

# ASSIGNMENT 3

## Exercise 5: Create and Use a Secret

**Objective:** Store sensitive data using Secrets and use it in a pod

**Step 1: Create a Secret for database credentials:**

```
master@master-vm:~$ kubectl create secret generic db-secret --from-literal=DB_USER=admin
secret/db-secret created
```

**Step 2: Verify the Secret:**

```
master@master-vm:~$ kubectl create secret generic db-secret \
> --from-literal=DB_USER=myusername \
> --from-literal=DB_PASS=mypassword \
> --dry-run=client -o yaml | kubectl apply -f -
Warning: resource secrets/db-secret is missing the kubect.kubernetes.io/last-applied-configuration annotation which is required by
kubectl apply. kubectl apply should only be used on resources created declaratively by either kubectl create --save-config or kubectl
apply. The missing annotation will be patched automatically.
secret/db-secret configured
```

```
master@master-vm:~$ kubectl describe secret db-secret
Name:         db-secret
Namespace:    default
Labels:       <none>
Annotations:  <none>

Type: Opaque

Data
====
DB_PASS:  10 bytes
DB_USER:  10 bytes
```

**Step 3: Create a Pod that uses the Secret (nginx-secret-pod.yaml):**

```
master@master-vm:~$ nano nginx-secret-pod.yaml
```

```

GNU nano 4.8 nginx-s
apiVersion: v1
kind: Pod
metadata:
  name: nginx-secret-pod
spec:
  containers:
    - name: nginx
      image: nginx
      env:
        - name: DB_USER
          valueFrom:
            secretKeyRef:
              name: db-secret
              key: DB_USER
        - name: DB_PASS
          valueFrom:
            secretKeyRef:
              name: db-secret
              key: DB_PASS

```

**Step 4: Deploy the pod:**

```

master@master-vm:~$ kubectl apply -f nginx-secret-pod.yaml
pod/nginx-secret-pod unchanged

```

**Step 5: Check the pod and logs:**

```

master@master-vm:~$ kubectl exec -it nginx-secret-pod -- printenv
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
HOSTNAME=nginx-secret-pod
TERM=xterm
DB_USER=myusername
DB_PASS=mypassword
KUBERNETES_SERVICE_PORT_HTTPS=443
KUBERNETES_PORT=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP_PROTO=tcp
KUBERNETES_PORT_443_TCP_PORT=443
KUBERNETES_PORT_443_TCP_ADDR=10.96.0.1
KUBERNETES_SERVICE_HOST=10.96.0.1
KUBERNETES_SERVICE_PORT=443
NGINX_VERSION=1.27.4
NJS_VERSION=0.8.9
NJS_RELEASE=1~bookworm
PKG_RELEASE=1~bookworm
DYNPKG_RELEASE=1~bookworm
HOME=/root

```

```

master@master-vm:~$ kubectl get pods
NAME                READY   STATUS    RESTARTS   AGE
nginx-secret-pod    1/1     Running   0           9m43s
master@master-vm:~$ kubectl logs nginx-secret-pod
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Sourcing /docker-entrypoint.d/15-local-resolvers.envsh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2025/03/13 12:01:14 [notice] 1#1: using the "epoll" event method
2025/03/13 12:01:14 [notice] 1#1: nginx/1.27.4
2025/03/13 12:01:14 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2025/03/13 12:01:14 [notice] 1#1: OS: Linux 5.15.0-131-generic
2025/03/13 12:01:14 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2025/03/13 12:01:14 [notice] 1#1: start worker processes
2025/03/13 12:01:14 [notice] 1#1: start worker process 29
2025/03/13 12:01:14 [notice] 1#1: start worker process 30

```

## Step 6: Delete the pod and Secret:

```

master@master-vm:~$ kubectl delete -f nginx-secret-pod.yaml
pod "nginx-secret-pod" deleted
master@master-vm:~$ kubectl delete secret db-secret
secret "db-secret" deleted
master@master-vm:~$

```

## Exercise 6: Create and Expose a Service

**Objective:** Deploy an application and expose it using a service.

### Step 1: Create a deployment:

```

master@master-vm:~$ minikube start
🐳 minikube v1.35.0 on Ubuntu 20.04
👉 Using the docker driver based on existing profile
🌟 Starting "minikube" primary control-plane node in "minikube" cluster
📡 Pulling base image v0.0.46 ...
🔄 Restarting existing docker container for "minikube" ...
🔧 Preparing Kubernetes v1.32.0 on Docker 27.4.1 ...
🔍 Verifying Kubernetes components...
   ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
🌟 Enabled addons: storage-provisioner, default-storageclass

! /usr/bin/kubectl is version 1.28.15, which may have incompatibilities with Kubernetes 1.32.0.
  ▪ Want kubectl v1.32.0? Try 'minikube kubectl -- get pods -A'
🏁 Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default

```

### Step 2: Expose the deployment using a service:

```

master@master-vm:~$ kubectl cluster-info
Kubernetes control plane is running at https://192.168.49.2:8443
CoreDNS is running at https://192.168.49.2:8443/api/v1/namespaces/kube-system/services/kube-dns:dns/proxy

To further debug and diagnose cluster problems, use 'kubectl cluster-info dump'.
master@master-vm:~$ kubectl config current-context
minikube
master@master-vm:~$ kubectl config use-context minikube
Switched to context "minikube".
master@master-vm:~$ kubectl create deployment webapp --image=nginx
deployment.apps/webapp created

```

```
master@master-vm:~$ kubectl expose deployment webapp --type=NodePort --port=80
service/webapp exposed
```

### Step 3: Get service details:

```
master@master-vm:~$ kubectl get svc webapp
```

NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
webapp	NodePort	10.102.63.54	<none>	80:30771/TCP	19s

### Step 4: Access the service (Minikube users):

```
master@master-vm:~$ minikube service webapp --url
http://192.168.49.2:30771
```

```
master@master-vm:~$ kubectl get pods
```

NAME	READY	STATUS	RESTARTS	AGE
webapp-6fddc68b96-5nwwt	1/1	Running	0	2m53s

### Step 5: Delete the service and deployment:

```
master@master-vm:~$ kubectl delete svc webapp
service "webapp" deleted
master@master-vm:~$ kubectl delete deployment webapp
deployment.apps "webapp" deleted
```