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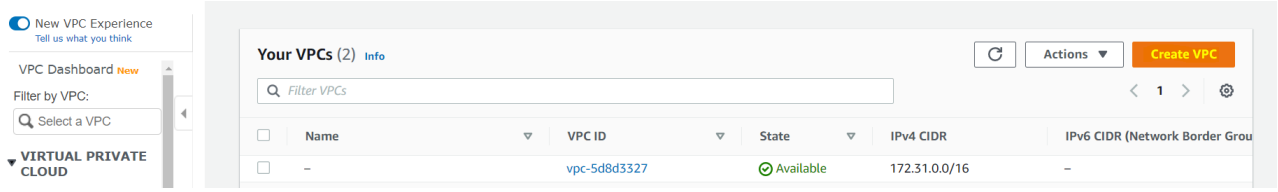
Defining your VPC :

- Last time we tried understanding the default VPC and all the components inside it .
- Agenda for today will be trying to replicate the exact same settings in our own VPC

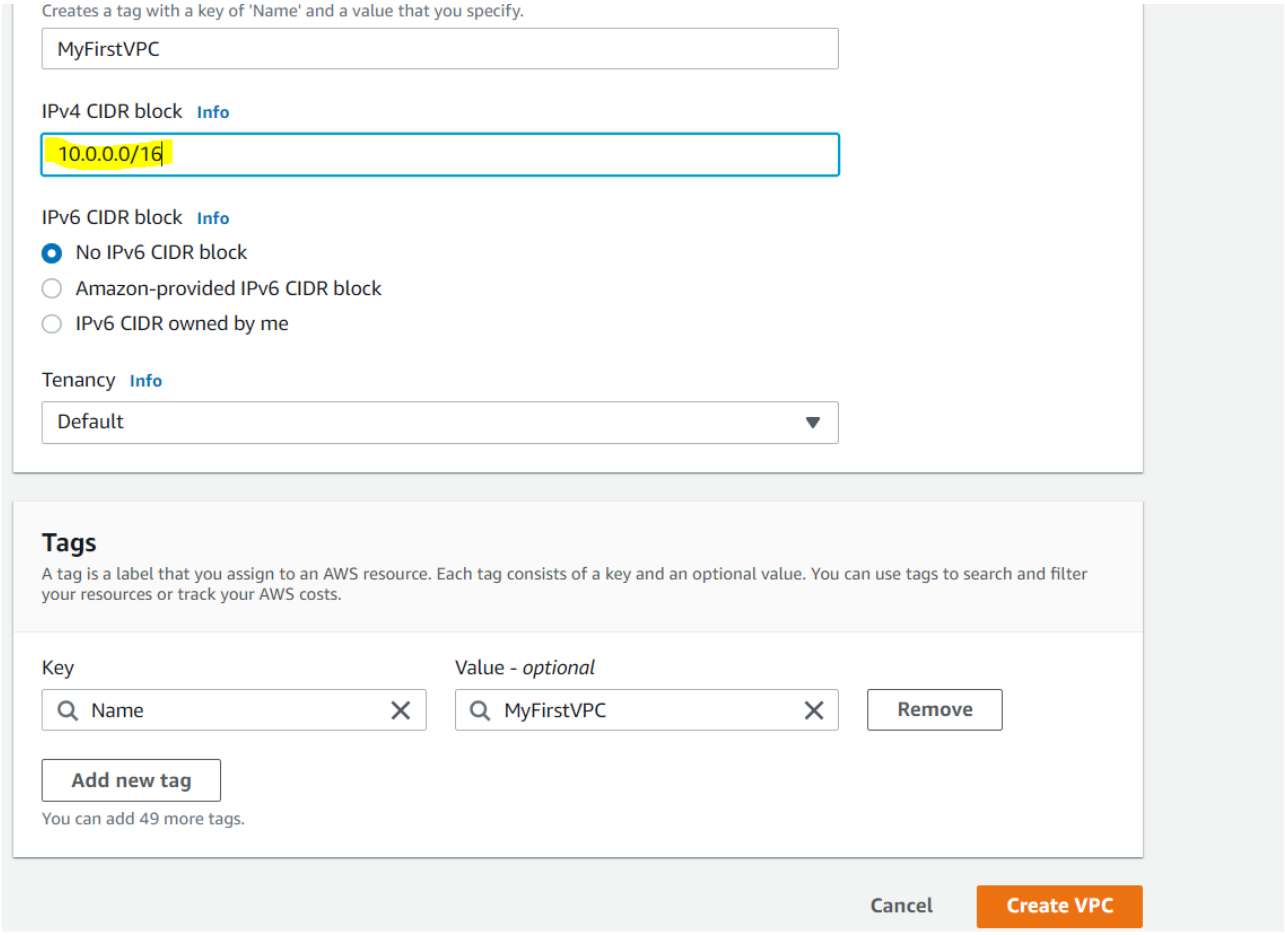
Creating VPC

- In order to start with our process , we need to create a VPC first .
- A VPC needs to have a private CIDR , decide it beforehand before initating the create process
- We will try our hand with "10.0.0.0/16"
- Navigate to VPC dashboard , and click on "Create VPC " on top right corner



- After clicking, enter the name , CIDR block and tags if required . Tenancy here is similar to which we saw earlier with EC2 . Dedicated tenancy ensure that the instances launched in the VPC are deployed on the dedicated hardware . Let us keep it at its default value which is "Default".

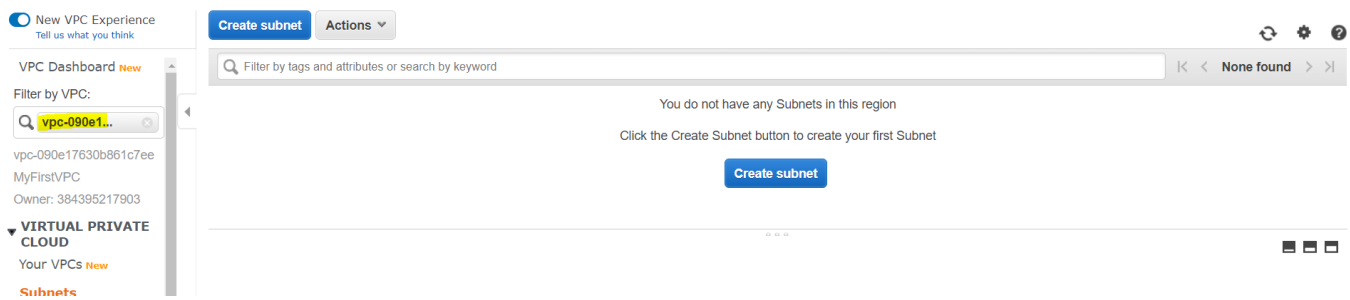
- Click on create VPC to create the VPC .



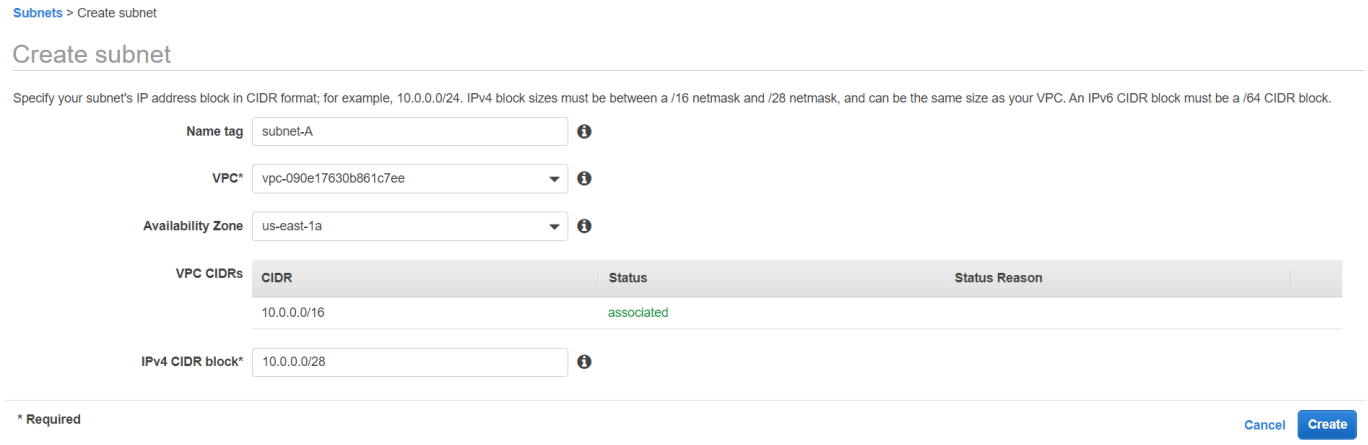
- We should now be able to see our new VPC under the "Your VPCs" section .
- Going forward we'll be using the same VPC for our operations.

Creating subnet under our VPC

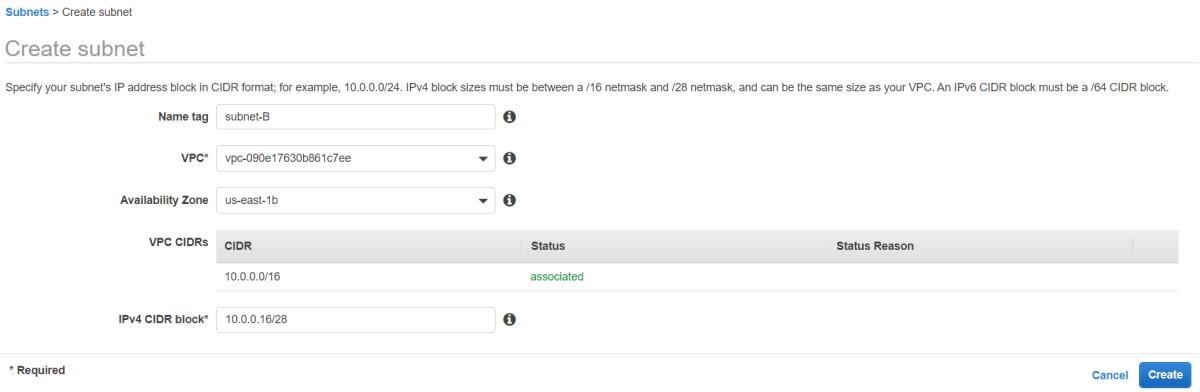
- Since we have a VPC setup, we can create the subsets of the VPC i.e. subnets .
- Subnets let us controle the CIDR , availability zone and auto assign publip ip settings .
- Let us create 2 subnets . Remember these should be a subset of the VPC , also these shoudnt be colliding with each other. For ex
  - Subnet A : 10.0.0.0/28
  - Subnet B : 10.0.0.16/28
- Let us go ahead and create these subnets . Before we do that , as a best practice select our own VPC from the filter in upper left corner . This is to ensure that all our operations are being under appropriate VPC



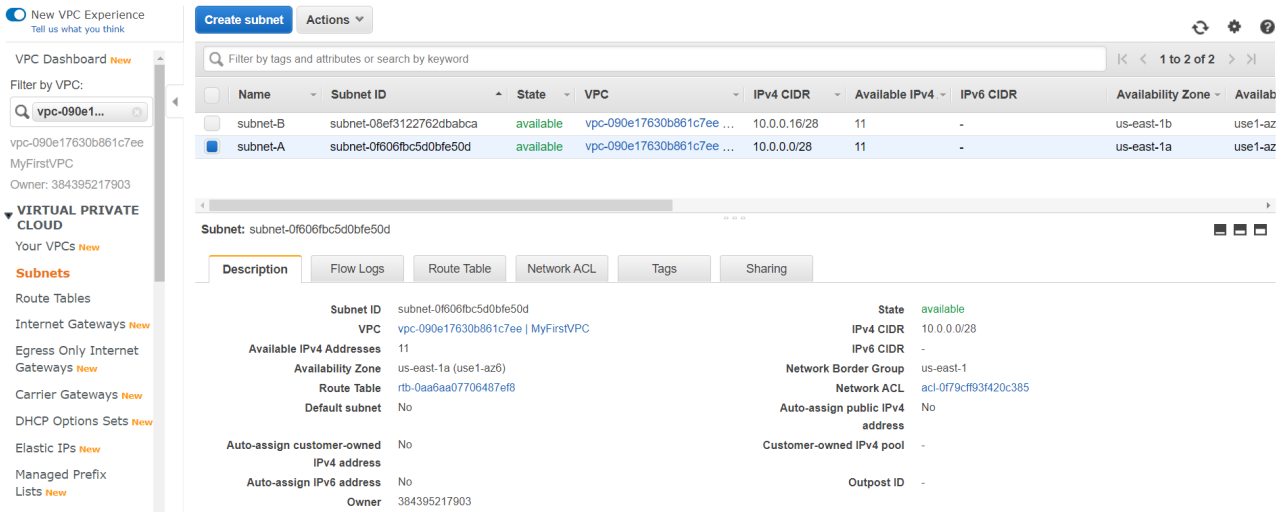
- Let us click on create subnet to get started with the subnet creation .
- We will have to enter the name , the VPC id,availability zone and the CIDR which we want to have .
    - Let us name our subnet as subnet-A
    - Select our newly created VPC
    - Select the availability zone as "us-east-1a"
    - Enter the CIDR that we have decided previously i.e "10.0.0.0/28"



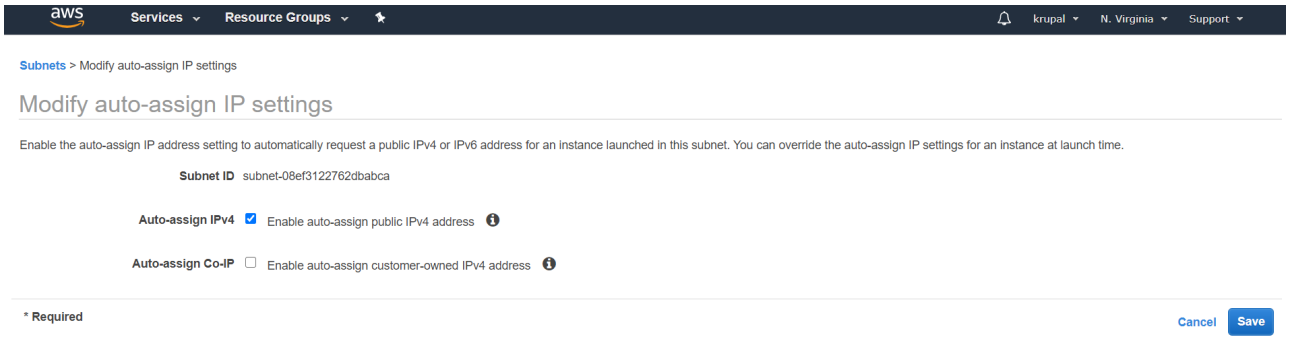
- Repeat the same process for subnet-B as well .
    - Let us name this subnet as subnet-B
    - Select the appropriate VPC
    - Fir this subnet , we will select avalabiltiy zone as "us-east-1b"
    - Enter the second CIDR i.e "10.0.0.16/28"



- We should now be able to see the newly created subnets under the subnet tab in our VPC



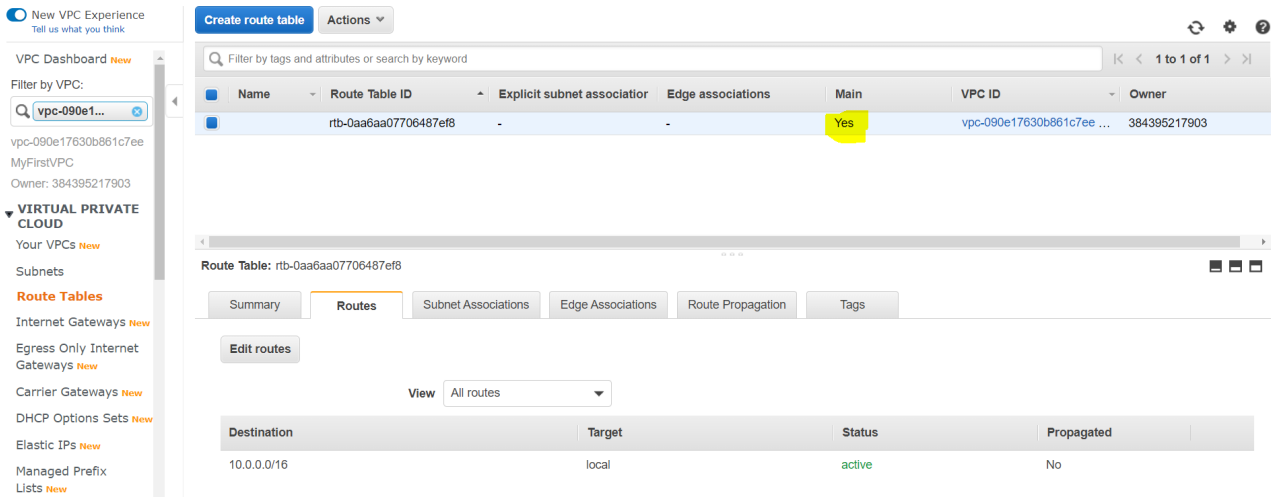
- Notice that the setting "auto assign public ip" as by default set to "No"
- Since we are yet in initiation phase , we want our instances to have public ip . Even though while launching the instance , this setting can be changed . Changing it here makes much more easier to use .
- In order to change it , select the subnet and click on actions
- We'll see an option called "Modify auto-assign public ip settings ". Post clicking we should see the screen with options as below



- As seen above , let us click on "Enable auto-assign public ipv4 address "
- The other option stated "Enable auto-assign customer-owned IPv4 address" is meant if we own a set of public ip addresses and want to use it . Since we do not own any , let us keep it blank .
- Click on save and proceed with the same approach for other subnet

Route tables

- Notice that there in one route table already created here . This is what we refer to as main route table
- When we create a new VPC , main route table is always created with it



- Observe that under "routes" there is already a route added . We can see the route of our VPC is already added . That is a default route that gets added whenever any route table is created .
- Since we are planning to have all the public instances , we will use the same route table .

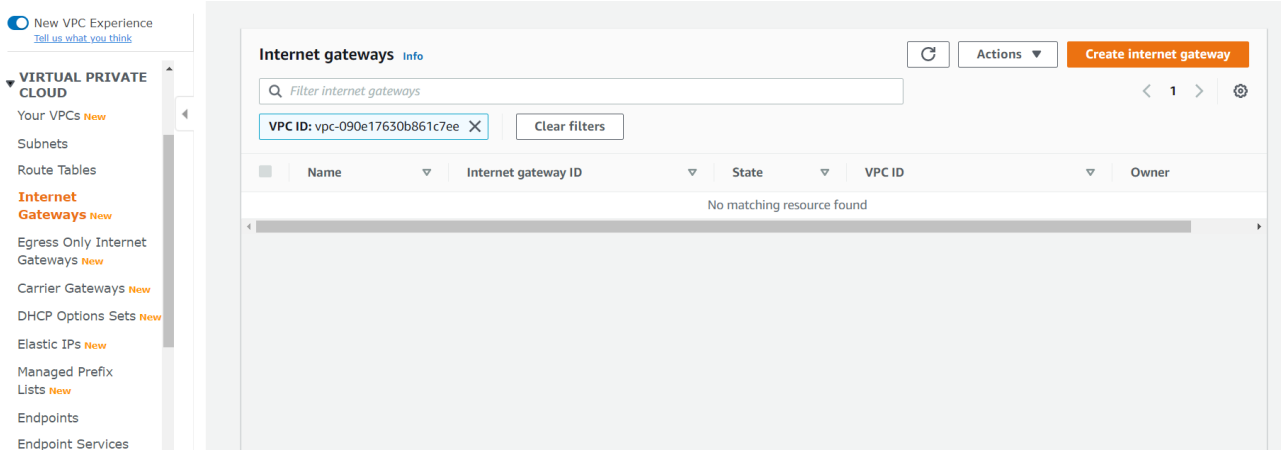
Test run of our new setup

- Let us launch a new instance in our VPC in any of the subnets.
- Test if you can connect to your instance once it is launched .
- Since we are yet to attach the internet gateway , the connection wont be established .

Internet gateway

- We have seen that the internet gateway is like a highway for our postal codes . i.e. allows our subnets to connect to the internet .

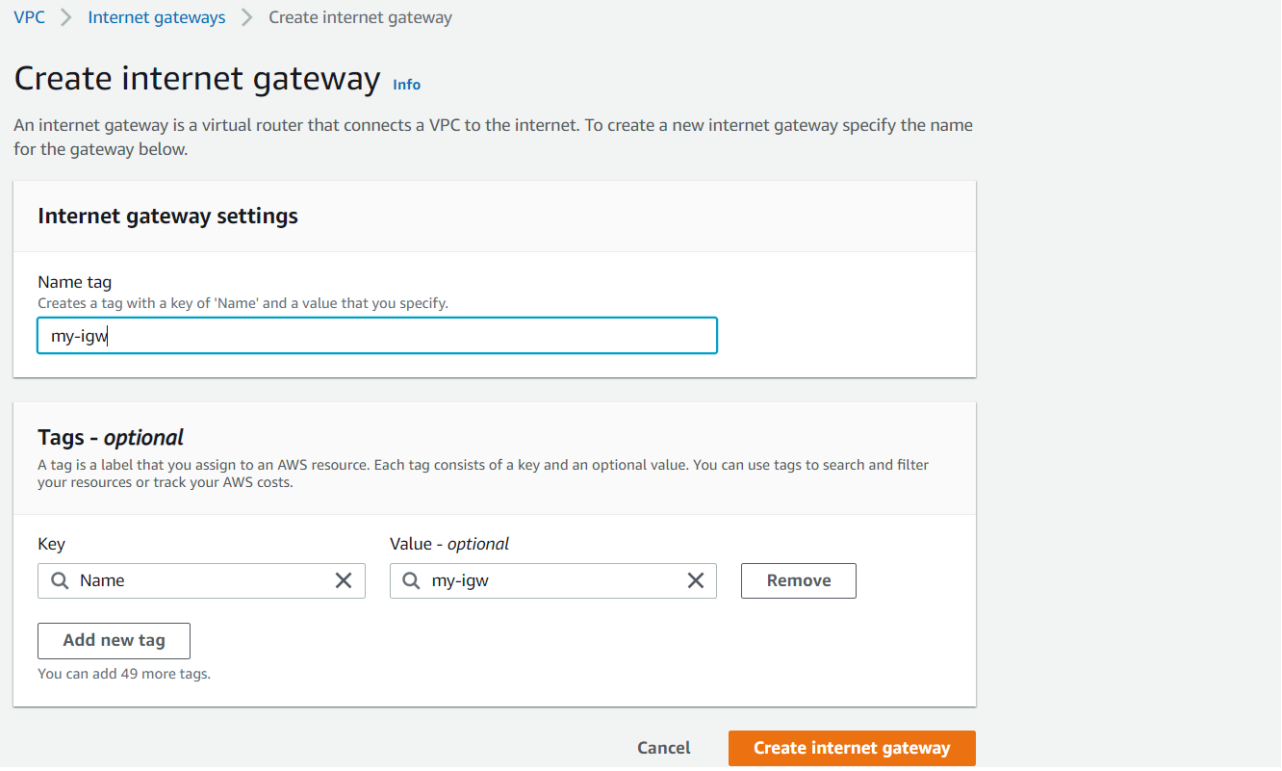
- In order to have that feature available , we'll need to create an igw .



- Note that an igw is not created by default with a VPC , it needs to ve created explicitely .

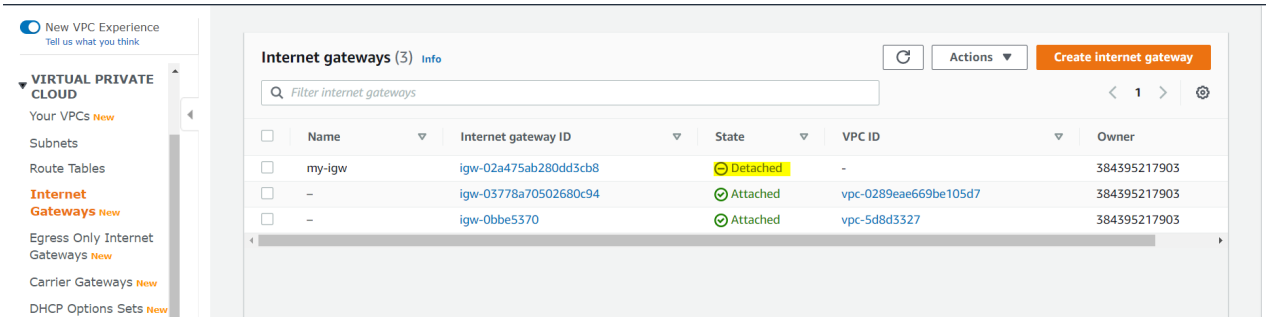
- Let us now create a igw by clicking on the upper right option of "Create internet gateway "

- We only have to provide the name for the igw and click on create

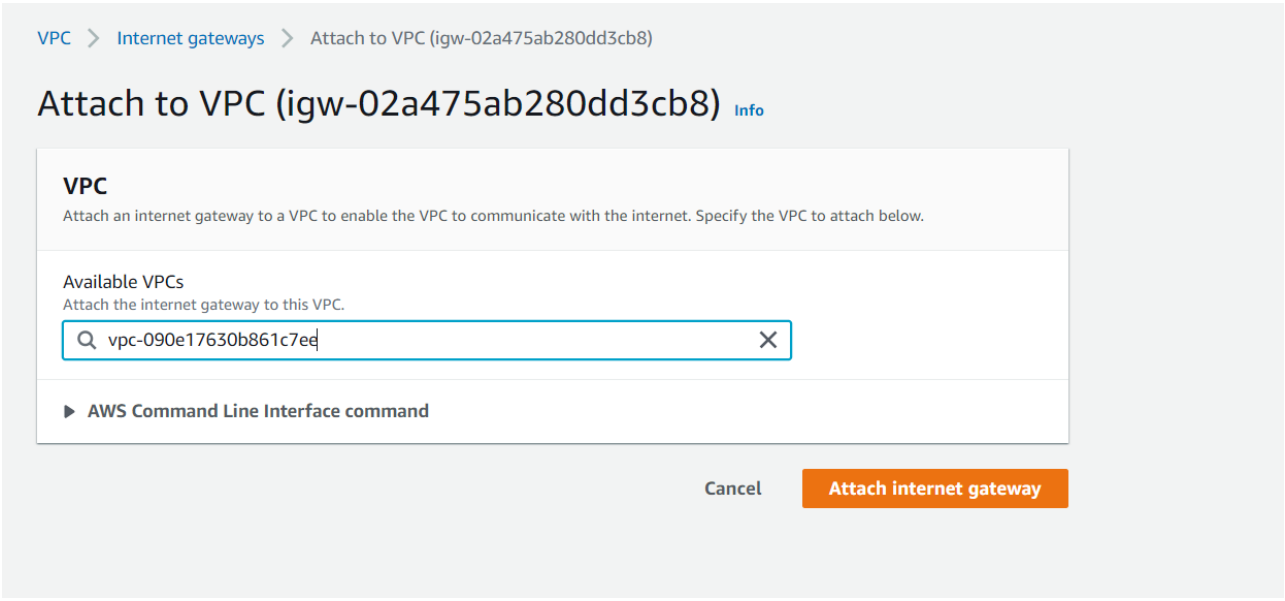


- Since we have the VPC filter set on top left corner , we wont be able to see the igw as it is yet to be attached to our VPC .

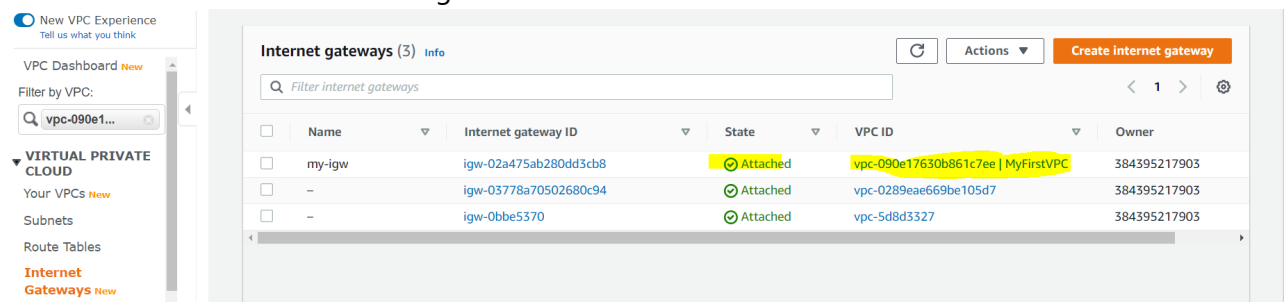
- Remove the filter temperorily and we should be able to see the igw
- Notice our newly created igw is in "detached " state .



- Let us select the igw and click on actions .
- Select "Attach to VPC "
- select our VPC and click on attach internet gateway .

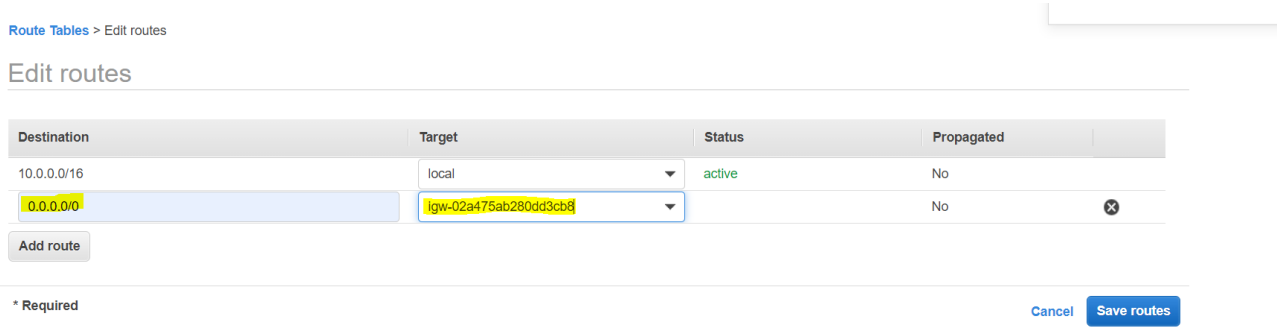


- We should now be able to see the igw is in "Attached " state



- Since the igw is attached ,it is safe for us to say that the highway has been created .
- But there will not be any use of this highway uness there are roads connecting to it . which can allow postal codes to connect to that highway
- Similarly subnets need a route to this igw. Same could be added in route table
- Let us go to the route table and select the one which has been created under our VPC
- Click on routes and select edit routes

- Under destination add "0.0.0.0/0" which indicates the internet
- For target select "internet gateway " option and that will propmpt available igw . Select the one which we have created



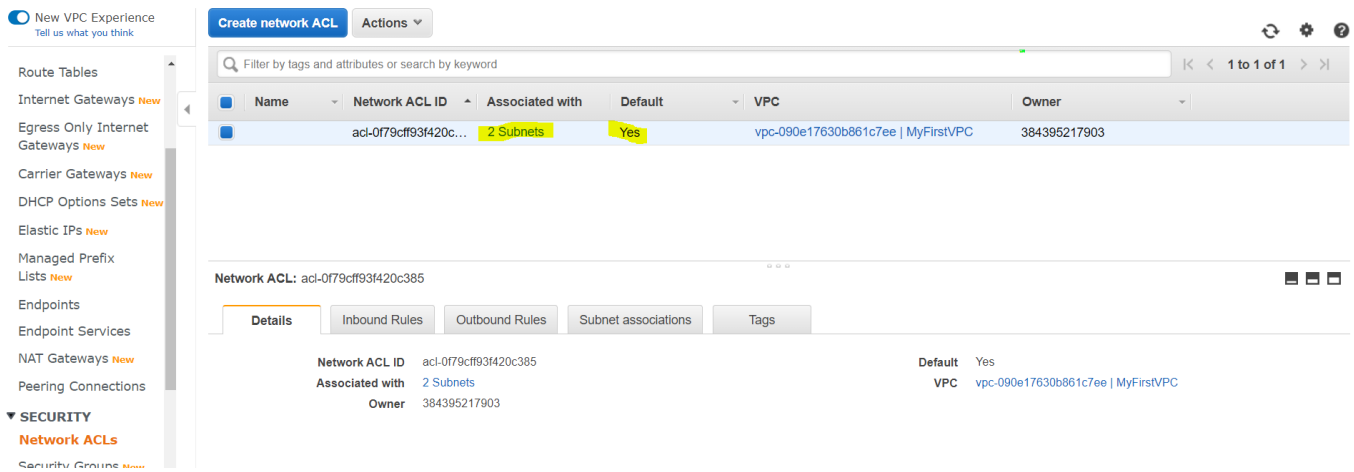
Test run of our new setup

- Since now we have an igw which could be used by our subnets , test the connectivity to the instance
- We should now be able to connect to the instance. Log in and check if it has internet connectivity by using below command

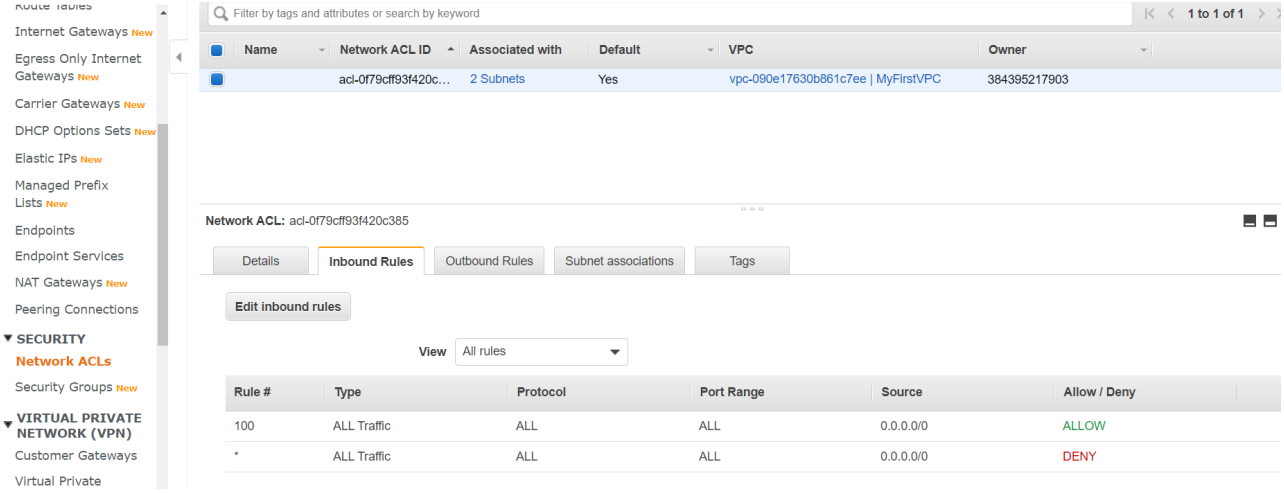
```
ping www.google.com
```

NACL

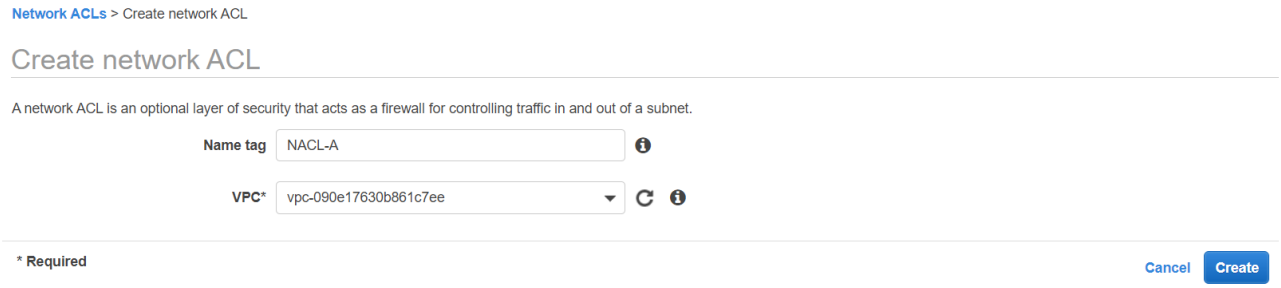
- Similar to route table , NACL is created by default with the VPC .



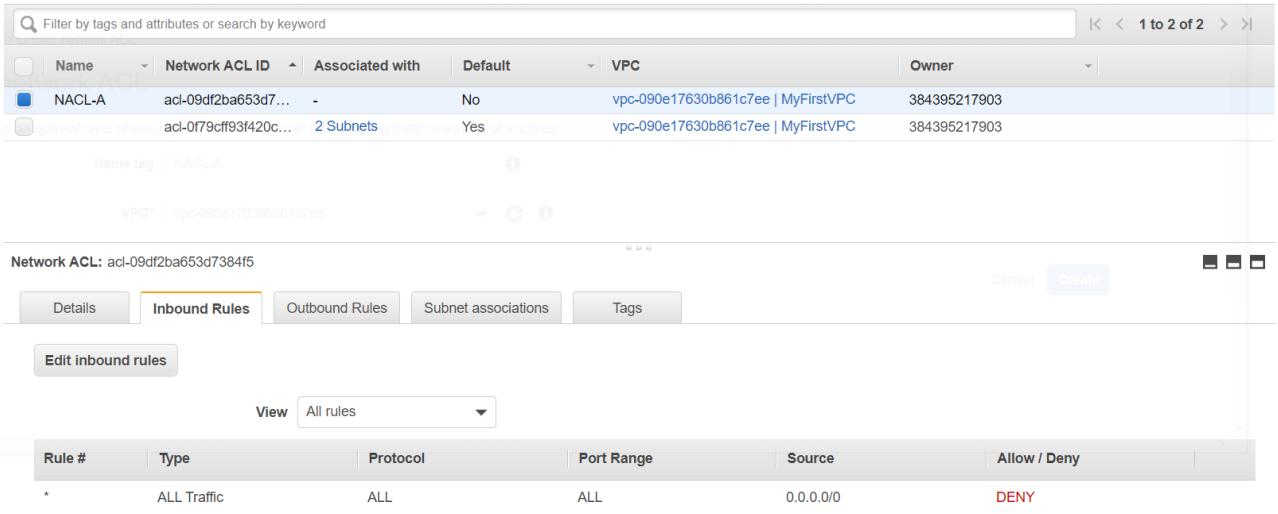
- Notice that since it is default , both the subnets we created in the VPC are associated with it



- Let us also not that inbound rules , we can see a rule with # 100 which allows all traffic from anywhere
- Hence we can conclude , the default NACL by default allows all access
- However , if you create a new NACL , it will not allow any traffic .
- Let us try and create a new NACL and use it .
- Click on create NACL

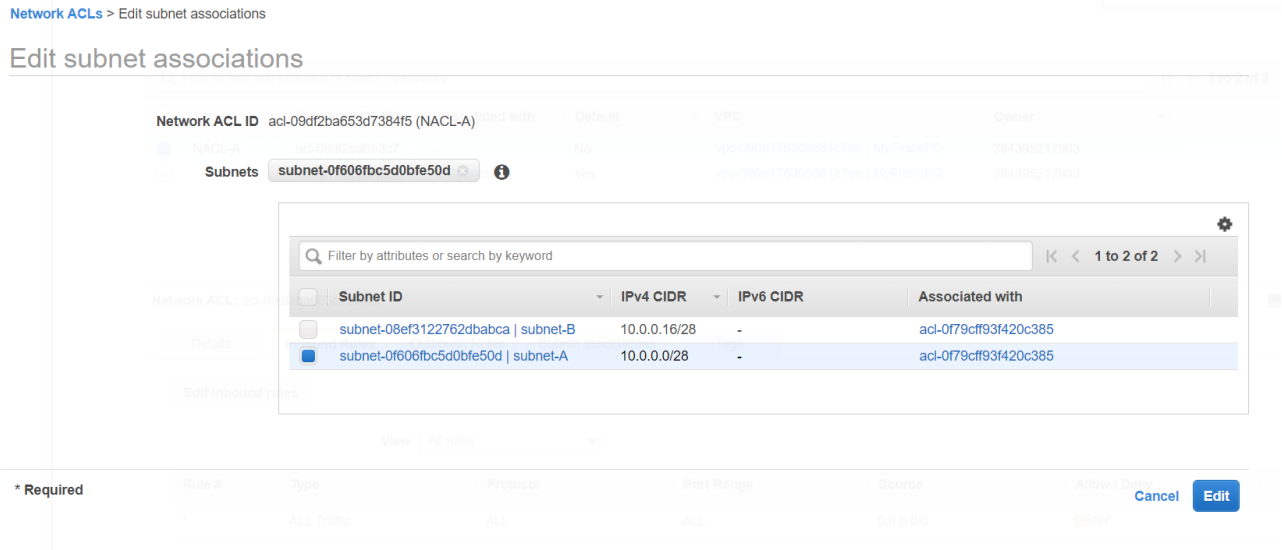


- Lets name it NACl-A , select the VPC and create it



- As stated earlier , we can observe from the inbound rules that it is not allowing access from anywhere
- We can also see that there are no subnets associated with it .
- Let us go ahead and attach subnet-A to it

- Select the NACL and go to actions
- Select edit subnet asscociation



- Select subnet-A and click on edit .
- This basically translates that any of the resources launched in the subnet will be having controlled traffic from this NACL
- Note that one subnet at a time can only be associated with one NACL
- Let us now edit the inbound rules to test the access .
- Things to test
    - Start with rule #100 which allows all traffic from anywhere
    - Then create additional rule #99 which denies any traffic from one of your friend's ip
    - Try and create a rule #101 which allows that ip
    - Experiment with different set of combinations to test how the priority works along with allow/deny actions
- **Points to consider**
- Post practice make sure to delete the components inside the VPC , i.e. igw ,NACL etc before deleting the VPC. Without that VPC will not be deleted
- Keep track of the resources created under a VPC
- NACL can be kept open to all ,however should be used to block known and malicious traffic
- Use multiples of 100 while adding rules in NACL. High priority or critical rules can be added as #99 etc