**Deployment to Kubernetes using Minikube (single node kubernetes cluster for development purposes)**

1. Install Kompose (converts/creates docker files to kubernetes deployment files)
2. Install Minikube
3. Download HelloWorldApp project from GitHub
4. If you already have minikube installed, run all the kubectl clean commands to start with a clean minikube environment.
5. Have Fun & Ask questions.
6. Send feedback to improve this documentation (marshallmonica@yahoo.com)

PS C:\Users\monica> **minikube start**

\* minikube v1.12.3 on Microsoft Windows 10 Pro 10.0.18362 Build 18362

\* Kubernetes 1.18.3 is now available. If you would like to upgrade, specify: --kubernetes-version=v1.18.3

\* Using the docker driver based on existing profile

! Your system has 32537MB memory but Docker has only 2996MB. For a better performance increase to at least 3GB.

Docker for Desktop > Settings > Resources > Memory

\* Starting control plane node minikube in cluster minikube

\* Restarting existing docker container for "minikube" ...

\* Preparing Kubernetes v1.16.0 on Docker 19.03.8 ...

\* Verifying Kubernetes components...

\* Enabled addons: dashboard, default-storageclass, storage-provisioner

\* **Done! kubectl is now configured to use "minikube"**

PS C:\Users\monica> **kubectl**

kubectl controls the Kubernetes cluster manager.

Find more information at: <https://kubernetes.io/docs/reference/kubectl/overview/>

Basic Commands (Beginner):

create Create a resource from a file or from stdin.

expose Take a replication controller, service, deployment or pod and expose it as a new Kubernetes Service

run Run a particular image on the cluster

set Set specific features on objects

Basic Commands (Intermediate):

explain Documentation of resources

get Display one or many resources

edit Edit a resource on the server

delete Delete resources by filenames, stdin, resources and names, or by resources and label selector

Deploy Commands:

rollout Manage the rollout of a resource

scale Set a new size for a Deployment, ReplicaSet, Replication Controller, or Job

autoscale Auto-scale a Deployment, ReplicaSet, or ReplicationController

Cluster Management Commands:

certificate Modify certificate resources.

cluster-info Display cluster info

top Display Resource (CPU/Memory/Storage) usage.

cordon Mark node as unschedulable

uncordon Mark node as schedulable

drain Drain node in preparation for maintenance

taint Update the taints on one or more nodes

Troubleshooting and Debugging Commands:

describe Show details of a specific resource or group of resources

logs Print the logs for a container in a pod

attach Attach to a running container

exec Execute a command in a container

port-forward Forward one or more local ports to a pod

proxy Run a proxy to the Kubernetes API server

cp Copy files and directories to and from containers.

auth Inspect authorization

Advanced Commands:

diff Diff live version against would-be applied version

apply Apply a configuration to a resource by filename or stdin

patch Update field(s) of a resource using strategic merge patch

replace Replace a resource by filename or stdin

wait Experimental: Wait for a specific condition on one or many resources.

convert Convert config files between different API versions

kustomize Build a kustomization target from a directory or a remote url.

Settings Commands:

label Update the labels on a resource

annotate Update the annotations on a resource

completion Output shell completion code for the specified shell (bash or zsh)

Other Commands:

api-resources Print the supported API resources on the server

api-versions Print the supported API versions on the server, in the form of "group/version"

config Modify kubeconfig files

plugin Provides utilities for interacting with plugins.

version Print the client and server version information

Usage:

kubectl [flags] [options]

Use "kubectl <command> --help" for more information about a given command.

Use "kubectl options" for a list of global command-line options (applies to all commands).

PS C:\Users\monica> **kubectl get nodes**

NAME STATUS ROLES AGE VERSION

docker-desktop Ready master 2d13h v1.16.6-beta.0

PS C:\Users\monica> **kubectl version**

Client Version: version.Info{Major:"1", Minor:"16+", GitVersion:"v1.16.6-beta.0", GitCommit:"e7f962ba86f4ce7033828210ca3556393c377bcc", GitTreeState:"clean", BuildDate:"2020-01-15T08:26:26Z", GoVersion:"go1.13.5", Compiler:"gc", Platform:"windows/amd64"}

Server Version: version.Info{Major:"1", Minor:"16+", GitVersion:"v1.16.6-beta.0", GitCommit:"e7f962ba86f4ce7033828210ca3556393c377bcc", GitTreeState:"clean", BuildDate:"2020-01-15T08:18:29Z", GoVersion:"go1.13.5", Compiler:"gc", Platform:"linux/amd64"}

PS C:\Users\monica> **kubectl config current-context**

minikube

PS C:\Users\monica> **kubectl config get-contexts**

CURRENT NAME CLUSTER AUTHINFO NAMESPACE

**docker-desktop docker-desktop docker-desktop**

**docker-for-desktop docker-desktop docker-desktop**

**\* minikube minikube minikube**

PS C:\Users\monica> cd ../..

Directory: C:\data\minikubeTests\**HelloWorldApp**

Mode LastWriteTime Length Name

---- ------------- ------ ----

d----- 8/25/2020 1:19 PM helloworld

d----- 8/25/2020 1:19 PM nginx

d----- 8/25/2020 1:19 PM sayhello

-a---- 8/25/2020 1:19 PM 40960 db.sqlite3

-a---- 8/25/2020 1:19 PM 379 docker-compose-gunicorn.yml

-a---- 8/25/2020 1:19 PM 368 docker-compose-sqlite.yml

-a---- 8/25/2020 1:19 PM 457 docker-compose.yml

-a---- 8/25/2020 1:19 PM 304 Dockerfile

-a---- 8/25/2020 1:19 PM 542 manage.py

-a---- 8/25/2020 1:19 PM 170 Pipfile

-a---- 8/25/2020 1:19 PM 1367 Pipfile.lock

-a---- 8/25/2020 1:19 PM 1810 README.md

PS C:\data\minikubeTests\HelloWorldApp> **kompose**

Kompose is a tool to help users who are familiar with docker-compose move to Kubernetes.

Usage:

**kompose [command]**

Available Commands:

completion Output shell completion code

convert Convert a Docker Compose file

down Delete instantiated services/deployments from kubernetes

help Help about any command

up Deploy your Dockerized application to a container orchestrator.

version Print the version of Kompose

Flags:

--error-on-warning Treat any warning as an error

-f, --file stringArray Specify an alternative compose file

-h, --help help for kompose

--provider string Specify a provider. Kubernetes or OpenShift. (default "kubernetes")

--suppress-warnings Suppress all warnings

-v, --verbose verbose output

Use "kompose [command] --help" for more information about a command.

subcommand is required

PS C:\data\minikubeTests\HelloWorldApp**> kompose up**

\_[36mINFO\_[0m Build key detected. Attempting to build image 'nginx'

\_[36mINFO\_[0m Building image 'nginx' from directory 'nginx'

\_[31mFATA\_[0m Error while deploying application: k.Transform failed: Unable to build Docker image for service nginx: Unable to build image. For more output, use -v or --verbose when converting.: dial unix /var/run/docker.sock: connect: A socket operation encountered a dead network.

PS C:\data\minikubeTests\HelloWorldApp> **kubectl config use-context minikube**

Switched to context "minikube".

PS C:\data\minikubeTests\HelloWorldApp> **kompose up**

\_[36mINFO\_[0m Build key detected. Attempting to build image 'nginx'

\_[36mINFO\_[0m Building image 'nginx' from directory 'nginx'

\_[31mFATA\_[0m Error while deploying application: k.Transform failed: Unable to build Docker image for service nginx: Unable to build image. For more output, use -v or --verbose when converting.: dial unix /var/run/docker.sock: connect: A socket operation encountered a dead network.

PS C:\data\minikubeTests\HelloWorldApp> ls

Directory: C:\data\minikubeTests\HelloWorldApp

Mode LastWriteTime Length Name

---- ------------- ------ ----

d----- 8/25/2020 1:19 PM helloworld

d----- 8/25/2020 1:19 PM nginx

d----- 8/25/2020 1:19 PM sayhello

-a---- 8/25/2020 1:56 PM 40960 db.sqlite3

-a---- 8/25/2020 1:19 PM 379 docker-compose-gunicorn.yml

-a---- 8/25/2020 1:19 PM 368 docker-compose-sqlite.yml

-a---- 8/25/2020 1:19 PM 457 docker-compose.yml

-a---- 8/25/2020 1:19 PM 304 Dockerfile

-a---- 8/25/2020 1:19 PM 542 manage.py

-a---- 8/25/2020 1:19 PM 170 Pipfile

-a---- 8/25/2020 1:19 PM 1367 Pipfile.lock

-a---- 8/25/2020 1:19 PM 1810 README.md

PS C:\data\minikubeTests\HelloWorldApp**> kompose convert**

**\_[36mINFO\_[0m Kubernetes file "nginx-service.yaml" created**

**\_[36mINFO\_[0m Kubernetes file "web-service.yaml" created**

**\_[36mINFO\_[0m Kubernetes file "db-deployment.yaml" created**

**\_[36mINFO\_[0m Kubernetes file "postgres-data-persistentvolumeclaim.yaml" created**

**\_[36mINFO\_[0m Kubernetes file "nginx-deployment.yaml" created**

**\_[36mINFO\_[0m Kubernetes file "web-deployment.yaml" created**

PS C:\Users\monica**> minikube status**

minikube

type: Control Plane

host: Running

kubelet: Running

apiserver: Running

kubeconfig: Configured

PS C:\Users\monica> **minikube ip**

127.0.0.1

PS C:\data\minikubeTests\**HelloWorldApp> ls**

Directory: C:\data\minikubeTests\HelloWorldApp

Mode LastWriteTime Length Name

---- ------------- ------ ----

d----- 8/25/2020 1:19 PM helloworld

d----- 8/25/2020 1:19 PM nginx

d----- 8/25/2020 1:19 PM sayhello

-a---- 8/25/2020 2:22 PM 1017 db-deployment.yaml

-a---- 8/25/2020 1:56 PM 40960 db.sqlite3

-a---- 8/25/2020 1:19 PM 379 docker-compose-gunicorn.yml

-a---- 8/25/2020 1:19 PM 368 docker-compose-sqlite.yml

-a---- 8/25/2020 1:19 PM 457 docker-compose.yml

-a---- 8/25/2020 1:19 PM 304 Dockerfile

-a---- 8/25/2020 6:35 PM 359 helloworld\_ingress.yaml.txt

-a---- 8/25/2020 1:19 PM 542 manage.py

-a---- 8/25/2020 2:22 PM 787 nginx-deployment.yaml

-a---- 8/25/2020 2:22 PM 353 nginx-service.yaml

-a---- 8/25/2020 1:19 PM 170 Pipfile

-a---- 8/25/2020 1:19 PM 1367 Pipfile.lock

-a---- 8/25/2020 2:22 PM 247 postgres-data-persistentvolumeclaim.yaml

-a---- 8/25/2020 1:19 PM 1810 README.md

-a---- 8/25/2020 3:12 PM 935 web-deployment.yaml

-a---- 8/25/2020 2:22 PM 349 web-service.yaml

PS C:\data\minikubeTests\HelloWorldApp**> kubectl apply -f .\web-deployment.yaml,.\web-service.yaml,.\nginx-deployment.yaml,.\nginx-service.yaml,.\db-deployment.yaml,.\postgres-data-persistentvolumeclaim.yaml**

deployment.apps/web created

service/web created

deployment.apps/nginx created

service/nginx created

deployment.apps/db created

persistentvolumeclaim/postgres-data created

PS C:\data\minikubeTests\HelloWorldApp> **kubectl apply -f .\web-deployment.yaml**  deployment.apps/web created

PS C:\data\minikubeTests\HelloWorldApp> **kubectl exec -it web-88d54fd6d-9szcm python manage.py createsuperuser**

Username (leave blank to use 'root'): monica

Error: That username is already taken.

Username (leave blank to use 'root'): monica2

Email address: monica2@gmail.com

Password:

Password (again):

The password is too similar to the email address.

This password is too short. It must contain at least 8 characters.

This password is too common.

Bypass password validation and create user anyway? [y/N]: y

Superuser created successfully.

PS C:\data\minikubeTests\HelloWorldApp> **kubectl exec -it web-88d54fd6d-9szcm python manage.py migrate**

Operations to perform:

Apply all migrations: admin, auth, contenttypes, sessions

Running migrations:

No migrations to apply.

PS C:\data\minikubeTests\HelloWorldApp> **kubectl get pods**

NAME READY STATUS RESTARTS AGE

db-cc664d479-cxrml 1/1 Running 0 56m

nginx-6489688998-2kqbl 1/1 Running 0 56m

web-88d54fd6d-9szcm 1/1 Running 0 50m

PS C:\data\minikubeTests\HelloWorldApp> **kubectl get events**

LAST SEEN TYPE REASON OBJECT MESSAGE

<unknown> Warning FailedScheduling pod/db-cc664d479-cxrml persistentvolumeclaim "postgres-data" not found

<unknown> Warning FailedScheduling pod/db-cc664d479-cxrml pod has unbound immediate PersistentVolumeClaims

<unknown> Normal Scheduled pod/db-cc664d479-cxrml Successfully assigned default/db-cc664d479-cxrml to minikube

56m Normal Pulled pod/db-cc664d479-cxrml Container image "postgres:11" already present on machine

56m Normal Created pod/db-cc664d479-cxrml Created container db

56m Normal Started pod/db-cc664d479-cxrml Started container db

56m Normal SuccessfulCreate replicaset/db-cc664d479 Created pod: db-cc664d479-cxrml

56m Normal ScalingReplicaSet deployment/db Scaled up replica set db-cc664d479 to 1

<unknown> Normal Scheduled pod/nginx-6489688998-2kqbl Successfully assigned default/nginx-6489688998-2kqbl to minikube

56m Normal Pulling pod/nginx-6489688998-2kqbl Pulling image "nginx"

56m Normal Pulled pod/nginx-6489688998-2kqbl Successfully pulled image "nginx"

56m Normal Created pod/nginx-6489688998-2kqbl Created container nginx

56m Normal Started pod/nginx-6489688998-2kqbl Started container nginx

56m Normal SuccessfulCreate replicaset/nginx-6489688998 Created pod: nginx-6489688998-2kqbl

56m Normal ScalingReplicaSet deployment/nginx Scaled up replica set nginx-6489688998 to 1

56m Normal ExternalProvisioning persistentvolumeclaim/postgres-data waiting for a volume to be created, either by external provisioner "k8s.io/minikube-hostpath" or manually created by system administrator

56m Normal Provisioning persistentvolumeclaim/postgres-data External provisioner is provisioning volume for claim "default/postgres-data"

56m Normal ProvisioningSucceeded persistentvolumeclaim/postgres-data Successfully provisioned volume pvc-c6401510-63f9-4aed-bc81-915f5bb70f74

<unknown> Normal Scheduled pod/web-657b74b8b5-c74jq Successfully assigned default/web-657b74b8b5-c74jq to minikube

55m Normal Pulling pod/web-657b74b8b5-c74jq Pulling image "web"

55m Warning Failed pod/web-657b74b8b5-c74jq Failed to pull image "web": rpc error: code = Unknown desc = Error response from daemon: pull access denied for web, repository does not exist or may require 'docker login': denied: requested access to the resource is denied

55m Warning Failed pod/web-657b74b8b5-c74jq Error: ErrImagePull

54m Normal BackOff pod/web-657b74b8b5-c74jq Back-off pulling image "web"

54m Warning Failed pod/web-657b74b8b5-c74jq Error: ImagePullBackOff

56m Normal SuccessfulCreate replicaset/web-657b74b8b5 Created pod: web-657b74b8b5-c74jq

<unknown> Normal Scheduled pod/web-88d54fd6d-9szcm Successfully assigned default/web-88d54fd6d-9szcm to minikube

50m Normal Pulling pod/web-88d54fd6d-9szcm Pulling image "monicamarshall/helloproject\_web:latest"

50m Normal Pulled pod/web-88d54fd6d-9szcm Successfully pulled image "monicamarshall/helloproject\_web:latest"

50m Normal Created pod/web-88d54fd6d-9szcm Created container web

50m Normal Started pod/web-88d54fd6d-9szcm Started container web

50m Normal SuccessfulCreate replicaset/web-88d54fd6d Created pod: web-88d54fd6d-9szcm

56m Normal ScalingReplicaSet deployment/web Scaled up replica set web-657b74b8b5 to 1

50m Normal ScalingReplicaSet deployment/web Scaled up replica set web-88d54fd6d to 1

PS C:\data\minikubeTests\HelloWorldApp> **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\monica\.minikube\ca.crt

server: <https://127.0.0.1:32768>

name: minikube

contexts:

- context:

cluster: docker-desktop

user: docker-desktop

name: docker-desktop

- context:

cluster: docker-desktop

user: docker-desktop

name: docker-for-desktop

- context:

cluster: minikube

user: minikube

name: minikube

current-context: minikube

kind: Config

preferences: {}

users:

- name: docker-desktop

user:

client-certificate-data: REDACTED

client-key-data: REDACTED

- name: minikube

user:

client-certificate: C:\Users\monica\.minikube\profiles\minikube\client.crt

client-key: C:\Users\monica\.minikube\profiles\minikube\client.key

PS C:\data\minikubeTests\HelloWorldApp> **kubectl get services**

NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE

kubernetes ClusterIP 10.96.0.1 <none> 443/TCP 2d

nginx ClusterIP 10.98.237.141 <none> 1337/TCP 61m

web ClusterIP 10.98.219.173 <none> 8000/TCP 61m

PS C:\data\minikubeTests\HelloWorldApp> **minikube service web**

|-----------|------|-------------|--------------|

| NAMESPACE | NAME | TARGET PORT | URL |

|-----------|------|-------------|--------------|

| default | web | | No node port |

|-----------|------|-------------|--------------|

\* service default/web has no node port

\* Starting tunnel for service web.

|-----------|------|-------------|------------------------|

| NAMESPACE | NAME | TARGET PORT | URL |

|-----------|------|-------------|------------------------|

**| default | web | |** [**http://127.0.0.1:54840**](http://127.0.0.1:54840) **|**

|-----------|------|-------------|------------------------|

\* **Opening service default/web 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 web.

\*

X error stopping tunnel: stopping ssh tunnel: TerminateProcess: Access is denied.

\*

\* minikube is exiting due to an error. If the above message is not useful, open an issue:

- <https://github.com/kubernetes/minikube/issues/new/choose>

PS C:\data\minikubeTests\HelloWorldApp> **minikube service web**

|-----------|------|-------------|--------------|

| NAMESPACE | NAME | TARGET PORT | URL |

|-----------|------|-------------|--------------|

| default | web | | No node port |

|-----------|------|-------------|--------------|

\* service default/web has no node port

\* Starting tunnel for service web.

|-----------|------|-------------|------------------------|

| NAMESPACE | NAME | TARGET PORT | URL |

|-----------|------|-------------|------------------------|

**| default | web | |** [**http://127.0.0.1:59869**](http://127.0.0.1:59869) **|**

|-----------|------|-------------|------------------------|

\* Opening service default/web 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 web.

\*

X error stopping tunnel: stopping ssh tunnel: TerminateProcess: Access is denied.

\*

\* minikube is exiting due to an error. If the above message is not useful, open an issue:

- <https://github.com/kubernetes/minikube/issues/new/choose>

PS C:\data\minikubeTests\HelloWorldApp>

PS C:\data\minikubeTests\HelloWorldApp> **minikube service web --url**

\* service default/web has no node port

\* Starting tunnel for service web.

|-----------|------|-------------|------------------------|

| NAMESPACE | NAME | TARGET PORT | URL |

|-----------|------|-------------|------------------------|

**| default | web | |** [**http://127.0.0.1:60215**](http://127.0.0.1:60215) **|**

|-----------|------|-------------|------------------------|

[**http://127.0.0.1:60215**](http://127.0.0.1:60215)

! Because you are using a Docker driver on windows, the terminal needs to be open to run it.

\* Stopping tunnel for service web.

\*

X error stopping tunnel: stopping ssh tunnel: TerminateProcess: Access is denied.

\*

\* minikube is exiting due to an error. If the above message is not useful, open an issue:

- <https://github.com/kubernetes/minikube/issues/new/choose>

PS C:\data\minikubeTests\HelloWorldApp**> kubectl apply -f .\helloworld\_ingress.yaml**

ingress.networking.k8s.io/helloworldapp-ingress created

PS C:\data\minikubeTests\HelloWorldApp**> kubectl get ingress**

NAME HOSTS ADDRESS PORTS AGE helloworldapp-ingress helloworld.com 80 62s

PS C:\data\minikubeTests\HelloWorldApp> **curl localhost**

StatusCode : 200

StatusDescription : OK

Content : <!DOCTYPE html>

<html>

<head>

<title>Welcome to nginx!</title>

<style>

body {

width: 35em;

margin: 0 auto;

font-family: Tahoma, Verdana, Arial, sans-serif;

}

</style>

<...

RawContent : HTTP/1.1 200 OK

Connection: keep-alive

Accept-Ranges: bytes Content-Length: 612 Content-Type: text/html Date: Wed, 26 Aug 2020 01:16:52 GMT ETag: "5e568b46-264"

Last-Modified: Wed, 26 Feb 2020 ...

Forms : {}

Headers : {[Connection, keep-alive], [Accept-Ranges, bytes], [Content-Length, 612], [Content-Type, text/html]...}

Images : {}

InputFields : {}

Links : {@{innerHTML=nginx.org; innerText=nginx.org; outerHTML=<A href="http://nginx.org/">nginx.org</A>; outerText=nginx.org; tagName=A; href=http://nginx.org/}, @{innerHTML=nginx.com; innerText=nginx.com; outerHTML=<A

href="http://nginx.com/">nginx.com</A>; outerText=nginx.com; tagName=A; href=http://nginx.com/}}

ParsedHtml : mshtml.HTMLDocumentClass

RawContentLength : 612

PS C:\data\minikubeTests\HelloWorldApp> **curl helloworld.info**

StatusCode : 200

StatusDescription : OK

Content : <!DOCTYPE html>

<html>

<head>

<title>Welcome to nginx!</title>

<style>

body {

width: 35em;

margin: 0 auto;

font-family: Tahoma, Verdana, Arial, sans-serif;

}

</style>

<...

RawContent : HTTP/1.1 200 OK

Connection: keep-alive

Accept-Ranges: bytes

Content-Length: 612

Content-Type: text/html

Date: Wed, 26 Aug 2020 01:25:10 GMT

ETag: "5e568b46-264"

Last-Modified: Wed, 26 Feb 2020 ...

Forms : {}

Headers : {[Connection, keep-alive], [Accept-Ranges, bytes], [Content-Length, 612], [Content-Type, text/html]...}

Images : {}

InputFields : {}

Links : {@{innerHTML=nginx.org; innerText=nginx.org; outerHTML=<A href="http://nginx.org/">nginx.org</A>; outerText=nginx.org; tagName=A; href=http://nginx.org/}, @{innerHTML=nginx.com; innerText=nginx.com; outerHTML=<A

href="http://nginx.com/">nginx.com</A>; outerText=nginx.com; tagName=A; href=http://nginx.com/}}

ParsedHtml : mshtml.HTMLDocumentClass

RawContentLength : 612