VPC 101: Technical Documentation

What is VPC?
A virtual private cloud (**VPC**) is an isolated private cloud environment typically hosted and secured within another cloud, which is usually a public cloud(AWS,GCP).

What is CIDR?
Classless Inter-Domain Routing (**CIDR**) is a group of IP addresses that are allocated to the customer when they demand a fixed number of IP addresses.

What is subnet?
If you divide a network into smaller, individual networks, those networks become **subnets.**Subnetting increases routing efficiency, which helps to enhance the security of the network.

What is Route table?
A ***route table*** contains a set of rules, called ***routes***, that are used to determine where network traffic from your subnet or gateway is directed.A route table tells network packets which way they need to go to get to their destination.

What is IGW?
An **Internet Gateway** is a logical connection between an AWS VPC and the Internet.

Each VPC has only one Internet Gateway. If a VPC doesn't have an Internet Gateway, then resources cannot be accessed from the Internet.

What is Natgateway?

NAT **(or Network Address Translation)** Gateway is a managed AWS service that is used so that instances in a private subnet can connect to services outside the VPC. These private resources don't allow any inbound traffic from the public Internet.

A Public NAT gateway is created in a Public Subnet. An Elastic IP address is associated with the NAT Gateway when it is created

A NAT Gateway relies on your Route Tables to be able to route traffic to the public Internet. It is important to create a route from the NAT Gateway to the Internet Gateway to ensure proper Internet connectivity.

What is Security Group?

A S***ecurity group*** acts as a virtual firewall for your EC2 instances to control incoming and outgoing traffic. Inbound rules control the incoming traffic to your instance, and outbound rules control the outgoing traffic from your instance.

What is NACL?

A **Network access control list** (NACL) is an optional layer of security for your VPC that acts as a firewall for controlling traffic in and out of one or more subnets. You might set up network ACLs with rules similar to your security groups in order to add an additional layer of security to your VPC.

Setup of VPC in AWS Cloud

A. Create a VPC in your AWS Account:-

1.Open the Amazon VPC console at https://console.aws.amazon.com/vpc/

2. Select **your vpc** option from left handside in the navigation pane, then click on **Create vpc** button on top right corner .

3. Under **Resources to create**, choose **VPC only**.

Specify the following VPC details as needed:-

4. For **Name tag,** provide a name for your VPC.

5. For **IPv4 CIDR block,** Select **IPv4 CIDR manual input** for your VPC.

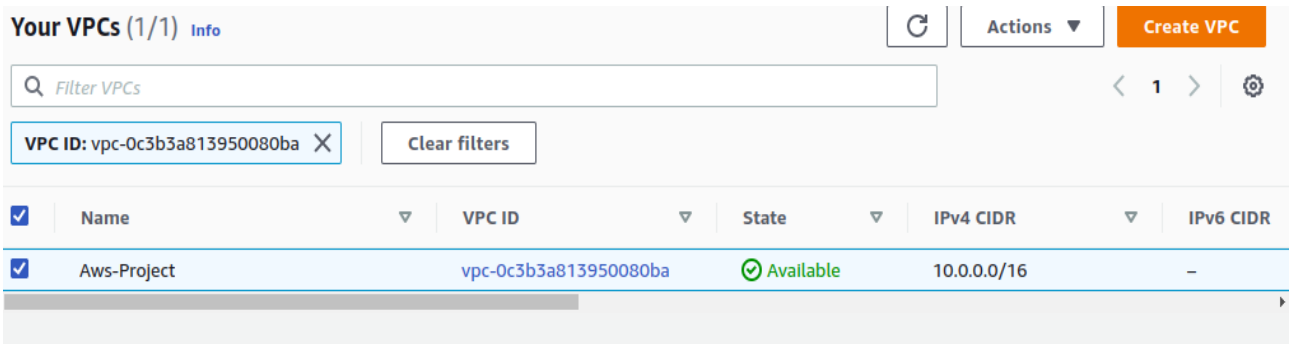
6. For **IPv4 CIDR,** Give the cidr range in ipv4 cidr block.(Range should be in b/w /16 to /28).

7. For **Ipv6CIDR block,** Choose the Default option No IPv6 CIDR block.

8. For **Tenancy,** Choose the Default option for this VPC.

9 For **Tags,** Add optional tags on the VPC.

10. Click on the **Create VPC** button. It will create your vpc.



B. Create a Subnet in your VPC:-

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/

2. Select **Subnets** option from left handside in the navigation pane, then click on **Create Subnet** button on the top right corner.

3. For **VPC ID,** Choose the VPC for which you're creating the subnet.

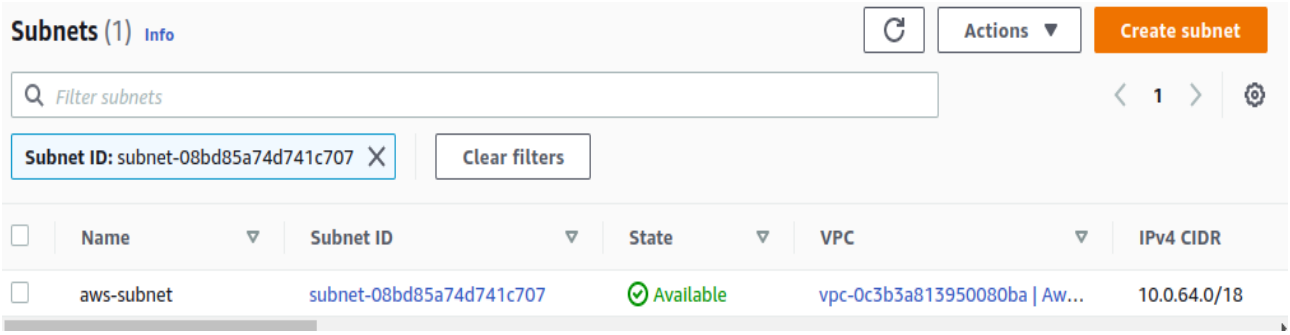
4. For **Subnet name,** Enter a name for your subnet.

5. For **Availability Zone,** you can choose a Zone for your subnet, or leave the default No preference to let AWS choose one for you.

6. For **IPv4 CIDR block,** Enter an IPv4 CIDR block for your subnet. For example,10.0.1.0/24. For more information, see IPv4 VPC CIDR blocks.

7. For **Tags,** Add optional tags on the Subnet.

8. Click on **Create subnet** button. It will create subnet for your vpc.



C. Create an IGW:-

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/

2. Select **Internet gateways** option from left handside in the navigation pane, then click on Create Internet gateway button on the top right corner.

3. For **Name tag,** provide a name for your IGW.

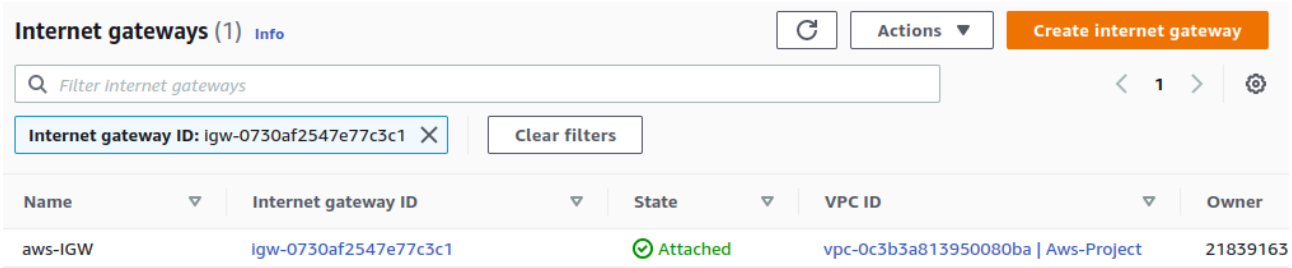
4. For **Tags,** Add optional tags on the Internet gateways.

5. Click on Create **Internet gateway** button. It will create your Internet gateway.

6. Click on Internet gateway, then Select the Internet gateway that you just created, and then choose Actions, then choose Attach to VPC.

7. Select your VPC from the list in the Available VPCs, and then click on Attach internet gateway button.

Note: Remember One IGW is connect with only one VPC.



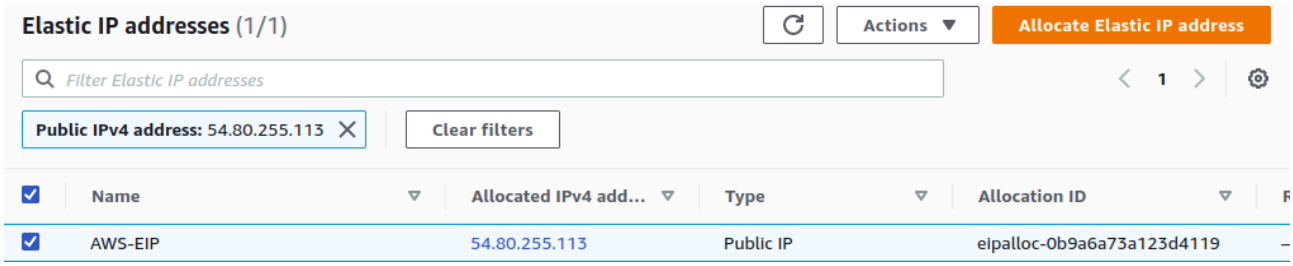
D. Create EIP:-

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/

2. Select **Elastic IP** option from left handside in the navigation pane, then click on **Allocate Elastic IP** address button on the top right corner.

3. For **Tags,** Add optional tags on the EIP.

4. Simple click on **Allocate** button.It will Create an EIP.



E. Create Natgateway:-

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/

2. Select **NAT gateways** option from left handside in the navigation pane, then click on **create NAT gateway** button on the top right corner.

3. For **Name,** Specify a name for the NAT gateway.

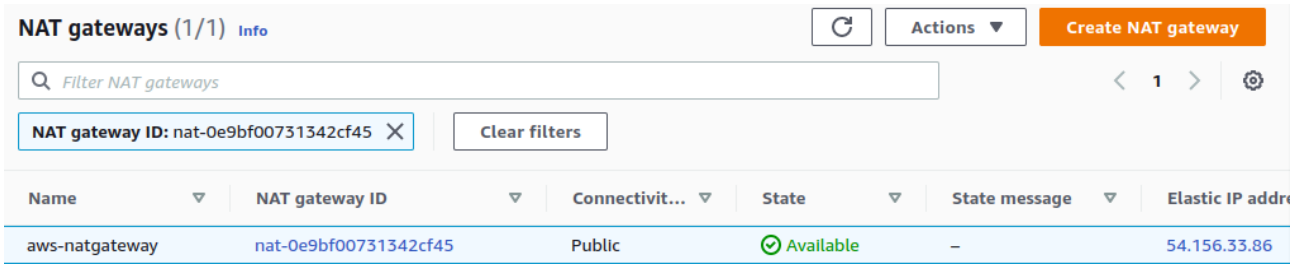
4. For **Subnet,** Select the subnet in which to create the NAT gateway.

5. For **Connectivity type,** please select Public-subnet (which is the default) to create a NAT gateway.

6. For **Elastic IP allocation ID,** Choose an Elastic IP allocation ID to assign an EIP to the NAT gateway or choose **Allocate Elastic IP** to automatically allocate an elastic IP address to use for your public NAT gateway.

7. For **Tags,**Add optional tags on the Nat gateway.

8. Click on **Create NAT Gateway** button. It will create a Natgateway on public subnet.



F. Create Route table:

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/

2. Select **Route Tables** option from left handside in the navigation pane, then click on **Create route table** button on the top right corner.

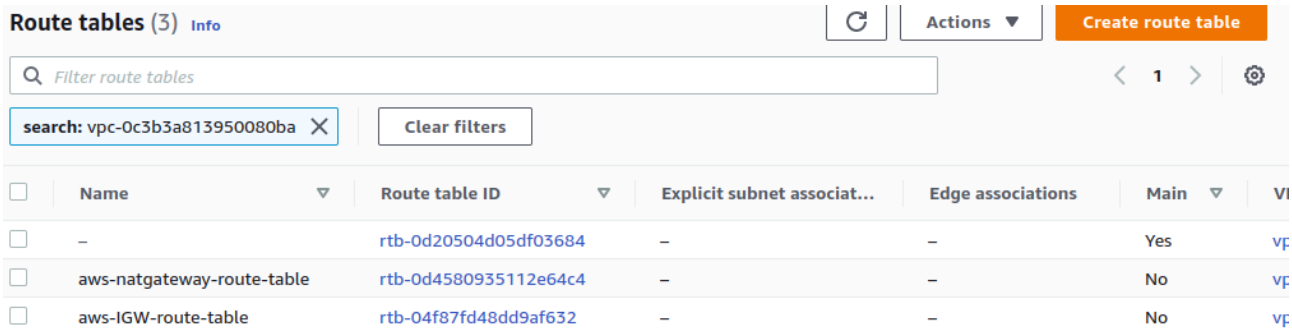
3. For **Name,** Enter a name for your Route table.

4. For **VPC,** choose your VPC from the list in the Available VPCs.

5. For **Tags,** Add optional tags on the Route table.

6. Click on **Create Route table** button.It will create a route table for your vpc and subnets.

Note: Create two Route table for association of **IGW** and **Natgateway.**



G. Attach IGW with Route table:-

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/.

2. Select **Route tables** option from left handside in the navigation pane, then select **your route table name** in which you want to associate the **IGW**.(click on check box for selecting route table).

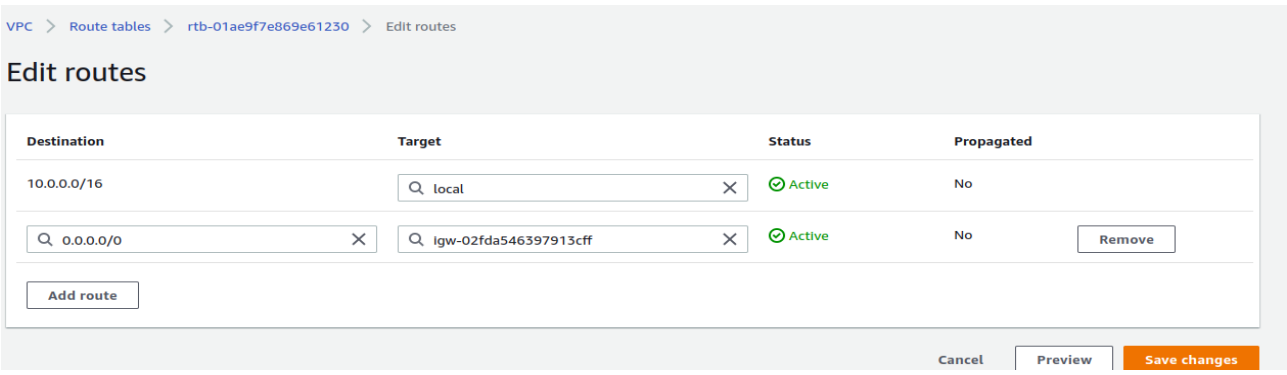
3. Choose **Actions**, then click on **Edit routes**.

4. To add a route, choose **Add route**. For **Destination** enter the destination CIDR block, a single IP address.i.e(0.0.0.0/0).

5. For **Target,** select Internet Gateway it will show your IGW id which is connected with your vpc.

6. Click on **Save Changes** button.

7. Now, you have created a **public Route table** because you attach an IGW with this Route table.



H. Associate a Subnet with a public-route table:-

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/.

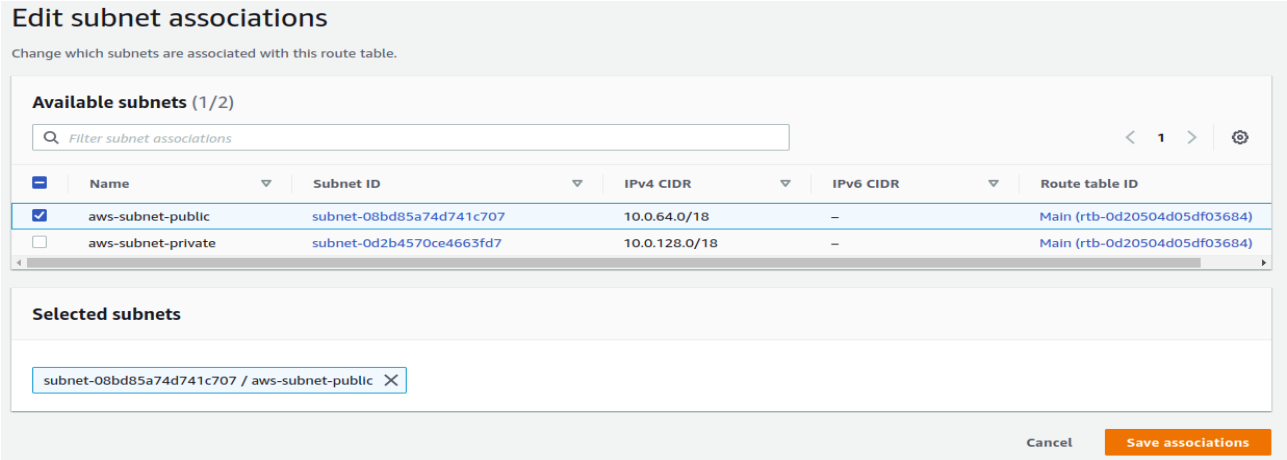
2. Select **route tables** option from left handside in the navigation pane and then select your route table name in which igw is already connected .This is a public route table.

3. Below, On the **Subnet associations** tab, choose **Edit subnet associations**.

4. Select the check box for the subnet to associate with the route table.

5. Click on **Save associations** button.

6. Those Subnets are associated with this Route table are **public subnet.**



I. Attach Natgateway with Route table:

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/.

2. Select **Route tables** option from left handside in the navigation pane, then select your route table name on which you want to associate the Natgateway.(click on check box for selecting route table).

3. Choose **Actions**, then click on **Edit routes**.

4. To add a route, choose **Add route**. For **Destination** enter the destination CIDR block, a single IP address.i.e(0.0.0.0/0).

5. For **Target,** select **Nat gatewa**y it will show your Natgateway id which is connected with your vpc.

6. Click on **Save Changes** button.

7. Now, you have created a **private Route table** because you attach a **Natgateway** with this Route

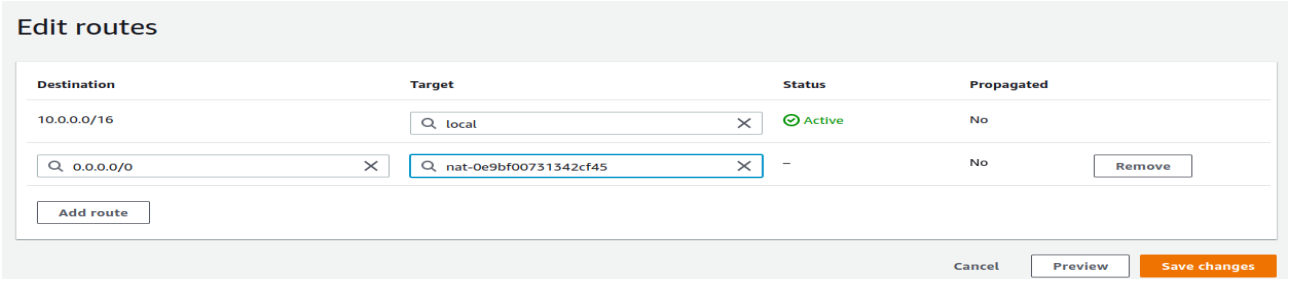


table.

J. Associate a Subnet with a Private-Route table:-

1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/.

2. Select **route tables** option from left handside in the navigation pane and then select your route table name on which Natgateway is already connected .This is a private route table.

3. Below, On the **Subnet associations** tab, choose **Edit subnet associations**.

4. Select the check box for the subnet to associate with the route table.

5. Click on **Save associations** button .

6. Those Subnets are associated with this Route table are **private subnet.**