Jose Rizal University

College of Computer Studies Engineering

Computer Engineering Department

PTF2 - AWS Pricing Estimate

CPE C405 – EMERGING TECHNOLOGIES

Submitted by:

Exiquiel John A. Pines

Submitted to:

Ms. Rosalina Estacio

Date Submitted:

September 1, 2023

Depending on your location, the best region for you to avail an AWS service depends on your needs and requirements. But since I am in the Philippines, the best region for me to avail is Asia Pacific (Singapore), since it is the nearest to me, I will get the lowest latency. In terms of reservation year and payment options, it will depend on my expected usage and budget.

All upfront offers the largest discount but you will have to pay a cancellation fee if you decide to cancel your reservation. On the other hand, partial upfront requires a smaller upfront payment and a higher hourly rate, but you can cancel your reservation anytime without a fee

I could recommend this pricing estimate a made to e-commerce businesses that have a predictable and consistent workload just like online retailers because they know how many customers would be expected to have each day. With the use of the AWS pricing model I created, the online retailers would be expected to have less cost in conducting business. The all-upfront payment option gives you the biggest discount, so this can be a good way to save money on the costs of running an online store. The t4g.micro instance would be a good choice for small to medium-sized online retail stores as it is affordable and burstable which means it is a good option for online stores that experience occasional spikes in traffic

https://calculator.aws/#/estimate?id=5df9fd0b63a2824a7d127c84c62b15575d3dc5c0

PTS1 – AWS TCO CASE ANALYSIS

CABONEGRO, MATTHAN DAVE
PINES, EXIQUEIL JOHN
PINTO, BRYCE
401G

ACTIVITY 1: AWS PRICING CALCULATOR

Scenario 1: Web application with an Amazon RDS-hosted database in the US East (Ohio) Region

Service	Data Required
Amazon Elastic Compute Cloud (Amazon EC2)	• Two Linux t3.2xlarge instances • 1-Year Standard Reserved billing with no upfront costs
Amazon Simple Storage Service (Amazon S3)	• 100 GB per month S3 Standard storage • 10,000 PUT, COPY, POST, or LIST requests • 5,000 GET, SELECT, and other requests • 1 GB data returned by S3 Select • 10 GB data scanned by S3 Select
Elastic Load Balancing	• Three Application Load Balancers • Average of 50 new connections/second per Application Load Balancer • Average connection time is 60 seconds • Average of 100 requests per second for each Application Load Balancer • Processed bytes per Application Load Balancer for EC2 instances and IP address as targets is 100 GB/month • 10 average number of rule evaluations per request
Amazon Route 53	• 5 hosted zones, not using traffic flow • 10 million standard queries per month • 10,000 basic Domain Name System (DNS) health checks within AWS • 20,000 basic DNS health checks outside of AWS • 10 elastic network interfaces • 2 million recursive average DNS queries per month
Amazon Relational Database Service (Amazon RDS)	• 2 RDS db.r5.8xlage standard instances that run MySQL • 100 GB of General Purpose storage • 30 GB additional backup storage

SERVICE	MONTHLY COST
AMAZON EC2	$324.56
AMAZON S3	$2.37
ELASTIC LOAD BALANCING	$84.31
AMAZON ROUTE 53	$20,894.80
AMAZON RDS FOR MYSQL	$3,263.55
TOTAL MONTHLY COST	**$24,569.59**

ACTIVITY 2: SUPPORT PLAN SCAVENGER HUNT

SCENARIO 1: STARTUP COMPANY THAT RUNS AN AMAZON ELASTIC COMPUTE CLOUD (AMAZON EC2) INSTANCE TO HOST A WEBSITE

- Based on the given scenario, the startup company runs an Amazon Elastic Compute Cloud (Amazon EC2) wherein it allows users to have or to run a virtual servers in the cloud.
- With that, the group would recommend a Developer Support Plan regardless of how the startup is doing well or is it a newly established company. Since the startup company is hosting a website, it is much better to have a technical support even though the response time is not that fast but it is a good support plan to avail. Also, between all support plans that has a pricing the Developer Support Plan has the reasonable price for a startup company. Overall, the recommended support plan can really help most startup companies that will host a website with a affordable monthly cost.
- Since they are hosting a website, the possible data they would collect to determine the should change their support plan is the website traffic like website views and unique visitors so that they can monitor changes to easily decide on their marketing strategies. Also, it is highly recommended to upgrade their support plan to have a faster response time in case of issues since they run an Amazon EC2 and they host a website.

DEVELOPER SUPPORT PLAN	
ENHANCED TECHNICAL SUPPORT	- BUSINESS HOURS IN WEB ACCESS TO CLOUD SUPPORT ASSOCIATES - UNLIMITED ACCESS WITH 1 PRIMARY CONTACT - PRIORITIZED RESPONSES ON AWS RE:POST
RESPONSE TIME	- GENERAL GUIDANCE IS LESS THAN 24 HOURS - SYSTEM IMPAIRED IS LESS THAN 12 HOURS
ARCHITECTURAL GUIDANCE	GENERAL
PROACTIVE PROGRAMS AND SELF SERVICE	- ACCESS TO SUPPORT AUTOMATION WORKSFLOWS WITH PREFIXES AWS SUPPORT AND AWS PREMIUM SUPPORT
PRICING	GREATER OF $29 PER MONTH

REFERENCES:

- https://calculator.aws/#/estimate?id=8db81aab4e6e2c9bd92565eacc654025a8219436
- https://aws.amazon.com/premiumsupport/plans/

Jose Rizal University

College of Computer Studies Engineering

Computer Engineering Department

PTS2: Introduction to IAM

CPE C405 – EMERGING TECHNOLOGIES IN CPE

Submitted by:

Exiquiel John A. Pines

Submitted to:

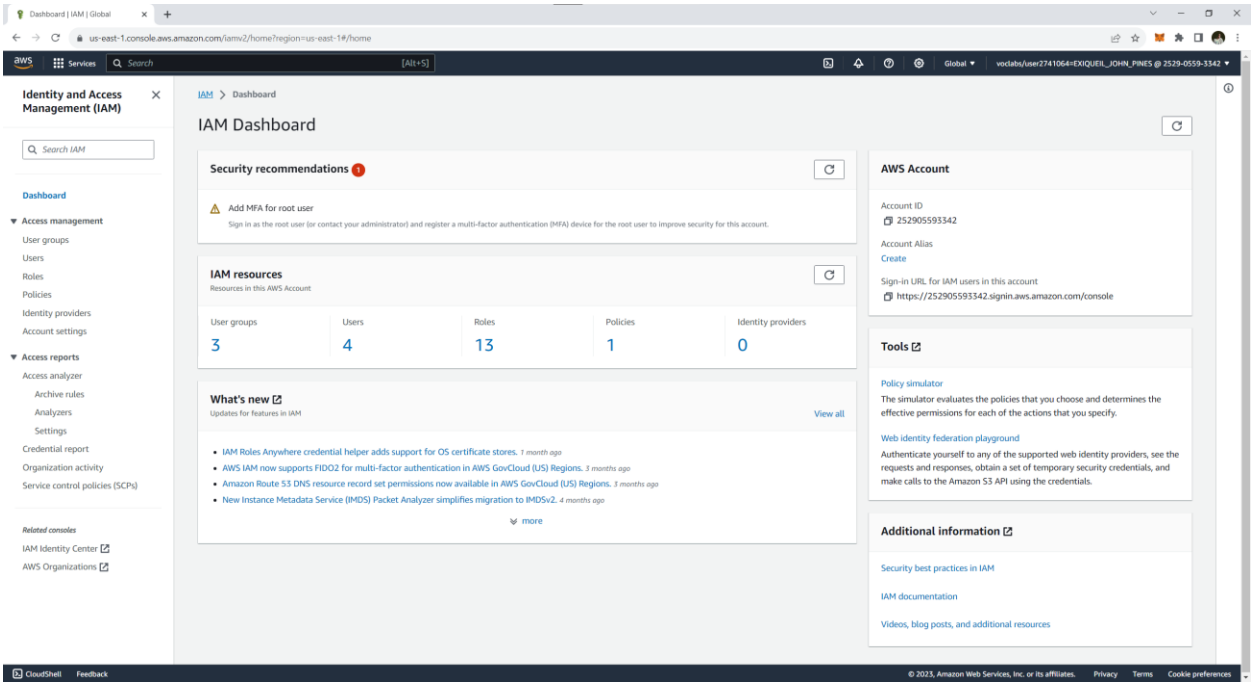
Engr. Rosalina Estacio

Date Submitted:

September 16, 2023

Task 1: Explore the Users and Groups

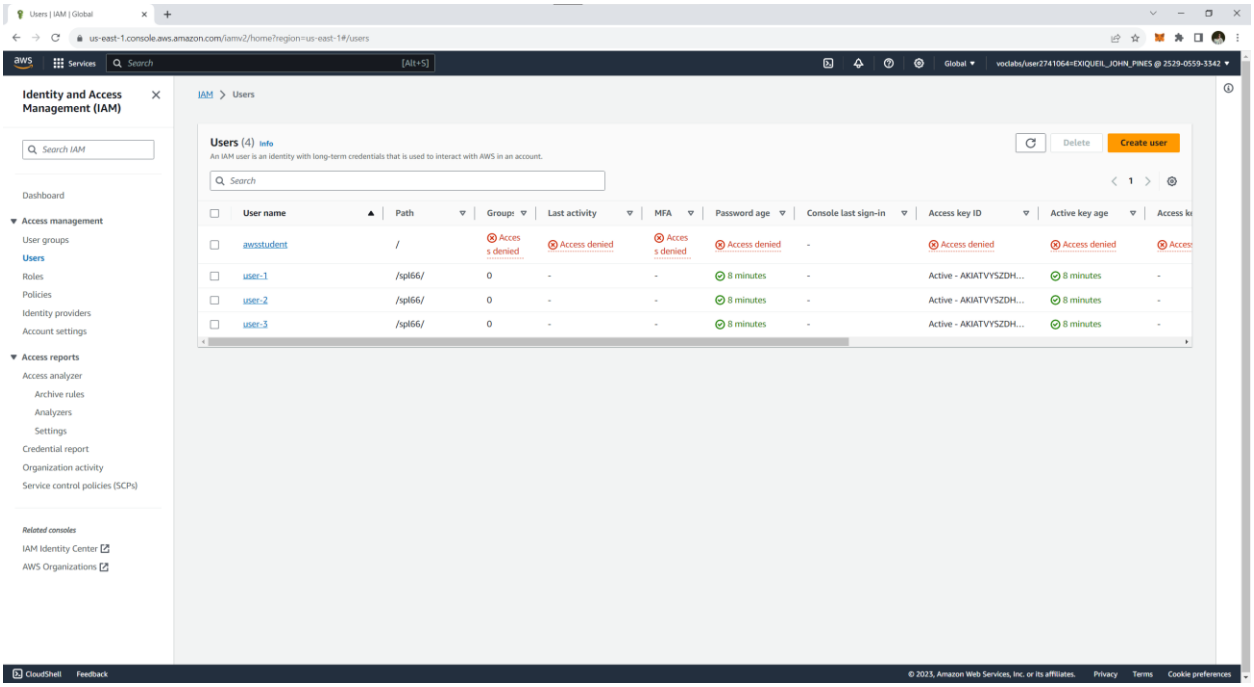
In the **AWS Management Console**, on the **Services** menu, select **IAM**.



In the navigation pane on the left, choose **Users**.

The following IAM Users have been created for you:

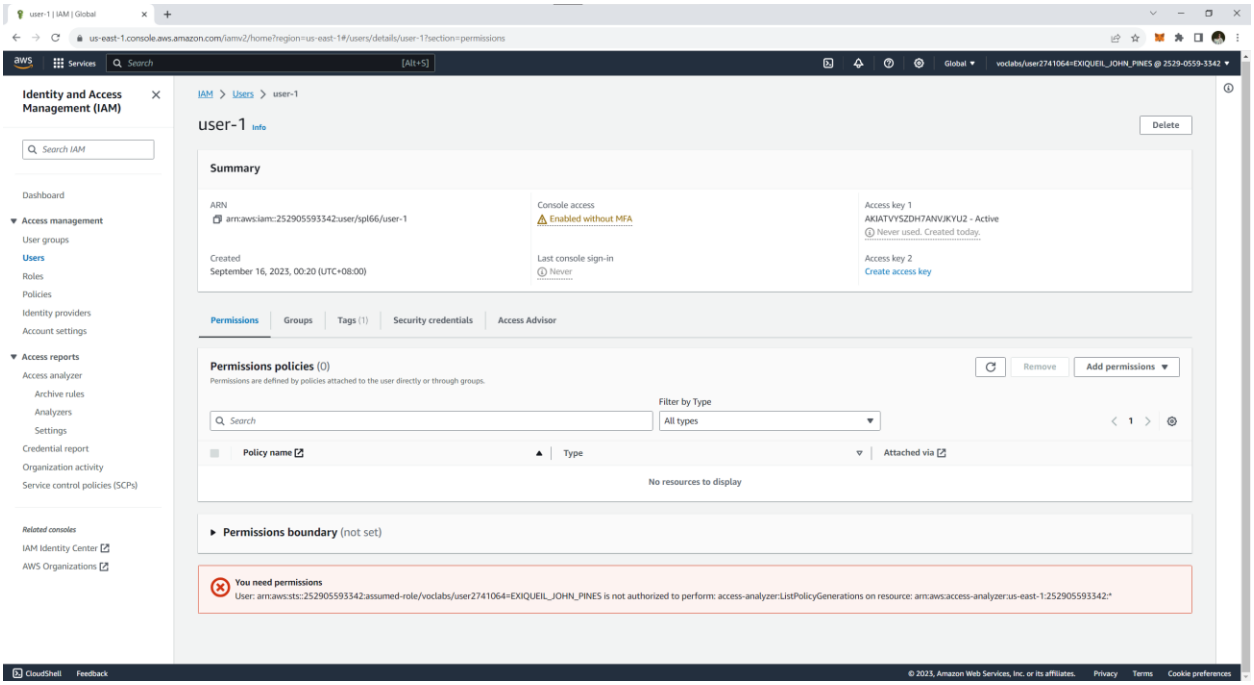
- user-1
- user-2
- user-3



Choose **user-1**.

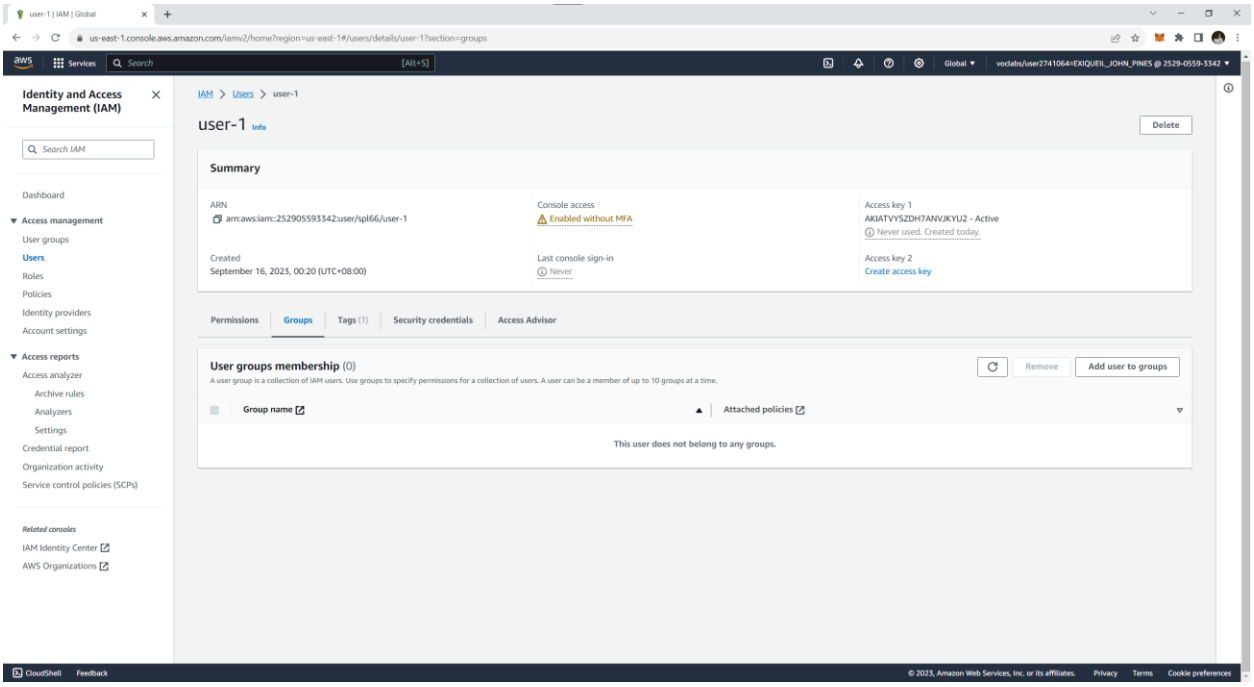
This will bring to a summary page for user-1. The **Permissions** tab will be displayed.

Notice that user-1 does not have any permissions.



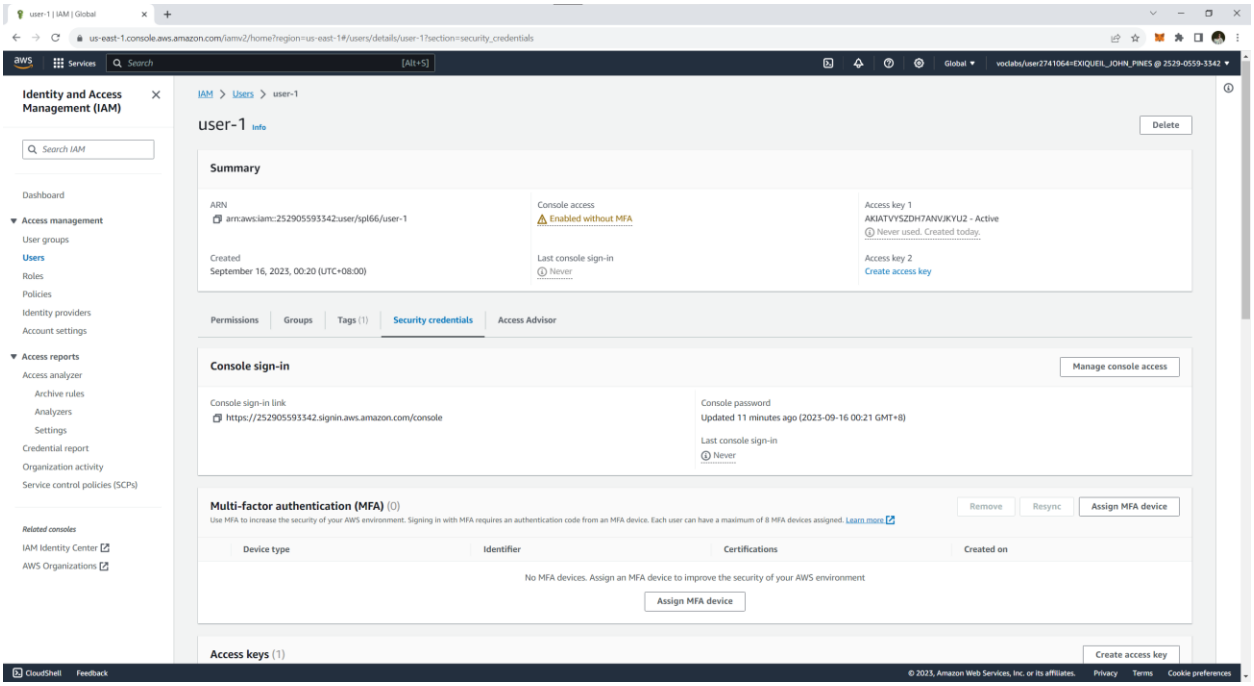
Choose the **Groups** tab.

user-1 also is not a member of any groups.



Choose the **Security credentials** tab.

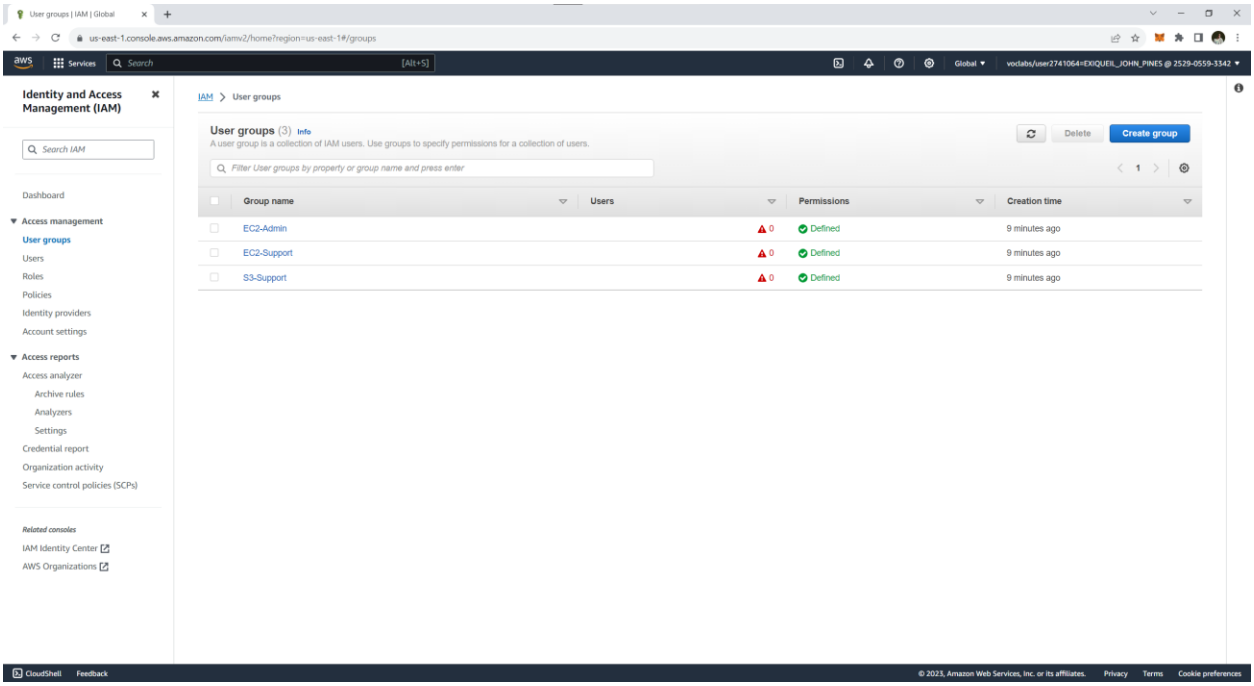
user-1 is assigned a **Console password**.



In the navigation pane on the left, choose **User groups**.

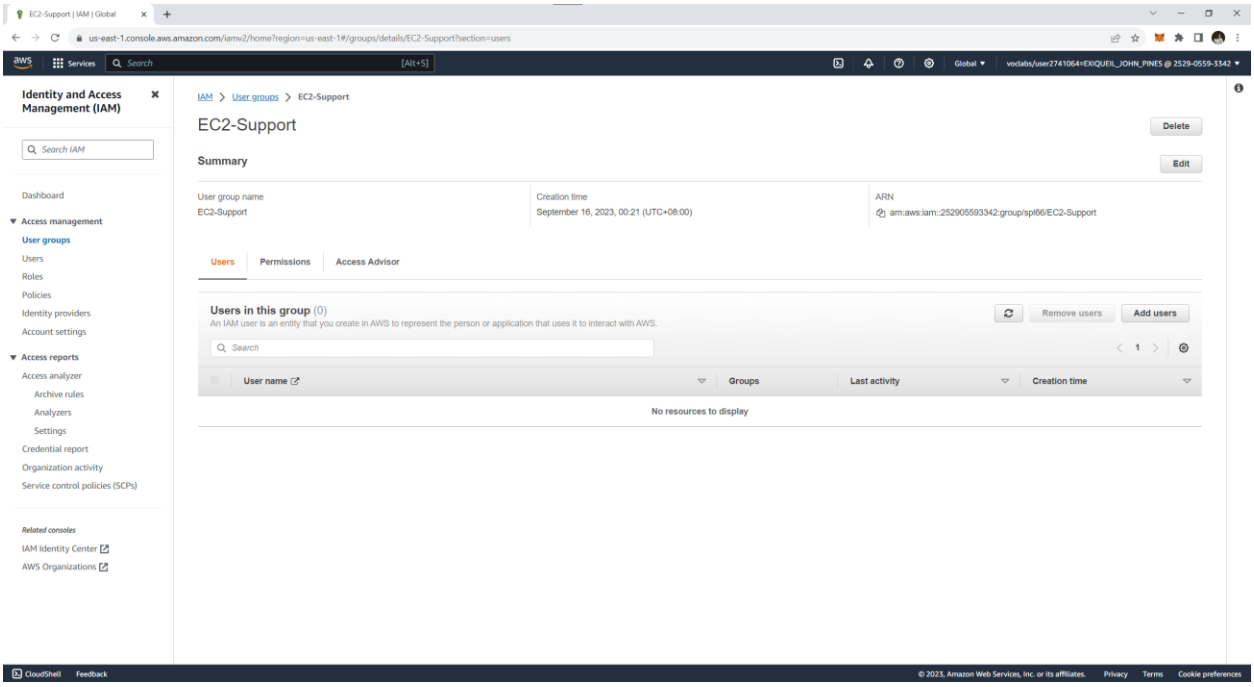
The following groups have already been created for you:

- EC2-Admin
- EC2-Support
- S3-Support



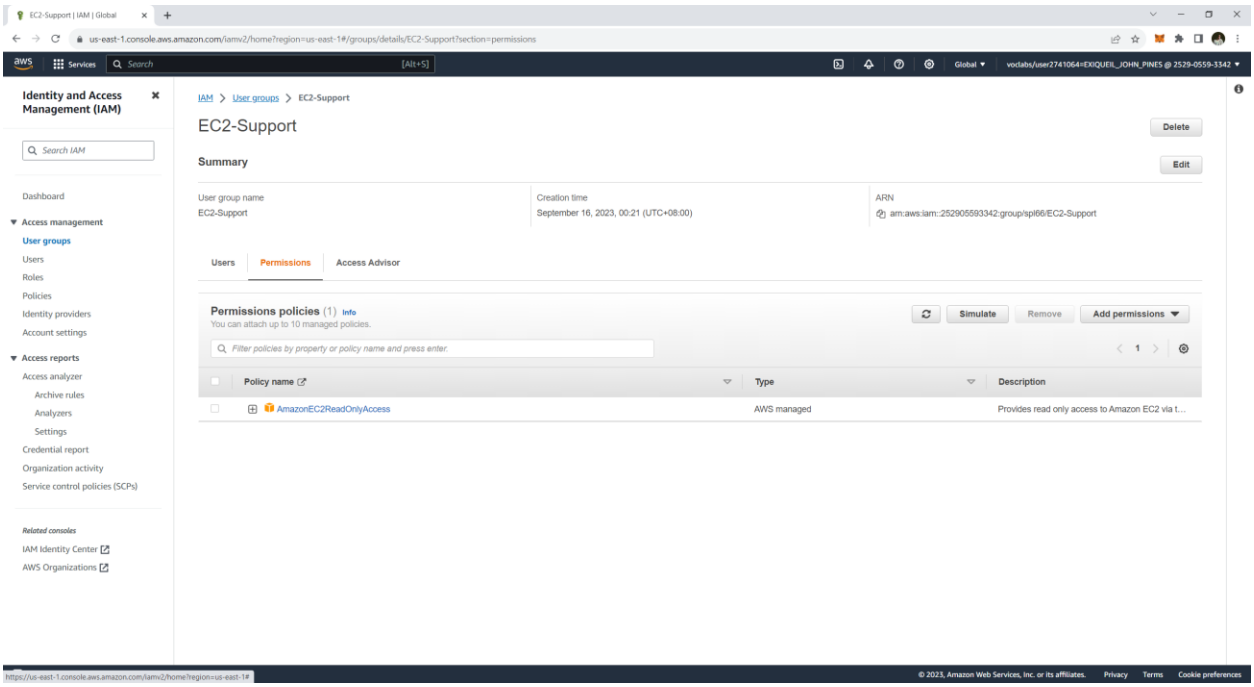
Choose the **EC2-Support** group.

This will bring you to the summary page for the **EC2-Support** group.



Choose the **Permissions** tab.

This group has a Managed Policy associated with it, called **AmazonEC2ReadOnlyAccess**. Managed Policies are pre-built policies (built either by AWS or by your administrators) that can be attached to IAM Users and Groups. When the policy is updated, the changes to the policy are immediately apply against all Users and Groups that are attached to the policy.



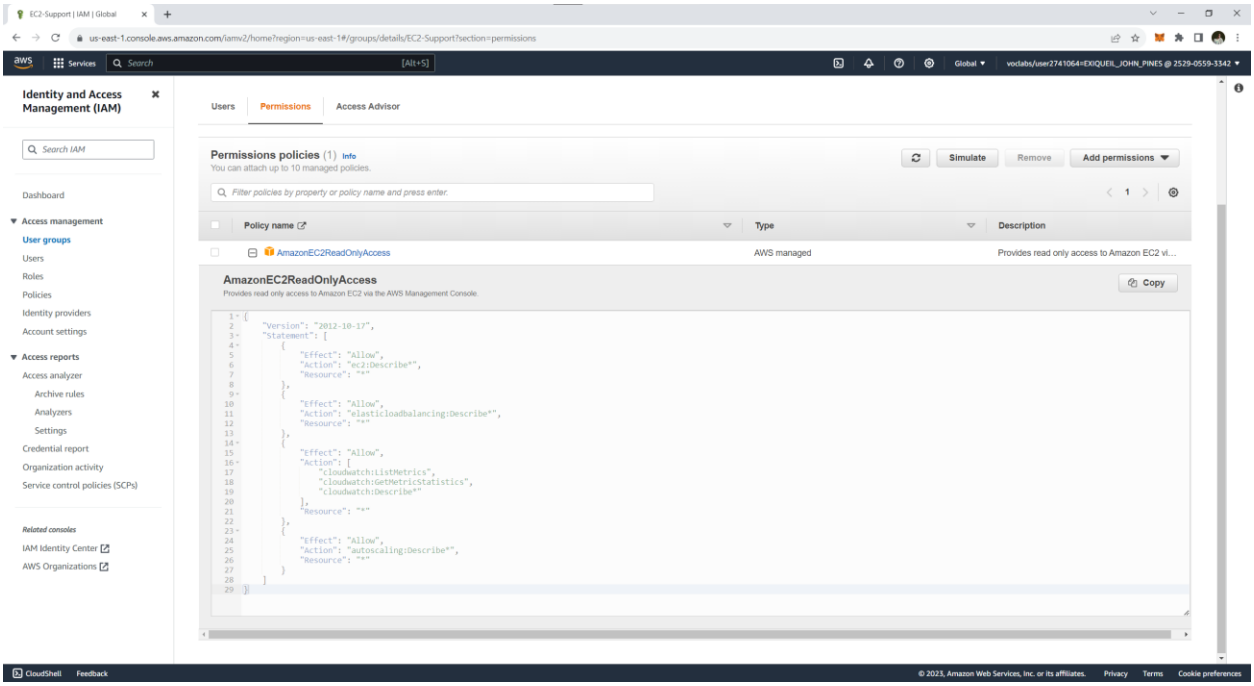
Choose the plus (+) icon next to the AmazonEC2ReadOnlyAccess policy to view the policy details.

Note: A policy defines what actions are allowed or denied for specific AWS resources.

This policy is granting permission to List and Describe information about EC2, Elastic Load Balancing, CloudWatch and Auto Scaling. This ability to view resources, but not modify them, is ideal for assigning to a Support role.

The basic structure of the statements in an IAM Policy is:

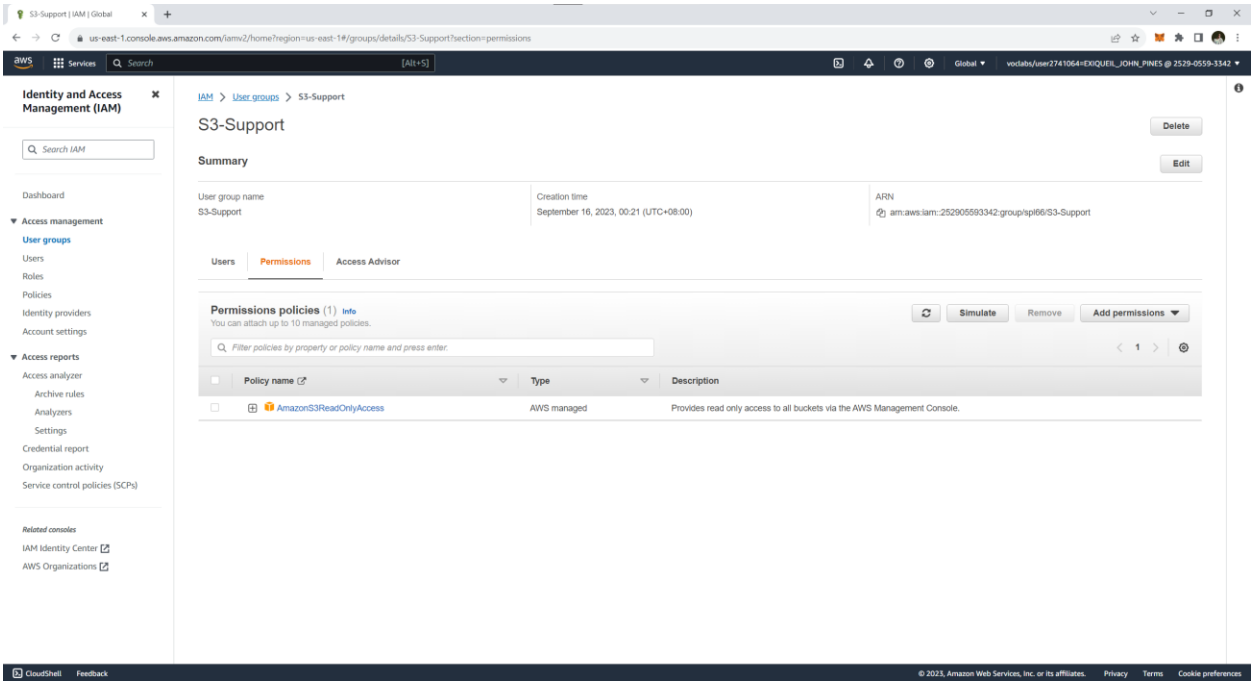
- **Effect** says whether to Allow or Deny the permissions.
- **Action** specifies the API calls that can be made against an AWS Service (eg cloudwatch:ListMetrics).
- **Resource** defines the scope of entities covered by the policy rule (eg a specific Amazon S3 bucket or Amazon EC2 instance, or * which means any resource).



In the navigation pane on the left, choose **User groups**.

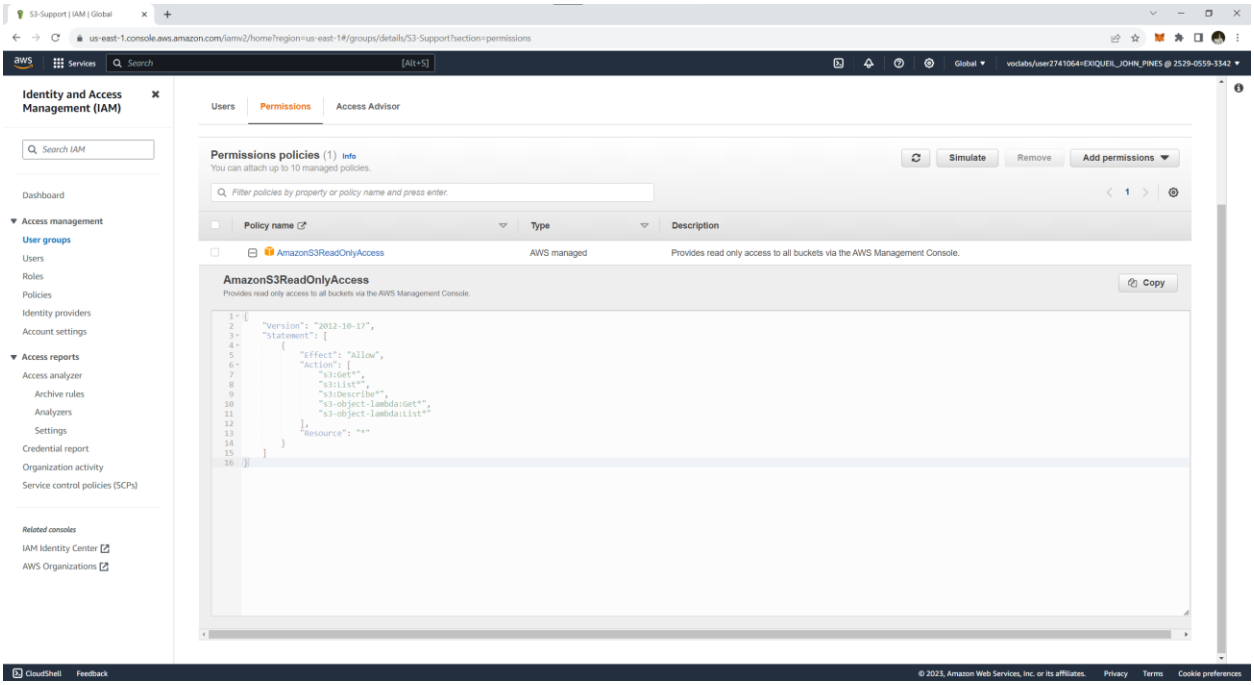
Choose the **S3-Support** group and then choose the **Permissions** tab.

The S3-Support group has the **AmazonS3ReadOnlyAccess** policy attached.



Choose the plus (+) icon to view the policy details.

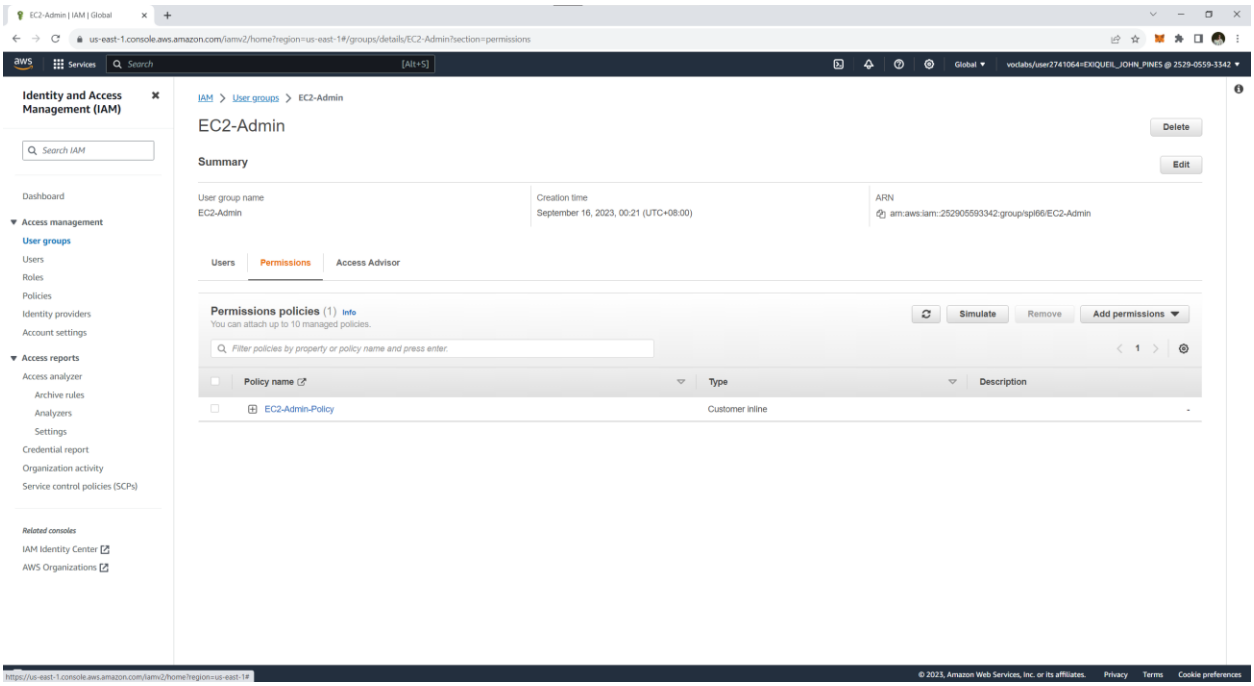
This policy grants permissions to Get and List resources in Amazon S3.



In the navigation pane on the left, choose **User groups**.

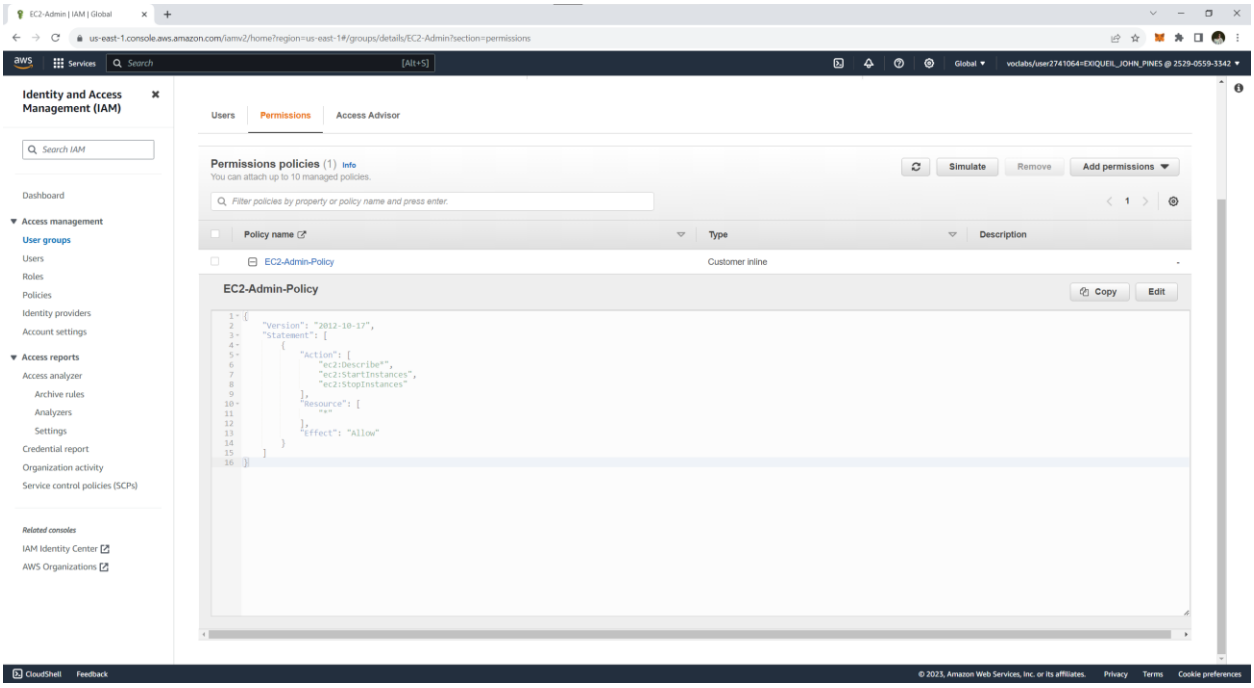
Choose the **EC2-Admin** group and then choose the **Permissions** tab.

This Group is slightly different from the other two. Instead of a Managed Policy, it has an **Inline Policy**, which is a policy assigned to just one User or Group. Inline Policies are typically used to apply permissions for one-off situations.



Choose the plus (+) icon to view the policy details.

This policy grants permission to view (Describe) information about Amazon EC2 and also the ability to Start and Stop instances.



Business Scenario

For the remainder of this lab, you will work with these Users and Groups to enable permissions supporting the following business scenario:

Your company is growing its use of Amazon Web Services, and is using many Amazon EC2 instances and a great deal of Amazon S3 storage. You wish to give access to new staff depending upon their job function:

User	In Group	Permissions
user-1	S3-Support	Read-Only access to Amazon S3
user-2	EC2-Support	Read-Only access to Amazon EC2
user-3	EC2-Admin	View, Start and Stop Amazon EC2 instances

Task 2: Add Users to Groups

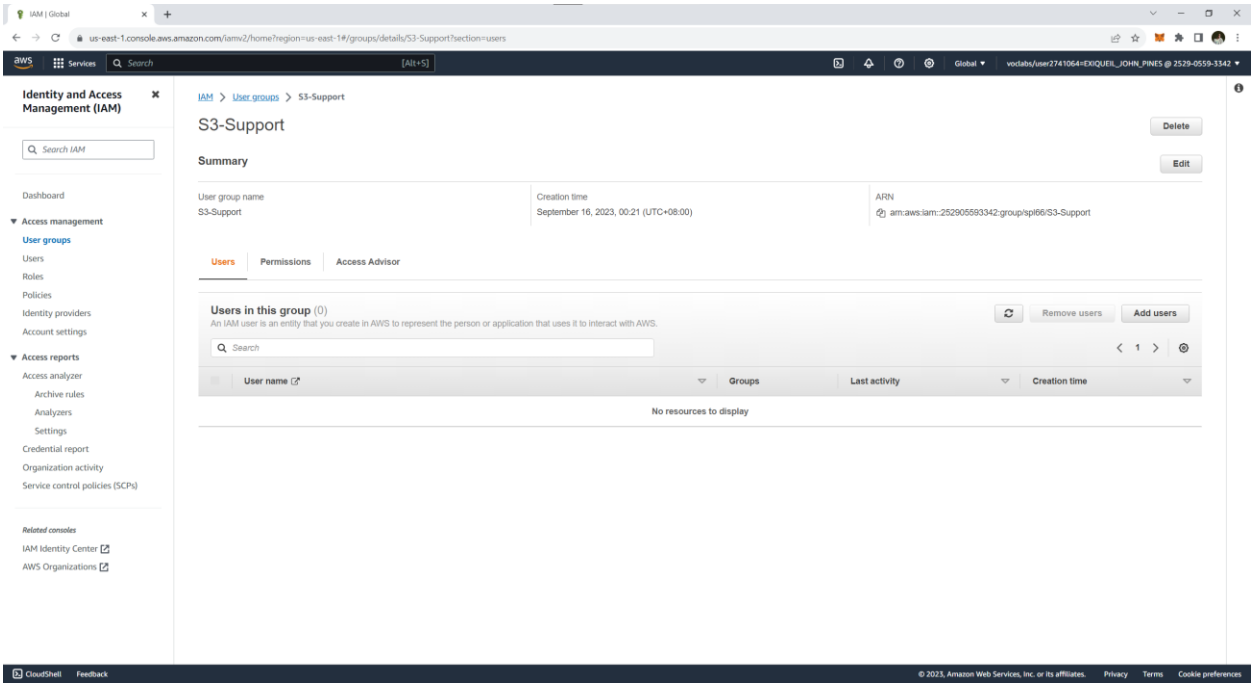
You have recently hired **user-1** into a role where they will provide support for Amazon S3. You will add them to the **S3-Support** group so that they inherit the necessary permissions via the attached AmazonS3ReadOnlyAccess policy.

You can ignore any "not authorized" errors that appear during this task. They are caused by your lab account having limited permissions and will not impact your ability to complete the lab.

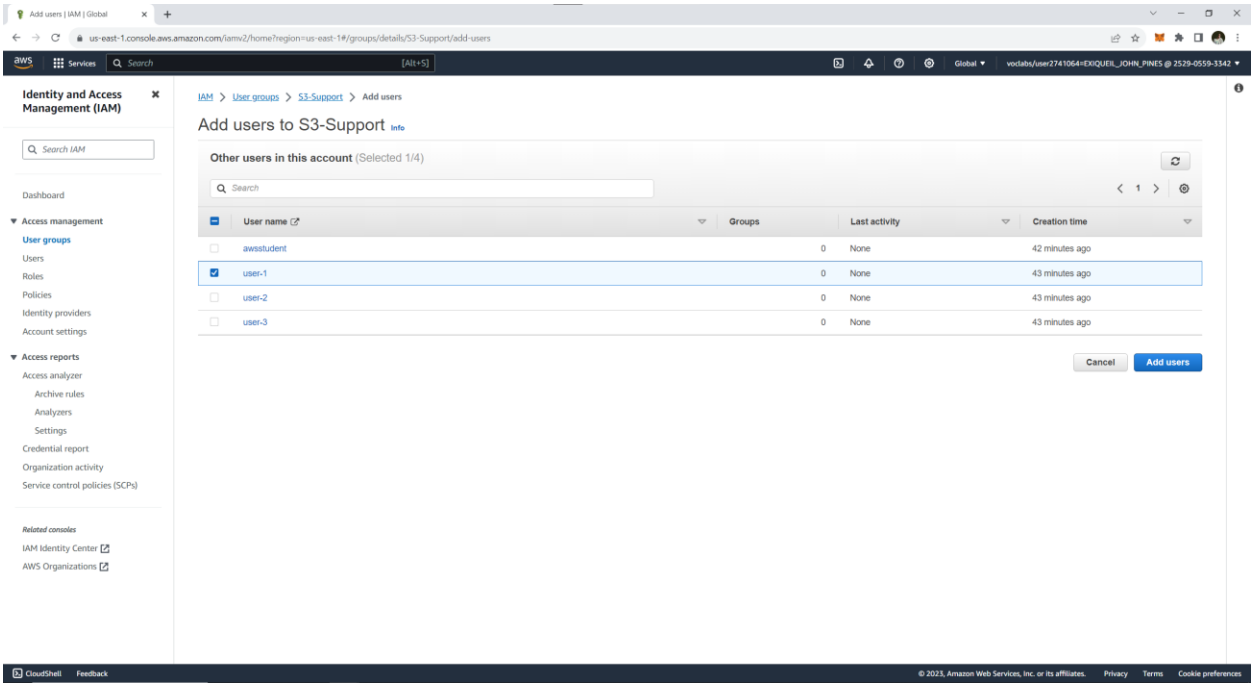
Add user-1 to the S3-Support Group

In the left navigation pane, choose **User groups**.

Choose the **S3-Support** group.



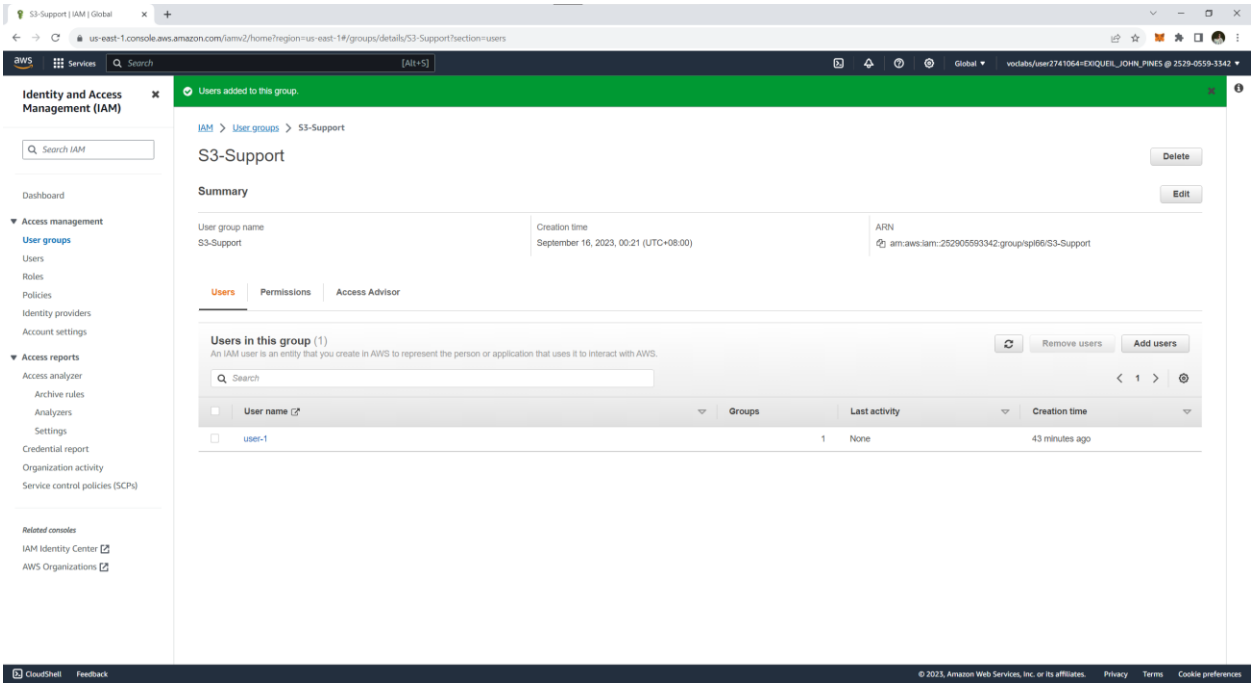
In the **Users** tab, choose **Add users**.



In the **Add Users to S3-Support** window, configure the following:

- Select **user-1**.
- At the bottom of the screen, choose **Add Users**.

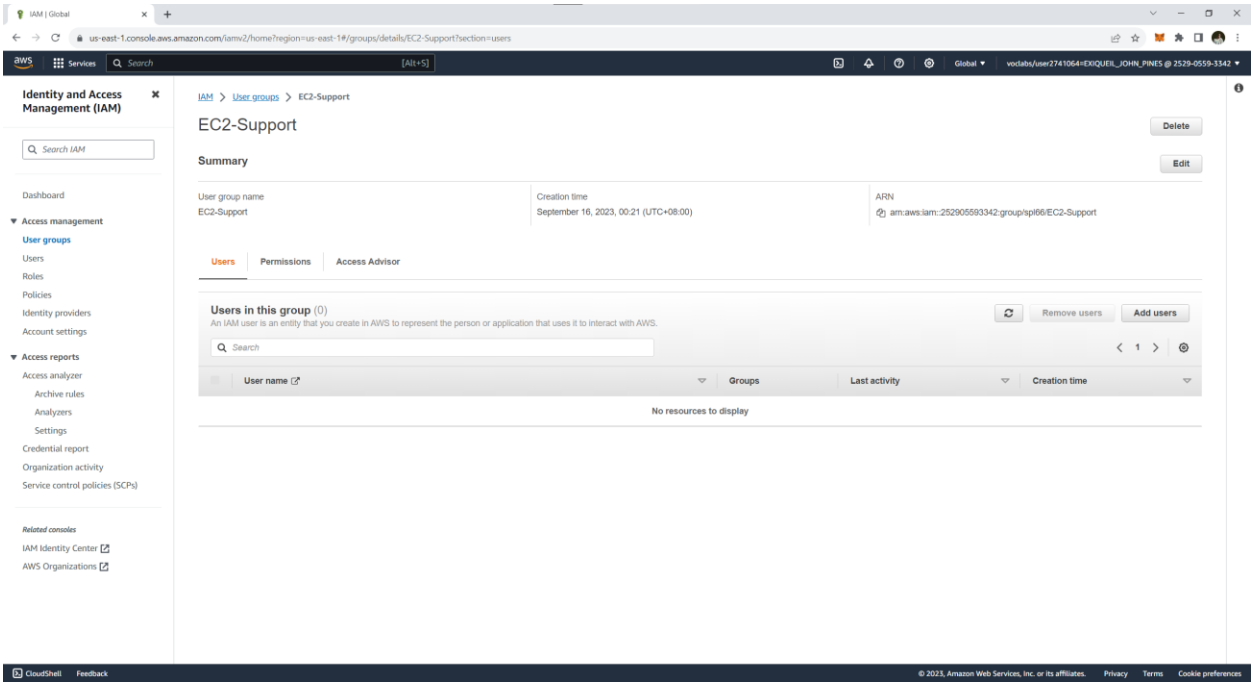
In the **Users** tab you will see that user-1 has been added to the group.



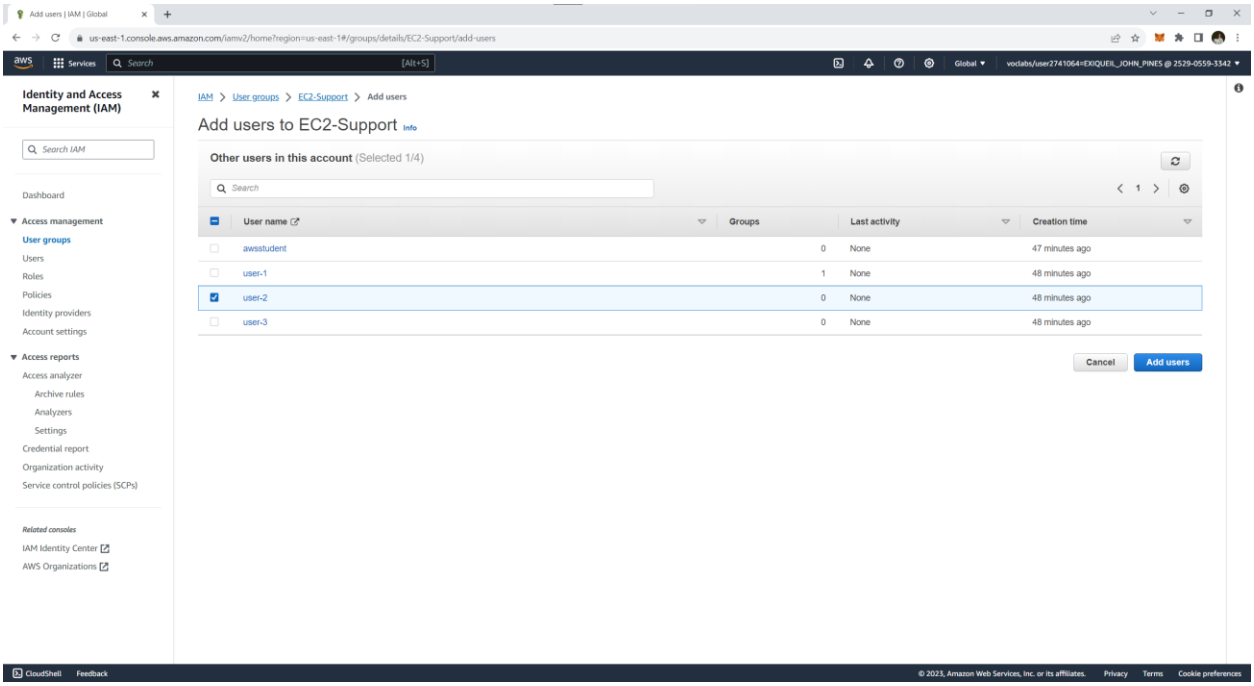
Add user-2 to the EC2-Support Group

In the left navigation pane, choose **User groups**.

Choose the **EC2-Support** group.



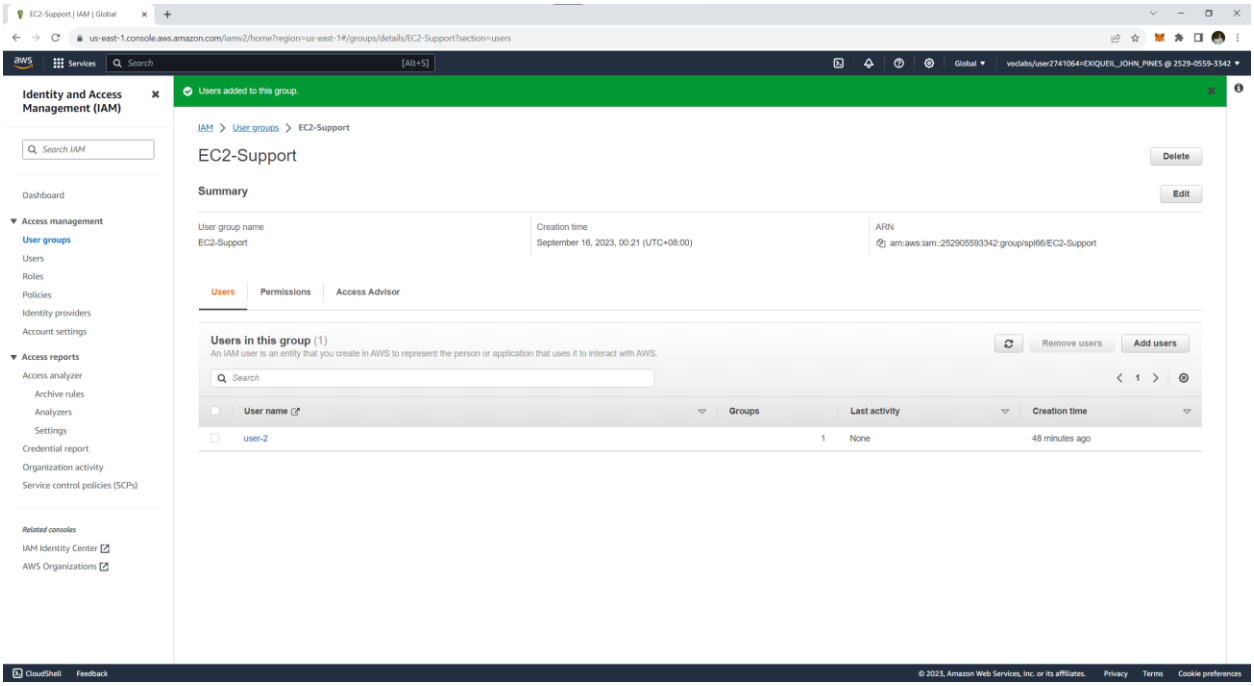
In the **Users** tab, choose **Add users**.



In the **Add Users to EC2-Support** window, configure the following:

- Select **user-2**.
- At the bottom of the screen, choose **Add Users**.

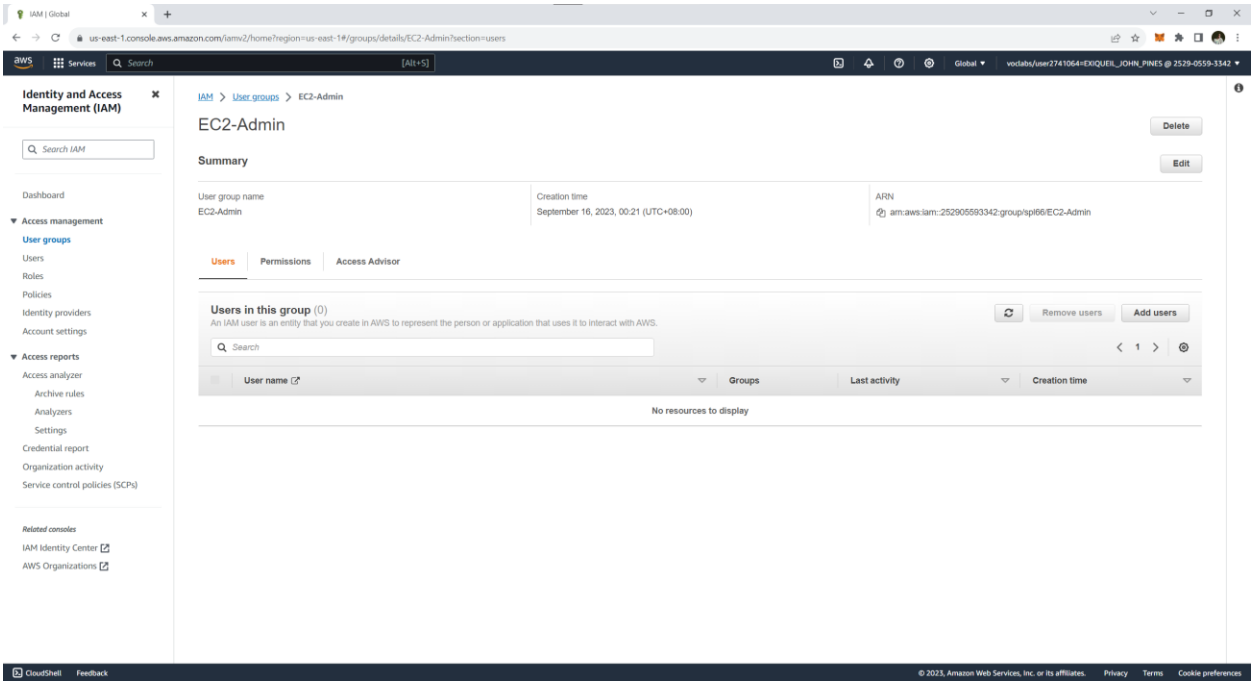
In the **Users** tab you will see that user-2 has been added to the group.



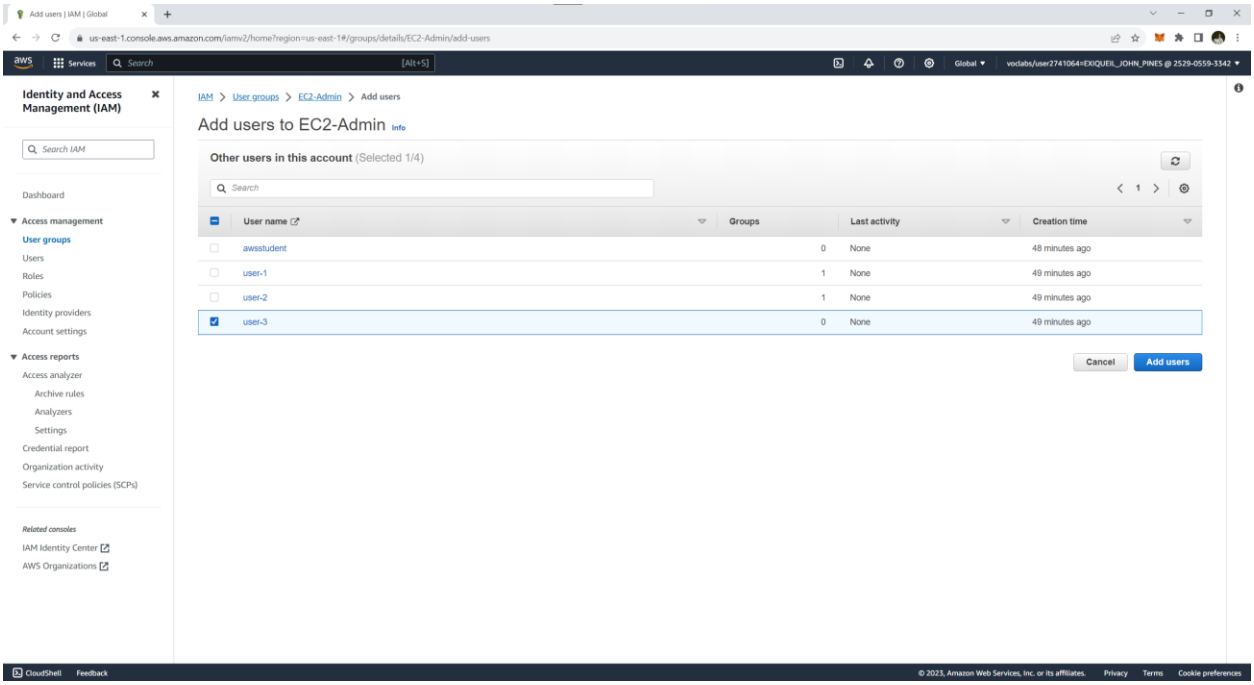
Add user-3 to the EC2-Admin Group

In the left navigation pane, choose **User groups**.

Choose the **EC2-Admin** group.



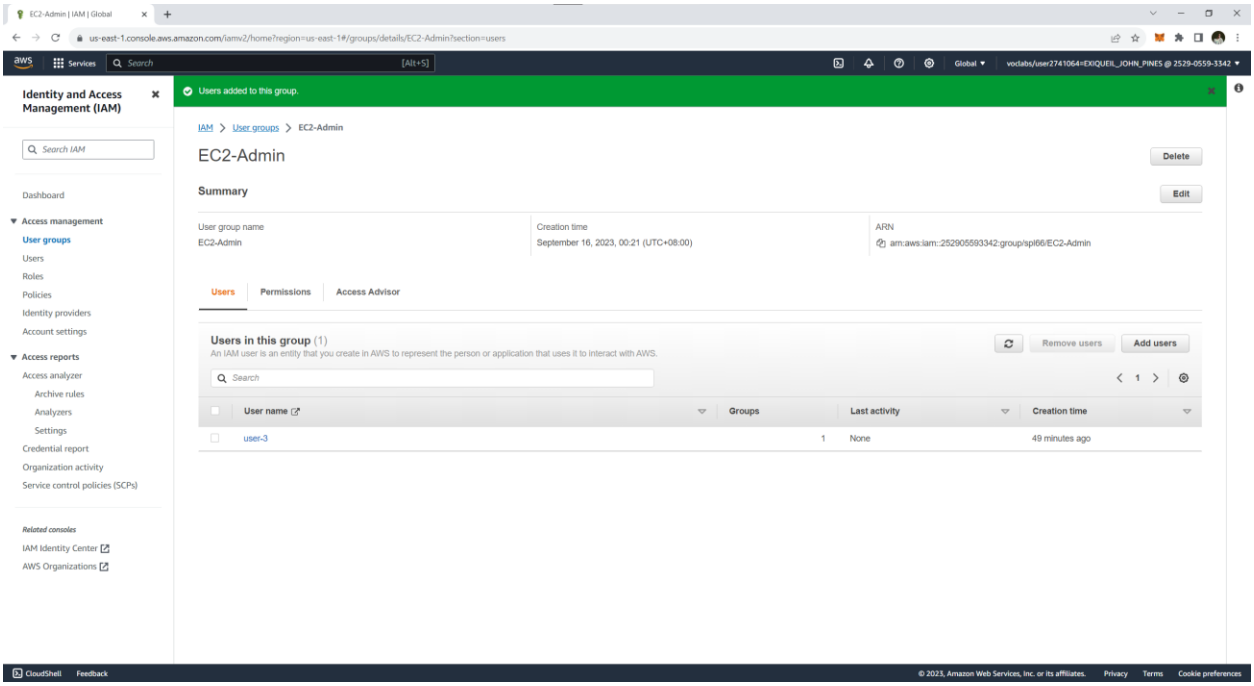
In the **Users** tab, choose **Add users**.



In the **Add Users to EC2-Admin** window, configure the following:

- Select **user-3**.
- At the bottom of the screen, choose **Add Users**.

In the **Users** tab you will see that user-3 has been added to the group.



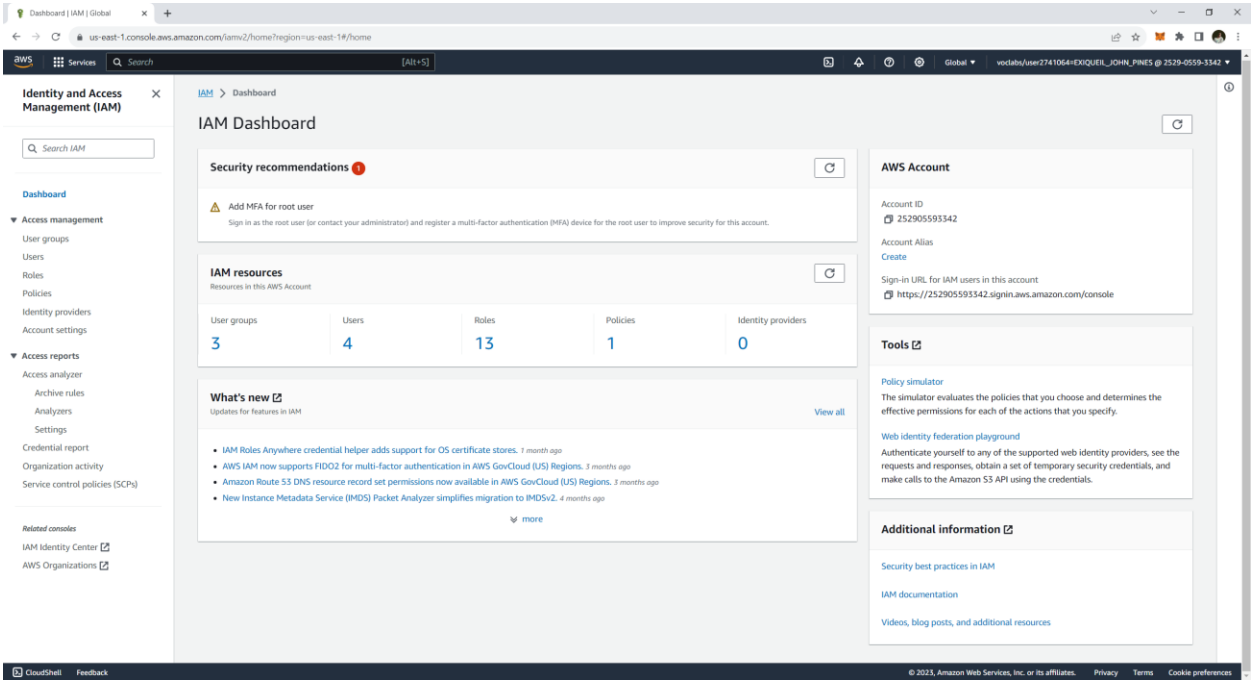
Task 3: Sign-In and Test Users

In this task, you will test the permissions of each IAM User.

In the navigation pane on the left, choose **Dashboard**.

An **IAM users sign-in link** is displayed on the right. It will look similar to: https://123456789012.signin.aws.amazon.com/console

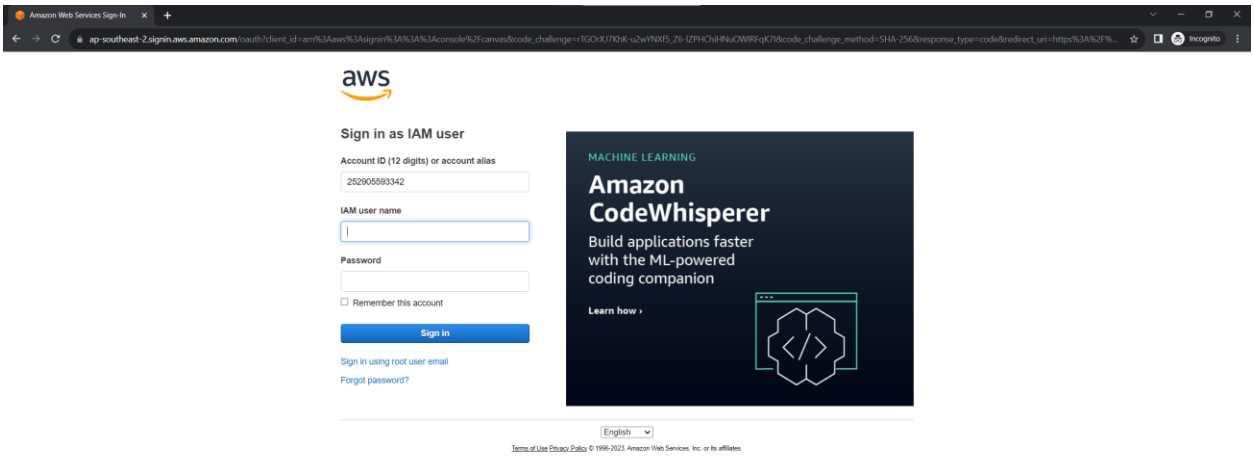
This link can be used to sign-in to the AWS Account you are currently using.



Copy the **Sign-in URL for IAM users in this account** to a text editor.

Open a private (Incognito) window.

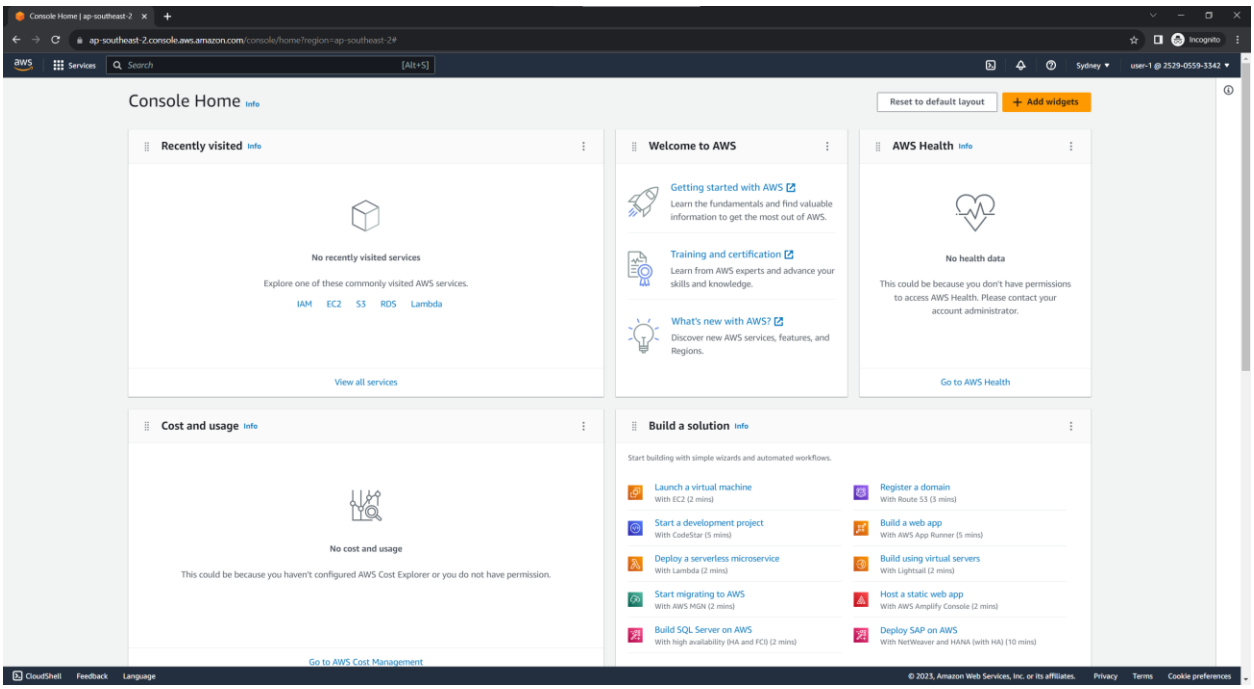
Paste the **IAM users sign-in** link into the address bar of your private browser session and press **Enter**.



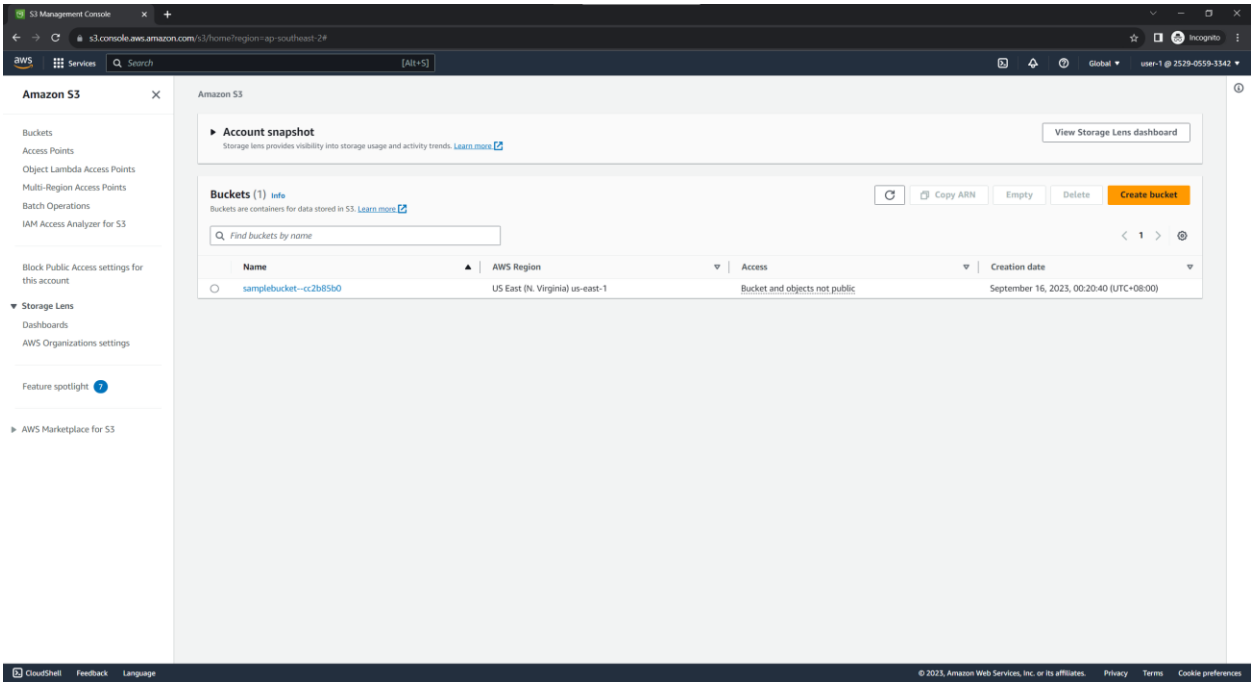
Next, you will sign-in as **user-1**, who has been hired as your Amazon S3 storage support staff.

Sign-in with:

- **IAM user name**: user-1
- **Password**: Lab-Password1



In the **Services** menu, choose **S3**.

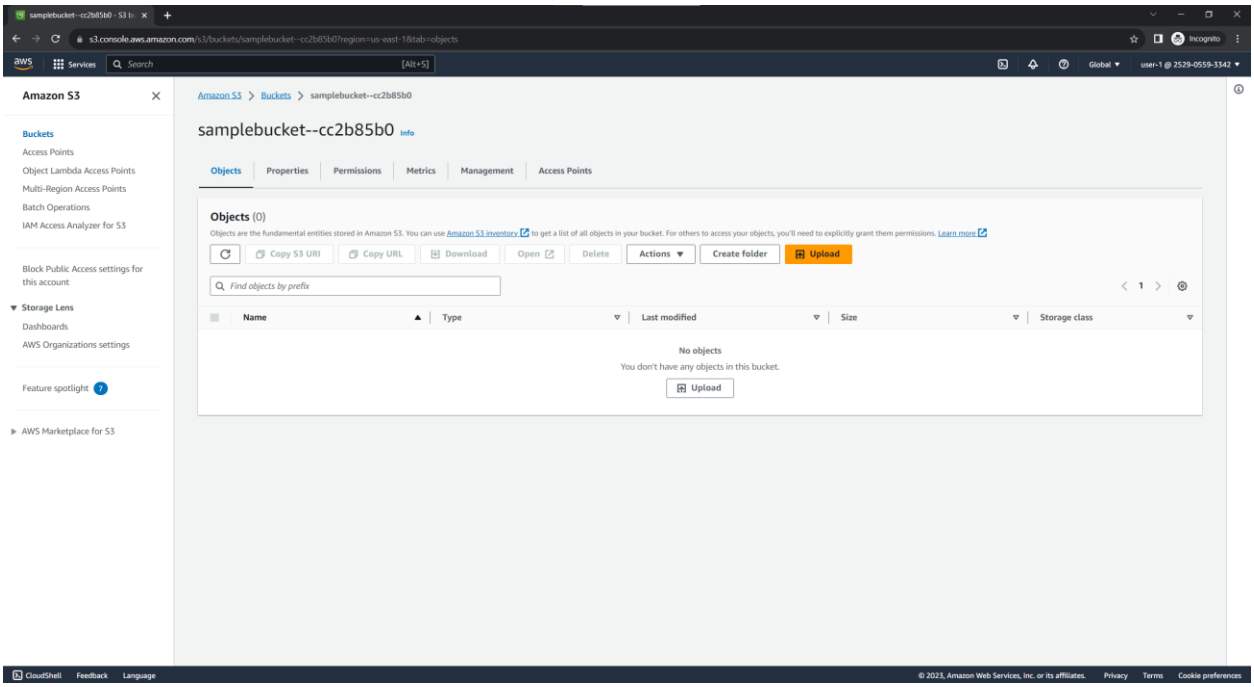


Choose the name of the bucket that exists in the account and browse the contents.

Since your user is part of the **S3-Support** Group in IAM, they have permission to view a list of Amazon S3 buckets and the contents.

Note: The bucket does not contain any objects.

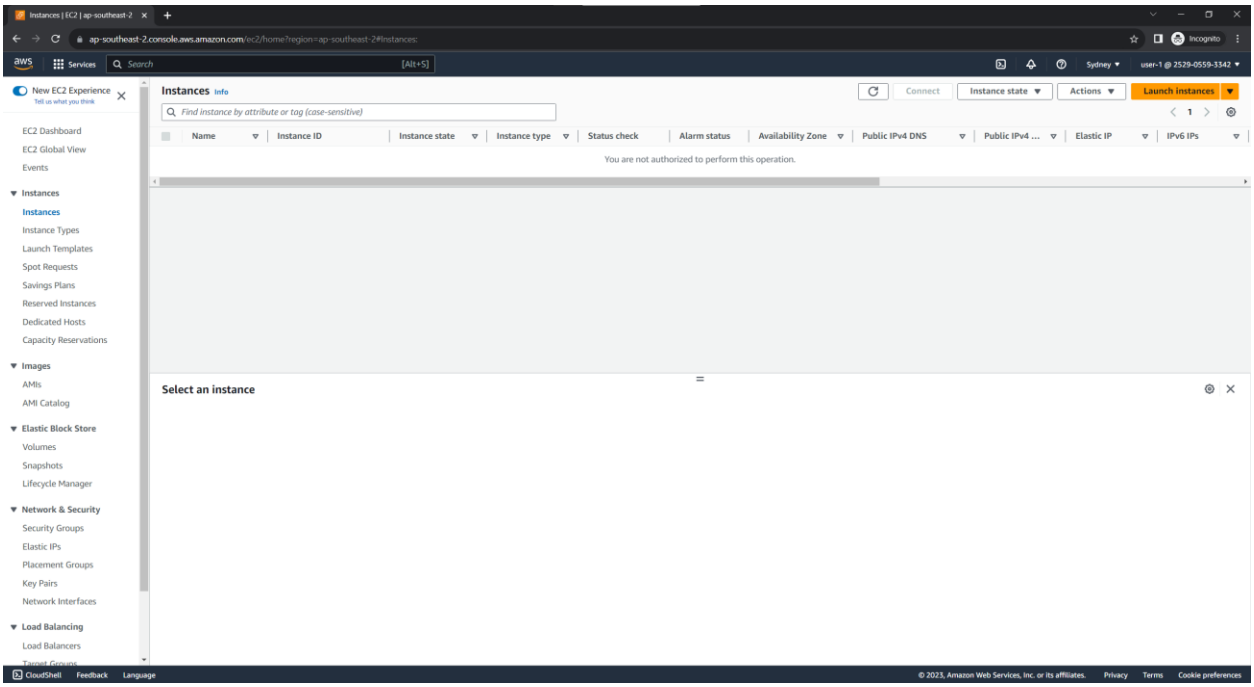
Now, test whether they have access to Amazon EC2.



In the Services menu, choose EC2.

In the left navigation pane, choose Instances.

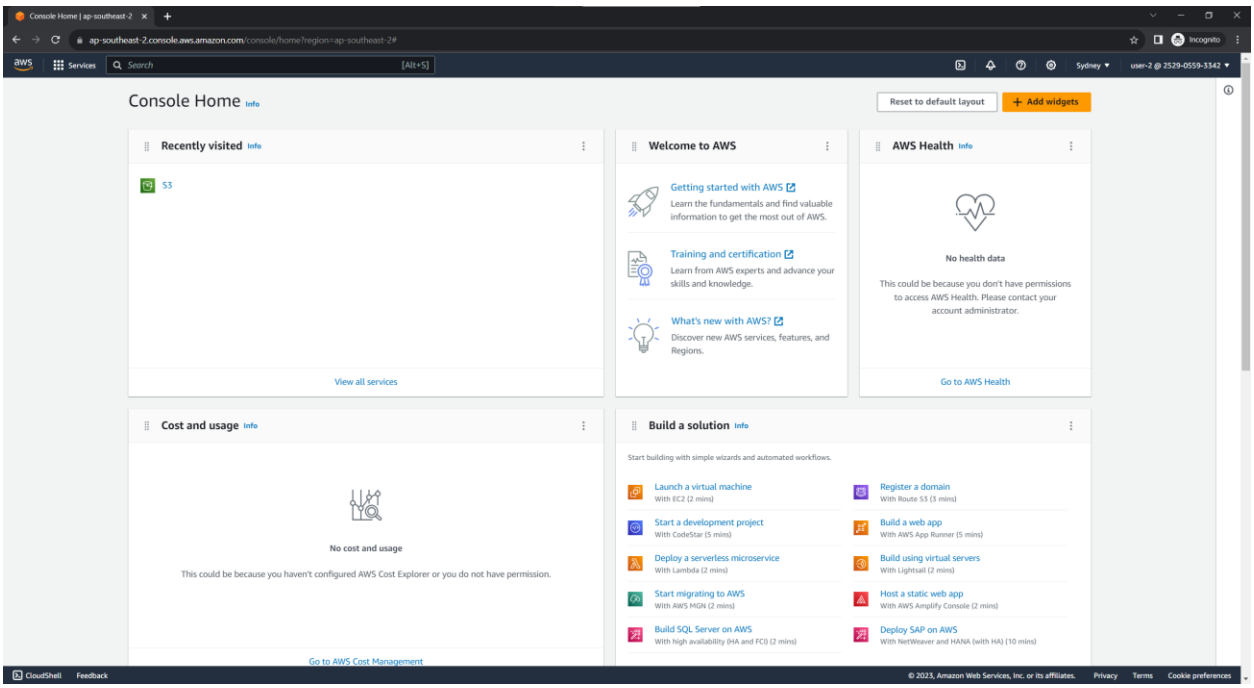
You cannot see any instances. Instead, you see a message that states You are not authorized to perform this operation. This is because this user has not been granted any permissions to access Amazon EC2.



You will now sign-in as **user-2**, who has been hired as your Amazon EC2 support person.

Sign-in with:

- **IAM user name**: user-2
- **Password**: Lab-Password2



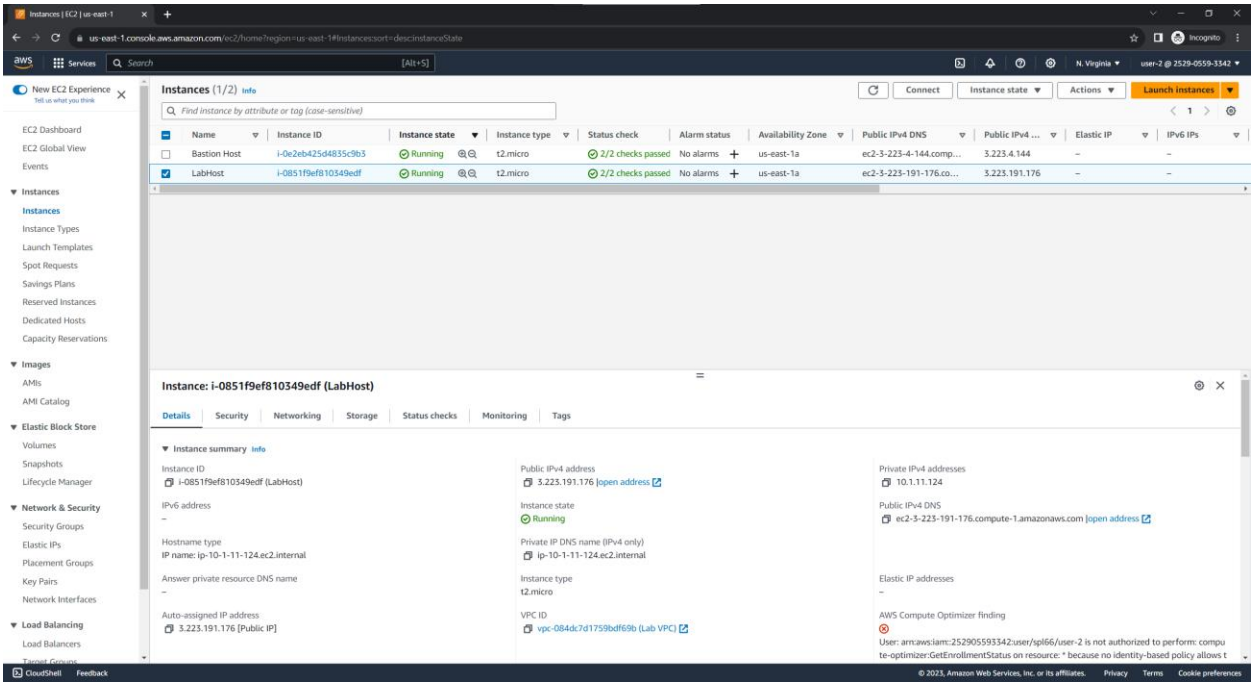
In the **Services** menu, choose **EC2**.

In the navigation pane on the left, choose **Instances**.

You are now able to see an Amazon EC2 instance because you have Read Only permissions. However, you will not be able to make any changes to Amazon EC2 resources.

If you cannot see an Amazon EC2 instance, then your Region may be incorrect. In the top-right of the screen, pull-down the Region menu and select the region that you noted at the start of the lab (for example, **N. Virginia**).

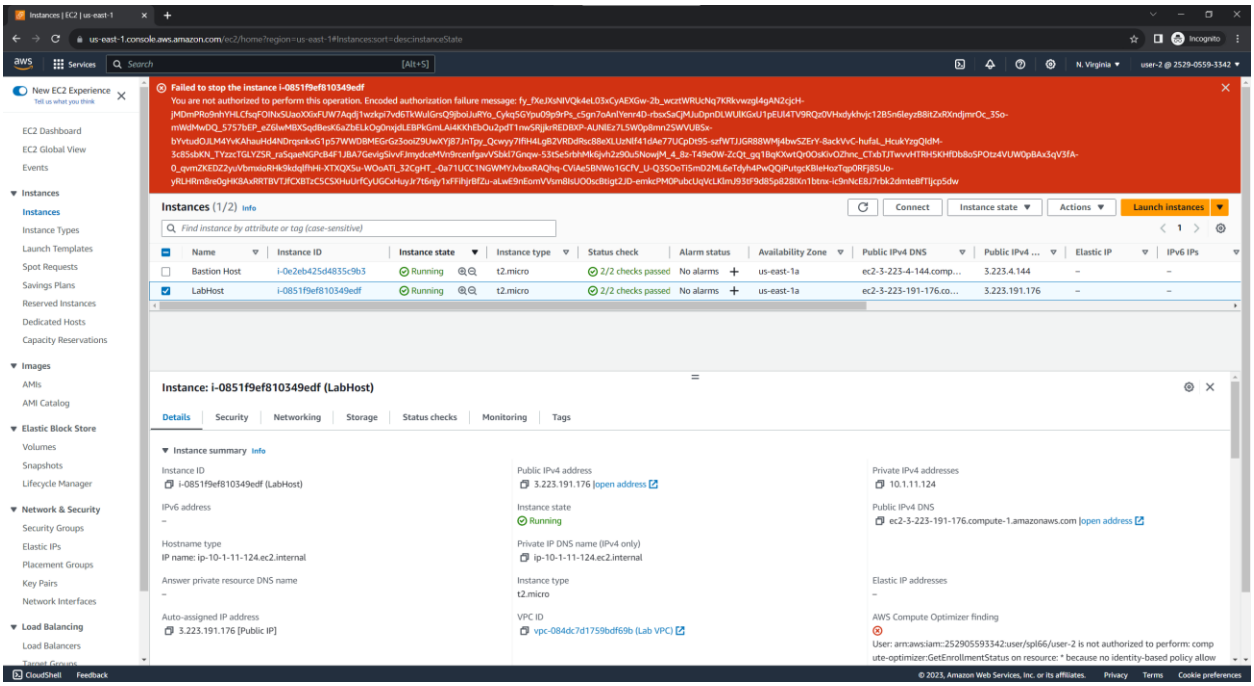
Select the instance named *LabHost*.



In the **Instance state** menu above, select **Stop instance**.

In the **Stop Instance** window, select **Stop**.

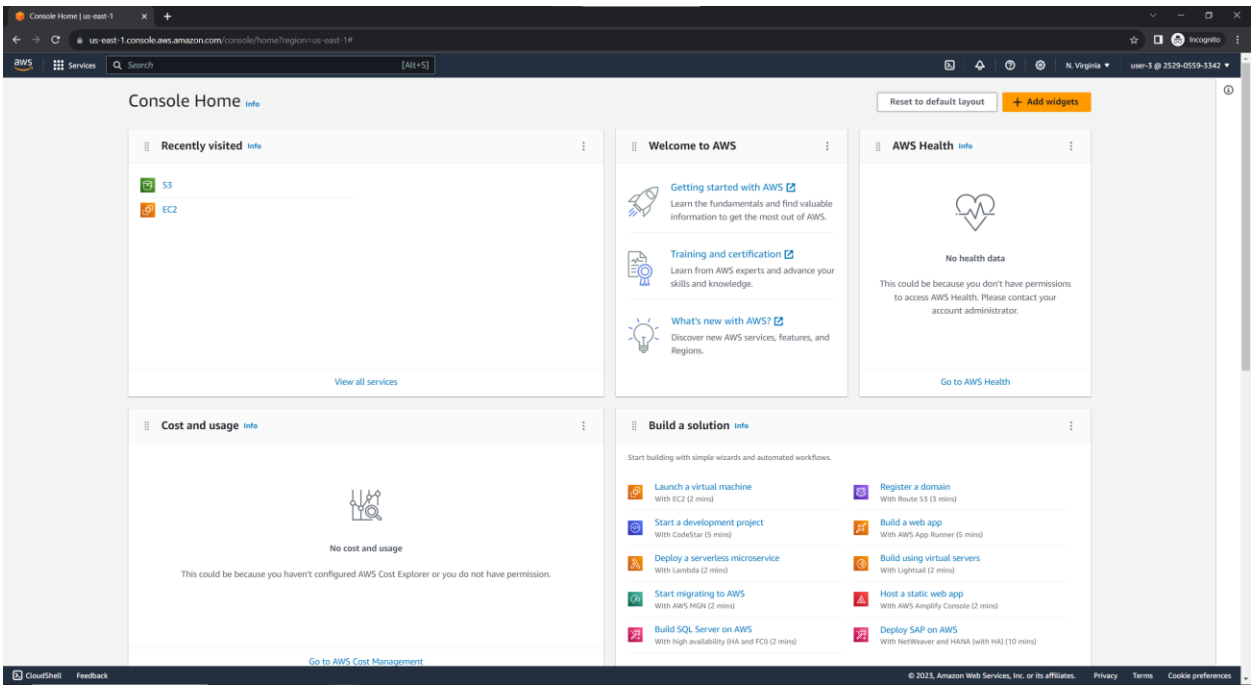
You will receive an error stating You are not authorized to perform this operation. This demonstrates that the policy only allows you to view information, without making changes.



You will now sign-in as **user-3**, who has been hired as your Amazon EC2 admin.

Sign-in with:

- **IAM user name**: user-3
- **Password**: Lab-Password3

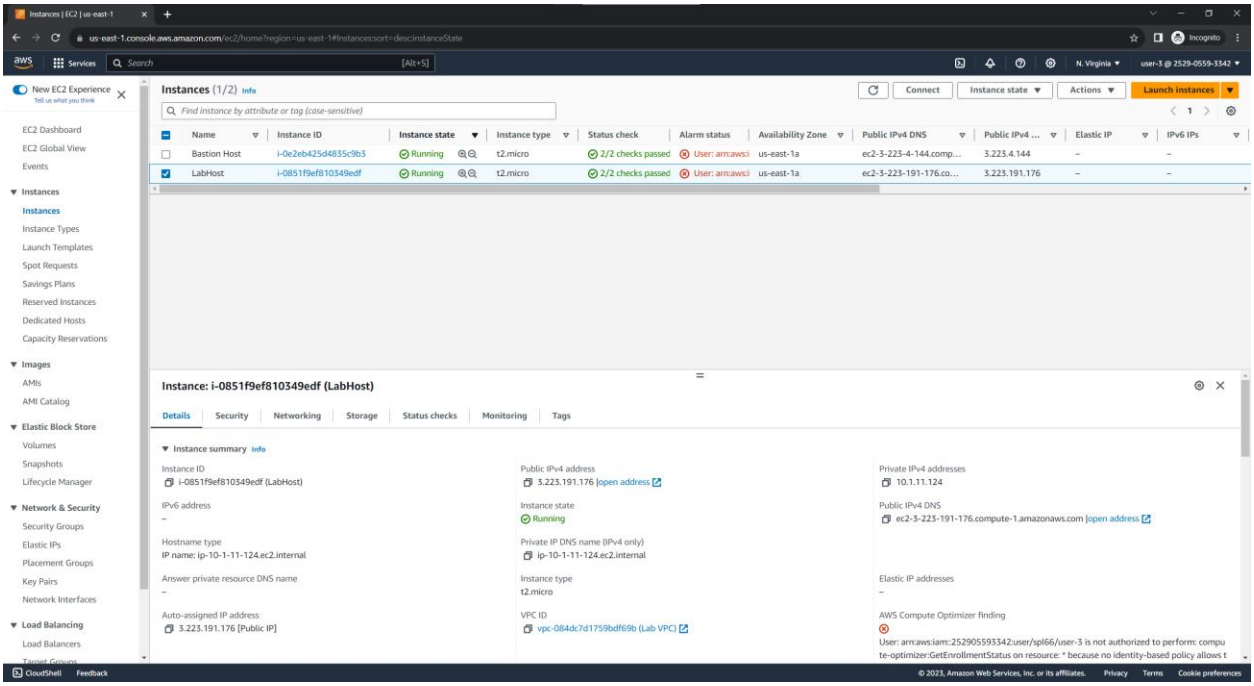


In the **Services** menu, choose **EC2**.

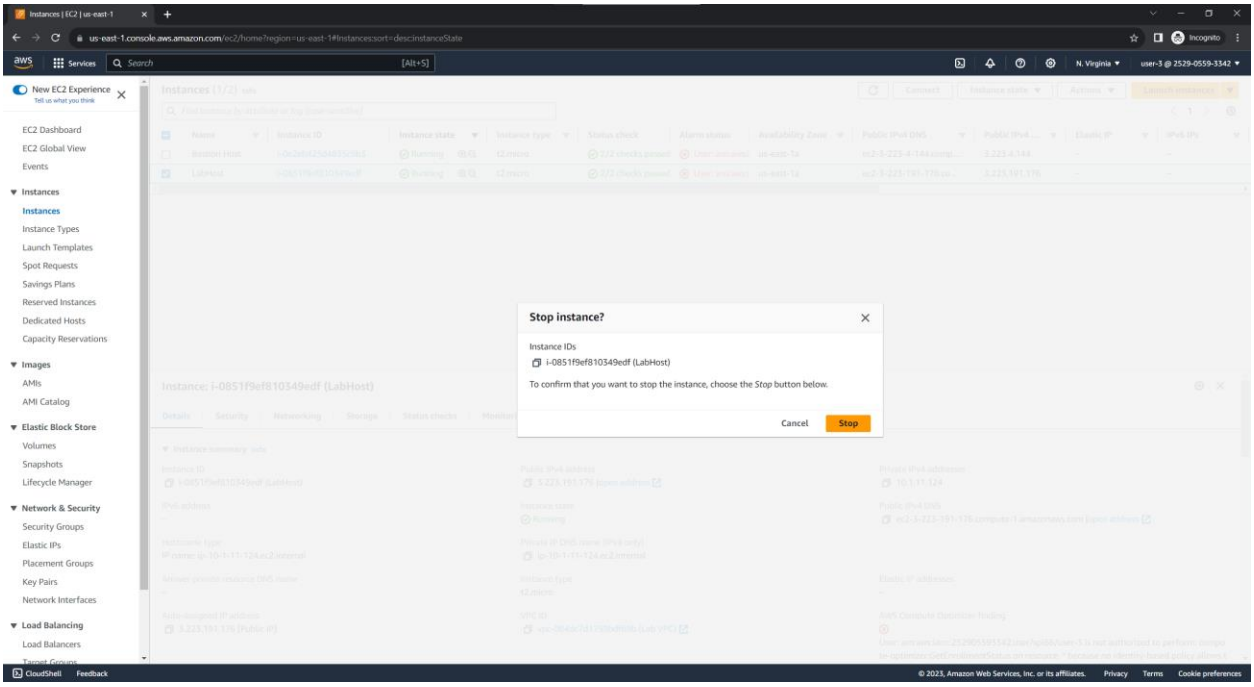
In the navigation pane on the left, choose **Instances**.

As an EC2 Administrator, you should now have permissions to Stop the Amazon EC2 instance.

Select the instance named *LabHost*.

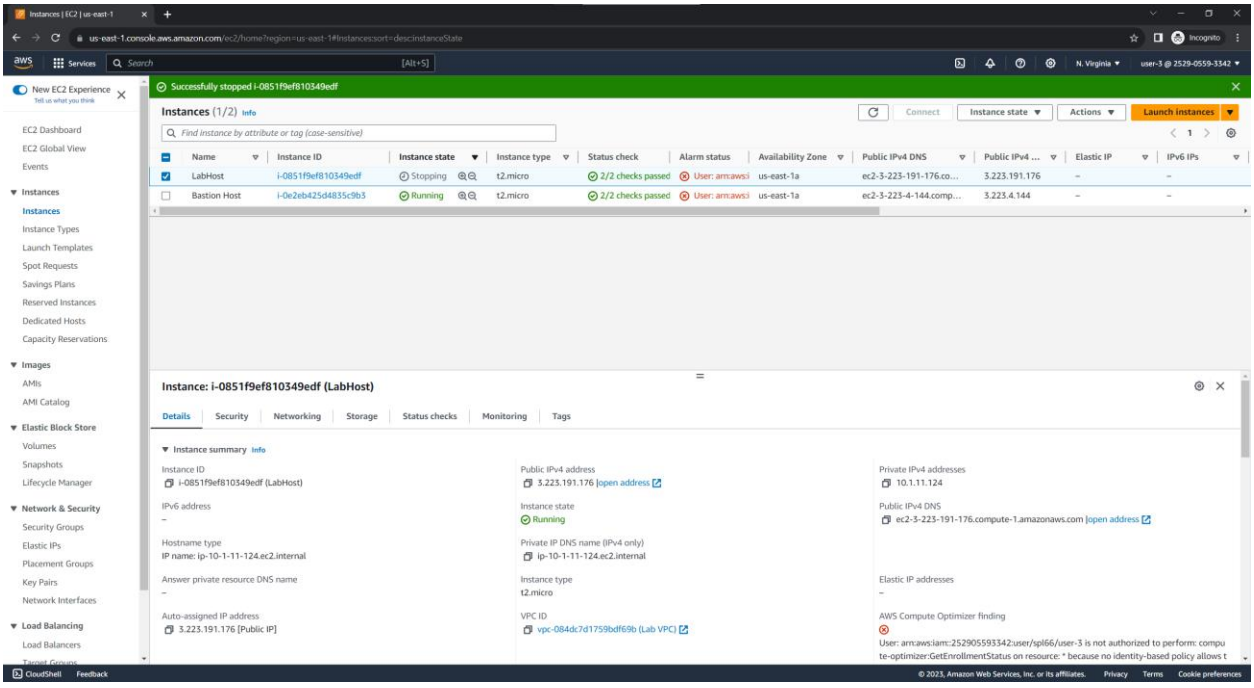


In the **Instance state** menu, choose **Stop instance**.



In the **Stop instance** window, choose **Stop**.

The instance will enter the stopping state and will shut down.



Close your private browser window.

Answer the following questions:

1. What AWS Services were used and how were they utilized?

The Amazon console was used to assign a role for each user such as the S3 support, EC2 support and EC2 admin.

2. In this lab, what is the difference in terms of access rights do users and groups have?

Each group has different policies and permission depending on what were allowed for that group, for example, in the S3 support group, they can only access the S3 buckets but not the EC2 instances. It's also the same for the EC2 support group

3. What is/are the effects of policies on services access?

If a user is in a group and tried to access a service, AWS will check the policies attached to that group and if the policy allows the user to access that service, the access will be granted. Otherwise, the user is denied access.

4. Is it possible to assign roles to multiple users? Why or why not?

Yes. By assigning roles to multiple users, you can centralize the management of permissions and make it easier to make changes. It also allows the users to access multiple services they need to do their jobs

5. What are Managed Policies and how does it affect users and groups?

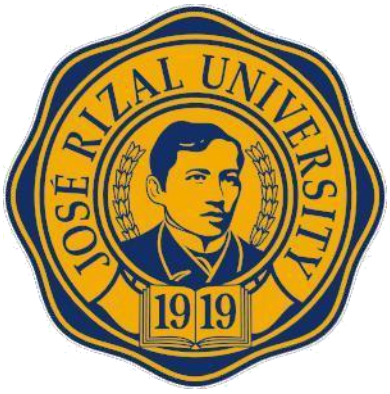
Managed policies are standalone policies that provide permissions for many common use cases. Managed policies are attached to IAM users, groups, and roles to grant or deny permissions. Managed policies can define which services and actions users and groups can access. It can also restrict access to specific resources within a service. Overall, it is used to control access to specific features within a service.

6. Is user-1 allowed to configure a new EC2 instance? Why? What about user-2 store data to an Amazon S3 bucket? What access rights does user-2 has?

User-1 is not allowed to configure a new EC2 instance because he has no access to EC2 instances. User-2 is also not allowed to store data to an Amazon S3 bucket because he has no access to S3 storage, he only has access to EC2 instances.

7. What are your key takeaways from this lab activity?

Assigning roles to multiple people would be so much easier and more organized rather than creating multiple users and assigning each one of them their respective roles.



Jose Rizal University College of

Computer Studies Engineering

Computer Engineering Department

CPE C405 – EMERGING TECHNOLOGIES in CPE

CREATE YOUR OWN VPC

SUBMITTED BY:

Pines, Exiquiel John A.

Ursabia, Elizher James P.

SUBMITTED TO:

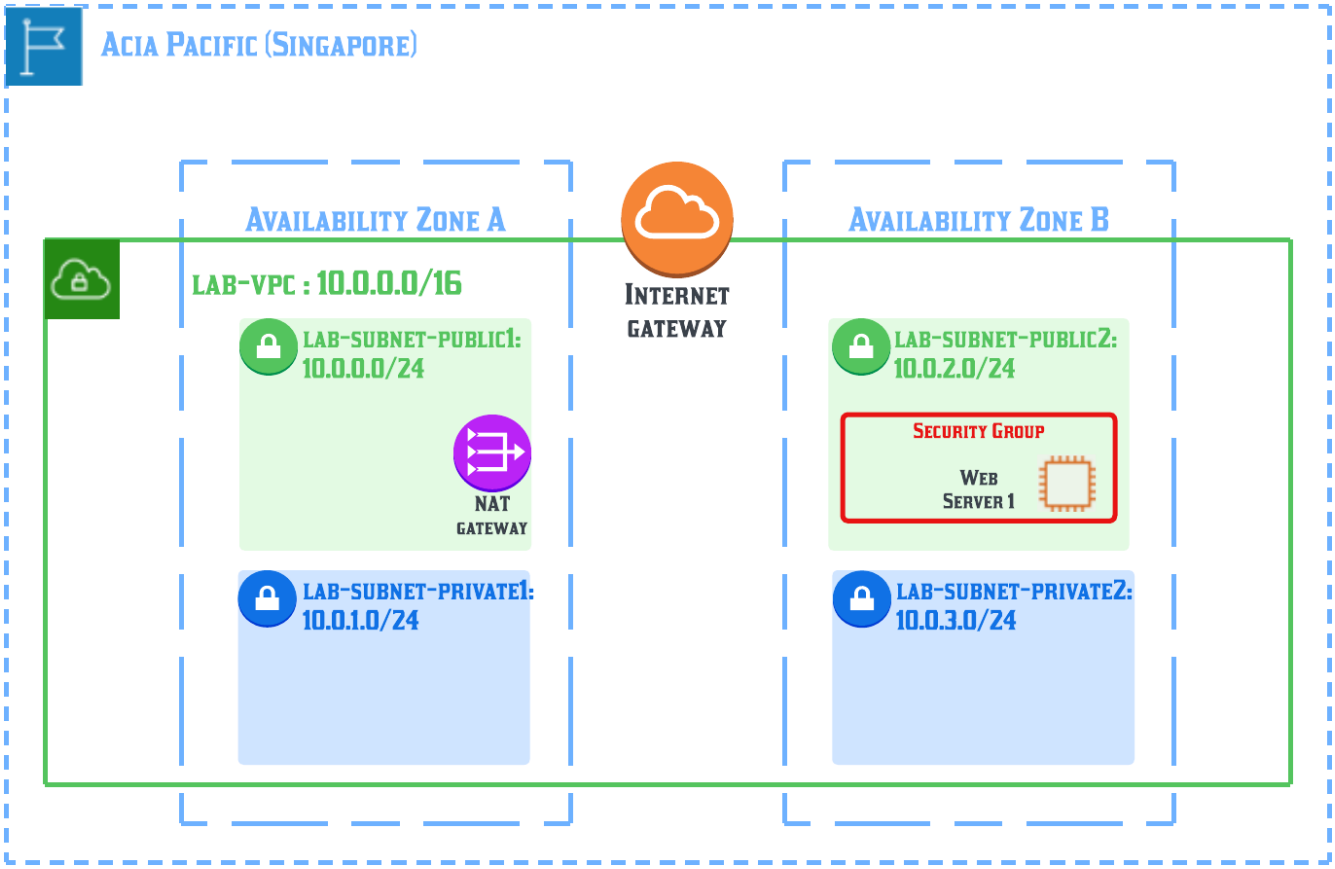
Engr. Rosalina Estacio

BSCpE – 401G

DATE SUBMITTED:

October 3, 2023

DIAGRAM



Our diagram shows an Amazon VPC Architecture with two Availability Zones. The VPC has two public subnets and two private subnets in each Availability Zone. The public subnets are connected to an internet gateway which allows the resources to access the internet. The private subnets are not directly connected to the internet but can still connect to the internet using the NAT gateway. Our architecture has five components which is the VPC, the subnets, the internet gateway, the NAT gateway and the security groups. The web server 1 is an EC2 instance that is used in the public subnet. This web server has public IP address which can be accessed directly from the internet.

Link:

https://lucid.app/lucidchart/abda703c-2ffb-4e04-bf2c-03b19f3dbfc3/edit?viewport_loc=-815%2C-86%2C2990%2C1202%2C0_0&invitationId=inv_d00d1881-e001-4b87-afcf-0d3bcad5c862

Jose Rizal University

College of Computer Studies Engineering

Computer Engineering Department

PT3.2 - Lab2 - Build your VPC & Launch Web Server

CPE C405 – EMERGING TECHNOLOGIES IN CPE

Submitted by:

Exiquiel John A. Pines

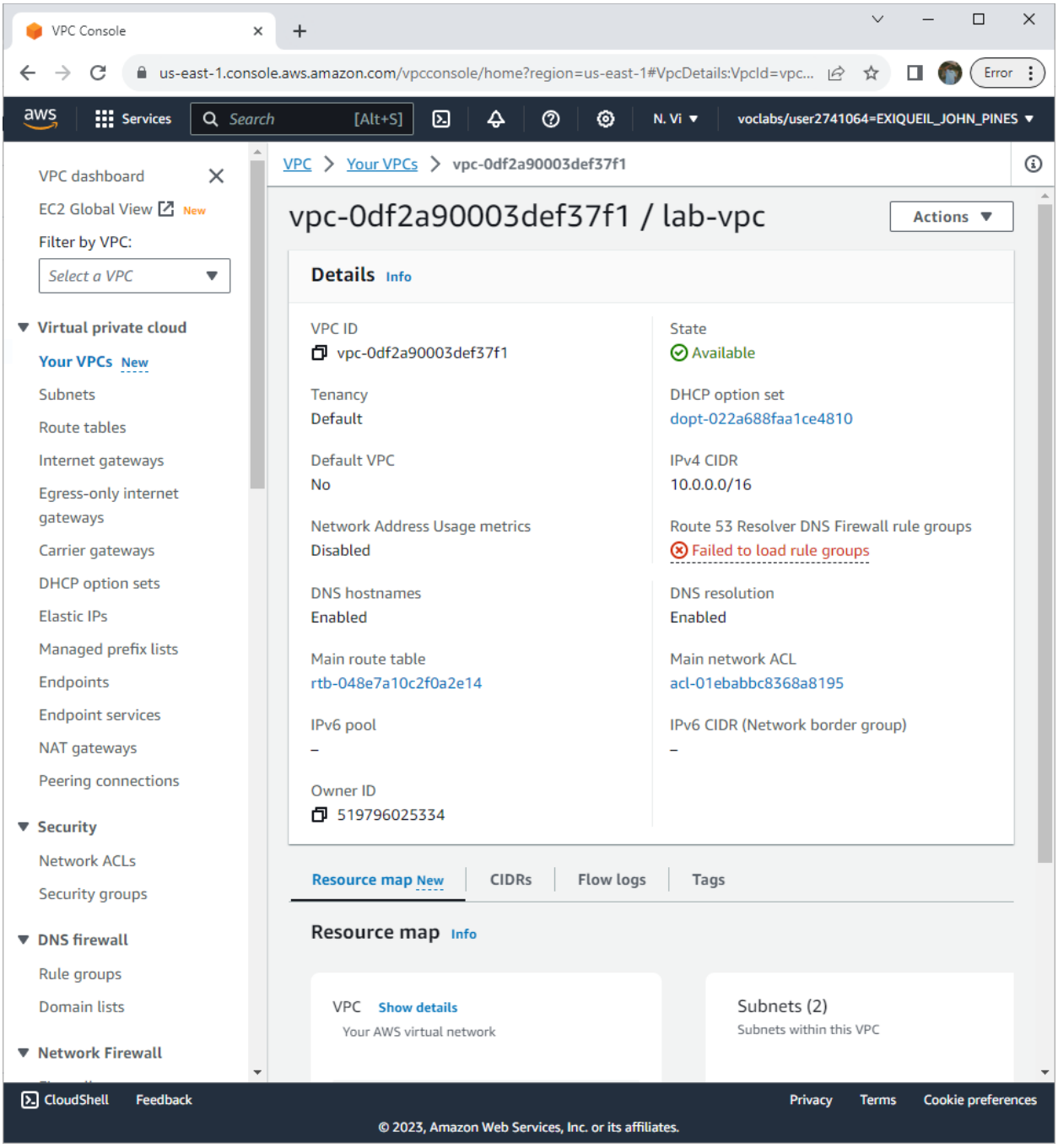
Submitted to:

Engr. Rosalina Estacio

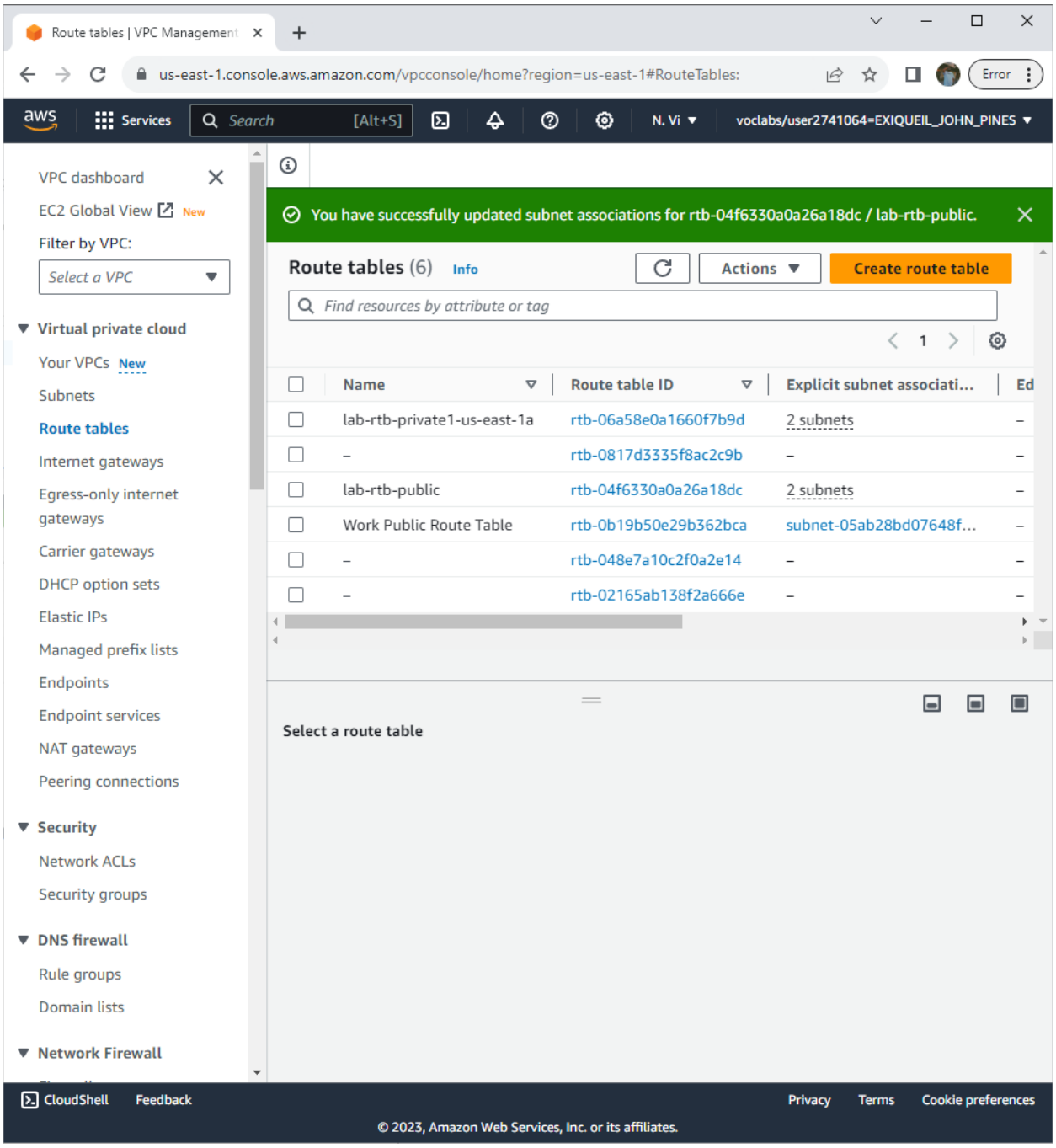
Date Submitted:

October 6, 2023

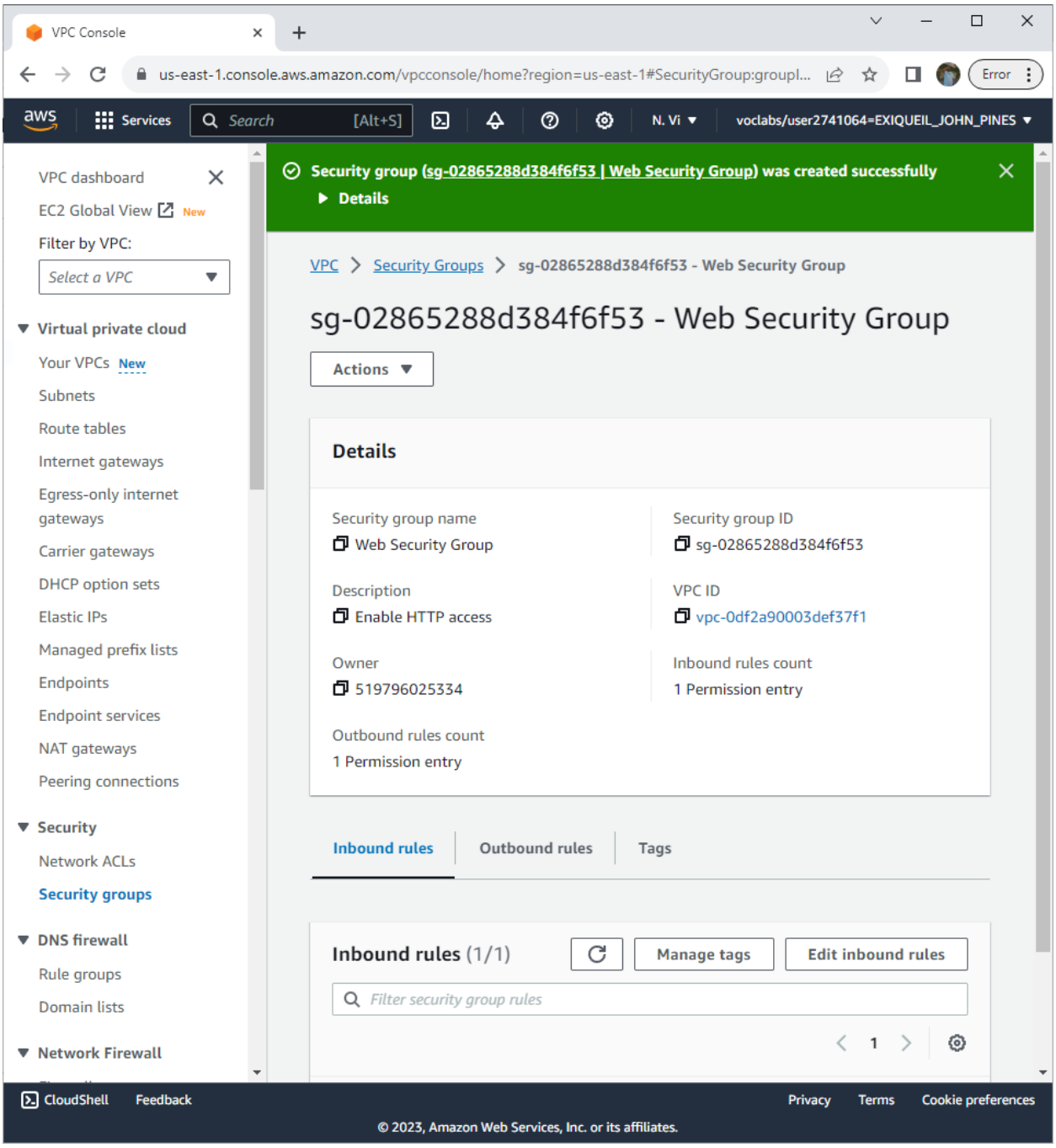
Task 1: Create Your VPC



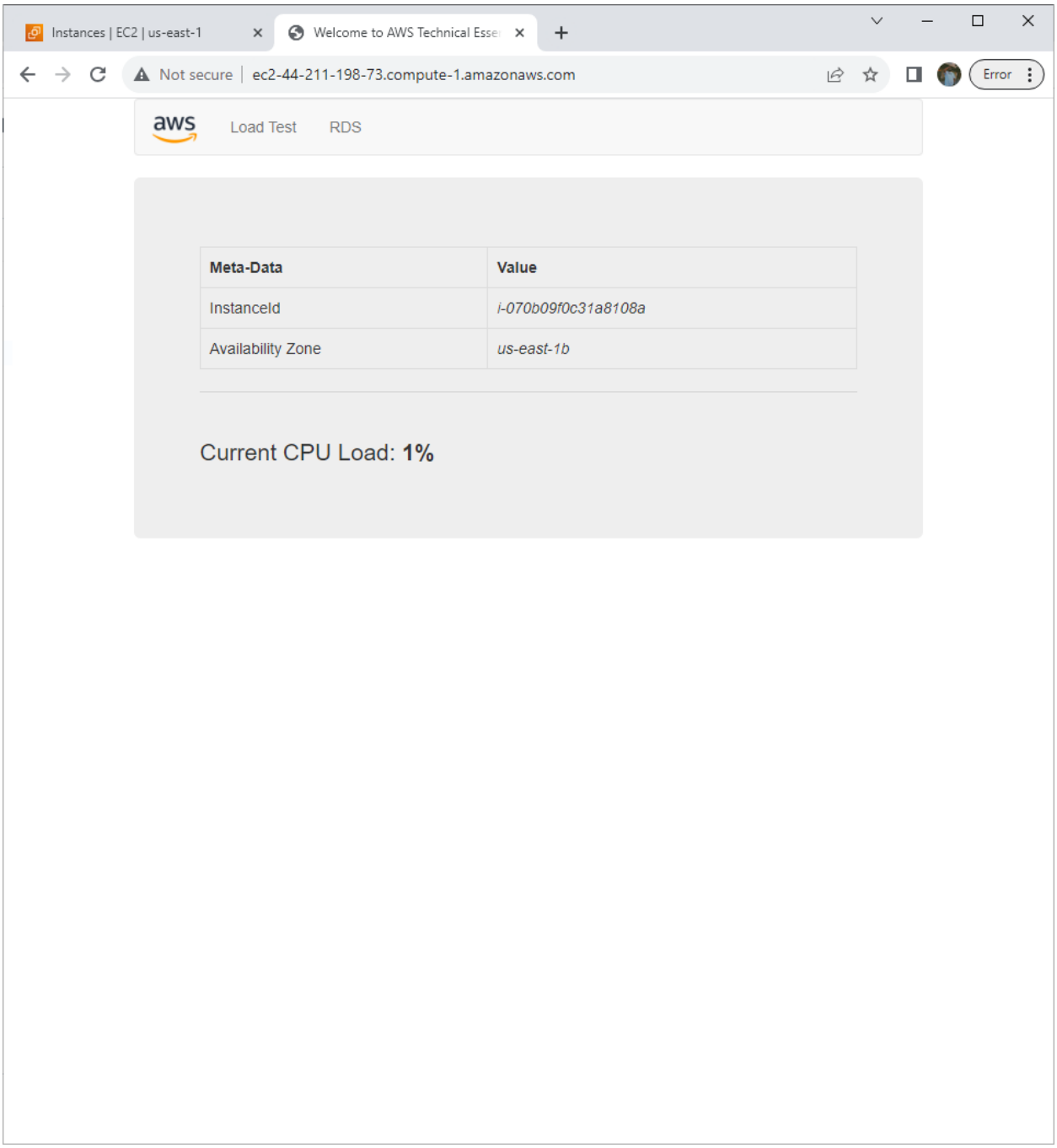
Task 2: Create Additional Subnets



Task 3: Create a VPC Security Group



Task 4: Launch a Web Server Instance



1. Why do you need to configure a NAT gateway for the Private subnets?

In a virtual private cloud (VPC), setting up a Network Address Translation (NAT) gateway for private subnets is a standard procedure. Enhancing security, preserving public IP addresses, streamlining routing, and facilitating outbound internet access for resources that require it while keeping a private network architecture are all benefits of configuring a NAT gateway for private subnets.

2. What is the purpose of setting Associations?

Setting associations is a crucial component of automation, cloud management, and system administration. It enables automation and orchestration, boosts security, enables the structured organization of resources and configurations, and contributes to the reliable and effective operation of systems and applications. The precise goals of association setting will vary depending on the technology or instrument being used and the anticipated results.

3. What scenario would you create in case you configure the NAT gateway to the public subnet and private subnets are routed with Internet gateway?

4. What is the purpose of a security group? Why is it necessary to attach it to an instance?

Controlling traffic to and from instances (virtual computers) within a Virtual Private Cloud (VPC) or network is the job of a security group. To enforce these guidelines and offer the appropriate degree of network security and isolation for your applications and infrastructure, you must attach a security group to an instance. The security posture of your cloud-based systems is improved by attaching security groups at the instance level, giving you fine-grained control over the network traffic for each instance.

5. What is an Amazon Machine Image (AMI)? What is its equivalent in setting up an typical VPN (not cloud based)

An (AMI) is a pre-configured virtual machine image used to create instances within the cloud. An AMI has all the data required to start a virtual machine, such as the configuration settings, application software, and operating system.

6. What are your key takeaways after performing Lab2? How will you apply what you learned?

Jose Rizal University

College of Computer Studies Engineering

Computer Engineering Department

PT4.1 - Lab 3 - Elastic Compute

CPE C405 – EMERGING TECHNOLOGIES IN CPE

Submitted by:

Exiquiel John A. Pines

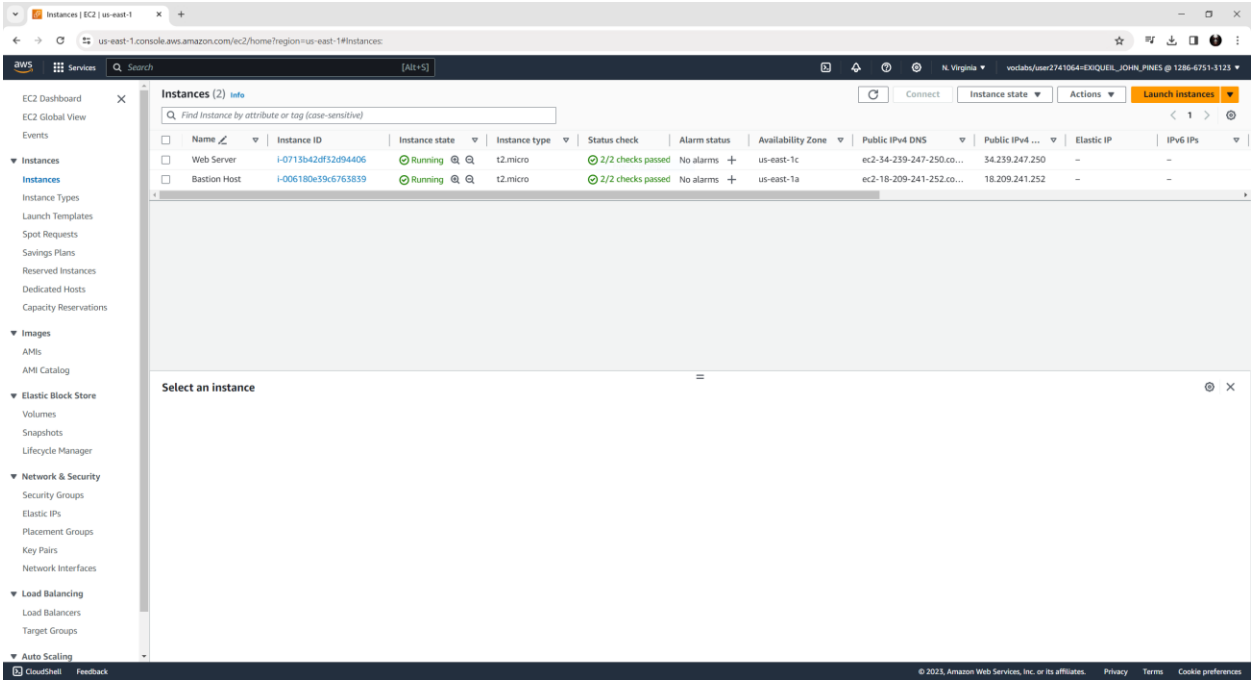
Submitted to:

Engr. Rosalina Estacio

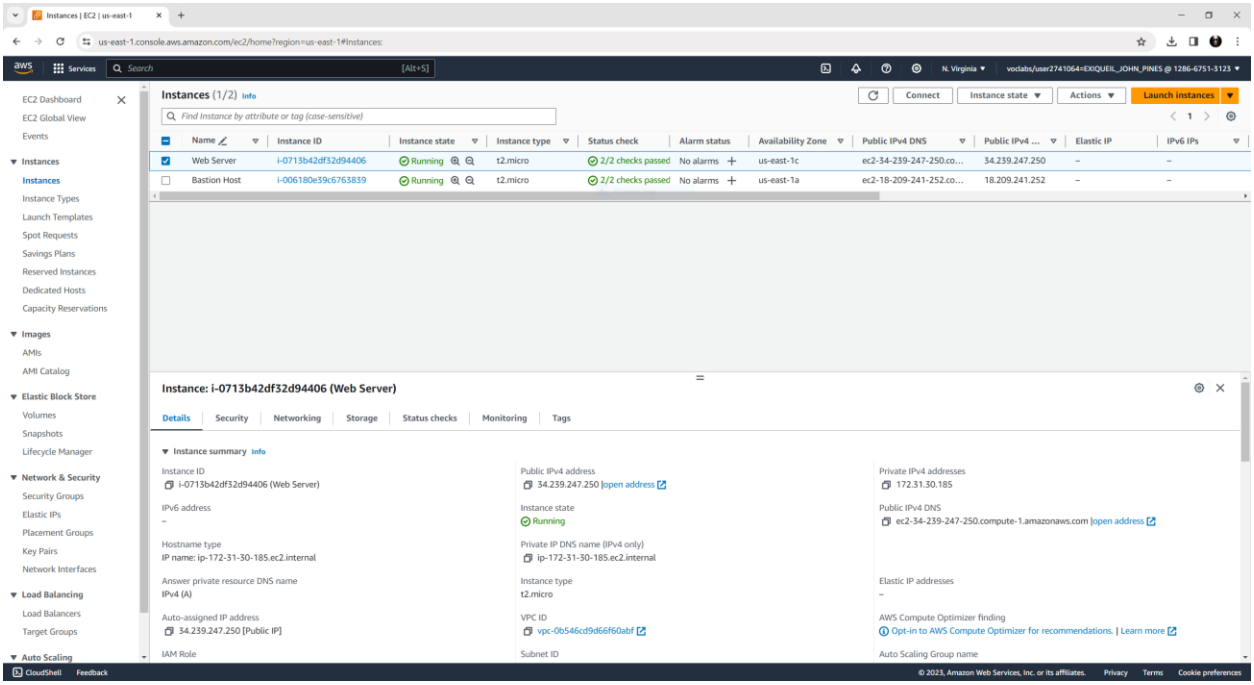
Date Submitted:

October 20, 2023

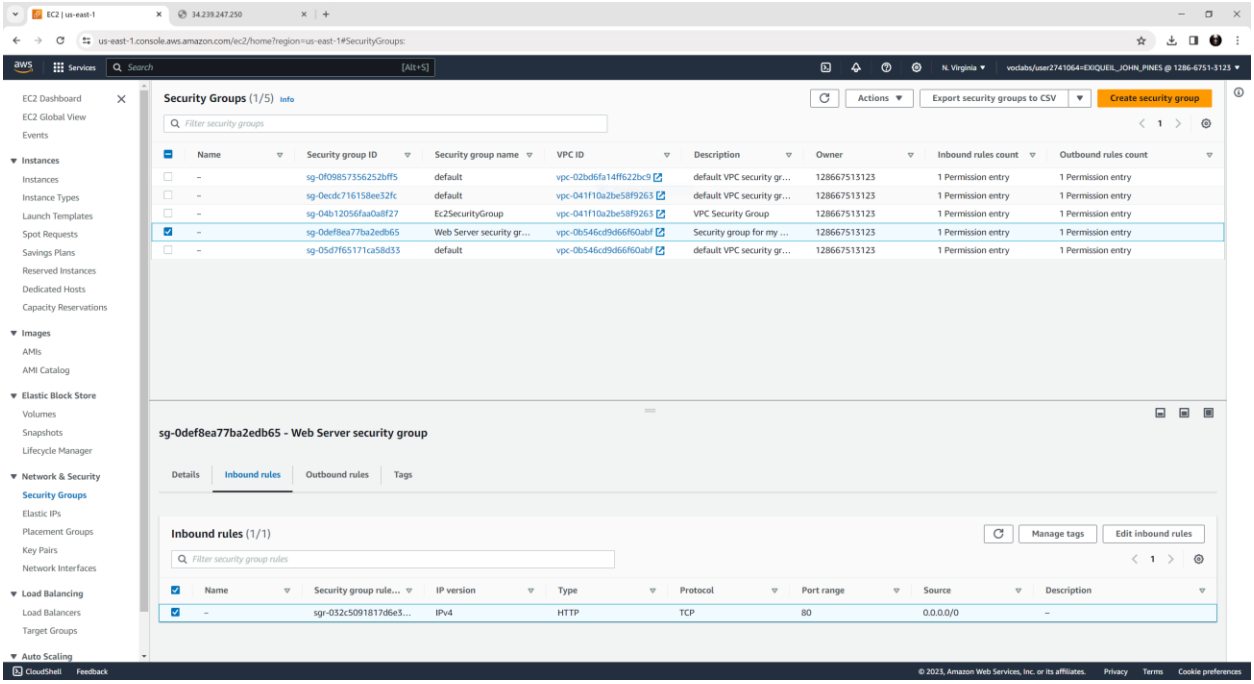
Task 1: Launch Your Amazon EC2 Instance



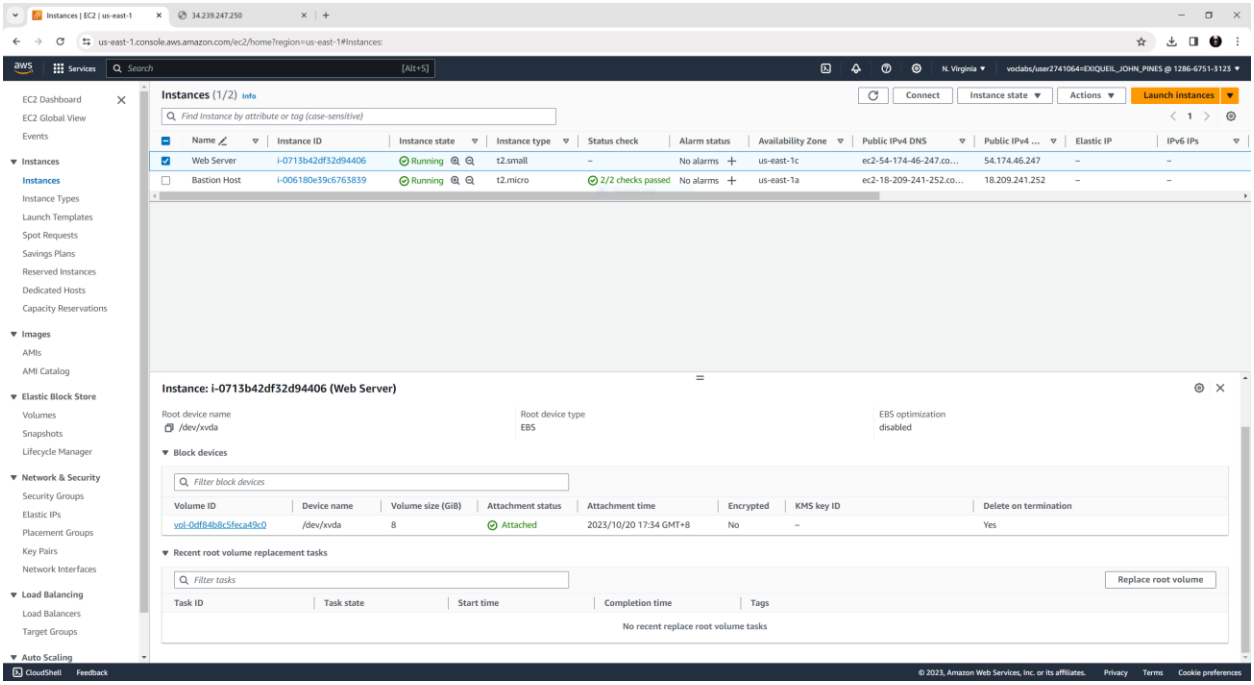
Task 2: Monitor Your Instance



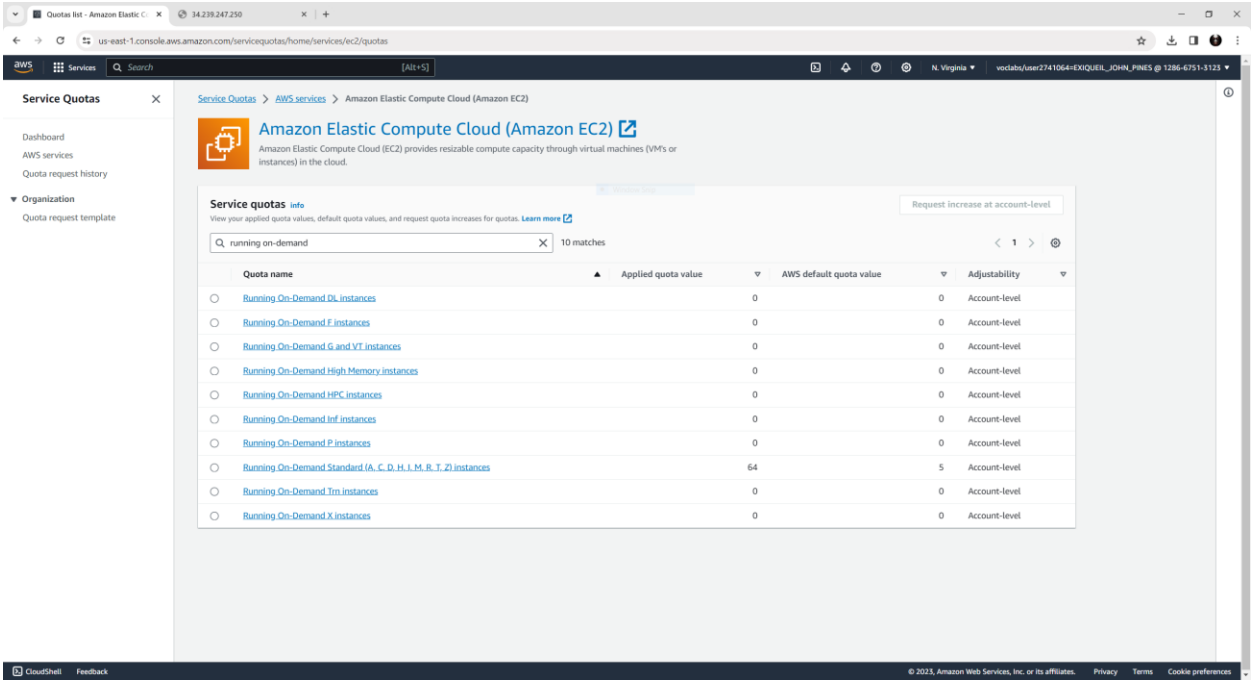
Task 3: Update Your Security Group and Access the Web Server



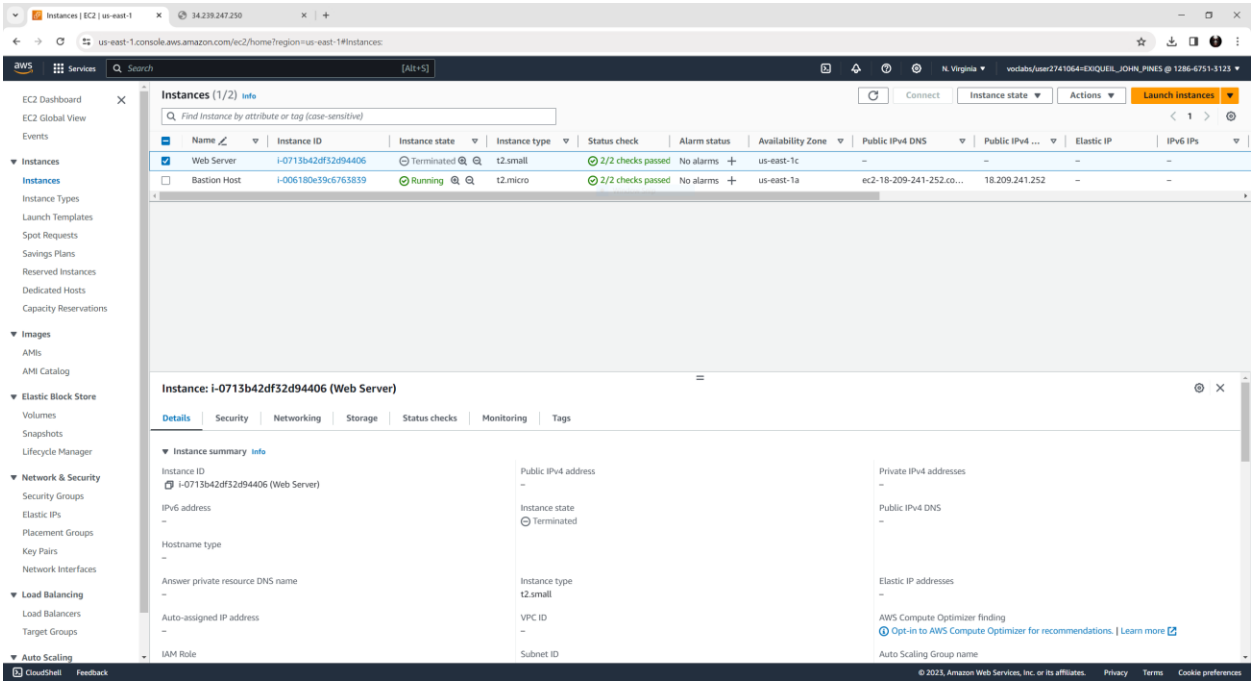
Task 4: Resize Your Instance: Instance Type and EBS Volume



Task 5: Explore EC2 Limits



Task 6: Test Termination Protection



1. Is it always necessary to use Amazon Machine Image (AMI) when launching a new EC2 instance? If user opted not to use default AMIs, what are the other options?

It's not always necessary to use an Amazon Machine Image (AMI) when launching a new Amazon EC2 instance. AMIs are essentially pre-configured templates that include an operating system and often additional software. There are various options available for customizing and selecting the right environment for your EC2 instances, depending on your needs and preferences.

2. Briefly discuss how the following concepts were applied in this lab activity:

2.1 User data

User Data in an EC2 context is a script or data that you can provide when launching an instance. It can be used to automate configuration tasks during instance initialization. It was used to perform automated installation and configuration tasks after the instance starts.

2.2 Tags

Tags are key-value pairs that you can assign to EC2 instances. In a lab setting, you can use tags to organize and categorize instances. The tag that was created in the lab activity consists of a key called Name with a value of Web Server.

2.3 Security Group

Security Groups act as virtual firewalls for EC2 instances, controlling inbound and outbound traffic. This helps in securing your instances and controlling network traffic. In the lab activity, the security group rules were removed.

2.4 System Logs

System logs, or instance logs, can be useful for diagnosing issues or monitoring the health of your instances. These logs can be essential for maintaining and optimizing your instances.

2.5 Inbound/Outbound Rules

Inbound and outbound rules are part of the Security Group configuration. In the lab, you would have defined inbound rules to specify which incoming traffic is allowed to reach your instances. Outbound rules control the traffic leaving your instances. Configuring these rules correctly is crucial for network security.

2.6 EC2 Limits

AWS has limits on the number of EC2 instances you can launch, and these limits vary by instance type and region. In the lab activity, you would have needed to be aware of these limits to ensure that you don't exceed them. If you require more instances, you might need to request a limit increase.

3. What are the ways to monitor an EC2 instance?

Monitoring an Amazon EC2 instance is crucial for maintaining its health, optimizing performance, and ensuring the security of your applications. There are several ways to monitor an EC2 instance such as, EC2 Instance Status Checks, System Logs, Security Groups and Network Flow Logs, etc.

4. If you need to resize an EC2 instance to meet specific demand, will you need to configure the instance again (security group, VPC, tags, etc)? Why or why not? Give an illustration.

When you resize an EC2 instance, you typically don't need to reconfigure most of the settings like security groups, VPC, tags, or other metadata. The reason for this is that resizing an instance usually involves changing the instance type while keeping the same operating system, configurations, and associated resources.

5. In case your business needs to deploy an AI application, what type of EC2 instance should be selected? Can you enumerate the steps in configuring the instance as an added resource to this activity?

Selecting the right EC2 instance type for deploying an AI application depends on the specific requirements of your application, including its computational and memory needs. AI workloads can vary widely, from training deep learning models to running inference on pre-trained models.

First step is to choose the appropriate EC2 instance, for AI workloads, instances with GPUs are often preferred due to their ability to accelerate AI tasks. Next is to launch an EC2 instance. After that, I will now setup a network to ensure that the instance is launched in a Virtual Private Cloud with the desired network configurations. Next is to determine the storage needs for my AI application. Then installation of OS and all necessary software are done. Then training and modeling of datasets are done inside the instances. Lastly is to test the application and verify that the AI application is functioning correctly on the EC2 instance. Additional steps are backup and data management and optimizing and fine-tuning the AI applications performance.

Jose Rizal University

College of Computer Studies Engineering

Computer Engineering Department

PT4.2 - AWS Lambda & AWS Elastic Beanstalk

CPE C405 – EMERGING TECHNOLOGIES IN CPE

Submitted by:

Exiquiel John A. Pines

Submitted to:

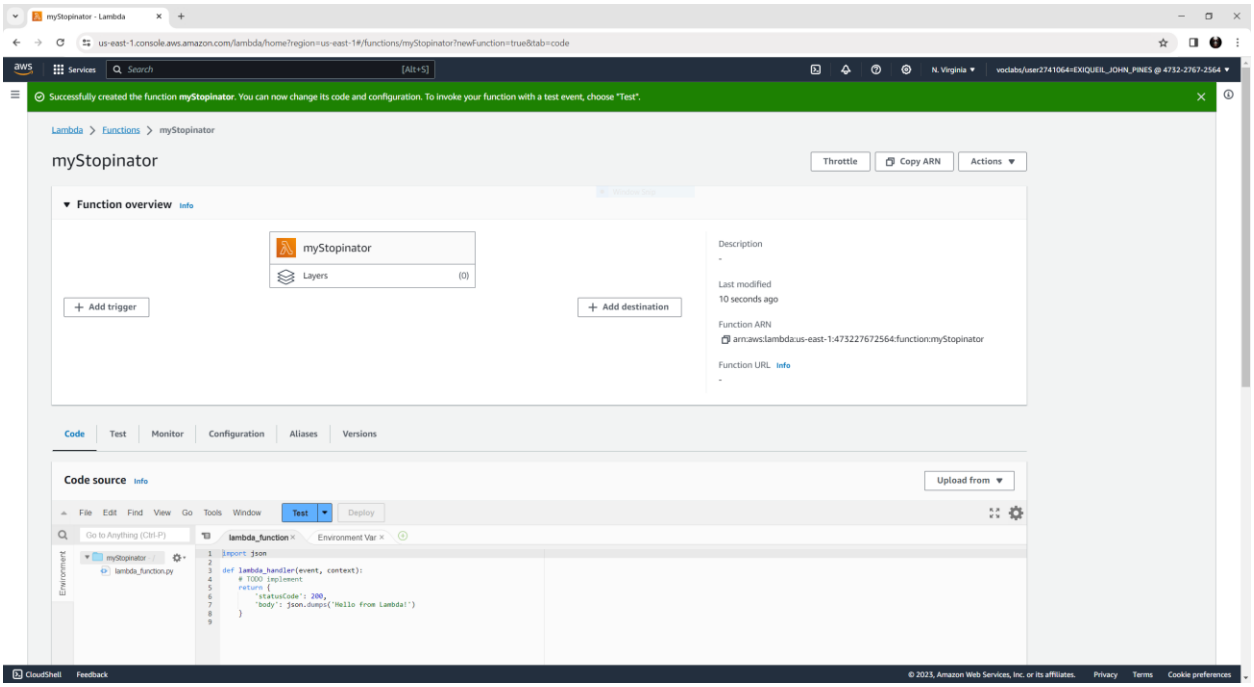
Engr. Rosalina Estacio

Date Submitted:

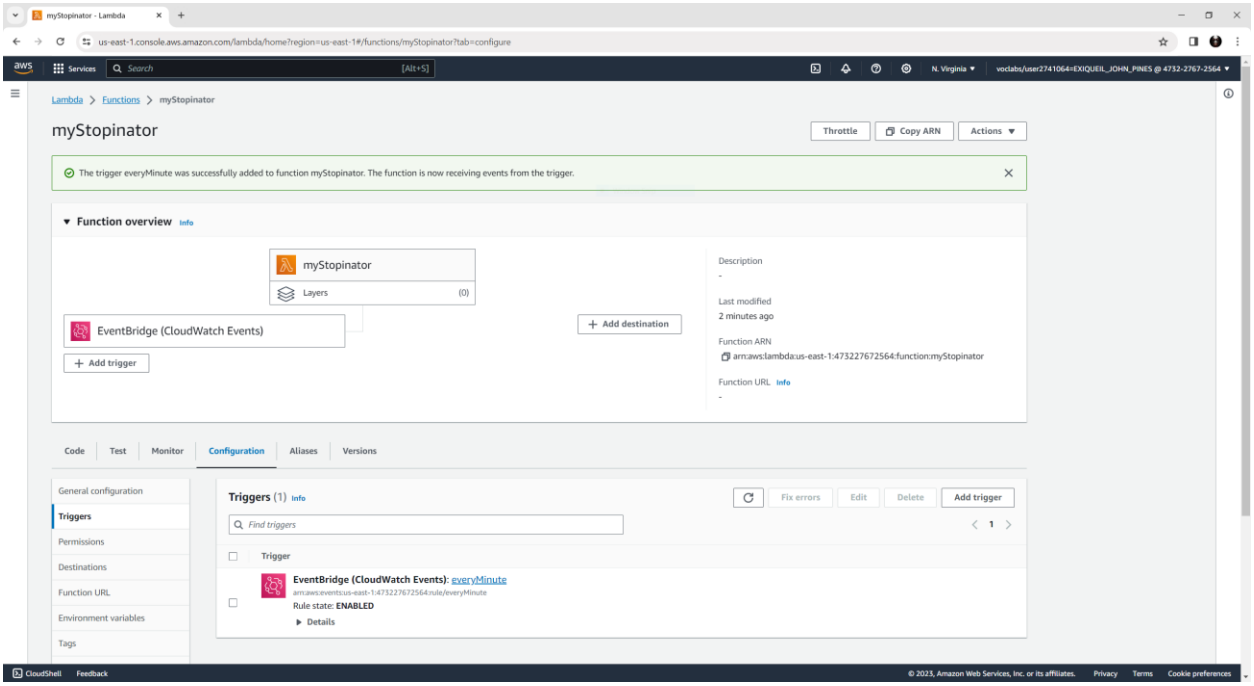
October 23, 2023

Activity: AWS Lambda

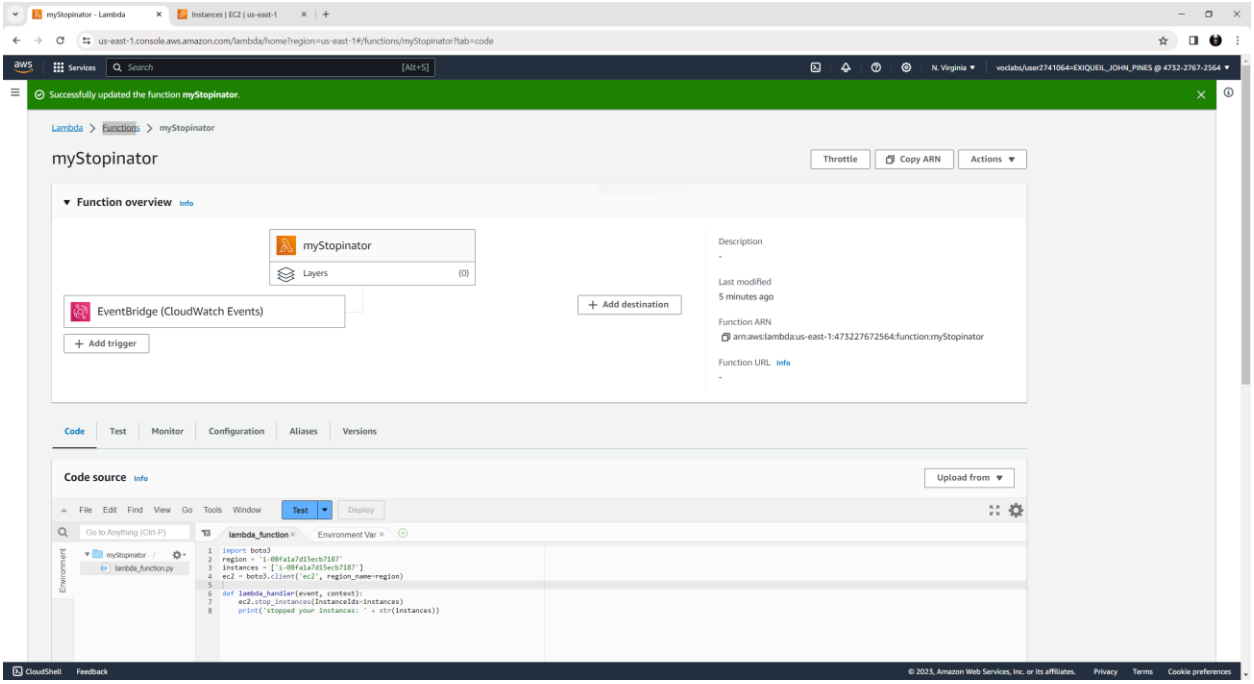
Task 1: Create a Lambda function



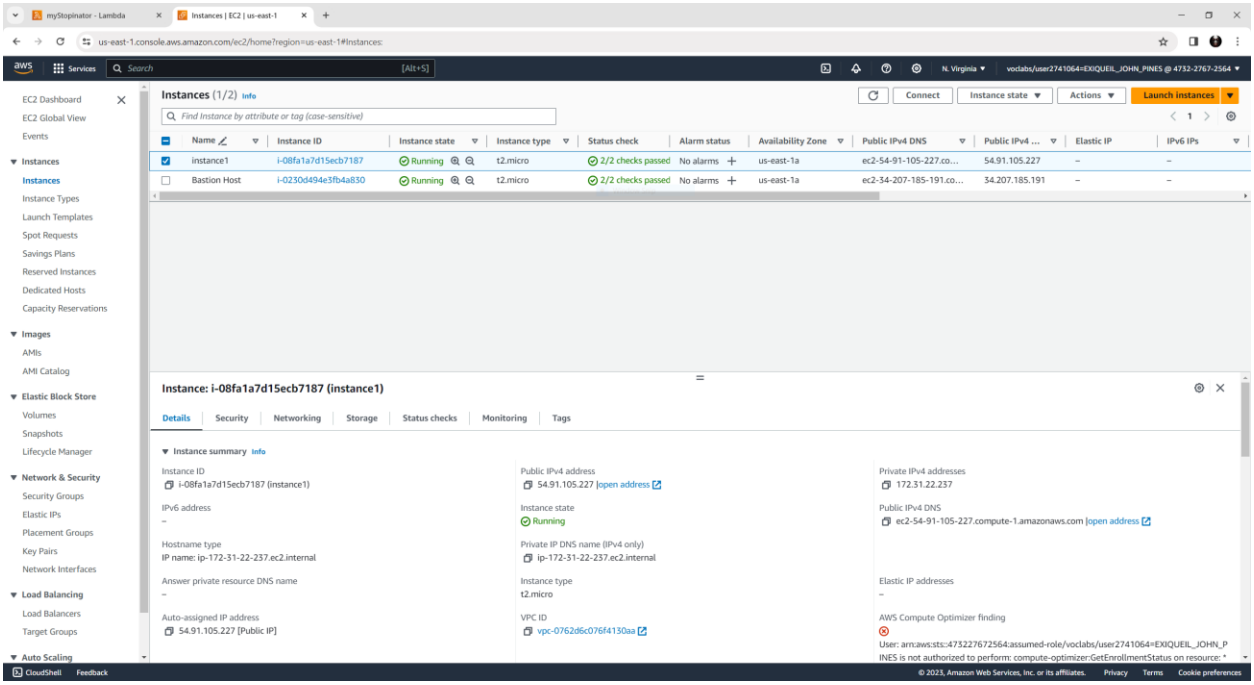
Task 2: Configure the trigger



Task 3: Configure the Lambda function



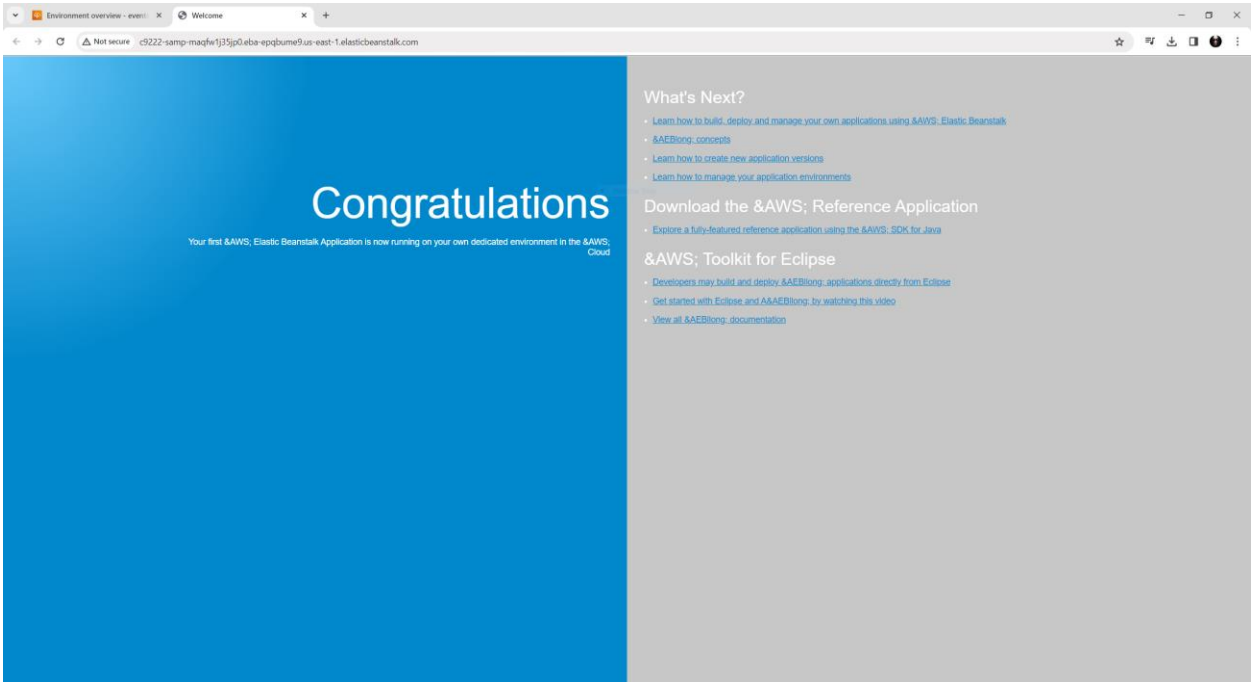
Task 4: Verify that the Lambda function worked



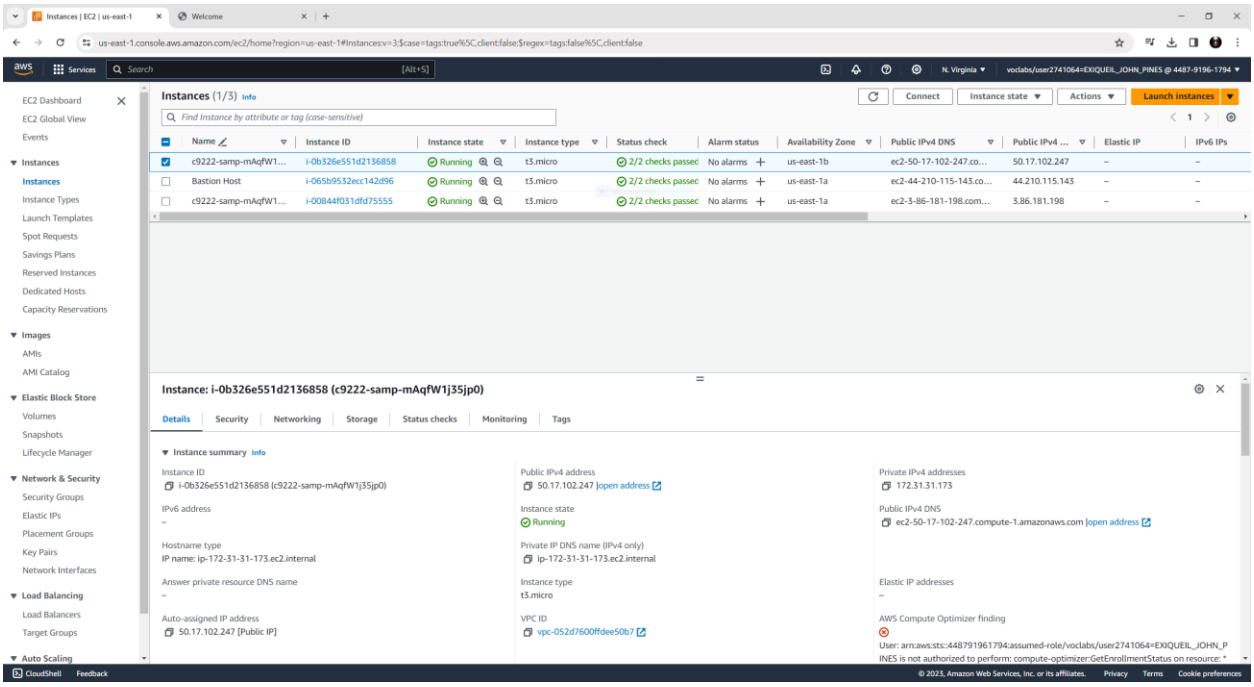
Activity: AWS Elastic Beanstalk

Task 1: Access the Elastic Beanstalk environment

Task 2: Deploy a sample application to Elastic Beanstalk



Task 3: Explore the AWS resources that support your application



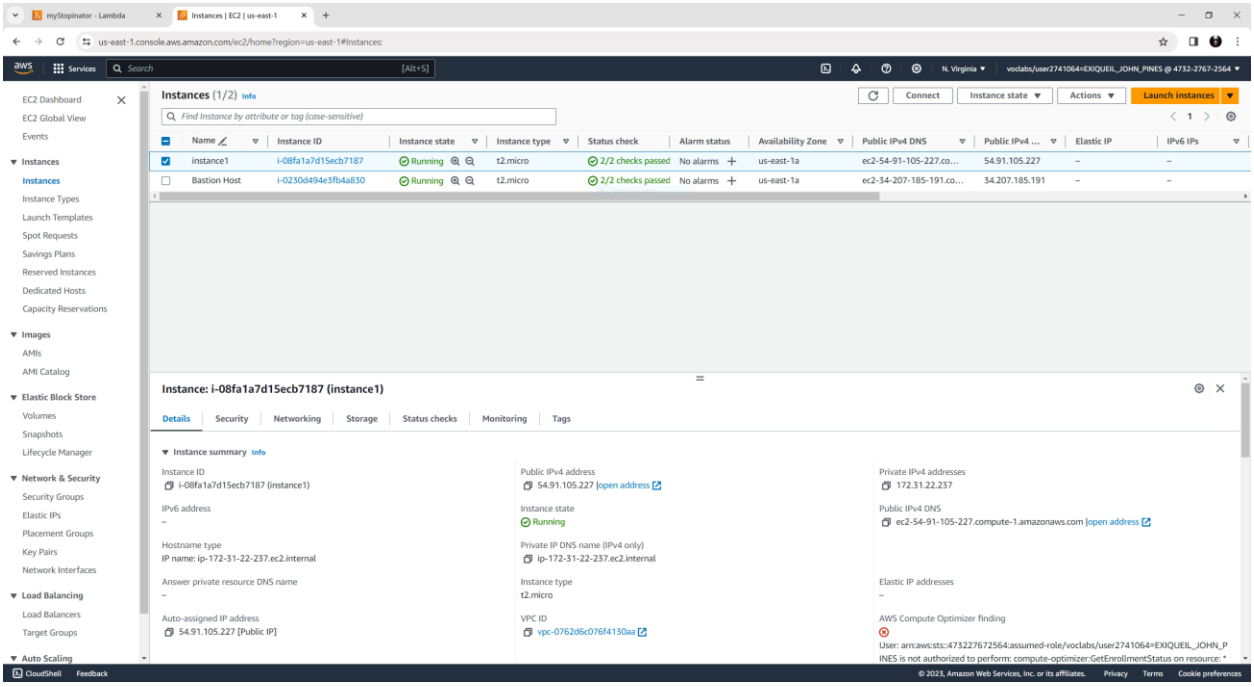
1. Why is it necessary to assign an IAM role to the AWS Lambda function?

Assigning an IAM role to an AWS Lambda function is necessary for security and access control purposes. This role defines what permissions the Lambda function has and what AWS resources it can interact with. By attaching an IAM role to a Lambda function, you can control which AWS services and resources it can access without hardcoding access keys or credentials in your code, which is a best practice for security.

2. What is the work of AWS CloudWatch?

AWS CloudWatch is a monitoring and observability service provided by Amazon Web Services. It allows you to collect and track metrics, collect and monitor log files, and set alarms. CloudWatch helps you gain insights into your AWS resources and applications, providing data and actionable insights to ensure the reliability and availability of your applications and infrastructure.

3. Run the CloudWatch and take an instance screenshot after running the myStopinator.



4. What are the resources supported by Elastic Beanstalk?

Elastic Beanstalk supports various resources including EC2 instances, databases, application versions, load balancers, and more. It provides a platform for deploying and managing web applications and services, abstracting the underlying infrastructure.

5. Can you try to deploy your own application in the Elastic Beanstalk environment? Screenshot your output.

Jose Rizal University

College of Computer Studies Engineering

Computer Engineering Department

PT1 - Lab 4: Working with EBS

CPE C405 – EMERGING TECHNOLOGIES IN CPE

Submitted by:

Exiquiel John A. Pines

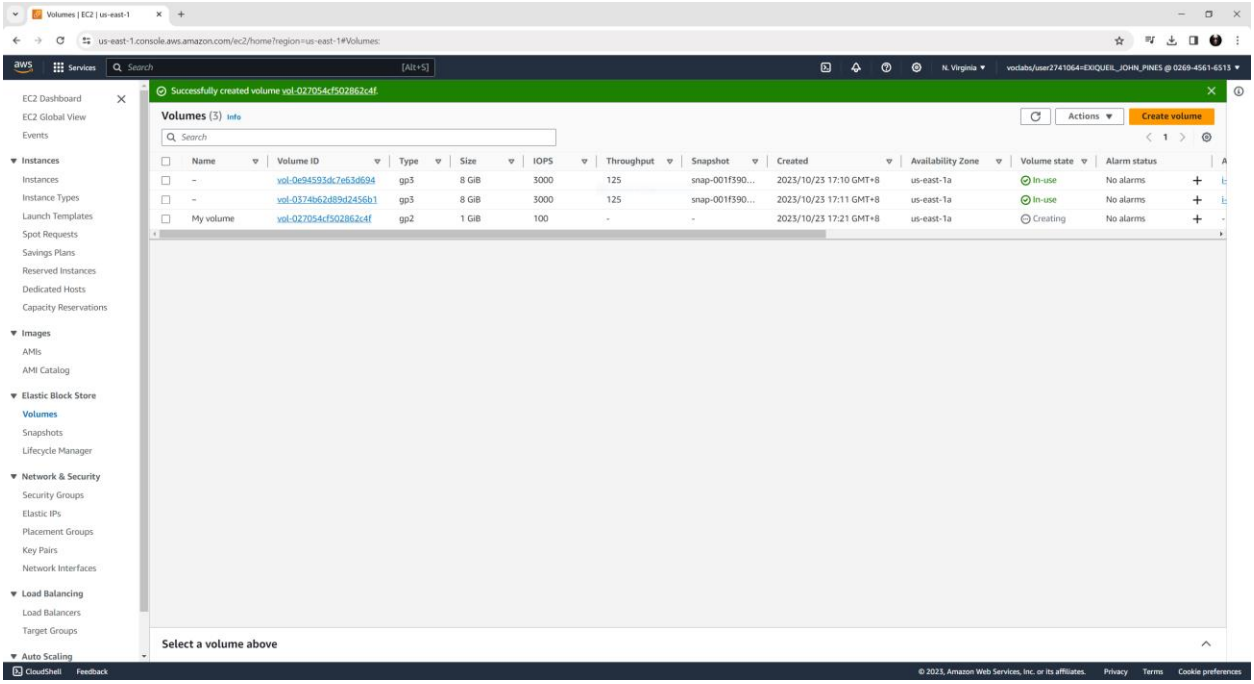
Submitted to:

Engr. Rosalina Estacio

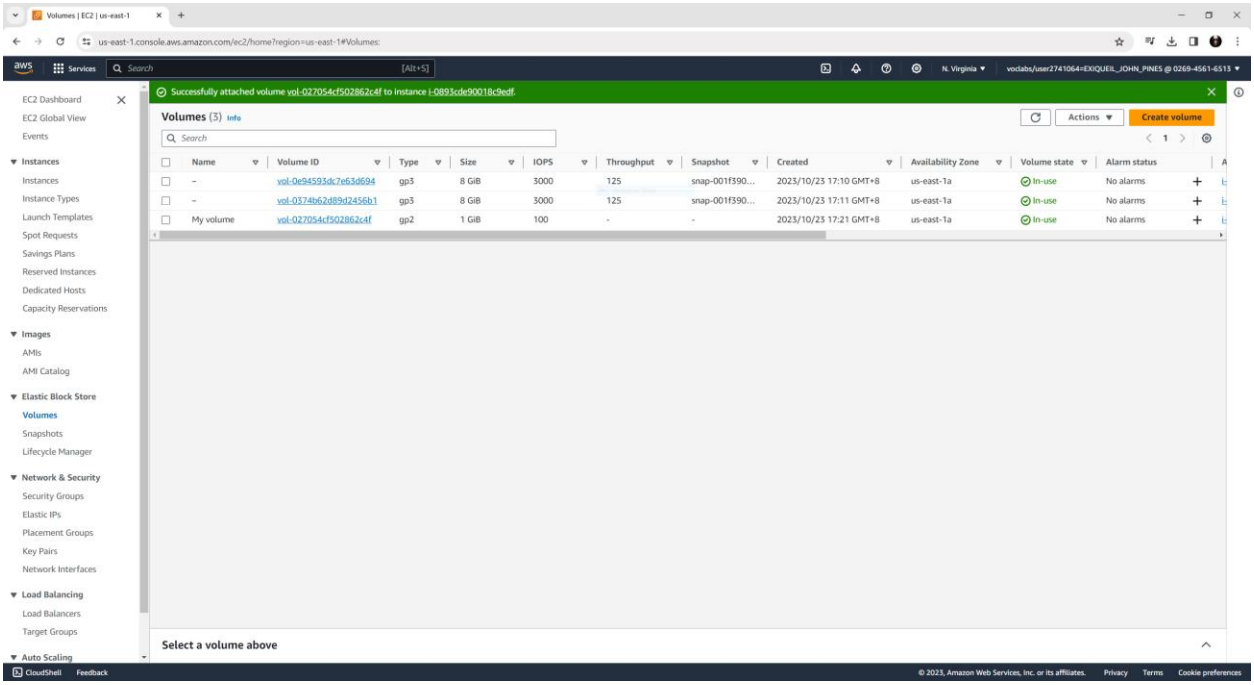
Date Submitted:

November 11, 2023

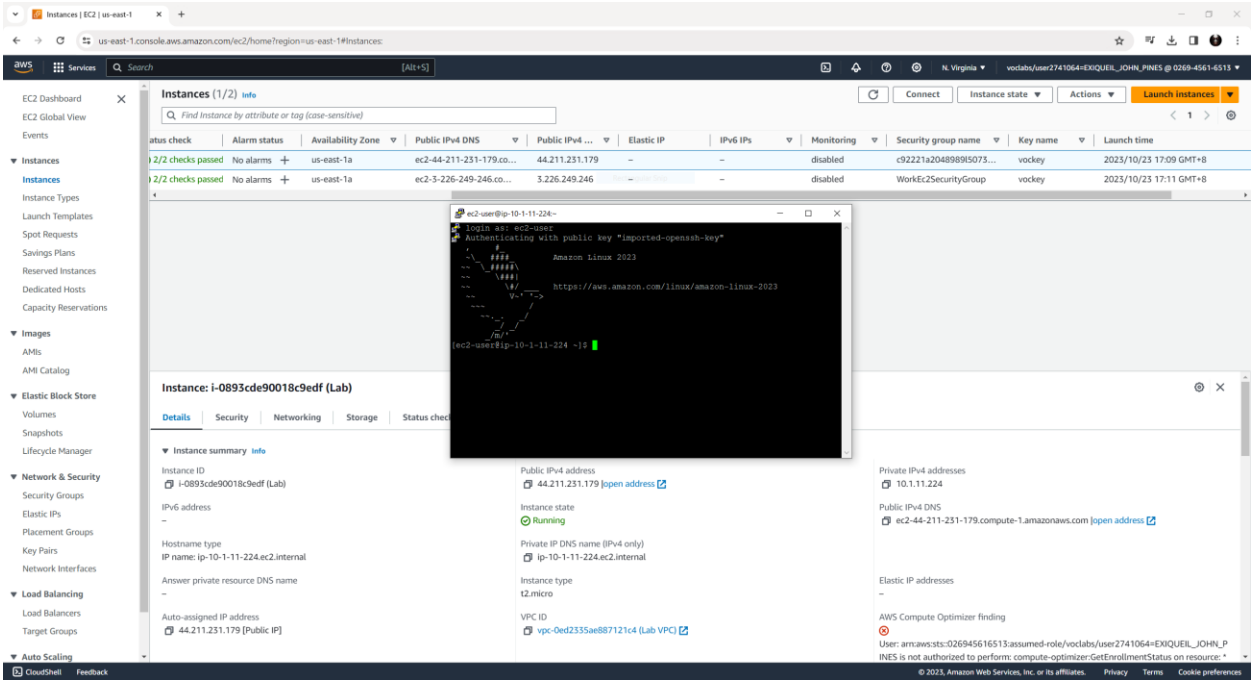
Task 1: Create a New EBS Volume



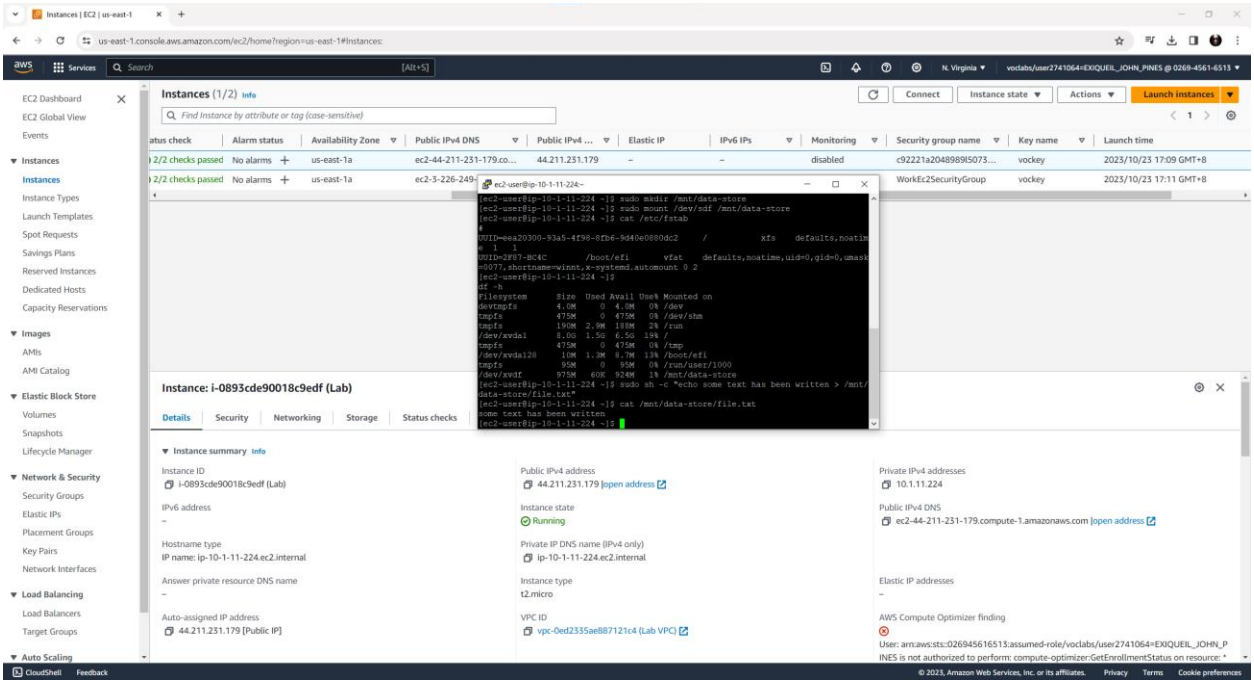
Task 2: Attach the Volume to an Instance



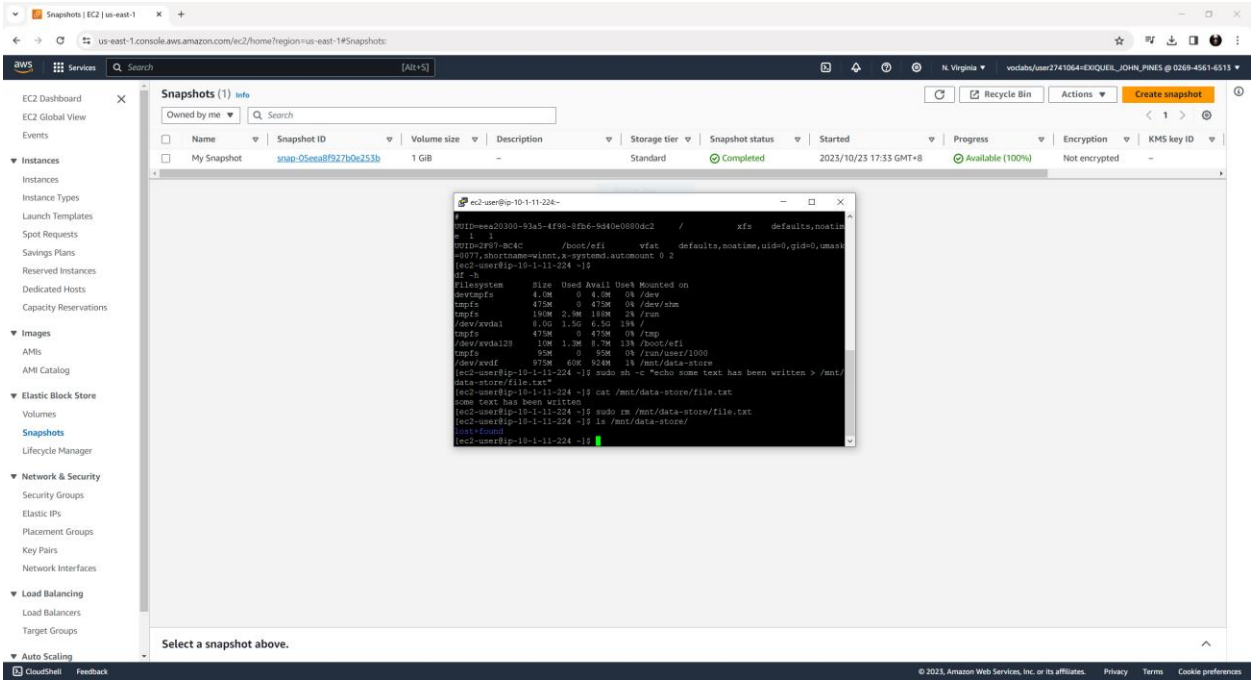
Task 3: Connect to Your Amazon EC2 Instance



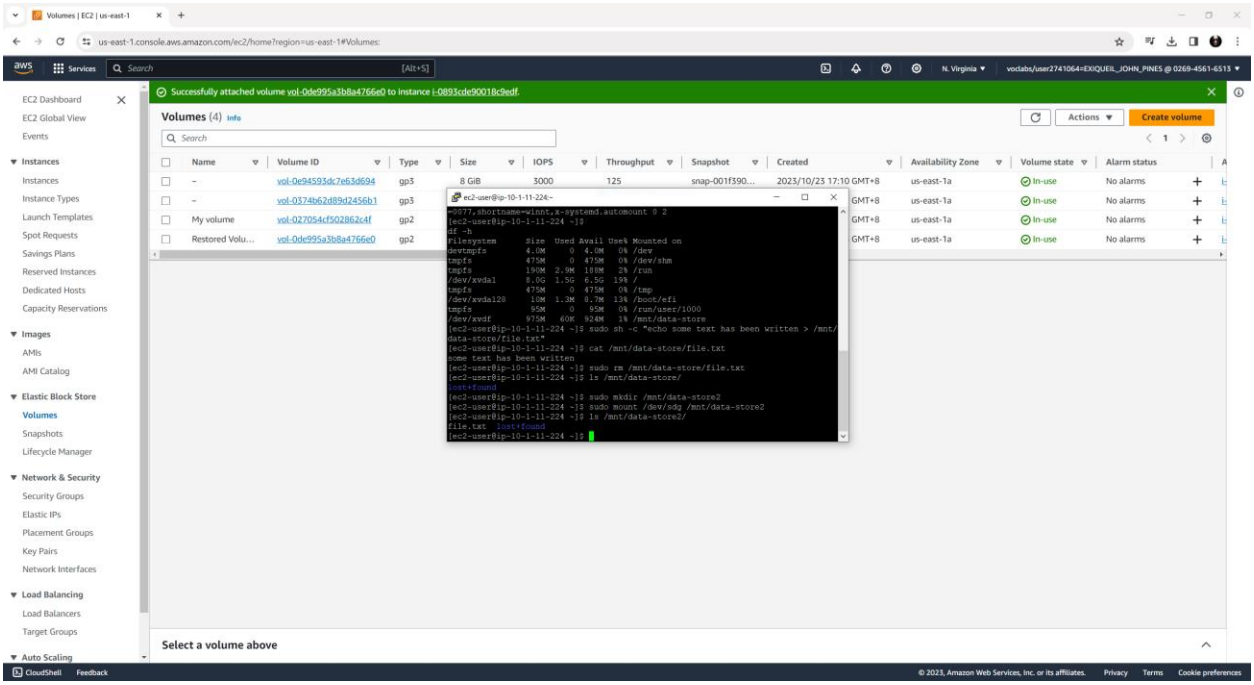
Task 4: Create and Configure Your File System



Task 5: Create an Amazon EBS Snapshot



Task 6: Restore the Amazon EBS Snapshot



Elastic Block Store (EBS) is a fully managed block storage service offered by Amazon Web Services. It is an essential part of many different AWS workloads since it is made to offer EC2 instances scalable, high-performance, and dependable storage. EBS volumes are a flexible option for managing and storing data since they are simple to attach to and remove from EC2 instances.

EBS is a versatile storage solution with applications in various scenarios, including:

- Database Storage - EBS volumes are commonly used for hosting database systems like Amazon RDS, Amazon Redshift, and self-managed databases running on EC2 instances.
- Application Storage - EBS volumes are an excellent choice for storing application code, logs, and user-generated content.
- Big Data and Analytics – EBS provides the necessary storage capacity and performance to handle large datasets efficiently.

Elastic Block Store (EBS) is a critical storage service within the AWS ecosystem, offering durability, scalability, and high performance for a wide range of workloads. Organizations may efficiently utilize EBS to store, manage, and safeguard their data in the cloud by being aware of its core features, use cases, and best practices. Applications and systems that are built on AWS are more successful and reliable overall when EBS volumes are configured and maintained properly.

Jose Rizal University

College of Computer Studies Engineering

Computer Engineering Department

PT2: Lab 5 - Build your DB Server

CPE C405 – EMERGING TECHNOLOGIES IN CPE

Submitted by:

Exiquiel John A. Pines

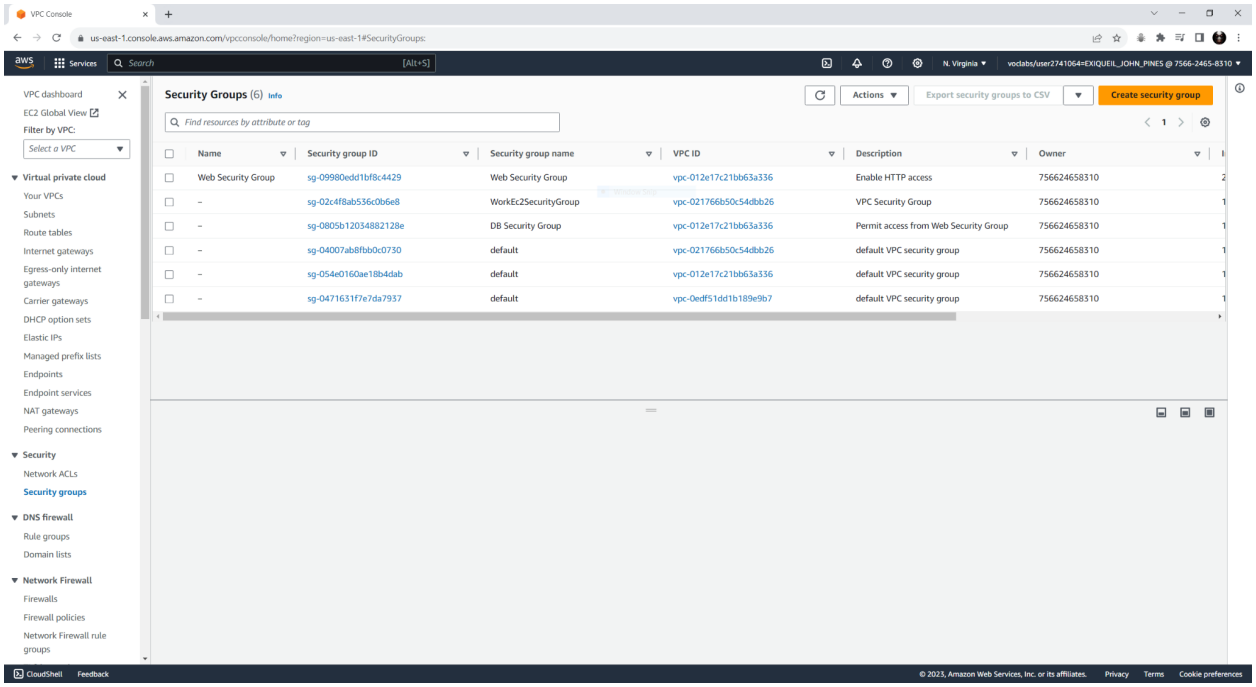
Submitted to:

Engr. Rosalina Estacio

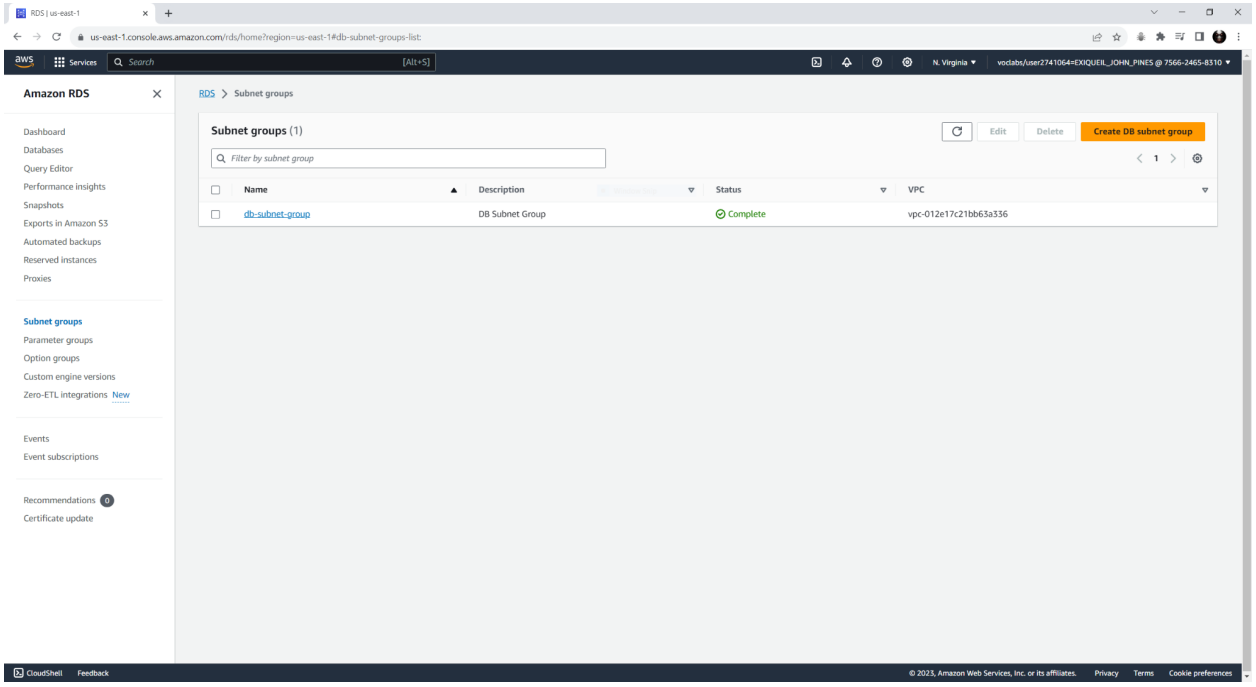
Date Submitted:

November 11, 2023

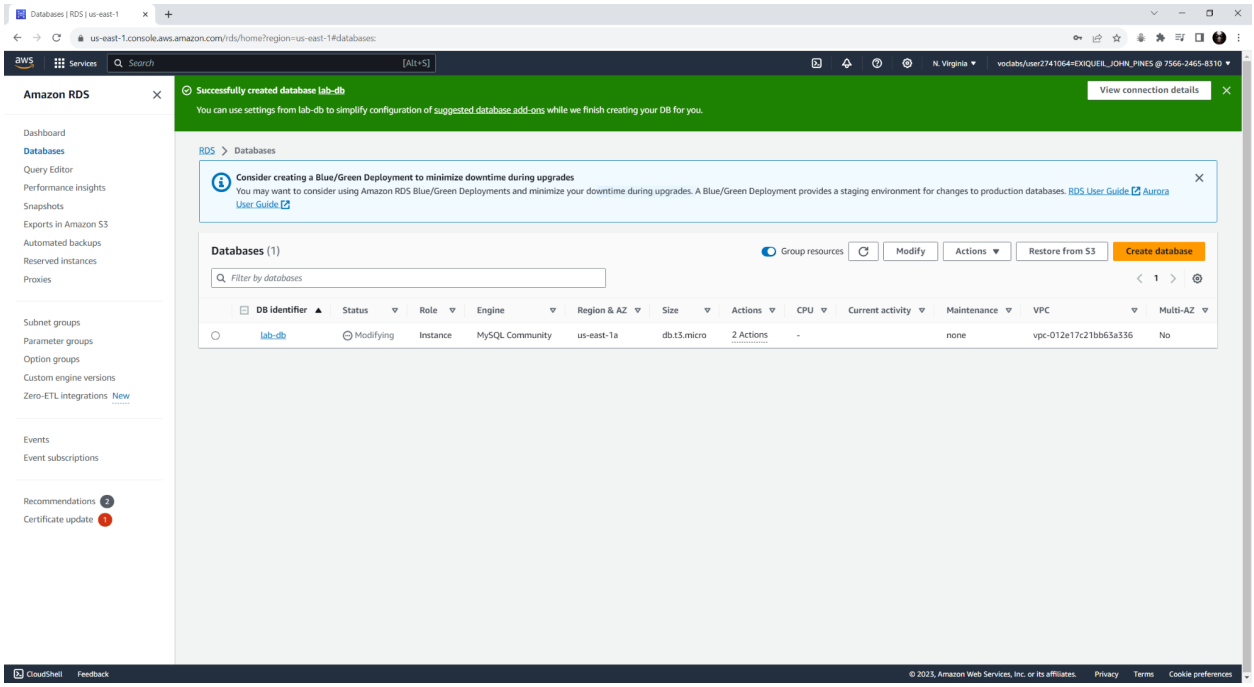
Task 1: Create a Security Group for the RDS DB Instance



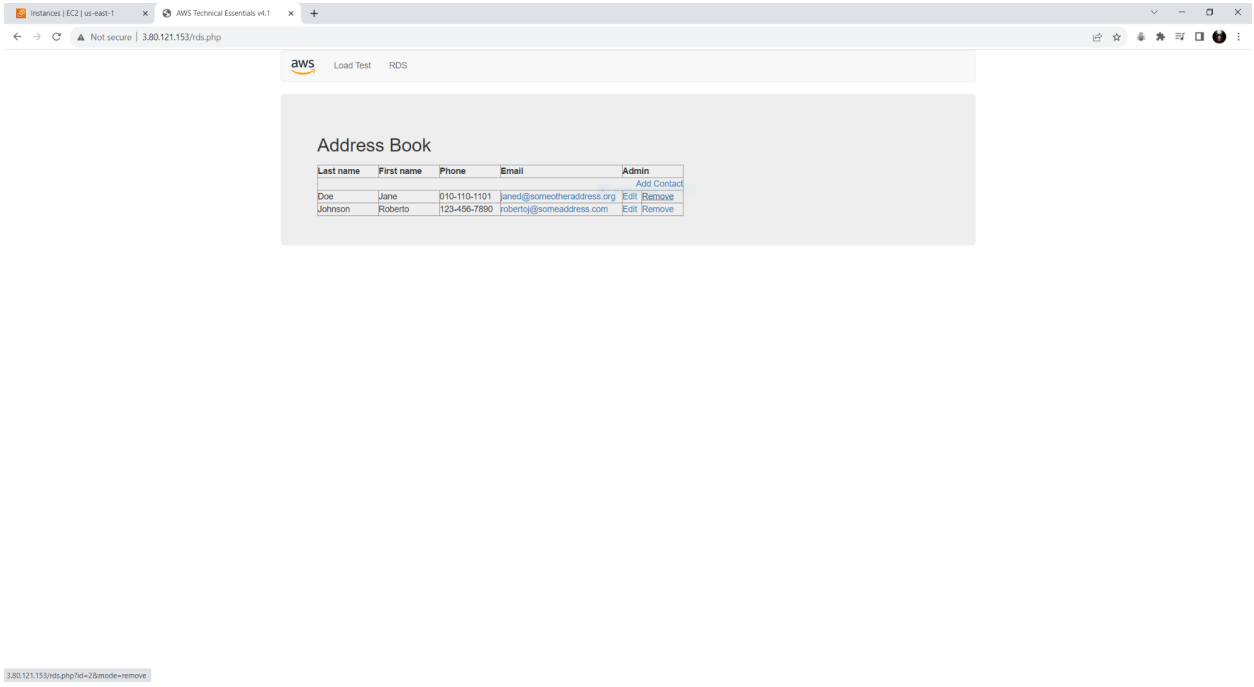
Task 2: Create a DB Subnet Group



Task 3: Create an Amazon RDS DB Instance



Task 4: Interact with Your Database



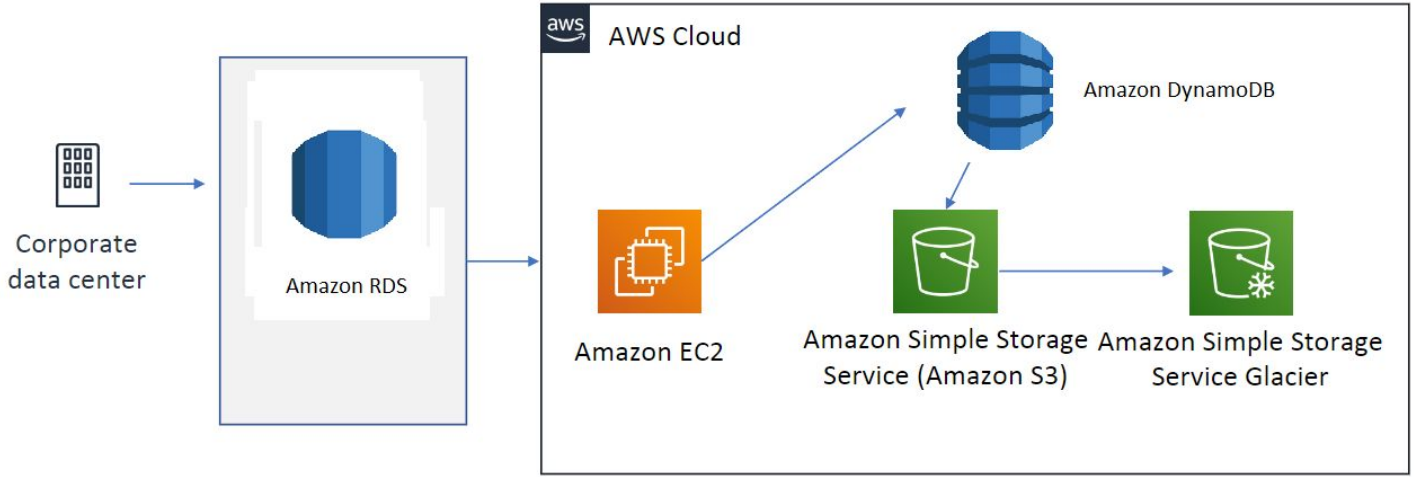
In this laboratory experiment, I learned how to build a database server in Amazon Relational Database Service (RDS). I created a security group, a DB subnet group, and an Amazon RDS DB instance. Ialso learned how to interact with my database using a MySQL client.

Module 8 Database Case Study

Canto, Ma. Pauline
Pines, Exiquiel John

Database Case Study Activity 1

Case 1: A data protection and management company that provides services to enterprises. They must provide database services for over 55 petabytes of data. They have two types of data that require a database solution. First, they need a relational database store for configuration data. Second, they need a store for unstructured metadata to support a de- duplication service. After the data is de-duplicated, it is stored in Amazon S3 for quick retrieval, and eventually moved to Amazon S3 Glacier for long-term storage. The following diagram illustrates their architecture.



Answer

In this case, they have two types of data that require a database solution.

- First, they need a relational database store for configuration data.
    - They can either choose between **Amazon RDS** and **Amazon Aurora**. By handling standard database duties like backups, patch management, and replication, these services offer a managed database solution. This aids in guaranteeing the configuration data availability and dependability.

- Second, they need a store for unstructured metadata to support a de- duplication service.
    - A NoSQL database solution that works well for managing unstructured data and offering quick, scalable access is **Amazon DynamoDB**. DynamoDB's scalability and flexibility are advantageous for unstructured metadata that facilitates deduplication services.

Conclusion

In conclusion, because of its relational structure, Amazon RDS/Aurora is advised for configuration data. And for the unstructured metadata, Amazon DynamoDB is advised because of its scalability and NoSQL features, is advised for unstructured information enabling deduplication services.

Jose Rizal University

College of Computer Studies Engineering

Computer Engineering Department

AnyCompany: Review for Pillars on AWS Well Architected Framework

CPE C405 – EMERGING TECHNOLOGIES IN CPE

Submitted by:

Dexter Brix Fernandez

Jude Iverson Madrid

Exiquiel John Pines

Bryce Pinto

Submitted to:

Engr. Rosalina Estacio

Date Submitted:

November 24, 2023

I. OPERATIONAL EXCELLENCE

1. Review the following three operational excellence questions from the AWS Well-Architected Framework:

OPS 4: How do you design your workload so that you can understand its state?

OPS 6: How do you mitigate deployment risk?

OPS 7: How do you know that you are ready to support a workload?

2. For each Well-Architected Framework question, answer what is the current state of the AnyCompany architecture and what is the final state.

AnyCompany's current architecture utilizes different AWS services like EC2, S3 and RDBMS. There are some processes that are being documented but it somehow lacks in providing a comprehensive overview of the system. The final state of the said company is adopting different AWS services like AWS CloudFormation for having a consistent environment and AWS CloudWatch for monitoring the documentation processes.

3. Agree on the top improvement that AnyCompany should make.

The top improvement for AnyCompany should make is the development and maintenance for a detailed documentation processes to support consistency for the entire architecture. Also, having a robust pipeline for testing and deployment and having less access controls to lessen the deployment risks.

II. SECURITY PILLAR

1. Review the following three security questions from the AWS Well-Architected Framework:

SEC 1: How do you securely operate your workload?

SEC 4: How do you detect and investigate security events?

SEC 6: How do you protect your compute resources?

2. For each Well-Architected Framework question, answer what is the current state of the AnyCompany architecture and what is the final state.

AnyCompany's current architecture have its workload in AWS by utilizing EC2 instances, S3 for storage and a relational database. The whole architecture of the company has a different process but it's security measures does not totally indicate here. Also, they lack on information on how they really detect security events like for its compute resources. The final state is the improved security measures in their different important processes.

3. Agree on the top improvement that AnyCompany should make.

The top improvement for AnyCompany should make is to enforce improvements for their security measures to totally secure their important data.

III. RELIABILITY PILLAR

1. Review the following three reliability questions from the AWS Well-Architected Framework:

REL 2: How do you plan your network topology?

REL 7: How do you design your system to adapt to changes in demand?

REL 9: How do you back up data?

2. For each Well-Architected Framework question, answer what is the current state of the AnyCompany architecture and what is the final state.

AnyCompany's current architecture uses both AWS and on-premises resources to analyze, store, and capture visual data. File transfer protocol (FTP) is the primary means of data transport in the network topology. Elastic load balancing, Auto Scaling groups, and Amazon EC2 instances are used by the system to adjust to variations in demand. Data backup is accomplished by compressing the data, writing it to tapes, and keeping it offsite with a third-party vendor. There is space for improvement in terms of streamlining data transfer techniques and improving flexibility in response to shifting demands, even though fundamental backup plans and adaptability are in place. AnyCompany wants to improve its architecture for greater reliability in the end. The implementation of more sophisticated auto-scaling configurations, dynamic resource allocation, and the investigation of predictive scaling options based on historical data will improve adaptability to changes in demand.

3. Agree on the top improvement that AnyCompany should make.

The top improvement for AnyCompany should focus on enhancing its overall network topology and data transfer methods to optimize efficiency and security. This involves exploring advanced AWS networking services, considering modern data transfer options, and potentially redesigning the on-premises to cloud data flow. Improvements in network topology, adaptability to changes in demand, and data backup strategies will collectively strengthen the reliability of AnyCompany's architecture.

IV. PERFORMANCE EFFICIENCY PILLAR

1. Review the following three performance efficiency questions from the AWS Well-Architected Framework:

PERF 1: How do you select the best performing architecture?

PERF 2: How do you select your compute solution?

PERF 4: How do you select your database solution?

2. For each Well-Architected Framework question, answer what is the current state of the AnyCompany architecture and what is the final state.

AnyCompany's current architecture is built on a combination of EC2 instances, with g2.2xlarge instances used for service rendering and S3 buckets controlling storage. There are no signs that serverless or containerization solutions are being employed; the system uses only EC2 instances for a number of purposes. Database solutions use an RDBMS to store flight data on Amazon EC2 and save photo assets on Amazon S3. Other database types are not considered, nor are managed database services put into practice. AnyCompany wants to maximize overall performance efficiency by optimizing architecture components, compute solutions, and database selections.

3. Agree on the top improvement that AnyCompany should make.

The top improvement for AnyCompany should focus on optimizing the selection of architecture components, including exploring the latest AWS offerings for improved efficiency and scalability. This involves assessing compute solutions, potentially adopting serverless options or containerization, and evaluating managed database services or alternative database types for specific requirements.

V. COST OPTIMIZATION PILLAR

1. Review the following three cost optimization questions from the AWS Well-Architected Framework:

COST 2: How do you govern usage?

COST 6: How do you meet cost targets when you select resource type, size, and number?

COST 7: How do you use pricing models to reduce cost?

2. For each Well-Architected Framework question, answer what is the current state of the AnyCompany architecture and what is the final state.

AnyCompany's current architecture in terms of cost optimization is they lack of relevant information on their usage like cost controls. Also, they have limited details in selecting their resources and to their pricing model in reducing the possible costs. The final state is that the company is implementing an effective cost optimization that would save money for the company.

3. Agree on the top improvement that AnyCompany should make.

The top improvement for AnyCompany should make is to have a proper mechanism for their usage that would help them to optimize the total costs and to lessen in releasing out their money.