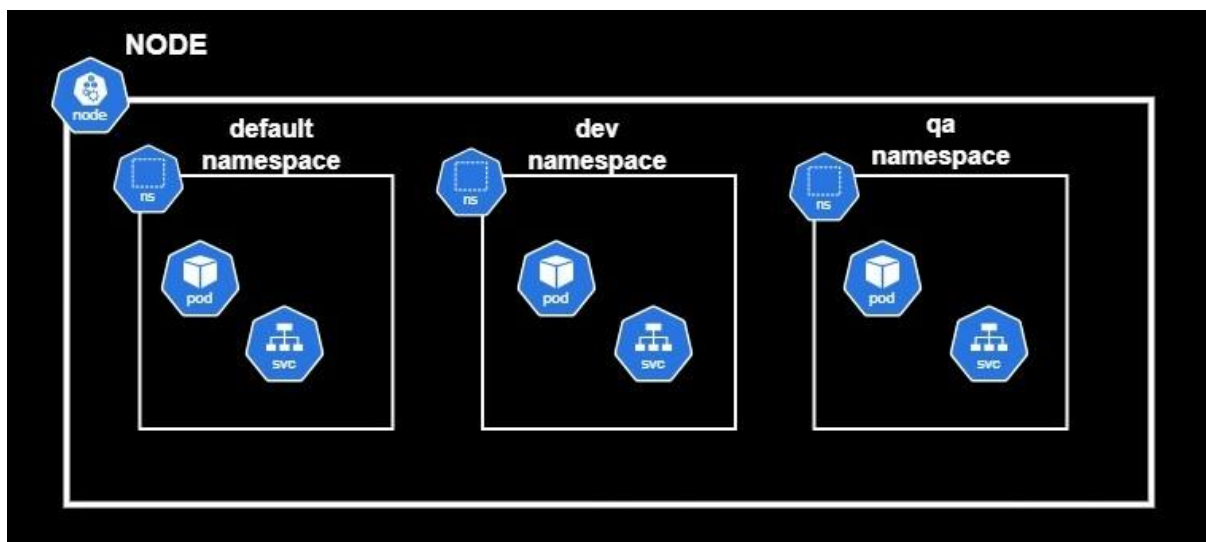


KUBERNETES NAMESPACE

Namespace is a logical partition that provides a way to divide cluster resources between multiple users or teams. Namespaces are useful for organizing resources within a cluster and can be used for various purposes, such as:

1. **Isolation:** Namespaces help isolate resources (like pods, services, and deployments) within the same cluster. This is particularly useful in multi-tenant environments.
2. **Resource Quotas:** You can set resource limits and quotas on a per-namespace basis to prevent any single team or application from consuming too many resources.
3. **Environment Separation:** Namespaces can represent different environments (e.g., development, testing, production), making it easier to manage configurations and resources specific to each environment.
4. **Access Control:** Role-Based Access Control (RBAC) can be applied at the namespace level, allowing you to control who can access and modify resources within a namespace.



Note:

- ❖ Pod needs to communicate with in same namespace it can easily interact using “host-name”
- ❖ Pod needs to communicate with pod present in different namespace (eg. Dev, QA), we need to use “fully qualified domain name” [FQDA].

The screenshot shows a code editor with a file named 'namespace.yaml' open. The content of the file is as follows:

```
namespace > ! namespace.yaml
1  apiVersion: v1
2  kind: Namespace
3  metadata:
4    name: demo-ns
5
```

Kubectl apply -f namespace.yaml (or) kubectl create namespace <namespace-name>

Kubectl get ns

KUBERNETES NAMESPACE

```
manoj -->
manoj -->
manoj --># let me create a name-space
manoj -->
manoj -->kubectl apply -f namespace.yaml
namespace/demo-ns created
manoj -->
manoj -->kubectl get ns
NAME              STATUS   AGE
default           Active   35d
demo-ns           Active   5s
kube-node-lease   Active   25d
kube-public       Active   25d
kube-system       Active   25d
local-path-storage Active   25d
manoj -->
manoj -->
```

A yellow box highlights the output of the `kubectl get ns` command, showing the `demo-ns` namespace is active and 5 seconds old. An arrow points from the text "NAME-SPACE created" to this box.

Now I want to create a pod inside namespace

Kubectl create deploy <name of pod> --image <image-name> -n < namespace>

Kubectl get pod -n <namespace>

```
manoj -->
manoj -->
manoj --># Deploying pod on default namespace
manoj -->
manoj -->kubectl create deploy nginx-default-ns --image nginx
deployment.apps/nginx-default-ns created
manoj -->
manoj -->kubectl get po
NAME                                READY   STATUS    RESTARTS   AGE
nginx-default-ns-57987fc9cf-xb9nx   1/1     Running   0           5s
manoj -->
manoj -->
```

```
manoj -->
manoj -->
manoj -->kubectl get po -o wide -n demo-ns
No resources found in demo-ns namespace.
manoj -->
manoj --># create a pod on namespace "demo-ns"
manoj -->
manoj -->kubectl create deploy nginx-demo-ns --image nginx -n demo-ns
deployment.apps/nginx-demo-ns created
manoj -->
manoj -->kubectl get po -o wide -n demo-ns
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE             NOMINATED NODE   READINESS GATES
nginx-demo-ns-7ddb4f55c5-q272l     1/1     Running   0           6s    10.244.1.7    kubernetes-worker <none>           <none>
manoj -->
manoj -->
```

A green box highlights the output of the `kubectl get po -o wide -n demo-ns` command, showing the pod `nginx-demo-ns-7ddb4f55c5-q272l` is running. An arrow points from the text "created a pod on namespace 'demo-ns'" to this box.


KUBERNETES NAMESPACE


Now let me check <demo-namespace> can reach default namespace, using container ip

```
manoj -->
manoj -->kubectl get po -n demo-ns -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE             NOMINATED NODE   READINESS GATES
nginx-demo-ns-7ddb4f55c5-q272l      1/1     Running   0           2m24s  10.244.1.7    kubernet-es-worker
manoj -->
manoj -->kubectl exec -it nginx-demo-ns-7ddb4f55c5-q272l -n demo-ns bash
kubectl exec [POD] [COMMAND] is DEPRECATED and will be removed in a future version. Use kubectl exec [POD] -- [COMMAND] instead.
root@nginx-demo-ns-7ddb4f55c5-q272l:/#
root@nginx-demo-ns-7ddb4f55c5-q272l:/#
root@nginx-demo-ns-7ddb4f55c5-q272l:/# #now let try to reach default name-space from demo-ns
root@nginx-demo-ns-7ddb4f55c5-q272l:/#
root@nginx-demo-ns-7ddb4f55c5-q272l:/# # curl < ip of default namespace pod >
root@nginx-demo-ns-7ddb4f55c5-q272l:/#
root@nginx-demo-ns-7ddb4f55c5-q272l:/# curl 10.244.1.6
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
root@nginx-demo-ns-7ddb4f55c5-q272l:/# # we can reach the default namespace using ip
```


 trying to reach to default namespace

 we can reach the default namespace using ip address

```
manoj -->
manoj -->kubectl get po -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE             NOMINATED NODE   READINESS GATES
nginx-default-ns-57987fc9cf-xb9nx    1/1     Running   0           9m47s  10.244.1.6    kubernet-es-worker
manoj -->
manoj -->
manoj -->kubectl exec -it nginx-default-ns-57987fc9cf-xb9nx bash
kubectl exec [POD] [COMMAND] is DEPRECATED and will be removed in a future version. Use kubectl exec [POD] -- [COMMAND] instead.
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/# # try to reach namespace "demo-ns" from default namespace
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/# # curl < ip of pod in demo-ns >
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/# curl 10.244.1.7
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/# #we can reach the demo-ns namespace using ip address
```

 trying to reach "demo-ns" from default namespace using ip address.

KUBERNETES NAMESPACE

Now let me expose “service” in both deployment.

```
manoj -->
manoj -->
manoj -->kubectl get svc
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
kubernetes    ClusterIP     10.96.0.1     <none>         443/TCP    25d
manoj -->
manoj -->
manoj -->kubectl get deploy
NAME          READY    UP-TO-DATE    AVAILABLE    AGE
nginx-default-ns  1/1      1             1            19m
manoj -->
manoj -->kubectl expose deploy/nginx-default-ns --name svc-default-ns --port 80
service/svc-default-ns exposed
manoj -->
manoj -->kubectl get svc
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
kubernetes    ClusterIP     10.96.0.1     <none>         443/TCP    25d
svc-default-ns ClusterIP     10.96.243.188 <none>         80/TCP     3s
manoj -->
manoj -->
```

created service on default namespace

```
manoj -->
manoj -->kubectl get svc -n demo-ns
No resources found in demo-ns namespace.
manoj -->
manoj -->kubectl get deploy -n demo-ns
NAME          READY    UP-TO-DATE    AVAILABLE    AGE
nginx-demo-ns  1/1      1             1            13m
manoj -->
manoj -->kubectl expose deploy/nginx-demo-ns --name svc-demo-ns --port 80
Error from server (NotFound): deployments.apps "nginx-demo-ns" not found
manoj -->
manoj -->kubectl expose deploy/nginx-demo-ns --name svc-demo-ns --port 80 -n demo-ns
service/svc-demo-ns exposed
manoj -->
manoj -->kubectl get deploy -n demo-ns
NAME          READY    UP-TO-DATE    AVAILABLE    AGE
nginx-demo-ns  1/1      1             1            15m
manoj -->kubectl get svc -n demo-ns
NAME          TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)    AGE
svc-demo-ns   ClusterIP     10.96.158.212 <none>         80/TCP     21s
manoj -->
manoj -->
```

created service on "demo-ns" namespace

Now let me check can I access service present in default namespace from the “dev/qa namespace”

```
manoj -->
manoj -->kubectl get po -n demo-ns
NAME          READY    STATUS    RESTARTS    AGE
nginx-demo-ns-7ddb4f55c5-q272l  1/1      Running   0            17m
manoj -->
manoj -->kubectl exec -it nginx-demo-ns-7ddb4f55c5-q272l -n demo-ns bash
kubectl exec [POD] [COMMAND] is DEPRECATED and will be removed in a future version. Use kubectl exec [POD] -- [COMMAND] instead.
root@nginx-demo-ns-7ddb4f55c5-q272l:/#
root@nginx-demo-ns-7ddb4f55c5-q272l:/# # try to reach the service present in default namespace
root@nginx-demo-ns-7ddb4f55c5-q272l:/# curl svc-default-ns
url: (6) could not resolve host: svc-default-ns
root@nginx-demo-ns-7ddb4f55c5-q272l:/# # we can't reach the default service using "host-name"
root@nginx-demo-ns-7ddb4f55c5-q272l:/#
root@nginx-demo-ns-7ddb4f55c5-q272l:/# # to access we need fully qualified domain name [ FQDN ]
root@nginx-demo-ns-7ddb4f55c5-q272l:/# curl svc-default-ns.default.svc.cluster.local
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx</title>
<style>
html { color: scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>
<p>For online documentation and support please refer to
<a href="http://nginx.org/">http://nginx.org/</a>.<br>
Commercial support is available at
<a href="http://nginx.com/">http://nginx.com/</a>.</p>
<p><em>Thank you for using nginx.</em></p>
```

I couldn't reach to service present in default namespace using "host-name"

so to reach I need to use "fully qualified domain name" [FQDN]

KUBERNETES NAMESPACE

Using “fully qualified domain name” I can access the service present in different namespace.

```
manoj -->
manoj -->kubectl get po -o wide
NAME                                READY   STATUS    RESTARTS   AGE   IP            NODE             NOMINATED NODE   READINESS GATES
nginx-default-ns-57987fc9cf-xb9nx   1/1     Running   0           32m   10.244.1.6    kubernetes-worker <none>          <none>
manoj -->
manoj -->kubectl exec -it nginx-default-ns-57987fc9cf-xb9nx bash
kubectl exec [POD] [COMMAND] is DEPRECATED and will be removed in a future version. Use kubectl exec [POD] -- [COMMAND] instead.
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/# # trying to reach the service present in namespace "demo-ns" from default namespace
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/# curl svc-demo-ns
curl: (6) could not resolve host: svc-demo-ns
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/# # to reach i need to use fully qualified domain name
root@nginx-default-ns-57987fc9cf-xb9nx:/#
root@nginx-default-ns-57987fc9cf-xb9nx:/# curl svc-demo-ns.demo-ns.svc.cluster.local
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
```

I couldn't reach the service present in "demo-ns" namespace using "host-name"

using "fully qualified domain name" I can reach the service present in "demo-ns" namespace

NOTE: We reach the pods & service present in different name-space with their ip address but not using their "host-name"