

COS20019 – Cloud Computing Architecture - Wk7: ACF Lab 6: Scaling and Load Balance your architecture

The screenshot displays the AWS Management Console interface. On the left, the navigation pane shows various AWS services, with 'Instances' highlighted. The main content area shows a list of EC2 instances. The 'Web Server 1' instance is selected, and the 'Actions' menu is open, showing options like 'Connect', 'View details', 'Manage instance state', 'Instance settings', 'Networking', 'Security', 'Image and templates', and 'Monitor and troubleshoot'. A red arrow points to the 'Web Server 1' instance in the table, and another red arrow points to the 'Create image' option in the 'Actions' menu.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
Bastion Host	i-07d1b56360cf8fd34	Running	t2.micro	Initializing	No alarms	us-east-1a	-
Web Server 1	i-00df2154936e30fb4	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-

Instance: i-00df2154936e30fb4 (Web Server 1)

**Details** | Security | Networking | Storage | Status checks | Monitoring | Tags

**Instance summary** Info

Instance ID i-00df2154936e30fb4 (Web Server 1)	Public IPv4 address 54.197.218.30   <a href="#">open address</a>	Private IPv4 addresses 10.0.0.156
IPv6 address -	Instance state Running	Public IPv4 DNS -
Hostname type IP name: ip-10-0-0-156.ec2.internal	Private IP DNS name (IPv4 only) ip-10-0-0-156.ec2.internal	Elastic IP addresses -
Answer private resource DNS name -	Instance type t2.micro	AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations.   <a href="#">Learn more</a>
Auto-assigned IP address 54.197.218.30 [Public IP]	VPC ID vpc-029ee3b7ba3344847 (Lab VPC)   <a href="#">VPC</a>	Auto Scaling Group name -
IAM Role -	Subnet ID subnet-0751637651f846061 (Public Subnet 1)   <a href="#">Subnet</a>	
IMDSv2 -		

Activate Windows  
Go to Settings to activate Windows.

Steps 5-8: After waiting for Web Server 1 to pass both status checks, create an AMI from it.

aws

Services

Search

[Alt+S]

N. Virginia

voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Instances > i-00df2154936e30fb4 > Create image

## Create image

Info

An image (also referred to as an AMI) defines the programs and settings that are applied when you launch an EC2 instance. You can create an image from the configuration of an existing instance.

Instance ID

i-00df2154936e30fb4 (Web Server 1)

Image name

WebServerAMI

Maximum 127 characters. Can't be modified after creation.

Image description - optional

Lab AMI for Web Server

Maximum 255 characters

No reboot

☐ Enable

Instance volumes

Storage type	Device	Snapshot	Size	Volume type	IOPS	Throughput	Delete on termination	Encrypted
EBS	/dev/...	Create new snapshot fr...	8	EBS General Purpose S...	3000		<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Enable

Add volume

During the image creation process, Amazon EC2 creates a snapshot of each of the above volumes.

Tags - optional

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

☒ Tag image and snapshots together

Tag the image and the snapshots with the same tag.

☐ Tag image and snapshots separately

Tag the image and the snapshots with different tags.

Activate Windows  
Go to Settings to activate Windows.

Step 9: Configure a name and description for the AMI.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

New EC2 Experience Tell us what you think

EC2 Dashboard  
EC2 Global View  
Events  
Limits

▼ Instances  
Instances  
Instance Types  
Launch Templates  
Spot Requests  
Savings Plans  
Reserved Instances  
Dedicated Hosts  
Scheduled Instances  
Capacity Reservations

▼ Images  
AMIs  
AMI Catalog

▼ Elastic Block Store  
Volumes  
Snapshots  
Lifecycle Manager

▼ Network & Security  
Security Groups  
Elastic IPs  
Placement Groups  
Key Pairs

Currently creating AMI ami-0360d1f11ff9a5be3 from instance i-00df2154936e30fb4. Check that the AMI status is 'Available' before deleting the instance or carrying out other actions related to this AMI.

Instances (2) Info

Find instance by name, ID, or tag (case-sensitive)

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
<input type="checkbox"/>	Bastion Host	i-07d1b56360cf8fd34	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	50.17.1.108	-
<input type="checkbox"/>	Web Server 1	i-00df2154936e30fb4	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	54.197.218.30	-

Select an instance

Activate Windows  
Go to Settings to activate Windows.

Step 10: The AMI is being created.

## Task 2 - Create a Load Balancer

The screenshot shows the AWS Management Console interface for creating a target group. The breadcrumb navigation at the top reads 'EC2 > Target groups > Create target group'. On the left, a sidebar shows 'Step 1 Specify group details' and 'Step 2 Register targets'. The main content area is titled 'Specify group details' with a subtitle 'Your load balancer routes requests to the targets in a target group and performs health checks on the targets.' Below this is a 'Basic configuration' section with a note: 'Settings in this section can't be changed after the target group is created.' Under 'Choose a target type', four options are listed: 'Instances' (selected with a radio button and highlighted by a red arrow), 'IP addresses', 'Lambda function', and 'Application Load Balancer'. Each option has a list of features. At the bottom, there is a 'Target group name' text input field and a note: 'A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.' The footer of the console shows 'Activate Windows' and 'Go to Settings to activate Windows.'

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Target groups > Create target group

Step 1  
Specify group details

Step 2  
Register targets

### Specify group details

Your load balancer routes requests to the targets in a target group and performs health checks on the targets.

#### Basic configuration

Settings in this section can't be changed after the target group is created.

Choose a target type

- ☒ **Instances**
  - Supports load balancing to instances within a specific VPC.
  - Facilitates the use of [Amazon EC2 Auto Scaling](#) to manage and scale your EC2 capacity.
- ☐ **IP addresses**
  - Supports load balancing to VPC and on-premises resources.
  - Facilitates routing to multiple IP addresses and network interfaces on the same instance.
  - Offers flexibility with microservice based architectures, simplifying inter-application communication.
  - Supports IPv6 targets, enabling end-to-end IPv6 communication, and IPv4-to-IPv6 NAT.
- ☐ **Lambda function**
  - Facilitates routing to a single Lambda function.
  - Accessible to Application Load Balancers only.
- ☐ **Application Load Balancer**
  - Offers the flexibility for a Network Load Balancer to accept and route TCP requests within a specific VPC.
  - Facilitates using static IP addresses and PrivateLink with an Application Load Balancer.

Target group name

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Port

Activate Windows  
Go to Settings to activate Windows.

Step 11: Create a target group – Choose target type of Instances.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

- Offers the flexibility for a Network Load Balancer to accept and route TCP requests within a specific VPC.
- Facilitates using static IP addresses and PrivateLink with an Application Load Balancer.

**Target group name**

LabGroup

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

**Protocol** HTTP **Port** 80

1-65535

**VPC**

Select the VPC with the instances that you want to include in the target group.

Lab VPC  
vpc-029ee3b7ba3344847  
IPv4: 10.0.0.0/16

**Protocol version**

☒ HTTP1  
Send requests to targets using HTTP/1.1. Supported when the request protocol is HTTP/1.1 or HTTP/2.

☐ HTTP2  
Send requests to targets using HTTP/2. Supported when the request protocol is HTTP/2 or gRPC, but gRPC-specific features are not available.

☐ gRPC  
Send requests to targets using gRPC. Supported when the request protocol is gRPC.

**Health checks**

The associated load balancer periodically sends requests, per the settings below, to the registered targets to test their status.

**Health check protocol**

HTTP

**Health check path**

Use the default path of "/" to ping the root, or specify a custom path if preferred.

/

1 to 1024 characters allowed

Activate Windows  
Go to Settings to activate Windows.

Step 11: Create a target group – Enter the group name of LabGroup and select the Lab VPC.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

New EC2 Experience Tell us what you think

EC2 Dashboard  
EC2 Global View  
Events  
Limits

▼ Instances  
Instances  
Instance Types  
Launch Templates  
Spot Requests  
Savings Plans  
Reserved Instances  
Dedicated Hosts  
Scheduled Instances  
Capacity Reservations

▼ Images  
AMIs  
AMI Catalog

▼ Elastic Block Store  
Volumes  
Snapshots  
Lifecycle Manager

▼ Network & Security  
Security Groups  
Elastic IPs  
Placement Groups  
Key Pairs

Successfully created target group: LabGroup

EC2 > Target groups

Target groups (1) Info

Find resources by attribute or tag

< 1 > ⚙

<input type="checkbox"/>	Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
<input type="checkbox"/>	LabGroup	arn:aws:elasticloadbalanci...	80	HTTP	Instance	None associated	vpc-029ee3b7ba3344847

0 target groups selected

Select a target group above.

Activate Windows  
Go to Settings to activate Windows.

Steps 12-13: The target group has been created.

aws

Services

Search

[Alt+S]

N. Virginia

voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

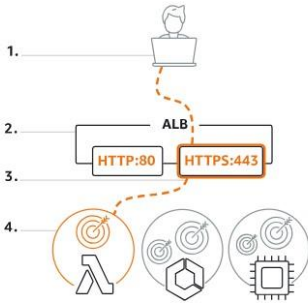
EC2 > Load balancers > Create Application Load Balancer

## Create Application Load Balancer [Info](#)

The Application Load Balancer distributes incoming HTTP and HTTPS traffic across multiple targets such as Amazon EC2 instances, microservices, and containers, based on request attributes. When the load balancer receives a connection request, it evaluates the listener rules in priority order to determine which rule to apply, and if applicable, it selects a target from the target group for the rule action.

### ▼ How Elastic Load Balancing works

1. Clients make requests to your application.
2. The listeners in your load balancer receive requests matching the protocol and port that you configure.
3. The receiving listener evaluates the incoming request against the rules you specify, and if applicable, routes the request to the appropriate target group. You can use an HTTPS listener to offload the work of TLS encryption and decryption to your load balancer.
4. Healthy targets in one or more target groups receive traffic based on the load balancing algorithm, and the routing rules you specify in the listener.



### Basic configuration

Load balancer name

Name must be unique within your AWS account and can't be changed after the load balancer is created.

LabELB

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Scheme

[Info](#)

Scheme can't be changed after the load balancer is created.

Activate Windows  
Go to Settings to activate Windows.

Steps 14-17: Create an Application Load Balancer – Enter the name LabELB.

aws Services Search [Alt+S]

Includes IPv4 and IPv6 addresses.

### Network mapping [Info](#)

The load balancer routes traffic to targets in the selected subnets, and in accordance with your IP address settings.

**VPC** [Info](#)

Select the virtual private cloud (VPC) for your targets or you can [create a new VPC](#). Only VPCs with an internet gateway are enabled for selection. The selected VPC can't be changed after the load balancer is created. To confirm the VPC for your targets, view your [target groups](#).

**Lab VPC**  
vpc-029ee3b7ba3344847  
IPv4: 10.0.0.0/16

**Mappings** [Info](#)

Select at least two Availability Zones and one subnet per zone. The load balancer routes traffic to targets in these Availability Zones only. Availability Zones that are not supported by the load balancer or the VPC are not available for selection.

☒ **us-east-1a (use1-az6)**

Subnet  
subnet-0751637651f846061 Public Subnet 1

IPv4 address  
Assigned by AWS

☒ **us-east-1b (use1-az1)**

Subnet  
subnet-071eb0e455e73692a Public Subnet 2

IPv4 address  
Assigned by AWS

Activate Windows  
Go to Settings to activate Windows.

Step 18: Create an Application Load Balancer – Under network mapping, choose the Lab VPC and the two public subnets.



aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

### Security groups [Info](#)

A security group is a set of firewall rules that control the traffic to your load balancer. Select an existing security group, or you can [create a new security group](#).

Security groups

Select up to 5 security groups

Web Security Group sg-0e3dff4391eef0eda X  
VPC: vpc-029ee3b7ba3344847

### Listeners and routing [Info](#)

A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

▼ Listener HTTP:80 Remove

Protocol Port Default action [Info](#)

HTTP : 80 Forward to LabGroup HTTP  
1-65535 Target type: Instance, IPv4

[Create target group](#)

Listener tags - optional

Consider adding tags to your listener. Tags enable you to categorize your AWS resources so you can more easily manage them.

Add listener tag

You can add up to 50 more tags.

Add listener

Activate Windows  
Go to Settings to activate Windows.

Steps 19-20: Create an Application Load Balancer – Assign only the Web Security Group and set the default action to forward to LabGroup.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

New EC2 Experience Tell us what you think

EC2 Dashboard  
EC2 Global View  
Events  
Limits

▼ Instances  
Instances  
Instance Types  
Launch Templates  
Spot Requests  
Savings Plans  
Reserved Instances  
Dedicated Hosts  
Scheduled Instances  
Capacity Reservations

▼ Images  
AMIs  
AMI Catalog

▼ Elastic Block Store  
Volumes  
Snapshots  
Lifecycle Manager

▼ Network & Security  
Security Groups  
Elastic IPs  
Placement Groups  
Kiosk Policy

EC2 > Load balancers

Load balancers (1)  
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Find resources by attribute or tag

LabELB X Clear filters

<input type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
<input type="checkbox"/>	LabELB	LabELB-930128242.us-eas...	Provisioning	vpc-029ee3b7ba3344847	2 Availability Zones	application	June 23, 2023, 22:43 (UTC+07:00)

0 load balancers selected

Select a load balancer above.

Activate Windows  
Go to Settings to activate Windows.

Step 21: The load balancer has been created.

## Task 3 - Create a Launch Template and an Auto Scaling Group

**Create launch template**

Creating a launch template allows you to create a saved instance configuration that can be reused, shared and launched at a later time. Templates can have multiple versions.

**Launch template name and description**

Launch template name - *required*

LabConfig

Must be unique to this account. Max 128 chars. No spaces or special characters like '&', '\*', '@'.

Template version description

A prod webserver for MyApp

Max 255 chars

**Auto Scaling guidance** [Info](#)

Select this if you intend to use this template with EC2 Auto Scaling

☒ Provide guidance to help me set up a template that I can use with EC2 Auto Scaling

▶ Template tags

▶ Source template

**Summary**

**Software Image (AMI)**

Lab AMI for Web Server  
ami-0360d1f11ff9a5be3

**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 IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel **Create launch template**

**Launch template contents**

Specify the details of your launch template below. Leaving a field blank will result in the field not being included in the launch template.

**▼ Application and OS Images (Amazon Machine Image) - required** [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Q Search our full catalog including 1000s of application and OS images

Steps 22-24: Create a launch template – Set the name to LabConfig and enable Provide Guidance.

aws Services Search [Alt+S]

### Application and OS Images (Amazon Machine Image) - required

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Recents My AMIs Quick Start

☒ Owned by me ☐ Shared with me

Browse more AMIs  
Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

**WebServerAMI**  
ami-0360d1f11ff9a5be3  
2023-06-23T15:23:29.000Z  
Virtualization: hvm ENA enabled: true Root device type: ebs  
boot mode: uefi-preferred

Description  
Lab AMI for Web Server

Architecture	AMI ID
x86_64	ami-0360d1f11ff9a5be3

### Instance type

Instance type

**t2.micro** Free tier eligible

Family: t2 1 vCPU 1 GiB Memory Current generation: true  
On-Demand Windows pricing: 0.0162 USD per Hour  
On-Demand SUSE pricing: 0.0116 USD per Hour  
On-Demand RHEL pricing: 0.0716 USD per Hour

☒ All generations [Compare instance types](#)

### Summary

Software Image (AMI)  
Lab AMI for Web Server  
ami-0360d1f11ff9a5be3

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 IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel **Create launch template**

Activate Windows  
Go to Settings to activate Windows.

Step 24: Create a launch template – Choose the Web Server AMI and instance type t2.micro.

**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 [Create new key pair](#)

**Network settings** Info

**Subnet** Info

Don't include in launch template [Create new subnet](#)

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-0e3dff4391eef0eda [X](#) [Compare security group rules](#)

VPC: vpc-029ee3b7ba3344847

► Advanced network configuration

**Storage (volumes)** Info

EBS Volumes [Hide details](#)

**Summary**

**Software Image (AMI)**

Lab AMI for Web Server  
ami-0360d1f11ff9a5be3

**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 IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

[Cancel](#) [Create launch template](#)

Activate Windows  
Go to Settings to activate Windows.

Step 24: Create a launch instance – Choose vockey and assign the Web Security group.

aws Services Search [Alt+S]

Instance auto-recovery Info  
Don't include in launch template

Shutdown behavior Info  
Don't include in launch template  
Not applicable for EC2 Auto Scaling

Stop - Hibernate behavior Info  
Don't include in launch template  
Not applicable for Amazon EC2 Auto Scaling.

Termination protection Info  
Don't include in launch template

Stop protection Info  
Don't include in launch template

Detailed CloudWatch monitoring Info  
Enable  
Additional charges apply

Elastic GPU Info  
Don't include in launch template

Elastic inference Info  
☐ Add Elastic Inference accelerators

Credit specification Info  
Don't include in launch template

Placement group Info  
Don't include in launch template  
[Create new placement group](#)

EBS-optimized instance Info

▼ Summary

Software Image (AMI)  
Lab AMI for Web Server  
ami-0360d1f11ff9a5be3

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 IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Create launch template

Activate Windows  
Go to Settings to activate Windows.

Step 24: Create a launch template – Enable detailed CloudWatch monitoring.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1  
Choose launch template

Step 2  
Choose instance launch options

Step 3 - optional  
Configure advanced options

Step 4 - optional  
Configure group size and scaling policies

Step 5 - optional  
Add notifications

Step 6 - optional  
Add tags

Step 7  
Review

## Choose launch template [Info](#)

Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group.

**Name**

Auto Scaling group name  
Enter a name to identify the group.

Lab Auto Scaling Group

Must be unique to this account in the current Region and no more than 255 characters.

**Launch template [Info](#)**

**Launch template**  
Choose a launch template that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.

LabConfig

[Create a launch template](#)

Version  
Default (1)

[Create a launch template version](#)

Description	Launch template <a href="#">LabConfig</a> lt-0a3cc26b3fb0e0f62	Instance type t2.micro
AMI ID	Security groups	Request Spot Instances

Activate Windows  
Go to Settings to activate Windows.

Steps 25-27: Create an Auto Scaling group - Step 1 – Enter a group name and select the LabConfig as the launch template.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1  
Choose launch template

Step 2  
**Choose instance launch options**

Step 3 - optional  
Configure advanced options

Step 4 - optional  
Configure group size and scaling policies

Step 5 - optional  
Add notifications

Step 6 - optional  
Add tags

Step 7  
Review

### Choose instance launch options [Info](#)

Choose the VPC network environment that your instances are launched into, and customize the instance types and purchase options.

#### Network [Info](#)

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

**VPC**  
Choose the VPC that defines the virtual network for your Auto Scaling group.

vpc-029ee3b7ba3344847 (Lab VPC) 10.0.0.0/16

[Create a VPC](#)

**Availability Zones and subnets**  
Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

Select Availability Zones and subnets

us-east-1a   subnet-005d4f3a83f26112d (Private Subnet 1) 10.0.1.0/24	X
us-east-1b   subnet-0bdb626b67724c6e3 (Private Subnet 2) 10.0.3.0/24	X

[Create a subnet](#)

#### Instance type requirements [Info](#)

You can keep the same instance attributes or instance type from your launch template, or you can choose to override the launch template by specifying different instance attributes or manually adding instance types.

[Override launch template](#)

Launch template	Version	Description
-----------------	---------	-------------

Activate Windows  
Go to Settings to activate Windows.

Step 28: Create an Auto Scaling group – Step 2 – Choose the Lab VPC and private subnets 1 and 2 to launch new instances in.



aws

Services

Search

[Alt+S]

N. Virginia

voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1  
Choose launch template

Step 2  
Choose instance launch options

Step 3 - optional  
Configure advanced options

Step 4 - optional  
Configure group size and scaling policies

Step 5 - optional  
Add notifications

Step 6 - optional  
Add tags

Step 7  
Review

## Configure advanced options - optional

Integrate your Auto Scaling group with other services to distribute network traffic across multiple servers using a load balancer or to establish service-to-service communications using VPC Lattice. You can also set options that give you more control over health check replacements and monitoring.

### Load balancing

Use the options below to attach your Auto Scaling group to an existing load balancer, or to a new load balancer that you define.

☐ No load balancer  
Traffic to your Auto Scaling group will not be fronted by a load balancer.

☒ Attach to an existing load balancer  
Choose from your existing load balancers.

☐ Attach to a new load balancer  
Quickly create a basic load balancer to attach to your Auto Scaling group.

#### Attach to an existing load balancer

Select the load balancers that you want to attach to your Auto Scaling group.

☒ Choose from your load balancer target groups  
This option allows you to attach Application, Network, or Gateway Load Balancers.

☐ Choose from Classic Load Balancers

Existing load balancer target groups

Only instance target groups that belong to the same VPC as your Auto Scaling group are available for selection.

Select target groups

LabGroup | HTTP  
Application Load Balancer: LabELB

### VPC Lattice integration options

To improve networking capabilities and scalability, integrate your Auto Scaling group with VPC Lattice. VPC Lattice facilitates communications between AWS services and helps you connect and manage your applications across compute services in AWS.

Activate Windows  
Go to Settings to activate Windows.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

Create new VPC Lattice service

### Health checks

Health checks increase availability by replacing unhealthy instances. When you use multiple health checks, all are evaluated, and if at least one fails, instance replacement occurs.

#### EC2 health checks

[Always enabled](#)

Additional health check types - optional [Info](#)

☐ Turn on Elastic Load Balancing health checks **Recommended**  
Elastic Load Balancing monitors whether instances are available to handle requests. When it reports an unhealthy instance, EC2 Auto Scaling can replace it on its next periodic check.

☒ Turn on VPC Lattice health checks  
VPC Lattice can monitor whether instances are available to handle requests. If it considers a target as failed a health check, EC2 Auto Scaling replaces it after its next periodic check.

Health check grace period [Info](#)  
This time period delays the first health check until your instances finish initializing. It doesn't prevent an instance from terminating when placed into a non-running state.

300 seconds

### Additional settings

Monitoring [Info](#)

☒ Enable group metrics collection within CloudWatch

Default instance warmup [Info](#)  
The amount of time that CloudWatch metrics for new instances do not contribute to the group's aggregated instance metrics, as their usage data is not reliable yet.

☐ Enable default instance warmup

Cancel Skip to review Previous **Next**

Activate Windows  
Go to Settings to activate Windows.

Step 29 – Create an Auto Scaling group – Step 3 – Attach the group to an existing load balancer, set the target group to LabGroup and enable group metrics collection within CloudWatch.

aws

Services

Search

[Alt+S]

N. Virginia

voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1

Choose launch template

Step 2

Choose instance launch options

Step 3 - optional

Configure advanced options

Step 4 - optional

Configure group size and scaling policies

Step 5 - optional

Add notifications

Step 6 - optional

Add tags

Step 7

Review

Configure group size and scaling policies - optional

Info

Set the desired, minimum, and maximum capacity of your Auto Scaling group. You can optionally add a scaling policy to dynamically scale the number of instances in the group.

Group size - optional

Info

Specify the size of the Auto Scaling group by changing the desired capacity. You can also specify minimum and maximum capacity limits. Your desired capacity must be within the limit range.

Desired capacity

2

Minimum capacity

2

Maximum capacity

6

Scaling policies - optional

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. Info

Target tracking scaling policy

Choose a desired outcome and leave it to the scaling policy to add and remove capacity as needed to achieve that outcome.

None

Scaling policy name

LabScalingPolicy

Activate Windows

Go to Settings to activate Windows.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

Review

### Scaling policies - optional

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. [Info](#)

☒ Target tracking scaling policy  
Choose a desired outcome and leave it to the scaling policy to add and remove capacity as needed to achieve that outcome.

☐ None

Scaling policy name  
LabScalingPolicy

Metric type  
Average CPU utilization

Target value  
60

Instances need  
300 seconds warm up before including in metric

☐ Disable scale in to create only a scale-out policy

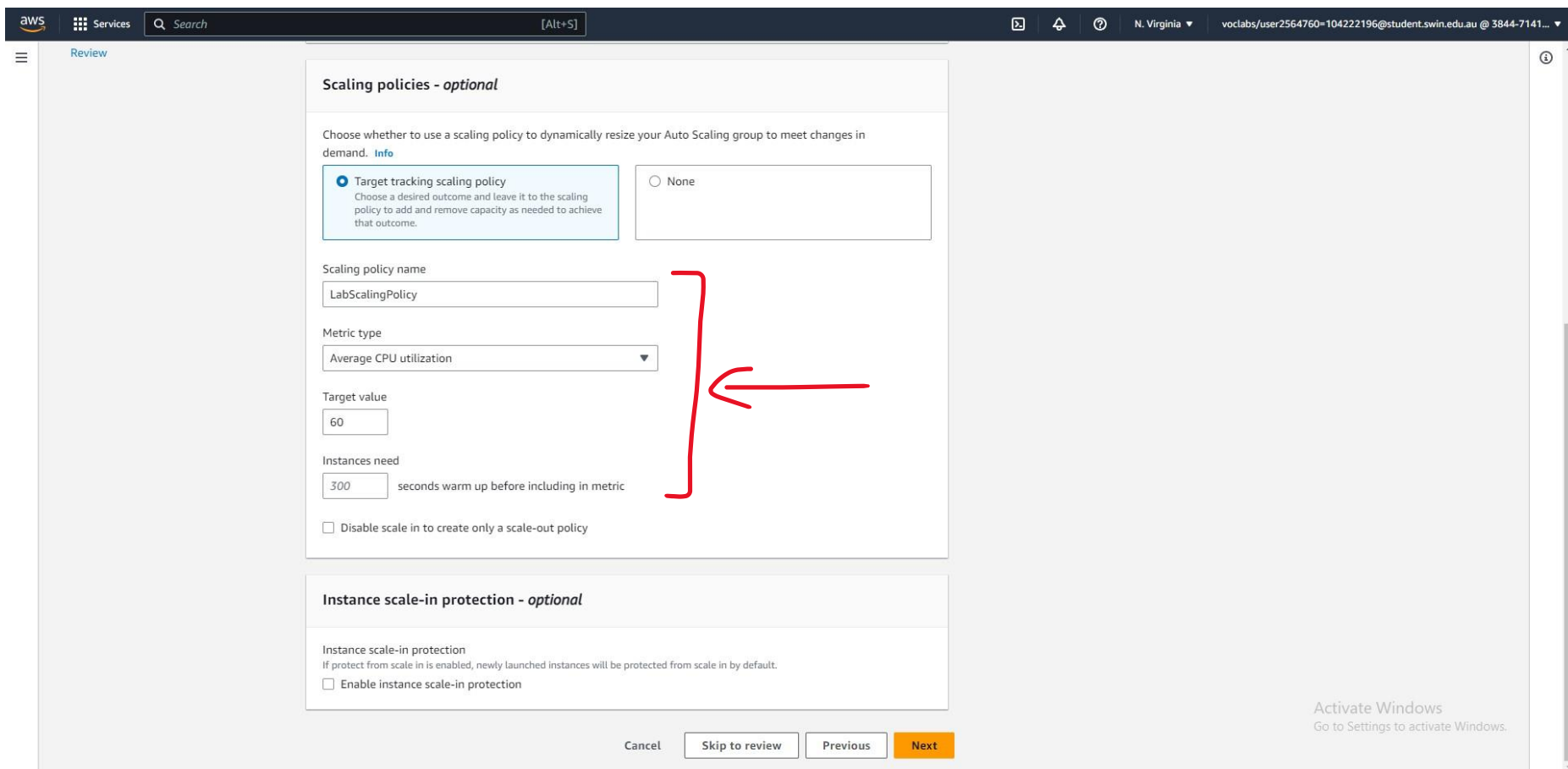
### Instance scale-in protection - optional

Instance scale-in protection  
If protect from scale in is enabled, newly launched instances will be protected from scale in by default.

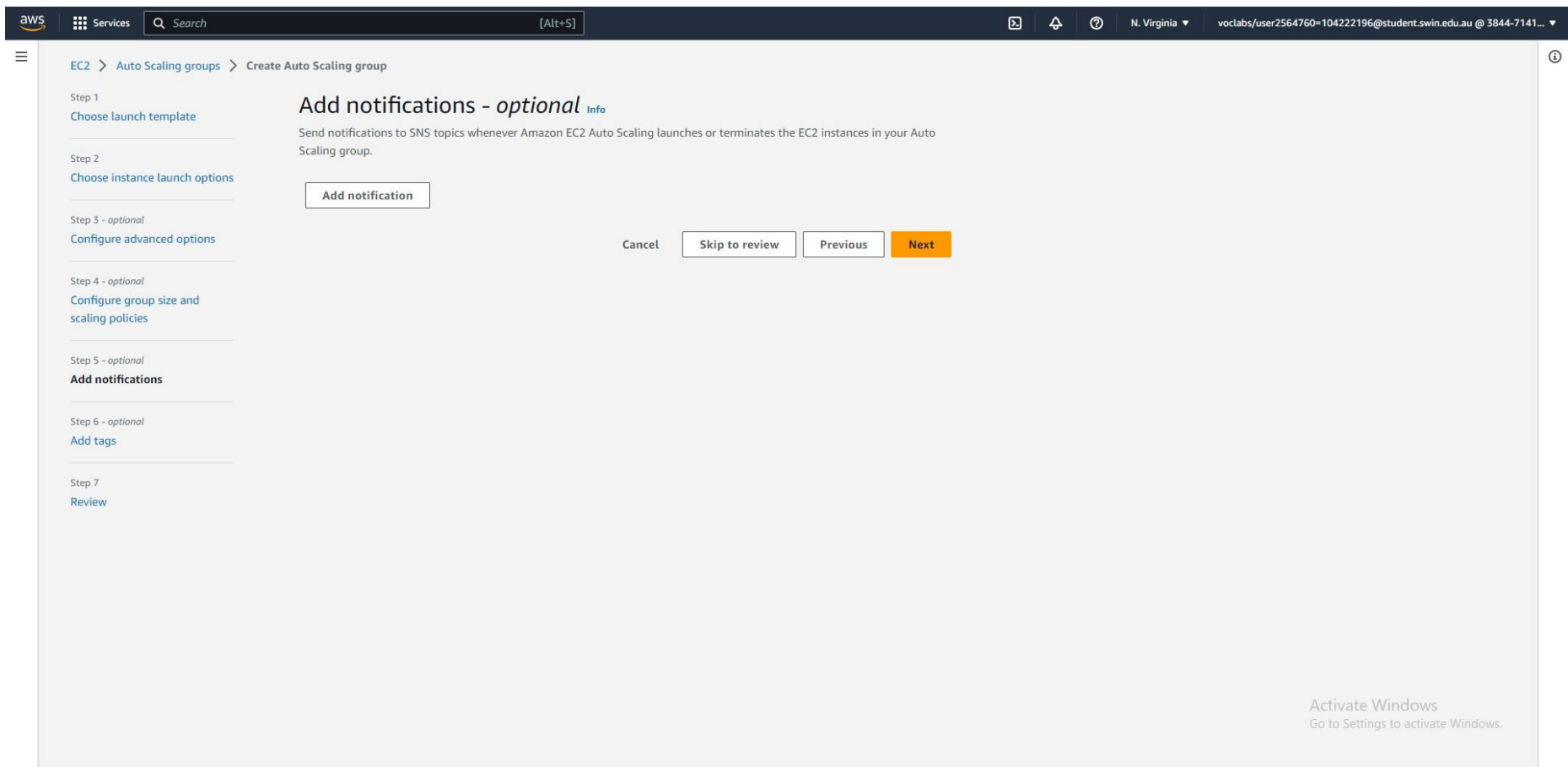
☐ Enable instance scale-in protection

Cancel Skip to review Previous **Next**

Activate Windows  
Go to Settings to activate Windows.



Step 30 – Create an Auto Scaling group – Step 4 – Configure the group size and scaling policies.



Step 31 – Create an Auto Scaling group – Step 5 – Leave as default.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1  
Choose launch template

Step 2  
Choose instance launch options

Step 3 - optional  
Configure advanced options

Step 4 - optional  
Configure group size and scaling policies

Step 5 - optional  
Add notifications

Step 6 - optional  
**Add tags**

Step 7  
Review

### Add tags - optional [Info](#)

Add tags to help you search, filter, and track your Auto Scaling group across AWS. You can also choose to automatically add these tags to instances when they are launched.

**Tags (1)**

Key	Value - optional	Tag new instances	
Name	Lab Instance	<input checked="" type="checkbox"/>	<button>Remove</button>

Add tag  
49 remaining

[Cancel](#) [Previous](#) [Next](#)

Activate Windows  
Go to Settings to activate Windows.

Step 32 – Create an Auto Scaling group – Step 6 – Add a name tag which will be applied to all instances.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1  
Choose launch template

Step 2  
Choose instance launch options

Step 3 - optional  
Configure advanced options

Step 4 - optional  
Configure group size and scaling policies

Step 5 - optional  
Add notifications

Step 6 - optional  
Add tags

Step 7  
Review

## Review [Info](#)

Step 1: Choose launch template [Edit](#)

**Group details**

Auto Scaling group name  
Lab Auto Scaling Group

**Launch template**

Launch template	Version	Description
<a href="#">LabConfig</a> lt-0a3cc26b3fb0e0f62	Default	

Step 2: Choose instance launch options [Edit](#)

**Network**

Network  
VPC  
[vpc-029ee3b7ba3344847](#)

Availability Zone	Subnet	
us-east-1a	<a href="#">subnet-005d4f3a83f26112d</a>	10.0.1.0/24
us-east-1b	<a href="#">subnet-0bdb626b67724c6e3</a>	10.0.3.0/24

Activate Windows  
Go to Settings to activate Windows.

Step 33 – Create an Auto Scaling group – Review.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

Lab Auto Scaling Group, 1 Scaling policy created successfully. Group metrics collection is enabled.

EC2 > Auto Scaling groups

Auto Scaling groups (1) Info

Search your Auto Scaling groups

Launch configurations Launch templates Actions Create Auto Scaling group

<input type="checkbox"/>	Name	Launch template/configuration	Instances	Status	Desired capacity	Min	Max	Availability Zones
<input type="checkbox"/>	Lab Auto Scaling Group	LabConfig   Version Default	0	Updating capacity...	2	2	6	us-east-1a, us-east-1b

0 Auto Scaling groups selected

Activate Windows  
Go to Settings to activate Windows.

Step 33: The scaling group has been created successfully.



## Task 4: Verify that Load Balancing is Working

The screenshot displays the AWS Management Console interface for the EC2 service. The left-hand navigation pane shows various AWS services, with 'Instances' selected under the 'EC2' category. The main content area shows a list of four EC2 instances. The instances are:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
Bastion Host	i-07d1b56360cf8fd34	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	50.17.1.108	-
Lab Instance	i-0dd2ae8e285922419	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	-	-
Lab Instance	i-0589f03de5683fcb6	Running	t2.micro	2/2 checks passed	No alarms	us-east-1b	-	-	-
Web Server 1	i-00df2154936e30fb4	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	54.197.218.30	-

A red arrow points to the 'Lab Instance' with ID 'i-0589f03de5683fcb6'. Below the table, there is a 'Select an instance' dropdown menu. The bottom right corner of the console shows a watermark for 'Activate Windows'.

Step 44: Two Lab Instances have been launched by Auto Scaling.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

Instances

- Instance Types
- Launch Templates
- Spot Requests
- Savings Plans
- Reserved Instances
- Dedicated Hosts
- Scheduled Instances
- Capacity Reservations

▼ Images

- AMIs
- AMI Catalog

▼ Elastic Block Store

- Volumes
- Snapshots
- Lifecycle Manager

▼ Network & Security

- Security Groups
- Elastic IPs
- Placement Groups
- Key Pairs
- Network Interfaces

▼ Load Balancing

- Load Balancers
- Target Groups**

▼ Auto Scaling

- Auto Scaling Groups

EC2 > Target groups

Target groups (1/1) Info

Find resources by attribute or tag

<input checked="" type="checkbox"/>	Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
<input checked="" type="checkbox"/>	LabGroup	arn:aws:elasticloadbalanci...	80	HTTP	Instance	LabELB	vpc-029ee3b7ba3344847

Target group: LabGroup

Details Targets Monitoring Health checks Attributes Tags

Registered targets (2)

Filter resources by property or value

<input type="checkbox"/>	Instance ID	Name	Port	Zone	Health status	Health status details
<input type="checkbox"/>	i-Odd2ae8e285922419	Lab Instance	80	us-east-1a	✓ healthy	
<input type="checkbox"/>	i-0589f03de5683fcb6	Lab Instance	80	us-east-1b	✓ healthy	

Activate Windows  
Go to Settings to activate Windows.

Steps 45-48: The “Targets” tab of the LabGroup target group shows two healthy Lab Instances launched by Auto Scaling.

aws Services Search [Alt+S] N. Virginia voclabs/user2564760=104222196@student.swin.edu.au @ 3844-7141...

EC2 > Load balancers

**Load balancers (1/1)**  
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Find resources by attribute or tag

<input checked="" type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
<input checked="" type="checkbox"/>	LabELB	LabELB-930128242.us-east-1.elb.amazonaws.com	Active	vpc-029ee3b7ba3344847	2 Availability Zones	application	June 23, 2023, 22:43 (UTC+07:00)

**Load balancer: LabELB**

Details | Listeners | Network mapping | Security | Monitoring | Integrations | Attributes | Tags

**Details**

Load balancer type Application	Status Active	VPC vpc-029ee3b7ba3344847	IP address type IPv4
Scheme Internet-facing	Hosted zone Z35SXDOTRQ7X7K	Availability Zones subnet-0751637651f846061 us-east-1a (use1-az6) subnet-0e455e73692a us-east-1b (use1-az1)	Date created June 23, 2023, 22:43 (UTC+07:00)
Load balancer ARN arn:aws:elasticloadbalancing:us-east-1:384471410936:loadbalancer/app/LabELB/46ce6557b809ad3d	DNS name LabELB-930128242.us-east-1.elb.amazonaws.com (A Record)		

DNS name copied

Activate Windows  
Go to Settings to activate Windows.

Steps 49-51: Copy the DNS name of the LabELB load balancer.


Welcome to Academy Cloud Fou x

Not secure | labelb-930128242.us-east-1.elb.amazonaws.com

aws Load Test RDS

Meta-Data	Value
InstanceId	i-0589f03de5683fcb6
Availability Zone	us-east-1b

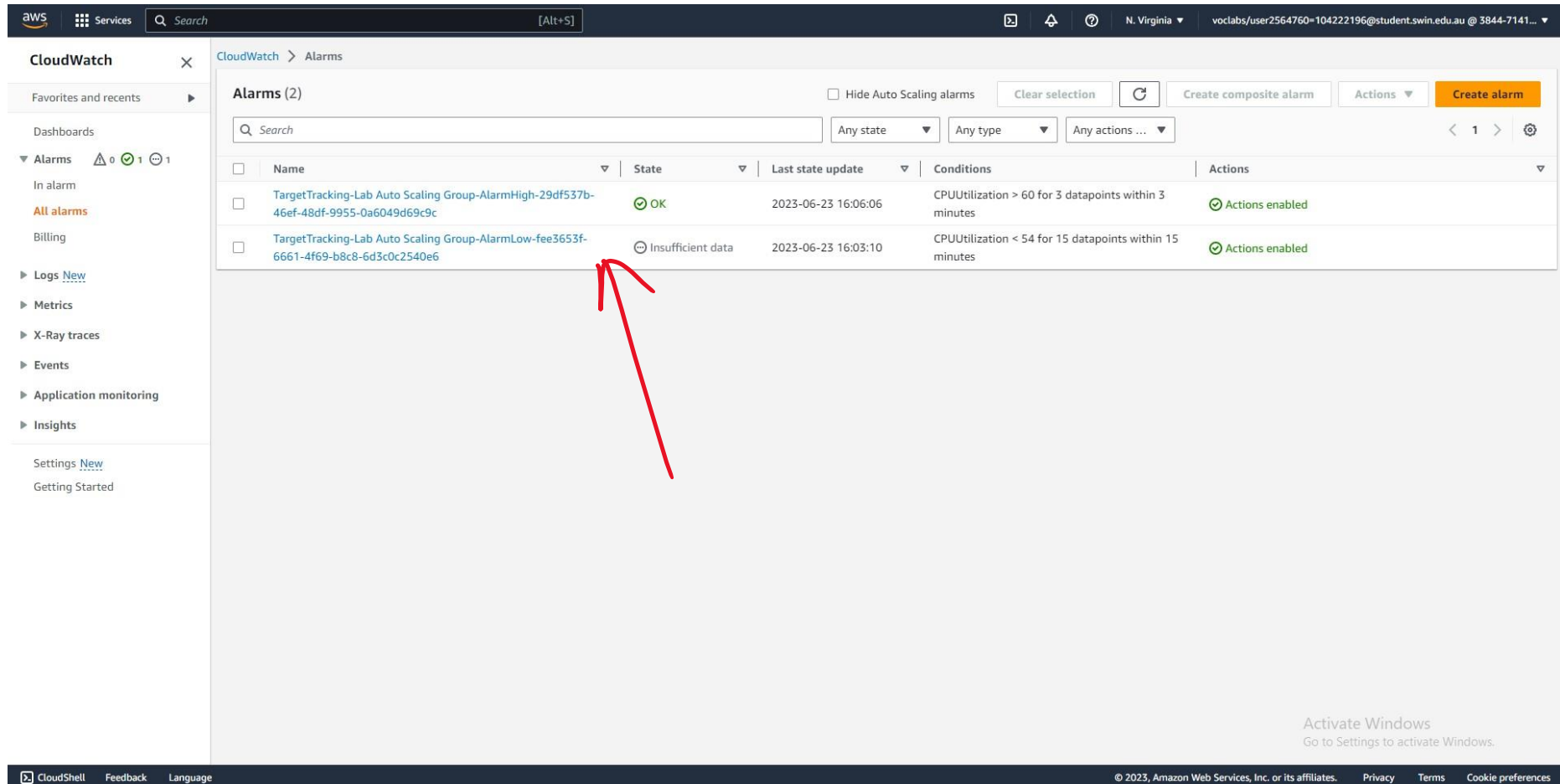
Current CPU Load: 0%



Activate Windows  
Go to Settings to activate Windows.

Step 52: Open the DNS name in a new tab. The request was sent to an EC2 instance.

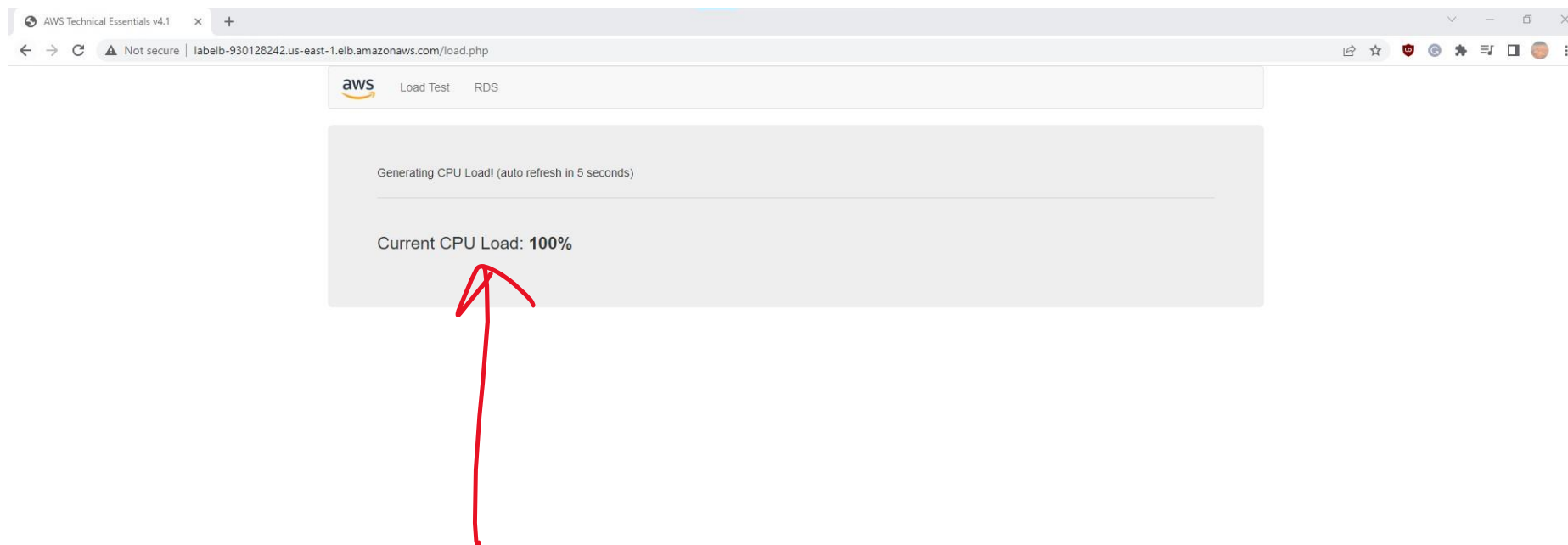
## Task 5 - Test Auto Scaling



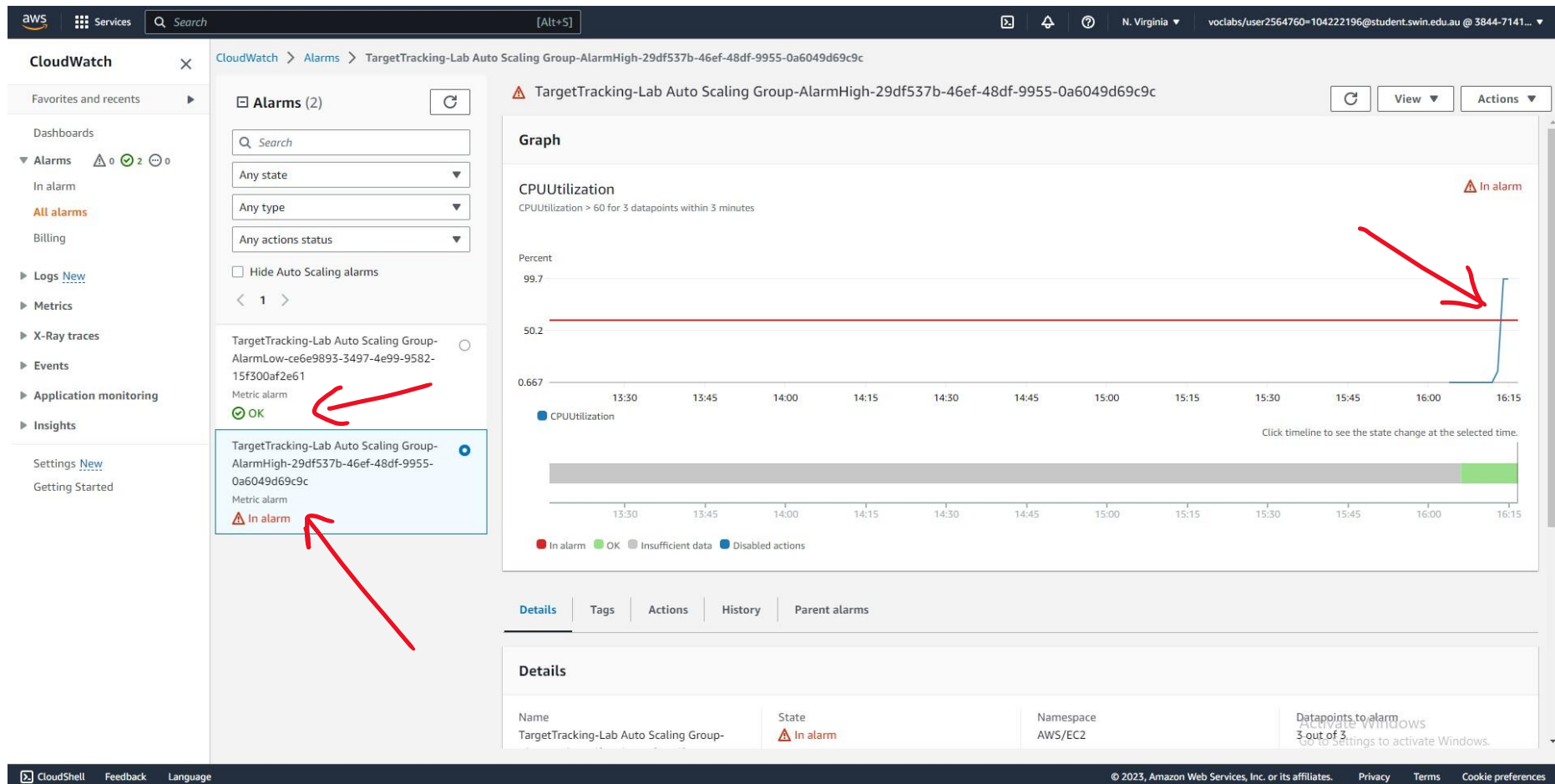
The screenshot shows the AWS CloudWatch Alarms console. The left sidebar contains navigation links for CloudWatch, Alarms, Logs, Metrics, X-Ray traces, Events, Application monitoring, and Insights. The main content area displays a list of alarms. The first alarm, 'TargetTracking-Lab Auto Scaling Group-AlarmHigh-29df537b-46ef-48df-9955-0a6049d69c9c', is in the 'OK' state. The second alarm, 'TargetTracking-Lab Auto Scaling Group-AlarmLow-fee3653f-6661-4f69-b8c8-6d3c0c2540e6', is in the 'Insufficient data' state. A red arrow points to the 'Insufficient data' state of the second alarm.

Name	State	Last state update	Conditions	Actions
TargetTracking-Lab Auto Scaling Group-AlarmHigh-29df537b-46ef-48df-9955-0a6049d69c9c	OK	2023-06-23 16:06:06	CPUUtilization > 60 for 3 datapoints within 3 minutes	Actions enabled
TargetTracking-Lab Auto Scaling Group-AlarmLow-fee3653f-6661-4f69-b8c8-6d3c0c2540e6	Insufficient data	2023-06-23 16:03:10	CPUUtilization < 54 for 15 datapoints within 15 minutes	Actions enabled

Steps 52-55: CloudWatch shows two alarms, one of which is OK.



Steps 56-57: Choose Load Test in the web application to generate a high load.



Steps 58-59: After creating the load, AlarmLow changes to OK and AlarmHigh changes to In alarm. CPU utilization is over 60%.

aws Services Search [Alt+S]

New EC2 Experience Tell us what you think

EC2 Dashboard  
EC2 Global View  
Events  
Limits

▼ Instances  
Instances  
Instance Types  
Launch Templates  
Spot Requests  
Savings Plans  
Reserved Instances  
Dedicated Hosts  
Scheduled Instances  
Capacity Reservations

▼ Images  
AMIs  
AMI Catalog

▼ Elastic Block Store  
Volumes  
Snapshots  
Lifecycle Manager

▼ Network & Security  
Security Groups  
Elastic IPs  
Placement Groups  
Key Pairs  
Network Interfaces

Instances (6) Info

Find instance by attribute or tag (case-sensitive)

Instance state = running Clear filters

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
<input type="checkbox"/>	Bastion Host	i-07d1b56360cf8fd34	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	50.17.1.108	-
<input type="checkbox"/>	Lab Instance	i-0dd2ae8e285922419	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	-	-
<input type="checkbox"/>	Lab Instance	i-0c08f6cd10699eb62	Running	t2.micro	Initializing	No alarms	us-east-1a	-	-	-
<input type="checkbox"/>	Lab Instance	i-0589f03de5683fcb6	Running	t2.micro	2/2 checks passed	No alarms	us-east-1b	-	-	-
<input type="checkbox"/>	Lab Instance	i-005e03b4887d29af3	Running	t2.micro	Initializing	No alarms	us-east-1b	-	-	-
<input type="checkbox"/>	Web Server 1	i-00df2154936e30fb4	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	54.197.218.30	-

Select an instance

Activate Windows  
Go to Settings to activate Windows.

Steps 60-61: More Lab Instances have been launched by Auto Scaling to accommodate the increased CPU usage.



## Task 6 - Terminate Web Server 1

**Successfully terminated i-00df2154936e30fb4**

**Instances (1/6) Info**

Find instance by attribute or tag (case-sensitive)

Instance state = running Clear filters

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
<input type="checkbox"/>	Bastion Host	i-07d1b56360cf8fd34	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	50.17.1.108	-
<input type="checkbox"/>	Lab Instance	i-0dd2ae8e285922419	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	-	-
<input type="checkbox"/>	Lab Instance	i-0c08f6cd10699eb62	Running	t2.micro	Initializing	No alarms	us-east-1a	-	-	-
<input type="checkbox"/>	Lab Instance	i-0589f03de5683fcb6	Running	t2.micro	2/2 checks passed	No alarms	us-east-1b	-	-	-
<input type="checkbox"/>	Lab Instance	i-005ed3b4887d29af3	Running	t2.micro	Initializing	No alarms	us-east-1b	-	-	-
<input checked="" type="checkbox"/>	Web Server 1	i-00df2154936e30fb4	Shutting-down	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	54.197.218.30	-

**Instance: i-00df2154936e30fb4 (Web Server 1)**

Details Security Networking Storage Status checks Monitoring Tags

**Instance summary Info**

Instance ID	Public IPv4 address	Private IPv4 addresses
i-00df2154936e30fb4 (Web Server 1)	54.197.218.30   open address	10.0.0.156
IPv6 address	Instance state	Public IPv4 DNS
-	Running	-
Hostname type	Private IP DNS name (IPv4 only)	Elastic IP addresses
IP name: ip-10-0-0-156.ec2.internal	ip-10-0-0-156.ec2.internal	-
Answer private resource DNS name	Instance type	AWS Compute Optimizer finding
-	t2.micro	Opt-in to AWS Compute Optimizer for recommendations.   Learn more
Auto-assigned IP address	VPC ID	Auto Scaling Group name
54.197.218.30 [Public IP]	vpc-029ee3b7ba3344847 (Lab VPC)	Activate Windows Go to Settings to activate Windows.
IAM Role	Subnet ID	
-	subnet-0751637651f846061 (Public Subnet 1)	
IMDSv2		
Reserved		

Steps 62-64: Successfully terminated Web Server 1.