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**Course and Batch: Btech CSE(DevOps)-B4**

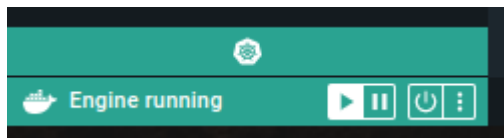
**Submitted to: Dr Hitesh Kumar Sharma**

## **Lab Exercise 7– Creating Pods in Kubernetes**

Below is a lab exercise that will help you understand and practice creating pods in Kubernetes:

### **Task 1: Start Kubernetes in Docker-Desktop**

- Start Kubernetes service in Docker-Desktop



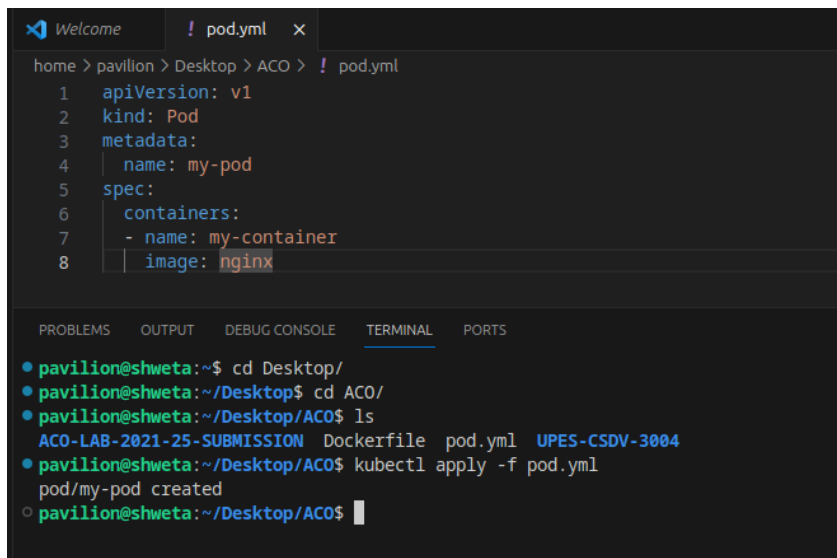
### **Task 2: Creating a Simple Pod**

- Create a simple YAML manifest file named pod.yaml to define a basic Pod in Kubernetes. An example of the file content is as follows:

```
apiVersion: v1
kind: Pod
metadata:
  name: my-pod
spec:
  containers:
  - name: my-container
    image: nginx
```

- Apply the Pod configuration using the following command:

```
kubectl apply -f pod.yaml
```



The screenshot shows a VS Code editor with a file named `pod.yaml` open. The file content is as follows:

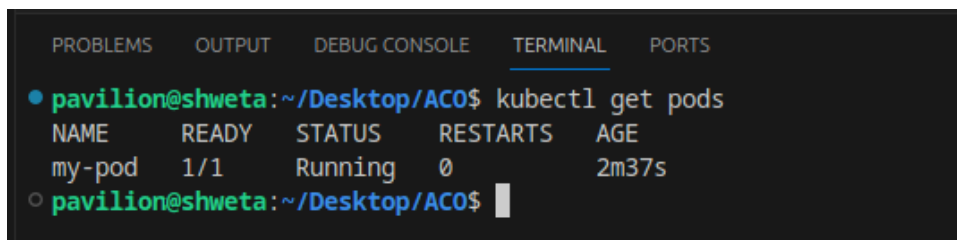
```
1 apiVersion: v1
2 kind: Pod
3 metadata:
4   name: my-pod
5 spec:
6   containers:
7   - name: my-container
8     image: nginx
```

Below the editor, the TERMINAL tab is active, showing the following commands and output:

```
pavilion@shweta:~$ cd Desktop/
pavilion@shweta:~/Desktop$ cd ACO/
pavilion@shweta:~/Desktop/ACO$ ls
ACO-LAB-2021-25-SUBMISSION  Dockerfile  pod.yaml  UPES-CSDV-3004
pavilion@shweta:~/Desktop/ACO$ kubectl apply -f pod.yaml
pod/my-pod created
pavilion@shweta:~/Desktop/ACO$
```

Check the status of the Pod using the following command:

```
kubectl get pods
```



The screenshot shows a terminal window with the following output:

```
pavilion@shweta:~/Desktop/ACO$ kubectl get pods
NAME      READY   STATUS    RESTARTS   AGE
my-pod    1/1     Running   0           2m37s
pavilion@shweta:~/Desktop/ACO$
```

### Task 3: Accessing the Pod

Access the Pod by using port forwarding to the container. Run the following command:

```
kubectl port-forward my-pod 8080:80
```

Access the Nginx server running in the Pod by opening a web browser and navigating to <http://localhost:8080>.

```
o pavilion@shweta:~/Desktop/ACO$ kubectl port-forward my-pod 8081:80
Forwarding from 127.0.0.1:8081 -> 80
Forwarding from [::1]:8081 -> 80
Handling connection for 8081
Handling connection for 8081
```



## Task 4: Exploring Pod Details

Retrieve detailed information about the Pod using the following command:

```
kubectl describe pod my-pod
```

```
pavilion@shweta:~/Desktop/AC0$ kubectl describe pod my-pod
Name:          my-pod
Namespace:     default
Priority:       0
Service Account: default
Node:          docker-desktop/192.168.65.9
Start Time:    Mon, 23 Oct 2023 11:07:59 +0530
Labels:        <none>
Annotations:   <none>
Status:        Running
IP:            10.1.0.14
IPs:
  IP: 10.1.0.14
Containers:
  my-container:
    Container ID:  docker://9a90aa75e58497a450af65fefab9e1d17978842fd60b4ebd7f25f3d8bc420f6d
    Image:         nginx
    Image ID:      docker-pullable://nginx@sha256:b4af4f8b6470febf45dc10f564551af682a802eda1743055a7dfc8332dffa595
    Port:         <none>
    Host Port:    <none>
    State:        Running
      Started:    Mon, 23 Oct 2023 11:10:21 +0530
    Ready:        True
    Restart Count: 0
    Environment:  <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-d8zz7 (ro)
Conditions:
  Type            Status
  Initialized      True
  Ready            True
  ContainersReady  True
  PodScheduled     True
Volumes:
  kube-api-access-d8zz7:
    Type:          Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:  kube-root-ca.crt
    ConfigMapOptional: <nil>
    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:
  Type     Reason      Age   From          Message
  ----     -
  Normal   Scheduled   9m41s default-scheduler Successfully assigned default/my-pod to docker-desktop
  Normal   Pulling     9m40s kubelet        Pulling image "nginx"
  Normal   Pulled      7m19s kubelet        Successfully pulled image "nginx" in 2m21.654682925s (2m21.65521052s including waiting)
  Normal   Created     7m19s kubelet        Created container my-container
  Normal   Started     7m19s kubelet        Started container my-container
```

Check the logs of the Pod to understand its behavior using the following command:

```
kubectl logs my-pod
```

```

● pavilion@shweta:~/Desktop/ACO$ kubectl logs my-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
2023/10/23 05:40:21 [notice] 1#1: using the "epoll" event method
2023/10/23 05:40:21 [notice] 1#1: nginx/1.25.2
2023/10/23 05:40:21 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2023/10/23 05:40:21 [notice] 1#1: OS: Linux 6.4.16-linuxkit
2023/10/23 05:40:21 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/10/23 05:40:21 [notice] 1#1: start worker processes
2023/10/23 05:40:21 [notice] 1#1: start worker process 29
2023/10/23 05:40:21 [notice] 1#1: start worker process 30
2023/10/23 05:40:21 [notice] 1#1: start worker process 31
2023/10/23 05:40:21 [notice] 1#1: start worker process 32
2023/10/23 05:40:21 [notice] 1#1: start worker process 33
2023/10/23 05:40:21 [notice] 1#1: start worker process 34
2023/10/23 05:40:21 [notice] 1#1: start worker process 35
2023/10/23 05:40:21 [notice] 1#1: start worker process 36
● pavilion@shweta:~/Desktop/ACO$

```

## Task 5: Deleting the Pod

Delete the Pod using the following command:

```
kubectl delete pod my-pod
```

Verify that the Pod has been deleted by running the `kubectl get pods` command.

```

● pavilion@shweta:~/Desktop/ACO$ kubectl delete pod my-pod
pod "my-pod" deleted
● pavilion@shweta:~/Desktop/ACO$

```

## Task 6: Advanced Pod Configuration

- Experiment with advanced Pod configuration options such as environment variables, volume mounts, resource limits, and labels.
- Update the Pod manifest file and apply the changes to the Kubernetes cluster.

## Task 7: Cleanup

Delete any remaining Pods, services, and deployments created during the exercise using the appropriate `kubectl delete` commands.

## Task 8: Documentation and Best Practices

Document your findings and the best practices for creating and managing Pods in Kubernetes.

Through this exercise, you'll gain a better understanding of how to create, manage, and interact with Pods in Kubernetes. Adjust the exercise based on your specific use case and requirements.