

Lab Exercise 13- Managing Namespaces in Kubernetes

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B2 DevOps

Step 1: Understand Namespaces

Namespaces provide a mechanism for scoping resources in a cluster. Namespaces can be used to:

- Create environments for different applications or teams.
- Apply policies like resource quotas or network policies on a per-namespace basis.
- Separate operational environments (like development and production).

Step 2: List Existing Namespaces

To list all the namespaces in your Kubernetes cluster:

```
kubectl get namespaces
```

```
PS C:\Users\ASUS> kubectl get namespaces
NAME          STATUS   AGE
default       Active   25m
kube-node-lease  Active   25m
kube-public    Active   25m
kube-system    Active   25m
kubernetes-dashboard  Active   21m
PS C:\Users\ASUS>
```

You will typically see default namespaces like default, kube-system, and kube-public.

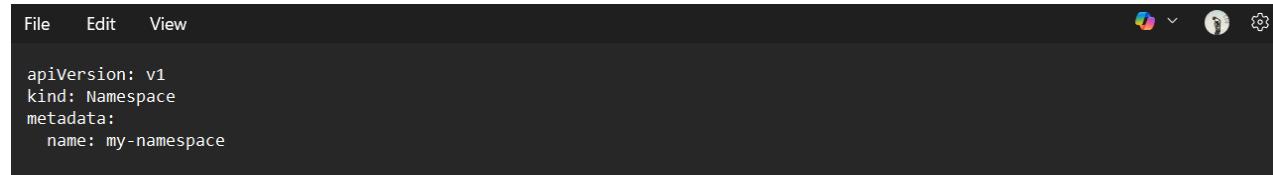
Step 3: Create a Namespace

You can create a namespace using a YAML file or directly with the kubectl command.

Using YAML File

Create a file named my-namespace.yaml with the following content:

```
apiVersion: v1
kind: Namespace
metadata:
  name: my-namespace
```



A screenshot of a Windows Notepad application. The menu bar shows 'File', 'Edit', and 'View'. The title bar is empty. The main content area contains the following YAML code:

```
apiVersion: v1
kind: Namespace
metadata:
  name: my-namespace
```

Apply this YAML to create the namespace:

```
kubectl apply -f my-namespace.yaml
```

Using kubectl Command

```
PS C:\Users\ASUS> notepad my-namespace.yaml
PS C:\Users\ASUS> kubectl apply -f my-namespace.yaml
namespace/my-namespace created
PS C:\Users\ASUS>
```

Alternatively, create a namespace using the kubectl command:

```
kubectl create namespace my-namespace
```

Verify that the namespace is created:

```
kubectl get namespaces
```

```
PS C:\Users\ASUS> kubectl get namespaces
NAME          STATUS   AGE
default       Active   27m
kube-node-lease Active   27m
kube-public   Active   27m
kube-system   Active   27m
kubernetes-dashboard Active   22m
my-namespace  Active   19s
PS C:\Users\ASUS>
```

You should see my-namespace listed in the output.

Step 4: Deploy Resources in a Namespace

Create resources such as Pods, Services, or Deployments within the new namespace.

Deploy a Pod in the Namespace

Create a YAML file named nginx-pod.yaml with the following content:

```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  namespace: my-namespace
spec:
  containers:
    - name: nginx
```

```
image: nginx:latest
ports:
- containerPort: 80
```



```
File Edit View
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  namespace: my-namespace
spec:
  containers:
    - name: nginx
      image: nginx:latest
      ports:
        - containerPort: 80
```

Apply this YAML to create the Pod:

```
kubectl apply -f nginx-pod.yaml
```

```
PS C:\Users\ASUS> notepad nginx-pod.yaml
PS C:\Users\ASUS> kubectl apply -f nginx-pod.yaml
pod/nginx-pod created
PS C:\Users\ASUS>
```

Check the status of the Pod within the namespace:

```
kubectl get pods -n my-namespace
```

```
PS C:\Users\ASUS> kubectl get pods -n my-namespace
NAME        READY   STATUS    RESTARTS   AGE
nginx-pod   1/1     Running   0          30s
PS C:\Users\ASUS>
```

To describe the Pod and see detailed information:

```
kubectl describe pod nginx-pod -n my-namespace
```

```
PS C:\Users\ASUS> kubectl describe pod nginx-pod -n my-namespace
Name:           nginx-pod
Namespace:      my-namespace
Priority:       0
Service Account: default
Node:           docker-desktop/192.168.65.3
Start Time:     Sun, 22 Feb 2026 14:49:59 +0530
Labels:          <none>
Annotations:    <none>
Status:         Running
IP:             10.1.0.8
IPs:
  IP:  10.1.0.8
Containers:
  nginx:
    Container ID:   docker://169c0acf5f00c77f71fbe0bc7b9516c42347e56cf342c5dc9256f7c94c61b95c
    Image:          nginx:latest
    Image ID:       docker-pullable://nginx@sha256:341bf0f3ce6c5277d6002cf6e1fb0319fa4252add24ab6a0e262e0056d313208
    Port:           80/TCP
    Host Port:     0/TCP
    State:          Running
      Started:     Sun, 22 Feb 2026 14:50:16 +0530
    Ready:          True
    Restart Count:  0
    Environment:   <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-2xvgd (ro)
Conditions:
  Type              Status
  PodReadyToStartContainers  True
  Initialized       True
  Ready             True
  ContainersReady  True
  PodScheduled     True
Volumes:
  kube-api-access-2xvgd:
    Type:            Projected (a volume that contains injected data
                    from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:    kube-root-ca.crt
    Optional:        false
    DownwardAPI:     true
    QoS Class:       BestEffort
```

```

Node-Selectors: <none>
Tolerations:      node.kubernetes.io/not-ready:NoExecute op=Exist
                  node.kubernetes.io/unreachable:NoExecute op=Exist
  for 300s
  for 300s
Events:
  Type   Reason     Age   From           Message
  ----  -----     ---  ----           -----
  Normal Scheduled  45s   default-scheduler  Successfully assigned my-namespace/nginx-pod to docker-desktop
  Normal Pulling    45s   kubelet          Pulling image "nginx:latest"
  Normal Pulled    29s   kubelet          Successfully pulled image "nginx:latest" in 15.931s (15.931s including waiting). Image size: 62939286 bytes.
  Normal Created    28s   kubelet          Created container: nginx
  Normal Started    28s   kubelet          Started container nginx
PS C:\Users\ASUS>

```

Create a Service in the Namespace

Create a YAML file named **nginx-service.yaml** with the following content:

```

apiVersion: v1
kind: Service
metadata:
  name: nginx-service
  namespace: my-namespace
spec:
  selector:
    app: nginx-pod
  ports:
    - protocol: TCP
      port: 80
      targetPort: 80
  type: ClusterIP

```

```
File Edit View

apiVersion: v1
kind: Service
metadata:
  name: nginx-service
  namespace: my-namespace
spec:
  selector:
    app: nginx-pod
  ports:
  - protocol: TCP
    port: 80
    targetPort: 80
  type: ClusterIP
```

Apply this YAML to create the Service:

```
kubectl apply -f nginx-service.yaml
```

```
PS C:\Users\ASUS> notepad nginx-service.yaml
PS C:\Users\ASUS> kubectl apply -f nginx-service.yaml
service/nginx-service created
PS C:\Users\ASUS>
```

Check the status of the Service within the namespace:

```
kubectl get services -n my-namespace
```

```
PS C:\Users\ASUS> kubectl get services -n my-namespace
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)      AGE
nginx-service   ClusterIP   10.108.146.94   <none>        80/TCP      32s
PS C:\Users\ASUS>
```

To describe the Service and see detailed information:

```
kubectl describe service nginx-service -n my-namespace
```

```
PS C:\Users\ASUS> kubectl describe service nginx-service -n my-namespace
Name:           nginx-service
Namespace:      my-namespace
Labels:          <none>
Annotations:    <none>
Selector:        app=nginx-pod
Type:            ClusterIP
IP Family Policy: SingleStack
IP Families:    IPv4
IP:              10.108.146.94
IPs:             10.108.146.94
Port:            <unset>  80/TCP
TargetPort:      80/TCP
Endpoints:       None
Session Affinity: None
Internal Traffic Policy: Cluster
Events:          <none>
PS C:\Users\ASUS>
```

Step 5: Switching Context Between Namespaces

When working with multiple namespaces, you can specify the namespace in kubectl commands or switch the default context.

Specify Namespace in Commands

You can specify the namespace directly in kubectl commands using the -n or --namespace flag:

```
kubectl get pods -n my-namespace
```

```
PS C:\Users\ASUS> kubectl get pods -n my-namespace
NAME      READY   STATUS    RESTARTS   AGE
nginx-pod 1/1     Running   0          3m41s
PS C:\Users\ASUS>
```

Set Default Namespace for kubectl Commands

To avoid specifying the namespace every time, you can set the default namespace for the current context:

```
kubectl config set-context --current --namespace=my-namespace
```

```
PS C:\Users\ASUS> kubectl config set-context --current --namespace=my-namespace
Context "docker-desktop" modified.
PS C:\Users\ASUS>
```

Verify the current context's namespace:

```
kubectl config view --minify | grep namespace
```

```
PS C:\Users\ASUS> kubectl config view --minify
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: DATA+OMITTED
    server: https://kubernetes.docker.internal:6443
    name: docker-desktop
contexts:
- context:
    cluster: docker-desktop
    namespace: my-namespace
    user: docker-desktop
    name: docker-desktop
current-context: docker-desktop
kind: Config
users:
- name: docker-desktop
  user:
    client-certificate-data: DATA+OMITTED
    client-key-data: DATA+OMITTED
PS C:\Users\ASUS>
```

Step 6: Clean Up Resources

To delete the resources and the namespace you created:

```
kubectl delete -f nginx-pod.yaml  
kubectl delete -f nginx-service.yaml  
kubectl delete namespace my-namespace
```

```
PS C:\Users\ASUS> kubectl delete -f nginx-pod.yaml  
pod "nginx-pod" deleted from my-namespace namespace  
PS C:\Users\ASUS> kubectl delete -f nginx-service.yaml  
service "nginx-service" deleted from my-namespace namespace  
PS C:\Users\ASUS> kubectl delete namespace my-namespace  
namespace "my-namespace" deleted
```

Ensure that the namespace and all its resources are deleted:

```
kubectl get namespaces
```

```
PS C:\Users\ASUS> kubectl get namespaces  
NAME          STATUS   AGE  
default       Active   33m  
kube-node-lease Active   33m  
kube-public   Active   33m  
kube-system   Active   33m  
kubernetes-dashboard Active  28m  
PS C:\Users\ASUS>
```