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Lesson 06 Demo 04

Creating and Using Secrets as a Volume

Objective: To create a Kubernetes secret and mount it as a volume inside a pod for enhancing security in the Kubernetes environment

Tools required: kubeadm, kubectl, kubelet, and containerd

Prerequisites: A Kubernetes cluster (refer to Demo 01 from Lesson 01 for setting up a cluster)

Steps to be followed:

1. Create a Kubernetes secret
2. Create a pod that uses the secret as a volume

Step 1: Create a Kubernetes secret

1.1 On the master node, use the following command to create a Kubernetes secret named **mysecret**:
kubectl create secret generic mysecret --from-literal='dbpass'='simplilearn'

```
labsuser@master:~$ kubectl get nodes
NAME                      STATUS   ROLES           AGE     VERSION
master.example.com        Ready    control-plane   2d22h   v1.28.2
worker-node-1.example.com Ready    <none>          2d22h   v1.28.2
worker-node-2.example.com Ready    <none>          2d22h   v1.28.2
labsuser@master:~$ kubectl create secret generic mysecret --from-literal='dbpass'='simplilearn'
secret/mysecret created
labsuser@master:~$
```

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1.2 View the created secret using the following commands:
kubectl get secrets mysecret -o yaml
kubectl get secrets

```
labsuser@master:~$ kubectl get secrets mysecret -o yaml
apiVersion: v1
data:
  dbpass: c2ltcGxpbGVhcm4=
kind: Secret
metadata:
  creationTimestamp: "2023-10-20T09:40:37Z"
  name: mysecret
  namespace: default
  resourceVersion: "16610"
  uid: 9250107c-ded1-484c-b424-1ce8811a0eed
type: Opaque
labsuser@master:~$ kubectl get secrets
NAME       TYPE     DATA   AGE
mysecret   Opaque   1      48s
```

1.3 View detailed information about a secret stored in Kubernetes by using the following command:
kubectl describe secret mysecret

```
labsuser@master:~$ kubectl get secrets
NAME       TYPE     DATA   AGE
mysecret   Opaque   1      21s
labsuser@master:~$ kubectl describe secret mysecret
Name:         mysecret
Namespace:    default
Labels:       <none>
Annotations:  <none>

Type:  Opaque

Data
====
dbpass:  11 bytes
labsuser@master:~$
```

Note: The secret stored in Kubernetes is encrypted in a human-readable format.

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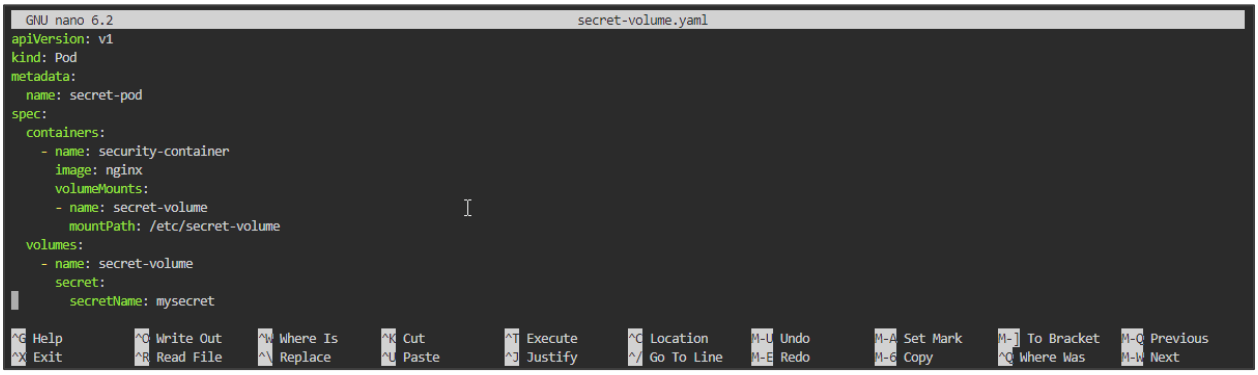
Step 2: Create a pod that uses the secret as a volume

2.1 Create a new YAML configuration file for the pod by running the following command:
nano secret-volume.yaml

```
labsuser@master:~$ nano secret-volume.yaml
```

2.2 Add the following code to the **secret-volume.yaml** file:

```
apiVersion: v1
kind: Pod
metadata:
  name: secret-pod
spec:
  containers:
    - name: security-container
      image: nginx
      volumeMounts:
      - name: secret-volume
        mountPath: /etc/secret-volume
  volumes:
    - name: secret-volume
      secret:
        secretName: mysecret
```



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2.3 Run the following command to create a pod:
kubectl apply -f secret-volume.yaml

```
labsuser@master:~$ nano secret-volume.yaml
labsuser@master:~$ kubectl apply -f secret-volume.yaml
pod/secret-pod created
labsuser@master:~$
```

2.4 View the pod using the following command:
kubectl get pods

```
labsuser@master:~$ nano secret-volume.yaml
labsuser@master:~$ kubectl apply -f secret-volume.yaml
pod/secret-pod created
labsuser@master:~$ kubectl get pods
NAME                        READY   STATUS              RESTARTS   AGE
myhttpd-5bd4687fff-c65mk    0/1     ContainerCreating   0          40m
secret-pod                  1/1     Running             0          118s
labsuser@master:~$
```

2.5 Verify if the secret is properly mounted as a volume by starting a shell session inside the pod with the following command:
kubectl exec -it secret-pod -- /bin/bash

```
labsuser@master:~$ kubectl get pods
NAME          READY   STATUS    RESTARTS       AGE
my-nginx-pod  1/1     Running   1 (113m ago)   2d22h
secret-pod    1/1     Running   0              53s
labsuser@master:~$ kubectl exec -it secret-pod -- /bin/bash
root@secret-pod:/#
```

2.6 Inside the pod, navigate to the directory named **secret-volume**, and view the secret data using the following commands:
cd /etc/secret-volume
ls

```
root@secret-pod:/# cd /etc/secret-volume
root@secret-pod:/etc/secret-volume# ls
dbpass
root@secret-pod:/etc/secret-volume#
```

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2.7 View the content of the **dbpass** file using the following command:
cat dbpass

```
root@secret-pod:/etc/secret-volume# cat dbpass
simplilearnroot@secret-pod:/etc/secret-volume#
root@secret-pod:/etc/secret-volume#
```

This command displays the decrypted secret value, Simplilearn, which was provided when the secret was created.

By following these steps, you have successfully created a Kubernetes secret and mounted it as a volume inside a pod. This helps enhance security by securely storing and providing controlled access to sensitive information or configuration data within a Kubernetes cluster.