**Assignment 3: Deploying AWS VPC, EC2 Instance and RDS Instance using CloudFormation**

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**Course:** PROG8870  
**Assignment:** Assignment3: Deploying AWS EC2 Instance and RDS Instance using CloudFormation

**1. Objective**

To create AWS CloudFormation templates to automate the deployment of networking infrastructure and EC2 instance and RDS MySQL database in a secure, repeatable, and scalable manner.

**2. AWS CLI Configuration**

* **CLI Profile Used:** cc
* **Region:** us-east-1
* **Key Pair:** prog8870-key
* **AMI ID:** ami-0cbbe2c6a1bb2ad63

**3. VPC, Subnets, IGW, Route Table**

* A custom VPC with CIDR 10.0.0.0/16
* Two public subnets in us-east-1a and us-east-1b
* Internet gateway with public route table associated

PRO8870-Assignment3-VPC Template:

|  |
| --- |
| AWSTemplateFormatVersion: "2010-09-09"  Description: "Assignment 3 - Networking Infrastructure with Two Subnets"  Resources:    Assignment3VPC:      Type: AWS::EC2::VPC      Properties:        CidrBlock: 10.0.0.0/16        EnableDnsSupport: true        EnableDnsHostnames: true        Tags:          - Key: Name            Value: assignment3    Assignment3Subnet1:      Type: AWS::EC2::Subnet      Properties:        VpcId: !Ref Assignment3VPC        CidrBlock: 10.0.1.0/24        AvailabilityZone: us-east-1a        MapPublicIpOnLaunch: true        Tags:          - Key: Name            Value: assignment3-subnet-a    Assignment3Subnet2:      Type: AWS::EC2::Subnet      Properties:        VpcId: !Ref Assignment3VPC        CidrBlock: 10.0.2.0/24        AvailabilityZone: us-east-1b        MapPublicIpOnLaunch: true        Tags:          - Key: Name            Value: assignment3-subnet-b    Assignment3InternetGateway:      Type: AWS::EC2::InternetGateway      Properties:        Tags:          - Key: Name            Value: assignment3    AttachIGW:      Type: AWS::EC2::VPCGatewayAttachment      Properties:        VpcId: !Ref Assignment3VPC        InternetGatewayId: !Ref Assignment3InternetGateway    Assignment3RouteTable:      Type: AWS::EC2::RouteTable      Properties:        VpcId: !Ref Assignment3VPC        Tags:          - Key: Name            Value: assignment3    Assignment3Route:      Type: AWS::EC2::Route      Properties:        RouteTableId: !Ref Assignment3RouteTable        DestinationCidrBlock: 0.0.0.0/0        GatewayId: !Ref Assignment3InternetGateway    SubnetRouteTableAssociationA:      Type: AWS::EC2::SubnetRouteTableAssociation      Properties:        SubnetId: !Ref Assignment3Subnet1        RouteTableId: !Ref Assignment3RouteTable    SubnetRouteTableAssociationB:      Type: AWS::EC2::SubnetRouteTableAssociation      Properties:        SubnetId: !Ref Assignment3Subnet2        RouteTableId: !Ref Assignment3RouteTable  Outputs:    VPCId:      Value: !Ref Assignment3VPC      Export:        Name: Assignment3-VPC-ID    Subnet1Id:      Value: !Ref Assignment3Subnet1      Export:        Name: Assignment3-Subnet1-ID    Subnet2Id:      Value: !Ref Assignment3Subnet2      Export:        Name: Assignment3-Subnet2-ID |

CLI Command:

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| --- |
| aws cloudformation create-stack \  --stack-name PRO8870-Assignment3-VPC \  --template-body file://networking.yaml \  --capabilities CAPABILITY\_NAMED\_IAM \  --profile cc |

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**4. EC2**

* EC2 resource with ami-0cbbe2c6a1bb2ad63
* subnet in us-east-1a

PRO8870-Assignment3-EC2 Template:

|  |
| --- |
| AWSTemplateFormatVersion: "2010-09-09"  Description: "Assignment 3 - EC2 Instance"  Parameters:    AMIId:      Type: String    InstanceType:      Type: String      Default: t2.micro    KeyName:      Type: AWS::EC2::KeyPair::KeyName  Resources:    Assignment3SecurityGroup:      Type: AWS::EC2::SecurityGroup      Properties:        GroupDescription: Allow SSH access        VpcId: !ImportValue Assignment3-VPC-ID        SecurityGroupIngress:          - IpProtocol: tcp            FromPort: 22            ToPort: 22            CidrIp: 0.0.0.0/0    Assignment3EC2Instance:      Type: AWS::EC2::Instance      Properties:        ImageId: !Ref AMIId        InstanceType: !Ref InstanceType        KeyName: !Ref KeyName        NetworkInterfaces:          - AssociatePublicIpAddress: true            DeviceIndex: 0            SubnetId: !ImportValue Assignment3-Subnet1-ID            GroupSet:              - !Ref Assignment3SecurityGroup        Tags:          - Key: Name            Value: assignment3  Outputs:    EC2PublicIP:      Value: !GetAtt Assignment3EC2Instance.PublicIp      Description: Public IP of the EC2 instance |

CLI Command:

|  |
| --- |
| aws cloudformation create-stack \  --stack-name PRO8870-Assignment3-EC2 \  --template-body file://ec2.yaml \  --parameters \  ParameterKey=AMIId,ParameterValue=ami-0cbbe2c6a1bb2ad63 \  ParameterKey=InstanceType,ParameterValue=t2.micro \  ParameterKey=KeyName,ParameterValue=prog8870-key \  --capabilities CAPABILITY\_NAMED\_IAM \  --profile cc |

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**5. RDS**

* Mysql RDS resource creation
* Multi-AZ on Two public subnets in us-east-1a and us-east-1b
* Security group associated with resptective access.

PRO8870-Assignment3-RDS Template:

|  |
| --- |
| AWSTemplateFormatVersion: "2010-09-09"  Description: "Assignment 3 - RDS MySQL Instance"  Parameters:    DBUsername:      Type: String      NoEcho: true    DBPassword:      Type: String      NoEcho: true  Resources:    Assignment3RDSSecurityGroup:      Type: AWS::EC2::SecurityGroup      Properties:        GroupDescription: Allow MySQL traffic        VpcId: !ImportValue Assignment3-VPC-ID        SecurityGroupIngress:          - IpProtocol: tcp            FromPort: 3306            ToPort: 3306            CidrIp: 0.0.0.0/0    Assignment3RDSSubnetGroup:      Type: AWS::RDS::DBSubnetGroup      Properties:        DBSubnetGroupDescription: "RDS subnet group for assignment3"        SubnetIds:          - !ImportValue Assignment3-Subnet1-ID          - !ImportValue Assignment3-Subnet2-ID        DBSubnetGroupName: assignment3-subnet-group    Assignment3RDSInstance:      Type: AWS::RDS::DBInstance      Properties:        DBInstanceIdentifier: assignment3-db        DBName: assignment3        AllocatedStorage: 20        DBInstanceClass: db.t3.micro        Engine: mysql        MasterUsername: !Ref DBUsername        MasterUserPassword: !Ref DBPassword        VPCSecurityGroups:          - !Ref Assignment3RDSSecurityGroup        DBSubnetGroupName: !Ref Assignment3RDSSubnetGroup        PubliclyAccessible: true        BackupRetentionPeriod: 0        Tags:          - Key: Name            Value: assignment3  Outputs:    RDSEndpoint:      Description: RDS endpoint      Value: !GetAtt Assignment3RDSInstance.Endpoint.Address |

CLI Command:

|  |
| --- |
| aws cloudformation create-stack \  --stack-name PRO8870-Assignment3-RDS \  --template-body file://rds.yaml \  --parameters \  ParameterKey=DBUsername,ParameterValue=dbadmin \  ParameterKey=DBPassword,ParameterValue=SecretPwd7777 \  --capabilities CAPABILITY\_NAMED\_IAM \  --profile cc |

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