



Application Containerization And Orchestration Lab

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Batch – DevOps B4

Submitted to

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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-nginx-pod
  labels:
    app: lbnginx
spec:
  containers:
  - name: nginx-container
    image: nginx
```

Apply the Pod configuration using the following command:

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

```
PS C:\Users\Vidhyarthi\Desktop\ACO-LAB-2021-25> kubectl apply -f pod.yaml
pod/my-nginx-pod created
```

Check the status of the Pod using the following command:

```
kubectl get pods
```

```
PS C:\Users\Vidarthi\Desktop\ACO-LAB-2021-25> kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
my-nginx-pod  1/1     Running   0           20s
```

Task 3: Accessing the Pod

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

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

```
PS C:\Users\Vidarthi\Desktop\ACO-LAB-2021-25> kubectl port-forward my-nginx-pod 8081:80
Forwarding from 127.0.0.1:8081 -> 80
Forwarding from [::1]:8081 -> 80
Handling connection for 8081
Handling connection for 8081
```

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



Task 4: Exploring Pod Details

Retrieve detailed information about the Pod using the following command:

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

```

PS C:\Users\Vidarthi> kubectl describe pod my-nginx-pod
Name:          my-nginx-pod
Namespace:     default
Priority:       0
Service Account: default
Node:          docker-desktop/192.168.65.4
Start Time:    Sun, 03 Dec 2023 23:35:23 +0530
Labels:        <none>
Annotations:   <none>
Status:        Running
IP:            10.1.0.69
IPs:           IP: 10.1.0.69
Containers:
  nginx-container:
    Container ID:  docker://817b74fe5cac697b9a9b06745b68aeea430d02fde1ea0fef45c248e99c63b5f0
    Image:         nginx:latest
    Image ID:      docker-pullable://nginx@sha256:10d1f5b58f74683ad34eb29287e07dab1e90f10af243f151bb50aa5dbb4d62ee
    Port:         <none>
    Host Port:    <none>
    State:        Running
      Started:    Sun, 03 Dec 2023 23:35:32 +0530
    Ready:        True
    Restart Count: 0
    Environment:  <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-z6754 (ro)
Conditions:
  Type              Status
  Initialized        True
  Ready              True
  ContainersReady    True
  PodScheduled       True
Volumes:
  kube-api-access-z6754:
    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   5m13s default-scheduler Successfully assigned default/my-nginx-pod to docker-desktop
  Normal    Pulling     5m12s kubelet        Pulling image "nginx:latest"
  Normal    Pulled      5m4s kubelet        Successfully pulled image "nginx:latest" in 7.625751561s (7.625832667s including waiting)
  Normal    Created     5m4s kubelet        Created container nginx-container
  Normal    Started     5m3s kubelet        Started container nginx-container

```

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

```
kubectl logs my-nginx-pod
```

```

PS C:\Users\Vidarthi> kubectl logs my-nginx-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
2023/12/03 18:05:33 [notice] 1#1: using the "epoll" event method
2023/12/03 18:05:33 [notice] 1#1: nginx/1.25.3
2023/12/03 18:05:33 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2023/12/03 18:05:33 [notice] 1#1: OS: Linux 5.15.133.1-microsoft-standard-WSL2
2023/12/03 18:05:33 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/12/03 18:05:33 [notice] 1#1: start worker processes
2023/12/03 18:05:33 [notice] 1#1: start worker process 29
2023/12/03 18:05:33 [notice] 1#1: start worker process 30
2023/12/03 18:05:33 [notice] 1#1: start worker process 31
2023/12/03 18:05:33 [notice] 1#1: start worker process 32
127.0.0.1 - - [03/Dec/2023:18:09:57 +0000] "GET / HTTP/1.1" 200 615 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/120.0.0.0 Safari/537.36" "-"
2023/12/03 18:09:57 [error] 29#29: *2 open() "/usr/share/nginx/html/favicon.ico" failed (2: No such file or directory), client: 127.0.0.1, server: localhost, request: "GET /favicon.ico HTTP/1.1", host: "localhost:8081", referer: "http://localhost:8081/"
127.0.0.1 - - [03/Dec/2023:18:09:57 +0000] "GET /favicon.ico HTTP/1.1" 404 555 "http://localhost:8081/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/120.0.0.0 Safari/537.36" "-"

```

Task 5: Deleting the Pod

Delete the Pod using the following command:

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

```
PS C:\Users\Vidhyarthi> kubectl delete pod my-nginx-pod  
pod "my-nginx-pod" deleted
```

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

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.