Week 2 Day 2 - Deployments

Created	@January 13, 2024 4:01 PM
Class	Week2
Type	Demo
Reviewed	☐

Agenda

- Start minikube with two nodes
- Deploy full stack application
- Discuss Objects in Kubernetes

Deployment Demo

- Minikube with two nodes

```
minikube start --nodes 2 -p multinode-demo
```

- Get list of nodes

```
kubectl get nodes
```

- Check status of nodes

```
minikube status -p multinode-demo
```

- To view dashboard

```
minikube dashboard -p multinode-demo
```

- To stop the node and clean minikube environment

```
minikube stop -p multinode-demo
minikube delete --all
```

ReplicaSet Demo

- Replica Set YAML and apply.

```
apiVersion: apps/v1
kind: ReplicaSet
metadata:
  name: nginx
  labels:
    app: nginx
    tier: lb
spec:
  replicas: 3
  selector:
    matchLabels:
        tier: lb
  template:
    metadata:
      labels:
```

```
          tier: lb
    spec:
        containers:
        - name: nginx-replicaset
            image: nginx
```

```
kubectl apply -f replicaset.yaml

kubectl get pods
```

- Delete a pod in the ReplicaSet

```
kubectl delete pod nginx-<code>

kubectl get pods

kubectl get replicasets
```

- Deployment YAML with ReplicaSet

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
  labels:
    app: nginx
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:1.14.2
        ports:
        - containerPort: 80

kubectl get deployments

kubectl rollout status deployment nginx
```

- StatefulSet YAML

```
apiVersion: v1
kind: Service
metadata:
  name: nginx
  labels:
    app: nginx
spec:
  ports:
  - port: 80
```

```
    name: web
  clusterIP: None
  selector:
    app: nginx
---
apiVersion: apps/v1
kind: StatefulSet
metadata:
  name: web
spec:
  selector:
    matchLabels:
      app: nginx # has to match .spec.template.metadata.labels
  serviceName: "nginx"
  replicas: 3 # by default is 1
  template:
    metadata:
      labels:
        app: nginx # has to match .spec.selector.matchLabels
    spec:
      terminationGracePeriodSeconds: 10
      containers:
      - name: nginx
        image: k8s.gcr.io/nginx-slim:0.8
        ports:
        - containerPort: 80
          name: web
        volumeMounts:
        - name: www
          mountPath: /usr/share/nginx/html
  volumeClaimTemplates:
  - metadata:
      name: www
    spec:
      accessModes: [ "ReadWriteOnce" ]
      storageClassName: "my-storage-class"
      resources:
        requests:
          storage: 1Gi
```

```
kubectl get statefulsets
```

- DaemonSet YAML.

```
apiVersion: apps/v1
kind: DaemonSet
metadata:
  name: nginx
spec:
  selector:
    matchLabels:
      name: nginx-lb
  template:
    metadata:
      labels:
        name: nginx-lb
    spec:
      containers:
```

```
      - name: nginx
        image: nginx
```

- Deployment example with resource limits.

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:latest
        ports:
        - containerPort: 80
        resources:
          limits:
            memory: "256Mi"  # Maximum memory allowed
            cpu: "200m"       # Maximum CPU allowed (200 milliCPU)
          requests:
            memory: "128Mi"  # Initial memory request
            cpu: "100m"       # Initial CPU request
```

- Deployment with health checks.

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: nginx-deployment
spec:
  replicas: 3
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
      - name: nginx
        image: nginx:latest
        ports:
        - containerPort: 80
        livenessProbe:
          httpGet:
            path: /               # The path to check for the liveness probe
            port: 80              # The port to check on
          initialDelaySeconds: 15  # Wait this many seconds before starting the probe
```

```
      periodSeconds: 10        # Check the probe every 10 seconds
    readinessProbe:
      httpGet:
        path: /                # The path to check for the readiness probe
        port: 80               # The port to check on
      initialDelaySeconds: 5   # Wait this many seconds before starting the probe
      periodSeconds: 5         # Check the probe every 5 seconds
```

Full stack Application Deployment

https://ananyacodes.hashnode.dev/deploy-mern-app-to-k8s-minikube

https://github.com/Ananya2001-an/kubernetes-demo

Lab 3

- Run a multi-node cluster using the commands above. Submission should include screenshots for each command.
- Run all types of deployment yaml separately. Submission should include screenshots for each command.
- Run the full stack application deployment as provided in the instructions.
  - Submission should include screenshots for each command.
  - Screenshot with the Front end of the application open.
- **Task:** Bring down note-depp pod. Demonstrate using screenshot if a new pod has started.