D Y PATIL INTERNATIONAL UNIVERSITY
AKURDI PUNE

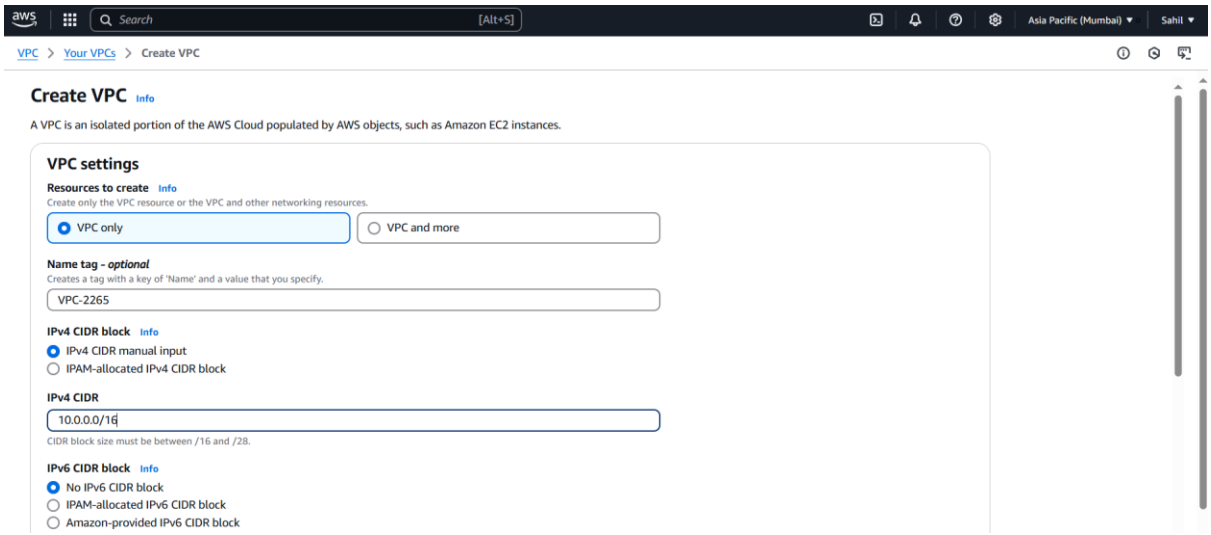
School of Computer Science, Engineering and Applications (SCSEA)
B. Tech TY (CCSA)
Subject: Cloud Architecture And Protocol

Name of the Student: Sahil S. Mandawgade **PRN: 20220802265**

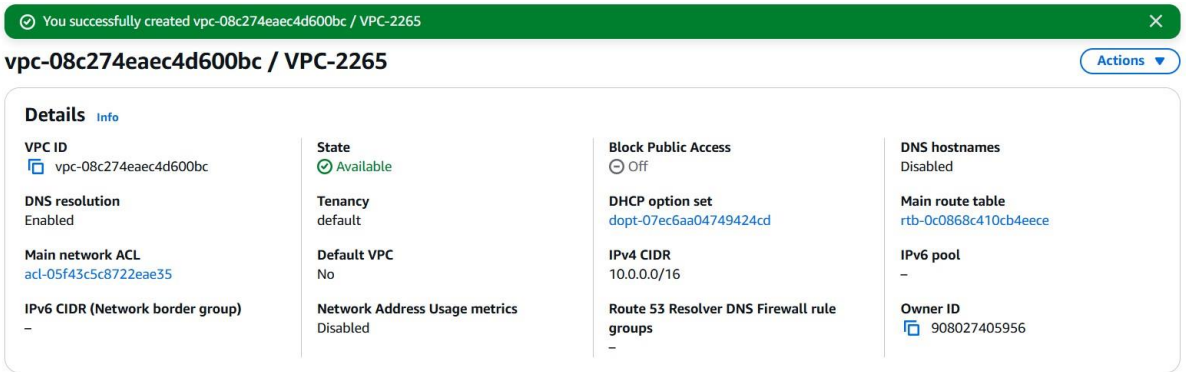
Title of Practical: 2. Building a Dual-Subnet Architecture on AWS: Secure Communication Between Public and Private Instances with NAT Gateway.

Step 1: Create VPC.

- Log-in to Your AWS Console.
- Search "VPC" in AWS search bar and enter VPC Dashboard.
- Go to "Your VPCs" - you will have your default VPC > Click on "Create VPC"
- Assign name & CIDR: 10.0.0.0/16 - Click "Create VPC".



- VPC Successfully Created.



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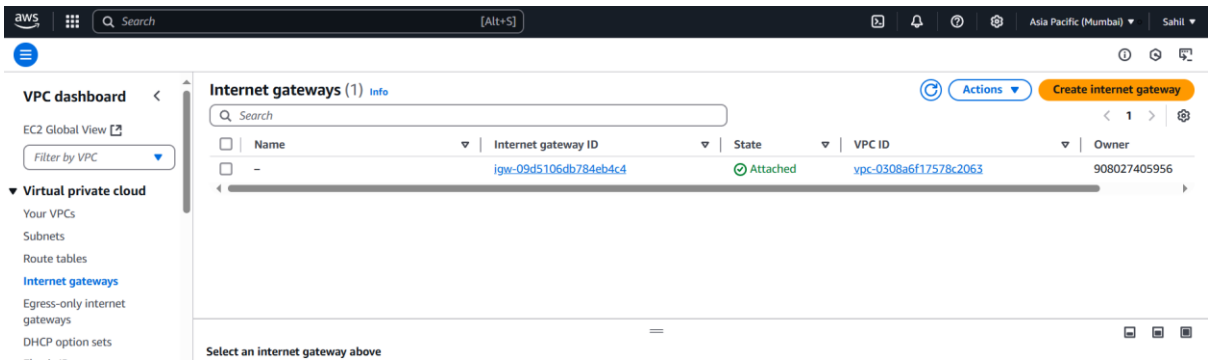
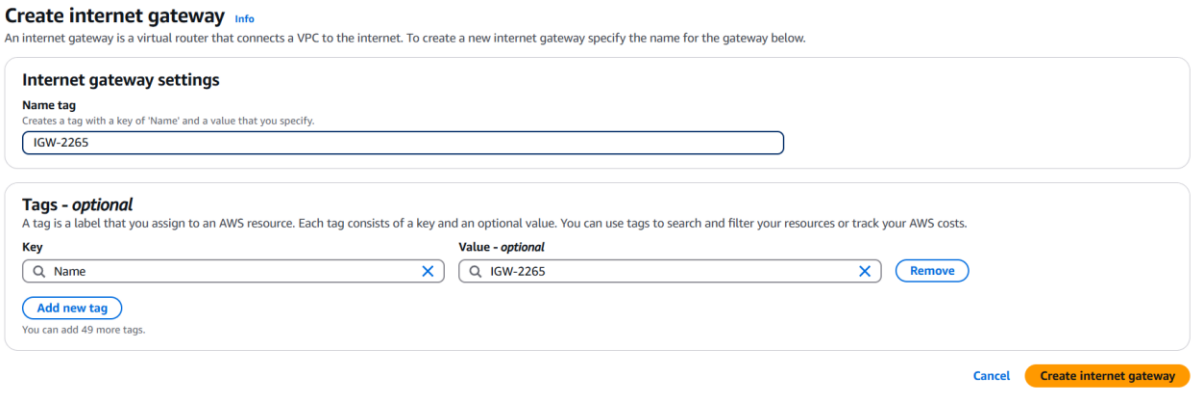
Step 2: Creation of Internet Gateway (IGW).

- Under Virtual Private Could (sidebar) - Internet Gateway - Create internet gateway.
- Note: There will be a default IGW to the default VPC, do not delete it.



- Assign IGW Name - Create IGW.



- IGW Dashboard - Select your new IGW - Actions - Attach VPC.
- Select Your VPC - Attach IGW.

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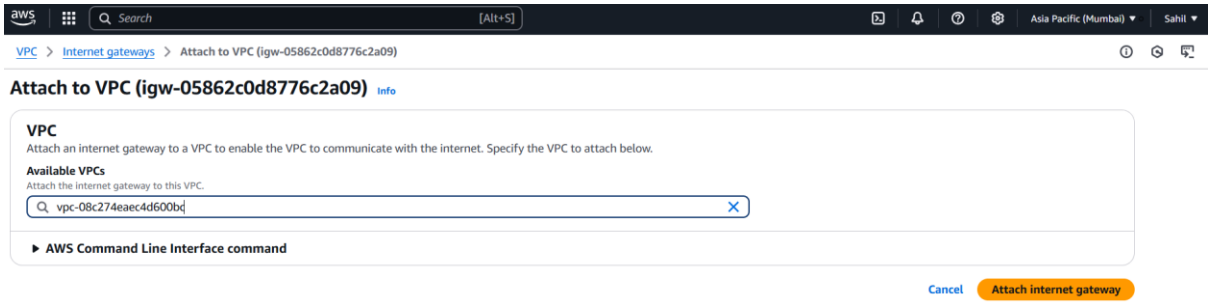
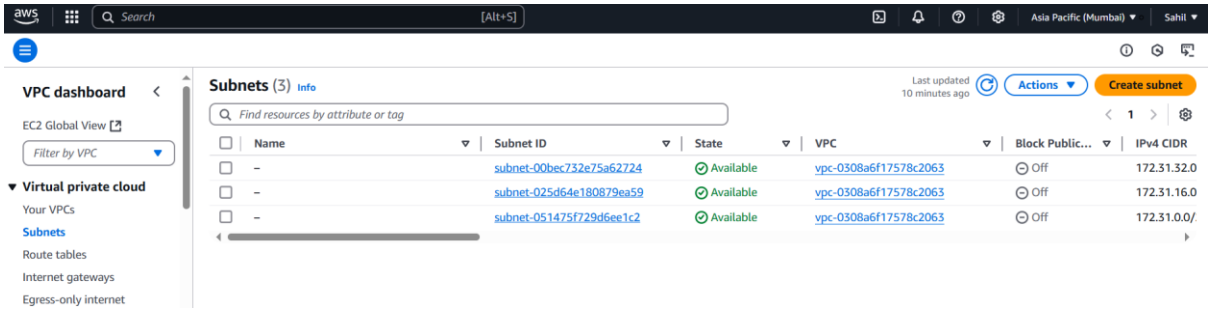


Step 3: Create Public and Private Subnet.

- Under Virtual Private Cloud - Subnets - Create subnet.



- Select your VPC - Assign Name: Private subnet - Assign CIDR: 10.0.1.0/24 - Create Subnet.

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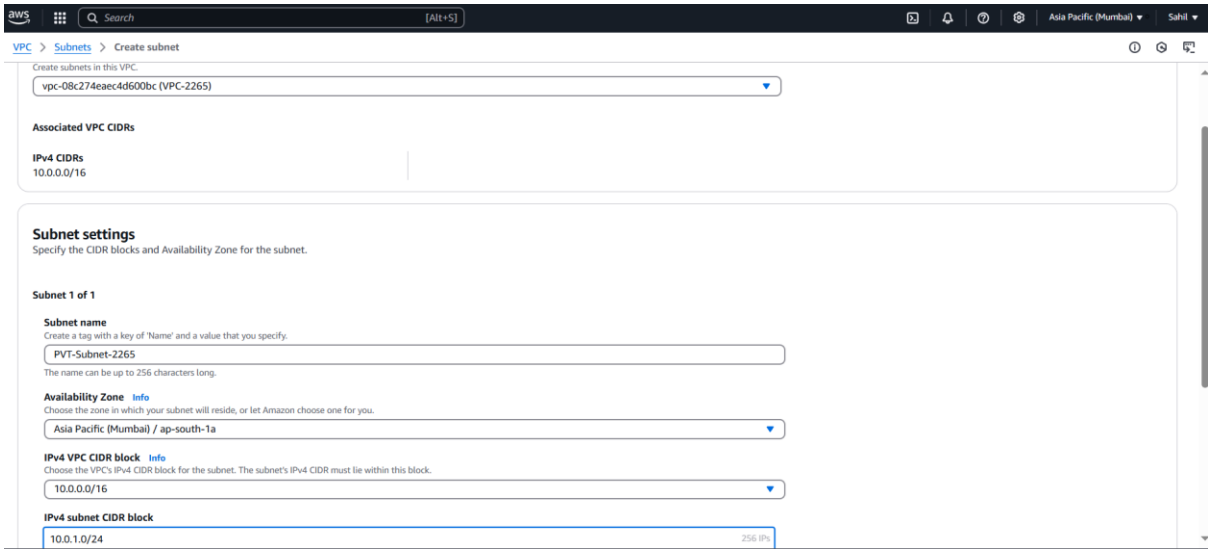
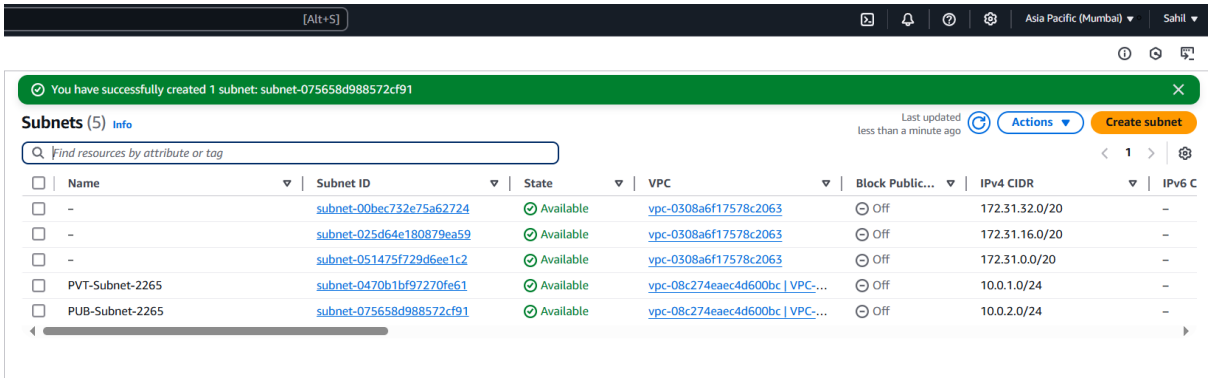


- Create Another Subnet named “Public Subnet” with CIDR: 10.0.2.0/24.
- Successful Creation of 2 Subnets.



Step 4: Attaching NACL.

- Under security - Network ACLs - Create NACL.
- Select your VPC & Assign NACL Name - Create NACL.

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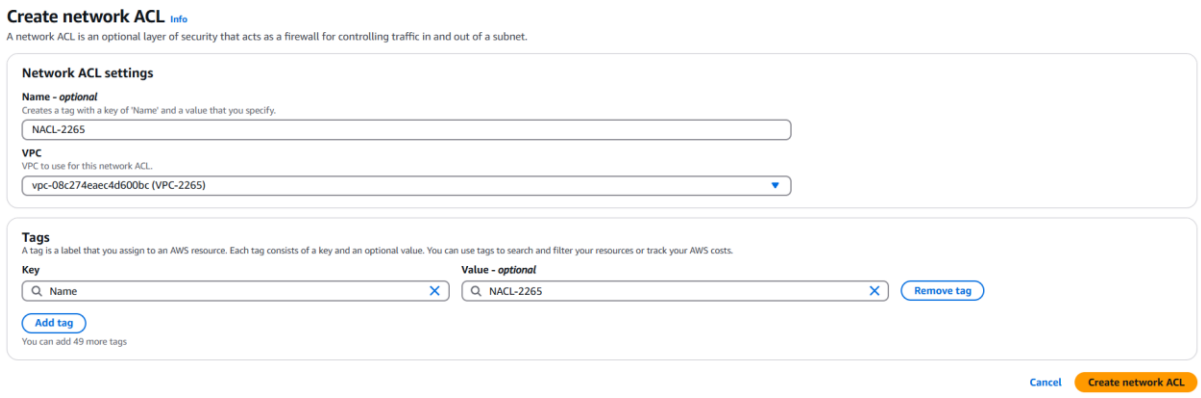
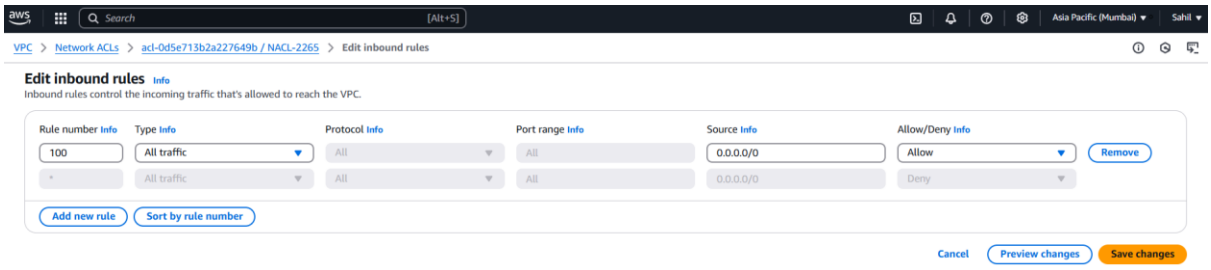
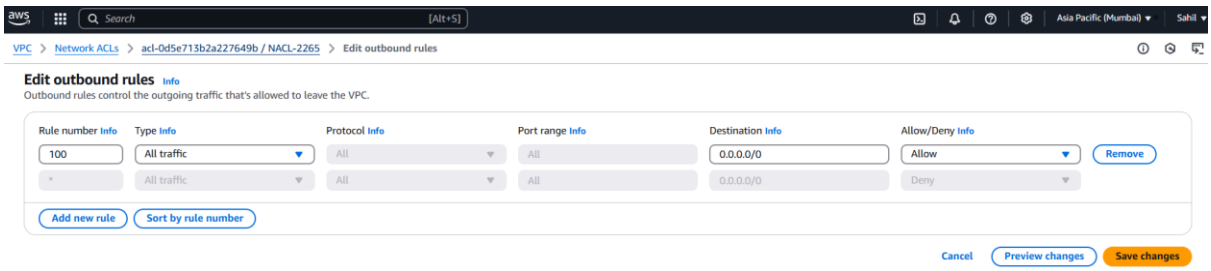


- Select your NACL - Inbound Rules - Edit Inbound Rules.
- Assign Rule Number: 100 - Allow all traffic - Save Changes.



- Select your NACL - Outbound Rules - Edit Outbound Rules.
- Assign Rule Number: 100 - Allow all traffic - Save Changes.



- Keep NACL Selected - Subnet Association – Edit subnet associations.
- Select Both Subnets & Save Changes.

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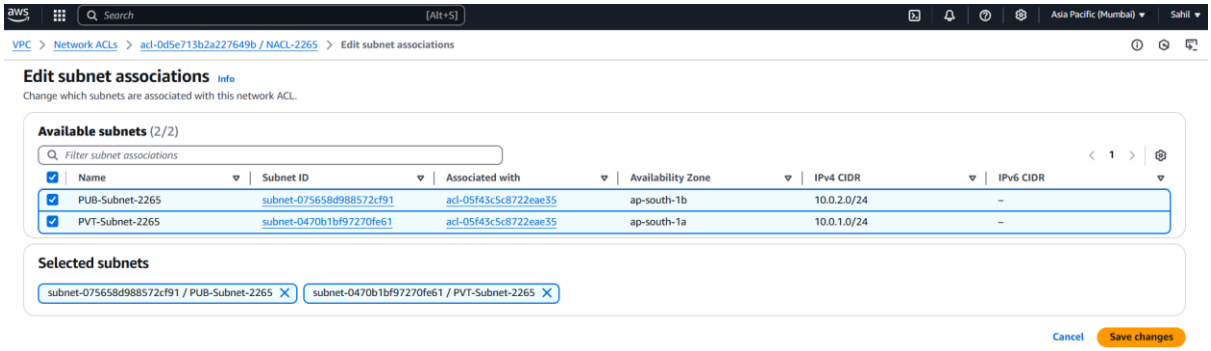
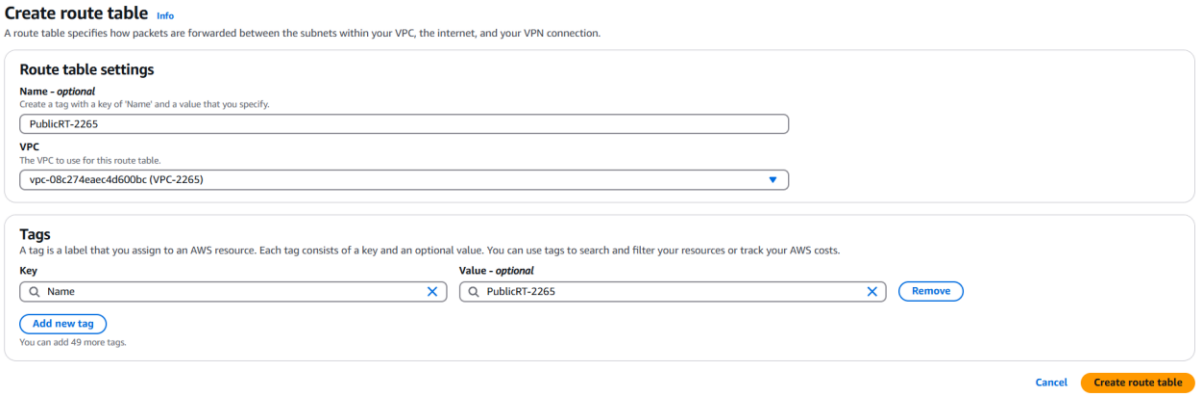


Step 5: Route Table.

- Sidebar - VPC - Route Table - Create 2 Route Table, 1 for Public & 1 for Private.
- Assign name and select your VPC.



- Do the same for Private Route Table.

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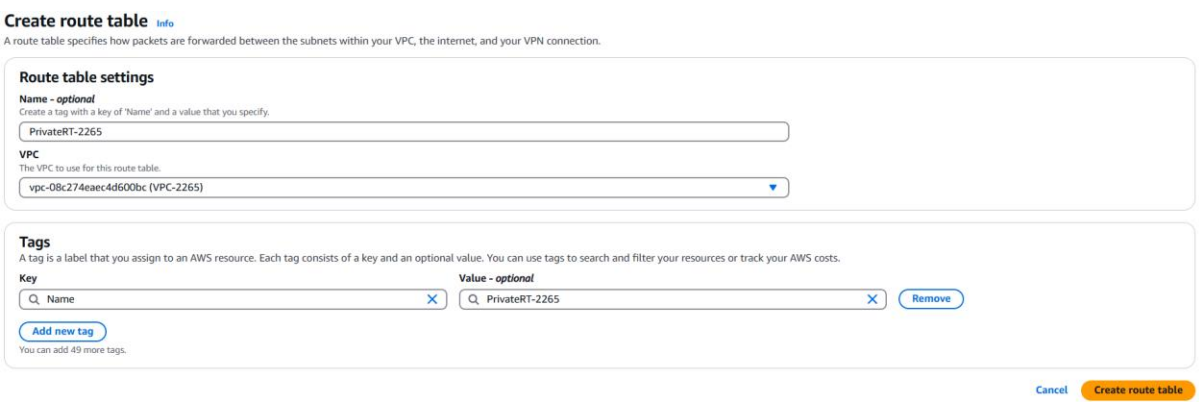
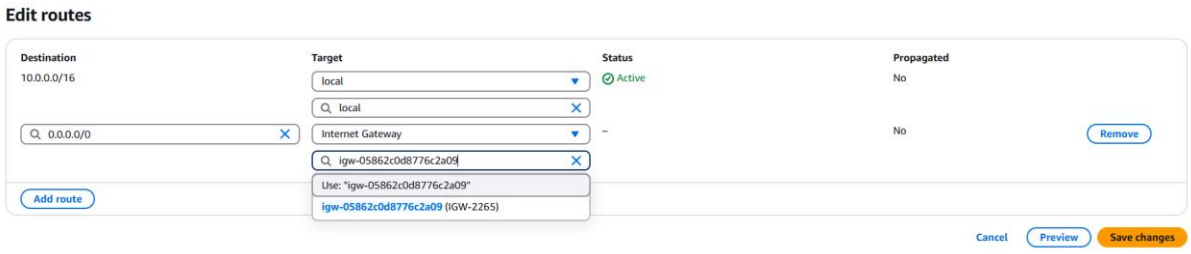
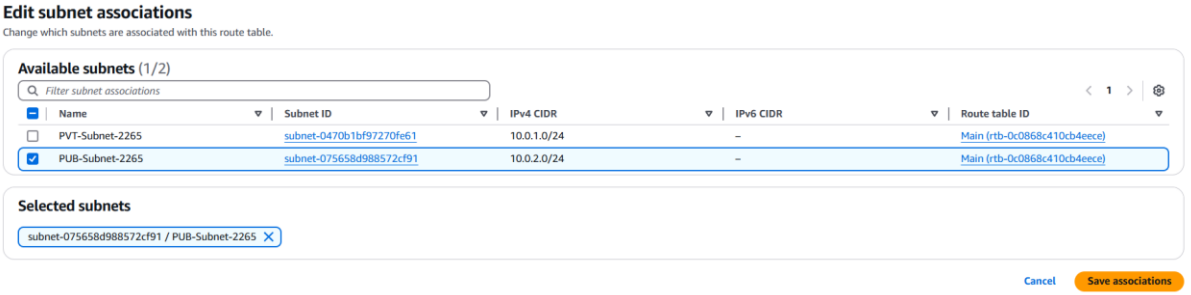


- Select Public Route Table - Routes - Edit Routes.
- Select Destination: 0.0.0.0/0(all to any IP/ All IP) and choose your IGW - as we want internet connectivity for Public Subnet.

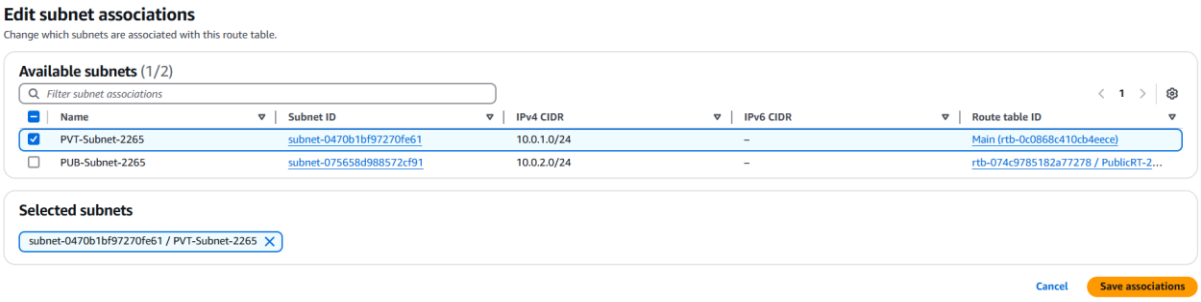


- Keep Public Route Table Selected - Subnet Association - Edit Subnet Association (Associate the Public Route Table to It's Public Subnet).
- Select Public Subnet - Save Association.



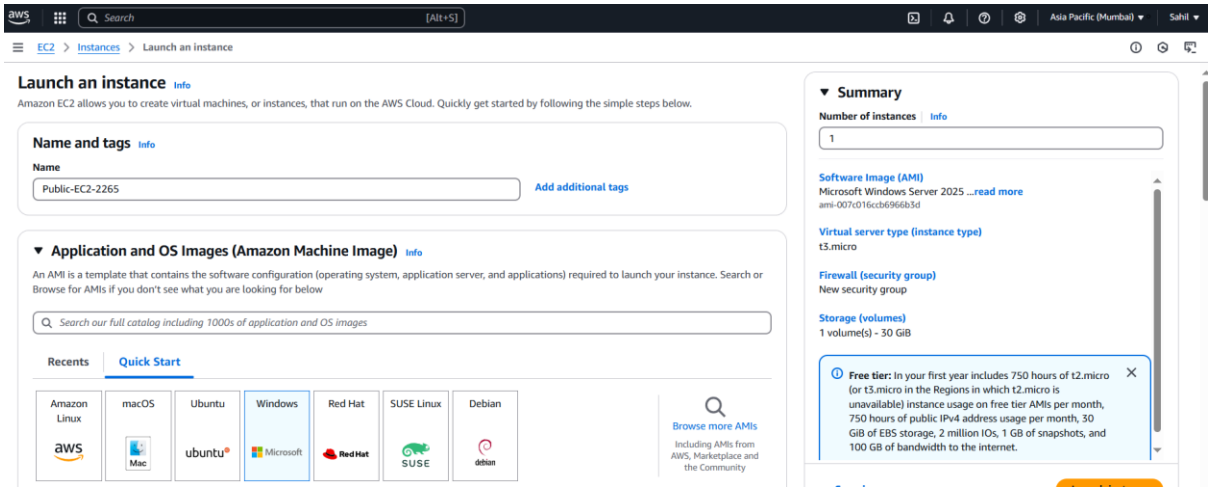
- Select Private Route Table - Routes - Edit Routes.

- Keep local only and save changes - we later attach it with public subnet's NAT Gateway.
- Select Private Route Table - Subnet Association - edit subnet association - Add Private Subnet - Save Changes.



Step 6: Create 2 EC2 Instances: Public and Private.

- Type EC2 in Search bar - EC2 Dashboard - First Create Public Instance.
- Assign Name - Choose Windows as AMI.



- Choose 4Gb t3.medium Instance for speed and use existing key pair.

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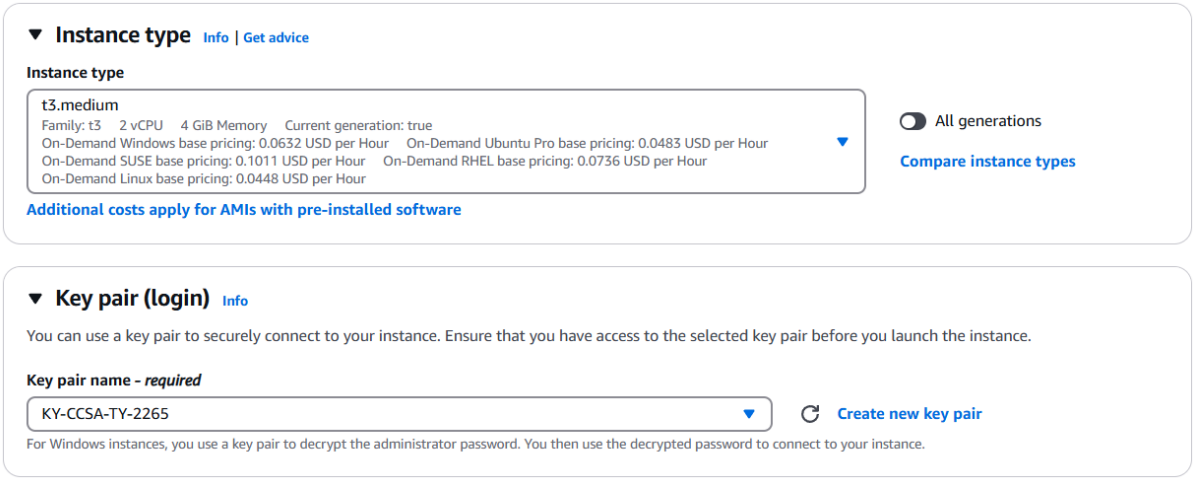
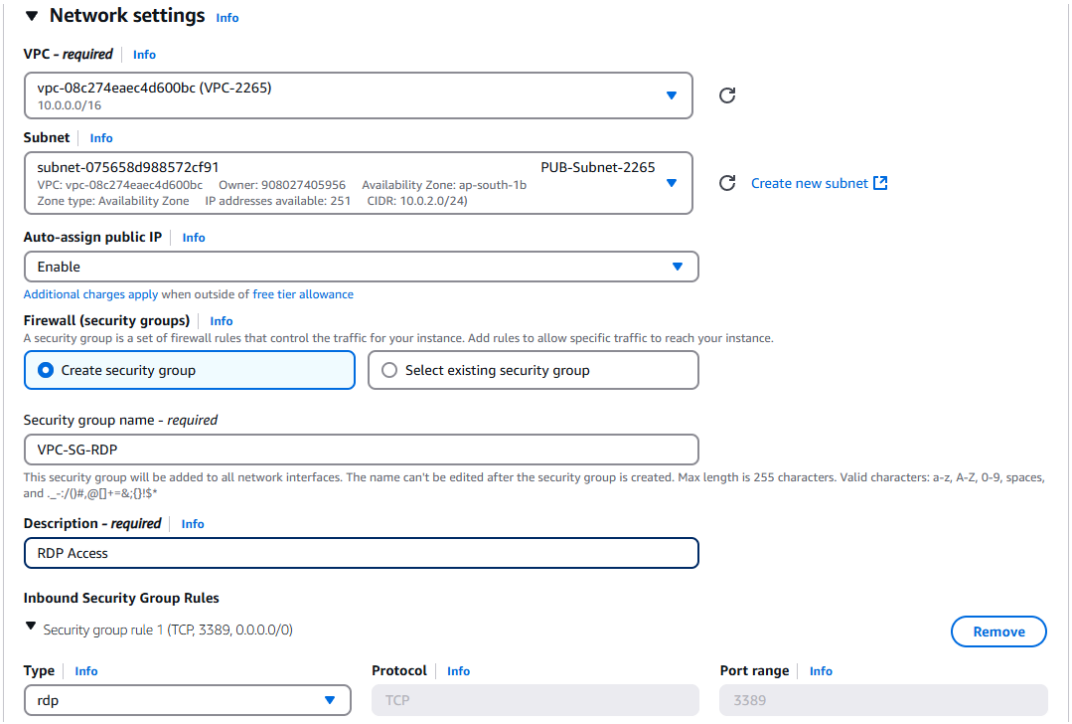


- Network Settings - Edit - Choose your VPC - Choose Public Subnet - Enable Auto-assign IP - Create SG which allows RDP - Launch Instance.



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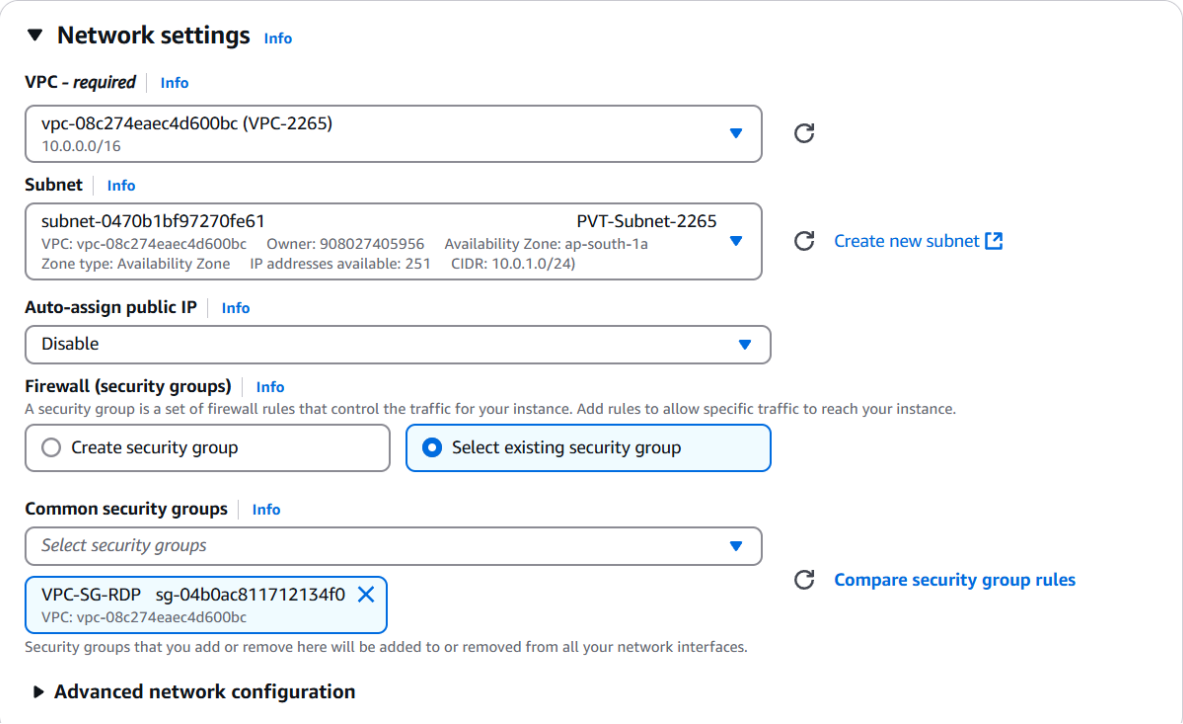
- Create Another instance - Use Same SG, follow same steps - Choose Private Subnet - Don't Add Auto Assign to it.



Step 7: Check Internet Access in your Public and Private Instances - Private should not have internet access.

- Copy public IP of Public Subnet - Open RDP Client - paste IP in PC Name - Click on Credentials - Add Credentials - Username: Administrator.

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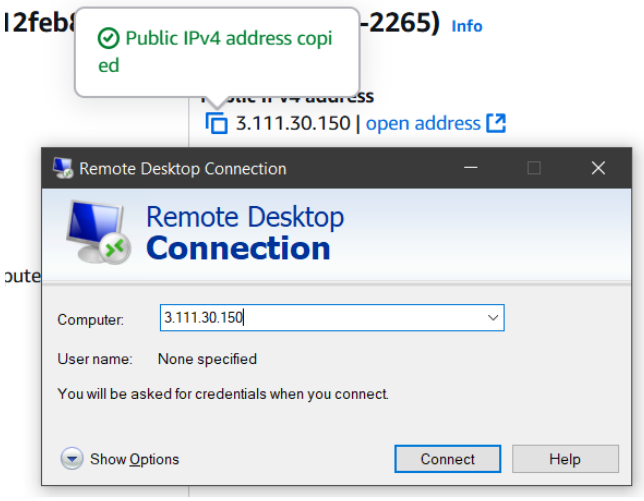
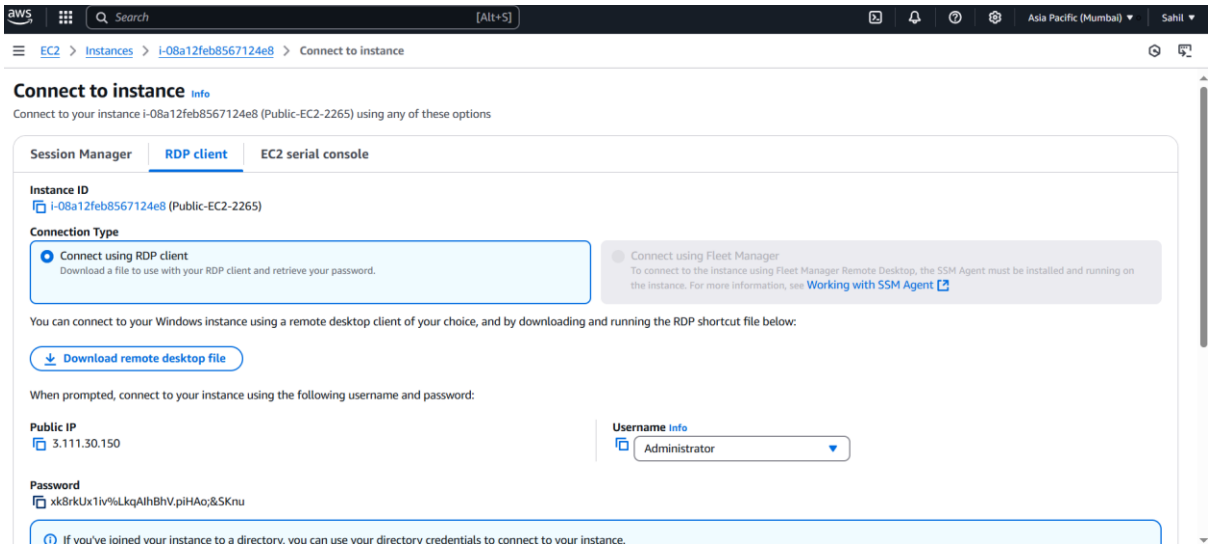


- Go Back to AWS Public Instance – Connect - RDP Client - Get Password - Upload Your .pem Key and Decrypt Password.



- Copy Password - Paste in RDP . Press Yes.
- Public Instance Successfully Accessed.
- As we can see the internet access is there.

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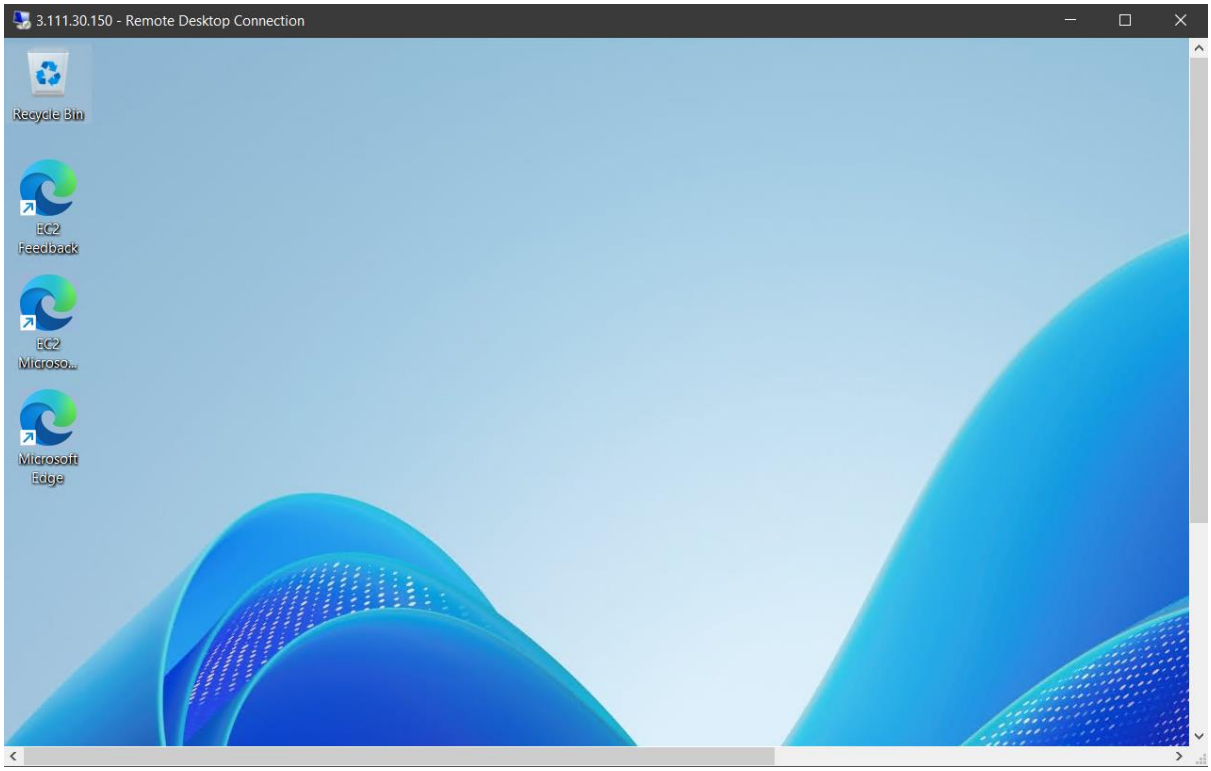

- Now we open RDP in Public Instance - Do the same process with Private Instance.

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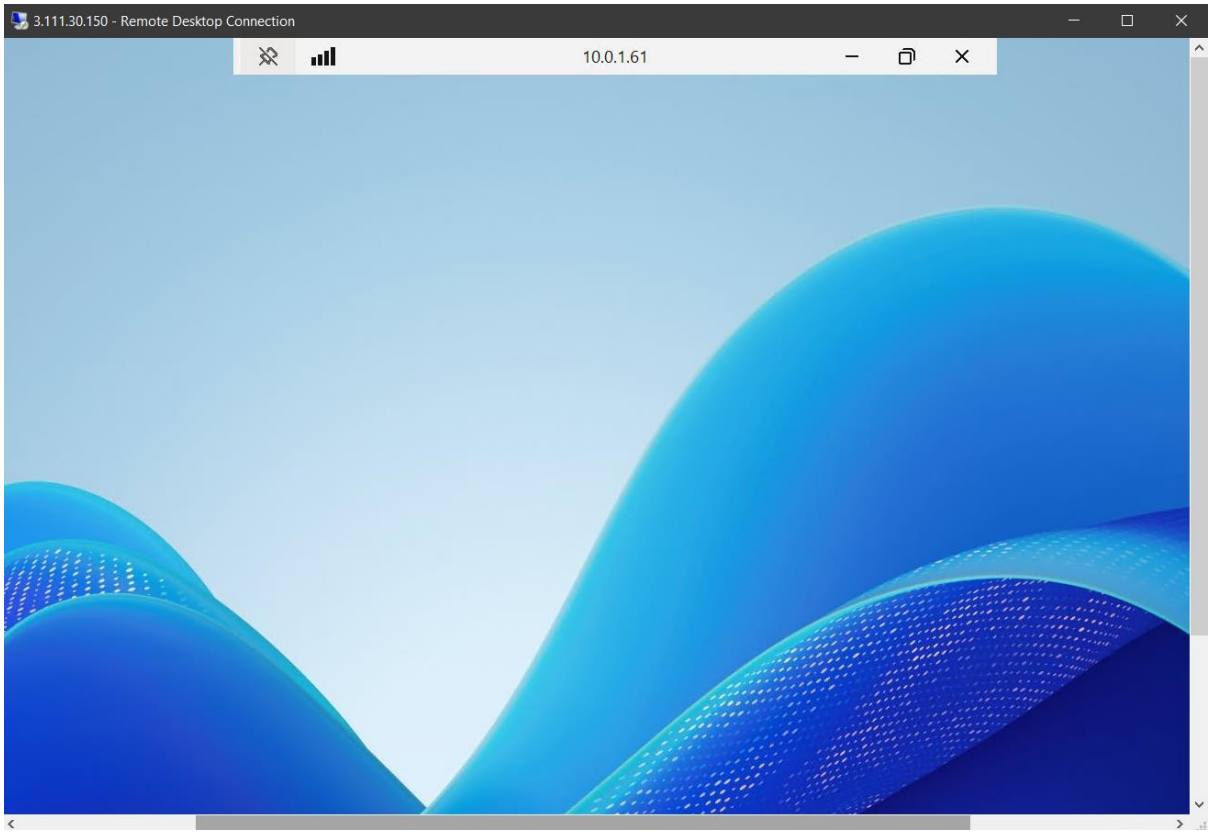

- We are in Private Instance - verify with the IP the top - as we can see we don't have internet access and we also tried opening google which failed as we don't have internet access in Private Instance.

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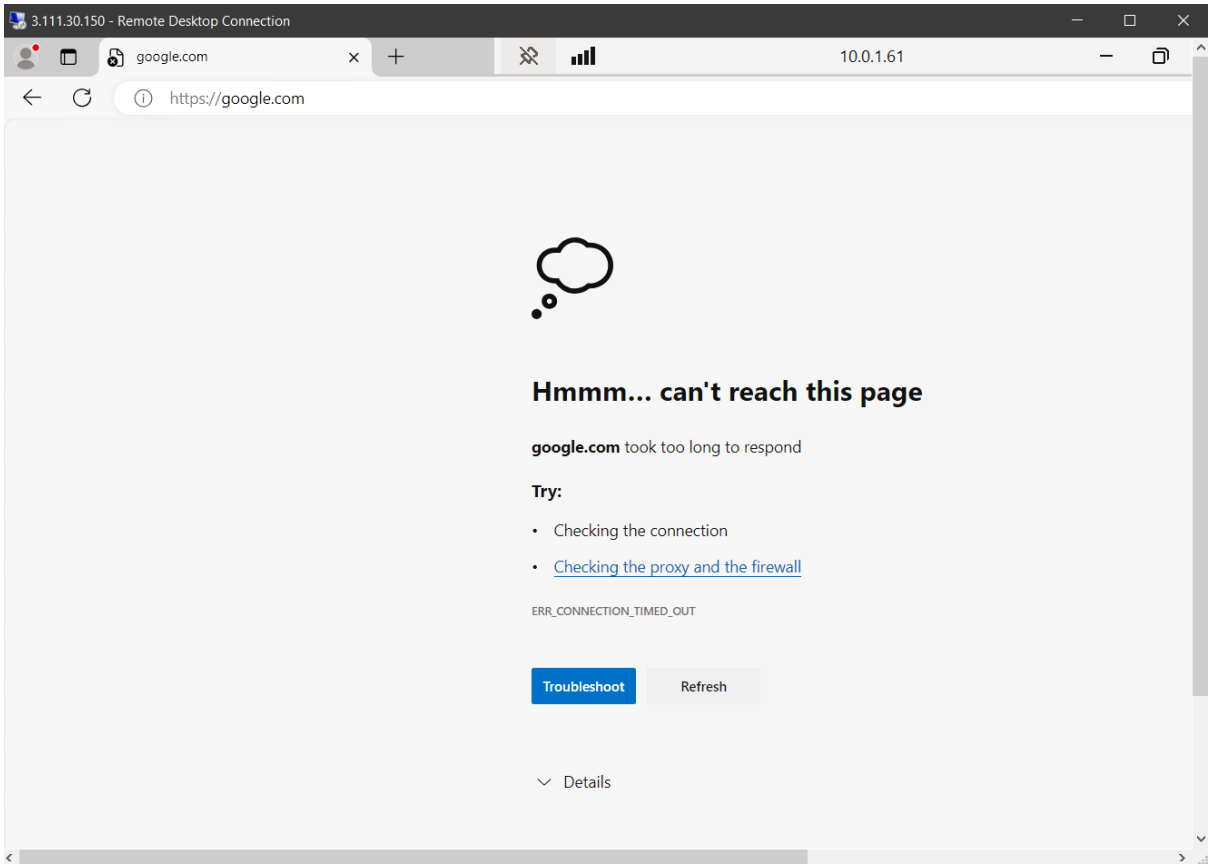

- Now we will Close these sessions - and attach NAT with Public Subnet and update it in Private Subnet's Route Table so we can access internet in Private Instance without attaching it to IGW.

Step 8: NAT Gateway.

- Open AWS - VPC - NAT - Create Nat Gateway.
- Assign Name - Public Subnet - Connectivity: Public - Allocate Elastic IP - Create NAT Gateway.

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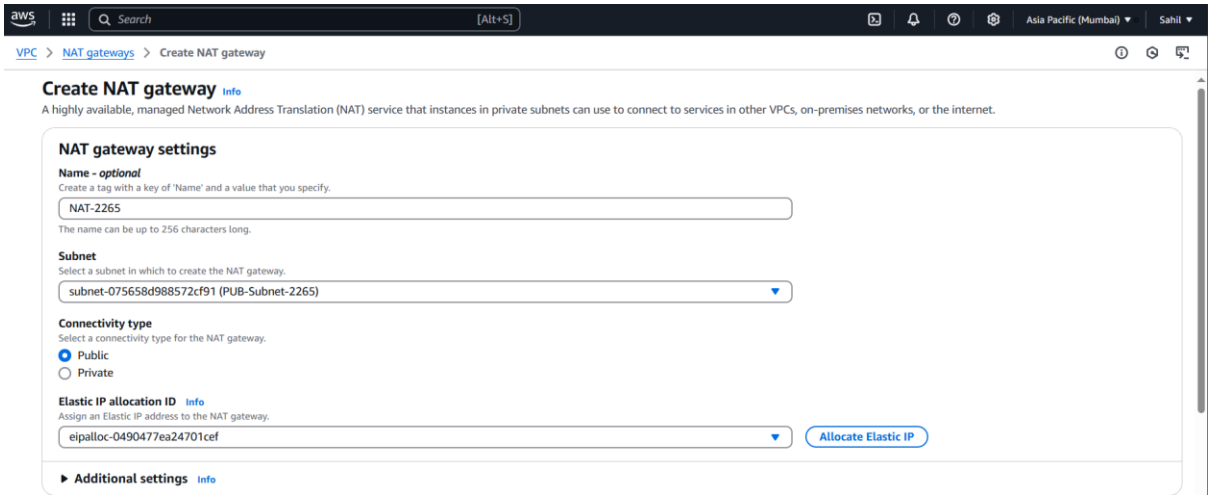
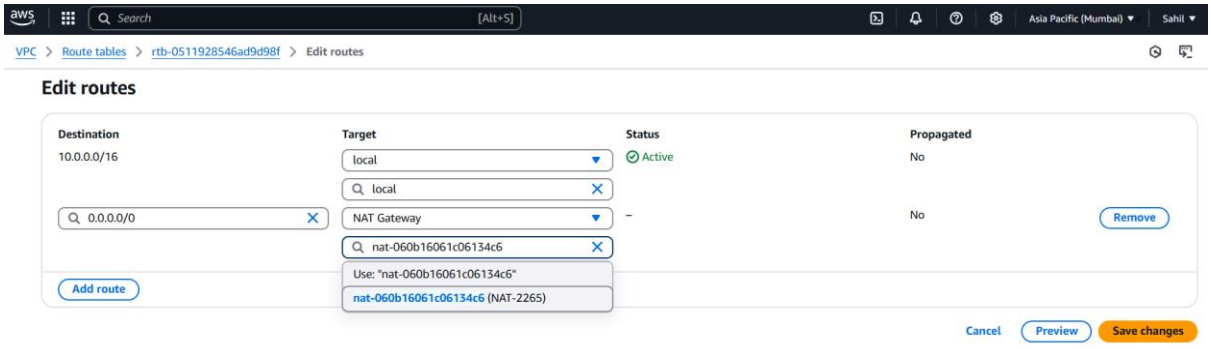


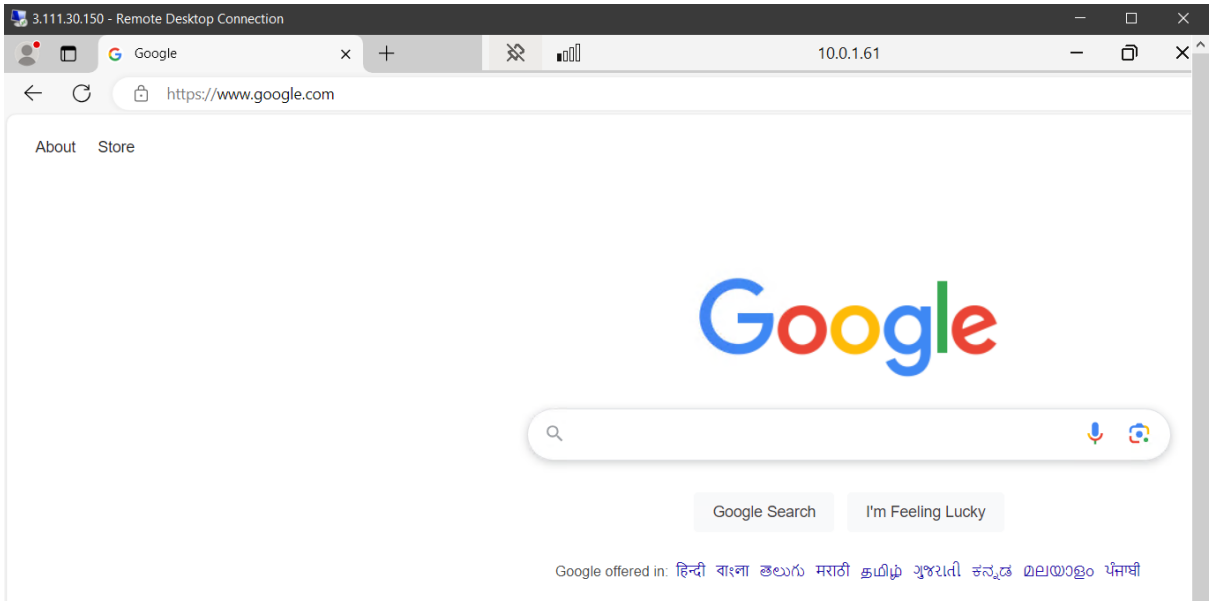
- Go to Routes Tables - Select Private Route Table - Routes - Edit Routes.
- Add Destination: 0.0.0.0/0 - Select NAT Gateway and choose your created NAT - Save Changes.



Step 9: Network Access into Private EC2 Instance Accessing from Public EC2.

- Open RDP – Connect to Your Public Instance.
- Open RDP in Public instance windows - Connect Private Instance - Open Google in Microsoft Edge in Private instance.

- As we can see successful internet access into the private EC2 instance - Successfully accessed internet in private ec2 in private subnet without connect it to IGW.



Step 10: Deletion Of Resources.

- Delete the resources in a manner where they don't leave any dependencies not to cause complications later.
- Order of Deletion of Recourses:

EC2 instances - Delete Security Groups from VPC Dashboard - delete NAT Gateway - Release Elastic IP - de-associate subnets from route tables and delete route tables - de-associate subnets from NACL and delete NACL - Delete Subnets - Detach IGW from VPC & Delete IGW - Delete VPC.