## Create IAM User

This is to have different users login with different access instead having a single root account. Follow the steps from the below link and setup the access permissions needed.
https://docs.aws.amazon.com/IAM/latest/UserGuide/id_users_create.html

## Install and Configure the AWS CLI

1. https://docs.aws.amazon.com/cli/latest/userguide/cli-chap-install.html
2. https://docs.aws.amazon.com/cli/latest/userguide/cli-chap-configure.html

## Install Docker and Minikube

Raise ticket to helpdesk and get it installed

## Create docker file

Create a new docker file if it's not created during project creation. Below is the sample docker file.

https://github.com/selvarajdpm/CloudLearning/blob/master/Dockerfile

## Build docker image

In command prompt navigate to the project folder and make sure to have the docker file also presents in the same directory.

- ➢ docker build -t *imagename:v1* .   # Build docker image
- ➢ docker images  # list the images in local
- ➢ docker run -it -p 5000:80  *imagename:v1* # Run the built docker image in http://localhost:5000/

## Create ECR Repository

- ➢ aws ecr create-repository --repository-name *reposirotyname* --image-scanning-configuration scanOnPush=true --region us-east-2

## Login to ECR

- ➢ aws ecr get-login-password --region us-east-2 | docker login --username AWS --password-stdin *287782517406.dkr.ecr.us-east-2.amazonaws.com*

  *# 287782517406 is IAM username*

## Tag docker image

Tag the docker name with aws ecr

- ➢ docker tag *imagename:v1* 287782517406.dkr.ecr.us-east-2.amazonaws.com/*imagename:v1*

## Push the image to ECR

- docker push 287782517406.dkr.ecr.us-east-2.amazonaws.com/*imagename:v1*

## Install eksctl

Eksctl can directly connect to kubernetes cluster to manage it from CLI.

https://docs.aws.amazon.com/eks/latest/userguide/getting-started-eksctl.html

## Create EKS Cluster

- eksctl create *clustername* -f cluster-creation.yaml --install-vpc-controllers

cluster-spec.yaml is available in below location

https://github.com/selvarajdpm/CloudLearning/blob/master/cluster-creation.yaml

## Deploy into EKS

Prepare yaml file with the image name available in ECR

Sample file is available in below location

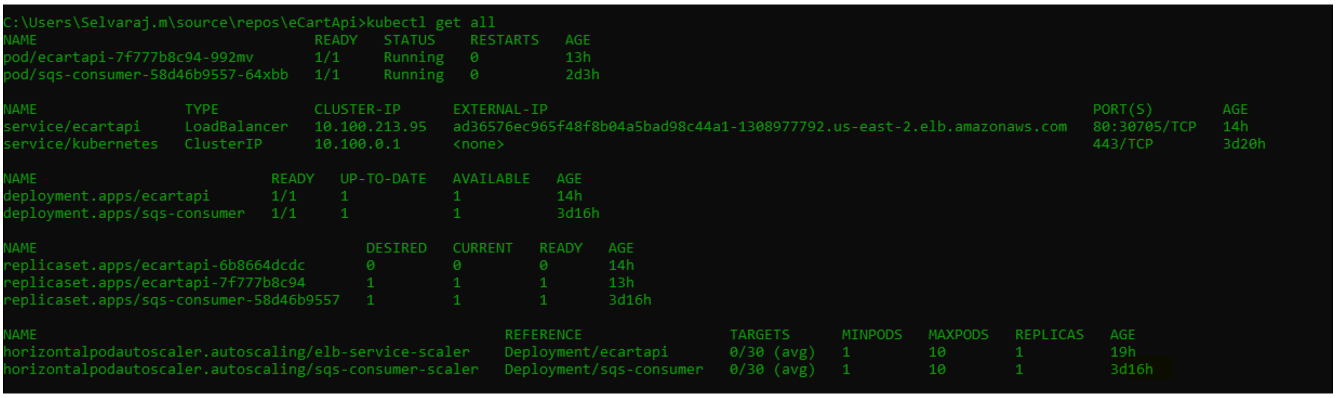
https://github.com/selvarajdpm/CloudLearning/blob/master/deploy-myMicroservice-aws.yaml

- kubectl apply -f deploy-myMicroservice-aws.yaml

## Verify if the pod is running

- kubectl get all

Get the external-ip from load balancer and browse it to see the app running



```
C:\Users\Selvaraj.m\source\repos\eCartApi>kubectl get all
NAME                                READY   STATUS    RESTARTS   AGE
pod/ecartapi-7f777b8c94-992mv       1/1     Running   0          13h
pod/sqs-consumer-58d46b9557-64xbb   1/1     Running   0          2d3h

NAME                 TYPE           CLUSTER-IP      EXTERNAL-IP                                                               PORT(S)        AGE
service/ecartapi     LoadBalancer   10.100.213.95   ad36576ec965f48f8b04a5bad98c44a1-1308977792.us-east-2.elb.amazonaws.com   80:30705/TCP   14h
service/kubernetes   ClusterIP      10.100.0.1      <none>                                                                    443/TCP        3d20h

NAME                           READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/ecartapi       1/1     1            1           14h
deployment.apps/sqs-consumer   1/1     1            1           3d16h

NAME                                      DESIRED   CURRENT   READY   AGE
replicaset.apps/ecartapi-6b8664dcdc       0         0         0       14h
replicaset.apps/ecartapi-7f777b8c94       1         1         1       13h
replicaset.apps/sqs-consumer-58d46b9557   1         1         1       3d16h

NAME                                                      REFERENCE                 TARGETS      MINPODS   MAXPODS   REPLICAS   AGE
horizontalpodautoscaler.autoscaling/elb-service-scaler    Deployment/ecartapi       0/30 (avg)   1         10        1          19h
horizontalpodautoscaler.autoscaling/sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)   1         10        1          3d16h
```

## Horizontal Pod Auto Scaling (HPA)

We have the default number of pods running once the app is deployed. If there is any huge load on app side, we may have to increase the number of pods to meet the load and this can be reduced as well when the load decreases. This is achieved through HPA.

Here, we aim to increase the number of pods if the number of requests count surges. The request count can be read from cloudwatch.

### Configure CloudWatch

https://www.youtube.com/watch?v=9BODRmzpEao

### Add CloudWatch Permission to Nodes

1. Go to cloud formation service in AWS console
2. Find the stack created for your cluster
3. Go to resources tab under the stack
4. Find the NodeInstnaceRole attached for this node
5. Navigate to IAM and add CloudWatch permission to the role

### Install CloudWatch Adapter

This enables the pods to read data from CloudWatch

- kubectl apply -f adapter.yaml

Adapter.yaml is available in below location

https://github.com/selvarajdpm/CloudLearning/blob/master/adapter.yaml

### Configure ExternalMetric

Here we mention the configuration to read the data from CloudWatch

- kubectl apply -f externalmetric-requestcount.yaml

Adapter.yaml is available in below location

https://github.com/selvarajdpm/CloudLearning/blob/master/externalmetric-requestcount.yaml

### Deploy HPA

Deploy HPA to autoscale the pods based on external metric

- kubectl apply -f hpa-requestcount.yaml

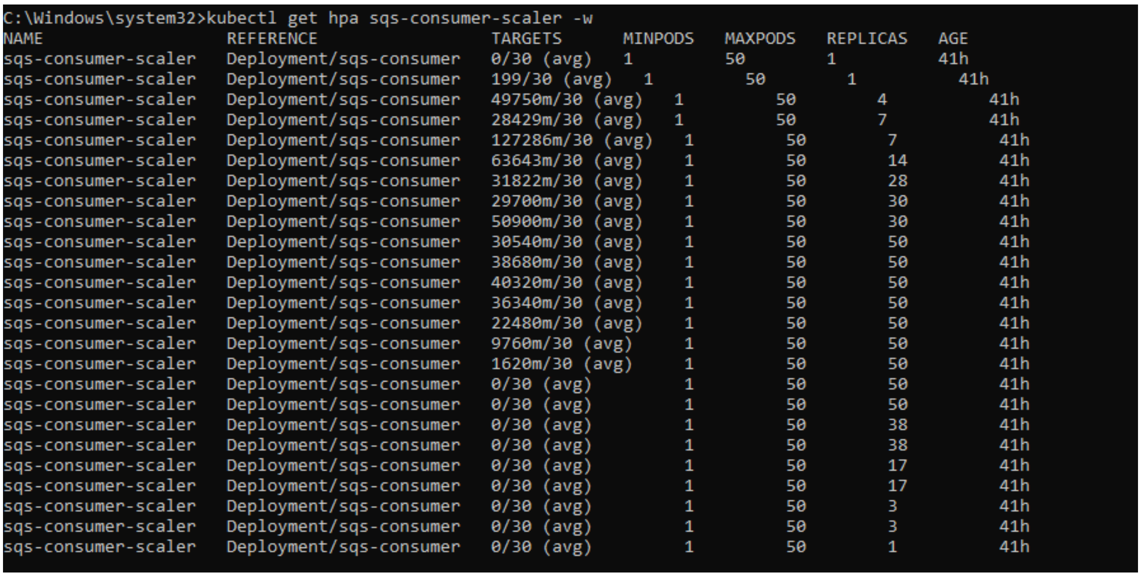
Adapter.yaml is available in below location

https://github.com/selvarajdpm/CloudLearning/blob/master/hpa-requestcount.yaml

### Verify HPA

Increase the load on the app and verify HPA

- kubectl get hpa elb-service-scaler -w



```
C:\Windows\system32>kubectl get hpa sqs-consumer-scaler -w
NAME                  REFERENCE                 TARGETS      MINPODS   MAXPODS   REPLICAS   AGE
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)   1         50        1          41h
sqs-consumer-scaler   Deployment/sqs-consumer   199/30 (avg)   1         50        1          41h
sqs-consumer-scaler   Deployment/sqs-consumer   49750m/30 (avg)   1         50        4          41h
sqs-consumer-scaler   Deployment/sqs-consumer   28429m/30 (avg)   1         50        7          41h
sqs-consumer-scaler   Deployment/sqs-consumer   127286m/30 (avg)   1         50        7          41h
sqs-consumer-scaler   Deployment/sqs-consumer   63643m/30 (avg)    1         50        14         41h
sqs-consumer-scaler   Deployment/sqs-consumer   31822m/30 (avg)    1         50        28         41h
sqs-consumer-scaler   Deployment/sqs-consumer   29700m/30 (avg)    1         50        30         41h
sqs-consumer-scaler   Deployment/sqs-consumer   50900m/30 (avg)    1         50        30         41h
sqs-consumer-scaler   Deployment/sqs-consumer   30540m/30 (avg)    1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   38680m/30 (avg)    1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   40320m/30 (avg)    1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   36340m/30 (avg)    1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   22480m/30 (avg)    1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   9760m/30 (avg)     1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   1620m/30 (avg)     1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        50         41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        38         41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        38         41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        17         41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        17         41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        3          41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        3          41h
sqs-consumer-scaler   Deployment/sqs-consumer   0/30 (avg)         1         50        1          41h
```

## Cluster Auto Scaler

https://docs.aws.amazon.com/eks/latest/userguide/cluster-autoscaler.html