

Exercise 4 - Kubernetes Advanced

Assignments

1. Create two new yaml files with following definitions: First yaml file: Object definition for node-RED Service for node-RED Route for node-RED

Second yaml file: PersistentVolumeClaim

Object definition for node-RED should include the following: Use deployment or deploymentConfig Use image: nodered/node-red Mount directory /data with volumeMount Create a volume for the mounted directory Declare a persistentVolumeClaim for the volume and give it a name

Service for node-RED should include the following Use port: 1880 Type: LoadBalancer

Route for node-RED Use spec.host: nodered..rahtiapp.fi

PersistentVolumeClaim (Separate yaml file!) Use spec. accessModes: - ReadWriteOnce

2. Use "oc create" command to create the objects defined in your yaml files in Rahti

Inspect your deployment with "oc get all" and "oc status" Use "oc get pod" to get node-RED pod name, should be something like nodered-75883903-hwk9y Use "oc exec -i -t -- sh" (e.g. "oc exec nodered-75883903-hwk9y -i -t -- sh") to get access inside the container. Once inside use "cd /data" to get into /data folder. Check with "ls" Use "echo hello > hello.txt" to create hello.txt file with text hello. Check that file was created with "cat hello.txt" Exit pod with "exit" command. Destroy pod with "oc delete pod nodered-pod". Use "oc replace -f ".yaml"". Use "oc get pods" and wait until pod is ready. Repeat steps 3 and 4. Pod names should be different! Do not create a new hello.txt file. Check that persistent volume works with "cat hello.txt" 3. Read <https://nodered.org/docs/tutorials/>

4. Edit flow.json file. Change the text inside the comparison operators <>. e.g. "topic": "/#", change into "topic": "student123/#",
5. With your browser go to nodered..rahtiapp.fi. Add node-red-dashboard, by clicking the menu (upper right corner) and selecting "manage palette". Select install tab and type "node-red-dashboard". Install it. Import flow.json by copy-pasting it into import prompt. Select menu> import. Upload certificates. Click Deploy.
6. Use image from exercise 1 to run an MQTT publisher on your own machine. Use MQTT_URL=mqtt..rahtiapp.fi and MQTT_PORT=443 in the docker run command.
7. Go to nodered..rahtiapp.fi/ui. Check that speedometer is moving. Take a screenshot.

USE ONLY CHARACTERS a-z AND minus sign (-) IN SERVICE NAMES

Deliverables

1. Two yaml files. First defining at least a Deployment, a Service, an Route and second yaml with PersistentVolumeClaim Object definition-

2. Short text report with screenshots from the inputs and output of all of the commands in tasks 2 including commands in subtasks.
3. Screenshots of working node-red speedometer and modified flow.json file

Possibly useful commands:

oc -help

oc create -f .yaml

oc status

oc replace --force -f .yaml

oc delete --all service (OR route OR configmap OR deployment OR etc..)

oc get pods (OR routes OR deployments OR etc..)

My Text Report

INFO:

My name: Xinyuan Ma

CSC Rahti account: student297

STEPS:

1. Create two new yaml files with following definitions [node-RED](#) and [PersistentVolumeClaim](#)
2. Use "oc create" command to create the objects defined in your yaml files in Rahti

```
(base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc create -f node-RED.yaml
deployment.extensions/node-red-deployment created
service/node-red-service created
route.route.openshift.io/node-red created
```

3. Inspect your deployment with "oc get all" and "oc status"

```
(base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc get all
NAME                                READY   STATUS    RESTARTS   AGE
pod/mosquito-deployment-574d588fdb-z9gd1  1/1     Running   0           8d
pod/node-red-deployment-6dd49ccd79-bskzt  0/1     ContainerCreating  0           5s

NAME                                TYPE          CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
service/mosquitto-service           ClusterIP      172.30.101.49   <none>            8883/TCP,1883/TCP 8d
service/node-red-service            ClusterIP      172.30.254.228  <none>            1880/TCP          5s

NAME                                DESIRED   CURRENT   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/mosquito-deployment  1          1          1             1           8d
deployment.apps/node-red-deployment  1          1          1             0           5s

NAME                                DESIRED   CURRENT   READY   AGE
replicaset.apps/mosquito-deployment-574d588fdb  1          1          1       8d
replicaset.apps/node-red-deployment-6dd49ccd79  1          1          0       5s

NAME                                DOCKER REPO          TAGS          UPDATED
imagestream.image.openshift.io/toyotafeeder  docker-registry.default.svc:5000/xinyuan-ma/toyotafeeder  1.0,2.0       8 days ago

NAME                                HOST/PORT          PATH      SERVICES          PORT      TERMINATION      WILDCARD
route.route.openshift.io/mosquitto  mqtt.student297.rahtiapp.fi  node-red-service  mosquitto-service  8883      passthrough      None
route.route.openshift.io/node-red    nodered.student297.rahtiapp.fi  node-red-service  node-red-service   1880      passthrough      None
(base) ericma@EricdeMacBook-Pro toyota-data-feeder %
```

```

● (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc status
In project xinyuan-ma on server https://rahti.csc.fi:8443

https://mqtt.student297.rahtiapp.fi (passthrough) to pod port 8883 (svc/mosquitto-service)
https://nodered.student297.rahtiapp.fi (passthrough) to pod port 1800 (svc/node-red-service)

deployment/mosquito-deployment deploys eclipse-mosquitto:latest
deployment #1 running for 8 days - 1 pod

deployment/node-red-deployment deploys nodered/node-red:latest
deployment #1 running for about a minute - 1 pod

1 warning, 2 infos identified, use 'oc status --suggest' to see details.
○ (base) ericma@EricdeMacBook-Pro toyota-data-feeder %

```

4. Use "oc get pod" to get node-RED pod name, should be something like nodered-75883903-hwk9y

```

● (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc get pod
NAME                                READY   STATUS    RESTARTS   AGE
mosquito-deployment-574d588fdb-z9gdl 1/1     Running   0           8d
node-red-deployment-6dd49ccd79-bskzt 1/1     Running   0           3m

```

5. Use "oc exec -i -t -- sh" (e.g. "oc exec nodered-75883903-hwk9y -i -t -- sh") to get access inside the container.

```

○ (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc exec node-red-deployment-6dd49ccd79-bskzt -i -t -- sh
/usr/src/node-red $

```

6. Once inside use "cd /data" to get into /data folder. Check with "ls"

```

○ (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc exec node-red-deployment-6dd49ccd79-bskzt -i -t -- sh
/usr/src/node-red $ cd /data
/data $ ls
flows.json      lib              node_modules    package.json    settings.js
/data $

```

7. Use "echo hello > hello.txt" to create hello.txt file with text hello. Check that file was created with "cat

```

/data $ echo hello > hello.txt
/data $ cat hello.txt
hello
/data $

```

hello.txt"

8. Exit pod with "exit" command. Destroy pod with "oc delete pod nodered-pod". Use "oc replace -force -f ".yaml"". Use "oc get pods" and wait until pod is ready. Repeat steps 3 and 4. Pod names should be different! Do not create a new hello.txt file. Check that persistent volume works with "cat hello.txt"

```

● (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc delete pod node-red-deployment-6dd49ccd79-bskzt
pod "node-red-deployment-6dd49ccd79-bskzt" deleted
⊗ (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc replace -f node-RED.yaml
error: the path "orce" does not exist
● (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc replace --force -f node-RED.yaml
deployment.extensions "node-red-deployment" deleted
service "node-red-service" deleted
route.route.openshift.io "node-red" deleted
deployment.extensions/node-red-deployment replaced
service/node-red-service replaced
route.route.openshift.io/node-red replaced

● (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc replace --force -f node-RED.yaml
deployment.apps "node-red-deployment" deleted
deployment.apps/node-red-deployment replaced
service/node-red-service replaced
route.route.openshift.io/node-red replaced
● (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc get pod
NAME                                READY   STATUS              RESTARTS   AGE
mosquito-deployment-574d588fdb-z9gdl 1/1     Running             0          10d
node-red-deployment-74f8cfc9bb-g85gh 0/1     ContainerCreating   0          4s
node-red-deployment-8dbdd759d-75fq8 0/1     Terminating       0          4h
● (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc get pod
NAME                                READY   STATUS    RESTARTS   AGE
mosquito-deployment-574d588fdb-z9gdl 1/1     Running   0          10d
node-red-deployment-74f8cfc9bb-g85gh 1/1     Running   0          12s
○ (base) ericma@EricdeMacBook-Pro toyota-data-feeder % oc exec node-red-deployment-74f8cfc9bb-g85gh -i -t -- sh
/usr/src/node-red $ cd /data
/data $ ls
hello.txt  lib          node_modules  package.json  settings.js
/data $ cat hello.txt
hello
/data $

```

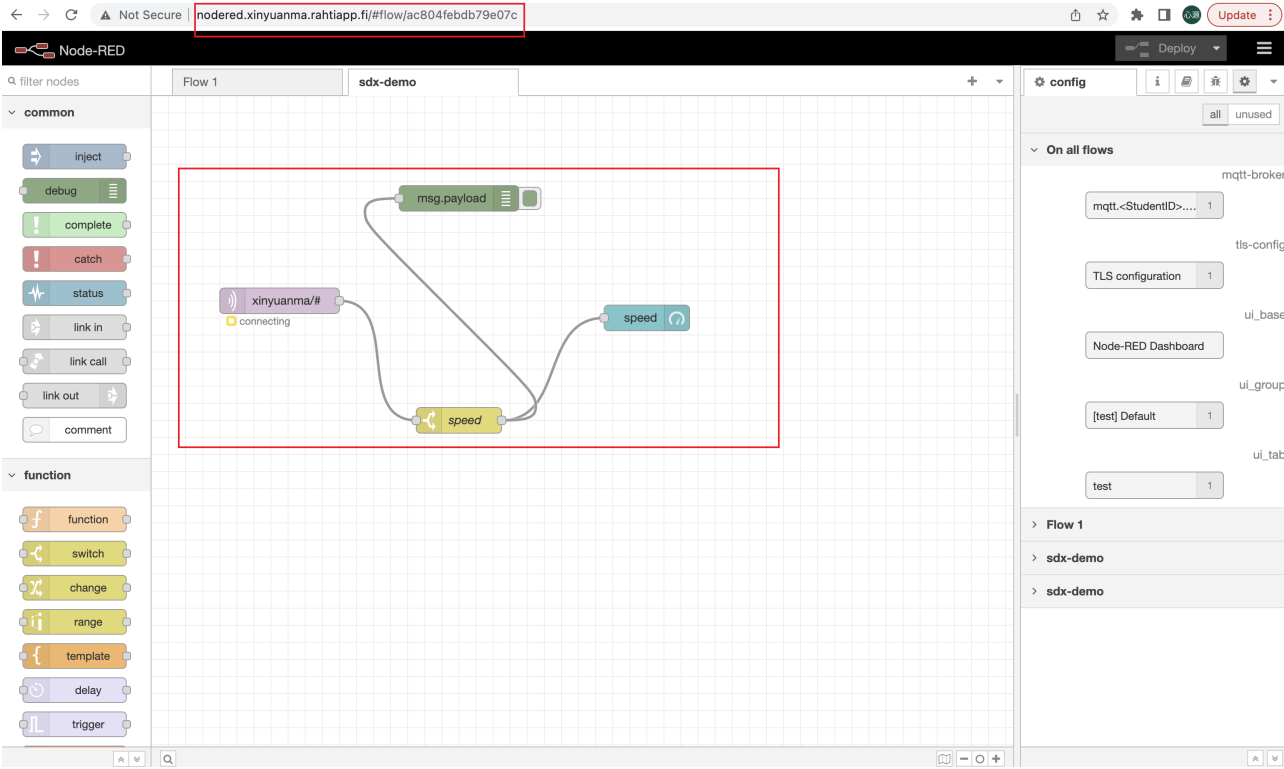
9. modify json.file

```




{
  "id": "8c1f6024ea14c085",
  "type": "mqtt in",
  "z": "61e276be557acd2b",
  "name": "",
  "topic": "xinyuanma/#",
  "qos": "0",
  "datatype": "auto",
  "broker": "e1e1b92214b867ab",
  "nl": false,
  "rap": true,
  "rh": 0,
  "x": 150,
  "y": 240,
  "wires": [

```


10. nodered web






11. update certs



 **Properties**



☐ Use key and certificates from local files


 Certificate



 Upload
 server.crt
 

 Private Key


 Upload
 server.key
 


Passphrase


 CA Certificate

 Upload
 ca.crt
 

☐ Verify server certificate

 Server Name

 ALPN Protocol

 Name

12. publish the info

```
(base) ericma@EricdeMacBook-Pro toyota-data-feeder % docker run --rm -it -e MQTT_URL=mqtt.student297.rahtiapp.fi -e MQTT_PORT=443 -e CLIENT_ID=student297 d
ocker-registry.rahti.csc.fi/xinyuan-ma/toyotafeeder:1.0
Connecting...
Connected to broker
Msg id published: 1
Msg id published: 2
Msg id published: 3
Msg id published: 4
Msg id published: 5
Msg id published: 6
Msg id published: 7
Msg id published: 8
Msg id published: 9
Msg id published: 10
Msg id published: 11
```

13. subscribe it

```
(base) ericma@EricdeMacBook-Pro toyota-data-feeder % mosquitto_sub -h mqtt.student297.rahtiapp.fi -p 443 -t 'student297/#' --verbose --insecure --cafile ca
.crt
student297/toyota/GAS_PEDAL 0
student297/toyota/ENCODER 145
student297/toyota/SPEED 57.34
student297/toyota/CHECKSUM 201
student297/toyota/GAS_PEDAL 0
student297/toyota/BRAKE_AMOUNT 0
student297/toyota/BRAKE_PEDAL 0
student297/toyota/BRAKE_AMOUNT 0
student297/toyota/BRAKE_PEDAL 0
student297/toyota/BRAKE_AMOUNT 0
student297/toyota/BRAKE_PEDAL 0
student297/toyota/BRAKE_AMOUNT 0
```

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14. check it on the website

