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IV - BCSAD

Assignment# 5 - Kubernetes Home Lab Activity

Hello Minikube

This tutorial shows you how to run a sample app on Kubernetes using minikube. The tutorial provides a container image that uses NGINX to echo back all the requests.

Objectives

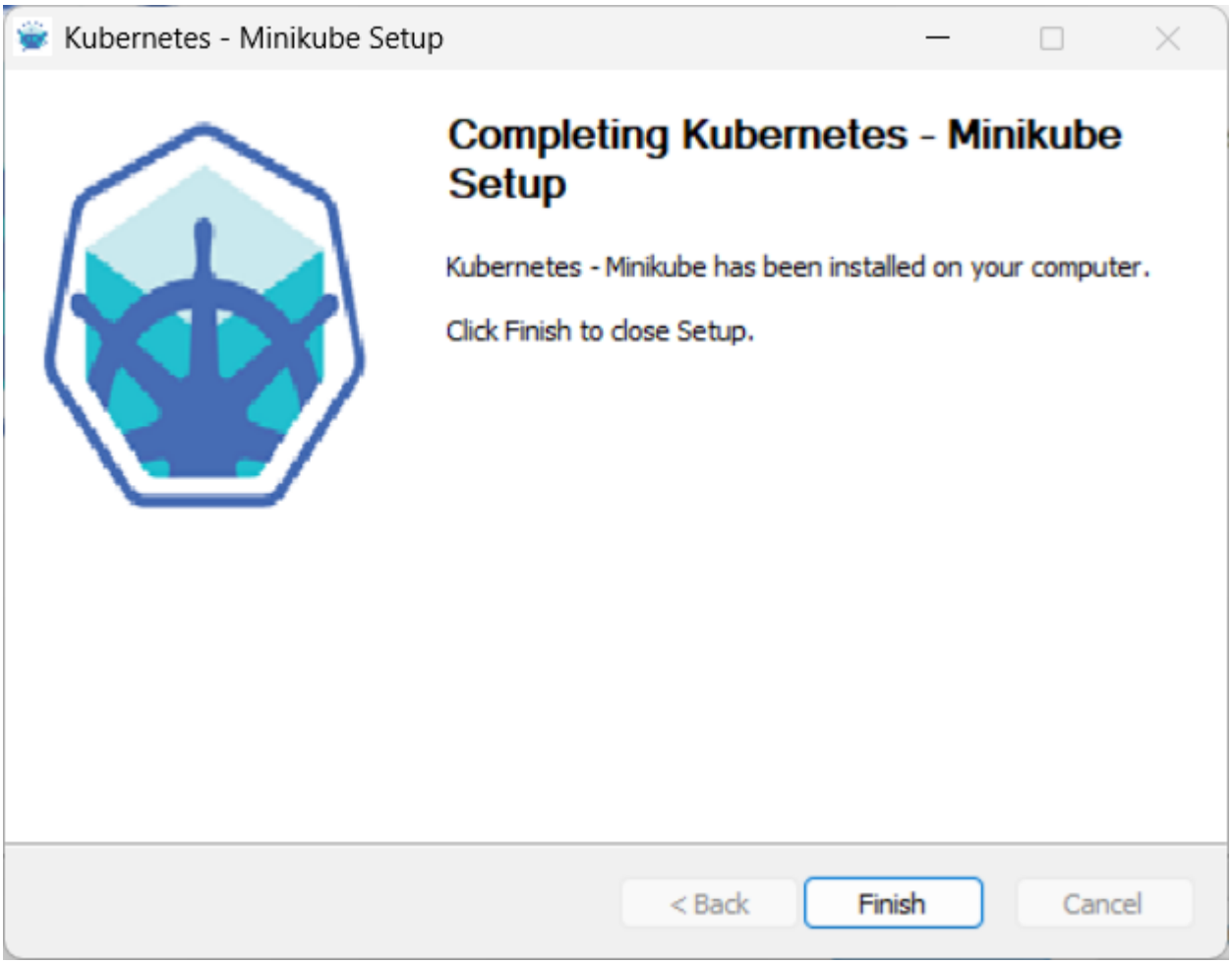
- Deploy a sample application to minikube.
- Run the app.
- View application logs.

Before you begin

This tutorial assumes that you have already set up minikube. See **Step 1** in minikube start for installation instructions.

Note: Only execute the instructions in **Step 1, Installation**. The rest is covered on this page.

You also need to install kubectl. See Install tools for installation instructions.



Create a minikube cluster

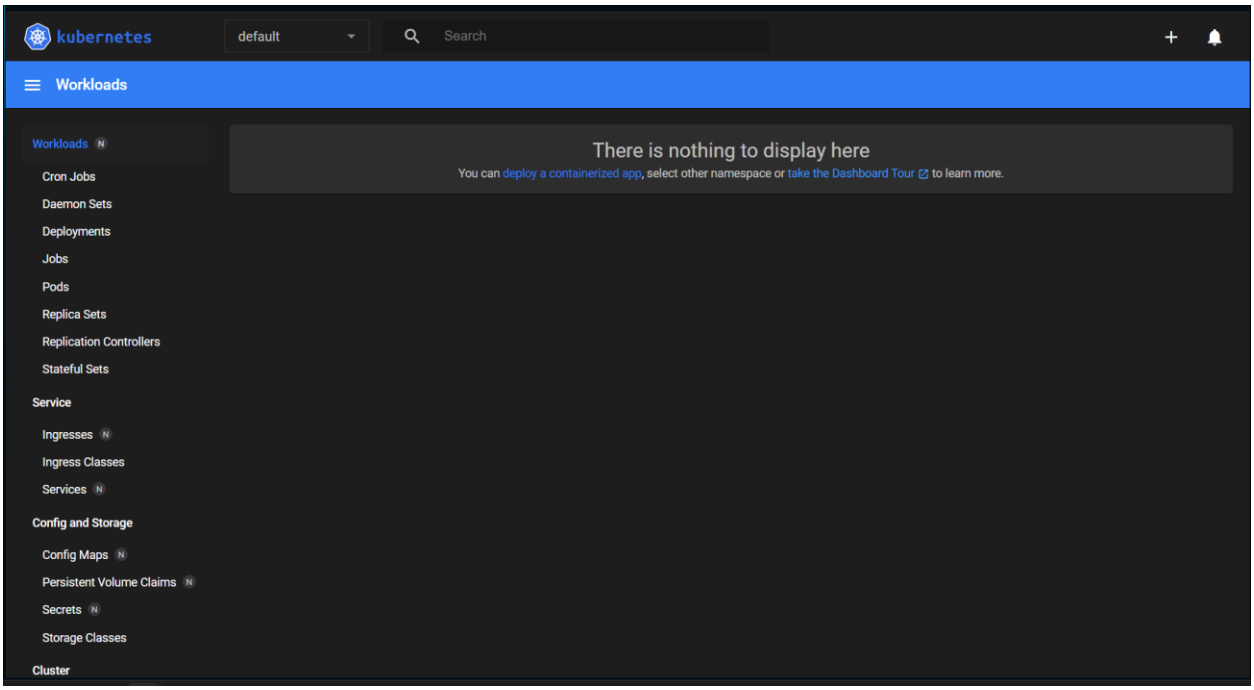
```
C:\Users\silen>minikube start
* minikube v1.37.0 on Microsoft Windows 11 Home 10.0.26200.7171 Build 26200.7171
* Automatically selected the docker driver
* Using Docker Desktop driver with root privileges
* Starting "minikube" primary control-plane node in "minikube" cluster
* Pulling base image v0.0.48 ...
* Downloading Kubernetes v1.34.0 preload ...
    > gcr.io/k8s-minikube/kicbase...:  488.52 MiB / 488.52 MiB  100.00% 4.57 Mi
    > preloaded-images-k8s-v18-v1...:  337.07 MiB / 337.07 MiB  100.00% 3.02 Mi
* Creating docker container (CPUs=2, Memory=8100MB) ...
! Failing to connect to https://registry.k8s.io/ from inside the minikube container
* To pull new external images, you may need to configure a proxy: https://minikube.sigs.k8s.io/
docs/reference/networking/proxy/
* Preparing Kubernetes v1.34.0 on Docker 28.4.0 ...
* Configuring bridge CNI (Container Networking Interface) ...
* 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
```

Open the Dashboard

```
C:\Users\silen>minikube dashboard
* Enabling dashboard ...
  - Using image docker.io/kubernetesui/dashboard:v2.7.0
  - Using image docker.io/kubernetesui/metrics-scraper:v1.0.8
* Some dashboard features require the metrics-server addon. To enable all features please run:

        minikube addons enable metrics-server

* Verifying dashboard health ...
* Launching proxy ...
* Verifying proxy health ...
* Opening http://127.0.0.1:56488/api/v1/namespaces/kubernetes-dashboard/services/http:kubernete
s-dashboard:/proxy/ in your default browser...
```



Create a Deployment

1.

```
C:\Users\silen>kubectl create deployment hello-node --image=registry.k8s.io/e2e-test-images/agnhost:2.53 -- /agnhost net
exec --http-port=8080
deployment.apps/hello-node created

C:\Users\silen>kubectl get deployments
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
hello-node   0/1     1            0           10s
```

2 – 3.

```
C:\Users\silen>kubectl get deployments
NAME         READY   UP-TO-DATE   AVAILABLE   AGE
hello-node   0/1     1            0           10s

C:\Users\silen>kubectl get pods
NAME                          READY   STATUS    RESTARTS   AGE
hello-node-6c9b5f4b59-j62sl   1/1     Running   0          24s
```

4.

```
C:\Users\silen>kubectl get events
LAST SEEN   TYPE     REASON                   OBJECT                                  MESSAGE
34s         Normal   Scheduled                pod/hello-node-6c9b5f4b59-j62sl         Successfully assigned default/hello-no
de-6c9b5f4b59-j62sl to minikube
34s         Normal   Pulling                  pod/hello-node-6c9b5f4b59-j62sl         Pulling image "registry.k8s.io/e2e-tes
t-images/agnhost:2.53"
17s         Normal   Pulled                   pod/hello-node-6c9b5f4b59-j62sl         Successfully pulled image "registry.k8
s.io/e2e-test-images/agnhost:2.53" in 16.935s (16.935s including waiting). Image size: 139374622 bytes.
17s         Normal   Created                  pod/hello-node-6c9b5f4b59-j62sl         Created container: agnhost
17s         Normal   Started                  pod/hello-node-6c9b5f4b59-j62sl         Started container agnhost
35s         Normal   SuccessfulCreate         replicaset/hello-node-6c9b5f4b59        Created pod: hello-node-6c9b5f4b59-j62
sl
35s         Normal   ScalingReplicaSet        deployment/hello-node                   Scaled up replica set hello-node-6c9b5
f4b59 from 0 to 1
13m         Normal   Starting                 node/minikube                           Starting kubelet.
13m         Normal   NodeHasSufficientMemory  node/minikube                           Node minikube status is now: NodeHasSu
fficientMemory
13m         Normal   NodeHasNoDiskPressure    node/minikube                           Node minikube status is now: NodeHasNo
DiskPressure
13m         Normal   NodeHasSufficientPID     node/minikube                           Node minikube status is now: NodeHasSu
fficientPID
13m         Normal   NodeAllocatableEnforced  node/minikube                           Updated Node Allocatable limit across
pods
13m         Normal   Starting                 node/minikube                           Starting kubelet.
13m         Normal   NodeAllocatableEnforced  node/minikube                           Updated Node Allocatable limit across
pods
13m         Normal   NodeHasSufficientMemory  node/minikube                           Node minikube status is now: NodeHasSu
fficientMemory
13m         Normal   NodeHasNoDiskPressure    node/minikube                           Node minikube status is now: NodeHasNo
DiskPressure
13m         Normal   NodeHasSufficientPID     node/minikube                           Node minikube status is now: NodeHasSu
fficientPID
13m         Normal   RegisteredNode           node/minikube                           Node minikube event: Registered Node m
inikube in Controller
13m         Normal   Starting                 node/minikube
4m29s       Normal   Starting                 node/minikube
4m27s       Normal   RegisteredNode           node/minikube                           Node minikube event: Registered Node m
inikube in Controller
```

5.

```
C:\Users\silen>kubectl config view
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: DATA+OMITTED
    server: https://kubernetes.docker.internal:6443
  name: docker-desktop
- cluster:
    certificate-authority: C:\Users\silen\.minikube\ca.crt
    extensions:
    - extension:
        last-update: Sun, 30 Nov 2025 22:24:03 +08
        provider: minikube.sigs.k8s.io
        version: v1.37.0
      name: cluster_info
    server: https://127.0.0.1:56446
  name: minikube
contexts:
- context:
    cluster: docker-desktop
    user: docker-desktop
  name: docker-desktop
- context:
    cluster: minikube
    extensions:
    - extension:
        last-update: Sun, 30 Nov 2025 22:24:03 +08
        provider: minikube.sigs.k8s.io
        version: v1.37.0
      name: context_info
    namespace: default
    user: minikube
  name: minikube
current-context: minikube
kind: Config
users:
- name: docker-desktop
  user:
    client-certificate-data: DATA+OMITTED
    client-key-data: DATA+OMITTED
- name: minikube
  user:
    client-certificate: C:\Users\silen\.minikube\profiles\minikube\client.crt
    client-key: C:\Users\silen\.minikube\profiles\minikube\client.key
```

6.

```
C:\Users\silen>kubectl logs hello-node-6c9b5f4b59-j62sl
I1130 14:28:18.710619       1 log.go:245] Started HTTP server on port 8080
I1130 14:28:18.710897       1 log.go:245] Started UDP server on port  8081
```

Create a Service

1.

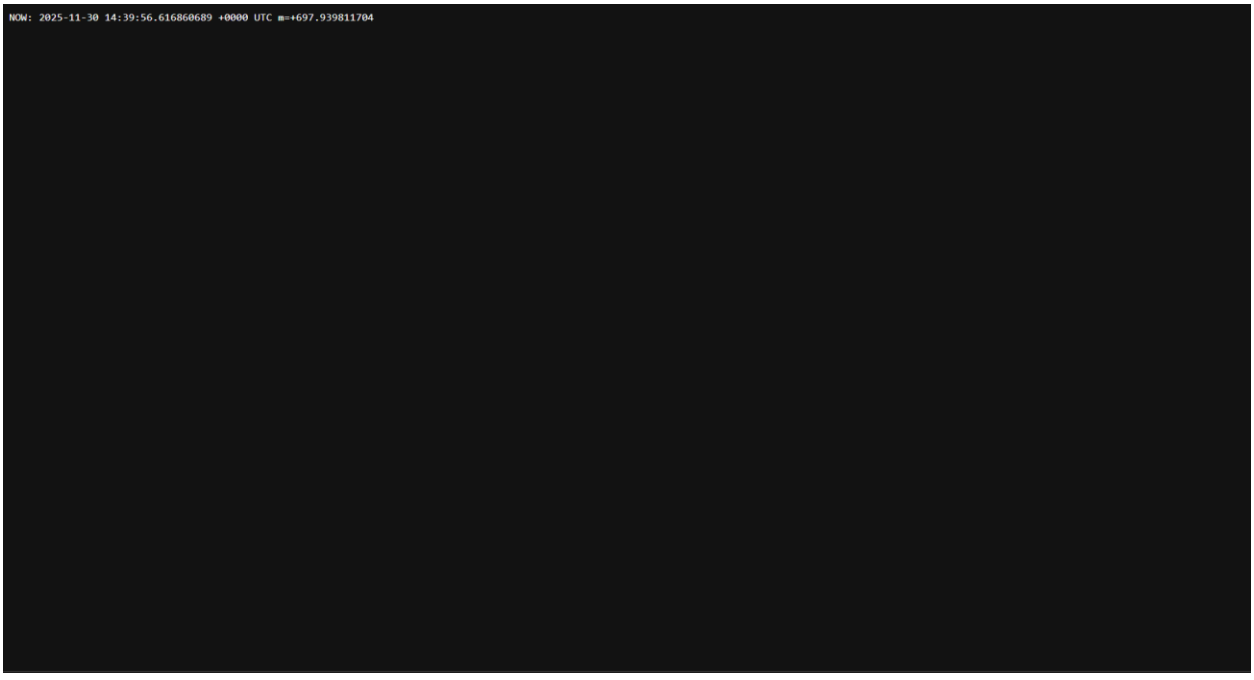
```
C:\Users\silen>kubectl expose deployment hello-node --type=LoadBalancer --port=8080
service/hello-node exposed
```

2.

```
C:\Users\silen>kubectl get services
NAME         TYPE           CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
hello-node   LoadBalancer   10.105.103.16   <pending>     8080:32174/TCP   56s
kubernetes   ClusterIP      10.96.0.1       <none>        443/TCP          24m
```

3.

```
C:\Users\silen>minikube service hello-node
|-----------|------------|-------------|---------------------------|
| NAMESPACE |    NAME    | TARGET PORT |            URL            |
|-----------|------------|-------------|---------------------------|
| default   | hello-node | 8080        | http://192.168.49.2:32174 |
|-----------|------------|-------------|---------------------------|
* Starting tunnel for service hello-node.
|-----------|------------|-------------|------------------------|
| NAMESPACE |    NAME    | TARGET PORT |          URL           |
|-----------|------------|-------------|------------------------|
| default   | hello-node |             | http://127.0.0.1:57033 |
|-----------|------------|-------------|------------------------|
* Starting tunnel for service hello-node.
* Opening service default/hello-node in default browser...
! Because you are using a Docker driver on windows, the terminal needs to be open to run it.
```



Enable addons

1.

```
C:\Users\silen>minikube addons list
```

ADDON NAME	PROFILE	STATUS	MAINTAINER
ambassador	minikube	disabled	3rd party (Ambassador)
amd-gpu-device-plugin	minikube	disabled	3rd party (AMD)
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)
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)
kubeflow	minikube	disabled	3rd party
kubetail	minikube	disabled	3rd party (kubetail.com)
kubevirt	minikube	disabled	3rd party (KubeVirt)
logviewer	minikube	disabled	3rd party (unknown)
metallb	minikube	disabled	3rd party (MetalLB)
metrics-server	minikube	disabled	Kubernetes
nvidia-device-plugin	minikube	disabled	3rd party (NVIDIA)
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)
registry-creds	minikube	disabled	3rd party (UPMC Enterprises)
storage-provisioner	minikube	enabled ✅	minikube
storage-provisioner-gluster	minikube	disabled	3rd party (Gluster)
storage-provisioner-rancher	minikube	disabled	3rd party (Rancher)
volcano	minikube	disabled	third-party (volcano)
volumesnapshots	minikube	disabled	Kubernetes
yakd	minikube	disabled	3rd party (marcnuri.com)

2.

```
C:\Users\silen>minikube addons enable metrics-server
* metrics-server is an addon maintained by Kubernetes. For any concerns contact minikube on GitHub.
You can view the list of minikube maintainers at: https://github.com/kubernetes/minikube/blob/master/OWNERS
  - Using image registry.k8s.io/metrics-server/metrics-server:v0.8.0
* The 'metrics-server' addon is enabled
```

3.

```
C:\Users\silen>kubectl get pod,svc -n kube-system
NAME                                   READY   STATUS    RESTARTS        AGE
pod/coredns-66bc5c9577-fv2cj           1/1     Running   2 (6m40s ago)   33m
pod/etcd-minikube                      1/1     Running   2 (6m38s ago)   33m
pod/kube-apiserver-minikube            1/1     Running   3 (6m35s ago)   33m
pod/kube-controller-manager-minikube   1/1     Running   2 (6m45s ago)   33m
pod/kube-proxy-9w2sb                   1/1     Running   2 (6m45s ago)   33m
pod/kube-scheduler-minikube            1/1     Running   2 (6m45s ago)   33m
pod/metrics-server-85b7d694d7-x2h2l    1/1     Running   0               5m25s
pod/storage-provisioner                1/1     Running   5 (6m32s ago)   33m

NAME                     TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)                  AGE
service/kube-dns         ClusterIP   10.96.0.10     <none>        53/UDP,53/TCP,9153/TCP   33m
service/metrics-server   ClusterIP   10.103.56.53   <none>        443/TCP                  5m25s
```

4.

```
C:\Users\silen>kubectl top pods
NAME                              CPU(cores)   MEMORY(bytes)
hello-node-6c9b5f4b59-j62sl   1m           7Mi
```

5.

```
C:\Users\silen>minikube addons disable metrics-server
* "The 'metrics-server' addon is disabled
```

Clean up

```
C:\Users\silen>kubectl delete service hello-node
service "hello-node" deleted from default namespace

C:\Users\silen>kubectl delete deployment hello-node
deployment.apps "hello-node" deleted from default namespace
```

```
C:\Users\silen>minikube stop
* Stopping node "minikube"  ...
* Powering off "minikube" via SSH ...
* 1 node stopped.
```

```
C:\Users\silen>minikube delete
* Deleting "minikube" in docker ...
* Deleting container "minikube" ...
* Removing C:\Users\silen\.minikube\machines\minikube ...
* Removed all traces of the "minikube" cluster.
```

Get a Shell to a Running Container

This page shows how to use kubectl exec to get a shell to a running container.

Before you begin

You need to have a Kubernetes cluster, and the kubectl command-line tool must be configured to communicate with your cluster. It is recommended to run this tutorial on a cluster with at least two nodes that are not acting as control plane hosts. If you do not already have a cluster, you can create one by using minikube or you can use one of these Kubernetes playgrounds:

- iximiuz Labs
- Killercoda
- KodeKloud
- Play with Kubernetes

Getting a shell to a container

1.

```
C:\Users\silen>kubectl apply -f https://k8s.io/examples/application/shell-demo.yaml
pod/shell-demo created
```

```
C:\Users\silen>kubectl get pod shell-demo
NAME         READY   STATUS    RESTARTS   AGE
shell-demo   1/1     Running   0          53s
```

```
C:\Users\silen>kubectl exec --stdin --tty shell-demo -- /bin/bash
root@minikube:/# ls /
bin   dev                 docker-entrypoint.sh  home  lib64  mnt  proc  run   srv  tmp  var
boot  docker-entrypoint.d  etc                   lib   media  opt  root  sbin  sys  usr
root@minikube:/#
```

Writing the root page for nginx

I’m very sorry sir; this is the farthest I can do since I could not find the nginx folder. Again, I am very sorry sir.