Lab16 – Troubleshooting an issue with Control Plane

In this exercise, you will learn how to troubleshooting the underlying issue of a Deployment not being able to schedule its Pods. The cluster will contain of a single control plane node named `kube-control-plane`, and one worker node named `kube-node1`.

1. Delete all objects in default namespace, then lanch `problem-setup.sh script`to create the problem.

```
brahim@Training:~/lab16-troubleshooting-control-plane$ scp problem-setup.sh vagrant@192.168.56.10:~/
vagrant@192.168.56.10's password:
problem-setup.sh                                                                              100%  741     1.3MB/s   00:00
brahim@Training:~/lab16-troubleshooting-control-plane$ ssh vagrant@192.168.56.10
vagrant@192.168.56.10's password:
Last login: Fri Mar  8 20:44:19 2024 from 192.168.56.1
vagrant@kube-control-plane:~$ ./problem-setup.sh
deployment.apps/deploy created
vagrant@kube-control-plane:~$
vagrant@kube-control-plane:~$
```

2. Check the status of the Deployment named `deploy` and its Pods. How many Pods have been scheduled?

```
vagrant@kube-control-plane:~$
logout
Connection to 192.168.56.10 closed.
brahim@Training:~/lab16-troubleshooting-control-plane$ kubectl get all -owide
NAME                          READY   STATUS    RESTARTS   AGE     IP       NODE     NOMINATED NODE   READINESS GATES
pod/deploy-7df57ccbd-9kbmw    0/1     Pending   0          6m32s   <none>   <none>   <none>           <none>
pod/deploy-7df57ccbd-k27ng    0/1     Pending   0          6m32s   <none>   <none>   <none>           <none>
pod/deploy-7df57ccbd-rm9x5    0/1     Pending   0          6m32s   <none>   <none>   <none>           <none>

NAME                 TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE   SELECTOR
service/kubernetes   ClusterIP   10.96.0.1    <none>        443/TCP   26m   <none>

NAME                     READY   UP-TO-DATE   AVAILABLE   AGE     CONTAINERS   IMAGES   SELECTOR
deployment.apps/deploy   0/3     3            0           6m32s   nginx        nginx    app=deploy

NAME                                DESIRED   CURRENT   READY   AGE     CONTAINERS   IMAGES   SELECTOR
replicaset.apps/deploy-7df57ccbd    3         3         0       6m32s   nginx        nginx    app=deploy,pod-template-hash=7df57ccbd
brahim@Training:~/lab16-troubleshooting-control-plane$
```

3. Check the events of any of the Pods.

```
brahim@Training:~/lab16-troubleshooting-control-plane$ kubectl get pods
NAME                      READY   STATUS    RESTARTS   AGE
deploy-7df57ccbd-9kbmw    0/1     Pending   0          6m54s
deploy-7df57ccbd-k27ng    0/1     Pending   0          6m54s
deploy-7df57ccbd-rm9x5    0/1     Pending   0          6m54s
brahim@Training:~/lab16-troubleshooting-control-plane$
brahim@Training:~/lab16-troubleshooting-control-plane$ kubectl describe pod deploy-7df57ccbd-9kbmw
Name:             deploy-7df57ccbd-9kbmw
Namespace:        default
Priority:         0
Service Account:  default
Node:             <none>
Labels:           app=deploy
                  pod-template-hash=7df57ccbd
Annotations:      <none>
Status:           Pending
IP:
IPs:              <none>
```

...

```
    DownwardAPI:             true
QoS Class:                   BestEffort
Node-Selectors:              <none>
Tolerations:                 node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                             node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:                      <none>
brahim@Training:~/lab16-troubleshooting-control-plane$
```

4. Check the status of the Pods in the namespace `kube-system`. Can you identify an issue?

   The Pod running the Kubernetes scheduler reports an issue indicated by the "CrashLoopBackOff" status. Apparently, something's wrong with it. The events of the Pod only confirm that it has been restarted multiple times.

```
brahim@Training:~/lab16-troubleshooting-control-plane$ kubectl get pods -n kube-system
NAME                                      READY   STATUS             RESTARTS         AGE
coredns-76f75df574-96rwf                  1/1     Running            5 (143m ago)     9d
coredns-76f75df574-w94c8                  1/1     Running            6 (143m ago)     10d
etcd-kube-control-plane                   1/1     Running            5 (143m ago)     10d
kube-apiserver-kube-control-plane         1/1     Running            8 (143m ago)     10d
kube-controller-manager-kube-control-plane 1/1    Running            9 (143m ago)     10d
kube-proxy-64d5z                          1/1     Running            6 (141m ago)     10d
kube-proxy-75wmr                          1/1     Running            7 (143m ago)     10d
kube-proxy-fqnlr                          1/1     Running            6 (139m ago)     10d
kube-scheduler-kube-control-plane         0/1     CrashLoopBackOff   6 (3m11s ago)    9m24s
weave-net-hr6wb                           2/2     Running            13 (141m ago)    10d
weave-net-mzmln                           2/2     Running            12 (139m ago)    10d
weave-net-pxp9z                           2/2     Running            18 (143m ago)    10d
brahim@Training:~/lab16-troubleshooting-control-plane$
```

```
brahim@Training:~/lab16-troubleshooting-control-plane$ kubectl describe pod kube-scheduler-kube-control-plane -n kube-system
Name:                 kube-scheduler-kube-control-plane
Namespace:            kube-system
Priority:             2000001000
Priority Class Name:  system-node-critical
Node:                 kube-control-plane/192.168.56.10
Start Time:           Fri, 08 Mar 2024 19:30:40 +0100
Labels:               component=kube-scheduler
```

…

The logs of the Pod are more helpful. It looks like its configuration points to a file or directory that doesn't exist.

```
brahim@Training:~/lab16-troubleshooting-control-plane$ kubectl logs kube-scheduler-kube-control-plane -n kube-system
I0308 20:55:55.438372       1 serving.go:380] Generated self-signed cert in-memory
E0308 20:55:55.935005       1 run.go:74] "command failed" err="failed to get delegated authentication kubeconfig: failed to get delegated auth
entication kubeconfig: stat /etc/kubernetes/scheduler-authentication.conf: no such file or directory"
brahim@Training:~/lab16-troubleshooting-control-plane$
brahim@Training:~/lab16-troubleshooting-control-plane$
```

5. Fix the issue so that the Deployment can schedule all three replicas.

   Check the file `/etc/kubernetes/scheduler-authentication.conf`. It does exist but there's a file which sounds right: `/etc/kubernetes/scheduler.conf`. Let's point to it by changing the configuration of the scheduler in `/etc/kubernetes/manifests/kube-scheduler.yaml`. Change the value of the command line option `--authentication-kubeconfig`.

```
brahim@Training:~/lab16-troubleshooting-control-plane$ ssh vagrant@192.168.56.10
vagrant@192.168.56.10's password:
Last login: Fri Mar  8 20:48:44 2024 from 10.0.2.2
ls vagrant@kube-control-plane:~$ /etc/kubernetes/scheduler-authentication.confonf
ls: cannot access '/etc/kubernetes/scheduler-authentication.conf': No such file or directory
vagrant@kube-control-plane:~$
vagrant@kube-control-plane:~$ ls /etc/kubernetes/
admin.conf  controller-manager.conf  kubelet.conf  manifests  pki  scheduler.conf  super-admin.conf  tmp
vagrant@kube-control-plane:~$
vagrant@kube-control-plane:~$ sudo vim /etc/kubernetes/manifests/kube-scheduler.yaml
vagrant@kube-control-plane:~$
vagrant@kube-control-plane:~$
```

```
apiVersion: v1
kind: Pod
metadata:
  creationTimestamp: null
  labels:
    component: kube-scheduler
    tier: control-plane
  name: kube-scheduler
  namespace: kube-system
spec:
  containers:
  - command:
    - kube-scheduler
#    - --authentication-kubeconfig=/etc/kubernetes/scheduler-authentication.conf
    - --authentication-kubeconfig=/etc/kubernetes/scheduler.conf
    - --authorization-kubeconfig=/etc/kubernetes/scheduler.conf
    - --bind-address=127.0.0.1
```

After saving the change, the Pod `kube-scheduler-kube-control-plane` will be restarted.

```
vagrant@kube-control-plane:~$
logout
Connection to 192.168.56.10 closed.
brahim@Training:~/lab16-troubleshooting-control-plane$ kubectl get pods -n kube-syste
NAME                                      READY   STATUS    RESTARTS         AGE
coredns-76f75df574-96rwf                  1/1     Running   5 (150m ago)     9d
coredns-76f75df574-w94c8                  1/1     Running   6 (150m ago)     10d
etcd-kube-control-plane                   1/1     Running   5 (150m ago)     10d
kube-apiserver-kube-control-plane         1/1     Running   8 (150m ago)     10d
kube-controller-manager-kube-control-plane   1/1     Running   9 (150m ago)     10d
kube-proxy-64d5z                          1/1     Running   6 (148m ago)     10d
kube-proxy-75wmr                          1/1     Running   7 (150m ago)     10d
kube-proxy-fqnlr                          1/1     Running   6 (147m ago)     10d
kube-scheduler-kube-control-plane         1/1     Running   0                82s
weave-net-hr6wb                           2/2     Running   13 (148m ago)    10d
weave-net-mzmln                           2/2     Running   12 (147m ago)    10d
weave-net-pxp9z                           2/2     Running   18 (150m ago)    10d
brahim@Training:~/lab16-troubleshooting-control-plane$
brahim@Training:~/lab16-troubleshooting-control-plane$ kubectl get pods
NAME                      READY   STATUS    RESTARTS   AGE
deploy-7df57ccbd-9kbmw    1/1     Running   0          16m
deploy-7df57ccbd-k27ng    1/1     Running   0          16m
deploy-7df57ccbd-rm9x5    1/1     Running   0          16m
brahim@Training:~/lab16-troubleshooting-control-plane$
brahim@Training:~/lab16-troubleshooting-control-plane$
```