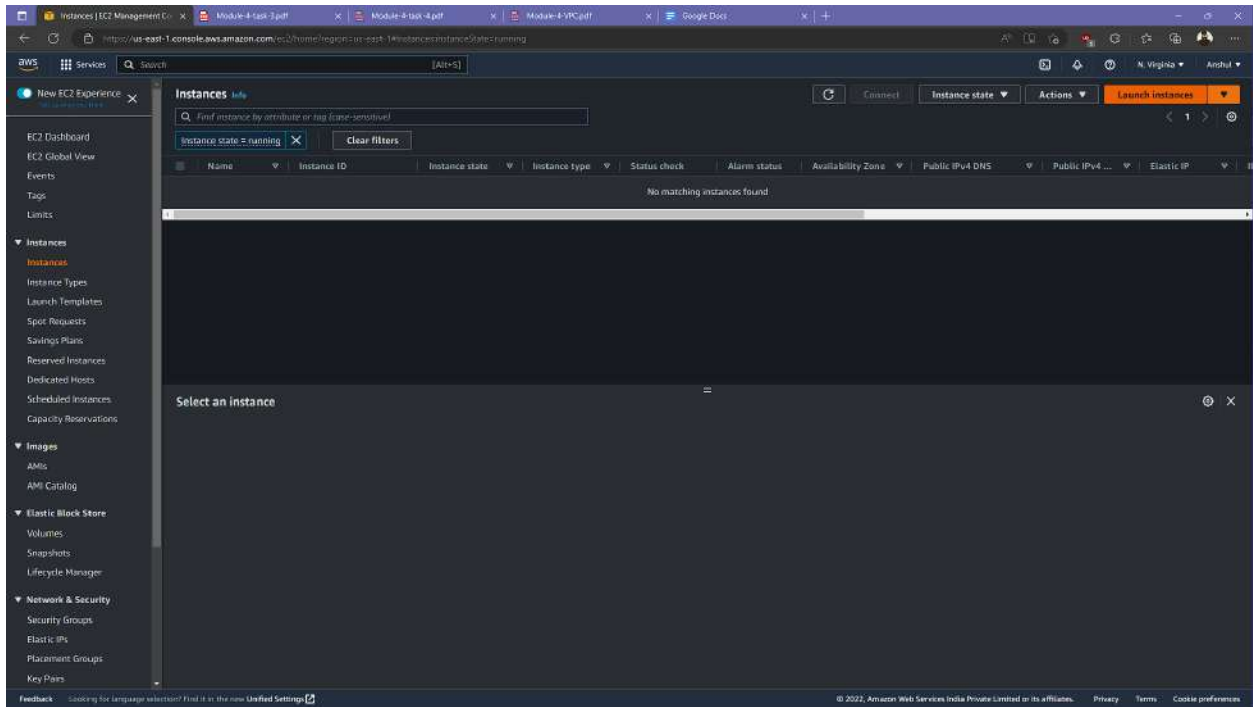


## Module 4: VPC Assignment - 3

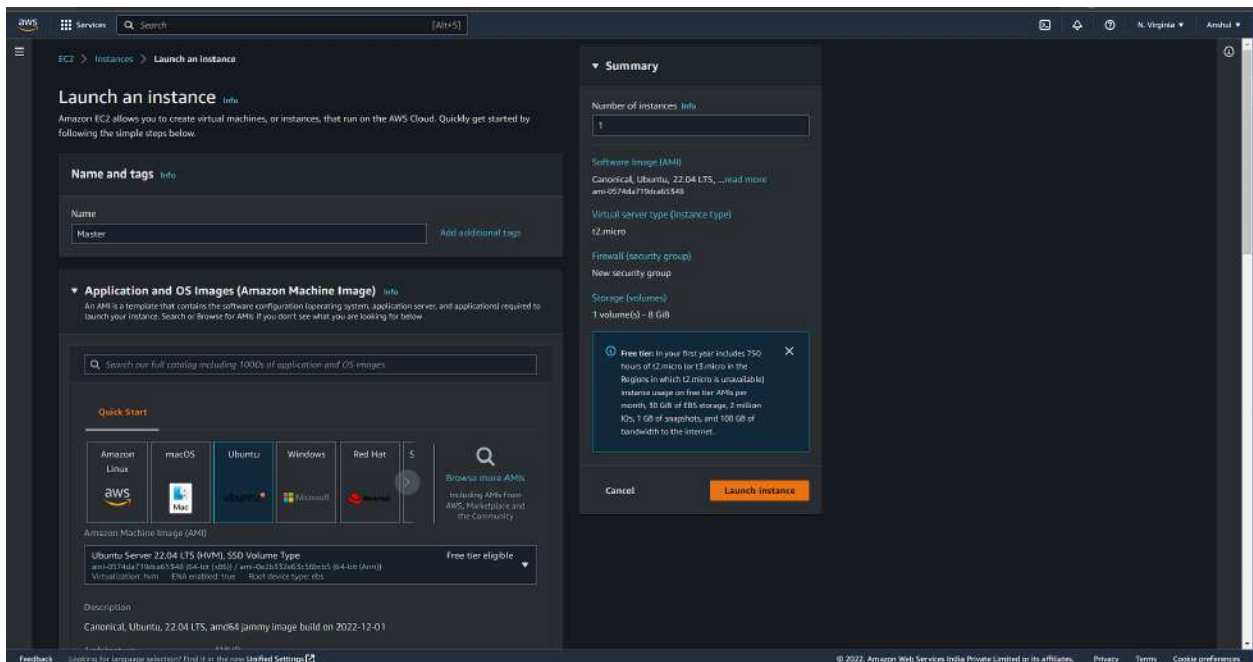
You have been asked to:

1. Create 2 EC2 instances in any public subnet of any VPC and name them Master and Client.
2. Using security groups, make sure that Client instances can only be accessed (SSH) through the Master instance.

Let's launch 2 EC2 instances.



Name the first one as master.



## Allow SSH traffic from anywhere.

Launch an instance | EC2 Management Console

Instance type: **t2.micro** (Free tier eligible) [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: **For-VPC-Assignment** [Create a new key pair](#)

**Network settings** info [Edit](#)  
Network: **vpc-077b06a7f35a1c93a**  
Subnet: **No preference (Default subnet in all availability zones)**  
Auto-assign public IP: **Enable**  
Firewall (security group) info  
A security group is a set of firewall rules that control the traffic for your instances. Add rules to allow specific traffic to reach your instance.  
☒ **Create security group** ☐ **Select existing security group**  
We'll create a new security group called **launch-wizard-5** with the following rules:  
☒ **Allow SSH traffic from** Helps you connect to your instance. **Anywhere** **0.0.0.0/0**  
☐ **Allow HTTPS traffic from the internet** To set up an endpoint, for example when creating a web server.  
☐ **Allow HTTP traffic from the internet**

**Summary**  
Number of instances: **1**  
Software Image (AMI): **Canonical, Ubuntu, 22.04 LTS, ...** [Read more](#)  
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 for 1 month in the Regions in which t2.micro is unavailable. Instance usage on free tier AMIs per month: 30 GiB of EBS storage, 2 million IOPS, 1 GiB of snapshots and 100 GiB of bandwidth to the internet.

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

## Launch a second instance.

Instances | EC2 Management Console

**Instances (1)** info [Connect](#) [Instance state](#) [Actions](#) [Launch instances](#)

Find instance by attribute or tag (case-sensitive)

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
Master	i-08faff3dd591f610f	Pending	t2.micro	-	No alarms	us-east-1c	ec2-54-224-113-252.co...	54.224.113.252	-

**Select an instance**

## Name it as a client.

following the simple steps below.

**Name and tags** info

Name  
Client [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.

Search our full catalog including 1000s of application and OS images

**Quick Start**

Amazon Linux macOS Ubuntu Windows Red Hat S Browse more AMIs  
Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type  
ami-0574db719dc65348 (64-bit x86) / ami-0c2b33263c56b05 (64-bit x86)  
Virtualization: hvm EBS: enabled: true Root device type: ebs Free tier eligible

Description  
Canonical, Ubuntu, 22.04 LTS, amd64 jammy image build on 2022-12-01

Architecture AMI ID  
64-bit (x86) ami-0574db719dc65348 [Verified provider](#)

**Summary**

Number of instances info  
1

Software Image (AMI)  
Canonical, Ubuntu, 22.04 LTS, ...[read more](#)  
ami-0574db719dc65348

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 for 1 month in the Regions in which t2.micro is unavailable.  
Instance usage on free tier AMIs per month: 30 GB of EBS storage, 1 million I/Os, 1 GB of snapshots and 100 GB of bandwidth to the Internet.

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

## Create a keypair for connection.

**Create key pair**

Key pairs allow you to connect to your instance securely.

Enter the name of the key pair below. When prompted, store the private key in a secure and accessible location on your computer. You will need it later to connect to your instance. [Learn more](#)

Key pair name  
client-keypair  
The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type  
☒ RSA  
RSA encrypted private and public key pair  
☐ ED25519  
ED25519 encrypted private and public key pair (Not supported for Windows instances)

Private key file format  
☒ pem  
For use with OpenSSH  
☐ ppk  
For use with PuTTY

[Cancel](#) [Create key pair](#)

## Allow SSH from anywhere for now.

The screenshot shows the AWS Management Console 'Launch wizard' for a new EC2 instance. The 'Firewall (security groups)' section is expanded, showing the 'Create security group' step. The 'Allow SSH traffic from' checkbox is checked, and the 'From' field is set to 'Anywhere'. The 'Launch Instance' button is visible at the bottom right.

## Copy Master Instance's Private IPv4. We will need that later.

The screenshot shows the AWS Management Console 'Instances' page. The 'Master' instance is selected, and its details are displayed. The 'Private IPv4 address' is highlighted, showing the value 'ip-172-31-27-64.ec2.internal'.

Select Client instance. And go to security and tap on security group.

The screenshot shows the AWS Management Console interface. At the top, there's a navigation bar with 'Services' and a search bar. Below it, the 'Instances' page is displayed. A table lists two instances: 'Client' (i-019d1f0d23d2e3fb5) and 'Master' (i-00b0ff54e051f69f). The 'Client' instance is selected. The 'Security' tab is active, showing the security group 'sg-08ca8a1e259b3d6d3' (launch-wizard-6). The 'Inbound rules' section shows a single rule for port 22 (SSH) from 0.0.0.0/0.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP	IPv6 IPs	Monitor
Client	i-019d1f0d23d2e3fb5	Running	t2.micro	Initializing	No alarms	us-east-1c	ec2-3-80-155-19.comp...	3.80.155.19	-	-	disabled
Master	i-00b0ff54e051f69f	Running	t2.micro	7/7 checks passed	No alarms	us-east-1c	ec2-54-224-113-252.co...	54.224.113.252	-	-	disabled

Instance: i-019d1f0d23d2e3fb5 (Client)

Details | **Security** | Networking | Storage | Status checks | Monitoring | Tags

▼ Security details

IAM role: --

Owner ID: 623332020272

Launch time: Thu Dec 22 2022 14:01:59 GMT+0530 (India Standard Time)

Security groups: sg-08ca8a1e259b3d6d3 (launch-wizard-6)

▼ Inbound rules

Name	Security group rule ID	Port range	Protocol	Source	Security groups	Description
-	sg-05b48ee0d09a43dd	22	TCP	0.0.0.0/0	launch-wizard-6	-

▼ Outbound rules

Select security group and select edit inbound rules.

The screenshot shows the AWS Management Console interface. At the top, there's a navigation bar with 'Services' and a search bar. Below it, the 'Security Groups' page is displayed. A table lists one security group: 'sg-08ca8a1e259b3d6d3' (launch-wizard-6). The 'Inbound rules' tab is active, showing a single rule for port 22 (SSH) from 0.0.0.0/0.

EC2 > Security Groups > sg-08ca8a1e259b3d6d3 - launch-wizard-6

sg-08ca8a1e259b3d6d3 - launch-wizard-6

Details

Security group name: launch-wizard-6

Security group ID: sg-08ca8a1e259b3d6d3

Description: launch-wizard-6 created 2022-12-22T08:31:25.052Z

VPC ID: vpc-077b06a7715ea1d93a

Owner: 623332020272

Inbound rules count: 1 Permission entry

Outbound rules count: 1 Permission entry

Inbound rules | Outbound rules | Tags

You can now check network connectivity with Reachability Analyzer

Run Reachability Analyzer

Inbound rules (1/1)

Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
-	sg-05b48ee0d09a43dd	IPv4	SSH	TCP	22	0.0.0.0/0	-

## Delete current rule.

The screenshot shows the AWS Management Console interface for editing inbound rules of a security group. The breadcrumb navigation indicates the path: EC2 > Security Groups > sg-08ca8a1e259b3d6d3 - launch-wizard-6 > Edit inbound rules. The page title is 'Edit inbound rules' with an 'info' link. Below the title, a message states: 'Inbound rules control the incoming traffic that's allowed to reach the instance.'

The 'Inbound rules' section contains a table with the following columns: Security group rule ID, Type, Protocol, Port range, Source, and Description - optional. A single rule is listed with the ID 'sgn-05b48ee0d5d9a43dd', Type 'SSH', Protocol 'TCP', Port range '22', and Source 'Custom'. A 'Delete' button is located to the right of the rule's description field. Below the table is an 'Add rule' button. At the bottom right of the panel, there are three buttons: 'Cancel', 'Preview changes', and 'Save rules'.

Feedback: Looking for language selection? Find it in the new Unified Settings.

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## Select Add Rule.

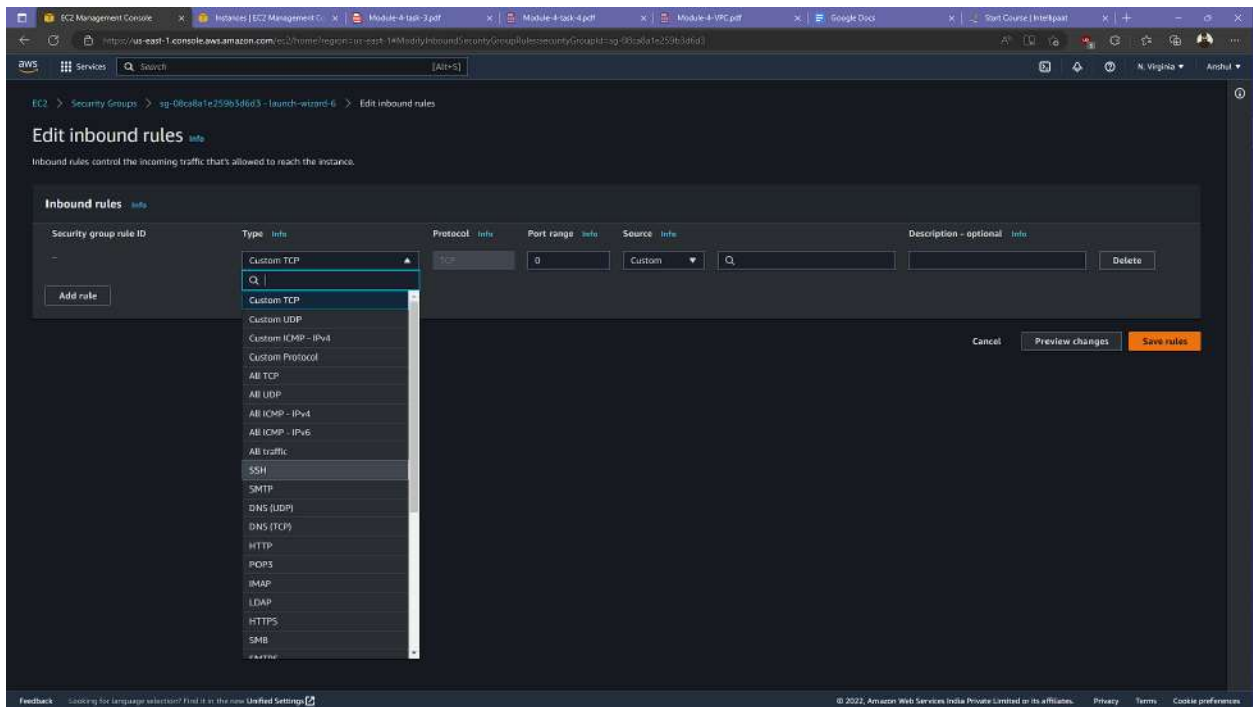
The screenshot shows the same AWS Management Console interface, but the 'Inbound rules' section now displays a message: 'This security group has no inbound rules.' The 'Add rule' button is highlighted with a blue border. The rest of the interface, including the breadcrumb navigation, page title, and bottom buttons, remains the same.

Feedback: Looking for language selection? Find it in the new Unified Settings.

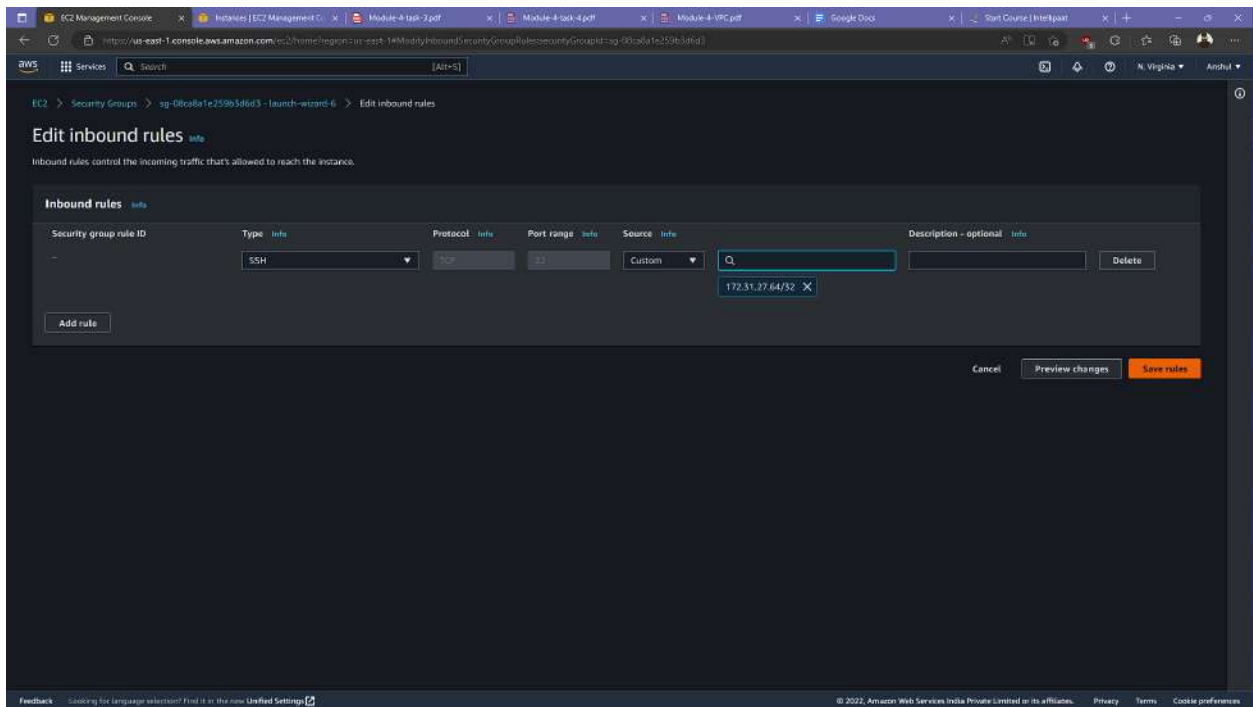
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## Choose type as SSH



## Let source be custom and paste the Private IPv4 of Master Instance.



Let's check if it is working or not. Connect to Master instance.

The screenshot shows the AWS Management Console interface. At the top, there's a navigation bar with 'Instances | EC2 Manager' and a search bar. Below this, the 'Instances' page is displayed, showing a table of instances. The 'Master' instance is selected, and its details are shown in a modal window. The details include:

- Instance summary:** Instance ID (i-0f8faff3dd591fc9f), IPv6 address, Hostname type (IP name: ip-172-31-27-64.ec2.internal), Auto-assign IP address (54.224.113.252), IAM Role.
- Public IPv4 address:** 54.224.113.252 (open address).
- Instance state:** Running.
- Private IP DNS name (IPv4 only):** ip-172-31-27-64.ec2.internal.
- Instance type:** t2.micro.
- VPC ID:** vpc-077b06a7f5e1c95a.
- Subnet ID:** (not visible).
- Private IPv4 addresses:** 172.31.27.64.
- Public IPv4 DNS:** ec2-54-224-113-252.compute-1.amazonaws.com (open address).
- Elastic IP addresses:** (not visible).
- AWS Compute Optimizer Finding:** Opt-in to AWS Compute Optimizer for recommendations.
- Auto Scaling Group name:** (not visible).

Connected to master instance.

The screenshot shows a terminal window with the Ubuntu 22.04.1 LTS login screen. The terminal displays the following text:

```
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-1026-aws x86_64)

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

System information as of Thu Dec 22 08:39:55 UTC 2022

System load: 0.0          Processes: 97
Usage of /: 19.8% of 7.57GB   Users logged in: 0
Memory usage: 21%          IPv4 address for eth0: 172.31.27.64
Swap usage: 0%

0 updates can be applied immediately.

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.

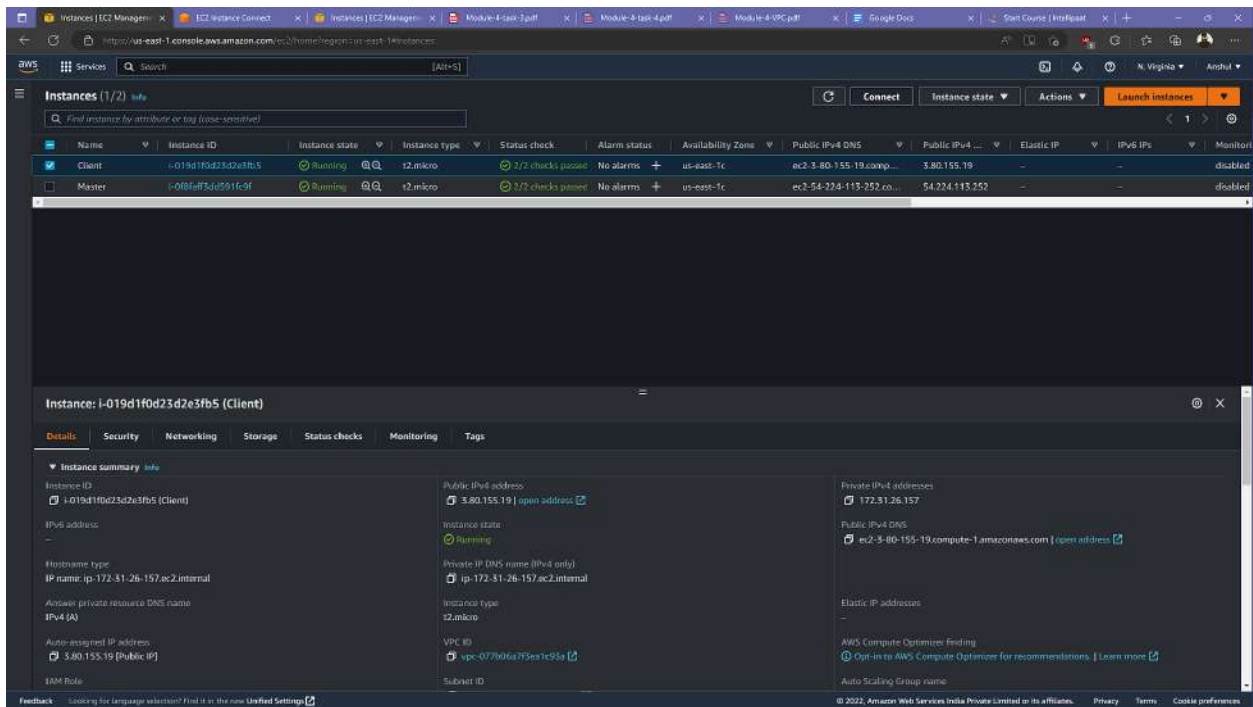
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

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

ubuntu@ip-172-31-27-64:~$
```



Now select the Client instance in another tab.



The screenshot shows the AWS Management Console with the EC2 Instances page. The 'Client' instance is selected. The instance details panel is open, showing the instance summary, including the instance ID, name, state, type, and various IP addresses.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP	IPv6 IPs	Monitor
Client	i-019d1f0d23d2e3fb5	Running	t2.micro	2/2 checks passed	No alarms	us-east-1c	ec2-3-80-155-19.compute-1.amazonaws.com	3.80.155.19	-	-	disabled
Master	i-00bf0754u05b1c9f	Running	t2.micro	2/2 checks passed	No alarms	us-east-1c	ec2-54-224-113-252.compute-1.amazonaws.com	54.224.113.252	-	-	disabled

**Instance: i-019d1f0d23d2e3fb5 (Client)**

**Instance summary**

Instance ID: i-019d1f0d23d2e3fb5 (Client)

IPv6 address: -

Hostname type: IP name: ip-172-31-26-157.ec2.internal

Auto-assign private IP address: 5.80.155.19 (Public IP)

Auto-assign public IP address: 5.80.155.19 (Public IP)

Instance state: Running

Private IP DNS name (IPv4 only): ip-172-31-26-157.ec2.internal

Instance type: t2.micro

VPC ID: vpc-077b06a795e1c95a

Subnet ID: -

Public IPv4 address: 3.80.155.19 | open address

Private IPv4 addresses: 172.31.26.157

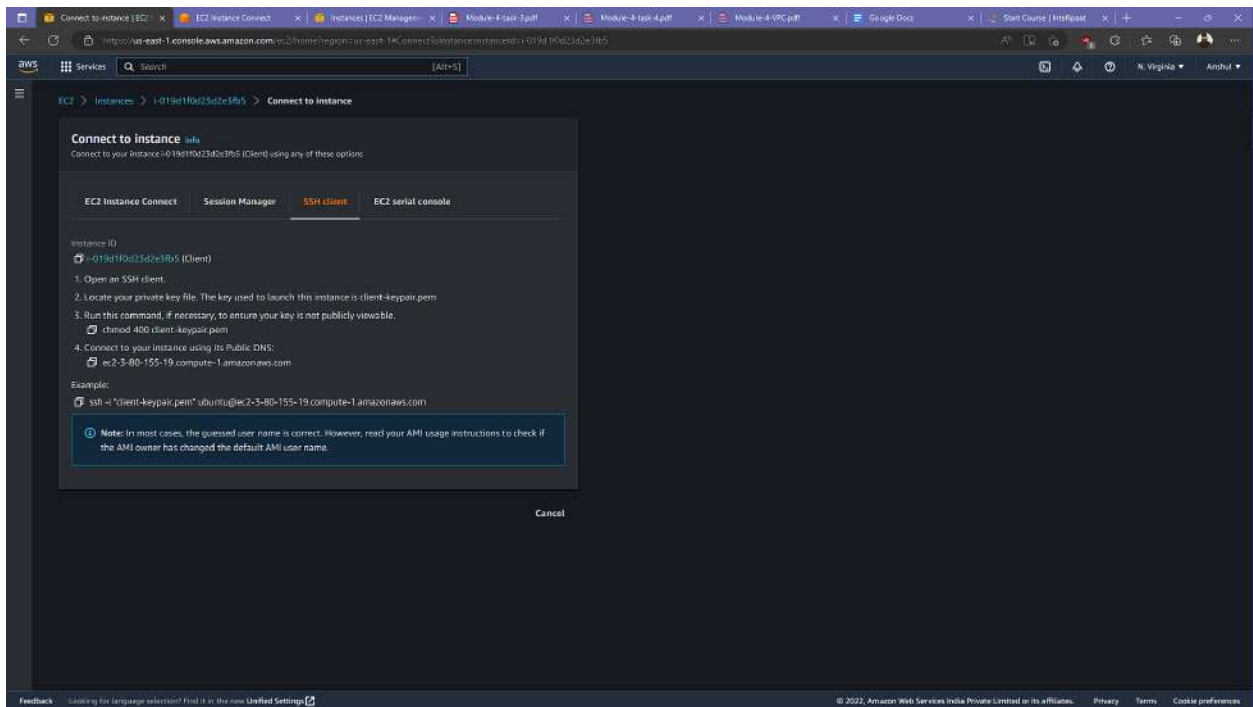
Public IPv4 DNS: ec2-3-80-155-19.compute-1.amazonaws.com | open address

Elastic IP addresses: -

AWS Compute Optimizer Finding: Opt-in to AWS Compute Optimizer for recommendations. | Learn more

Auto Scaling Group name: -

Click on connect and then choose SSH client. WE will need this later.



The screenshot shows the AWS Management Console with the 'Connect to Instance' dialog box. The 'SSH client' option is selected. The dialog provides instructions on how to connect to the instance using an SSH client, including the command to run and the public DNS name.

**Connect to Instance**

Connect to your instance i-019d1f0d23d2e3fb5 (Client) using any of these options:

EC2 Instance Connect | Session Manager | **SSH client** | EC2 serial console

Instance ID: i-019d1f0d23d2e3fb5 (Client)

1. Open an SSH client.

2. Locate your private key file. The key used to launch this instance is client-keypair.pem

3. Run this command, if necessary, to ensure your key is not publicly viewable.

4. Connect to your instance using its Public DNS:

ec2-3-80-155-19.compute-1.amazonaws.com

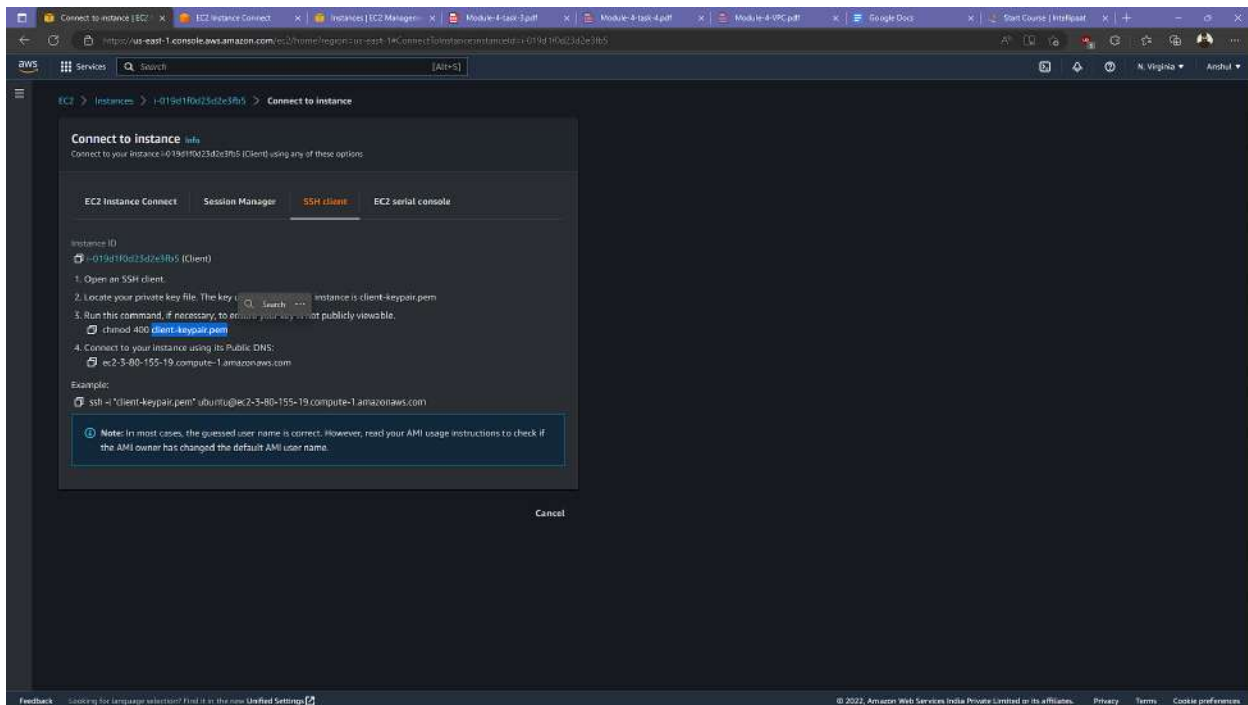
Example:

```
ssh -i "client-keypair.pem" ubuntu@ec2-3-80-155-19.compute-1.amazonaws.com
```

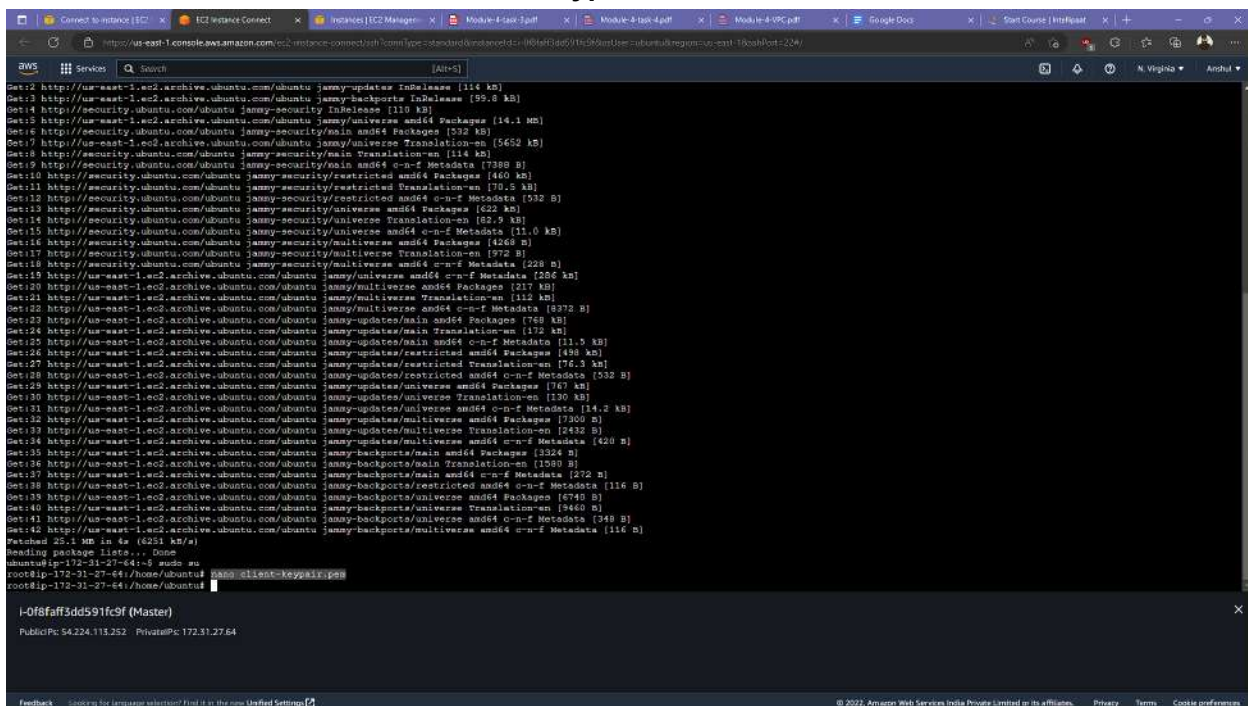
Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default user name.

Cancel

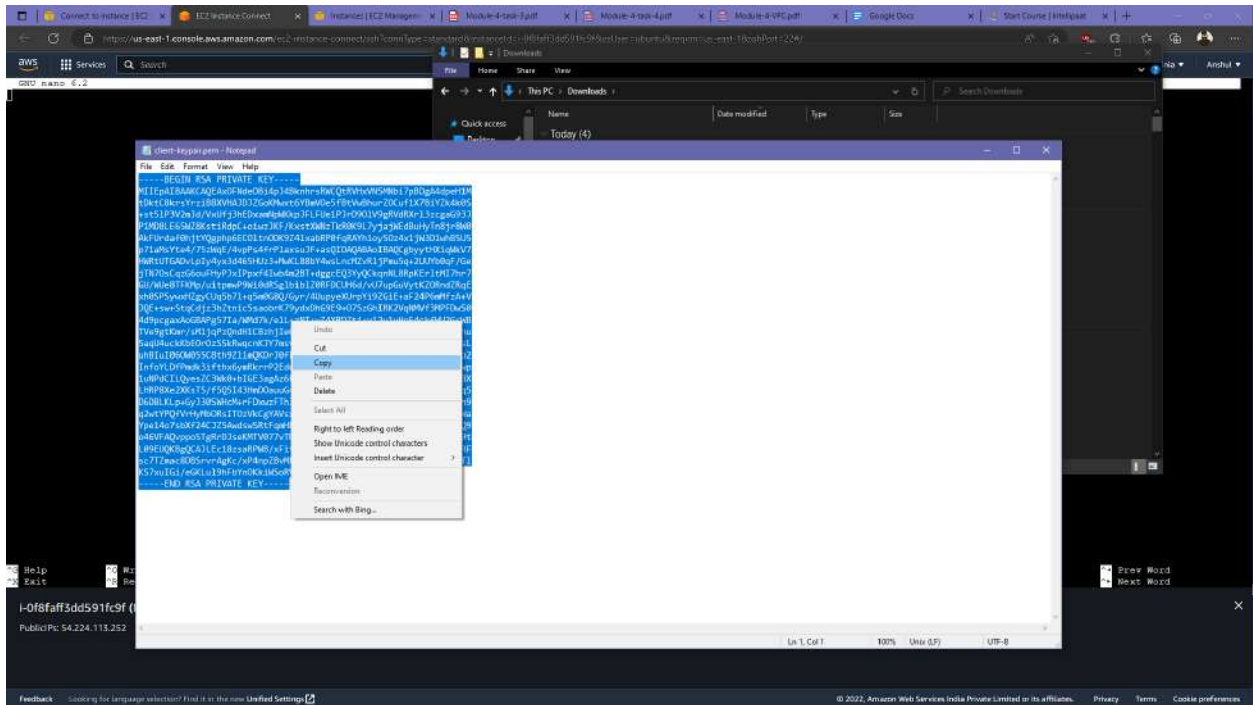
## Copy the key pair name of Client.



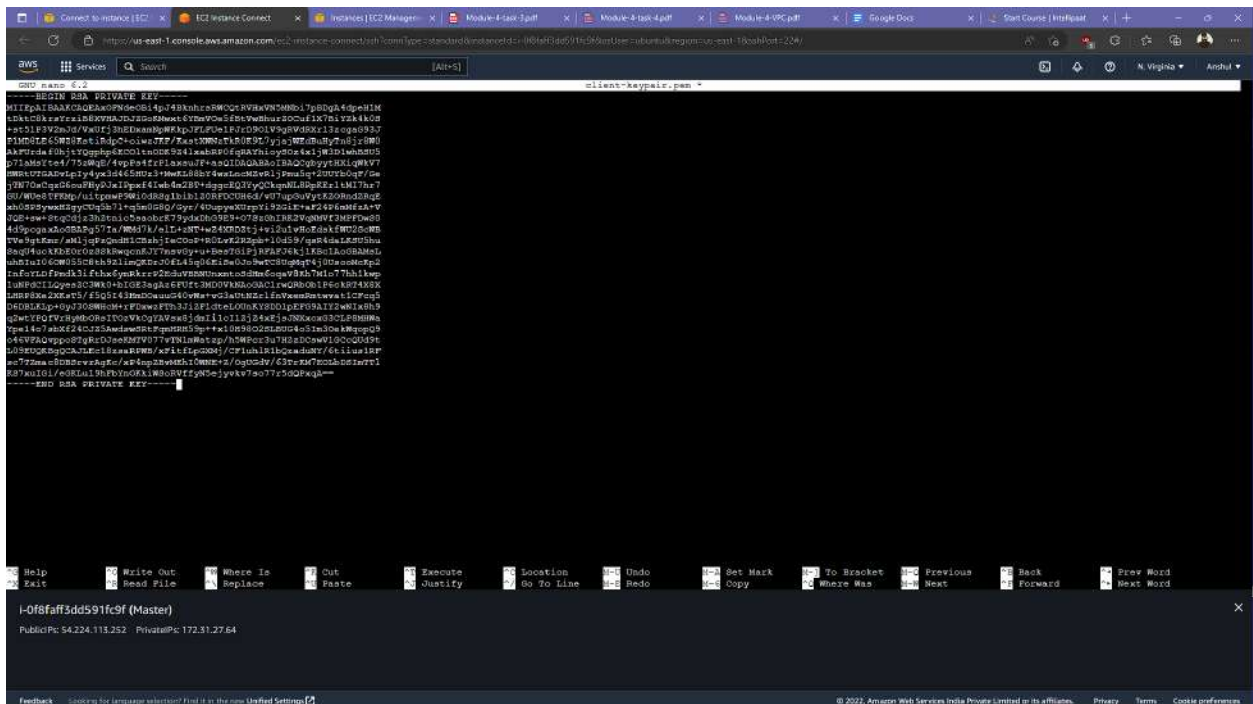
## Nano <name of keypair> in master instance.



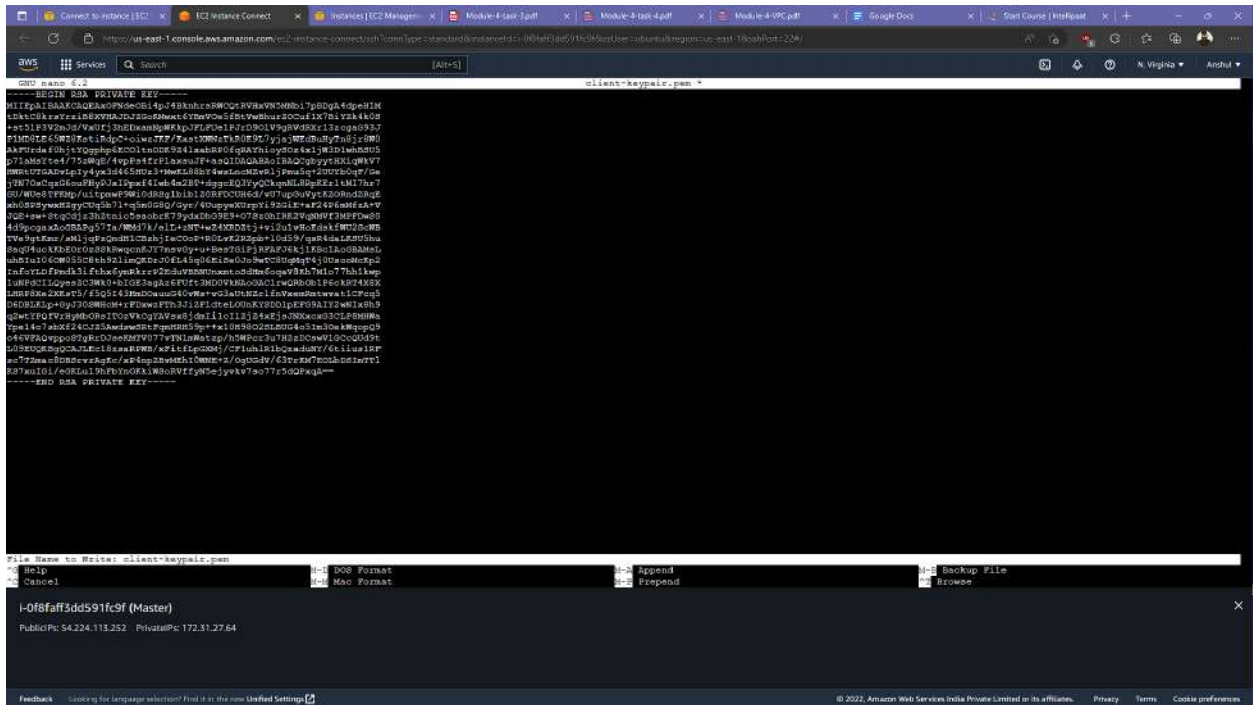
## Open the keypair and copy all.



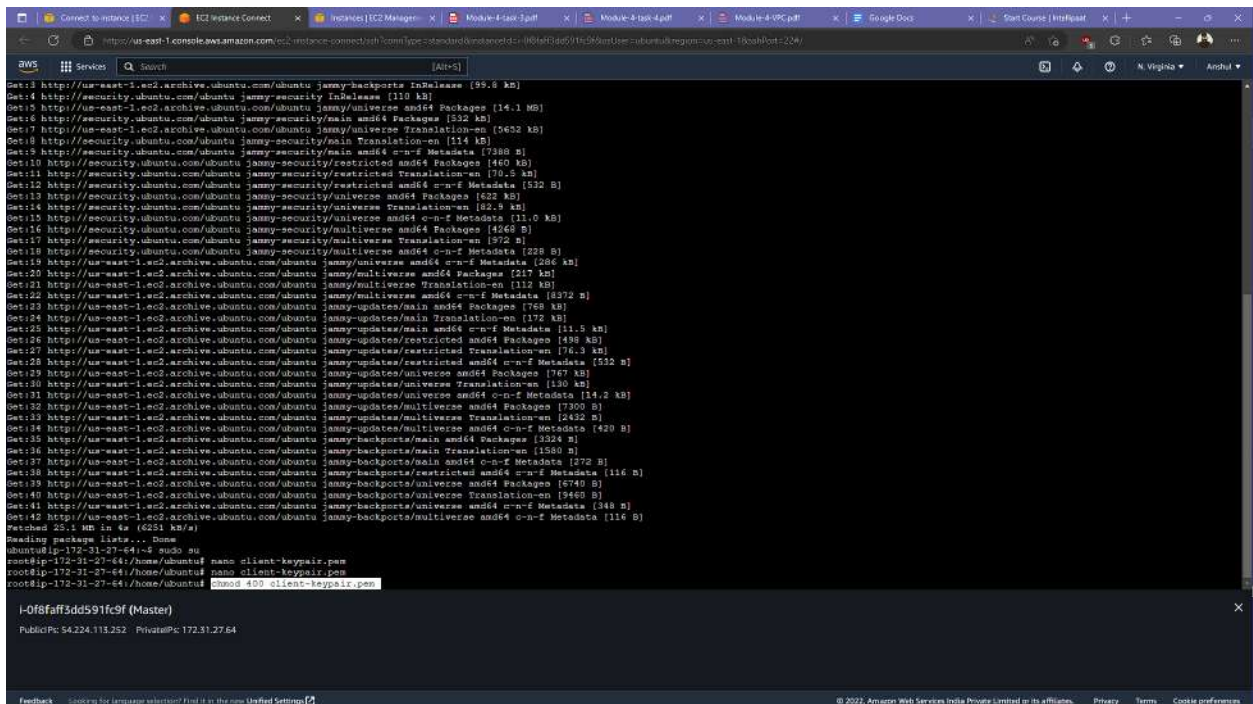
## Paste it in Nano keypair in master instance.



**save and exit.**



**Now chmod 400 keypair so that now keypair is rreadonly now.**





## Connect to Client from Master.

```
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [532 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:8 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [114 kB]
Get:9 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [7289 B]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [460 kB]
Get:11 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [70.5 kB]
Get:12 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 c-n-f Metadata [1532 B]
Get:13 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [622 kB]
Get:14 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [82.9 kB]
Get:15 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [11.0 kB]
Get:16 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [4569 B]
Get:17 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [972 B]
Get:18 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [228 B]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [2284 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [1972 B]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [768 kB]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [172 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [11.5 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [498 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [76.3 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [532 B]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [767 kB]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [130 kB]
Get:31 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [14.2 kB]
Get:32 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [1700 B]
Get:33 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [2432 B]
Get:34 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [420 B]
Get:35 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [3254 B]
Get:36 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [1580 B]
Get:37 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [272 B]
Get:38 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:39 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [6740 B]
Get:40 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [9460 B]
Get:41 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [348 B]
Get:42 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Fetched 25.1 MB in 4s (6251 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-27-64:~$ sudo su
root@ip-172-31-27-64:/home/ubuntu# nano client-keypair.pem
root@ip-172-31-27-64:/home/ubuntu# chmod 400 client-keypair.pem
root@ip-172-31-27-64:/home/ubuntu# cat -l "client-keypair.pem" ubuntu@ec2-3-80-155-19.compute-1.amazonaws.com
-----BEGIN RSA PRIVATE KEY-----
MIIEpAIBAAKCAQEA...
-----END RSA PRIVATE KEY-----

Public key: 54.224.115.252 Private key: 172.31.27.64

Feedback Loading for language selection? Find it in the new Unified Settings
```

## We are connected.

```
Get:40 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [9460 B]
Get:41 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [348 B]
Get:42 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Fetched 25.1 MB in 4s (6251 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-27-64:~$ sudo su
root@ip-172-31-27-64:/home/ubuntu# nano client-keypair.pem
root@ip-172-31-27-64:/home/ubuntu# chmod 400 client-keypair.pem
root@ip-172-31-27-64:/home/ubuntu# cat -l "client-keypair.pem" ubuntu@ec2-3-80-155-19.compute-1.amazonaws.com
-----BEGIN RSA PRIVATE KEY-----
MIIEpAIBAAKCAQEA...
-----END RSA PRIVATE KEY-----

Public key: 54.224.115.252 Private key: 172.31.26.157
The authenticity of host 'ec2-3-80-155-19.compute-1.amazonaws.com (172.31.26.157)' can't be established.
ED25519 key fingerprint is SHA256:UgqktsG2/ghhataw20d6tzcay67Wp26A+Jd8en.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-80-155-19.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-1026-aws x86_64)

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

System information as of Thu Dec 22 08:43:27 UTC 2022

System load: 0.0      Processes:    97
Usage of /: 15.8% of 7.57GB   Users logged in: 0
Memory usage: 22%      IPV6 address for eth0: 172.31.26.157
Swap usage: 0%

0 updates can be applied immediately.

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.

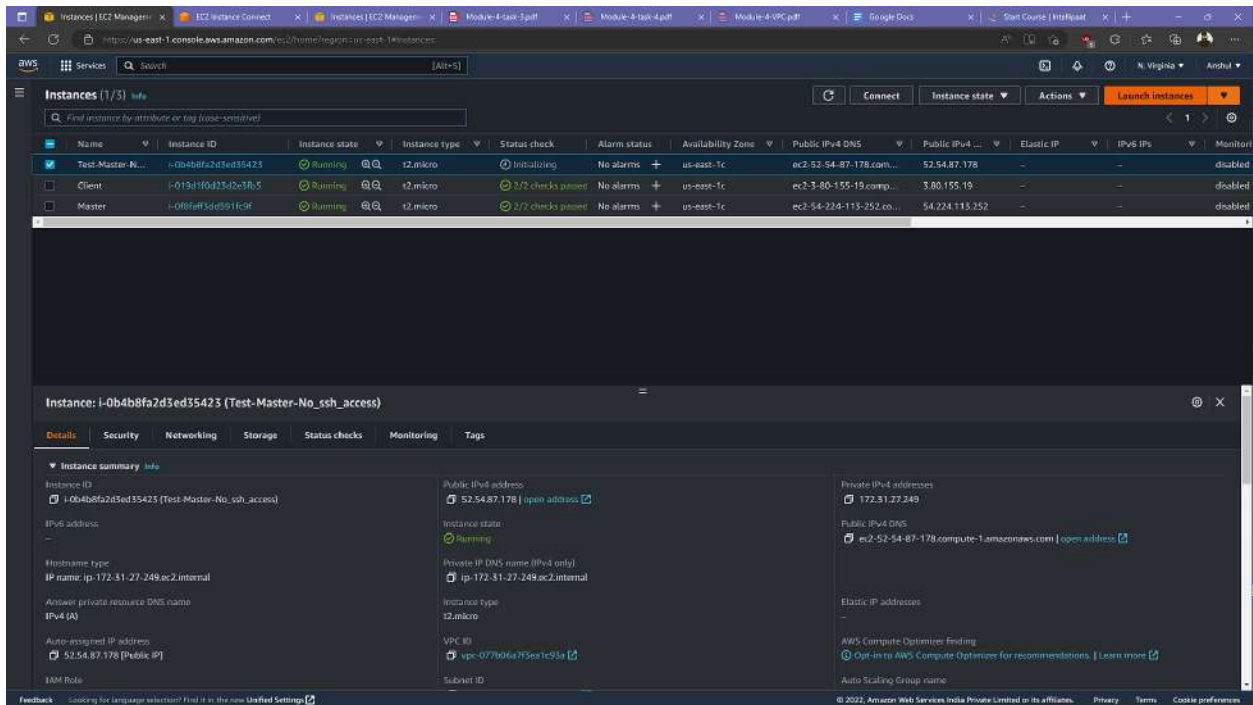
To run a command as administrator (user "root"), use "sudo ".
See "man sudo_root" for details.

ubuntu@ip-172-31-26-157:~$

Public key: 54.224.115.252 Private key: 172.31.27.64

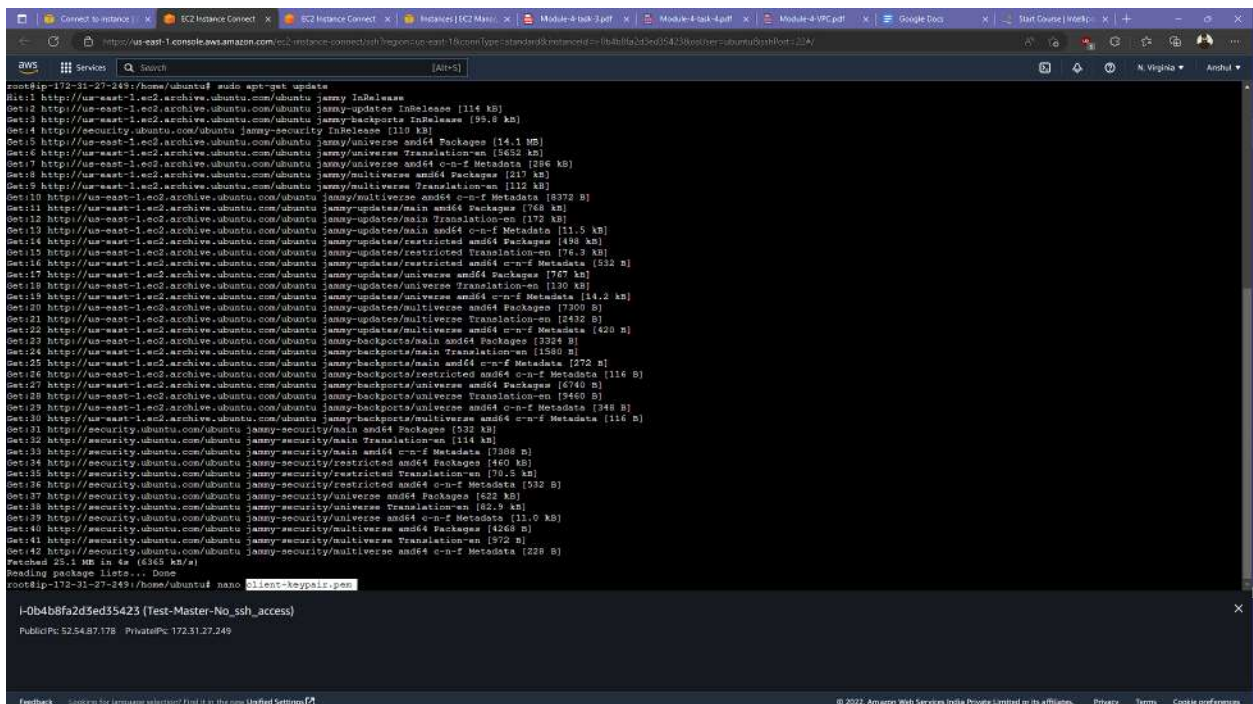
Feedback Loading for language selection? Find it in the new Unified Settings
```

Let's try it from another instance which doesn't have access to it. Connect to that instance.



The screenshot shows the AWS Management Console interface. At the top, there's a navigation bar with 'Services' and a search bar. Below that, the 'Instances' page is displayed, showing a list of instances. The 'Test-Master-No\_ssh\_access' instance is selected, and its details are shown in a modal window. The details include the instance ID, name, state, type, status check, alarm status, availability zone, public IP address, private IP address, and other configuration details. The instance is a t2.micro instance in the us-east-1c availability zone, with a public IP address of 52.54.87.178 and a private IP address of 172.31.27.249. The instance is in the 'Running' state.

Follow the same procedure of keypair and connection.



The screenshot shows the 'Connect to instance' page in the AWS Management Console. The 'Test-Master-No\_ssh\_access' instance is selected. The page displays the public IP address (52.54.87.178) and the private IP address (172.31.27.249). The 'Connect to instance' button is highlighted. Below the IP addresses, there's a terminal window showing the output of the 'sudo apt-get update' command, which lists various packages and their sizes. The terminal output is as follows:

```
root@ip-172-31-27-249:/home/ubuntu# sudo apt-get update
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [114 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [99.8 kB]
Get:3 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu InRelease [119 kB]
Get:31 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:32 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:33 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:34 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:35 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:36 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:37 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:38 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:39 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:40 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:41 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Get:42 http://security.ubuntu.com/ubuntu InRelease [119 kB]
Patched 25.1 MB in 4s (6365 kB/s)
Reading package lists... Done
```





Turns out we can't connect to the Client from another instance apart from the Master instance.

```
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [59.6 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8772 B]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [768 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [172 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [11.5 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [498 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [76.3 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [532 B]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [767 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [130 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [14.2 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [7300 B]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [2432 B]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [420 B]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [3324 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [1080 B]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [228 B]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [6740 B]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [9460 B]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [348 B]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [532 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [114 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [7388 B]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [460 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [70.5 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 c-n-f Metadata [532 B]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [622 kB]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [82.9 kB]
Get:39 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [11.0 kB]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [4268 B]
Get:41 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [972 B]
Get:42 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [228 B]
Fetched 25.1 MB in 4s (6365 kB/s)
Reading package lists... Done
root@ip-172-31-27-249:/home/ubuntu# nano client-keypair.pem
root@ip-172-31-27-249:/home/ubuntu# chmod 400 client-keypair.pem
root@ip-172-31-27-249:/home/ubuntu# ssh -i "client-keypair.pem" ubuntu@ec2-3-80-155-19.compute-1.amazonaws.com

-0b4b8fa2d5ed35423 (Test-Master-No_ssh_access)
PublicPc:52.54.87.178 PrivatePc:172.31.27.249
```

```
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8772 B]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [768 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [172 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [11.5 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [498 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [76.3 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [532 B]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [767 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [130 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [14.2 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [7300 B]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [2432 B]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [420 B]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [3324 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [1080 B]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [228 B]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [6740 B]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [9460 B]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [348 B]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [532 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [114 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [7388 B]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [460 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [70.5 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 c-n-f Metadata [532 B]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [622 kB]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [82.9 kB]
Get:39 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [11.0 kB]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [4268 B]
Get:41 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [972 B]
Get:42 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [228 B]
Fetched 25.1 MB in 4s (6365 kB/s)
Reading package lists... Done
root@ip-172-31-27-249:/home/ubuntu# nano client-keypair.pem
root@ip-172-31-27-249:/home/ubuntu# chmod 400 client-keypair.pem
root@ip-172-31-27-249:/home/ubuntu# ssh -i "client-keypair.pem" ubuntu@ec2-3-80-155-19.compute-1.amazonaws.com
%
root@ip-172-31-27-249:/home/ubuntu#

-0b4b8fa2d5ed35423 (Test-Master-No_ssh_access)
PublicPc:52.54.87.178 PrivatePc:172.31.27.249
```