Lab Exercise 7– Creating Pods in Kubernetes

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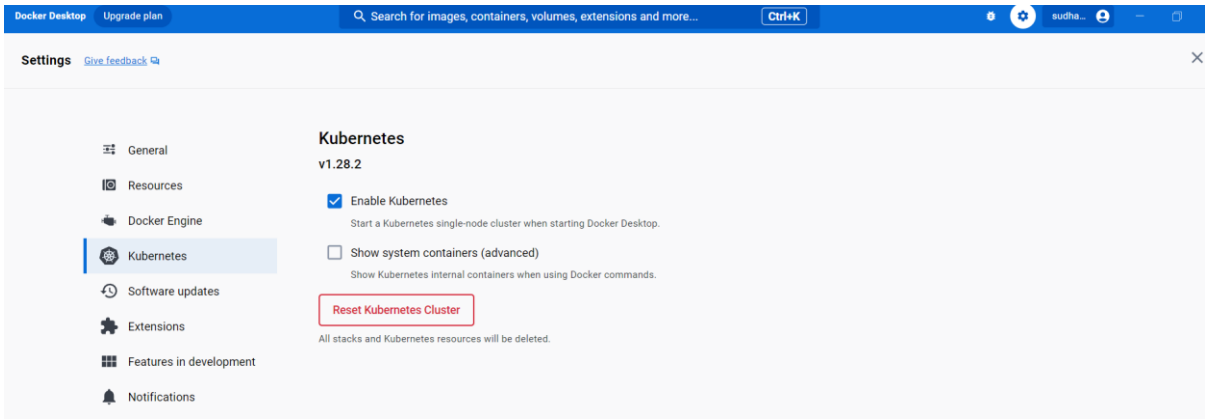
Below is a lab exercise that will help you understand and practice creating pods in Kubernetes:

Task 1: Start Kubernetes in Docker-Desktop

- Start Kubernetes service in Docker-Desktop

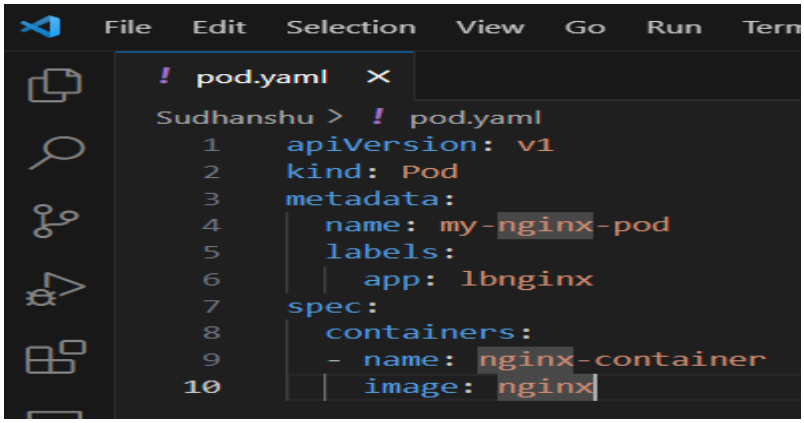


Task 2: Creating a Simple Pod

- 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 F:\dockerlab\Sudhanshu> kubectl apply -f pod.yaml
pod/my-nginx-pod created
```

Check the status of the Pod using the following command:

```
kubectl get pods
```

```
PS F:\dockerlab\Sudhanshu> kubectl get pods
NAME           READY   STATUS    RESTARTS   AGE
my-nginx-pod   1/1     Running   0          3m23s
```

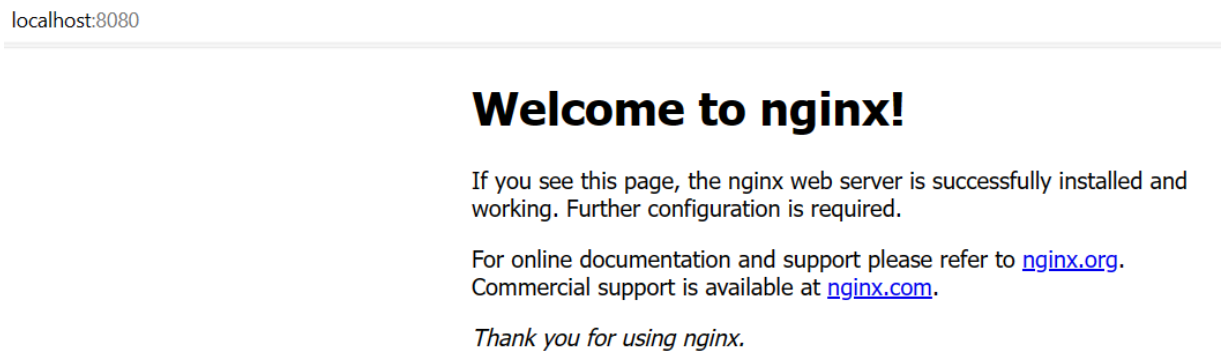
Task 3: Accessing the Pod

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

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

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

```
PS F:\dockerlab\Sudhanshu> kubectl port-forward my-nginx-pod 8080:80
Forwarding from 127.0.0.1:8080 -> 80
Forwarding from [::1]:8080 -> 80
Handling connection for 8080
Handling connection for 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\Sudhanshu> kubectl describe pod my-nginx-pod
Name:             my-nginx-pod
Namespace:        default
Priority:         0
Service Account:  default
Node:             docker-desktop/192.168.65.3
Start Time:       Fri, 01 Dec 2023 16:34:41 +0530
Labels:           app=lbnginx
Annotations:      <none>
Status:           Running
IP:               10.1.0.37
IPs:
  IP:  10.1.0.37
Containers:
  nginx-container:
    Container ID:   docker://3a6d27d7c06c3e7b89f3635dcb0434fd161a4f2ef1b251f423e6d3548511bdcb
    Image:          nginx
    Image ID:       docker-pullable://nginx@sha256:10d1f5b58f74683ad34eb29287e07dab1e90f10af243f151bb50aa5dbb4d62ee
    Port:           <none>
    Host Port:      <none>
    State:          Running
      Started:      Fri, 01 Dec 2023 16:34:44 +0530
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-rvdlf (ro)
Conditions:
  Type              Status
  Initialized       True
  Ready             True
  ContainersReady   True
  PodScheduled      True
Volumes:
  kube-api-access-rvdlf:
    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 300sEvents:
  Type    Reason     Age    From               Message
  ----    ------     ----   ----               -------
  Normal  Scheduled  9m38s  default-scheduler  Successfully assigned default/my-nginx-pod to docker-desktop
  Normal  Pulling    9m39s  kubelet            Pulling image "nginx"
  Normal  Pulled     9m36s  kubelet            Successfully pulled image "nginx" in 2.720586166s (2.720593337s including waiting)
  Normal  Created    9m36s  kubelet            Created container nginx-container
  Normal  Started    9m36s  kubelet            Started container nginx-container
PS C:\Users\Sudhanshu>
```

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

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

```
PS C:\Users\Sudhanshu> 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
2023/12/01 11:04:44 [notice] 1#1: using the "epoll" event method
2023/12/01 11:04:44 [notice] 1#1: nginx/1.25.3
2023/12/01 11:04:44 [notice] 1#1: built by gcc 12.2.0 (Debian 12.2.0-14)
2023/12/01 11:04:44 [notice] 1#1: OS: Linux 5.15.133.1-microsoft-standard-WSL2
2023/12/01 11:04:44 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/12/01 11:04:44 [notice] 1#1: start worker processes
2023/12/01 11:04:44 [notice] 1#1: start worker process 29
2023/12/01 11:04:44 [notice] 1#1: start worker process 30
2023/12/01 11:04:44 [notice] 1#1: start worker process 31
2023/12/01 11:04:44 [notice] 1#1: start worker process 32
2023/12/01 11:04:44 [notice] 1#1: start worker process 33
2023/12/01 11:04:44 [notice] 1#1: start worker process 34
2023/12/01 11:04:44 [notice] 1#1: start worker process 35
2023/12/01 11:04:44 [notice] 1#1: start worker process 36
2023/12/01 11:04:44 [notice] 1#1: start worker process 37
2023/12/01 11:04:44 [notice] 1#1: start worker process 38
2023/12/01 11:04:44 [notice] 1#1: start worker process 39
2023/12/01 11:04:44 [notice] 1#1: start worker process 40
2023/12/01 11:04:44 [notice] 1#1: start worker process 41
2023/12/01 11:04:44 [notice] 1#1: start worker process 42
2023/12/01 11:04:44 [notice] 1#1: start worker process 43
2023/12/01 11:04:44 [notice] 1#1: start worker process 44
2023/12/01 11:04:44 [notice] 1#1: start worker process 45
2023/12/01 11:04:44 [notice] 1#1: start worker process 46
2023/12/01 11:04:44 [notice] 1#1: start worker process 47
2023/12/01 11:04:44 [notice] 1#1: start worker process 48
127.0.0.1 - - [01/Dec/2023:11:12:50 +0000] "GET / HTTP/1.1" 200 615 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5
/119.0.0.0" "-"
127.0.0.1 - - [01/Dec/2023:11:12:50 +0000] "GET /favicon.ico HTTP/1.1" 404 555 "http://localhost:8080/" "Mozilla/5.0 (Windows NT
rome/119.0.0.0 Safari/537.36 Edg/119.0.0.0" "-"
2023/12/01 11:12:50 [error] 29#29: *1 open() "/usr/share/nginx/html/favicon.ico" failed (2: No such file or directory), client:
P/1.1", host: "localhost:8080", referrer: "http://localhost:8080/"
```

Task 5: Deleting the Pod

Delete the Pod using the following command:

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

```
PS C:\Users\Sudhanshu> 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.

```
PS C:\Users\Sudhanshu> kubectl get pods
No resources found in default namespace.
```

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.