SWE645 - HW2: Containerize survey form and setup Kubernetes cluster using Rancher

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Step 1: Build Docker image and containerize survey form using Docker

- Write Dockerfile as below

```
Dockerfile > ...
1   # Base image.
2   FROM tomcat:8.5.73
3
4   # Author/Maintainer; This will be visible from docker inspect with the other labels.
5   LABEL author.name="Aniket Pandey"
6
7   # Copying war file to tomcat server.
8   ADD Survey.war /usr/local/tomcat/webapps/
```

- Build docker image with the below command. My Dockerfile is inside infra folder and therefore I've specified path as infra/Dockerfile. As a standard practice all the infrastructure setup related files should be kept inside infra folder for easy segregation.

  docker build -f infra/Dockerfile --tag survey:amd64-v1.0 .
- Tag the docker image and push it on dockerhub using the below command

  docker tag survey:amd64-v1.0 aniket414/survey:amd64-v1.0

  docker push aniket414/survey:amd64-v1.0

Step 2: Create two EC2 instance, one for deployment and the other for Rancher setup

- Select the ubuntu ami from AWS marketplace and create two instances
- Allow inbound traffic using security group from following ports

Inbound rules (9) | Manage tags | Edit inbound rules

Filter security group rules | 1

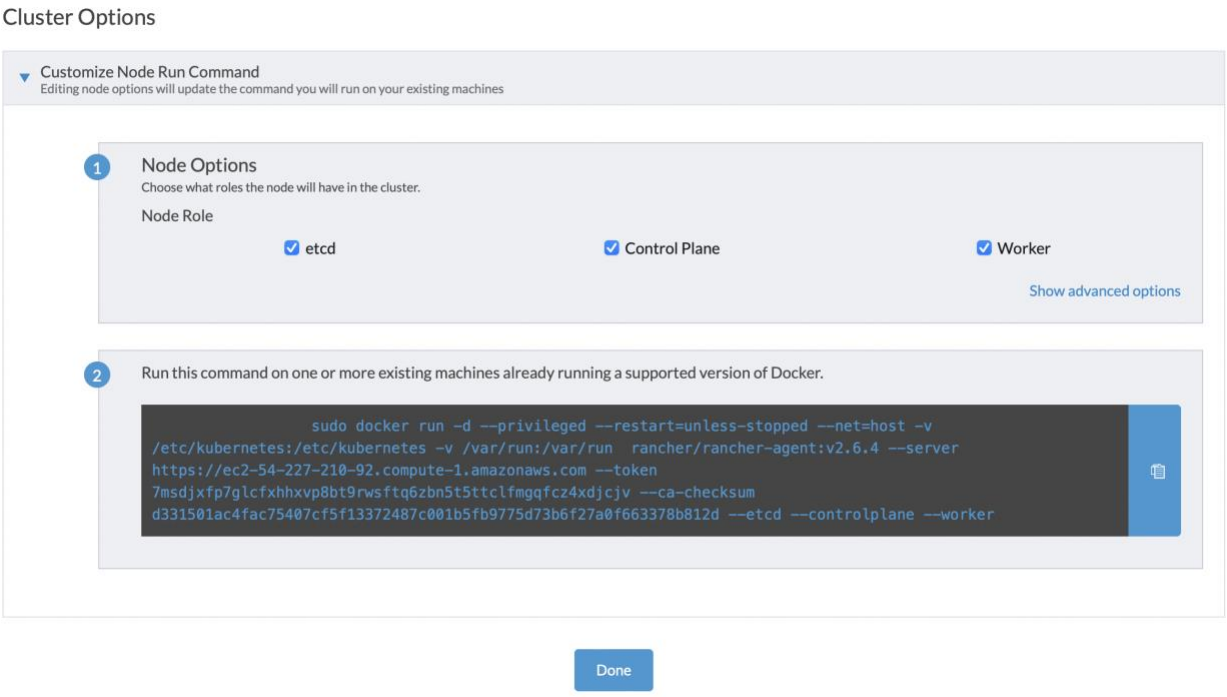
Security group rule...	IP version	Type	Protocol	Port range	Source
sgr-0225625f9a78f1e54	IPv4	HTTP	TCP	80	0.0.0.0/0
sgr-04640b85a1c4f2a9e	IPv6	Custom TCP	TCP	8080	::/0
sgr-06d9bba398e7fabd4	IPv4	All traffic	All	All	0.0.0.0/0
sgr-024dd4f67097e3ba3	IPv4	HTTPS	TCP	443	0.0.0.0/0
sgr-0246fd54e55a3a1e6	IPv6	HTTP	TCP	80	::/0
sgr-02bd1b51428929...	IPv6	HTTPS	TCP	443	::/0
sgr-021b81b98f23fd7f6	IPv4	SSH	TCP	22	0.0.0.0/0
sgr-0365140e4d19cf91b	IPv4	Custom TCP	TCP	8080	0.0.0.0/0
sgr-0d96147c2f4eb03f3	IPv6	All traffic	All	All	::/0

Step 3: Setup Rancher on one of the instance

- SSH into the instance using pem file
  ssh -i key-value.pem ubuntu@public-dns
- Install docker after updating
  sudo apt-get update
  sudo apt install docker.io
- Install Rancher using the following command

sudo docker run --privileged -d --restart=unless-stopped -p 80:80 -p 443:443 rancher/rancher

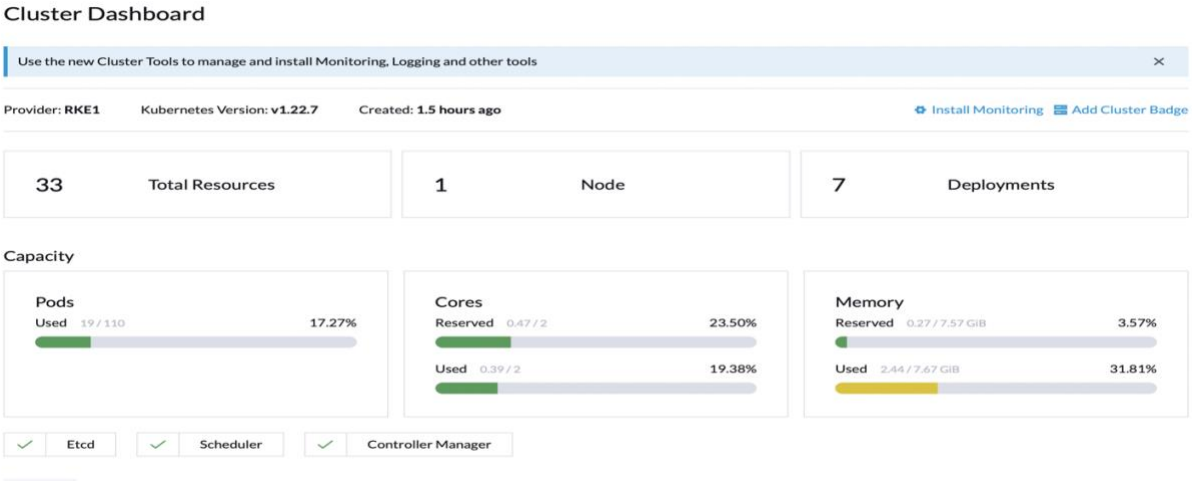
- After some time open instance public dns which will display Rancher login page where we'll setup username and password
- Login inside and click on create cluster
- Choose custom option from the list of available of available choices and click next
- Enter the cluster name and leave everything as default and click on next
- In the next section select control plane, etcd, and worker and copy the command generated



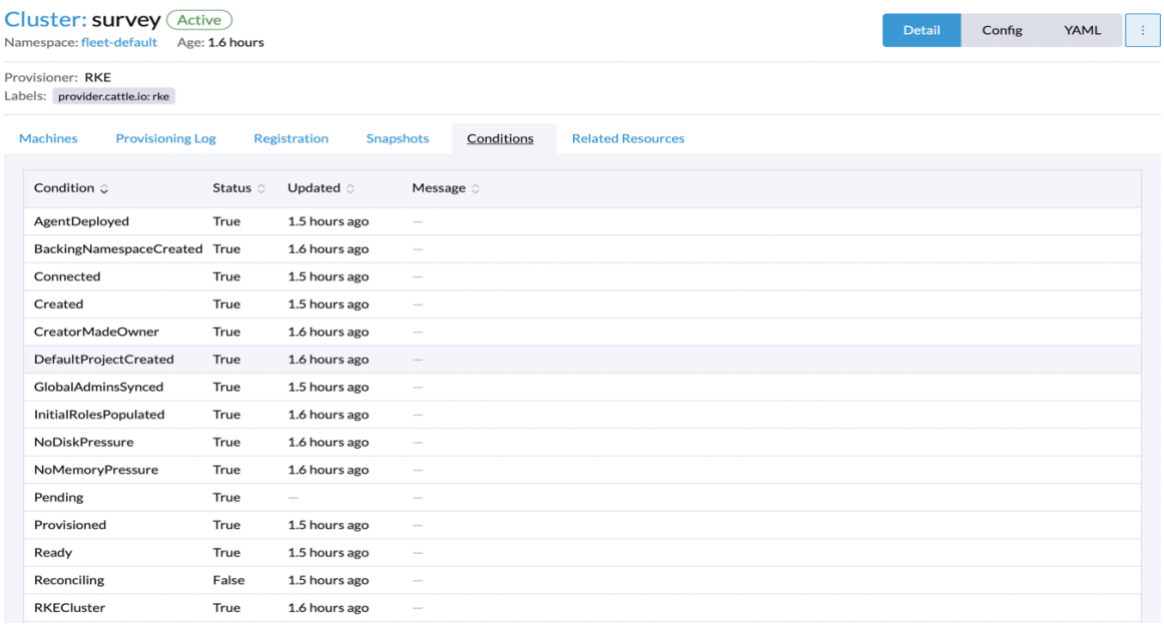
Step 4: Setting up another instance for orchestration

- SSH into the instance using pem file
  ssh -i key-value.pem ubuntu@public-dns
- Install docker after updating
  sudo apt-get update
  sudo apt install docker.io

- Run the above copied command and after some time go to the Rancher page and you should see cluster provisioning has started.



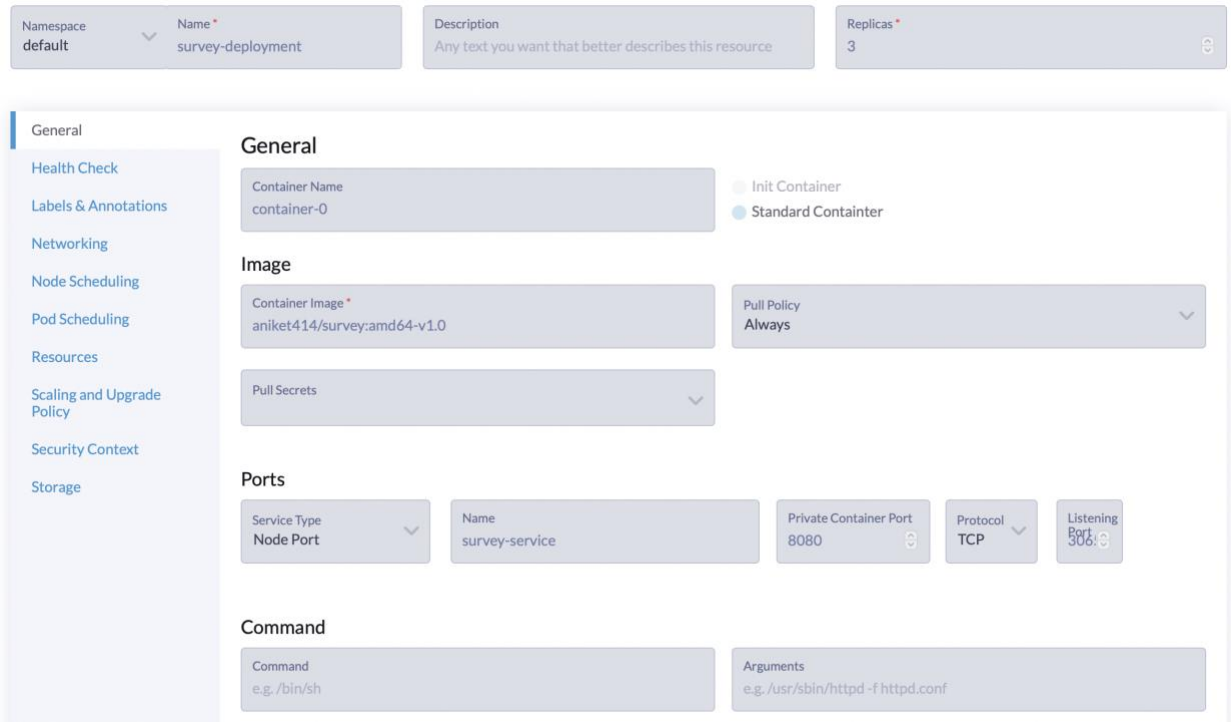
- Condition of the cluster is active and healthy



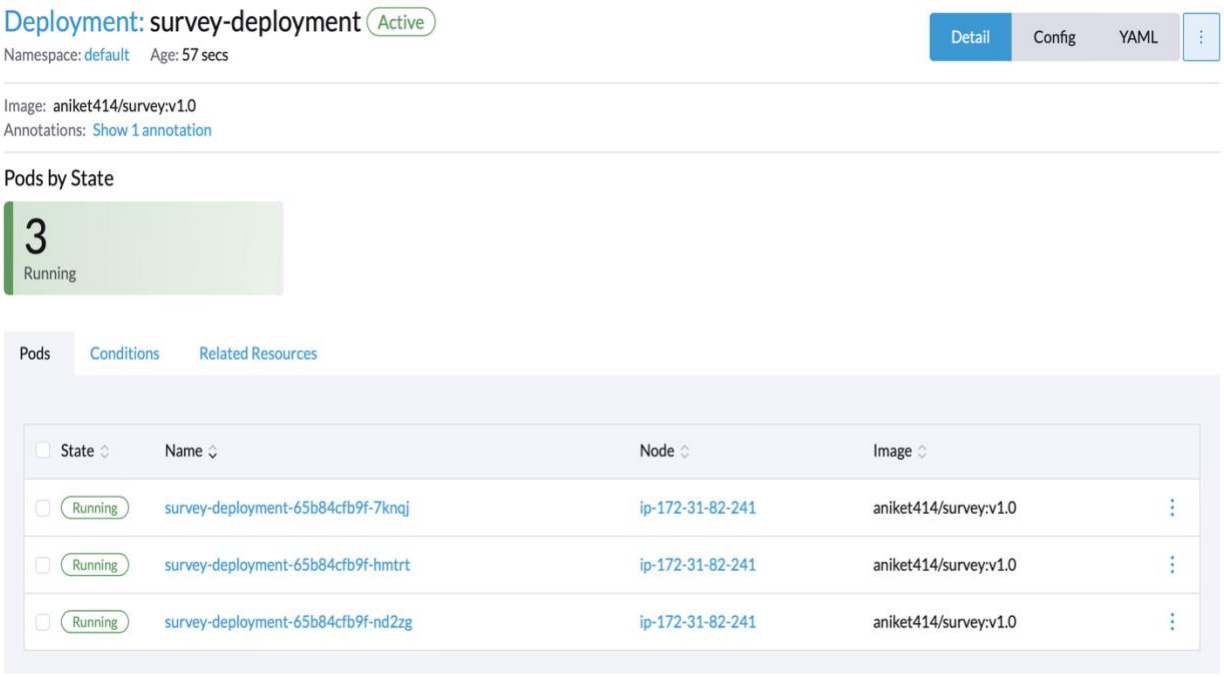
Step 5: Deploy the docker image on cluster on setup three pods running at all time

- Enter the cluster just created on Rancher and click on Deployment under the Workload section. Alternatively you can also copy the kubeconfig file and if you have kubectl setup done on your local then paste the kubeconfig file content in .kube/config and you can easily access the cluster and deployment using kubectl from your local.
- Enter the replica set as mentioned in assignment i.e. 3
- Enter the docker image uri

- Setup NodePort as a service



- Click on done and you should see your pods coming up.



- You can also verify the status from local using kubectl command

- Following are the screenshot of service, node, deployment, and pods

```
(base) aniket@Anikets-MacBook-Pro Assignment-2 % kubectl get service
NAME                         TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE
kubernetes                   ClusterIP   10.43.0.1       <none>        443/TCP          2d13h
survey-deployment            ClusterIP   10.43.84.201    <none>        8080/TCP         2d12h
survey-deployment-nodeport   NodePort    10.43.181.229   <none>        8080:30654/TCP   2d12h
(base) aniket@Anikets-MacBook-Pro Assignment-2 % kubectl get nodes
NAME               STATUS   ROLES                       AGE     VERSION
ip-172-31-82-241   Ready    controlplane,etcd,worker   2d13h   v1.22.7
(base) aniket@Anikets-MacBook-Pro Assignment-2 % kubectl get pods
NAME                                  READY   STATUS    RESTARTS   AGE
survey-deployment-667774c59b-fs75l   1/1     Running   0          43h
survey-deployment-667774c59b-rth9q   1/1     Running   0          43h
survey-deployment-667774c59b-t9zsh   1/1     Running   0          43h
(base) aniket@Anikets-MacBook-Pro Assignment-2 % kubectl get deployment
NAME                READY   UP-TO-DATE   AVAILABLE   AGE
survey-deployment   3/3     3            3           2d12h
```