

## Interview Assignment For DevOps Engineer

- **Cluster MariaDB – Kubernetes**

Requirements:

- Docker CE
- Minikube ou Microk8s
- Linux Ubuntu 20.04 ( Preferably higher than version 18 )
- GitHub ( [https://github.com/wagnersoftwareengineer/Cluster\\_MariaDB\\_Kubernetes](https://github.com/wagnersoftwareengineer/Cluster_MariaDB_Kubernetes) )
- VsCode

I initially installed the softwares , below evidence about Microk8s or Minikube:

```
wagner@Wagner: ~  
wagner@Wagner:~$ sudo chown -f -R $USER ~/.kube  
wagner@Wagner:~$ su - $USER  
Password:  
wagner@Wagner:~$ microk8s status --wait-ready  
microk8s is running  
high-availability: no  
datastore master nodes: 127.0.0.1:19001  
datastore standby nodes: none  
addons:  
enabled:  
  dns                # (core) CoreDNS  
  ha-cluster         # (core) Configure high availability on the current node  
  helm               # (core) Helm - the package manager for Kubernetes  
  helm3              # (core) Helm 3 - the package manager for Kubernetes  
disabled:  
  cert-manager       # (core) Cloud native certificate management  
  cis-hardening       # (core) Apply CIS K8s hardening  
  community           # (core) The community addons repository  
  dashboard           # (core) The Kubernetes dashboard  
  gpu                 # (core) Automatic enablement of Nvidia CUDA  
  host-access         # (core) Allow Pods connecting to Host services smoothly  
  hostpath-storage    # (core) Storage class; allocates storage from host directory  
  ingress             # (core) Ingress controller for external access  
  kube-ovn            # (core) An advanced network fabric for Kubernetes  
  mayastor            # (core) OpenEBS MayaStor  
  metallb             # (core) Loadbalancer for your Kubernetes cluster  
  metrics-server      # (core) K8s Metrics Server for API access to service metrics  
  minio               # (core) MinIO object storage  
  observability       # (core) A lightweight observability stack for logs, traces and metrics  
  prometheus          # (core) Prometheus operator for monitoring and logging  
  rbac                # (core) Role-Based Access Control for authorisation  
  registry            # (core) Private image registry exposed on localhost:32000  
  rook-ceph           # (core) Distributed Ceph storage using Rook  
  storage             # (core) Alias to hostpath-storage add-on, deprecated  
wagner@Wagner:~$ |
```

The screenshot shows the VS Code editor with the file `mariadb-statefulset.yaml` open. The file content is as follows:

```
1 apiVersion: apps/v1  
2 kind: StatefulSet  
3 metadata:  
4   name: mariadb-cluster  
5 spec:  
6   serviceName: mariadb  
7   replicas: 3  
8   selector:  
9     matchLabels:  
10    app: mariadb  
11   template:
```

The terminal output at the bottom shows the installation steps:

```
Installing kubectl...  
Installing Helm...  
Installing Minikube...  
Installing kubectl...  
Installing Helm...  
Installing Minikube...  
Already got kubectl...  
Installing Helm...  
Installing Minikube...  
Done  
Done  
Done
```

Then, i create new files about MariaDB configurations inside Yaml and by terminal we can use some commands to start. Attention, you need stay inside the folder to run commands.

```
microk8s kubectl apply -f mariadb-statefulset.yaml
microk8s kubectl apply -f mariadb-service.yaml
```

Here , created MariaDB Server :

```
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl apply -f mariadb-statefulset.yaml
statefulset.apps/mariadb-cluster created
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl apply -f mariadb-service.yaml
service/mariadb created
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ |
```

A change was made to Yaml to expose the IP for external access, so I modified it to run again.

Command delete :

```
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl delete statefulset mariadb-cluster
statefulset.apps "mariadb-cluster" deleted
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl get services
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
kubernetes   ClusterIP   10.152.183.1 <none>        443/TCP    26m
mariadb       ClusterIP   None         <none>        3306/TCP    6m
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl delete service mariadb
service "mariadb" deleted
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl get services
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
kubernetes   ClusterIP   10.152.183.1 <none>        443/TCP    27m
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ |
```

Server created:

```
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl get services
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
kubernetes   ClusterIP   10.152.183.1 <none>        443/TCP    35m
mariadb       NodePort    10.152.183.248 <none>        3306:30884/TCP 7s
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ |
```

Next page I share the Yaml:

```
EXPLORER
CLUSTER_MARIADB_KUBERNETES
  mariadb-service.yaml
  mariadb-statefulset.yaml

mariadb-service.yaml > {} spec > type
3 metadata:
4   name: mariadb
5 spec:
6   selector:
7     app: mariadb
8   ports:
9     - protocol: TCP
10       port: 3306
11       targetPort: 3306
12   type: NodePort
```

```
mariadb-statefulset.yaml > {} spec > [ ] volumeClaimTemplates > {} 0 > {} metadata
io.k8s.api.apps.v1.StatefulSet (v1@statefulset.json)
1 apiVersion: apps/v1
2 kind: StatefulSet
3 metadata:
4   name: mariadb-cluster
5 spec:
6   serviceName: mariadb
7   replicas: 3
8   selector:
9     matchLabels:
10       app: mariadb
11   template:
12     metadata:
13       labels:
14         app: mariadb
15     spec:
16       containers:
17         - name: mariadb
18           image: mariadb:latest
19           ports:
20             - containerPort: 3306
21           env:
22             - name: MYSQL_ROOT_PASSWORD
23               value: "master"
24             - name: MYSQL_DATABASE
25               value: "DevopsDatabase"
26           volumeMounts:
27             - name: mariadb-storage
28               mountPath: /var/lib/mysql
29   volumeClaimTemplates:
30     - metadata:
31       name: mariadb-storage
32     spec:
33       accessModes: [ "ReadWriteOnce" ]
34       resources:
35         requests:
36           storage: 10Gi
37
```

To test access :

- 1 - List the created pods
- 2 - Access via kubectl exec command
- 3 - After that, I can use the MariaDB client, which is MySQL
- 4 - Now connected, I can run any command on the MariaDB Database Client that was applied in Yaml.

**Note:** I installed the Client to connect to the Bank. In my case the "DevOpsDatabase" database.

```
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl delete service mariadb
service "mariadb" deleted
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl delete statefulset mariadb-cluster
statefulset.apps "mariadb-cluster" deleted
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl apply -f mariadb-statefulset.yaml
statefulset.apps/mariadb-cluster created
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl apply -f mariadb-service.yaml
service/mariadb created
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
mariadb-cluster-0  0/1     ContainerCreating   0          16s
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
mariadb-cluster-0  0/1     ContainerCreating   0          23s
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl get node
NAME    STATUS   ROLES    AGE   VERSION
wagner  Ready    <none>   59m   v1.28.3
wagner@Wagner:/mnt/c/Users/Wagner Santos/Documents/Cluster_MariaDB_Kubernetes$ microk8s kubectl exec -it mariadb-cluster-0 -- /bin/bash
root@mariadb-cluster-0:/# mysql -u root -p
```

```
root@mariadb-cluster-0:/# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 3
Server version: 11.1.2-MariaDB-1:11.1.2+maria-ubu2204 mariadb.org binary distribution

Copyright (c) 2000, 2023, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> |
```

```
mysql>
mysql>
mysql>
mysql> SHOW DATABASES;
+-----+
| Database |
+-----+
| DevopsDatabase |
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.00 sec)

mysql>
mysql>
mysql>
mysql>
```