CLOUD COMPUTING

Assignment – 2b

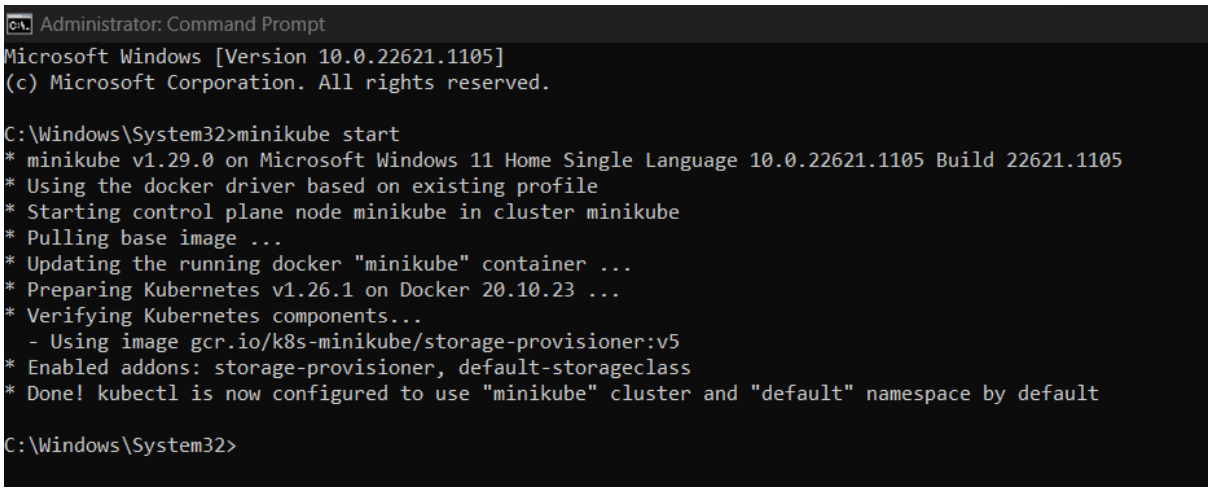
Name : Sanmat Sanjayakumar Payagoudar

SRN : PES1UG20CS385

Section : G

1. Section 1: Installation

1a - Minikube running successfully



2. Section 2: Creating pods and deployments, Editing them and observing Rollback

2a - get nodes, pod and services command

```
C:\Windows\System32>kubectl get nodes
NAME       STATUS   ROLES           AGE     VERSION
minikube   Ready    control-plane   3m30s   v1.26.1

C:\Windows\System32>kubectl get pod
No resources found in default namespace.

C:\Windows\System32>kubectl get services
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
kubernetes   ClusterIP   10.96.0.1    <none>        443/TCP   3m34s
```

2b- Deployment created

```
C:\Windows\System32>kubectl create deployment pes1ug20cs385 --image=nginx
deployment.apps/pes1ug20cs385 created
```

2c- get deployment and pod command

```
C:\Windows\System32>kubectl get deployment
NAME            READY   UP-TO-DATE   AVAILABLE   AGE
pes1ug20cs385   1/1     1            1           20s

C:\Windows\System32>kubectl get pod
NAME                             READY   STATUS    RESTARTS   AGE
pes1ug20cs385-665fb4fd44-s9n9r   1/1     Running   0          26s
```

2d- editing '-image:nginx.'

```
containers:
- image: nginx:1.16
  imagePullPolicy: Always
```

2e- showing edited deployment

```
C:\Windows\System32>kubectl edit deployment pes1ug20cs385
deployment.apps/pes1ug20cs385 edited
```

2f- deployment is rolled back

```
C:\Windows\System32>kubectl rollout undo deployment/pes1ug20cs385
deployment.apps/pes1ug20cs385 rolled back
```

2g- showing original nginx image

```
containers:
- image: nginx
  imagePullPolicy: Always
```

3. Section 3:Debugging Pods

3a - Kubectl logs displayed

```
C:\Windows\System32>kubectl get pod
NAME                              READY   STATUS    RESTARTS   AGE
pes1ug20cs385-665fb4fd44-b976g   1/1     Running   0          9s

C:\Windows\System32>kubectl logs pes1ug20cs385-665fb4fd44-b976g
/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: 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
2023/02/23 05:56:45 [notice] 1#1: using the "epoll" event method
2023/02/23 05:56:45 [notice] 1#1: nginx/1.23.3
2023/02/23 05:56:45 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
2023/02/23 05:56:45 [notice] 1#1: OS: Linux 5.15.79.1-microsoft-standard-WSL2
2023/02/23 05:56:45 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/02/23 05:56:45 [notice] 1#1: start worker processes
2023/02/23 05:56:45 [notice] 1#1: start worker process 29
2023/02/23 05:56:45 [notice] 1#1: start worker process 30
2023/02/23 05:56:45 [notice] 1#1: start worker process 31
2023/02/23 05:56:45 [notice] 1#1: start worker process 32
2023/02/23 05:56:45 [notice] 1#1: start worker process 33
2023/02/23 05:56:45 [notice] 1#1: start worker process 34
2023/02/23 05:56:45 [notice] 1#1: start worker process 35
2023/02/23 05:56:45 [notice] 1#1: start worker process 36
2023/02/23 05:56:45 [notice] 1#1: start worker process 37
2023/02/23 05:56:45 [notice] 1#1: start worker process 38
2023/02/23 05:56:45 [notice] 1#1: start worker process 39
2023/02/23 05:56:45 [notice] 1#1: start worker process 40
```

3b- Kubectl ‘describe pod ‘ command

```
Events:
  Type    Reason     Age   From               Message
  ----    ------     ----  ----               -------
  Normal  Scheduled  68s   default-scheduler  Successfully assigned default/pes1ug20cs385-665fb4fd44-b976g to minikube
  Normal  Pulling    67s   kubelet            Pulling image "nginx"
  Normal  Pulled     63s   kubelet            Successfully pulled image "nginx" in 4.581736333s (4.581743637s including waiting)
  Normal  Created    62s   kubelet            Created container nginx
  Normal  Started    62s   kubelet            Started container nginx
```

3c - Create mongo deployment

```
C:\Windows\System32>kubectl exec -it pes1ug20cs385-mongo-68cbb59845-xvb6p -- bin/bash
root@pes1ug20cs385-mongo-68cbb59845-xvb6p:/# ls
bin   data  docker-entrypoint-initdb.d  home        lib    lib64   media  opt   root  sbin  sys  usr
boot  dev   etc                        js-yaml.js  lib32  libx32  mnt    proc  run   srv   tmp  var
root@pes1ug20cs385-mongo-68cbb59845-xvb6p:/# exit
exit
```

3d - Delete both requirements

```
C:\Windows\System32>kubectl delete deployment pes1ug20cs385
deployment.apps "pes1ug20cs385" deleted

C:\Windows\System32>kubectl delete deployment pes1ug20cs385-mongo
deployment.apps "pes1ug20cs385-mongo" deleted
```

4. Section 4: Applying configuration files

4a - Kubectl apply command on yaml file

```
C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl apply -f nginx-deployment.yaml
deployment.apps/nginx-deployment-pes1ug20cs385 created
```

4b- Kubectl get on yaml file

```
C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl get deployment nginx-deployment-pes1ug20cs385 -o
yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  annotations:
    deployment.kubernetes.io/revision: "1"
    kubectl.kubernetes.io/last-applied-configuration: |
      {"apiVersion":"apps/v1","kind":"Deployment","metadata":{"annotations":{},"labels":{"app":"nginx"},
"name":"nginx-deployment-pes1ug20cs385","namespace":"default"},"spec":{"replicas":3,"selector":{"matchLa
bels":{"app":"nginx"}},"template":{"metadata":{"labels":{"app":"nginx"}},"spec":{"containers":[{"image":
"nginx:1.22","name":"nginx","ports":[{"containerPort":80}]}]}}}}
  creationTimestamp: "2023-02-23T06:29:21Z"
  generation: 2
  labels:
    app: nginx
  name: nginx-deployment-pes1ug20cs385
  namespace: default
  resourceVersion: "5450"
  uid: b05e908c-a1ad-473e-9b50-18ce355f477b
```

```
status:
  availableReplicas: 3
  conditions:
  - lastTransitionTime: "2023-02-23T06:29:21Z"
    lastUpdateTime: "2023-02-23T06:29:26Z"
    message: ReplicaSet "nginx-deployment-pes1ug20cs385-8cf4bf97" has successfully
      progressed.
    reason: NewReplicaSetAvailable
    status: "True"
    type: Progressing
  - lastTransitionTime: "2023-02-23T06:31:07Z"
    lastUpdateTime: "2023-02-23T06:31:07Z"
    message: Deployment has minimum availability.
    reason: MinimumReplicasAvailable
    status: "True"
    type: Available
  observedGeneration: 2
  readyReplicas: 3
  replicas: 3
  updatedReplicas: 3
```

5. Section 5: Delete a pod to observe the self-healing feature

5a - Deleted pod

```
C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl get pod
NAME                                     READY   STATUS    RESTARTS   AGE
nginx-deployment-pes1ug20cs385-8cf4bf97-5mnt4   1/1     Running   0          9s
nginx-deployment-pes1ug20cs385-8cf4bf97-bmj4m   1/1     Running   0          9s
nginx-deployment-pes1ug20cs385-8cf4bf97-fx77h   1/1     Running   0          9s

C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl delete pod nginx-deployment-pes1ug20cs385-8cf4bf97-5mnt4
pod "nginx-deployment-pes1ug20cs385-8cf4bf97-5mnt4" deleted

C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl get pod
NAME                                     READY   STATUS    RESTARTS   AGE
nginx-deployment-pes1ug20cs385-8cf4bf97-bmj4m   1/1     Running   0          34s
nginx-deployment-pes1ug20cs385-8cf4bf97-fx77h   1/1     Running   0          34s
nginx-deployment-pes1ug20cs385-8cf4bf97-tgz5r   1/1     Running   0          3s
```

6. Section 6 : Connecting Services to Deployments

6a- Kubectl apply and get command

```
C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl get service
NAME                          TYPE        CLUSTER-IP    EXTERNAL-IP   PORT(S)    AGE
kubernetes                    ClusterIP   10.96.0.1     <none>        443/TCP    97m
nginx-service-pes1ug20cs385   ClusterIP   10.96.26.21   <none>        8080/TCP   14s

C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl describe service nginx-service
Name:              nginx-service-pes1ug20cs385
Namespace:         default
Labels:            <none>
Annotations:       <none>
Selector:          app=nginx
Type:              ClusterIP
IP Family Policy:  SingleStack
IP Families:       IPv4
IP:                10.96.26.21
IPs:               10.96.26.21
Port:              <unset>  8080/TCP
TargetPort:        80/TCP
Endpoints:         <none>
Session Affinity:  None
Events:            <none>
```

6b-kubectl get pod -o wide command

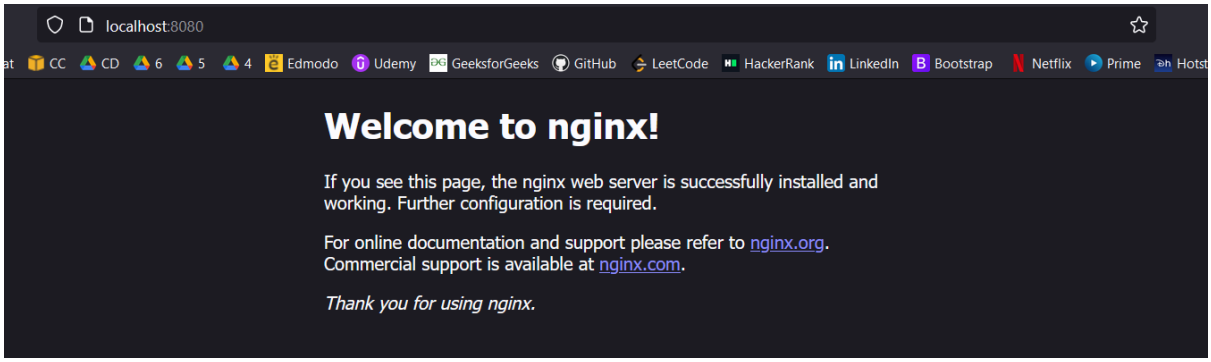
```
C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl get pod -o wide
NAME                                          READY   STATUS    RESTARTS   AGE   IP            NODE       NOMINATED NODE   READINESS GATES
nginx-deployment-pes1ug20cs385-8cf4bf97-dz9k4   1/1     Running   0          87s   10.244.0.29   minikube   <none>           <none>
nginx-deployment-pes1ug20cs385-8cf4bf97-h2vzd   1/1     Running   0          87s   10.244.0.28   minikube   <none>           <none>
nginx-deployment-pes1ug20cs385-8cf4bf97-vzmgg   1/1     Running   0          87s   10.244.0.27   minikube   <none>           <none>
```

7. Section 7: Port Forwarding

7a -Kubectl port-forward command

```
C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl port-forward service/nginx-service-pes1ug20cs385
8080:8080
Forwarding from 127.0.0.1:8080 -> 80
Forwarding from [::1]:8080 -> 80
Handling connection for 8080
```

7b- Display welcome to nginx on web page



8. Section 8: Deleting service/deployment and Cleanup

8a - Delete nginx deployments

```
C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl delete deployment nginx-deployment-pes1ug20cs385
deployment.apps "nginx-deployment-pes1ug20cs385" deleted

C:\Users\Sanam\Desktop\Study\CC\Assignment\2\b>kubectl delete service nginx-service-pes1ug20cs385
service "nginx-service-pes1ug20cs385" deleted
```

8b - Stop minikube

```
C:\Windows\System32>minikube stop
* Stopping node "minikube"  ...
* Powering off "minikube" via SSH ...
* 1 node stopped.
```

9. Section 9: Expose an external IP address to access an Application in a cluster

9a - Screenshot of the command which exposes specifies the type of service (NodePort)

```
C:\Windows\System32>kubectl expose deployment nginx-pes1ug20cs385 --type=NodePort --port=80
service/nginx-pes1ug20cs385 exposed
```

9b - Screenshot of kubectl get service command which displays the node port

```
C:\Windows\System32>kubectl get services
NAME                  TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)        AGE
kubernetes            ClusterIP   10.96.0.1        <none>        443/TCP        23h
nginx-pes1ug20cs385   NodePort    10.103.210.202   <none>        80:32194/TCP   2s
```

9c - Screenshot of minikube IP address

```
C:\Windows\System32>minikube ip
192.168.49.2
```

9d - Screenshot of the webpage with the IP Address visible.