

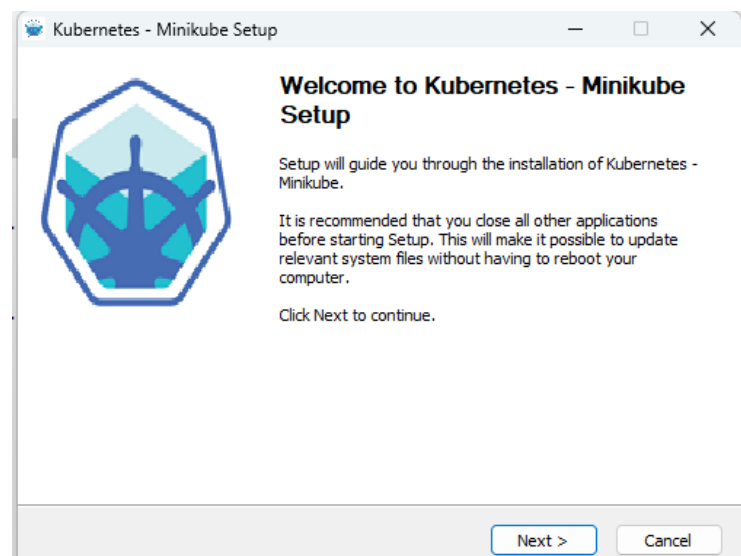
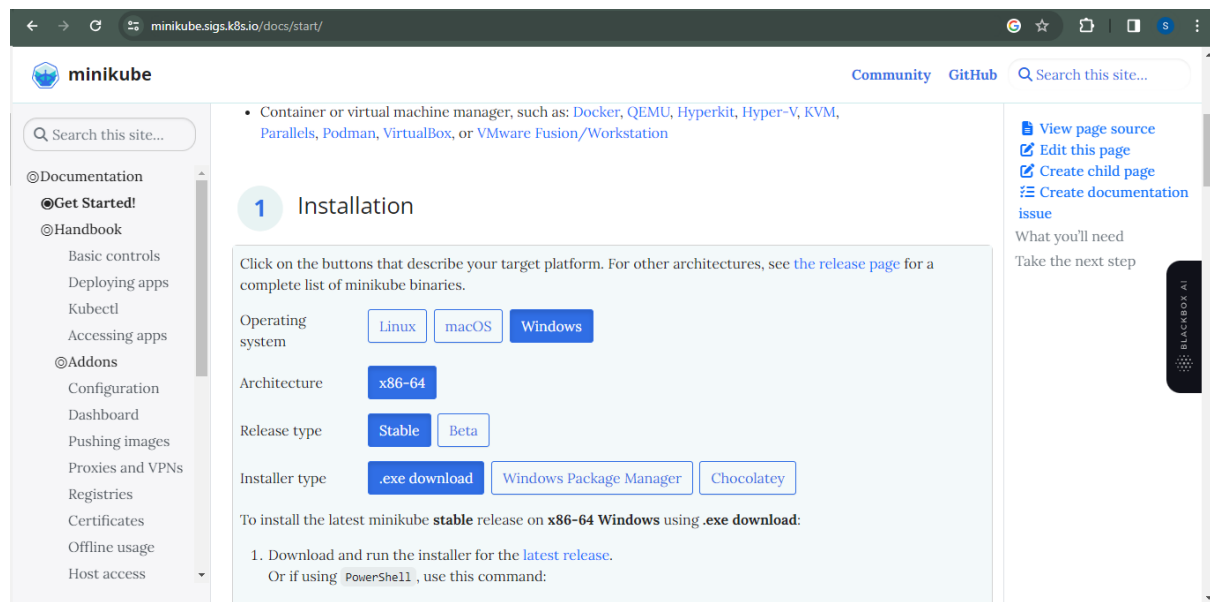
Kubernetes

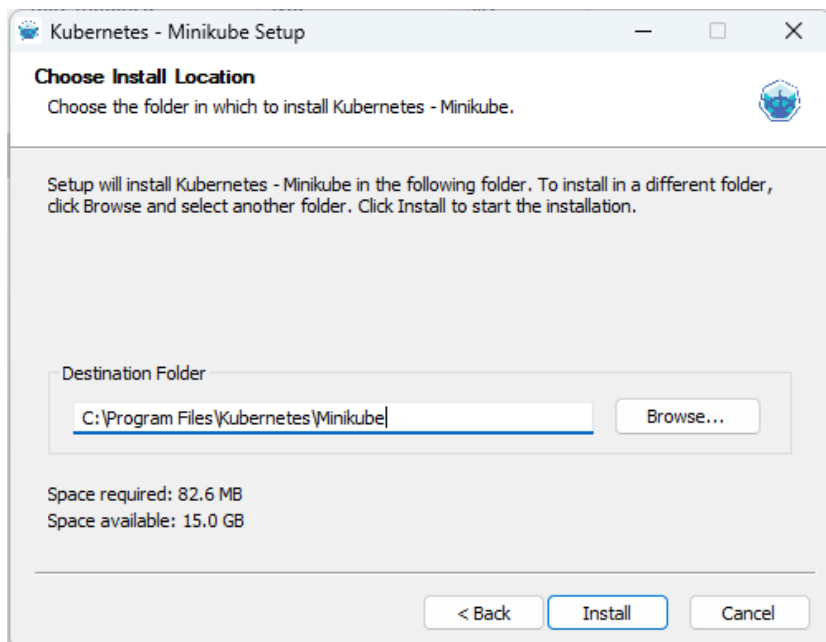
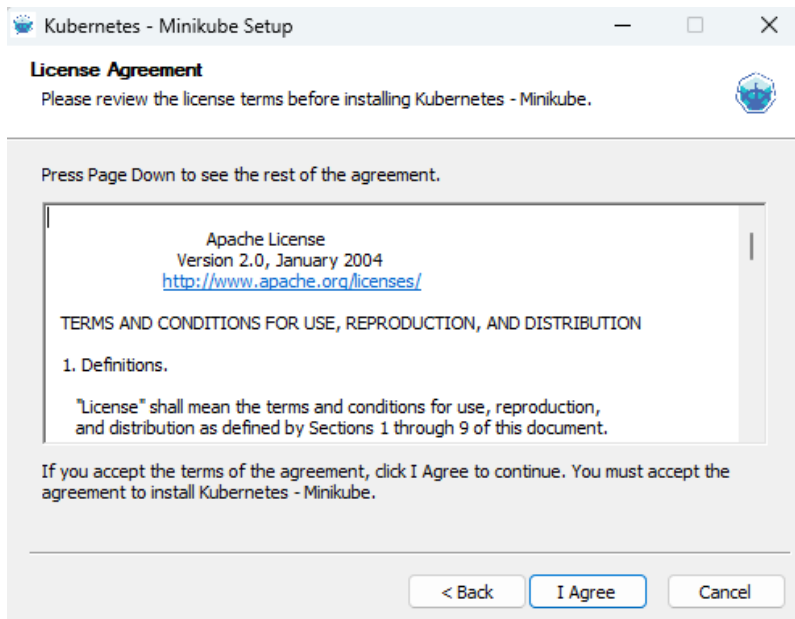
Prerequisites:

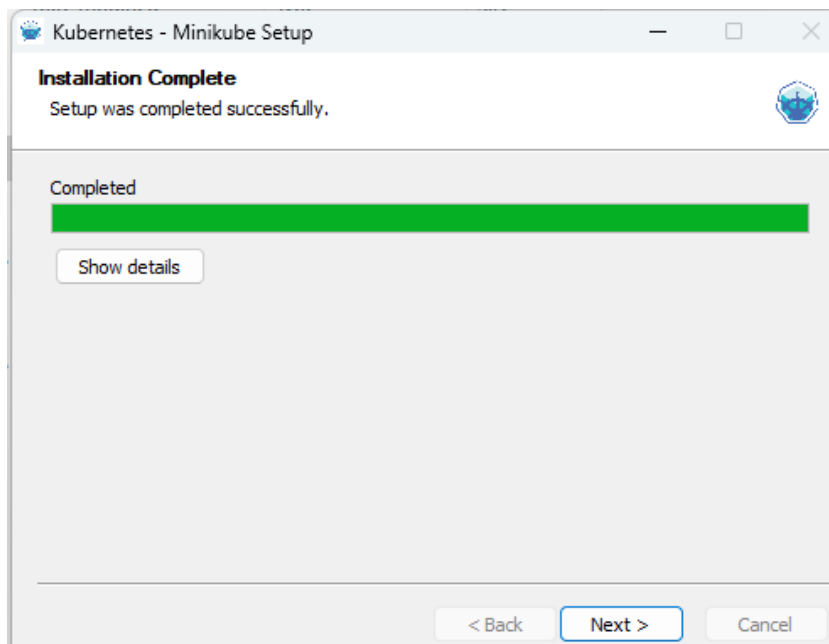
- 2 CPUs or more
- 2GB of free memory
- 20GB of free disk space
- Internet connection
- Container or virtual machine manager, such as: [Docker](#), [QEMU](#), [Hyperkit](#), [HyperV](#), [KVM](#), [Parallels](#), [Podman](#), [VirtualBox](#), or [VMware Fusion/Workstation](#)

Note: I will be using Docker in this document. Make sure you have Docker Desktop installed in your system.

Install Minikube







Start Your cluster

1) Now open windows powershell in admin mode and run the command:

minikube start

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\Lenovo> minikube start
W1025 09:29:24.743966 21456 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8ee1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* minikube v1.31.2 on Microsoft Windows 11 Home Single Language 10.0.22621.2428 Build 22621.2428
* Automatically selected the docker driver. Other choices: virtualbox, ssh
* Using Docker Desktop driver with root privileges
* Starting control plane node minikube in cluster minikube
* Pulling base image ...
* Downloading Kubernetes v1.27.4 preload ...
  > preloaded-images-k8s-v18-v1...: 393.21 MiB / 393.21 MiB 100.00% 2.36 Mi
  > gcr.io/k8s-minikube/kicbase...: 447.62 MiB / 447.62 MiB 100.00% 1.27 Mi
* Creating docker container (CPUs=2, Memory=2200MB) ...
! This container is having trouble accessing https://registry.k8s.io
* To pull new external images, you may need to configure a proxy: https://minikube.sigs.k8s.io/docs/reference/networking/proxy/
* Preparing Kubernetes v1.27.4 on Docker 24.0.4 ...
  - Generating certificates and keys ...
  - Booting up control plane ...
  - Configuring RBAC rules ...
* Configuring bridge CNI (Container Networking Interface) ...
* Verifying Kubernetes components...
  - Using image gcr.io/k8s-minikube/storage-provisioner:v5
* Enabled addons: default-storageclass, storage-provisioner
* Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
PS C:\Users\Lenovo>
```

Interact with your cluster

2) Now, you can interact with the cluster using the kubectl command line tool.

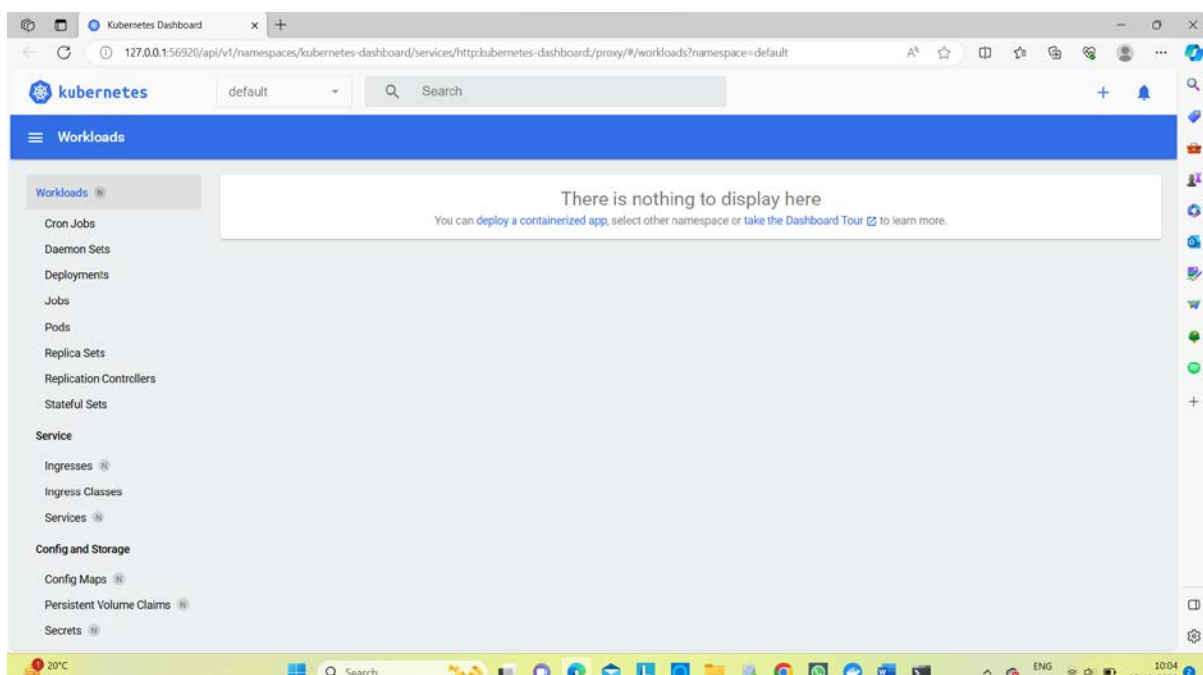
Kubectl get po -A

```
* Done! Kubectl is now configured to use minikube cluster and default namespace by default
PS C:\Users\Lenovo> kubectl get po -A
NAMESPACE      NAME                                                    READY   STATUS    RESTARTS   AGE
kube-system     coredns-5d78c9869d-nbjzr                             1/1     Running   0           84s
kube-system     etcd-minikube                                           1/1     Running   0           97s
kube-system     kube-apiserver-minikube                                1/1     Running   0           97s
kube-system     kube-controller-manager-minikube                       1/1     Running   0           97s
kube-system     kube-proxy-jnfjx                                         1/1     Running   0           85s
kube-system     kube-scheduler-minikube                                1/1     Running   0           97s
kube-system     storage-provisioner                                     1/1     Running   1 (74s ago) 96s
```

3) This command retrieves a list of all pods running in all namespaces within the Minikube Kubernetes cluster.

minikube kubectl -- get po -A

```
PS C:\Users\Lenovo> minikube kubectl -- get po -A
W1025 10:20:41.651157 23836 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8e6c1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
NAMESPACE      NAME                                                    READY   STATUS    RESTARTS   AGE
kube-system     coredns-5d78c9869d-nbjzr                             1/1     Running   2 (57s ago) 43m
kube-system     etcd-minikube                                           1/1     Running   2 (62s ago) 43m
kube-system     kube-apiserver-minikube                                1/1     Running   2 (52s ago) 43m
kube-system     kube-controller-manager-minikube                       1/1     Running   2 (62s ago) 43m
kube-system     kube-proxy-jnfjx                                         1/1     Running   2 (62s ago) 43m
kube-system     kube-scheduler-minikube                                1/1     Running   2 (62s ago) 43m
kube-system     storage-provisioner                                     1/1     Running   5 (34s ago) 43m
kubernetes-dashboard dashboard-metrics-scraper-5dd9cbfd69-w4bfc             1/1     Running   0           22m
kubernetes-dashboard kubernetes-dashboard-5c5cfc8747-b42mz               1/1     Running   2 (31s ago) 22m
```



4) This command opens a web-based interface for managing a local Kubernetes cluster created with Minikube.

Minikube dashboard

```
PS C:\Users\Lenovo> minikube dashboard
W1025 10:20:58.470127 20028 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8e6c1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* Verifying dashboard health ...
* Launching proxy ...
* Verifying proxy health ...
* Opening http://127.0.0.1:57475/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashboard:/proxy/ in your default browser...
```

Deploy Applications

i) Service

1) Create a sample deployment and expose it on port 8080:

```
kubectl create deployment hello-minikube --image=kicbase/echo-server:1.0
```

```
kubectl expose deployment hello-minikube --type=NodePort --port=8080
```

```
PS C:\Users\Lenovo> kubectl create deployment hello-minikube --image=kicbase/echo-server:1.0
deployment.apps/hello-minikube created
PS C:\Users\Lenovo> kubectl expose deployment hello-minikube --type=NodePort --port=8080
service/hello-minikube exposed
```

2) The above command will take a moment but the deployment will soon show up when you run:

```
kubectl get services hello-minikube
```

3) Now, the easiest way to access this service is to let the minikube launch a web browser for you:

```
minikube service hello-minikube
```

```
PS C:\Users\Lenovo> kubectl get services hello-minikube
NAME      TYPE      CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
hello-minikube  NodePort  10.100.24.197    <none>           8080:32356/TCP   20s
PS C:\Users\Lenovo> minikube service hello-minikube
W1025 10:22:41.636746 7384 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8ee1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
+ Starting tunnel for service hello-minikube
+ Opening service default/hello-minikube in default browser...
! Because you are using a Docker driver on windows, the terminal needs to be open to run it.
```

NAMESPACE	NAME	TARGET PORT	URL
default	hello-minikube	8080	http://192.168.49.2:32356

NAMESPACE	NAME	TARGET PORT	URL
default	hello-minikube		http://127.0.0.1:57545

The screenshot shows a web browser window with the address bar displaying '127.0.0.1:57545'. The page content shows a request log for the 'hello-minikube-59c4768566-z6pkk' service. The log includes the following details:

```
Request served by hello-minikube-59c4768566-z6pkk
HTTP/1.1 GET /
Host: 127.0.0.1:57545
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9
Connection: keep-alive
Sec-Ch-Ua: "Chromium";v="118", "Microsoft Edge";v="118", "Not=A?Brand";v="99"
Sec-Ch-Ua-Mobile: ?0
Sec-Ch-Ua-Platform: "Windows"
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: none
Sec-Fetch-User: ?1
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/118.0.0.0 Safari/537.36 Edg/118.0.2088.61
```

4) Alternatively, we can use kubectl to forward the port:

```
kubectl port-forward service/hello-minikube 7080:8080
```

Now we can access the application at:

http://localhost:7080/

```
PS C:\Users\Lenovo> kubectl port-forward service/hello-minikube 7080:8080
Forwarding from 127.0.0.1:7080 -> 8080
Forwarding from [::1]:7080 -> 8080
Handling connection for 7080
Handling connection for 7080
```

ii)Load Balancer

1) To use a LoadBalancer deployment, use the “minikube tunnel” command:

kubectl create deployment balanced --image=kicbase/echo-server:1.0

kubectl expose deployment balanced --type=LoadBalancer --port=8080

```
PS C:\Users\Lenovo> kubectl create deployment balanced --image=kicbase/echo-server:1.0
deployment.apps/balanced created
PS C:\Users\Lenovo> kubectl expose deployment balanced --type=LoadBalancer --port=8080
service/balanced exposed
```

2) In another window, start the tunnel to create a routable IP for the ‘balanced’ deployment:

minikube tunnel

```
Command Prompt - minikube x + v
Microsoft Windows [Version 10.0.22621.2428]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo>minikube tunnel
W1025 10:27:33.522368 21664 main.go:291] Unable to resolve the current Docker CLI context "default": context "default"
: context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a
33f0688f\meta.json: The system cannot find the path specified.
* Tunnel successfully started

* NOTE: Please do not close this terminal as this process must stay alive for the tunnel to be accessible ...

* Starting tunnel for service balanced.
```

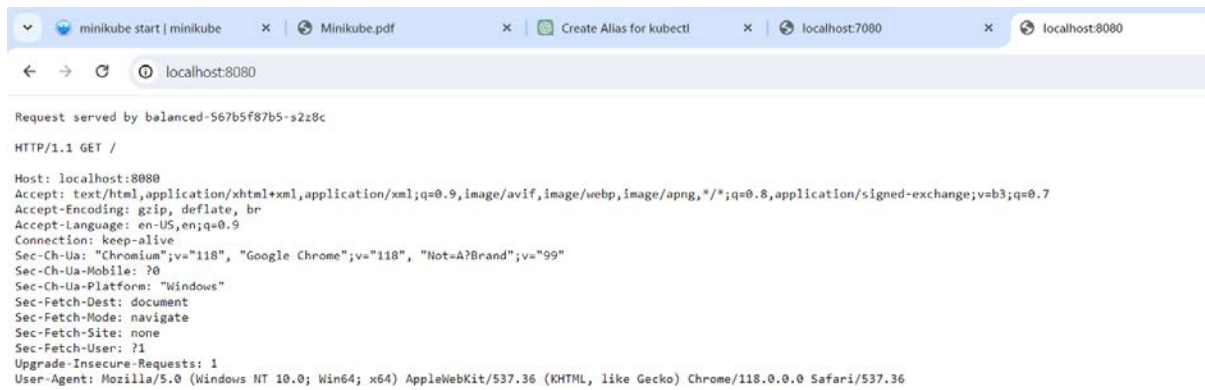
3) To find the routable IP, run this command and examine the EXTERNALIP column:

kubectl get services balanced

```
service/balanced exposed
PS C:\Users\Lenovo> kubectl get services balanced
NAME      TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)          AGE
balanced  LoadBalancer 10.101.255.1  127.0.0.1      8080:32220/TCP   89s
```

Your deployment is now available at <EXTERNAL-IP>:8080

Here in my case the External IP will be replaced by : 127.0.0.1



Manage Your Cluster

- 1) To pause Kubernetes without impacting deployed applications, run:

minikube pause

- 2) To unpause the paused instance, run:

minikube unpause

- 3) To change the default memory limit run:



minikube config set memory 9001

```
PS C:\Users\Lenovo> minikube pause
W1025 10:29:57.049999 23600 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8ee1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* Pausing node minikube ...
* Paused 18 containers in: kube-system, kubernetes-dashboard, storage-gluster, istio-operator
PS C:\Users\Lenovo> minikube unpause
W1025 10:31:45.379532 24464 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8ee1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* Unpausing node minikube ...
* Unpaused 18 containers in: kube-system, kubernetes-dashboard, storage-gluster, istio-operator
PS C:\Users\Lenovo> minikube config set memory 9001
W1025 10:38:20.268860 2752 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8ee1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
! These changes will take effect upon a minikube delete and then a minikube start
```

- 4) To browse the catalog of easily installed Kubernetes services, run:

minikube addons list

```
PS C:\Users\Lenovo> minikube addons list
W1025 10:38:42.572293 20568 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8eec1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
```

ADDON NAME	PROFILE	STATUS	MAINTAINER
ambassador	minikube	disabled	3rd party (Ambassador)
auto-pause	minikube	disabled	minikube
cloud-spanner	minikube	disabled	Google
csi-hostpath-driver	minikube	disabled	Kubernetes
dashboard	minikube	enabled 	Kubernetes
default-storageclass	minikube	enabled 	Kubernetes
efk	minikube	disabled	3rd party (Elastic)
freshpod	minikube	disabled	Google
gcp-auth	minikube	disabled	Google
gvisor	minikube	disabled	minikube
headlamp	minikube	disabled	3rd party (kinvolk.io)
helm-tiller	minikube	disabled	3rd party (Helm)
inaccel	minikube	disabled	3rd party (InAccel [info@inaccel.com])
ingress	minikube	disabled	Kubernetes
ingress-dns	minikube	disabled	minikube
inspektor-gadget	minikube	disabled	3rd party (inspektor-gadget.io)
istio	minikube	disabled	3rd party (Istio)
istio-provisioner	minikube	disabled	3rd party (Istio)
kong	minikube	disabled	3rd party (Kong HQ)
kubevirt	minikube	disabled	3rd party (KubeVirt)
logviewer	minikube	disabled	3rd party (unknown)
metallb	minikube	disabled	3rd party (MetalLB)
metrics-server	minikube	disabled	Kubernetes
nvidia-driver-installer	minikube	disabled	3rd party (Nvidia)
nvidia-gpu-device-plugin	minikube	disabled	3rd party (Nvidia)
olm	minikube	disabled	3rd party (Operator Framework)
pod-security-policy	minikube	disabled	3rd party (unknown)
portainer	minikube	disabled	3rd party (Portainer.io)
registry	minikube	disabled	minikube
registry-aliases	minikube	disabled	3rd party (unknown)

5) To create a second cluser running an older Kubernetes release, run:

minikube start -p aged --kubernetes-version=v1.16.1

6) To halt the cluser, run:

minikube stop

7) To delete all the minikube clusters, run:

minikube delete --all

```
PS C:\Users\Lenovo> minikube start -p aged --kubernetes-version=v1.16.1
W1025 10:39:03.007762 17608 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8eec1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* [aged] minikube v1.31.2 on Microsoft Windows 11 Home Single Language 10.0.22621.2428 Build 22621.2428
* Automatically selected the docker driver. Other choices: virtualbox, ssh

X Exiting due to MK_USAGE: Docker Desktop has only 3869MB memory but you specified 9001MB

PS C:\Users\Lenovo> minikube stop
W1025 10:39:35.226279 24136 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8eec1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* Stopping node "minikube" ...
* Powering off "minikube" via SSH ...
* 1 node stopped.
PS C:\Users\Lenovo> minikube delete --all
W1025 10:39:53.520128 24036 main.go:291] Unable to resolve the current Docker CLI context "default": context "default": context not found: open C:\Users\Lenovo\.docker\contexts\meta\37a8eec1ce19687d132fe29851dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.

X Exiting due to MK_USAGE: Usage: minikube delete
```