SUPER MARIO GAME DEPLOYMENT

(AWS DEVOPS PROJECT)

Prerequisite →

1. We will use AWS account .
2. Then we configure Terraform inside an ec2 instance
3. we also need an IAM ec2 role that provide necessary permission to ec2

Completion steps →

Step 1 → Login and basics setup

Step 2 → Setup Docker ,Terraform ,aws cli , and Kubectl

Step 3 → IAM Role for EC2

Step 4 →Attach IAM role with your EC2

Step 5 → Building Infrastructure Using terraform

Step 6 → Creation of deployment and service for EKS

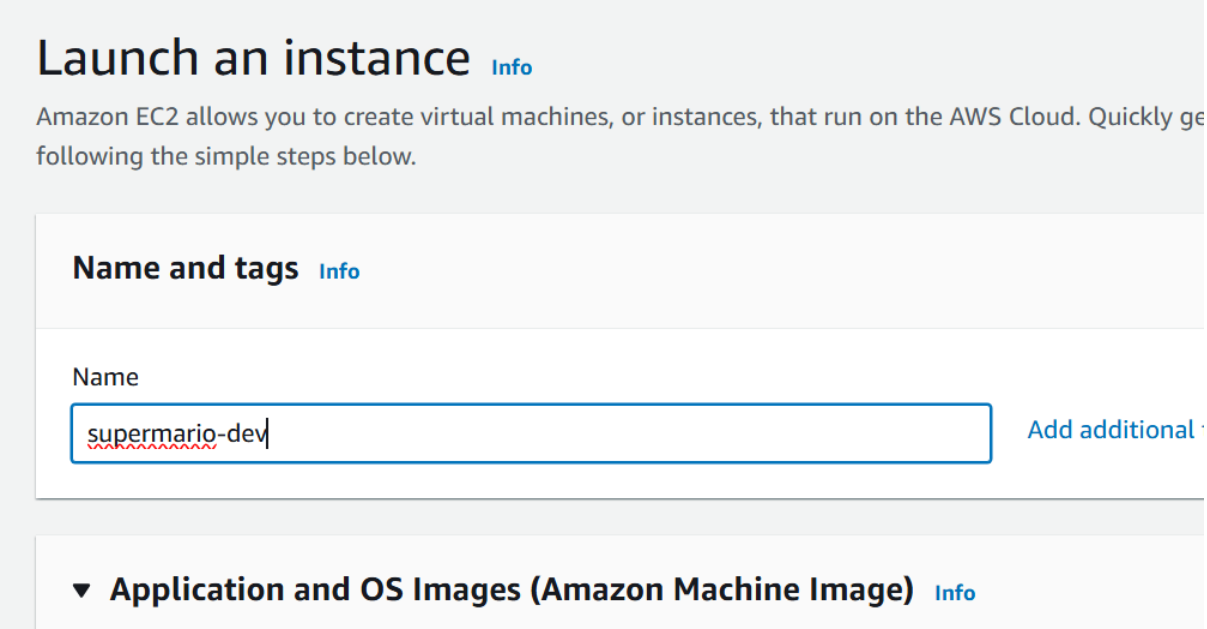
Step 7 → Destroy all the Insrastructure

Steps:

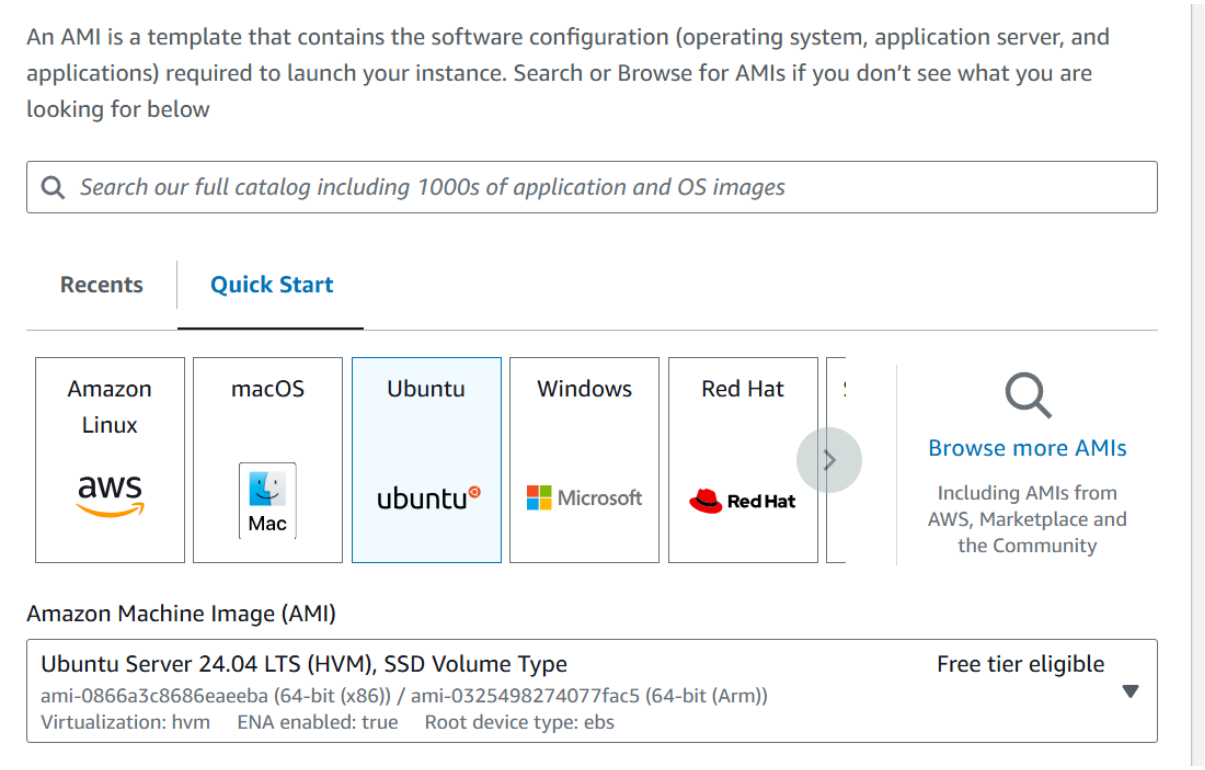
Step 1 : First we will Launch EC2 machine

Go to aws account

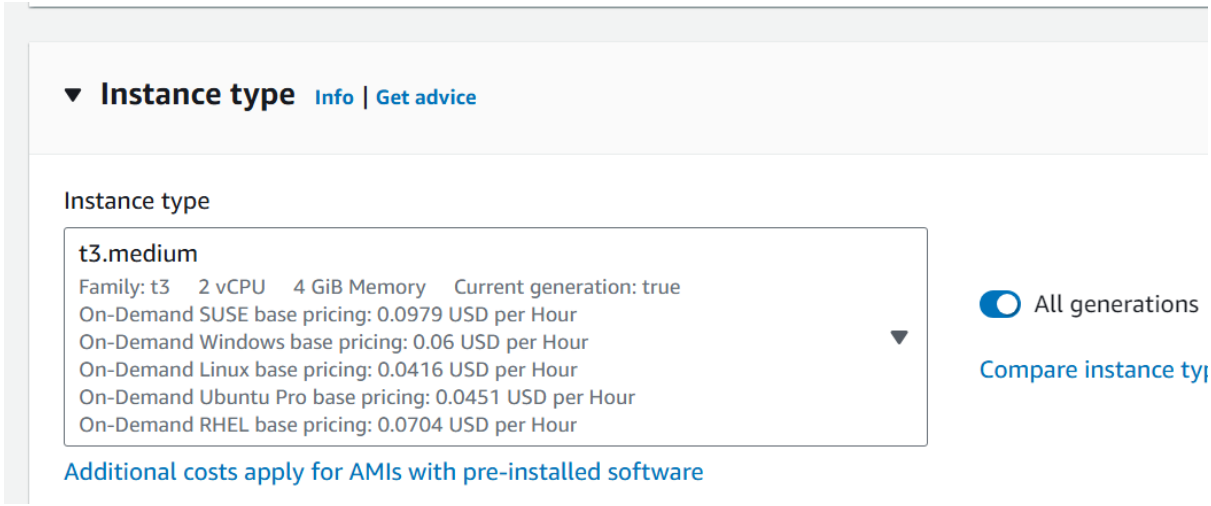
Go to Instances ->Launch instance



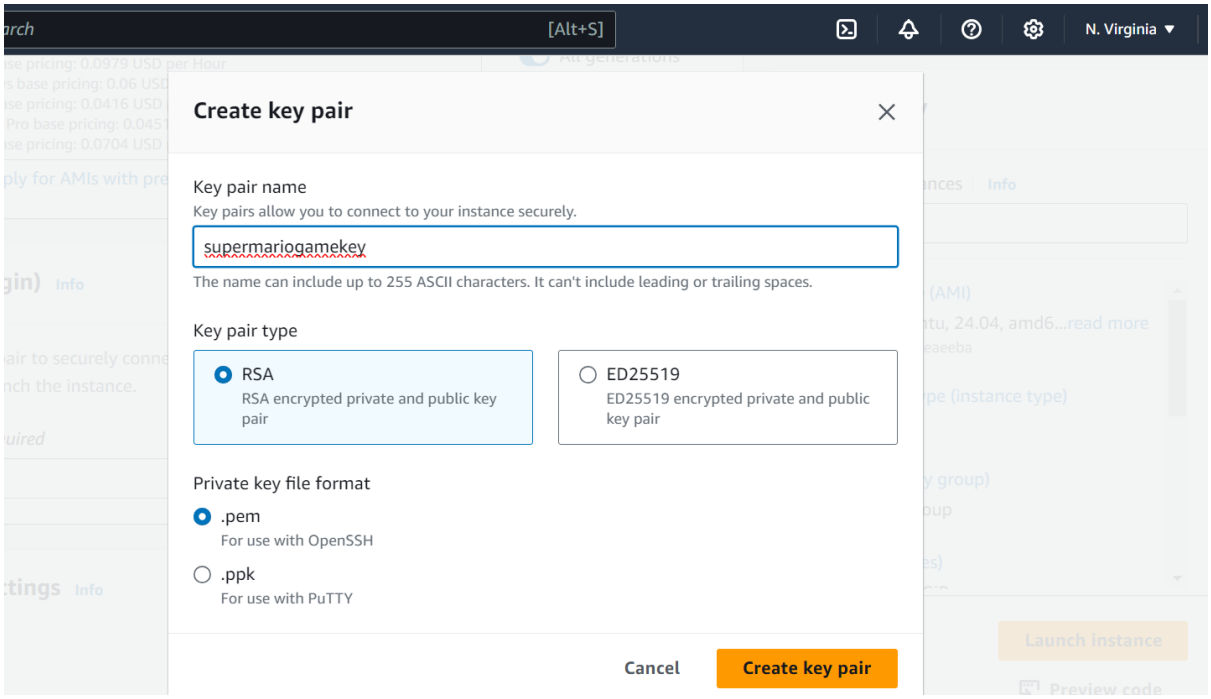
Use AMI as ubuntu



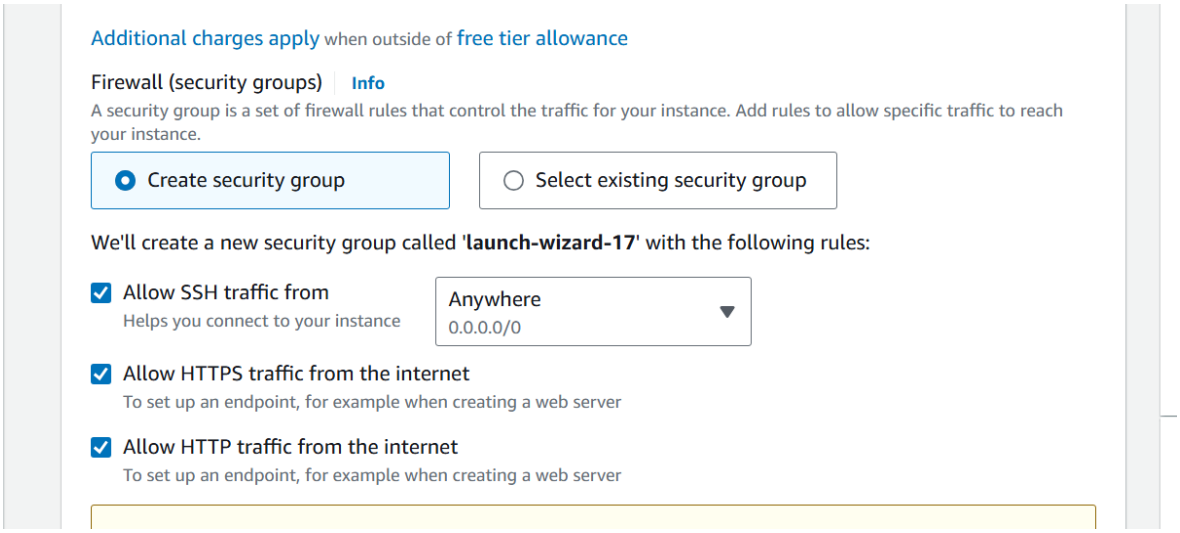
Instance type : c7i-flex.large



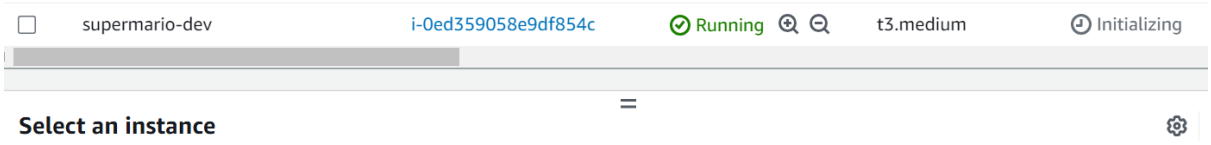
Create a new key pair



In security group allow ssh and http traffic



Go ahead and launch the instance

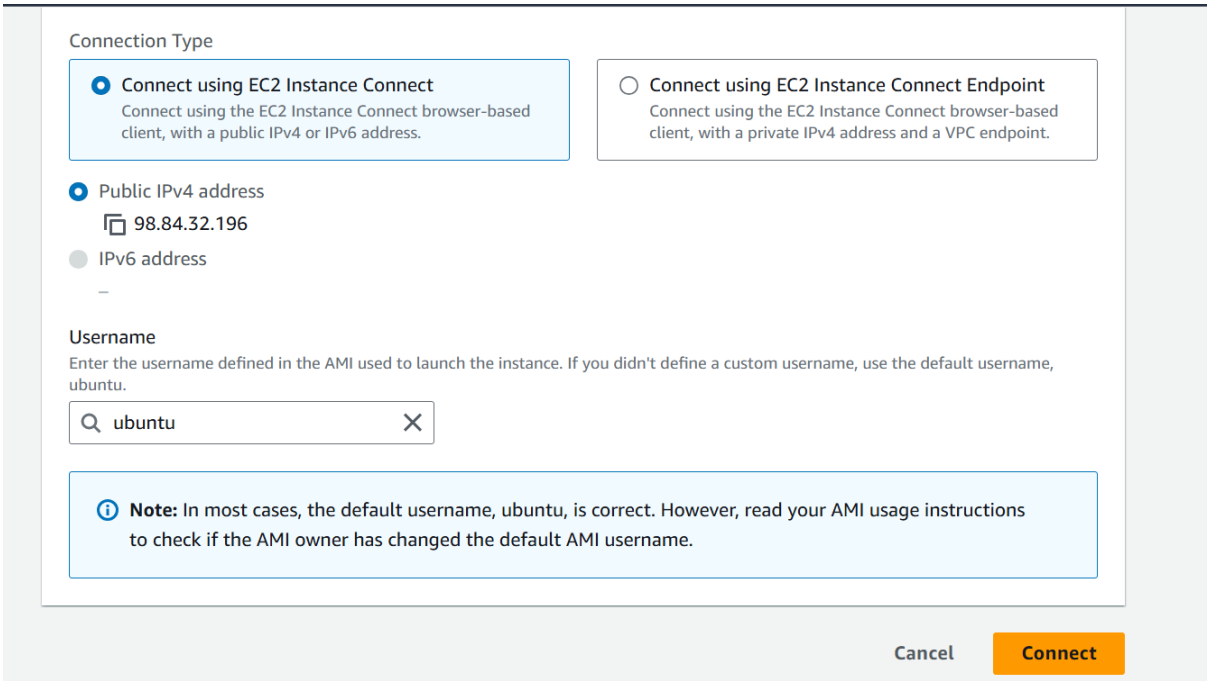


2) Now we will connect to the machine . For that we will first select the machine

And then click on connect button

Click on Ec2 instance connect tab

And click on connect button



3) Run the following commands

a. sudo su

b. apt update

4) **Setup Docker ,Terraform ,aws cli , and Kubectl**

1. **apt install docker.io**

```
root@ip-172-31-35-40:/home/ubuntu# docker --version
Docker version 24.0.7, build 24.0.7-0ubuntu4.1
```

2. **usermod -aG docker $USER** # Replace with your username e.g 'ubuntu' **usermod -aG docker ubuntu**

3. **newgrp docker**

5) We will now setup terraform in the machine

wget -O- https://apt.releases.hashicorp.com/gpg | sudo gpg --dearmor -o /usr/share/keyrings/hashicorp-archive-keyring.gpg

echo "deb [signed-by=/usr/share/keyrings/hashicorp-archive-keyring.gpg] https://apt.releases.hashicorp.com $(lsb_release -cs) main" | sudo tee /etc/apt/sources.list.d/hashicorp.list

sudo apt update && sudo apt install terraform

6) Now we will setup the AWS CL

curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o "awscliv2.zip"

apt install unzip -y

unzip awscliv2.zip

sudo ./aws/install

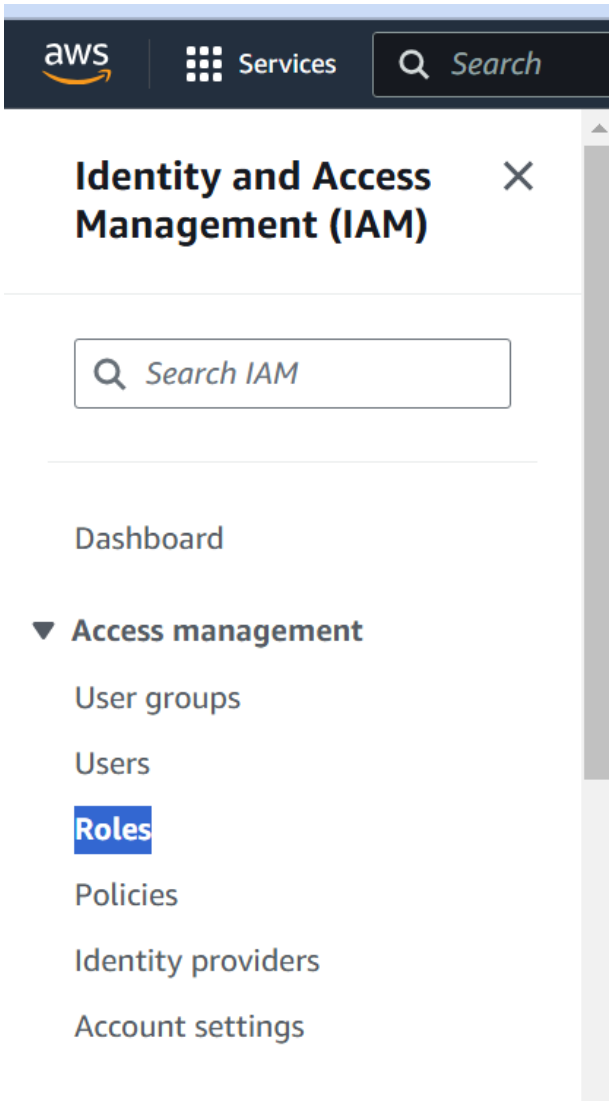
7) Now we will setup Kubectl

1. sudo apt install curl -y
2. curl -LO https://dl.k8s.io/release/$(curl -L -s https://dl.k8s.io/release/stable.txt)/bin/linux/amd64/kubectl
3. sudo install -o root -g root -m 0755 kubectl /usr/local/bin/kubectl

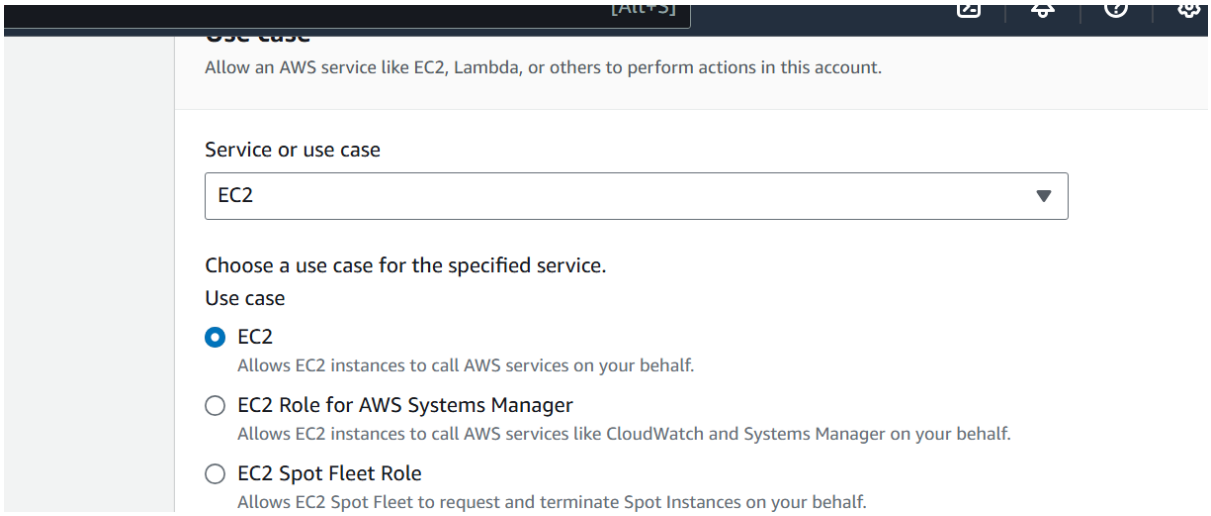
```
root@ip-172-31-35-40:/home/ubuntu# kubectl version --client
Client Version: v1.31.2
Kustomize Version: v5.4.2
```

8) Every thing is setup and installed let's make a IAM EC2 Role

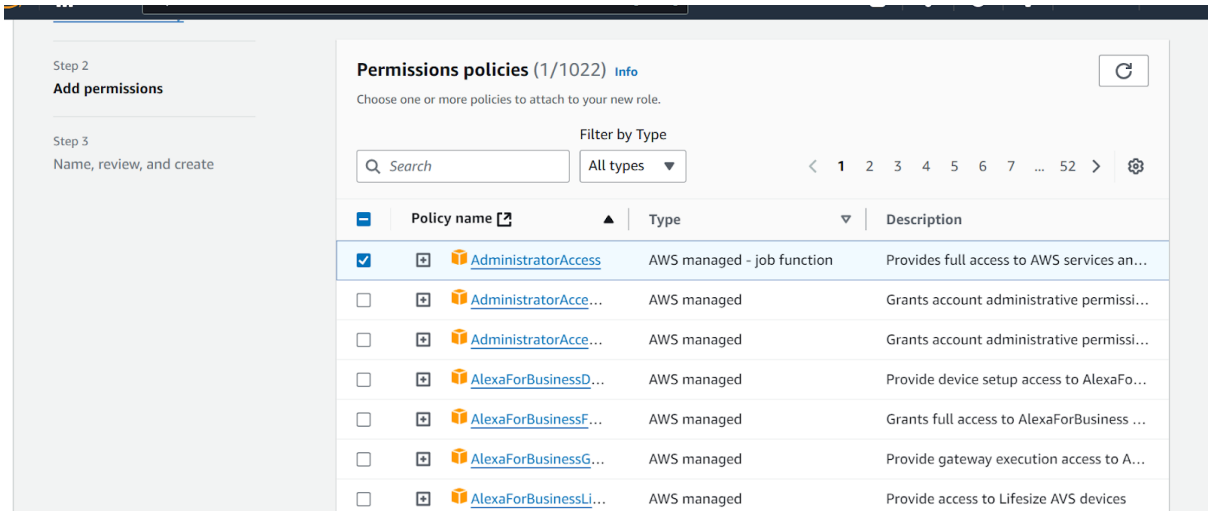
Go to IAM -> Roles



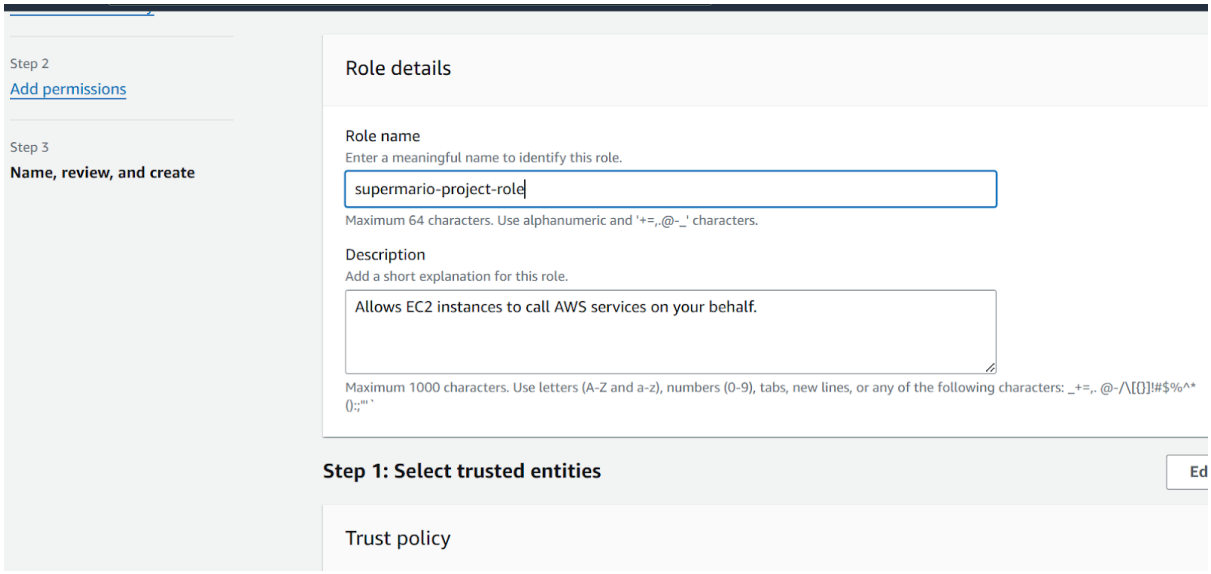
click on create role and choose EC2 from the dropdown



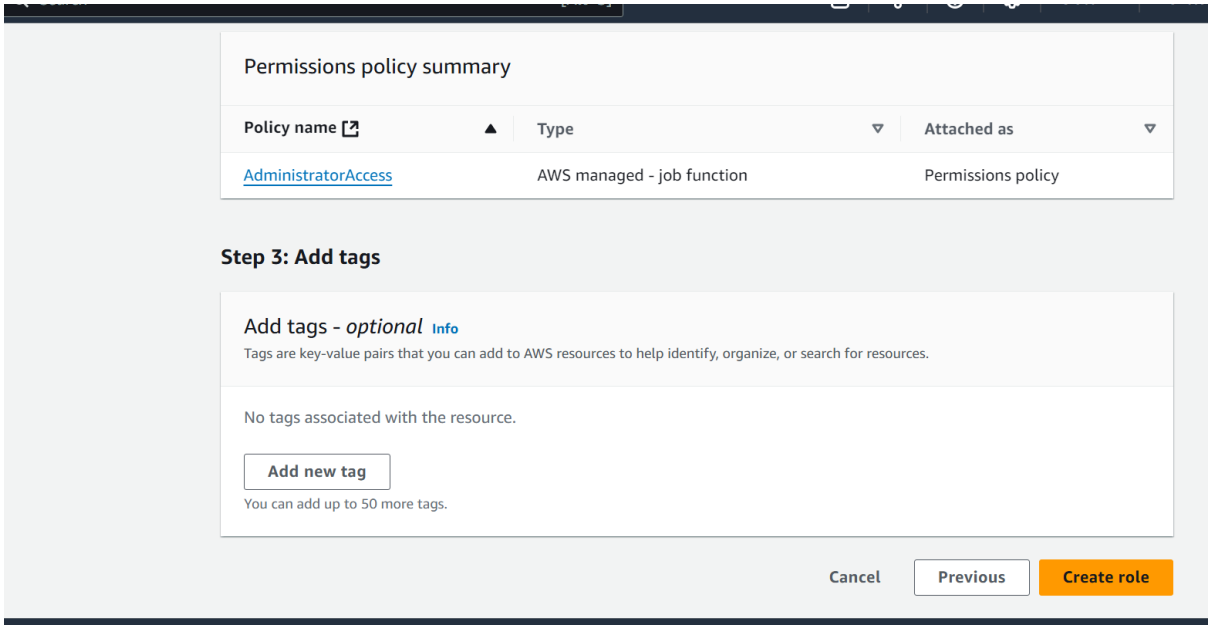
Choose administrator access



Next

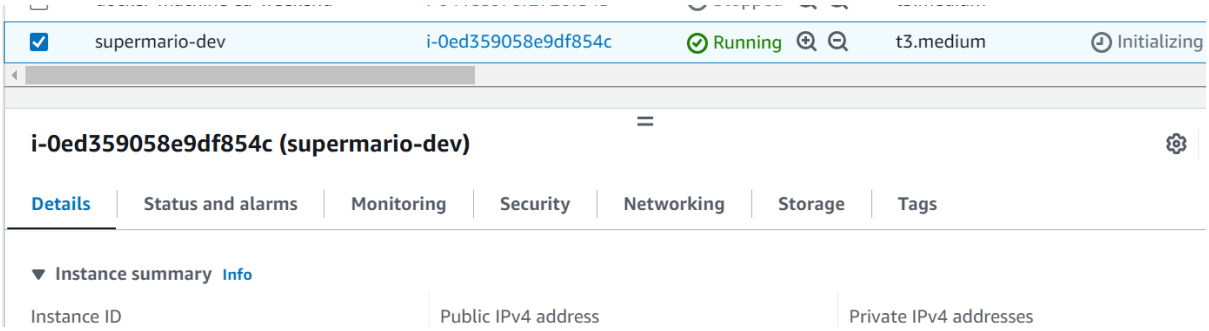


Click on Create role



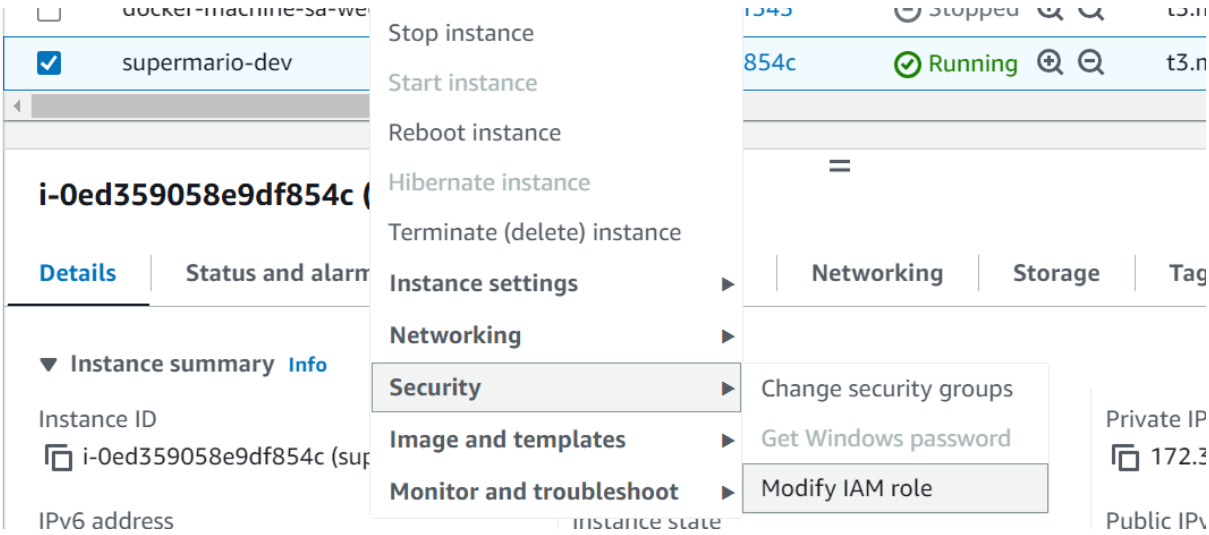
9) Now we will attach the IAM role to Ec2 machine

Go to ec2 machine and select the machine

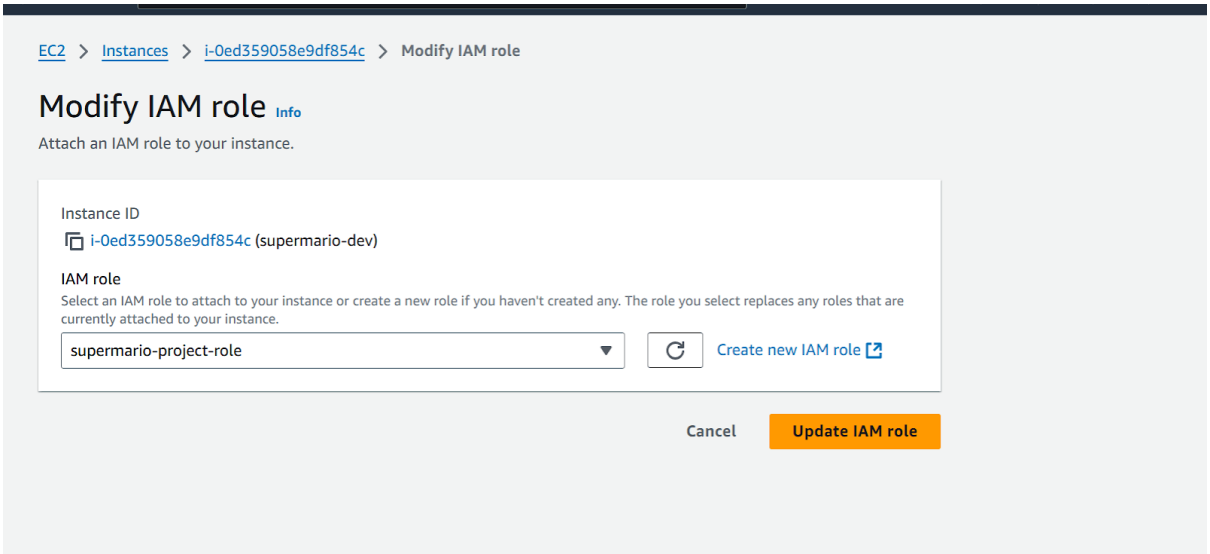


Right click on the machine

Click on Security -> modify IAM role



Select IAM role which we created previously



Click on update IAM role

10) **Building Infrastructure Using terraform**

First we will clone the github repo

Go to the machine

mkdir supermario

cd supermario

```
root@ip-172-31-35-40:/home/ubuntu# mkdir supermario
root@ip-172-31-35-40:/home/ubuntu# cd supermario
root@ip-172-31-35-40:/home/ubuntu/supermario# pwd
/home/ubuntu/supermario
root@ip-172-31-35-40:/home/ubuntu/supermario#
```

i-0ed359058e9df854c (supermario-dev)

git clone https://github.com/akshu20791/supermario-game

```
root@ip-172-31-35-40:/home/ubuntu/supermario# git clone https://github.com/akshu20791/supermario-game
Cloning into 'supermario-game'...
remote: Enumerating objects: 8, done.
remote: Counting objects: 100% (8/8), done.
remote: Compressing objects: 100% (8/8), done.
remote: Total 8 (delta 0), reused 8 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (8/8), done.
root@ip-172-31-35-40:/home/ubuntu/supermario#
```

i-0ed359058e9df854c (supermario-dev)

```
root@ip-172-31-35-40:/home/ubuntu/supermario# ls
supermario-game
```

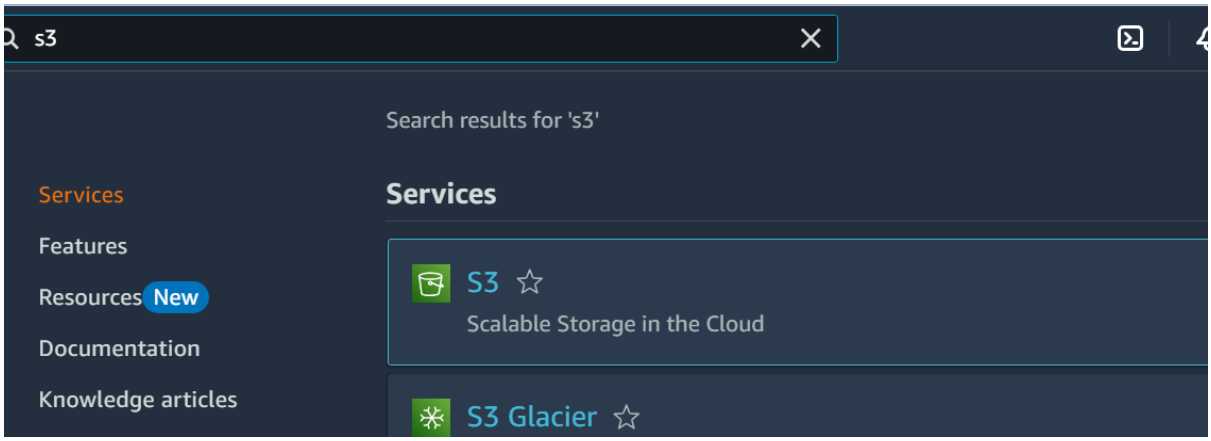
cd supermario-game

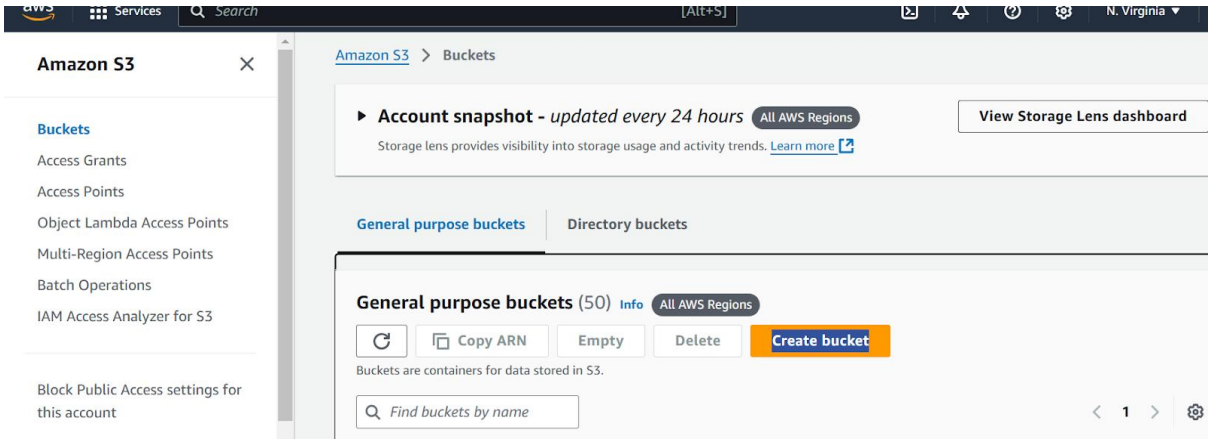
```
-172-31-35-40:/home/ubuntu/supermario# cd supermario-game
-172-31-35-40:/home/ubuntu/supermario/supermario-game#
```

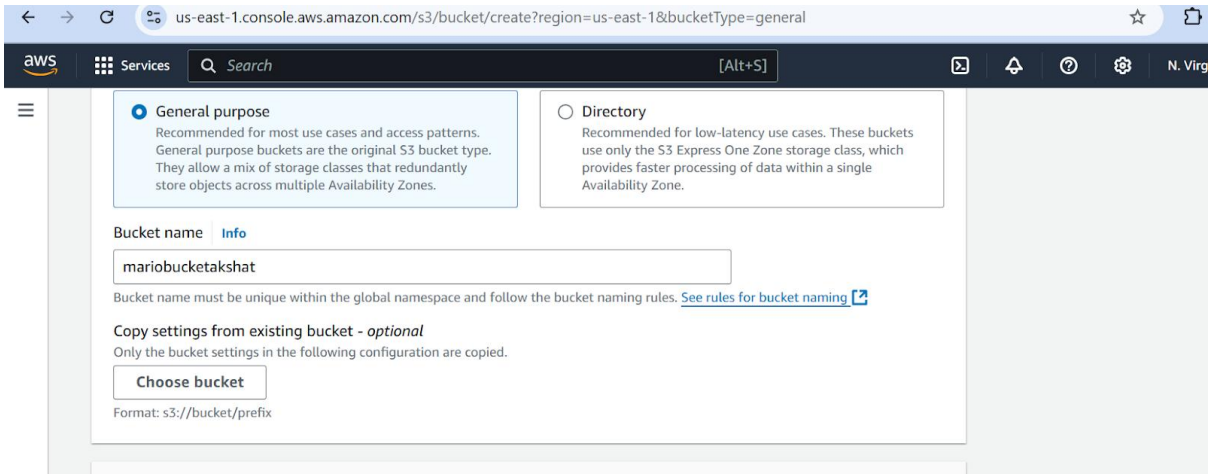
cd EKS-TF

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game# cd EKS-TF
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game/EKS-TF# ls
backend.tf  main.tf  provider.tf
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game/EKS-TF#
```

12) Go to aws -> S3 -> Create a s3 bucket with some unique name







Create bucket

13) Go back to Ec2 machine

edit the backend.tf file by → **vim backend.tf**

```
terraform {
  backend "s3" {
    bucket = "mariobucketakshat" # Replace with your actual S3 bucket name
    key    = "EKS/terraform.tfstate"
    region = "us-east-1"
  }
}
~
~
~
```

Note →make sure to provide your bucket and region name in this file otherwise it doesn't work and IAM role is also associated with your ec2 which helps ec2 to use other services such S3 bucket

>> nano main.tf

Change instance type → c7i-flex.large

14) Now we will run

terraform init

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game/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 v5.75.1...
- Installed hashicorp/aws v5.75.1 (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
```

terraform validate

```
commands will detect it and remind you to do so if necessary.
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game/EKS-TF# terraform validate
Success! The configuration is valid.
```

go to AWS ACCOUNT -> GO TO VPC -> GO TO SUBNETS -> DELETE subnet in availability zone us-east-1e

terraform plan

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game/EKS-TF# terraform plan
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 2s [id=vpc-0b918116e453a16a9]
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 followin
symbols:
  + create

Terraform will perform the following actions:

  # aws_eks_cluster.example will be created
```

```
Terraform will perform the following actions:

  # aws_eks_cluster.example will be created
  + resource "aws_eks_cluster" "example" {
      + arn                           = (known after apply)
      + bootstrap_self_managed_addons = true
      + 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)
```

terraform apply --auto-approve

```
Plan: 8 to add, 0 to change, 0 to destroy.
aws_iam_role.example: Creating...
aws_iam_role.example1: Creating...
aws_iam_role.example: Creation complete after 0s [id=eks-cluster-cloud]
aws_iam_role_policy_attachment.example-AmazonEKSClusterPolicy: Creating...
aws_iam_role.example1: Creation complete after 0s [id=eks-node-group-cloud]
aws_iam_role_policy_attachment.example-AmazonEKSWorkerNodePolicy: Creating...
aws_iam_role_policy_attachment.example-AmazonEKS_CNI_Policy: Creating...
aws_iam_role_policy_attachment.example-AmazonEC2ContainerRegistryReadOnly: Creating...
aws_iam_role_policy_attachment.example-AmazonEKSClusterPolicy: Creation complete after 0s [id=eks-cluster-cloud-20240114062220905000000001]
aws_eks_cluster.example: Creating...
aws_iam_role_policy_attachment.example-AmazonEC2ContainerRegistryReadOnly: Creation complete after 0s [id=eks-node-group-cloud-20240114062220947300000002]
aws_iam_role_policy_attachment.example-AmazonEKS_CNI_Policy: Creation complete after 0s [id=eks-node-group-cloud-20240114062220978900000003]
aws_iam_role_policy_attachment.example-AmazonEKSWorkerNodePolicy: Creation complete after 0s [id=eks-node-group-cloud-20240114062220986200000004]
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]
```

It will take 10-15 minutes to complete

```
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 6m9s [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: Creation complete after 1m51s [id=EKS_CLOUD:Node-cloud]

Apply complete! Resources: 8 added, 0 changed, 0 destroyed.
```

15) Now we will update the configuration of EKS

aws eks update-kubeconfig --name EKS_CLOUD --region us-east-1

ensure that you take care of the region you are working in

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game/EKS-TF# aws eks update-kubeconfig --name EKS_CLOUD --region ap-south-1
Added new context arn:aws:eks:ap-south-1:975050323630:cluster/EKS_CLOUD to /root/.kube/config
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game/EKS-TF#
```

16) **Creation of deployment and service for EKS**

1. change the directory where deployment and service files are stored use the command → **cd ..**

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game/EKS-TF# cd ..
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game# ls
EKS-TF  deployment.yaml  service.yaml
```

2. create the deployment

kubectl apply -f deployment.yaml

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game# kubectl apply -f deployment.yaml
deployment.apps/mario-deployment created
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game#
```

kubectl apply -f service.yaml

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game# kubectl apply -f service.yaml
service/mario-service created
```

run → kubectl get all

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game# kubectl get all
NAME                                 READY   STATUS    RESTARTS   AGE
pod/mario-deployment-6bfd49df4b-tgzrd   1/1     Running   0          64s
pod/mario-deployment-6bfd49df4b-vxf7q   1/1     Running   0          64s

NAME                    TYPE           CLUSTER-IP      EXTERNAL-IP                                                              PORT(S)
       AGE
service/kubernetes      ClusterIP      10.100.0.1      <none>                                                                   443/TCP
       13m
service/mario-service   LoadBalancer   10.100.68.49    a086c1c645bc8444f943afe7a74c47a5-1256226015.ap-south-1.elb.amazonaws.com   80:3155
3/TCP   25s

NAME                               READY   UP-TO-DATE   AVAILABLE   AGE
deployment.apps/mario-deployment   2/2     2            2           65s

NAME                                          DESIRED   CURRENT   READY   AGE
replicaset.apps/mario-deployment-6bfd49df4b   2         2         2       65s
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game#
```

i-0ed359058e9df854c (supermario-dev)

PublicIPs: 98.84.32.196 PrivateIPs: 172.31.35.40

16) Now Run the follwing command to get the load balancer ingress

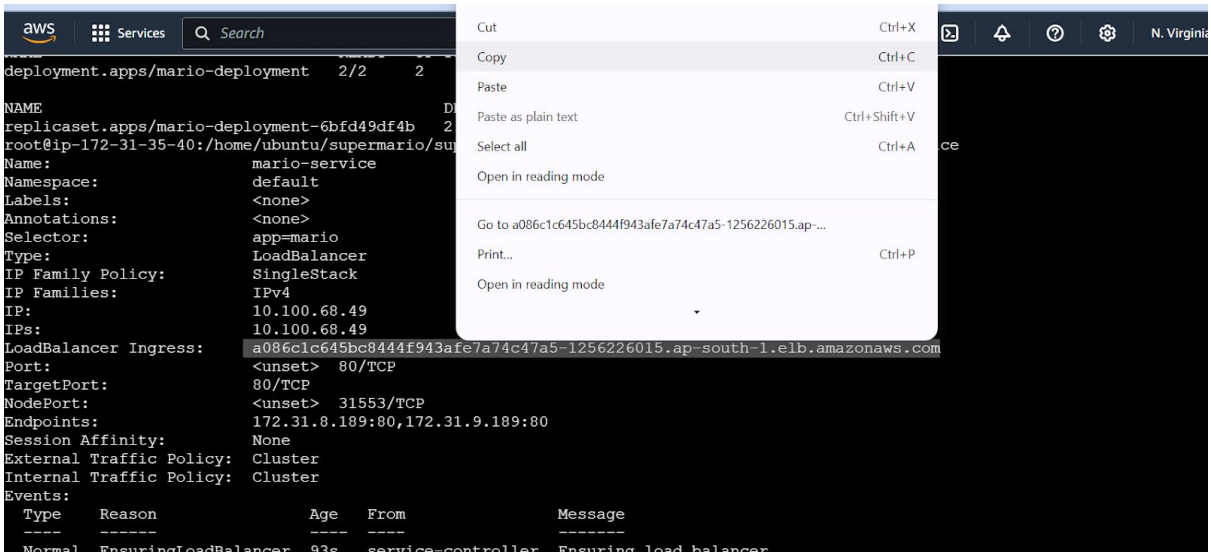
This command tells all the details of your application

kubectl describe service mario-service

```
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game# kubectl describe service mario-service
Name:                     mario-service
Namespace:                default
Labels:                   <none>
Annotations:              <none>
Selector:                 app=mario
Type:                     LoadBalancer
IP Family Policy:         SingleStack
IP Families:              IPv4
IP:                       10.100.68.49
IPs:                      10.100.68.49
LoadBalancer Ingress:     a086c1c645bc8444f943afe7a74c47a5-1256226015.ap-south-1.elb.amazonaws.com
Port:                     <unset>  80/TCP
TargetPort:               80/TCP
NodePort:                 <unset>  31553/TCP
Endpoints:                172.31.8.189:80,172.31.9.189:80
Session Affinity:         None
External Traffic Policy:  Cluster
Internal Traffic Policy:  Cluster
Events:
  Type    Reason                Age   From                Message
  ----    ------                ----  ----                -------
  Normal  EnsuringLoadBalancer  93s   service-controller  Ensuring load balancer
  Normal  EnsuredLoadBalancer   89s   service-controller  Ensured load balancer
root@ip-172-31-35-40:/home/ubuntu/supermario/supermario-game#
```

Here you will see load balancer ingress link

Copy that



17) paste it in the browser

Ensure that when you copy paste …it should be http not https