**Lab Exercise 26- Using ClusterIP Service in Kubernetes**

This lab exercise will guide you through deploying a simple Nginx application in a Kubernetes cluster and exposing it internally using a **ClusterIP** service.

**Objective**

* Deploy an Nginx pod.
* Expose the pod internally in the cluster using a **ClusterIP** service.
* Access the application from another pod in the cluster.

**Prerequisites**

1. A running Kubernetes cluster (e.g., Minikube, Kind, or any other cluster).
2. **kubectl** installed and configured.

**Steps**

**1. Create a Namespace**

Namespaces allow you to group and isolate resources in Kubernetes.

kubectl create namespace clusterip-lab

**2. Create a Deployment**

Deploy an Nginx pod using a Deployment.

**nginx-deployment.yaml**:

apiVersion: apps/v1

kind: Deployment

metadata:

name: nginx-deployment

namespace: clusterip-lab

spec:

replicas: 1

selector:

matchLabels:

app: nginx

template:

metadata:

labels:

app: nginx

spec:

containers:

- name: nginx

image: nginx:latest

ports:

- containerPort: 80

**Apply the file:**

kubectl apply -f nginx-deployment.yaml

**Verify the deployment:**

kubectl get deployments -n clusterip-lab

**3. Create a ClusterIP Service**

Expose the Nginx deployment using a **ClusterIP** service.

**nginx-service.yaml**:

apiVersion: v1

kind: Service

metadata:

name: nginx-service

namespace: clusterip-lab

spec:

selector:

app: nginx

ports:

- protocol: TCP

port: 80

targetPort: 80

type: ClusterIP

**Apply the file:**

kubectl apply -f nginx-service.yaml

**Verify the service:**

kubectl get services -n clusterip-lab

**4. Test the Service**

1. **Create a Test Pod**: Launch a temporary pod to test the ClusterIP service.

kubectl run test-pod --image=busybox -n clusterip-lab -- sleep 3600

Verify the pod is running:

kubectl get pods -n clusterip-lab

1. **Access the Service from Test Pod**:
   * Exec into the test pod:

kubectl exec -it test-pod -n clusterip-lab -- sh

* + Use wget to access the Nginx service:

wget -qO- http://nginx-service.clusterip-lab.svc.cluster.local

1. You should see the default Nginx welcome page content.

**5. Clean Up Resources**

To clean up all resources created in this exercise:

kubectl delete namespace clusterip-lab

**Expected Output**

1. The nginx-deployment creates one pod.
2. The nginx-service exposes the pod internally within the cluster using a ClusterIP.
3. The test pod successfully accesses the Nginx service through its ClusterIP.