Lab 12: Deploying a Network Load Balancer with EC2 Targets

Objective

To deploy a **Network Load Balancer** (NLB) that distributes traffic across **two EC2 instances**, each running an Apache web server with a custom webpage. The traffic should be load-balanced in a **round-robin** manner.

Prerequisites

- AWS Free Tier account
- IAM user with EC2 and ELB permissions
- AWS region: `ap-south-1` (Mumbai) or your preferred region
- Key pair for SSH (or use EC2 Instance Connect)

Part A: Launch EC2 Instances

1. Go to **EC2 > Launch Instances**
2. Launch two instances:
    - Name: `WebServer1`, `WebServer2`
    - AMI: Amazon Linux 2
    - Instance type: `t2.micro`
    - Network: Default VPC or custom
    - Enable **Auto-assign public IP**
    - Security group: Allow **TCP port 80** (HTTP) and **SSH (22)** from your IP
    - Key pair: Choose an existing one or create new
3. Launch the instances and wait until their state is **Running**

Part B: Configure Web Servers

SSH into both instances using EC2 Instance Connect or SSH, then run the following on **each**:

```
sudo yum update -y
sudo yum install httpd -y
sudo systemctl start httpd
sudo systemctl enable httpd
```

Now create a custom index.html file.

On `WebServer1`:

```
echo "<h1>Welcome to Web Server 1</h1>" | sudo tee /var/www/html/index.html
```

On `WebServer2`:

```
echo "<h1>Welcome to Web Server 2</h1>" | sudo tee /var/www/html/index.html
```

Test from browser:

- `http://<PublicIP-of-WebServer1>`
- `http://<PublicIP-of-WebServer2>`

Part C: Create Target Group

1. Go to **EC2** > **Target Groups**
2. Click **Create target group**
    - Target type: **Instances**
    - Protocol: **TCP**
    - Port: **80**
    - Target group name: `nlb-targets`
    - VPC: same as EC2 instances
3. Click **Next**
4. Register both EC2 instances
5. Click **Create target group**

Wait until both targets show **healthy** (under "Targets" tab)

Part D: Create Network Load Balancer

1. Go to **EC2** > **Load Balancers** > **Create Load Balancer**
2. Choose **Network Load Balancer**
3. Name: `nlb-demo`
4. Scheme: **Internet-facing**
5. IP address type: IPv4
6. Listener:
    - Protocol: TCP
    - Port: 80
    - Forward to: Target group `nlb-targets`
7. Select **Availability Zones** where your EC2s are located
8. Click **Create**

Part E: Test the Load Balancer

- Go to **EC2 > Load Balancers**
- Copy the **DNS name** of the **NLB**
- Open it in your browser:

  `http://<NLB-DNS>`

- **Refresh the page multiple times**, and you should see output alternating between:
  - "Welcome to Web Server 1"
  - "Welcome to Web Server 2"

Round-robin load balancing is working!

Cleanup (Optional)

To avoid ongoing costs:

- Terminate EC2 instances
- Delete NLB and target group
- Delete security groups if created manually

Student Assignment

- Replace static `index.html` with a styled HTML page
- Add a 3rd EC2 instance and register it to the target group
- Setup health check route `/status` and test failover