Lesson 04 Demo 14

Configuring Horizontal Pod Autoscaling (HPA)

Objective: To create and configure horizontal pod autoscaling to optimize performance and implement efficient resource utilization

Tools required: kubeadm, kubectl, kubelet, and containerd

Prerequisites: A Kubernetes cluster should already be set up (refer to the steps provided in Lesson 02, Demo 01 for guidance).

Steps to be followed:

1. Create HPA in the master node
2. Check the deployment
3. Verify the HPA

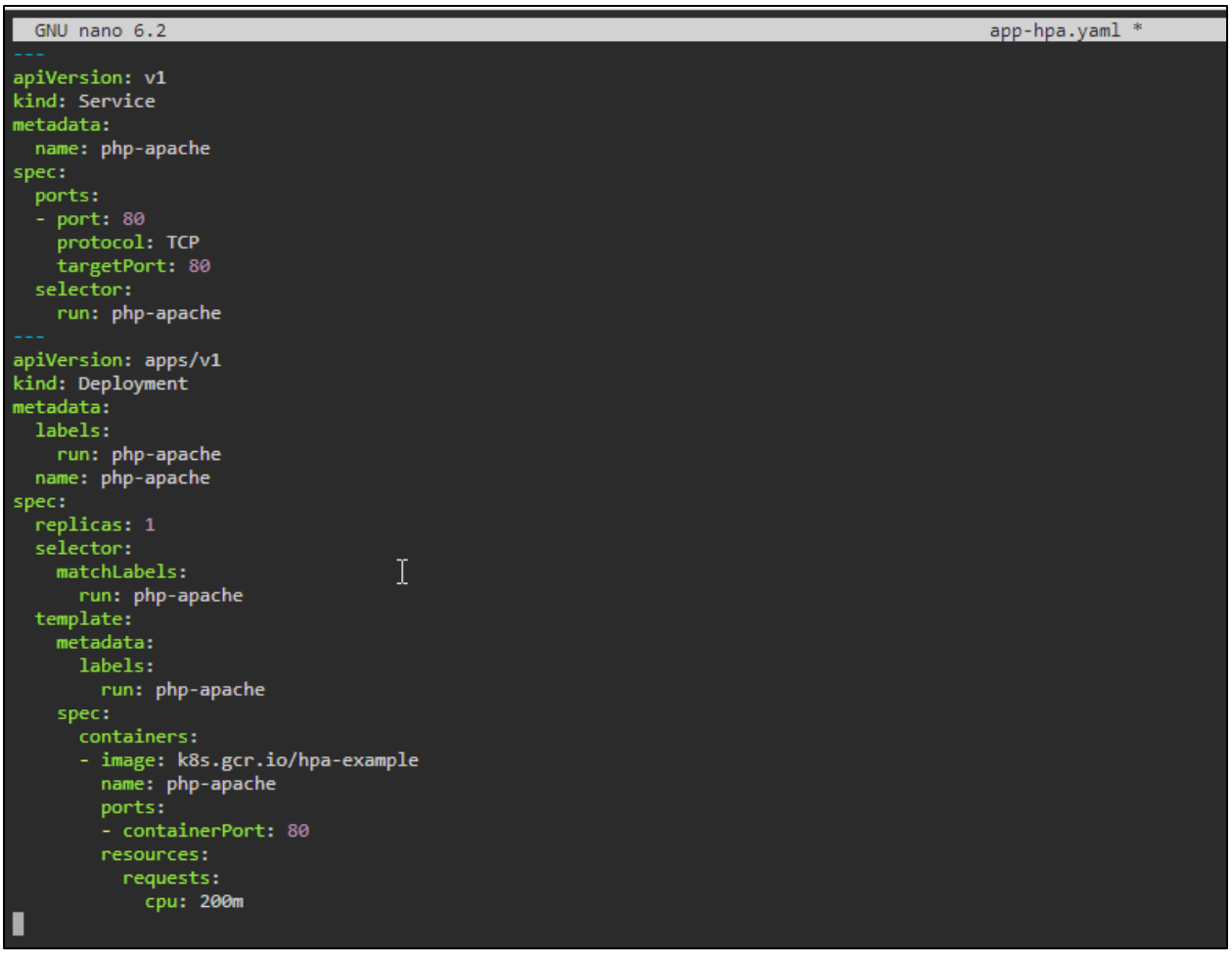
Step 1: Create HPA in the master node

1.1 On the master node, enter the **nano app-hpa.yaml** command to create a YAML file

1.2 Copy the following code in the YAML file:

```
apiVersion: v1
kind: Service
metadata:
  name: php-apache
spec:
```

```
  ports:
  - port: 80
    protocol: TCP
    targetPort: 80
  selector:
    run: php-apache
---
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    run: php-apache
  name: php-apache
spec:
  replicas: 1
  selector:
    matchLabels:
      run: php-apache
  template:
    metadata:
      labels:
        run: php-apache
    spec:
      containers:
      - image: k8s.gcr.io/hpa-example
        name: php-apache
        ports:
        - containerPort: 80
        resources:
          requests:
            cpu: 200m
```



```
  GNU nano 6.2                                                app-hpa.yaml *
---
apiVersion: v1
kind: Service
metadata:
  name: php-apache
spec:
  ports:
  - port: 80
    protocol: TCP
    targetPort: 80
  selector:
    run: php-apache
---
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    run: php-apache
  name: php-apache
spec:
  replicas: 1
  selector:
    matchLabels:
      run: php-apache
  template:
    metadata:
      labels:
        run: php-apache
    spec:
      containers:
      - image: k8s.gcr.io/hpa-example
        name: php-apache
        ports:
        - containerPort: 80
        resources:
          requests:
            cpu: 200m
```

Step 2: Check the deployment

2.1 Create the HPA by entering the following command:
kubectl create -f app-hpa.yaml

```
labsuser@master:~$ kubectl create -f app-hpa.yaml
service/php-apache created
deployment.apps/php-apache created
labsuser@master:~$
```

2.2 Verify the pod status by entering the following command:
kubectl get pods

```
labsuser@master:~$ kubectl get pods
NAME                          READY   STATUS    RESTARTS      AGE
frontend-6xkgb                1/1     Running   1 (10m ago)   23m
frontend-7q6qg                1/1     Running   1 (10m ago)   23m
frontend-bltgs                1/1     Running   1 (10m ago)   23m
php-apache-5f9f45d488-fg591   1/1     Running   0             26s
```

2.3 Check the HPA deployment by entering the following command:
kubectl get deployment

```
labsuser@master:~$ kubectl get deployment
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
php-apache   1/1     1            1           64s
labsuser@master:~$
```

2.4 Run the following command to get the SVC:
kubectl get svc

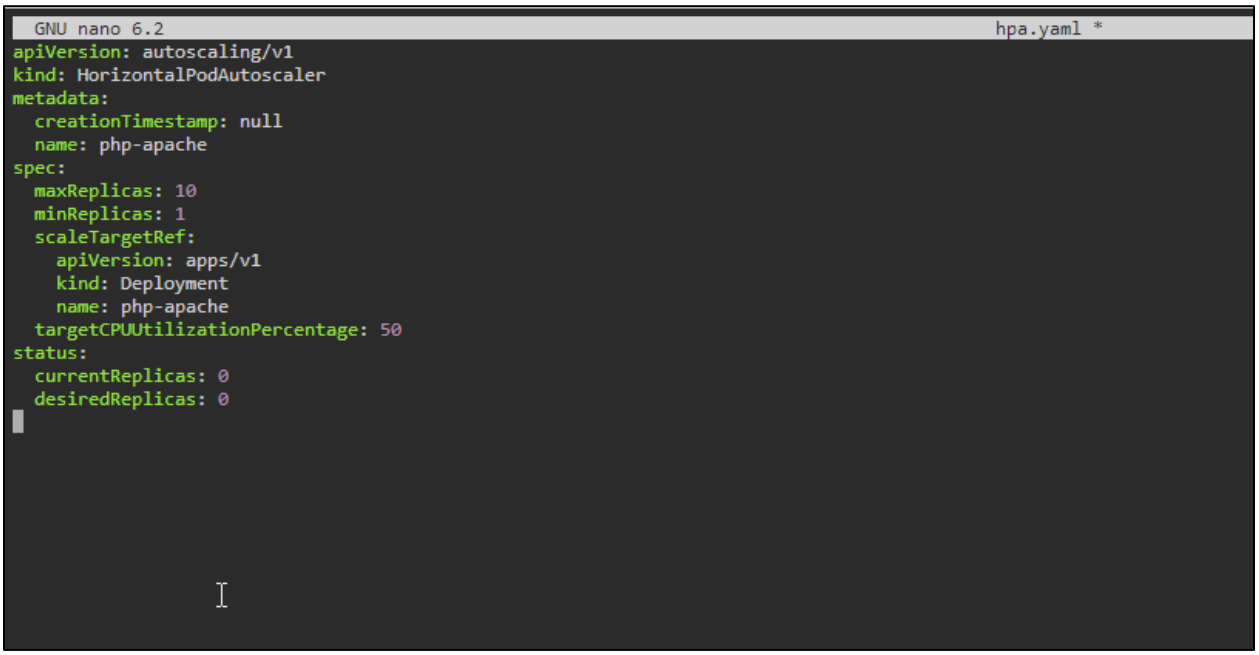
```
labsuser@master:~$ kubectl get svc
NAME         TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)   AGE
kubernetes   ClusterIP   10.96.0.1      <none>        443/TCP   133m
php-apache   ClusterIP   10.96.172.52   <none>        80/TCP    84s
labsuser@master:~$
```

2.5 Run the **nano hpa.yaml** command to create a YAML file

```
labsuser@master:~$ nano hpa.yaml
```

2.6 Copy the following code in the YAML file:

```
apiVersion: autoscaling/v1
kind: HorizontalPodAutoscaler
metadata:
  creationTimestamp: null
  name: php-apache
spec:
  maxReplicas: 10
  minReplicas: 1
  scaleTargetRef:
    apiVersion: apps/v1
    kind: Deployment
    name: php-apache
  targetCPUUtilizationPercentage: 50
status:
  currentReplicas: 0
  desiredReplicas: 0
```



2.7 Run the following command to create the HPA:
kubectl create -f hpa.yaml

```
labsuser@master:~$ kubectl create -f hpa.yaml
horizontalpodautoscaler.autoscaling/php-apache created
labsuser@master:~$
```

Step 3: Verify the HPA

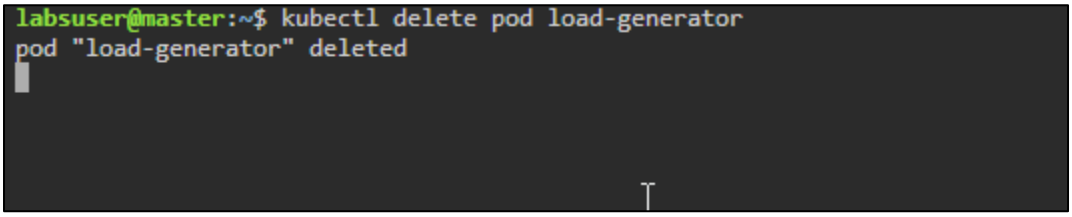
3.1 Run the following command to verify the HPA:
kubectl get hpa

```
labsuser@master:~$ kubectl get hpa
NAME         REFERENCE                TARGETS   MINPODS   MAXPODS   REPLICAS   AGE
php-apache   Deployment/php-apache   0%/50%    1         10        1          29s
labsuser@master:~$
```

3.2 Run the following command to create a pod load generator:
kubectl run load-generator --image=busybox -- /bin/sh -c "while sleep 0.01; do wget -q -O- http://php-apache; done"

```
labsuser@master:~$ kubectl run load-generator --image=busybox -- /bin/sh -c "while sleep 0.01; do wget -q -O- http://php-apache; done"
pod/load-generator created
labsuser@master:~$
```

3.3 Run the following command to delete the pod:
kubectl delete pod load-generator



The pod has been successfully deleted.

By following these steps, you have successfully created and configured the horizontal pod autoscaling.