**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 MessageBoardApp 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:\data\minikubeTests\MessageBoardApp> **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\MessageBoardApp> **kubectl config use-context minikube**

Switched to context "minikube".

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

[33mWARN[0m Volume mount on the host "/static-volume" isn't supported - ignoring path on the host

[33mWARN[0m Volume mount on the host "/static-volume" isn't supported - ignoring path on the host

[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 "nginx-claim0-persistentvolumeclaim.yaml" created

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

[36mINFO[0m Kubernetes file "env-configmap.yaml" created

[36mINFO[0m Kubernetes file "web-claim0-persistentvolumeclaim.yaml"

Created

Create a Docker Registry credential file to allow kompose to download the image from DockerHub.

kubectl create secret docker-registry regcred \

--docker-server=<your registry> \

--docker-username=<your username> \

--docker-password=<your password> \

--docker-email=<your email>

PS C:\data\minikubeTests\MessageBoardApp> **kubectl create secret docker-registry regcred --docker-server=https://index.docker.io/v1/ --docker-username=monicamarshall --docker-password=<YourDockerHubPassword> --docker-email=marshallmonica@yahoo.com**

secret/regcred created

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

127.0.0.1

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

**Directory: C:\data\minikubeTests\MessageBoardApp**

Mode LastWriteTime Length Name

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

d----- 8/28/2020 9:11 AM .settings

d----- 8/28/2020 9:58 AM documentation

d----- 8/28/2020 10:32 AM messageboardapp

d----- 8/26/2020 2:12 PM nginx

d----- 8/26/2020 2:12 PM posts

d----- 8/26/2020 2:12 PM templates

-a---- 8/27/2020 9:30 AM 221 .env

-a---- 8/28/2020 9:11 AM 406 .project

-a---- 8/27/2020 9:20 AM 804 configmap.yaml

-a---- 8/28/2020 10:29 AM 1017 db-deployment.yaml

-a---- 8/26/2020 2:11 PM 45056 db.sqlite3

-a---- 8/26/2020 9:18 PM 562 docker-compose.yml

-a---- 8/26/2020 2:40 PM 305 Dockerfile

-a---- 8/28/2020 10:29 AM 323 env-configmap.yaml

-a---- 8/26/2020 2:11 PM 547 manage.py

-a---- 8/28/2020 10:29 AM 245 nginx-claim0-persistentvolumeclaim.yaml

-a---- 8/28/2020 10:29 AM 975 nginx-deployment.yaml

-a---- 8/28/2020 10:29 AM 353 nginx-service.yaml

-a---- 8/26/2020 2:11 PM 213 Pipfile

-a---- 8/26/2020 2:11 PM 4558 Pipfile.lock

-a---- 8/28/2020 10:29 AM 247 postgres-data-persistentvolumeclaim.yaml

-a---- 8/26/2020 2:11 PM 2269 README.md

-a---- 8/26/2020 2:11 PM 87 requirements.txt

-a---- 8/28/2020 10:29 AM 241 web-claim0-persistentvolumeclaim.yaml

-a---- 8/28/2020 10:29 AM 1870 web-deployment.yaml

-a---- 8/28/2020 10:29 AM 349 web-service.yaml

PS C:\data\minikubeTests\MessageBoardApp> **kubectl apply -f .**

deployment.apps/db created

configmap/env created

persistentvolumeclaim/nginx-claim0 created

deployment.apps/nginx created

service/nginx created

persistentvolumeclaim/postgres-data created

persistentvolumeclaim/web-claim0 created

deployment.apps/web configured

service/web created

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

NAME READY STATUS RESTARTS AGE

db-cc664d479-hzr84 1/1 Running 0 24m

nginx-689fbfc5c7-hxjw5 1/1 Running 0 24m

web-f6d755dbc-j9lj8 1/1 Running 0 25m

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

LAST SEEN TYPE REASON OBJECT MESSAGE

<unknown> Warning FailedScheduling pod/db-cc664d479-hzr84 persistentvolumeclaim "postgres-data" not found

<unknown> Warning FailedScheduling pod/db-cc664d479-hzr84 persistentvolumeclaim "postgres-data" not found

<unknown> Normal Scheduled pod/db-cc664d479-hzr84 Successfully assigned default/db-cc664d479-hzr84 to minikube

24m Normal Pulling pod/db-cc664d479-hzr84 Pulling image "postgres:11"

23m Normal Pulled pod/db-cc664d479-hzr84 Successfully pulled image "postgres:11"

23m Normal Created pod/db-cc664d479-hzr84 Created container db

23m Normal Started pod/db-cc664d479-hzr84 Started container db

24m Normal SuccessfulCreate replicaset/db-cc664d479 Created pod: db-cc664d479-hzr84

24m Normal ScalingReplicaSet deployment/db Scaled up replica set db-cc664d479 to 1

<unknown> Warning FailedScheduling pod/nginx-689fbfc5c7-hxjw5 pod has unbound immediate PersistentVolumeClaims

<unknown> Normal Scheduled pod/nginx-689fbfc5c7-hxjw5 Successfully assigned default/nginx-689fbfc5c7-hxjw5 to minikube

24m Normal Pulling pod/nginx-689fbfc5c7-hxjw5 Pulling image "nginx"

24m Warning Failed pod/nginx-689fbfc5c7-hxjw5 Failed to pull image "nginx": rpc error: code = Unknown desc = error pulling image configuration: Get https://registry-1.docker.io/v2/library/nginx/blobs/sha256:4bb46517cac397bdb0bab6eba09b0e1f8e90ddd17cf99662997c3253531136f8: EOF

24m Warning Failed pod/nginx-689fbfc5c7-hxjw5 Error: ErrImagePull

24m Normal BackOff pod/nginx-689fbfc5c7-hxjw5 Back-off pulling image "nginx"

24m Warning Failed pod/nginx-689fbfc5c7-hxjw5 Error: ImagePullBackOff

22m Normal Pulled pod/nginx-689fbfc5c7-hxjw5 Successfully pulled image "nginx"

22m Normal Created pod/nginx-689fbfc5c7-hxjw5 Created container nginx

22m Normal Started pod/nginx-689fbfc5c7-hxjw5 Started container nginx

24m Normal SuccessfulCreate replicaset/nginx-689fbfc5c7 Created pod: nginx-689fbfc5c7-hxjw5

24m Normal ExternalProvisioning persistentvolumeclaim/nginx-claim0 waiting for a volume to be created, either by external provisioner "k8s.io/minikube-hostpath" or manually created by system administrator

24m Normal Provisioning persistentvolumeclaim/nginx-claim0 External provisioner is provisioning volume for claim "default/nginx-claim0"

24m Normal ProvisioningSucceeded persistentvolumeclaim/nginx-claim0 Successfully provisioned volume pvc-cc023048-c6e8-4708-a18d-4b11298b3fbf

24m Normal ScalingReplicaSet deployment/nginx Scaled up replica set nginx-689fbfc5c7 to 1

24m 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

24m Normal Provisioning persistentvolumeclaim/postgres-data External provisioner is provisioning volume for claim "default/postgres-data"

24m Normal ProvisioningSucceeded persistentvolumeclaim/postgres-data Successfully provisioned volume pvc-b6190291-6346-44a0-964a-474e9110301f

24m Normal ExternalProvisioning persistentvolumeclaim/web-claim0 waiting for a volume to be created, either by external provisioner "k8s.io/minikube-hostpath" or manually created by system administrator

24m Normal Provisioning persistentvolumeclaim/web-claim0 External provisioner is provisioning volume for claim "default/web-claim0"

24m Normal ProvisioningSucceeded persistentvolumeclaim/web-claim0 Successfully provisioned volume pvc-9806adee-2778-43a0-b0a1-78c78752c3d7

<unknown> Warning FailedScheduling pod/web-f6d755dbc-j9lj8 persistentvolumeclaim "web-claim0" not found

<unknown> Warning FailedScheduling pod/web-f6d755dbc-j9lj8 persistentvolumeclaim "web-claim0" not found

<unknown> Normal Scheduled pod/web-f6d755dbc-j9lj8 Successfully assigned default/web-f6d755dbc-j9lj8 to minikube

24m Normal Pulling pod/web-f6d755dbc-j9lj8 Pulling image "monicamarshall/messageboardproject\_web:v1.0"

23m Normal Pulled pod/web-f6d755dbc-j9lj8 Successfully pulled image "monicamarshall/messageboardproject\_web:v1.0"

23m Normal Created pod/web-f6d755dbc-j9lj8 Created container web

23m Normal Started pod/web-f6d755dbc-j9lj8 Started container web

25m Normal SuccessfulCreate replicaset/web-f6d755dbc Created pod: web-f6d755dbc-j9lj8

25m Normal ScalingReplicaSet deployment/web Scaled up replica set web-f6d755dbc to 1

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

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

kubernetes ClusterIP 10.96.0.1 <none> 443/TCP 28h

nginx ClusterIP 10.104.118.82 <none> 1338/TCP 25m

web ClusterIP 10.111.161.166 <none> 8000/TCP 25m

kubectl exec -it web-f6d755dbc-j9lj8 python manage.py collectstatic

kubectl exec -it web-f6d755dbc-j9lj8 python manage.py migrate

kubectl exec -it web-f6d755dbc-j9lj8 python manage.py createsuperuser

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

NAME READY STATUS RESTARTS AGE

db-cc664d479-hzr84 1/1 Running 0 24m

nginx-689fbfc5c7-hxjw5 1/1 Running 0 24m

web-f6d755dbc-j9lj8 1/1 Running 0 25m

PS C:\data\minikubeTests\MessageBoardApp> **kubectl exec -it web-f6d755dbc-j9lj8 python manage.py collectstatic**

119 static files copied to '/code/static'.

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.

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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