

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 atleast 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`

 RANCHER









Welcome to Rancher

Learn more about the improvements and new capabilities in this version. [What's new in 2.7](#)

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

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

State 	Name 	Provider 	Kubernetes Version	CPU 	Memory 	Pods 
Active	kubernetescluster	Custom RKE2	v1.25.10+rke2r1	2 cores	7.76 GiB	32/110
Active	local	Local K3s	v1.25.5+k3s1	2 cores	7.76 GiB	5/110

Links

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

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 Rancher 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.

Cluster Management


Clusters2


Cloud Credentials


Drivers

RKE1 Configuration


Advanced


 Amazon EKS


 Azure AKS


 Google GKE


Provision new nodes and create a cluster using RKE2/K3s


 Amazon EC2

 Azure


 DigitalOcean

 Harvester

 Linode

 VMware vSphere

Use existing nodes and create a cluster using RKE2/K3s

 Custom

RKE1

☒

RKE2/K3s

Cancel

https://ec2-34-233-228-98.compute-1.amazonaws.com/dashboard/c/ /manager/provisioning.cattle.io.cluster

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.

Cluster: kubernetescluster Active

Namespace: [fleet-default](#) Age: 3.5 hours

[Explore](#)[Detail](#)[Config](#)

Provisioner: RKE2

[Machines](#)[Provisioning Log](#)[Registration](#)[Snapshots](#)[Conditions](#)[Recent Events](#)[Related Resources](#)

Step 1

Node Role

Choose what roles the node will have in the cluster. The cluster needs to have at least one node with each role.

☒ etcd ☒ Control Plane ☒ Worker

[Show Advanced](#)

Step 2

Registration Command

Run this command on each of the existing Linux machines you want to register.

```
curl -fL https://ec2-34-233-228-98.compute-1.amazonaws.com/system-agent-install.sh | sudo sh -s - --server  
https://ec2-34-233-228-98.compute-1.amazonaws.com --label 'cattle.io/os=linux' --token  
8wjdv75n7ks5qqvttb9zrn8t8stdn4f4nhqpqxhvs9k7qcrfzc8v9 --ca-checksum e8d1a04b70042554b91941ab7fc51b45e52d18488996531c225496c867df0d97  
--etcd --controlplane --worker
```

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.

The screenshot shows the Rancher UI for a Kubernetes cluster named 'kubernetescluster'. The top navigation bar includes a hamburger menu, the cluster name, a search bar with 'surveyform' entered, and various utility icons. A 'Download KubeConfig' button is visible near the top right. The left sidebar contains a navigation menu with options like Cluster, Projects/Namespaces, Nodes, Cluster and Project Members, Events, Workloads, Apps, Service Discovery, Storage, Policy, and More Resources. The main content area is titled 'Cluster Dashboard' and displays cluster details: Provider: RKE2, Kubernetes Version: v1.25.10+rke2r1, and Created: 3.6 hours ago. Below this, three summary cards show 222 Total Resources, 1 Node, and 13 Deployments. At the bottom, a 'Capacity' section is partially visible.

Cluster Dashboard

Use the new Cluster Tools to manage and install Monitoring, Logging and other tools

Provider: RKE2 Kubernetes Version: v1.25.10+rke2r1 Created: 3.6 hours ago

222 Total Resources 1 Node 13 Deployments


Capacity

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.





 **Jenkins**

Search (CTRL+K) ?


 1  Dev-vrat Pandey  log out

Dashboard > Manage Jenkins > Credentials

Credentials

T	P	Store ↓	Domain	ID	Name
		System	(global)	GIT_CREDS	dev1996bravo@gmail.com/*****
		System	(global)	DOCKERHUB_PASS	DOCKERHUB_PASS/*****

Stores scoped to Jenkins

P	Store ↓	Domains
	System	(global)

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.



The screenshot shows the Jenkins 'Build Triggers' configuration page. On the left, there is a sidebar with three tabs: 'General' (selected), 'Advanced Project Options', and 'Pipeline'. The main area is titled 'Build Triggers' and contains several checkboxes: 'Build after other projects are built' (unchecked), 'Build periodically' (unchecked), 'GitHub hook trigger for GITScm polling' (checked), and 'Poll SCM' (checked). Below these is a 'Schedule' section with a text input field containing the cron expression '*/* * * * *'. A warning message is displayed below the input field, stating: 'Spread load evenly by using 'H/3 * * * *' rather than '*/* * * * *'. Would last have run at Sunday, June 25, 2023 at 2:03:15 PM Coordinated Universal Time; would next run at Sunday, June 25, 2023 at 2:03:15 PM Coordinated Universal Time.' At the bottom, there is an unchecked checkbox for 'Ignore post-commit hooks'.

Build Triggers

- ☐ Build after other projects are built ?
- ☐ Build periodically ?
- ☒ GitHub hook trigger for GITScm polling ?
- ☒ Poll SCM ?

Schedule ?

`*/* * * * *`

⚠ Spread load evenly by using 'H/3 * * * *' rather than '*/* * * * *'
Would last have run at Sunday, June 25, 2023 at 2:03:15 PM Coordinated Universal Time; would next run at Sunday, June 25, 2023 at 2:03:15 PM Coordinated Universal Time.

☐ Ignore post-commit hooks ?

11. Jenkinsfile for pipeline is in code repository itself.

Application Setup

1. All the kubernetes 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-19f49	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

 **Jenkins**

Search (CTRL+K) ?

! 1 Dev-vrat Pandey log out

Dashboard > SurveyForm >

Status

</> Changes

▶ Build Now

⚙️ Configure

🗑️ Delete Pipeline

🔍 Full Stage View

✎ Rename

❓ Pipeline Syntax

📄 GitHub Hook Log

📄 Git Polling Log

Pipeline SurveyForm

Add description

Disable Project

Stage View

Average stage times:
(Average full run time: ~11s)

	Declarative: Checkout SCM	Building Student Survey Form page	Pushing Image to DockerHub	Deploying to Rancher
#22 Jun 25 18:57 1 commit	476ms	2s	2s	336ms
#21 Jun 25 18:54 1 commit	498ms	2s	2s	325ms
#20 Jun 25 2 1 commit	503ms	1s	54ms	54ms


Build History trend ▾

Filter builds... /

#22 Jun 25, 2023, 1:27 PM








#21 Jun 25, 2023, 1:24 PM

☰

kubernetescluster

surveyform X

▼



Cluster▼

Workloads▼

Apps▼

Service Discovery▲

HorizontalPodAutoscalers0

Ingresses1

Services1

Storage▼

Policy▼

More Resources▼

Ingresses ☆

Create


Download YAML

Delete

Filter








<input type="checkbox"/>	State ◊	Name ◊	Namespace ◊	Target ◊	Default ◊	Ingress Class ◊	Age ◊	
<input type="checkbox"/>	Active	surveyform-ingress	surveyform	/ > surveyform-service	—		3.2 hours	⋮

☰

kubernetescluster

surveyform X

▼



Cluster▼

Workloads▼

Apps▼

Service Discovery▲

HorizontalPodAutoscalers0

Ingresses1

Services1

Storage▼

Policy▼

More Resources▼

Services ☆

Create

Download YAML

Delete

Filter

<input type="checkbox"/>	State ◊	Name ◊	Namespace ◊	Target ◊	Selector ◊	Type ◊	Age ◊	
<input type="checkbox"/>	Active	surveyform-service	surveyform	10.43.156.19:8080 ⬆ 8080/TCP	app=surveyform	Cluster IP	3.3 hours	⋮



kubernetescluster

surveyform X



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

<input type="checkbox"/>	State ↕	Name ↕	Namespace ↕	Image ↕	Ready ↕	Up To Date ↕	Available ↕	Restarts	Age ↕	Health
<input type="checkbox"/>	Active	surveyform	surveyform	devbravo1996/surveyform:1687699629	3/3	3	3	3	3.4 hours	<div><div></div></div> ⌵ ⋮



GMU Survey Form

Username

Street Address

Zipcode

City *

Alexandria

State *

VA

Telephone number