Lab Exercise 13- Managing Namespaces in Kubernetes

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Step 1: Understand Namespaces

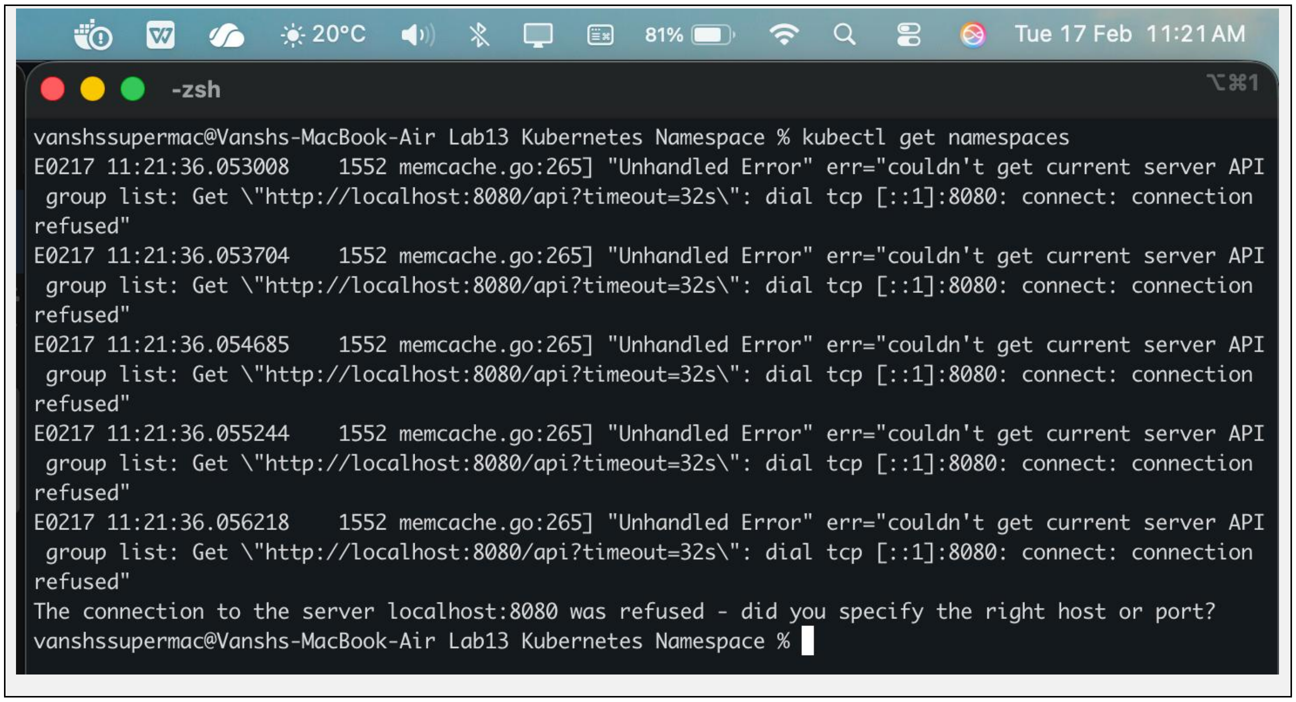
Namespaces provide a mechanism for scoping resources in a cluster. Namespaces can be used to:

- 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
```



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl get namespaces
E0217 11:21:36.053008    1552 memcache.go:265] "Unhandled Error" err="couldn't get current server API
 group list: Get \"http://localhost:8080/api?timeout=32s\": dial tcp [::1]:8080: connect: connection
refused"
E0217 11:21:36.053704    1552 memcache.go:265] "Unhandled Error" err="couldn't get current server API
 group list: Get \"http://localhost:8080/api?timeout=32s\": dial tcp [::1]:8080: connect: connection
refused"
E0217 11:21:36.054685    1552 memcache.go:265] "Unhandled Error" err="couldn't get current server API
 group list: Get \"http://localhost:8080/api?timeout=32s\": dial tcp [::1]:8080: connect: connection
refused"
E0217 11:21:36.055244    1552 memcache.go:265] "Unhandled Error" err="couldn't get current server API
 group list: Get \"http://localhost:8080/api?timeout=32s\": dial tcp [::1]:8080: connect: connection
refused"
E0217 11:21:36.056218    1552 memcache.go:265] "Unhandled Error" err="couldn't get current server API
 group list: Get \"http://localhost:8080/api?timeout=32s\": dial tcp [::1]:8080: connect: connection
refused"
The connection to the server localhost:8080 was refused - did you specify the right host or port?
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

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

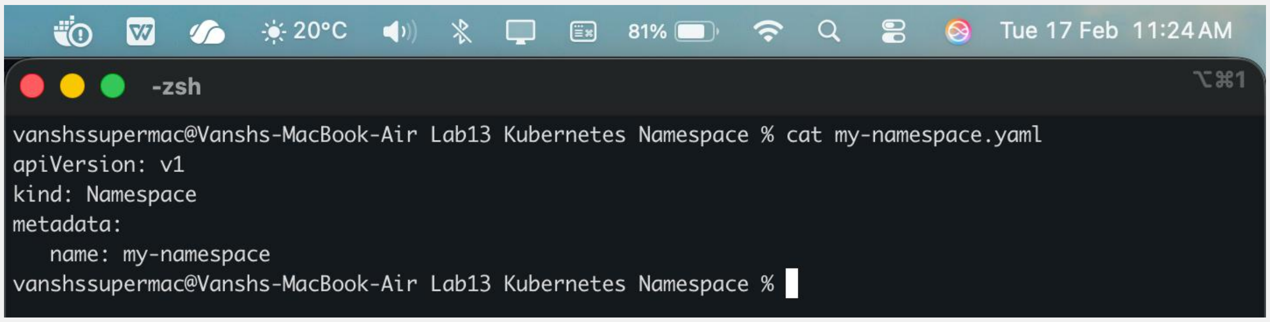
Step 3: Create a Namespace

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:

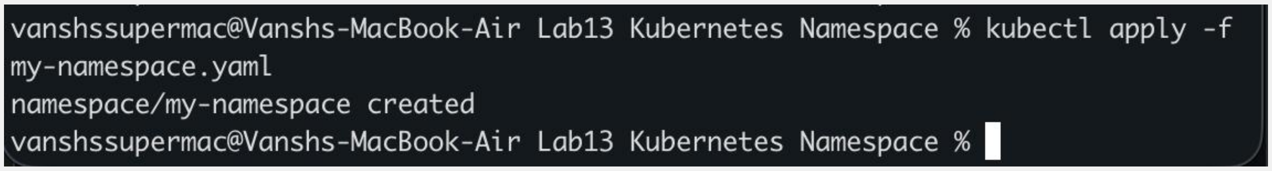
```
apiVersion: v1
kind: Namespace
metadata:
  name: my-namespace
```



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % cat my-namespace.yaml
apiVersion: v1
kind: Namespace
metadata:
   name: my-namespace
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

Apply this YAML to create the namespace:

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



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl apply -f
my-namespace.yaml
namespace/my-namespace created
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

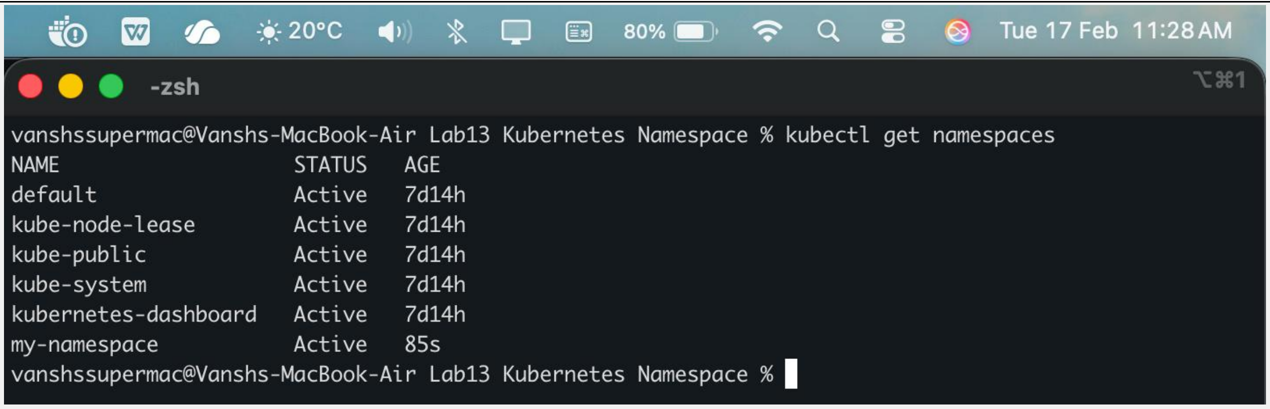
Using kubectl Command

Alternatively, create a namespace using the kubectl command:

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

Verify that the namespace is created:

```
kubectl get namespaces
```



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl get namespaces
NAME                   STATUS   AGE
default                Active   7d14h
kube-node-lease        Active   7d14h
kube-public            Active   7d14h
kube-system            Active   7d14h
kubernetes-dashboard   Active   7d14h
my-namespace           Active   85s
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

You should see my-namespace listed in the output.

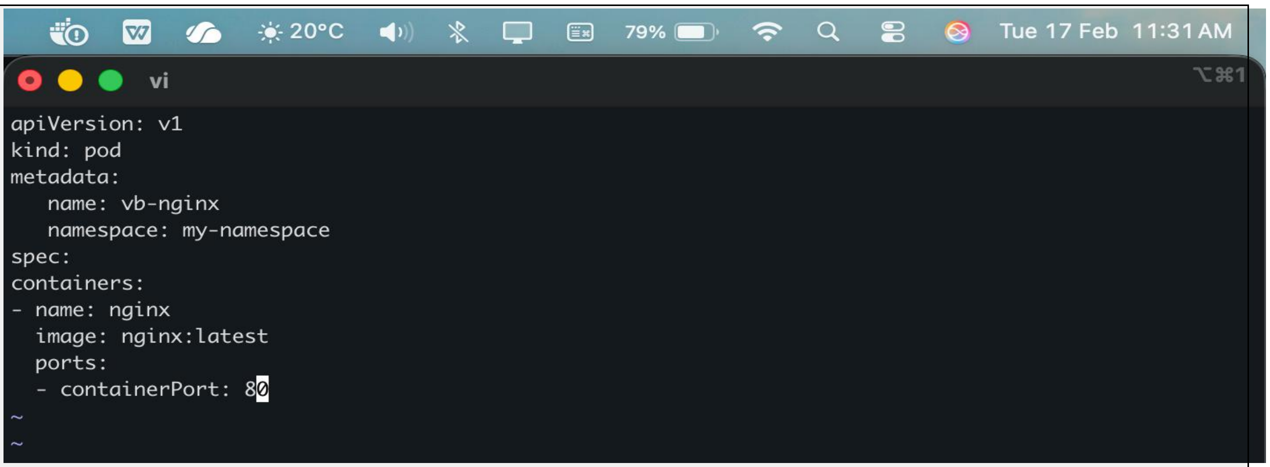
Step 4: Deploy Resources in a Namespace

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:

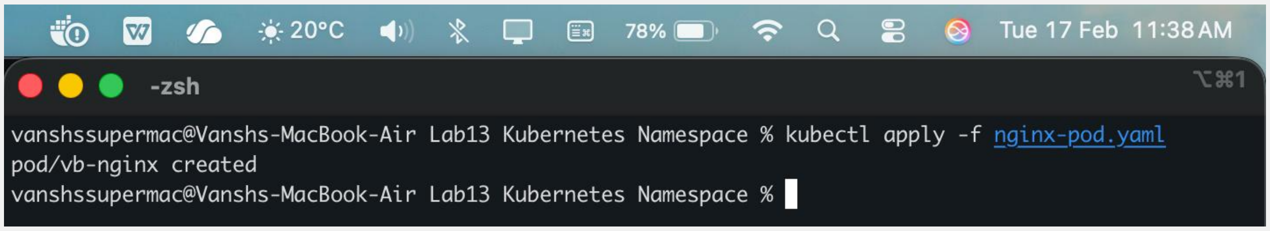
```
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  namespace: my-namespace
spec:
  containers:
  - name: nginx
    image: nginx:latest
    ports:
    - containerPort: 80
```



```
apiVersion: v1
kind: pod
metadata:
   name: vb-nginx
   namespace: my-namespace
spec:
containers:
- name: nginx
  image: nginx:latest
  ports:
  - containerPort: 80
~
~
```

Apply this YAML to create the Pod:

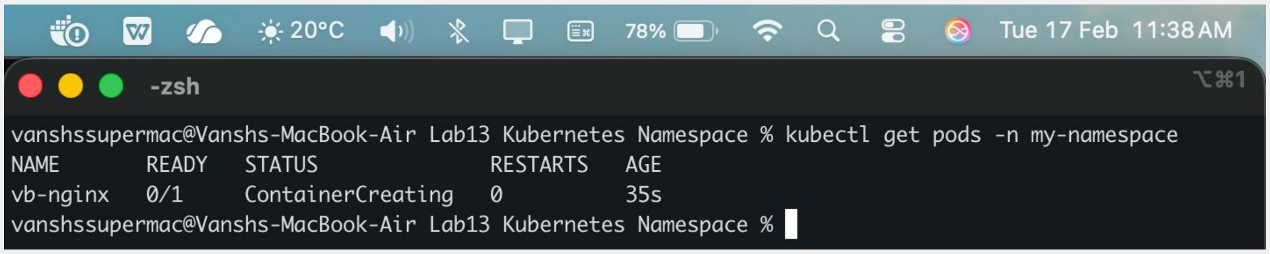
kubectl apply -f nginx-pod.yaml



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl apply -f nginx-pod.yaml
pod/vb-nginx created
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

Check the status of the Pod within the namespace:

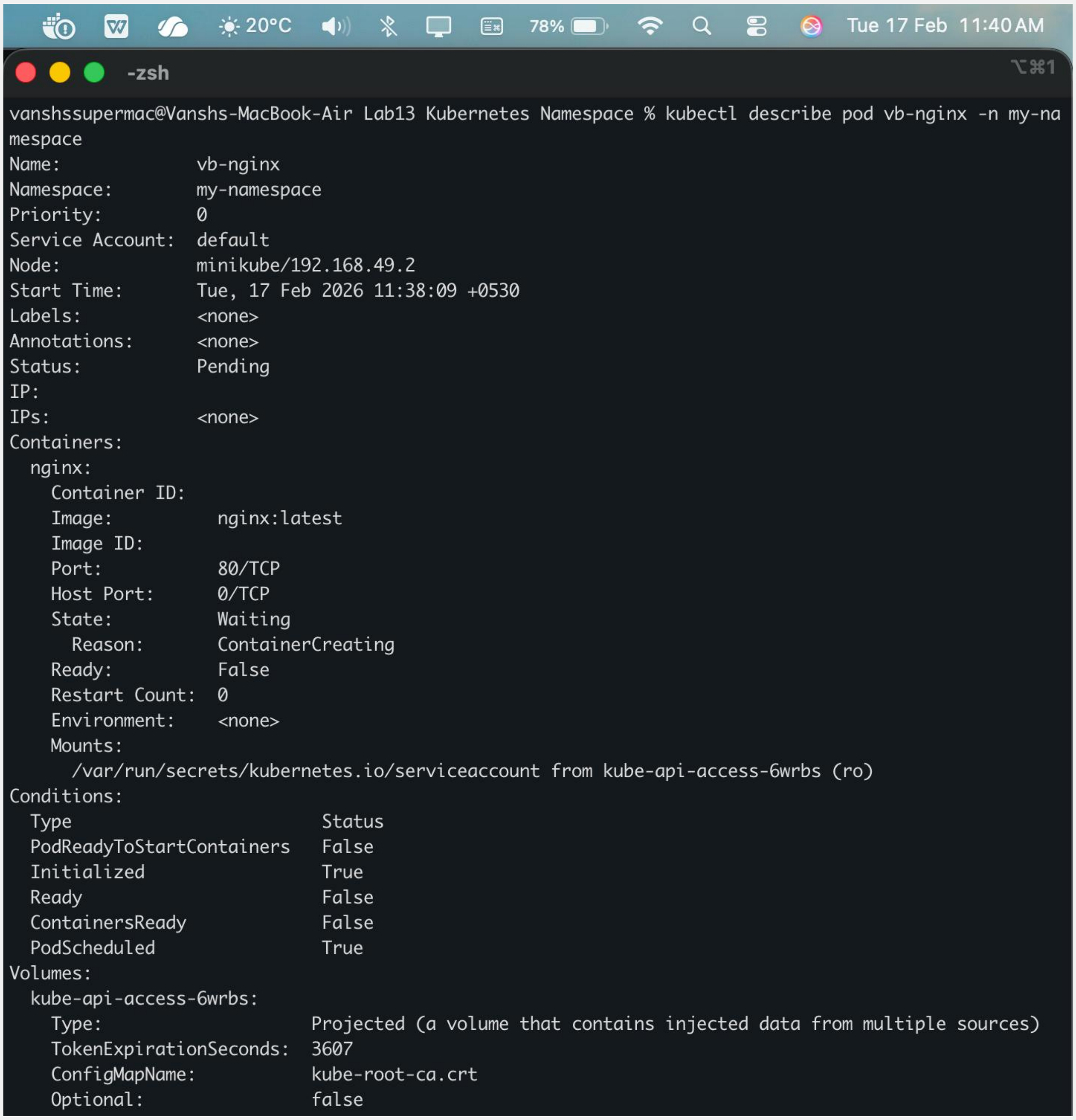
kubectl get pods -n my-namespace



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl get pods -n my-namespace
NAME       READY   STATUS              RESTARTS   AGE
vb-nginx   0/1     ContainerCreating   0          35s
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

To describe the Pod and see detailed information:

kubectl describe pod nginx-pod -n my-namespace



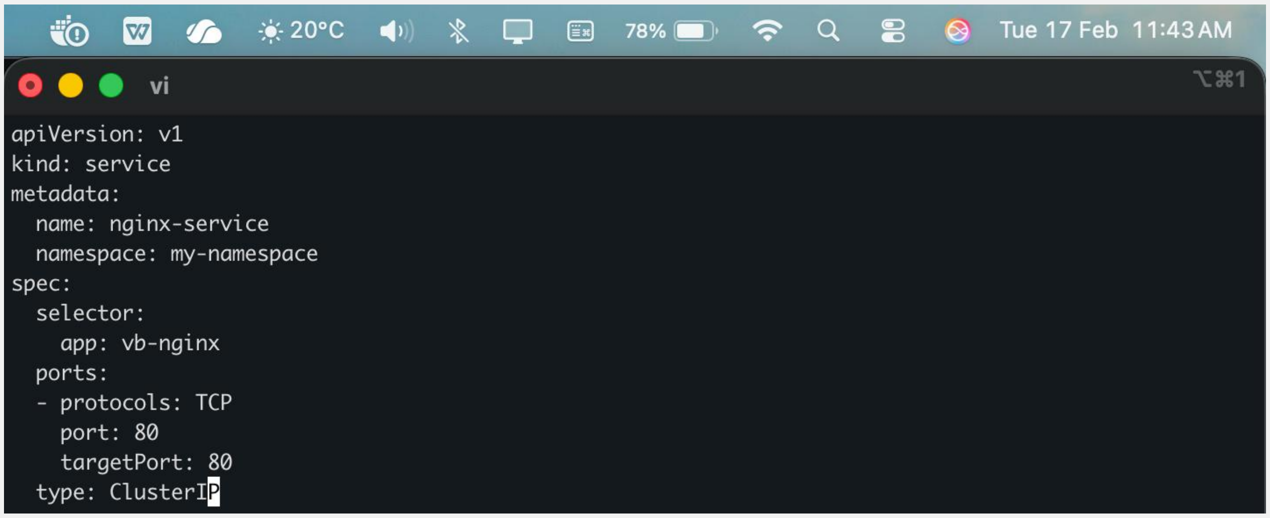
```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl describe pod vb-nginx -n my-na
mespace
Name:             vb-nginx
Namespace:        my-namespace
Priority:         0
Service Account:  default
Node:             minikube/192.168.49.2
Start Time:       Tue, 17 Feb 2026 11:38:09 +0530
Labels:           <none>
Annotations:      <none>
Status:           Pending
IP:
IPs:              <none>
Containers:
  nginx:
    Container ID:
    Image:          nginx:latest
    Image ID:
    Port:           80/TCP
    Host Port:      0/TCP
    State:          Waiting
      Reason:       ContainerCreating
    Ready:          False
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-6wrbs (ro)
Conditions:
  Type                        Status
  PodReadyToStartContainers   False
  Initialized                 True
  Ready                       False
  ContainersReady             False
  PodScheduled                True
Volumes:
  kube-api-access-6wrbs:
    Type:                    Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds:  3607
    ConfigMapName:           kube-root-ca.crt
    Optional:                false
```

Create a Service in the Namespace

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

```
apiVersion: v1
```

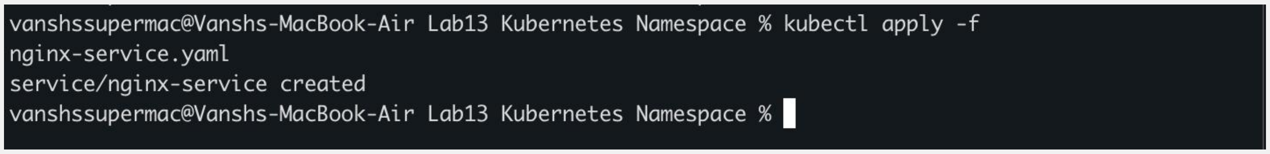
```
kind: Service
metadata:
  name: nginx-service
  namespace: my-namespace
spec:
  selector:
    app: nginx-pod
  ports:
  - protocol: TCP
    port: 80
    targetPort: 80
  type: ClusterIP
```



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

Apply this YAML to create the Service:

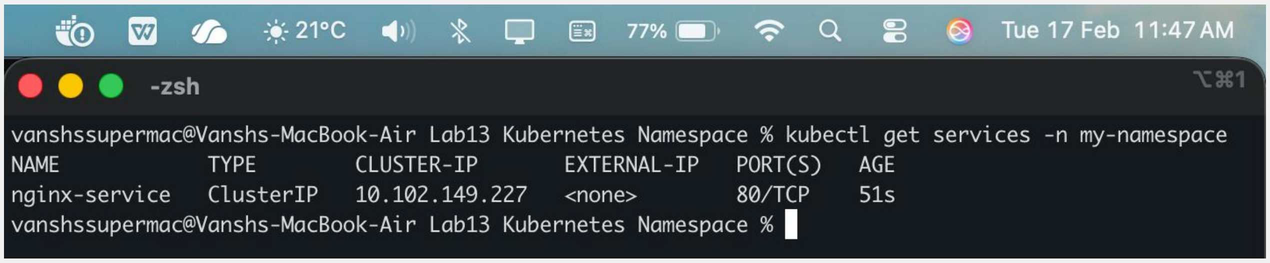
```
kubectl apply -f nginx-service.yaml
```



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl apply -f
nginx-service.yaml
service/nginx-service created
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

Check the status of the Service within the namespace:

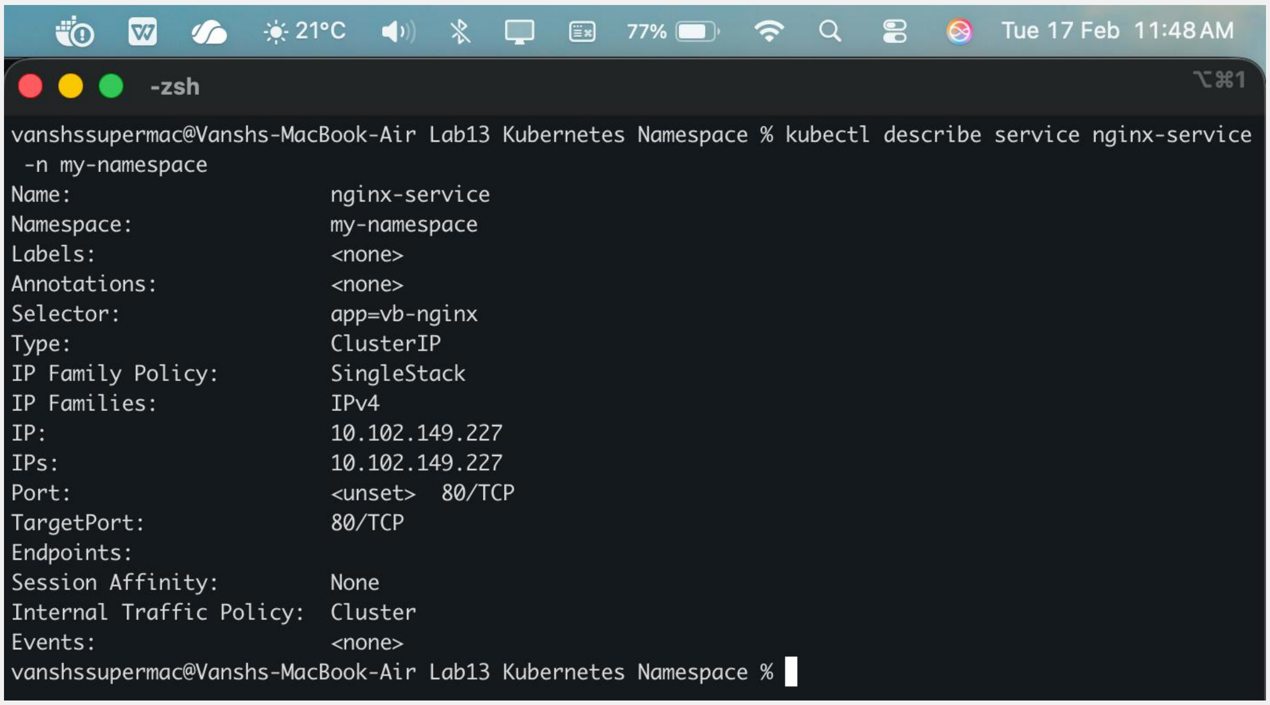
kubectl get services -n my-namespace



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl get services -n my-namespace
NAME            TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)   AGE
nginx-service   ClusterIP   10.102.149.227   <none>        80/TCP    51s
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

To describe the Service and see detailed information:

kubectl describe service nginx-service -n my-namespace



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl describe service nginx-service
 -n my-namespace
Name:                     nginx-service
Namespace:                my-namespace
Labels:                   <none>
Annotations:              <none>
Selector:                 app=vb-nginx
Type:                     ClusterIP
IP Family Policy:         SingleStack
IP Families:              IPv4
IP:                       10.102.149.227
IPs:                      10.102.149.227
Port:                     <unset>  80/TCP
TargetPort:               80/TCP
Endpoints:
Session Affinity:         None
Internal Traffic Policy:  Cluster
Events:                   <none>
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

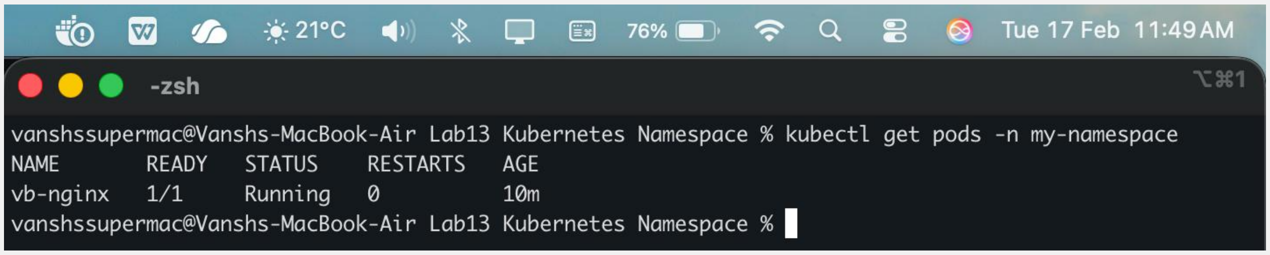
Step 5: Switching Context Between Namespaces

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
```

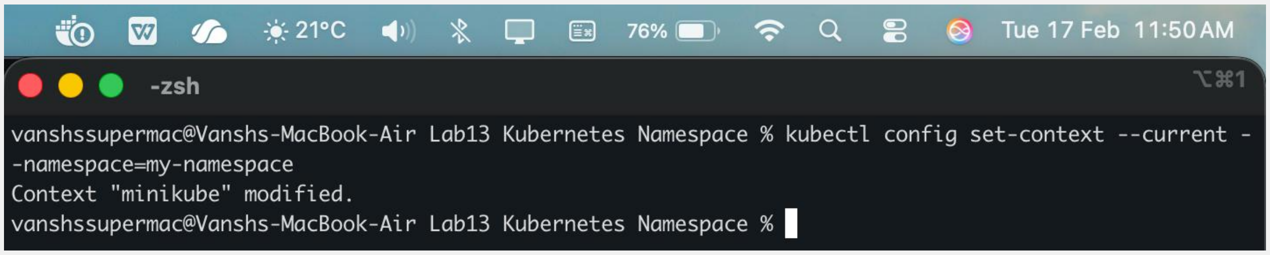


```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl get pods -n my-namespace
NAME       READY   STATUS    RESTARTS   AGE
vb-nginx   1/1     Running   0          10m
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

Set Default Namespace for kubectl Commands

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

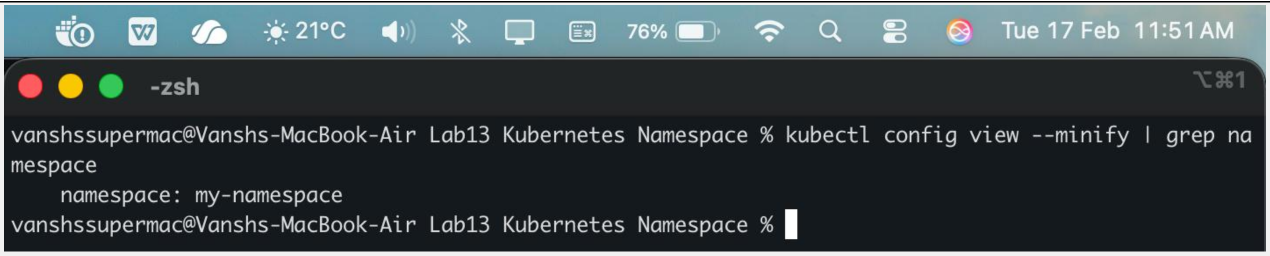
```
kubectl config set-context --current --namespace=my-namespace
```



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl config set-context --current -
-namespace=my-namespace
Context "minikube" modified.
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

Verify the current context's namespace:

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

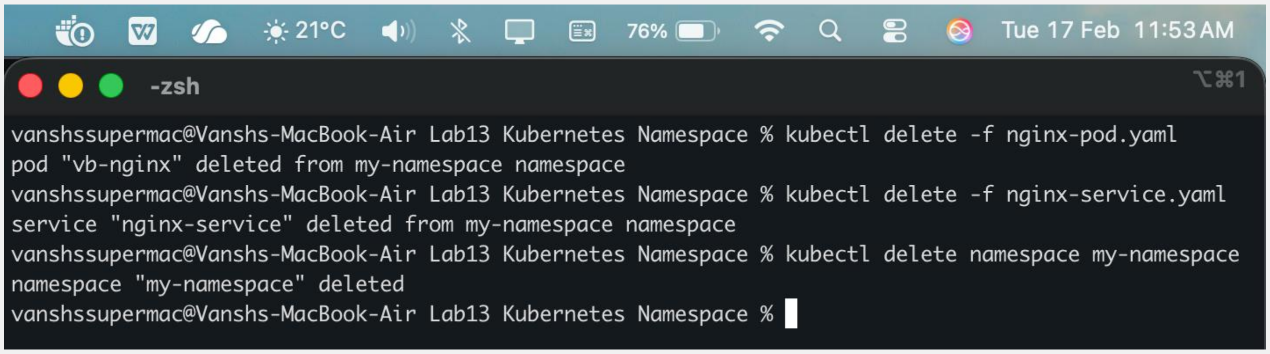


```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl config view --minify | grep na
mespace
    namespace: my-namespace
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

Step 6: Clean Up Resources

To delete the resources and the namespace you created:

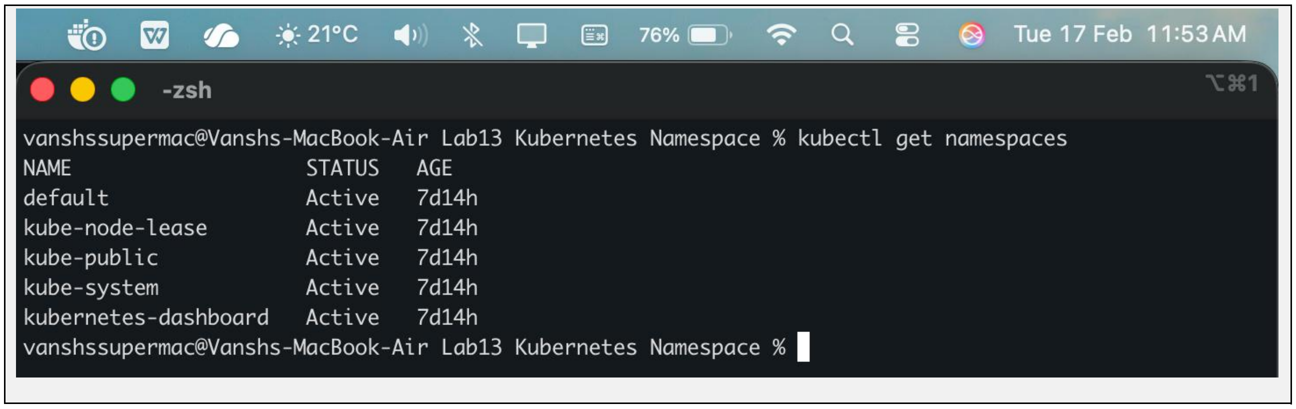
```
kubectl delete -f nginx-pod.yaml
kubectl delete -f nginx-service.yaml
kubectl delete namespace my-namespace
```



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl delete -f nginx-pod.yaml
pod "vb-nginx" deleted from my-namespace namespace
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl delete -f nginx-service.yaml
service "nginx-service" deleted from my-namespace namespace
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl delete namespace my-namespace
namespace "my-namespace" deleted
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

Ensure that the namespace and all its resources are deleted:

```
kubectl get namespaces
```



```
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace % kubectl get namespaces
NAME                   STATUS   AGE
default                Active   7d14h
kube-node-lease        Active   7d14h
kube-public            Active   7d14h
kube-system            Active   7d14h
kubernetes-dashboard   Active   7d14h
vanshssupermac@Vanshs-MacBook-Air Lab13 Kubernetes Namespace %
```

Thank You