

EXPERIMENT NO: 8

Integrate Kubernetes and Docker

Aim: Kubernetes and Docker are both popular technologies for managing containers, but they are used for different purposes. Kubernetes is an orchestration platform that provides higher-level abstractions for managing containers, while Docker is a containerization technology that provides a lower-level runtime for containers. To integrate Kubernetes and Docker, you need to use Docker to build and package your application as a container image, and then use Kubernetes to manage and orchestrate the containers.

Step 1: Install dependencies

1. Install Docker Desktop (needed for containers):

Download Docker Desktop for Windows

Step 2: Install Kubectl

Kubectl is the CLI for Kubernetes.

Open PowerShell as Administrator and run:

```
--> cd windows
```

```
---> cd system32
```

Step 3: (run below line at powershell prompt, downloads the kubectl from official website and install in the system)

```
curl.exe -LO "https://dl.k8s.io/release/v1.30.0/bin/windows/amd64/kubectl.exe"
```

Step4:

Check the version:(run the below command to get version of kubectl)

```
kubectl version --client
```

Client Version: v1.30.0

Kustomize Version: v5.0.4-0.20230601165947-6ce0bf390ce3

Step 5: Install Minikube (it create cluster or Virtual Machine for Kubernetes run in local machine)

Download Minikube: (check powershell at c:\windows\system32 only)

`curl.exe -LO "https://storage.googleapis.com/minikube/releases/latest/minikube-windows-amd64.exe"`

Rename the application:

`ren minikube-windows-amd64.exe minikube.exe`

Step 6: Start Minikube

(Now start a single-node cluster using below command)

minikube start --driver=docker

Verify: (use below command to verify kubectl)

`kubectl get nodes`

☑️ Now you have Kubernetes running locally!

Option B: Docker Desktop with Kubernetes

If you don't want Minikube:

1. Open Docker Desktop → Settings → Kubernetes

2. Tick Enable Kubernetes → Apply & Restart

3. Once running, test with:

`kubectl get nodes`

1. Create a Docker Hub Account

Go to <https://hub.docker.com>

Sign up (free)

Your username will be used in the image name (e.g., cjitscse/exp7:tag).

2. Login to Docker Hub

Open PowerShell (Windows) or Terminal (Linux/macOS):

`docker login`

It will ask for your:

Username

Password (or Access Token)

☒ **If successful:**

Login Succeeded

3. Build Docker Image

Move into your project folder (exp7/) where Dockerfile exists:

```
cd exp7
```

Build the image with your Docker Hub username:

```
docker build -t cjitscse/exp7-app:latest .
```

Example:

```
docker build -t cjitscse/exp7-app:latest .
```

5. Push Image to Docker Hub

Now push it:

```
docker push cjitscse/exp7-app:latest
```

6. Verify on Docker Hub

☐ **Log in to Docker Hub**

☐ **You'll see a new repository exp8-app under your account.**