



ACF Lab 6: Scale and Load Balance your Architecture

COS 20019- Cloud Computing Architecture

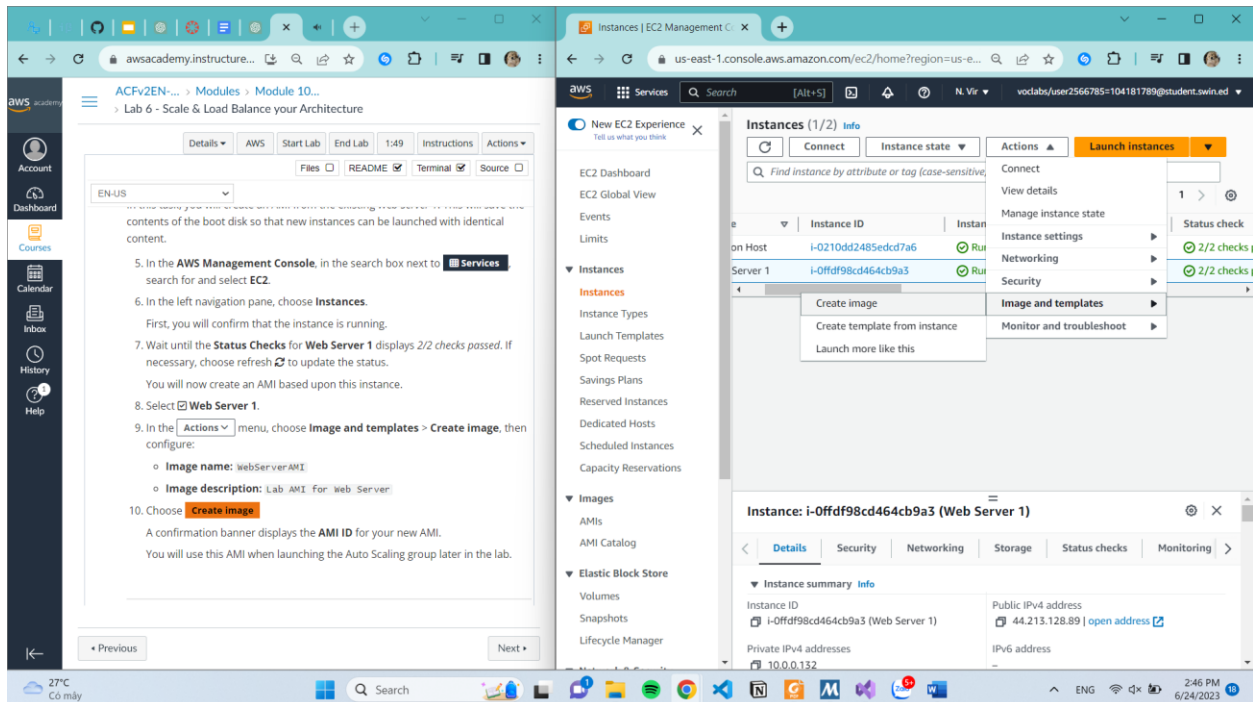
Nguyen Manh Dung

24/6/2023

This is all my step to finish ACF Lab 6, with requirements beside the screenshotted.

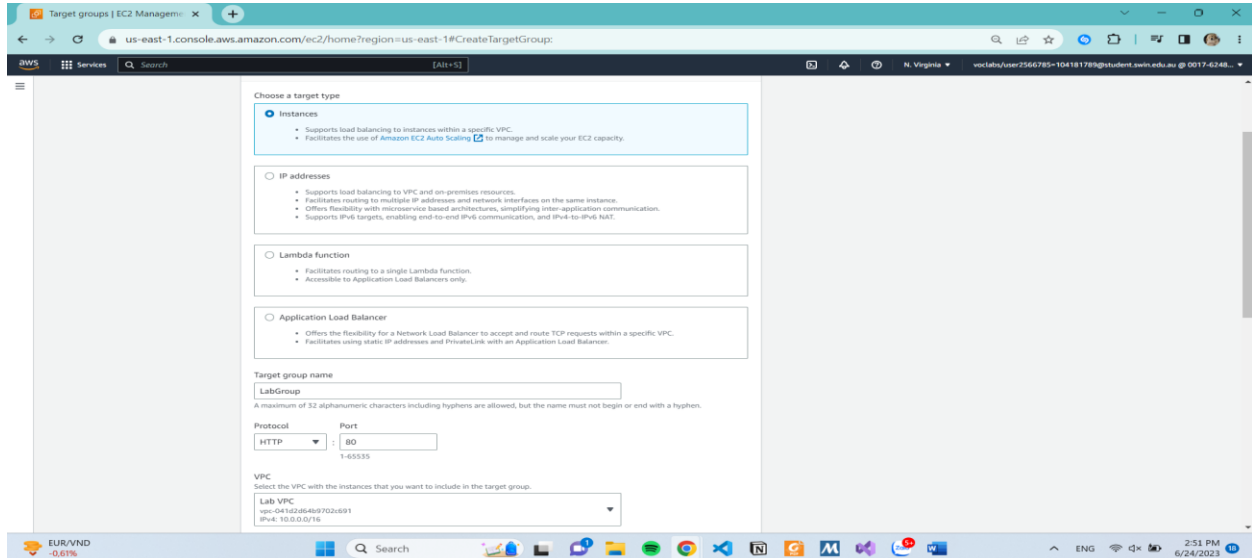
Task 1: Create an AMI for Auto Scaling

- Select **Web Server 1**.
- In the Actions menu, choose **Image and templates > Create image**, then configure:
 - **Image name:** WebServerAMI
 - **Image description:** Lab AMI for Web Server
- Choose **Create image**



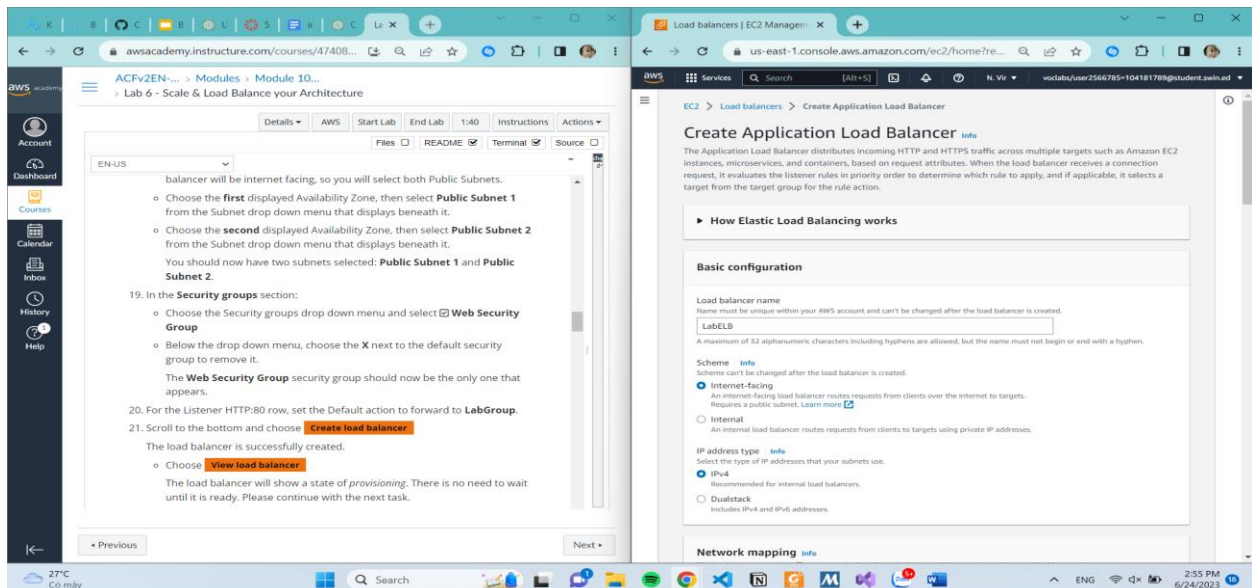
Task 2 : Create a Load Balancer

- Choose **Create target group**
- Choose a target type: **Instances**
- **Target group name**, enter: LabGroup



Create load balancer

- **Load balancer name**, enter: LabELB
- For **VPC**, choose **Lab VPC**
- Choose the **first** displayed Availability Zone, then select **Public Subnet 1**
- Choose the **second** displayed Availability Zone, then select **Public Subnet 2**



The screenshot shows two browser windows. The left window displays the AWS Academy lab 'Lab 6 - Scale & Load Balance your Architecture'. The instructions are as follows:

- balancer will be internet facing, so you will select both Public Subnets.
- Choose the **first** displayed Availability Zone, then select **Public Subnet 1** from the Subnet drop down menu that displays beneath it.
- Choose the **second** displayed Availability Zone, then select **Public Subnet 2** from the Subnet drop down menu that displays beneath it.
- You should now have two subnets selected: **Public Subnet 1** and **Public Subnet 2**.
- 19. In the **Security groups** section:
 - Choose the Security groups drop down menu and select ☒ **Web Security Group**
 - Below the drop down menu, choose the **X** next to the default security group to remove it.
 - The **Web Security Group** security group should now be the only one that appears.
- 20. For the Listener HTTP:80 row, set the Default action to forward to **LabGroup**.
- 21. Scroll to the bottom and choose **Create load balancer**.

The load balancer is successfully created.

- Choose **View load balancer**.

The load balancer will show a state of *provisioning*. There is no need to wait until it is ready. Please continue with the next task.

The right window shows the AWS console 'Load balancers | EC2 Manager'. The 'Network mapping' section is visible, showing the VPC 'vpc-04162364b9702d691' and two mappings:

- us-east-1a (use1-az1)**: Subnet 'subnet-09a81429ad7a62ffd' (Public Subnet 1), IPv4 address assigned by AWS.
- us-east-1b (use1-az2)**: Subnet 'subnet-08607917486033ef9' (Private Subnet 2).

A warning message states: 'The selected subnet does not have a route to an internet gateway. This means that your load balancer will not receive internet traffic. You can proceed with this selection; however, for internet traffic to reach your load balancer, you must update the subnet's route table in the VPC console.'

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- Choose the **first** displayed Availability Zone, then select **Public Subnet 1** from the Subnet drop down menu that displays beneath it.
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- 20. For the Listener HTTP:80 row, set the Default action to forward to **LabGroup**.
- 21. Scroll to the bottom and choose **Create load balancer**.

The load balancer is successfully created.

- Choose **View load balancer**.

The load balancer will show a state of *provisioning*. There is no need to wait until it is ready. Please continue with the next task.

The right window shows the AWS console 'Load balancers | EC2 Manager'. The 'Security groups' section is visible, showing the selected security group 'Web Security Group sg-0ff8de519cee784d' for VPC 'vpc-04162364b9702d691'.

The 'Listeners and routing' section shows a listener for 'HTTP:80' with the following configuration:

- Protocol: HTTP
- Port: 80
- Default action: **Forward to LabGroup** (Target type: Instance, IPv4)

There is an option to 'Create target group'.

Below the listener configuration, there is a section for 'Listener tags - optional' with buttons for 'Add listener tag' and 'Add listener'.

Task 3: Create a Launch Template and an Auto Scaling Group

Launch template name: LabConfig

Under **Auto Scaling guidance**, select *Provide guidance to help me set up a template that I can use with EC2 Auto Scaling*

Amazon Machine Image (AMI): choose Web Server AMI

Instance type: choose t2.micro

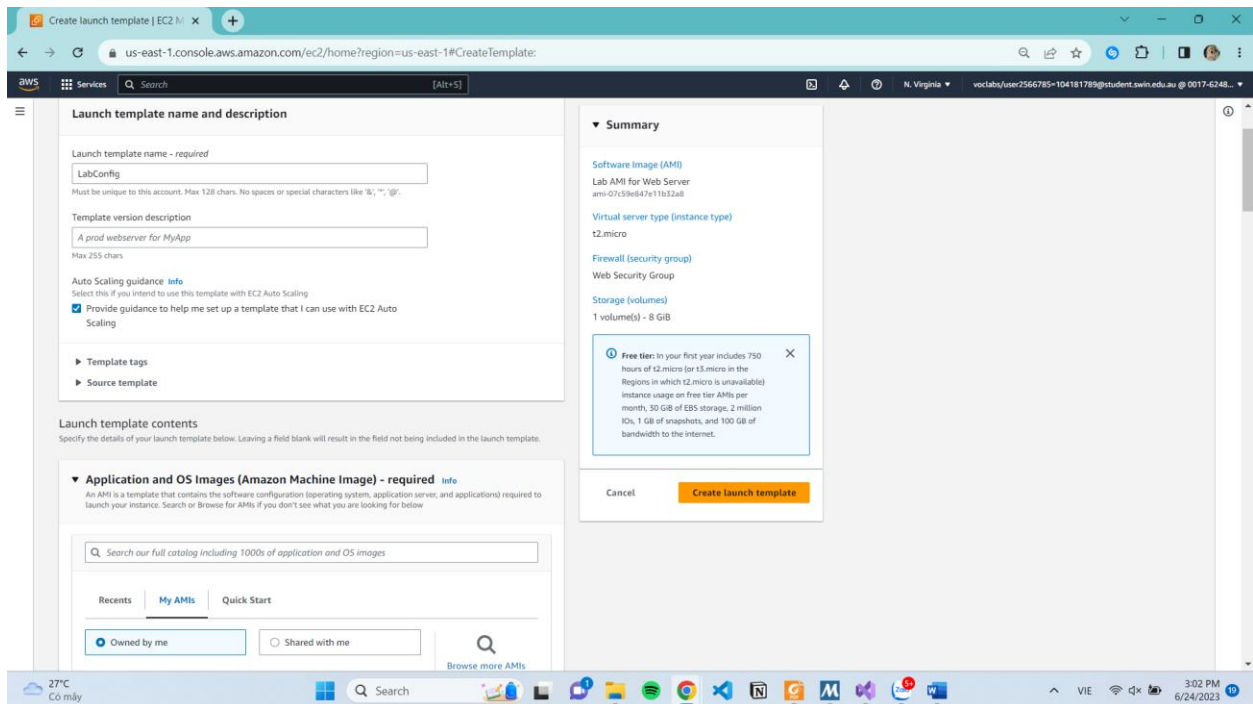
Key pair name: choose vockey

Firewall (security groups): choose Select existing security group

Security groups: choose Web Security Group

Scroll down to the **Advanced details** area and expand it.

Scroll down to the **Detailed CloudWatch monitoring** setting. Select **Enable**



Create launch template | EC2 |

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Services Search [Alt+S]

Amazon Machine Image (AMI)

WebServerAMI
ami-07c59e847e11b32a8
2023-06-24T07:48:09.000Z
Virtualization: hvm Eki enabled: true Root device type: ebs
boot mode: self-granted

Description
Lab AMI for Web Server

Architecture x86_64 AMI ID ami-07c59e847e11b32a8

▼ Instance type info Advanced

Instance type
t2.micro
Family: t2 1 vCPU 1 GiB Memory Current generation: true Free tier eligible
On-Demand Windows pricing: 0.0162 USD per Hour
On-Demand Linux pricing: 0.0116 USD per Hour
On-Demand Linux pricing: 0.0116 USD per Hour

▼ Key pair (login) info

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.

Key pair name
vockey

▼ Network settings info

Subnet info
Don't include in launch template
When you specify a subnet, a network interface is automatically added to your template.

Firewall (security groups) info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Select existing security group ☒ Create security group ☐

Security groups info
Select security groups
Web Security Group sg-0ff8de519cee784d
VPC: vpc-041a2d8409702c991

▼ Summary

Software Image (AMI)
Lab AMI for Web Server
ami-07c59e847e11b32a8

Virtual server type (instance type)
t2.micro

Firewall (security group)
Web Security Group

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.

Cancel Create launch template

Create launch template | EC2 |

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Services Search [Alt+S]

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.

Key pair name
vockey

▼ Network settings info

Subnet info
Don't include in launch template
When you specify a subnet, a network interface is automatically added to your template.

Firewall (security groups) info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Select existing security group ☒ Create security group ☐

Security groups info
Select security groups
Web Security Group sg-0ff8de519cee784d
VPC: vpc-041a2d8409702c991

▼ Storage (volumes) info

EBS Volumes
Hide details

Volume 1 (AMI Root) (8 GiB, EBS, General purpose SSD (gp3))
AMI Volumes are not included in the template unless modified

▼ Summary

Software Image (AMI)
Lab AMI for Web Server
ami-07c59e847e11b32a8

Virtual server type (instance type)
t2.micro

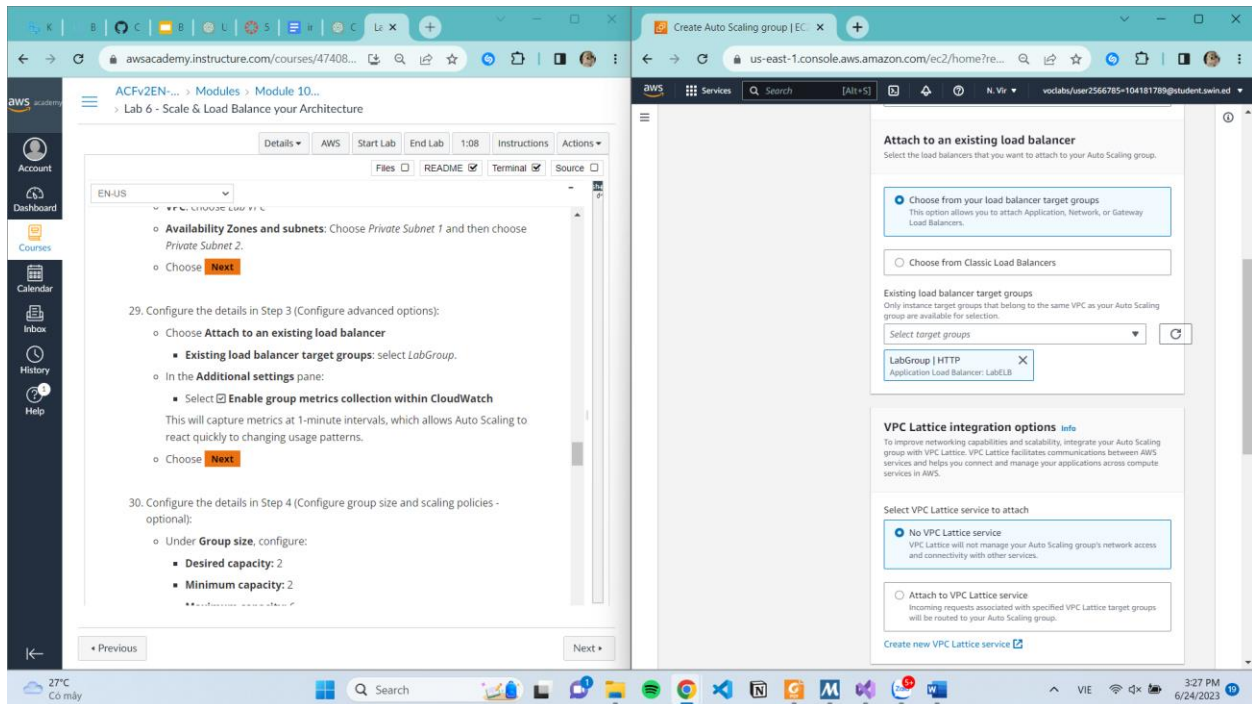
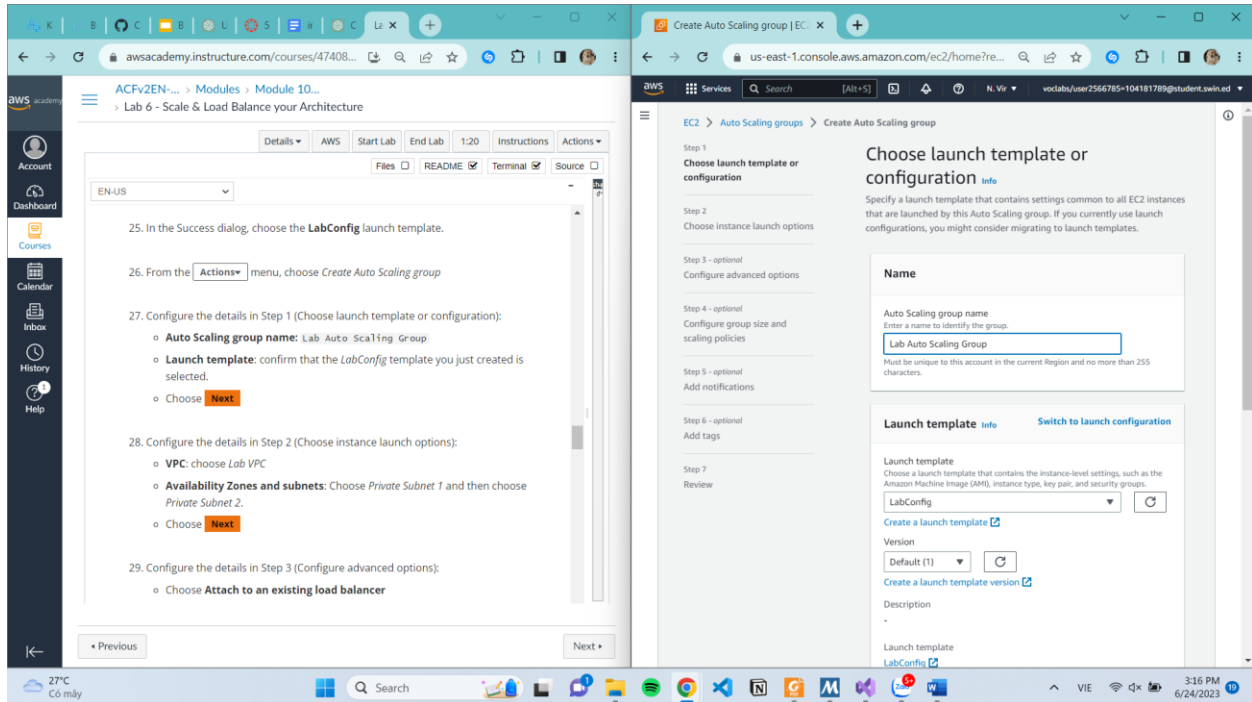
Firewall (security group)
Web Security Group

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.

Cancel Create launch template

Create Auto Scaling group



The image displays four screenshots from a web browser, showing the AWS Academy lab interface and the AWS Management Console.

The top-left screenshot shows the AWS Academy lab interface for "Lab 6 - Scale & Load Balance your Architecture". It includes a sidebar with navigation options like Account, Dashboard, Courses, Calendar, Inbox, History, and Help. The main content area shows instructions for configuring the details in Step 4 (Configure group size and scaling policies - optional). The instructions specify:

- Under **Group size**, configure:
 - Desired capacity:** 2
 - Minimum capacity:** 2
 - Maximum capacity:** 6
- Under **Scaling policies**, choose **Target tracking scaling policy** and configure:
 - Scaling policy name:** LabScalingPolicy
 - Metric type:** Average CPU Utilization
 - Target value:** 60

The top-right screenshot shows the "Create Auto Scaling group" wizard in the AWS Management Console. It displays the "scaling policies" step, where the "Desired capacity" is set to 2, "Minimum capacity" is 2, and "Maximum capacity" is 6. The "Scaling policies - optional" section shows the "Target tracking scaling policy" selected, with the "Scaling policy name" set to "LabScalingPolicy" and the "Metric type" set to "Average CPU Utilization".

The bottom-left screenshot shows the AWS Academy lab interface for "Task 4: Verify that Load Balancing is Working". It includes instructions for configuring the details in Step 6 (Add tags - optional). The instructions specify:

- Tags applied to the Auto Scaling group will be automatically propagated to the instances that are launched.
- Choose **Add tag** and Configure the following:
 - Key:** Name
 - Value:** Lab Instance

The bottom-right screenshot shows the "Add tags - optional" step in the AWS Management Console. It displays a list of tags with the following details:

- Key:** Name
- Value - optional:** Lab Instance
- Tag new instances:** ☒

The "Add tag" button is visible, and the "49 remaining" tag limit is shown at the bottom.

Task 4: Verify that Load Balancing is Working

The screenshot shows two browser windows. The left window displays the AWS Academy course 'Lab 6 - Scale & Load Balance your Architecture' with instructions for creating target groups. The right window shows the AWS Management Console 'Target groups' page for 'us-east-1'. It lists a target group named 'LabGroup' with two registered targets: 'Lab Instance' (ID: i-0d9a416def50353d) and 'Lab Instance' (ID: i-085967...). The console also shows the 'Details' tab for the 'LabGroup' target group.

The screenshot shows two browser windows. The left window displays the AWS Academy course 'Lab 6 - Scale & Load Balance your Architecture' with instructions for testing auto scaling. The right window shows the AWS Management Console 'Load balancers' page for 'us-east-1'. It displays the details for a load balancer named 'LabGroup' (ID: i-0d9a416def50353d) in the 'us-east-1a' availability zone. The console also shows the 'Current CPU Load: 0%'.

Task 5: Test Auto Scaling

The screenshot shows two browser windows. The left window displays the AWS Academy course 'ACFV2EN-...' under 'Module 10...' and 'Lab 6 - Scale & Load Balance your Architecture'. The instructions for step 54 are visible, detailing the setup of CloudWatch alarms for the 'Lab Auto Scaling Group'. The right window shows the AWS CloudWatch console for the 'us-east-1' region. It displays two alarms: 'TargetTracking-Lab Auto Scaling Group-AlarmHigh' and 'TargetTracking-Lab Auto Scaling Group-AlarmLow'. Both alarms are in the 'OK' state. The 'AlarmHigh' alarm has a threshold of 60% CPU utilization, and the 'AlarmLow' alarm has a threshold of 30% CPU utilization. The console also shows the 'Create alarm' button and various filters for the alarms.

The screenshot shows two browser windows. The left window displays the AWS Academy course 'ACFV2EN-...' under 'Module 10...' and 'Lab 6 - Scale & Load Balance your Architecture'. The instructions for steps 56 through 61 are visible, detailing the process of testing the auto scaling group by generating high loads and monitoring the CloudWatch console. The right window shows the AWS CloudWatch console for the 'us-east-1' region. It displays two alarms: 'TargetTracking-Lab Auto Scaling Group-AlarmLow-3f2f1ccf-fe82-4354-bb6d-593e61e1af56' and 'TargetTracking-Lab Auto Scaling Group-AlarmHigh-e5cab3de-5a2e-47fa-8d64-534eedb40eb'. Both alarms are in the 'OK' state. The 'AlarmLow' alarm has a threshold of 30% CPU utilization, and the 'AlarmHigh' alarm has a threshold of 60% CPU utilization. The console also shows the 'Create alarm' button and various filters for the alarms.

Task 6: Terminate WebServer 1

The screenshot displays two browser windows. The left window is the AWS Academy course page for 'Lab 6 - Scale & Load Balance your Architecture', specifically 'Task 6: Terminate Web Server 1'. The task instructions state: 'In this task, you will terminate Web Server 1. This instance was used to create the AMI used by your Auto Scaling group, but it is no longer needed. 62. Select **Web Server 1** (and ensure it is the only instance selected). 63. In the **Instance state** menu, choose **Instance State > Terminate Instance**. 64. Choose **Terminate**.' The page also shows a 'Lab Complete' message: 'Congratulations! You have completed the lab.'

The right window is the AWS Management Console 'Instances' page. A green banner at the top reads 'Successfully terminated i-0ffdf98cd464cb9a3'. Below this, the 'Instances (1/6)' table shows the following data:

Name	Instance ID	Instance state	Instance type
Bastion Host	i-0210dd2485edcd7a6	Running	t2.micro
Web Server 1	i-0ffdf98cd464cb9a3	Terminated	t2.micro
Lab Instance	i-028a534b800a0dc8f	Running	t2.micro
Lab Instance	i-0d9a416ade5f0353d	Running	t2.micro
Lab Instance	i-085967428d5f0480f	Running	t2.micro
Lab Instance	i-0dc33ae9fd109c28c	Running	t2.micro

Below the table, the details for 'Instance: i-0ffdf98cd464cb9a3 (Web Server 1)' are shown. The 'Instance summary info' section includes:

- Instance ID: i-0ffdf98cd464cb9a3 (Web Server 1)
- Public IPv4 address: 44.213.128.89 | [open address](#)
- Private IPv4 addresses: [empty]
- IPv6 address: [empty]