

SWE645 – HW2 – Installation and Setup Instruction

Team Members:

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A. Setting Git Repository

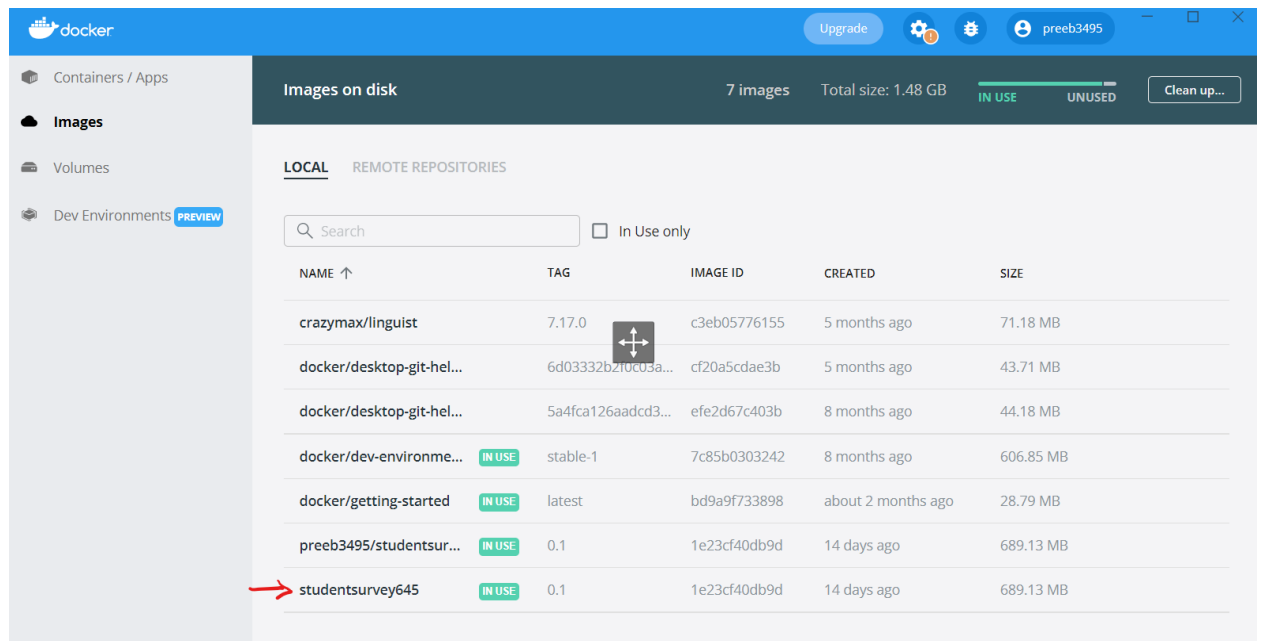
1. We are using the Survey form which we created in Homework1.
2. To use this survey form we are pushing our project in the git repository.
3. To push we are using “Teams” in eclipse for that src->[Right click] ->Team->Commit.

B. Creating Docker Image and Pushing it in Docker hub

1. Install “docker desktop” on your desktop.
2. Create your account using “<https://hub.docker.com/>”.
3. In Eclipse, create a file called “Dockerfile”.
4. Put the Survey form war file in the same folder as docker file. Here the name is Survey_Form.war
5. In the docker file write the below code.

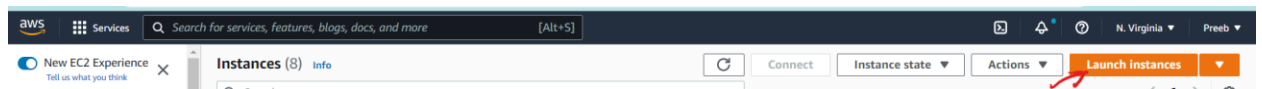
```
1 FROM tomcat:9.0-jdk15
2 COPY Survey_Form.war /usr/local/tomcat/webapps/
3
```

6. Open Cmd and use this command “docker build --tag studentsurvey645”.
7. We are verifying by running “docker run -it -p 8182:8080 studentsurvey645” to check whether the image is running properly.
8. To check, open the browser at “http://localhost:8182/Survey_Form”.
9. In cmd login docker using “docker login -u <your username>”.
10. Change the name of your image to be <your username on dockerhub>/<name of the app>:<image tag> using the docker tag command.
11. In our case: ‘docker tag studentsurvey645:0.1 preeb3495/studentsurvey645:0.1
12. Verify your image on dockerhub and it should be accessible through the internet.



C. Creating AWS EC2 instance and installing Rancher

1. Log in to the AWS console <https://aws.amazon.com/> and create an account.
2. Navigate to EC2.
3. Launch a new instance.



4. Search Ubuntu AMI.
5. Search for Ubuntu AMI and select the Ubuntu Server 20.04 LTS (HVM), SSD Volume Type image and click Select.
6. Select t2.medium to support Kubernetes.
7. Then click at Next: Add Storage.
8. Then click at Next: Add Tags. And then we have given Key as "Name" and Value as "SWE645HW3new".
9. Then click at Next: Configure Security Group.
10. Then create SSH, HTTP, HTTPS security groups with "anywhere" accessible and also add Custom TCP port 8080 for Jenkins to work with and "anywhere" accessible.
11. Then click Review and Launch.
12. Review your configure and Launch.
13. Create a new key pair to access EC2 machine and download it for further use.
14. Then click Launch Instances.

15. Then click View Instance after that you can see your instance up and running after some time.
16. To see its configuration like public IPv4 address, Public IPv4 DNS click on instance ID.

Instance summary for i-0a36fb7755e73703c (SWE645HW3new) [Info](#)

Updated less than a minute ago

<p>Instance ID</p> <p>i-0a36fb7755e73703c (SWE645HW3new)</p> <p>IPv6 address</p> <p>–</p> <p>Hostname type</p> <p>IP name: ip-172-31-81-49.ec2.internal</p> <p>Instance type</p> <p>t2.medium</p> <p>AWS Compute Optimizer finding</p> <p>Opt-in to AWS Compute Optimizer for recommendations. Learn more</p>	<p>Public IPv4 address</p> <p>3.93.10.103 open address</p> <p>Instance state</p> <p>Running</p> <p>Private IP DNS name (IPv4 only)</p> <p>ip-172-31-81-49.ec2.internal</p> <p>Elastic IP addresses</p> <p>–</p> <p>IAM Role</p> <p>–</p>	<p>Private IPv4 addresses</p> <p>172.31.81.49</p> <p>Public IPv4 DNS</p> <p>ec2-3-93-10-103.compute-1.amazonaws.com open address</p> <p>Answer private resource DNS name</p> <p>IPv4 (A)</p> <p>VPC ID</p> <p>vpc-09c1361ccd87270db</p> <p>Subnet ID</p> <p>subnet-0c5a535666447a8f0</p>
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C. To create an IAM user

1. Navigate to the IAM user dashboard.
2. Click on users on the left panel.
3. Click Add users.
4. We have given the username as “swe645hw3”.
5. And under AWS access type, select Access Key- Programmatic access.
6. Then click Next:Permissions.
7. Then click on Attach existing policies directly and click next
8. Then review configuration and click create User.
9. Click on Download .csv and download the Access Key and Secret Key required for cluster configuration.

D. Setting up Rancher to create Kubernetes Cluster

1. Connect to your EC2 machine using the Public IPv4 DNS and Private Key file using the command: `ssh -i .pem ubuntu@<publicIPv4DNS>`
2. Run command after login: `sudo apt-get update`.
3. Install docker using `sudo apt install docker.io`
4. Verify docker using `sudo docker -v`
5. Start rancher using command: `sudo docker run --privileged=true -d -- restart=unless-stopped -p 80:80 -p 443:443 rancher/rancher`.
6. Verify rancher container is running using command `sudo docker ps -a`.
7. Copy the AMES ID and save it for later.

8. And go to your instance and click Public IPv4DNS.
9. After starting up rancher. It will take a couple of minutes for UI to come up.
10. To run Use command `sudo docker logs <container Id>`. Container Id is the AMES ID which we saved earlier.
11. Once the UI is up it will show a command for getting password `sudo docker logs<container Id> 2>&1 | grep "Bootstrap Password:"`.
12. Run the command as sudo user as we have installed docker as sudo user and it should output the password.
13. Paste the password in the UI and then click: Set the specific password to use. Save and generate the new password as you desire.
14. Click continue.
15. Navigate to cluster management on the left panel.
16. Click on Cloud Credentials and Click Create.
17. Give your Access Key and Secret Key from the earlier saved file.
18. Then select your "Amazon" as cloud provider.
19. Enter Name, Access Key, Secret key and select region as us-east-1.
20. Click create.
21. You should now see your credentials on the Cloud Credential Dashboard.
22. Then we will now navigate to Cluster Management and click on create cluster
23. Select Amazon EC2 and click next.

Cluster Management

Clusters 3

Cloud Credentials

Drivers

Pod Security Policies

RKE1 Configuration

Advanced

Add Cluster - Amazon EC2

Cluster Name * Add a Description

e.g. sandbox

Name Prefix	Count	Template	Auto Replace	Drain Before Delete	etcd	Control Plane	Worker	Taints
	1	swe645template	minutes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Number of nodes required: 1, 3, or 5 1 or more 1 or more

[+ Add Node Pool](#)

Member Roles
Control who has access to the cluster and what permission they have to change it.

Labels & Annotations
Configure labels and annotations for the cluster. None

24. Then give cluster name and create node template with previous cloud credentials created.
25. Click create and don't change the VPC or security group.
26. In "IAM Profile Name" given AWS role name created.
27. To create IAM role:
28. Login to AWS console using created user.
29. Click Create Role
30. Select EC2.
31. Click on 'Generate Policy'
32. Give a policy name and paste the following in the JSON,

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "*",
      "Resource": "*"
    }
  ]
}

```

33. Complete creating Policy and Role.

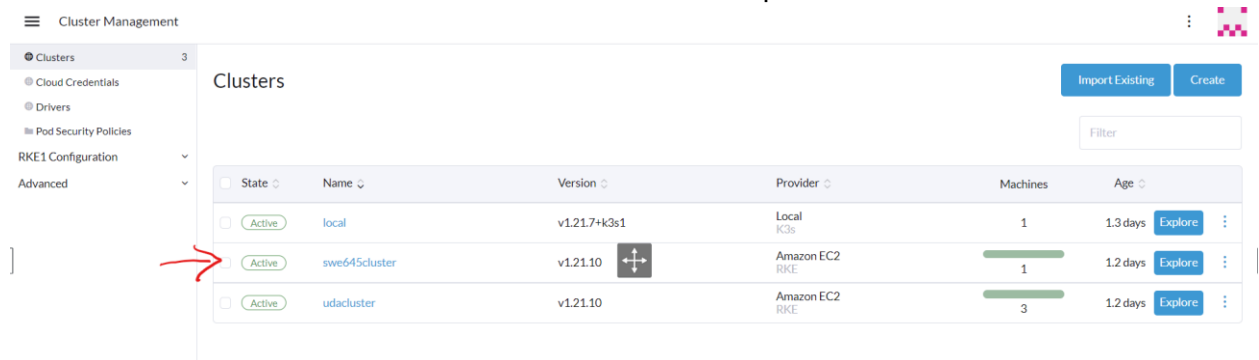
34. We created "swe645Role" role

35. We gave "swe645Role" as "IAM Instance Profile Name"

36. Then given name to template and click on create.

37. Given Name Prefix for cluster and selected etcd, Control Plane, Worker checkbox and click on create button.

38. In some time the cluster will be in an active state from the provision state.

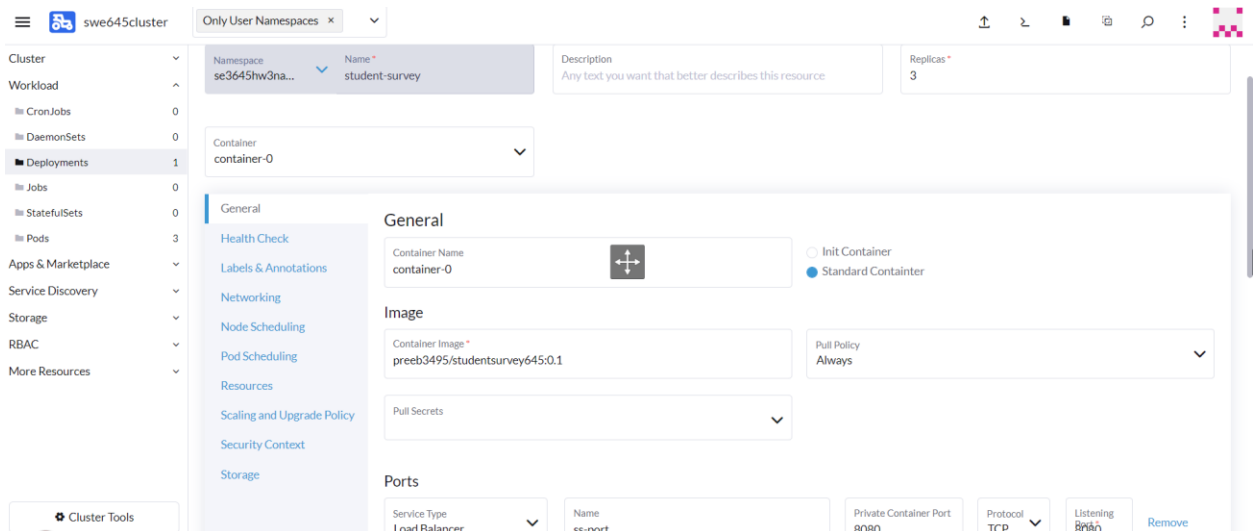


The screenshot shows the 'Cluster Management' interface. On the left, a sidebar lists navigation options: Clusters (3), Cloud Credentials, Drivers, Pod Security Policies, RKE1 Configuration, and Advanced. The main panel, titled 'Clusters', contains a table with columns: State, Name, Version, Provider, Machines, and Age. There are also buttons for 'Import Existing' and 'Create', and a 'Filter' input field.

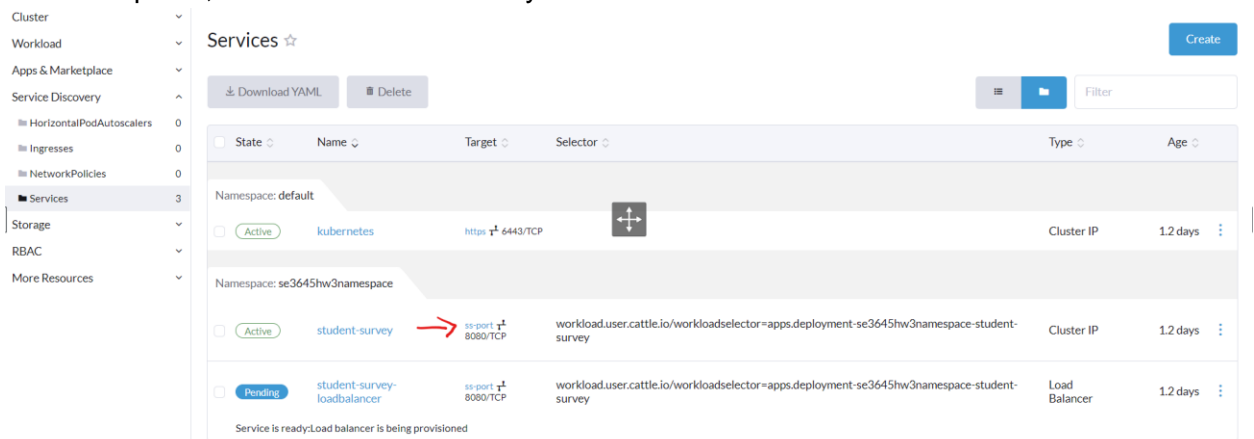
State	Name	Version	Provider	Machines	Age	
Active	local	v1.21.7+k3s1	Local K3s	1	1.3 days	Explore
Active	swe645cluster	v1.21.10	Amazon EC2 RKE	1	1.2 days	Explore
Active	udacluster	v1.21.10	Amazon EC2 RKE	3	1.2 days	Explore

E. Deploying Docker Image on Cluster.

1. Once the created cluster in Active, click on created cluster on the left panel.
2. Click on Projects/Namespaces.
3. Create a Project with a unique name and in that project create a unique namespace.
4. After that expand 'Workload' on the left panel, under that we will get the "Deployment" option.
5. In deployments click on the create button.



6. Select the namespace we have created previously and give Name for deployment.
7. We selected replicas 3.
8. In container image given the Docker hub container image we pushed previously.
9. In ports added Load Balancer with name “ss-port” and Given Private container port- 8080, Protocol - tcp, Listening- 8080 as shown in above image.
10. Click on Create.
11. Once deployment is done, we will be able to see the pods on the left panel.
12. In the left panel, under Service Discovery.



13. We will be able to see our deployment with Active status. Click on the ss-port hyperlink. It will open a page with an 404 error.
14. Add /Survey_Form (War file name) to the URL .
15. We were able to see our Student Survey Form once we added “/Survey_Form” to end of the URL (hyperlink of ss-port).
16. Initial URL:: <https://ec2-3-93-10-103.compute-1.amazonaws.com/k8s/clusters/c-rrmcq/api/v1/namespaces/se3645hw3namespace/services/http:student-survey:8080/proxy>
17. Edited URL:
https://ec2-3-93-10-103.compute-1.amazonaws.com/k8s/clusters/c-rrmcq/api/v1/namespaces/se3645hw3namespace/services/http:student-survey:8080/proxy/Survey_Form/

We were able to access the docker image Student Form from the rancher deployment :

The screenshot shows a web browser window with multiple tabs. The active tab is titled "Student Survey Form using..." and shows a "Redirecting..." page. The address bar displays a URL from Amazon AWS. The main content area shows a video of students in green and yellow shirts. A white "Student Survey Form" is overlaid on the video. The form has the following sections:

- Name ***
 - Enter your first name
 - Enter your last name
- Address ***
 - Enter your street address
 - Enter your city
 - Enter your state
 - Enter your zip
- Contact ***
 - Enter your email
 - Enter your phone number
- Enter your survey date ***
 - mm/dd/yyyy

At the bottom of the video, there is a red "Rec" button and a progress bar showing "0:36.85". Below the video, the text "What do you liked most about the campus? (Check all that apply)" is visible.