

Devops Assignment-1 Task 2 by Team - 9

Developing and deploying a Node.js app from Docker to kubernetes

1. First off all install Docker, minikube ,node ,npm, express server create a docker hub account and verify installation and initialize node

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

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Nikhil kumar> cd assign-2
PS C:\Users\Nikhil kumar\assign-2> node -v
v14.17.6
PS C:\Users\Nikhil kumar\assign-2> npm -v
6.14.15
PS C:\Users\Nikhil kumar\assign-2> docker -v
Docker version 20.10.8, build 3967b7d
PS C:\Users\Nikhil kumar\assign-2> minikube version
minikube version: v1.23.2
commit: 8ebae7645c2002477c0051d247528b5d39ceed
PS C:\Users\Nikhil kumar\assign-2> kubect version --client
Client Version: version.Info{Major:"1", Minor:"22", GitVersion:"v1.22.2", GitCommit:"8b5a19147530baac9476b0ab82988b4888bbcb12", GitTreeState:"clean", BuildDate:"2021-09-15T21:38:50Z", GoVersion:"go1.16.8", Compiler:"gc", Platform:"windows/amd64"}
PS C:\Users\Nikhil kumar\assign-2> npm init
This utility will walk you through creating a package.json file.
It only covers the most common items, and tries to guess sensible defaults.

See 'npm help init' for definitive documentation on these fields
and exactly what they do.

Use 'npm install <pkg>' afterwards to install a package and
save it as a dependency in the package.json file.

Press ^C at any time to quit.
package name: (assign-2)
version: (1.0.0)
description: nodejs docker to kubernetes
entry point: (index.js)
test command:
git repository:
keywords:
author: nikhil kumar
license: (ISC)
About to write to C:\Users\Nikhil kumar\assign-2\package.json:

{
  "name": "assign-2",
  "version": "1.0.0",
  "description": "nodejs docker to kubernetes",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "nikhil kumar",
  "license": "ISC"
}

Is this OK? (yes) yes
PS C:\Users\Nikhil kumar\assign-2>
```

2. Configure the node.js app , Dockerize, build image, create container and running

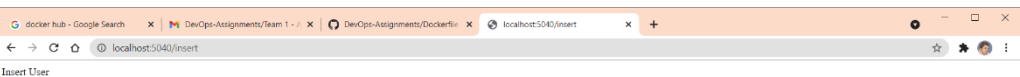
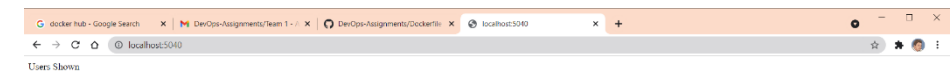
```
Administrator: Windows PowerShell
PS C:\Users\Nikhil kumar\assign-2> node index.js
listening on 5040
PS C:\Users\Nikhil kumar\assign-2> docker build -t node-server .
[+] Building 38.3s (11/11) FINISHED
#0 FROM node:14.17.6
#0 WORKDIR /app
#0 COPY package.json package-lock.json ./
#0 RUN npm install
#0 CMD ["node", "index.js"]
#0 DONE 38.3s
PS C:\Users\Nikhil kumar\assign-2> docker run -d --name=assign -p 5040:5040 node-server
809153421fba1fe238eb55274f9f9d880bac9b5d7017bbb4721e782
PS C:\Users\Nikhil kumar\assign-2> docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
809153421fba   node-server    "docker-entrypoint.s..." 12 seconds ago Up 9 seconds  0.0.0.0:5040->5040/tcp, :::5040->5040/tcp   assign1
6218e774543e   d2c677c7272c   "docker-entrypoint.s..." 27 minutes ago Up 27 minutes  0.0.0.0:3000->3000/tcp, :::3000->3000/tcp   team9task2

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
PS C:\Users\Nikhil kumar\assign-2> docker run -d --name=assign -p 5040:5040 node-server
809153421fba1fe238eb55274f9f9d880bac9b5d7017bbb4721e782
PS C:\Users\Nikhil kumar\assign-2> docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
809153421fba   node-server    "docker-entrypoint.s..." 12 seconds ago Up 9 seconds  0.0.0.0:5040->5040/tcp, :::5040->5040/tcp   assign1
6218e774543e   d2c677c7272c   "docker-entrypoint.s..." 27 minutes ago Up 27 minutes  0.0.0.0:3000->3000/tcp, :::3000->3000/tcp   team9task2

REPOSITORY    TAG        IMAGE ID      CREATED        SIZE
node-server    latest     bf3a58865f92 About a minute ago  948MB
nikhilkumar1602/devops    latest     d2c677c7272c 28 minutes ago  948MB
nikhilkumar1602/team9devops    latest     376406c81f38 10 hours ago  948MB
nikhilkumar1602/team9devops    <none>     7f46f2be4cf1 18 hours ago  948MB
gcr.io/k8s-minikube/kicbase    v0.0.27   9fa1c16ad6d4 8 days ago  1.08GB
docker/desktop-kubernetes     kubenetes-v1.21.4-cni-v0.8.5-critools-v1.17.0-debian 5e8f23e779a 6 weeks ago  299MB
k8s.gcr.io/kube-apiserver     v1.21.4   ce7457710b1 6 weeks ago  126MB
k8s.gcr.io/kube-scheduler     v1.21.4   993d3ec13feb 6 weeks ago  50.6MB
k8s.gcr.io/kube-controller-manager v1.21.4   2c25b0f89db7 6 weeks ago  120MB
k8s.gcr.io/kube-proxy         v1.21.4   eef4bceba7569 6 weeks ago  103MB
docker/desktop-vpnkit-controller v2.0      8c2c38aa676e 4 months ago  21MB
docker/desktop-storage-provisioner v2.0      99f89471f470 5 months ago  41.9MB
k8s.gcr.io/pause              3.4.1     0f84574dc2ec 8 months ago  683kB
k8s.gcr.io/coredns            v1.8.0    296a6d5035e2 11 months ago  42.5MB
k8s.gcr.io/etcd               3.4.13-0  0363cf4303ff 13 months ago  253MB

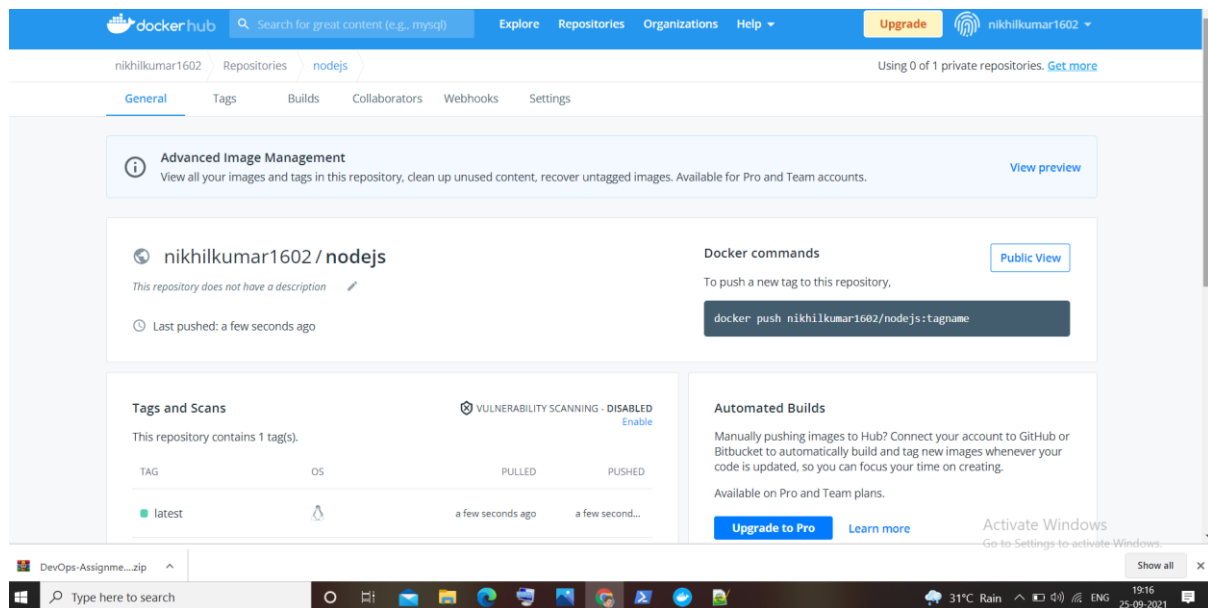
PS C:\Users\Nikhil kumar\assign-2>
```

3. Checking web application by browsing in local host



4. Tag and Push the image to docker hub repository

```
Administrator: Windows PowerShell
PS C:\Users\Nikhil Kumar\Assign1-2> docker tag node-server nikhilkumar1602/nodejs
PS C:\Users\Nikhil Kumar\Assign1-2> docker push nikhilkumar1602/nodejs
Using default tag: latest
The push refers to repository [docker.io/nikhilkumar1602/nodejs]
c4819ac080c5: Pushed
161b747bdf8f: Pushed
a81609306534: Pushed
3182ff8d7d32: Mounted from nikhilkumar1602/devops
e09928f5a32: Mounted from nikhilkumar1602/devops
ee50c22fd66c: Mounted from nikhilkumar1602/devops
68183b2c9c73: Mounted from nikhilkumar1602/devops
5ee2f8eabdf: Mounted from nikhilkumar1602/devops
95f4935a990a: Mounted from nikhilkumar1602/devops
c96f238ab16: Mounted from nikhilkumar1602/devops
38c2f9ead2d: Mounted from nikhilkumar1602/devops
8db8c08eef: Mounted from nikhilkumar1602/devops
6885f9385cda: Mounted from nikhilkumar1602/devops
latest: digest: sha256:1326dc98cf9e71a73b95f7180e46dc58f04695d2a39b49994c960430e992f116 size: 3050
PS C:\Users\Nikhil Kumar\Assign1-2>
```



5. Start kubernetes cluster using minikube and define yaml file and deploy

```
Administrator: Windows PowerShell
PS C:\Users\Nikhil kumar\assign1-2> minikube start
* minikube v1.23.2 on Microsoft Windows 10 Pro 10.0.19042 Build 19042
* 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 v1.22.2 on Docker 20.10.8 ...
* Verifying Kubernetes components...
  - Using image gcr.io/k8s-minikube/storage-provisioner:v5
* Enabled addons: storage-provisioner, default-storageclass
* Done! kubectll is now configured to use "minikube" cluster and "default" namespace by default
PS C:\Users\Nikhil kumar\assign1-2> kubectl create -f deploy.yaml
deployment.apps/nodejs-deployment created
PS C:\Users\Nikhil kumar\assign1-2> kubectl get deploy po
NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/nodejs-deployment    0/2     2             0           31s

NAME                                READY   STATUS              RESTARTS   AGE
pod/nodejs-deployment-7647d9c8d5-9ppps 0/1     ContainerCreating   0           31s
pod/nodejs-deployment-7647d9c8d5-rh6n5 0/1     ContainerCreating   0           31s
PS C:\Users\Nikhil kumar\assign1-2> kubectl get deploy po
NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/nodejs-deployment    0/2     2             0           55s

NAME                                READY   STATUS              RESTARTS   AGE
pod/nodejs-deployment-7647d9c8d5-9ppps 0/1     ContainerCreating   0           55s
pod/nodejs-deployment-7647d9c8d5-rh6n5 0/1     ContainerCreating   0           55s
PS C:\Users\Nikhil kumar\assign1-2> kubectl get deploy po
NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/nodejs-deployment    0/2     2             0           2m5s

NAME                                READY   STATUS              RESTARTS   AGE
pod/nodejs-deployment-7647d9c8d5-9ppps 0/1     ContainerCreating   0           2m5s
pod/nodejs-deployment-7647d9c8d5-rh6n5 0/1     ContainerCreating   0           2m5s
PS C:\Users\Nikhil kumar\assign1-2> kubectl get deploy po
NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/nodejs-deployment    2/2     2             2           4m15s

NAME                                READY   STATUS              RESTARTS   AGE
pod/nodejs-deployment-7647d9c8d5-9ppps 1/1     Running           0           4m15s
pod/nodejs-deployment-7647d9c8d5-rh6n5 1/1     Running           0           4m15s
PS C:\Users\Nikhil kumar\assign1-2> get deploy
get: The term 'get' is not recognized as the name of a cmdlet, function, script file, or operable program. Check the spelling of the name, or if a path was included, verify that the path is correct and try again.
PS C:\Users\Nikhil kumar\assign1-2> kubectl get deploy
NAME                                READY   UP-TO-DATE   AVAILABLE   AGE
nodejs-deployment                   2/2     2             2           4m53s
PS C:\Users\Nikhil kumar\assign1-2>
```

```
Administrator: Windows PowerShell
PS C:\Users\Nikhil kumar\assign1-2> kubectl expose deployment nodejs-deployment --type="LoadBalancer"
service/nodejs-deployment exposed
PS C:\Users\Nikhil kumar\assign1-2> kubectl get svc
NAME                                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes                         ClusterIP            10.96.0.1        <none>            443/TCP          18h
nodejs-deployment                  LoadBalancer        10.110.248.158   <pending>        5040:31276/TCP   12s
PS C:\Users\Nikhil kumar\assign1-2>
```

6. Using metallb in minikube env to get ip

```
Administrator: Windows PowerShell
PS C:\Users\Nikhil kumar\assign1-2> kubectl expose deployment nodejs-deployment --type=LoadBalancer
service/nodejs-deployment exposed
PS C:\Users\Nikhil kumar\assign1-2> kubectl get svc
NAME                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes           ClusterIP           10.96.0.1        <none>            443/TCP          18h
nodejs-deployment    LoadBalancer       10.110.248.158   <pending>         5040:31276/TCP   12s
PS C:\Users\Nikhil kumar\assign1-2> kubectl apply -f https://raw.githubusercontent.com/google/metallb/v0.9.3/manifests/namespace.yaml
error: unable to read URL "https://raw.githubusercontent.com/google/metallb/v0.9.3/manifests/namespace.yaml", server reported 404 Not Found, status code=404
PS C:\Users\Nikhil kumar\assign1-2> kubectl apply -f https://raw.githubusercontent.com/google/metallb/v0.9.3/manifests/namespace.yaml
namespace/namespace created
PS C:\Users\Nikhil kumar\assign1-2> kubectl apply -f https://raw.githubusercontent.com/google/metallb/v0.9.3/manifests/metallb.yaml
Warning: policy/v1beta1 PodSecurityPolicy is deprecated in v1.21+, unavailable in v1.25+
podsecuritypolicy.policy/controller created
podsecuritypolicy.policy/speaker created
serviceaccount/controller created
serviceaccount/speaker created
clusterrole.rbac.authorization.k8s.io/metallb-system:controller created
clusterrole.rbac.authorization.k8s.io/metallb-system:speaker created
role.rbac.authorization.k8s.io/config-watcher created
role.rbac.authorization.k8s.io/pod-lister created
clusterrolebinding.rbac.authorization.k8s.io/metallb-system:controller created
clusterrolebinding.rbac.authorization.k8s.io/metallb-system:speaker created
rolebinding.rbac.authorization.k8s.io/config-watcher created
rolebinding.rbac.authorization.k8s.io/pod-lister created
Warning: spec.template.spec.nodeSelector[beta.kubernetes.io/os]: deprecated since v1.14; use "kubernetes.io/os" instead
daemonset.apps/speaker created
deployment.apps/controller created
PS C:\Users\Nikhil kumar\assign1-2> kubectl create secret generic --from-literal=secretkey="I(openssl rand -base64 128)"
openssl: The term 'openssl' is not recognized as the name of a cmdlet, function, script file, or operable program. Check the spelling of the name, or if a path was included, verify that the path is correct and try again.
At line:1 char:18
+ ... metallb-system memberlist --from-literal=secretkey="I(openssl rand -base64 128)"
+ ~~~~~
+ CategoryInfo          : ObjectNotFound: (openssl:String) [], CommandNotFoundException
+ FullyQualifiedErrorId : CommandNotFoundException

secret/memberlist created
PS C:\Users\Nikhil kumar\assign1-2> minikube ip
192.168.49.2
PS C:\Users\Nikhil kumar\assign1-2> kubectl get svc
NAME                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes           ClusterIP           10.96.0.1        <none>            443/TCP          18h
nodejs-deployment    LoadBalancer       10.110.248.158   <pending>         5040:31276/TCP   8m2s
PS C:\Users\Nikhil kumar\assign1-2>
```

```
Administrator: Windows PowerShell
PS C:\Users\Nikhil kumar\assign1-2> kubectl create -f configmap.yaml
configmap/config created
PS C:\Users\Nikhil kumar\assign1-2> kubectl delete svc nodejs-deployment
service "nodejs-deployment" deleted
PS C:\Users\Nikhil kumar\assign1-2> kubectl expose deployment nodejs-deployment --type=LoadBalancer
service/nodejs-deployment exposed
PS C:\Users\Nikhil kumar\assign1-2> kubectl get svc
NAME                TYPE                CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes           ClusterIP           10.96.0.1        <none>            443/TCP          18h
nodejs-deployment    LoadBalancer       10.107.221.22    192.168.49.2     5040:31823/TCP   15s
PS C:\Users\Nikhil kumar\assign1-2> kubectl describe services
Name:                 kubernetes
Namespace:            default
Labels:               component=apiserver,provider=kubernetes
Annotations:          <none>
Selector:              <none>
Type:                 ClusterIP
IP Family Policy:     SingleStack
IP Families:          IPv4
IP:                   10.96.0.1
IPs:                  10.96.0.1
Port:                 https 443/TCP
TargetPort:           8443/TCP
Endpoints:            192.168.49.2:8443
Session Affinity:     None
Events:               <none>

Name:                 nodejs-deployment
Namespace:            default
Labels:               <none>
Annotations:          <none>
Selector:             app=nodejs
Type:                 LoadBalancer
IP Family Policy:     SingleStack
IP Families:          IPv4
IP:                   10.107.221.22
IPs:                  10.107.221.22
LoadBalancer Ingress: 192.168.49.2
Port:                 <unset> 5040/TCP
TargetPort:           5040/TCP
NodePort:             <unset> 31823/TCP
Endpoints:            172.17.0.3:5040,172.17.0.4:5040
Session Affinity:     None
External Traffic Policy: Cluster
Events:               <none>
PS C:\Users\Nikhil kumar\assign1-2>
```

By Team – 9 Devops

N Nikhil Kumar 18bec031, Y Santhi Swarup 18bec051

V Harsha Vardhan 18bcs118, K Yashwanth 18bec020

M Vinod 18bec027, P Bhanu Prakash 18bec035

