AWS Task-2

Task Description:

Set up a VPC with an Internet gateway, create a public subnet with 256 IP addresses, a private subnet with 256 IP addresses, make a route table connecting the Internet gateway and the subnets, and launch a Linux EC2 instance by using the above VPC and public subnet.

Part A: Base VPC & Public EC2 Setup

Step 1: Create a VPC
Step 2: Create public and private subnets (256 IPs each)
Step 3: Create and attach an Internet Gateway
Step 4: Public Route Table configuration and Internet Gateway association
Step 5: Create a Security Group
Step 6: Verify Network ACLs
Step 7: Launch a Linux EC2 Instance in the Public Subnet
Step 8: Verify EC2 Instance and Web Access

Part B: DMZ Setup & Private Subnet Access

Step 9: Create a security group for private subnet
Step 10: Launch an EC2 instance in the private subnet
Step 11: Connect to the private server via the public server (bastion host)

Part C: Public Subnet Internet Access using NAT Gateway

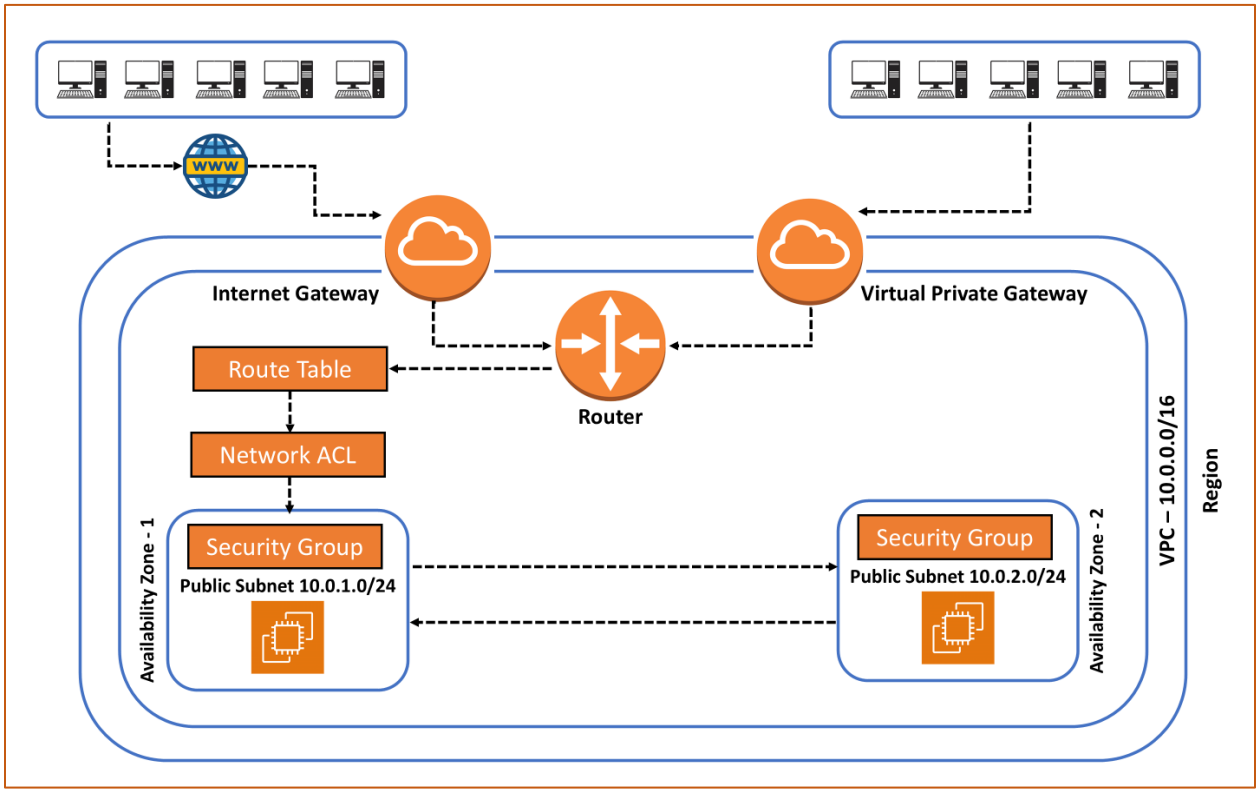
Step 12: Create a NAT Gateway and allocate an Elastic IP
Step 13: Create a private route table and associate the NAT Gateway with it
Step 14: Verify private subnet access to the internet
Step 15: Restrict direct internet access for the private subnet

Part D : Clean up

Delete all created AWS resources

- NAT Gateway
- Elastic IP
- EC2 Instances
- Custom VPC and associated components

VPC Architecture:



This architecture showcases a standard AWS network design using a VPC, public and private subnets, bastion host access, and NAT Gateway–based internet connectivity. The following steps outline the AWS networking and EC2 setup implemented as part of this task.

- Created a VPC with CIDR block **10.0.0.0/16**.
- Created a **public subnet (10.0.1.0/24)** and a **private subnet (10.0.2.0/24)**, each supporting 256 IP addresses.
- Created an **Internet Gateway (IGW)** and attached it to the VPC.
- **Modified the default route table** by adding the route **0.0.0.0/0 → Internet Gateway** and associated it with the public subnet.
- Created a **security group** allowing **SSH (22)** and **HTTP (80)** access from the internet.
- Verified that **Network ACLs** allow the required inbound and outbound traffic.
- Launched a **Linux EC2 instance** in the public subnet.
- Verified EC2 instance connectivity and web access from the internet.
- Created a **security group for the private subnet** allowing SSH access only from the public subnet security group.
- Launched a **Linux EC2 instance** in the private subnet with no public IP assigned.
- Connected to the private EC2 instance via the public EC2 instance (**bastion host**) using SSH.

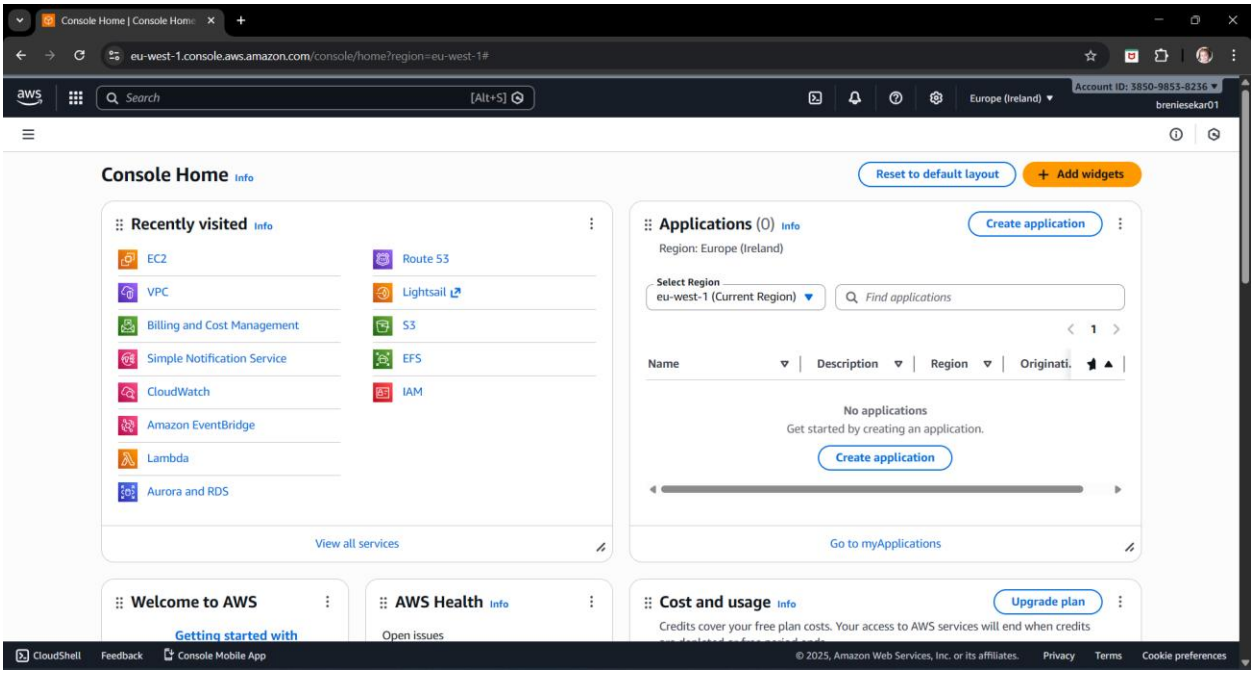
- Created a **NAT Gateway** in the public subnet and allocated an **Elastic IP address**.
- Created a **private route table** with route **0.0.0.0/0 → NAT Gateway** and associated it with the private subnet.
- Verified that the private EC2 instance can access the internet (e.g., software updates).
- Ensured that no direct Internet Gateway route exists for the private subnet.
- Terminated both public and private EC2 instances.
- Deleted the NAT Gateway and released the Elastic IP address.
- Deleted route tables, security groups, subnets, Internet Gateway, and finally the custom VPC.

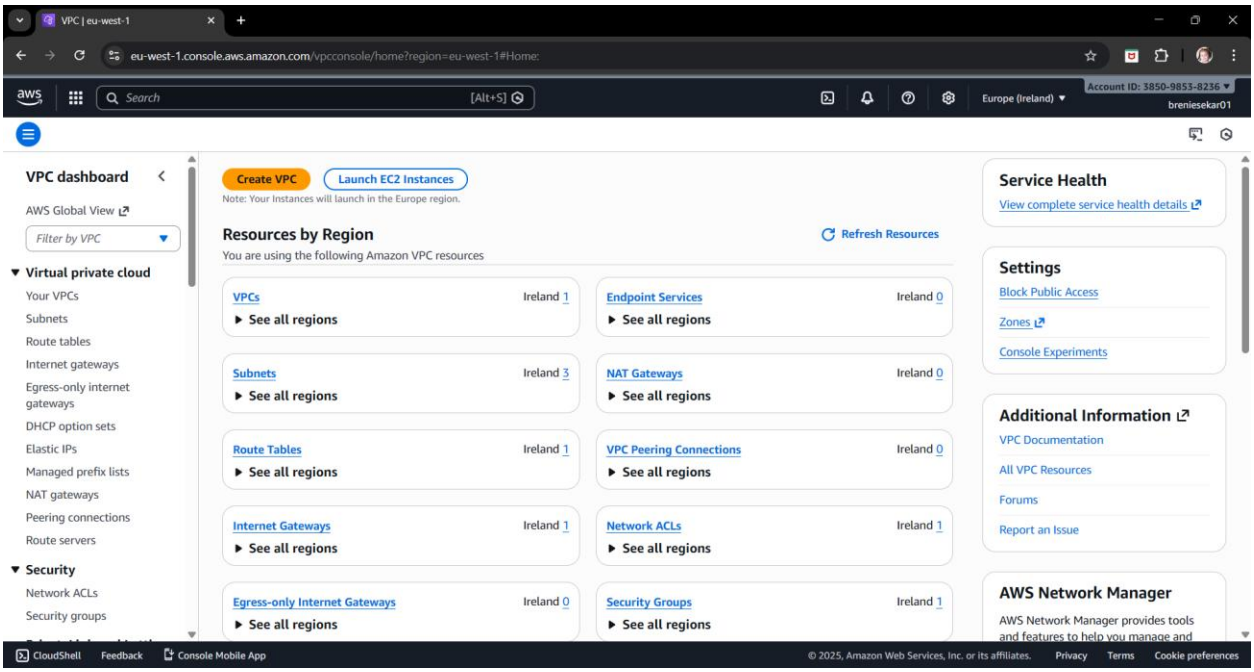
Part A : Base VPC & Public EC2 Setup

Step 1: Create a VPC

A VPC is a logically isolated network in AWS used to deploy and manage cloud resources securely.

- A custom VPC named **custVPC01** was created in the **eu-west-1 (Ireland) region** using the AWS Management Console.
- The VPC was assigned an IPv4 CIDR block of **10.0.0.0/16,** providing sufficient IP addresses for public and private subnets.
- AWS automatically created a default route table and network ACL for the VPC.
- The VPC was successfully created and is in the **Available** state.




VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#Home:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
Create VPC
Launch EC2 Instances
Note: Your Instances will launch in the Europe region.
Resources by Region
Refresh Resources
You are using the following Amazon VPC resources
VPCs Ireland 1
See all regions
Endpoint Services Ireland 0
See all regions
Subnets Ireland 3
See all regions
NAT Gateways Ireland 0
See all regions
Route Tables Ireland 1
See all regions
VPC Peering Connections Ireland 0
See all regions
Internet Gateways Ireland 1
See all regions
Network ACLs Ireland 1
See all regions
Egress-only Internet Gateways Ireland 0
See all regions
Security Groups Ireland 1
See all regions
Service Health
View complete service health details
Settings
Block Public Access
Zones
Console Experiments
Additional Information
VPC Documentation
All VPC Resources
Forums
Report an Issue
AWS Network Manager
AWS Network Manager provides tools and features to help you manage and
CloudShell
Feedback
Console Mobile App
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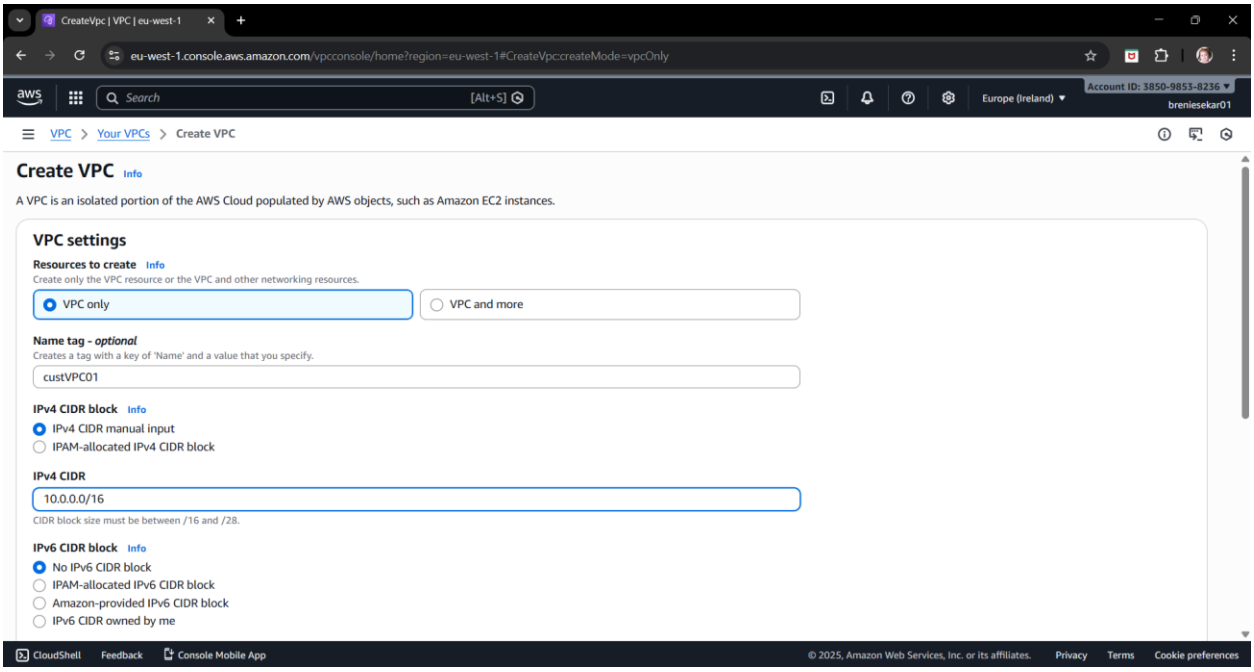
CreateVpc | VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateVpc:createMode=vpcOnly
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Your VPCs > Create VPC
Create VPC Info
A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.
VPC settings
Resources to create Info
Create only the VPC resource or the VPC and other networking resources.
VPC only
VPC and more
Name tag - optional
Creates a tag with a key of 'Name' and a value that you specify.
custVPC01
IPv4 CIDR block Info
IPv4 CIDR manual input
IPAM-allocated IPv4 CIDR block
IPv4 CIDR
10.0.0.0/16
CIDR block size must be between /16 and /28.
IPv6 CIDR block Info
No IPv6 CIDR block
IPAM-allocated IPv6 CIDR block
Amazon-provided IPv6 CIDR block
IPv6 CIDR owned by me
CloudShell
Feedback
Console Mobile App
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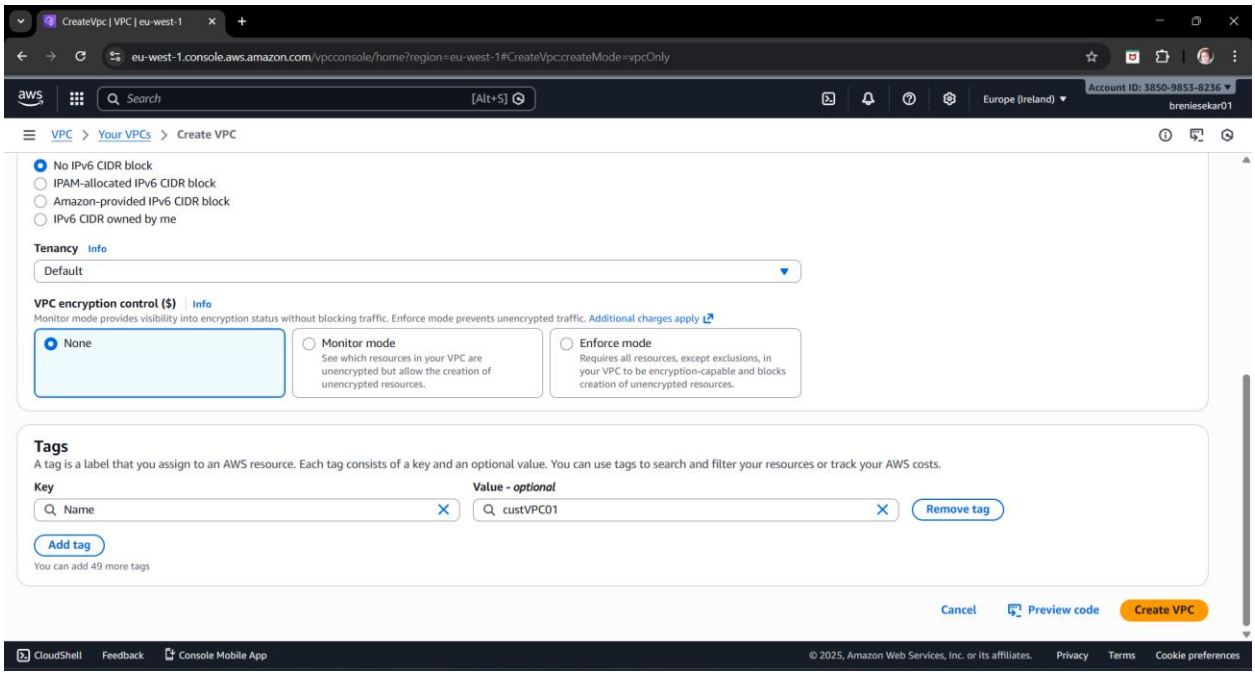
CreateVpc | VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateVpc:createMode=vpcOnly
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Your VPCs > Create VPC
No IPv6 CIDR block
IPAM-allocated IPv6 CIDR block
Amazon-provided IPv6 CIDR block
IPv6 CIDR owned by me
Tenancy Info
Default
VPC encryption control ($) Info
Monitor mode provides visibility into encryption status without blocking traffic. Enforce mode prevents unencrypted traffic. Additional charges apply
None
Monitor mode
See which resources in your VPC are unencrypted but allow the creation of unencrypted resources.
Enforce mode
Requires all resources, except exclusions, in your VPC to be encryption-capable and blocks creation of unencrypted resources.
Tags
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
custVPC01
Remove tag
Add tag
You can add 49 more tags
Cancel
Preview code
Create VPC
CloudShell
Feedback
Console Mobile App
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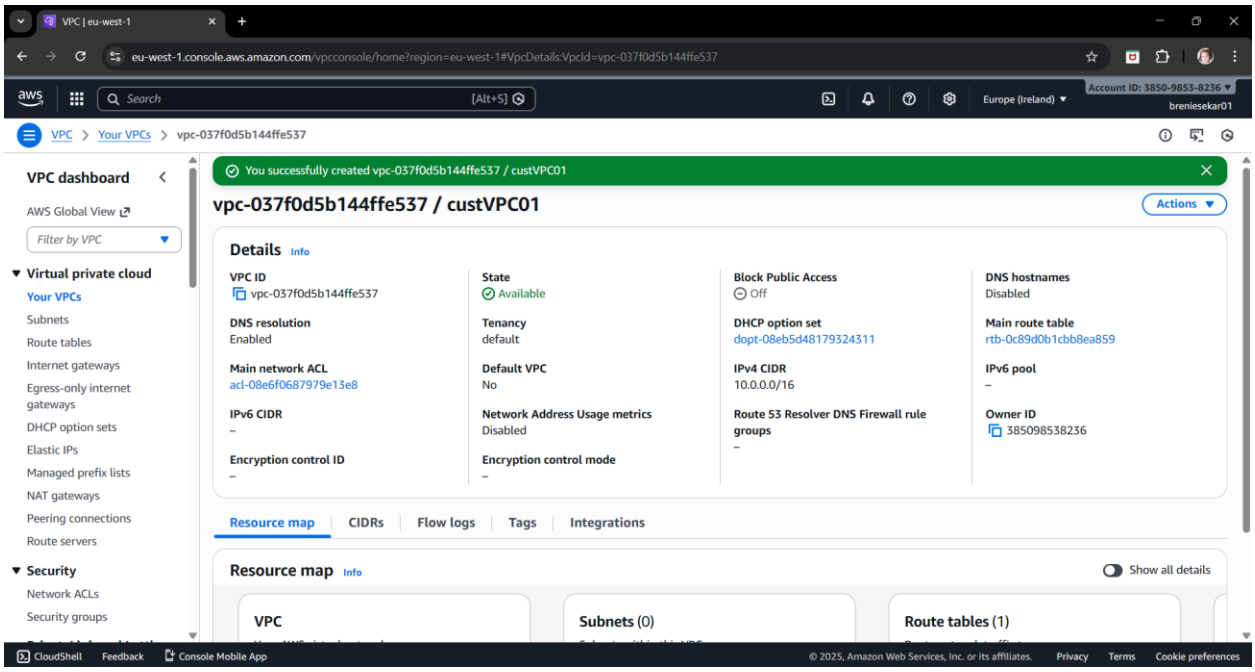
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#VpcDetails:VpcId=vpc-037f0d5b144ffe537
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Your VPCs > vpc-037f0d5b144ffe537
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
You successfully created vpc-037f0d5b144ffe537 / custVPC01
vpc-037f0d5b144ffe537 / custVPC01
Actions
Details Info
VPC ID
vpc-037f0d5b144ffe537
State
Available
Block Public Access
Off
DNS hostnames
Disabled
DNS resolution
Enabled
Tenancy
default
DHCP option set
dopt-08eb5d48179324311
Main route table
rtb-0c89d0b1cbb8ea859
Main network ACL
acl-08e6f0687979e13e8
Default VPC
No
IPv4 CIDR
10.0.0.0/16
IPv6 pool
–
IPv6 CIDR
–
Network Address Usage metrics
Disabled
Route 53 Resolver DNS Firewall rule groups
–
Owner ID
385098538236
Encryption control ID
–
Encryption control mode
–
Resource map
CIDRs
Flow logs
Tags
Integrations
Resource map Info
Show all details
VPC
Subnets (0)
Route tables (1)
CloudShell
Feedback
Console Mobile App
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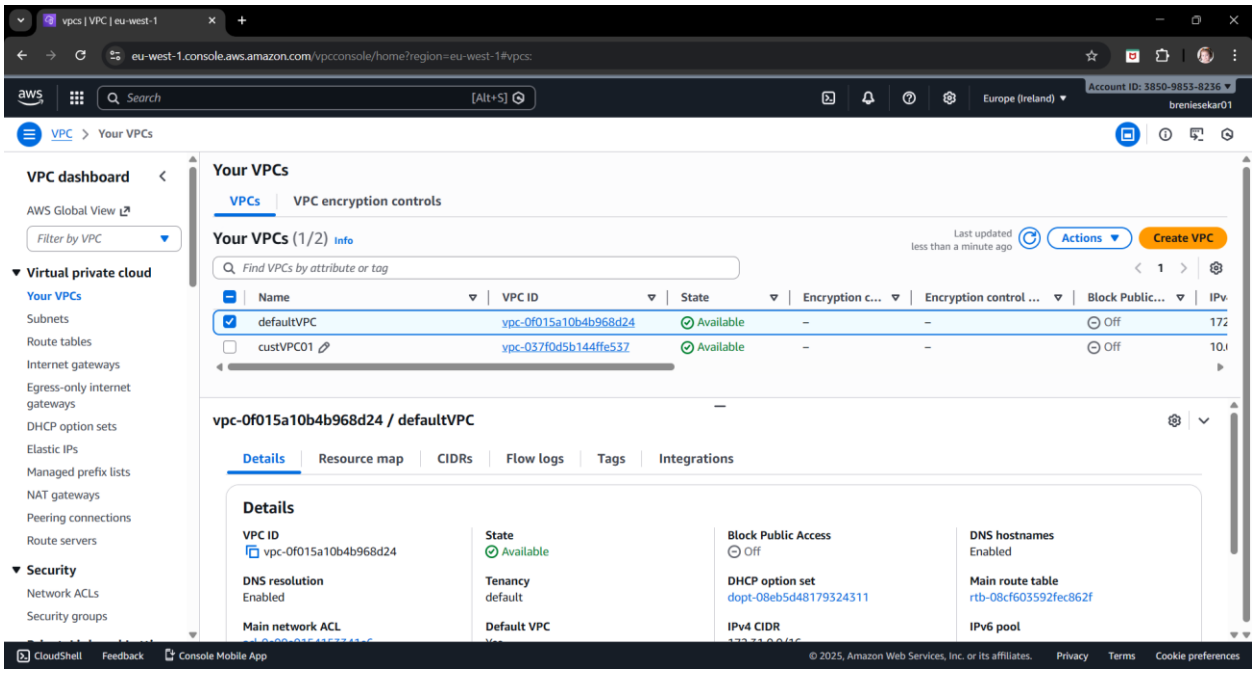
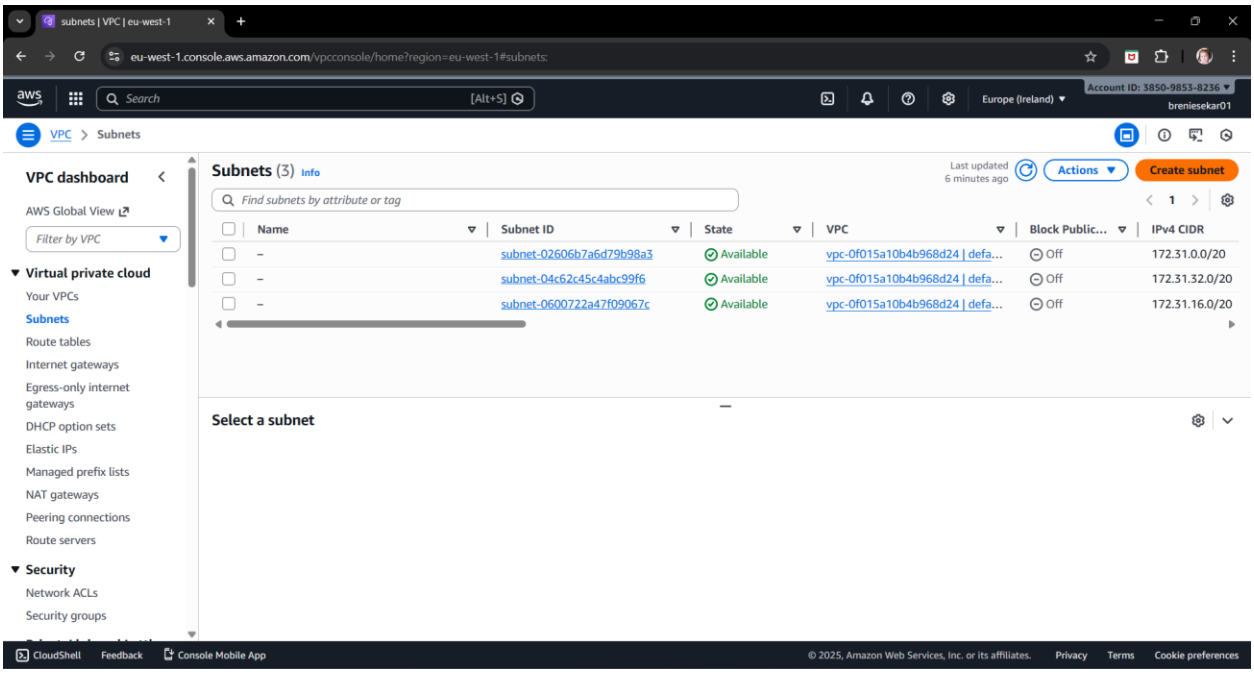


Step 2: Create public and private subnets (256 IPs each)

A subnet is a logical subdivision of a VPC that defines a range of IP addresses where AWS resources such as EC2 instances can be launched.

- Two subnets were created within the custom VPC **custVPC01**.
- A **public subnet** named **sn01-pub** was created with the CIDR block **10.0.1.0/24**, providing 256 IP addresses.
- A **private subnet** named **sn02-priv** was created with the CIDR block **10.0.2.0/24**, also providing 256 IP addresses.
- Both subnets were created within the VPC CIDR range **10.0.0.0/16**.
- The subnets were successfully created and are in the **Available** state.


subnets | VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#subnets:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Subnets
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
Subnets (3) Info
Last updated 6 minutes ago
Actions
Create subnet
Find subnets by attribute or tag
Name
Subnet ID
State
VPC
Block Public...
IPv4 CIDR
subnet-02606b7a6d79b98a3
Available
vpc-0f015a10b4b968d24 | defa...
Off
172.31.0.0/20
subnet-04c62c45c4abc99f6
Available
vpc-0f015a10b4b968d24 | defa...
Off
172.31.32.0/20
subnet-0600722a47f09067c
Available
vpc-0f015a10b4b968d24 | defa...
Off
172.31.16.0/20
Select a subnet
CloudShell
Feedback
Console Mobile App
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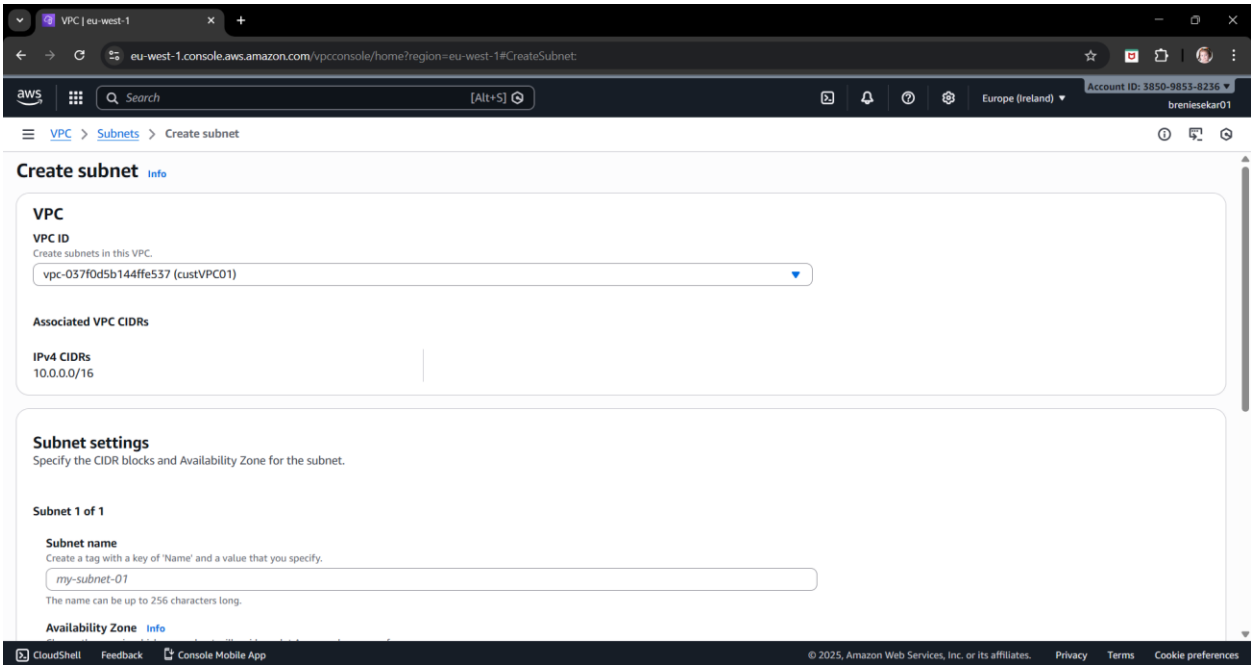
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateSubnet:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Subnets > Create subnet
Create subnet Info
VPC
VPC ID
Create subnets in this VPC.
vpc-037f0d5b144ffe537 (custVPC01)
Associated VPC CIDRs
IPv4 CIDRs
10.0.0.0/16
Subnet settings
Specify the CIDR blocks and Availability Zone for the subnet.
Subnet 1 of 1
Subnet name
Create a tag with a key of 'Name' and a value that you specify.
my-subnet-01
The name can be up to 256 characters long.
Availability Zone Info
CloudShell
Feedback
Console Mobile App
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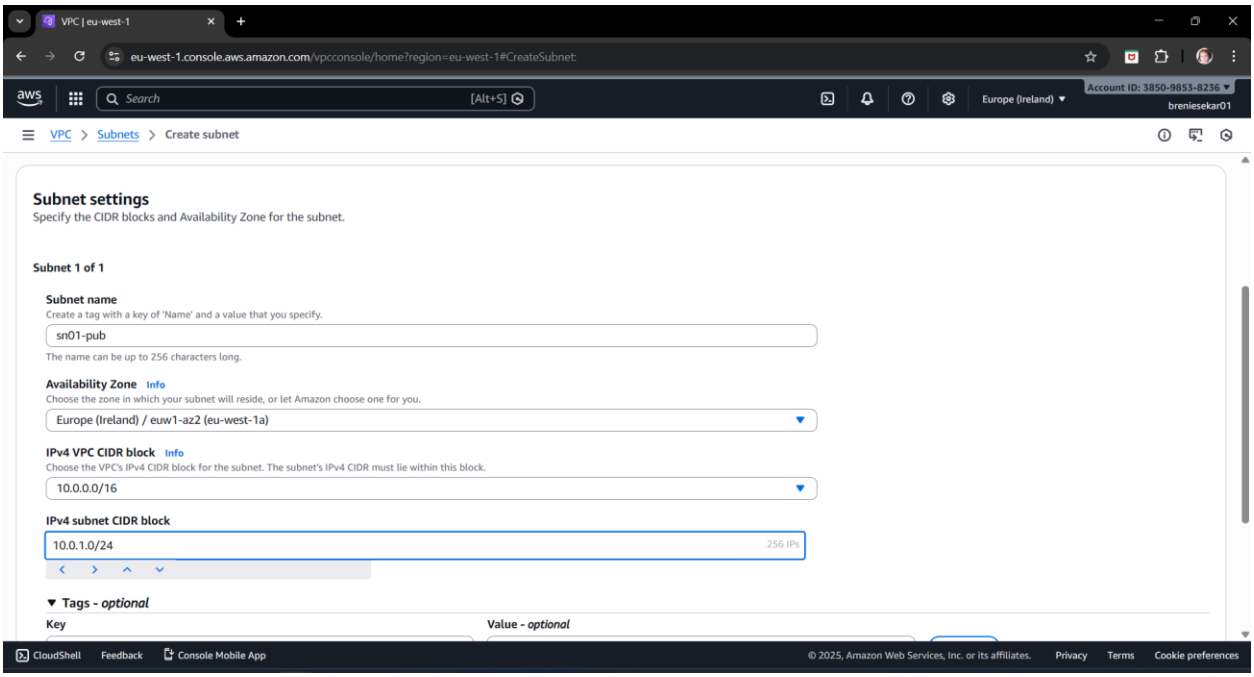
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateSubnet:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Subnets > Create subnet
Subnet settings
Specify the CIDR blocks and Availability Zone for the subnet.
Subnet 1 of 1
Subnet name
Create a tag with a key of 'Name' and a value that you specify.
sn01-pub
The name can be up to 256 characters long.
Availability Zone Info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.
Europe (Ireland) / euw1-az2 (eu-west-1a)
IPv4 VPC CIDR block Info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.
10.0.0.0/16
IPv4 subnet CIDR block
10.0.1.0/24
256 IPs
Tags - optional
Key
Value - optional
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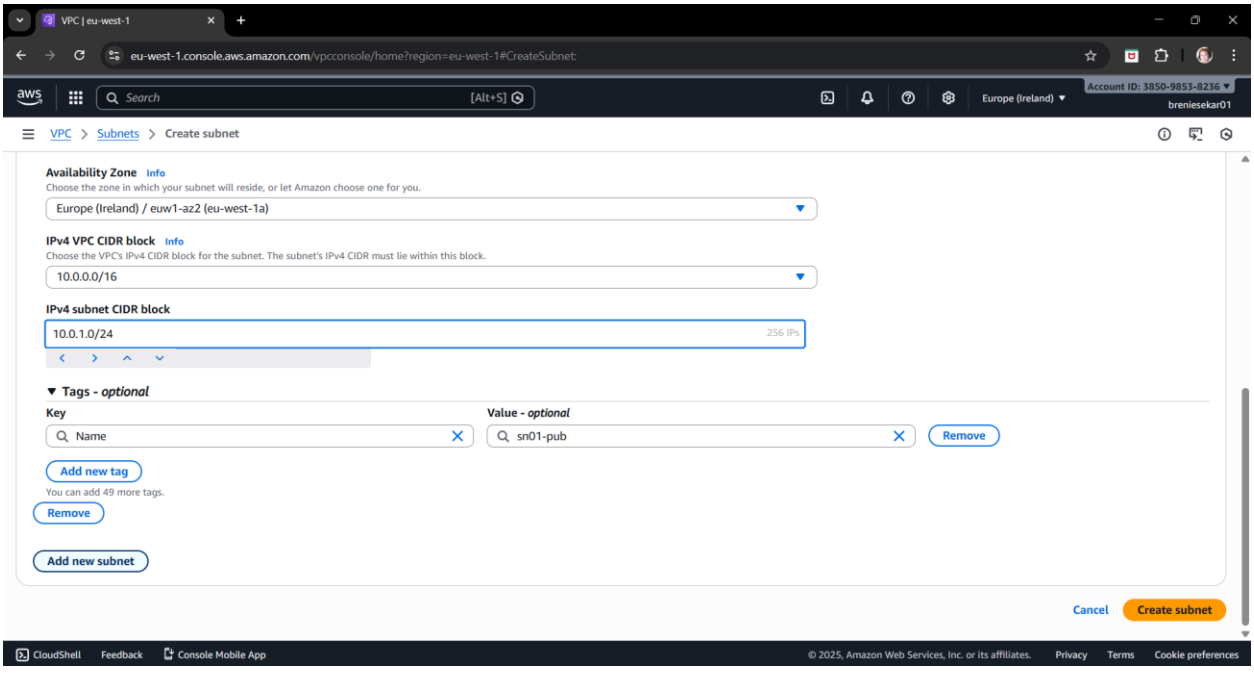
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateSubnet:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Subnets > Create subnet
Availability Zone Info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.
Europe (Ireland) / euw1-az2 (eu-west-1a)
IPv4 VPC CIDR block Info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.
10.0.0.0/16
IPv4 subnet CIDR block
10.0.1.0/24
256 IPs
Tags - optional
Key
Value - optional
Name
sn01-pub
Remove
Add new tag
You can add 49 more tags.
Remove
Add new subnet
Cancel
Create subnet
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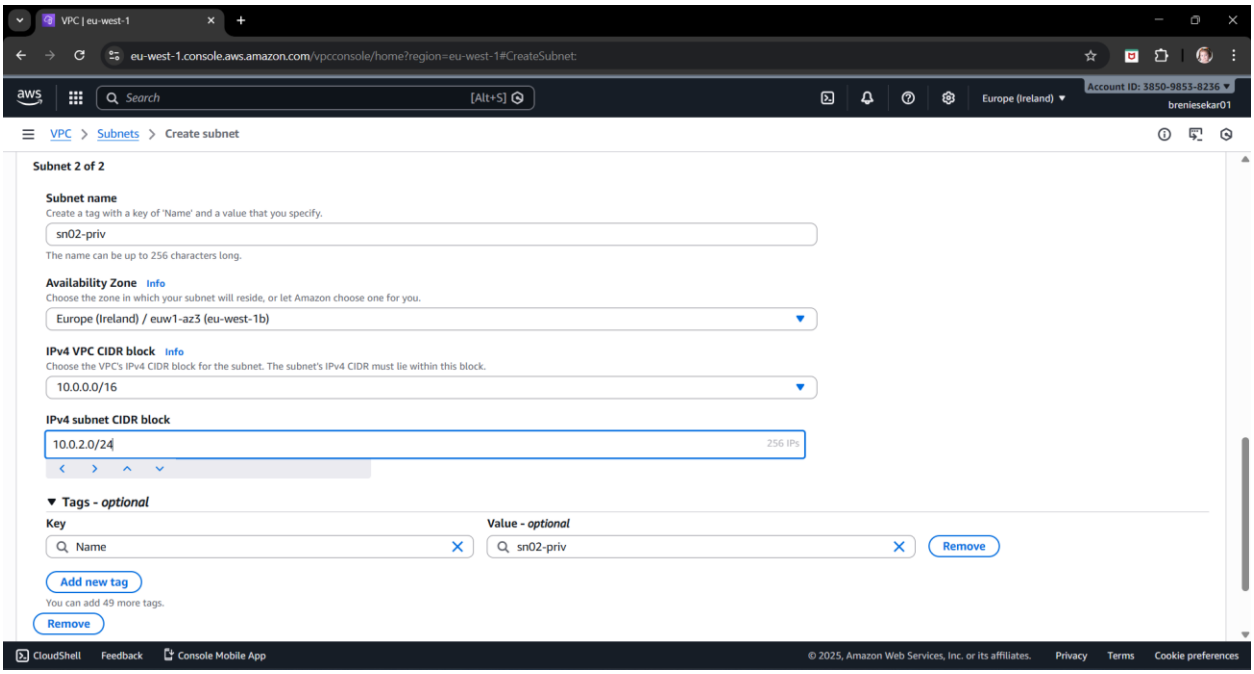
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateSubnet:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Subnets > Create subnet
Subnet 2 of 2
Subnet name
Create a tag with a key of 'Name' and a value that you specify.
sn02-priv
The name can be up to 256 characters long.
Availability Zone Info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.
Europe (Ireland) / euw1-az3 (eu-west-1b)
IPv4 VPC CIDR block Info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.
10.0.0.0/16
IPv4 subnet CIDR block
10.0.2.0/24
256 IPs
Tags - optional
Key
Value - optional
Name
sn02-priv
Remove
Add new tag
You can add 49 more tags.
Remove
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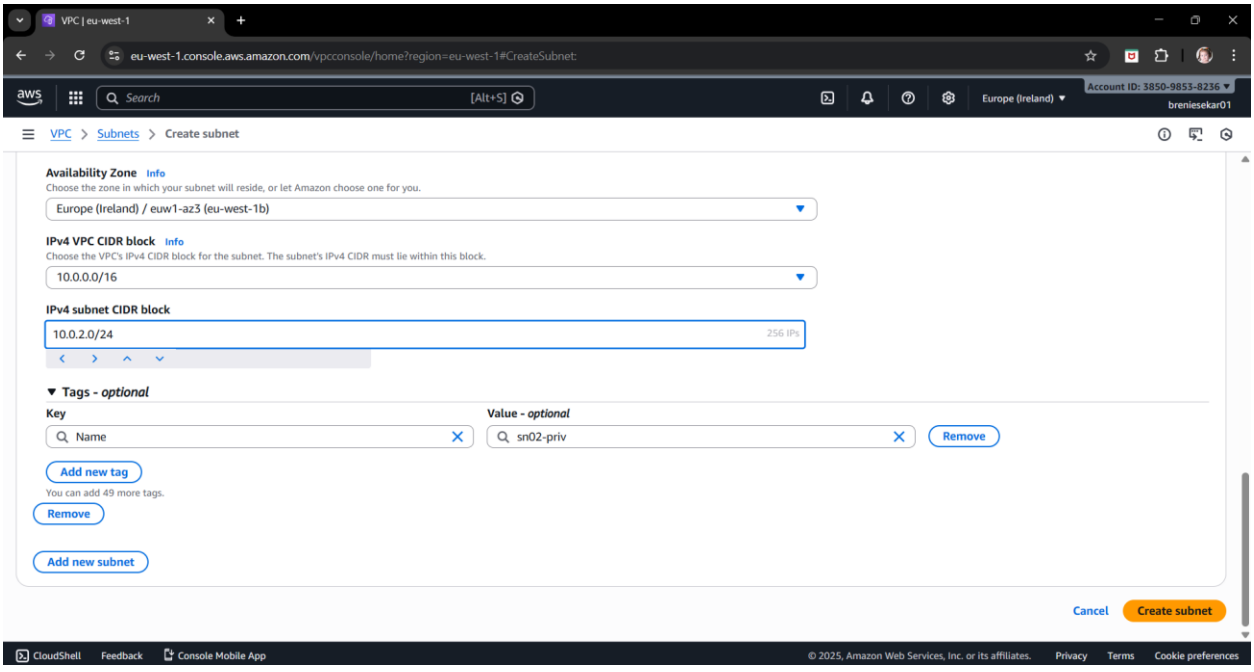
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateSubnet:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
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VPC > Subnets > Create subnet
Availability Zone Info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.
Europe (Ireland) / euw1-az3 (eu-west-1b)
IPv4 VPC CIDR block Info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.
10.0.0.0/16
IPv4 subnet CIDR block
10.0.2.0/24
256 IPs
Tags - optional
Key
Value - optional
Name
sn02-priv
Remove
Add new tag
You can add 49 more tags.
Remove
Add new subnet
Cancel
Create subnet
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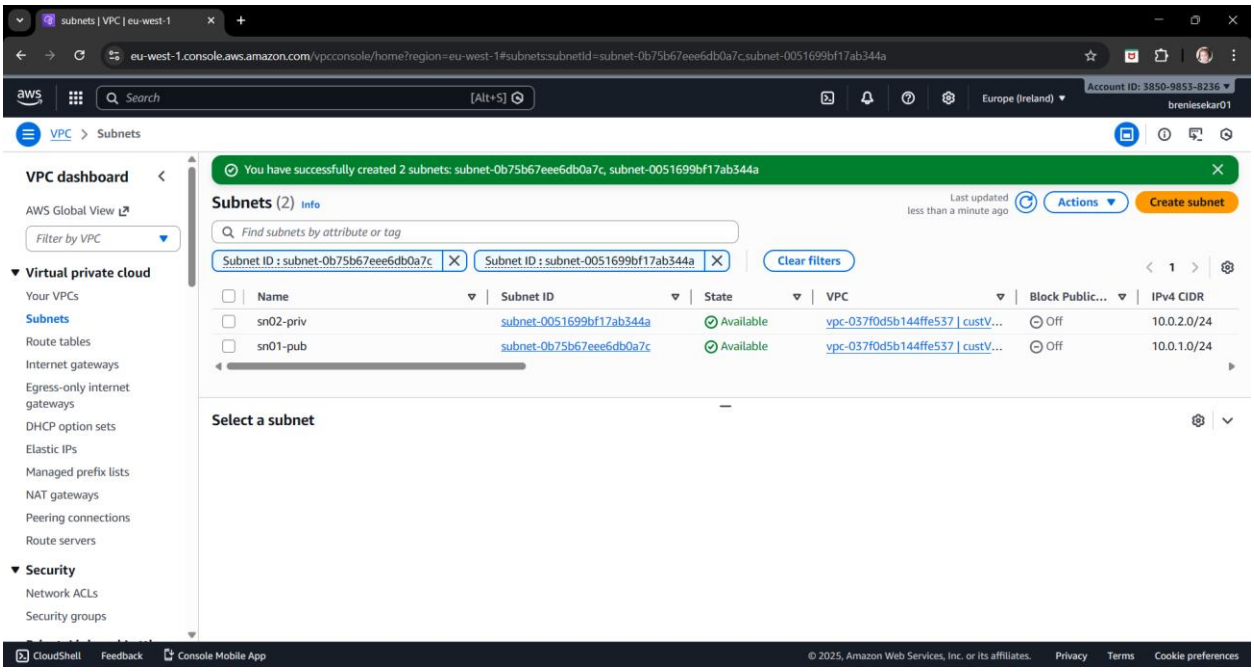
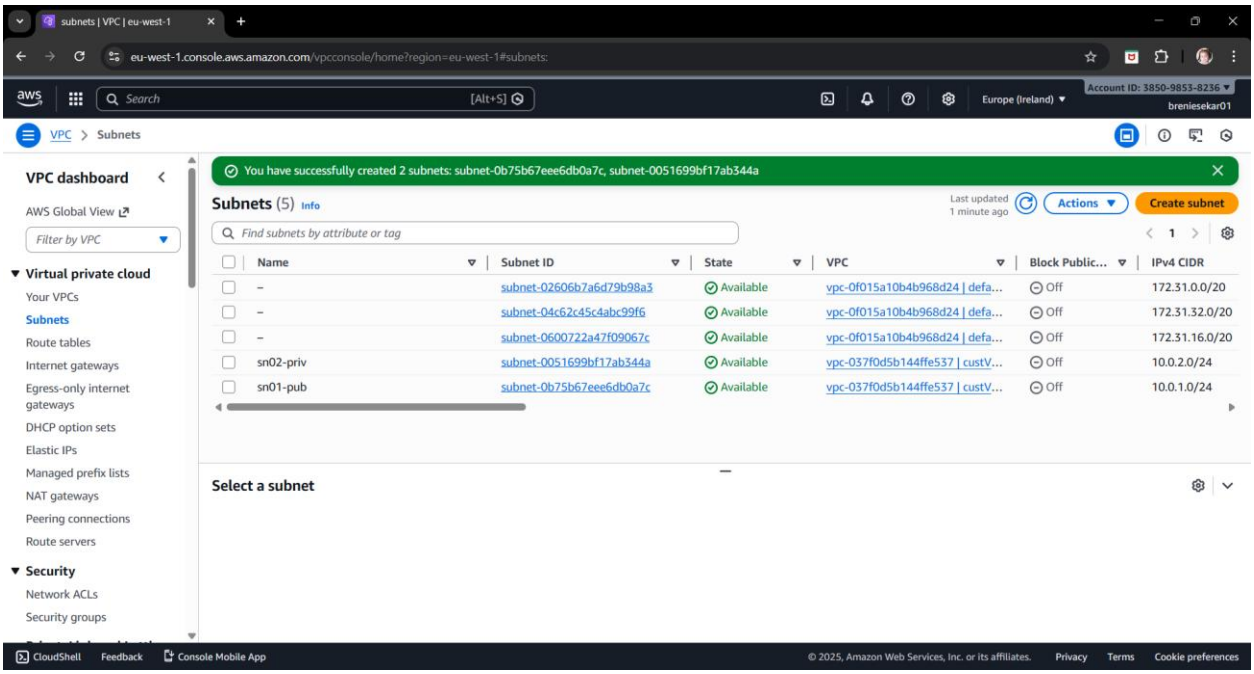


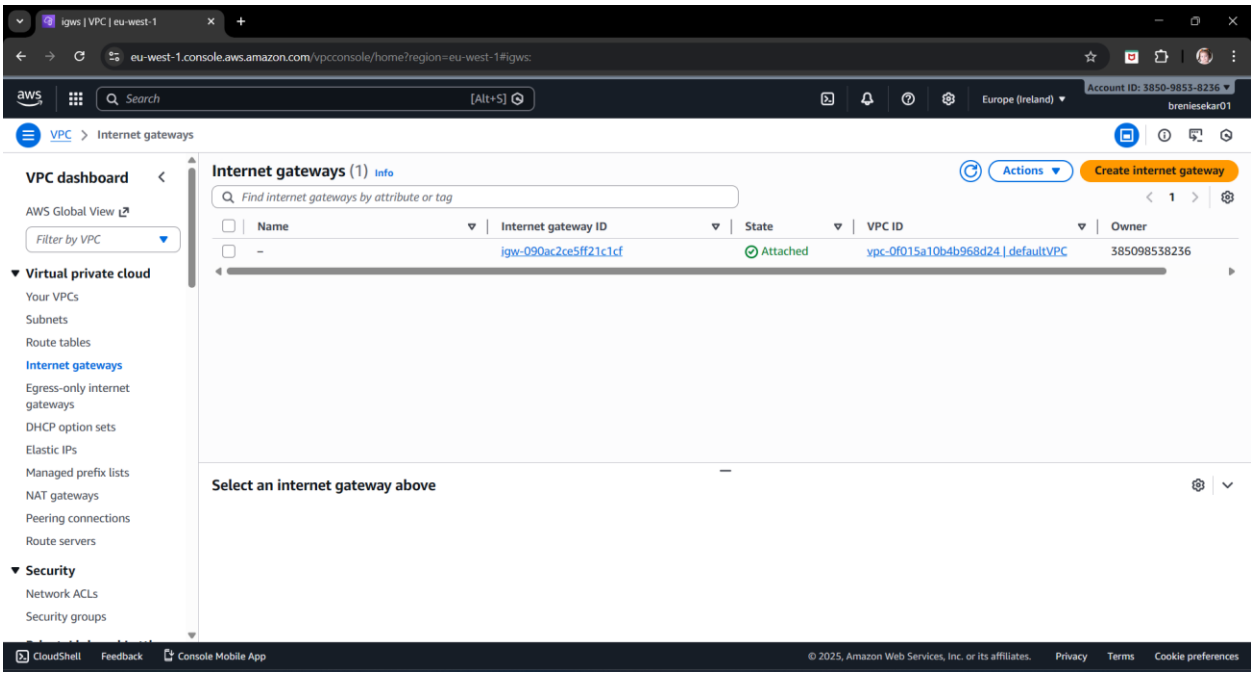


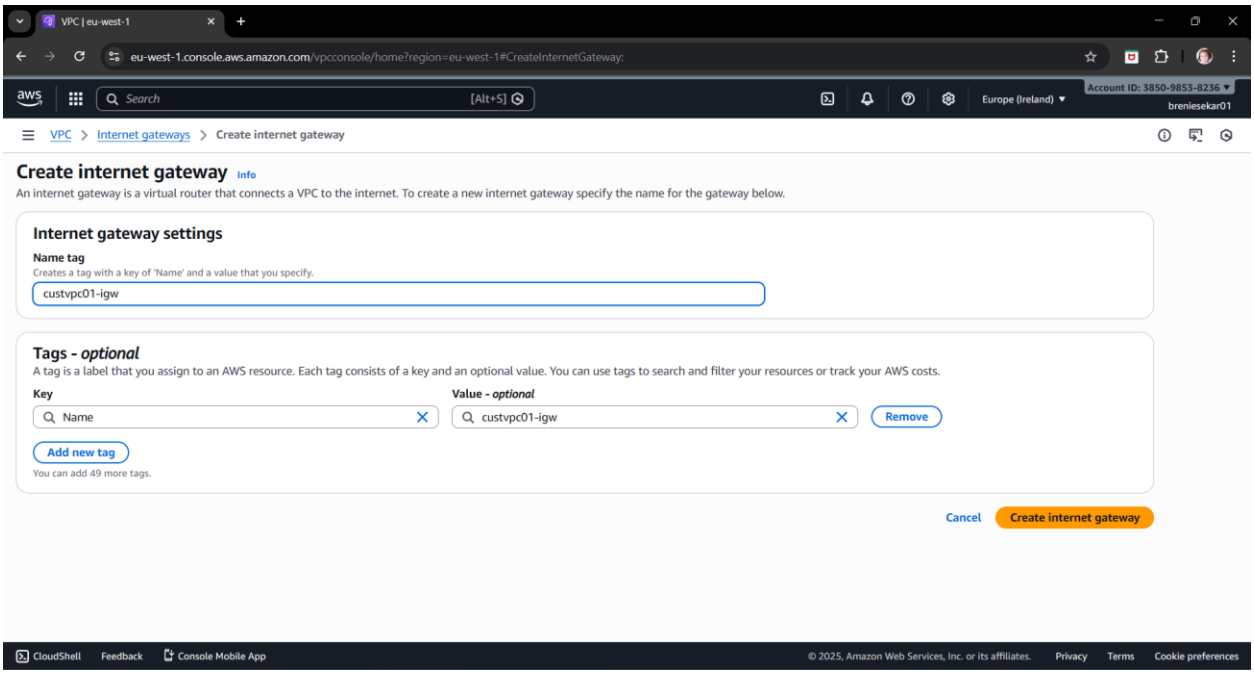
Step 3: Create and attach an Internet Gateway

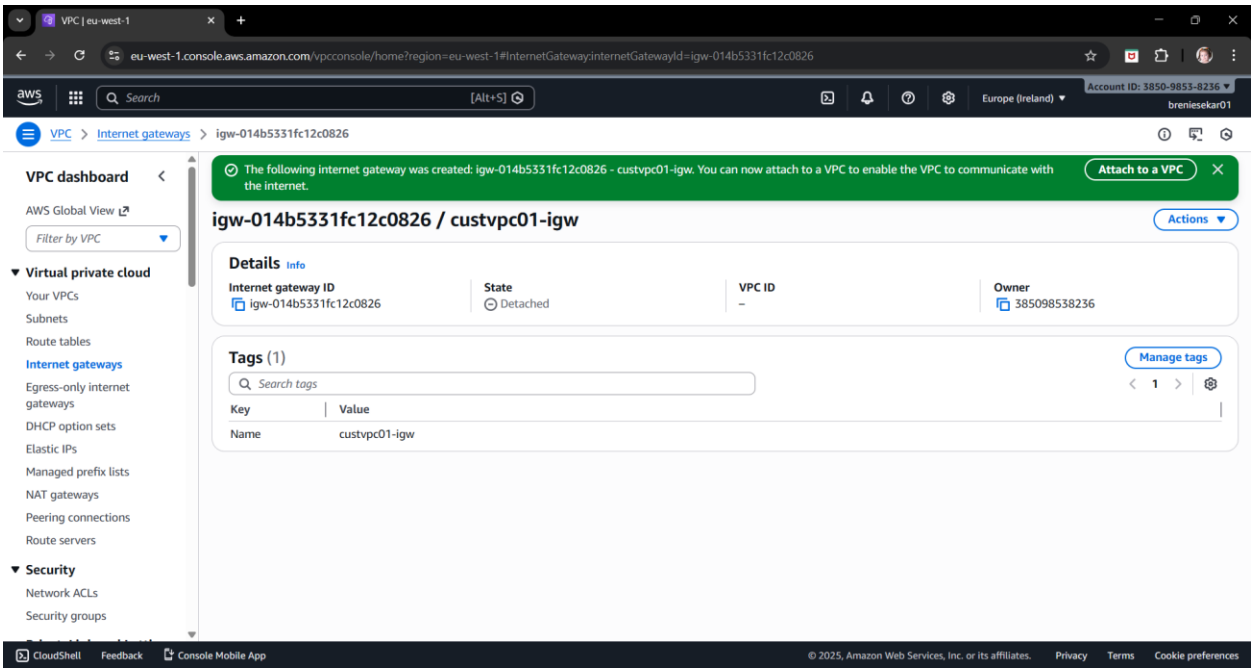
An Internet Gateway is an AWS-managed component that allows resources inside a VPC to communicate with the public internet. The Internet Gateway was **not automatically created** when the custom VPC **custVPC01** was created.

- An Internet Gateway was created to enable communication between the VPC and the public internet.

- The Internet Gateway was attached to the custom VPC **custVPC01**.
- This allows resources in the public subnet to send and receive internet traffic.
- The Internet Gateway was named **custvpc01-igw** with the ID **igw-014b5331fc12c0826**.
- The Internet Gateway state is **Attached**, confirming it is actively associated with the VPC.






VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#InternetGateway:internetGatewayId=igw-014b5331fc12c0826
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Internet gateways > igw-014b5331fc12c0826
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
The following internet gateway was created: igw-014b5331fc12c0826 - custvpc01-igw. You can now attach to a VPC to enable the VPC to communicate with the internet.
Attach to a VPC
igw-014b5331fc12c0826 / custvpc01-igw
Actions
Details Info
Internet gateway ID
igw-014b5331fc12c0826
State
Detached
VPC ID
–
Owner
385098538236
Tags (1)
Manage tags
Search tags
Key
Value
Name
custvpc01-igw
CloudShell
Feedback
Console Mobile App
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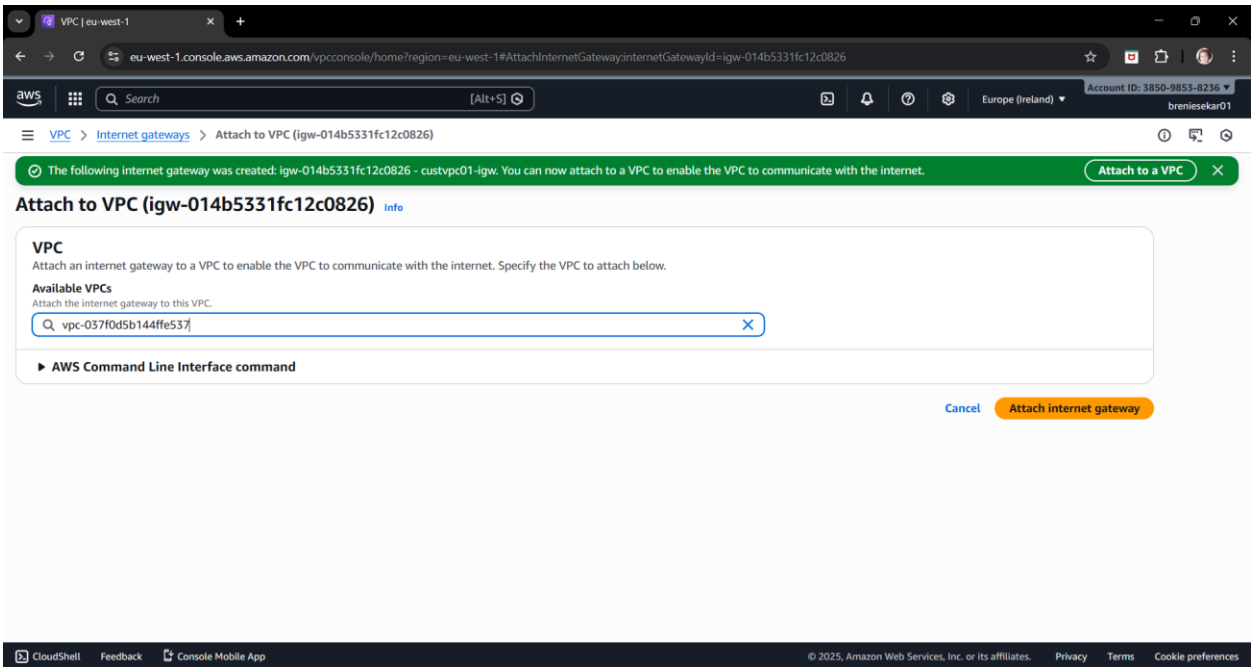
Privacy
Terms
Cookie preferences


VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#AttachInternetGateway:internetGatewayId=igw-014b5331fc12c0826
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Internet gateways > Attach to VPC (igw-014b5331fc12c0826)
The following internet gateway was created: igw-014b5331fc12c0826 - custvpc01-igw. You can now attach to a VPC to enable the VPC to communicate with the internet.
Attach to a VPC
Attach to VPC (igw-014b5331fc12c0826) Info
VPC
Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.
Available VPCs
Attach the internet gateway to this VPC.
vpc-037f0d5b144ffe537
AWS Command Line Interface command
Cancel
Attach internet gateway
CloudShell
Feedback
Console Mobile App
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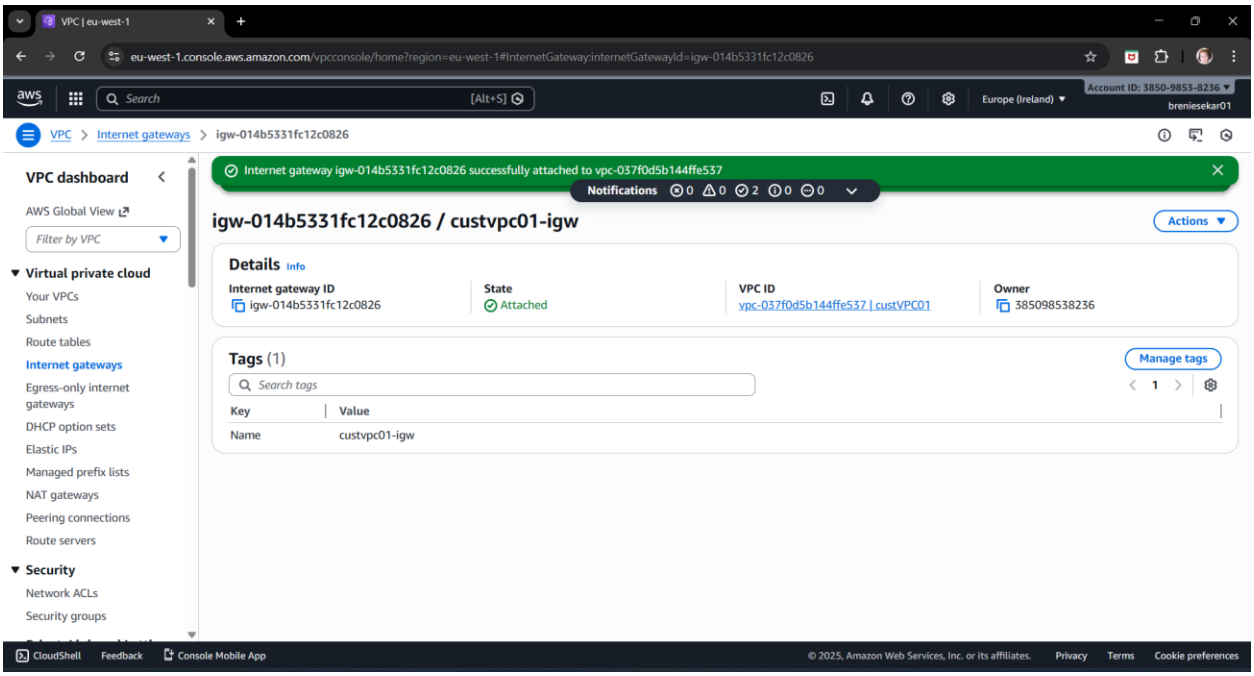
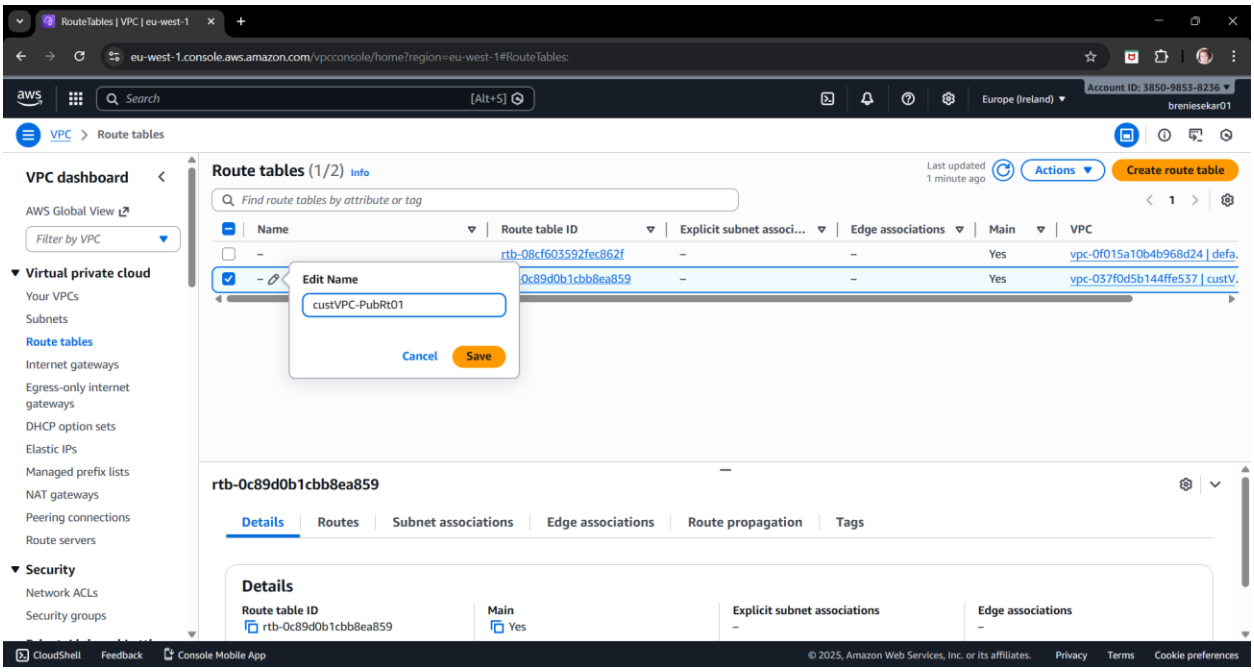
Terms
Cookie preferences



Step 4: Public Route Table configuration and Internet Gateway association

A routing table controls how network traffic is directed within a VPC.

- When the custom VPC was created, AWS automatically created a default route table.
- The default route table contained a local route that allowed communication within the VPC CIDR range.
- By default, the route table did not provide internet access.
- The renamed route table **custVPC-PubRt01** was used to enable internet connectivity for the public subnet.
- A new route was added with the destination set to **0.0.0.0/0**.
- The target for this route was the Internet Gateway **igw-014b5331fc12c0826**.
- The public subnet was associated with the default route table.
- This configuration enabled resources in the public subnet to communicate with the outside world through the Internet Gateway.


RouteTables | VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#RouteTables:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
Route tables (1/2) Info
Last updated 1 minute ago
Actions
Create route table
Find route tables by attribute or tag
Name
Route table ID
Explicit subnet associ...
Edge associations
Main
VPC
rtb-08cf603592fec862f
Yes
vpc-0f015a10b4b968d24 | defa.
Edit Name
custVPC-PubRt01
Cancel
Save
rtb-0c89d0b1cbb8ea859
Yes
vpc-037f0d5b144ffe537 | custV.
rtb-0c89d0b1cbb8ea859
Details
Routes
Subnet associations
Edge associations
Route propagation
Tags
Details
Route table ID
rtb-0c89d0b1cbb8ea859
Main
Yes
Explicit subnet associations
Edge associations
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Feedback
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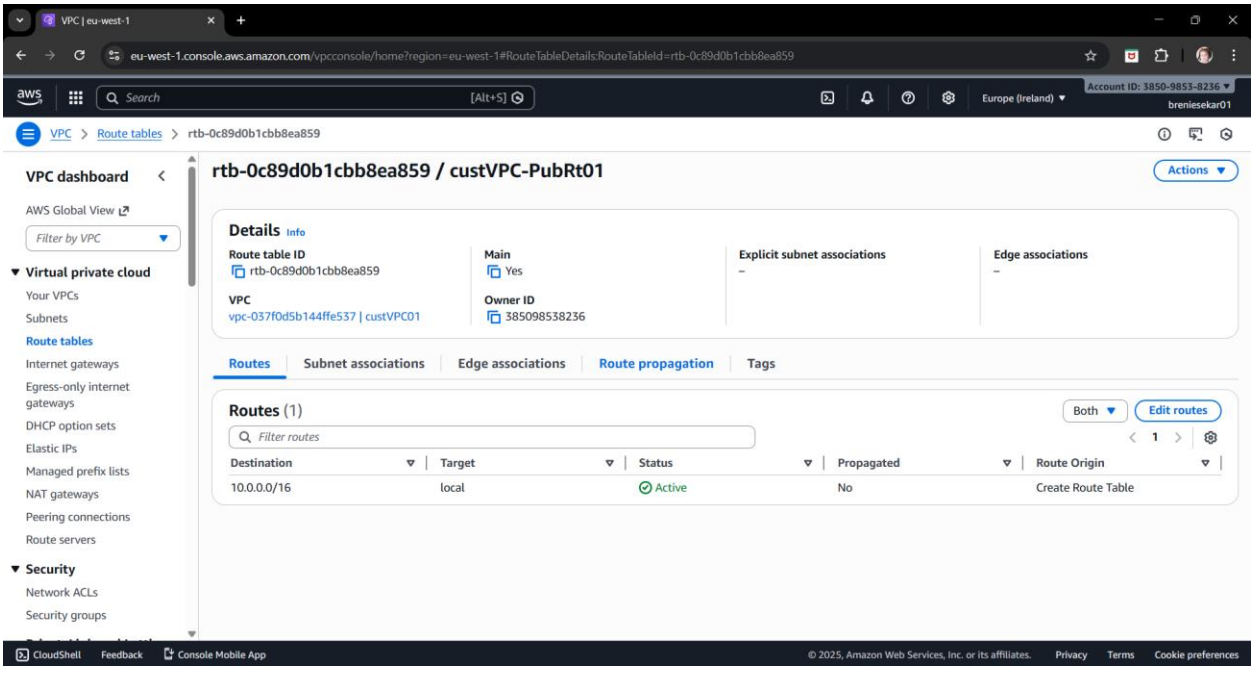
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#RouteTableDetails:RouteTableId=rtb-0c89d0b1cbb8ea859
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables > rtb-0c89d0b1cbb8ea859
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
rtb-0c89d0b1cbb8ea859 / custVPC-PubRt01
Actions
Details Info
Route table ID
rtb-0c89d0b1cbb8ea859
Main
Yes
Explicit subnet associations
Edge associations
VPC
vpc-037f0d5b144ffe537 | custVPC01
Owner ID
385098538236
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (1)
Both
Edit routes
Filter routes
Destination
Target
Status
Propagated
Route Origin
10.0.0.0/16
local
Active
No
Create Route Table
CloudShell
Feedback
Console Mobile App
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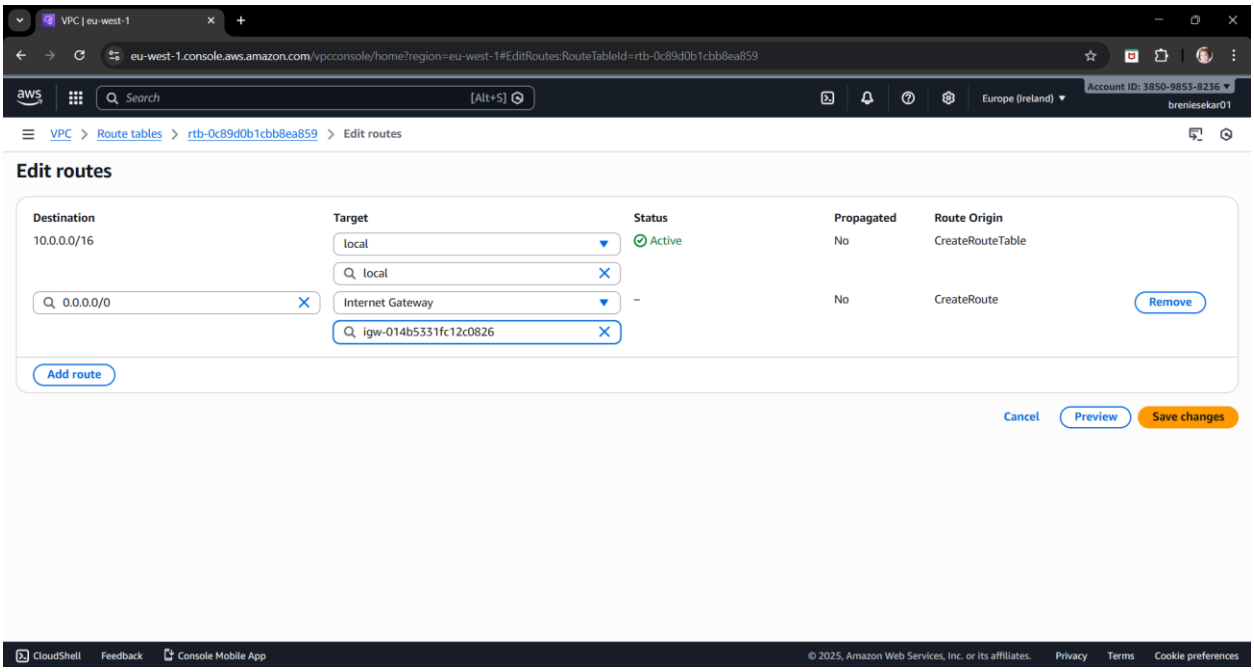
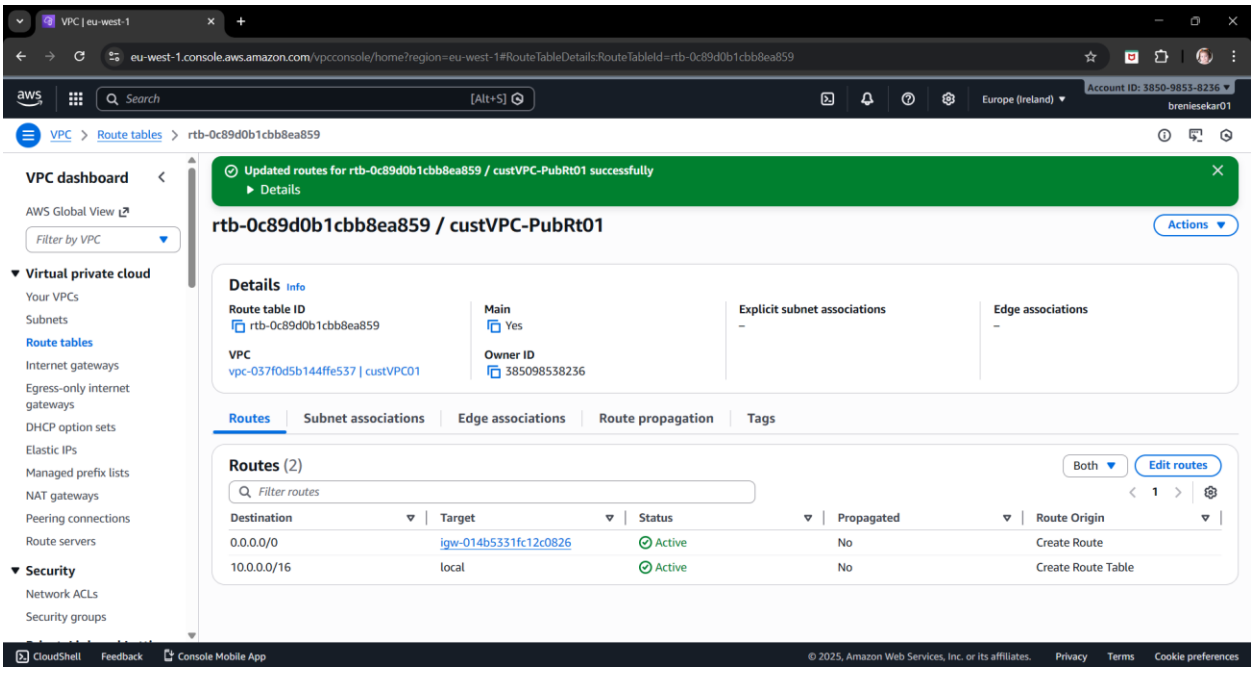


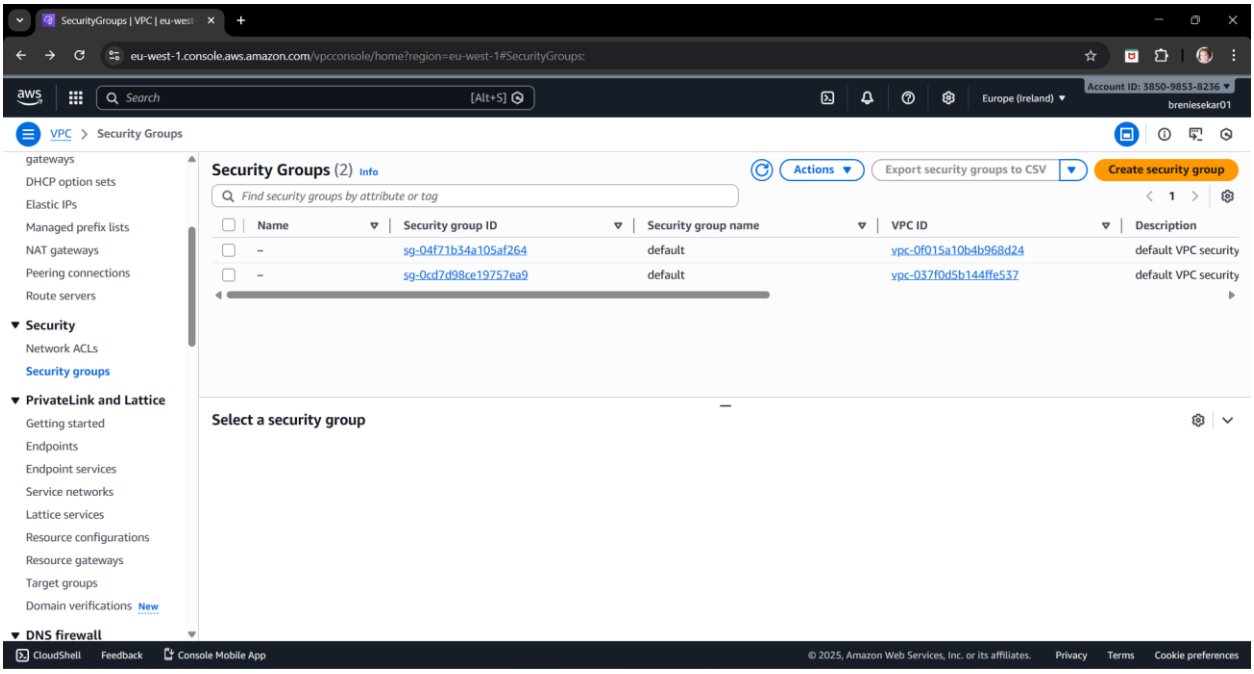


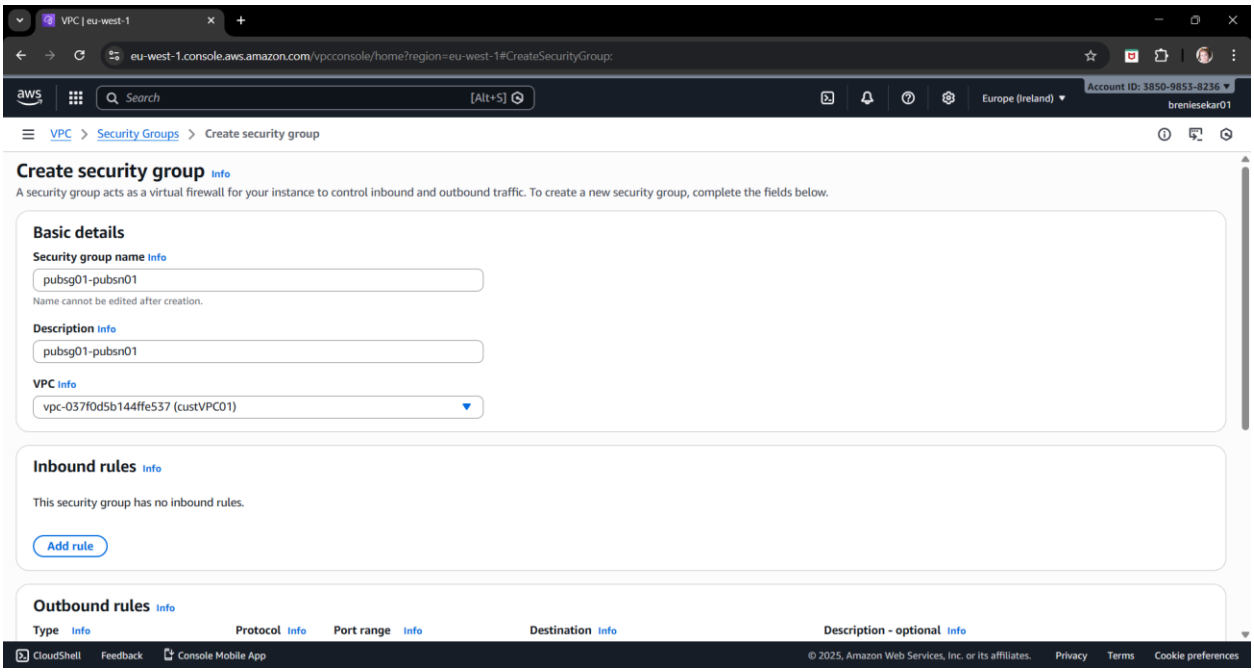
Step 5: Create a Security Group

A Security Group is a virtual firewall in AWS that controls inbound and outbound network traffic for resources such as EC2 instances within a VPC. It is a **stateful firewall** and supports only allow rules—there are no explicit deny rules.

- Navigate to **VPC → Security Groups → Create security group**

- A **public subnet security group** named **pubsg01-pubsn01** was created to control inbound and outbound traffic for public-facing resources.
- The security group was created by navigating to **VPC → Security Groups → Create security group**.
- The custom VPC **custVPC01** was selected while creating this security group.
- This security group is associated with resources launched in the **public subnet (sn01-pub)**.
- **Inbound Rules:**
  - SSH access is allowed on port 22 from any IPv4 (0.0.0.0/0) and any IPv6 (::/0) address.
  - HTTP access is allowed on port 80 from any IPv4 (0.0.0.0/0) and any IPv6 (::/0) address.
- **Outbound Rules:**
  All outbound traffic is allowed by default.




VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateSecurityGroup:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Security Groups > Create security group
Create security group Info
A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.
Basic details
Security group name Info
pubsg01-pubsn01
Name cannot be edited after creation.
Description Info
pubsg01-pubsn01
VPC Info
vpc-037f0d5b144ffe537 (custVPC01)
Inbound rules Info
This security group has no inbound rules.
Add rule
Outbound rules Info
Type Info
Protocol Info
Port range Info
Destination Info
Description - optional Info
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Feedback
Console Mobile App
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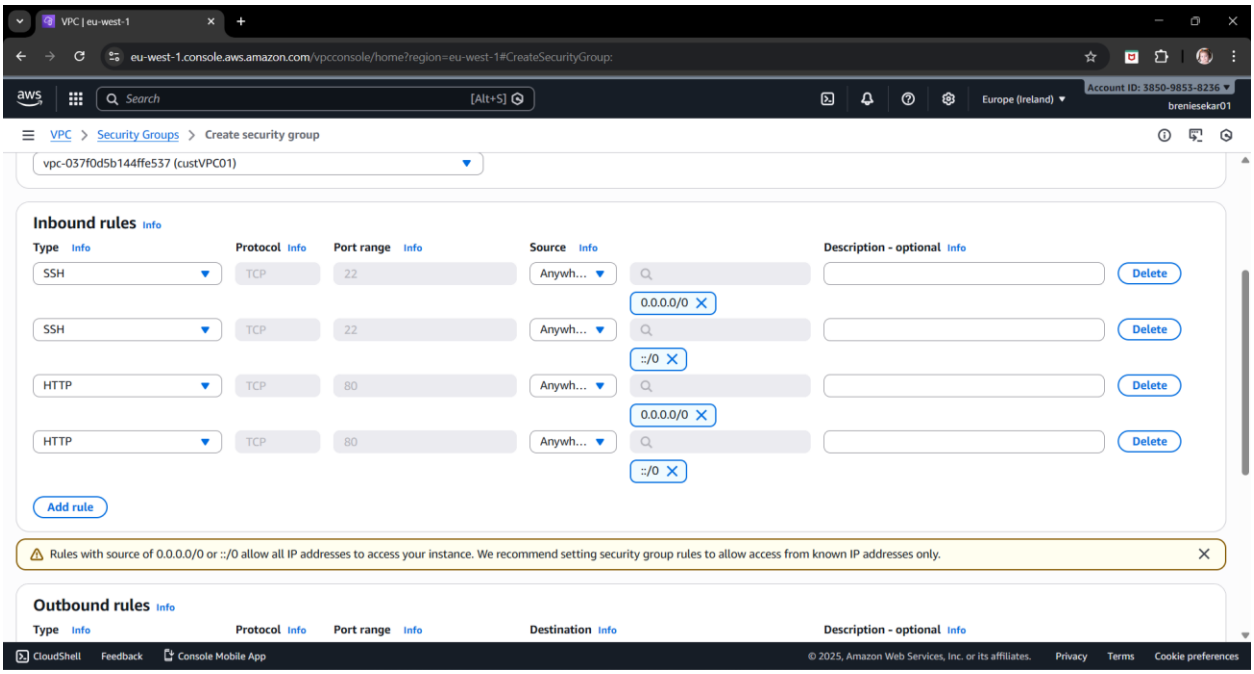
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateSecurityGroup:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Security Groups > Create security group
vpc-037f0d5b144ffe537 (custVPC01)
Inbound rules Info
Type Info
Protocol Info
Port range Info
Source Info
Description - optional Info
SSH
TCP
22
Anywh...
0.0.0.0/0
Delete
SSH
TCP
22
Anywh...
::/0
Delete
HTTP
TCP
80
Anywh...
0.0.0.0/0
Delete
HTTP
TCP
80
Anywh...
::/0
Delete
Add rule
Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.
Outbound rules Info
Type Info
Protocol Info
Port range Info
Destination Info
Description - optional Info
CloudShell
Feedback
Console Mobile App
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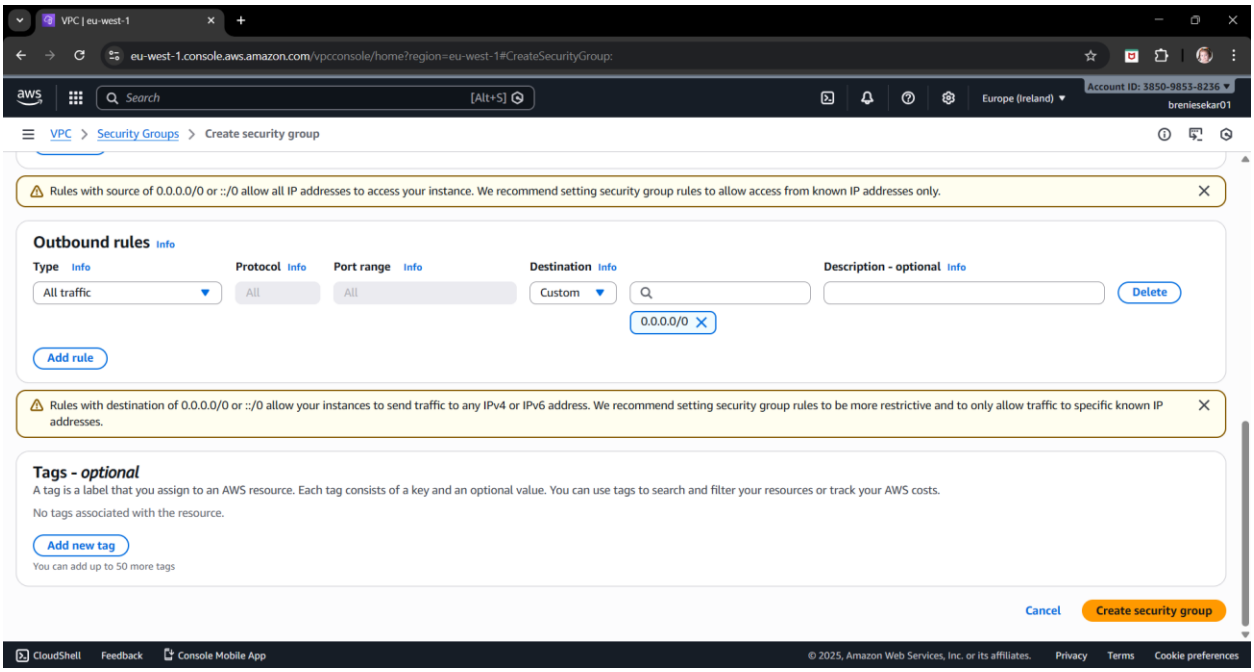
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateSecurityGroup:
Search [Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Security Groups > Create security group
Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.
Outbound rules Info
Type Info
Protocol Info
Port range Info
Destination Info
Description - optional Info
All traffic
All
All
Custom
0.0.0.0/0
Delete
Add rule
Rules with destination of 0.0.0.0/0 or ::/0 allow your instances to send traffic to any IPv4 or IPv6 address. We recommend setting security group rules to be more restrictive and to only allow traffic to specific known IP addresses.
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.
No tags associated with the resource.
Add new tag
You can add up to 50 more tags
Cancel
Create security group
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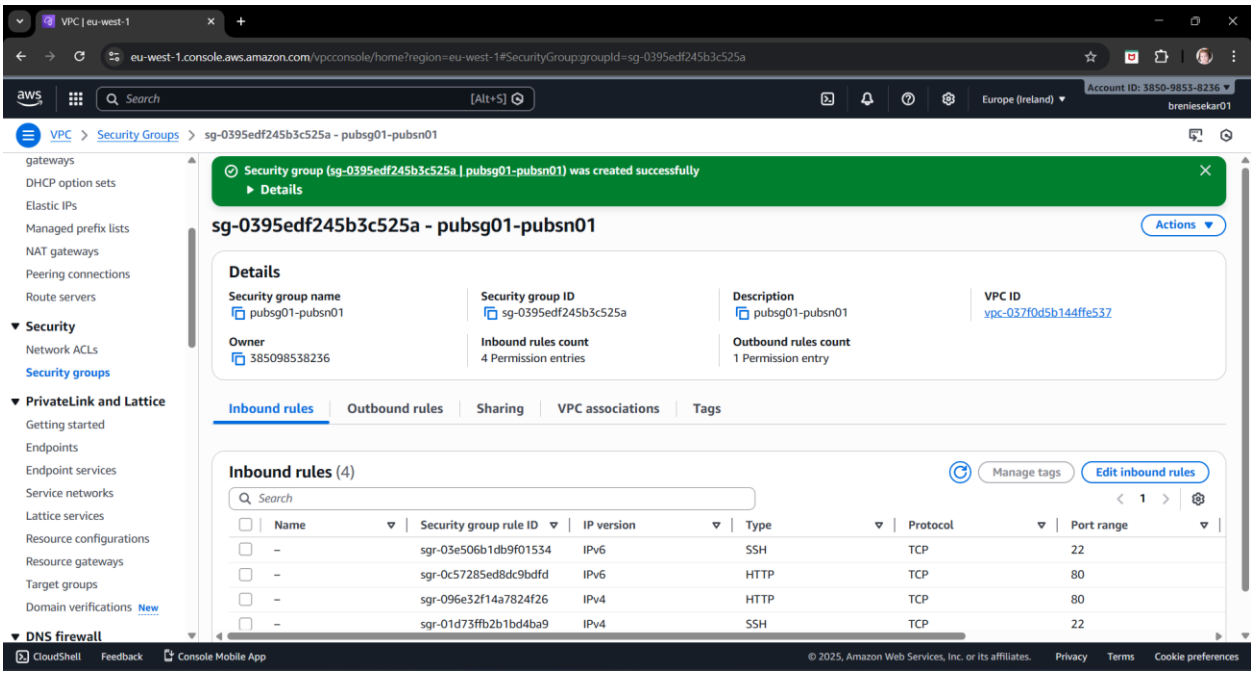
VPC | eu-west-1
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#SecurityGroup:groupId=sg-0395edf245b3c525a
Search [Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Security Groups > sg-0395edf245b3c525a - pubsg01-pubsn01
gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
PrivateLink and Lattice
Getting started
Endpoints
Endpoint services
Service networks
Lattice services
Resource configurations
Resource gateways
Target groups
Domain verifications New
DNS firewall
Security group (sg-0395edf245b3c525a | pubsg01-pubsn01) was created successfully
Details
sg-0395edf245b3c525a - pubsg01-pubsn01
Actions
Details
Security group name
pubsg01-pubsn01
Security group ID
sg-0395edf245b3c525a
Description
pubsg01-pubsn01
VPC ID
vpc-037f0d5b144ffe537
Owner
385098538236
Inbound rules count
4 Permission entries
Outbound rules count
1 Permission entry
Inbound rules
Outbound rules
Sharing
VPC associations
Tags
Inbound rules (4)
Manage tags
Edit inbound rules
Search
Name
Security group rule ID
IP version
Type
Protocol
Port range
sgr-03e506b1db9f01534 IPv6 SSH TCP 22
sgr-0c57285ed8dc9bdfd IPv6 HTTP TCP 80
sgr-096e32f14a7824f26 IPv4 HTTP TCP 80
sgr-01d73ffb2b1bd4ba9 IPv4 SSH TCP 22
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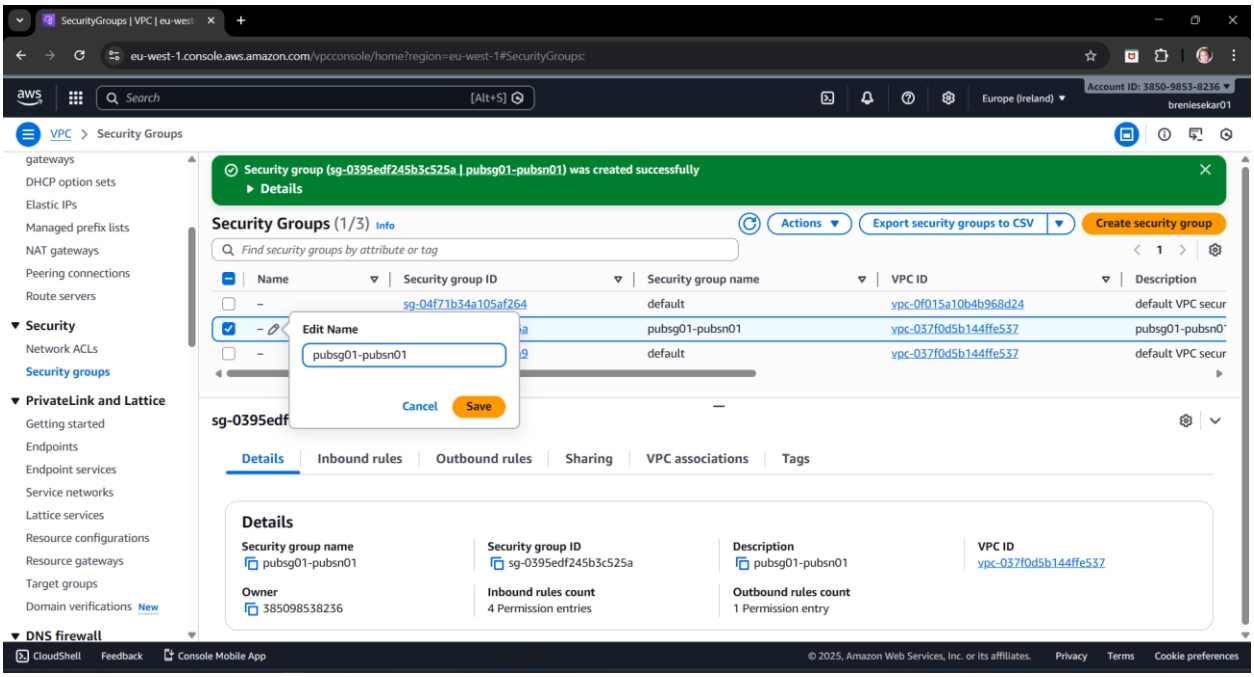
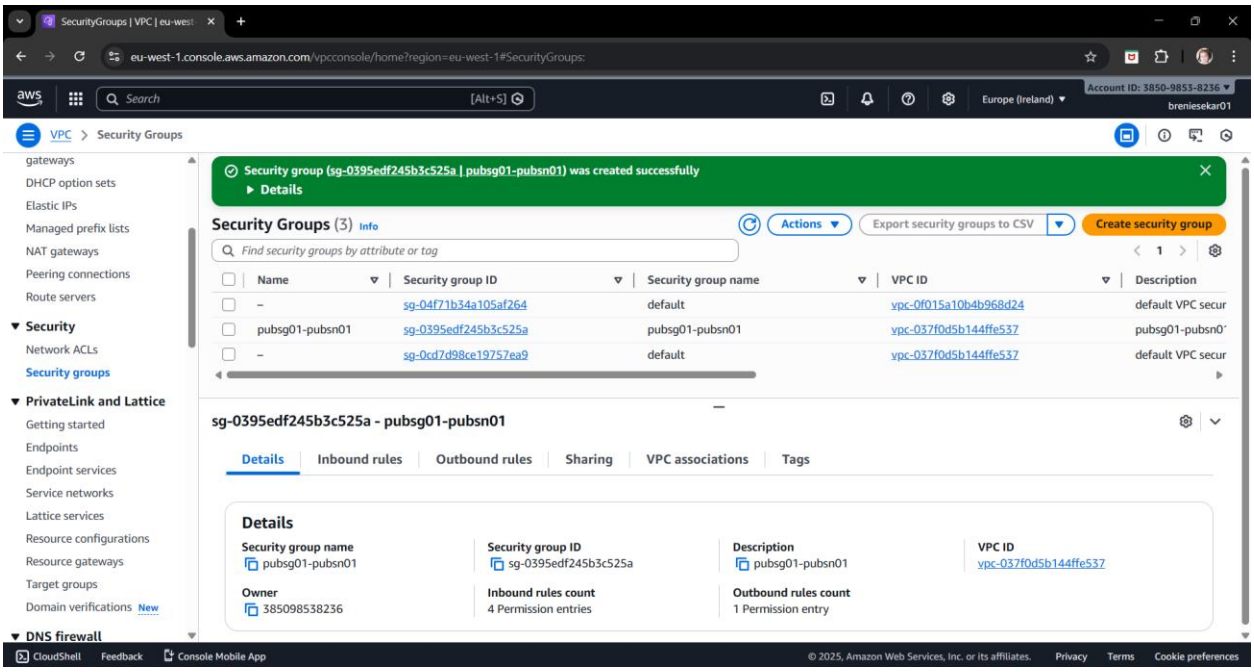


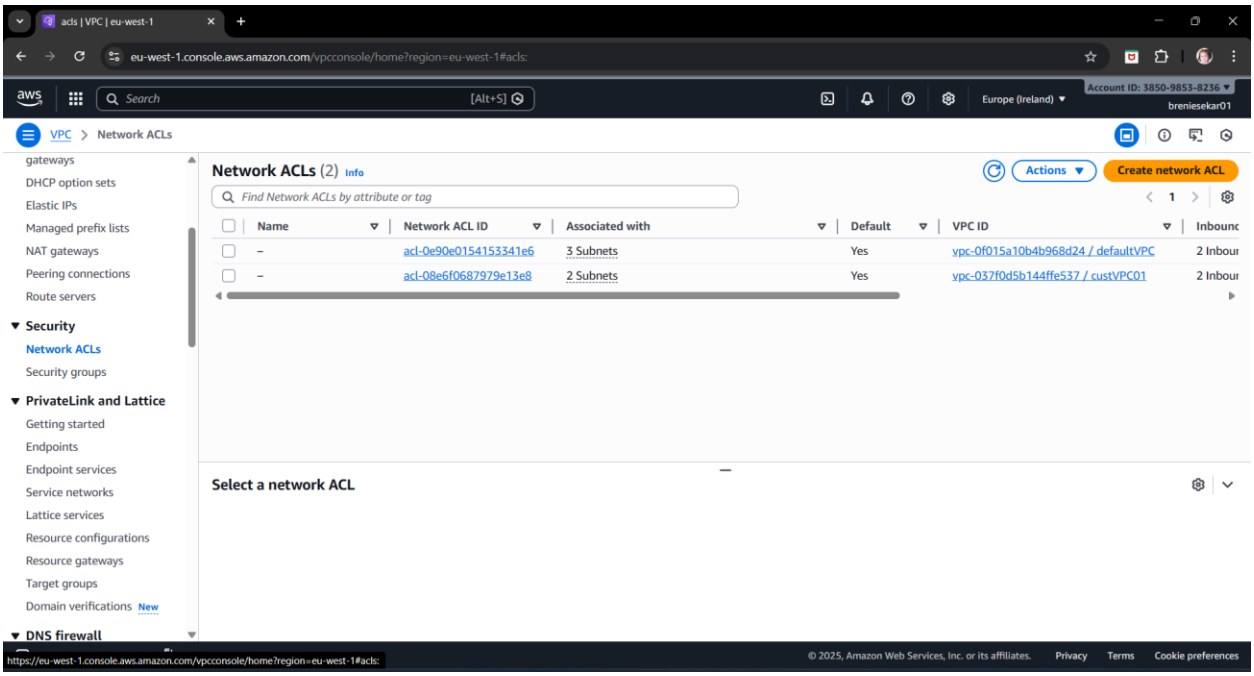


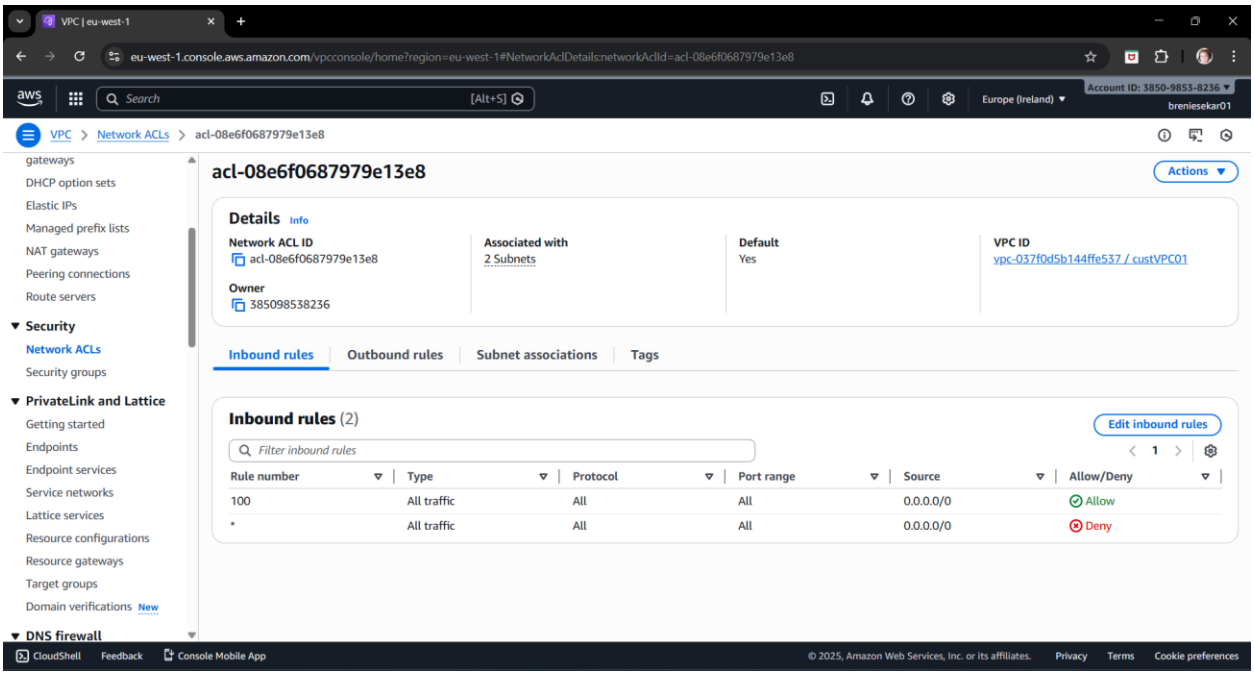
Step 6: Verify Network ACLs

Network ACL (NACL) is a **stateless, subnet-level** firewall that controls inbound and outbound traffic for subnets in a VPC.

- Verified that the **default Network ACL** is associated with the required subnets.
- Confirmed that **Rule 100** allows **all inbound traffic** from 0.0.0.0/0.

- Ensured that the **default deny rule (*)** is present at the end of the rule list.
- This confirms that required inbound traffic is explicitly allowed, while all other traffic is denied by default.





Step 7: Launch a Linux EC2 Instance in the Public Subnet

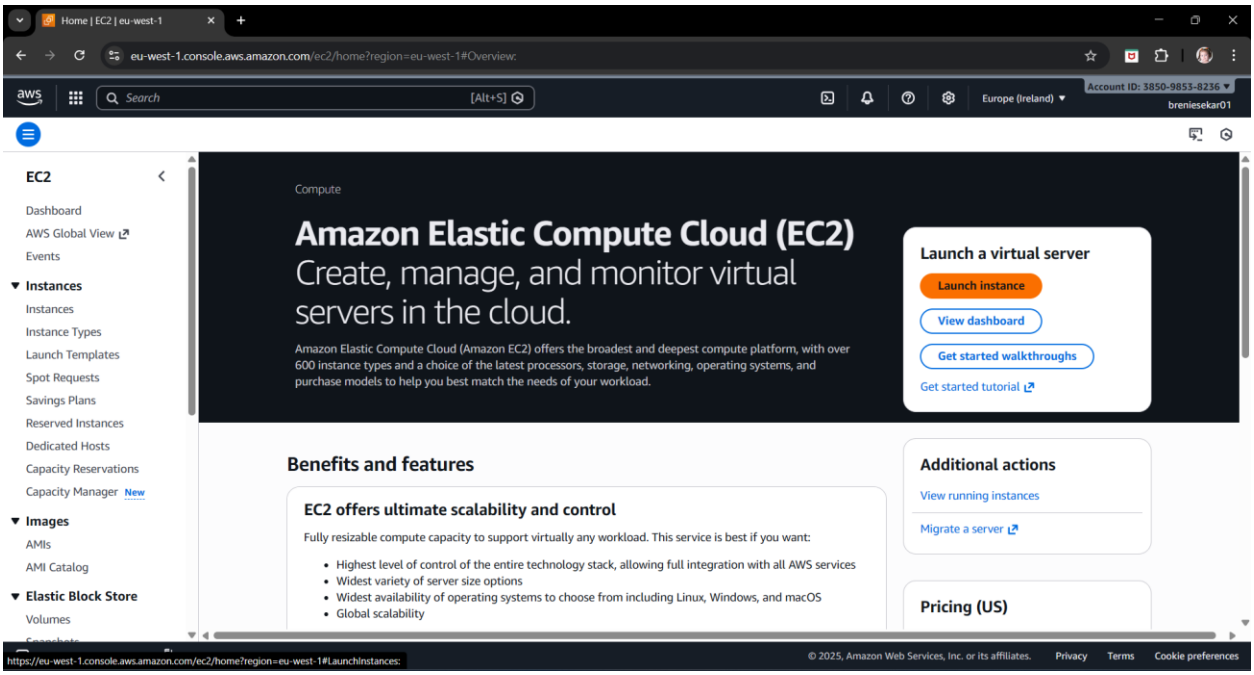
- A new **EC2 instance** was launched.
- The instance was named **pubWebServer01**.
- The **Ubuntu Server 24.04 LTS (HVM), SSD Volume Type** AMI was selected.
- The instance type **t3.micro** was chosen.
- The instance was launched in the **CustVPC01** network.
- The **public subnet sn01-pub** was selected.
- **Auto-assign Public IP** was enabled.
- The security group **pubsg01-pubsn01** was associated with the instance.
- The root storage size was configured as **10 GB**.
- A **user data (bootstrap) script** was added to install Apache and deploy web content.

```
#!/bin/bash
apt install wget unzip apache2 -y
cd /tmp
wget https://www.tooplate.com/zip-templates/2139_neural_portfolio.zip
unzip 2139_neural_portfolio.zip
mv /tmp/2139_neural_portfolio/* /var/www/html/
```

- The instance configuration was reviewed and the instance was successfully launched.

Script Explanation:

Line	Command	Explanation
1	#!/bin/bash	Specifies the script should run using the Bash shell
2	apt install wget unzip apache2 -y	Installs **Apache web server**, **wget**, and **unzip** packages
3	cd /tmp	Changes directory to /tmp
4	wget https://www.tooplate.com/zip-templates/2139_neural_portfolio.zip	Downloads the website template ZIP file
5	unzip 2139_neural_portfolio.zip	Extracts the downloaded ZIP file
6	mv /tmp/2139_neural_portfolio/* /var/www/html/	Moves website files to Apache's web root directory


Home | EC2 | eu-west-1
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#Overview:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2
Dashboard
AWS Global View
Events
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Capacity Manager New
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Compute
Amazon Elastic Compute Cloud (EC2)
Create, manage, and monitor virtual servers in the cloud.
Amazon Elastic Compute Cloud (Amazon EC2) offers the broadest and deepest compute platform, with over 600 instance types and a choice of the latest processors, storage, networking, operating systems, and purchase models to help you best match the needs of your workload.
Launch a virtual server
Launch instance
View dashboard
Get started walkthroughs
Get started tutorial
Benefits and features
EC2 offers ultimate scalability and control
Fully resizable compute capacity to support virtually any workload. This service is best if you want:
Highest level of control of the entire technology stack, allowing full integration with all AWS services
Widest variety of server size options
Widest availability of operating systems to choose from including Linux, Windows, and macOS
Global scalability
Additional actions
View running instances
Migrate a server
Pricing (US)
https://eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
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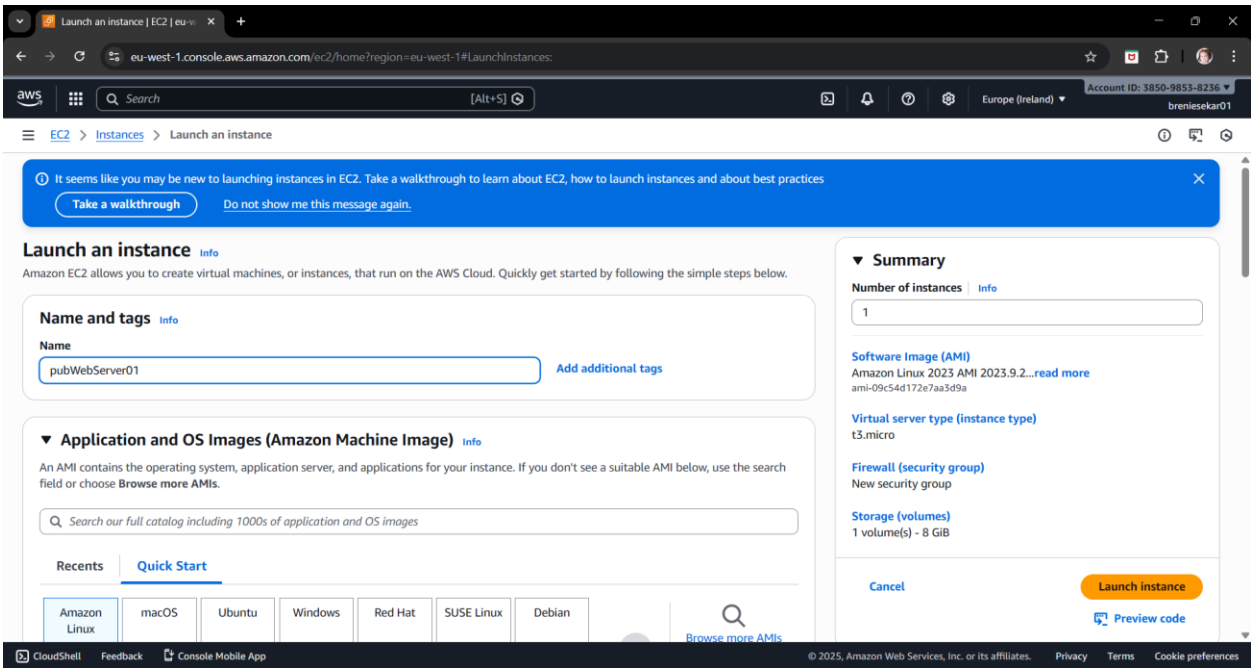
Launch an instance | EC2 | eu-w
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
It seems like you may be new to launching instances in EC2. Take a walkthrough to learn about EC2, how to launch instances and about best practices
Take a walkthrough
Do not show me this message again.
Launch an instance Info
Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.
Name and tags Info
Name
pubWebServer01
Add additional tags
Application and OS Images (Amazon Machine Image) Info
An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose Browse more AMIs.
Search our full catalog including 1000s of application and OS images
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.9.2...read more
ami-09c54d172e7aa3d9a
Virtual server type (instance type)
t3.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
Console Mobile App
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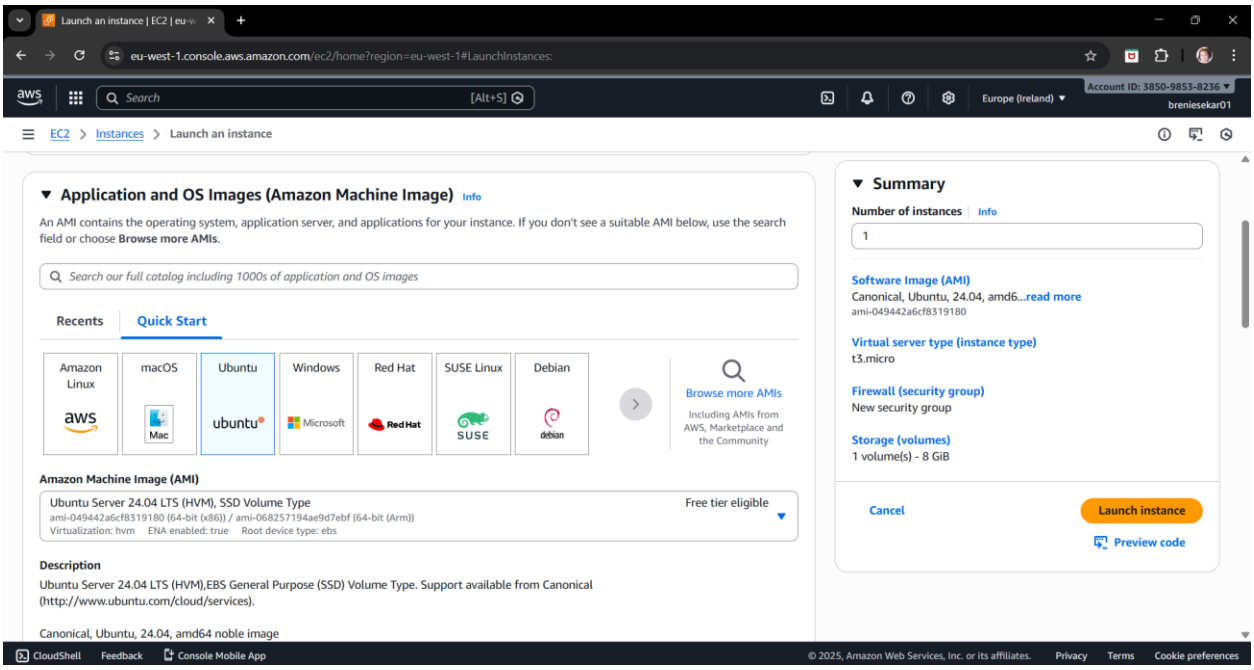
Cookie preferences


Launch an instance | EC2 | eu-w
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
Application and OS Images (Amazon Machine Image) Info
An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose Browse more AMIs.
Search our full catalog including 1000s of application and OS images
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community
Amazon Machine Image (AMI)
Ubuntu Server 24.04 LTS (HVM), SSD Volume Type
ami-049442a6cf8319180 (64-bit (x86)) / ami-068257194ae9d7ebf (64-bit (Arm))
Virtualization: hvm ENA enabled: true Root device type: ebs
Free tier eligible
Description
Ubuntu Server 24.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).
Canonical, Ubuntu, 24.04, amd64 noble image
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
Console Mobile App
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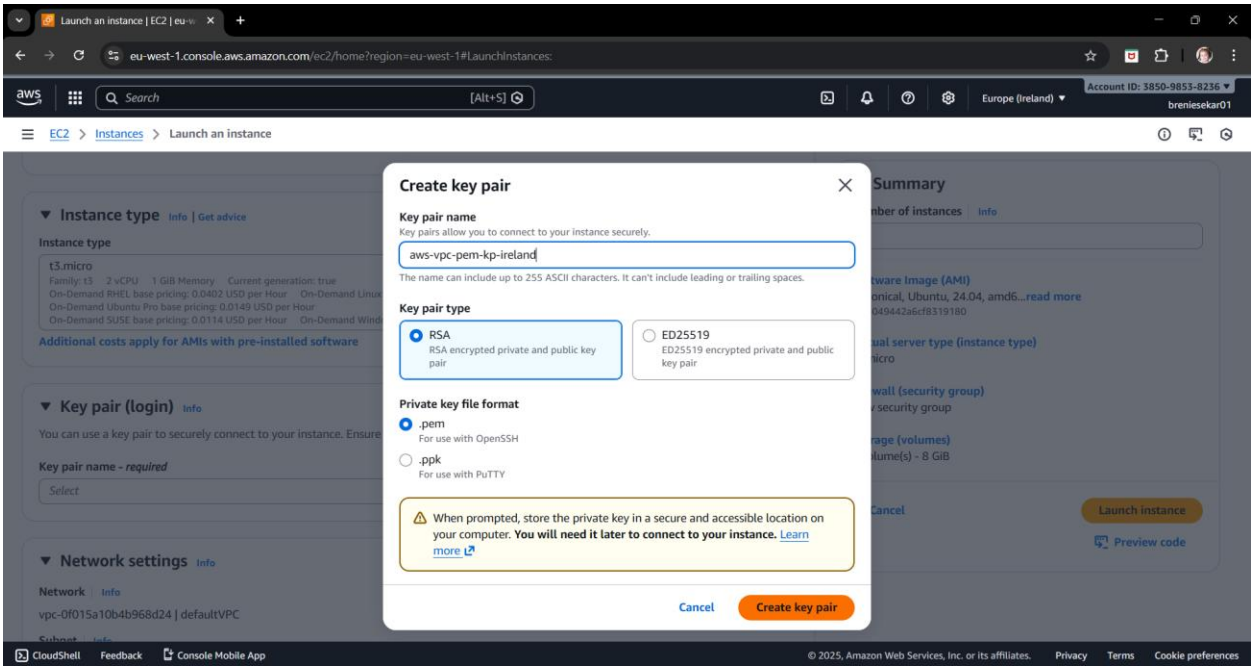
Launch an instance | EC2 | eu-w
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
Instance type Info | Get advice
Instance type
t3.micro
Additional costs apply for AMIs with pre-installed software
Key pair (login) Info
You can use a key pair to securely connect to your instance. Ensure
Key pair name - required
Select
Network settings Info
Network Info
vpc-0f015a10b4b968d24 | defaultVPC
Create key pair
Key pair name
Key pairs allow you to connect to your instance securely.
aws-vpc-pem-kp-ireland
The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.
Key pair type
RSA
RSA encrypted private and public key pair
ED25519
ED25519 encrypted private and public key pair
Private key file format
.pem
For use with OpenSSH
.ppk
For use with PuTTY
When prompted, store the private key in a secure and accessible location on your computer. You will need it later to connect to your instance. Learn more
Cancel
Create key pair
Summary
Launch instance
Preview code
CloudShell
Feedback
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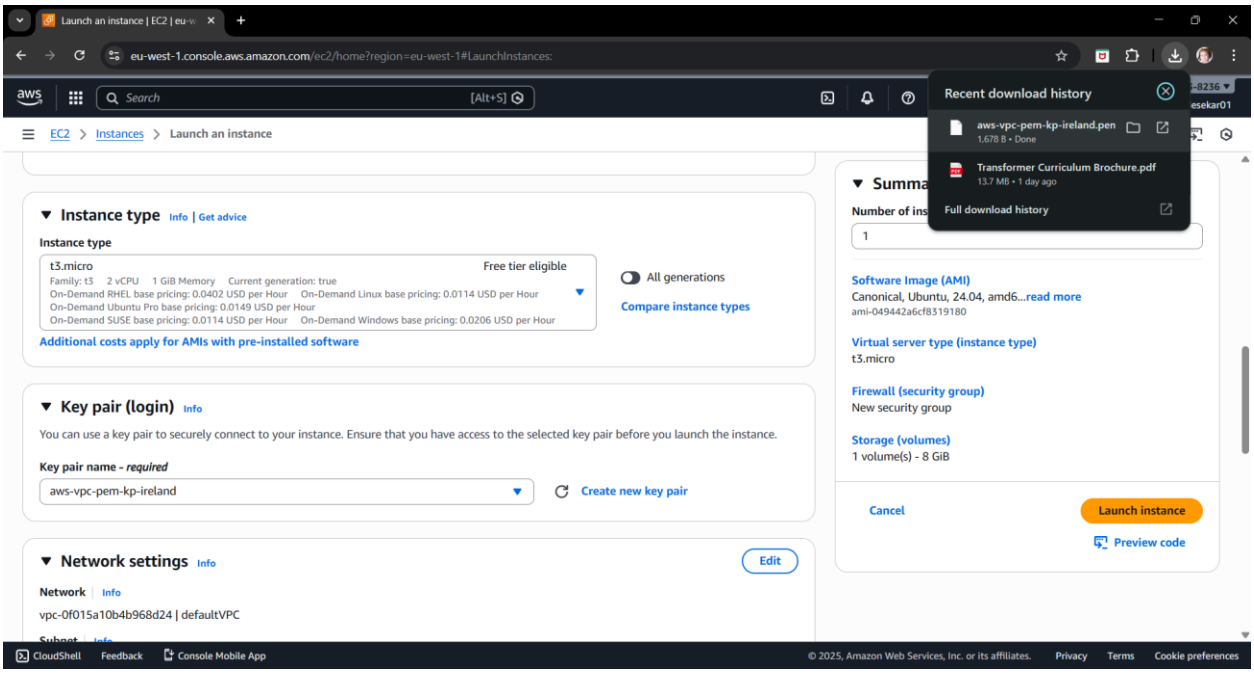
Launch an instance | EC2 | eu-w
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search [Alt+S]
Recent download history
aws-vpc-pem-kp-ireland.pen
1,678 B • Done
Transformer Curriculum Brochure.pdf
13.7 MB • 1 day ago
Full download history
EC2 > Instances > Launch an instance
Instance type Info | Get advice
Instance type
t3.micro Free tier eligible
Family: t3 2 vCPU 1 GiB Memory Current generation: true
On-Demand RHEL base pricing: 0.0402 USD per Hour On-Demand Linux base pricing: 0.0114 USD per Hour
On-Demand Ubuntu Pro base pricing: 0.0149 USD per Hour
On-Demand SUSE base pricing: 0.0114 USD per Hour On-Demand Windows base pricing: 0.0206 USD per Hour
All generations
Compare instance types
Additional costs apply for AMIs with pre-installed software
Key pair (login) Info
You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.
Key pair name - required
aws-vpc-pem-kp-ireland
Create new key pair
Network settings Info
Edit
Network Info
vpc-0f015a10b4b968d24 | defaultVPC
Number of instances
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell Feedback Console Mobile App
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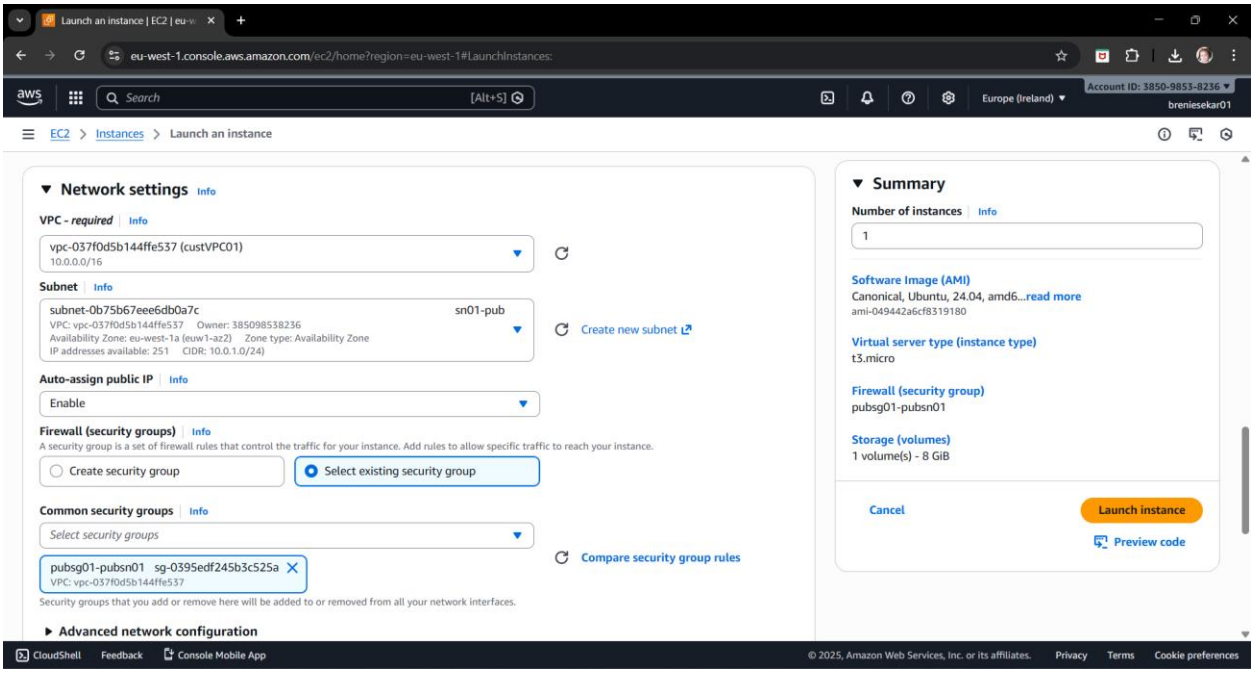
Launch an instance | EC2 | eu-w
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search [Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
EC2 > Instances > Launch an instance
Network settings Info
VPC - required Info
vpc-037f0d5b144ffe537 (custVPC01)
10.0.0.0/16
Subnet Info
subnet-0b75b67eee6db0a7c sn01-pub
VPC: vpc-037f0d5b144ffe537 Owner: 385098538236
Availability Zone: eu-west-1a (euw1-az2) Zone type: Availability Zone
IP addresses available: 251 CIDR: 10.0.1.0/24)
Create new subnet
Auto-assign public IP Info
Enable
Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
Create security group
Select existing security group
Common security groups Info
Select security groups
pubsg01-pubsn01 sg-0395edf245b3c525a
VPC: vpc-037f0d5b144ffe537
Compare security group rules
Security groups that you add or remove here will be added to or removed from all your network interfaces.
Advanced network configuration
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
pubsg01-pubsn01
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell Feedback Console Mobile App
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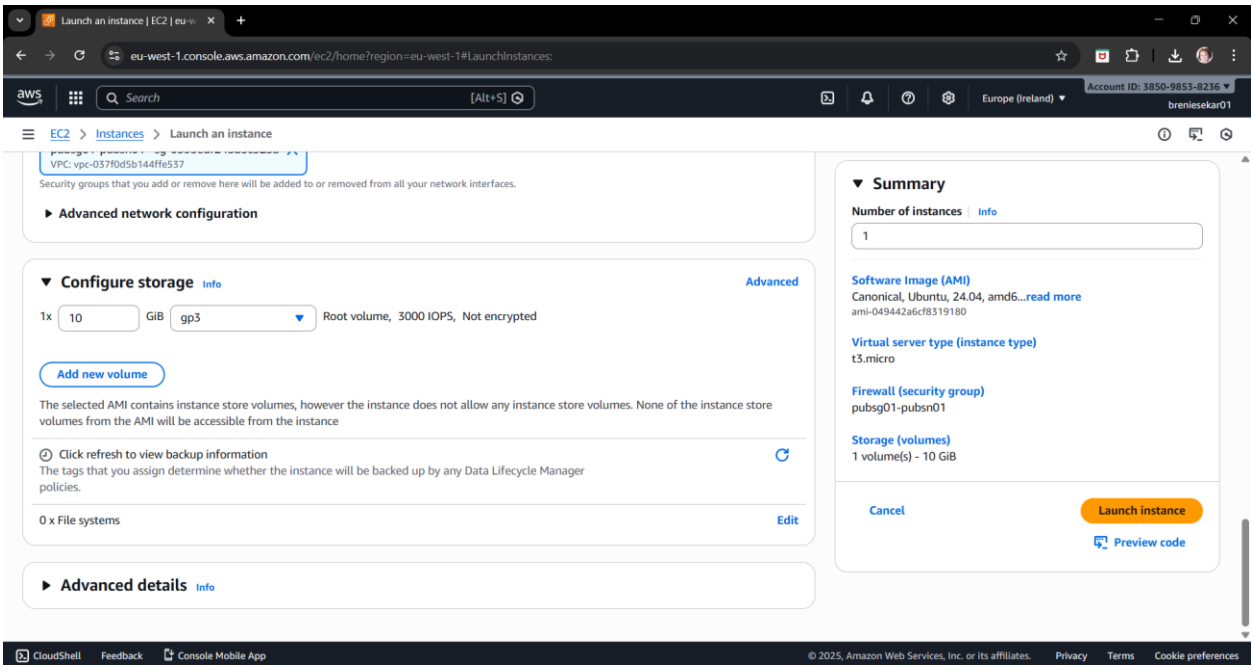
Launch an instance | EC2 | eu-w
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
VPC: vpc-037f0d5b144ffe537
Security groups that you add or remove here will be added to or removed from all your network interfaces.
Advanced network configuration
Configure storage Info
Advanced
1x 10 GiB gp3 Root volume, 3000 IOPS, Not encrypted
Add new volume
The selected AMI contains instance store volumes, however the instance does not allow any instance store volumes. None of the instance store volumes from the AMI will be accessible from the instance
Click refresh to view backup information
The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.
0 x File systems
Edit
Advanced details Info
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
pubsg01-pubsn01
Storage (volumes)
1 volume(s) - 10 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
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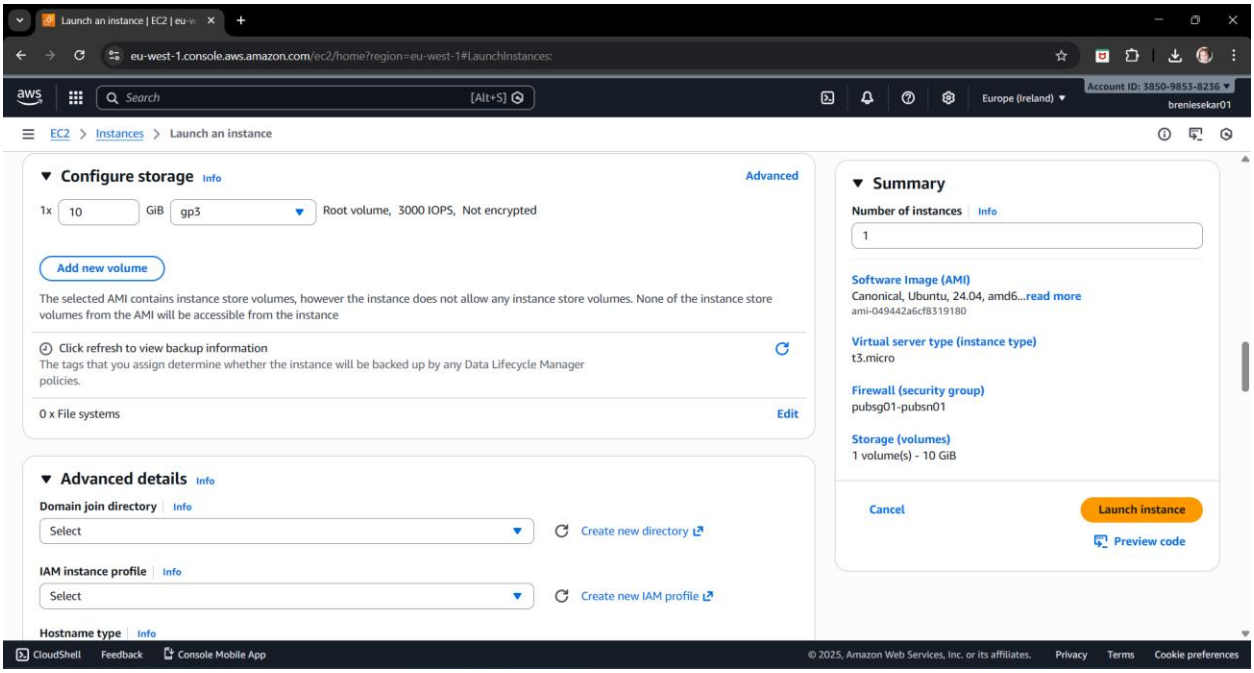
Launch an instance | EC2 | eu-w
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
Configure storage Info
Advanced
1x 10 GiB gp3 Root volume, 3000 IOPS, Not encrypted
Add new volume
The selected AMI contains instance store volumes, however the instance does not allow any instance store volumes. None of the instance store volumes from the AMI will be accessible from the instance
Click refresh to view backup information
The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.
0 x File systems
Edit
Advanced details Info
Domain join directory Info
Select
Create new directory
IAM instance profile Info
Select
Create new IAM profile
Hostname type Info
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
pubsg01-pubsn01
Storage (volumes)
1 volume(s) - 10 GiB
Cancel
Launch instance
Preview code
CloudShell
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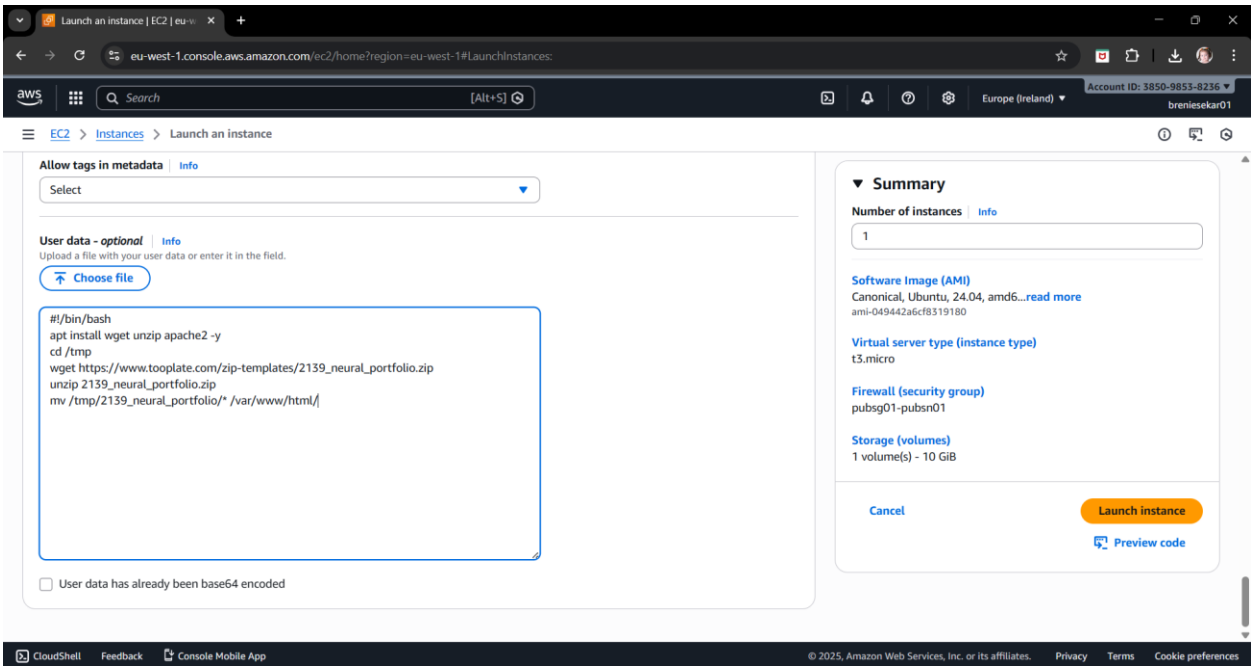
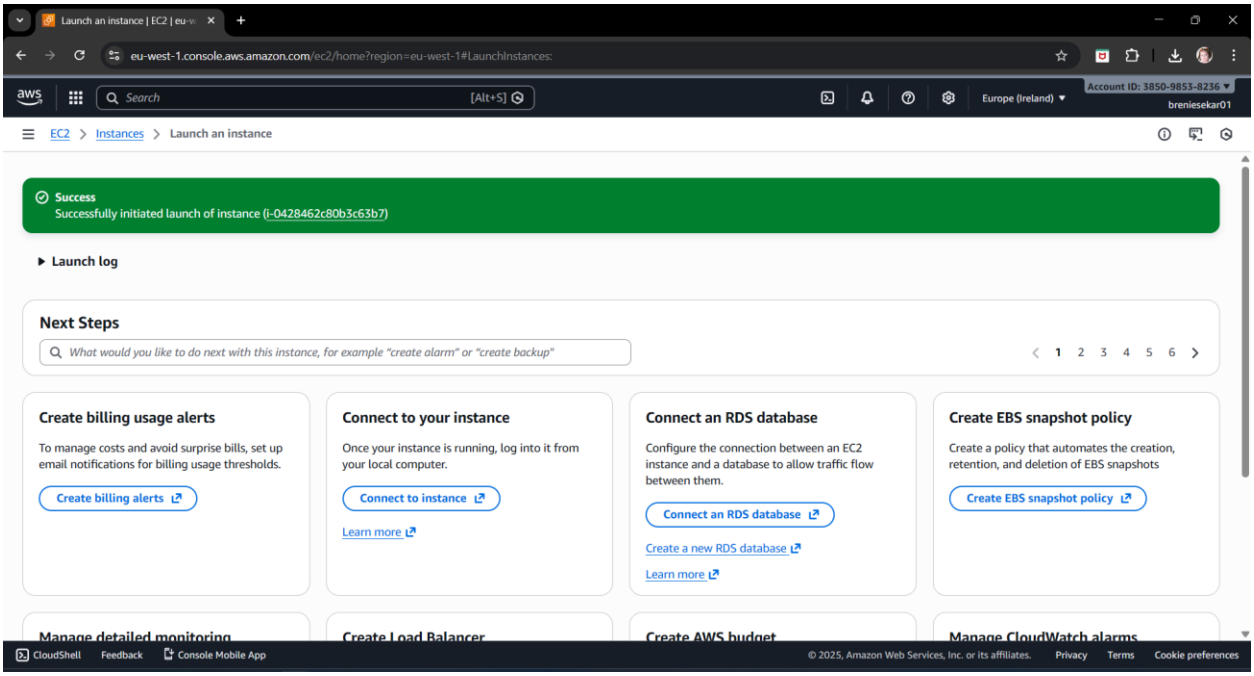
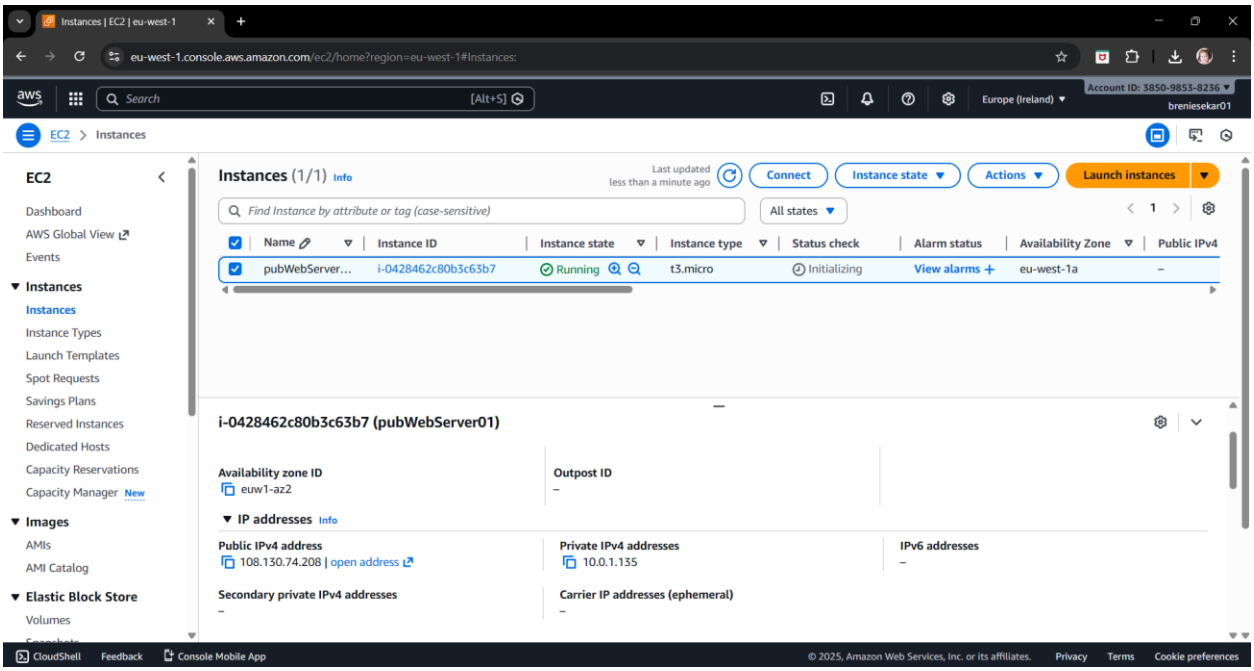


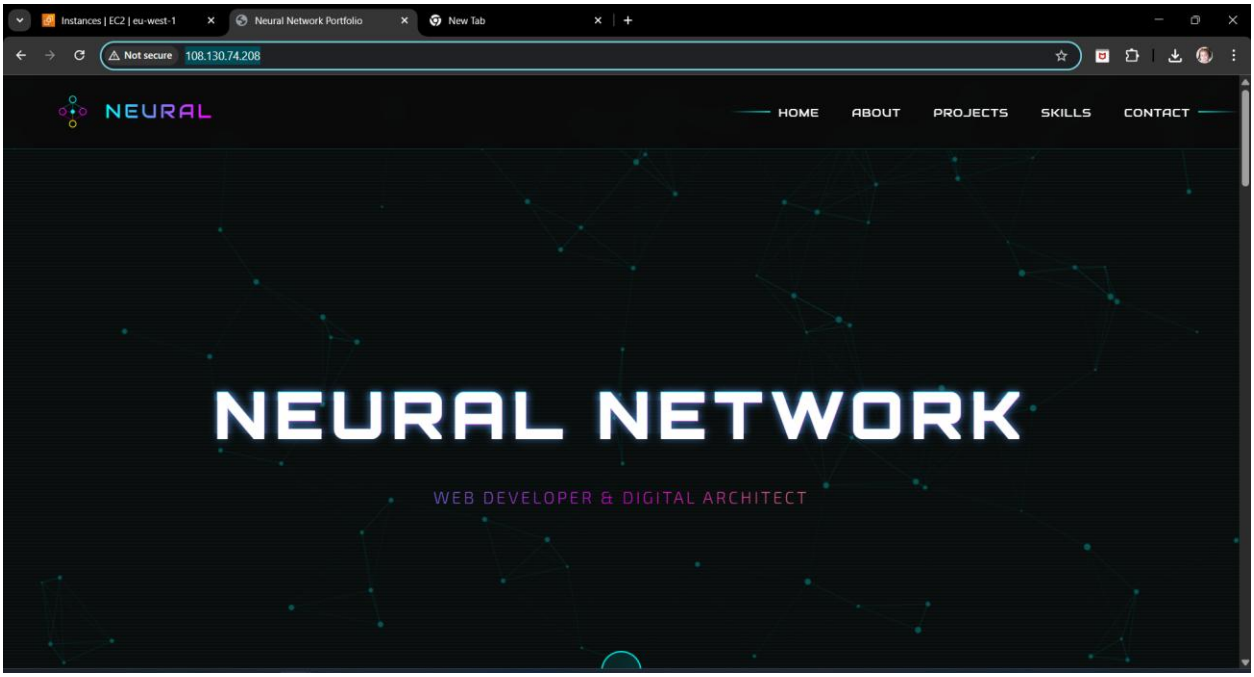


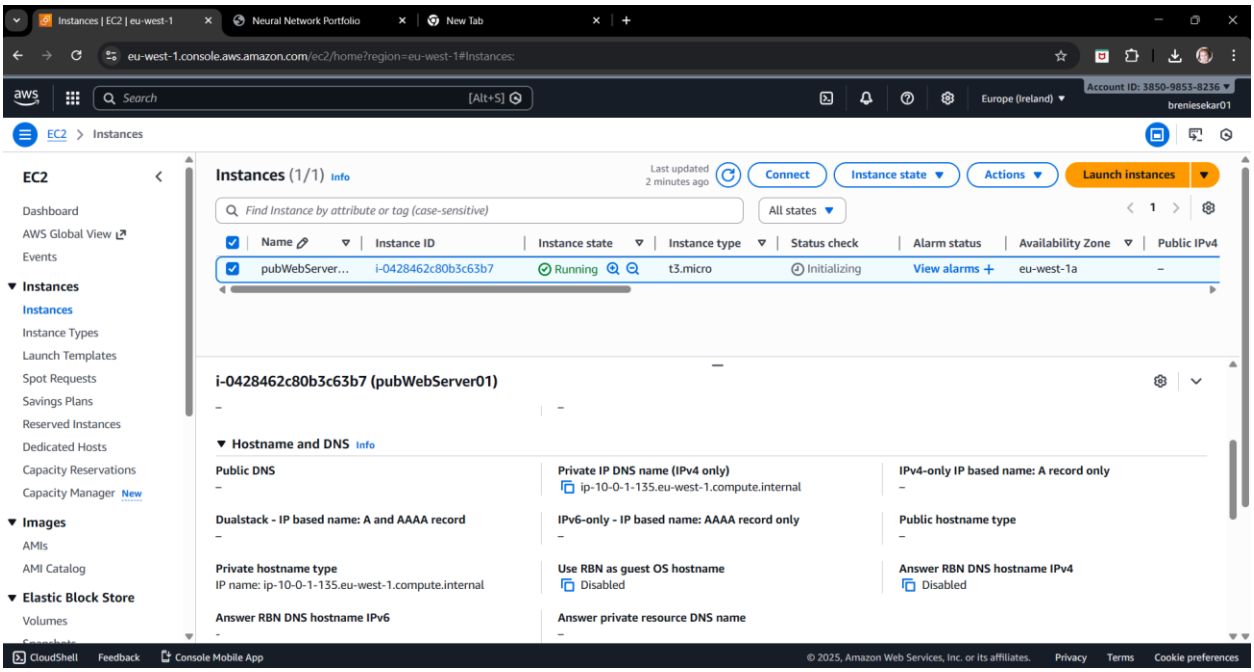
Step 8: Verify EC2 Instance and Web Access

- The EC2 instance **pubWebServer01** was successfully launched and is in the **Running** state.
- The instance was assigned the public IPv4 address **108.130.74.208.**

- The Apache web server was installed and started using the **bootstrap script.**
- The public IP address 108.130.74.208 was accessed through a web browser.
- The **Neural Network Portfolio webpage** loaded successfully.
- This verified that the **public subnet, route table, Internet Gateway, security group, and Network ACLs** were correctly configured.







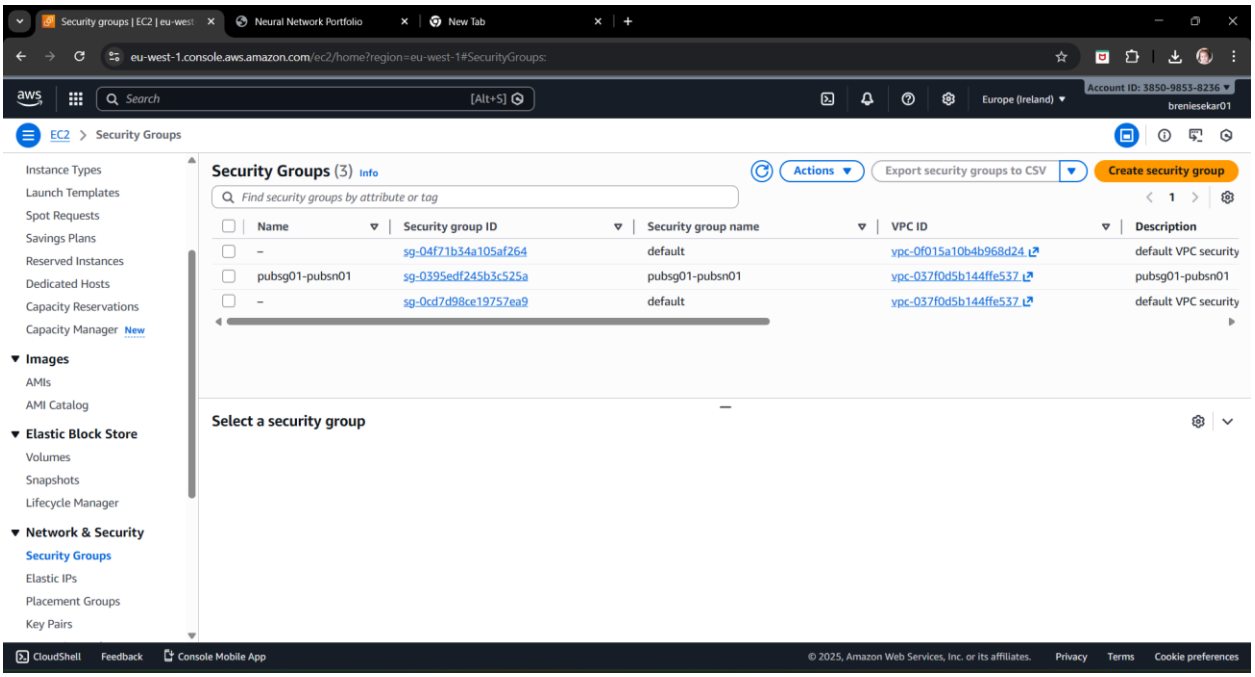
Part B: DMZ Setup & Private Subnet Access

A DMZ (Demilitarized Zone) setup is used to securely access private resources through a public-facing instance. In this architecture, the public subnet EC2 instance acts as a bastion/DMZ host. Private subnet instances are not directly accessible from the internet

Step 9 : Create a security group for private subnet

The purpose of the **private security group** is to allow secure SSH access from the **public subnet (DMZ host)** to the **private subnet**, enable basic connectivity testing using **ICMP**, and prevent direct internet access to private instances by following the **DMZ security architecture**.

- A new security group named **privsg01-privsn01** was created.
- The custom VPC **custVPC01** was selected while creating the security group.
- This security group is associated with instances launched in the **private subnet (sn02-priv)**.
- **Inbound Rules:**
  SSH access was allowed using **TCP port 22** from the **public subnet CIDR 10.0.1.0/24**.
  ICMP (IPv4) traffic was allowed from **10.0.1.0/24** for basic connectivity testing.
- **Outbound Rules:**
  All outbound traffic was allowed to **0.0.0.0/0**.


Security groups | EC2 | eu-west
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#SecurityGroups:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Security Groups
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Capacity Manager New
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Snapshots
Lifecycle Manager
Network & Security
Security Groups
Elastic IPs
Placement Groups
Key Pairs
Security Groups (3) Info
Actions
Export security groups to CSV
Create security group
Find security groups by attribute or tag
Name
Security group ID
Security group name
VPC ID
Description
– sg-04f71b34a105af264 default vpc-0f015a10b4b968d24 default VPC security
pubsg01-pubsn01 sg-0395edf245b3c525a pubsg01-pubsn01 vpc-037f0d5b144ffe537 pubsg01-pubsn01
– sg-0cd7d98ce19757ea9 default vpc-037f0d5b144ffe537 default VPC security
Select a security group
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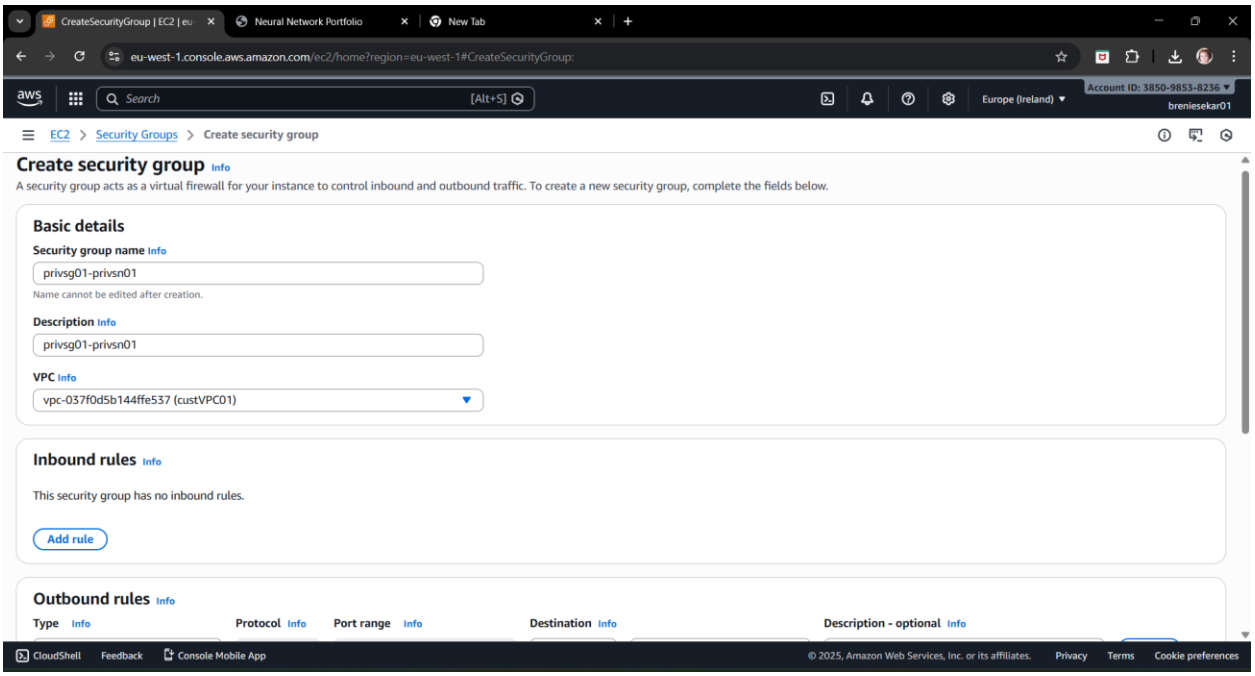
CreateSecurityGroup | EC2 | eu
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#CreateSecurityGroup:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Security Groups > Create security group
Create security group Info
A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.
Basic details
Security group name Info
privsg01-privsn01
Name cannot be edited after creation.
Description Info
privsg01-privsn01
VPC Info
vpc-037f0d5b144ffe537 (custVPC01)
Inbound rules Info
This security group has no inbound rules.
Add rule
Outbound rules Info
Type Info
Protocol Info
Port range Info
Destination Info
Description - optional Info
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Console Mobile App
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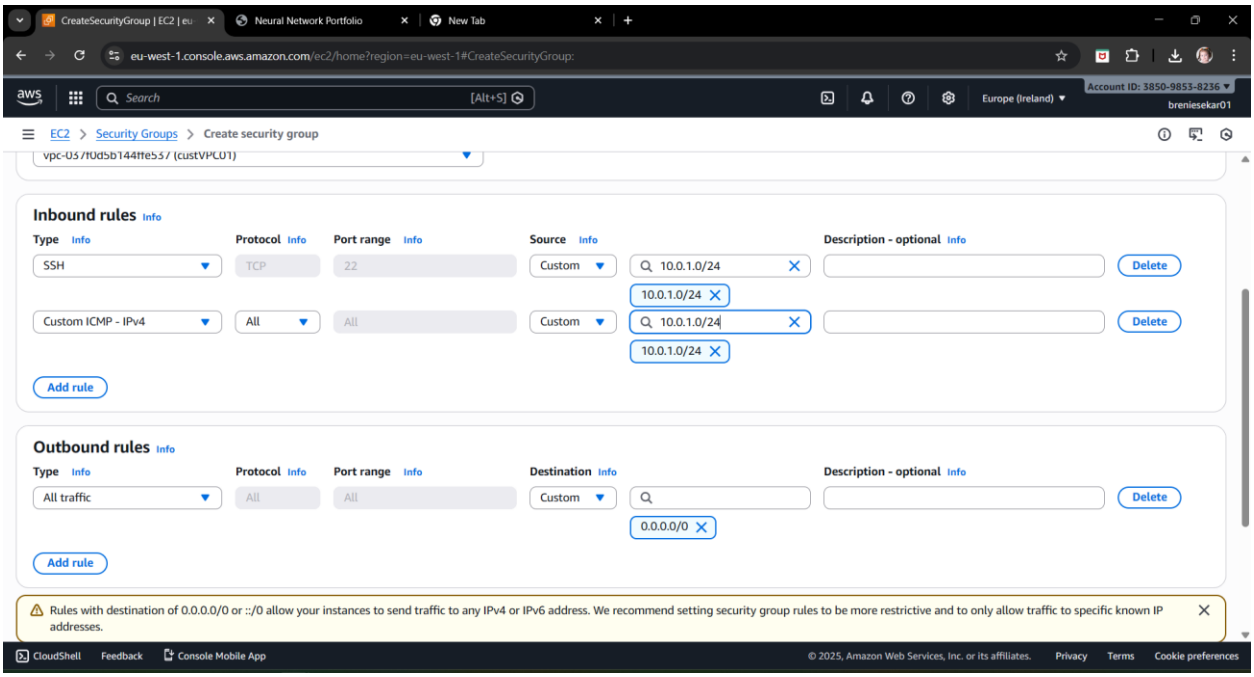
CreateSecurityGroup | EC2 | eu-
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#CreateSecurityGroup:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Security Groups > Create security group
Inbound rules Info
Type Info
Protocol Info
Port range Info
Source Info
Description - optional Info
SSH
TCP
22
Custom
10.0.1.0/24
Delete
Custom ICMP - IPv4
All
Add rule
Outbound rules Info
All traffic
0.0.0.0/0
Rules with destination of 0.0.0.0/0 or ::/0 allow your instances to send traffic to any IPv4 or IPv6 address. We recommend setting security group rules to be more restrictive and to only allow traffic to specific known IP addresses.
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Feedback
Console Mobile App
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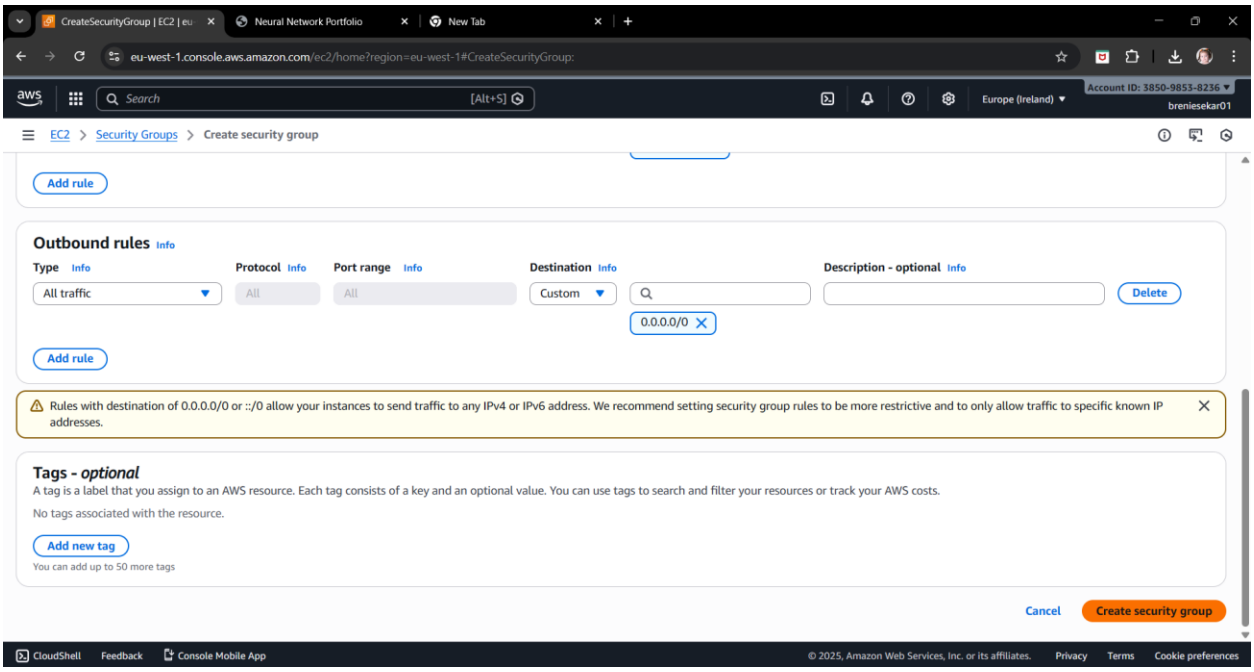
CreateSecurityGroup | EC2 | eu-
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#CreateSecurityGroup:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Security Groups > Create security group
Add rule
Outbound rules Info
Type Info
Protocol Info
Port range Info
Destination Info
Description - optional Info
All traffic
Custom
0.0.0.0/0
Delete
Add rule
Rules with destination of 0.0.0.0/0 or ::/0 allow your instances to send traffic to any IPv4 or IPv6 address. We recommend setting security group rules to be more restrictive and to only allow traffic to specific known IP addresses.
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.
No tags associated with the resource.
Add new tag
You can add up to 50 more tags
Cancel
Create security group
CloudShell
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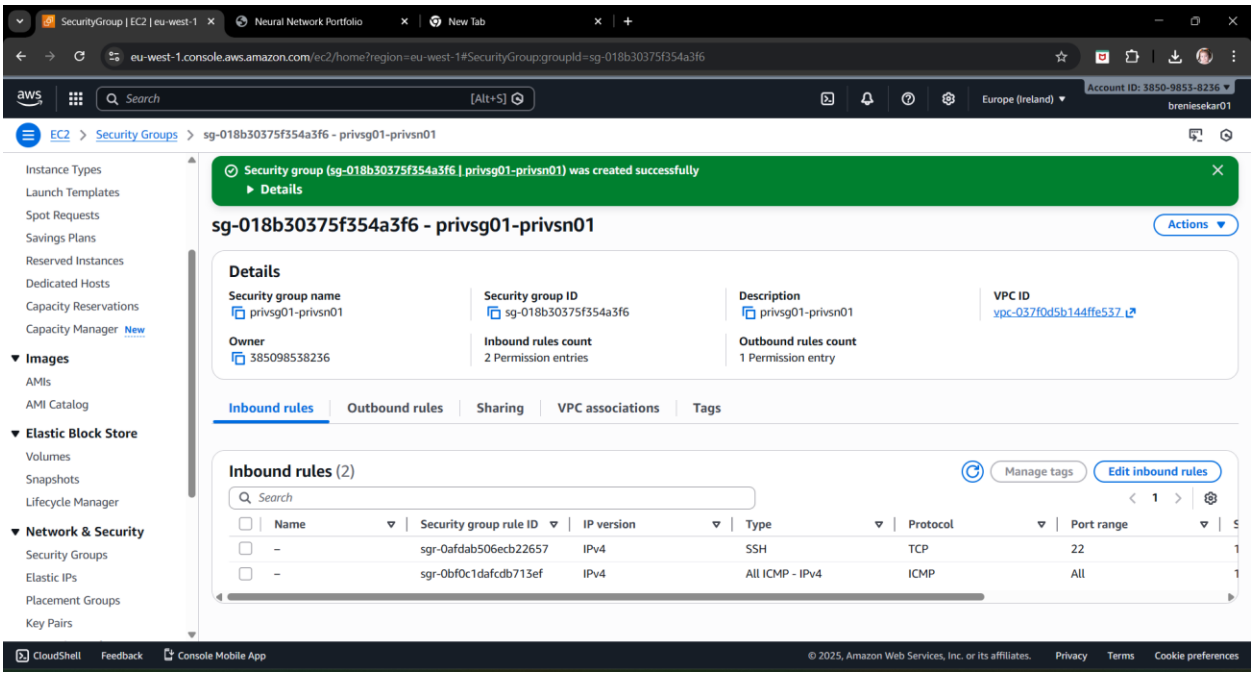
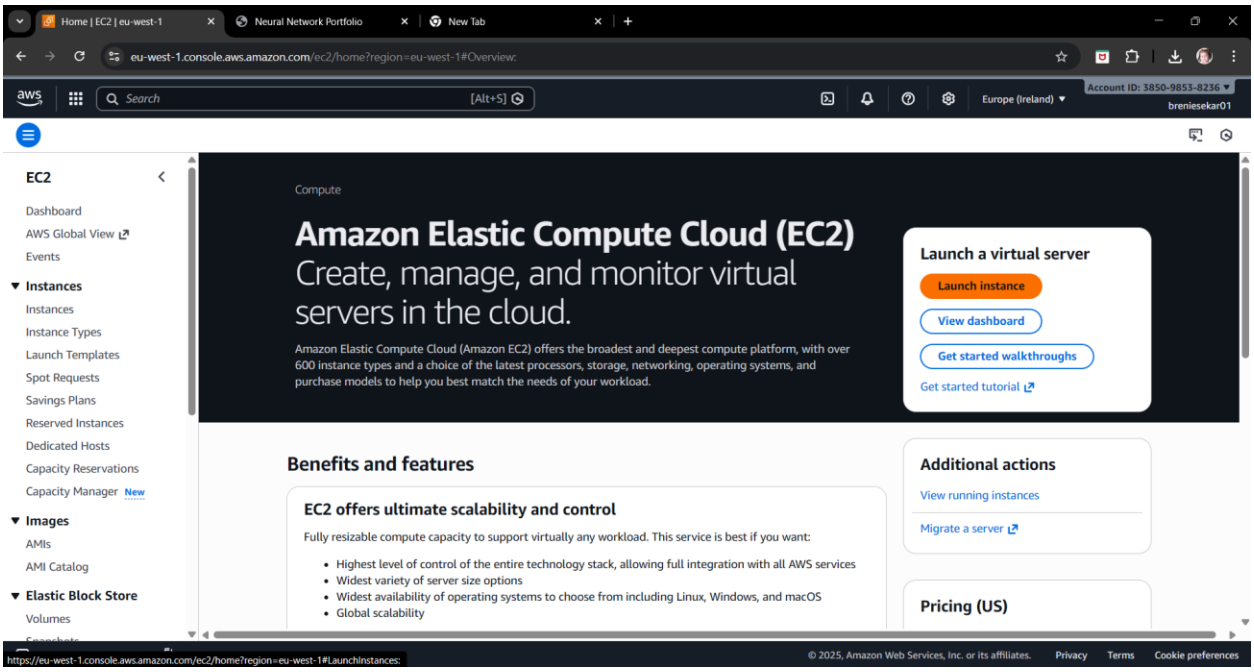


Step 10 : Launch an EC2 in the Private Subnet

This step launches an **EC2 instance in the private subnet** with **no direct internet access**, ensuring secure access only through the **DMZ (public subnet) host**.

- A new EC2 instance was launched.
- A name **dbServerPrivSn01** was assigned to the instance.
- An appropriate **Ubuntu Server AMI** was selected.
- The instance type **t3.micro** was chosen.
- The instance was launched in the **CustVPC01** network.
- The **private subnet (sn02-priv)** was selected.
- **Auto-assign Public IP** was set to **Disable**.
- The security group **privsg01-privsn01** was associated with the instance.
- Storage was configured using the **default settings**.
- The configuration was reviewed and the instance was successfully launched.


Home | EC2 | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#Overview:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2
Dashboard
AWS Global View
Events
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Capacity Manager New
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Compute
Amazon Elastic Compute Cloud (EC2)
Create, manage, and monitor virtual servers in the cloud.
Amazon Elastic Compute Cloud (Amazon EC2) offers the broadest and deepest compute platform, with over 600 instance types and a choice of the latest processors, storage, networking, operating systems, and purchase models to help you best match the needs of your workload.
Launch a virtual server
Launch instance
View dashboard
Get started walkthroughs
Get started tutorial
Benefits and features
EC2 offers ultimate scalability and control
Fully resizable compute capacity to support virtually any workload. This service is best if you want:
Highest level of control of the entire technology stack, allowing full integration with all AWS services
Widest variety of server size options
Widest availability of operating systems to choose from including Linux, Windows, and macOS
Global scalability
Additional actions
View running instances
Migrate a server
Pricing (US)
https://eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
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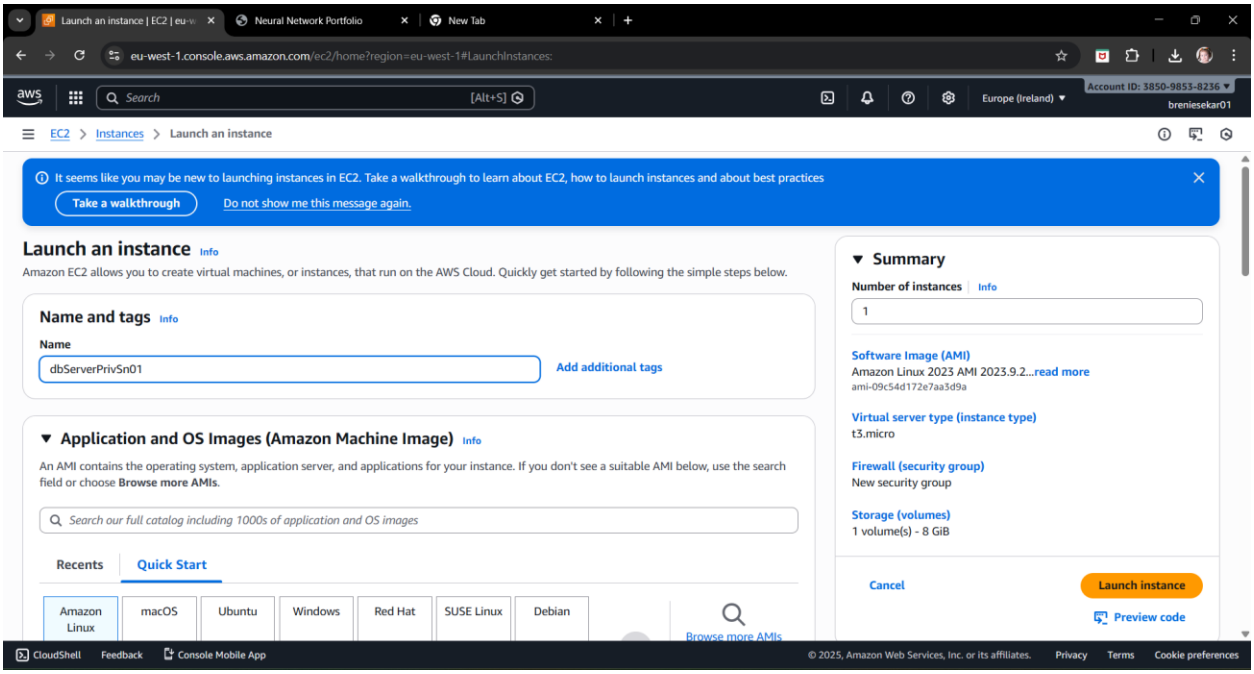
Launch an instance | EC2 | eu-w
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
It seems like you may be new to launching instances in EC2. Take a walkthrough to learn about EC2, how to launch instances and about best practices
Take a walkthrough
Do not show me this message again.
Launch an instance Info
Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.
Name and tags Info
Name
dbServerPrivSn01
Add additional tags
Application and OS Images (Amazon Machine Image) Info
An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose Browse more AMIs.
Search our full catalog including 1000s of application and OS images
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.9.2...read more
ami-09c54d172e7aa3d9a
Virtual server type (instance type)
t3.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
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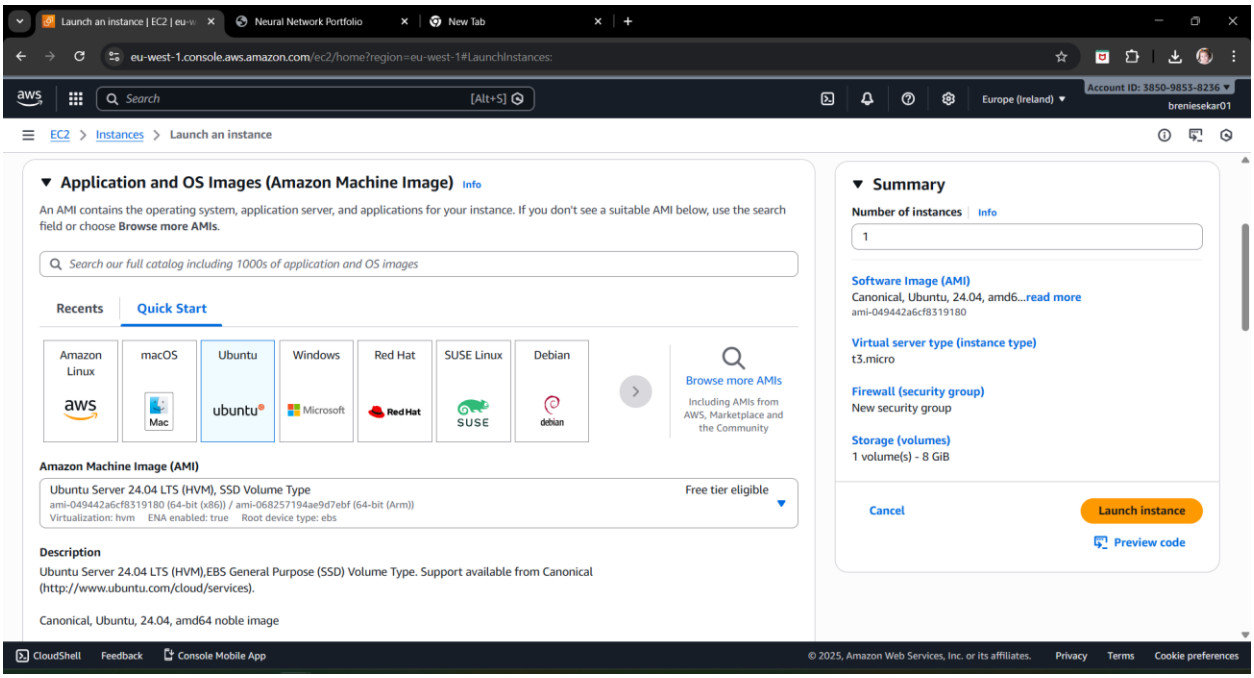
Launch an instance | EC2 | eu-w
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
Application and OS Images (Amazon Machine Image) Info
An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose Browse more AMIs.
Search our full catalog including 1000s of application and OS images
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community
Amazon Machine Image (AMI)
Ubuntu Server 24.04 LTS (HVM), SSD Volume Type
ami-049442a6cf8319180 (64-bit (x86)) / ami-068257194ae9d7ebf (64-bit (Arm))
Virtualization: hvm ENA enabled: true Root device type: ebs
Free tier eligible
Description
Ubuntu Server 24.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).
Canonical, Ubuntu, 24.04, amd64 noble image
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
Console Mobile App
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Privacy
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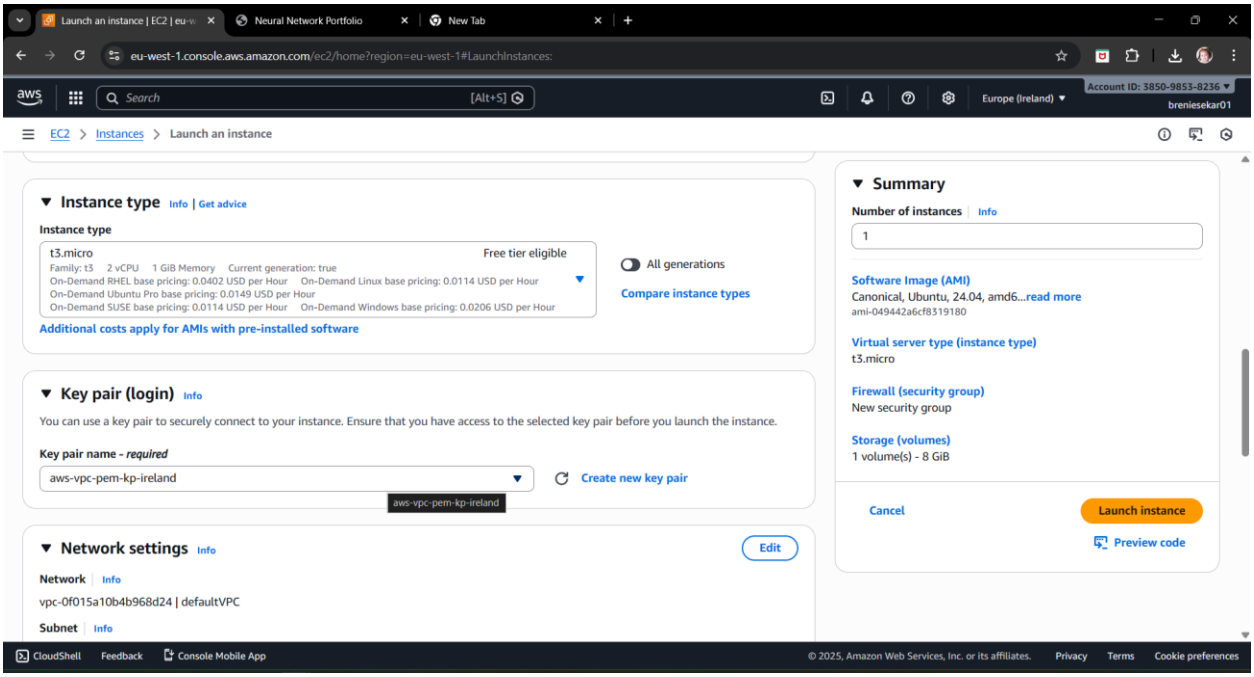
Cookie preferences


Launch an instance | EC2 | eu-w
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
Instance type Info | Get advice
Instance type
t3.micro
Family: t3 2 vCPU 1 GiB Memory Current generation: true
On-Demand RHEL base pricing: 0.0402 USD per Hour On-Demand Linux base pricing: 0.0114 USD per Hour
On-Demand Ubuntu Pro base pricing: 0.0149 USD per Hour
On-Demand SUSE base pricing: 0.0114 USD per Hour On-Demand Windows base pricing: 0.0206 USD per Hour
Free tier eligible
All generations
Compare instance types
Additional costs apply for AMIs with pre-installed software
Key pair (login) Info
You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.
Key pair name - required
aws-vpc-pem-kp-ireland
Create new key pair
Network settings Info
Edit
Network Info
vpc-0f015a10b4b968d24 | defaultVPC
Subnet Info
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
Console Mobile App
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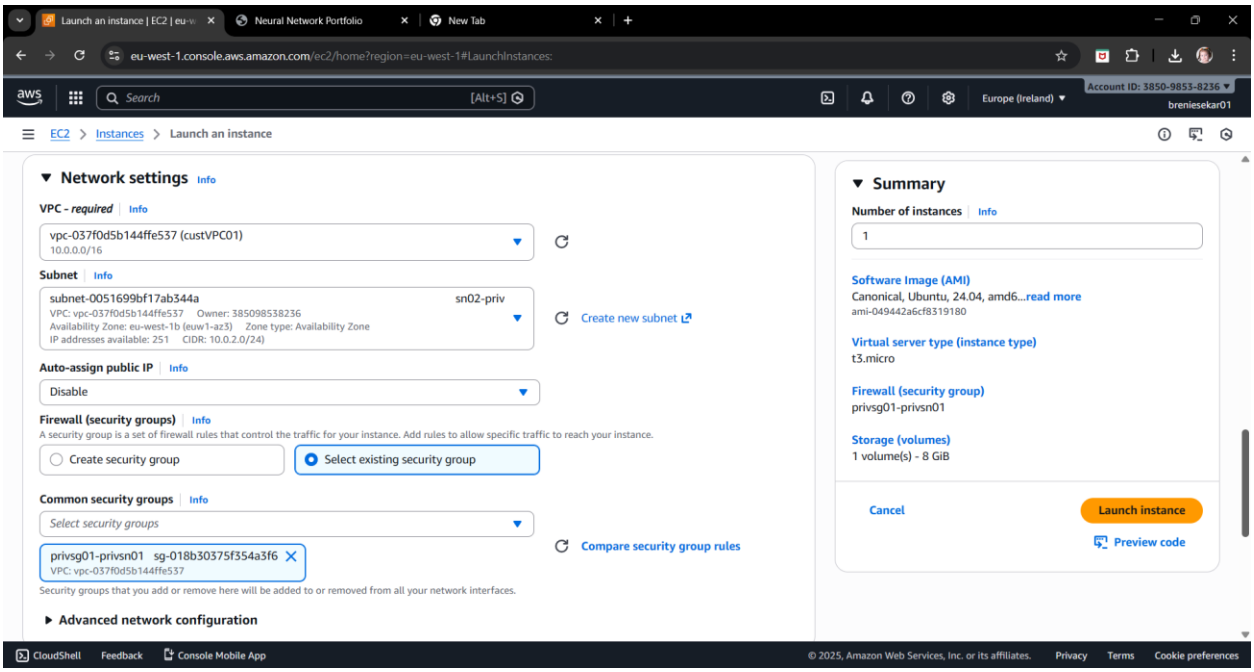
Terms
Cookie preferences


Launch an instance | EC2 | eu-w
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
Network settings Info
VPC - required Info
vpc-037f0d5b144ffe537 (custVPC01)
10.0.0.0/16
Subnet Info
subnet-0051699bf17ab344a sn02-priv
VPC: vpc-037f0d5b144ffe537 Owner: 385098538236
Availability Zone: eu-west-1b (euw1-az3) Zone type: Availability Zone
IP addresses available: 251 CIDR: 10.0.2.0/24)
Create new subnet
Auto-assign public IP Info
Disable
Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
Create security group
Select existing security group
Common security groups Info
Select security groups
privsg01-privsn01 sg-018b30375f354a3f6
VPC: vpc-037f0d5b144ffe537
Compare security group rules
Security groups that you add or remove here will be added to or removed from all your network interfaces.
Advanced network configuration
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
privsg01-privsn01
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
Console Mobile App
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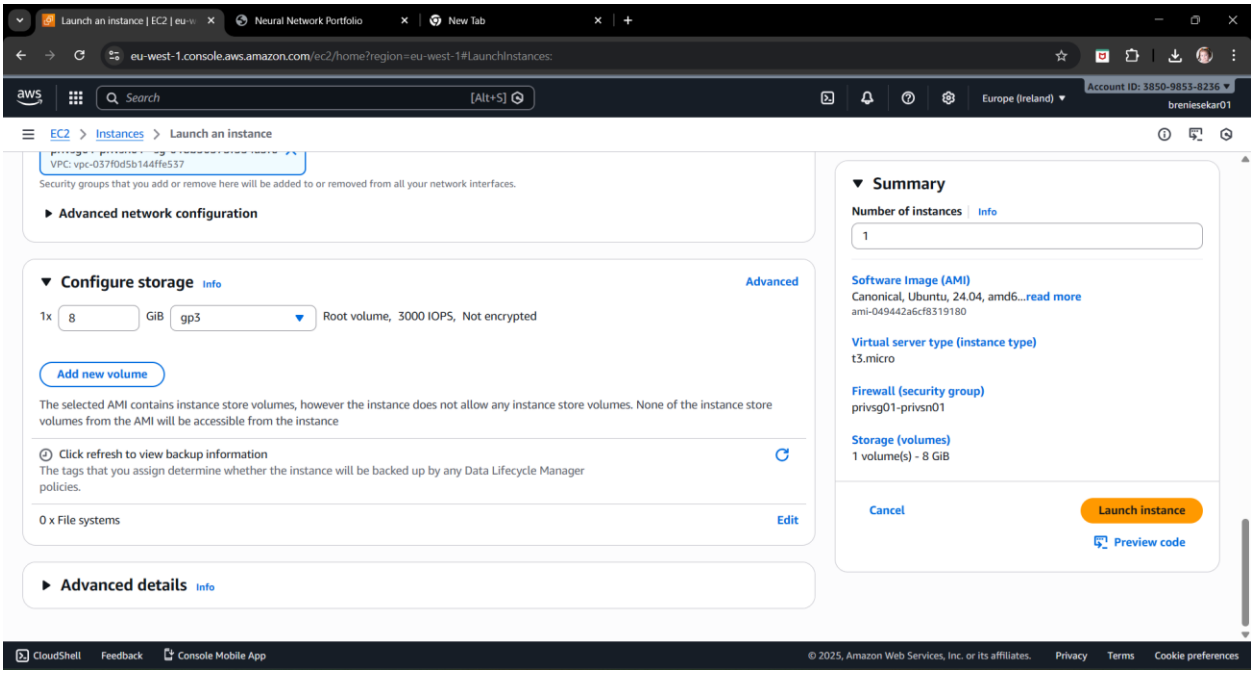
Launch an instance | EC2 | eu-w
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#LaunchInstances:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances > Launch an instance
VPC: vpc-037f0d5b144ffe537
Security groups that you add or remove here will be added to or removed from all your network interfaces.
Advanced network configuration
Configure storage Info
Advanced
1x 8 GiB gp3 Root volume, 3000 IOPS, Not encrypted
Add new volume
The selected AMI contains instance store volumes, however the instance does not allow any instance store volumes. None of the instance store volumes from the AMI will be accessible from the instance
Click refresh to view backup information
The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.
0 x File systems
Edit
Advanced details Info
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-049442a6cf8319180
Virtual server type (instance type)
t3.micro
Firewall (security group)
privsg01-privsn01
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
Console Mobile App
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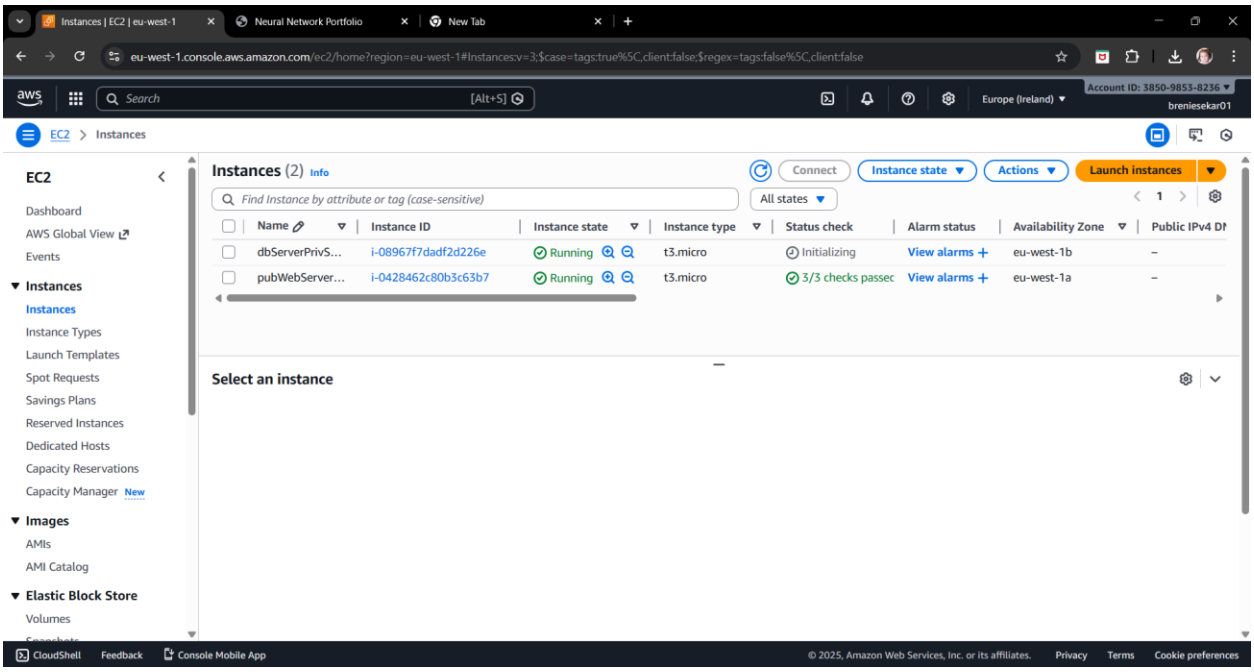
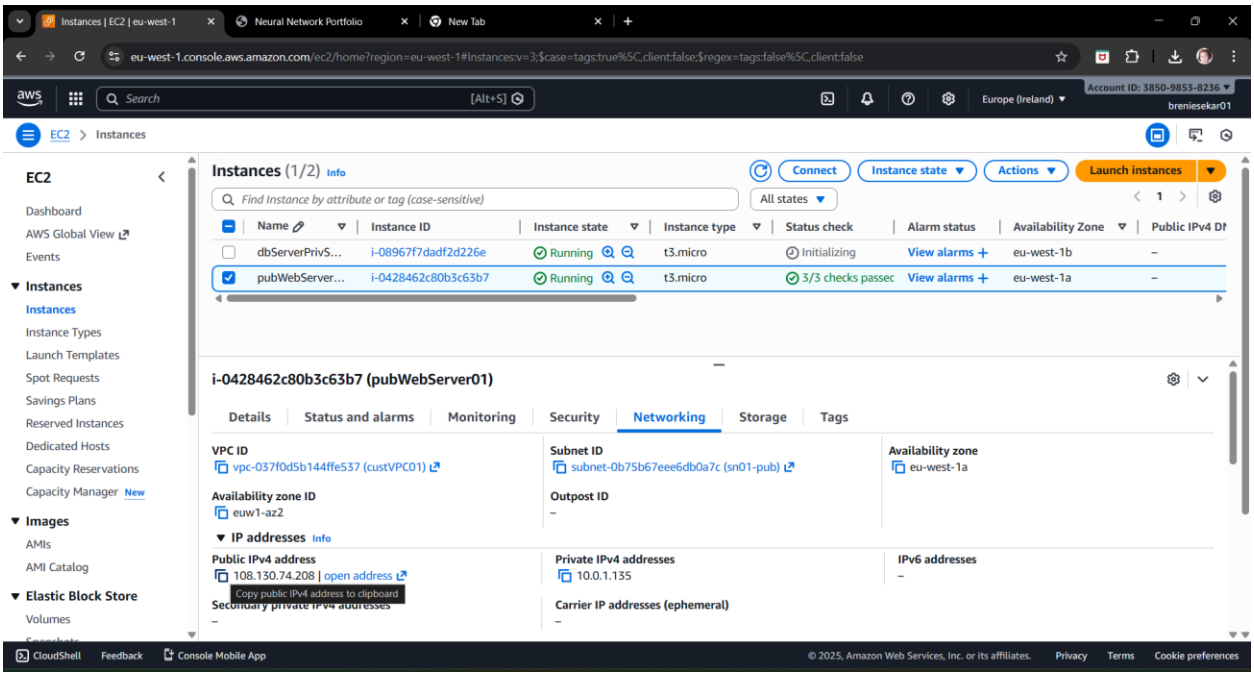


Step 11 : Connecting the Private server via the public server (bastion host)

This step verifies that the **private subnet** is securely accessible only through the **public server**, following best practices for network isolation and security.

- The **public EC2 instance** acts as a **DMZ / bastion host**.
- Direct internet access to the **private EC2 instance** is not allowed.
- An SSH connection was first established to the **public EC2 instance**.
- From the public instance, an **SSH connection** was initiated to the private EC2 instance.
- The private EC2 instance was accessed using its **private IP address 10.0.2.59**, and successful ICMP ping responses confirmed network connectivity between the public (DMZ) instance and the private subnet instance.
- SSH access was permitted because the **private security group allows SSH traffic from the public security group**.
- This confirmed secure access to the private server through the **DMZ architecture**.


Instances | EC2 | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#Instances:v=3;$case=tags:true%5C,client:false;$regex=tags:false%5C,client:false
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances
EC2
Dashboard
AWS Global View
Events
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Capacity Manager New
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Instances (1/2) Info
Connect
Instance state
Actions
Launch instances
Find Instance by attribute or tag (case-sensitive)
All states
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability Zone
Public IPv4 DI
dbServerPrivS...
i-08967f7dadf2d226e
Running
t3.micro
Initializing
View alarms +
eu-west-1b
pubWebServer...
i-0428462c80b3c63b7
Running
t3.micro
3/3 checks passec
View alarms +
eu-west-1a
i-0428462c80b3c63b7 (pubWebServer01)
Details
Status and alarms
Monitoring
Security
Networking
Storage
Tags
VPC ID
vpc-037f0d5b144ffe537 (custVPC01)
Subnet ID
subnet-0b75b67eee6db0a7c (sn01-pub)
Availability zone
eu-west-1a
Availability zone ID
euw1-az2
Outpost ID
IP addresses Info
Public IPv4 address
108.130.74.208 | open address
Copy public IPv4 address to clipboard
Private IPv4 addresses
10.0.1.135
IPv6 addresses
Carrier IP addresses (ephemeral)
CloudShell
Feedback
Console Mobile App
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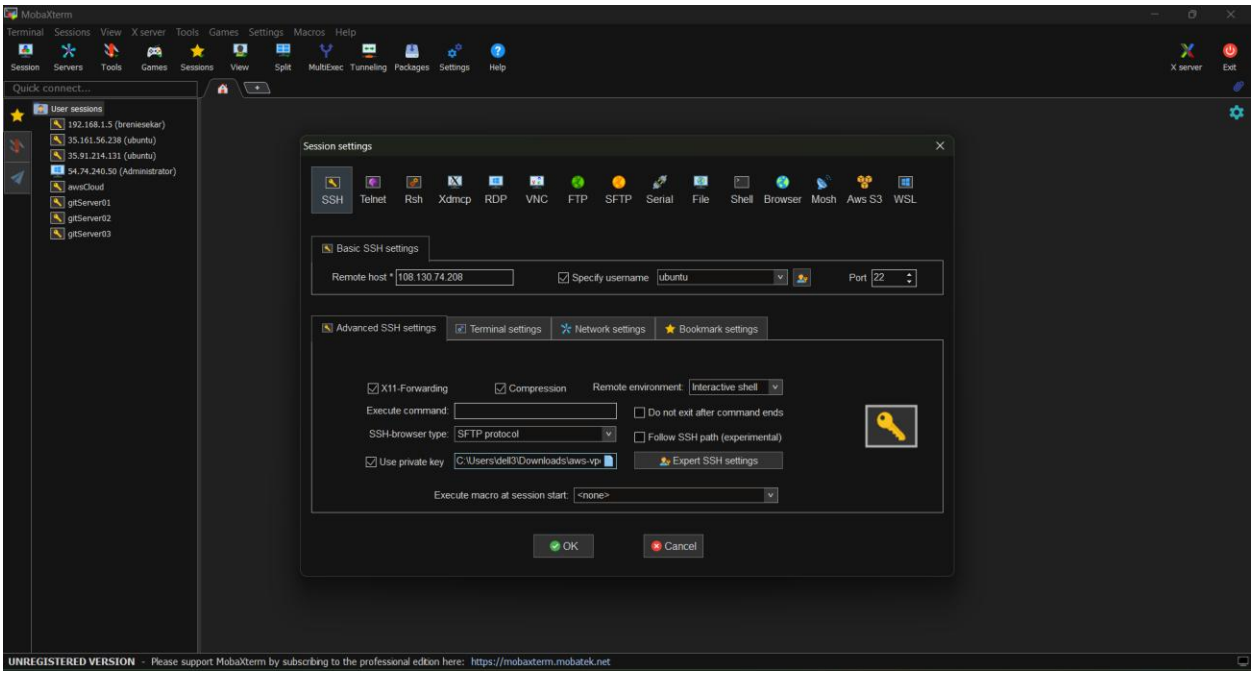
MobaXterm
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
X server Exit
Quick connect...
User sessions
192.168.1.5 (breniesekar)
35.161.56.238 (ubuntu)
35.91.214.131 (ubuntu)
54.74.240.50 (Administrator)
awsCloud
gitServer01
gitServer02
gitServer03
Session settings
SSH Telnet Rsh Xdmcp RDP VNC FTP SFTP Serial File Shell Browser Mosh Aws S3 WSL
Basic SSH settings
Remote host * 108.130.74.208
Specify username ubuntu
Port 22
Advanced SSH settings
Terminal settings
Network settings
Bookmark settings
X11-Forwarding
Compression
Remote environment: Interactive shell
Execute command:
Do not exit after command ends
SSH-browser type: SFTP protocol
Follow SSH path (experimental)
Use private key C:\Users\dell3\Downloads\aws-vp
Expert SSH settings
Execute macro at session start: <none>
OK
Cancel
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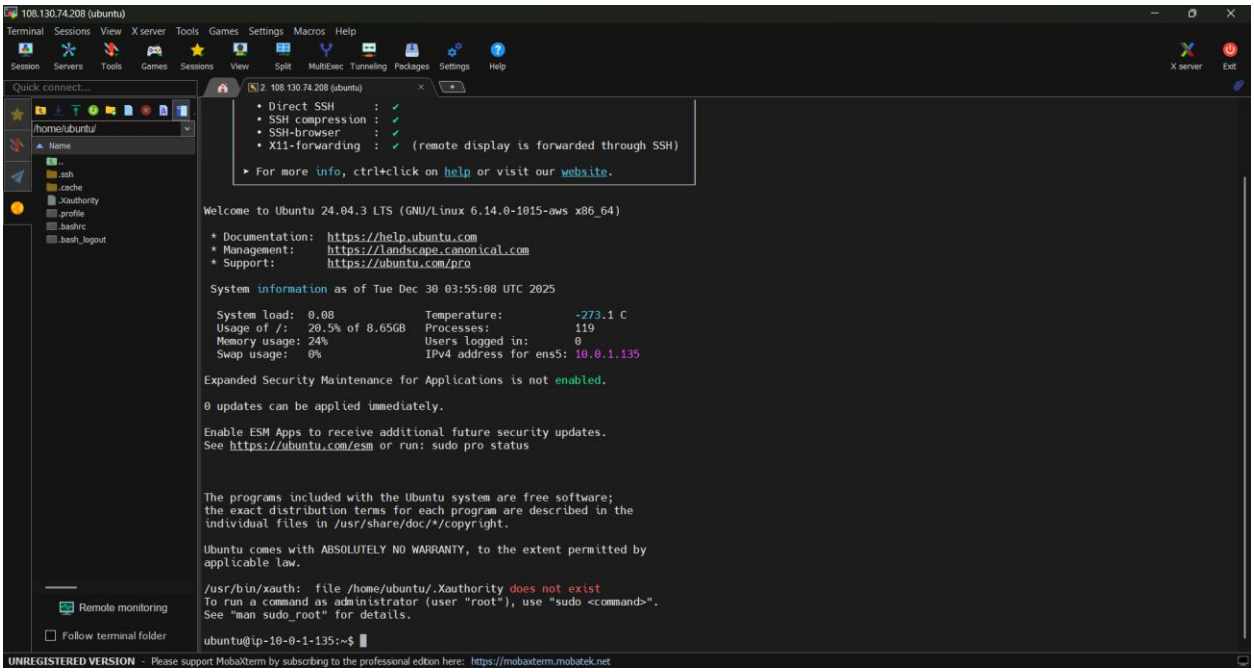
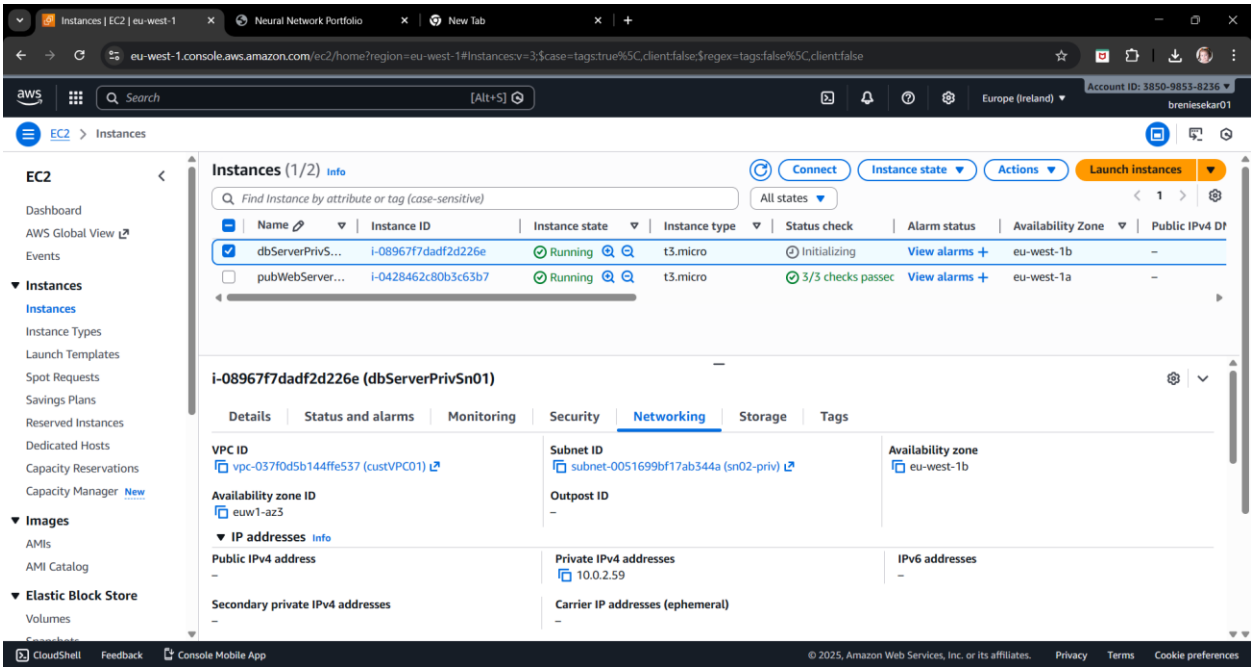

108.130.74.208 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
X server Exit
Quick connect...
/home/ubuntu/
Name
.ssh
.cache
.Xauthority
.profile
.bashrc
.bash_logout
2. 108.130.74.208 (ubuntu)
• Direct SSH : ✓
• SSH compression : ✓
• SSH-browser : ✓
• X11-forwarding : ✓ (remote display is forwarded through SSH)
▸ For more info, ctrl+click on help or visit our website.
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-1015-aws x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro
System information as of Tue Dec 30 03:55:08 UTC 2025
System load: 0.08
Usage of /: 20.5% of 8.65GB
Memory usage: 24%
Swap usage: 0%
Temperature: -273.1 C
Processes: 119
Users logged in: 0
IPv4 address for ens5: 10.0.1.135
Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
/usr/bin/xauth: file /home/ubuntu/.Xauthority does not exist
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ip-10-0-1-135:~$
Remote monitoring
Follow terminal folder
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net


Instances | EC2 | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/ec2/home?region=eu-west-1#Instances:v=3;$case=tags:true%5C,client:false;$regex=tags:false%5C,client:false
aws
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
EC2 > Instances
EC2
Dashboard
AWS Global View
Events
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Capacity Manager New
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Instances (1/2) Info
Connect
Instance state
Actions
Launch instances
Find Instance by attribute or tag (case-sensitive)
All states
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability Zone
Public IPv4 DN
dbServerPrivS...
i-08967f7dadf2d226e
Running
t3.micro
Initializing
View alarms +
eu-west-1b
pubWebServer...
i-0428462c80b3c63b7
Running
t3.micro
3/3 checks passec
View alarms +
eu-west-1a
i-08967f7dadf2d226e (dbServerPrivSn01)
Details
Status and alarms
Monitoring
Security
Networking
Storage
Tags
VPC ID
vpc-037f0d5b144ffe537 (custVPC01)
Subnet ID
subnet-0051699bf17ab344a (sn02-priv)
Availability zone
eu-west-1b
Availability zone ID
euw1-az3
Outpost ID
IP addresses Info
Public IPv4 address
Private IPv4 addresses
10.0.2.59
IPv6 addresses
Secondary private IPv4 addresses
Carrier IP addresses (ephemeral)
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Feedback
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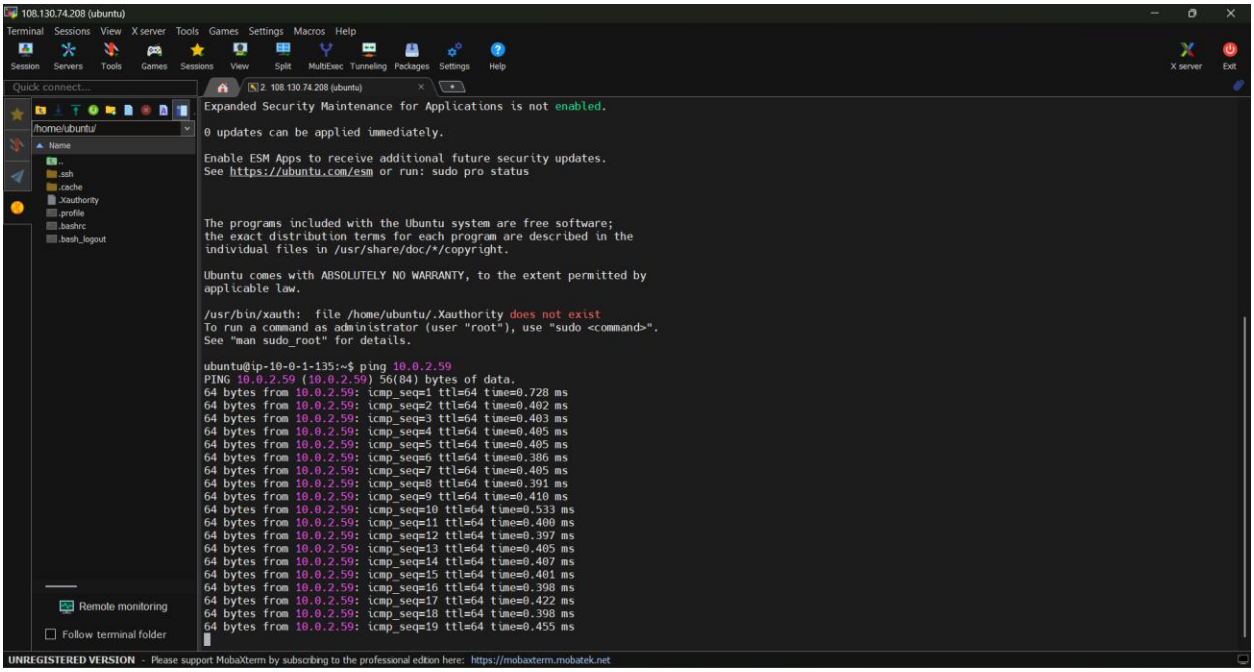
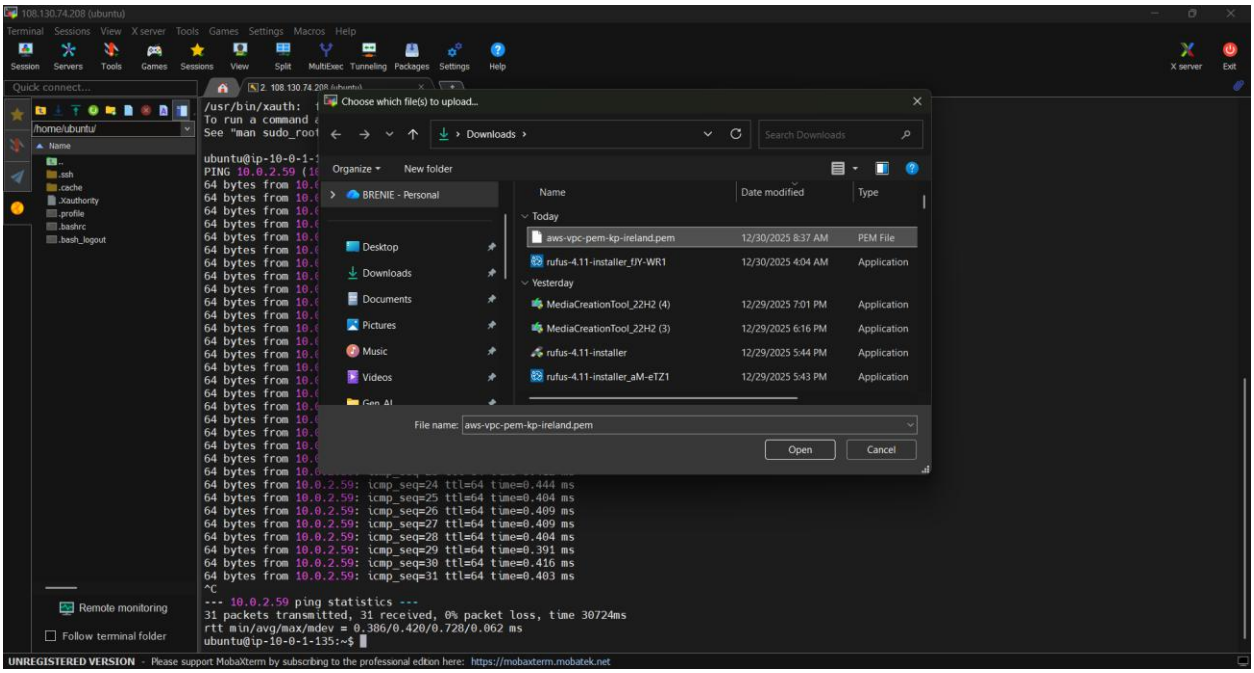


The **public EC2 instance** was used as a **DMZ / bastion host** to access the private subnet.

- **Direct internet access** to the private EC2 instance is **not permitted**.
- **SSH access** was first established to the **public EC2 instance** using its **public IP address**.
- The **private key pair** was securely **uploaded to the public server** and proper **file permissions** were applied.
- From the public instance, an **SSH connection** was initiated to the **private EC2 instance** using its **private IP address 10.0.2.59**.
- SSH access was allowed because the **private security group** permits **SSH traffic from the public subnet**.
- Successful login to the private instance **confirms secure access through the DMZ architecture**.


108.130.74.208 (ubuntu)
Choose which file(s) to upload...
Downloads
Search Downloads
Organize
New folder
BRENIE - Personal
Desktop
Downloads
Documents
Pictures
Music
Videos
Name
Date modified
Type
Today
aws-vpc-pem-kp-ireland.pem 12/30/2025 8:37 AM PEM File
rufus-4.11-installer_fJY-WR1 12/30/2025 4:04 AM Application
Yesterday
MediaCreationTool_22H2 (4) 12/29/2025 7:01 PM Application
MediaCreationTool_22H2 (3) 12/29/2025 6:16 PM Application
rufus-4.11-installer 12/29/2025 5:44 PM Application
rufus-4.11-installer_aM-eTZ1 12/29/2025 5:43 PM Application
File name: aws-vpc-pem-kp-ireland.pem
Open
Cancel
Remote monitoring
Follow terminal folder
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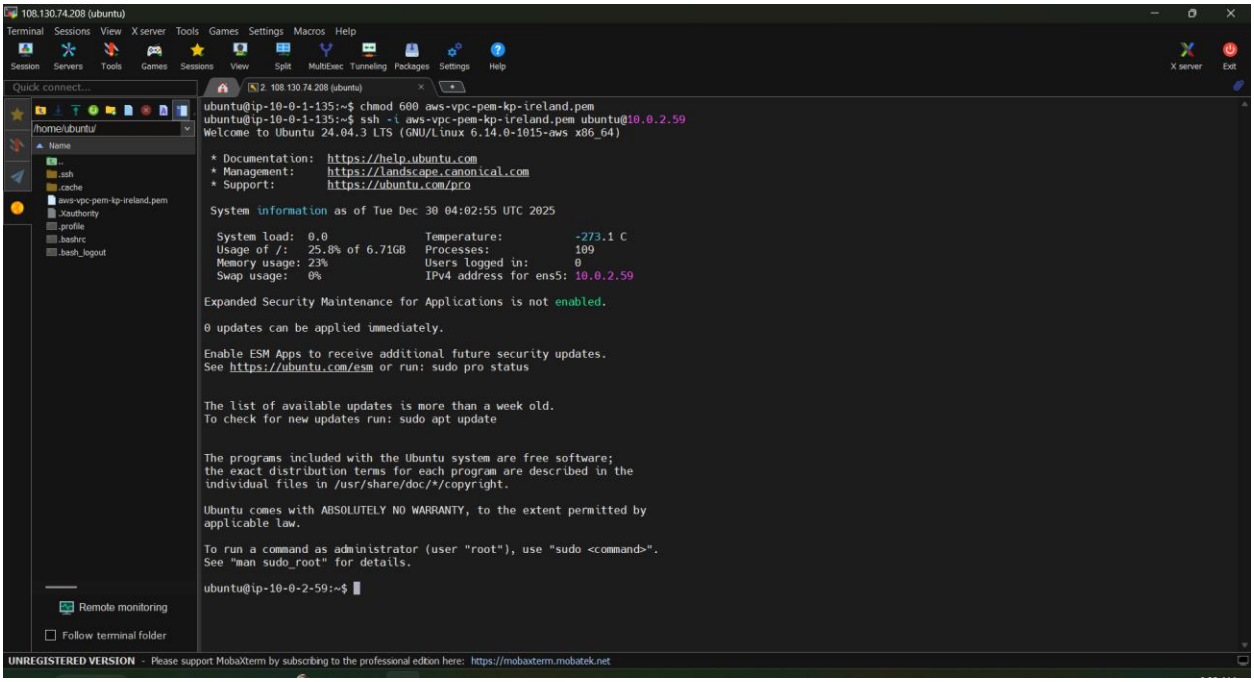
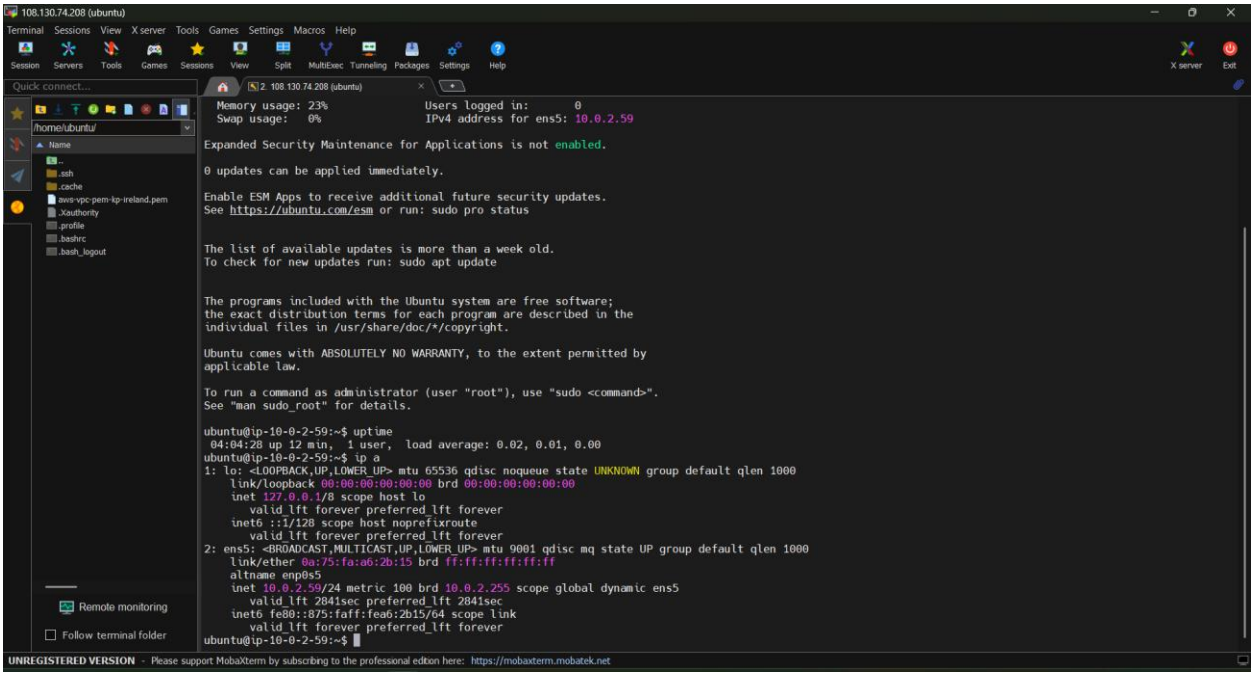

108.130.74.208 (ubuntu)
ubuntu@ip-10-0-1-135:~$ chmod 600 aws-vpc-pem-kp-ireland.pem
ubuntu@ip-10-0-1-135:~$ ssh -i aws-vpc-pem-kp-ireland.pem ubuntu@10.0.2.59
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-1015-aws x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro
System information as of Tue Dec 30 04:02:55 UTC 2025
System load: 0.0 Temperature: -273.1 C
Usage of /: 25.8% of 6.71GB Processes: 109
Memory usage: 23% Users logged in: 0
Swap usage: 0% IPv4 address for ens5: 10.0.2.59
Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
The list of available updates is more than a week old.
To check for new updates run: sudo apt update
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ip-10-0-2-59:~$
Remote monitoring
Follow terminal folder
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net


108.130.74.208 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
X server Exit
Quick connect...
2. 108.130.74.208 (ubuntu)
/home/ubuntu/
Name
.ssh
.cache
aws-vpc-pem-kp-ireland.pem
.Xauthority
.profile
.bashrc
.bash_logout
Remote monitoring
Follow terminal folder
Memory usage: 23%
Swap usage: 0%
Users logged in: 0
IPv4 address for ens5: 10.0.2.59
Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
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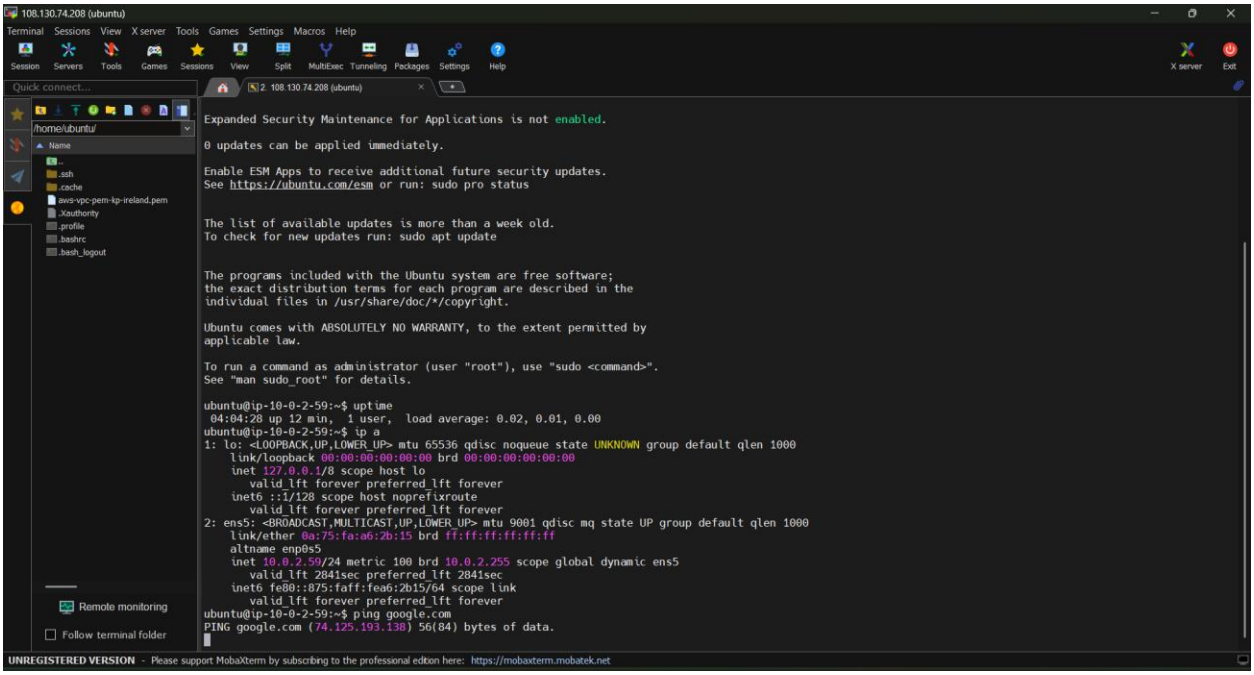
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ip-10-0-2-59:~$ uptime
04:04:28 up 12 min, 1 user, load average: 0.02, 0.01, 0.00
ubuntu@ip-10-0-2-59:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
valid_lft forever preferred_lft forever
inet6 ::1/128 scope host noprefixroute
valid_lft forever preferred_lft forever
2: ens5: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc mq state UP group default qlen 1000
link/ether 0a:75:fa:a6:2b:15 brd ff:ff:ff:ff:ff:ff
altname enp0s5
inet 10.0.2.59/24 metric 100 brd 10.0.2.255 scope global dynamic ens5
valid_lft 2841sec preferred_lft 2841sec
inet6 fe80::875:faff:fea6:2b15/64 scope link
valid_lft forever preferred_lft forever
ubuntu@ip-10-0-2-59:~$
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net


108.130.74.208 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
X server Exit
Quick connect...
2. 108.130.74.208 (ubuntu)
/home/ubuntu/
Name
.ssh
.cache
aws-vpc-pem-kp-ireland.pem
.Xauthority
.profile
.bashrc
.bash_logout
Remote monitoring
Follow terminal folder
Expanded Security Maintenance for Applications is not enabled.
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Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
The list of available updates is more than a week old.
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the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ip-10-0-2-59:~$ uptime
04:04:28 up 12 min, 1 user, load average: 0.02, 0.01, 0.00
ubuntu@ip-10-0-2-59:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
valid_lft forever preferred_lft forever
inet6 ::1/128 scope host noprefixroute
valid_lft forever preferred_lft forever
2: ens5: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc mq state UP group default qlen 1000
link/ether 0a:75:fa:a6:2b:15 brd ff:ff:ff:ff:ff:ff
altname enp0s5
inet 10.0.2.59/24 metric 100 brd 10.0.2.255 scope global dynamic ens5
valid_lft 2841sec preferred_lft 2841sec
inet6 fe80::875:faff:fea6:2b15/64 scope link
valid_lft forever preferred_lft forever
ubuntu@ip-10-0-2-59:~$ ping google.com
PING google.com (74.125.193.138) 56(84) bytes of data.
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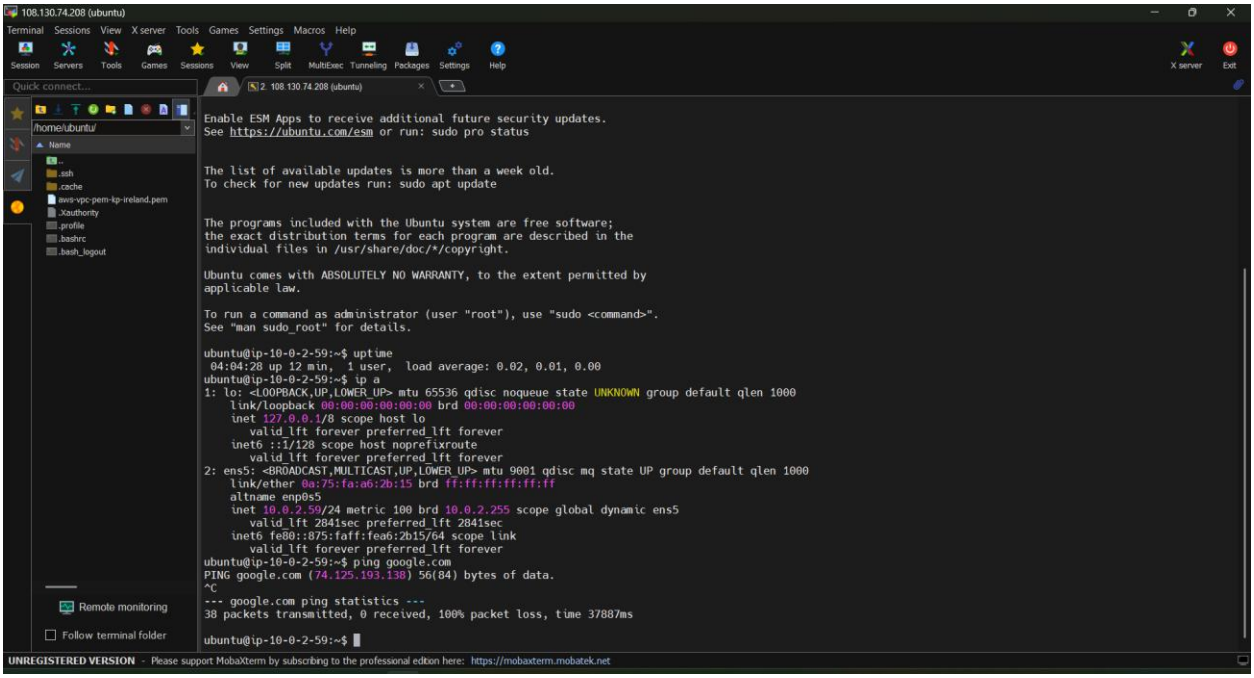
108.130.74.208 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
X server Exit
Quick connect...
2. 108.130.74.208 (ubuntu)
/home/ubuntu/
Name
.ssh
.cache
aws-vpc-pem-kp-ireland.pem
.Xauthority
.profile
.bashrc
.bash_logout
Remote monitoring
Follow terminal folder
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
The list of available updates is more than a week old.
To check for new updates run: sudo apt update
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ip-10-0-2-59:~$ uptime
04:04:28 up 12 min, 1 user, load average: 0.02, 0.01, 0.00
ubuntu@ip-10-0-2-59:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
valid_lft forever preferred_lft forever
inet6 ::1/128 scope host noprefixroute
valid_lft forever preferred_lft forever
2: ens5: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc mq state UP group default qlen 1000
link/ether 0a:75:fa:a6:2b:15 brd ff:ff:ff:ff:ff:ff
altname enp0s5
inet 10.0.2.59/24 metric 100 brd 10.0.2.255 scope global dynamic ens5
valid_lft 2841sec preferred_lft 2841sec
inet6 fe80::875:faff:fea6:2b15/64 scope link
valid_lft forever preferred_lft forever
ubuntu@ip-10-0-2-59:~$ ping google.com
PING google.com (74.125.193.138) 56(84) bytes of data.
^C
--- google.com ping statistics ---
38 packets transmitted, 0 received, 100% packet loss, time 37887ms
ubuntu@ip-10-0-2-59:~$
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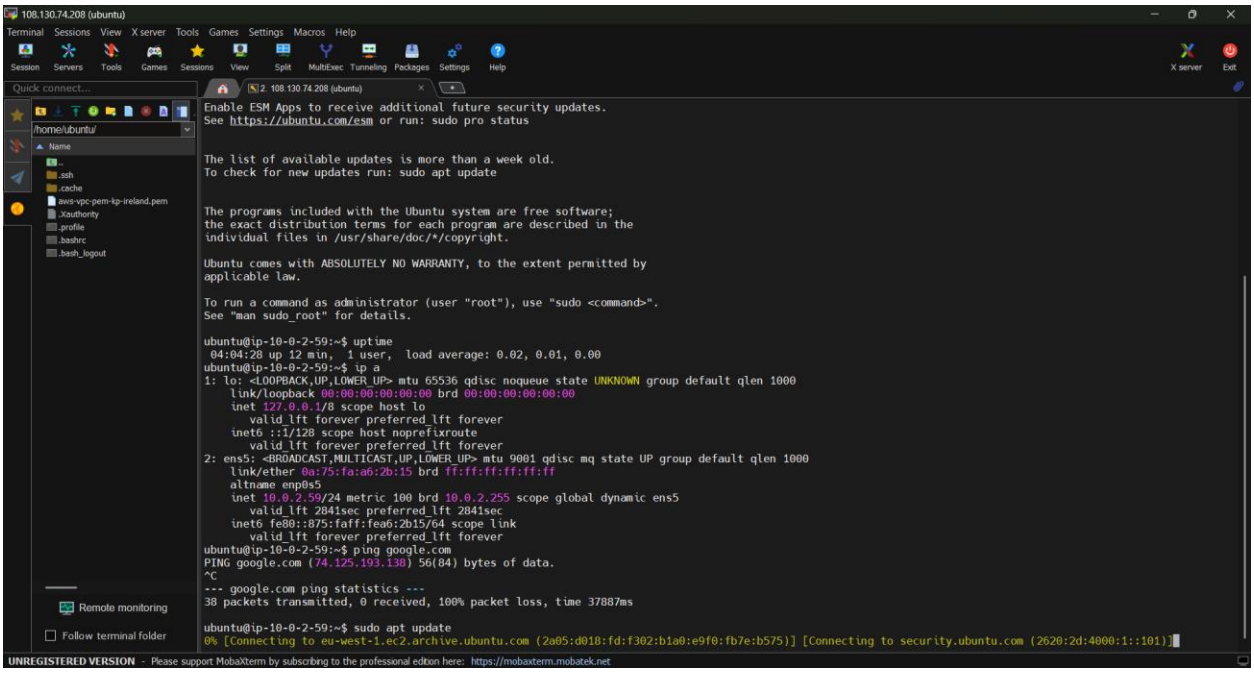
108.130.74.208 (ubuntu)
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
X server Exit
Quick connect...
2. 108.130.74.208 (ubuntu)
/home/ubuntu/
Name
.ssh
.cache
aws-vpc-pem-kp-ireland.pem
.Xauthority
.profile
.bashrc
.bash_logout
Remote monitoring
Follow terminal folder
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
The list of available updates is more than a week old.
To check for new updates run: sudo apt update
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ip-10-0-2-59:~$ uptime
04:04:28 up 12 min, 1 user, load average: 0.02, 0.01, 0.00
ubuntu@ip-10-0-2-59:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
valid_lft forever preferred_lft forever
inet6 ::1/128 scope host noprefixroute
valid_lft forever preferred_lft forever
2: ens5: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc mq state UP group default qlen 1000
link/ether 0a:75:fa:a6:2b:15 brd ff:ff:ff:ff:ff:ff
altname enp0s5
inet 10.0.2.59/24 metric 100 brd 10.0.2.255 scope global dynamic ens5
valid_lft 2841sec preferred_lft 2841sec
inet6 fe80::875:faff:fea6:2b15/64 scope link
valid_lft forever preferred_lft forever
ubuntu@ip-10-0-2-59:~$ ping google.com
PING google.com (74.125.193.138) 56(84) bytes of data.
^C
--- google.com ping statistics ---
38 packets transmitted, 0 received, 100% packet loss, time 37887ms
ubuntu@ip-10-0-2-59:~$ sudo apt update
0% [Connecting to eu-west-1.ec2.archive.ubuntu.com (2a05:d018:fd:f302:b1a0:e9f0:fb7e:b575)] [Connecting to security.ubuntu.com (2620:2d:4000:1::101)]
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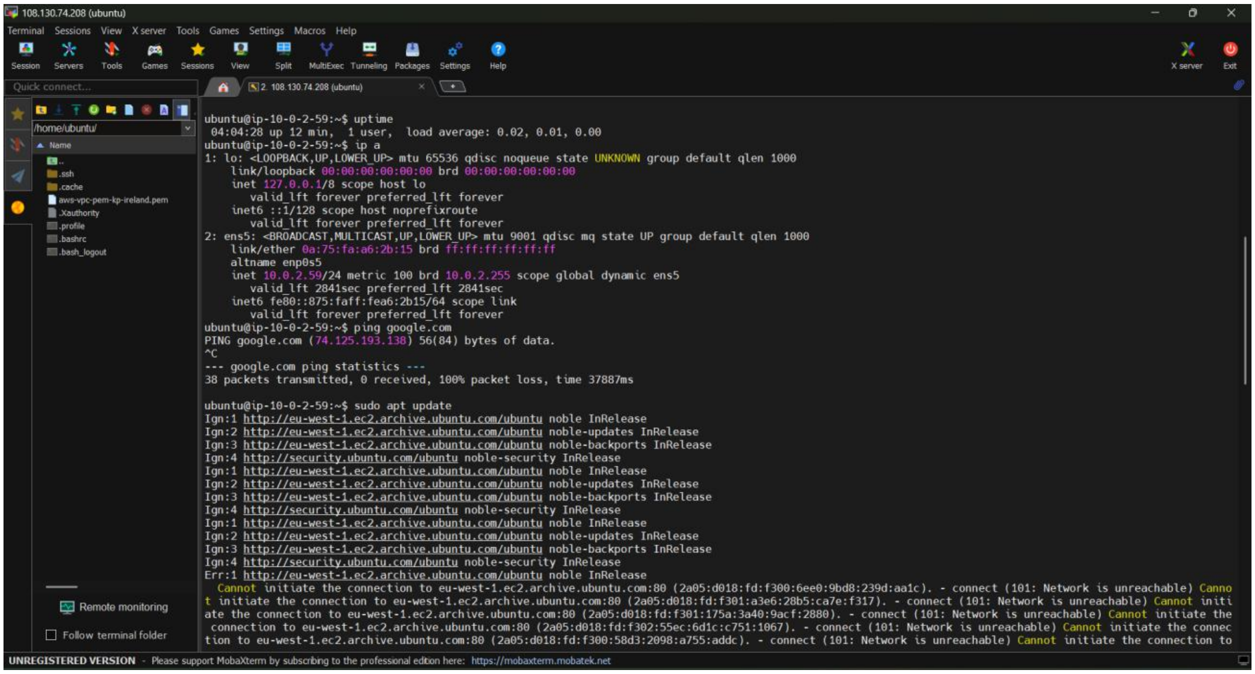


Private Subnet Internet Access Verification

- The EC2 instance launched in the **private subnet** was accessed successfully through the **public EC2 instance (DMZ host)** using SSH.
- The private instance was confirmed to have the **private IP address 10.0.2.59**.
- Network interface details were verified using the ip a command.
- An **attempt to reach the internet** using *ping google.com* **failed**, indicating no outbound internet connectivity.
- Running *sudo apt update* also failed with **"Network is unreachable"** errors.
- This confirms that the **private subnet does not have direct internet access**.
- The behavior is **expected**, as no **NAT Gateway and private route table** were yet configured at this stage.
- This validates proper **network isolation of the private subnet** as per security best practices.

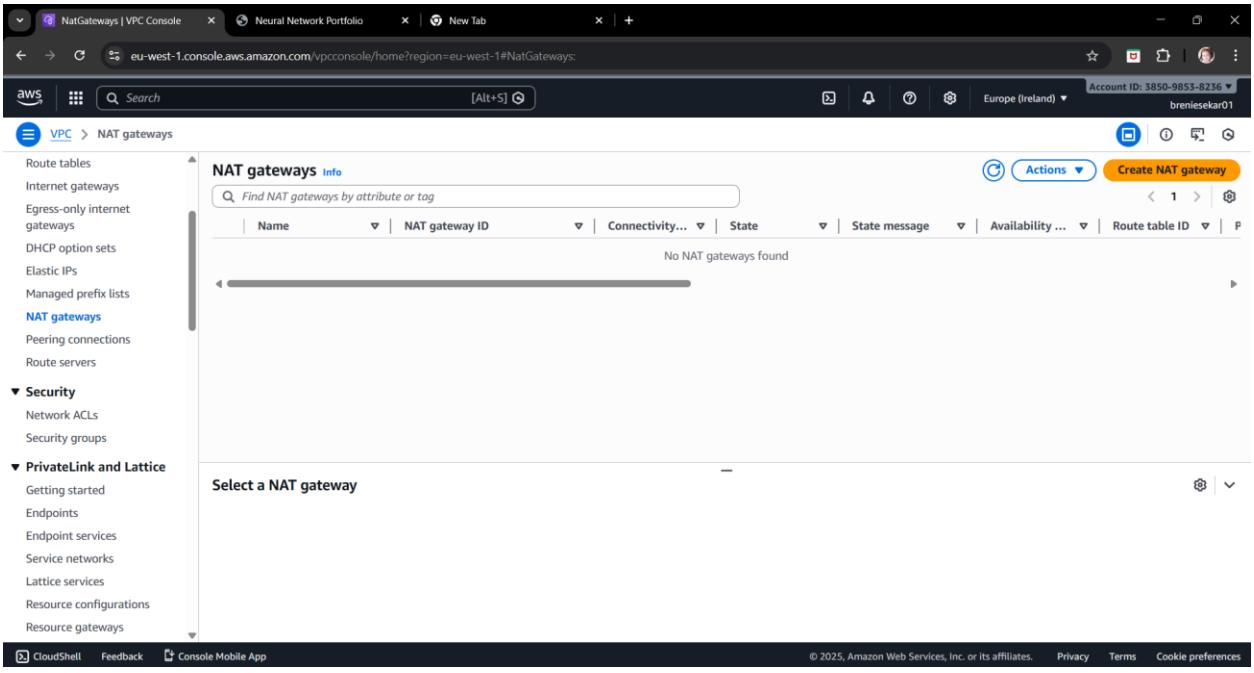
Part C: Private Subnet Internet Access Using NAT Gateway

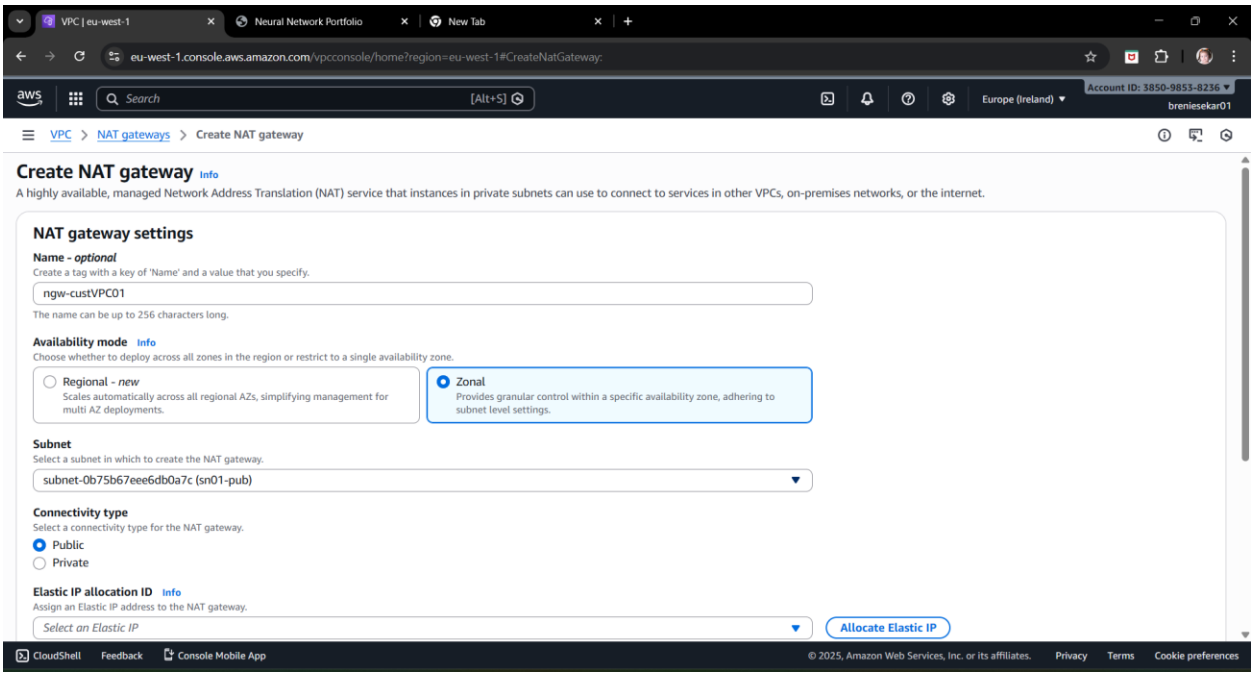
This step enables **instances in the private subnet** to access the **internet for outbound traffic** while preventing any **direct inbound access** from the internet. This is achieved by routing private subnet traffic through a **NAT Gateway placed in the public subnet**, ensuring secure and controlled internet connectivity.

Step 12 : Create a NAT Gateway and allocate an Elastic IP

The purpose of a NAT Gateway is to allow instances in a **private subnet to access the internet for outbound traffic** (such as updates or downloads) while preventing inbound internet access, thereby **maintaining security and isolation.** A NAT Gateway enables private subnet instances to initiate outbound connections to the internet without being directly reachable from it.

- During the NAT Gateway creation process, AWS **automatically allocates and associates an Elastic IP (EIP)** to provide a stable public IP address.
- The NAT Gateway was created by navigating to **VPC → NAT Gateways → Create NAT Gateway**.
- The public subnet **sn01-pub** was selected to host the NAT Gateway.
- An Elastic IP was allocated and associated with the NAT Gateway as part of the creation process.
- The NAT Gateway was successfully created, and its state changed to **Available**.
- The NAT Gateway is now ready to provide secure internet access to instances in the private subnet.




VPC | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateNatGateway:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > NAT gateways > Create NAT gateway
Create NAT gateway Info
A highly available, managed Network Address Translation (NAT) service that instances in private subnets can use to connect to services in other VPCs, on-premises networks, or the internet.
NAT gateway settings
Name - optional
Create a tag with a key of 'Name' and a value that you specify.
ngw-custVPC01
The name can be up to 256 characters long.
Availability mode Info
Choose whether to deploy across all zones in the region or restrict to a single availability zone.
Regional - new
Scales automatically across all regional AZs, simplifying management for multi AZ deployments.
Zonal
Provides granular control within a specific availability zone, adhering to subnet level settings.
Subnet
Select a subnet in which to create the NAT gateway.
subnet-0b75b67eee6db0a7c (sn01-pub)
Connectivity type
Select a connectivity type for the NAT gateway.
Public
Private
Elastic IP allocation ID Info
Assign an Elastic IP address to the NAT gateway.
Select an Elastic IP
Allocate Elastic IP
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Feedback
Console Mobile App
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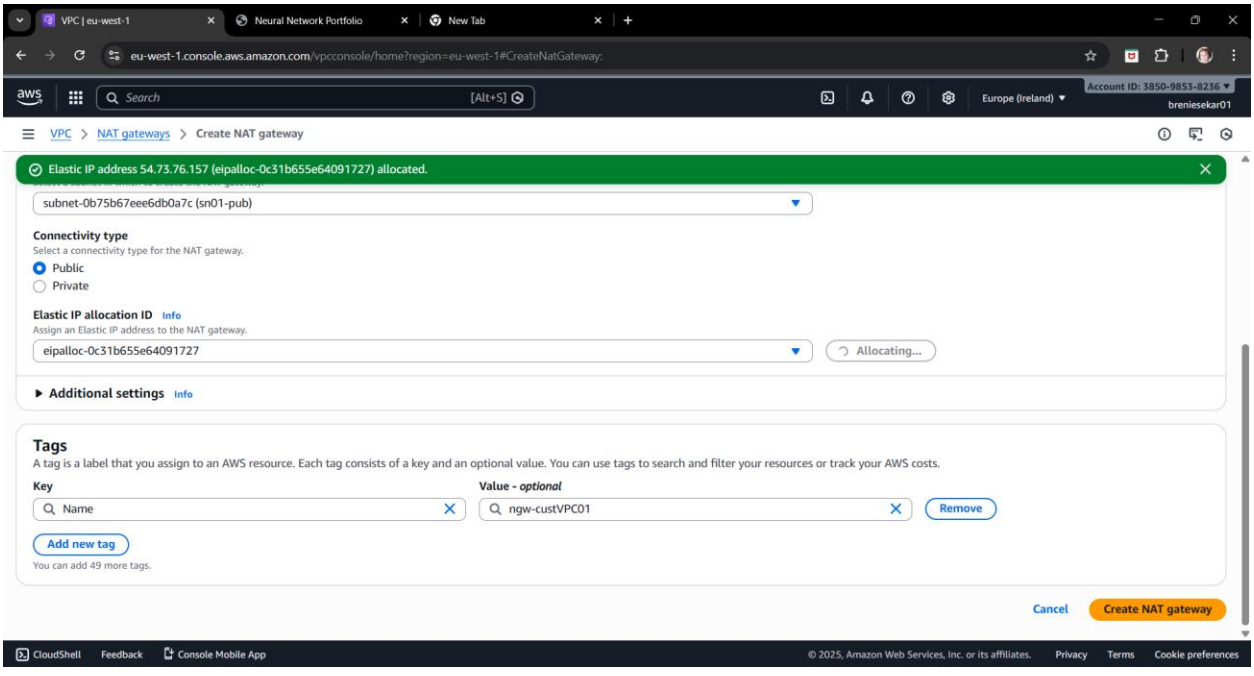
VPC | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateNatGateway:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > NAT gateways > Create NAT gateway
Elastic IP address 54.73.76.157 (eipalloc-0c31b655e64091727) allocated.
subnet-0b75b67eee6db0a7c (sn01-pub)
Connectivity type
Select a connectivity type for the NAT gateway.
Public
Private
Elastic IP allocation ID Info
Assign an Elastic IP address to the NAT gateway.
eipalloc-0c31b655e64091727
Allocating...
Additional settings Info
Tags
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
Name
Value - optional
ngw-custVPC01
Remove
Add new tag
You can add 49 more tags.
Cancel
Create NAT gateway
CloudShell
Feedback
Console Mobile App
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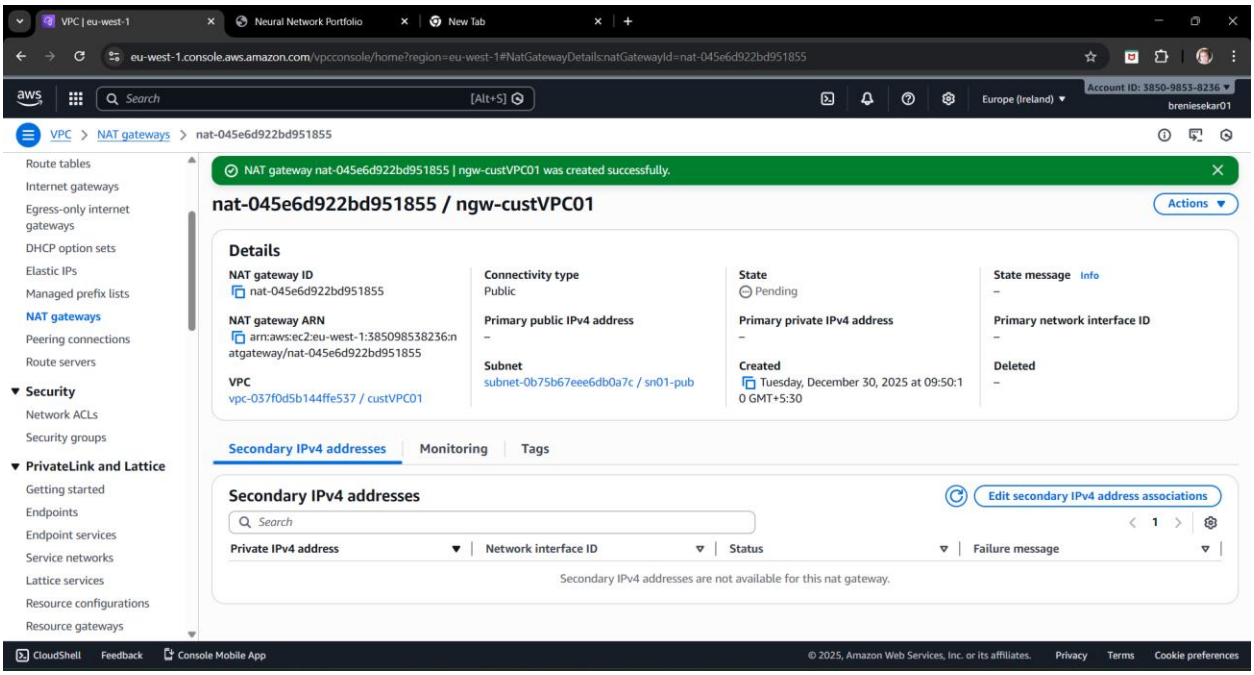
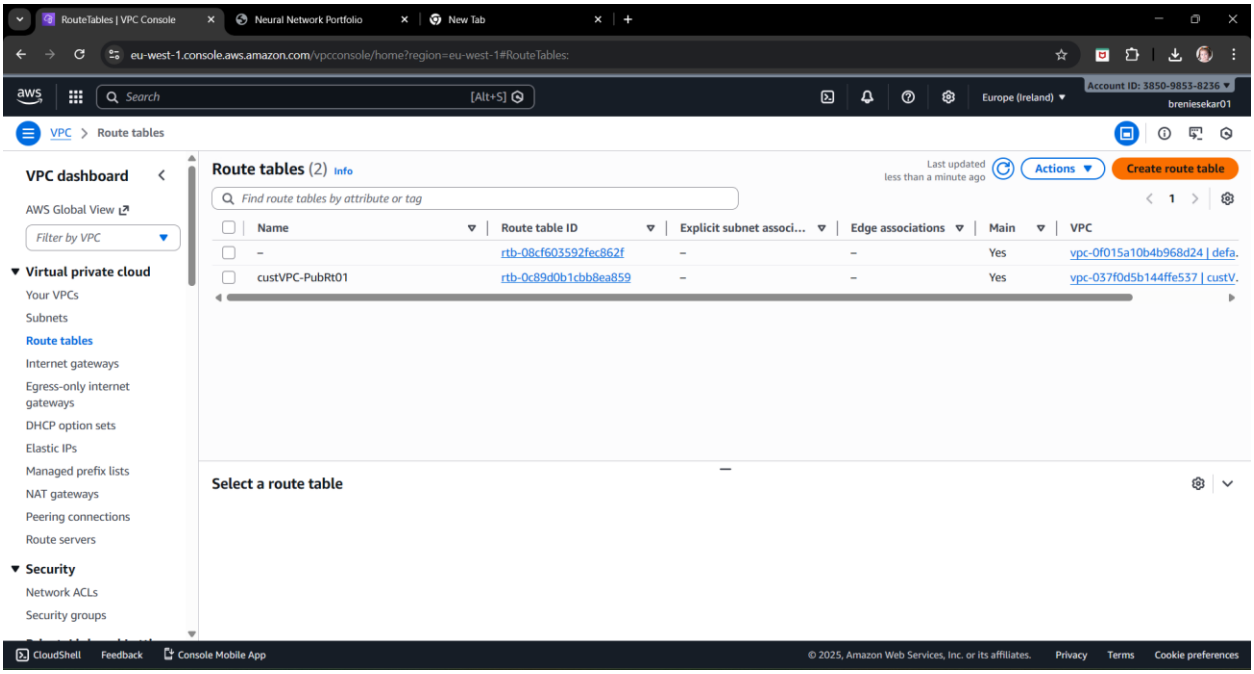


Step 13 : Create a private route table and associate the NAT Gateway with it

The purpose of the private route table is to allow instances in the private subnet to access the internet only for outbound traffic through the NAT Gateway, while preventing direct inbound internet access.

- A private route table named **custVPC-PrivRt01** was created in the custom VPC to manage outbound internet access for instances in the private subnet while preserving network isolation.
- A default route was added with destination **0.0.0.0/0**, targeting the **NAT Gateway**.
- The private route table was explicitly associated with the private subnet **sn02-priv (10.0.2.0/24)**.
- This configuration allows private subnet instances to access the internet only for outbound traffic while preventing any direct inbound internet access.


RouteTables | VPC Console
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#RouteTables:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
Route tables (2) Info
Last updated less than a minute ago
Actions
Create route table
Find route tables by attribute or tag
Name
Route table ID
Explicit subnet associ...
Edge associations
Main
VPC
rtb-08cf603592fec862f
Yes
vpc-0f015a10b4b968d24 | defa.
custVPC-PubRt01
rtb-0c89d0b1cbb8ea859
Yes
vpc-037f0d5b144ffe537 | custV.
Select a route table
CloudShell
Feedback
Console Mobile App
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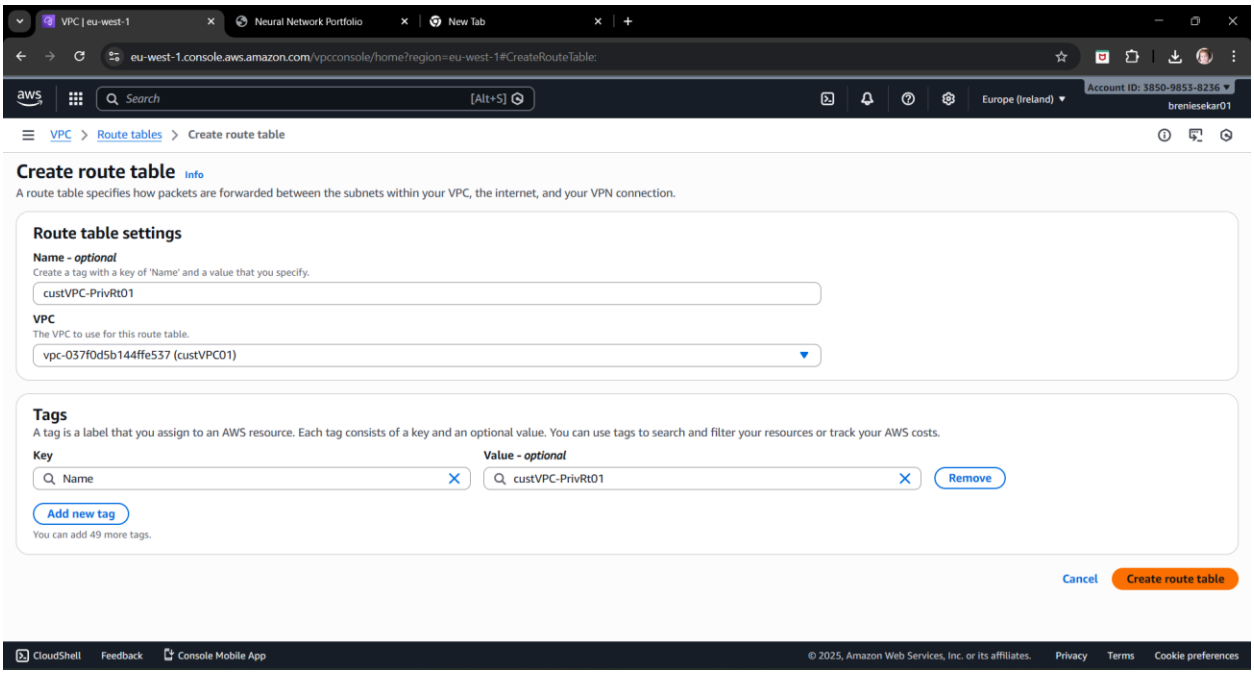
VPC | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#CreateRouteTable:
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables > Create route table
Create route table Info
A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.
Route table settings
Name - optional
Create a tag with a key of 'Name' and a value that you specify.
custVPC-PrivRt01
VPC
The VPC to use for this route table.
vpc-037f0d5b144ffe537 (custVPC01)
Tags
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
custVPC-PrivRt01
Remove
Add new tag
You can add 49 more tags.
Cancel
Create route table
CloudShell
Feedback
Console Mobile App
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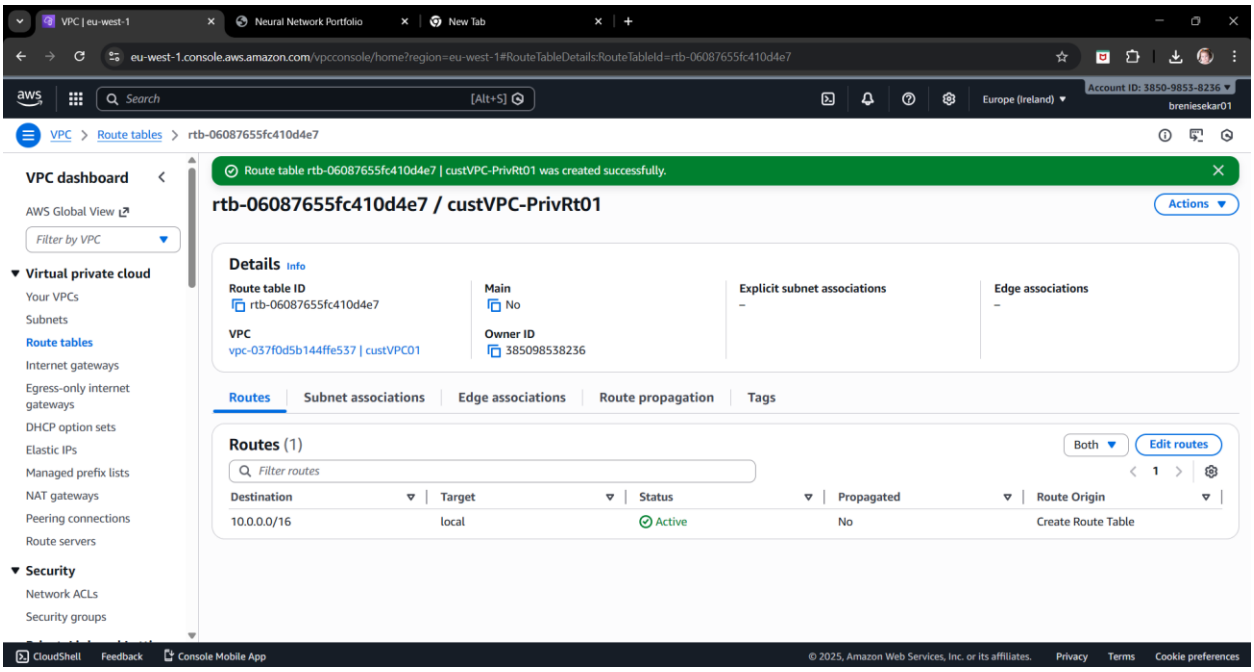
VPC | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#RouteTableDetails:RouteTableId=rtb-06087655fc410d4e7
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
brenisekar01
VPC > Route tables > rtb-06087655fc410d4e7
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
Route table rtb-06087655fc410d4e7 | custVPC-PrivRt01 was created successfully.
rtb-06087655fc410d4e7 / custVPC-PrivRt01
Actions
Details Info
Route table ID
rtb-06087655fc410d4e7
Main
No
Explicit subnet associations
–
Edge associations
–
VPC
vpc-037f0d5b144ffe537 | custVPC01
Owner ID
385098538236
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (1)
Both
Edit routes
Filter routes
Destination
Target
Status
Propagated
Route Origin
10.0.0.0/16
local
Active
No
Create Route Table
CloudShell
Feedback
Console Mobile App
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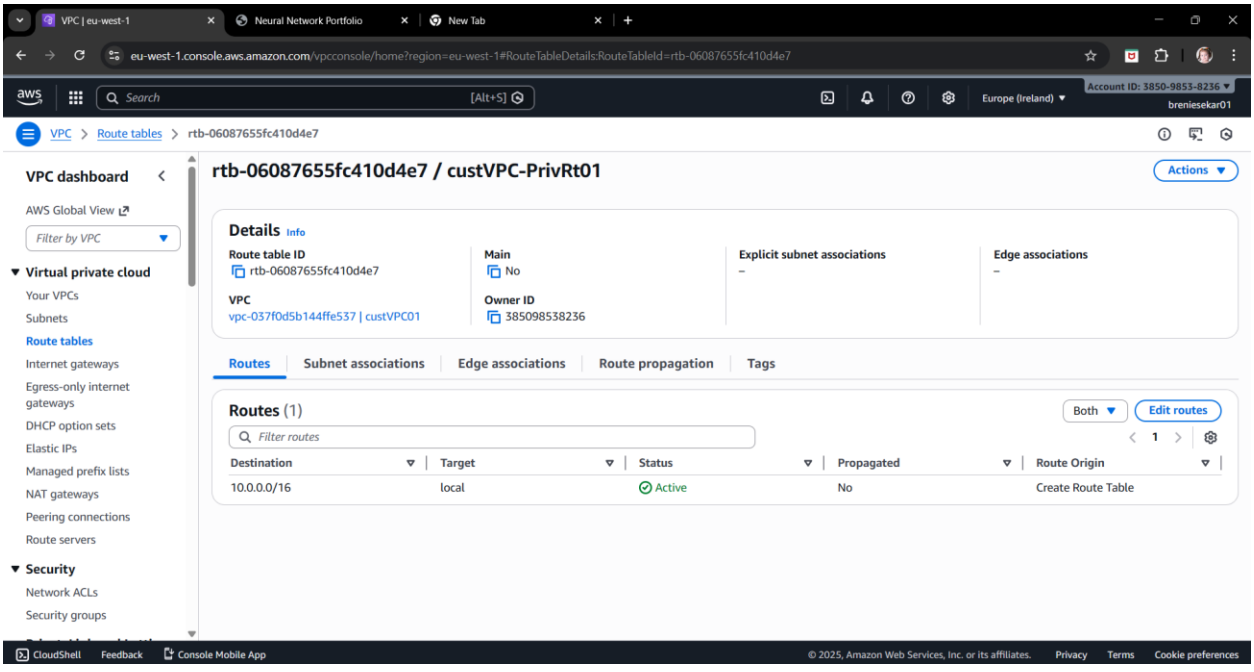
VPC | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#RouteTableDetails:RouteTableId=rtb-06087655fc410d4e7
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
brenisekar01
VPC > Route tables > rtb-06087655fc410d4e7
VPC dashboard
AWS Global View
Filter by VPC
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Your VPCs
Subnets
Route tables
Internet gateways
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NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
rtb-06087655fc410d4e7 / custVPC-PrivRt01
Actions
Details Info
Route table ID
rtb-06087655fc410d4e7
Main
No
Explicit subnet associations
–
Edge associations
–
VPC
vpc-037f0d5b144ffe537 | custVPC01
Owner ID
385098538236
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (1)
Both
Edit routes
Filter routes
Destination
Target
Status
Propagated
Route Origin
10.0.0.0/16
local
Active
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Create Route Table
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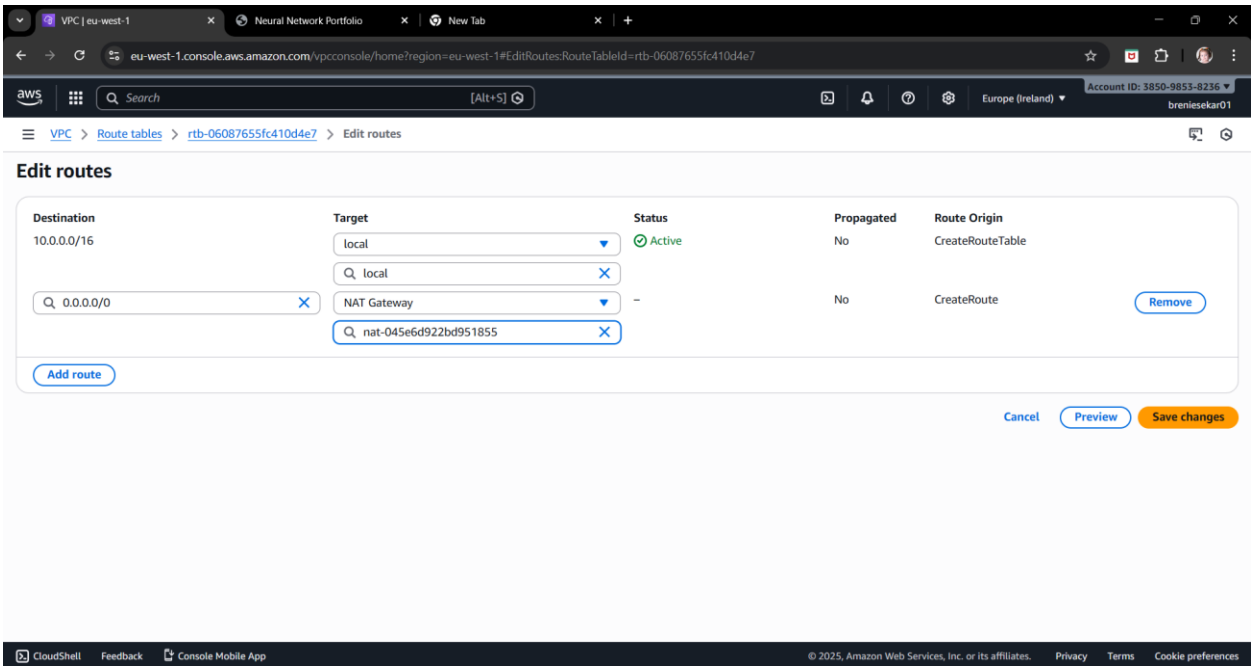
VPC | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#EditRoutes:RouteTableId=rtb-06087655fc410d4e7
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables > rtb-06087655fc410d4e7 > Edit routes
Edit routes
Destination
Target
Status
Propagated
Route Origin
10.0.0.0/16
local
Active
No
CreateRouteTable
local
0.0.0.0/0
NAT Gateway
–
No
CreateRoute
Remove
nat-045e6d922bd951855
Add route
Cancel
Preview
Save changes
CloudShell
Feedback
Console Mobile App
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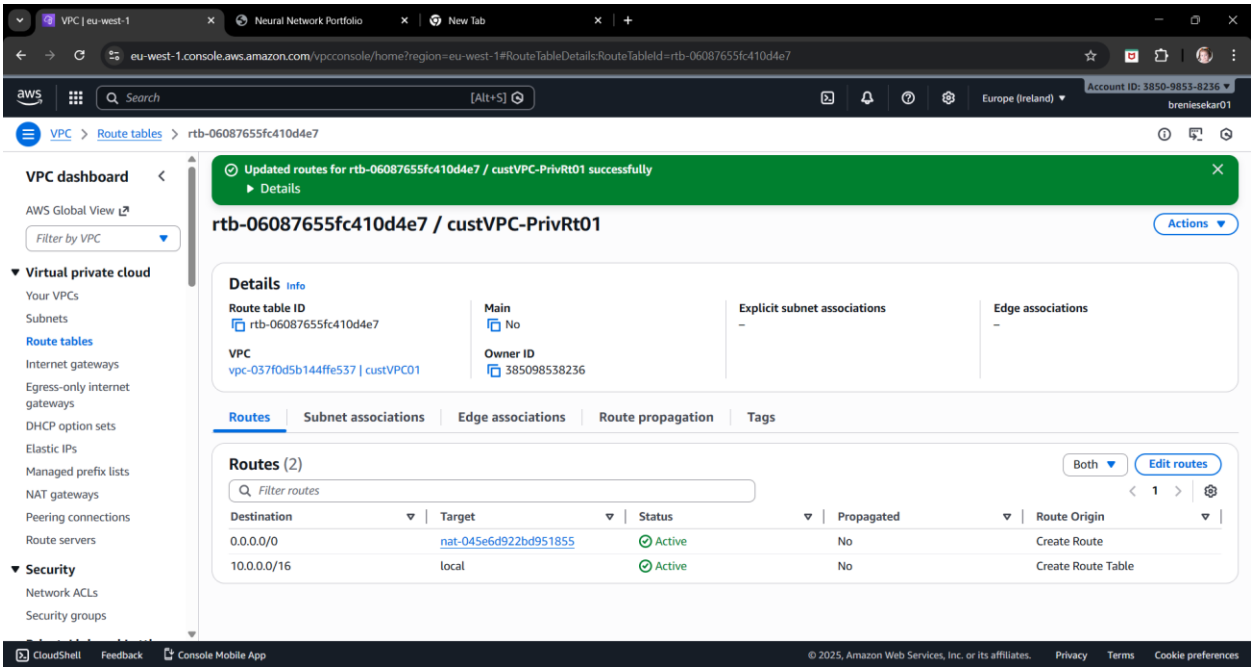
VPC | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#RouteTableDetails:RouteTableId=rtb-06087655fc410d4e7
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables > rtb-06087655fc410d4e7
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
Updated routes for rtb-06087655fc410d4e7 / custVPC-PrivRt01 successfully
Details
rtb-06087655fc410d4e7 / custVPC-PrivRt01
Actions
Details Info
Route table ID
rtb-06087655fc410d4e7
Main
No
Explicit subnet associations
–
Edge associations
–
VPC
vpc-037f0d5b144ffe537 | custVPC01
Owner ID
385098538236
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (2)
Both
Edit routes
Filter routes
1
Destination
Target
Status
Propagated
Route Origin
0.0.0.0/0
nat-045e6d922bd951855
Active
No
Create Route
10.0.0.0/16
local
Active
No
Create Route Table
CloudShell
Feedback
Console Mobile App
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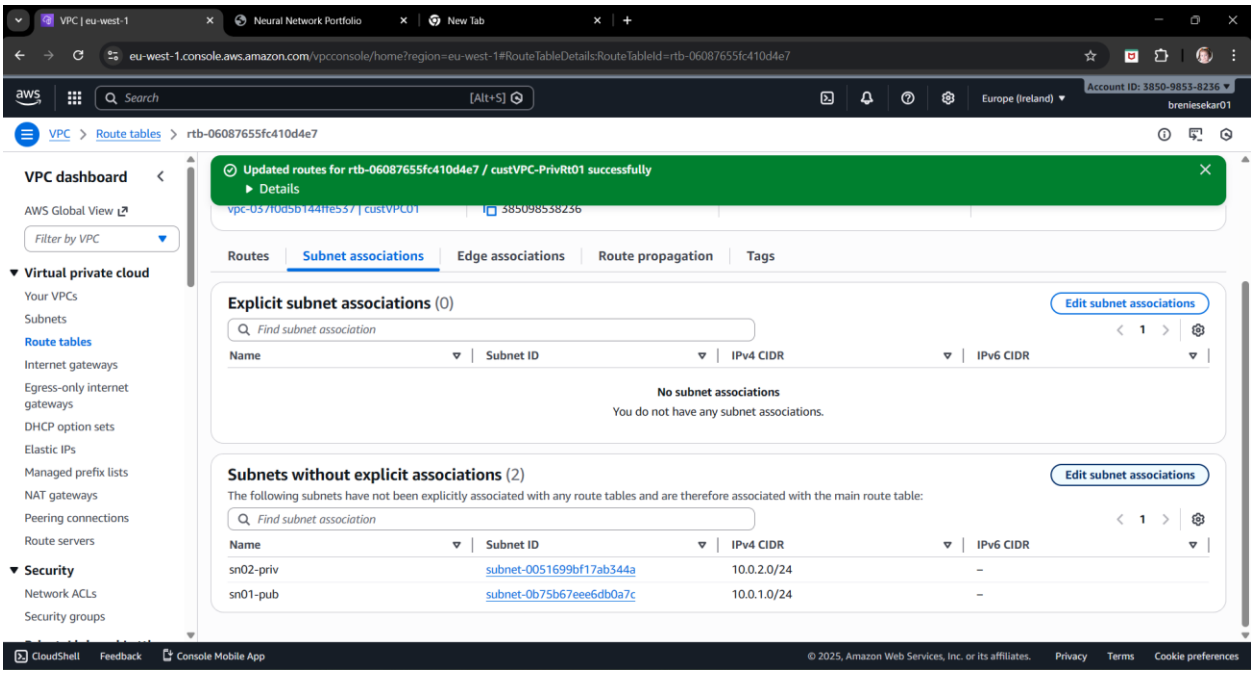
VPC | eu-west-1
Neural Network Portfolio
New Tab
eu-west-1.console.aws.amazon.com/vpcconsole/home?region=eu-west-1#RouteTableDetails:RouteTableId=rtb-06087655fc410d4e7
Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables > rtb-06087655fc410d4e7
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
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Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
Updated routes for rtb-06087655fc410d4e7 / custVPC-PrivRt01 successfully
Details
Routes
Subnet associations
Edge associations
Route propagation
Tags
Explicit subnet associations (0)
Edit subnet associations
Find subnet association
Name
Subnet ID
IPv4 CIDR
IPv6 CIDR
No subnet associations
You do not have any subnet associations.
Subnets without explicit associations (2)
Edit subnet associations
The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:
Find subnet association
Name
Subnet ID
IPv4 CIDR
IPv6 CIDR
sn02-priv
subnet-0051699bf17ab344a
10.0.2.0/24
–
sn01-pub
subnet-0b75b67eee6db0a7c
10.0.1.0/24
–
CloudShell
Feedback
Console Mobile App
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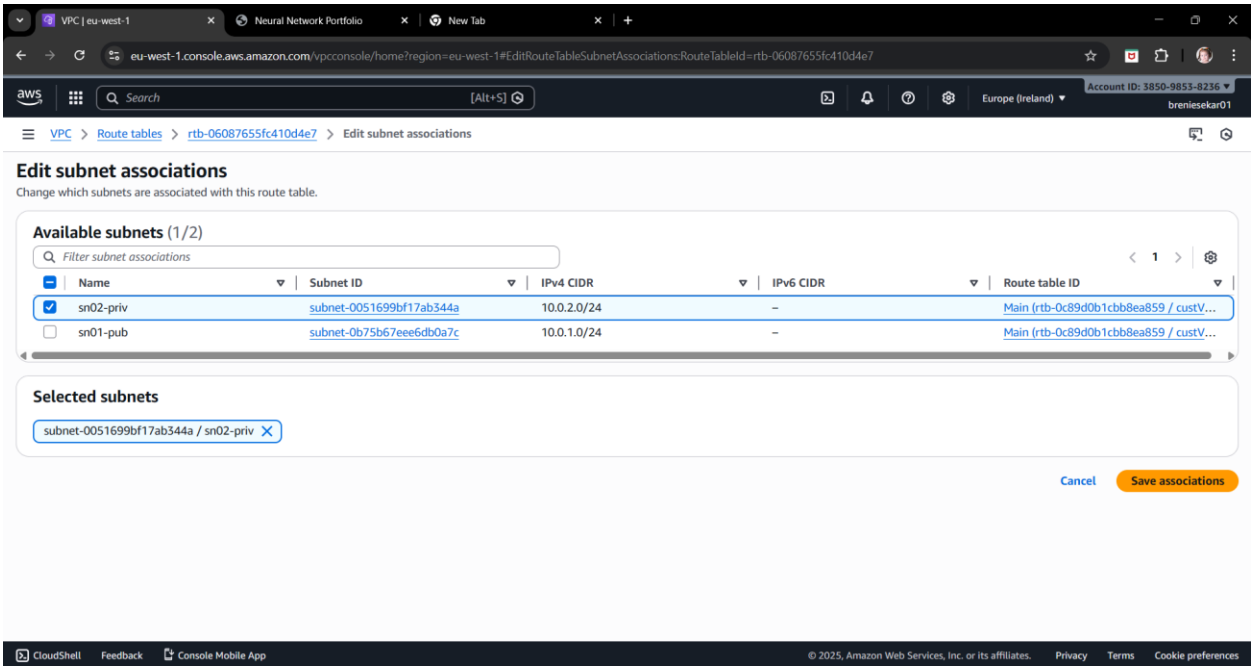
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Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables > rtb-06087655fc410d4e7 > Edit subnet associations
Edit subnet associations
Change which subnets are associated with this route table.
Available subnets (1/2)
Filter subnet associations
Name
Subnet ID
IPv4 CIDR
IPv6 CIDR
Route table ID
sn02-priv
subnet-0051699bf17ab344a
10.0.2.0/24
–
Main (rtb-0c89d0b1cbb8ea859 / custV...
sn01-pub
subnet-0b75b67eee6db0a7c
10.0.1.0/24
–
Main (rtb-0c89d0b1cbb8ea859 / custV...
Selected subnets
subnet-0051699bf17ab344a / sn02-priv
Cancel
Save associations
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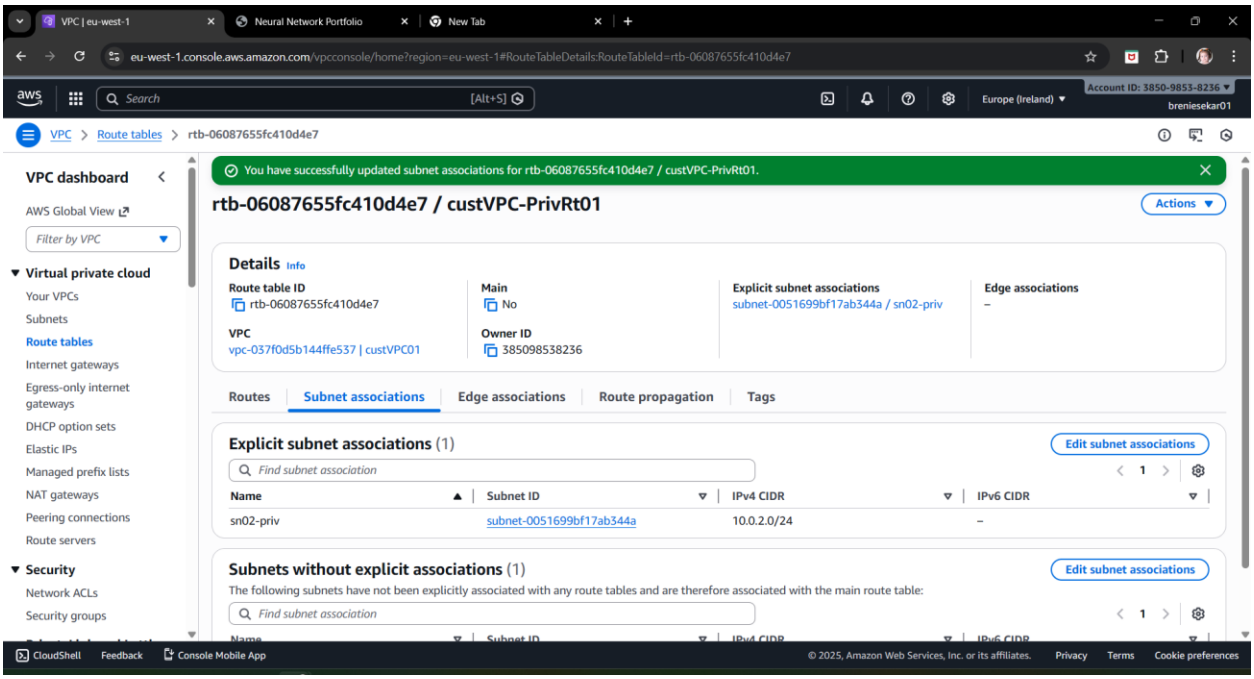
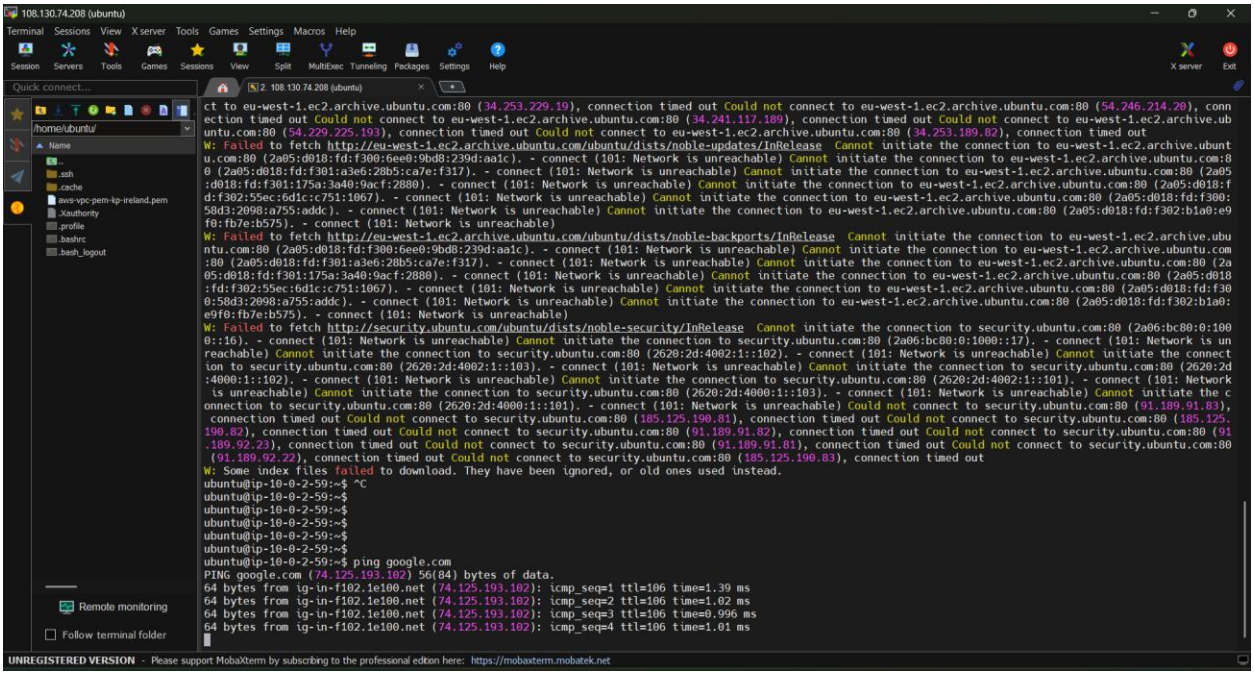
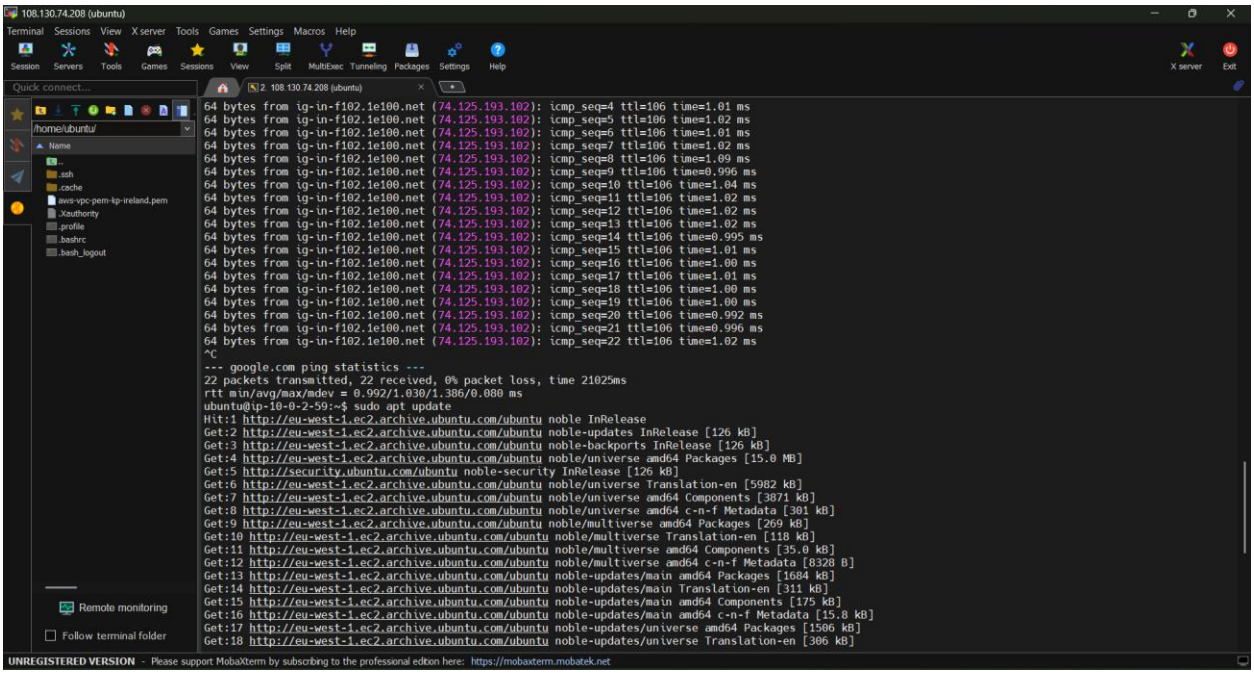


Step 14: Verify Internet Access from Private Subnet

The purpose of this step is to ensure that the **private EC2 instance can access the internet only through the NAT Gateway,** confirming proper routing and maintaining security by preventing direct inbound access.



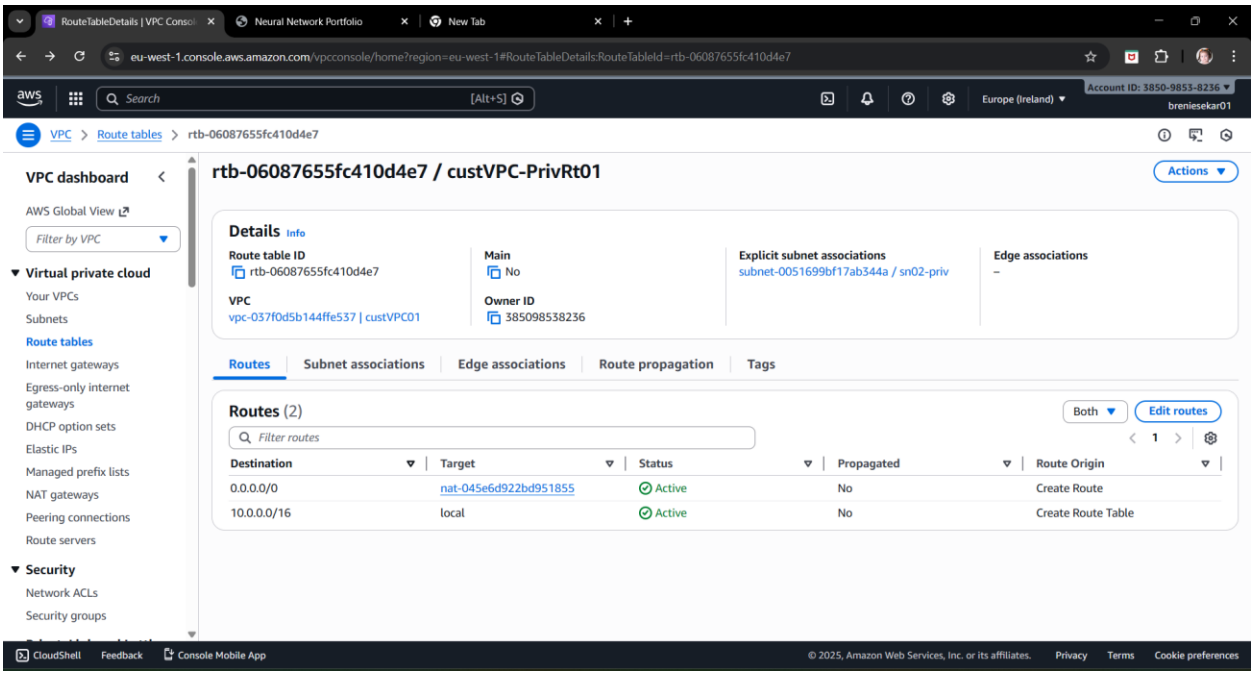


- After completing the NAT Gateway and private route table configuration, outbound internet connectivity was **tested from the private EC2 instance**.
- The private instance was able to **successfully reach external destinations** (for example, using ***ping google.com***).
- The command ***sudo apt update*** executed successfully, confirming access to external package repositories.
- This verifies that **internet-bound traffic from the private subnet is correctly routed through the NAT Gateway**.
- The private subnet **remains secure**, with no direct inbound internet access allowed.

Step 15 : Restrict direct internet access for the private subnet

The purpose of this step is to ensure that instances in the private subnet do not have direct internet access, enforcing secure network isolation once the update is completed.

- The **NAT Gateway was removed** from the private route table.
- The associated **Elastic IP was automatically released** by AWS.
- The private route table **no longer contained a 0.0.0.0/0 route** to the NAT Gateway.
- **Outbound internet access was tested** from the private subnet.
- **Ping and package update commands failed**, confirming no external connectivity.
- This **verified complete network isolation** of the private subnet.


RouteTableDetails | VPC Consol
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[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables > rtb-06087655fc410d4e7
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Security groups
rtb-06087655fc410d4e7 / custVPC-PrivRt01
Actions
Details Info
Route table ID
rtb-06087655fc410d4e7
Main
No
Explicit subnet associations
subnet-0051699bf17ab344a / sn02-priv
Edge associations
–
VPC
vpc-037f0d5b144ffe537 | custVPC01
Owner ID
385098538236
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (2)
Both
Edit routes
Filter routes
Destination
Target
Status
Propagated
Route Origin
0.0.0.0/0
nat-045e6d922bd951855
Active
No
Create Route
10.0.0.0/16
local
Active
No
Create Route Table
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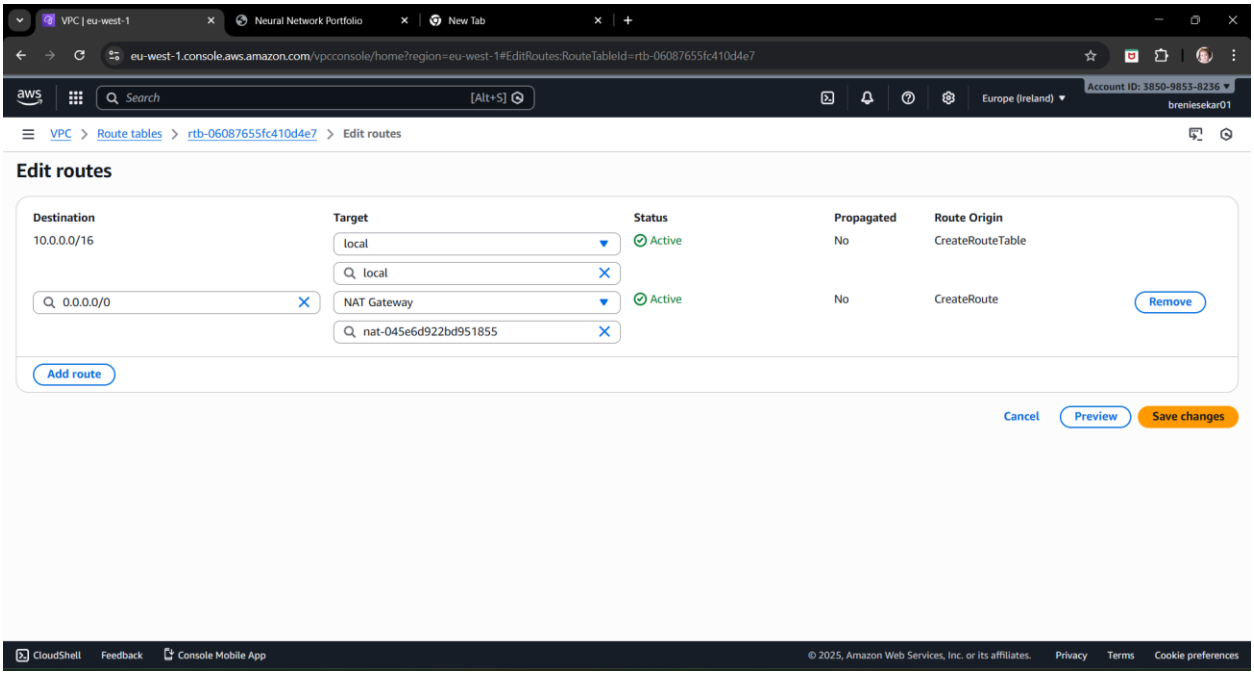
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Neural Network Portfolio
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Search
[Alt+S]
Europe (Ireland)
Account ID: 3850-9853-8236
breniesekar01
VPC > Route tables > rtb-06087655fc410d4e7 > Edit routes
Edit routes
Destination
Target
Status
Propagated
Route Origin
10.0.0.0/16
local
Active
No
CreateRouteTable
local
0.0.0.0/0
NAT Gateway
Active
No
CreateRoute
Remove
nat-045e6d922bd951855
Add route
Cancel
Preview
Save changes
CloudShell
Feedback
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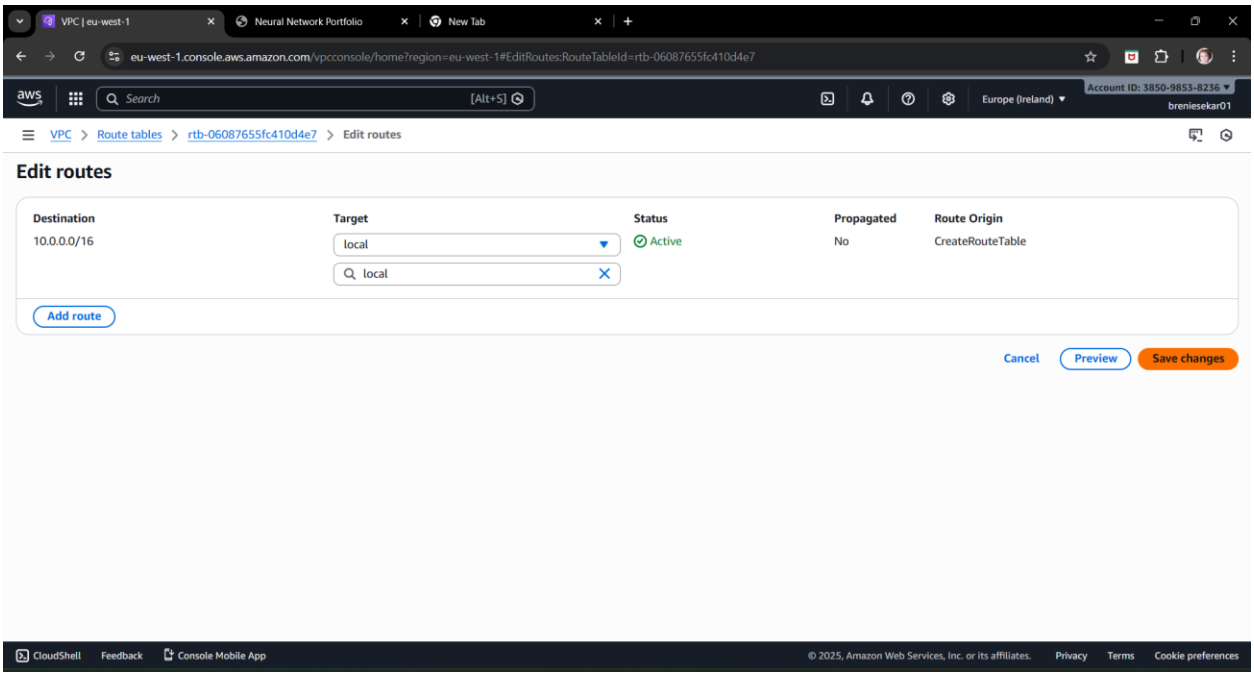
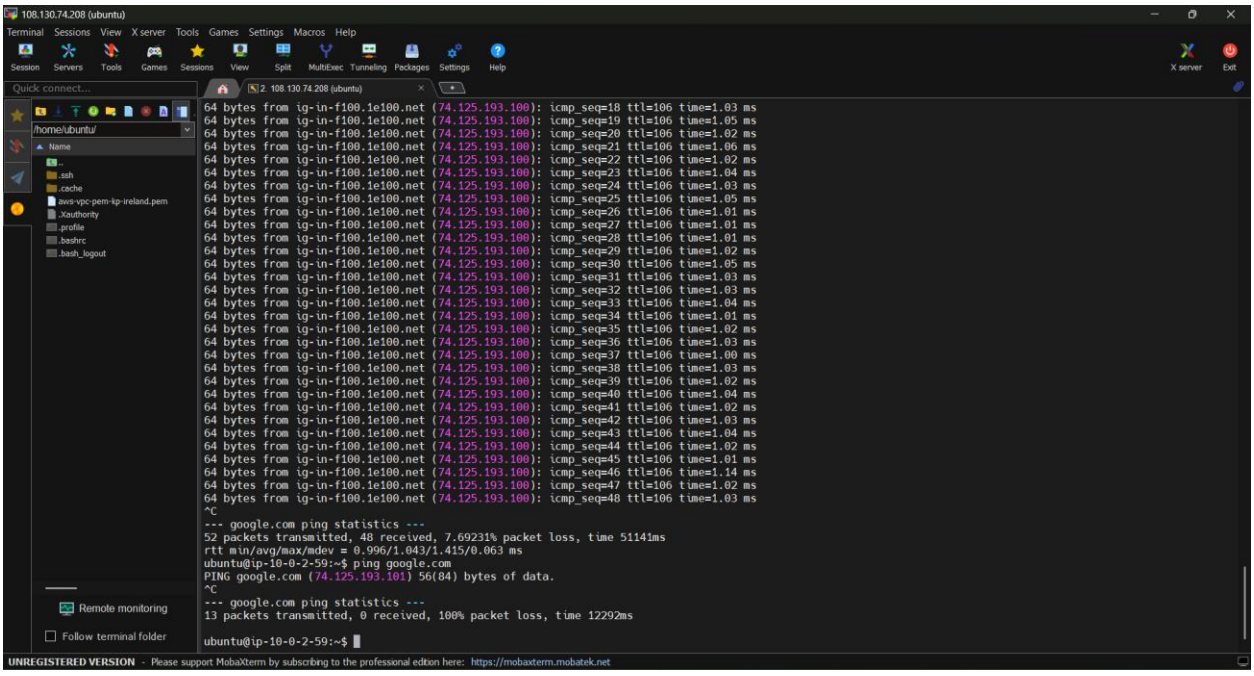




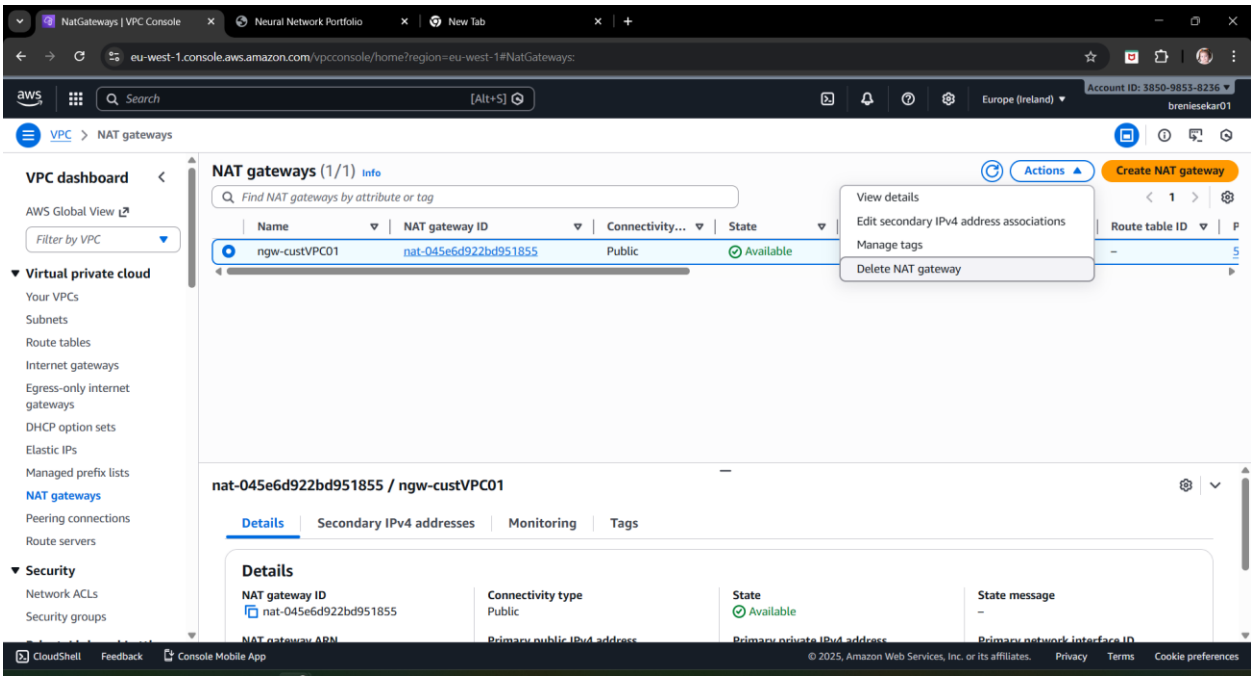
Part D: Clean Up

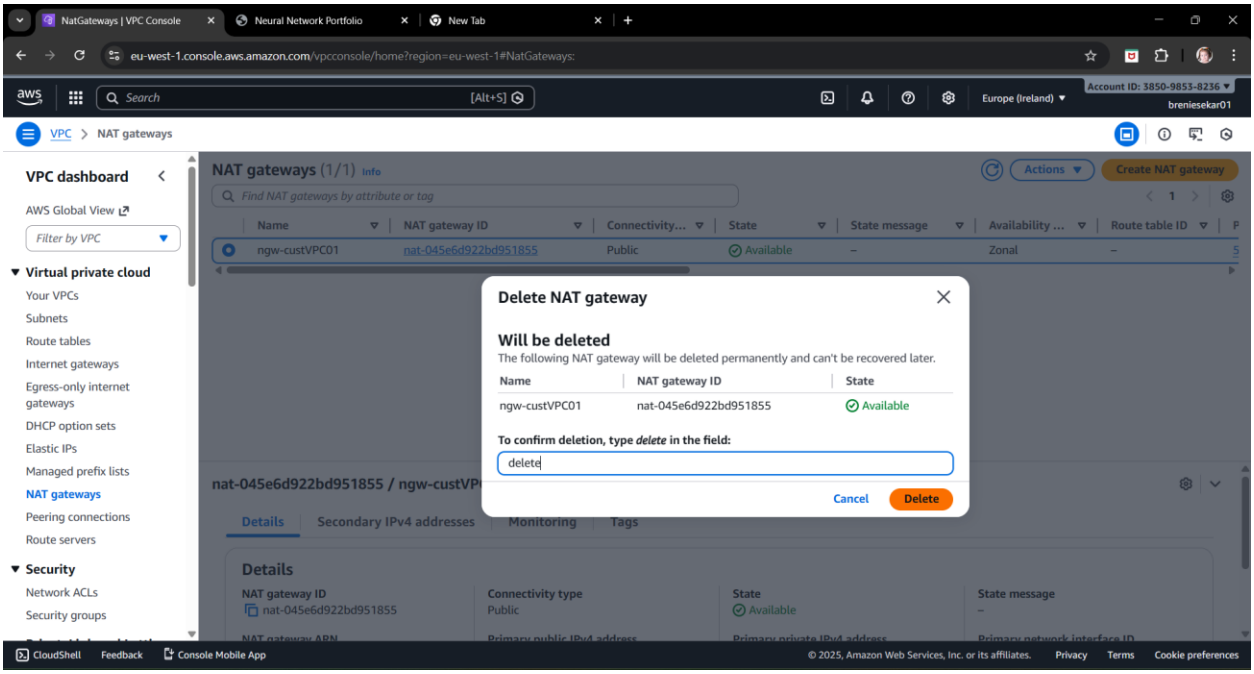
This step involves removing all resources created during the VPC setup to ensure no residual configurations remain.

- The **NAT Gateway was deleted** to remove outbound internet access for the private subnet.
- The **associated Elastic IP was released** as part of the NAT Gateway deletion.

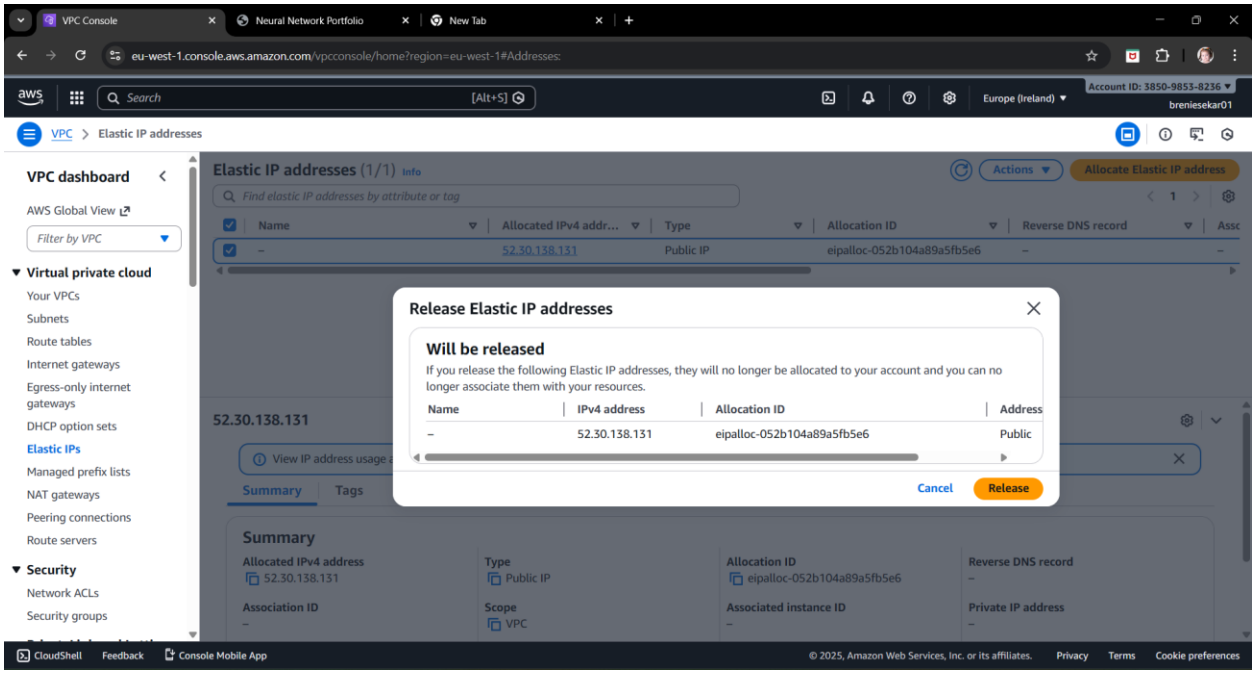
- All **EC2 instances** created during the setup **were terminated**, including public and private instances.
- The **custom VPC was deleted** after removing dependent resources.
- Deleting the custom VPC automatically removed all associated components, such as subnets, route tables, security groups, and network ACLs.

1. Deleting the NAT Gateway

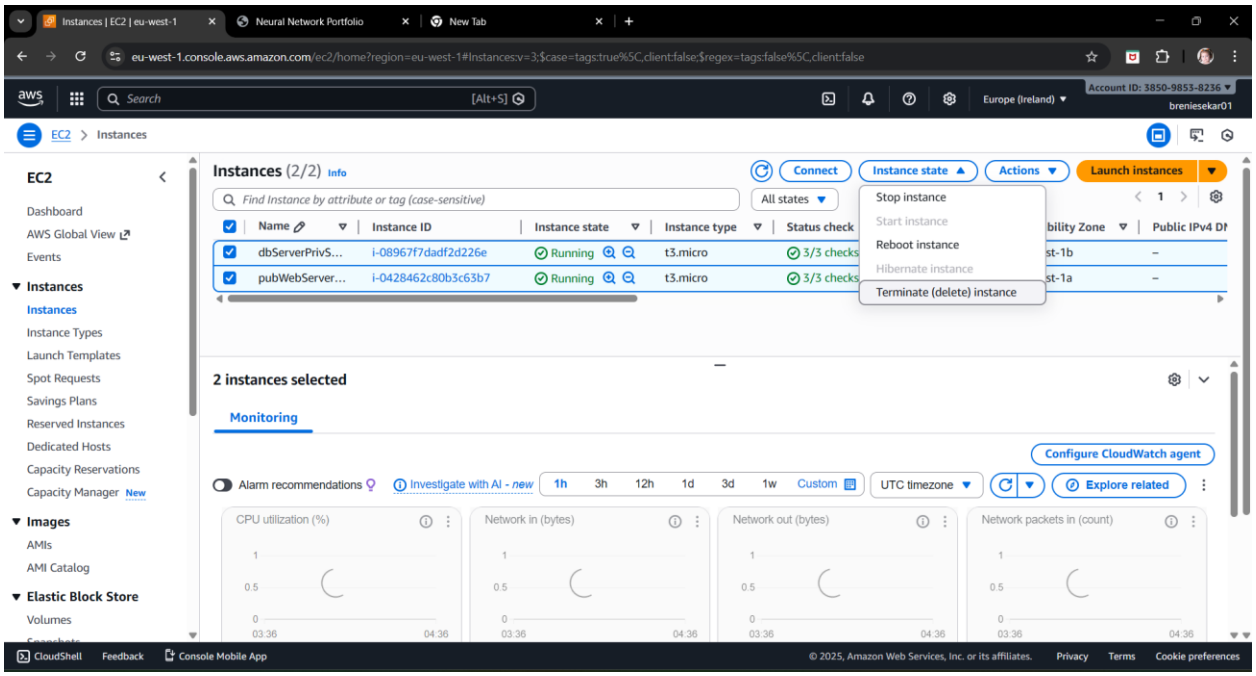


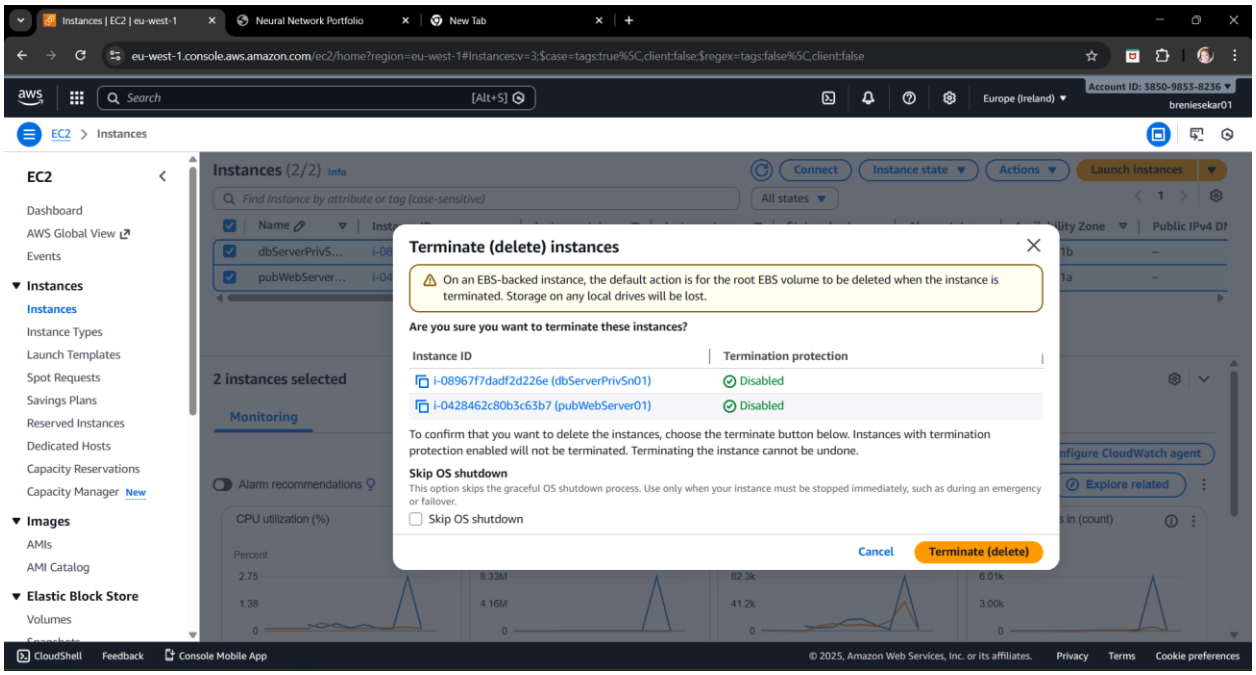


2. Deleting the Elastic IP

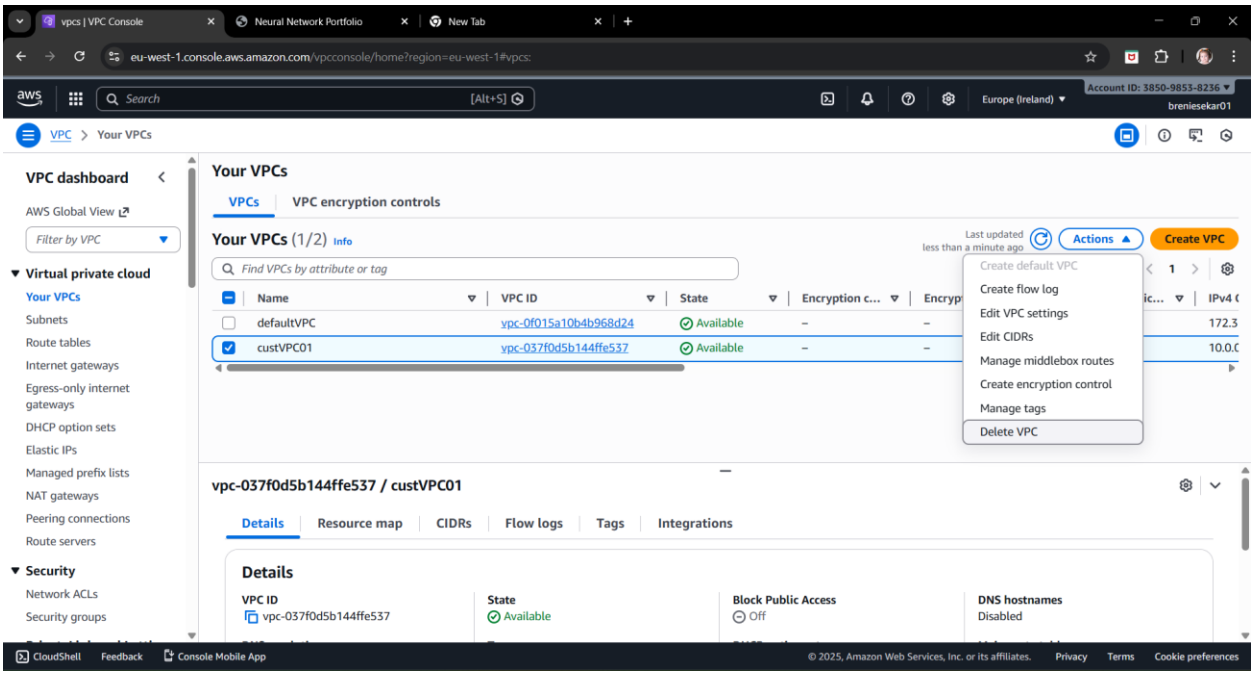


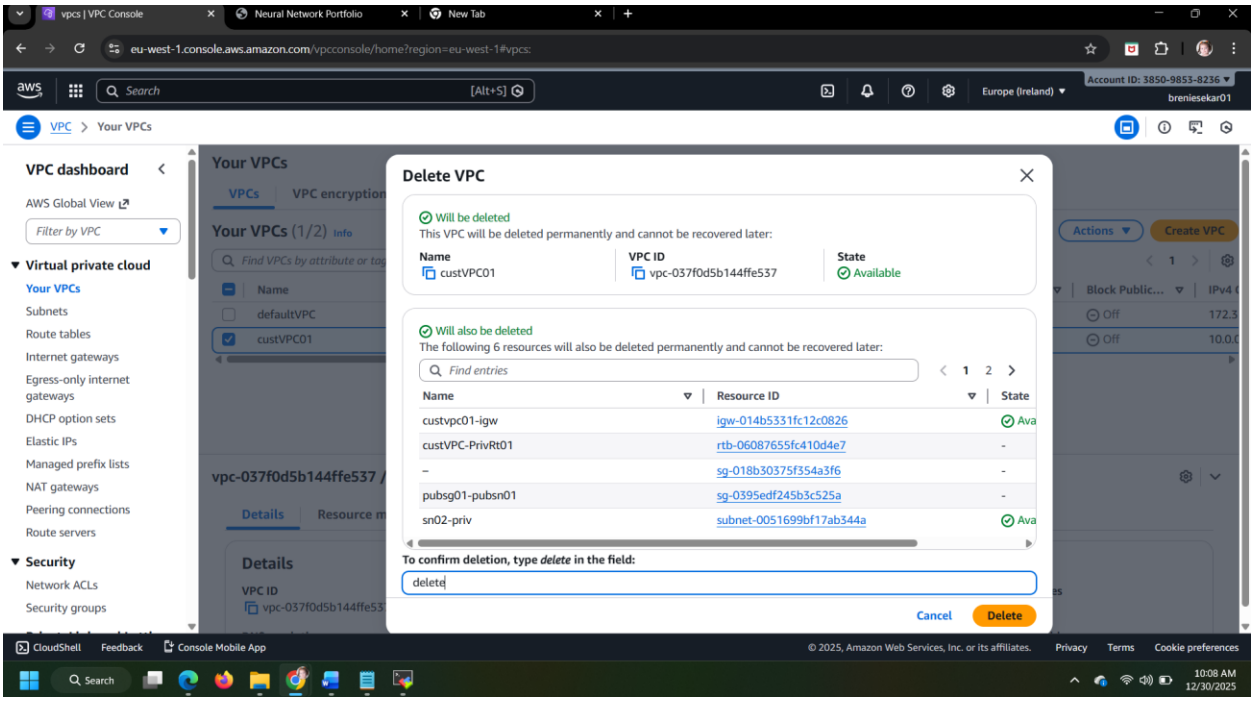
3. Deleting the created EC2 Instances





4. Deleting the custom VPC





Task Summary :

- Created a **custom VPC** to host the network infrastructure.
- Configured an **Internet Gateway** and attached it to the VPC.
- Created a **public subnet (256 IPs)** and a **private subnet (256 IPs)** within the VPC.
- Configured a **route table** to connect the public subnet to the Internet Gateway.
- Launched a **Linux EC2 instance configured as a web server** in the public subnet and **successfully accessed the web server using its public IP address**.
- Extended the setup by implementing a **DMZ architecture** for secure private subnet access.
- Further enhanced the design using a **NAT Gateway** for controlled private subnet internet access.
- Cleaned up all created AWS resources after verification.