Kubernetize - Deploy the application to kubernetes cluster

In this lab, we shall deploy the application to a kubernetes cluster.

Learning Outcomes

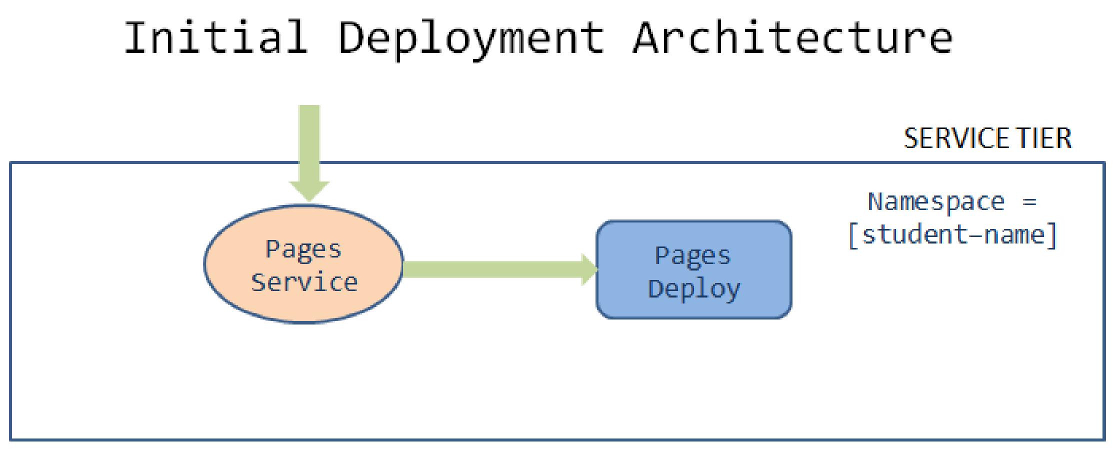
After completing the lab, you will be able to:

1. Describe how to create Kubernetes Objects
2. Describe how to write yaml files for pods, deployments and services
3. Run your Spring boot application within a kubernetes cluster
4. Basics of K8s service discovery concepts

Starting to Kubernetize

Before starting the lab, verify the pages image created in the previous lab exists in docker hub

Below the inital version of our deployment architecture which will evolve as our application evolves.



Complete the following tasks to implement the above architecture

1. Create a unique namespace `[student-name]` in the cluster. For example, if your name is `Bryan Evans` you can replace `[student-name]` as `bryan` or `evans`

which ever is unique across the cluster.

2. Create a deployment object with the following specifications.

```
name -> pages
namespace -> [student-name]
labels -> app: pages
replicas -> 1
image -> [docker-username]/pages:[tag](name of the image c
reated in the previous lab)
containerPort -> 8080
```

3. Create a service object to expose the deployment with the following specifications.

```
name -> pages
namespace -> [student-name]
labels -> app: pages
selector -> pages
Type -> NodePort
targetPort -> 8080
port -> 8080
protocol -> TCP
```

Solution guide:

Create manifest files for deployment

1. Create deployment/pages-namespace.yaml from the root project folder

```
apiVersion: v1
kind: Namespace
metadata:
  name: [student-name]
```

2. Create deployment/pages-deployment.yaml from the root project folder

```
apiVersion: apps/v1
kind: Deployment
metadata:
  labels:
    app: pages
  name: pages
  namespace: [student-name]
spec:
  replicas: 1
  selector:
    matchLabels:
      app: pages
  strategy: {}
  template:
    metadata:
      labels:
        app: pages
    spec:
      containers:
      - image: [docker-username]/pages:[tag]
        name: pages
        ports:
          - containerPort: 8080
```

3. Create deployment/pages-service.yaml from the root project folder

```
apiVersion: v1
kind: Service
metadata:
  labels:
    app: pages
  name: pages
  namespace: [student-name]
spec:
  ports:
  - name: pages-service-port
    port: 8080
    protocol: TCP
    targetPort: 8080
  selector:
    app: pages
  type: NodePort
```

Start minikube locally

1. Start minikube locally `minikube start --driver=virtualbox`
2. Verify the kubectl context `kubectl config get-contexts` is set to minikube. If not, set it to minikube `kubectl config use-context minikube`
3. Deploy and test the application in minikube. Refer to Deployment Guide

Deploy the application to production cluster

1. Follow Production Cluster Guide to login/connect to the production cluster.
2. Deploy and test the application in production cluster. Refer to Deployment Guide
3. Commit code changes to the github repository

```
git add .
git commit -m "Added K8 deployment objects"
git push -u origin master
```

Deployment Guide

1. Create kubernetes objects

```
kubectl apply -f deployment/pages-namespace.yaml
kubectl apply -f deployment/pages-service.yaml
kubectl apply -f deployment/pages-deployment.yaml
```

2. Verify the created objects

```
kubectl get deployment pages --namespace [student-name]
kubectl get service pages --namespace [student-name]
```

3. Set up `[student-name]` namespace to point to the current context

```
kubectl config set-context --current --namespace=[student-
name]
```

4. Access the pages application by port-forwarding using kubectl, enabling the application can be served via `localhost` on port `8080`

```
kubectl port-forward svc/pages 8080:8080

curl localhost:8080
```