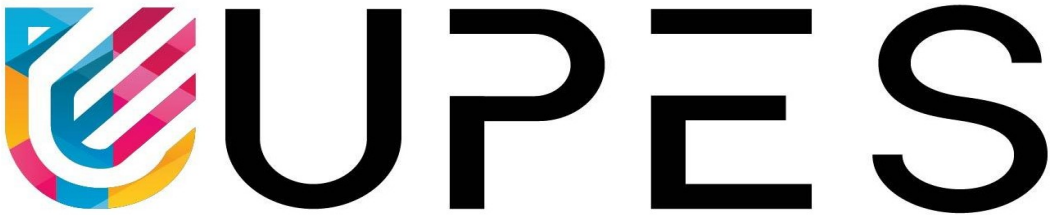

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

APPLICATION CONTAINERIZATION AND ORCHESTRATION LAB

COURSE: B.Tech CSE (Devops)

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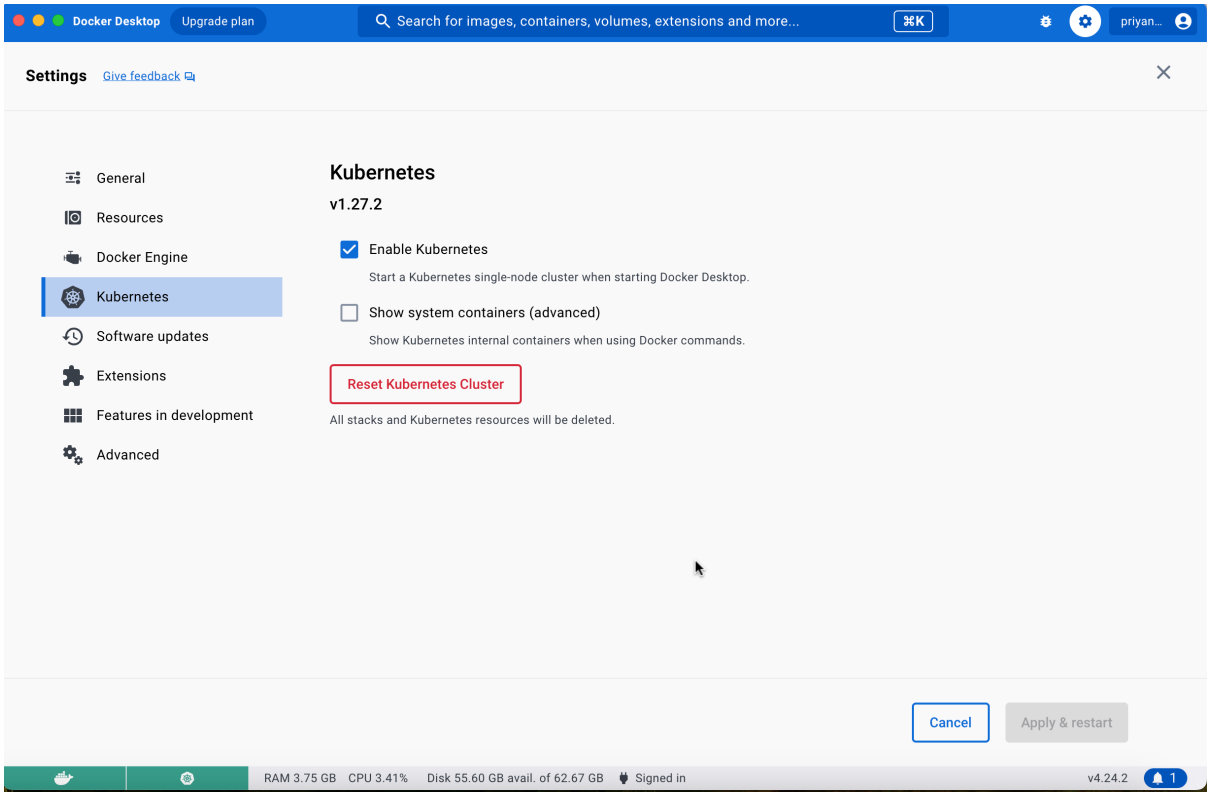
Lab Exercise 7– Creating Pods in Kubernetes

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:

- Apply the Pod configuration
- Check the status of the Pod

```
priyanshurai@MacBook-Air Kubernetes_lab % kubectl apply -f pod.yaml
pod/my-nginx-pod-2 created
priyanshurai@MacBook-Air Kubernetes_lab % kubectl get pods
NAME              READY   STATUS    RESTARTS   AGE
my-nginx-pod-2    1/1     Running   0          60s
priyanshurai@MacBook-Air Kubernetes_lab %
```

Task 3: Accessing the Pod

```
Volumes:
  kube-api-access-rftbt:
    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  10m    default-scheduler  Successfully assigned default/my-nginx-pod-2 to docker-desktop
  Normal  Pulling    10m    kubelet            Pulling image "nginx:1.17.0"
  Normal  Pulled     9m47s  kubelet            Successfully pulled image "nginx:1.17.0" in 15.417070883s (15.41709546
)
  Normal  Created    9m47s  kubelet            Created container nginx-container
  Normal  Started    9m47s  kubelet            Started container nginx-container
```

```
priyanshurai@MacBook-Air Kubernetes_lab % kubectl describe pod my-nginx-pod
Name:             my-nginx-pod-2
Namespace:        default
Priority:         0
Service Account:  default
Node:             docker-desktop/192.168.65.3
Start Time:       Fri, 20 Oct 2023 13:04:20 +0530
Labels:           app=nginx
Annotations:      <none>
Status:           Running
IP:               10.1.0.6
IPs:
  IP:  10.1.0.6
Containers:
  nginx-container:
    Container ID:   docker://a0cdf7c12ce355ab58410fc26cad7cc1a522f35ba032a3b6d94c622e2beae76a
    Image:          nginx:1.17.0
    Image ID:       docker-pullable://nginx@sha256:bdbf36b7f1f77ffe7bd2a32e59235dff6ecf131e3b6b5b96061c652f30685f3a
    Port:           <none>
    Host Port:      <none>
    State:          Running
      Started:      Fri, 20 Oct 2023 13:04:36 +0530
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-rftbt (ro)
Conditions:
  Type              Status
  Initialized       True
  Ready             True
  ContainersReady   True
  PodScheduled      True
Volumes:
  kube-api-access-rftbt:
```

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

Task 4: Exploring Pod Details

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

```
priyanshurai@MacBook-Air Kubernetes_lab % kubectl logs my-nginx-pod-2
priyanshurai@MacBook-Air Kubernetes_lab %
```

Task 5: Deleting the Pod

Delete the Pod using the following command:

```
priyanshurai@MacBook-Air Kubernetes_lab % kubectl delete pod my-nginx-pod-2
pod "my-nginx-pod-2" deleted
priyanshurai@MacBook-Air Kubernetes_lab %
```

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

```
priyanshurai@MacBook-Air Kubernetes_lab % kubectl get pods
No resources found in default namespace.
priyanshurai@MacBook-Air Kubernetes_lab %
```

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.