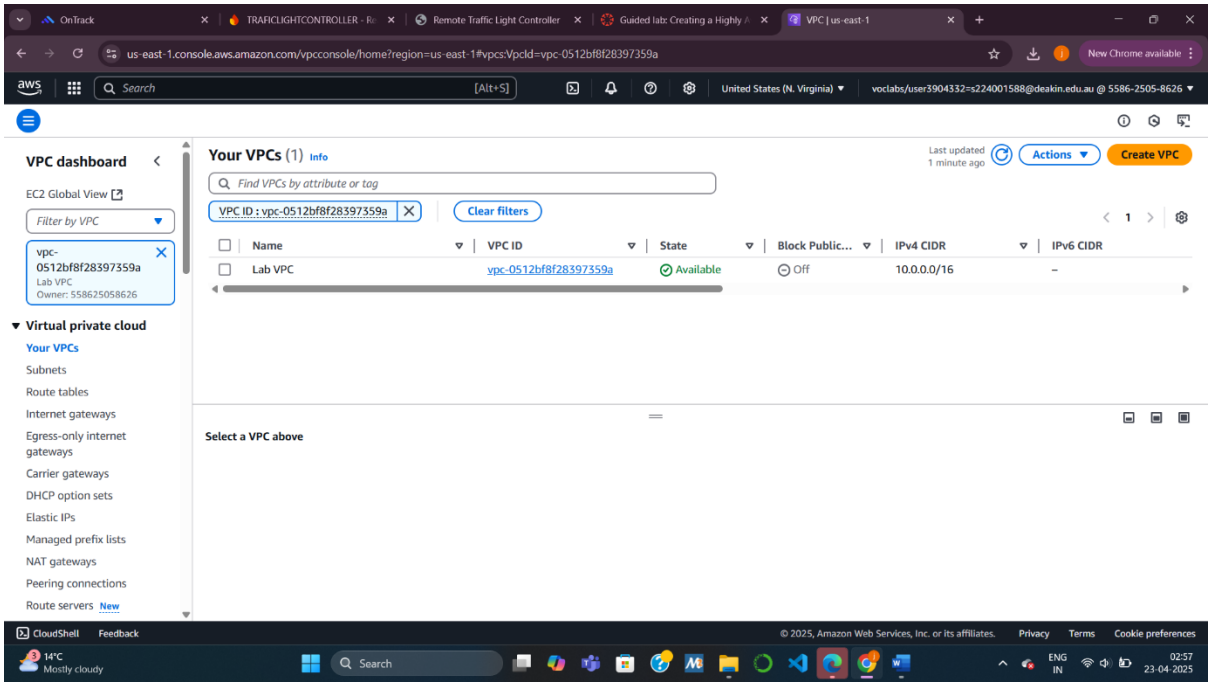
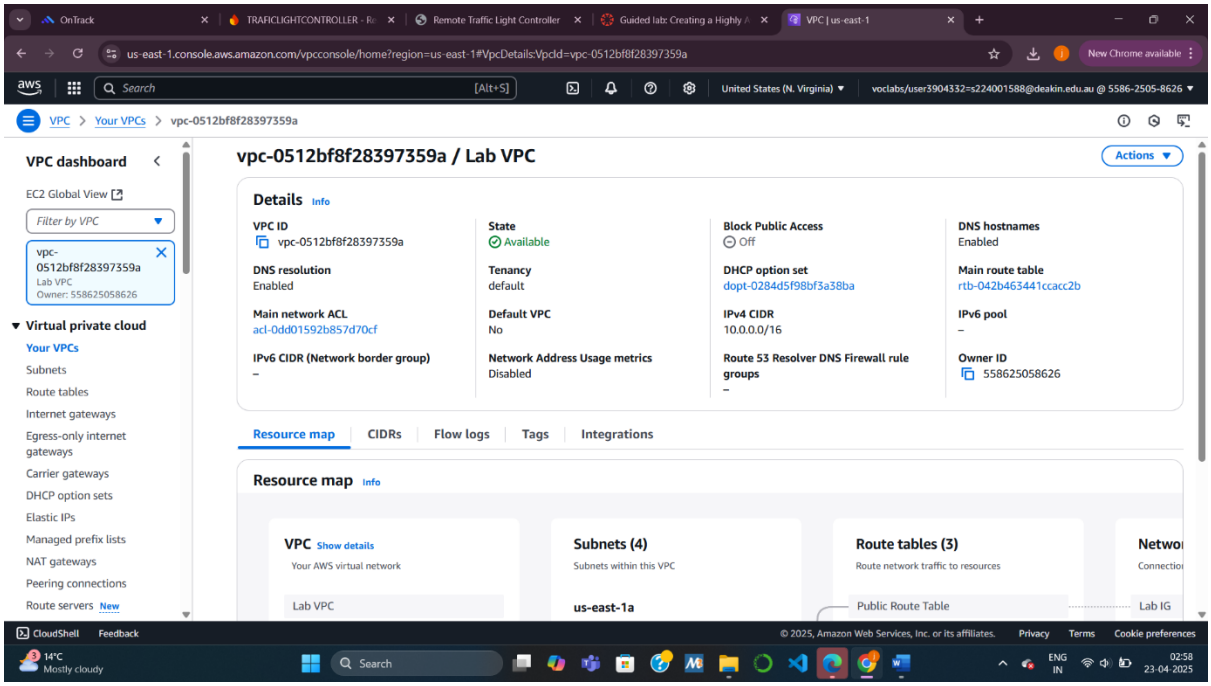
TASK 7.1P

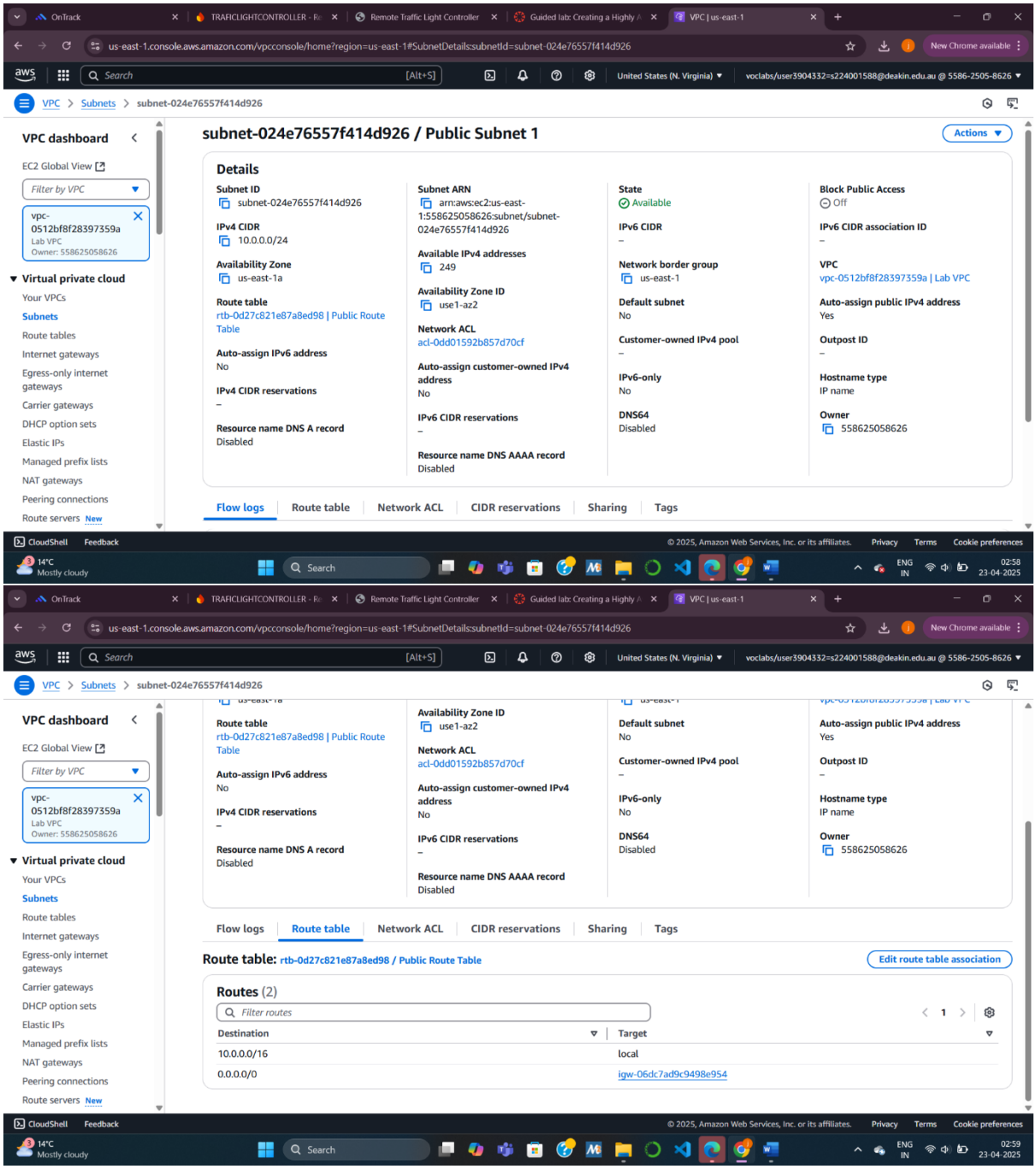
Creating a Highly Available Environment

Task 1: Inspecting Your VPC

In this task, I reviewed the pre-configured Virtual Private Cloud (VPC) and its components. The VPC included public and private subnets across two Availability Zones, an internet gateway for public subnets, a NAT gateway for outbound internet access from private subnets, and an Amazon RDS instance located within a private subnet. This inspection helped me understand the network architecture, including routing tables, network ACLs, and existing security groups. The key takeaway was to ensure that only required components have internet access while maintaining private communication between tiers.






OnTrack
TRAFICLIGHTCONTROLLER - Re
Remote Traffic Light Controller
Guided lab: Creating a Highly A
VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#SubnetDetails:subnetId=subnet-024e76557f414d926
New Chrome available
Search [Alt+S]
United States (N. Virginia)
voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
VPC > Subnets > subnet-024e76557f414d926
VPC dashboard
EC2 Global View
Filter by VPC
vpc-0512bf8f28397359a
Lab VPC
Owner: 558625058626
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers New
subnet-024e76557f414d926 / Public Subnet 1
Actions
Details
Subnet ID
subnet-024e76557f414d926
IPv4 CIDR
10.0.0.0/24
Availability Zone
us-east-1a
Route table
rtb-0d27c821e87a8ed98 | Public Route Table
Auto-assign IPv6 address
No
IPv4 CIDR reservations
–
Resource name DNS A record
Disabled
Subnet ARN
arn:aws:ec2:us-east-1:558625058626:subnet/subnet-024e76557f414d926
Available IPv4 addresses
249
Availability Zone ID
use1-az2
Network ACL
acl-0dd01592b857d70cf
Auto-assign customer-owned IPv4 address
No
IPv6 CIDR reservations
–
Resource name DNS AAAA record
Disabled
State
Available
IPv6 CIDR
–
Network border group
us-east-1
Default subnet
No
Customer-owned IPv4 pool
–
IPv6-only
No
DNS64
Disabled
Block Public Access
Off
IPv6 CIDR association ID
–
VPC
vpc-0512bf8f28397359a | Lab VPC
Auto-assign public IPv4 address
Yes
Outpost ID
–
Hostname type
IP name
Owner
558625058626
Flow logs
Route table
Network ACL
CIDR reservations
Sharing
Tags
CloudShell
Feedback
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VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#SubnetDetails:subnetId=subnet-024e76557f414d926
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voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
VPC > Subnets > subnet-024e76557f414d926
VPC dashboard
EC2 Global View
Filter by VPC
vpc-0512bf8f28397359a
Lab VPC
Owner: 558625058626
Virtual private cloud
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Subnets
Route tables
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Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers New
Route table
rtb-0d27c821e87a8ed98 | Public Route Table
Auto-assign IPv6 address
No
IPv4 CIDR reservations
–
Resource name DNS A record
Disabled
Availability Zone ID
use1-az2
Network ACL
acl-0dd01592b857d70cf
Auto-assign customer-owned IPv4 address
No
IPv6 CIDR reservations
–
Resource name DNS AAAA record
Disabled
Default subnet
No
Customer-owned IPv4 pool
–
IPv6-only
No
DNS64
Disabled
Auto-assign public IPv4 address
Yes
Outpost ID
–
Hostname type
IP name
Owner
558625058626
Flow logs
Route table
Network ACL
CIDR reservations
Sharing
Tags
Route table: rtb-0d27c821e87a8ed98 / Public Route Table
Edit route table association
Routes (2)
Filter routes
1
Destination
Target
10.0.0.0/16
local
0.0.0.0/0
igw-06dc7ad9c9498e954
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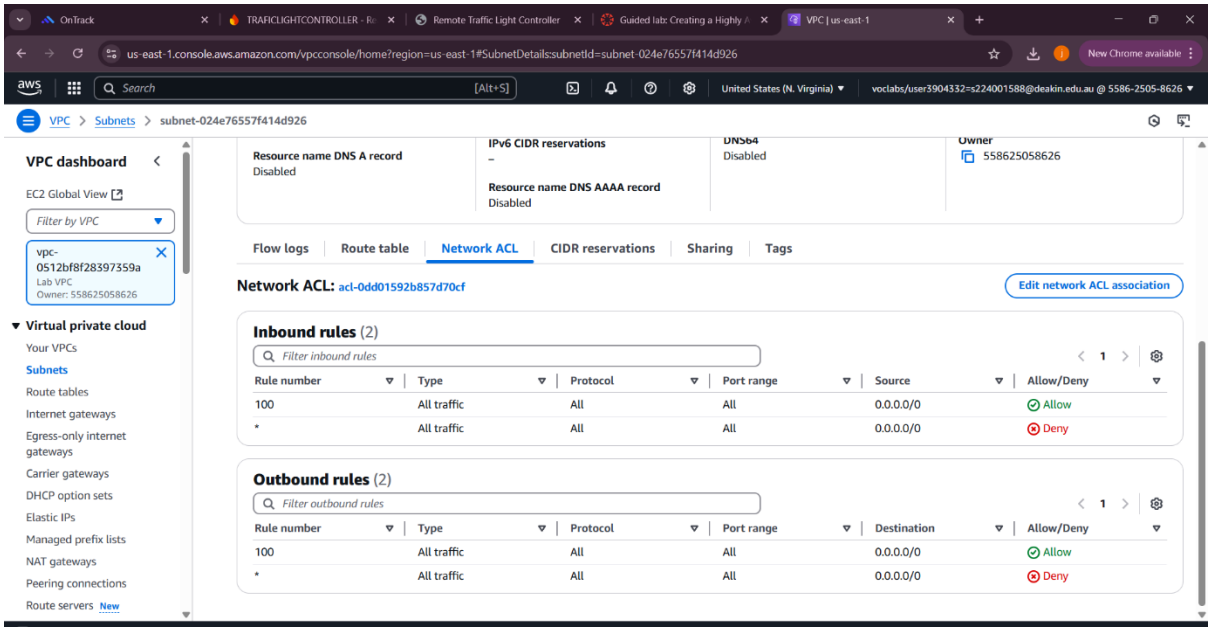
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us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#SubnetDetails:subnetId=subnet-024e76557f414d926
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VPC > Subnets > subnet-024e76557f414d926
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EC2 Global View
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vpc-0512bf8f28397359a
Lab VPC
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Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers New
Resource name DNS A record
Disabled
IPv6 CIDR reservations
-
Resource name DNS AAAA record
Disabled
DNS64
Disabled
Owner
558625058626
Flow logs
Route table
Network ACL
CIDR reservations
Sharing
Tags
Network ACL: acl-0dd01592b857d70cf
Edit network ACL association
Inbound rules (2)
Filter inbound rules
Rule number
Type
Protocol
Port range
Source
Allow/Deny
100
All traffic
All
All
0.0.0.0/0
Allow
*
All traffic
All
All
0.0.0.0/0
Deny
Outbound rules (2)
Filter outbound rules
Rule number
Type
Protocol
Port range
Destination
Allow/Deny
100
All traffic
All
All
0.0.0.0/0
Allow
*
All traffic
All
All
0.0.0.0/0
Deny
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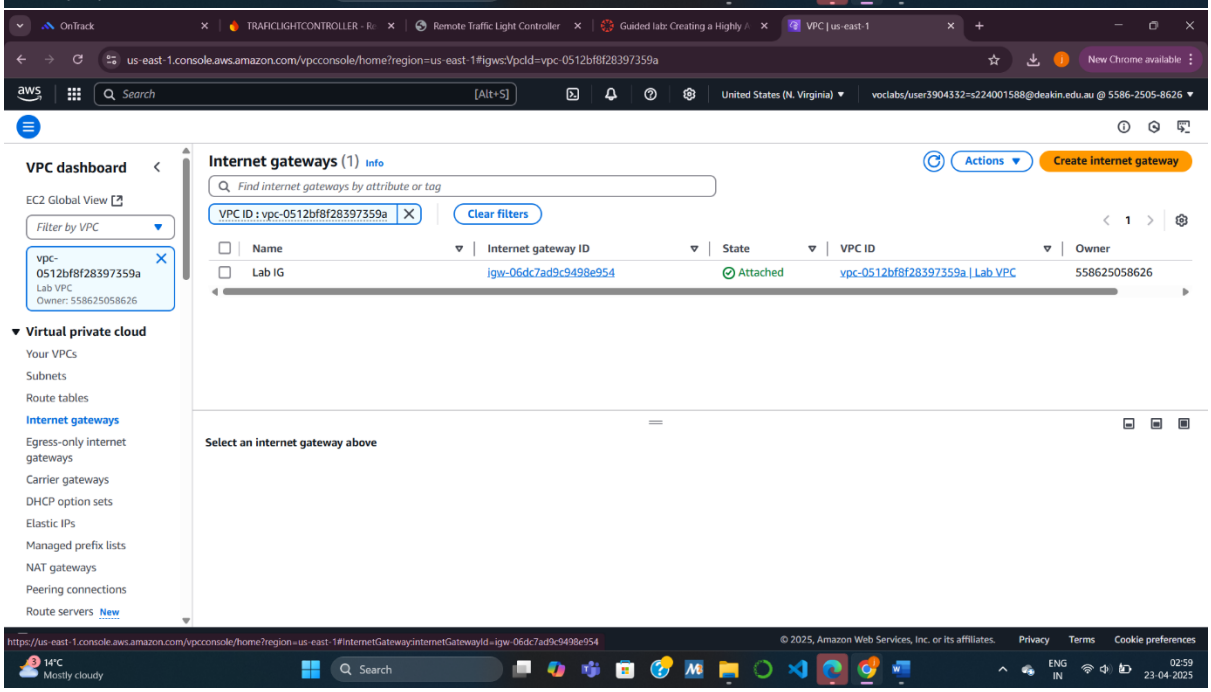
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VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#igws:VpcId=vpc-0512bf8f28397359a
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VPC dashboard
EC2 Global View
Filter by VPC
vpc-0512bf8f28397359a
Lab VPC
Owner: 558625058626
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Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers New
Internet gateways (1) Info
Actions
Create internet gateway
Find internet gateways by attribute or tag
VPC ID : vpc-0512bf8f28397359a
Clear filters
Name
Internet gateway ID
State
VPC ID
Owner
Lab IG
igw-06dc7ad9c9498e954
Attached
vpc-0512bf8f28397359a | Lab VPC
558625058626
Select an internet gateway above
https://us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#InternetGateway:internetGatewayId=igw-06dc7ad9c9498e954
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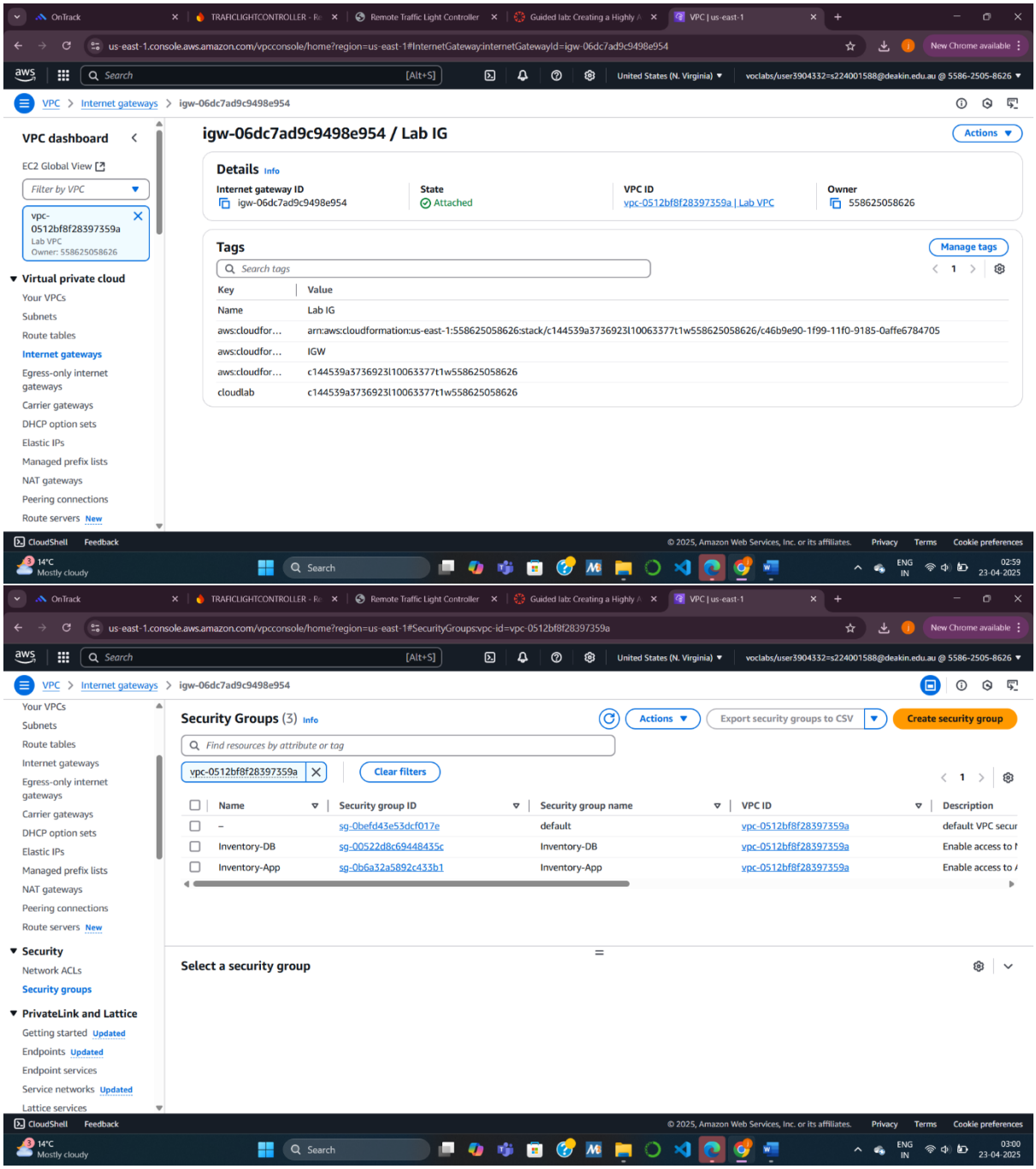
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VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#InternetGateway:internetGatewayId=igw-06dc7ad9c9498e954
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voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
VPC > Internet gateways > igw-06dc7ad9c9498e954
VPC dashboard
EC2 Global View
Filter by VPC
vpc-0512bf8f28397359a
Lab VPC
Owner: 558625058626
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers New
igw-06dc7ad9c9498e954 / Lab IG
Actions
Details Info
Internet gateway ID
igw-06dc7ad9c9498e954
State
Attached
VPC ID
vpc-0512bf8f28397359a | Lab VPC
Owner
558625058626
Tags
Manage tags
Search tags
Key
Value
Name
Lab IG
aws:cloudfor...
arn:aws:cloudformation:us-east-1:558625058626:stack/c144539a3736923l10063377t1w558625058626/c46b9e90-1f99-11f0-9185-0affe6784705
aws:cloudfor...
IGW
aws:cloudfor...
c144539a3736923l10063377t1w558625058626
cloudlab
c144539a3736923l10063377t1w558625058626
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us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#SecurityGroups:vpc-id=vpc-0512bf8f28397359a
Security Groups (3) Info
Actions
Export security groups to CSV
Create security group
Find resources by attribute or tag
vpc-0512bf8f28397359a
Clear filters
Name
Security group ID
Security group name
VPC ID
Description
–
sg-0befd43e53dcf017e
default
vpc-0512bf8f28397359a
default VPC secur
Inventory-DB
sg-00522d8c69448435c
Inventory-DB
vpc-0512bf8f28397359a
Enable access to I
Inventory-App
sg-0b6a32a5892c433b1
Inventory-App
vpc-0512bf8f28397359a
Enable access to A
Security
Network ACLs
Security groups
PrivateLink and Lattice
Getting started Updated
Endpoints Updated
Endpoint services
Service networks Updated
Lattice services
Select a security group
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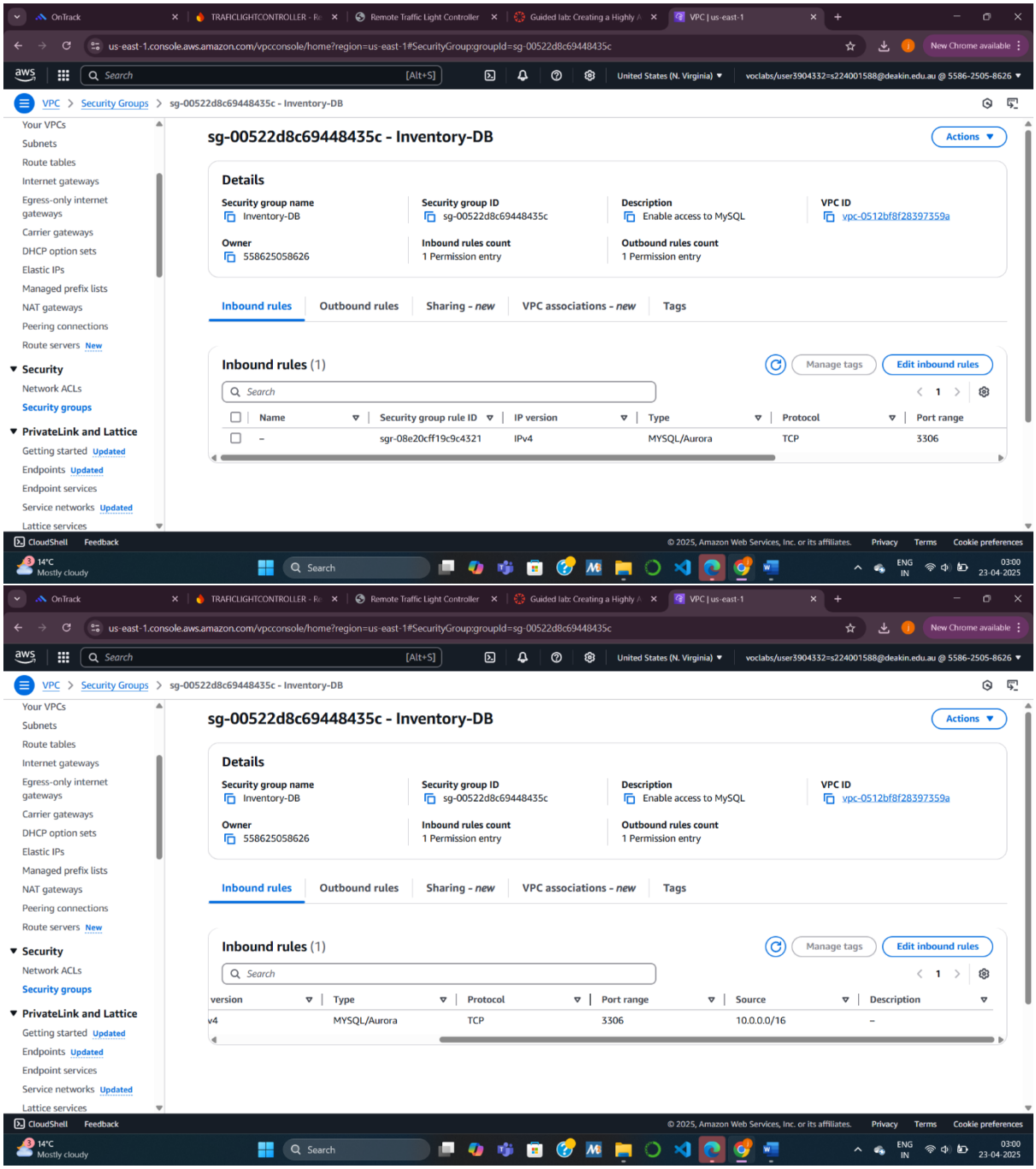
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VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#SecurityGroup:groupId=sg-00522d8c69448435c
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voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
VPC > Security Groups > sg-00522d8c69448435c - Inventory-DB
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers New
Security
Network ACLs
Security groups
PrivateLink and Lattice
Getting started Updated
Endpoints Updated
Endpoint services
Service networks Updated
Lattice services
sg-00522d8c69448435c - Inventory-DB
Actions
Details
Security group name
Inventory-DB
Security group ID
sg-00522d8c69448435c
Description
Enable access to MySQL
VPC ID
vpc-0512bf8f28397359a
Owner
558625058626
Inbound rules count
1 Permission entry
Outbound rules count
1 Permission entry
Inbound rules
Outbound rules
Sharing - new
VPC associations - new
Tags
Inbound rules (1)
Manage tags
Edit inbound rules
Search
Name
Security group rule ID
IP version
Type
Protocol
Port range
sgr-08e20cff19c9c4321
IPv4
MYSQL/Aurora
TCP
3306
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VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#SecurityGroup:groupId=sg-00522d8c69448435c
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voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
VPC > Security Groups > sg-00522d8c69448435c - Inventory-DB
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers New
Security
Network ACLs
Security groups
PrivateLink and Lattice
Getting started Updated
Endpoints Updated
Endpoint services
Service networks Updated
Lattice services
sg-00522d8c69448435c - Inventory-DB
Actions
Details
Security group name
Inventory-DB
Security group ID
sg-00522d8c69448435c
Description
Enable access to MySQL
VPC ID
vpc-0512bf8f28397359a
Owner
558625058626
Inbound rules count
1 Permission entry
Outbound rules count
1 Permission entry
Inbound rules
Outbound rules
Sharing - new
VPC associations - new
Tags
Inbound rules (1)
Manage tags
Edit inbound rules
Search
version
Type
Protocol
Port range
Source
Description
v4
MYSQL/Aurora
TCP
3306
10.0.0.0/16
–
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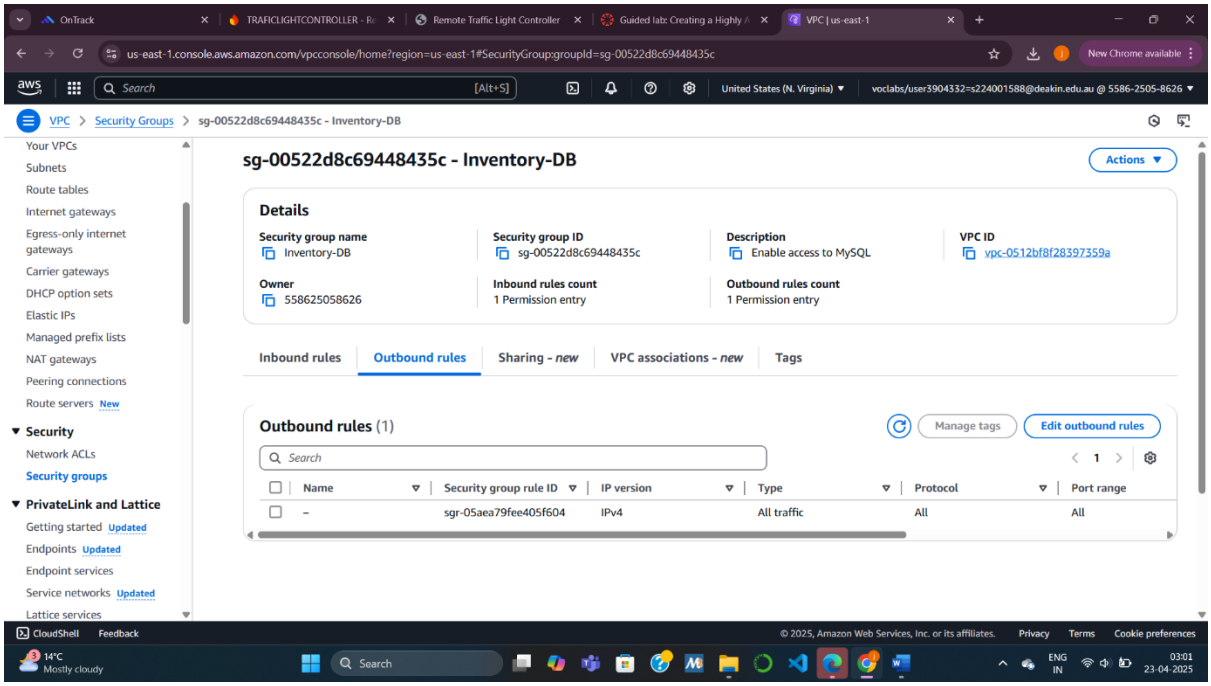
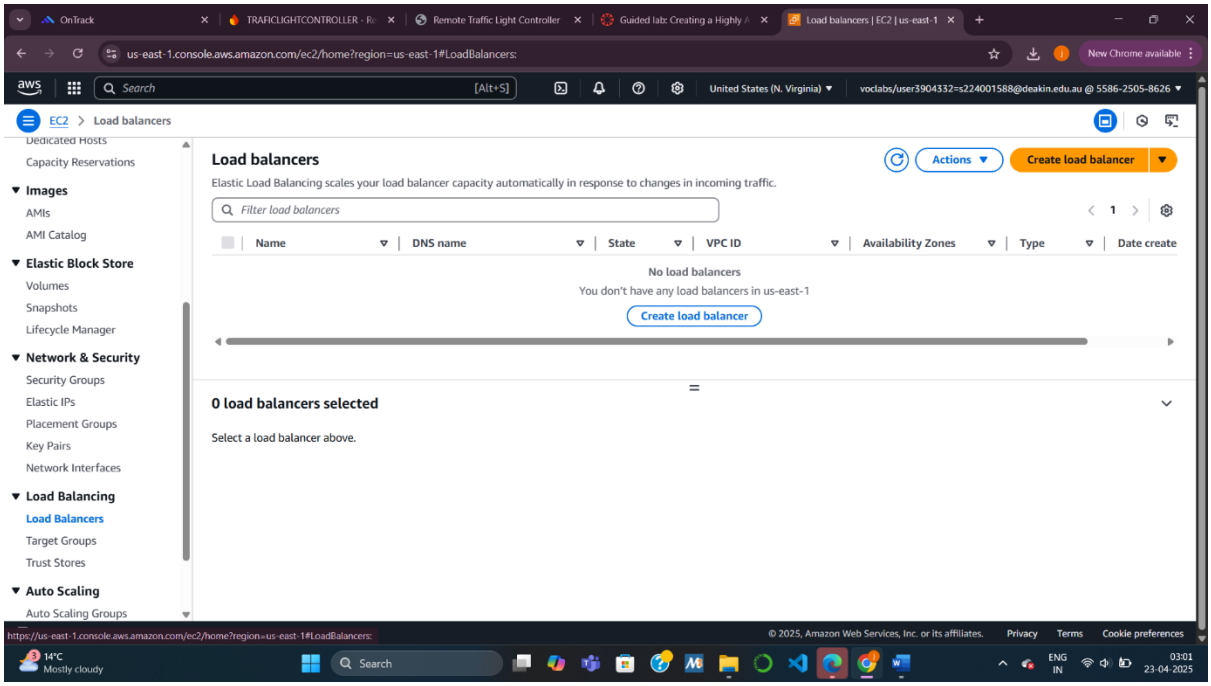


Task 2: Creating an Application Load Balancer (ALB)

Here, I set up an Application Load Balancer (ALB) to distribute traffic across multiple instances. I configured the ALB to operate in two public subnets (each in different Availability Zones), ensuring resilience against data center failures. I also created a new security group (Inventory-LB) to allow HTTP and HTTPS traffic. A Target Group (Inventory-App) was configured with health check settings to continuously monitor the health of EC2 instances. This task ensured that incoming traffic would only be directed to healthy application servers, contributing to the high availability of the application.


Load balancers
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.
Actions
Create load balancer
Filter load balancers
Name
DNS name
State
VPC ID
Availability Zones
Type
Date create
No load balancers
You don't have any load balancers in us-east-1
Create load balancer
0 load balancers selected
Select a load balancer above.

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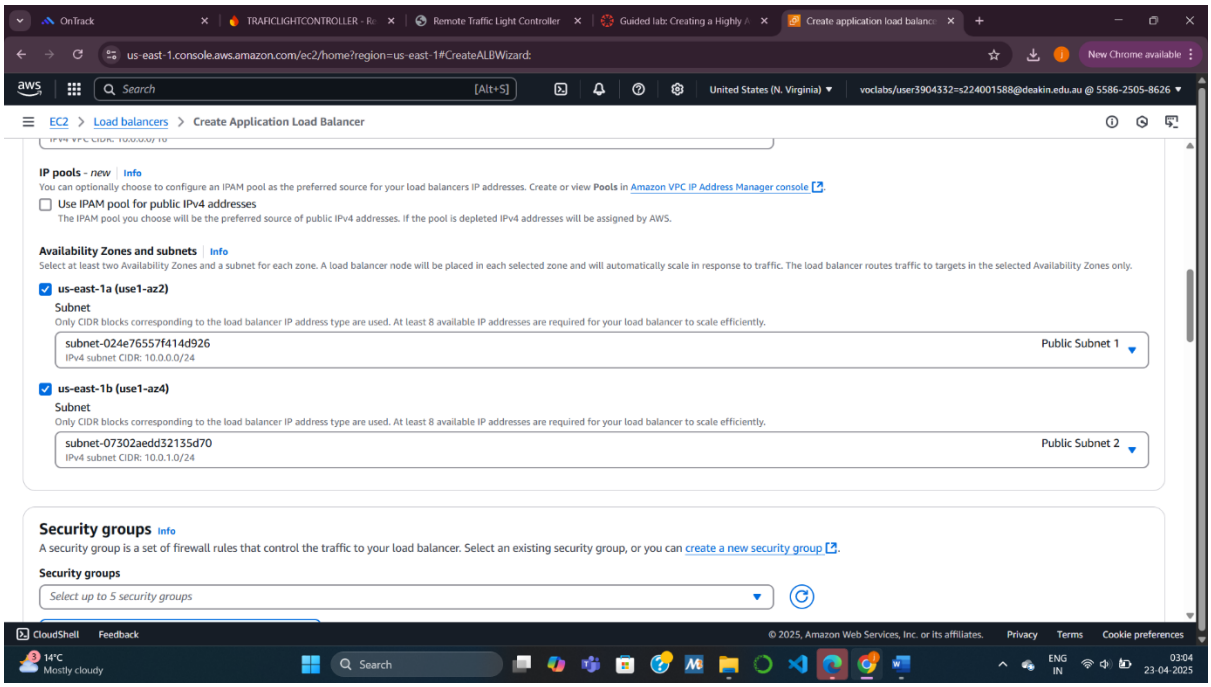
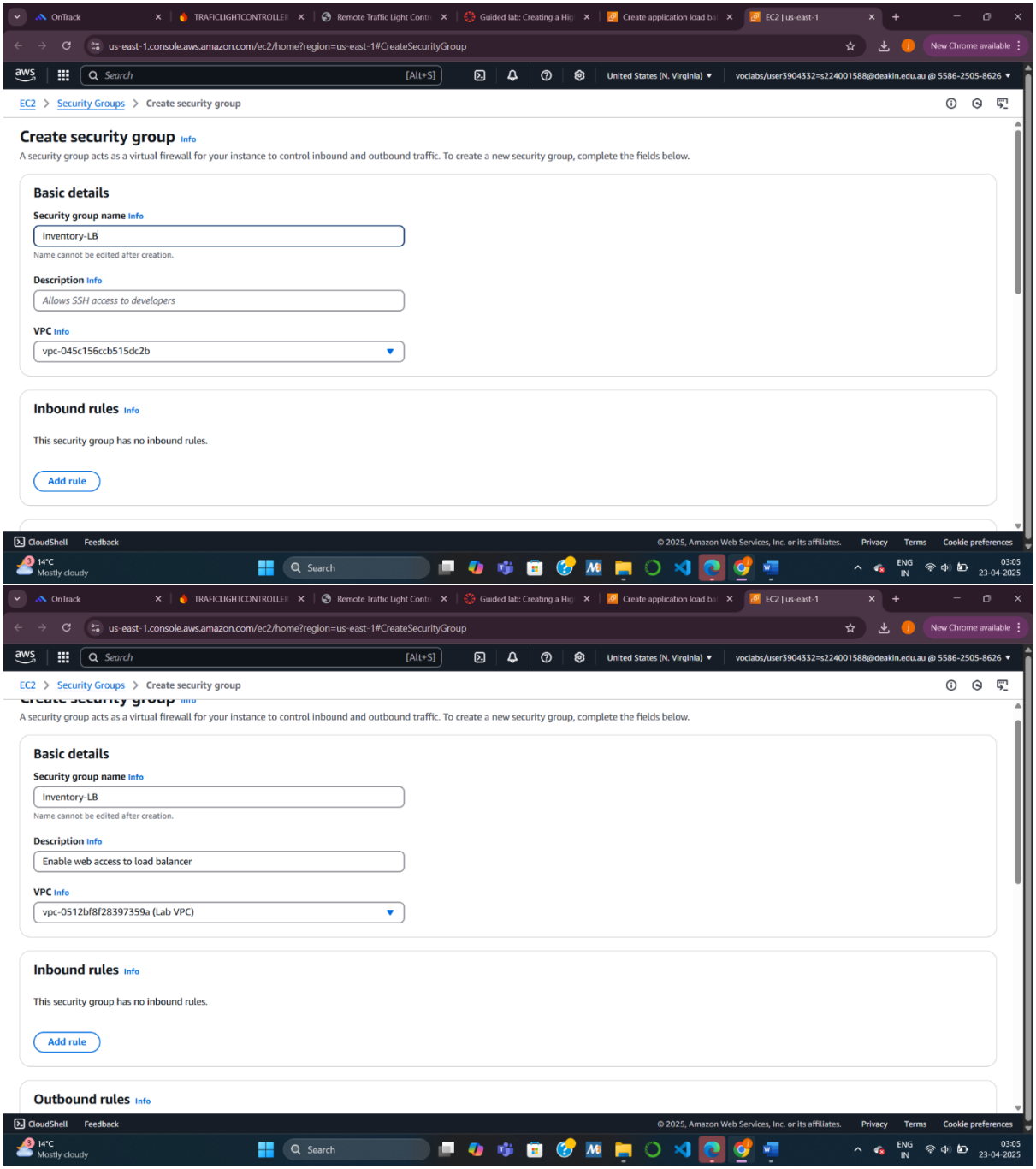

Create Application Load Balancer
IP pools - new
Use IPAM pool for public IPv4 addresses
Availability Zones and subnets
us-east-1a (use1-az2)
subnet-024e76557f414d926
Public Subnet 1
us-east-1b (use1-az4)
subnet-07302aedd32135d70
Public Subnet 2
Security groups
Select up to 5 security groups


us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateSecurityGroup
EC2 > Security Groups > Create security group
Create security group Info
A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.
Basic details
Security group name Info
Inventory-LB
Name cannot be edited after creation.
Description Info
Allows SSH access to developers
VPC Info
vpc-045c156ccb515dc2b
Inbound rules Info
This security group has no inbound rules.
Add rule
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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateSecurityGroup
EC2 > Security Groups > Create security group
A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.
Basic details
Security group name Info
Inventory-LB
Name cannot be edited after creation.
Description Info
Enable web access to load balancer
VPC Info
vpc-0512bf8f28397359a (Lab VPC)
Inbound rules Info
This security group has no inbound rules.
Add rule
Outbound rules Info
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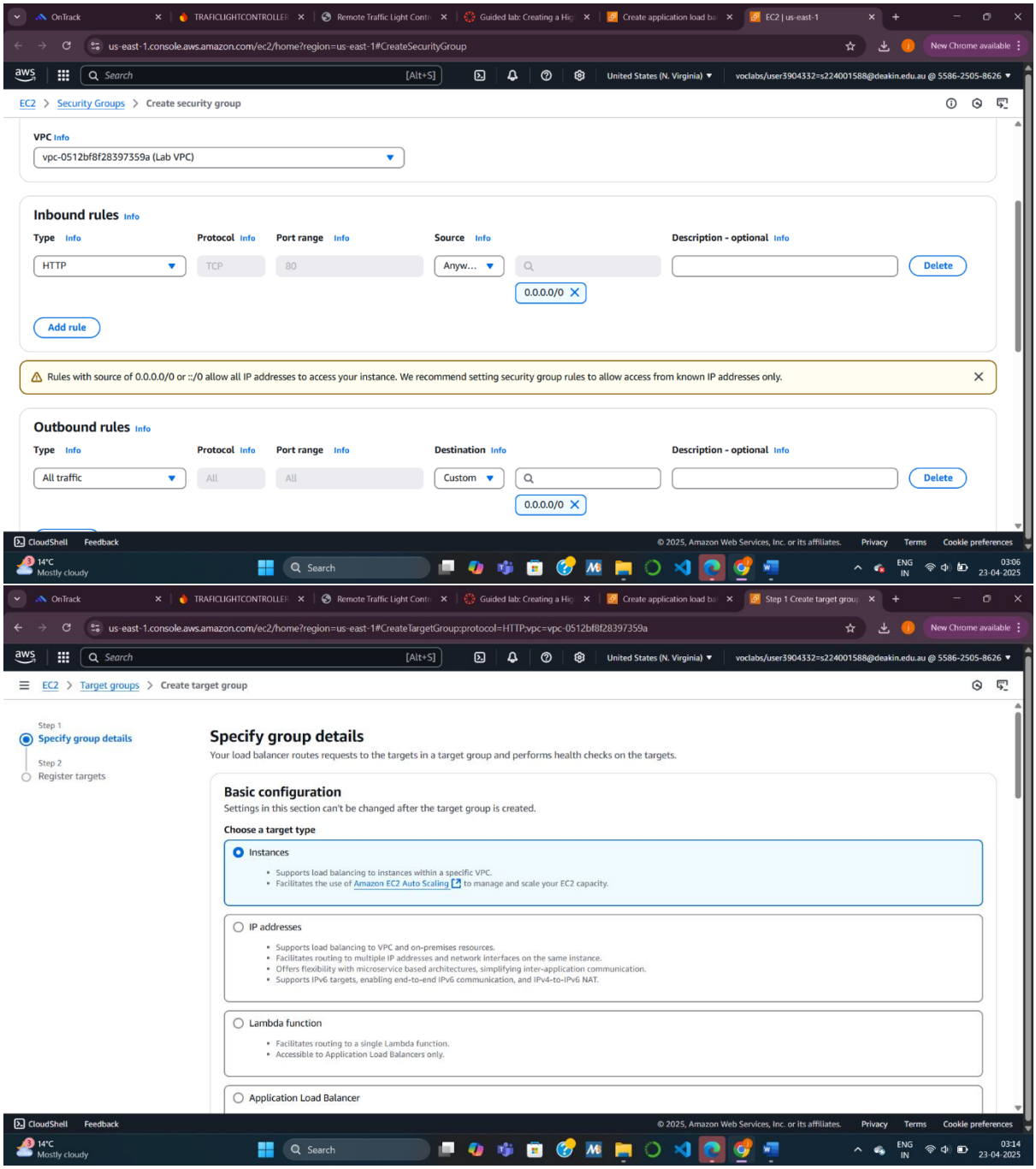
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateSecurityGroup
EC2 > Security Groups > Create security group
VPC Info
vpc-0512bf8f28397359a (Lab VPC)
Inbound rules Info
Type Info
Protocol Info
Port range Info
Source Info
Description - optional Info
HTTP
TCP
80
Anyw...
0.0.0.0/0
Delete
Add rule
Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.
Outbound rules Info
Type Info
Protocol Info
Port range Info
Destination Info
Description - optional Info
All traffic
All
All
Custom
0.0.0.0/0
Delete
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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTargetGroup:protocol=HTTP;vpc=vpc-0512bf8f28397359a
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
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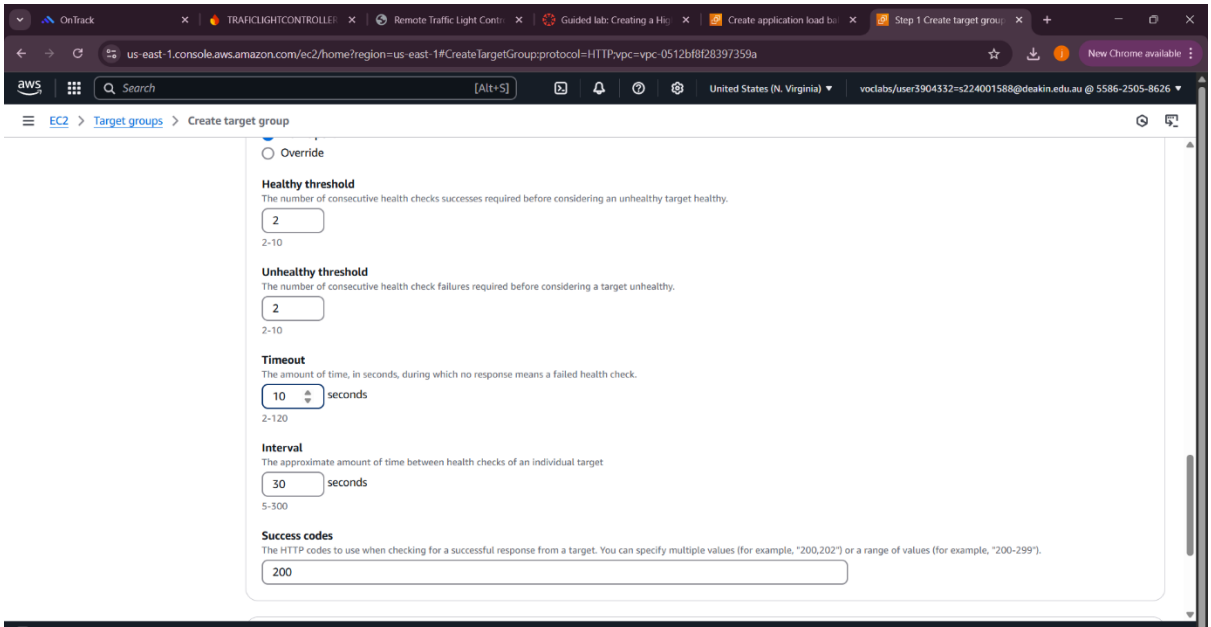
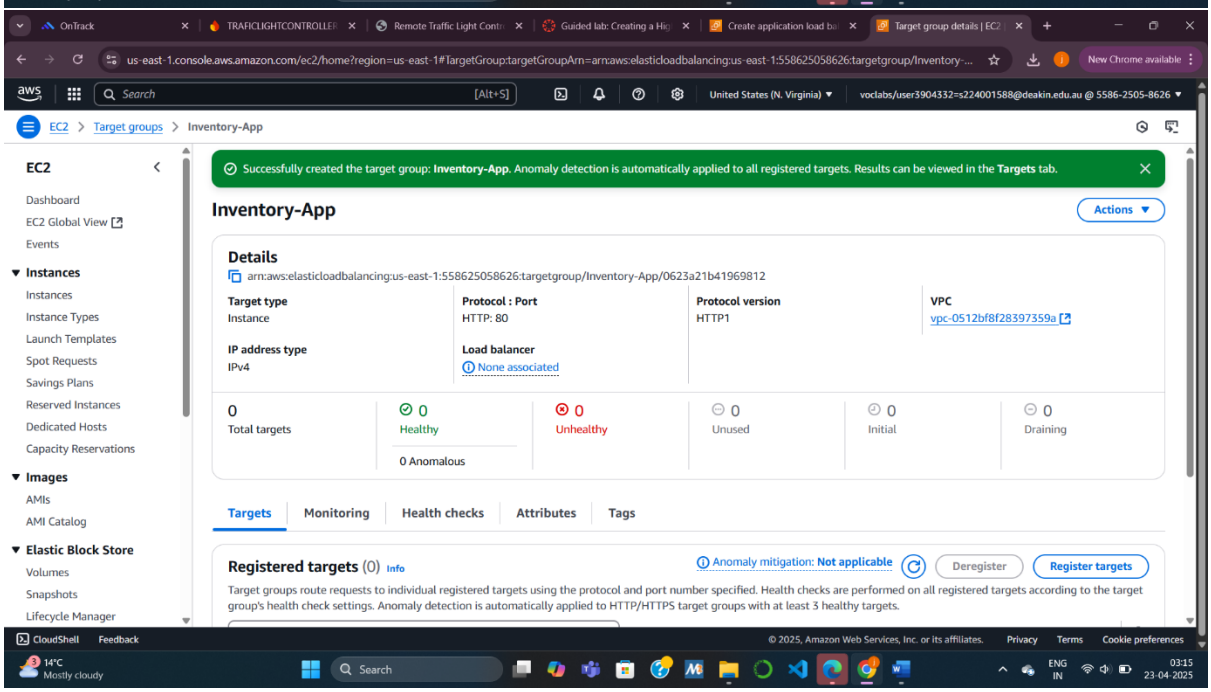
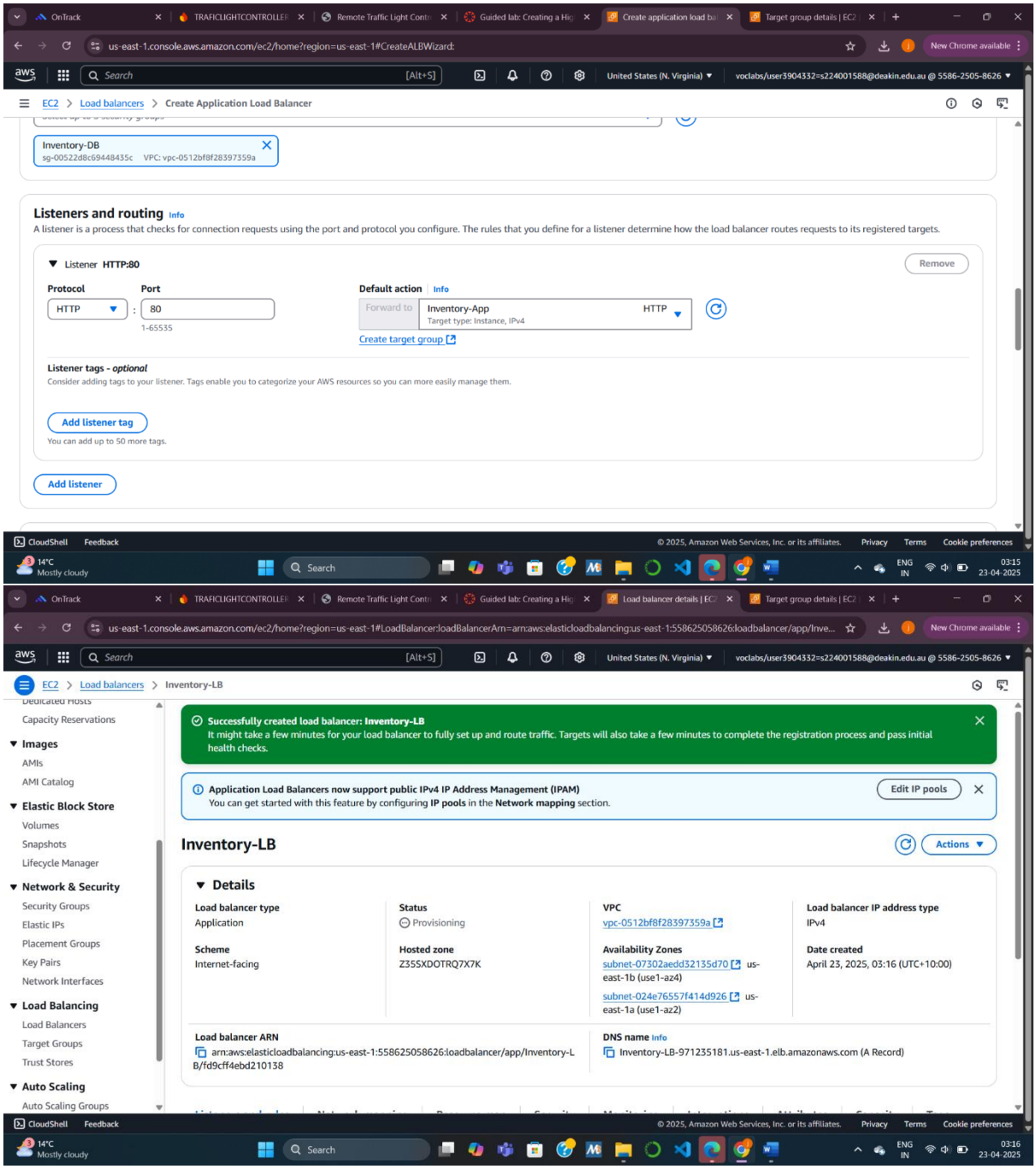

Override
Healthy threshold
The number of consecutive health checks successes required before considering an unhealthy target healthy.
2
2-10
Unhealthy threshold
The number of consecutive health check failures required before considering a target unhealthy.
2
2-10
Timeout
The amount of time, in seconds, during which no response means a failed health check.
10
seconds
2-120
Interval
The approximate amount of time between health checks of an individual target
30
seconds
5-300
Success codes
The HTTP codes to use when checking for a successful response from a target. You can specify multiple values (for example, "200,202") or a range of values (for example, "200-299").
200


Successfully created the target group: Inventory-App. Anomaly detection is automatically applied to all registered targets. Results can be viewed in the Targets tab.
Inventory-App
Actions
Details
arn:aws:elasticloadbalancing:us-east-1:558625058626:targetgroup/Inventory-App/0623a21b41969812
Target type
Instance
Protocol : Port
HTTP: 80
Protocol version
HTTP1
VPC
vpc-0512bf8f28397359a
IP address type
IPv4
Load balancer
None associated
0
Total targets
0
Healthy
0 Anomalous
0
Unhealthy
0
Unused
0
Initial
0
Draining
Targets
Monitoring
Health checks
Attributes
Tags
Registered targets (0)
Info
Anomaly mitigation: Not applicable
Deregister
Register targets
Target groups route requests to individual registered targets using the protocol and port number specified. Health checks are performed on all registered targets according to the target group's health check settings. Anomaly detection is automatically applied to HTTP/HTTPS target groups with at least 3 healthy targets.



Task 3: Creating an Auto Scaling Group

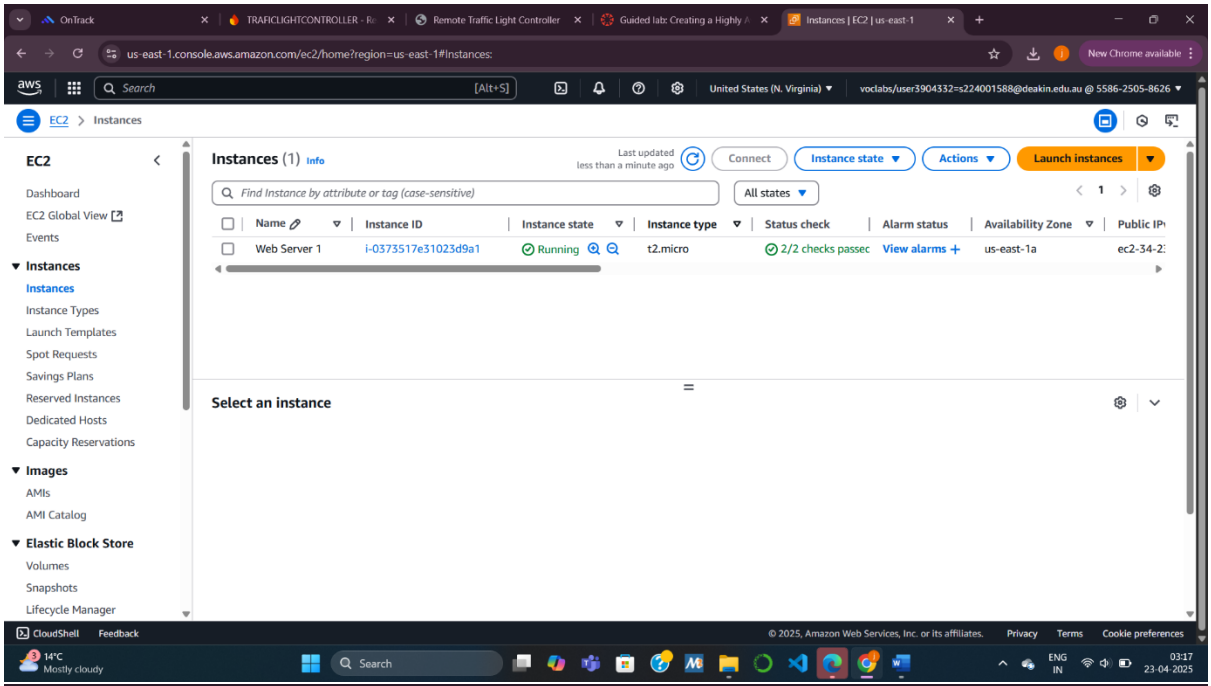
Task 3.1: Creating an AMI for Auto Scaling

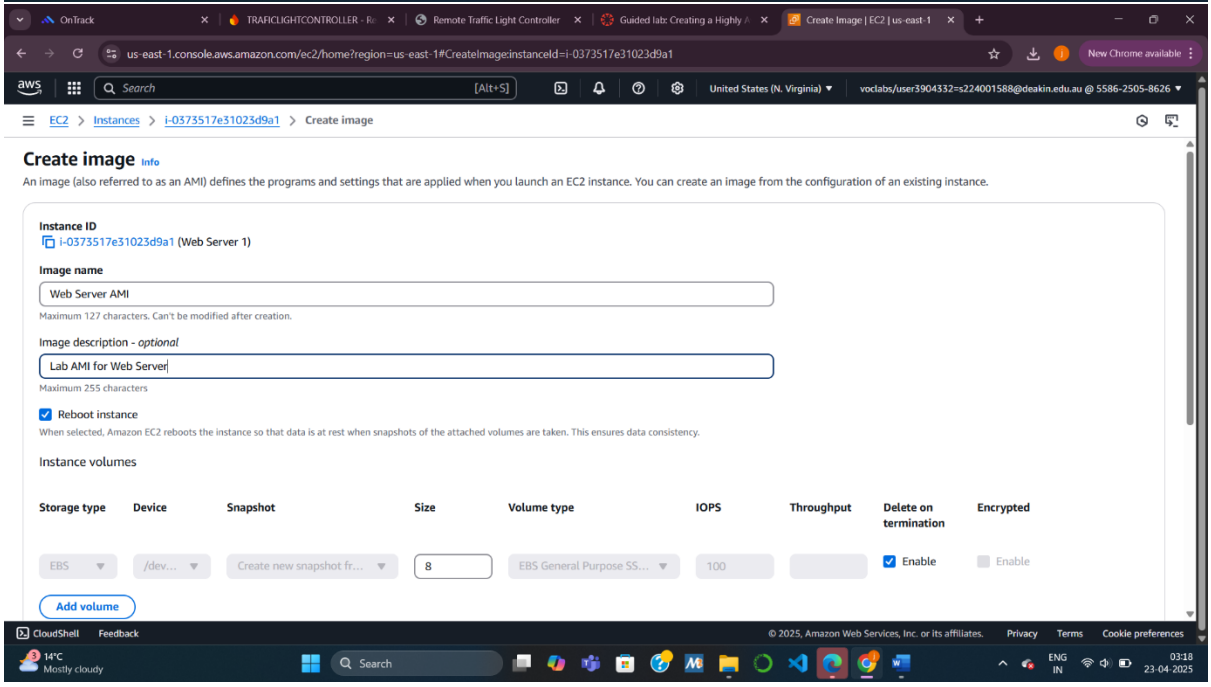
I created an Amazon Machine Image (AMI) from the existing Web Server 1. This AMI captured the configuration of the instance, allowing me to launch identical instances through the Auto Scaling group later.

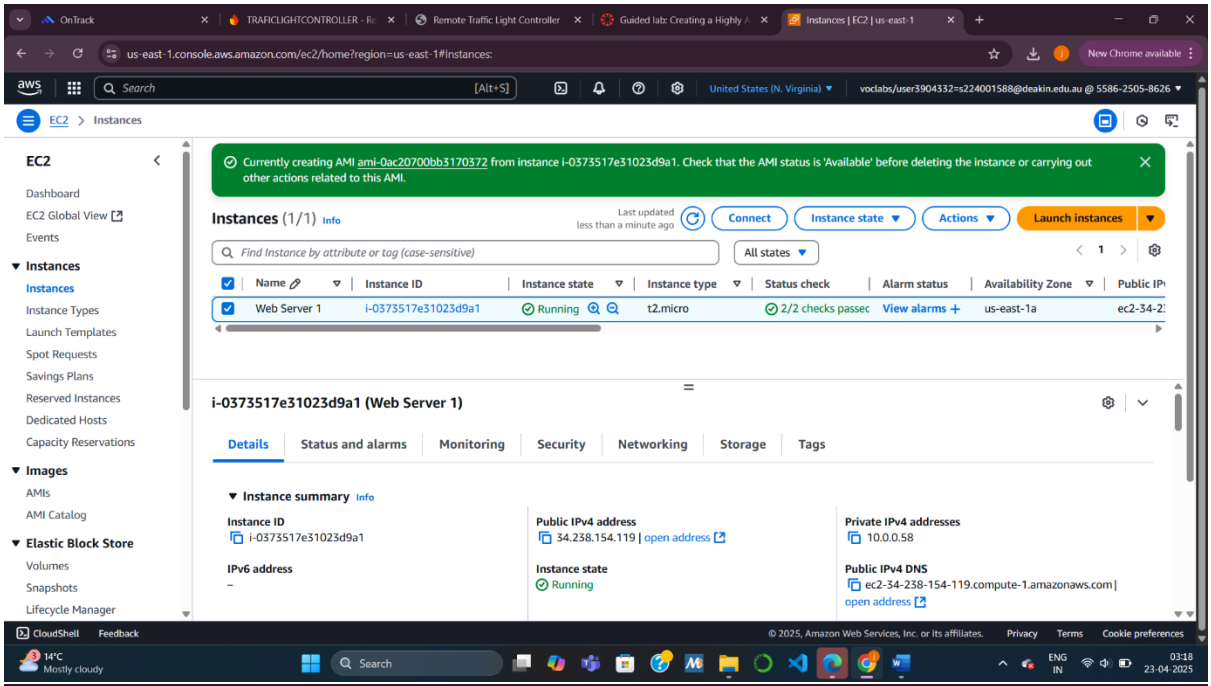
Task 3.2: Creating a Launch Template and an Auto Scaling Group

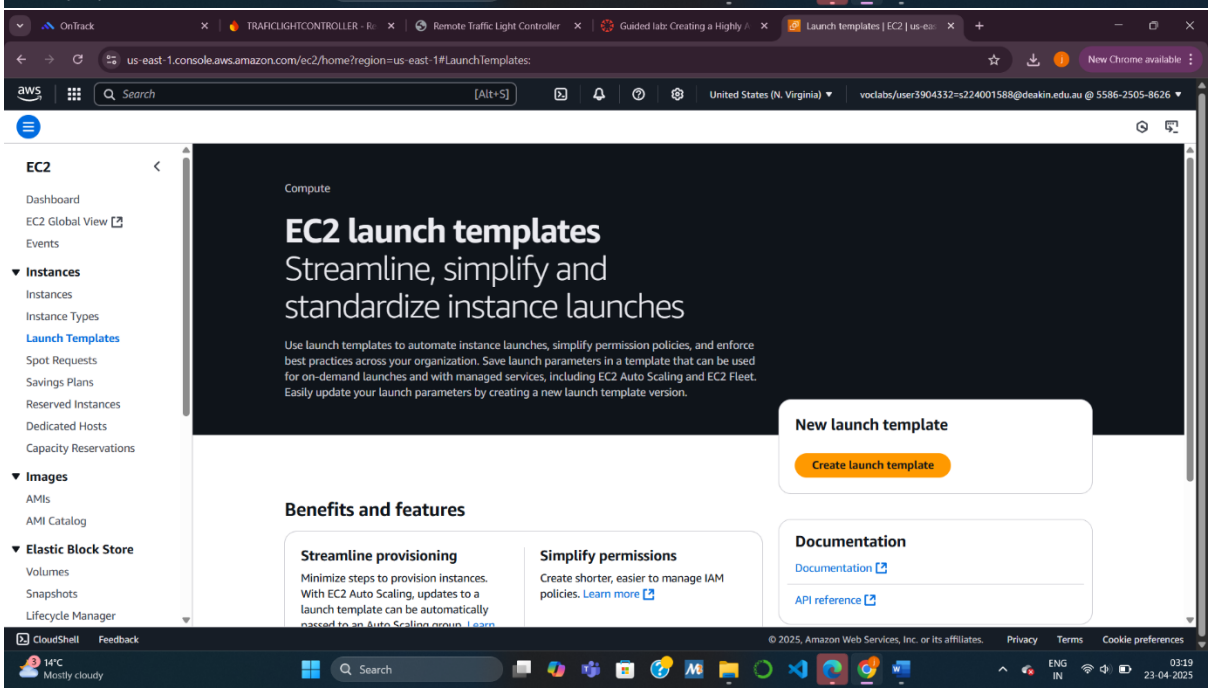
Using the AMI, I created a Launch Template (Inventory-LT) specifying details like instance type, key pair, IAM role, and user data to automate server setup. Then, I created an Auto Scaling Group (Inventory-ASG) configured to maintain two EC2 instances across two private subnets. The group was attached to the previously created Target Group (Inventory-App). This ensured that instances were

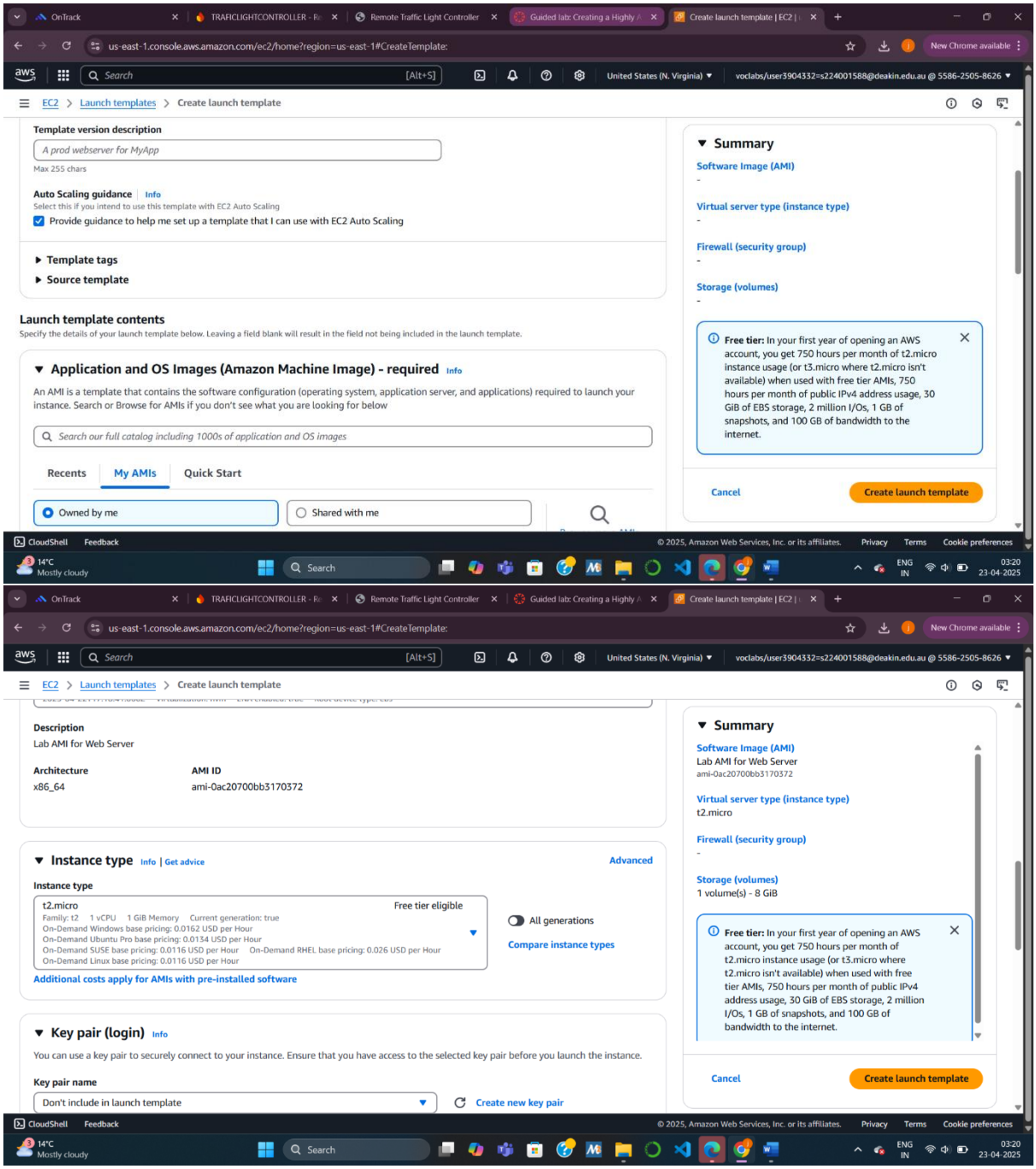
automatically launched, monitored, and replaced in case of failure, supporting continuous application availability.






us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:
EC2 > Instances
Currently creating AMI ami-0ac20700bb3170372 from instance i-0373517e31023d9a1. Check that the AMI status is 'Available' before deleting the instance or carrying out other actions related to this AMI.
Instances (1/1) Info
Connect
Instance state
Actions
Launch instances
Web Server 1
i-0373517e31023d9a1
Running
t2.micro
2/2 checks passed
View alarms
us-east-1a
i-0373517e31023d9a1 (Web Server 1)
Details
Status and alarms
Monitoring
Security
Networking
Storage
Tags
Instance summary Info
Instance ID
i-0373517e31023d9a1
Public IPv4 address
34.238.154.119 | open address
Private IPv4 addresses
10.0.0.58
IPv6 address
Instance state
Running
Public IPv4 DNS
ec2-34-238-154-119.compute-1.amazonaws.com | open address


us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchTemplates:
Compute
EC2 launch templates
Streamline, simplify and standardize instance launches
Use launch templates to automate instance launches, simplify permission policies, and enforce best practices across your organization. Save launch parameters in a template that can be used for on-demand launches and with managed services, including EC2 Auto Scaling and EC2 Fleet. Easily update your launch parameters by creating a new launch template version.
New launch template
Create launch template
Benefits and features
Streamline provisioning
Minimize steps to provision instances. With EC2 Auto Scaling, updates to a launch template can be automatically
Simplify permissions
Create shorter, easier to manage IAM policies. Learn more
Documentation
Documentation
API reference


us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:
EC2 > Launch templates > Create launch template
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
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
Search our full catalog including 1000s of application and OS images
Recents
My AMIs
Quick Start
Owned by me
Shared with me
Summary
Software Image (AMI)
Virtual server type (instance type)
Firewall (security group)
Storage (volumes)
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where t2.micro isn't available) when used with free tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.
Cancel
Create launch template
CloudShell
Feedback
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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:
EC2 > Launch templates > Create launch template
Description
Lab AMI for Web Server
Architecture
x86_64
AMI ID
ami-0ac20700bb3170372
Instance type Info | Get advice
Advanced
Instance type
t2.micro
Free tier eligible
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Windows base pricing: 0.0162 USD per Hour
On-Demand Ubuntu Pro base pricing: 0.0134 USD per Hour
On-Demand SUSE base pricing: 0.0116 USD per Hour On-Demand RHEL base pricing: 0.026 USD per Hour
On-Demand Linux base pricing: 0.0116 USD per Hour
All generations
Compare instance types
Additional costs apply for AMIs with pre-installed software
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
Don't include in launch template
Create new key pair
Summary
Software Image (AMI)
Lab AMI for Web Server
ami-0ac20700bb3170372
Virtual server type (instance type)
t2.micro
Firewall (security group)
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where t2.micro isn't available) when used with free tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.
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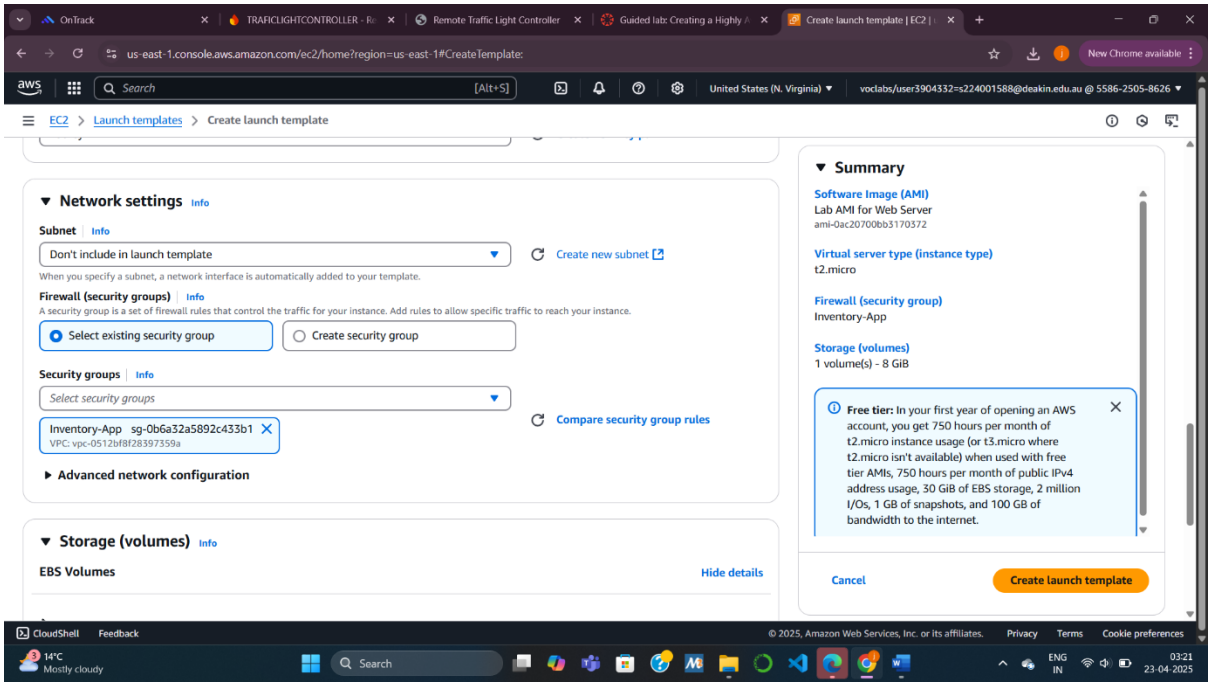
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Guided lab: Creating a Highly A
Create launch template | EC2 |
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:
New Chrome available
Search
[Alt+S]
United States (N. Virginia)
voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
EC2 > Launch templates > Create launch template
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
Inventory-App sg-0b6a32a5892c433b1
VPC: vpc-0512bf8f28397359a
Compare security group rules
Advanced network configuration
Storage (volumes) Info
EBS Volumes
Hide details
Summary
Software Image (AMI)
Lab AMI for Web Server
ami-0ac20700bb3170372
Virtual server type (instance type)
t2.micro
Firewall (security group)
Inventory-App
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where t2.micro isn't available) when used with free tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.
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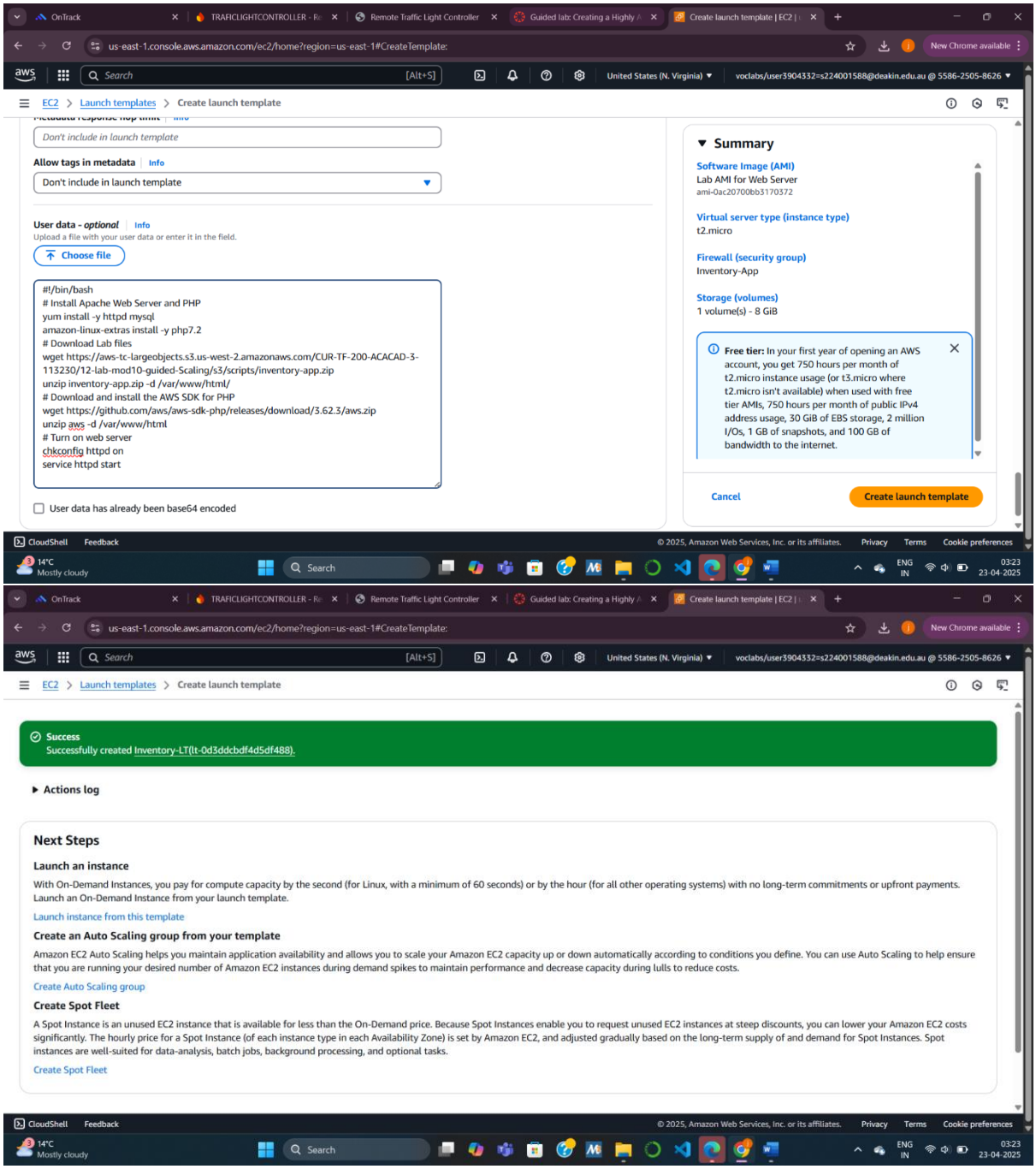
Don't include in launch template
Allow tags in metadata
Info
Don't include in launch template
User data - optional
Info
Upload a file with your user data or enter it in the field.
Choose file
#!/bin/bash
Install Apache Web Server and PHP
yum install -y httpd mysql
amazon-linux-extras install -y php7.2
Download Lab files
wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACACAD-3-113230/12-lab-mod10-guided-Scaling/s3/scripts/inventory-app.zip
unzip inventory-app.zip -d /var/www/html/
Download and install the AWS SDK for PHP
wget https://github.com/aws/aws-sdk-php/releases/download/3.62.3/aws.zip
unzip aws -d /var/www/html
Turn on web server
chkconfig httpd on
service httpd start
User data has already been base64 encoded
Summary
Software Image (AMI)
Lab AMI for Web Server
ami-0ac20700bb3170372
Virtual server type (instance type)
t2.micro
Firewall (security group)
Inventory-App
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where t2.micro isn't available) when used with free tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.
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Success
Successfully created Inventory-LT(lt-0d3ddcbdf4d5df488).
Actions log
Next Steps
Launch an instance
With On-Demand Instances, you pay for compute capacity by the second (for Linux, with a minimum of 60 seconds) or by the hour (for all other operating systems) with no long-term commitments or upfront payments. Launch an On-Demand Instance from your launch template.
Launch instance from this template
Create an Auto Scaling group from your template
Amazon EC2 Auto Scaling helps you maintain application availability and allows you to scale your Amazon EC2 capacity up or down automatically according to conditions you define. You can use Auto Scaling to help ensure that you are running your desired number of Amazon EC2 instances during demand spikes to maintain performance and decrease capacity during lulls to reduce costs.
Create Auto Scaling group
Create Spot Fleet
A Spot Instance is an unused EC2 instance that is available for less than the On-Demand price. Because Spot Instances enable you to request unused EC2 instances at steep discounts, you can lower your Amazon EC2 costs significantly. The hourly price for a Spot Instance (of each instance type in each Availability Zone) is set by Amazon EC2, and adjusted gradually based on the long-term supply of and demand for Spot Instances. Spot instances are well-suited for data-analysis, batch jobs, background processing, and optional tasks.
Create Spot Fleet
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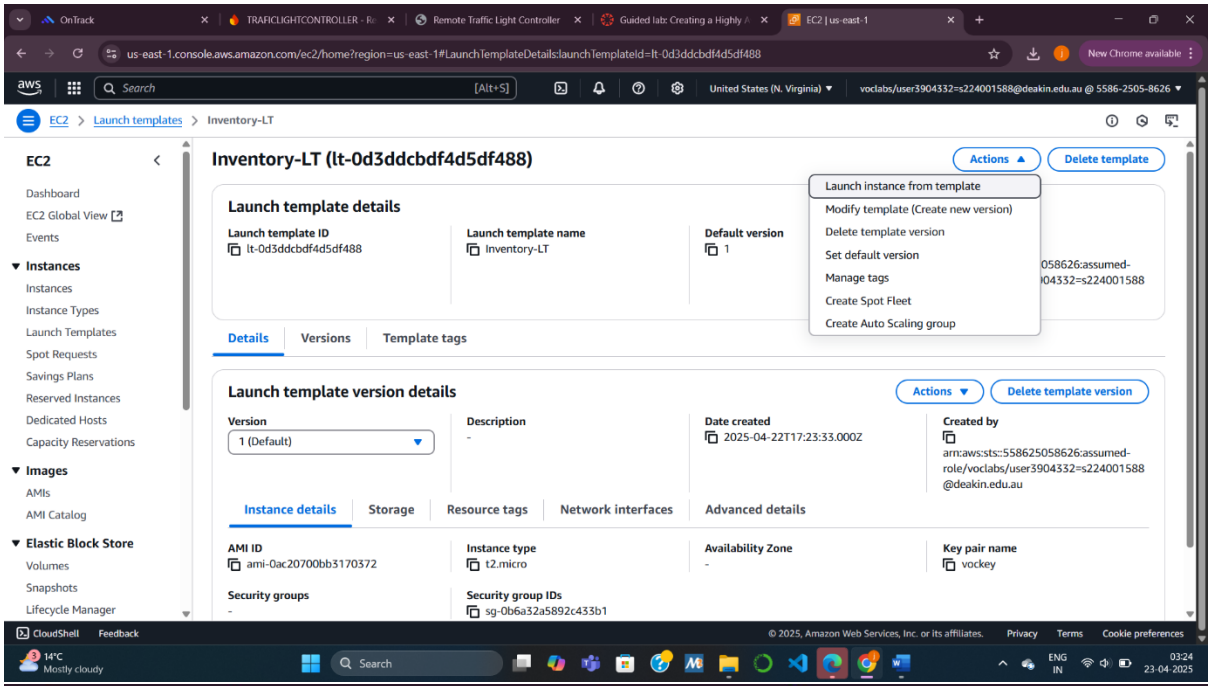
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EC2 | us-east-1
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchTemplateDetails:launchTemplateId=lt-0d3ddcbdf4d5df488
New Chrome available
Search
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United States (N. Virginia)
voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
EC2 > Launch templates > Inventory-LT
EC2
Dashboard
EC2 Global View
Events
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
Images
AMIs
AMI Catalog
Elastic Block Store
Volumes
Snapshots
Lifecycle Manager
Inventory-LT (lt-0d3ddcbdf4d5df488)
Actions
Delete template
Launch instance from template
Modify template (Create new version)
Delete template version
Set default version
Manage tags
Create Spot Fleet
Create Auto Scaling group
Launch template details
Launch template ID
lt-0d3ddcbdf4d5df488
Launch template name
Inventory-LT
Default version
1
Details
Versions
Template tags
Launch template version details
Actions
Delete template version
Version
1 (Default)
Description
-
Date created
2025-04-22T17:23:33.000Z
Created by
arn:aws:sts::558625058626:assumed-role/voclabs/user3904332=s224001588@deakin.edu.au
Instance details
Storage
Resource tags
Network interfaces
Advanced details
AMI ID
ami-0ac20700bb3170372
Instance type
t2.micro
Availability Zone
-
Key pair name
vockey
Security groups
-
Security group IDs
sg-0b6a32a5892c433b1
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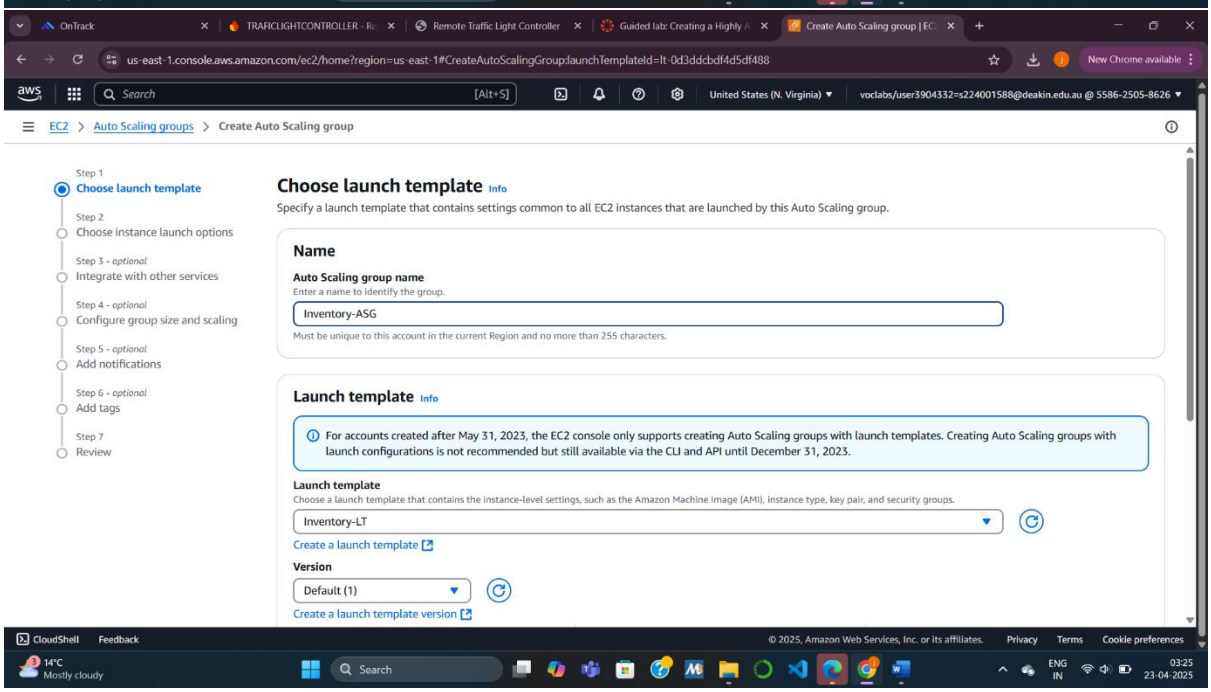
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Create Auto Scaling group | EC
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:launchTemplateId=lt-0d3ddcbdf4d5df488
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EC2 > Auto Scaling groups > Create Auto Scaling group
Step 1
Choose launch template
Step 2
Choose instance launch options
Step 3 - optional
Integrate with other services
Step 4 - optional
Configure group size and scaling
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.
Inventory-ASG
Must be unique to this account in the current Region and no more than 255 characters.
Launch template Info
For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch templates. Creating Auto Scaling groups with launch configurations is not recommended but still available via the CLI and API until December 31, 2023.
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.
Inventory-LT
Create a launch template
Version
Default (1)
Create a launch template version
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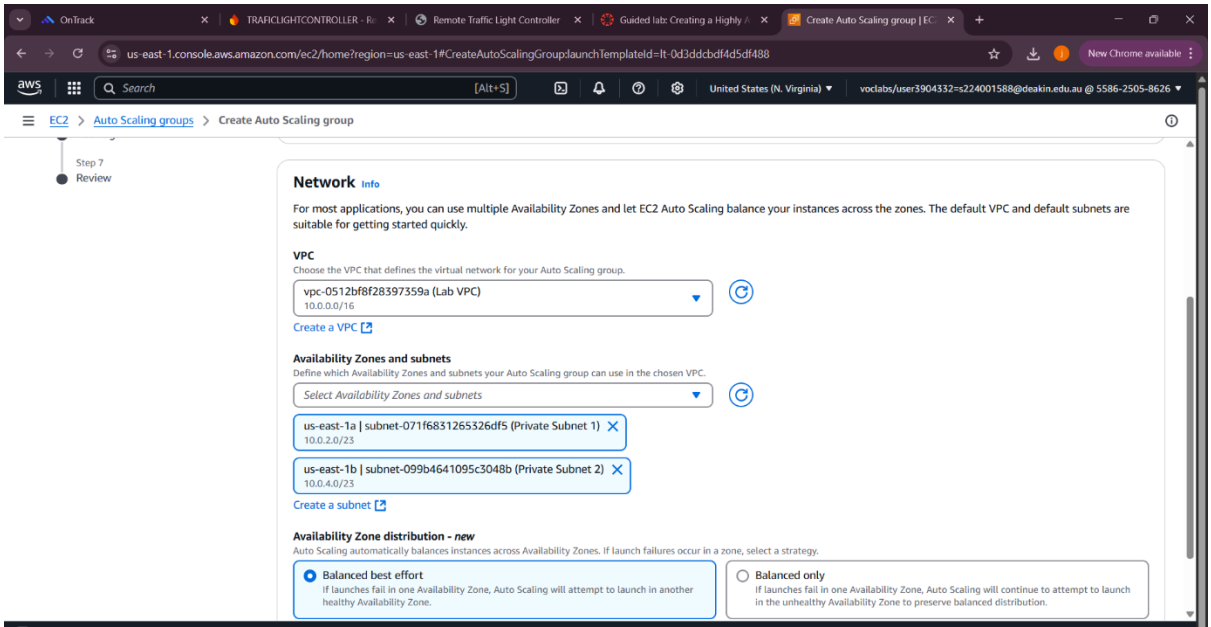
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Create Auto Scaling group | EC2
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:launchTemplateId=lt-0d3ddcbdf4d5df488
New Chrome available
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voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
EC2 > Auto Scaling groups > Create Auto Scaling group
Step 7
Review
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-0512bf8f28397359a (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-071f6831265326df5 (Private Subnet 1)
10.0.2.0/23
us-east-1b | subnet-099b4641095c3048b (Private Subnet 2)
10.0.4.0/23
Create a subnet
Availability Zone distribution - new
Auto Scaling automatically balances instances across Availability Zones. If launch failures occur in a zone, select a strategy.
Balanced best effort
If launches fail in one Availability Zone, Auto Scaling will attempt to launch in another healthy Availability Zone.
Balanced only
If launches fail in one Availability Zone, Auto Scaling will continue to attempt to launch in the unhealthy Availability Zone to preserve balanced distribution.
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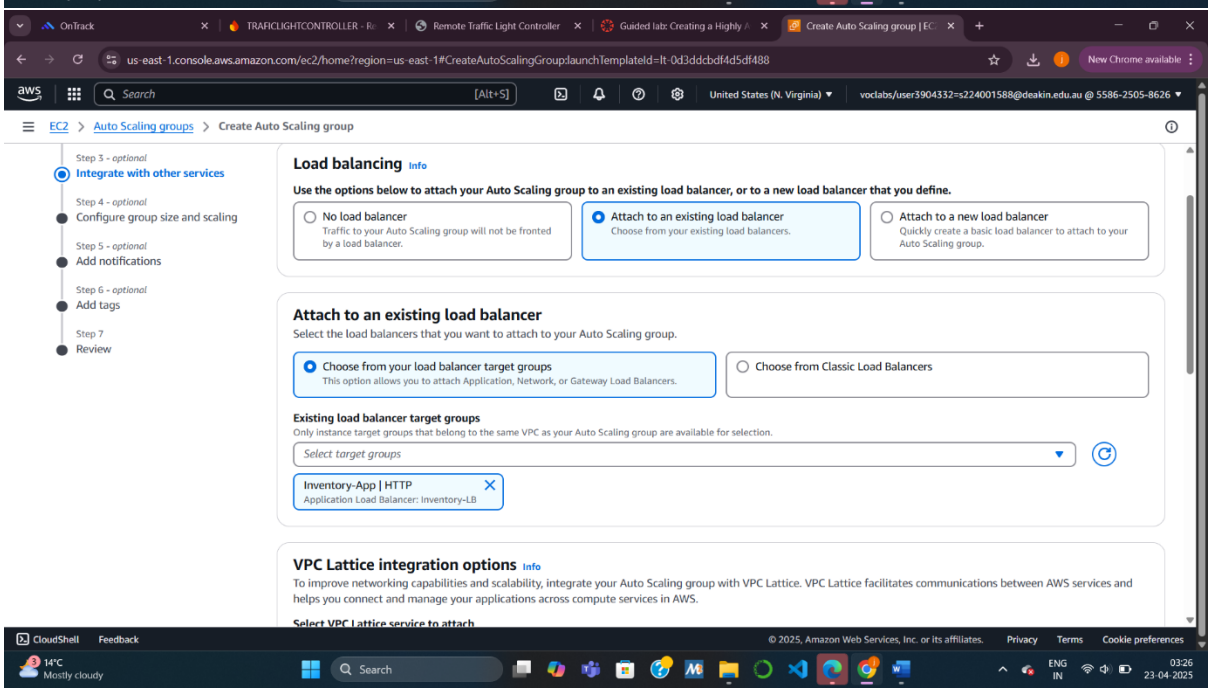
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Guided lab: Creating a Highly A
Create Auto Scaling group | EC2
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:launchTemplateId=lt-0d3ddcbdf4d5df488
New Chrome available
Search [Alt+S]
United States (N. Virginia)
voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
EC2 > Auto Scaling groups > Create Auto Scaling group
Step 3 - optional
Integrate with other services
Step 4 - optional
Configure group size and scaling
Step 5 - optional
Add notifications
Step 6 - optional
Add tags
Step 7
Review
Load balancing Info
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
Inventory-App | HTTP
Application Load Balancer: Inventory-LB
VPC Lattice integration options Info
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.
Select VPC Lattice service to attach
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Cookie preferences
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Mostly cloudy
Search
ENG
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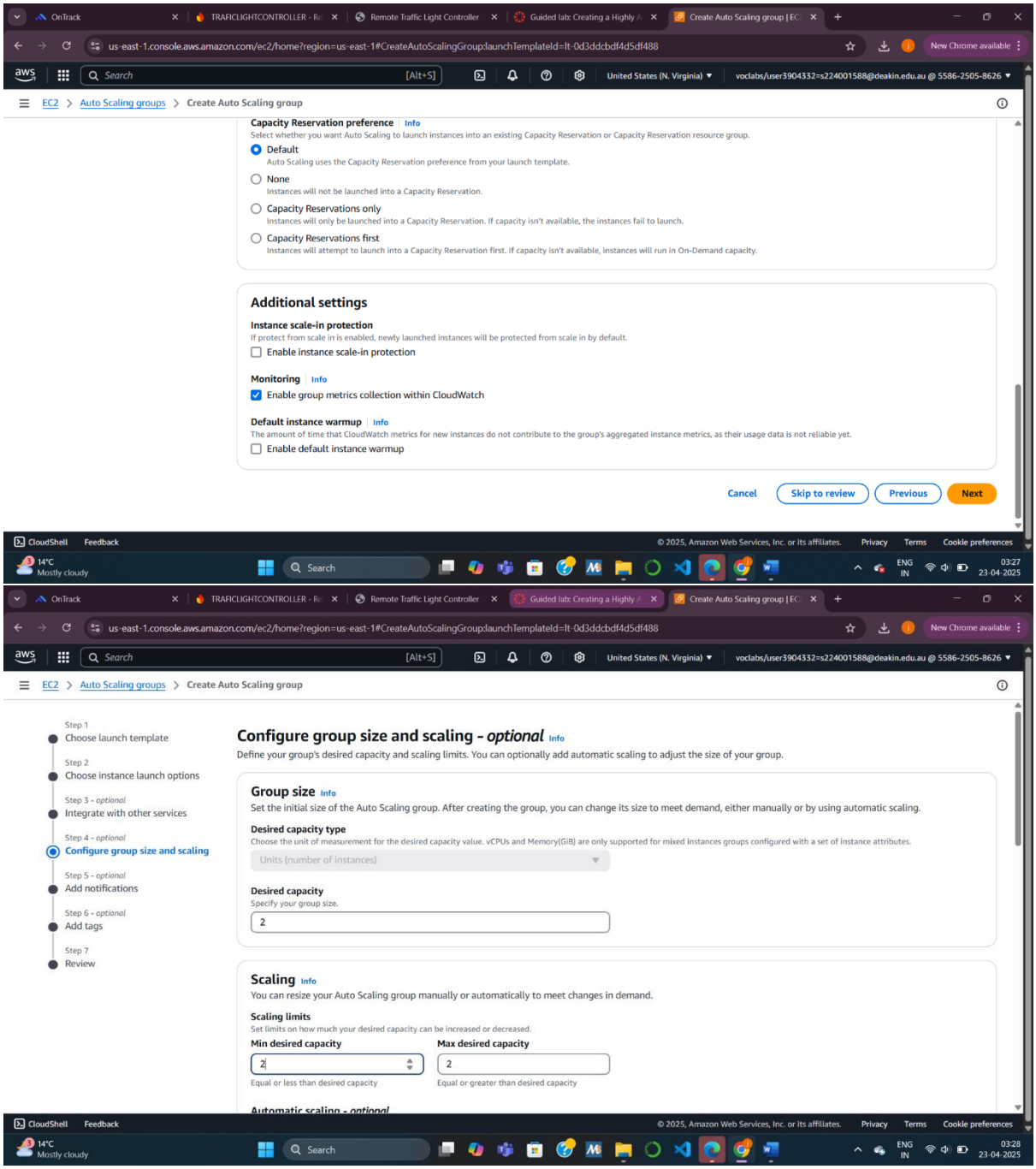
23-04-2025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Guided lab: Creating a Highly A
Create Auto Scaling group | EC2
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:launchTemplateId=lt-0d3ddcbdf4d5df488
New Chrome available
Search
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United States (N. Virginia)
voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
EC2 > Auto Scaling groups > Create Auto Scaling group
Capacity Reservation preference | Info
Select whether you want Auto Scaling to launch instances into an existing Capacity Reservation or Capacity Reservation resource group.
Default
Auto Scaling uses the Capacity Reservation preference from your launch template.
None
Instances will not be launched into a Capacity Reservation.
Capacity Reservations only
Instances will only be launched into a Capacity Reservation. If capacity isn't available, the instances fail to launch.
Capacity Reservations first
Instances will attempt to launch into a Capacity Reservation first. If capacity isn't available, instances will run in On-Demand capacity.
Additional settings
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
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
CloudShell
Feedback
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TRAFICLIGHTCONTROLLER - Re
Remote Traffic Light Controller
Guided lab: Creating a Highly A
Create Auto Scaling group | EC2
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:launchTemplateId=lt-0d3ddcbdf4d5df488
New Chrome available
Search
[Alt+S]
United States (N. Virginia)
voclabs/user3904332=s224001588@deakin.edu.au @ 5586-2505-8626
EC2 > Auto Scaling groups > Create Auto Scaling group
Step 1
Choose launch template
Step 2
Choose instance launch options
Step 3 - optional
Integrate with other services
Step 4 - optional
Configure group size and scaling
Step 5 - optional
Add notifications
Step 6 - optional
Add tags
Step 7
Review
Configure group size and scaling - optional Info
Define your group's desired capacity and scaling limits. You can optionally add automatic scaling to adjust the size of your group.
Group size Info
Set the initial size of the Auto Scaling group. After creating the group, you can change its size to meet demand, either manually or by using automatic scaling.
Desired capacity type
Choose the unit of measurement for the desired capacity value. vCPUs and Memory(GiB) are only supported for mixed instances groups configured with a set of instance attributes.
Units (number of instances)
Desired capacity
Specify your group size.
2
Scaling Info
You can resize your Auto Scaling group manually or automatically to meet changes in demand.
Scaling limits
Set limits on how much your desired capacity can be increased or decreased.
Min desired capacity
2
Equal or less than desired capacity
Max desired capacity
2
Equal or greater than desired capacity
Automatic scaling - optional
CloudShell
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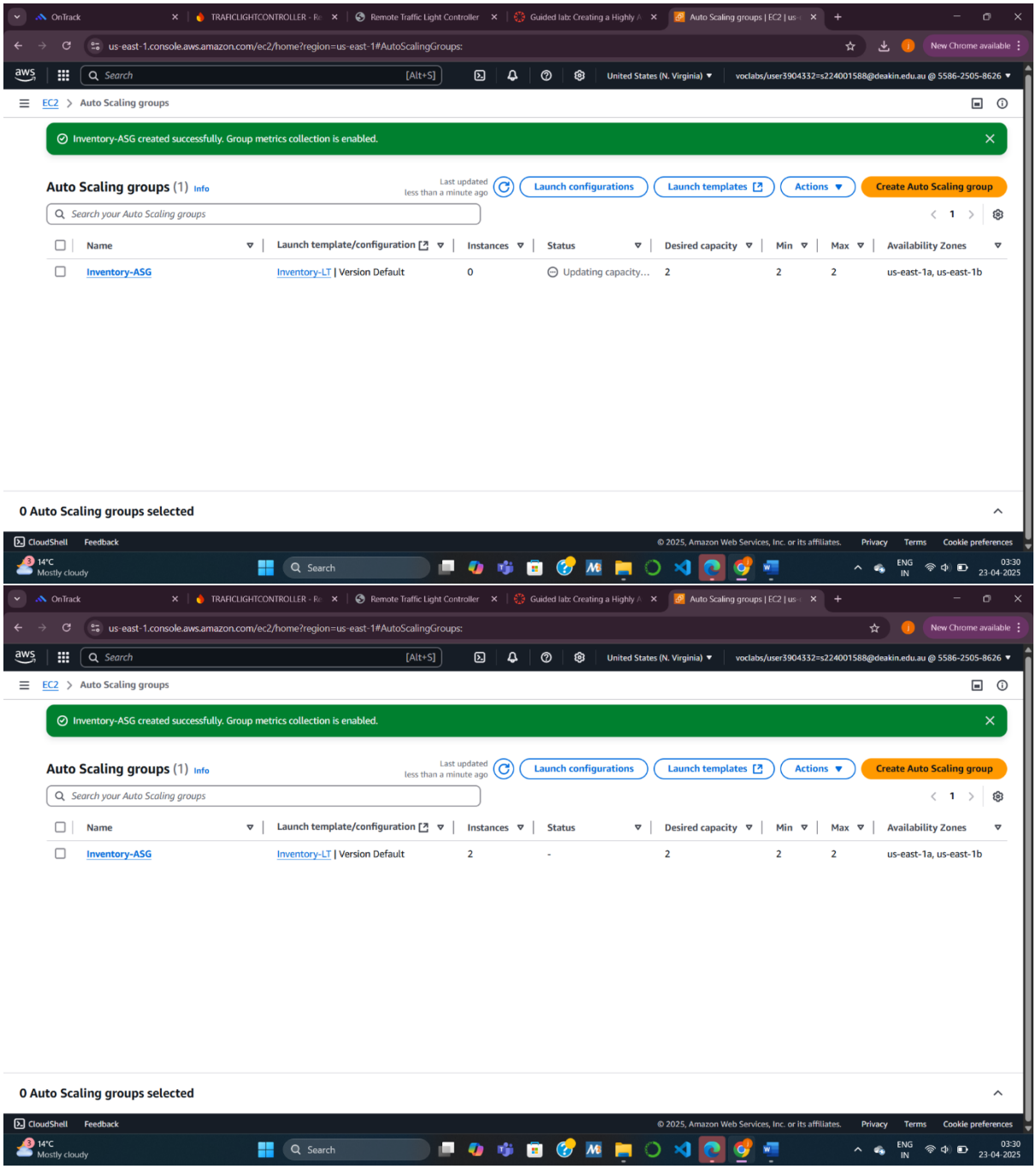
23-04-2025



Task 4: Updating Security Groups

Task 4.1: Configuring the Load Balancer Security Group

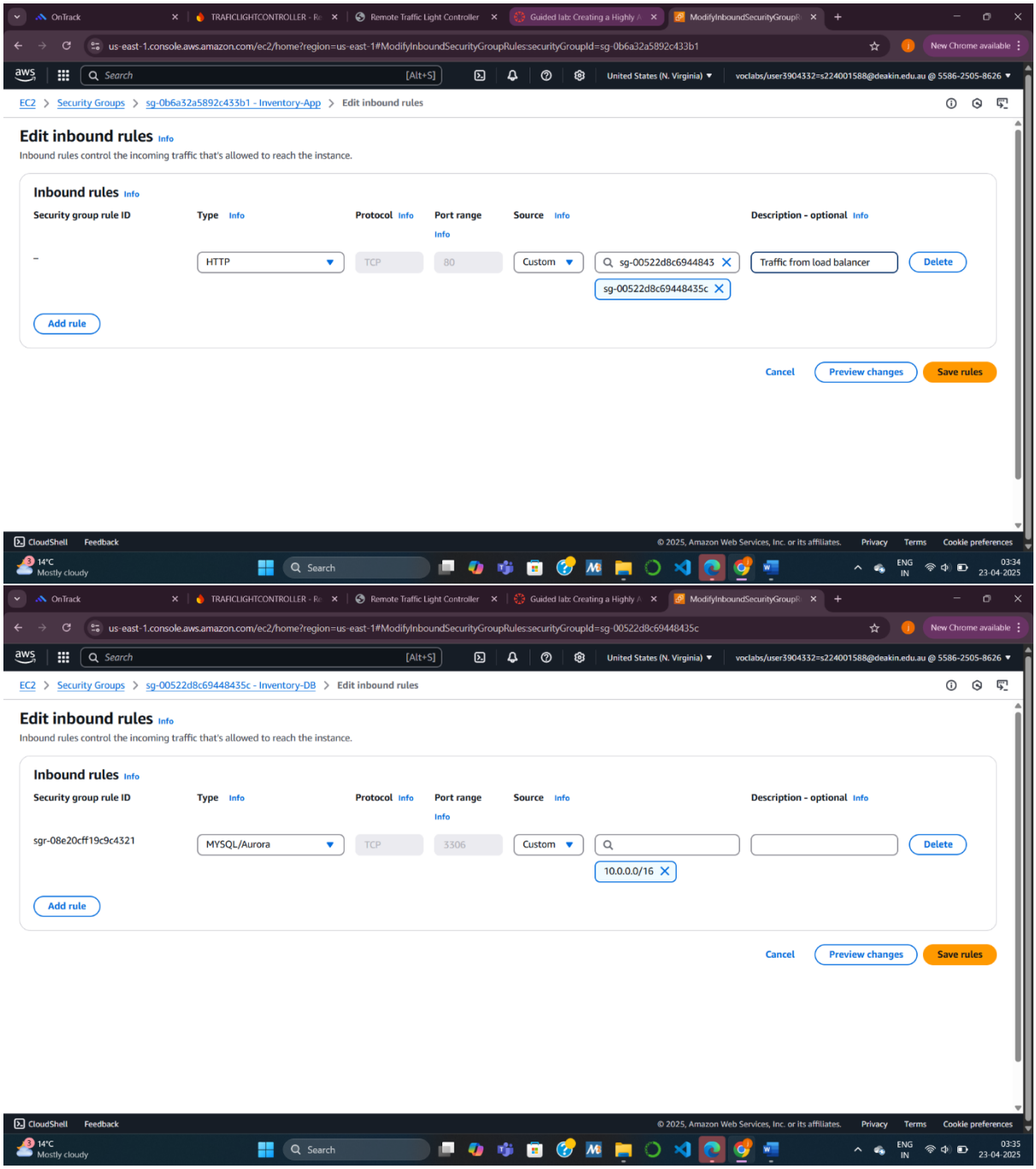
I verified that the Load Balancer's Security Group (Inventory-LB) was set to allow HTTP and HTTPS traffic from external sources. This group facilitates client communication with the application.

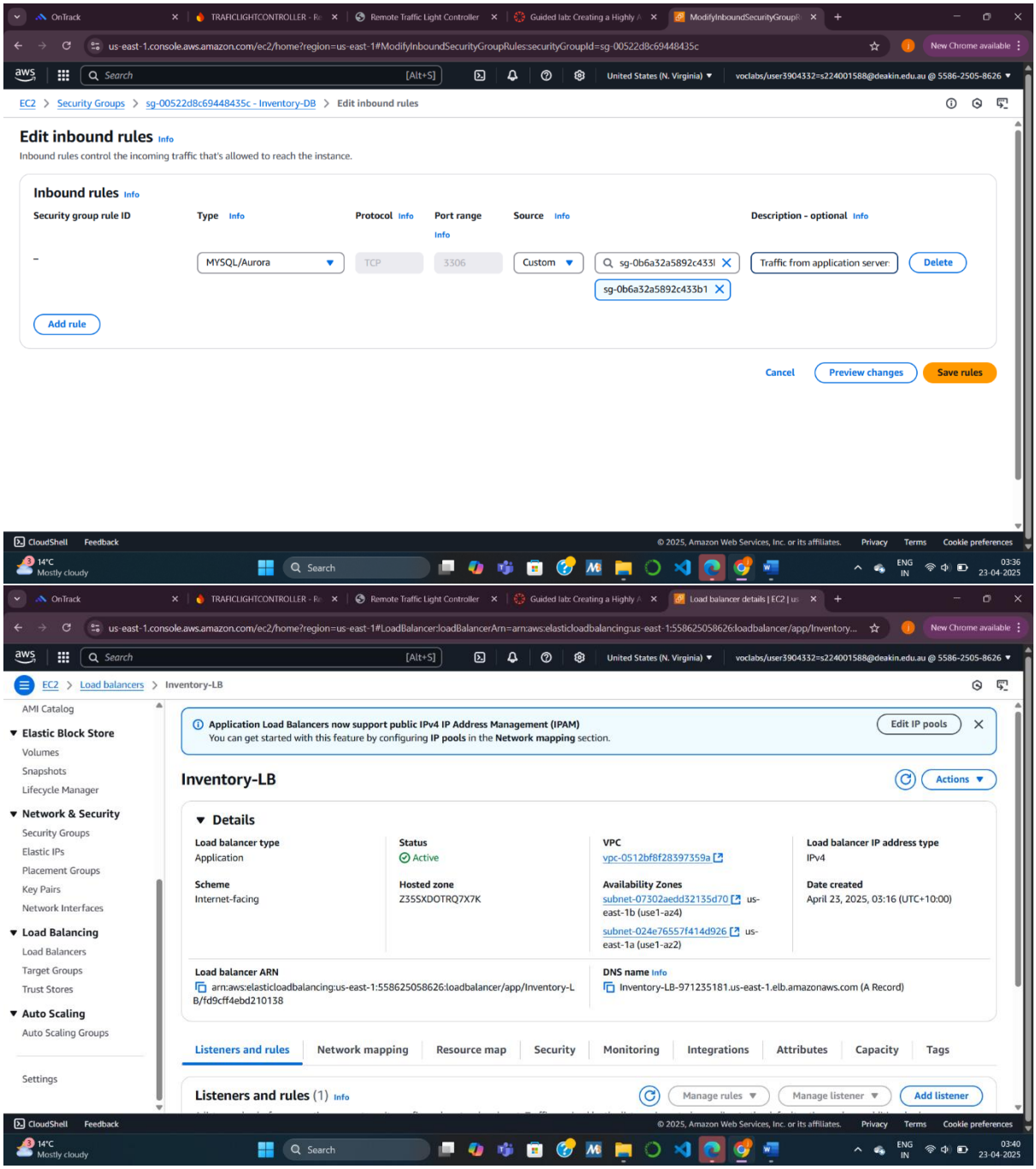
Task 4.2: Configuring the Application Security Group

The Application Security Group (Inventory-App) was configured to accept incoming HTTP traffic only from the Load Balancer Security Group. This prevents direct access to the EC2 instances from the internet, enforcing a secure tiered architecture.

Task 4.3: Configuring the Database Security Group

I updated the Database Security Group (Inventory-DB) to only allow MySQL (port 3306) traffic from the Application Security Group. This enforced the principle of least privilege by restricting database access solely to the application layer.

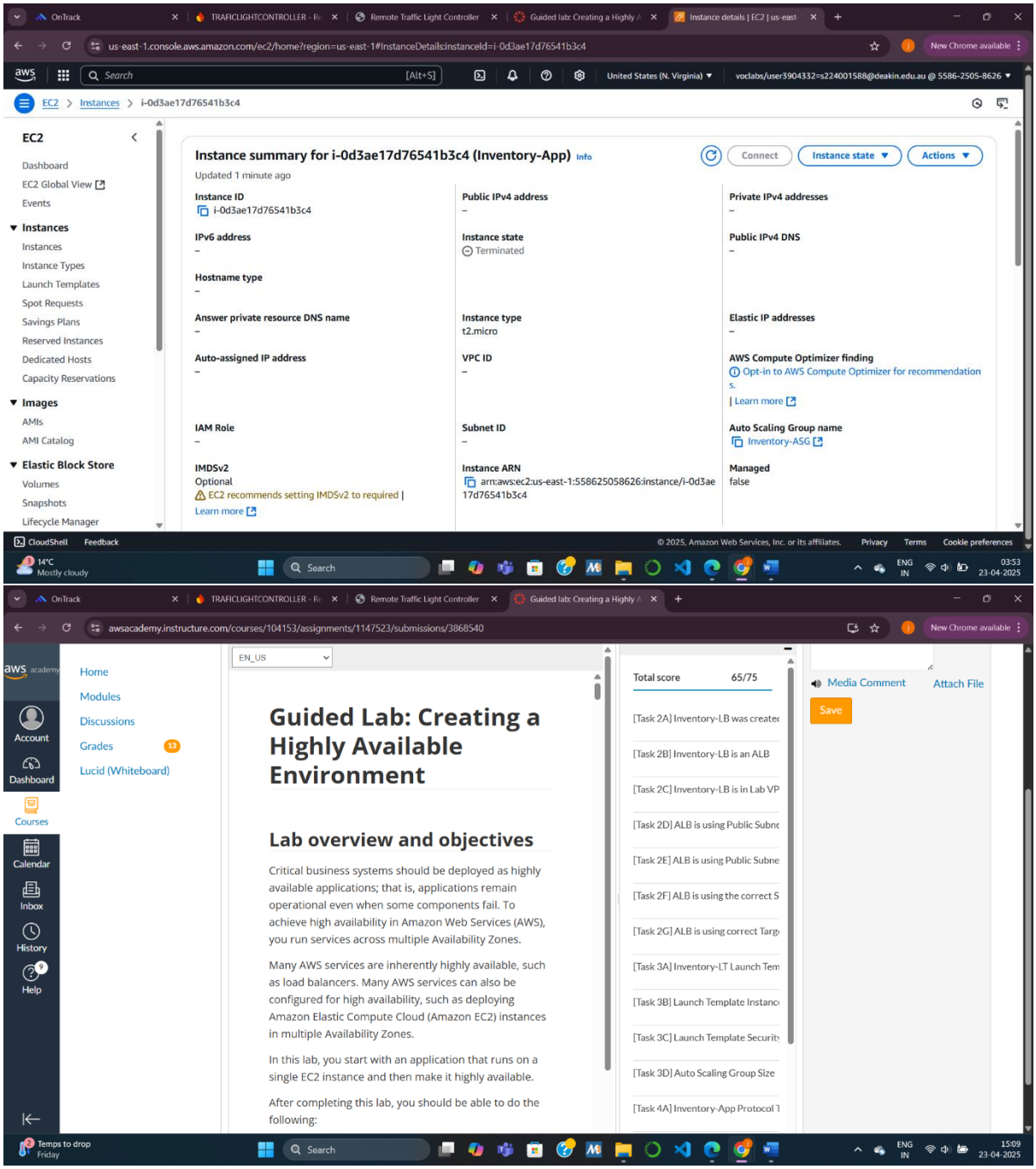




Task 5: Testing the Application

In this task, I verified that the application was properly deployed and reachable through the Load Balancer's DNS. I confirmed that the Target Group registered two healthy EC2 instances and tested the Load Balancer by accessing the application's web page. Reloading the page showed load distribution between the two instances, proving correct setup and functionality.

Additionally , To simulate a failure scenario, I terminated one of the application's EC2 instances. The Load Balancer detected the failure and routed traffic to the remaining healthy instance without service interruption. The Auto Scaling Group automatically launched a replacement instance to maintain the desired instance count. This test validated the effectiveness of the high availability setup.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EC2 > Instances > i-0d3ae17d76541b3c4
Instance summary for i-0d3ae17d76541b3c4 (Inventory-App) Info
Updated 1 minute ago
Connect
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Actions
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i-0d3ae17d76541b3c4
Public IPv4 address
–
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–
IPv6 address
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Hostname type
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Answer private resource DNS name
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Instance type
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Elastic IP addresses
–
Auto-assigned IP address
–
VPC ID
–
AWS Compute Optimizer finding
Opt-in to AWS Compute Optimizer for recommendations.
Learn more
IAM Role
–
Subnet ID
–
Auto Scaling Group name
Inventory-ASG
IMDSv2
Optional
EC2 recommends setting IMDSv2 to required
Learn more
Instance ARN
arn:aws:ec2:us-east-1:558625058626:instance/i-0d3ae17d76541b3c4
Managed
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CloudShell
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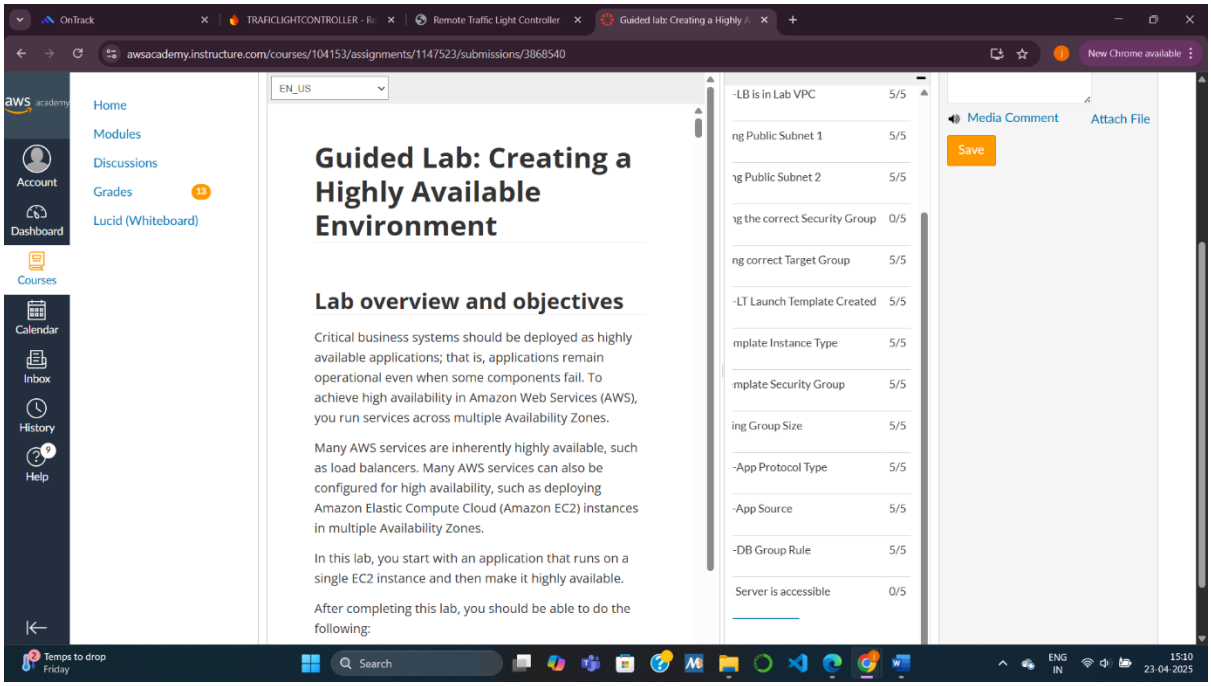
Modules
Discussions
Grades
Lucid (Whiteboard)
Guided Lab: Creating a Highly Available Environment
Lab overview and objectives
Critical business systems should be deployed as highly available applications; that is, applications remain operational even when some components fail. To achieve high availability in Amazon Web Services (AWS), you run services across multiple Availability Zones.
Many AWS services are inherently highly available, such as load balancers. Many AWS services can also be configured for high availability, such as deploying Amazon Elastic Compute Cloud (Amazon EC2) instances in multiple Availability Zones.
In this lab, you start with an application that runs on a single EC2 instance and then make it highly available.
After completing this lab, you should be able to do the following:
Total score 65/75
[Task 2A] Inventory-LB was create
[Task 2B] Inventory-LB is an ALB
[Task 2C] Inventory-LB is in Lab VP
[Task 2D] ALB is using Public Subnc
[Task 2E] ALB is using Public Subne
[Task 2F] ALB is using the correct S
[Task 2G] ALB is using correct Targ
[Task 3A] Inventory-LT Launch Tem
[Task 3B] Launch Template Instanc
[Task 3C] Launch Template Securit
[Task 3D] Auto Scaling Group Size
[Task 4A] Inventory-App Protocol T
Media Comment
Attach File
Save



WHAT WENT WRONG ?

Problem 1: Load Balancer Security Group is Incorrect

What Went Wrong:

- The Load Balancer (Inventory-LB) was **not assigned the correct Security Group**.
- The Security Group attached to the Load Balancer is **not named or configured as "Inventory-LB" Security Group** as expected.
- Security Groups act like virtual firewalls for your instances and Load Balancer — if these aren't configured correctly, the application won't be reachable.

How to Rectify :

1. **Identify the Correct Security Group:**
    - Make sure there is a dedicated Security Group created for the Load Balancer named properly (e.g., Inventory-LB).
    - This Security Group should allow **incoming HTTP/HTTPS traffic (TCP port 80 and/or 443)** from anywhere (0.0.0.0/0) or your allowed IP ranges.
2. **Check Security Group Attachment:**
    - When creating or configuring the Load Balancer, explicitly **attach the correct Security Group** (Inventory-LB group).
    - Verify this in the AWS Console under **EC2 → Load Balancers → Select your LB → Description → Security Groups**.
3. **Double-Check Inbound and Outbound Rules:**

- Inbound Rule:
  - Allow HTTP (Port 80) and/or HTTPS (Port 443).
- Outbound Rule:
  - Allow all outbound traffic (default is usually fine unless restricted).

Problem 2: Application is Not Reachable (Possible Subnet or Instance Issue)

What Went Wrong:

- Even though your Load Balancer is in **public subnets**, the system reports that **the application is not reachable**.
- The issue may relate to **subnet configuration, Security Group settings, or unhealthy target instances**.

How to Rectify :

1. **Verify Public Subnet Settings:**
   - Ensure the subnets used by the Load Balancer are:
     - Marked as **public** (i.e., have a Route Table with a route to the **Internet Gateway**).
   - Check subnet settings under **VPC → Subnets → Route Table → Routes**.
2. **Check Auto Scaling Group and Target Group Health:**
   - Confirm that **two healthy instances** are running in the Auto Scaling Group.
   - Check that the **Target Group health check path** is correct (e.g., /index.html or /health endpoint).
   - Instances must respond successfully to the health check; otherwise, they will be marked as **unhealthy**.
3. **Instance Security Group Rules:**
   - The Security Group attached to your EC2 instances (through Launch Template or Auto Scaling Group) **must allow inbound traffic from the Load Balancer Security Group** on the application port (usually TCP port 80).
   - Example:
     - Inbound Rule:
       - Type: HTTP
       - Source: **Inventory-LB Security Group ID**
4. **Confirm Web Server is Running:**
   - Ensure that the EC2 instances are actually **running the web server** (like Apache, Nginx, etc.) and listening on the correct port.

TO SUMMARIZE:

* Ensure the correct Security Group is attached to the Load Balancer with proper inbound rules (HTTP/HTTPS).

* Verify public subnets are properly routed through an Internet Gateway.

* Confirm that the Auto Scaling Group is launching healthy instances.

* Double-check that instances accept traffic from the Load Balancer's Security Group on the correct port.

* Validate the web server is running and reachable on the target instances.

* Always test instance health and Load Balancer reachability before submission.

Task Questions

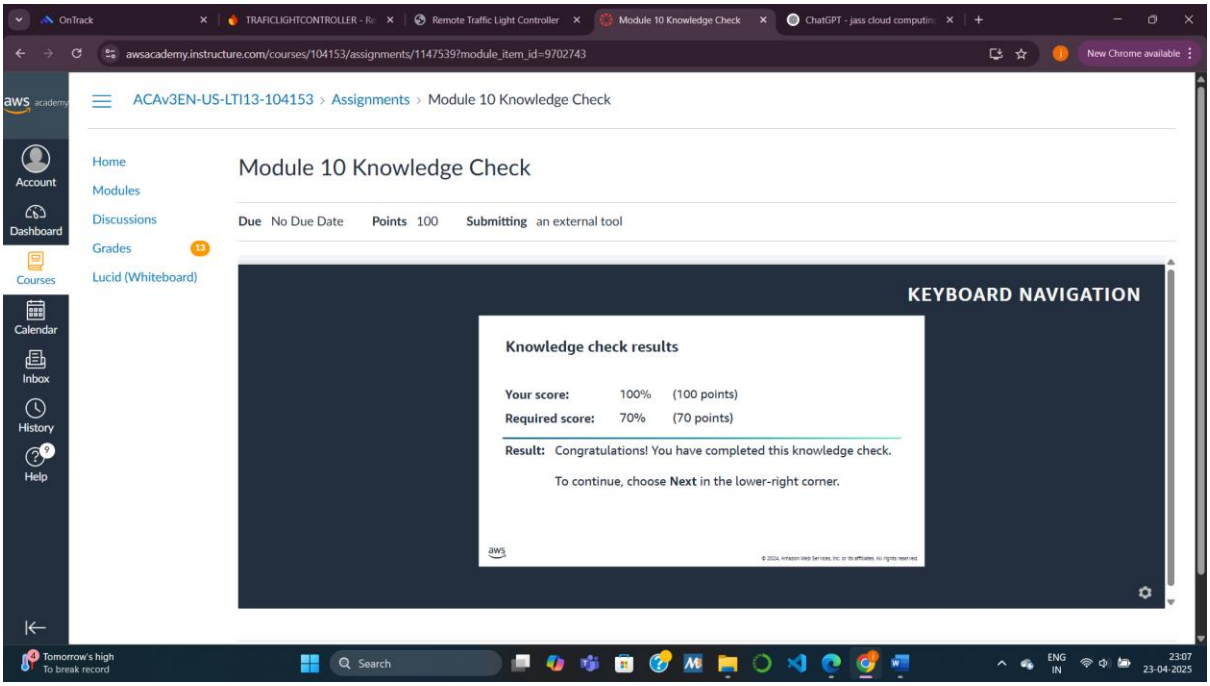
- What is an AWS Region and Availability Zone? How are they related?
  An **AWS Region** is a geographical area containing multiple isolated **Availability Zones (AZs)**. An AZ is one or more separate data centers with independent power, networking, and cooling within a Region. They are related because multiple AZs within a Region enable high availability and fault tolerance for applications.

- What are the different types of Elastic Load Balancer?
  The three types of Elastic Load Balancers (ELB) in AWS are:
  Application Load Balancer (ALB): Used for HTTP/HTTPS traffic with Layer 7 features like path-based and host-based routing.
  Network Load Balancer (NLB): Designed for TCP/UDP traffic, providing high performance and ultra-low latency at Layer 4.
  Gateway Load Balancer (GWLB): Used for deploying and managing third-party virtual appliances like firewalls, operating at Layer 3.

- When should you use Application Load Balancer?
  Use **Application Load Balancer** when your application requires:
  Advanced request routing (based on URL path or hostname).
  HTTP/HTTPS traffic handling with SSL/TLS termination.
  WebSocket support and routing to containers (ECS/EKS).
  Sticky sessions or need for Layer 7 features like redirects or fixed responses.
  It is ideal for **web applications** where content-based routing is needed.

- How do you make an RDS highly available?
  To make Amazon RDS highly available, use **Multi-AZ deployments**. This automatically creates a standby replica in a different Availability Zone and enables failover in case of instance failure, ensuring continuous database operation.

  KNOWLEDGE CHECK :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TRAFICLIGHTCONTROLLER - Re
Remote Traffic Light Controller
Module 10 Knowledge Check
ChatGPT - jass cloud computin
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Inbox
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Help
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Modules
Discussions
Grades
13
Lucid (Whiteboard)
Module 10 Knowledge Check
Due No Due Date
Points 100
Submitting an external tool
KEYBOARD NAVIGATION
Knowledge check results
Your score: 100% (100 points)
Required score: 70% (70 points)
Result: Congratulations! You have completed this knowledge check.
To continue, choose Next in the lower-right corner.
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