

The screenshot shows a Mac OS X desktop with VS Code open. The file structure in the Explorer sidebar includes a folder named 'Lab4/docker-ethereum' containing several files: et.yaml, replicaSetDeployment.yaml, statefulScript.yaml, daemonSet.yaml, and healthChecks.yaml. The 'et.yaml' file is open in the editor, showing its content:

```

replicaSetDeployment:
  replicas: 3
  selector:
    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: 1 # Check the probe every 1 second

```

The terminal window shows the command line activity:

```

wahajhaider@Wahais-MacBook-Pro docker-ethereum % kompose convert -f docker-compose.yml
INFO Kubernetes file "dapp-deployment.yaml" created
INFO Kubernetes file "ganache-service.yaml" created
INFO Kubernetes file "react-service.yaml" created
INFO Kubernetes file "nodejs-deployment.yaml" created
INFO Kubernetes file "nodejs-service.yaml" created
INFO Kubernetes file "note-deployment.yaml" created
INFO Kubernetes file "note-service.yaml" created
wahajhaider@Wahais-MacBook-Pro docker-ethereum % kubectl apply -f .
deployment/dapp created
service/dapp created
deployment/apps/ganache created
service/ganache created
deployment/react created
service/react created
error validating "docker-compose.yml": error validating data: [apiVersion not set, kind not set]; if you choose to ignore these errors, turn validation off with --validate=false
error validating "package-lock.json": error validating data: [apiVersion not set, kind not set]; if you choose to ignore these errors, turn validation off with --validate=false
error validating "package.json": error validating data: [apiVersion not set, kind not set]; if you choose to ignore these errors, turn validation off with --validate=false
wahajhaider@Wahais-MacBook-Pro docker-ethereum % kubectl get po
NAME           READY   STATUS    RESTARTS   AGE
dapp-869fb4765-f114   1/1   Running   0          22s
ganache-598947db7-phb5k   1/1   Running   0          28s
mongodb-stateful-set-0   1/1   Running   1 (5m ago) 6d23h
mongodb-stateful-set-1   1/1   Running   1 (5m ago) 6d23h
note-deployment-74cc946c08-6kfjw   1/1   Running   2 (4m37s ago) 6d23h
note-deployment-74cc946c08-22jg7   1/1   Running   2 (4m37s ago) 6d23h
note-server-deployment-6f65fcbb7f-2gm4s  1/1   Running   1 (4m51s ago) 6d23h
note-server-deployment-6f65fcbb7f-t5v7s  1/1   Running   2 (4m51s ago) 6d23h
note-server-stateful-set-0   1/1   Running   0          22s

```

The status bar at the bottom indicates: 'With Kompose, you can now push the same file to Kubernetes'.

-Docker compose files converted to different yaml files and applied to get different pods for each service

The screenshot shows a macOS desktop with a VS Code workspace open. The workspace is titled 'Labs' and contains several files under 'LABS': et.yaml, healthChecks.yaml, statefulScript.yaml, daemonSet.yaml, and healthChecks.yaml. The 'et.yaml' file is the active tab, displaying a Kubernetes deployment configuration for an 'nginx' app. The 'TERMINAL' tab shows a 'minikube' session with the following output:

```
wahajhaider@wahajs-MacBook-Pro:~$ minikube ganache
Error: failed to find a host for minikube
Run 'minikube --help' for usage.
wahajhaider@wahajs-MacBook-Pro:~$ minikube service ganache
✖ Exiting due to SVC_NOT_FOUND: Service 'ganache' was not found in 'default' namespace.
You may select another namespace by using 'minikube service ganache -n <namespace>'. Or list out all the services
using 'minikube service list'

○ wahajhaider@wahajs-MacBook-Pro:~$ minikube service ganache
|-----|
| NAMESPACE | NAME | TARGET PORT | URL |
|-----|
| default   | ganache | No node port | |
|-----|
✖ service default/ganache has no node port
✖ Starting tunnel for service ganache.
|-----|
| NAMESPACE | NAME | TARGET PORT | URL |
|-----|
| default   | ganache | http://127.0.0.1:161647 | |
|-----|
✖ Opening service default/ganache in default browser...
|-----|
| Because you are using a Docker driver on darwin, the terminal needs to be open to run it.
|-----|
```

A browser window is also visible, showing a 400 Bad Request error at the URL 127.0.0.1:161647.

## Running Services

The screenshot shows a Mac OS X desktop environment with the Dock at the bottom. An instance of Visual Studio Code is open, displaying a Node.js project named 'Labs'. The Explorer sidebar shows files like 'index.js', 'Dockerfile', and 'docker-compose.yml'. The 'TERMINAL' tab shows the command `minikube service dapp` being run, followed by a port-forwarding command `kubectl port-forward service/dapp 4000:4000`. The 'OUTPUT' tab shows logs from the minikube service. The 'PROBLEMS' tab has some errors related to 'ganache' files. The 'DEBUG CONSOLE' tab is visible. A browser window in the background shows the application running at [127.0.0.1](http://127.0.0.1).

-Running services

Google Chrome Labs

```
Lab4 > docker-ethereum > ethereum > receipt-ganache.json
1 :false,"inputs": [{"name": "newMessage", "type": "string"}], "name": "setMessage", "outputs": []
2
```

set message

Set Message
Get Message
Compile Contract
Deploy Contract

Contract compiled successfully!

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL GITLENS COMMENTS

wahajhaider@Wahajs-MacBook-Pro:~/Labs % minikube service react

NAMESPACE	NAME	TARGET PORT	URL
default	react		No node port

service default/react has no node port
Starting tunnel for service react.

NAMESPACE	NAME	TARGET PORT	URL
default	react		http://127.0.0.1:49729

Opening service default/react in default browser...
! Because you are using a Docker driver on darwin, the terminal needs to be open to run it

Ln 1, Col 1 Spaces: 4 UTF-8 LF { JSON ⌂ Go

127.0.0.1:49729

set message

Set Message
Get Message
Compile Contract
Deploy Contract

0xe6eB46BB6e4f88a0eBE82A0f4Af8F35504023dd3

Google Chrome Labs

```
Lab4 > docker-ethereum > ethereum > receipt-ganache.json
1 :false,"inputs": [{"name": "newMessage", "type": "string"}], "name": "setMessage", "outputs": []
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```

set message

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PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL GITLENS COMMENTS

wahajhaider@Wahajs-MacBook-Pro:~/Labs % minikube service react

NAMESPACE	NAME	TARGET PORT	URL
default	react		No node port

service default/react has no node port
Starting tunnel for service react.

NAMESPACE	NAME	TARGET PORT	URL
default	react		http://127.0.0.1:49729

Opening service default/react in default browser...
! Because you are using a Docker driver on darwin, the terminal needs to be open to run it

Ln 1, Col 1 Spaces: 4 UTF-8 LF { JSON ⌂ Go

127.0.0.1:49729

set message

Set Message
Get Message
Compile Contract
Deploy Contract

0xe6eB46BB6e4f88a0eBE82A0f4Af8F35504023dd3

Google Chrome Labs

```
Lab4 > docker-ethereum > ethereum > receipt-ganache.json
1 :false,"inputs": [{"name": "newMessage", "type": "string"}], "name": "setMessage", "outputs": []
2
```

set message

Set Message
Get Message
Compile Contract
Deploy Contract

Contract compiled successfully!

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL GITLENS COMMENTS

wahajhaider@Wahajs-MacBook-Pro:~/Labs % minikube service react

NAMESPACE	NAME	TARGET PORT	URL
default	react		No node port

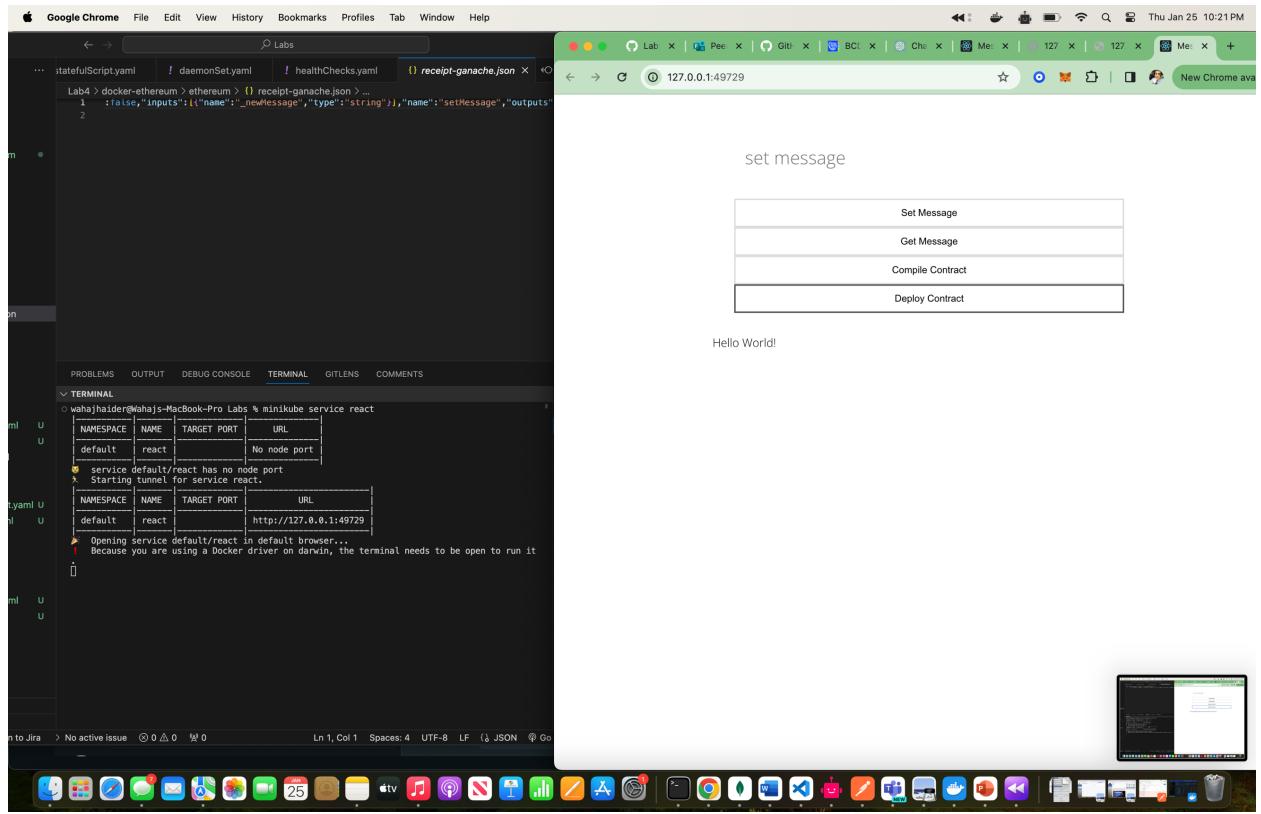
service default/react has no node port
Starting tunnel for service react.

NAMESPACE	NAME	TARGET PORT	URL
default	react		http://127.0.0.1:49729

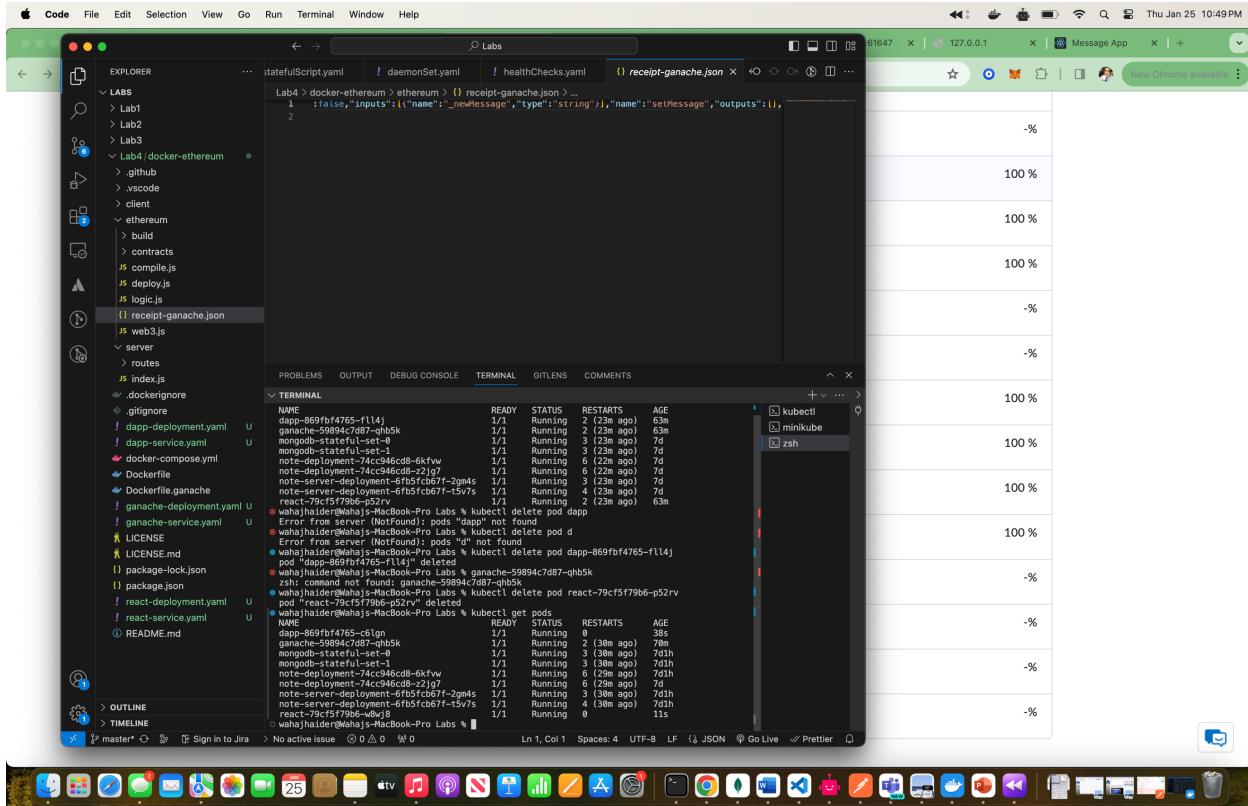
Opening service default/react in default browser...
! Because you are using a Docker driver on darwin, the terminal needs to be open to run it

Ln 1, Col 1 Spaces: 4 UTF-8 LF { JSON ⌂ Go

127.0.0.1:49729



Checking whether duplicates work



## Adding env in cluster and accessing it

```
KUBERNETES_PORT_443_TCP=tcp://10.96.0.1:443
KUBERNETES_PORT_443_TCP_ADDR=10.96.0.1
NOTE_SERVER_SERVICE_PORT=tcp://10.109.128.231:5000
REACT_PORT_3000_TCP_ADDR=10.110.202.103
GANACHE_PORT_8545_TCP=8545
KUBERNETES_SERVICE_HOST=10.96.0.1
NOTE_SERVICE_PORT_3000_TCP_ADDR=10.105.98.235
MONGODB_SERVICE_PORT_27017_TCP=tcp://10.105.22.131:27017
DAPP_PORT_4000_TCP=tcp://10.101.146.71:4000
NOTE_SERVER_SERVICE_PORT=5000
DAPP_PORT_4000_TCP_PROTO=tcp
DAPP_SERVICE_PORT_4000=tcp://10.101.146.71:4000
DAPP_PORT_4000_TCP=tcp://10.101.146.71:4000
MONGODB_SERVICE_PORT_27017_TCP=tcp://10.105.22.131:27017
MONGODB_SERVICE_PORT=tcp://10.105.22.131:27017
NOTE_SERVICE_PORT_3000_TCP=tcp://10.105.98.235:3000
REACT_SERVICE_PORT_3000=tcp://10.110.202.103:3000
REACT_PORT=tcp://10.110.202.103:3000
DAPP_SERVICE_HOST=10.101.146.71
DAPP_PORT_4000_TCP_PROTO=tcp
NODE_VERSION=8.12.0
YARN_VERSION=1.9.4
HOME=/root
waha.haidar@whaha5-MacBook-Pro docker-ethereum % 
waha.haidar@whaha5-MacBook-Pro docker-ethereum % kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
dapp-764b7d6d05-pz7x6   1/1     Running   0          20m
ganache-59894c7d87-qhb5k   1/1     Running   3 (58m ago) 97m
mongodb-stateful-set-0     1/1     Running   3 (58m ago) 7d1h
mongodb-stateful-set-1     1/1     Running   3 (58m ago) 7d1h
note-deployment-74cc946cd8-6kfww  1/1     Running   6 (57m ago) 7d1h
note-deployment-74cc946cd8-2zqj7  1/1     Running   6 (57m ago) 7d1h
note-server-deployment-6fb5fc6b7f-2qm4s  1/1     Running   3 (58m ago) 7d1h
note-server-deployment-6fb5fc6b7f-t5v7s  1/1     Running   4 (58m ago) 7d1h
react-79cf5f79b6-w6w18      1/1     Running   0          27m
waha.haidar@whaha5-MacBook-Pro docker-ethereum % kubectl exec dapp-764b7d6d05-pz7x6 -- env
PATH=/usr/local/sbin:/usr/bin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
NODE_NAME=dapp-764b7d6d05-pz7x6
NODE_PORT=8080
KUBERNETES_PORT_443_TCP_PORT=443
KUBERNETES_PORT=tcp://10.96.0.1:443
NOTE_SERVER_SERVICE_SERVICE_HOST=10.109.128.231
NOTE_SERVICE_SERVICE_HOST=10.105.98.235
REACT_PORT_3000_TCP=tcp://10.110.202.103:3000
GANACHE_SERVICE_HOST=10.106.143.199
GMACACHE_SERVICE_PORT_3000_TCP=tcp://10.106.143.199:8545
REACT_SERVICE_PORT_3000=tcp://10.105.98.235:3000
MONGODB_SERVICE_PORT_27017_TCP_PROTO=tcp
NOTE_SERVICE_PORT=tcp://10.105.98.235:3000
REACT_PORT_3000_TCP_PORT=3000
NOTE_SERVER_SERVICE_PORT_5000_TCP_PORT=5000
NOTE_SERVER_SERVICE_PORT_5000_TCP_ADDR=10.109.128.231
KUBERNETES_PORT_443_TCP_PROTO=tcp
MONGODB_SERVICE_SERVICE_PORT=27017
```

## Load balancer added

```
KUBERNETES_SERVICE_HOST=10.96.0.1
NOTE_SERVICE_PORT_3000_TCP_ADDR=10.105.98.235
MONGODB_SERVICE_PORT_27017_TCP=tcp://10.105.22.131:27017
DAPP_PORT_4000_TCP=tcp://10.101.146.71:4000
NOTE_SERVER_SERVICE_SERVICE_PORT=5000
DAPP_SERVICE_PORT=4000
DAPP_SERVICE_PORT_4000=4000
DAPP_PORT=tcp://10.101.146.71:4000
MONGODB_SERVICE_PORT_27017_TCP=tcp://10.105.22.131:27017
NOTE_SERVICE_PORT_3000_TCP_PORT=3000
REACT_SERVICE_HOST=10.110.202.103
DAPP_PORT_4000_TCP_ADDR=10.101.146.71
NOTE_SERVER_SERVICE_SERVICE_HOST=10.105.22.131
MONGODB_SERVICE_PORT_27017_TCP_ADDR=10.105.98.235:3000
NOTE_SERVICE_PORT_3000_TCP=tcp://10.105.98.235:3000
REACT_SERVICE_PORT=3000
REACT_PORT=tcp://10.110.202.103:3000
DAPP_SERVICE_HOST=10.101.146.71
DAPP_PORT_4000_TCP_PROTO=tcp
NODE_VERSION=8.12.0
YARN_VERSION=1.9.4
HOME=/root
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % rm .git
rm: .git: is a directory
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % rm -rf .git
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl apply -f react-service.yaml
service/react configured
wahajhaider@Wahajs-MacBook-Pro docker-ethereum %

MONGODB_SERVICE_PORT_27017_TCP_PORT=27017
MONGODB_SERVICE_PORT=tcp://10.105.22.131:27017
NOTE_SERVICE_PORT_3000_TCP_PORT=3000
REACT_SERVICE_HOST=10.110.202.103
DAPP_PORT_4000_TCP_ADDR=10.101.146.71
NOTE_SERVER_SERVICE_PORT_5000_TCP=tcp://10.109.128.231:5000
NOTE_SERVICE_SERVICE_PORT=3000
MONGODB_SERVICE_SERVICE_HOST=10.105.22.131
MONGODB_SERVICE_PORT_27017_TCP_ADDR=10.105.22.131
NOTE_SERVICE_PORT_3000_TCP=tcp://10.105.98.235:3000
REACT_SERVICE_PORT=3000
REACT_PORT=tcp://10.110.202.103:3000
DAPP_SERVICE_HOST=10.101.146.71
DAPP_PORT_4000_TCP_PROTO=tcp
NODE_VERSION=8.12.0
YARN_VERSION=1.9.4
HOME=/root
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % rm .git
rm: .git: is a directory
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % rm -rf .git
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl apply -f react-service.yaml
service/react configured
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl get services
NAME          TYPE        CLUSTER-IP      EXTERNAL-IP     PORT(S)        AGE
dapp          ClusterIP   10.101.146.71   <none>        4000/TCP      3d1h
ganache       ClusterIP   10.106.143.199  <none>        8545/TCP      3d1h
kubernetes    ClusterIP   10.96.0.1       <none>        443/TCP       10d
mongodb-service ClusterIP  10.105.22.131  <none>        27017/TCP     10d
note-server-service ClusterIP  10.109.128.231 <none>        5000/TCP      10d
note-service   LoadBalancer 10.105.98.235   <pending>    3000:30705/TCP 10d
react          LoadBalancer 10.110.202.103  <pending>    3001:31068/TCP 3d1h
wahajhaider@Wahajs-MacBook-Pro docker-ethereum %

active issue  ⌂ 3 ▲ 0  ⌂ 0  Ln 17, Col 30  Spaces: 2  UTF-8  LF  ⌂ YAML  ⌂ Go Live  No JSON Schema  ⌂ Prettier  ⌂
1. Open WhatsApp on your phone.
```



## React Service running on different port

The screenshot shows a Mac desktop environment with a terminal window and a browser window.

**Terminal Window:**

```
Lab4 > docker-ethereum > ! react-service.yaml > {} spec > {} selector > io.kompose.service
1  apiVersion: v1
2  kind: Service
3  metadata:
4    annotations:
5      kompose.cmd: kompose convert -f docker-compose.yml
6      kompose.version: 1.32.0 (HEAD)
7    labels:
8      io.kompose.service: react
9    name: react
10   spec:
11     type: LoadBalancer
12     ports:
13       - name: "http"
14         port: 3001
15         targetPort: 80
16     selector:
17       io.kompose.service: react
You, now + Uncommitted changes
```

**Browser Window:**

The browser window displays a simple web application with the title "Message App". The page content is "set message". Below the title, there are four buttons:

- Set Message
- Get Message
- Compile Contract
- Deploy Contract

-Adding secrets for permissions

```
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl config set-context test-user-context --cluster=miniku  
be --user=test-user  
Context "test-user-context" created.  
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl --context=test-user-context get pods  
Error from server (Forbidden): pods is forbidden: User "test-user" cannot list resource "pods" in API group ""  
in the namespace "default"  
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl create role example-role --verb=get,list,watch --resou  
rce=pods  
role.rbac.authorization.k8s.io/example-role created  
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl create rolebinding example-binding --role=example-rol  
e --user=test-user  
rolebinding.rbac.authorization.k8s.io/example-binding created  
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl --context=test-user-context get pods  
NAME READY STATUS RESTARTS AGE  
dapp-764b7d6d95-pzx76 1/1 Running 0 3d  
ganache-59894c7d87-qhb5k 1/1 Running 2 (3d1h ago) 3d1h  
mongodb-stateful-set-0 1/1 Running 3 (3d1h ago) 10d  
mongodb-stateful-set-1 1/1 Running 3 (3d1h ago) 10d  
note-deployment-74cc946cd8-6kfvw 1/1 Running 6 (3d1h ago) 10d  
note-deployment-74cc946cd8-2zjg7 1/1 Running 6 (3d1h ago) 10d  
note-server-deployment-6fb5fc67f-2gm4s 1/1 Running 3 (3d1h ago) 10d  
note-server-deployment-6fb5fc67f-t5v7s 1/1 Running 4 (3d1h ago) 10d  
react-79cf5f79b6-w8wj8 1/1 Running 0 3d  
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % - kubectl --context=test-user-context delete pod <YOUR pod na  
me>  
  
zsh: parse error near `\'\n'  
wahajhaider@Wahajs-MacBook-Pro docker-ethereum % - kubectl --context=test-user-context delete pod react  
_vsc_escape_value;print:21: bad option: -  
Error from server (Forbidden): pods "react" is forbidden: User "test-user" cannot delete resource "pods" in AP  
I group "" in the namespace "default"  
wahajhaider@Wahajs-MacBook-Pro docker-ethereum %
```

## Adding HPA

```
U i group in the namespace default
● wahajhaider@Wahajs-MacBook-Pro docker-ethereum % minikube addons enable metrics-server
 metrics-server is an addon maintained by Kubernetes. For any concerns contact minikube on GitHub.
You can view the list of minikube maintainers at: https://github.com/kubernetes/minikube/blob/master/OWNERS
  Using image registry.k8s.io/metrics-server/metrics-server:v0.6.4
★ The 'metrics-server' addon is enabled
● wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl apply -f dapp-hpa.yaml
horizontalpodautoscaler.autoscaling/dapp-hpa created
● wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl apply -f frontend-hpa.yaml
horizontalpodautoscaler.autoscaling/frontend-hpa created
● wahajhaider@Wahajs-MacBook-Pro docker-ethereum % kubectl get hpa
NAME      REFERENCE      TARGETS      MINPODS      MAXPODS      REPLICAS      AGE
dapp-hpa   Deployment/dapp   <unknown>/50%    1            5            0           12s
frontend-hpa Deployment/react <unknown>/50%    1            5            0           6s
○ wahajhaider@Wahajs-MacBook-Pro docker-ethereum % █
> No active issue  ✘ 3 ▲ 0  ⌂ 0          Spaces: 2  UTF-8  LF  { YAML  ⚡ Go Live  No JSON Schema  ✓ Pret
1. Open WhatsApp on your phone.
```