Project 3:

Creating an Auto Scaling Group (ASG) with an EC2 launch configuration and attaching an Elastic Load Balancer (ELB) involves several steps. Here's a detailed guide:

**Prerequisites**

1. **AWS Account**: Ensure you have an active AWS account.
2. **IAM Permissions**: You need permissions to create EC2 instances, launch configurations, ASGs, and ELBs.
3. **VPC and Subnets**: Ensure your AWS VPC and at least two subnets are properly configured.
4. **Security Groups**: Have security groups created for your instances and ELB with the necessary inbound/outbound rules.

**Steps**

**Step 1: Create a Security Group**

1. **Navigate to the EC2 Dashboard** in the AWS Management Console.
2. Click on **Security Groups** under the **Network & Security** section.
3. Click **Create Security Group**:
   * Name: my-asg-sg.
   * Description: Security group for Auto Scaling Group.
   * Add inbound rules for SSH (port 22) and HTTP/HTTPS (ports 80/443) as required.
4. Save the security group.

**Step 2: Create a Launch Configuration**

1. Navigate to the **Auto Scaling** section in the EC2 Dashboard.
2. Under the **Launch Configurations** section, click **Create Launch Configuration**.
3. **Choose an Amazon Machine Image (AMI)**:
   * Select an AMI, such as Amazon Linux 2 or another appropriate one for your workload.
4. **Choose an Instance Type**:
   * Select an instance type, e.g., t2.micro.
5. **Configure Details**:
   * Assign the previously created security group (my-asg-sg).
   * Specify the IAM role for the instance if required.
6. **Add Storage**: Configure the storage volumes as needed.
7. **Configure Advanced Options**: Add any additional settings like instance metadata or monitoring as required.
8. **Review and Create**: Provide a name for the launch configuration, such as my-launch-config.
9. **Click Create**.

**Step 3: Create an Elastic Load Balancer (ELB)**

1. Navigate to the **Load Balancers** section in the EC2 Dashboard.
2. Click **Create Load Balancer**.
3. Choose the **Application Load Balancer** (or another type as needed).
4. **Configure Load Balancer Settings**:
   * Name: my-elb.
   * Scheme: Internet-facing.
   * Listeners: Add a listener for HTTP (port 80).
   * Availability Zones: Select the subnets in the VPC.
5. **Configure Security Groups**:
   * Use or create a security group that allows inbound traffic on port 80.
6. **Configure Routing**:
   * Create a new target group for the ELB, e.g., my-target-group.
   * Protocol: HTTP.
   * Register targets later.
7. **Review and Create**: Finish the ELB setup.

**Step 4: Create the Auto Scaling Group**

1. Navigate to the **Auto Scaling Groups** section in the EC2 Dashboard.
2. Click **Create Auto Scaling Group**.
3. **Basic Configuration**:
   * Name: my-asg.
   * Launch configuration: Select my-launch-config.
4. **Network**:
   * Select your VPC.
   * Choose at least two subnets in different Availability Zones for high availability.
5. **Attach to Load Balancer**:
   * Select the previously created ELB and target group (my-target-group).
6. **Set Desired Capacity**:
   * Desired instances: 2.
   * Minimum instances: 1.
   * Maximum instances: 3.
7. **Configure Scaling Policies** (Optional):
   * Add scaling policies if required, e.g., based on CPU utilization.
8. **Add Notifications and Tags**:
   * Configure notifications to send alerts to an SNS topic.
   * Add tags to organize your resources.
9. **Review and Create**: Confirm and create the ASG.

**Step 5: Test the Setup**

1. Navigate to the **Load Balancer** in the console and ensure its state is "active."
2. Check the **Instances** tab in the Load Balancer to confirm that your EC2 instances are being registered.
3. Verify that the desired instance count in the ASG is maintained at 2.