README.md

swe645

In this project swe645 HW2 has been dockerized and then deployed to self hosted ec2 cluster in aws.

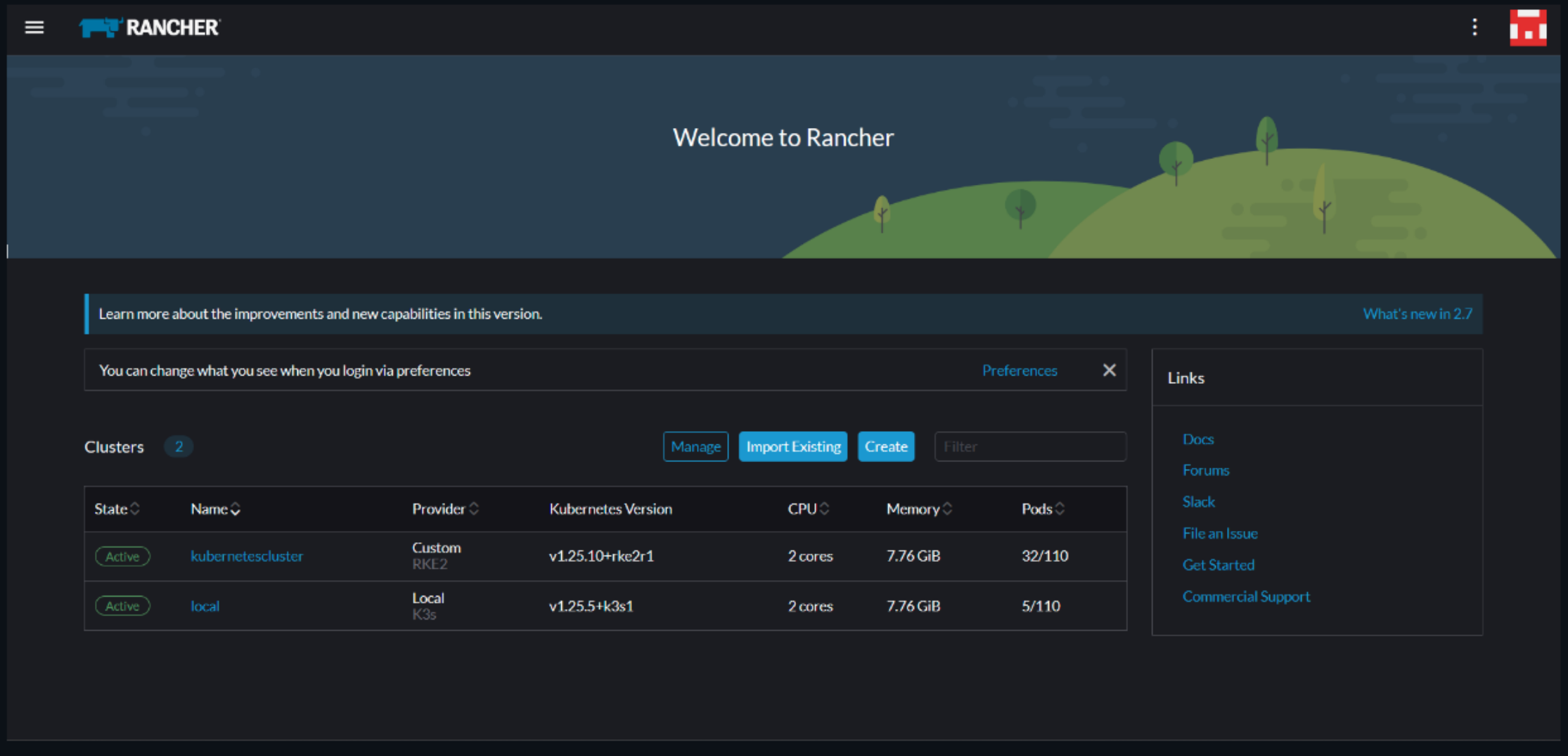
1. Rancher Node: https://ec2-34-233-228-98.compute-1.amazonaws.com/dashboard/
2. Application URL: https://ec2-3-222-240-66.compute-1.amazonaws.com/SurveyForm/
3. Jenkins URL: http://34.228.87.20:8080/
4. Make Sure that EC2 IP's are whitelisted for communication with each other.

Docker installation Steps:

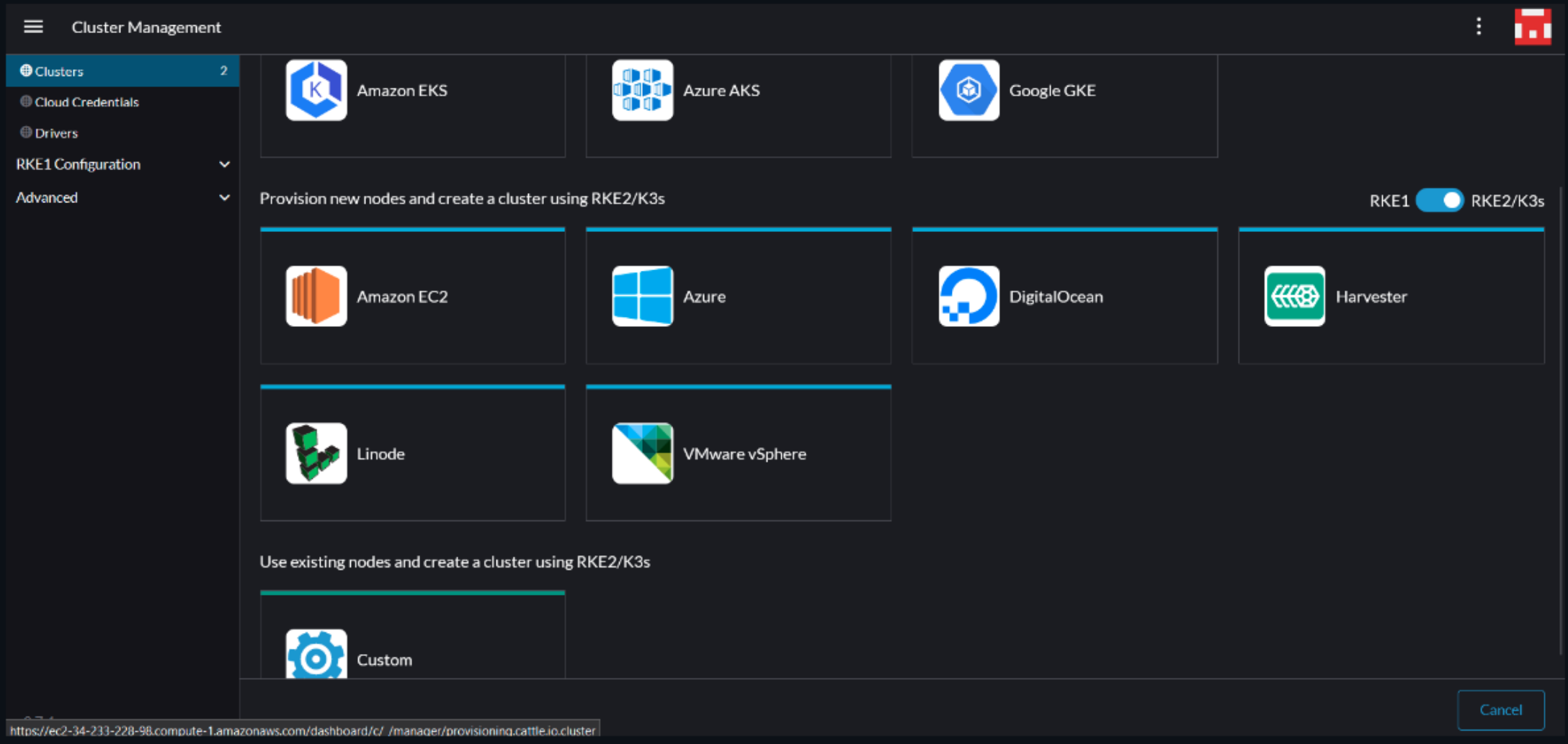
1. sudo apt update
2. sudo apt install docker.io

Rancher Setup:

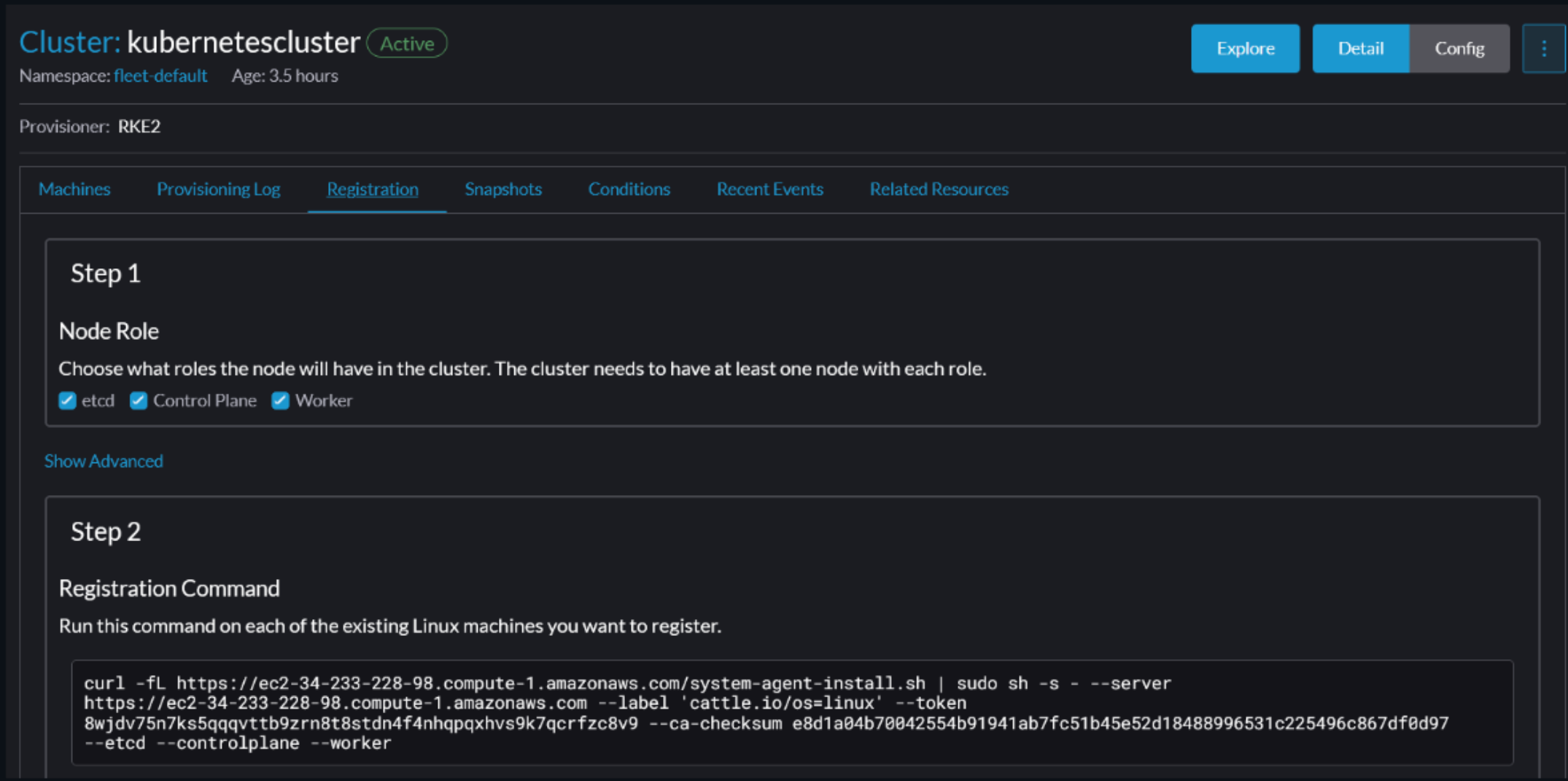
1. Spin up EC2 host with atlease t2.medium as rancher consumes more memory it might crash in free tier.
2. Install docker in EC2 host created for Rancher For this usecase Ubuntu image is used.
3. Execute: sudo docker run --privileged=true -d --restart=unless-stopped -p 80:80 -p 443:443 rancher/rancher



5. Local cluster is created by default. We cannot schedule our application pods in that as it has taints to it
6. Create another Ec2 machine with tier t2.medium this will be used as a cluster for deploying application code.
7. In Racher UI navigate to cluster management for creating new cluster. There are various options present We can use different cloud providers or even use an ec2 iam user for managing the cluster. For our use case we have used custom one.

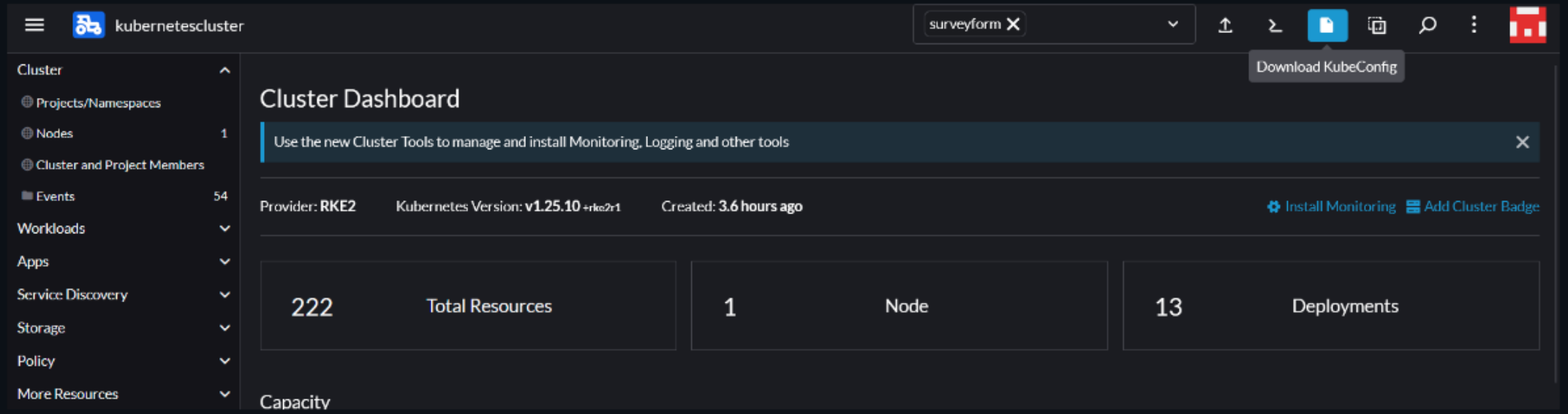


8. In case of custom when the cluster is created in order to make it active we have to register it with the Rancher node which was previously created. For this we have to execute the registration command in new EC2 node provided in Rancher UI. Once this is done cluster will appear as active in 4-5 mins.



Jenkins Setup:

1. Spin up an EC2 container for installing jenkins.
2. Install docker using command: sudo apt install docker.io
3. Install java
4. Use following page for installing jenkins https://www.digitalocean.com/community/tutorials/how-to-install-jenkins-on-ubuntu-22-04
5. After jenkins is up and started install kubectl utility for interacting with cluster.
6. Create .kube directory in /home/jenkins. This will store the config file for connecting to cluster. DOwnload kubeconfig file from Rancher cluster UI.

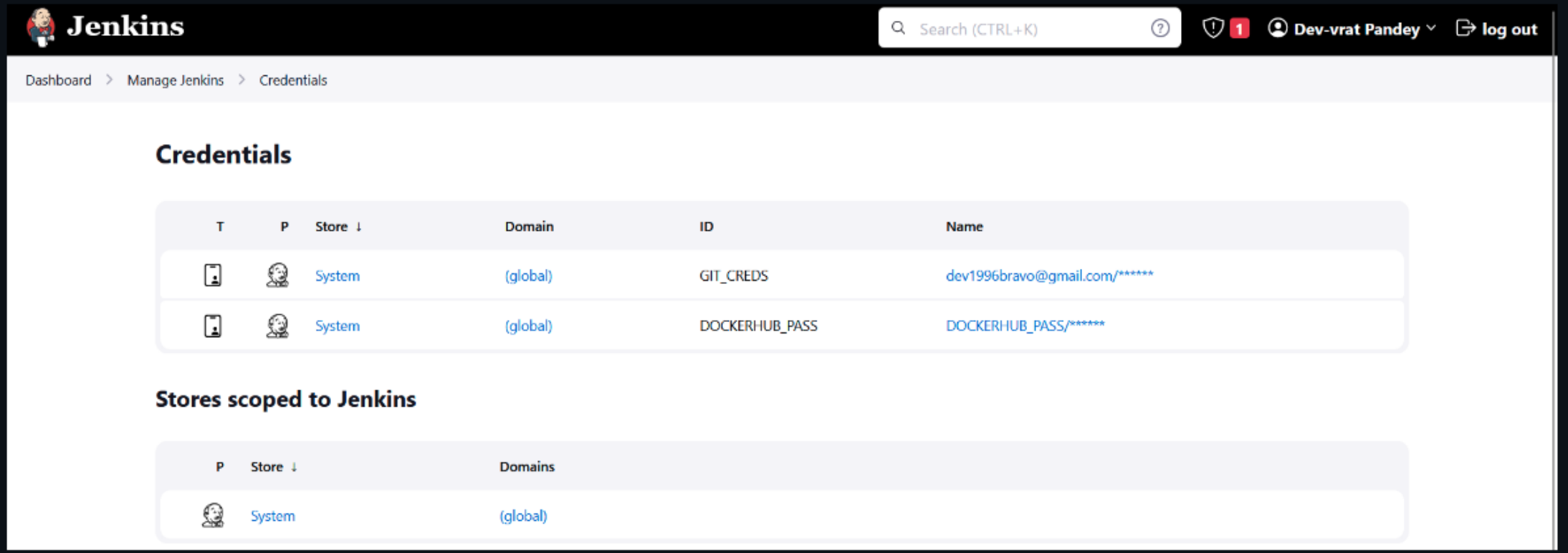


7. Once this is done connection with the cluster can be tested using kubectl command ex: kubectl get nodes

```
Last login: Sun Jun 25 13:26:28 2023 from 18.206.107.27
ubuntu@ip-172-31-29-28:~$ sudo -su jenkins
jenkins@ip-172-31-29-28:/home/ubuntu$ kubectl get pods
No resources found in default namespace.
jenkins@ip-172-31-29-28:/home/ubuntu$ kubectl get nodes
NAME               STATUS   ROLES                              AGE     VERSION
ip-172-31-94-69    Ready    control-plane,etcd,master,worker   3h41m   v1.25.10+rke2r1
jenkins@ip-172-31-29-28:/home/ubuntu$
```

8. In order to push image from jenkins server to dockerhub we need to add jenkins user to docker group. sudo usermod -a -G docker jenkins

9. Credentials to be configured inside Manage Credentials in jenkins for security reasons.



10. After the configuration for jenkins server side is done then we can simply create a new pipeline script from UI. In our case we have a cron scheduler that polls changes in github repository and if identified then triggers the job.

11. Jenkinsfile is for pipeline is in code repository itself.

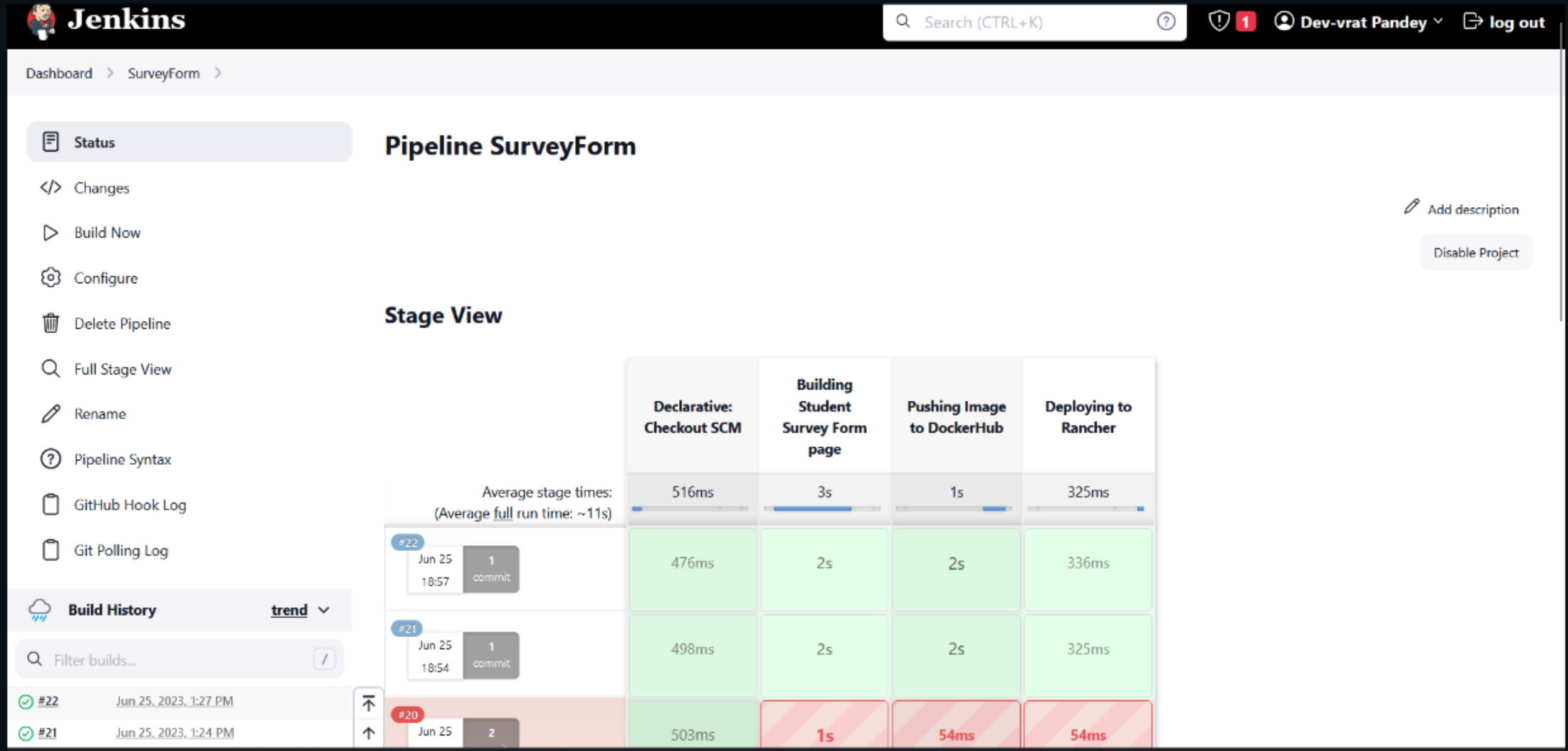
Application Setup

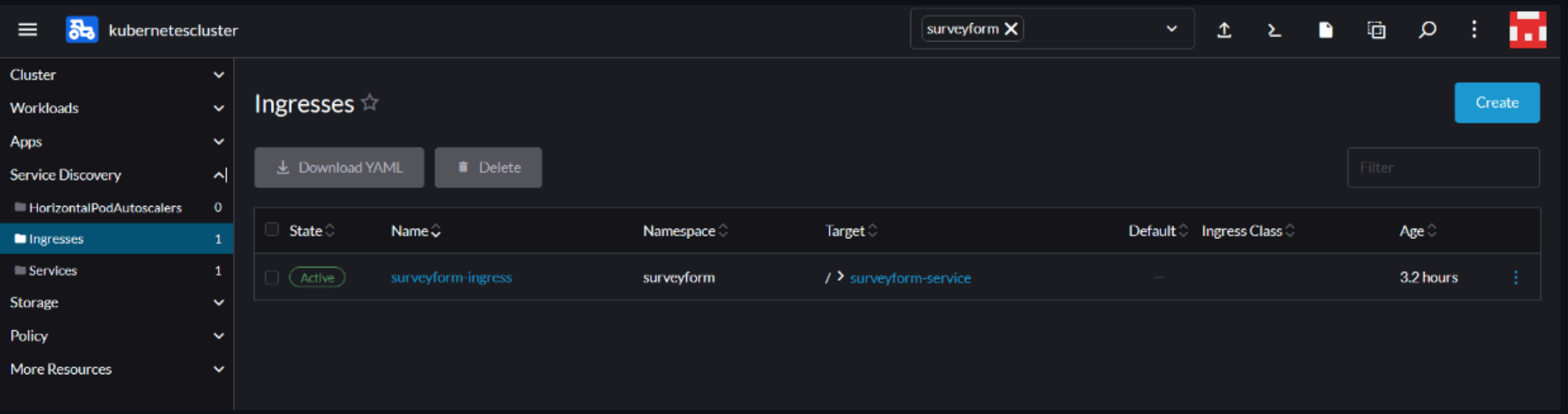
1. All the kubernets related configuration are present inside kubernetes/
2. ingress.yaml defines the ingress for communicating with the service.
3. deployment.yaml is used for fetching the image from hub.docker.com and then create number of pods as specified in replica. In our case it is 3.
4. service.yaml is used for connecting deployment to other kubernetes components. Once service is created then ingress can send traffic to application pods.

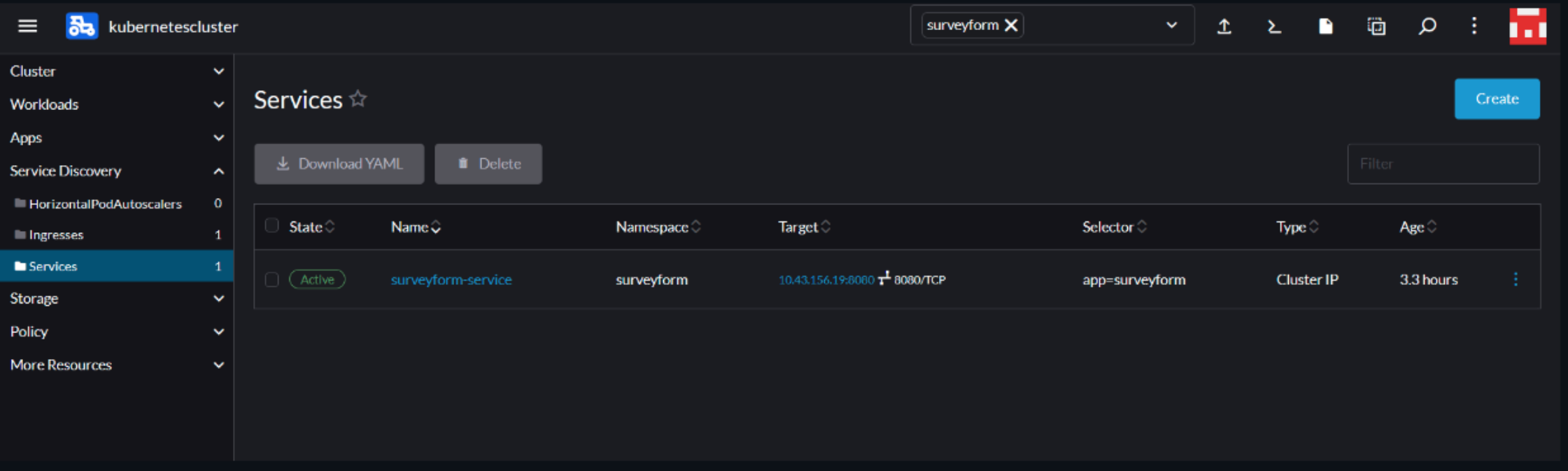
```
jenkins@ip-172-31-29-28:/home/ubuntu$ kubectl get all -n surveyform
NAME                                 READY   STATUS    RESTARTS      AGE
pod/surveyform-75567c5f5b-4j8kz      1/1     Running   1 (15m ago)   44m
pod/surveyform-75567c5f5b-l9f49      1/1     Running   1 (15m ago)   44m
pod/surveyform-75567c5f5b-x428v      1/1     Running   1 (15m ago)   44m

NAME                          TYPE        CLUSTER-IP     EXTERNAL-IP   PORT(S)    AGE
service/surveyform-service    ClusterIP   10.43.156.19   <none>        8080/TCP   3h22m

NAME                          READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/surveyform    3/3     3            3           3h27m

NAME                                     DESIRED   CURRENT   READY   AGE
replicaset.apps/surveyform-6f5db5d6c4    0         0         0       3h27m
replicaset.apps/surveyform-75567c5f5b    3         3         3       44m
replicaset.apps/surveyform-766c746cf9    0         0         0       80m
replicaset.apps/surveyform-78b48b586f    0         0         0       46m
replicaset.apps/surveyform-84b5fc5bf7    0         0         0       79m
jenkins@ip-172-31-29-28:/home/ubuntu$
```

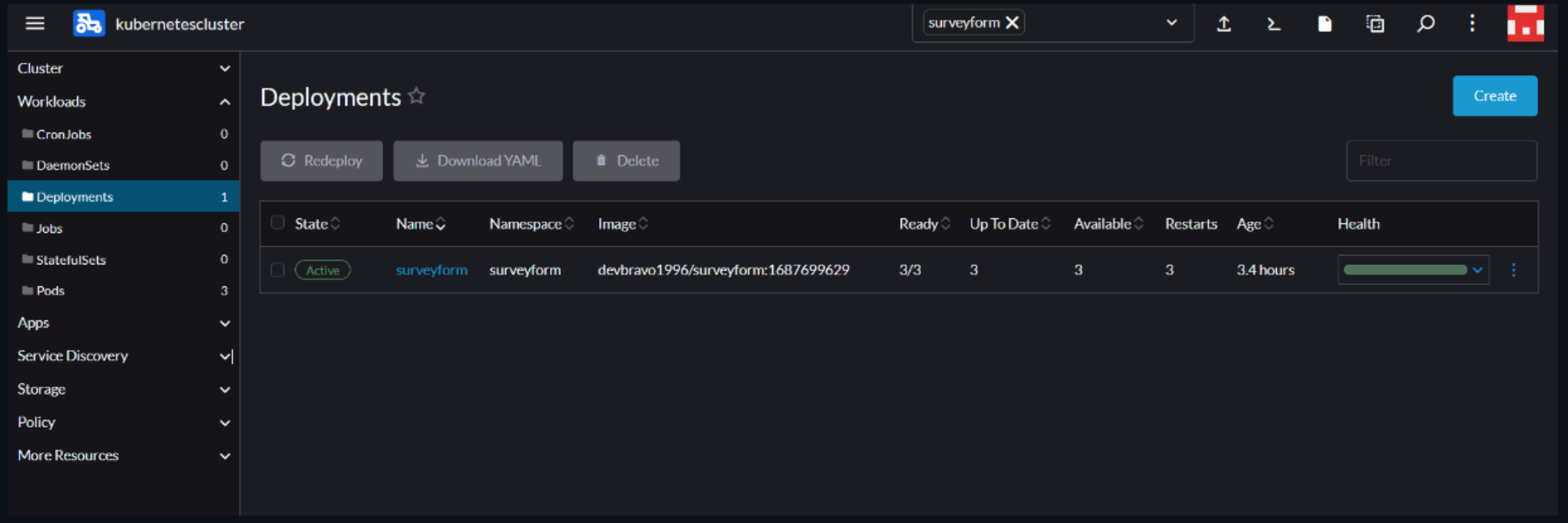
5. Base image used for creating docker image is tomcat:9.0-jdk15

Working Screenshots




kubernetescluster
surveyform
Cluster
Workloads
Apps
Service Discovery
HorizontalPodAutoscalers 0
Ingresses 1
Services 1
Storage
Policy
More Resources
Ingresses
Create
Download YAML
Delete
Filter
State
Name
Namespace
Target
Default
Ingress Class
Age
Active
surveyform-ingress
surveyform
/ > surveyform-service
3.2 hours


kubernetescluster
surveyform
Cluster
Workloads
Apps
Service Discovery
HorizontalPodAutoscalers 0
Ingresses 1
Services 1
Storage
Policy
More Resources
Services
Create
Download YAML
Delete
Filter
State
Name
Namespace
Target
Selector
Type
Age
Active
surveyform-service
surveyform
10.43.156.19:8080 8080/TCP
app=surveyform
Cluster IP
3.3 hours


kubernetescluster
surveyform
Cluster
Workloads
CronJobs 0
DaemonSets 0
Deployments 1
Jobs 0
StatefulSets 0
Pods 3
Apps
Service Discovery
Storage
Policy
More Resources
Deployments
Create
Redeploy
Download YAML
Delete
Filter
State
Name
Namespace
Image
Ready
Up To Date
Available
Restarts
Age
Health
Active
surveyform
surveyform
devbravo1996/surveyform:1687699629
3/3
3
3
3
3.4 hours

GMU Survey Form

Username

Dev

Street Address

Enter Street address

Zipcode

22312

City *

Alexandria

State *

VA

Telephone number

Format:123-456-7890