Docker and Kubernetes Mini Assignment

Check docker version:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker --version
Docker version 27.2.0, build 3ab4256
```

Create & Clone a Repository from GitHub:

```
PS C:\Users\pratik\Desktop\Assignment> git clone https://github.com/Prasadrasal2002/Docker-kubernets.git
Cloning into 'Docker-kubernets'...
remote: Enumerating objects: 19, done.
remote: Counting objects: 100% (19/19), done.
remote: Compressing objects: 100% (16/16), done.
remote: Total 19 (delta 2), reused 0 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (19/19), 5.46 KiB | 932.00 KiB/s, done.
Resolving deltas: 100% (2/2), done.
PS C:\Users\pratik\Desktop\Assignment> ls


    Directory: C:\Users\pratik\Desktop\Assignment


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----        05-03-2025     11:10                Docker-kubernets


PS C:\Users\pratik\Desktop\Assignment> cd .\Docker-kubernets\
```

To list all files in a directory:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets> cd .\web-server-pipeline\
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> ls


    Directory:
    C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----        05-03-2025     11:10            150 Dockerfile
-a----        05-03-2025     11:10            384 index.html
-a----        05-03-2025     11:10            424 web-deployment.yml
-a----        05-03-2025     11:10            227 web-service.yml
```

Index.html:

Docker-kubernets > web-server-pipeline > index.html > ...

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>DevOps Web Server</title>
    <link rel="stylesheet" href="styles.css">
</head>
<body>
    <h1>Welcome to My DevOps Web Server 🚀</h1>
    <p>This website is deployed using a Docker & Kubernetes.</p>
</body>
</html>

```

Dockerfile:

```
#FREEC
FROM ubuntu:latest
RUN apt update -y && apt install nginx -y
EXPOSE 80
COPY index.html /var/www/html/
CMD ["nginx", "-g", "daemon off;"]
~
```

Build Docker Image:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker build . -t nginx-assignment1-docker-k8s
[+] Building 256.2s (8/8) FINISHED                                                                  docker:desktop-linux
 => [internal] load build definition from Dockerfile                                                              0.0s
 => => transferring dockerfile: 189B                                                                              0.0s
 => [internal] load metadata for docker.io/library/ubuntu:latest                                                  3.5s
 => [internal] load .dockerignore                                                                                 0.1s
 => => transferring context: 2B                                                                                   0.0s
 => CACHED [1/3] FROM docker.io/library/ubuntu:latest@sha256:72297848456d5d37d1262630108ab308d3e9ec7ed1c3         0.0s
 => [internal] load build context                                                                                 0.1s
 => => transferring context: 423B                                                                                 0.0s
 => [2/3] RUN apt update -y && apt install nginx -y                                                             251.9s
 => [3/3] COPY index.html /var/www/html/                                                                          0.1s
 => exporting to image                                                                                            0.4s
 => => exporting layers                                                                                           0.3s
 => => writing image sha256:f37841bc8c1562b593c0bbb073833eda064865c86dc42af1f684db201cb54d8b                      0.0s
 => => naming to docker.io/library/nginx-assignment1-docker-k8s                                                   0.0s

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/j532nkrwb8gtcr3ikr6va49qm

What's next:
    View a summary of image vulnerabilities and recommendations → docker scout quickview
```

Run Docker Container:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker run -itd -p 80:80 nginx-assig
nment1-docker-k8s:latest
ba7e9c7ea0633eb27bf4e577d0e458510aaccd591cee15d82b22b7702be43df0
```

docker ps → List Running Containers

docker images → List Available Images

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker ps
CONTAINER ID   IMAGE                                  COMMAND                  CREATED         STATUS         PORTS     NAMES
24b1b6852114   nginx-assignment1-docker-k8s:latest   "nginx -g 'daemon of…"   6 seconds ago   Up 5 seconds   80/tcp    eager_northcutt
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker images
REPOSITORY                     TAG         IMAGE ID       CREATED         SIZE
nginx-assignment1-docker-k8s   latest      f37841bc8c15   5 minutes ago   133MB
```

Running a Web Application (Containerized) in Chrome:

Stop docker container:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker stop ba7e9c7ea063
ba7e9c7ea063
```

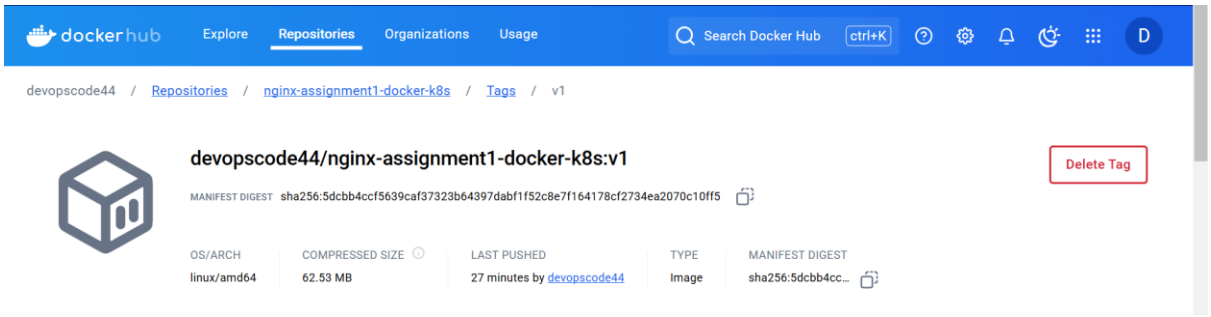
Tag Docker Image:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker tag nginx-assignment1-docker-k8s:latest  devopscode44
/nginx-assignment1-docker-k8s:v1
```

Log In to Docker Hub and push image to docker Hub :

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker login -u devopscode44
Password:
Error response from daemon: Get "https://registry-1.docker.io/v2/": unauthorized: incorrect username or password
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker login -u devopscode44
Password:
Login Succeeded
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> docker push devopscode44/nginx-assignment1-docker-k8s:v1
The push refers to repository [docker.io/devopscode44/nginx-assignment1-docker-k8s]
12ba21529a21: Pushed
82aab81d5bfd: Pushed
4b7c01ed0534: Mounted from library/ubuntu
v1: digest: sha256:5dcbb4ccf5639caf37323b64397dabf1f52c8e7f164178cf2734ea2070c10ff5 size: 948
```

Docker Hub:



Check Minikube Version:

```
PS C:\Users\pratik\Desktop\Assignment> minikube version
minikube version: v1.34.0
commit: 210b148df93a80eb872ecbeb7e35281b3c582c61
```

Check Minikube Version:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> minikube status
minikube
type: Control Plane
host: Stopped
kubelet: Stopped
apiserver: Stopped
kubeconfig: Stopped
```

Start minikube:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> minikube start
😄  minikube v1.34.0 on Microsoft Windows 11 Home Single Language 10.0.22621.4317 Build 22621.4317
🎉  minikube 1.35.0 is available! Download it: https://github.com/kubernetes/minikube/releases/tag/v1.35.0
💡  To disable this notice, run: 'minikube config set WantUpdateNotification false'

✨  Using the docker driver based on existing profile
👍  Starting "minikube" primary control-plane node in "minikube" cluster
🚜  Pulling base image v0.0.45 ...
🔄  Restarting existing docker container for "minikube" ...
❗  Failing to connect to https://registry.k8s.io/ from both inside the minikube container and host machine
💡  To pull new external images, you may need to configure a proxy: https://minikube.sigs.k8s.io/docs/reference/networking/proxy/
🐳  Preparing Kubernetes v1.31.0 on Docker 27.2.0 ...
🔎  Verifying Kubernetes components...
    ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
🌟  Enabled addons: storage-provisioner, default-storageclass
🏄  Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
```

Minikube status:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured
```

Web-namespace.yml :

```yaml
apiVersion: v1
kind: Namespace
metadata:
  name: web

```

Apply the Namespace Configuration:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> kubectl apply -f web-namespace.yml
namespace/web created
```

web-deployment.yml :

Docker-kubernets > web-server-pipeline > ! web-deployment.yml

```yaml
apiVersion: apps/v1
kind: Deployment
metadata:
  name: my-web-server-deployment
  namespace: web
spec:
  replicas: 3
  selector:
    matchLabels:
      app: web-server
  template:
    metadata:
      labels:
        app: web-server
    spec:
      containers:
        - name: web-server-container
          image: devopscode44/nginx-assignment1-docker-k8s:v1
          ports:
            - containerPort: 80
```

Apply the Deployment Configuration:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> kubectl apply -f web-deployment.yml
deployment.apps/my-web-server-deployment created
deployment.apps/my-web-server-deployment created
deployment.apps/my-web-server-deployment created
```

Verify the Deployment:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> kubectl get deployments -n web
NAME                     READY   UP-TO-DATE   AVAILABLE   AGE
my-web-server-deployment   3/3     3            3           14m
```

web-service.yml:

Docker-kubernets > web-server-pipeline > ! web-service.yml

```yaml
#akms sp3t
kind: Service
apiVersion: v1
metadata:
  name: web-service
  namespace: web
spec:
  selector:
    app: web-server
  ports:
  - protocol: TCP
    port: 80
    targetPort: 80
  type: NodePort
```

Apply the Service Configuration:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> kubectl apply -f web-service.yml
service/web-service created
```

Verify the Service:

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> kubectl get svc -n web
NAME          TYPE       CLUSTER-IP       EXTERNAL-IP   PORT(S)        AGE
web-service   NodePort   10.107.145.136   <none>        80:30972/TCP   24m
```

Access the Web Server Application

```
PS C:\Users\pratik\Desktop\Assignment\Docker-kubernets\web-server-pipeline> minikube service web-service --url  -n web
http://127.0.0.1:55453
```

Docker image in a Kubernetes (K8s) cluster and access it via Chrome (browser):