



TRABAJO DE GRADO
Opción Seminario-Diplomado.

ARQUITECTURA ESCALABLE EN LA NUBE

Corporación Universitaria Remington.
Nombre de la facultad: INGENIERIA DE SISTEMAS
Nombre del programa académico:

Nombres de los estudiantes autores del trabajo de grado.
Diego Fernando Guerrero paz
Loren Katalina Mosquera Mosquera
Nombre del Tutor del trabajo de grado (Juan Pablo Berrio Lopez).
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2024

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Resumen

El seminario destacó la importancia de Amazon Web Services (AWS) como una herramienta esencial para la transformación digital en empresas y organizaciones. Se abordaron los beneficios de la nube, como la escalabilidad, la seguridad y la alta disponibilidad, así como su capacidad para reducir costos y promover la innovación tecnológica.

Además, se enfatizó la versatilidad de AWS en áreas como almacenamiento, auto escalado y bases de datos, lo que la posiciona como una solución integral para diversos sectores. Se subrayó también la relevancia de la formación y certificación en AWS para aprovechar al máximo sus funcionalidades, consolidando a los profesionales como actores clave en el mercado laboral actual.

Finalmente, el seminario evidenció cómo AWS fomenta un entorno de experimentación e innovación, permitiendo desarrollar y desplegar soluciones tecnológicas de forma rápida, eficiente y segura.

Palabras clave

(Incluya 5 palabras clave que representen su trabajo de grado)

- Amazon EC2
- Amazon VPC (Virtual Private Cloud)
- Escalabilidad
- Innovación
- Amazon ECS

Marco conceptual

1. Computación en la Nube

La computación en la nube se refiere a la provisión de recursos informáticos, como servidores, almacenamiento y bases de datos, a través de Internet. AWS es uno de los principales proveedores de nube, ofreciendo soluciones escalables, seguras y accesibles para individuos y organizaciones.

- **Referencia:** Mell, P., & Grance, T. (2011). The NIST Definition of Cloud Computing.

2. Amazon Web Services (AWS)

AWS es una plataforma de servicios en la nube que proporciona herramientas y recursos para implementar soluciones tecnológicas de manera eficiente. Entre sus características principales se encuentran:

- **Elasticidad y Escalabilidad:** Capacidad para ajustar los recursos según la demanda.
- **Modelo de Pago por Uso:** Los usuarios solo pagan por los recursos que utilizan.
- **Seguridad y Confiabilidad:** AWS garantiza altos estándares de seguridad y disponibilidad a través de certificaciones y auditorías.

3. Servicios Clave de AWS

Los servicios de AWS abarcan diferentes áreas tecnológicas:

- **Amazon EC2 (Elastic Compute Cloud):** Servicio para ejecutar instancias de servidores virtuales.
- **Amazon VPC (Virtual Private Cloud):** Red privada virtual que permite el aislamiento y control de entornos en la nube.

- **Amazon ECS (Elastic Container Service):** Solución para la gestión de contenedores, facilitando el desarrollo de aplicaciones modernas.

4. Escalabilidad en la Nube

La escalabilidad es la capacidad de un sistema para adaptarse al crecimiento de la carga de trabajo. AWS ofrece herramientas como Auto Scaling y Elastic Load Balancing para garantizar el rendimiento óptimo de las aplicaciones.

5. Innovación Tecnológica

AWS impulsa la innovación tecnológica mediante servicios avanzados como machine learning, inteligencia artificial, y análisis de datos. Esto permite a las empresas experimentar, desarrollar y desplegar soluciones disruptivas rápidamente.

6. Impacto en el Mercado Laboral y Empresarial

El dominio de AWS es una habilidad altamente demandada, proporcionando ventajas competitivas tanto para profesionales como para empresas que buscan optimizar sus procesos e infraestructura tecnológica.

Marco contextual

1. Contexto Tecnológico

En un mundo cada vez más digitalizado, la computación en la nube se ha convertido en una herramienta fundamental para organizaciones de todos los tamaños. Amazon Web Services (AWS) lidera el mercado global de la nube, ofreciendo soluciones que permiten la transformación digital de las empresas al proporcionar infraestructura escalable, segura y confiable.

En un contexto donde la innovación y la agilidad son esenciales para la competitividad, AWS se posiciona como un socio estratégico para implementar tecnologías avanzadas como inteligencia artificial, machine learning, big data y aplicaciones basadas en contenedores.

2. Contexto Académico

El uso de plataformas en la nube como AWS no solo es relevante en el ámbito empresarial, sino también en el académico. Universidades e instituciones educativas han comenzado a incluir contenidos sobre la computación en la nube dentro de sus programas, reconociendo la necesidad de formar profesionales capacitados en herramientas líderes como AWS. Este seminario de grado busca contribuir a este objetivo, proporcionando a los estudiantes conocimientos prácticos y conceptuales que fortalezcan sus competencias técnicas.

3. Contexto Laboral

La demanda de profesionales con experiencia en AWS ha crecido exponencialmente en los últimos años, reflejando la necesidad de empresas de todos los sectores de contar con expertos en tecnologías de la nube. Certificaciones como AWS Certified Solutions Architect y AWS Certified Developer son cada vez más valoradas en el mercado laboral. Este seminario se enmarca dentro de esa demanda, preparando a los futuros egresados para enfrentar los retos y aprovechar las oportunidades del entorno profesional actual.

4. Contexto Empresarial

En el ámbito empresarial, AWS es un motor clave para la innovación, permitiendo a las organizaciones reducir costos, aumentar la eficiencia operativa y desarrollar nuevas capacidades. Sectores como el comercio electrónico, la salud, la educación y las startups tecnológicas han adoptado AWS como su principal plataforma tecnológica. Este seminario proporciona un enfoque práctico y contextual para entender cómo las empresas están utilizando AWS para transformar sus modelos de negocio.

Desarrollo e implementación del aprendizaje

ENTREGA 1

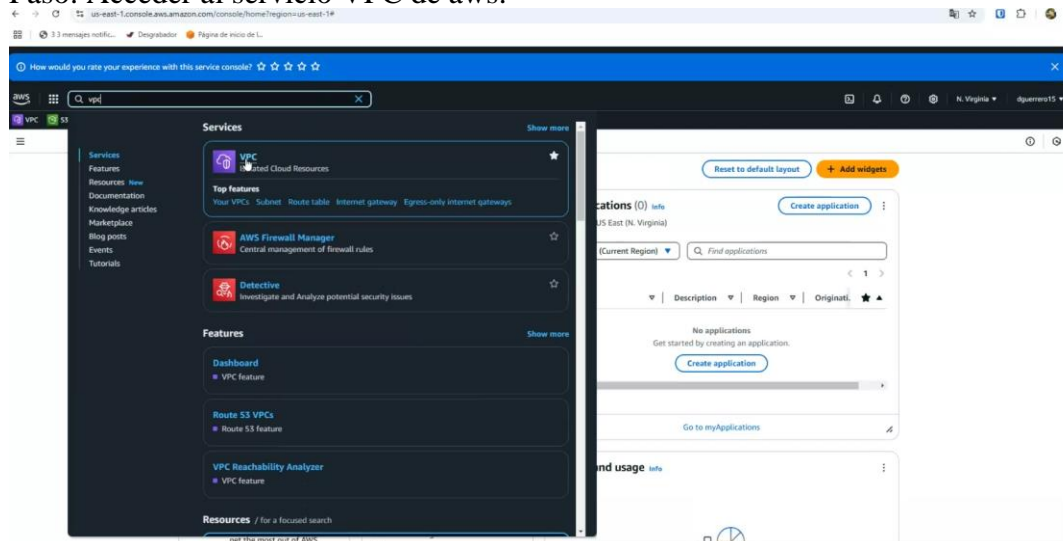
Cuales son los recursos de aws que permite ejecutar instancias de aws

1. Amazon EC2 (Elastic Compute Cloud) Amazon EC2 es un servicio de AWS que ofrece servidores virtuales escalables bajo demanda, reduciendo costos de hardware y acelerando el desarrollo de aplicaciones. Permite lanzar, configurar y gestionar instancias según necesidades específicas, adaptándose a tareas intensivas o picos de tráfico mediante escalado vertical. Las instancias EC2 varían en recursos como computación, memoria y almacenamiento, según el tipo seleccionado.

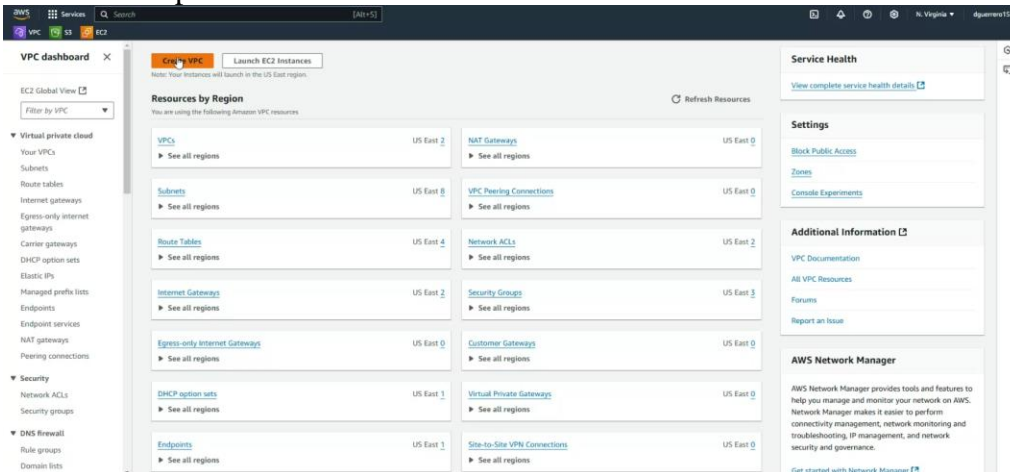
2. Amazon ECS (Elastic Container Service) Permite ejecutar contenedores en instancias de EC2 o en AWS Fargate (una opción sin servidor). Diseñado para administrar aplicaciones en contenedores, como Docker.
3. AWS Elastic Beanstalk Plataforma que simplifica la implementación y el escalado de aplicaciones web. Usa EC2 para ejecutar instancias detrás de escena.
4. AWS Fargate Servicio que ejecuta contenedores sin la necesidad de aprovisionar y administrar instancias de EC2. Compatible con Amazon ECS y Amazon EKS.
5. Amazon Lightsail Proporciona instancias simplificadas para proyectos más pequeños, como sitios web o aplicaciones simples. Incluye un enfoque fácil de usar para configurar máquinas virtuales con almacenamiento, bases de datos y redes.

Implemente un servidor web en amazon Linux, Y explique toda la configuración necesaria que hizo en aws y dentro de la instancia

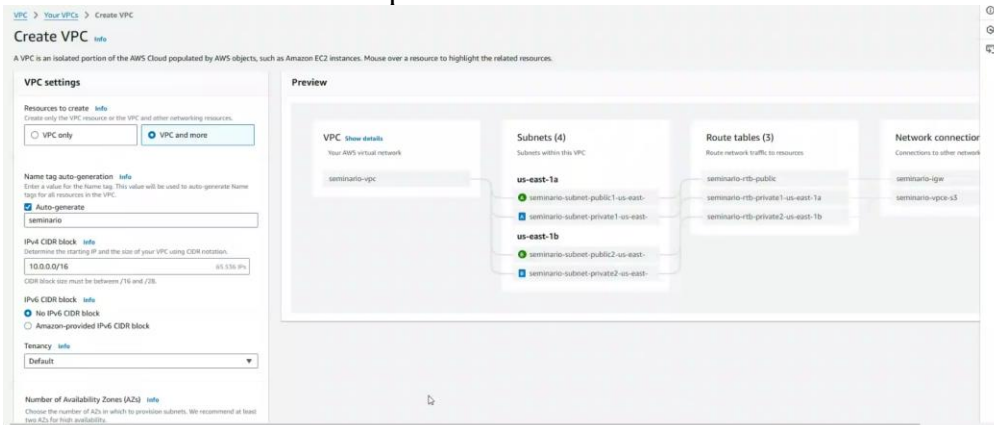
1. Paso: Acceder al servicio VPC de aws.



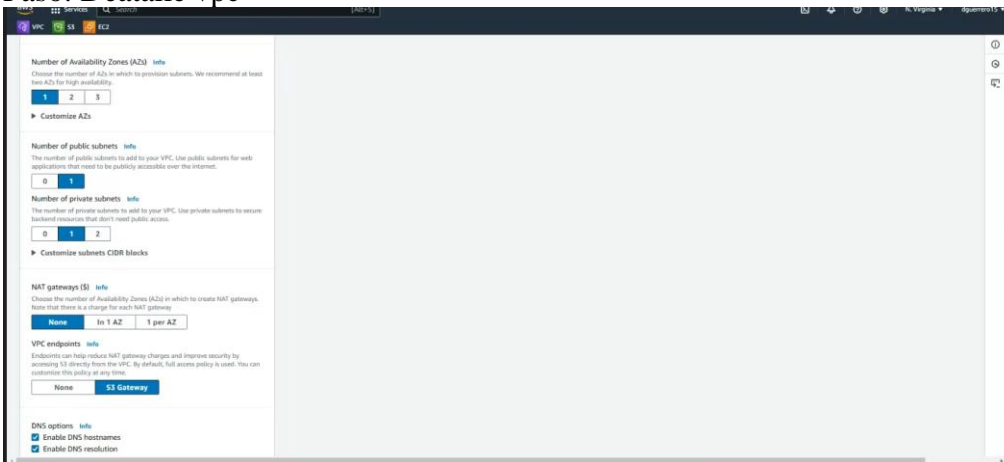
2. Paso: Crear vpc



3. Paso: Detalle de creación de vpc



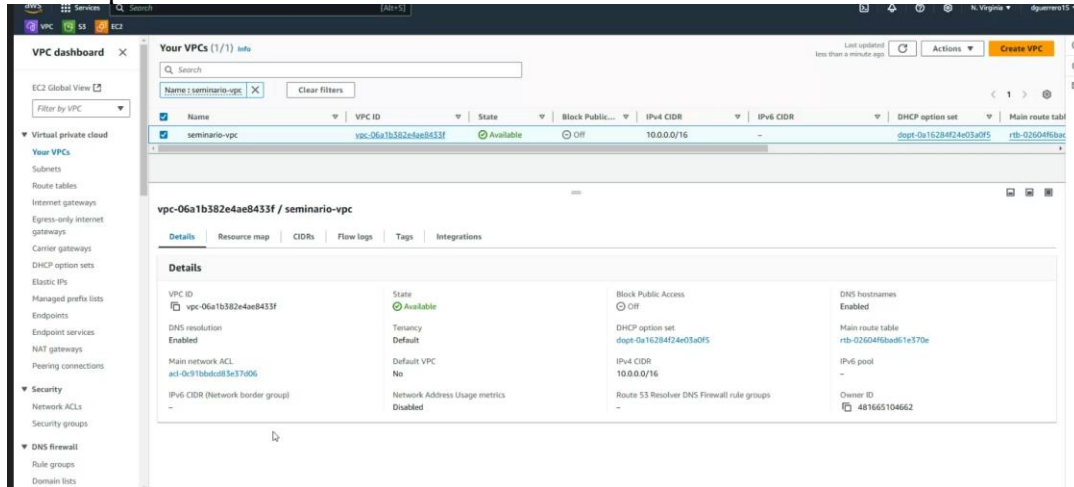
4. Paso: Detalle vpc



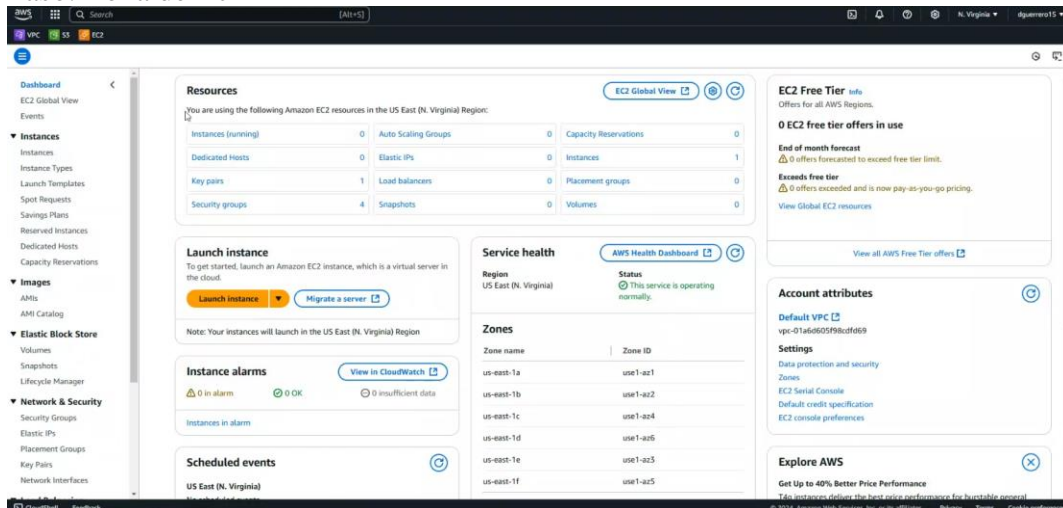
5. Paso: La vpc se crea con una subnet publica y una subnet privada



6. Paso: Vpc creada



7. Paso: Zona de Ec2



8. Paso: Creación de servidor AMAZON LINUX 2023ami

Launch an instance info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags info

Name: [Add additional tags](#)

Application and OS Images (Amazon Machine Image) info

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

Recents **Quick Start**

Amazon Linux macOS Ubuntu Windows Red Hat SUSE Linux [Browse more AMIs](#)

Amazon Machine Image (AMI)

Amazon Linux 2023 AMI Free tier eligible

ami-0453ec754f44f9a4a (64-bit (x86), uefi-preferred) / ami-0c083c7a791a23314e (64-bit (ARM), uefi)

Virtualization: hvm | ENA enabled: true | Root device type: ebs

Description

Amazon Linux 2023 is a modern, general purpose Linux-based OS that comes with 5 years of long term support. It is optimized

Summary

Number of instances: info

Software image (AMI)
Amazon Linux 2023 AMI 2023.6.2... [read more](#)
ami-0453ec754f44f9a4a

Virtual server type (instance type)
t2.micro

Firewall (security group)
New security group

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

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.

[Preview code](#)

9. Paso: Tipo de instancia T2micro 1vcpu 1gbr

Launch an instance

Virtualization: hvm | ENA enabled: true | Root device type: ebs

Description

Amazon Linux 2023 is a modern, general purpose Linux-based OS that comes with 5 years of long term support. It is optimized for AWS and designed to provide a secure, stable and high-performance execution environment to develop and run your cloud applications.

Amazon Linux 2023 AMI 2023.6.20241121.0 x86_64 HVM kernel-6.1

Architecture: Boot mode: AMI ID: Username: Verified provider

Instance type info [Get advice](#)

Instance type: Free tier eligible

Family: t2 | 1 vCPU | 1 GiB Memory | Current generation: true

On-Demand Windows base pricing: 0.0762 USD per hour
On-Demand Ubuntu Pro base pricing: 0.0734 USD per hour
On-Demand SUSE base pricing: 0.0716 USD per hour
On-Demand RHEL base pricing: 0.029 USD per hour
On-Demand Linux base pricing: 0.0216 USD per hour

[Additional costs apply for AMIs with pre-installed software](#)

All generations [Compare instance types](#)

Key pair (login) info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required

[Create new key pair](#)

Summary

Number of instances: info

Software image (AMI)
Amazon Linux 2023 AMI 2023.6.2... [read more](#)
ami-0453ec754f44f9a4a

Virtual server type (instance type)
t2.micro

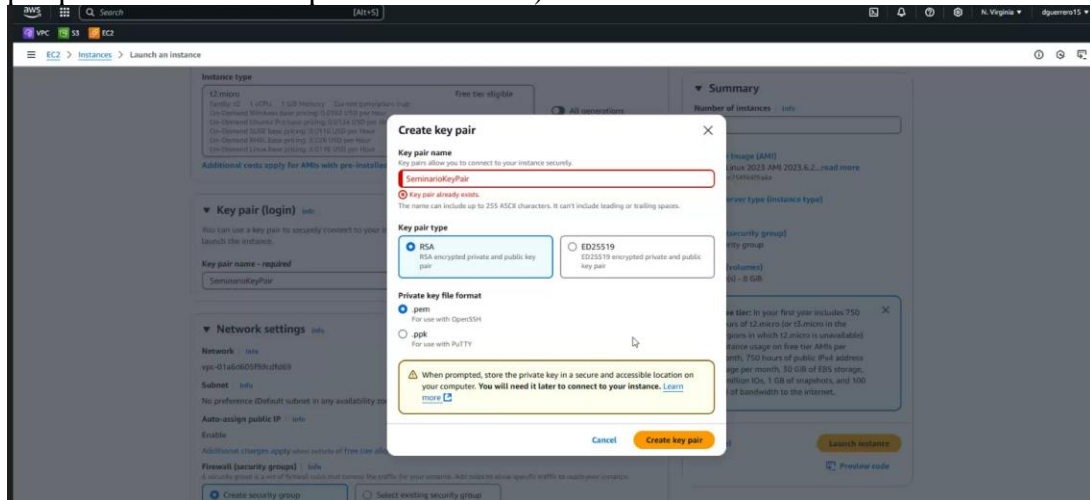
Firewall (security group)
New security group

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

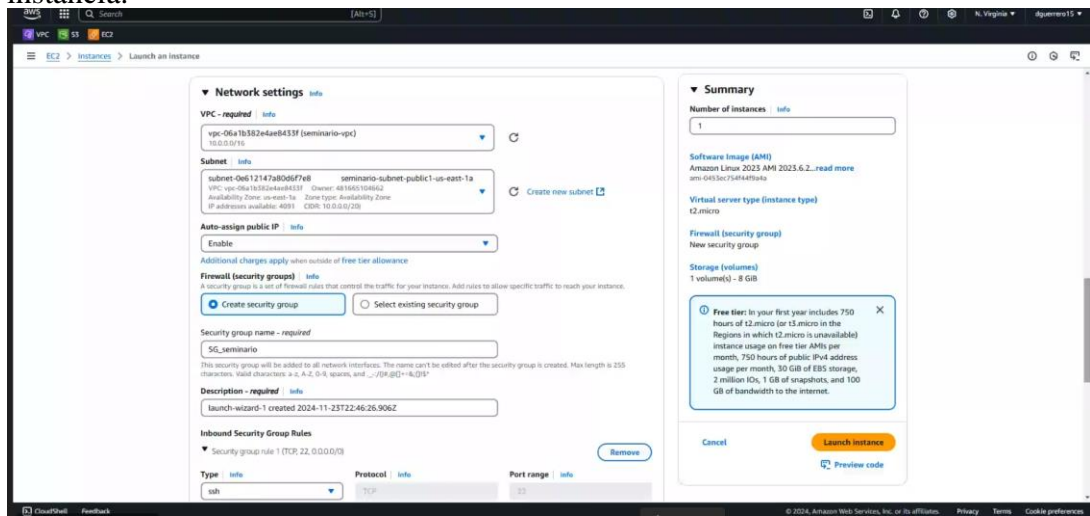
Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.

[Preview code](#)

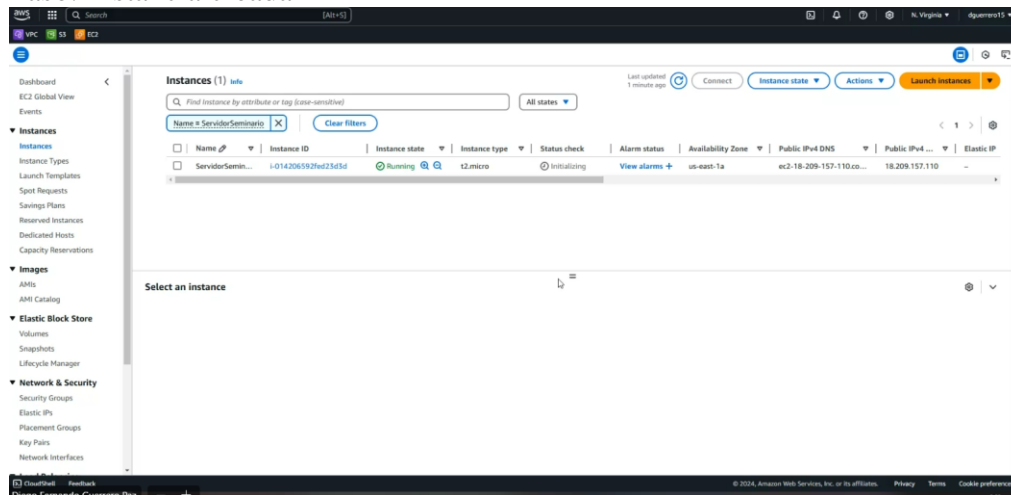
10. Paso: Creación de llaves, se escoge .pem de tipo RSA (mostramos esta imagen porque se nos olvidó capturarla al crearla)



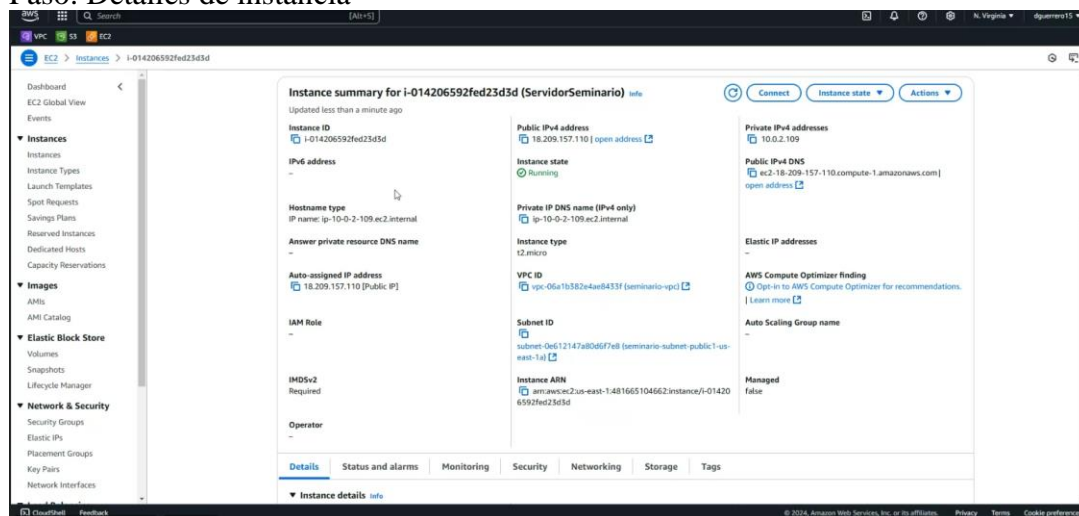
11. Paso: Se escoge la vpc creada (seminario-vpc), se escoge la subnet publica para acceso a internet como también la asignación automática ip publica y lanzamos instancia.



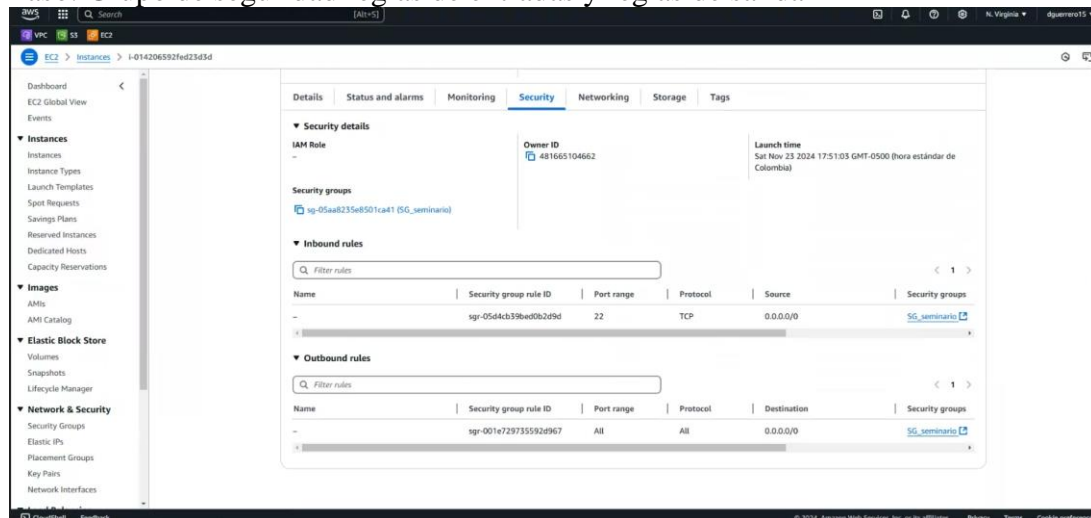
12. Paso: Instancia creada



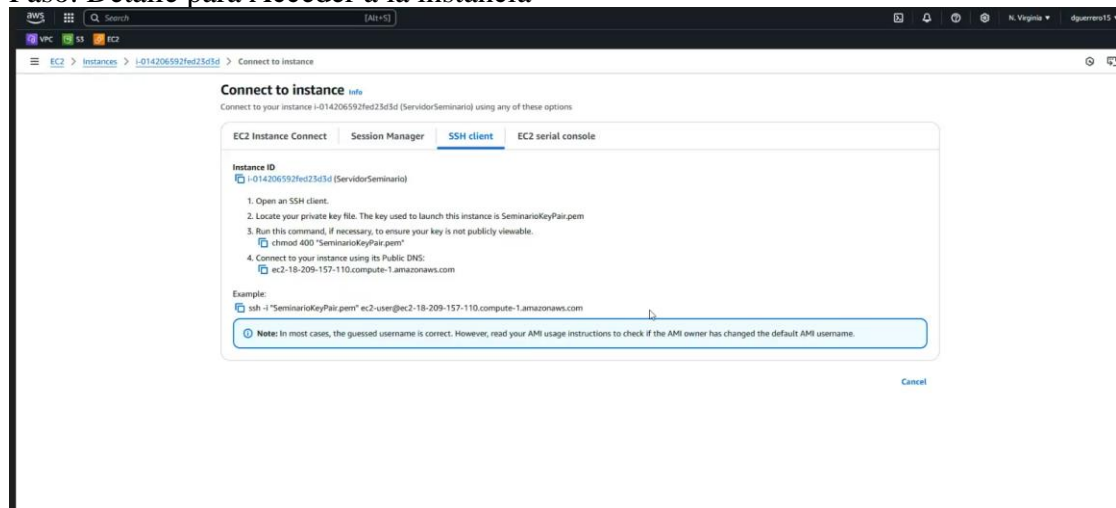
13. Paso: Detalles de instancia



14. Paso: Grupo de seguridad reglas de entradas y reglas de salida

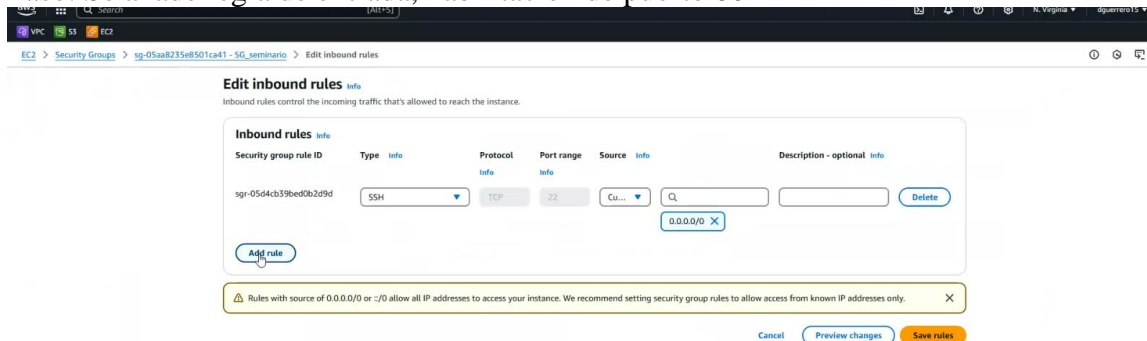


15. Paso: Detalle para Acceder a la instancia

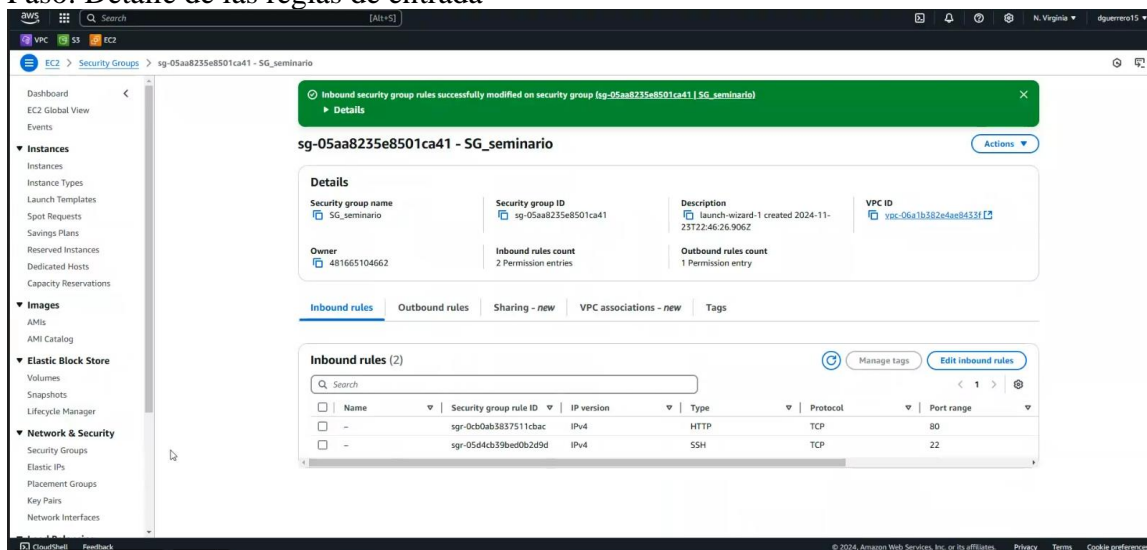


16. Paso: Se accede a instancia por medio del comando `ssh -i "SeminarioKeyPair.pem" ec2-user@ec2-18-209-157-110.compute-`

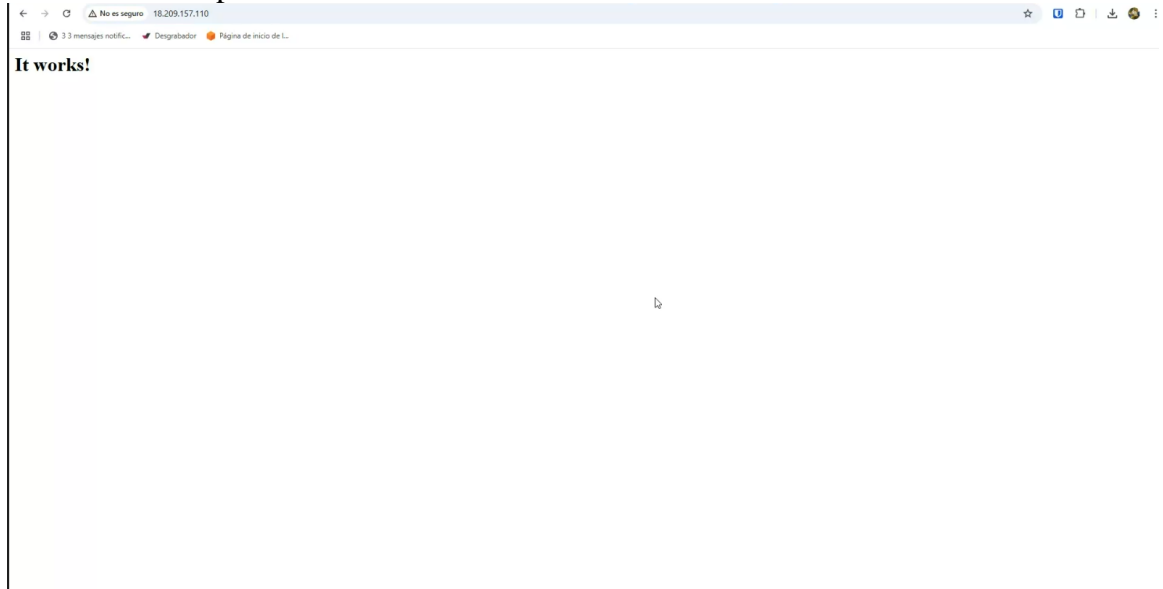
19. Paso: Se añade regla de entrada, habilitación de puerto 80



20. Paso: Detalle de las reglas de entrada



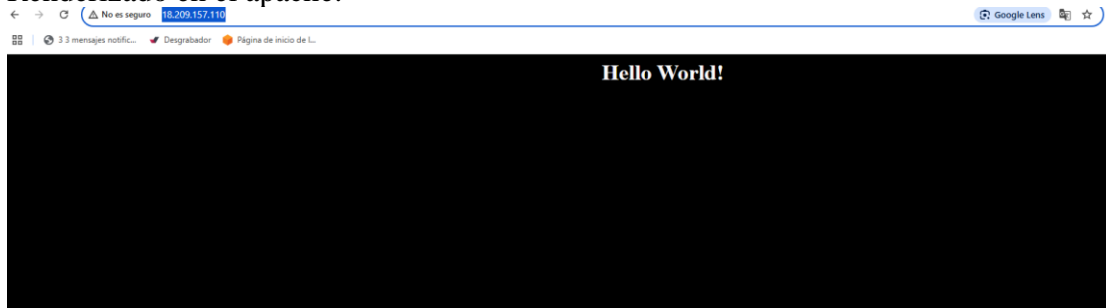
21. Paso: Servidor apache funcionando desde acceso a internet



22. Paso: Diseño de pagina

```
root@ip-10-0-2-103:~# vi /www/html  
GNU nano 5.8  
<body style="background-color: #000;width: 100%;">  
  <h1 style="color: #fafafa;text-align: center;"> Hello World!</h1>  
</body>
```

23. Renderizado en el apache:



Explicacion de trabajo realizado, publicacion de video en youtube
<https://www.youtube.com/watch?v=4iabc2KZfLg>

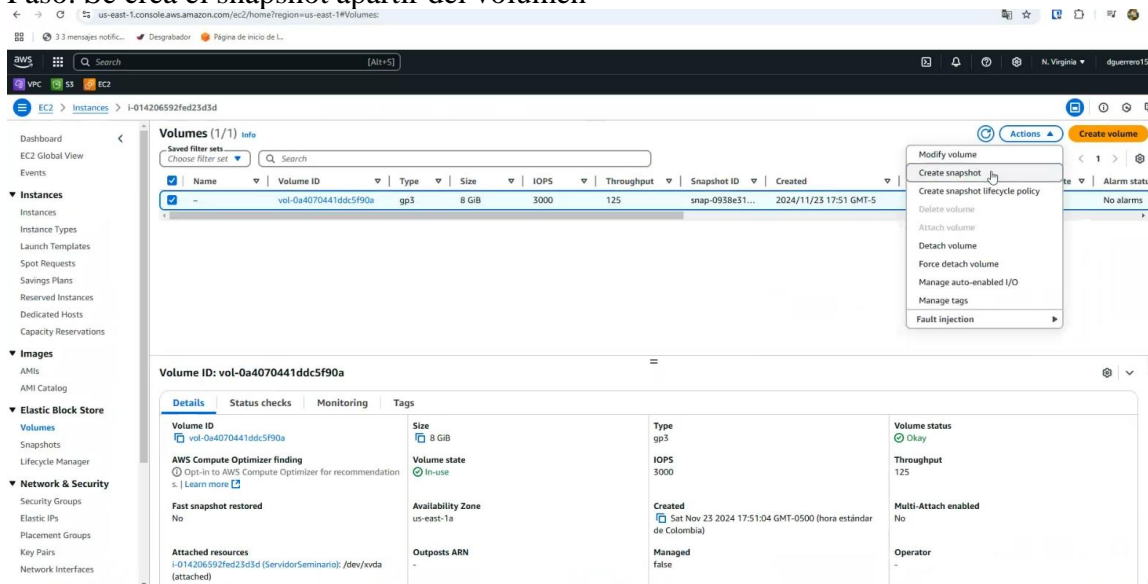
ENTREGA 2

1. Implemente un servidor web en Amazon Linux, que ejecute una aplicación en una instancia, haga pruebas mostrando como las instancias se crean automáticamente y la aplicación queda funcionando correctamente.

Adjuntar video con explicación. máx 5 min. Link no listado de youtube

PRACTICA

1. Paso: Se crea el snapshot a partir del volumen



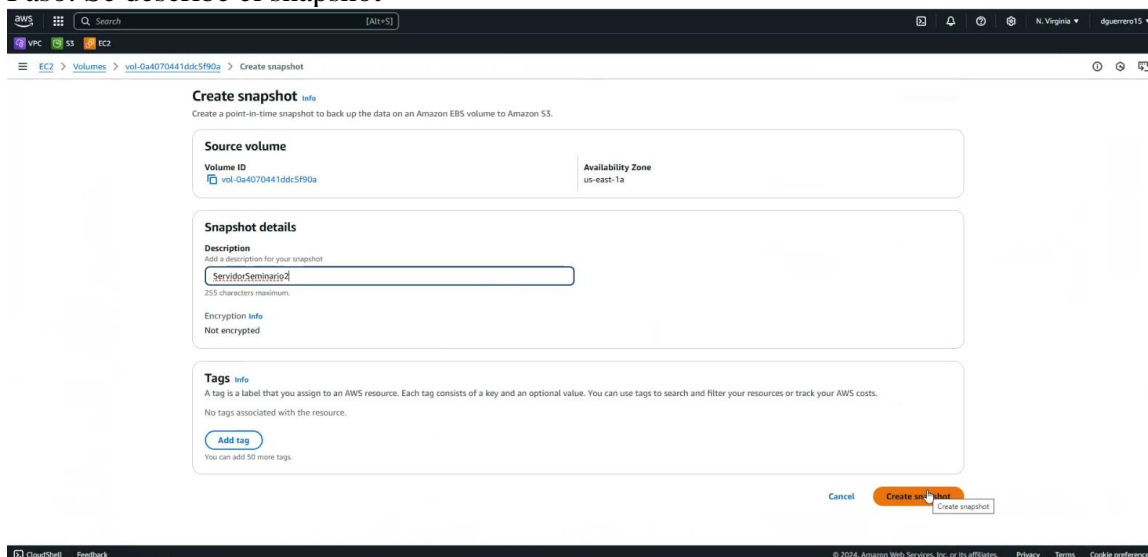
The screenshot shows the AWS Management Console interface for the 'Volumes' section. The 'Actions' menu is open, showing options like 'Modify volume', 'Create snapshot', 'Delete volume', etc. The 'Create snapshot' option is highlighted. Below the menu, the details for the selected volume 'vol-0a4070441ddc5f90a' are displayed, including its ID, type (gp3), size (8 GiB), IOPS (3000), and creation date.

| Name | Volume ID | Type | Size | IOPS | Throughput | Snapshot ID | Created |
|------|-----------------------|------|-------|------|------------|-----------------|------------------------|
| - | vol-0a4070441ddc5f90a | gp3 | 8 GiB | 3000 | 125 | snap-0938e31... | 2024/11/23 17:51 GMT-5 |

Volume ID: vol-0a4070441ddc5f90a

| Details | Status checks | Monitoring | Tags |
|--|---|---|---|
| Volume ID vol-0a4070441ddc5f90a AWS Compute Optimizer finding Dpt-in to AWS Compute Optimizer for recommendation Fast snapshot restored No Attached resources i-014206592fed23d3d (ServidorSeminario: /dev/xvda (attached)) | Size 8 GiB Volume state In-use Availability Zone us-east-1a Outposts ARN - | Type gp3 IOPS 3000 Created Sat Nov 23 2024 17:51:04 GMT-0500 (hora estándar de Colombia) Managed false | Volume status Okay Throughput 125 Multi-Attach enabled No Operator - |

2. Paso: Se describe el snapshot



The screenshot shows the 'Create snapshot' wizard in the AWS Management Console. The 'Source volume' is 'vol-0a4070441ddc5f90a' and the 'Availability Zone' is 'us-east-1a'. The 'Description' field contains 'ServidorSeminario'. The 'Encryption info' is 'Not encrypted'. The 'Tags info' section shows 'No tags associated with the resource.' and an 'Add tag' button.

Source volume

Volume ID: vol-0a4070441ddc5f90a | Availability Zone: us-east-1a

Snapshot details

Description: Add a description for your snapshot
ServidorSeminario
255 characters maximum.

Encryption info: Not encrypted

Tags info

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

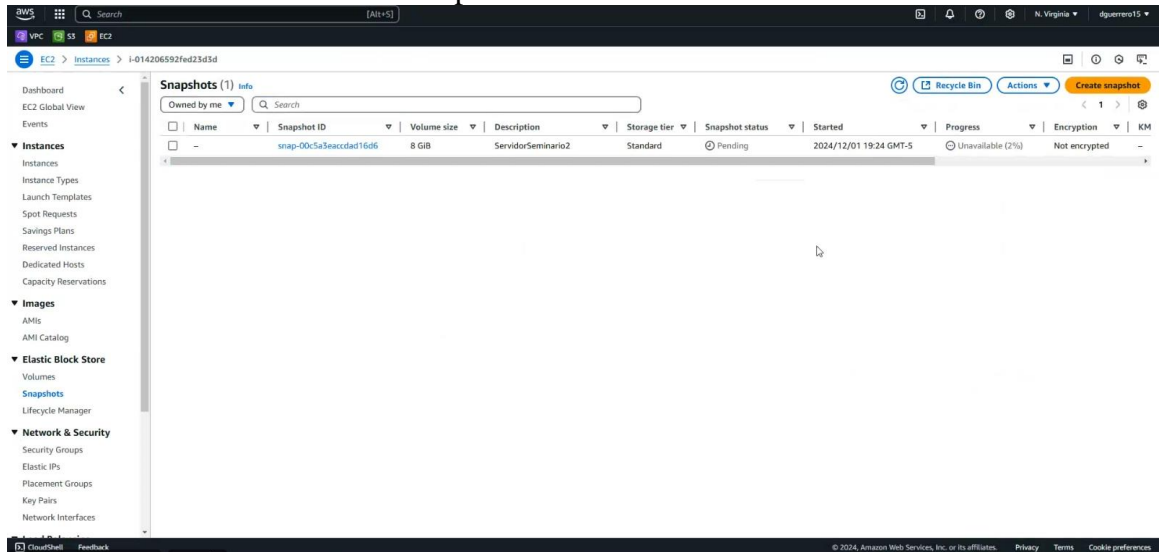
No tags associated with the resource.

Add tag

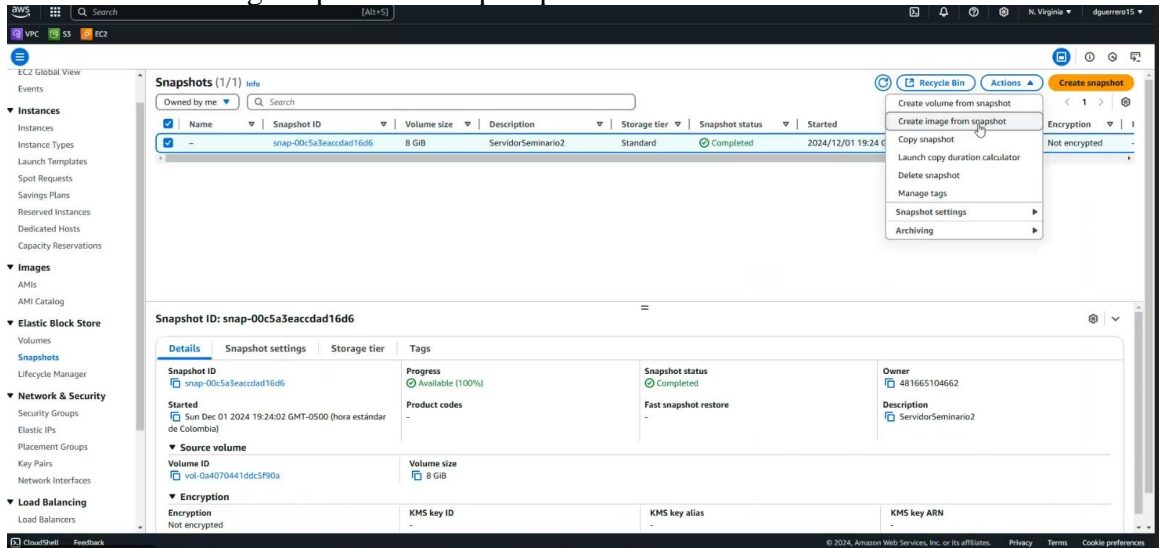
You can add 50 more tags.

Cancel Create snapshot

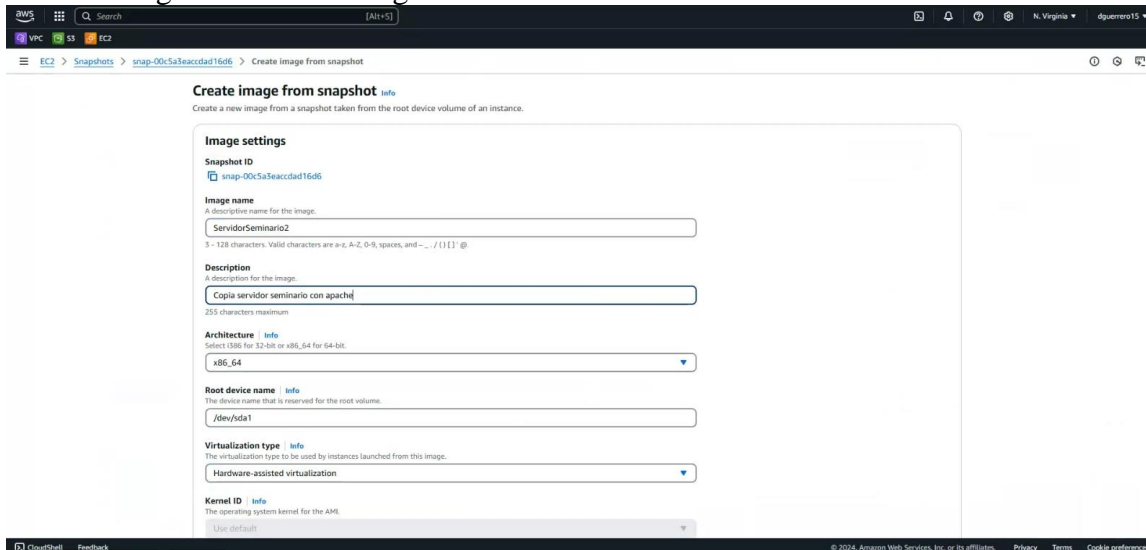
3. Paso: Evidencia de creación de snapshot



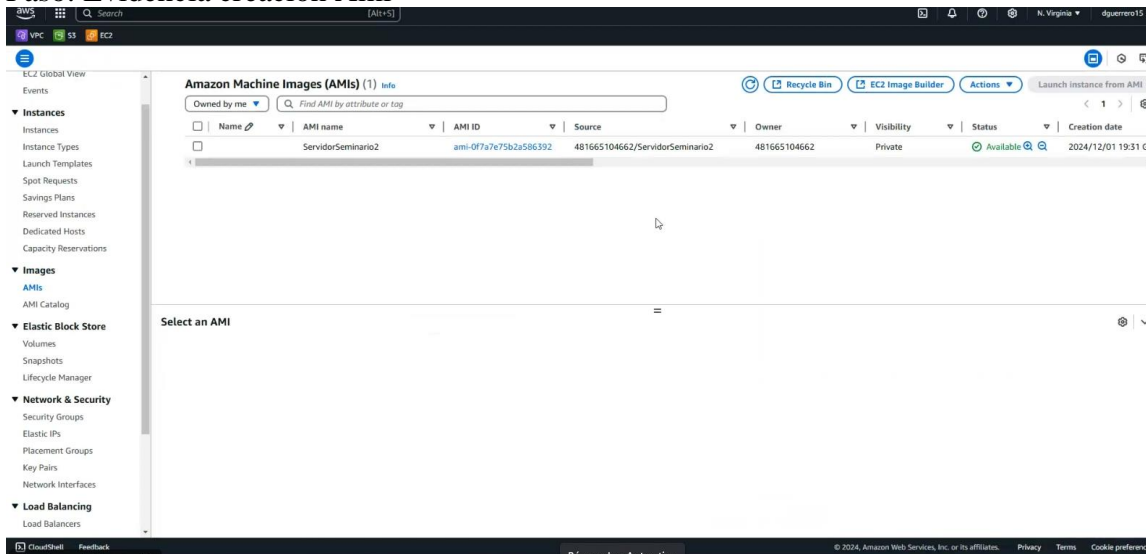
4. Paso: Sea crea imagen apartir de Snapshop



5. Paso: Configuración de la imagen



6. Paso: Evidencia creación Ami



7. Paso: Se crea instancia apartir de Ami

Launch an instance info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags info

Name
 [Add additional tags](#)

Application and OS Images (Amazon Machine Image) info

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

Recents **My AMIs** Quick Start

Owned by me Shared with me

[Browse more AMIs](#)
Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

ServidorSeminario2
 ami-0f7a7e75b2a586392 Virtualization: hvm ENA enabled: true Root device type: ebs

Description
 Copia servidor seminario con apache

Summary

Number of instances info

Software Image (AMI)
 Copia servidor seminario con a...[read more](#)
 ami-0f7a7e75b2a586392

Virtual server type (instance type)
 t2.micro

Firewall (security group)
 New security group

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

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

[Cancel](#) [Launch instance](#) [Preview code](#)

8. Paso: Configuración de instancia

Instance type info [Get advice](#)

Instance type
 t2.micro Free tier eligible

Family: t2 1 vCPU 1 GiB Memory Current generation: true
 On-Demand Windows base pricing: 0.0162 USD per Hour
 On-Demand Ubuntu Pro base pricing: 0.0134 USD per Hour
 On-Demand SUSE base pricing: 0.0118 USD per Hour
 On-Demand RHEL base pricing: 0.026 USD per Hour
 On-Demand Linux base pricing: 0.0116 USD per Hour

All generations [Compare instance types](#)

Additional costs apply for AMIs with pre-installed software

Key pair (login) info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - **required**
 [Create new key pair](#)

Network settings info [Edit](#)

Network info
 vpc-01a5d605f98cfd69

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 groups) info

Summary

Number of instances info

Software Image (AMI)
 Copia servidor seminario con a...[read more](#)
 ami-0f7a7e75b2a586392

Virtual server type (instance type)
 t2.micro

Firewall (security group)
 New security group

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

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

[Cancel](#) [Launch instance](#) [Preview code](#)

9. Paso: Selección de vpc y selección subnet publica

Network settings

VPC - required
vpc-06a1b582e4ae8433f (seminario-vpc)

Subnet
subnet-0e612147a80d6f7e8 (seminario-subnet-public1-us-east-1a)

Auto-assign public IP
Enable

Firewall (security groups)
Create security group (selected)

Security group name - required
launch-wizard-1

Description - required
launch-wizard-1 created 2024-12-02T00:32:08.542Z

Inbound Security Group Rules

| Type | Protocol | Port range |
|------|----------|------------|
| ssh | TCP | 22 |

Summary

Number of instances: 1

Software Image (AMI): Copia servidor seminario con a...

Virtual server type (instance type): t2.micro

Firewall (security group): New security group

Storage (volumes): 1 volume(s) - 8 GB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

10. Paso: Configuración de reglas de entrada y salida

Inbound Security Group Rules

Security group rule 1 (TCP: 22, 0.0.0.0/0)

| Type | Protocol | Port range | Source type | Source | Description - optional |
|------|----------|------------|-------------|-----------|----------------------------|
| ssh | TCP | 22 | Anywhere | 0.0.0.0/0 | e.g. SSH for admin desktop |

Security group rule 2 (TCP: 80, 0.0.0.0/0)

| Type | Protocol | Port range | Source type | Source | Description - optional |
|------------|----------|------------|-------------|-----------|----------------------------|
| Custom TCP | TCP | 80 | Custom | 0.0.0.0/0 | e.g. SSH for admin desktop |

Warning: 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.

Summary

Number of instances: 1

Software Image (AMI): Copia servidor seminario con a...

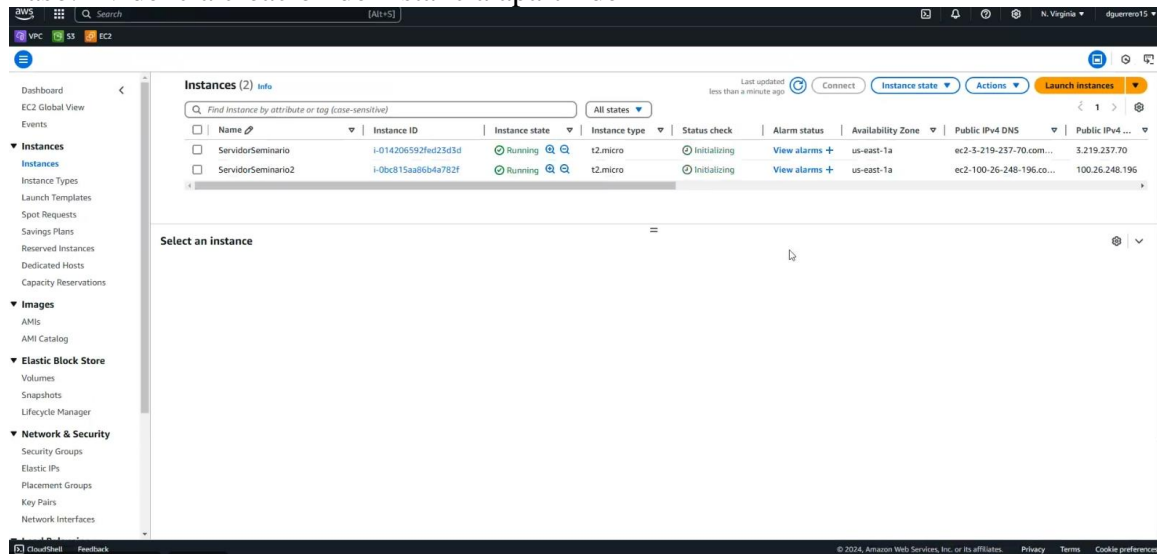
Virtual server type (instance type): t2.micro

Firewall (security group): New security group

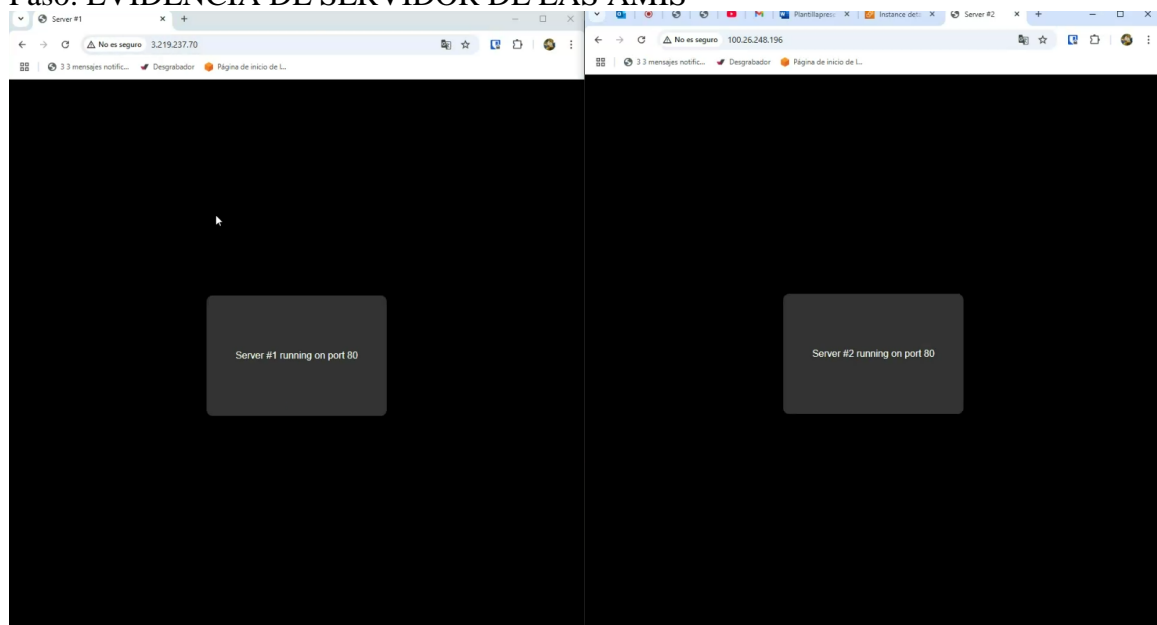
Storage (volumes): 1 volume(s) - 8 GB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

11. Paso: Evidencia creación de instancia apartir de Ami



12. Paso: EVIDENCIA DE SERVIDOR DE LAS AMIS



13. Paso: Creación de subnet para balanceador de carga

Services [Alt+S] | [N. Virginia] | [dguerra15]

VPC > Subnets > Create subnet

Create subnet info

VPC

VPC ID
Create subnets in this VPC
vpc-06a7b302e4ae8433f (seminario-vpc)

Associated VPC CDRs

IPv4 CDRs
10.0.0.0/16

Subnet settings
Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name
Create a tag with a key of 'Name' and a value that you specify.
subnet-public-elb
The name can be up to 256 characters long.

Availability Zone info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.
US East (N. Virginia) / us-east-1b

IPv4 VPC CDR block info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.
10.0.0.0/16

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14. Paso: Detalles de subnet

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name
Create a tag with a key of 'Name' and a value that you specify.
subnet-public-elb
The name can be up to 256 characters long.

Availability Zone info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.
US East (N. Virginia) / us-east-1b

IPv4 VPC CDR block info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.
10.0.0.0/16

IPv4 subnet CDR block
10.0.192.0/20 4096 IPs

▼ Tags - optional

| Key | Value - optional | |
|------|-------------------|--------|
| Name | subnet-public-elb | Remove |

Add new tag
You can add 49 more tags.

Remove

Add new subnet

Cancel Create subnet

cloudShell Feedback | Microsoft Store | Services, Inc. or its affiliates. Privacy Terms Cookie preferences

15. Paso: Evidencia creación subnet

The screenshot shows the AWS VPC console interface. A green notification banner at the top states: "You have successfully created 1 subnet: subnet-00cc3d975df4bf7f". The main content area displays the "Subnets (1) info" page. A search bar is present with the text "Find resources by attribute or tag". Below it, a table lists the created subnet:

| Name | Subnet ID | State | VPC | Block Public... | IPv4 CIDR | IPv6 CIDR |
|-------------------|-------------------------|-----------|----------------------------------|-----------------|---------------|-----------|
| subnet-public-elb | subnet-00cc3d975df4bf7f | Available | vpc-06a1b382e4ae8433f semin... | Off | 10.0.192.0/20 | - |

Below the table, there is a "Select a subnet" section with a search bar and a "Create subnet" button.

16. Paso: Lista de subnets

The screenshot shows the AWS VPC console interface displaying a list of subnets. A green notification banner at the top states: "You have successfully created 1 subnet: subnet-00cc3d975df4bf7f". The main content area displays the "Subnets (1/9) info" page. A search bar is present with the text "Find resources by attribute or tag". Below it, a table lists the subnets:

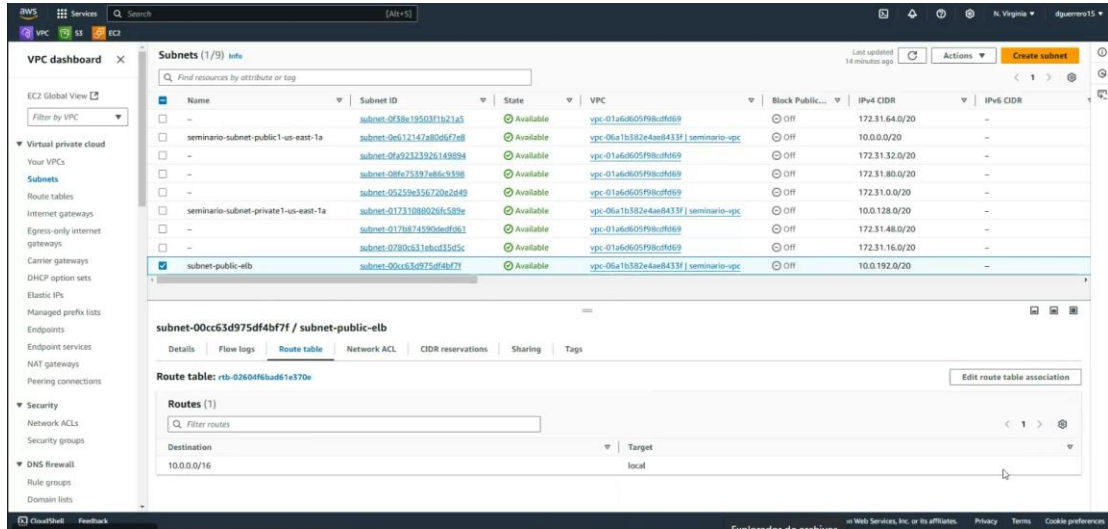
| Name | Subnet ID | State | VPC | Block Public... | IPv4 CIDR | IPv6 CIDR |
|---------------------------------------|---------------------------|-----------|---------------------------------------|-----------------|----------------|-----------|
| - | subnet-0f38e1950311b21a5 | Available | vpc-01a6d05f9bcbf609 | Off | 172.31.64.0/20 | - |
| seminario-subnet-public-1-us-east-1a | subnet-0a6512147a80a6f7e8 | Available | vpc-06a1b382e4ae8433f seminario-vpc | Off | 10.0.0.0/20 | - |
| - | subnet-0f9232326149a934 | Available | vpc-01a6d05f9bcbf609 | Off | 172.31.32.0/20 | - |
| - | subnet-08f72597e8b-9398 | Available | vpc-01a6d05f9bcbf609 | Off | 172.31.80.0/20 | - |
| - | subnet-02255e356720e2d89 | Available | vpc-01a6d05f9bcbf609 | Off | 172.31.0.0/20 | - |
| seminario-subnet-private-1-us-east-1a | subnet-017310880261580e | Available | vpc-06a1b382e4ae8433f seminario-vpc | Off | 10.0.128.0/20 | - |
| - | subnet-017b874590a0e0ff61 | Available | vpc-01a6d05f9bcbf609 | Off | 172.31.48.0/20 | - |
| - | subnet-0780c631ebcd15d5c | Available | vpc-01a6d05f9bcbf609 | Off | 172.31.16.0/20 | - |
| subnet-public-elb | subnet-00cc3d975df4bf7f | Available | vpc-06a1b382e4ae8433f seminario-vpc | Off | 10.0.192.0/20 | - |

Below the table, there is a "Select a subnet" section with a search bar and a "Create subnet" button. The selected subnet, "subnet-00cc3d975df4bf7f / subnet-public-elb", is shown in the details view below:

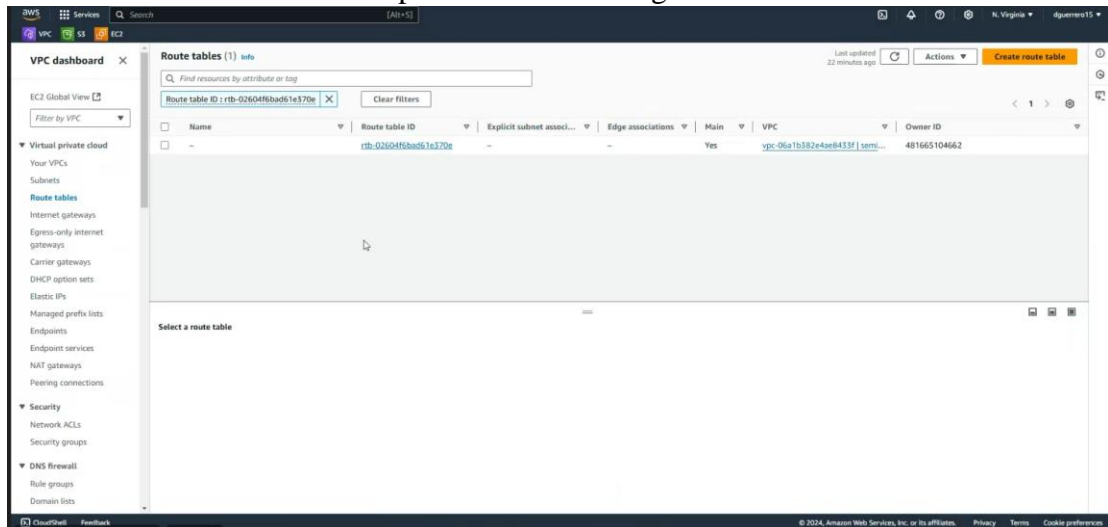
Details

- Subnet ID: subnet-00cc3d975df4bf7f
- Subnet ARN: arn:aws:ec2:us-east-1:481665:104662:subnet/subnet-00cc3d975df4bf7f
- State: Available
- Block Public Access: Off
- IPv4 CIDR: 10.0.192.0/20
- Available IPv4 addresses: 4091
- IPv6 CIDR: -
- IPv6 CIDR association ID: -
- Availability Zone: us-east-1b
- Availability Zone ID: -
- Network border group: us-east-1
- VPC: vpc-06a1b382e4ae8433f | seminario-vpc

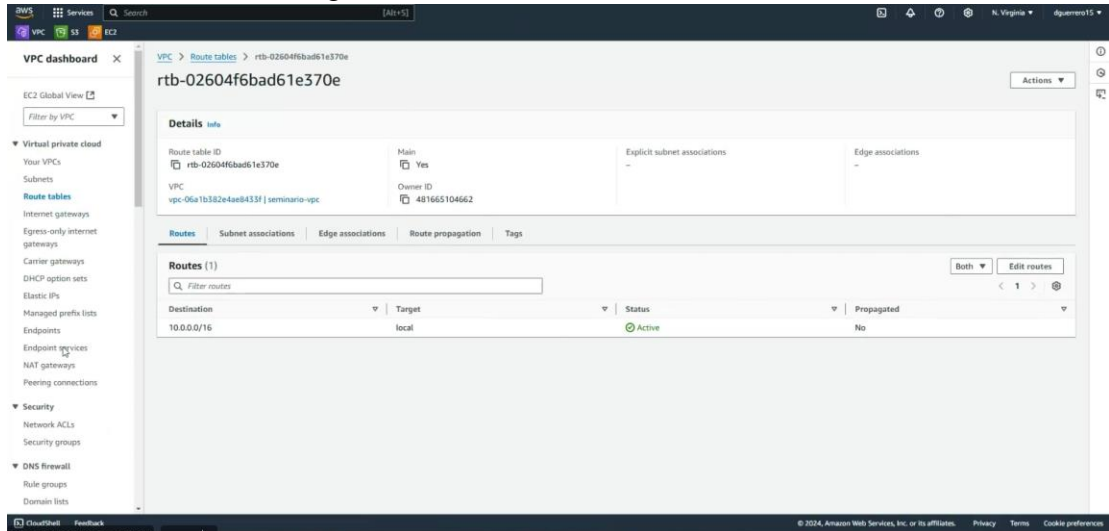
17. Paso: Detalle del route table



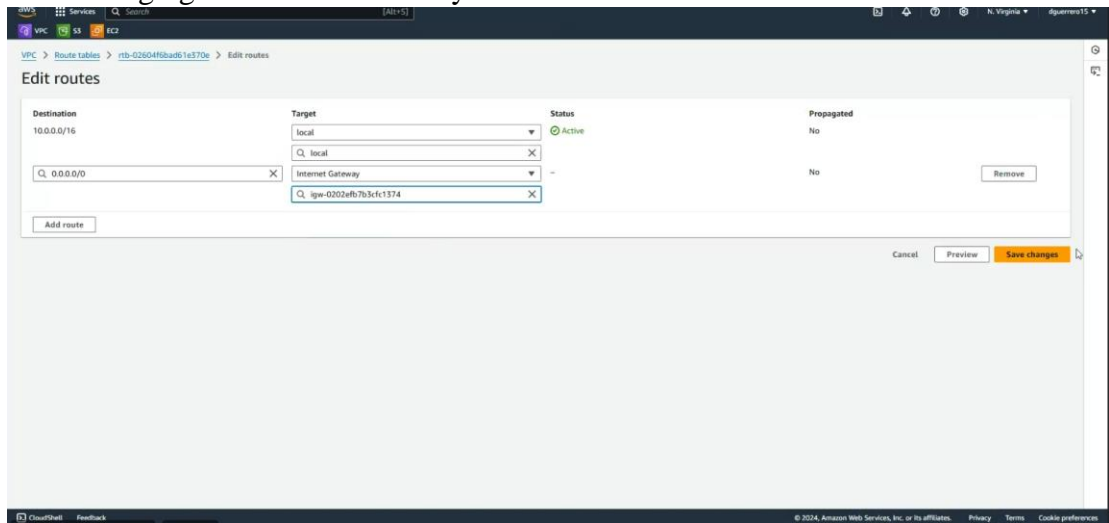
18. Paso: Selección de route table para selección de reglas



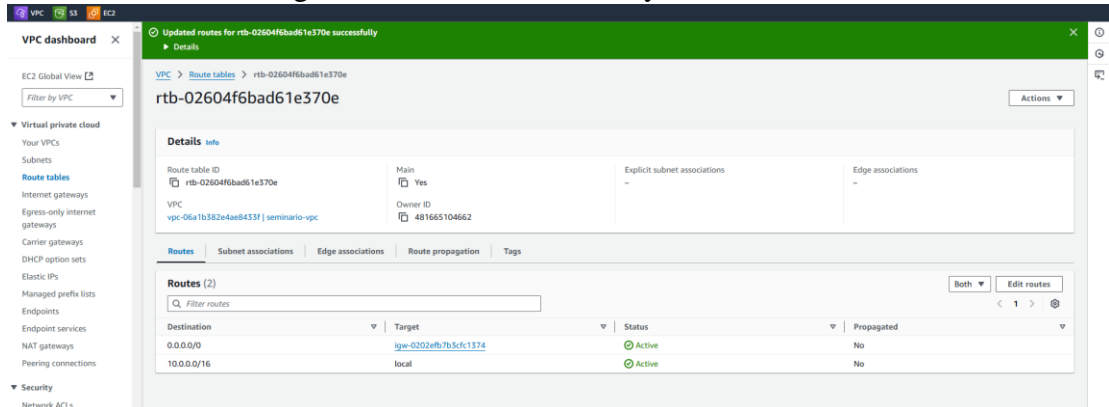
19. Paso: Modificación de reglas



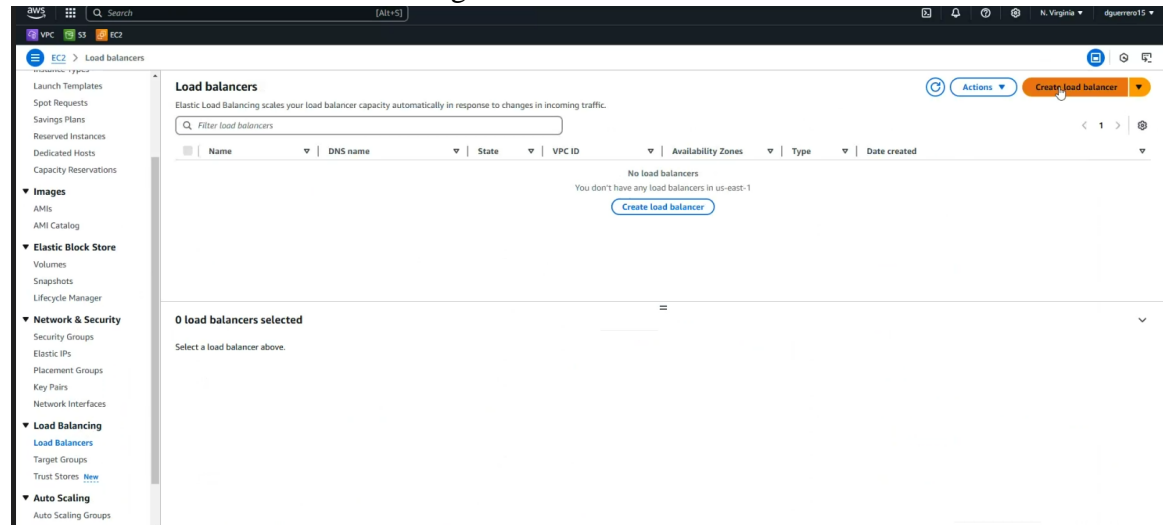
20. Paso: Se agrega el internet Gateway a la subnet



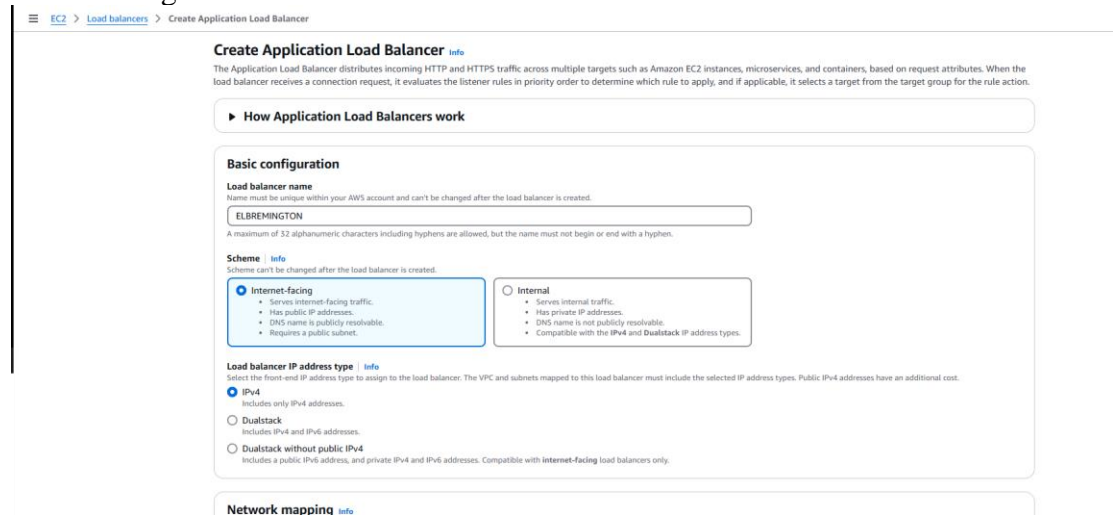
21. Paso: Evidencia de asignación de internet Gateway



22. Paso: Creación balanceador de carga



23. Paso: Configuración balanceador



24. Paso: Configuración de vpc

EC2 > Load balancers > Create Application Load Balancer

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

VPC Info
The load balancer will exist and scale within the selected VPC. The selected VPC is also where the load balancer targets must be hosted unless routing to Lambda or on-premises targets, or if using VPC peering. To confirm the VPC for your targets, view [target group](#). For a new VPC, [create a VPC](#).

seminario-vpc
vpc-06a1b382e4ae8433f
IPv4 VPC CIDR: 10.0.0.0/16

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

Availability Zones
 us-east-1a (use1-az1)

Subnet
subnet-0e512147a80d6f7e8 seminar-subnet-public1-us-east-1a
IPv4 subnet CIDR: 10.0.0.0/20

IPv4 address
Assigned by AWS

us-east-1b (use1-az2)

Subnet
subnet-00cc5d975df4bf7f1 subnet-public-elb
IPv4 subnet CIDR: 10.0.192.0/20

IPv4 address
Assigned by AWS

25. Paso: Creacion de security group y regla de entrada al puerto 80

EC2 > Security Groups > Create security group

Create security group Info
A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name Info
SG_ELB
Name cannot be edited after creation.

Description Info
ELB TEST SEMINARIO

VPC Info
vpc-06a1b382e4ae8433f (seminario-vpc)

Inbound rules Info

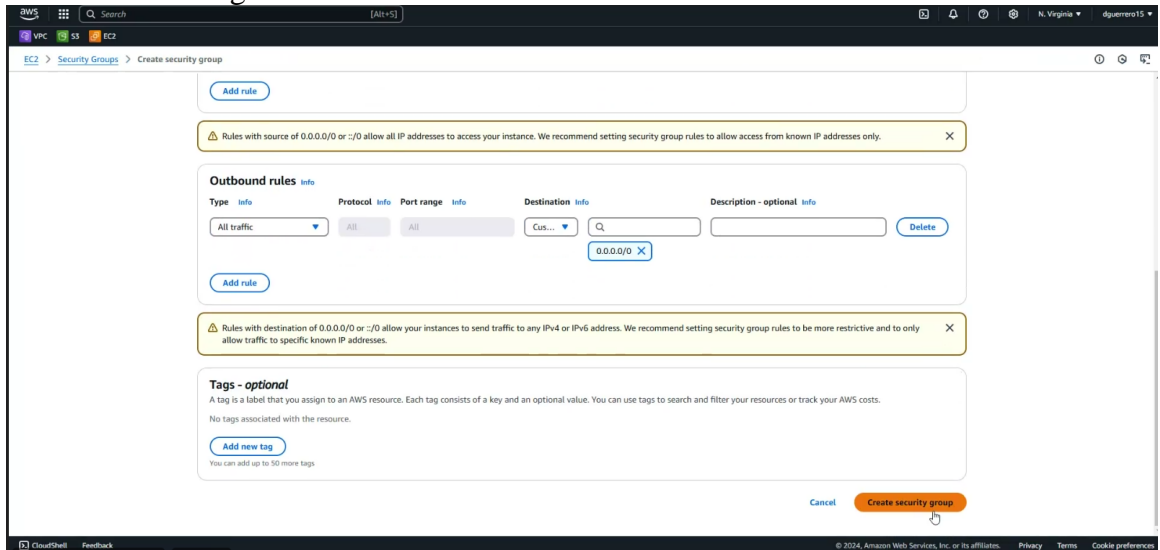
| Type | Protocol | Port range | Source | Description - optional |
|------------|----------|------------|--------|------------------------|
| Custom TCP | TCP | 80 | Any | 0.0.0.0/0 |
| | | | | 0.0.0.0/0 |

[Add rule](#) [Delete](#)

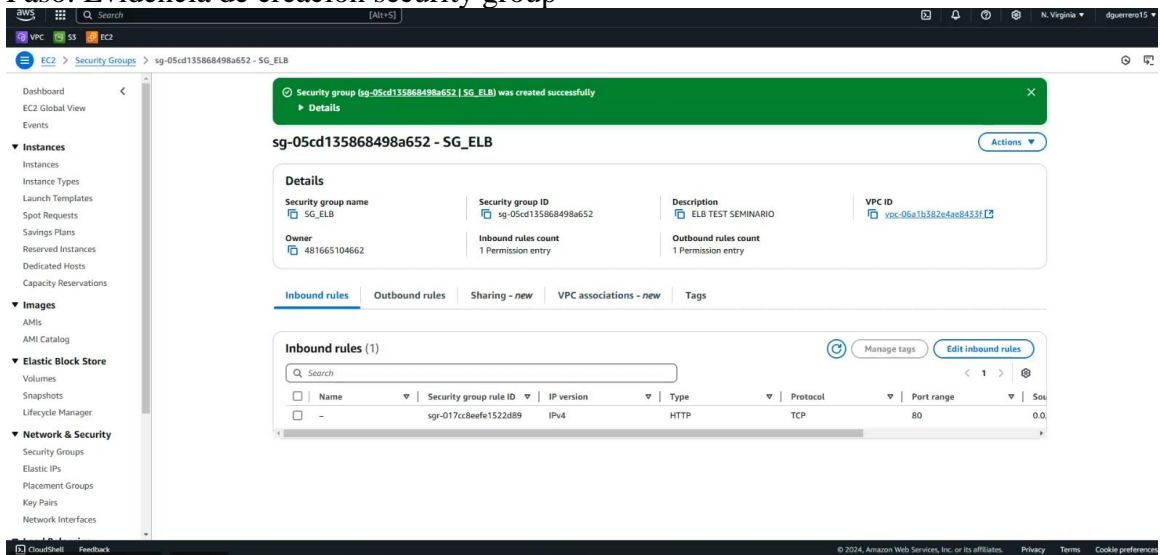
Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Outbound rules Info

26. Paso: Se añade regla de salida de todo el trafico



27. Paso: Evidencia de creación security group



28. Paso: Creación de target group

Protocol : Port
Choose a protocol for your target group that corresponds to the Load Balancer type that will route traffic to it. Some protocols now include anomaly detection for the targets and you can set mitigation options once your target group is created. This choice cannot be changed after creation.

HTTP 80
1-65535

IP address type
Only targets with the indicated IP address type can be registered to this target group.

IPv4
Each instance has a default network interface (eth0) that is assigned the primary private IPv4 address. The instance's primary private IPv4 address is the one that will be applied to the target.

IPv6
Each instance you register must have an assigned primary IPv6 address. This is configured on the instance's default network interface (pnet0). [Learn more](#)

VPC
Select the VPC with the instances that you want to include in the target group. Only VPCs that support the IP address type selected above are available in this list.

seminario-vcpc
vpc-061b382d-4ae8453f
IPv4 VPC CIDR: 10.0.0.0/16

Protocol version

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

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

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

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

Health check protocol
HTTP

29. Paso: Configuración target group

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

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

Health check protocol
HTTP

Health check path
Use the default path of "/" to perform health checks on the root, or specify a custom path if preferred.

/

Up to 1024 characters allowed.

► **Advanced health check settings**

Attributes
Certain default attributes will be applied to your target group. You can view and edit them after creating the target group.

► **Tags - optional**
Consider adding tags to your target group. Tags enable you to categorize your AWS resources so you can more easily manage them.

Cancel Next

30. Paso: Se seleccionan las 2 instancias y se incluyen como pendiente a continuación

The screenshot shows the 'Register targets' step in the AWS Management Console. The 'Available instances (2)' table lists two instances:

| Instance ID | Name | State | Security groups | Zone | Private IPv4 address | Subnet |
|--|--------------------|---------|-----------------|------------|----------------------|---------|
| <input type="checkbox"/> i-014206592fed23d5d | ServidorSeminario | Running | SG_seminario | us-east-1a | 10.0.2.109 | subnet- |
| <input type="checkbox"/> i-0bc815aa86b4a782f | ServidorSeminario2 | Running | launch-wizard-1 | us-east-1a | 10.0.6.53 | subnet- |

Below the table, the 'Ports for the selected instances' field contains '80'. The 'Include as pending below' button is visible.

The 'Review targets' section shows 'Targets (0)' and a 'Remove all pending' button.

31. Paso: Evidencia de las 2 instancias

The screenshot shows the 'Review targets' step in the AWS Management Console. The 'Available instances (2)' table is the same as in the previous step. The 'Ports for the selected instances' field contains '80'. Below it, a message states: '2 selections are now pending below. Include more or register targets when ready.' The 'Include as pending below' button is now disabled.

The 'Review targets' section shows 'Targets (2)'. The 'Show only pending' toggle is turned on. The 'Targets (2)' table lists the two instances with their respective ports:

| Instance ID | Name | Port | State | Security groups | Zone | Private IPv4 address | Subnet ID | Launch time |
|---------------------|--------------------|------|---------|-----------------|------------|----------------------|-------------------------|-------------------------------------|
| i-014206592fed23d5d | ServidorSeminario | 80 | Running | SG_seminario | us-east-1a | 10.0.2.109 | subnet-0e612147a80df7e8 | December 1, 2024, 19:39 (UTC-05:00) |
| i-0bc815aa86b4a782f | ServidorSeminario2 | 80 | Running | launch-wizard-1 | us-east-1a | 10.0.6.53 | subnet-0e612147a80df7e8 | December 1, 2024, 19:38 (UTC-05:00) |

The 'Remove all pending' button is now active.

32. Paso: Evidencia de target group

Successfully created the target group: **TGREMINOTON**. Anomaly detection is automatically applied to all registered targets. Results can be viewed in the **Targets** tab.

TGREMINOTON

Details

Target type: Instance
 Protocol: Port: HTTP: 80
 Protocol version: HTTP1
 VPC: vpc-06a1b382e4ae8433f

IP address type: IPv4
 Load balancer: None associated

| | | | | | |
|---------------|-------------|-----------|--------|---------|----------|
| 2 | 0 | 0 | 2 | 0 | 0 |
| Total targets | Healthy | Unhealthy | Unused | Initial | Draining |
| | 0 Anomalous | | | | |

► **Distribution of targets by Availability Zone (AZ)**
 Select values in this table to see corresponding filters applied to the Registered targets table below.

Targets | Monitoring | Health checks | Attributes | Tags

Registered targets (2) [info](#) [Anomaly mitigation: Not applicable](#) [Deregister](#) [Register targets](#)

Target groups route requests to individual registered targets using the protocol and port number specified. Health checks are performed on all registered targets according to the target group's health check settings. Anomaly detection is automatically applied to HTTP/HTTPS target groups with at least 3 healthy targets.

Filter targets

33. Paso: Evidencia de creación balanceador

Successfully created load balancer: **ELBREMINOTON**. It might take a few minutes for your load balancer to fully set up and route traffic. Targets will also take a few minutes to complete the registration process and pass initial health checks.

ELBREMINOTON

Details

Load balancer type: Application
 Status: Provisioning
 VPC: vpc-06a1b382e4ae8433f
 Load balancer IP address type: IPv4

Scheme: Internet-facing
 Hosted zone: Z35SXDOTRQ7X7K
 Availability Zones: us-east-1a (subnet-0e612147a80d6f7e8) (use 1-az1), us-east-1b (subnet-00cc63d975df4bf7f) (use 1-az2)
 Date created: December 1, 2024, 21:04 (UTC-05:00)

Load balancer ARN: arn:aws:elasticloadbalancing:us-east-1:481665:104662:loadbalancer/app/ELBREMINOTON/51429af3f93040e4
 DNS name: ELBREMINOTON-252961589-us-east-1.elb.amazonaws.com (A Record)

Listeners and rules (1) [info](#) [Manage rules](#) [Manage listener](#) [Add listener](#)

A listener checks for connection requests on its configured protocol and port. Traffic received by the listener is routed according to the default action and any additional rules.

Filter listeners

| Protocol:Port | Default action | Rules | ARN | Security policy | Default SSL/TLS certificate |
|---------------|-------------------------|-------|-----|-----------------|-----------------------------|
| | Forward to target group | | | | |

34. Paso: se acceso al security group del balanceador

ARC zonal shift for Application Load Balancers has changed Learn more ×

- Use of Amazon Application Recovery Controller (ARC) zonal shift now requires the Application Load Balancer attribute **ARC zonal shift integration** to be enabled.
- ARC zonal shift now supports cross-zone enabled Application Load Balancers.

Load balancers (1/1) Actions Create load balancer

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

Filter load balancers

| Name | DNS name | State | VPC ID | Availability Zones | Type | Date created |
|--------------|--------------------------|--------|-----------------------|----------------------|-------------|-------------------------------------|
| ELBREMINGTON | ELBREMINGTON-25296138... | Active | vpc-06a1b382e4ae8433f | 2 Availability Zones | application | December 1, 2024, 21:04 (UTC-05:00) |

Load balancer: ELBREMINGTON

Details | Listeners and rules | Network mapping | Resource map - new | **Security** | Monitoring | Integrations | Attributes | Capacity - new | Tags

Security groups (1) Edit

A security group is a set of firewall rules that control the traffic to your load balancer.

| Security Group ID | Name | Description |
|----------------------|---------|----------------------------|
| sg-0df760c05a1e5d381 | default | default VPC security group |

35. Paso: Se agrega el security group para el balanceador

EC2 > Load balancers > ELBREMINGTON > Edit security groups

Edit security groups

▶ Load balancer details: ELBREMINGTON

Security groups
A security group is a set of firewall rules that control the traffic to your load balancer. Select an existing security group, or you can create a new security group.

Security groups
Select up to 5 security groups

SG_ELB sg-05cd133868498a652 VPC: vpc-06a1b382e4ae8433f × default sg-0df760c05a1e5d381 VPC: vpc-06a1b382e4ae8433f ×

Cancel Save changes

36. Paso: Evidencia de balanceador con las dos instancias saludables

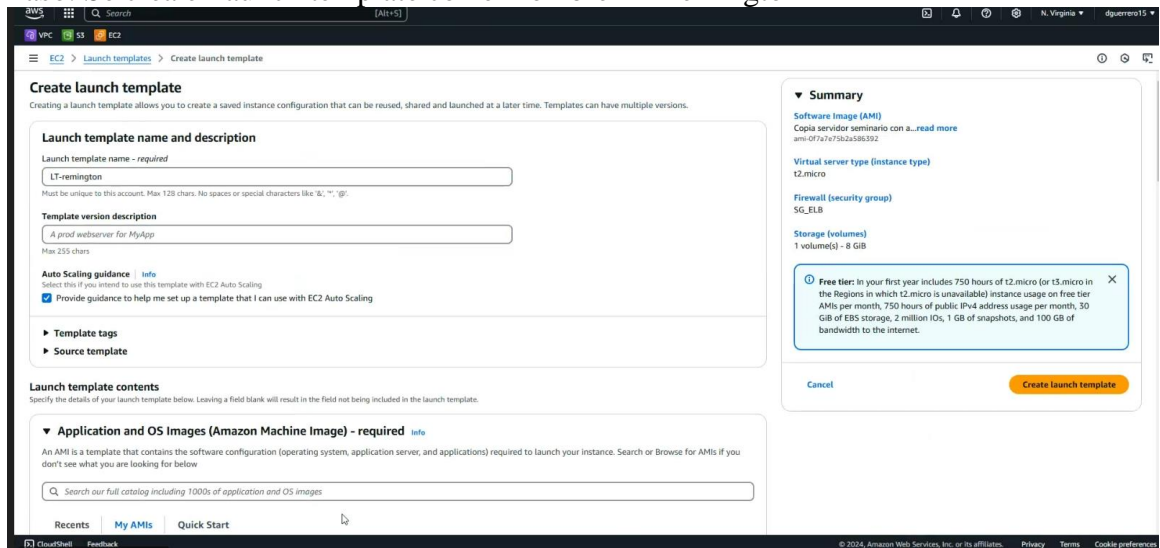
The screenshot displays the AWS Management Console interface for a Target Group named 'TGREMINGTON'. The 'Registered targets' section shows two instances with a 'Healthy' status.

| Instance ID | Name | Port | Zone | Health status | Health status details | Admini... | Overri... |
|---------------------|------------------|------|--------------------|---------------|-----------------------|--------------|--------------|
| i-014206592fed23d3d | ServidorSemin... | 80 | us-east-1a (us...) | Healthy | - | No override. | No overri... |
| i-0bc815aa86b4a782f | ServidorSemin... | 80 | us-east-1a (us...) | Healthy | - | No override. | No overri... |

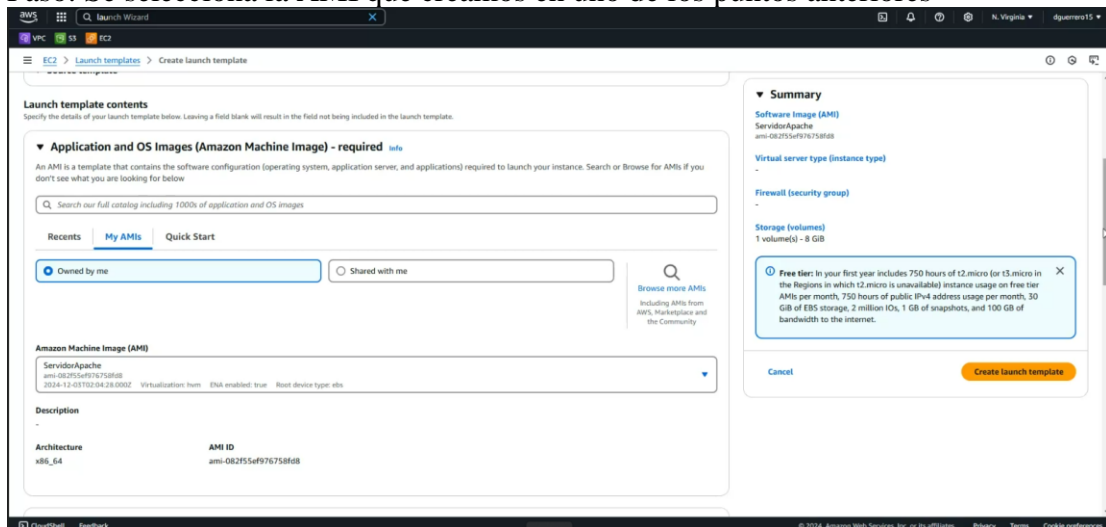
37. Paso: Evidencia balanceador funcionando hacia las 2 instancias

The screenshot shows a web browser window with a message box displayed in the center. The message box contains the text: "Server #1 running on port 80".

38. Paso: Se crea el launch template con el nombre LT-remington



39. Paso: Se selecciona la AMI que creamos en uno de los puntos anteriores



40. Paso: Se selecciona el tipo de instancia en este caso de tipo free, se selecciona la llave ya creada por reutilización con motivo de poder acceder a la instancia también escogemos el security group del seminario el cual contiene el acceso al

puerto 22 y al 80

Instance type | Get advice

Instance type: t2.micro (Free tier eligible)

Key pair (login)

Key pair name: SeminarialKeyPair

Network settings

Subnet: Don't include in launch template

Firewall (security groups): Select existing security group

Security groups: SG_seminario sg-05aa8235a8501ca41

Summary

Software Image (AMI): Copia servidor seminario con a...
Virtual server type (instance type): t2.micro
Firewall (security group): SG_seminario
Storage (volumes): 1 volume(s) - 8 GB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Create launch template

41. Paso: Configuración de la tarjeta de red solo escogemos que la ip publica sea auto asignada

Network settings

Subnet: Don't include in launch template

Firewall (security groups): Select existing security group

Common security groups: SG_seminario sg-05aa8235a8501ca41

Advanced network configuration

Network interface 1

Device index: 0

Network interface: New interface

Auto-assign public IP: Enable

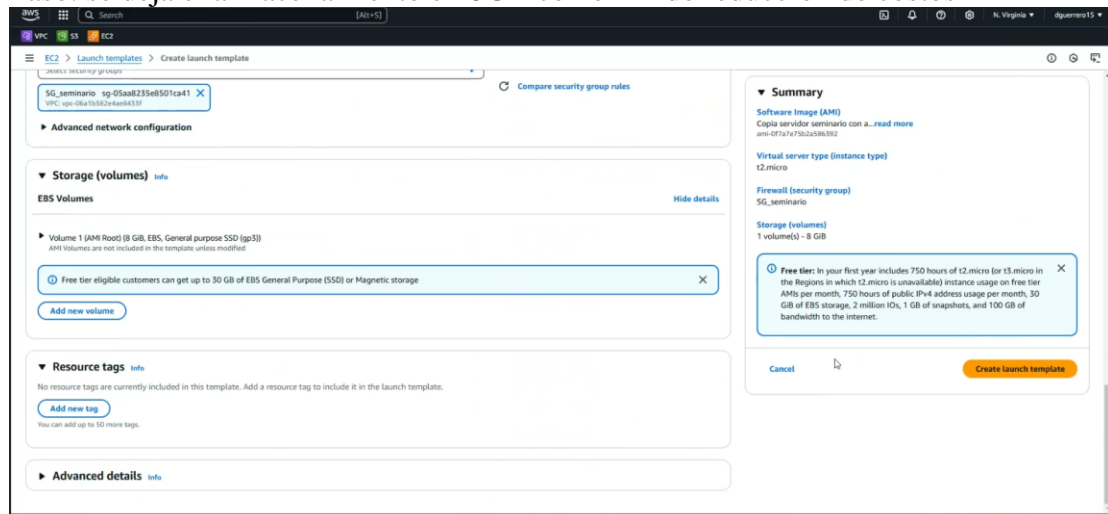
Summary

Software Image (AMI): ServidorApache
Virtual server type (instance type): t2.micro
Firewall (security group): SG_seminario
Storage (volumes): 1 volume(s) - 8 GB

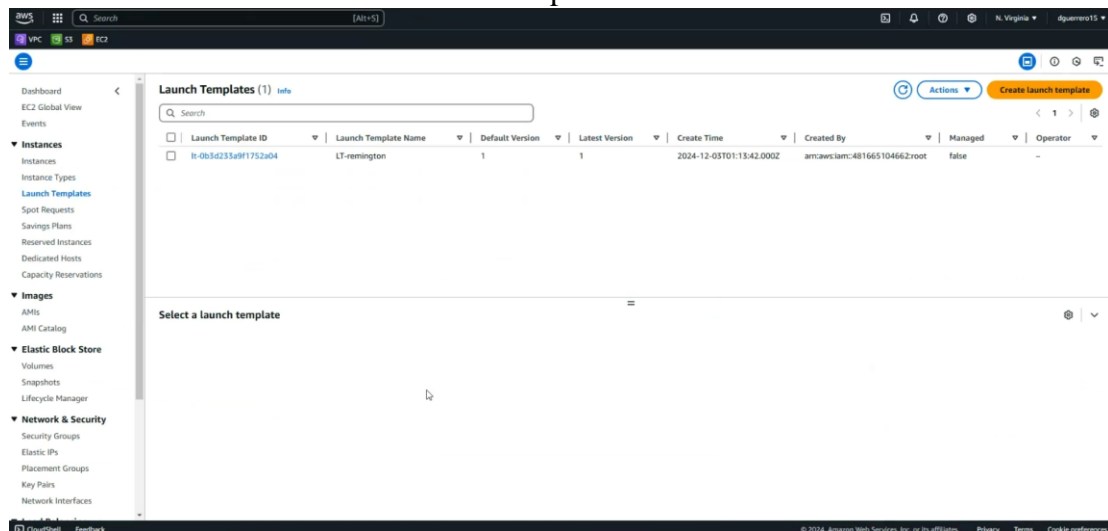
Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Create launch template

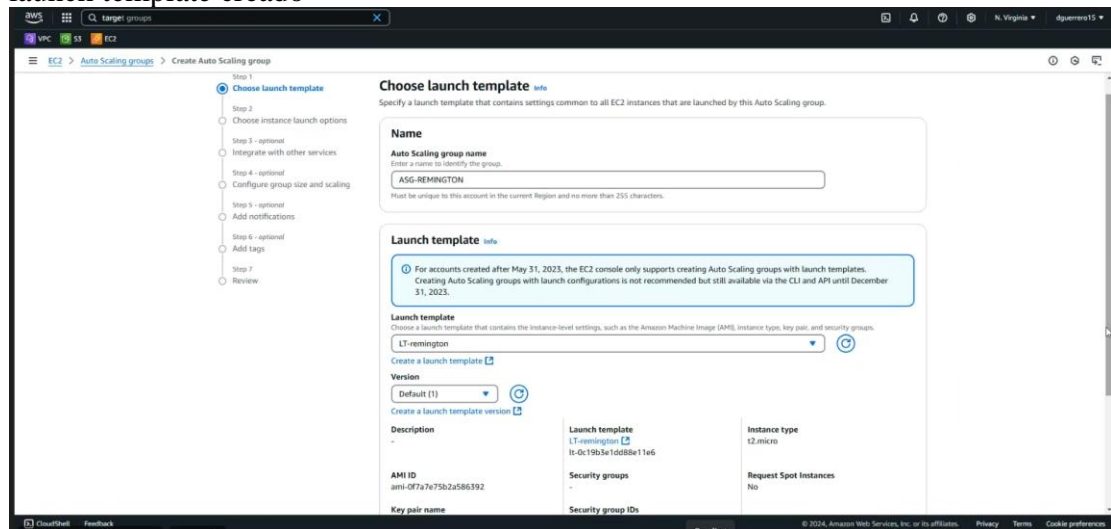
42. Paso: se deja el almacenamiento en 8GB con el fin de reducción de costos



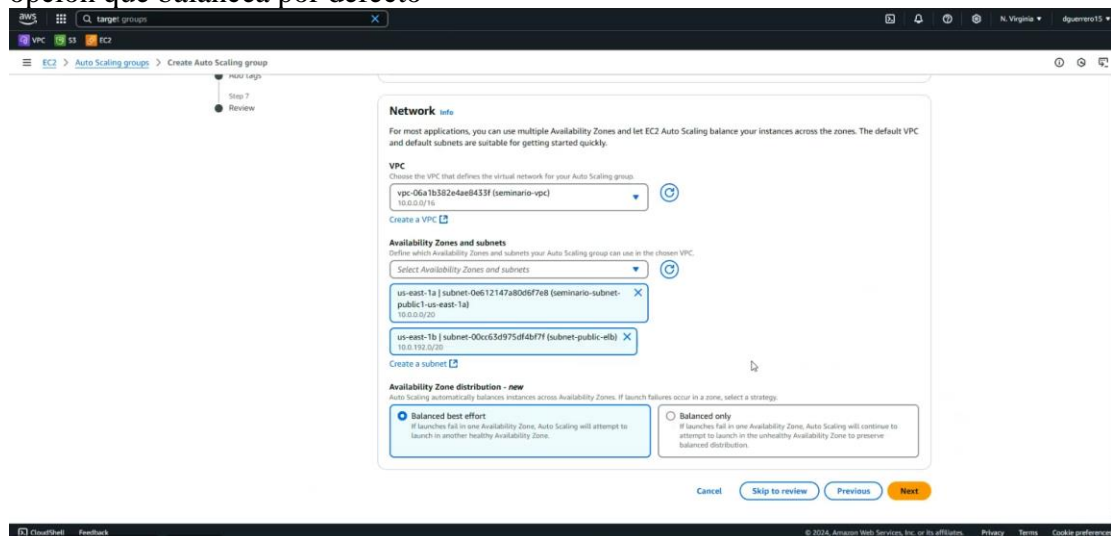
43. Paso: evidencia de creacion de launch template:



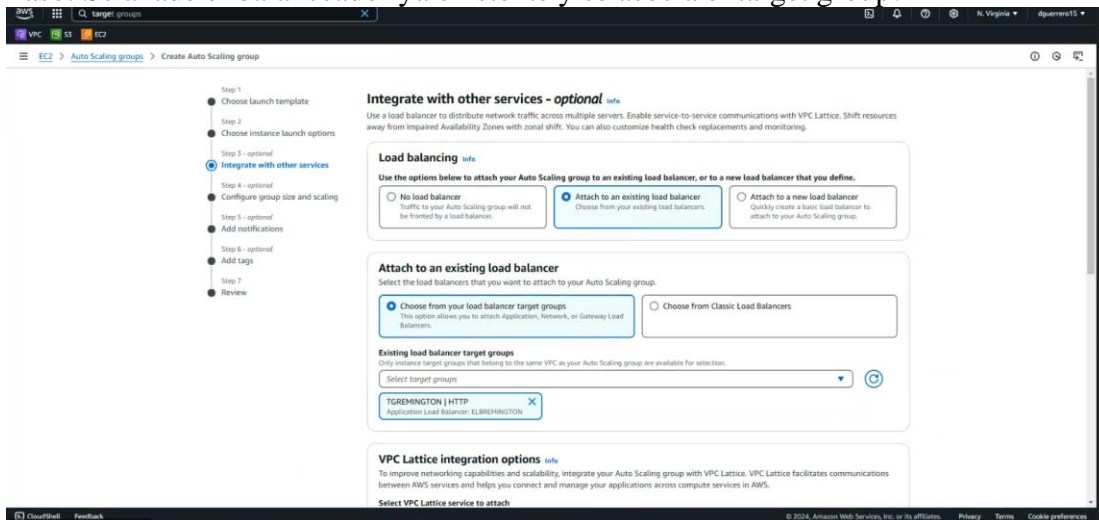
44. Paso: Paso siguiente es refrescar en la pantalla del auto scaling para escoger el launch template creado



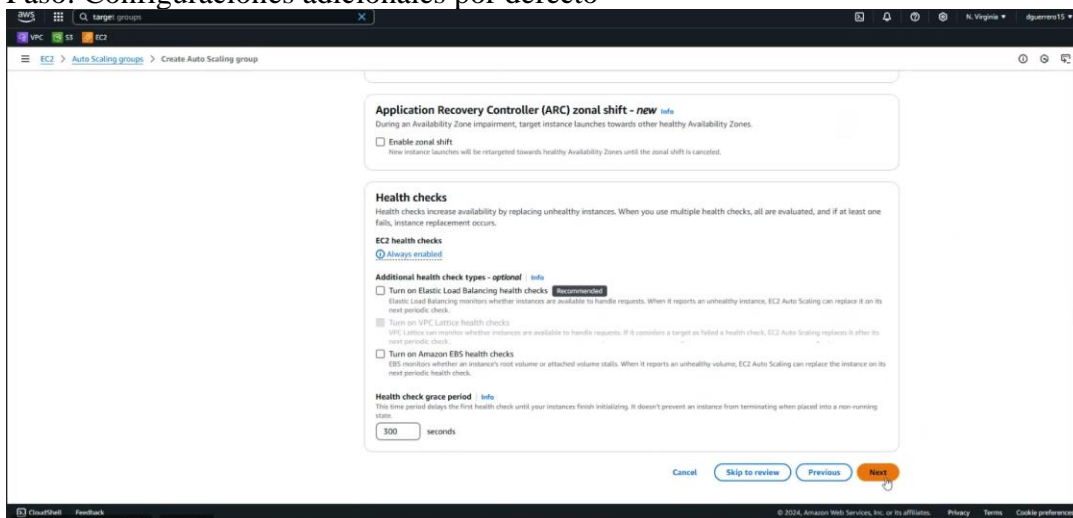
45. Paso: Se selecciona la VPC que contiene las dos subnets publicas se deja la opcion que balancea por defecto



46. Paso: Se añade el balanceador ya existente y se asocia el target group:



47. Paso: Configuraciones adicionales por defecto



48. Paso: Se configura el escalado por defecto 2 min 1 y max 2

The screenshot shows the 'Configure group size and scaling' step in the AWS console. The left sidebar lists steps from 1 to 7, with step 4 highlighted. The main content area is titled 'Configure group size and scaling - optional' and includes the following sections:

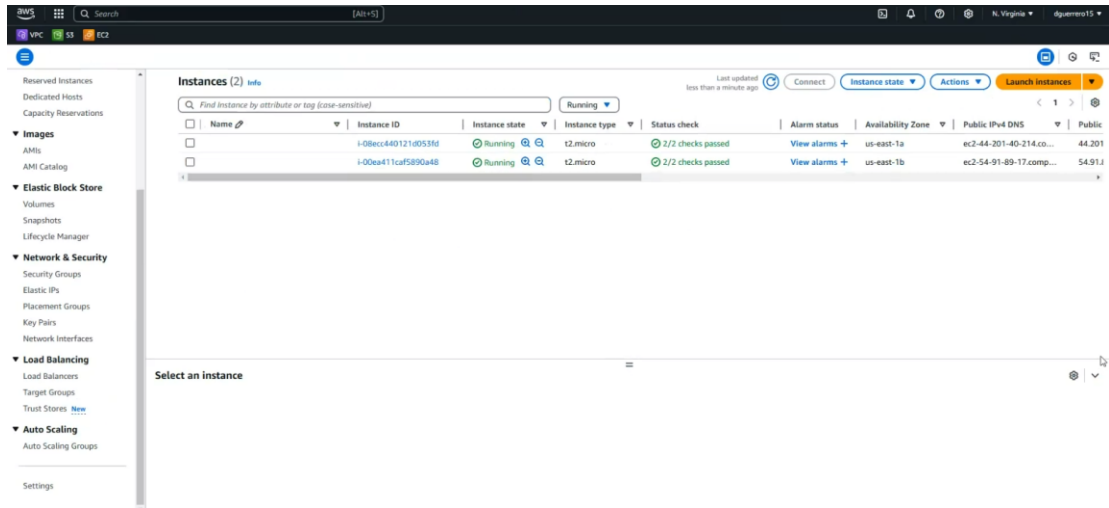
- Group size info:** 'Set the initial size of the Auto Scaling group. After creating the group, you can change its size to meet demand, either manually or by using automatic scaling.'
 - Desired capacity type:** A dropdown menu set to 'Limits (number of instances)'.
 - Desired capacity:** A text input field containing the value '2'.
- Scaling info:** 'You can resize your Auto Scaling group manually or automatically to meet changes in demand.'
 - Scaling limits:** 'Set limits on how much your desired capacity can be increased or decreased.'
 - Min desired capacity:** A text input field containing '1'.
 - Max desired capacity:** A text input field containing '2'.
- Automatic scaling - optional:** 'Choose whether to use a target tracking policy'.
 - No scaling policies:** 'Your Auto Scaling group will remain at its initial size and will not automatically resize to meet demand.'
 - Target tracking scaling policy:** 'Choose a CloudWatch metric, and target value and let the scaling policy adjust the desired capacity in proportion to the metric's value.'

49. Paso: evidencia de auto scaling creado

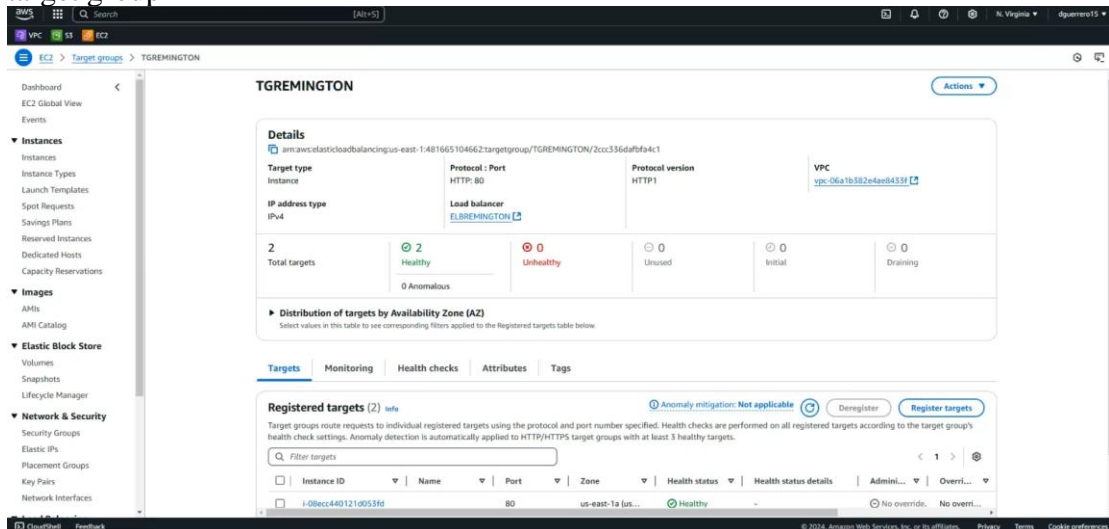
The screenshot shows the 'Auto Scaling groups' page in the AWS console. The page title is 'Auto Scaling groups (1)'. A search bar is present. Below the search bar is a table with the following columns: Name, Launch template/configuration, Instances, Status, Desired capacity, Min, Max, and Availability Zones. One group is listed:

| Name | Launch template/configuration | Instances | Status | Desired capacity | Min | Max | Availability Zones |
|---------------|--------------------------------|-----------|--------|------------------|-----|-----|------------------------|
| ASG-REMINGTON | LT-remington Version Default | 2 | - | 2 | 1 | 2 | us-east-1a, us-east-1b |

50. Paso: Evidencia de las dos tareas iniciando



51. Paso: Evidencia del healthy saludable sobre las dos instancias registradas en el target group



Url entrega 2: <https://www.youtube.com/watch?v=mPYi2FK-9SA>

ENTREGA FINAL

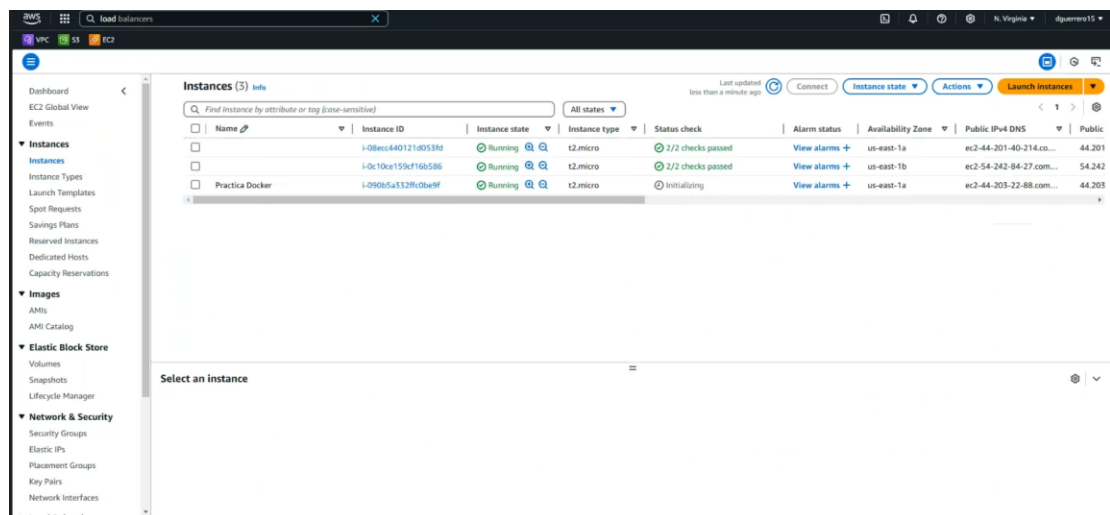
Implementar una arquitectura en AWS que cumpla con los siguientes requisitos:

1. **Balanceador de Carga:** Configure un **Application Load Balancer (ALB)** para distribuir el tráfico entrante a múltiples instancias EC2.
2. **Instancias EC2:** Implemente al menos dos instancias EC2 en una configuración multizona para garantizar alta disponibilidad.

3. **Instancias con Proxy Reverso:** Dentro de cada instancia EC2, deben implementar un **proxy reverso** (por ejemplo, Nginx) para redirigir solicitudes a servicios internos.
4. **Autoescalado:** Configure políticas de autoescalado para aumentar o reducir las instancias EC2 según la carga.
5. **Seguridad:** Asegure el tráfico utilizando grupos de seguridad adecuados y habilitando HTTPS en el balanceador de carga.
6. **Documentación:** Toda la documentación debe estar en el formato de trabajo de grado proporcionado.
 1. **Incluya un diagrama de los recursos usados y cómo se comunican entre ellos.**
 2. **Incluya Evidencia de las pruebas realizadas mostrando el correcto funcionamiento de la arquitectura.**
7. Fecha entrega final 11 de diciembre 12 medio día.

Incluya un video con la demostración de los servicios funcionando.

1. Paso: Se crea una instancia para la instalación de Docker



2. Paso: se instala nginx para el balanceo interno de servicios

```

root@ip-10-0-7-87:/var/www/html
root@ip-10-0-7-87/html]# dnf install nginx -y
Last metadata expiration check: 0:18:56 ago on Tue Dec 10 00:25:26 2024.
Dependencies resolved.
-----
Package                                Architecture      Version           Repository        Size
-----
Installing:
nginx                                   x86_64            1:1.26.2-1.amzn2023.0.1  amazonlinux      33 k
Installing dependencies:
gperftools-libs                         x86_64            2.9.1-1.amzn2023.0.3  amazonlinux      308 k
libunwind                               x86_64            1.4.0-5.amzn2023.0.2  amazonlinux      66 k
nginx-core                               x86_64            1:1.26.2-1.amzn2023.0.1  amazonlinux      670 k
nginxfilesystem                         noarch            1:1.26.2-1.amzn2023.0.1  amazonlinux      9.9 k
nginx-mimetypes                         noarch            2.1.49-3.amzn2023.0.3  amazonlinux      21 k
-----
Transaction Summary
-----
Install 6 Packages

Total download size: 1.1 M
Installed size: 3.6 M
Downloading Packages:
(1/6): gperftools-libs-2.9.1-1.amzn2023.0.3.x86_64.rpm           5.6 MB/s | 308 kB | 00:00
(2/6): libunwind-1.4.0-5.amzn2023.0.2.x86_64.rpm                1.1 MB/s | 66 kB | 00:00
(3/6): nginx-1.26.2-1.amzn2023.0.1.x86_64.rpm                   566 kB/s | 33 kB | 00:00
(4/6): nginxfilesystem-1.26.2-1.amzn2023.0.1.noarch.rpm         477 kB/s | 9.9 kB | 00:00
(5/6): nginx-mimetypes-2.1.49-3.amzn2023.0.3.noarch.rpm         887 kB/s | 21 kB | 00:00
(6/6): nginx-core-1.26.2-1.amzn2023.0.1.x86_64.rpm              18 MB/s | 670 kB | 00:00
-----
Total                                                                7.5 MB/s | 1.1 MB | 00:00

```

3. Paso: Se evidencia el funcionamiento de nginx

```

http://44.203.22.88/
13 mensajes recibidos
Desgrabador
Página de inicio de L...
Blanco Tennis Mickey...

```

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

```

root@ip-10-0-7-87:/var/www/html
root@ip-10-0-7-87/html]# systemctl start nginx
Job for nginx.service failed because the control process exited with error code.
See "systemctl status nginx.service" and "journalctl -xeu nginx.service" for details.
root@ip-10-0-7-87/html]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; preset: disabled)
   Active: active (running) since Tue 2024-12-10 00:25:28 UTC; 23min ago
     Docs: man:httpd.service(8)
   Main PID: 2002 (httpd)
   Status: "Total requests: 2; Idle/Busy workers 100/0; Requests/sec: 0.00143; Bytes served/sec: 1 B/sec"
     Tasks: 230 (limit: 1111)
     Memory: 21.1M
     CPU: 926ms
   CGroup: /system.slice/httpd.service
           └─2002 /usr/sbin/httpd -DFONGROUND
           └─2004 /usr/sbin/httpd -DFONGROUND
           └─2009 /usr/sbin/httpd -DFONGROUND
           └─2014 /usr/sbin/httpd -DFONGROUND
           └─2011 /usr/sbin/httpd -DFONGROUND
           └─2006 /usr/sbin/httpd -DFONGROUND

Dec 10 00:25:28 ip-10-0-10-42.ec2.internal systemd[1]: Starting httpd.service - The Apache HTTP Server...
Dec 10 00:25:28 ip-10-0-10-42.ec2.internal systemd[1]: Started httpd.service - The Apache HTTP Server.
root@ip-10-0-7-87/html]# systemctl stop httpd
root@ip-10-0-7-87/html]# systemctl disable httpd
root@ip-10-0-7-87/html]# systemctl start nginx
root@ip-10-0-7-87/html]# systemctl enable nginx
Created symlink /etc/systemd/system/multi-user.target.wants/nginx.service → /usr/lib/systemd/system/nginx.service.
root@ip-10-0-7-87/html]#

```

4. Paso: Se evidencia la instalación de docker dentro de la instancia ec2

```

root@ip-10-0-7-87:/var/www/html
root@ip-10-0-7-87 html]# yum install docker -y
Last metadata expiration check: 0:26:06 ago on Tue Dec 10 00:25:26 2024.
Dependencies resolved.
=====
Package                               Architecture      Version           Repository        Size
=====
Installing:
docker                                 x86_64            25.0.6-1.amzn2023.0.2  amazonlinux      44 M
Installing dependencies:
containerd                             x86_64            1.7.23-1.amzn2023.0.1  amazonlinux      36 M
iptables-libs                          x86_64            1.8.8-3.amzn2023.0.2  amazonlinux      401 k
iptables-nft                            x86_64            1.8.8-3.amzn2023.0.2  amazonlinux      183 k
libcgroup                               x86_64            3.0-1.amzn2023.0.1    amazonlinux       75 k
libnetfilter_conntrack                 x86_64            1.0.8-2.amzn2023.0.2  amazonlinux       58 k
libnftnl                               x86_64            1.0.1-19.amzn2023.0.2 amazonlinux        30 k
libnftlink                             x86_64            1.2.2-2.amzn2023.0.2  amazonlinux       84 k
pigz                                    x86_64            2.5-1.amzn2023.0.3    amazonlinux       83 k
runc                                    x86_64            1.1.14-1.amzn2023.0.1  amazonlinux       3.2 M
=====
Transaction Summary
=====
Install 10 Packages

Total download size: 84 M
Installed size: 317 M
Downloading Packages:
(1/10): iptables-libs-1.8.8-3.amzn2023.0.2.x86_64.rpm           6.2 MB/s | 401 kB | 00:00
(2/10): iptables-nft-1.8.8-3.amzn2023.0.2.x86_64.rpm           4.8 MB/s | 183 kB | 00:00
(3/10): libcgroup-3.0-1.amzn2023.0.1.x86_64.rpm                1.9 MB/s | 75 kB | 00:00
(4/10): libnetfilter_conntrack-1.0.8-2.amzn2023.0.2.x86_64.rpm 2.2 MB/s | 58 kB | 00:00

```

5. Paso: Se descarga la imagen de docker con httpd

```

root@ip-10-0-7-87:/var/www/html
[root@ip-10-0-7-87 html]# docker pull httpd
Using default tag: latest
latest: Pulling from library/httpd
bc0965b23a04: Pull complete
47ad38c6dd97: Pull complete
4f4fb700ef54: Pull complete
79b49624e34b: Pull complete
7d9f97915db2: Pull complete
9bd25d4f7b77: Pull complete
Digest: sha256:f4c5139eda466e45814122d9bd8b886d8ef6877296126c09b76dbad72b03c336
Status: Downloaded newer image for httpd:latest
docker.io/library/httpd:latest
[root@ip-10-0-7-87 html]#

```

6. Paso: Se evidencia el comando de ejecución del contenedor se establece el puerto por el 8080 se evidencia también la ruta del volumen dentro del ec2:

```

root@ip-10-0-7-87:~# ls
root@ip-10-0-7-87:~# pwd
root
root@ip-10-0-7-87:~# docker run -dit --name web1 --restart always -p 8080:80 -v /web1:/usr/local/apache2/htdocs/ httpd_

```

7. Paso: Evidencia del balanceo de nginx, la ruta de la ip publica sobre la instancia de docker y la lista de los contenedores dentro de la misma utilizando puerto 8080, 8081 y 8082

3 3 mensajes notific... Desgrabador Página de inicio de L... Blanco Tennis Midcity...

Hello world docker web3

```

CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS                               NAMES
3398b365ab1e  httpd    "httpd-foreground"      28 minutes ago Up 48 seconds 0.0.0.0:8082->80/tcp, :::8082->80/tcp  web3
bdbc03b5c3a   httpd    "httpd-foreground"      28 minutes ago Up 47 seconds 0.0.0.0:8081->80/tcp, :::8081->80/tcp  web2
e1c4c98a5fee  httpd    "httpd-foreground"      38 minutes ago Up 36 seconds 0.0.0.0:8080->80/tcp, :::8080->80/tcp  web1
[root@ip-10-0-7-87 /]# ll
total 32
drwxr-xr-x. 1 root root    7 Jan 30  2023 bin -> usr/bin
dr-xr-xr-x. 5 root root 16384 Nov 22 05:03 boot
drwxr-xr-x. 15 root root   3040 Dec 18 00:25 dev
drwxr-xr-x. 82 root root 16384 Dec 18 00:59 etc
drwxr-xr-x. 3 root root    22 Dec 3 01:53 home
lrwxrwxrwx. 1 root root    7 Jan 30  2023 lib -> usr/lib
lrwxrwxrwx. 1 root root    9 Jan 30  2023 lib64 -> usr/lib64
drwxr-xr-x. 2 root root    6 Nov 22 05:01 local
drwxr-xr-x. 2 root root    6 Jan 30  2023 media
drwxr-xr-x. 2 root root    6 Jan 30  2023 mnt
drwxr-xr-x. 4 root root   35 Dec 10 00:59 opt
dr-xr-xr-x. 190 root root    0 Dec 18 00:25 proc
dr-xr-xr-x. 3 root root   183 Dec 18 01:44 root
drwxr-xr-x. 30 root root   900 Dec 10 01:38 run
lrwxrwxrwx. 1 root root    8 Jan 30  2023 sbin -> usr/sbin
drwxr-xr-x. 2 root root    6 Jan 30  2023 srv
dr-xr-xr-x. 13 root root    0 Dec 18 00:25 sys
drwxrwxrwt. 12 root root   240 Dec 18 01:45 tmp
drwxr-xr-x. 12 root root   144 Nov 22 05:02 usr
drwxr-xr-x. 20 root root   277 Dec 3 01:55 var
drwxrwxrwx. 2 root root    24 Dec 18 01:08 www
drwxrwxrwx. 2 root root    24 Dec 18 01:32 www
drwxrwxrwx. 2 root root    24 Dec 18 01:33 www
[root@ip-10-0-7-87 /]#

```

8. Paso: Se lista el target group

DETAILS

arn:aws:elasticloadbalancing:us-east-1:481665104662:targetgroup:TGREMINGTON/2ccc336dafbfa4c1

Target type
Instance

Protocol : Port
HTTP: 80

Protocol version
HTTP1

VPC
vpc-06a1b382e4ae8433f

IP address type
IPv4

Load balancer
ELBREMINGTON

2 Total targets

2 Healthy

0 Unhealthy

0 Anomalous

0 Unused

0 Initial

0 Draining

Distribution of targets by Availability Zone (AZ)
Select values in this table to see corresponding filters applied to the Registered targets table below.

Registered targets (2)

Target groups route requests to individual registered targets using the protocol and port number specified. Health checks are performed on all registered targets according to the target group's health check settings. Anomaly detection is automatically applied to HTTP/HTTPS target groups with at least 3 healthy targets.

| Instance ID | Name | Port | Zone | Health status | Health status details | Admini... | Overri... |
|--|------|------|---------------------|---------------|-----------------------|-----------------------------------|--------------|
| <input type="checkbox"/> i-0c10ce159cf16b586 | | 80 | us-east-1b (us-...) | Healthy | - | <input type="radio"/> No override | No overri... |
| <input type="checkbox"/> i-08ecc440121d053fd | | 80 | us-east-1a (us-...) | Healthy | - | <input type="radio"/> No override | No overri... |

9. Paso: Se va a registrar la instancia con descripción practica docker que contiene el nginx instalado como tambien el docker.

Register targets

Select instances, specify ports, and add the instances to the list of pending targets. Repeat to add additional combinations of instances and ports to the list of pending targets. Once you are satisfied with your selections, click Register pending targets.

Available instances (3)

| Instance ID | Name | State | Security groups | Zone | Private IPv4 address | Subnet ID | Launch tim |
|--|-----------------|---------|-----------------|------------|----------------------|--------------------------|------------|
| <input type="checkbox"/> i-090b5a328f0be9f | Practica Docker | Running | SG_seminario | us-east-1a | 10.0.7.87 | subnet-0e612147a80d667e8 | December 3 |
| <input type="checkbox"/> i-0c10ce159cf16b586 | | Running | SG_seminario | us-east-1b | 10.0.205.29 | subnet-0bce5d975df46f7f | December 3 |
| <input type="checkbox"/> i-08ecc440121d053fd | | Running | SG_seminario | us-east-1a | 10.0.10.203 | subnet-0e612147a80d667e8 | December 2 |

0 selected

Ports for the selected instances
Ports for routing traffic to the selected instances.

80

1-65535 (separate multiple ports with comma)

Include as pending below

Review targets

Targets (2)

Show only pending

Remove all pending

10. Paso: Se evidencia el registro exitoso de la instancia práctica docker

0 selected

Ports for the selected instances
Ports for routing traffic to the selected instances.

80

1-85555 (separate multiple ports with comma)

Include as pending below

1 selection is now pending below. Include more or register targets when ready.

Review targets

Targets (3)

Filter targets

Show only pending

| Instance ID | Name | Port | State | Security groups | Zone | Private IPv4 address | Subnet ID | Launch time |
|---------------------|-----------------|------|---------|-----------------|------------|----------------------|-------------------------|-------------------------------------|
| i-090b5a332fc0be9f | Practica Docker | 80 | Running | SG_seminario | us-east-1a | 10.0.7.87 | subnet-0e612147a806f7e8 | December 5, 2024, 19:25 (UTC-05:00) |
| i-0c10ce159cf16b586 | Practica Docker | 80 | Running | SG_seminario | us-east-1b | 10.0.205.29 | subnet-00cc63d975d46f7f | December 5, 2024, 18:48 (UTC-05:00) |
| i-08ecc440121d053fd | Practica Docker | 80 | Running | SG_seminario | us-east-1a | 10.0.10.203 | subnet-0e612147a806f7e8 | December 2, 2024, 21:22 (UTC-05:00) |

1 pending

Cancel Register pending targets

11. Paso: El target group con estado saludables.

Target type: Instance

Protocol: Port: HTTP: 80

Protocol version: HTTP1

VPC: vpc-06a1b382e4ae0433f

IP address type: IPv4

Load balancer: ELBREMINGTON

3 Total targets

3 Healthy

0 Unhealthy

0 Anomalous

0 Unused

0 Initial

0 Draining

Distribution of targets by Availability Zone (AZ)

Targets Monitoring Health checks Attributes Tags

Registered targets (3)

Anomaly mitigation: Not applicable

Deregister Register targets

Target groups route requests to individual registered targets using the protocol and port number specified. Health checks are performed on all registered targets according to the target group's health check settings. Anomaly detection is automatically applied to HTTP/HTTPS target groups with at least 3 healthy targets.

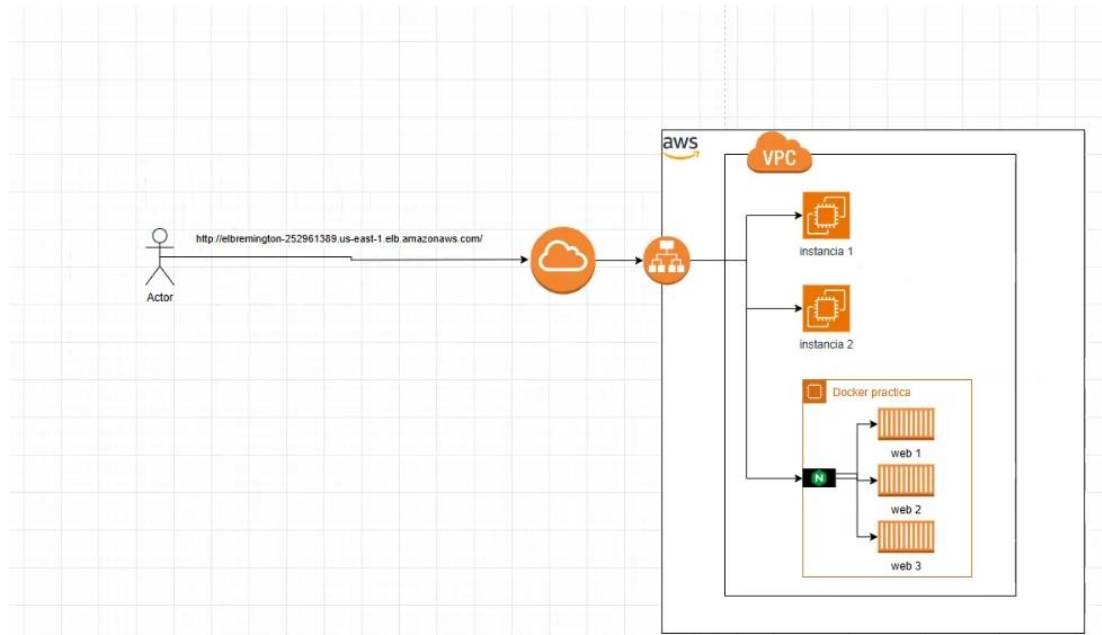
| Instance ID | Name | Port | Zone | Health status | Health status details | Admin... | Overri... |
|---------------------|-----------------|------|--------------------|---------------|-----------------------|-------------|--------------|
| i-090b5a332fc0be9f | Practica Docker | 80 | us-east-1a (us...) | Healthy | - | No override | No overri... |
| i-0c10ce159cf16b586 | Practica Docker | 80 | us-east-1b (us...) | Healthy | - | No override | No overri... |
| i-08ecc440121d053fd | Practica Docker | 80 | us-east-1a (us...) | Healthy | - | No override | No overri... |

12. Paso: Se evidencia el acceso al nginx desde el balanceador de carga.

No es seguro elbreminpton-252961389.us-east-1.elb.amazonaws.com

3 3 mensajes notific... Desgrabador Página de inicio de l... Blanco Tennis Midcity...

Hello world docker web3



13.

<https://youtu.be/OndUwPvhsGA>

Conclusiones

AWS ofrece una infraestructura escalable, segura y confiable, que permite a empresas y organizaciones adoptar soluciones basadas en la nube para optimizar procesos, reducir costos y acelerar la innovación....Los servicios de AWS abarcan desde almacenamiento y bases de datos hasta inteligencia artificial y machine learning, proporcionando herramientas que pueden ser adaptadas a diversas industrias y necesidades.

AWS garantiza la entrega de servicios a nivel global con alta disponibilidad, lo que facilita el crecimiento de aplicaciones y negocios sin comprometer el rendimiento....AWS implementa robustos estándares de seguridad y cumplimiento normativo, ofreciendo a las empresas tranquilidad al gestionar datos sensibles y cumplir con regulaciones locales e internacionales.

El dominio de AWS no solo requiere conocimientos técnicos, sino también una comprensión de sus mejores prácticas....Este seminario ha resaltado la importancia de la formación continua y la certificación para maximizar el uso de esta plataforma....AWS fomenta un entorno propicio para la experimentación, permitiendo a los desarrolladores y empresas prototipar y desplegar soluciones de forma rápida y eficiente....Las habilidades en AWS son altamente demandadas, convirtiéndose en una ventaja competitiva para los profesionales que buscan oportunidades en el ámbito tecnológico.

Referencias

(Puedes citar con normas APA o Vancouver. Se anexa ejemplo de normas APA)

Borges, J.L. (2013). *Ficciones*. Buenos Aires, Argentina: Debolsillo.

Bastidas, L.R. (2007). *El inicio del siglo XXI*. Planeta. Sitio web:

<http://www.rbastidasl.com/libro-inicio-del-sigloxxi>.

https://docs.aws.amazon.com/es_es/AmazonECS/latest/developerguide/Welcome.html

https://docs.aws.amazon.com/es_es/AWSEC2/latest/UserGuide/concepts.html