How does Kubernetes ensure different teams and projects stay organized and don't interfere with each other?

1️⃣ What is a Namespace?

- A **logical partition** within a Kubernetes cluster.
- Helps organize and **isolate resources** (Pods, Services, ConfigMaps, etc.).
- Useful for managing **multi-tenant environments** or different environments (e.g., `dev`, `staging`, `prod`).

2️⃣ Why Do We Need Namespaces?

- **Avoids naming conflicts** when multiple teams work in the same cluster.
- Provides **access control** using Role-Based Access Control (RBAC).
- Enables **resource quotas** to limit CPU & memory per namespace.

3️⃣ Default Namespaces in Kubernetes

Namespace	Description
`default`	Used when no namespace is specified.
`kube-system`	Stores system-level resources (e.g., CoreDNS, Kube Proxy).
`kube-public`	Public data accessible across the cluster.
`kube-node-lease`	Stores node heartbeat information for faster failure detection.

4️⃣ Creating a Namespace (YAML Example)

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

Apply it using:

```
sh
---------
```

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

5️⃣ Deploying a Pod in a Specific Namespace

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

6️⃣ Useful Namespace Commands

- **List all namespaces:**

```
sh
---------
kubectl get namespaces
```

- **Get resources in a specific namespace:**

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

- **Set a default namespace for a session:**

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

7️⃣ Key Benefits of Namespaces

✅ Helps **organize** cluster resources.
✅ Provides **isolation** for teams & applications.
✅ Supports **access control** via RBAC.
✅ Allows **resource limits** per namespace.

1. What is the primary purpose of a Namespace in Kubernetes?

A) To define network policies
B) To isolate resources within a cluster
C) To provide storage for persistent volumes
D) To deploy only stateful applications

Answer: B) To isolate resources within a cluster

2. Which command is used to list all the namespaces in a Kubernetes cluster?

A) `kubectl get all`
B) `kubectl get ns`
C) `kubectl list namespaces`
D) `kubectl show namespaces`

Answer: B) `kubectl get ns`

How can you create a new Namespace in Kubernetes using `kubectl`?

A) `kubectl new namespace mynamespace`
B) `kubectl create ns mynamespace`
C) `kubectl namespace create mynamespace`
D) `kubectl add namespace mynamespace`

Answer: B) `kubectl create ns mynamespace`

What happens when you delete a Namespace in Kubernetes?

A) The cluster is reset
B) Only the Namespace name is removed, but objects remain
C) All resources inside the Namespace are deleted
D) The API server stops working

Answer: C) All resources inside the Namespace are deleted