Hafida Saidi   SAA Project Report

Deploy Simple Web App with EC2 + ALB + ASG on AWS

Step 1: Set Up the Network Infrastructure

1. **Create a VPC** with two public subnets across two Availability Zones (AZs) to ensure fault tolerance.

2. **Create an Internet Gateway (IGW)** and attach it to the VPC.

3. **Route tables:** Associate public subnets with a route to the IGW.

4. **Security groups:** Create security groups to allow HTTP (80) inbound traffic from the ALB to EC2 instances, and allow inbound SSH (22) only from trusted IPs (for admin access).

Step 2: Create EC2 Launch Template or Configuration

1. **Create a launch template/configuration** that defines:

   - AMI ID (Amazon Linux 2)
   - Instance type (t3.micro for cost-effective testing)
   - Key pair for SSH access
   - Security group to allow traffic only from ALB and SSH from admin IPs
   - IAM Role attached for EC2 if needed (for accessing S3 / CloudWatch)
   - User data script to install and start the web application on boot
     1. #!/bin/bash
     2. yum update -y
     3. yum install -y httpd
     4. systemctl start httpd
     5. systemctl enable httpd

Step 3: Set Up Auto Scaling Group (ASG)

1. Create an Auto Scaling Group using the launch template.

2. Attach the ASG to the **public subnets** in multiple AZs for high availability.

3. Define **scaling policies** based on CPU utilization or request count:

   - Scale out if CPU > 70% for 5 minutes
   - Scale in if CPU < 30% for 5 minutes

Step 4: Configure Application Load Balancer (ALB)

1. Create an **Application Load Balancer** in the same VPC.

   - Define listeners: HTTP (port 80).

2. Register the target group with the ASG instances.

3. Set health check on the ALB to monitor instance health.

4. Configure security group to allow inbound traffic from the internet on port 80.

Step 5: Implement Security Best Practices

1. **Security Groups:**

   - ALB SG: Allow inbound HTTP from 0.0.0.0/0
   - EC2 SG: Allow inbound only from ALB's security group on port 80

2. **IAM Role for EC2**

3. **SSH Access**

4. **Enable CloudWatch monitoring:** Collect logs and metrics for EC2, ALB, and ASG

Step 6: Deployment & Validation

1. Deploy the solution.

2. Access the web app via the ALB DNS name:

   http://my-alb-765694842.eu-west-2.elb.amazonaws.com/