# VPC Creation

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

1. **Login to AWS Management Console**:
    - Open the AWS Management Console.
    - Navigate to the **VPC Dashboard**.
2. **Create a VPC**:
    - In the VPC Dashboard, click **Create VPC**.
    - Provide a **VPC Name** and set the **IPv4 CIDR block** (e.g., 10.0.0.0/16).
    - Leave **IPv6 CIDR block** set to **No IPv6 CIDR block** unless you require IPv6.
    - Choose the **Tenancy** (default or dedicated).
    - Click **Create**.

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**Step 2: Create Subnets**

You need 6 subnets (3 public and 3 private subnets). The subnets will span across multiple Availability Zones (AZs) for high availability.

1. **Create Public Subnets**:
    - Go to **Subnets** in the VPC Dashboard.
    - Click **Create Subnet**.
    - Provide a **Subnet Name** and select an **Availability Zone** (e.g., us-east-1a).
    - Specify the **IPv4 CIDR block** (e.g., 10.0.1.0/24 for the first public subnet).
    - Repeat this process for other 2 public subnets with different CIDR blocks (e.g., 10.0.2.0/24 and 10.0.3.0/24).
    - Ensure these subnets are created in different AZs for better availability.
2. **Create Private Subnets**:
    - Repeat the process for private subnets by selecting different CIDR blocks (e.g., 10.0.4.0/24, 10.0.5.0/24, 10.0.6.0/24), ensuring they are in the different Availability Zones as required.



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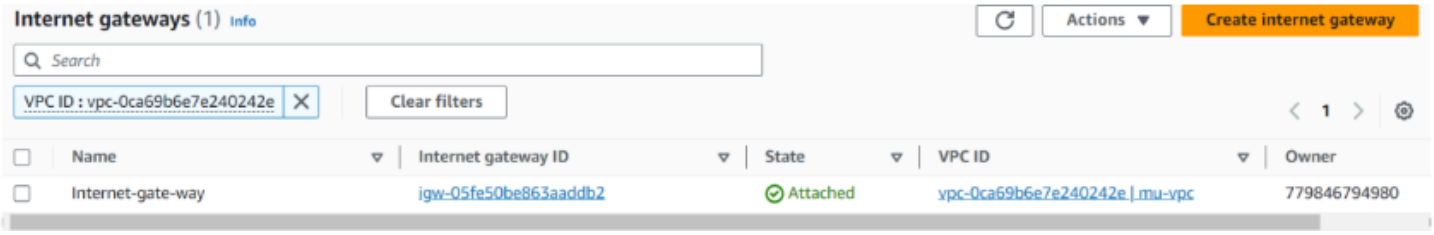
**Step 3: Create Internet Gateway (IGW)**

1. **Create an Internet Gateway**:
    - In the **VPC Dashboard**, navigate to **Internet Gateways**.
    - Click **Create Internet Gateway**.
    - Provide a **Name** for the IGW (e.g., MyIGW).
    - Click **Create**.




3. **Attach Internet Gateway to VPC**:
    - After creating the IGW, select it from the list.
    - Click **Actions**, then **Attach to VPC**.
    - Select your VPC and click **Attach**.

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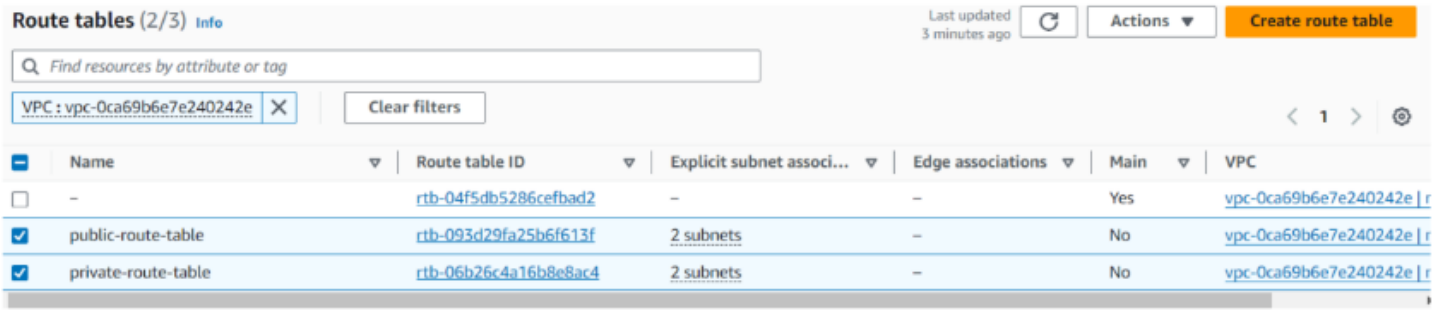
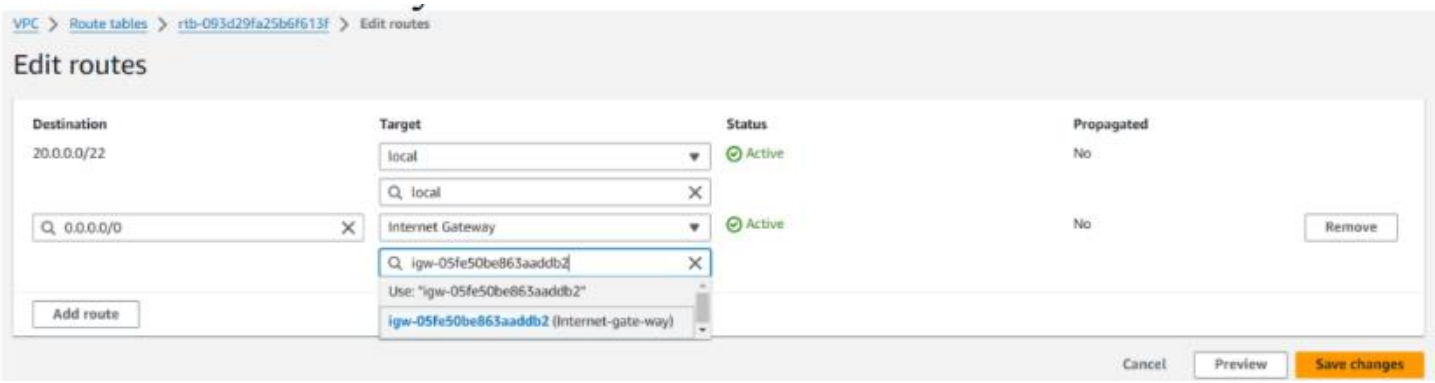
**Step 4: Create Route Tables**

1. **Create Public Route Table**:
    - In the **VPC Dashboard**, navigate to **Route Tables**.
    - Click **Create Route Table**.
    - Provide a **Name** for the route table (e.g., PublicRouteTable).
    - Select your VPC and click **Create**.
2. **Add Route to Public Route Table**:
    - Select the public route table you just created.
    - Click the **Routes** tab, then **Edit Routes**.
    - Click **Add Route**, and set the **Destination** to 0.0.0.0/0 (for all internet traffic).
    - Set the **Target** to your **Internet Gateway** (e.g., MyIGW).
    - Click **Save Routes**.
3. **Associate Public Subnets with Public Route Table**:
    - Select the **Subnet Associations** tab in the Public Route Table.
    - Click **Edit subnet associations**.
    - Select all the **public subnets** (e.g., 10.0.1.0/24, 10.0.2.0/24, 10.0.3.0/24).
    - Click **Save**.
4. **Create Private Route Table**:
    - Similarly, create another route table for the **private subnets** (e.g., PrivateRouteTable).
    - Select your VPC and click **Create**.
5. **Add Route to Private Route Table**:
    - Select the **PrivateRouteTable** and navigate to the **Routes** tab.
    - Click **Edit Routes** and **Add Route**.
    - Add a route with **Destination** 0.0.0.0/0 and leave **Target** as None (because the private subnets will route traffic through the NAT Gateway).
    - Click **Save Routes**.
6. **Associate Private Subnets with Private Route Table**:
    - Go to the **Subnet Associations** tab of the Private Route Table.
    - Click **Edit subnet associations**.
    - Select all the **private subnets** (e.g., 10.0.4.0/24, 10.0.5.0/24, 10.0.6.0/24).
    - Click **Save**.





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**Step 5: Create NAT Gateway**

1. **Allocate an Elastic IP Address**:
   - Go to the **EC2 Dashboard**, and navigate to **Elastic IPs**.
   - Click **Allocate new address**, and then **Allocate**.
   - This will give you an Elastic IP (EIP) that can be used for the NAT Gateway.
2. **Create NAT Gateway**:
   - In the **VPC Dashboard**, go to **NAT Gateways**.
   - Click **Create NAT Gateway**.
   - Select a **Public Subnet** (e.g., 10.0.1.0/24).
   - Choose the previously allocated **Elastic IP**.
   - Click **Create NAT Gateway**.
3. **Update Route Table for Private Subnets**:
   - Go to the **Private Route Table**.
   - Click **Edit Routes**, and add a new route for 0.0.0.0/0.
   - Set the **Target** to the **NAT Gateway** (e.g., NatGateway-1).
   - Click **Save Routes**.



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**Step 6: Create Security Groups**

1. **Create Security Groups**:
   - Go to the **EC2 Dashboard** and click **Security Groups**.
   - Click **Create Security Group**.
   - Provide a **Name** and **Description**.
   - Add inbound and outbound rules as required (e.g., allow HTTP/HTTPS traffic to public subnets, allow SSH traffic for EC2 management, etc.).
2. **Assign Security Groups**:
   - When launching EC2 instances in public and private subnets, assign them the appropriate security group for controlling inbound and outbound traffic.

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**Step 7: Verify and Test**

1. **Launch EC2 Instances**:
   - Launch EC2 instances in both public and private subnets.
   - Ensure that EC2 instances in the public subnets can access the internet.
   - Ensure that EC2 instances in the private subnets can access the internet through the NAT Gateway.
2. **Test Connectivity**: