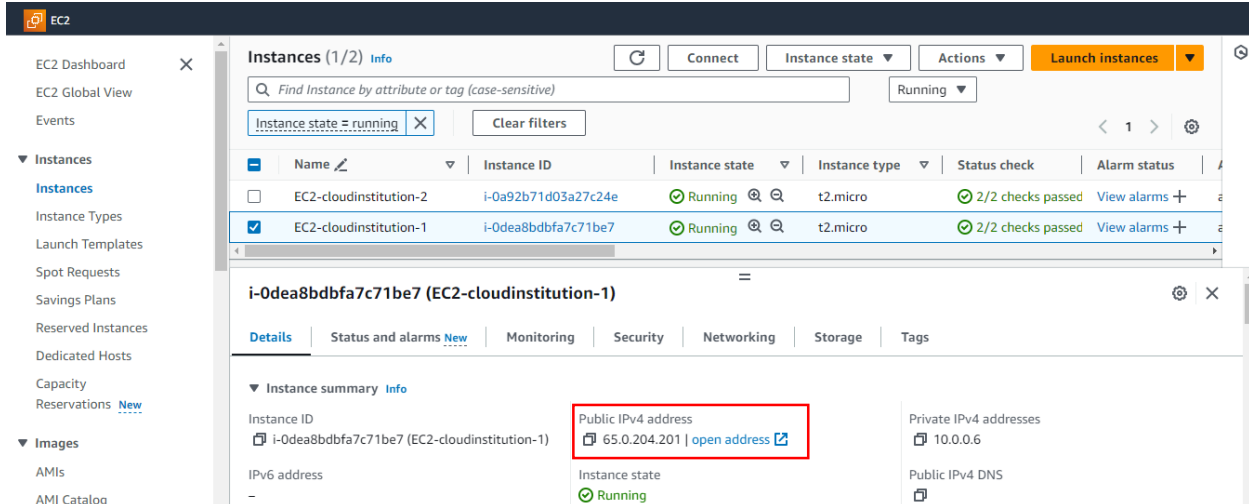


NAT GATEWAY

Step 1 : Create 2 instances

“Ec2-cloudinstitution-1” in public subnet and



The screenshot shows the AWS Management Console for EC2 instances. Two instances are listed: 'EC2-cloudinstitution-2' and 'EC2-cloudinstitution-1'. The details for 'EC2-cloudinstitution-1' (Instance ID: i-0dea8bdbfa7c71be7) are expanded. The 'Public IPv4 address' is 65.0.204.201, which is highlighted with a red box. The instance state is 'Running'.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
EC2-cloudinstitution-2	i-0a92b71d03a27c24e	Running	t2.micro	2/2 checks passed	View alarms
EC2-cloudinstitution-1	i-0dea8bdbfa7c71be7	Running	t2.micro	2/2 checks passed	View alarms

i-0dea8bdbfa7c71be7 (EC2-cloudinstitution-1)

Instance summary

Instance ID: i-0dea8bdbfa7c71be7 (EC2-cloudinstitution-1)

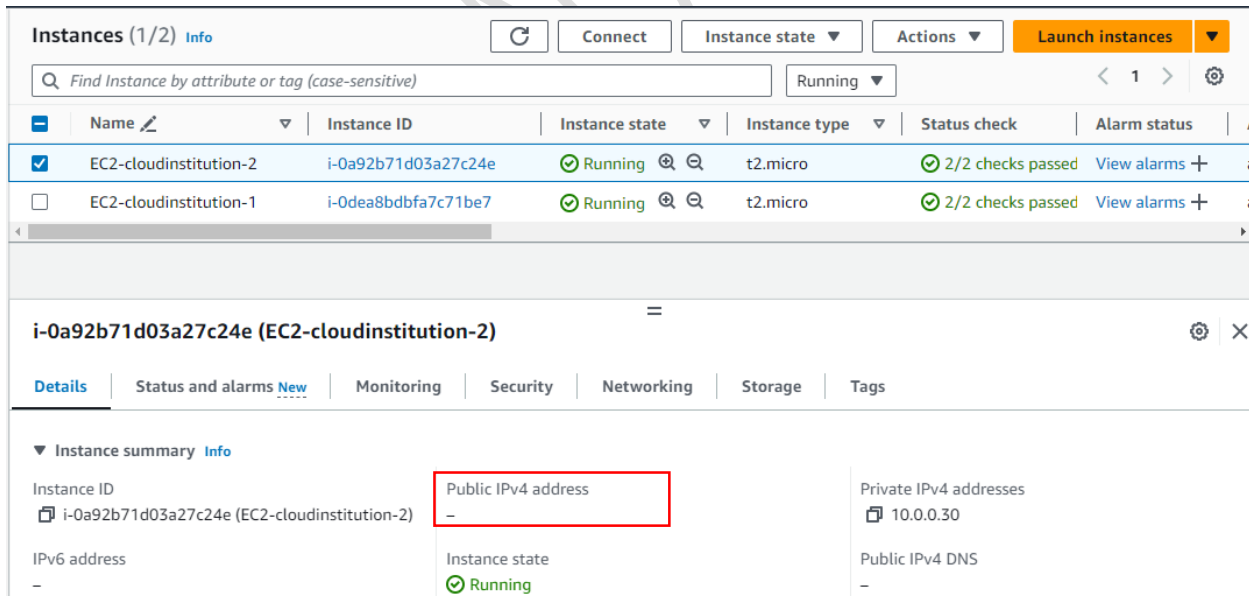
Public IPv4 address: 65.0.204.201 | [open address](#)

Private IPv4 addresses: 10.0.0.6

Public IPv4 DNS: -

Instance state: Running

“Ec2-cloudinstitution-2” in private subnet



The screenshot shows the AWS Management Console for EC2 instances. Two instances are listed: 'EC2-cloudinstitution-2' and 'EC2-cloudinstitution-1'. The details for 'EC2-cloudinstitution-2' (Instance ID: i-0a92b71d03a27c24e) are expanded. The 'Public IPv4 address' is empty, highlighted with a red box. The instance state is 'Running'.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
EC2-cloudinstitution-2	i-0a92b71d03a27c24e	Running	t2.micro	2/2 checks passed	View alarms
EC2-cloudinstitution-1	i-0dea8bdbfa7c71be7	Running	t2.micro	2/2 checks passed	View alarms

i-0a92b71d03a27c24e (EC2-cloudinstitution-2)

Instance summary

Instance ID: i-0a92b71d03a27c24e (EC2-cloudinstitution-2)

Public IPv4 address: -

Private IPv4 addresses: 10.0.0.30

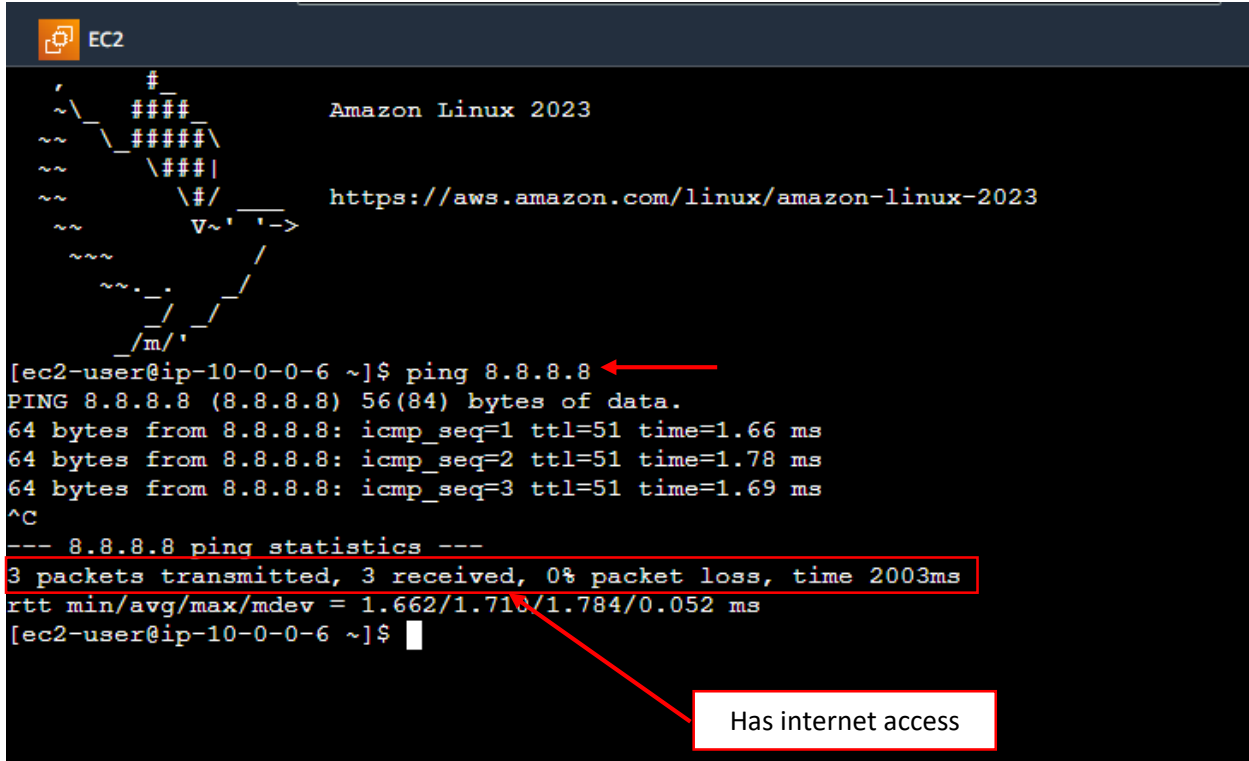
Public IPv4 DNS: -

Instance state: Running

Note: While you are creating an instance in private subnet, you don't get a public IPV4 address

Step 2 : Connect your EC2-cloudinstitution-1 instance

“ping 8.8.8.8” - Internet Connectivity Check helps to confirm that your network has internet access.




The screenshot shows an EC2 terminal window with the title bar 'EC2'. The terminal output includes the Amazon Linux 2023 logo, the URL <https://aws.amazon.com/linux/amazon-linux-2023>, and the command `[ec2-user@ip-10-0-0-6 ~]$ ping 8.8.8.8`. The output shows three successful ping requests with times around 1.66 ms to 1.78 ms. A red arrow points to the command. Below the ping output, the statistics are shown: `--- 8.8.8.8 ping statistics ---`, `3 packets transmitted, 3 received, 0% packet loss, time 2003ms`, and `rtt min/avg/max/mdev = 1.662/1.710/1.784/0.052 ms`. A red box highlights the statistics line, and a red arrow points from it to a white box with the text 'Has internet access'.


```
[ec2-user@ip-10-0-0-6 ~]$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data:
64 bytes from 8.8.8.8: icmp_seq=1 ttl=51 time=1.66 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=51 time=1.78 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=51 time=1.69 ms
^C
--- 8.8.8.8 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 1.662/1.710/1.784/0.052 ms
[ec2-user@ip-10-0-0-6 ~]$
```

Has internet access

Create a .pem file

 EC2
[ec2-user@ip-10-0-0-6 ~]\$ vi cloudinstitution.pem ←

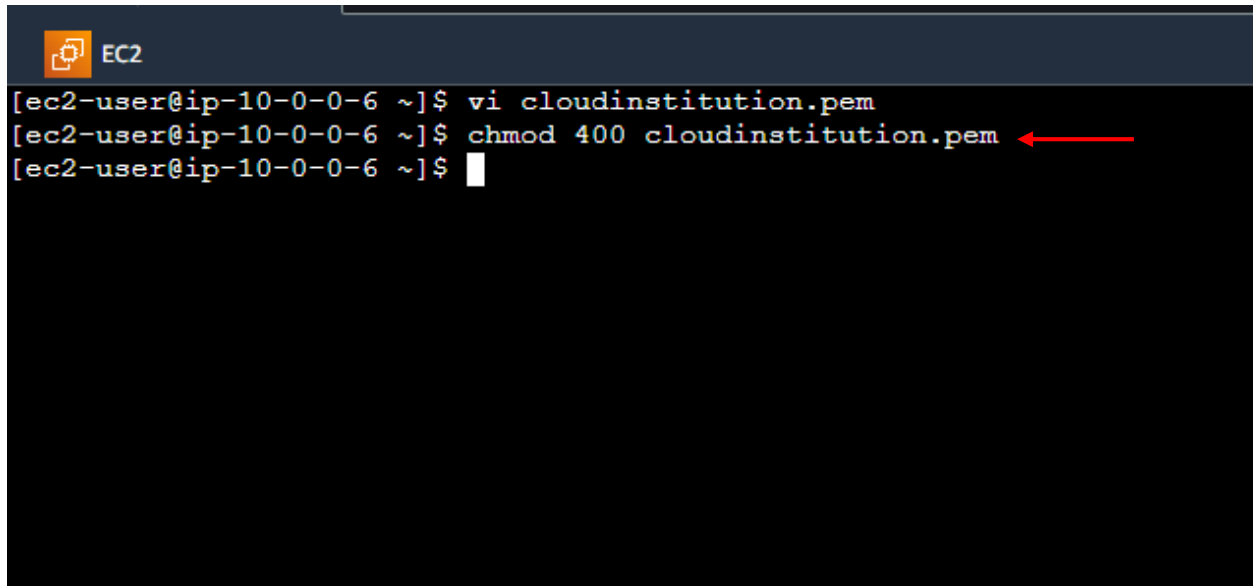
Copy your keypair

 EC2
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQEAoFJO05+gMklnxak2DYiulzX2TCj1dzWgf0zu/EnJdDmIgCit
74Bsd21D5KwmvMgk0OS5EP5FFAF4PvFAZkNRCCHmbJBfdEmGDu9uzFEP2oxdRKTy
UwaiiIMetnuVyyqSbmnlpR0tly3S5/vqE0Fr0htuaaQJLNx2CmtHkANbLjTOWZ8JL
RO+0TVojsaG3Js8ltfckUBZnePY7ePusSPJoMraqb6NgYSTroqFPazoN+guRq1Db
PzFoSde4g3kHZ5Zh5orvFWOp70A2w9BxT35BuL2FwBhxR00U21JPJjGbNX5k1MF
uLM6ZQn/in434CwX8jywvhiAkx7E95T3nZQHzwIDAQABAoIBAA/dlXtQMvSHG0QO
pjIWSu4MHX9HsCfiBDRNl2118Bu6Tl1zTEEzrdLEwsQlozcafhaio5J++As/Q+O
SXZVdzGM2VcpOqkx1zjozVhfNWh1t81RXcIlx/Qms1K0DHEPtW6lrLynk519IeNA
O+C6/6oGJdP6rCL6QrC70QrcNyz0I9ErUlPwywsurDAVynU6woKfEn7B8zWa0CEp
q0qE6d+4ZiTwg0fPoVJJfHphcfBySiq4fDY5/T5Trn9Sr69W8j4poco5r9LbjfHs
t6/pacFJu4W+5ubD+CrmXmbuR4zxM8RIjbBVK/vmnwrD4QzetmY8DzTxmUMT9bY9
ReDZ/uECgYEA3LuTeNzFYe7WHfr7ikqbFHSzfyZc74yJIFi8s8h6TXg16QFqqXN6
PQegN2B53M6Yx9yS6hdyDbR7+x+Dhuygrtka5dy00Crg2xl6zxwU2Go1jWCcVNRq
y26pNX89/phnplJzVZhVrOl0ypTeEVtzyGNklpblTiPEd77ab1P+GLkCgYEAue/J
9RchID5mDN32Mr2GeowdeTNWZqdGR0EDgvQvn2aANVbolSEtmPq5yBTv29c2D1At
NaV9YazmN/uiLmHpPLYlSLTSy8gI39YoKJdG5pBiEam+aRNRHqgGXE//MSpduFDi
xIlmTWuxMW5x+nDWLbwO6HXslxhkDCF7TCF9UMcCgYALQY19plRycAl/MeNN5AwV
xqW4oC4xEQuVGLFWwaxq8uXC23oi/H6JSjBDYqoUNnzYBEmBonxwcnm4Dp1Ybgyr
neqfOiYWO3mH8r6ufRIdX93/Cs8sDBZ+2Spk7mHmCIA+0diYAhObwFDq1+/ptg6
qcbhXwSGfZBxQsxExRWyEQKBgDsUjj9qUgREz3hXLtuAjTJzQwo33cRQcmxBpDQA
EwG7OBG6w7xfBnYNdOq2fGCGSY8kErlxFB3tKlmvgYDpy4sbJE2t5y0JKoi1K516
M/Ue+4pRPud189ih2yOJ57RfmdfvG58HaZJAHDVvGphRMjz1/HawwbRg88pSuTK/
-- INSERT --
Paste here

i-0dea8bdbfa7c71be7 (EC2-cloudinstitution-1)

PublicIPs: 65.0.204.201 PrivateIPs: 10.0.0.6

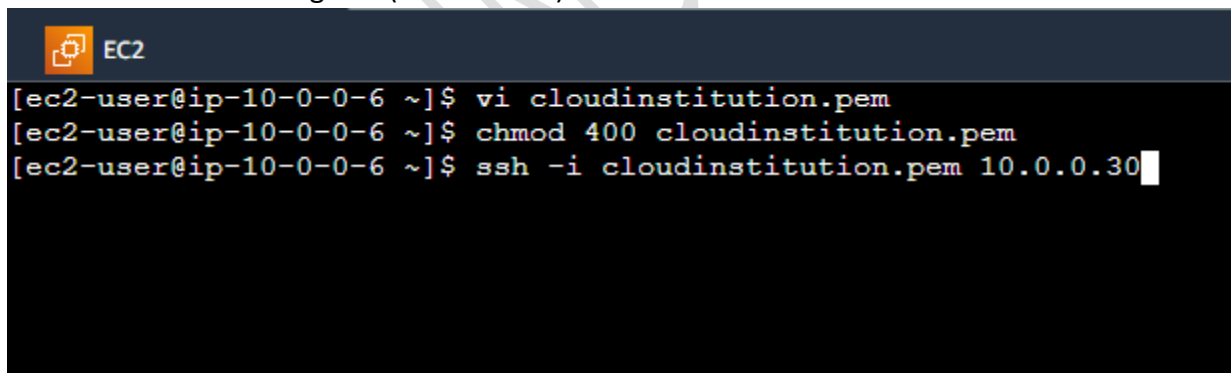
The command **chmod 400 <filename>.pem** is used to set the permissions of the file <filename>.pem to ensure it is secure.



```
EC2
[ec2-user@ip-10-0-0-6 ~]$ vi cloudinstitution.pem
[ec2-user@ip-10-0-0-6 ~]$ chmod 400 cloudinstitution.pem
[ec2-user@ip-10-0-0-6 ~]$
```

A terminal window titled 'EC2' showing a user editing a file and then running the 'chmod 400 cloudinstitution.pem' command. A red arrow points to the command.

The command **ssh -i <filename>.pem <private instance ip address>** is used to securely connect to a remote server using SSH (Secure Shell)



```
EC2
[ec2-user@ip-10-0-0-6 ~]$ vi cloudinstitution.pem
[ec2-user@ip-10-0-0-6 ~]$ chmod 400 cloudinstitution.pem
[ec2-user@ip-10-0-0-6 ~]$ ssh -i cloudinstitution.pem 10.0.0.30
```

A terminal window titled 'EC2' showing a user editing a file, running 'chmod 400 cloudinstitution.pem', and then running 'ssh -i cloudinstitution.pem 10.0.0.30'.

Successfully logged in to the private
subnet instance

PublicIPs: 65.0.204.201 PrivateIPs: 10.0.0.6

```
[ec2-user@ip-10-0-0-6 ~]$ vi cloudinstitution.pem
[ec2-user@ip-10-0-0-6 ~]$ chmod 400 cloudinstitution.pem
[ec2-user@ip-10-0-0-6 ~]$ ssh -i cloudinstitution.pem 10.0.0.30

#_
~\##### Amazon Linux 2023
~~\#####\
~~\###|
~~\#/ https://aws.amazon.com/linux/amazon-linux-2023
~~V~'-'->
~~~
~~.-.
~/m/'

Last login: Sat May 25 07:46:41 2024 from 10.0.0.6
[ec2-user@ip-10-0-0-30 ~]$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
^C
--- 8.8.8.8 ping statistics ---
22 packets transmitted, 0 received, 100% packet loss, time 21829ms

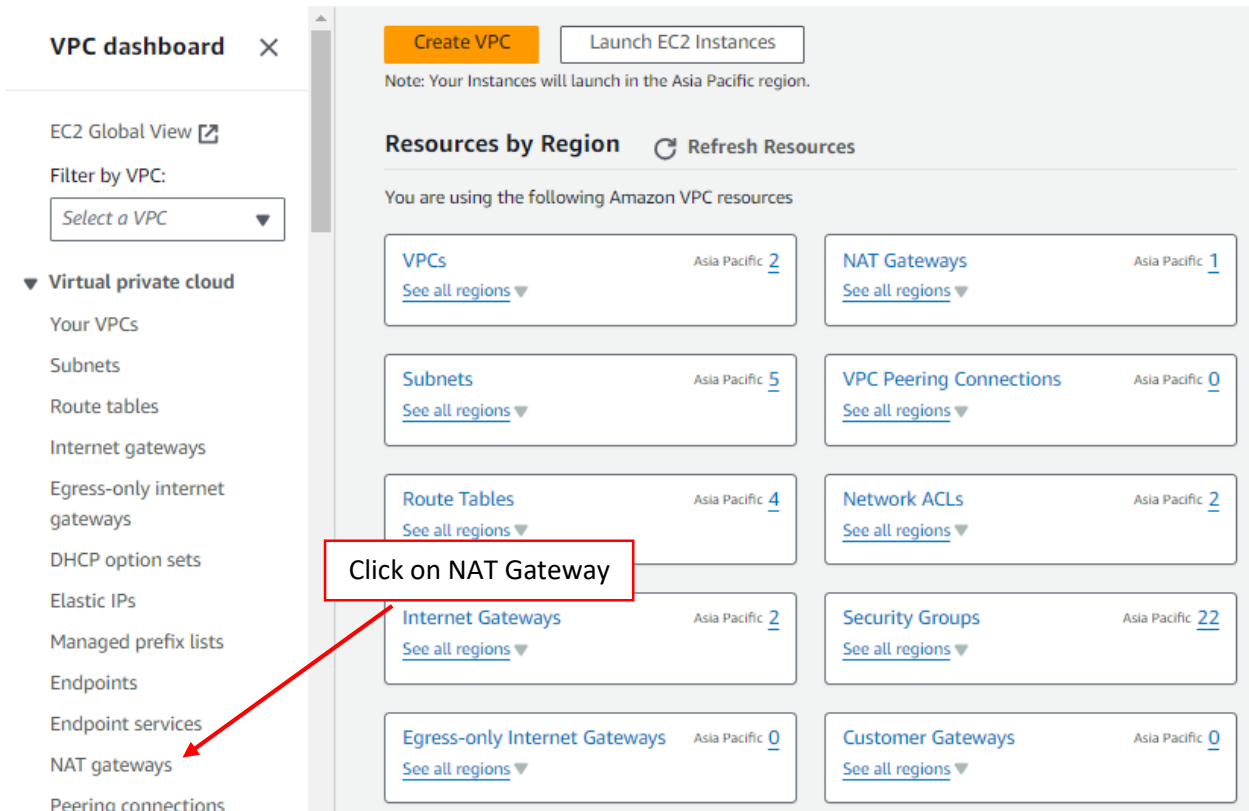
[ec2-user@ip-10-0-0-30 ~]$
```

Does not have internet connection

PublicIPs: 65.0.204.201 PrivateIPs: 10.0.0.6

Step 3 : Create a NAT Gateway

Now go to the VPC dashboard



VPC dashboard X

Create VPC Launch EC2 Instances

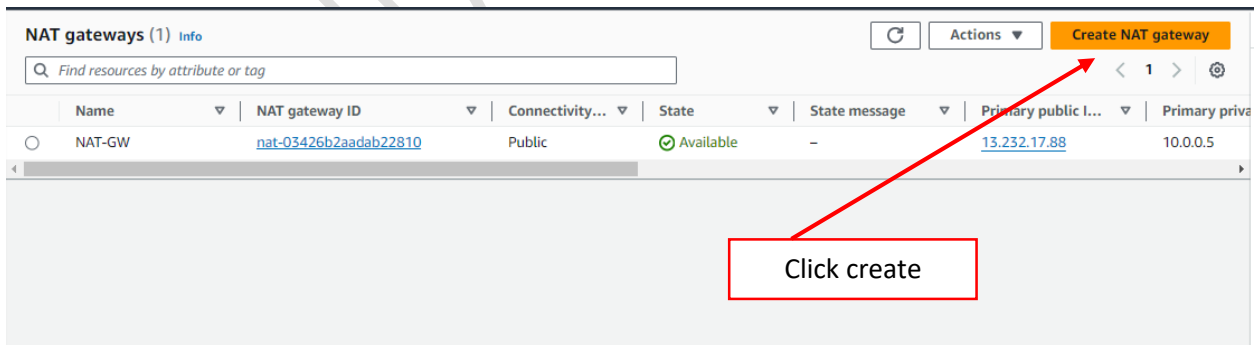
Note: Your Instances will launch in the Asia Pacific region.

Resources by Region Refresh Resources

You are using the following Amazon VPC resources

Resource	Asia Pacific
VPCs See all regions	2
NAT Gateways See all regions	1
Subnets See all regions	5
VPC Peering Connections See all regions	0
Route Tables See all regions	4
Network ACLs See all regions	2
Internet Gateways See all regions	2
Security Groups See all regions	22
Egress-only Internet Gateways See all regions	0
Customer Gateways See all regions	0

Click on NAT Gateway



NAT gateways (1) Info

Find resources by attribute or tag

Actions Create NAT gateway

Name	NAT gateway ID	Connectivity...	State	State message	Primary public I...	Primary priv
NAT-GW	nat-03426b2aadab22810	Public	Available	-	13.232.17.88	10.0.0.5

Click create

[VPC](#) > [NAT gateways](#) > Create NAT gateway

Create NAT gateway [Info](#)

A highly available, managed Network Address Translation (NAT) service that instances in private subnets can use to connect to services in other VPCs, on-premises networks, or the internet.

NAT gateway settings

Name - optional

Create a tag with a key of 'Name' and a value that you specify.

NAT-GATEWAY

The name can be up to 256 characters long.

Subnet

Select a subnet in which to create the NAT gateway.

subnet-0cda3696129bd0570 (SN1)

Connectivity type

Select a connectivity type for the NAT gateway.

☒ Public

☐ Private

Elastic IP allocation ID [Info](#)

Assign an Elastic IP address to the NAT gateway.

Select an Elastic IP

Allocate Elastic IP

Connectivity type

Select a connectivity type for the NAT gateway.

☒ Public

☐ Private

Automatically allocates elastic IP

Elastic IP allocation ID [Info](#)

Assign an Elastic IP address to the NAT gateway.

eipalloc-080518e547149768e

Allocate Elastic IP

► Additional settings [Info](#)

Tags

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.

Key

Value - optional

Q Name

Q NAT-GW

Remove

Add new tag

Click create

You can add 49 more tags.

Cancel

Create NAT gateway

✔ NAT gateway nat-03426b2aadab22810 | NAT-GW was created successfully.

NAT gateways (1) [Info](#)

Find resources by attribute or tag

	Name	NAT gateway ID	Connectivity...	State	State message	Primary public I...	Primary priv
○	NAT-GW	nat-03426b2aadab22810	Public	✔ Available	-	13.232.17.88	10.0.0.5

NAT Gateway Created

VPC dashboard ✕

Create VPC Launch EC2 Instances

Note: Your Instances will launch in the Asia Pacific region.

Resources by Region Refresh Resources

You are using the following Amazon VPC resources

VPCs Asia Pacific [2](#)

NAT Gateways Asia Pacific [1](#)

Subnets Asia Pacific [5](#)

VPC Peering Connections Asia Pacific [0](#)

Route Tables Asia Pacific [4](#)

Network ACLs Asia Pacific [2](#)

Internet Gateways Asia Pacific [2](#)

Security Groups Asia Pacific [22](#)

Egress-only Internet Gateways Asia Pacific [0](#)

Customer Gateways Asia Pacific [0](#)

Virtual private cloud

Your VPCs

Subnets

Route tables

Internet gateways

Egress-only internet gateways

DHCP option sets

Elastic IPs

Managed prefix lists

Endpoints

Endpoint services

NAT gateways

Peering connections

Go to Route Tables

Route tables (1/4) Info

Find resources by attribute or tag

Select the Private route table

	Name	Route table ID	Explicit subnet associ...	Edge associations	Main	VPC
<input type="checkbox"/>	MUM-PUBLIC-RT	rtb-02d964f01211a0a26	subnet-0cda3696129bd0...	-	No	vpc-0c49231c175ebffcb
<input checked="" type="checkbox"/>	MUM-PRIVATE-RT	rtb-0aa221d6a048b0454	subnet-050d771bc2c11d...	-	No	vpc-0c49231c175ebffcb
<input type="checkbox"/>	-	rtb-059fdd95eafe57d45	-	-	Yes	vpc-0c3cd85059c1bcf31
<input type="checkbox"/>	-	rtb-0827134e9727d39f7	-	-	Yes	vpc-0c49231c175ebffcb

rtb-0aa221d6a048b0454 / MUM-PRIVATE-RT

Details Routes Subnet associations Edge associations Route propagation Tags

Routes (1)

Filter routes

Click edit routes

Destination	Target	Status	Propagated
10.0.0.0/24	local	Active	No

VPC > Route tables > rtb-0aa221d6a048b0454 > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/24	local	Active	No

Q local X

Click on Add route

Add route

VPC > Route tables > rtb-0aa221d6a048b0454 > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/24	local	Active	No

Q local X

Q 0.0.0.0/0 X

Select 0.0.0.0 as destination

NAT Gateway

Q nat- X

Use: "nat-"

nat-03426b2aadab22810 (NAT-GW)

Add route

Remove

Cancel Preview **Save changes**

VPC > Route tables > rtb-0aa221d6a048b0454 > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/24	local	Active	No

Q local X

Q 0.0.0.0/0 X

Choose NAT Gateway

NAT Gateway

Q nat- X

Use: "nat-"

nat-03426b2aadab22810 (NAT-GW)

Choose the created Gateway and click Save

Add route

Remove

Cancel Preview **Save changes**

Note : Public route table is attached to internet gateway

Route tables (1/4) Info Find resources by attribute or tag Actions Create route table

Name	Route table ID	Explicit subnet associ...	Edge associations	Main	VPC
<input checked="" type="checkbox"/> MUM-PUBLIC-RT	rtb-02d964f01211a0a26	subnet-0cda3696129bd0...	-	No	vpc-0c49231c175ebffcb
<input type="checkbox"/> MUM-PRIVATE-RT	rtb-0aa221d6a048b0454	subnet-050d771bc2c11d...	-	No	vpc-0c49231c175ebffcb
<input type="checkbox"/> -	rtb-059fdd95eafe57d45	-	-	Yes	vpc-0c3cd85059c1bcf31
<input type="checkbox"/> -	rtb-0827134e9727d39f7	-	-	Yes	vpc-0c49231c175ebffcb

rtb-02d964f01211a0a26 / MUM-PUBLIC-RT

Details Routes Subnet associations Edge associations Route propagation Tags

Routes (2) Both Edit routes

Filter routes

Destination	Target	Status	Propagated
0.0.0.0/0	igw-0995d332557152e64	Active	No
10.0.0.0/24	local	Active	No

Note : Private route table is attached to NAT gateway

Route tables (1/4) Info Find resources by attribute or tag Actions Create route table

Name	Route table ID	Explicit subnet associ...	Edge associations	Main	VPC
<input type="checkbox"/> MUM-PUBLIC-RT	rtb-02d964f01211a0a26	subnet-0cda3696129bd0...	-	No	vpc-0c49231c175ebffcb
<input checked="" type="checkbox"/> MUM-PRIVATE-RT	rtb-0aa221d6a048b0454	subnet-050d771bc2c11d...	-	No	vpc-0c49231c175ebffcb
<input type="checkbox"/> -	rtb-059fdd95eafe57d45	-	-	Yes	vpc-0c3cd85059c1bcf31
<input type="checkbox"/> -	rtb-0827134e9727d39f7	-	-	Yes	vpc-0c49231c175ebffcb

rtb-0aa221d6a048b0454 / MUM-PRIVATE-RT

Details Routes Subnet associations Edge associations Route propagation Tags

Routes (2) Both Edit routes

Filter routes

Destination	Target	Status	Propagated
0.0.0.0/0	nat-03426b2aadab22810	Active	No
10.0.0.0/24	local	Active	No

Step 4 : Now connect the private subnet instance

```
EC2
#_
~\#### Amazon Linux 2023
~~\#####\
~~\###|
~~\#/ https://aws.amazon.com/linux/amazon-linux-2023
~~v~'~>
~~~
~~~.
~~~/_/
~~~/_/m/'

Last login: Sat May 25 07:50:44 2024 from 13.233.177.4
[ec2-user@ip-10-0-0-6 ~]$ ssh -i cloudinstitution.pem 10.0.0.30
```

i-0dea8bdbfa7c71be7 (EC2-cloudinstitution-1)

PublicIPs: 65.1.132.208 PrivateIPs: 10.0.0.6



Logged in to the private instance

PublicIPs: 65.1.132.208 PrivateIPs: 10.0.0.6

[illegible]

PublicIPs: 65.1.132.208 PrivateIPs: 10.0.0.6

Successfully given
access to the private
subnet