Problem Statement:

You work for XYZ Corporation. Your corporation wants to launch a new web-based application. The development team has prepared the code but it is not tested yet. The development team needs the system admins to build a web server to test the code but the system admins are not available.

Tasks To Be Performed:

1. Web tier: Launch an instance in a public subnet and that instance should allow HTTP and SSH from the internet.

2. Application tier: Launch an instance in a private subnet of the web tier and it should allow only SSH from the public subnet of Web Tier-3.

3. DB tier: Launch an RDS MYSQL instance in a private subnet and it should allow connection on port 3306 only from the private subnet of Application Tier-4.

4. Setup a Route 53 hosted zone and direct traffic to the EC2 instance.

You have been also asked to propose a solution so that:

1. 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.

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

Procedure: -

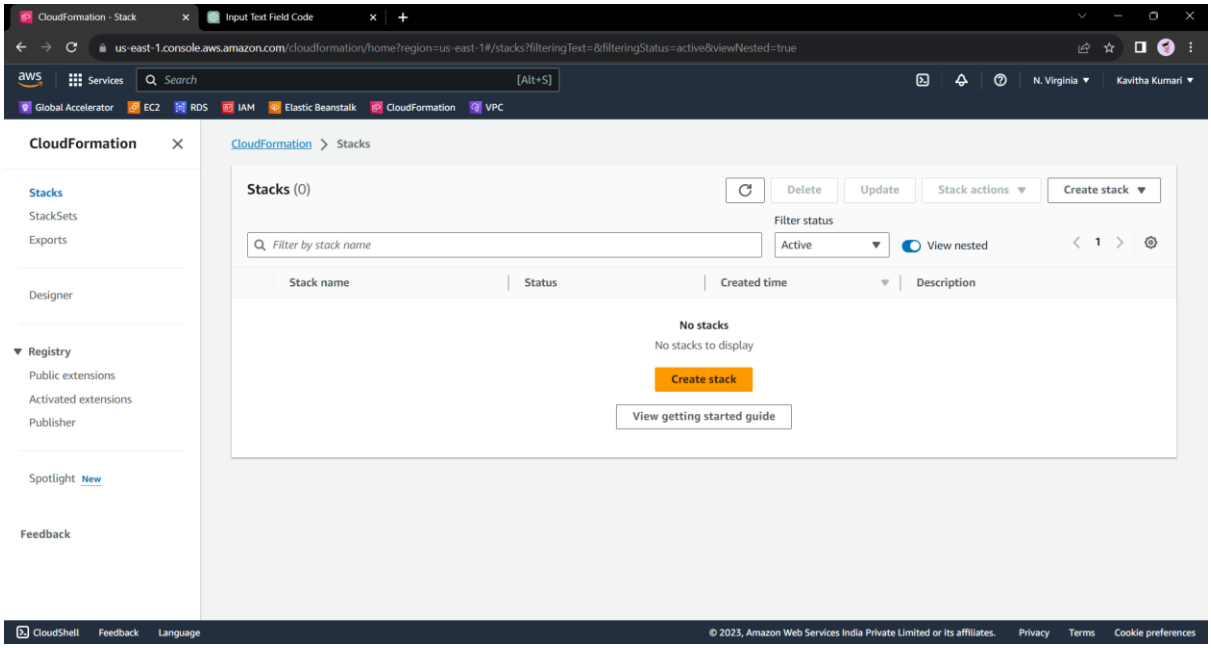
To achieve the tasks and propose a solution for automating the setup and testing environment, you can use AWS CloudFormation along with AWS services like EC2, RDS, and Route 53. CloudFormation allows you to define and provision infrastructure as code, making it easier to create and manage your resources consistently. Additionally, you can use CloudFormation Stack Policies to prevent the deletion of specific resources like the RDS DB instance.

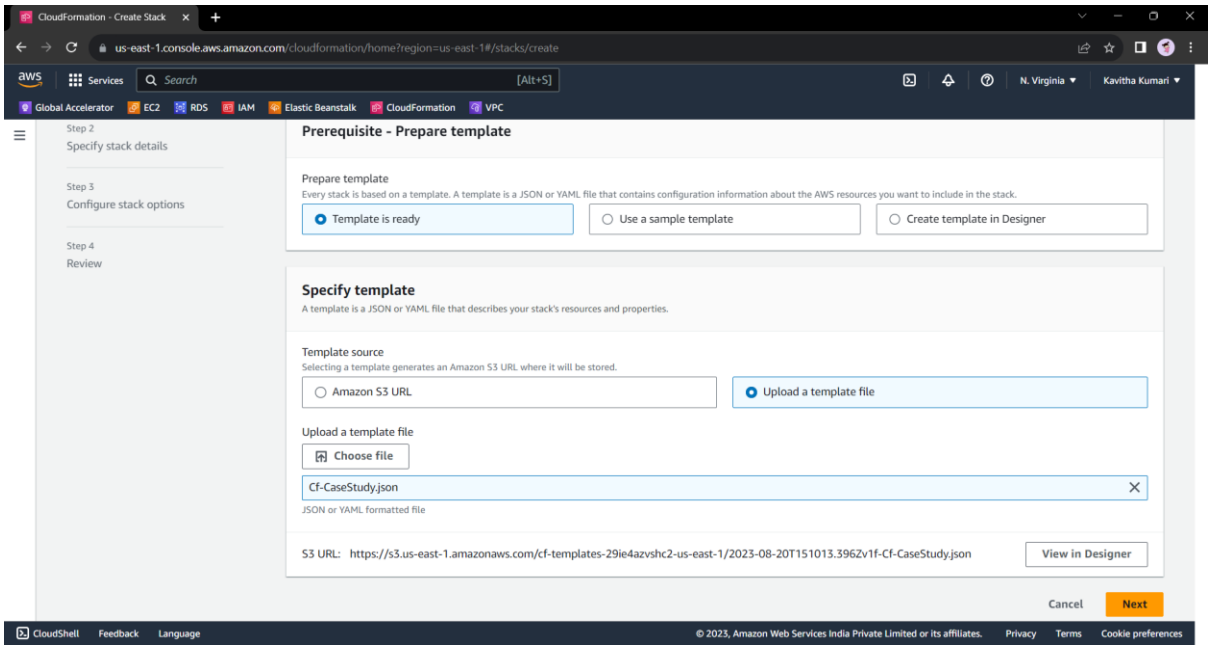
Let us create the stack which has the following resources.

- VPC with the CIDR block as 10.10.0.0/16
- Internet gateway attached to the VPC.
- SubnetA with the CIDR block as 10.10.1.0/24 and create a Route table where we give the target of internet gateway which we create to make it as public route table. SubnetA will be associated with the Public route table.
- SubnetB with the CIDR block as 10.10.2.0/24 and create the Route table which is private and associate SubnetB with it.
- NAT gateway where we will associate the subnetA and we will allocate the Elastic IP address for it. In the Public route table, we will give the destination CIDR block as 0.0.0.0/0 and target as NAT gateway.

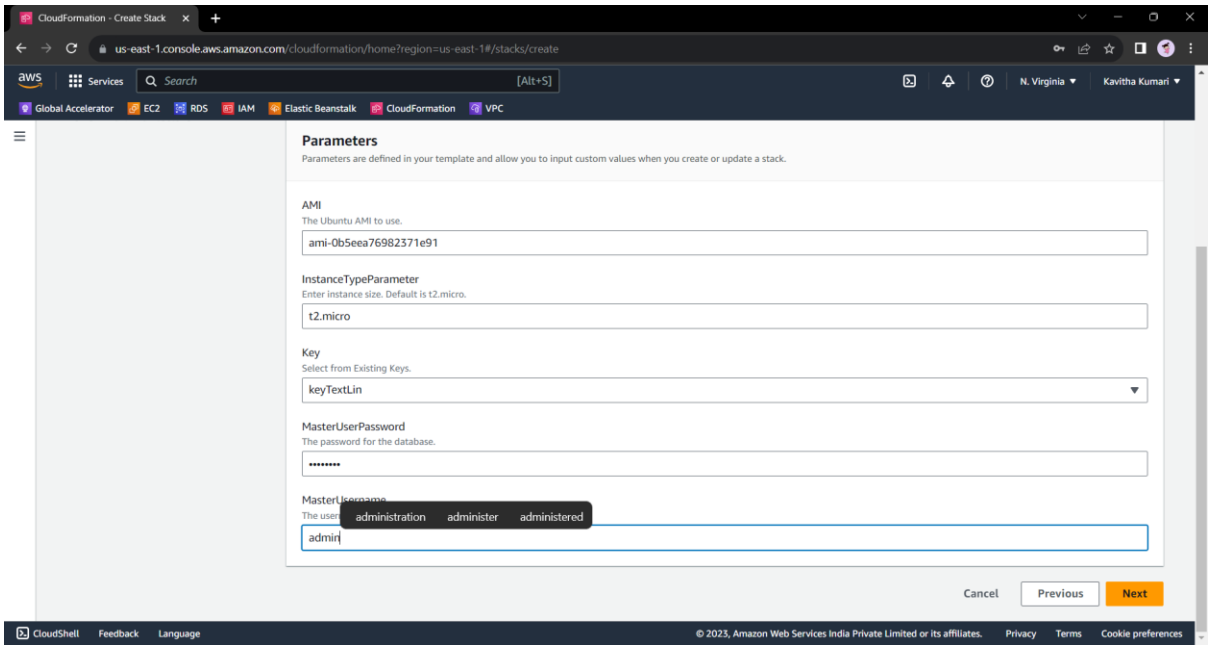
- Security group for the VPC and we will allow the TCP with the port number 22 and it will allow traffic from anywhere.
- Security group for the database.
- MYSQL database.
- Linuxpublic intance and Linuxpublic instance
- Hosted zone
- https://github.com/Origamini/JSONFiles/blob/main/Cf-CaseStudy.json
- Form the above link you can directly fork the JSON file for the project.

Let us create a stack.

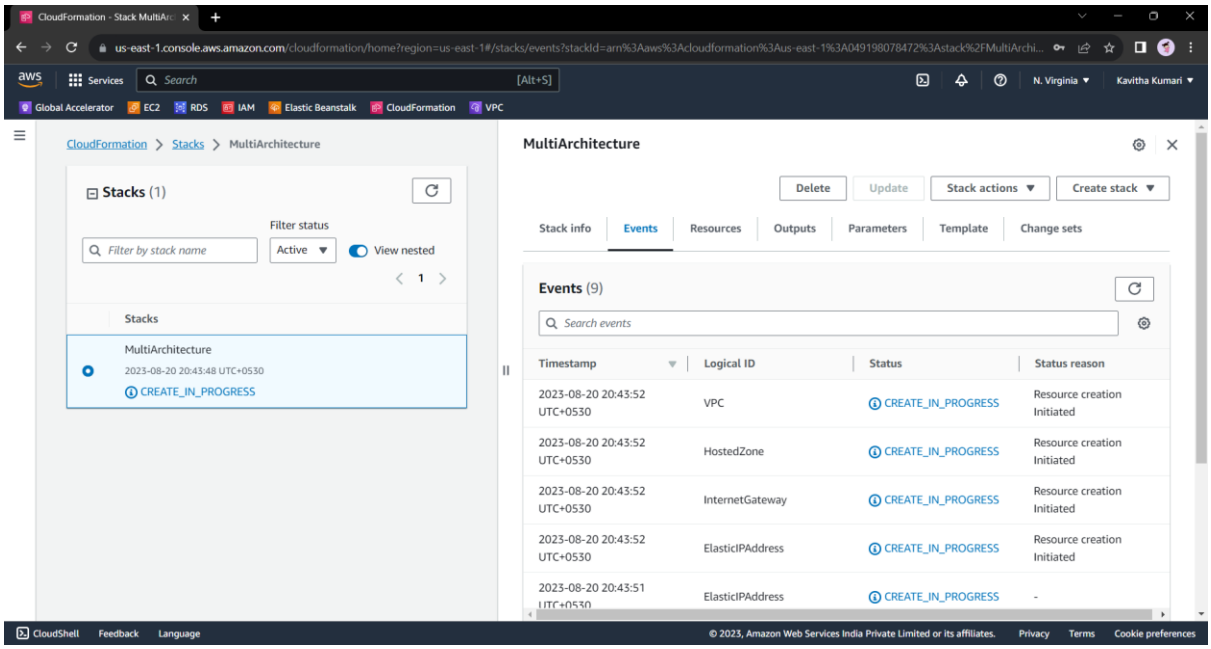




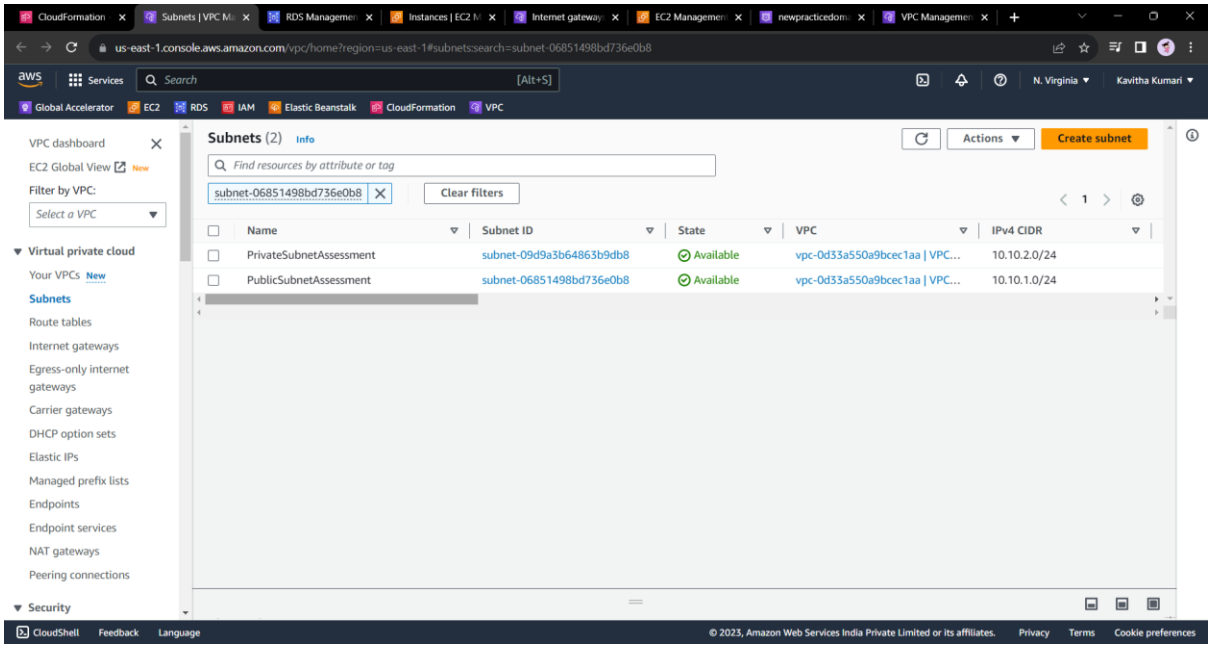
- Click on next



- Leave everything default and click on next.



- The creation is in progress.
- Thus, the resources will be created.


us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#subnets:search=subnet-06851498bd736e0b8
Subnets (2) Info
Actions
Create subnet
Find resources by attribute or tag
subnet-06851498bd736e0b8
Clear filters
Name
Subnet ID
State
VPC
IPv4 CIDR
PrivateSubnetAssessment
subnet-09d9a3b64863b9db8
Available
vpc-0d33a550a9bcec1aa | VPC...
10.10.2.0/24
PublicSubnetAssessment
subnet-06851498bd736e0b8
Available
vpc-0d33a550a9bcec1aa | VPC...
10.10.1.0/24
VPC dashboard
EC2 Global View
Filter by VPC:
Select a VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
CloudShell
Feedback
Language
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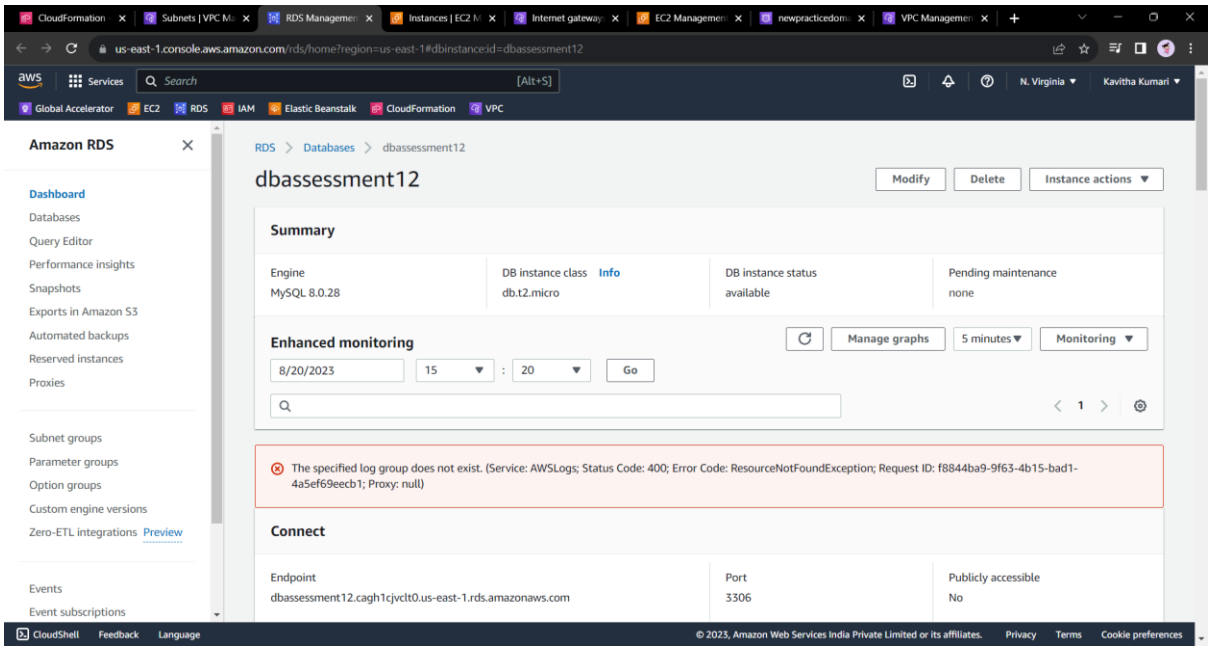
us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#dbinstanceid=dbassessment12
Amazon RDS
RDS > Databases > dbassessment12
dbassessment12
Modify
Delete
Instance actions
Summary
Engine
MySQL 8.0.28
DB instance class Info
db.t2.micro
DB instance status
available
Pending maintenance
none
Enhanced monitoring
Manage graphs
5 minutes
Monitoring
8/20/2023
15
20
Go
The specified log group does not exist. (Service: AWSLogs; Status Code: 400; Error Code: ResourceNotFoundException; Request ID: f8844ba9-9f63-4b15-bad1-4a5ef69eecb1; Proxy: null)
Connect
Endpoint
dbassessment12.cagh1cjvclt0.us-east-1.rds.amazonaws.com
Port
3306
Publicly accessible
No
Dashboard
Databases
Query Editor
Performance insights
Snapshots
Exports in Amazon S3
Automated backups
Reserved instances
Proxies
Subnet groups
Parameter groups
Option groups
Custom engine versions
Zero-ETL integrations Preview
Events
Event subscriptions
CloudShell
Feedback
Language
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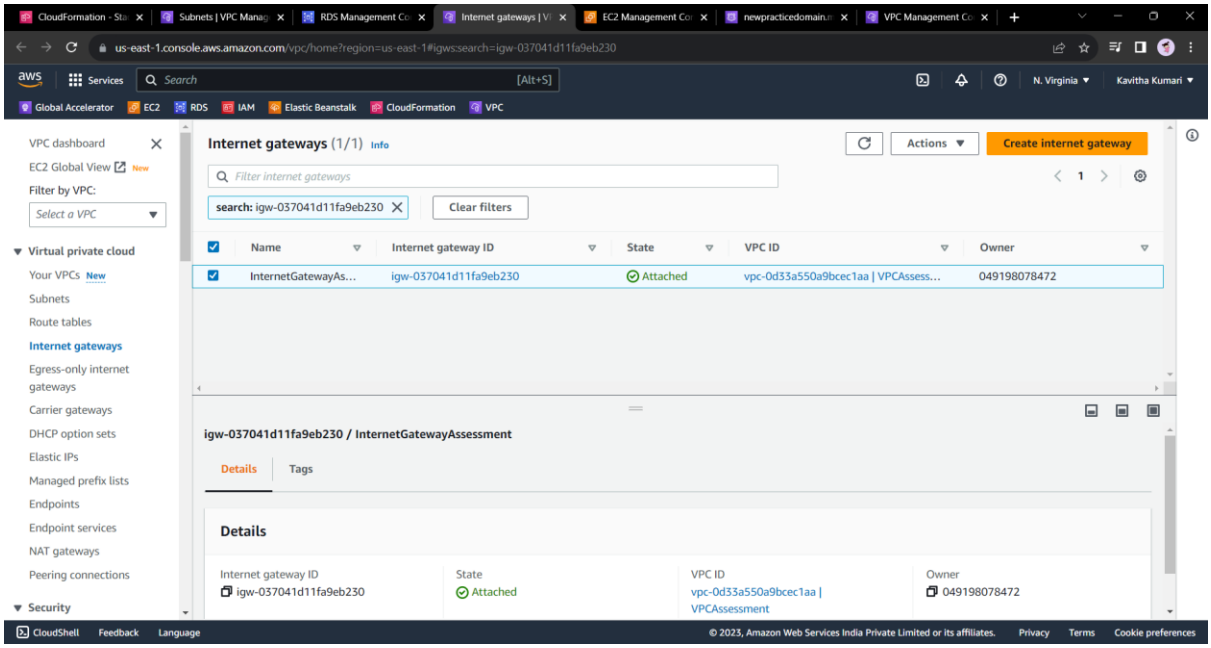
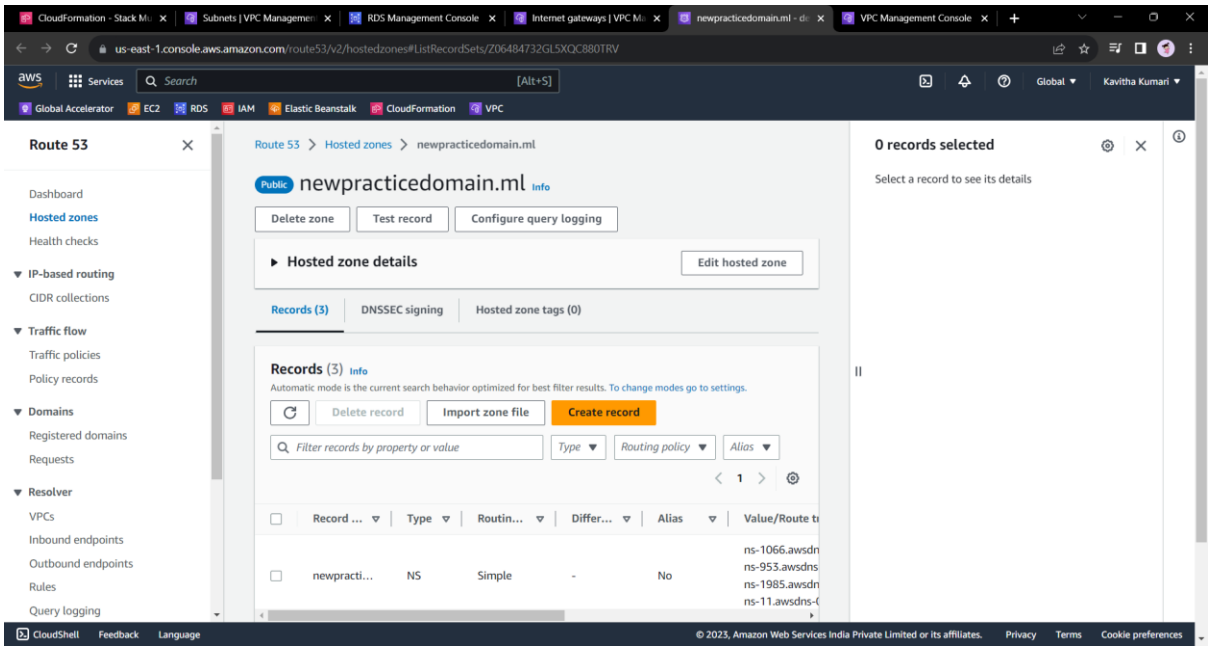
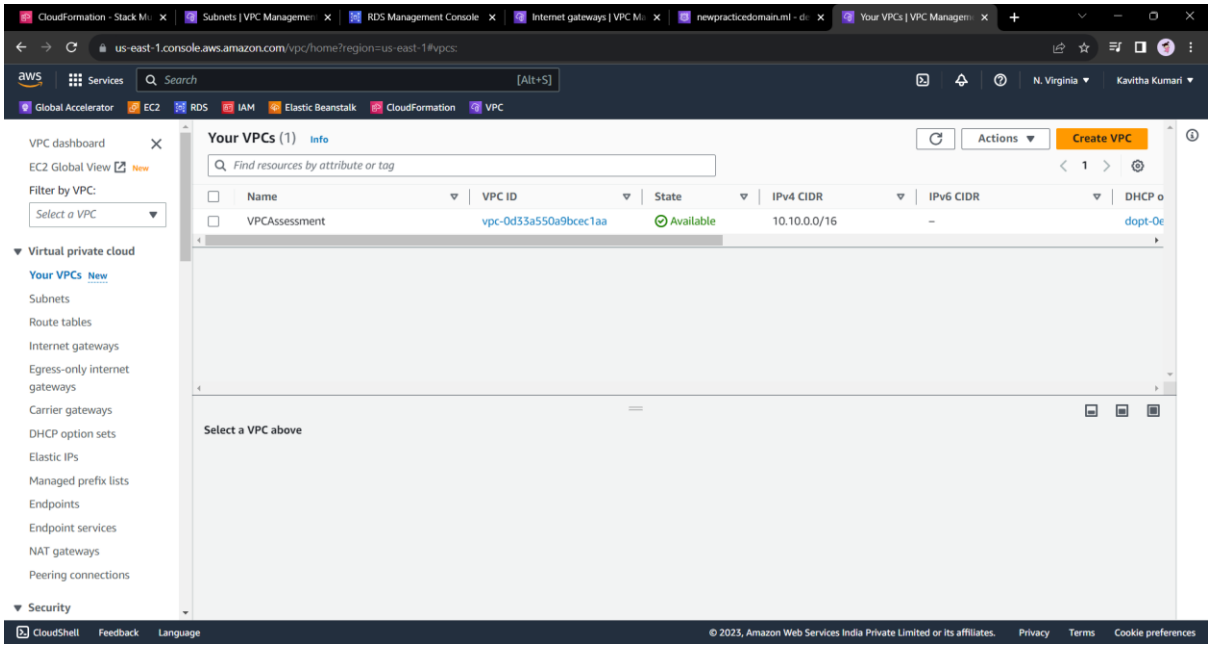

us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#igwssearch=igw-037041d11fa9eb230
Internet gateways (1/1) Info
Actions
Create internet gateway
search: igw-037041d11fa9eb230
Clear filters
Name
Internet gateway ID
State
VPC ID
Owner
InternetGatewayAs...
igw-037041d11fa9eb230
Attached
vpc-0d33a550a9bcec1aa | VPCAssess...
049198078472
igw-037041d11fa9eb230 / InternetGatewayAssessment
Details
Tags
Internet gateway ID
State
VPC ID
Owner
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security


us-east-1.console.aws.amazon.com/route53/v2/hostedzones#ListRecordSets/Z06484732GL5XQC880TRV
Route 53
Route 53 > Hosted zones > newpracticedomain.ml
Public
newpracticedomain.ml Info
Delete zone
Test record
Configure query logging
Hosted zone details
Edit hosted zone
Records (3)
DNSSEC signing
Hosted zone tags (0)
Records (3) Info
Automatic mode is the current search behavior optimized for best filter results. To change modes go to settings.
Delete record
Import zone file
Create record
Filter records by property or value
Type
Routing policy
Alias
Record ...
Type
Routin...
Differ...
Alias
Value/Route ti
newpracti...
NS
Simple
-
No
ns-1066.awsdn
ns-953.awsdns
ns-1985.awsdn
0 records selected
Select a record to see its details
Dashboard
Hosted zones
Health checks
IP-based routing
CIDR collections
Traffic flow
Traffic policies
Policy records
Domains
Registered domains
Requests
Resolver
VPCs
Inbound endpoints
Outbound endpoints
Rules
Query logging



Proposed Solution:

- **Automated Provisioning:** Provide the development team with a CloudFormation template and instructions on how to deploy the stack. They can launch the stack on their own using the AWS Management Console or AWS Command Line Interface (CLI).
- **Deletion Protection for RDS:** To prevent the RDS instance from being deleted when the stack is deleted, set up a CloudFormation stack policy that prevents updates or deletions of the RDS resource. This ensures that the development team can safely delete the stack without affecting the RDS instance.
- **Testing and Validation:** The development team can test their code on the launched instances in the designated subnets. They can access the instances using the provided IP addresses. The Route 53 hosted zone can be configured to route traffic to the WebInstance using the Public IP or an Elastic Load Balancer (not included in the template).

By providing the CloudFormation template and the solution approach, you empower the development team to create and manage their testing environment independently without needing the involvement of system administrators. This approach encourages automation, reduces manual intervention, and promotes faster development and testing cycles.

----End----