D Y PATIL INTERNATIONAL UNIVERSITY
AKURDI PUNE

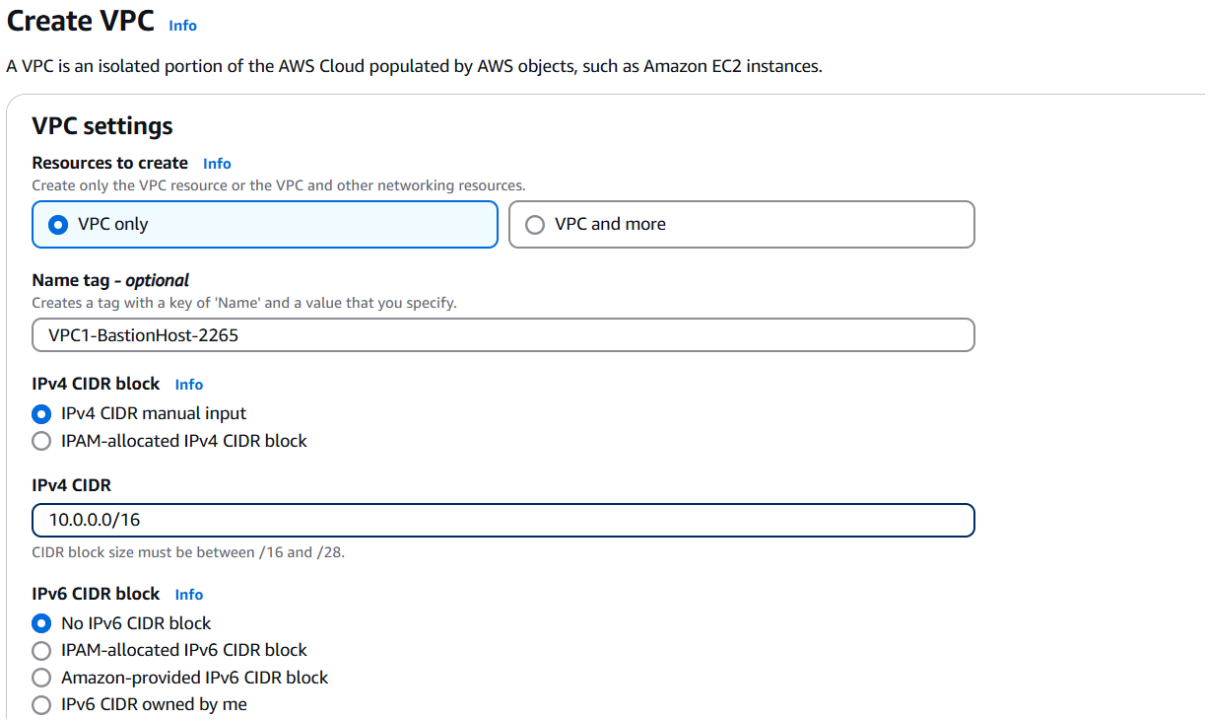
School of Computer Science, Engineering and Applications (SCSEA)
B. Tech TY (CCSA)
Subject: Cloud Architecture And Protocol

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

Title of Practical: 6. AWS Transit Gateway: Centralized VPC Connectivity and Network Management.

Step 1:- Create Three VPCs & connect an Internet gateway to the Public VPC.

- Search for VPC on AWS Console.
- Select VPC.
- Create First VPC with the name “VPC1-BastionHost-2265” with CIDR - ”10.0.0.0/16”.
- Create Second VPC with the name “VPC2-Private-2265” with CIDR-”11.0.0.0/16”.
- Create Third VPC with the name “VPC3-Private-2265” with CIDR-”12.0.0.0/16”.



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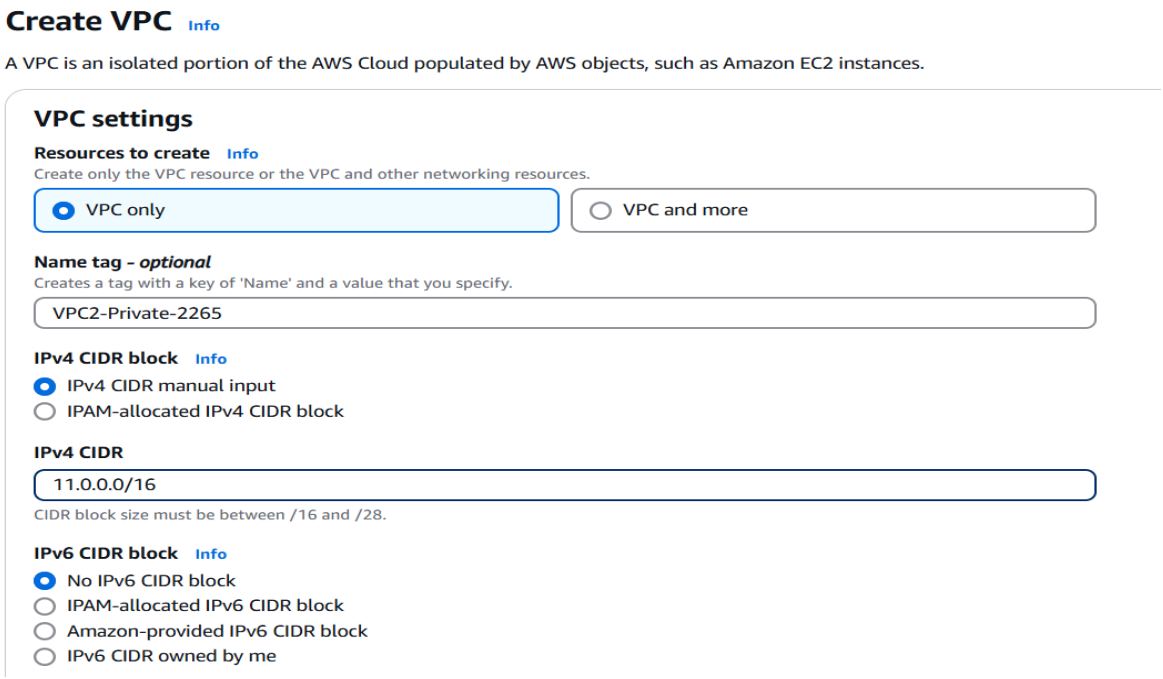

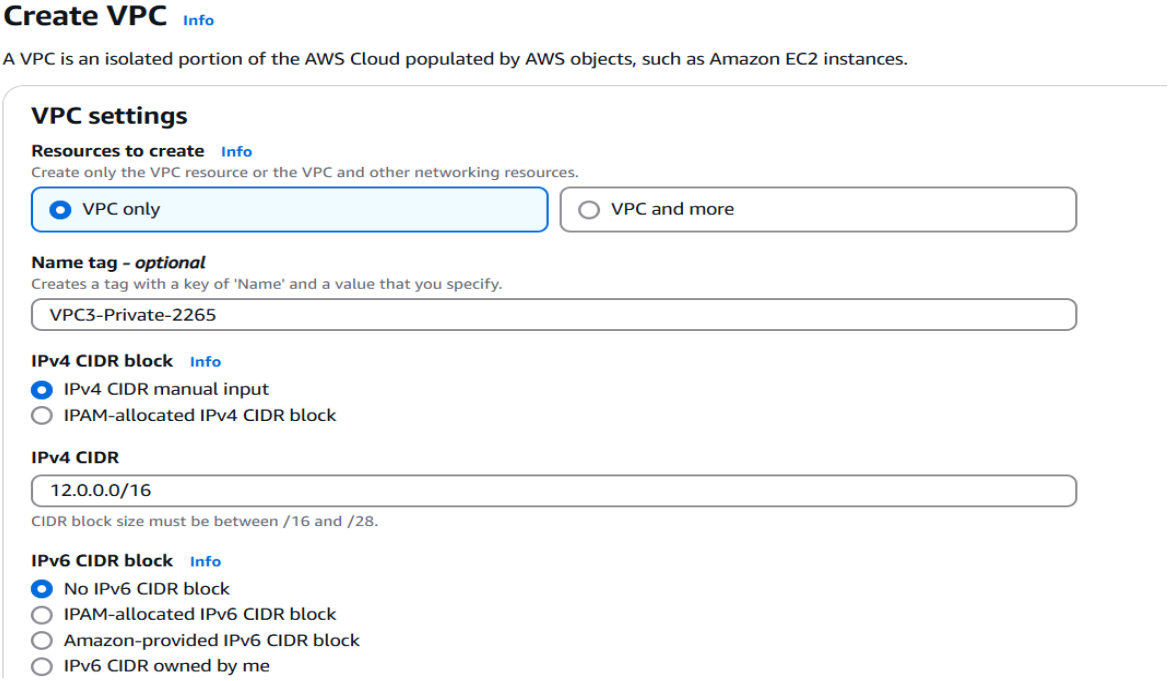

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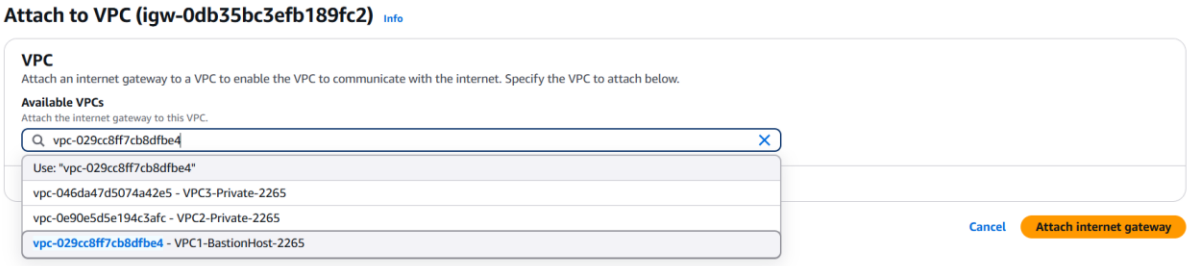
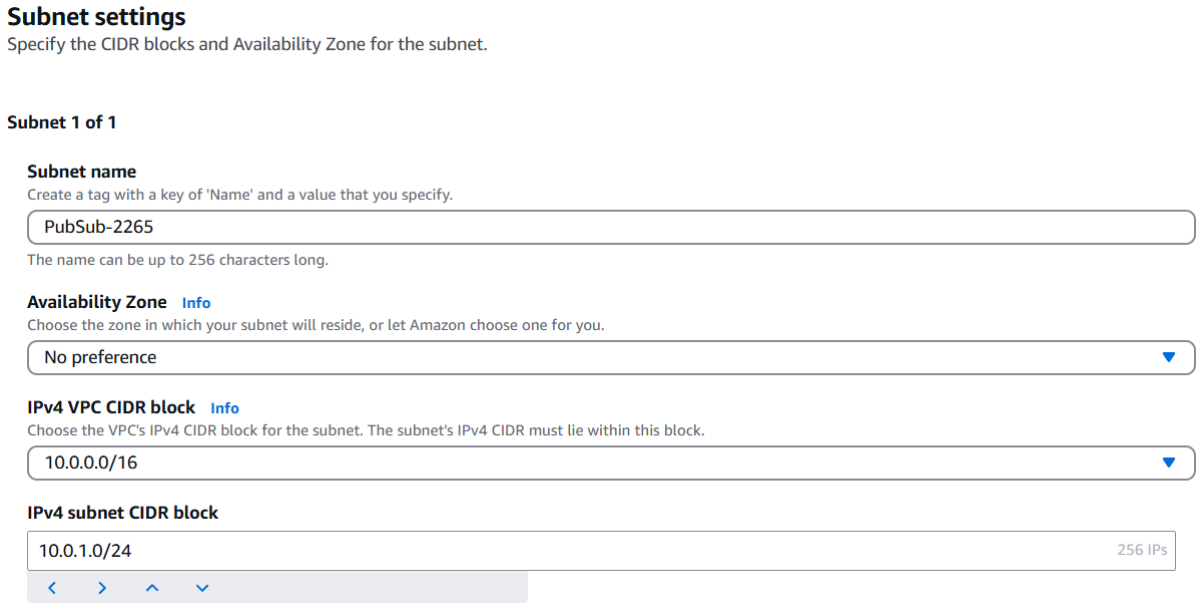
- Create an Internet Gateway with name "IGW-2265".
- Then attach it to the Public VPC.



Step 2:- Create one Subnet for each VPC.

- Create a Subnet for the First VPC.
- Select VPC – 'VPC1-BastionHost-2265'.
- Set name of the Subnet as "PubSub-2265" and IPv4 range as "10.0.1.0/24".



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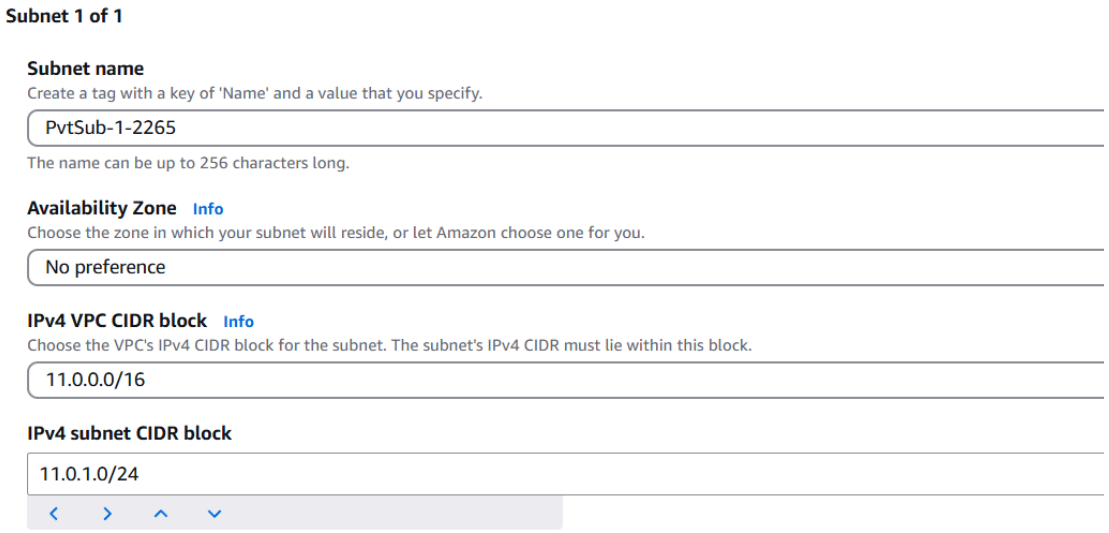
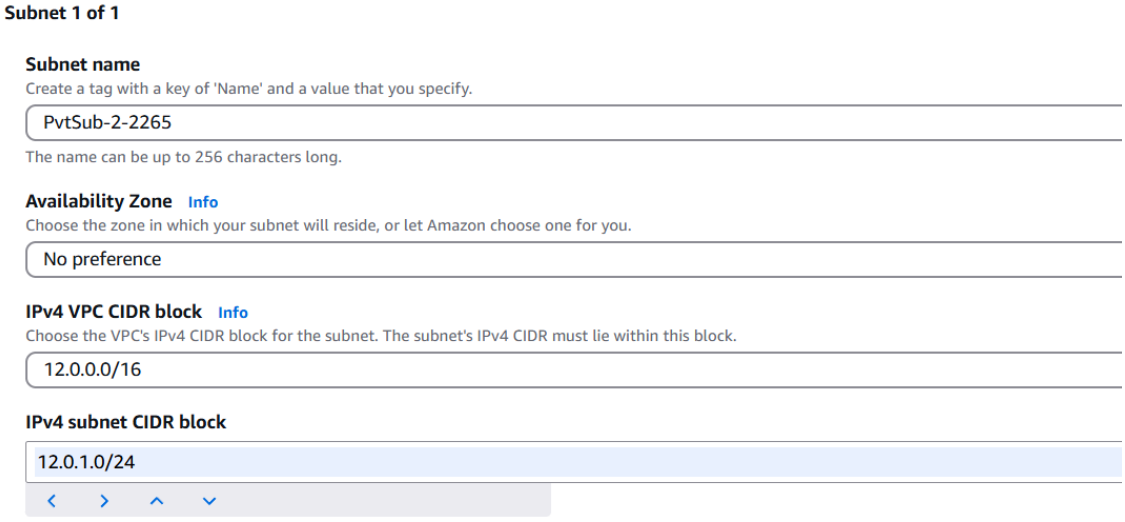
Title of Practical: 6. AWS Transit Gateway: Centralized VPC Connectivity and Network Management.

- Create a Subnet for the Second VPC.
- Select VPC – 'VPC2-Private-2265'.
- Set name of the Subnet as "PvtSub-1-2265" and IPv4 range as "11.0.1.0/24".



- Create a Subnet for the First VPC.
- Select VPC – 'VPC3-Private-2265'.
- Set name of the Subnet as "PvtSub-2-2265" and IPv4 range as "12.0.1.0/24".



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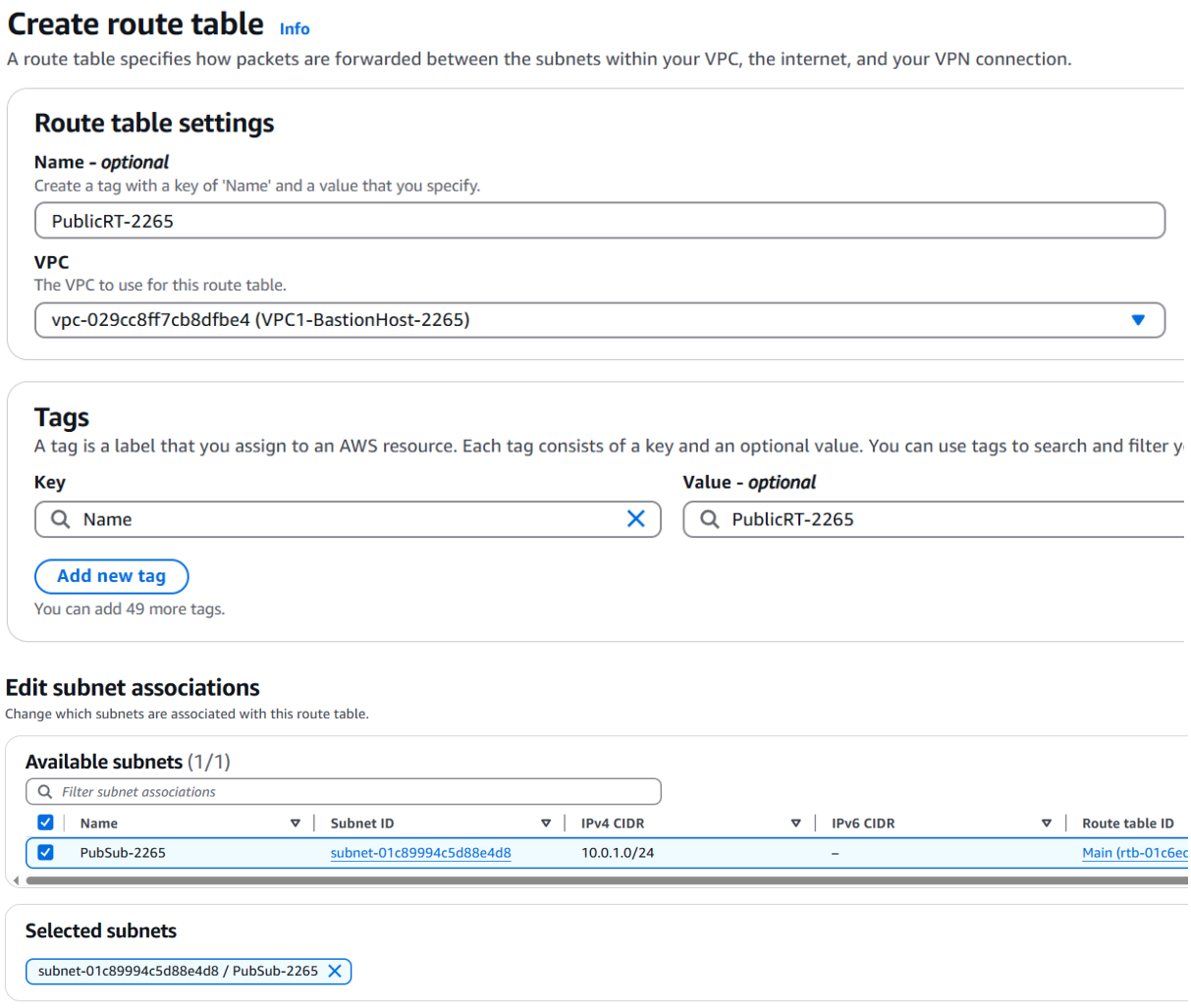
Title of Practical: 6. AWS Transit Gateway: Centralized VPC Connectivity and Network Management.

Step 3:- Create Three Route tables and associate them with each Subnet.

- Create a Route Table with name 'PublicRT-2265' for VPC 1 i.e. 'VPC1-BastionHost-2265'.
- Associate it with the Public Subnet – 'PubSub-2265'.
- Now, go to "Edit Routes" and add Internet Gateway 'IGW-2265' in Public Route Table.



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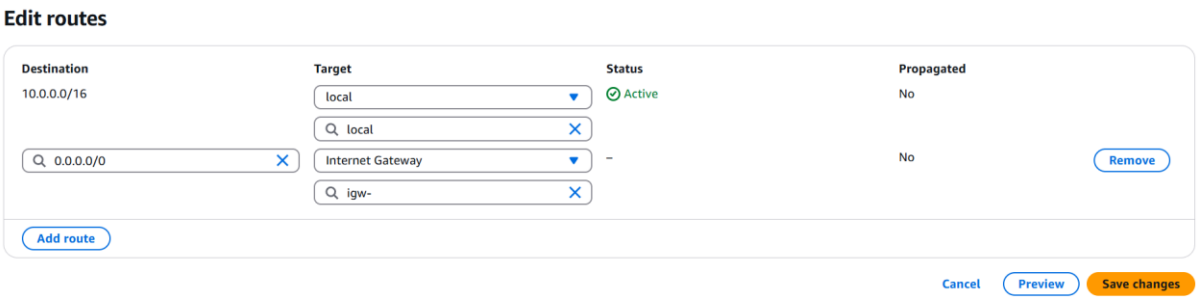
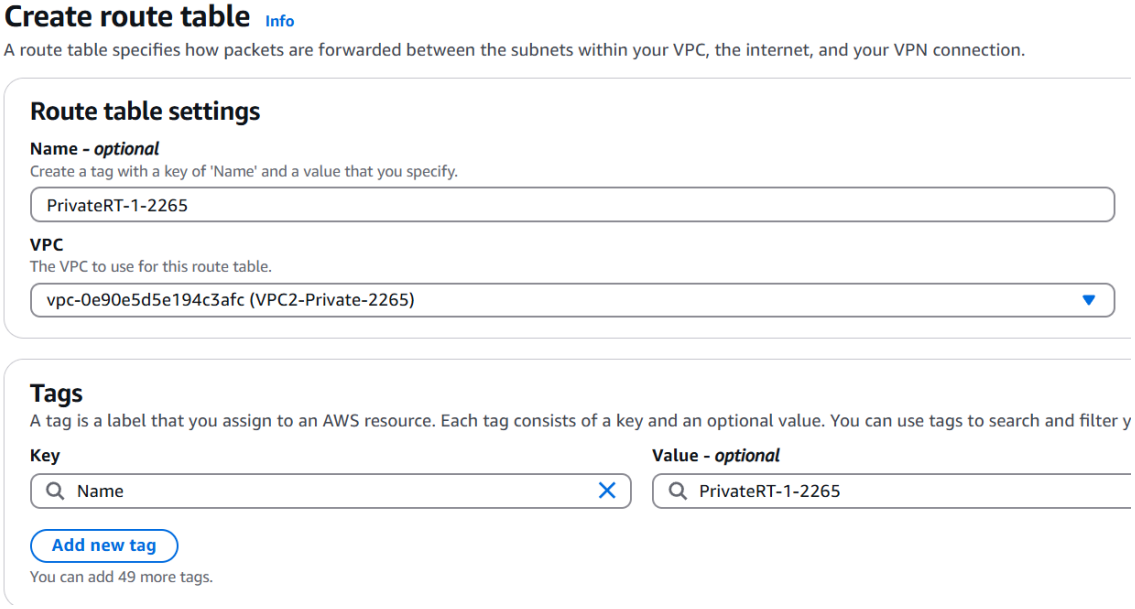
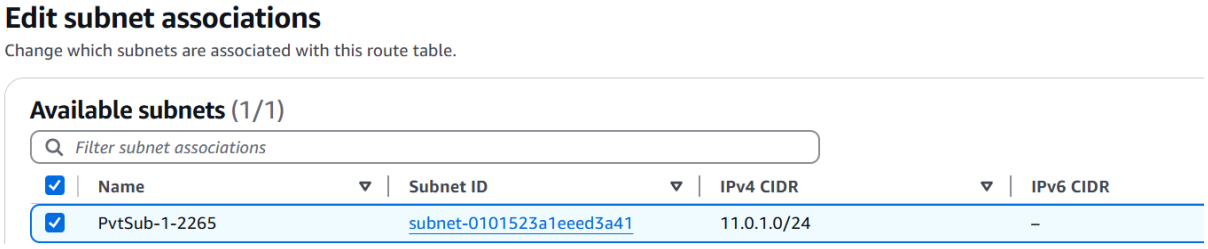


- Create another Route Table with name "PrivateRT-1-2265" for VPC 2 i.e. – 'VPC2-Private-2265'.
- Associate it with the Private Subnet – 'PvtSub-1-2265'.





- Create another Route Table with name "PrivateRT-2-2265" for VPC 2 i.e. – 'VPC3-Private-2265'.
- Associate it with the Private Subnet – 'PvtSub-2-2265'.

Create route table Info

A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.

Route table settings

Name - *optional*

Create a tag with a key of 'Name' and a value that you specify.

PrivateRT-2-2265

VPC

The VPC to use for this route table.

vpc-046da47d5074a42e5 (VPC3-Private-2265)

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 y

Key	Value - *optional*
Name	PrivateRT-2-2265

Add new tag

You can add 49 more tags.

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (1/1)

Filter subnet associations

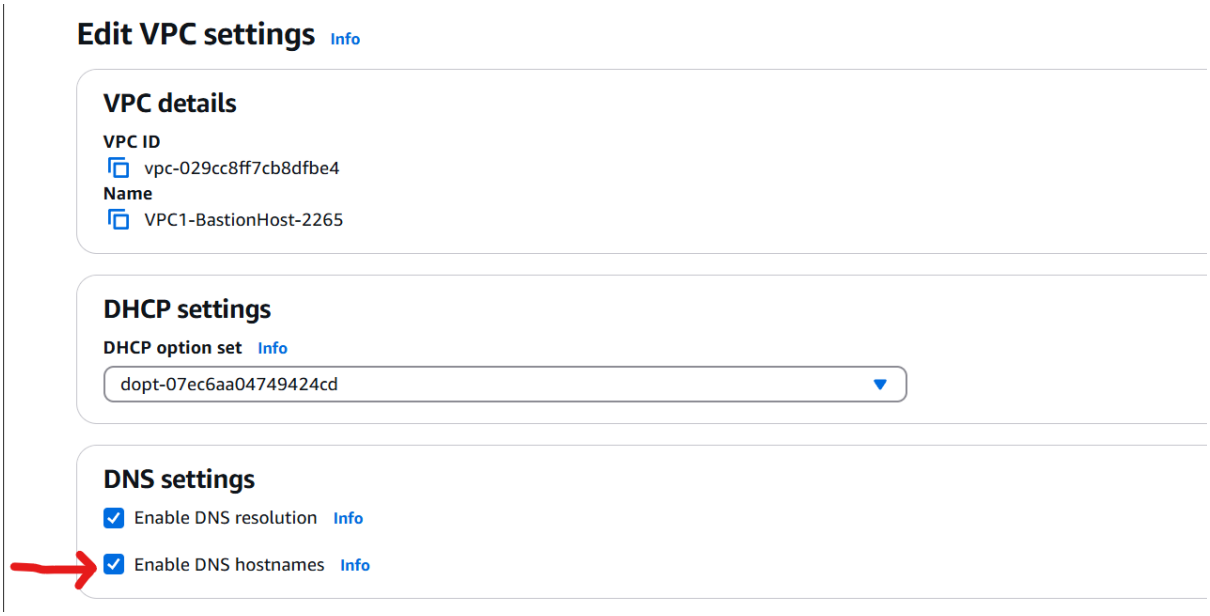
Name	Subnet ID	IPv4 CIDR	IPv6 CIDR
PvtSub-2-2265	subnet-0640630824d9310f2	12.0.1.0/24	–

Selected subnets

subnet-0640630824d9310f2 / PvtSub-2-2265

Step 4: Allow "Enable DNS Hostname" in VPCs and Create Three Security Groups (One Public and Two Private).

- Select the Public VPC – 'VPC1-BastionHost-2265' and go to 'Edit VPC settings' and under 'DNS setting' tick "Enable DNS hostnames", **also repeat this for the other two VPCs**.



- Create a Public Security Group with name 'PublicSG-2265'.
- Select VPC – 'VPC1-BastionHost-2265' and add three inbound rules (SSH, HTTP, HTTPS) with source as "Anywhere IPv4" for all three rules.

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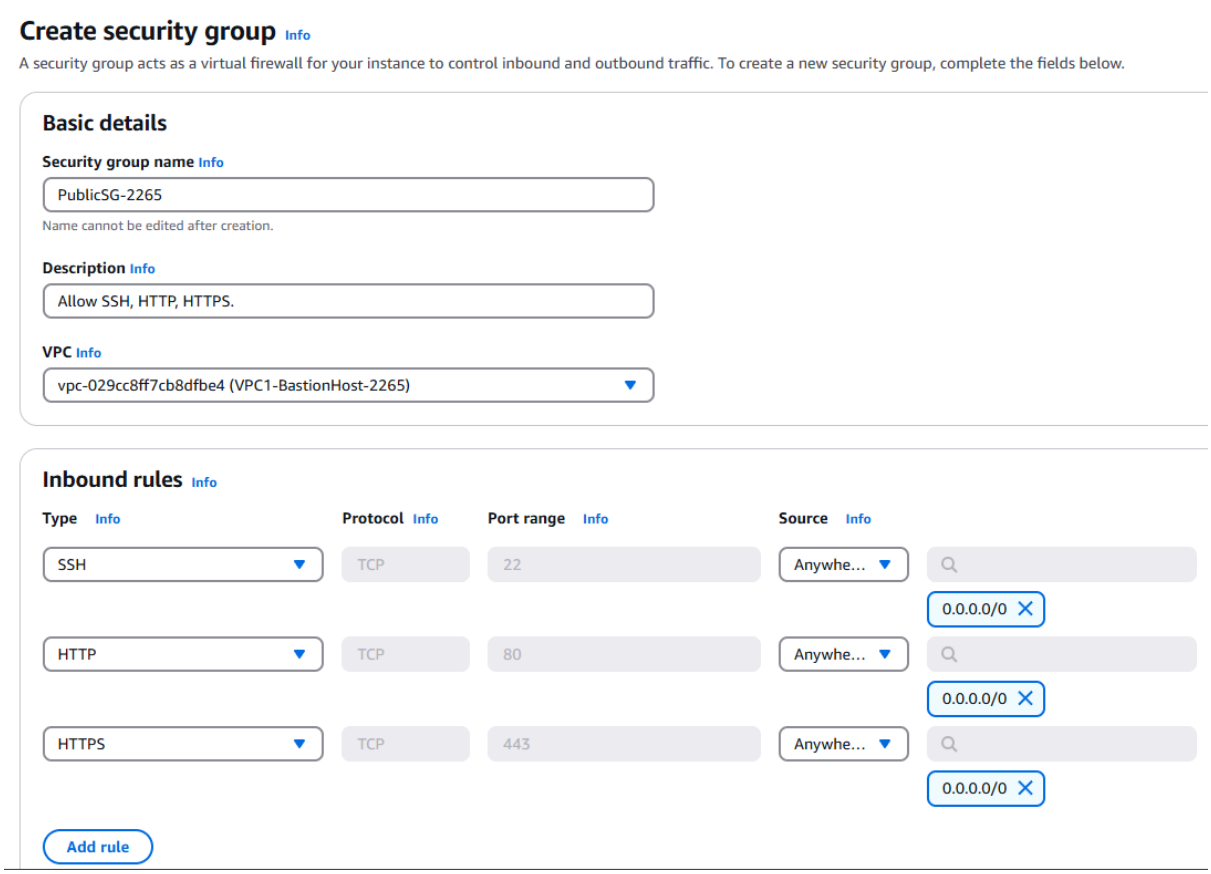

- Create a Private Security Group with name 'PrivateSG-1-2265'.
- Select VPC – 'VPC2-Private-2265' and give four inbound rules (SSH, HTTP, SSH, HTTP) with source as CIDR of other two VPCs (i.e. "10.0.0.0/16" & "12.0.0.0/16").

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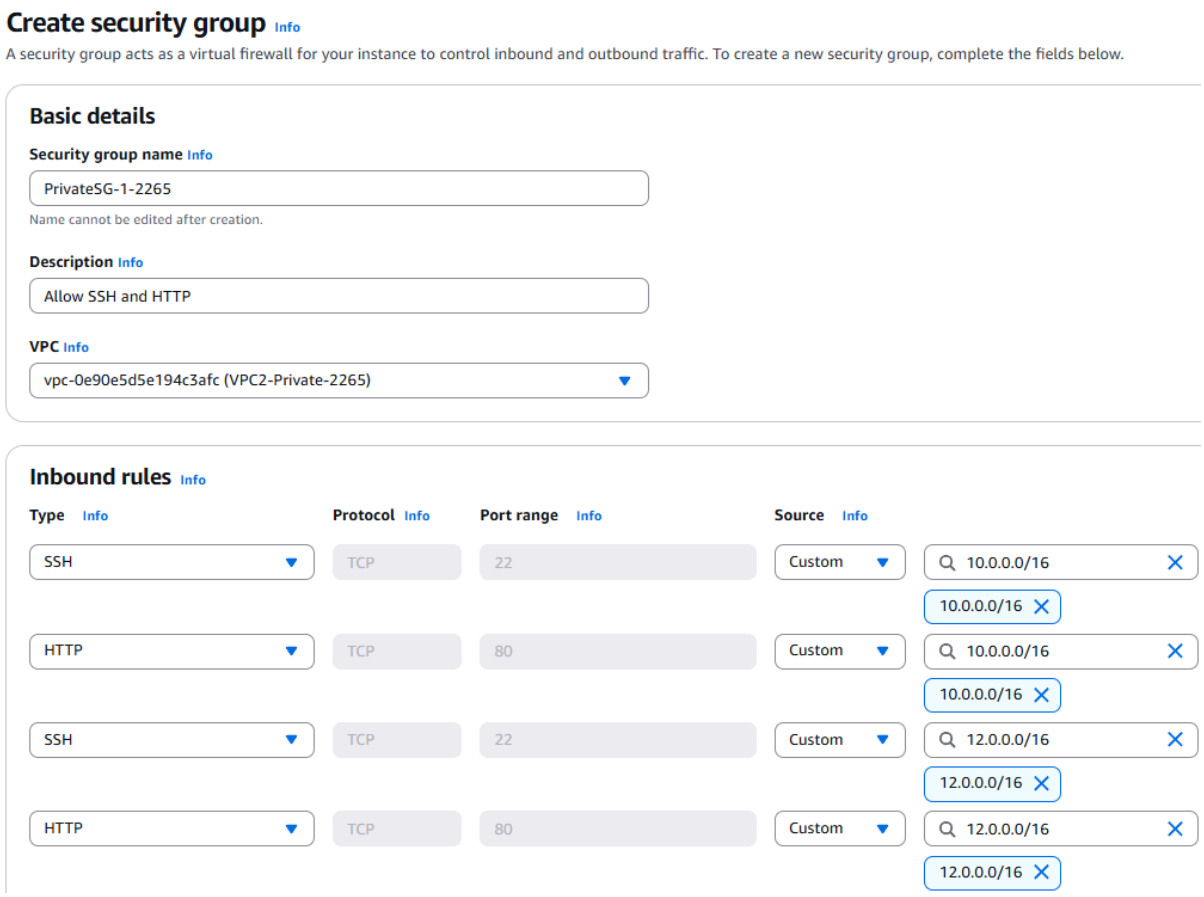

- Create a Private Security Group with name 'PrivateSG-2-2265'.
- Select VPC – 'VPC3-Private-2265' and give four inbound rules (SSH, HTTP, SSH, HTTP) with source as CIDR of other two VPCs (i.e. "10.0.0.0/16" & "11.0.0.0/16").

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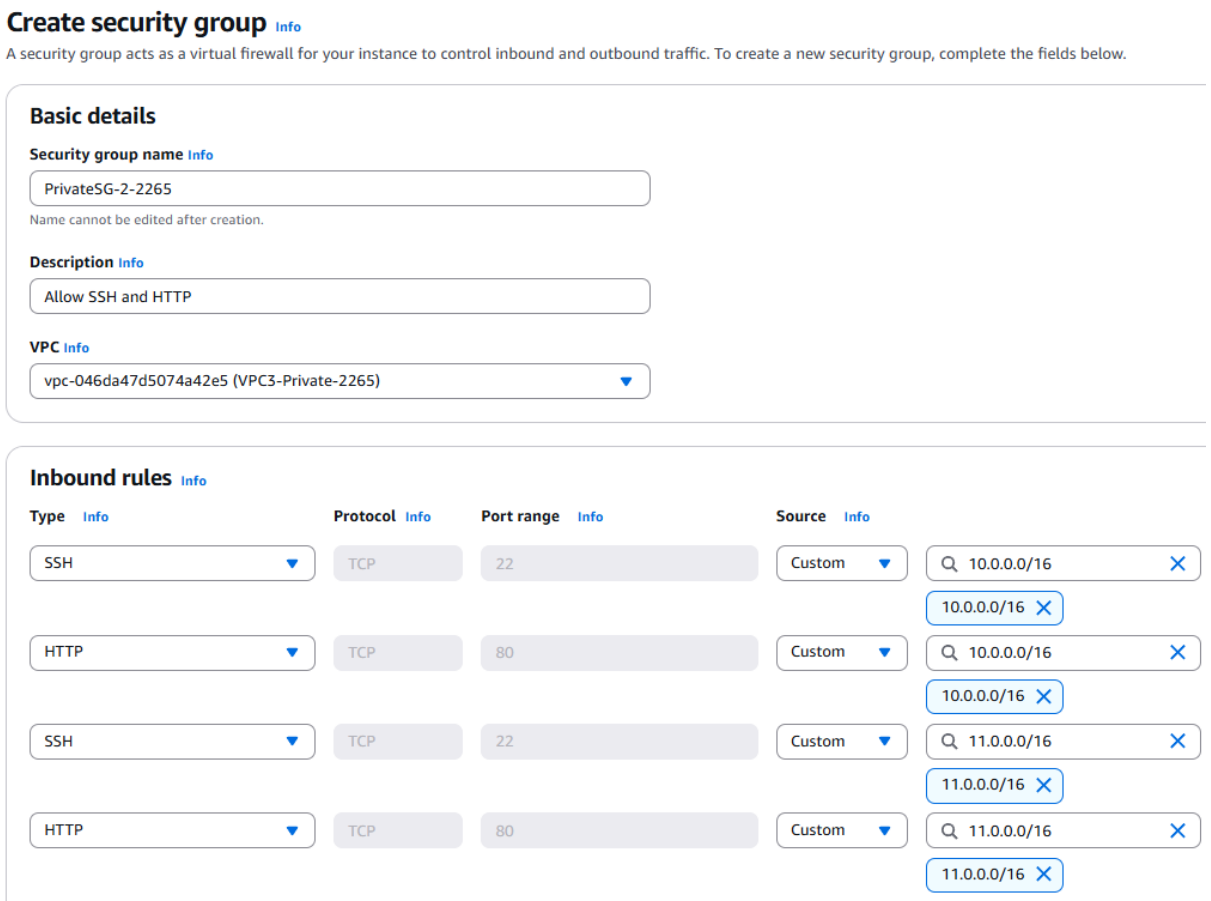
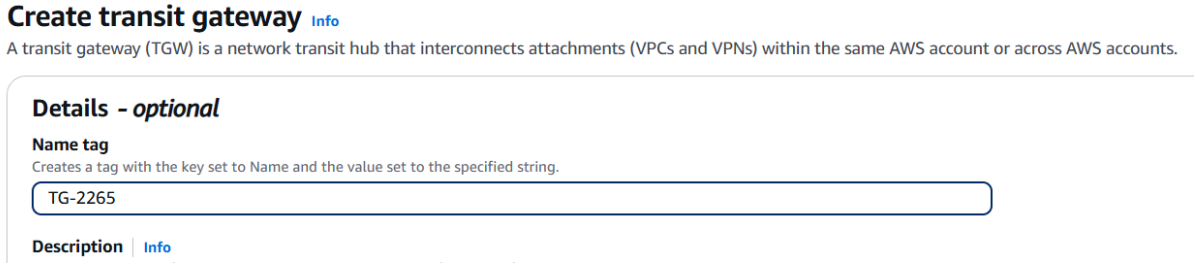
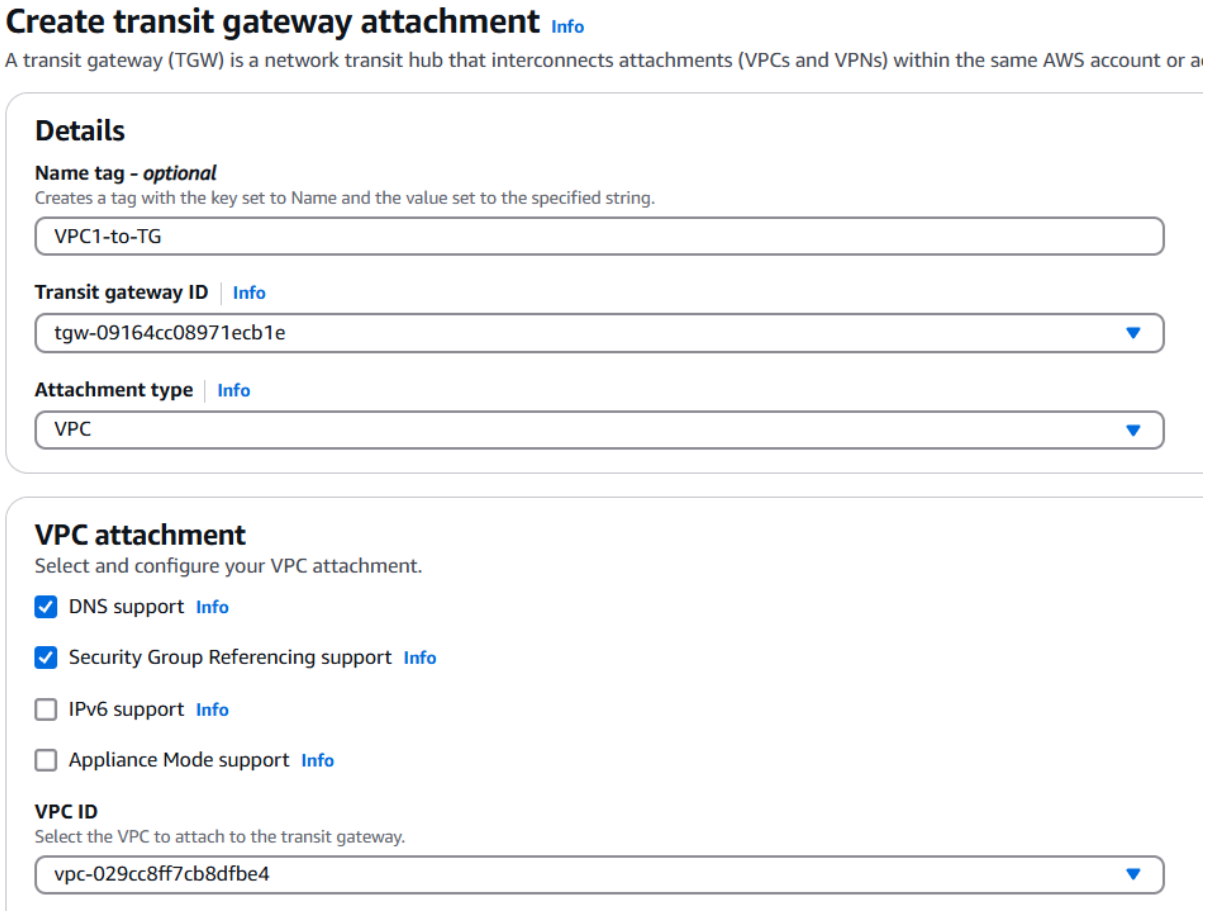


Step 5:- Create Transit Gateway & Transit Gateway Attachments.

- Create a Transit Gateway named “TG-2265”.



- Now create the First Transit Gateway Attachment named "VPC1-to-TG".
- Select the First VPC – 'VPC1-BastionHost-2265' in VPC ID.



- Now create the Second Transit Gateway Attachment named "VPC2-to-TG".
- Select the Second VPC – 'VPC2-Private-2265' in VPC ID.

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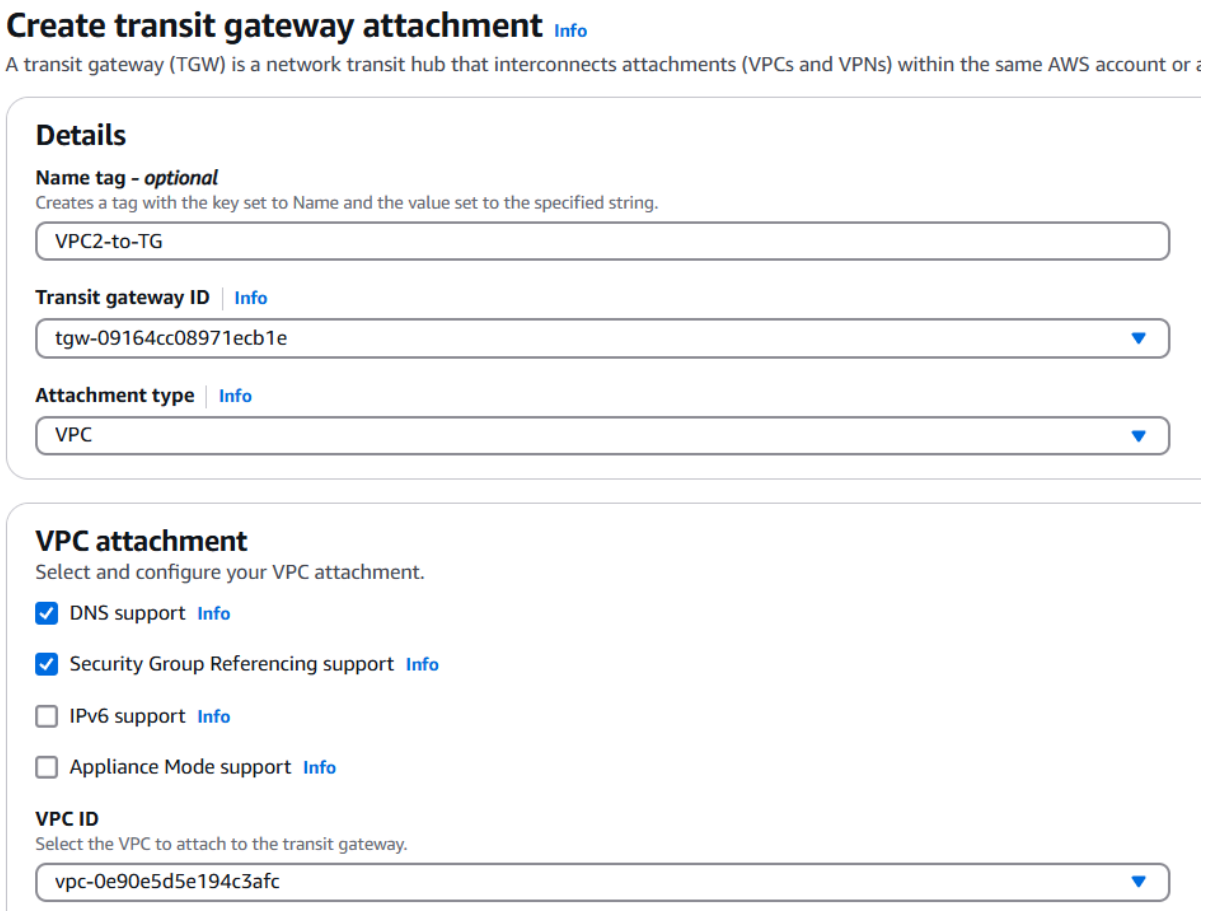

- Now create the Third Transit Gateway Attachment named “VPC3-to-TG”.
- Select the Third VPC – ‘VPC3-Private-2265’ in VPC ID.

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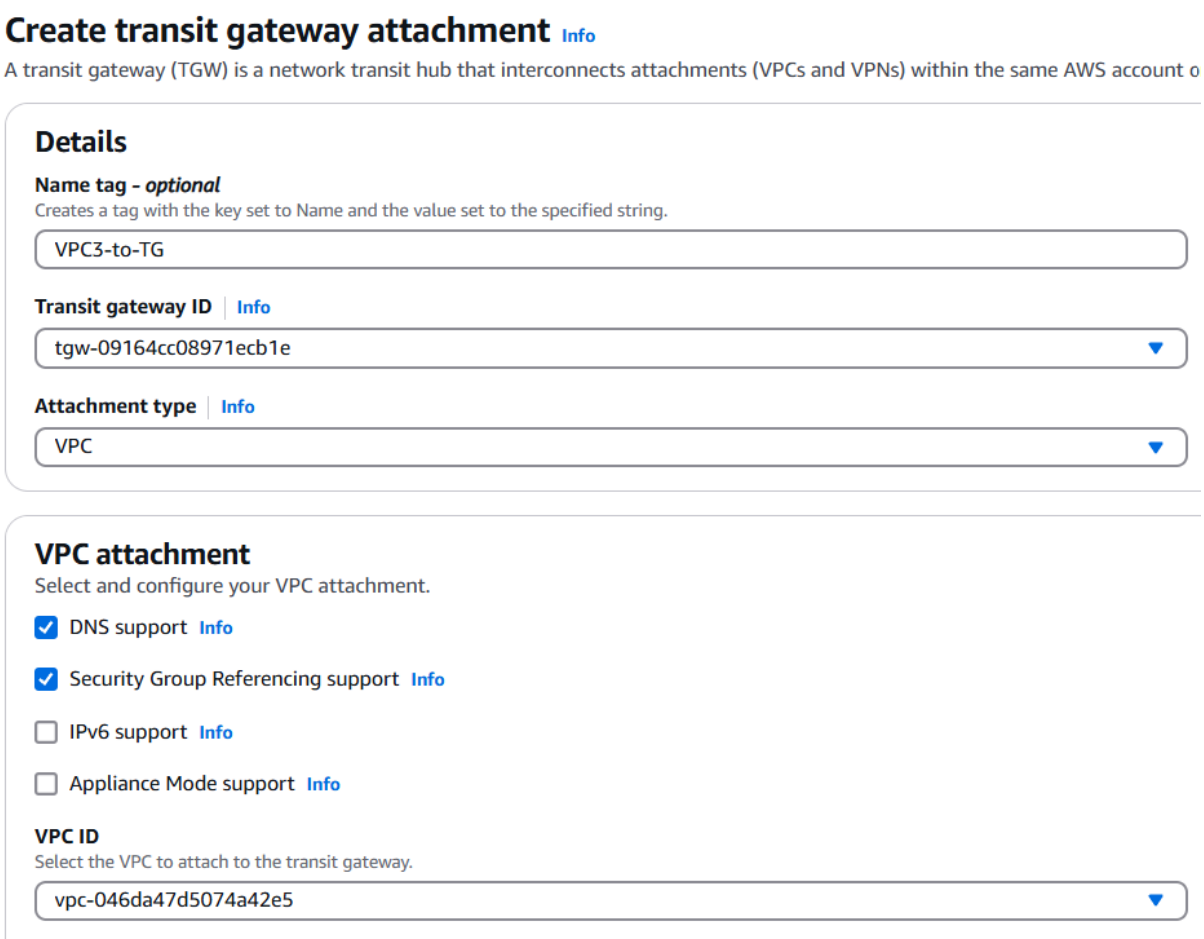

Step 6:- Add Transit Gateway Routes in all three Route Tables.

- In Public Route table (PublicRT-2265) add two routes with Destination as “11.0.0.0/16” & “12.0.0.0/16” with target “Transit Gateway” for both.

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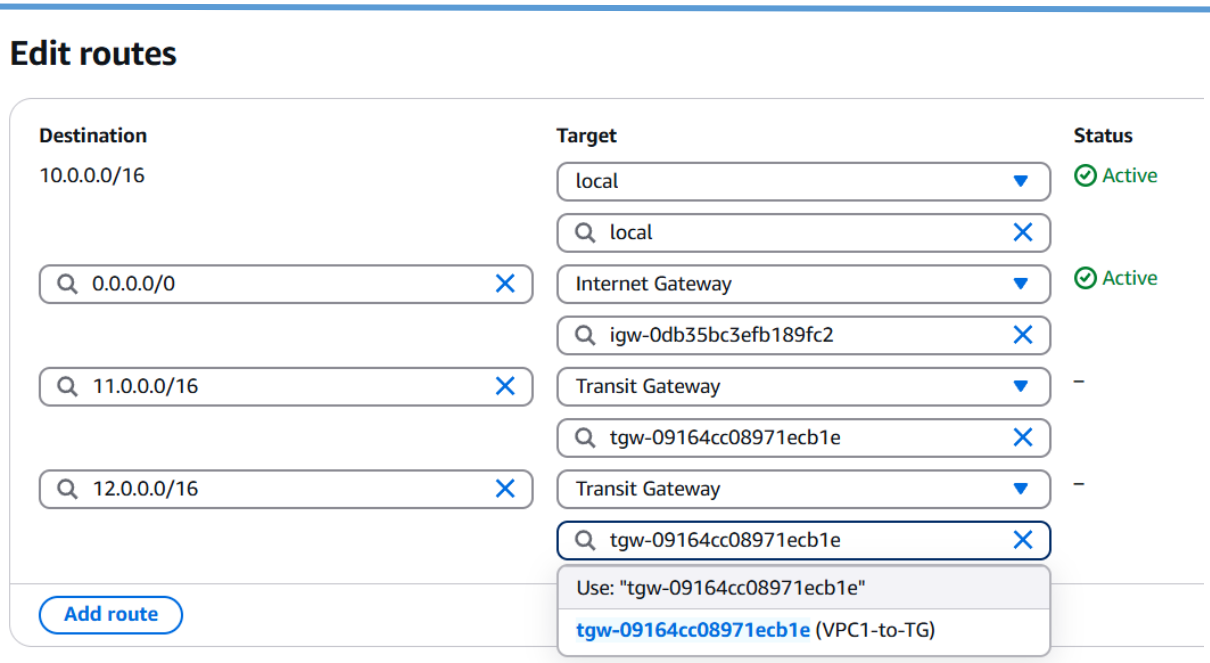
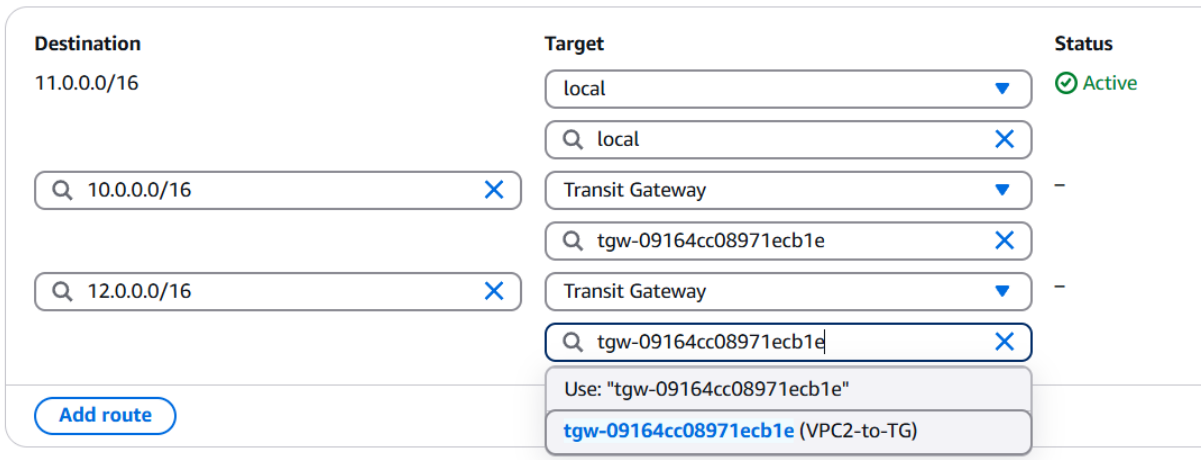
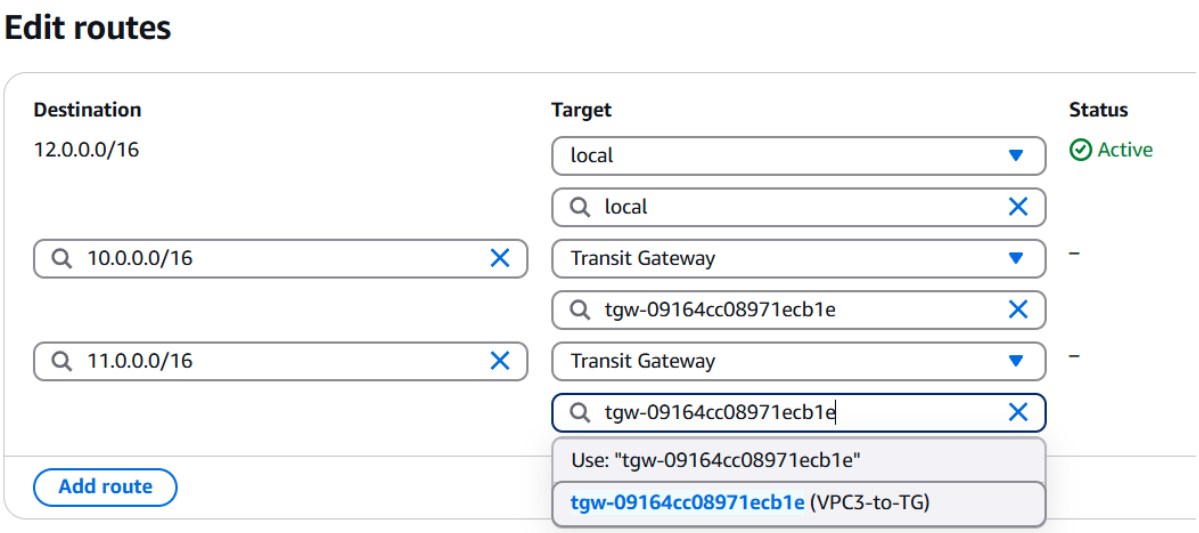


- In Private Route table 1 (PrivateRT-1-2265) add two routes with Destination as "10.0.0.0/16" & "12.0.0.0/16" with target "Transit Gateway" for both.



- In Private Route table 2 (PrivateRT-2-2265) add two routes with Destination as "10.0.0.0/16" & "11.0.0.0/16" with target "Transit Gateway" for both.



Step 7:- Launch Three EC2 Instances with one in each VPC.

- Go to EC2 console and click on 'Launch Instances'.
- Name the public instance – 'BastionHost-2265'.
- Select AMI as 'Amazon Linux' and under that select 'Amazon Linux 2 AMI (HMV)'.

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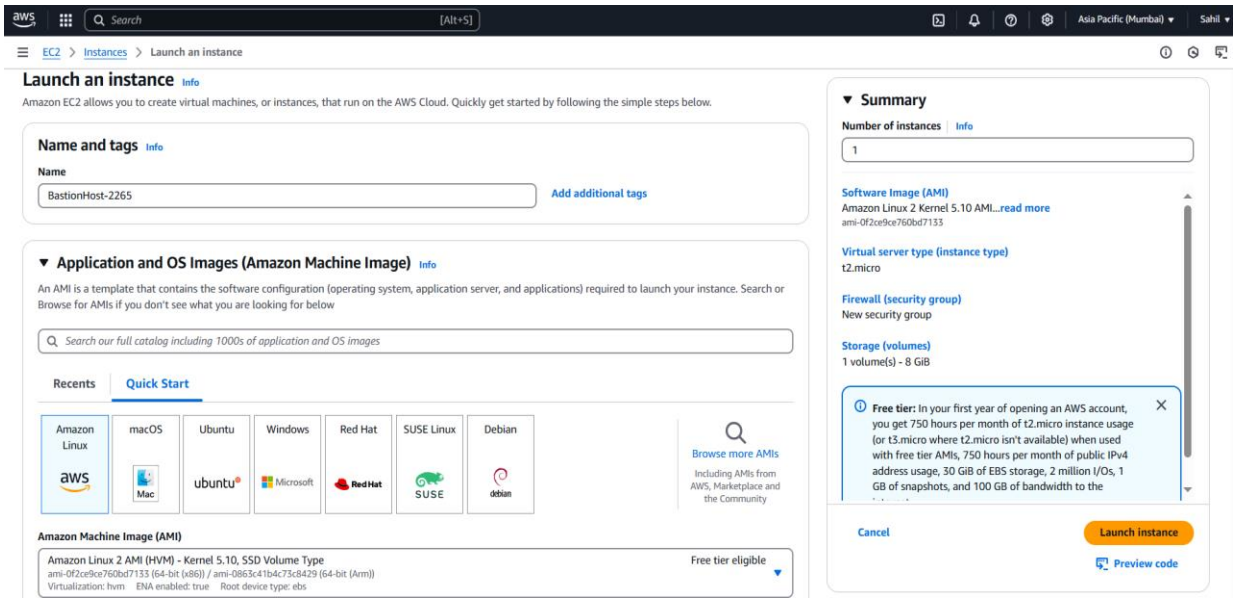

- Now, select Key Pair.
- Under Network settings – select the Public VPC 'VPC1-BastionHost-2265'.
- Select Subnet as 'PubSub-2265'.
- Enable auto-assign public IP.
- For Security group, select the public SG we created earlier i.e. 'PublicSG-2265'.

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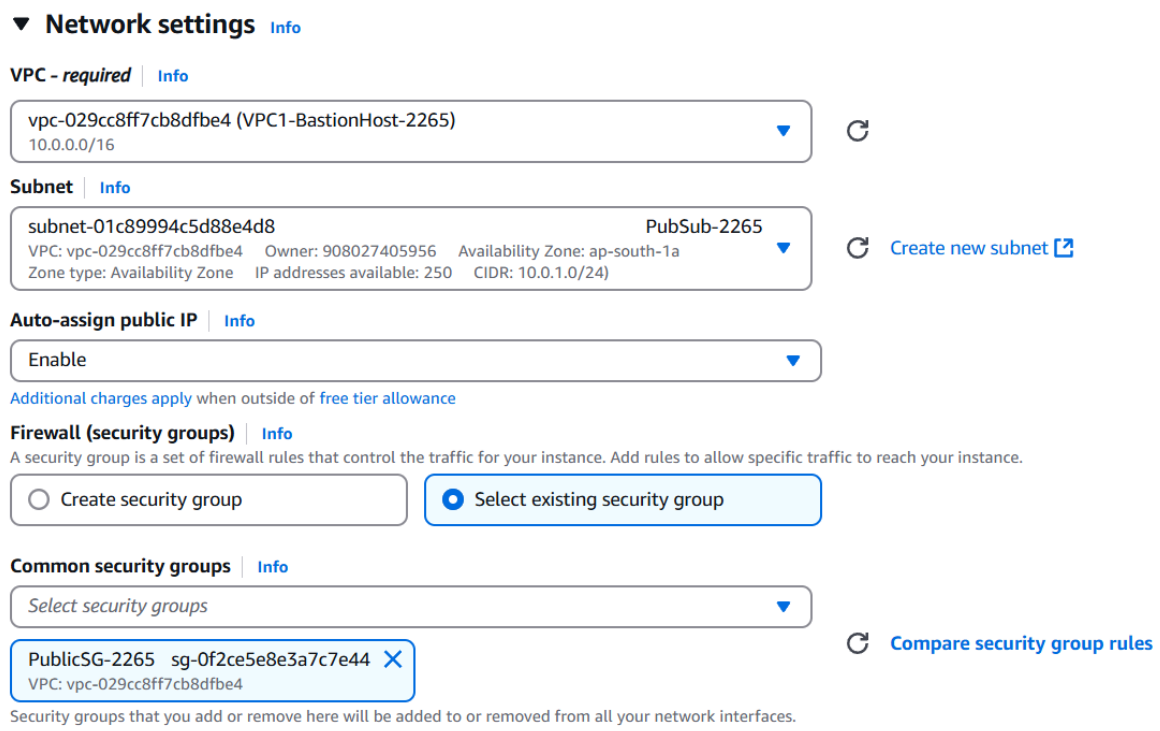

- In Advanced details, in 'User data' write the following script:
  #!/bin/bash
  sudo yum update -y
  sudo yum install httpd -y
  systemctl start httpd
  systemctl enable httpd
  echo "<h1>Welcome to Transit Gateway – 2265</h1>" >var/www/html/index.html

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User data - *optional* | Info

Upload a file with your user data or enter it in the field.

Choose file

```
#!/bin/bash
sudo yum update -y
sudo yum install httpd -y
systemctl start httpd
systemctl enable httpd
echo "<h1>Welcome to Transit Gateway - 2265</h1>" >var/www/html/index.html
```

- Launch the instance.

- Now, launch two more EC2 Instances with other 2 VPCs. (Private Instances)
- Name the first Private Instance – 'PvtInstance-1-2265'.
- Select AMI as 'Amazon Linux' and under that select 'Amazon Linux 2 AMI (HMV)'.
- Now, select Key Pair.
- Under Network settings – select the Private VPC 1 'VPC2-Private-2265'.
- Select Private Subnet 1 - 'PvtSub-1-2265'.
- For Security group, select the Private SG we created earlier i.e. 'PrivateSG-1-2265'.
- Launch the instance.

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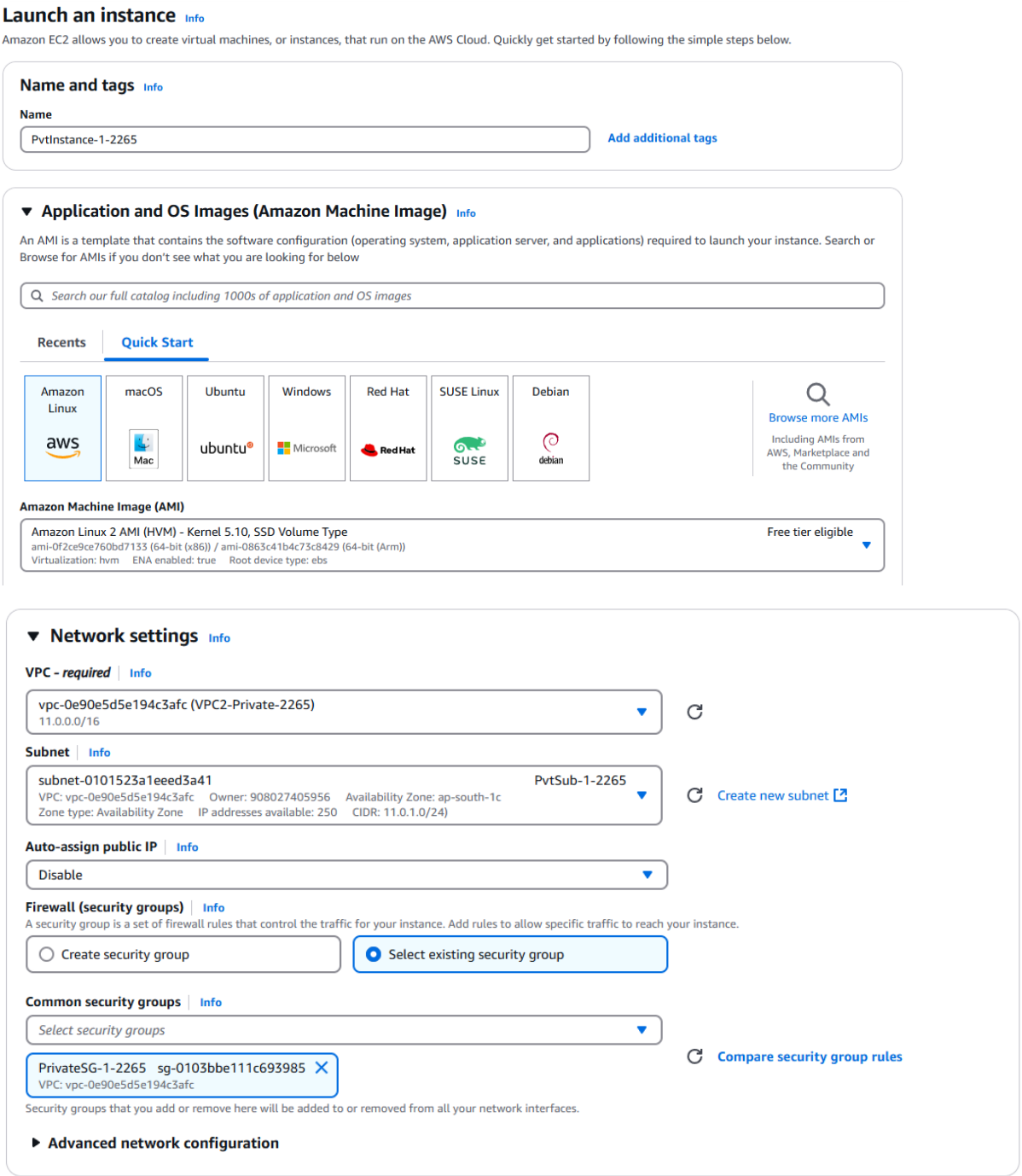

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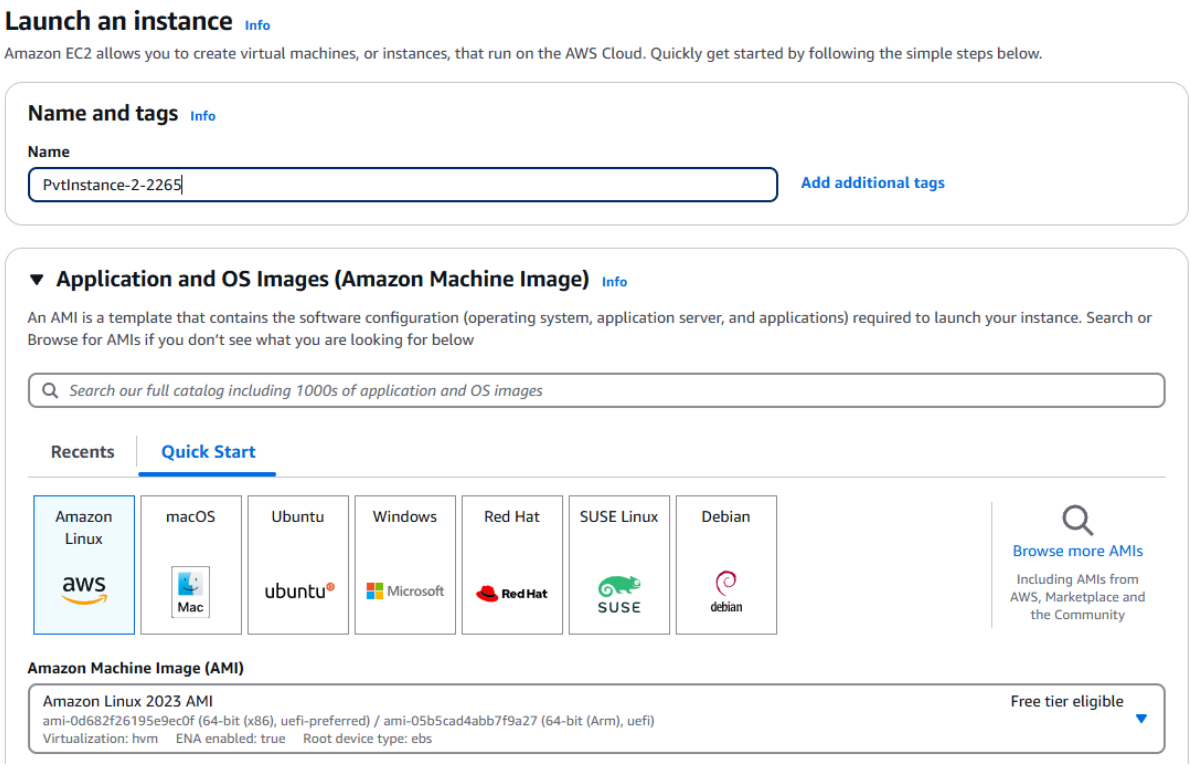
- Name the second Private Instance – 'PvtInstance-2-2265'.
- Select AMI as 'Amazon Linux' and under that select 'Amazon Linux 2 AMI (HMV)'.
- Now, select Key Pair.
- Under Network settings – select the Private VPC 2 'VPC3-Private-2265'.
- Select Private Subnet 2 - 'PvtSub-2-2265'.
- For Security group, select the Private SG we created earlier i.e. 'PrivateSG-2-2265'.
- Launch the instance.



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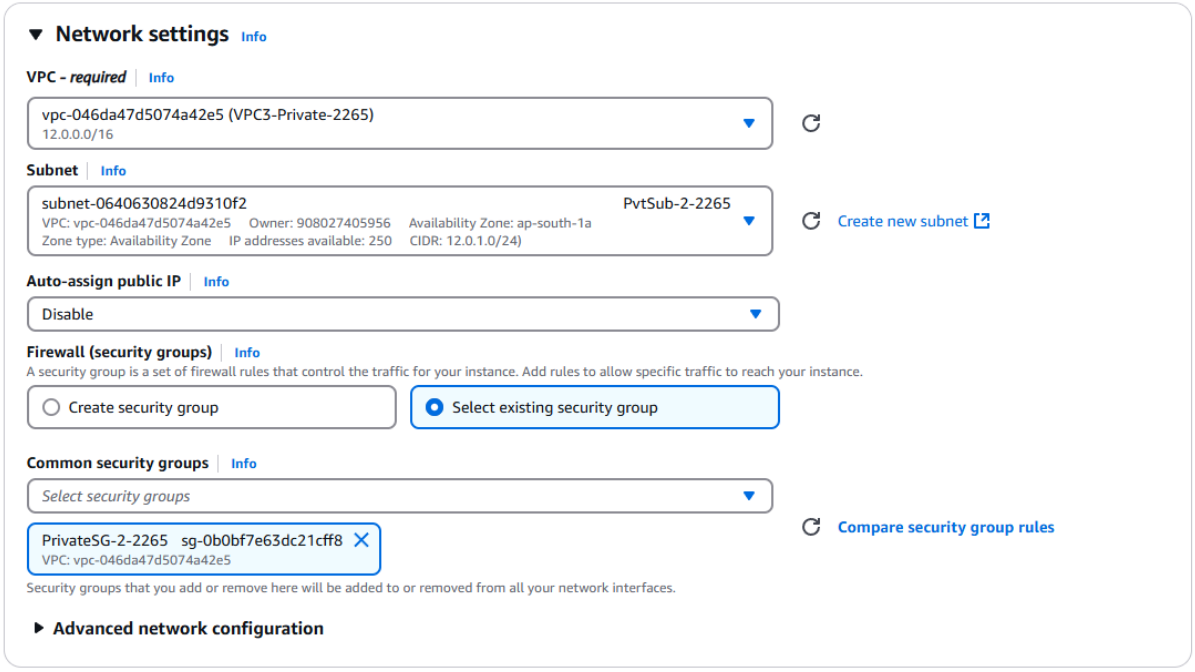

Step 8:- Connect to Public Instance & try to connect to other two Private instances through Public instance.

- Copy the SSH endpoint of instance 'BastionHost-2265' and paste it in Command Prompt to connect to the instance.
- The IP address of Public Instance is : **10.0.1.204**. Now, Start Key Pair creation.
- Type the command 'vi KP-2265.pem' to create a Key pair in the Public instance so that we can launch the private instance inside this public instance.
- Open the Key on the device and copy the contents of the key and paste it in the terminal (vi editor) – press 'esc' key and type command ':wq' to save and exit the window.
- Now type the command 'chmod 400 KP-2265.pem' and press Enter button.
- Now, go to the private instance 'PvtInstance-1-2265' and connect it in terminal.
- The IP address of Private Instance 1 is : **11.0.1.126**.
- Follow the Key Pair creation steps again.
- Now, go to the private instance 'PvtInstance-2-2265' and connect it in terminal.
- The IP address of Private Instance 2 is : **12.0.1.81**.

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```
Microsoft Windows [Version 10.0.19045.5371]
(c) Microsoft Corporation. All rights reserved.

C:\Users\asus>cd downloads

C:\Users\asus\Downloads>ssh -i "KP-2265.pem" ec2-user@ec2-13-201-58-58.ap-south-1.compute.amazonaws.com
   ,     #_
   ~\_  ####_        Amazon Linux 2
  ~~  \_#####\
  ~~     \###|       AL2 End of Life is 2026-06-30.
  ~~       \#/ ___
   ~~       V~' '->
    ~~~         /    A newer version of Amazon Linux is available!
      ~~._.   _/
         _/ _/       Amazon Linux 2023, GA and supported until 2028-03-15.
       _/m/'           https://aws.amazon.com/linux/amazon-linux-2023/

[ec2-user@ip-10-0-1-204 ~]$ vi KP-2265.pem
[ec2-user@ip-10-0-1-204 ~]$ ls
KP-2265.pem
[ec2-user@ip-10-0-1-204 ~]$ chmod 400 KP-2265.pem
```

```
[ec2-user@ip-10-0-1-204 ~]$ ssh -i "KP-2265.pem" ec2-user@11.0.1.126
   ,     #_
   ~\_  ####_        Amazon Linux 2
  ~~  \_#####\
  ~~     \###|       AL2 End of Life is 2026-06-30.
  ~~       \#/ ___
   ~~       V~' '->
    ~~~         /    A newer version of Amazon Linux is available!
      ~~._.   _/
         _/ _/       Amazon Linux 2023, GA and supported until 2028-03-15.
       _/m/'           https://aws.amazon.com/linux/amazon-linux-2023/

[ec2-user@ip-11-0-1-126 ~]$ vi KP-2265.pem
[ec2-user@ip-11-0-1-126 ~]$ [ec2-user@ip-11-0-1-126 ~]$ chmod 400 KP-2265.pem
[ec2-user@ip-11-0-1-126 ~]$ ssh -i "KP-2265.pem" ec2-user@12.0.1.81
The authenticity of host '12.0.1.81 (12.0.1.81)' can't be established.
ECDSA key fingerprint is SHA256:Zl8vwcMZSbnk/6Lq/TyeivRm3WzHbfDe4vcdDDlyIjs.
ECDSA key fingerprint is MD5:eb:0d:ee:df:1b:6c:ec:e2:64:e2:a4:e0:31:be:fd:ff.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '12.0.1.81' (ECDSA) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2
  ~~  \_#####\
  ~~     \###|       AL2 End of Life is 2026-06-30.
  ~~       \#/ ___
   ~~       V~' '->
    ~~~         /    A newer version of Amazon Linux is available!
      ~~._.   _/
         _/ _/       Amazon Linux 2023, GA and supported until 2028-03-15.
       _/m/'           https://aws.amazon.com/linux/amazon-linux-2023/

[ec2-user@ip-12-0-1-81 ~]$
```