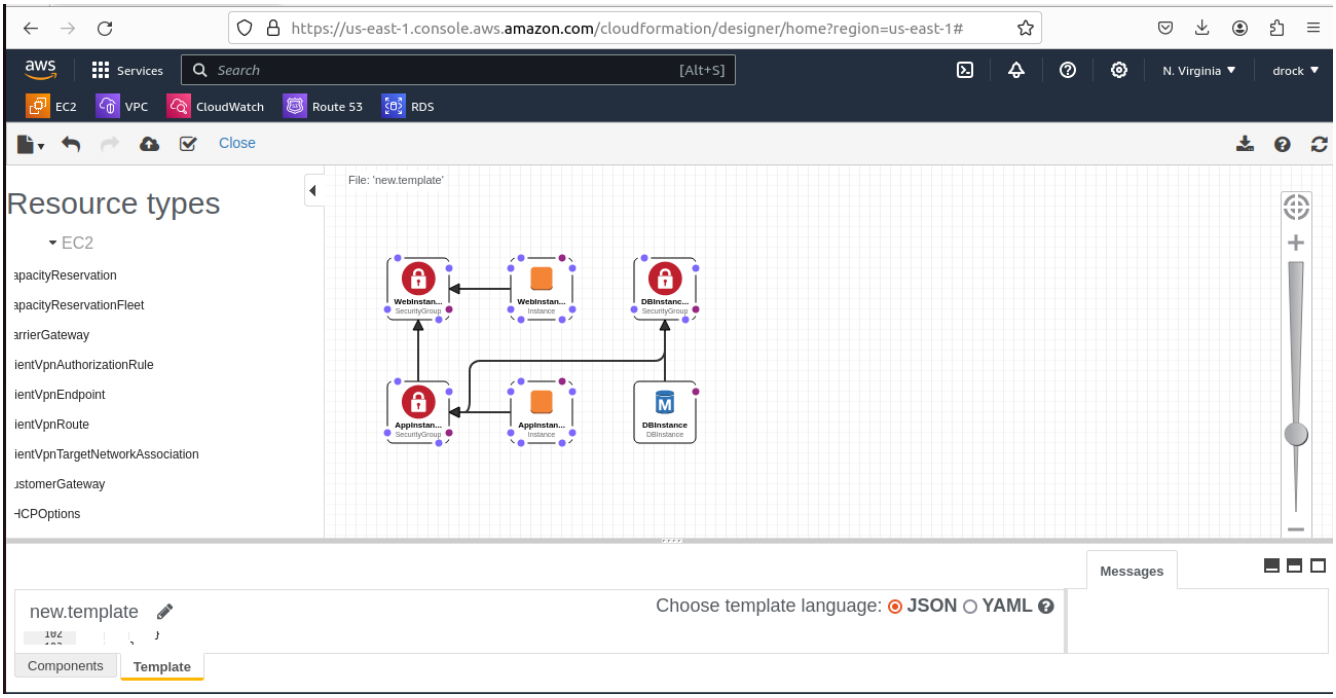
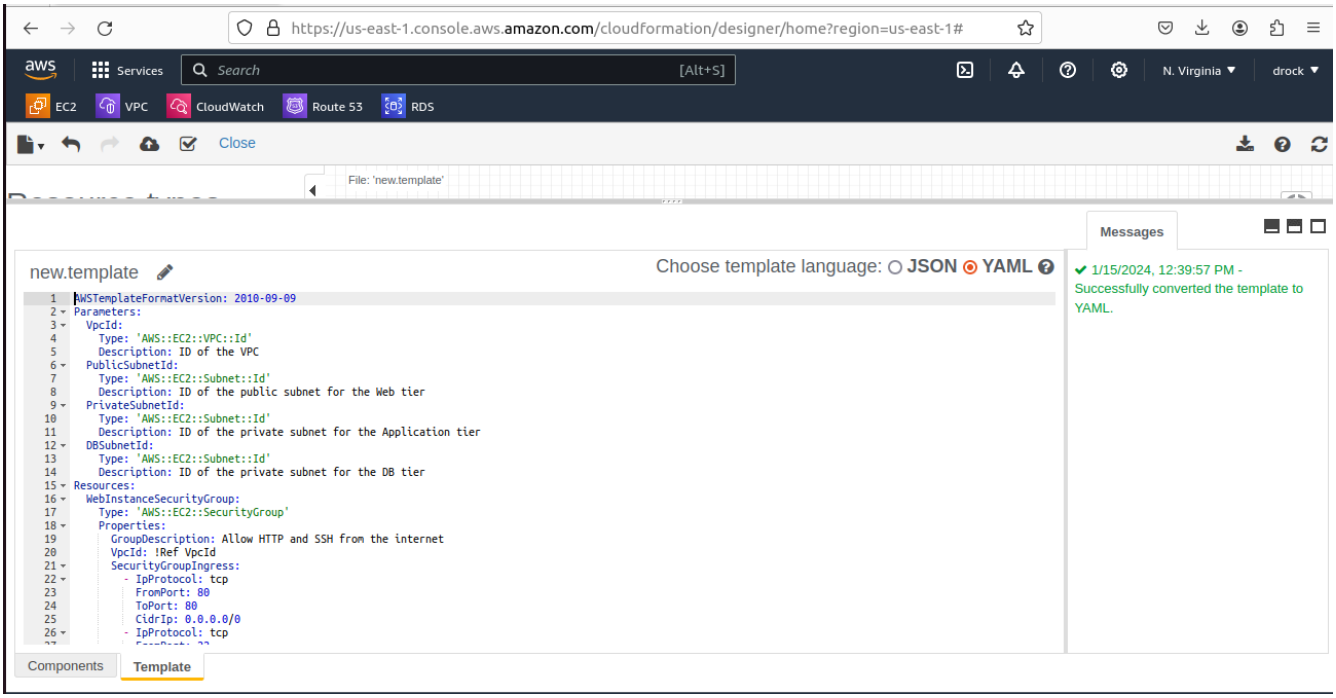
1.

I don't have actual values for the DNS parameters (HostedZoneId and Name) in the "MyDNSRecordSet" resource, it can causingan error in CloudFormation.

So, I removed "MyDNSRecordSet" resource from the template





DETAILS OF THE YAML FILE

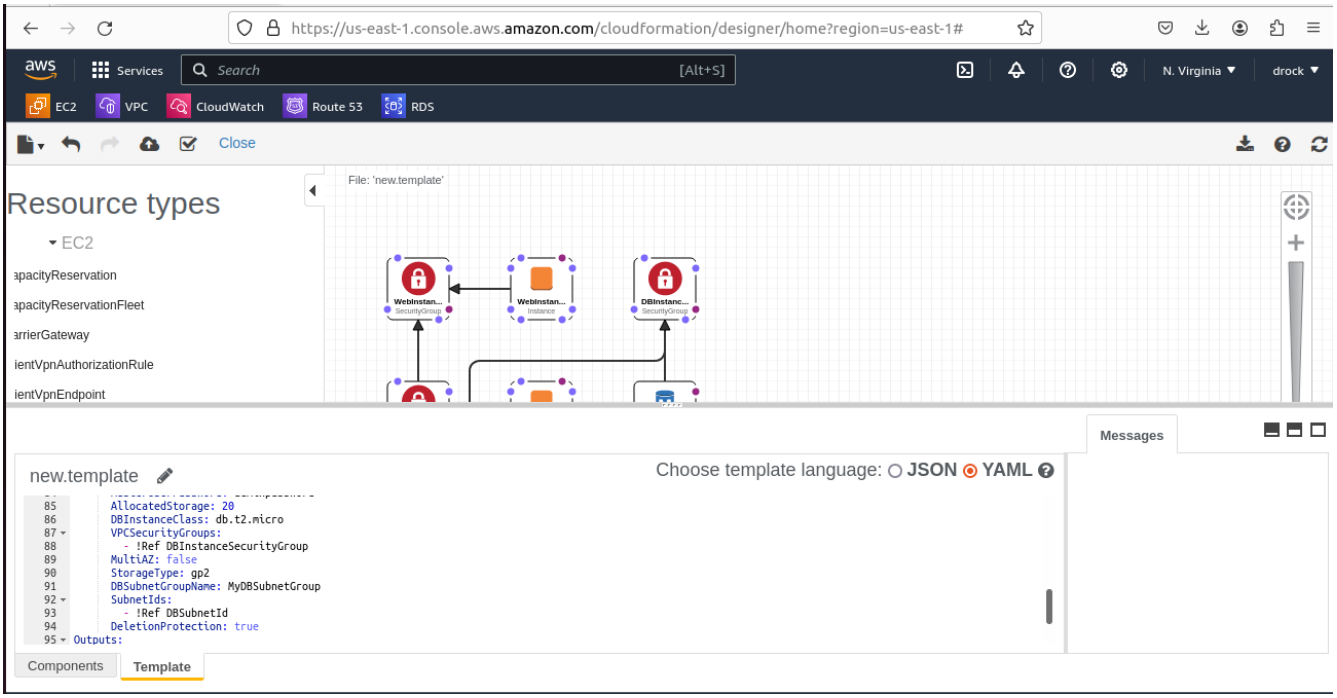
```
AWSTemplateFormatVersion: 2010-09-09
Parameters:
  VpcId:
    Type: 'AWS::EC2::VPC::Id'
    Description: ID of the VPC
  PublicSubnetId:
    Type: 'AWS::EC2::Subnet::Id'
    Description: ID of the public subnet for the Web tier
  PrivateSubnetId:
    Type: 'AWS::EC2::Subnet::Id'
    Description: ID of the private subnet for the Application tier
  DBSubnetId:
    Type: 'AWS::EC2::Subnet::Id'
    Description: ID of the private subnet for the DB tier
Resources:
  WebInstanceSecurityGroup:
    Type: 'AWS::EC2::SecurityGroup'
    Properties:
      GroupDescription: Allow HTTP and SSH from the internet
      VpcId: !Ref VpcId
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: 80
          ToPort: 80
          CidrIp: 0.0.0.0/0
        - IpProtocol: tcp
          FromPort: 22
          ToPort: 22
          CidrIp: 0.0.0.0/0
```

```
AppInstanceSecurityGroup:
    Type: 'AWS::EC2::SecurityGroup'
    Properties:
      GroupDescription: Allow only SSH from the public subnet of Web Tier-3
      VpcId: !Ref VpcId
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: 22
          ToPort: 22
          SourceSecurityGroupId: !Ref WebInstanceSecurityGroup
  DBInstanceSecurityGroup:
    Type: 'AWS::EC2::SecurityGroup'
    Properties:
      GroupDescription: >-
        Allow connection on port 3306 only from the private subnet of
        Application Tier-4
      VpcId: !Ref VpcId
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: 3306
          ToPort: 3306
          SourceSecurityGroupId: !Ref AppInstanceSecurityGroup
  WebInstance:
    Type: 'AWS::EC2::Instance'
    Properties:
      ImageId: ami-0005e0cfe09cc9050
      InstanceType: t2.micro
      KeyName: newkey-virginia
      SubnetId: !Ref PublicSubnetId
      SecurityGroupIds:
        - !Ref WebInstanceSecurityGroup
      UserData: !Base64
        'Fn::Sub': |
          #!/bin/bash
          # Your initialization script here
  AppInstance:
    Type: 'AWS::EC2::Instance'
    Properties:
      ImageId: ami-0005e0cfe09cc9050
      InstanceType: t2.micro
      KeyName: newkey-virginia
      SubnetId: !Ref PrivateSubnetId
      SecurityGroupIds:
        - !Ref AppInstanceSecurityGroup
      UserData: !Base64
        'Fn::Sub': |
          #!/bin/bash
          # Your initialization script here
  DBInstance:
    Type: 'AWS::RDS::DBInstance'
    Properties:
      Engine: mysql
      DBInstanceIdentifier: MyDBInstance
      MasterUsername: admin
      MasterUserPassword: adminpassword
      AllocatedStorage: 20
      DBInstanceClass: db.t2.micro
      VPCSecurityGroups:
```

```
      - !Ref DBInstanceSecurityGroup
      MultiAZ: false
      StorageType: gp2
      DBSubnetGroupName: MyDBSubnetGroup
      SubnetIds:
        - !Ref DBSubnetId
Outputs:
  WebInstance:
    Description: Public IP of the EC2 instance in the Web tier
    Value: !GetAtt
      - WebInstance
      - PublicIp
  AppInstance:
    Description: Private IP of the EC2 instance in the Application tier
    Value: !GetAtt
      - AppInstance
      - PrivateIp
  DBInstance:
    Description: DB Instance Endpoint of the RDS MySQL instance in the DB tier
    Value: !GetAtt
      - DBInstance
- Endpoint.Address
```

2.
Make sure when the development team deletes the stack, RDS DB instances should not be deleted.

Here Deletion Protection under RDS is set to TRUE



The cloudformation Template (include Deletion protection)is copied below:

```
AWSTemplateFormatVersion: 2010-09-09
Parameters:
  VpcId:
    Type: 'AWS::EC2::VPC::Id'
    Description: ID of the VPC
  PublicSubnetId:
    Type: 'AWS::EC2::Subnet::Id'
    Description: ID of the public subnet for the Web tier
  PrivateSubnetId:
    Type: 'AWS::EC2::Subnet::Id'
    Description: ID of the private subnet for the Application tier
  DBSubnetId:
    Type: 'AWS::EC2::Subnet::Id'
    Description: ID of the private subnet for the DB tier
Resources:
  WebInstanceSecurityGroup:
    Type: 'AWS::EC2::SecurityGroup'
    Properties:
      GroupDescription: Allow HTTP and SSH from the internet
      VpcId: !Ref VpcId
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: 80
          ToPort: 80
          CidrIp: 0.0.0.0/0
        - IpProtocol: tcp
          FromPort: 22
          ToPort: 22
          CidrIp: 0.0.0.0/0
  AppInstanceSecurityGroup:
    Type: 'AWS::EC2::SecurityGroup'
    Properties:
      GroupDescription: Allow only SSH from the public subnet of Web Tier-3
      VpcId: !Ref VpcId
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: 22
          ToPort: 22
          SourceSecurityGroupId: !Ref WebInstanceSecurityGroup
  DBInstanceSecurityGroup:
    Type: 'AWS::EC2::SecurityGroup'
    Properties:
      GroupDescription: >-
        Allow connection on port 3306 only from the private subnet of
        Application Tier-4
      VpcId: !Ref VpcId
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: 3306
          ToPort: 3306
          SourceSecurityGroupId: !Ref AppInstanceSecurityGroup
  WebInstance:
    Type: 'AWS::EC2::Instance'
    Properties:
      ImageId: ami-0005e0cfe09cc9050
```

```
      InstanceType: t2.micro
      KeyName: newkey-virginia
      SubnetId: !Ref PublicSubnetId
      SecurityGroupIds:
        - !Ref WebInstanceSecurityGroup
      UserData: !Base64
        'Fn::Sub': |
          #!/bin/bash
          # Your initialization script here
  AppInstance:
    Type: 'AWS::EC2::Instance'
    Properties:
      ImageId: ami-0005e0cfe09cc9050
      InstanceType: t2.micro
      KeyName: newkey-virginia
      SubnetId: !Ref PrivateSubnetId
      SecurityGroupIds:
        - !Ref AppInstanceSecurityGroup
      UserData: !Base64
        'Fn::Sub': |
          #!/bin/bash
          # Your initialization script here
  DBInstance:
    Type: 'AWS::RDS::DBInstance'
    Properties:
      Engine: mysql
      DBInstanceIdentifier: MyDBInstance
      MasterUsername: admin
      MasterUserPassword: adminpassword
      AllocatedStorage: 20
      DBInstanceClass: db.t2.micro
      VPCSecurityGroups:
        - !Ref DBInstanceSecurityGroup
      MultiAZ: false
      StorageType: gp2
      DBSubnetGroupName: MyDBSubnetGroup
      SubnetIds:
        - !Ref DBSubnetId
      DeletionProtection: true
Outputs:
  WebInstance:
    Description: Public IP of the EC2 instance in the Web tier
    Value: !GetAtt
      - WebInstance
      - PublicIp
  AppInstance:
    Description: Private IP of the EC2 instance in the Application tier
    Value: !GetAtt
      - AppInstance
      - PrivateIp
  DBInstance:
    Description: DB Instance Endpoint of the RDS MySQL instance in the DB tier
    Value: !GetAtt
      - DBInstance
- Endpoint.Address
```

Propose a solution so that:
Development team can test their code without having to involve the system admins and can invest their time in testing the code rather than provisioning, configuring and updating the resources needed to test the code.

To enable the development team to test their code without involving system administrators and to streamline the process, you can use AWS CloudFormation to automate the provisioning and management of resources. Here's a solution:

AWS CloudFormation Template:

Create an AWS CloudFormation template that defines the infrastructure needed for the web-based application. This includes instances, security groups, RDS instances, and any other required resources.

Launch Stack:

Provide the development team with a pre-configured AWS CloudFormation template. They can use the AWS Management Console, AWS CLI, or SDKs to launch the stack without having to manually provision resources.

Parameterize Key Configuration:

Use parameters in your CloudFormation template for configurable values such as instance types, AMI IDs, and database credentials. This allows the development team to customize the deployment without modifying the template.

Scripted Deployment:

Encourage the development team to use scripts or automation tools that leverage AWS CloudFormation. This can be integrated into their continuous integration/continuous deployment (CI/CD) pipelines, making it easy to deploy and test code changes.

Version Control:

Store the CloudFormation template in version control (e.g., Git). This enables the development team to track changes, collaborate, and roll back to previous versions if needed.