

# Assignments

## Kubernetes:

Kubernetes is an open-source container orchestration platform used to deploy, manage, scale, and run containerized applications automatically. It helps developers and DevOps teams run applications reliably by handling tasks such as container scheduling, load balancing, auto-scaling, self-healing (restarting failed containers), and rolling updates without downtime. Kubernetes works by grouping containers into units called pods and managing them across a cluster of machines (nodes) using a control plane. Instead of manually managing servers and containers, Kubernetes ensures that the desired state of an application is always maintained, making it widely used for microservices, cloud-native applications, and large-scale production systems.

## Minikube:

Minikube is a lightweight tool that allows you to run a single-node Kubernetes cluster locally on your computer. It is mainly used for learning, development, and testing purposes, enabling developers to practice Kubernetes concepts without needing a cloud environment or multiple servers. Minikube runs Kubernetes inside a virtual machine or container and supports core Kubernetes features such as pods, deployments, services, and add-ons like the dashboard. It is commonly used by beginners and DevOps engineers to test applications locally before deploying them to production Kubernetes clusters.

## Steps to Start the minikube in windows:

### Step 1:(Download the minikube)

The screenshot shows a web browser window with the URL [minikube.sigs.k8s.io/docs/start/?arch=%2Fwindows%2Fx86\\_64%2fstable%2F.exe+download](https://minikube.sigs.k8s.io/docs/start/?arch=%2Fwindows%2Fx86_64%2fstable%2F.exe+download). The page is titled "minikube" and has a sidebar with links like Documentation, Get Started!, Handbook, Basic controls, Deploying apps, Kubectl, Accessing apps, Addons, Configuration, Dashboard, Pushing images, Proxies and VPNs, Registries, Certificates, Offline usage, Host access, Network Policy, Persistent Volumes, and Mounting filesystems. The main content area is titled "1 Installation". It says "Click on the buttons that describe your target platform. For other architectures, see the release page for a complete list of minikube binaries." Below this are four buttons: "Operating system" (Windows is selected), "Architecture" (x86-64 is selected), "Release type" (Stable is selected), and "Installer type" (.exe download is selected). A note below says "To install the latest minikube stable release on x86-64 Windows using .exe download:". Step 1 is listed: "1. Download and run the installer for the latest release. Or if using PowerShell , use this command:" followed by a PowerShell command in a code block.

```
New-Item -Path 'c:' -Name 'minikube' -ItemType Directory -Force  
$ProgressPreference = 'SilentlyContinue'; Invoke-WebRequest -OutFile 'c:\minikube\minikube.exe' -Uri 'https://github.com/kut'
```

## Step 2:(Download the Docker desktop)

The screenshot shows the Docker Desktop documentation page on the Docker website. The URL is <https://docs.docker.com/desktop/setup/install/windows-install/>. The page is titled "Install Docker Desktop on Windows". On the left, there's a sidebar with various links such as Model Runner, Ask Gordon, AI and Docker Compose, and a detailed "Install" section for Windows. The main content area has a "Docker Desktop terms" section, followed by a "System requirements" section which includes a "Tip" about using Hyper-V or WSL.

## Step 3:(Download the kubectl in cmd)

### Commands:

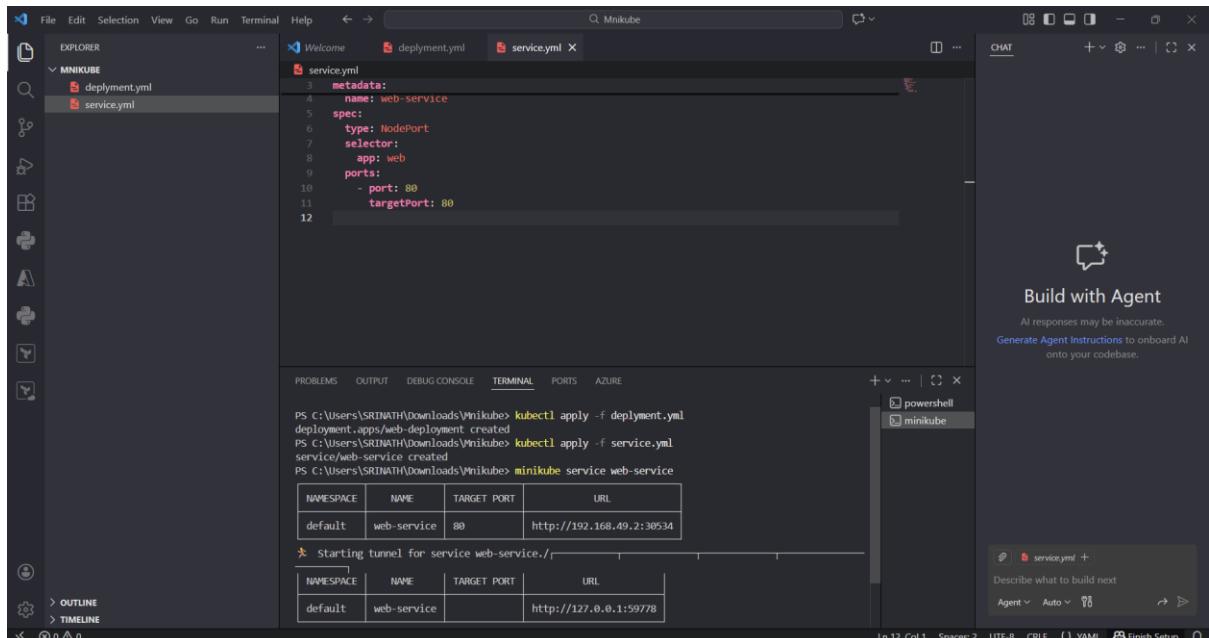
```
cd C:\  
mkdir kubectl  
cd kubectl  
curl -LO https://dl.k8s.io/release/v1.30.0/bin/windows/amd64/kubectl.exe  
setx PATH "%PATH%;C:\kubectl"  
close and open  
kubectl version --client
```

## Step 4:(Start the minikube)

Command: minikube Start

```
C:\Users\SRINATH>minikube start
* minikube v1.37.0 on Microsoft Windows 11 Home Single Language 10.0.26200.7462 Build 26200.7462
* Automatically selected the docker driver
* Using Docker Desktop driver with root privileges
* Starting "minikube" primary control-plane node in "minikube" cluster
* Pulling base image v0.0.48 ...
* Downloading Kubernetes v1.34.0 preloaded ...
    > preloaded-images-k8s-v18-v1...: 46.77 MiB / 337.07 MiB [>] 0.01% ? p/    > gcr.io/k8s-minikube/kicbase...: 0 B [-----] ?% ? p/
    > preloaded-images-k8s-v18-v1...: 78.76 MiB / 337.07 MiB [>] 0.02% ? p/    > gcr.io/k8s-minikube/kicbase...: 0 B [-----] ?% ? p/    > prela
    *d_IMAGES-k8s-v18-v1...: 478.76 MiB / 337.07 MiB [0.14% ? p/    > gcr.io/k8s-minikube/kicbase...: 0 B [-----] ?% ? p/    > prela
    *d_IMAGES-k8s-v18-v1...: 1.01 MiB / 337.07 MiB 0.30% 1.61 MiB    > gcr.io/k8s-minikube/kicbase...: 1.61 MiB / 488.52 MiB 0.00% 2.68 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 1.01 MiB / 337.07 MiB 0.59% 1.61 MiB    > gcr.io/k8s-minikube/kicbase...: 1.61 MiB / 488.52 MiB 0.00% 2.68 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 3.41 MiB / 337.07 MiB 1.01% 1.61 MiB    > gcr.io/k8s-minikube/kicbase...: 1.61 MiB / 488.52 MiB 0.00% 2.68 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 4.83 MiB / 337.07 MiB 1.43% 1.92 MiB    > gcr.io/k8s-minikube/kicbase...: 1.61 MiB / 488.52 MiB 0.00% 2.51 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 5.75 MiB / 337.07 MiB 1.71% 1.92 MiB    > gcr.io/k8s-minikube/kicbase...: 2.50 MiB / 488.52 MiB 0.00% 2.51 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 7.01 MiB / 337.07 MiB 2.08% 1.92 MiB    > gcr.io/k8s-minikube/kicbase...: 257.75 MiB / 488.52 MiB 0.05% 2.51 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 8.17 MiB / 337.07 MiB 2.42% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 1.03 MiB / 488.52 MiB 0.21% 115.82 K    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 8.92 MiB / 337.07 MiB 2.65% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 2.42 MiB / 488.52 MiB 0.50% 115.82 K    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 9.20 MiB / 337.07 MiB 2.73% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 3.67 MiB / 488.52 MiB 0.75% 115.82 K    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 9.48 MiB / 337.07 MiB 2.81% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 5.27 MiB / 488.52 MiB 1.08% 574.78 K    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 9.92 MiB / 337.07 MiB 2.94% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 6.88 MiB / 488.52 MiB 1.39% 574.78 K    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 10.39 MiB / 337.07 MiB 3.08% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 8.33 MiB / 488.52 MiB 1.71% 574.78 K    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 10.88 MiB / 337.07 MiB 3.20% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 9.81 MiB / 488.52 MiB 2.01% 1.01 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 11.33 MiB / 337.07 MiB 3.36% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 10.97 MiB / 488.52 MiB 2.25% 1.01 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 12.17 MiB / 337.07 MiB 3.61% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...: 12.36 MiB / 488.52 MiB 2.53% 1.01 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 12.73 MiB / 337.07 MiB 3.78% 2.2 MiB    > gcr.io/k8s-minikube/kicbase...: 13.66 MiB / 488.52 MiB 2.80% 1.36 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 13.33 MiB / 337.07 MiB 3.95% 2.23 MiB    > gcr.io/k8s-minikube/kicbase...: 16.16 MiB / 488.52 MiB 3.31% 1.36 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 14.55 MiB / 337.07 MiB 4.32% 2.28 MiB    > gcr.io/k8s-minikube/kicbase...: 17.49 MiB / 488.52 MiB 3.58% 1.69 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 14.88 MiB / 337.07 MiB 4.42% 2.28 MiB    > gcr.io/k8s-minikube/kicbase...: 18.89 MiB / 488.52 MiB 3.87% 1.69 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 15.51 MiB / 337.07 MiB 4.60% 2.28 MiB    > gcr.io/k8s-minikube/kicbase...: 19.55 MiB / 488.52 MiB 4.00% 1.69 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 16.42 MiB / 337.07 MiB 4.87% 2.33 MiB    > gcr.io/k8s-minikube/kicbase...: 20.36 MiB / 488.52 MiB 4.17% 1.89 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 17.48 MiB / 337.07 MiB 5.19% 2.33 MiB    > gcr.io/k8s-minikube/kicbase...: 21.77 MiB / 488.52 MiB 4.46% 1.89 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 18.11 MiB / 337.07 MiB 5.37% 2.33 MiB    > gcr.io/k8s-minikube/kicbase...: 23.27 MiB / 488.52 MiB 4.76% 1.89 MiB    > preloaded-
    *d_IMAGES-k8s-v18-v1...: 18.39 MiB / 337.07 MiB 5.46% 2.40 MiB    > gcr.io/k8s-minikube/kicbas
```

## Step 5: (Create a deployment & Service.yml file)



**Code:****Deployment.yml:**

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: web-deployment
spec:
  replicas: 2
  selector:
    matchLabels:
      app: web
  template:
    metadata:
      labels:
        app: web
    spec:
      containers:
        - name: web
          image: nginx:latest
          ports:
            - containerPort: 80
```

**Service.yml**

```
apiVersion: v1
kind: Service
metadata:
  name: web-service
spec:
  type: NodePort
  selector:
    app: web
  ports:
    - port: 80
      targetPort: 80
```

## Step 6: (Save the file run the commands)

```
kubectl apply -f deployment.yaml  
kubectl apply -f service.yaml  
minikube service web-service
```

## Output:

