Project1: Building a Highly Available, Scalable Web Application

The challenge is to plan, design, build, and deploy the web application to the AWS Cloud in a way that is consistent with best practices of the AWS Well-Architected Framework. During the peak admissions period, the application must support thousands of users, and be highly available, scalable, load balanced, secure, and high performing.

The following image shows an example of the student records web application. The site lists records of students who have applied for admission to the university. Users can view, add, delete, and modify student records.

The solution must meet the following requirements:

- Functional: The solution meets the functional requirements, such as the ability to view, add, delete, or modify the student records, without any perceivable delay.

- Load balanced: The solution can properly balance user traffic to avoid overloaded or underutilized resources.

- Scalable: The solution is designed to scale to meet the demands that are placed on the application.

- Highly available: The solution is designed to have limited downtime when a web server becomes unavailable.

- Secure:

The database is secured and can't be accessed directly from public networks.

The web servers and database can be accessed only over the appropriate ports.

The web application is accessible over the internet.

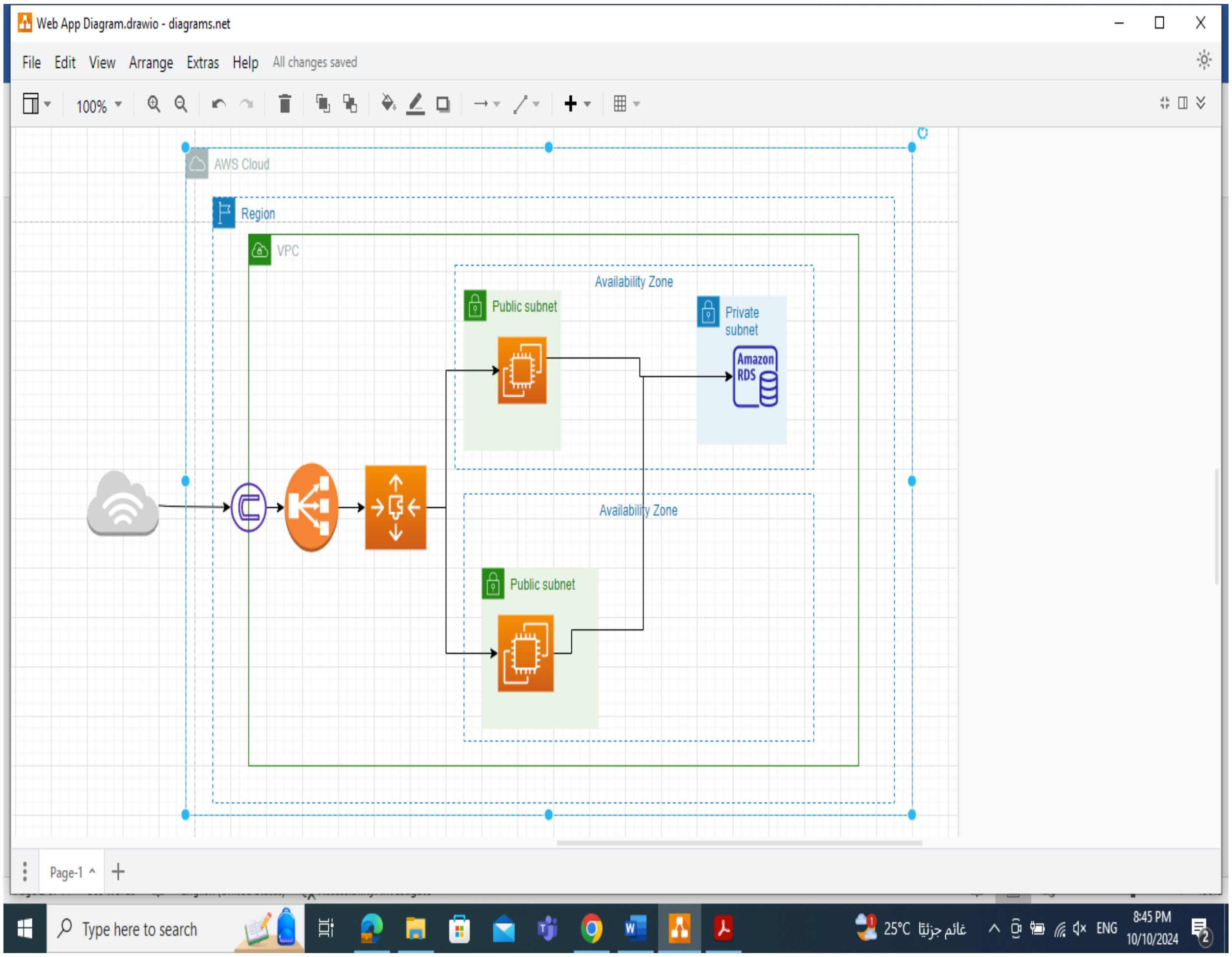
The database credentials aren't hardcoded into the web application.

cost optimized: The solution is designed to keep costs low.

- High performing: The routine operations (viewing, adding, deleting, or modifying records) are performed without a perceivable delay under normal, variable, and peak loads

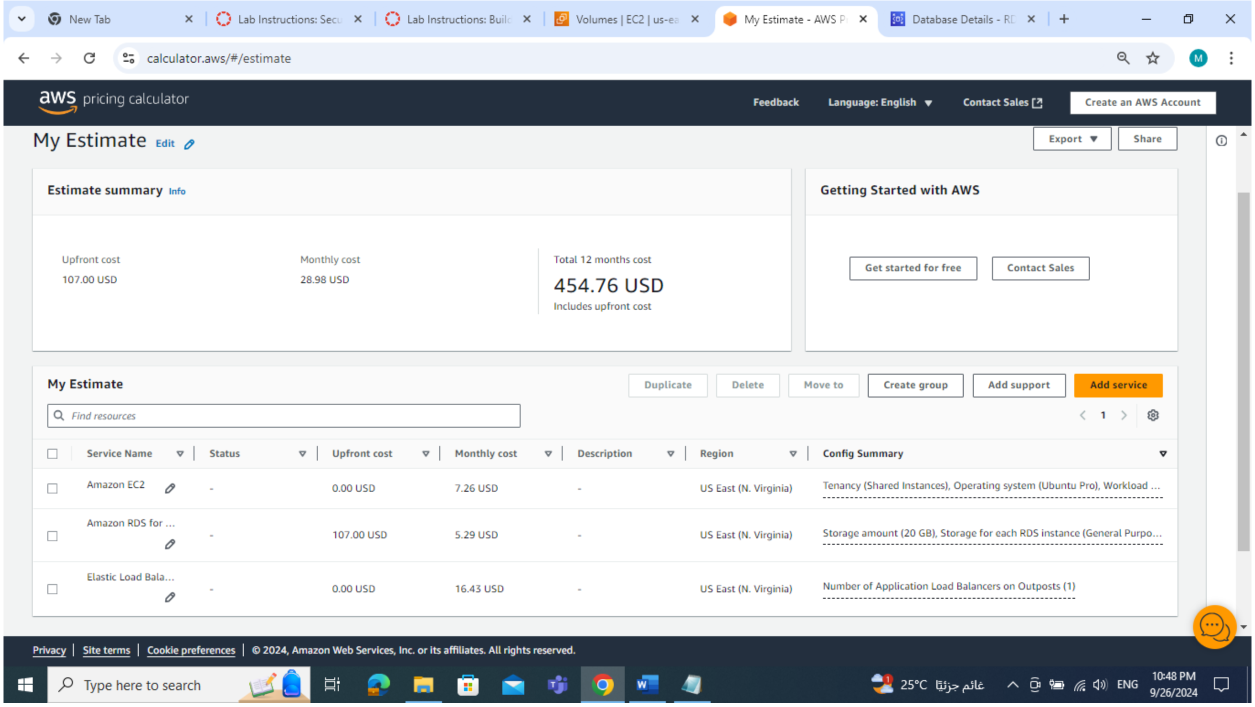
Phase 1: Planning the design and estimating cost

Task 1: Creating an architectural diagram



Task 2: Developing a cost estimate

This estimate for 3 years of no upfront to ec2 , partcial front to Rds and application load balancer



My Estimate Edit

Estimate summary Info

Upfront cost	Monthly cost	Total 12 months cost
107.00 USD	28.98 USD	454.76 USD Includes upfront cost

Getting Started with AWS

My Estimate

□	Service Name	Status	Upfront cost	Monthly cost	Description	Region	Config Summary
□	Amazon EC2	-	0.00 USD	7.26 USD	-	US East (N. Virginia)	Tenancy (Shared Instances), Operating system (Ubuntu Pro), Workload ...
□	Amazon RDS for ...	-	107.00 USD	5.29 USD	-	US East (N. Virginia)	Storage amount (20 GB), Storage for each RDS instance (General Purpo...
□	Elastic Load Bala...	-	0.00 USD	16.43 USD	-	US East (N. Virginia)	Number of Application Load Balancers on Outposts (1)

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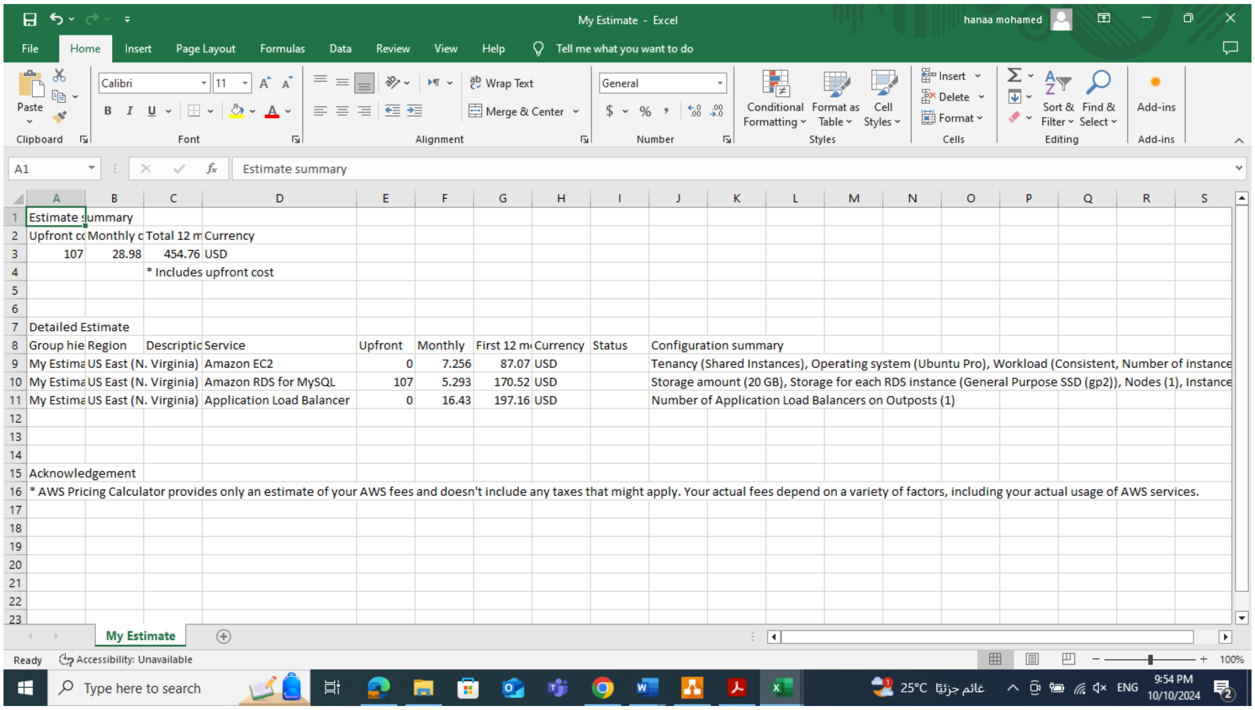
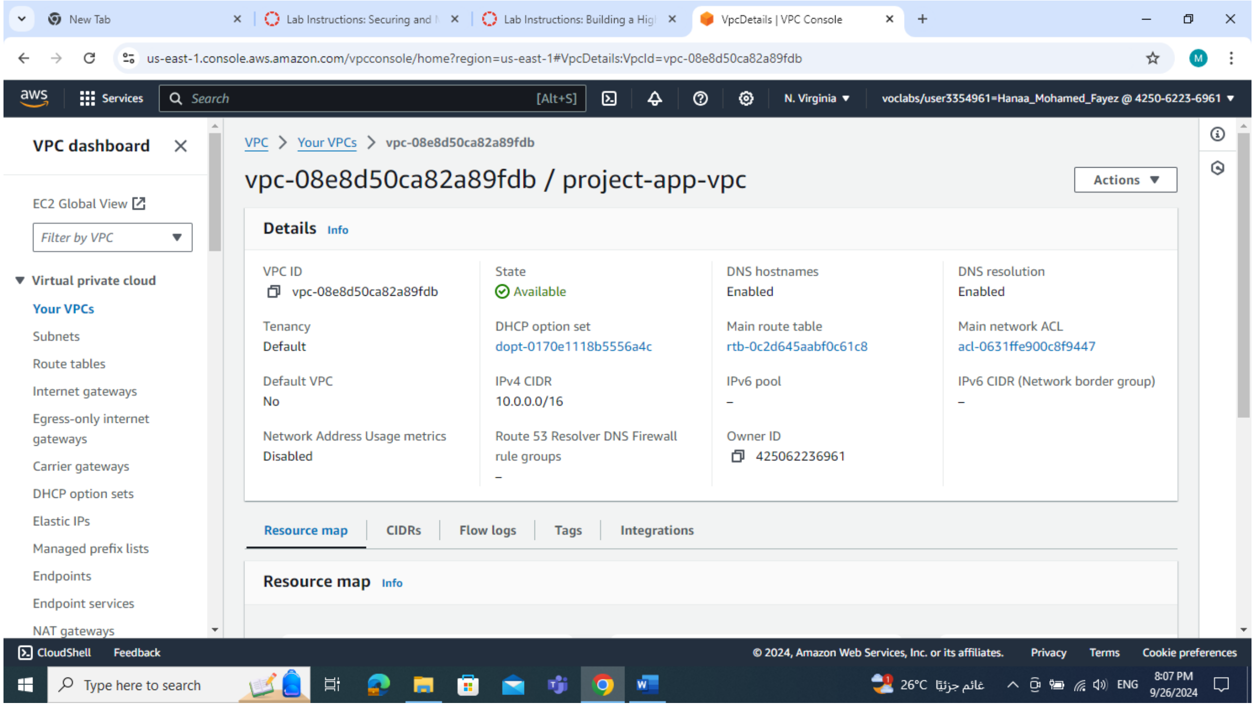


	A	B	C	D	E	F	G	H	I	J
1	Estimate summary									
2	Upfront cc	Monthly c	Total 12 m	Currency						
3	107	28.98	454.76	USD						
4			* Includes upfront cost							
5										
6										
7	Detailed Estimate									
8	Group hie	Region	Descriptic	Service	Upfront	Monthly	First 12 m	Currency	Status	Configuration summary
9	My Estima	US East (N. Virginia)		Amazon EC2	0	7.256	87.07	USD		Tenancy (Shared Instances), Operating system (Ubuntu Pro), Workload (Consistent, Number of instance
10	My Estima	US East (N. Virginia)		Amazon RDS for MySQL	107	5.293	170.52	USD		Storage amount (20 GB), Storage for each RDS instance (General Purpose SSD (gp2)), Nodes (1), Instance
11	My Estima	US East (N. Virginia)		Application Load Balancer	0	16.43	197.16	USD		Number of Application Load Balancers on Outposts (1)
12										
13										
14										
15	Acknowledgement									
16	* AWS Pricing Calculator provides only an estimate of your AWS fees and doesn't include any taxes that might apply. Your actual fees depend on a variety of factors, including your actual usage of AWS services.									

Phase 2: Creating a basic functional web application

Task 1: Creating a virtual network (project _app)



VPC > Your VPCs > vpc-08e8d50ca82a89fdb

vpc-08e8d50ca82a89fdb / project-app-vpc

Actions ▼

Details Info

VPC ID
vpc-08e8d50ca82a89fdb

State
Available

DNS hostnames
Enabled

DNS resolution
Enabled

Tenancy
Default

DHCP option set
dopt-0170e1118b5556a4c

Main route table
rtb-0c2d645aabf0c61c8

Main network ACL
acl-0631ffe900c8f9447

Default VPC
No

IPv4 CIDR
10.0.0.0/16

IPv6 pool
–

IPv6 CIDR (Network border group)
–

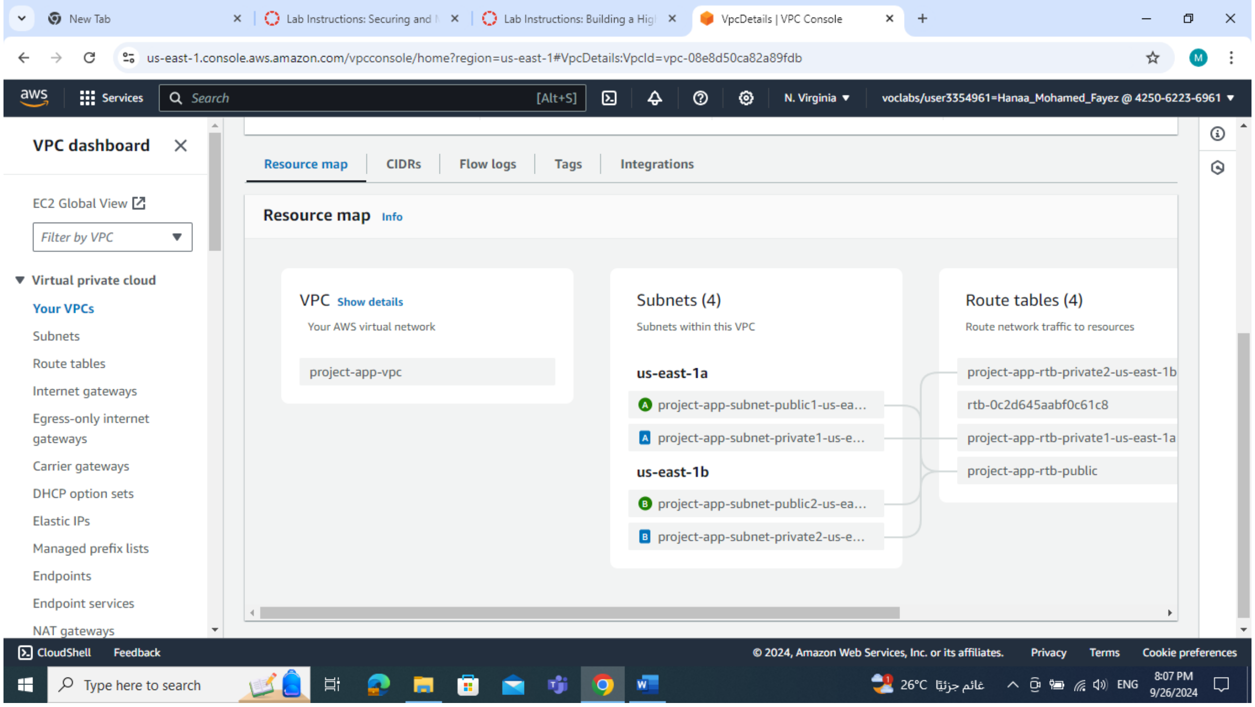
Network Address Usage metrics
Disabled

Route 53 Resolver DNS Firewall rule groups
–

Owner ID
425062236961

Resource map | CIDRs | Flow logs | Tags | Integrations

Resource map Info



Resource map | CIDRs | Flow logs | Tags | Integrations

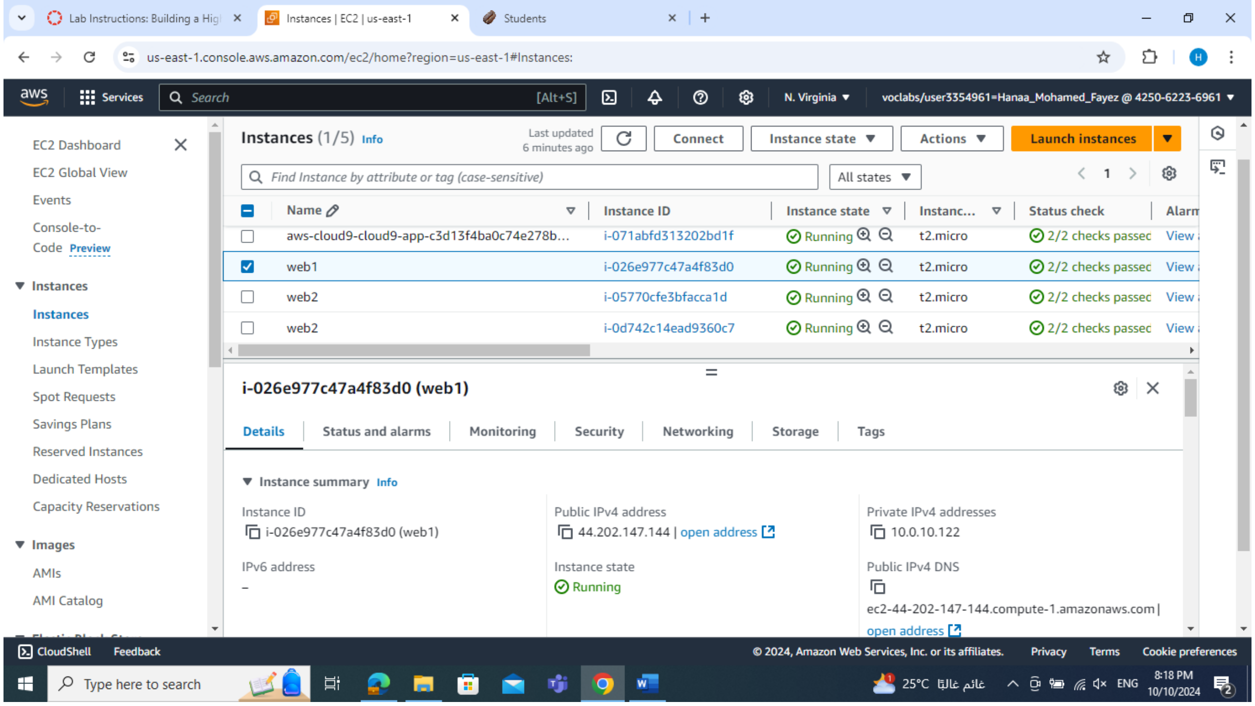
Resource map Info

VPC Show details
Your AWS virtual network
project-app-vpc

Subnets (4)
Subnets within this VPC
us-east-1a
A project-app-subnet-public1-us-ea...
A project-app-subnet-private1-us-e...
us-east-1b
B project-app-subnet-public2-us-ea...
B project-app-subnet-private2-us-e...

Route tables (4)
Route network traffic to resources
project-app-rtb-private2-us-east-1b
rtb-0c2d645aabf0c61c8
project-app-rtb-private1-us-east-1a
project-app-rtb-public

Task 2: Creating a virtual machine (web1)



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

N. Virginia ▼ voclabs/user3354961=Hanaa_Mohamed_Fayez @ 4250-6223-6961 ▼

Instances (1/5) Info — Last updated 6 minutes ago — Connect — Instance state ▼ — Actions ▼ — Launch instances ▼

Find Instance by attribute or tag (case-sensitive) — All states ▼

	Name	Instance ID	Instance state	Instanc…	Status check	Alarm
□	aws-cloud9-cloud9-app-c3d13f4ba0c74e278b…	i-071abfd313202bd1f	✓ Running	t2.micro	✓ 2/2 checks passec	View
☑	web1	i-026e977c47a4f83d0	✓ Running	t2.micro	✓ 2/2 checks passec	View
□	web2	i-05770cfe3bfacca1d	✓ Running	t2.micro	✓ 2/2 checks passec	View
□	web2	i-0d742c14ead9360c7	✓ Running	t2.micro	✓ 2/2 checks passec	View

i-026e977c47a4f83d0 (web1)

Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags

▼ Instance summary Info

Instance ID: i-026e977c47a4f83d0 (web1)

Public IPv4 address: 44.202.147.144 | open address

Private IPv4 addresses: 10.0.10.122

IPv6 address: –

Instance state: ✓ Running

Public IPv4 DNS: ec2-44-202-147-144.compute-1.amazonaws.com | open address

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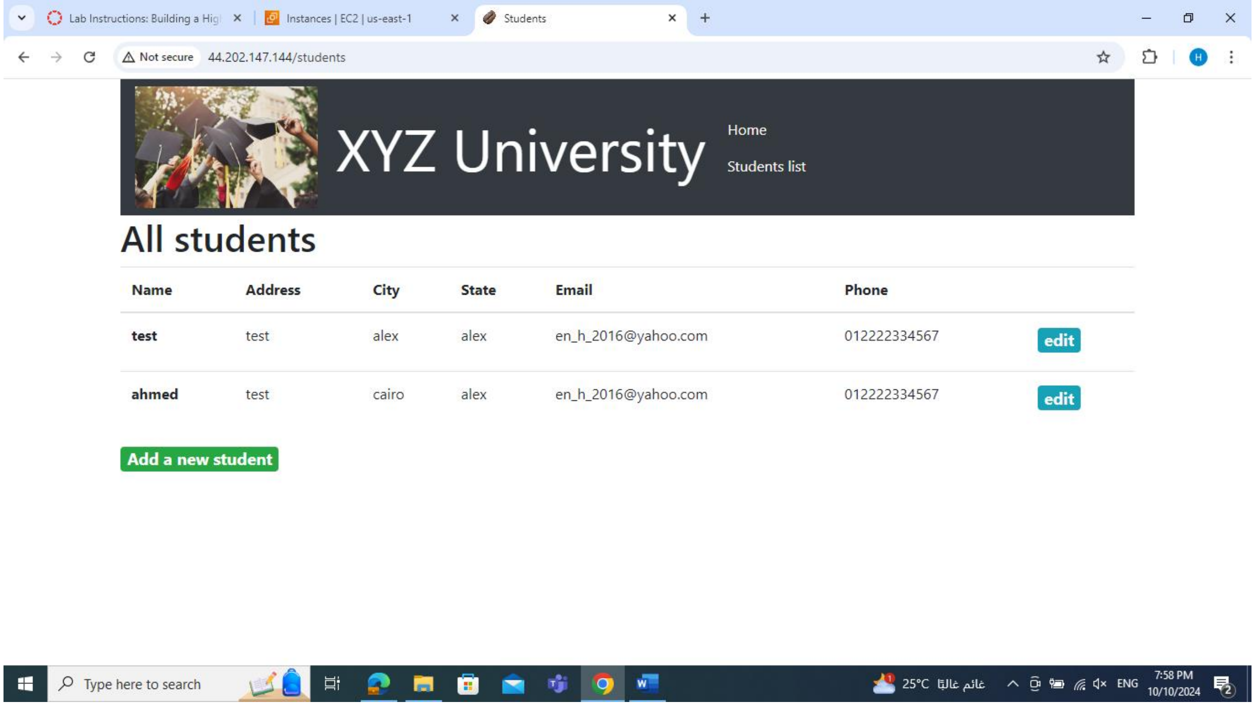
Task 3: Testing the deployment



Not secure 44.202.147.144/students

XYZ University

Home

Students list

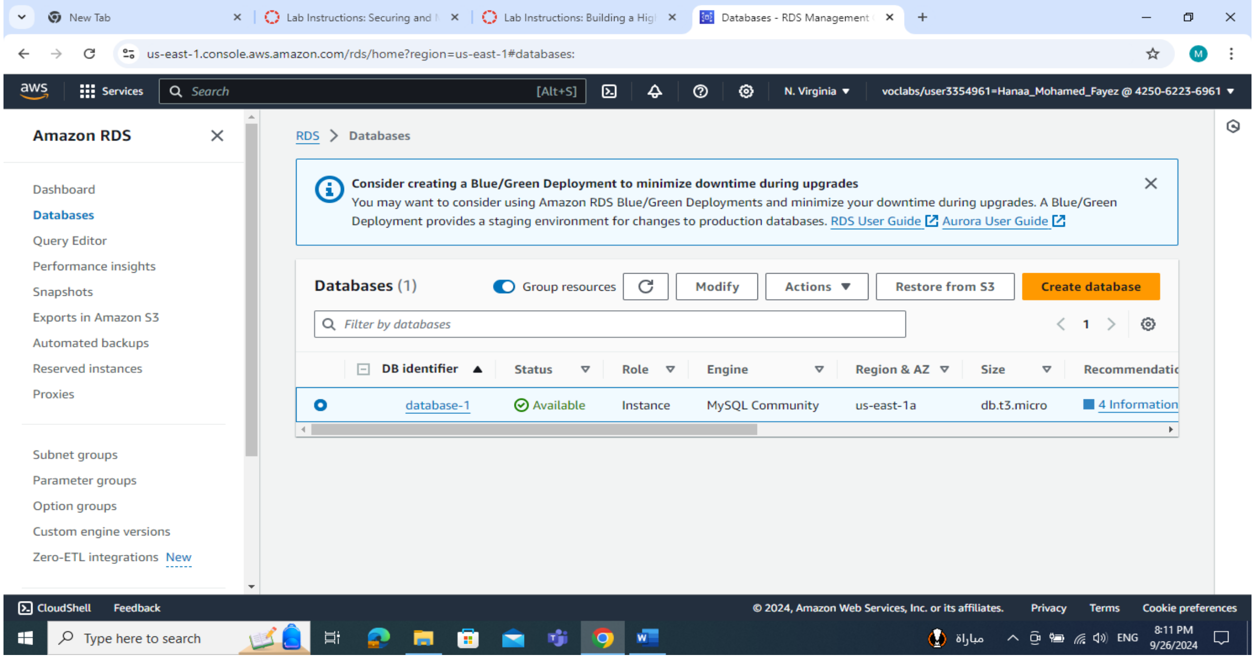
All students

Name	Address	City	State	Email	Phone	
test	test	alex	alex	en_h_2016@yahoo.com	012222334567	edit
ahmed	test	cairo	alex	en_h_2016@yahoo.com	012222334567	edit

Add a new student

Phase 3: Decoupling the application components

Task 2: Creating and configuring the Amazon RDS database (database1)

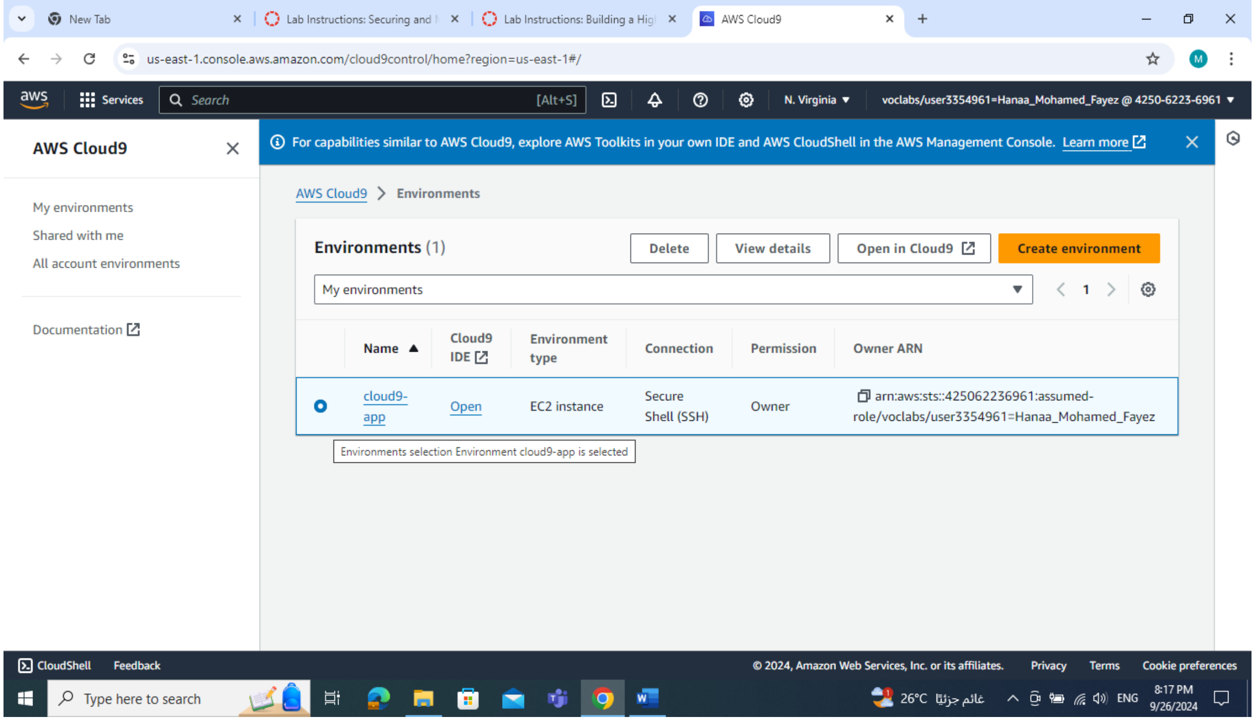


Consider creating a Blue/Green Deployment to minimize downtime during upgrades
You may want to consider using Amazon RDS Blue/Green Deployments and minimize your downtime during upgrades. A Blue/Green Deployment provides a staging environment for changes to production databases. RDS User Guide Aurora User Guide

Databases (1)

	DB identifier	Status	Role	Engine	Region & AZ	Size	Recommendatio
●	database-1	✓ Available	Instance	MySQL Community	us-east-1a	db.t3.micro	4 Information

Task 3: Configuring the development environment

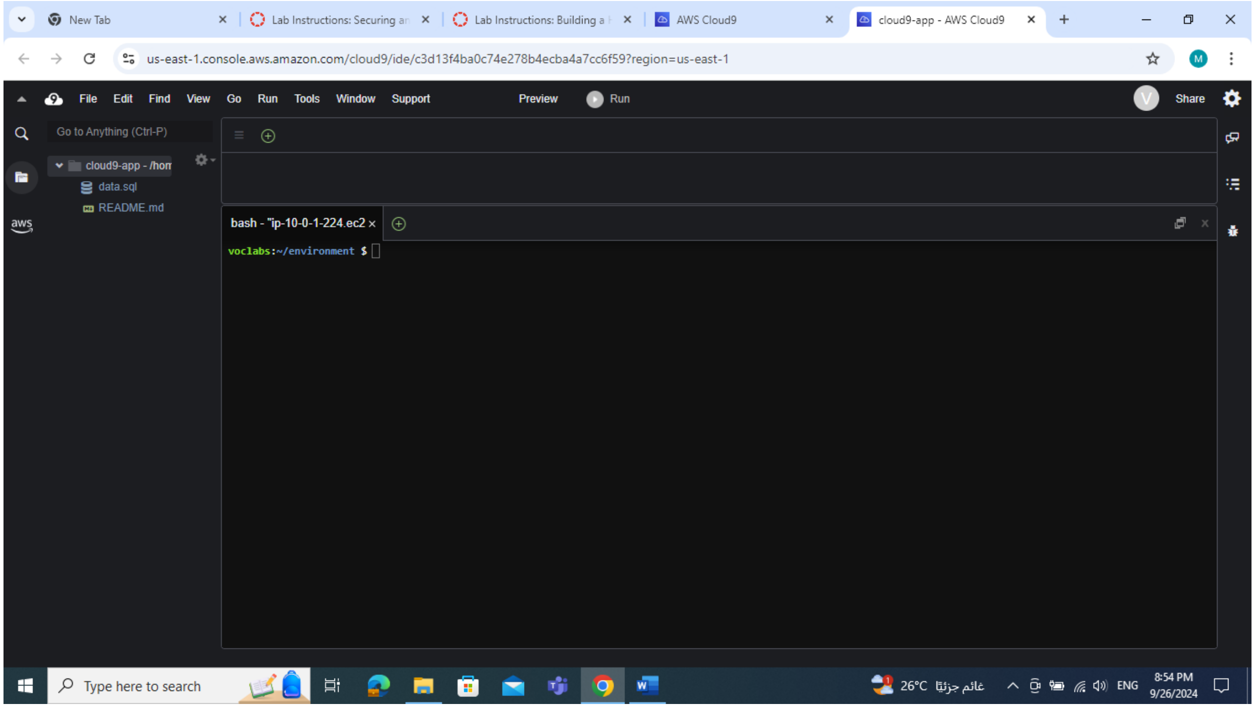


For capabilities similar to AWS Cloud9, explore AWS Toolkits in your own IDE and AWS CloudShell in the AWS Management Console. Learn more

Environments (1)

	Name	Cloud9 IDE	Environment type	Connection	Permission	Owner ARN
●	cloud9-app	Open	EC2 instance	Secure Shell (SSH)	Owner	arn:aws:sts::425062236961:assumed-role/voclabs/user3354961=Hanaa_Mohamed_Fayez

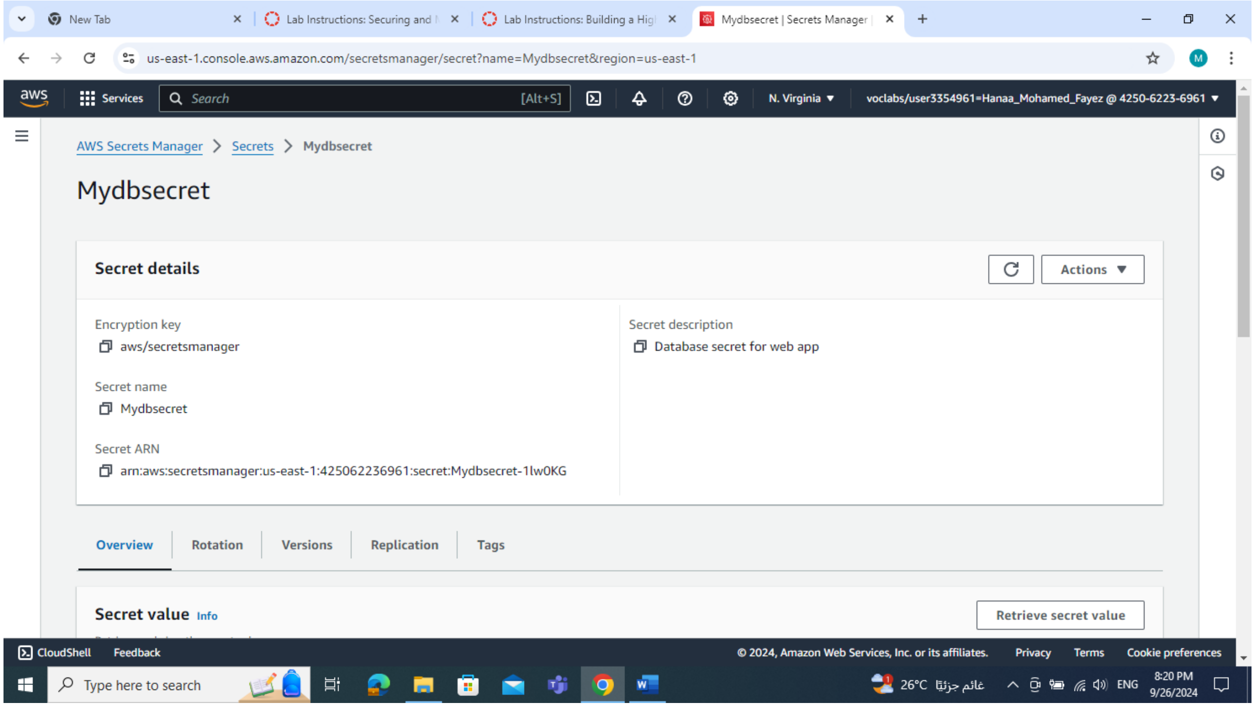
Environments selection Environment cloud9-app is selected



us-east-1.console.aws.amazon.com/cloud9/ide/c3d13f4ba0c74e278b4ecba4a7cc6f59?region=us-east-1

```
voclabs:~/environment $
```

Task 4: Provisioning Secrets Manager (Mydbsecret)



New Tab
Lab Instructions: Securing and
Lab Instructions: Building a Hig
Mydbsecret | Secrets Manager
Services
Search
[Alt+S]
N. Virginia
voclabs/user3354961=Hanaa_Mohamed_Fayez @ 4250-6223-6961
AWS Secrets Manager > Secrets > Mydbsecret
Actions
Overview
Rotation
Versions
Replication
Tags
Info
Retrieve secret value
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
Type here to search
26°C غائم جزئيًا
ENG
8:20 PM
9/26/2024

us-east-1.console.aws.amazon.com/secretsmanager/secret?name=Mydbsecret&region=us-east-1

Mydbsecret

Secret details

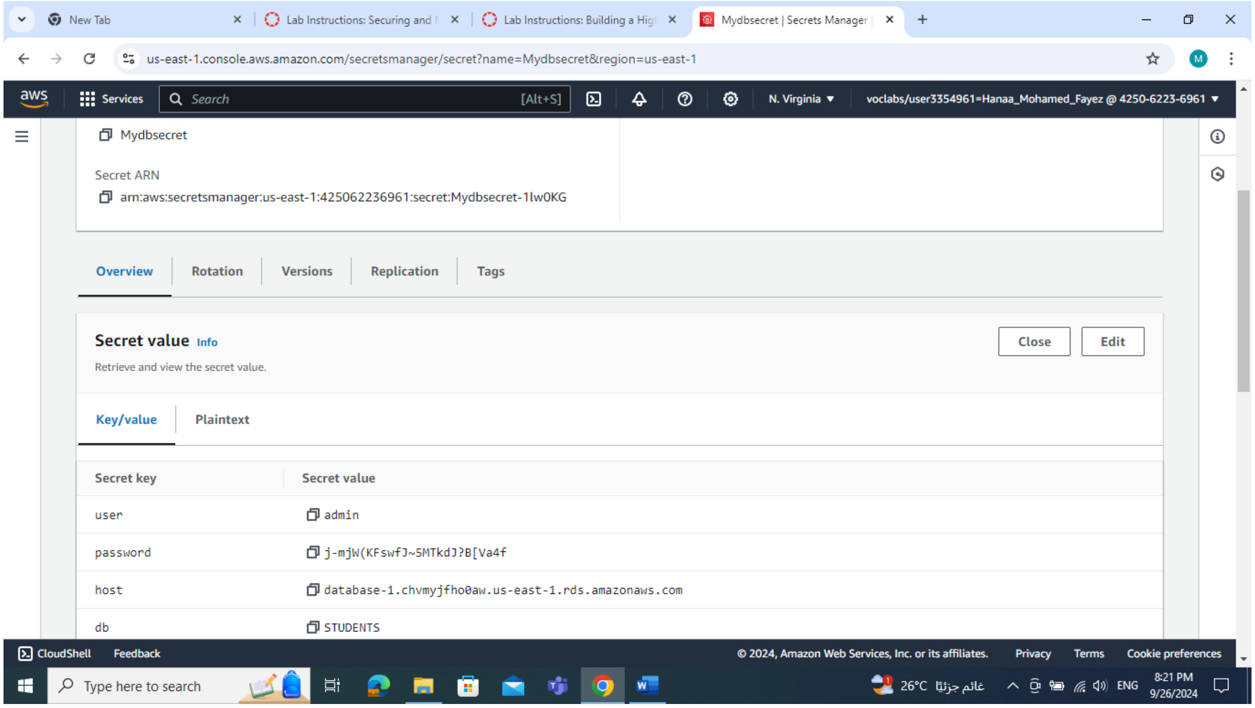
Encryption key
aws/secretsmanager

Secret name
Mydbsecret

Secret ARN
arn:aws:secretsmanager:us-east-1:425062236961:secret:Mydbsecret-1lw0KG

Secret description
Database secret for web app

Secret value



us-east-1.console.aws.amazon.com/secretsmanager/secret?name=Mydbsecret&region=us-east-1

Mydbsecret

Secret ARN

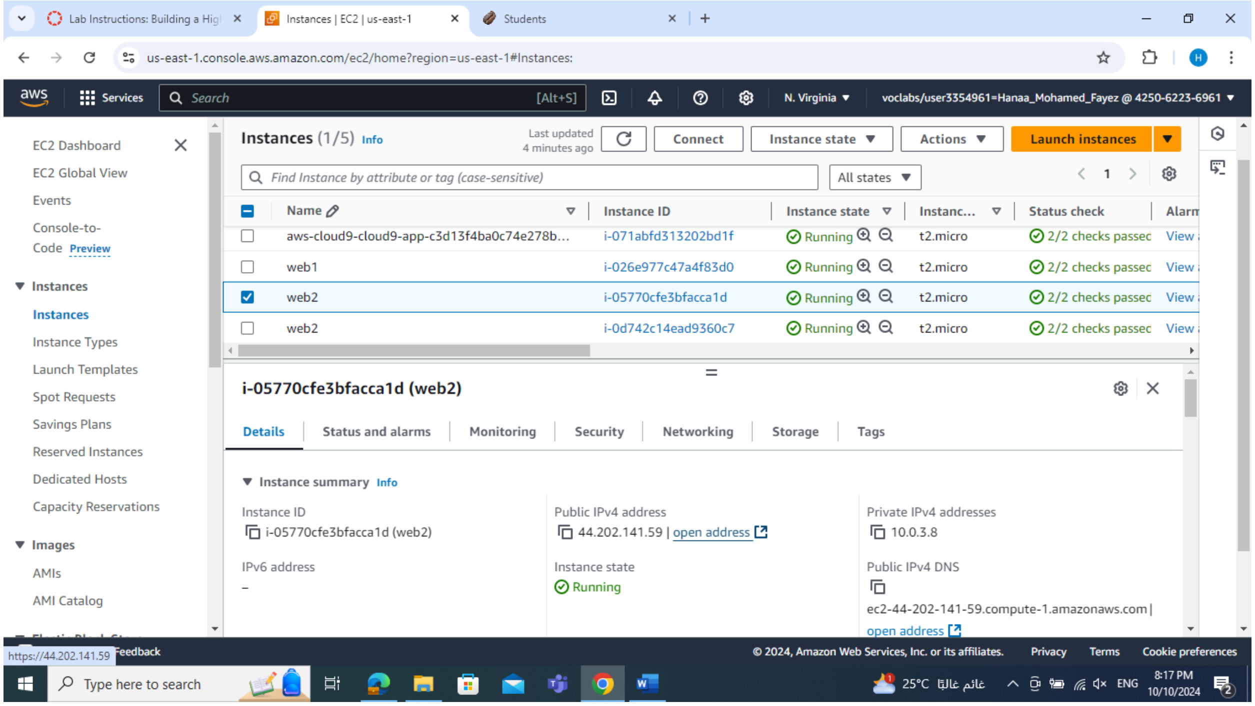
arn:aws:secretsmanager:us-east-1:425062236961:secret:Mydbsecret-1lw0KG

Secret value Info

Retrieve and view the secret value.

Secret key	Secret value
user	admin
password	j-mjW(KFswfJ~5MTkdJ?B[Va4f
host	database-1.chvmyjfho0aw.us-east-1.rds.amazonaws.com
db	STUDENTS

Task 5: Provisioning a new instance for the web server (web2)



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

Instances (1/5) Info

Last updated 4 minutes ago

	Name	Instance ID	Instance state	Instanc...	Status check	Alarm
□	aws-cloud9-cloud9-app-c3d13f4ba0c74e278b...	i-071abfd313202bd1f	✓ Running	t2.micro	✓ 2/2 checks passec	View
□	web1	i-026e977c47a4f83d0	✓ Running	t2.micro	✓ 2/2 checks passec	View
☑	web2	i-05770cfe3bfacca1d	✓ Running	t2.micro	✓ 2/2 checks passec	View
□	web2	i-0d742c14ead9360c7	✓ Running	t2.micro	✓ 2/2 checks passec	View

i-05770cfe3bfacca1d (web2)

Instance summary Info

Instance ID: i-05770cfe3bfacca1d (web2)

Public IPv4 address: 44.202.141.59 | open address

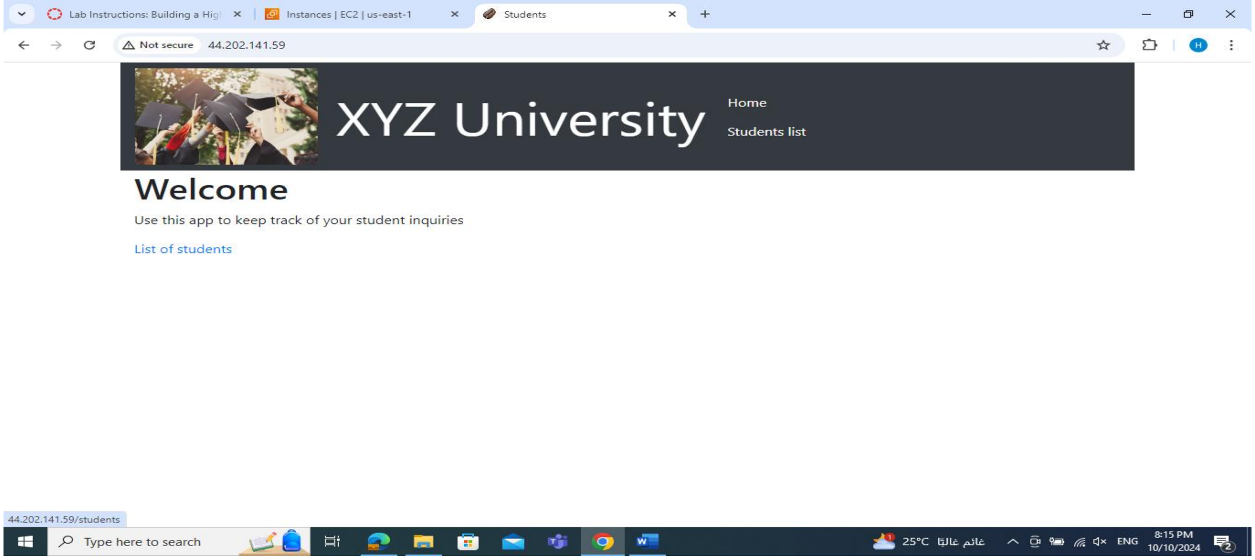
Private IPv4 addresses: 10.0.3.8

IPv6 address: –

Instance state: Running

Public IPv4 DNS: ec2-44-202-141-59.compute-1.amazonaws.com | open address

Testing the application



XYZ University

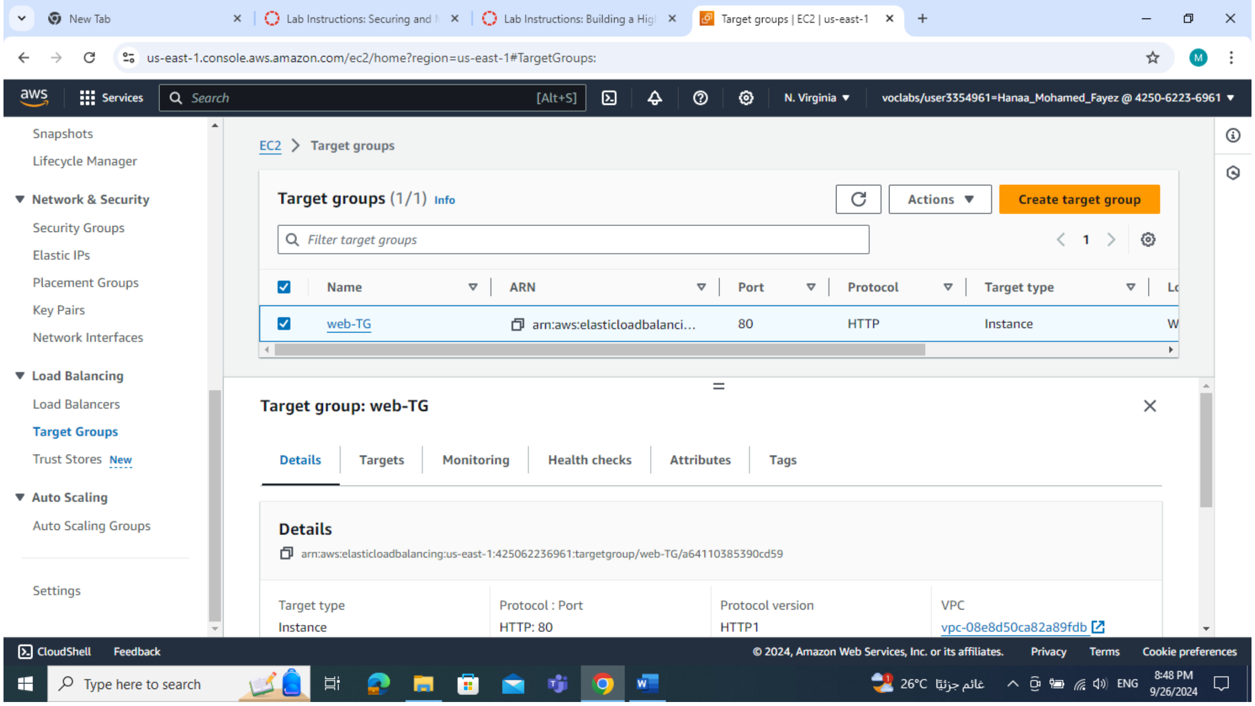
Welcome

Use this app to keep track of your student inquiries

List of students

Phase 4: Implementing high availability and scalability

Creat Target group(web-TG)



Target groups (1/1)

☑	Name	ARN	Port	Protocol	Target type	Lo
☑	web-TG	arn:aws:elasticloadbalanci...	80	HTTP	Instance	W

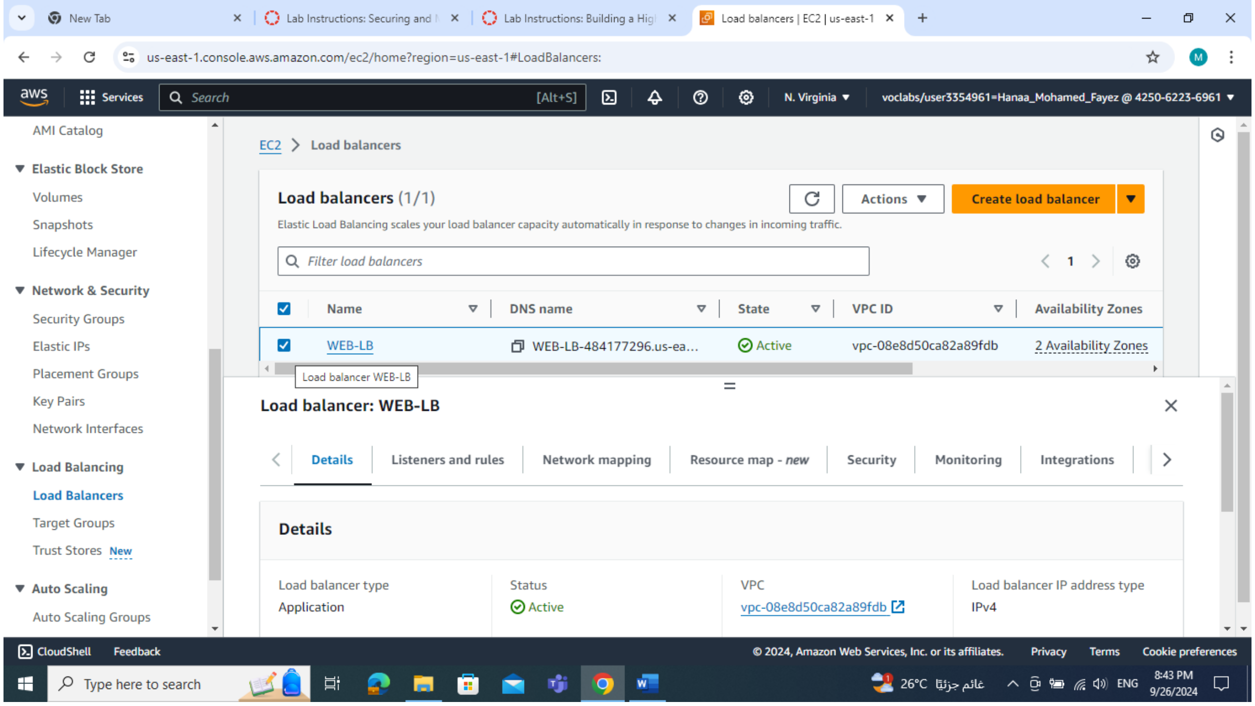
Target group: web-TG

Details

arn:aws:elasticloadbalancing:us-east-1:425062236961:targetgroup/web-TG/a64110385390cd59

Target type	Protocol : Port	Protocol version	VPC
Instance	HTTP: 80	HTTP1	vpc-08e8d50ca82a89fdb

Task 1: Creating an Application Load Balancer (WEB-LB)



Load balancers (1/1)

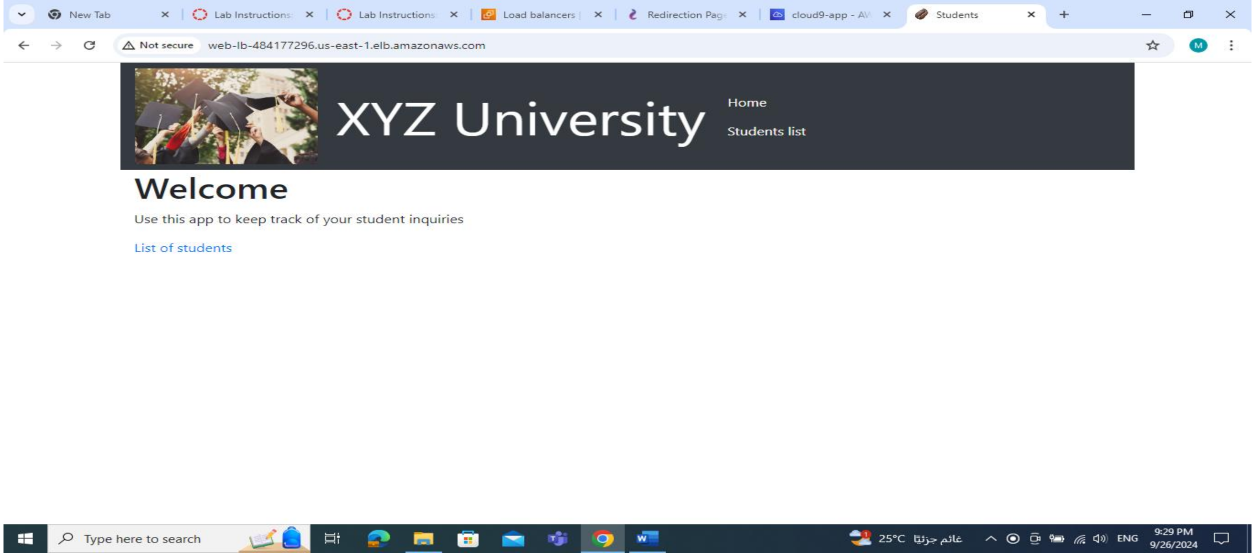
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

☑	Name	DNS name	State	VPC ID	Availability Zones
☑	WEB-LB	WEB-LB-484177296.us-ea...	✓ Active	vpc-08e8d50ca82a89fdb	2 Availability Zones

Load balancer: WEB-LB

Details

Load balancer type	Status	VPC	Load balancer IP address type
Application	✓ Active	vpc-08e8d50ca82a89fdb	IPv4



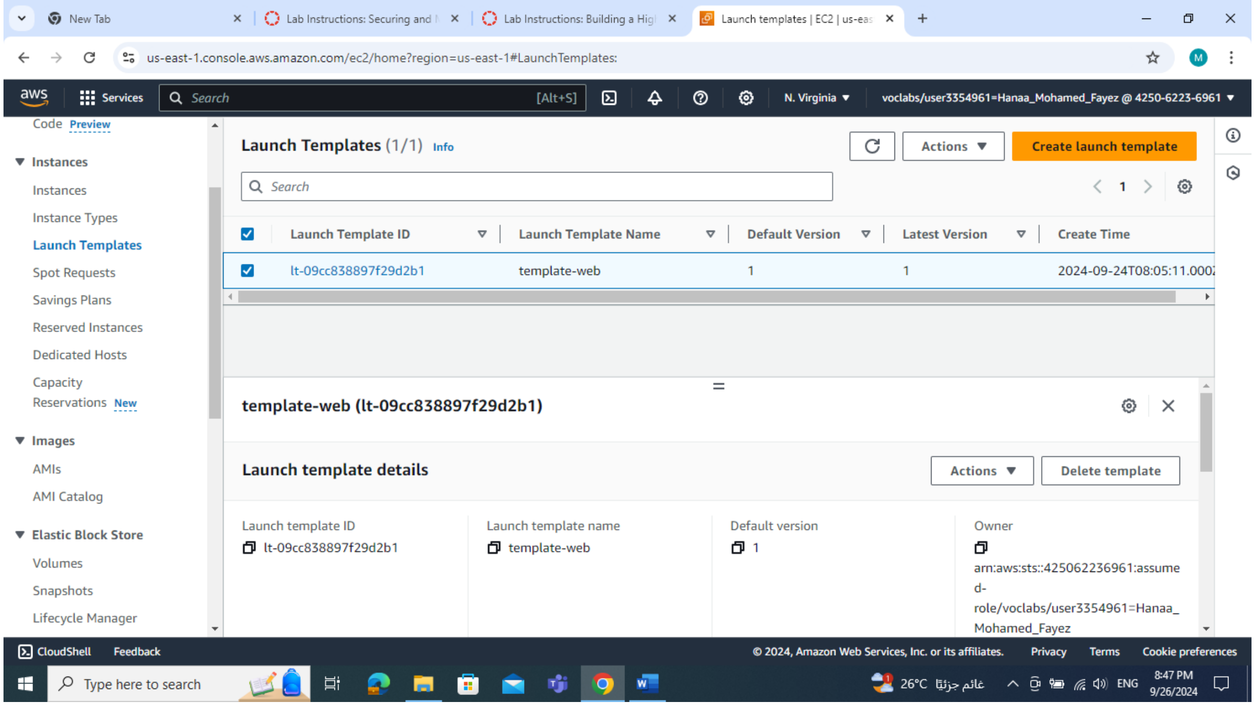
Welcome

Use this app to keep track of your student inquiries

List of students

Task 2: Implementing Amazon EC2 Auto Scaling

Create a new launch template (template-web)



Launch Templates (1/1) Info

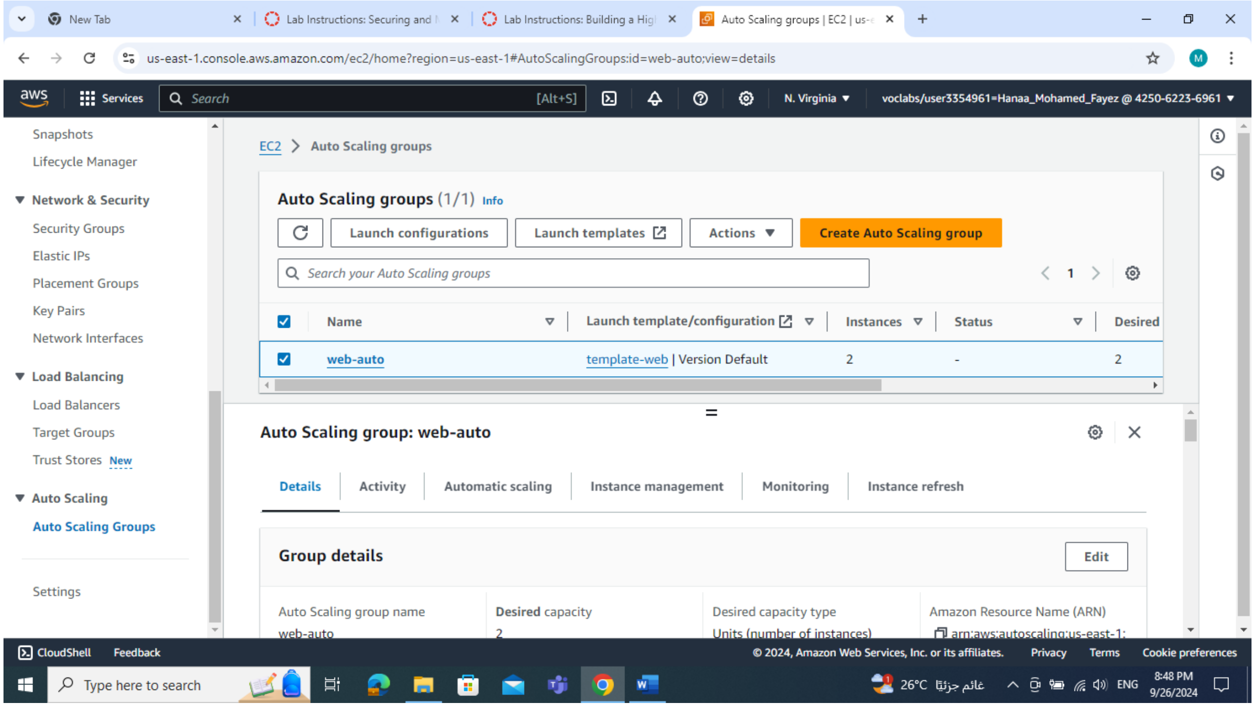
Launch Template ID	Launch Template Name	Default Version	Latest Version	Create Time
lt-09cc838897f29d2b1	template-web	1	1	2024-09-24T08:05:11.000

template-web (lt-09cc838897f29d2b1)

Launch template details

Launch template ID	Launch template name	Default version	Owner
lt-09cc838897f29d2b1	template-web	1	arn:aws:sts::425062236961:assumed-role/voclabs/user3354961=Hanaa_Mohamed_Fayez

create Auto Scaling group (web-auto)



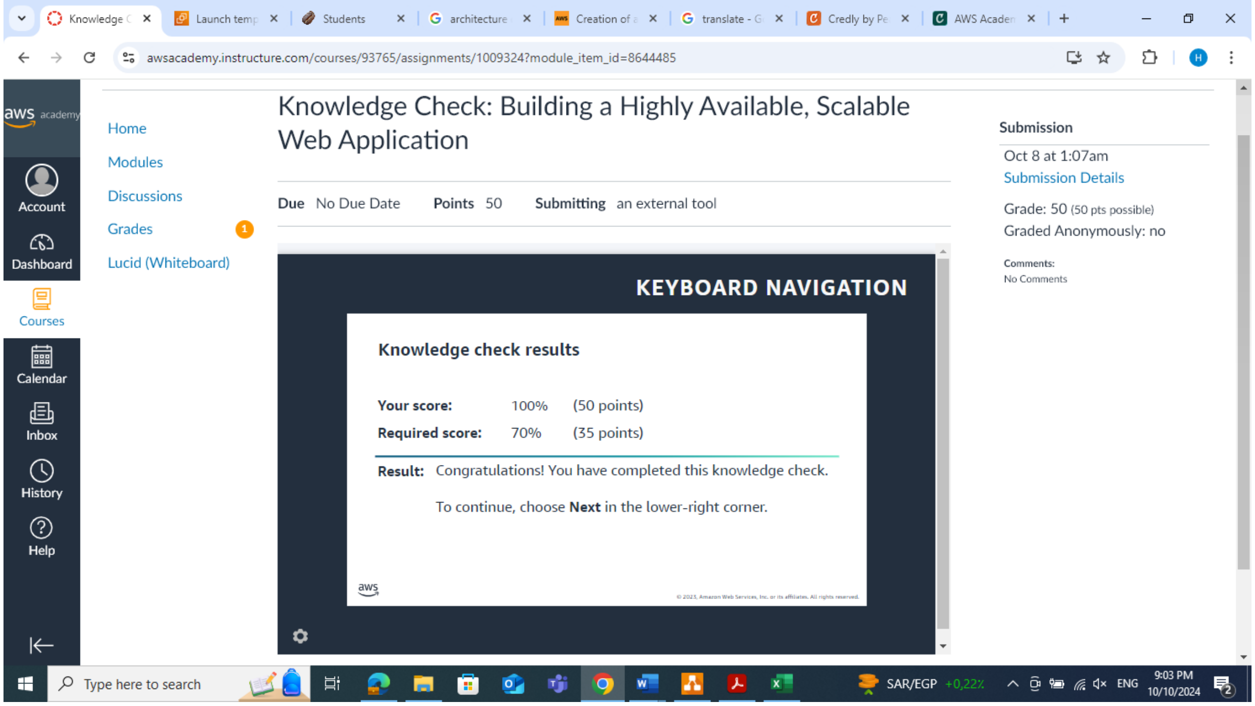
Auto Scaling groups (1/1) Info

Name	Launch template/configuration	Instances	Status	Desired
web-auto	template-web | Version Default	2	-	2

Auto Scaling group: web-auto

Group details

Auto Scaling group name	Desired capacity	Desired capacity type	Amazon Resource Name (ARN)
web-auto	2	Units (number of instances)	arn:aws:autoscaling:us-east-1:



Knowledge Check: Building a Highly Available, Scalable Web Application

Due No Due Date **Points** 50 **Submitting** an external tool

Submission

Oct 8 at 1:07am

Submission Details

Grade: 50 (50 pts possible)

Graded Anonymously: no

Comments:
No Comments

KEYBOARD NAVIGATION

Knowledge check results

Your score: 100% (50 points)

Required score: 70% (35 points)

Result: Congratulations! You have completed this knowledge check.

To continue, choose **Next** in the lower-right corner.

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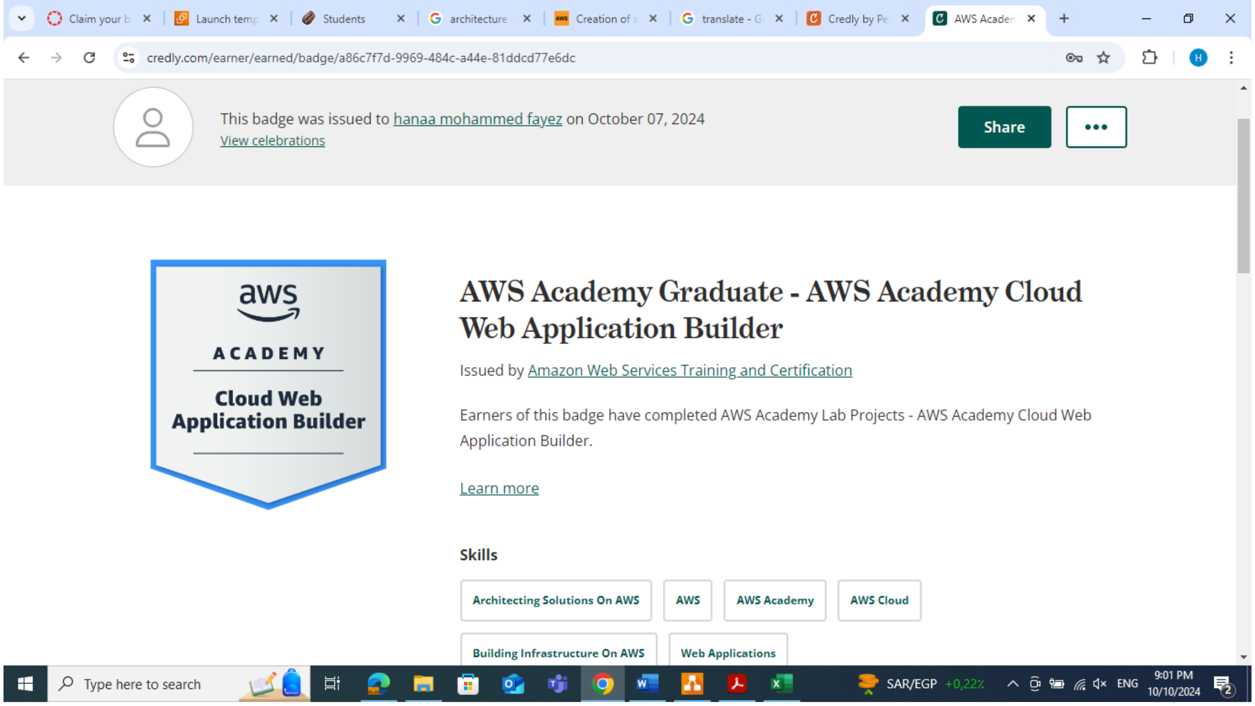

This badge was issued to hanaa mohammed fayez on October 07, 2024
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