Lab Exercise 9- Managing Namespaces in Kubernetes

Step 1: Understand Namespaces

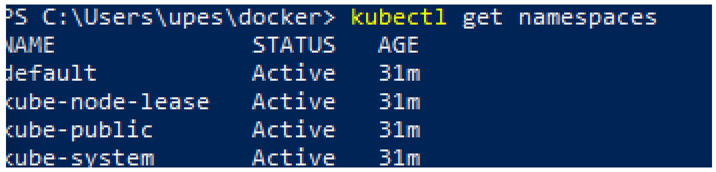
Namespaces provide a mechanism for scoping resources in a cluster. Namespaces can be used to:

- 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:

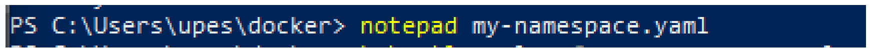
```
kubectl get namespaces
```



```
PS C:\Users\upes\docker> kubectl get namespaces
NAME              STATUS   AGE
default           Active   31m
kube-node-lease   Active   31m
kube-public       Active   31m
kube-system       Active   31m
```

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

Step 3: Create a Namespace



```
PS C:\Users\upes\docker> notepad my-namespace.yaml
```

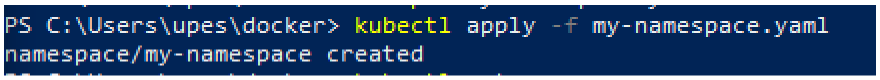
You can create a namespace using a YAML file or directly with the kubectl command.

Using YAML File

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

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

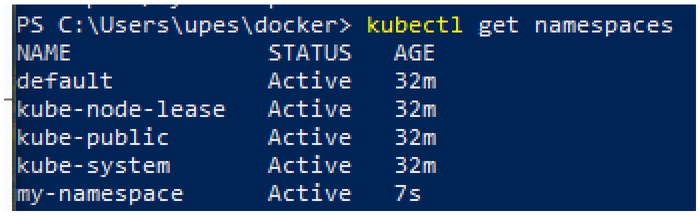
Apply this YAML to create the namespace:



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

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

Verify that the namespace is created:



```
PS C:\Users\upes\docker> kubectl get namespaces
NAME              STATUS   AGE
default           Active   32m
kube-node-lease   Active   32m
kube-public       Active   32m
kube-system       Active   32m
my-namespace      Active   7s
```

```
kubectl get namespaces
```

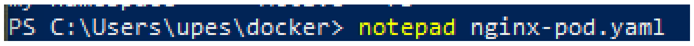
You should see my-namespace listed in the output.

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:

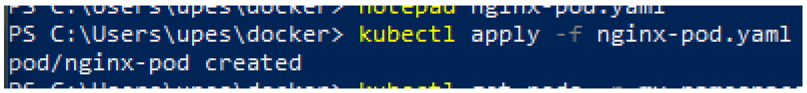


```
PS C:\Users\upes\docker> notepad nginx-pod.yaml
```

```
apiVersion: v1
```

```
kind: Pod
metadata:
  name: nginx-pod
  namespace: my-namespace   # Specify the namespace for the Pod.
spec:
  containers:
  - name: nginx
    image: nginx:latest
    ports:
    - containerPort: 80
```

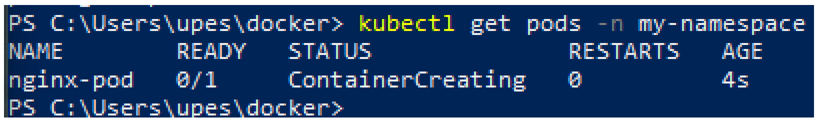
Apply this YAML to create the Pod:



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

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

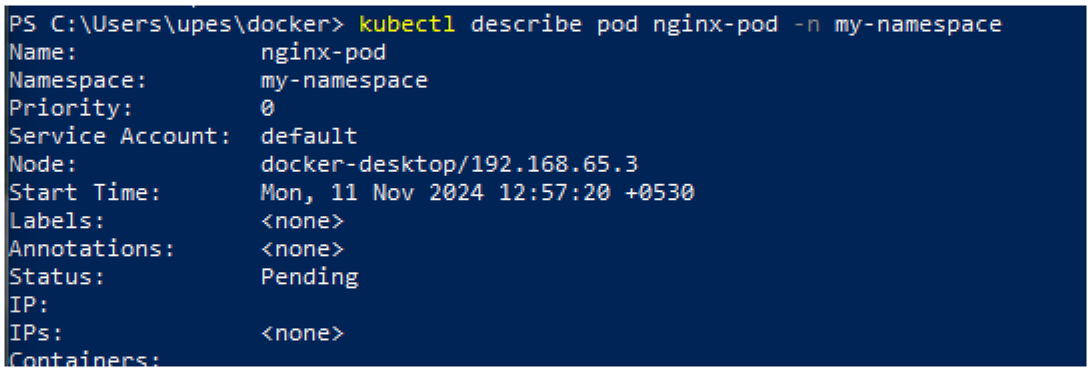
Check the status of the Pod within the namespace:



```
PS C:\Users\upes\docker> kubectl get pods -n my-namespace
NAME        READY   STATUS              RESTARTS   AGE
nginx-pod   0/1     ContainerCreating   0          4s
PS C:\Users\upes\docker>
```

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

To describe the Pod and see detailed information:

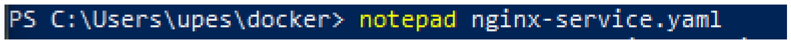


```
PS C:\Users\upes\docker> kubectl describe pod nginx-pod -n my-namespace
Name:             nginx-pod
Namespace:        my-namespace
Priority:         0
Service Account:  default
Node:             docker-desktop/192.168.65.3
Start Time:       Mon, 11 Nov 2024 12:57:20 +0530
Labels:           <none>
Annotations:      <none>
Status:           Pending
IP:
IPs:              <none>
Containers:
```

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

Create a Service in the Namespace

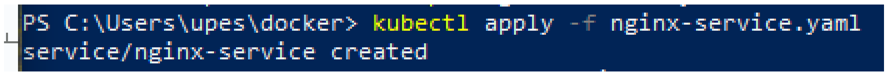
Create a YAML file named nginx-service.yaml with the following content:



```
PS C:\Users\upes\docker> notepad nginx-service.yaml
```

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

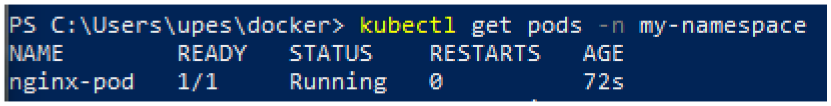
Apply this YAML to create the Service:



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

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

Check the status of the Service within the namespace:



```
PS C:\Users\upes\docker> kubectl get pods -n my-namespace
NAME        READY   STATUS    RESTARTS   AGE
nginx-pod   1/1     Running   0          72s
```

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

To describe the Service and see detailed information:

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

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:

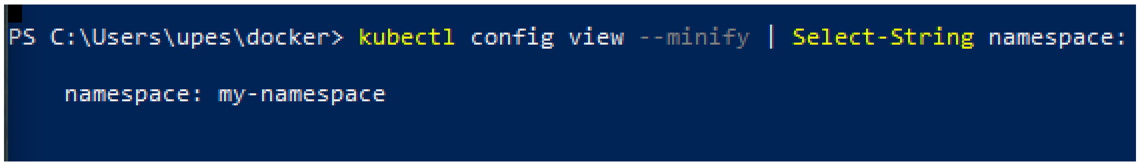
```
kubectl get pods -n my-namespace
```

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
```

Verify the current context's namespace:



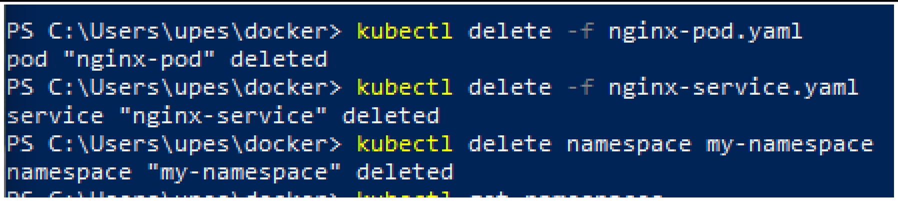
```
PS C:\Users\upes\docker> kubectl config view --minify | Select-String namespace:

    namespace: my-namespace
```

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

Step 6: Clean Up Resources

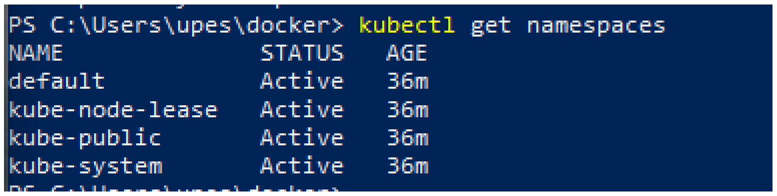
To delete the resources and the namespace you created:

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



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

Ensure that the namespace and all its resources are deleted:



```
PS C:\Users\upes\docker> kubectl get namespaces
NAME              STATUS   AGE
default           Active   36m
kube-node-lease   Active   36m
kube-public       Active   36m
kube-system       Active   36m
```

```
kubectl get namespaces
```