Declaration	
Questions in this exercise are intentionally complex and could be convoluted or confusing. This is by design and to simulate real life situations where customers seldom give crystal clear requirements and ask unambiguous questions.	

I have read the above statement and agree to these conditions	
I AGREE	Pratibha Dixit
	<Enter your name above this line to indicate that you are in agreement>

Instructions
Every screenshot requested in this workbook is compulsory and carries 0.5 marks
Your AWS account ID must be clearly visible in every screenshot using the AWS console; missing id or using someone else's id is not permitted. Such cases will be considered as plagiarism and severe penalty will be imposed.
All screenshots must be in the order mentioned under "Expected Screenshots" for every step
DO NOT WAIT UNTIL THE LAST MINUTE.
The file should be renamed in the format BATCH_FIRSTNAME_LASTNAME_PROJECT1. For example: IITR_FSD_VIJAY_DWIVEDI_PROJECT1.docx

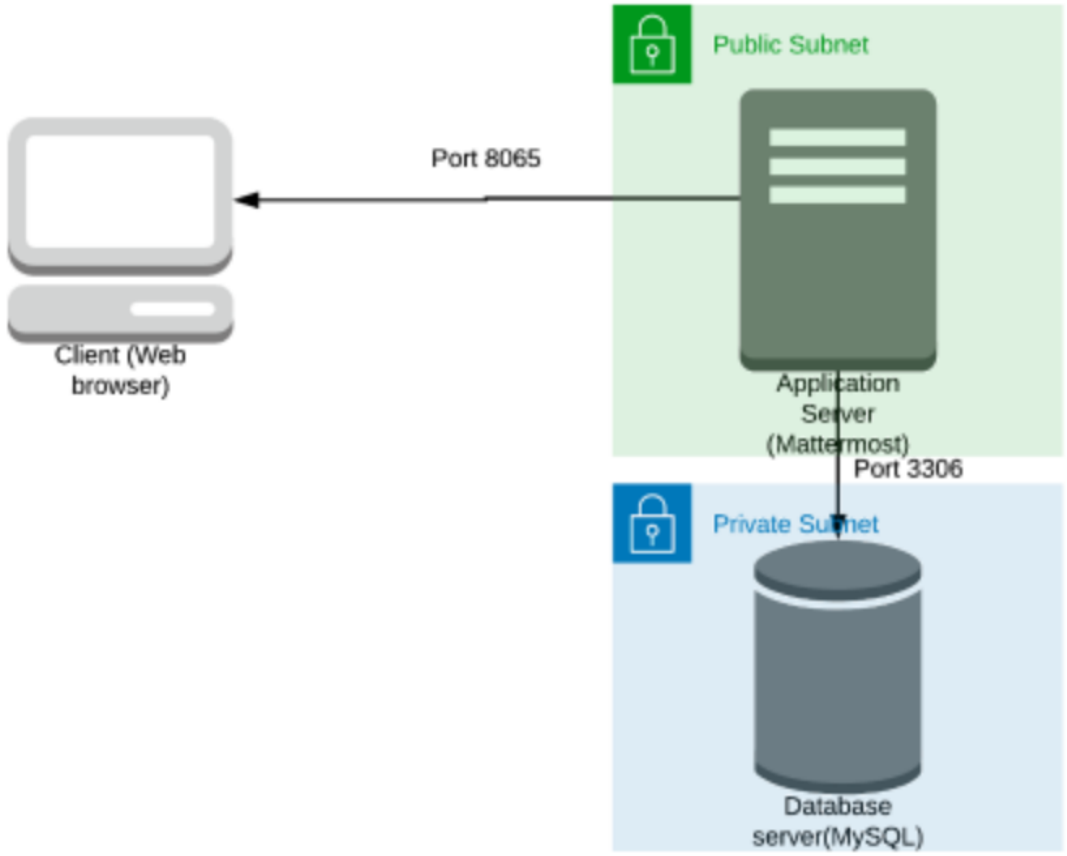
Resource Clean Up
Cloud is always pay per use model and all resources/services that we consume are chargeable. Cleaning up when you've completed your lab or project is always necessary. This is true whether you're doing a lab or implementing a project at your workplace.
After completing the lab, make sure to delete each resource created in reverse chronological order.

Scenario

Team communication and instant messaging solutions are an integral part of any business environment today. As of 2020, the total number of users of Slack and Microsoft Teams exceeded 20 million.

Some organizations might have compliance policies in place which do not allow them to use services managed by third parties. They will prefer solutions that can be managed and hosted on servers controlled by them. The same will extend to communication solutions as well.

Architecture diagram



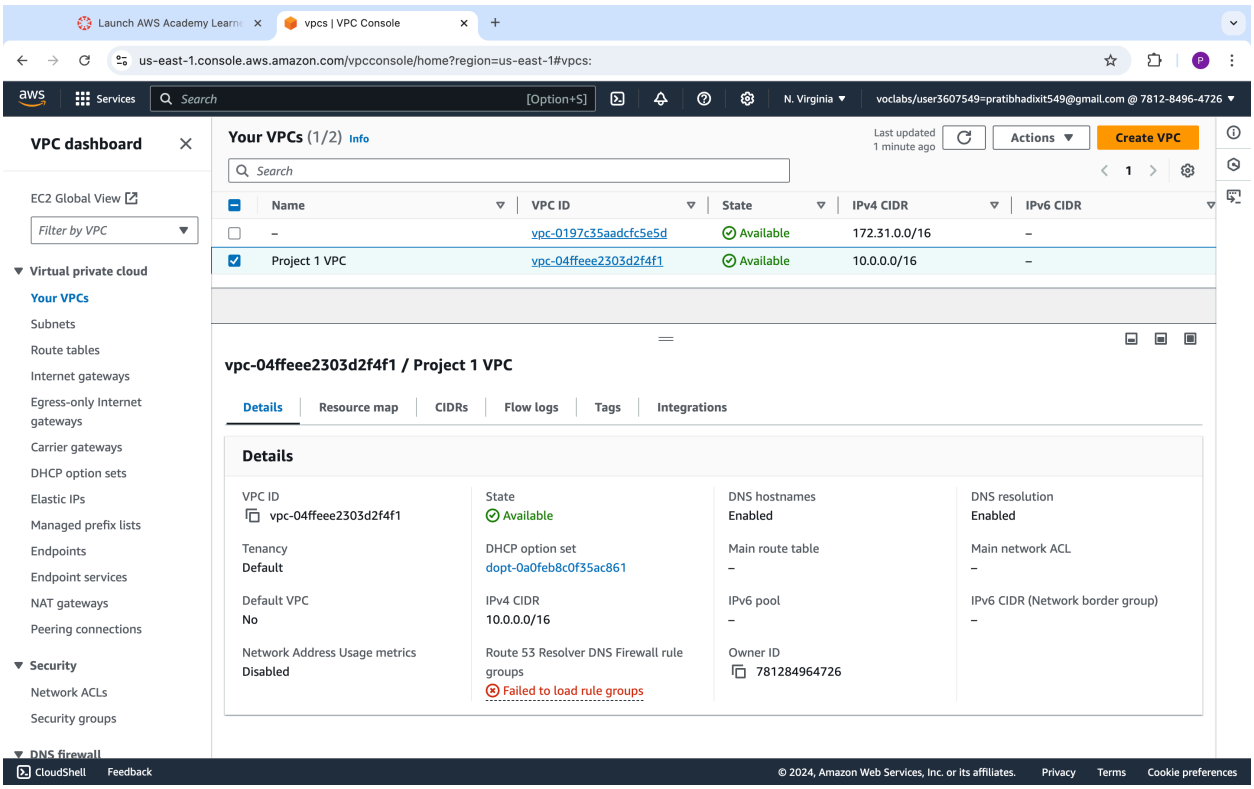
Architecture Implementation	
1	Implement 2 different subnets (one public and the other private) in a custom VPC
2	Install and configure MySQL on an Amazon Linux 2 instance on the private subnet using the instructions provided. (Hint: Use a bastion host and a NAT gateway)

3	Install and configure Mattermost on an Amazon Linux 2 instance on the public subnet using the provided instructions.
4	Configure the security groups to allow the ports as shown in the architecture.
5	Test the installation by accessing the IP of the public instance in a browser via the port 8065.

Step 1: VPC and Subnet Creation

Step number	A
Step name	Creation of VPC
Instructions	1) Navigate to VPC using the Services button at the top of the screen 2) Select "Your VPCs" on the left side of the screen 3) Click on "Create VPC" 4) Enter the following fields : Name: Project 1 VPC IPv4 CIDR Block : 10.0.0.0/16 The rest of the options can be ignored 5) Select "Create VPC" 6) Select the VPC and click on Actions->Edit DNS hostnames 7) Enable DNS hostnames and click on Save
Expected screenshots	1) Created VPC with properties visible

<Insert Screenshot a(1) here>


Launch AWS Academy Learn
vpcs | VPC Console
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#vpcs:
Services
Search
[Option+S]
N. Virginia
voclabs/user3607549=pratibhadixit549@gmail.com @ 7812-8496-4726
VPC dashboard
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only Internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
Network ACLs
Security groups
DNS firewall
Your VPCs (1/2) Info
Last updated 1 minute ago
Actions
Create VPC
Search
Name
VPC ID
State
IPv4 CIDR
IPv6 CIDR
– vpc-0197c35aadcfc5e5d Available 172.31.0.0/16 –
Project 1 VPC vpc-04ffeee2303d2f4f1 Available 10.0.0.0/16 –
vpc-04ffeee2303d2f4f1 / Project 1 VPC
Details
Resource map
CIDRs
Flow logs
Tags
Integrations
Details
VPC ID vpc-04ffeee2303d2f4f1
State Available
DNS hostnames Enabled
DNS resolution Enabled
Tenancy Default
DHCP option set dopt-0a0feb8c0f35ac861
Main route table –
Main network ACL –
Default VPC No
IPv4 CIDR 10.0.0.0/16
IPv6 pool –
IPv6 CIDR (Network border group) –
Network Address Usage metrics Disabled
Route 53 Resolver DNS Firewall rule groups Failed to load rule groups
Owner ID 781284964726
CloudShell
Feedback
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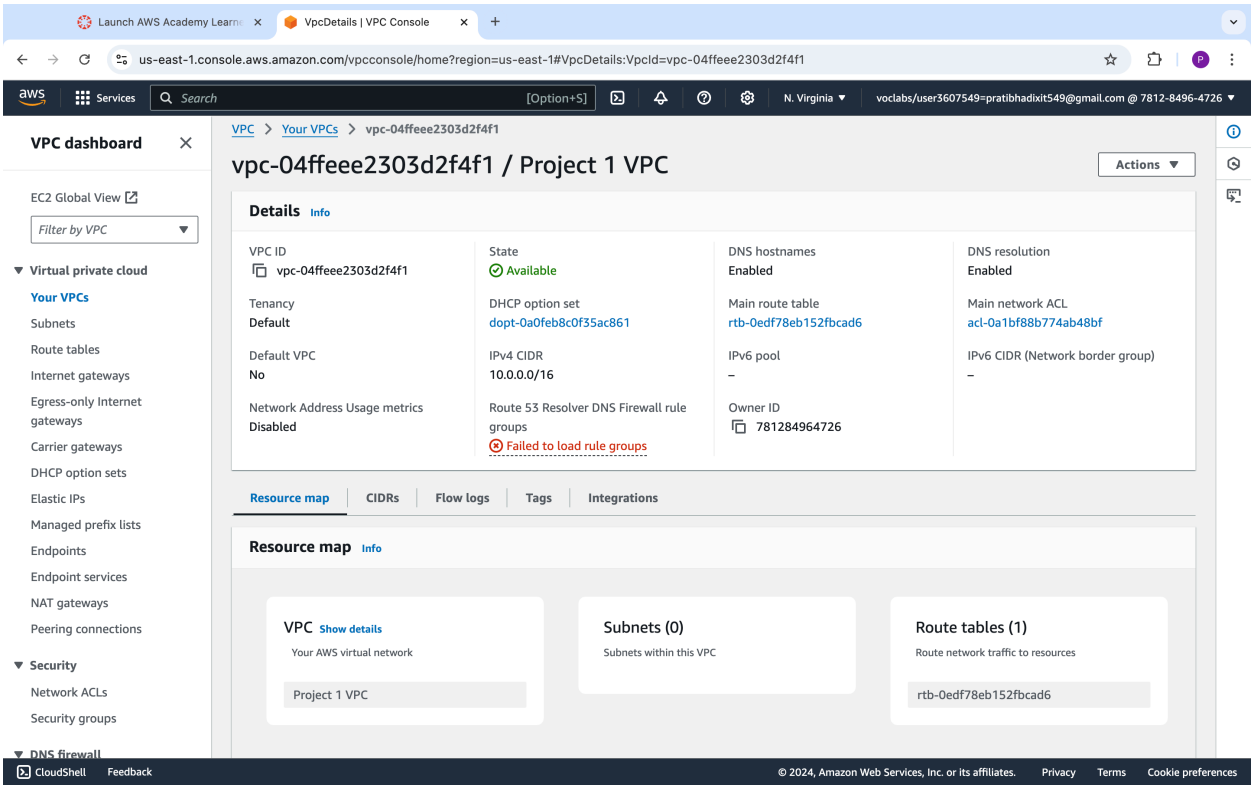
Launch AWS Academy Learn
VpcDetails | VPC Console
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#VpcDetails:VpcId=vpc-04ffeee2303d2f4f1
Services
Search
[Option+S]
N. Virginia
voclabs/user3607549=pratibhadixit549@gmail.com @ 7812-8496-4726
VPC dashboard
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only Internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
Network ACLs
Security groups
DNS firewall
VPC > Your VPCs > vpc-04ffeee2303d2f4f1
vpc-04ffeee2303d2f4f1 / Project 1 VPC
Actions
Details Info
VPC ID vpc-04ffeee2303d2f4f1
State Available
DNS hostnames Enabled
DNS resolution Enabled
Tenancy Default
DHCP option set dopt-0a0feb8c0f35ac861
Main route table rtb-0edf78eb152fbcad6
Main network ACL acl-0a1bf88b774ab48bf
Default VPC No
IPv4 CIDR 10.0.0.0/16
IPv6 pool –
IPv6 CIDR (Network border group) –
Network Address Usage metrics Disabled
Route 53 Resolver DNS Firewall rule groups Failed to load rule groups
Owner ID 781284964726
Resource map
CIDRs
Flow logs
Tags
Integrations
Resource map Info
VPC Show details
Your AWS virtual network
Project 1 VPC
Subnets (0)
Subnets within this VPC
Route tables (1)
Route network traffic to resources
rtb-0edf78eb152fbcad6
CloudShell
Feedback
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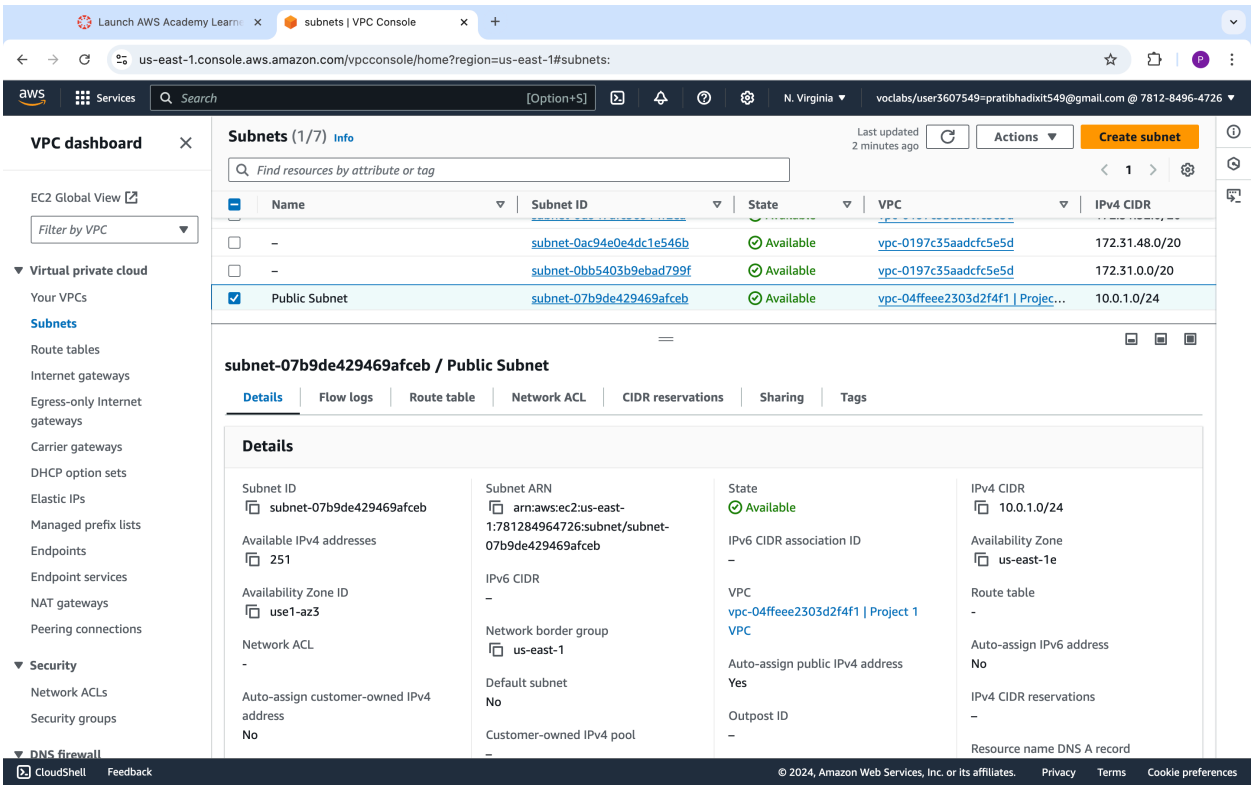
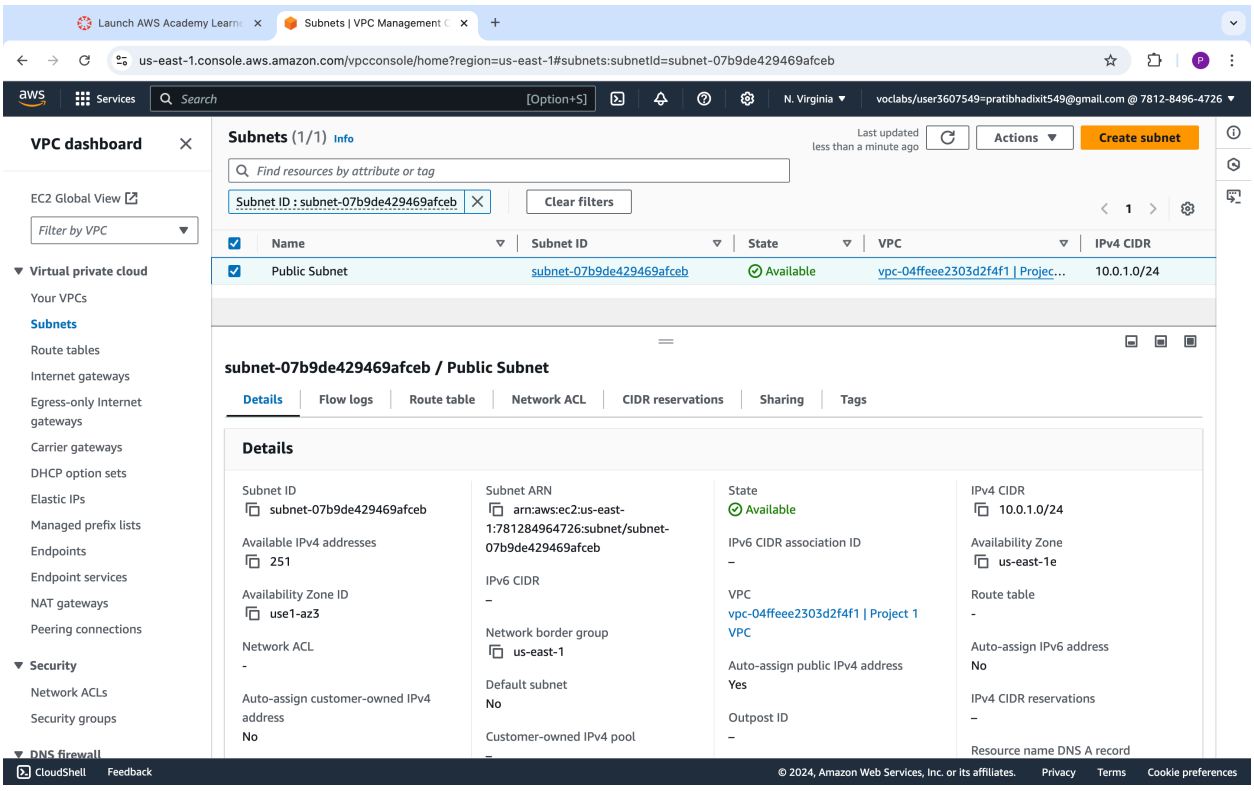
Step number	b
Step name	Creation of public subnet
Instructions	1) Navigate to VPC->Subnets 2) Click on "Create Subnet" 3) Enter the following fields Name tag : Public Subnet VPC : Select the Project 1 VPC IPv4 CIDR block : 10.0.1.0/24 The other options can be ignored 4) Click on Create 5) Once the subnet has been created, select the subnet and click on Actions->Modify Auto-assign IP settings 6) Enable the option "Auto assign IPv4" and select Save
Expected screenshots	1) Subnet Creation screen

<Insert Screenshot b(1) here>




Launch AWS Academy Learn
Subnets | VPC Management
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#subnets:subnetId=subnet-07b9de429469afceb
Services
Search
[Option+S]
N. Virginia
voclabs/user3607549=pratibhadixit549@gmail.com @ 7812-8496-4726
VPC dashboard
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only Internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
Network ACLs
Security groups
DNS firewall
Subnets (1/1) Info
Last updated less than a minute ago
Actions
Create subnet
Find resources by attribute or tag
Subnet ID : subnet-07b9de429469afceb
Clear filters
Name
Subnet ID
State
VPC
IPv4 CIDR
Public Subnet
subnet-07b9de429469afceb
Available
vpc-04ffeee2303d2f4f1 | Projec...
10.0.1.0/24
subnet-07b9de429469afceb / Public Subnet
Details
Flow logs
Route table
Network ACL
CIDR reservations
Sharing
Tags
Details
Subnet ID
subnet-07b9de429469afceb
Available IPv4 addresses
251
Availability Zone ID
use1-az3
Network ACL
-
Auto-assign customer-owned IPv4 address
No
Subnet ARN
arn:aws:ec2:us-east-1:781284964726:subnet/subnet-07b9de429469afceb
IPv6 CIDR
–
Network border group
us-east-1
Default subnet
No
Customer-owned IPv4 pool
–
State
Available
IPv6 CIDR association ID
–
VPC
vpc-04ffeee2303d2f4f1 | Project 1 VPC
Auto-assign public IPv4 address
Yes
Outpost ID
–
IPv4 CIDR
10.0.1.0/24
Availability Zone
us-east-1e
Route table
-
Auto-assign IPv6 address
No
IPv4 CIDR reservations
–
Resource name DNS A record
CloudShell
Feedback
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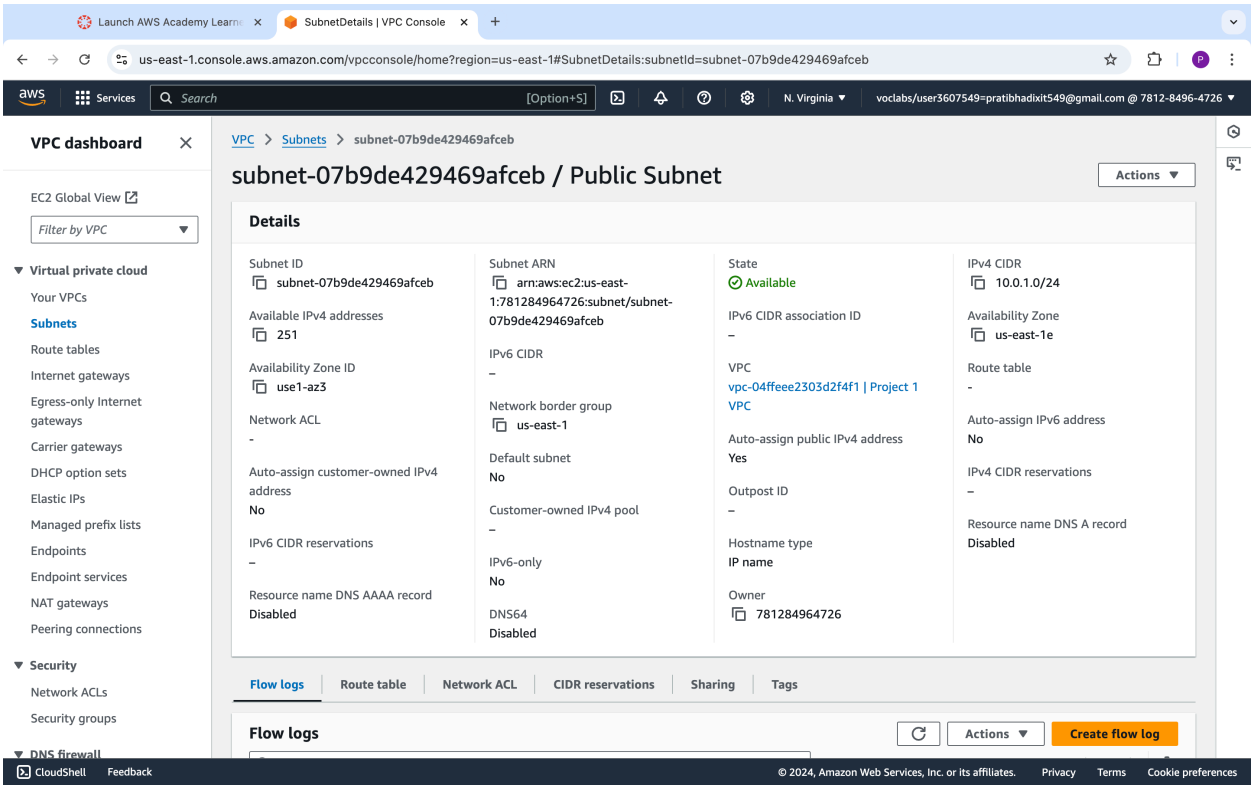
Launch AWS Academy Learn
SubnetDetails | VPC Console
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#SubnetDetails:subnetId=subnet-07b9de429469afceb
Services
Search
[Option+S]
N. Virginia
voclabs/user3607549=pratibhadixit549@gmail.com @ 7812-8496-4726
VPC dashboard
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only Internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
Network ACLs
Security groups
DNS firewall
VPC > Subnets > subnet-07b9de429469afceb
subnet-07b9de429469afceb / Public Subnet
Actions
Details
Subnet ID
subnet-07b9de429469afceb
Available IPv4 addresses
251
Availability Zone ID
use1-az3
Network ACL
-
Auto-assign customer-owned IPv4 address
No
IPv6 CIDR reservations
–
Resource name DNS AAAA record
Disabled
Subnet ARN
arn:aws:ec2:us-east-1:781284964726:subnet/subnet-07b9de429469afceb
IPv6 CIDR
–
Network border group
us-east-1
Default subnet
No
Customer-owned IPv4 pool
–
IPv6-only
No
DNS64
Disabled
State
Available
IPv6 CIDR association ID
–
VPC
vpc-04ffeee2303d2f4f1 | Project 1 VPC
Auto-assign public IPv4 address
Yes
Outpost ID
–
Hostname type
IP name
Owner
781284964726
IPv4 CIDR
10.0.1.0/24
Availability Zone
us-east-1e
Route table
-
Auto-assign IPv6 address
No
IPv4 CIDR reservations
–
Resource name DNS A record
Disabled
Flow logs
Route table
Network ACL
CIDR reservations
Sharing
Tags
Flow logs
Actions
Create flow log
CloudShell
Feedback
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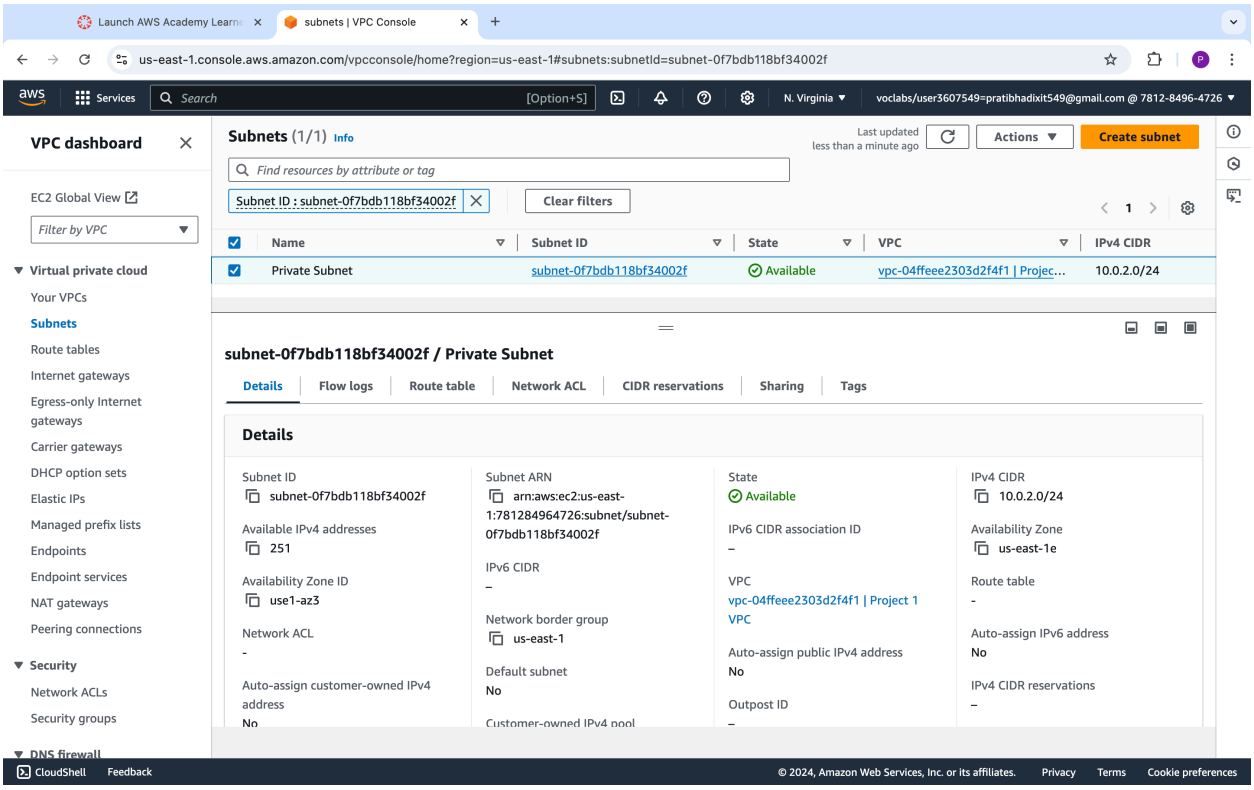
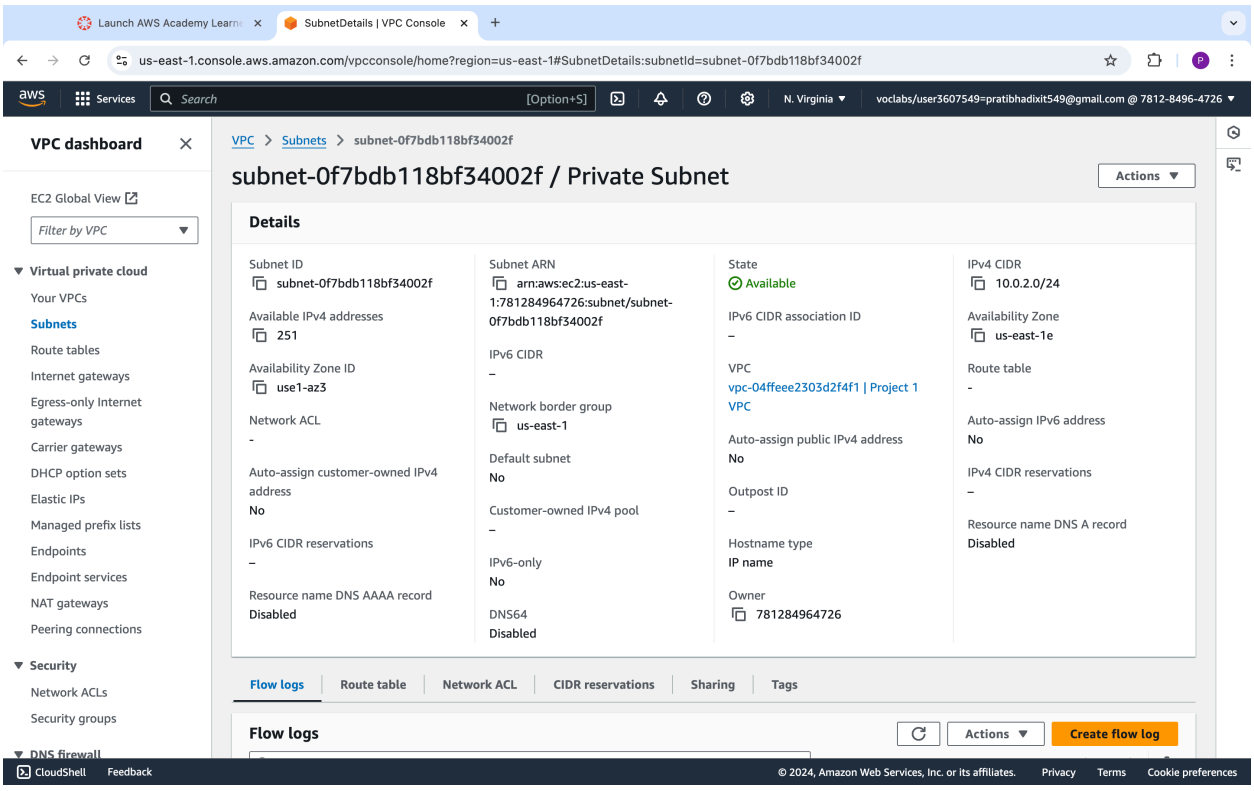
Step number	C
Step name	Creation of private subnet
Instructions	1) Navigate to VPC->Subnets 2) Click on "Create Subnet" 3) Enter the following fields Name tag : Private Subnet VPC : Select the Project 1 VPC IPv4 CIDR block : 10.0.2.0/24 The other options can be ignored 4) Click on Create
Expected screenshots	1) Subnet Creation screen

<Insert Screenshot c(1) here>




Launch AWS Academy Learn
SubnetDetails | VPC Console
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#SubnetDetails:subnetId=subnet-0f7bdb118bf34002f
Services
Search
[Option+S]
N. Virginia
voclabs/user3607549=pratibhadixit549@gmail.com @ 7812-8496-4726
VPC dashboard
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only Internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
Network ACLs
Security groups
DNS firewall
VPC > Subnets > subnet-0f7bdb118bf34002f
subnet-0f7bdb118bf34002f / Private Subnet
Actions
Details
Subnet ID
subnet-0f7bdb118bf34002f
Available IPv4 addresses
251
Availability Zone ID
use1-az3
Network ACL
-
Auto-assign customer-owned IPv4 address
No
IPv6 CIDR reservations
–
Resource name DNS AAAA record
Disabled
Subnet ARN
arn:aws:ec2:us-east-1:781284964726:subnet/subnet-0f7bdb118bf34002f
IPv6 CIDR
–
Network border group
us-east-1
Default subnet
No
Customer-owned IPv4 pool
–
IPv6-only
No
DNS64
Disabled
State
Available
IPv6 CIDR association ID
–
VPC
vpc-04ffeee2303d2f4f1 | Project 1 VPC
Auto-assign public IPv4 address
No
Outpost ID
–
Hostname type
IP name
Owner
781284964726
IPv4 CIDR
10.0.2.0/24
Availability Zone
us-east-1e
Route table
-
Auto-assign IPv6 address
No
IPv4 CIDR reservations
–
Resource name DNS A record
Disabled
Flow logs
Route table
Network ACL
CIDR reservations
Sharing
Tags
Flow logs
Actions
Create flow log
CloudShell
Feedback
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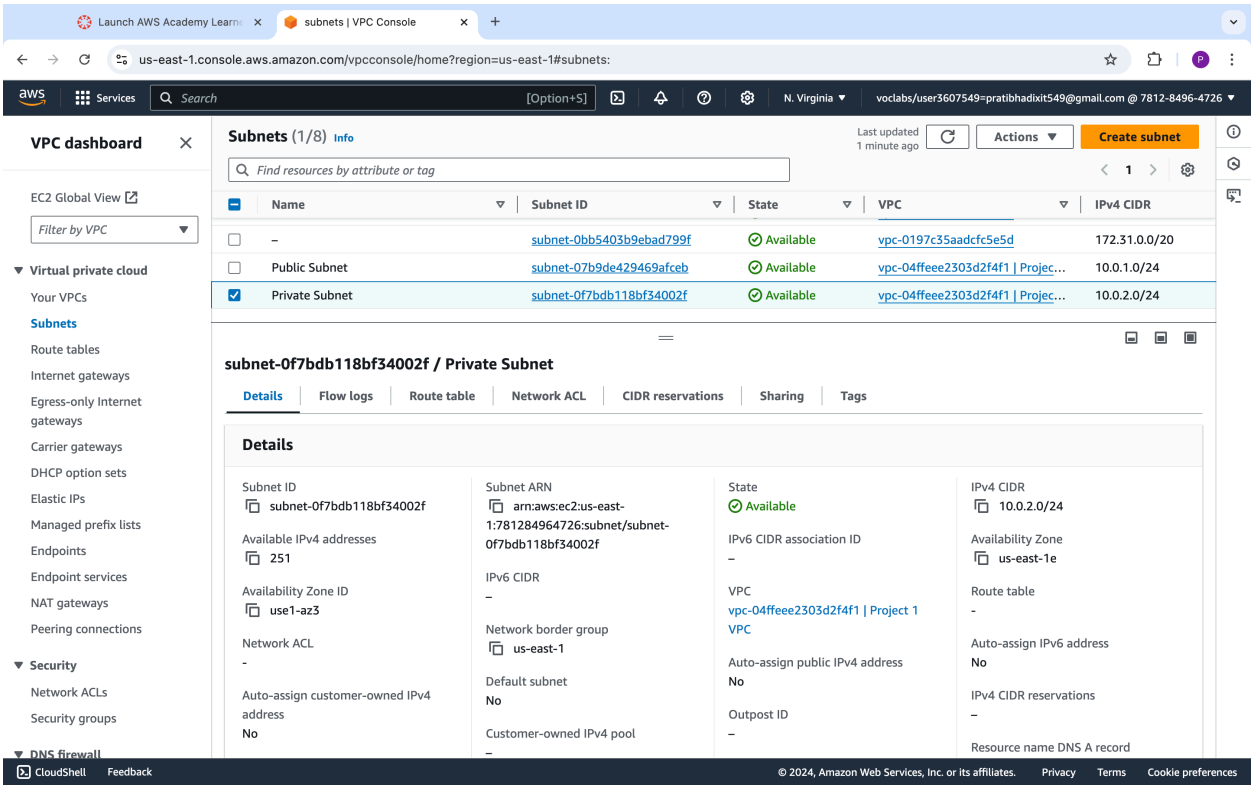
Launch AWS Academy Learn
subnets | VPC Console
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#subnets:
Services
Search
[Option+S]
N. Virginia
voclabs/user3607549=pratibhadixit549@gmail.com @ 7812-8496-4726
VPC dashboard
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only Internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
Network ACLs
Security groups
DNS firewall
Subnets (1/8) Info
Last updated 1 minute ago
Actions
Create subnet
Find resources by attribute or tag
Name
Subnet ID
State
VPC
IPv4 CIDR
– subnet-0bb5403b9ebad799f Available vpc-0197c35aadcfc5e5d 172.31.0.0/20
Public Subnet subnet-07b9de429469afceb Available vpc-04ffeee2303d2f4f1 | Projec... 10.0.1.0/24
Private Subnet subnet-0f7bdb118bf34002f Available vpc-04ffeee2303d2f4f1 | Projec... 10.0.2.0/24
subnet-0f7bdb118bf34002f / Private Subnet
Details
Flow logs
Route table
Network ACL
CIDR reservations
Sharing
Tags
Details
Subnet ID
subnet-0f7bdb118bf34002f
Available IPv4 addresses
251
Availability Zone ID
use1-az3
Network ACL
-
Auto-assign customer-owned IPv4 address
No
Subnet ARN
arn:aws:ec2:us-east-1:781284964726:subnet/subnet-0f7bdb118bf34002f
IPv6 CIDR
–
Network border group
us-east-1
Default subnet
No
Customer-owned IPv4 pool
–
State
Available
IPv6 CIDR association ID
–
VPC
vpc-04ffeee2303d2f4f1 | Project 1 VPC
Auto-assign public IPv4 address
No
Outpost ID
–
IPv4 CIDR
10.0.2.0/24
Availability Zone
us-east-1e
Route table
-
Auto-assign IPv6 address
No
IPv4 CIDR reservations
–
Resource name DNS A record
CloudShell
Feedback
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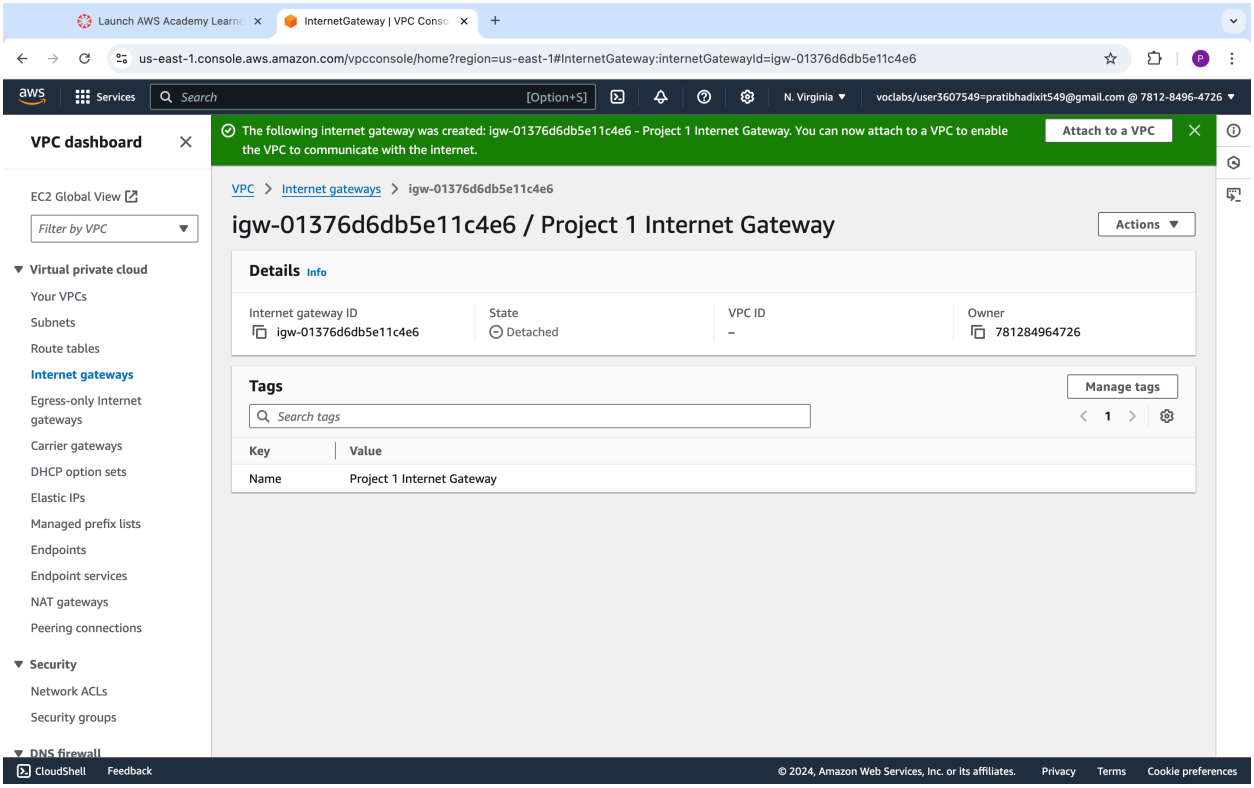
Step 2 : Internet Gateway and VPC

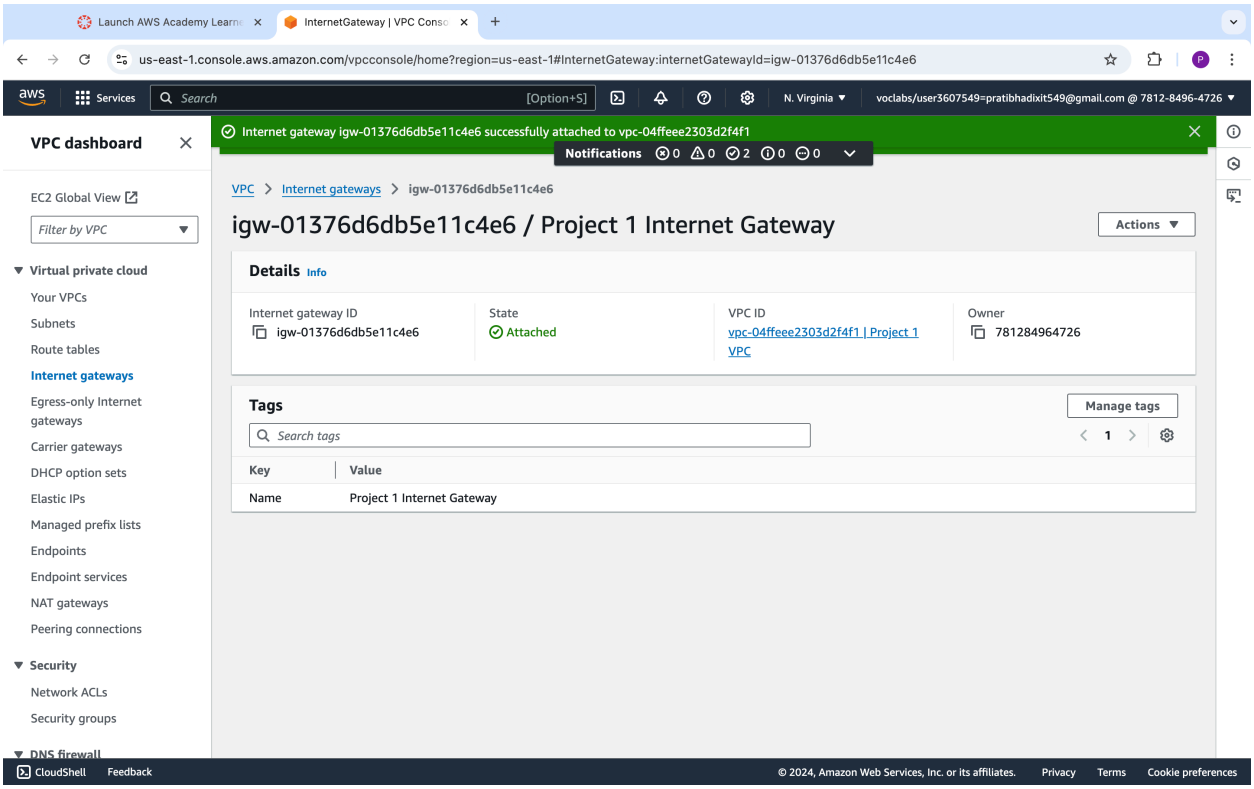
Step number	a
Step name	Creation and Configuration of Internet Gateway
Instructions	1) Navigate to VPCs->Internet Gateway 2) Click on "Create Internet Gateway" 3) Enter the name tag "Project 1 Internet Gateway" and click on "Create Internet Gateway" 4) After the gateway is created, select it and click on Actions->Attach to VPC 5) Select the Project 1 VPC and click on "Attach Internet Gateway"
Expected screenshots	1) Creation of Internet Gateway

<Insert Screenshot a(1) here >

Internet Gateway Creation before VPC attached Screenshot:



Internet Gateway Creation Screenshot after VPC attached:


Launch AWS Academy Learne
InternetGateway | VPC Conso
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#InternetGateway:internetGatewayId=igw-01376d6db5e11c4e6
Services
Search
[Option+S]
N. Virginia
voclabs/user3607549=pratibhadixit549@gmail.com @ 7812-8496-4726
VPC dashboard
Internet gateway igw-01376d6db5e11c4e6 successfully attached to vpc-04ffeee2303d2f4f1
Notifications
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only Internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
Network ACLs
Security groups
DNS firewall
VPC > Internet gateways > igw-01376d6db5e11c4e6
igw-01376d6db5e11c4e6 / Project 1 Internet Gateway
Actions
Details Info
Internet gateway ID
igw-01376d6db5e11c4e6
State
Attached
VPC ID
vpc-04ffeee2303d2f4f1 | Project 1 VPC
Owner
781284964726
Tags
Manage tags
Search tags
Key
Value
Name
Project 1 Internet Gateway
CloudShell
Feedback
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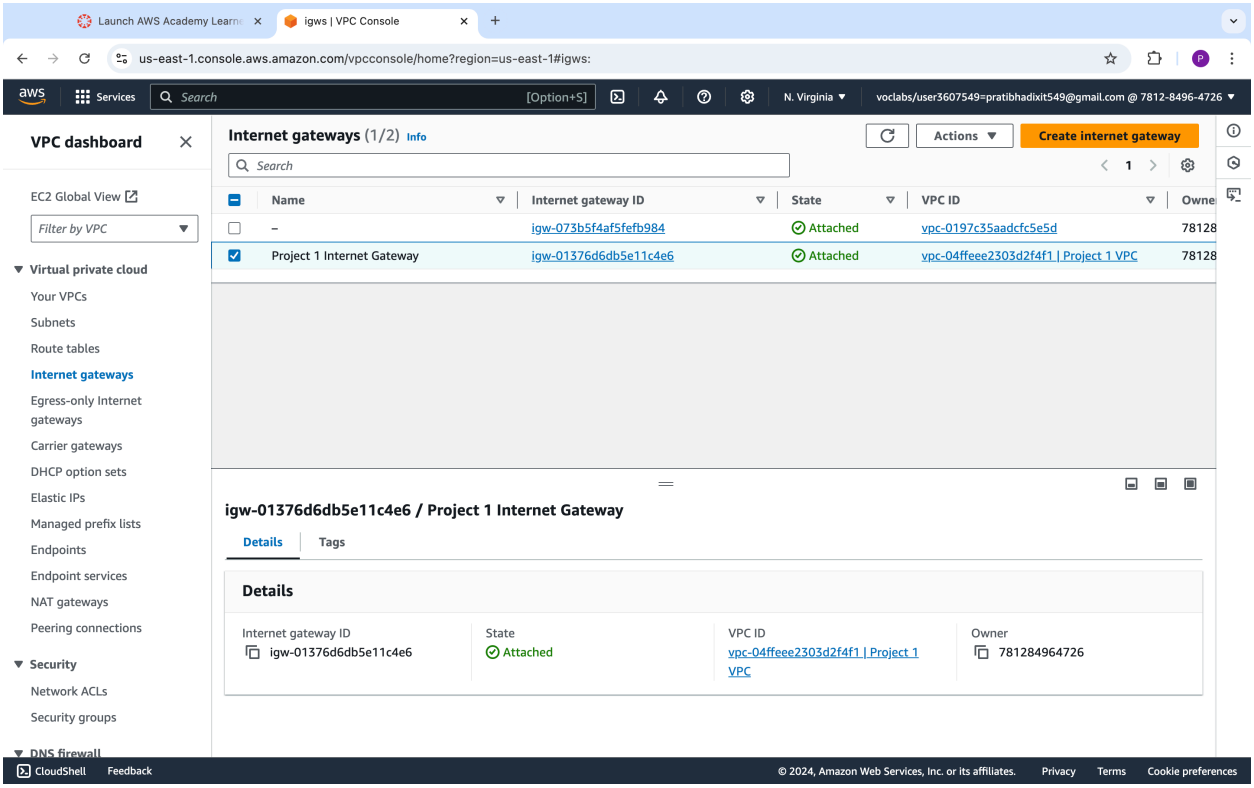
Launch AWS Academy Learne
igws | VPC Console
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#igws:
Services
Search
[Option+S]
N. Virginia
voclabs/user3607549=pratibhadixit549@gmail.com @ 7812-8496-4726
VPC dashboard
Internet gateways (1/2) Info
Actions
Create internet gateway
Search
Name
Internet gateway ID
State
VPC ID
Owne
–
igw-073b5f4af5fefb984
Attached
vpc-0197c35aadcfc5e5d
78128
Project 1 Internet Gateway
igw-01376d6db5e11c4e6
Attached
vpc-04ffeee2303d2f4f1 | Project 1 VPC
78128
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only Internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
Endpoints
Endpoint services
NAT gateways
Peering connections
Security
Network ACLs
Security groups
DNS firewall
igw-01376d6db5e11c4e6 / Project 1 Internet Gateway
Details
Tags
Details
Internet gateway ID
igw-01376d6db5e11c4e6
State
Attached
VPC ID
vpc-04ffeee2303d2f4f1 | Project 1 VPC
Owner
781284964726
CloudShell
Feedback
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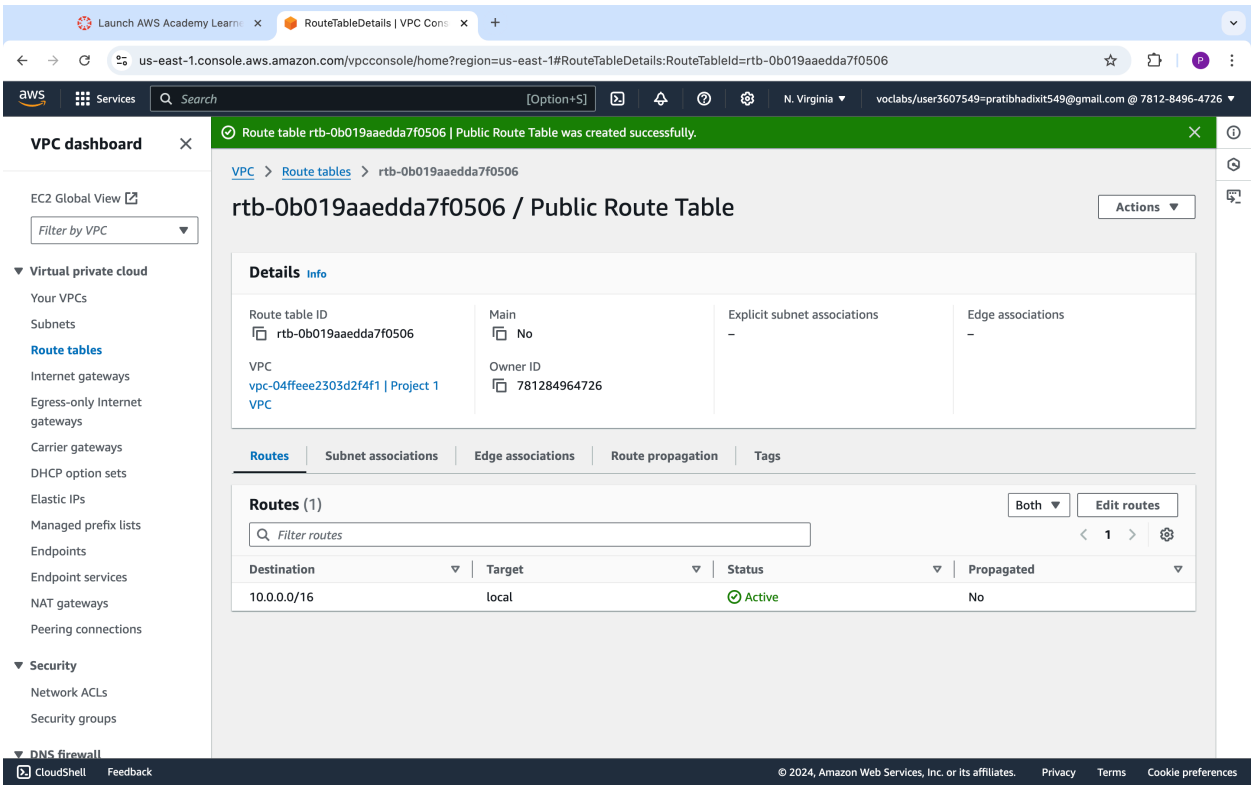
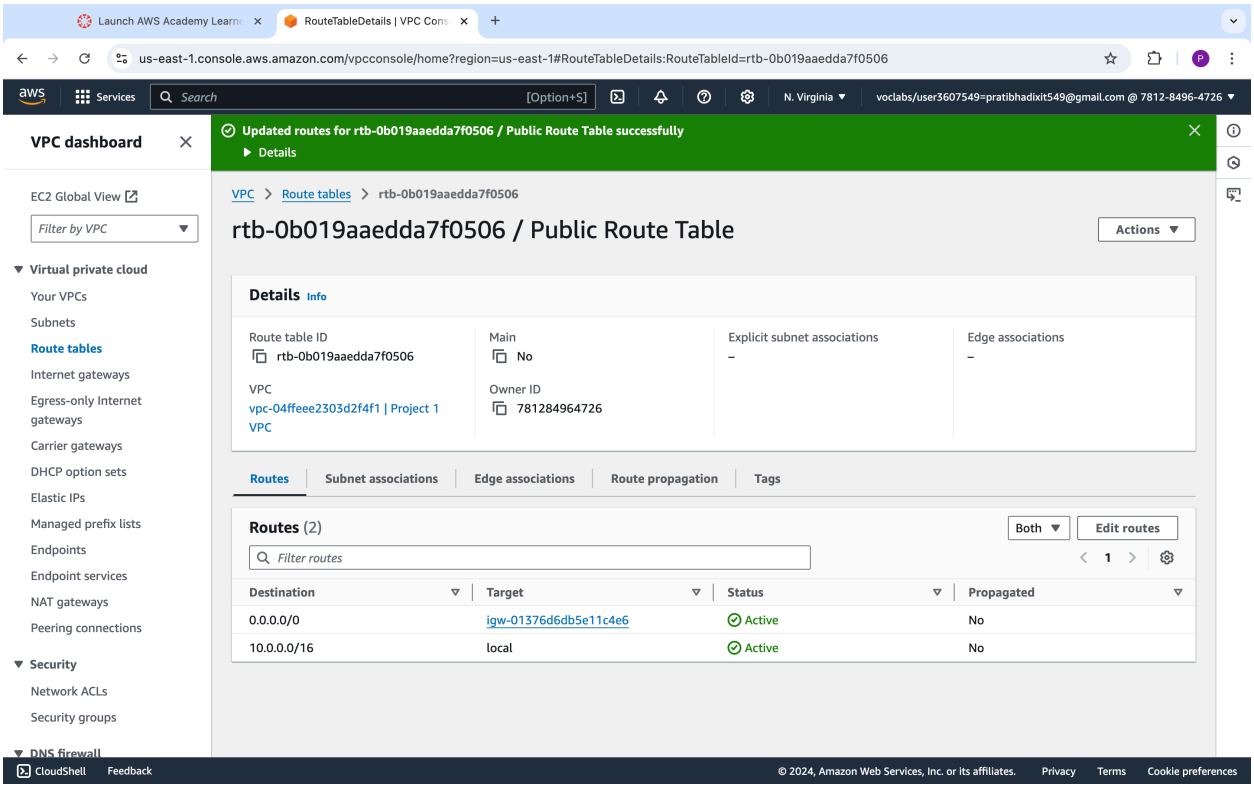
Step number	b
Step name	Creation of public route table
Instructions	1) Navigate to VPC -> Route Tables and click on Create Route table 2) Enter the name tag "Public Route Table", select the Project 1 VPC from the dropdown and click on Create 3) Once the route table is created, select it and select the Routes tab below the list of route tables 4) Click in Edit Routes and add the following route (Don't edit the existing one) - Destination : 0.0.0.0/0 - Target : Select Internet Gateway and the select the Project 1 Internet Gateway Click on Save Routes 5) Select the Subnet Associations tab and click on Edit Subnet Associations 6) Select the Public Subnet from the list and click on Save
Expected screenshots	1) Route list of the route table 2) Subnet Associations of the route table

<Insert Screenshot b(1) here>

Screenshot before editing Routes:

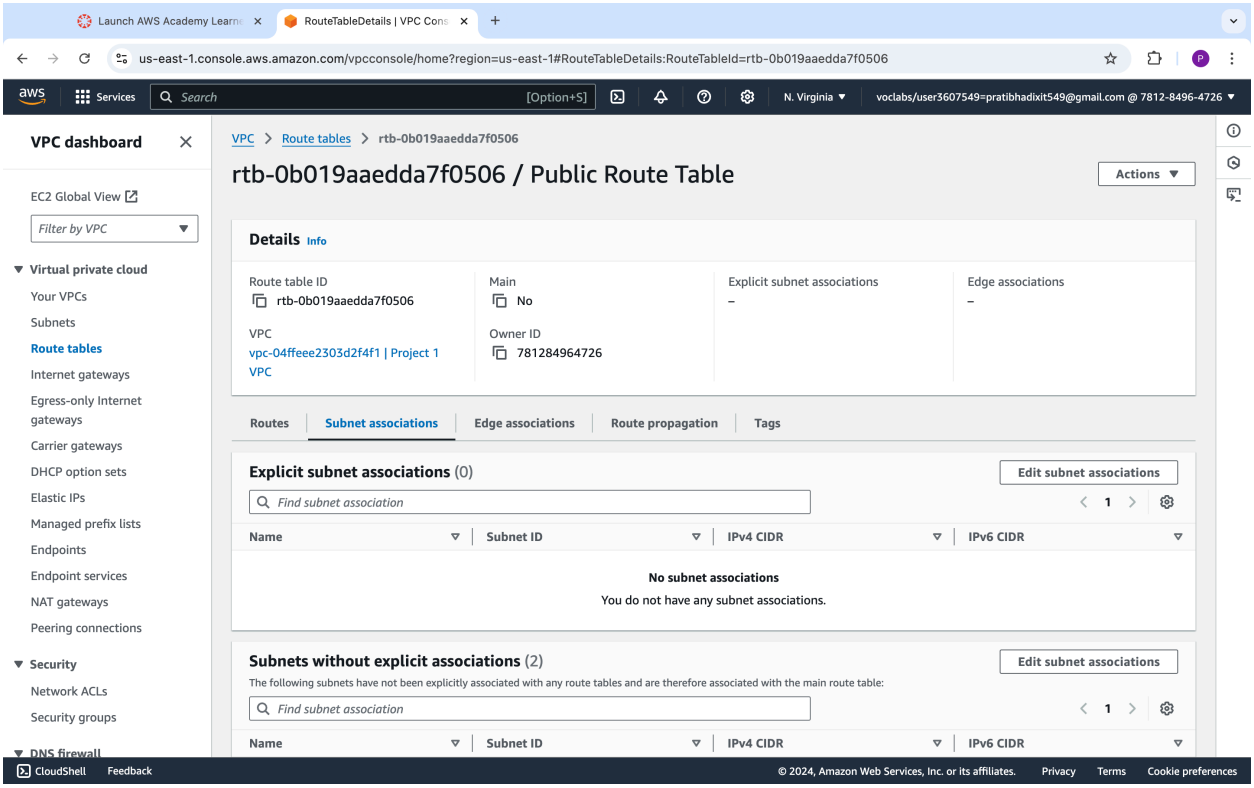


Screenshot after editing Routes:

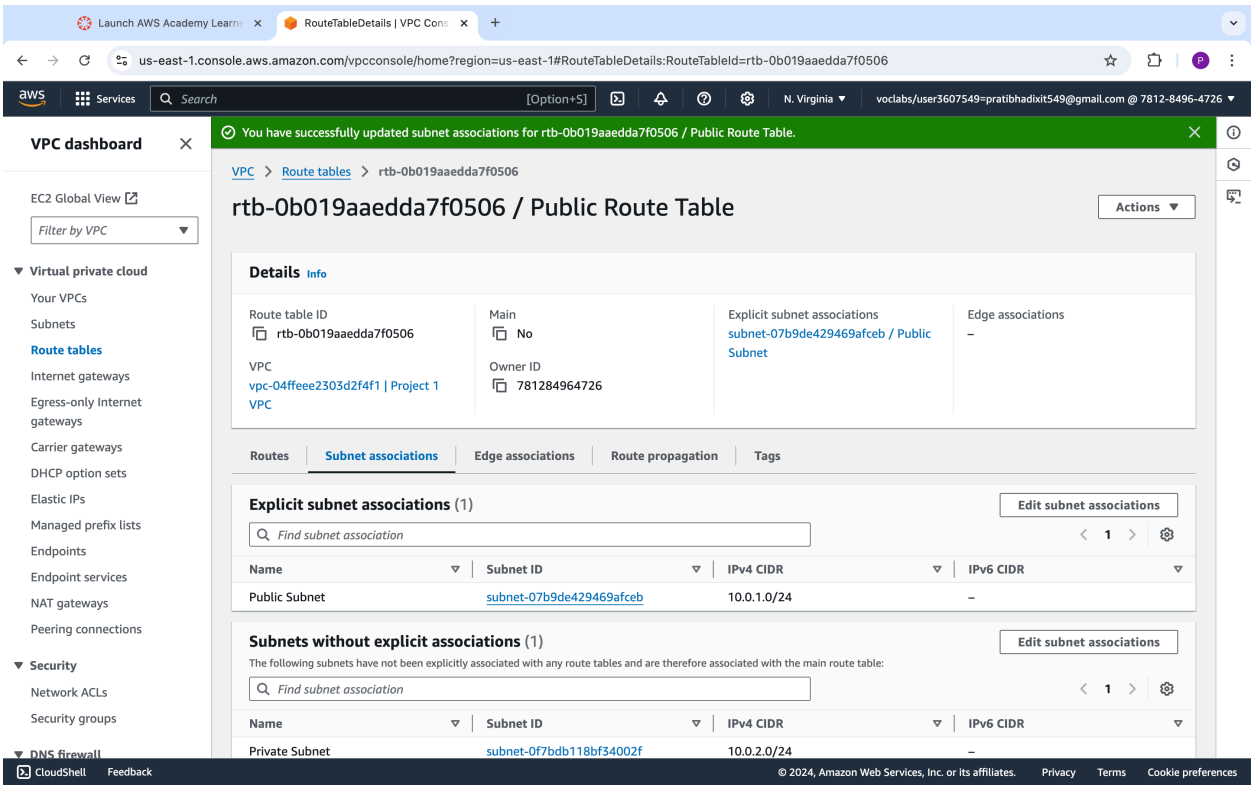


<Insert Screenshot b(2) here>

Screenshot before editing Subnet :



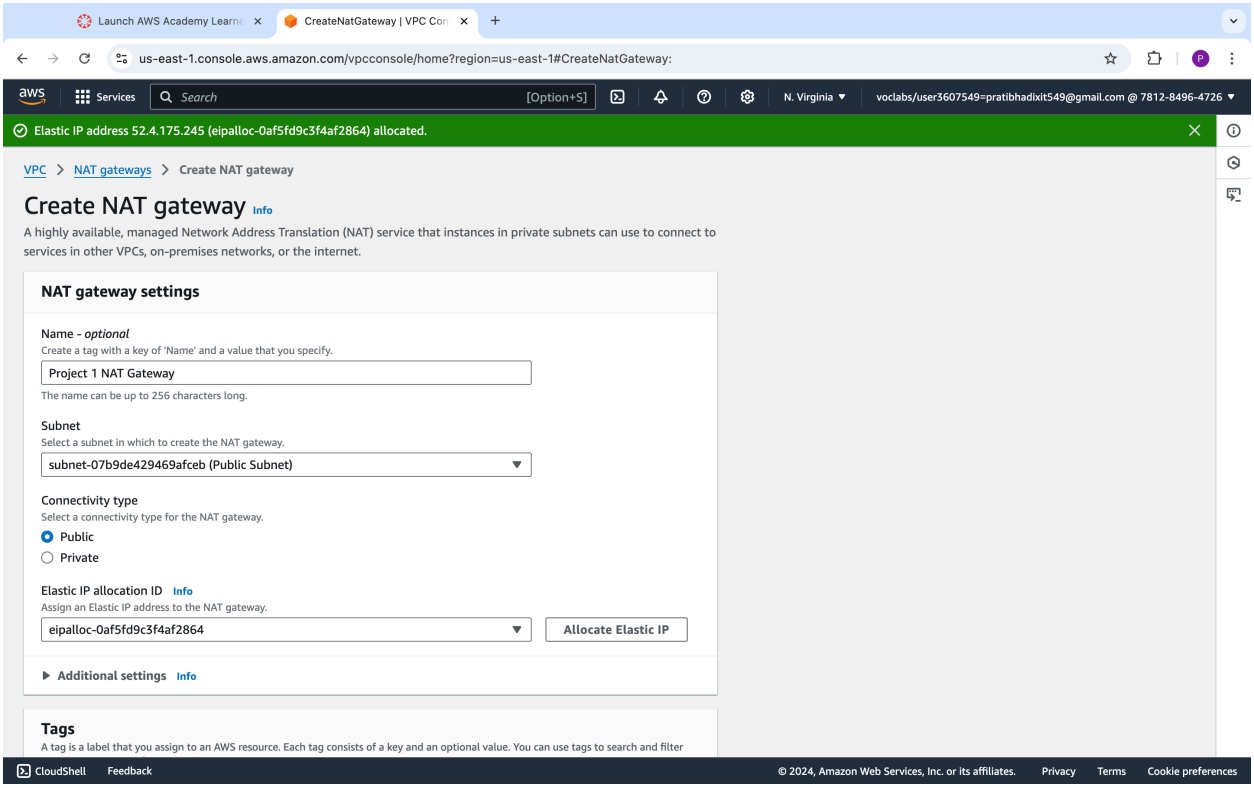
Screenshot after editing Subnet :

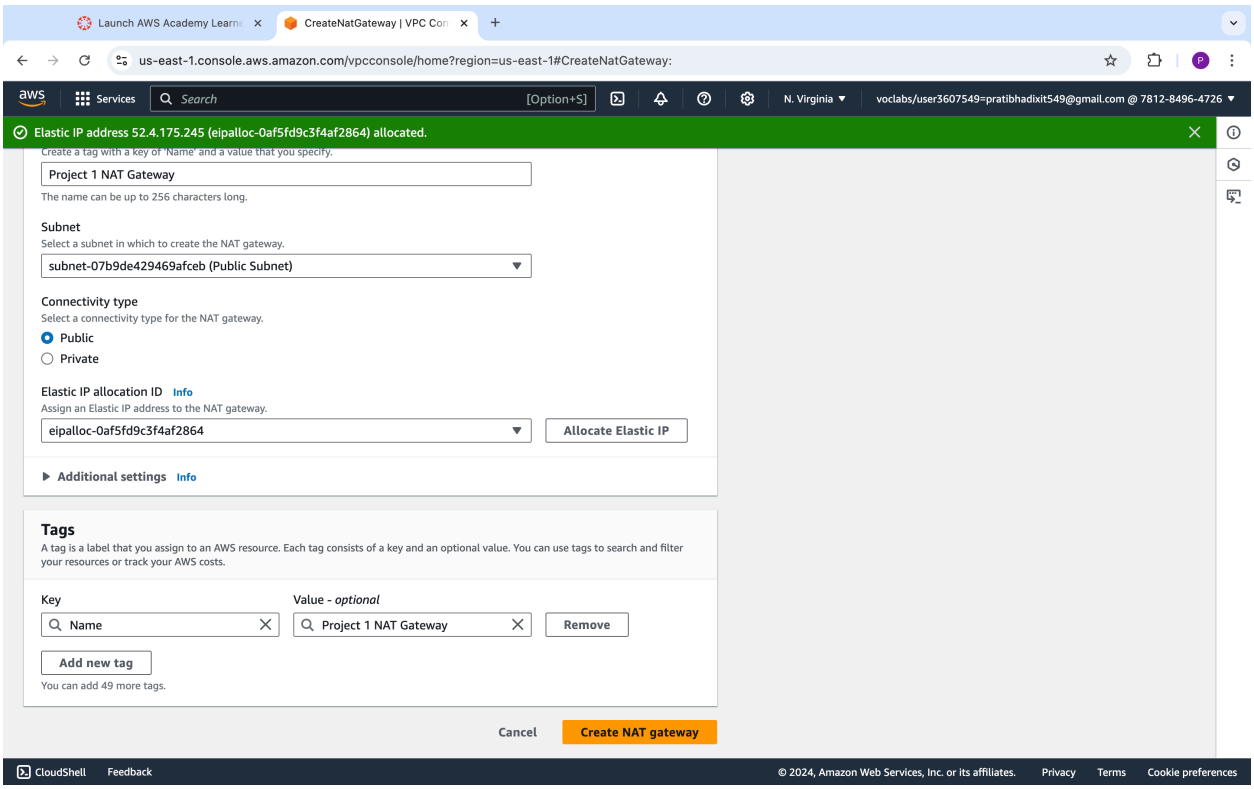


Step number	c
Step name	Creation of NAT gateway

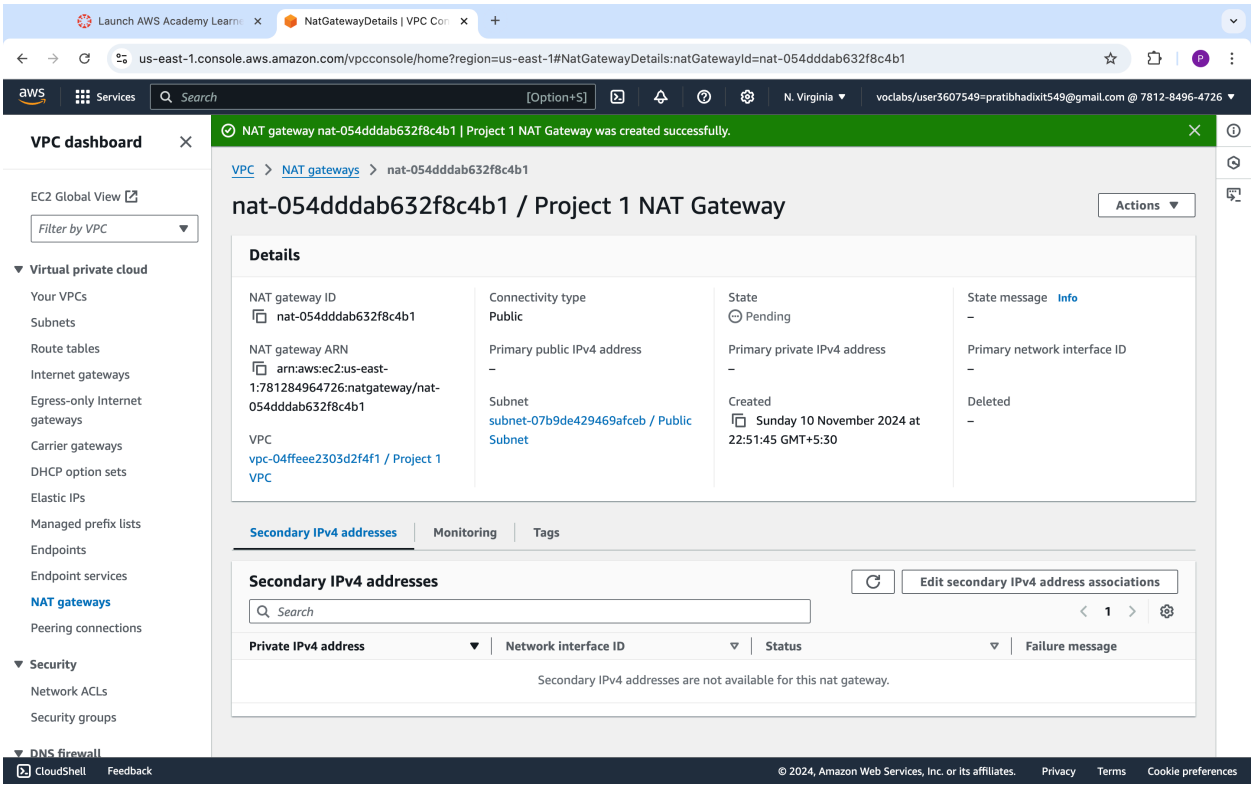
Instructions	1) Navigate to VPC using the Services button at the top of the screen 2) Select NAT Gateway at the left side of the screen 3) Click on Create NAT Gateway - Deploy it in the public subnet - Connectivity type : Public - Allocate an elastic IP by clicking on “Allocate Elastic IP” 4) Click on “Create NAT Gateway” to create the gateway
Expected screenshots	1) NAT gateway creation details 2) Gateway after creation

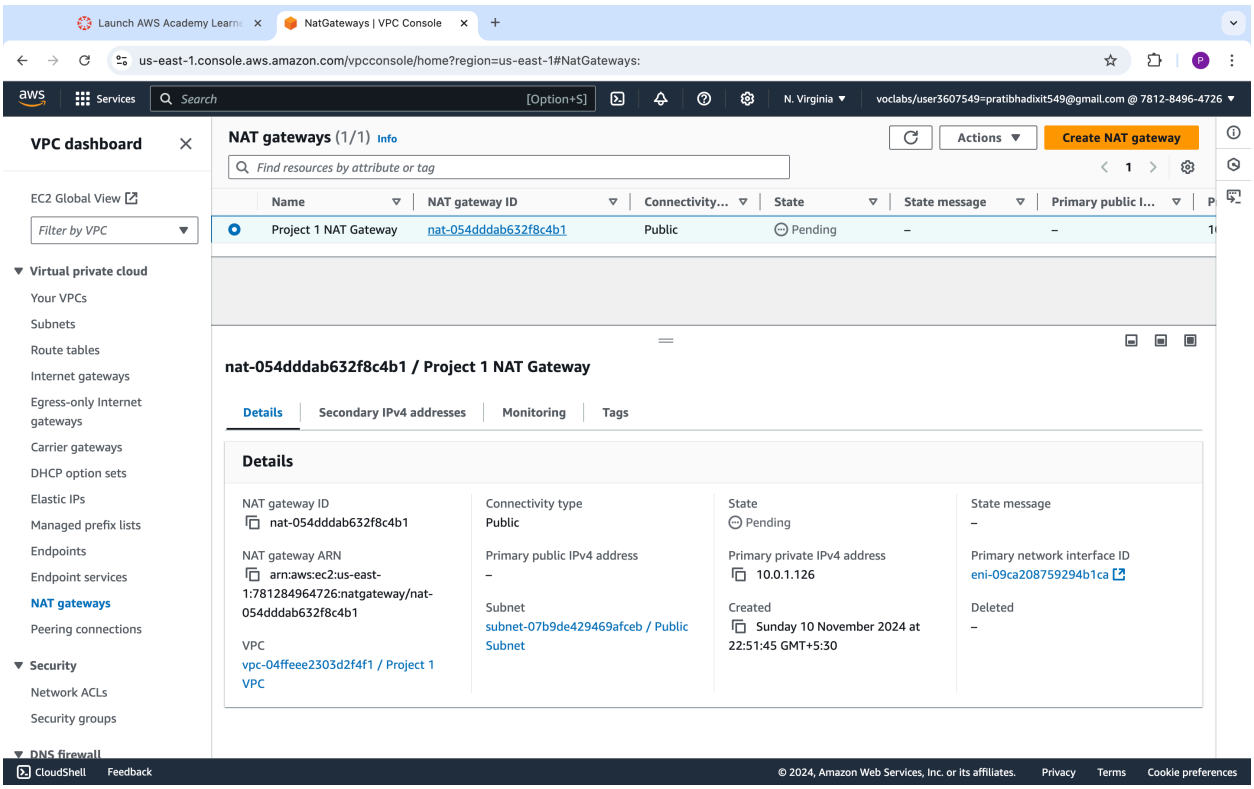
<Insert Screenshot c(1) here>





<Insert Screenshot c(2) here>



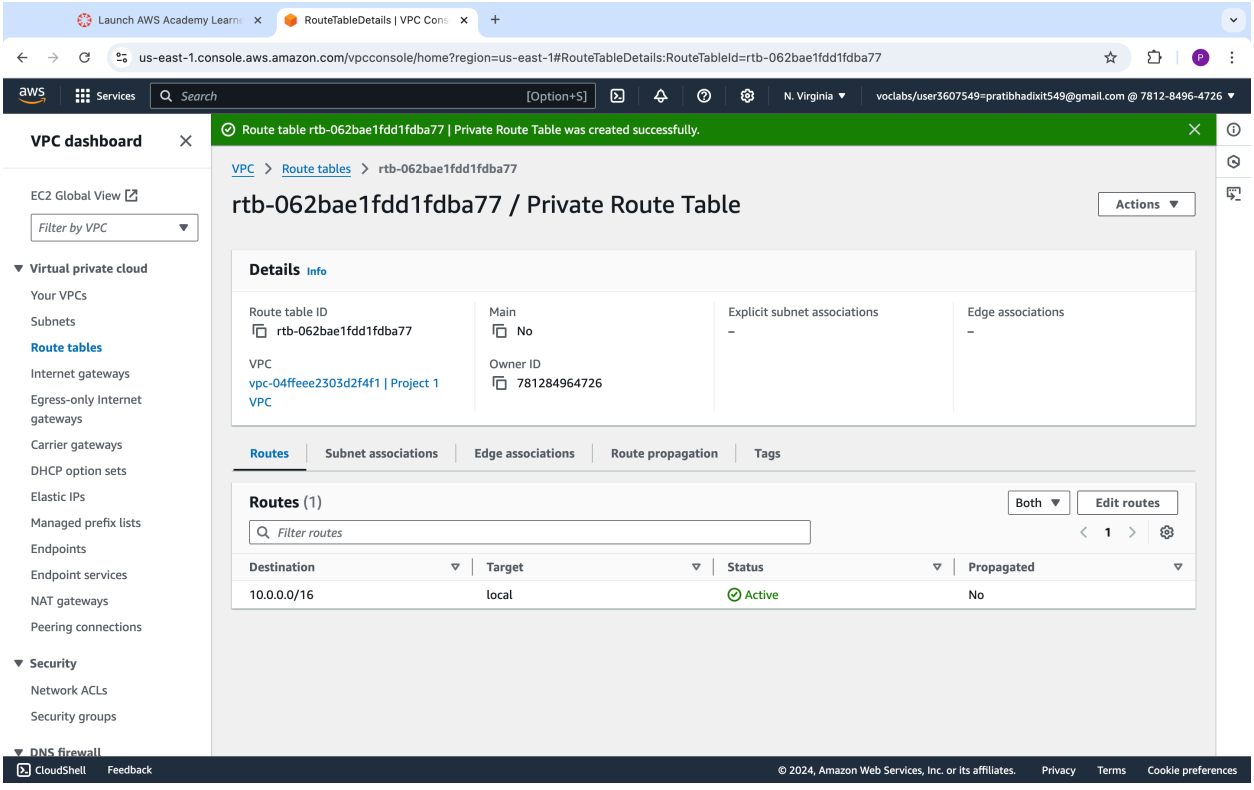


Step number	d
Step name	Creation of private route tables

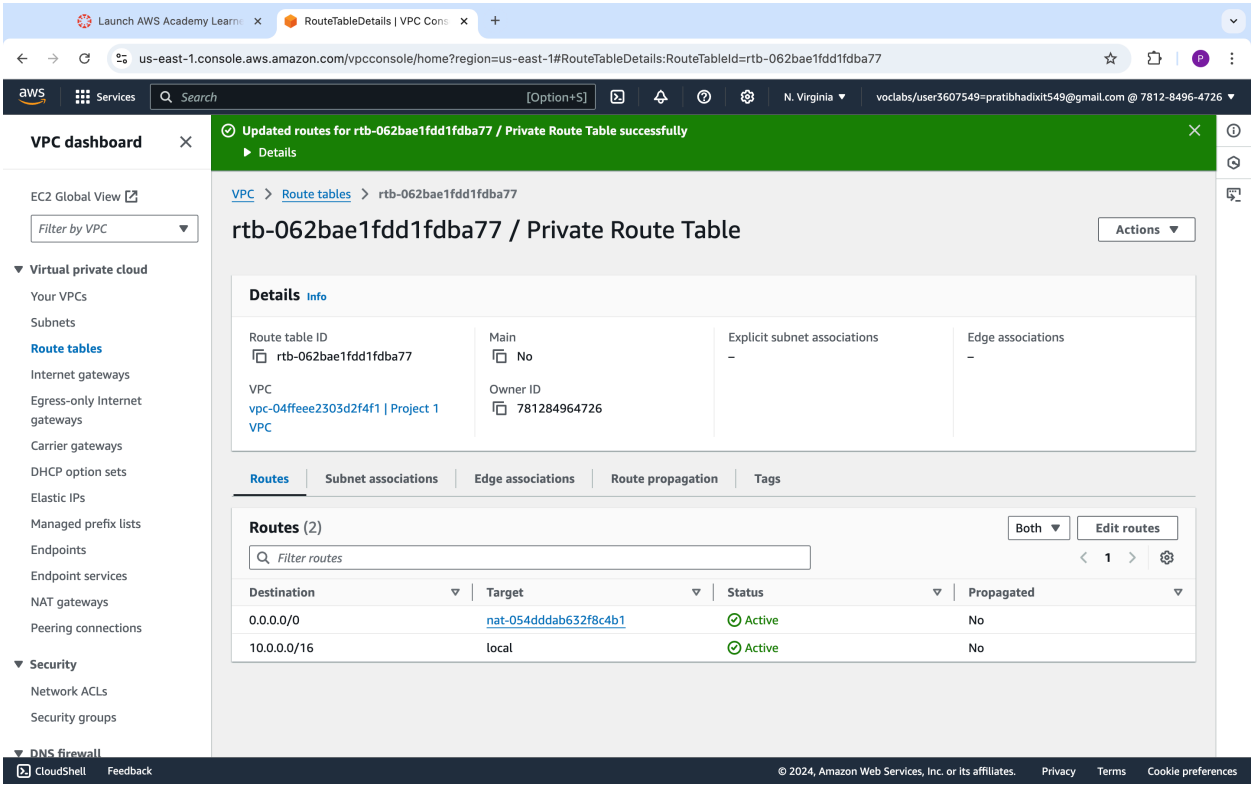
Instructions	1) Navigate to VPC -> Route Tables and click on Create Route table 2) Enter the name tag "Private Route Table", select the Project 1 VPC from the dropdown and click on Create 3) Once the route table is created, select it and select the Routes tab below the list of route tables 4) Click in Edit Routes and add the following route (Don't edit the existing one) - Destination : 0.0.0.0/0 - Target: Select NAT Gateway and select the NAT Gateway created in the previous step Click on Save Routes 5) Select the Subnet Associations tab and click on Edit Subnet Associations 6) Select the private Subnet from the list and click on Save
Expected screenshots	1) Route list of the route table 2) Subnet association of the route table

<Insert Screenshot for d(1) here >

Screenshot before editing Routes:

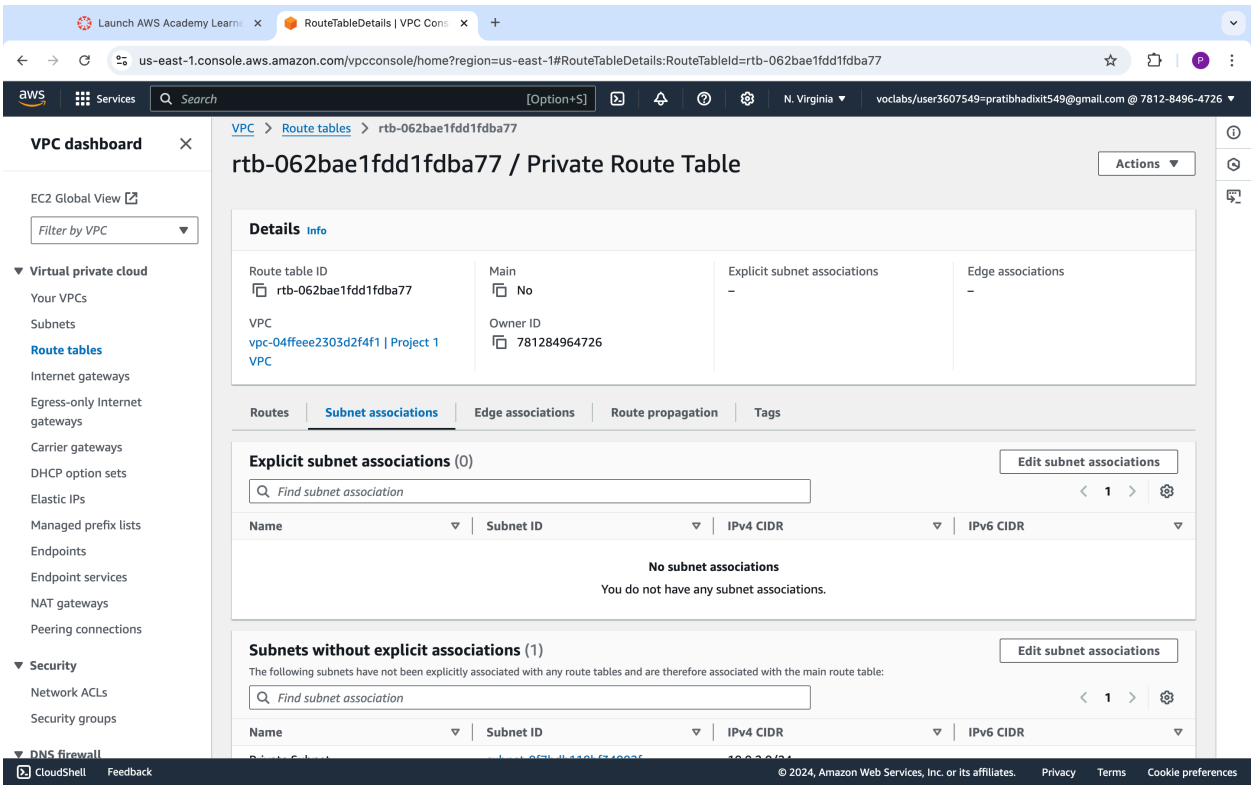


Screenshot after editing Routes:



<Insert Screenshot for d(2) here>

Screenshot before editing Subnet :



Screenshot after editing Subnet :