

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 **Security 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.

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.

Subnets (1) Info						Refresh	Actions ▼	Create subnet
<input type="text" value="Filter subnets"/>						< 1 > ⚙		
Subnet ID: subnet-08bd85a74d741c707 ✕						Clear filters		
<input type="checkbox"/>	Name ▼	Subnet ID ▼	State ▼	VPC ▼	IPv4 CIDR			
<input type="checkbox"/>	aws-subnet	subnet-08bd85a74d741c707	✔ Available	vpc-0c3b3a813950080ba Aw...	10.0.64.0/18			

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.

Internet gateways (1) Info

↻

Actions ▾

Create internet gateway

🔍

Filter internet gateways

< 1 > ⚙

Internet gateway ID: igw-0730af2547e77c3c1 ✕

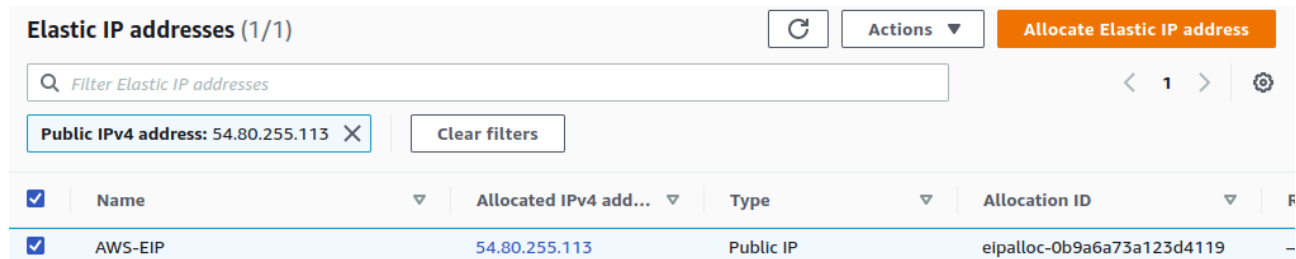
Clear filters

Name ▾	Internet gateway ID ▾	State ▾	VPC ID ▾	Owner
aws-IGW	lgw-0730af2547e77c3c1	✔ Attached	vpc-0c3b3a813950080ba Aws-Project	21839163

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.

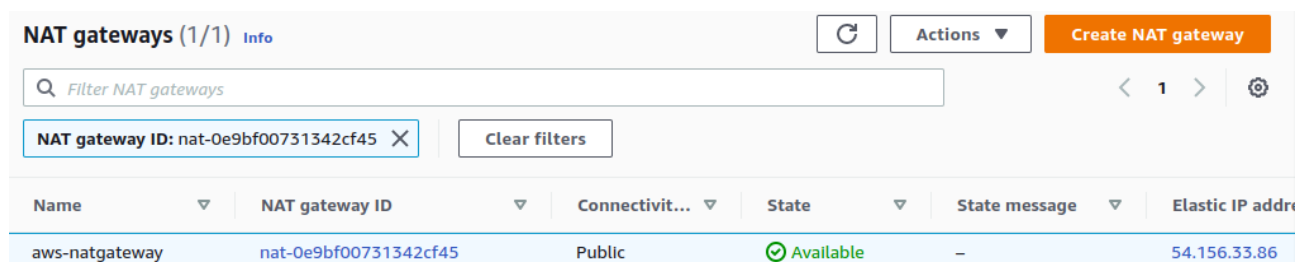


The screenshot shows the 'Elastic IP addresses (1/1)' page in the AWS console. It includes a search bar, a filter for 'Public IPv4 address: 54.80.255.113', and a table with one entry.

<input checked="" type="checkbox"/>	Name	Allocated IPv4 add...	Type	Allocation ID
<input checked="" type="checkbox"/>	AWS-EIP	54.80.255.113	Public IP	elpalloc-0b9a6a73a123d4119

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.



The screenshot shows the 'NAT gateways (1/1)' page in the AWS console. It includes a search bar, a filter for 'NAT gateway ID: nat-0e9bf00731342cf45', and a table with one entry.

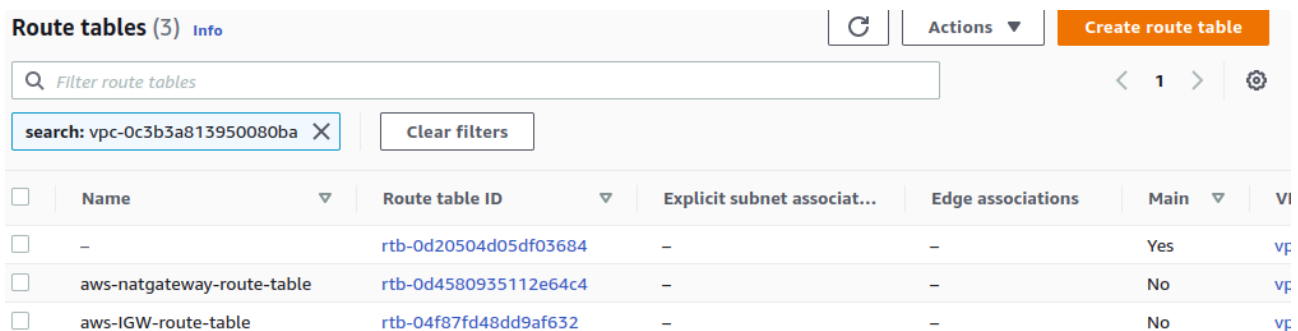
Name	NAT gateway ID	Connectivit...	State	State message	Elastic IP addre
aws-natgateway	nat-0e9bf00731342cf45	Public	Available	-	54.156.33.86

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**.

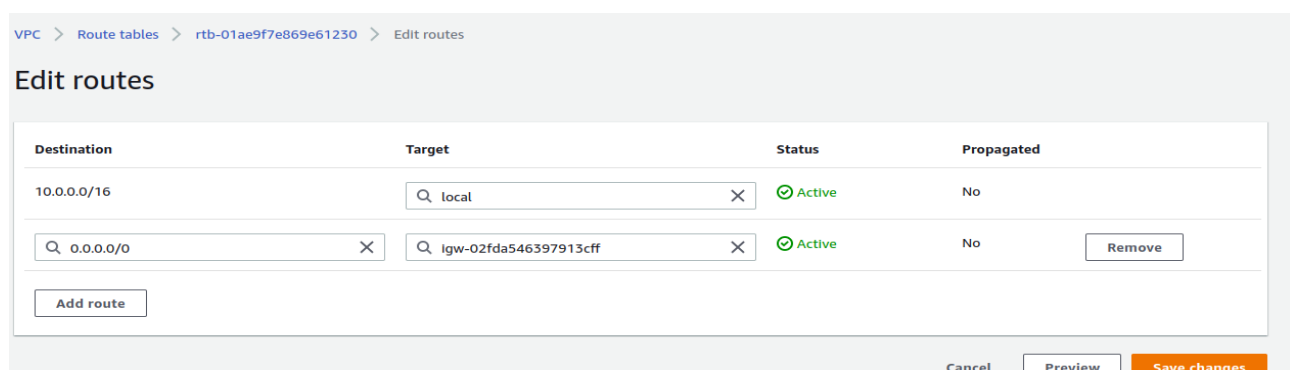


The screenshot shows the AWS Route Tables console. At the top, there's a header with 'Route tables (3)' and an 'Info' link. To the right are buttons for 'Create route table' and 'Actions'. Below the header is a search bar with the text 'Filter route tables'. A search filter is applied: 'search: vpc-0c3b3a813950080ba'. Below the search bar is a table with the following columns: Name, Route table ID, Explicit subnet associat..., Edge associations, Main, and VPC. The table contains three entries:

Name	Route table ID	Explicit subnet associat...	Edge associations	Main	VPC
-	rtb-0d20504d05df03684	-	-	Yes	vpc-
aws-natgateway-route-table	rtb-0d4580935112e64c4	-	-	No	vpc-
aws-IGW-route-table	rtb-04f87fd48dd9af632	-	-	No	vpc-

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.



The screenshot shows the 'Edit routes' console for a specific route table. The breadcrumb navigation is 'VPC > Route tables > rtb-01ae9f7e869e61230 > Edit routes'. The title is 'Edit routes'. Below the title is a table with the following columns: Destination, Target, Status, and Propagated. The table contains two entries:

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No
0.0.0.0/0	igw-02fda546397913cff	Active	No

Below the table is an 'Add route' button. At the bottom right of the console are buttons for 'Cancel', 'Preview', and 'Save changes'.

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**.

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (1/2)

Filter subnet associations

	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
<input checked="" type="checkbox"/>	aws-subnet-public	subnet-08bd85a74d741c707	10.0.64.0/18	–	Main (rtb-Od20504d05df03684)
<input type="checkbox"/>	aws-subnet-private	subnet-0d2b4570ce4663fd7	10.0.128.0/18	–	Main (rtb-Od20504d05df03684)

Selected subnets

subnet-08bd85a74d741c707 / aws-subnet-public X

Cancel Save associations

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 gateway** 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

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No
0.0.0.0/0	nat-0e9bf00731342cf45	-	No

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**.

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (1/2)

Filter subnet associations

	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
<input type="checkbox"/>	aws-subnet-public	subnet-08bd85a74d741c707	10.0.64.0/18	-	rtb-04f87fd48dd9af632 / aws-IGW-route-table
<input checked="" type="checkbox"/>	aws-subnet-private	subnet-0d2b4570ce4663fd7	10.0.128.0/18	-	Main (rtb-0d20504d05df03684)

Selected subnets

subnet-0d2b4570ce4663fd7 / aws-subnet-private