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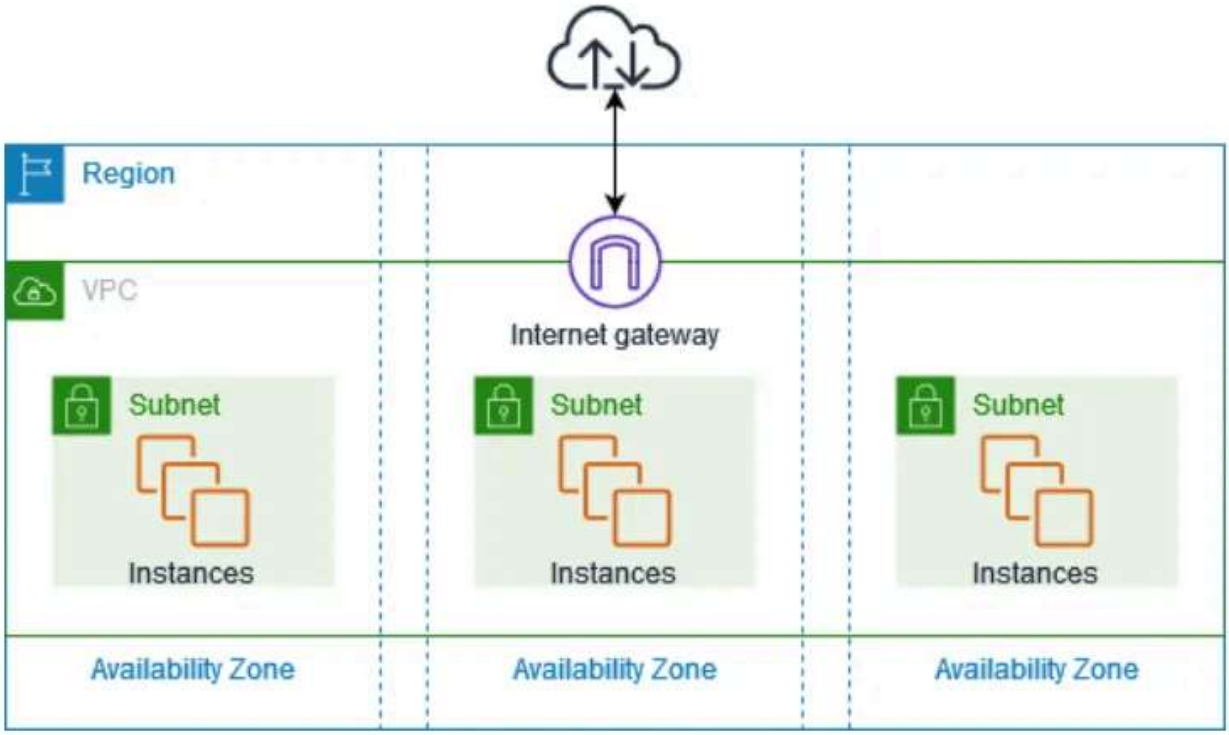
What is VPC in AWS ? How to Create a VPC in AWS?

Amazon Virtual Private Cloud (Amazon VPC) enables you to launch AWS resources into a virtual network that you've defined. This virtual network closely resembles a traditional network that you'd operate in your own data center , with the benefits of using the scalable infrastructure of AWS.

Why we need VPC ?

AWS VPC allows you to create a secure and isolated network for your resources, which provides a high level of security and control. This means that you can create your own private network, which is not accessible from the internet or other networks.

The following diagram shows an example VPC. The VPC has one subnet in each of the Availability Zones in the Region, EC2 instances in each subnet, and an internet gateway to allow communication between the resources in your VPC and the internet.



AWS VPC Components:

Subnet : subnet is a range of IP addresses in your VPC. You can launch AWS resources into a specified subnet. Use a public subnet for resources that must be connected to the internet, and a private subnet for resources that won't be connected to the internet.

Route Tables: A route table is a set of rules that determines how traffic is directed in your VPC. You can create multiple route tables and assign them to different subnets to control the flow of traffic.

Internet Gateway: AWS component that provides a path for network traffic to travel between a Virtual Private Cloud (VPC) and the public internet. It acts as a bridge between the two networks, enabling inbound and outbound connections from resources within the VPC.

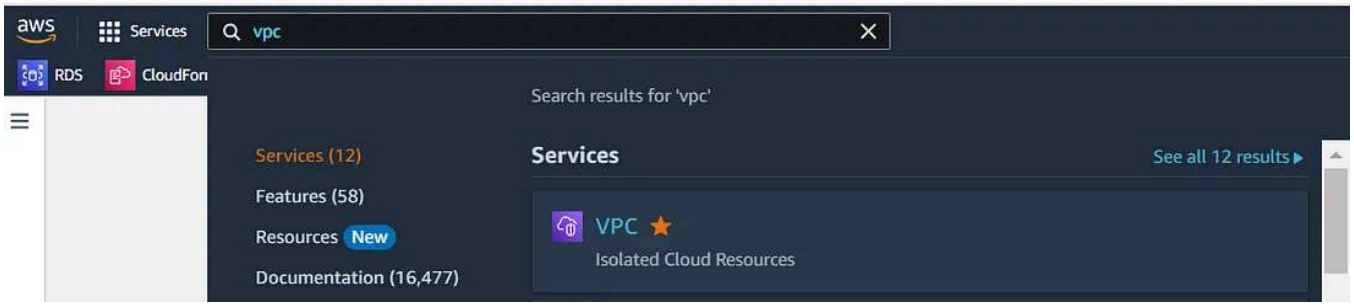
NAT Gateway: A network address translation (NAT) gateway enables instances in a private subnet to connect to the internet or other AWS services while preventing the internet from initiating connections with the instances.

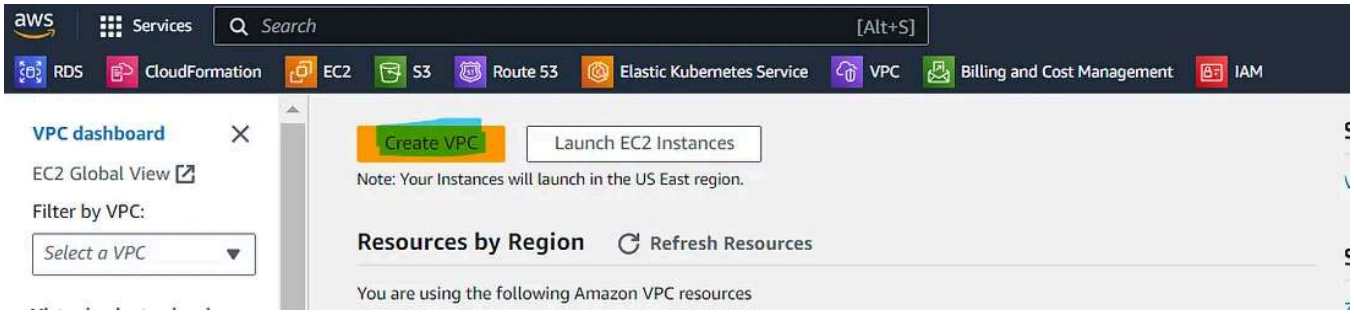
Security Groups: Security groups act as a virtual firewall for your instances. You can create security groups to control inbound and outbound traffic for your instances. When you launch an instance in a VPC, you can assign up to five security groups to

the instance. Security groups act at the instance level, not the subnet level. Therefore, each instance in a subnet in your VPC could be assigned to a different set of security groups. If you don't specify a particular group at launch time, the instance is automatically assigned to the default security group for the VPC.

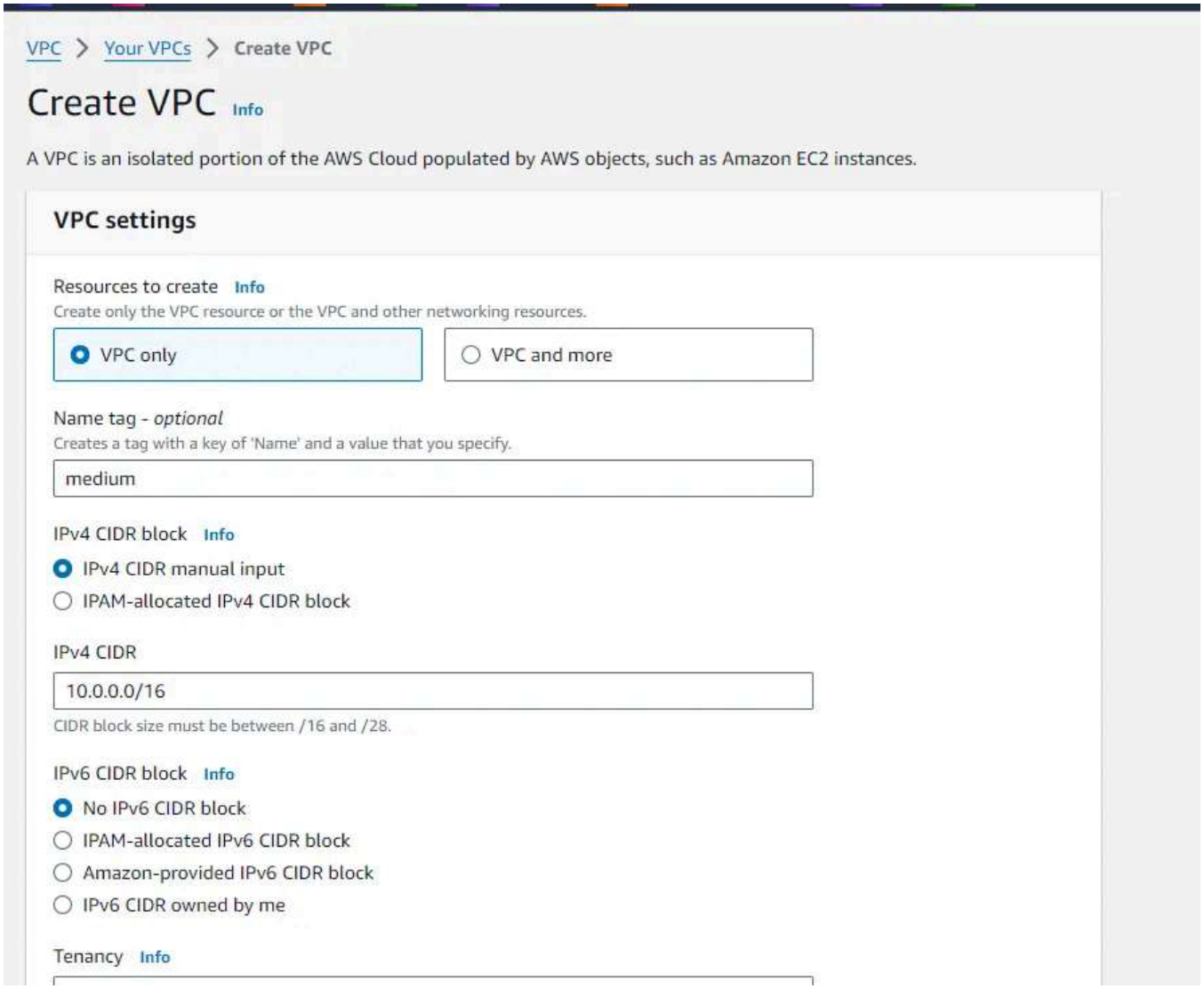
Network Access Control Lists (NACLs): NACLs are another layer of security that act as a firewall for subnets. You can use NACLs to control inbound and outbound traffic at the subnet level.

Creating your own VPC:



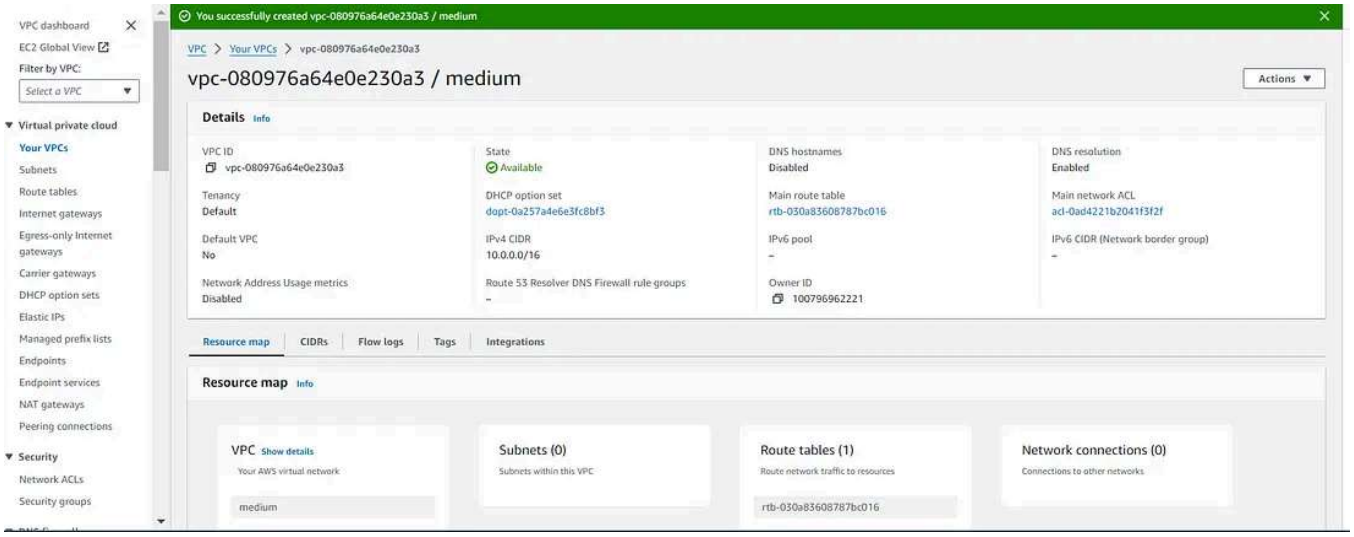


If you clicked on the button "**Create VPC**" you will get following screen.

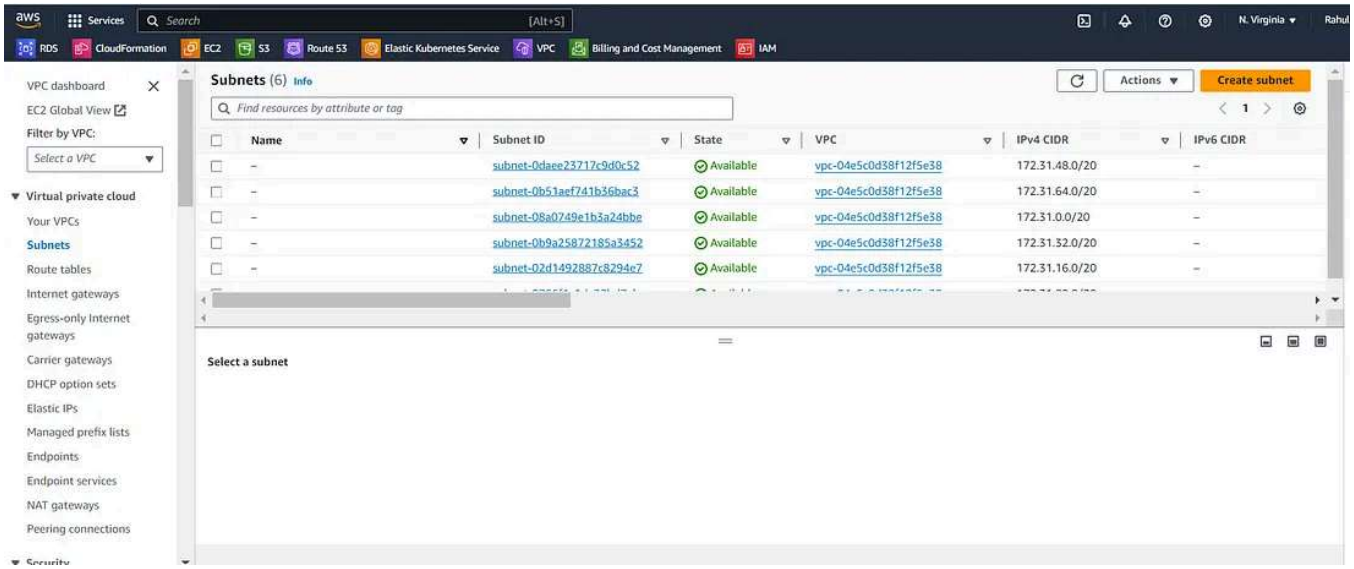


Now give your VPC name and your custom CIDR(Classless Inter Domain Routing) Range as I have given both parameters as you can see in below image.

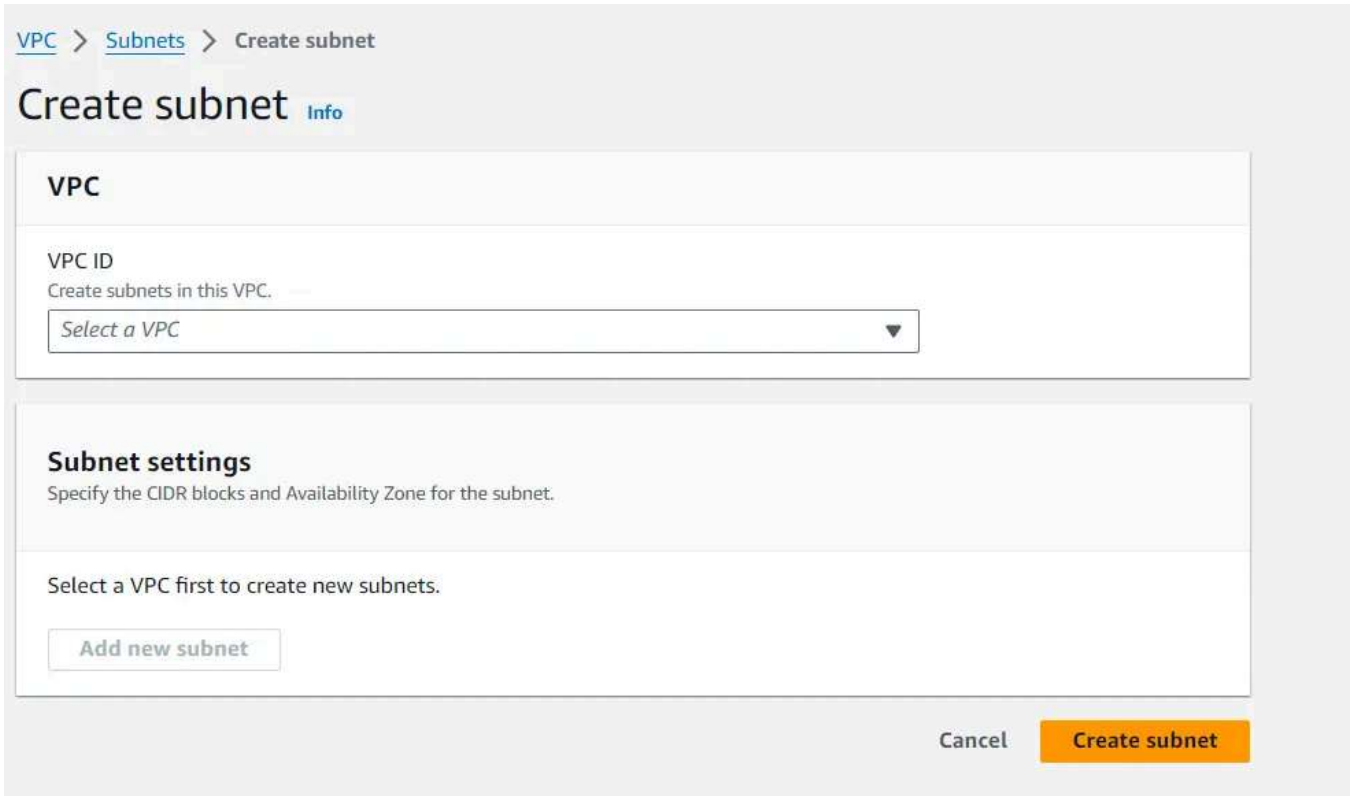
After Click on the “**Create VPC**” following screen will appear.



Step 2: Click on the “Subnets” in the left-side pane, after that the following screen will appear.



Step 2.1: Click on the **“Create Subnet”** After that following screen will appear.

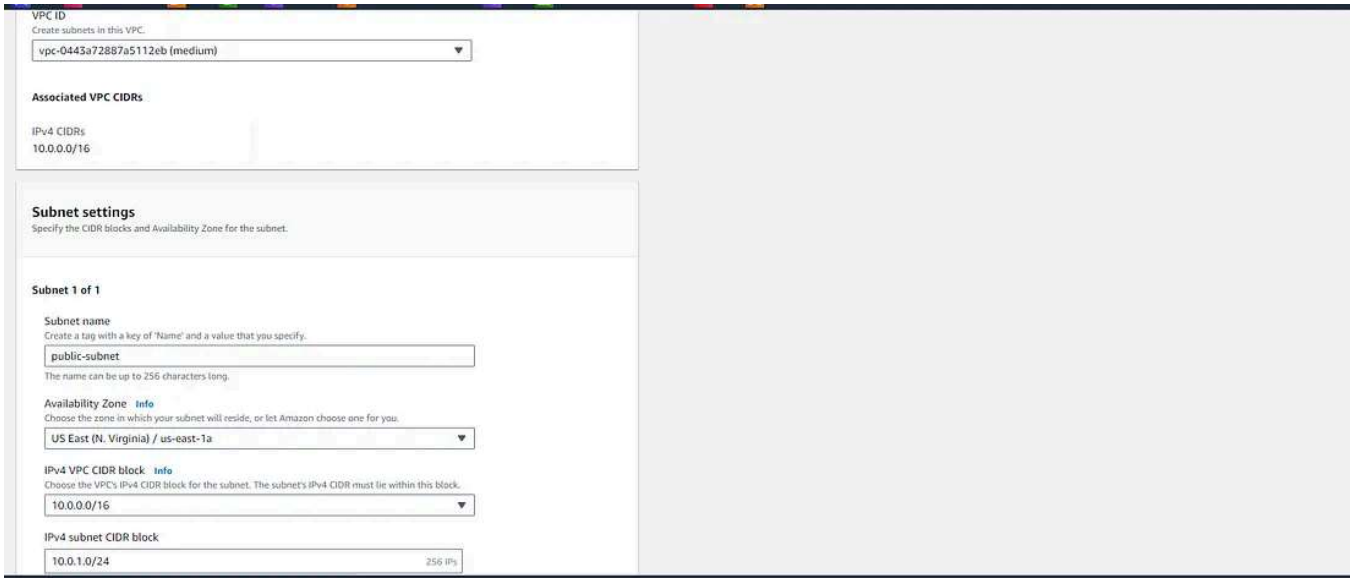


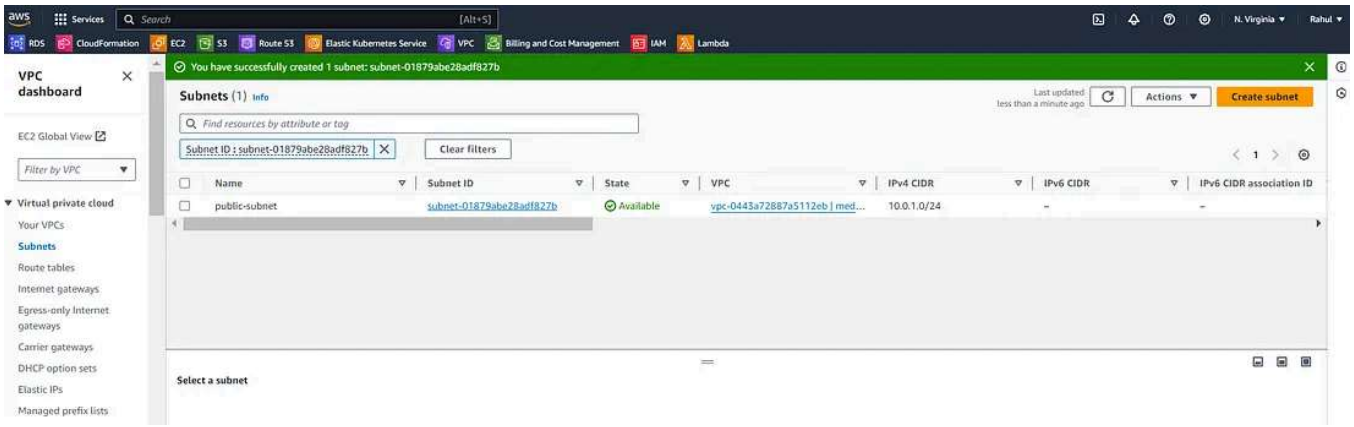
Step 2.2: After selecting the “VPC ID” do the following things:

- Choose your custom “VPC ID” from the dropdown menu.
- Provide a subnet name.
- Select the desired Availability Zone (AZ) for the subnet.

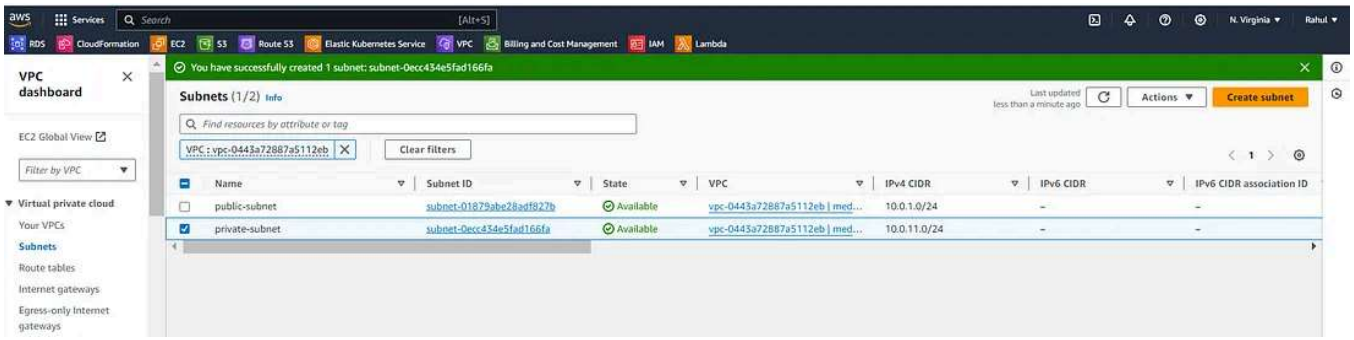
- Fill in the subnet range.
- Click on “Create Subnet.”

For reference following are the screen shot of the steps.



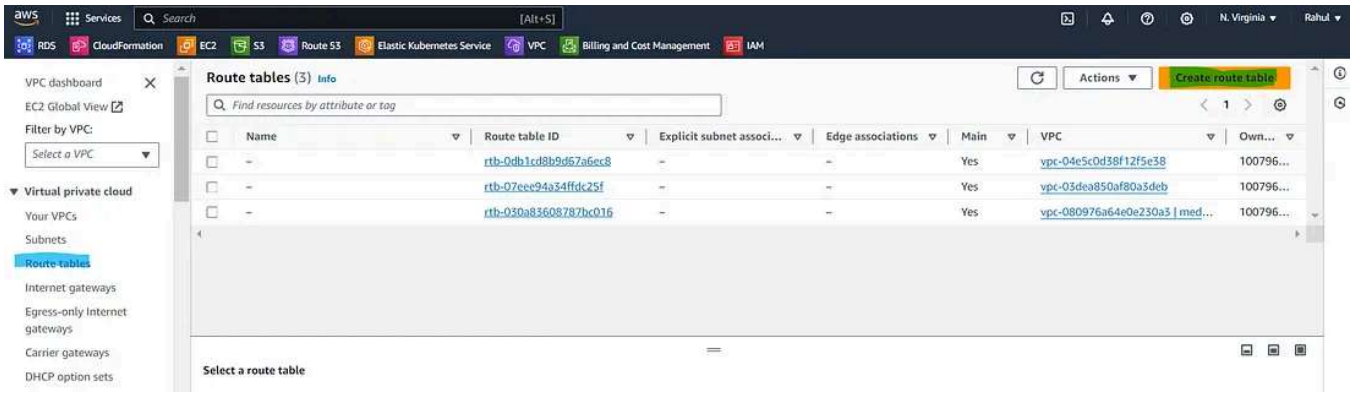


Now create Private-subnet as well , please do follow same steps like above.



Step 3: Now create Route Table for that click on the “**Route Tables**” that is present on the left side window pane, after click on the “**Route Tables**” following screen will

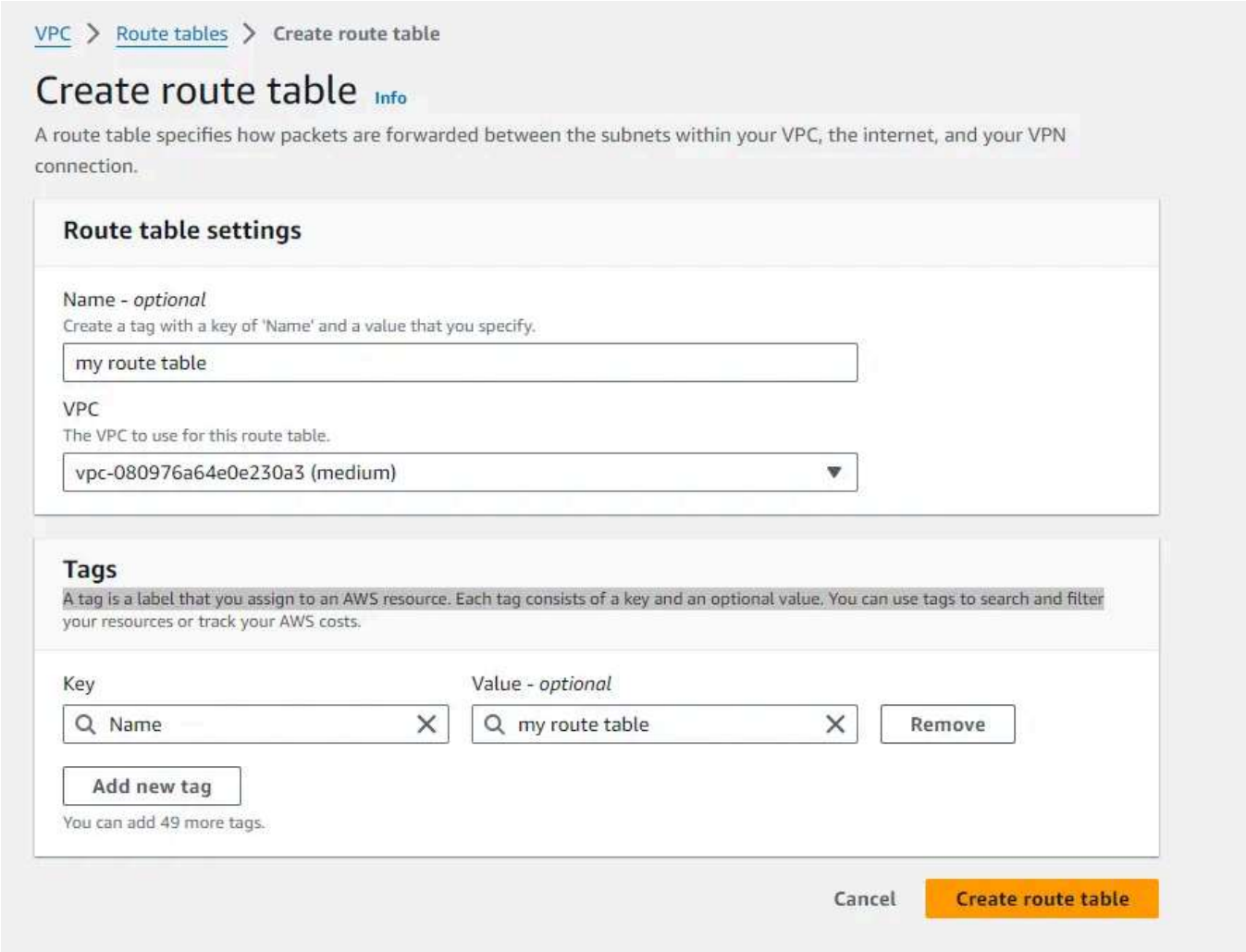
appear.



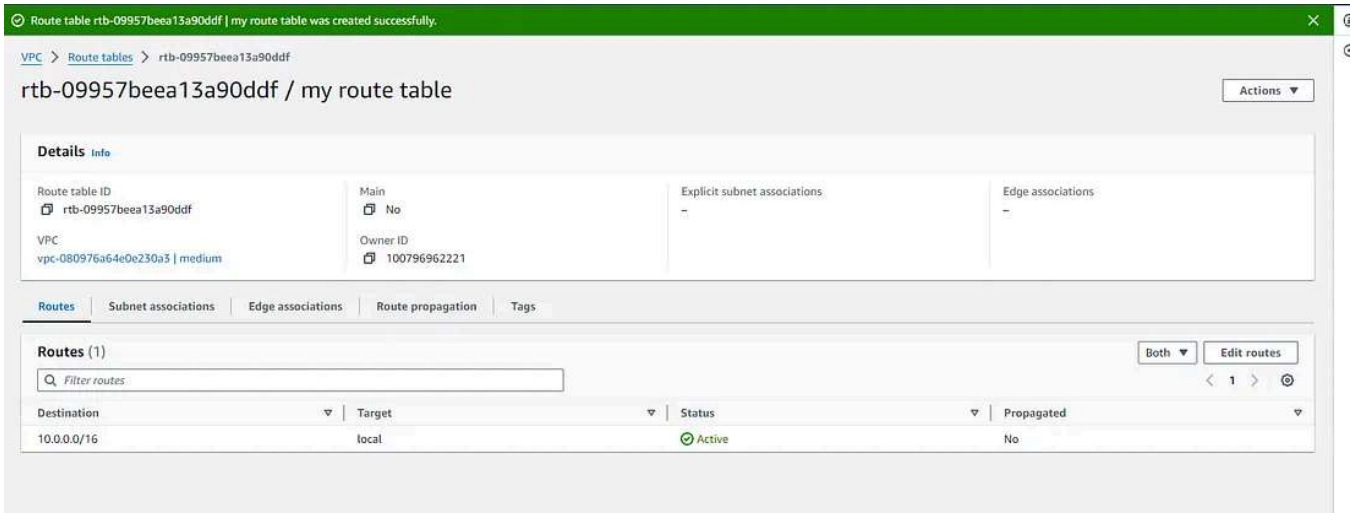
Step 3.1:

- Click on the orange “Create route table” button.
- Provide a name for the route table.
- Select the VPC for which you want to create the route table.
- Click the “Create route table” button.

For Reference following are the screenshot of the steps:



After clicking on the “Create route table” following screen will appear.

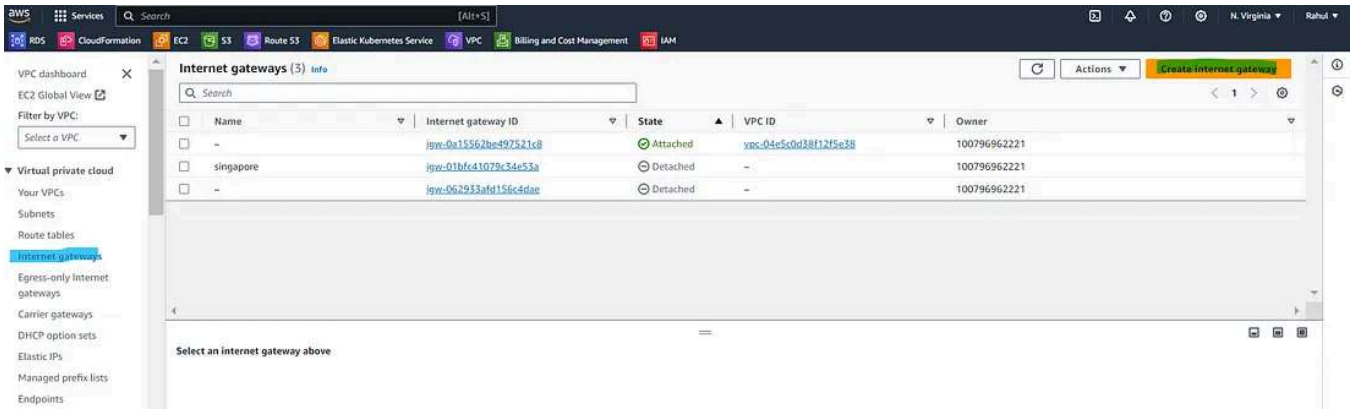


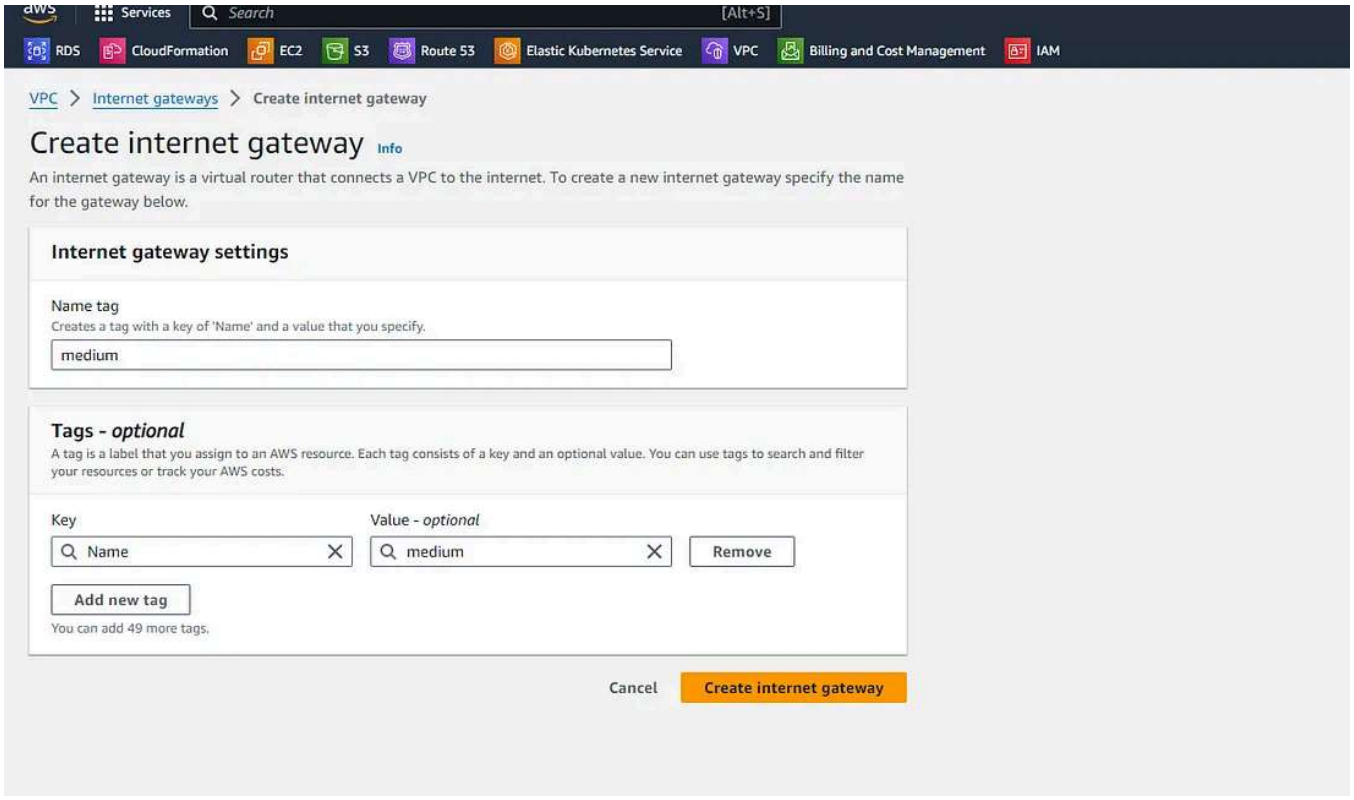
Step 4:

- Click on “Internet gateways.”
- Click the orange “Create Internet Gateway” button.
- Provide a name for the Internet gateway.

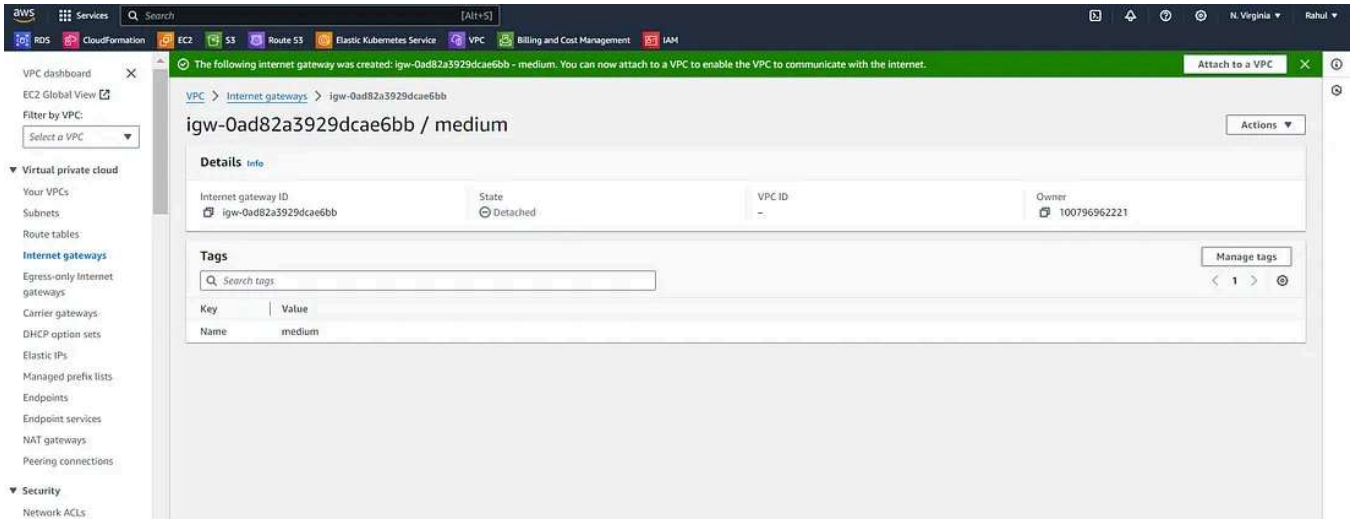
- Click on the “Create Internet Gateway” button.

For reference following are the screenshot of the steps:





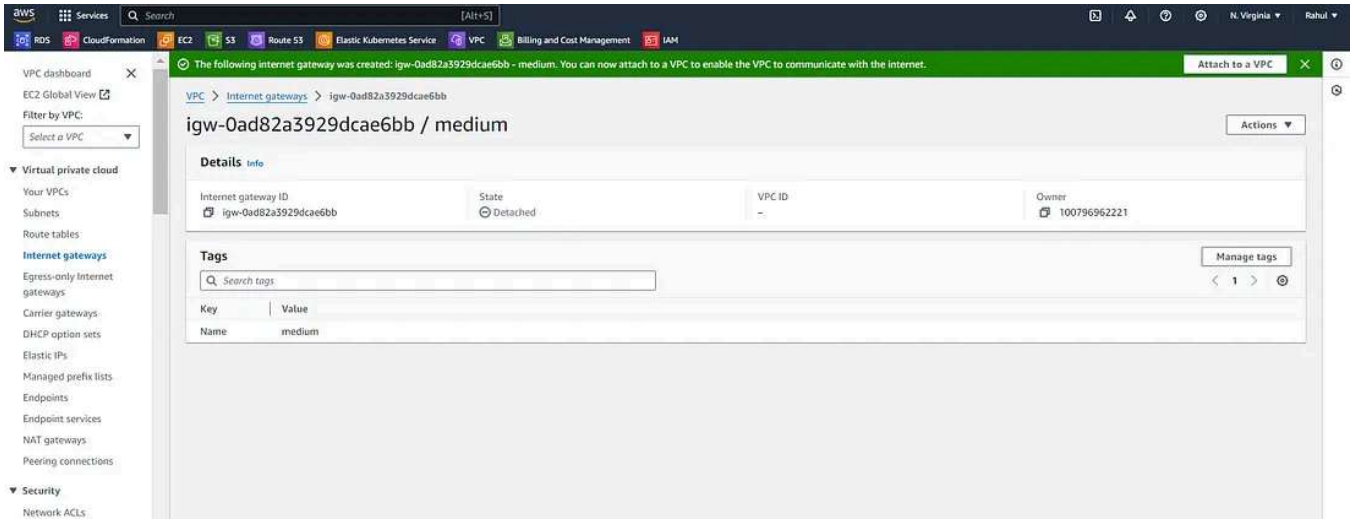
After clicking on the “**Create Internet Gateway**” button following screen will appear.

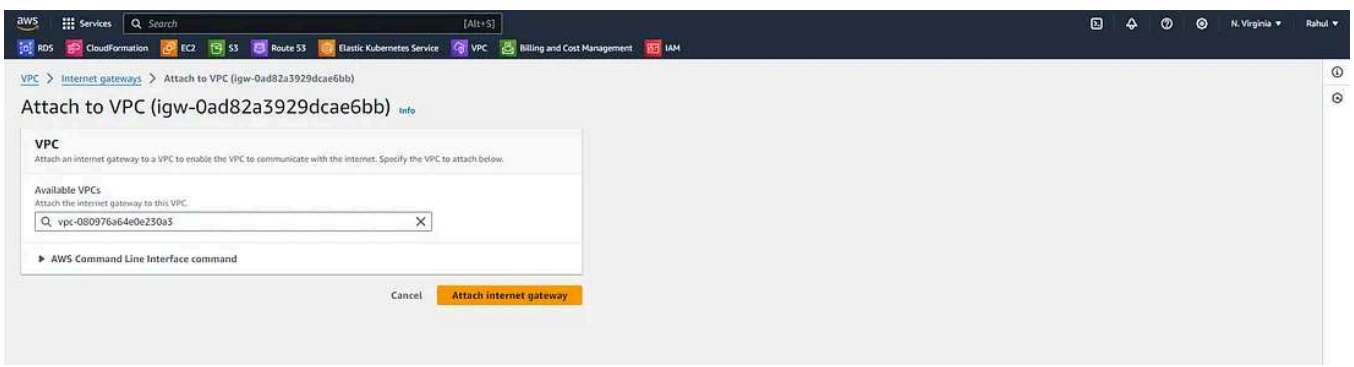


Step 4.1:

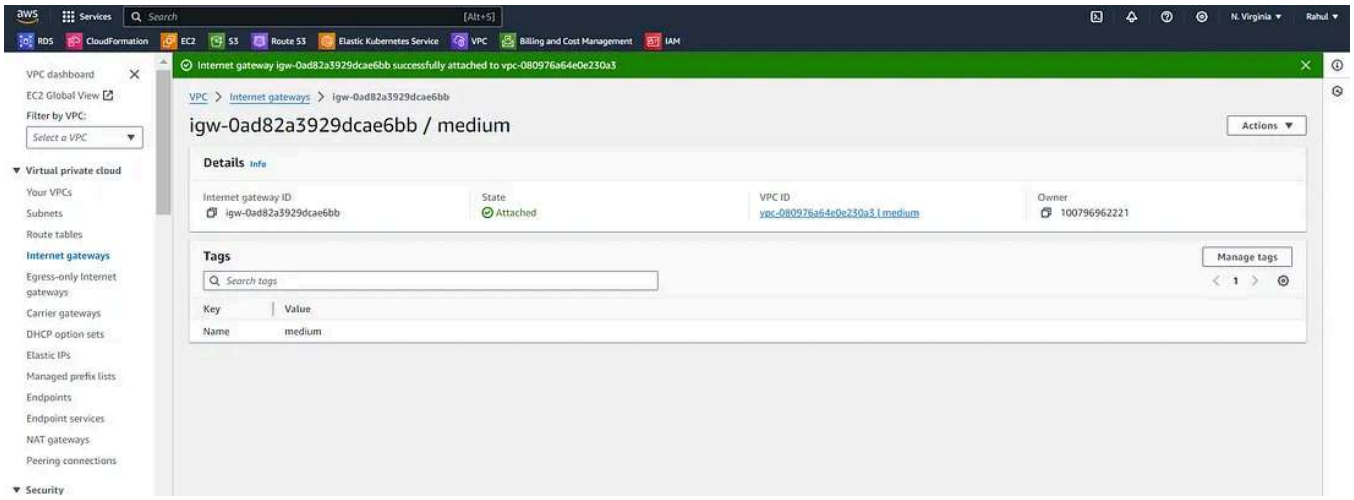
- Click on the “Attach to a VPC” button in white.
- Alternatively, click on the “Action” button, then select “Attach to VPC.”
- Choose your VPC from the list.
- Click on the “Attach Internet Gateway” button.

Following are the screenshot of the above steps for reference:





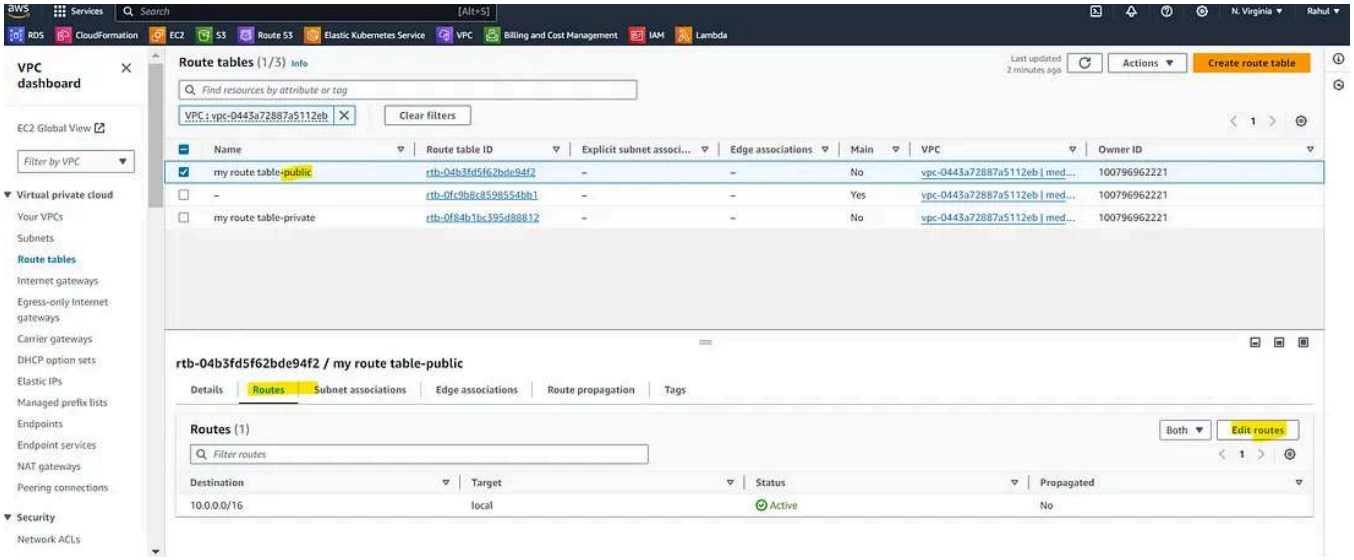
After clicking on the “Attach internet gateway” following screen will appear.

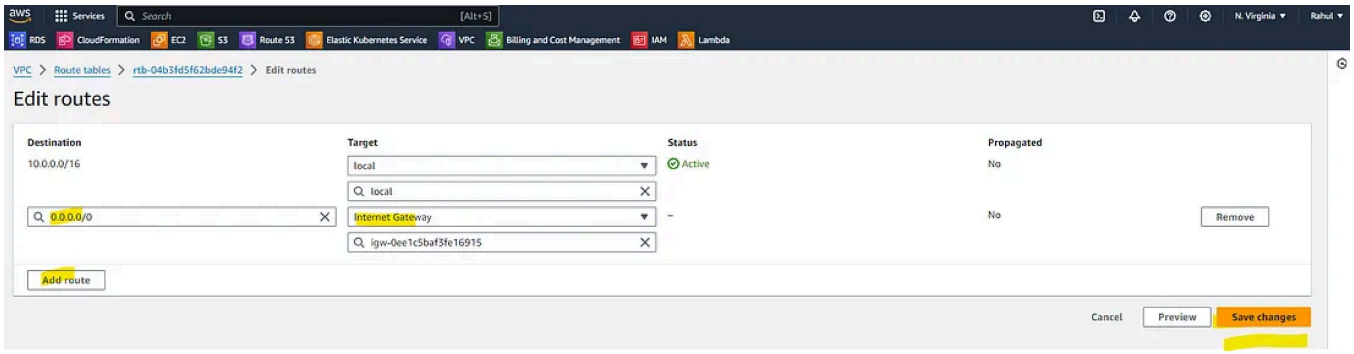


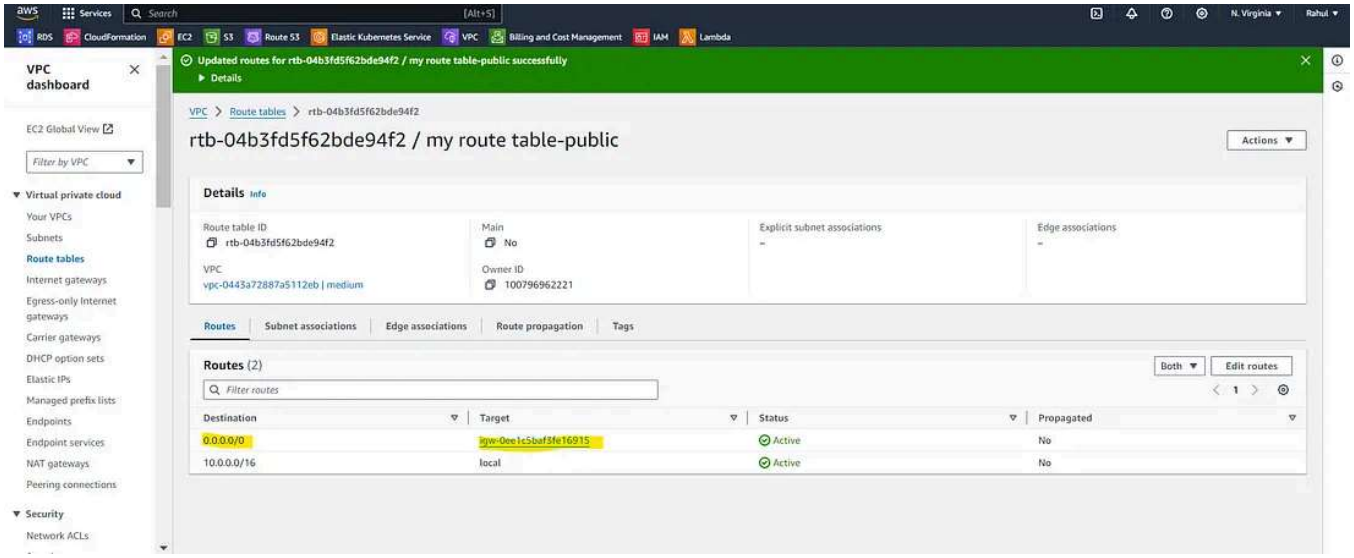
Step 5: Configure the Route table with Internet gateway and subnet.

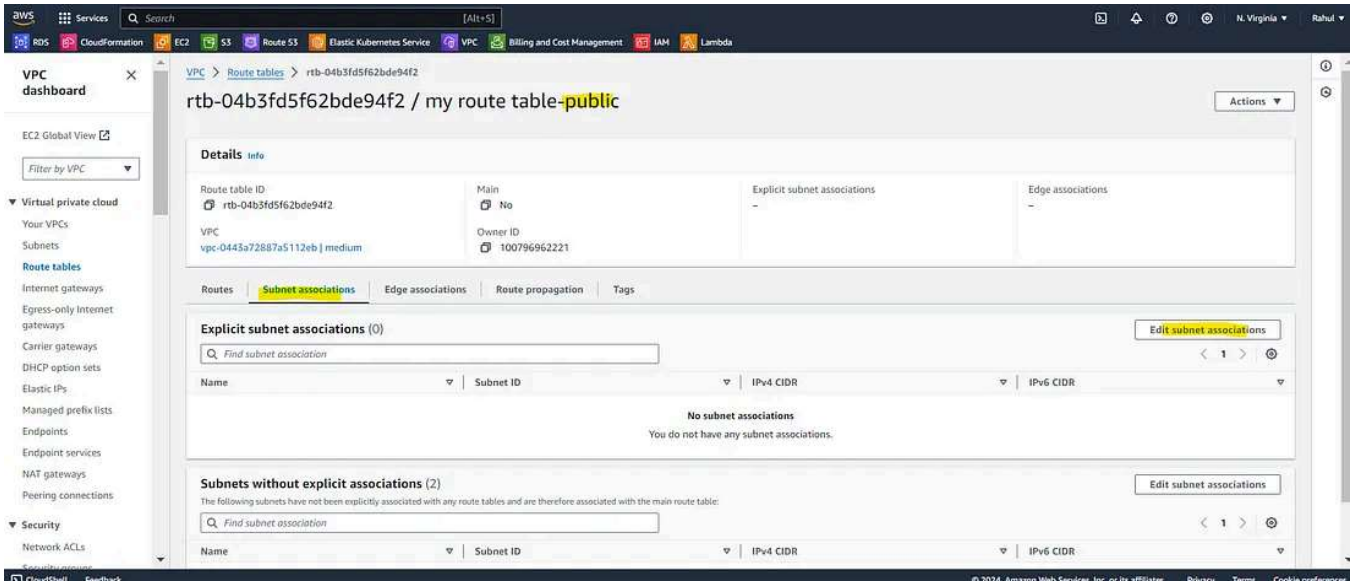
- Go to “Route Tables.”
- Select your desired route table.
- Click on the “Routes” tab.
- Click “Edit Routes.”
- Click “Add Route.”
- Enter the destination IP address CIDR value (e.g., 0.0.0.0/0) to communicate with any IP address or use CIDR range 0.0.0.0/0 for internet access.
- Select the target as “Internet Gateway.”
- Click “Save Changes.”
- Click “ Subnet associations”
- Click “Edit subnet associations”
- Click on subnet “check box”
- Click on “Save Associations”

Following are the screenshots of the above steps for your reference:

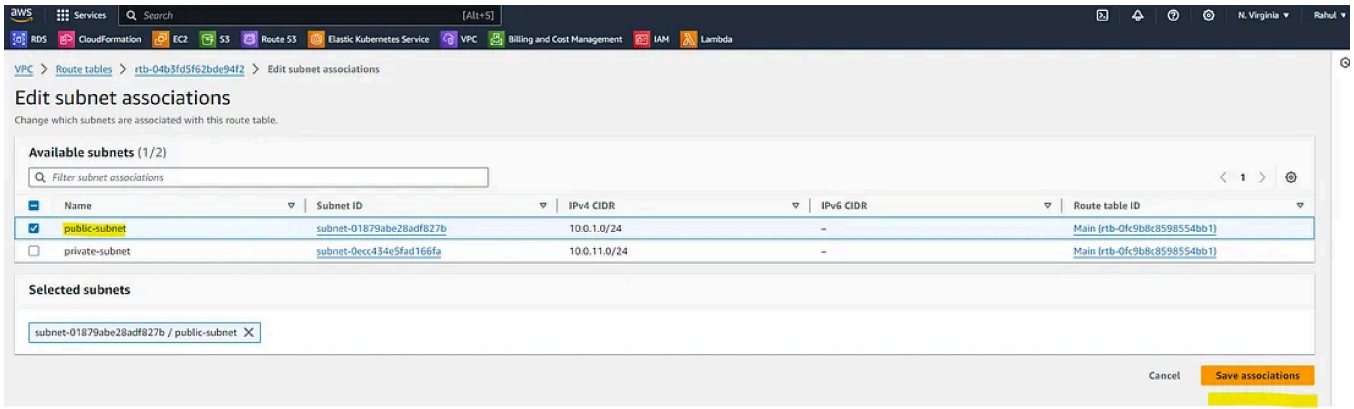

VPC dashboard
Route tables (1/3) Info
Create route table
my route table-public
rtb-04b3fd5f62bde94f2
my route table-private
rtb-0f84b1bc395d88812
rtb-04b3fd5f62bde94f2 / my route table-public
Details
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (1)
Edit routes
Destination
Target
Status
Propagated
10.0.0.0/16
local
Active
No

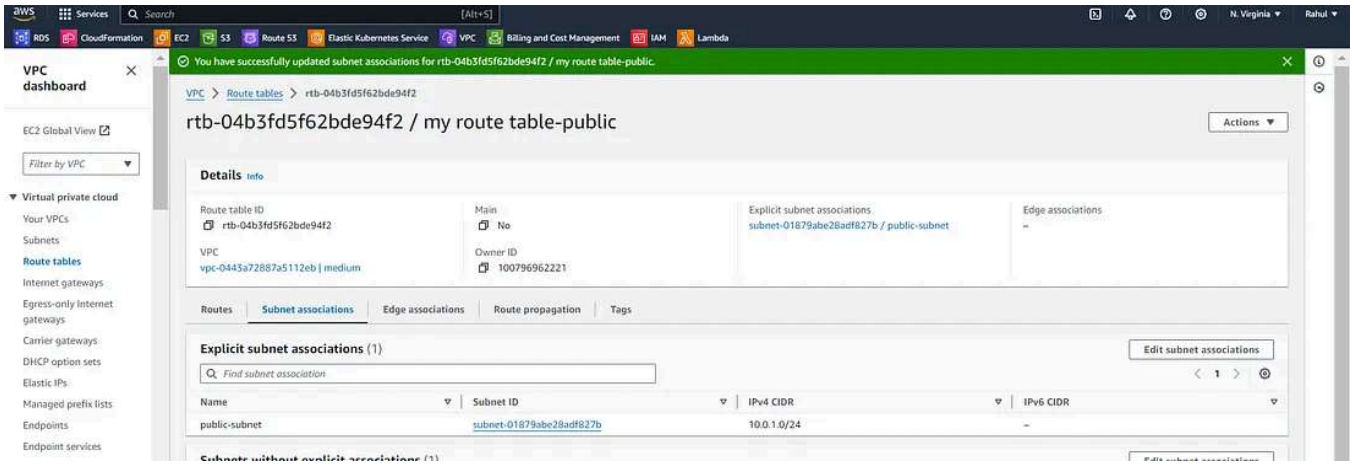

VPC > Route tables > rtb-04b3fd5f62bde94f2 > Edit routes
Edit routes
Destination
Target
Status
Propagated
10.0.0.0/16
local
Active
No
0.0.0.0/0
Internet Gateway
igw-0ee1c5baf3fe16915
Remove
Add route
Cancel
Preview
Save changes


Updated routes for rtb-04b3fd5f62bde94f2 / my route table-public successfully
rtb-04b3fd5f62bde94f2 / my route table-public
Actions
Details
Routes (2)
Edit routes
Destination
Target
Status
Propagated
0.0.0.0/0
igw-0ee1c5baf3fe16915
Active
No
10.0.0.0/16
local
Active
No



Now select a public subnet that has a direct route to the internet, allowing resources in that subnet to access the public internet.



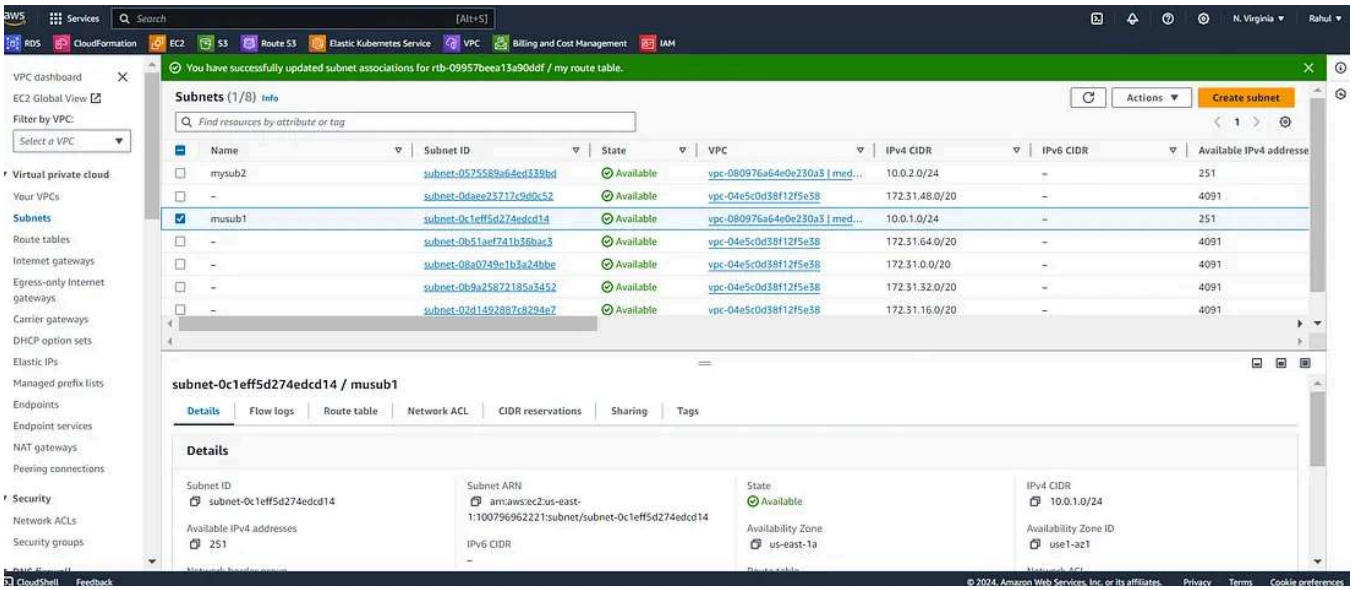


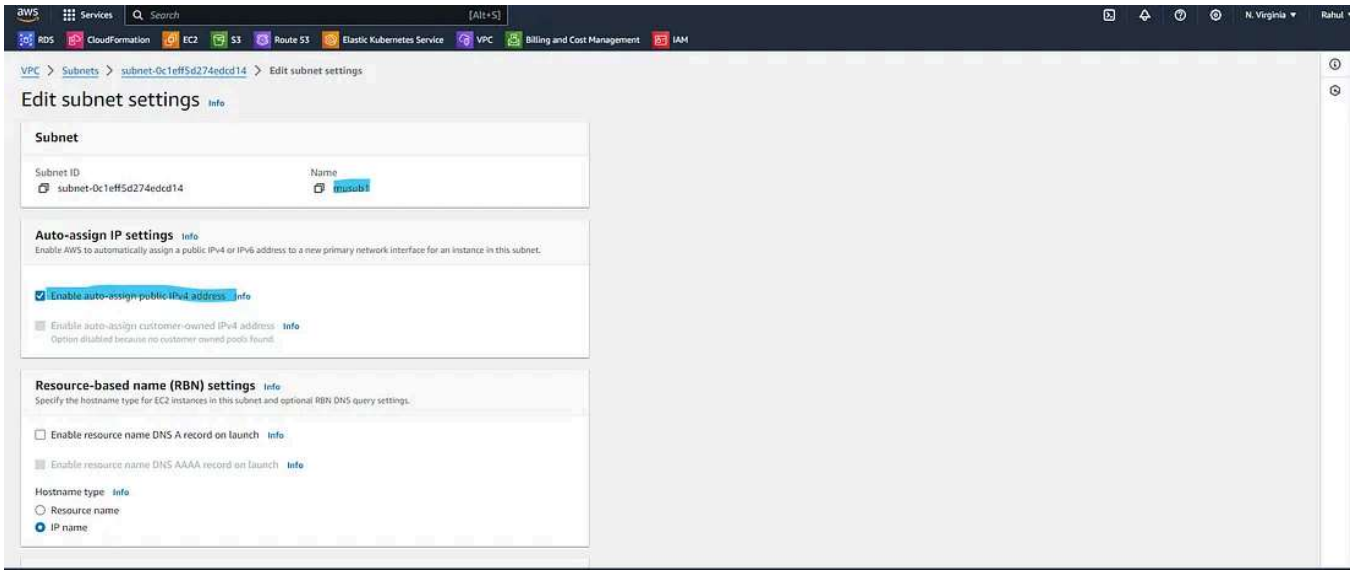
Steps 6: Enable Public IP Configuration for Subnet

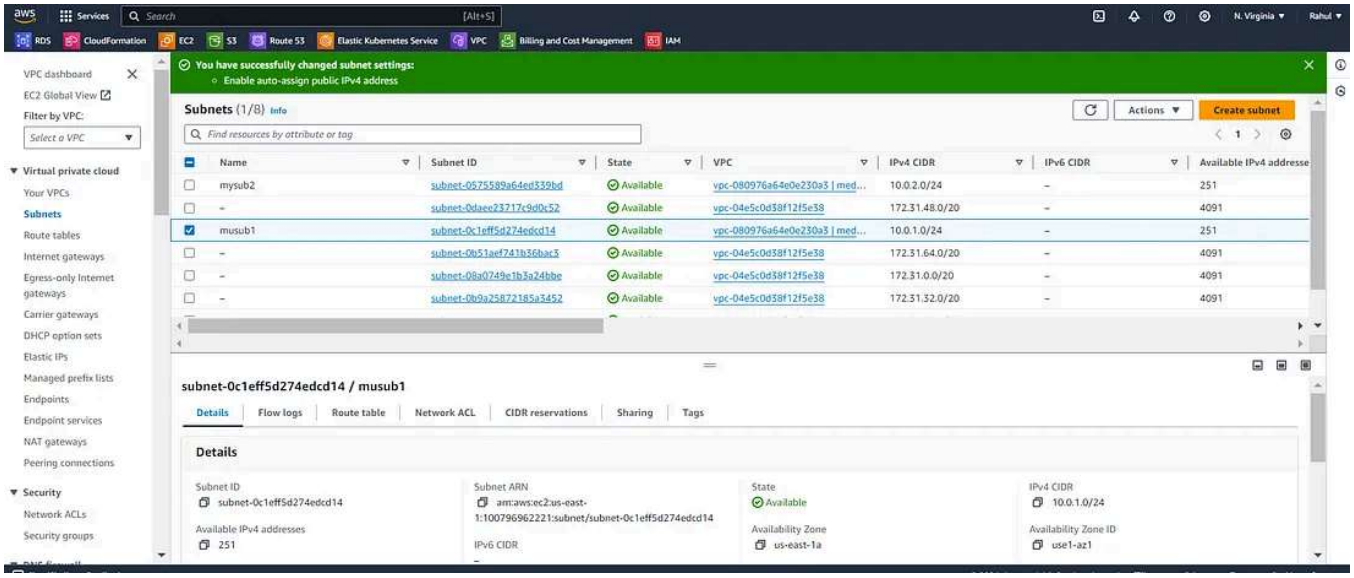
- Click on “Subnets” in the left-side window.
- Select your desired subnet.

- Click on “Actions.”
- Choose “Edit Subnet Settings.”
- Check the box for “Enable auto assign public IPv4 address.”
- Click “Save.”

Following are the screenshots of the above steps for the reference:



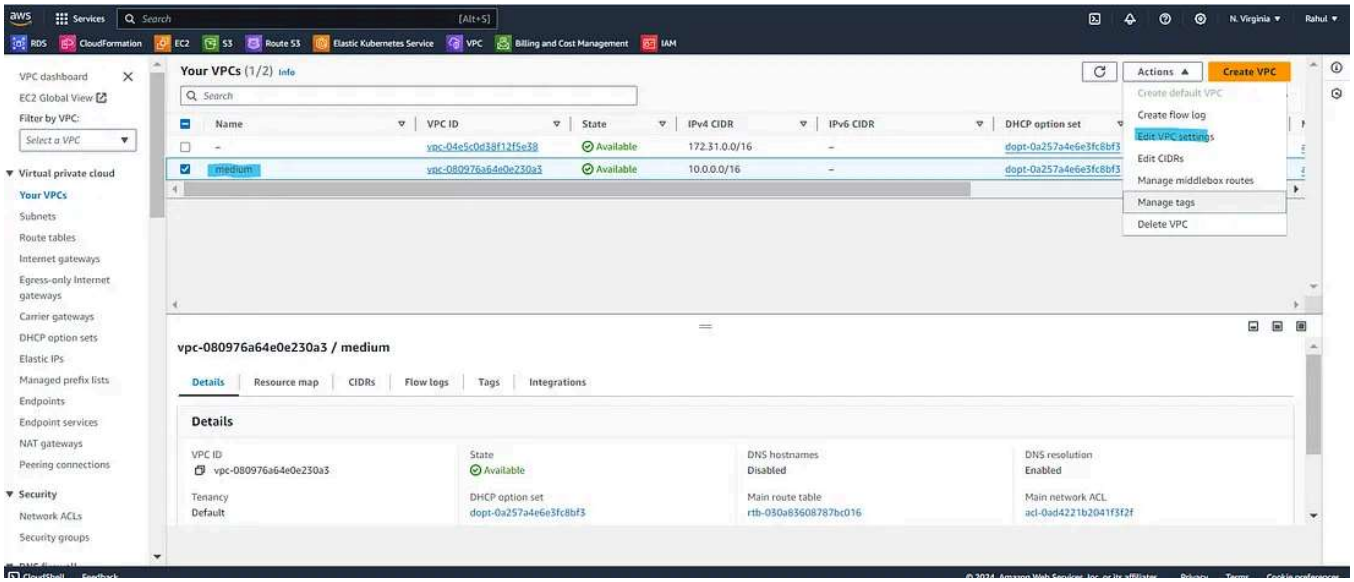


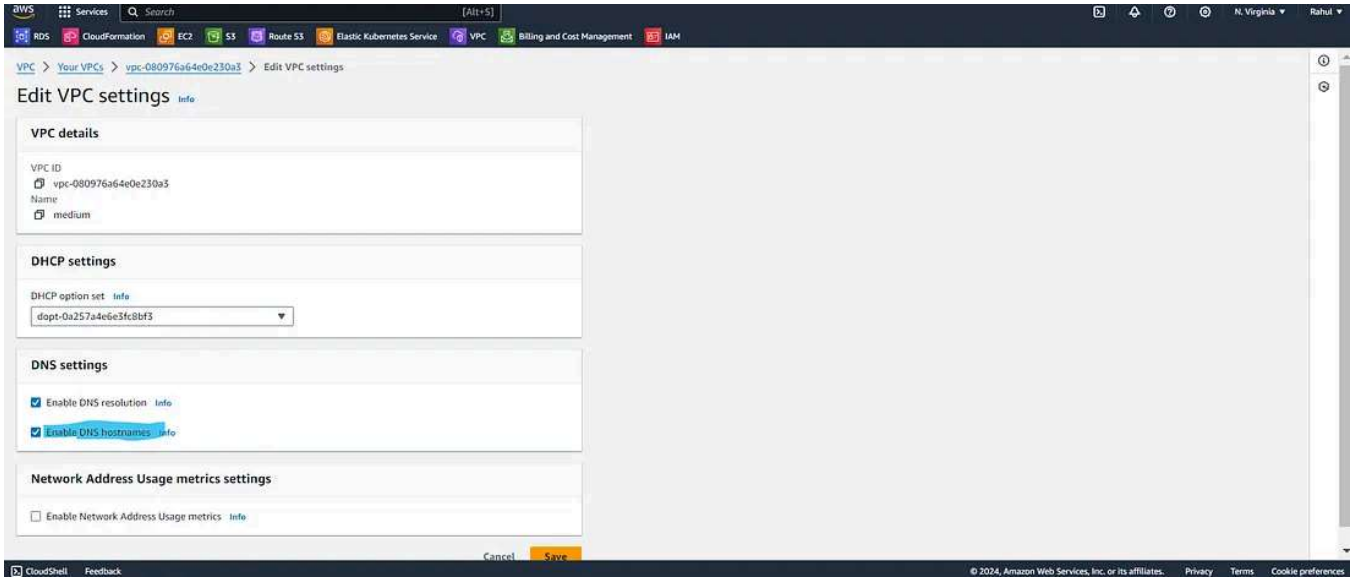


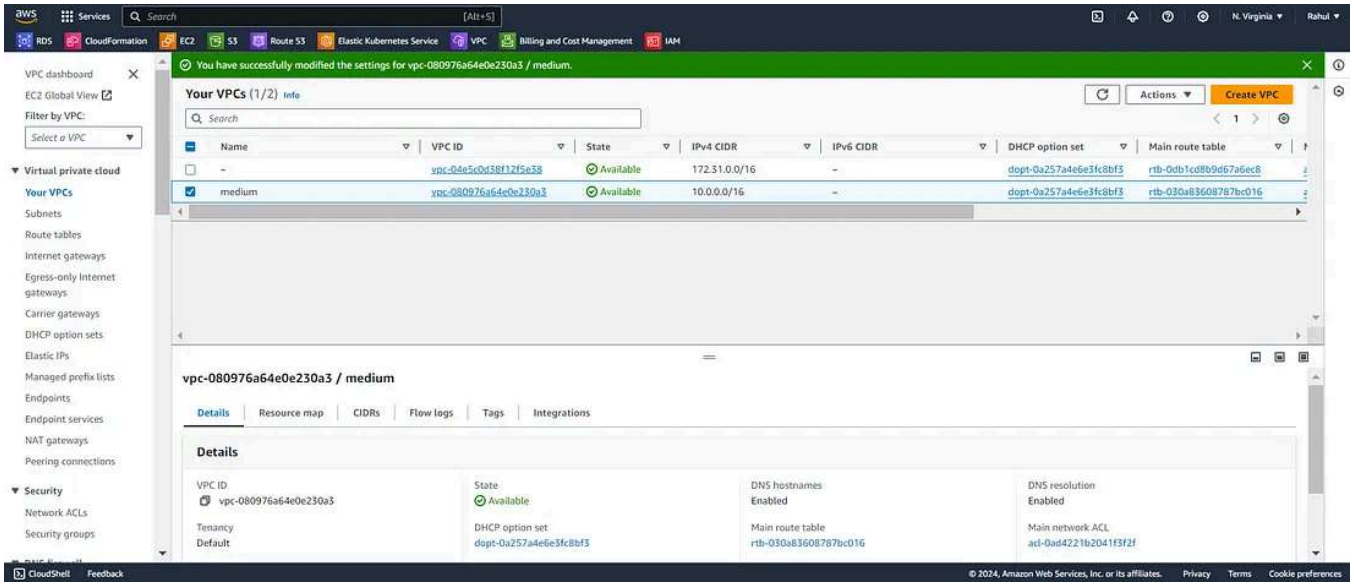
Step 7: Enable DNS Hostname Resolution for VPC

- Click on “Your VPC.”
- Select your VPC.
- Click on “Actions.”
- Choose “Edit VPC Settings.”
- Check the box for “Enable DNS hostnames.”
- Click “Save.”

Following are the screenshot of above steps for reference:



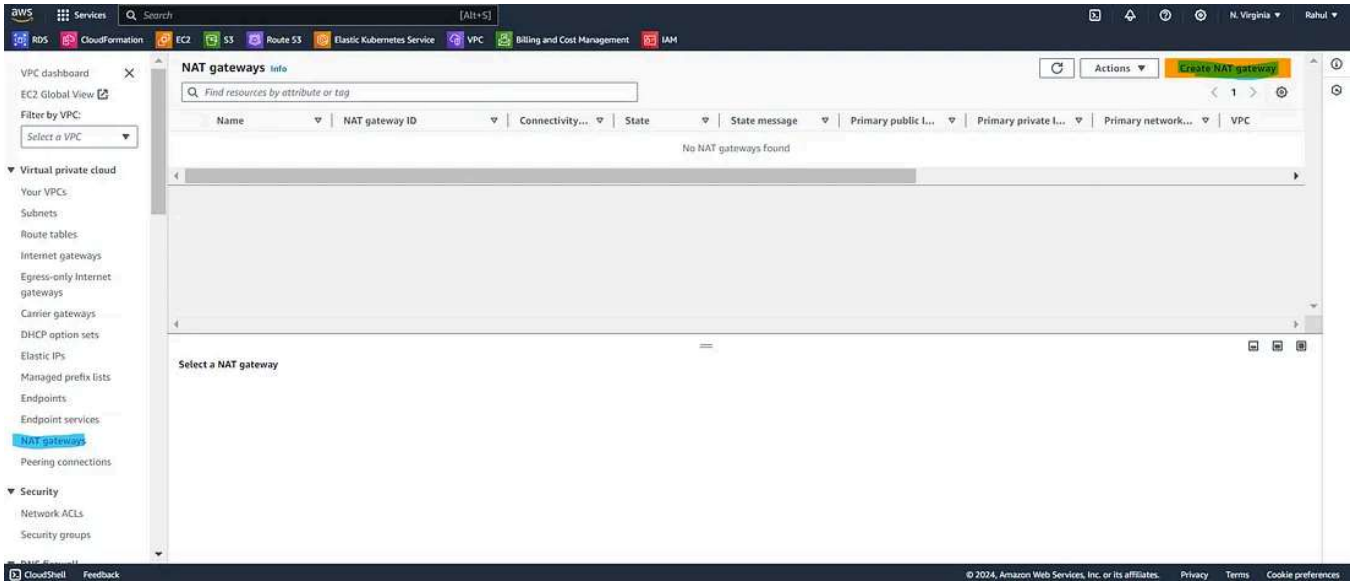


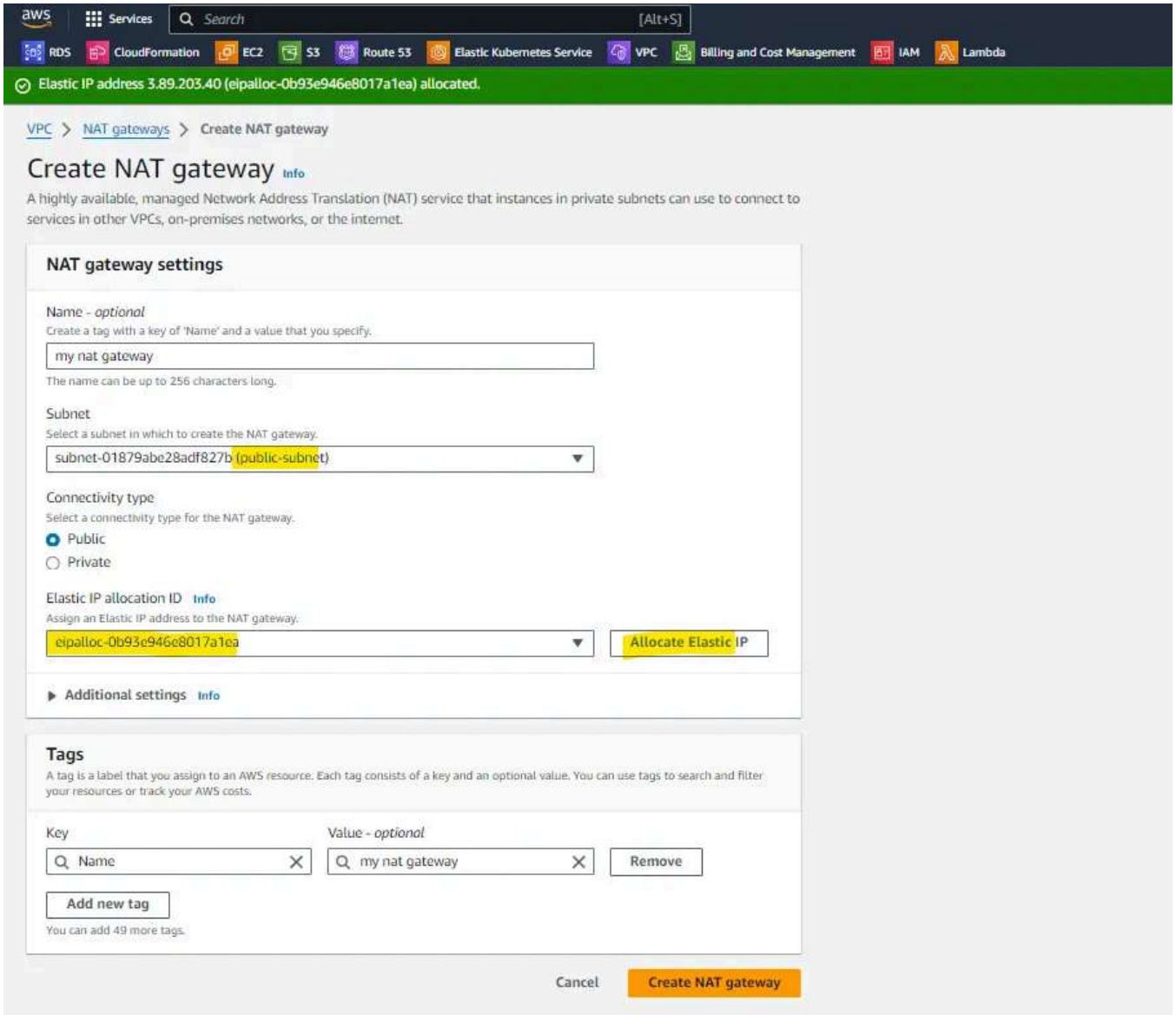


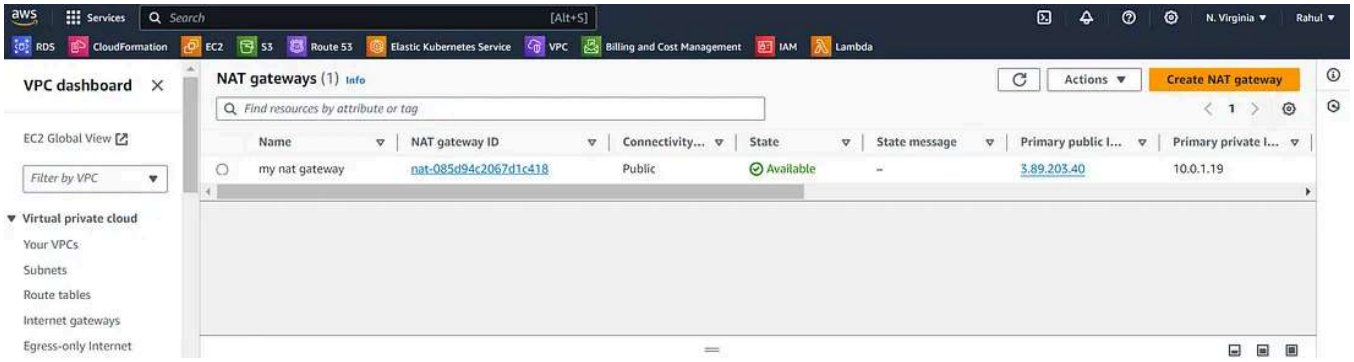
Step 8:

- Click on " NAT Gateway"
- Click the orange "Create NAT Gateway" button.
- Provide a name for the NAT Gateway.
- Click on the "Create NAT Gateway" button.
- Make sure you select the Public Subnet.

For reference following are the screenshot of the steps:


NAT gateways Info
Actions
Create NAT gateway
No NAT gateways found
Select a NAT gateway

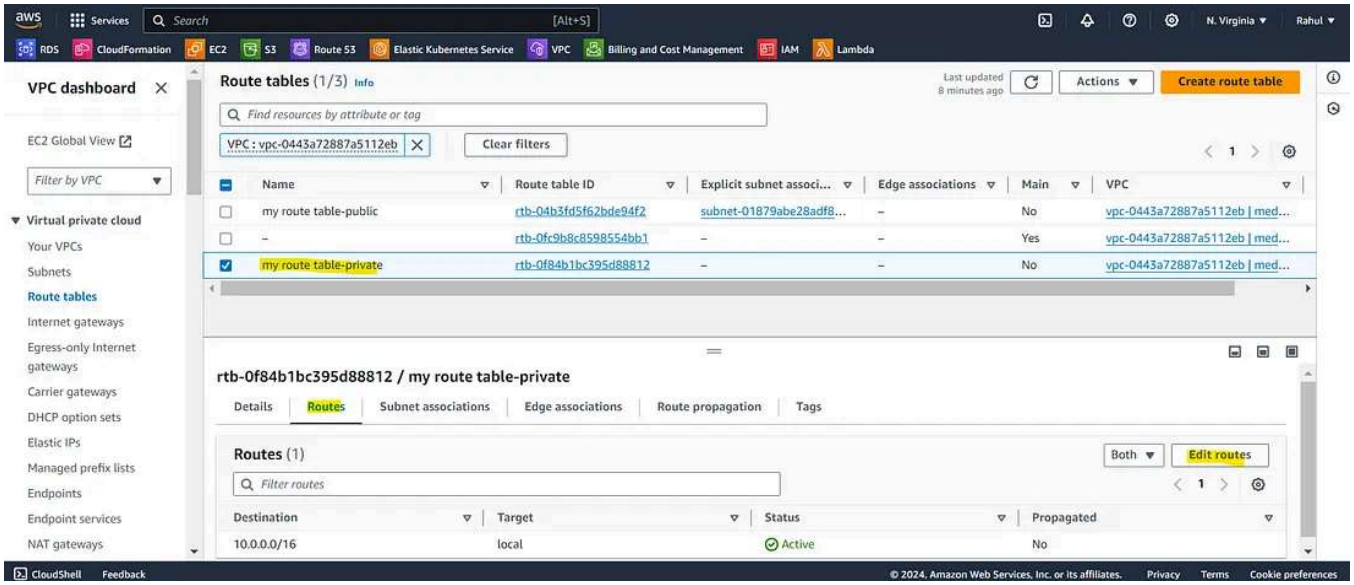

Elastic IP address 3.89.203.40 (eipalloc-0b93e946e8017a1ea) allocated.
VPC > NAT gateways > Create NAT gateway
Create NAT gateway Info
A highly available, managed Network Address Translation (NAT) service that instances in private subnets can use to connect to services in other VPCs, on-premises networks, or the internet.
NAT gateway settings
Name - optional
Create a tag with a key of 'Name' and a value that you specify.
my nat gateway
The name can be up to 256 characters long.
Subnet
Select a subnet in which to create the NAT gateway.
subnet-01879abe28adf827b (public-subnet)
Connectivity type
Select a connectivity type for the NAT gateway.
Public
Private
Elastic IP allocation ID Info
Assign an Elastic IP address to the NAT gateway.
eipalloc-0b93e946e8017a1ea
Allocate Elastic IP
Additional settings Info
Tags
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.
Key
Value - optional
Name
my nat gateway
Remove
Add new tag
You can add 49 more tags.
Cancel
Create NAT gateway

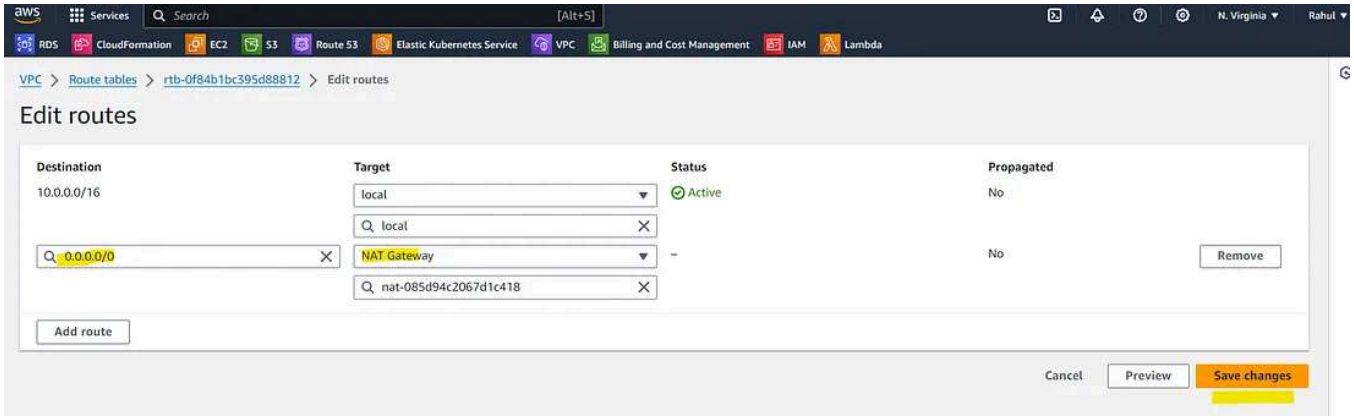


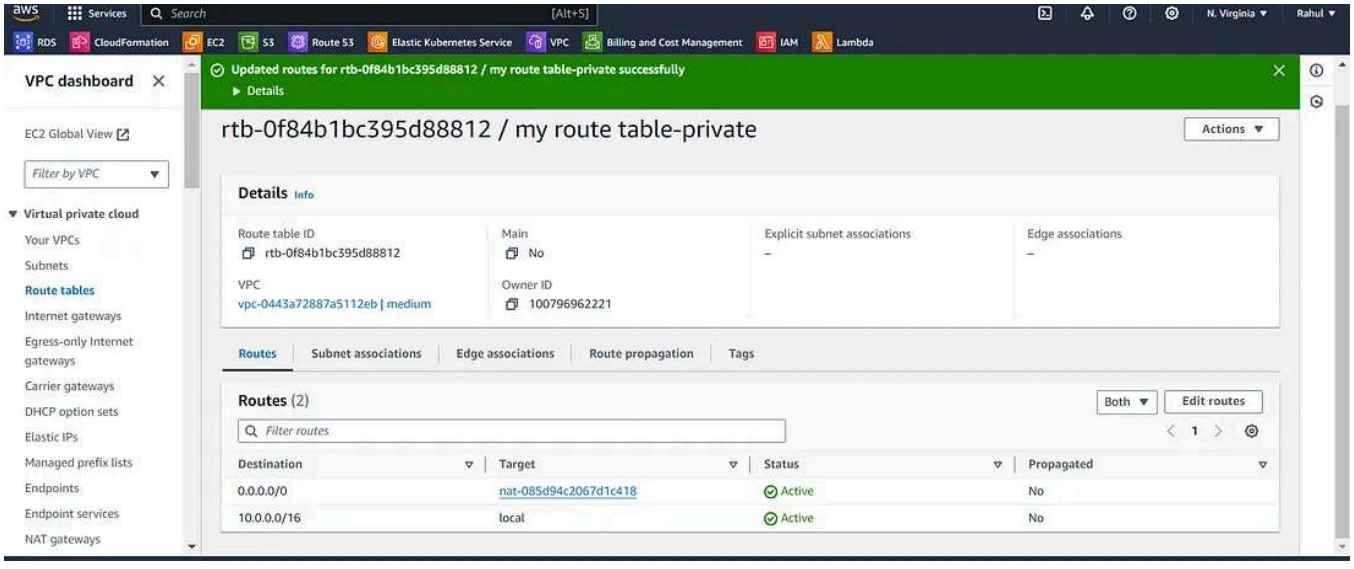
Step 9: Configure the Route table with NAT Gate way and subnet.

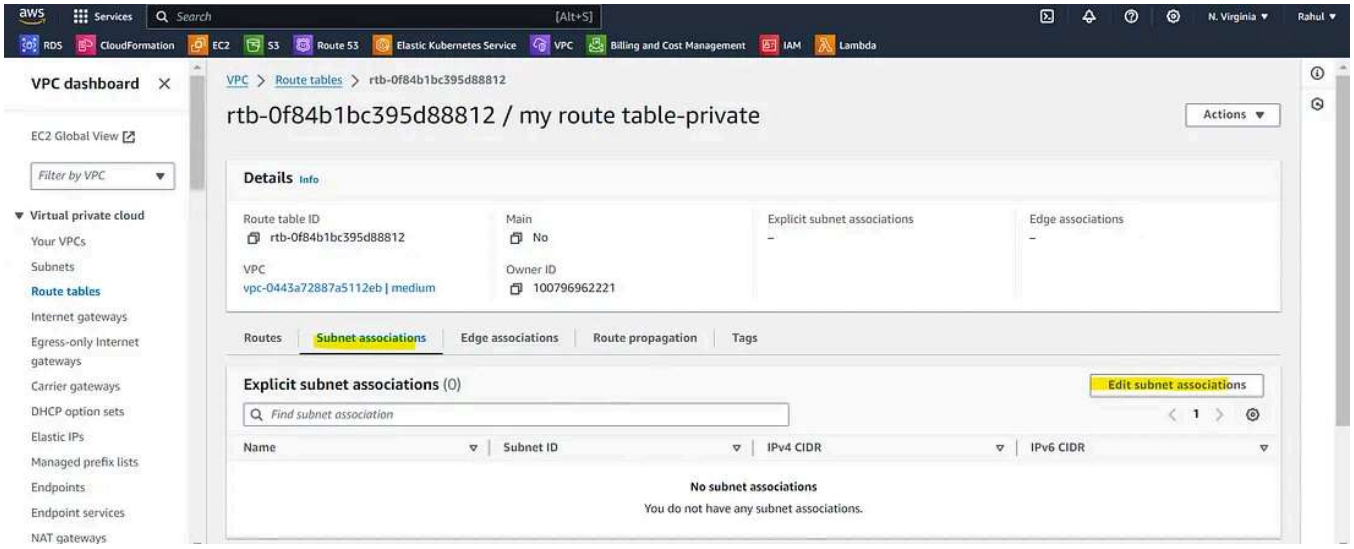
- Go to “Route Tables.”
- Select your desired route table.
- Click on the “Routes” tab.
- Click “Edit Routes.”
- Click “Add Route.”
- Select the target as “NAT Gateway.”
- Click “Save Changes.”
- Click “ Subnet associations”
- Click “Edit subnet associations”
- Click on subnet “check box”
- Click on “Save Associations”

Following are the screenshots of the above steps for your reference:

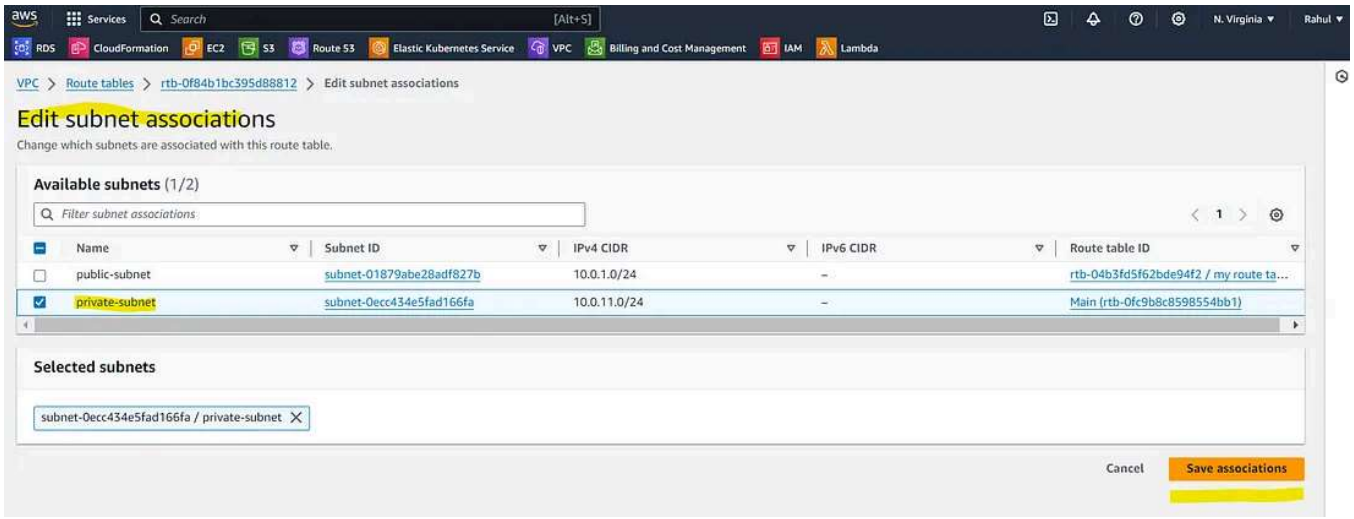

VPC dashboard
Route tables (1/3) Info
Actions
Create route table
VPC : vpc-0443a72887a5112eb
Clear filters
Name
Route table ID
Explicit subnet associ...
Edge associations
Main
VPC
my route table-public
rtb-04b3fd5f62bde94f2
subnet-01879abe28adf8...
No
vpc-0443a72887a5112eb | med...
rtb-0fc9b8c8598554bb1
Yes
my route table-private
rtb-0f84b1bc395d88812
rtb-0f84b1bc395d88812 / my route table-private
Details
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (1)
Both
Edit routes
Filter routes
Destination
Target
Status
Propagated
10.0.0.0/16
local
Active
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

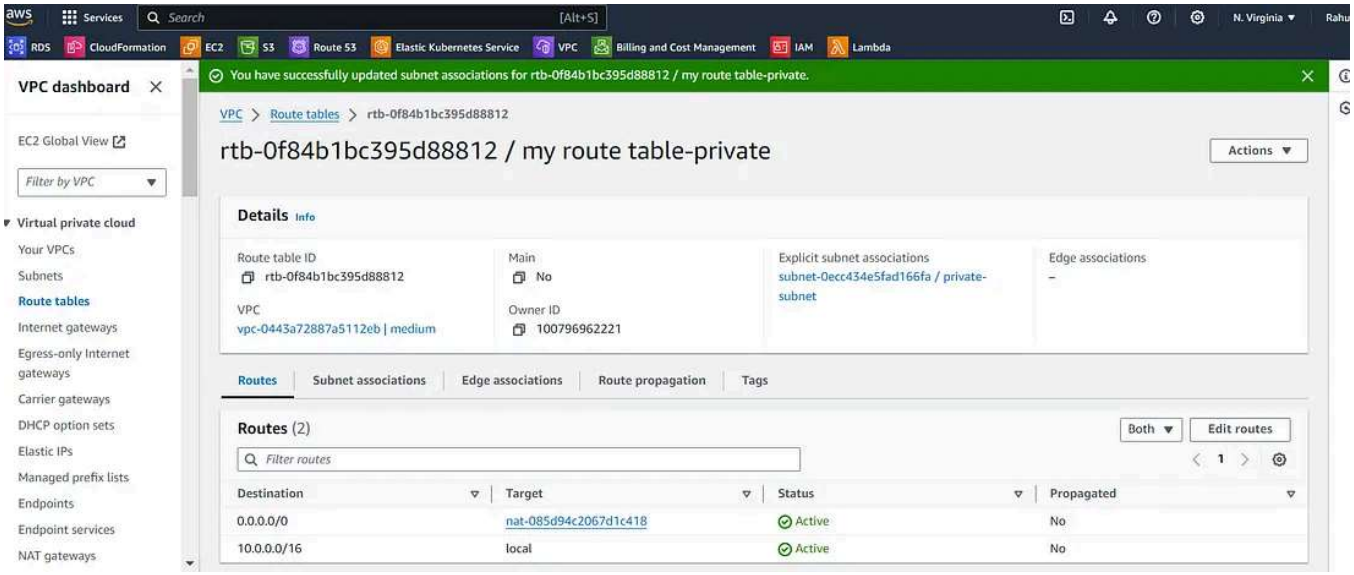

VPC > Route tables > rtb-0f84b1bc395d88812 > Edit routes
Edit routes
Destination
Target
Status
Propagated
10.0.0.0/16
local
Active
No
0.0.0.0/0
NAT Gateway
nat-085d94c2067d1c418
Remove
Add route
Cancel
Preview
Save changes


Updated routes for rtb-0f84b1bc395d88812 / my route table-private successfully
Details
rtb-0f84b1bc395d88812 / my route table-private
Actions
Details Info
Route table ID
rtb-0f84b1bc395d88812
Main
No
Explicit subnet associations
Edge associations
VPC
vpc-0443a72887a5112eb | medium
Owner ID
100796962221
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (2)
Both
Edit routes
Filter routes
Destination
Target
Status
Propagated
0.0.0.0/0
nat-085d94c2067d1c418
Active
No
10.0.0.0/16
local
Active
No



Now select the private subnet and please see the screenshot as below.





By following these steps, you'll have successfully created a secure and tailored Virtual Private Cloud (VPC) in AWS, providing a robust foundation for your cloud-based applications and services.