

Lab Exercise 13- Managing Namespaces in Kubernetes

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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.

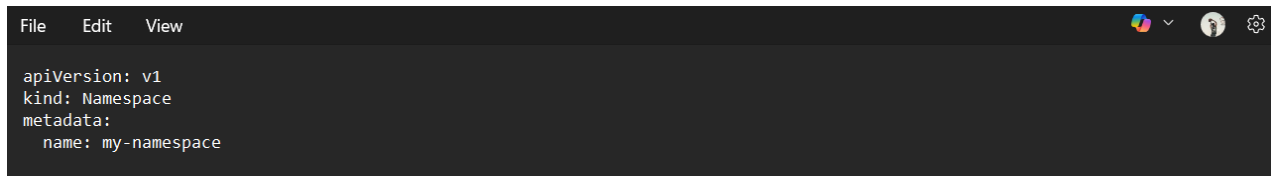
Step 3: Create a Namespace

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
```

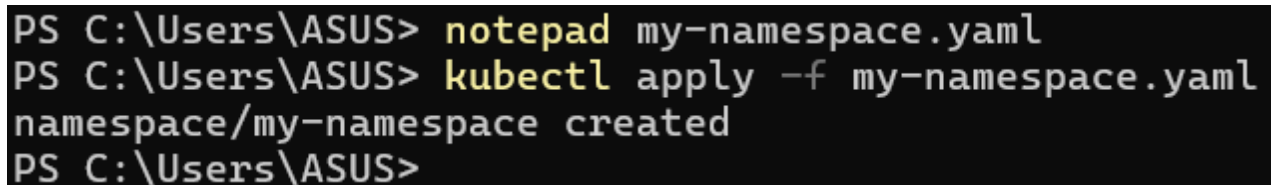
A screenshot of a code editor window with a dark theme. The menu bar at the top shows 'File', 'Edit', and 'View'. On the right side, there are icons for a color palette, a dropdown arrow, a user profile, and a settings gear. The main text area contains the following YAML code:

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

Apply this YAML to create the namespace:

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

Using kubectl Command

A screenshot of a Windows command prompt window. The prompt shows the user is at 'PS C:\Users\ASUS>'. They enter the command 'notepad my-namespace.yaml' and press enter. Then they enter 'kubectl apply -f my-namespace.yaml' and press enter. The output shows 'namespace/my-namespace created'. Finally, they press enter again, and the prompt returns to 'PS C:\Users\ASUS>'.

```
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
```

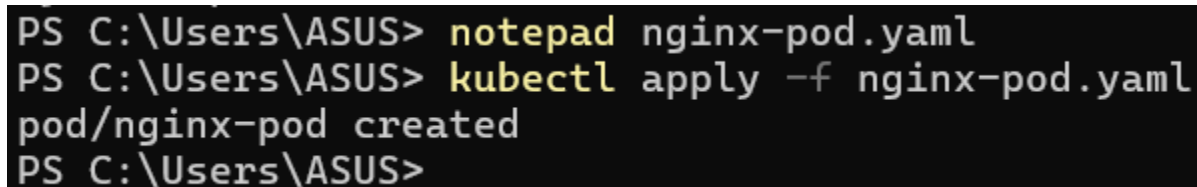
```
image: nginx:latest
ports:
- containerPort: 80
```



```
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:

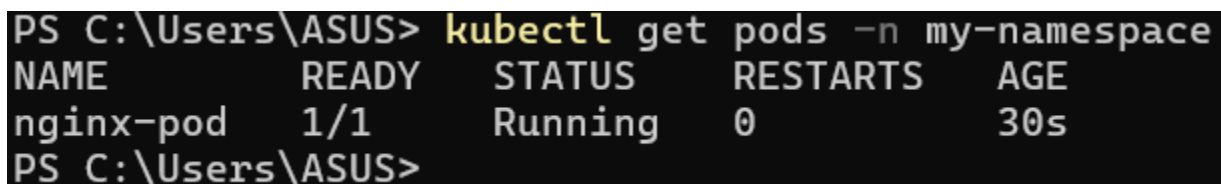
```
kubectl apply -f nginx-pod.yaml
```



```
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://169c0acf5f00c77f71fbe0bc7b9516c42347e56cf342c5d
c9256f7c94c61b95c
    Image:         nginx:latest
    Image ID:      docker-pullable://nginx@sha256:341bf0f3ce6c5277d6002cf6e
1fb0319fa4252add24ab6a0e262e0056d313208
    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-2xv
gd (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=Exists for 300s
                    node.kubernetes.io/unreachable:NoExecute op=Exists 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:
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>
```