Kubernetes

Kubernetes (K8s) is an open-source container orchestration platform that automates the deployment, scaling, and management of containerized applications. It provides a framework for running distributed systems resiliently, ensuring high availability, load balancing, and fault tolerance across multiple containers.

Minikube

Minikube is a lightweight Kubernetes implementation designed for local development and testing. It enables developers to run a single-node Kubernetes cluster on their local machine, making it easier to experiment with Kubernetes features before deploying applications to a full-scale production cluster.

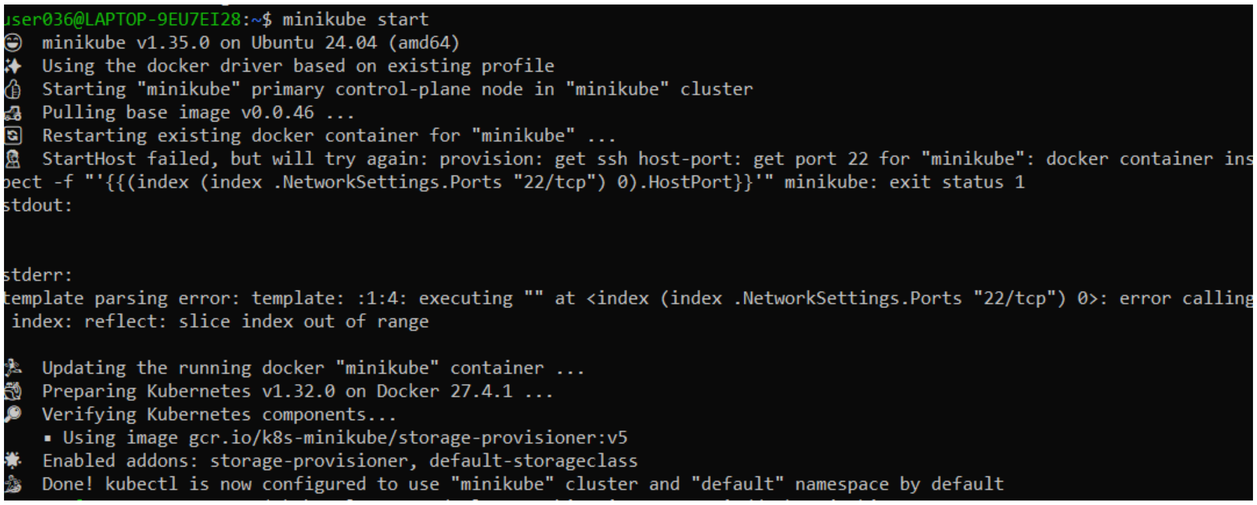
Prerequisites

★ Ubuntu installed on your system
★ Docker installed and running
★ Minikube installed and configured
★ kubectl (Kubernetes CLI) installed

Steps to Run a Docker Image in Minikube

Step 1: Start Minikube

Open a terminal and start Minikube with:

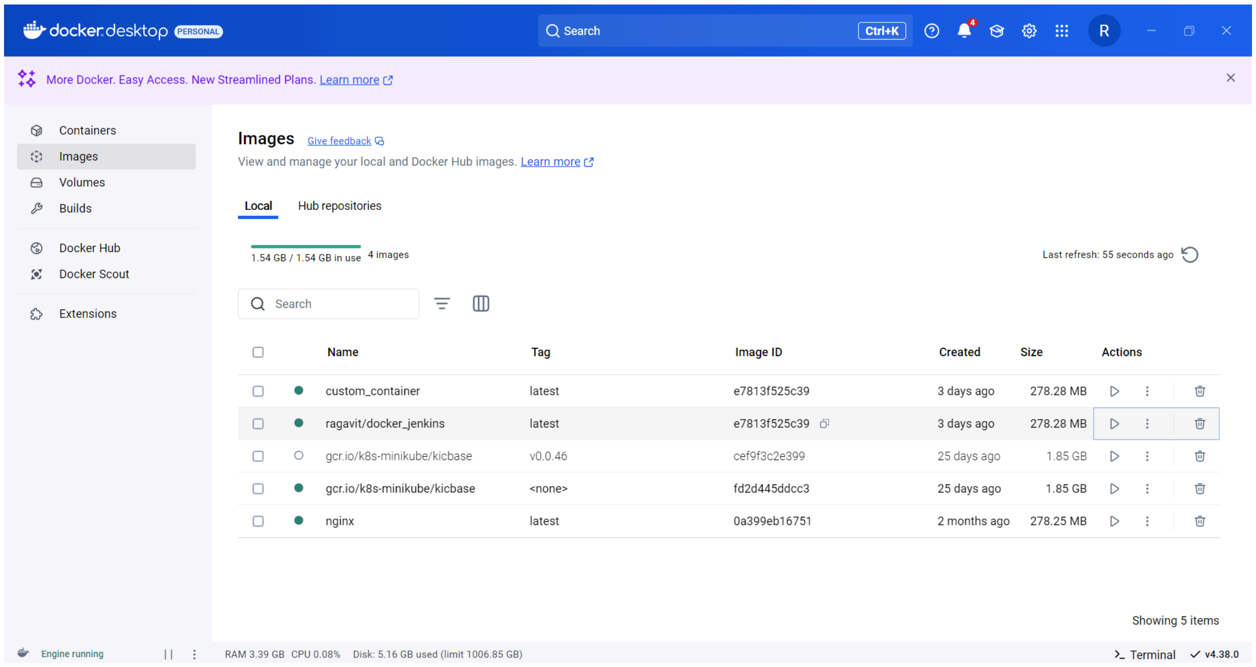


```
user036@LAPTOP-9EU7EI28:~$ minikube start
   minikube v1.35.0 on Ubuntu 24.04 (amd64)
   Using the docker driver based on existing profile
   Starting "minikube" primary control-plane node in "minikube" cluster
   Pulling base image v0.0.46 ...
   Restarting existing docker container for "minikube" ...
   StartHost failed, but will try again: provision: get ssh host-port: get port 22 for "minikube": docker container ins
pect -f "'{{(index (index .NetworkSettings.Ports "22/tcp") 0).HostPort}}'" minikube: exit status 1
stdout:


stderr:
template parsing error: template: :1:4: executing "" at <index (index .NetworkSettings.Ports "22/tcp") 0>: error calling
 index: reflect: slice index out of range

   Updating the running docker "minikube" container ...
   Preparing Kubernetes v1.32.0 on Docker 27.4.1 ...
   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
```

This initializes a local Kubernetes cluster.

Step 2: Run the Image in Docker

Go to docker and run the image that you want to deploy



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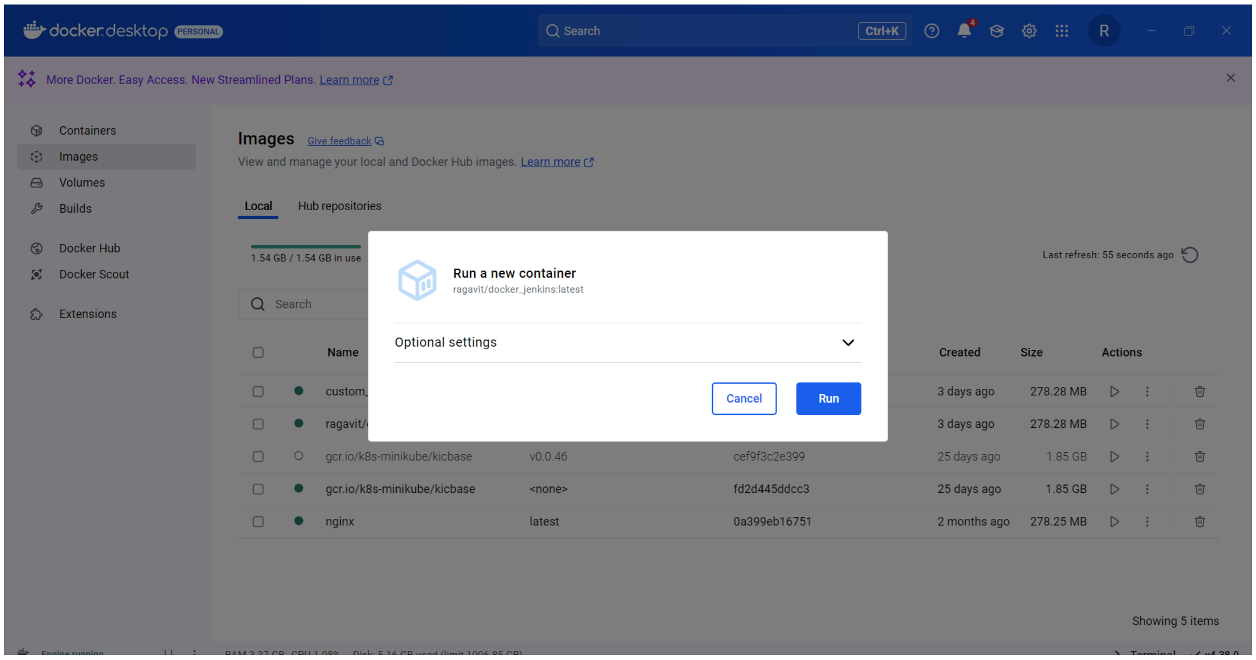
1.54 GB / 1.54 GB in use 4 images

Last refresh: 55 seconds ago

	Name	Tag	Image ID	Created	Size	Actions
●	custom_container	latest	e7813f525c39	3 days ago	278.28 MB	
●	ragavit/docker_jenkins	latest	e7813f525c39	3 days ago	278.28 MB	
○	gcr.io/k8s-minikube/kicbase	v0.0.46	cef9f3c2e399	25 days ago	1.85 GB	
●	gcr.io/k8s-minikube/kicbase	<none>	fd2d445ddcc3	25 days ago	1.85 GB	
●	nginx	latest	0a399eb16751	2 months ago	278.25 MB	

Showing 5 items

Engine running RAM 3.39 GB CPU 0.08% Disk: 5.16 GB used (limit 1006.85 GB) Terminal v4.38.0



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Run a new container
ragavit/docker_jenkins:latest

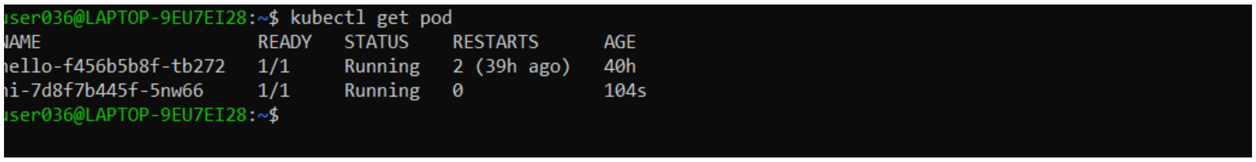
Optional settings

Name			Created	Size	Actions
custom_			3 days ago	278.28 MB	
ragavit/			3 days ago	278.28 MB	
gcr.io/k8s-minikube/kicbase	v0.0.46	cef9f3c2e399	25 days ago	1.85 GB	
gcr.io/k8s-minikube/kicbase	<none>	fd2d445ddcc3	25 days ago	1.85 GB	
nginx	latest	0a399eb16751	2 months ago	278.25 MB	

Showing 5 items

Step 3: Verify Docker Images

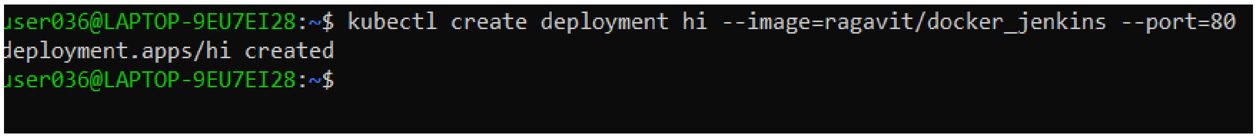
Check if your previously created Docker image is available inside Minikube's Docker environment



```
ser036@LAPTOP-9EU7EI28:~$ kubectl get pod
AME                       READY   STATUS    RESTARTS      AGE
ello-f456b5b8f-tb272      1/1     Running   2 (39h ago)   40h
i-7d8f7b445f-5nw66        1/1     Running   0             104s
ser036@LAPTOP-9EU7EI28:~$
```

Step 4: Create a Kubernetes Deployment

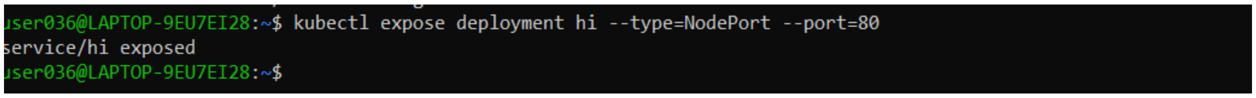
Create a Kubernetes deployment using your Docker image:



```
ser036@LAPTOP-9EU7EI28:~$ kubectl create deployment hi --image=ragavit/docker_jenkins --port=80
eployment.apps/hi created
ser036@LAPTOP-9EU7EI28:~$
```

Step 5: Expose the Deployment

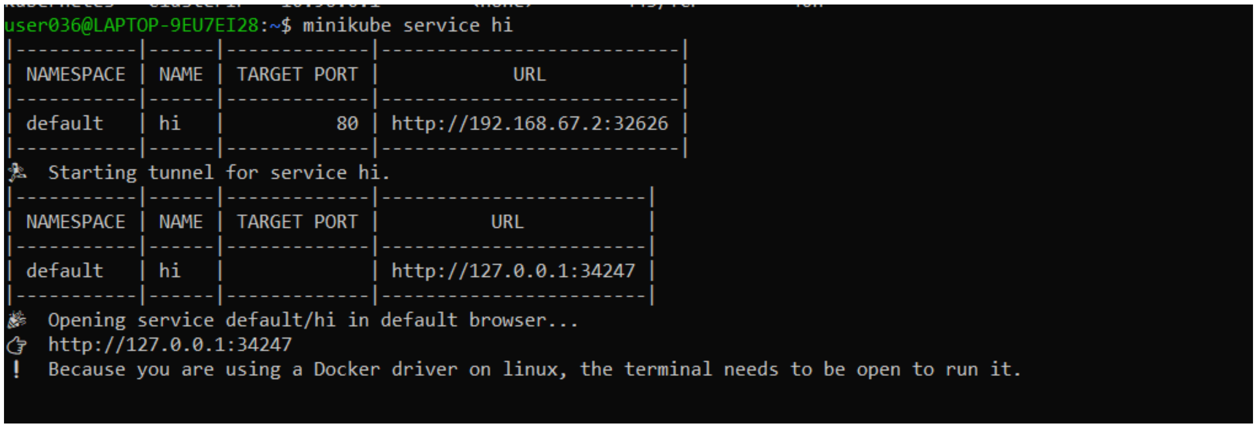
Expose the deployment as a service so it can be accessed:



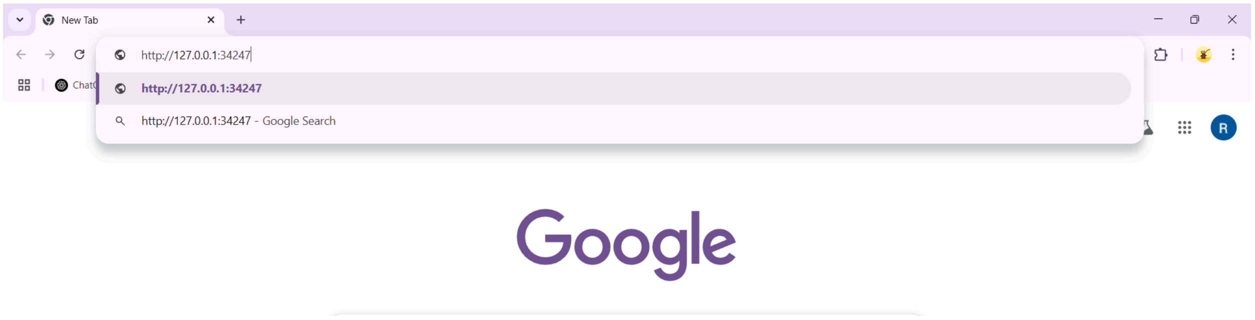
```
ser036@LAPTOP-9EU7EI28:~$ kubectl expose deployment hi --type=NodePort --port=80
ervice/hi exposed
ser036@LAPTOP-9EU7EI28:~$
```

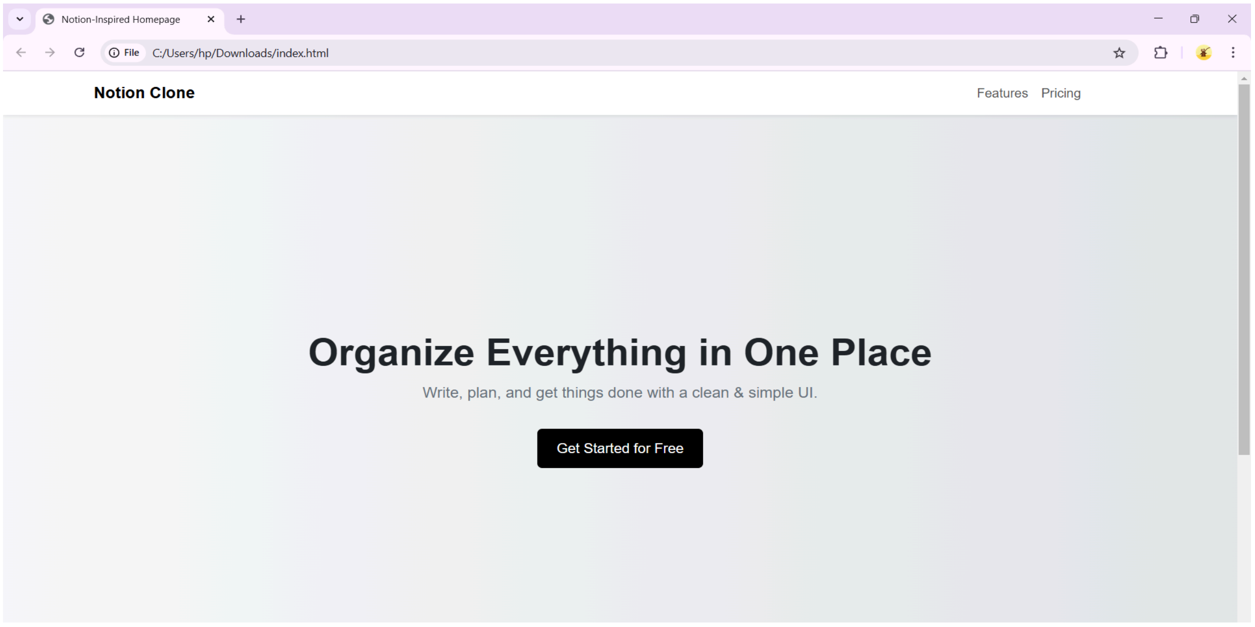
Step 6: Get the Service URL

To access your running container, get the service URL with:



```
user036@LAPTOP-9EU7EI28:~$ minikube service hi
|-----------|------|-------------|---------------------------|
| NAMESPACE | NAME | TARGET PORT |            URL            |
|-----------|------|-------------|---------------------------|
| default   | hi   |          80 | http://192.168.67.2:32626 |
|-----------|------|-------------|---------------------------|
🏃  Starting tunnel for service hi.
|-----------|------|-------------|------------------------|
| NAMESPACE | NAME | TARGET PORT |          URL           |
|-----------|------|-------------|------------------------|
| default   | hi   |             | http://127.0.0.1:34247 |
|-----------|------|-------------|------------------------|
🎉  Opening service default/hi in default browser...
👉  http://127.0.0.1:34247
❗  Because you are using a Docker driver on linux, the terminal needs to be open to run it.
```





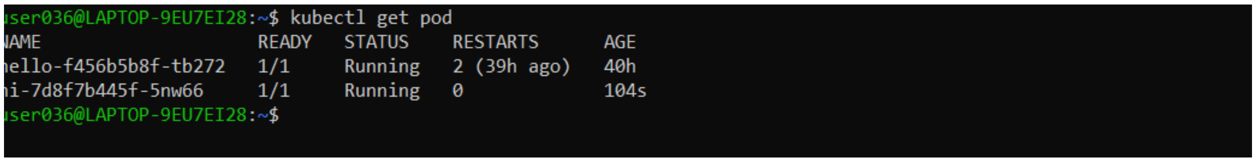
Organize Everything in One Place

Write, plan, and get things done with a clean & simple UI.

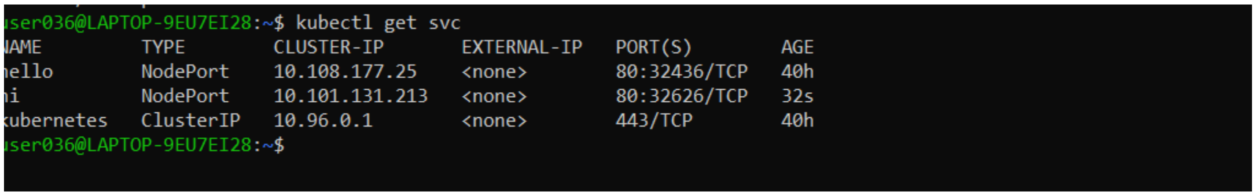
Copy and paste the provided URL into your browser to access the application.

Step 7: Verify the Deployment

Check the status of your deployment using:



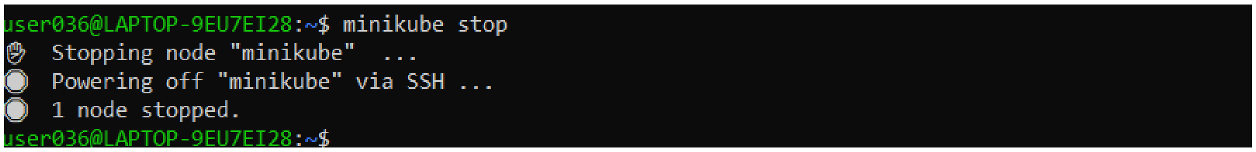
```
ıser036@LAPTOP-9EU7EI28:~$ kubectl get pod
IAME                    READY   STATUS    RESTARTS       AGE
ıello-f456b5b8f-tb272   1/1     Running   2 (39h ago)    40h
ıi-7d8f7b445f-5nw66     1/1     Running   0              104s
ıser036@LAPTOP-9EU7EI28:~$
```



```
ıser036@LAPTOP-9EU7EI28:~$ kubectl get svc
IAME         TYPE        CLUSTER-IP       EXTERNAL-IP   PORT(S)        AGE
ıello        NodePort    10.108.177.25    <none>        80:32436/TCP   40h
ıi           NodePort    10.101.131.213   <none>        80:32626/TCP   32s
ubernetes    ClusterIP   10.96.0.1        <none>        443/TCP        40h
ıser036@LAPTOP-9EU7EI28:~$
```

Step 8: Stop Minikube (Optional)

Once testing is complete, you can stop Minikube with:



```
user036@LAPTOP-9EU7EI28:~$ minikube stop
✋  Stopping node "minikube"  ...
🛑  Powering off "minikube" via SSH ...
🛑  1 node stopped.
user036@LAPTOP-9EU7EI28:~$
```

This structured procedure ensures that the Docker image runs successfully in Minikube on Ubuntu.