DevOps

Deploying Super Mario on Kubernetes

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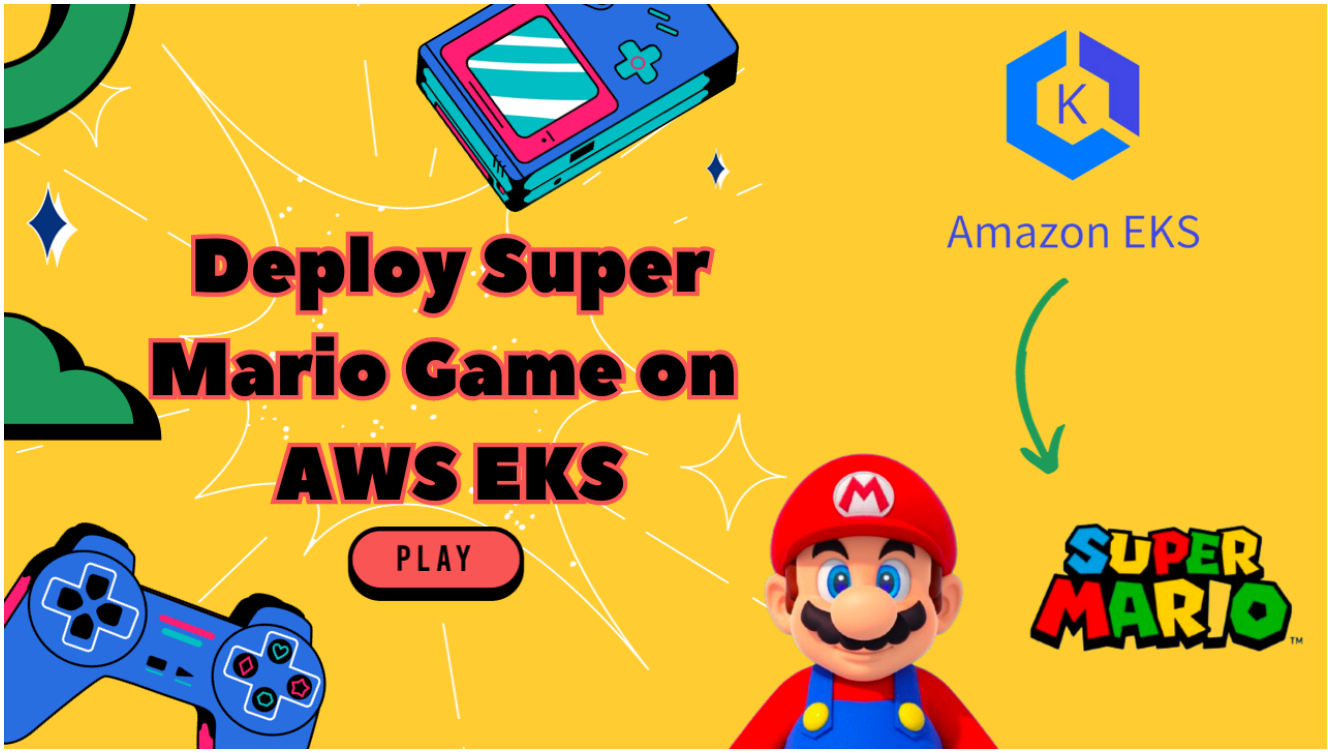


Hey folks, remember the thrill of 90's gaming? Let's step back in time and relive those exciting moments! With the game deployed on Kubernetes, it's time to dive into the nostalgic world of Mario. Grab your controllers, it's game time!

Super Mario is a classic game loved by many. In this guide, we'll explore how to deploy a Super Mario game on Amazon's Elastic Kubernetes Service (EKS). Utilizing

Kubernetes, we can orchestrate the game's deployment on AWS EKS, allowing for scalability, reliability, and easy management.

Contents [hide]

Prerequisites:

1. An Ubuntu Instance
2. IAM role
3. Terraform should be installed on instance
4. AWS CLI and KUBECTL on Instance

LET'S DEPLOY

STEP 1: Launch Ubuntu instance

1. **Sign in to AWS Console:** Log in to your AWS Management Console.
2. **Navigate to EC2 Dashboard:** Go to the EC2 Dashboard by selecting "Services" in the top menu and then choosing "EC2" under the Compute section.
3. **Launch Instance:** Click on the "Launch Instance" button to start the instance creation process.
4. **Choose an Amazon Machine Image (AMI):** Select an appropriate AMI for your instance. For example, you can choose Ubuntu image.
5. **Choose an Instance Type:** In the "Choose Instance Type" step, select `t2.micro` as your instance type. Proceed by clicking "Next: Configure Instance Details."
6. **Configure Instance Details:**

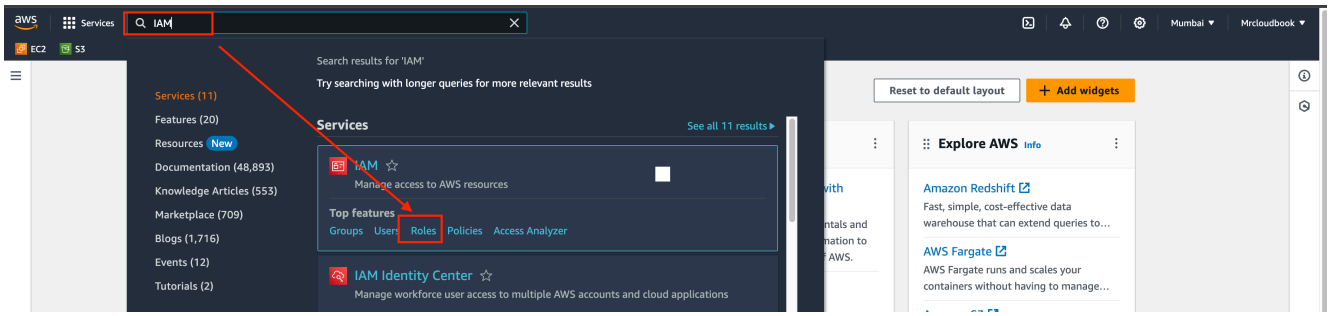
- For “Number of Instances,” set it to 1 (unless you need multiple instances).
- Configure additional settings like network, subnets, IAM role, etc., if necessary.
- For “Storage,” click “Add New Volume” and set the size to 8GB (or modify the existing storage to 8GB).
- Click “Next: Add Tags” when you’re done.

7. **Add Tags (Optional):** Add any desired tags to your instance. This step is optional, but it helps in organizing instances.
8. **Configure Security Group:**
   - Choose an existing security group or create a new one.
   - Ensure the security group has the necessary inbound/outbound rules to allow access as required.
9. **Review and Launch:** Review the configuration details. Ensure everything is set as desired.
10. **Select Key Pair:**
    - Select “Choose an existing key pair” and choose the key pair from the dropdown.
    - Acknowledge that you have access to the selected private key file.
    - Click “Launch Instances” to create the instance.
11. **Access the EC2 Instance:** Once the instance is launched, you can access it using the key pair and the instance’s public IP or DNS.

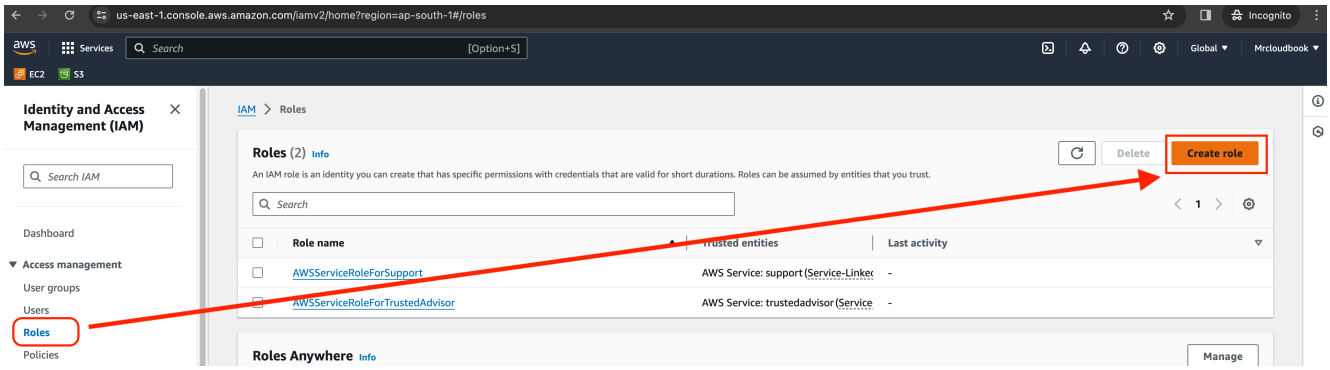
Ensure you have necessary permissions and follow best practices while configuring security groups and key pairs to maintain security for your EC2 instance.

STEP 2: Create IAM role

Search for IAM in the search bar of AWS and click on roles.

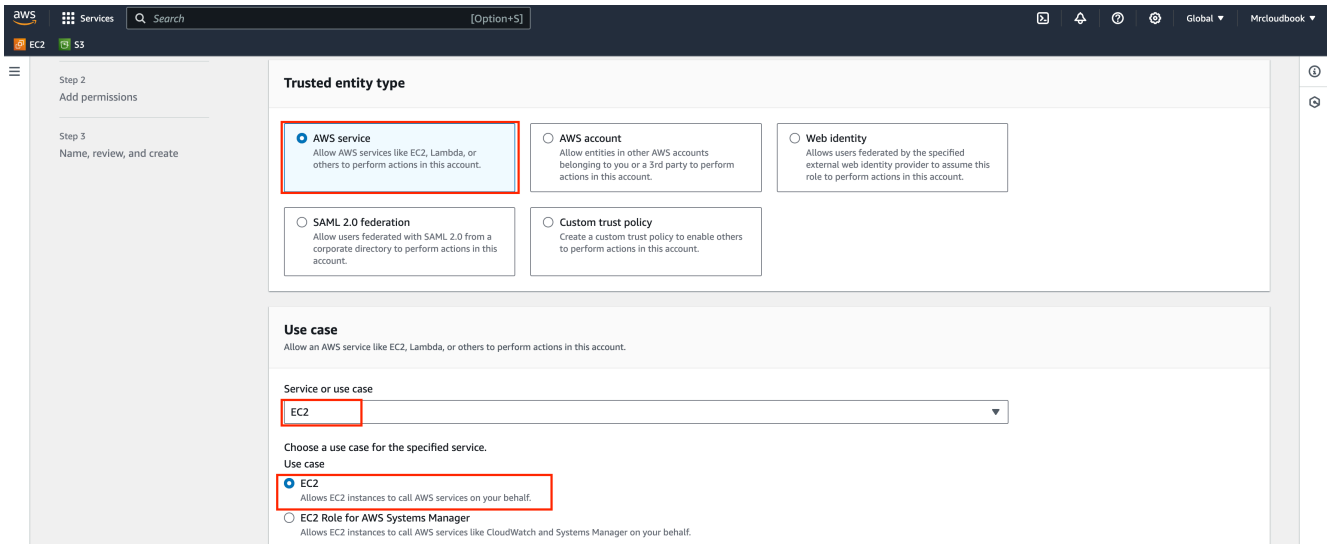


Click on Create Role

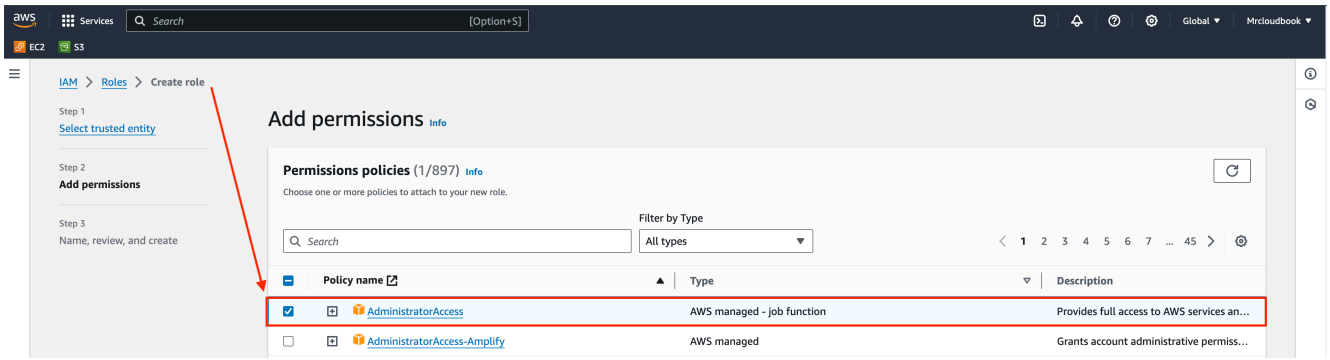


Select entity type as AWS service

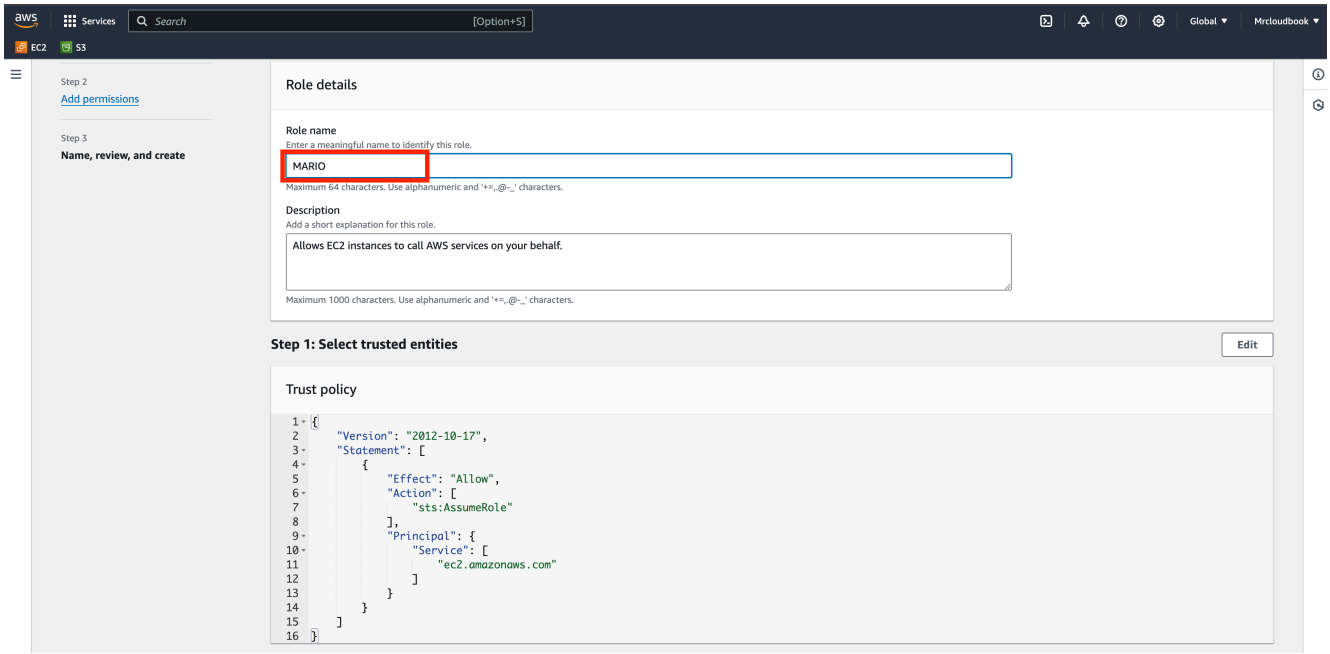
Use case as EC2 and click on Next.



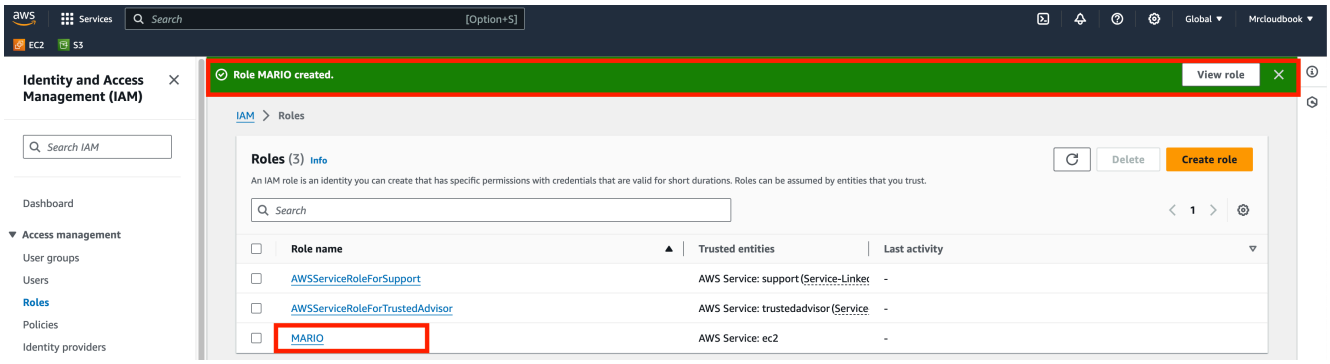
For permission policy select Administrator Access (Just for learning purpose), click Next.



Provide a Name for Role and click on Create role.



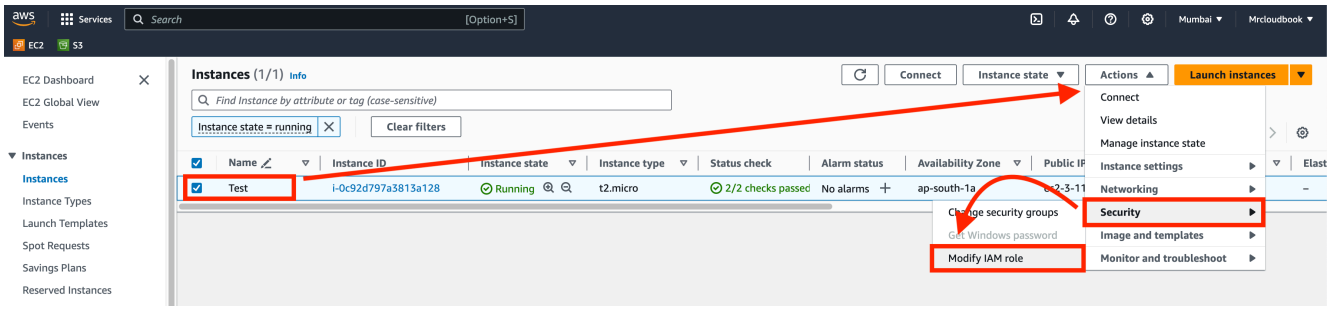
Role is created.



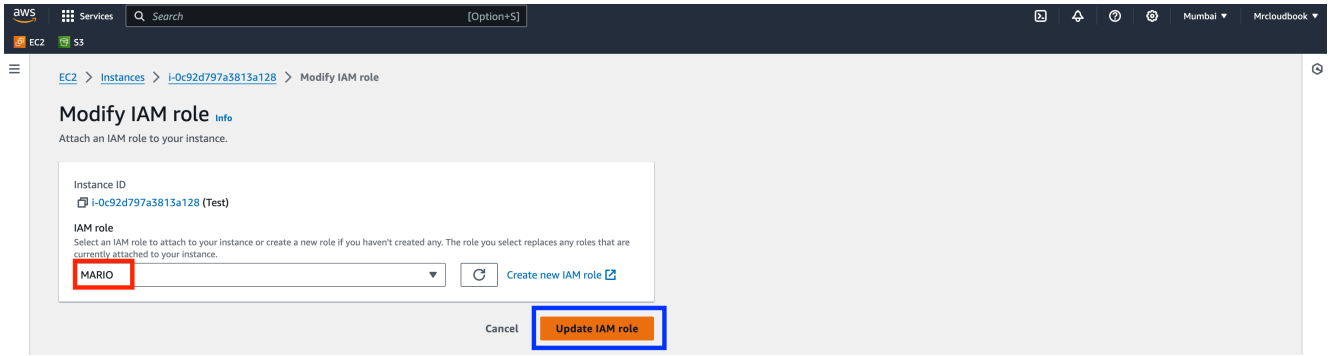
Now Attach this role to Ec2 instance that we created earlier, so we can provision cluster from that instance.

Go to EC2 Dashboard and select the instance.

Click on Actions –> Security –> Modify IAM role.



Select the Role that created earlier and click on Update IAM role.

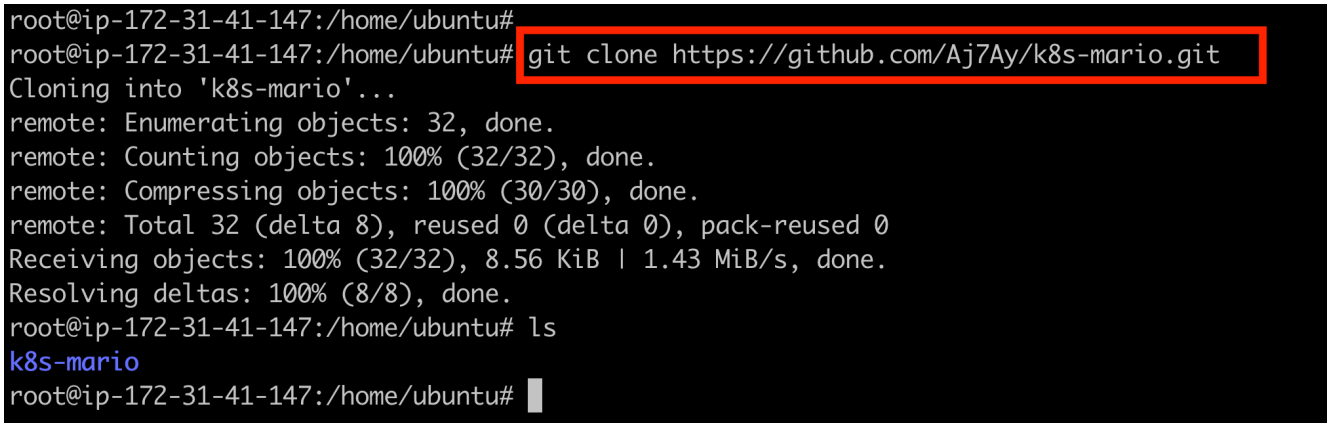


Connect the instance to Mobaxtreme or Putty

STEP 3: Cluster provision

Now clone this Repo.

```
git clone https://github.com/Aj7Ay/k8s-mario.git
```



change directory

```
cd k8s-mario
```

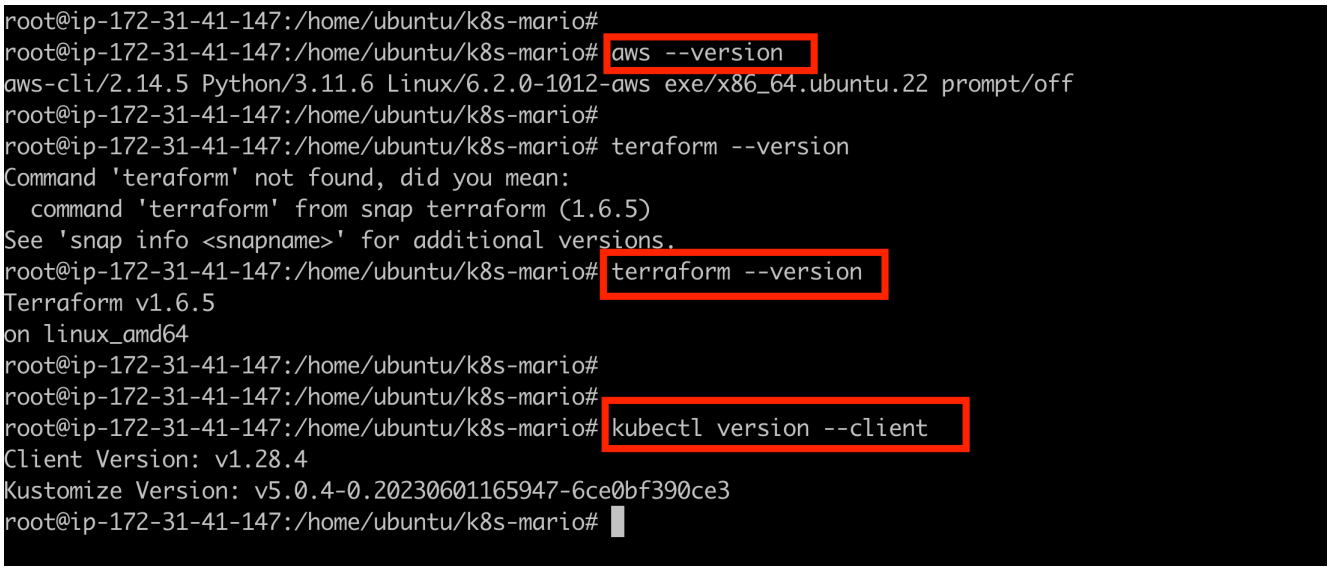
Provide the executable permission to script.sh file, and run it.

```
sudo chmod +x script.sh
./script.sh
```

This script will install `Terraform, AWS cli, Kubectl, Docker.`

Check versions

```
docker --version
aws --version
kubectl version --client
terraform --version
```



Now change directory into the EKS-TF

Run Terraform init

NOTE: Don’t forgot to change the s3 bucket name in the backend.tf file

```
cd EKS-TF
terraform init
```

```
root@ip-172-31-41-147:/home/ubuntu/k8s-mario#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario# ls
EKS-TF  aws  awscliv2.zip  deployment.yaml  kubectl  script.sh  service.yaml
root@ip-172-31-41-147:/home/ubuntu/k8s-mario# cd EKS-TF/
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF# ls
backend.tf  main.tf  provider.tf
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF# terraform init

Initializing the backend...

Successfully configured the backend "s3"! Terraform will automatically
use this backend unless the backend configuration changes.

Initializing provider plugins...
- Finding hashicorp/aws versions matching "~> 5.0"...
- Installing hashicorp/aws v5.29.0...
- Installed hashicorp/aws v5.29.0 (signed by HashiCorp)

Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
```

Now run terraform validate and terraform plan

```
terraform validate
terraform plan
```

```
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF# terraform validate
Success! The configuration is valid.

root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF# terraform plan
data.aws_iam_policy_document.assume_role: Reading...
data.aws_vpc.default: Reading...
data.aws_iam_policy_document.assume_role: Read complete after 0s [id=3552664922]
data.aws_vpc.default: Read complete after 0s [id=vpc-0f6bdd74ced5c07c0]
data.aws_subnets.public: Reading...
data.aws_subnets.public: Read complete after 0s [id=ap-south-1]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # aws_eks_cluster.example will be created
  + resource "aws_eks_cluster" "example" {
      + arn                   = (known after apply)
      + certificate_authority = (known after apply)
      + cluster_id            = (known after apply)
      + created_at            = (known after apply)
      + endpoint              = (known after apply)
      + id                    = (known after apply)
      + identity              = (known after apply)
      + name                  = "EKS_CLOUD"
      + platform_version      = (known after apply)
      + role_arn              = (known after apply)
      + status                = (known after apply)
      + tags_all              = (known after apply)
      + version               = (known after apply)
```

Now Run terraform apply to provision cluster.

```
terraform apply --auto-approve
```

```
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF# terraform apply --auto-approve
data.aws_vpc.default: Reading...
data.aws_iam_policy_document.assume_role: Reading...
data.aws_iam_policy_document.assume_role: Read complete after 0s [id=3552664922]
data.aws_vpc.default: Read complete after 0s [id=vpc-0f6bdd74ced5c07c0]
data.aws_subnets.public: Reading...
data.aws_subnets.public: Read complete after 0s [id=ap-south-1]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # aws_eks_cluster.example will be created
  + resource "aws_eks_cluster" "example" {
      + arn                   = (known after apply)
      + certificate_authority = (known after apply)
      + cluster_id            = (known after apply)
      + created_at            = (known after apply)
      + endpoint              = (known after apply)
      + id                    = (known after apply)
      + identity              = (known after apply)
      + name                  = "EKS_CLOUD"
      + platform_version      = (known after apply)
      + role_arn              = (known after apply)
      + status                = (known after apply)
      + tags_all              = (known after apply)
      + version               = (known after apply)
```

Completed in 10mins

```
Plan: 8 to add, 0 to change, 0 to destroy.
aws_iam_role.example1: Creating...
aws_iam_role.example: Creating...
aws_iam_role.example: Creation complete after 1s [id=eks-cluster-cloud]
aws_iam_role_policy_attachment.example-AmazonEKSClusterPolicy: Creating...
aws_iam_role.example1: Creation complete after 1s [id=eks-node-group-cloud]
aws_iam_role_policy_attachment.example-AmazonEC2ContainerRegistryReadOnly: Creating...
aws_iam_role_policy_attachment.example-AmazonEKSWorkerNodePolicy: Creating...
aws_iam_role_policy_attachment.example-AmazonEKS_CNI_Policy: Creating...
aws_iam_role_policy_attachment.example-AmazonEKSClusterPolicy: Creation complete after 1s [id=eks-cluster-cloud-20231205133150541700000001]
aws_eks_cluster.example: Creating...
aws_iam_role_policy_attachment.example-AmazonEC2ContainerRegistryReadOnly: Creation complete after 1s [id=eks-node-group-cloud-20231205133150682600000002]
aws_iam_role_policy_attachment.example-AmazonEKSWorkerNodePolicy: Creation complete after 1s [id=eks-node-group-cloud-20231205133150786300000003]
aws_iam_role_policy_attachment.example-AmazonEKS_CNI_Policy: Creation complete after 1s [id=eks-node-group-cloud-20231205133150926900000004]
aws_eks_cluster.example: Still creating... [10s elapsed]
aws_eks_cluster.example: Still creating... [20s elapsed]
aws_eks_cluster.example: Still creating... [30s elapsed]
aws_eks_cluster.example: Still creating... [40s elapsed]
aws_eks_cluster.example: Still creating... [50s elapsed]
aws_eks_cluster.example: Still creating... [1m0s elapsed]
aws_eks_cluster.example: Still creating... [1m10s elapsed]
aws_eks_cluster.example: Still creating... [1m20s elapsed]
aws_eks_cluster.example: Still creating... [1m30s elapsed]
aws_eks_cluster.example: Still creating... [1m40s elapsed]
aws_eks_cluster.example: Still creating... [1m50s elapsed]
aws_eks_cluster.example: Still creating... [2m0s elapsed]
aws_eks_cluster.example: Still creating... [2m10s elapsed]
aws_eks_cluster.example: Still creating... [2m20s elapsed]
aws_eks_cluster.example: Still creating... [2m30s elapsed]
aws_eks_cluster.example: Still creating... [2m40s elapsed]
aws_eks_cluster.example: Still creating... [2m50s elapsed]
aws_eks_cluster.example: Still creating... [3m0s elapsed]
aws_eks_cluster.example: Still creating... [3m10s elapsed]
aws_eks_cluster.example: Still creating... [3m20s elapsed]
aws_eks_cluster.example: Still creating... [3m30s elapsed]
aws_eks_cluster.example: Still creating... [3m40s elapsed]
aws_eks_cluster.example: Still creating... [3m50s elapsed]
aws_eks_cluster.example: Still creating... [4m0s elapsed]
aws_eks_cluster.example: Still creating... [4m10s elapsed]
aws_eks_cluster.example: Still creating... [4m20s elapsed]
aws_eks_cluster.example: Still creating... [4m30s elapsed]
aws_eks_cluster.example: Still creating... [4m40s elapsed]
aws_eks_cluster.example: Still creating... [4m50s elapsed]
aws_eks_cluster.example: Still creating... [5m0s elapsed]
aws_eks_cluster.example: Still creating... [5m10s elapsed]
aws_eks_cluster.example: Still creating... [5m20s elapsed]
aws_eks_cluster.example: Still creating... [5m30s elapsed]
aws_eks_cluster.example: Still creating... [5m40s elapsed]
aws_eks_cluster.example: Still creating... [5m50s elapsed]
aws_eks_cluster.example: Still creating... [6m0s elapsed]
aws_eks_cluster.example: Creation complete after 6m10s [id=EKS_CLOUD]
aws_eks_node_group.example: Creating...
aws_eks_node_group.example: Still creating... [10s elapsed]
aws_eks_node_group.example: Still creating... [20s elapsed]
aws_eks_node_group.example: Still creating... [30s elapsed]
aws_eks_node_group.example: Still creating... [40s elapsed]
aws_eks_node_group.example: Still creating... [50s elapsed]
aws_eks_node_group.example: Still creating... [1m0s elapsed]
aws_eks_node_group.example: Still creating... [1m10s elapsed]
aws_eks_node_group.example: Still creating... [1m20s elapsed]
aws_eks_node_group.example: Still creating... [1m30s elapsed]
aws_eks_node_group.example: Still creating... [1m40s elapsed]
aws_eks_node_group.example: Still creating... [1m50s elapsed]
aws_eks_node_group.example: Still creating... [2m0s elapsed]
aws_eks_node_group.example: Still creating... [2m10s elapsed]
aws_eks_node_group.example: Creation complete after 2m18s [id=EKS_CLOUD:Node-cloud]

Apply complete! Resources: 8 added, 0 changed, 0 destroyed.
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
```

Update the Kubernetes configuration

Make sure change your desired region

```
aws eks update-kubeconfig --name EKS_CLOUD --region ap-south-1
```

```
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF# aws eks update-kubeconfig --name EKS_CLOUD --region ap-south-1
Added new context arn:aws:eks:ap-south-1:672618677785:cluster/EKS_CLOUD to /root/.kube/config
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
```

Now change directory back to k8s-mario

```
cd ..
```

Let's apply the deployment and service

Deployment

```
kubectl apply -f deployment.yaml
#to check the deployment
kubectl get all
```

```
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF# cd ..
root@ip-172-31-41-147:/home/ubuntu/k8s-mario#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario# ls -l
total 107168
drwxr-xr-x 3 root root       4096 Dec  5 13:30 EKS-TF
drwxr-xr-x 3 root docker     4096 Nov 30 22:22 aws
-rw-r--r-- 1 root docker 59832742 Dec  5 13:28 awscliv2.zip
-rw-r--r-- 1 root root        387 Dec  5 13:26 deployment.yaml
-rw-r--r-- 1 root docker 49885184 Dec  5 13:28 kubectl
-rwxr-xr-x 1 root root        933 Dec  5 13:28 script.sh
-rw-r--r-- 1 root root        180 Dec  5 13:26 service.yaml
root@ip-172-31-41-147:/home/ubuntu/k8s-mario#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario# kubectl apply -f deployment.yaml
deployment.apps/mario-deployment created
root@ip-172-31-41-147:/home/ubuntu/k8s-mario# kubectl get all
NAME                                 READY   STATUS    RESTARTS   AGE
pod/mario-deployment-78cbc65cb-9n547   1/1     Running   0          11s
pod/mario-deployment-78cbc65cb-stxkr   1/1     Running   0          11s

NAME                 TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)   AGE
service/kubernetes   ClusterIP   10.100.0.1   <none>        443/TCP   7m6s

NAME                               READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/mario-deployment   2/2     2            2           11s

NAME                                          DESIRED   CURRENT   READY   AGE
replicaset.apps/mario-deployment-78cbc65cb    2         2         2       11s
root@ip-172-31-41-147:/home/ubuntu/k8s-mario#
```

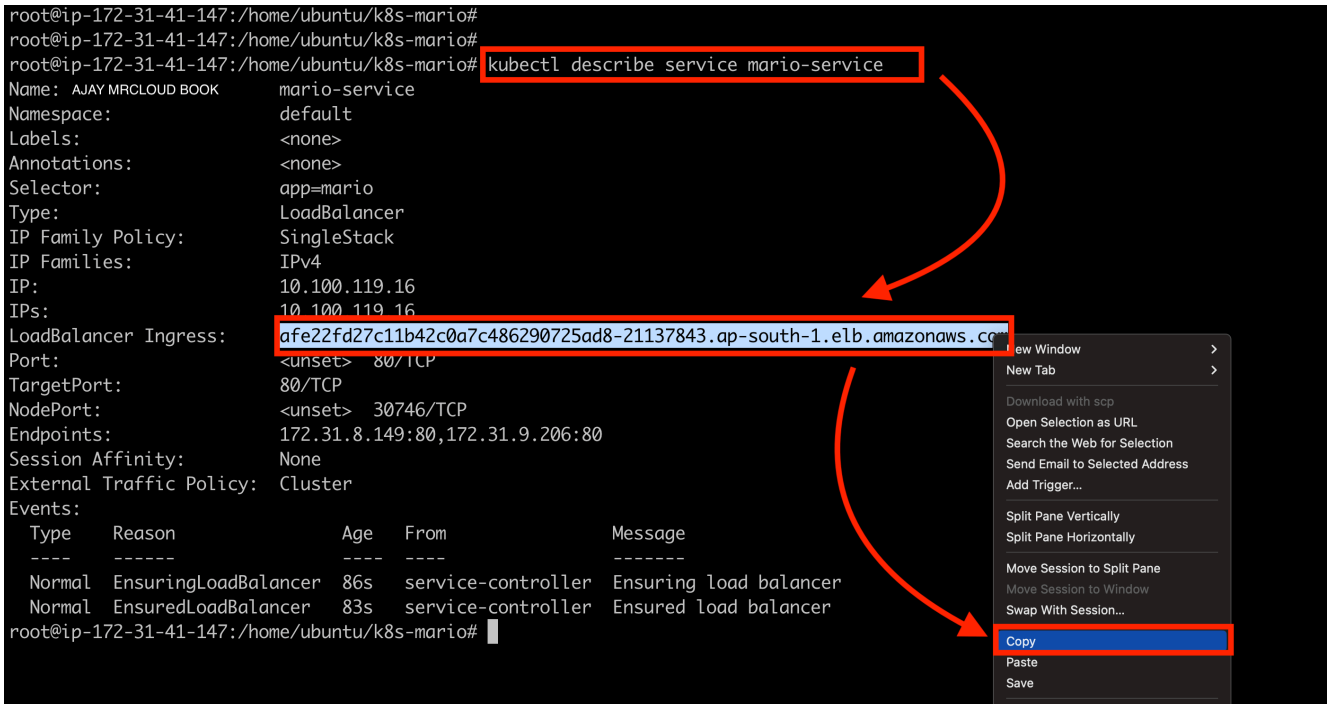
Now let's apply the service

Service

```
kubectl apply -f service.yaml
kubectl get all
```

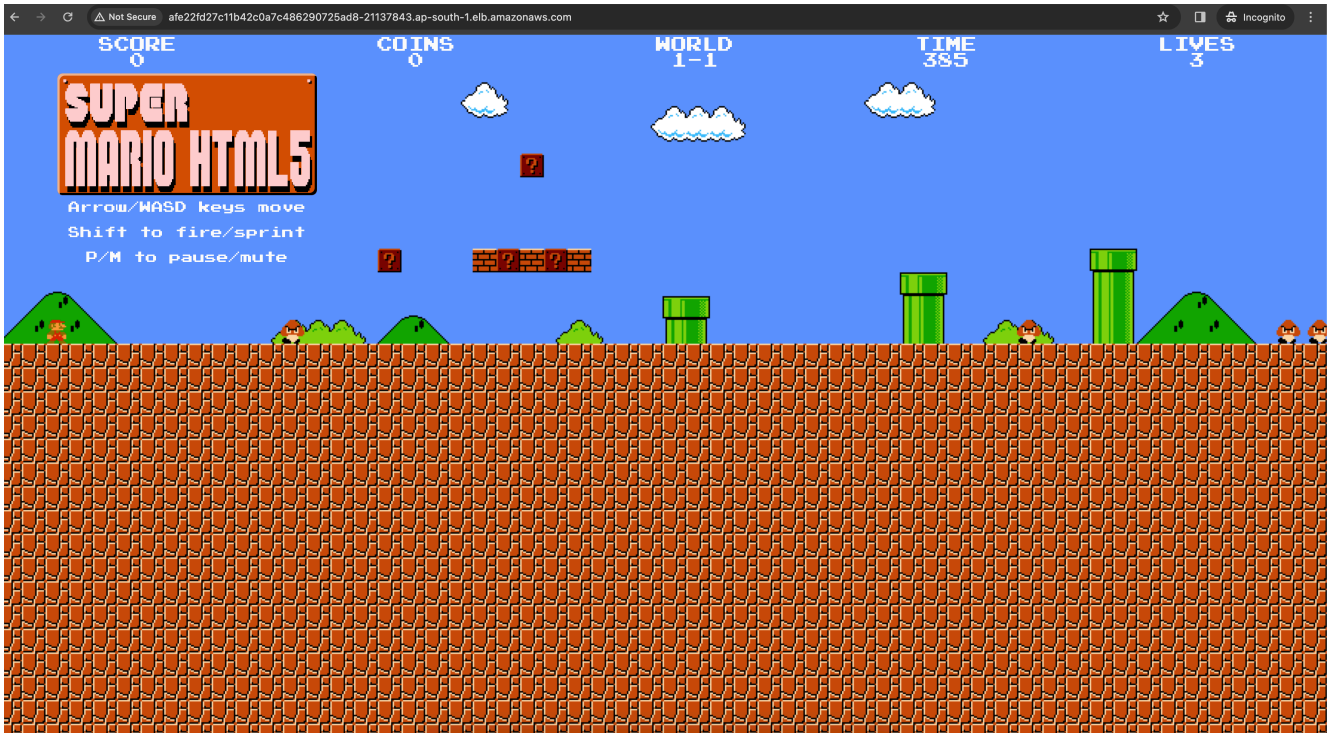
Now let's describe the service and copy the LoadBalancer Ingress

```
kubectl describe service mario-service
```



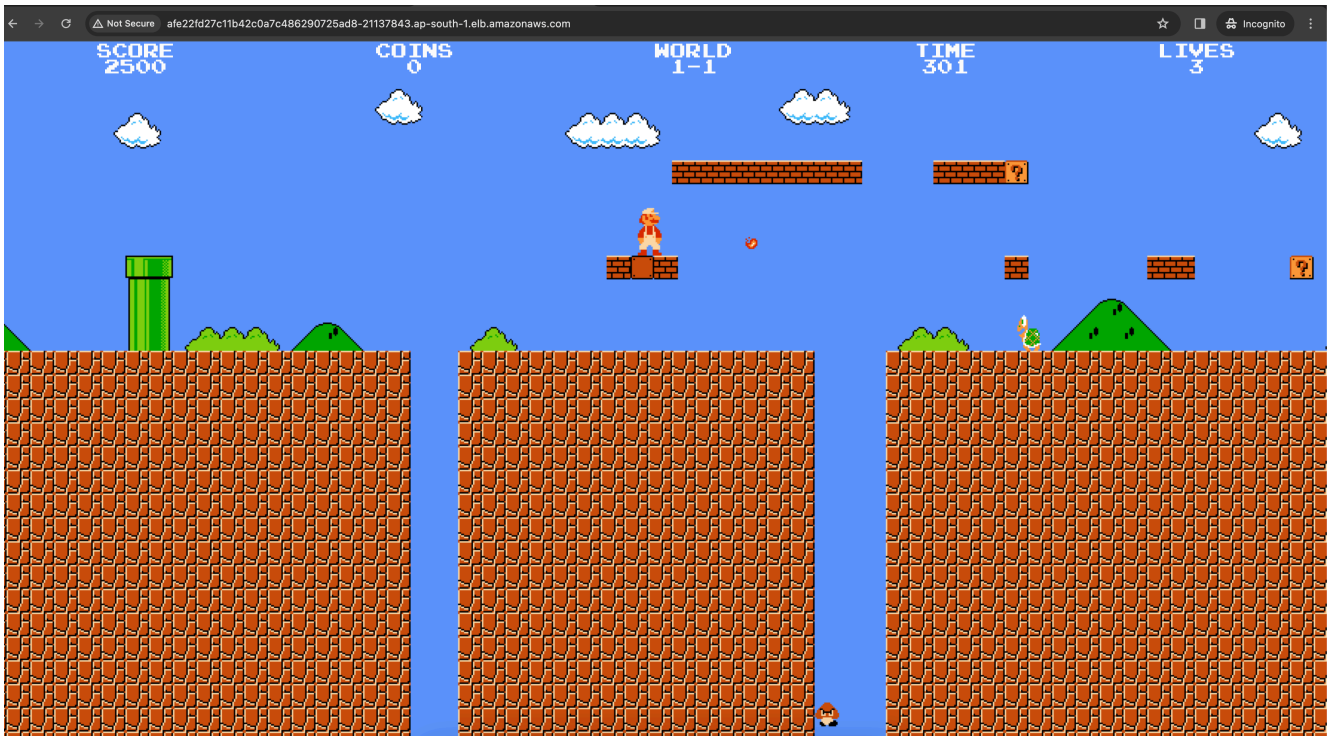
Paste the ingress link in a browser and you will see the Mario game.

Let's Go back to 1985 and play the game like children.



This is official image by `MR CLOUD BOOK`

You can check in Docker-hub as well `sevenajay/mario:latest`



Destruction :

Let's remove the service and deployment first

```
kubectl get all
kubectl delete service mario-service
kubectl delete deployment mario-deployment
```

Let's Destroy the cluster

```
terraform destroy --auto-approve
```

```
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF# terraform destroy --auto-approve
data.aws_iam_policy_document.assume_role: Reading...
aws_iam_role.example1: Refreshing state... [id=eks-node-group-cloud]
data.aws_vpc.default: Reading...
data.aws_iam_policy_document.assume_role: Read complete after 0s [id=3552664922]
aws_iam_role.example: Refreshing state... [id=eks-cluster-cloud]
data.aws_vpc.default: Read complete after 0s [id=vpc-0f6bdd74ced5c07c0]
data.aws_subnets.public: Reading...
data.aws_subnets.public: Read complete after 0s [id=ap-south-1]
aws_iam_role_policy_attachment.example-AmazonEKS_CNI_Policy: Refreshing state... [id=eks-node-group-cloud-20231205133150926900000004]
aws_iam_role_policy_attachment.example-AmazonEKSWorkerNodePolicy: Refreshing state... [id=eks-node-group-cloud-20231205133150786300000003]
aws_iam_role_policy_attachment.example-AmazonEC2ContainerRegistryReadOnly: Refreshing state... [id=eks-node-group-cloud-20231205133150682600000002]
aws_iam_role_policy_attachment.example-AmazonEKSClusterPolicy: Refreshing state... [id=eks-cluster-cloud-20231205133150541700000001]
aws_eks_cluster.example: Refreshing state... [id=EKS_CLOUD]
aws_eks_node_group.example: Refreshing state... [id=EKS_CLOUD:Node-cloud]
```

After 10mins Resources that are provisioned will be removed.

```
aws_eks_node_group.example: Destruction complete after 9m22s
aws_iam_role_policy_attachment.example-AmazonEKS_CNI_Policy: Destroying... [id=eks-node-group-cloud-20231205133150926900000004]
aws_iam_role_policy_attachment.example-AmazonEKSWorkerNodePolicy: Destroying... [id=eks-node-group-cloud-20231205133150786300000003]
aws_iam_role_policy_attachment.example-AmazonEC2ContainerRegistryReadOnly: Destroying... [id=eks-node-group-cloud-20231205133150682600000002]
aws_eks_cluster.example: Destroying... [id=EKS_CLOUD]
aws_iam_role_policy_attachment.example-AmazonEC2ContainerRegistryReadOnly: Destruction complete after 0s
aws_iam_role_policy_attachment.example-AmazonEKSWorkerNodePolicy: Destruction complete after 0s
aws_iam_role_policy_attachment.example-AmazonEKS_CNI_Policy: Destruction complete after 0s
aws_iam_role.example1: Destroying... [id=eks-node-group-cloud]
aws_iam_role.example1: Destruction complete after 1s AJAY MR CLOUD BOOK
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 10s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 20s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 30s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 40s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 50s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 1m0s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 1m10s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 1m20s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 1m30s elapsed]
aws_eks_cluster.example: Still destroying... [id=EKS_CLOUD, 1m40s elapsed]
aws_eks_cluster.example: Destruction complete after 1m42s
aws_iam_role_policy_attachment.example-AmazonEKSClusterPolicy: Destroying... [id=eks-cluster-cloud-20231205133150541700000001]
aws_iam_role_policy_attachment.example-AmazonEKSClusterPolicy: Destruction complete after 1s
aws_iam_role.example: Destroying... [id=eks-cluster-cloud]
aws_iam_role.example: Destruction complete after 0s

Destroy complete! Resources: 8 destroyed.
root@ip-172-31-41-147:/home/ubuntu/k8s-mario/EKS-TF#
```

Thank you for joining this nostalgic journey to the 90s! We hope you enjoyed rekindling your love for gaming with the deployment of the iconic Mario game on Kubernetes. Embracing the past while exploring new technologies is a true testament to the timeless allure of classic games. Until next time, keep gaming and reliving those fantastic memories! 👾 🎮 .

Ajay Kumar Yegireddi is a DevSecOps Engineer and System Administrator, with a passion for sharing real-world DevSecOps projects and tasks. **Mr. Cloud Book**, provides hands-on tutorials and practical insights to help others master DevSecOps tools and workflows. Content is designed to bridge the gap between development, security, and operations, making complex concepts easy to understand for both beginners and professionals.

Comments

8 responses to “Deploying Super Mario on Kubernetes”

harun
11 January 2024

if you want to apply terraform destroy comman. you must run it in the EKS_TF folder.

good project thank you..

Reply

isaac Ambi
13 January 2024

I am so excited that I found the channel, every single detail is explained very much

Reply

mrcloudbook.com
14 January 2024

glad it helped

Reply

DP
1 February 2024

Hello Mr cloud book

Content and projects are really helpful. Can we also have E2E implementation projects on Azure cloud using azure portal services and Azure DevOps

Thanks,
DP

Reply

Ajay
6 February 2024

Hi,

It was a great guide to get EKS deployed in AWS. We were able to see the Mario game running by hitting the loadbalancer ingress.

However when we see the EKS cluster in AWS Console there are no deployments and services seen in there.

Thanks,
Ajay V

Reply

david prabhakar
22 March 2024

hi bro just now i completed this simple project thanks a lot and i am facing some issues while setup k8s i gone through many tutorials if possible can you help me . this is my insta id “davidprabhakar67”

thank you.

Reply

mehul
5 May 2024

IS IT OK TO POST THIS PROJECT ON LINKEDIN IN UK? I MEAN COMPLIANCE WITH REGION?

Reply

mrcloudbook.com
8 May 2024

Sure you can post

Reply

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