Deploy to AWS EC2 using Terraform and Github Actions CI/CD

Tushar Rajpoot · Follow

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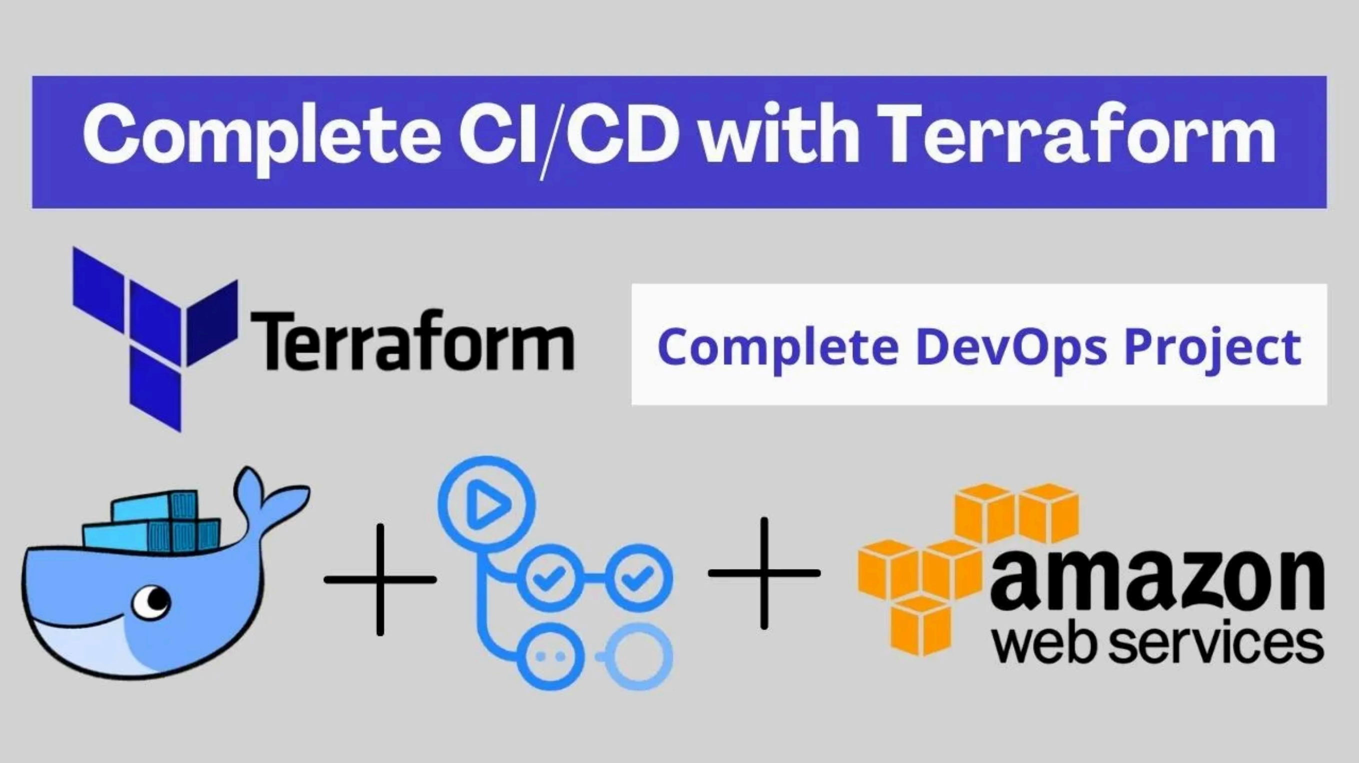

Technologies:

- Terraform

- Github Actions
- Docker
- Node.js
- AWS EC2
- AWS S3
- AWS ECR

Tasks:

- Get access id, secret id from AWS
- Develop a simple nodejs app

```
const express = require("express")
const app = express()
```

```
app.get("/",(req,res)=>{
    res.send("Service is up and running")
})

app.listen(8080,()=>{
    console.log("Server is up")
})
```

- Write Dockerfile for Simple Application

```
FROM node:14
WORKDIR /user/app
COPY package.json ./
RUN npm install
COPY . .
EXPOSE 8080
CMD ["npm","start"]
```

- Generate SSH keys for connecting to the EC2 instance
- Create an S3 bucket for storing Terraform State file

Write Terraform Scripts for provisioning EC2 instance

```
terraform {
  required_providers {
    aws = {
      source  = "hashicorp/aws"
      version = "~>4.0"
    }
  }
  backend "s3" {
    key = "aws/ec2-deploy/terraform.tfstate"
  }
}

provider "aws" {
  region = var.region
}
```

```
resource "aws_instance" "servernode" {
  ami                    = "ami-052efd3df9dad4825"
  instance_type          = "t2.micro"
  key_name               = aws_key_pair.deployer.key_name
  vpc_security_group_ids = [aws_security_group.maingroup.id]
  iam_instance_profile   = aws_iam_instance_profile.ec2-profile.name
  connection {
    type        = "ssh"
    host        = self.public_ip
    user        = "ubuntu"
    private_key = var.private_key
    timeout     = "4m"
  }
  tags = {
    "name" = "DeployVM"
  }
}
resource "aws_iam_instance_profile" "ec2-profile" {
  name = "ec2-profile"
  role = "ECR-LOGIN-AUTO"
}
resource "aws_security_group" "maingroup" {
  egress = [
    {
      cidr_blocks      = ["0.0.0.0/0"]
      description      = ""
      from_port        = 0
      ipv6_cidr_blocks = []
      prefix_list_ids  = []
      protocol         = "-1"
      security_groups  = []
      self             = false
      to_port          = 0
    }
  ]
  ingress = [
    {
      cidr_blocks      = ["0.0.0.0/0", ]
      description      = ""
      from_port        = 22
      ipv6_cidr_blocks = []
      prefix_list_ids  = []
      protocol         = "tcp"
      security_groups  = []
      self             = false
      to_port          = 22
    },
    {
      cidr_blocks      = ["0.0.0.0/0", ]
      description      = ""
      from_port        = 80
      ipv6_cidr_blocks = []
      prefix_list_ids  = []
      protocol         = "tcp"
      security_groups  = []
      self             = false
      to_port          = 80
    }
  ]

}

resource "aws_key_pair" "deployer" {
  key_name   = var.key_name
  public_key = var.public_key
}

output "instance_public_ip" {
  value     = aws_instance.servernode.public_ip
  sensitive = true
}
```

- variables.tf file

```
variable "region" {
    default = "us-east-1"
}
variable "public_key" {

}
variable "private_key" {

}
variable "key_name" {

}
```

Write CI/CD pipeline

- Write Github Actions workflow: Set environment variables

```
env:
  AWS_ACCESS_KEY_ID: ${{ secrets.AWS_ACCESS_KEY_ID }}
```

```
 AWS_SECRET_ACCESS_KEY: ${{ secrets.AWS_SECRET_ACCESS_KEY }}
 TF_STATE_BUCKET_NAME: ${{ secrets.AWS_TF_STATE_BUCKET_NAME }}
 PRIVATE_SSH_KEY: ${{ secrets.AWS_SSH_KEY_PRIVATE }}
 PUBLIC_SSH_KEY: ${{ secrets.AWS_SSH_KEY_PUBLIC }}
 AWS_REGION: us-east-1
```

- Setup backend for S3 bucket with terraform init

```
- name: checkout repo
   uses: actions/checkout@v2
  - name: setup terraform
   uses: hashicorp/setup-terraform@v1
   with:
    terraform_wrapper: false
  - name: Terraform Init
   id: init
   run: terraform init -backend-
config="bucket=$TF_STATE_BUCKET_NAME" -backend-config="region=us-
east-1"
   working-directory: ./terraform
```

- Pass tf variables with Terraform plan

```
- name: Terraform Plan
 id: plan
 run: |-
  terraform plan \
  -var="region=us-east-1" \
  -var="bucket=$TF_STATE_BUCKET_NAME" \
  -var="public_key=$PUBLIC_SSH_KEY" \
  -var="private_key=$PRIVATE_SSH_KEY" \
  -var="key_name=deployer-key" \
  -out=PLAN
 working-directory: ./terraform
```

- Run terraform apply

```
- name: Terraform Apply
    id: apply
    run: |-
      terraform apply PLAN
    working-directory: ./terraform
```

- Set EC2 instance public ip as job output

```
- name: Set output
    id: set-dns
    run: |-
        echo "::set-output name=instance_public_dns::$(terraform
output instance_public_ip)"
    working-directory: ./terraform
```

- Authenticate ECR

```
- name: Login to AWS ECR
  id: login-ecr
  uses: aws-actions/amazon-ecr-login@v1
```

- Set ec2 public ip as environment variable for later use

```
- run: echo SERVER_PUBLIC_IP=${{ needs.deploy-
infra.outputs.SERVER_PUBLIC_DNS }} >> $GITHUB_ENV
```

- Build, tag and push docker image to Amazon ECR

```
- name: Build, tag, and push docker image to Amazon ECR
    env:
      REGISTRY: ${{ steps.login-ecr.outputs.registry }}
      REPOSITORY: example-node-app
      IMAGE_TAG: ${{ github.sha }}
    run: |
      docker build -t $REGISTRY/$REPOSITORY:$IMAGE_TAG .
      docker push $REGISTRY/$REPOSITORY:$IMAGE_TAG
    working-directory: ./nodeapp
```

- Connect to EC2 using ssh and deploy docker container

```
- name: Deploy Docker Image to EC2
  env:
    REGISTRY: ${{ steps.login-ecr.outputs.registry }}
    REPOSITORY: example-node-app
    IMAGE_TAG: ${{ github.sha }}
    AWS_DEFAULT_REGION: us-east-1
  uses: appleboy/ssh-action@master
  with:
    host: ${{ env.SERVER_PUBLIC_IP }}
    username: ubuntu
    key: ${{ env.PRIVATE_SSH_KEY }}
    envs:
PRIVATE_SSH_KEY,REGISTRY,REPOSITORY,IMAGE_TAG,AWS_ACCESS_KEY_ID,AWS_S
ECRET_ACCESS_KEY,AWS_REGION
    script: |-
      sudo apt update
      sudo apt install docker.io -y
      sudo apt install awscli -y
      sudo $(aws ecr get-login --no-include-email --region us-east-
1);
      sudo docker stop myappcontainer || true
      sudo docker rm myappcontainer || true
      sudo docker pull $REGISTRY/$REPOSITORY:$IMAGE_TAG
      sudo docker run -d --name myappcontainer -p 80:8080
$REGISTRY/$REPOSITORY:$IMAGE_TAG
```

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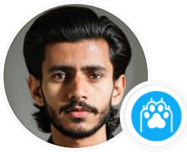

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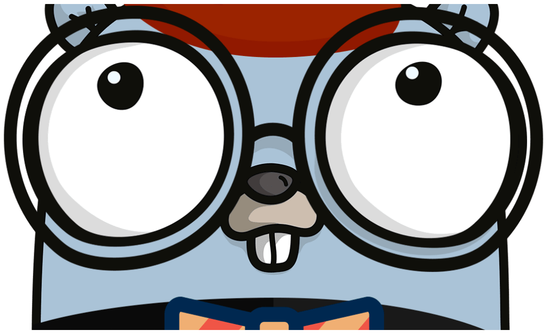

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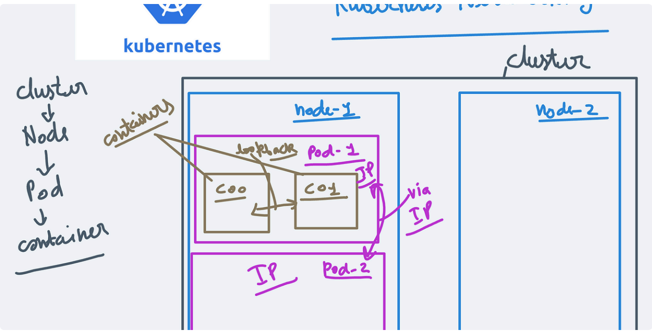

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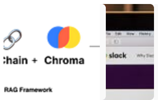

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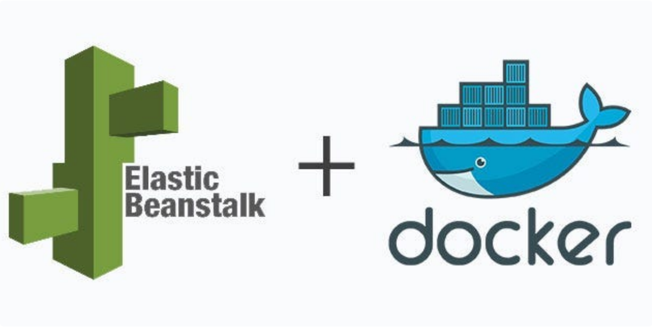

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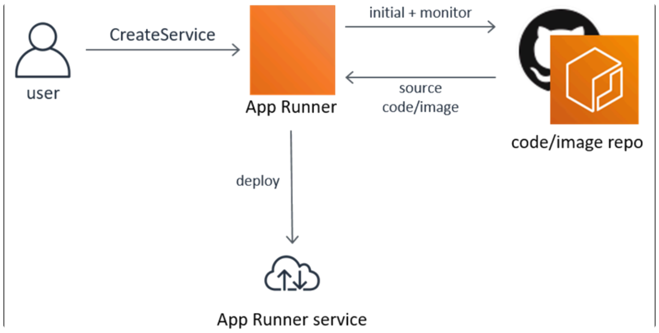

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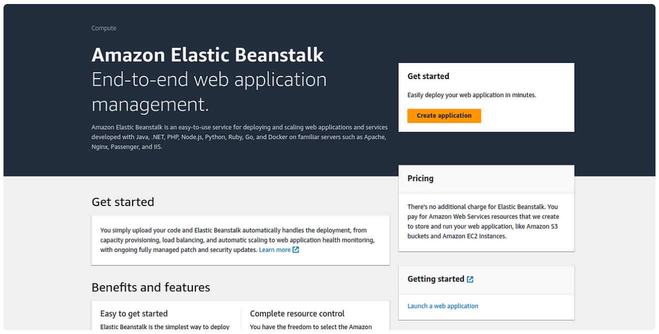

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Get started

Easily deploy your web application in minutes.

Create application

Get started

You simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, and automatic scaling to web application health monitoring, with ongoing fully managed patch and security updates. Learn more

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Getting started

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