

## Run a multi-node cluster

```
chingheilo@Chinghei ~ % minikube start --nodes 2 -p multinode-demo
😊 [multinode-demo] minikube v1.32.0 on Darwin 13.1 (arm64)
✨ Automatically selected the docker driver
🔥 Using Docker Desktop driver with root privileges
👍 Starting control plane node multinode-demo in cluster multinode-demo
🌐 Pulling base image ...
🔥 Creating docker container (CPUs=2, Memory=2200MB) ...
🐳 Preparing Kubernetes v1.28.3 on Docker 24.0.7 ...
    ■ Generating certificates and keys ...
    ■ Booting up control plane ...
    ■ Configuring RBAC rules ...
🔧 Configuring CNI (Container Networking Interface) ...
🌐 Verifying Kubernetes components...
    ■ Using image gcr.io/k8s-minikube/storage-provisioner:v5
⭐ Enabled addons: storage-provisioner, default-storageclass

👍 Starting worker node multinode-demo-m02 in cluster multinode-demo
🌐 Pulling base image ...
🔥 Creating docker container (CPUs=2, Memory=2200MB) ...
🌐 Found network options:
    ■ NO_PROXY=192.168.58.2
🐳 Preparing Kubernetes v1.28.3 on Docker 24.0.7 ...
    ■ env NO_PROXY=192.168.58.2
🌐 Verifying Kubernetes components...
⚡ Done! kubectl is now configured to use "multinode-demo" cluster and "default" namespace by default
chingheilo@Chinghei ~ %
```

```
chingheilo@Chinghei ~ % kubectl get nodes
NAME           STATUS   ROLES      AGE   VERSION
multinode-demo   Ready    control-plane   92s   v1.28.3
multinode-demo-m02   Ready    <none>     73s   v1.28.3
```

```
chingheilo@Chinghei ~ % kubectl get nodes
NAME           STATUS   ROLES      AGE   VERSION
multinode-demo   Ready    control-plane   92s   v1.28.3
multinode-demo-m02   Ready    <none>     73s   v1.28.3
chingheilo@Chinghei ~ % minikube status -p multinode-demo
multinode-demo
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured

multinode-demo-m02
type: Worker
host: Running
kubelet: Running
```

```
chingheilo@Chinghei ~ % minikube dashboard -p multinode-demo
  Enabling dashboard ...
    • Using image docker.io/kubernetesui/metrics-scraper:v1.0.8
    • Using image docker.io/kubernetesui/dashboard:v2.7.0
💡 Some dashboard features require the metrics-server addon. To enable all features please run:
  minikube -p multinode-demo addons enable metrics-server

💡 Verifying dashboard health ...
🚀 Launching proxy ...
💡 Verifying proxy health ...
🌐 Opening http://127.0.0.1:57316/api/v1/namespaces/kubernetes-dashboard/services/http:kubernetes-dashboard:/proxy/ in your default browser...
```

The screenshot shows the Kubernetes Metrics UI interface. It includes three main sections: 'Metadata' (with details like Name: kubernetes, Namespace: default, Created: Jan 17, 2024, Age: 4 minutes ago, UID: eae64ba1-a6d8-4f00-b9bc-e5893721fd1c, and Labels: component: apiserver, provider: kubernetes), 'Resource information' (with Type: ClusterIP, Cluster IP: 10.96.0.1, and Session Affinity: None), and 'Endpoints' (listing a single endpoint at Host: 192.168.58.2, Port: https:8443,TCP, Node: -, and Ready: true).

```
chingheilo@Chinghei ~ % minikube stop -p multinode-demo
👋 Stopping node "multinode-demo" ...
👋 Powering off "multinode-demo" via SSH ...
👋 Stopping node "multinode-demo-m02" ...
👋 Powering off "multinode-demo-m02" via SSH ...
2 nodes stopped.
chingheilo@Chinghei ~ % minikube delete --all
🔥 Deleting "minikube" in docker ...
🔥 Removing /Users/chingheilo/.minikube/machines/minikube ...
💀 Removed all traces of the "minikube" cluster.
🔥 Deleting "multinode-demo" in docker ...
🔥 Removing /Users/chingheilo/.minikube/machines/multinode-demo ...
🔥 Removing /Users/chingheilo/.minikube/machines/multinode-demo-m02 ...
💀 Removed all traces of the "multinode-demo" cluster.
🔥 Successfully deleted all profiles
```

# Deployment yaml files

```
chingheilo@Chinghei lab3 % nano replicaset.yaml
chingheilo@Chinghei lab3 % kubectl apply -f replicaset.yaml
replicaset.apps/nginx created
chingheilo@Chinghei lab3 % kubectl get pods
NAME           READY   STATUS      RESTARTS   AGE
frontend-8g2fh 0/1     ImagePullBackOff 0          4m30s
frontend-dn8m6  0/1     ImagePullBackOff 0          4m30s
frontend-slgtv  0/1     ImagePullBackOff 0          4m30s
nginx-7854ff8877-5sbt 1/1     Running      0          20m
nginx-7854ff8877-mq6wk 1/1     Running      0          20m
```

```
chingheilo@Chinghei lab3 % kubectl delete --all pod
pod "frontend-8g2fh" deleted
pod "frontend-dn8m6" deleted
pod "frontend-slgtv" deleted
pod "nginx-7854ff8877-5sbt" deleted
pod "nginx-7854ff8877-mq6wk" deleted
chingheilo@Chinghei lab3 % kubectl get pods
NAME           READY   STATUS      RESTARTS   AGE
frontend-217z9 0/1     ErrImagePull 0          10s
frontend-hn4jj  0/1     ErrImagePull 0          10s
frontend-qq8zb  0/1     ErrImagePull 0          10s
nginx-7854ff8877-pbq6b 1/1     Running      0          10s
nginx-7854ff8877-zs89n 1/1     Running      0          10s
chingheilo@Chinghei lab3 % kubectl get replicasets
NAME        DESIRED   CURRENT   READY   AGE
frontend      3         3         0       9m59s
nginx         0         0         0       6m24s
nginx-7854ff8877 2         2         2       26m
```

```
chingheilo@Chinghei lab3 % nano deployment.yaml
chingheilo@Chinghei lab3 % kubectl apply -f deployment.yaml
deployment.apps/nginx-deployment created
chingheilo@Chinghei lab3 % kubectl get deployments
NAME           READY   UP-TO-DATE   AVAILABLE   AGE
nginx          2/2     2           2           23h
nginx-deployment 3/3     3           3           12s
chingheilo@Chinghei lab3 % kubectl rollout status deployment nginx
deployment "nginx" successfully rolled out
```

```
chingheilo@Chinghei lab3 % nano statefulset.yaml
chingheilo@Chinghei lab3 % kubectl apply -f statefulset.yaml
service/nginx created
statefulset.apps/web configured
chingheilo@Chinghei lab3 % kubectl get statefulsets
NAME    READY   AGE
web     0/3     7m54s
```

```
chingheilo@Chinghei lab3 % nano daemonset.yaml
chingheilo@Chinghei lab3 % kubectl apply -f deployment.yaml
deployment.apps/nginx-deployment unchanged
chingheilo@Chinghei lab3 % kubectl apply -f daemonset.yaml
daemonset.apps/nginx created
chingheilo@Chinghei lab3 % kubectl get daemonset
NAME    DESIRED   CURRENT   READY   UP-TO-DATE   AVAILABLE   NODE SELECTOR   AGE
nginx   1         1         1         1           1           <none>        20s
chingheilo@Chinghei lab3 %
```

Name: Lo Ching Hei

ID:101486171

```
chingheilo@Chinghei lab3 % nano deployment_with_limit.yaml
chingheilo@Chinghei lab3 % kubectl apply -f deployment_with_limit.yaml
deployment.apps/nginx-deployment created
chingheilo@Chinghei lab3 % kubectl get deployments
NAME           READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment  3/3     3            3           4s
```

```
chingheilo@Chinghei lab3 % nano deployment_with_healthchecks.yaml
chingheilo@Chinghei lab3 % kubectl apply -f deployment_with_healthchecks.yaml
deployment.apps/nginx-deployment-healthcheck created
chingheilo@Chinghei lab3 % kubectl get deployments
NAME           READY   UP-TO-DATE   AVAILABLE   AGE
nginx-deployment  3/3     3            3           5m9s
nginx-deployment-healthcheck  3/3     3            3           18s
```

Name: Lo Ching Hei

ID:101486171

# Full stack application deployment

```
chingheilo@Chinghei kubernetes % minikube start
😄 minikube v1.32.0 on Darwin 13.1 (arm64)
💡 Automatically selected the docker driver
📌 Using Docker Desktop driver with root privileges
👍 Starting control plane node minikube in cluster minikube
🌐 Pulling base image ...
🔥 Creating docker container (CPUs=2, Memory=2200MB) ...
🛠️ Preparing Kubernetes v1.28.3 on Docker 24.0.7 ...
🔧 Configuring bridge CNI (Container Networking Interface) ...
🌐 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
```

```
chingheilo@Chinghei secrets % kubectl apply -f mongodb-secret.yml
secret/mongodb-secret created
```

Persistent Volume Claims							
Name	Labels	Status	Volume	Capacity	Access Modes	Storage Class	Created
mongodb-data-mongodb-stateful-set-1	app: mongodb	Bound	pvc-8615274d-1608-4212-8995-5964d21d441a	1Gi	ReadWriteOnce	standard	a minute ago
mongodb-data-mongodb-stateful-set-0	app: mongodb	Bound	pvc-d10e862b-7491-42a6-bdbe-d429e7cc291a	1Gi	ReadWriteOnce	standard	a minute ago

Pods							
Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)
mongodb-stateful-set-1	mongo:latest	app: mongodb apps.kubernetes.io/pod-index: 1 controller-revision-hash: mongodb-stateful-set-6b9cbf98c7	minikube	Running	0	-	21 minutes ago
mongodb-stateful-set-0	mongo:latest	app: mongodb apps.kubernetes.io/pod-index: 0 controller-revision-hash: mongodb-stateful-set-6b9cbf98c7	minikube	Running	0	-	21 minutes ago

```
chingheilo@Chinghei stateful-sets % kubectl apply -f mongodb-stateful-set.yml
statefulset.apps/mongodb-stateful-set created
```

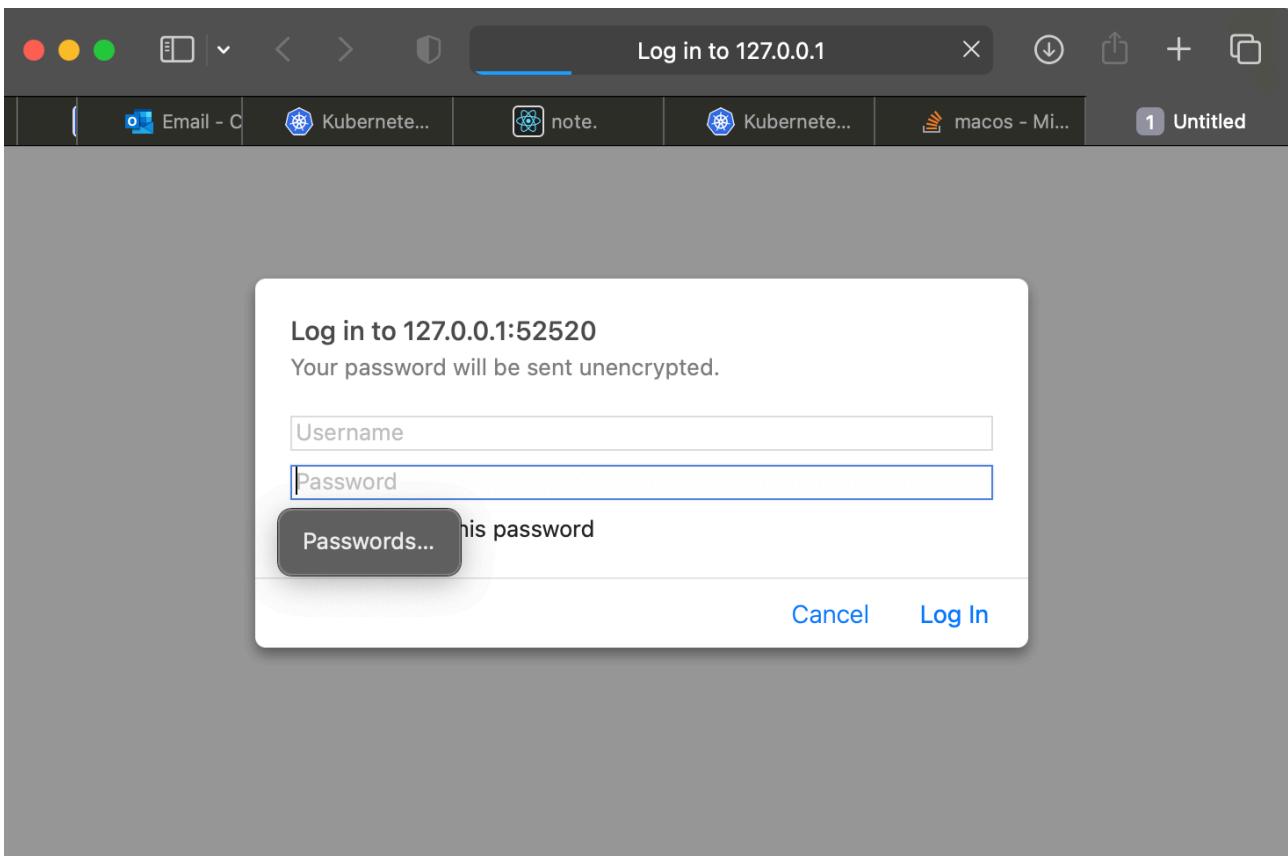
```
chingheilo@Chinghei deployments % kubectl apply -f note-server-depl.yml
deployment.apps/note-server-deployment created
```

```
chingheilo@Chinghei services % kubectl apply -f note-server-service.yml
service/note-server-service created
```

```
chingheilo@Chinghei kubernetes % kubectl apply -f services/note-service.yml
service/note-service created
```

```
chingheilo@Chinghei services % kubectl apply -f mongodb-service.yml
service/mongodb-service created
```

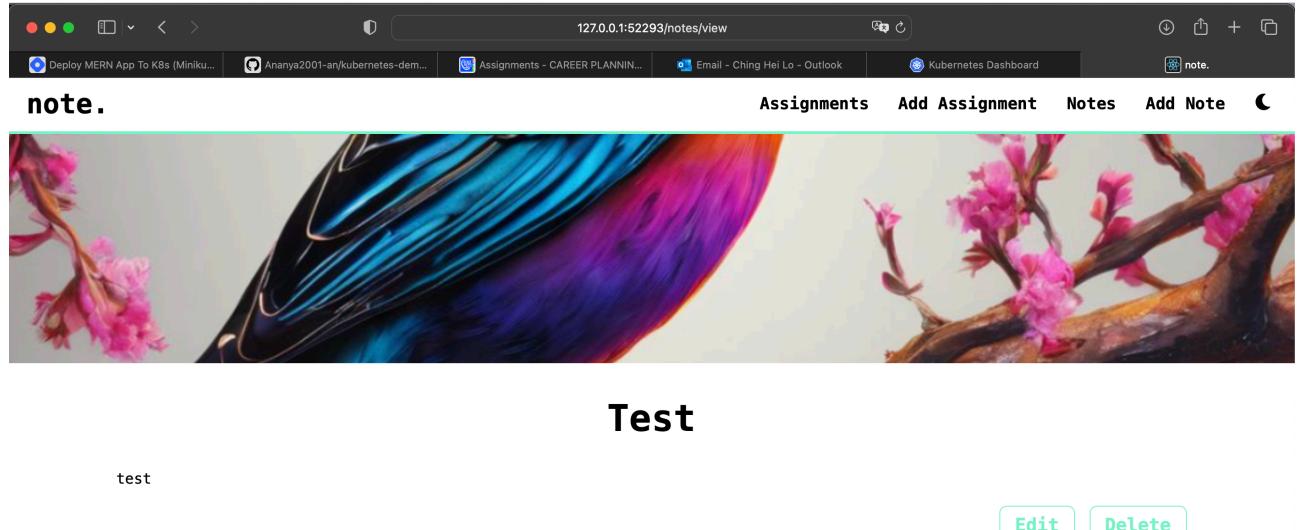
```
chingheilo@Chinghei secrets % minikube service mongo-express-service
|-----|-----|-----|-----|
| NAMESPACE | NAME | TARGET PORT | URL |
|-----|-----|-----|-----|
| default | mongo-express-service | 8081 | http://192.168.49.2:31212 |
|-----|-----|-----|-----|
🏃 Starting tunnel for service mongo-express-service.
|-----|-----|-----|-----|
| NAMESPACE | NAME | TARGET PORT | URL |
|-----|-----|-----|-----|
| default | mongo-express-service | | http://127.0.0.1:52520 |
|-----|-----|-----|-----|
⚠️ Opening service default/mongo-express-service in default browser...
Because you are using a Docker driver on darwin, the terminal needs to be open to run it.
```



Name: Lo Ching Hei

ID:101486171

```
chingheilo@Chinghei kubernetes % minikube service note-service
|-----|-----|-----|-----|
| NAMESPACE | NAME | TARGET PORT | URL |
|-----|-----|-----|-----|
| default | note-service | 3000 | http://192.168.49.2:30371 |
|-----|-----|-----|-----|
🏃 Starting tunnel for service note-service.
|-----|-----|-----|-----|
| NAMESPACE | NAME | TARGET PORT | URL |
|-----|-----|-----|-----|
| default | note-service | http://127.0.0.1:52293 |
|-----|-----|-----|-----|
⚠️ Opening service default/note-service in default browser...
! Because you are using a Docker driver on darwin, the terminal needs to be open to run it.
```



The screenshot shows a web browser window with the URL `127.0.0.1:52293/notes/view`. The page displays a note titled "Test" with the content "test". There are "Edit" and "Delete" buttons at the bottom right. The browser's tab bar is visible at the top, showing several other open tabs related to Kubernetes and assignments.



## Task

```
chingheilo@Chinghei secrets % kubectl get pods
NAME                               READY   STATUS    RESTARTS   AGE
mongo-express-deployment-b88f6d45f-xdj9g   1/1     Running   0          15m
mongodb-stateful-set-0                 1/1     Running   0          25m
mongodb-stateful-set-1                 1/1     Running   0          25m
note-deployment-74cc946cd8-g65m2        1/1     Running   0          19m
note-deployment-74cc946cd8-njlwq         1/1     Running   0          19m
note-server-deployment-6fb5fc67f-m4qnk   1/1     Running   0          21m
note-server-deployment-6fb5fc67f-pmngm   1/1     Running   0          21m
chingheilo@Chinghei secrets % kubectl delete pod note-deployment-74cc946cd8-g65m2
pod "note-deployment-74cc946cd8-g65m2" deleted
chingheilo@Chinghei secrets % kubectl get pods
NAME                               READY   STATUS    RESTARTS   AGE
mongo-express-deployment-b88f6d45f-xdj9g   1/1     Running   0          16m
mongodb-stateful-set-0                 1/1     Running   0          26m
mongodb-stateful-set-1                 1/1     Running   0          26m
note-deployment-74cc946cd8-67ng6        1/1     Running   0          5s
note-deployment-74cc946cd8-njlwq         1/1     Running   0          20m
note-server-deployment-6fb5fc67f-m4qnk   1/1     Running   0          22m
note-server-deployment-6fb5fc67f-pmngm   1/1     Running   0          22m
```