

Exercise 1: Deploy a Nginx Pod

1. Start a Kubernetes cluster (Minikube or other cluster):

```
master@master-vm:~$ minikube start
🐳 minikube v1.35.0 on Ubuntu 24.04
🌟 Using the docker driver based on existing profile
👉 Starting "minikube" primary control-plane node in "minikube" cluster
📡 Pulling base image v0.0.46 ...
🔄 Restarting existing docker container for "minikube" ...
🔧 Preparing Kubernetes v1.32.0 on Docker 27.4.1 ...
🔍 Verifying Kubernetes components...
   ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
   ▪ Enabled addons: default-storageclass, storage-provisioner
❌ Problems detected in kubelet:
Mar 13 06:56:49 minikube kubelet[1208]: W0313 06:56:49.720192 1208 reflector.go:569] object-"kube-system"/"kube-proxy": failed to list *v1.ConfigMap: configmaps "kube-proxy" is forbidden: User "system:node:minikube" cannot list resource "configmaps" in API group "" in the namespace "kube-system": no relationship found between node 'minikube' and this object
Mar 13 06:56:49 minikube kubelet[1208]: object-"kube-system"/"kube-proxy": Failed to watch *v1.ConfigMap: failed to list *v1.ConfigMap: configmaps "kube-proxy" is forbidden: User "system:node:minikube" cannot list resource "configmaps" in API group "" in the namespace "kube-system": no relationship found between node 'minikube' and this object
Mar 13 06:56:49 minikube kubelet[1208]: W0313 06:56:49.796359 1208 reflector.go:569] object-"kube-system"/"kube-root-ca.crt": failed to list *v1.ConfigMap: configmaps "kube-root-ca.crt" is forbidden: User "system:node:minikube" cannot list resource "configmaps" in API group "" in the namespace "kube-system": no relationship found between node 'minikube' and this object
Mar 13 06:56:49 minikube kubelet[1208]: object-"kube-system"/"kube-root-ca.crt": Failed to watch *v1.ConfigMap: failed to list *v1.ConfigMap: configmaps "kube-root-ca.crt" is forbidden: User "system:node:minikube" cannot list resource "configmaps" in API group "" in the namespace "kube-system": no relationship found between node 'minikube' and this object
Mar 13 06:56:49 minikube kubelet[1208]: pods "kube-apiserver-minikube" is forbidden: User "system:node:minikube" cannot get resource "pods" in API group "" in the namespace "kube-system": no relationship found between node 'minikube' and this object
❌ Problems detected in kubelet:
Mar 13 06:56:49 minikube kubelet[1208]: W0313 06:56:49.720192 1208 reflector.go:569] object-"kube-system"/"kube-proxy": failed to list *v1.ConfigMap: configmaps "kube-proxy" is forbidden: User "system:node:minikube" cannot list resource "configmaps" in API group "" in the namespace "kube-system": no relationship found between node 'minikube' and this object
```

2. Create an Nginx pod

```
master@master-vm:~$ kubectl run nginx-pod --image=nginx --restart=Never
pod/nginx-pod created
```

3. Verify the pod is running:

```
master@master-vm:~$ kubectl get pods
NAME     READY   STATUS    RESTARTS   AGE
nginx    1/1     Running   0           15s
```

4. Check pod details:

```
master@master-vm:~/nginx-pod$ kubectl describe pod nginx-pod
Name:         nginx-pod
Namespace:    default
Priority:      0
Service Account: default
Node:         minikube/192.168.49.2
Start Time:   Thu, 13 Mar 2025 17:26:03 +0530
Labels:       <none>
Annotations:  <none>
Status:       Running
IP:           10.244.0.13
IPs:          IP: 10.244.0.13
Containers:
  nginx-container:
    Container ID:   docker://41a714187371b31ce55b7934114c4af2800e077a60bf690af76743f18e8b81e0
    Image:          nginx:latest
    Image ID:       docker-pullable://nginx@sha256:9d6b58feebd2dbd3c56ab585333d627cc6e281011cfd6050fa4bcf2072c9496
    Port:          80/TCP
    Host Port:      0/TCP
    State:          Running
      Started:      Fri, 14 Mar 2025 09:57:07 +0530
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:          <none>
```

5. Delete the pod:

```
master@master-vm:~$ kubectl delete pod nginx
pod "nginx" deleted
```

Exercise 2: Create an Nginx Deployment and Scale It

1. Create a deployment with Nginx:

```
master@master-vm:~/nginx-deployment$ kubectl create deployment nginx-deployment --image=nginx
deployment.apps/nginx-deployment created
```

2. Check the deployment:

```
master@master-vm:~/nginx-deployment$ kubectl get deployments
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment 1/1     1            1           10s
```

3. Scale the deployment to 3 replicas:

```
master@master-vm:~/nginx-deployment$ kubectl scale deployment nginx-deployment --replicas=3
deployment.apps/nginx-deployment scaled
```

4. Check the running pods:

```
master@master-vm:~/nginx-deployment$ kubectl get pods -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE
nginx-deployment-6cfb98644c-5xbrd   1/1     Running   0          69s   10.244.0.15   minikube
nginx-deployment-6cfb98644c-8nkhd   1/1     Running   0          15s   10.244.0.16   minikube
nginx-deployment-6cfb98644c-9dvf9   1/1     Running   0          15s   10.244.0.17   minikube
```

5. Delete the deployment:

```
master@master-vm:~/nginx-deployment$ kubectl delete deployment nginx-deployment
deployment.apps "nginx-deployment" deleted
master@master-vm:~/nginx-deployment$
```