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## Practical 4 : Cloud Computing lab

**Aim:** Demonstrate the virtual private cloud creation having public and private subnet. Describe the step-by-step process, including subnet creation, route table configuration, and launching instances(ec2 windows).

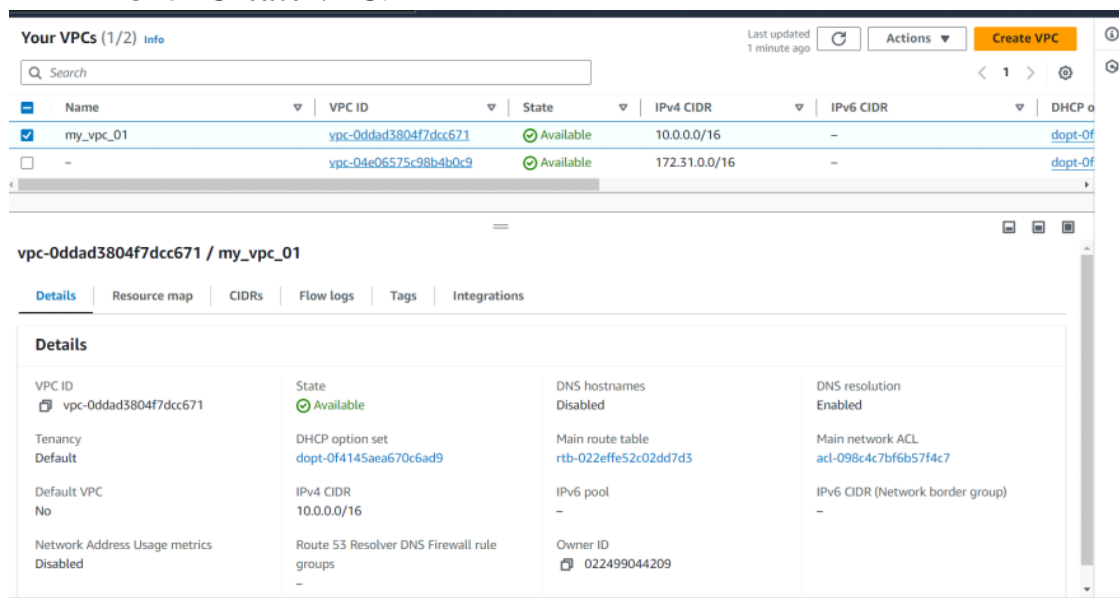
### Step 1: Create a Virtual Private Cloud (VPC)

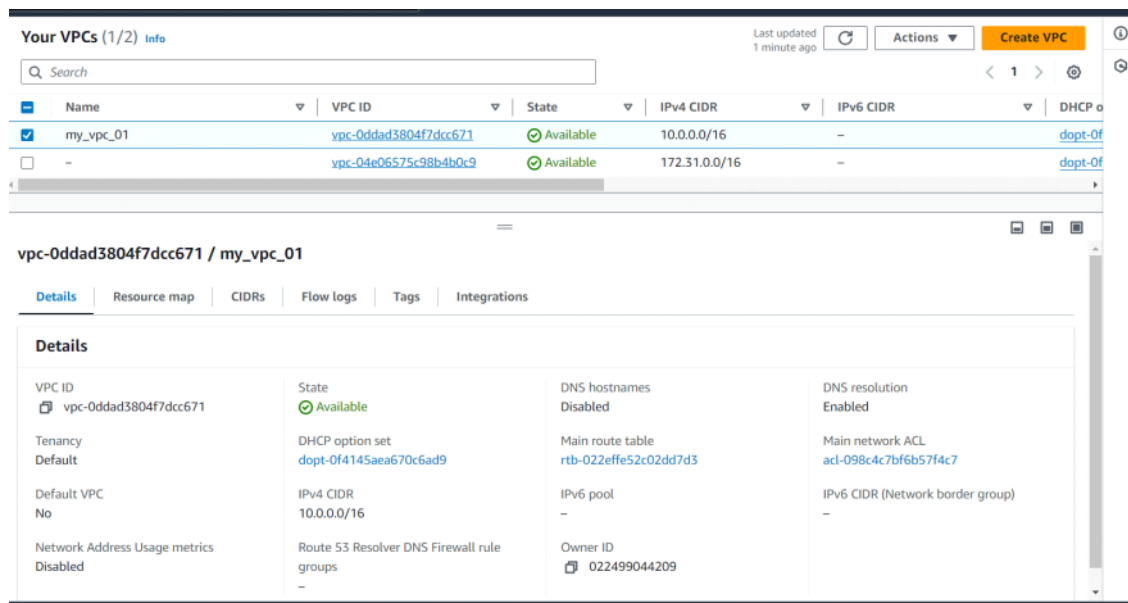
#### 1. Navigate to the VPC Dashboard:

- Log in to the AWS Management Console.
- In the search bar, type "VPC" and select **VPC** from the services list.

#### 2. Create a New VPC:

- In the VPC dashboard, click on **Create VPC**.
- Choose **VPC and more** from the wizard options.
- **VPC Name:** Enter a name for your VPC (e.g., my\_vpc\_01).
- **IPv4 CIDR block:** Enter a CIDR block, such as 10.0.0.0/16.
- **IPv6 CIDR block:** Leave as "No IPv6 CIDR block" unless you need IPv6.
- **Tenancy:** Choose "default" unless you require dedicated instances.
- Click **Create VPC**.





## Step 2: Create Subnets

### Create a Public Subnet

#### 1. Go to Subnets:

- In the VPC dashboard, click on **Subnets** in the left-hand menu.
- Click **Create Subnet**.

#### 2. Configure the Public Subnet:

- **Name:** Enter a name for the subnet (e.g., Public-Subnet).
- **VPC:** Select the VPC you created earlier (my\_vpc\_01).
- **Availability Zone:** Choose an Availability Zone (e.g., us-east-1a).
- **IPv4 CIDR block:** Enter a subnet CIDR block (e.g., 10.0.1.0/24).
- Click **Create Subnet**.

### Create a Private Subnet

#### 1. Repeat the Steps for Creating a Private Subnet:

- Click **Create Subnet** again.
- **Name:** Enter a name for the subnet (e.g., Private-Subnet).
- **VPC:** Select the same VPC (my\_vpc\_01).
- **Availability Zone:** Choose the same or a different Availability Zone (e.g., us-east-1a).
- **IPv4 CIDR block:** Enter a subnet CIDR block (e.g., 10.0.2.0/24).
- Click **Create Subnet**.

**Subnets (1/8) Info**

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Find resources by attribute or tag

Name	Subnet ID	State	VPC	IPv4 CIDR
-	subnet-0eeceaece0f2c6cea1	Available	vpc-04e06575c98b4b0c9	172.31.0.0/20
-	subnet-0191c462917c11c6f	Available	vpc-04e06575c98b4b0c9	172.31.16.0/20
-	subnet-039e14b5830b0c8e3	Available	vpc-04e06575c98b4b0c9	172.31.64.0/20
-	subnet-04282c84e5dfcef4a	Available	vpc-04e06575c98b4b0c9	172.31.32.0/20
-	subnet-0528aba3f61db98b9	Available	vpc-04e06575c98b4b0c9	172.31.80.0/20
my_subnet_01_public	subnet-051f5517e965da4be	Available	vpc-0ddad3804f7dcc671   my_...	10.0.1.0/24
my_subnet_02_private	subnet-0e9310ddf80cb7760	Available	vpc-0ddad3804f7dcc671   my_...	10.0.2.0/24

### subnet-051f5517e965da4be / my\_subnet\_01\_public

- Details
- Flow logs
- Route table
- Network ACL
- CIDR reservations
- Sharing
- Tags

#### Details

Subnet ID subnet-051f5517e965da4be	Subnet ARN arn:aws:ec2:us-east-1:022499044209:subnet/subnet-051f5517e965da4be	State <span>Available</span>	IPv4 CIDR 10.0.1.0/24
Available IPv4 addresses 250	IPv6 CIDR	IPv6 CIDR association ID	Availability Zone us-east-1a

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VPC > Subnets > subnet-051f5517e965da4be

### subnet-051f5517e965da4be / my\_subnet\_01\_public

Actions

#### Details

Subnet ID subnet-051f5517e965da4be	Subnet ARN arn:aws:ec2:us-east-1:022499044209:subnet/subnet-051f5517e965da4be	State <span>Available</span>	IPv4 CIDR 10.0.1.0/24
Available IPv4 addresses 250	IPv6 CIDR	IPv6 CIDR association ID	Availability Zone us-east-1a
Availability Zone ID use1-az6	Network border group us-east-1	VPC vpc-0ddad3804f7dcc671   my_vpc_01	Route table rtb-02b2d17a306e119be   my_route_table_01
Network ACL acl-098c4c7bf6b57f4c7	Default subnet No	Auto-assign public IPv4 address No	Auto-assign IPv6 address No
Auto-assign customer-owned IPv4 address No	Customer-owned IPv4 pool	Outpost ID	IPv4 CIDR reservations
IPv6 CIDR reservations	IPv6-only No	Hostname type IP name	Resource name DNS A record Disabled
Resource name DNS AAAA record Disabled	DNS64 Disabled	Owner 022499044209	

- Flow logs
- Route table
- Network ACL
- CIDR reservations
- Sharing
- Tags

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Resource map

- CIDRs
- Flow logs
- Tags
- Integrations

#### Resource map Info

**VPC** Show details  
Your AWS virtual network  
my\_vpc\_01

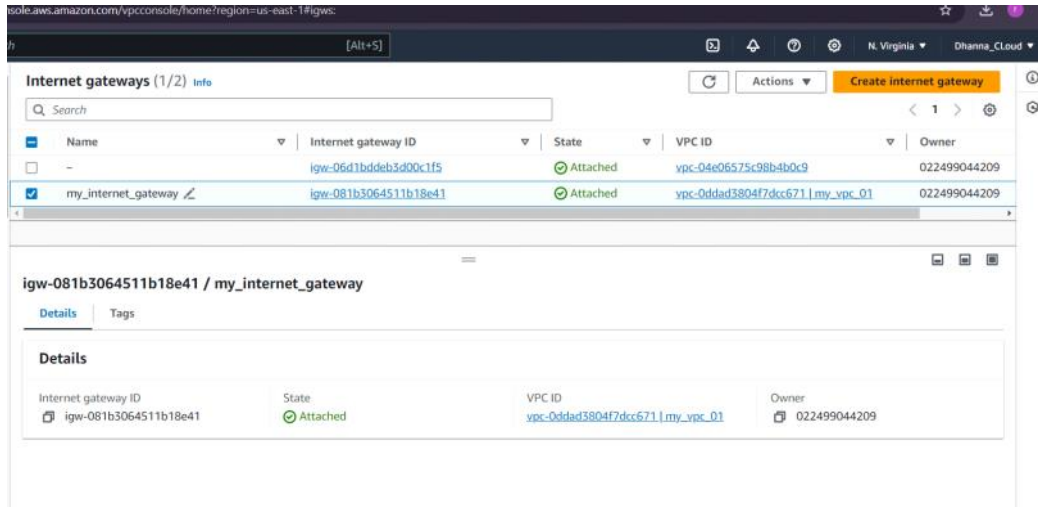
**Subnets (2)**  
Subnets within this VPC  
us-east-1a  
my\_subnet\_02\_private  
my\_subnet\_01\_public

**Route tables (2)**  
Route network traffic to resources  
my\_route\_table\_01  
rtb-022effe52c02dd7d3

### Step 3: Create an Internet Gateway

#### 1. Create the Internet Gateway:

- In the VPC dashboard, click on **Internet Gateways** in the left-hand menu.
  - Click **Create Internet Gateway**.
  - **Name:** Enter a name for the Internet Gateway (e.g., MyInternetGateway).
  - Click **Create Internet Gateway**.
- 2. Attach the Internet Gateway to Your VPC:**
- Select the Internet Gateway you just created.
  - Click **Actions** and choose **Attach to VPC**.
  - Select your VPC (my\_vpc\_01) from the list and click **Attach**.



## Step 4: Configure Route Tables

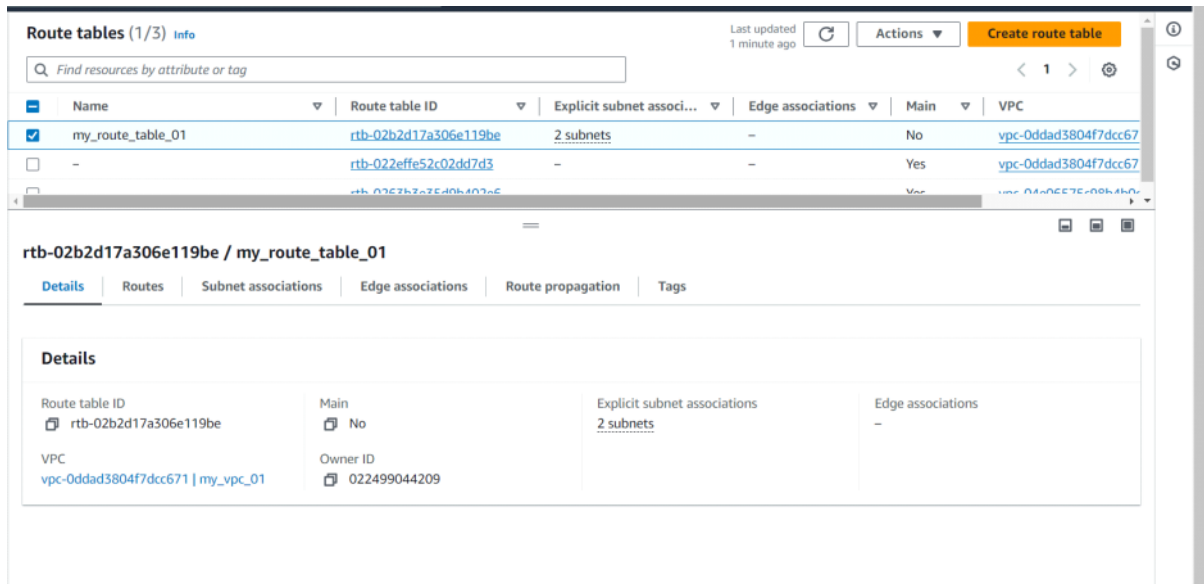
### Public Route Table

- Create a Route Table for the Public Subnet:**
  - In the VPC dashboard, click on **Route Tables**.
  - Click **Create Route Table**.
  - **Name:** Enter a name (e.g., Public-Route-Table).
  - **VPC:** Select your VPC (my\_vpc\_01).
  - Click **Create Route Table**.
- Add a Route to the Internet Gateway:**
  - Select the route table you just created (Public-Route-Table).
  - Click on the **Routes** tab, then click **Edit routes**.
  - Click **Add route**:
    - **Destination:** Enter 0.0.0.0/0 (this means all traffic).
    - **Target:** Select the Internet Gateway you created (MyInternetGateway).
  - Click **Save changes**.
- Associate the Public Subnet with the Public Route Table:**
  - Click on the **Subnet Associations** tab.
  - Click **Edit subnet associations**.
  - Select the public subnet (Public-Subnet) and click **Save associations**.

### Private Route Table

- Create a Route Table for the Private Subnet:**
  - Click **Create Route Table**.
  - **Name:** Enter a name (e.g., Private-Route-Table).
  - **VPC:** Select your VPC (my\_vpc\_01).
  - Click **Create Route Table**.
- Associate the Private Subnet with the Private Route Table:**
  - Click on the **Subnet Associations** tab.

- Click **Edit subnet associations**.
  - Select the private subnet (Private-Subnet) and click **Save associations**.
- 3. (Optional) Configure a NAT Gateway:**
- If you want instances in the private subnet to access the internet (for software updates, etc.), you'll need to create a NAT Gateway in the public subnet and add a route in the private route table pointing to this NAT Gateway.
  - This step involves additional charges and is necessary only if private instances need outbound internet access.( I didn't created the nat gateway as it is chargeble but we can )



## Step 5: Configure Security Groups

### Public Security Group

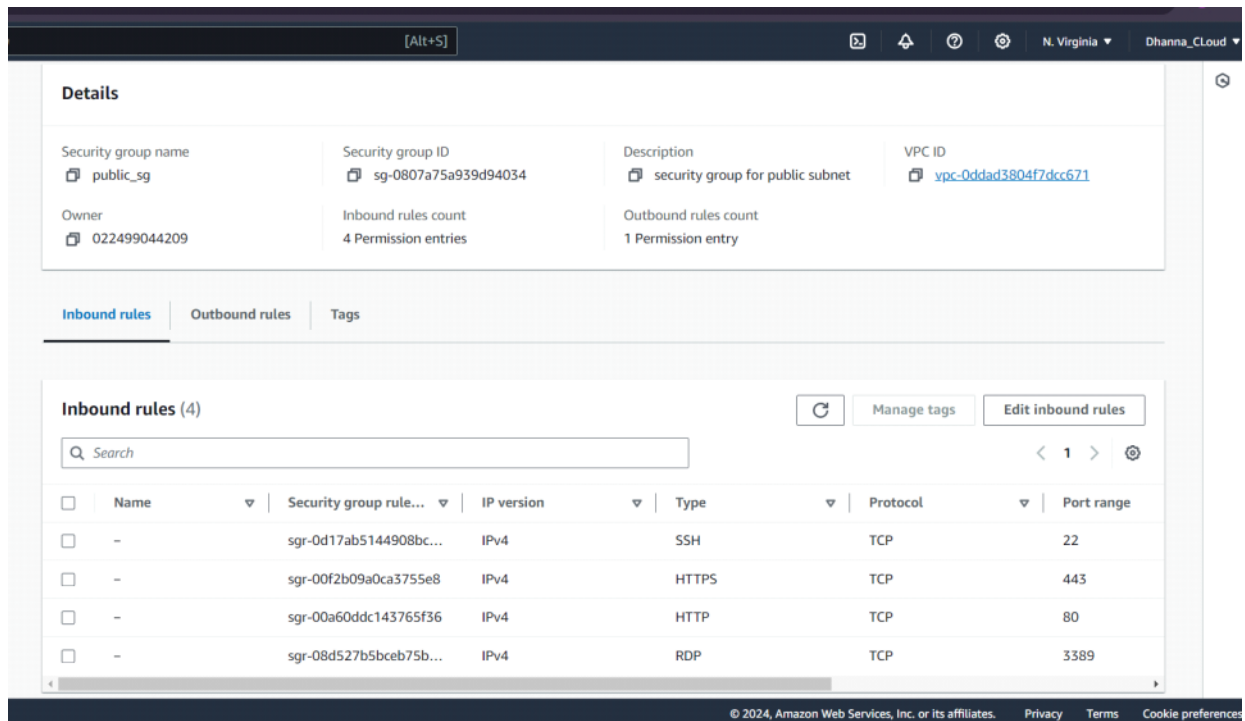
#### 1. Create a Security Group for the Public Subnet:

- In the VPC dashboard, click on **Security Groups**.
- Click **Create Security Group**.
- **Name:** Enter Public-SG.
- **VPC:** Select your VPC (my\_vpc\_01).
- **Inbound Rules:**
  - **HTTP:** Type: HTTP, Port: 80, Source: Anywhere (0.0.0.0/0).
  - **HTTPS:** Type: HTTPS, Port: 443, Source: Anywhere (0.0.0.0/0).
  - **RDP:** Type: RDP, Port: 3389, Source: My IP (recommended for security).
- **Outbound Rules:** Allow all traffic by default.
- Click **Create Security Group**.

### Private Security Group

#### 1. Create a Security Group for the Private Subnet:

- Follow the same steps as above to create another security group, naming it Private-SG.
- **Inbound Rules:**
  - **Database Traffic:** If your private subnet hosts a database, add rules for the specific database (e.g., MySQL on port 3306), allowing traffic from the Public-SG.
- **Outbound Rules:** Allow all traffic by default.
- Click **Create Security Group**.



## Step 6: Launch a Windows EC2 Instance in the Public Subnet

1. **Go to the EC2 Dashboard:**
  - Navigate to the **EC2** service from the AWS Management Console.
2. **Click on Launch Instance:**
  - Click the **Launch Instance** button to start creating a new instance.
3. **Choose an Amazon Machine Image (AMI):**
  - Select a Windows AMI, such as "Microsoft Windows Server 2022 Base."
4. **Select an Instance Type:**
  - Choose t2.micro (if eligible for the free tier), which is sufficient for basic tasks.
5. **Configure Instance Details:**
  - **Network:** Select your VPC (my\_vpc\_01).
  - **Subnet:** Choose the public subnet (Public-Subnet).
  - **Auto-assign Public IP:** Ensure this is **enabled**.
  - Leave other settings as default unless you have specific requirements.
6. **Configure Security Group:**
  - Choose **Select an existing security group**.
  - Select the Public-SG security group.
7. **Review and Launch:**
  - Review your settings and click **Launch**.
  - Select an existing key pair or create a new one to access the instance via RDP.
8. **Connect to Your Instance:**
  - Once the instance is running, go to the **Instances** section.
  - Select your instance, and under **Connect**, choose **Get Windows Password**.
  - Decrypt the password using the .pem file you downloaded earlier.
  - Use an RDP client to connect to the instance.



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

Search [Alt+S]

Instances (1/1) Info

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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 IP
windowswebs...	i-09fe1ed31a4e4ca4c	Running	t2.micro	2/2 checks passed	View alarms	us-east-1a	-

**i-09fe1ed31a4e4ca4c (windowswebserver)**

Instance ID: i-09fe1ed31a4e4ca4c (windowswebserver)

Public IPv4 address: 34.204.85.13 | [open address](#)

Private IPv4 addresses: 10.0.1.214

IPv6 address: -

Instance state: Running

Public IPv4 DNS: -

Hostname type: IP name: ip-10-0-1-214.ec2.internal

Private IP DNS name (IPv4 only): ip-10-0-1-214.ec2.internal

Instance type: t2.micro

Elastic IP addresses: -

Answer private resource DNS name: -

Auto-assigned IP address: 34.204.85.13 [Public IP]

VPC ID: vpc-0ddad3804f7dcc671 (my\_vpc\_01)

AWS Compute Optimizer finding: [Opt-in to AWS Compute Optimizer for recommendations.](#) | [Learn more](#)

IAM Role: -

Subnet ID: subnet-051f5537a05f5d01a (my\_subnet\_01) | [public](#)

Auto Scaling Group name: -

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