



Module 13 Challenge Lab - Implementing a Serverless Architecture for the Cafe

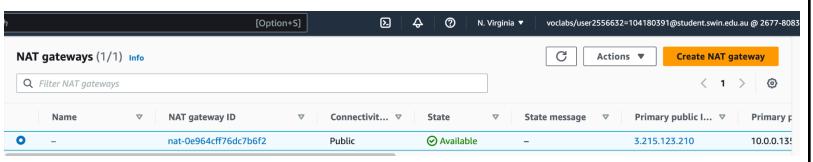
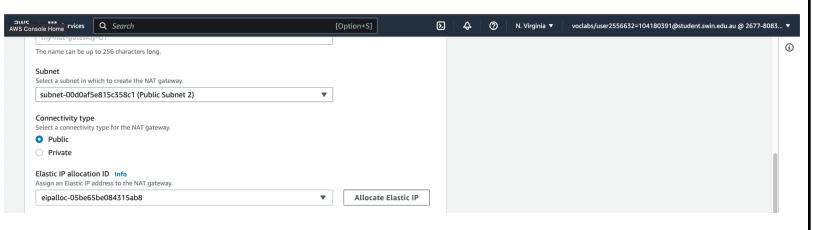
June 22, 2023

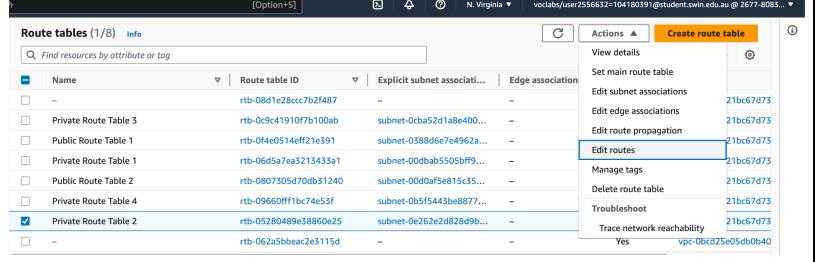
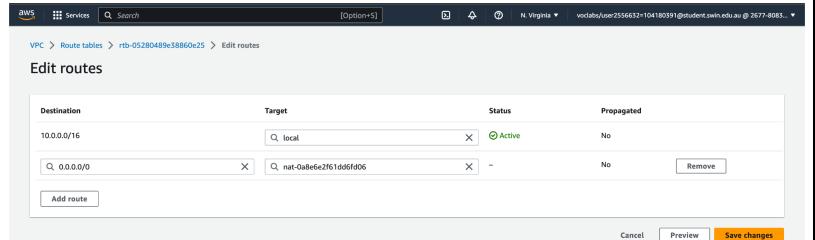
Luu Tuan Hoang
Student ID: 104180391

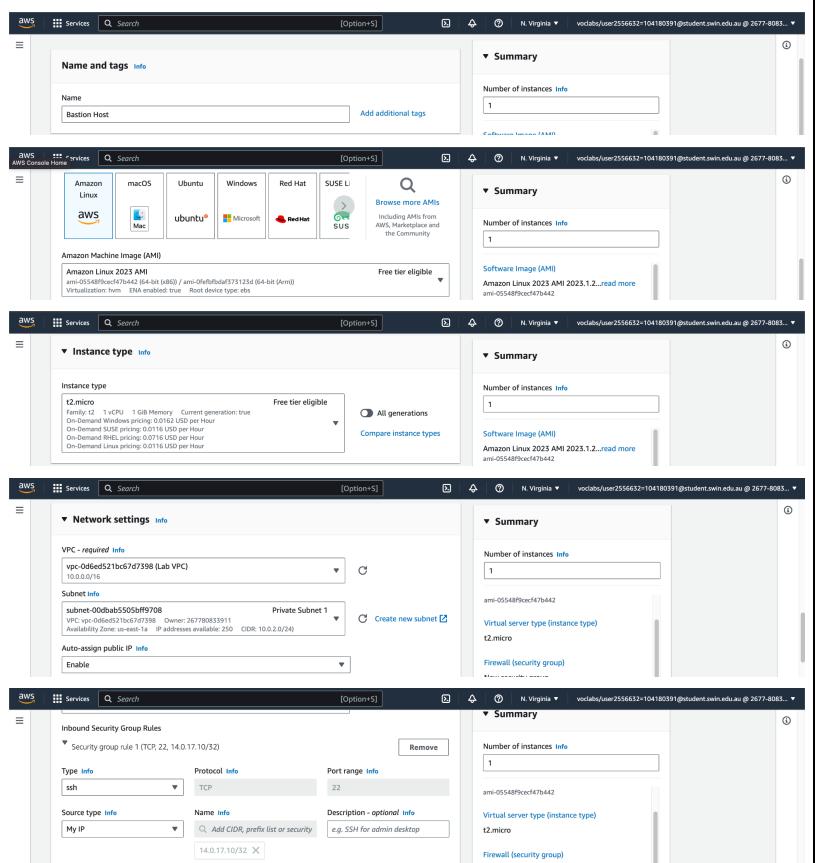
Task 1: Inspecting your environment

Step	Description	Screenshot
1	Question 1, 2, 3	<p>Question 1: Which ports are open in the CafeSG security group?</p> <p><input type="radio"/> Ports 80 and 443 <input checked="" type="radio"/> Ports 80 <input type="radio"/> Ports 80, 443, and 3899 <input type="radio"/> Ports 22, 80, and 443</p> <p>Submit</p> <p>Question 2: Can you connect from the internet to instances in Public Subnet 1?</p> <p><input checked="" type="radio"/> Yes - If this instance has a public IP address, and the security group and network ACL allow it <input type="radio"/> No - The public subnet has no internet gateway <input type="radio"/> No - The public subnet has no NAT gateway configured for it <input type="radio"/> No - The network access control list (network ACL) prevents any inbound traffic from the internet</p> <p>Submit</p> <p>Question 3: Should an instance in Private Subnet 1 be able to reach the internet?</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>Submit</p>
2	Question 4, 5, 6	<p>Question 4: Should an instance in Private Subnet 2 be able to reach the internet?</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>Submit</p> <p>Question 5: Can you connect to the CafeWebAppServer instance from the internet?</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>Submit</p> <p>Question 6: What is the name of the Amazon Machine Image (AMI)?</p> <p><input type="radio"/> Amazon Linux <input type="radio"/> WebServerAMI <input checked="" type="radio"/> Cafe WebServer Image <input type="radio"/> My Amazing Image</p> <p>Submit</p>

Task 2: Creating a NAT gateway for the second Availability Zone

1	In the left panel, choose NAT gateway	
2	Choose Public Subnet 2 and allocate an Elastic IP	

3	<p>In Private Route Table 2, choose Edit routes</p>	
4	<p>Add new routes with the following configuration:</p> <ul style="list-style-type: none"> - Destination: 0.0.0.0/0 - Target: Choose earlier created NAT gateway 	

1	<p>From the Amazon EC2 console, create an EC2 instance in one of the public subnets of the Lab VPC. It must meet the following criteria:</p> <ul style="list-style-type: none"> - Name: Bastion Host - Amazon Machine Image (AMI): Amazon Linux 2023 AMI - Instance type: t2.micro - Uses the vockey key pair - Auto-assign Public IP: This setting should be enabled - Only allows the following traffic: <ul style="list-style-type: none"> + Type: SSH + Port: 22 + Source: Your IP address 	
---	--	---

Task 4: Creating a launch template

- 1 Create a launch template by using the AMI that was created during lab setup. It must meet the following criteria.
- AMI: Cafe WebServer Image
 - Instance type: t2.micro
 - Key pair (login): Uses a new key pair
 - Security groups: CafeSG
 - Resource tags:
 - + Key: Name
 - + Value: webserver
 - + Resource types: Instances - IAM Instance Profile: CafeRole

The four screenshots illustrate the step-by-step process of creating a launch template in the AWS CloudFormation console:

- Screenshot 1: AMI Selection**
Shows the "My AMIs" tab selected in the CloudFormation console. A search bar at the top is empty. Below it, there are two radio buttons: "Owned by me" (selected) and "Shared with me". A "Search" button is on the right. A "Browse more AMIs" link is visible on the right side of the search bar.
- Screenshot 2: Instance Type Selection**
Shows the "Instance type" section. It lists the "t2.micro" instance type with its details: Family: t2, 1 vCPU, 1 GB Memory, Current generation: true, On-Demand price: \$0.0116 USD per hour, On-Demand SUSE pricing: \$0.0116 USD per hour, On-Demand RHEL pricing: \$0.0116 USD per hour, and On-Demand Linux pricing: \$0.0116 USD per hour. A "Compare instance types" link is present.
- Screenshot 3: Key Pair Selection**
Shows the "Key pair (login)" section. It displays a dropdown menu with "Lab9" selected. A "Create new key pair" button is available. A note below says: "You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance."
- Screenshot 4: Security Groups Selection**
Shows the "Security groups" section. It lists two security groups: "c84296a17954871446688941w267780835911-CafeSG-W23LWSRTJS" and "sg-0ff7d2115a07183b". A "Compare security group rules" link is shown.
- Screenshot 5: Resource Tags Selection**
Shows the "Resource tags" section. It has three tabs: "Key info", "Value info", and "Resource types info". Under "Key info", there is a search bar for "Name" with "webserver" entered. Under "Value info", there is a search bar for "Value" with "webserver" entered. Under "Resource types info", there is a dropdown menu with "Select resource type..." and a "Remove" button. A "Instances" link is also present.
- Screenshot 6: IAM Instance Profile Selection**
Shows the "IAM instance profile" section. It lists the "CafeRole" IAM instance profile with the ARN "arn:aws:iam::267780835911:instance-profile/CafeRole". A "Create new IAM profile" button is available.

Task 5: Creating an Auto Scaling group

- 1 Create a new Auto Scaling Group that meets the following criteria:
- Launch template: Uses the launch template that you created in the previous task
 - VPC: Uses the VPC that was configured for this lab
 - Subnets: Uses Private Subnet 1 and Private Subnet 2
 - Skips all the advanced options
 - Has a Group size configured as:
 - + Desired capacity: 2
 - + Minimum capacity: 2
 - + Maximum capacity: 6
 - Enables the Target tracking scaling policy configured as:
 - + Metric type: Average CPU utilization
 - + Target Value: 25
 - + Instances need: 60

The image contains four screenshots of the AWS Auto Scaling 'Create New Auto Scaling Group' wizard, showing the configuration process from Step 5 to Step 8.

- Step 5 - optional:** Launch template. A note states: "For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch configurations. Creating Auto Scaling groups with launch templates is not recommended but still available via the CLI and API until December 31, 2023." A dropdown menu shows "LaunchTemplate" selected.
- Step 6 - optional:** Configure group size and scaling policies. A dropdown menu shows "vpc-066ed521bc67d7398 (Lab VPC)" selected. Below it, "Availability Zones and subnets" are listed: "us-east-1a | subnet-00bab550abff9708 (Private)" and "us-east-1b | subnet-0c262z2d828d9b58e (Private)".
- Step 7:** Review. The "Group size - optional" section shows:
 - Desired capacity: 2
 - Minimum capacity: 2
 - Maximum capacity: 6
- Step 8:** Group size - optional. This screen is identical to the Step 7 review screen, showing the same group size settings.

Task 6: Creating a load balancer

- 1 Create an HTTP Application Load Balancer that meets the following criteria:
- VPC: Uses the VPC configured for this lab
 - Subnets: Uses the two public subnets
 - Skips the HTTPS security configuration settings
 - Security group: Creates a new security group that allows HTTP traffic from anywhere
 - Target group: Creates a new target group
 - Skips registering targets

The image consists of three vertically stacked screenshots from the AWS CloudFormation console.

Screenshot 1: VPC Configuration

This screenshot shows the "VPC" section of the CloudFormation console. It lists a single VPC named "Lab VPC" with the ARN "arn:aws:vpc:us-east-1:0215c67d7398". Below this, there are two subnets: "subnet-0388d6e7e4962a5b8" (Public Subnet 1) and "subnet-00d0af5e815c558c" (Public Subnet 2). Both subnets have their IP addresses assigned by AWS.

Screenshot 2: Inbound Rules Configuration

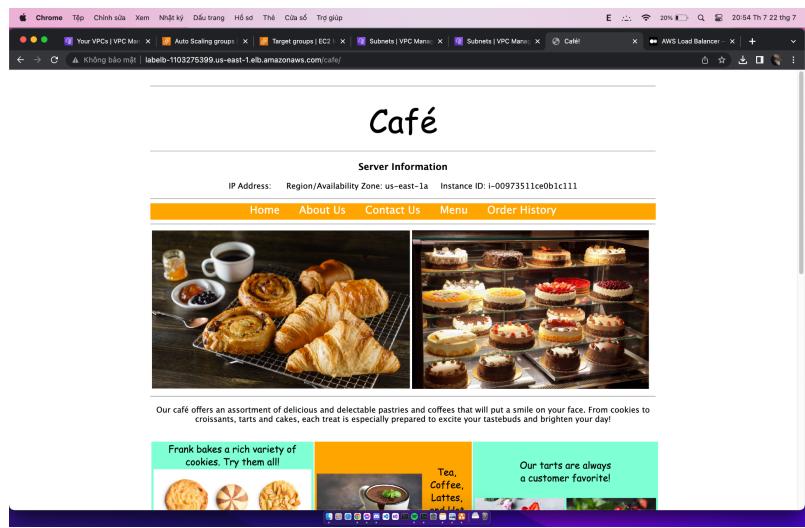
This screenshot shows the "Inbound rules" section. It displays a single rule for port 80, which is mapped to the "HTTP" protocol. The source is set to "Anywhere". The rule has a description "0000/0" and a status of "0000/0 X".

Screenshot 3: Listener and Routing Configuration

This screenshot shows the "Listeners and routing" section. It lists a single listener named "Listener HTTP-80" configured for port 80 (Protocol: HTTP). The default action is "Forward to TargetGroupLab", which is a target type instance (IP+4). There is a link to "Create target group".

Task 7: Testing the web application

- 1 To test the café web application, visit the Domain Name System (DNS) name of your load balancer and append /cafe to the URL.
- The café application should load.



Task 8: Testing automatic scaling under load

- 1 Stress testing target tracking policy group

```
Tải về - ec2-user@ip-10-0-1-185:~ ssh ec2-user@ec2-34-237-218-214.compute-1.amazonaws.com - 144x40
stress -c 1 --timeout 600
Last metadata expiration check: 0:01:10 ago on Sat Jul 22 14:12:08 2023.
apt-get release -latest -> /var/cache/apt/archives
Error:
  Problem: conflicting requests
    need to hold packages >= 7 needed by apt-get release -> /var/cache/apt/archives
    (try to add '--skip-broken' to skip uninstallable packages)
Last metadata expiration check: 0:01:10 ago on Sat Jul 22 14:12:08 2023.
Dependencies resolved.
=====
Preparing Packages
Architecture: x86_64
Version: 1.0.4-28.amzn2023.0.2.x86_64
Repository: amazonlinux
Size: 37 kB
Installing:
  stress x86_64 1.0.4-28.amzn2023.0.2.x86_64.rpm
=====
Transaction Summary
=====
Install 1 Package
=====
Total download size: 37 k
Installed size: 78 k
Downloading Packages:
stress-1.0.4-28.amzn2023.0.2.x86_64.rpm
=====
Total
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing:
    installing : stress-1.0.4-28.amzn2023.0.2.x86_64
  Running scriptlet: stress-1.0.4-28.amzn2023.0.2.x86_64
  Verifying :
    stress-1.0.4-28.amzn2023.0.2.x86_64
  Installed:
    stress-1.0.4-28.amzn2023.0.2.x86_64
  Complete!
stress: info: [2354] dispatching hogs: 1 cpu, 0 io, 0 vm, 0 hdd
```

- 2 All tasks completed with maximum points.

