Assignments

Kubernetes:

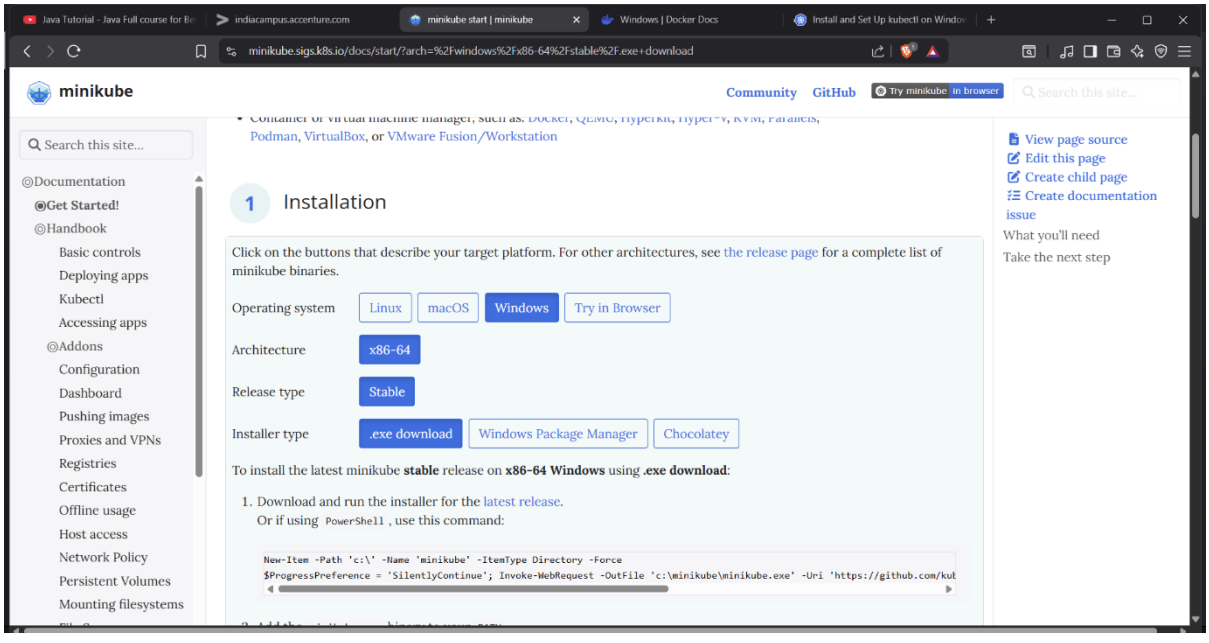
Kubernetes is an open-source container orchestration platform used to deploy, manage, scale, and run containerized applications automatically. It helps developers and DevOps teams run applications reliably by handling tasks such as container scheduling, load balancing, auto-scaling, self-healing (restarting 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:

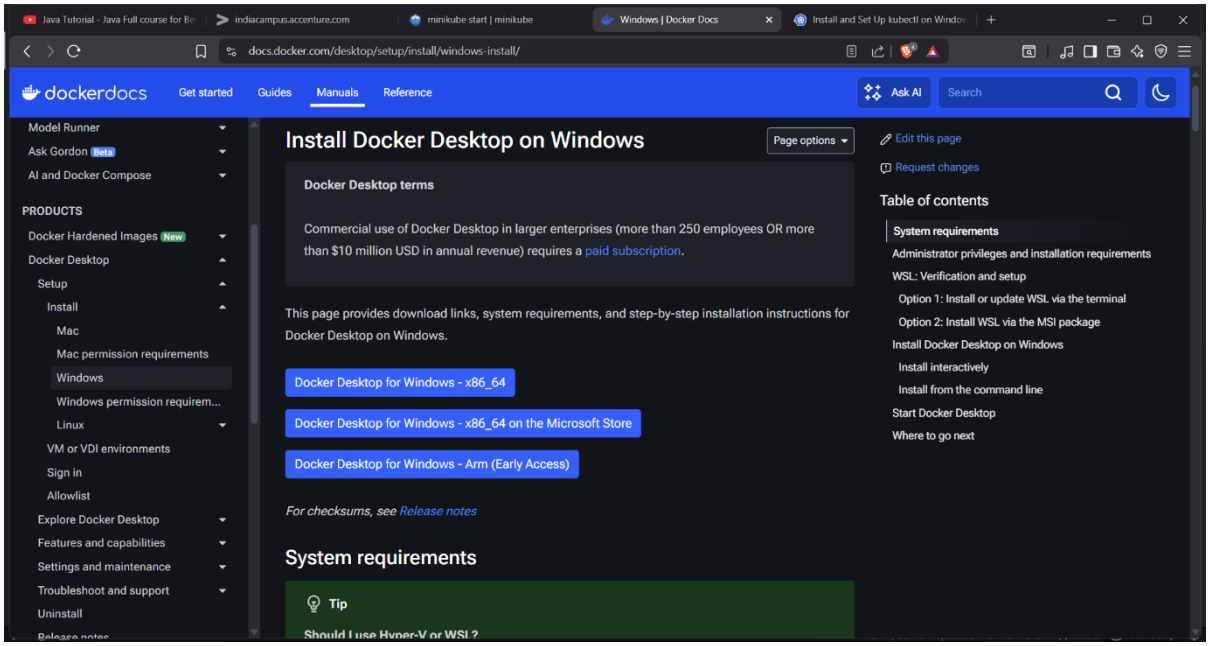
Minikube is a lightweight tool that allows you to run a single-node Kubernetes cluster locally on your computer. It is mainly used for learning, development, and testing purposes, enabling developers to practice Kubernetes concepts without needing a cloud environment or multiple servers. Minikube runs 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)



Step 2:(Download the Docker desktop)



Step 3:(Download the kubectl in cmd)

Commends:

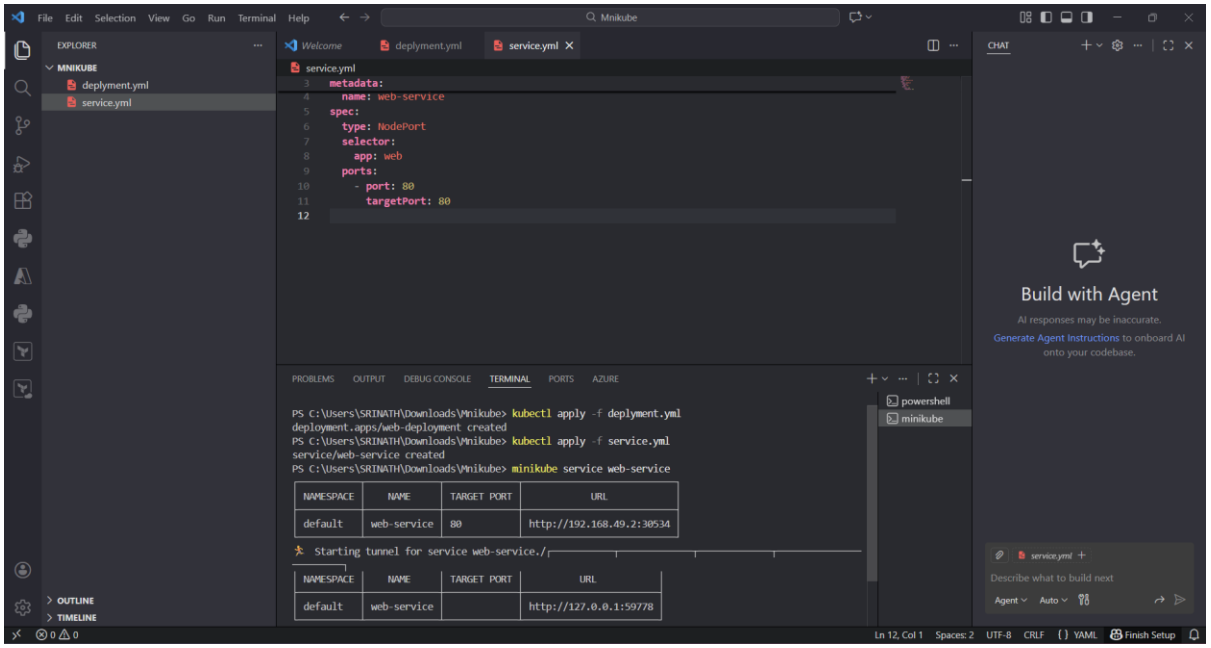
cd C:\
mkdir kubectl
cd kubectl
curl -LO https://dl.k8s.io/release/v1.30.0/bin/windows/amd64/kubectl.exe
setx PATH "%PATH%;C:\kubectl"
close and open
kubectl version –client

Step 4:(Start the minikube)

Commend: 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 preload ...
    > preloaded-images-k8s-v18-v1...:  46.77 KiB / 337.07 MiB [>] 0.01% ? p/    > gcr.io/k8s-minikube/kicbase...:  0 B [_____________________] ?% ? p/
> preloaded-images-k8s-v18-v1...:  78.76 KiB / 337.07 MiB [>] 0.02% ? p/    > gcr.io/k8s-minikube/kicbase...:  0 B [_____________________] ?% ? p/    > pr
eloaded-images-k8s-v18-v1...:  478.76 KiB / 337.07 MiB [] 0.14% ? p/    > gcr.io/k8s-minikube/kicbase...:  0 B [_____________________] ?% ? p/    > preloa
ded-images-k8s-v18-v1...:  1.01 MiB / 337.07 MiB  0.30% 1.61 MiB    > gcr.io/k8s-minikube/kicbase...:  1.61 KiB / 488.52 MiB  0.00% 2.68 KiB    > preloaded-
images-k8s-v18-v1...:  1.98 MiB / 337.07 MiB  0.59% 1.61 MiB    > gcr.io/k8s-minikube/kicbase...:  1.61 KiB / 488.52 MiB  0.00% 2.68 KiB    > preloaded-imag
es-k8s-v18-v1...:  3.41 MiB / 337.07 MiB  1.01% 1.61 MiB    > gcr.io/k8s-minikube/kicbase...:  1.61 KiB / 488.52 MiB  0.00% 2.68 KiB    > preloaded-images-k
8s-v18-v1...:  4.83 MiB / 337.07 MiB  1.43% 1.92 MiB    > gcr.io/k8s-minikube/kicbase...:  1.61 KiB / 488.52 MiB  0.00% 2.51 KiB    > preloaded-images-k8s-v
18-v1...:  5.75 MiB / 337.07 MiB  1.71% 1.92 MiB    > gcr.io/k8s-minikube/kicbase...:  2.50 KiB / 488.52 MiB  0.00% 2.51 KiB    > preloaded-images-k8s-v18-v
1...:  7.01 MiB / 337.07 MiB  2.08% 1.92 MiB    > gcr.io/k8s-minikube/kicbase...:  257.75 KiB / 488.52 MiB  0.05% 2.51 K    > preloaded-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-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-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-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-images-k8s-v18-v1...:  9.92 MiB / 33
7.07 MiB  2.94% 2.16 MiB    > gcr.io/k8s-minikube/kicbase...:  6.80 MiB / 488.52 MiB  1.39% 574.78 K    > preloaded-images-k8s-v18-v1...:  10.39 MiB / 337.0
7 MiB  3.08% 2.16 Mi    > gcr.io/k8s-minikube/kicbase...:  8.33 MiB / 488.52 MiB  1.71% 574.78 K    > preloaded-images-k8s-v18-v1...:  10.80 MiB / 337.07 Mi
B  3.20% 2.16 Mi    > gcr.io/k8s-minikube/kicbase...:  9.81 MiB / 488.52 MiB  2.01% 1.01 MiB    > preloaded-images-k8s-v18-v1...:  11.33 MiB / 337.07 MiB  3
.36% 2.16 Mi    > gcr.io/k8s-minikube/kicbase...:  10.97 MiB / 488.52 MiB  2.25% 1.01 Mi    > preloaded-images-k8s-v18-v1...:  12.17 MiB / 337.07 MiB  3.61%
 2.16 Mi    > gcr.io/k8s-minikube/kicbase...:  12.36 MiB / 488.52 MiB  2.53% 1.01 Mi    > preloaded-images-k8s-v18-v1...:  12.73 MiB / 337.07 MiB  3.78% 2.2
3 Mi    > gcr.io/k8s-minikube/kicbase...:  13.66 MiB / 488.52 MiB  2.80% 1.36 Mi    > preloaded-images-k8s-v18-v1...:  13.33 MiB / 337.07 MiB  3.95% 2.23 Mi
    > gcr.io/k8s-minikube/kicbase...:  14.80 MiB / 488.52 MiB  3.03% 1.36 Mi    > preloaded-images-k8s-v18-v1...:  13.86 MiB / 337.07 MiB  4.11% 2.23 Mi
> gcr.io/k8s-minikube/kicbase...:  16.16 MiB / 488.52 MiB  3.31% 1.36 Mi    > preloaded-images-k8s-v18-v1...:  14.55 MiB / 337.07 MiB  4.32% 2.28 Mi    > gc
r.io/k8s-minikube/kicbase...:  17.49 MiB / 488.52 MiB  3.58% 1.69 Mi    > preloaded-images-k8s-v18-v1...:  14.89 MiB / 337.07 MiB  4.42% 2.28 Mi    > gcr.io
/k8s-minikube/kicbase...:  18.89 MiB / 488.52 MiB  3.87% 1.69 Mi    > preloaded-images-k8s-v18-v1...:  15.51 MiB / 337.07 MiB  4.60% 2.28 Mi    > gcr.io/k8s
-minikube/kicbase...:  19.55 MiB / 488.52 MiB  4.00% 1.69 Mi    > preloaded-images-k8s-v18-v1...:  16.42 MiB / 337.07 MiB  4.87% 2.33 Mi    > gcr.io/k8s-min
ikube/kicbase...:  20.36 MiB / 488.52 MiB  4.17% 1.89 Mi    > preloaded-images-k8s-v18-v1...:  17.48 MiB / 337.07 MiB  5.19% 2.33 Mi    > gcr.io/k8s-minikub
e/kicbase...:  21.77 MiB / 488.52 MiB  4.46% 1.89 Mi    > preloaded-images-k8s-v18-v1...:  18.11 MiB / 337.07 MiB  5.37% 2.33 Mi    > gcr.io/k8s-minikube/ki
cbase...:  23.27 MiB / 488.52 MiB  4.76% 1.89 Mi    > preloaded-images-k8s-v18-v1...:  18.39 MiB / 337.07 MiB  5.46% 2.40 Mi    > 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 commends)

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

Output: