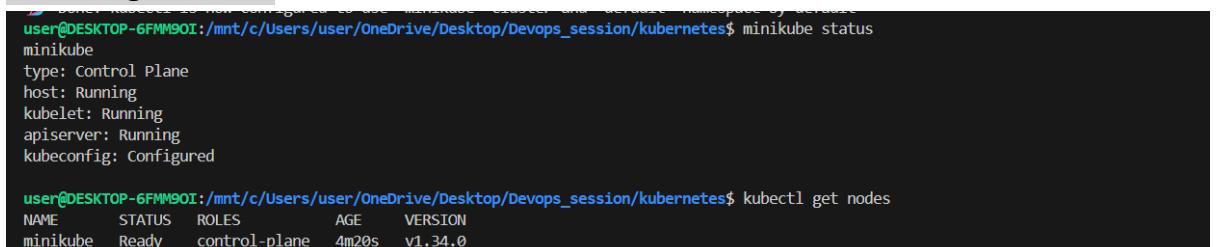
💡 Enabled addons: storage-provisioner, default-storageclass

❗ /usr/local/bin/kubectl is version 1.32.2, which may have incompatibilities with Kubernetes 1.34.0.
▪ Want kubectl v1.34.0? Try 'minikube kubectl -- get pods -A'
👉 Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ 
```

- Checks Lists all nodes (usually just 1 Minikube node) in your cluster.

Confirms Kubernetes is up and running.

kubectl get nodes



```

user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured

user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl get nodes
NAME      STATUS   ROLES      AGE      VERSION
minikube  Ready    control-plane  4m20s   v1.34.0
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ 
```

8. Creates a **deployment** named hello-k8s using the **nginx** container image.
A deployment manages a ReplicaSet that ensures a desired number of pod replicas are running.

```
kubectl create deployment hello-k8s --image=nginx
```

9. Lists all deployments in the cluster - including hello-k8s.

```
kubectl get deployment
```

10. Exposes the deployment as a **Service** accessible on port 80. NodePort type lets you access it via a specific port on the Minikube node.

```
kubectl expose deployment hello-k8s --type=NodePort --port=80
```

11. Lists all services, showing the **NodePort** assigned for hello-k8s

```
kubectl get service
```

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

user@DESKTOP-6FMM9OI:~$ kubectl create deployment hello-k8s --image=nginx
deployment.apps/hello-k8s created
user@DESKTOP-6FMM9OI:~$ kubectl get deployment
NAME      READY   UP-TO-DATE   AVAILABLE   AGE
hello-k8s  1/1     1           1           10s
user@DESKTOP-6FMM9OI:~$ kubectl expose deployment hello-k8s --type=NodePort --port=80
service/hello-k8s exposed
user@DESKTOP-6FMM9OI:~$ kubectl get service
NAME        TYPE        CLUSTER-IP    EXTERNAL-IP   PORT(S)        AGE
hello-k8s   NodePort   10.107.180.141  <none>       80:30599/TCP   14s
kubernetes  ClusterIP  10.96.0.1    <none>       443/TCP       3m44s
user@DESKTOP-6FMM9OI:~$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
hello-k8s-665c4d7677-brhrw  1/1     Running   0          66s
user@DESKTOP-6FMM9OI:~$
```

12. Opens the hello-k8s service in your browser — Minikube automatically finds the URL (something like <http://127.0.0.1:xxxx>)

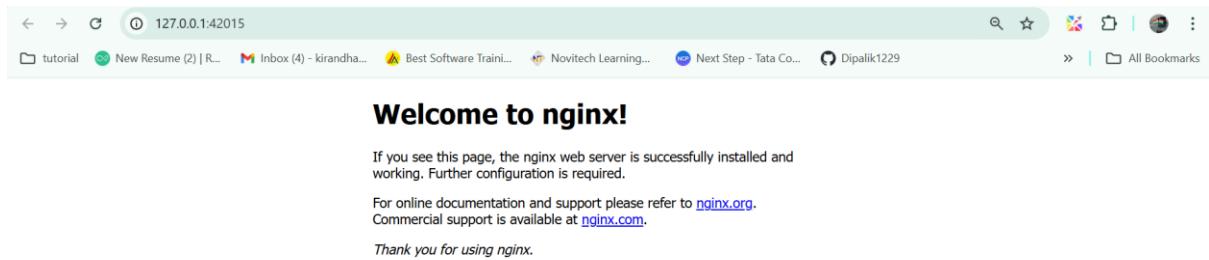
```
minikube service hello-k8s
```

```
hello-k8s-665c4d7677-brhrw  1/1     Running   0          66s
user@DESKTOP-6FMM9OI:~$ minikube service hello-k8s
NAME        PORT(S)        URL
hello-k8s   80            http://192.168.58.2:30599

Starting tunnel for service hello-k8s...
NAME        TARGET PORT   URL
hello-k8s   80           http://127.0.0.1:42015

Starting tunnel for service hello-k8s.
Opening service default/hello-k8s in default browser...
http://127.0.0.1:42015
! Because you are using a Docker driver on linux, the terminal needs to be open to run it.
```

- ✓ It'll open NGINX in your browser.



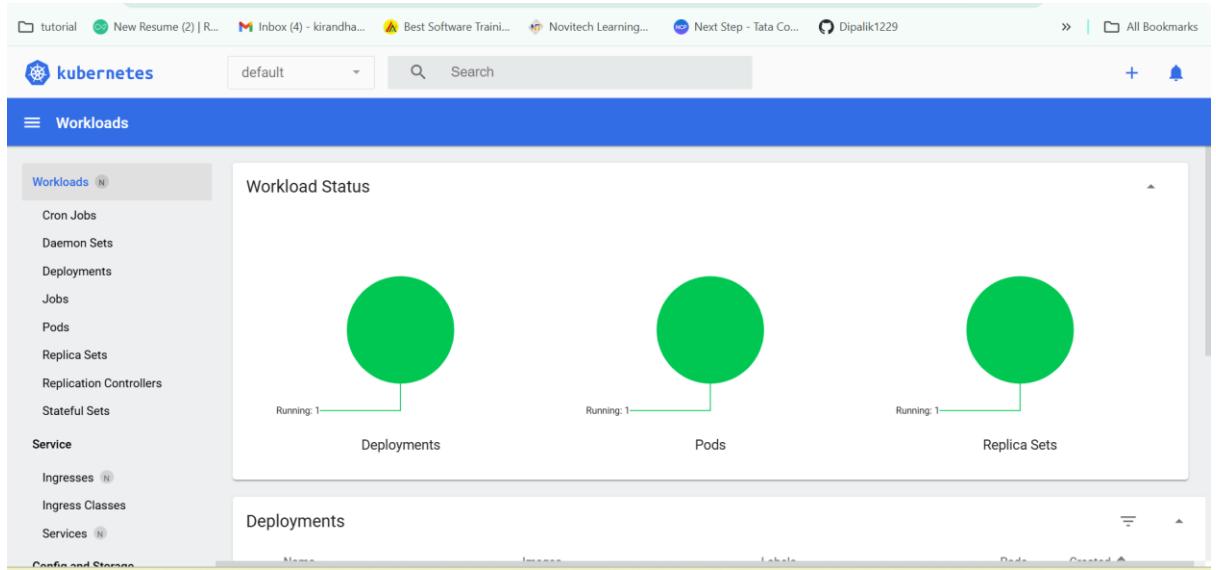
13. Launches the **Kubernetes Dashboard UI** — a web-based interface to manage and monitor your cluster.

minikube dashboard

A screenshot of a terminal window with tabs for PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL (which is selected), and PORTS. The terminal is running the command 'minikube dashboard'. It shows the process starting, verifying dashboard health, launching the proxy, and opening the default browser at the URL 'http://127.0.0.1:40891/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashboard:/proxy/'. A small icon of a hand pointing right is visible on the left side of the terminal window.

14. Copy the URL displayed in your terminal and paste it into your Chrome browser to open the Kubernetes Dashboard:

👉 <http://127.0.0.1:44369/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashboard:/proxy/>



15. Scales your deployment to 3 replicas (pods) for high availability or load balancing.

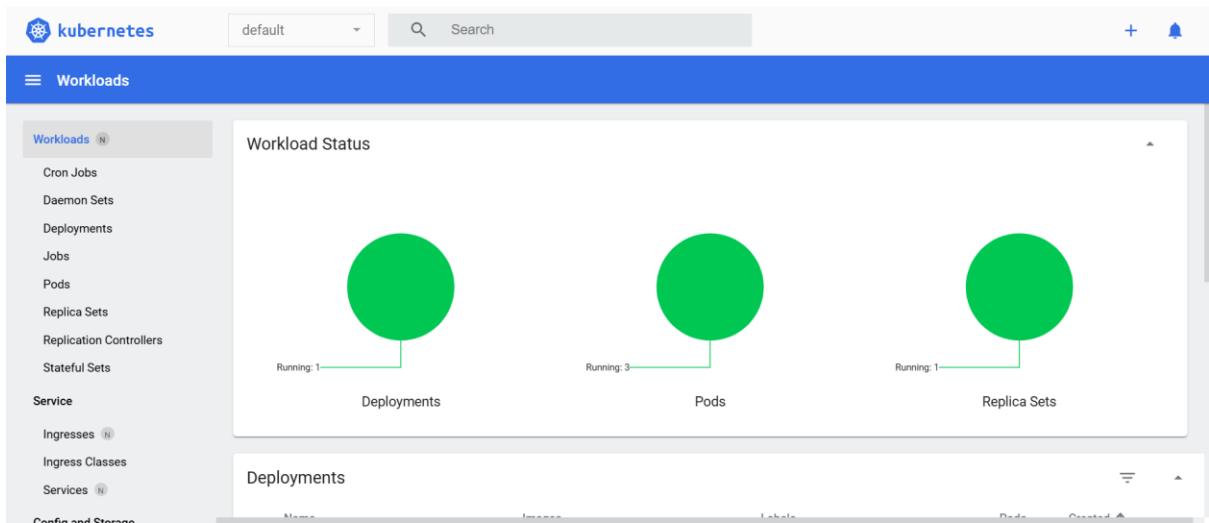
```
kubectl scale deployment hello-k8s --replicas=3
```

```
[6]+ Stopped minikube dashboard
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl scale deployment hello-k8s --replicas=3
deployment.apps/hello-k8s scaled
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl get service
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)      AGE
hello-k8s  NodePort  10.107.180.141  <none>          80:30599/TCP  25m
kubernetes  ClusterIP  10.96.0.1    <none>          443/TCP     28m
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl get pods
NAME           READY   STATUS    RESTARTS   AGE
hello-k8s-665c4d7677-brhrw  1/1     Running   0          26m
hello-k8s-665c4d7677-r27sj  1/1     Running   0          11s
hello-k8s-665c4d7677-wszgj  1/1     Running   0          11s
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$
```

16. After Reopens the kubernetes dashboard :-

```
hello-k8s-665c4d7677-11s
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ minikube dashboard
👉 Verifying dashboard health ...
👉 Launching proxy ...
👉 Verifying proxy health ...
👉 Opening http://127.0.0.1:38781/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashboard:/proxy/ in your default browser...
👉 http://127.0.0.1:38781/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashboard:/proxy/
Ln 1, Col 6 (5 selected) Spaces:4 UTF-8 CRLF {} pip requirement
```

17. you can see only 1 pod earlier, this command increases it to 3 pods, improving load balancing and availability.



18. Deletes a specific pod (by name). Kubernetes automatically recreates a new pod from the deployment to maintain the desired replica count.

```
kubectl delete pod hello-k8s-665c4d7677-wszgj
```

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
powershell
wsl
wsl

[7]+ Stopped minikube dashboard
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl get pods
NAME READY STATUS RESTARTS AGE
hello-k8s-665c4d7677-brhrw 1/1 Running 0 32m
hello-k8s-665c4d7677-r27sj 1/1 Running 0 6m54s
hello-k8s-665c4d7677-wszgj 1/1 Running 0 6m54s
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl delete pod hello-k8s-665c4d7677-wszgj
pod "hello-k8s-665c4d7677-wszgj" deleted
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl get pods
NAME READY STATUS RESTARTS AGE
hello-k8s-665c4d7677-brhrw 1/1 Running 0 33m
hello-k8s-665c4d7677-hgsxk 1/1 Running 0 7s
hello-k8s-665c4d7677-r27sj 1/1 Running 0 8m1s
user@DESKTOP-6FMW9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ 
```

To test self-healing — when a pod is deleted, Kubernetes will launch a new one automatically.

19. to confirm that the deleted pod has been recreated successfully and all replicas are running.

```
kubectl get pods
```

20. Deletes the deployment named hello-k8s from your Kubernetes cluster.

```
kubectl delete deployment hello-k8s
```

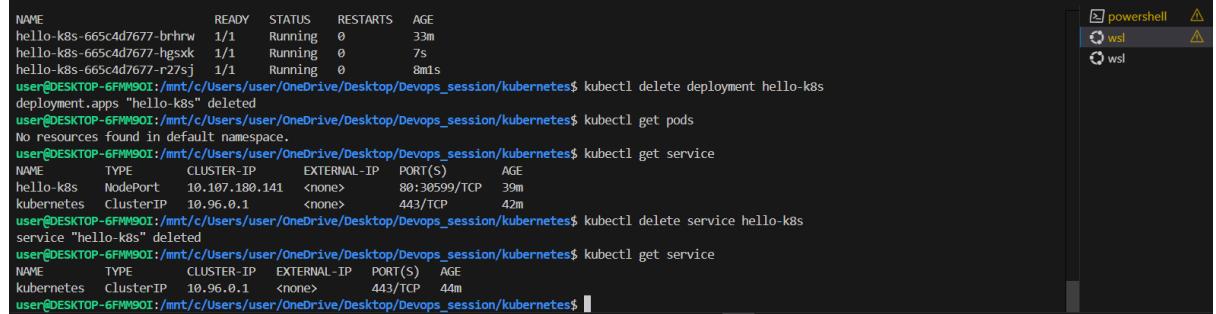
21. after deleting the deployment to confirm that all the pods created by it are removed successfully.

```
kubectl get pods
```

22. deletes the Kubernetes Service named hello-k8s

```
        kubectl delete service hello-k8s
```

```
kubectl get service
```



The screenshot shows a Windows terminal window with a dark theme. At the top, there are three tabs: "powershell", "wsl", and another "wsl" tab which is currently active. The terminal window displays the following command history:

```
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl delete deployment hello-k8s
deployment.apps "hello-k8s" deleted
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl get pods
No resources found in default namespace.
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl get service
NAME          TYPE      CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
hello-k8s     NodePort   10.107.180.141 <none>       80:30599/TCP  39m
kubernetes   ClusterIP  10.96.0.1    <none>       443/TCP    42m
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl delete service hello-k8s
service "hello-k8s" deleted
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$ kubectl get service
NAME          TYPE      CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
kubernetes   ClusterIP  10.96.0.1    <none>       443/TCP    44m
user@DESKTOP-6FMM9OI:/mnt/c/Users/user/OneDrive/Desktop/Devops_session/kubernetes$
```