

Batch: A-4 Roll No.: 16010122151

Experiment No. 09

Signature of the Staff In-charge with date

Title: VM Creation Using AWS

Objective:

The objective of this project is to demonstrate the step-by-step process of creating a Virtual Machine (VM) using Amazon Web Services (AWS) through the EC2 (Elastic Compute Cloud) service. This includes configuring the instance type, selecting an operating system, setting up network and security configurations, and launching the VM for remote access. The goal is to provide a foundational understanding of cloud-based virtual machine deployment using AWS.

Expected Outcome of Experiment:

	Outcome
	Understand and apply fundamental cloud computing concepts using AWS. Demonstrate the ability to create and manage virtual machines using cloud services.

Books/ Journals/ Websites referred:

■ **Amazon Web Services (AWS) Official Documentation**

- <https://docs.aws.amazon.com>
- Used for step-by-step guidance on EC2 instance creation and cloud configuration best practices.

■ **AWS Educate Program**

- <https://aws.amazon.com/education/awseducate>
- Referred for cloud learning resources, tutorials, and hands-on labs.

■ AWS Training and Certification Portal

- <https://aws.amazon.com/training>
- Accessed for foundational cloud computing concepts and introductory EC2 usage.

■ Getting Started with Amazon EC2 – AWS Documentation

- https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EC2_GetStarted.html

Abstract:-

In the era of cloud computing, the ability to deploy scalable and cost-effective virtual infrastructure is essential for modern IT solutions. This project focuses on the creation and configuration of a Virtual Machine (VM) using **Amazon Web Services (AWS)**, specifically through the **EC2 (Elastic Compute Cloud)** service. The objective is to provide hands-on experience with launching and managing a VM in the cloud, including selecting appropriate Amazon Machine Images (AMIs), configuring instance types, storage, network settings, and accessing the VM securely via SSH. Through this practical approach, learners gain foundational knowledge of Infrastructure as a Service (IaaS) and cloud deployment models. Resources such as AWS Educate and official AWS documentation were referenced to ensure best practices and industry-aligned implementation. This project helps bridge the gap between theoretical cloud concepts and real-world application, enhancing technical skills in cloud infrastructure management.

Related Theory: -

1. Introduction to Cloud Computing

Cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, and analytics—over the Internet (“the cloud”). It allows users to access and use IT resources on-demand without direct active management of hardware.

Cloud services fall into three main categories:

- **IaaS (Infrastructure as a Service)** – provides virtualized computing resources over the internet (e.g., Amazon EC2)
- **PaaS (Platform as a Service)** – provides a platform allowing customers to develop, run, and manage applications (e.g., AWS Elastic Beanstalk)
- **SaaS (Software as a Service)** – delivers software applications over the internet (e.g., Gmail, Dropbox)

2. Virtual Machines (VMs)

A **Virtual Machine** is an emulation of a physical computer that runs an operating system and applications. VMs run on physical hardware via a **hypervisor**, which manages multiple VMs on a host machine. VMs provide flexibility, isolation, and resource efficiency, making them ideal for cloud computing environments.

3. Amazon Web Services (AWS)

Amazon Web Services (AWS) is the most widely adopted cloud platform offering over 200 fully featured services. It supports businesses of all sizes in deploying applications, storing data, and managing resources efficiently.

One of the core components of AWS is **Amazon EC2**.

4. Amazon EC2 (Elastic Compute Cloud)

Amazon EC2 provides scalable computing capacity in the cloud. It allows users to launch virtual machines (called *instances*) with various configurations of CPU, memory, storage, and networking.

Key features:

- **AMI (Amazon Machine Image):** Preconfigured templates with an OS and software
- **Instance Types:** Defines the hardware (t2.micro, t3.medium, etc.)
- **Key Pairs:** Used for secure SSH access
- **Security Groups:** Virtual firewalls that control inbound and outbound traffic
- **Elastic IPs:** Static IP addresses that can be associated with instances
- **EBS (Elastic Block Store):** Persistent storage volumes for EC2 instances

5. Security in AWS

Security is a shared responsibility:

- **AWS manages:** Physical security, infrastructure, and virtualization
- **Users manage:** Data, access, configurations, and application security

Security features:

- IAM (Identity and Access Management) for user roles and permissions
- Security Groups and Network ACLs for traffic control
- Key Pair Authentication (public/private SSH keys)

◊ *6. AWS Educate and Learning Tools*

AWS Educate provides students and educators access to learning content, credits, and hands-on experience with AWS tools. It supports cloud literacy and provides training for careers in cloud technologies.

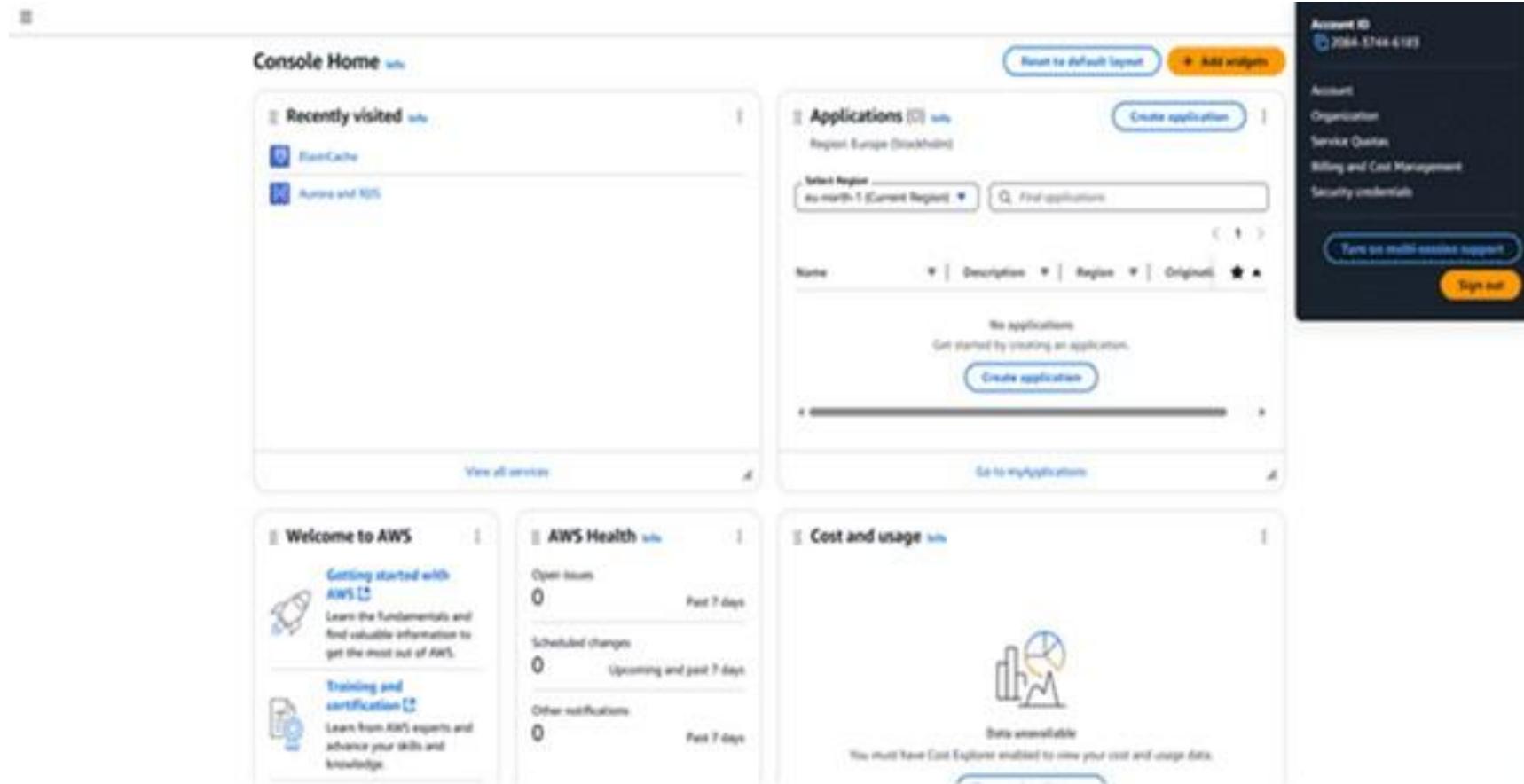
◊ *7. Real-world Applications of VMs in AWS*

- Hosting websites and web applications
- Development and testing environments
- Running legacy software
- High-performance computing (HPC) tasks
- Scalable and on-demand IT infrastructure for businesses

Implementation Details:

A] Part One : Getting Started with the compute

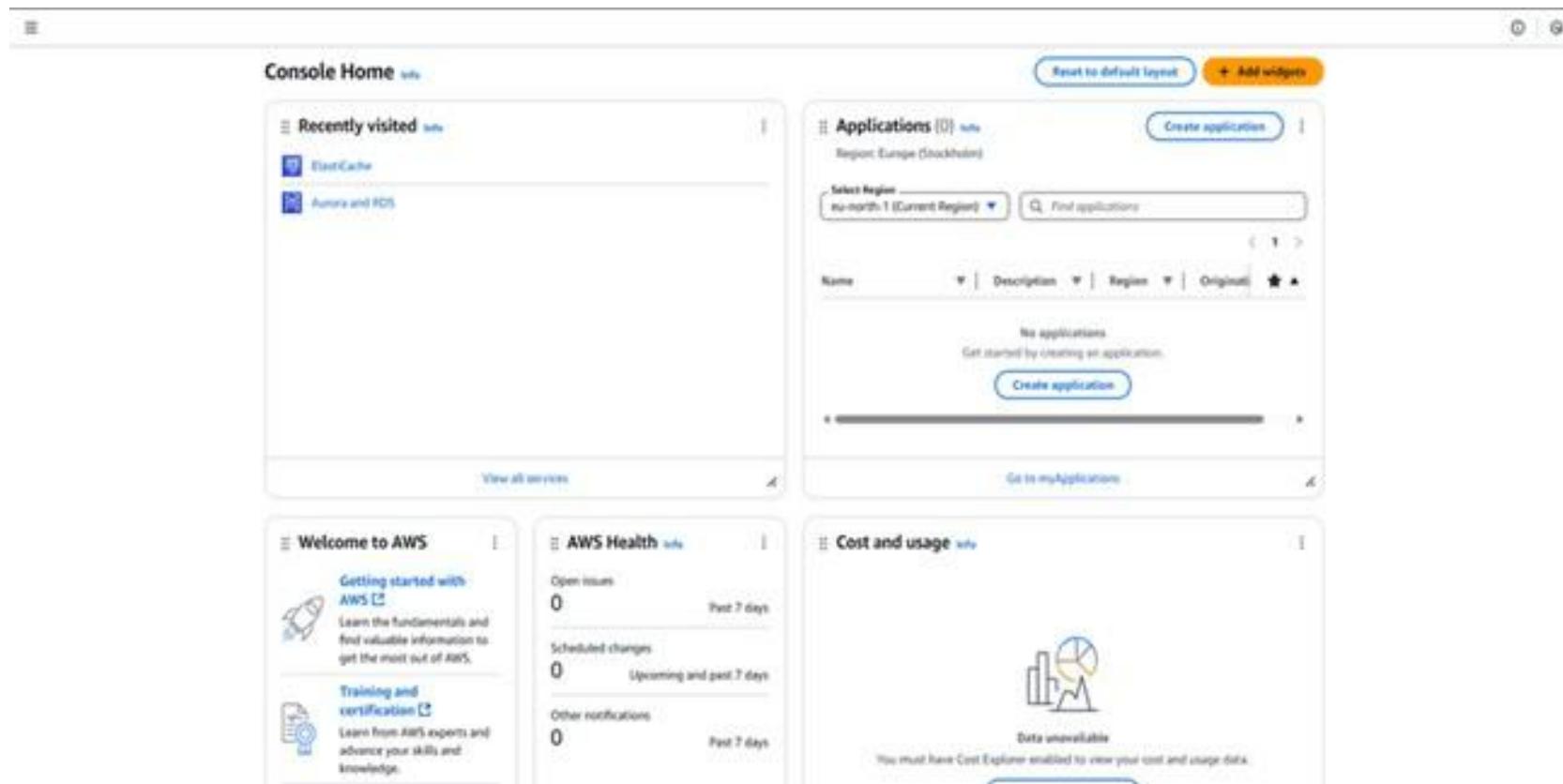
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(Somaiya Vidyavihar University)
Department of Computer Engineering



The screenshot shows the AWS Console Home page. At the top right, there is a sidebar with account information: Account ID (2084-3744-4183), Account (Somaiya), Organization (Somaiya), Service Quotas, Billing and Cost Management, and Security credentials. Below the sidebar is a "Type or multi-select support" input field and a "Sign out" button.

The main content area is divided into several sections:

- Recently visited:** Shows two items: ElastiCache and Aurora and RDS.
- Applications:** Shows a table with columns: Name, Description, Region, and Original. It includes a "Create application" button and a "Get started by creating an application." link.
- Welcome to AWS:** Includes sections for "Getting started with AWS Lambda" (Learn the fundamentals and find valuable information to get the most out of AWS) and "Training and certification" (Learn from AWS experts and advance your skills and knowledge).
- AWS Health:** Shows Open issues (0, Past 7 days), Scheduled changes (0, Upcoming and past 7 days), and Other notifications (0, Past 7 days).
- Cost and usage:** Displays a chart icon and the message "Data unavailable. You must have Cost Explorer enabled to view your cost and usage data."



The screenshot shows the AWS CloudWatch Metrics dashboard. At the top, there are two main sections: 'Recently visited' (containing links to 'CloudWatch Metrics' and 'Amazon CloudWatch Metrics') and 'Applications' (listing 'Region: Europe (Stockholm)' and a 'Create application' button). Below these are four cards: 'Welcome to AWS' (with links to 'Getting started with AWS' and 'Training and certification'), 'AWS Health' (showing 'Open issues: 0' for the 'Past 7 days', 'Scheduled changes: 0' for 'Upcoming and past 7 days', and 'Other notifications: 0' for 'Past 7 days'), 'Cost and usage' (with a 'Data unavailable' message: 'You must have Cost Explorer enabled to view your cost and usage data.'), and a 'View all services' link.

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All services

Services by category

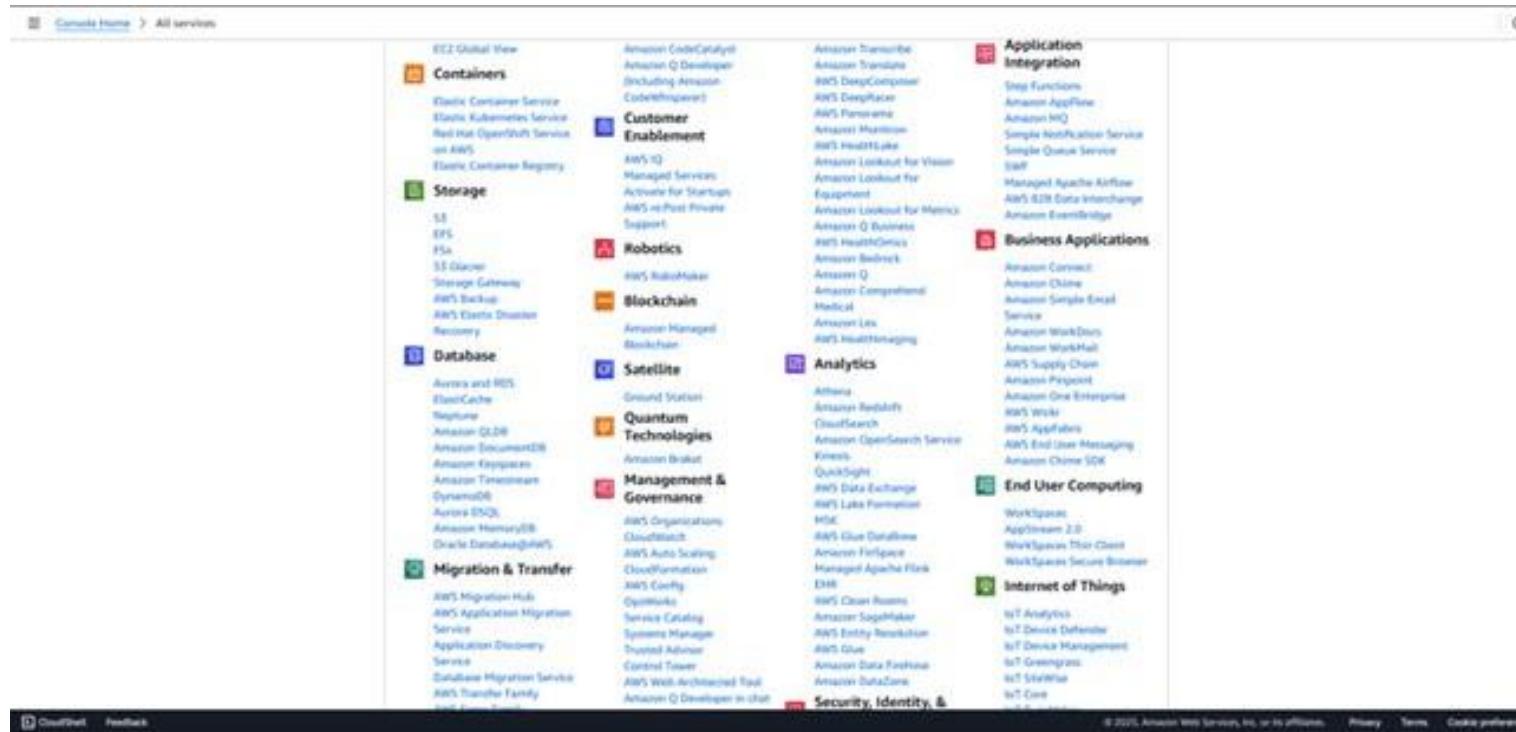
Compute	Developer Tools	Machine Learning	Cloud Financial Management
ECS Lightsail Lambda Batch Elastic Beanstalk Serverless Application Repository AWS Outposts ECS Image Builder AWS App Runner AWS Step Functions Parallel Computing Service ECS Global View	CodeCommit CodeBuild CodeDeploy CodePipeline Cloud9 CloudShell X-Ray AWS FIS Infrastructure Composer AWS App Studio AWS AppConfig CodeArtifact Amazon CodeCatalyst Amazon Q Developer (including Amazon CodeWhisperer)	Amazon SageMaker AI Amazon Augmented AI Amazon CodeGuru Amazon DevOps Guru Amazon Comprehend Amazon Forecast Amazon Fraud Detector Amazon Kendra Amazon Personalize Amazon Polly Amazon Rekognition Amazon Textract Amazon Transcribe	AWS Marketplace AWS Billing Conductor Billing and Cost Management
Containers	Customer Enablement	Front-end Web & Mobile	Application Integration
Elastic Container Service Elastic Kubernetes Service Red Hat OpenShift Service on AWS Elastic Container Registry	AWS IoT Managed Services Activate for Startups AWS re:Post Private Support	AWS Amplify AWS AppSync Device Farm Amazon Location Service	Temp Free-tier Amazon AppFlow Amazon HQ Simple Notification Service Simple Queue Service Textract Managed Apache Airflow AWS QLDB Data Interchange Amazon EventBridge
Storage	Robotics	Business Applications	
S3 ETL FSx S3 Glacier Storage Gateway AWS Backup AWS Elastic Disaster Recovery	AWS RoboMaker	Amazon Connect Amazon Chime Amazon Simple Email Service Amazon WorkDocs Amazon WorkMail AWS Supply Chain Amazon Pinpoint	
Database	Blockchain	Analytics	
Aurora MySQL	Amazon Managed Blockchain	Amazon Q Amazon Comprehend Medical Amazon Lex Amazon Translate	
Satellite			

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The screenshot displays the AWS Global View dashboard, which provides a comprehensive overview of various AWS services. The services are organized into several categories:

- Containers:** Amazon CodeBuild, Amazon Q (including Amazon CodeTranslator)
- Storage:** S3, EFS, FSx, S3 Glacier, Storage Gateway, AWS Backup, AWS Client Disaster Recovery
- Database:** Aurora and RDS, Amazon ElastiCache, Neptune, Amazon QLDB, Amazon DocumentDB, Amazon Keyspaces, Amazon TimeStream, DynamoDB, Aurora PostgreSQL, Amazon MemoryDB, Oracle Database on AWS
- Migration & Transfer:** AWS Migration Hub, AWS Application Migration Service, Application Discovery Service, Database Migration Service, AWS Transfer Family
- Compute:** Lambda, Step Functions, Amazon AppSync, AWS MQ, Simple Notification Service, Simple Queue Service, SageMaker, Managed Apache Airflow, AWS Step Functions, AWS Data Exchange, Amazon EventBridge
- Customer Enablement:** AWS IoT, Managed Services, Activate for Startup, AWS re:Post, Private Support
- Robotics:** AWS RoboMaker
- Blockchain:** Amazon Managed Blockchain
- Satellite:** Ground Station
- Quantum Technologies:** Amazon Braket
- Management & Governance:** AWS Organizations, CloudWatch Metrics, AWS Auto Scaling, CloudFormation, AWS Config, Optimize, Service Catalog, Systems Manager, Trusted Advisor, Control Tower, AWS Web Architecture Tool, Amazon Q (Developer in chat)
- Analytics:** Athena, Amazon Redshift, Amazon Quicksight, Amazon OpenSearch Service, Kinesis, QuickSight, AWS Data Exchange, AWS Lake Formation, HIVE, AWS Glue DataBrew, Amazon Firehose, Managed Apache Flink, EMR, AWS Clean Rooms, Amazon SageMaker, AWS Entity Resolution, AWS Glue, Amazon Data Pipeline, Amazon DataZone, Security, Identity, & Compliance
- Application Integration:** Step Functions, Amazon AppSync, AWS MQ, Simple Notification Service, Simple Queue Service, SageMaker, Managed Apache Airflow, AWS Step Functions, AWS Data Exchange, Amazon EventBridge
- Business Applications:** Amazon Connect, Amazon Chime, Amazon Simple Email Service, Amazon WorkDocs, Amazon WorkMail, AWS Supply Chain, Amazon Project, Amazon Greengrass, AWS Lambda, AWS AppFabric, AWS End User Messaging, Amazon Chime SDK
- End User Computing:** WorkSpaces, Application 2.0, WorkSpaces Thin Client, WorkSpaces Secure Browser
- Internet of Things:** IoT Analytics, IoT Device Defender, IoT Device Management, IoT Greengrass, IoT SiteWise, IoT Core

At the bottom of the dashboard, there are links for CloudWatch, Feedback, © 2023, Amazon Web Services, Inc. or its affiliates., Privacy, Terms, and Cookie preferences.

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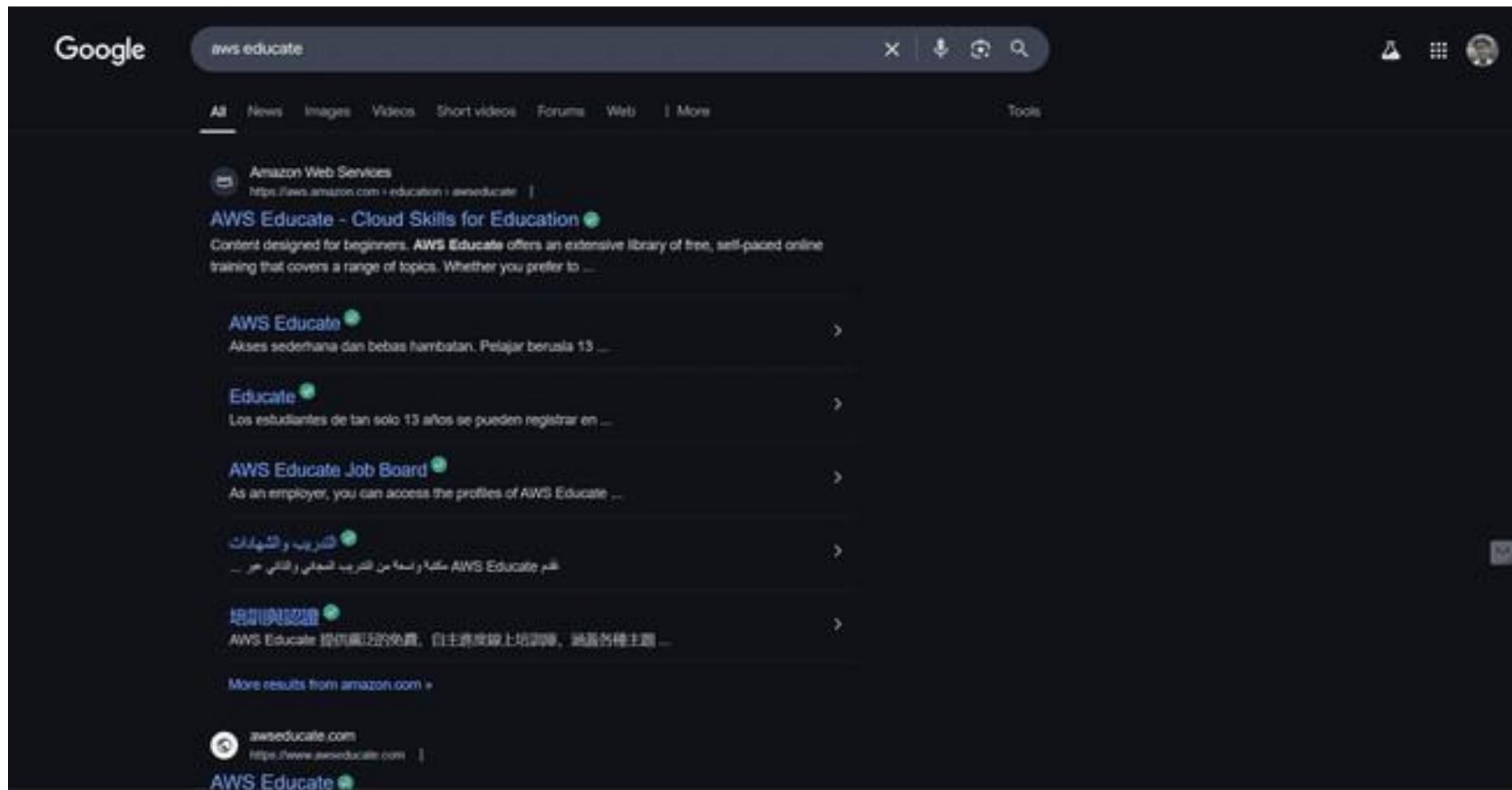


Console Home > All services

Service <ul style="list-style-type: none"> Application Discovery Service Database Migration Service AWS Transfer Family AWS Snow Family DataSync AWS Macie Modernization Amazon Elastic Volumes Services [Preview] Networking & Content Delivery <ul style="list-style-type: none"> VPC CloudFront API Gateway Direct Connect AWS App Mesh Global Accelerator Route 53 AWS Data Transfer Terminal AWS Private 5G AWS Cloud Map Application Recovery Controller 	Systems Manager <ul style="list-style-type: none"> Troubled Advisor Control Tower AWS Well-Architected Tool AWS Cloud Developer in Chat applications (Previously AWS Chatbot) Launch Wizard AWS Compute Optimizer Resource Groups & Tag Editor Amazon Grafana Amazon Prometheus AWS Resilience Hub Incident Manager AWS Trusted Network Builder AWS Health Dashboard AWS Firewall AWS User Notifications CloudTrail AWS License Manager AWS Resource Explorer Service Quotas Media Services <ul style="list-style-type: none"> Kinesis Video Streams MediaConvert MediaLive MediaPackage MediaStore MediaTailor Elemental Appliances & Software Elastic Transcoder Amazon Interactive Video Service AWS Originate Cloud MediaConnect 	AWS Entity Resolution <ul style="list-style-type: none"> AWS Edge Amazon Data Firehose Amazon DataZone Security, Identity, & Compliance <ul style="list-style-type: none"> Resource Access Manager Cognito Secrets Manager GuardDuty Amazon Inspector Amazon Macie IAM Identity Center Certificate Manager Key Management Service CloudHSM Directory Service AWS Firewall Manager AWS Artifact Device AWS Signer Security Lake WAF & Shield Amazon Verified Permissions AWS Audit Manager Security Hub WAF AWS Private Certificate Authority AWS Payment Cryptography AWS Security Incident Response 	IoT Device Defender <ul style="list-style-type: none"> IoT Device Management IoT Greengrass IoT SiteWise IoT Core IoT TwinMaker IoT Events AWS IoT Fleetwise Game Development <ul style="list-style-type: none"> Amazon GameLift Servers Amazon GameLift Streams
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<https://aws.amazon.com/console/> | [Feedback](#) | [Home](#) | [Regions](#) | [Watchlist](#)

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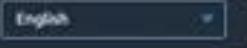
A screenshot of a Google search results page for the query "aws educate". The results are displayed in a dark-themed interface.

- Amazon Web Services**
<https://aws.amazon.com/education/awseducate/>
AWS Educate - Cloud Skills for Education ●
Content designed for beginners. AWS Educate offers an extensive library of free, self-paced online training that covers a range of topics. Whether you prefer to ...
AWS Educate ●
Akses sederhana dan bebas hambatan. Pelajar berusia 13 ...
- Educate** ●
Los estudiantes de tan solo 13 años se pueden registrar en ...
- AWS Educate Job Board** ●
As an employer, you can access the profiles of AWS Educate ...
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Create your account

Already have a learner account? [Sign in](#)
Looking to hire cloud talent? [Register as a recruiter](#)

First name:

Middle name - optional:

Last name:

Country:

State or province:

City:

Birth month:

Birth year:

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soumil.m@somaiya.edu

What program(s) are you associated with?

None of these

Language

English

Registration code - *optional*

EducateLP

protected by reCAPTCHA

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By creating your account, you agree to the [AWS Learner Terms and Conditions](#). The information you provide will be handled by AWS as described in the [AWS Privacy Notice](#).

Back

Create account

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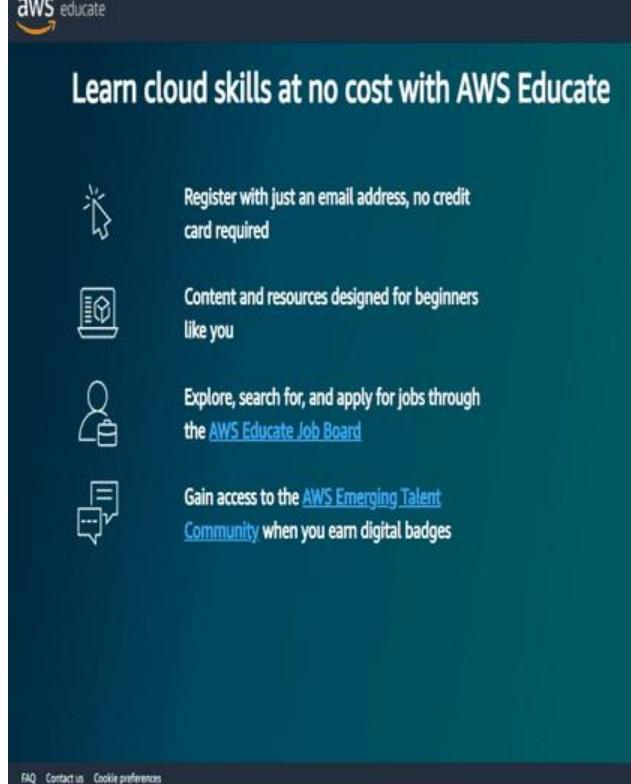
aws educate

English

Learn cloud skills at no cost with AWS Educate

Verify email

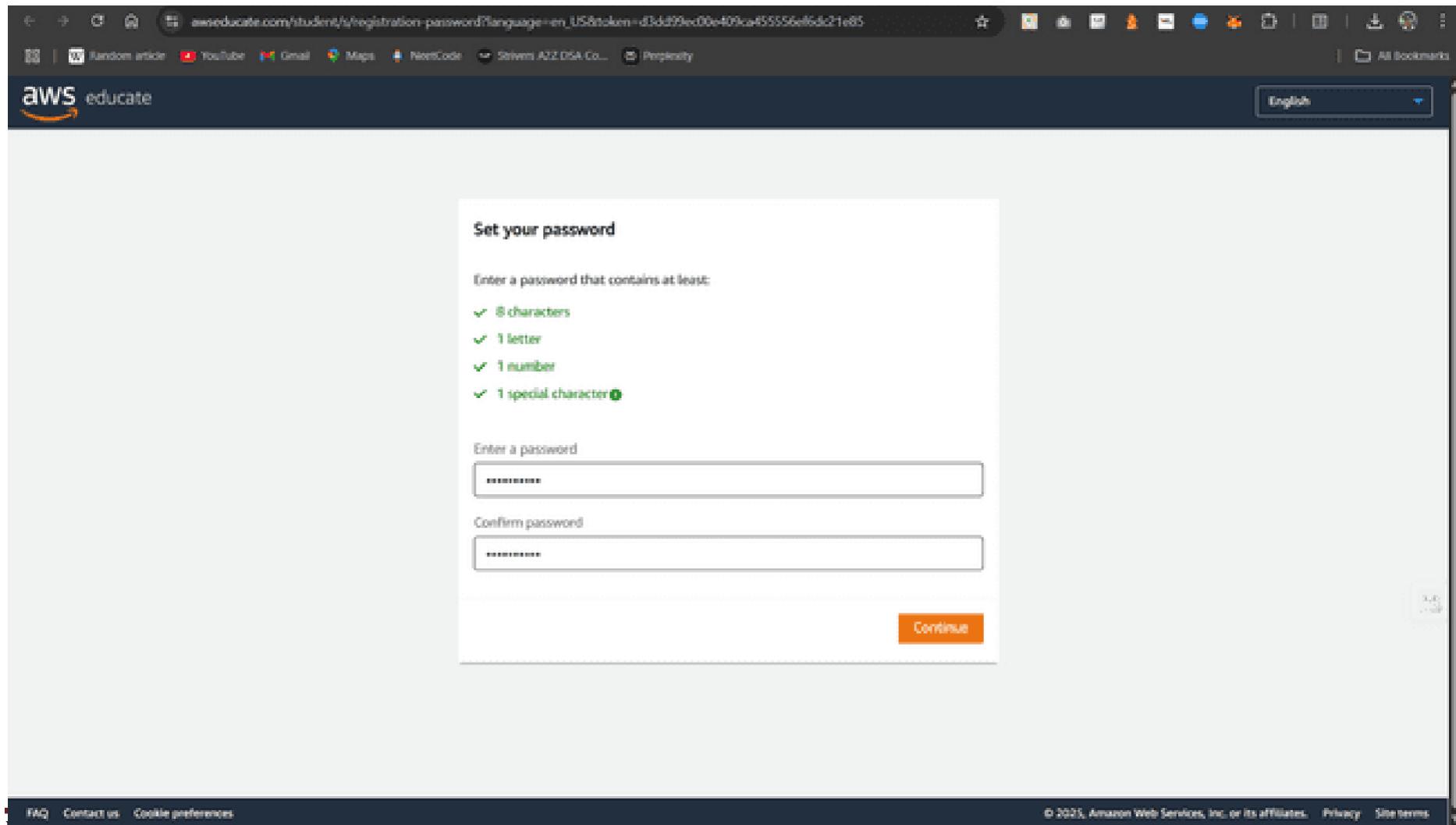
To verify your email, we've sent a link to soumil.m@somaiya.edu. Please open the link to verify your account.



The landing page features four icons with corresponding text: 1. A cursor icon: Register with just an email address, no credit card required. 2. A document icon: Content and resources designed for beginners like you. 3. A person icon: Explore, search for, and apply for jobs through the [AWS Educate Job Board](#). 4. A speech bubble icon: Gain access to the [AWS Emerging Talent Community](#) when you earn digital badges.

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The screenshot shows a web browser window for AWS Educate. The URL in the address bar is `awseducate.com/student/s/registration-password?language=en_US&token=d3dd59e00e409ca455556ef6d21e85`. The page title is "Set your password". It instructs the user to enter a password that contains at least 8 characters, 1 letter, 1 number, and 1 special character. There are two input fields: "Enter a password" and "Confirm password", both containing masked text. A "Continue" button is at the bottom right. The browser interface includes tabs for Random article, YouTube, Gmail, Maps, NextCode, Stevens AZZ DSA Co., and Prodigy, along with a sidebar for All Bookmarks.

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awseducate.com/student/s/content

w Random article YouTube Gmail Maps NextCode Stevens A2Z DSA Course Peoply All Bookmarks

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Interested in learning about GenAI or cloud basics from an instructor? AWS offers free, live instructor-led training - virtual & in-person - to kick start

Filters

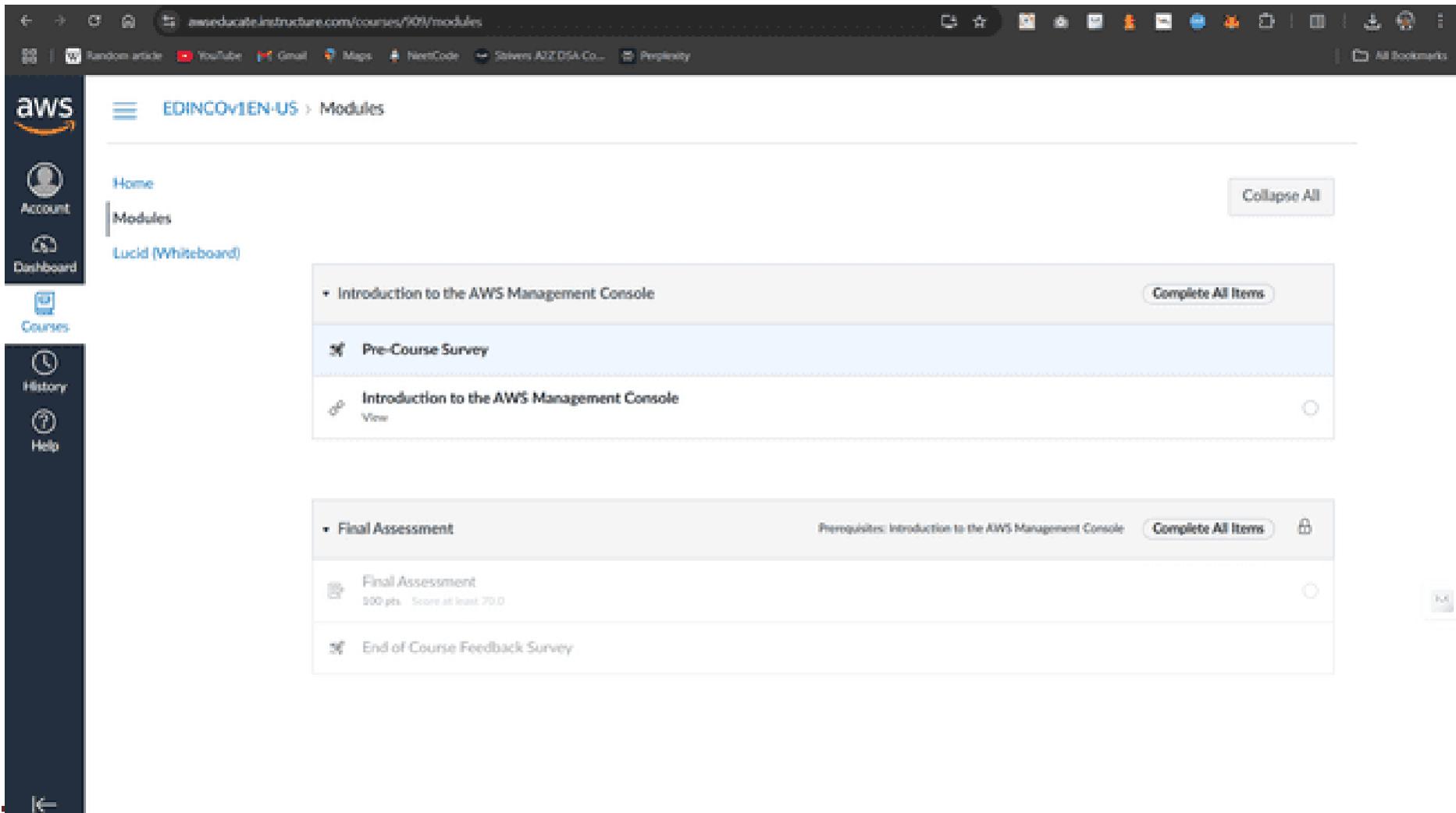
Search for courses using keywords

Getting Started

New to cloud computing? Start here.

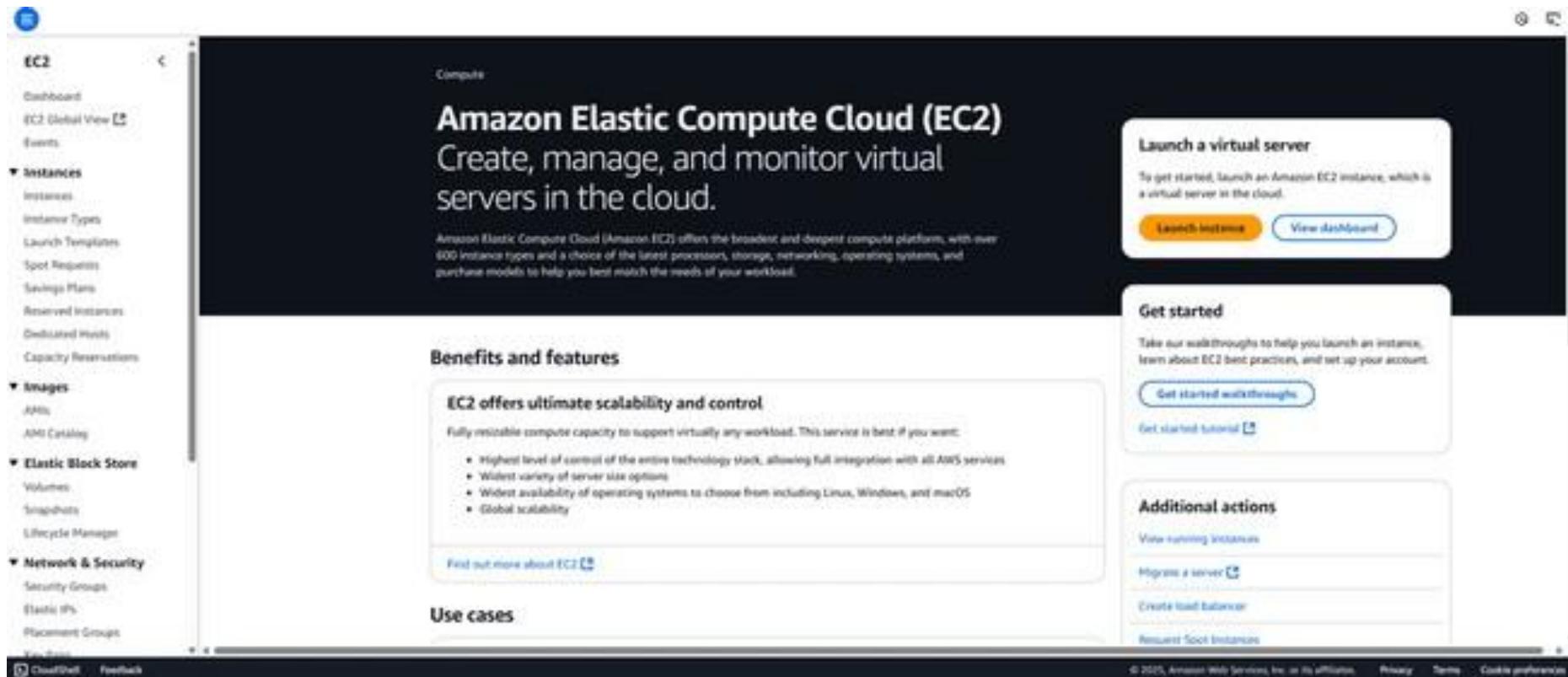
1/3 < >

Introduction to the AWS Management Console	Introduction to Cloud 101	Getting Started with Storage
Foundational 1 hour(s)	Foundational 3 hour(s)	Foundational 2 hour(s)
Cloud Computing	Cloud Computing	Cloud Computing



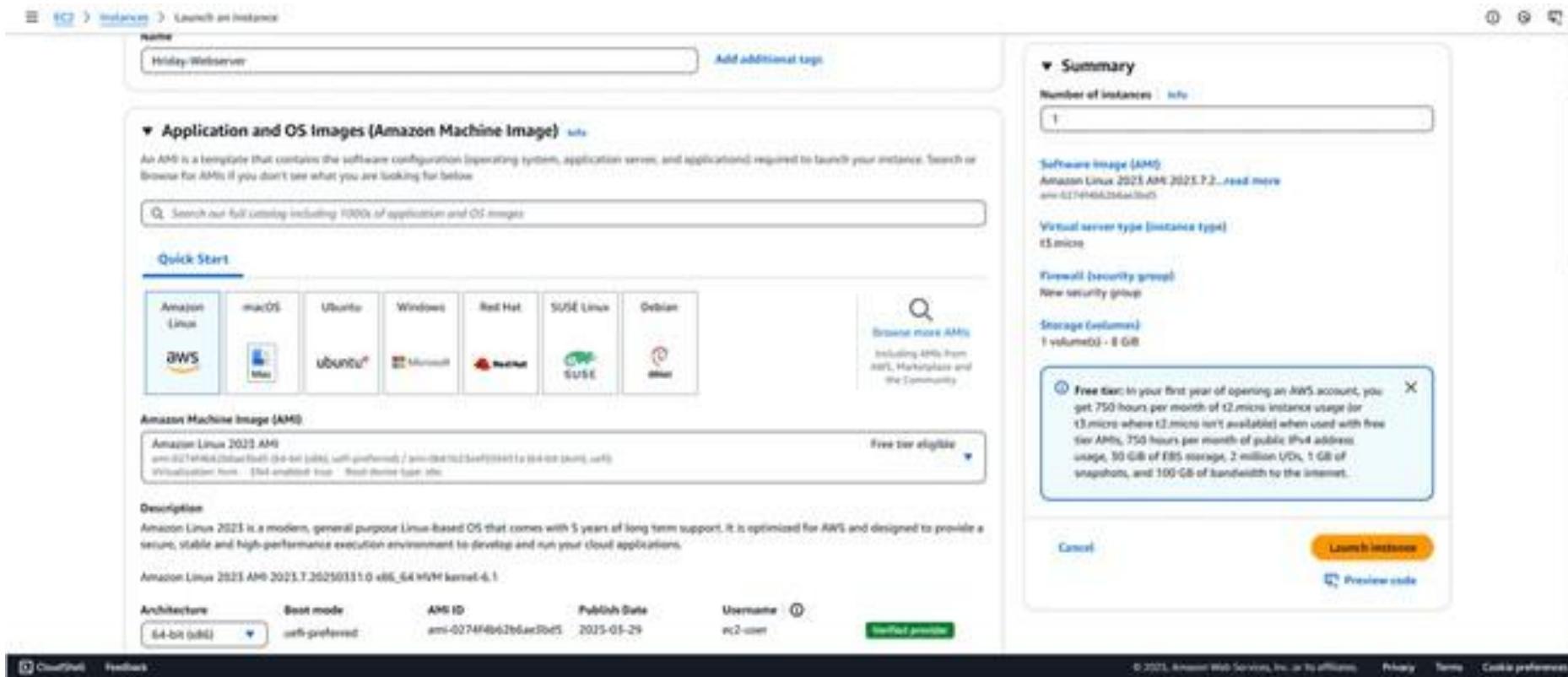
The screenshot shows a web browser displaying a course module on the Instructure Learn platform. The left sidebar contains navigation links for AWS Management Console, Account, Dashboard, Courses, History, and Help. The main content area shows a course titled "EDINCOV1EN-US" under the "Modules" section. The course structure includes:

- Introduction to the AWS Management Console** (with a "Complete All Items" button)
- Pre-Course Survey**
- Introduction to the AWS Management Console** (with a "View" link)
- Final Assessment** (Prerequisites: Introduction to the AWS Management Console; with a "Complete All Items" button)
- Final Assessment** (100 pts, Score at least 70.0)
- End of Course Feedback Survey**



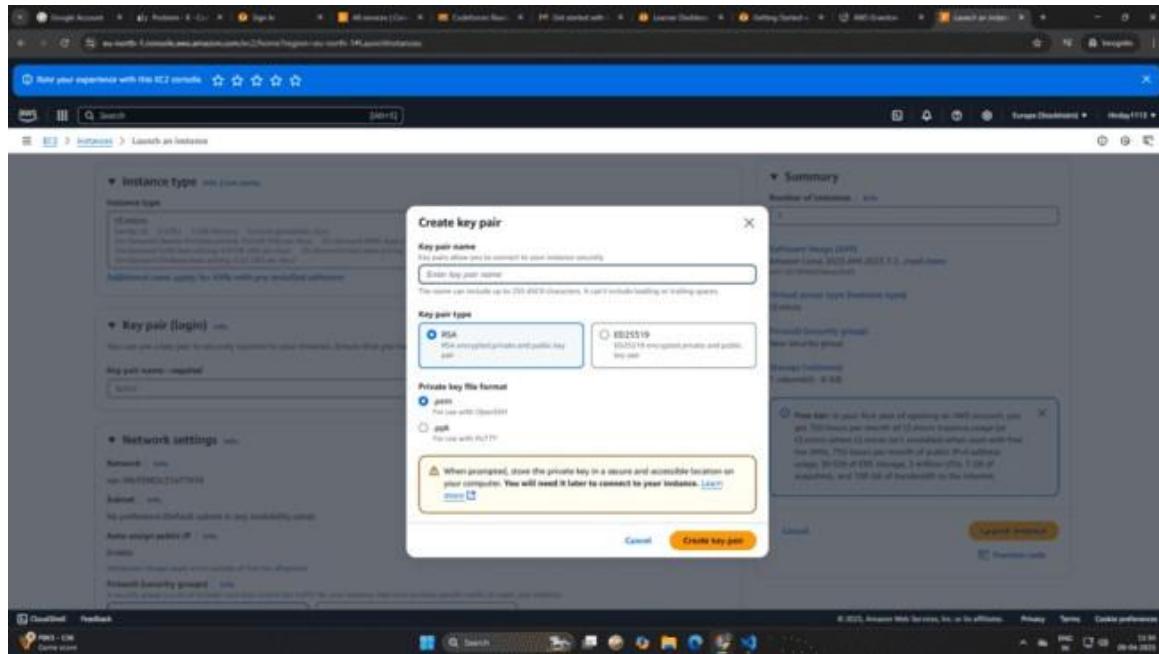
The screenshot shows the AWS EC2 landing page. On the left, there's a sidebar with navigation links for EC2 services like Dashboard, Global View, Events, Instances, Images, Elastic Block Store, Network & Security, and CloudShell. The main content area has a dark header "Compute" and a title "Amazon Elastic Compute Cloud (EC2)". Below it, a sub-section title "Create, manage, and monitor virtual servers in the cloud." is followed by a brief description of EC2's capabilities. A large call-to-action button "Launch a virtual server" with sub-links "Launch instance" and "View dashboard" is present. To the right, sections for "Get started" (with links to walkthroughs and tutorials) and "Additional actions" (with links to start instances, migrate servers, create load balancers, and request spot instances) are shown. At the bottom, there's a footer with copyright information and links to Privacy, Terms, and Cookies.

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The screenshot shows the AWS Lambda console interface. The user is in the process of creating a new Lambda function named "Hello-WebServer". They have selected the "Amazon Machine Image (AMI)" configuration. A dropdown menu is open over the "Amazon Linux" option, showing other available AMIs such as "Ubuntu" and "Windows". The "Description" section provides details about the selected AMI, which is "Amazon Linux 2023 AMI (ami-0274f4b62b6e5d5)". The "Configuration" section includes fields for "Architecture" (set to "64-bit (x86)"), "Best mode" (set to "self-preferred"), and the "AMI ID" (set to "ami-0274f4b62b6e5d5"). The "Publish Date" is listed as "2023-05-29". The "Username" is set to "ec2-user" and the "Verified provider" status is indicated as "Verified provider". On the right side of the screen, there is a summary panel showing "Number of instances: 1" and a note about "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, 50 GB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet." Below this summary are buttons for "Launch in browser", "Preview code", and "Cancel".

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Network settings

Network: [info](#)
subnet-00cf1992 (37.27.79.72)

Subnet: [info](#)
No preference (Default subnet in any availability zone)

Auto-assign public IP: [info](#)
Enable

Additional charges apply when outside of free tier allowance.

Firewall (security group): [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.

Create security group Select existing security group

We'll create a new security group called `Launch-wizard-T` with the following rules:

- Allow SSH traffic from Anywhere (0.0.0.0/0)
- Allow HTTPS traffic from the internet To set up an endpoint, for example when creating a web server
- Allow HTTP traffic from the internet To set up an endpoint, for example when creating a web server

Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Configure storage

Advanced

Summary

Number of instances: [info](#)
1

Software Image (AMI): [Amazon Linux 2023 AMI 2023.7.2... read more](#)
[AMI Details](#)

Virtual server type (instance type): [t2.micro](#)

Firewall (security group): [New security group](#)

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

Note: 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 GiB of snapshots, and 100 GiB of bandwidth to the internet.

Launch instance

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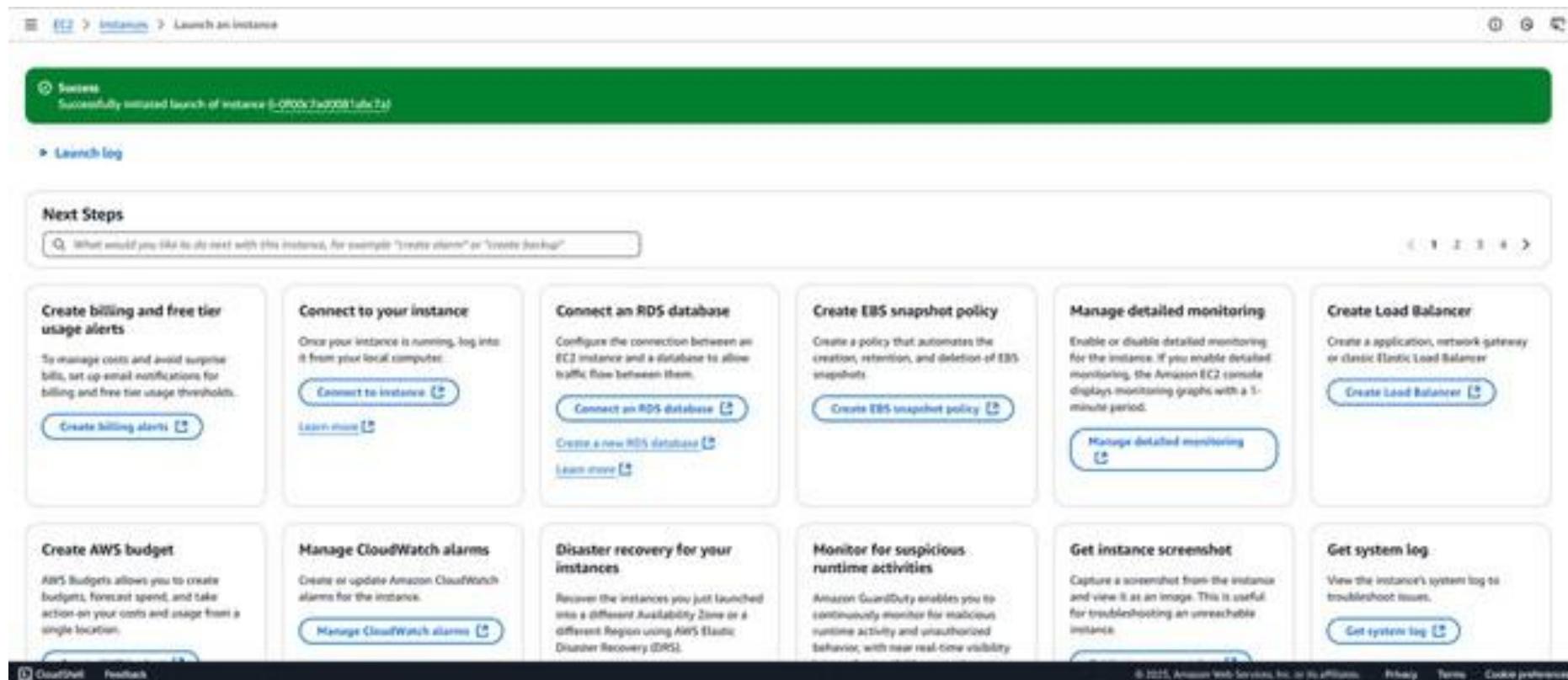


EC2 > Instances > Launch an instance

Launch Instance Launch Instances

Details

Please wait while we launch your instance.
Do not close your browser while this is loading.



The screenshot shows the AWS EC2 console after launching an instance. A green success bar at the top indicates "Successfully initiated launch of instance i-000023a00000abc246". Below it, a "Launch log" button is visible. The main area is titled "Next Steps" and lists several actions:

- Create billing and free tier usage alerts**: To manage costs and avoid surprise bills, set up email notifications for billing and free tier usage thresholds. Buttons: "Create billing alerts" and "Learn more".
- Connect to your instance**: Once your instance is running, log into it from your local computer. Buttons: "Connect to instance" and "Learn more".
- Connect an RDS database**: Configure the connection between an EC2 instance and a database to allow traffic flow between them. Buttons: "Connect an RDS database", "Create a new RDS database", and "Learn more".
- Create EBS snapshot policy**: Create a policy that automates the creation, retention, and deletion of EBS snapshots. Button: "Create EBS snapshot policy".
- Manage detailed monitoring**: Enable or disable detailed monitoring for the instance. If you enable detailed monitoring, the Amazon EC2 console displays monitoring graphs with a 1-minute period. Button: "Manage detailed monitoring".
- Create Load Balancer**: Create a application, network gateway or classic Elastic Load Balancer. Button: "Create Load Balancer".
- Create AWS budget**: AWS Budgets allows you to create budgets, forecast spend, and take action on your costs and usage from a single location. Button: "Create AWS budget".
- Manage CloudWatch alarms**: Create or update Amazon CloudWatch alarms for the instance. Button: "Manage CloudWatch alarms".
- Disaster recovery for your instances**: Recover the instances you just launched into a different Availability Zone or a different Region using AWS Elastic Disaster Recovery (EDR). Button: "Get started".
- Monitor for suspicious runtime activities**: Amazon GuardDuty enables you to continuously monitor for malicious runtime activity and unauthorized behavior, with near real-time visibility. Button: "Get started".
- Get instance screenshot**: Capture a screenshot from the instance and view it as an image. This is useful for troubleshooting an unreachable instance. Button: "Get instance screenshot".
- Get system log**: View the instance's system log to troubleshoot issues. Button: "Get system log".

At the bottom left are "Dashboard" and "Feedback" buttons. At the bottom right are links for "© 2021, Amazon Web Services, Inc. or its affiliates.", "Privacy", "Terms", and "Cookie preferences".

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EC2 > Instances > i-000c7a0001abc7a > Connect to instance

Connect to instance Info

Connect to your Instance i-000c7a0001abc7a (Somaiya-Webserver) using any of these options.

EC2 instance Connect Session Manager SSH client EC2 serial console

Instance ID [i-000c7a0001abc7a \(Somaiya-Webserver\)](#)

Connection Type

Connect using EC2 Instance Connect: Connect using the EC2 Instance Connect (browser-based client), with a public (IPv4 or IPv6) address.

Public IPv4 address [13.48.249.130](#)

IPv6 address

Username Enter the username defined in the AMI used to launch the instance. If you didn't define a custom username, use the default username, ec2-user.

ec2-user [X](#)

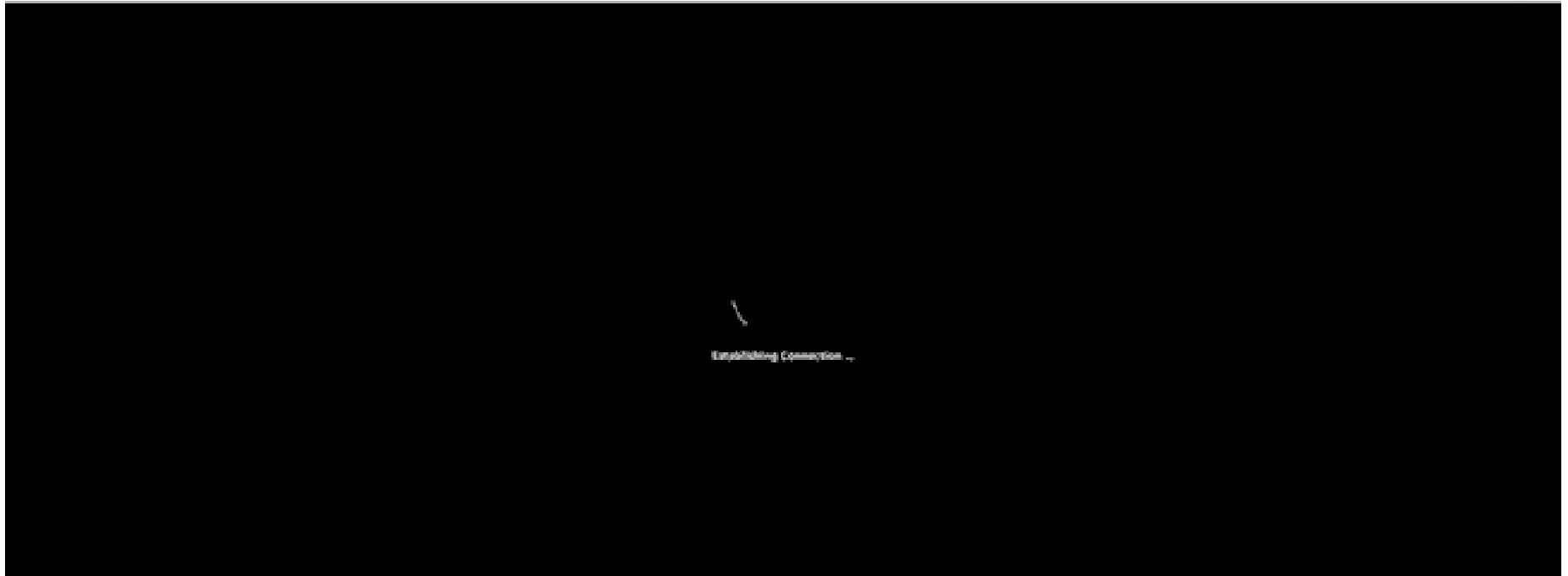
Note: In most cases, the default username, ec2-user, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

[Cancel](#) [Connect](#)

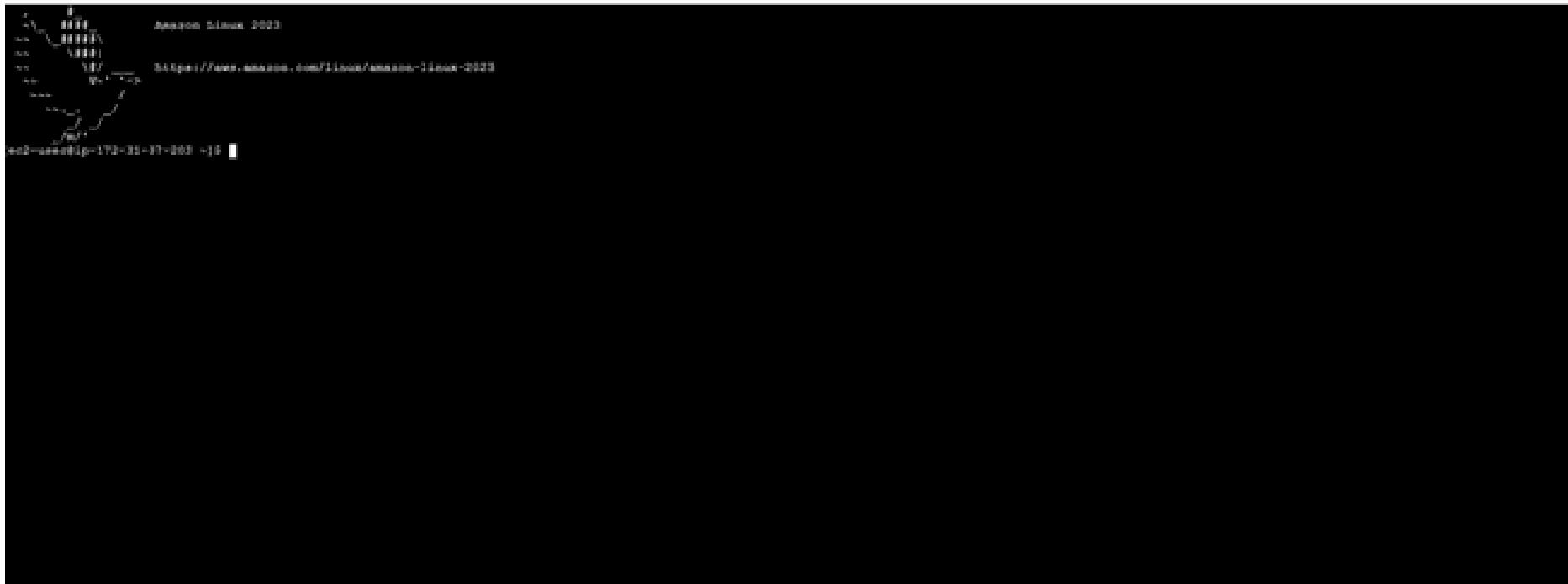
[Dashboard](#) [Feedback](#)

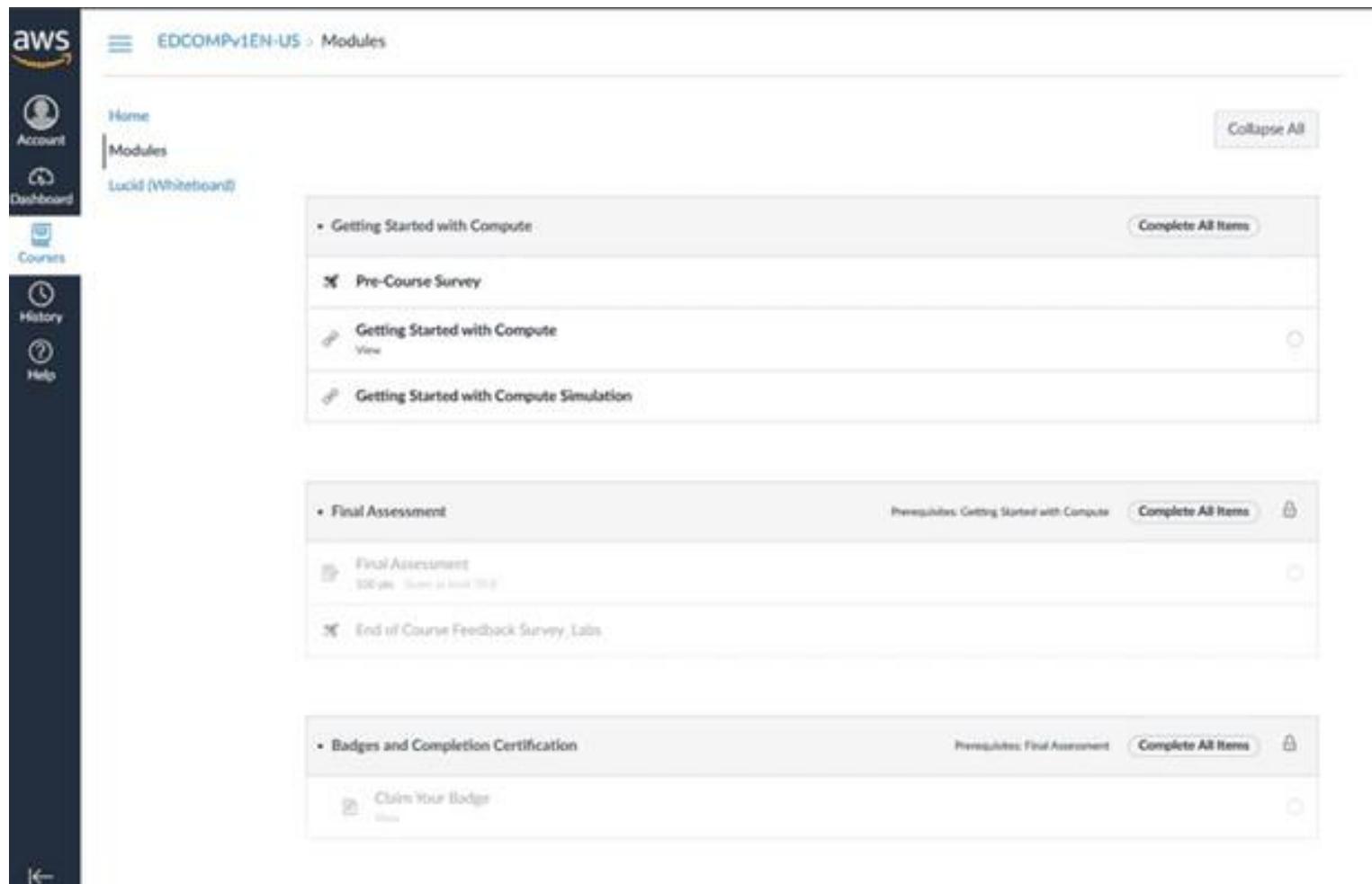
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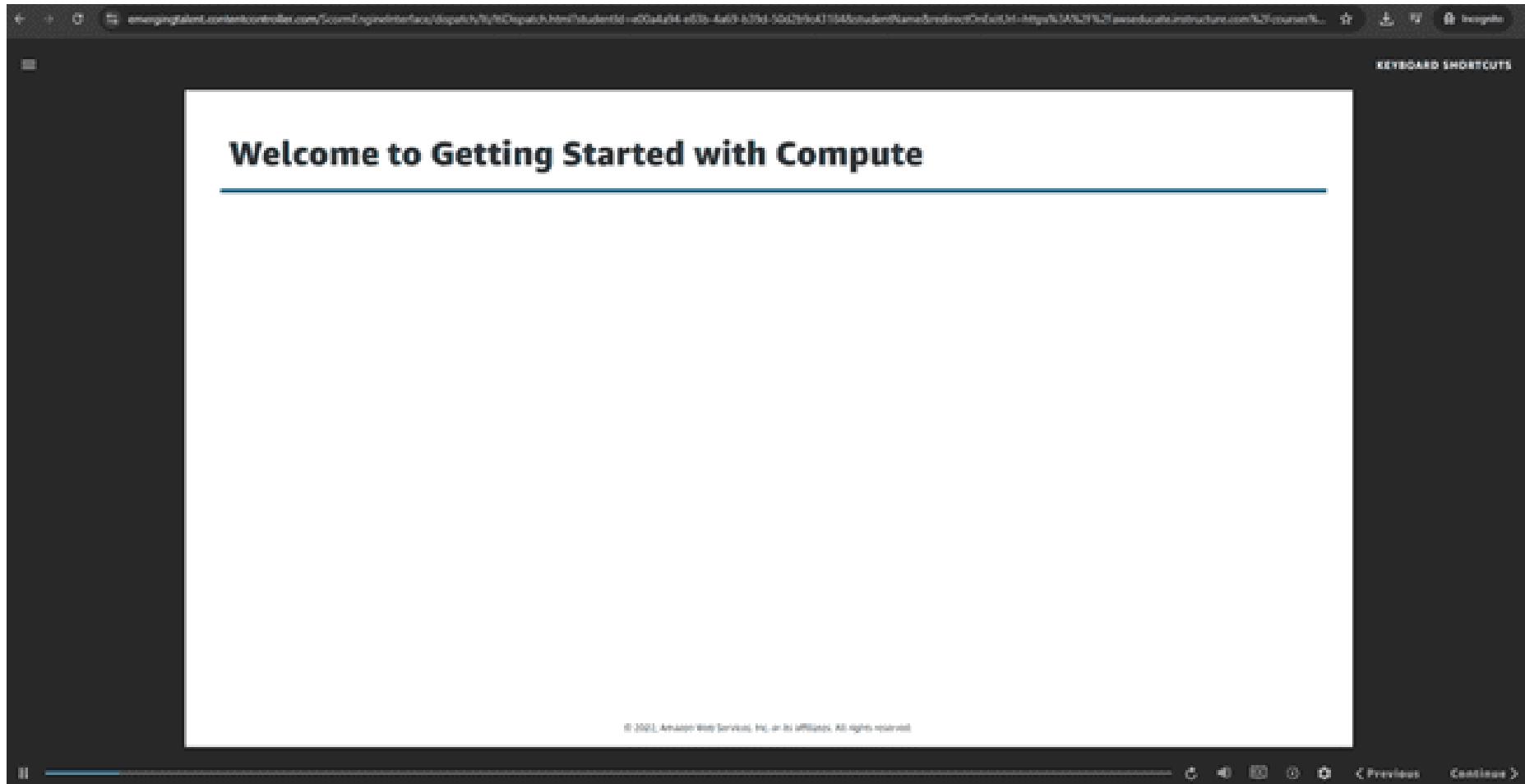
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The screenshot shows the AWS EdTech platform interface for the course EDCOMP1EN-US. The left sidebar includes links for AWS, Account, Dashboard, Courses, History, and Help. The main content area displays three sections of modules:

- Getting Started with Compute**: Includes "Pre-Course Survey" (marked as completed), "Getting Started with Compute" (View), and "Getting Started with Compute Simulation". A "Complete All Items" button is available.
- Final Assessment**: Prerequisites: Getting Started with Compute. Includes "Final Assessment" (300 pts, due at least 100%) and "End of Course Feedback Survey, Labs". A "Complete All Items" button is available.
- Badges and Completion Certification**: Prerequisites: Final Assessment. Includes "Claim Your Badge" (View). A "Complete All Items" button is available.



The screenshot shows a web browser window with a dark theme. The main content area displays a white page with the heading "Welcome to Getting Started with Compute" in bold black font. Below this heading, there is a large, empty white space, likely a placeholder for course content. At the bottom of the white page, there is a small, faint copyright notice: "© 2021, Academic Study Services, Inc. or its affiliates. All rights reserved." The browser's address bar contains a URL related to "emergentalent.contentcontroller.com". The bottom of the screen features a standard Windows-style taskbar with icons for file operations and system status.

KEYBOARD SHORTCUTS

Introduction to Amazon EC2



The diagram shows three main benefits of Amazon EC2:

- Resizable:** Represented by two computer chips connected by a double-headed arrow.
- Affordable:** Represented by a computer chip with a dollar sign (\$) icon.
- Global:** Represented by a computer chip with a globe icon.

Below the diagram, there is a navigation bar with five items:

- Introduction to Compute
- Amazon Elastic Compute Cloud
- Using Amazon EC2
- Managing Amazon EC2

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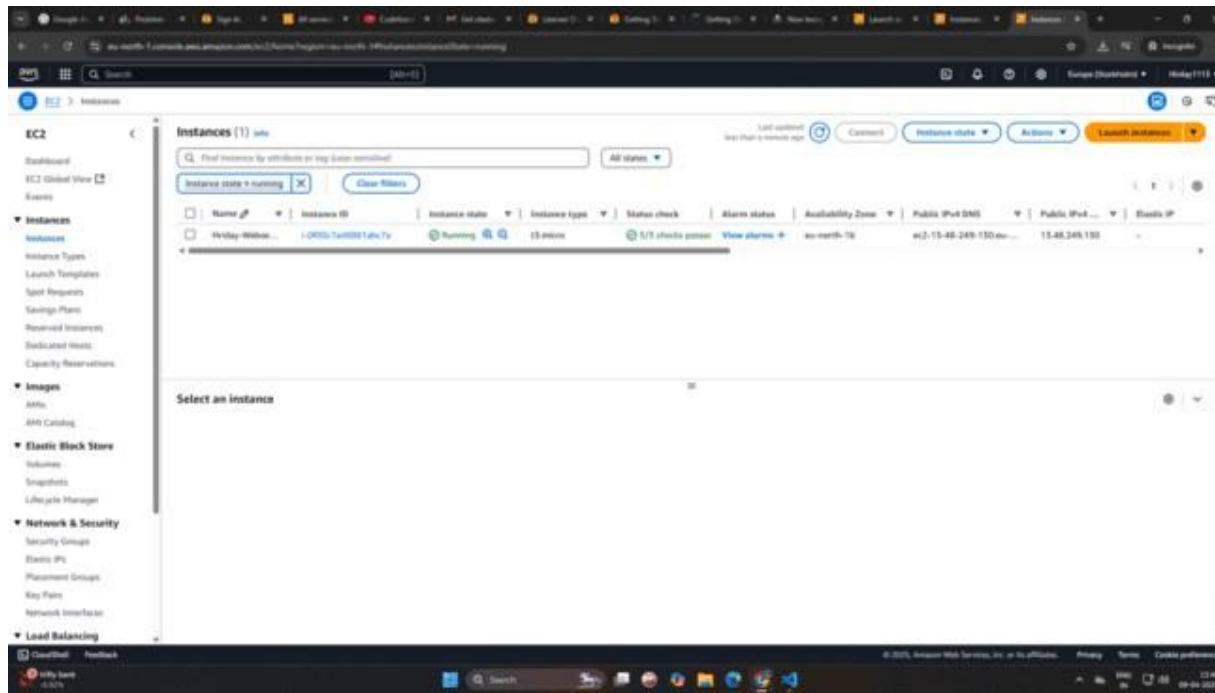
Navigation icons at the bottom include arrows, a magnifying glass, and links to 'Previous' and 'Continue'.



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```
root@www:~# ping google.com
PING google.com (142.250.74.130) 56(84) bytes of data:
64 bytes from www10-in-f14.1e100.net (142.250.74.130): icmp_seq=1 ttl=55 time=0.12 ms
64 bytes from www10-in-f14.1e100.net (142.250.74.130): icmp_seq=2 ttl=55 time=0.21 ms
64 bytes from www10-in-f14.1e100.net (142.250.74.130): icmp_seq=3 ttl=55 time=0.13 ms
64 bytes from www10-in-f14.1e100.net (142.250.74.130): icmp_seq=4 ttl=55 time=0.13 ms
64 bytes from www10-in-f14.1e100.net (142.250.74.130): icmp_seq=5 ttl=55 time=0.18 ms
64 bytes from www10-in-f14.1e100.net (142.250.74.130): icmp_seq=6 ttl=55 time=0.13 ms
64 bytes from www10-in-f14.1e100.net (142.250.74.130): icmp_seq=7 ttl=55 time=0.12 ms
64 bytes from www10-in-f14.1e100.net (142.250.74.130): icmp_seq=8 ttl=55 time=0.12 ms
```



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EC2 > Instances > i-0f00c7ad0081abc7a

Instance summary for i-0f00c7ad0081abc7a (Hriday-Webserver)

Updated less than a minute ago

Instance ID	i-0f00c7ad0081abc7a	Public IPv4 address	13.46.249.150 [open address]
IPv6 address	-	Instance state	Running
Hostname type	IP name: ip-172-31-37-203.eu-north-1.compute.internal	Private IP DNS name (IPv4 only)	ip-172-31-37-203.eu-north-1.compute.internal
Assign private resource DNS name (IPv4)	-	Instance type	t3.micro
Auto-assigned IP address	13.46.249.150 [Public IP]	VPC ID	vpc-00cf9a03117a179e
IM Role	-	Subnet ID	subnet-00440e52b4d807ae0
IMDv2	Required	Instance ARN	arn:aws:ec2:eu-north-1:20643786183:instance/i-0f00c7ad0081abc7a
Operator	-		

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

Instance details

AMI ID	ami-027a084756ae0d5	Monitoring	Enabled
AMI Name	al2023-ami-2023.7.20250511.0-kernel-6.1-x86_64	Allowed image	-
Stop protection	-	Launch time	-

Platform details

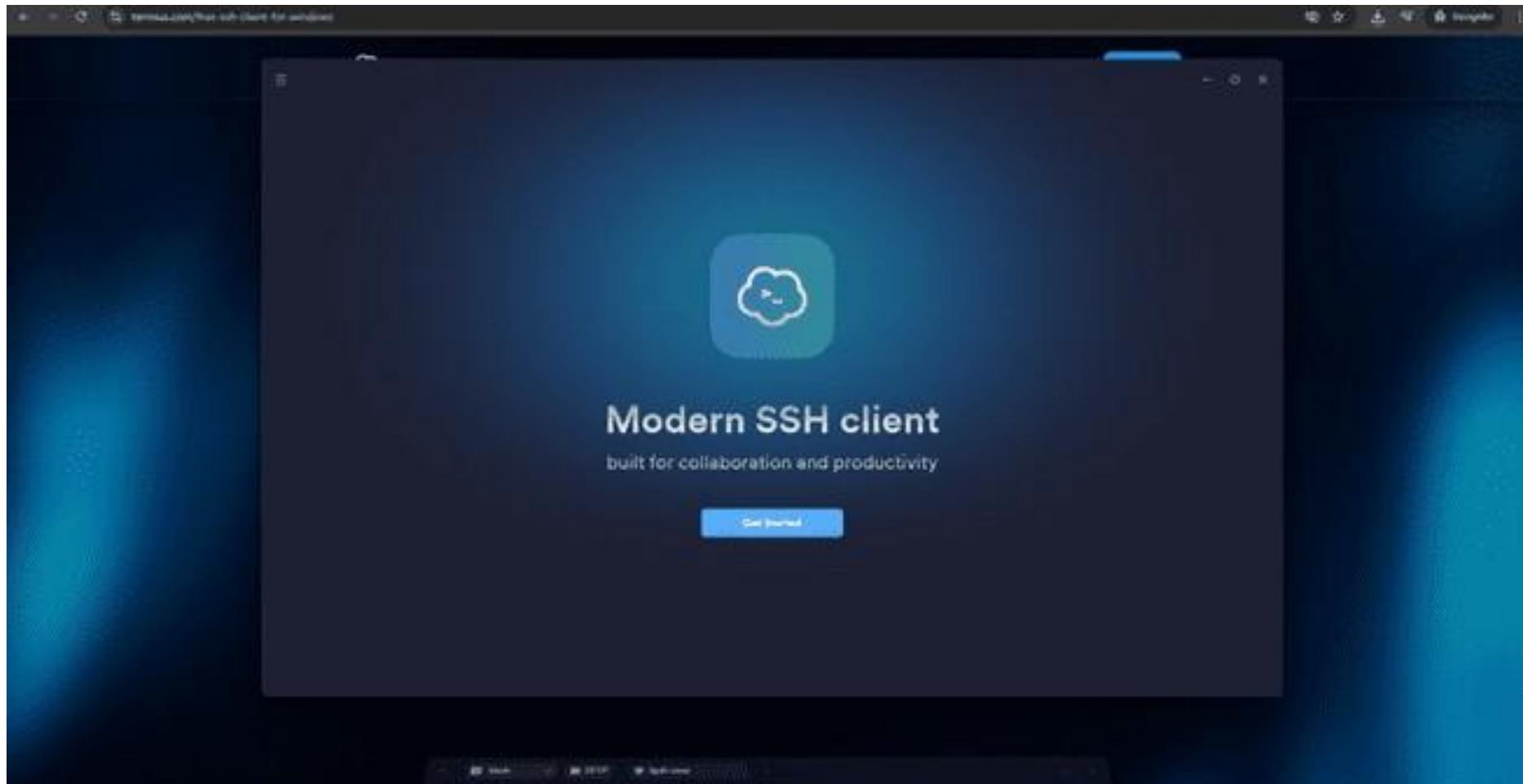
- Linux/UNIX

Termination protection

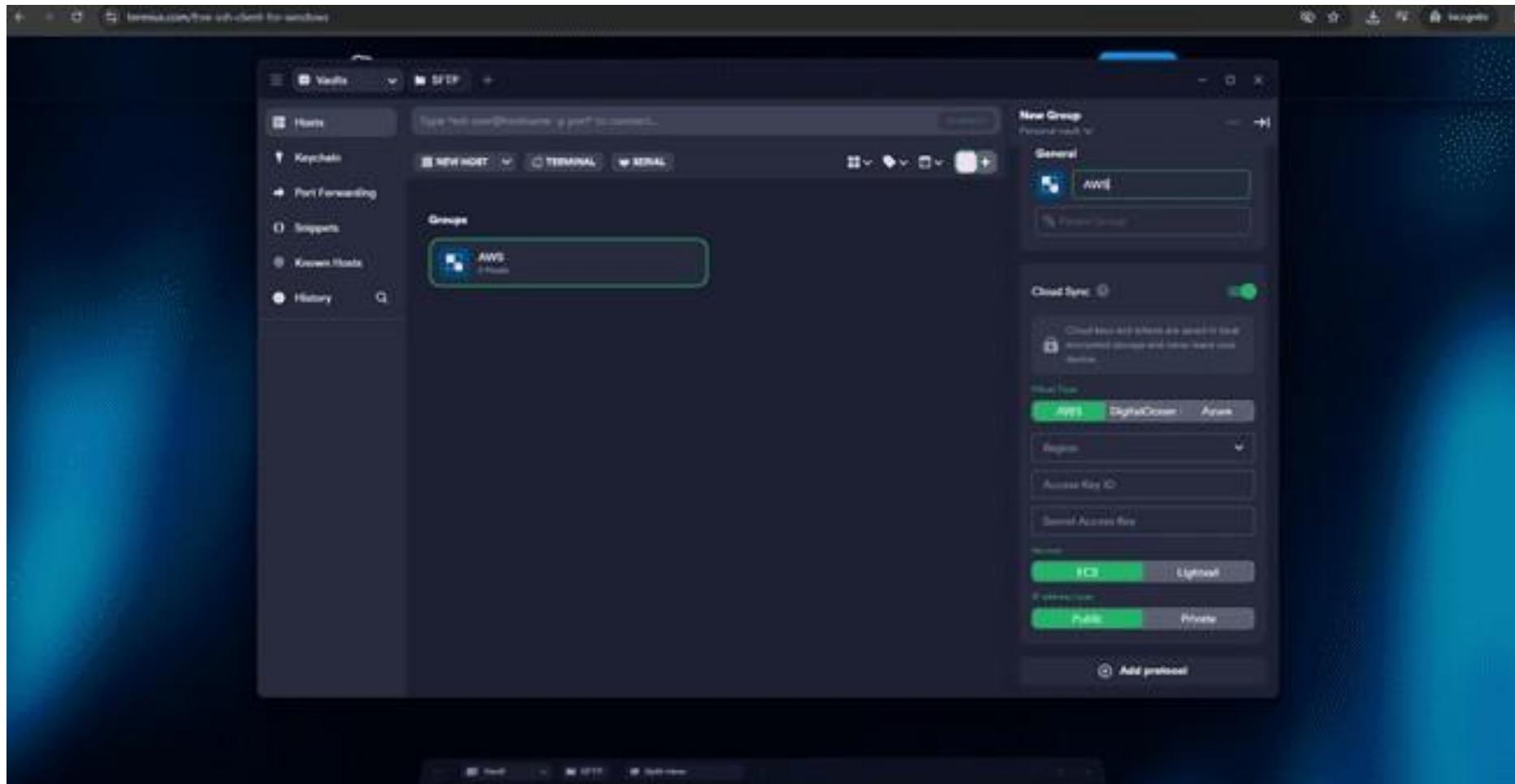
- Disabled

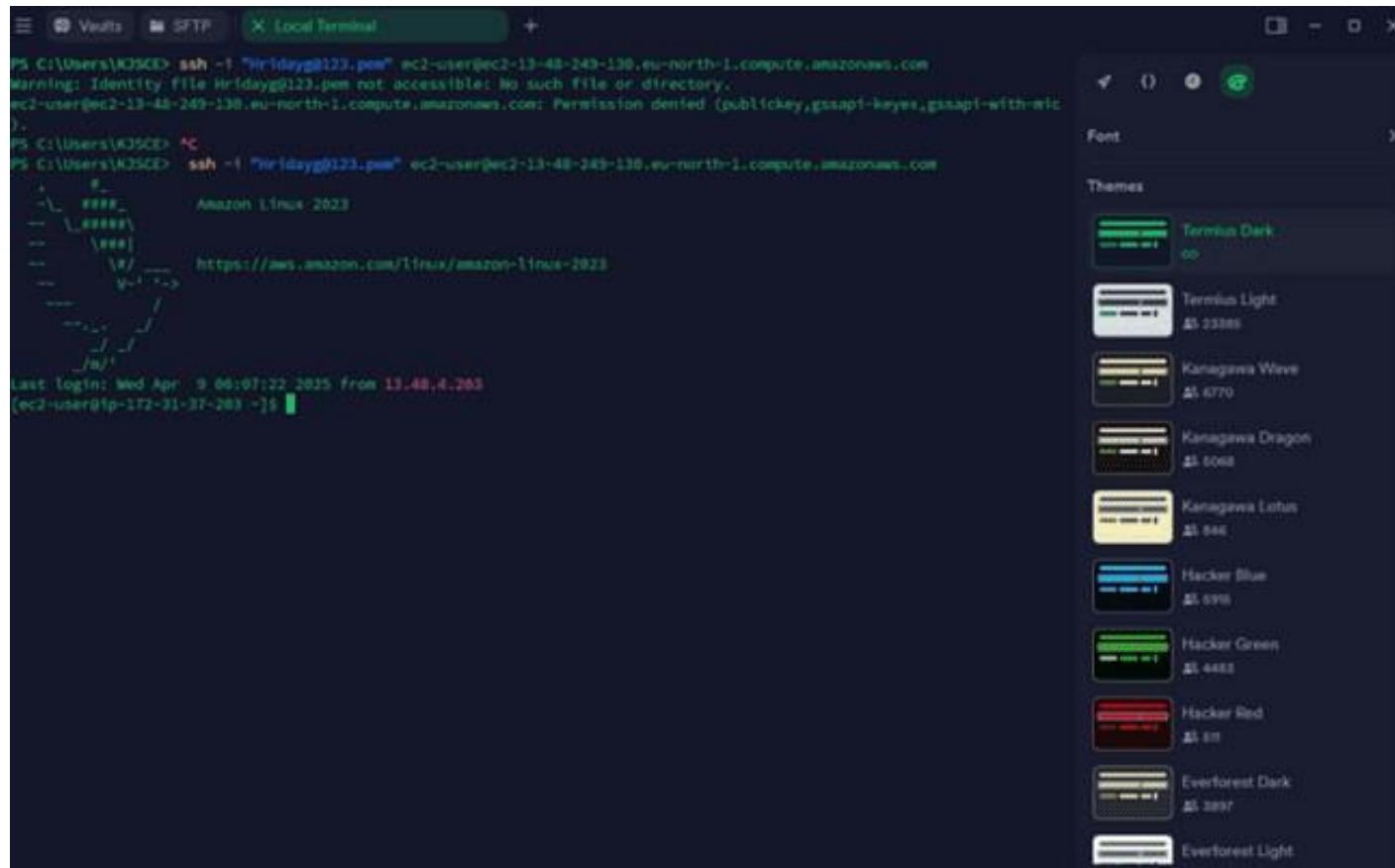
AMI location

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A screenshot of a terminal window titled "Local Terminal". The terminal shows a command-line session where the user is attempting to log in via SSH. The session starts with:

```
PS C:\Users\KJ50D> ssh -i "Mridayg@123.pem" ec2-user@ec2-13-48-249-138.eu-north-1.compute.amazonaws.com
```

Followed by an error message:

```
Warning: Identity file Mridayg@123.pem not accessible: No such file or directory.
```

```
ec2-user@ec2-13-48-249-138.eu-north-1.compute.amazonaws.com: Permission denied (publickey,gssapi-keyex,gssapi-with-mic).
```

The user then types "exit" to log out:

```
PS C:\Users\KJ50D> exit
```

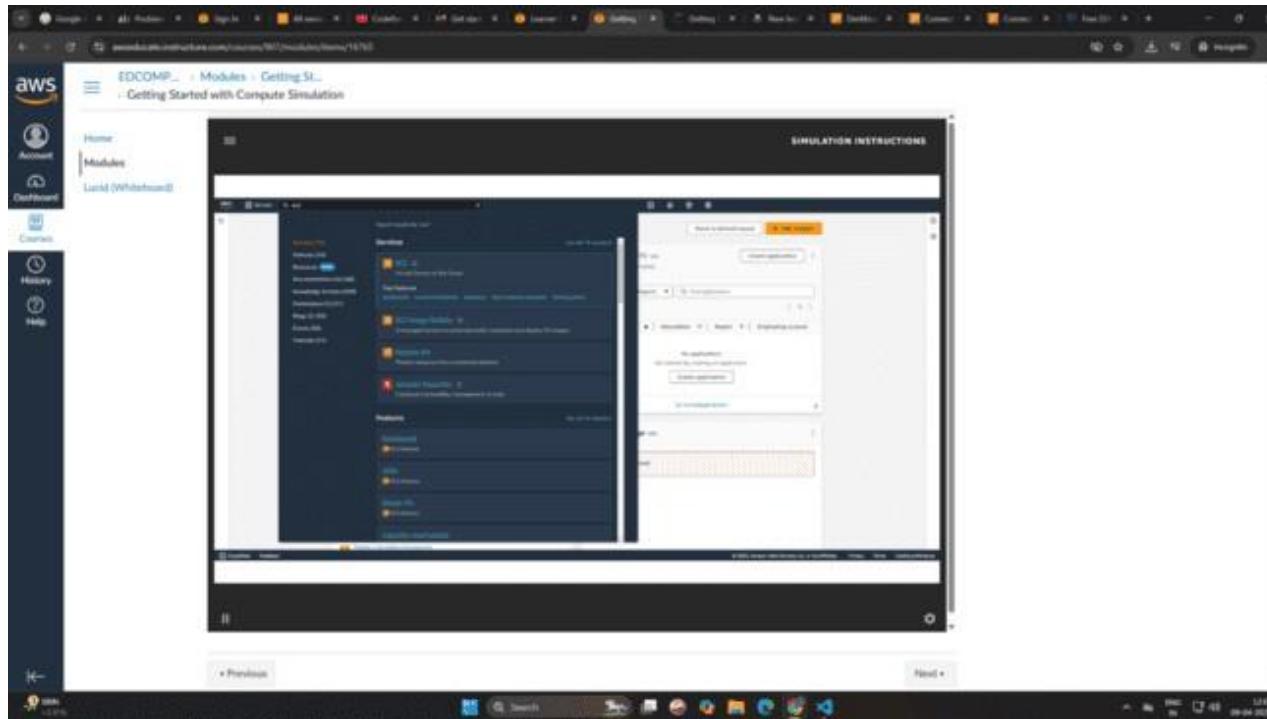
After exiting, the terminal shows the current directory as "C:\Users\KJ50D" and the URL "https://aws.amazon.com/linux/amazon-linux-2023". The terminal ends with:

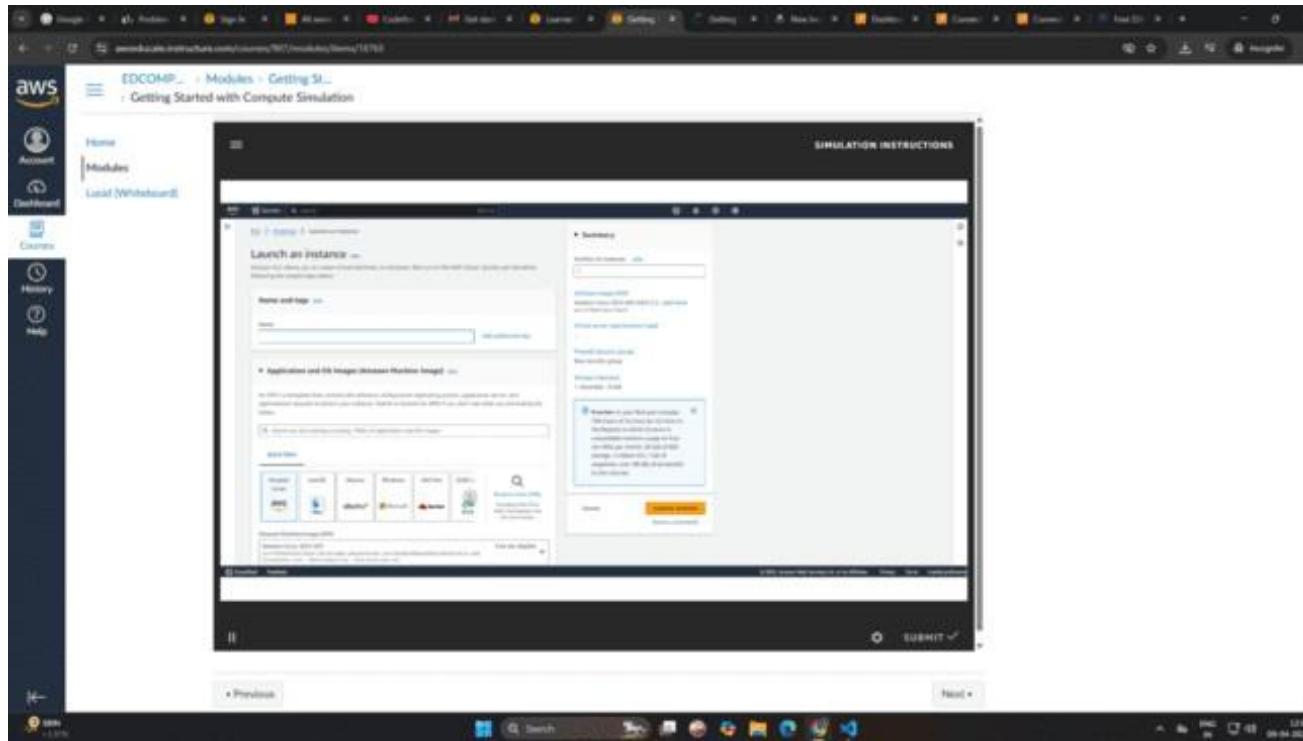
```
Last login: Wed Apr  9 00:07:22 2025 from 13.48.4.263
```

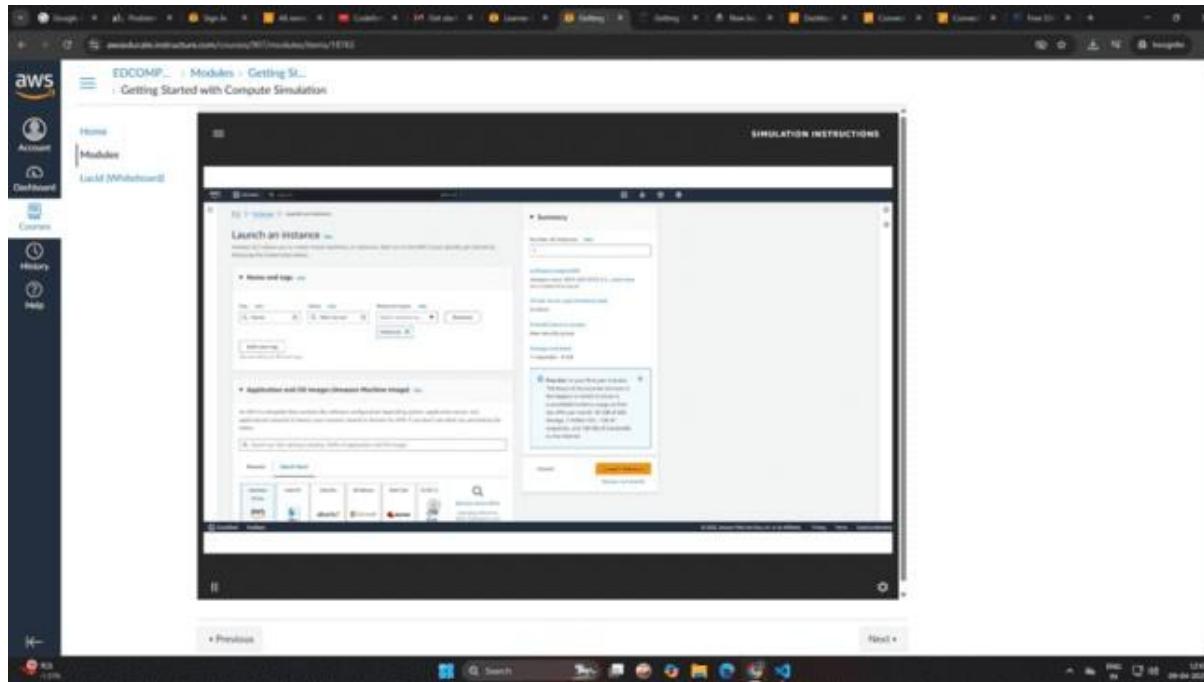
(ec2-user@ip-172-31-37-283 ~)\$

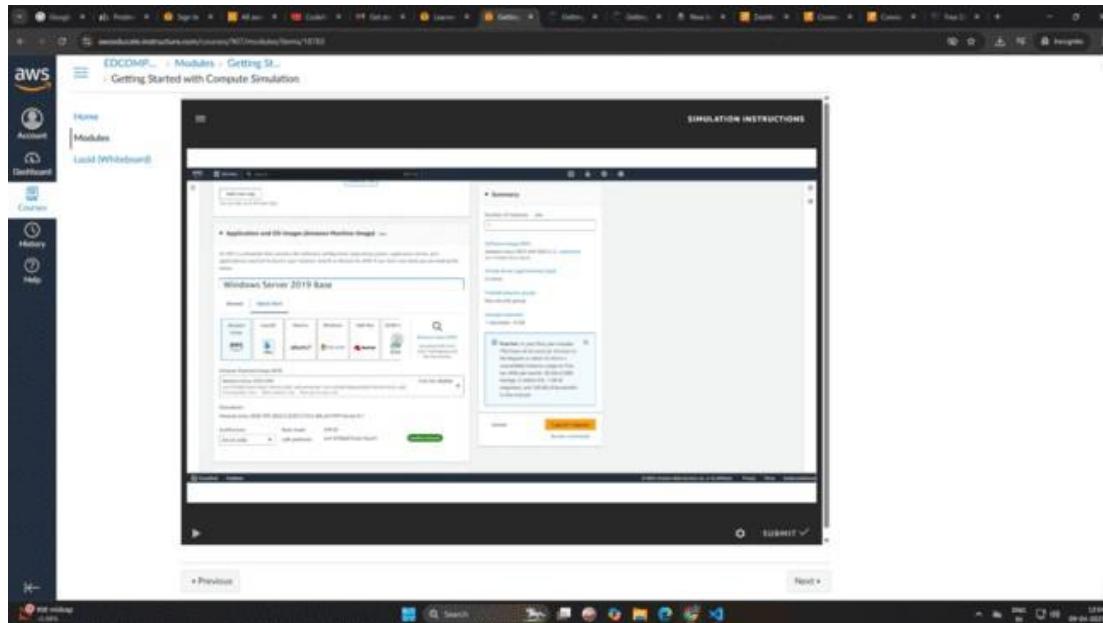
To the right of the terminal window, there is a sidebar titled "Themes" which lists several terminal themes with their names and download counts:

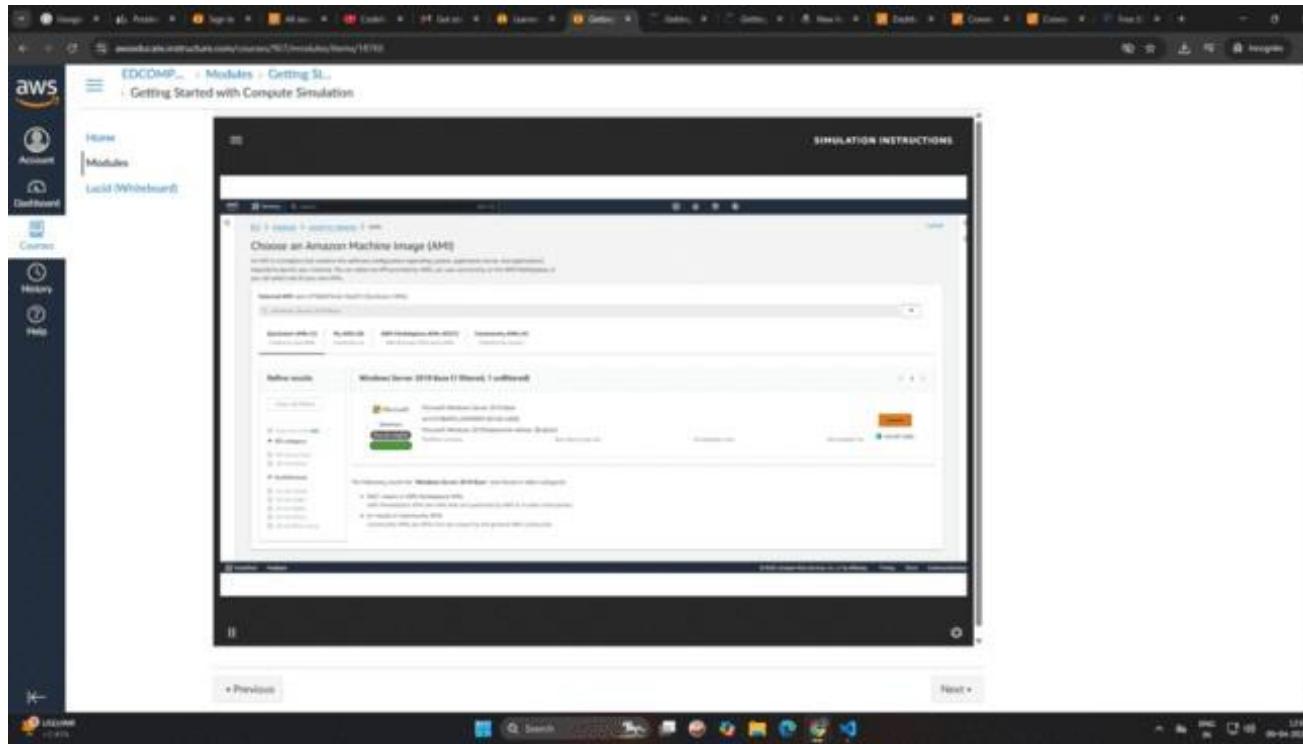
- Terminus Dark (23385)
- Terminus Light (23385)
- Kanagawa Wave (6770)
- Kanagawa Dragon (5068)
- Kanagawa Lotus (846)
- Hacker Blue (5916)
- Hacker Green (4483)
- Hacker Red (411)
- Everforest Dark (2097)
- Everforest Light

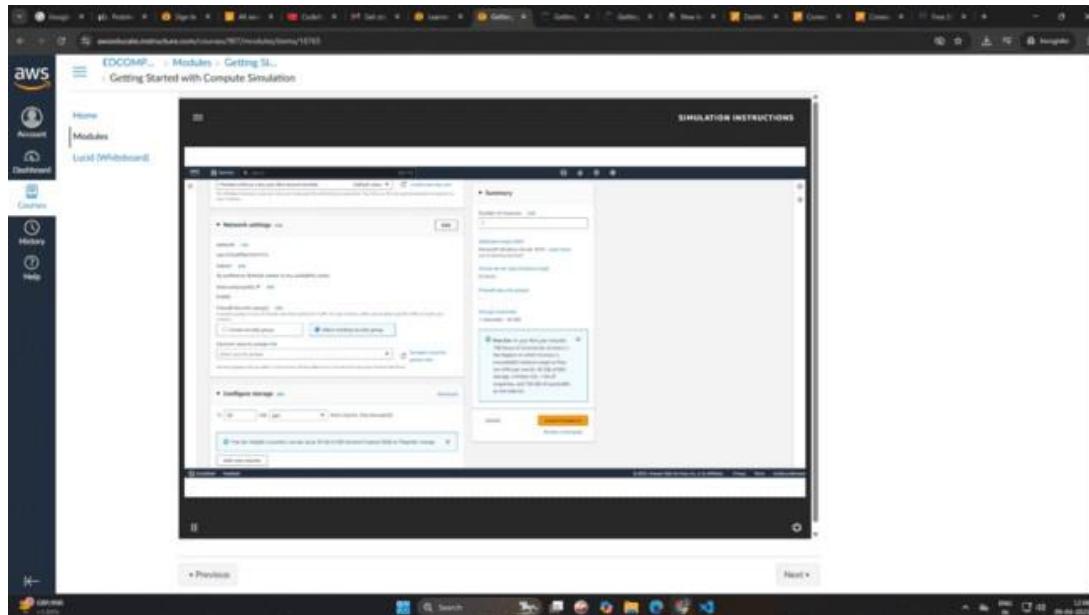


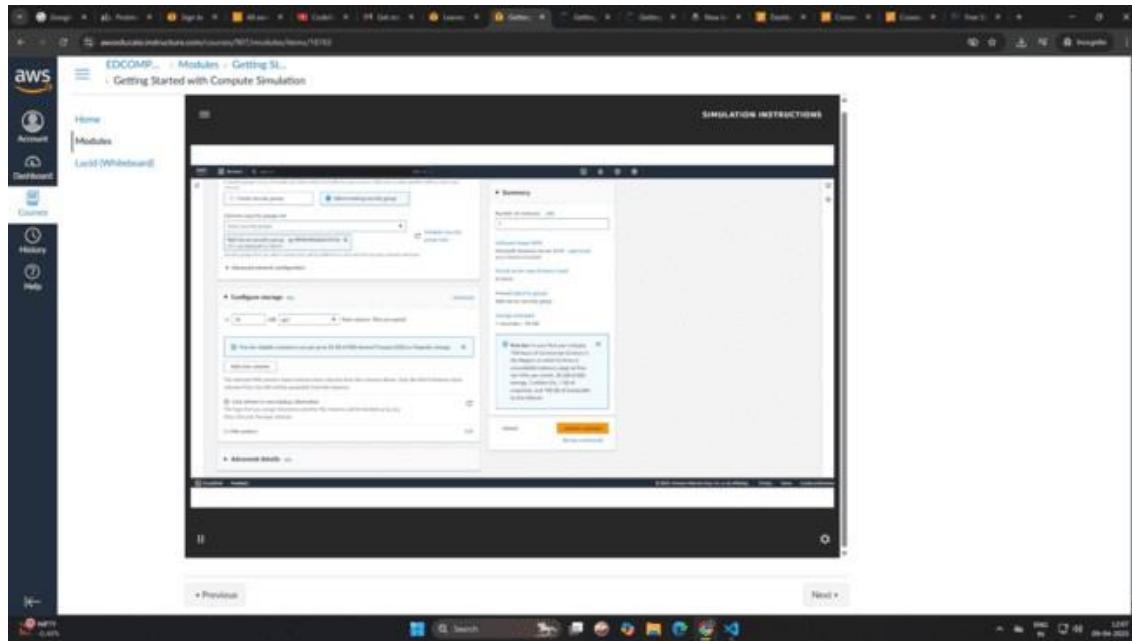


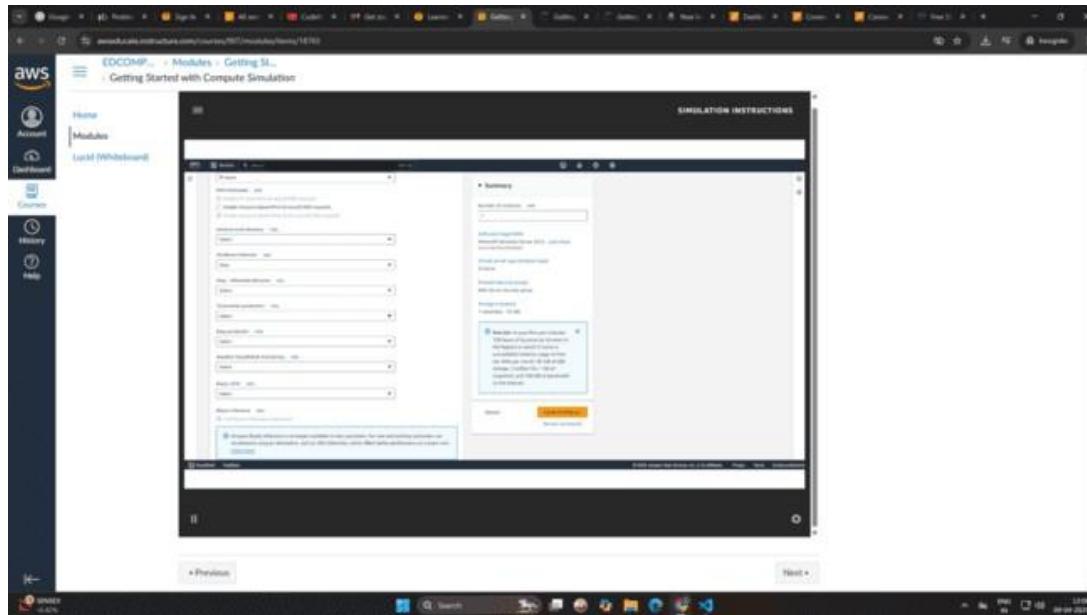


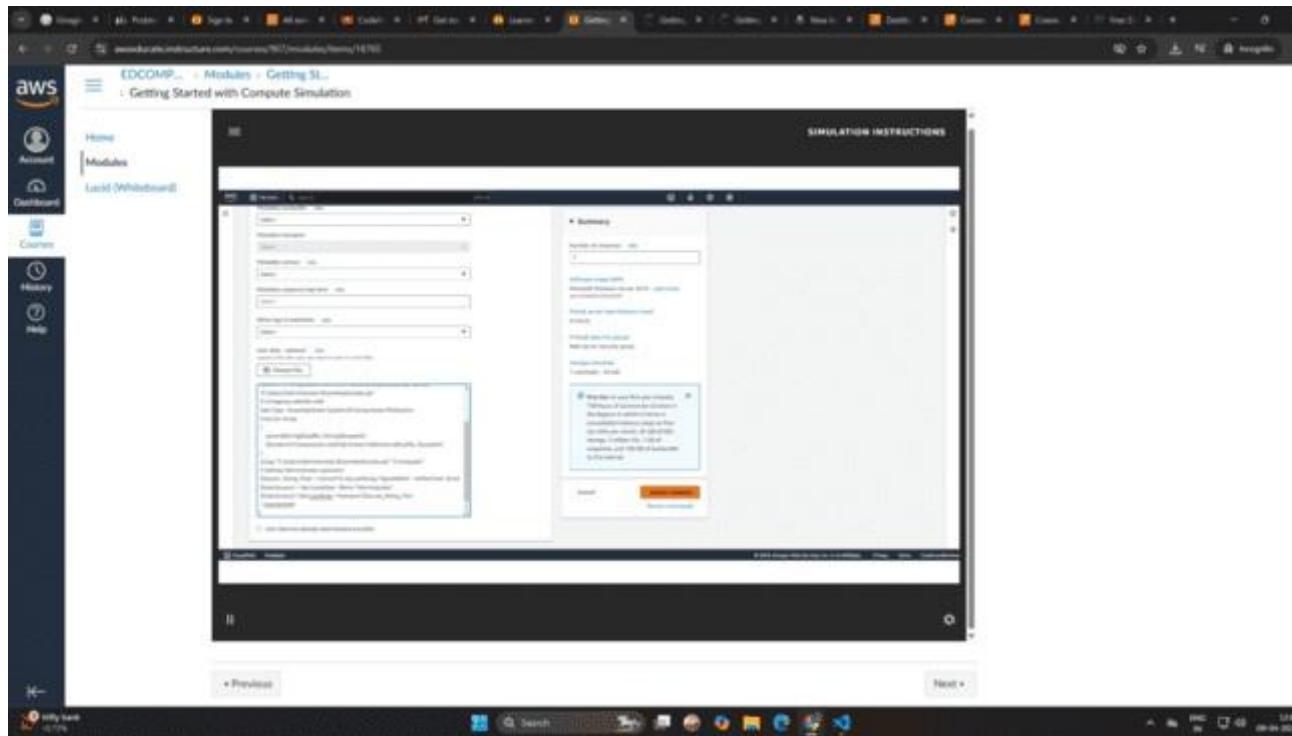


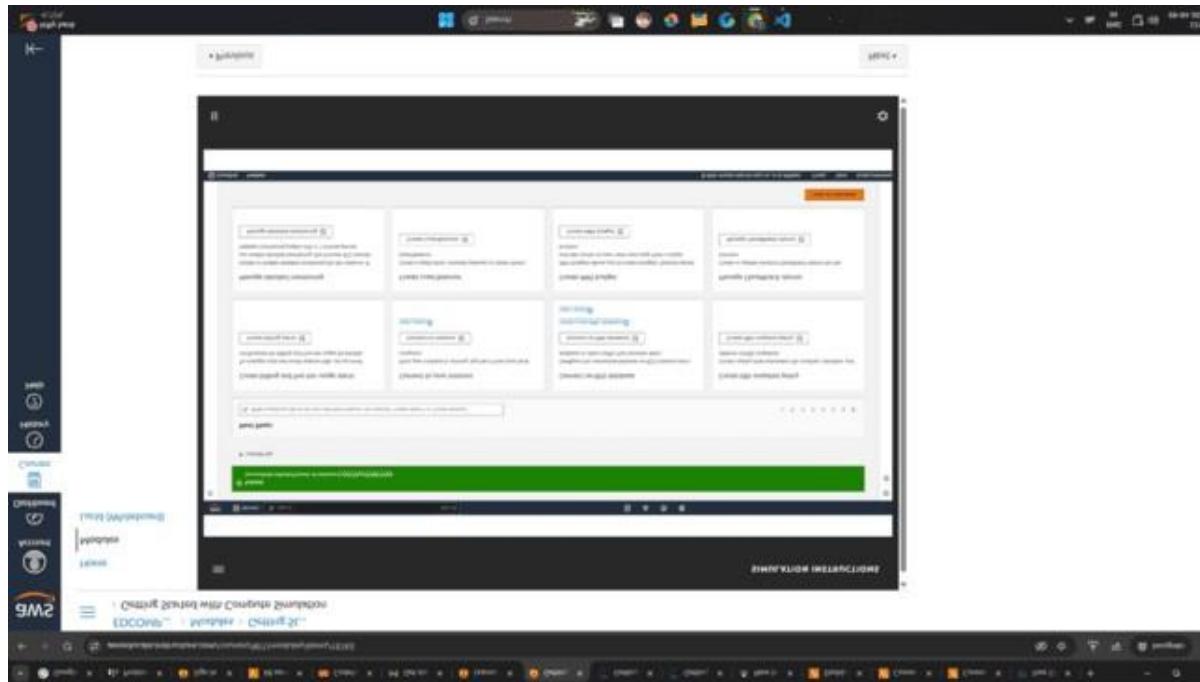


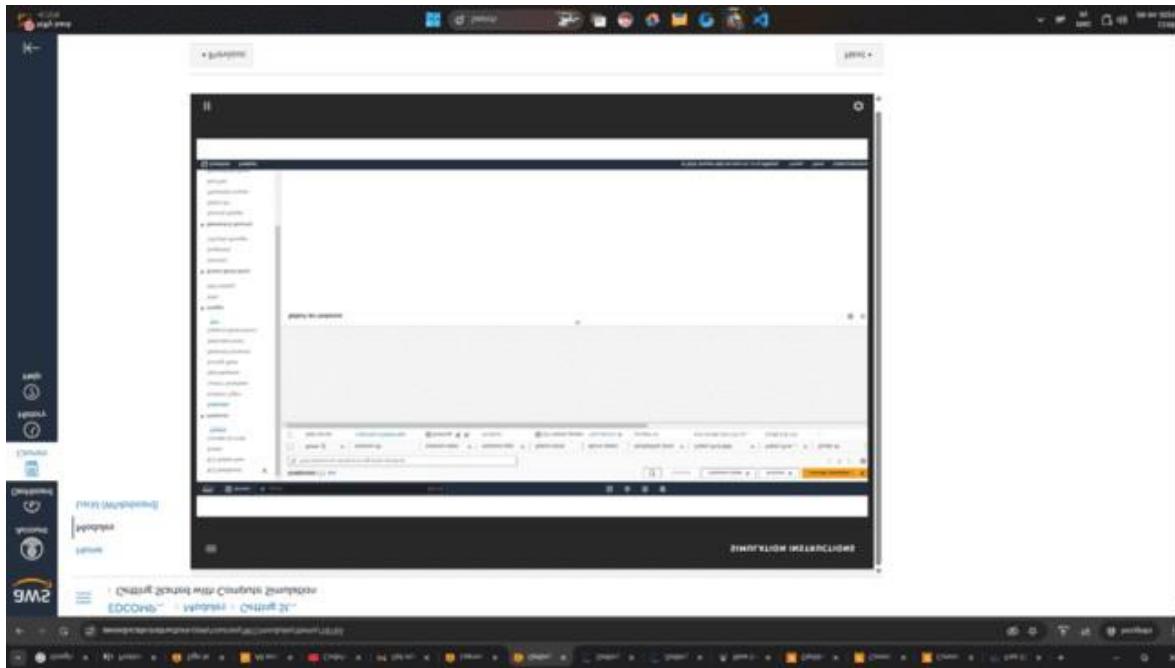


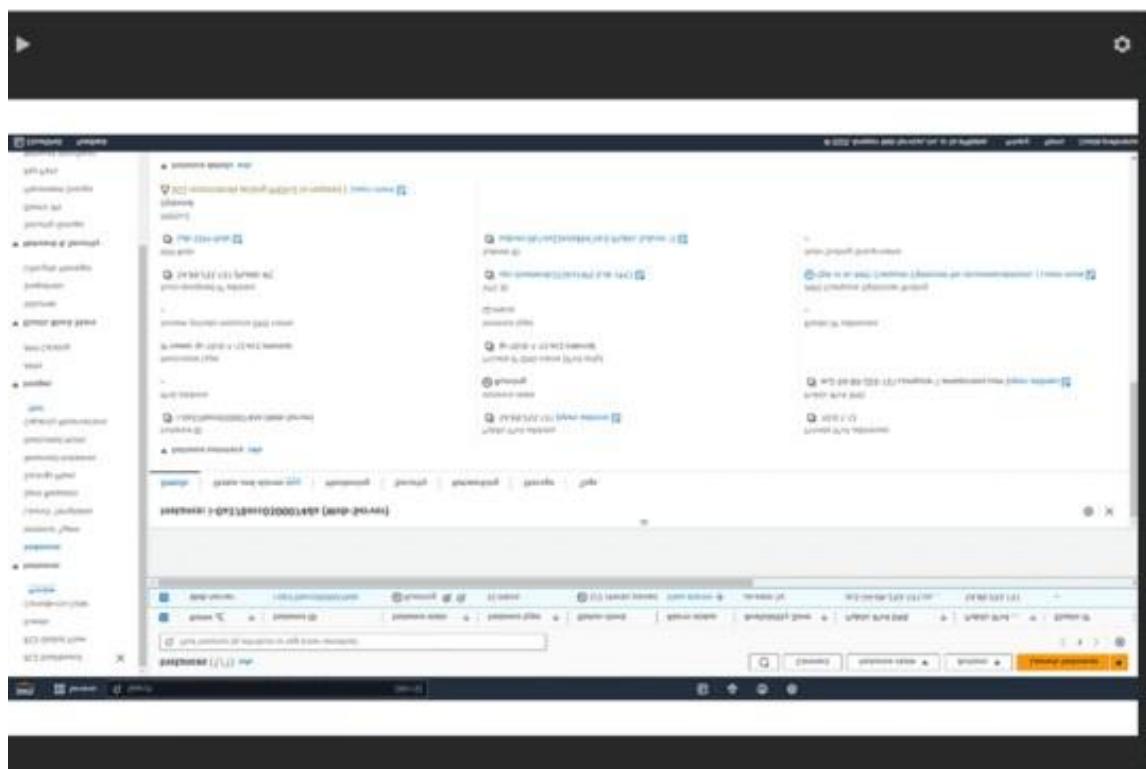


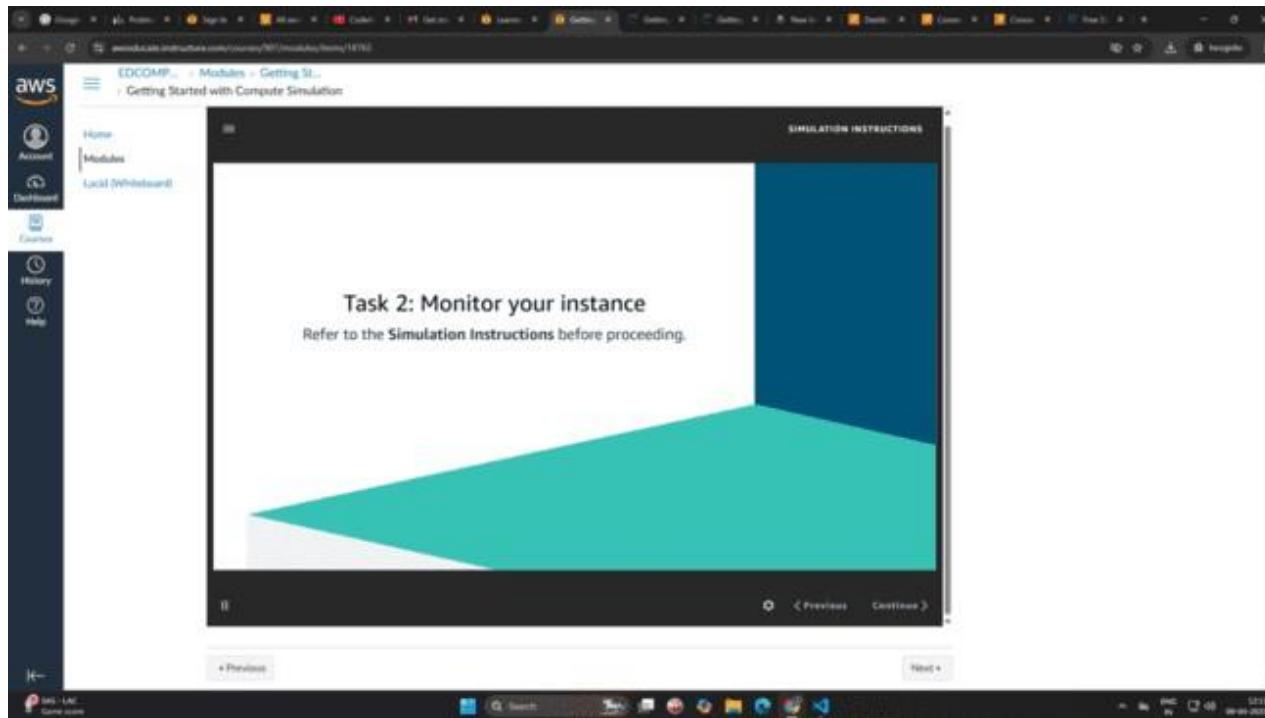


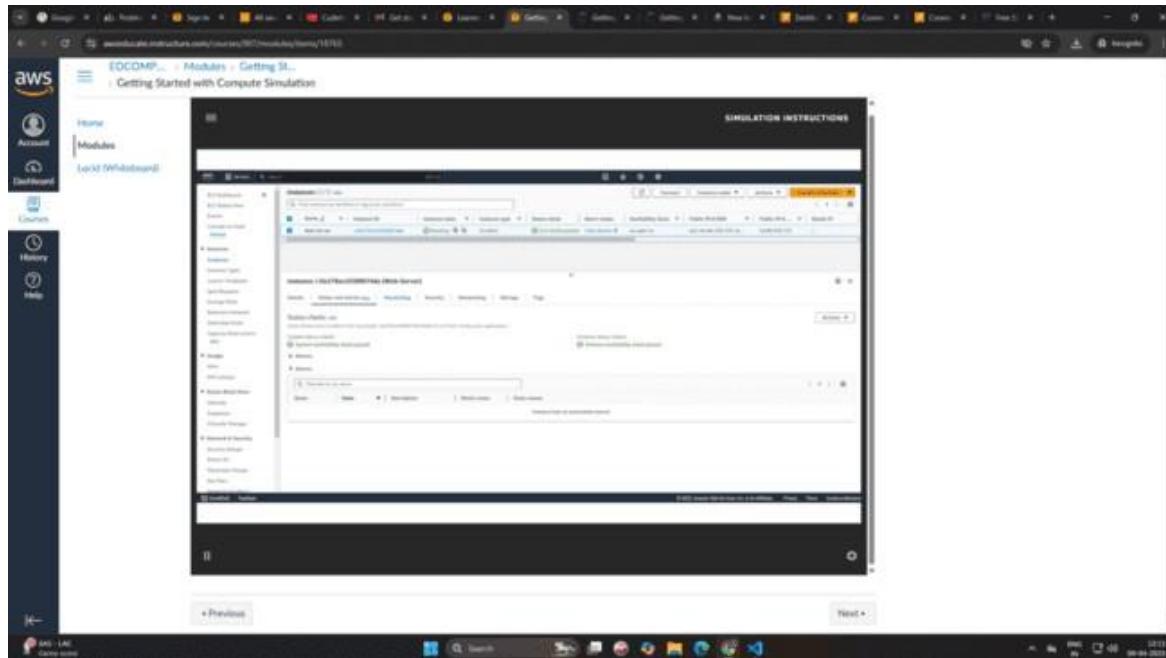


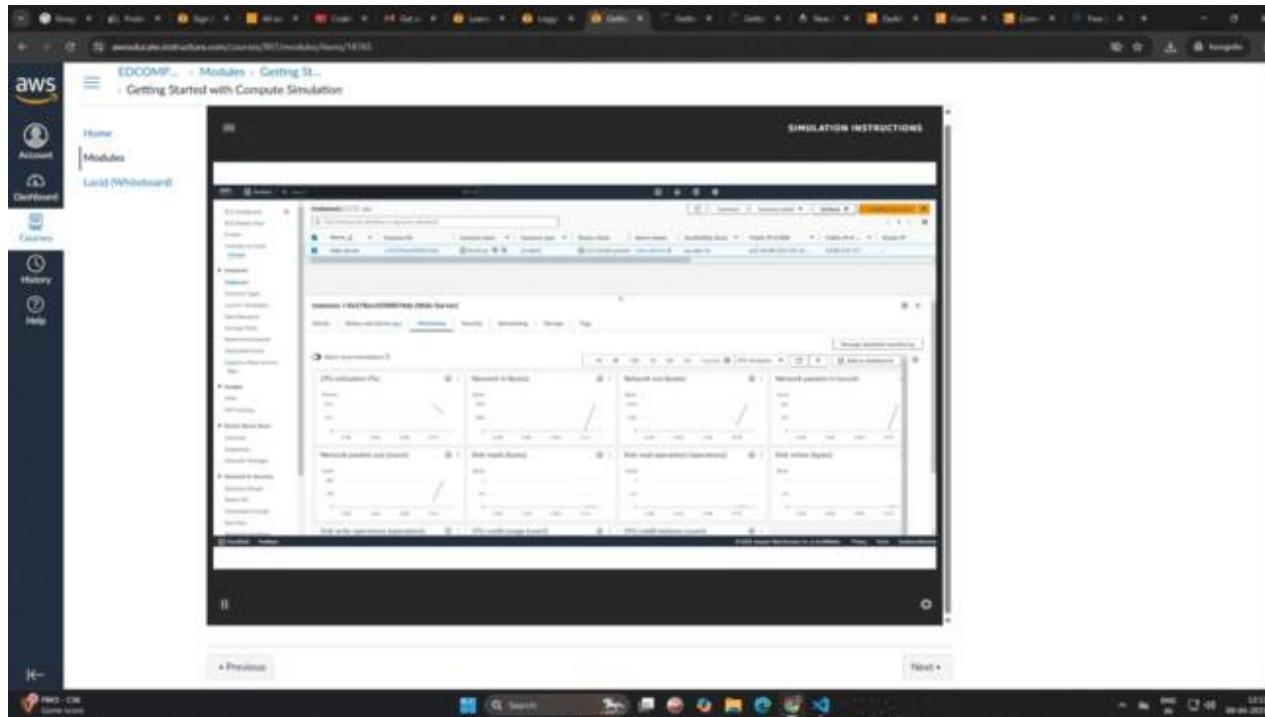


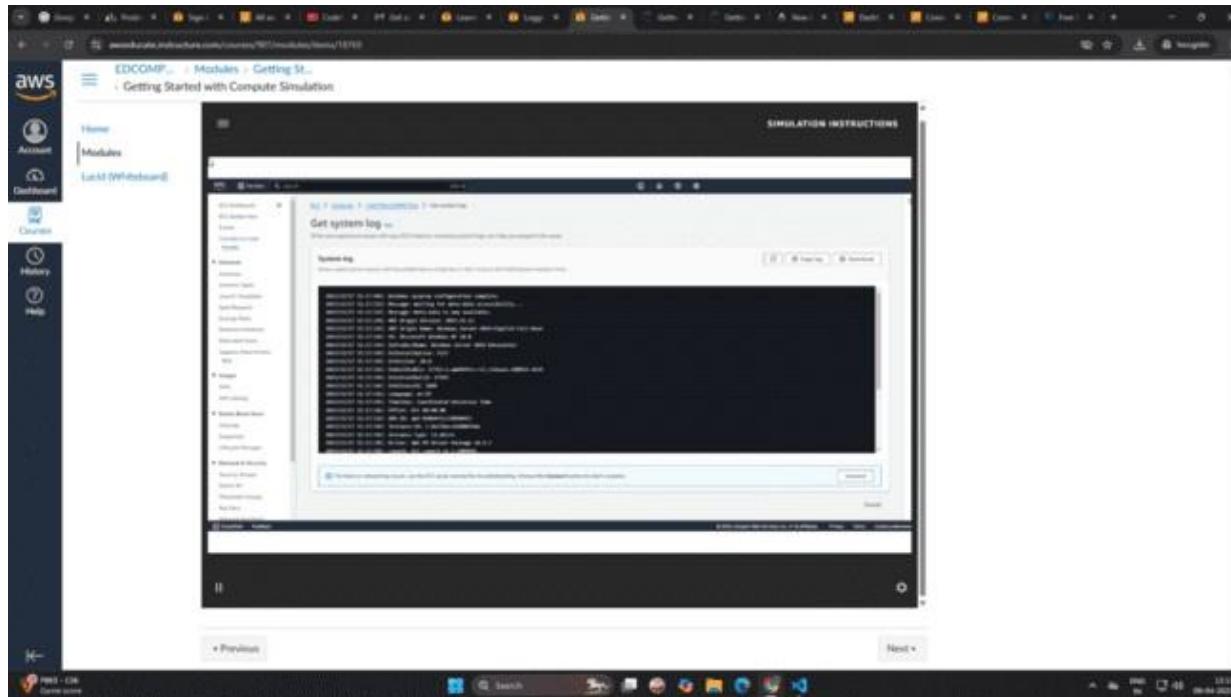


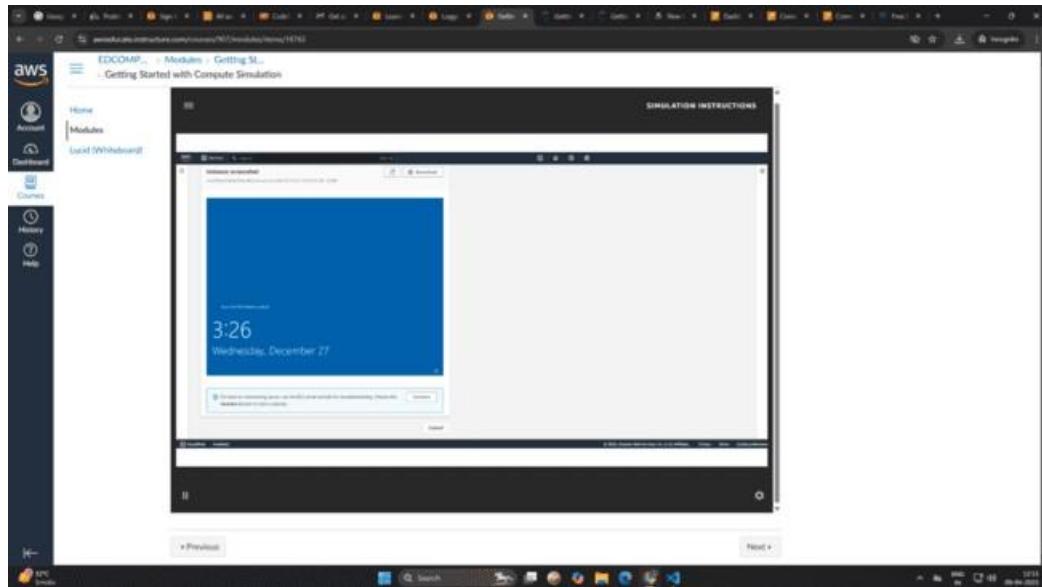


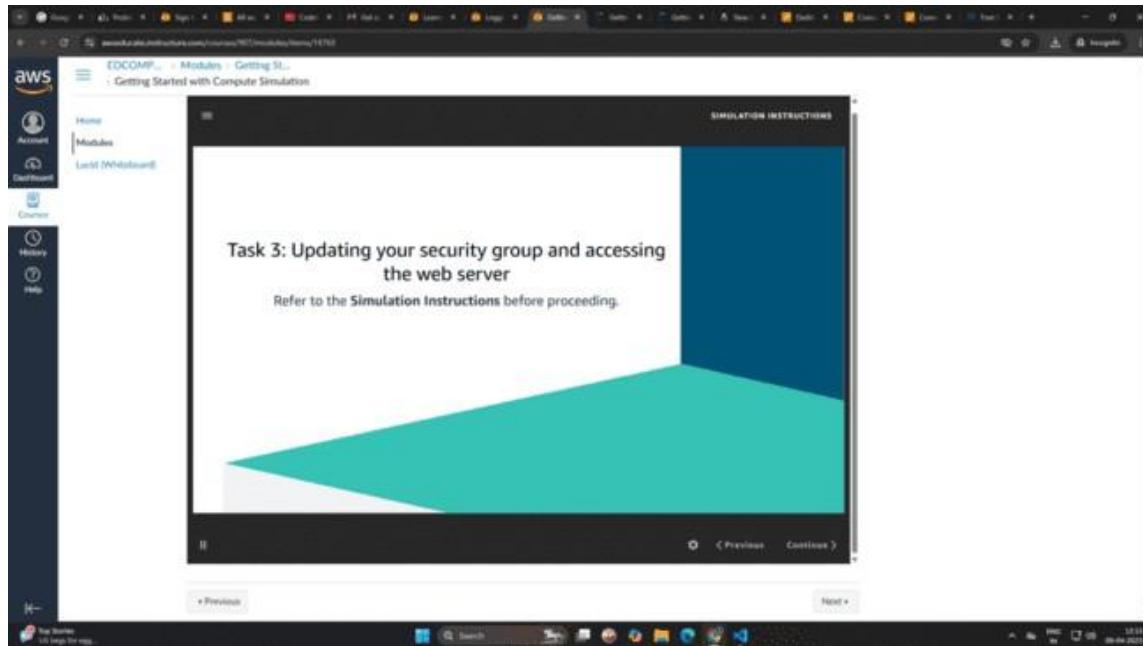




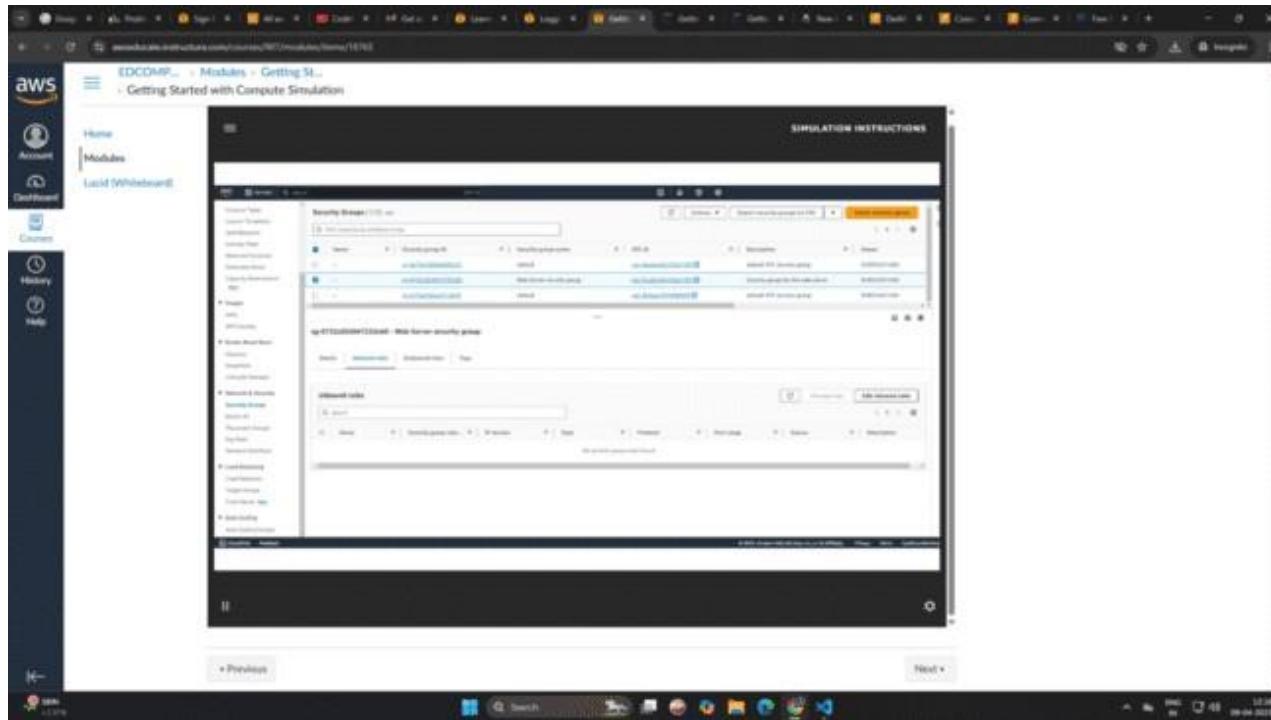


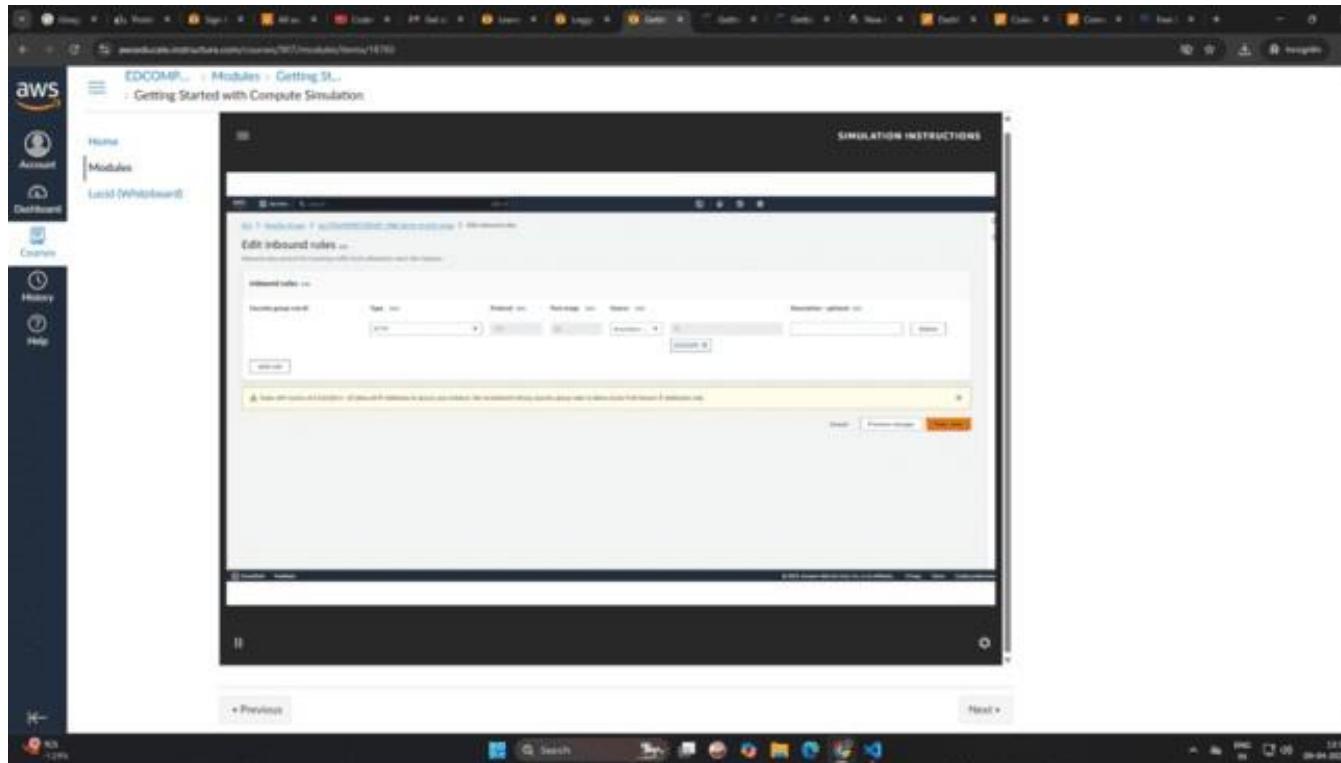


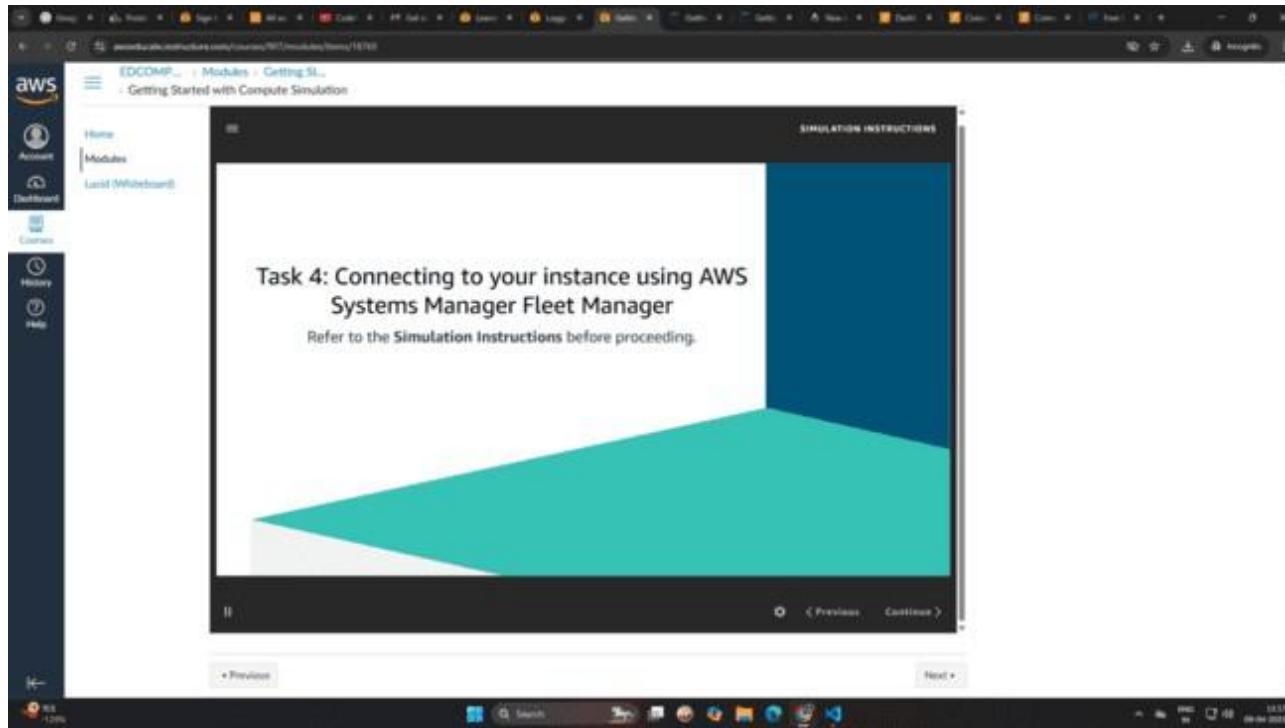




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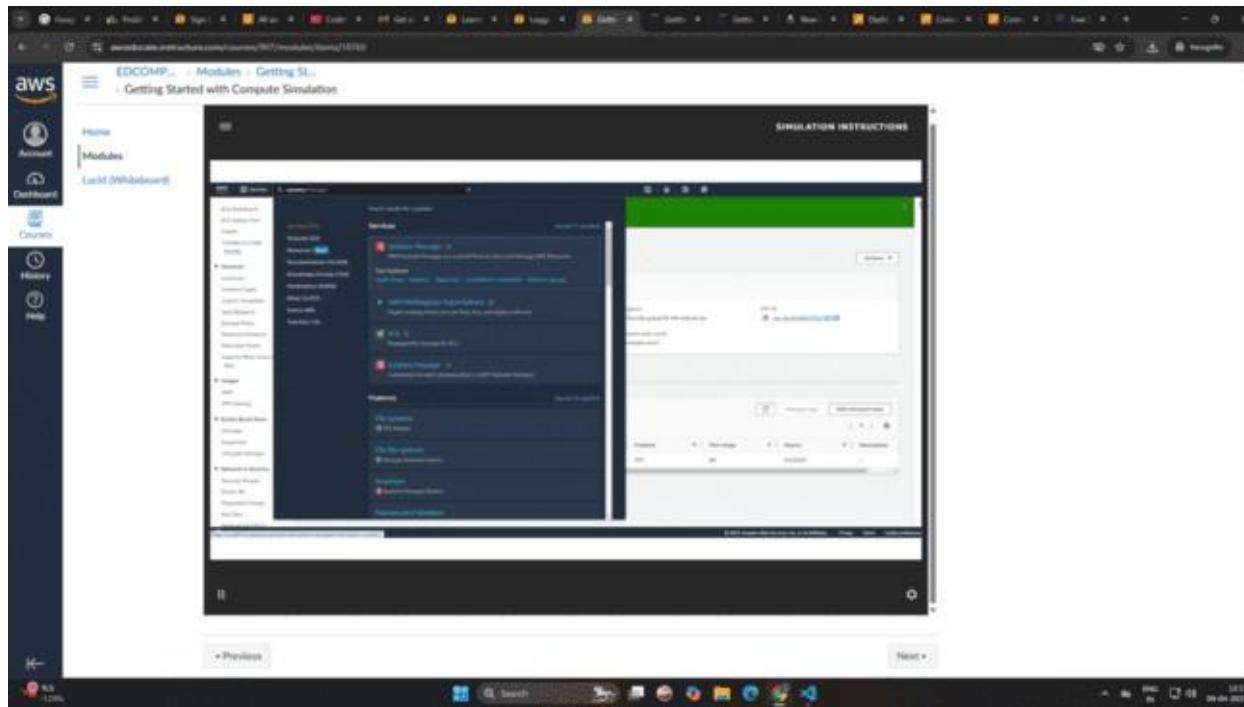


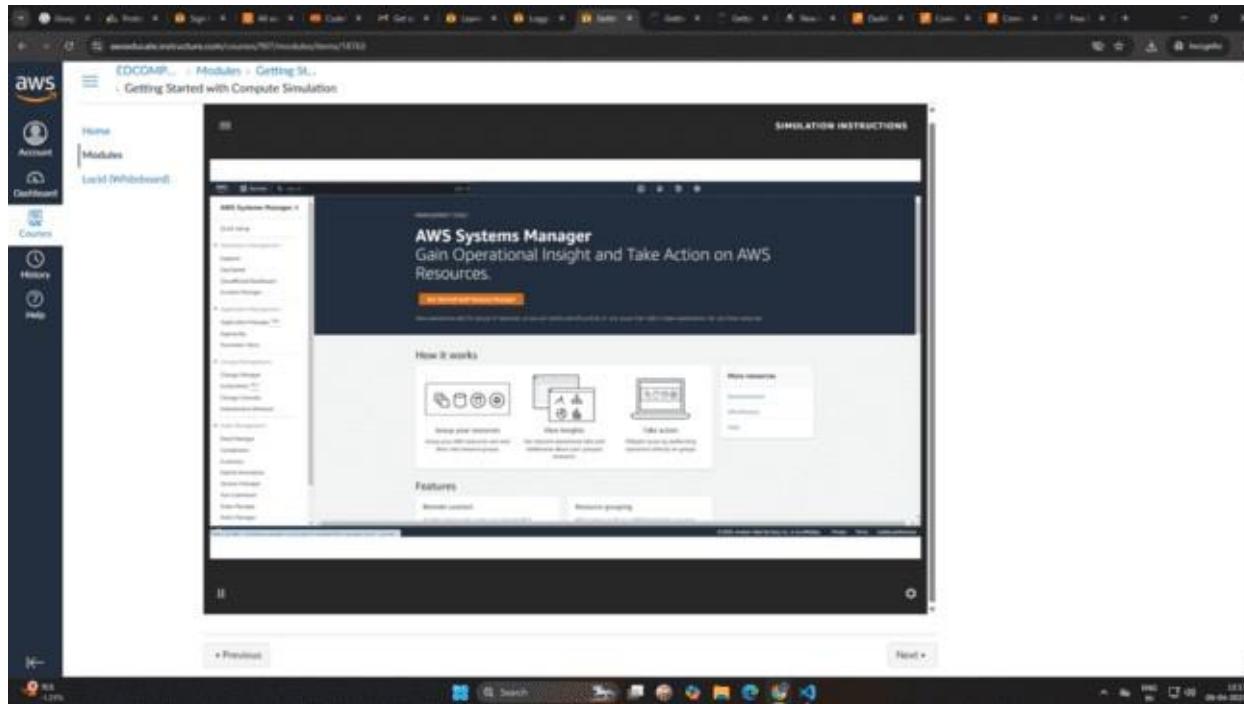


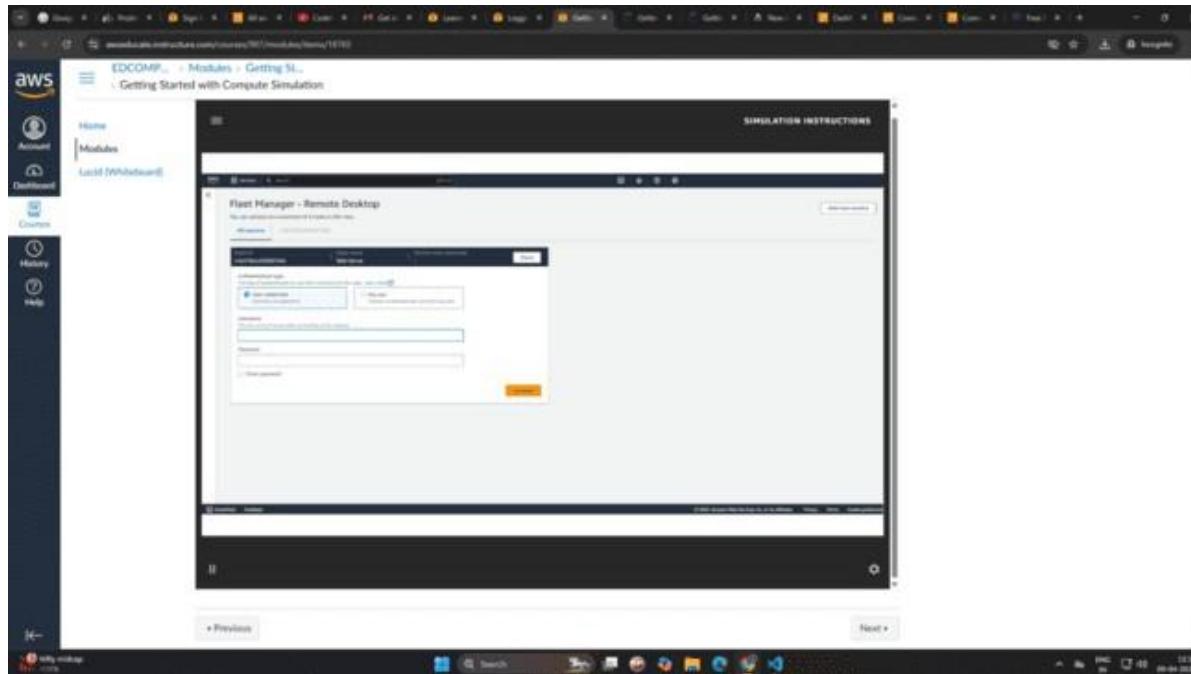


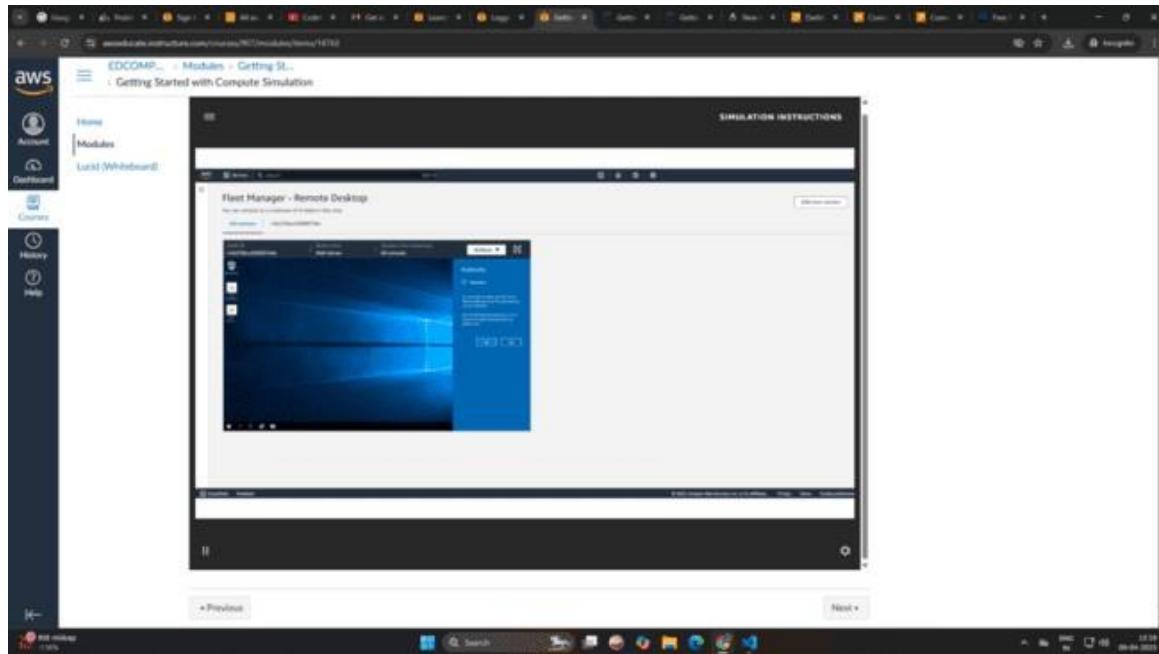


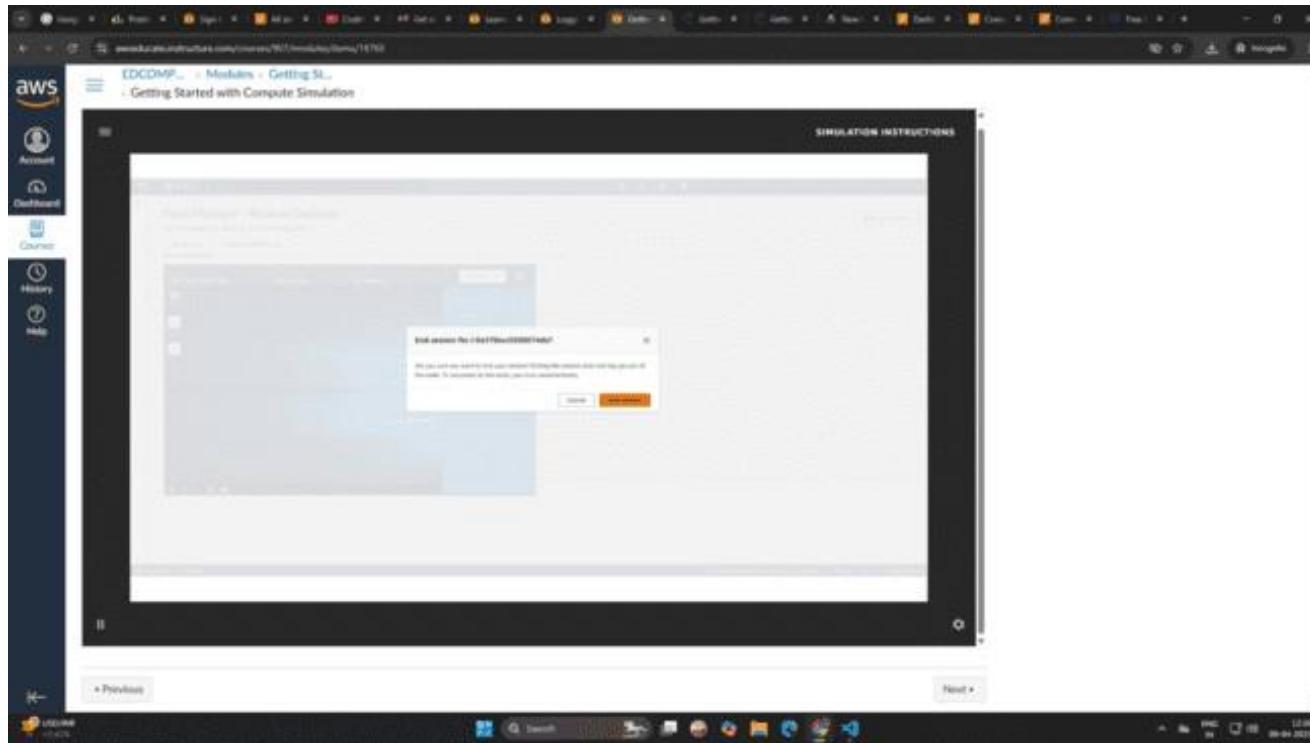
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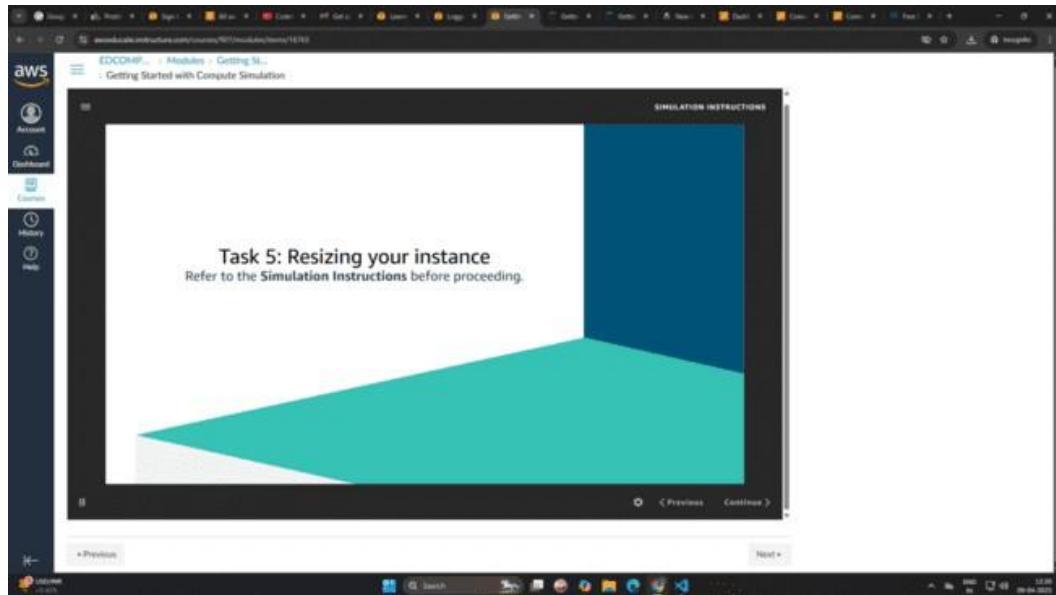


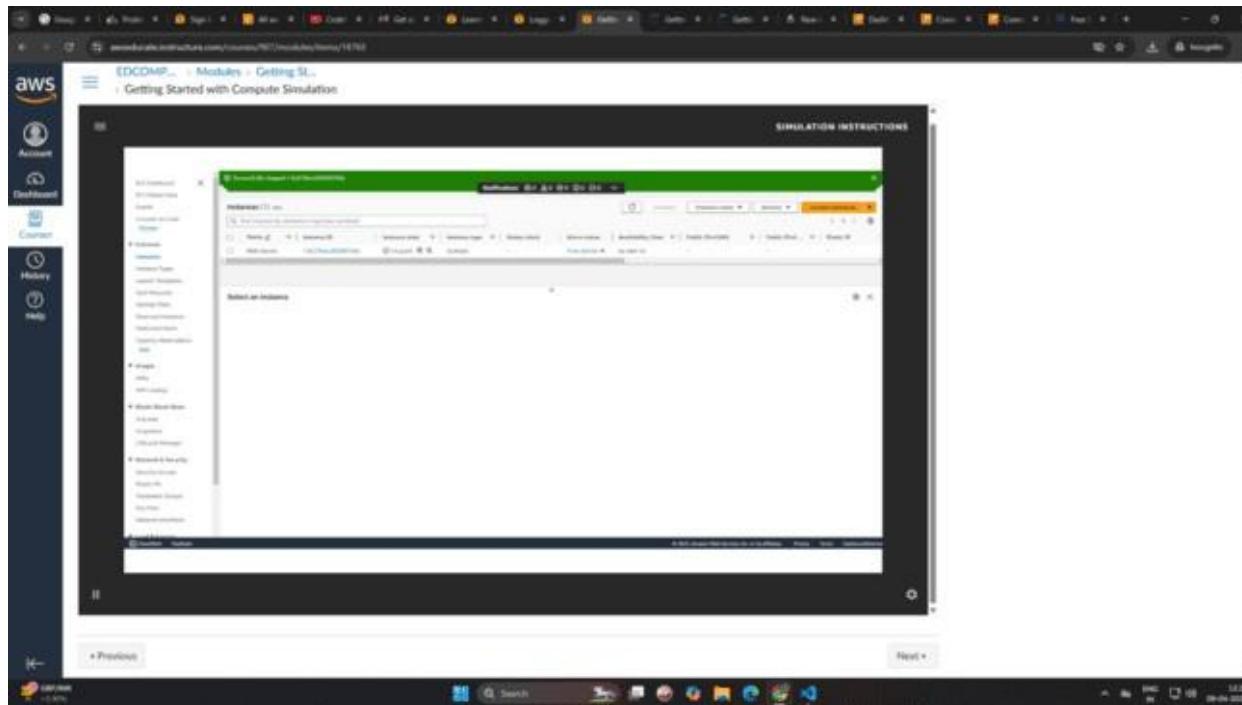


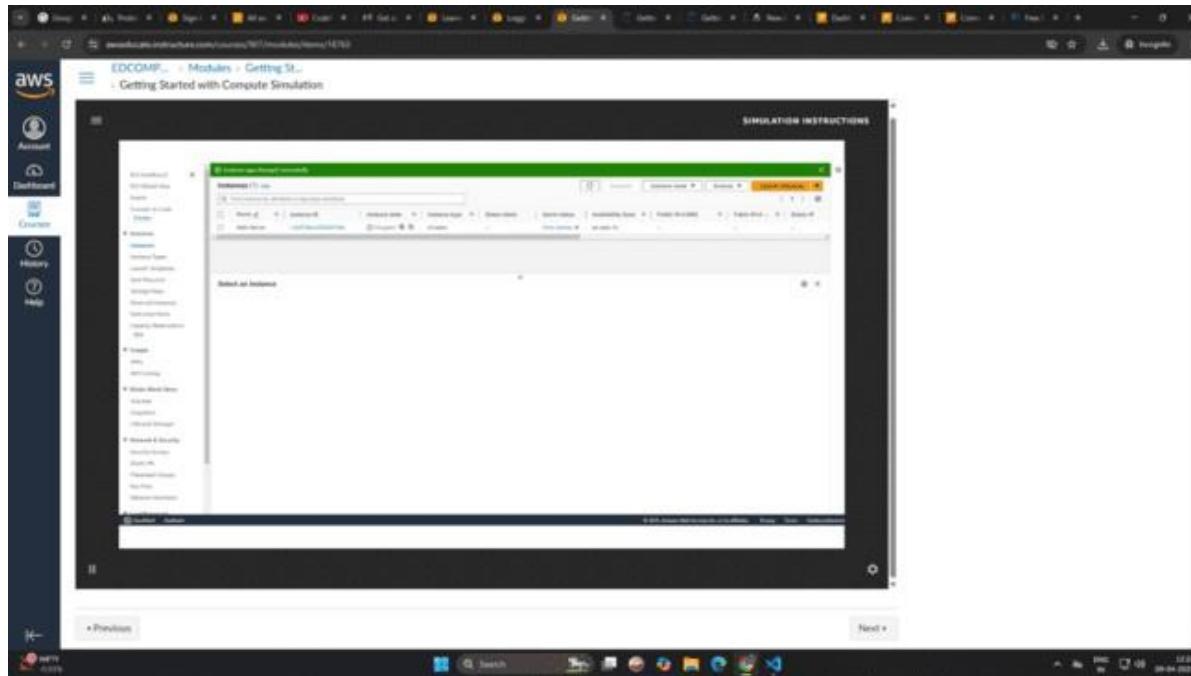


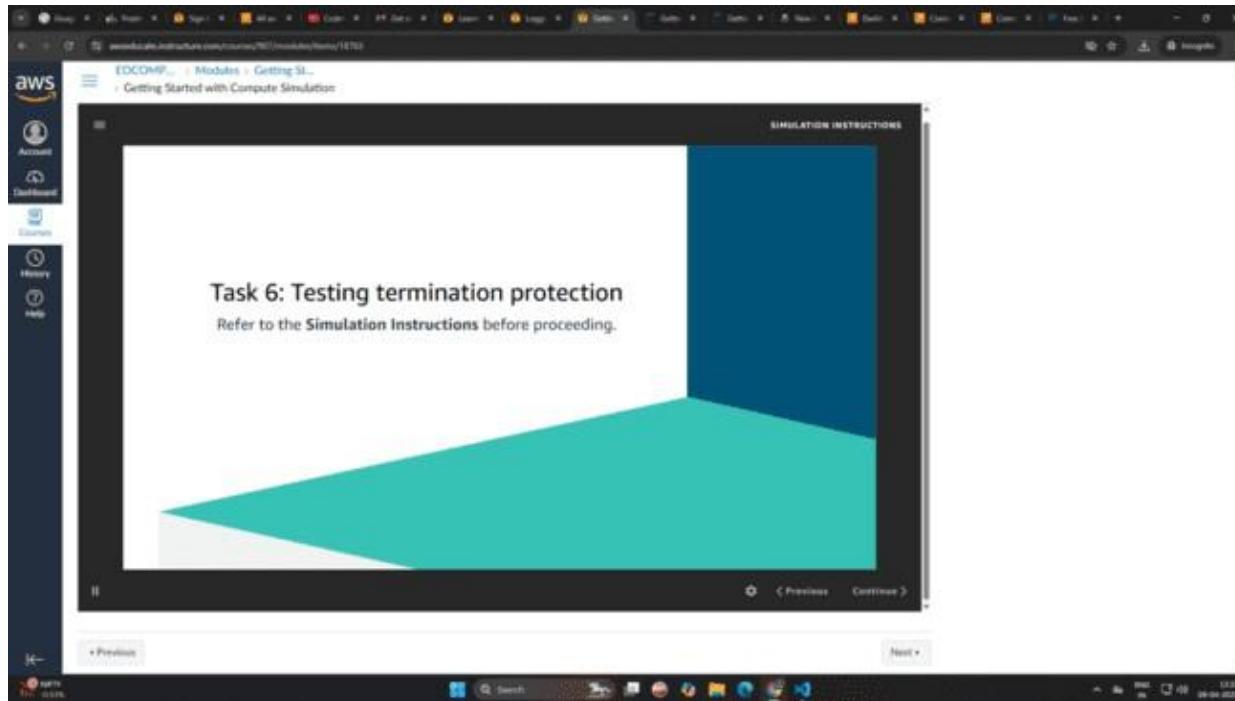


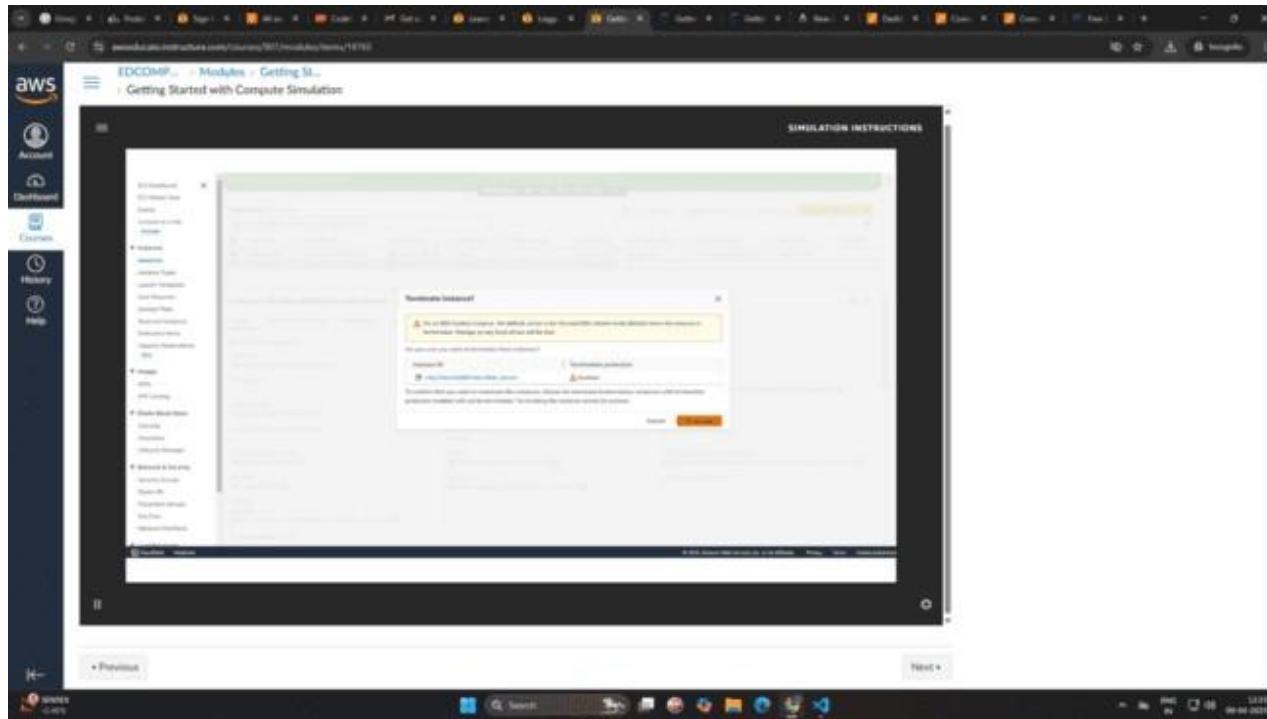


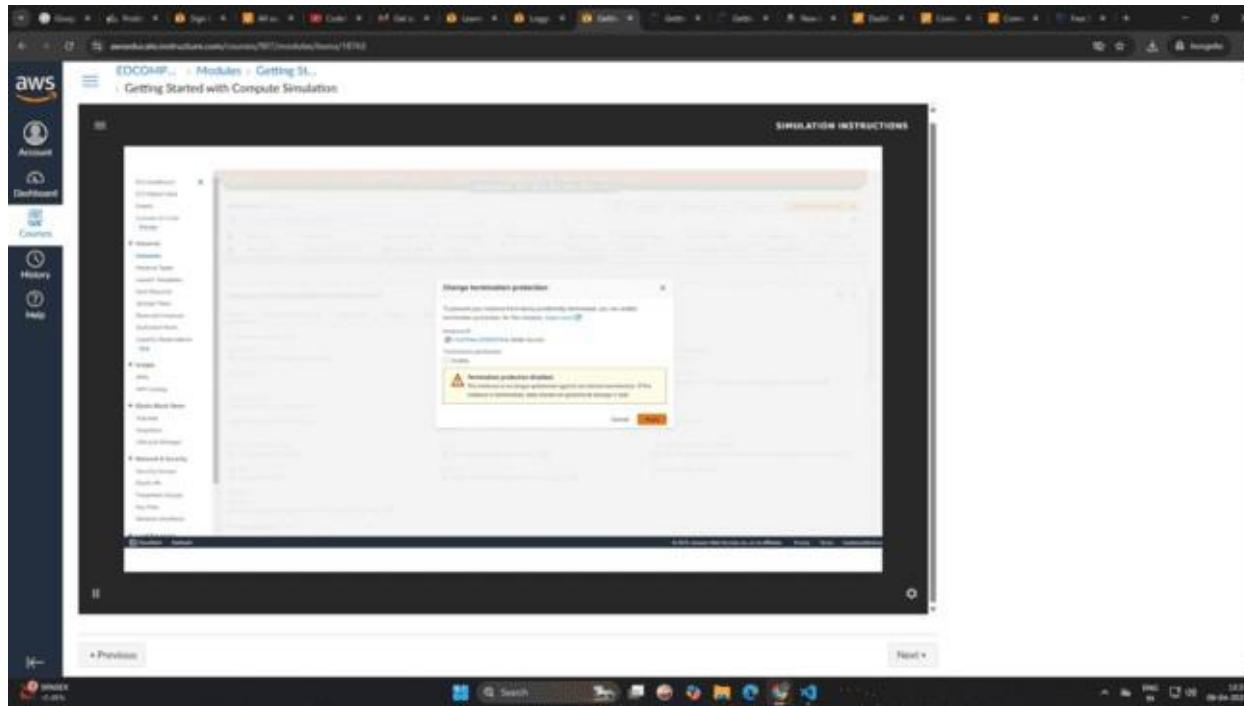


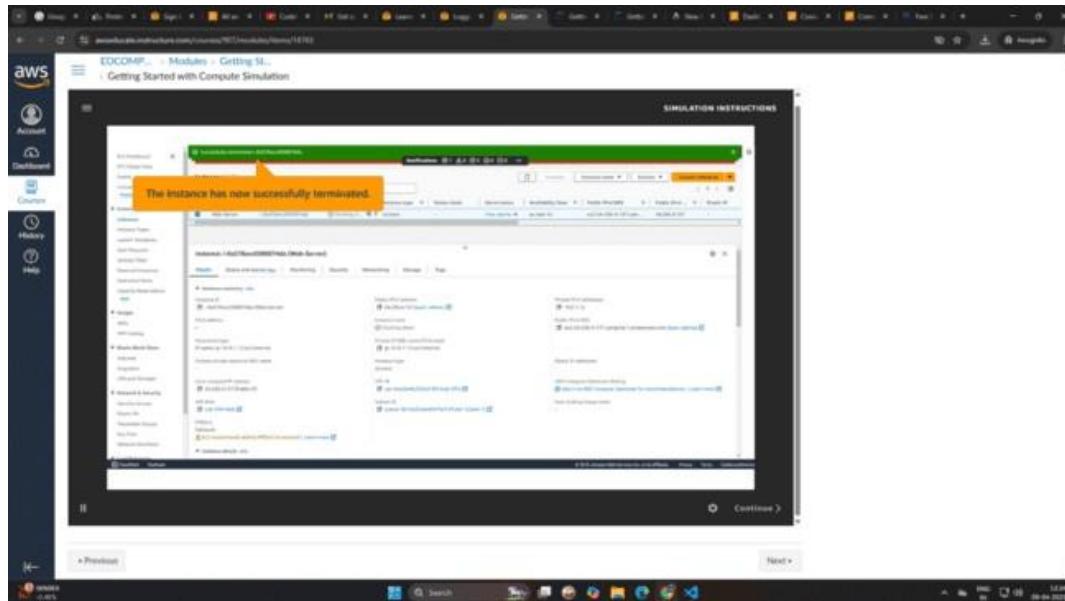


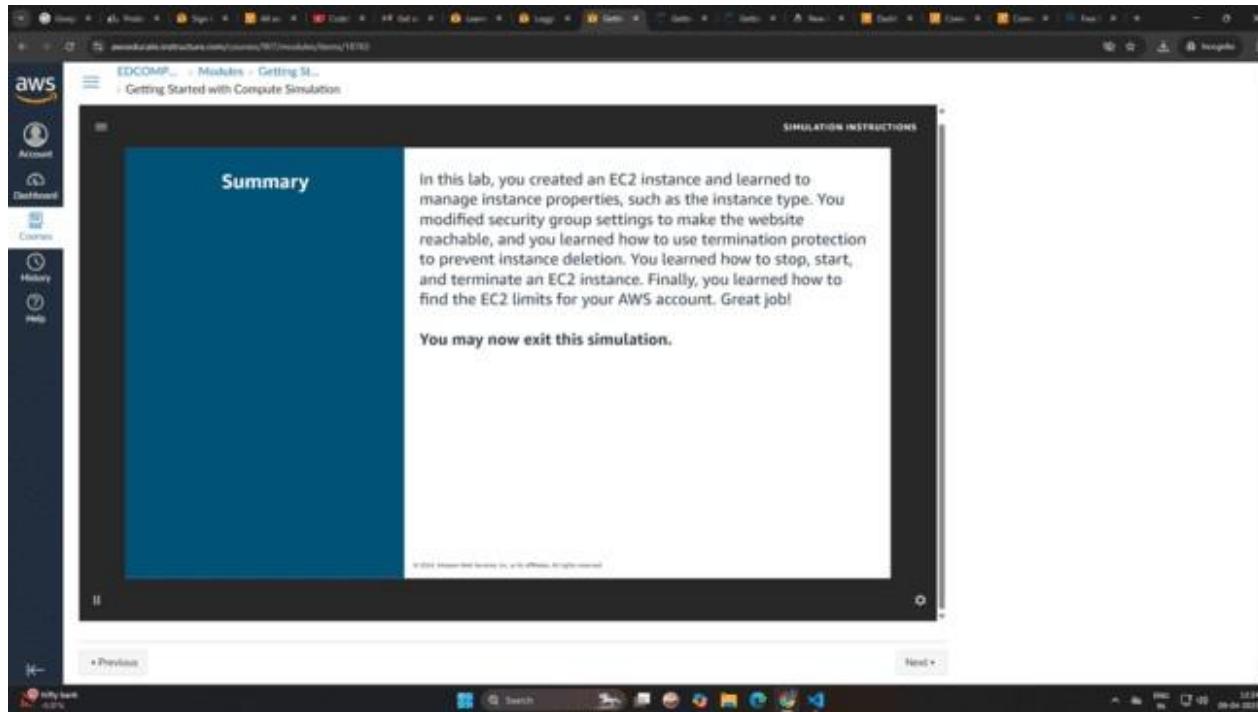




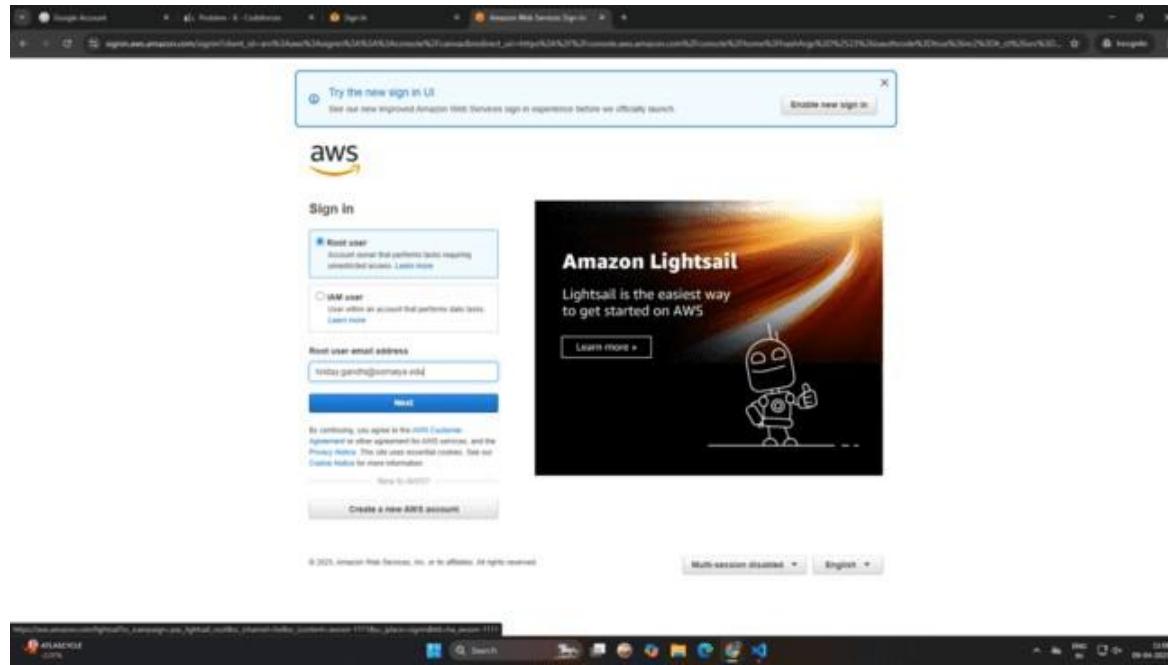








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Steps Taken :-

Step 1: Access AWS Educate Lab Environment

Logged into the AWS Educate Student Portal and launched the lab titled "Getting Started with Compute." Clicked "Start Lab" to activate a temporary AWS account with limited permissions for the session.

Step 2: Open AWS Management Console

From the lab interface, clicked on "AWS Console" to open the AWS Management Console. The login was handled automatically through temporary lab credentials.

Step 3: Navigate to EC2 Dashboard

In the AWS Console, used the search bar to look for "EC2" and selected "EC2 (Elastic Compute Cloud)" to go to the EC2 Dashboard.

Step 4: Launch an EC2 Instance

Clicked on "Launch Instance" to begin setting up a virtual machine. Entered a name for the instance such as "MyComputeInstance."

Step 5: Select Amazon Machine Image (AMI)

Chose an operating system image, typically Amazon Linux 2 or Ubuntu Server. Selected a Free Tier eligible AMI for cost-free testing during the lab.

Step 6: Choose Instance Type

Selected the instance type "t2.micro," which includes 1 vCPU and 1 GB RAM, suitable for basic workloads and Free Tier eligible.

Step 7: Configure Key Pair for SSH

In the lab environment, proceeded without creating a key pair, since SSH login wasn't required. In real scenarios, a key pair (.pem file) would be created and downloaded.

Step 8: Configure Network Settings

Chose the default VPC and subnet. Allowed SSH (port 22) access from all IPs (0.0.0.0/0) for Linux instances. For Windows, RDP (port 3389) would be selected instead.

Step 9: Add Storage

Accepted the default storage configuration, typically an 8 GB General Purpose SSD (gp2) volume.

Step 10: Launch the Instance

Clicked "Launch Instance." After a few moments, the instance appeared in the dashboard with a "running" status.

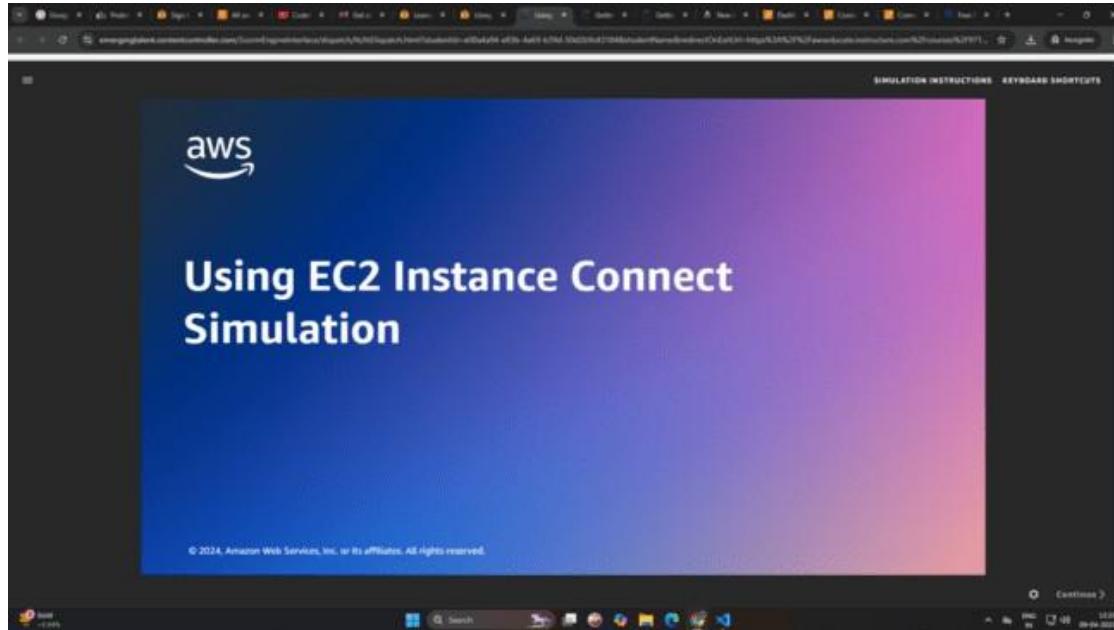
Step 11: Connect to the Instance

Clicked "Connect" on the instance details page. For Linux instances, used EC2 Instance Connect (browser-based terminal) to access the VM and run basic commands.

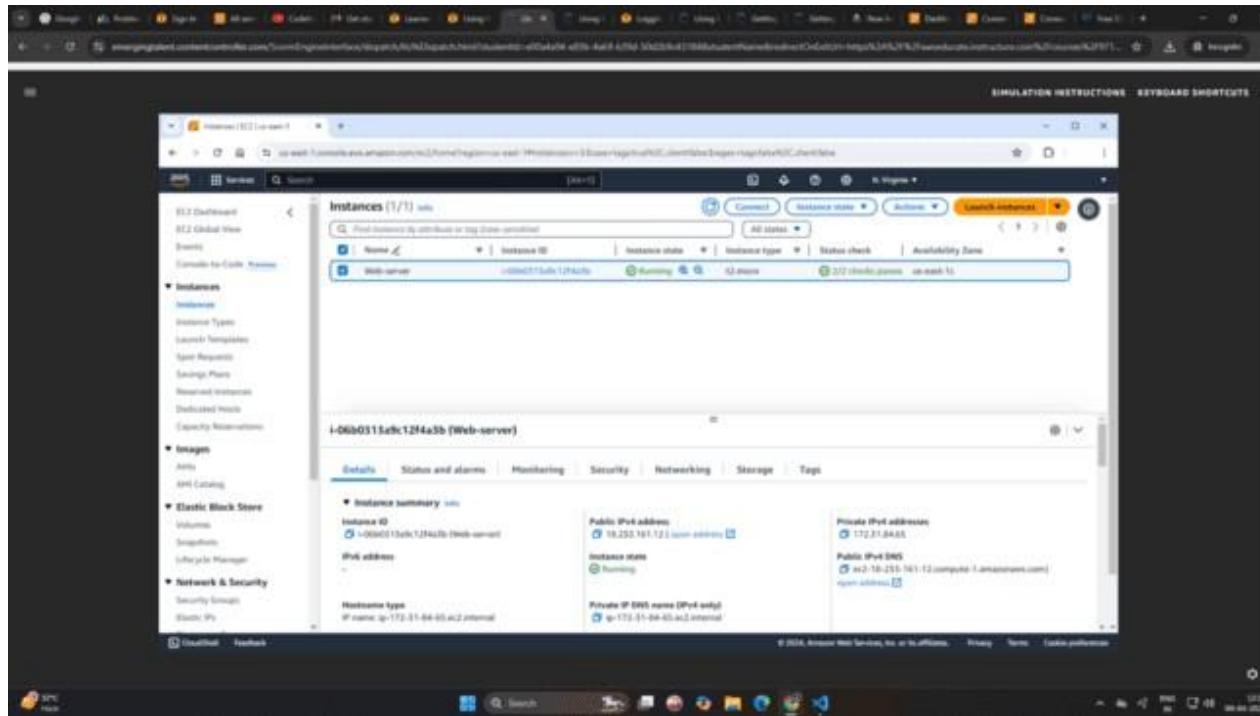
Step 12: End the Lab

After completing the lab activities, returned to the AWS Educate interface and clicked "End Lab." This action automatically stopped and cleaned up all temporary resources.

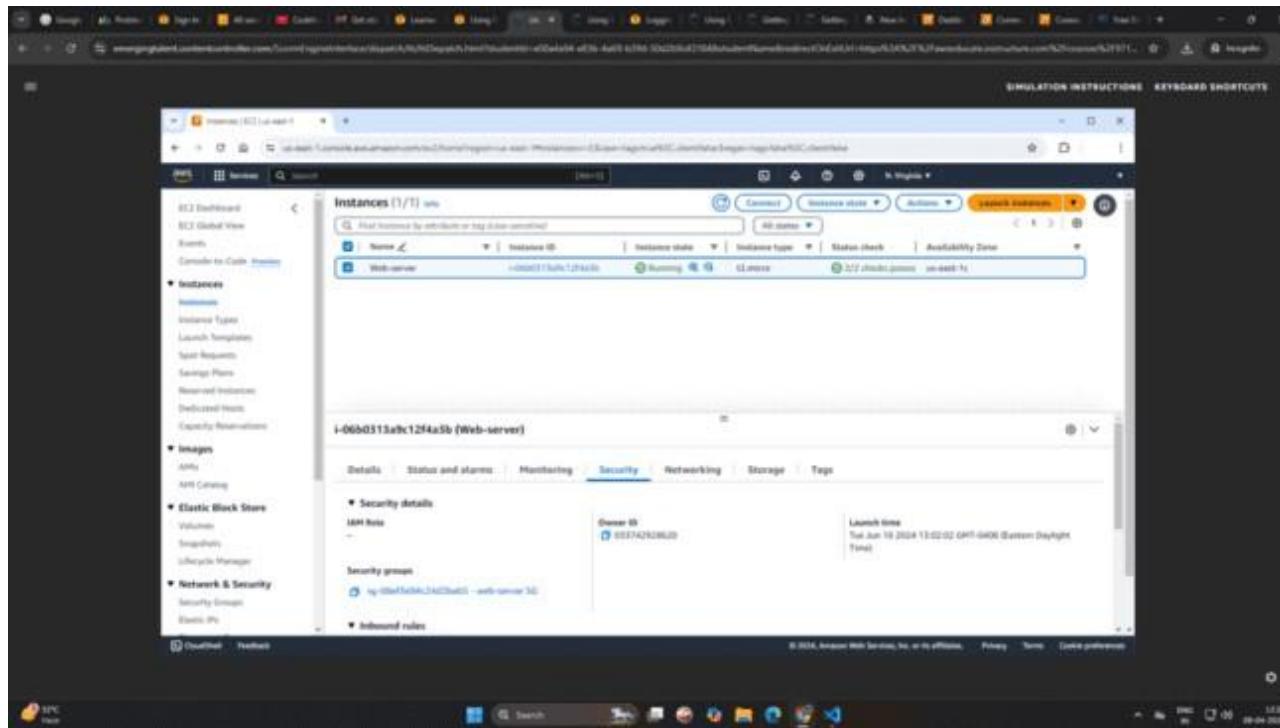
Part B] Using EC2 Instance Connect Simulation



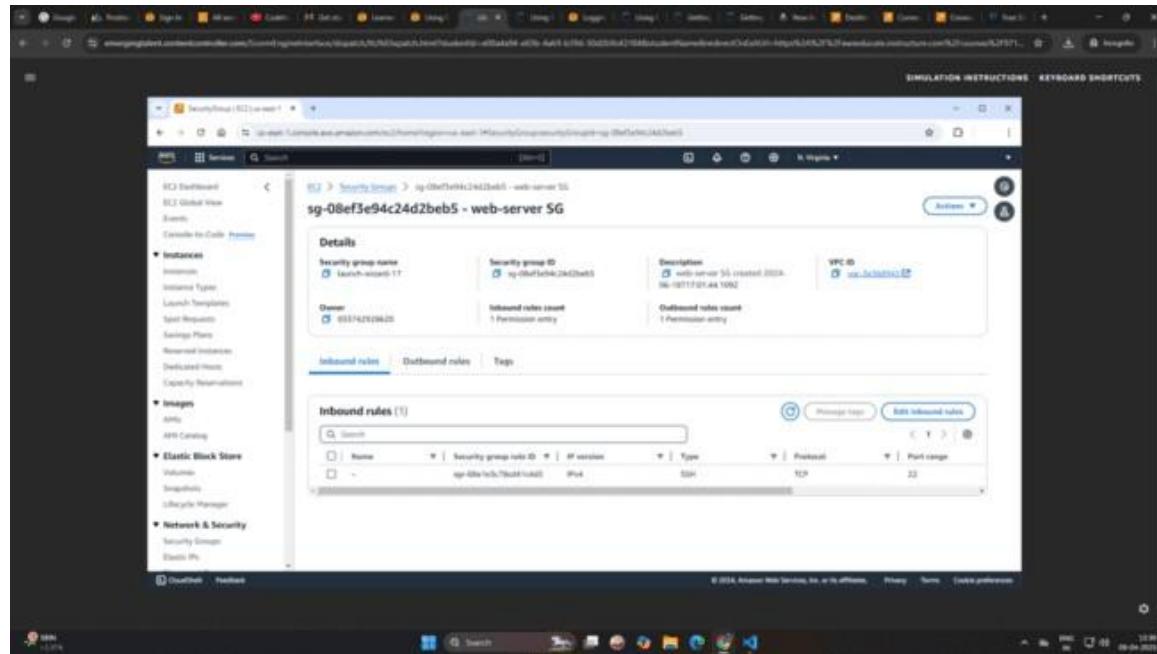
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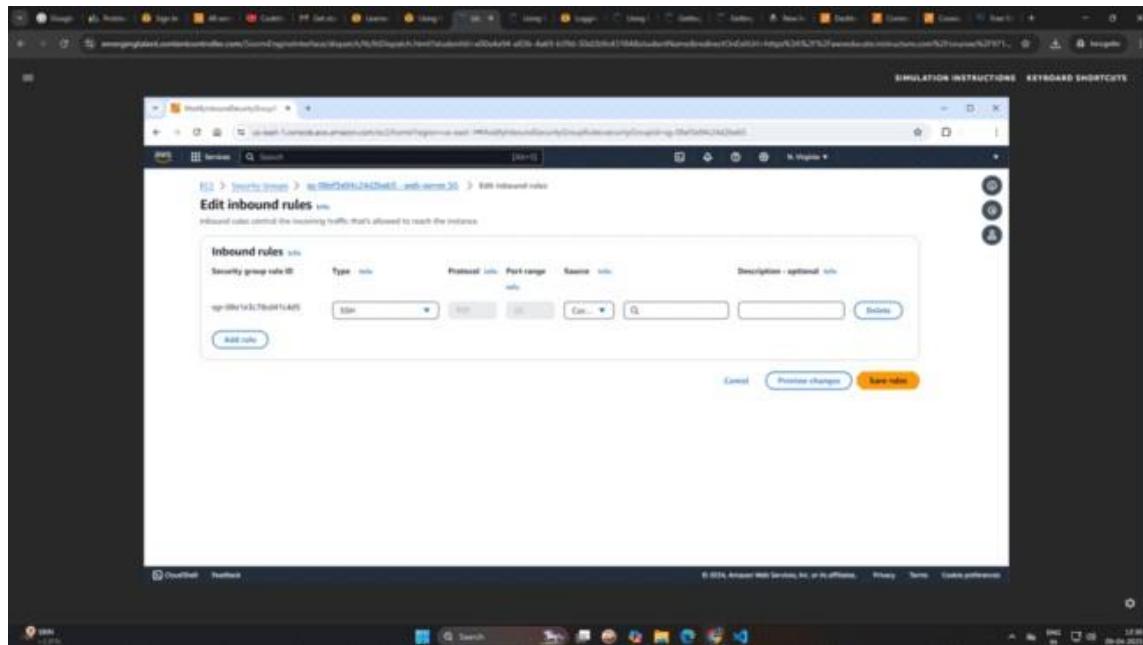


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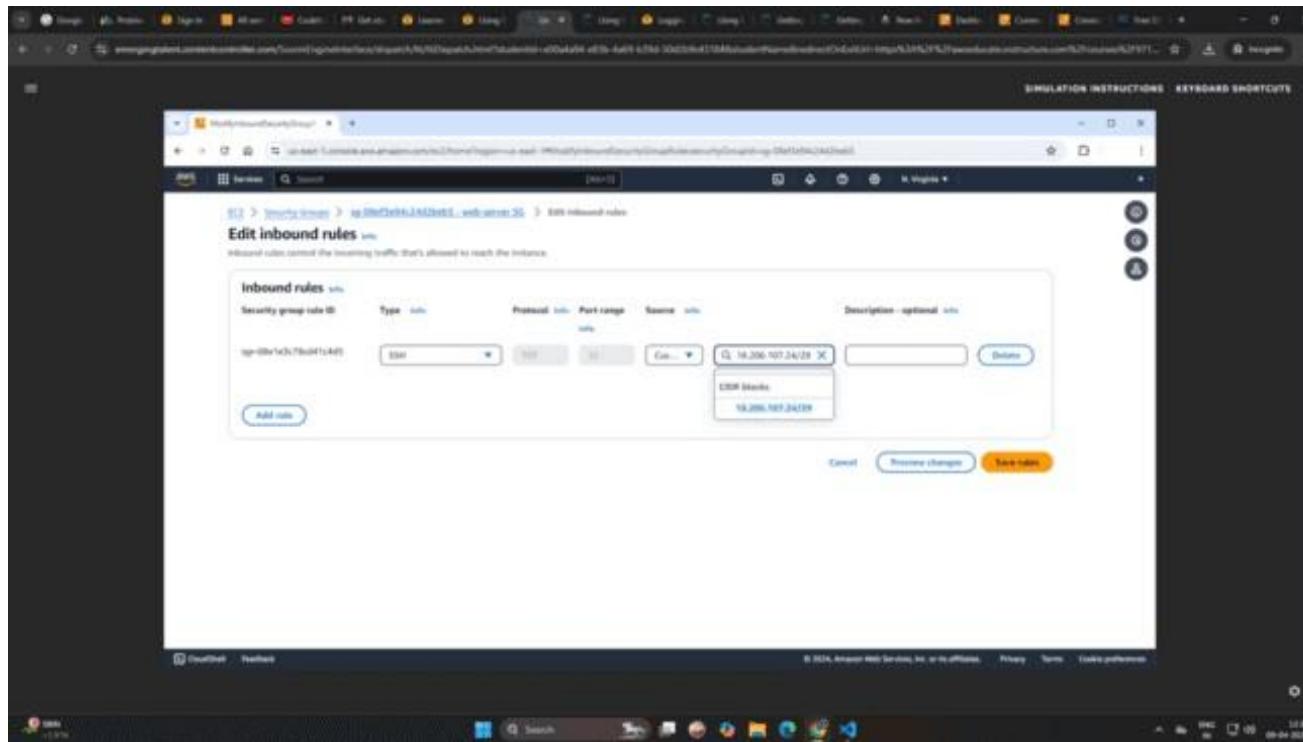


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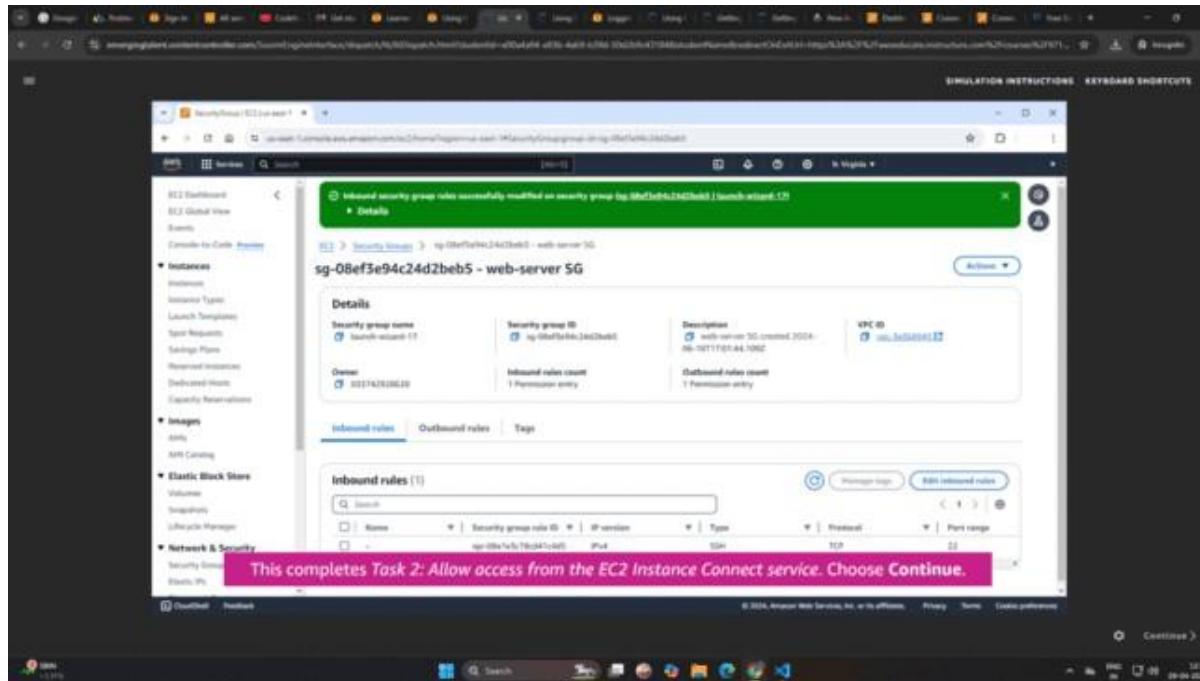


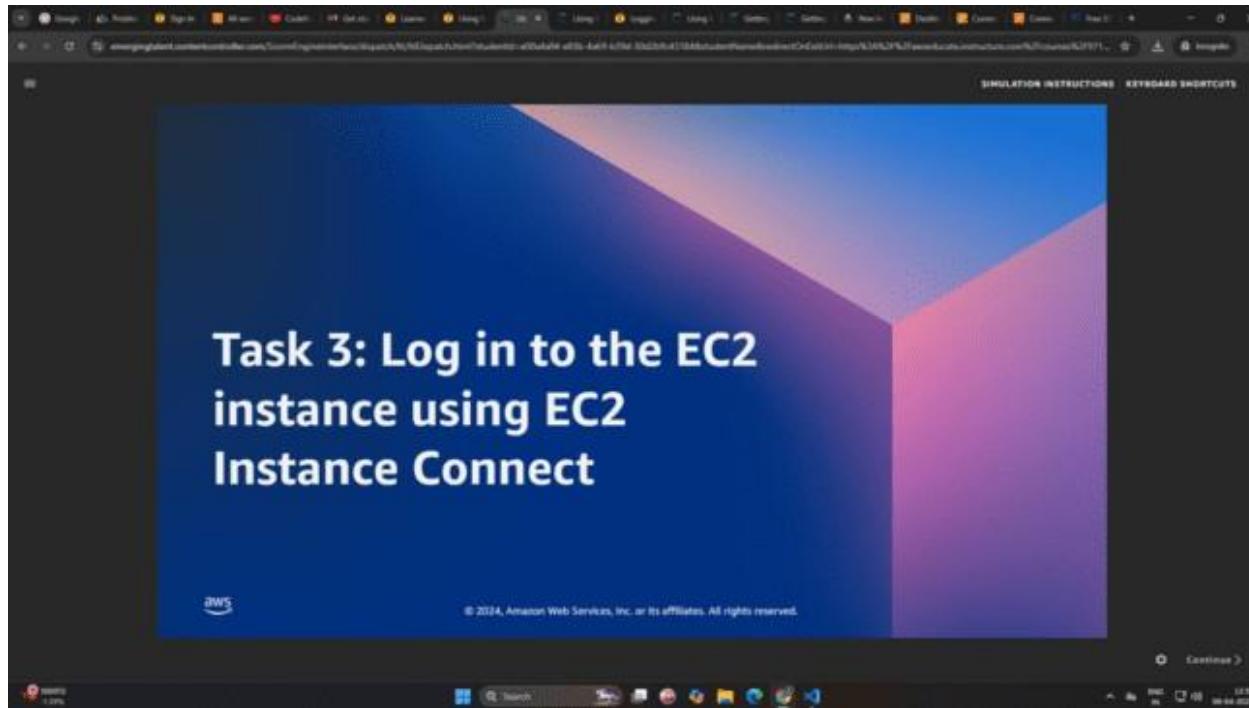


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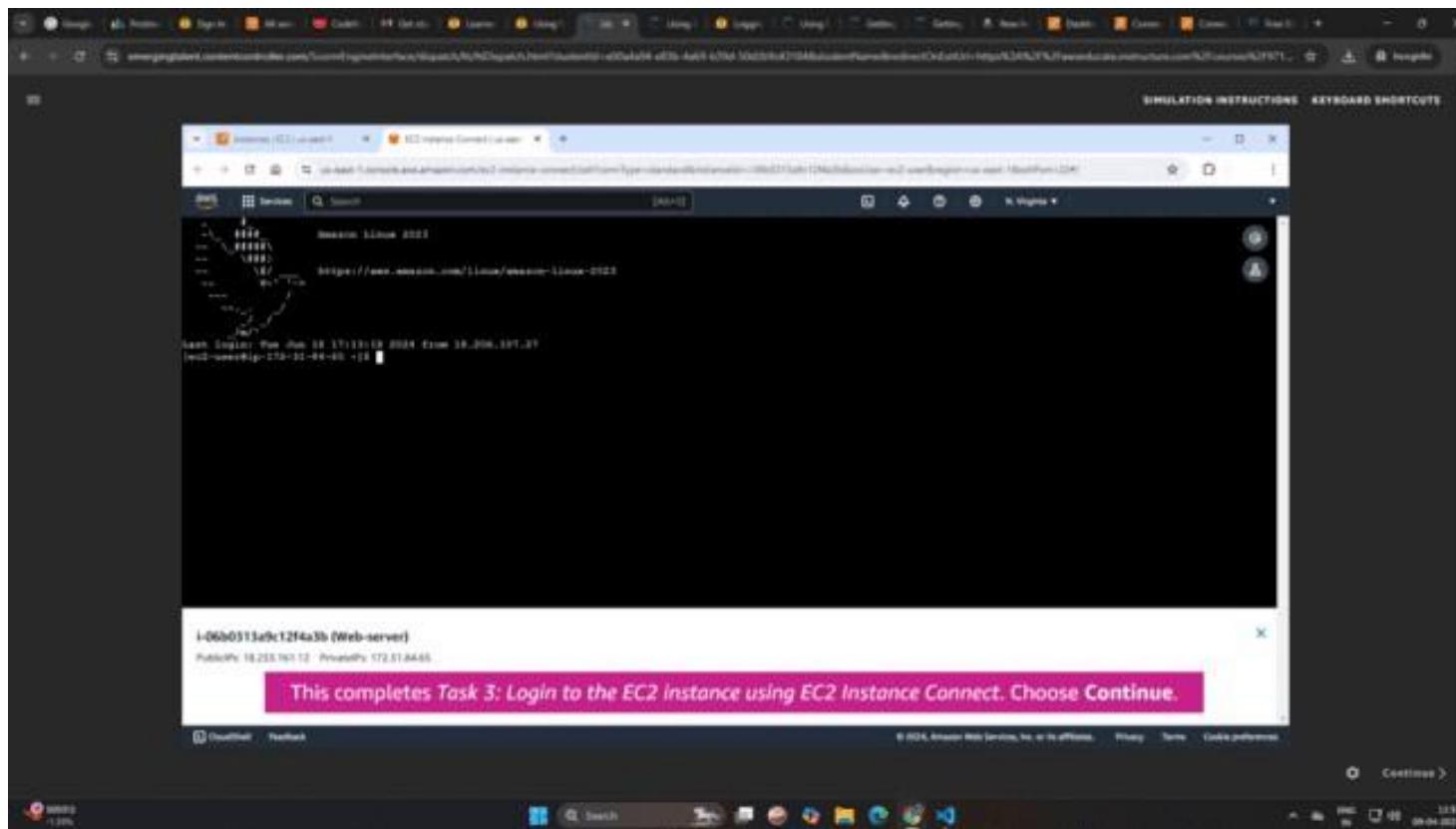


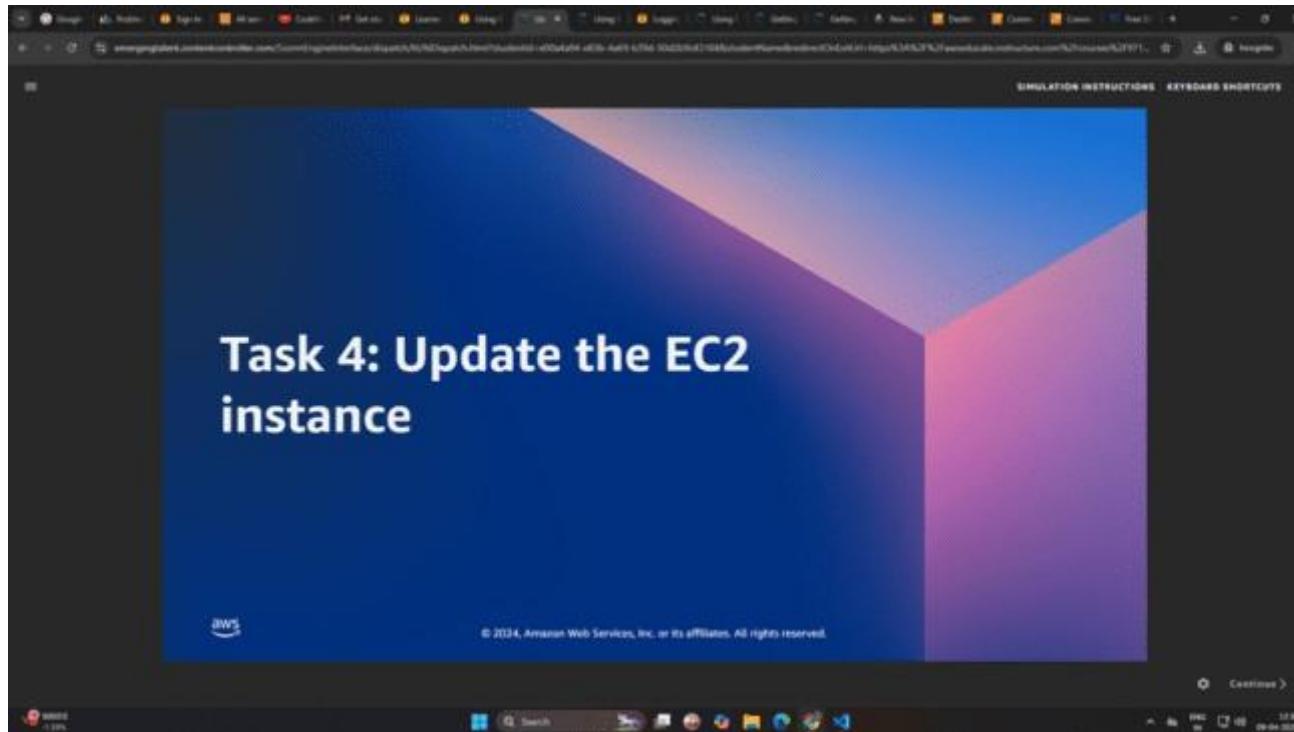
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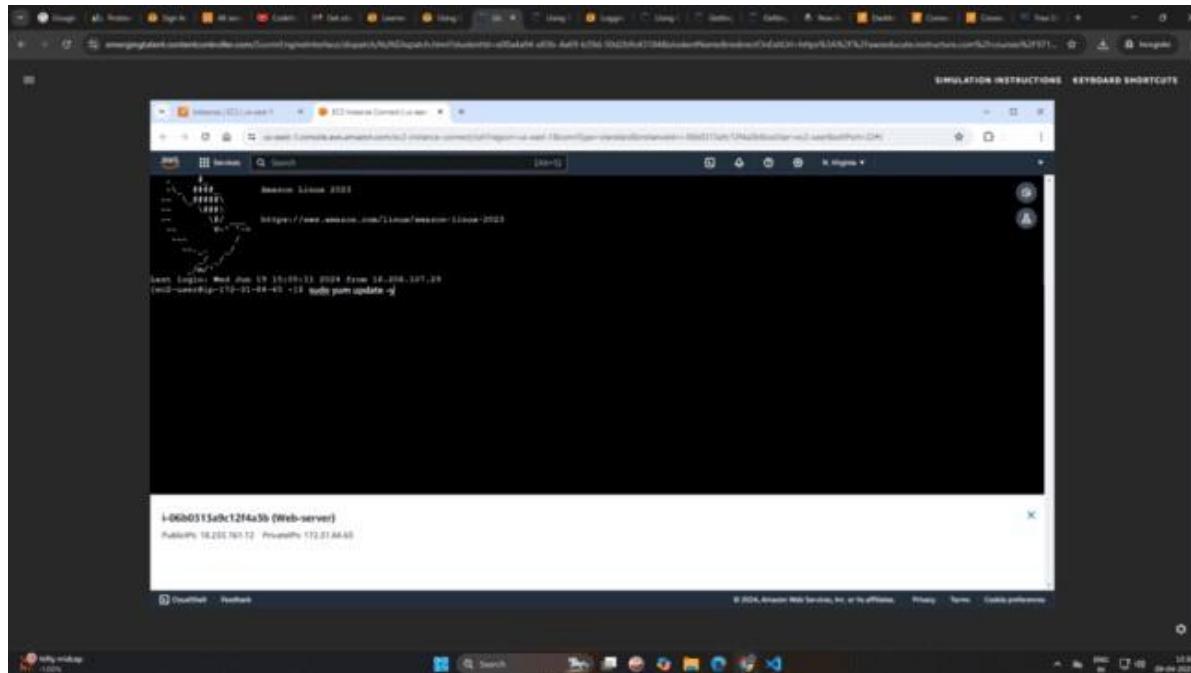


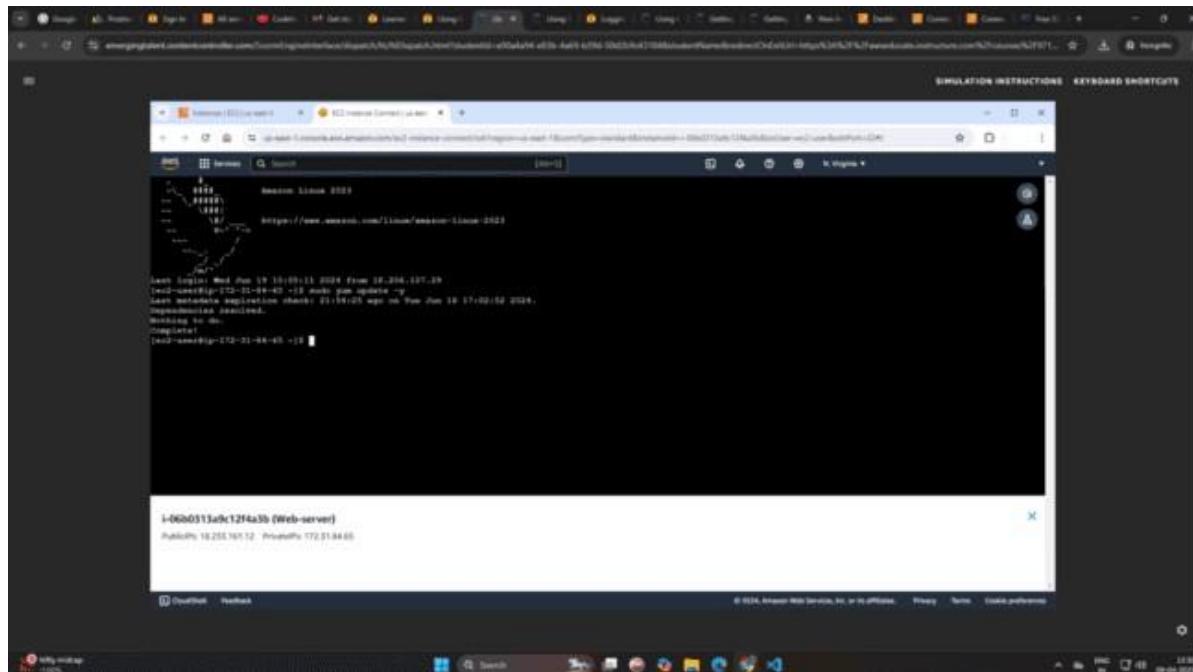


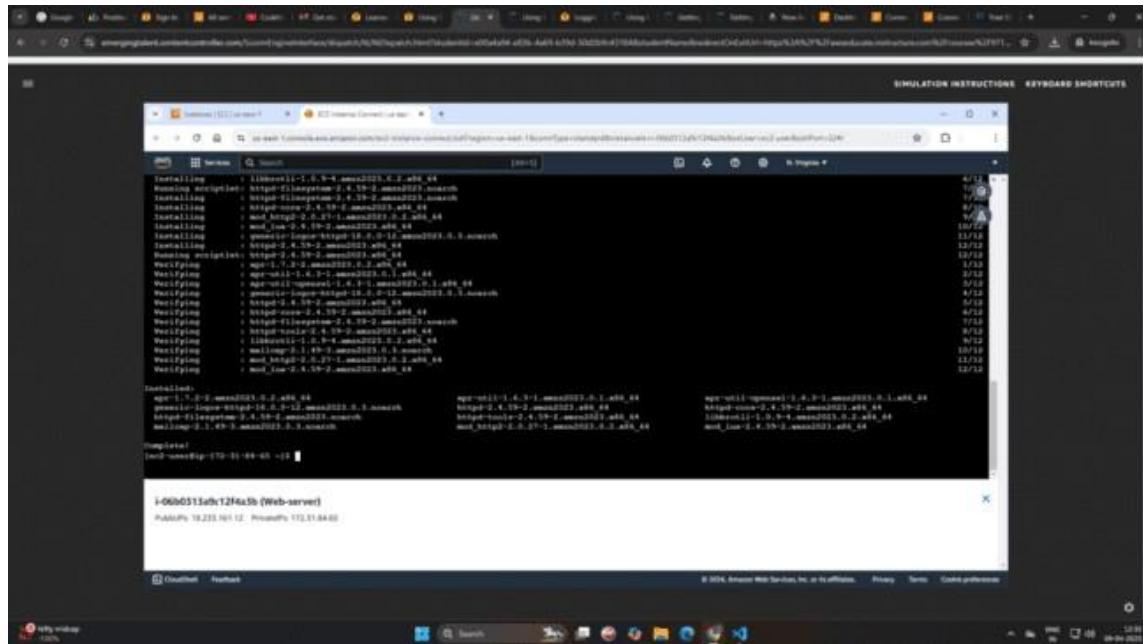
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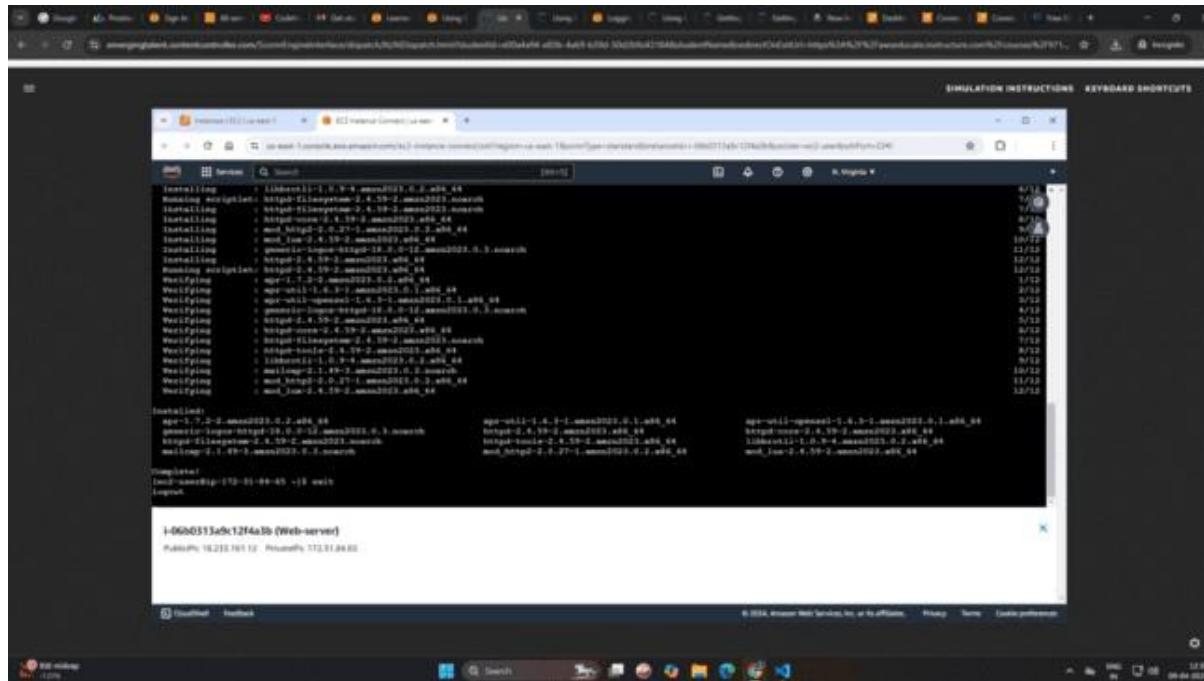




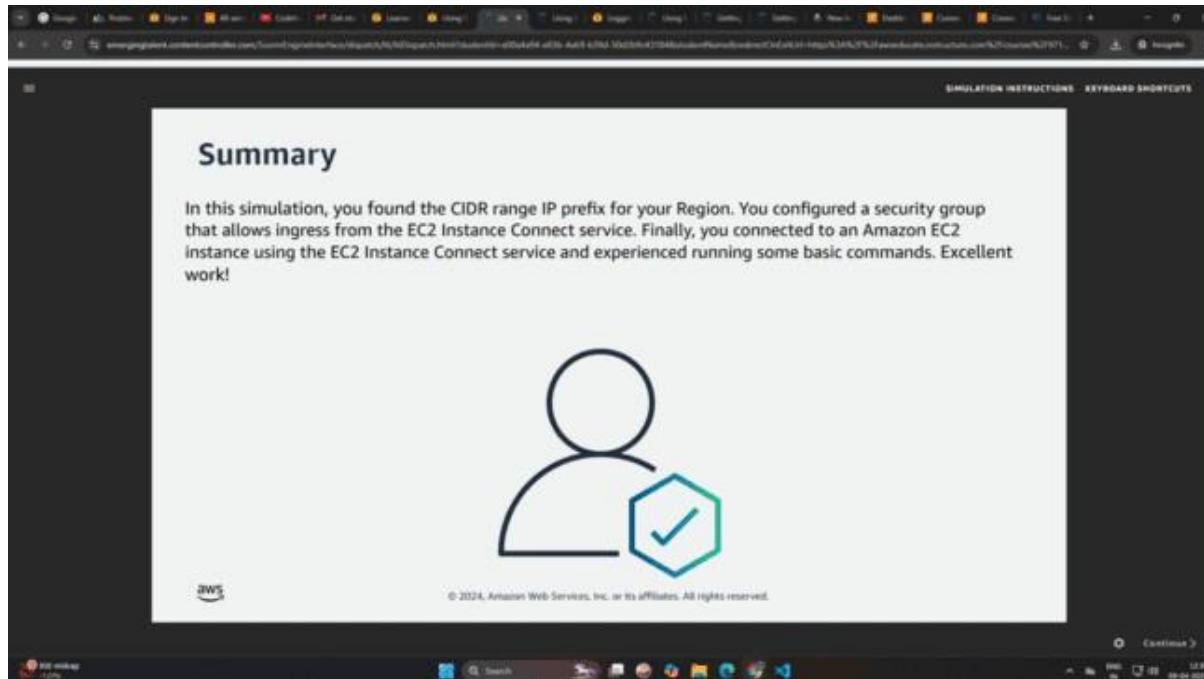


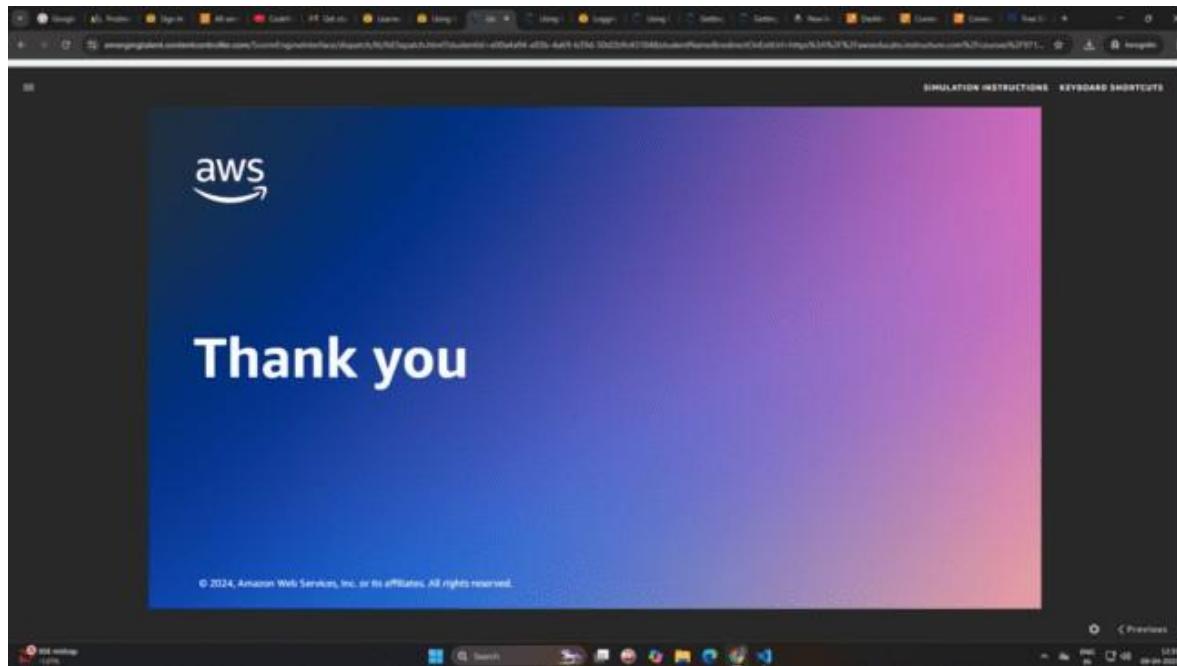


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The screenshot shows a terminal window with a black background and white text. The title bar says "Terminal (Ubuntu 22.04) - 1". The window contains the output of an "apt-get update" command. The output lists various packages and their versions, such as "libcurl4=7.67.0-1ubuntu22.0.0.2.eb4_64", "libcurl4-openssl=7.67.0-1ubuntu22.0.1.eb4_64", and "curl=7.67.0-1ubuntu22.0.1.eb4_64". It also shows "Generating sources.list: 1/1" and "Reading package lists: 1/1". At the bottom, there is a "Completed!" message and a timestamp "2024-04-24 12:34". Below the terminal, the desktop environment shows icons for Home, Dash, Search, and other applications.





Steps Taken :-

Step 1: Launch Your EC2 Instance

First, you need to launch a virtual machine (EC2 instance) using a Linux-based operating system, such as Amazon Linux or Ubuntu. Make sure the instance is in the **running** state.

Step 2: Ensure SSH Access is Enabled

During the setup of the instance, make sure the **security group** allows access via SSH. This means the instance is allowed to receive connections from port 22, which is used for remote login.

Step 3: Go to the EC2 Dashboard

Log into the AWS Management Console. From the top search bar, type and select "**EC2**". This opens the EC2 Dashboard, where you can manage your virtual machines.

Step 4: Find and Select the Instance

In the EC2 Dashboard, go to **Instances** on the left menu. A list of all your running instances will be displayed. Click on the checkbox next to the instance you want to connect to.

Step 5: Click the Connect Button

Once your instance is selected, click the "**Connect**" button at the top of the page. This will open a new panel with different connection options.

Step 6: Choose EC2 Instance Connect

In the connection panel, make sure the "**EC2 Instance Connect**" tab is selected. This option allows you to access your instance directly from your web browser without needing any software or key files.

Step 7: Review the Connection Settings

The system will automatically fill in the connection settings, such as the username and instance ID. You usually don't need to change anything here.

Step 8: Click the Final Connect Button

Click the "Connect" button at the bottom of the page. This will open a browser-based terminal session where you will be connected to your EC2 instance.

Step 9: Use the Instance Terminal

Once connected, a terminal window will appear inside your browser. You are now logged into the Linux virtual machine and can interact with it just like a real computer.

Step 10: Disconnect When Finished

When you're done, you can simply close the browser tab or return to the EC2 Dashboard and stop or terminate the instance as needed.

Conclusion:-

The rapid growth of cloud computing has transformed the way individuals and organizations deploy, manage, and scale their IT infrastructure. This project, centered around the creation and management of a Virtual Machine (VM) using Amazon Web Services (AWS), offered a comprehensive, hands-on experience with one of the most fundamental services in cloud computing—**Amazon EC2 (Elastic Compute Cloud)**.

Through the AWS Educate lab environment and guided exercises, we successfully launched a Linux-based EC2 instance, configured essential parameters such as instance type, AMI, networking, and storage, and explored multiple ways to connect to the VM, including the browser-based **EC2 Instance Connect**. This practical exposure not only reinforced theoretical concepts of Infrastructure as a Service (IaaS) but also developed critical skills in cloud resource provisioning, secure access management, and virtual environment control.

Moreover, the project highlighted the flexibility, scalability, and simplicity of using cloud platforms for hosting and managing virtual servers. By using AWS's intuitive interface and powerful infrastructure, users are empowered to deploy enterprise-grade applications and systems with minimal setup and cost.

The knowledge gained from this project is highly applicable in modern IT roles and paves the way for further exploration into advanced AWS services such as auto-scaling, load balancing, containerization, and serverless computing. Overall, this experience lays a strong foundation for anyone pursuing a career in cloud computing, DevOps, or system administration.