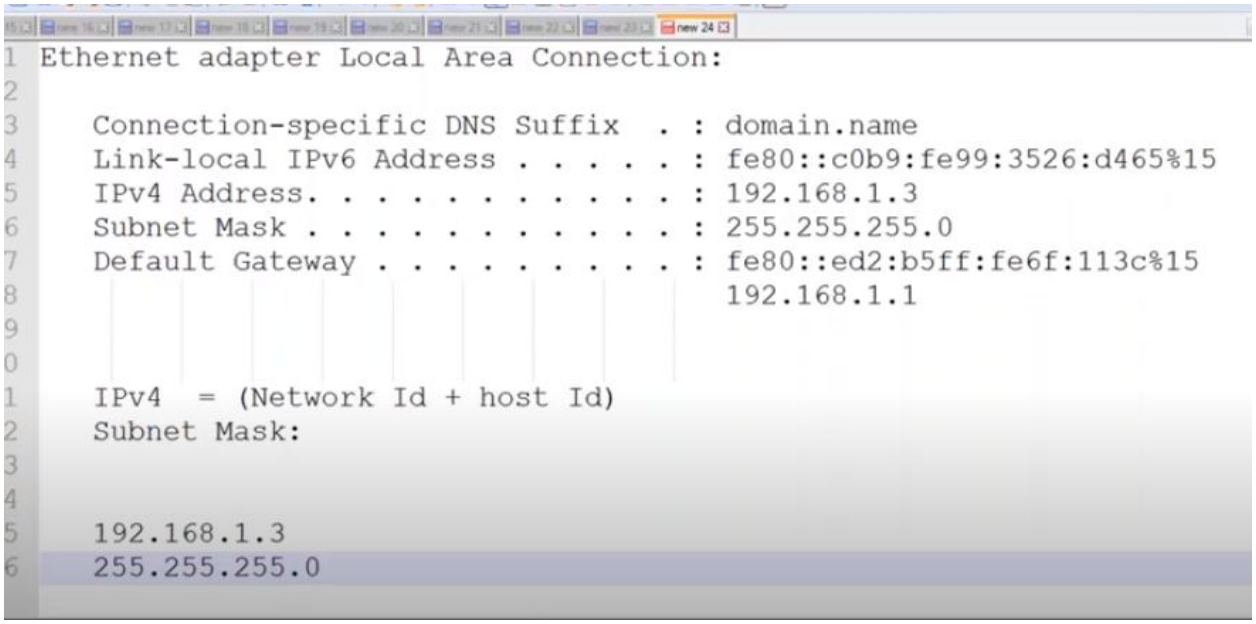
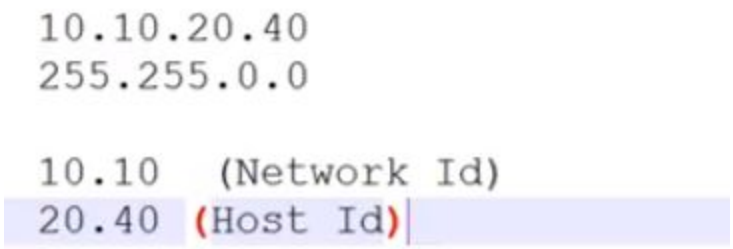


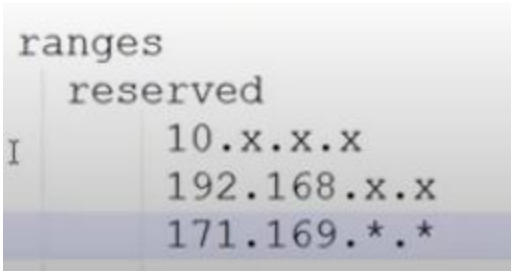


Network packet can be send from one machine to other machine if they have same network id(private network)
Router(route table) send the packet to outside network(default gateway)
Packet with in network we don't need anything

255.255.255.0 = 8 bites = 255 -2 = 253
1 is network id
2 is broadcast

For example
10.10.20.40
 10.10 (network id =1)
 20.40 (host id = 0) = 2^16 -2 (physical network calculation)
 So ipv4(total bit 32 bit) = (network id + host id)
(software define network) Virtual network calculation 2^16 -5

Public IP- anyone with internet reach to your network(dynamic ip)

Private IP- 

reserved ip so its costly(static ip)

CIDR-classless inter domain routing

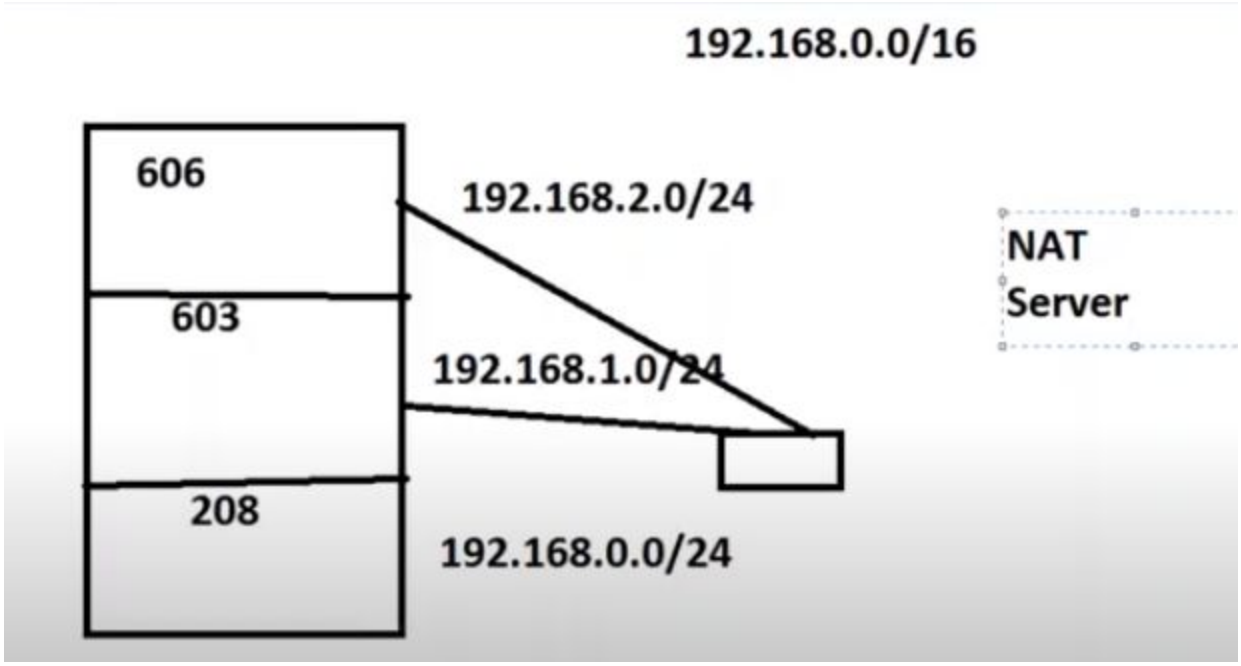
255.255.255.0 = 253

255.255.0.0 = 65534

11111111.11111111.11111111.00000000 = 255.255.255.0 = 254
11111111.11111111.11111110.00000000 = 510 10.10.10.0/23
11111111.11111111.1111100.00000000 = 1022

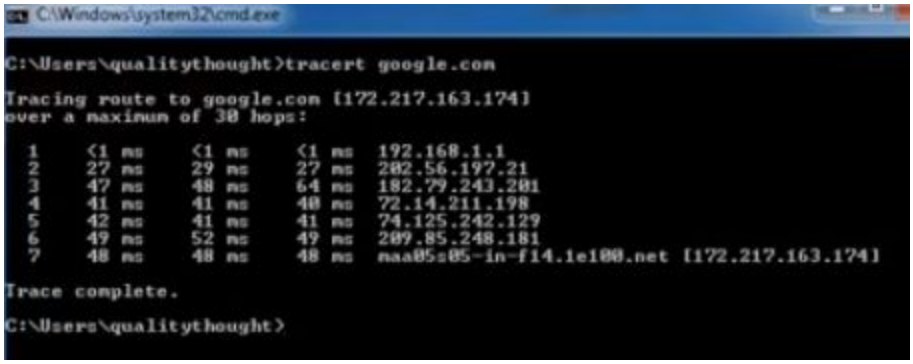
10.10.10.0/22

10.10.10.0/24



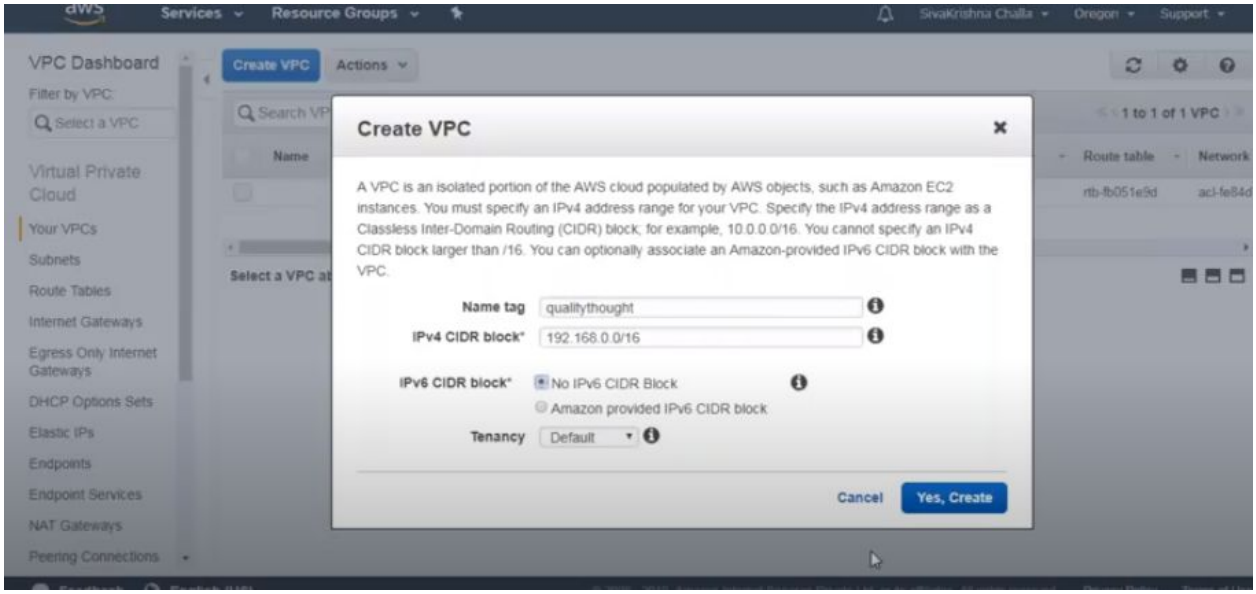
Router or routable use to send packet outside network

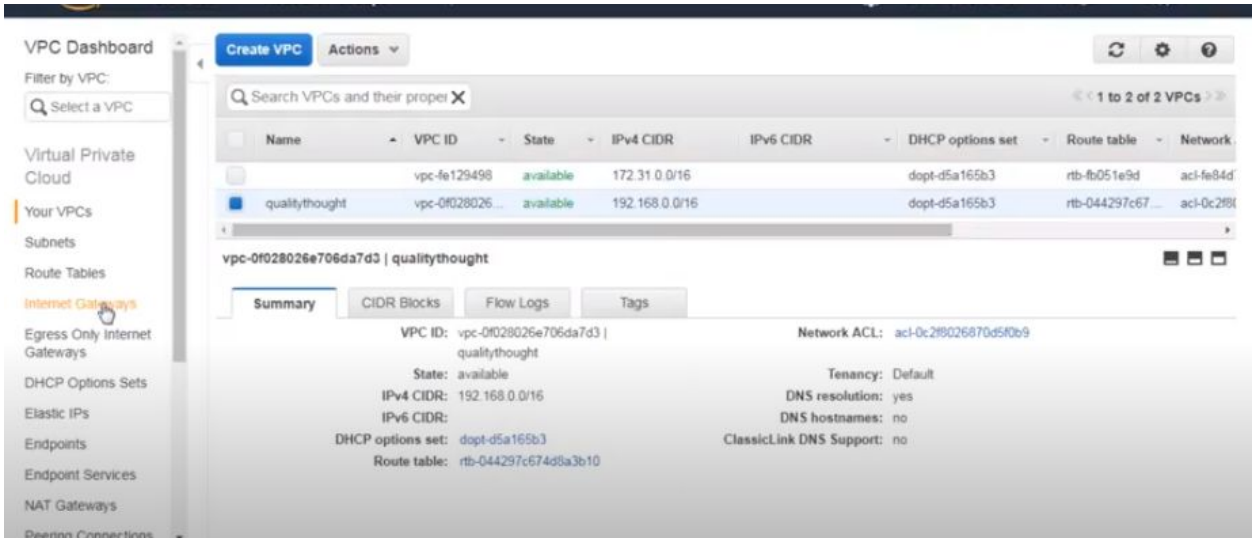
Nat server go in one direction only(nat server send packet to google.com and google.com will again response packet to nat server then nat convert it and send router we can get response

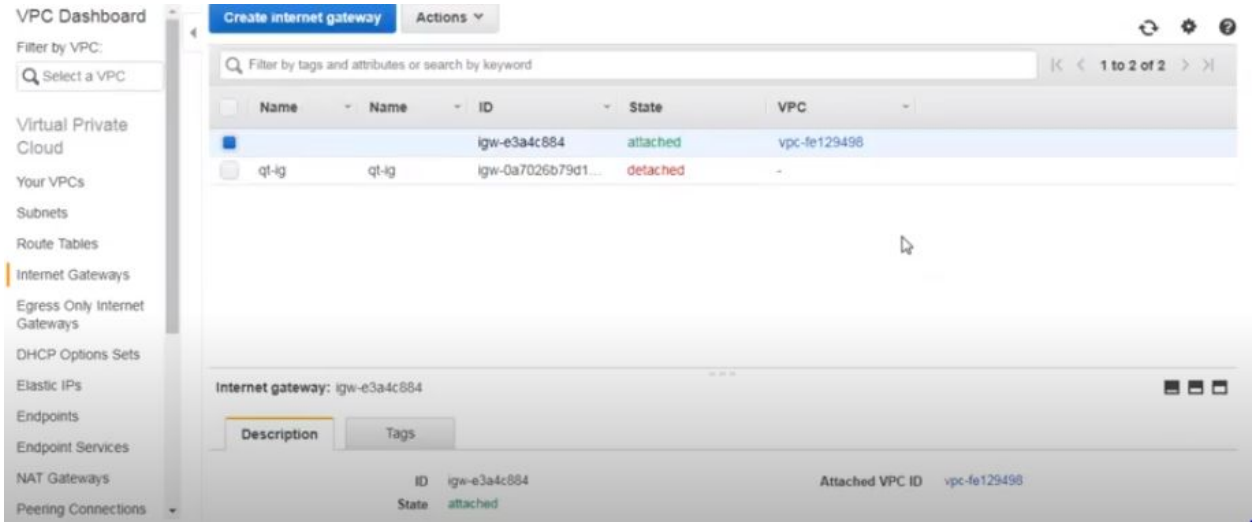


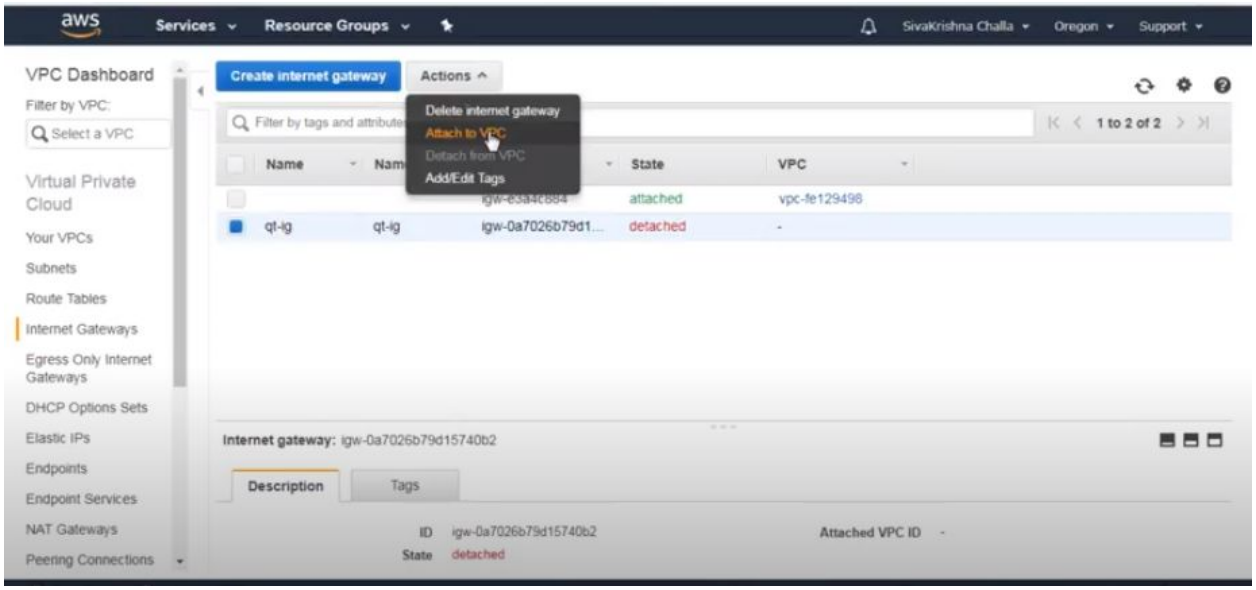
Packet travel trace windows and for linux we can use command traceroute

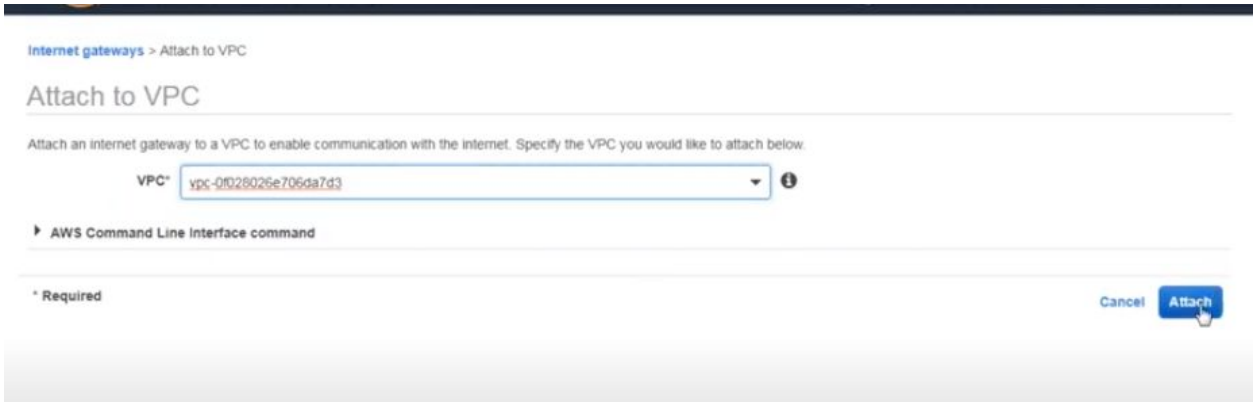
https://www.qualitythought.in/wp-content/uploads/2017/02/NetworkingBasics.pdf
https://www.qualitythought.in/wp-content/uploads/2017/02/VPC-Introduction.pdf
VPC

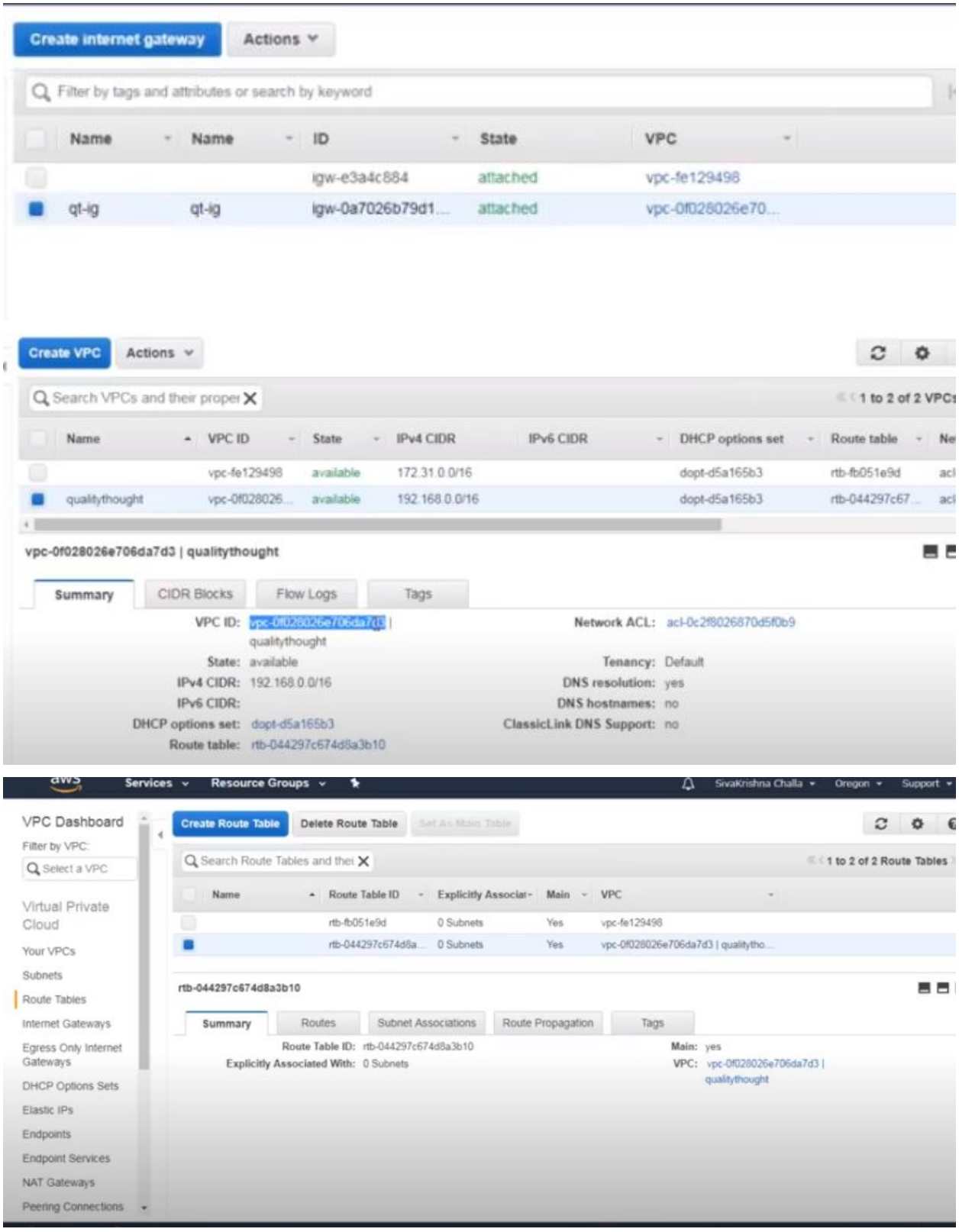

Services
Resource Groups
SivaKrishna Challa
Oregon
Support
VPC Dashboard
Filter by VPC:
Select a VPC
Virtual Private Cloud
Your VPCs
Subnets
Route Tables
Internet Gateways
Egress Only Internet Gateways
DHCP Options Sets
Elastic IPs
Endpoints
Endpoint Services
NAT Gateways
Peering Connections
Create VPC
Actions
Search VP
1 to 1 of 1 VPC
Name
Route table
Network
rtb-fb051e9d
acl-fe84d
Select a VPC at
Create VPC
A VPC is an isolated portion of the AWS cloud populated by AWS objects, such as Amazon EC2 instances. You must specify an IPv4 address range for your VPC. Specify the IPv4 address range as a Classless Inter-Domain Routing (CIDR) block; for example, 10.0.0.0/16. You cannot specify an IPv4 CIDR block larger than /16. You can optionally associate an Amazon-provided IPv6 CIDR block with the VPC.
Name tag
qualitythought
IPv4 CIDR block*
192.168.0.0/16
IPv6 CIDR block*
No IPv6 CIDR Block
Amazon provided IPv6 CIDR block
Tenancy
Default
Cancel
Yes, Create


VPC Dashboard
Filter by VPC:
Select a VPC
Virtual Private Cloud
Your VPCs
Subnets
Route Tables
Internet Gateways
Egress Only Internet Gateways
DHCP Options Sets
Elastic IPs
Endpoints
Endpoint Services
NAT Gateways
Create VPC
Actions
Search VPCs and their proper
1 to 2 of 2 VPCs
Name
VPC ID
State
IPv4 CIDR
IPv6 CIDR
DHCP options set
Route table
Network
vpc-fe129498
available
172.31.0.0/16
dopt-d5a165b3
rtb-fb051e9d
acl-fe84d
qualitythought
vpc-0f028026...
available
192.168.0.0/16
dopt-d5a165b3
rtb-044297c67...
acl-0c2f8
vpc-0f028026e706da7d3 | qualitythought
Summary
CIDR Blocks
Flow Logs
Tags
VPC ID: vpc-0f028026e706da7d3 | qualitythought
State: available
IPv4 CIDR: 192.168.0.0/16
IPv6 CIDR:
DHCP options set: dopt-d5a165b3
Route table: rtb-044297c674d8a3b10
Network ACL: acl-0c2f8026870d5f0b9
Tenancy: Default
DNS resolution: yes
DNS hostnames: no
ClassicLink DNS Support: no

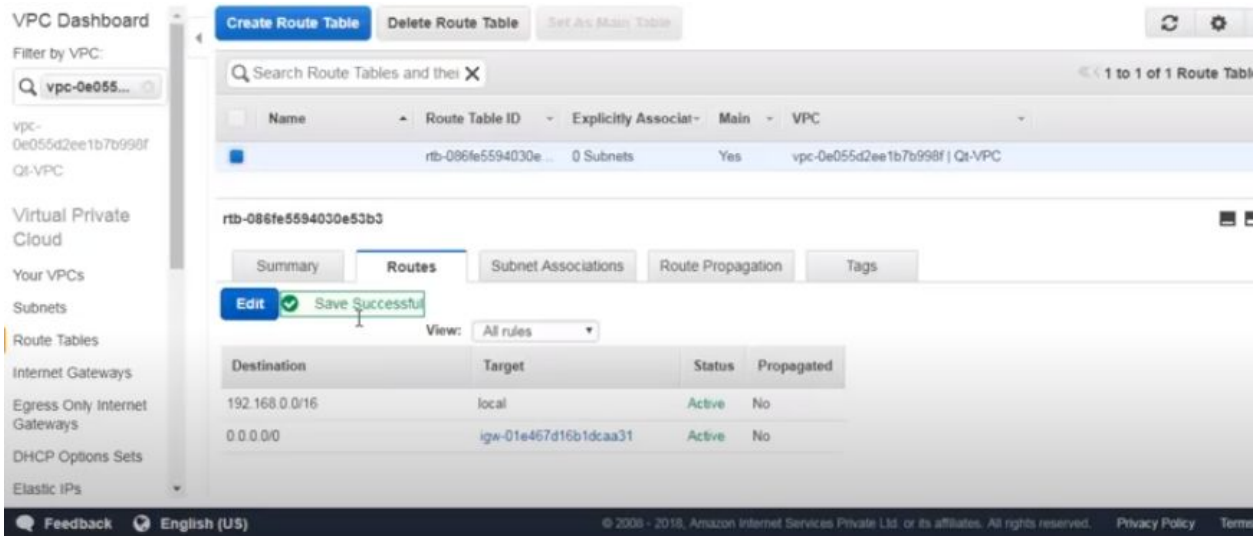

VPC Dashboard
Filter by VPC:
Select a VPC
Virtual Private Cloud
Your VPCs
Subnets
Route Tables
Internet Gateways
Egress Only Internet Gateways
DHCP Options Sets
Elastic IPs
Endpoints
Endpoint Services
NAT Gateways
Peering Connections
Create internet gateway
Actions
Filter by tags and attributes or search by keyword
1 to 2 of 2
Name
Name
ID
State
VPC
igw-e3a4c884
attached
vpc-fe129498
qt-ig
qt-ig
igw-0a7026b79d1...
detached
-
Internet gateway: igw-e3a4c884
Description
Tags
ID
igw-e3a4c884
State
attached
Attached VPC ID
vpc-fe129498


aws
Services
Resource Groups
SivaKrishna Challa
Oregon
Support
VPC Dashboard
Filter by VPC:
Select a VPC
Virtual Private Cloud
Your VPCs
Subnets
Route Tables
Internet Gateways
Egress Only Internet Gateways
DHCP Options Sets
Elastic IPs
Endpoints
Endpoint Services
NAT Gateways
Peering Connections
Create internet gateway
Actions
Delete internet gateway
Attach to VPC
Detach from VPC
Add/Edit Tags
1 to 2 of 2
Name
State
VPC
attached
vpc-fe129498
qt-ig
qt-ig
igw-0a7026b79d1...
detached
-
Internet gateway: igw-0a7026b79d15740b2
Description
Tags
ID
igw-0a7026b79d15740b2
State
detached
Attached VPC ID
-


Internet gateways > Attach to VPC
Attach to VPC
Attach an internet gateway to a VPC to enable communication with the internet. Specify the VPC you would like to attach below.
VPC*
vpc-0f028026e706da7d3
AWS Command Line Interface command
* Required
Cancel
Attach

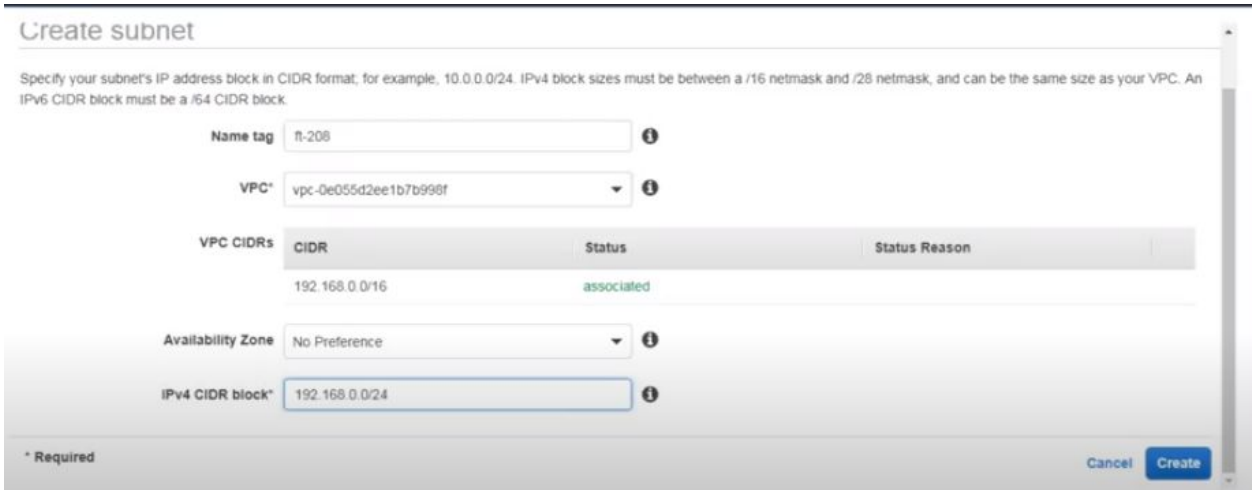


By default when we create vpc amazon create route table

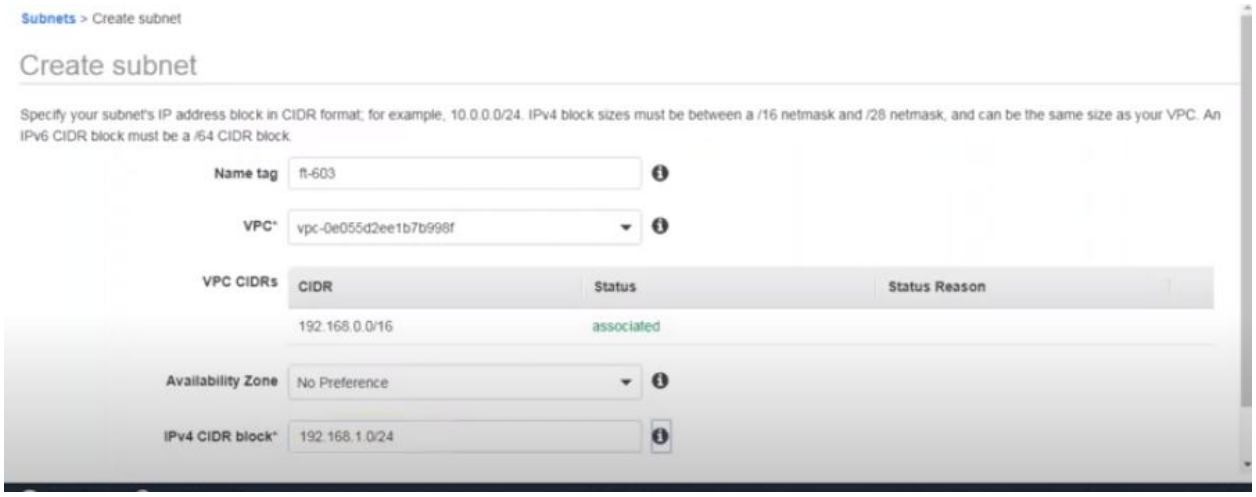


Add edit route table 0.0.0.0 to internet gateway

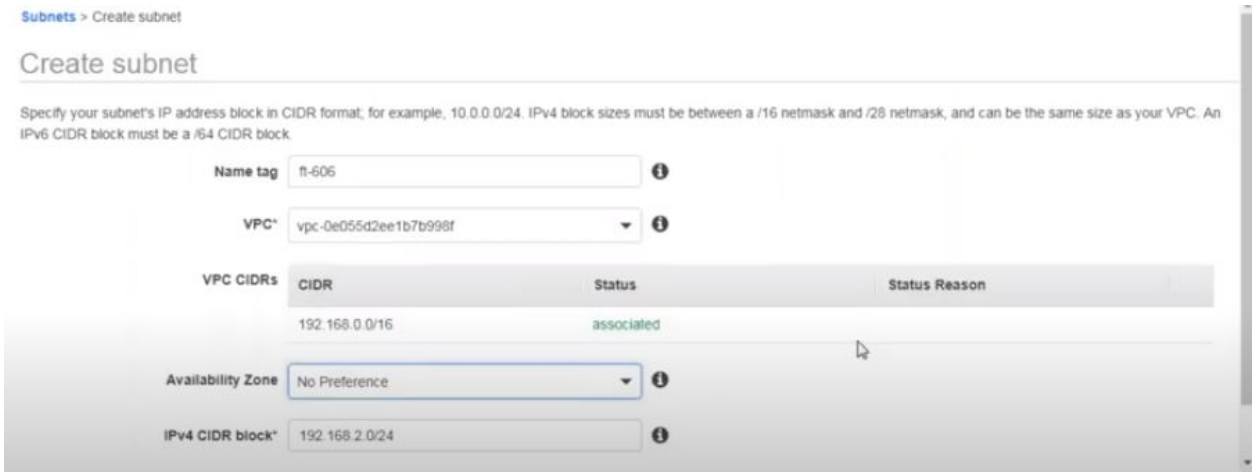
Create Subnet 1



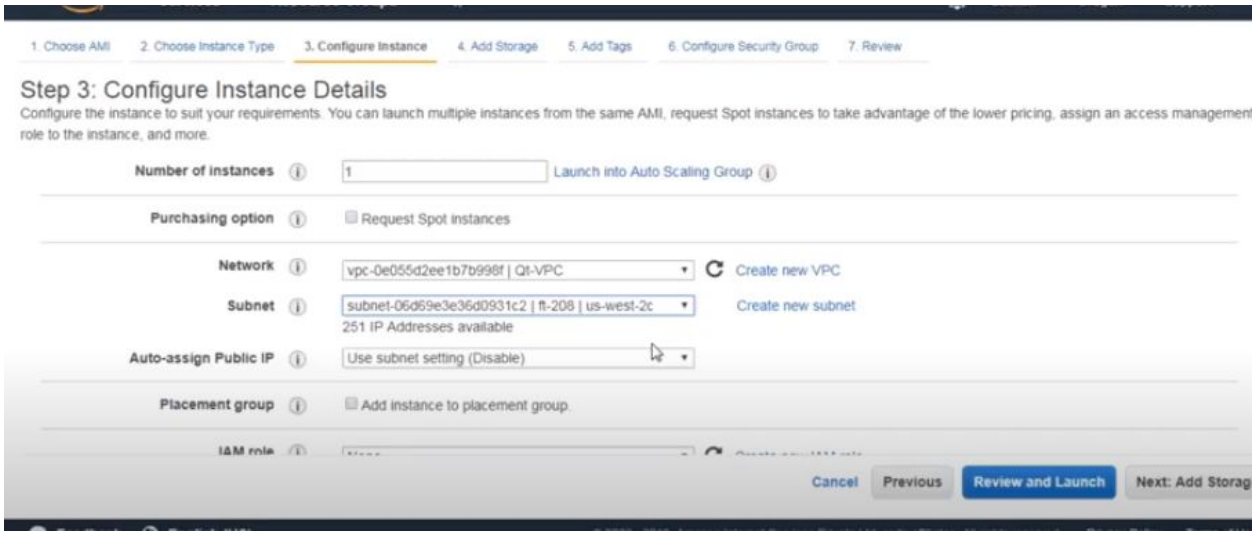
Subnet 2



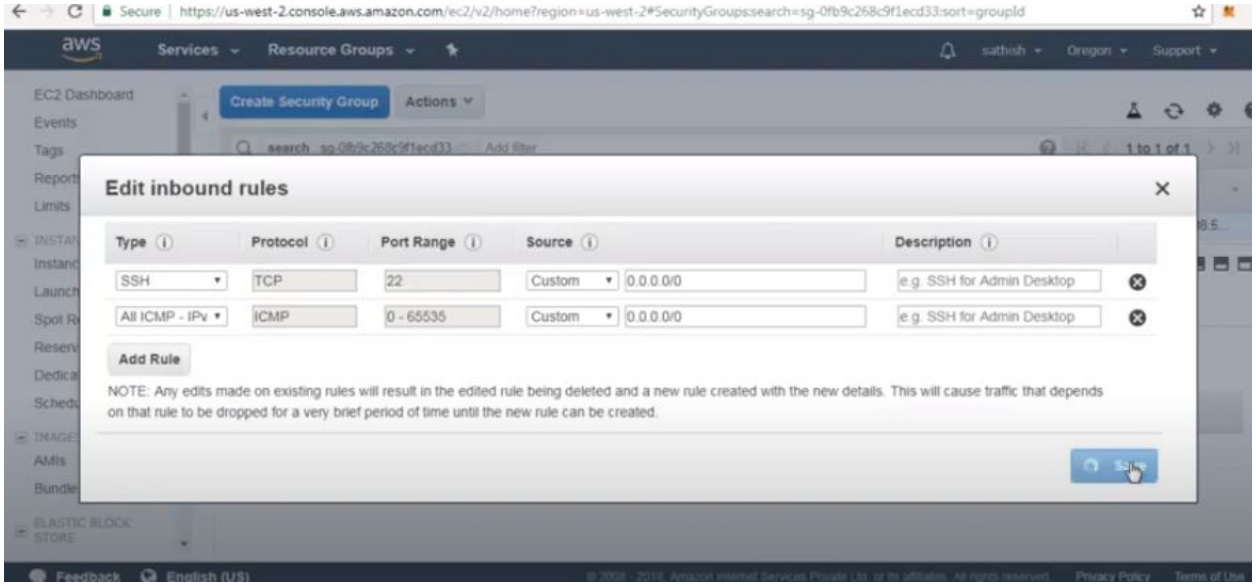
Subnet 3



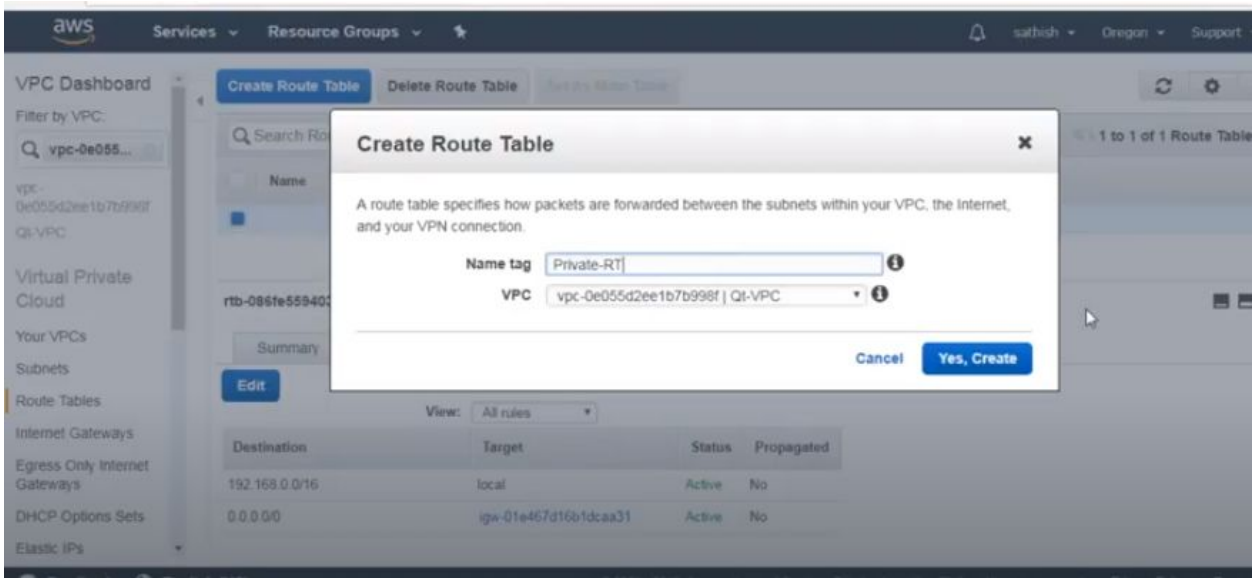
If main is yes in route table(no association) then all subnet connect to default route table
Now launch ec2 instance (select vpc and subnet 208 as per example and Enable auto assign public ip address)



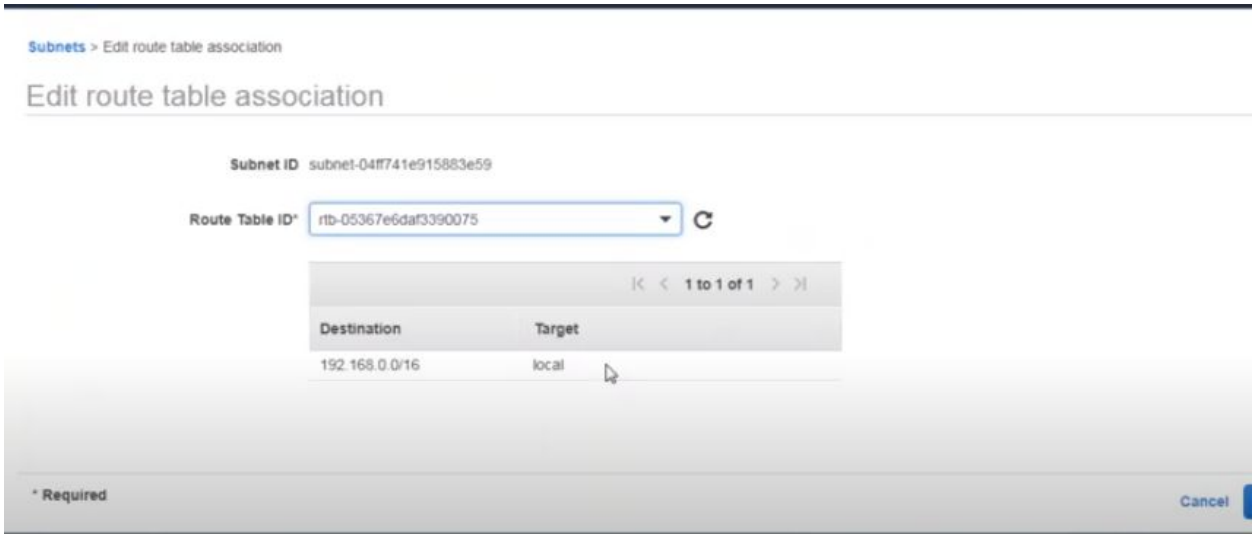
Icmp security group use for allow ping from outside



Private route Table (main is No)

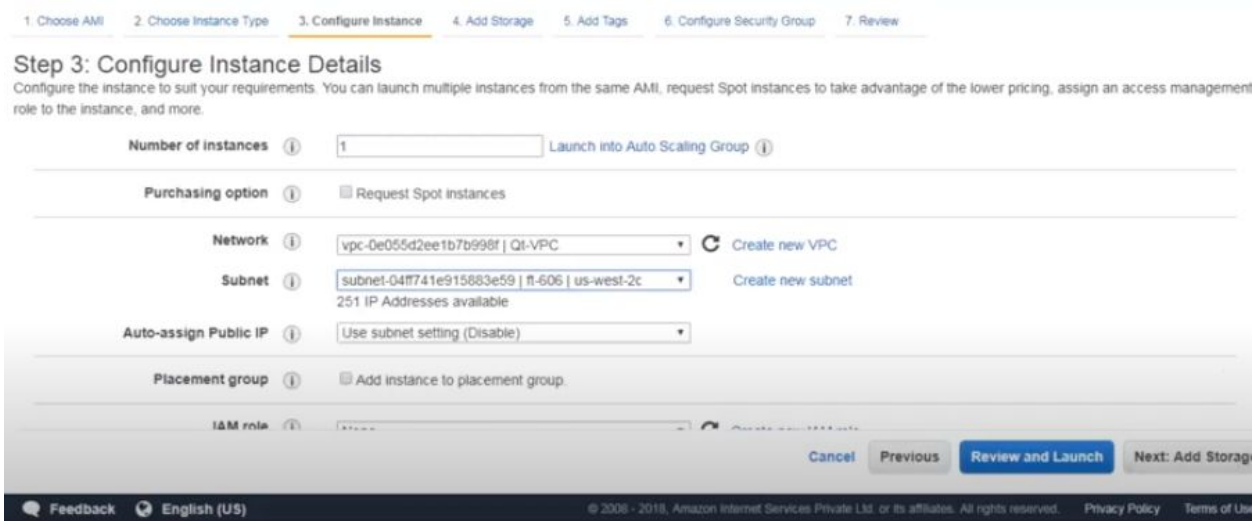


Edit private subnet route table association

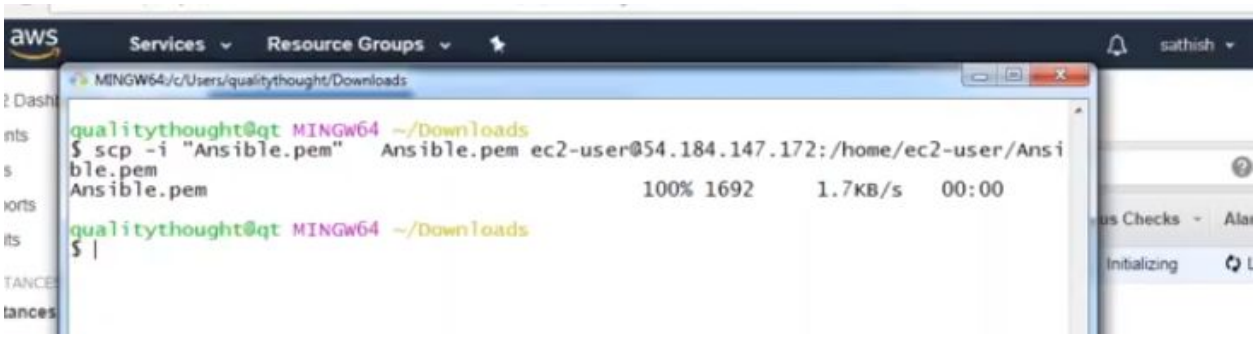


Same as do for another private subnet

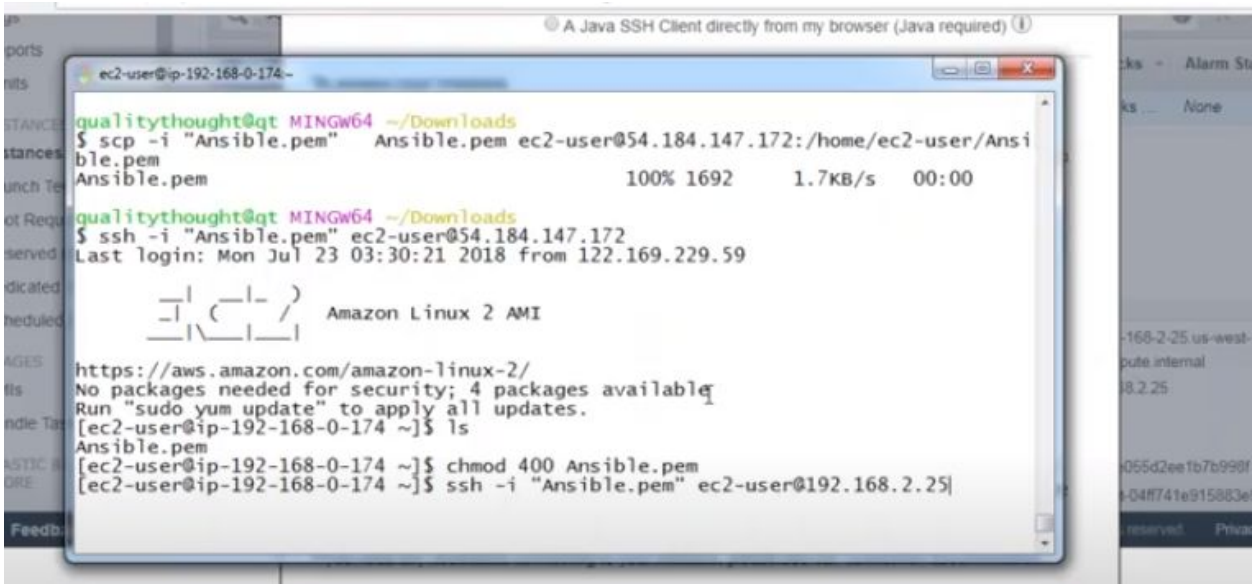
Now launch ec2 for both private subnet



So to login private subnet ec2 machine we need to be inside public subnet ec2 machine and try to connect so now login public subnet ec2 machine
And test with ping ip of ec2 of private subnet machine
To transfer pem key file command



Chmod 400 key



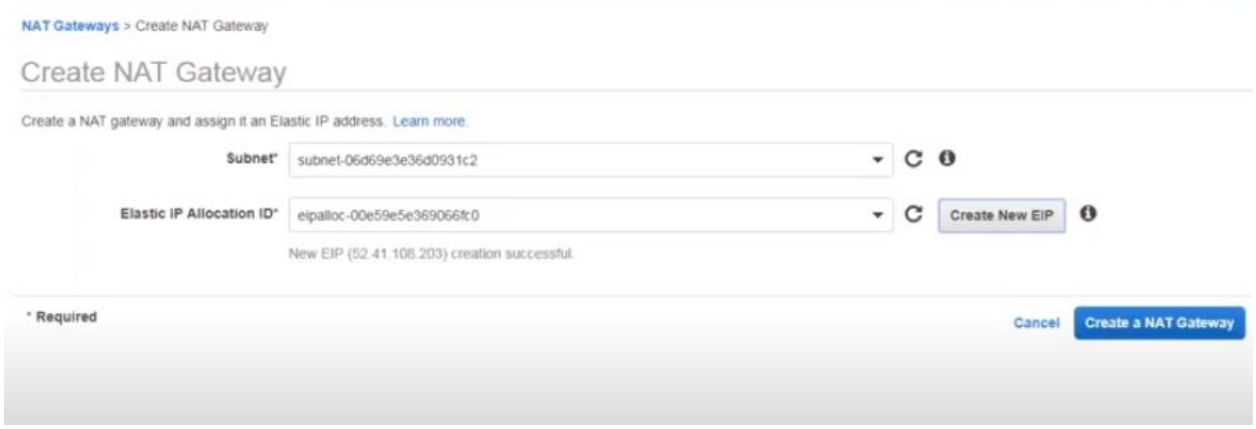
A machine which is present in public subnet and helps to connect private subnet is called
In azure jump box and in aws it's called a bastion server.

We can not access internet as of now in private subnet ec2 machine now we need to solve it
By using NAT Gateway so private subnet will get internet but can not access from outside world.
In aws two way to create nat server

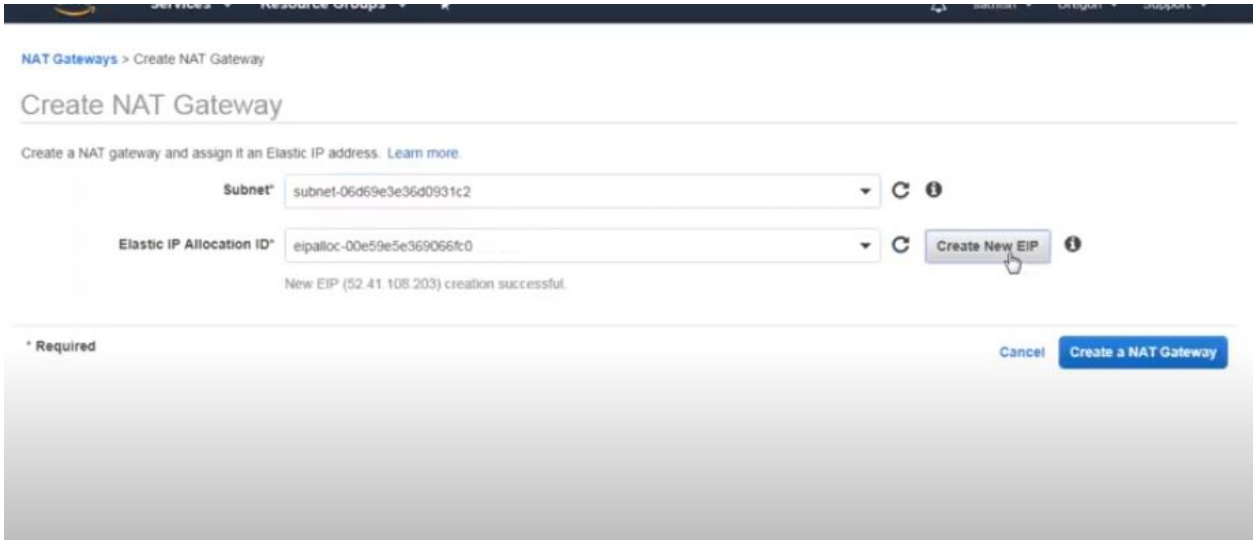
1. Create ec2 instance and install nat software(older)
2. Nat gateway (latest approach)

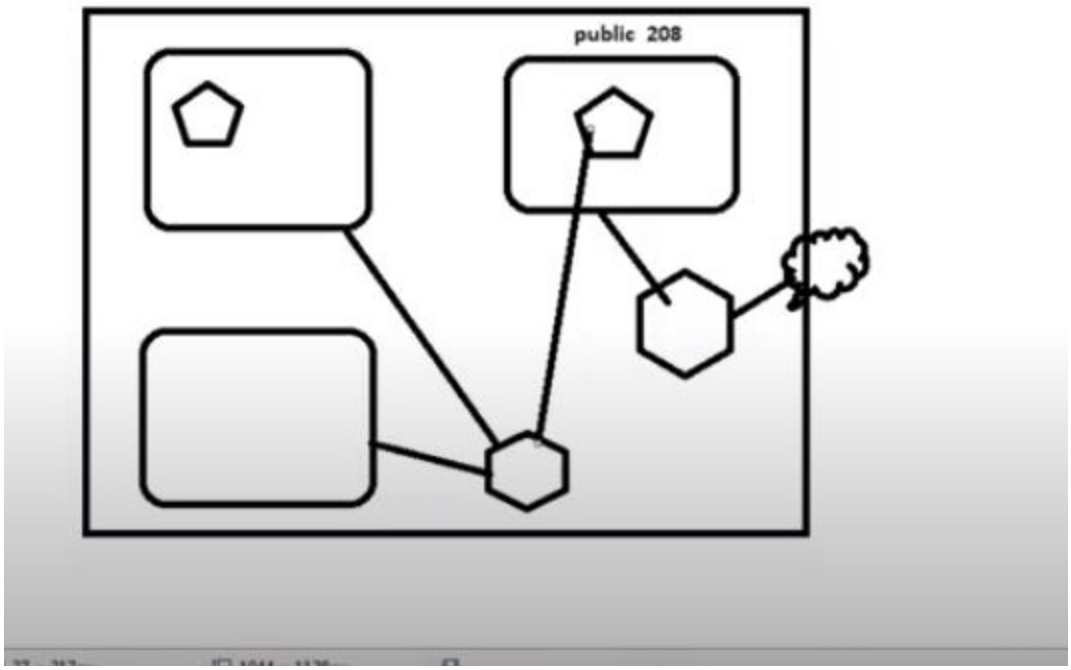
Create nat gateway

Identify the above subnet id so it easy to find out public subnet
Also remember for nat gateway we need to have static ip(in amazon its called elastic ip)



Now in route table private route edit and add 0.0.0.0/0 with nat gateway



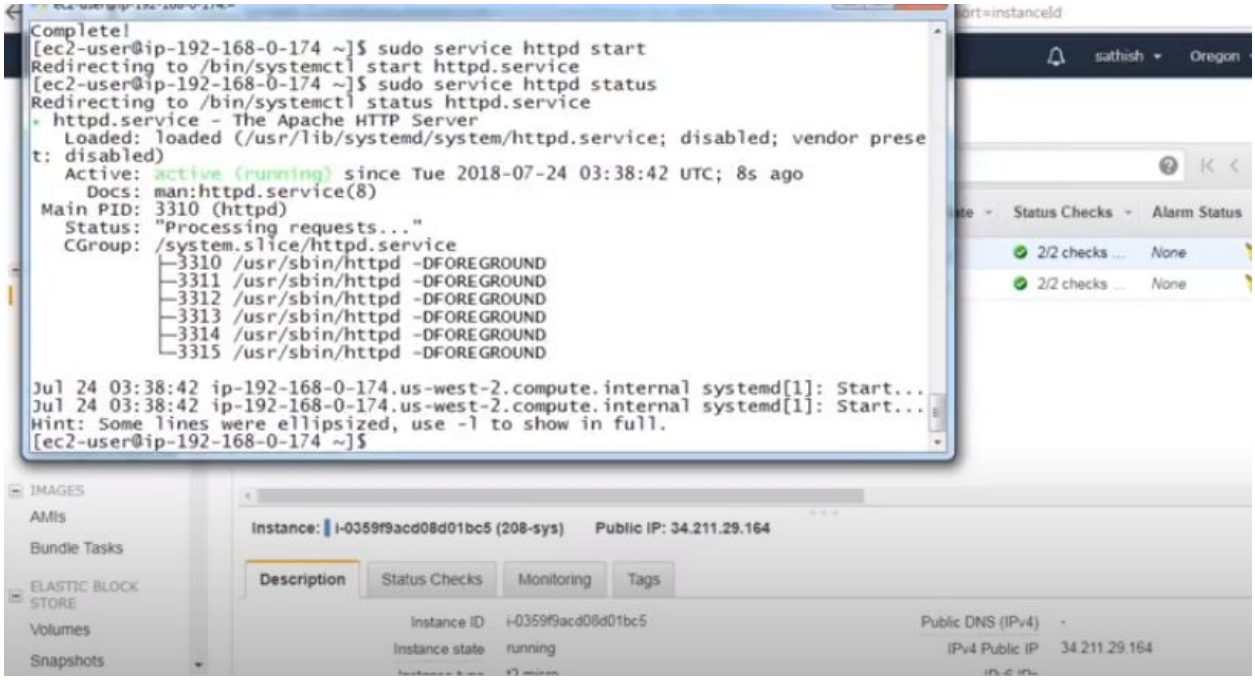


Vpc diagram

Nat is managed by amazon so there is no down time and Elastic ip is chargeable if you are not using.because we are block particular ip.

Proxy server: proxy server will use if packet need it will transfer or else it will block packet

Now let us install apache in public ec2



Security group:

Everything is closed in ec2 machine ,inbound incoming traffic and outbound is traffic out goingt

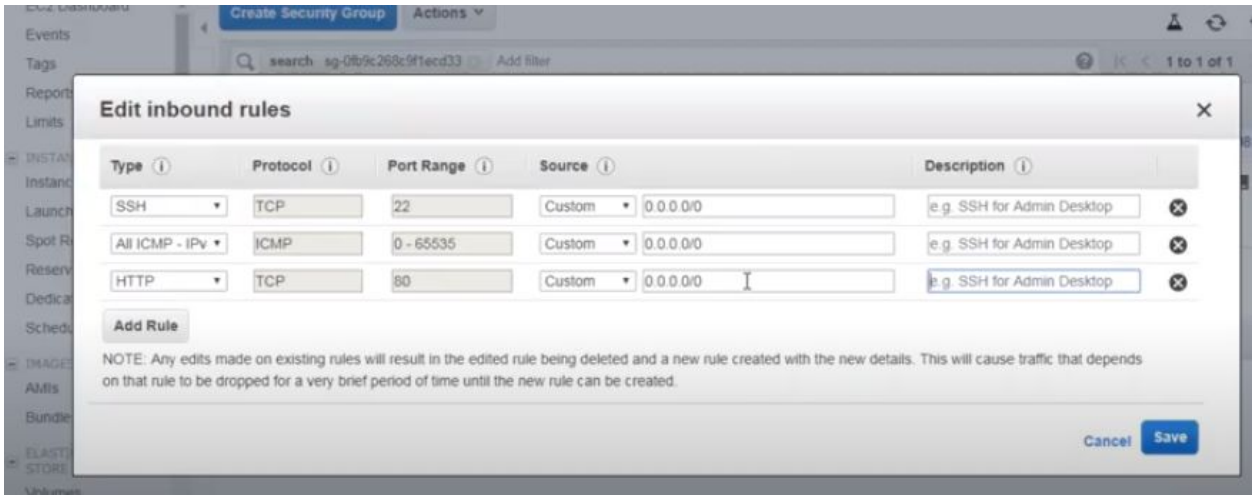
What ever you see it open remaining all port closed

Restriction are generally on network id not on host id

35.35.35.35/0 no network id or we can write like 0.0.0.0/0

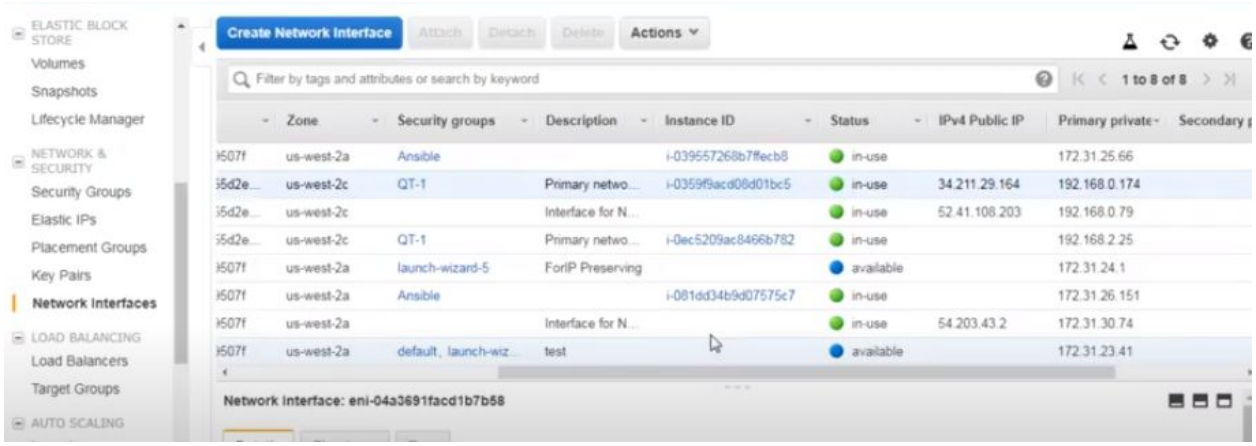
35.35.35.35/32 means complete network id only one ip address

35.35.x.y/16 means allow any of the ip from the pool



Network interface which is create when security group created

s



You can create flow logs on your resources to capture IP traffic flow information for the network interfaces for your resources

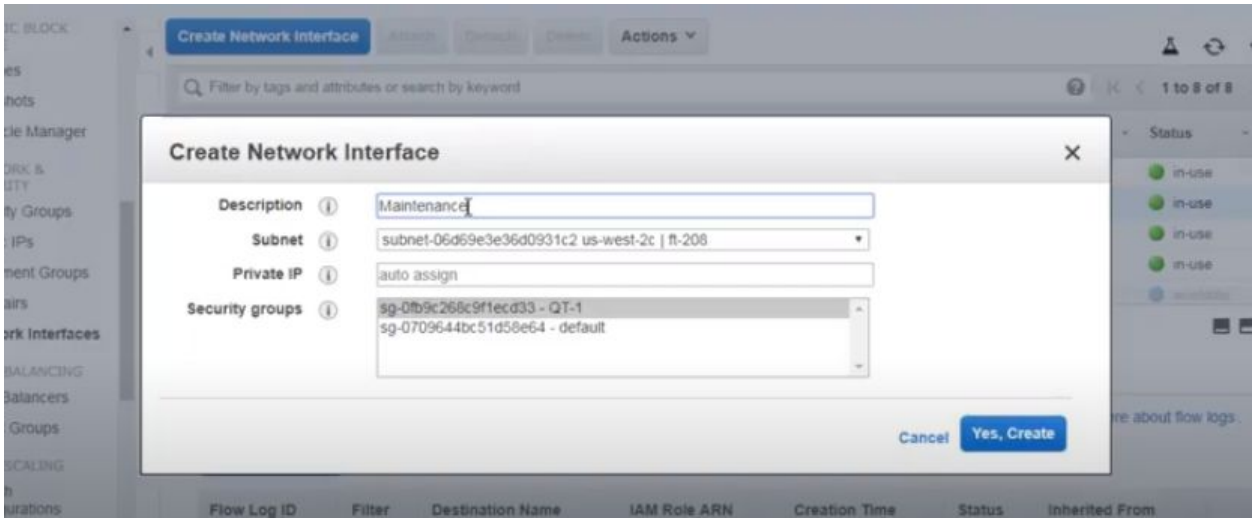
We can create flow logs in the network interface.

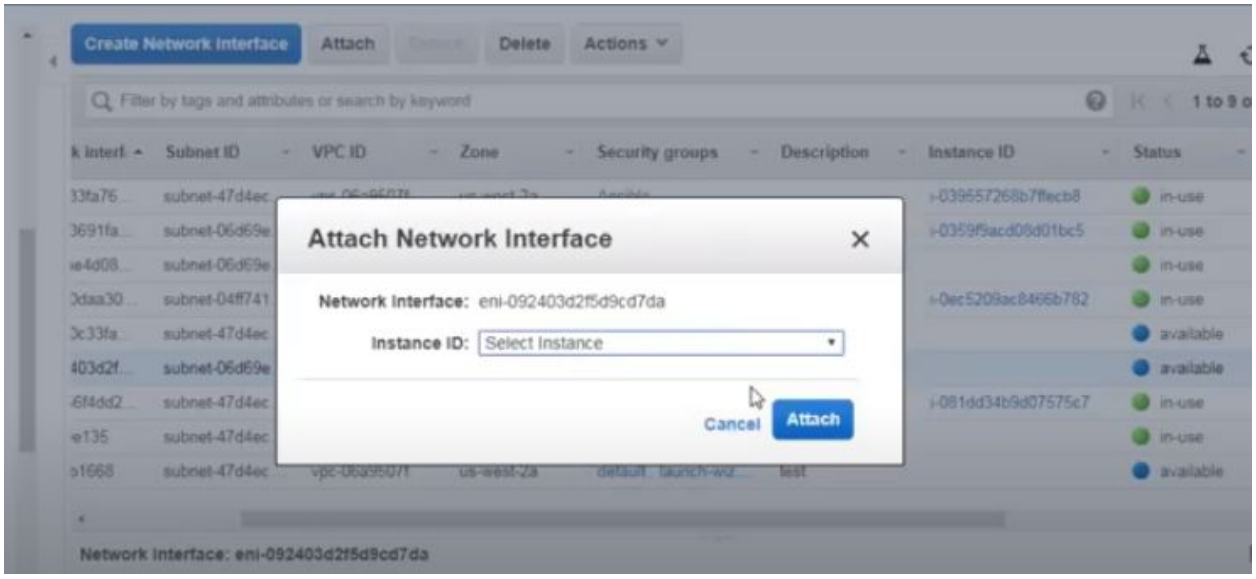
Your system can have multiple network interfaces and multiple ip.

We can not change the security group but we can change the rules and we can only kill the security group.

So for high availability of servers we can disassociate network interfaces and associate with other systems so there will be less down time.

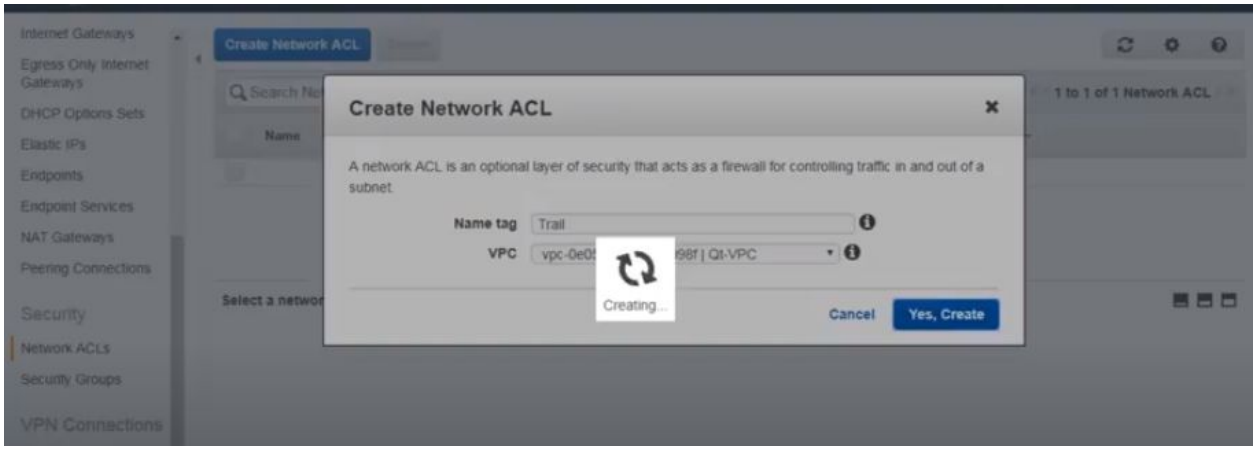
We can create a network interface and you should know what is your vpc and availability zone.



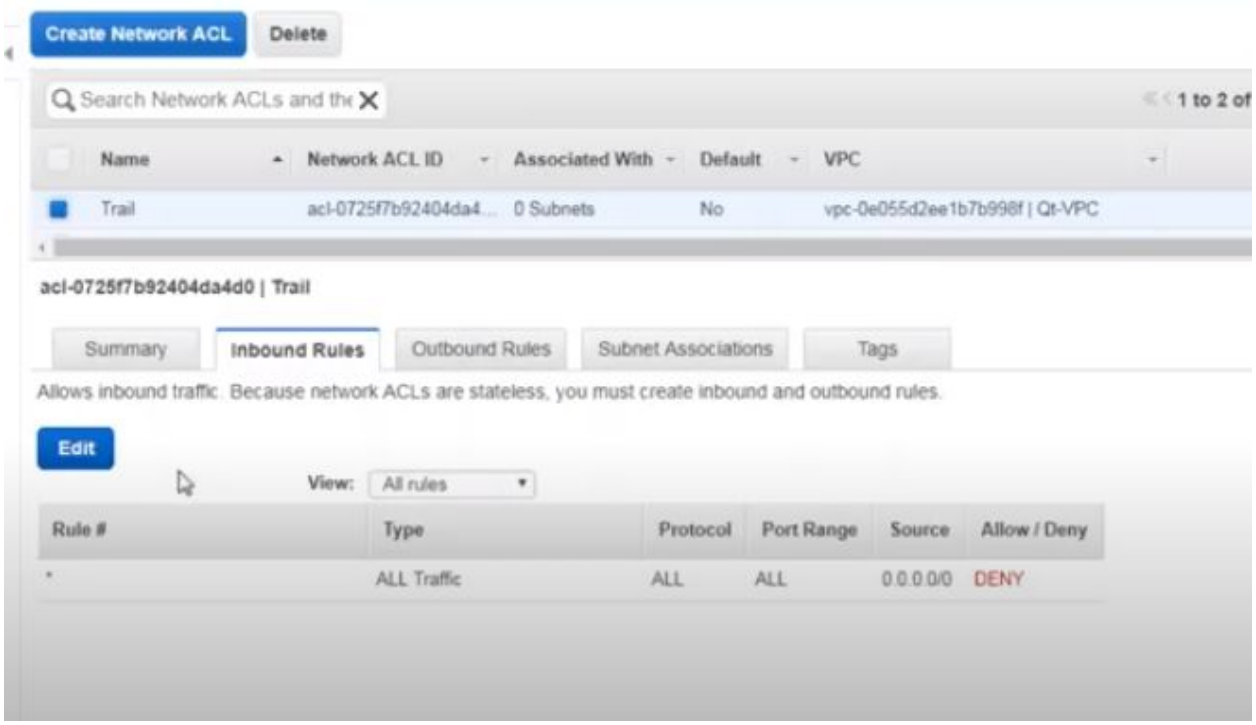


Security group(stateful) we are giving to the network interface so we can secure our ec2 instance so we can deny service attacks for unnecessary traffic .in sg we need only inbound setup.

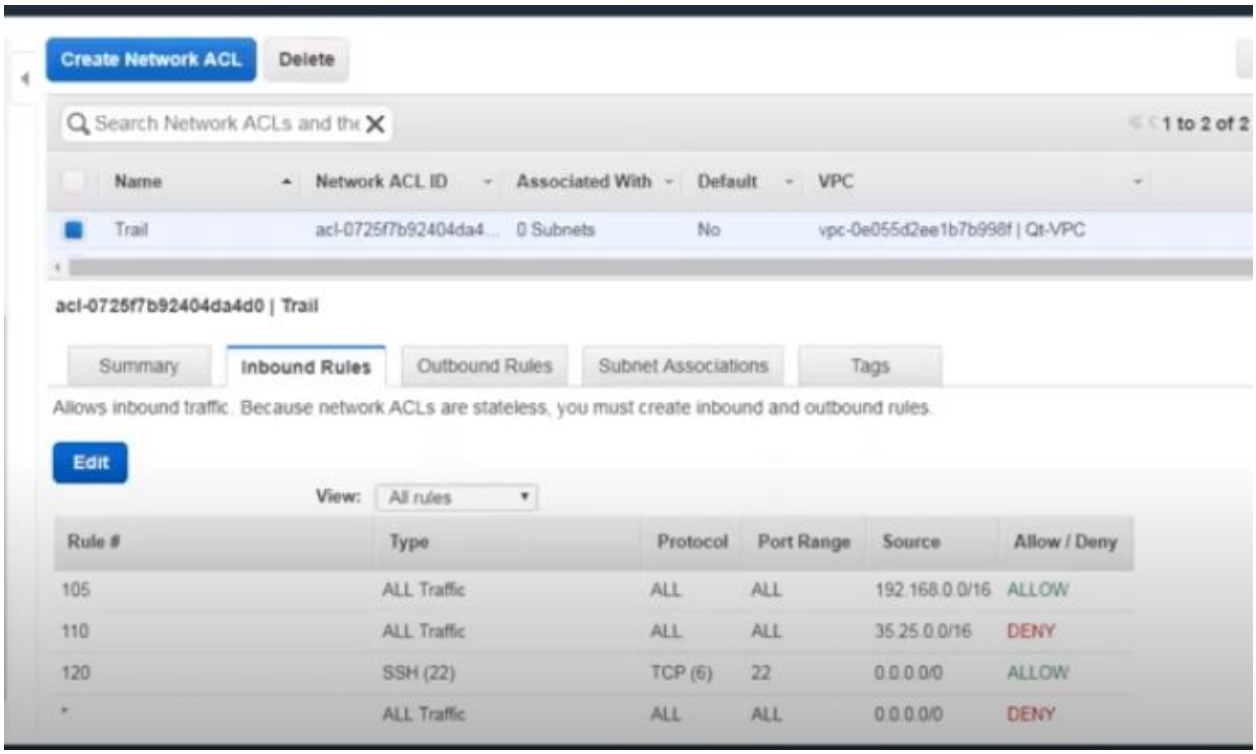
NACL(stateless) network access control list which operate security in subnet level
So the 1st layer network interface for which we have a security group,here we write rules to only allow.
The 2nd layer is the subnet for which we use NACL,here we write rules for both allow and deny.,for nacl we need to setup both inbound and outbound

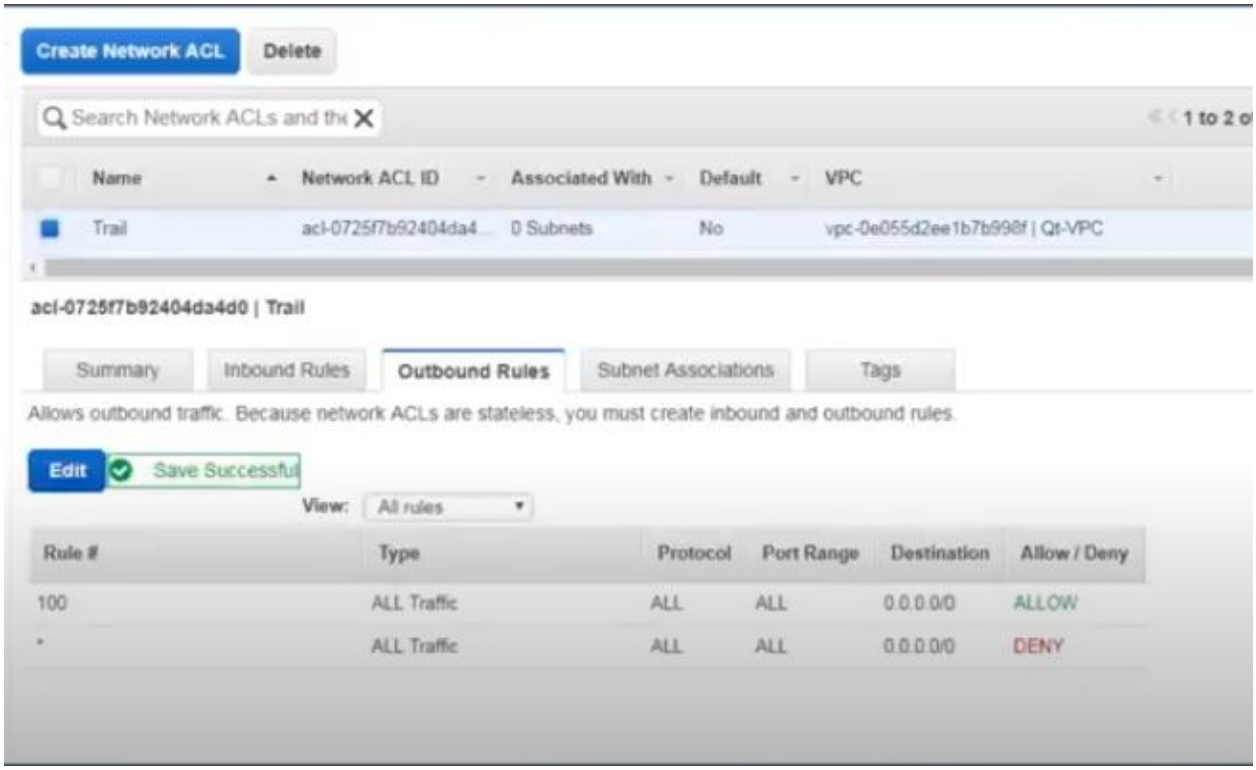


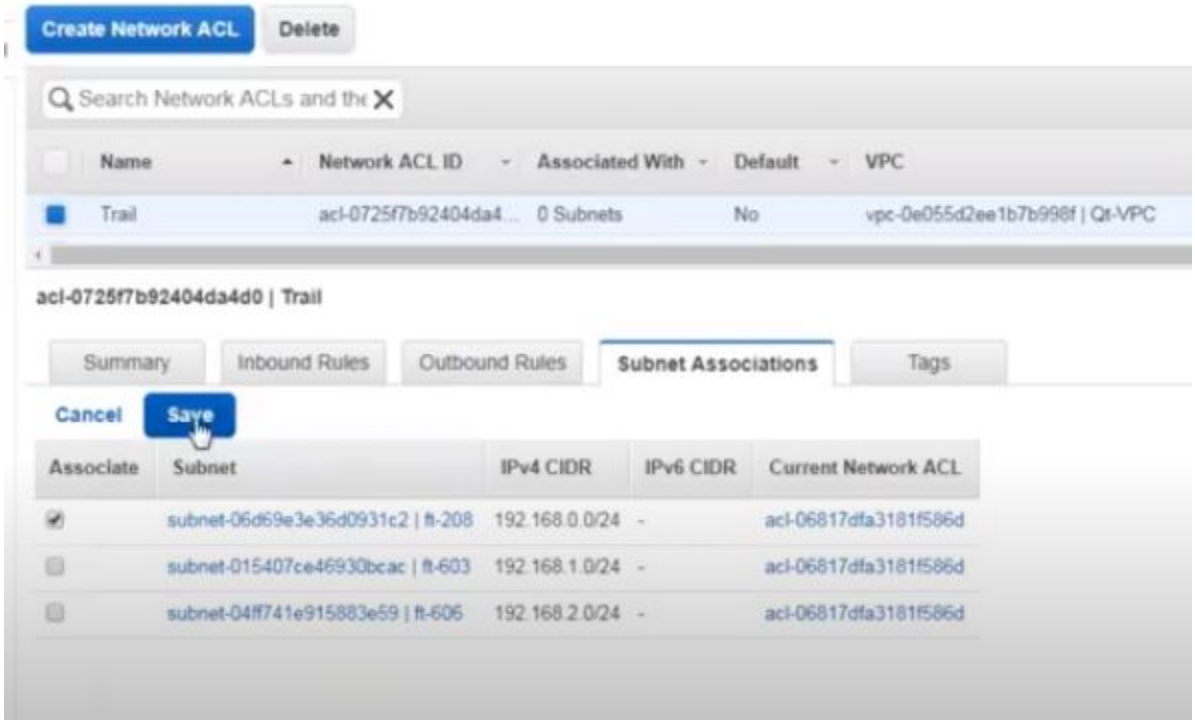
Rule will have priority based on number,lower the number higher the priority



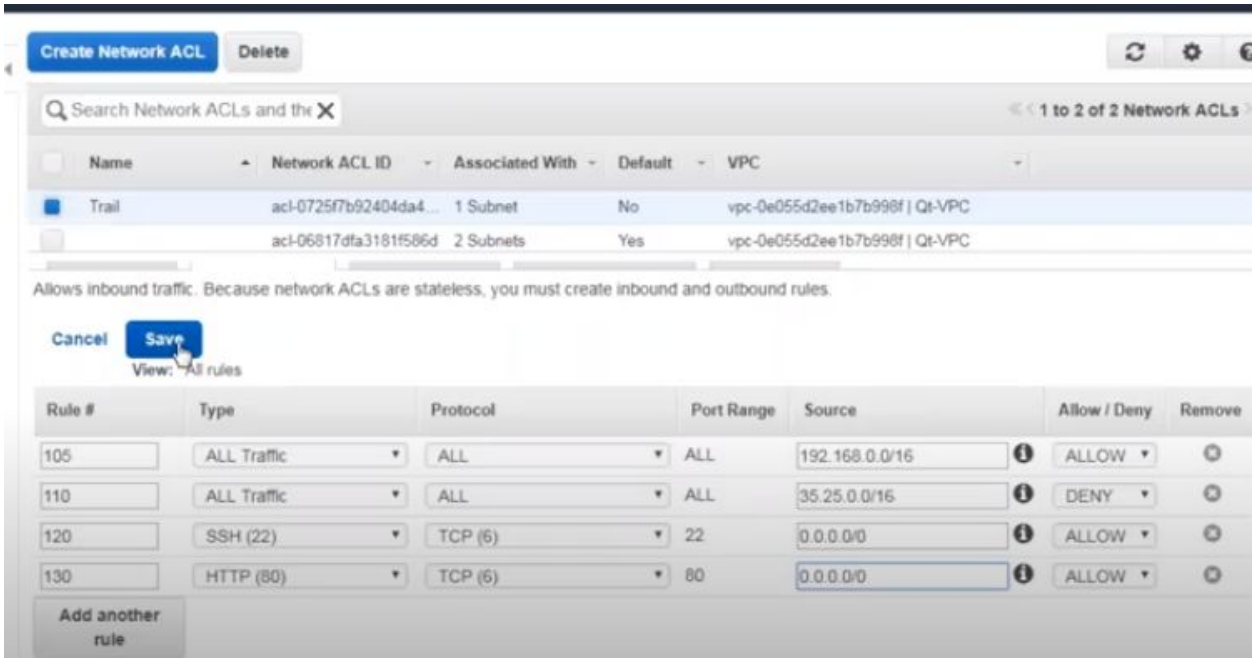
We can restrict traffic from particular ip which is unwanted for denial of service attack


Create Network ACL
Delete
Search Network ACLs and the
1 to 2 of 2
Name
Network ACL ID
Associated With
Default
VPC
Trail
acl-0725f7b92404da4...
0 Subnets
No
vpc-0e055d2ee1b7b998f | Qt-VPC
acl-0725f7b92404da4d0 | Trail
Summary
Inbound Rules
Outbound Rules
Subnet Associations
Tags
Allows inbound traffic. Because network ACLs are stateless, you must create inbound and outbound rules.
Edit
View:
All rules
Rule #
Type
Protocol
Port Range
Source
Allow / Deny
105
ALL Traffic
ALL
ALL
192.168.0.0/16
ALLOW
110
ALL Traffic
ALL
ALL
35.25.0.0/16
DENY
120
SSH (22)
TCP (6)
22
0.0.0.0/0
ALLOW
*
ALL Traffic
ALL
ALL
0.0.0.0/0
DENY


Create Network ACL
Delete
Search Network ACLs and the
1 to 2 o
Name
Network ACL ID
Associated With
Default
VPC
Trail
acl-0725f7b92404da4...
0 Subnets
No
vpc-0e055d2ee1b7b998f | Qt-VPC
acl-0725f7b92404da4d0 | Trail
Summary
Inbound Rules
Outbound Rules
Subnet Associations
Tags
Allows outbound traffic. Because network ACLs are stateless, you must create inbound and outbound rules.
Edit
Save Successful
View:
All rules
Rule #
Type
Protocol
Port Range
Destination
Allow / Deny
100
ALL Traffic
ALL
ALL
0.0.0.0/0
ALLOW
*
ALL Traffic
ALL
ALL
0.0.0.0/0
DENY

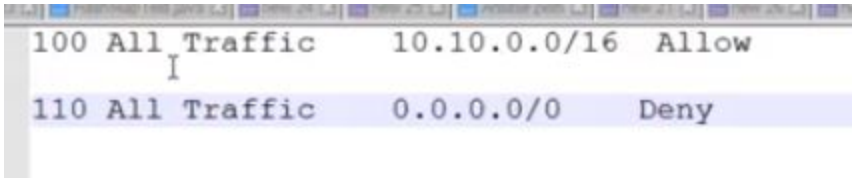


Subnet association



Default nacl is allow all both inbound and outbound(*)

Default security group is allow 22 port allow everything apart from that other block



here allow only 10. Network other all blocked