



CONTINUOUS ASSESSMENT

LAB 4

CLOUD DATA CENTRES

ZAPPC4202

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Installations

```
Administrator: Command Prompt

C:\Windows\System32>curl.exe -LO "https://dl.k8s.io/release/v1.29.2/bin/windows/amd64/kubectl.exe"
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left   Speed
100 138    100    138    0     0    166      0  --:--:-- --:--:-- --:--:--    167
100 48.6M  100 48.6M    0     0 2492k      0  0:00:19 0:00:19 --:--:-- 3488k

C:\Windows\System32>curl.exe -LO "https://dl.k8s.io/v1.29.2/bin/windows/amd64/kubectl.exe.sha256"
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left   Speed
100 138    100    138    0     0    176      0  --:--:-- --:--:-- --:--:--    176
100 64    100    64    0     0    66      0  --:--:-- --:--:-- --:--:--    66

C:\Windows\System32>CertUtil -hashfile kubectl.exe SHA256
SHA256 hash of kubectl.exe:
5107162e20ef6e6f06c2db37e56da5db552858d83fa43b51787bf48c6e6d1caf
CertUtil: -hashfile command completed successfully.

C:\Windows\System32>type kubectl.exe.sha256
5107162e20ef6e6f06c2db37e56da5db552858d83fa43b51787bf48c6e6d1caf
C:\Windows\System32>
```

```
Administrator: Windows PowerShell

True
PS C:\WINDOWS\system32> (Get-FileHash -Algorithm SHA256 .\kubectl.exe).Hash -eq $(Get-Content .\kubectl.exe.sha256)
True
PS C:\WINDOWS\system32>
```

```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> Set-ExecutionPolicy Bypass -Scope Process -Force; [System.Net.ServicePointManager]::SecurityProtocol = [System.Net.ServicePointManager]::SecurityProtocol -bor 3072; iex ((New-Object System.Net.WebClient).DownloadString('https://community.chocolatey.org/install.ps1'))
Forcing web requests to allow TLS v1.2 (Required for requests to Chocolatey.org)
Getting latest version of the Chocolatey package for download.
Not using proxy.
Getting Chocolatey from https://community.chocolatey.org/api/v2/package/chocolatey/2.2.2.
Downloading https://community.chocolatey.org/api/v2/package/chocolatey/2.2.2 to C:\Users\saeda\AppData\Local\Temp\chocolatey\chocoInstall\chocolatey.zip
Not using proxy.
Extracting C:\Users\saeda\AppData\Local\Temp\chocolatey\chocoInstall\chocolatey.zip to C:\Users\saeda\AppData\Local\Temp\chocolatey\chocoInstall
Installing Chocolatey on the local machine
Creating ChocolateyInstall as an environment variable (targeting 'Machine')
Setting ChocolateyInstall to 'C:\ProgramData\chocolatey'
WARNING: It's very likely you will need to close and reopen your shell
before you can use choco.
Restricting write permissions to Administrators
We are setting up the Chocolatey package repository.
The packages themselves go to 'C:\ProgramData\chocolatey\lib'
(i.e. C:\ProgramData\chocolatey\lib\yourPackageName).
A shim file for the command line goes to 'C:\ProgramData\chocolatey\bin'
and points to an executable in 'C:\ProgramData\chocolatey\lib\yourPackageName'.

Creating Chocolatey folders if they do not already exist.

chocolatey.nupkg file not installed in lib.
Attempting to locate it from bootstrapper.
PATH environment variable does not have C:\ProgramData\chocolatey\bin in it. Adding...
WARNING: Not setting tab completion: Profile file does not exist at
'C:\Users\saeda\OneDrive\Documents\WindowsPowerShell\Microsoft.PowerShell_profile.ps1'.
Chocolatey (choco.exe) is now ready.
You can call choco from anywhere, command line or powershell by typing choco.
Run choco /? for a list of functions.
You may need to shut down and restart powershell and/or consoles
first prior to using choco.
Ensuring Chocolatey commands are on the path
Ensuring chocolatey.nupkg is in the lib folder
PS C:\WINDOWS\system32>
```

```
Administrator: Windows PowerShell
Installing the following packages:
kubernetes-cli
By installing, you accept licenses for the packages.
Progress: Downloading kubernetes-cli 1.29.1... 100%

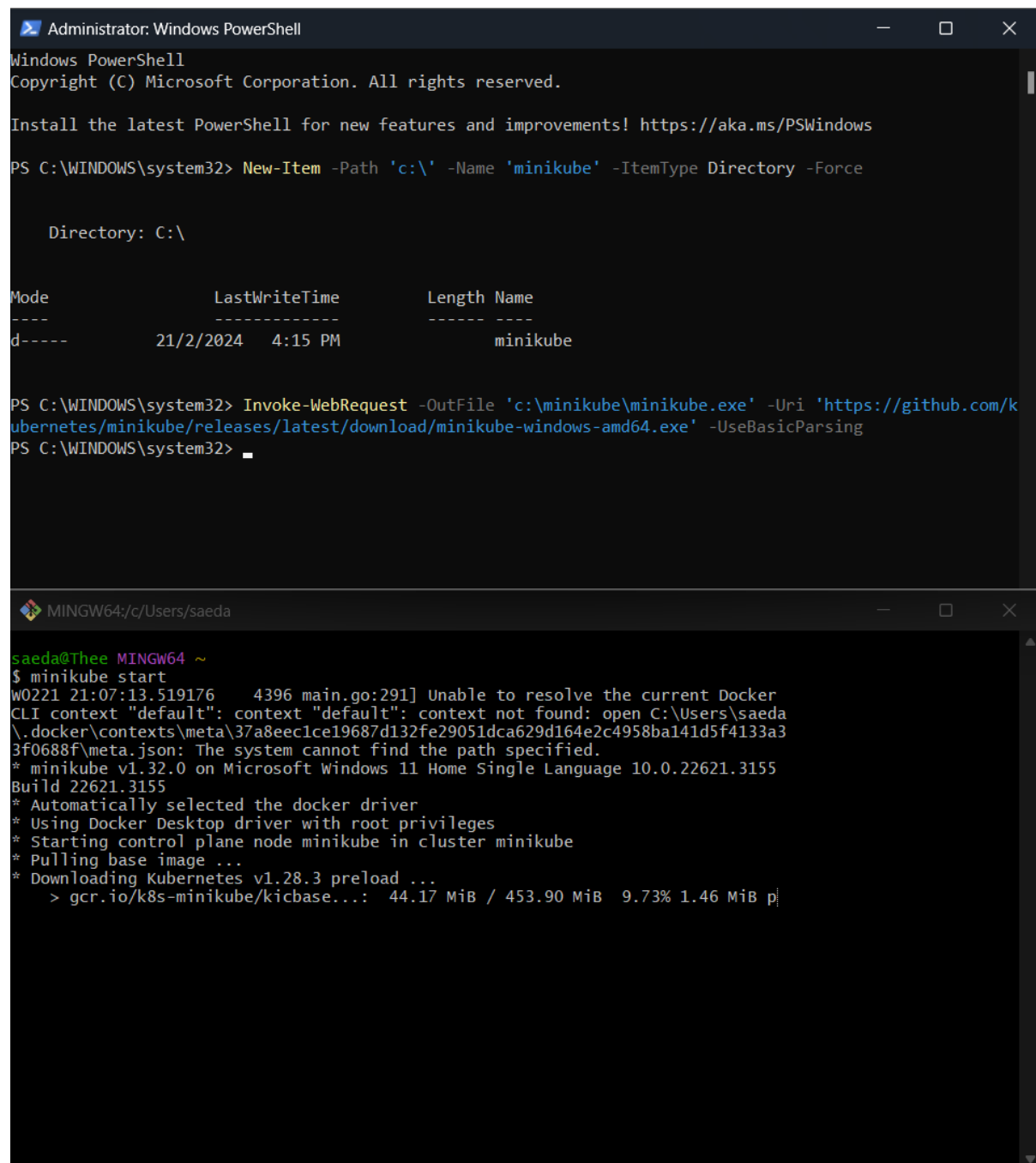
kubernetes-cli v1.29.1 [Approved]
kubernetes-cli package files install completed. Performing other installation steps.
The package kubernetes-cli wants to run 'chocolateyInstall.ps1'.
Note: If you don't run this script, the installation will fail.
Note: To confirm automatically next time, use '-y' or consider:
choco feature enable -n allowGlobalConfirmation
Do you want to run the script?([Y]es/[A]ll - yes to all/[N]o/[P]rint): y

Extracting 64-bit C:\ProgramData\chocolatey\lib\kubernetes-cli\tools\kubernetes-client-windows-amd64.tar.gz to C:\ProgramData\chocolatey\lib\kubernetes-cli\tools...
C:\ProgramData\chocolatey\lib\kubernetes-cli\tools
Extracting 64-bit C:\ProgramData\chocolatey\lib\kubernetes-cli\tools\kubernetes-client-windows-amd64.tar to C:\ProgramData\chocolatey\lib\kubernetes-cli\tools...
C:\ProgramData\chocolatey\lib\kubernetes-cli\tools
ShimGen has successfully created a shim for kubectl-convert.exe
ShimGen has successfully created a shim for kubectl.exe
The install of kubernetes-cli was successful.
Software installed to 'C:\ProgramData\chocolatey\lib\kubernetes-cli\tools'

Chocolatey installed 1/1 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
PS C:\WINDOWS\system32>
```

Module 1: Create a Kubernetes cluster

Create a minikube cluster.



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

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

PS C:\WINDOWS\system32> New-Item -Path 'c:\' -Name 'minikube' -ItemType Directory -Force

Directory: C:\

Mode                LastWriteTime         Length Name
----                -
d-----          21/2/2024   4:15 PM             minikube

PS C:\WINDOWS\system32> Invoke-WebRequest -OutFile 'c:\minikube\minikube.exe' -Uri 'https://github.com/k
ubernetes/minikube/releases/latest/download/minikube-windows-amd64.exe' -UseBasicParsing
PS C:\WINDOWS\system32>

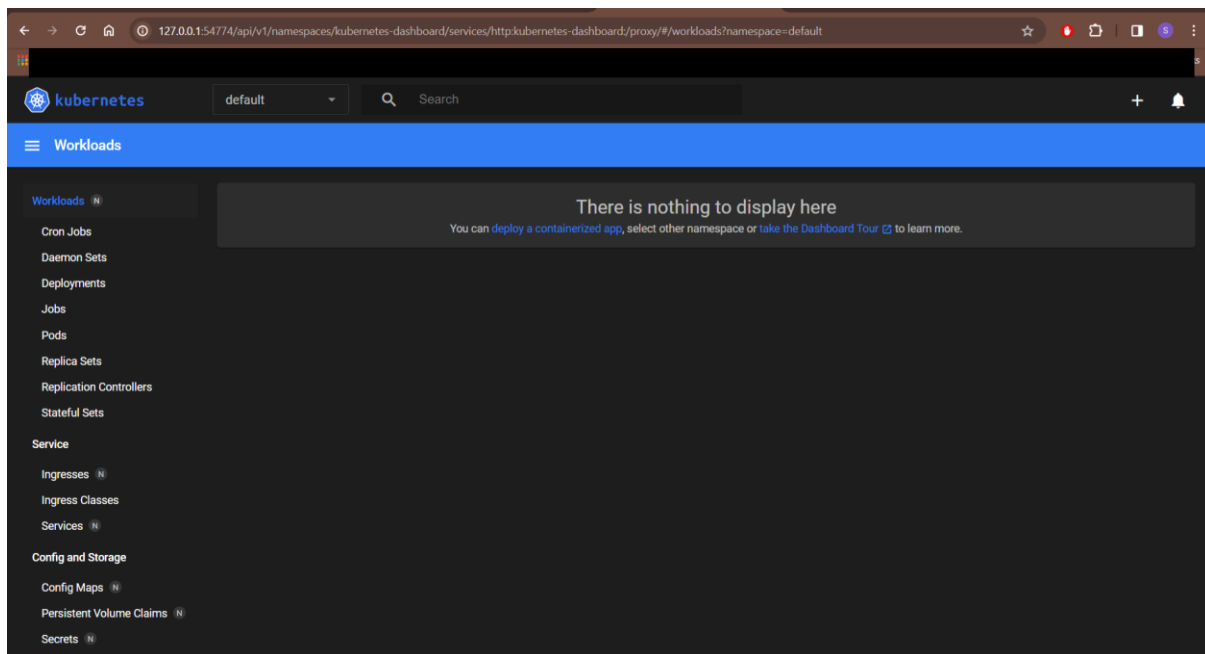
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ minikube start
w0221 21:07:13.519176    4396 main.go:291] Unable to resolve the current Docker
CLI context "default": context "default": context not found: open C:\Users\saeda
\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a3
3f0688f\meta.json: The system cannot find the path specified.
* minikube v1.32.0 on Microsoft Windows 11 Home Single Language 10.0.22621.3155
Build 22621.3155
* Automatically selected the docker driver
* Using Docker Desktop driver with root privileges
* Starting control plane node minikube in cluster minikube
* Pulling base image ...
* Downloading Kubernetes v1.28.3 preload ...
  > gcr.io/k8s-minikube/kicbase...: 44.17 MiB / 453.90 MiB  9.73% 1.46 MiB p|
```

Open the Dashboard

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ minikube dashboard
w0221 21:14:47.802980 10460 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* Enabling dashboard ...
  - Using image docker.io/kubernetes/dashboard:v2.7.0
  - Using image docker.io/kubernetes/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://127.0.0.1:54774/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashbo
ard:/proxy/ in your default browser...
```

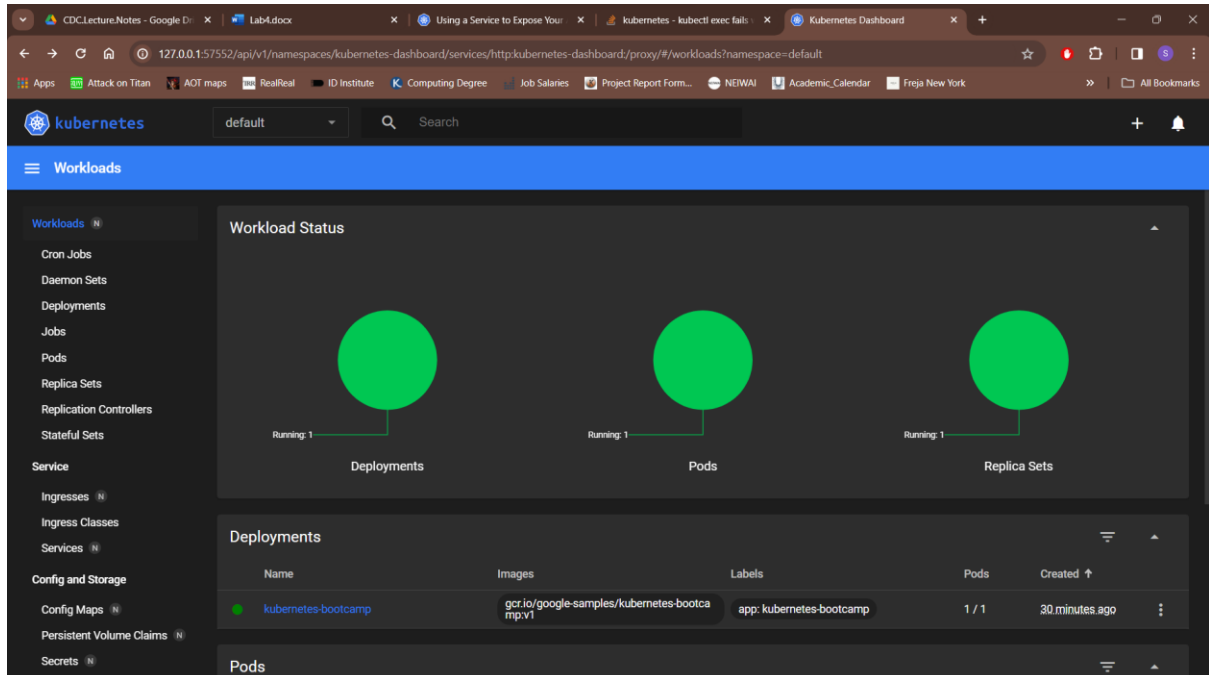


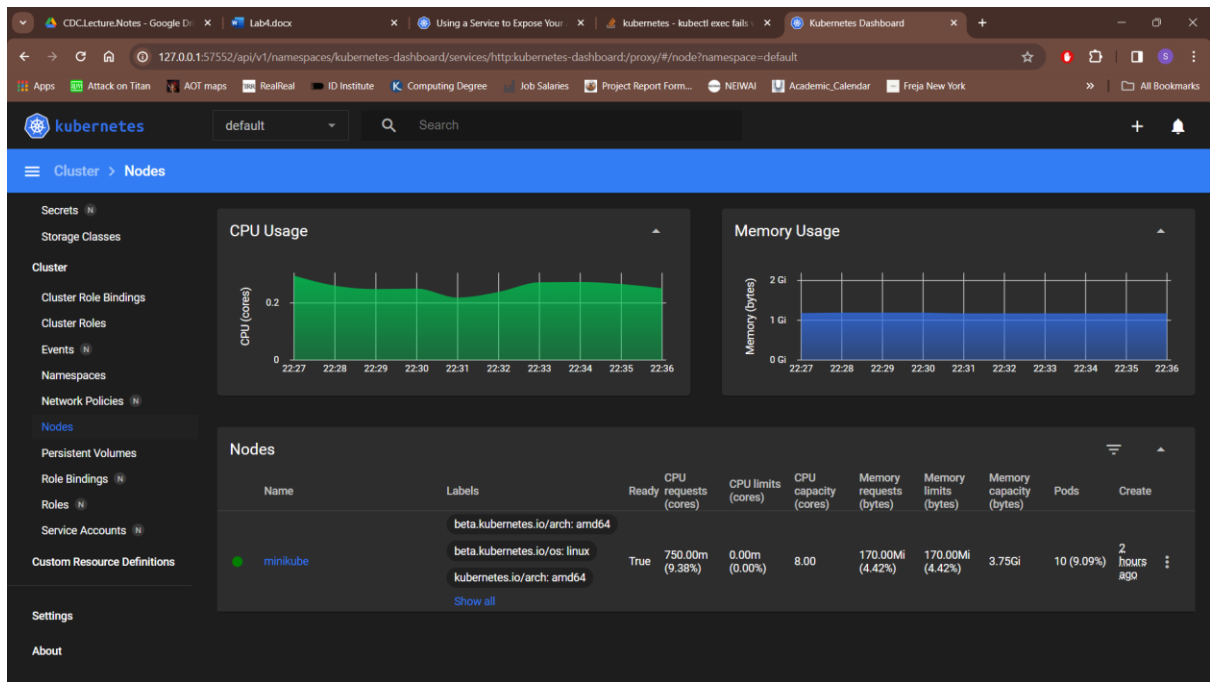
[illegible]


```
MINGW64/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl config view
apiVersion: v1
clusters:
- cluster:
  certificate-authority: C:\Users\saeda\.minikube\ca.crt
  extensions:
  - extension:
    last-update: Wed, 21 Feb 2024 21:13:50 GMT
    provider: minikube.sigs.k8s.io
    version: v1.32.0
    name: cluster_info
  server: https://127.0.0.1:54717
  name: minikube
contexts:
- context:
  cluster: minikube
  extensions:
  - extension:
    last-update: Wed, 21 Feb 2024 21:13:50 GMT
    provider: minikube.sigs.k8s.io
    version: v1.32.0
    name: context_info
  namespace: default
  user: minikube
  name: minikube
current-context: minikube
kind: Config
preferences: {}
users:
- name: minikube
  user:
  client-certificate: C:\Users\saeda\.minikube\profiles\minikube\client.crt
  client-key: C:\Users\saeda\.minikube\profiles\minikube\client.key

saeda@Thee MINGW64 ~
$ kubectl logs hello-node-58f6974cb6-tjbtff

saeda@Thee MINGW64 ~
$
```





Create a service

The browser window shows a connection error: "This site can't be reached. The connection was reset." The terminal window shows the following commands and output:

```
saeda@Thee MINGW64 ~$ kubectl logs hello-node-58f6974cb6-tjbt
saeda@Thee MINGW64 ~$ kubectl logs hello-node-58f6974cb6-tjbt
saeda@Thee MINGW64 ~$ kubectl logs hello-node-5f76cf6ccf-br9b5
Error from server (NotFound): pods "hello-node-5f76cf6ccf-br9b5" not found
saeda@Thee MINGW64 ~$ kubectl expose deployment hello-node --type=LoadBalancer --port=8080
service/hello-node exposed
saeda@Thee MINGW64 ~$ kubectl get services
NAME         TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
hello-node   LoadBalancer 10.97.233.110    <pending>        8080:32511/TCP   22s
kubernetes   ClusterIP      10.96.0.1        <none>           443/TCP          20m
saeda@Thee MINGW64 ~$ minikube service hello-node
w0221 21:34:30.171736 12148 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8ee1c19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
NAMESPACE   NAME      TARGET PORT  URL
-----
default     hello-node 8080         http://192.168.49.2:32511
Starting tunnel for service hello-node.
NAMESPACE   NAME      TARGET PORT  URL
-----
default     hello-node 8080         http://127.0.0.1:55199
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.
```

The browser window shows the message: "Client sent an HTTP request to an HTTPS server." The terminal window shows the following commands and output:

```
saeda@Thee MINGW64 ~$ minikube service hello-node
w0221 21:42:42.211320 9184 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8ee1c19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
NAMESPACE   NAME      TARGET PORT  URL
-----
default     hello-node 8080         http://192.168.49.2:32511
Starting tunnel for service hello-node.
NAMESPACE   NAME      TARGET PORT  URL
-----
default     hello-node 8080         http://127.0.0.1:55414
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.
Stopping tunnel for service hello-node.
saeda@Thee MINGW64 ~$ kubectl port-forward service/hello-minikube 7080:8080
Error from server (NotFound): services "hello-minikube" not found
saeda@Thee MINGW64 ~$
saeda@Thee MINGW64 ~$ Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Hyper-V -All
bash: Enable-WindowsOptionalFeature: command not found
saeda@Thee MINGW64 ~$ minikube service --all
w0221 21:47:51.481620 5668 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8ee1c19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
NAMESPACE   NAME      TARGET PORT  URL
-----
default     hello-node 8080         http://192.168.49.2:32511
NAMESPACE   NAME      TARGET PORT  URL
-----
default     kubernet  No node port
service default/kubernet has no node port
Starting tunnel for service hello-node.
Starting tunnel for service kubernet.
NAMESPACE   NAME      TARGET PORT  URL
-----
default     hello-node 8080         http://127.0.0.1:55535
default     kubernet  No node port  http://127.0.0.1:55537
Opening service default/hello-node in default browser...
Opening service default/kubernet in default browser...
! Because you are using a Docker driver on windows, the terminal needs to be open to run it.
```

<https://stackoverflow.com/questions/71714919/unable-to-access-my-minikube-cluster-from-the-browser-because-you-are-using-a>

Enable addons.

```
MINGW64/c/Users/saeda
saeda@Thee MINGW64 ~
$ minikube addons list
W0221 22:25:47.170918 10900 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\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) |
| kubeflow | minikube | disabled | 3rd party |
| 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) |
| volumesnapshots | minikube | disabled | Kubernetes |
+-----+-----+-----+-----+

saeda@Thee MINGW64 ~
$ minikube addons enable metrics-server
W0221 22:26:07.858630 16680 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* 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:v0.6.4
* The 'metrics-server' addon is enabled

saeda@Thee MINGW64 ~
```

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl get pod,svc -n kube-system
NAME                                     READY   STATUS    RESTARTS   AGE
pod/coredns-5dd5756b68-ktzjm           1/1     Running   0           89m
pod/etcd-minikube                       1/1     Running   0           90m
pod/kube-apiserver-minikube             1/1     Running   0           90m
pod/kube-controller-manager-minikube    1/1     Running   0           90m
pod/kube-proxy-gwfhp                    1/1     Running   0           89m
pod/kube-scheduler-minikube             1/1     Running   0           90m
pod/metrics-server-7c66d45ddc-j5vrh    0/1     Running   0           8s
pod/storage-provisioner                 1/1     Running   1 (89m ago) 90m

NAME                                TYPE          CLUSTER-IP    EXTERNAL-IP    PORT(S)                                AGE
service/kube-dns                    ClusterIP      10.96.0.10    <none>         53/UDP,53/TCP,9153/TCP               90m
service/metrics-server              ClusterIP      10.101.61.57  <none>         443/TCP                               8s

saeda@Thee MINGW64 ~
$ kubectl top pods
error: Metrics API not available

saeda@Thee MINGW64 ~
$ kubectl top pods
error: Metrics API not available

saeda@Thee MINGW64 ~
$ minikube addons disable metrics-server
W0221 22:44:25.457653    5160 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* "The 'metrics-server' addon is disabled

saeda@Thee MINGW64 ~
$
```

Clean up

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl delete service hello-node
kubectl delete deployment hello-node
service "hello-node" deleted
deployment.apps "hello-node" deleted

saeda@Thee MINGW64 ~
$ minikube stop
W0221 22:45:20.656022    10904 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* Stopping node "minikube" ...
* Powering off "minikube" via SSH ...
* 1 node stopped.

saeda@Thee MINGW64 ~
$ |
```

Module 2: Deploy an app.

Deploy an app

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ minikube start
W0221 22:57:59.001033 15368 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
* minikube v1.32.0 on Microsoft Windows 11 Home Single Language 10.0.22621.3155 Build 22621.3155
* Using the docker driver based on existing profile
* Starting control plane node minikube in cluster minikube
* Pulling base image ...
* Updating the running docker "minikube" container ...
* Preparing Kubernetes v1.28.3 on Docker 24.0.7 ...
* Verifying Kubernetes components...
  - Using image docker.io/kubernetes/metrics-scrapers:v1.0.8
  - Using image docker.io/kubernetes/dashboard:v2.7.0
  - Using image gcr.io/k8s-minikube/storage-provisioner:v5
* Some dashboard features require the metrics-server addon. To enable all features please run:

    minikube addons enable metrics-server

* Enabled addons: storage-provisioner, dashboard, default-storageclass
* Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default

saeda@Thee MINGW64 ~
$ kubectl create deployment kubernetes-bootcamp --image=gcr.io/google-samples/kubernetes-bootcamp:v1
error: failed to create deployment: deployments.apps "kubernetes-bootcamp" already exists

saeda@Thee MINGW64 ~
$ kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
kubernetes-bootcamp 0/1      1             0           68s

saeda@Thee MINGW64 ~
$ curl http://localhost:8001/version
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
100  264    100    264    0    0  1179      0 --:--:-- --:--:-- --:--:-- 1183{
  "major": "1",
  "minor": "28",
  "gitVersion": "v1.28.3",
  "gitCommit": "a8a1abc25cad87333840cd7d54be2efaf31a3177",
  "gitTreeState": "clean",
  "buildDate": "2023-10-18T11:33:18Z",
  "goVersion": "go1.20.10",
  "compiler": "gc",
  "platform": "linux/amd64"
}

saeda@Thee MINGW64 ~
$ curl http://localhost:8001/api/v1/namespaces/default/pods/$POD_NAME/
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left   Speed
100    67    100    67    0    0   326      0 --:--:-- --:--:-- --:--:-- 326<a href="/api/v1/namespac
es/default/pods/">Moved Permanently</a>.

saeda@Thee MINGW64 ~
$ export POD_NAME=$(kubectl get pods -o go-template --template '{{range .items}}{{.metadata.name}}{{"\n"
}}'{{end}}')
echo Name of the Pod: $POD_NAME
```

[View the app](#)

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl proxy
Starting to serve on 127.0.0.1:8001

saeda@Thee MINGW64 ~
$ curl http://localhost:8001/version
% Total % Received % Xferd Average Speed Time Time Time Current
Dload Upload Total Spent Left Speed
100 264 100 264 0 0 1179 0 --:--:-- --:--:-- --:--:-- 1183{
  "major": "1",
  "minor": "28",
  "gitVersion": "v1.28.3",
  "gitCommit": "a8a1abc25cad87333840cd7d54be2efaf31a3177",
  "gitTreeState": "clean",
  "buildDate": "2023-10-18T11:33:18Z",
  "goVersion": "go1.20.10",
  "compiler": "gc",
  "platform": "linux/amd64"
}

saeda@Thee MINGW64 ~
$ curl http://localhost:8001/api/v1/namespaces/default/pods/$POD_NAME/
% Total % Received % Xferd Average Speed Time Time Time Current
Dload Upload Total Spent Left Speed
100 67 100 67 0 0 326 0 --:--:-- --:--:-- --:--:-- 326<a href="/api/v1/namespac
es/default/pods/">Moved Permanently</a>.

saeda@Thee MINGW64 ~
$ export POD_NAME=$(kubectl get pods -o go-template --template '{{range .items}}{{.metadata.name}}{{"\n"
}}{{end}}')
echo Name of the Pod: $POD_NAME
```

MINGW64: c:/Users/saeda

```
saeda@Thee MINGW64 ~  
$ export POD_NAME=$(kubectl get pods -o go-template --template '{{range .items}}{{.metadata.name}}{{"\n"}}{{end}}')
```

```
echo Name of the Pod: $POD_NAME
```

```
Name of the Pod: kubernetes-bootcamp-f95c5b745-pgwsq
```

```
saeda@Thee MINGW64 ~
```

```
$ curl http://localhost:8001/api/v1/namespaces/default/pods/$POD_NAME/  
% Total % Received % Xferd Average Speed Time Time Time Current  
Dload Upload Total Spent Left Speed  
0 0 0 0 0 0 0 0 --:--:-- --:--:-- --:--:-- 0{  
"kind": "Pod",  
"apiVersion": "v1",  
"metadata": {  
"name": "kubernetes-bootcamp-f95c5b745-pgwsq",  
"generateName": "kubernetes-bootcamp-f95c5b745-",  
"namespace": "default",  
"uid": "6efe1cd7-f504-4cc4-9ce7-8a1cbfd66867",  
"resourceVersion": "5601",  
"creationTimestamp": "2024-02-21T22:57:51Z",  
"labels": {  
"app": "kubernetes-bootcamp",  
"pod-template-hash": "f95c5b745"  
},  
"ownerReferences": [  
{  
"apiVersion": "apps/v1",  
"kind": "ReplicaSet",  
"name": "kubernetes-bootcamp-f95c5b745",  
"uid": "7296db6a-1ff1-4180-a892-3529e24aac52",  
"controller": true,  
"blockOwnerDeletion": true  
}  
],  
"managedFields": [  
{  
"manager": "kube-controller-manager",  
"operation": "Update",  
"apiVersion": "v1",  
"time": "2024-02-21T22:57:51Z",  
"fieldsType": "FieldsV1",  
"fieldsV1": {  
"f:metadata": {  
"f:generateName": {},  
"f:labels": {  
".": {},  
"f:app": {},  
"f:pod-template-hash": {}  
},  
"f:ownerReferences": {  
".": {},  
"k:{\"uid\": \"7296db6a-1ff1-4180-a892-3529e24aac52\"}": {}  
}  
},  
"spec": {  
"containers": {  
"k:{\"name\": \"kubernetes-bootcamp\"}": {  
".": {},  
"f:image": {},  
"f:imagePullPolicy": {},  
"f:name": {},
```


Module 3: Explore your app.

Check application configuration.

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
kubernetes-bootcamp-f95c5b745-pgwsq 1/1     Running   0          12m

saeda@Thee MINGW64 ~
$ kubectl describe pods
Name:                                kubernetes-bootcamp-f95c5b745-pgwsq
Namespace:                          default
Priority:                            0
Service Account:                    default
Node:                                minikube/192.168.49.2
Start Time:                         Wed, 21 Feb 2024 22:57:51 +0000
Labels:                             app=kubernetes-bootcamp
                                     pod-template-hash=f95c5b745
Annotations:                        <none>
Status:                             Running
IP:                                  10.244.0.14
IPs:
  IP:                                10.244.0.14
Controlled By:                      ReplicaSet/kubernetes-bootcamp-f95c5b745
Containers:
  kubernetes-bootcamp:
    Container ID:  docker://e19125310d6041abadc4a54e655f771cad27885e4d37760dcd522696f1faf89e
    Image:         gcr.io/google-samples/kubernetes-bootcamp:v1
    Image ID:      docker-pullable://gcr.io/google-samples/kubernetes-bootcamp@sha256:0d6b8ee63bb57c5f5b6156f446b3bc3b3c143d233037f3a2f00e279c8fcc64af
    Port:         <none>
    Host Port:    <none>
    State:        Running
      Started:    Wed, 21 Feb 2024 22:59:30 +0000
    Ready:        True
    Restart Count: 0
    Environment:  <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-7ph6d (ro)
Conditions:
  Type             Status
  Initialized       True
  Ready            True
  ContainersReady  True
  PodScheduled     True
Volumes:
  kube-api-access-7ph6d:
    Type:              Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:      kube-root-ca.crt
    ConfigMapOptional:  <nil>
    DownwardAPI:        true
QoS Class:           BestEffort
Node-Selectors:      <none>
Tolerations:         node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                     node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type     Reason          Age    From          Message
  ----     -
  Normal   Scheduled       13m    default-scheduler   Successfully assigned default/kubernetes-bootcamp-f95c5b745-pgwsq to minikube
  Warning   Failed          12m    kubelet         Failed to pull image "gcr.io/google-samples/kubernetes-bootcamp:v1": unexpected EOF
  Warning   Failed          12m    kubelet         Error: ErrImagePull
```

Show the app in the terminal.

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl proxy
Starting to serve on 127.0.0.1:8001

saeda@Thee MINGW64 ~
$ export POD_NAME="$(kubectl get pods -o go-template --template '{{range .items}}{{.metadata.name}}{{"\n"}}{{end}}')'"
echo Name of the Pod: $POD_NAME
Name of the Pod: kubernetes-bootcamp-f95c5b745-pgwsq

saeda@Thee MINGW64 ~
$ curl http://localhost:8001/api/v1/namespaces/default/pods/$POD_NAME:8080/proxy/
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left     Speed
100    83      0    83      0      0    346      0 --:--:-- --:--:-- --:--:--    345Hello Kubernetes bootcamp
! | Running on: kubernetes-bootcamp-f95c5b745-pgwsq | v=1

saeda@Thee MINGW64 ~
$ kubectl logs "$POD_NAME"
Kubernetes Bootcamp App Started At: 2024-02-21T22:59:31.132Z | Running On: kubernetes-bootcamp-f95c5b745-pgwsq

Running On: kubernetes-bootcamp-f95c5b745-pgwsq | Total Requests: 1 | App Uptime: 769.214 seconds | Log Time: 2024-02-21T23:12:20.346Z

saeda@Thee MINGW64 ~
$ kubectl exec "$POD_NAME" -- env
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
HOSTNAME=kubernetes-bootcamp-f95c5b745-pgwsq
KUBERNETES_SERVICE_PORT=443
KUBERNETES_SERVICE_PORT_HTTPS=443
KUBERNETES_PORT=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP_PROTO=tcp
KUBERNETES_PORT_443_TCP_PORT=443
KUBERNETES_PORT_443_TCP_ADDR=10.96.0.1
KUBERNETES_SERVICE_HOST=10.96.0.1
NPM_CONFIG_LOGLEVEL=info
NODE_VERSION=6.3.1
HOME=/root

saeda@Thee MINGW64 ~
$ kubectl exec -ti $POD_NAME -- bash
Unable to use a TTY - input is not a terminal or the right kind of file
```

View the container logs.

```
saeda@Thee MINGW64 ~
$ kubectl logs "$POD_NAME"
Kubernetes Bootcamp App Started At: 2024-02-21T22:59:31.132Z | Running On: kubernetes-bootcamp-f95c5b745-pgwsq

Running On: kubernetes-bootcamp-f95c5b745-pgwsq | Total Requests: 1 | App Uptime: 769.214 seconds | Log Time: 2024-02-21T23:12:20.346Z

saeda@Thee MINGW64 ~
$ kubectl exec "$POD_NAME" -- env
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
HOSTNAME=kubernetes-bootcamp-f95c5b745-pgwsq
KUBERNETES_SERVICE_PORT=443
KUBERNETES_SERVICE_PORT_HTTPS=443
KUBERNETES_PORT=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP_PROTO=tcp
KUBERNETES_PORT_443_TCP_PORT=443
KUBERNETES_PORT_443_TCP_ADDR=10.96.0.1
KUBERNETES_SERVICE_HOST=10.96.0.1
NPM_CONFIG_LOGLEVEL=info
NODE_VERSION=6.3.1
HOME=/root

saeda@Thee MINGW64 ~
$ kubectl exec -ti $POD_NAME -- bash
Unable to use a TTY - input is not a terminal or the right kind of file
```

Executing command on the container

```
saeda@Thee MINGW64 ~
$ kubectl exec "$POD_NAME" -- env
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
HOSTNAME=kubernetes-bootcamp-f95c5b745-pgwsq
KUBERNETES_SERVICE_PORT=443
KUBERNETES_SERVICE_PORT_HTTPS=443
KUBERNETES_PORT=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP_PROTO=tcp
KUBERNETES_PORT_443_TCP_PORT=443
KUBERNETES_PORT_443_TCP_ADDR=10.96.0.1
KUBERNETES_SERVICE_HOST=10.96.0.1
NPM_CONFIG_LOGLEVEL=info
NODE_VERSION=6.3.1
HOME=/root

saeda@Thee MINGW64 ~
$ kubectl exec -ti $POD_NAME -- bash
Unable to use a TTY - input is not a terminal or the right kind of file
```

I used winpty for this command. winpty is a Windows software package providing an interface similar to a Unix pty-master for communicating with Windows console programs.

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ winpty kubectl exec -ti $POD_NAME -- bash
root@kubernetes-bootcamp-f95c5b745-pgwsq:/# cat server.js
var http = require('http');
var requests=0;
var podname= process.env.HOSTNAME;
var startTime;
var host;
var handleRequest = function(request, response) {
  response.setHeader('Content-Type', 'text/plain');
  response.writeHead(200);
  response.write("Hello Kubernetes bootcamp! | Running on: ");
  response.write(host);
  response.end(" | v=1\n");
  console.log("Running On:" ,host, "| Total Requests:", ++requests,"| App Uptime:", (new Date() - start
Time)/1000 , "seconds", "| Log Time:",new Date());
}
var www = http.createServer(handleRequest);
www.listen(8080,function () {
  startTime = new Date();
  host = process.env.HOSTNAME;
  console.log ("Kubernetes Bootcamp App Started At:",startTime, "| Running On: " ,host, "\n" );
});
root@kubernetes-bootcamp-f95c5b745-pgwsq:/# curl http://localhost:8080
Hello Kubernetes bootcamp! | Running on: kubernetes-bootcamp-f95c5b745-pgwsq | v=1
root@kubernetes-bootcamp-f95c5b745-pgwsq:/#
```

Module 4: Expose your app publicly.

Services and Labels

Step 1: Creating a new Service.

```
MINGW64~/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
kubernetes-bootcamp-f95c5b745-pgwsq 1/1     Running   0           25m

saeda@Thee MINGW64 ~
$ kubectl get services
NAME      TYPE      CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
kubernetes ClusterIP  10.96.0.1     <none>        443/TCP     129m

saeda@Thee MINGW64 ~
$ kubectl expose deployment/kubernetes-bootcamp --type="NodePort" --port 8080
service/kubernetes-bootcamp exposed

saeda@Thee MINGW64 ~
$ kubectl get services
NAME            TYPE      CLUSTER-IP   EXTERNAL-IP   PORT(S)            AGE
kubernetes      ClusterIP  10.96.0.1     <none>        443/TCP            130m
kubernetes-bootcamp NodePort    10.106.38.81  <none>        8080:32645/TCP     5s

saeda@Thee MINGW64 ~
$ kubectl describe services/kubernetes-bootcamp
Name:         kubernetes-bootcamp
Namespace:    default
Labels:       app=kubernetes-bootcamp
Annotations:  <none>
Selector:     app=kubernetes-bootcamp
Type:         NodePort
IP Family Policy: SingleStack
IP Families:  IPv4
IP:           10.106.38.81
IPs:          10.106.38.81
Port:         <unset> 8080/TCP
TargetPort:   8080/TCP
NodePort:     <unset> 32645/TCP
Endpoints:    10.244.0.14:8080
Session Affinity: None
External Traffic Policy: Cluster
Events:       <none>

saeda@Thee MINGW64 ~
$ export NODE_PORT="$(kubectl get services/kubernetes-bootcamp -o go-template='{{(index .spec.ports 0).nodePort}}')'"
echo "NODE_PORT=$NODE_PORT"
NODE_PORT=32645

saeda@Thee MINGW64 ~
$ curl http://"$((minikube ip)):$NODE_PORT"
W0221 23:24:16.251328 11032 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
   0         0     0     0         0      0     0     0      0
  0         0     0     0         0      0     0     0      0
curl: (28) Failed to connect to 192.168.49.2 port 32645 after 21324 ms: Couldn't connect to server

saeda@Thee MINGW64 ~
$ curl http://"$((minikube ip)):$NODE_PORT"
W0221 23:24:48.873640 12656 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
```

```
MINGW64/c/Users/saeda

saeda@Thee MINGW64 ~
$ minikube service kubernetes-bootcamp --url
W0221 23:25:40.010406 17900 main.go:291] Unable to resolve the current Docker
CLI context "default": context "default": context not found: open C:\Users\saeda
\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a3
3f0688f\meta.json: The system cannot find the path specified.
http://127.0.0.1:57475
! Because you are using a Docker driver on windows, the terminal needs to be ope
n to run it.

saeda@Thee MINGW64 ~
$ curl 127.0.0.1:51082
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left     Speed
  0     0     0     0     0     0      0      0  --:--:--  0:00:02 --:--:--     0
curl: (7) Failed to connect to 127.0.0.1 port 51082 after 2019 ms: Couldn't conn
ect to server

saeda@Thee MINGW64 ~
$ curl 127.0.0.1:51082
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total   Spent    Left     Speed
  0     0     0     0     0     0      0      0  --:--:--  0:00:02 --:--:--     0
curl: (7) Failed to connect to 127.0.0.1 port 51082 after 2029 ms: Couldn't conn
ect to server
```

Step 2: Using labels.

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl describe deployment
Name:          kubernetes-bootcamp
Namespace:     default
CreationTimestamp: Wed, 21 Feb 2024 22:57:51 +0000
Labels:        app=kubernetes-bootcamp
Annotations:    deployment.kubernetes.io/revision: 1
Selector:       app=kubernetes-bootcamp
Replicas:       1 desired | 1 updated | 1 total | 1 available | 0 unavailable
StrategyType:   RollingUpdate
MinReadySeconds: 0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
  Labels:  app=kubernetes-bootcamp
  Containers:
    kubernetes-bootcamp:
      Image:          gcr.io/google-samples/kubernetes-bootcamp:v1
      Port:           <none>
      Host Port:       <none>
      Environment:    <none>
      Mounts:          <none>
      Volumes:         <none>
  Conditions:
    Type           Status    Reason
    ----           -
    Available       True      MinimumReplicasAvailable
    Progressing     True      NewReplicaSetAvailable
OldReplicaSets:    <none>
NewReplicaSet:     kubernetes-bootcamp-f95c5b745 (1/1 replicas created)
Events:            <none>

saeda@Thee MINGW64 ~
$ kubectl get pods -l app=kubernetes-bootcamp
NAME                                READY   STATUS    RESTARTS   AGE
kubernetes-bootcamp-f95c5b745-pgwsq 1/1     Running   0           15h

saeda@Thee MINGW64 ~
$ kubectl get services -l app=kubernetes-bootcamp
NAME          TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)          AGE
kubernetes-bootcamp  NodePort    10.106.38.81 <none>        8080:32645/TCP   14h

saeda@Thee MINGW64 ~
$ export POD_NAME="$(kubectl get pods -o go-template --template '{{range .items}}{{.metadata.name}}{{"\n"}}{{end}}')"
echo "Name of the Pod: $POD_NAME"
Name of the Pod: kubernetes-bootcamp-f95c5b745-pgwsq

saeda@Thee MINGW64 ~
$ kubectl label pods "$POD_NAME" version=v1
pod/kubernetes-bootcamp-f95c5b745-pgwsq labeled

saeda@Thee MINGW64 ~
$ kubectl describe pods "$POD_NAME"
Name:          kubernetes-bootcamp-f95c5b745-pgwsq
Namespace:     default
Priority:       0
Service Account: default
Node:          minikube/192.168.49.2
Start Time:    Wed, 21 Feb 2024 22:57:51 +0000
Labels:        app=kubernetes-bootcamp
               pod-template-hash=f95c5b745
```

```

MINGW64:/c/Users/saeda
$ kubectl label pods "$POD_NAME" version=v1
pod/kubernetes-bootcamp-f95c5b745-pgwsq labeled

saeda@Thee MINGW64 ~
$ kubectl describe pods "$POD_NAME"
Name:          kubernetes-bootcamp-f95c5b745-pgwsq
Namespace:     default
Priority:       0
Service Account: default
Node:          minikube/192.168.49.2
Start Time:    Wed, 21 Feb 2024 22:57:51 +0000
Labels:        app=kubernetes-bootcamp
               pod-template-hash=f95c5b745
               version=v1
Annotations:   <none>
Status:        Running
IP:            10.244.0.14
IPs:           IP: 10.244.0.14
Controlled By: ReplicaSet/kubernetes-bootcamp-f95c5b745
Containers:
  kubernetes-bootcamp:
    Container ID:  docker://e19125310d6041abadc4a54e655f771cad27885e4d37760dcd522696f1faf89e
    Image:         gcr.io/google-samples/kubernetes-bootcamp:v1
    Image ID:      docker-pullable://gcr.io/google-samples/kubernetes-bootcamp@sha256:0d6b8ee63bb57c5f5b6156f446b3bc3b3c143d233037f3a2f00e279c8fcc64af
    Port:          <none>
    Host Port:     <none>
    State:         Running
      Started:     Wed, 21 Feb 2024 22:59:30 +0000
    Ready:         True
    Restart Count:  0
    Environment:   <none>
    Mounts:
      /var/run/secrets/kubernetes.io/serviceaccount from kube-api-access-7ph6d (ro)
Conditions:
  Type            Status
  Initialized      True
  Ready           True
  ContainersReady True
  PodScheduled    True
Volumes:
  kube-api-access-7ph6d:
    Type:              Projected (a volume that contains injected data from multiple sources)
    TokenExpirationSeconds: 3607
    ConfigMapName:       kube-root-ca.crt
    ConfigMapOptional:   <nil>
    DownwardAPI:         true
  QoS Class:           BestEffort
  Node-Selectors:      <none>
  Tolerations:         node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                       node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
  Events:              <none>

saeda@Thee MINGW64 ~
$ kubectl get pods -l version=v1
NAME                                READY  STATUS   RESTARTS  AGE
kubernetes-bootcamp-f95c5b745-pgwsq  1/1    Running  0         15h

saeda@Thee MINGW64 ~
$

```

Step 3: Deleting a service.

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl delete service -l app=kubernetes-bootcamp
service "kubernetes-bootcamp" deleted

saeda@Thee MINGW64 ~
$ kubectl get services
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
kubernetes   ClusterIP   10.96.0.1    <none>        443/TCP    16h

saeda@Thee MINGW64 ~
$ curl http://"$((minikube ip)):$NODE_PORT"
W0222 14:10:52.660891 21596 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
   0      0     0     0         0      0         0      0  --:--:--  0:00:21  --:--:--    0
curl: (28) Failed to connect to 192.168.49.2 port 32645 after 21047 ms: Couldn't connect to server

saeda@Thee MINGW64 ~
$ kubectl exec -ti $POD_NAME -- curl http://localhost:8080
Unable to use a TTY - input is not a terminal or the right kind of file
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
   0      0     0     0         0      0         0      0  --:--:--  --:--:--  --:--:--    0Hello Kubernetes bootcamp
! | Running on: kubernetes-bootcamp-f95c5b745-pgwsq | v=1
100   83     0    83     0     0    921     0  --:--:--  --:--:--  --:--:--   965

saeda@Thee MINGW64 ~
$
```


Module 5: Scale up your app.

Scaling a Deployment

```
MINGW64:/c/Users/saeda

saeda@Thee MINGW64 ~
$ kubectl expose deployment/kubernetes-bootcamp --type="NodePort" --port 8080
service/kubernetes-bootcamp exposed

saeda@Thee MINGW64 ~
$ kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
kubernetes-bootcamp 1/1     1            1           15h

saeda@Thee MINGW64 ~
$ kubectl get rs
NAME                DESIRED   CURRENT   READY   AGE
kubernetes-bootcamp-f95c5b745 1         1         1       15h

saeda@Thee MINGW64 ~
$ kubectl scale deployments/kubernetes-bootcamp --replicas=4
deployment.apps/kubernetes-bootcamp scaled

saeda@Thee MINGW64 ~
$ kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
kubernetes-bootcamp 4/4     4            4           15h

saeda@Thee MINGW64 ~
$ kubectl get pods -o wide
NAME                READY   STATUS    RESTARTS   AGE   IP            NODE       NOMIN
ATED NODE   READINESS GATES
kubernetes-bootcamp-f95c5b745-clx4v 1/1     Running   0          10s   10.244.0.18   minikube   <none>
> <none>
kubernetes-bootcamp-f95c5b745-k1hd1 1/1     Running   0          10s   10.244.0.19   minikube   <none>
> <none>
kubernetes-bootcamp-f95c5b745-pgwsq 1/1     Running   0          15h   10.244.0.14   minikube   <none>
> <none>
kubernetes-bootcamp-f95c5b745-r2q8k 1/1     Running   0          10s   10.244.0.20   minikube   <none>
> <none>

saeda@Thee MINGW64 ~
$ kubectl describe deployments/kubernetes-bootcamp
Name:                kubernetes-bootcamp
Namespace:           default
CreationTimestamp:    Wed, 21 Feb 2024 22:57:51 +0000
Labels:              app=kubernetes-bootcamp
Annotations:         deployment.kubernetes.io/revision: 1
Selector:            app=kubernetes-bootcamp
Replicas:            4 desired | 4 updated | 4 total | 4 available | 0 unavailable
StrategyType:        RollingUpdate
MinReadySeconds:     0
RollingUpdateStrategy: 25% max unavailable, 25% max surge
Pod Template:
  Labels:  app=kubernetes-bootcamp
  Containers:
    kubernetes-bootcamp:
      Image:      gcr.io/google-samples/kubernetes-bootcamp:v1
      Port:       <none>
      Host Port:  <none>
      Environment: <none>
      Mounts:      <none>
      Volumes:     <none>
  Conditions:
    Type           Status  Reason
```

Load Balancing

```
MINGW64:/c/Users/saeda

saeda@Thee MINGW64 ~
$ kubectl describe services/kubernetes-bootcamp
Name:          kubernetes-bootcamp
Namespace:     default
Labels:        app=kubernetes-bootcamp
Annotations:   <none>
Selector:      app=kubernetes-bootcamp
Type:          NodePort
IP Family Policy: SingleStack
IP Families:   IPv4
IP:            10.109.117.204
IPs:           10.109.117.204
Port:          <unset> 8080/TCP
TargetPort:    8080/TCP
NodePort:      <unset> 30376/TCP
Endpoints:     10.244.0.14:8080,10.244.0.20:8080,10.244.0.21:8080 + 1 more...
Session Affinity: None
External Traffic Policy: Cluster
Events:        <none>

saeda@Thee MINGW64 ~
$ export NODE_PORT="$(kubectl get services/kubernetes-bootcamp -o go-template='{{(index .spec.ports 0).nodePort}}')"
```

```
saeda@Thee MINGW64 ~
$ echo NODE_PORT=$NODE_PORT
NODE_PORT=30376

saeda@Thee MINGW64 ~
$ curl http://"$((minikube ip)): $NODE_PORT"
w0222 20:15:26.706065 20616 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left   Speed
  0     0     0     0     0     0      0      0  --:--:--  0:00:21 --:--:--    0
curl: (28) Failed to connect to 192.168.49.2 port 30376 after 21056 ms: Couldn't connect to server

saeda@Thee MINGW64 ~
$ curl 127.0.0.1:60391
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left   Speed
100    83     0    83     0     0    882     0  --:--:--  --:--:--  --:--:--   882Hello Kubernetes bootcamp
! | Running on: kubernetes-bootcamp-f95c5b745-pgwsq | v=1

saeda@Thee MINGW64 ~
$
```

Minikube tunnel is needed if you run minikube with Docker Desktop as the container driver:

```
MINGW64:/c/Users/saeda

saeda@Thee MINGW64 ~
$ minikube service kubernetes-bootcamp --url
w0222 20:15:56.755725 20432 main.go:291] Unable to resolve the current Docker
CLI context "default": context "default": context not found: open C:\Users\saeda
\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a3
3f0688f\meta.json: The system cannot find the path specified.
http://127.0.0.1:60391
! Because you are using a Docker driver on windows, the terminal needs to be ope
n to run it.
```

Scale down.

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl scale deployments/kubernetes-bootcamp --replicas=2
deployment.apps/kubernetes-bootcamp scaled

saeda@Thee MINGW64 ~
$ kubectl get deployments
NAME                READY    UP-TO-DATE    AVAILABLE    AGE
kubernetes-bootcamp 2/2      2             2            15h

saeda@Thee MINGW64 ~
$ kubectl get pods -o wide
NAME                                READY    STATUS      RESTARTS    AGE    IP             NODE       N
OMINATED NODE    READINESS GATES
kubernetes-bootcamp-f95c5b745-clx4v 1/1      Terminating 0         31m    10.244.0.18    minikube  <
none>              <none>
kubernetes-bootcamp-f95c5b745-klhd1 1/1      Terminating 0         31m    10.244.0.19    minikube  <
none>              <none>
kubernetes-bootcamp-f95c5b745-pgwsq 1/1      Running      0         15h    10.244.0.14    minikube  <
none>              <none>
kubernetes-bootcamp-f95c5b745-r2q8k 1/1      Running      0         31m    10.244.0.20    minikube  <
none>              <none>

saeda@Thee MINGW64 ~
$
```

Module 6: Update your app.

Update the version of the app.

```
MINGW64:/c/Users/saeda

saeda@Thee MINGW64 ~
$ kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
kubernetes-bootcamp 4/4     4            4           21h

saeda@Thee MINGW64 ~
$ kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
kubernetes-bootcamp-f95c5b745-9bbj6 1/1     Running   0          10m
kubernetes-bootcamp-f95c5b745-f8bdm 1/1     Running   0          10m
kubernetes-bootcamp-f95c5b745-pgwsq 1/1     Running   0          21h
kubernetes-bootcamp-f95c5b745-r2q8k 1/1     Running   0          6h7m

saeda@Thee MINGW64 ~
$ kubectl describe pods
Name:                kubernetes-bootcamp-f95c5b745-9bbj6
Namespace:           default
Priority:             0
Service Account:     default
Node:                minikube/192.168.49.2
Start Time:          Thu, 22 Feb 2024 20:09:51 +0000
Labels:              app=kubernetes-bootcamp
                    pod-template-hash=f95c5b745
Annotations:         <none>
Status:              Running
IP:                  10.244.0.22
IPs:                 IP: 10.244.0.22
Controlled By:       ReplicaSet/kubernetes-bootcamp-f95c5b745
Containers:
  kubernetes-bootcamp:
    Container ID:   docker://b32659aa824e473fc2e446d564b080cefba25d725fdcefafcb4d30cb4ac80
    Image:          gcr.io/google-samples/kubernetes-bootcamp:v1
    Image ID:       docker-pullable://gcr.io/google-samples/kubernetes-bootcamp@sha256:0d6b8ee63bb57c5f5b6156f446b3bc3b3c143d233037f3a2f00e279c8fcc64af
```

To update the image of the application to version 2:

```
MINGW64:/c/Users/saeda

saeda@Thee MINGW64 ~
$ kubectl set image deployments/kubernetes-bootcamp kubernetes-bootcamp=jocatalin/kubernetes-bootcamp:v2
deployment.apps/kubernetes-bootcamp image updated

saeda@Thee MINGW64 ~
$ kubectl get pods
NAME                                READY   STATUS             RESTARTS   AGE
kubernetes-bootcamp-65df967b7f-kzgx8 0/1     ContainerCreating   0          1s
kubernetes-bootcamp-65df967b7f-pnvrx 1/1     Running             0          5s
kubernetes-bootcamp-65df967b7f-xmjbs 0/1     ContainerCreating   0          5s
kubernetes-bootcamp-f95c5b745-9bbj6 1/1     Terminating       0          11m
kubernetes-bootcamp-f95c5b745-f8bdm 1/1     Terminating       0          11m
kubernetes-bootcamp-f95c5b745-pgwsq 1/1     Running             0          21h
kubernetes-bootcamp-f95c5b745-r2q8k 1/1     Running             0          6h7m
```

Verify an update.

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl describe services/kubernetes-bootcamp
Name: kubernetes-bootcamp
Namespace: default
Labels: app=kubernetes-bootcamp
Annotations: <none>
Selector: app=kubernetes-bootcamp
Type: NodePort
IP Family Policy: SingleStack
IP Families: IPv4
IP: 10.109.117.204
IPs: 10.109.117.204
Port: <unset> 8080/TCP
TargetPort: 8080/TCP
NodePort: <unset> 30376/TCP
Endpoints: 10.244.0.23:8080,10.244.0.24:8080,10.244.0.25:8080 + 1 more...
Session Affinity: None
External Traffic Policy: Cluster
Events: <none>

saeda@Thee MINGW64 ~
$ export NODE_PORT=$(kubectl get services/kubernetes-bootcamp -o go-template='{{(index .spec.ports 0).nodePort}}')
echo "NODE_PORT=$NODE_PORT"
NODE_PORT=30376

saeda@Thee MINGW64 ~
$ curl http://"$(minikube ip):$NODE_PORT"
W0222 20:23:35.277753 21068 main.go:291] Unable to resolve the current Docker CLI context "default":
context "default": context not found: open C:\Users\saeda\.docker\contexts\meta\37a8eec1ce19687d132fe29
051dca629d164e2c4958ba141d5f4133a33f0688f\meta.json: The system cannot find the path specified.
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total     Spent    Left     Speed
  0     0     0     0     0     0      0      0  --:--:--  0:00:21 --:--:--    0
curl: (28) Failed to connect to 192.168.49.2 port 30376 after 21037 ms: Couldn't connect to server

saeda@Thee MINGW64 ~
$ curl 127.0.0.1:60391
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total     Spent    Left     Speed
100    84     0    84     0     0   1386     0  --:--:--  --:--:--  --:--:-- 1400Hello Kubernetes bootcamp
! | Running on: kubernetes-bootcamp-65df967b7f-qwp2h | v=2

saeda@Thee MINGW64 ~
$ kubectl rollout status deployments/kubernetes-bootcamp
deployment "kubernetes-bootcamp" successfully rolled out

saeda@Thee MINGW64 ~
$ kubectl describe pods
```

The result:

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl describe pods
Name: kubernetes-bootcamp-65df967b7f-kzgx8
Namespace: default
Priority: 0
Service Account: default
Node: minikube/192.168.49.2
Start Time: Thu, 22 Feb 2024 20:20:52 +0000
Labels: app=kubernetes-bootcamp
        pod-template-hash=65df967b7f
Annotations: <none>
Status: Running
IP: 10.244.0.25
IPs:
IP: 10.244.0.25
Controlled By: ReplicaSet/kubernetes-bootcamp-65df967b7f
Containers:
  kubernetes-bootcamp:
    Container ID: docker://07802e5385d193fc32f75af8665e2ef5b0bc8121ce98519b4dd3844fd6bb9457
    Image: jocatalin/kubernetes-bootcamp:v2
    Image ID: docker-pullable://jocatalin/kubernetes-bootcamp@sha256:fb1a3ced00cefcfc1f83f18ab5cd1
4199e30adc1b49aa4244f5d65ad3f5feb2a5
```

Roll back an update.

Notice that some of the Pods have a status of ImagePullBackOff.

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl set image deployments/kubernetes-bootcamp kubernetes-bootcamp=gcr.io/google-samples/kubernet
s-bootcamp:v10
deployment.apps/kubernetes-bootcamp image updated

saeda@Thee MINGW64 ~
$ kubectl get deployments
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
kubernetes-bootcamp 3/4      2            3           21h

saeda@Thee MINGW64 ~
$ kubectl get pods
NAME                READY   STATUS              RESTARTS   AGE
kubernetes-bootcamp-65df967b7f-kzgx8 1/1     Running            0          9m32s
kubernetes-bootcamp-65df967b7f-pnvrx 1/1     Terminating      0          9m36s
kubernetes-bootcamp-65df967b7f-qwp2h 1/1     Running            0          9m31s
kubernetes-bootcamp-65df967b7f-xmjbs 1/1     Running            0          9m36s
kubernetes-bootcamp-7497bc6797-nqh6c 0/1     ErrImagePull       0          11s
kubernetes-bootcamp-7497bc6797-wmr17 0/1     ErrImagePull       0          11s

saeda@Thee MINGW64 ~
$ kubectl describe pods
```

In the Events section of the output for the affected Pods, notice that the v10 image version did not exist in the repository:

```
Events:
  Type     Reason      Age   From          Message
  ----     -
Normal    Scheduled   13m   default-scheduler Successfully assigned default/kubernetes-bootcamp-65df967b7f-xmjbs to minikube
Normal    Pulling     13m   kubelet       Pulling image "jocatalin/kubernetes-bootcamp:v2"
Normal    Pulled      13m   kubelet       Successfully pulled image "jocatalin/kubernetes-bootcamp:v2" in 1.253s (3.618s including waiting)
Normal    Created     13m   kubelet       Created container kubernetes-bootcamp
Normal    Started     13m   kubelet       Started container kubernetes-bootcamp
```

To roll back the deployment to your last working version:

```
saeda@Thee MINGW64 ~
$ kubectl rollout undo deployments/kubernetes-bootcamp
deployment.apps/kubernetes-bootcamp rolled back

saeda@Thee MINGW64 ~
$ kubectl get pods
NAME                READY   STATUS              RESTARTS   AGE
kubernetes-bootcamp-65df967b7f-f485k 1/1     Terminating      0          77s
kubernetes-bootcamp-65df967b7f-kzgx8 1/1     Running            0          14m
kubernetes-bootcamp-65df967b7f-qwp2h 1/1     Running            0          14m
kubernetes-bootcamp-65df967b7f-xmjbs 1/1     Running            0          14m
kubernetes-bootcamp-7497bc6797-p7pxv 0/1     ErrImagePull       0          3s
kubernetes-bootcamp-7497bc6797-ztnhw 0/1     ContainerCreating  0          3s

saeda@Thee MINGW64 ~
$ kubectl describe pods
```

The Deployment is once again using a stable version of the app (v2). The rollback was successful.

```
Events:
  Type     Reason      Age   From          Message
  ----     -
Normal    Scheduled   7s    default-scheduler Successfully assigned default/kubernetes-bootcamp-7497bc6797-ztnhw to minikube
Normal    Pulling     6s    kubelet       Pulling image "gcr.io/google-samples/kubernetes-bootcamp:v10"
Warning   Failed      4s    kubelet       Failed to pull image "gcr.io/google-samples/kubernetes-bootcamp:v10": Error response from daemon: manifest for gcr.io/google-samples/kubernetes-bootcamp:v10 not found: manifest unknown: Failed to fetch "v10" from request "/v2/google-samples/kubernetes-bootcamp/manifests/v10".
Warning   Failed      4s    kubelet       Error: ErrImagePull
Normal    BackOff     3s    kubelet       Back-off pulling image "gcr.io/google-samples/kubernetes-bootcamp:v10"
Warning   Failed      3s    kubelet       Error: ImagePullBackOff
```

To clean up local cluster:

```
MINGW64:/c/Users/saeda
saeda@Thee MINGW64 ~
$ kubectl delete deployments/kubernetes-bootcamp services/kubernetes-bootcamp
deployment.apps "kubernetes-bootcamp" deleted
service "kubernetes-bootcamp" deleted
saeda@Thee MINGW64 ~
$
```