Assignment-9 Submission

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Task 1: Create a Pod with an NGINX Image

nginx-pod.yaml:

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  labels:
    app: nginx
spec:
  containers:
  - name: nginx-container
    image: nginx:latest  # Use the latest NGINX image
    ports:
    - containerPort: 80  # NGINX listens on port 80
```

Apply and Verify:

```
kubectl get pods
```

Screenshot:

Task 2: Create a Deployment with 4 Replicas

nginx-deployment.yaml:

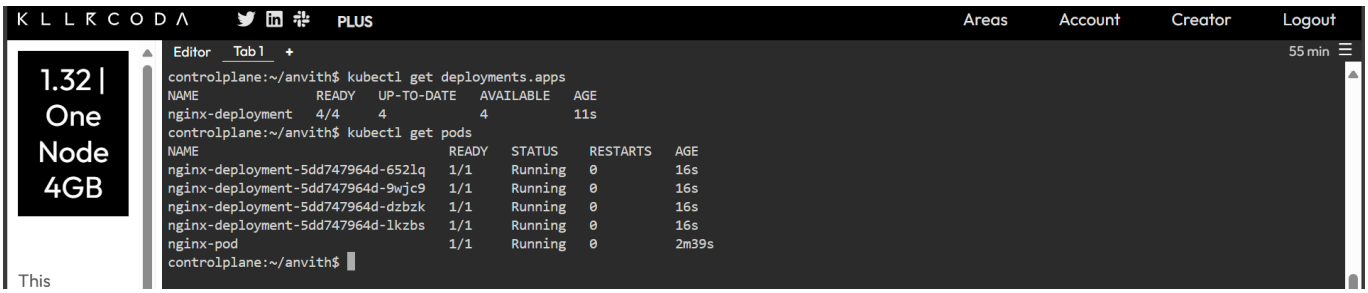
```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
```

```yaml
  replicas: 4  # Specify 4 replicas
  selector:
    matchLabels:
      app: nginx  # This selector must match the Pod template's labels
  template:
    metadata:
      labels:
        app: nginx  # Labels for the Pods created by this Deployment
    spec:
      containers:
      - name: nginx-container
        image: nginx:latest
        ports:
        - containerPort: 80
```

Apply and Verify:

```
kubectl get deploy
kubectl get pods
```

Screenshot:



Task 2.1: Test Self-Healing (Delete a Pod)

```
kubectl get pods
kubectl delete pod <pod-name>
kubectl get deploy
kubectl get pods
```

Screenshot:

```
controlplane:~/anvith$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
nginx-deployment-5dd747964d-652lq   1/1     Running   0          16s
nginx-deployment-5dd747964d-9wjc9   1/1     Running   0          16s
nginx-deployment-5dd747964d-dzbzk   1/1     Running   0          16s
nginx-deployment-5dd747964d-lkzbs   1/1     Running   0          16s
nginx-pod                           1/1     Running   0          2m39s
controlplane:~/anvith$ kubectl delete pod nginx-deployment-5dd747964d-652lq
pod "nginx-deployment-5dd747964d-652lq" deleted
controlplane:~/anvith$ kubectl get deployments.apps
NAME               READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment   4/4     4            4           60s
controlplane:~/anvith$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
nginx-deployment-5dd747964d-9wjc9   1/1     Running   0          62s
nginx-deployment-5dd747964d-dzbzk   1/1     Running   0          62s
nginx-deployment-5dd747964d-gd24g   1/1     Running   0          6s
nginx-deployment-5dd747964d-lkzbs   1/1     Running   0          62s
nginx-pod                           1/1     Running   0          3m25s
controlplane:~/anvith$
```

Task 3.1: Create a ClusterIP Service

nginx-clusterip-service.yaml:

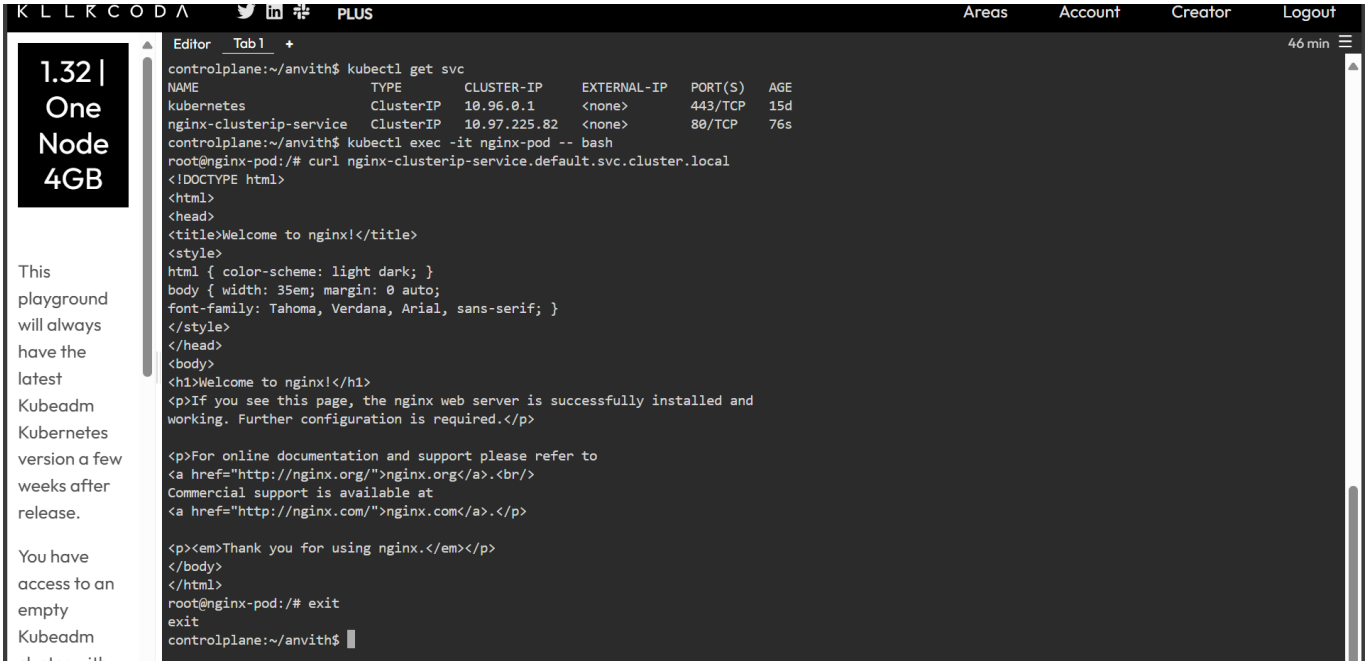
```yaml
apiVersion: v1
kind: Service
metadata:
  name: nginx-clusterip-service
spec:
  selector:
    app: nginx  # Select Pods with the label 'app: nginx'
  ports:
    - protocol: TCP
      port: 80        # Service port
      targetPort: 80  # Port on the Pods
  type: ClusterIP     # Expose the Service on a cluster-internal IP
```

Apply and Verify:

```bash
kubectl apply -f nginx-clusterip-service.yaml
kubectl get services

# Fired from inside a pod to check resolution
curl -v http://nginx-clusterip-service.default.svc.cluster.local
```

Screenshot:



Task 3.2: Create a NodePort Service

nginx-nodeport-service.yaml:

```yaml
apiVersion: v1
kind: Service
metadata:
  name: nginx-nodeport-service
spec:
  selector:
    app: nginx
  ports:
    - protocol: TCP
      port: 80
      targetPort: 80
      nodePort: 30000  # Choose a port in the range 30000-32767
  type: NodePort      # Expose the Service on each node's IP at a static port
```

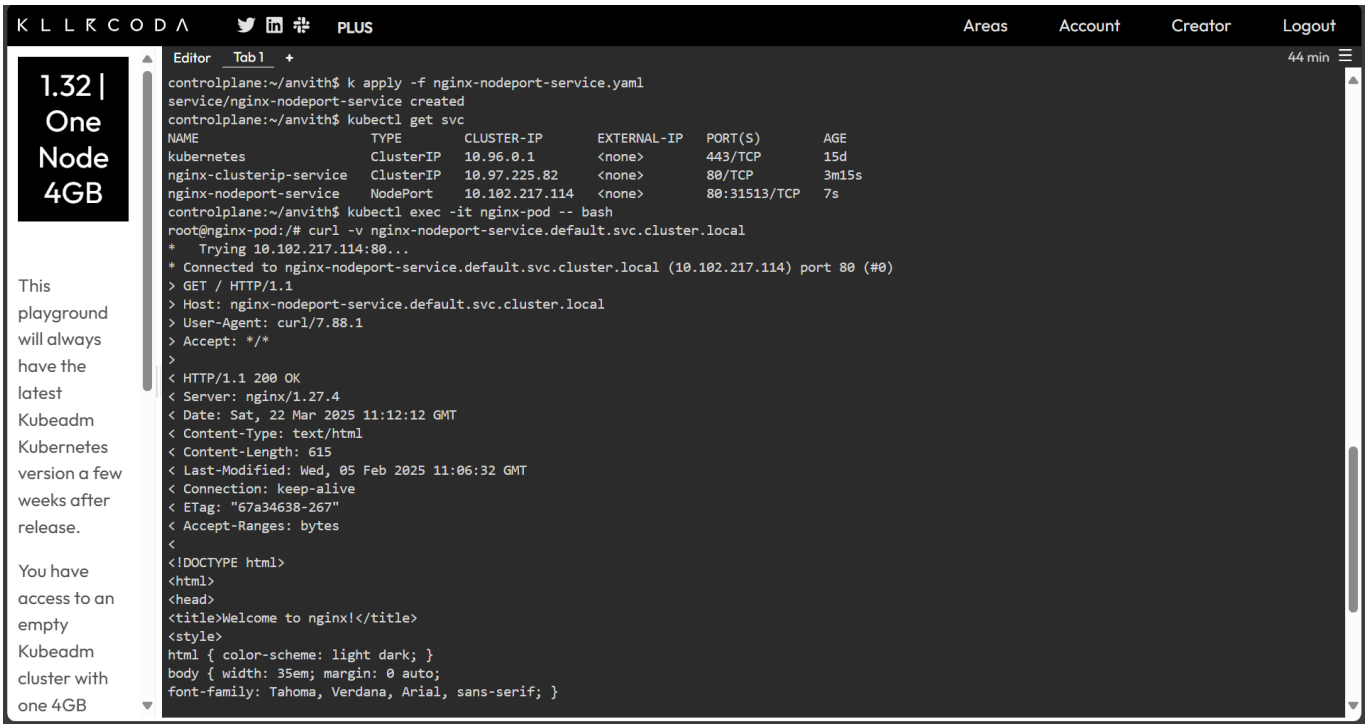
Apply and Verify:

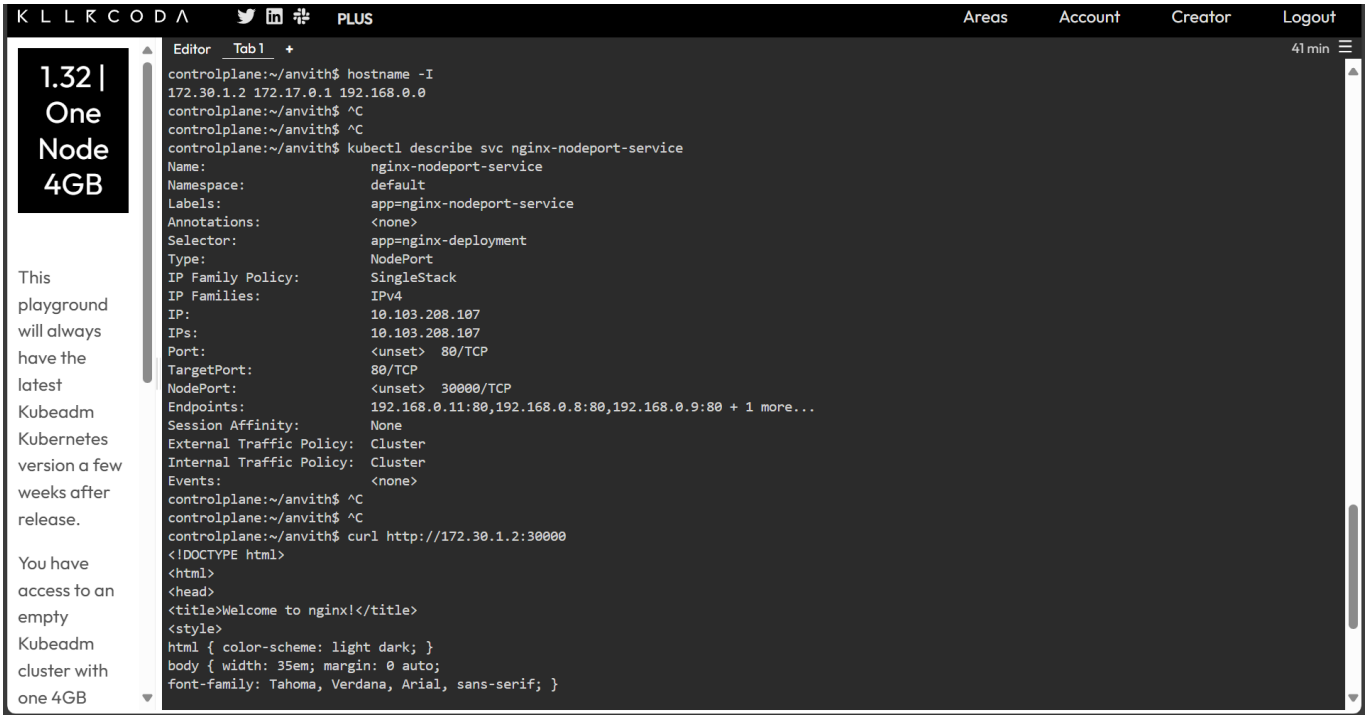
```
kubectl apply -f nginx-nodeport-service.yaml
kubectl get services

**Testing Nodeport:**
```bash
# Fired from inside a pod to check resolution
curl -v http://nginx-clusterip-service.default.svc.cluster.local

# Fired on NodeIP and nodePort
curl -v http://172.30.1.2:30000
```
```

Screenshot:





Task 4.1: Create a Persistent Volume (PV)

nginx-pv.yaml:

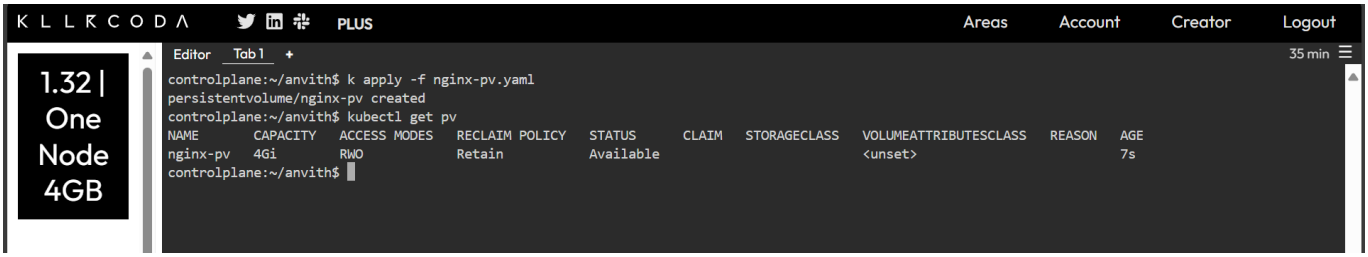
```yaml
apiVersion: v1
kind: PersistentVolume
metadata:
  name: nginx-pv
```

```
spec:
  storageClassName: manual
  capacity:
    storage: 4Gi  # Request 1 GB of storage
  accessModes:
    - ReadWriteOnce  # The volume can be mounted as read-write by a single node
  hostPath:
    path: /mnt/data # This is for testing on a single-node cluster (like kind).
In a real cluster, use a proper storage provider.
  persistentVolumeReclaimPolicy: Retain  # Keep the volume even if the PVC is
deleted
```

Apply and Verify:

```
kubectl apply -f nginx-pv.yaml
kubectl get pv
```

Screenshot:



Task 4.2: Create a Persistent Volume Claim (PVC)

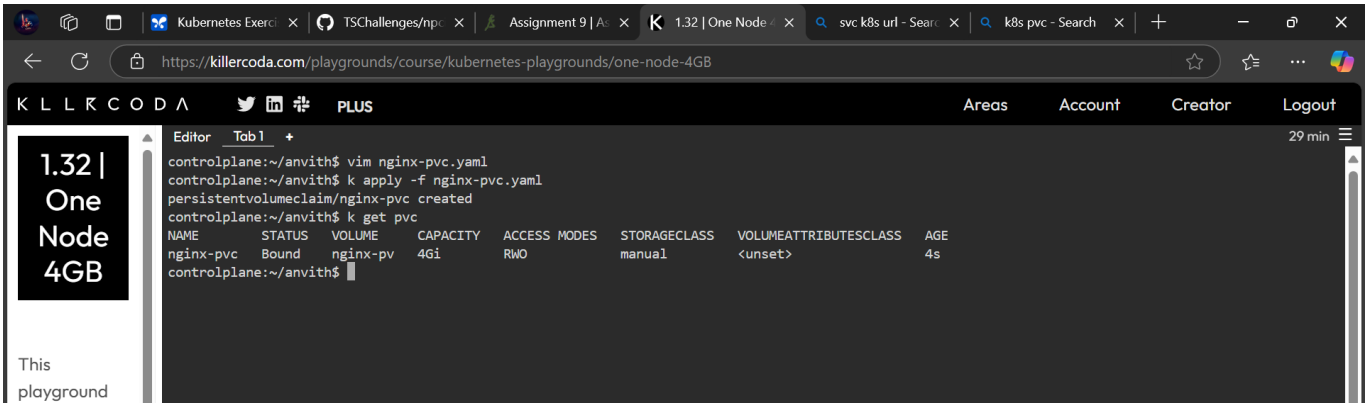
nginx-pvc.yaml:

```
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  name: nginx-pvc
spec:
  storageClassName: manual
  accessModes:
    - ReadWriteOnce  # Must match the PV's access modes
  resources:
    requests:
      storage: 500Mi  # Request 500 MB of storage (less than or equal to the PV's
capacity)
```

Apply and Verify:

```
kubectl apply -f nginx-pvc.yaml
kubectl get pvc
```

Screenshot:



Task 5: Assign PVC to a Pod

nginx-pvc-pod.yaml:

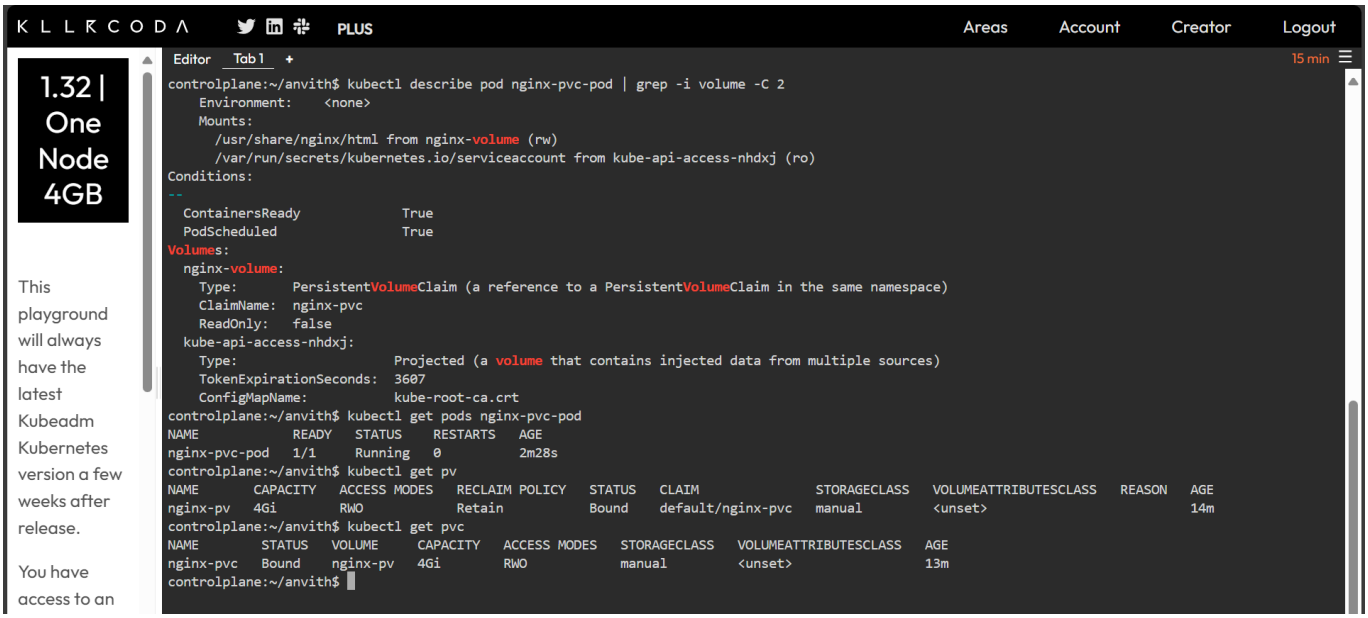
```yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pvc-pod
spec:
  containers:
  - name: nginx-container
    image: nginx:latest
    ports:
    - containerPort: 80
    volumeMounts:
    - name: nginx-volume  # Name of the volume
      mountPath: /usr/share/nginx/html  # Mount point inside the container
(standard Nginx data directory)
  volumes:
  - name: nginx-volume  # Name of the volume (must match volumeMounts.name)
    persistentVolumeClaim:
      claimName: nginx-pvc  # Reference the PVC we created
```

Apply and Verify:

```bash
kubectl apply -f nginx-pvc-pod.yaml
kubectl get pods nginx-pvc-pod

# Verify the mount point
kubectl describe pod nginx-pvc-pod | grep -i volume -C 2
kubectl get pv
kubectl get pvc
```

Screenshot:


KLLRCODA
PLUS
Areas
Account
Creator
Logout
1.32 | One Node 4GB
This playground will always have the latest Kubeadm Kubernetes version a few weeks after release.
You have access to an
Editor
Tab 1
15 min
controlplane:~/anvith$ kubectl describe pod nginx-pvc-pod | grep -i volume -C 2
Environment: <none>
Mounts:
/usr/share/nginx/html from nginx-volume (rw)
/var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-nhdxj (ro)
Conditions:
--
ContainersReady True
PodScheduled True
Volumes:
nginx-volume:
Type: PersistentVolumeClaim (a reference to a PersistentVolumeClaim in the same namespace)
ClaimName: nginx-pvc
ReadOnly: false
kube-api-access-nhdxj:
Type: Projected (a volume that contains injected data from multiple sources)
TokenExpirationSeconds: 3607
ConfigMapName: kube-root-ca.crt
controlplane:~/anvith$ kubectl get pods nginx-pvc-pod
NAME READY STATUS RESTARTS AGE
nginx-pvc-pod 1/1 Running 0 2m28s
controlplane:~/anvith$ kubectl get pv
NAME CAPACITY ACCESS MODES RECLAIM POLICY STATUS CLAIM STORAGECLASS VOLUMEATTRIBUTESCLASS REASON AGE
nginx-pv 4Gi RWO Retain Bound default/nginx-pvc manual <unset> 14m
controlplane:~/anvith$ kubectl get pvc
NAME STATUS VOLUME CAPACITY ACCESS MODES STORAGECLASS VOLUMEATTRIBUTESCLASS AGE
nginx-pvc Bound nginx-pv 4Gi RWO manual <unset> 13m
controlplane:~/anvith$