

KUBERNETES HANDS-ON EXERCISES WITH STEP-BY-STEP COMMANDS AND SOLUTIONS

Kubernetes hands-on exercises with **step-by-step commands and solutions** to help you gain practical experience. These exercises range from basic to intermediate levels.

Exercise 1: Deploy an Nginx Pod

Objective: Deploy a simple Nginx pod and access it.

Steps & Commands:

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

```
master@master-vm:~/Desktop$ minikube start
🐳 minikube v1.35.0 on Ubuntu 20.04
🌟 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
🎉 Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
master@master-vm:~/Desktop$
```

2. Create an Nginx pod:

```
master@master-vm:~/Desktop/flask-ci-cd$ kubectl run nginx-pod --image=nginx --restart=Never
pod/nginx-pod created
master@master-vm:~/Desktop/flask-ci-cd$ kubectl get pods
```

3. Verify the pod is running:

```
master@master-vm:~/Desktop/flask-ci-cd$ kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
nginx-pod     1/1     Running   0           61s
master@master-vm:~/Desktop/flask-ci-cd$
```

4. Check pod details:

```
master@master-vm:~/Desktop/flask-ci-cd$ 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 13:09:23 +0530
Labels:        run=nginx-pod
Annotations:   <none>
Status:        Running
IP:            10.244.0.23
IPs:           IP: 10.244.0.23
Containers:
  nginx-pod:
    Container ID:  docker://224cdd15a49fc318bff99d6d6613e6e3bb249b1d9c7e1f5bbe61902b6ec4b29
    Image:         registry.k8s.io/nginx
    Image ID:      docker-pullable://registry.k8s.io/nginx@sha256:f49a843c290594dcf4d193535d1f4ba8af7d56cea2cf79d1e9554f077f1e7aaa
    Port:          <none>
    Host Port:     <none>
    State:         Running
      Started:     Thu, 13 Mar 2025 13:10:21 +0530
    Ready:         True
    Restart Count: 0
    Environment:   <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-pfs2d (ro)
Conditions:
  Type                               Status
PodReadyToStartContainers            True
Initialized                          True
Ready                                True
ContainersReady                      True
PodScheduled                         True
Volumes:
  kube-api-access-pfs2d:
```

5. Delete the pod:

```
nginx-pod 0/1 ...
master@master-vm:~/Desktop/flask-ci-cd$ kubectl delete pod nginx-pod
pod "nginx-pod" deleted
master@master-vm:~/Desktop/flask-ci-cd$ kubectl get pods
```

Exercise 2: Create an Nginx Deployment and Scale It

Objective: Create an Nginx deployment and scale it up.

Steps & Commands:

1. Create a deployment with Nginx:

```
minikube ready ...
master@master-vm:~$ kubectl create deployment nginx-deployment --image=nginx
error: failed to create deployment: deployments.apps "nginx-deployment" already exists
master@master-vm:~$ kubectl get deployments
```

2. Check the deployment:

```

error: failed to create deployment: deployments.apps "nginx-
master@master-vm:~$ kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment    3/3     3            3           20h
master@master-vm:~$ kubectl scale deployment nginx-deployment

```

3. Scale the deployment to 3 replicas:

```

master@master-vm:~$ kubectl scale deployment nginx-deployment --replicas=3
deployment.apps/nginx-deployment scaled
master@master-vm:~$ kubectl get pods -o wide

```

4. Check the running pods:

```

deployment.apps/nginx-deployment scaled
master@master-vm:~$ kubectl get pods -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE       NOMINATED NODE   READINESS GATES
nginx-deployment-6cfb98644c-7dn8m   1/1     Running   0          20h   10.244.0.33   minikube   <none>           <none>
nginx-deployment-6cfb98644c-bh8s2   1/1     Running   0          20h   10.244.0.34   minikube   <none>           <none>
nginx-deployment-6cfb98644c-cs7qd   1/1     Running   0          20h   10.244.0.35   minikube   <none>           <none>
nginx-pod                           0/1     Completed 0          21h   10.244.0.36   minikube   <none>           <none>

```

5. Delete the deployment:

```

nginx-pod                           0/1     Completed 0          21h
master@master-vm:~$ kubectl delete deployment nginx-deployment
deployment.apps "nginx-deployment" deleted
master@master-vm:~$ kubectl delete deployment nginx-pod

```
