

Assignment-6

Docker and Kubernetes: The container masterclass

Problem Statement:

Scale and Update Deployments, update the number of instances a deployment from 1 to 10, make sure to you need a running deployment as you did in the previous assignments. Perform also a rolling upgrade of your application to a new container image, update your deployment to use the v2 image

Methodology:

I had created a docker image in “Assignment-5” and it was a simple webapp developed using nodejs and expressjs. The image was already uploaded onto dockerhub hence the same image will be deployed in this assignment.

Step 1: Start minikube cluster

```
taneeshq@DESKTOP-63B6L7D:~$ minikube start --driver=docker
🔍 minikube v1.36.0 on Ubuntu 24.04 (amd64)
🔍 Using the docker driver based on user configuration
🔍 Using Docker driver with root privileges
🔍 For an improved experience it's recommended to use Docker Engine instead of Docker Desktop.
Docker Engine installation instructions: https://docs.docker.com/engine/install/#server
🔍 Starting "minikube" primary control-plane node in "minikube" cluster
🔍 Pulling base image v0.0.47 ...
🔍 Creating docker container (CPUs=2, Memory=2200MB) ...
🔍 StartHost failed, but will try again: creating host: create host timed out in 360.000000 seconds
🔍 docker "minikube" container is missing, will recreate.
🔍 Creating docker container (CPUs=2, Memory=2200MB) ...
🔍 Preparing Kubernetes v1.33.1 on Docker 28.1.1 ...
   ▪ Generating certificates and keys ...
   ▪ Booting up control plane ...
   ▪ Configuring RBAC rules ...
🔍 Configuring bridge CNI (Container Networking Interface) ...
🔍 Verifying Kubernetes components...
   ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
🔍 Executing "docker container inspect minikube --format={{.State.Status}}" took an unusually long time: 4.597435945s
🔍 Restarting the docker service may improve performance.
🔍 Enabled addons: storage-provisioner, default-storageclass
🔍 Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
```

Step 2: Create a deployment for webapp using the latest image.

```
taneeshq@DESKTOP-63B6L7D:~$ kubectl create deployment webapp --image=tanc2002/simple-webapp:latest
deployment.apps/webapp created
taneeshq@DESKTOP-63B6L7D:~$ kubectl get deployments
NAME          READY   UP-TO-DATE   AVAILABLE   AGE
webapp        0/1     1            0           48s
```

Step 3: Expose the deployment on port 3000 to run the application. Verify the url given by minikube and browser url.

```
taneeshq@DESKTOP-63B6L7D:~$ kubectl expose deployment webapp --type=NodePort --port=3000
service/webapp exposed
taneeshq@DESKTOP-63B6L7D:~$ kubectl get svc
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)          AGE
kubernetes   ClusterIP   10.96.0.1    <none>        443/TCP          35m
webapp       NodePort    10.107.0.7   <none>        3000:31137/TCP   11s
taneeshq@DESKTOP-63B6L7D:~$ minikube service webapp
❗ Executing "docker container inspect minikube --format={{.State.Status}}" took an unusually long time: 3.225900816s
❗ Restarting the docker service may improve performance.

|-----|
| NAMESPACE | NAME   | TARGET PORT | URL                |
|-----|
| default   | webapp | 3000        | http://192.168.58.2:31137 |
|-----|
❗ Starting tunnel for service webapp.

|-----|
| NAMESPACE | NAME   | TARGET PORT | URL                |
|-----|
| default   | webapp |             | http://127.0.0.1:38549 |
|-----|
❗ Opening service default/webapp in default browser...
```



Hello from my simple web app! Made by Taneeshq



Step 5: Perform a rolling upgrade by using the tag “v2” along with the image. (Note version v2 is existing in the repository).

Check the rollout status then run the minikube service to view the output of new image. Also verify in browser.

```
taneeshq@DESKTOP-63B6L7D:~$ kubectl set image deployment/webapp simple-webapp=tanc2002/simple-webapp:v2
deployment.apps/webapp image updated
taneeshq@DESKTOP-63B6L7D:~$ kubectl rollout status deployment webapp
Waiting for deployment "webapp" rollout to finish: 1 old replicas are pending termination...
^Ctaneeshq@DESKTOP-63B6L7D:~$ kubectl rollout status deployment webapp
deployment "webapp" successfully rolled out
taneeshq@DESKTOP-63B6L7D:~$ minikube service webapp
```

NAMESPACE	NAME	TARGET PORT	URL
default	webapp	3000	http://192.168.58.2:31137

```
Starting tunnel for service webapp.
```

NAMESPACE	NAME	TARGET PORT	URL
default	webapp		http://127.0.0.1:42099

```
Opening service default/webapp in default browser...
/usr/bin/ydgs -port 9021 -x-ctrl-browserctl-not-found
```



Hello from my simple web app version 2! Made by Taneeshq



Step 6: Create 10 replicas of the deployment and view their status.

```
taneeshq@DESKTOP-63B6L7D:~$ kubectl scale deployment webapp --replicas=10
deployment.apps/webapp scaled
taneeshq@DESKTOP-63B6L7D:~$ kubectl get pods -o wide
```

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE	NOMINATED NODE	READINESS GATES
webapp-7b854958d9-4r67f	0/1	ContainerCreating	0	11s	<none>	minikube	<none>	<none>
webapp-7b854958d9-55dnj	0/1	Pending	0	12s	<none>	minikube	<none>	<none>
webapp-7b854958d9-5qp4f	1/1	Running	0	2m54s	10.244.0.9	minikube	<none>	<none>
webapp-7b854958d9-99hh2	0/1	Pending	0	12s	<none>	minikube	<none>	<none>
webapp-7b854958d9-jrfdz	0/1	ContainerCreating	0	12s	<none>	minikube	<none>	<none>
webapp-7b854958d9-nrsjk	0/1	Pending	0	11s	<none>	minikube	<none>	<none>
webapp-7b854958d9-qcvt7	0/1	Pending	0	12s	<none>	minikube	<none>	<none>
webapp-7b854958d9-rj4jj	0/1	ContainerCreating	0	13s	<none>	minikube	<none>	<none>
webapp-7b854958d9-tpkq7	0/1	ContainerCreating	0	13s	<none>	minikube	<none>	<none>
webapp-7b854958d9-trhdg	0/1	ContainerCreating	0	13s	<none>	minikube	<none>	<none>

```
taneeshq@DESKTOP-63B6L7D:~$ kubectl get pods -o wide
```

NAME	READY	STATUS	RESTARTS	AGE	IP	NODE	NOMINATED NODE	READINESS GATES
webapp-7b854958d9-4r67f	0/1	ContainerCreating	0	2m31s	<none>	minikube	<none>	<none>
webapp-7b854958d9-55dnj	1/1	Running	0	2m32s	10.244.0.14	minikube	<none>	<none>
webapp-7b854958d9-5qp4f	1/1	Running	0	5m14s	10.244.0.9	minikube	<none>	<none>
webapp-7b854958d9-99hh2	1/1	Running	0	2m32s	10.244.0.11	minikube	<none>	<none>
webapp-7b854958d9-jrfdz	1/1	Running	0	2m32s	10.244.0.15	minikube	<none>	<none>
webapp-7b854958d9-nrsjk	0/1	ContainerCreating	0	2m31s	<none>	minikube	<none>	<none>
webapp-7b854958d9-qcvt7	0/1	ContainerCreating	0	2m32s	<none>	minikube	<none>	<none>
webapp-7b854958d9-rj4jj	1/1	Running	0	2m33s	10.244.0.13	minikube	<none>	<none>
webapp-7b854958d9-tpkq7	1/1	Running	0	2m33s	10.244.0.10	minikube	<none>	<none>
webapp-7b854958d9-trhdg	1/1	Running	0	2m33s	10.244.0.12	minikube	<none>	<none>

```
taneeshq@DESKTOP-63B6L7D:~$
```