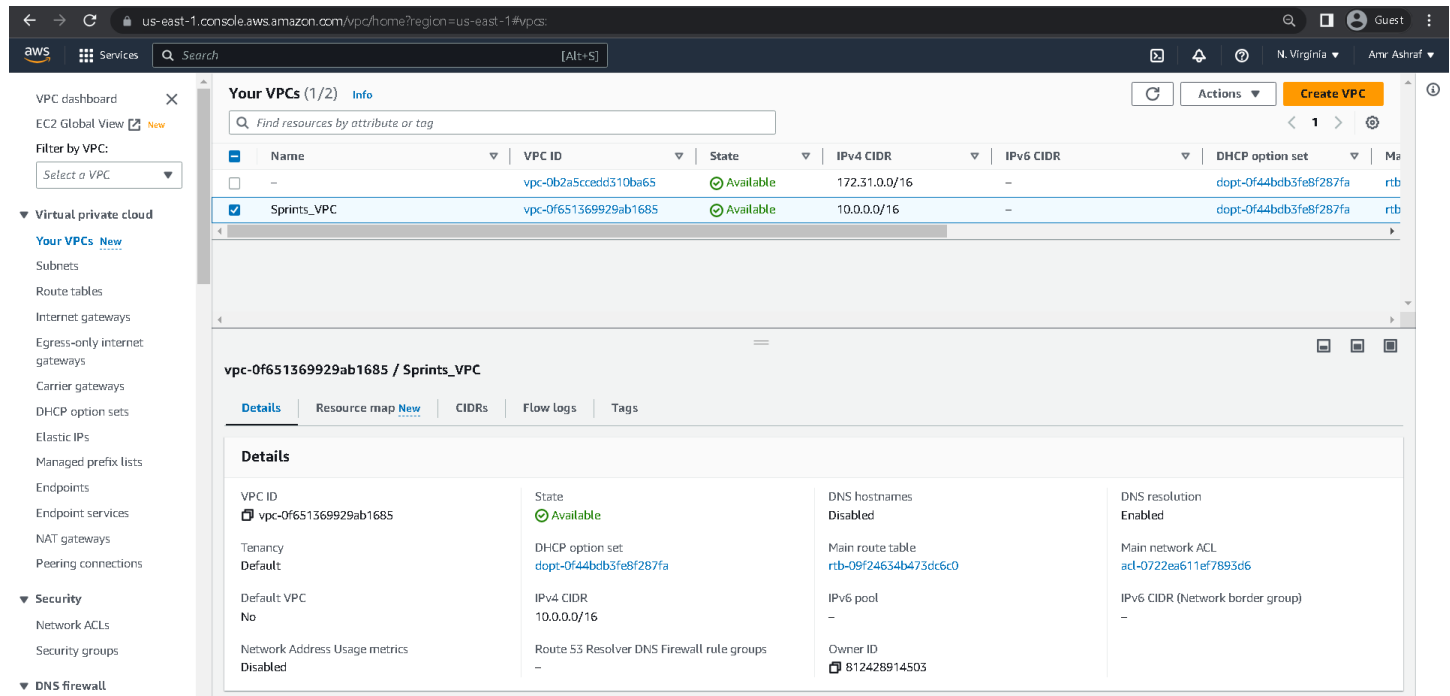


Lab 4

The Solution:

1 – Create 1 VPC



The screenshot shows the AWS Management Console for the 'us-east-1' region. The left sidebar contains navigation links for VPC dashboard, EC2 Global View, and various VPC resources. The main content area displays 'Your VPCs (1/2)' with a table listing VPCs. The 'Sprints_VPC' is selected, and its details are shown below.

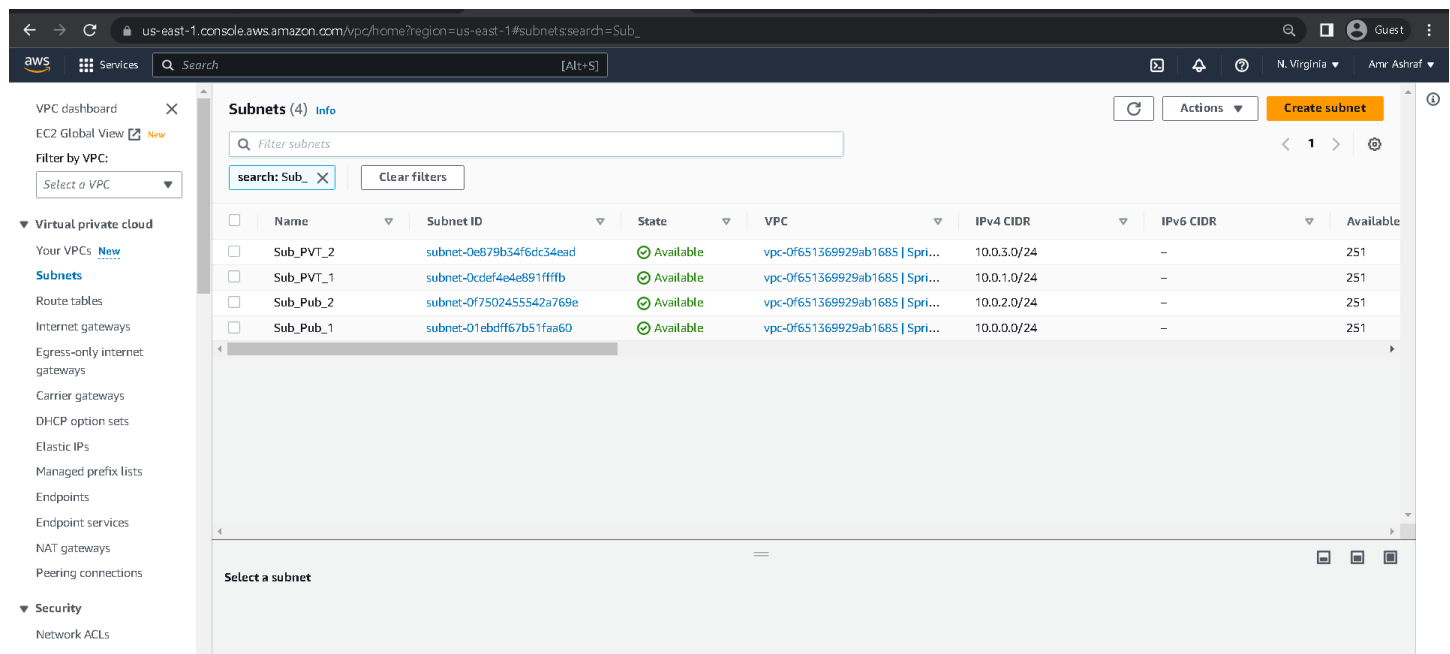
Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP option set	Main route table
-	vpc-0b2a5ccedd510ba65	Available	172.31.0.0/16	-	dopt-0f44bdb3fe8f287fa	rtb-
Sprints_VPC	vpc-0f651369929ab1685	Available	10.0.0.0/16	-	dopt-0f44bdb3fe8f287fa	rtb-

vpc-0f651369929ab1685 / Sprints_VPC

Details

Property	Value
VPC ID	vpc-0f651369929ab1685
State	Available
DNS hostnames	Disabled
DNS resolution	Enabled
Tenancy	Default
DHCP option set	dopt-0f44bdb3fe8f287fa
Main route table	rtb-09f24654b473dc6c0
Default VPC	No
IPv4 CIDR	10.0.0.0/16
IPv6 pool	-
IPv6 CIDR (Network border group)	-
Network Address Usage metrics	Disabled
Route 53 Resolver DNS Firewall rule groups	-
Owner ID	812428914503

2 – Create 4 Subnet

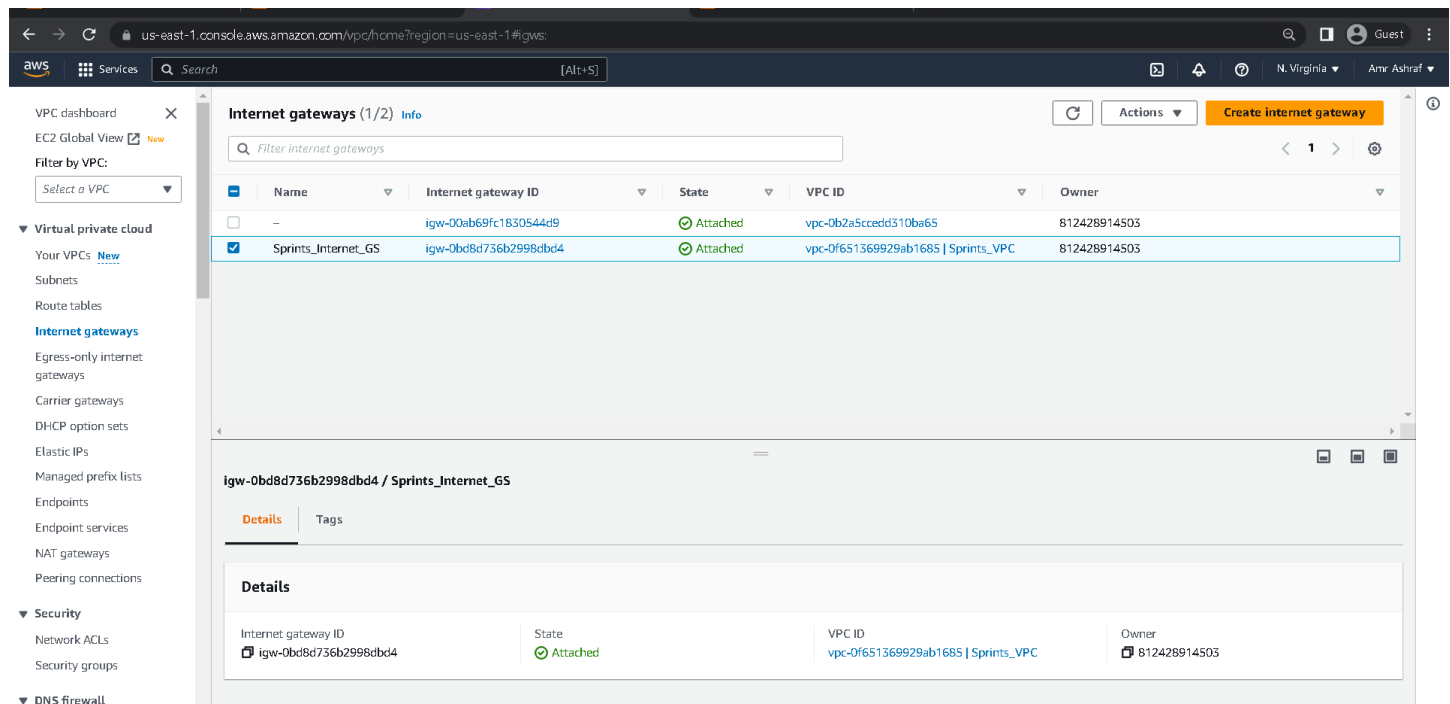


The screenshot shows the AWS Management Console for the 'us-east-1' region. The left sidebar contains navigation links for VPC dashboard, EC2 Global View, and various VPC resources. The main content area displays 'Subnets (4)' with a table listing subnets. The 'Sub_Pub_1' is selected, and its details are shown below.

Name	Subnet ID	State	VPC	IPv4 CIDR	IPv6 CIDR	Available
Sub_PVT_2	subnet-0e879b34f6dc34ead	Available	vpc-0f651369929ab1685 Sprints_VPC	10.0.3.0/24	-	251
Sub_PVT_1	subnet-0cdef4e4e891ffffb	Available	vpc-0f651369929ab1685 Sprints_VPC	10.0.1.0/24	-	251
Sub_Pub_2	subnet-0f750245542a769e	Available	vpc-0f651369929ab1685 Sprints_VPC	10.0.2.0/24	-	251
Sub_Pub_1	subnet-01ebdff67b51faa60	Available	vpc-0f651369929ab1685 Sprints_VPC	10.0.0.0/24	-	251

Select a subnet

3 – Internet Gateway



The screenshot shows the AWS Management Console for the us-east-1 region. The left sidebar contains navigation links for VPC dashboard, EC2 Global View, and various VPC services. The main content area is titled 'Internet gateways (1/2) Info'. It features a table with columns: Name, Internet gateway ID, State, VPC ID, and Owner. The table lists two gateways: one with ID 'igw-00ab69fc1830544d9' and another with ID 'igw-0bd8d736b2998dbd4' (Sprints_Internet_GS). The selected gateway is in an 'Attached' state and is associated with VPC 'vpc-0f651369929ab1685 | Sprints_VPC'. Below the table, the details for 'igw-0bd8d736b2998dbd4 / Sprints_Internet_GS' are displayed, showing its state as 'Attached' and its VPC ID as 'vpc-0f651369929ab1685 | Sprints_VPC'.

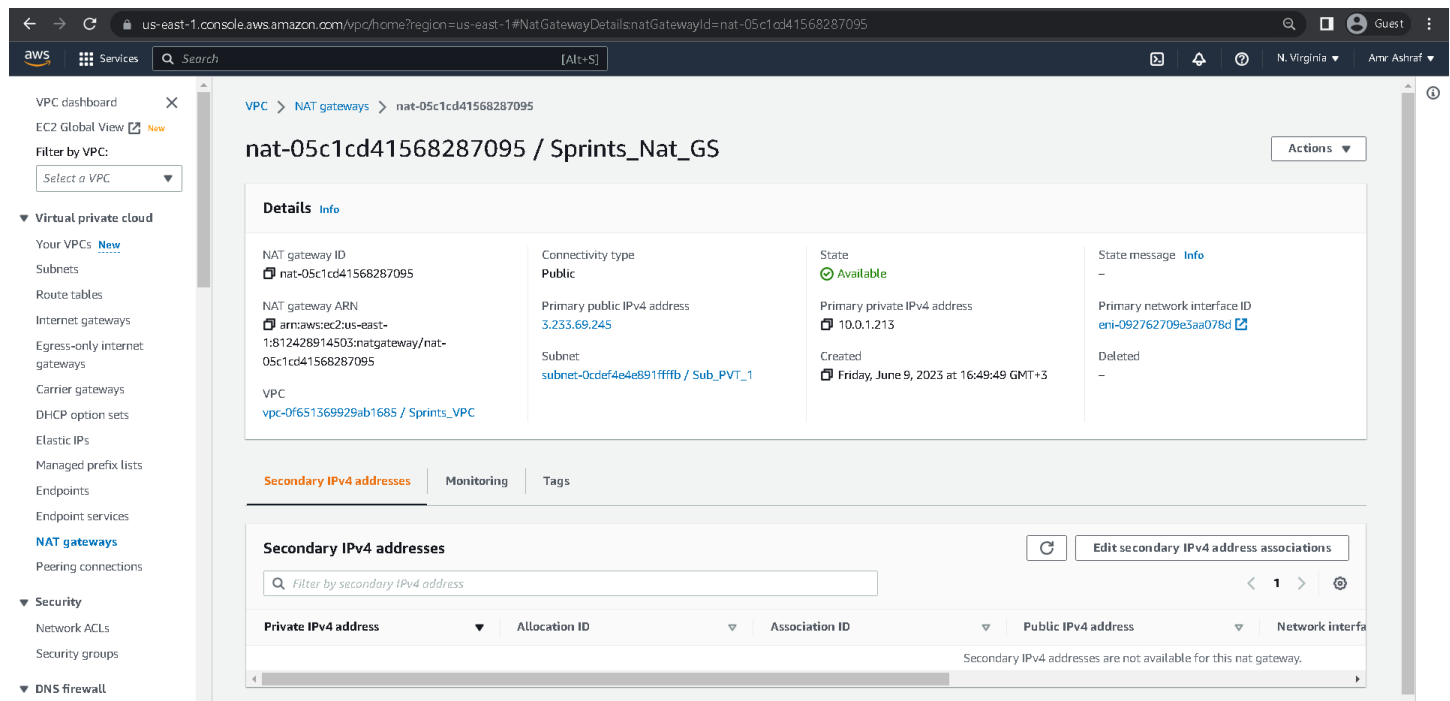
Name	Internet gateway ID	State	VPC ID	Owner
-	igw-00ab69fc1830544d9	Attached	vpc-0b2a5ccedd310ba65	812428914503
Sprints_Internet_GS	igw-0bd8d736b2998dbd4	Attached	vpc-0f651369929ab1685 Sprints_VPC	812428914503

igw-0bd8d736b2998dbd4 / Sprints_Internet_GS

Details

Internet gateway ID: igw-0bd8d736b2998dbd4
State: Attached
VPC ID: vpc-0f651369929ab1685 | Sprints_VPC
Owner: 812428914503

4 – Create Nat Gateway



The screenshot shows the AWS Management Console for the us-east-1 region. The left sidebar contains navigation links for VPC dashboard, EC2 Global View, and various VPC services. The main content area is titled 'NAT gateways > nat-05c1cd41568287095'. It features a section for 'nat-05c1cd41568287095 / Sprints_Nat_GS' with tabs for Details, Info, and Actions. The Details tab is active, showing the following information: NAT gateway ID (nat-05c1cd41568287095), Connectivity type (Public), State (Available), Primary public IPv4 address (3.233.69.245), Primary private IPv4 address (10.0.1.213), and Creation time (Friday, June 9, 2023 at 16:49:49 GMT+3). Below the details, there is a section for 'Secondary IPv4 addresses' with a table for Private IPv4 address, Allocation ID, Association ID, Public IPv4 address, and Network interface. A message states: 'Secondary IPv4 addresses are not available for this nat gateway.'

nat-05c1cd41568287095 / Sprints_Nat_GS

Details

NAT gateway ID: nat-05c1cd41568287095
Connectivity type: Public
State: Available
Primary public IPv4 address: 3.233.69.245
Primary private IPv4 address: 10.0.1.213
Created: Friday, June 9, 2023 at 16:49:49 GMT+3

Secondary IPv4 addresses

Private IPv4 address	Allocation ID	Association ID	Public IPv4 address	Network interface
Secondary IPv4 addresses are not available for this nat gateway.				

5 – Create 2 Route Tables

us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#RouteTableDetails:RouteTableId=rtb-004057f83f4444642

Services Search [Alt+S]

VPC dashboard X

EC2 Global View New

Filter by VPC:

Virtual private cloud

Your VPCs [New](#)

Subnets

Route tables

Internet gateways

Egress-only internet gateways

Carrier gateways

DHCP option sets

Elastic IPs

Managed prefix lists

Endpoints

Endpoint services

NAT gateways

Peering connections

Security

Network ACLs

Security groups

DNS firewall

VPC > Route tables > rtb-004057f83f4444642

rtb-004057f83f4444642 / Route_Public

Actions

You can now check network connectivity with Reachability Analyzer [Run Reachability Analyzer](#) X

Details Info

Route table ID: **rtb-004057f83f4444642**

Main: ☐ No

Owner ID: **812428914503**

Explicit subnet associations: **2 subnets**

subnet-0f7502455542a769e / Sub_Pub_2 X

subnet-01ebdff67b51faa60 / Sub_Pub_1

Edge associations

Routes Subnet associations Edge associations Route propagation Tags

Routes (2) [Edit routes](#)

Both

Destination	Target	Status	Propagated
0.0.0.0/0	igw-0bcd8d736b2998dbd4	Active	No
10.0.0.0/16	local	Active	No

us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#RouteTableDetails:RouteTableId=rtb-06bb18c445ddf6a71

Services Search [Alt+S]

VPC dashboard X

EC2 Global View New

Filter by VPC:

Virtual private cloud

Your VPCs [New](#)

Subnets

Route tables

Internet gateways

Egress-only internet gateways

Carrier gateways

DHCP option sets

Elastic IPs

Managed prefix lists

Endpoints

Endpoint services

NAT gateways

Peering connections

Security

Network ACLs

Security groups

VPC > Route tables > rtb-06bb18c445ddf6a71

rtb-06bb18c445ddf6a71 / Route_Private

Actions

You can now check network connectivity with Reachability Analyzer [Run Reachability Analyzer](#) X

Details Info

Route table ID: **rtb-06bb18c445ddf6a71**

Main: ☐ No

Owner ID: **812428914503**

Explicit subnet associations: **2 subnets**

subnet-0cdef4e4e891ffffb / Sub_PVT_1 X

subnet-0e879b34f6dc34ead / Sub_PVT_2

Edge associations

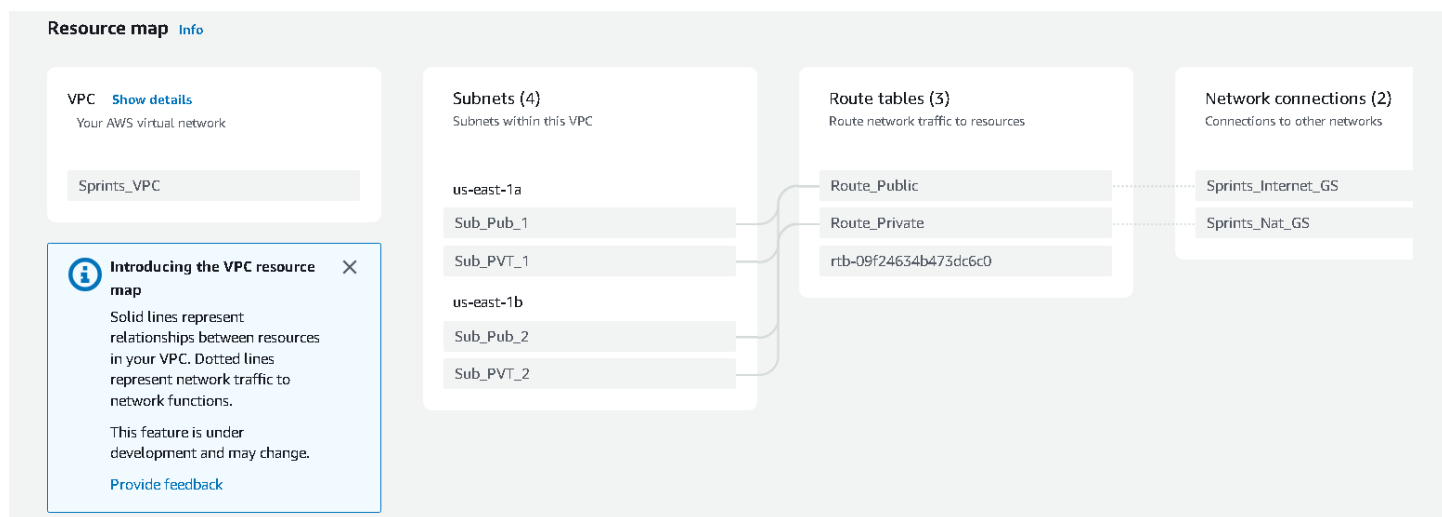
Routes Subnet associations Edge associations Route propagation Tags

Routes (2) [Edit routes](#)

Both

Destination	Target	Status	Propagated
0.0.0.0/0	nat-05c1cd41568267095	Active	No
10.0.0.0/16	local	Active	No

6 – VPC Should Like This



7 – Create 2 Security Groups

us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#SecurityGroups;search=Security_G

Security Groups (2) Info

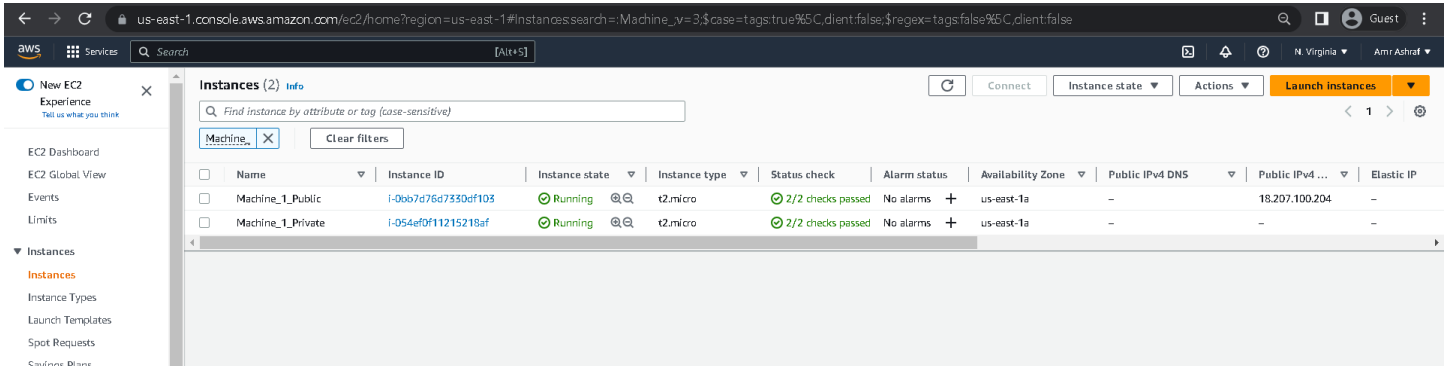
Filter security groups

search: Security_G X Clear filters

	Name	Security group ID	Security group name	VPC ID	Description	Owner	Inbound rules
<input type="checkbox"/>	Security_Group_Pri...	sg-08c68674d29491e12	Security_Group_Private	vpc-0f651369929ab1685	Security_Group_Private	812428914503	2 Permission entries
<input type="checkbox"/>	Security_Group_Pu...	sg-03d17ab191801273e	Security_Group_Public	vpc-0f651369929ab1685	Security_Group_Public	812428914503	2 Permission entries

For First Question

1 – Create 2 Instance [1 Public >> Machine_1_Public] [1 Private >> Machine_1_Private]



The screenshot shows the AWS Management Console for the us-east-1 region. The 'Instances (2)' page is displayed, showing a list of two EC2 instances. The left sidebar contains navigation links for EC2 Dashboard, EC2 Global View, Events, Limits, and Instances. The main content area shows a table with the following data:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
Machine_1_Public	i-0b67d76d7330df103	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	18.207.100.204	-
Machine_1_Private	i-054ef0f11215218af	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	-	-

2 – Copy Key File From my pc to Public Machine

```
amr@DESKTOP-D5VVHN0: ~$ ls
Docker_Projects  Sprints.pem  Zone.Identifier  aws  awscli2.zip  build  test
amr@DESKTOP-D5VVHN0:~$ scp -i "Sprints.pem" Sprints.pem ubuntu@18.207.100.204:/home/ubuntu/
The authenticity of host '18.207.100.204 (18.207.100.204)' can't be established.
ED25519 key fingerprint is SHA256:iE5XhvsYYDiP63Sa3Qo9HN7qPb/jhq76Q4CaNEAlCkQ.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '18.207.100.204' (ED25519) to the list of known hosts.
Sprints.pem
100% 1674 8.8KB/s 00:00

amr@DESKTOP-D5VVHN0:~$ ssh -i "Sprints.pem" ubuntu@18.207.100.204
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-1025-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Fri Jun 9 14:14:57 UTC 2023

System load:  0.02490234375   Processes:            96
Usage of /:   20.6% of 7.57GB   Users logged in:     0
Memory usage: 24%           IPv4 address for eth0: 10.0.0.45
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-0-45:~$ ls
Sprints.pem
ubuntu@ip-10-0-0-45:~$ |
```

3 – Connect ssh from Public to the Private machine

```
ubuntu@ip-10-0-0-45:~$ ls
Sprints.pem
ubuntu@ip-10-0-0-45:~$ ssh -i "Sprints.pem" ubuntu@10.0.1.88
The authenticity of host '10.0.1.88 (10.0.1.88)' can't be established.
ED25519 key fingerprint is SHA256:0qzSKDxpHtw4LqL/Zfh6KGyREK5m7Q17yLeDdjCF26I.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.1.88' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-1025-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Fri Jun  9 14:16:51 UTC 2023

System load:  0.080078125      Processes:           95
Usage of /:   20.6% of 7.57GB   Users logged in:    0
Memory usage: 23%             IPv4 address for eth0: 10.0.1.88
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ip-10-0-1-88:~$
```

For The Next Question:

1 – Create 2 Instance [1 Public >> Machine_Nginx_Public] [1 Private >> Machine_Apache_Private]

The screenshot shows the AWS Management Console for the us-east-1 region. The 'Instances' page is active, displaying a list of four EC2 instances. The left sidebar shows the navigation menu with 'Instances' selected. The top navigation bar includes the AWS logo, a search bar, and user information (Guest, N. Virginia, Amr Ashraf). The main content area shows the 'Instances (4)' list with columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, Public IPv4 DNS, Public IPv4 address, and Elastic IP.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
Machine_Nginx_Public	i-019a9b3b08b594e2d	Running	t2.micro	2/2 checks passed	No alarms	us-east-1b	-	3.86.39.217	-
Machine_Apache_Private	i-0b5c0910758bfad9d	Running	t2.micro	2/2 checks passed	No alarms	us-east-1b	-	-	-
Machine_1_Public	i-0b67d76d7330df103	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	18.207.100.204	-
Machine_1_Private	i-054ef0f11215218af	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	-	-	-

2 – Create 2 Load Balancer

1 – Balancer For Public Machines

2 – Balancer For Private Machines

EC2 > Load balancers

Load balancers (2) Actions Create load balancer

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

Find resources by attribute or tag

<input type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
<input type="checkbox"/>	Balancer-Private	Balancer-Private-43490327...	Active	vpc-0f651369929ab1685	2 Availability Zones	application	June 9, 2023, 17:35 (UTC+03:00)
<input type="checkbox"/>	Balancer-Public	Balancer-Public-21221727...	Active	vpc-0f651369929ab1685	2 Availability Zones	application	June 9, 2023, 17:34 (UTC+03:00)

3 – Create 2 Target Groups

1 – Target For Public Machines

2 – Target For Private Machines

EC2 > Target groups

Target groups (2) Actions Create target group

Find resources by attribute or tag

<input type="checkbox"/>	Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
<input type="checkbox"/>	Target-Private	arn:aws:elasticloadbalancing...	80	HTTP	Instance	Balancer-Private	vpc-0f651369929ab1685
<input type="checkbox"/>	Target-Public	arn:aws:elasticloadbalancing...	80	HTTP	Instance	Balancer-Public	vpc-0f651369929ab1685

← → ↻ ⚠ Not secure | balancer-public-354913796.us-east-1.elb.amazonaws.com Guest

Hello From Machine 1 Public

← → ↻ ⚠ Not secure | balancer-public-354913796.us-east-1.elb.amazonaws.com Guest

Hello From Machine inginx Public

4 – Create Template

EC2 > Launch templates

Launch templates (1) Info

Filter by tags or properties or search by keyword

Actions

Create launch template

Launch template ID	Launch template name	Default version	Latest version	Create time
lt-08b0d7308085f5cac	Template-Apache	1	1	2023-06-09T17:23:17.000Z

5 – Create Auto Scaling For Private Load Balancer [Private Machines]

EC2 > Auto Scaling groups

Auto Scaling groups (1/1) Info

Search your Auto Scaling groups

Launch configurations

Launch templates

Actions

Create Auto Scaling group

Name	Launch template/configuration...	Instances	Status	Desired capac...	Min	Max	Availability Zones
Auto-Scaling	Template-Apache Version Default	1	-	1	1	1	us-east-1a, us-east-1b

Auto Scaling group: Auto-Scaling

Details

Activity

Automatic scaling

Instance management

Monitoring

Instance refresh

Group details

Auto Scaling group name

Auto-Scaling

Date created

Fri Jun 09 2023 20:27:43 GMT+0300 (Eastern European Summer Time)

Desired capacity

1

Minimum capacity

1

Maximum capacity

1

Status

-

Amazon Resource Name (ARN)

arn:aws:autoscaling:us-east-1:181242891450:autoScalingGroup:b4215c4f-16f3-4139-828e-51e30c82d683:autoScalingGroupName/Auto-Scaling

Auto Scaling group: Auto-Scaling

Details

Activity

Automatic scaling

Instance management

Monitoring

Instance refresh

Instances (1)

Filter instances

Actions

Instance ID	Lifecycle	Instance type	Weighted capacity	Launch template/co...	Availability Zone	Health status	Protected from
i-0855eb87071781952	InService	t2.micro	-	Template-Apache Versi	us-east-1a	Healthy	

Lifecycle hooks (0) Info

Actions

Create lifecycle hook