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EXPERIMENT NO:04

Aim: To install Kubectl and execute Kubectl commands to manage the Kubernetes cluster and deploy Your First Kubernetes Application.

Theory:

What is Kubernetes?

Kubernetes, often referred to as K8s, is an open-source container orchestration platform that automates the deployment, scaling, and management of containerized applications. Originally developed by Google, it has become the industry standard for managing container workloads due to its flexibility and robust features.

Core Concepts of Kubernetes

1. Containers: These are lightweight, portable packages that include everything needed to run an application, ensuring consistency across different environments.
2. Pods: The smallest deployable units in Kubernetes, pods can contain one or more containers that share storage and network resources.
3. Nodes: A node is a worker machine in the Kubernetes cluster that runs at least one pod. Nodes can be either physical or virtual machines.
4. Clusters: A cluster comprises multiple nodes that run containerized applications. The control plane manages the cluster's state.
5. Services: Services provide stable endpoints for accessing pods and facilitate load balancing and service discovery.
6. Deployments: A deployment manages the lifecycle of pods, allowing users to specify the number of replicas and facilitating rolling updates and rollbacks.

Implementation:

Commands:-

Create yaml file

```
ubuntu@master:~$ sudo nano deploy.yaml
ubuntu@master:~$ kubectl create -f deploy.yaml
deployment.apps/nginx-deployment created
ubuntu@master:~$ kubectl get deploy
NAME               READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment   3/3     3            3           29s
```

Add below lines in the file

```
ubuntu@master:~$ cat deploy.yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.14.2
        ports:
        - containerPort: 80
ubuntu@master:~$
```

```
ubuntu@master:~$ kubectl expose deployment.apps/nginx-deployment \
> --type="LoadBalancer"
service/nginx-deployment exposed
ubuntu@master:~$ kubectl get svc
NAME               TYPE           CLUSTER-IP      EXTERNAL-IP   PORT(S)        AGE
kubernetes         ClusterIP      10.96.0.1       <none>        443/TCP        18m
nginx-deployment   LoadBalancer   10.111.16.154   <pending>     80:30171/TCP   24s
ubuntu@master:~$
```

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.