



NAME: VOMMIDAPU CHINNI

BATCH NO: 120

MAIL.ID: vommidapuchinni@gmail.com

DATE: 25/02/24

TRAINER: Mr. Madhukar

ASSIGNMENT – 2

1. Create transit gateway in two different accounts?

Transit Gateway is a service that facilitates connectivity between two and more Virtual Private Clouds (vpc) in same or different regions or different accounts.

Create transit gateway in two different accounts we need to follow several steps in both different accounts :

1. Create VPC.
2. Create subnet and internet gateway.
3. Create route tables and associate their subnets.
4. Create transit gateway and their attachments.
5. Create static route in transit gateway route table.
6. Launch EC2 instance.

Step 1: In first account in California region, second account in Virginia.

Step 2: Create VPC in California and Virginia.

1. Search VPC, open VPC dash board.
2. Click on create VPC.
3. Give name and IPV4 CIDR as 15.0.0.0/16.
4. Create VPC.

❖ VPC in California:

The screenshot shows the 'Create VPC' page in the AWS console for the us-east-1 region. The page title is 'Create VPC' with an 'info' link. Below the title, a description states: 'A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.' The 'VPC settings' section contains the following fields:

- Resources to create:** Two radio buttons are present: 'VPC only' (selected) and 'VPC and more'.
- Name tag - optional:** A text input field containing 'my-VPC-1'. A note below states: 'Creates a tag with a key of 'Name' and a value that you specify.'
- IPv4 CIDR block:** Two radio buttons are present: 'IPv4 CIDR manual input' (selected) and 'IPAM-allocated IPv4 CIDR block'. Below is a text input field for 'IPv4 CIDR' containing '15.0.0.0/16'. A note below states: 'CIDR block size must be between /16 and /28.'
- IPv6 CIDR block:** Three radio buttons are present: 'No IPv6 CIDR block' (selected), 'IPAM-allocated IPv6 CIDR block', and 'Amazon-provided IPv6 CIDR block'.

The footer of the console shows 'CloudShell', 'Feedback', and copyright information for Amazon Web Services, Inc. or its affiliates.

❖ VPC in Virginia:

Give IPV4 CIDR as 16.0.0.0/16.

The screenshot shows the 'Create VPC' page in the AWS console for the us-west-1 region. The page title is 'Create VPC' with an 'info' link. Below the title, a description states: 'A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.' The 'VPC settings' section contains the following fields:

- Resources to create:** Two radio buttons are present: 'VPC only' (selected) and 'VPC and more'.
- Name tag - optional:** A text input field containing 'my-VPC-1'. A note below states: 'Creates a tag with a key of 'Name' and a value that you specify.'
- IPv4 CIDR block:** Two radio buttons are present: 'IPv4 CIDR manual input' (selected) and 'IPAM-allocated IPv4 CIDR block'. Below is a text input field for 'IPv4 CIDR' containing '16.0.0.0/16'. A note below states: 'CIDR block size must be between /16 and /28.'
- IPv6 CIDR block:** Four radio buttons are present: 'No IPv6 CIDR block' (selected), 'IPAM-allocated IPv6 CIDR block', 'Amazon-provided IPv6 CIDR block', and 'IPv6 CIDR owned by me'.

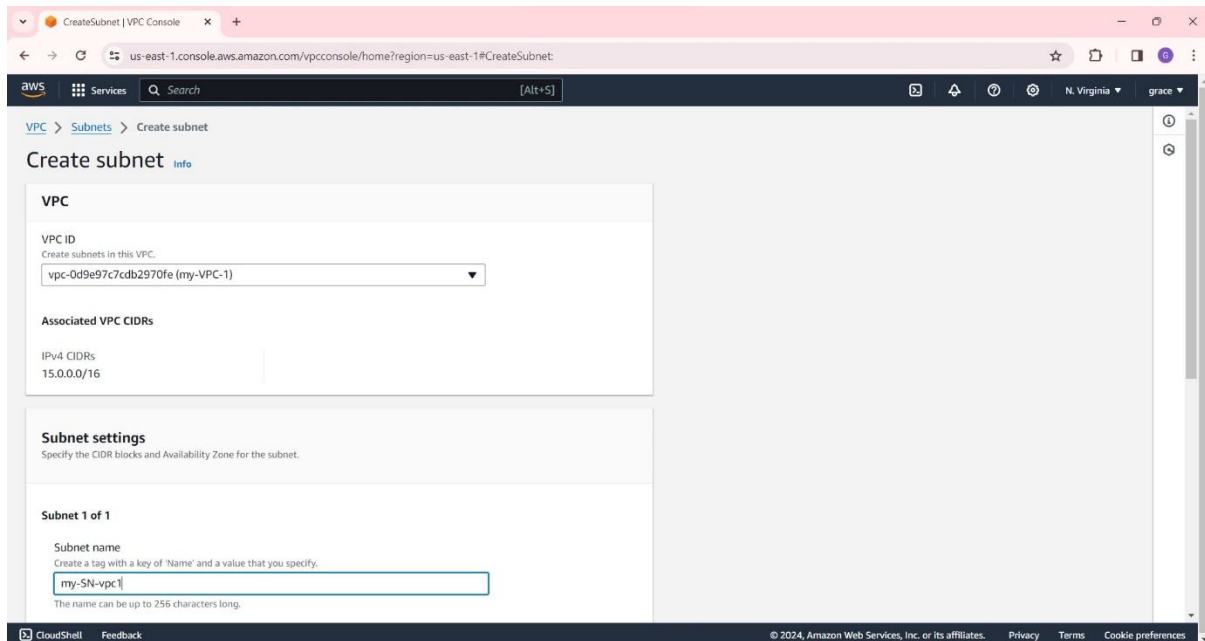
The footer of the console shows 'CloudShell', 'Feedback', and copyright information for Amazon Web Services, Inc. or its affiliates. The browser's taskbar at the bottom shows the date as 01-03-2024 and time as 12:26.

Step 3: Create subnet

In VPC dashboard click on subnet.

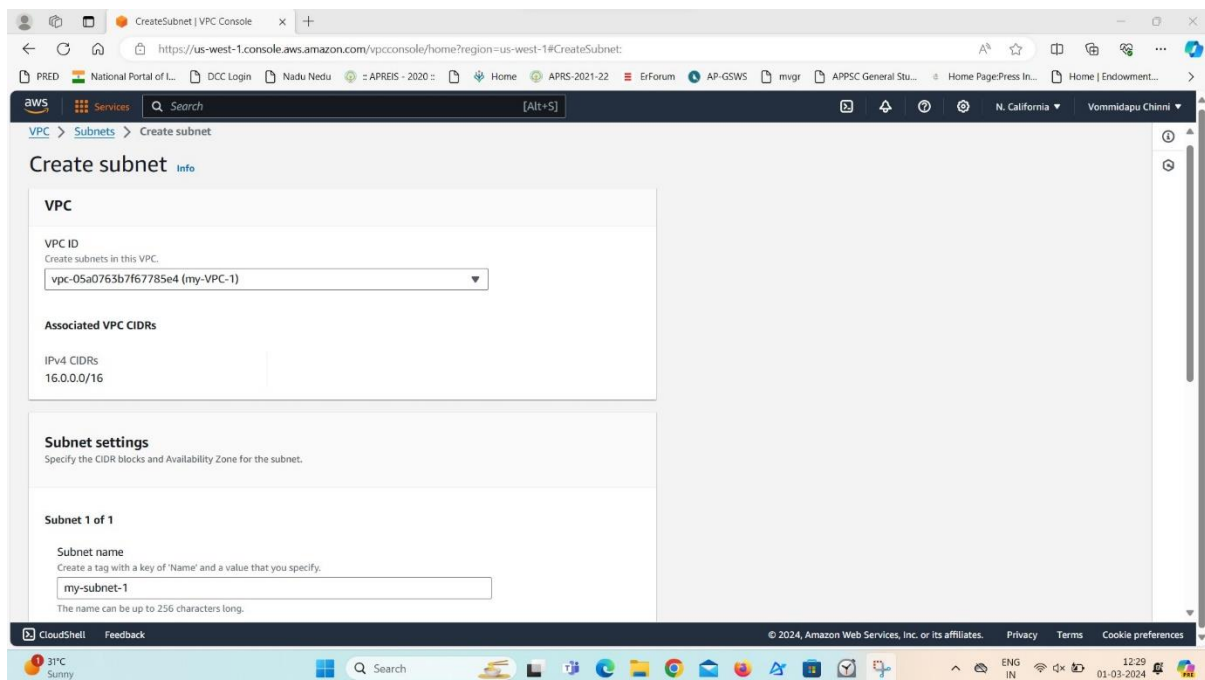
Select VPC ID and name the subnet and give IP as 15.0.0.0/24

❖ Subnet in California:



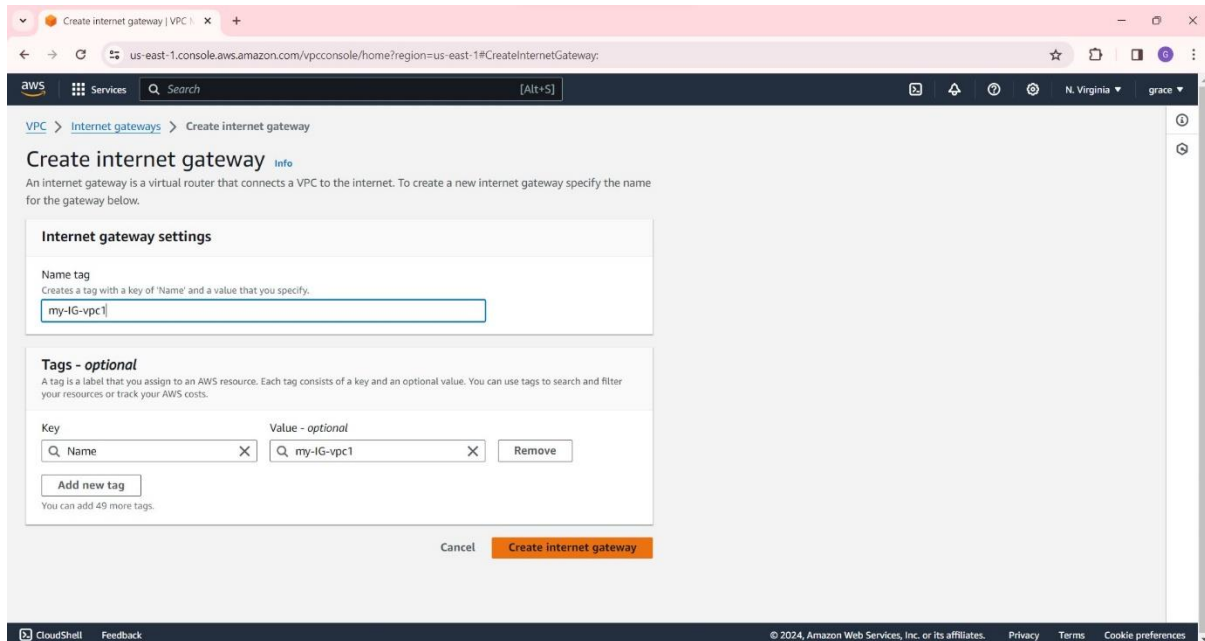
❖ Subnet in Virginia:

Subnet IP as 16.0.0.0/24.



Step 4: Create Internet Gateway and attach to VPC's.

❖ Internet Gateway in California.



The screenshot shows the 'Create internet gateway' page in the AWS Management Console. The breadcrumb navigation is 'VPC > Internet gateways > Create internet gateway'. The page title is 'Create internet gateway' with an 'Info' link. A descriptive text states: 'An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.' The 'Internet gateway settings' section contains a 'Name tag' field with the value 'my-ig-vpc1'. Below this is the 'Tags - optional' section, which includes a table with one tag: 'Name' as the key and 'my-ig-vpc1' as the value. There is a 'Remove' button next to the tag and an 'Add new tag' button. At the bottom of the form are 'Cancel' and 'Create internet gateway' buttons.

Create internet gateway | VPC | x +

us-east-1.console.aws.amazon.com/vpconsole/home?region=us-east-1#CreateInternetGateway;

AWS Services Search [Alt+S]

VPC > Internet gateways > Create internet gateway

Create internet gateway [Info](#)

An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.

Internet gateway settings

Name tag
Creates a tag with a key of 'Name' and a value that you specify.

my-ig-vpc1

Tags - optional
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

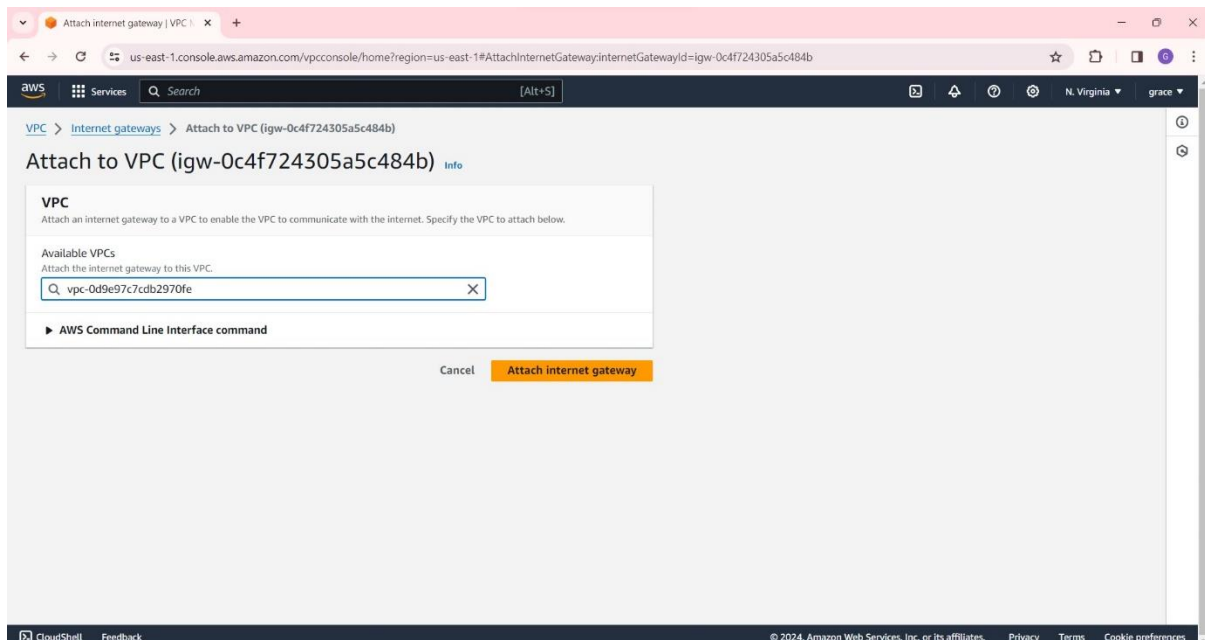
| Key | Value - optional | |
|------|------------------|--------|
| Name | my-ig-vpc1 | Remove |

Add new tag
You can add 49 more tags.

Cancel Create internet gateway

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This internet gateway attach to the respected VPC.



The screenshot shows the 'Attach internet gateway' page in the AWS Management Console. The breadcrumb navigation is 'VPC > Internet gateways > Attach to VPC (igw-0c4f724305a5c484b)'. The page title is 'Attach to VPC (igw-0c4f724305a5c484b)' with an 'Info' link. A descriptive text states: 'Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.' The 'VPC' section contains a search box for 'Available VPCs' with the value 'vpc-0d9e97c7c4b2970fe'. Below this is the 'AWS Command Line Interface command' section. At the bottom of the form are 'Cancel' and 'Attach internet gateway' buttons.

Create internet gateway | VPC | x +

us-east-1.console.aws.amazon.com/vpconsole/home?region=us-east-1#AttachInternetGateway:internetGatewayId=igw-0c4f724305a5c484b

AWS Services Search [Alt+S]

VPC > Internet gateways > Attach to VPC (igw-0c4f724305a5c484b)

Attach to VPC (igw-0c4f724305a5c484b) [Info](#)

Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.

VPC

Available VPCs
Attach the internet gateway to this VPC.

vpc-0d9e97c7c4b2970fe

► AWS Command Line Interface command

Cancel Attach internet gateway

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❖ Internet Gateway in Virginia.

The screenshot shows the AWS Management Console interface for creating a new internet gateway. The breadcrumb navigation indicates the path: VPC > Internet gateways > Create internet gateway. The main heading is 'Create internet gateway' with an 'Info' link. Below the heading, a descriptive text states: 'An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.'

The 'Internet gateway settings' section contains a 'Name tag' field with the value 'igw-1'. Below this, the 'Tags - optional' section explains that a tag is a label for an AWS resource. It shows a 'Key' field with 'Name' and a 'Value - optional' field with 'igw-1'. There is a 'Remove' button and an 'Add new tag' button. At the bottom of the settings section, it says 'You can add 49 more tags.'

At the bottom of the console window, there are 'Cancel' and 'Create internet gateway' buttons. The taskbar at the very bottom shows the Windows taskbar with various application icons and the system clock displaying 12:31 on 01-03-2024.

This internet gateway attached to the respected VPC.

The screenshot shows the AWS Management Console interface for attaching an existing internet gateway to a VPC. The breadcrumb navigation indicates the path: VPC > Internet gateways > Attach to VPC (igw-01bca36988e2ab322). The main heading is 'Attach to VPC (igw-01bca36988e2ab322)' with an 'Info' link. Below the heading, a descriptive text states: 'Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.'

The 'Available VPCs' section contains a search bar with the value 'vpc-05a0763b7f67785e4'. Below this, there is a section for 'AWS Command Line Interface command'. At the bottom of the console window, there are 'Cancel' and 'Attach internet gateway' buttons. The taskbar at the very bottom shows the Windows taskbar with various application icons and the system clock displaying 12:31 on 01-03-2024.

Step 5: Create route tables and give subnet association to respected routes.

❖ Route table in Virginia.

The screenshot shows the 'Create route table' page in the AWS VPC console. The page title is 'Create route table' with an 'Info' link. Below the title is a brief description: 'A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.'

The 'Route table settings' section contains two fields: 'Name - optional' with the value 'my-RT-vpc1' and 'VPC' with a dropdown menu showing 'vpc-0d9e97c7cdb2970fe (my-VPC-1)'. Below this is the 'Tags' section, which includes a table for adding tags. The table has columns for 'Key' and 'Value - optional'. One tag is already added: 'Name' with the value 'my-RT-vpc1'. There is a 'Remove' button next to the tag and an 'Add new tag' button below. A note states 'You can add 49 more tags.'

At the bottom of the settings section are 'Cancel' and 'Create route table' buttons.

❖ Subnet association

The screenshot shows the 'Edit subnet associations' page in the AWS VPC console. The page title is 'Edit subnet associations' with a subtitle 'Change which subnets are associated with this route table.' The breadcrumb trail is 'VPC > Route tables > rtb-09f32467e81406e01 > Edit subnet associations'.

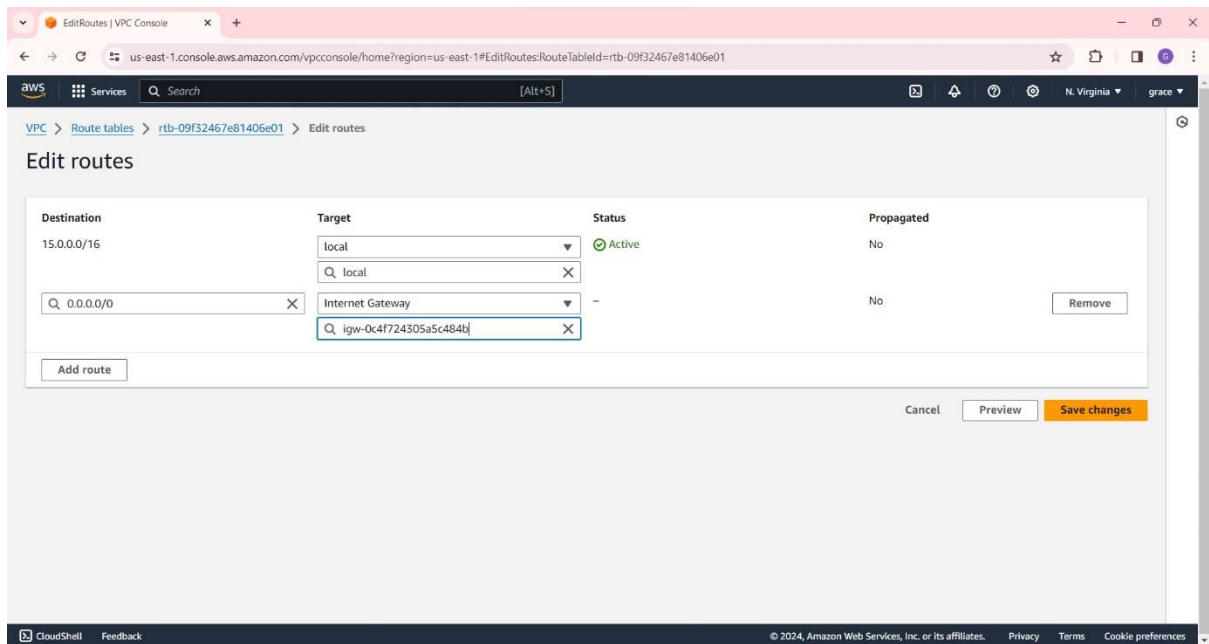
The 'Available subnets (1/1)' section contains a search bar and a table with the following columns: 'Name', 'Subnet ID', 'IPv4 CIDR', 'IPv6 CIDR', and 'Route table ID'. One subnet is listed: 'my-SN-vpc1' with Subnet ID 'subnet-005511628dd39106b', IPv4 CIDR '15.0.0.0/24', and Route table ID 'Main (rtb-0c294ac278914e4fa)'. The 'Name' column has a checkbox that is checked.

The 'Selected subnets' section contains a text box with the value 'subnet-005511628dd39106b / my-SN-vpc1' and a close button.

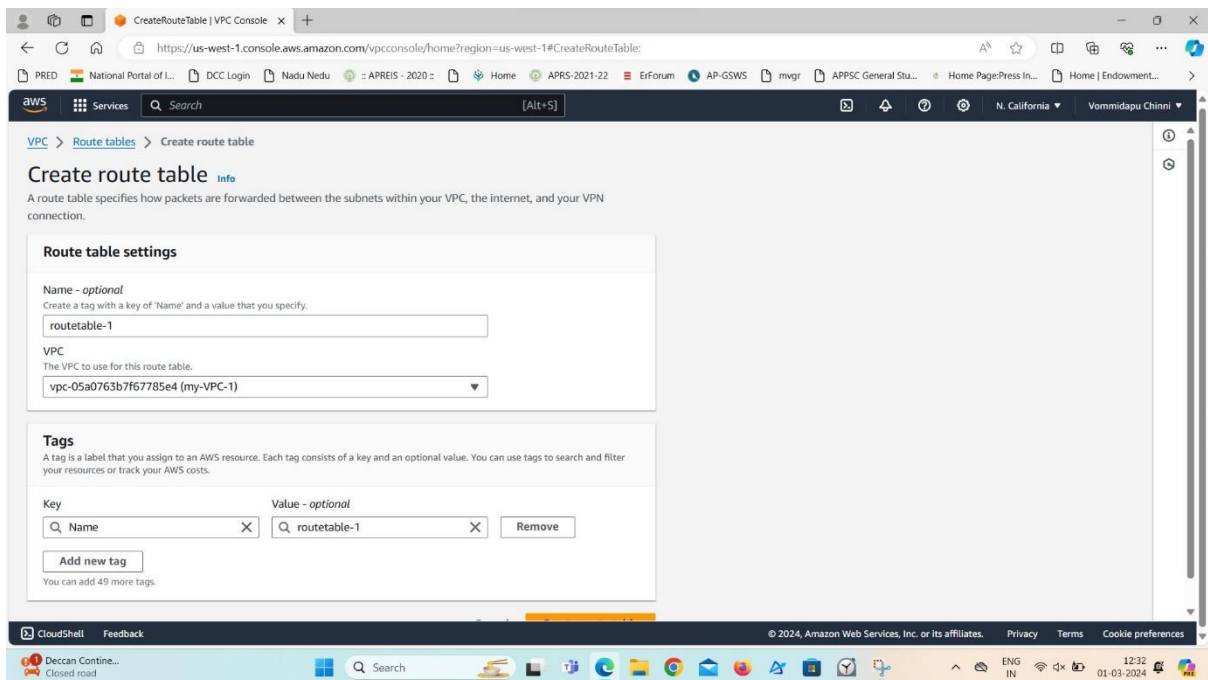
At the bottom right are 'Cancel' and 'Save associations' buttons.

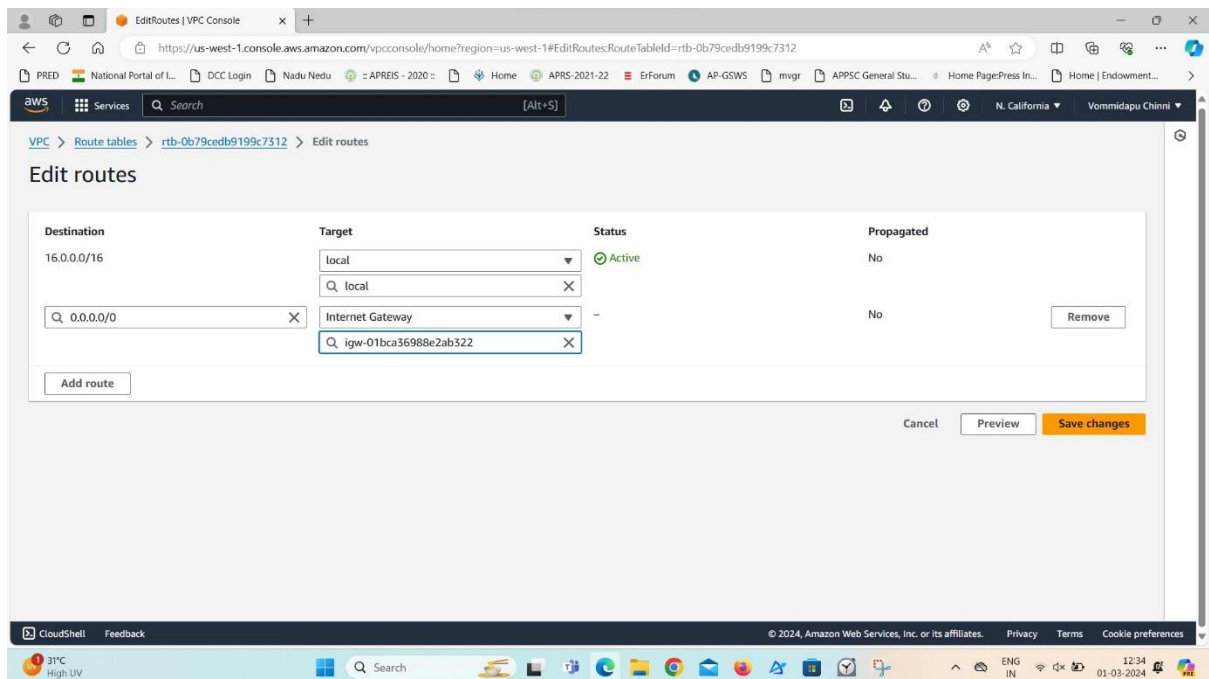
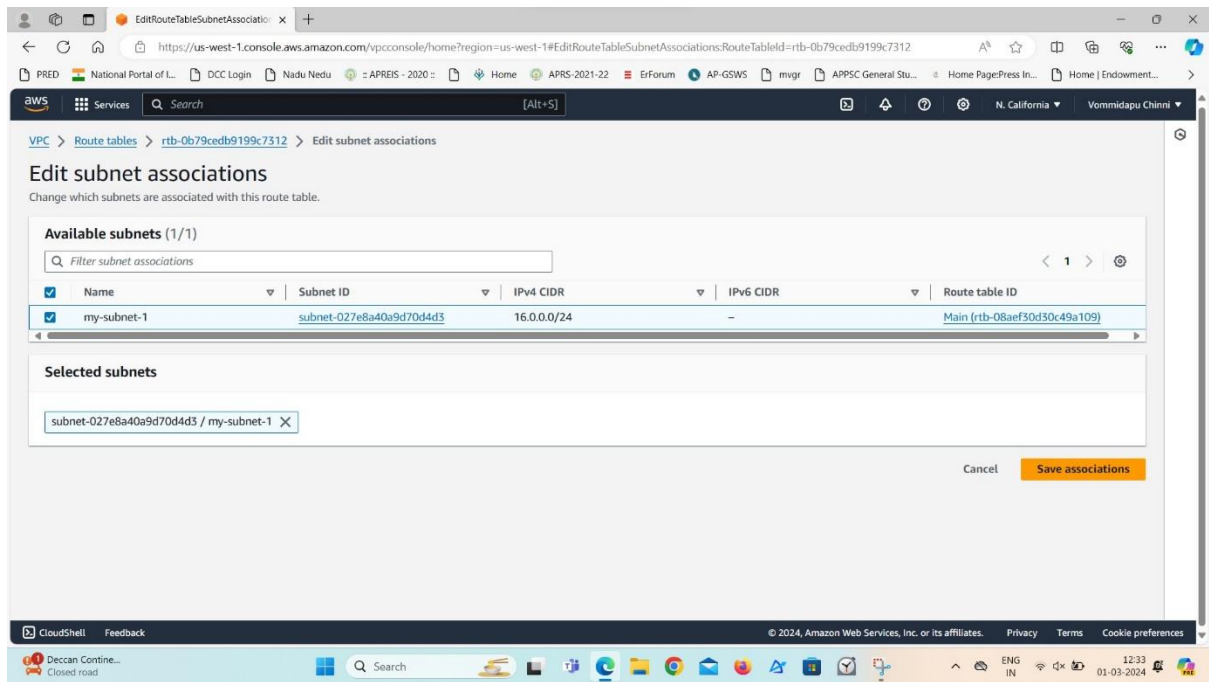
Add internet gate way to the route table.

Actions → edit routes → add route → internet gateway → select the created igw → give all traffic (0.0.0.0/0) → save changes.



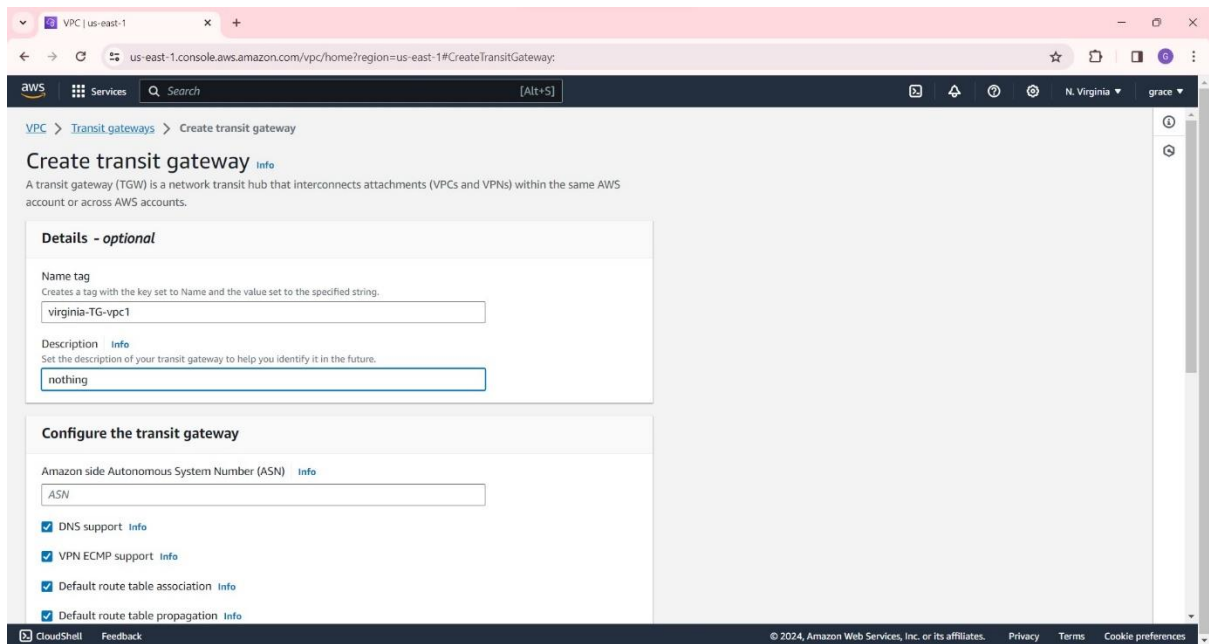
❖ Route table in California.



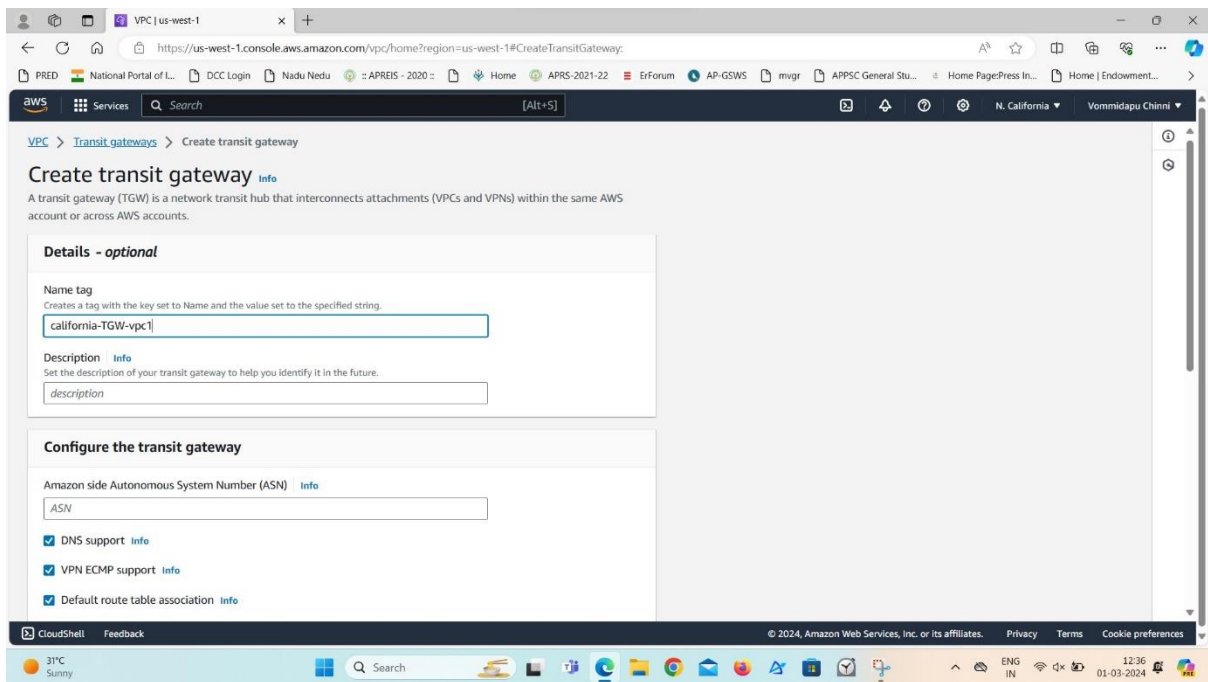


Step 6: Create transit gateway.

❖ Transit gateway in Virginia.



❖ Transit gateway in California.



Step 7: Create transit gateway attachment.

❖ Transit gateway attachment in Virginia.

Create transit gateway attachment [Info](#)

A transit gateway (TGW) is a network transit hub that interconnects attachments (VPCs and VPNs) within the same AWS account or across AWS accounts.

Details

Name tag - optional
Creates a tag with the key set to Name and the value set to the specified string.

virgina-TG-attachment

Transit gateway ID [Info](#)

tgw-04bcd273913363ac2

Attachment type [Info](#)

VPC

VPC attachment
Select and configure your VPC attachment.

☒ **DNS support** [Info](#)

☐ **IPv6 support** [Info](#)

☐ **Appliance Mode support** [Info](#)

VPC ID

VPC ID
Select the VPC to attach to the transit gateway.

vpc-0d9e97c7cdb2970fe

Subnet IDs [Info](#)
Select the subnets in which to create the transit gateway VPC attachment.

☒ **us-east-1a** subnet-005511628dd39106b

☐ us-east-1b No subnet available

☐ us-east-1c No subnet available

☐ us-east-1d No subnet available

☐ us-east-1e No subnet available

☐ us-east-1f No subnet available

subnet-005511628dd39106b X

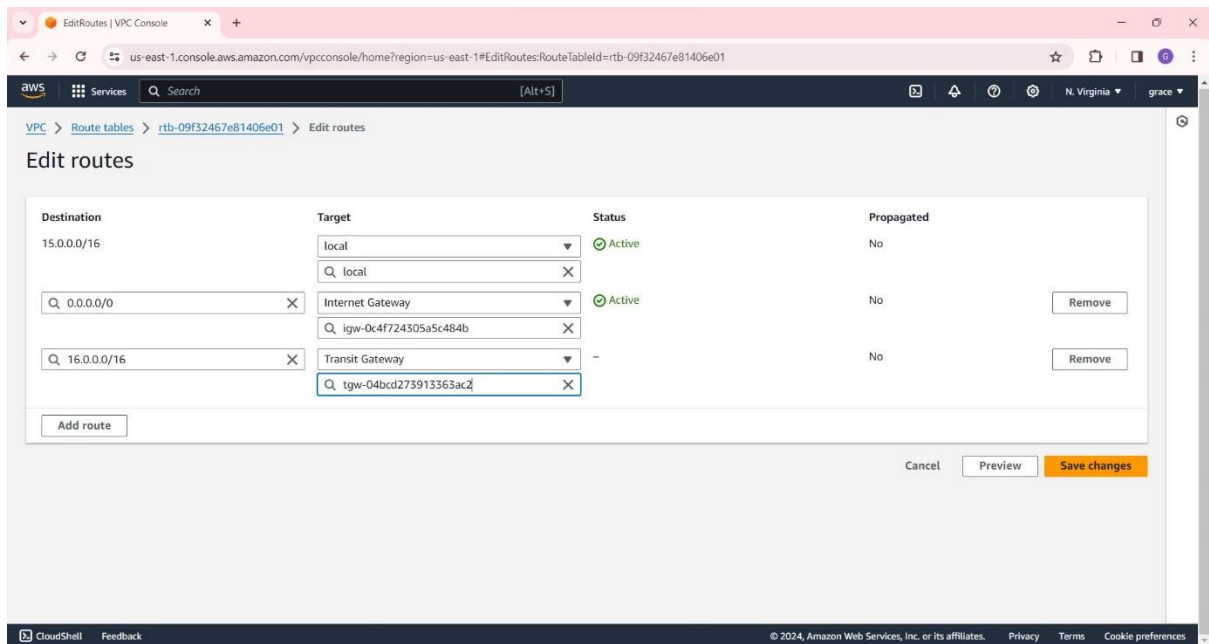
Tags - optional
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key **Value - optional**

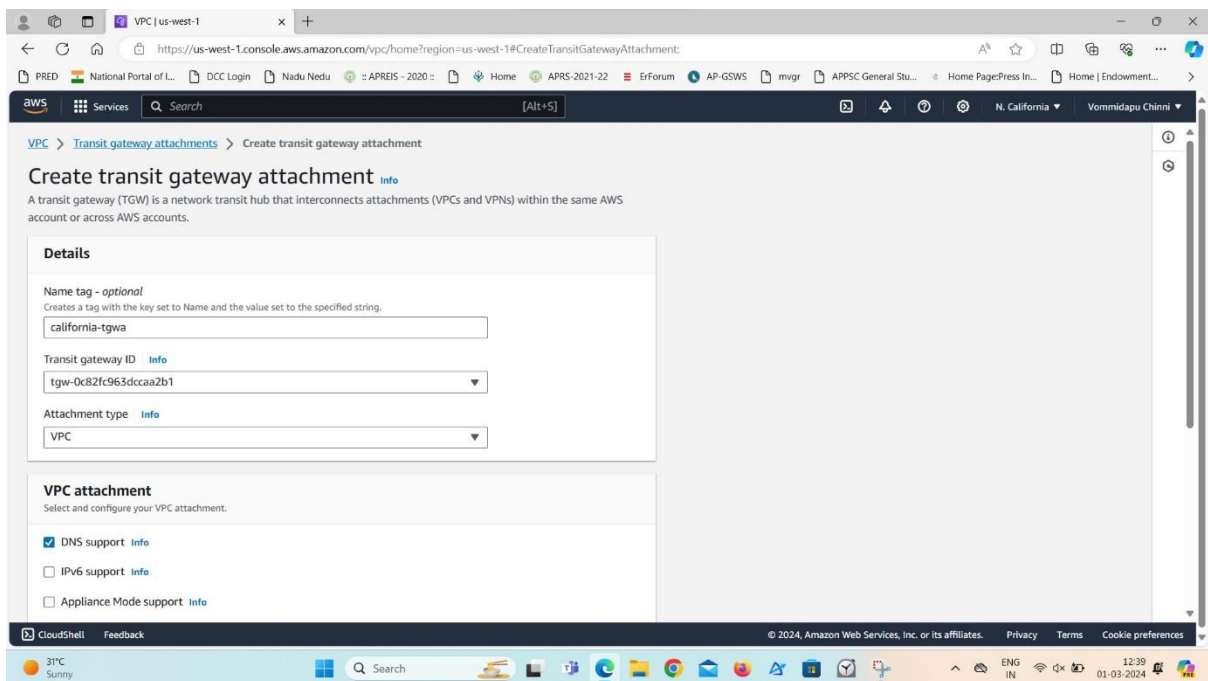
Q Name X Q virgina-TG-attachment X Remove

Add new tag

You can add up to 49 more tags.



❖ Transit gateway attachment in California.



Step 8: Create transit gateway attachment for peering connection.

Creating transit gateway attachment for connecting two different accounts.

Create transit gateway attachment [Info](#)

A transit gateway (TGW) is a network transit hub that interconnects attachments (VPCs and VPNs) within the same AWS account or across AWS accounts.

Details

Name tag - optional
Creates a tag with the key set to Name and the value set to the specified string.

virginia-to-california-attachment

Transit gateway ID [Info](#)
tgw-04bcd273913363ac2

Attachment type [Info](#)
Peering Connection

Peering connection attachment
Select and configure your peering connection attachment.

Account [Info](#)
☐ My account
☒ Other account

Account ID
Add 12 digits AWS account number (without hyphens) of the transit gateway you are peering with.

7673-9768-7374

Select and configure your peering connection attachment.

Account [Info](#)
☐ My account
☒ Other account

Account ID
Add 12 digits AWS account number (without hyphens) of the transit gateway you are peering with.

7673-9768-7374

Region [Info](#)
US West (N. California) (us-west-1)

Transit gateway (accepter) [Info](#)
tgw-0c82f-963dcca2b1

Tags - optional
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

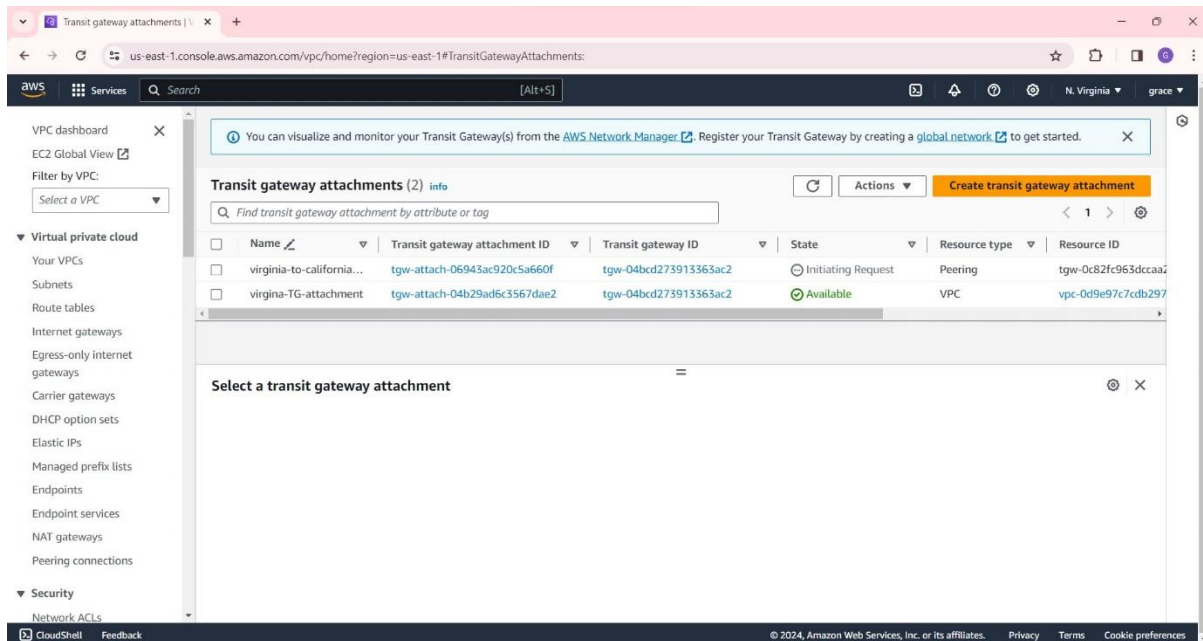
Key
Q Name X

Value - optional
Q virginia-to-california-attachment X Remove

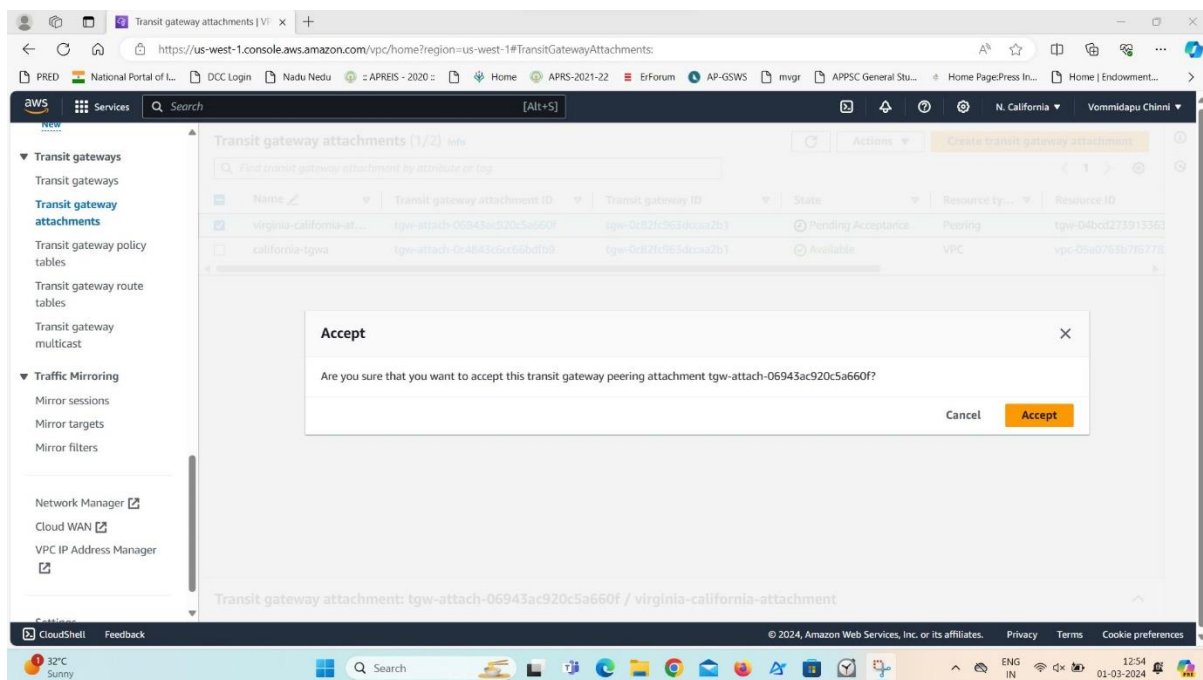
Add new tag
You can add up to 49 more tags.

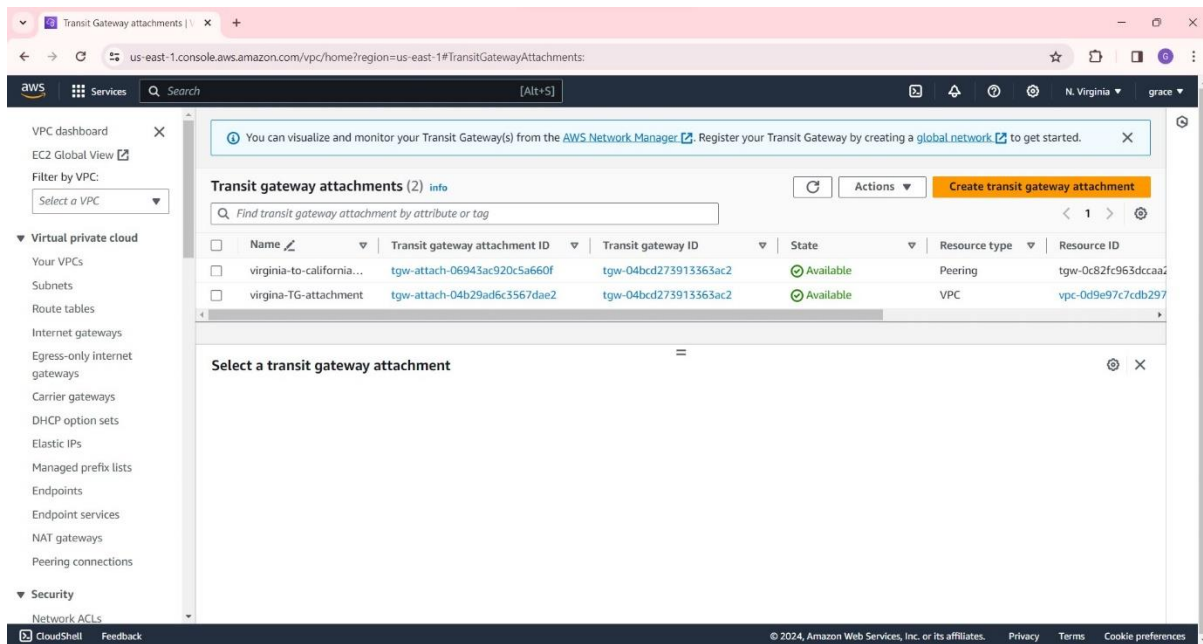
Cancel **Create transit gateway attachment**

❖ Initiating request in account 1 in Virginia.



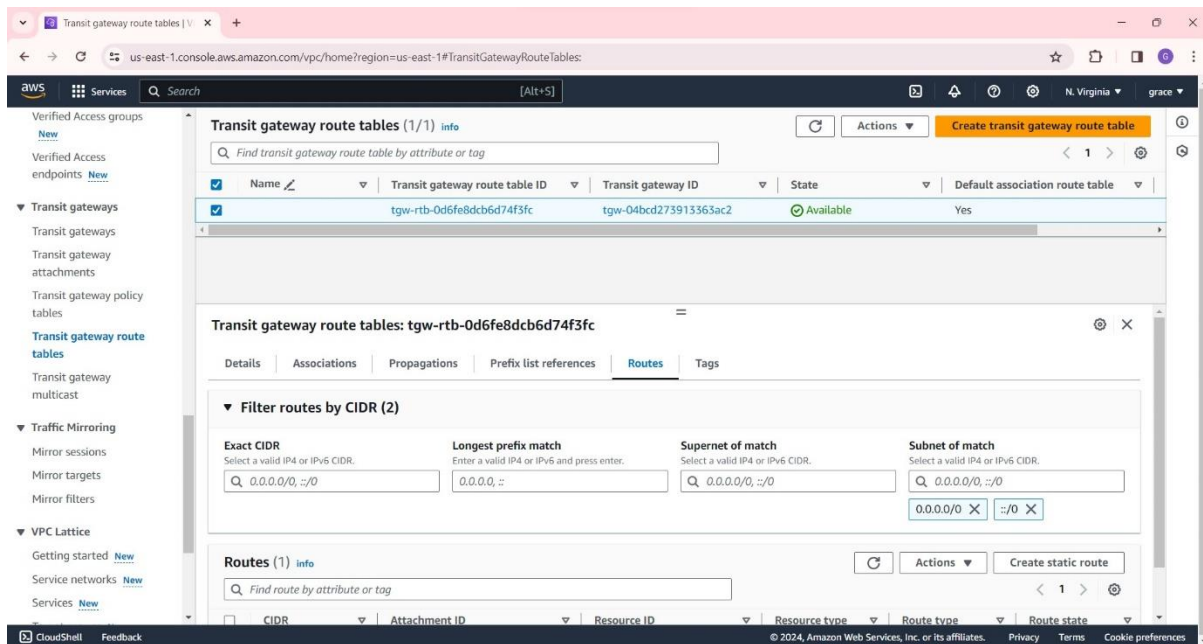
Accepting request in account 2 california.

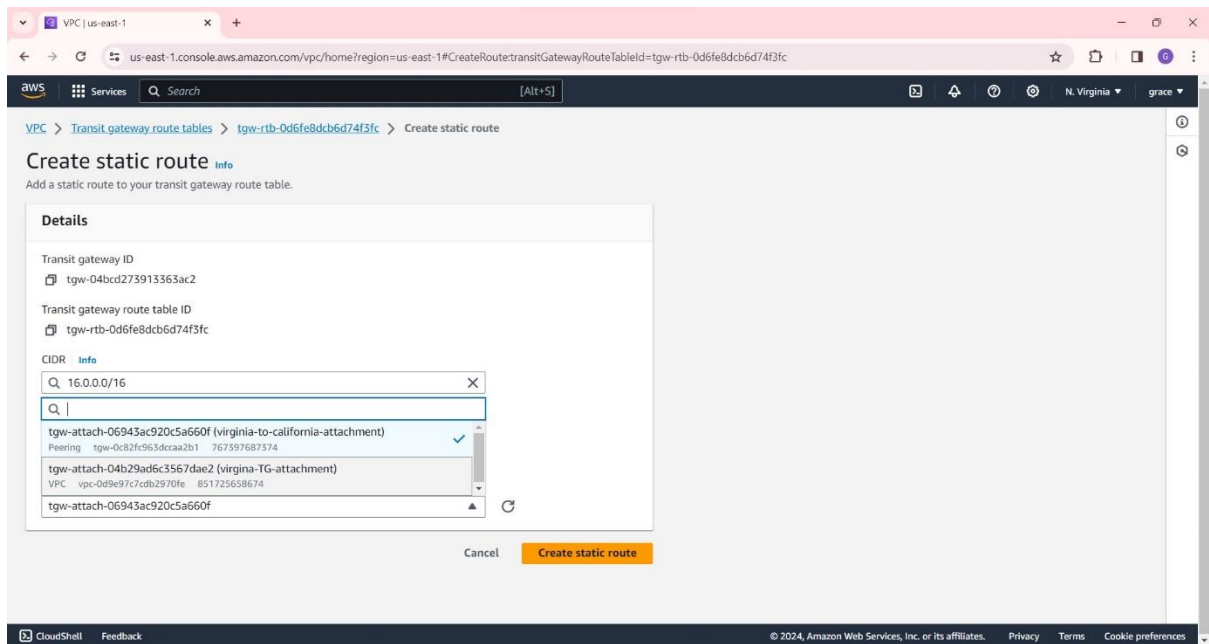




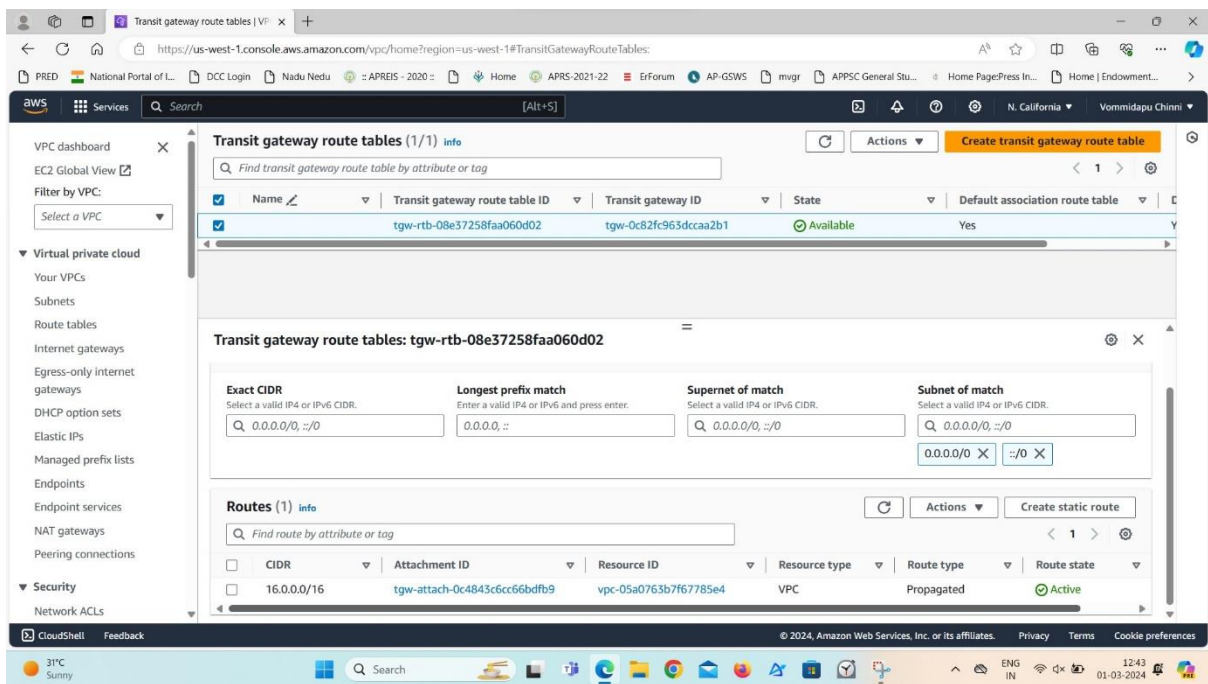
Step 9: Create static route table in transit gateway route table.

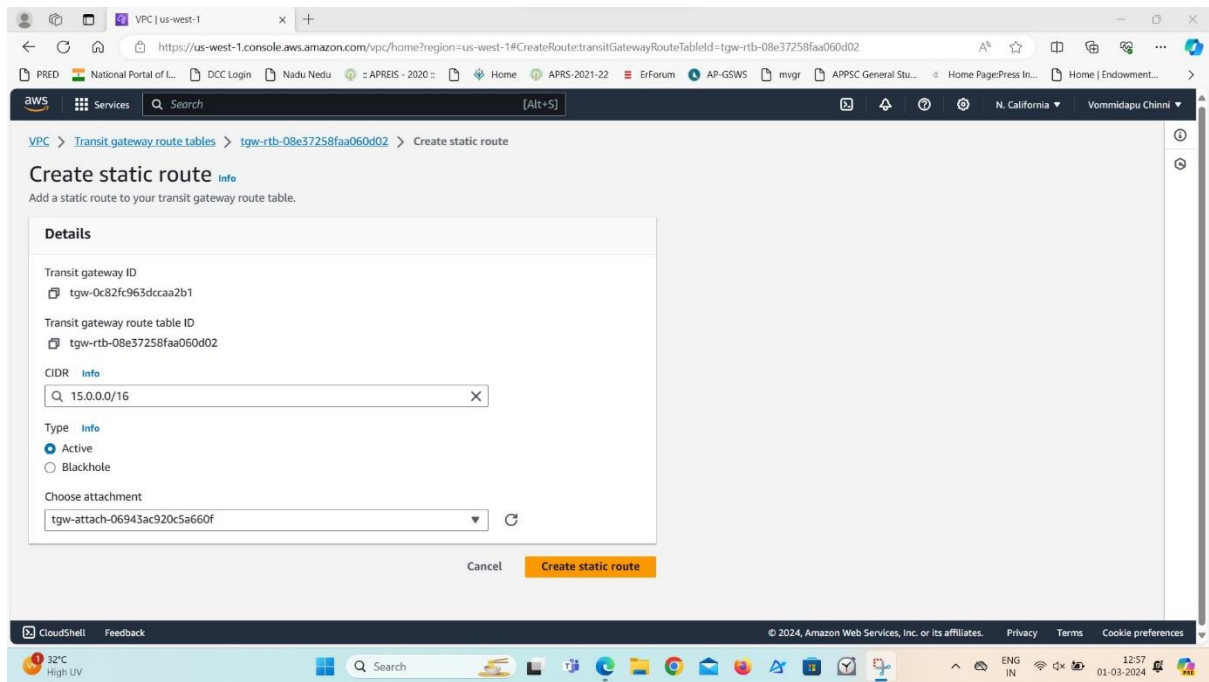
❖ Static route table in Virginia.





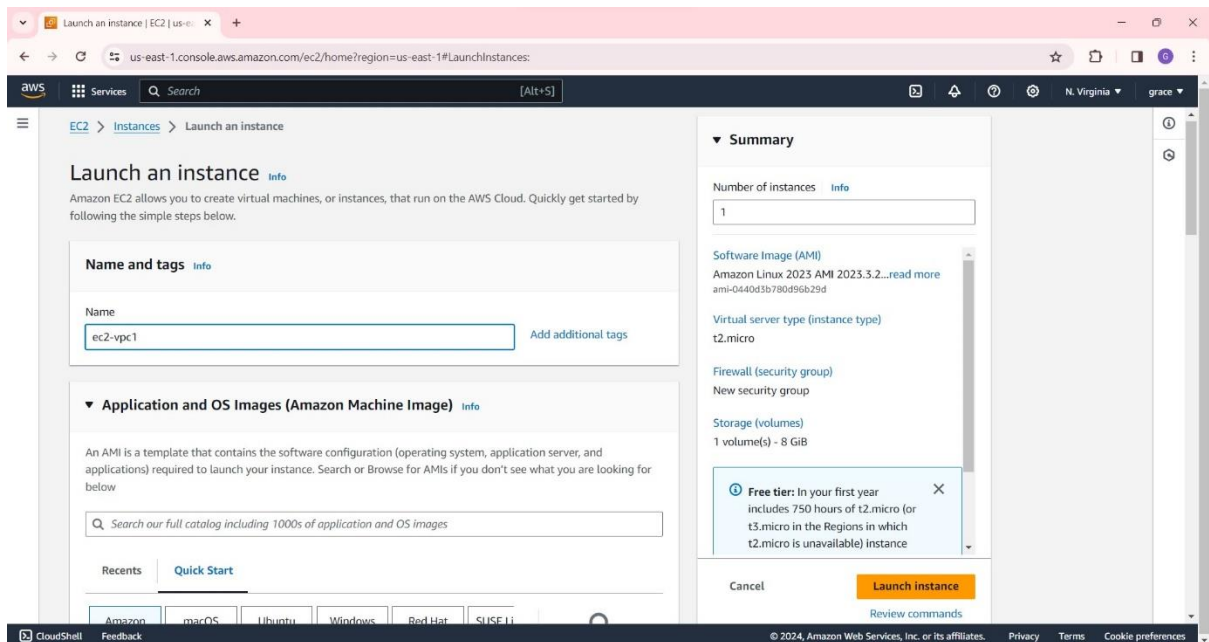
❖ Static route table in California.





Step 10: Launch instance.

❖ Launching an instance in Virginia.



Select respected VPC and subnet.

Launch an instance | EC2 | us-east-1

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Key pair name - required
chinni

▼ Network settings info

VPC - required info
vpc-0d9e97c7cdb2970fe (my-VPC-1)
15.0.0.0/16

Subnet - info
subnet-005511628dd39106b my-SN-vpc1
VPC: vpc-0d9e97c7cdb2970fe Owner: 851725658674 Availability Zone: us-east-1a
IP addresses available: 250 CIDR: 15.0.0.0/24

Auto-assign public IP - info
Enable

Firewall (security groups) - info
Create security group Select existing security group

Security group name - required
launch-wizard-2

Summary

Number of instances info
1

Software Image (AMI)
Amazon Linux 2023 AMI 2023.3.2...read more
ami-0440d5b780d96b29d

Virtual server type (instance type)
t2.micro

Firewall (security group)
New security group

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance

Cancel Launch instance

Review commands

Give inbound security group rules.

Launch an instance | EC2 | us-east-1

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Inbound Security Group Rules

▼ Security group rule 1 (TCP, 22, 0.0.0.0/0) Remove

Type info
ssh

Protocol info
TCP

Port range info
22

Source type info
Anywhere

Source info
Add CIDR, prefix list or security
0.0.0.0/0

Description - optional info
e.g. SSH for admin desktop

▼ Security group rule 2 (TCP, 80, 16.0.0.0/16) Remove

Type info
HTTP

Protocol info
TCP

Port range info
80

Source type info
Custom

Source info
Add CIDR, prefix list or security
16.0.0.0/16

Description - optional info
e.g. SSH for admin desktop

Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Add security group rule

Summary

Number of instances info
1

Software Image (AMI)
Amazon Linux 2023 AMI 2023.3.2...read more
ami-0440d5b780d96b29d

Virtual server type (instance type)
t2.micro

Firewall (security group)
New security group

Storage (volumes)
1 volume(s) - 8 GiB

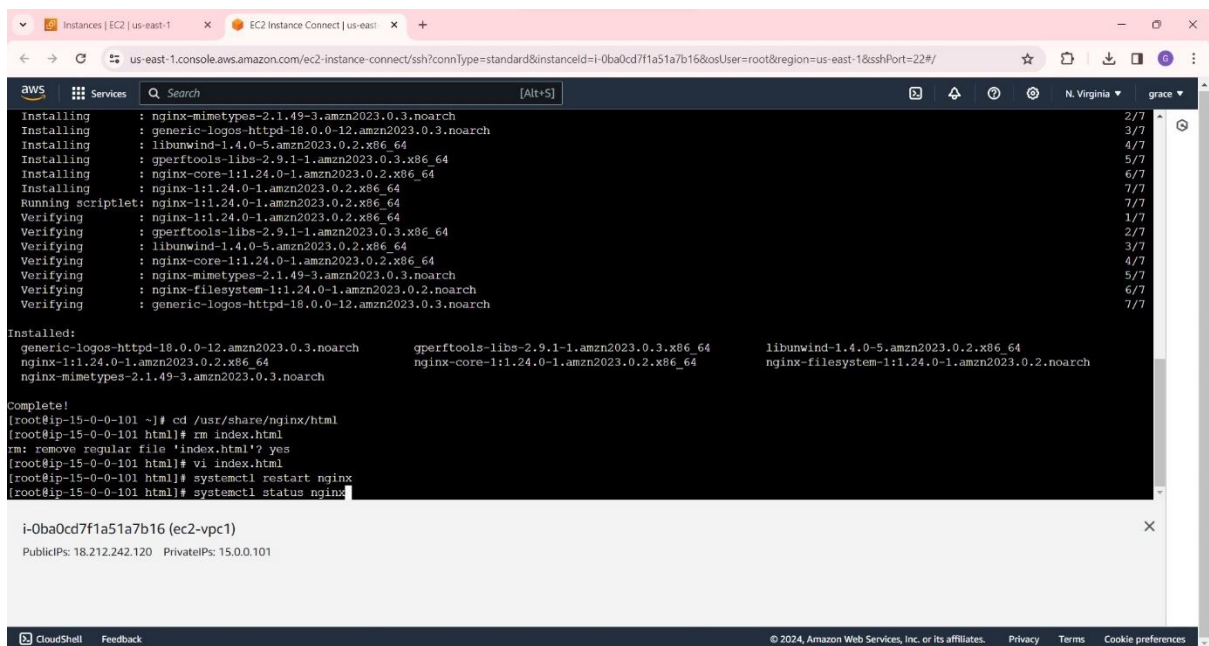
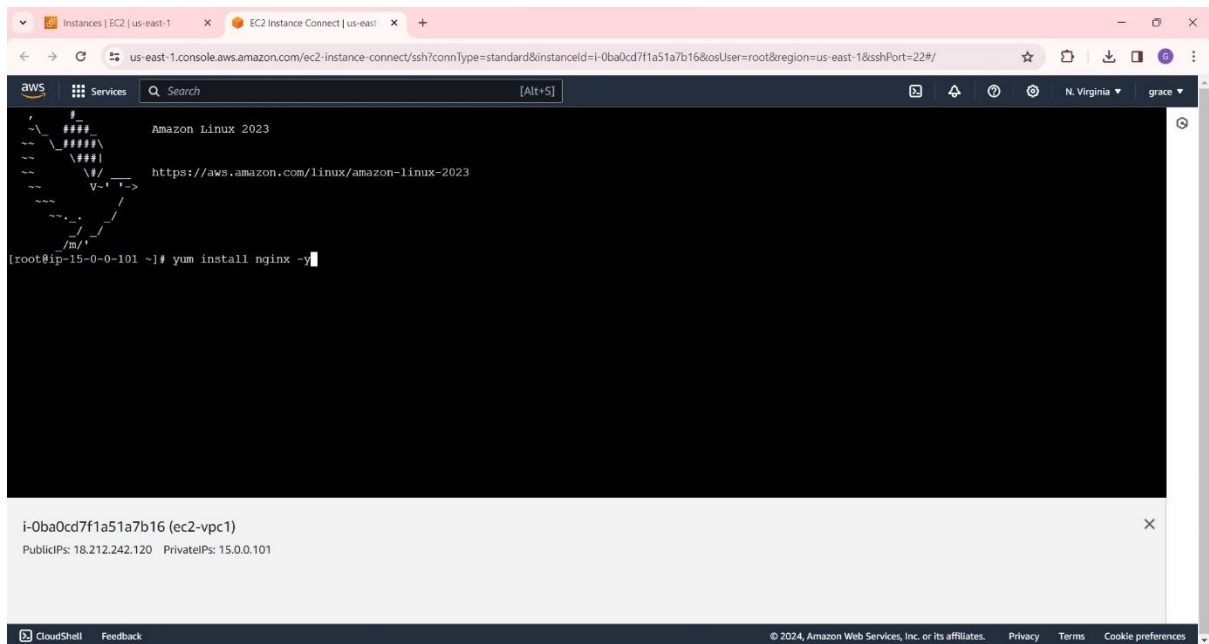
Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance

Cancel Launch instance

Review commands

Launch instance.

Connect to the server.



The screenshot shows a terminal window in AWS CloudShell. The user is logged in as root on an EC2 instance. They run the following commands:

```
[root@ip-15-0-0-101 html]# vi index.html
[root@ip-15-0-0-101 html]# systemctl restart nginx
[root@ip-15-0-0-101 html]# systemctl status nginx
```

The output of the status command shows that the nginx service is loaded and active (running). It was started by systemd on Mar 01 07:37:40. The logs show that the configuration file /etc/nginx/nginx.conf is valid and the service started successfully.

```
nginx.service - The nginx HTTP and reverse proxy server
Loaded: loaded (/usr/lib/systemd/system/nginx.service; disabled; preset: disabled)
Active: active (running) since Fri 2024-03-01 07:37:41 UTC; 17s ago
Process: 25826 ExecStartPre=/usr/bin/rm -f /run/nginx.pid (code=exited, status=0/SUCCESS)
Process: 25827 ExecStartPre=/usr/sbin/nginx -t (code=exited, status=0/SUCCESS)
Process: 25828 ExecStart=/usr/sbin/nginx -t (code=exited, status=0/SUCCESS)
Main PID: 25829 (nginx)
Tasks: 2 (limit: 1114)
Memory: 2.2M
CPU: 56ms
CGroup: /system.slice/nginx.service
        └─25829 "nginx: master process /usr/sbin/nginx"
          └─25830 "nginx: worker process"
```

The logs show the following messages:

```
Mar 01 07:37:40 ip-15-0-0-101.ec2.internal systemd[1]: Starting nginx.service - The nginx HTTP and reverse proxy server...
Mar 01 07:37:40 ip-15-0-0-101.ec2.internal nginx[25827]: nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
Mar 01 07:37:40 ip-15-0-0-101.ec2.internal nginx[25827]: nginx: configuration file /etc/nginx/nginx.conf test is successful
Mar 01 07:37:41 ip-15-0-0-101.ec2.internal systemd[1]: Started nginx.service - The nginx HTTP and reverse proxy server.
```

The user then runs the following commands:

```
[root@ip-15-0-0-101 html]# cd
[root@ip-15-0-0-101 ~]# curl 15.0.0.101:80
I AM WEB SERVER 1 !
This is transit gateway attachment
```

The terminal output shows the public IP of the instance: 18.212.242.120 and the private IP: 15.0.0.101.

❖ Launching an instance in California.

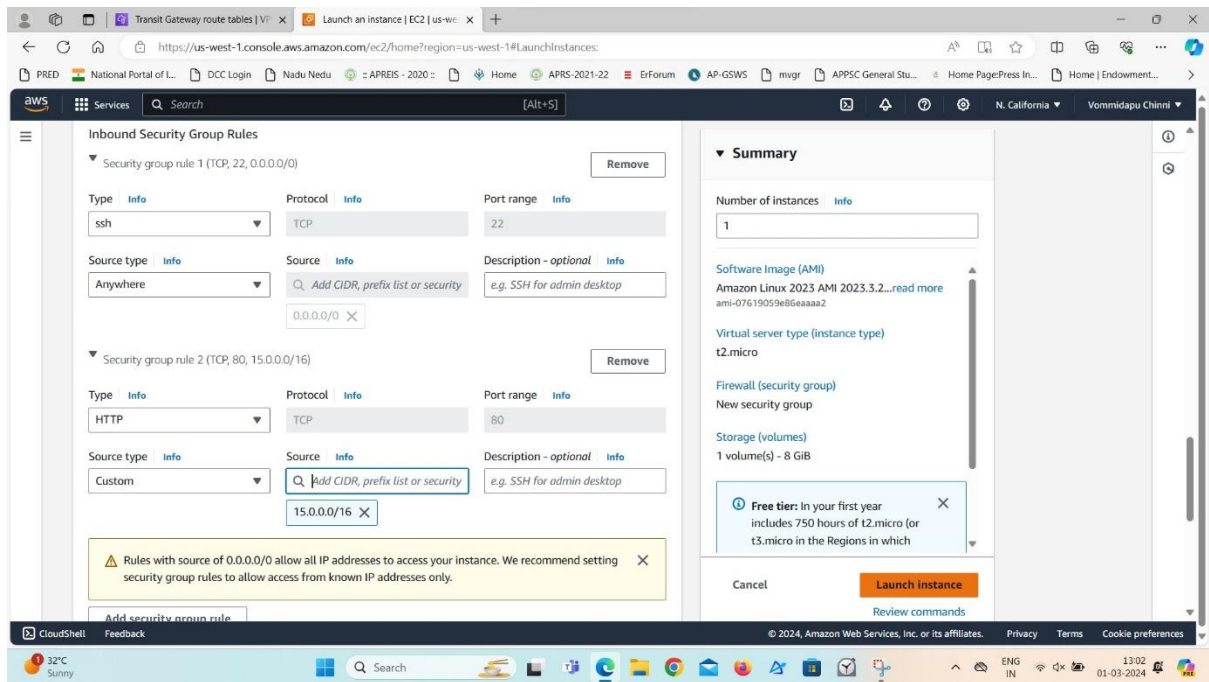
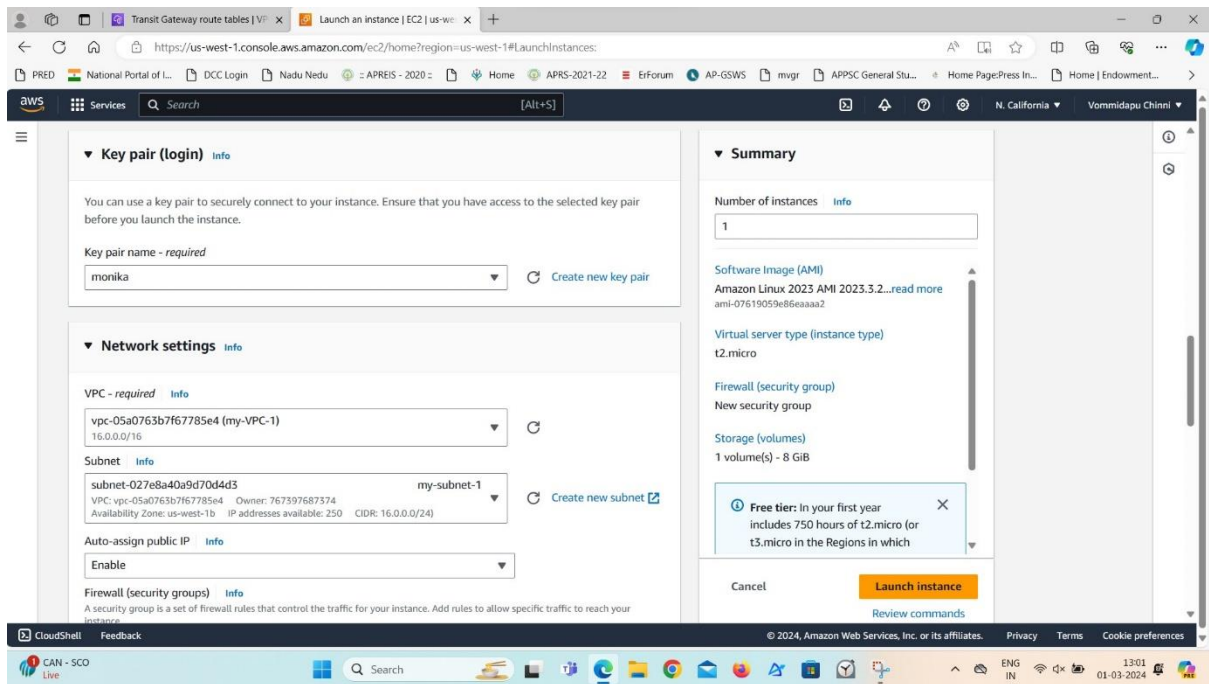
The screenshot shows the 'Launch an instance' page in the AWS Management Console. The page is for launching an EC2 instance in the us-west-1 region, N. California.

Summary

- Number of instances: 1
- Software Image (AMI): Amazon Linux 2023 AMI 2023.3.2...read more
- Virtual server type (instance type): t2.micro
- Firewall (security group): New security group
- Storage (volumes): 1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which

Launch instance



The screenshot shows the AWS CloudShell interface. The terminal output is as follows:

```
Amazon Linux 2023
https://aws.amazon.com/linux/amazon-linux-2023

[ec2-user@ip-16-0-0-131 ~]$ sudo -i
[root@ip-16-0-0-131 ~]# curl 15.0.0.101:80
I AM WEB SERVER 1 !
This is transit gateway attachment

[root@ip-16-0-0-131 ~]#
```

Below the terminal, the instance details are shown:

i-0d12d9076133795d3 (ec1-vpc1)
PublicIPs: 18.144.169.158 PrivateIPs: 16.0.0.131