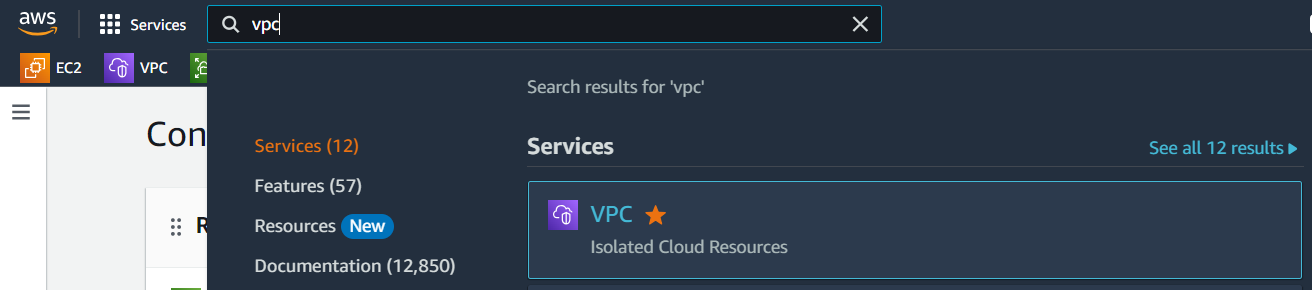
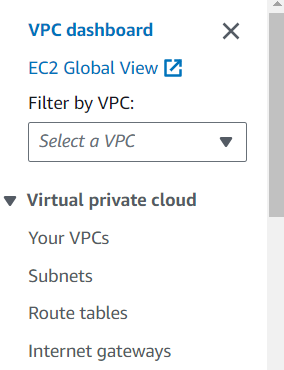
ASSIGNMENT-2

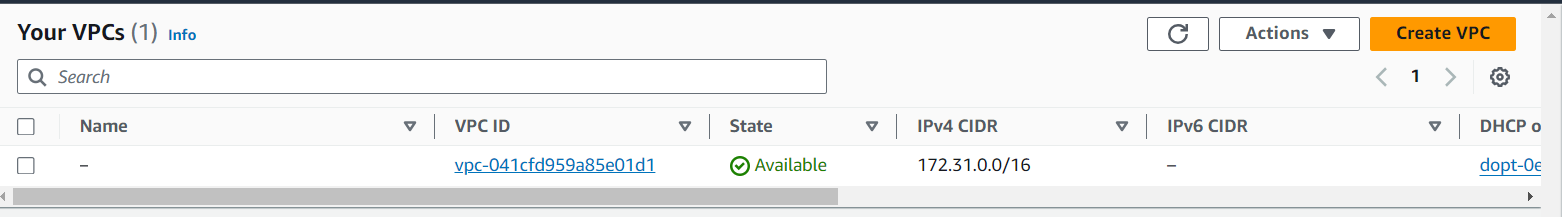
Task: Crete 3 VPCs and connect them using Transit Gateway

* Search for VPC in search bar of AWS home page and click on VPC under **Services**

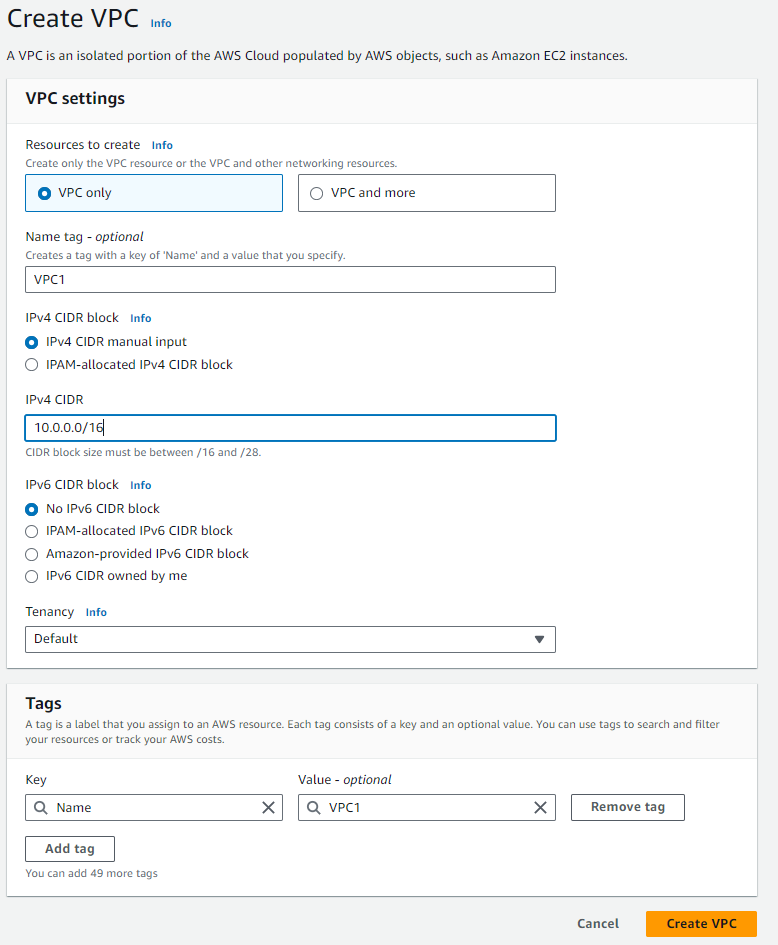


* Click on **Your VPCs** option under **Virtual private cloud** and Click on Create VPC

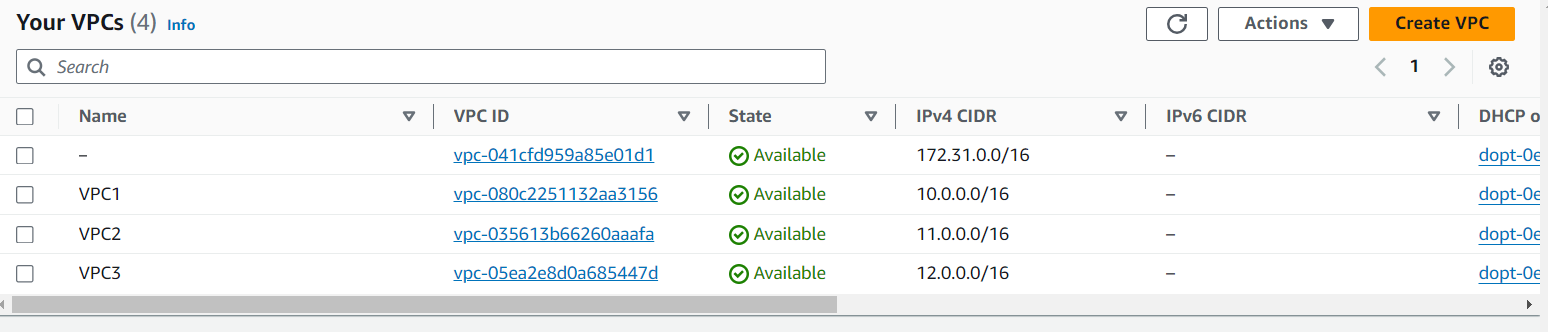




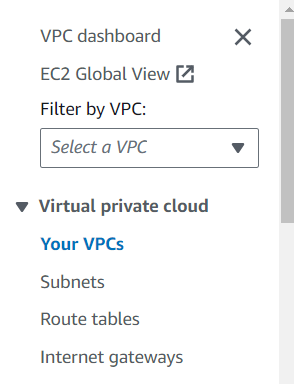
* Fill details like **name** and **IPv4 CIDR** and click on Create VPC button (here I have named my VPC as VPC1 and CIDR is 10.0.0.0/16)

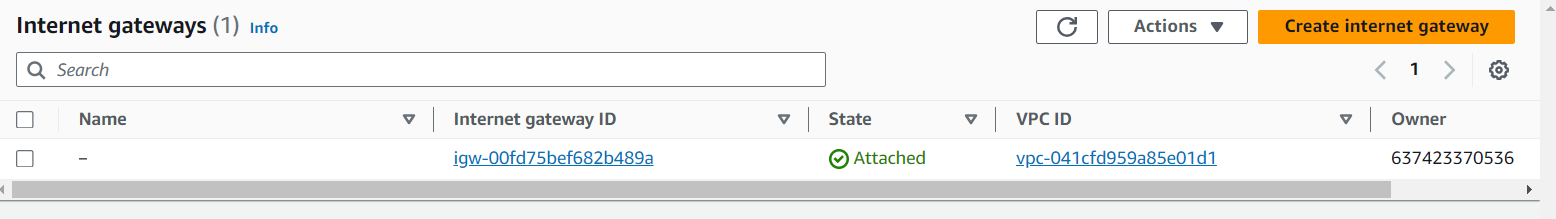


* Now Create 2 more VPCs in the same way (name second VPC as VPC2, give IPv4 CIDR as 11.0.0.0/16 and name third VPC as VPC3 and IPv4 CIDR is 12.0.0.0/16)
* Now go to **Your VPCs** and we can see our 3 VPCs

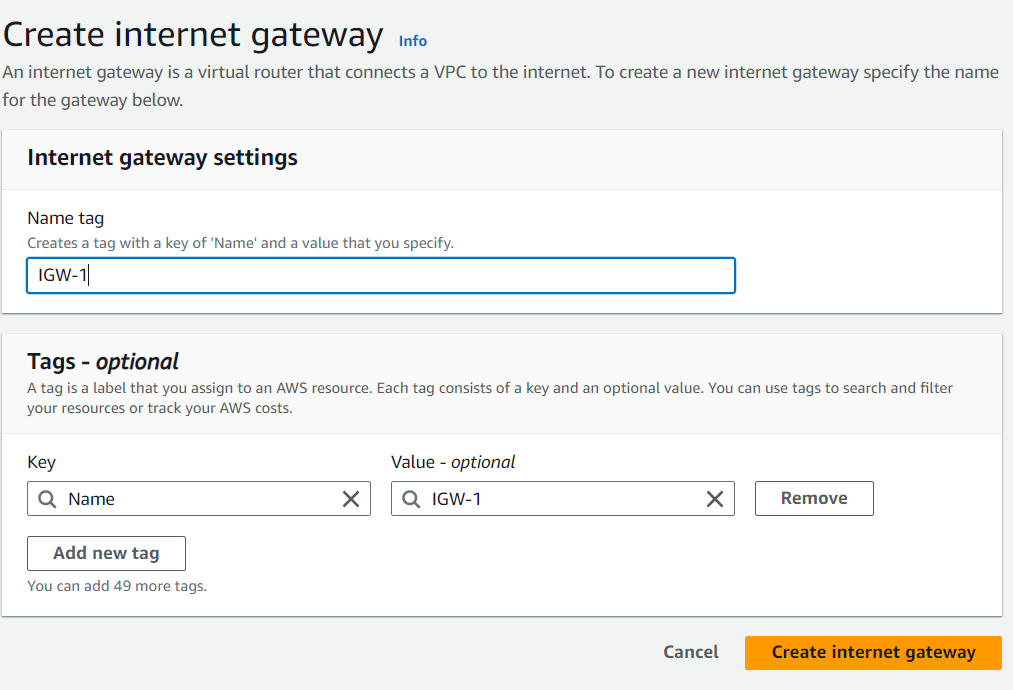


* Now we have to create 3 Internet Gateways as we have 3 VPCs. So, click on **Internet gateways** option under **Virtual private cloud** and click on Create internet gateway button.

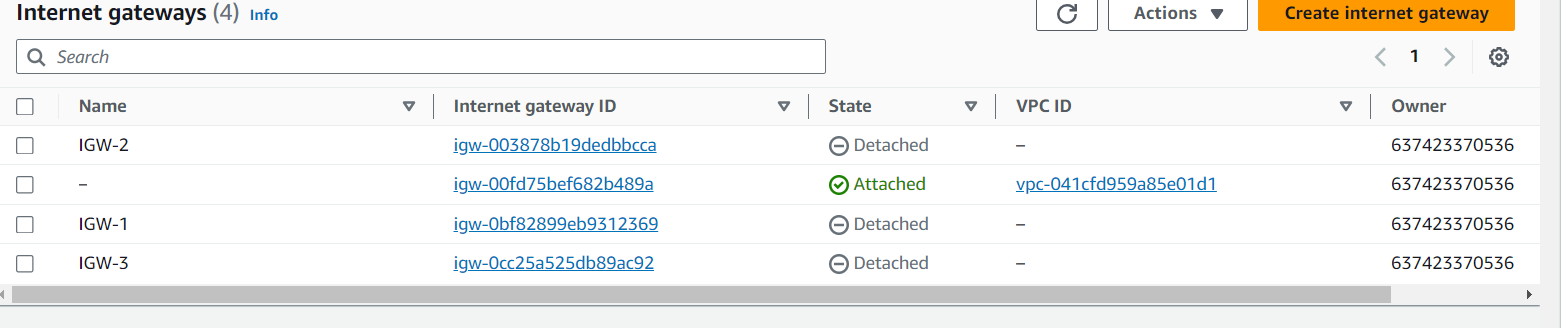




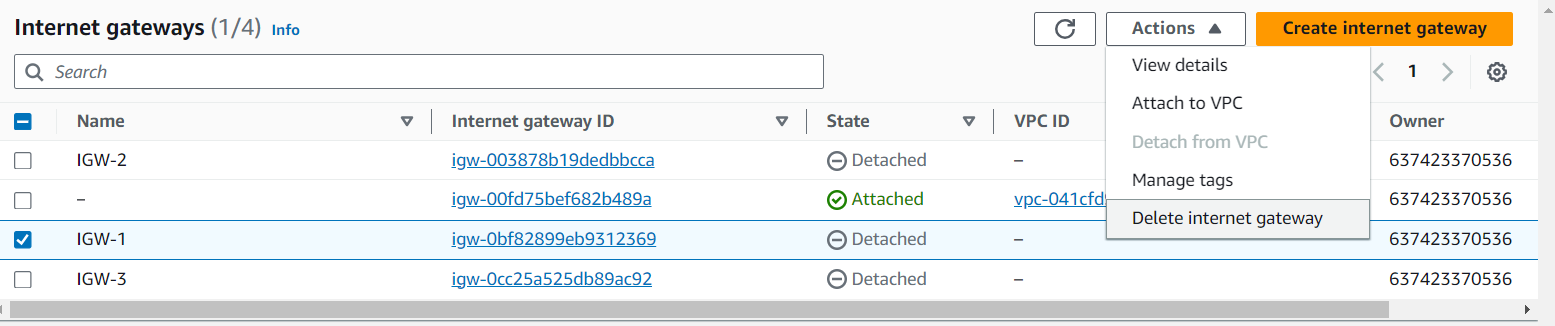
* Give any name to our Internet gateway (ex: IGW-1) and click on Create internet gateway.

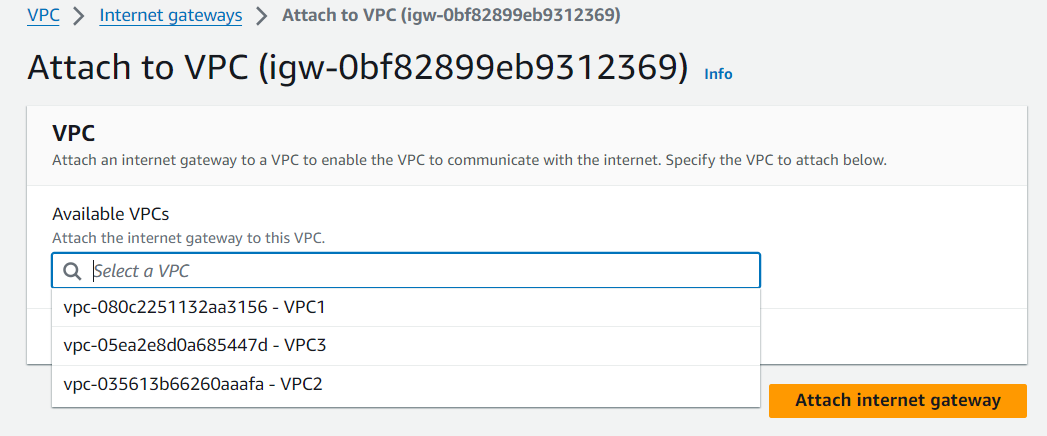


* Create 2 more Internet gateways in the same way (for second Internet gateway give name as IGW-2, and for third one give name as IGW-3).
* Now click on **Internet gateways** option and we can see our 3 internet gateways.

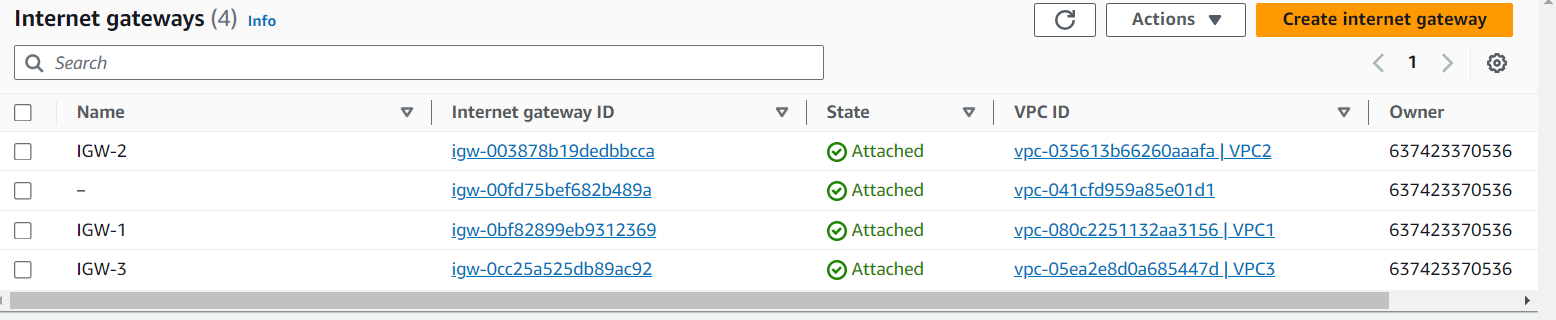


* Now we have to attach our internet gateways with our VPCs. Observe the above picture, we can see the State our internet gateways as Detached.
* So, select IGW-1 🡪 click on **Actions** and click on **Attach to VPC** 🡪 Select our VPC1 and finally click on Attach internet gateway.

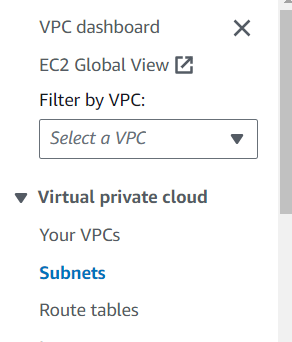


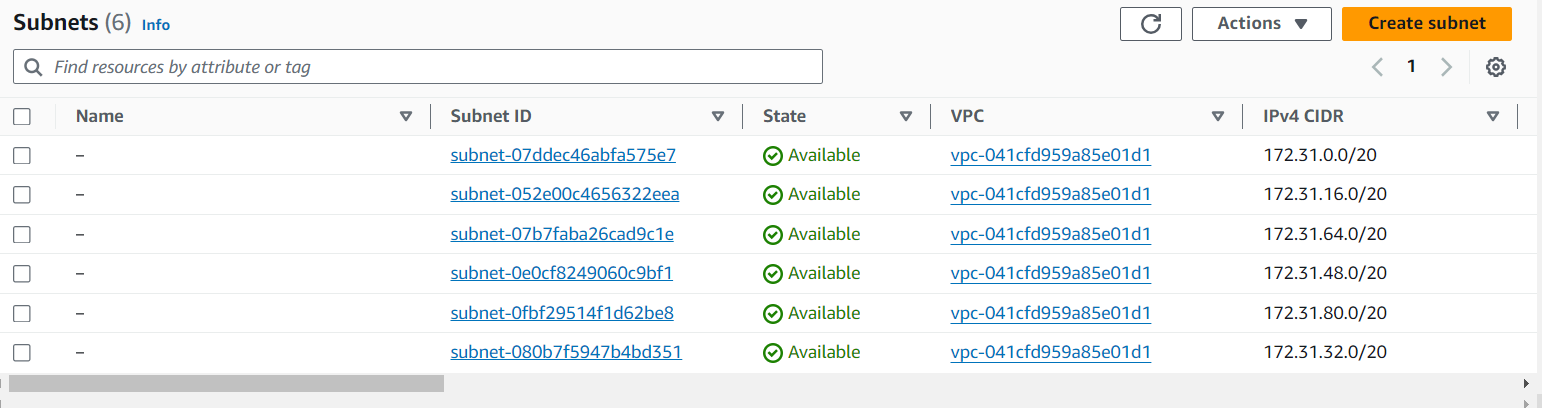


* Now do the same for remaining Internet gateways. (select IGW-2 and attach it with VPC2 and attach IGW-3 with VPC3)
* Now go to **Internet gateways** and we can see our internet gateways in Attached state.

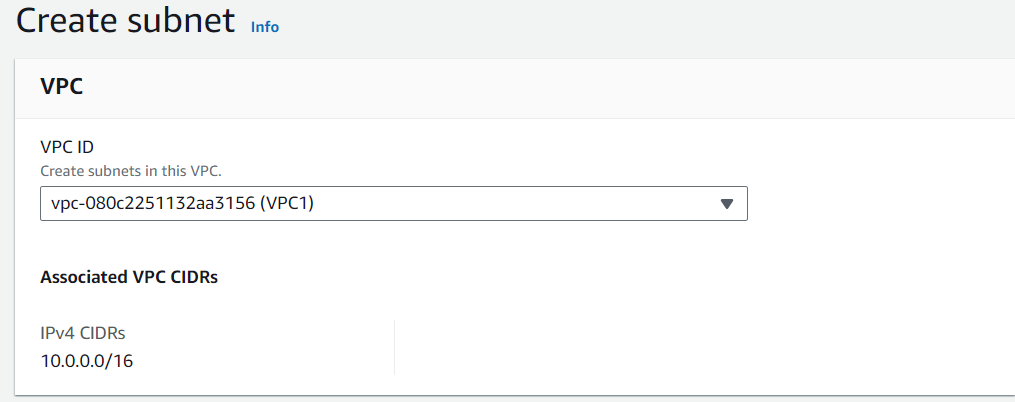


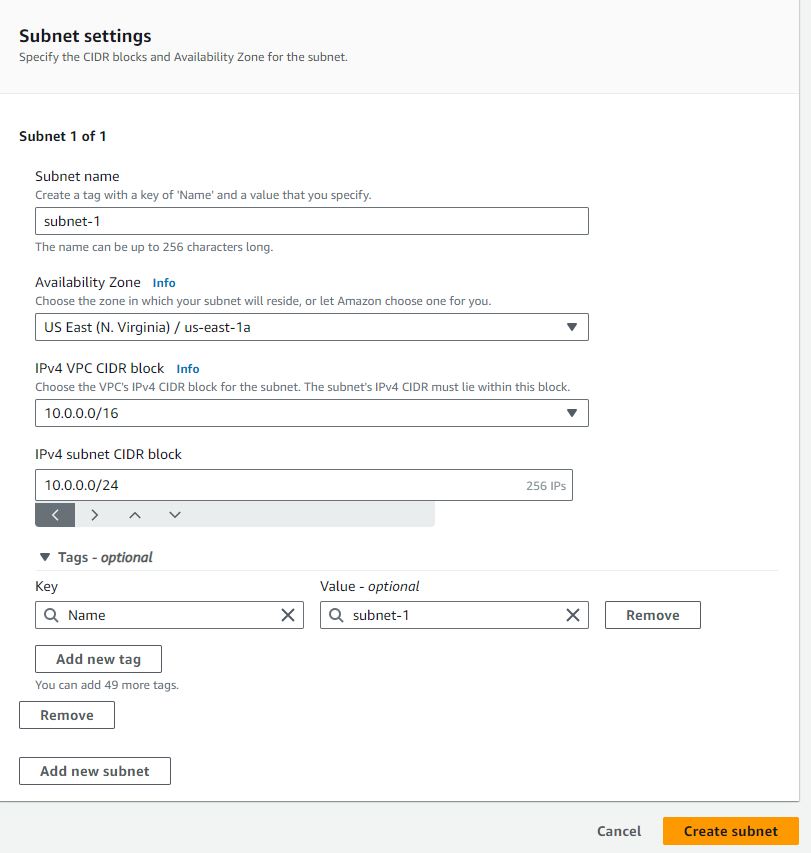
* Click on **Subnets** option under **Virtual private cloud** and click on Create subnet button.





* Under **VPC ID**, select our VPC1 from drop down and under Subnet settings, name the subnet (subnet-1), select the Availability Zone (us-east-1a) and give CIDR in IPv4 subnet CIDR block (10.0.0.0/24) and finally click on Create subnet button.



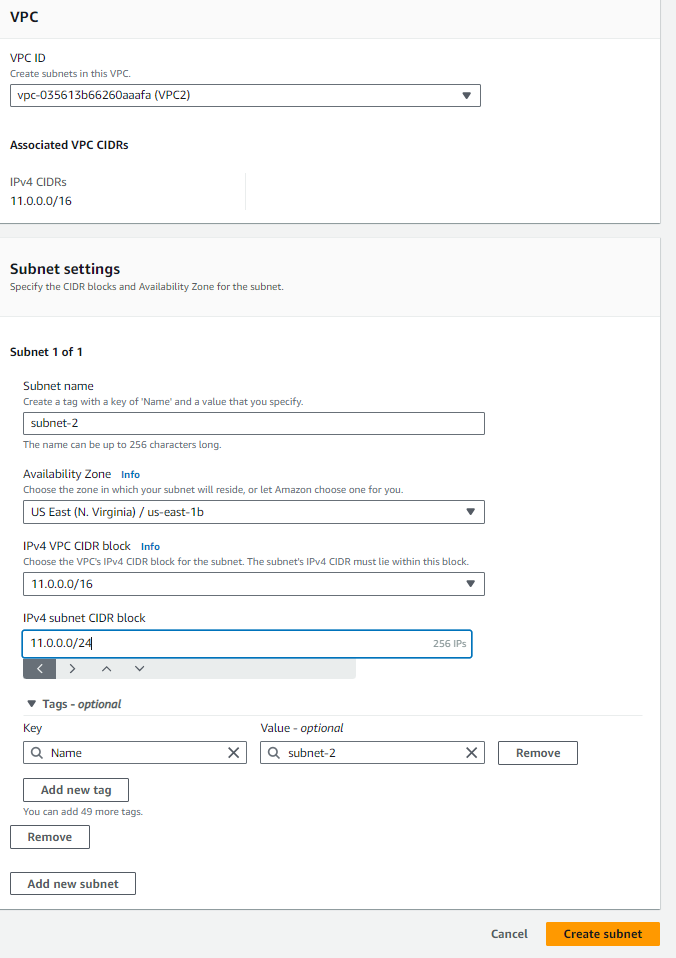


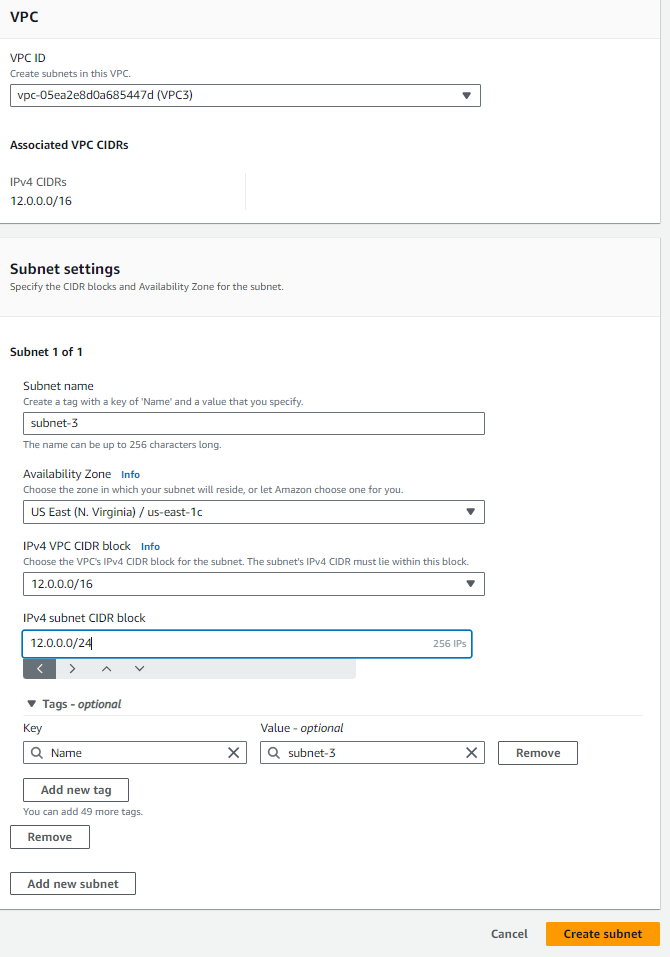
* Create two more subnets

🡪select VPC2 for second subnet and name it as subnet-2, select AZ as us-east-1b, IPv4 subnet CIDR is 11.0.0.0/24 and click on Create subnet button.

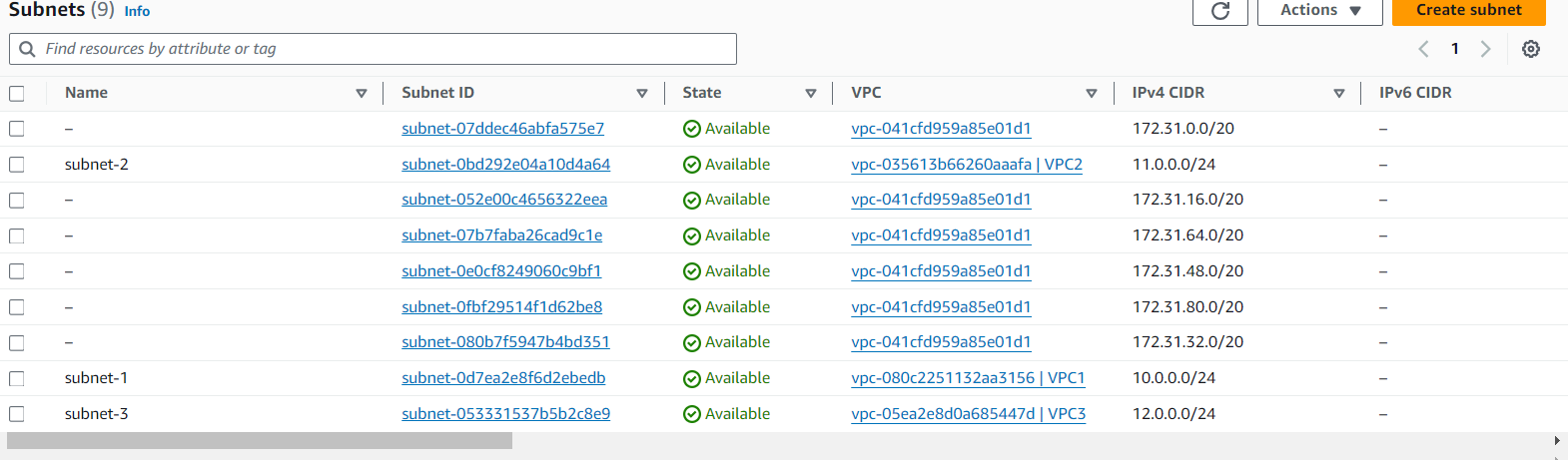
🡪 select VPC3 for third subnet and name it as subnet-3, select AZ as us-east-1c, IPv4 subnet CIDR is 12.0.0.0/24 and Create subnet button.

* Have a look on below 2 pictures for clear understanding.

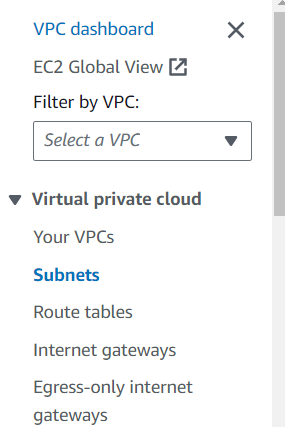


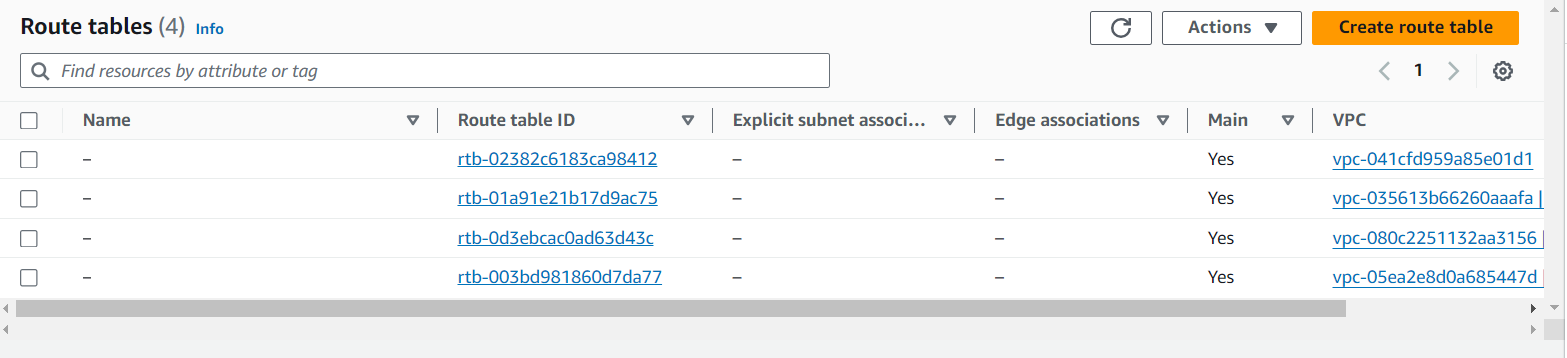


* Now go to **Subnets** and see our 3 subnets created.

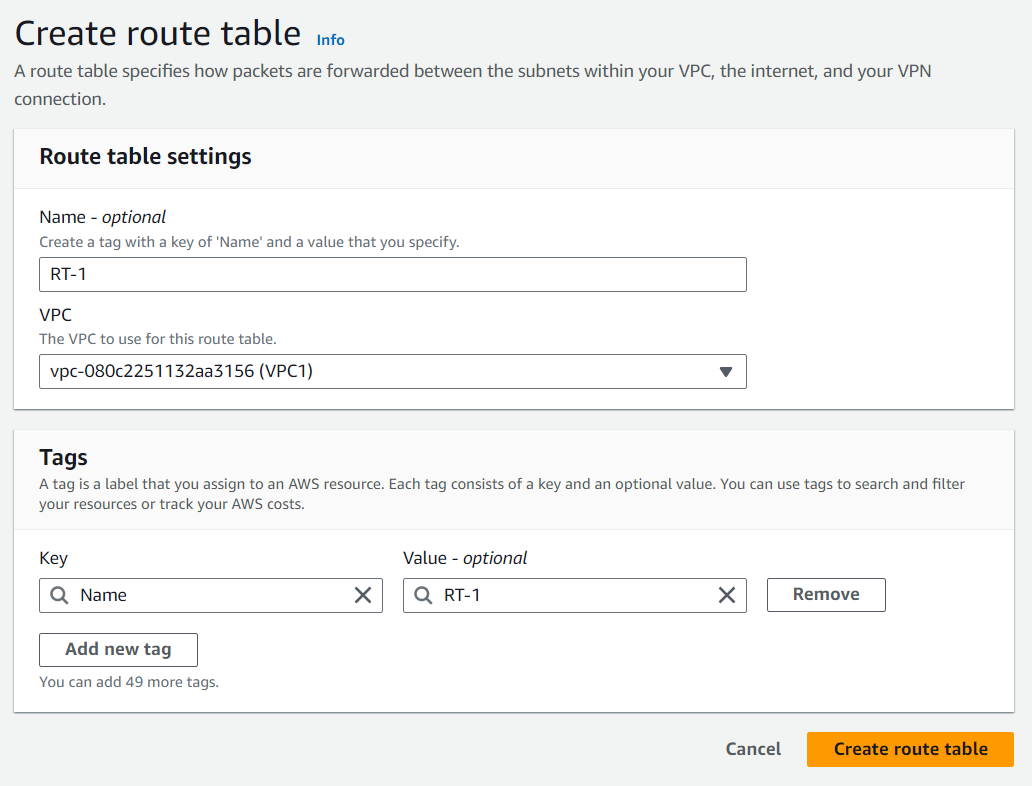


* Now create 3 route tables for three subnets.
* Click on **Route tables** under **Virtual private cloud** and click on Create route table button.





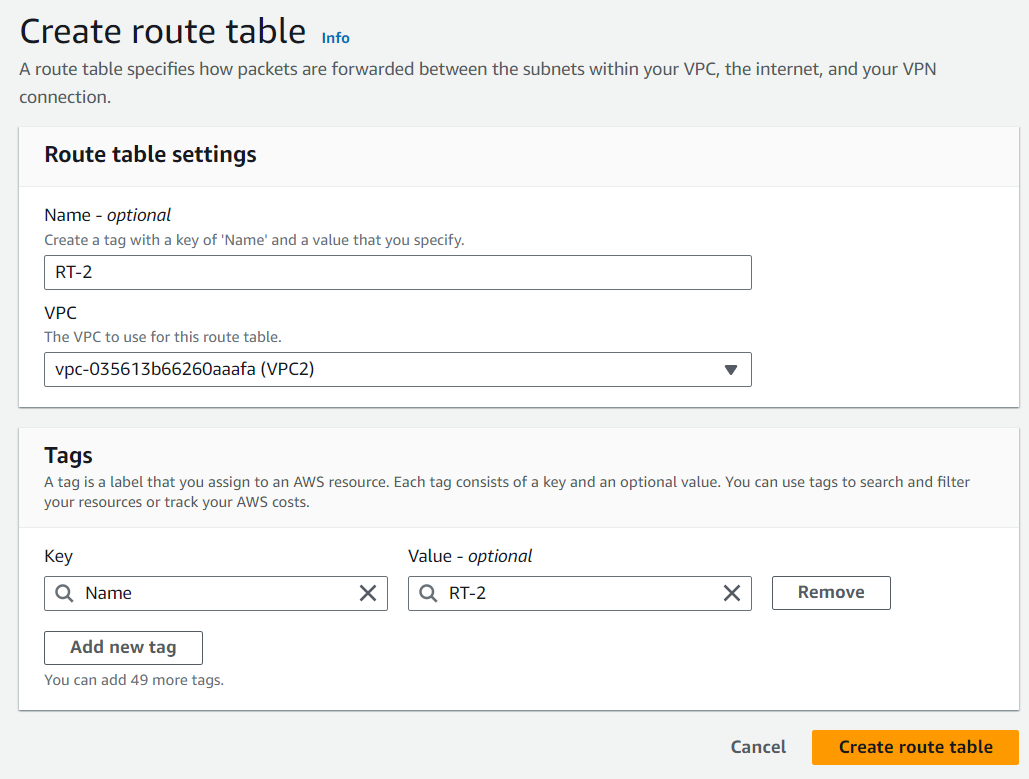
* Name our route table (RT-1) and select our VPC1 under VPC form drop down and finally click on Create route table.

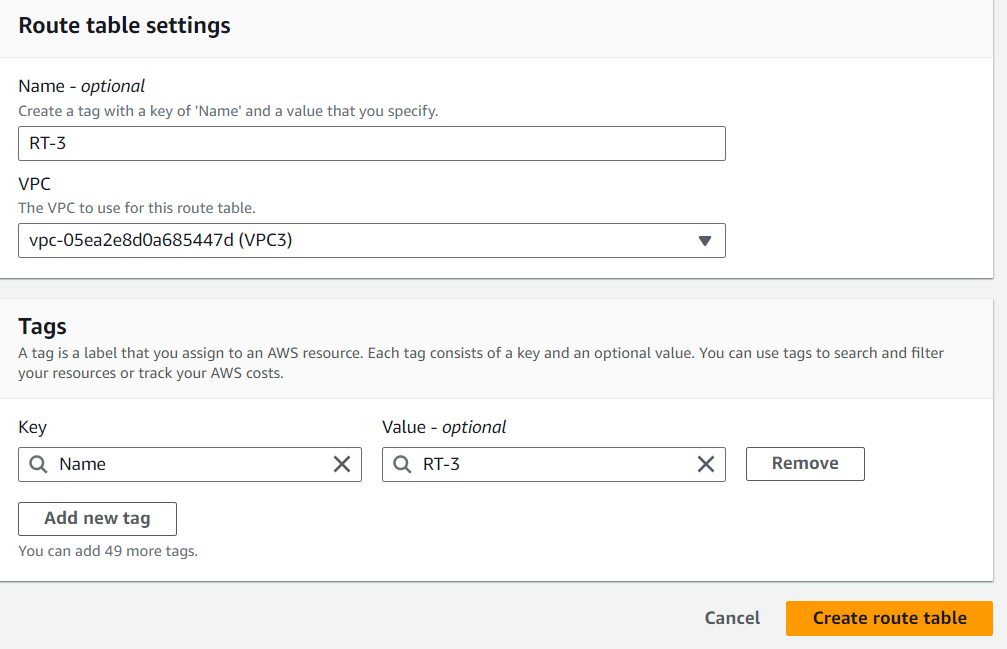


* Create 2 more rote tables

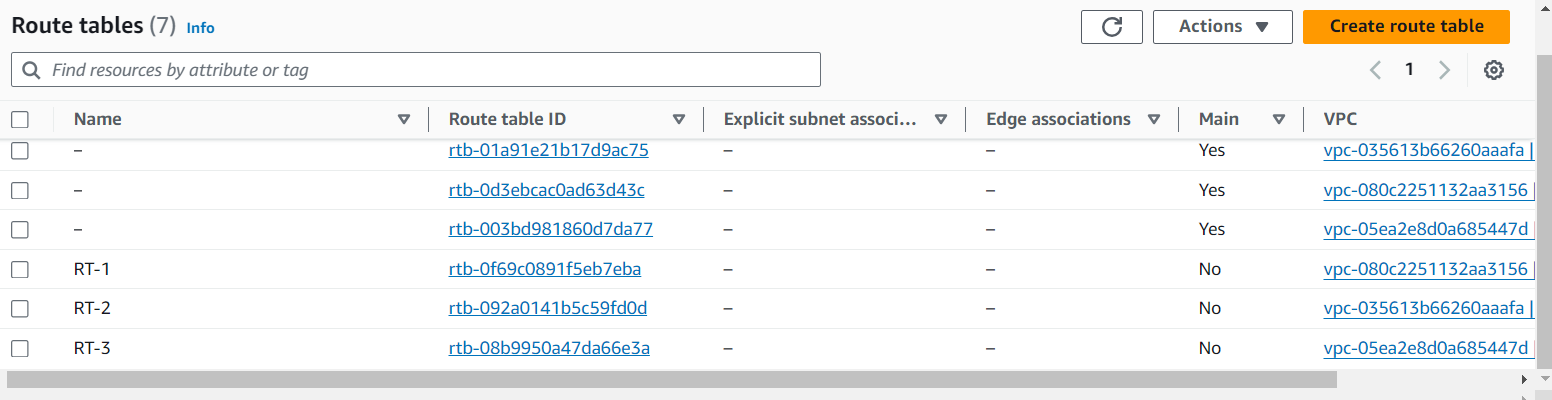
🡪for second route table give name as RT-2 and select VPC2 and Create route table

🡪for third one, give name as RT-3 and select VPC3 and Create route table

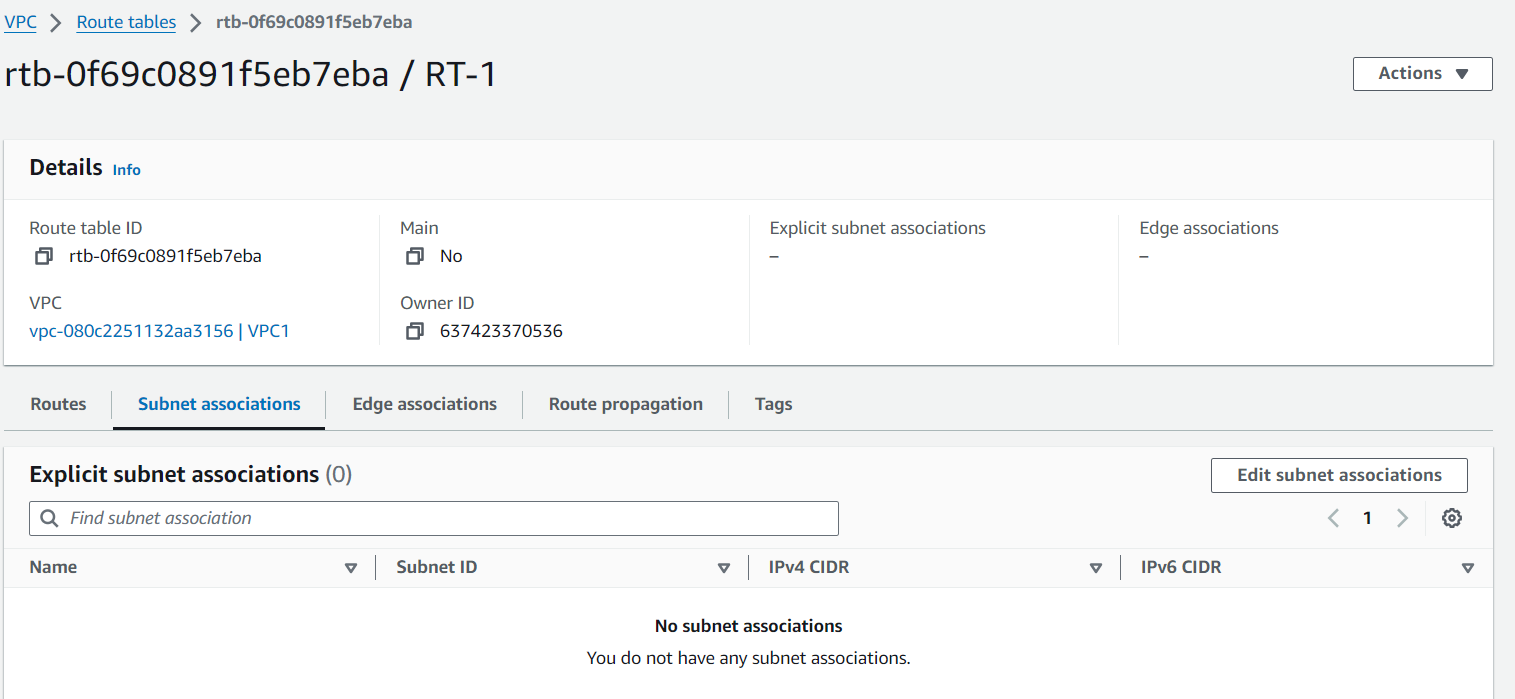




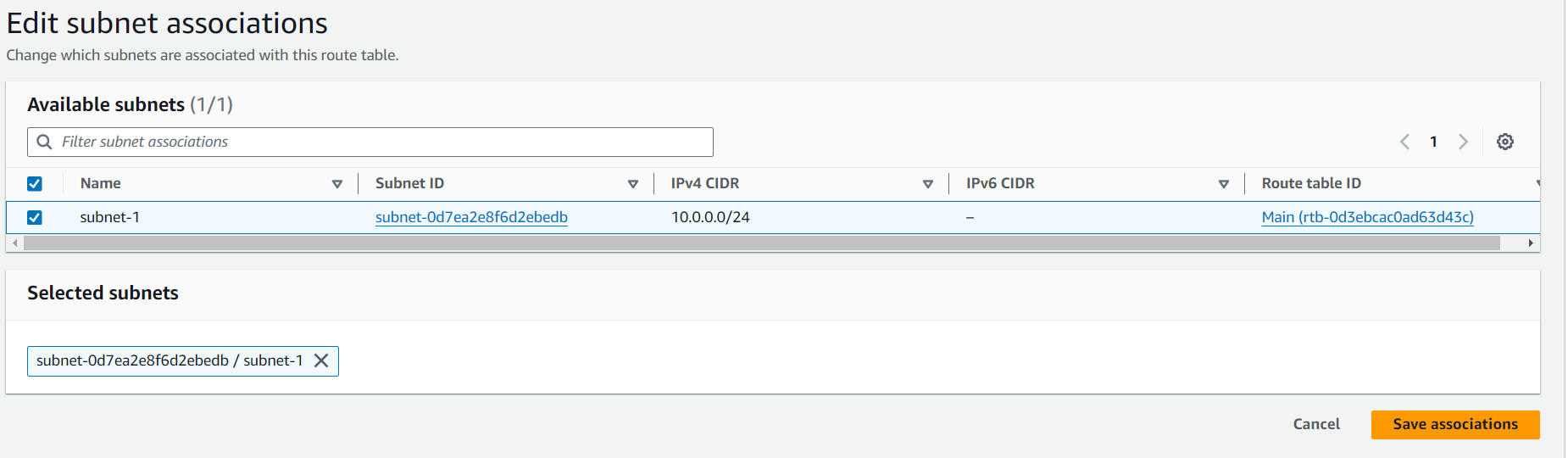
* Now go to **Route tables** and can see our route tables are created.



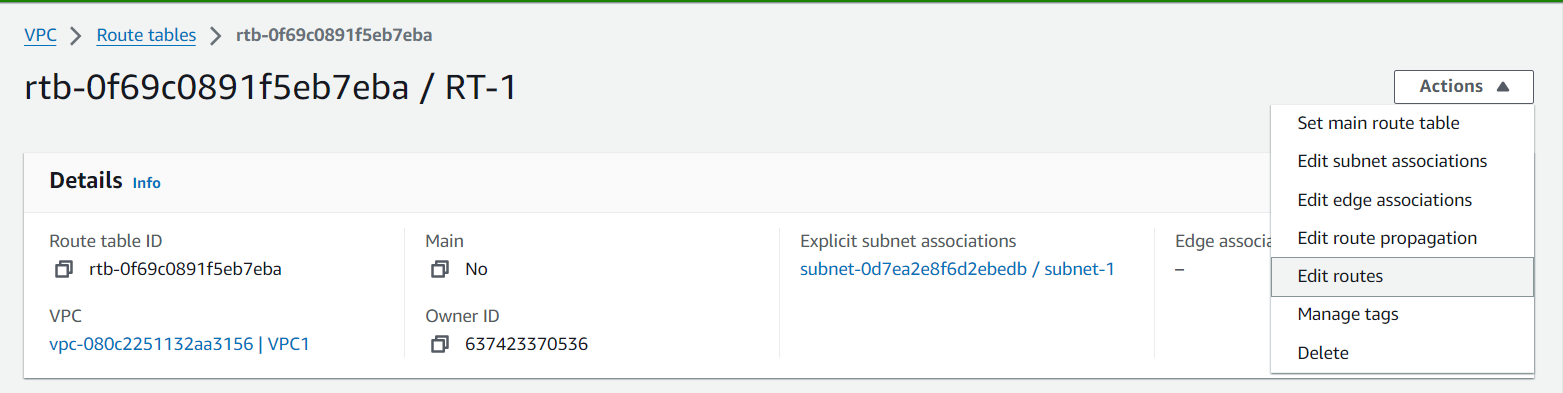
* Now go to route table 1 i.e. RT-1 (click on RT-1’s Route table ID), click on **Subnet associations** and click on **Edit subnet associations**



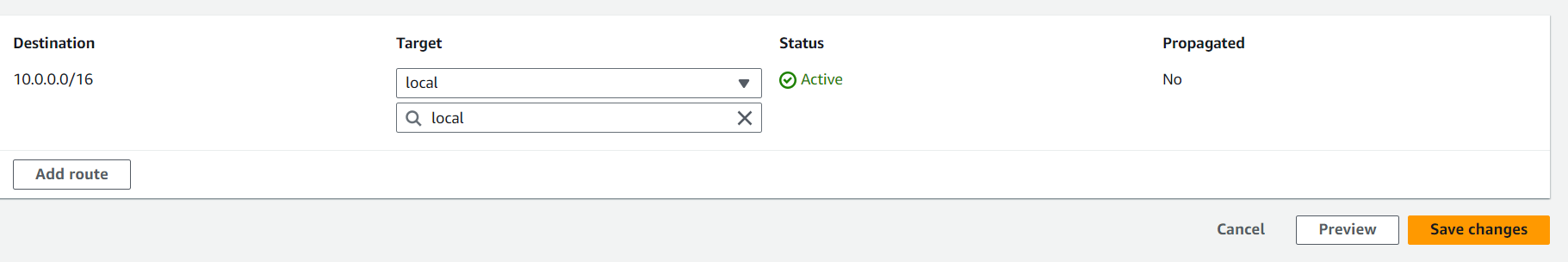
* Select subnet-1 and click on Save associations button.

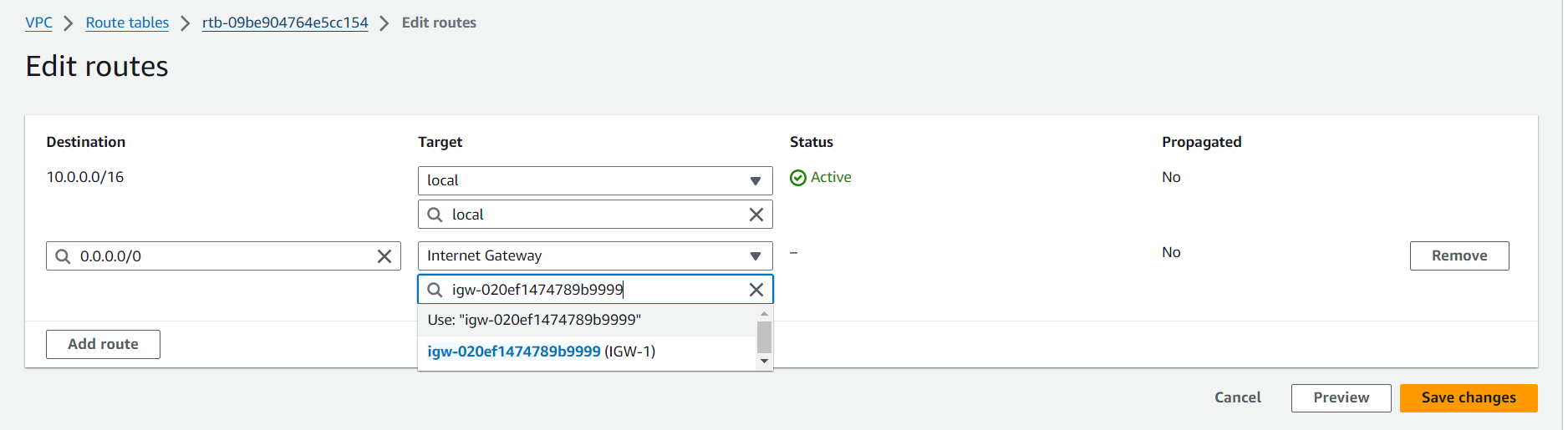


* Now click on **Actions** and click on **Edit routes**

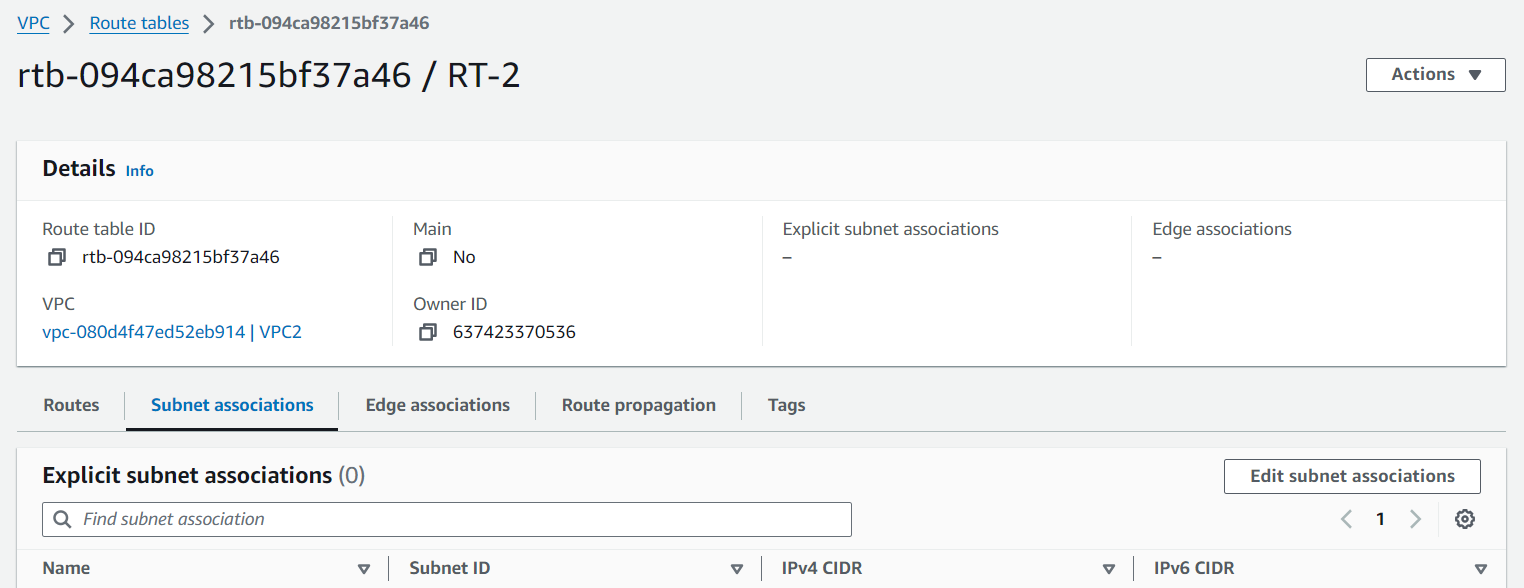


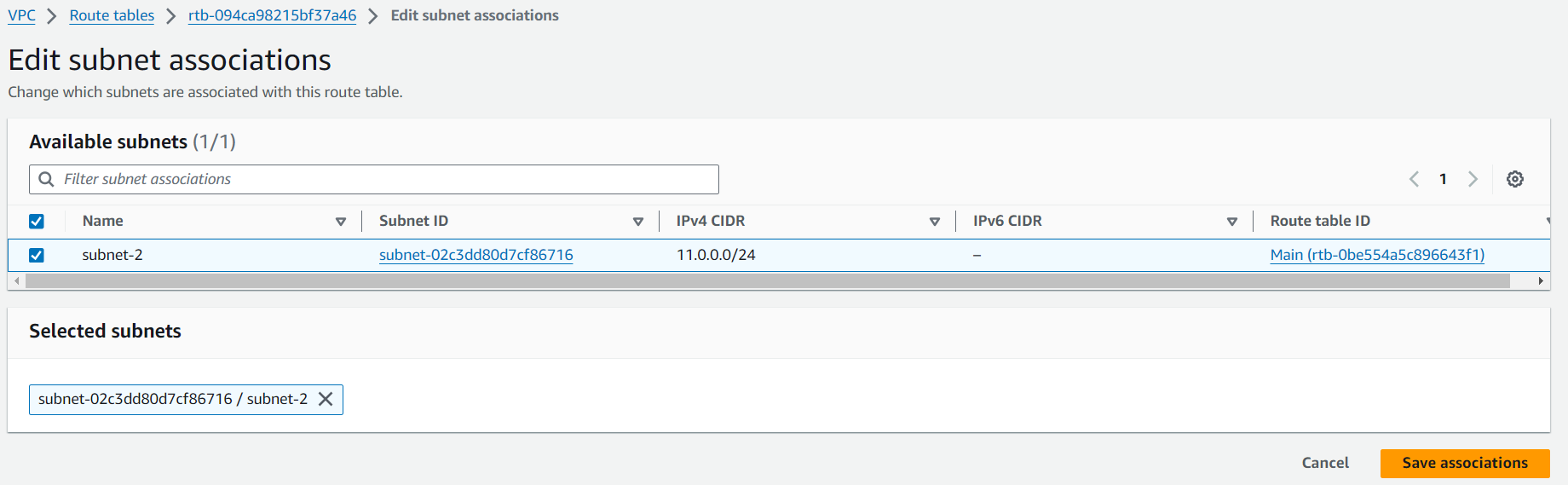
* Click on **Add route**, give 0.0.0.0/0 as **Destination** and select **Internet gateway** from drop down under **Target** and select our **IGW-1** and finally click on Save changes button.



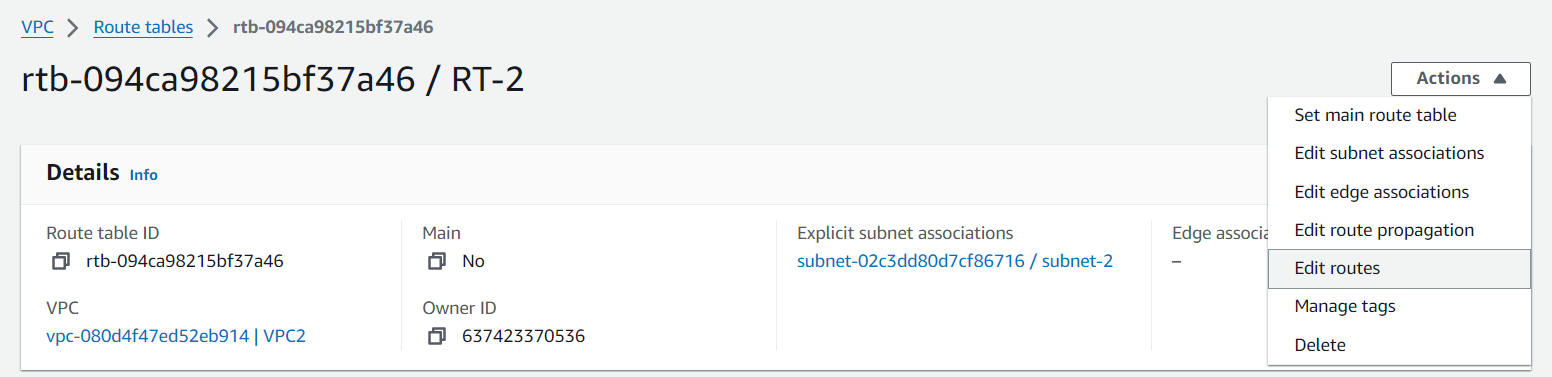


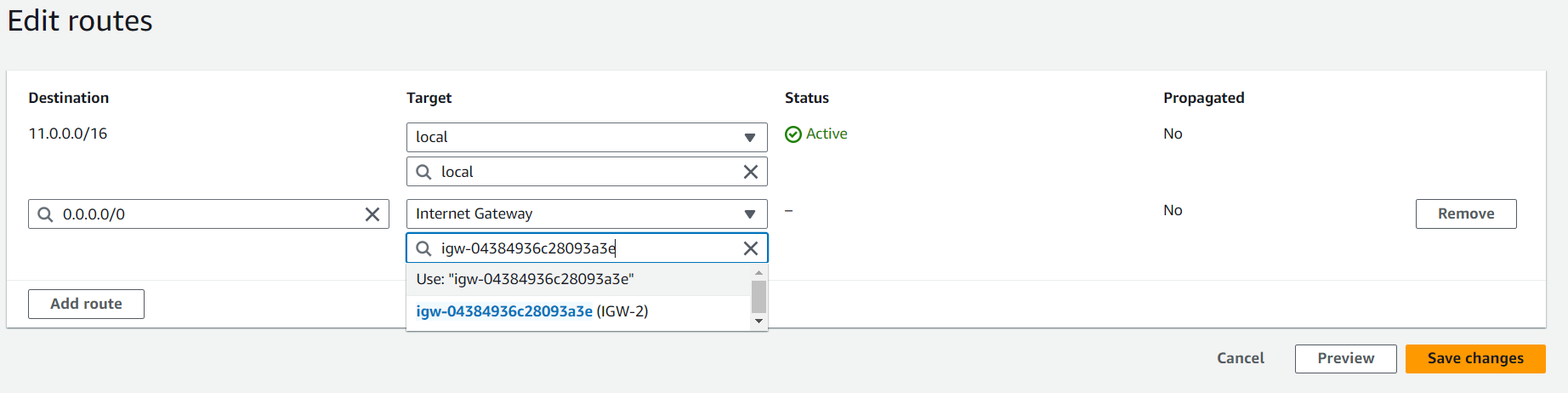
* Now go to **Route tables**, go to second route table (RT-2), click on **Subnet associations** and click on **Edit subnet associations**. Select our **subnet-2** and finally click on Save associations button.



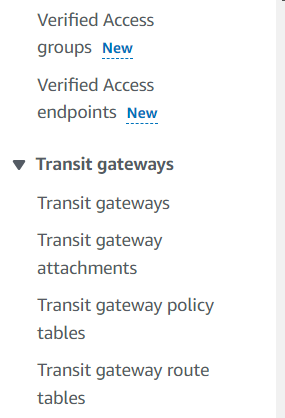


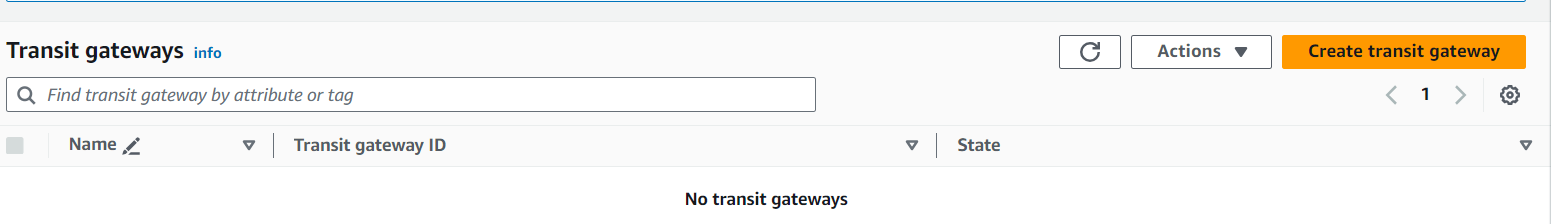
* Click on **Actions** and click on **Edit routes** and click on **Add route**, give Destination as 0.0.0.0/0 and under Target, select Internet Gateway option from drop down list and select our IGW-2 and finally click on Save changes.



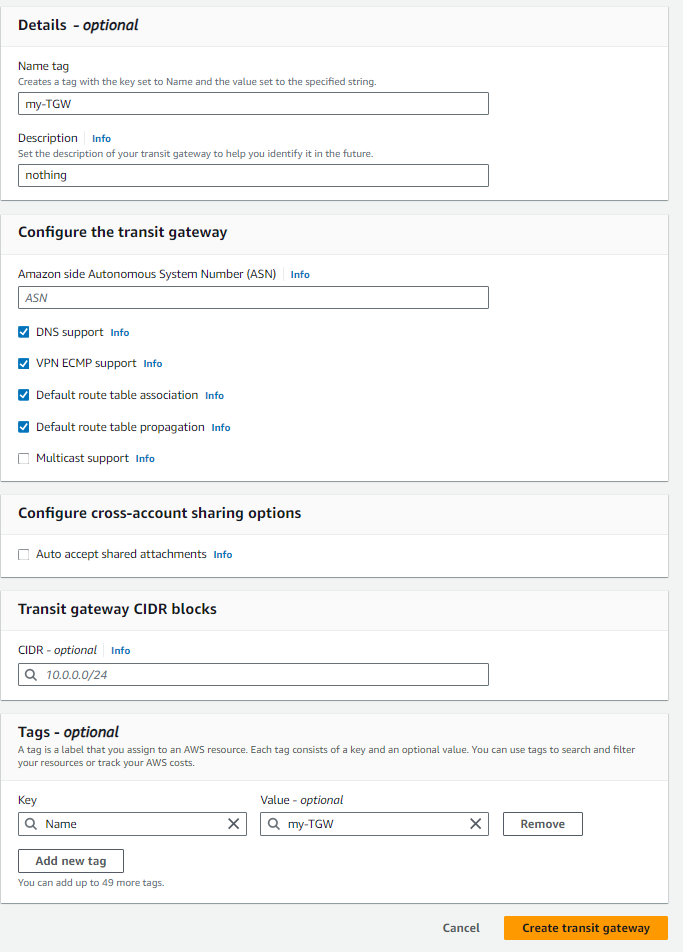


* Now do the same for 3rd route table (RT-3). Associate it with subnet-3. Under Actions, Destination as 0.0.0.0/0, select Internet Gateway (IGW-3) as Target.
* Now we have to create Transit Gateway, for that click on **Transit gateways** and click on Create transit gateway.

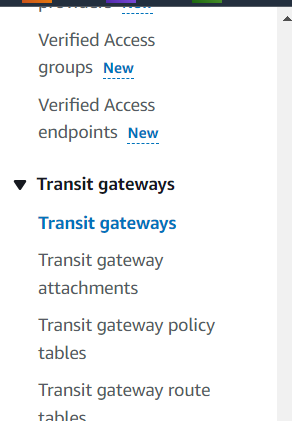


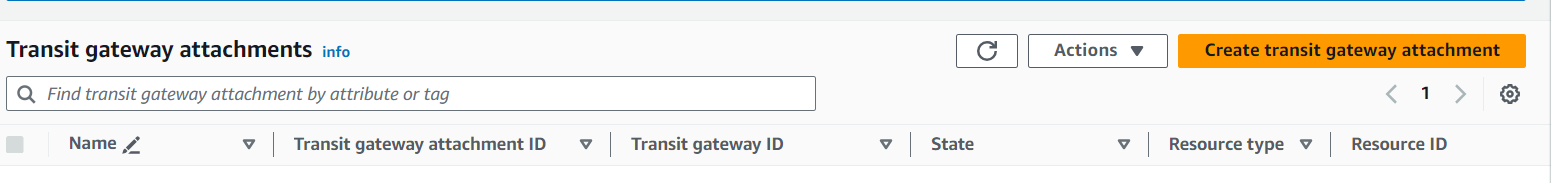


* Name our Transit gateway (my-TGW), give Description as nothing and click on Create transit gateway.

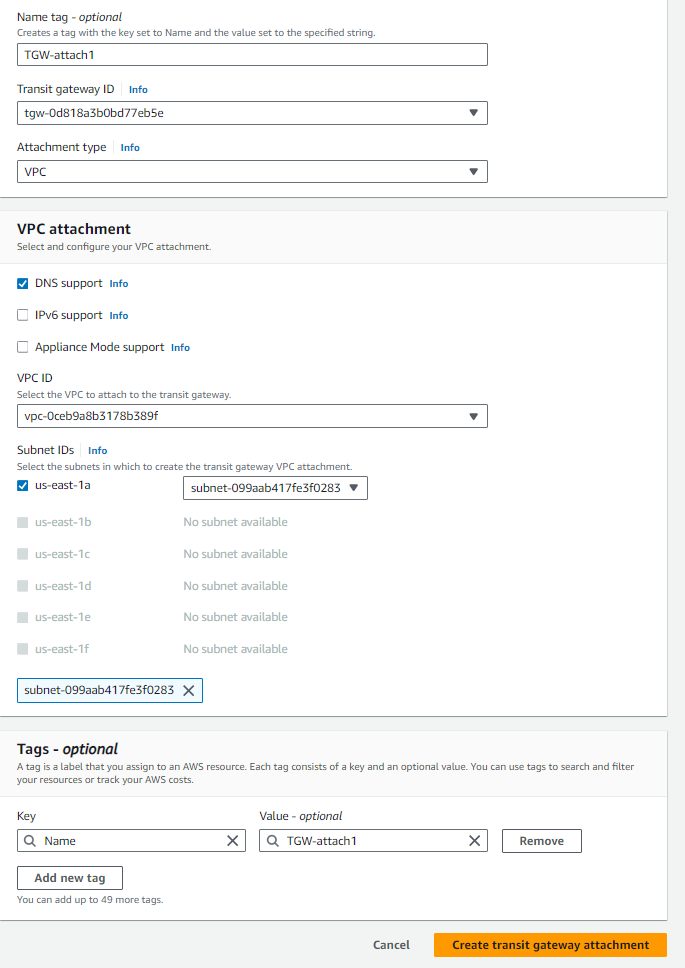


* Now click on **Transit gateway attachments** and click on Create transit gateway attachment.

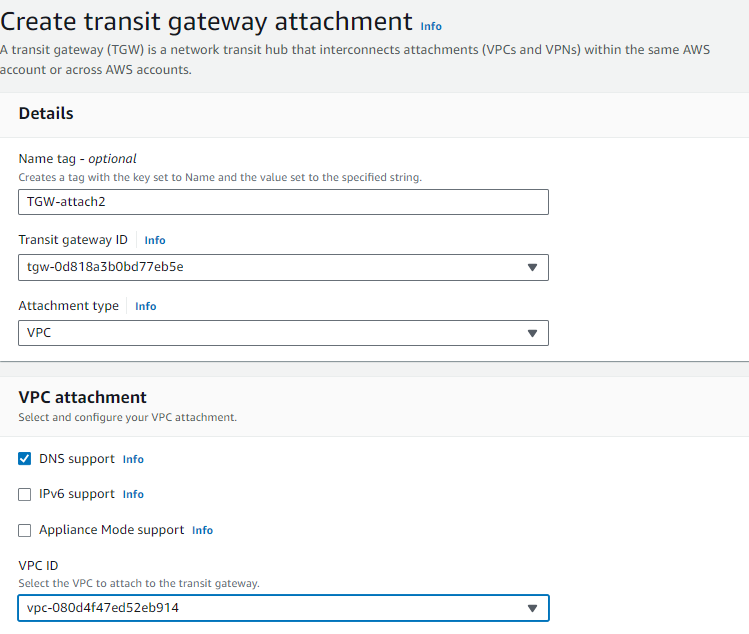


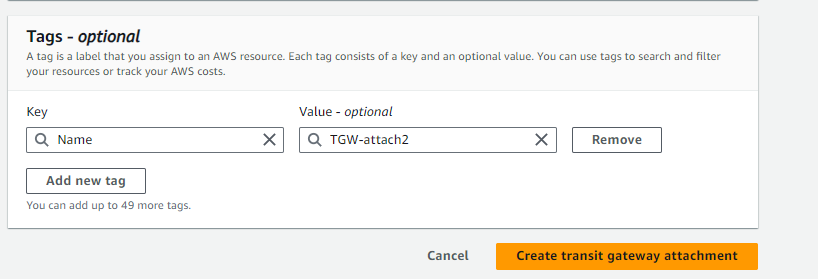


* Give name to attachment (TGW-attach1), under Transit gateway ID, select our Transit gateway that we already created (my-TGW). Under VPC ID, select our VPC1 and finally click on Create transit gateway attachment.

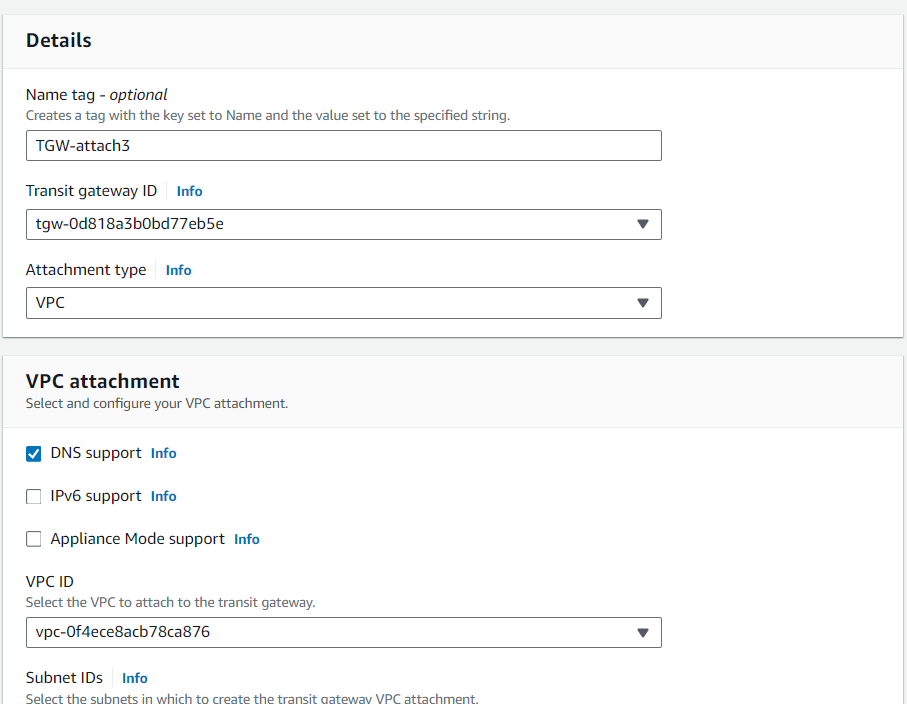


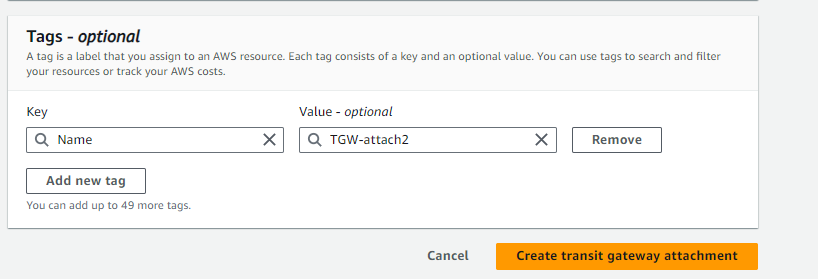
* Again click on Create transit gateway attachment, name the attachment (TGW-attach2), under Transit gateway ID, select our Transit gateway. Under VPC ID, select our VPC2 and finally click on Create transit gateway attachment.



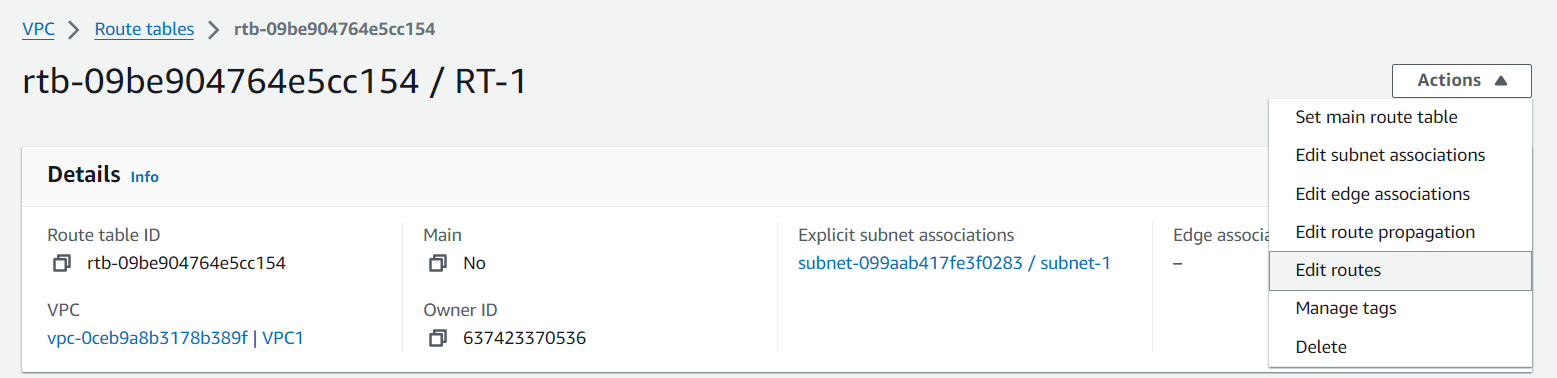


* Do the same once more. Click on Create transit gateway attachment, name the attachment (TGW-attach3), select our Transit gateway, and select our VPC3 Under VPC ID, and Create transit gateway attachment.

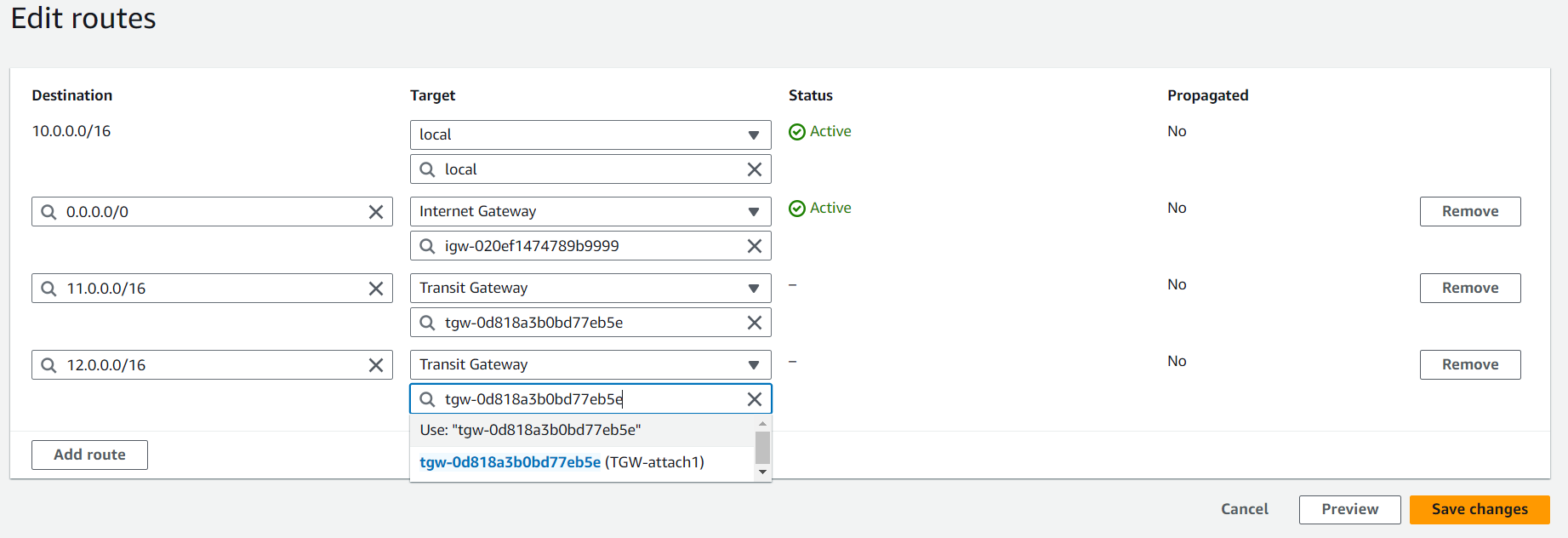




* Go to **Route tables**, go to first route table (RT-1), click on **Actions**, click on **Edit routes,**

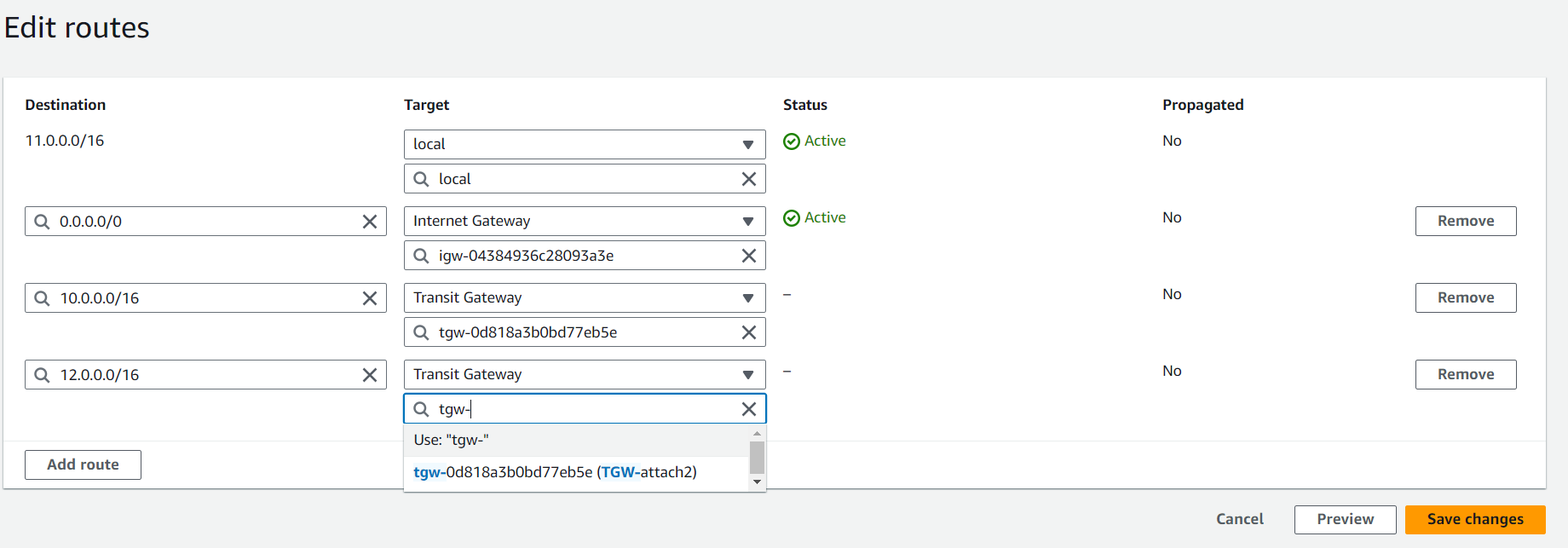


* First click on **Add route**, give Destination as 11.0.0.0/16, under Target, select Transit Gateway form drop down and select our Transit gateway attachment (TGW-attach1). Again click on **Add route**, give Destination as 12.0.0.0/16, select Transit Gateway form drop down as Target and select our Transit gateway attachment (TGW-attach1). Finally click on Save changes.

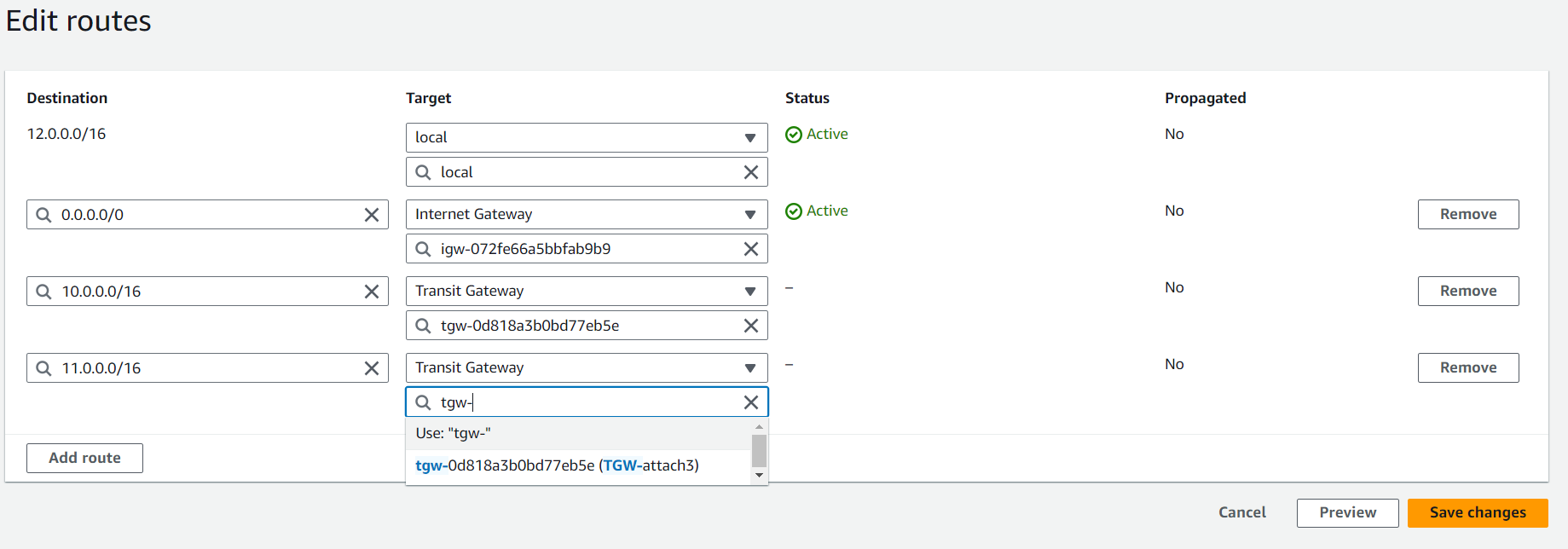


\*Note: here we are in rote table one (RT-1), and its Destination is 10.0.0.0/16. So, we have to give another two IPv4 addresses as Destinations.

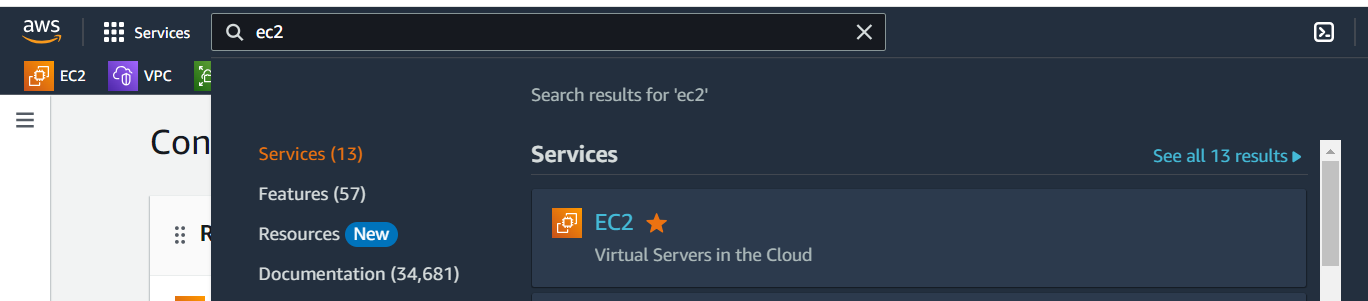
* Now do the same for remaining two route tables. Go to second route table (RT-2), click on **Actions**, click on **Edit routes**. click on Add route, give Destination as 10.0.0.0/16, under Target, select Transit Gateway form drop down and select our Transit gateway attachment (TGW-attach2). Again click on Add route, give Destination as 12.0.0.0/16, select Transit Gateway form drop down as Target and select our Transit gateway attachment (TGW-attach2). Finally click on Save changes

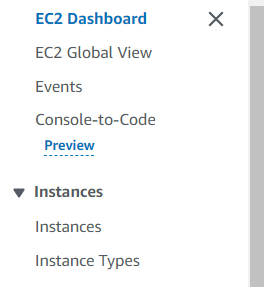


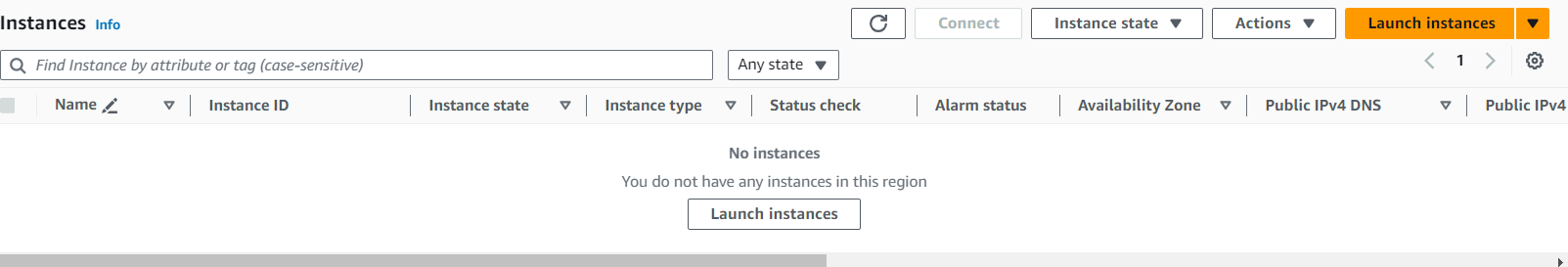
* Now do the same for third route table (gives Destinations as 10.0.0.0/16 and 11.0.0.0/16. And select Transit gateway (TGW-attach3). Have a look on below pic.



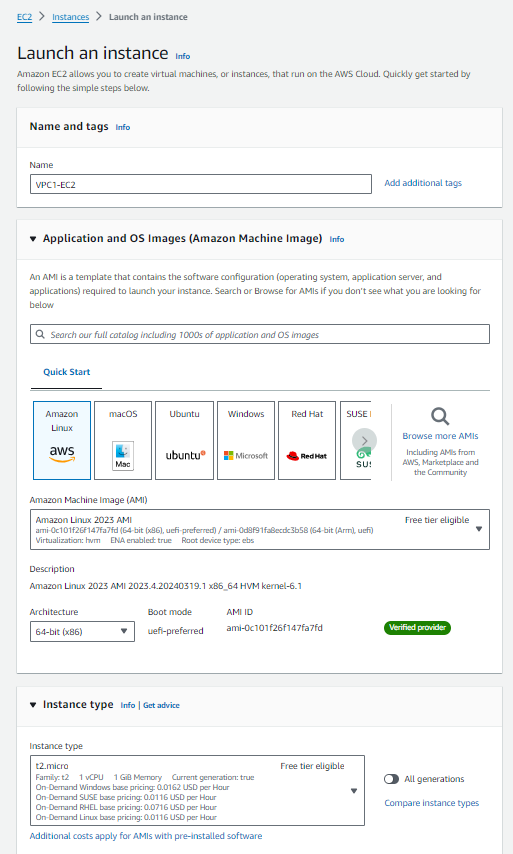
* Now we are going launch three (3) instances.
* Search for EC2 in search bar in AWS home page, click on EC2 under **Services**. And click on **instances** form menu and click on Launch instance.



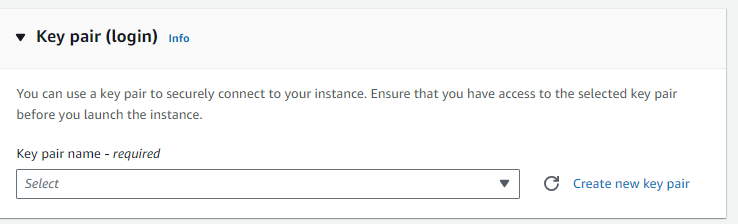


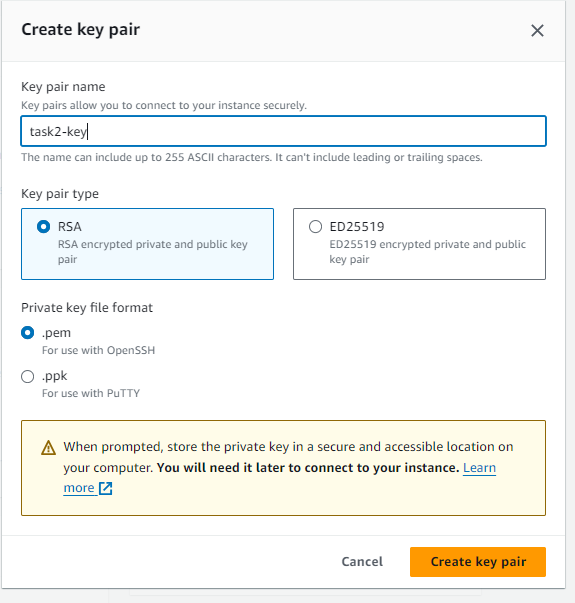


* Give any name to our instance (ex: VPC1-EC2). Select OS of your choice (I have selected Amazon Linux) and instance type as t2.micro.

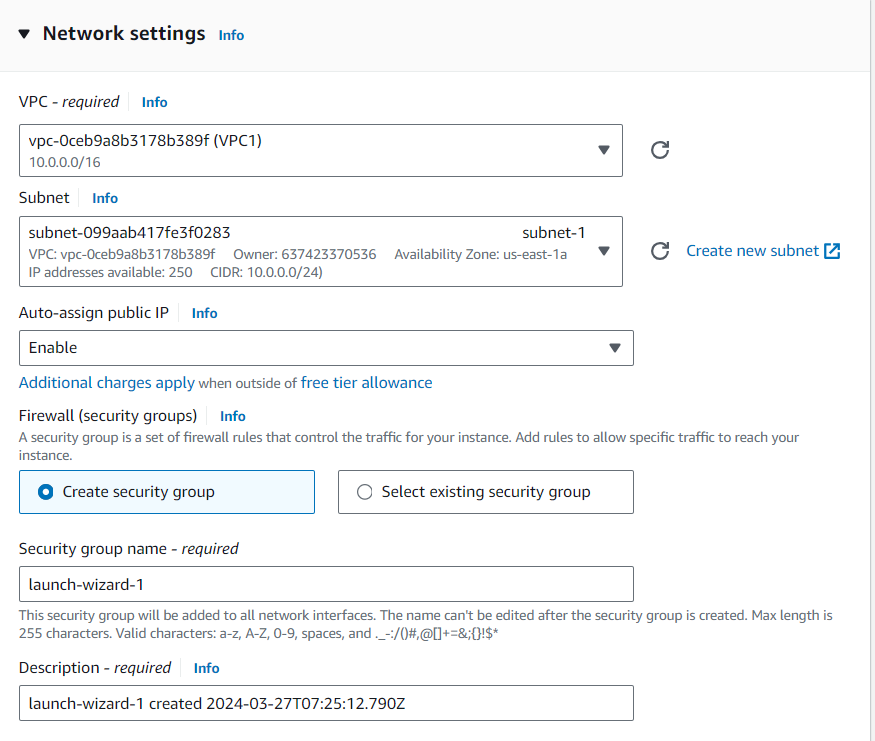


* We have to create a key pair. So, click on Create new key pair option. Give name to our key pair and click on Create key pair button.

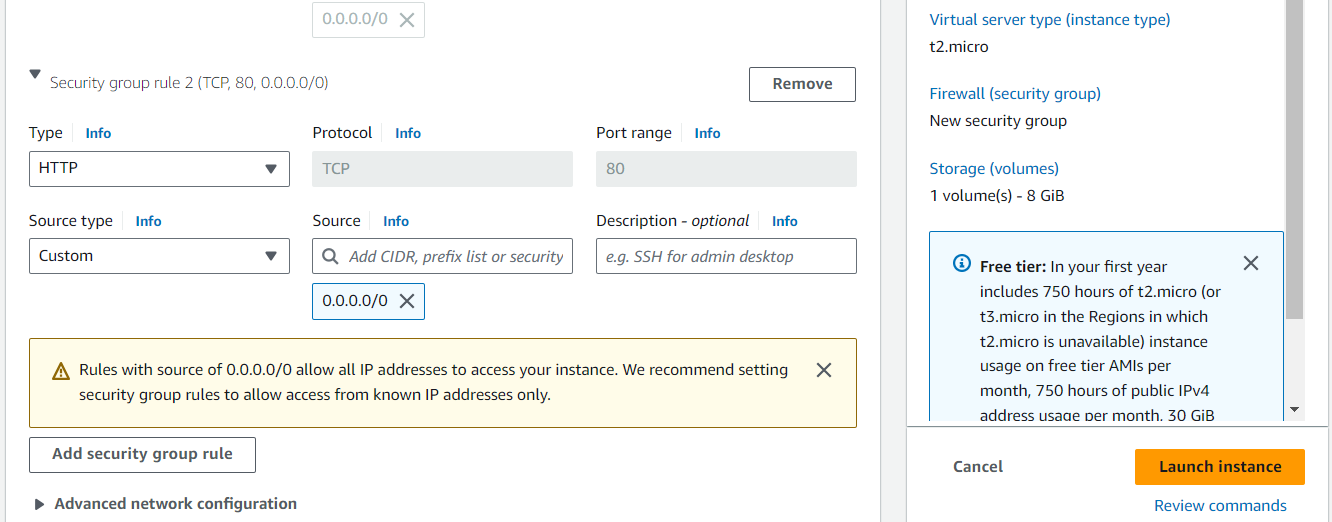




* In Network settings area, click on **Edit** button to configure with our custom VPCs.
* Under VPC section, select our VPC1. Enable Auto-assign public IP. Select Create security group (if we already have a security group, we can select Select existing security group option)



* Now click on **Add security group rule** (under Network settings), instead of Custom TCP, give Type as HTTP and under source give 0.0.0.0/0 and finally click on Launch instance button.

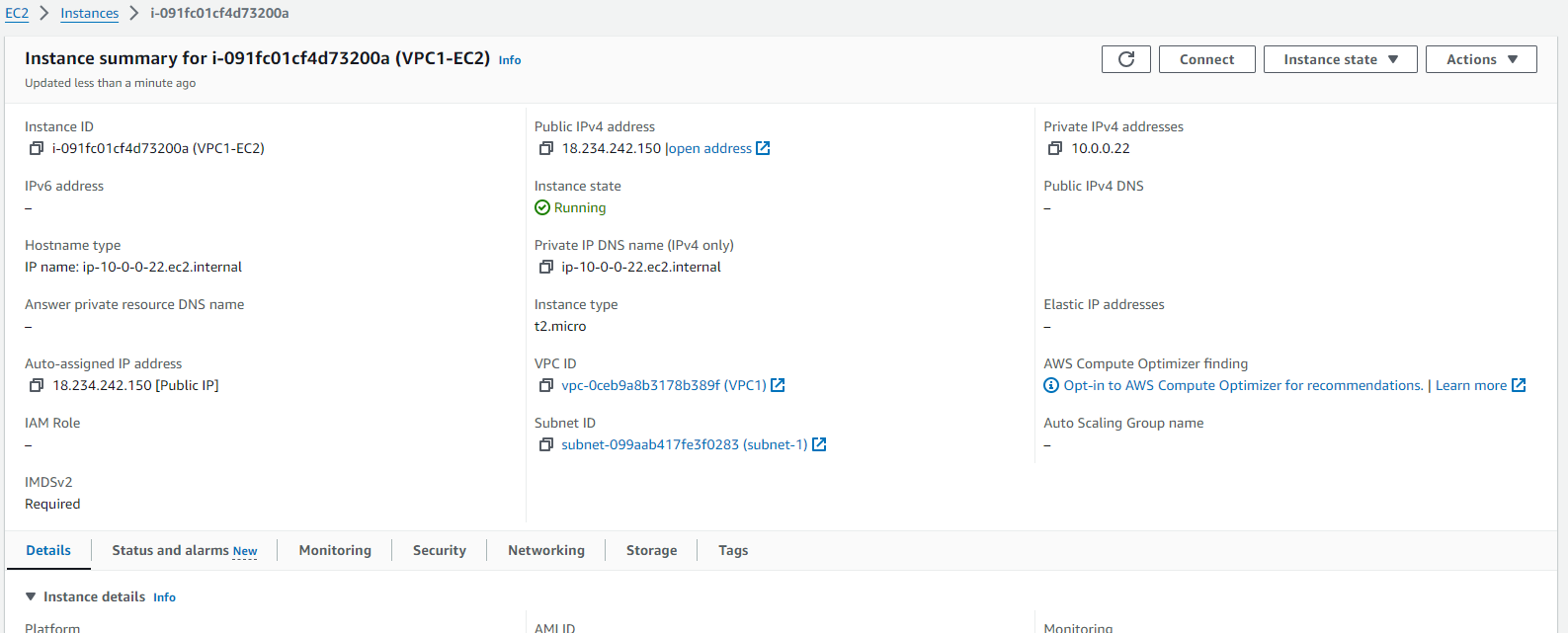


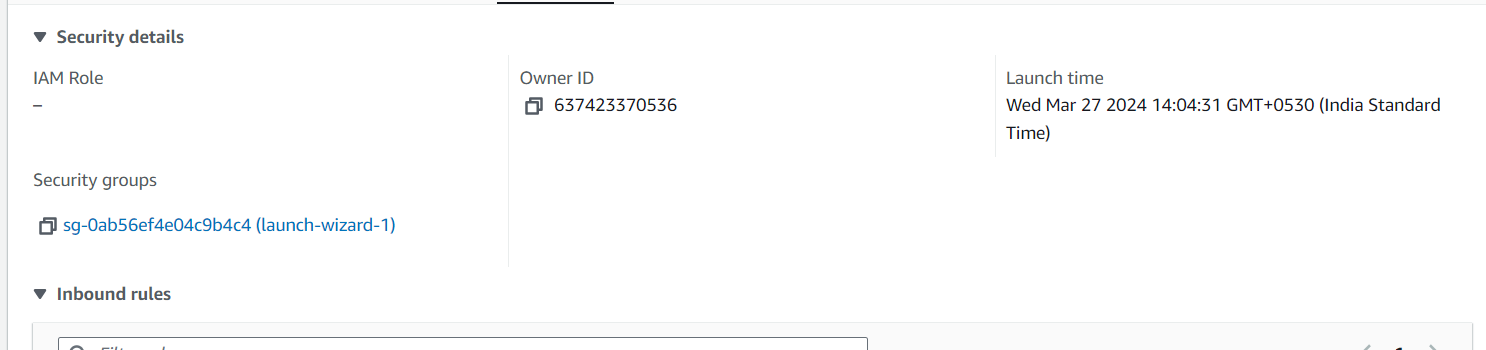
* Now launch two more instances in the same way as we launched our first instance. But we have change few things, observe the points below

🡪for second instance, name (VPC2-EC2), select the key pair under Key pair section that we already created when launching our first instance. Edit network settings, select VPC2, Give HTTP inbound rule and launch instance.

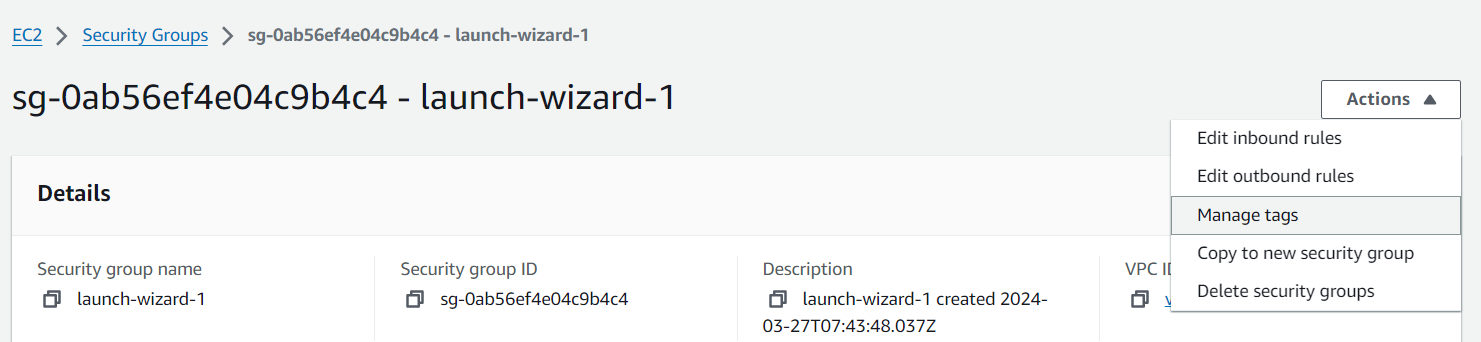
🡪 for third instance, name (VPC3-EC2), select the key pair, Edit network settings, select VPC3, Give HTTP inbound rule and launch instance.

* We have successfully launched our instances. Now, go to **Instances**
* Go to instance one (VPC1-EC2), scroll down and click on **Security**. Now click on the link under **Security groups**

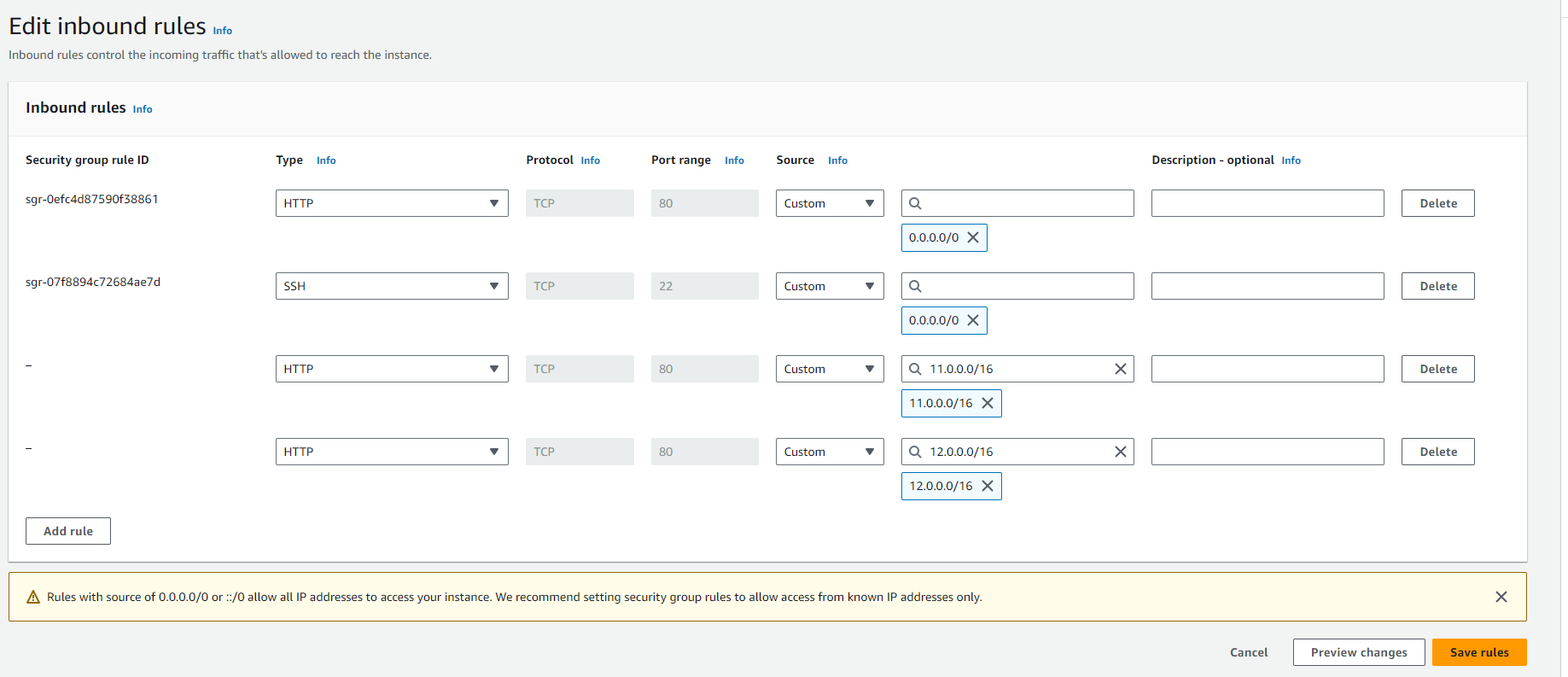




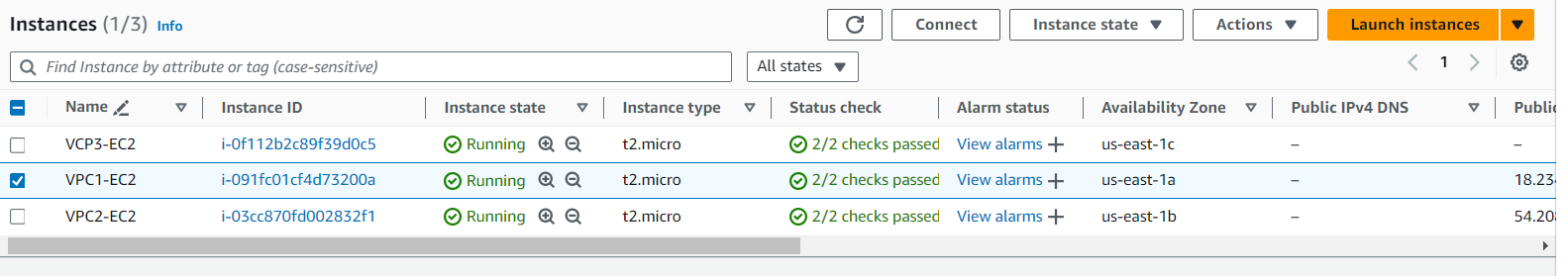
* Click on **Actions**, click on **Edit inbound rules**

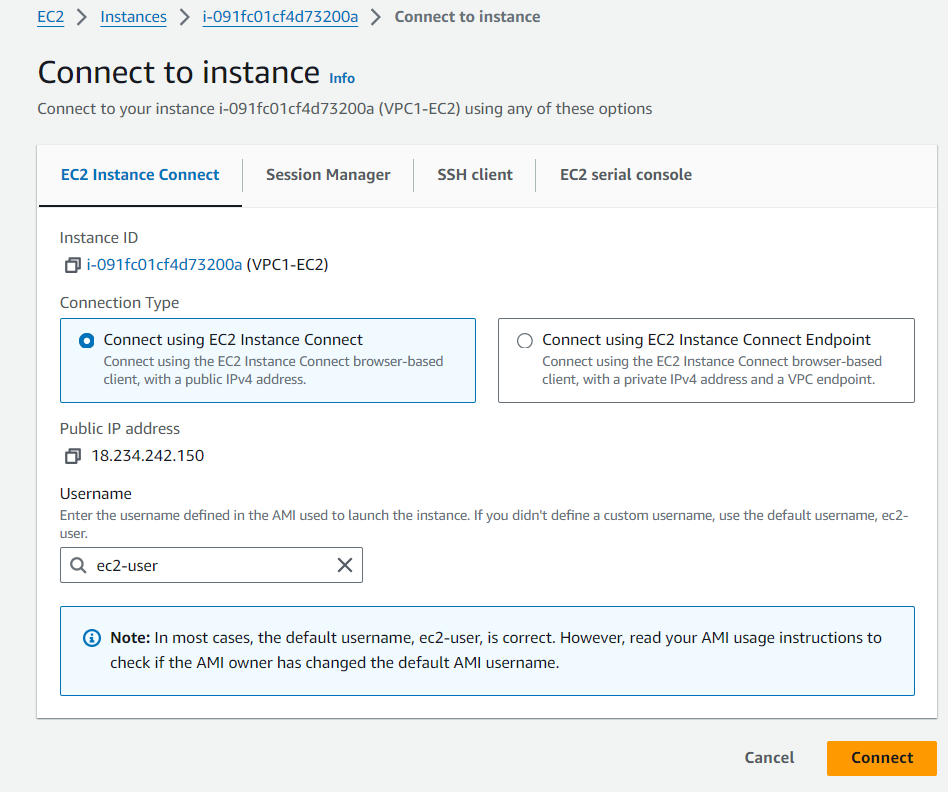


* Click on **Add rule**, select HTTP instead of Custom TCP and give 11.0.0.0/16 as Source. Add one more rule for HTTP and give source as 12.0.0.0/16. And click on Save rules.

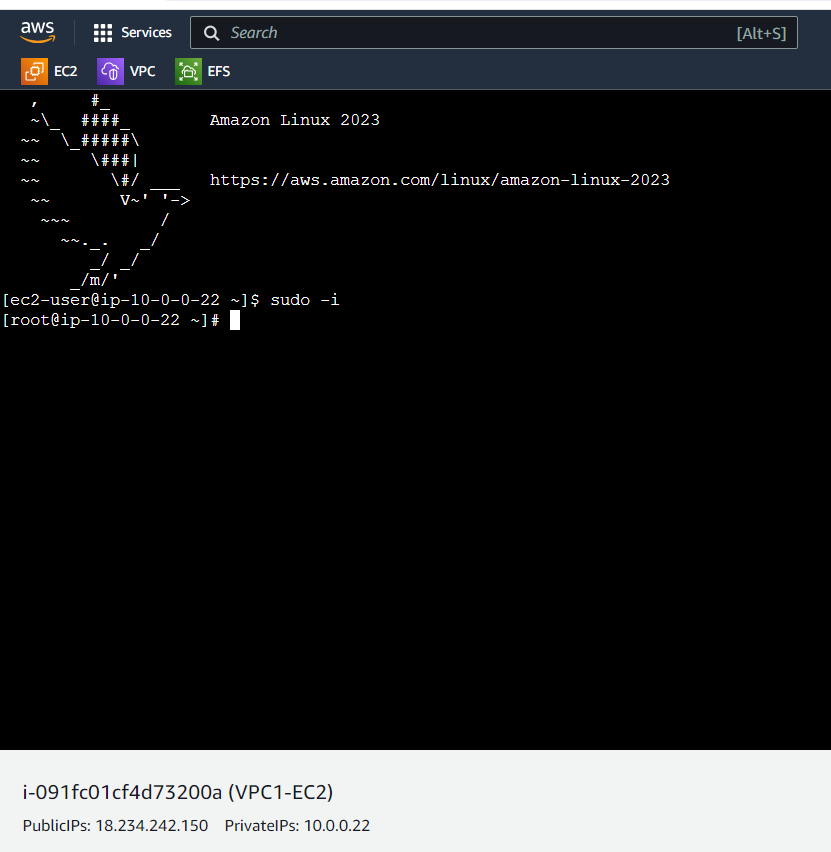


* Now go to second instance and do the same things. (add two rules with HTTP, one for source 10.0.0.0/16 and another one is for 12.0.0.0/16) and Save rules
* Now go to third instance and do the same things. (add two rules with HTTP, one for source 10.0.0.0/16 and another one is for 11.0.0.0/16)
* We have to connect to the instances/servers one by one.
* Go to instances, select first instance (VPC1-EC2) and click on **Connect** option and finally click on Connect button.





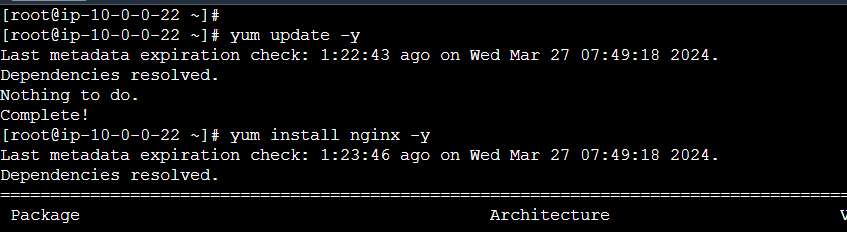
* After successful connection of our instance (server), give sudo -i to change to root user.



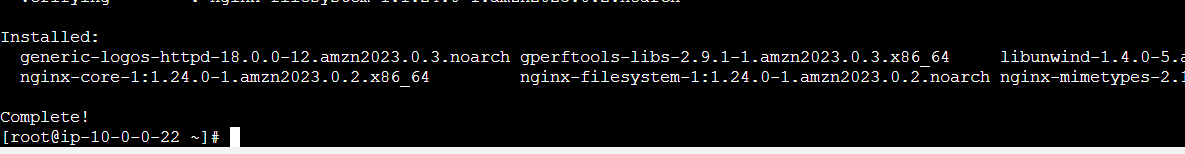
* I’m going to install nginx in connected server.

🡪yum update –y

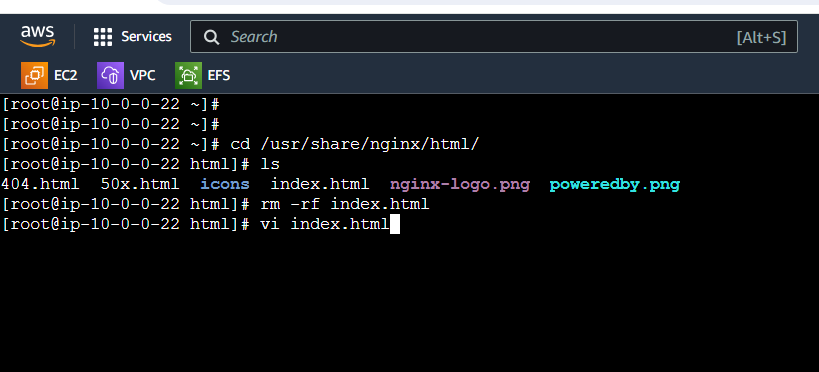
🡪yum install nginx –y

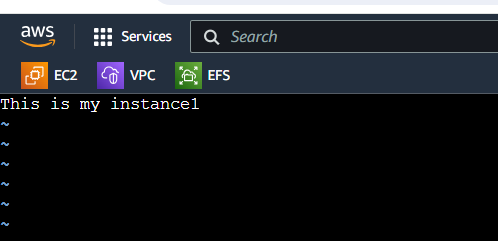


* After successful installation, will get Complete notification like below.



* Now go to /usr/share/nginx/html path, there we have an index.html file. Please remove it and create the same file (index.html) with our own content. And save the file.



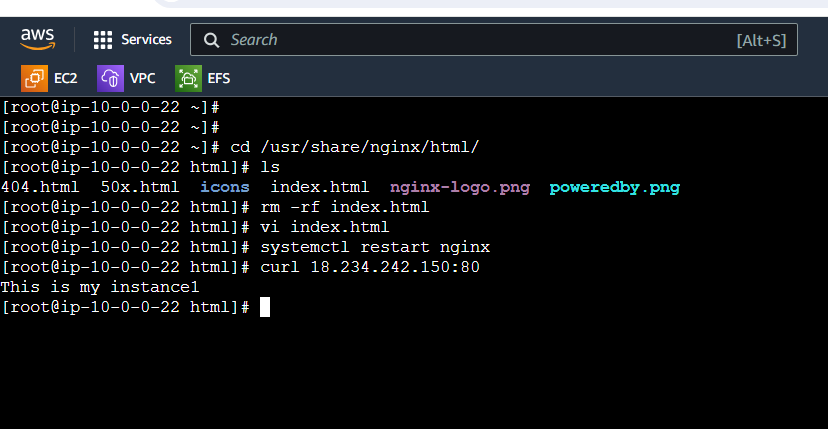


* Now restart nginx with following command

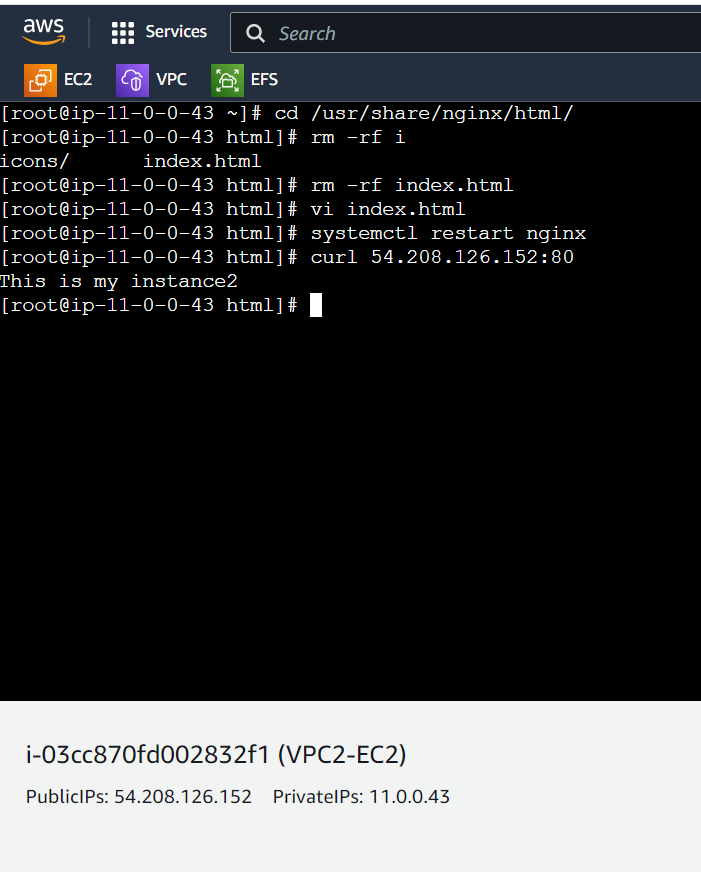
🡪 systemctl restart nginx

* Now copy the public IP of connected server and use below command to see the connect in the index.html file

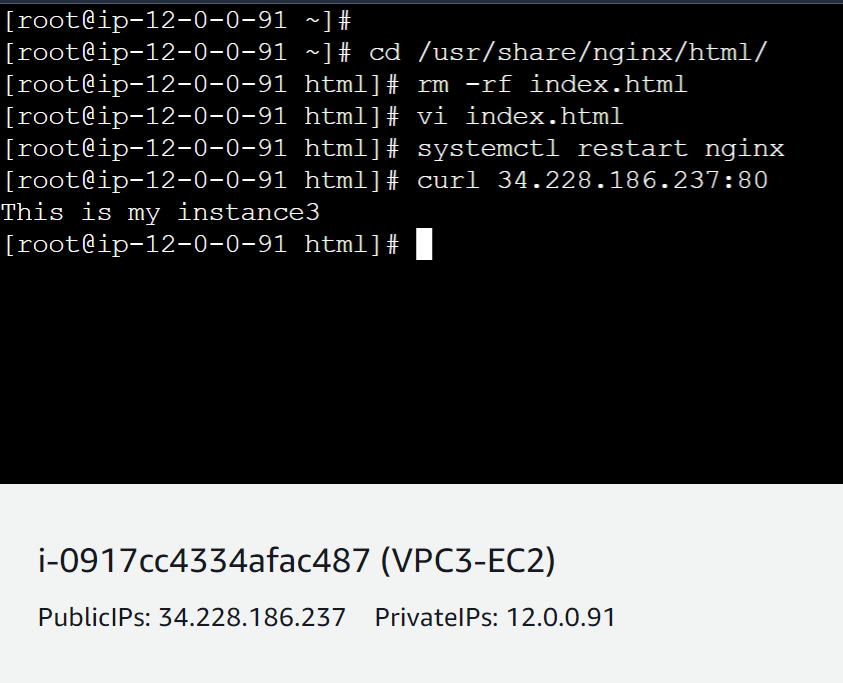
🡪curl 18.234.242.150:80 (see the below pic for clarity)



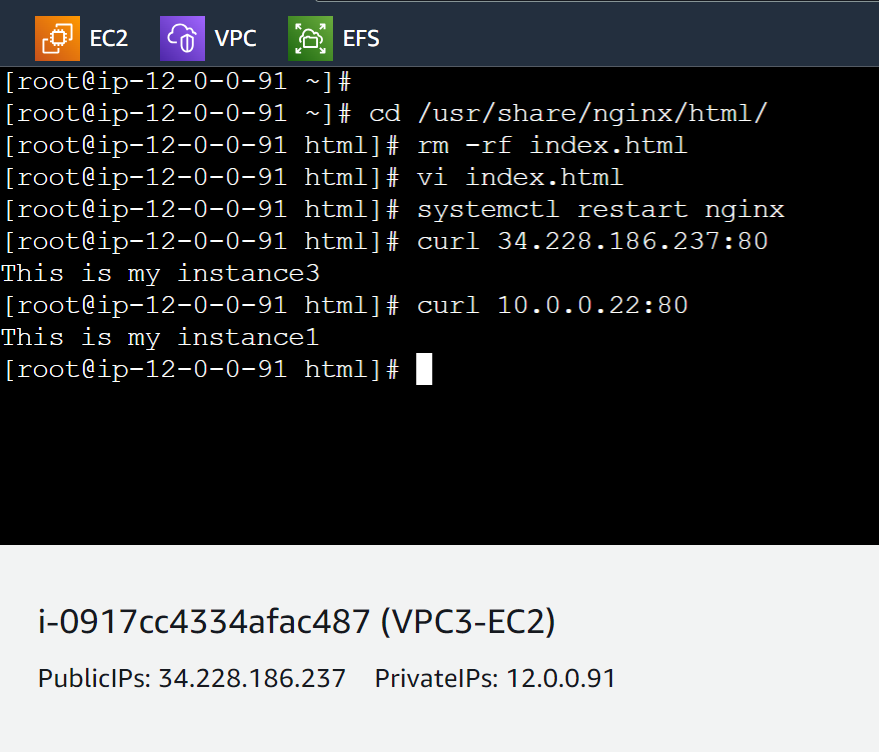
* Now connect to second instance (VPC2-EC2) and follow same process and commands (in index.html, type This is my instance2). Refer below pic



* Now connect to third instance (VPC3-EC2) and follow same process and commands (in index.html, type This is my instance3). Refer below pic



* Now copy the private IP of any connected instance and go to another connected instance (for example I have copied the private IP of instance one i.e. our VPC1-EC2 and paste that IP in third instance i.e. our VPC3-EC2) and use curl command. Refer below pic



* If we observe above pic, I have copied the private IP of instance1 and pasted on instance3. And after using curl command we got – This is my instance1 content/message in instance3 (VPC3-EC2).
* So our Transit gateway task successfully completed.