

# AWS CLOUD SOLUTIONS PROJECT 1

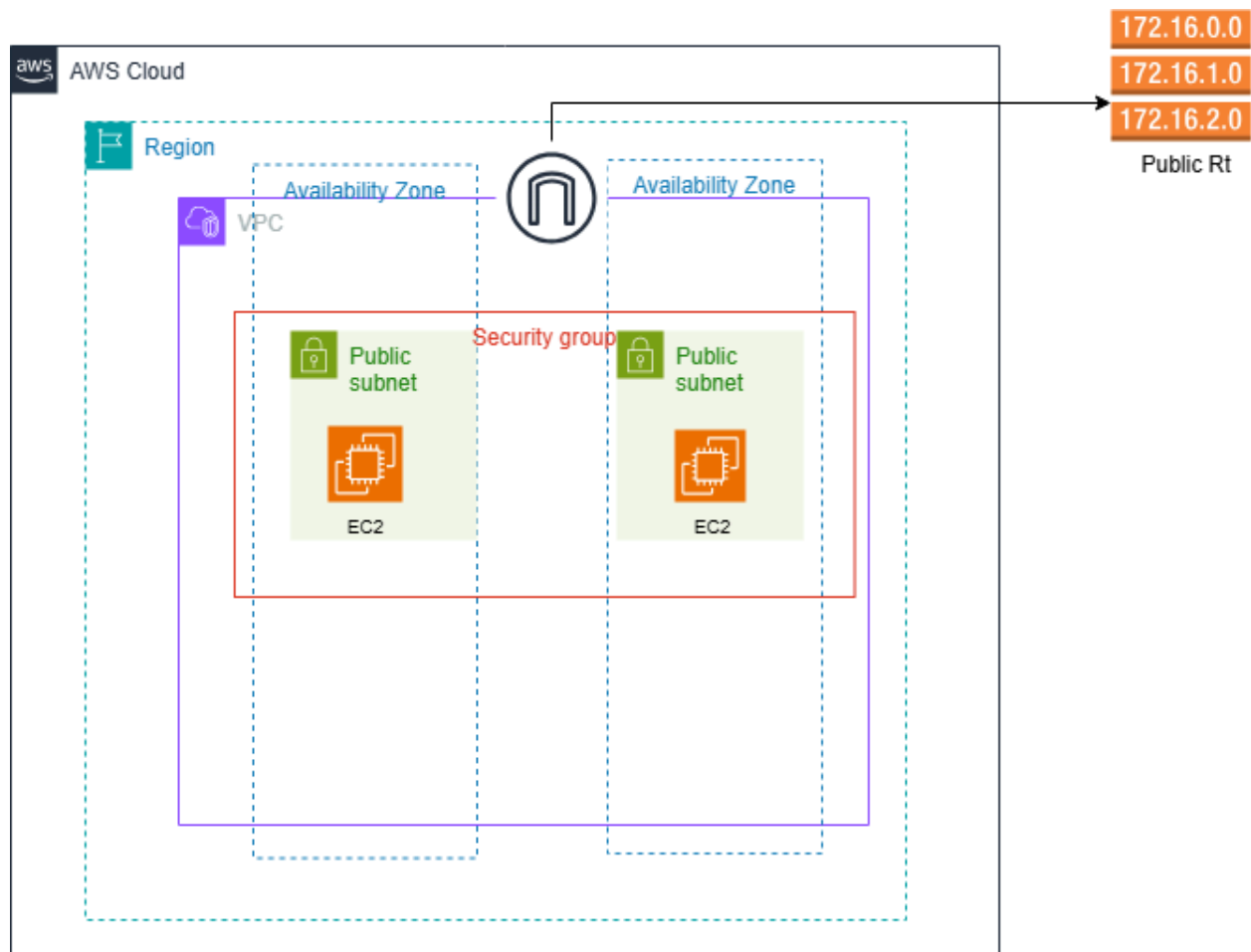
## Setting up a Virtual Private Cloud (VPC) and launching of EC2 Instances On AWS Cloud.

This project shows a detailed step-by-by process of setting up a VPC, creating subnets, configuring a route table, security groups and NACL on AWS cloud.

This project validates my knowledge and skills in the following areas on AWS cloud.

1. AWS infrastructure
2. IP Address (Cidr block)
3. Subnet
4. Virtual Machines (EC2)
5. Network Traffic
6. Security (SG and NACL)

Below is the architectural diagram of this project:



# Step 1

## Setting up a VPC (Virtual Private Cloud)

The screenshot shows the AWS Management Console interface for creating a new VPC. The breadcrumb navigation at the top reads 'VPC > Your VPCs > Create VPC'. The main heading is 'Create VPC' with an 'Info' link. Below this, a descriptive sentence states: 'A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.'

The 'VPC settings' section contains the following configuration options:

- Resources to create:** Two radio buttons are present. 'VPC only' is selected, while 'VPC and more' is unselected.
- Name tag - optional:** A text input field contains the value 'Cletus-VPC'. A small note indicates it creates a tag with a key of 'Name' and a value that you specify.
- IPv4 CIDR block:** Two radio buttons are present. 'IPv4 CIDR manual input' is selected, while 'IPAM-allocated IPv4 CIDR block' is unselected. Below, a text input field for 'IPv4 CIDR' contains '30.0.0.0/16'. A note specifies: 'CIDR block size must be between /16 and /28.'
- IPv6 CIDR block:** Four radio buttons are present. 'No IPv6 CIDR block' is selected. The other options are 'IPAM-allocated IPv6 CIDR block', 'Amazon-provided IPv6 CIDR block', and 'IPv6 CIDR owned by me', all of which are unselected.
- Tenancy:** A dropdown menu is set to 'Default'.

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# Step 1b

Configure your VPC settings by enabling DNS host names, which would allow resources provisioned within this subnet especially servers to have a DNS host name. This function is vital when routing traffic with Route53 Service

The screenshot shows the 'Edit VPC settings' page in the AWS Management Console. The breadcrumb navigation at the top reads 'VPC > Your VPCs > vpc-0f4a2a01a46d37bae > Edit VPC settings'. The main heading is 'Edit VPC settings' with an 'Info' link.

The settings are organized into several sections:

- VPC details:** Displays the 'VPC ID' as 'vpc-0f4a2a01a46d37bae' and the 'Name' as 'Cletus-VPC'.
- DHCP settings:** A dropdown menu for 'DHCP option set' is set to 'dopt-0956bb5be41c29d4c'.
- DNS settings:** Two checkboxes are checked: 'Enable DNS resolution' and 'Enable DNS hostnames'. Both have 'Info' links next to them.
- Network Address Usage metrics settings:** A checkbox for 'Enable Network Address Usage metrics' is currently unchecked.

At the bottom right of the settings panel, there are two buttons: 'Cancel' and 'Save'.

## Step 2

Creating and attaching an internet gateway (IGW) to make the VPC accessible to the internet

aws Services Search [Alt+S]

🔍 IAM EC2 VPC

You have successfully modified the settings for vpc-0f4a2a01a46d37bae / Cletus-VPC.

VPC > Internet gateways > Create internet gateway

### Create internet gateway [info](#)

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

#### Internet gateway settings

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

cletus-IGW

#### Tags - optional

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

Key	Value - optional	
Name	cletus-IGW	Remove

[Add new tag](#)

You can add 49 more tags.

[Cancel](#) [Create internet gateway](#)

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VPC > Internet gateways > Attach to VPC (igw-087b97ef1167a55c9)

### Attach to VPC (igw-087b97ef1167a55c9) [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-0f4a2a01a46d37bae

[AWS Command Line Interface command](#)

[Cancel](#) [Attach internet gateway](#)

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## Step 3

Creating two public subnets and keep them in different availability zones

VPC > Subnets > Create subnet

Create subnet [info](#)

VPC

VPC ID  
Create subnets in this VPC.  
vpc-0f42a01a46d37bae (cletus-VPC)

Associated VPC CIDRs  
IPv4 CIDRs  
30.0.0.0/16

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 2

Subnet name  
Create a tag with a key of 'Name' and a value that you specify.  
cletus-pub-subnet1  
The name can be up to 255 characters long.

Availability Zone [info](#)  
Choose the zone in which your subnet will reside, or let Amazon choose one for you.  
US East (Ohio) / us-east-2a

IPv4 VPC CIDR block [info](#)  
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must be within this block.  
30.0.0.0/16

IPv4 subnet CIDR block  
30.0.0.0/24 256 IPs

Subnet 2 of 2

Subnet name  
Create a tag with a key of 'Name' and a value that you specify.  
cletus-pub-subnet2  
The name can be up to 255 characters long.

Availability Zone [info](#)  
Choose the zone in which your subnet will reside, or let Amazon choose one for you.  
US East (Ohio) / us-east-2b

IPv4 VPC CIDR block [info](#)  
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must be within this block.  
30.0.0.0/16

IPv4 subnet CIDR block  
30.0.1.0/24 256 IPs

Tags - optional

Key

Value - optional

Q Name X Q cletus-pub-subnet2 X Remove

Add new tag

You can add 49 more tags.

Remove

Add new subnet

Cancel

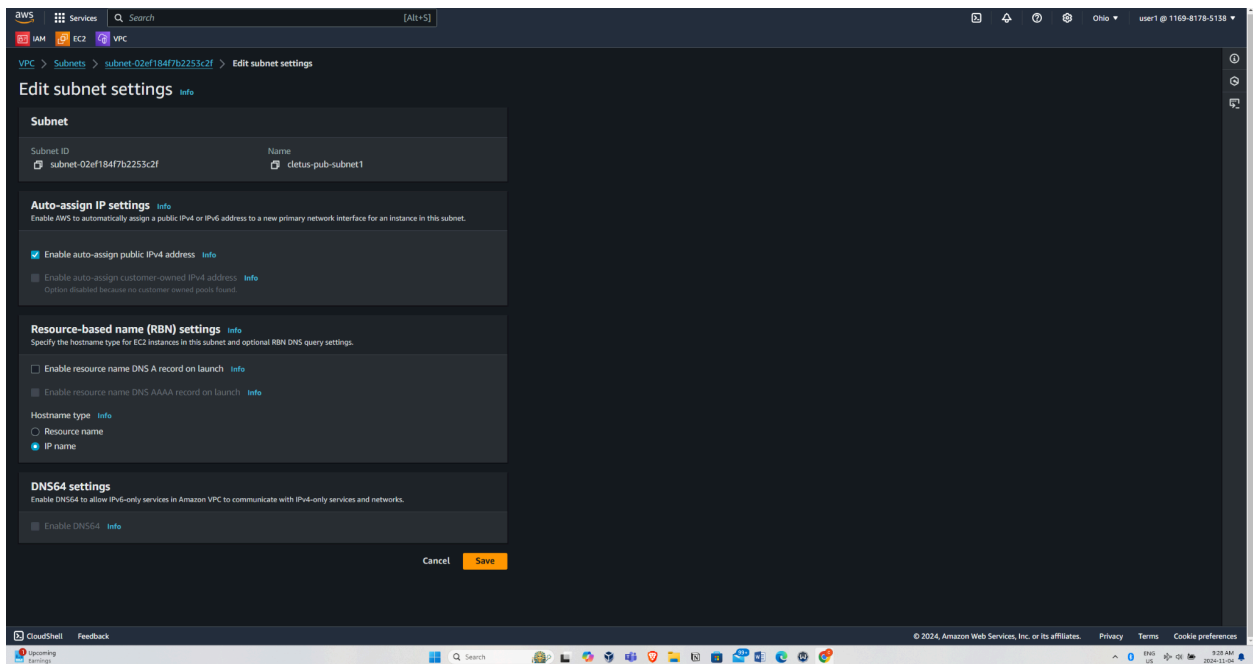
Create subnet

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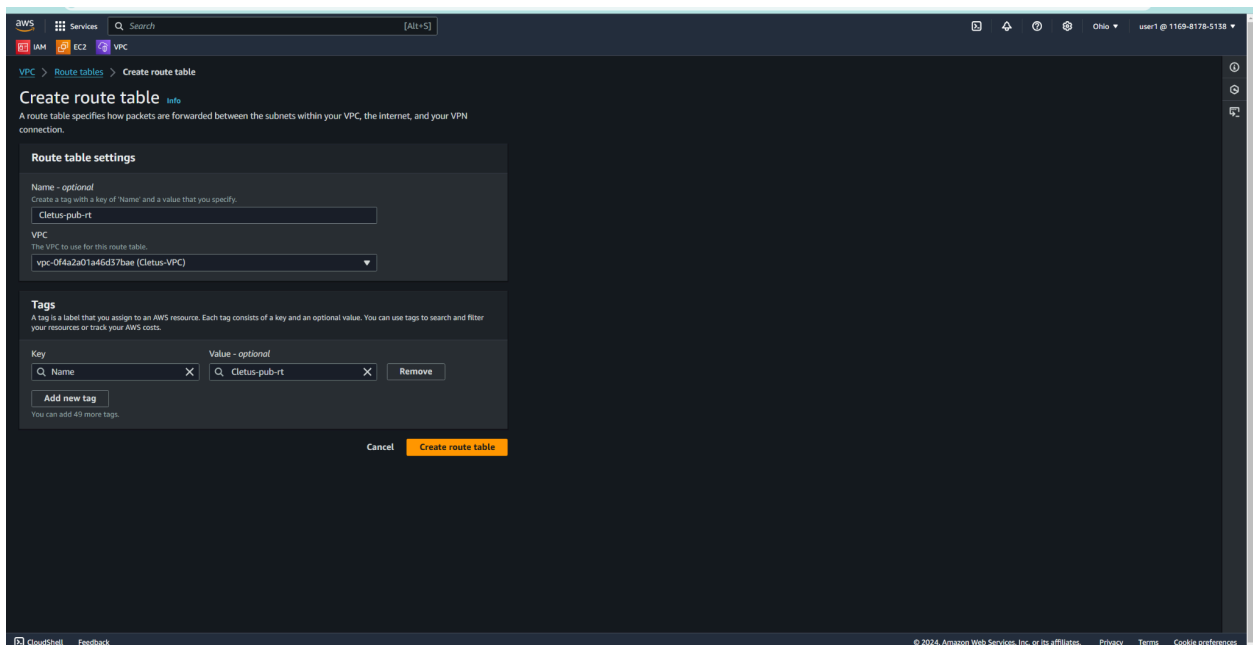
## Step 3b

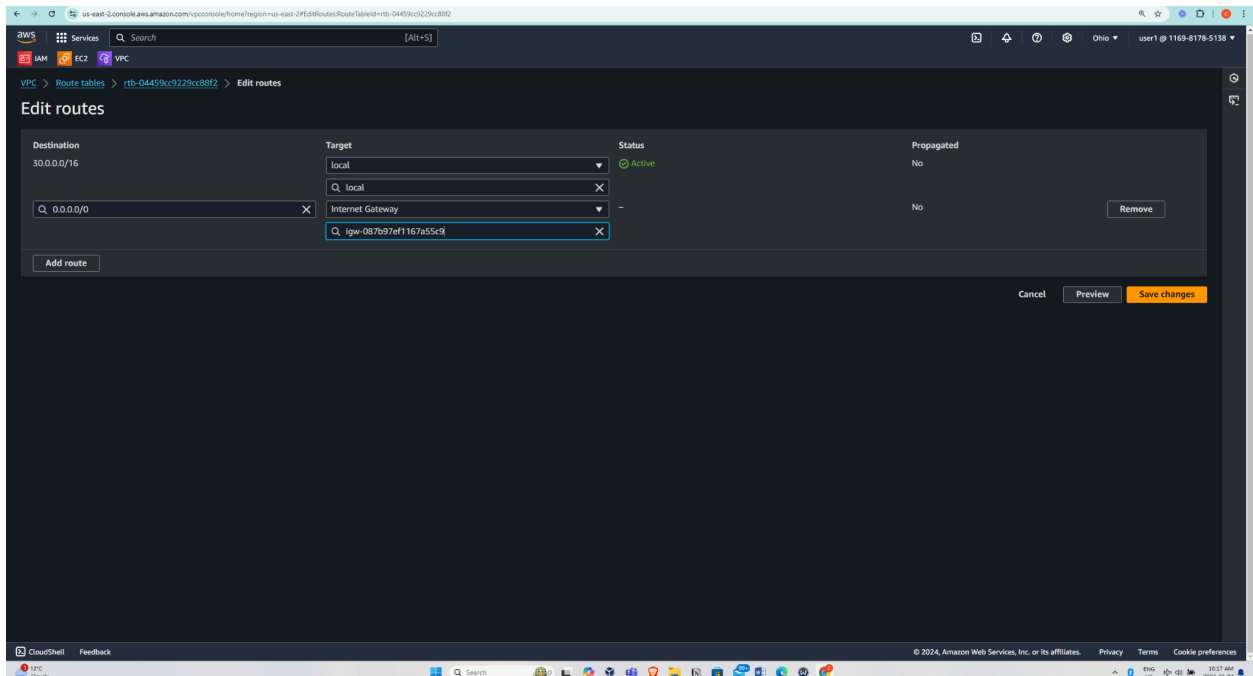
Edit your subnet settings and enable auto-assign public address. This setting would allow resources launched within this subnet to be assigned public IP addresses dynamically. This is a public subnet which means resources within this subnet need to be accessible to the internet. So having a public IP address is very vital.



## Step 4

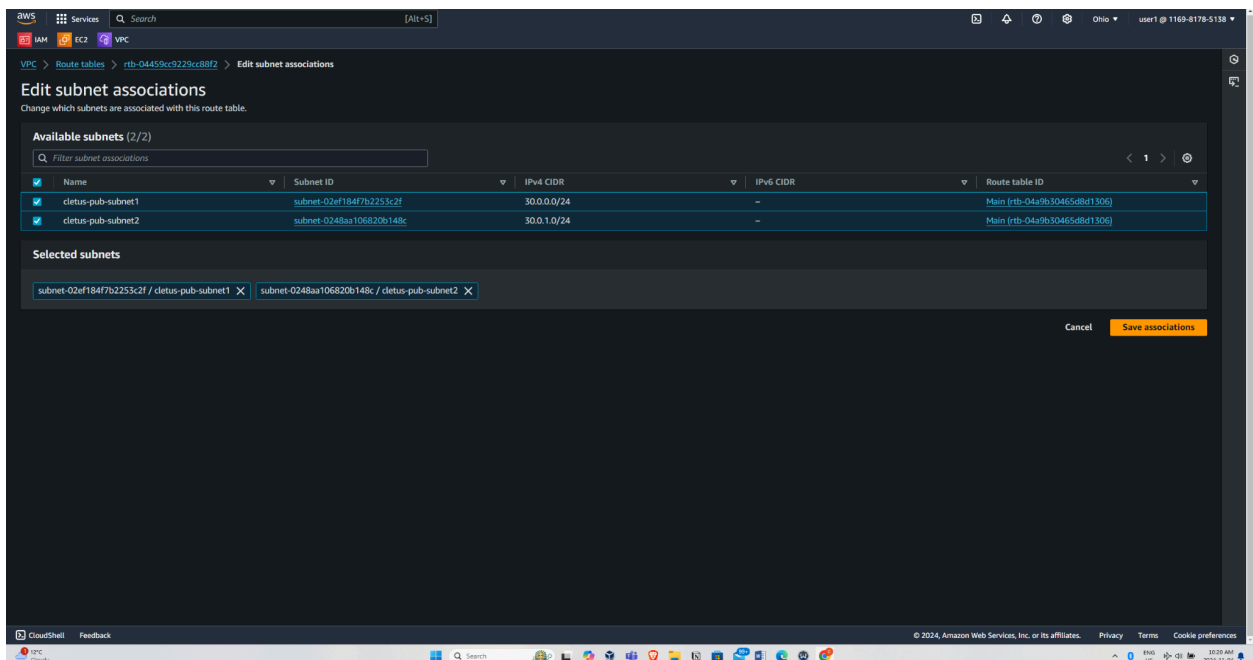
Create a public route table and associate the subnets to the newly created public route table which has a route pointing to the internet gateway.





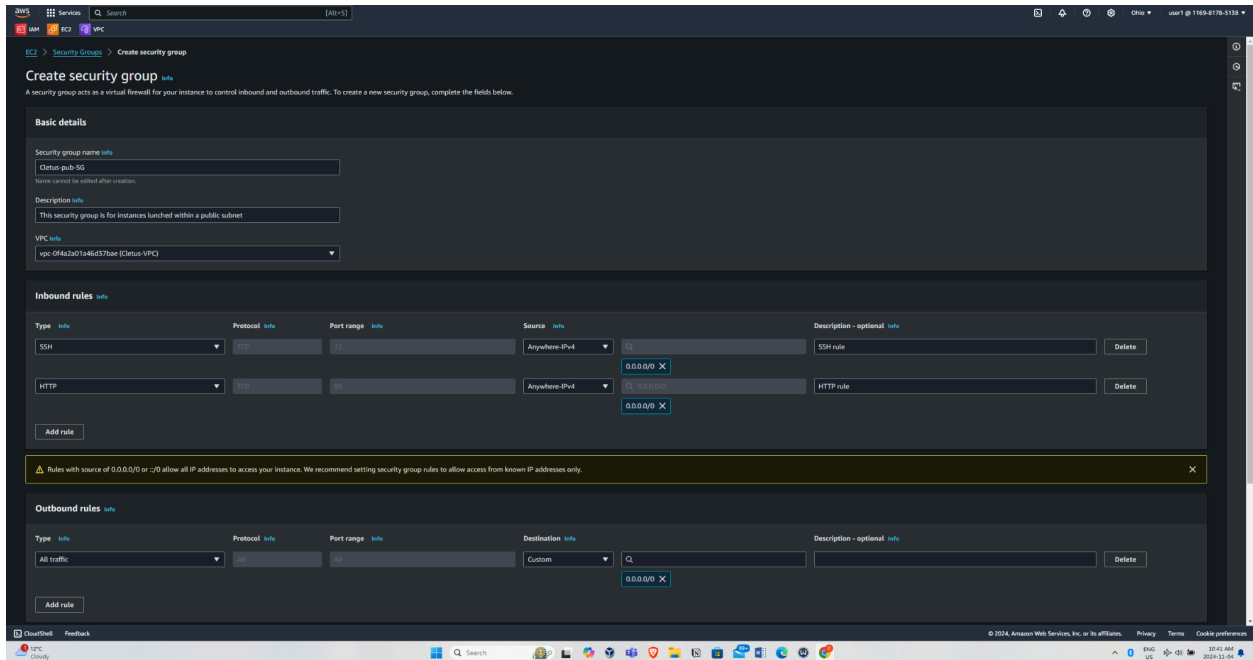
## Step 4b

### Associating Subnets.



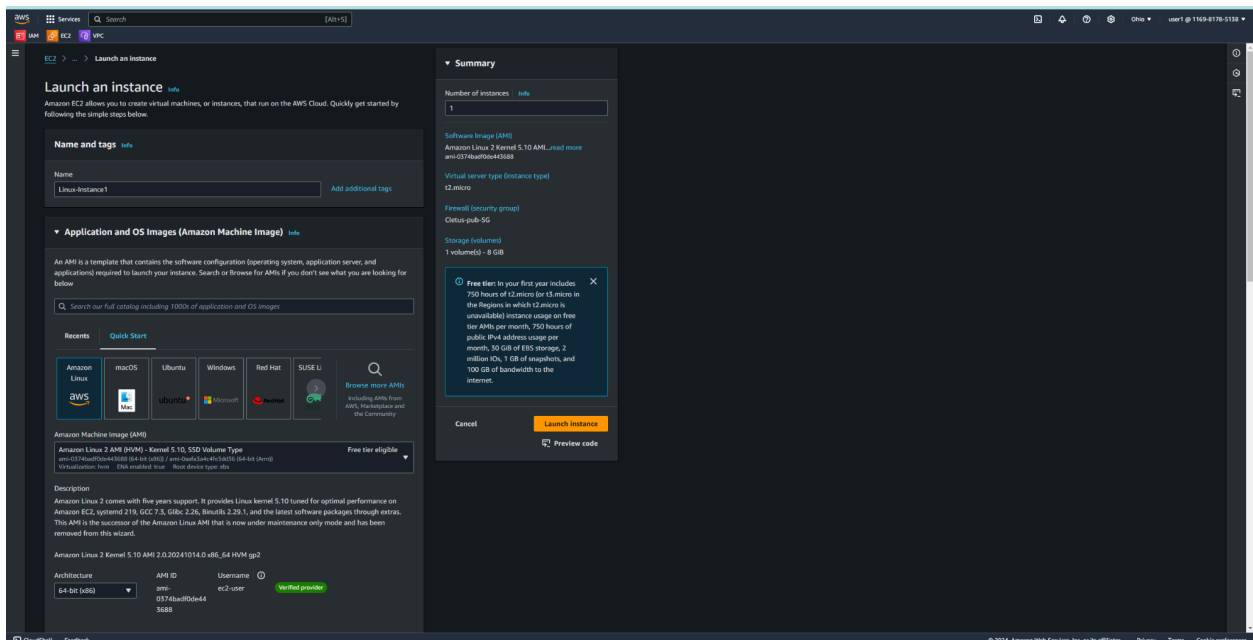
## Step 5

Create a security group (SG) and configure inbound rules to allow SSH and HTTP traffic. The SG dictates the Egress and Ingress traffic at the instance level.



## Step 6

Launch 2 instances within the VPC (cletus-VPC) and keep each of them in our public subnets. That is, one in cletus-pub-subnet1 and the other in cletus-pub-subnet2.



**AWS** Services [Alt+S]

**Instance type** [info](#) [See advice](#)

Instance type: **t2.micro** Free tier eligible Compare instance types

Family: t2 - 1 vCPU - 1 GB Memory - Current generation: true  
On-Demand Linux bare pricing: \$0.016 USD per Hour  
On-Demand Linux bare pricing: \$0.016 USD per Hour  
On-Demand Windows bare pricing: \$0.062 USD per Hour  
On-Demand Linux bare pricing: \$0.016 USD per Hour

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: **Ohio-KP** Create new key pair

**Network settings** [info](#)

VPC - required: **vpc-0f4a23d7a46d37bae (Cetus VPC)** Info

Subnet: **subnet-03af184f7b2353c2f (cetus-pub-subnet1)** Info Create new subnet

Auto-assign public IP: **Enable**

Additional charges apply when outside of free tier allowance

Firewall (security group) [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 group: **Cetus-pub-56 sg-08090c427709c6c29** Info Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

**Summary** [info](#)

Number of instances: **1**

Software Image (AMI): **Amazon Linux 2 Kernel 5.10 AMI...  
ami-031b4b0a4e03d3d3d3**

Virtual server type (instance type): **t2.micro**

Firewall (security group): **Cetus-pub-56**

Storage (included): **1 volume(s) - 8 GB**

**Free tier:** In your first year includes 750 hours of t2.micro (or t3.micro in the regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Launch instances Preview code

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**AWS** Services [Alt+S]

**Instances (1/2)** [info](#)

Find instance by attribute or tag (case-sensitive) All states Last updated less than 5 minutes ago Connect Instance state Actions Launch instances

Name	Instance ID	Instance state	Instance type	Status checks	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4...	Elastic IP	IPv4 IPs	Monitoring	Security group name	Key name
Linux-Instance2	i-0665b2d47cdf27483	Running	t2.micro	2/2 checks passed	View alarms	us-east-2b	ec2-18-220-30-221.us-east-2a...	18.220.30.221	-	-	disabled	Cetus-pub-56	Ohio-KP
Linux-Instance1	i-064d802a39710b7d5	Running	t2.micro	2/2 checks passed	View alarms	us-east-2a	ec2-5-144-3-166.us-east-2a...	3.144.3.166	-	-	disabled	Cetus-pub-56	Ohio-KP

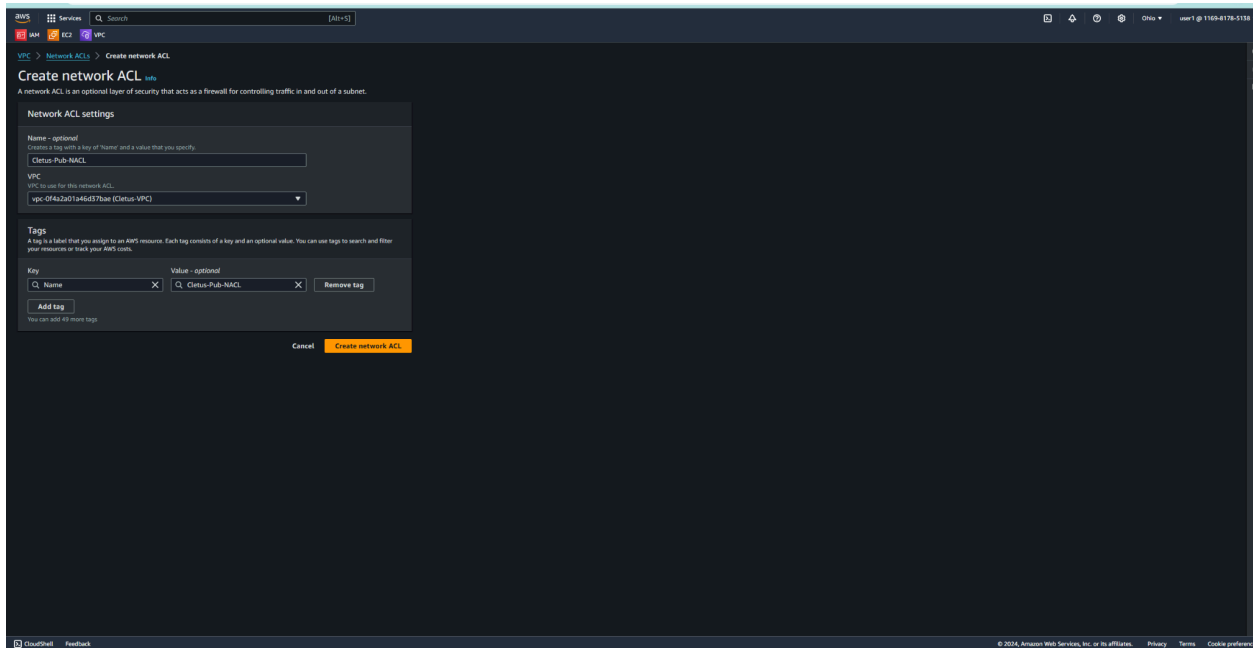
**CloudShell** [Feedback](#)

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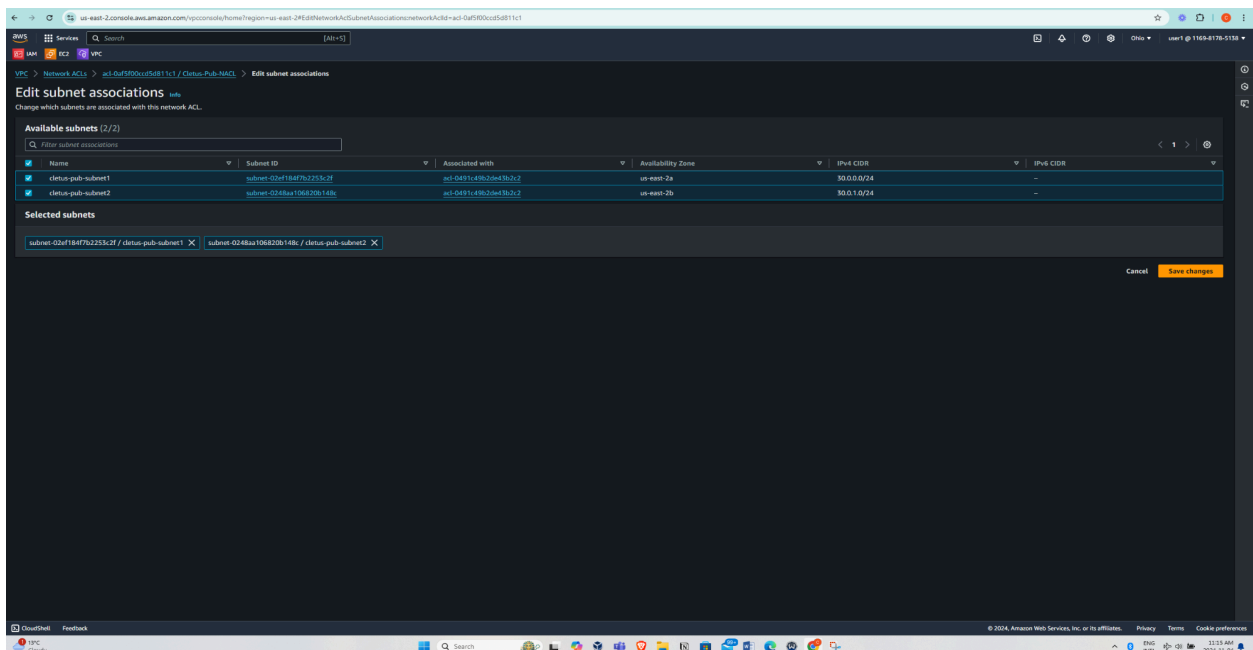
## Step 7

Create and configure a Network Access Control List (NACL). To enhance the security of the infrastructure, I need to implement NACL which dictates the Ingress and Egress traffic at the subnet level. This is just like a firewall that allows or denies traffic based on set rules. Also, This is similar to a SG. The difference is that a SG is only effective at the Instance level while NACL is effective at the subnet level.



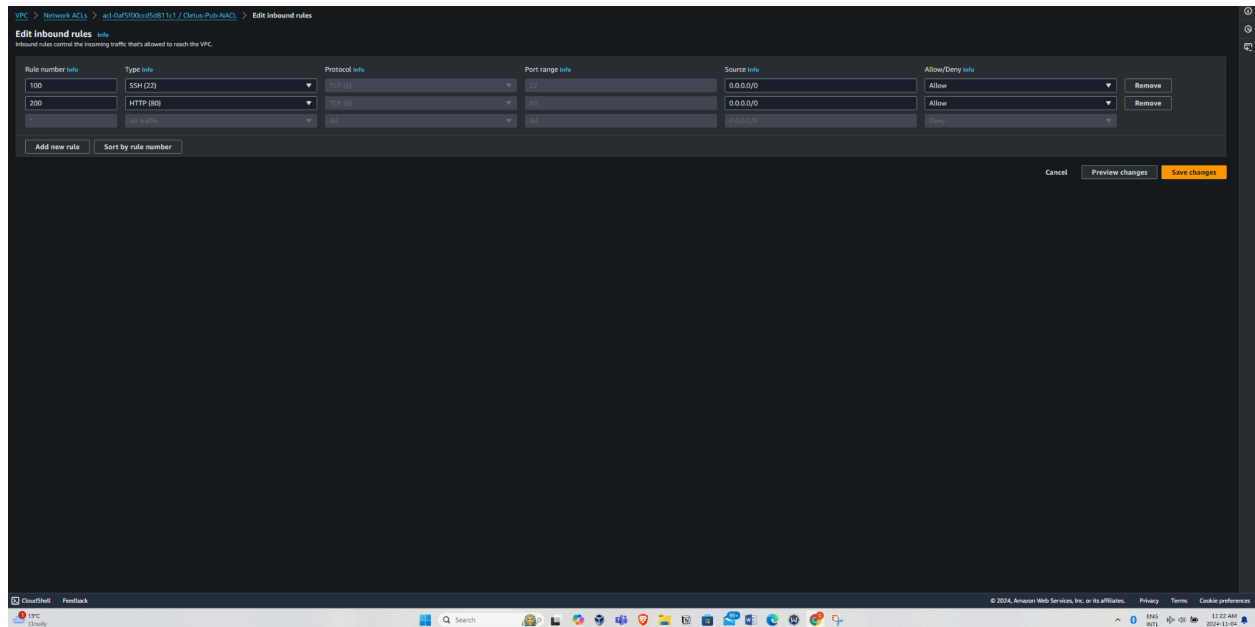
## Step 7b

Associate the public subnets.

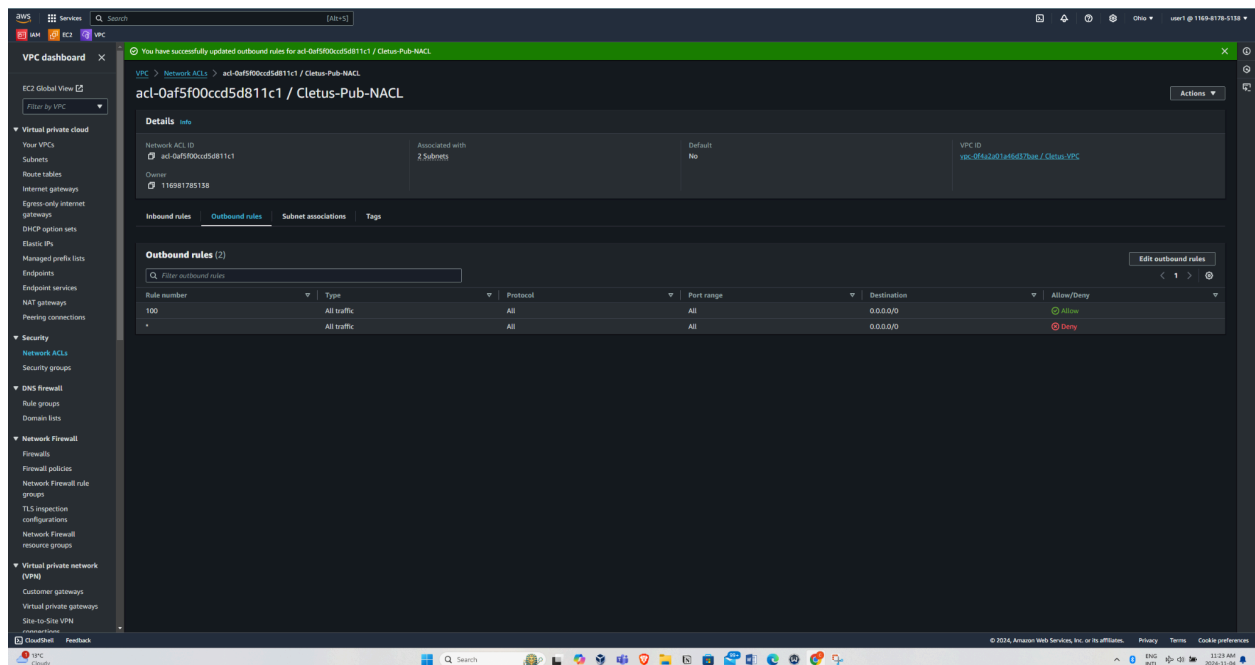


## Step 7c

Configure inbound rule to allow traffic from port 22(SSH) and port 80 (HTTP)



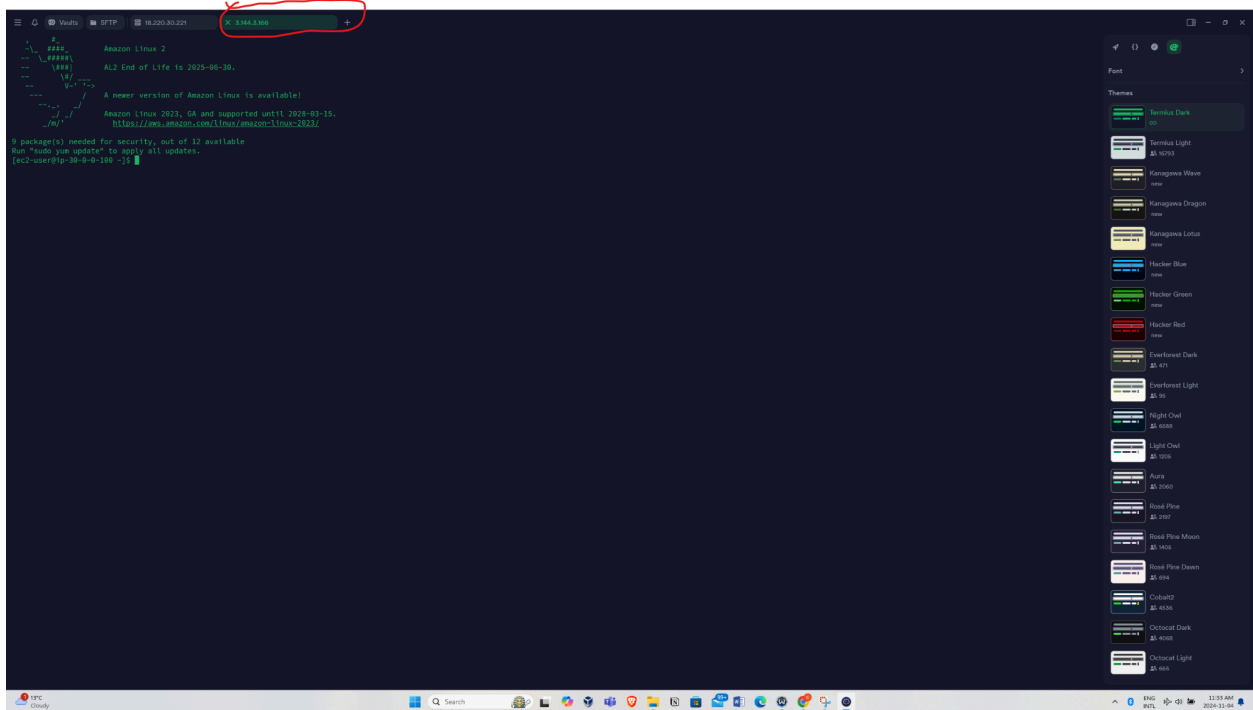
Configure outbound rules to allow all traffic.



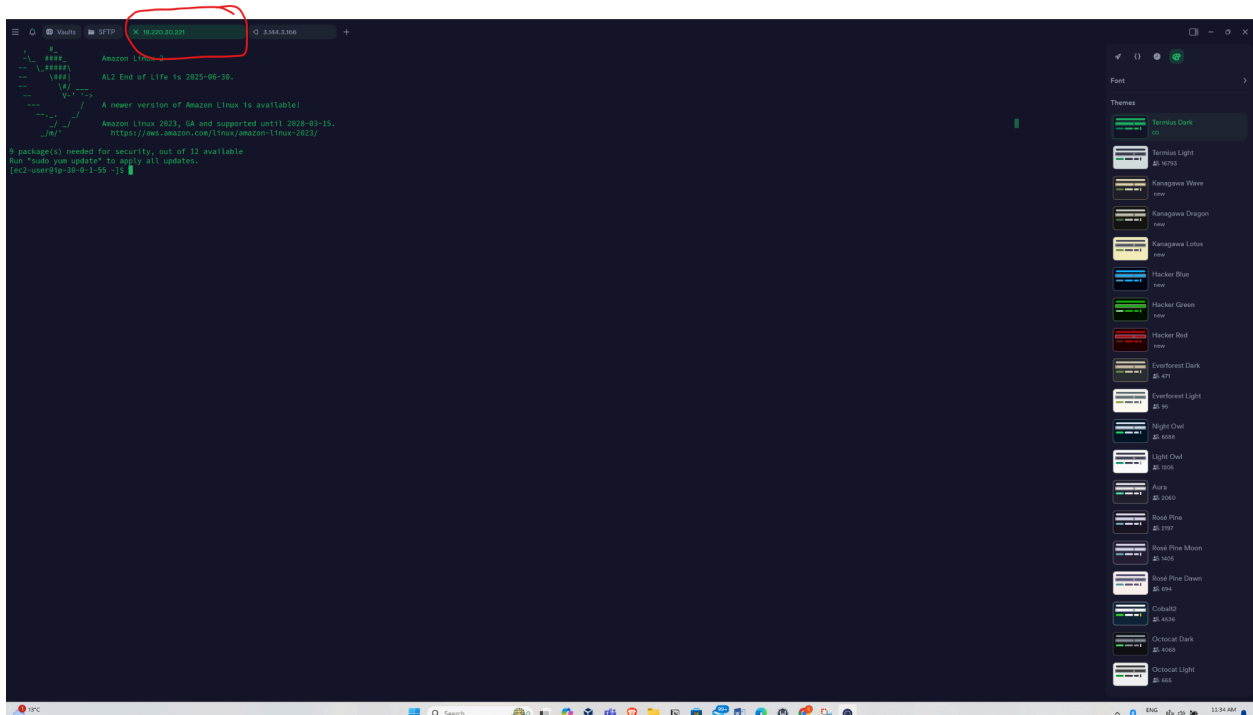
## Step 8

Validating The instances can be accessible via the internet by connecting remotely with SSH.

### Instance1



### Instance2



Resource Map of what i have done so far in this project

