

SWE 645 Assignment 2

Group Members

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Overview

We have created 3 EC2 instances namely, k8, rancher and jenkins. On the hosted Jenkins EC2 Node, we installed jenkins, docker and rancher cli. On k8 EC2 we have installed docker and rancher agent while one rancher EC2, we have installed docker and created a container of rancher stable version.

Jenkins EC2 details:

Instance summary for i-07ba03ce72b75afd4 (hemu_jenkins) [Info](#)

Updated 3 minutes ago

Instance ID

i-07ba03ce72b75afd4 (hemu_jenkins)

IPv6 address

–

Hostname type

IP name: ip-172-31-33-192.ec2.internal

Answer private resource DNS name IPv4 (A)

–

Auto-assigned IP address

–

IAM Role

–

IMDSv2

Required

Public IPv4 address

50.17.89.204 (jenkins) [open address](#)

Instance state

Running

Private IP DNS name (IPv4 only)

ip-172-31-33-192.ec2.internal

Instance type

t2.micro

VPC ID

vpc-0d3768a36a2dedcb7

Subnet ID

subnet-02caf4e4824244b67

Private IPv4 addresses

172.31.33.192

Public IPv4 DNS

ec2-50-17-89-204.compute-1.amazonaws.com [open address](#)

Elastic IP addresses

50.17.89.204 (jenkins) [Public IP]

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Auto Scaling Group name

–

Jenkins shell jobs:

docker job to build and push the new image:

Execute shell ?

Command

See [the list of available environment variables](#)

```

docker build -t hemu1999/surveyform:latest .
docker push hemu1999/surveyform:latest
docker image rm hemu1999/surveyform:latest

```

Advanced ▾

docker job to remove old deployment and do a fresh deployment via rancher

Execute shell ?

Command

See [the list of available environment variables](#)

```

echo "pods in hw2"
echo $rancher_tok
rancher login https://3.222.156.48/v3 --token $rancher_tok --skip-verify --context c-m-tpn6f6kw:p-mc97f
rancher kubectl get pods -n hw2
num_pods=$(rancher kubectl get pods -n hw2 --no-headers -o custom-columns=":metadata.name" | wc -l)
echo $num_pods
if [[ $num_pods -gt 0 ]]
then
rancher kubectl delete deployment hw2-deployment -n hw2
rancher kubectl delete svc hw2-service -n hw2
fi
rancher kubectl apply -f surveyform_deployment.yaml
rancher kubectl apply -f surveyform_nodeport.yaml

```

Advanced ▾

Rancher EC2 details:

Instance summary for i-094aaae3fc14b1a4f (rancher) Info		
Updated less than a minute ago		
Instance ID i-094aaae3fc14b1a4f (rancher)	Public IPv4 address 3.222.156.48 (rancher) open address	Private IPv4 addresses 172.31.87.130
IPv6 address -	Instance state Running	Public IPv4 DNS ec2-3-222-156-48.compute-1.amazonaws.com open address
Hostname type IP name: ip-172-31-87-130.ec2.internal	Private IP DNS name (IPv4 only) ip-172-31-87-130.ec2.internal	Elastic IP addresses 3.222.156.48 (rancher) [Public IP]
Answer private resource DNS name IPv4 (A)	Instance type t2.medium	AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendation s. Learn more
Auto-assigned IP address -	VPC ID vpc-0d3768a36a2dedcb7	Auto Scaling Group name -
IAM Role -	Subnet ID subnet-0e42b277850260ecf (k8_subnet)	
IMDSv2 Required		

Rancher cluster details:

Welcome to Rancher

Learn more about the improvements and new capabilities in this version. [What's new in 2.8](#)

You can change what you see when you login via preferences [Preferences](#)

Clusters **2** [Manage](#) [Import Existing](#) [Create](#) [Filter](#)

State	Name	Provider	Kubernetes Version	CPU	Memory	Pods
Active	local	Local K3s	v1.27.6+k3s1	2 cores	3.81 GiB	6/110
Active	surveyform	Custom RKE2	v1.27.10+rke2r1	2 cores	3.81 GiB	23/110

Links

- [Docs](#)
- [Forums](#)
- [Slack](#)
- [File an Issue](#)
- [Get Started](#)
- [Commercial Support](#)

Rancher deployment details:

surveyform [Only User Namespaces](#)

Cluster: [Cluster](#)

Workloads: [Workloads](#)

CronJobs: [CronJobs](#) (0)

DaemonSets: [DaemonSets](#) (0)

Deployments: [Deployments](#) (1)

Jobs: [Jobs](#) (0)

StatefulSets: [StatefulSets](#) (0)

Pods: [Pods](#) (3)

Apps: [Apps](#)

Service Discovery: [Service Discovery](#)

Storage: [Storage](#)

Policy: [Policy](#)

More Resources: [More Resources](#)

Deployments [Create](#)

[Redeploy](#) [Download YAML](#) [Delete](#)

[Filter](#)

State	Name	Image	Ready	Up To Date	Available	Restarts	Age	Health
Active	hw2-deployment	hemu1999/surveyform	3/3	3	3	0	3.7 mins	Health

Namespace: hw2

kubernetes EC2 details:

Instance summary for i-0343c10814e9d9f21 (k8) [Info](#)

Updated less than a minute ago

Instance ID
i-0343c10814e9d9f21 (k8)

IPv6 address
-

Hostname type
IP name: ip-172-31-80-137.ec2.internal

Answer private resource DNS name
IPv4 (A)

Auto-assigned IP address
-

IAM Role
-

IMDSv2
Required

Public IPv4 address
52.45.114.79 (surveyform) [open address](#)

Instance state
Running

Private IP DNS name (IPv4 only)
ip-172-31-80-137.ec2.internal

Instance type
t2.medium

VPC ID
vpc-0d3768a36a2dedcb7

Subnet ID
subnet-0e42b277850260ecf (k8_subnet)

Private IPv4 addresses
172.31.80.137

Public IPv4 DNS
ec2-52-45-114-79.compute-1.amazonaws.com [open address](#)

Elastic IP addresses
52.45.114.79 (surveyform) [Public IP]

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Auto Scaling Group name
-

Home Page Image:

← ↻ 🔒 Not secure | 52.45.114.79:30091

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SWE 645 Survey

First Name

Last Name

Address

City

State

Zipcode

Telephone

Email

Date
mm/dd/yyyy

What do you like the most about the campus?
☐ Students ☐ Location ☐ Atmosphere ☐ sports ☐ Dorm rooms

How you become interested in this university?
☐ Friend ☐ Television ☐ Internet ☐ Other

How likely will you recommend the university to your friend?

Choose

Put 10 comma seperated number between 1 and 100 for raffle

Additional Comments

Submit

Cancel

Setting up the docker things

1. Installed docker container runtime
2. created Dockerfile using nginx and copy
3. docker build -t
4. docker run --name surveyformc -d -p 8080:80 surveyform

5. docker login hemu1999
6. docker tag surveyform hemu1999/surveyform

Setting up the jenkins on EC2

- Create t2.micro on AWS, allowing HTTPs and saving the key
- run the following set of commands to install jenkins on EC2 [1]
- Ensure that your software packages are up to date on your instance by using the following command to perform a quick software update:
- `[ec2-user ~]$ sudo yum update -y`
- Add the Jenkins repo using the following command:
- `[ec2-user ~]$ sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhat-stable/jenkins.repo`
- Import a key file from Jenkins-CI to enable installation from the package:
- `[ec2-user ~]$ sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key`
- `[ec2-user ~]$ sudo yum upgrade`
- Install Java (Amazon Linux 2023):
- `[ec2-user ~]$ sudo dnf install java-17-amazon-corretto -y`
- Install Jenkins:
- `[ec2-user ~]$ sudo yum install jenkins -y`
- Enable the Jenkins service to start at boot:
- `[ec2-user ~]$ sudo systemctl enable jenkins`
- Start Jenkins as a service:
- `[ec2-user ~]$ sudo systemctl start jenkins`
- You can check the status of the Jenkins service using the command:
- `[ec2-user ~]$ sudo systemctl status jenkins`
- Our jenkins is available at <http://50.17.89.204:8080/>

Github setup

- Create an ssh key pair locally
- add the public key to the github sshkey in the repo settings

- add the private key as the credentials on jenkins
- create a webhook with the payload <http://50.17.89.204:8080/web-hook/>
- create it

Jenkins pipeline Setup

- Create a job
- Select **free style project**
- Give a description
- choose github project
- add the github url <https://github.com/hem1999/k8-automated-deployment>
- choose git as SCM
- add repo url
- choose credentials which are already stored in Jenkins Credentials
- make branch to blank so that it will take the default as main.
- choose github hook trigger.
- then add the docker build job as a shell script

```
docker build -t hemu1999/surveyform:latest .
docker push hemu1999/surveyform:latest
docker image rm hemu1999/surveyform:latest
```

- then next job is to deploy on kubernetes

```
rancher login https://3.222.156.48/v3 --token $rancher_tok --skip-verify --
context c-m-tpn6f6kw:p-mc97f
rancher kubectl get pods -n hw2
num_pods=$(rancher kubectl get pods -n hw2 --no-headers -o custom-
columns=":metadata.name" | wc -l)
echo $num_pods
if [[ $num_pods -gt 0 ]]
then
rancher kubectl delete deployment hw2-deployment -n hw2
rancher kubectl delete svc hw2-service -n hw2
fi
rancher kubectl apply -f surveyform_deployment.yaml
rancher kubectl apply -f surveyform_nodeport.yaml
```

- this script will connect to our cluster via rancher, remove the old deployment if exists and deploy with the updated yaml files

Installing docker on Jenkins Node

- To install docker on jenkins node [2]
- `sudo yum update -y`
- `sudo yum install -y docker`

- `sudo systemctl start docker`
- `sudo systemctl enable docker`
- giving jenkins user permissions using: `sudo usermod -aG docker $USER`
- `sudo usermod -aG docker jenkins`
- Install rancher cli on the node
- get token from the rancher
- use the following script to connect, remove old pods and create new one

Installing rancher CLI on Jenkins Node

- Install using the instructions on <https://github.com/rancher/cli/releases>
- Go to rancher on <https://3.222.156.48/>, go to accounts and api key and create one and copy the **Bearer token**
- Save the Bearer token as credential in Jenkins

Installing rancher

- create a t2.medium instance with 24gb of ebs allowing HTTP & HTTPS with AMI LINUX 2
- `yum update -y` to update the existing packages
- `yum install docker -y` to install docker
- `systemctl enable docker` to enable the system link with docker
- `systemctl start docker` to start the docker service in backend
- `docker run -d --restart=unless-stopped -p 80:80 -p 443:443 --privileged rancher/rancher:stable` use this command to start a rancher container.
- Then go to `ec2-ipaddress:80` to see the rancher dashboard
- run the `docker logs container-id 2>&1 | grep "Bootstrap Password:"` gives the current password
- use that to create your own new password.
- In the dashboard, click **create**.
- Scroll down and choose **custom** and then click on **create**.
- Then choose the curl command presented on screen, enable the insecure flag.
- copy this command to paste it in the **k8 ec2 machine** to make the cluster on **ec2** manageable with rancher.

Setting up the k8 ec2

- create a t2.medium instance with 24gb of ebs allowing HTTP & HTTPS with ubuntu and open the service port **30091** on EC2 security group.
- `sudo apt-get update -y` to update current packages
- `sudo apt-get install docker.io -y` to install docker service, it should automatically create system link, if not follow above systemctl commands to start docker service in the backend.
- paste the rancher agent curl command and click enter. this will make the cluster accessible via rancher.
- Now go to rancher dashboard and start deploying your yaml files.
- below are the 2 yamls we created, the first one is about deployment

```

! surveyform_deployment.yaml
1  apiVersion: apps/v1
2  kind: Deployment
3  metadata:
4    name: hw2-deployment
5    namespace: hw2
6  spec:
7    replicas: 3
8    selector:
9      matchLabels:
10     app: surveyform
11   template:
12     metadata:
13       labels:
14         app: surveyform
15     spec:
16       containers:
17       - name: surveyform
18         image: hemu1999/surveyform:latest
19         ports:
20         - containerPort: 80
21

```

- we created a new namespace `hw2`, then named our deployment `hw2-deployment` with selectors as `app: surveyform`.
- The other yaml is about the `NodePort` service deployment with `EXTERNAL_IP` as EC2 elastic IP.


```
! surveyform_nodeport.yaml
1  apiVersion: v1
2  kind: Service
3  metadata:
4    name: hw2-service
5    namespace: hw2
6  spec:
7    selector:
8      app: surveyform
9    ports:
10     - protocol: TCP
11       port: 80
12       targetPort: 80
13       nodePort: 30091
14     type: NodePort
15     externalIPs:
16     - 52.45.114.79
```

References

- [1] <https://www.jenkins.io/doc/tutorials/tutorial-for-installing-jenkins-on-AWS/>
- [2] <https://docs.aws.amazon.com/serverless-application-model/latest/developerguide/install-docker.html>