APPLICATION CONTAINERIZATION AND ORCHESTRATION LAB

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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:

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

- Apply the Pod configuration using the following command:

```
sachinaggarwal@Sachins-MacBook-Air k8s % kubectl apply -f pod.yml

pod/my-pod created
```

Check the status of the Pod using the following command:

```
sachinaggarwal@Sachins-MacBook-Air k8s % kubectl get pods
NAME     READY   STATUS         RESTARTS   AGE
my-pod   0/1     ErrImagePull   0          2m49s
```

Task 3: Accessing the Pod

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

```
sachinaggarwal@Sachins-MacBook-Air k8s % kubectl port-forward my-pod 8080:80

Forwarding from [::1]:8080 -> 80
Handling connection for 8080
Handling connection for 8080
```

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:

```
sachinaggarwal@Sachins-MacBook-Air k8s % kubectl describe pod my-pod
Name:             my-pod
Namespace:        default
Priority:         0
Service Account:  default
Node:             docker-desktop/192.168.65.4
Start Time:       Fri, 20 Oct 2023 12:57:41 +0530
Labels:           <none>
Annotations:      <none>
Status:           Running
IP:               10.1.0.7
IPs:
  IP:  10.1.0.7
Containers:
  my-container:
    Container ID:   docker://f2fb3955df61934d40764bb7c8e62783ffe4be8df313b3ff9fe5689a44a5dbf3
    Image:          nginx
    Image ID:       docker-pullable://nginx@sha256:b4af4f8b6470febf45dc10f564551af682a802eda17430
55a7dfc8332dffa595
    Port:           <none>
    Host Port:      <none>
    State:          Running
      Started:      Fri, 20 Oct 2023 12:57:44 +0530
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-66zbv (ro)
```

```
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-66zbv (ro)
Conditions:
  Type              Status
  Initialized       True
  Ready             True
  ContainersReady   True
  PodScheduled      True
Volumes:
  kube-api-access-66zbv:
    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  4m4s  default-scheduler  Successfully assigned default/my-pod to docker-desktop
  Normal  Pulling    4m4s  kubelet            Pulling image "nginx"
  Normal  Pulled     4m1s  kubelet            Successfully pulled image "nginx" in 2.82643371s (2.826444168s including waiting)
  Normal  Created    4m1s  kubelet            Created container my-container
  Normal  Started    4m1s  kubelet            Started container my-container
```

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

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

```
sachinaggarwal@Sachins-MacBook-Air k8s % 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
2023/10/20 07:27:44 [notice] 1#1: using the "epoll" event method
2023/10/20 07:27:44 [notice] 1#1: nginx/1.25.2
2023/10/20 07:27:44 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2023/10/20 07:27:44 [notice] 1#1: OS: Linux 5.15.49-linuxkit-pr
2023/10/20 07:27:44 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/10/20 07:27:44 [notice] 1#1: start worker processes
2023/10/20 07:27:44 [notice] 1#1: start worker process 29
2023/10/20 07:27:44 [notice] 1#1: start worker process 30
2023/10/20 07:27:44 [notice] 1#1: start worker process 31
2023/10/20 07:27:44 [notice] 1#1: start worker process 32
127.0.0.1 - - [20/Oct/2023:07:29:13 +0000] "GET / HTTP/1.1" 200 615 "-" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) App
leWebKit/537.36 (KHTML, like Gecko) Chrome/118.0.0.0 Safari/537.36" "-"
2023/10/20 07:29:13 [error] 32#32: *2 open() "/usr/share/nginx/html/favicon.ico" failed (2: No such file or directory), clie
nt: 127.0.0.1, server: localhost, request: "GET /favicon.ico HTTP/1.1", host: "localhost:8080", referrer: "http://localhost:
8080/"
127.0.0.1 - - [20/Oct/2023:07:29:13 +0000] "GET /favicon.ico HTTP/1.1" 404 555 "http://localhost:8080/" "Mozilla/5.0 (Macint
osh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/118.0.0.0 Safari/537.36" "-"
```

Task 5: Deleting the Pod

Delete the Pod using the following command:

```
sachinaggarwal@Sachins-MacBook-Air k8s % kubectl delete pod my-pod

pod "my-pod" deleted
```