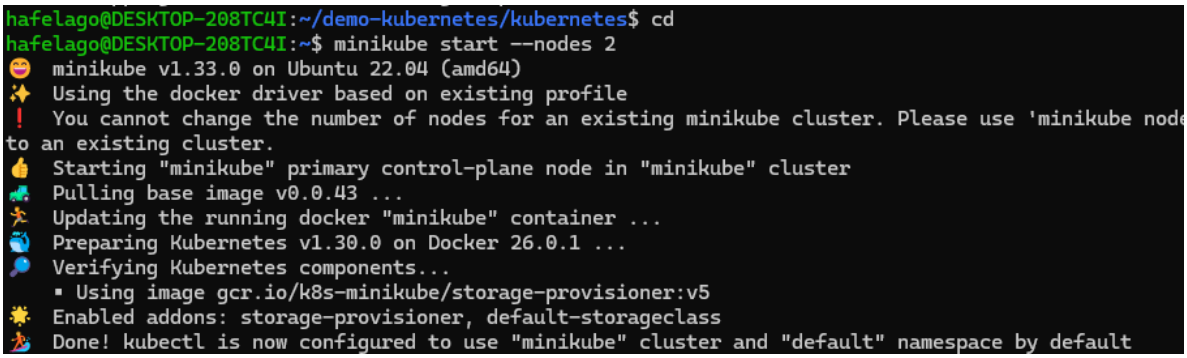
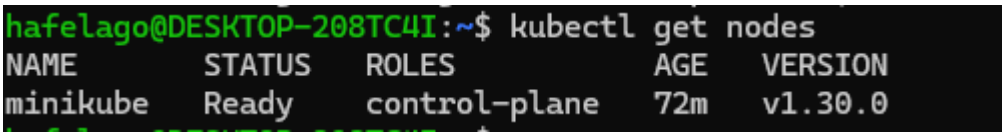
Multi-Node Kubernetes Cluster workloads



cluster is up and running

Check the nodes in the cluster



ReplicaSet Deployment: replicaset-deployment.yaml

```
hafelago@DESKTOP-208TC4I:~/kubernetes-configs$ cd ReplicaSet
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/ReplicaSet$ ls
replicaset-deployment.yaml
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/ReplicaSet$ kubectl apply -f replicaset-deployment.yaml
replicaset.apps/example-replicaset created
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/ReplicaSet$ kubectl get pods
NAME                                  READY   STATUS              RESTARTS      AGE
example-replicaset-4mdnn              0/1     ContainerCreating   0             7s
example-replicaset-lx9z7              0/1     ContainerCreating   0             7s
mongo-express-deployment-77bd456f64-jpp6s   1/1     Running             1 (25m ago)   32m
mongodb-stateful-set-0                1/1     Running             1 (25m ago)   51m
mongodb-stateful-set-1                1/1     Running             1 (25m ago)   50m
note-deployment-677bf6c757-9htmb      1/1     Running             2 (25m ago)   40m
note-deployment-677bf6c757-v6sg5      1/1     Running             2 (25m ago)   40m
note-server-deployment-c5d4dd7b8-4nf8n      1/1     Running             1 (25m ago)   46m
note-server-deployment-c5d4dd7b8-h5lcl      1/1     Running             1 (25m ago)   46m
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/ReplicaSet$
```

Deployment `deployment.yaml`

```
hafelago@DESKTOP-208TC4I:~$ cd kubernetes-configs
hafelago@DESKTOP-208TC4I:~/kubernetes-configs$ ls
DaemonSet  Deployment  ReplicaSet
hafelago@DESKTOP-208TC4I:~/kubernetes-configs$ cd Deployment
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/Deployment$ ls
deployment.yaml
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/Deployment$ kubectl apply -f deployment.yaml
deployment.apps/example-deployment created
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/Deployment$ kubectl get pods
NAME                                  READY   STATUS    RESTARTS      AGE
example-deployment-67b49d989-9jj4c    1/1     Running   0             8s
example-deployment-67b49d989-w9zwj    1/1     Running   0             8s
example-replicaset-4mdnn              1/1     Running   0             5m40s
example-replicaset-lx9z7              1/1     Running   0             5m40s
mongo-express-deployment-77bd456f64-jpp6s   1/1     Running   1 (30m ago)   38m
mongodb-stateful-set-0                1/1     Running   1 (30m ago)   56m
mongodb-stateful-set-1                1/1     Running   1 (30m ago)   56m
note-deployment-677bf6c757-9htmb      1/1     Running   2 (30m ago)   45m
note-deployment-677bf6c757-v6sg5      1/1     Running   2 (30m ago)   45m
note-server-deployment-c5d4dd7b8-4nf8n      1/1     Running   1 (30m ago)   52m
note-server-deployment-c5d4dd7b8-h5lcl      1/1     Running   1 (30m ago)   52m
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/Deployment$
```

StatefulSet Deployment `statefulset-deployment.yaml`

```
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/StatefulSet$ kubectl apply -f statefulset.yaml
error: no objects passed to apply
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/StatefulSet$
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/StatefulSet$ kubectl apply -f statefulset.yaml
statefulset.apps/my-statefulset created
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/StatefulSet$ kubectl get pods
NAME                                     READY   STATUS    RESTARTS      AGE
example-deployment-67b49d989-9jj4c       1/1     Running   0             6m51s
example-deployment-67b49d989-w9zwj       1/1     Running   0             6m51s
example-replicaset-4mdnn                 1/1     Running   0             12m
example-replicaset-lx9z7                 1/1     Running   0             12m
mongo-express-deployment-77bd456f64-jpp6s   1/1     Running   1 (37m ago)   45m
mongodb-stateful-set-0                   1/1     Running   1 (37m ago)   63m
mongodb-stateful-set-1                   1/1     Running   1 (37m ago)   62m
my-statefulset-0                         1/1     Running   0             34s
my-statefulset-1                         1/1     Running   0             30s
my-statefulset-2                         1/1     Running   0             26s
note-deployment-677bf6c757-9htmb         1/1     Running   2 (37m ago)   52m
note-deployment-677bf6c757-v6sg5         1/1     Running   2 (37m ago)   52m
note-server-deployment-c5d4dd7b8-4nf8n   1/1     Running   1 (37m ago)   58m
note-server-deployment-c5d4dd7b8-h5lcl   1/1     Running   1 (37m ago)   58m
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/StatefulSet$
```

DaemonSet Deployment `daemonset-deployment.yaml`

```
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/DaemonSet$ kubectl apply -f daemonset-deployment.
daemonset.apps/example-daemonset created
hafelago@DESKTOP-208TC4I:~/kubernetes-configs/DaemonSet$ kubectl get pods
NAME                                 READY   STATUS    RESTARTS      AGE
example-daemonset-n24jt              1/1     Running   0             7s
example-deployment-67b49d989-9jj4c   1/1     Running   0             11m
example-deployment-67b49d989-w9zwj   1/1     Running   0             11m
```

Kubectl get all

```
hafelago@DESKTOP-208TC4I:~$ kubectl get all
NAME                                          READY   STATUS    RESTARTS   AGE
pod/example-daemonset-wgxgg                   1/1     Running   0          22m
pod/example-deployment-67b49d989-b4lfg        1/1     Running   0          22m
pod/example-deployment-67b49d989-s8glj        1/1     Running   0          22m
pod/example-replicaset-czzlg                  1/1     Running   0          22m
pod/example-replicaset-zxckx                  1/1     Running   0          22m
pod/mongo-express-deployment-77bd456f64-wl4dr 1/1     Running   0          22m
pod/mongodb-stateful-set-0                    1/1     Running   0          22m
pod/mongodb-stateful-set-1                    1/1     Running   0          22m
pod/my-statefulset-0                          1/1     Running   0          22m
pod/my-statefulset-1                          1/1     Running   0          22m
pod/my-statefulset-2                          1/1     Running   0          22m
pod/note-deployment-677bf6c757-6hvwp          1/1     Running   0          22m
pod/note-deployment-677bf6c757-dmtv6          1/1     Running   0          22m
pod/note-server-deployment-c5d4dd7b8-2cpzr    1/1     Running   0          20m
pod/note-server-deployment-c5d4dd7b8-p8bhl    1/1     Running   0          22m

NAME                           TYPE           CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
service/kubernetes             ClusterIP      10.96.0.1       <none>        443/TCP          146m
service/mongo-express-service  LoadBalancer   10.108.38.250   <pending>     8081:30416/TCP   83m
service/mongodb-service        ClusterIP      10.109.49.37    <none>        27017/TCP        100m
service/note-server-service    ClusterIP      10.101.96.175   <none>        5000/TCP         93m
service/note-service           LoadBalancer   10.103.86.169   <pending>     3000:30344/TCP   91m

NAME                                 DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR   AGE
daemonset.apps/example-daemonset     1         1         1       1            1           <none>          34m

NAME                                       READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/example-deployment         2/2     2            2           46m
deployment.apps/mongo-express-deployment   1/1     1            1           84m
deployment.apps/note-deployment            2/2     2            2           91m
deployment.apps/note-server-deployment     2/2     2            2           98m

NAME                                                DESIRED   CURRENT   READY   AGE
replicaset.apps/example-deployment-67b49d989        2         2         2       46m
replicaset.apps/example-replicaset                  2         2         2       51m
replicaset.apps/mongo-express-deployment-77bd456f64 1         1         1       84m
replicaset.apps/note-deployment-677bf6c757          2         2         2       91m
replicaset.apps/note-server-deployment-c5d4dd7b8    2         2         2       98m

NAME                                 READY   AGE
statefulset.apps/mongodb-stateful-set   2/2     103m
statefulset.apps/my-statefulset         3/3     40m
```

Start Minikube and connect to Lens

```
This message is shown once a day. To disable it please create the
/home/hafelago/.hushlogin file.
hafelago@DESKTOP-208TC4I:~$ minikube start
😄  minikube v1.33.0 on Ubuntu 22.04 (amd64)
🎉  minikube 1.33.1 is available! Download it: https://github.com/kubernetes/minikube/releases/tag/v1.33.1
💡  To disable this notice, run: 'minikube config set WantUpdateNotification false'

✨  Using the docker driver based on existing profile
👍  Starting "minikube" primary control-plane node in "minikube" cluster
🚜  Pulling base image v0.0.43 ...
🔄  Restarting existing docker container for "minikube" ...
🐳  Preparing Kubernetes v1.30.0 on Docker 26.0.1 ...
🔎  Verifying Kubernetes components...
    ▪ Using image gcr.io/k8s-minikube/storage-provisioner:v5
🌟  Enabled addons: storage-provisioner, default-storageclass
🏄  Done! kubectl is now configured to use "minikube" cluster and "default" namespace by default
hafelago@DESKTOP-208TC4I:~$
```

`kubectl get nodes`

```
hafelago@DESKTOP-208TC4I:~$ kubectl get nodes
NAME       STATUS   ROLES           AGE   VERSION
minikube   Ready    control-plane   8d    v1.30.0
hafelago@DESKTOP-208TC4I:~$
```

kubectl config view

```
hafelago@DESKTOP-208TC4I:~$ kubectl config view
apiVersion: v1
clusters:
- cluster:
    certificate-authority-data: DATA+OMITTED
    server: https://kubernetes.docker.internal:6443
  name: docker-desktop
- cluster:
    certificate-authority-data: DATA+OMITTED
    server: https://127.0.0.1:38399
  name: kind-kind
- cluster:
    certificate-authority: /home/hafelago/.minikube/ca.crt
    extensions:
    - extension:
        last-update: Sat, 25 May 2024 19:50:08 EDT
        provider: minikube.sigs.k8s.io
        version: v1.33.0
      name: cluster_info
    server: https://127.0.0.1:53703
  name: minikube
contexts:
- context:
    cluster: docker-desktop
    user: docker-desktop
  name: docker-desktop
- context:
    cluster: kind-kind
    user: kind-kind
  name: kind-kind
- context:
    cluster: minikube
    extensions:
    - extension:
        last-update: Sat, 25 May 2024 19:50:08 EDT
        provider: minikube.sigs.k8s.io
        version: v1.33.0
      name: context_info
    namespace: default
    user: minikube
```

Create a Secret for MongoDB and Apply the secret

```
hafelago@DESKTOP-208TC4I:~/kubernetes/kubernetes$ kubectl apply -f secrets/mongodb-secret.yml
secret/mongodb-secret created
hafelago@DESKTOP-208TC4I:~/kubernetes/kubernetes$
```

Create the StatefulSet and Persistent Volume Claim and Apply the StatefulSet

```
hafelago@DESKTOP-208TC4I:~/kubernetes$ cd kubernetes
hafelago@DESKTOP-208TC4I:~/kubernetes/kubernetes$ kubectl apply -f stateful-sets/mongodb-stateful-set.
yml
statefulset.apps/mongodb-stateful-set created
hafelago@DESKTOP-208TC4I:~/kubernetes/kubernetes$
```

Create an Internal Service for MongoDB

```
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ kubectl apply -f services/mongodb-service.yml
service/mongodb-service created
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$
```

```
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ cd services
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes/services$ ls
mongo-express-service.yml  mongodb-service.yml  note-server-service.yml  note-service.yml
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes/services$
```

Deploy Server Application

```
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ kubectl apply -f deployments/note-server-depl.y
ml
deployment.apps/note-server-deployment created
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$
```

Create Server Internal Service

```
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ kubectl apply -f services/note-server-service.y
ml
service/note-server-service unchanged
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$
```

Deploy Frontend Application

```
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ kubectl apply -f deployments/note-depl.yml
deployment.apps/note-deployment created
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$
```

Create External Service for Frontend (Load Balancer)

```
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ kubectl apply -f services/note-service.yml
service/note-service created
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$
```

Access Deployed Application

```
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ minikube service note-service
|-----------|--------------|-------------|--------------------------|
| NAMESPACE |     NAME     | TARGET PORT |           URL            |
|-----------|--------------|-------------|--------------------------|
| default   | note-service |        3000 | http://192.168.49.2:30344 |
|-----------|--------------|-------------|--------------------------|
🏃  Starting tunnel for service note-service.
|-----------|--------------|-------------|------------------------|
| NAMESPACE |     NAME     | TARGET PORT |          URL           |
|-----------|--------------|-------------|------------------------|
| default   | note-service |             | http://127.0.0.1:37273 |
|-----------|--------------|-------------|------------------------|
🎉  Opening service default/note-service in default browser...
👉  http://127.0.0.1:37273
❗  Because you are using a Docker driver on linux, the terminal needs to be open to run it.
```

Web browser

Important Assignments

Search Assignments

Name:

Search

lab3

New Note

Name:

important

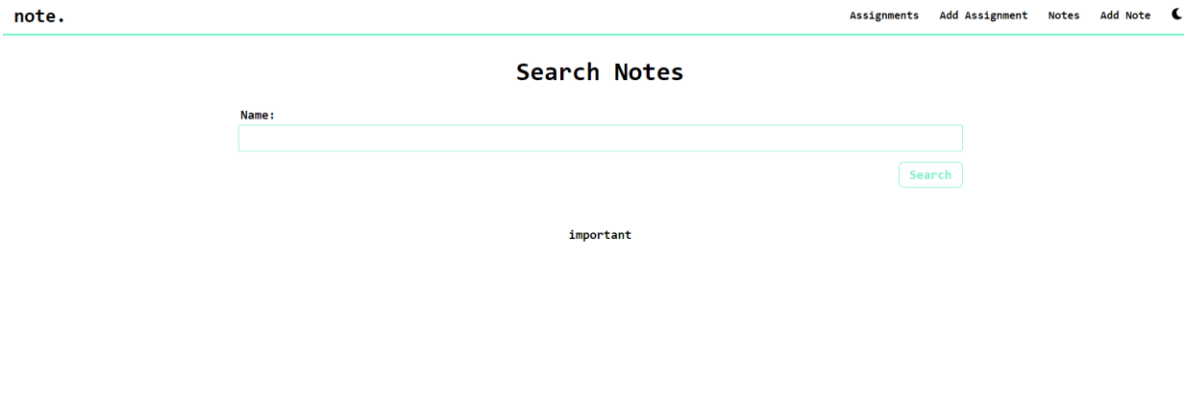
Choose cover image

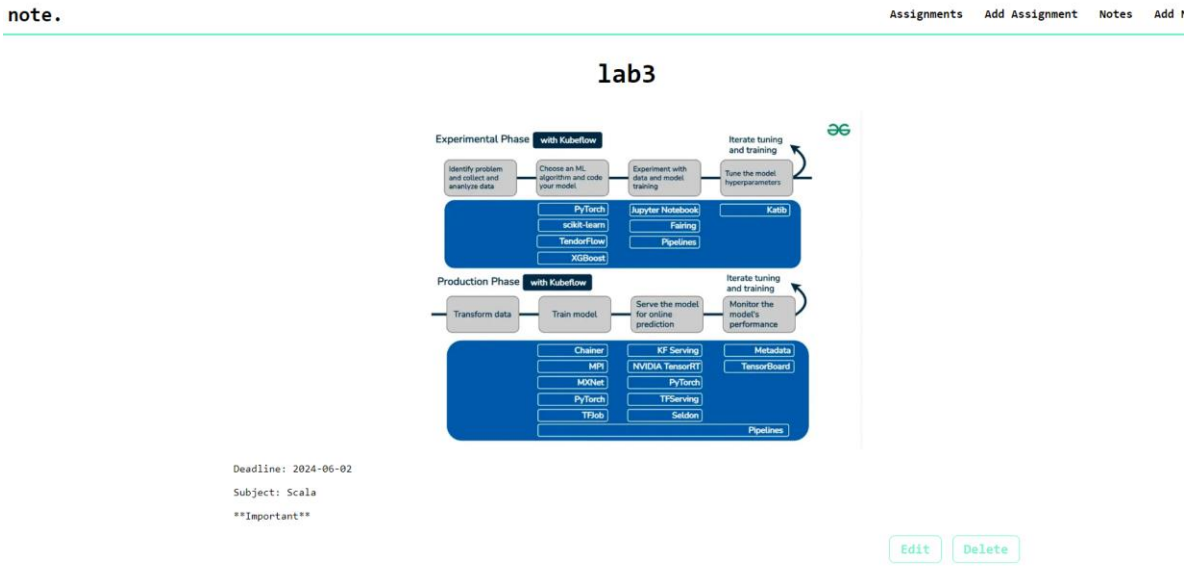
Note:

this is a text for the lab

Cancel

Create





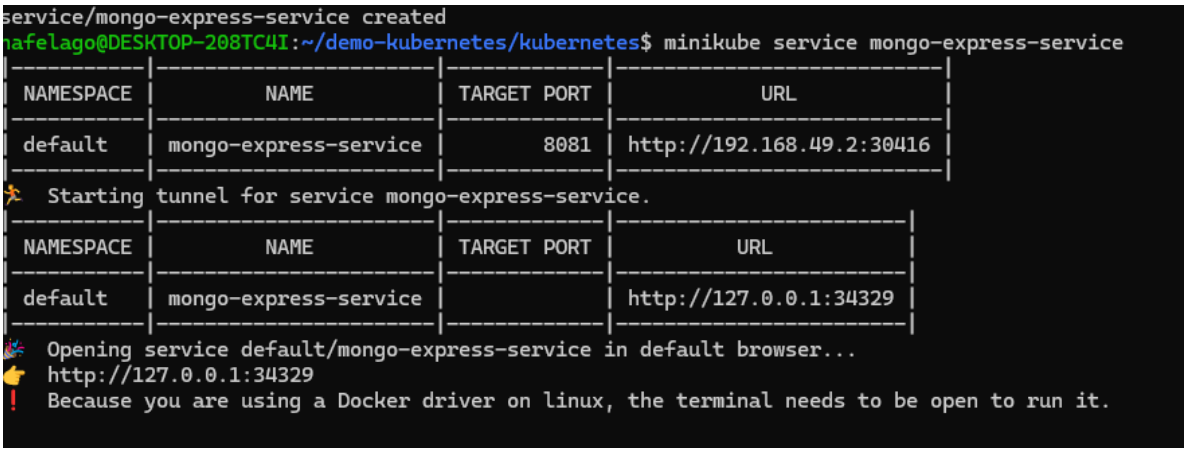
Deploy MongoDB GUI

```
^C✋  Stopping tunnel for service note-service.
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ kubectl apply -f deployments/mongo-express-depl
.yml
deployment.apps/mongo-express-deployment created
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$
```

Create External Service for MongoDB GUI

```
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ kubectl apply -f services/mongo-express-service
.yml
service/mongo-express-service created
hafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$
```

Access MongoDB GUI


service/mongo-express-service created
nafelago@DESKTOP-208TC4I:~/demo-kubernetes/kubernetes$ minikube service mongo-express-service
| NAMESPACE | NAME | TARGET PORT | URL |
| default | mongo-express-service | 8081 | http://192.168.49.2:30416 |
Starting tunnel for service mongo-express-service.
| NAMESPACE | NAME | TARGET PORT | URL |
| default | mongo-express-service | | http://127.0.0.1:34329 |
Opening service default/mongo-express-service in default browser...
http://127.0.0.1:34329
Because you are using a Docker driver on linux, the terminal needs to be open to run it.